WORLD CONGRESS
ON OSTEOPOROSIS,
OSTEOARTHRITIS AND
MUSCULOSKELETAL
DISEASES

VIRTUAL CONGRESS
August 20-22, 2020
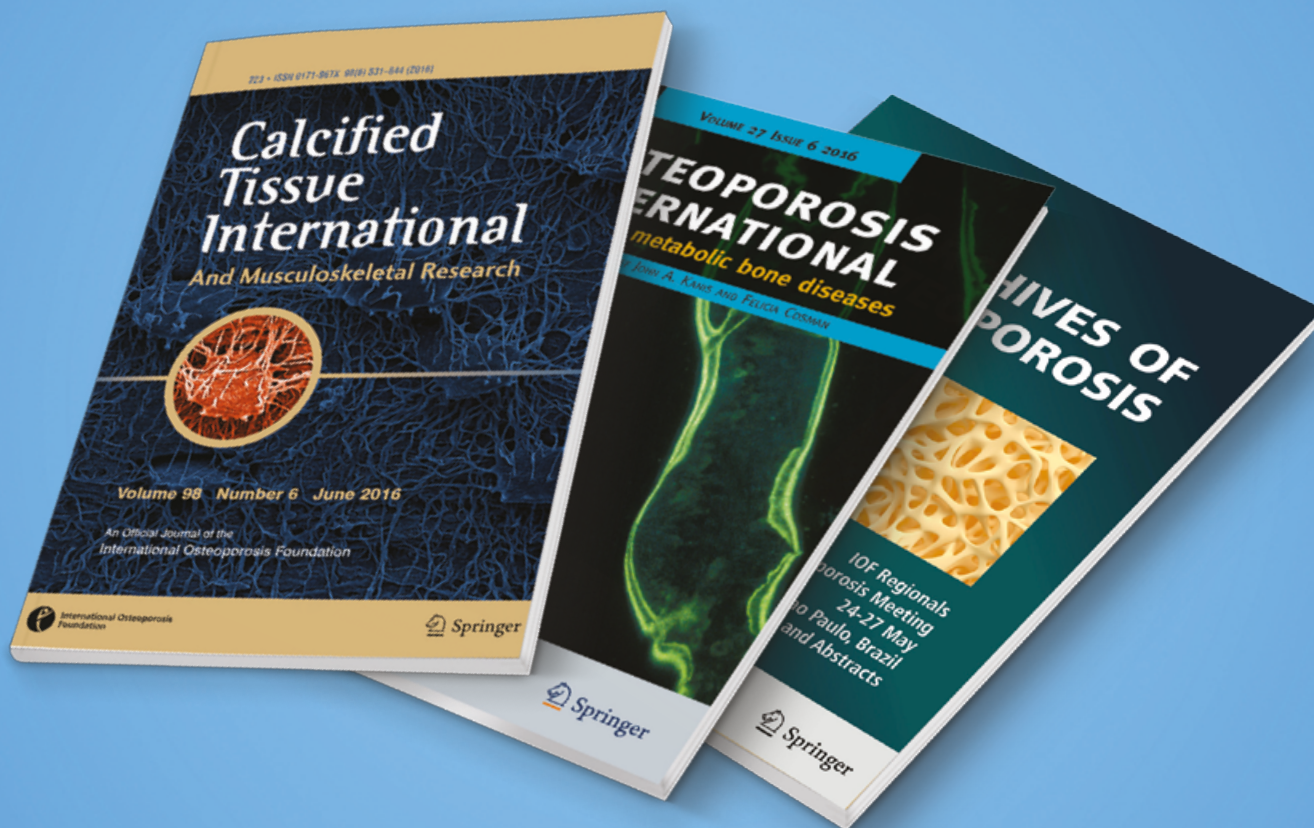
IOF International Osteoporosis Foundation

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AbstractBook

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VIRTUAL
CONGRESS
2020
WORLD CONGRESS ON
OSTEOPOROSIS, OSTEOARTHRITIS
AND MUSCULOSKELETAL DISEASES

ABOUT ESCEO

The European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) is a not-for-profit organization, dedicated to a close interaction between clinical scientists dealing with bone, joint and muscle disorder, pharmaceutical industry developing new compounds in this field, regulators responsible for the registration of such drugs and health policy makers, to integrate the management of Osteoporosis and Osteoarthritis within the comprehensive perspective of health resources utilization.

The objective of ESCEO is to provide practitioners with the latest clinical and economic information, allowing them to organize their daily practice, in an evidence-based medicine perspective, with a cost-conscious perception.

www.esceo.org

ABOUT IOF

The International Osteoporosis Foundation (IOF) is a non-profit, non- governmental organization dedicated to the worldwide fight against osteoporosis, the disease known as "the silent epidemic". IOF's members – committees of scientific researchers, patient, medical and research societies and industry representatives from around the world – share a common vision of a world without osteoporotic fractures. IOF now represents 260 societies in 102 locations around the world.

www.iofbonehealth.org

Mission

- Increase awareness and understanding of osteoporosis.
- Motivate people to take action to prevent, diagnose and treat osteoporosis.
- Support national osteoporosis societies in order to maximize their effectiveness

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EVENT

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August 20-22, 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

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2021 LONDON

August 26-29, 2021

London | United Kingdom
Hilton London Metropole

IOF International Osteoporosis Foundation

ESCEO

WORLD'S LEADING CLINICAL CONFERENCE ON BONE, JOINT AND MUSCLE HEALTH

Congress Organizer Sinklar Congress Management B.V.
Congress Secretariat www.humacom.com

www.WCO-IOF-ESCEO.org

CEST (Central European summer time)

14.50 - 17.30
SCIENTIFIC SESSION I
Chairpersons: Nicholas Harvey, John A. Kanis

14.50
Opening of the Congress
• Cyrus Cooper

15.00
ESCEO-IOF algorithm for the management of patients at low/high/very high risk of fracture
• John A. Kanis

15.30
Plenary Lecture 1
• *Bone turnover markers in clinical practice* Roland D. Chapurlat

16.00
Presentation of the IOF Olof Johnell Science Award
• Cyrus Cooper

16.00
Presentation of the IOF President's Award
• Cyrus Cooper

16.10
Presentation of the IOF Medal of Achievement
• Cyrus Cooper

16.10
Presentation of the ESCEO-IOF Herbert Fleisch Medal
• Cyrus Cooper

16.15
Plenary Lecture 2
• *Differences in clinical guidelines* Eugene McCloskey

16.45
Meet-the-Expert Session I
• *Discussion of complex osteoporotic cases* Adolfo Diez-Perez

17.30 - 19.30
SCIENTIFIC SESSION II
Chairpersons: Eugene McCloskey, Cyrus Cooper

17.30
Plenary Lecture 3
• *Transient treatment discontinuation : pros and cons* Michael R. McClung

18.00
Meet-the-Expert Session II
• *Management of CKD-MBD* Jorge Cannata Andia

18.45
Meet-the-Expert Session III
• *Risks and benefits of calcium supplementation* Nicholas Harvey

19.30 - 19.45
Adjournment

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CEST (Central European summer time)

10.30 - 13.00
SCIENTIFIC SESSION III
Chairpersons: Cyrus Cooper, Nicholas R. Fuggle

10.30
Plenary Lecture 4
• *Strategies to fill the Treatment Gap in Osteoporosis: place of Combination and Sequential Regimens* Manju Chandran

11.00
Meet-the-Expert Session IV
• *Milk, yogurt, cheese and bone: Friends or foes?* Sandra Iuliano

11.45
Meet-the-Expert Session V
• *Local bone treatments* Maria Luisa Brandi

12.30
Plenary Lecture 5
• *New pharmacological treatments for osteoarthritis* Elaine M. Dennison

13.00 - 14.30
INDUSTRY SATELLITE LUNCH SYMPOSIUM

13.00 - 14.30
INDUSTRY SATELLITE LUNCH SYMPOSIUM

14.30 - 16.30
SCIENTIFIC SESSION IV
Chairperson: Nicholas Harvey, Elaine M. Dennison

14.30
Plenary Lecture 6
• *Rare bone diseases : what do they teach us for musculoskeletal disorders management* Kassim Javaid

15.00
Meet-the-Expert Session VI
• *Nutritional approach of osteoporosis prevention* Stefania Maggi

15.45
Meet-the-Expert Session VII
• *GIOP : what to do ?* Bernard Cortet

16.30 - 18.15
SCIENTIFIC SESSION V
Chairpersons: John A. Kanis, Kassim Javaid

16.30
Plenary Lecture 7
• *Sarcopenia : new definitions and clinical implications* Alfonso Cruz Jentoft

17.00
Plenary Lecture 8
• *What did we learn from the recent large vitamin D trials* Bess Dawson-Hughes

17.30
Meet-the-Expert Session VIII
• *Menopausal hormone therapy in 2020* Santiago Palacios

18.15 - 19.45
INDUSTRY SATELLITE SYMPOSIUM

18.15 - 19.45
INDUSTRY SATELLITE SYMPOSIUM

18.05 - 18.15
Presentation of the IOF Skeletal Rare Disease Academy Awards Ceremony 2020 (Financially supported by Kyowa Kirin, which had no input into the Committee, abstract selection or awards) Nicholas Harvey

19.45 - 20.00
Adjournment

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CEST (Central European summer time)

08.45 - 10.30
SCIENTIFIC SESSION VI
Chairpersons: Jean-Marc Kaufman, Charlotte Beaudart

08.45
Best clinical papers published in 2019
• René Rizzoli

09.15
Meet-the-Expert Session IX
• *High Bone Mass: What are the causes and how should we manage it?* Celia L. Gregson

10.00
Presentation of the 2020 ESCEO Medal of Excellence
• Jean-Yves Reginster

10.05
Presentation of the ESCEO-AgNovos Healthcare Young Investigator Awards
• Jean-Yves Reginster

10.10
Presentation of the IOF Committee of National Societies Medal
• Jean-Yves Reginster

10.15
Presentation of the ESCEO-IOF Pierre Meunier Young Scientist Award
• Jean-Yves Reginster

10.20
Presentation of the ESCEO-IOF Young Investigator Awards
• Jean-Yves Reginster

10.30 - 12.45
SCIENTIFIC SESSION VII
Chairpersons: Caroline Coolen, Jean-Yves Reginster

10.30
Meet-the-Expert Session X
• *Bariatric surgery, bone and joints* Eric Lespessailles

11.15
Meet-the-Expert Session XI
• *Androgens, bone and muscles*
Jean-Marc Kaufman

12.00
Meet-the-Expert Session XII
• *Efficacy and cost/benefit of FLS*
Radmila Matijevic

14.15 - 15.30
SCIENTIFIC SESSION VIII
Chairperson: Philippe Halbout

14.15
Plenary Lecture 9
• *Bone fragility: beyond bone loss* Serge Ferrari

14.45
Meet-the-Expert Session XIII
• *Physical therapy for osteoarthritis* Olivier Bruyère, Daniel Pinto

15.30 - 16.45
SCIENTIFIC SESSION IX
Chairpersons: Olivier Bruyère, René Rizzoli

15.30
Meet-the-Expert Session XIV
• *Local Bone Treatment in Osteoporosis (supported by an Unrestricted Educational Grant from Agnovos Healthcare)* Andreas Kurth

16.15
Plenary Lecture 10
• *How to reduce falls in oldest people ?* Andrea Trombetti

16.45 - 18.15
INDUSTRY SATELLITE SYMPOSIUM

18.15 - 18.30
Adjournment

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Oral Communications (OC)

OC1
EFFICACY AND SAFETY OF ROMOSOZUMAB AMONG POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AND MILD-TO-MODERATE CHRONIC KIDNEY DISEASE
D. Miller, J. Adachi, B.-H. Albergaria, A. M. Cheung, A. Chines, E. Gielen, B. Langdahl, A. Miyauchi, M. Oates, I. R. Reid, N. Ruiz Santiago, M. Vanderkelen, W. Yang, Z. Yu

OC2
ROMOSOZUMAB AFTER DENOSUMAB IMPROVES LUMBAR SPINE AND MAINTAINS TOTAL HIP BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH LOW BONE MASS
M. R. McClung , M. A. Bolognese , J. P. Brown , J.-Y. Reginster , B. L. Langdahl , N. Ruiz-Santiago , Y. Shi , M. Rojeski , J. Timoshanko , C. Libanati , H. Kassahun , M. Oates

OC3
VERTEBRAL FRACTURES BEFORE, DURING AND AFTER DENOSUMAB. A RETROSPECTIVE STUDY OF 858 CASES
P. Burckhardt, O. Lamy, T. H. Buclin, M. Faouzi, D. Aeberli, F. Cattaneo, J. Dudler, M. Felder, D. Frey, P. Hasler, H. J. Häuselmann, S. Jehle-Kunz, I. Krull, T. H. Lehmann, K. Lippuner, C. Meier, U. Moser, M. Oehri, A. Rohrer, F. Tanzi, M. Toniolo, B. Uebelhart, L. Wildi, D. Wildpaner

OC4
DIFFERENTIAL EFFECTS OF ABALOPARATIDE AND TERIPARATIDE ON CORTICAL VOLUMETRIC BMD AND BONE STRENGTH INDICES IN THE PROXIMAL FEMUR BY DXA-BASED 3D MODELING
R. Winzenrieth, S. Ominsky , Y. Wang , L. Humbert , J. Weiss

OC5
FRACTURE RISK REDUCTION BY ANTI-OSTEOPOROSIS PHARMACOTHERAPY ACCORDING TO BASELINE RISK FACTORS AMONG POSTMENOPAUSAL WOMEN: METAREGRESSION ANALYSES OF RANDOMISED TRIALS
M. N. Händel, I. Cardoso, C. Von Bülow, J. F. Rohde, A. Ussing, S. M. Nielsen, R. Christensen, B. Langdahl, T. Thomas, J.-J. Body, M. L. Brandi, A. Diez-Perez, P. Hadji, M. K. Javaid, W. F. Lems, X. Nogues, C. Roux, S. Minisola, A. Kurth, S. L. Ferrari, D. Prieto-Alhambra, B. Abrahamsen

OC6
BUROSUMAB IMPROVES BIOCHEMICAL, SKELETAL, AND CLINICAL FEATURES OF TUMOR-INDUCED OSTEOMALACIA (TIO) SYNDROME
S. Jan de Beur, P. D. Miller, T. J. Weber, M. Peacock, K. L. Insogna, R. Kumar, D. Luca, T. Cimms, M. S. Roberts, T. O. Carpenter

OC7
TEMPORAL TRENDS AND FACTORS ASSOCIATED WITH BISPHOSPHONATE DISCONTINUATION AND RESTART
G. Adami, A. Jaleel , J. C. Curtis , E. Delzell , R. Chen , H. Yun, S. Daigle, T. Arora, M. I. Danila, N. C. Wright, S. M. Cadarette, A. S. Mudano, J. Foster, K. G. Saag

OC8
MACROBIOTIC DIETS, PLANT-BASED DIETS, VEGETARIANISM, VEGANISM AND BONE HEALTH: A SYSTEMATIC REVIEW AND META-ANALYSES
I. Iguacel, L. A. Moreno

OC9
DISEASE PHENOTYPE AS A PREDICTOR OF TREATMENT RESPONSE IN OSTEOARTHRITIS: RESULTS FROM A PHASE II CLINICAL TRIAL OF THE FIRST-IN-CLASS IMIDAZOLINE-2 RECEPTOR LIGAND CR4056
L. C. Rovati, N. Brambilla, T. Blicharski, J. Connell, C. Vi- talini, A. Bonazzi, G. Giacovelli, F. Girolami, M. D'Amato

OC10
THE NOVEL, INTRA-ARTICULAR CLK/DYRK1A INHIBITOR LORECIVIVINT (SM04690), A WNT PATHWAY MODULATOR, IMPROVED RESPONDER OUTCOMES IN SUBJECTS WITH KNEE OSTEOARTHRITIS: A POST HOC ANALYSIS FROM A PHASE 2B TRIAL
J. Tambiah, S. Kennedy , C. Swearingen , Y. Yazici

OC11

EFFICACY AND SAFETY OF AN INTRA-ARTICULAR INJECTION OF JTA-004, A NOVEL ENHANCED PROTEIN SOLUTION, IN KNEE OSTEOARTHRITIS PAIN: A RANDOMISED, DOUBLE-BLIND CONTROLLED PHASE II/III STUDY

M. Bettonville, M. Léon, J. Margaux, D. Urbin-Choffray, E. Theunissen, T. Besse-Hammer, Y. Fortems, S. Verlin- den, O. Godeaux, A.-S. Delmarcelle, J.-F. Kaux

OC12

CONFIRMED AND SEVERE SARCOPENIA BY EWGSOP2 PREDICT 10-YEAR FRACTURE RISK INDEPENDENT OF FRAX, FALLS AND BMD IN THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY: A META-ANALYSIS

N. C. W. Harvey, E. Orwoll, T. Kwok, M. K. Karlsson, B. E. Rosengren, E. Ribom, J. Cauley, P. M. Cawthon, K. Ensrud, E. Liu, A. Cruz-Jentoft, C. Cooper, J. A. Kanis, M. Lorentzon, C. Ohlsson, D. Mellström, H. Johansson, E. McCloskey

OC13

MUSCLE DENSITY, BUT NOT SIZE, CORRELATES WELL WITH MUSCLE PERFORMANCE

L. Wang, Y. Yin, G. Guglielmi, X. Cheng, G. M. Blake, K. Engelke

OC14

THE MULTIDIMENSIONAL PROGNOSTIC INDEX PREDICTS FALLS IN OLDER PEOPLE: AN 8-YEAR LONGITUDINAL COHORT STUDY OF THE OSTEOARTHRITIS INITIATIVE

N. Veronese, G. Siri, A. Cella, S. Maggi, E. Zigoura, M. Puntoni, L. Smith, C. Musacchio, A. Barone, C. Sabbà, F. Vallone, A. Pilotto

OC15

5-YEAR ADVERSE OUTCOMES OF SARCOPENIA DIAGNOSED ACCORDING TO SIX DIFFERENT DEFINITIONS

L. Lengelé, C. Beaudart , M. Locquet , J.-Y. Reginster, O. Bruyère

OC16

LEVEL AND CHANGE IN SARCOPENIA COMPONENTS PREDICT ADVERSE HEALTH OUTCOMES: FINDINGS FROM THE HEALTH, AGING AND BODY COMPOSITION STUDY

L. D. Westbury, H. E. Syddall, N. R. Fuggle, E. M. Dennison, J. A. Cauley, E. J. Shiroma, R. A. Fielding, A. B. Newman, C. Cooper

OC17

RELATIONSHIP BETWEEN OBESITY AND RISK OF MAJOR OSTEOPOROTIC FRACTURE IN POSTMENOPAUSAL WOMEN: TAKING FRAILTY INTO CONSIDERATION

G. Li, Z. Li, L. Thabane, J. Adachi

OC18

IDENTIFICATION OF THE MOST IMPORTANT FEATURES OF KNEE OSTEOARTHRITIS PROGRESSORS USING MACHINE LEARNING METHODS

A. Jamshidi, M. Leclercq, A. Labbe, J.-P. Pelletier, F. Abram, A. Droit, J. Martel-Pelletier

OC19

RESVERATROL BENEFITS BONE HEALTH IN POSTMENOPAUSAL WOMEN – OUTCOMES OF THE TWO-YEAR RESHAW TRIAL

R. Wong, J. J. Thaung Zaw, C. Xian, P. Howe

OC20

GEOGRAPHICAL ASSESSMENT OF BONE MINERAL DENSITY WITH RELUGOLIX COMBINATION THERAPY: RESULTS FROM THE PHASE 3 LIBERTY PROGRAM

M. McClung, A. Al-Hendy, R. Venturella, J. Li, L. Mckain, R. Wagman

OC21

VITAMIN D SUPPLEMENTATION IN PREGNANCY RESULTS IN GREATER OFFSPRING BONE MASS AT 4 YEARS: FINDINGS FROM THE MAVIDOS TRIAL

E. M. Curtis, R. J. Moon, S. D'Angelo, S. R. Crozier, N. J. Bishop, S. Gopal-Kothandapani, S. Kennedy, A. T. Papa- georghiou, R. Fraser, S. V. Gandhi, I. Schoenmakers, A. Prentice, H. M. Inskip, K. M. Godfrey, M. K. Javaid, R. Eastell, C. Cooper, N. C. Harvey

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OC22

SUPERIOR EFFICACY OF CALCIFEDIOL SOFT GELATIN CAPSULES VS CHOLECALCIFEROL FOR THE MANAGEMENT OF VITAMIN D DEFICIENCY IN POSTMENOPAUSAL WOMEN: A TREATMENT TO BE CONSIDERED IN THERAPEUTIC GUIDELINES

M. L. Brandi, J. L. Pérez-Castrillón, A. Dueñas-Laita, G. Hernández-Herrero, N. Fernández-Hernando, L. Elgezabal

OC23

PERIOSTEAL EXPANSION DOES NOT COMPENSATE LOSS OF BONE STRENGTH CAUSED BY ENDOSTEAL RESORPTION WITH AGING: A LONGITUDINAL HR-PQCT STUDY WITH 3D-REGISTRATION FROM THE GERICO COHORT

E. Biver, B. van Rietbergen, T. Chevalley, S. Ferrari

OC24

MEASURES OF MUSCLE ADIPOSITY, BUT NOT MUSCLE CROSS-SECTIONAL AREA, PREDICT FRACTURES INDEPENDENT OF FRAX, FALLS AND BMD IN THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY

N. C. W. Harvey, E. Orwoll, J. Cauley, T. Kwok, M. K. Karlsson, B. E. Rosengren, E. Ribom, P. M. Cawthon, K. Ensrud, E. Liu, K. Ward, C. Cooper, J. A. Kanis, M. Lorentzon, C. Ohlsson, D. Mellström, H. Johansson, E. McCloskey

OC25

A NEW PREDICTION TOOL BASED ON ELECTRONIC MEDICAL RECORDS DATA TO ASSESS IMMINENT HIP FRACTURE RISK IN SECONDARY FRACTURE PREVENTION: A COHORT ANALYSIS INCLUDING OVER 700,000 PATIENTS FROM DENMARK, SPAIN AND THE UK

M. T. Pineda-Moncusí, S. Khalid, L. Elhussein, C. Dyer-Smith, A. Moayyeri, M. Ernst, D. Martinez-Laguna, X. Nogués, C. Reyes, E. Toth, F. Lebon, C. Libanati, M. Javaid, C. Cooper, B. Abrahamsen, D. Prieto-Alhambra

OC26

THE POTENTIAL FOR OPPORTUNISTIC IDENTIFICATION OF VERTEBRAL FRACTURES IN PATIENTS UNDERGOING A CT SCAN AS PART OF DAILY CLINICAL PRACTICE: A DESCRIPTIVE STUDY USING REGISTRY DATA

M. K. Skjødt , J. Nicolaes , C. D. Smith , J. Banefelt, F. Lebon, C. Libanati, K. R. Olsen, C. Cooper, B. Abrahamsen

OC27

A CLINICAL TOOL FOR AUTOMATED PREDICTION OF HIP AND MAJOR OSTEOPOROTIC AT FIVE- AND ONE-YEARS FRACTURES USING ELECTRONIC MEDICAL RECORDS DATA: THE EPIC STUDY

D. Martinez-Laguna, C. Tebé, N. Pallarés, C. Carbonell-Abella, C. Reyes, X. Nogués, A. Diez-Perez, D. Prieto-Alhambra

OC28

HIGH RISK OF HIP FRACTURE AND HIP FRACTURES SAVED IN THE SCOOP STUDY

E. McCloskey, N. Harvey, H. Johansson, C. Cooper, J. Kanis & The Scoop Study Team

OC29

BONE MICROARCHITECTURE OR AREAL BONE MINERAL DENSITY FOR DISCRIMINATION OF VERTEBRAL DEFORMITY IN OLDER ADULTS: A CROSS-SECTIONAL STUDY

C. Ma, F. Wu, F. Pan, L. Laslett, A. Shah, K. Squibb, R. Zebaze, T. Winzenberg, G. Jones

OC30

NO NEGATIVE ASSOCIATIONS, AND EVEN SOME POSITIVE ONES, BETWEEN BONE MASS, MICROSTRUCTURE AND STRENGTH, AND DIETARY ACID LOAD IN A PROSPECTIVE COHORT OF COMMUNITY-DWELLING WOMEN AND MEN

M. Papageorgiou, F. Merminod, T. Chevalley, B. Van Rietbergen, S. Ferrari, R. Rizzoli, E. Biver

OC31

FREQUENCY OF NORMAL DXA AND T-SCORE OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN WITH FRACTURE: A REGISTRY-BASED COHORT STUDY

N. Binkley, S. N. Morin, P. Martineau, L. M. Lix, D. Hans, W. D. Leslie

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OC32

THE RISK OF HIP AND NON-VERTEBRAL FRACTURES IN PARKINSON'S DISEASE: A SYSTEMATIC REVIEW AND META-ANALYSIS

M. Schini, T. Vilaca, E. Poku, S. Harnan, A. Sutton, I. E. Allen, S. Cummings, R. Eastell

OC33

MUSCLE DENSITY IS BETTER THAN BONE DENSITY IN THE DISCRIMINATION OF INCIDENT HIP FRACTURE: A PROPENSITY SCORE MATCHING STUDY

L. Wang, Y. Yin, G. B. Blake, X. Cheng, K. Engelke

OC34

EFFICACY OF SYMPTOMATIC TREATMENTS FOR KNEE OA: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS WITH A 6-MONTH TIME-HORIZON

C. Beaudart , L. Lengelé , A. Geerinck , V. Leclercq , D.Sanchez Rodriguez , O. Bruyère , J.-Y. Reginster

OC35

OSTEOGENESIS IMPERFECTA: FRACTURE CHARACTERISTICS DURING PREGNANCY AND POST-PARTUM

E. Koumakis, A. Dellal, M. Debernardi, B. Cortet, F. Debiais, R. M. Javier, T. Thomas, N. Mehsen, M. Cohen-Solal, E. Fontanges, M. Laroche, C. Marcelli, K. Briot, C. Roux, C. Cormier

OC36

TREATMENT INITIATION RATE POST HIP FRACTURE AS A KEY INDICATOR IN AN ORTHOPAEDIC FRACTURE LIAISON SERVICE.

J. Delisle, B. Benoit, G. Y. Laflamme, S. Leduc, H. Ngyuen, P. Ranger, J. Fernandes

OC37

PHYSICAL PERFORMANCE TRAJECTORIES AND MORTALITY AMONG NURSING HOME RESIDENTS: THE RESULTS OF THE SENIOR COHORT

A. Charles, J. Detilleux, F. Buckinx, J.-Y. Reginster, B. Gruslin, O. Bruyère

OC38

LIFESTYLE, ANTHROPOMETRY, AND BONE HEALTH ACROSS THREE GENERATIONS OF THE HERTFORDSHIRE COHORT STUDY

S. Carter, C. Parsons, M. O'Breasail, K. Ward, C. Cooper, N. Harvey, E. Dennison, M. Clynes

OC39

THE DIFFERENT DIAGNOSIS CRITERIA OF THE EWGSOP2 DEFINITION AND LONG-TERM CLINICAL OUTCOMES

C. Beaudart, M. Locquet, L. Lengelé, J.-Y. Reginster, O. Bruyère

OC40

COST-EFFECTIVENESS OF BINOSTO (BUFFERED SOLUBLE ALENDRONATE 70 MG) EFFERVESCENT TABLET FOR THE TREATMENT OF POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS IN ITALY

M. Hiligsmann , S. Maggi, G. Onder, L. Galluzzo, J.-Y. Reginster

Oral Presentations (OP)

OP1

LONG-TERM SAFETY IN ADULTS WITH X-LINKED HYPOPHOSPHATEMIA (XLH) TREATED WITH BUROSUMAB, A FULLY HUMAN MONOCLONAL ANTIBODY AGAINST FGF23: FINAL RESULTS OF A PHASE 3 TRIAL

M. L. Brandi, A. A. Portale, T. O. Carpenter, K. Briot, E. A. Imel, P. Kamenický, T. J. Weber, P. Pitukcheewanont, H. I. Cheong, S. Jan de Beur, Y. Imanishi, N. Ito, R. Lachmann, H. Tanaka, F. Perwad, L. Zhang, A. Skrinar, L. Rees, K. L. Insogna

OP2

DOES ENDOGENOUS INFLAMMATION EXPLAIN ETHNIC VARIATION IN BONE MINERAL DENSITY? RESULTS FROM THE SABRE COHORT STUDY

R. Durdin, C. Parsons, E. M. Dennison, S. Williams, T. Tillin, N. Chaturvedi, C. Cooper, N. C. Harvey, K. Ward

OP3

AN INTERACTIVE BENEFITS AND BUDGET IMPACT CALCULATOR TO ESTIMATE POTENTIAL EFFECTS OF FRACTURE LIAISON SERVICES

R. Pinedo-Villanueva, A. Sami, S. Kolovos, E. Burn, M. Fujita, P. Halbout, C. Cooper, M. K. Javaid

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

OP4

PHASE I/III STUDY TO CONFIRM BIOEQUIVALENCE AND SAFE SWITCHING OF PROPOSED BIOSIMILAR DENOSUMAB IN POSTMENOPAUSAL OSTEOPOROSIS

J.-J. Body, C. Nie, B. Vogg, R. Eastell

OP5

SARCOPENIA AND HEALTH-RELATED OUTCOMES: AN UMBRELLA REVIEW OF OBSERVATIONAL STUDIES

N. Veronese, J. Demurtas, P. Soysal, L. Smith, O. Bruyere, J.-Y. Reginster, C. Beaudart, C. Cooper, M. Mirko, S. Maggi

OP6

HORMONE THERAPY REDUCES THE RISK OF FRACTURE REGARDLESS OF BASELINE FRACTURE RISK – RESULTS FROM THE WOMEN'S HEALTH INITIATIVE HORMONE THERAPY TRIALS

M. Lorentzon, H. Johansson, N. Harvey, E. Liu, C. Crandall, E. McCloskey, J. Kanis

OP7

DISABILITY-ADJUSTED LIFE YEARS RELATED TO FRAGILITY FRACTURES

F. Borgström, N. V. Norton, L. Karlsson, G. Ortsäter, N. C. Harvey, E. V. McCloskey, J. A. Kanis

OP8

INTEGRATED SAFETY SUMMARY OF THE NOVEL, INTRA-ARTICULAR AGENT LORECIVIVINT (LOR; SM04690), A CLK/DYRK1A INHIBITOR THAT MODULATES THE WNT PATHWAY, IN SUBJECTS WITH KNEE OSTEOARTHRITIS

I. Simsek, C. Swearingen, S. Kennedy, J. Tambiah, C. Damatarca, Y. Yazici, N. Lane, M. Hochberg

OP9

INTRA-ARTICULAR CORTICOSTEROID KNEE INJECTION INDUCES A REDUCTION IN MENISCAL THICKNESS WITH NO TREATMENT EFFECT ON CARTILAGE VOLUME: A CASE-CONTROL STUDY

J.-P. Pelletier, J.-P. Raynauld, F. Abram, M. Dorais, P. Paiement, J. Martel-Pelletier

OP10

ASSOCIATION BETWEEN SARC-F AND QUALITY OF LIFE MEASURED WITH THE SARQOL® QUESTIONNAIRE IN OLDER, COMMUNITY-DWELLING SUBJECTS FROM THE SARCOPHAGE COHORT

A. Geerinck, C. Beaudart, M. Locquet, J.-Y. Reginster, O. Bruyère

OP11

FEASIBILITY, SAFETY AND EFFECTIVENESS OF A 16-WEEK HOME-BASED HOPPING AND JUMPING PILOT EXERCISE INTERVENTION IN POST-MENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY

C.-A. Ng, L. B. McMillan, J. Mesinovic, L. Humbert, P. R. Ebeling, D. Scott

OP12

BONE DENSITOMETRY WORLDWIDE: A GLOBAL SURVEY BY THE ISCD AND IOF

M. A. Clynes, L.D. Westbury, E. M. Dennison, J. A. Kanis, M. K. Javaid, N. C. Harvey, M. Fujita, C. Cooper, W. D. Leslie, C. R. Shuhart

OP13

EPIGENOME-WIDE ASSOCIATION STUDY IDENTIFIES ASSOCIATION BETWEEN 5' WNT5B CPG DNA METHYLATION AND BONE MINERAL DENSITY AT THE FEMORAL NECK IN OLDER UK ADULTS

N. R. Fuggle, E. M. Dennison, C. G. Bell, C. Cooper

OP14

IDENTIFICATION OF FRAIL PATIENTS USING FEMORAL RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS)

G. Adami, G. Arioli, G. Bianchi, M. L. Brandi, C. Caffarelli, L. Cianferotti, G. Girasole, S. Gonnelli, M. Manfredini, M. Muratore, E. Quarta, L. Quarta, D. Gatti

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

OP15

FRACTURE RISK SCREENING USING FRAX IS EFFECTIVE FOR SECONDARY FRACTURE PREVENTION: A POST-HOC ANALYSIS OF THE SCOOP TRIAL

C. Parsons, E. M. Curtis, L. Shepstone, J. A. Kanis, E. Lenaghan, S. Clarke, R. Fordham, N. Gittoes, I. Harvey, R. The Netherlands, N. M. Redmond, A. Howe, T. Marshall, T. J. Peters, D. Torgerson, T. W. O'Neil, E. McCloskey, N. C. Harvey, C. Cooper

OP16

EVALUATING QUALITY OF LIFE IN FRAILTY: APPLICABILITY AND PSYCHOMETRIC PROPERTIES OF THE SARQOL® QUESTIONNAIRE

A. Geerinck, M. Locquet, O. Bruyère, J.-Y. Reginster, C. Beaudart

OP17

HEALTH SERVICE USE AND RECOVERY OF QUALITY OF LIFE 12-MONTHS POST-FRACTURE: LATENT CLASS ANALYSES OF THE INTERNATIONAL COST AND UTILITIES RELATED TO OSTEOPOROTIC FRACTURES STUDY (ICUROS)

J. Talevski, K. Sanders, L. Busija, C. Connaughton, A. Beauchamp, G. Duque, K. Lim, F. Borgström, J. A. Kanis, S. Brennan-Olsen

OP18

COMPARATIVE FUNCTIONAL STATUS BETWEEN CENTENARIES AND OLDER ADULTS WITH HIP FRACTURE IN SPAIN: DATA FORM THE SPANISH NATIONAL HIP FRACTURE REGISTRY (RNFC)

B. A. Cedeno-Veloz, M. Gonzalo Lazaro, C. Bermejo Boixareu, A. Guijarro Valtuena , L. Navarro Castellanos, P. Saez-Lopez, R. Queipo, C. Ojeda-Thies, P. Gomez Campelo, J. I. Gonzalez Montalvo

OP19

SARCOPENIA ACCORDING TO EWGSOP2 IS ASSOCIATED WITH GLOBAL SAGITTAL IMBALANCE OF THE SPINE IN OLDER ADULTS: THE SAFE COHORT STUDY

M. Hars, A. Faundez, J. Fechtenbaum, K. Briot, C. Roux, F. Herrmann, S. Ferrari, S. Genevay, S. Boudabbous, A. Trombetti

OP20

DEVELOPMENT OF A SHORT VERSION OF THE SARCOPENIA QUALITY OF LIFE (SARQOL®) QUESTIONNAIRE

A. Geerinck, O. Bruyère, M. Locquet, S. Gillain, C. Monseur, J.-Y. Reginster, C. Beaudart

CNS Plenary Session (OCs)

OCs1

THE BELGIAN BONE CLUB 2020 GUIDELINES FOR THE MANAGEMENT OF OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN

D. Sanchez-Rodriguez, P. Bergmann, J.-J. Body, E. Cavalier, E. Gielen, S. Goemaere, B. Lapauw, M. R. Laurent, S. Rozenberg, G. Honvo, C. Beaudart, O. Bruyère

OCs2

THE TRABECULAR BONE SCORE IS ASSOCIATED WITH BONE MINERAL DENSITY, AND MARKERS OF BONE TURNOVER IN NON-OBESE SUBJECTS: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

S. Gharibzadeh, N. Fahimfar, M. Sanjari, G. Shafiee, R. Heshmat, N. Mehrdad, F. Razi, P. Khashayar A. Raiesei, I. Nabipour, B. Larijani, A. Ostovar

OCs3

FREQUENCY OF DEFICIENCY AND INSUFFICIENCY OF VITAMIN D IN 547 PREGNANT BULGARIAN WOMEN (SCREENING OF BULGARIAN SOCIETY OF ENDOCRINOLOGY)

A.-M. Borissova, B. Cvetanova, L. Dakovska, E. Mihailova, M. Vukov

OCs4

DISCONTINUATION OF DENOSUMAB RESULTS IN RAPID INCREASE OF BONE RESORPTION AND LOSS OF BONE MINERAL DENSITY GAIN

M. Cokolic , M. Krajnc

OCs5

CONSERVATIVE OR SURGICAL TREATMENT IN QUALITY OF LIFE PERCEPTION OF PATIENTS AFTER 3 YEARS OF VERTEBRAL OSTEOPOROTIC FRACTURE

R. Coronado-Zarco, A. Olascoaga-Gomez de Leon, P. R. Pina-Navarro

OCs6
PERFORMANCE OF THE "YUBI-WAKKA (FINGER-RING)" TEST AS SELF-SCREENING METHOD FOR SARCOPENIA USING THE SARCOPHAGE, BELGIAN COHORT STUDY
C. Beaudart, M. Locquet, L. Lengelé, J.-Y. Reginster, O. Bruyère

OCs7
CUSTOMIZED POSTURAL REBALANCING IN OSTEOPENIC SUBJECTS WITH PAINFUL DEVIATIONS OF THE SPINE: PRELIMINARY FUNCTIONAL AND DENSITOMETRIC RESULTS
L. Cavalli, G. Malevolti, E. Martinelli, M. L. Brandi

OCs8
AN INTERACTIVE BENEFITS AND BUDGET IMPACT CALCULATOR TO ESTIMATE POTENTIAL EFFECTS OF FRACTURE LIAISON SERVICES
R. Pinedo-Villanueva, A. Sami, S. Kolovos, E. Burn, M. Fujita, P. Halbout, C. Cooper, M. K. Javaid

OCs9
OVERLAP BETWEEN OSTEOSARCOPENIA AND FRAILTY AND THEIR ASSOCIATION WITH POOR HEALTH CONDITIONS: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM
G. Shafiee, R. Heshmat, A. Ostovar, N. Fahimfar, F. Sharifi, S. Gharibzadeh, I. Nabipour, B. Larijani

OCs10
PHARMACOGENETICS OF RESPONSE TO BISPHOSPHONATE TREATMENT IN POSTMENOPAUSAL OSTEOPOROSIS
P. Marozik, V. Alekna, E. Rudenko, M. Tamulaitiene, A. Rudenka, V. Samokhovec, K. Kobets

OCs11
HIP AREAL BMD BY DXA (ABMD) AND HIP VOLUMETRIC BMD BY 3D MODELING OF HIP DXA (VBMD) ARE HIGHLY CORRELATED IN BOTH FRACTURE PREVALENT AND FRACTURE NON-PREVALENT OSTEOPOROSIS PATIENTS
A. Mann, C. Kam, V. Singh, R. Winzenried, M. Almohaya, *D. Kendler*

CSA Special Session

Committee of Scientific Advisors Special Session: Technology, comorbidity and rehabilitation in bone health- highlights from the IOF Committee of Scientific Advisors 2020
Chairperson: *Nicholas Harvey, Serge Ferrari*
• *Novel technologies for the non-invasive evaluation of femoral strength in fracture risk assessment - Mary Bouxsein*
• *Optimisation of bone health in chronic kidney disease: EUROD-IOF consensus statement - Kassim Javaid*
• *Maximising function through post-fracture rehabilitation - Olivier Bruyère*

Non-Sponsored Symposium (NSS)

Transgender therapy and relationship with bone disorders
Chairperson: *Bruno Muzzi Camargos*
• *Guidelines for hormonal therapy on transgender patients - Ariana Sierra Osorio*
• *From man to woman and from woman to man: Does it matter? - Andres Coy*
• *Densitometric acquisition, analysis and reporting - Bruno Muzzi Camargos*
• *Recommendations to maintain bone health on transgender patients - Adriana Medina Orjuella*

Vitamin D deficiency and rheumatic diseases
Chairperson: *Panagiotis Athanassiou*
• *Vitamin D deficiency and autoimmunity - Ifigenia Kostoglou-Athanassiou*
• *Vitamin D deficiency and rheumatoid arthritis - Yannis Dionyssiotis*
• *Vitamin D deficiency and systemic lupus erythematosus - Panagiotis Athanassiou*
• *Vitamin D receptor polymorphisms and autoimmune diseases - Lambros Athanassiou*

Global Impact of Bone Health TeleECHO: The Prototype for Technology Enabled Collaborative Learning for Skeletal Healthcare

Chairperson: *E. Michael Lewiecki*
• *Introduction and Background of Bone Health TeleECHO - E. Michael Lewiecki*
• *National University of Ireland Galway Bone Health TeleECHO - John J. Carey*
• *Bone Health TeleECHO Moscow - Zhanna Belaya*
• *Rare Bone Disease TeleECHO - Kassim Javaid*
• *Panel discussion with all faculty*

Artificial Intelligence (AI) in Musculoskeletal Imaging – A Paradigm Shift 'ante portas'?

Chairperson: *Hans Peter Dimai*
• *AI in various modalities of musculoskeletal imaging (radiography, DXA, CT, MRT) - Ronald M. Summers*
• *Knee osteoarthritis assessment by AI increases physicians' agreement rate and accuracy - Stefan Nehrer*
• *Questions and Answers*

Managing fracture risk in primary care: roles and requirements

Chairperson: *Z. Paskins*
• *Current challenges for primary care osteoporosis management - Z. Paskins*
• *What osteoporosis care looks like in current UK general practice - Elizabeth Cottrell*
• *Primary care and the management of special groups at risk of fracture - Elizabeth Cottrell*
• *How primary care osteoporosis management can be improved - John Edwards*
• *Summing up: Challenges and opportunities for better integration of primary and secondary care - Z. Paskins*
• *Close - Z. Paskins*

Nationwide identification of vertebral fragility fractures: Collaborating with Radiology

Chairperson: *Bo Abrahamsen*
• *Collaboration for better patient outcomes in vertebral fracture - Jill Griffin*

• *National audit on the reporting of incidentally found vertebral fractures in routine radiology practice - Nadia Mahmood*
• *Evaluation of the identification of vertebral fractures within fracture liaison services- looking to the future - Kassim Javaid*
• *Evaluating the demand on fracture liaison services with effective identification of vertebral fractures - Helen Glenn*

Winning the political case for change – launch of a policy toolkit for osteoporosis and fragility fractures

Chairperson: *Ed Harding*
• *Welcome and introduction to the project - Ed Harding*
• *Critical challenges in osteoporosis and fragility fracture care - Cyrus Cooper*
• *Policy actions needed to improve prevention and care of osteoporosis and fragility fractures - John Bowis*
• *Next steps for the network - Ed Harding*
• *Discussion and wrap-up - Ed Harding*

Targeting bone and muscle: Novel therapeutic approaches to osteosarcopenia

Chairperson: *Serge Ferrari*
• *RANKL inhibition improves muscle strength and insulin sensitivity and restores bone mass from mice to humans - Nicolas Bonnet*
• *Old and new roles of amino acids and amino butyric acids in musculoskeletal diseases - Marco Brotto*
• *Fat as a therapeutic target in osteosarcopenia - Gustavo Duque*

Joint Symposium of the IOF Skeletal Rare Diseases Working Group (SRD-WG) and the a European Reference Network on Rare Bone Diseases (ERN-BOND)

Chairperson: *Maria Luisa Brandi*
• *Diversity on the pathophysiology of increased bone fragility in rare bone diseases - Naveen Hamdy*
• *Quality of bone in Osteogenesis Imperfecta patients - Luca Sangiorgi*

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The importance of explanations: improving communication about osteoporosis and osteoarthritis to support uptake of evidence-based treatments

Chairperson: *John Edwards*
• *Evidence-care gap in osteoporosis and osteoarthritis - John Edwards*
• *What do we already know about how to frame explanations? - Z. Paskins*
• *Targeting communication in the clinician-patient consultation to improve uptake of fracture prevention treatments: early findings from the iFraP study - Z. Paskins*
• *What patients with osteoarthritis want and need to know to support them to undertake self-management: early findings from the PEP-OA study - Elizabeth Cottrell*
• *Lessons for clinical practice and research - John Edwards*
• *Close - John Edwards*

CTF getting to gold framework

Chairperson: *Kassim Javaid*
• *Presentation of the Getting to Gold programme framework and milestones - Kassim Javaid*
• *Evaluation of the mentorship programme - Monica Calo*
• *Evaluation of the mentorship programme- mentees perspective - Andrea Olascoaga*
• *Next steps for Getting to Gold - Kassim Javaid*

Stronger Together: Innovative Collaborative Initiatives to Improve Osteoporosis Care The Asia Pacific Consortium on Osteoporosis and the Asia Pacific Fragility Fracture Alliance

Chairperson: *John A. Kanis*
• *The Burden of Osteoporosis and Fragility Fractures in Asia Pacific - Joon-Kiong Lee*
• *Asia Pacific Consortium on Osteoporosis: Development of The Framework - Manju Chandran*
• *Asia Pacific Fragility Fracture Alliance: Working group outputs - Derrick Chan*
• *Q&A Session*

Inter-relation between bone, muscle, strength and fat in older adults: influence of nutrition and exercise

Chairperson: *Mylène Aubertin-Leheudre*
• *Influence of initial protein intake on bone density and architecture in dynapenic-obese older adults - Fanny Buckinx*
• *Preserving Body & muscle composition in Obese-Osteopenic Older Women: High-Intensity Interval Training a potential intervention? - Mylène Aubertin-Leheudre*
• *Physical performance in obese-osteopenic elderly women: high-intensity interval training more efficient than continuous aerobic training? - Bertrand Fougère*

Bone Health in Patients with Chronic Kidney Disease

Chairperson: *Matthew Abramowitz*
• *Bone disorders, mineral metabolism, and vascular calcification in chronic kidney disease - Wei Chen*
• *Bone disease, muscle dysfunction, and sarcopenia in chronic kidney disease - Matthew Abramowitz*

Patient-reported outcomes in sarcopenia

Chairperson: *Yves Rolland, Olivier Bruyère*
• *Welcome and introduction - Olivier Bruyère*
• *Quality of life in sarcopenia : an update - Charlotte Beaudart*
• *Overview of generic and specific Patient Reported Outcome Measures (PROMs) in sarcopenia - Anton Geerinck*
• *Conclusion - Yves Rolland*
• *Questions*

DENOSUMAB discontinuation: Trends, challenges, ups-and-downs

Chairperson: *Bruno Muzzi Camargos*
• *Vertebral Fracture Following D-Mab Discontinuation: Supporting Data - Oscar Rosero Olarte*
• *Pathophysiology Of The Osteoclastic "Flare" After Discontinuation Adriana - Medina Orjuella*
• *Biochemichal And Imaging Assessment: Ups And Downs - Bruno Muzzi Camargos*
• *Bone Loss After D-Mab Discontinuation In 150 Patients - Maria Belen Zanchetta*
• *D-Mab Patient Management In The Clinical Setting: Stepping On The Right Foot - Luis Fernando Vidal Neira*

When a DXA is indicated, a VFA is also recommended

Chairperson: *Willem Lems, Kristina Åkesson*
• *Introduction* - Willem Lems
• *Clinical relevance of vertebral fractures* - Julien Paccou
• *Radiological diagnosis of vertebral fractures with VFA* - Jean Zhang
• *Advantages and limitations of VFA* - Manju Chandran
• *Discussion* - Kristina Åkesson

Fragility fractures in Sub-Saharan Africa: Time to break the myth!

Chairperson: *Kate Ward*
• *Chairs introduction and setting the scene* - Kate Ward
• *Trends in fracture incidence in high-income countries* - Bo Abrahamsen
• *Breaking the myth in Sub-Saharan Africa – what do we know about fragility fracture?* - Kate Ward
• *Panel discussion*
• *Summary and wrap-up* - Kate Ward

Female Bone Health: a gynecological approach on women's special conditions

Chairperson: *Adriana Orcesi Pedro*
• *Opening* - Adriana Orcesi Pedro
• *Update on management of low bone mass in young women* - Adriana Orcesi Pedro
• *Bone mass and fracture risk during pregnancy and lactation* - BenHur Albergaria
• *Evaluation and management of osteopenia and osteoporosis in breast and gynecological cancer survivors* - Marcelo Luis Steiner
• *Question & Answers with audience*

Sarcopenic obesity

Chairperson: *Ifigenia Kostoglou-Athanassiou*
• *Sarcopenia. Diagnosis and evaluation* - Panagiotis Athanassiou
• *Sarcopenia and nutrition* - Lambros Athanassiou
• *Sarcopenic obesity. Definition and pathophysiology* - Ifigenia Kostoglou-Athanassiou
• *Sarcopenic obesity. Management* - Yannis Dionyssiottis
• *Discussion*

The Brussels study on the early predictors of frailty (BUTTERFLY) – part 1: Defining Frailty

Chairperson: *Dominique Verté*
• *Introduction* - Ivan Bautmans
• *Towards a uniform language of Frailty* - Roberta Vella-Azzopardi
• *Fatigue in the frailty constructs* - Veerle Knoop
• *The disability paradox in the frailty constructs* - Axelle Costenoble
• *Measures of cognition in the frailty constructs* - Ellen Gorus
• *Discussion*

The Brussels study on the early predictors of frailty (BUTTERFLY) – part 2: First results from the BUTTERFLY study

Chairperson: *Dominique Verté*
• *Introduction* - Ivan Bautmans
• *General profile of the Butterfly participants* - Aziz Debain
• *Validated equations for estimating body composition in the oldest old* - Jona Van den Broeck
• *Immunosenescence signatures in pre-frailty* - Rose Njemini
• *Discussion*

Clinical diagnostics of chronic and acute pain. Multimodal approach

Chairperson: *Olga Kurushina*
• *Acute and chronic pain: The difference between diagnostic approaches* - Olga Kurushina
• *Pain and biomechanics* - Alexander Barulin
• *Features of clinical diagnosis of cervicogenic headache* - Anna Drushlyakova
• *Diagnosis of temporomandibular disorders in patients with chronic facial pain* - Bogdan Kalinchenko

Awareness, Risk factors and Early Detection of Osteoporosis in Turkish Postmenopausal Female Patients

Chairperson: *Pinar Borman, Vesile Sepici*
• *The Awareness and Knowledge of Osteoporosis and Risk factors in a group Turkish Geriatric Patients - Belgin Karaoglan*
• *The Knowledge about Osteoporosis in a Group of Turkish Females: Relationship with Quantitative Ultrasonographic Scores - Pinar Borman*
• *Laboratory overview of bone turnover markers - Aylin Sepici Dincel*
• *Risk Factors of osteoporosis and osteoporotic fractures - Vesile Sepici*

Controversies regarding the management of gout and asymptomatic hyperuricemia

Chairperson: *Razvan Adrian Ionescu*
• *Uric acid - Friend or foe? - Mihai Bojinca*
• *Asymptomatic hyperuricemia - The hidden realm (Imaging clue) - Florentin Ananu Vreju*
• *Bone mineral density in hyperuricemia and gout - Collateral damage? - Claudiu Avram*
• *Gout treatment - As easy as it seems? - Razvan Adrian Ionescu*

The microcirculation abnormalities in osteoporosis and osteoarthritis

Chairperson: *Sekib Sokolovic, Alena Rudenko*
• *Introduction - Sekib Sokolovic*
• *Angiogenesis and Bone - Gerold Holzer*
• *Vascular pathology and Osteoarthritis, Imaging of Microcirculation - Juan Jose Scali*
• *The Microcirculation abnormalities in Osteoporosis and Osteoarthritis - Sekib Sokolovic*
• *Discussion and Closing remarks*

Non-pharmacological approaches in the management of osteoporosis

Chairperson: *Yesim Gokce Kutsal*
• *How to modify life-style? - Yesim Gokce Kutsal*
• *The role of exercises: What type of exercise when? - Jale Meray*
• *Are orthoses and physical modalities effective for osteoporosis and/or osteoporotic fractures? - Ayse A. Kucukdeveci*
• *Case presentations - Yesim Kirazli*

Relevance of body composition in chronic diseases

Chairperson: *Mislav Radić*
• *Association of body composition with disease activity in rheumatoid arthritis - Mislav Radić*
• *Relationship of body composition with osteoporosis - Tonko Vlak*
• *Impact of disability on body composition in multiple sclerosis - Ozren Polasek*

Osteosarcopenia school

Chairperson: *Mark Lissens, Yannis Dionyssiotis*
• *Osteosarcopenia - Ifigenia Kostoglou-Athanassiou*
• *Neurogenic osteoporosis due to sarcopenia in post poliomyelitis patients - Mark Lissens*
• *Osteosarcopenia school - Yannis Dionyssiotis*
• *Discussion*

Educational Lectures (EL)

EL1
Behavioral strategies for the busy clinician
Daniel Pinto

EL2
Vascular calcification and bone fragility: Links beyond the ageing
Jorge Cannata Andia

ESPRM-ESCEO-IOF Symposium

ESPRM-ESCEO-IOF Joint Session - Fibromyalgia : An evidence-based approach for diagnosis and management

Chairperson: *Fitnat DINCER*
• *Update in Diagnosis of Fibromyalgia on the basis of Evidence Based Medicine - Andreas WINKELMAN*
• *Update in Pharmacological Management of Fibromyalgia on the Basis of Evidence Based Medicine - Fitnat DINCER*
• *Update in Non-Pharmacological Management of Fibromyalgia on the Basis of Evidence Based Medicine - Raquel VALERO, Susana MUNOZ*

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ESCEO-WHO Collaborating Center Symposium

Gut microbiota (GMB) and osteoarthritis (OA) management: outcomes of an ESCEO experts consensus meeting organized under the auspices of the World Health Organization Collaborating Center for Public Health Aspects of Musculoskeletal Health and Ageing.

Chairperson: *Sansin TUZUN*
• *Introduction - René RIZZOLI*
• *Role of gut microbiota in non-communicable disease and osteoarthritis management - René RIZZOLI*
• *Gut microbiota and inflammation - Claudio FRANCESCHI*
• *Discussion - René RIZZOLI*

Algorithm for the use of biochemical markers of bone turnover in the diagnosis and follow-up of treatment for osteoporosis: outcomes of an ESCEO experts consensus meeting organized under the auspices of the World Health Organization Collaborating Center for Public Health Aspects of Musculoskeletal Health and Ageing

Chairperson: *Adolfo DIEZ-PEREZ*
• *Introduction - John A. KANIS*
• *Clinical application of bone turnover markers in post-menopausal osteoporosis - Mattias LORENTZON*
• *Algorithm for the assessment of anti-osteoporosis treatments by bone turnover markers - Eugene MCCLOSKEY*
• *Discussion - Eugene MCCLOSKEY*

EUGMS-ESCEO-IOF Symposium

EUGMS-ESCEO-IOF Joint Session "Avoiding medication related harm when treating osteoarticular disease in older people"
Chairperson: *Finbarr MARTIN*

• *Introduction: Medication related harm - Finbarr MARTIN*
• *Drugs that may harm your older patients: potentially inappropriate prescribing - Mirko PETROVIC*
• *Potential problems in the use of drugs for osteoarticular conditions in old age - Antonio CHERUBINI*

ESCEO Symposium

Impact of whole dairy matrix on musculoskeletal health and aging. Outcomes of a workshop organized under the auspices of the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO).

Chairperson: *Arne ASTRUP*
• *The concept of food matrix compared to single nutrients - Ian GIVENS*
• *Importance of dairy matrix for skeletal health - Sandra IULIANO*
• *Discussion - Arne ASTRUP*

ESCEO-IOF Symposia

Alternative treatments for osteoarthritis: stem cells, platelet-rich plasma, autologous chondrocyte transplantation, ...: outcomes of an experts consensus meeting organized under the auspices of the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) and under the auspices of the International Osteoporosis Foundation (IOF).

Chairperson: *Willem LEMS, Andrew PRICE*
• *Introduction and scope of the problem - Emmanuel MAHEU*
• *Role of surgical regenerative therapies in the management of knee osteoarthritis - Willem LEMS*
• *Role of "alternative" treatments of knee osteoarthritis - Nicholas R. FUGGLE*
• *Discussion - Andrew PRICE*

Is there a role for MHT in the management of post-menopausal osteoporosis? Outcomes of an experts consensus meeting organized under the auspices of the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) and under the auspices of the International Osteoporosis Foundation (IOF).

Chairperson: *Maria Luisa BRANDI, Tim HILLARD*
• *Welcome and scope of the problem - Antonio CANO*
• *Effects of MHT on bone: What, when, how? - Andrea GENAZZANI*
• *Risk/benefit ratio of MHT before and after 60 years - Serge ROZENBERG*
• *Conclusions - Antonio CANO*

Radiofrequency Echographic Multi-Spectrometry for the in-Vivo Assessment of Bone Strength: State of the Art: outcomes of an experts consensus meeting organized under the auspices of the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) and under the auspices of the International Osteoporosis Foundation (IOF).

Chairperson: *Maria Luisa BRANDI, Adolfo DIEZ-PEREZ*
• *Introduction - Hans Peter DIMAI*
• *Current role of bone strength in the assessment of fracture risk - Thierry THOMAS*
• *Radiofrequency echographic multi-spectrometry: Basic principles and clinical validation - Maria Luisa BRANDI*

Assessment of cardio-vascular safety of anti-osteoporosis medications. Outcomes of an experts consensus meeting organized under the auspices of the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) and under the auspices of the International Osteoporosis Foundation (IOF).

Chairperson: *Adolfo DIEZ-PEREZ, Nicholas R. FUGGLE*
• *Welcome and scope of the problem - Adolfo DIEZ-PEREZ*
• *Assessment of cardio-vascular safety of Calcium and Vitamin D - Nicholas HARVEY*
• *Assessment of cardio-vascular safety of menopausal hormonal therapy and SERMs - Santiago PALACIOS*
• *Assessment of cardio-vascular safety of peptides and monoclonal antibodies used as a treatment for osteoporosis - René RIZZOLI*
• *Conclusion - Nicholas R. FUGGLE*

CEST (Central European summer time)
09.30 - 10.30

GEDEON RICHTER SATELLITE BREAKFAST SYMPOSIUM: ONE GIANT LEAP FOR MANKIND

Chairperson: Enrique Casado

• Future Space Missions Marc Torras Ribell
• Future Osteoporosis Guidelines Mattias Lorentzon

13.00 - 14.30

UCB SATELLITE LUNCH SYMPOSIUM: BUILDING A STRONGER FUTURE FOR POSTMENOPAUSAL WOMEN WITH SEVERE OSTEOPOROSIS

Chairpersons: Josep Blanch Rubió, Serge Ferrari

• *Welcome and introduction* Serge Ferrari, Josep Blanch Rubió
• *Challenges of reducing fracture risk for patients with severe osteoporosis* Bo Abrahamsen
• *A new treatment option for patients with severe osteoporosis at high risk of fracture* Bente Langdahl
• *Individualising the treatment approach for patients with severe osteoporosis: Evaluating the balance of benefits and risks* Gaetano De Ferrari, Eugene McCloskey
• *Discussion* All
• *Conclusion and closing remarks* Serge Ferrari, Josep Blanch Rubió

13.00 - 14.30

MYLAN SATELLITE LUNCH SYMPOSIUM: PATIENT-CENTERED CARE FOR OA: PATIENTS' VALUES AS A COMPASS FOR CLINICAL DECISION

Chairpersons: Jean-Yves Reginster, Stefania Maggi

• *Welcome and Introduction* Jean-Yves Reginster
• *Improving osteoarthritis care: the value of patients' preference research* Mickaël Hiligsmann

• *Drugs safety in the treatment of osteoarthritis: a critical appraisal* Stefania Maggi
• *What makes a difference between SYSADOAs* Jean-Yves Reginster
• *Discussion*
• *Conclusion*

18.15 - 19.45

KYOWA KIRIN SATELLITE SYMPOSIUM: COULD YOUR OSTEOPOROSIS PATIENT BE HIDING ANOTHER BONE DISORDER?

Chairperson: Maria Luisa Brandi

• *Osteoporosis or osteomalacia? – A differential diagnosis* Roland D. Chapurlat
• *Osteomalacia and bone quality* Ralf Oheim
• *A missing link: Understanding X-linked hypophosphatemia and FGF23-mediated osteomalacia* Maria Luisa Brandi

18.15 - 19.45

TRB CHEMEDICA SATELLITE SYMPOSIUM: CA-CHITOSAN: AN INNOVATIVE SINGLE-SHOT IMPLANT FOR THE SYMPTOMATIC TREATMENT OF KNEE OSTEOARTHRITIS

Chairpersons: Jean-Yves Reginster, Jacques Bentin

• *Introduction* Jacques Bentin
• *CA-chitosan: origin, properties and preclinical activity* Laurence Hermitte
• *Clinical efficacy of intra-articular CA-chitosan in knee osteoarthritis* Pieter Emans
• *Questions and Answers* Pieter Emans
• *Closing words* Jacques Bentin

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

CEST (Central European summer time)

12.45 - 14.15
AMGEN SATELLITE LUNCH SYMPOSIUM: A CHRONIC DISEASE: GOING BEYOND TODAY WITH OSTEOPOROSIS

Chairpersons: Adolfo Diez-Perez, Serge Ferrari

• *Welcome and Introduction* Serge Ferrari, Adolfo Diez Perez
• *Fractured patients – latest data from EU registries* Cristina OjedaThies
• *Deep diving into sequential therapy: focus on medical society guidelines* Eugene McCloskey
• *What role does denosumab play in long-term therapy of osteoporosis?* Serge Ferrari
• *Panel discussion and summary* Serge Ferrari, Adolfo Diez Perez

16.45 - 18.15
ALEXION SATELLITE SYMPOSIUM: A NEEDLE IN A HAYSTACK: RECOGNISING AND MANAGING ADULTS WITH HYPOPHOSPHATASIA AMONG OTHER MORE COMMON BONE DISEASES

Chairperson: Maria Luisa Brandi

• *Welcome and Introduction* Maria Luisa Brandi
• *What happens if we don't find the needle: understanding the burden of disease and misdiagnosis in adults with HPP* Maria Luisa Brandi
• *Find the needle in the haystack: differential diagnosis of HPP in the setting of adult osteoporosis* Richard Eastell
• *After the needle: managing adult patients with HPP* Lothar Seefried
• *Panel discussion and Questions & Answers session* All

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES
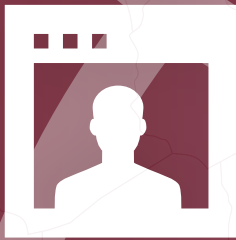
Abstract Book

Special Lecture Abstract

SL1

ESCEO-IOF ALGORITHM FOR THE MANAGEMENT OF PATIENTS AT LOW/HIGH/VERY HIGH RISK OF FRACTURE

J. A. Kanis[1,2], N. C. Harvey[3,4], E. V. McCloskey[5], O. Bruyère[6], N. Veronese[7], M. Lorentzon[8], C. Cooper[3,9,10], R. Rizzoli[11], G. Adib[12], N. Al-Daghri[13], C. Campusano[14], M. Chandran[15], B. Dawson-Hughes[16], M. K. Javaid[9], F. Jiwa[17], H. Johansson[1,2], J. K. Lee[18], E. Liu[2], O. D. Messina[19], O. Mkinsi[20], D. Pinto[21], D. Prieto-Alhambra[9], K. Saag[22], W. Xia[23], L. Zakraoui[24], J.-Y. Reginster[13,25,26]

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In 2019 the International Osteoporosis Foundation (IOF) and the European Society for Clinical and Economic Evaluation of Osteoporosis and Osteoarthritis (ESCEO) published updated guidance for the diagnosis and management of postmenopausal osteoporosis. The algorithm supplements this guidance to recognise that the risk of a subsequent osteoporotic fracture is particularly acute immediately after an index fracture and wanes progressively with time. Additionally, new anabolic agents with more rapid and greater fracture risk reduction compared to antiresorptive treatments have been developed. These have the potential to revolutionise treatment strategies, particularly in individuals at very high fracture risk. These considerations argue for the identification of individuals at very high risk of fracture. The algorithm follows the guidance of the IOF and ESCEO in the use of age-dependent intervention thresholds with the use of FRAX. In addition to the categories of low and high risk espoused in the current IOF-ESCEO guideline, very high risk can be identified as a fracture probability that exceeds the current intervention threshold by 20%. In women age 50 years or more from the UK, 64.8% would be categorised at low risk, 19.7% at high risk and 15.6% at very high risk. A FRAX adjustment is provided to take account that the probability of second fracture is particularly high in the first 2 years after a clinical vertebral fracture. The 10-year probability of a major osteoporotic fracture is multiplied by 1.04 to 2.47, depending on age. FRAX adjustments are still needed men and for index fractures other than spine fracture.

The rationale for the more refined characterisation of risk is to direct appropriate interventions. Thus, initial treatment recommendations for women at high risk might most usually start with an inhibitor of bone resorption. In contrast, women at very high risk might be more suitably treated with an anabolic treatment followed thereafter by an inhibitor of bone resorption. Such regimens save more fractures than inhibitors of bone resorption followed by anabolic agents.

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IOF International Osteoporosis Foundation

WCO IOF-ESCEO

ESCEO
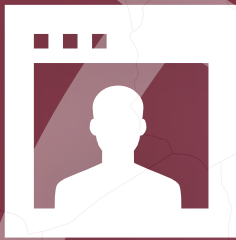
Abstract Book

Educational Lectures Abstracts

EL1
VASCULAR CALCIFICATION AND BONE FRAGILITY: LINKS BEYOND THE AGEING

J. B. Cannata-Andía[1]

[1]Bone and Mineral Research Unit, Hospital Universitario Central de Asturias, RedinRen, ISCIII, Instituto de Investigación del Principado de Asturias. Universidad de Oviedo, Spain

Vascular mineralization, bone loss and increased fracture risk are frequent age-associated disorders. Several epidemiological studies have suggested a relationship between them and increased mortality. Until recently, this important aspect had been underestimated as osteoporosis and vascular calcification had been considered poorly or non-modifiable disorders. However, recent data suggest that the association of vascular calcification and bone loss are not just a consequence of the ageing. Vascular calcification, osteoporosis and bone fragility seems to be biologically linked. involving important bone regulators such as the RANK/RANKL/OPG/(LGR4) system and the Wnt/Betacatenin pathway.

Evidence is now emerging, suggesting that LGR4, the recently discovered second RANKL receptor and the inhibitors of the Wnt/Betacatenin pathway, such as the secreted frizzled-related proteins (SRFP), the Dickkopf Wnt signaling pathway inhibitor 1 (DKK-1), and sclerostin may play a role in the connections between vascular calcification and bone loss. The clinical, epidemiological and experimental data linking bone and vessels will be analysed.
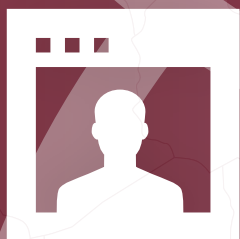
EL2
BEHAVIORAL STRATEGIE FOR THE BUSY CLINICIAN

D. Pinto[1]

[1]Department of Physical Therapy, Marquette University, Milwaukee, United States

Dr. Daniel Pinto, PT, PhD will present the ongoing work in his research lab in the development of an electronic framework for the application of Brief Action Planning as a clinical tool during clinical management of patients with musculoskeletal injuries. Dr. Pinto will discuss initial beta testing of the software and patient cases within the context of rehabilitation. Dr. Pinto is an Assistant Professor in the Department of Physical Therapy, Marquette University, USA.

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

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Abstract Book

Plenary Lectures Abstracts

PL1
BONE TURNOVER MARKERS IN CLINICAL PRACTICE

R. Chapurlat[1]

[1]INSERM UMR 1033, Université de Lyon, Hôpital E Herriot, Lyon, France

Bone turnover markers (BTM) have been widely used to evaluate the level of bone turnover in many observational studies and clinical trials. They include markers of formation and markers of resorption. Their role in clinical practice remains controversial so we will review the evidence for their use in the prediction of the risk of fracture and for treatment monitoring.

The value of BTM has been assessed in several large prospective cohorts as soon as the 1990s. Serum bone formation marker PINP and resorption marker betaCTX-I are to be preferred for evaluating bone turnover in the clinical setting because of their specificity to bone, performance in clinical studies, wide use and low analytical variability. BTMs can be of

value in patient evaluation where high values may indicate the need to investigate some causes of secondary osteoporosis. Assessing serum levels of betaCTX-I and PINP can slightly improve fracture prediction, with a gradient of risk of about 1.2 per SD increase in the bone marker.

For an individual patient, BTMs are not useful in predicting bone loss. Serum PINP and betaCTX-I can be used to monitor adherence to treatments of osteoporosis. Decrease of the BTMs greater than the least significant change or to levels in the lower half of the reference interval in young and healthy premenopausal women is closely related to treatment adherence.

In conclusion, BTMs may be used in the screening of secondary causes of osteoporosis, and mainly for treatment monitoring.

PL2
DIFFERENCES IN CLINICAL GUIDELINES

E. V. McCloskey[1]

[1]Department of Oncology & Metabolism, Centre for Integrated research in Musculoskeletal Ageing, University of Sheffield, Sheffield, United Kingdom

The majority of clinical guidelines for the management of osteoporosis adopt a case-finding strategy, combining clinical risk factors with measurement of bone mineral density (BMD), preferably at the hip, and subsequent use of defined intervention thresholds. While this suggests a reasonable degree of consensus about the management of osteoporosis globally, there are subtle but important differences between clinical guidelines. These differences relate to the conceptual approach underpinning the assessment strategy, the dependency on BMD as a gateway to treatment, the definition of intervention thresholds based on fracture risk, and the specificity of advice around therapeutic agents.

Conceptual differences are exemplified by the approaches proposed by guideline committees in the USA (e.g the NOF) and Europe (e.g. IOF, ESCEO); in the former, the approach is driven by the

value of assessment and treatment of each individual, whereas the European approach considers the value of a strategy applied to the targeted population in general. In most guidelines, treatment for osteoporosis is recommended in individuals with prior fragility fractures, especially fractures at the spine and hip. However, for those without these specified fractures, many guidelines historically have BMD as the next step so that all individuals with a risk factor will receive a BMD scan; in many countries, this approach has been influenced by the association between BMD defined osteoporosis and the reimbursement of osteoporosis treatments. In other guidelines, most notably those of NOGG in the UK and European guidelines, the need for BMD scanning is driven by the assessment of fracture risk leading to a more efficient use of scanning resources. The advent of risk assessment algorithms, such as FRAX®, has also led to the incorporation of absolute risk into the definition of intervention thresholds; here again there are differences in approach with some guidelines recommending fixed intervention thresholds, frequently as a component of more complex guidance (e.g. BMD thresholds), while others have proposed age-dependent thresholds or, in a minority of cases, a hybrid of age-dependent and fixed thresholds. Finally, while many guidelines have stratified treatment sequences on the basis of cost-effectiveness, several recent developments are impacting on treatment strategies, namely the concept of very high risk, of which imminent risk after a sentinel fracture is a component, and the growing evidence that greater fracture reductions can ensue in very high risk patients with earlier, rather than delayed, use of anabolic therapies.

PL3
TRANSIENT TREATMENT DISCONTINUATION: PROS AND CONS

M. R. McClung[1,2]

[1]Oregon Osteoporosis Center, Portland, United States, [2]Australian Catholic University, Melbourne, VIC, Australia

A unique perception exists in the community of osteoporosis practitioners that treatment of osteoporosis entails drug therapy for a few years, followed by transient or even permanent discontinuation of therapy. However, osteoporosis is a chronic disorder involving structural deterioration of the skeleton resulting in impaired bone strength and an increased risk of fragility fractures. Several drugs with varied mechanisms of action are available to increase bone mineral density (BMD), improve bone strength and reduce fracture risk. However, none of our current therapies restore bone architecture and strength to normal. More importantly, the treatment benefits of all drugs disappear – often quickly – upon stopping therapy.

In this presentation, I will

1. explore the origins and justification for the perception that osteoporosis treatment needs to be interrupted, how that perception has been incorporated into practice guidelines and how it has influenced treatment decisions by physicians.

2. make the clear point that management of osteoporosis is a life-long process and that even temporary discontinuation of therapy is not appropriate for all non-bisphosphonate therapies.

3. review recent evidence about the benefits or risks of temporary discontinuation of bisphosphonates.

4. discuss clinical circumstances where bisphosphonate holidays are and are not appropriate.

PL4
STRATEGIES TO FILL THE TREATMENT GAP IN OSTEOPOROSIS: PLACE OF COMBINATION AND SEQUENTIAL REGIMENS

M. Chandran[1]

[1]Senior Consultant and Director, Metabolic Bone Disorders Unit, Department of Endocrinology, Singapore General Hospital, Singapore, Singapore

Just as with the treatment of other chronic diseases such as diabetes and hypertension, it is now well recognized that over a lifetime, more than one medication will be needed to treat osteoporosis and to decrease the risk of fractures long-term. However, treatment regimens that are being offered to the osteoporosis patient currently are not in accordance with the physiological needs of the skeleton. How to move seamlessly amongst the multiple treatments currently available for osteoporosis for sustained efficacy is still unclear. It however is increasingly apparent that current gaps in osteoporosis therapy can be potentially mitigated with sequential and combination regimens. Data from recent studies such as the DATA Switch show that an anabolic agent followed by an antiresorptive affords maximal gain in BMD compared to a regimen which follows the opposite sequence with, in fact decreases in BMD at some sites with the latter sequence. Sequentially moving to a bisphosphonate such as Alendronate from an agent such as the PthrP analogue -Abaloparatide has also been shown to preserve the fracture reduction benefits seen with the latter. The phenomenon of potentially rebuilding bone with the sclerostin antibody -Romosozumab given in the first year with resultant continued lower fracture risk after transitioning to Denosumab has been termed the Foundation effect. This sequence of an anabolic agent followed by an antiresorptive should especially be considered in the high-risk patient with imminent fracture risk to rapidly reduce the risk of subsequent fractures. Though data suggests that combining a bisphosphonate with the PTH analogue-Teriparatide does not provide substantial BMD gains compared to monotherapy, the concomitant administration of Denosumab with Teriparatide has been shown in the DATA study to significantly increase areal BMD as well as to increase volumetric BMD and estimated bone strength. This session will review the available evidence regarding the various sequential and combination therapy approaches and the potential role they could play in better managing osteoporosis.

PL5
NEW PHARMACOLOGICAL TREATMENTS FOR OSTEOARTHRITIS

E. M. Dennison[1]

[1]MRC Lifecourse Epidemiology Unit, Southampton, United Kingdom

Osteoarthritis (OA) is the most common joint disease in later life, affecting more than 10% of the population over the age of 60 years. It is characterised by articular cartilage destruction, synovial membrane inflammation and subchondral bone remodelling. The condition is associated with very significant morbidity, disability and limitations in quality of life. Demographic population changes mean that the prevalence of OA, and its associated healthcare burden, is set to increase further.

Currently management of OA is based on a combination of physical therapy, analgesia and surgical interventions as required. To date, attempts to find a disease modifying agent for OA that are not associated with other risks has been unsuccessful, and many of the current analgesic therapies are also associated with significant side effects. Hence the search for novel OA treatments is an important one.

Our increased understanding of the pathogenesis of OA has enlightened this search. Emerging therapies include serotonin-norepinephrine reuptake inhibitors, Il-1 receptor antagonists, antibodies to nerve growth factors and regenerative therapy. Future therapies might include those that target key matrix degrading enzymes. The evidence that strontium ranelate may impact OA disease progression will also be discussed. Given the variable pathophysiology of OA, it seems likely that an armamentarium of drug therapies will be required, that might include combination therapies.

Disclosures

ED has received fees from UCB and Pfizer

PL6
RARE BONE DISEASES : WHAT DO THEY TEACH US FOR MUSCULOSKELETAL DISORDERS MANAGEMENT

M. K. Javaid[1]

[1]The Botnar Research Centre, NDORMS, University of Oxford, Oxford, United Kingdom

Rare diseases are defined as those with a prevalence of less than 1:2000 within Europe. There are over 400 rare diseases of the bone in addition to several rare diseases in other systems with significant musculoskeletal features. The advent of whole exome and genome sequencing has added a valuable tool to improve our diagnostic and therapeutic options rare diseases, informing the development of potential biomarkers and therapeutic targets. This understanding has been pivotal for the development of a range of anti-osteoporosis treatments. Also, the extra-skel-

etal manifestations of primary rare bone diseases offer insights into the broader impact of osteoporosis on patients' health. This session will highlight how rare bone diseases have influenced the management of osteoporosis, including hypophosphatasia, van Buham's disease and rare forms of rickets.

PL7
SARCOPENIA: NEW DEFINITIONS AND CLINICAL IMPLICATIONS

A. J. Cruz-Jentoft[1]

[1]Hospital Universitario Ramón y Cajal (IRYCIS), Madrid, Spain

This presentation has the aim to review and summarize the latest advances and caveats in defining sarcopenia and discuss the implications of the most recent worldwide initiatives which are trying to harmonize the definition.

The evolution over time of the definitions of sarcopenia will be described, with a focus on the European Working Group on Sarcopenia in Older People 2 (EWGSOP2) definition and the Sarcopenia Definitions and Outcomes Consortium (SDOC) conference, the most recent international initiatives. The EWGSOP2 and the SDOC agree on the overall concept of sarcopenia, which involves both impaired function (low muscle strength) and structural damage (low muscle mass/quality). However, physical performance is considered as a diagnostic criterion (EWGSOP), a severity grading assessment (EWGSOP2) or an outcome (SDOC) depending on the definition used. Muscle strength has been recognized as the best predictor of health outcomes. Muscle mass alone, as part of the definition of cachexia, sarcopenia and malnutrition, is a non-defining parameter. Furthermore, there is a lack of precision in measurement techniques and variability of the cut-off points in defining it. The inclusion of low muscle mass in the definitions of sarcopenia, cachexia, malnutrition and frailty adds to the complexity of this field.

The clinical implications of this ongoing discussion over the definition of sarcopenia will be addressed in the final part of the presentation. Wide efforts are needed to include sarcopenia in mainstream clinical practice.

References:

- Cruz-Jentoft AJ, Sayer AA. Sarcopenia Lancet. 2019;393(10191):2636–2646.

- Sanchez-Rodriguez D, Marco E, Cruz-Jentoft AJ. Defining sarcopenia: some caveats and challenges. Curr Opin Clin Nutr Metab Care. 2019 [Epub ahead of print]

- Bauer J, Morley JE, Schols AMWJ, et al. Sarcopenia: A Time for Action. An SCWD Position Paper. J Cachexia Sarcopenia Muscle. 2019;10(5):956–961.

PL8
WHAT DID WE LEARN FROM THE RECENT LARGE VITAMIN D TRIALS?

B. Dawson-Hughes[1]

[1]Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, United States

In recent times, several large placebo-controlled clinical trials examining the effect of supplemental vitamin D on a variety of outcomes including cancer, cardiovascular disease, diabetes, falls and fractures have been published. The objective of this presentation is to review the results of these trials to assess what we have learned. The published trials to be considered and their primary endpoints include:

1) ViDA (5,000 older adults, Rx 100,000 IU/mo of D_3 for 5 years) – cardiovascular disease

2) VITAL (25,000 older adults, Rx 2,000 IU/d of D_3 for 5 years) – cancer and cardiovascular disease

3) D2d – (2,400 older adults, Rx 4,000 IU D_3/d for 2.5 years) - conversion from prediabetes to type 2 diabetes

4) PETAL – (1,360 critically ill patients, Rx single enteral dose of 540,000 IU D_3) - mortality over ensuing 90 days.

Findings related to the primary endpoint of each of these trials were null, indicating that the studies did not achieve the group difference set forth in their statistical power estimates. These reports do not exclude the possibility of clinically meaningful benefit from vitamin D. The D2d study, for instance, had statistical power to detect a 25% group difference in conversion to diabetes. A smaller risk reduction could nonetheless be clinically meaningful.

Falls and fractures were secondary endpoints in the ViDA and VITAL studies. In ViDA, mean serum 25(OH)D increased from 25 to 45 ng/ml in the supplemented group but the supplementation did not alter risk of falls or fractures. Similarly, in VITAL the mean serum 25(OH)D level increased from 30 to 42 ng/ml, but supplementation had no significant impact on risk of falling (fracture results are pending). Meanwhile, a recent meta-analysis of randomized controlled trials found that vitamin D alone had no impact on fracture risk, but the combination of vitamin D and calcium lowered risk of any fracture by 6% and risk of hip fracture by 16%.

In conclusion, the mega-trials published to date have been null regarding their primary endpoints. Replacement doses of vitamin D continue to be widely recommended but, at this time, high doses of vitamin D for non-skeletal benefits do not appear to be warranted. This conclusion is subject to change pending the publication of several mega-trials that are ongoing.

References:

ViDA: Scragg R. JAMA Cardiol 2017; 2: 608-616; Khaw K-T. Lancet Diab Endocrinol 2017; 5: 438-56.

VITAL: Manson J. N Engl J Med 2019; 380: 23-32.

D2d: Pittas A. N Engl J Med 2019; 381: 520-530.

PETAL: N Engl J Med 2019; 381; 2529-2540.

PL9
BONE FRAGILITY : BEYOND BONE LOSS

S. Ferrari[1]

[1]Division of Bone Diseases, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland

Osteoporosis is a systemic skeletal disorder characterized by loss of bone mineral and microstructural alterations in the trabecular and cortical compartments, leading to decreased bone strength. In addition, falls and their determinants, including sarcopenia and dynapenia, also play a major role in fracture risk. We will present some recent data providing new mechanisms to explain how bone fragility develops with aging.

The mechanisms by which bone loss occurs are well understood, including the central role of RANK Ligand, which triggers osteoclasts differentiation and activation, thereby increasing bone resorption in all compartments. Many years ago a DXA study proposed that in addition to BMD loss, the bone area was not expanding properly from the periosteum, thereby failing to compensate for the loss of endosteal bone. A recent longitudinal analysis using HR-pQCT at distal radius and tibia in 65+ yrs-old women and men indeed demonstrates that the bone total volume increases proportionally less than the medullary area, leading to a decrease in cortical bone volume and bone strength. These observations suggest that modelling-based bone formation at the periosteum also declines with aging, in parallel with an increase in endosteal bone remodelling, generating a double hit on bone fragility. Animal models and pharmacological data have started to delineate the underlying mechanisms for this dual effect. Hence, overexpression of RANK Ligand in mice replicates the human observations, whereas inhibition of RANKL, cathepsin K or sclerostin specifically both prevent bone loss and promote cortical expansion.

Hence, as the relationship between bone remodeling and modelling becomes better understood, the effects of newer drugs on restoring bone strength are clarified.

PL10
HOW TO REDUCE FALLS IN OLDEST PEOPLE?

A. Trombetti[1,2]

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The overwhelming majority of fractures occur after a low-trauma fall. Despite important strides made in the recent decade, falls prevention remains a vastly underexplored territory of fractures prevention.
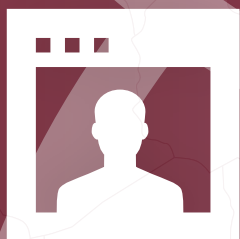
A major concern with falls is the combination of a high incidence and a high susceptibility to injury, with over 1 in 3 adults over age 65 years experiencing at least 1 fall annually, and 1 in every 10 falls resulting in a severe injury (e.g., fracture, subdural haematoma). Hence, falls are devastating in older people, significantly contributing to disability, hospitalization, premature institutionalization and death.

While the etiology of most falls is multifactorial, with a wide range of intrinsic and extrinsic risk factors identified, physical impairments (i.e., deficits in gait and balance, and muscle strentgh) have revealed as the most prominent predisposing risk factors at the population level, and with sarcopenia and frailty underlying many of these impairments. Thus, current guidelines for falls prevention strongly recommend the use of tools based on physical performances (e.g., Timed up and go or Short Physical Performance Battery) to screen falls risk annually in older individuals, in addition to fall history. Executive functioning or dual-tasking deficits, commonly investigated using dual-task gait paradigms, have also revealed as potent contributing factors to physical impairments and falls.

Multifactorial interventions based on an initial falls risk assessment followed by direct individualized interventions tailored to the identified risk factors, including a suitable exercise program, is recommended in high-risk individuals. Exercise interventions as a stand-alone strategy, whether delivered individually or in group setting, are recognized as the most efficacious interventions for preventing falls, with greater effects achieved with programs involving a strong balance component and provided at high dose. Exercise interventions may also be effective in preventing physical disability, even in frail individuals [1]. Emerging evidence also suggests that interventions targeting not solely physical but also cognitive processes (e.g., music-based multitask Dalcroze Eurhythmics) are promising strategies to elicit improvements towards falls risk reduction [2].

[1] Trombetti A, et al. Ann Intern Med. 2018;168(5):309-16.

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OC1

EFFICACY AND SAFETY OF ROMOSOZUMAB AMONG POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AND MILD-TO-MODERATE CHRONIC KIDNEY DISEASE

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Objective: To determine if baseline (BL) renal function affects the efficacy and safety of romosozumab (Romo).

Materials and Methods: We performed post hoc analyses of 2 Romo trials in postmenopausal women with osteoporosis. In ARCH, 4,093 patients (pts) were randomized 1:1 to Romo 210 mg monthly or alendronate (ALN) 70 mg weekly for 12 months (mean age, 74.3; 96.1% with prevalent vertebral fractures [VFx]). In FRAME, 7,180 pts were randomized 1:1 to Romo 210 mg or placebo (Pbo) monthly for 12 months (mean age, 70.9; 18.3% with prevalent VFx). For these analyses, pts were categorized by BL eGFR (mL/min/1.73m^2): normal renal function (eGFR ≥ 90), mild renal insufficiency (eGFR 60−89), or moderate renal insufficiency (eGFR 30−59). Least squares mean (LSM) % change from BL in BMD at the lumbar spine, total hip, and femoral neck; incidence of new VFx and adverse events (AEs); and changes in renal function were assessed for each eGFR category at month 12 of the double-blind treatment period.

Results: At BL, most pts had mild/moderate renal insufficiency: 84% in ARCH, 88% in FRAME. In both studies, change from BL in BMD was significantly higher in the Romo group across BL eGFR categories (Figure). There was an interaction between BMD increase and renal function, and although BMD increase was less in women with impaired renal function, differences between Romo and control groups remained significant (Figure). Among pts with eGFR ≥ 90, 60−89, and 30−59, the incidence of new VFx (Romo vs ALN or Pbo) at month 12 was 3.3% vs 7.3%, 3.2% vs 3.9%, and 3.4% vs 6.2% in ARCH and 0.5% vs 3.0%, 0.4% vs 1.5%, and 0.6% vs 2.1% in FRAME. In both studies, the incidences of AEs and serious AEs were similar in both treatment groups within and across eGFR categories. AEs of mild-to-moderate hypocalcemia (investigator reported) occurred in 2 pts (1 Romo [eGFR 60−89], 1 ALN [eGFR ≥ 90]) in ARCH and 1 pt (Romo [eGFR 60−89]) in FRAME. Five pts (0 Romo, 5 ALN) in ARCH and 19 pts (14 Romo, 5 Pbo) in FRAME had decreases in serum Ca levels (albumin adjusted);
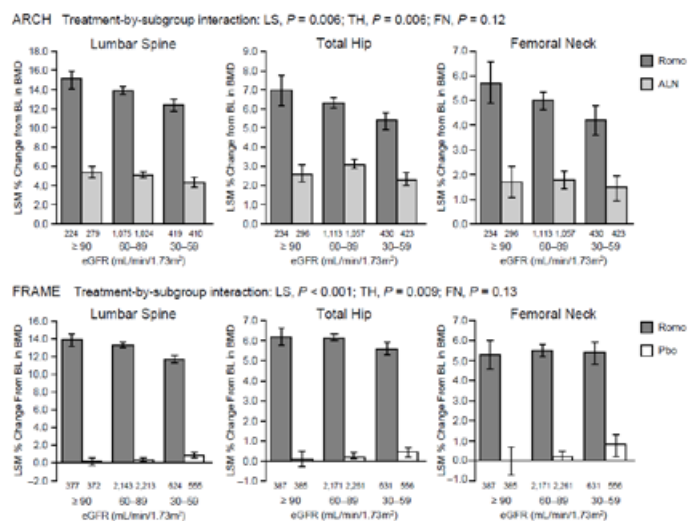
in the Romo group all were mild (< LLN−8.0 mg/dL) or moderate (< 8.0−7.0 mg/dL). Similar % of pts in each group had changes in renal function over 12 months of treatment.

Conclusion: The efficacy and safety of Romo vs ALN or Pbo was similar among postmenopausal women with osteoporosis and different levels of renal function.

Figure. LSM (95% CI) % Change in BMD From Baseline to Month 12

OC2

ROMOSOZUMAB AFTER DENOSUMAB IMPROVES LUMBAR SPINE AND MAINTAINS TOTAL HIP BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH LOW BONE MASS

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Objective: Romosozumab (Romo), an anti-sclerostin antibody that increases bone formation while decreasing bone resorption, reduces fracture risk within 12 months. Here we evaluate the effects of transitioning from denosumab (DMAb) to Romo in treatment-naïve patients.

Materials and Methods: This phase 2 trial (NCT00896532) enrolled postmenopausal women with a lumbar spine (LS), total hip (TH), or femoral neck T-score ≤−2.0 and ≥−3.5. Patients were randomized to placebo (Pbo) or various doses of Romo monthly or every 3 months from baseline (BL) to month (M) 24, were re-randomized to 12 months of DMAb or Pbo (M24-36), and then all were to receive Romo 210mg monthly for 12 months (M36-48). Results for the overall population have been previously published (1,2). Here we present data from a subset of patients who were randomized to Pbo for 24 months, DMAb (n=16) or Pbo (n=12) for 12 months, and then Romo for 12 months.

Results: In patients who were randomized to Pbo followed by DMAb, Romo treatment for 12 months maintained bone mineral density (BMD) gained during DMAb treatment at the TH (mean change from end of DMAb treatment, 0.9%) and further increased BMD gains at the LS (mean change from end of DMAb treatment, 5.3%) (Table). As expected, P1NP and β-CTX levels decreased with DMAb. Upon transition to Romo (M36-48), P1NP levels initially increased and gradually returned to BL by M48 while β-CTX gradually increased to BL levels.

In patients who transitioned to Romo after 36 months of Pbo, BMD increased at the LS and TH (Table). P1NP levels initially increased with Romo and gradually returned to BL by M48 while median β-CTX level remained below BL with Romo treatment.

Conclusions: BMD response in the Pbo to Romo group was similar to that observed in other studies. Transitioning to Romo after 12 months of DMAb further improves LS BMD and maintains TH BMD.

References: 1) McClung MR, J Bone Miner Res 2018;33:1397-1406. 2) Kendler DL, Osteoporos Int 2019;30:2437-2448.

Disclosures: This study was sponsored by Amgen, Astellas, and UCB Pharma. MR McClung received consulting fees and honorarium from Amgen. MA Bolognese received contract fees from Amgen and was a speaker for Amgen. JP Brown received research support from Mereo, Radius, and Servier; received consulting fees from Amgen, Eli Lilly, and Servier; and was on the speakers' bureau for Amgen and Eli Lilly. J-Y Reginster received research funding from IBSA-Genevrier, Mylan, CNIEL, and Radius Health; received lecture fees from IBSA-Genevrier, Mylan, CNIEL, and Dairy Research Council; and received consulting fees or participated in paid advisory boards for IBSA-Genevrier, Mylan, Radius Health, and Pierre Fabre. BL Langdahl received research support from Amgen and Novo Nordisk and was on the speakers' bureau for UCB, Amgen, and Eli Lilly. N Ruiz-Santiago, Y Shi, M Rojeski, H Kassahun, and M Oates are employees of and own stock in Amgen. J Timoshanko and C Libanati are employees of and own stock in UCB.

Table

Treatment from M0–24: Treatment from M24–36: Treatment from M36–48:	Pbo Pbo Romo 210 mg QM N = 12	Pbo DMAb 60 mg Q6M Romo 210 mg QM N = 16
BMD, mean % change (95% CI)		
Lumbar spine		
M0–24	2.7 (0.2, 5.1)	−0.8 (−2.8, 1.1)
M24–36	−0.4 (−2.1, 1.4)	5.5 (3.6, 7.4)
M36–48	9.1 (6.1, 12.1)	5.3 (3.2, 7.4)
M24–48	8.9 (5.5, 12.4)	11.5 (8.8, 14.3)
Total hip		
M0–24	−2.2 (−3.6, −0.8)	−1.6 (−2.7, −0.5)
M24–36	−0.3 (−1.4, 0.8)	2.8 (2.1, 3.6)
M36–48	4.6 (2.7, 6.4)	0.9 (−0.1, 1.8)
M24–48	4.7 (2.7, 6.7)	3.8 (2.6, 5.0)
BTM, median (Q1, Q3)		
P1NP, µg/L		
M0	37.0 (33.8, 41.0)	52.4 (44.9, 59.2)
M24	38.2 (30.0, 55.6)	50.0 (40.0, 56.0)
M36	35.9 (30.3, 55.5)	17.4 (11.2, 21.4)
M39	49.5 (36.3, 79.9)	43.1 (31.6, 55.6)
M48	36.2 (29.2, 48.2)	64.6 (54.2, 72.5)
β-CTX, ng/L		
M0	372.0 (306.0, 415.5)	503.5 (392.5, 635.5)
M24	534.0 (433.5, 692.0)	626.0 (466.0, 833.0)
M36	376.0 (305.0, 533.5)	162.5 (95.5, 268.0)
M39	348.0 (282.0, 438.5)	311.0 (239.0, 385.0)
M48	321.0 (276.5, 407.0)	532.0 (378.0, 661.0)

β-CTX, β-isomer of the C-terminal telopeptide of type I collagen; BMD, bone mineral density; BTM, bone turnover marker; CI, confidence interval; DMAb, denosumab; M, month; P1NP, procollagen type 1 N-terminal propeptide; Pbo, placebo; Q1, quartile 1; Q3, quartile 3; QM, monthly; Q6M, every 6 months; Romo, romosozumab.

OC3
VERTEBRAL FRACTURES BEFORE, DURING AND AFTER DENOSUMAB. A RETROSPECTIVE STUDY OF 858 CASES

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OBJECTIVE: Evaluate subject characteristics and risk factors associated with the occurrence of vertebral fractures (VF) after treatment with Denosumab (DMAB).

METHODS: Among a network of 22 bone consultants from different parts of Switzerland, we collected the clinical history of 858 randomly chosen women, in whom treatment with DMAB was

interrupted, 172 of them having breast cancer. Our questionnaire documented age, BMI, Bone Mineral Density (BMD), life style, family history, bone related diseases and treatments, fractures, bone resorption markers, and treatments for breast cancer. Data for these variables were recorded for the periods before, during and after DMAB treatment.

RESULTS: The mean age was 65 years [range 27 – 92]. Bisphosphonates had been administered before DMAB in 46%, and after in 64.5% (76.4% of them with Zoledronate). The mean duration of DMAB treatment was 35 months [6-96]. Follow-up, starting 6 months after the last dose, was 28 months (1 -107). In 96.5% the follow-up lasted > 6 months. The mean Tscore of lumbar spine BMD was -2.55 (SD 0.97) before, 1.90 (1.11) during, and 2.15 (1.16) after treatment. The Tscore at femoral neck was 2.06 (SD 0.78) before, 1.45 (0.83) during, and 1.93 (0.76) after treatment. Trabecular Bone Score (TBS) was measured among 95 patients in each period, and was 1.22 before, 1.27 during, and 1.29 after DMAB treatment; with significant increases (p<0.001 for trend). The percent of patients with osteoporotic fractures was 36.1% before, 5.2% during and 12.5 % after DMAB treatment; and that of patients with vertebral fractures (VF) was 20.4 % before (2.9 % with multiple VF), in 2.1% during (0.5 % with multiple VF), and in 11.0 % after treatment (6.4 % with multiple VF, with a mean of 2.9 VF per fractured patient). Hip fractures were observed in 3.5 % before, 0.7% during and 0.6% after treatment. The numbers of humerus, pelvis and rib fractures were similar.

The influence of each parameter mentioned above on the occurrence of fractures will be evaluated.

CONCLUSION: Treatment with Denosumab in 858 women led to an increase in BMD and TBS, and to a decrease in fractures. In the $\pm$ 28 months following treatment cessation, vertebral fractures increased. The occurrence of fractures will be analyzed in respect to case history, clinical characteristics, risk factors as well as evolution of BMD and resorption markers.

OC4
DIFFERENTIAL EFFECTS OF ABALOPARATIDE AND TERIPARATIDE ON CORTICAL VOLUMETRIC BMD AND BONE STRENGTH INDICES IN THE PROXIMAL FEMUR BY DXA-BASED 3D MODELING

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Objectives: To estimate changes in bone strength indices in the proximal femur over 18 months of treatment with placebo (PBO), abaloparatide (ABL), or teriparatide (TPTD) using a 3D modeling approach applied to DXA images from the ACTIVE trial.

Materials and Methods: A subset of 750 pts from the ACTIVE trial, 250 from each treatment group (PBO, ABL, TPTD) were randomly selected with data stratified by study site and patient race/ethnicity. Using Hip DXA scans at baseline and months 6 and 18, DXA-based 3D modeling (3D-SHAPER v2.10.1, Galgo Medical, Spain) was performed to evaluate cortical volumetric BMD (vBMD) and

geometric parameters. Density-weighted cross-sectional moment of inertia (CSMI*) and section modulus (Z*) were generated at the femur neck (FN) and intertrochanteric (IT) regions as indices of bone strength. Pairwise group comparisons were made for % change from baseline data using P-values derived from contrast tests based on an MMRM model.

Results: After 18 months of treatment, ABL and TPTD similarly increased cortical thickness in the total hip (+1.5%) (both P<0.001 vs PBO). However, only ABL significantly increased hip cortical vBMD (+1.3%) vs PBO (-0.2%) and did so to a significantly greater extent than TPTD (0.4%) (both P<0.05 vs ABL). After 18 months, the increases from baseline in CSMI* and Z* were significantly greater in both the ABL and TPTD groups vs PBO in the FN and IT regions (P<0.0001 for all; Table). The increases with ABL were significantly greater than with TPTD for both CSMI* and Z* in the FN region (P<0.001 for both).

Conclusion: Both ABL and TPTD resulted in increased hip bone strength indices by DXA-based 3D modeling after 18 months. ABL significantly increased CSMI* and Z* to a greater extent than TPTD at the femur neck, consistent with its greater increase in hip cortical vBMD. Further studies may be warranted to investigate how these differences in clinically important regions impact hip strength.

Table: Changes in Hip Bone Strength Indices at 18 Months

% Change from Baseline	PBO	ABL	TPTD
FN CSMI*	0.5 ± 0.4	7.2 ± 0.6 [#^]	4.5 ± 0.5 [#]
FN Z*	0.2 ± 0.3	7.7 ± 0.5 [#^]	5.0 ± 0.4 [#]
IT CSMI*	0.7 ± 0.5	6.6 ± 0.5 [#]	5.6 ± 0.5 [#]
IT Z*	0.7 ± 0.6	7.3 ± 0.6 [#]	6.4 ± 0.6 [#]

Mean ± SE; [#]p<0.0001 vs PBO; [^]p<0.001 vs TPTD

OC5
FRACTURE RISK REDUCTION BY ANTI-OSTEOPOROSIS PHARMACOTHERAPY ACCORDING TO BASELINE RISK FACTORS AMONG POSTMENOPAUSAL WOMEN: METAREGRESSION ANALYSES OF RANDOMISED TRIALS

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Objectives: To synthesise the evidence on the effect of anti-osteoporosis pharmacotherapy according to baseline variables known to influence fracture risk among postmenopausal women; and to critically appraise internal validity of RCTs.

Materials and Methods: Meta-regression analysis was based on restricted maximum likelihood (mixed) models. We included 143 references representing 69 distinct trials that examined the effect of bisphosphonates [BP], denosumab [DMAB], selective oestrogen receptor modulators [SERM], parathyroid hormone receptor [PTHR] agonists and romosozumab, either compared to placebo or head-to-head. The baseline covariates were: fracture history, age, lumbar spine T-score and BMI. The Cochrane risk of bias tool was used to evaluate the RCTs. Data sources were MEDLINE, EMBASE and Cochrane Library from Jan 1996 to Nov 2019.

Results: Antiresorptive treatment (BP, SERM and DMAB) is more efficient compared to placebo in reducing vertebral fractures [VF] (RR= 0.59, 95% CI: 0.51, 0.69), with improved efficacy following increasing age (trial average range: 50-85 years): k=25; β: 0.96, 95% CI: 0.93, 0.99, but irrespective of the other baseline covariates. Regardless of the baseline covariates there was an effect of antiresorptive treatment compared to placebo on non-VF (RR= 0.82, 95% CI: 0.76, 0.89). Compared to either placebo or BP, anabolic treatment (PTHR, romosozumab) reduced the risk of both VF and non-VF irrespective of any of the baseline covariates. The certainty of the evidence was moderate; due to the apparent risk of bias related to the internal validity (incl. reporting bias).

Conclusions: Antiresorptive and anabolic treatment were beneficial in fracture risk reduction among postmenopausal women mostly independently of baseline risk. Since anabolic treatment was more effective than BP irrespective of baseline risk, there is no trial evidence to support the notion that anabolic treatment should be limited for the very high-risk patients.

OC6

BUROSUMAB IMPROVES BIOCHEMICAL, SKELETAL, AND CLINICAL FEATURES OF TUMOR-INDUCED OSTEOMALACIA (TIO) SYNDROME

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Objective: Evaluate the efficacy and safety of burosumab, a fully human monoclonal antibody to FGF23, in adults with TIO.

Materials/Methods: In an ongoing open-label Phase 2 study (NCT02304367), 17 adults with TIO or cutaneous skeletal hypophosphatemia syndrome (CSHS) were enrolled and received burosumab. Key endpoints were changes in serum phosphorus and osteomalacia as assessed from trans-iliac crest bone biopsies. This report excludes 3/17 subjects who did not have TIO: 2 subjects diagnosed with X-linked hypophosphatemia post-enrollment and 1 subject with CSHS.

Results: Serum phosphorus increased from baseline (BL; 1.60 mg/dL) and was maintained after titration, from Week (W) 22 (2.85 mg/dL, dose cycle midpoint) to W144 (2.56 mg/dL, dose cycle endpoint, p<0.0001). Serum TmP/GFR and $1,25(OH)_2D$ also increased with burosumab. 11 subjects underwent paired bone biopsies at BL and W48. Osteoid volume/bone volume decreased from a mean ± SE of 17.6% ± 5.9% at BL to 12.1% ± 4.7% at W48 (p=0.086). Mean ± SE osteoid thickness decreased from 16.5 ± 3.6 μm to 11.3 ± 2.8 μm (p<0.05). Using imputation, mineralization lag time decreased from a mean ± SE of 1598 ± 420 days to 1032 ± 712 days (p=0.41). Osteoid surface/bone surface showed no change from BL (mean ± SE BL: 57% ± 9%, W48: 57% ± 7%). Of 249 areas identified with increased uptake on bone scan at BL, 68 (27%) and 81 (33%) were fully healed at W96 and W144, respectively; 56 (23%) and 32 (13%) were partially healed at W96 and W144, respectively. There were significant improvements in patient-reported outcomes of fatigue and pain as well as measures of physical functioning and proximal muscle function with burosumab. All subjects had ≥1 adverse event (AE). Two subjects discontinued: 1 to undergo chemotherapy to treat an AE of neoplasm progression and 1 failed to meet serum phosphorus dosing criteria (receiving minimal burosumab dosing). There were 16 serious AEs in 7 subjects, all unrelated to drug. Of the 6 subjects

with a serious AE of tumor progression/compression, 5 had a history of tumor progression prior to enrollment. There was 1 death, considered unrelated to treatment.

Conclusions: In adults with TIO Syndrome, burosumab was associated with improvements in phosphate metabolism, osteomalacia, skeletal metabolism, physical functioning, fatigue, pain, and quality of life.

OC7

TEMPORAL TRENDS AND FACTORS ASSOCIATED WITH BISPHOSPHONATE DISCONTINUATION AND RESTART

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Background: Adverse events related to long-term use of bisphosphonates have raised interest in temporary drug discontinuation. Trends in bisphosphonate discontinuation and restart, as well as factors associated with these decisions are not fully understood at a population level.

Methods: We investigated temporal trends of bisphosphonate discontinuation from 2010 to 2015, and identified factors associated with discontinuation and restart of osteoporosis therapy. Our cohort consisted of long-term bisphosphonate users identified from 2010-2015 Medicare data. We defined discontinuation as ≥ 12 months without bisphosphonate prescription claims. We used conditional logistic regression to compare factors associated with alendronate discontinuation or osteoporosis therapy restart in the 120-day period preceding discontinuation or restart referent to the 120-day preceding control periods.

Results: Among 73,800 long-term bisphosphonates users, 59,251 (80.3%) used alendronate, 6,806 (9.2%) risedronate, and 7,743 (10.5%) zoledronic acid, exclusively. Overall 26,281 (35.6%) discontinued bisphosphonates for at least 12 months. Discontinuation of bisphosphonates increased from 1.7% in 2010, reaching a peak of 14% in 2012 with levels plateauing through 2015. The factors most strongly associated with discontinuation of alendronate were: benzodiazepine prescription (aOR = 2.5, 95% CI [2.1, 3.0]), having a dual-energy X-ray absorptiometry (DXA) scan (aOR = 1.8, 95% CI [1.7, 2.0]) and skilled nursing facility care utilization (aOR = 1.8, 95% CI [1.6, 2.1]). The factors most strongly associated with restart of osteoporosis therapy were: having a DXA scan (aOR = 9.9, 95% CI [7.7, 12.6]), sustaining a fragility fracture (aOR = 2.8, 95% CI [1.8, 4.5]), and an osteoporosis or osteopenia diagnosis (aOR = 2.5, 95% CI [2.0, 3.1]).

Conclusions: Our national evaluation of bisphosphonate discontinuation showed that an increasing proportion of patients on long-term bisphosphonate therapy discontinue medications. The factors associated with discontinuation of alendronate were

primarily related to worsening of overall health status, while traditional factors associated with worsening bone health were associated with restarting osteoporosis medication.

OC8

MACROBIOTIC DIETS, PLANT-BASED DIETS, VEGETARIANISM, VEGANISM AND BONE HEALTH: A SYSTEMATIC REVIEW AND META-ANALYSES

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Abstract

Objectives: Despite the benefits that vegetarian and vegan diets have on cardiovascular diseases, such as obesity, hypertension, type 2 diabetes mellitus, and ischemic heart disease, vegetarians and vegans have a lower bone mineral density (BMD) and vegans seem to have, in addition to some adverse nutritional consequences, higher levels on fractures compared to omnivores. Nevertheless, the effect that less restrictive options like plant-based diets (defined in terms of low frequency of animal food consumption) and macrobiotic diets (a diet that consists of cereals, pulses, and vegetables with small additions of seaweeds, fermented food, nuts, and seeds avoiding animal products but fish may be taken occasionally) can have on bone health is still unknown. The objective of this systematic review and meta-analyses is to evaluate possible benefits/risks that macrobiotic and plant-based diets can have on bone health and to update new information of vegetarian and vegan diets regarding bone status.

Material and methods: A systematic search was conducted in PubMed, Scopus, and Science Direct, covering the period from the respective start date of each database to January 2020. Inclusion criteria (original studies in children and adults, written in English or Spanish comparing those following macrobiotic, plant-based diets, vegetarian or vegan diets with omnivores as controls, with BMD information for the whole body, lumbar spine, or femoral neck and/or the number of fractures as the outcome). Following a diet for less than six months was an exclusion criteria. The quality assessment tool for observational cohort and cross-sectional studies is used to assess the quality of the studies.

Results: Preliminary results show that macrobiotic, vegetarian and vegan diets have a negative impact on BMD. Conversely, those following a plant-based diet seem to have better bone health outcomes. Nevertheless, most of the studies did not include important confounders such as calcium intake, body mass index, physical activity, hormone use, sunlight exposure, consumption of alcohol, and smoking behavior.

Conclusions: Vegetarians, vegans and those following macrobiotic diets have a lower BMD compared to omnivores. Well-planned plant-based diets however seem to be a good choice to build and maintain good bone health. More studies including important confounders are needed to draw appropriate conclusions.

The authors declare no conflicts of interest.

OC9

DISEASE PHENOTYPE AS A PREDICTOR OF TREATMENT RESPONSE IN OSTEOARTHRITIS: RESULTS FROM A PHASE II CLINICAL TRIAL OF THE FIRST-IN-CLASS IMIDAZOLINE-2 RECEPTOR LIGAND CR4056

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Objective: CR4056 is a novel imidazoline-2 receptor (I_2R) ligand endowed with potent analgesic activities in animal pain models, by innovative modulation of the monoaminergic descending inhibitory pathway [1]. The present proof-of-concept study tested the short-term efficacy and safety of CR4056 in patients with knee osteoarthritis (OA) pain with different disease phenotypes.

Methods: This multicenter, prospective, randomized, placebo-controlled, double-blind trial (EudraCT n. 2015-001136-37) enrolled patients with different OA phenotypes, including patients with a neuropathic pain component (painDETECT questionnaire ≥19), inflammatory OA (flares) or metabolic OA (BMI ≥27.5 kg/m², the WHO threshold for pre-obesity). Patients with knee OA (ACR clinical/radiological criteria, K-L grade 2/3) and moderate/severe pain (score ≥50 on 0-100 WOMAC pain subscale) received oral CR4056 (100 mg bid in women and 200 mg bid in men) or placebo (both genders) for 14 days. Intention-to-treat (ITT: Worst-Case approach for non-completers) changes in WOMAC pain (primary endpoint) were analyzed by the Wilcoxon test.

Results: 213 patients were treated with CR4056 (92 women, 52 men) or placebo (69 overall). CR4056 decreased WOMAC pain vs. placebo after only 14 days and with a similar pattern in the overall population and the investigated OA phenotypes. In the metabolic OA phenotype (BMI ≥27.5, N=156), all CR4056-treated groups showed a statistically and clinically significant improvement vs. placebo in WOMAC pain of 12-18 points. Secondary pain and function outcomes followed a pattern consistent with the primary endpoint. There were too few patients with a neuropathic or inflammatory phenotype for a meaningful analysis. There were no serious adverse events and CR4056 was well tolerated: the most common AE was mild headache.

Conclusions: CR4056 is the first I_2R ligand showing analgesic activity in humans. The compound was safe and effective in reducing knee OA pain in this short phase II trial, especially in overweight patients representing the metabolic OA phenotype. This observation prompts longer-term evaluation of the analgesic activity of CR4056 and the exploration of possible links between the I_2 pathway and altered pain perception in the metabolic OA phenotype.

Reference: [1] Li JX. Imidazoline I(2) receptors: An update. Pharmacol Ther 2017;178:48-56.

OC10

THE NOVEL, INTRA-ARTICULAR CLK/DYRK1A INHIBITOR LORECIVIVINT (SM04690), A WNT PATHWAY MODULATOR, IMPROVED RESPONDER OUTCOMES IN SUBJECTS WITH KNEE OSTEOARTHRITIS: A POST HOC ANALYSIS FROM A PHASE 2B TRIAL

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Objectives: Lorecivivint (LOR; SM04690) is a small-molecule, intra-articular (IA) CLK/DYRK1A inhibitor that modulates the Wnt pathway and has demonstrated beneficial effects on patient-reported outcomes (PROs) relative to placebo (PBO) in two Phase 2 knee OA trials. Representing PROs as discrete threshold responses instead of as changes in mean point estimates may more meaningfully evaluate clinical benefits experienced by trial subjects. This post hoc analysis was conducted to measure the proportion of LOR-treated subjects in a 24-week Phase 2b study who achieved 30%, 50%, or 70% threshold responses over baseline in Pain Numeric Rating Scale (NRS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) subscores, and Patient Global Assessment (PtGA). Results from the Phase 3 selected dose of 0.07 mg LOR are presented here.

Material and Methods: Subjects had ACR-defined knee OA, Kellgren-Lawrence (KL) grades 2−3, and Pain NRS scores ≥4 to ≤8 in the target knee and <4 in the contralateral knee. A single 2mL IA injection of 0.03 mg, 0.07 mg, 0.15 mg, or 0.23 mg LOR, or vehicle PBO was given in the target knee at baseline. The proportion of subjects meeting 30%, 50%, or 70% threshold responses over baseline in the weekly average of daily Pain NRS [0−10], WOMAC Pain [0−100], WOMAC Function [0−100], and PtGA [0−100] at Week 12 was determined. The odds ratios (OR [95%CI]) of achieving each threshold response level were calculated.

Results: 635 subjects (91.4%) completed the study. Treatment with 0.07 mg LOR versus PBO at Week 12 led to

Significantly ($P < 0.05$) increased odds of achieving a 30% threshold response in Pain NRS (OR 2.47 [1.45, 4.19]) and WOMAC Function (OR 1.86 [1.10, 3.12])

Significantly increased odds of achieving a 50% threshold response in WOMAC Pain (OR 1.79 [1.06, 3.03]) and PtGA (OR 2.28 [1.25, 4.16])

Numerically, but not significantly, more subjects achieving a 70% threshold response in all PROs

Improvements were maintained through Week 24.

Conclusions: LOR, in development as a potential disease-modifying knee OA drug, demonstrated significantly higher odds ratios of achieving and maintaining clinically relevant improvements in PROs compared with placebo from Week 12 through Week 24. Phase 3 studies are ongoing.

Figure: Responder outcomes from a Phase 2b trial of LOR: Pain NRS, WOMAC Pain, WOMAC Function, and Patient Global Assessment at Week 12.
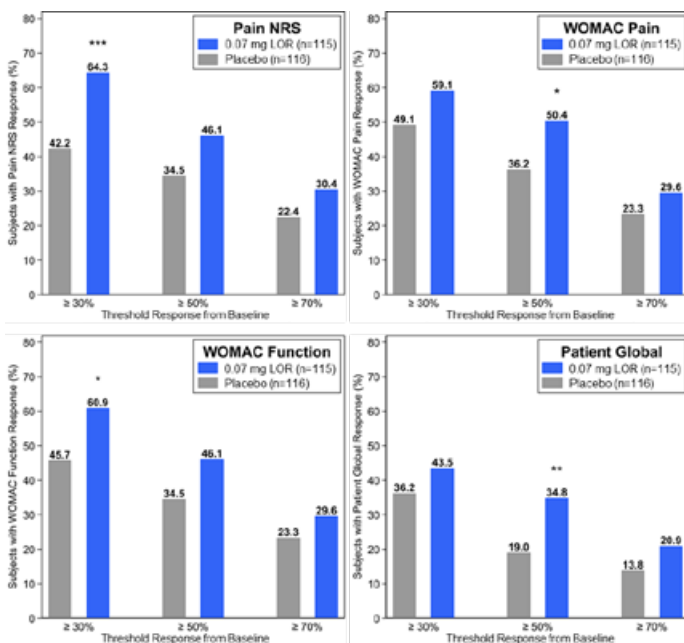
Logistic regression of LOR versus placebo using the FAS (Full Analysis Set, all dosed subjects) and non-responder imputation. *P<0.05, **P<0.01, ***P<0.001

OC11

EFFICACY AND SAFETY OF AN INTRA-ARTICULAR INJECTION OF JTA-004, A NOVEL ENHANCED PROTEIN SOLUTION, IN KNEE OSTEOARTHRITIS PAIN: A RANDOMISED, DOUBLE-BLIND CONTROLLED PHASE II/III STUDY

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Objective: The objective was to assess the efficacy and safety of a single intra-articular administration of JTA-004, a novel protein solution in development for the treatment of knee osteoarthritis (OA) pain. 3 JTA-004 formulations were tested and compared to Hylan G-F 20 during a 6-month period.

Material and methods: In this prospective, multicentre, double-blind phase II/III trial (NCT02740231), 164 patients were randomly assigned to one of the three JTA-004 formulations or the reference treatment (Hylan G-F 20) in a 1:1:1:1 ratio. Patients were evaluated using Western Ontario McMaster Universities (WOMAC®) scores and Short-Form health survey (SF-12). The primary efficacy endpoint was the change from baseline at 6 months in WOMAC® VA3.1 Pain Subscale. Safety was assessed by monitoring and reporting vital signs, physical examination, adverse events and concomitant medications throughout the study.

Results: At 6 months, patients in the three JTA-004 groups showed a better improvement in pain compared to patients in the reference group. The between-group difference (between each JTA-004 test group and reference group) in adjusted (adapted to difference in baseline values) mean change in WOMAC® Pain Subscale Score from baseline ranged between 9.49 mm and -11.63 mm at 6 months post-injection. Statistical superiority of each JTA-004 formulation over Hylan G-F 20 was however not demonstrated (p-value between 0.052 and 0.141). As the three JTA-004 formulations had a similar efficacy in terms of pain reduction, a *post hoc* analysis was subsequently performed between the pooled JTA-004-treated patients and the reference group. This analysis showed a 26.1 ± 2.4 (adjusted mean ± SE) mm improvement in pain in the pooled JTA-004 group vs. 15.6 ± 4.1 mm in the reference group at 6 months, demonstrating a statistically significant superiority of JTA-004 over the reference (between-group difference = -10.57; p = 0.030).

All JTA-004 formulations were shown to be well tolerated and had a clinically acceptable safety profile.

Conclusions: This study provides a first evidence of efficacy and safety of JTA-004 in the treatment of knee OA pain. A subsequent larger pivotal phase III study involving 676 patients will be conducted to further confirm these promising findings.

OC12

CONFIRMED AND SEVERE SARCOPENIA BY EWGSOP2 PREDICT 10-YEAR FRACTURE RISK INDEPENDENT OF FRAX, FALLS AND BMD IN THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY: A META-ANALYSIS

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Aims: Having demonstrated that measures of physical function, but not DXA appendicular lean mass (ALM), are predictive of incident fracture, we investigated the predictive value of confirmed and severe sarcopenia, using the recent European Working Group on Sarcopenia in Older People (EWGSOP2) recommendations, for incident fracture, independent of femoral neck bone mineral density (FNBMD), FRAX 10-year fracture probability and prior falls.

Methods: In USA, Sweden and Hong Kong (HK) MrOS cohorts, we used an extension of Poisson regression to investigate relationships between sarcopenia (y/n) and incident major osteoporotic fracture (MOF: clinical vertebral, hip, wrist or proximal humerus). Confirmed sarcopenia was based on low DXA ALM/height^2 in combination with high chair stand time or low grip strength. Additional low gait speed constituted severe sarcopenia. Associations were adjusted for age and follow-up time, reported as hazard ratio (HR) for first incident MOF. Further analyses adjusted additionally for FRAX MOF probability, prior falls (y/n) or FNBMD T-score. Results were synthesized by meta-analysis.

Results: We studied 5660 men in USA, 2764 in Sweden and 1987 in HK; (mean ages 73.5, 75.4 and 72.4 years; mean follow-up time 10.9, 8.7 and 9.9 years; mean % incident MOF 10%, 16%, 7% respectively). Confirmed sarcopenia (prevalence=5.5% USA; 2.9% Sweden; 10.1% HK) was associated with incident MOF [HR: 1.82 (95%CI: 1.46, 2.27)]. Associations remained after adjustment for prior falls or FRAX probability. Adjustment for FNBMD T-score led to attenuation of the relationship: (HR:1.39; 95%CI:1.11, 1.75). In addition, severe sarcopenia (prevalence 0.5% USA; 0.6% Sweden; 3.6% HK) appeared more robustly associated with incident MOF [HR: 2.07 (95%CI: 1.28, 3.33)], and remained associated after each adjustment [e.g. with BMD T-score, HR: 1.80 (95%CI: 1.12, 2.91)].

Conclusions: The predictive value for fracture of EWGSOP2 sarcopenia definitions is reduced by inclusion of FN BMD T-score, but addition of low gait speed as the marker of severe sarcopenia yields a more robust predictive measure, albeit with lower prevalence. These findings further support the importance of physical performance measures in defining sarcopenia.

OC13
MUSCLE DENSITY, BUT NOT SIZE, CORRELATES WELL WITH MUSCLE PERFORMANCE

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OBJECTIVE: To determine the associations of handgrip strength (HGS) and the Timed Up and Go test (TUG) with muscle size and density of different muscle levels in healthy controls.

METHODS: 301 controls were enrolled in this study and recruited for QCT imaging of the lumber, hip and mid-thigh. We also test muscle strength (HGS) and physical performance (TUG). Gluteus maximus muscle(GMaxM) and gluteus medius/minimus muscle(GM/MinM), trunk muscle at vertebrae L2 level and mid-thigh muscle were measured for cross-sectional areas and attenuations. Health-related covariates included blood pressure, diabetes mellitus, fracture history, fast serum glucose and the EuroQol five-dimension score (EQ-5D).General linear models were fitted using method of least squares to evaluate associations of TUG and handgrip strength with muscle CSA and density.

RESULTS: None of the associations between muscle area and TUG was significant after adjustment for age, height and weight. The same result was observed in men for associations between muscle density and TUG. In contrast, in women gluteus maximus and trunk muscle density showed a significant association with TUG even after adjustment for age, height and weight, although slopes were rather small. Interestingly the slope was even negative in females (β -0.06, p =0.001, adjusted). In men but not in women muscle area of the gluteus maximus and of the mid-thigh were significantly associated with HGS but results were not significant for the trunk muscle. Gluteus maximus and trunk muscle density were significantly associated with HGS in men and women. Mid-thigh muscle density was significantly associated with HGS in men only.

CONCLUSION: Our study results show that muscle density performs better than muscle size in associating with muscle performance and seems to be as a surrogate for the role of physical performance as hip fracture risk factors.

OC14
THE MULTIDIMENSIONAL PROGNOSTIC INDEX PREDICTS FALLS IN OLDER PEOPLE: AN 8-YEAR LONGITUDINAL COHORT STUDY OF THE OSTEOARTHRITIS INITIATIVE

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OBJECTIVES: Falls are associated with several negative outcomes. Early identification of those who are at risk of falling is of importance in geriatrics, and comprehensive geriatric assessment (CGA) seems to be promising. Therefore, the present study investigated whether the multidimensional prognostic index (MPI), based on a standard CGA, is associated with falls in the Osteoarthritis Initiative (OAI).

MATERIALS AND METHODS: A standardized CGA including information on functional, nutritional, mood, comorbidities, medications, quality of life, and cohabitation status was used to calculate a modified version of the MPI, categorized as MPI-1 (low), MPI-2 (moderate), and MPI-3 (high risk). Falls were self-reported and recurrent fallers were defined as ≥2 in the previous year. Logistic regression was carried out and results are reported as odds ratio (ORs) with their 95% confidence intervals (CIs).

RESULTS: The final sample consisted of 885 older adults (mean age 71.3 years, female = 54.6%). Recurrent fallers showed a significant higher MPI than their counterparts (0.46 ± 0.17 vs 0.38 ± 0.16; P < .001). Compared with those in MPI-1 category, participants in MPI-2 (OR 2.13; 95% CI 1.53-2.94; P < .001) and in MPI-3 (OR 5.98; 95% CI 3.29-10.86; P < .001) reported a significant higher risk of recurrent falls over the 8-years of follow-up.

CONCLUSIONS: Higher MPI values at baseline were associated with an increased risk of recurrent falls, suggesting the importance of CGA in predicting falls in older people.

OC15

5-YEAR ADVERSE OUTCOMES OF SARCOPENIA DIAGNOSED ACCORDING TO SIX DIFFERENT DEFINITIONS

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Introduction: Six operational definitions are proposed by different working groups for the diagnosis of sarcopenia. We have previously shown, out of our SarcoPhAge study, that most of the sarcopenia definitions were significantly associated with deaths over a 3-year period, but not with physical disabilities and institutionalizations. Our aim is to compare, in the same cohort, the impact of using the 6 definitions on the prevalence and on the 5-years follow-up consequences of sarcopenia.

Methods: Sarcopenia was diagnosed according to: EWGSOP 1, IWGS, SSCWD, AWGS, FNHI and EWGSOP 2. Muscle mass was measured with DXA, muscle strength by hand dynamometer and physical performance by 4-m gait speed or the SPPB. Cox Proportional Hazard ratios were calculated for 5-year incidence of mortality, institutionalization, fracture, fall, or hospitalization during the 5-year follow-up period. Analyses were adjusted for age, sex, number of drugs and comorbidities, cognitive status and physical activity level.

Results: 534 older subjects were included at baseline (73 (68-78) years, with 321 (60.1%) women). The prevalence of sarcopenia differed depending on the definition used: 13.9% with EWGSOP1, 17.6% with IWGS, 8.6% with SSCWD, 7.9% with AWGS, 5.6% with FNHI and 4.5% with EWGSOP 2. A total of 481 participants were included in the analyses on the 5-year mortality and institutionalizations, 463 on fractures, 465 on hospitalizations and 459 on falls. Among them, 65 died, 10 were institutionalized, 54 had fractures, 240 were hospitalized and 191 fell. In multivariate analysis, a higher risk of mortality is observed when the diagnosis of sarcopenia was made with the EWGSOP 1 [HR of 2.12 (95% IC 1.12-4.03)] and the AWGS definitions [HR of 3.43 (95% IC 1.72-6.86)]. For EWGSOP 2, the smaller sample of sarcopenic individuals identified have impacted the statistical power of the study, and consequently the association was not significant [HR of 1.42 (95% IC 0.59-3.42)] but remained in the same range of those observed using the EWGSOP1. In subjects diagnosed with severe sarcopenia with EWGSOP 2, the association with 5-year mortality was not significant in the multivariate fully-adjusted model [HR of 2.18 (95% IC 0.88-5.40)], probably because of low statistical power, but these participants were at higher risk of experiencing at least one fracture at 5 years [3.76 (95% IC 1.08-13.05)]. Sarcopenia was not significantly associated with the 5-year incidence of institutionalization, fall and hospitalization regardless of the definition chosen.

Conclusion: In this sample, we found that sarcopenia diagnosed with EWGSOP 1 and AWGS and severe sarcopenia diagnosed with EWGSOP2 are associated with mortality and fracture respectively. However, the various definitions are leading to significantly different prevalences of sarcopenia, within the same population. This has to be taken into account in future researches.

OC16

LEVEL AND CHANGE IN SARCOPENIA COMPONENTS PREDICT ADVERSE HEALTH OUTCOMES: FINDINGS FROM THE HEALTH, AGING AND BODY COMPOSITION STUDY

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iology, and Sarcopenia Laboratory, Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University, Boston, United States

Objective: To examine level and change in muscle mass, strength and function in relation to risk of mortality, minor trauma fracture, hospital admission and falls among older people participating in the Health, Aging and Body Composition Study (USA).

Material and Methods: Analyses were based on 2902 men and women, aged 70-79 years at baseline (1997-8). Appendicular lean mass (ALM) was ascertained using DXA; muscle strength by grip dynamometry; and muscle function by gait speed. Exposures were mean level of each characteristic and change in age-specific z-scores (characterised by linear mixed models) between baseline and 5-year follow-up. These were examined as predictors of mortality, self-reported and adjudicated hospital admission and minor trauma fracture, and self-reported falls in the subsequent decade using sex-adjusted time-to-first event Cox regression with or without adjustment for potential confounders.

Results: Mean(SD) baseline grip strength, gait speed and ALM was 32.7(10.6) kg, 1.1(0.2) m/s and 20.1(5.0) kg respectively; annual percentage declines were 1.3(3.4), 1.3(3.8) and 0.7(1.1). The proportion experiencing each outcome was: death (64%), minor trauma fracture (15%); hospital admission (83%); and falls (71%). Lower grip strength and gait speed were associated with increased risk of all outcomes (p<0.03); lower ALM only predicted mortality and minor trauma fracture (p<0.03). Greater declines in grip strength, gait speed and ALM were related to increased risk of mortality and hospital admission (p<0.01); declines in gait speed and ALM also predicted falls (p<0.01). Hazard ratios for mortality, hospital admission and falls per SD greater decline in gait speed, adjusted for sociodemographic and lifestyle factors, were 1.18(95%CI:1.13,1.24), 1.15(1.11,1.21) and 1.12(1.07,1.18) respectively. Sex-adjusted models for level and change in grip strength and ALM each explained 4% of the variation for mortality; values for gait speed level and change were 12% and 4% respectively.

Conclusion: Lower levels and greater declines in muscle mass, strength and function were associated with increased risk of adverse health outcomes. This suggests that interventions to maximize peak levels in earlier life, and to reduce rates of age-related decline, may reduce the burden of disease in this age group.

OC17
RELATIONSHIP BETWEEN OBESITY AND RISK OF MAJOR OSTEOPOROTIC FRACTURE IN POSTMENOPAUSAL WOMEN: TAKING FRAILTY INTO CONSIDERATION

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Background: The role of obesity in fracture risk remains to be uncertain and inconclusive in postmenopausal women. Our study aimed to assess the relationship between obesity and risk of major osteoporotic fracture (MOF; i.e., a clinical fracture of upper arm or shoulder, hip, spine, or wrist) in postmenopausal women, after taking frailty into consideration.

Methods: We used the data from the Global Longitudinal Study of Osteoporosis in Women (GLOW) 5-year Hamilton cohort for this study. Frailty was measured by a frailty index (FI) of deficit accumulation at baseline. We incorporated an interaction term (obesity x FI) in the Cox proportional hazards regression model.

Results: We included 3985 women (mean age: 69.4 years) for analyses, among which 29% were obese (n = 1118). There were 200 (5.02%) MOF events documented during follow-up: 48 (4.29%) in obese women and 152 (5.65%) in the nonobese group. Significant relationships between obesity, frailty and MOF risk was found: HR = 0.72 (95% CI: 0.67 - 0.78) for obesity, and HR = 1.34 (95% CI: 1.11 - 1.62) per-SD increase in the FI. The interaction term was also significant: HR = 1.16 (95% CI: 1.02 - 1.34) per-SD increase. Increased HRs were found with higher FIs regarding the relationship between obesity and MOF risk, indicating increasing frailty attenuated the protective effect of obesity (Figure 1 below).

Conclusions: After taking frailty into consideration, obesity was significantly associated with decreased risk of MOF in postmenopausal women, but frailty modifies the propensity of obesity towards decreased fracture risk. Evaluating frailty status may aid in understanding of the complex relationship between obesity and fracture risk.
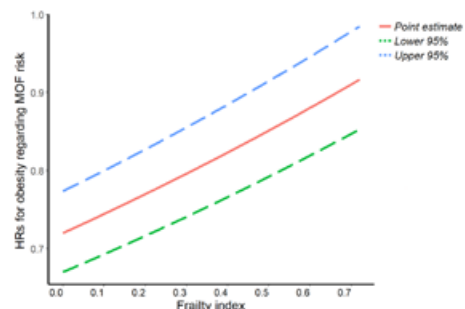

Figure 1. Different HRs for obesity regarding the MOF risk at different levels of the FI

OC18
IDENTIFICATION OF THE MOST IMPORTANT FEATURES OF KNEE OSTEOARTHRITIS PROGRESSORS USING MACHINE LEARNING METHODS

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ABSTRACT

Objective: We still lack robust prediction models that are able to guide clinical decisions and stratify osteoarthritis (OA) patients according to risk of disease progression. This study aimed at identifying the most important features of knee OA progressors. To this end, we used machine learning (ML) algorithms on a large set of subjects and features to develop advanced prediction models that provide high classification and prediction performance.

Methods: Participants, features and outcomes were from the Osteoarthritis Initiative. Features were from baseline (1107), including articular knee tissues (135) assessed by quantitative MRI. OA progressors were ascertained by four outcomes: cartilage volume loss in medial plateau at 48 and 96 months (Prop_CV_48M, 96M); Kellgren-Lawrence (KL) grade ≥2; and medial joint space narrowing (JSN) ≥1 at 48 months. Six feature selection models were used to identify the common features in each outcome. Six classification methods were applied to measure the accuracy of the selected features in classifying the subjects into progressors and non-progressors. Classification of the best features was done using auto-ML interface and the area under the curve (AUC). To prioritize the top features, Sparse Partial Least Square (sPLS) method was used.

Results: For the classification of the best common features in each outcome, Multi-Layer Perceptron (MLP) achieved the highest AUC in Prop_CV_96M, KL, and JSN (0.80, 0.88, 0.95), and Gradient Boosting Machine (GBM) for Prop_CV_48M (0.70). sPLS revealed that the baseline top five features to predict knee OA progressors are the joint space width (JSW), mean cartilage thickness of peripheral, medial, and central tibial plateau, and JSN.

Conclusion: This is the first time that such a comprehensive study was performed for identifying the best features and classification methods for knee OA progressors. Data revealed that early prediction of knee OA progression can be done with high accuracy and based on only a few features. This study identifies the baseline X-ray and MRI-based features and the most important for predicting knee OA progressors. These results could be used for the development of a tool enabling prediction of knee OA progressors.

OC19
RESVERATROL BENEFITS BONE HEALTH IN POSTMENOPAUSAL WOMEN – OUTCOMES OF THE TWO-YEAR RESHAW TRIAL

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Objective: To evaluate the effect of 12 months of resveratrol (RES) supplementation on bone mineral density (BMD) in postmenopausal women.

Methods: RESHAW (Resveratrol Supporting Healthy Ageing in Women) is the largest (146 participants) and longest (2 years) trial of RES supplementation undertaken in postmenopausal women (mean age 64 years). Participants were randomised to RES (75mg twice daily, >98% *trans*-resveratrol) or placebo for 12 months, after which they crossed over to the alternate supplement for a further 12 months. Before and after each phase, we assessed bone mineral density in the hips and lumbar spine (by DEXA) and the bone resorption marker, C-terminal telopeptide type-1 collagen (CTX).

Results: Following 12 months of RES, lumbar spine BMD increased by 1.5% compared to placebo, equating to an 18% improvement in t-score (P=0.005). RES reduced the loss of BMD in the femoral neck, resulting in a 12% improvement in FRAX t-score (P<0.001), a 36% reduction in hip fracture risk (P=0.040) and a 9% reduction in the 10-year risk of a major osteoporotic fracture (P=0.052). These results were confirmed by the within-individual comparisons from the 2 x 12-month analysis wherein BMD increased in both the femoral neck (P=0.040) and total femur (P=0.035) compared to placebo, and this was accompanied by a 7.3% reduction in plasma CTX (P=0.025). Our sub-analysis of responses to RES supplementation revealed a relative increase of BMD in the femoral neck and reduction in CTX levels in older women (≥65 years) compared to women at mid-life (45-64 years).

Conclusion: This is the first study demonstrating benefits of RES supplementation for older women at least 10 years postmenopausal who are at heightened risk of osteoporotic fractures and for whom the health risks of initiating hormone replacement therapy outweigh any bone protective benefits.

OC20
GEOGRAPHICAL ASSESSMENT OF BONE MINERAL DENSITY WITH RELUGOLIX COMBINATION THERAPY: RESULTS FROM THE PHASE 3 LIBERTY PROGRAM

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Objectives: In phase 3 LIBERTY 1 and 2 studies, once-daily relugolix combination therapy (Relugolix-CT [relugolix 40 mg, estradiol (E2) 1.0 mg, norethindrone acetate (NETA) 0.5 mg]) significantly reduced menstrual blood loss (MBL) in women with heavy menstrual bleeding associated with uterine fibroids (UF).[1] We assessed whether there was geographical variation in skeletal response to Relugolix-CT.

Materials and Methods: Premenopausal women (age 18–50 years) with heavy menstrual bleeding (MBL volume ≥ 80 mL/cycle) were randomized (1:1:1) to receive Relugolix-CT for 24 weeks, relugolix 40 mg alone for 12 weeks followed by Relugolix-CT for 12 weeks (delayed Relugolix-CT), or placebo for 24 weeks. Randomization was stratified by geographical region (North America vs Rest of World) and baseline MBL volume (< 225 vs ≥ 225 mL). Bone mineral density (BMD) by dual energy X-ray absorptiometry of the lumbar spine (LS) (L1–4) was assessed at screening and Weeks 12 and 24. Percent change in BMD from baseline was summarized by treatment group.

Results: In pooled LIBERTY studies (N: 768), mean % changes from baseline at 24 weeks in LS BMD for Relugolix-CT, placebo, and delayed Relugolix CT were -0.233, 0.184, and -1.972%, respectively. When evaluated by region, results were consistent in EU/South America/ South Africa: -0.346, 0.088, and -2.707% and in North America: -0.192, 0.164, and -1.844%, respectively (Table).

		Changes in lumbar spine BMD at 12 and 24 weeks	
	N	12 weeks	24 weeks
Total Cohort			
Placebo	256	0.342%	0.184%
Relugolix + E2/NETA	254	-0.626%	-0.233%
Relugolix → Relugolix + E2/NETA	258	-1.961%	-1.972%
EU, South American, South Africa			
Placebo	46	0.492%	0.088%
Relugolix + E2/NETA	51	-0.054%	-0.346%
Relugolix → Relugolix + E2/NETA	49	-2.070%	-2.707%
North American (United States)			
Placebo	161	0.262%	0.164%
Relugolix + E2/NETA	153	-0.888%	-0.192%
Relugolix → Relugolix + E2/NETA	149	-1.965%	-1.844%

Conclusions: Compared to relugolix alone, Relugolix-CT preserves bone mass in the lumbar spine over 24 weeks. Geographic differences in skeletal response were not observed, demonstrating consistent results across different ranges and populations. Initiating treatment for UF with relugolix combined with E2/NETA represents a potential method for preserving BMD while providing therapeutic benefit over the long-term.

Reference

1. Al-Hendy et al., ASRM 2019

Disclosures: Consulting fees: MM,AH, Myovant; RV, IBSA; MM, Amgen; AH, Abbvie, Bayer, MD stem cells. Myovant employee, stock, RBW, LM, JL.

OC21

VITAMIN D SUPPLEMENTATION IN PREGNANCY RESULTS IN GREATER OFFSPRING BONE MASS AT 4 YEARS: FINDINGS FROM THE MAVIDOS TRIAL

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Objectives: In the multi-centre MAVIDOS trial, pregnancy vitamin D supplementation increased neonatal bone mass amongst winter-born babies. We aimed to ascertain whether this effect is sustained into later childhood, and have now assessed bone indices at 4 years old in the Southampton participants.

Materials and Methods: In Southampton, Oxford and Sheffield, in a double-blind design, 1134 pregnant women were randomised to 1000 IU/day cholecalciferol or matched placebo from 14 weeks gestation to birth. At age 4 years (Southampton participants only, n=723 births), offspring assessments included anthropometry, whole-body dual-energy x-ray absorptiometry (DXA) [Hologic Horizon, yielding whole body less head (WBLH) bone mineral content (BMC), bone mineral density (BMD), bone area (BA) and lean mass (LM)], and a maternal questionnaire. Linear regression was used to estimate the mean difference (represented by β) in outcomes between the two randomisation arms, adjusted for sex, and age at DXA. Additional adjustment for gestational age, maternal early pregnancy BMI and the child's milk intake was performed in further models. Outcomes were standardised to a standard deviation scale, for ease of comparison.

Results: 564 children attended the 4-year visit; 452 had a useable DXA with minimal movement artefact. Maternal pregnancy vitamin D supplementation led to greater offspring indices of bone mass compared with placebo, irrespective of season, for example WBLH BMD at age 4 years, [supplemented group, 0.477 (95% CI: 0.472,0.481) g/cm^2; placebo group 0.470 (0.466,0.475) g/cm^2; β=0.18 (0.00,0.35) SD p=0.047], and evidence of associated greater LM [supplemented group, 9.25 (9.08,9.42) kg; placebo group 9.01 (8.83,9.18) kg; β=0.15 (-0.02, 0.31) SD p=0.081]. Associations were consistent for lumbar spine indices, for BA and BMC, and in the fully adjusted models. No differences in child height, weight or BMI were observed between groups.

Conclusions: This is the first ever demonstration, in a large placebo-controlled, double-blind randomised trial, that maternal pregnancy vitamin D supplementation leads to sustained improvement in offspring bone and muscle mass, informing public health approaches for the prevention of fractures.

OC22

SUPERIOR EFFICACY OF CALCIFEDIOL SOFT GELATIN CAPSULES VS CHOLECALCIFEROL FOR THE MANAGEMENT OF VITAMIN D DEFICIENCY IN POSTMENOPAUSAL WOMEN: A TREATMENT TO BE CONSIDERED IN THERAPEUTIC GUIDELINES

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Objective: To assess the efficacy of calcifediol in the treatment of vitamin D deficiency, compared with therapeutic guidelines recommendations for cholecalciferol in postmenopausal women.

Material and Methods: Phase III-IV, double blind, randomised, controlled, multicentre superiority clinical trial. Postmenopausal women with baseline levels of 25(OH)D < 20 ng/mL were randomised to three arms: 266 mcg of calcifediol/month for 4 or 12 months (standard and test regime), or to cholecalciferol 25000 IU/month for 12 months (as per therapeutic guidelines).

Results from an interim analysis - performed upon completion of month 4 visit by 100% of evaluable patients - are presented and reported without unblinding the study treatments. Both calcifediol groups are summarised for analysis.

The trial has been approved by the corresponding ethics committees and national competent authorities.

Results: 298 women were included in the ITT analysis. The average age was 63.4 ± 8.2 years, 10.7% had osteoporosis and received treatment, mean BMI was 29.3 ± 6 kg/m^{2}, 25% of the population had basal 25(OH)D levels <10ng/mL. All demographic characteristics and risk factors for osteoporosis were balanced amongst groups.

When analysing per treatment group,13.5% and 35% of women in the calcifediol group reached values of 25(OH)D > 30ng/mL at 1 and 4 months when compared to 0% and 8.2% respectively in the cholecalciferol group (p<0.01).

The mean change in ng/mL (Table 1) when compared to baseline was 14.9 ± 8.1 with calcifediol and 9.9 ± 5.7 with cholecalciferol (p<0.01).

No relevant safety issues were reported for the present analysis.

Table 1: Variation of mean 25(OH)D levels

	Calcifediol (n= 200)	Cholecalciferol (n = 98)	p
Baseline	12.8 ± 3.9	13.2 ± 3.7	-
Month 1	22.6 ± 7.8	18.4 ± 4.0	<0.001
Month 4	27.8± 9.0	23.1 ± 5.4	<0.001

Conclusions: Calcifediol shows a greater efficacy than cholecalciferol regime (as recommended in therapeutic guidelines), for the treatment of vitamin D deficiency in postmenopausal women. Cholecalciferol fails to achieve recommended levels in a significant proportion of this population.

OC23

PERIOSTEAL EXPANSION DOES NOT COMPENSATE LOSS OF BONE STRENGTH CAUSED BY ENDOSTEAL RESORPTION WITH AGING: A LONGITUDINAL HR-PQCT STUDY WITH 3D-REGISTRATION FROM THE GERICO COHORT

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Introduction: Age-related bone loss is classically associated with accelerated bone resorption at the trabecular and endocortical bone surfaces. Meanwhile, periosteal expansion has been proposed as a mechanical compensation to increase bone strength in response to endosteal bone loss. However, this concept has never been investigated in longitudinal studies, neither has the association with changes in bone strength.

Methods: Bone mineral density and microstructure at distal radius and tibia were assessed by high resolution peripheral quantitative computed tomography (HR-pQCT), and bone strength by micro-finite element analysis, at baseline and after 3.2 ± 0.4 years, in 303 postmenopausal women (80%) and men (20%) (age 65.0 ± 1.4 years) from the Geneva Retirees Cohort. An advanced 3D rigid registration technique was used to obtain a highly sensitive quantification of the net periosteal and endosteal volumes changes between the two HR-pQCT assessments.

Results: Cortical volume (Ct.V) and failure load (FL) decreased over time both at the radius and tibia (Ct.V, -3.0 ± 3.4% and − 1.7 ± 3.4%; FL -3.0 ± 5.0% and -0.6 ± 4.6% , respectively). Changes in failure load were negatively correlated with net endocortical resorption at the radius (r=-0.23, p<0.001) and tibia (r=-0.36, p<0.001). In contrast, net periosteal apposition was positively associated with net endocortical resorption at the radius (r=0.62, p<0.001) and tibia (r=0.33, p<0.001), but not with changes in failure load (r=0.02, p=0.688; r=0.03, p=0.584, respectively).

Conclusion: Periosteal and endocortical changes with aging are partially correlated, but changes of bone strength with ageing result predominantly from endocortical bone loss which is only partially compensated by periosteal expansion. These new data on the respective contribution of bone modeling and remodeling on changes in bone strength with ageing need to be confirmed in larger cohorts.

OC24

MEASURES OF MUSCLE ADIPOSITY, BUT NOT MUSCLE CROSS-SECTIONAL AREA, PREDICT FRACTURES INDEPENDENT OF FRAX, FALLS AND BMD IN THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY

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Aims: DXA appendicular lean mass (as an estimate of muscle mass) is poorly associated with incident fractures after adjustment for bone mineral density (BMD). We investigated the predictive value of muscle measures from peripheral quantitative (pQ)CT for incident fractures, controlling for BMD, FRAX 10-year fracture probability or prior falls.

Methods: In the US MrOS cohort, we used an extension of Poisson regression to investigate relationships between muscle measures from pQCT at the 66% tibia (Stratec XCT2000/3000; muscle cross-sectional area (CSA), muscle density and intramuscular fat area) and incident major osteoporotic fracture (MOF: clinical vertebral, hip, wrist or proximal humerus). Associations were adjusted for age and follow-up time, reported as hazard ratio (HR/SD increase in the exposure) for first incident MOF. Further analyses adjusted additionally for FRAX MOF probability, prior falls (y/n) or femoral neck BMD T-score.

Results: We studied 1008 men [mean (SD) age: 77.0 (5.1) years], followed for a mean(SD) 7.1(2.8) years until MOF (n=68 fractures). In models adjusted for age and follow-up time, there were no statistically significant associations between muscle CSA, density or intramuscular fat area, and risk of MOF. The pattern of relationships was not materially changed by adjustment for prior falls or FRAX probability. In contrast, after inclusion of femoral neck BMD T-score, greater intramuscular fat area was predictive of greater MOF risk [HR/SD: 1.49 (95%CI:1.17,1.90)], and higher muscle density was associated with lower MOF risk [HR/SD: 0.76 (95%CI: 0.59,0.98)].

Conclusions: pQCT measures of muscle adiposity [intramuscular fat area (positive) and muscle density (negative)], but not muscle cross-sectional area, were associated with an increased risk of incident major osteoporotic fractures only after adjustment for femoral neck BMD T-score. These findings demonstrate the complex interplay between muscle, fat and bone tissue in fracture risk.

OC25

A NEW PREDICTION TOOL BASED ON ELECTRONIC MEDICAL RECORDS DATA TO ASSESS IMMINENT HIP FRACTURE RISK IN SECONDARY FRACTURE PREVENTION: A COHORT ANALYSIS INCLUDING OVER 700,000 PATIENTS FROM DENMARK, SPAIN AND THE UK

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Objective: There is a scarcity of clinical tools to estimate imminent (1-year) Fx risk amongst recently fractured subjects. We have developed and externally validated a tool to predict the imminent hip Fx risk in the year following a first fragility Fx.

Methods: Patients with a first recorded Fx at age 50 or over were identified in primary care records from Catalonia (SIDIAP) and the UK (CPRD), and in the Danish Health Registers (DHR). SIDIAP participants were split in a training (80%) and test (20%) datasets. A total of 46 potential predictors were identified from previous literature. LASSO was used to select key predictors, and combined in a prediction tool using logistic regression. The model was internally (test set) and externally (CPRD and DHR) validated in terms of discrimination (area under ROC curve [AUC]) and calibration (observed vs predicted stratified by age and gender). Intercepts were recalibrated in CPRD and DHR to account for differences in baseline risk.

Results: The SIDIAP training/test datasets included 39,282/9,820 patients, with 310 (0.8%)/80 (0.8%) sustaining a hip Fx in the following year. CPRD and DHR contributed 148,077 and 509,551 participants and 10,814 and 12,713 hip Fx, respectively.

The final validated tool included 7 predictors (Table 1) and had an AUC of 0.78 with good calibration. External validation in CPRD and DHR showed AUC of 0.71 and 0.70, respectively.

Conclusions: We have developed and validated a prediction tool for the estimation of imminent hip Fx risk amongst patients who have just suffered their first Fx. The resulting tool has great predictive validity (discrimination and calibration) in three large real-world European populations.

Disclosures: all disclosures are outside the submitted work.

Table 1. Predictors (OR (95% CI)) for the Imminent Hip Fx tool

Variables	OR	Low 95%CI	High 95%CI
Age (years)	1.08	1.07	1.09
Sex (Male)	0.73	0.55	0.96
Dementia diagnosis	1.53	1.14	2.06
Diabetes without complications	1.29	1.01	1.66
Proton pump inhibitors use	1.21	0.96	1.53
Renal disease	1.18	0.86	1.62
Cardiovascular disease	1.11	0.85	1.44
Abbreviations: OR, Odds Ratio; CI, Confidence interval.			

OC26
THE POTENTIAL FOR OPPORTUNISTIC IDENTIFICATION OF VERTEBRAL FRACTURES IN PATIENTS UNDERGOING A CT SCAN AS PART OF DAILY CLINICAL PRACTICE: A DESCRIPTIVE STUDY USING REGISTRY DATA

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Objective: The individual and societal benefits of opportunistic screening for vertebral fractures using CT scans performed as part of daily clinical practice (*routine CT*) will be dependent not only on the diagnostic performance of the method but also on the proportion of referrals who have already been diagnosed with vertebral fractures and/or treated for osteoporosis. The purpose of this scoping analysis was to assess the potential for opportunistic screening for vertebral fractures in patients undergoing a routine CT.

Materials and methods: 2,000 consecutive men and women, aged ≥50 years, undergoing a CT of the thorax, abdomen and/or pelvis from 1st January 2010 at Holbæk Hospital, Denmark. These patients were matched 1:3 on age and gender against a randomly drawn background population cohort from the same geographic region and year. Data were retrieved from Danish health and prescription registers.

Results:

	CT scan population (n=2,000)	Background population controls (n=5,923)
Age, mean (years)	70.2	70.3
Gender, % men	51.6	51.5
Medical history, %[1]		
Vertebral fracture	1.5	0.6
Major osteoporotic fracture	14.2	11.7
Osteoporosis	3.5	3.0
Medications, %		
Current AOM[2]	6.1	4.0
Prior AOM[3]	14.0	10.8
Current corticosteroids[2]	14.6	6.9

AOM, anti-osteoporosis medication. [1] using hospital ICD-10 diagnosis codes from 1994 or later; [2] in the year prior to the year of the index scan; [3] from 1995 or later

Conclusion: Patients undergoing a routine CT scan of the thorax, abdomen and/or pelvis have a low prevalence of already recognized prior vertebral fractures, diagnosed osteoporosis, and current AOM treatment, although higher than in a matched background population comparator cohort. With vertebral fractures estimated to be prevalent in up to 1 in 4 men and women aged 50 years or older[1], these results indicate a significant potential for opportunistic identification of vertebral fractures using routine CT scans.

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JN, FL and CL: Employees of UCB pharma.

CDS and KRO: No disclosures.

OC27

A CLINICAL TOOL FOR AUTOMATED PREDICTION OF HIP AND MAJOR OSTEOPOROTIC AT FIVE- AND ONE-YEARS FRACTURES USING ELECTRONIC MEDICAL RECORDS DATA: THE EPIC STUDY

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Objectives: Increasing availability of patient data in healthcare is an unprecedented opportunity for creating prediction tools that can be automatically implemented in electronic medical records system. We aimed to develop and validate a fracture prediction tool that leverages patient data as routinely available in primary care computerized records.

Methods: Population-based cohort study. Data was extracted from all subjects ≥ 50 years old registered in the SIDIAP database on 1/1/2012, with data for 1+ years. SIDIAP contains primary care records linked to pharmacy dispensations for >6 million people (>80% Catalonian population). Participants were followed up until the earliest of death, transfer out/migration, or end of 2017.

A model was developed to predict hip fracture and major osteoporotic fracture risk at 1 and 5 years. Potential predictors were pre-specified based on previous literature and combined in Cox models to derive prediction tools. Bootstrapping methods were used to select key predictors to be combined in the final resulting models. Internal validation was performed on a reserved 20% random sample, using c-statistic for discrimination, and observed vs predicted plots for calibration.

Results: A total of 1.76 million people were included (1.41M development cohort and 0.35M validation cohort), 50.7% women, of average age 65.4 years.

Fracture rates were 3.57/1,000 person-years for hip and 11.61 for major fracture. Key predictors of increased fracture risk included age, female gender, history of falls or previous fractures, specific medication/s use (insulin, GnRH inhibitors, anticonvulsants, sedatives, SSRI, antipsychotics), and a history of diabetes mellitus (type 1>type 2), cerebrovascular disease, ischemic heart disease,

COPD and anorexia nervosa. Variables associated with lower fracture risk included use of statins, thiazide diuretics, and overweight/obesity.

Combined, these resulted in a c-statistic of 85% for hip and 84% for major fracture at 5 years and 85% and 72% at one year. Calibration was excellent for both outcomes and time points.

Conclusions: We have developed and validated a clinical prediction tool for hip and major osteoporotic fracture risks, with an excellent performance. This tool can be installed in electronic primary care records systems for automated risk calculations at the population level. More research is needed on the transportability and external validity of this tool.

OC28

HIGH RISK OF HIP FRACTURE AND HIP FRACTURES SAVED IN THE SCOOP STUDY

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Objective: The SCOOP study compared usual care to a FRAX-based screening strategy, whereby anti-osteoporosis treatments were targeted to women age 70-85 years at high risk of hip fracture. In the screening arm, 14.6% of the women were allocated to the high risk group. Over the course of 5 years, screening prevented 54 hip fractures compared with usual care (p=0.002). The present analysis examined the pattern of prevented hip fractures using observed (O) and expected (E) hip fracture rates.

Materials and Methods: Five-year probabilities of hip fracture were calculated, without the inclusion of femoral neck BMD, using an adaptation of the FRAX UK model.

Results: In the 6250 women in the usual care arm, a total of 212 women with incident hip fractures were expected, with a total of 218 fractures actually observed (O/E 1.03, 95% 0.90-1.18). In the 6233 women in the screening arm, 212 women with incident hip fractures were also expected, but only 164 were observed (O/E 0.77, 95% 0.66-0.90), a reduction of 48 hip fractures. Within the screening arm alone, 142 hip fractures were expected in the 5335 women (rate 2.7%) deemed not to be at high risk of hip fracture, with 125 hip fractures observed (O/E 0.88, 95% 0.73-1.05). In contrast, in the 898 women categorised at high risk and recommended for treatment, 70 hip fractures were expected (rate 7.8%) but only 39 were observed ((O/E 0.56, 95% 0.40-0.77).

Conclusion: Screening by FRAX hip fracture probability is associated with a significant reduction in hip fractures. The trend for a small non-significant reduction in those not deemed at high risk may infer an independent effect of screening on hip fracture risk, though this requires further exploration. However, the majority

of hip fractures prevented in SCOOP arose from the women designated to be high risk and recommended for anti-osteoporosis treatment. These results support the use of FRAX as a gateway for screening in women age 70 years or more.

OC29
BONE MICROARCHITECTURE OR AREAL BONE MINERAL DENSITY FOR DISCRIMINATION OF VERTEBRAL DEFORMITY IN OLDER ADULTS: A CROSS-SECTIONAL STUDY

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Background: Both areal bone mineral density (aBMD) and bone microarchitecture have been associated with vertebral deformity (VD), but there are limited data on the utility of bone microarchitecture measures in combination with aBMD in discriminating VD. Objective: This study aimed to describe whether bone microarchitecture measures alone or in combinations with aBMD can improve discrimination of VD in older adults. Material and Methods: Data on 196 subjects (mean age (standard deviation, SD) =72 (7) years, female 46%) were utilized. VD of T4-L4 and spine aBMD were measured using dual-energy X-ray absorptiometry. VD was defined if anterior to posterior height ratio (Ha/Hp) was more than 3-SD, 4-SD below, or >25% decrease compared with the sex-matched normal means. Bone microarchitecture parameters at distal radius were collected using high-resolution peripheral computed tomography (HRpQCT) and analyzed using StrAx. Results: The strongest associations were seen for the cortical thickness (odds ratios (ORs): 2.63/SD decrease for 25% and 2.38/SD decrease for 3-SD criterion) and compact cortical area (OR: 3.33/SD decrease for 4-SD criterion). The area under the curve (AUC) for spine aBMD for VD was 0.594, 0.597 and 0.634 for 25%, 3-SD and 4-SD criteria, respectively (all P<0.05). Compact cortical area, cortical thickness and compact cortical thickness alone had the largest AUCs for VD (0.680-0.685 for 25% criterion, 0.659-0.674 for 3-SD criterion and 0.699-0.707 for 4-SD criterion). Adding spine aBMD or radial volumetric bone mineral density (vBMD) to each cortical measure did not improve VD discrimination (ΔAUC 0.8% to 2.1%). Conclusions: Cortical measures had the best utility for discriminating VD when used alone. Somewhat surprisingly, adding either spine aBMD or radial vBMD did not improve the utility of cortical measures.

OC30
NO NEGATIVE ASSOCIATIONS, AND EVEN SOME POSITIVE ONES, BETWEEN BONE MASS, MICROSTRUCTURE AND STRENGTH, AND DIETARY ACID LOAD IN A PROSPECTIVE COHORT OF COMMUNITY-DWELLING WOMEN AND MEN

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Background: According to the debated acid-ash theory, dietary acid load (DAL) may be a risk factor for osteoporosis. Studies on the association of DAL with bone mineral density (BMD) have, however, yielded inconclusive results. Bone microstructure (MS) and strength have not yet been evaluated in relation to DAL. In this cross-sectional and longitudinal study conducted in the Geneva Retirees Cohort (GERICO), we explored the associations between BMD, bone MS and strength, fracture risk, and DAL in postmenopausal women and men.

Methods: GERICO comprised healthy women and men aged 65±1 years at baseline. Potential renal acid load (PRAL) (mEq/d) was calculated as a DAL proxy from 3-day food records to characterise participants' diet as alkaline (ALK-D) (PRAL<-5), neutral (NEUT-D) (-5≤PRAL≤5) or acidic (ACID-D) (PRAL>5). Volumetric BMD and bone MS at the distal radius and tibia, and areal BMD (aBMD) were assessed by peripheral high-resolution quantitative computed tomography and dual-energy X-ray absorptiometry, respectively, at baseline (n=853, 79% women) and after 6.1±1.4 years of follow-up (n=695). Bone strength was assessed by micro-finite element analysis at baseline (n=850) and after 3.0±0.5 years (n=613). Prevalent and incident fractures were recorded.

Results: Fifty-nine, 23 and 18% of the participants had ALK-D, NEUT-D and ACID-D, respectively. Baseline BMD, bone MS and strength were non-different or even better in those with an ACID-D as compared with those with ALK and NEUT-D. Indeed, women with ACID-D had higher values of tibia trabecular MS, while men had greater hip and radius aBMD and bone strength. Women, but not men, with an ACID-D had lower cortical, endocortical and trabecular bone loss at the radius compared to those with ALK and/or NEUT-D, even after adjustment for covariates. In both sexes, the changes of peripheral bone strength and of bone traits at the tibia and spine did not differ in the 3 PRAL groups. There was no difference in prevalent and incident fractures.

Conclusions: The null or even positive associations observed between BMD, bone MS and strength, fractures, and DAL in this cohort of healthy individuals, do not support the hypothesis of DAL-mediated negative effects on bone as postulated by the acid-ash theory.

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OC31
FREQUENCY OF NORMAL DXA AND T-SCORE OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN WITH FRACTURE: A REGISTRY-BASED COHORT STUDY

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Purpose: Some women who sustain osteoporotic fracture have normal BMD and the majority do not have T-score osteoporosis. We hypothesized that adding trabecular bone score (TBS) to DXA would: 1) demonstrate that few women with fracture have normal bone, (normal T-score AND TBS) and 2) increase the proportion of women with fracture that have abnormal bone (T-score ≤ -2.5 or low TBS).

Methods: In Manitoba a public healthcare system anonymously links DXA data to population-based databases. This study included all women age 50+ with a 1st DXA from 2/1999 to 3/2018 for whom valid spine and hip DXA, TBS and fracture data were available. Abnormal vertebrae were excluded from T-score calculation following ISCD guidance. Fractures were defined as any fracture (excluding head/neck, hands/feet, ankle and those from high-trauma) within 5 years before (prior) or 5 years after DXA (incident). Bone status was defined as: Normal = T-score of spine, femoral neck and total femur ≥ -1.0 AND TBS >1.31; Abnormal = T-score ≤ -2.5 OR TBS < 1.23; and borderline = all others. Analyses were stratified by age decade, (50-59, 60-69, 70-79 and 80+ years).

Results: 4649 women fractured prior to index DXA; only 261 (6%) had normal bone. The prevalence of normal bone in those with prior fracture declined with age from 11% age 50-59 to 1% age 80+ (Cochran-Armitage p-trend <0.001). Of the 451 women with prior hip fracture, bone was normal in 4 (<1%). In those with incident fracture (2547 any, 391 hip) only 4% and 1% respectively had normal bone. In those with any incident fracture an age-related decline in normal bone (9% age 50-59 to 1% age 80; p-trend <0.001) was observed. T-score osteoporosis was present in 40% with any prior and 46% with any incident fracture (65% and 60% for prior and incident hip fracture, respectively). Including TBS increased the proportion with abnormal bone to 61% and 68% for any prior or incident fracture, and to 80% and 81% for prior or incident hip fractures, respectively (all p < 0.001).

Conclusion: Normal bone by DXA is rare in women with fracture when both BMD and TBS are considered. Including TBS increases identification of abnormal bone compared to BMD alone. Most fractures occur in postmenopausal women without T-score osteoporosis. Treating only those women with a T-score ≤-2.5 will result in many with subsequent fractures not receiving therapy.

OC32
THE RISK OF HIP AND NON-VERTEBRAL FRACTURES IN PARKINSON'S DISEASE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objectives: Parkinson's disease (PD) is a neurodegenerative disorder that is more prevalent in older individuals. Previous studies have suggested that PD patients have an increased risk of fractures compared to the general population, mainly due to falls. However, the risk has not been fully assessed. To assess the impact of PD on the risk of hip and non-vertebral fractures, we conducted a systematic review and meta-analysis.

Materials and methods: Comprehensive searches of three key bibliographic databases (Medline, Embase and Cochrane) were conducted to identify reviews and primary studies relating to the risk of fractures in patients with PD. An initial search (December 2017) was conducted to identify relevant systematic reviews as a source of primary data. Further focused searches were undertaken to identify additional primary studies published since the most recent systematic review conducted their searches on hip fractures. The searches for primary studies were performed in March 2018 with an update in 2019 (Medline only) and supplemented with additional search techniques. Search terms were based around Parkinson's disease and fractures. We selected observational studies with data on the risk of fractures in adults with PD compared to controls without a diagnosis for this disorder. Study quality was assessed using the Newcastle Ottawa Scale. We used the random-effects model to pool the results.

Results: Seventeen independent studies (14 cohorts and 3 case-controls), that involved 2,337,184 participants were included in the hip fracture analysis. Nine studies (all cohorts), that involved 1,363,910 people were included in the non-vertebral fracture analysis. Study quality was judged to be moderate to good. Overall, PD patients have an increased risk for both hip fractures (RR 2.40, 95% CI 2.04 to 2.82) and non-vertebral fractures (RR 1.80, 95% CI 1.60 to 2.01) compared to controls. The relative risk for hip fractures is higher in men (RR 2.93, 95% CI 2.05 to 4.18) than in women (RR 1.81, 95% CI 1.61 to 2.04). There were no effects of the study design, geographical region, or criteria for diagnosing Parkinson's disease on the hip fracture rate.

Conclusions: There is an increase in the risk of hip and non-vertebral fractures in patients with Parkinson's disease, with male patients with PD being more at risk of hip fractures than female patients.

OC33
MUSCLE DENSITY IS BETTER THAN BONE DENSITY IN THE DISCRIMINATION OF INCIDENT HIP FRACTURE: A PROPENSITY SCORE MATCHING STUDY

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Objective: To explore the value of muscle parameters for the discrimination of acute hip fractures and to compare discriminating capabilities with bone variables.

Methods: 438 low-energy acute hip fracture cases and 316 healthy controls from the China Action on Spine and Hip Status (CASH) study were included in the study. Muscle cross sectional area (CSA) and density were measured for the gluteus maximus (G.max) and gluteus medius and minimus (G.med/min). Areal BMD (aBMD) of the femoral neck (FN) and total hip (TH) were measured. Using propensity score matching (PSM), we generated two samples with cases and controls matched for age, BMI and sex. Logistic models were used to evaluate the odds ratio (OR) of fracture per SD increase of muscle and bone parameters.

Results: After PSM, 159 femoral neck fracture cases were matched with 159 non-fracture controls, and 101 intertrochanteric fracture cases with 101 controls. G.max muscle Hounsfield unit (HU) value (FN fracture: OR 0.39, CI% 0.28-0.54, TR fracture: OR 0.23, CI% 0.13-0.39) and G.med/min muscle HU value (FN fracture: OR 0.11, CI% 0.07-0.19, TR fracture: OR 0.05, CI% 0.02-0.13) were strongly associated with hip fracture after adjustment for FN aBMD. At both fracture sites G.med/min muscle density showed the best discrimination (AUC 0.882 for FN fractures, 0.945 for TR fractures) while G.max muscle density was equivalent to FN aBMD in discrimination of fractures and G.max muscle CSA was poorer than the other indices.

Conclusion: Muscle density performs better than aBMD and muscle size in the discrimination of hip fracture.

OC34
EFFICACY OF SYMPTOMATIC TREATMENTS FOR KNEE OA: A SYSTEMATIC REVIEW AND NETWORK META- ANALYSIS WITH A 6-MONTH TIME-HORIZON

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Introduction: Several pharmacological options claim their ability to better control the symptoms of knee OA but their respective efficacy is still debated. The purpose of this network meta-analysis (NMA) is to assess and to compare the potential benefit of different pharmacological treatments (given for at least 6 months) on pain and function, in patients suffering from knee OA

Methods: Studies were retrieved through a systematic review process in accordance with the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA). Medline (via Ovid), Scopus, and Cochrane database of systematic reviews (via Ovid) were searched for RCTs published up to August 2018, performed in adults (18 years and over) and which assess the efficacy of knee OA treatments. All pharmacological treatments, commonly prescribed or currently reviewed by the regulatory authorities, for the symptomatic relief of knee OA, including all routes of administration, were considered, providing they were given for at least 6 consecutive months. The primary outcomes were pain and function changes from baseline. A Bayesian network meta-analysis combining direct and indirect comparisons was run and Standardized mean differences (SMDs) and mean differences with 95% credibility intervals (95%CrIs) were calculated. A hierarchy of the competing interventions using the surface under the cumulative ranking curve (SUCRA) and mean ranks was obtained.

Results: 9349 references were identified from the search strategy and 92 were concordant with our inclusion criteria. Among them, 83 interventions were studied for pain and 59 for function. More than half of the studies were performed on participants aged 60 years and older and the mean duration of treatment across studies was 50 months. A significant association with decreased pain was found for Hyaluronic Acid (SMD -0.28, 95%CrIs -0.39;-0.17), Crystalline Glucosamine Sulfate (SMD -0.29, 95%CrIs -0.57;-0.01), the combination of Hyaluronic acid and Triamcinolone (SMD -0.39, 95%CrIs -0.75;-0.04), Vitamin D (SMD -0.31, 95%CrIs - 0.55;-0.06) and pharmaceutical-grade Chondroitin Sulfate (SMD -0.23, 95%CrIs -0.39;-0.07). For pain, the combination Hyaluronic Acid + Triamcinolone had the highest probability of being the most effective long- term treatment (SUCRA value of 0.79). Moreover, a significant improvement in physical function was observed following treatment with Crystalline Glucosamine Sulfate (SMD -0.44, 95%CrIs -0.66;-0.22), Tanezumab (SMD -0.39, 95%CrIs -0.73,-0.05, Acetaminophen (SMD -0.34, 95%CrIs -0.69,0.00), Vitamin D (SMD -0.30, 95%CrIs -0.84,-0.24) and Hyaluronic Acid (SMD -0.21, 95%CrIs -0.44,0.01). For function, Crystalline Glucosamine Sulfate has the highest probability of being the most effective long-term treatment (SUCRA value of 0.91).

Conclusion: A minimum of 6-month treatment with Hyaluronic Acid, Crystalline Glucosamine Sulfate, pharmaceutical- grade Chondroitin Sulfate, Tanezumab, Vitamin D, Acetaminophen or the combination of Hyaluronic Acid and triamcinolone, was shown, in this NMA, to improve pain and/or physical function in patients suffering from knee OA.

OC35
OSTEOGENESIS IMPERFECTA: FRACTURE CHARACTERISTICS DURING PREGNANCY AND POST-PARTUM

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Objectives: Pregnancy and post-partum are conditions associated with bone loss. Fracture occurrence during pregnancy and post-partum, and the determinants of these fractures, are not well known in Osteogenesis imperfecta (OI). The aim of this study was to characterize the fractures that occurred during pregnancy and the post-partum period in a cohort of women suffering from OI followed in Cochin Hospital or recruited through the French GRIO study group.

Materials and methods: Retrospective multicentric study including 29 OI patients from the Reference Center for Rare Bone Diseases of Cochin Hospital, Paris, and 21 patients included from other French Centers via the GRIO. A total of 50 patients, and 83 pregnancies, were included.

Results: Among the 50 OI patients included, 12 patients (24%) (14 pregnancies/83) had a fracture during pregnancy or in the 6 months following delivery. Among these patients, 2 presented fractures for 2 consecutive pregnancies, and 2 other patients presented fractures during pregnancy and also during the post-partum period. Therefore 16 pregnancy-related fracture events were analyzed. The localization of fractures were: spine (4/16), proximal femur (6/16), pelvis or ribs (3/16), ankle (1) and wrist (1). The mechanisms of fractures were: spontaneous (10/16), low trauma (3/16) and traumatic (3/16). Fractures during pregnancy occurred during the third trimester and those that occurred in the post-partum period occurred with a mean delay of 2 months from delivery.

Patients characteristics: OI women from this cohort had had 1 pregnancy in 52% of cases, 2 pregnancies in 34% and 3 pregnancies or more in 14%. Mean age was 32,7±3,1 in the fracture group, compared with 29,3±5,0 years-old in the non-fractured group (p=0.002). Patients had OI type 1 in 77.1% of cases, type III in 14.3% of cases, and other OI subtypes in 8.6%. All patients that displayed fractures in the post-partum period were breastfeeding, compared with 47% of patients with no fractures (p=0.03). Fracture during pregnancy or post-partum was not associated with the severity of OI including number of fractures during childhood, number of fractures after puberty, scoliosis or orthopedic surgery. Bisphosphonates had been administered in 17% of patients with

fractures compared with 24% with no pregnancy-related fractures (non significant). Bone mineral density was lower in patients with pregnancy-related fractures compared with other patients : spine Z-score -2.9±1.6DS vs -1,48±1,67 (p=0.03), and total hip Z-score -2,05±0,74 vs -0,53±1,36 (p=0.04). At least one concomitant osteoporosis inducing disease or risk factor was identified in 81.8% of fractured patients: smoking, spondyloarthritis, Crohn's disease, low vitamin D level, anorexia nervosa, or immobilization.

Conclusion: OI management during pregnancy and post-partum should aim for the optimal control of modifiable risk factors. Breastfeeding should be avoided especially in women with low bone mass or other risk factors.

OC36
TREATMENT INITIATION RATE POST HIP FRACTURE AS A KEY INDICATOR IN AN ORTHOPAEDIC FRACTURE LIAISON SERVICE.

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Objectives: One of the major key indicator of Fracture Liaison Services (FLS) success is initiation/continuation of anti-osteoporosis treatment (Osteoporosis Canada Guidelines). These clinical indicators have been proposed to help assess the performance of FLS for the secondary prevention of fragility fractures (FF). Our objective was to assess the success of the Lucky Bone™ FLS in the management of hip fractures.

Methods: A FLS was implemented in our orthopaedic wards for the management of men and women ≥ 50 years that sustained a hip fracture. Data was obtained from patients that were admitted for a hip fracture between April 1 st, 2019 and September 30th, 2019. Key indicators of efficiency were measured as proportions of patients with treatment initiation and continuation. Xrays were also screened for atypical femoral fractures (AFF).

Results: Sixty three subjects sustained a hip fracture during this time period (mean age of 82.4 (±10.3), 30.2% male). Fifty-six (56) of the hip fractures were FF (88.9%) and 2 were AFF (3.5%). Only 15 out of the 56 subjects were already under bisphosphonates treatment (26.8%), including both AFF patients. Twelve out of 15 (80%) were switched to denosumab. The combined treatment initiation or continuation rate was 71.4%. Both AFF were identified during the review, not at the time of the fracture.

Conclusion: The combined treatment initiation or continuation rate of the hip fracture patients in our FLS was 71.4%. These results demonstrate that our FLS is efficient. Most FLS on hip fractures are reporting a 60 to 80% FF identification rates and ≈ 46% treatment initiation rate. We also noted that the ≈30% of patients that were not initiated on treatment were the most at-risk for a subsequent fracture, including the oldest old, suffering of dementia or were polymedicated. Finally, AFF is still underdiagnosed in our orthopaedic department.

OC37

PHYSICAL PERFORMANCE TRAJECTORIES AND MORTALITY AMONG NURSING HOME RESIDENTS: THE RESULTS OF THE SENIOR COHORT

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Objectives: This study aimed to identify physical performance (PP) trajectories and their association with mortality among nursing home residents who were followed up for 3 years.

Material and Methods: A longitudinal analysis of the data from the SENIOR (Sample of Elderly Nursing home Individuals: an Observational Research) cohort was conducted. Baseline clinical characteristics (i.e., age, sex, body mass index, medical history, medication, civil status, educational attainment, cognitive status, depressive symptoms) and the date of death were collected from the medical records. PP was assessed annually by the Short Physical Performance Battery (SPPB) test. Multiple imputations were performed to manage the missing data. PP trajectory groups were estimated using latent growth curve analysis. The association between the baseline characteristics and trajectory groups was evaluated with multinomial logistic regressions. Cox proportional hazard regression models were applied to examine the risk of mortality according to the PP trajectory groups after adjustments were made for all baseline characteristics.

Results: A total of 604 nursing home residents with a mean age of 82.9 ± 9.1 years were included. Three PP trajectory groups were identified: slow decline (N=96), moderate decline (N=234) and fast decline (N=274). Subjects in the fast decline trajectory group were more likely to be older, female and widow(er)s, to have cognitive impairment, take more medications and have a more involved medical history. After adjustments were made for potential confounding variables and the baseline SPPB scores, the residents in the fast decline and moderate decline trajectory groups had an increased risk of mortality compared to those in the slow decline trajectory group, with HR values of 1.78 (95% CI=1.34-2.26) and 1.37 (95% CI=1.10-1.66), respectively.

Conclusions: PP trajectories provide value-added information to baseline geriatric assessments and could be used for predicting 3-year mortality among nursing home residents. It may be important to regularly monitor the SPPB score and signal an alert when a fast decline in PP is detected in older people.

OC38

LIFESTYLE, ANTHROPOMETRY, AND BONE HEALTH ACROSS THREE GENERATIONS OF THE HERTFORDSHIRE COHORT STUDY

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Objectives: The aim of this study was to explore associations between lifestyle, anthropometry, and bone density across three generations of the Hertfordshire Cohort Study (HCS).

Materials and Methods: Data from three generations of participants in the HCS [grandparents (F0), parents (F1), and children (F2)] were utilized to assess associations between lifestyle, BMI, and bone health across these generations. Questionnaire data were used to run linear regressions in generational pairs (n=461 from F0 to F1, n=188 from F1 to F2, and n=273 from F0 to F2) examining prudent diet score, alcohol consumption, smoking behaviour, and adult BMI. A subset of participants had dual-energy x-ray absorptiometry (DXA) scans, and to increase statistical power, these data were collapsed into parent and child pairs (n=60). Linear regressions examining parent-child associations in femoral neck and lumbar spine bone mineral density (BMD) z-scores were run, with adjustment for parent-child prudent diet score and adult BMI residuals. Results are presented B (95% confidence interval).

Results: Prudent diet score and adult BMI were significantly positively associated in all three generational pairs: F0 to F1 (Prudent diet score: 0.188 (0.079, 0.298); BMI: 0.316 (0.193, 0.439), F1 to F2 (Prudent diet score: 0.198, (0.004, 0.391); BMI: 0.217, (0.093, 0.341), and F0 to F2 (Prudent diet score: 0.376, (0.205, 0.546); BMI: 0.222, (0.105, 0.339). Generational associations were reported for alcohol consumption (F0 to F1) and smoking behaviour (F0 to F1 and F1 to F2). Femoral neck and lumbar spine BMD z-scores were significantly associated between parents and children, with associations remaining robust after adjustment (Femoral neck adjusted for diet: 0.400, (0.037, 0.764); Lumbar spine adjusted for diet: 0.553, (0.359, 0.747); Lumbar spine adjusted for BMI: 0.433, (0.173, 0.692).

Conclusion: Some, but not all, lifestyle factors were associated across three generations of the HCS. Significant associations of femoral neck and lumbar spine BMD between parents and children were robust to adjustment for lifestyle. Future studies in larger groups are now warranted.

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OC39
THE DIFFERENT DIAGNOSIS CRITERIA OF THE EWGSOP2 DEFINITION AND THEIR RELATIONSHIP WITH 5-YEAR ADVERSE CONSEQUENCES

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Introduction: The new definition of the EWGSOP (2019) offers several diagnostic criteria for assessing muscle mass, muscle strength, and physical performance. We aimed to measure the impact of using one or other criteria on the prevalence of sarcopenia.

Methods: We included participants of the SarcoPhAge (Sarcopenia and Physical Impairments with Advancing Age) study, a population-based Belgian cohort involving 534 participants aged 65 years and older. Muscle mass was measured with Dual-Energy X-Ray absorptiometry (we compared ASM with ASM/height²), muscle strength was measured both by Grip Strength using Jamar hydraulic hand-held dynamometer and the 5-times Chair Stand test, physical performance was measured by the 4-meter gait speed test, the Short Physical Performance Battery test (SPPB) and the Timed up and Go (TUG) test. Cox Proportional Hazard ratios were measured for 5-year incidence of mortality, institutionalization, and incidence of at least one fracture, fall, or hospitalization during the 5-year follow-up period. Analyses were adjusted for age, sex, number of drugs and comorbidities, cognitive status and physical activity level.

Results: The following prevalence of sarcopenia was found: 4.5% using ASM/height² + Grip Strength, 8.2% using ASM + Grip Strength, 9.0% using ASM/height² + Chair Stand and 14.2% using ASM + Chair Stand. The prevalence of severe sarcopenia varied from 1.1% (using the combined criteria of Chair Stand + ASM/height² + TUG) to 8.1% (using the combined criteria of Chair Stand + ASM + SPPB). Mortality data was analysed on 481 participants (53 lost-to-follow-up). Sarcopenia appears to be significantly associated with 5-year mortality only when the Grip Strength is considered as muscle strength measurement and nor with the Chair Stand test criteria. However, this relationship was no more significant in the multivariate fully-adjusted model. Regarding severe sarcopenia criteria, significant fully-adjusted HR of 3.01 (95%CI 1.7-6.60) was found for mortality using Grip Strength + ASM + gait speed criteria, HR of 2.87 (95% CI 1.23-6.68) was found using Grip Strength + ASM + SPPB criteria, HR of 2.61 (95% CI 1.09-6.25) was found using Grip Strength + ASM/heigt² + gait speed criteria and finally, HR of 2.68 (95% CI 1.04-6.93) was found using Grip Strength + ASM/heigt² + SPPB criteria. We never highlighted any predictive power of mortality when the Chair Stand test is used as measure of muscle strength or when the TUG is used as measure of physical performance. Regarding muscle mass, the use of ASM or ASM/height² seems however to have no specific impact on the predictive value of mortality. We did not find any association between one of the diagnostic criteria employed and 5-year incidence of fractures, hospitalization, institutionalization and falls.

Conclusion: Within a diagnosis of sarcopenia/severe sarcopenia, highlighted by our results, it could be justify to privilege Grip Strength to measure muscle strength and gait speed or SPPB test to measure physical performance. Indeed, as compared with Chair Stand test and TUG test, those former criteria seem more related to 5-year incidence of mortality.

OC40
COST-EFFECTIVENESS OF BINOSTO (BUFFERED SOLUBLE ALENDRONATE 70 MG) EFFERVESCENT TABLET FOR THE TREATMENT OF POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS IN ITALY

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Objective: To estimate the cost-effectiveness of Binosto (buffered soluble alendronate 70 mg) effervescent tablet compared to relevant alternative treatments for postmenopausal women with osteoporosis in Italy.
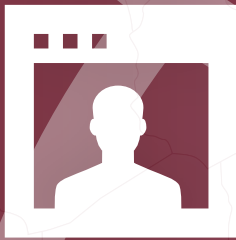
Methods: A previously validated Markov microsimulation model was adjusted to the Italian healthcare perspective to estimate the lifetime costs (expressed in €2019) per quality-adjusted life-years (QALY) of Binosto compared with generic alendronate, denosumab, zoledronic acid and no treatment. Pooled efficacy data for bisphosphonates derived from the NICE meta-analysis were used for bisphosphonate treatments and 1-year persistence of Binosto and alendronate was derived from a prospective observational study. Analyses were conducted for high-risk women 60-80 years of age with a bone mineral density (BMD) T-score ≤-3.0 or with existing vertebral fractures.

Results: In all of the simulated populations, Binosto was dominant (more QALYs, less costs) compared to denosumab. The cost per QALY gained of Binosto compared to generic alendronate and no treatment fall always below €20,000 per QALY gained. In women aged 75 years and older with prevalent vertebral fractures and in women aged 65 years and older with T-score ≤-3.0, Binosto was even shown to be dominant (more QALYs, less costs) compared to generic alendronate and no treatment. Zoledronic acid was associated with more QALY than Binosto but the cost per QALY gained of zoledronic acid compared to Binosto was always higher than €70,000 per QALY gained and thus not cost-effective.

Conclusion: This study provides the first economic analysis of an alendronate effervescent tablet, suggesting that Binosto represents a cost-effective strategy compared with generic alendronate, zolderonic acid and no treatment, and a dominant strategy compared to denosumab for the treatment of postmenopausal women with osteoporosis in Italy aged 60 years and over.

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Abstract Book

ESCEO Symposium Abstracts

ESCEO1
THE CONCEPT OF FOOD MATRIX COMPARED TO SINGLE NUTRIENTS

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Foods consist of a large number of different nutrients contained in a complex matrix structure. Traditionally evaluation of a food's impact on nutrient supply and health has been based on the content of individual nutrients such as proteins, fats, carbohydrates, etc. However, recent research shows that the health effects of a food product cannot be determined simply on the basis of the individual nutrients it contains and must be evaluated as a whole. The nature of the food structure and the nutrients therein (i.e. the food matrix) can determine nutrient digestion and absorption, thereby altering the overall nutritional properties of the food. As a result, the food matrix can lead to a different relationship with health indicators than would be interpreted from the single nutrients in isolation. An effect of the matrix is seen in a number of foods but the evidence for a dairy matrix effect is now convincing. For example, a number of studies comparing fat digestion in cheese with that in butter show that cheese leads to greater faecal fat excretion, in part due to the chemical association between fatty acids and calcium in the GIT[1]. The reduced fat absorbed leads to a moderated response in blood lipids. Also, the increasing evidence linking milk protein, casein in particular, with bone elongation highlights the benefit of the matrix of protein and calcium in the casein micelle[2]. In the future, diet assessment should consider the evidence on whole food effects alongside the evidence for individual nutrients.

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Potential conflicts of interest

ESCEO2
IMPORTANCE OF DAIRY MATRIX FOR SKELETAL HEALTH

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Dairy foods, such as milk, cheese and yoghurt feature on most dietary guidelines worldwide, being a principal source of calcium and protein that benefits skeletal health. Guidelines promote the consumption of dairy foods in various amounts throughout the lifecycle to support skeletal growth and development during childhood and adolescence, maintenance of bone during adulthood, and attenuation of bone loss in older adults. Dairy is also a good source of high-quality protein to promote muscle maintenance or growth. Avoidance of dairy foods in children is associated with increased fracture risk, while dairy supplementation is associated with greater bone mineral accrual during growth. Skeletal benefits of dairy supplementation have been observed in adults into old age. What is lacking is evidence of anti-fracture efficacy of dairy consumption, not because it is not plausible, but because a trial of its type has never been undertaken. The difficulty of performing such as trial is that the sample size would be large, compliance difficult to measure, and those being supplemented would need to be deficient in the nutrients of question; calcium and protein. Without these prerequisites it may be difficult to demonstrate any anti-fracture efficacy. Extrapolating anti-fracture outcomes from calcium or protein supplementation trials to dairy foods may not answer this important public health question. These trials are also fraught with the same issues that a dairy supplementation trial faces, but additional to this, the combination of nutrients in dairy, or the dairy matrix, may be greater that the effect of the individual nutrients. The form the dairy is consumed in; liquid (milk), solid (cheese) or gel / semi solid (yoghurt), the processing the dairy food has undergone, if it is fermented or not, may all play a role in the skeletal benefits attributed to dairy foods. It may only be when the complexities of the dairy matrix are understood, and dairy interventions are undertaken with stringent scientific rigor that the true anti-fracture efficacy of dairy consumption may be demonstrated.

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ESCEO3
DIETARY RECOMMENDATIONS: THE CONCEPT OF FOOD MATRIX COMPARED TO SINGLE NUTRIENTS – THE CASE FROM CARDIOVASCULAR DISEASE

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Dietary recommendations have historically focused on nutrients, and are typically constructed to ensure the diet meets requirements for individual nutrients, resulting in advice such as *"reduce intake of cholesterol and saturated fat"*. However, people consume foods not nutrients, and translation from individual nutrients to foods has proven problematic.

The nutrient content of any particular food may vary dramatically depending on the composition of the food matrix involved. Some of these differences may have consequences for nutrition guidelines for local populations, for harmonizing guidelines across countries, and for the health maintenance/disease prevention outcomes of the guidelines.

Recent research has shown that saturated fat (SAT) does not exert the adverse effect on cardiovascular disease (CVD) previously thought, and that the various saturated fatty acids exert very different biological effects, which are substantially modified by the food matrix. One example is cheese, which might be expected to increase CVD risk due to high content of SAT and sodium, but studies indicate the opposite, with a reduction in blood pressure, and reduced risk of CVD, and particularly of stroke.

Conclusions: Maintaining the general advice to reduce total SAT will work against the intentions of dietary advice, and weaken their impact on chronic disease incidence and mortality. A food-based translation of the recommendations for SAT intake would avoid unnecessary reduction or exclusion of foods that are key sources of important nutrients.

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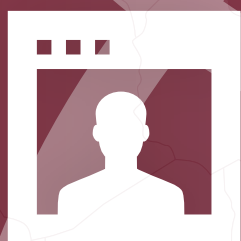
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ESCEO-IOF1
ROLE OF SURGICAL REGENERATIVE THERAPIES IN THE MANAGEMENT OF KNEE-OSTEOARTHRITIS

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Although in the past osteoarthritis was regarded as a gradually progressive disease, characterised by cartilage damage and cartilage loss, it is nowadays seen as a multi-compartment disease, involving cartilage, the subchrondral bone, synovial tissue and the surrounding muscles.

In end-stage disease, a total knee prosthesis is an established surgical technique, with a favorable effect on pain in many patients. Minor surgical procedures have been developed for patients with localized, traumatic or early disease to regenerate the cartilage, and rejuvenate the joint. Autologous chondrocyte implementation (ACI) involves an initial cartilage biopsy, from which chondrocytes are cultured and in a second procedure, the cultured chondrocytes are injected in the lesion. Some RCTs have been done, in which no effect was observed, or histological improvement, or better clinical and functional outcomes.

Because of these variable results, the lack of correlation between functional outcomes and evidence of structural repair with MRI, and the costs of the procedures, ACI is not common practice in daily practice in patients with chronic osteoarthritis. Nevertheless, it remains a potentially fruitful avenue for symptomatic therapy in early cartilage disease.

Reference: NR Fuggle, Cooper C, Oreffo ROC, et al. Alternative and complementary therapies in osteoarthritis and cartilage repair. Aging Clinical and Experimental Research 2020 Apr;32(4):547-560. doi: 10.1007/s40520-020-01515-1. Epub 2020 Mar 13

ESCEO-IOF2
THE ROLE OF "ALTERNATIVE" TREATMENTS FOR KNEE OSTEOARTHRITIS

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Osteoarthritis (OA) is the most common joint condition and, with a burgeoning ageing population, is due to increase in prevalence. Beyond conventional medical and surgical interventions, there are an increasing number of 'alternative' therapies. These alternative therapies may have a limited evidence base and, for this reason, are often only afforded brief reference (or completely excluded) from current OA guidelines. Thus, we synthesized the current evidence regarding autologous chondrocyte implantation (ACI), mesenchymal stem cell (MSC) therapy, platelet-rich plasma (PRP), vitamin D and other alternative therapies. The majority of studies were in knee OA or chondral defects.

Matrix-assisted ACI has demonstrated exceedingly limited, symptomatic improvements in the treatment of cartilage defects of the knee and is not supported for the treatment of knee OA.

There is some evidence to suggest symptomatic improvement with MSC injection in knee OA, with the suggestion of minimal structural improvement demonstrated on MRI and there are positive signals that PRP may also lead to symptomatic improvement, though variation in preparation makes inter-study comparison difficult. There is variability in findings with vitamin D supplementation in OA, and the only recommendation which can be made, at this time, is for replacement when vitamin D is deplete. Other alternative therapies reviewed have some evidence (though from small, poor quality studies) to support improvement in symptoms and again there is often wide variation in dosage and regimens.

For all these therapeutic modalities, although controlled studies have been undertaken to evaluate effectiveness in OA, these have often been of small size, limited statistical power, uncertain blindness and using various methodologies . These deficiencies must leave the question as to whether they have been validated as effective therapies in OA (or chondral defects).

In conclusion, all alternative interventions definitely require clinical trials with robust methodology, in order to assess their efficacy and safety in the treatment of OA beyond contextual and placebo effects.

ESCEO-IOF3
EFFECTS OF MHT ON BONE: WHAT, WHEN, HOW?

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A major concern in menopausal women is a decline in bone health. Postmenopausal osteoporosis is a degenerative bone disorder characterized by reduced bone mineral density (BMD) and altered bone structure, such as thinning and increased porosity of the cortex and decreased connectivity of trabeculae. Osteoporosis increases the risk of fractures which occur most frequently in the spine, hip and wrist in postmenopausal women with osteoporosis and might lead to long-term disability. Conventional-dose MHT prevents all fractures, including vertebral and hip fractures. The WHI data were the first to provide solid evidence of the fact that MHT prevents fractures Indeed women under MHT benefited from a 34% reduction in hip fractures and a 24% reduction in total fractures. MHT also causes a reduction in vertebral fractures. This is paralleled by an increase in bone mineral density, an effect that had already been shown in PEPI and other trials. MHT is the only therapy available with proven efficacy of fracture reduction in patients with osteopenia. The preventive effect of MHT, however, is probably attenuated when it is begun after 60 years of age. Stopping MHT has no rebound effect on bone as no increased fracture risk, either sustained or transient, has been reported for former MHT users compared with former placebo users in post-intervention follow-up. However, it does lead to inevitable loss in bone mineral density and therefore a gradual increase in fracture risk. WHI data indicate that only for former CEE-alone users was there a residual benefit for total fractures in the years following cessation of therapy. Low-dose MHT may improve bone mineral density in treated women (1mg estradiol+0.5 mg

norethisterone acetate or 0.5 mg of 17beta-estradiol and 0.25 mg of norethisterone acetate), however there are no results to date on fracture prevention.

ESCEO-IOF4
RISK/BENEFIT RATIO OF MHT BEFORE AND AFTER 60 YEARS

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Postmenopausal hormone therapy (MHT) is used for the relief of menopausal symptoms, which occur generally around 50 years of age. An important distinction should be made between the treatment of climacteric symptoms in young, generally healthy, postmenopausal women and the prevention of chronic diseases in elderly women. MHT seems to be beneficial and safe for women before the age of 60 years. Treatments with a high safety profile should be the preferred option, including low-dose MHT, oestrogen-only therapy in women who have had a hysterectomy, and vaginal oestrogen therapy for women with atrophic vaginitis. Nonandrogenic progestin might have a reduced thrombotic and breast cancer risk, and transdermal oestrogen could have a reduced thrombotic risk. In addition to alleviate symptoms and improve quality of life, MHT reduces also the risks osteoporosis and likely of coronary heart disease in these women. Nevertheless, ageing women, after 60, will often have less menopausal symptoms, with the exception of vaginal dryness which can still be helped with local estrogens). Other drugs can be used for osteoporosis treatment. Moreover, the stroke and breast cancer risks will increase progressively and must therefore be considered also. Finally, for all patients the decision to used MHT, must be taken considering the individual advantages and risks.

ESCEO-IOF5
INTRODUCTION

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Bone strength is determined by a large number of different components. One of them is bone size which is known to increase with puberty and change during adulthood. Another component is bone shape which has been shown to be largely dependent on habitual loading, e.g.. Bone architecture is a complex interplay among cortical diameter, thickness and porosity, and the number, thickness, shape (plate-like or rod-like), and connectivity of trabeculae. Finally, bone collagen matrix and its mineralization are important determinants of bone strength too. Methods to determine bone strength can be invasive (e.g. bone biopsy) or non-invasive. The latter ones encompass techniques such as dual X-ray absorptiometry (DXA), quantitative ultrasound (QUS), quantitative computed tomography (qCT) and more advanced and recent techniques such as high-resolution quantitative CT (HR-qCT) or magnetic resonance imaging (MRI). These techniques differ in their accuracy, reproducibility, prognostic relevance, cost and availability. Radiofrequency Echographic Multi-Spectrometry (REMS) constitutes a promising novel approach for in-vivo assessment of bone strength.

ESCEO-IOF6
ROLE OF BONE STRENGTH IN THE ASSESSMENT OF FRACTURE RISK

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Disclosures:

In the difficult task of assessing fracturing risk, the ultimate approach would be to determine whether the strength of bone would be superior or not to the load applied to the piece of the skeleton stressed by a fall or a motion in define circumstances. If not, which could be summarized by a load-to-strength ratio below one, then a fracture would occur. But this dichotomous threshold is difficult to determine as many parameters have to be taken in account including the intrinsic qualities of the bone tissue as well as its soft both lean and fat tissue environment together with the various ways the load is applied to the bone. Finite Element Analysis is definitely one procedure to get close to this but easy to perform in clinical practice. Alternative approaches could rely on epidemiological data helping in fracture threshold determination. Several recent studies showed that measurement of bone mineral density (BMD) is still a competitive estimate of bone strength for assessing fracture risk, even under treatment while many efforts have been made to develop techniques for better encompass bone microarchitecture characteristics in patient evaluation, including high resolution peripheral computerized tomography (HRpQCT), nano-CT imaging, nanoindentation or else DXA-based 3D modeling.

ESCEO-IOF7
RADIOFREQUENCY ECHOGRAPHIC MULTI-SPECTROMETRY: BASIC PRINCIPLES AND CLINICAL VALIDATION

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Objective: To provide insights into Radiofrequency Echographic Multi Spectrometry (REMS), a non-ionizing densitometric technique applied on lumbar vertebrae and/or femoral neck [1].

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Material and Methods: REMS is based on the analysis of raw unfiltered ultrasound signals acquired during an echographic scan of axial sites. The assessment of bone status is performed through the comparison of the patient's signal spectra with previously derived reference spectral models for the pathological or normal condition. REMS applied for osteoporosis diagnosis has been clinically validated through an observational multicentre clinical trial involving 7 Italian centres with over 1900 post-menopausal women [2].

Results: REMS is a clinically available technology for osteoporosis diagnosis and fracture risk assessment through the estimation of BMD on the axial skeleton reference sites. The automatic processing of unfiltered ultrasound signals provides accurate BMD values. As concerning clinical validation, results are reported in Table.

	Anatomical site	Lumbar spine (n=1195)	Femoral neck (n=1373)
Diagnostic accuracy	Sensitivity	91.7%	91.5%
	Specificity	92.0%	91.8%
	Pearson correlation coefficient between T-score values	0.94	0.93
	Average difference (bias±2SD, g/cm²)	−0.004 ± 0.088	−0.006 ± 0.076
	SEE (g/cm²)	0.044 (5.3%)	0.038 (5.8%)
	Cohen's kappa	0.82	0.79
Precision	RMS-CV	0.38% (95% CI: 0.28%-0.48%)	0.32% (95% CI: 0.24%-0.40%)
Repeatability	RMS-CV	0.54% (95% CI: 0.40%-0.68%)	0.48% (95% CI: 0.36%-0.60%)

Conclusion: The results obtained from the multicentre clinical study showed that REMS technology has a high sensitivity and specificity in osteoporotic patient identification, with a significant diagnostic agreement with DXA in the classification of patients as healthy, osteopenic or osteoporotic. Both intra- and inter-operator variability associated with REMS investigations were better than the corresponding values typically reported in literature for the employed comparative DXA. Thanks to its radiation-free approach, REMS might be applied for population mass investigations or prevention programs, early diagnosis in clinical practice, prediction of fragility fracture and therapeutic short-term follow-up.

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ESCEO-IOF8
ASSESSMENT OF CARDIO-VASCULAR SAFETY OF CALCIUM AND VITAMIN D

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The efficacy and safety of calcium supplementation, with or without concomitant vitamin D supplementation, has been much debated. There have been many trials and meta-analyses of supplementation for fracture reduction, and associations with risk of myocardial infarction have been suggested in recent years. In this symposium we will review the evidence for the safety of calcium supplementation, with or without vitamin D supplementation, in the context of healthy musculoskeletal ageing. We will investigate the evidence for potential adverse effects of supplementation such as gastrointestinal disturbance and renal stones. The assertion that calcium/vitamin D supplementation is associated with increased cardiovascular risk will be evaluated in detail, across observational, intervention and mechanistic data. Overall, the literature suggests that calcium with vitamin D supplementation leads to a modest reduction in fracture risk, and that calcium supplementation alone is not supported for this indication. Indeed there is scan mechanistic support for a link between calcium/vitamin D supplementation and cardiovascular outcomes out with end stage renal failure. Side effects of calcium supplementation thus include renal stones and gastrointestinal symptoms, but the existing evidence base is insufficient to support recent assertions of increased cardiovascular risk consequent to calcium/vitamin D supplementation.

ESCEO-IOF9
AN ASSESSMENT OF CARDIOVASCULAR SAFETY WITH HRT AND SERMS

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HRT comprises several different drug classes, including estrogens, progestogens, estrogen + progestogen combinations, tibolone, raloxifene, and a combination of a conjugated estrogen and a tissue-selective estrogen complex (TSEC). Treatment options are available in a wide range of doses and are formulated for oral, transdermal, or vaginal administration. HRT does not exhibit a class effect per se with regard to side effects or adverse events; each product has its own risk/benefit profile. Understanding the attributes of the available treatment options is key to optimising therapy for individual patients.

The absolute excess risk of adverse outcomes was low in women who began HRT treatment before the age of 60 years old. Cardiac mortality and coronary heart disease events actually decrease, but the trend is for the risk to increase with age.

The main risk associated with HRT use is VTE (deep vein thrombosis and pulmonary embolism), although again the actual incidence is low, estimated at one or two cases per 1000 woman-years among HRT users. VTE is rare in otherwise low-risk women aged <60 years old, but incidence increases with age, because age is a major risk factor for VTE. Other established risk factors for VTE include obesity, smoking, and thrombophilia. VTE risk appears to be highest during the period soon after initiating oral HRT, but reverts to the basal risk level for non-HRT users after treatment discontinuation. HRT regimens including a progestogen, and progestogen-type medications, may also impact on VTE risk. Dydrogesterone and micronised progesterone are considered

safer progestogens with an acceptable metabolic profile, and are preferred over MPA. Observational studies suggest that transdermal HRT is less thrombogenic than oral HRT, although this requires confirmation through randomised controlled trials.

Selective Estrogen Receptors Modulators (SERMs) compounds have a different molecular structure to steroids. They share their selective binding to estrogen receptors (ER) with steroids and produce an estrogen agonist or antagonist effect depending on the target cell and hormonal environment. They were developed with the aim of producing specific positive estrogenic effects in some target tissues, but with negative or neutral estrogenic effects in other tissues.

Initially known as anti-estrogens, they were developed for treating breast cancer. Currently the four best known SERMs are tamoxifen, raloxifene, bazedoxifene, and ospemifene. Tamoxifen is currently being used for breast cancer prevention and treatment, both raloxifene and bazedoxifene for treating osteoporosis, and ospemifene for dyspareunia or vulvovaginal atrophy. Therefore, the main aim of SERM pharmacological development involves increasing the benefit/risk ratio compared to estrogen therapy when preventing and treating several highly prevalent, chronic, postmenopausal diseases associated with this state of estrogen deficiency.

SERMs can have an estrogenic agonist effect that can benefit either bone or the vagina. The effect appears to depend on a SERM's level of potency (in postmenopausal women). When evaluated, SERMs appear to have anti-estrogenic or neutral effect on the breast. Tamoxifen, raloxifene, and lasofoxifene have shown anti-estrogenic effects in clinical trials, and bazedoxifene and ospemifene have shown anti-estrogenic effects in preclinical trials, but appear to be neutral in clinical trials to date. Most SERMs have been associated with a slightly higher risk of venous thromboembolism (VTE). The cardiovascular and cardiometabolic effects of SERMs in clinical trials appear to be positive or neutral. Compared to other SERMs, tamoxifen's adverse effects on the endometrium are well documented.

Extensive experience concerning the risks and benefits of SERMs is now available. Therefore, the ideal benefits required of a SERM are understood, including helping to prevent and treat osteoporosis, helping with the primary and secondary prevention of breast cancer, and potentially providing additional cardiovascular benefits. Now, with ospemifene, dyspareunia and vulvovaginal atrophy treatment can be added. The possible side effects to avoid are also known, such as the risk of endometrial cancer with tamoxifen, and venous thrombosis along the potential for more hot flushes occurring with all SERMs. Therefore, what is required from a SERM is clear.

Another interesting concept is TSEC, a combination of bazedoxifene with conjugated estrogens, as a possible alternative to classical hormonal treatment, which opens up the potential for different combinations.

Meanwhile, rapid developments in ER activation cascade molecular biology, along with advances in chemical genomics and proteomics, provide optimism about the future of different estrogen modulators over the medium-term.

ESCEO-IOF10
ASSESSMENT OF CARDIO-VASCULAR SAFETY OF PEPTIDES AND MONOCLONAL ANTIBODIES USED AS A TREATMENT FOR OSTEOPOROSIS
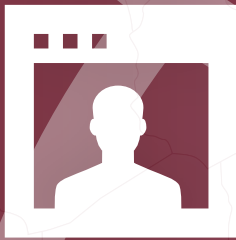
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Denosumab is a fully humanised monoclonal antibody inhibiting receptor activator of nuclear factor-кappa B ligand (RANKL) and preventing thereby the maturation and activity of osteoclasts. Osteoprotegerin could potentially inhibit the formation of vascular calcifications by blocking RANKL. Despite therefore a plausible biological connection between denosumab and cardiovascular disease, there is no evidence from human trials to support a negative association, at least at the dose used in osteoporosis treatment.

In animal studies, PTH and PTHrP have chronotropic effects via receptors in cardiac myocytes, and dilatory effects on the peripheral vasculature leading to an increase in heart rate and reduction in blood pressure. This may be related to increased risk of dizziness observed with PTH analogues. However, there is no current evidence to suggest an increased risk of atherosclerotic or thromboembolic cardiac disease during treatment with PTH or PTHrP analogs.

Romosozumab is a humanised anti-sclerostin monoclonal antibody, which antagonises Wnt signalling and thus acts as a stimulator of bone formation and as an inhibitor of bone resorption. Manipulation of sclerostin in the vascular system may contribute to the formation of vascular calcification. In its approval of the drug, the EMA noted a possible increased risk of serious adverse events of the cardio-vascular system in romosozumab treated patients. When all the data were analyzed together, there were more deaths in patients aged over 75 years. However, by limiting the use of romosozumab to women without history of heart attack or stroke, the benefits of the drug may outweigh its risks in postmenopausal women at a high risk of fracture.

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ESCEO-WHOCC1
GUT MICROBIOTA AND INFLAMMATION/ INFLAMMAGING

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Human aging is characterized by a chronic, low-grade inflammation, a phenomenon that I suggested to term "inflammaging." Inflammaging is a highly significant risk factor for both morbidity and mortality in the elderly people, as most if not all age-related diseases (ARDs) and geriatric syndromes (GSs) share an inflammatory pathogenesis. The last development of this inflammatory theory of aging ("garbaging") suggests that the most important/ causal inflammatory stimuli fueling inflammaging are to be identified in the lifelong, persistent exposure to exogenous, non-self microbial agents and environmental pollutants and to the age-related dysregulation of the production of endogenous, self and quasi-self (gut microbiota, GM) "molecular garbage". Such garbage is continuously/physiologically produced as a consequence of cell death (necroptosis; altered and misplaced molecules), metabolism and GM function, but also continuously neutralized by the remodeling and adaptive capability of the body (degradation of inflammatory molecules/molecular fragments; production of anti-inflammatory molecules) which quickly and efficiently down-regulate inflammatory responses in young subjects but fail to do so in older bodies. The causal role in inflammaging of age-related dysbiosis is suggested by animal data showing that aged GM contributes to systemical inflammaging after transfer to germ-free mice. I will illustrate the following points: i) the complex age-related remodeling of GM lifelong and the peculiar shotgun GM signature we found in centenarians (100+) and semi-supercentenarians (105+); ii) recent data obtained within the framework of the European project NU-AGE showing that taxa enriched by adherence to the Mediterranean Diet for one year were positively associated with: a) markers of lower frailty and improved cognitive function, and negatively associated with inflammatory markers including C-reactive protein and Interleukin-17; b) an increase in short/branch chained fatty acid production and lower production of secondary bile acids, p-cresols, ethanol and carbon dioxide; c) key-stone interaction positions in the GM network; iii) a parsimonious, mechanistic model of GM focused on GM biodiversity as a major characteristic of complex ecological systems which is a robust predictor of healthy/non-healthy status in aged humans.

ESCEO-WHOCC2
ROLE OF GUT MICROBIOTA IN NON-COMMUNICABLE DISEASE AND OSTEOARTHRITIS MANAGEMENT

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The prevalence of musculoskeletal diseases such as osteoarthritis (OA) increases not only because of longer life expectancy but also because of the modern lifestyle and diets which promote chronic low-grade inflammation and obesity. Adverse alterations of the gut microbiota (GMB) composition, called microbial dysbiosis, may favor metabolic syndrome and inflammaging, two important components of non-communicable diseases onset and evolution. The potential relationships between GMB and risk factors, pathogenesis and medications of OA will be discussed. The contribution of GMB is supported by observational or dietary intervention studies in animal models of OA and in humans. In addition, GMB interacts with several well-recognized risk factors of OA. Lastly, GMB is a critical determinant of drug metabolism and bioavailability and may influence the response to OA medications. Further research is needed to determine whether interventions targeting GMB or its metabolites may move the field of OA from symptomatic management to individualized interventions targeting its pathogenesis.

ESCEO-WHOCC3
CLINICAL APPLICATION OF BONE TURNOVER MARKERS IN POST-MENOPAUSAL OSTEOPOROSIS

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Introduction: It is well known that elevated blood biochemical bone turnover markers (BTMs) are associated with increased fracture risk, rate of bone loss, and poor treatment adherence, but their clinical utility is presently unclear. A consensus group was gathered with the aim to provide guidance to clinicians regarding the use of BTMs in patient evaluation in postmenopausal osteoporosis, in the monitoring of treatment efficacy and adherence to osteoporosis medication, and in fracture risk prediction.

METHODS: A working group with osteoporosis specialists and clinical scientists was invited by the Scientific Advisory Board of European Society on Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO), to discuss and provide recommendations regarding the use of BTMs in clinical practice.

RESULTS: Serum bone formation marker PINP and resorption marker βCTX-I were considered the preferred markers for evaluating bone turnover in clinical practice due to their high specificity to bone, documented performance in clinical studies, widespread use and acceptable analytical variability. However, as a result of low sensitivity and specificity, BTMs were considered to have no place in diagnosing osteoporosis, but could provide some guidance in patient evaluation where high values may indicate the need to investigate some causes of secondary osteoporosis. Measuring serum βCTX-I and PINP can slightly improve fracture prediction, with a gradient of risk of about 1.2 per SD increase in the BTM in addition to known clinical risk factors and bone mineral density. For an individual patient, assessing BTMs are not particularly useful in projecting treatment efficacy or bone loss. In contrast, it is recommended that BTMs PINP and βCTX-I could be used to monitor treatment adherence to oral bisphosphonates. An observed suppression of the serum BTMs to levels in the lower 50% of the reference interval in healthy and young premenopausal women or greater than the least significant change is strongly associated with treatment adherence.

CONCLUSION: The currently available evidence suggests that the main clinical utility of BTMs is for evaluating adherence to oral bisphosphonate therapy.

ESCEO-WHOCC4
ALGORITHM FOR THE ASSESSMENT OF ANTI-OSTEOPOROSIS TREATMENTS BY BONE TURNOVER MARKERS

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Virtually all of the currently used treatments for osteoporosis exert their effects by modifying bone cell activity; anti-resorptives decrease bone turnover by initially suppressing osteoclastic bone resorption followed by a consequential decrease in bone formation. An opposite direction and pattern is observed with the anabolic, teriparatide, whereby an increase in osteoblastic bone formation is followed by a somewhat smaller increase in bone resorption. It is not unreasonable, therefore, to consider that bone turnover markers (BTM) might be of clinical utility in the assessment of such treatments, and recent guidelines have recommended the use of serum PINP and bCTX-I as they are responsive to treatment and have low within-subject variability.

A commonly proposed approach to determine if the change in the bone marker is physiologically relevant (and not due to measurement or sampling error) is to compare the observed change with the least significant change (LSC, usually defined as 2.77 times the intra-individual coefficient of variation). Another approach

that has been proposed is to define the target for treatment as suppression of the BTM to the lower half of the reference interval in young and healthy premenopausal women.

At present, the role for BTM in assessing response to intravenous bisphosphonates, subcutaneous denosumab and teriparatide seems somewhat limited. This is not the case in patients receiving oral bisphosphonates where absorption is low and adherence is poor (e.g. less than half of patients are still taking medication after 1 year). Women adhering to oral bisphosphonates have greater reductions in serum BTM and lower fracture risk than women with poor adherence. Recently, the International Osteoporosis Foundation (IOF) and European Calcified Tissue Society (ECTS) Working Group issued a recommendation to monitor oral bisphosphonate treatment using a baseline and 3-month measurement of serum βCTX-I and/or PINP. According to this recommendation, if the decrease is smaller than the LSC, the treating clinician should reassess to identify problems with treatment, which usually relate to poor adherence.

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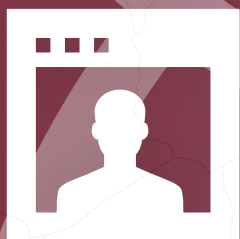
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EUGMS-ESCEO-IOF1
DRUGS THAT MAY HARM GERIATRIC PATIENTS: POTENTIALLY INAPPROPRIATE PRESCRIBING

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Objective: Given the fact that geriatric patients are more prone to drug related problems and adverse drug-related events than their younger counterparts, we aimed to provide an overview of interventions needed to assure appropriate prescribing in this patient group.

Methods: This narrative review describes approaches to assess and improve prescribing in geriatric patients with focus on the hospital setting.

Results: Screening to recognize geriatric patients susceptible to drug-related problems and adverse drug reactions (ADRs) is the first important stage within a multistep approach to pharmacotherapy in geriatric inpatients. Two methods that have been developed are the GerontoNet ADR risk score and the Brighton Adverse Drug Reactions Risk (BADRI) model, which take into consideration several elements, the most important of which is the number of drugs.

In order to decrease potentially inappropriate prescribing among geriatric patients, different types of interventions are available, for example pharmacist-led medication reviews, educational interventions, computerized decision support systems, and comprehensive geriatric assessment with pharmacotherapy assessment as its obligatory part.

The outcomes of the abovementioned interventions have been analysed, sometimes within a composite approach, i.e. by combining different techniques. None of the present interventions demonstrates an obvious positive effect on patients' health related outcomes if administered separately. Conversely, when these interventions are integrated within the setting of a multidisciplinary team, beneficial results on geriatric patients' health related outcomes can be anticipated.

Conclusion: Comprehensive assessment of geriatric patients' clinical and functional status, and integration of competencies of different healthcare professionals are necessary to deal with medical complexity of geriatric patients in order to assure appropriate prescribing in this patient group. Amplifying the consciousness of healthcare professionals with reference to appropriate and tailored pharmacotherapy in geriatric patients should be stimulated by tailored, interactive, multidisciplinary, and multifaceted programs.

The present methods to improve prescribing in geriatric patients should optimally be synchronized and incorporated in a single standardized intervention.

EUGMS-ESCEO-IOF2
POTENTIALS PROBLEMS IN THE USE OF DRUGS FOR OSTEOARTICULAR CONDITIONS IN OLD AGE

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Objective

To review potential problems with pharmacological treatment of osteoporosis and osteoarthritis in older subjects.

Material and Methods

An extensive search for articles on osteoporosis/osteoarthritis pharmacological therapy published on Pubmed in the last 20 years was performed, using the following keywords: osteoporosis, osteoarthritis, drug, side effect, older.
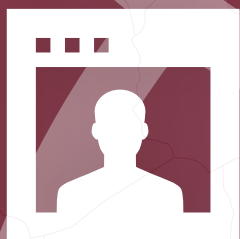
Results

30 papers concerning the safety of drugs in older adults were found. Concerning osteoporosis, bisphosphonates are contraindicated in case of renal impairment (i.e. creatinine clearance below 30-35 ml/min). It is recommended to take them with plenty of fluids, standing up for at least thirty minutes. Conditions such as dementia, dysphagia or disability might reduce the ability to comply with these instructions, increasing the risk of upper gastrointestinal side effects. Denosumab therapy is associated with increased risk of hypocalcemia, expecially in older adults. Teriparatide should not be used in patients with preexisting non-skeletal malignancies, renal stones, or severe renal impairment. Achlorhydria can interfere with the absorption of calcium supplementations.

Concerning osteoarthritis, the presence of comorbidities often interferes pharmacological treatment. Oral NSAIDs increase the risk of serious gastrointestinal, cardiovascular, and renal complications. Concomitant drug therapies can contribute to increase the risk of side effects e.g. aspirin, corticosteroids or anticoagulants. Cyclooxygenase (COX)-2 inhibitors increase the risk of cardiovascular adverse events and renal compromise, including acute kidney injury, and should be avoided in subjects with hypertension. The use of opioids, whose efficacy in chronic non- cancer pain is limited, is commonly associated with constipation, nausea, dizziness and falls. More serious effects could be respiratory drive depression, serotonergic syndrome and hyponatremia. Side effects are worsened by the simultaneous use of drugs that act on the central nervous system.

Conclusions

Osteoporosis and osteoarthritis are common clinical conditions in older adults. Comorbidity and polypharmacy can limit the use of potentially effective medications. Drug prescription should be always individualized, to reduce the risk of side effects.

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ESPRM-ESCEO-IOF1
UPDATE IN DIAGNOSIS OF FIBROMYALGIA ON THE BASIS OF EVIDENCE BASED MEDICINE

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Objective(s): The diagnosis of FM is the most important and helpful factor in the course of the disease for the majority of FM patients1. Diagnosis can improve the quality of life, reduce visits and health care costs[2,3]. Differential diagnosis should be considered and comorbidities should be diagnosed. The correct diagnosis of FM with the detection of comorbidities and relevant factors for restrictions of the activities of daily life within the framework of the biopsychosocial model is the key for an individual therapy with the aim of the best possible function and quality of life with FM[4, 5, 6]. There is controversial discussion, how best to diagnose fibromyalgia (FM). There is still a difference between criteria-based FM diagnosis (CritFM) and doctor's FM diagnosis (MDFM)

Material and methods: Reviews, meta-analyzes, guidelines and recommendations with the keywords fibromyalgia and diagnosis were reviewed by PubMed-listed publications until January 24, 2020.

Results: The ACR criteria from 1990, 2010 and the revised versions from 2011 and 2016 show an evidence-based process for optimizing the diagnosis of FM[8, 9, 10, 11]. In 1990, the criteria for characterizing FM were developed for clinical studies. The 2010 and 2011 criteria were developed for clinical use as preliminary diagnostic criteria and were initially implemented with graded questions on fatigue and functional complaints. The use of a "generalized pain criterion" in the revised criteria from 2016 eliminates the misclassification of regional pain syndromes as fibromyalgia. The revised ACR 2011/2016 criteria achieved a specificity of 90/87% and a sensitivity of 86/84% (medians). New criteria such as AAPT Diagnostic Criteria for Fibromyalgia 2019 with several dimensions provide an overview of the actual and future development of evidence-based diagnostic criteria[6]. A complete physical examination is required before the diagnosis of FM.[5]

Conclusion: Although the guidelines allow different options for diagnosing FM, the ACR criteria with the revised versions from 2011/2016 are still the gold standard. Don't forget to think about differential diagnosis, comorbidities and factors within the biopsychosocial model.

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ESPRM-ESCEO-IOF2
UPDATE IN PHARMACOLOGICAL MANAGEMENT OF FIBROMYALGIA ON THE BASIS OF EVIDENCE BASED MEDICINE

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Objective: Fibromyalgia is a disorder characterized by widespread musculoskeletal pain accompanied by fatigue, sleep, memory and mood issues.In this article, Update in Pharmacological Management of Fibromyalgia on the Basis of Evidence Based Medicine is mentioned on the basis of EULAR revised recommendations and updated literature.

Material and Methods :In this article the pharmacological management of FMS depending to EULAR revised recommendations and updated literature is mentioned. In revised EULAR recommendations ,Experts in FMS from 12 European countries evaluated evidence from systematic reviews and meta-analyses about pharmacological/non- pharmacological management for fibromyalgia.

Evidence is evaluated on pain, fatigue, sleep and daily functioning. Recommendations are designed depending on "The Grading of Recommendations Assessment, Development and Evaluation" system.

Results: In this recommendation literature search yielded 2979 titles,from these 107 reviews (and/or meta-analyses) evaluated as eligible. According to the results of GRADE system only Exercise terapy was evaluted as "strong for" FMS.

According to the results of GRADE system pregabalin,Duloxetine,Milnacipran, Tramadol ,cyclobenzapyrine ,amytriptiline,were evaluted as "weak for" in the pharmacological management of FMS ,where as Gabapentin is accepted in research group only. NSAIDs , SSRI-Selective serotonin reuptake inhibitors,Monoamine oxidase inhibitors,NSAIDs are accepted as "Weak Against" and Sodium oxybate,Growth hormone,Corticosteroids, Strong opioids,Cannabinoids classified as "Strong Against".

Conclusion: In management of FMS best results are achieved by both application of non- pharmacological and pharmacological therapies.Among pharmacological therapies pregabalin,Duloxetine,Milnacipran, Tramadol ,cyclobenzapyrine ,amytriptiline,were evaluted as "weak for" where as ,NSAIDs , SSRI-Selective serotonin reuptake inhibitors,Monoamine oxidase inhibitors,NSAIDs are accepted as "Weak Against".Research is still going on related with the pharmacotherapy of FMS.

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ESPRM-ESCEO-IOF3
UPDATE IN NON-PHARMACOLOGICAL MANAGEMENT OF FIBROMYALGIA ON THE BASIS OF EVIDENCE BASED MEDICINE

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Introduction: Fibromyalgia (FM) is a syndrome of persistent widespread pain, stiffness, fatigue, disrupted and unrefreshing sleep, and cognitive difficulties, often accompanied by multiple other unexplained symptoms, anxiety and/or depression, and functional impairment of activities of daily living (ADLs). Many recent studies have emphasized the role of central nervous system pain processing abnormalities in FM, including central sensitization and inadequate pain inhibition, because this chronic pain syndrome is associated with extensive secondary hyperalgesia and allodynia.

The treatment should be gradual and start with a group therapy session to improve awareness about the disease, as well as non-pharmacological and pharmacological modalities.

But a new field of research is arising, relating fibromyalgia with microbiome abnormalities, possibly allowing for new treatment modalities to be explored, such as oral ingestion of probiotics, Fecal Microbiota Transplantation (FMT) and diet.

Aims: The objective of this study is to demonstrate best effectiveness of the rehabilitation program in FM

METHOD: we have used different sources of search: Scientific Pub Med-MEDLINE, Dpedro, Cochrane Library, the Ottawa Panel, EULAR , APS Guideline

RESULTS: There is strong evidence in moderately intense aerobic exercise (60-75% of age adjusted

maximum heart rate [210 minus the person's age]) two to three times per week.

Encourage people with FMS to perform muscle-strengthening exercise two times per week.

Offer clinician-assisted treatments such as clinical hypnosis and biofeedback , acupuncture , chiropractic. Manipulation, therapeutic massage , and balneotherapy , which may be helpful for pain relief.

Incorporate cognitive-behavioral therapy into a multimodality treatment approach to reduce pain

Non-coeliac gluten sensitivity is increasingly recognized as a frequent condition with similar manifestations which overlap with those of FM. Regarding dietary intervention for fibromyalgia, it seems reasonable to eliminate some foods from the diet of FM patients, for example excitotoxins (glutamate and aspartate).
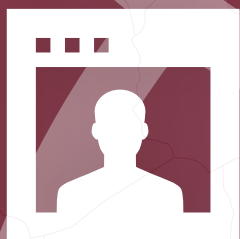
Conclusions: The important strategies for FM therapy appear useful at this time: reduction of peripheral nociceptive input, particularly from muscles; improvement or prevention of central sensitization; and treatment of negative affect, particularly depression.

PRM specialists utilize, exercise is an important part of the management of FMS. Aerobic, strengthening exercises, aquatic exercise and cognitive behavioural therapy as non pharmacological interventions seems most promising for the management of FM.

Educate them about pain management and self-management programs as an initial part of treatment

Good biological plausibility exists for how dietary excitotoxins may be leading to increased symptom occurrence in FM. Low intake of omega-3 fatty acids, vitamin B6, magnesium, zinc and antioxidants, as well as gluten consumption, may also play a supporting role in symptom occurrence. it is important a correct restoration of human gut microbiota.

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MTE1
DISCUSSION OF COMPLEX OSTEOPOROTIC CASES

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Osteoporosis is a state of bone fragility that can be reached my multiple mechanisms. A long list of diseases and conditions deteriorate the mechanical strength of the bone putting the patient at risk of low-trauma fractures. Genetic factors, general mechanisms of aging/frailty and incident conditions in the life of the individual induce deterioration in bone strength. How this bone strength is affected depends on the combination of a decline in bone mass (i.e. bone mineral density), a derangement in structure (microarchitecture) and negative changes in tissue composition (i.e. tissue quality). Our current approach to the management of the disease is based on bone-acting drugs used independently of the background pathophysiology that has created the skeletal fragility. However, this strategy of one-fit-all is likely less effective that more specific treatments adapted to the mechanisms underlying the individual patient. Therefore, our next horizon has to be an individualized treatment in line with a personalized medicine approach.

As in any area of medicine, the first step in the clinical encounter must be the profiling of the background mechanisms originating the presenting syndrome. We will discuss several examples of patients referred to our clinics for osteoporosis where they share the common denominator of increased skeletal fragility but with peculiar characteristics in the mechanisms that have made the patient's skeleton fragile. The bottom line is the understanding of osteoporosis as a heterogeneous disease.

MTE2
PATHOGENESIS AND MANAGEMENT OF CKD-MBD

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PTH, Calcium, Phosphorus, FGF 23 and Klotho play a critical role in the development of CKD-MBD, including vascular calcification, cardiovascular complications, fractures and poor outcomes. As CKD-MBD progresses, secondary hyperparathyroidism increases in severity resulting in the proliferation of parathyroid cells and the development of diffuse and nodular hyperplasia. These changes are accompanied by decreases in Klotho and vitamin D and calcium receptors. High phosphorus plays a critical role in the progression of CKD-MBD abnormalities not only worsening secondary hyperparathyroidism but also all several other mineral disorders such as bone and cardiovascular complications impacting in a reduced survival.

The current available therapies; phosphate binders, vitamin D receptor activators and calcimimetics have improved the management of CKD-MBD. However, many complications are still unsolved and the management of these disorders is highly complex. The mechanisms by which each of these factors worsens CKD-MBD will be address, the most appropriate use and limitations of the current therapies will be discussed.

MTE3
THE RISKS AND BENEFITS OF CALCIUM SUPPLEMENTATION

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The efficacy and safety of calcium supplementation, with or without concomitant vitamin D supplementation, has been much debated. There have been many trials and meta-analyses of supplementation for fracture reduction, and associations with risk of myocardial infarction have been suggested in recent years. In this presentation I will review the evidence for the value of calcium supplementation, with or without vitamin D supplementation, for healthy musculoskeletal ageing. I will investigate the evidence for beneficial effects of calcium/vitamin D supplementation on reduction of fracture risk and the potential adverse effects of supplementation such as gastrointestinal disturbance and renal stones. I will pay special attention to the suggested links between calcium/vitamin D supplementation and myocardial infarction. Overall, the literature suggests that calcium with vitamin D supplementation leads to a modest reduction in fracture risk, and that calcium supplementation alone is not supported for this indication. Furthermore, there is more robust evidence for fracture reduction amongst institutionalised patients than as part of a community public health intervention. Side effects of calcium supplementation include renal stones and gastrointestinal symptoms, but the existing evidence base is insufficient to support recent assertions of increased cardiovascular risk consequent to calcium/vitamin D supplementation. In conclusion, calcium with vitamin D supplementation is supported for patients at high risk of calcium and vitamin D insufficiency, and in those who are receiving treatment for osteoporosis.

MTE4
MILK, YOGURT, CHEESE AND BONE: FRIENDS OR FOES?

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Milk, yoghurt and cheese form the basis of the dairy food group within most dietary guidelines around the world due to their association with bone health throughout the lifespan. Evidence exists demonstrating improvements in bone accrual during growth and bone density in adulthood and into old age. Dairy foods also

contain saturated fats that are considered detrimental to cardiovascular health by increasing serum cholesterol levels. Some, but not all prospective observational studies have reported an increased risk of mortality with milk consumption, while lower mortality rates have been observed with increased consumption of fermented dairy foods such as yoghurt and cheese. The mechanisms for these observations are not clearly understood. Randomised controlled studies have provided some evidence of the potential mechanisms for the observed effects of dairy on serum cholesterol, indicating it may relate to the combination of various nutrients contained in dairy foods, or the dairy matrix, or factors associated with the processing of dairy foods such as during fermentation. However, before a conclusion about the potential benefit or detriment of dairy consumption on cardiovascular risk can be made, close examination of the design and execution of these prospective observational studies is required, that may also serve to guide study design in the future. Until a large randomised placebo controlled study of dairy consumption with both fractures and mortality as outcomes, and with sufficient sample size and rigorous study design is undertaken, the evidence for, or against a cardiovascular effect of dairy consumption is modest.

MTE5
LOCAL BONE TREATMENTS

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Fragility fractures are associated with significant morbidity and mortality, representing a significant burden both socially and economically. Even though several factors contribute to fragility fractures, a key factor is osteoporosis, a condition characterized by loss of bone mineral density. Through the augmentation of bone mass due to osteoporosis a reduction in fracture risk is achievable. This can be done using pharmacological agents (antifracture drugs) even though a small proportion of patients are pres di ed these therapies and the patients' compliance is low. The possibility to use local material capable to strengthen the weakened area(s) is, therefore, urgently felt.

In the case of hip 70% of the strength is explained by bone mineral density and patients with a recent hip fracture present with a significant risk of controlateral hip fracture for years. There is a growing consensus among leading physicians that minimally-invasive surgical approaches intended to complement standard of care therapies warrant consideration.

In this presentation the experience with a new local osteoporosis-enhancement procedure recently developed to provide an immediate and durable strengthening of hip bone through the implant of a biomaterial (AGN1) in osteoporotic patients at high risk of hip fractures.

MTE6
NUTRITIONAL APPROACH OF OSTEOPOROSIS PREVENTION

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Objective: to review the role of selected macro- and micro-nutrients, as well as of specific dietary patterns, in the pathogenesis of osteoporosis

Material and methods: a narrative review of concepts and controversies in the most recent scientific literature.

Results: scientists are searching for ways to prevent osteoporosis and, in addition to the obvious risk factors, such as female gender and advanced age, genetics and environment play a role. In particular, malnutrition (under/over-nutrition) is associated to a higher risk of osteoporosis in a life-course perspective (maternal nutrition, building bone in childhood and adolescence, maintaining bone mass in adulthood, and special nutritional needs of older individuals). Specifically, calcium and vitamin D, proteins, alcohol, sodium, caffeine, magnesium and zinc, possibly vitamin A, B and K play a role. Calcium and vitamin D affect bone health in utero, during childhood, adolescence, and early adult life. Those who reach a higher peak bone mass, are at lower risk of osteoporosis in middle and old age. At older age, the absorption of calcium and vitamin D levels decrease, therefore different nutritional recommendations are required. Good dietary intakes of calcium (1,000 mg/day before age 50, 1,200 mg/day beyond 50) and vitamin D (600 IU/day before the age of 70, and 800 IU/day thereafter) are therefore crucial. The main dietary sources of calcium are dairy foods (yogurt and hard cheeses are well tolerated also by lactose intolerant individuals), some vegetables and legumes, canned fish with soft edible bones, nuts, and some mineral waters, while for vitamin D are fish, fish products, and foods to which vitamins have been added. Epidemiologic studies have shown a positive association between protein intake (0.8 g/kg/ before the age of 50, 1.0-1.2 g/kg /day thereafter) and bone health. However, the sources of proteins, (vegetable vs animal products), might be relevant in the risk profile assessment. A high dietary intake of phosphate in combination with a low intake of calcium increases PTH concentrations and therefore may have adverse effects on bone mineral density. It has also been shown that acutely increasing dietary phosphate intake leads to PTH secretion and has an inhibitory effect on bone formation. Milk and animal products are the main sources of dietary phosphates, but it should be emphasised that the use of phosphates in food additives is increasing and this should be carefully considered in public health actions. Some studies demonstrate that retinol intake has a U shaped association with bone mineral density. The sources should preferably be non-fat dairy products, cereals, fruits and vegetables, not animal products. Vitamin K is required for the synthesis of osteocalcin, which is synthesised by osteoblasts and is the most abundant non-collagenous protein in bone. There is some evidence that Vitamin K deficiency is associated with an increased fracture rate in the elderly patients. However, further studies are required to determine the impact of Vitamins A, B and K on bone health. Mod-

erate alcohol intake may have beneficial effects on bone mass, to the contrary bone mineral density is reduced in male alcoholics; and this may result from a number of factors, including malnutrition, liver dysfunction, and a direct effect of alcohol on osteoblast function. Caffeine increases urinary calcium excretion, but epidemiological data on the relationship between caffeine intake and bone mass are conflicting. However, it seems that an optimal calcium intake should protect against the harmful effects of caffeine on bone.

Conclusions. According to this literature review, the adherence to a dietary pattern according to the Mediterranean Diet principles, supporting large intake of vegetables, fruits, and cereals moderate intake of dairy, meat, and wine, seems to offer the best life-course approach to the prevention of osteoporosis.

MTE7
GIOP: WHAT TO DO?

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Glucocorticoid-induced osteoporosis is the primary cause of secondary osteoporosis. 0.5 to 4.5% of postmenopausal women receive chronic glucocorticoid therapy. In the United States, 1% of the population is believed to be undergoing long-term corticosteroid treatment. Numerous studies have demonstrated the deleterious effect of corticosteroid therapy both in terms of bone loss but also in terms of increased risk of fracture, particularly with regard to vertebral fractures. The increased risk of fracture in patients on long-term corticosteroid therapy is only partially explained by the decrease in bone mineral density. Logically, the higher the glucocorticoid dose, both in terms of daily and cumulative dose, the greater the bone risk. Moreover, it is sometimes difficult regarding the increased risk of fractures, to differentiate the inflammatory disease justifying corticosteroid therapy and the effect of glucocorticoids themselves.

In pathophysiological terms, glucocorticoids are responsible for a deep depression of the osteoblasts and osteocytes with an increase in their apoptosis. The increase in bone resorption associated with corticosteroid therapy is only transient. This is also partly explained by the underlying inflammatory disease.

Any patient exposed to prolonged corticosteroid therapy requires bone evaluation. In particular, a personal history of fractures, especially vertebral fractures, should be sought. Systematic measurement of bone mineral density is required, preferably in conjunction with a vertebral fracture assessment (VFA). Postmenopausal women are particularly affected, as the menopause is a risk factor for osteoporosis and fracture. However, bone sensitivity to high doses of glucocorticoids seems to be more pronounced in premenopausal women.

General measures in case of prolonged glucocorticoid use are to use the lowest dose of glucocorticoids. Calcium supplementation is useful if intakes are low. Vitamin D supplementation is also useful, especially if initial vitamin D level is low.

In postmenopausal women and men over 50 years of age, the following situations constitute a high risk of fracture: corticosteroid therapy greater than or equal to 7.5 mg per day of prednisone-equivalent, personal history of fracture in the absence of major trauma, age higher than or equal to 70 years, T-score less than or equal to -2.5. In these situations it is recommended to start treatment with bisphosphonates, denosumab or teriparatide. These treatments have marketing authorisation for the prevention and treatment of glucocorticoid-induced osteoporosis, but their conditions of reimbursement vary from one country to another. All of these treatments have demonstrated their value in the prevention of glucocorticoid-induced bone loss. There is also data suggesting that these treatments reduce the risk of fractures, particularly of the vertebrae. If these criteria are not met, then the FRAX index should be calculated to determine the probability of a major fracture at 10 years. The above-mentioned treatments should be used when the patient is above the intervention threshold.

In premenopausal women and men under 50 years of age, each situation must be analyzed on a case-by-case basis and the decision to use osteoporotic therapy will depend on the individual assessment of fracture risk.

MTE8
HORMONE REPLACEMENT THERAPY IN 2020

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Hormone replacement therapy (HRT) for women with menopausal symptoms has undergone significant changes over the past 18 years. HRT would have been the standard treatment 18 years ago for menopausal symptoms, such as flushes, night sweats, and vulvovaginal atrophy. The Women's Health Initiative (WHI) trial was designed to test the hypothesis that HRT would provide women with primary protection against coronary heart disease (CHD). Women with an intact uterus received conjugated equine oestrogens (CEE) + medroxyprogesterone acetate (MPA) or placebo, while women without a uterus only received CEE. Preliminary analysis of the WHI trial results in 2002 set out concerns about the associated adverse outcomes. CEE + MPA was reported to be associated with a higher risk of coronary heart disease, stroke, venous thromboembolism (VTE), and breast cancer. Using CEE as a single therapy was reported to be associated with a higher risk of stroke and VTE, to have no effect on coronary heart disease, and to reduce the risk of breast cancer.

The 15 year period since the WHI has seen several re-analyses and publications that have questioned the validity of the original conclusions. Specifically, age-stratified data showed that the absolute excess risk of adverse outcomes was low in women aged under 60 years old, with a tendency for the risk to increase with age. In fact, among women aged 50-59 years old or within 10 years of the onset of the menopause, total mortality was 30% lower with HRT (CEE ± MPA) compared to with placebo.

Several scientific societies updated their scientific standpoints in 2016 and 2017 to provide an update for using HRT. The different scientific societies generally agree that HRT is the most effective treatment for vasomotor and genitourinary symptoms for women aged under 60 years old or within 10 years of the onset of the menopause, and that it can prevent bone loss and fractures. However, no changes in HRT prescription during clinical practice have been observed to date, with experts believing that these conclusions need to be communicated more widely. The preliminary WHI findings were published 18 years ago as it stands and a more scientific and robust assessment has led to greater acceptance of HRT's benefits for the right patients.

The future requires examination of the remaining uncertainties associated with HRT's risks and benefits during the menopause. A deeper understanding of the different HRT regimens in terms of the dose, route of administration, type of progestogen, and the length of treatment. Of course, HRT should be combined with lifestyle measures. There is a need to progress towards an era of personalised medicine using diagnostic tools that can identify a patient's characteristics on a genetic/molecular level. This is in addition to understanding the physiological and physiopathological changes occurring during the menopause, with the development of specific targeted therapies for stimulating or inhibiting different receptors being a pathway for investigation and development.

Many believe that HRT's benefits have been interpreted incorrectly, resulting in a reduction in health expectations for menopausal women. HRT is currently considered an effective and safe option for healthy symptomatic women without contraindications aged under 60 years old or within 10 years of the onset of the menopause. There is also a need to understand that the idea of using HRT in combination with lifestyle measures can prove important for many menopausal women when it comes to improving their sexual activity, quality of life, and preventing bone mass loss.

MTE9
HIGH BONE MASS: WHAT ARE THE CAUSES AND HOW SHOULD WE MANAGE IT?

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A finding of high bone mineral density (BMD) on routine DXA scanning is not infrequent and most commonly reflects degenerative disease. However, BMD increases may also arise secondary to a range of underlying disorders affecting the skeleton. Although low BMD increases fracture risk, the converse may not hold for high BMD, since elevated BMD may occur in conditions (i) with increased fracture risk (*e.g.* osteopetrosis or Paget's disease), or (ii) such as artefacts which themselves do not affect fracture risk but may mask low BMD and (iii) where fracture risk may be reduced but other co-morbidities may exist which are starting to be recognised.

I will outline a classification for the causes of raised BMD, based upon identification of focal or generalised BMD changes, which can be used to structure appropriate investigation by clinicians after careful interpretation of DXA scan findings within the context of the clinical history. I will describe our learning from conducting the first systematic analysis of patients undergoing routine clinical DXA scanning, having screened 335,115 DXA scans across 15 UK centres. I will include discussion of prevalence of HBM conditions and will review the mild skeletal dysplasia associated with the largely yet to be explained High Bone Mass phenotype. I will discuss the phenotypes seen in *LRP4*, *LRP5*, *LRP6* HBM, as well as Sclerosteosis and van Buchem's disease, and go on to describe HBM pedigrees affected by the recently identified mutation in *SMAD9*; a c.65T>C loss-of-function mutation thought to reduce BMP inhibition.

MTE10
BARIATRIC SURGERY, BONE AND JOINTS

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Obesity is associated with numerous comorbidities including some rheumatic conditions. Through adipose- derived inflammation, obesity has been shown to induce increased initiation, progression, and worse responses on outcomes of rheumatic diseases. Bariatric surgery is being increasingly used thanks to its positive effects on major comorbidities such as type 2 diabetes mellitus and hypertension. Consequently, surgically induced weight and adipose tissue losses might play a role in the course of rheumatic conditions.

The learning objectives of the present "Meet-The-Expert session" is to provide attendees a focused update on first: emergent data on positive effects in osteoarthritis; second: evidence linking bariatric surgery and incident fracture; third: strategies proposed to reduce bariatric surgery associated bone loss.

A better knowledge of these issues will permit some clarification of both beneficial and deleterious effects of bariatric surgery to improve the patient management.

MTE11
ANDROGENS, BONE AND MUSCLES

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Androgens are anabolic to skeletal muscle with dose- / concentration-dependent effects on muscle mass as well as on muscle strength and power. Androgens exert anabolic effects on muscle both in men and women and in the elderly as well as in the young. As to bone health, the importance of androgens lies primarily in their role as precursors for aromatization to estrogens, the main sex steroid regulators of bone homeostasis, but they also exert favorable direct androgen receptor-mediated effects on bone. Moreover they exert indirect beneficial effects on bone by increasing mechanical loading through increase in

muscle mass and strength. In men both androgen levels as well as muscle mass and function decline with age, which may result in sarcopenia and further into frailty. Sarcopenia in turn is not uncommonly paralleled by- and contributing to increased skeletal fragility, occurrence of falls and risk of fracture. However, according to the data from observational studies, decline in androgen exposure in aging men does not seem to fully account for their decreases in muscle strength and physical performance, and both processes may rather be related to the underlying processes of aging *per se*. Bone loss and increased fracture risk in aging men is associated with low estradiol rather than low T, but the highest fracture risk is in men with both low estradiol and testosterone and with high SHBG.

Testosterone therapy in older men with low to low-normal serum testosterone results in small, but consistent improvements in lean mass, which are associated with more variable effects on muscle strength and power, with limited improvements or no effect depending on the considered study or muscle group and test. Results on the impact of testosterone treatment on physical function have in turn been disappointing with both negative, or positive effects with small effect size and of doubtful clinical significance. Although testosterone treatment in men with low testosterone has limited positive effects on bone homeostasis, there is no documented effect on fracture risk and testosterone therapy should not be considered a treatment of osteoporosis in men. Moreover, a major limitation for testosterone treatment in older men is the lack of long term controlled data on (cardiovascular and prostate) safety.

In postmenopausal women, adrenal androgens (androstenedione, DHEA and DHEA-sulfate) and some residual ovarian testosterone secretion are the only source of sex steroids and in particular of estrogens, for which they are precursors. Lower androgen levels have been associated with poorer muscle functional status and skeletal health. Whereas androgen treatment can improve muscle mass and function, their use is limited by dose-dependent virilizing side-effects and controlled data on (longer-term) efficacy and safety in women is presently very limited. More recently, there has been interest in the development of (non-steroidal) selective androgen receptor modulators, aiming at improving the benefit-risk profile of androgen-based anabolic treatment.

In conclusion, androgens are significant players in muscle and bone physiology. Although there is a potential for androgen treatment in the management of muscle and bone disorders, presently clinical indications remain limited awaiting more data from randomized clinical trials.

MTE12
EFFICACY AND COST/BENEFIT OF FLS

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Osteoporosis is a very common condition. Among the population aged over 50 years, one in three women and one in five men will suffer a fragility fracture. At the turn of the century, 9 million fragility fractures occurred annually. This included 1.6 million hip fractures which impose a devastating burden on sufferers and their families, and all too often result in premature death. The 1.4 million individuals who sustained vertebral fractures endure back pain, loss of height and many other adverse effects on the quality of their lives. In addition, the cost that osteoporosis imposes on healthcare budgets is staggering. In 2010, European Union countries spent Euro 37 billion (US$40 billion), while in 2015 the United States spent US$20 billion.

In the year following a vertebral fracture about 20 % of women will have a new vertebral fracture and about 25% will have a new fracture. Individuals who have sustained a fragility fracture are at approximately twice the risk of suffering future fractures, as compared to their fracture-free peers. Approximately half of patients who present to hospital with a hip fracture have sustained prior fractures in the months or years before breaking their hip and just one-fifth of eligible fracture patients receive osteoporosis treatment after a fracture, and that considerable variation is evident between countries.

Fracture Liaison Services (FLS) is a coordinated model of care for secondary fracture prevention. A FLS ensures that all patients aged 50 years or over, who present to urgent care services with a fragility fracture, undergo fracture risk assessment and receive treatment in accordance with prevailing national clinical guidelines for osteoporosis. FLS have been shown to dramatically improve osteoporosis treatment rates for fragility fracture patients and reduce secondary fracture incidence. Further, FLS may have potential beneficial effects on mortality outcomes. Fracture Liaison Services improve quality and reduce costs through a reduction in unscheduled emergency admissions for hip and other fragility fractures.

In a growing number of countries throughout the world, FLS have been shown to be highly cost-effective and cost-saving.

MTE13
PHYSICAL THERAPY FOR OSTEOARTHRITIS

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Osteoarthritis (OA) is a major public health problem. Besides pharmacological and surgical therapies, non-pharmacological therapies, including but not restricted to education and self-management, regular telephone contact, referral to a physical therapist, aerobic, muscle strengthening and water-based exercises, weight reduction, walking aids, knee braces, footwear and insoles, thermal modalities, transcutaneous electrical nerve stimulation or acupuncture, are of available for the management of OA. The objective of this Meet-The-Expert session is to critically review for evidence regarding physical therapy for OA.

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MTE14
LOCAL BONE ENHANCEMENT TREATMENT IN HIGH RISK OSTEOPOROTIC PATIENTS

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Introduction: Osteoporosis diminishes the quality and quantity of bone, resulting in compromised bone strength and increased fracture risk in 200 million patients worldwide. Hip fractures are the most devastating complication. They are associated with a 25% increase in mortality in the following year and a 4-fold increase of mortality risk in the first 3 months after fracture. The incidence of death from a hip fracture equals the breast cancer mortality rate. Furthermore, patients with a recent hip fracture carry at least a 10% early risk of a contralateral fracture. Hence, osteoporosis is a severe and escalating socio-economic problem.

The prevention of osteoporotic fractures, especially hip fractures, remains a challenge. Currently available pharmaceutical treatments fail to address fracture risk reduction during the early stages of therapy, taking up to 18 months to reduce fracture risk. An estimated 20% increase in bone mineral density is required to prevent a hip from fracture in a simple fall.

Furthermore, hip fracture risk reduction with existing drug therapies is achieved only when patients are compliant and persistent with the recommended treatment. However, less than 35% of patients continue with osteoporosis therapy at year 1.

Hence, complementary approaches to immediately prevent hip fractures in patients at very high risk are still an unmet clinical need.

Surgical approaches, in order to augment the local bone have been proposed to strengthen fragile bone, particularly in the proximal femur, prior to subsequent fracture. Techniques investigated are **prophylactic osteosynthesis, femoroplasty** with bone cement, and **local bone enhancement treatment** with osteoconductive or osteoinductive materials.

Prophylactic Osteoysthesis: Prophylactic nailing to stabilize highly fragile osteoporotic hips is not currently performed in clinical practice. In a randomized controlled trial, contralateral hip fixation using a hydroxyapatite-coated titanium tubular screw was evaluated on the risk of recurrent fracture. Although the feasibility and safety of the procedure were confirmed, the results were not conclusive since no contralateral hip fracture occurred over the 16-month follow-up.

A device called YSTRUT ®, which is indicated for contralateral percutaneous internal fixation of proximal femur in patients with a low-energy pertrochanteric fracture. This device is implanted during the same anesthesia as for the fracture stabilization. The implant consists of two interlocking peek rods linked with surgical cement (polymethylmethacrylate (PMMA)). The loadings until failure of cadaver specimens with this implant showed increased both fracture load (+18%) and energy to fracture (+32%) as compared to contralateral femur. However, peri-prosthetic fracture

risk should be taken into consideration in a careful benefit-risk and cost-effectiveness analysis for any new local procedure aimed at preventing hip fractures.

Indeed, prophylactic fixation with a cephalon-medullary nail was not found to be cost-effective in elderly women with hip fracture. However, the case may differ in selected patients.

Bone Augmentation with PMMA: Several preclinical and clinical studies addressing the augmentation of bones by polymethyl methacrylate (PMMA) cement have been published over the last decades, investigating the augmentation of fractures of different locations, which have shown a better stability, stiffness and strength. For the hip, the augmentation of conventional osteosynthesis of femoral neck fractures and intertrochanteric fractures has been studied, as well as the effectiveness of different types of cements.

In the spine, cement-augmentation of fractured or sintered vertebral bodies, well known as Vertebroplasty and Kyphoplasty, has been introduced in clinical use several years ago and has shown significant positive outcome with regard to pain reduction in osteoporotic fractures.

Prophylactic cement augmentation of the proximal femur ("Femoroplasty") may reduce fracture risk. This technique has only been evaluated to date in cadaver or animals. The results showed 30–80% improvement in bone strength, the results being volume dependent (cement augmentations of 20 to 40 ml) and location dependent.

Despite the encouraging positive biomechanical effects of PMMA augmentation, this cement augmentation has not gained wide acceptance, since these non-biological approache involves the permanent placement of inert materials in bone. Furthermore, femoroplasty may be associated with the occurrence of sub-trochanteric fractures, fat embolism, circulatory damage, possible bone necrosis, compromise bone healing and the cement is difficult to remove in revision surgery.

Local Bone Enhancement Treatment with osteoconductive or osteoinductive materials: Very promising results in preclinical and clinical studies have been published for bioactive cements. They cure with a non- or less-exothermic reaction and are considered to be osteoconductive, meaning that they can be resorbed gradually with time and replaced by host bone.

Synthetic bone grafts are mainly made of calcium-phosphate (e.g. hydroxyapatite and tricalcium phosphate), bioglass and calcium sulphate. Such materials can be used as carriers for growth factors (e.g. BMPs) as well to enhance bone graft efficacy, drugs (bisphosphonates) or ions (strontium) to promote osteoblast proliferation.

In osteoporosis, the administration of osteoconductive or osteoinductive materials requires low viscosity material to avoid injection under high pressure in the trabecular bone network of the proximal femur.

One new investigational treatment to lower hip fracture risk in osteoporosis uses a minimally-invasive local osteo-enhancement procedure (LOEP) to inject a unique, resorbable, triphasic calci-

um sulfate/calcium phosphate implant material (AGN1) into the proximal femur with the intent of immediate increasing femoral strength by regenerating bone lost due to osteoporosis. Preclinical studies demonstrate that the AGN1 fully resorbs and is replaced with host bone, suggesting that fracture protection may be sustained over time. An In-Human-Clinical-Study examined the potential utility of the novel local osteo-enhancement procedure to improve hip bone strength in postmenopausal women. A unique aspect of AGN1 treatment is that it directly addresses osteoporotic bone loss in the area treated. Treatment with AGN1 resulted in remarkable, statistically significant, and sustained increases in proximal femur BMD and these changes in BMD correlated with a substantial increase in femoral strength. In particular, femoral neck BMD in the treated hip was on average 58% greater and femoral strength was 36% greater than the control hip at 5–7 years after treatment.

Resorption of AGN1 was closely coupled to new bone formation and the area of bone formation correlated with the area of material implantation.

Conclusion: The prevention of hip fractures and vertebral fractures, the most devastating complication of osteoporosis, remains a challenge in clinical routine. Current medical treatment of osteoporosis, result in an increase in bone mass and reduction of fracture risk. However, there are non-responders, a lack of compliance and the effect of an anti-resorptiv or osteoanabolic treatment may need a long time to achieve a sufficient gain of bone density and fracture risk reduction. Hence, complementary approaches, such as surgical procedures, to immediately prevent hip fractures in patients at very high risk are needed. Prophylactic osteosynthesis and PMMA augmentation of osteoporotic bone has been investigated pre-clinically and in clinical studies, but have not gained clinical acceptance over the years.

Some new procedures are currently being developed that are synthetic, resorbable, osteoconductive and osteoinductive materials, with the aim of an early local strengthening of fragile bone, to fill an unmet clinical need in the management of elderly patients with osteoporosis and an increased imminent risk of hip fracture.

The first-in-human study establishes AGN1 as an emerging treatment for local osteoporotic bone loss in patients at high risk of hip fracture has recently been published and provides the rationale for further clinical investigation of this treatment.

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES
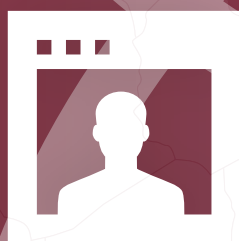
Abstract Book

Committee of National Societies Abstracts

OCs1

THE BELGIAN BONE CLUB 2020 GUIDELINES FOR THE MANAGEMENT OF OSTEOPOROSIS IN POST-MENOPAUSAL WOMEN

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Objective: To provide updated evidence-based guidelines for the management of osteoporosis in postmenopausal women in Belgium.

Methods: The Belgian Bone Club (BBC) gathered a guideline developer group. Nine "Population, Intervention, Comparator, Outcome" (PICO) questions covering screening, diagnosis, non-pharmacological and pharmacological treatments, and monitoring were formulated. A systematic search of Medline, the Cochrane Database of Systematic Reviews, and Scopus was performed to find network meta-analyses (NMA), meta-analyses (MA), systematic reviews (SR), guidelines, and recommendations from scientific societies published in the last 10 years. Manual searches were also performed. NMA were considered as the highest level of evidence. Summaries of evidence were provided, and recommendations were further validated by the BBC board members and other national scientific societies experts.

Results: Of the 3840 references in the search, 333 full texts were assessed for eligibility, and 129 met the inclusion criteria (11 NMA, 79 MA, 12 SR, and 27 guidelines). Osteoporosis screening using clinical risk factors should be considered. Vertebral, pelvis, hip, femur, humerus, radius/ulna, and age-dependent wrist fracture were considered as major osteoporotic fracture (MOF). Patients with a recent (<2 years) major osteoporotic fracture were considered at very high and imminent risk of future fracture. A DXA BMD T-score ≤-2.5 or a threshold for 10-year risk of MOF ≥20% and of hip fracture ≥3% (<70 years) or ≥5% (≥70 years) was used to categorize patients as high risk. Patient education, the combination of weight-bearing and resistance training and optimal calcium intake and vitamin D status were recommended. Antiresorptive and anabolic osteoporosis treatment should be considered for patients at high and very high fracture risk, respectively. Follow-up should focus on compliance, and patient-tailored monitoring should be considered. Expert voting results: 12 strong and 13 weak recommendations were formulated.

Conclusion: The BBC 2020 guidelines provide updated algorithms for evidence-based clinical management of osteoporosis in postmenopausal women.

OCs2

TRABECULAR BONE SCORE IS ASSOCIATED WITH BONE MINERAL DENSITY, AND MARKERS OF BONE TURNOVER IN NON-OBESE SUBJECTS: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: Obesity is associated with greater BMD and is considered protective against hip and vertebral fracture. Obesity results in low bone turnover and improves bone microarchitecture parameters. We aimed to determine if there are differences in TBS, BMD, or bone turnover markers between obese and non-obese older adults.

Methods: The present study was conducted within the framework of the BEH programme, a population-based prospective cohort study being conducted in Bushehr, a southern province of Iran. In brief, 400 persons (186 men and 214 women) from participants of the second stage of BEH program were randomly selected and serum bone turnover markers including bone-specific alkaline phosphatase (bALP), N-terminal procollagen propeptides of type I collagen (P1NP), osteocalcin (OC), and tartrate-resistant acid phosphatase isoenzyme 5b (TRAP) were measured using chemiluminescence method. BMD was measured through DXA (Discovery WI, Hologic, Bedford, Virginia, USA). Obesity was defined as BMI of ≥30. Nonparametric Spearman's rho was used to assess the correlation between different measurements. Between-group differences were checked by independent t-test or Mann-Whitney U test, where applicable.

Results: The mean (SD) age of participants were 69.5(6.4) and 69.1(6.3) among men and women, respectively. The mean (SD) values of TBS and BMD were 1.3(0.1) and 0.9(0.2), respectively. Obesity was found in 118(28%) of study participants 48(25%)

among men and 66(31%) among women (P=0.21). TBS values greater than 1.35 considered to indicate a low risk of microarchitectural damage were present in 100(35%) and 28(25%) of non-obese and obese subjects, respectively (P=0.051). TBS was significantly positively correlated with bone mass in both groups, but the association was stronger in non-obese group (r=0.74 vs. r=0.57). In non-obese subjects all BTMs (both bone formation including OC, and bALP and bone resorption including CTX and TRAP) were significantly negatively correlated with TBS. Surprisingly, comparing to obese group, non-obese group had higher BMD and TBS values, although a difference of BMD was not significant (p=0.09).

Conclusion: Obesity was associated with a lower TBS values, predictive of increased microarchitectural damage, and higher bone turnover markers.

OCs3

FREQUENCY OF DEFICIENCY AND INSUFFICIENCY OF VITAMIN D IN 547 PREGNANT BULGARIAN WOMEN (SCREENING OF BULGARIAN SOCIETY OF ENDOCRINOLOGY)

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Objective: Population screening data are available in Bulgaria on the prevalence of vitamin D deficiency and its distribution by gender, age, place of residence, as well as its seasonal dynamics. Our aim was population screening for vitamin D level in pregnant women in Bulgaria.

Methods: 547 pregnant Bulgarian women from 10 regions of the country or a total of 84 settlements (large, small towns and adjacent villages) were surveyed. The mean age of pregnant women is 30±5 y, median-30 (18-47). Pregnant women are also distributed according to the duration of pregnancy: first trimester 111 (20.3%), second trimester 275 (50.4%), third trimester 161 (29.3%). We investigated: height, weight at the time of pregnancy and pre-pregnancy; BMI is calculated; the level of 25(OH)D was determined by chemiluminescent immunoassay. Statistics – characteristics of quantitative variables, frequency distributions of qualitative variables by age groups, nonparametric correlation.

Results: The mean BMI before pregnancy was 23.57±6.9 kg/m^2; and at the time of screening the mean BMI was 26.15±7.28 kg/m^2. The mean level of 25(OH)D for the whole group of pregnant women was 25.86±9.46 ng/ml, i.e., vitamin D deficiency is present among Bulgarian pregnant women. According to the level of 25(OH)D, pregnant women were divided into 4 groups: 1 – severely deficient <10 ng/ml, 2 – moderate deficient 10-20 ng/ml, 3 – insufficient 20-30 ng/ml, 4 – with sufficient >30 ng/ml. It was found that 72.94% of pregnant women are deficient or insufficient of vitamin D (27% are deficient and 45.88% are insufficient). Only 27% of pregnant women have normal level of vitamin D. There is a significant correlation of vitamin D with age [Spearman's rho=0.151, p<0.0001], with pre-pregnancy BMI [Spearman's rho=-0.142, p<0.001] and BMI at present [Spearman's rho=-0.171, p<0.0001], but not correlation with gestational week (NS).

Conclusion: The population of pregnant Bulgarian women should be adequately supplemented with cholecalciferol.

OCs4

DISCONTINUATION OF DENOSUMAB RESULTS IN RAPID INCREASE OF BONE RESORPTION AND LOSS OF BONE MINERAL DENSITY GAIN

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Objective: Denosumab acts as the strongest known inhibitor of bone resorption. It significantly reduces the risk of all types of osteoporotic fractures. Unlike bisphosphonates, it does not bind to the bone, therefore its effect is completely reversible. Duration of treatment with denosumab should be 10 y for high risk patients and 4-5 y for the rest. Discontinuation of denosumab results in rapid increase of bone resorption and loss of BMD gain.

Methods: Denosumab is a fully human monoclonal antibody against RANKL, a cytokine playing a crucial role in osteoclast formation, therefore functioning as the strongest inhibitor of bone resorption. For treating postmenopausal osteoporosis, it is administered as a subcutaneous injection every 6 months. Discontinuing denosumab in clinical trials resulted in a rapid increase of bone resorption and loss of BMD, which was only slightly higher after a year than in the group receiving placebo.

Results: Therefore, it seems likely that discontinuing denosumab increases the risk for multiple vertebral fractures due to sudden and excessive growth of bone breakdown. In our 9 patients, who discontinued taking denosumab, lumbar BMD decreased for 15.3% on the hip to 9.1% in 1 year. Based on baseline values, lumbar BMD decreased for 4.5% on the hip to 2.4%.

Conclusion: Denosumab effectively prevents osteoporotic fractures. After its discontinuation treatment should continue with antiresorptive therapy, preferably bisphosphonate, to prevent fast bone breakdown and loss of BMD gain as well as potentially increased risk for vertebral fractures.

OCs5

CONSERVATIVE OR SURGICAL TREATMENT IN QUALITY OF LIFE PERCEPTION OF PATIENTS AFTER 3 YEARS OF VERTEBRAL OSTEOPOROTIC FRACTURE

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Objective: To assess the quality of life in patients who had clinical vertebral fracture due to osteoporosis who received conservative and surgical treatment after 3 y.

Methods: Comparative cross-sectional analytical study. Considering the patients who had osteoporotic vertebral fractures during 2015, 51 patients who received conservative treatment and 51 patients with surgical treatment (arthrodesis, vertebroplasty/ kyphoplasty) were randomly selected. The specific quality of life scale for vertebral fractures due to osteoporosis QUALEFFO and WHODAS were applied. Statistical analysis: synthesis of quantitative data with measures of central tendency, qualitative data frequencies. Qualitative comparisons using chi-square, quantitative according to type of distribution T-student, Mann-Whitney U, Pearson and Spearman correlation, ANOVA analysis of variance with Welch test, Brown-Forsythe and post-hoc analysis with Gamos-Howell. Significance level p=0.05. Protocol was registered in the institutional research committee.

Results: We included 51 patients in the conservative group and 51 in the surgical group (arthrodesis=27 and vertebroplasty/ kyphoplasty 24). The average age was 70.4 (9.8) range from 53-96 and 71.6 (9.1) from 53-96 y, respectively. No significant difference between both groups by age (p=0.53, student t). However, when dividing by intervention, a significant difference was observed for the conservative (0.019) and arthrodesis (0.001) treatment groups in relation to the average vertebroplasty group. When we analyzed the two groups, a better quality of life was observed in the conservative group (X=32.5±16.9) than in the surgical group (X=38.3±17.4; p=0.08). When analyzing by subgroups, a better perception of quality of life was observed in the arthrodesis group (29.03±13.83) in comparison with conservative and vertebroplasty (X=48.76±15.11; vs. conservative p=0.003; vs. arthrodesis p=0.001). The same behavior was observed for pain, mobility, social and leisure time domains. 17 patients had second fractures, pharmacological osteoporosis treatment was given to 43 patients (11 with second fractures). Hypertension was associated with second fractures (n=42 patients; p=0.03). Age was positively correlated with the perception of quality of life (r=0.809; p=001).

Conclusion: A better perception of quality of life was observed in patients who underwent arthrodesis and conservative management in relation to patients who were treated with vertebroplasty 3 years after the event. The reported performance was better for the domains of the scale in relation to pain, activities of human daily life, housework, mobility, social and leisure time, general health. Age was associated with the perception of quality of life. Hypertension was linked to the incidence of second fractures.

OCs6

PERFORMANCE OF THE "YUBI-WAKKA (FINGER-RING)" TEST AS SELF-SCREENING METHOD FOR SARCOPENIA USING THE SARCOPHAGE, BELGIAN COHORT STUDY

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Objective: Last year, a very original and easy-to-use self-screening method for sarcopenia was introduced by Tanaka et al. The "Yubi-wakka (finger-ring)" test checks whether the maximum non-dominant calf circumference is bigger than the individual's own finger-ring circumference and is used as a screening method for sarcopenia. We aim to measure the performance of this new screening method in a Belgian study by measuring its specificity (Sp), sensibility (Se), positive and negative predictive values (PPV, NPV) against a clinical diagnosis of sarcopenia.

Methods: We applied procedure during the 5-year follow-up examination of the Belgian SarcoPhAge (Sarcopenia and Physical impairments with advancing Age) cohort, a population-based study including individuals aged 65 years and older. Sarcopenia was diagnosed according to the revised criteria of EWGSOP2. Muscle mass was measured by daily-calibrated Dual-Energy x-ray absorptiometry and muscle strength was measured using a calibrated Jamar handheld dynamometer. Participants were asked to apply a self-screening for sarcopenia using the finger-ring test. Participants were classified "bigger", "just fit" or "smaller" based on the comparison between their right calf-circumference and the right finger-ring circumference (formed by the thumb and the forefinger of both hands).

Results: 272 participants were included in this analysis (mean age of 77.5±5.37 years, 53.2% of women), with 32 participants diagnosed sarcopenia according to EWGSOP2 criteria (11.8%). Using a classification with both "just fit" or "smaller" as being at risk of sarcopenia, we found the following results: Se=68.7%, Sp=46.2%, PPV=14.6%, NPV=91.7% and accuracy=48.9%. Using the solely criteria of "smaller" as being at risk of sarcopenia, we found the following results: Se=53.1%, a Sp=78.3%, PPV=24.6%, NPV=92.6% and accuracy=75.4%.

Conclusion: The overall probability that a participant is correctly classified as sarcopenic using the "Yubi-wakka (finger-ring) test" in our population is increased when the calf-circumference is smaller than the finger-ring circumference of this same participant. This extremely practical method of self-screening of sarcopenia has been shown, for the very first time, to have a moderate sensitivity and acceptable specificity in regards of sarcopenia diagnosis. As comparison, the SARC-F questionnaire, a well-known screening test for sarcopenia has an even lower sensitivity but a better specificity[1].

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OCs7

CUSTOMIZED POSTURAL REBALANCING IN OS-TEOPENIC SUBJECTS WITH PAINFUL DEVIATIONS OF THE SPINE: PRELIMINARY FUNCTIONAL AND DENSITOMETRIC RESULTS

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Objective: Evaluation of the functional and densitometric effects of a personalized postural rebalancing process aimed at improving the static and dynamic postural structure in subjects suffering from osteoporosis and rachialgia. Posture is the result of the functional interaction between the biomechanical, neurophysiological, psychological and psychomotor components of the individual, and is achieved through the tonic reflex contraction of the antigravity muscles. muscle strength and work affect bone remodeling: according to Wolff's Law, the load modifies the geometric properties of the bone, inducing it to be deposited where needed and reabsorbed where useless, thus contrasting the same load [1].

Methods: Six patients affected by osteopenia, pain and deviations of the spine in kyphosis and/or scoliosis, underwent a morphofunctional examination of posture and an ultrasound bone densitometry by radiofrequency echographic multispectrometry (REMS) [2] at lumbar spine and femur. On the basis of the postural physical examination, a customized program of exercises (the "C.A.MO.® method") was proposed to each patient, aimed to remove any incongruous postural and behavioral scheme and to create a new correct one, lasting one hour to be carried out individually with bi-weekly frequency over 4 weeks. At the end of the program, a new morphofunctional exam and a new REMS analysis were performed to each patient.

Results: All the patients reported a visible improvement of postural structure, a reduction in spine deflections and complete pain relief. Furthermore, 2 subjects of 6 have curiously shown also a slight but interesting improvement of the femoral T-score at the REMS (+0.2 DS), and the maintenance of vertebral values, after just one month of postural exercise.

Conclusion: These preliminary data suggest that a customized program of postural exercise, in addition to improving body awareness and preventing the risk of falling, can provide a stimulation on the bone mass, as well as on the postural musculature, with an osteotrophic effect in the short term.

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OCs8

AN INTERACTIVE BENEFITS AND BUDGET IMPACT CALCULATOR TO ESTIMATE POTENTIAL EFFECTS OF FRACTURE LIAISON SERVICES

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Objective: To develop an interactive tool that models the expected clinical and healthcare resource use impact from fracture liaison services (FLS).

Methods: Model type, time horizon, patient description and schema were retrieved from a literature review of published economic models. A patient pathway was developed based on the review and multinational expert clinician and health economist input. An economic model was designed to estimate the clinical and healthcare resource impacts of implementing an FLS.

Results: After removing duplicates and screening titles and abstracts, the full text of 33 studies were reviewed and 20 included for analysis from 1173 publications. Most studies used cohort-based, Markov models with a lifetime horizon. Hip and vertebrae were the commonest fractures sites. Patient pathways varied across models and included screening, patient classification, treatment, and discharge locations. Following expert input, a single patient pathway was built where patients would attend the Emergency Room following an index fracture and then be discharged, referred to ambulatory care or admitted for treatment. Discharge destinations include their own home, that of a relative, or career-supported setting. An interactive model was developed to estimate the benefits and budget impact of FLSs. A patient-level simulation was used, considering how previous events affect re-fracture rates. Patients transit through health states for hip, spine and other fractures, fracture-free and death, over two and five years. The model generates estimates for the effects of scenarios with and without an FLS, on identifying fractured patients, running investigations, recommending treatment and monitoring. Clinical outcomes include fractures and mortality; resource outcomes include hospital admissions, bed days, operations, theatre time, community rehabilitation, and costs of the FLS. The model is currently undergoing input parameter population and calibration for Spain and Japan and is expected to be operational for two dozen countries by 2022.

Conclusion: A novel interactive model to estimate the benefits and budget impact of FLSs has been developed. This will be a critical tool to inform decision making at the national and local levels to reduce secondary fractures, frailty and mortality in older patients.

OCs9

OVERLAP BETWEEN OSTEOSARCOPENIA AND FRAILTY AND THEIR ASSOCIATION WITH POOR HEALTH CONDITIONS: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: Osteosarcopenia and frailty are correlates of musculoskeletal aging, with several adverse health outcomes. However, risk factors for osteosarcopenia with frailty and associated poor health conditions remain unclear. The aim of this study is to investigate the clinical characteristics and relevant factors for osteosarcopenia with frailty in the Iranian elderly.

Methods: A total of 2426 Iranian adults aged ≥60 y, participating in stage II of the BEH program, a population-based prospective cohort study; were included in this study. Osteopenia/osteoporosis was defined as a T-score ≤ -1.0 SD below the mean values of a young healthy adult. We defined sarcopenia as reduced skeletal muscle mass plus low muscle strength and/or low physical performance. Osteosarcopenia was considered as the presence of both osteopenia/osteoporosis and sarcopenia. Frailty was assessed by Fried criteria including; weight loss, exhaustion, low muscle strength, slow gait speed, and low physical activity. We assessed history of falls in the past year, health-related quality of life (HRQOL), including physical component summary (PCS) and mental component summary (MCS), history fractures and Self-reported activities of daily living (ADLs).

Results: The prevalence of osteosarcopenia with frailty was 5.0%; such participants were older and had lower protein and energy intake, and lower BMI. Osteosarcopenia with frailty participants were significantly associated with incident falls (OR: 1.66, 95%CI: 1.04-2.66), poor daily activities (OR: 2.52, 95%CI: 1.64-3.89) and poor HRQOL in full models. However, Osteosarcopenia with frailty was associated with a history of fractures, in the multivariate model this association was diluted.

Conclusion: This study showed that osteosarcopenia with frailty was associated with incidences of falls, poor daily activities, and poor HRQOL among Iranian older people. Therefore, intervention programs should take an integrated approach to strengthen musculoskeletal health as well as prevention of falls and other health conditions in older people, especially in frail participants.

OCs10

PHARMACOGENETICS OF RESPONSE TO BISPHOSPHONATE TREATMENT IN POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Treatment strategy of osteoporosis (OP) is mainly based on increase in BMD and reduction of fracture risk. Bisphosphonates (BPs) are the most commonly used first-line antiresorptive agents. However, up to 30-50% of OP patients exhibit inadequate treatment response to BPs treatment, mainly due to resistance. Use of genetic markers to predict treatment response to BPs has huge potential. The aim of this study was to develop personalized approach for the assessment of the individual response to BPs treatment of OP based on screening of genetic markers before pharmacotherapy.

Methods: In total, 201 subjects with OP treated with BPs were included in the study, mean age 64.0, mean treatment duration 2.1 y. Lumbar spine (LS) BMD was measured DXA (GE Lunar, USA). *SOST* (sclerostin, rs1234612), *PTH* (PTH, rs7125774), *FGF2* (fibroblast growth factor 2, rs6854081), *FDPS* (farnesyl diphosphate synthase, rs2297480), *GGPS1* (geranylgeranyl diphosphate synthase, rs10925503), and *LRP5* (LDLR-related protein 5, rs3736228) markers were determined using the quantitative PCR.

Results: Response to BPs therapy was evaluated according to the BMD trend in LS region. 122 patients were identified as responders (increased lumbar spine BMD that exceeded the least significant change) and 79 – as nonresponders (decrease in BMD, more detailed in [1]). No statistically significant difference was observed in baseline BMD levels between responders and nonresponders, but it was identified after treatment (Figure).
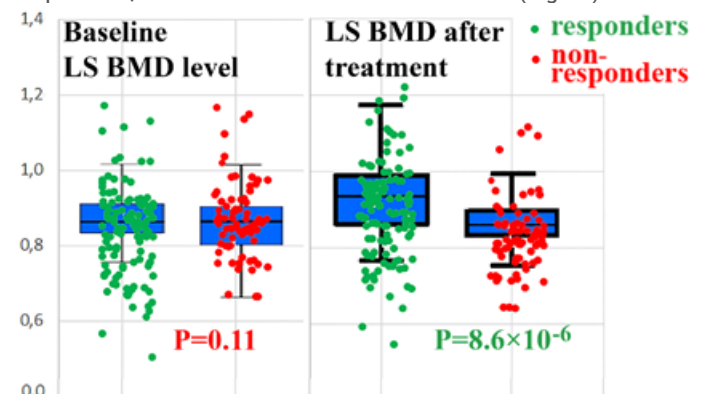

Figure. Baseline LS BMD levels in responders and nonresponders and after BPs therapy

SOST T/T, *PTH* T/T, *FDPS* G/G, *GGPS1* T/T genotypes were significantly over-represented in nonresponders (P<0.002 for all

variants), suggesting their association with negative response to BPs therapy. Multiple analysis of *FDPS* and *GGPS1* genes revealed a dramatical increase in the risk of negative response to BPs therapy (OR=5.2 (95%CI 2.8-9.9, P=0.0001, [1]).

Conclusion: Our findings highlight the importance of identified genetic markers for pharmacogenetics of BPs therapy of osteoporosis as a new strategy for personalized antiresorptive therapy.

Reference: Marozik P et al. PLoS ONE 2019;14:e0221511.

OCs11

HIP AREAL BMD BY DXA (ABMD) AND HIP VOLUMETRIC BMD BY 3D MODELING OF HIP DXA (VBMD) ARE HIGHLY CORRELATED IN BOTH FRACTURE PREVALENT AND FRACTURE NONPREVALENT OSTEOPOROSIS PATIENTS

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Objective: Hip fractures are the most serious fragility fracture, accounting for the greatest morbidity, mortality, and health care expense. There is a need to investigate clinically available tools designed to improve estimates of fracture risk, to better evaluate patients who may be candidates for osteoporosis pharmacotherapy. This may complement prevalent fragility fracture, aBMD, and fracture risk assessment tools. We investigated the correlation of hip aBMD with hip vBMD derived from modeling hip DXA data in patients with and without prevalent fragility fractures.

Methods: We retrospectively reviewed treatment-naïve osteoporosis patients prior to initiating osteoporosis therapy, from an osteoporosis referral centre. Patients were clinically determined to be candidates for osteoporosis therapy. Patients were divided into fracture prevalent and fracture non-prevalent groups defining prevalent fracture as hip, spine, pelvis, humerus, clavicle, rib, forearm, and lower leg fractures. Total hip aBMD was evaluated by DXA (Hologic Discovery) and integral hip vBMD by 3D-SHAPER (v2.7.3, Galgo Medical SL, Spain). 3D-SHAPER registers a 3D appearance model of the femoral shape and density onto the DXA projection to obtain a 3D subject-specific model of the femur and can quantitate vBMD at various regions. Correlations were evaluated by Pearson tests.

Results: We included 133 patients (115 females, 18 males). Mean age was 70.66 ± 10.4 y; mean total hip (TH) aBMD was 0.69 mg/cm^2; mean femoral neck (FN) aBMD was 0.57 mg/cm^2. There were 76 patients with a prevalent fracture (57%) of whom 11 had a hip fracture. We observed a high correlation between hip integral vBMD and TH aBMD in both fracture (r=0.85 p<0.0001) and nonfracture (r=0.72 p<0.0001) prevalent groups. FN aBMD also correlated well with hip integral vBMD in fracture (r=0.79 p<0.0001) patients. There was a lower FN aBMD correlation with hip integral vBMD in nonfracture patients (r=0.41 p=0.0017).

Conclusion: The validation of software modeling hip strength

or volumetric BMD from routine hip DXA scans may prove to be an important and clinically available technology to improve the clinical evaluation of fracture risk. Further studies are required to evaluate fracture risk prospectively with this technique.

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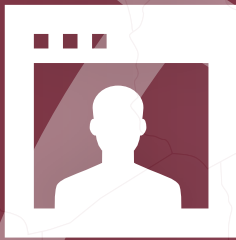
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CSA-OC1
NOVEL TECHNOLOGIES FOR THE NON-INVASIVE EVALUATION OF FEMORAL STRENGTH IN FRAC-TURE RISK ASSESSMENT

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Objective: There were 1.6 million hip fractures worldwide in 2000, with incidence expected to increase 3 to 4-fold by 2050. The risk of hip fractures increases exponentially with age due to a progressive loss of bone mass, deterioration of bone structure and increased incidence of falls. DXA-based areal bone mineral density (aBMD) is the most commonly used surrogate marker of femoral strength. However, age-related declines in bone strength exceed those of aBMD and the majority of fractures occur in those who are not identified as osteoporotic by aBMD. Thus, the development of accurate methods to estimate bone strength *in vivo* would be useful to improve the prediction of hip fracture risk and monitor the efficacy of therapies. Thus, we aimed to critically evaluate the clinical utility of non-invasive evaluations of hip strength.

Materials and Methods: We conducted a literature search and reviewed experimental and clinical evidence regarding the association between aBMD and/or CT-finite element analysis (FEA) estimated femoral strength and hip fracture risk as well as their changes with treatment.

Results: Our review confirmed that femoral aBMD and strength estimates by CT-FEA explain a large proportion of femoral strength *ex vivo* and are strong predictors of hip fracture risk. In addition, changes in femoral aBMD are strongly associated with anti-fracture efficacy of osteoporosis treatments, though comparable data for CT-FEA are currently not available.

Conclusions: Hip aBMD and estimated femoral strength are good predictors of fracture risk and could potentially be used as surrogate endpoints for fracture in clinical trials.

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CSA-OC2
OPTIMISATION OF BONE HEALTH IN CHRONIC KIDNEY DISEASE: EUROD-IOF CONSENSUS STATE-MENT

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Background
Chronic Kidney Disease (CKD) is defined by the Kidney Disease: Improving Global Outcomes (KDIGO) CKD guideline as abnormalities of kidney structure or function, present for more than three months, with implications for health including an increased risk of fragility fractures. While there are many anti-osteoporosis medications for patients, management of patients with CKD stage 4-5D remains challenging because of the complex pathophysiology of their bone fragility and paucity of data on efficacy and safety of AOMs in this specific population.
Method
The European Renal Association - European Dialysis and Transplant Association (ERA-EDTA) CKD-MBD working group, in collaboration with the International Osteoporosis Foundation convened in 2018 a working group to inventory evidence gaps concerning the diagnosis and treatment of osteoporosis in patients with CKD stage 4-5D, to list important research questions, and to provide some guidance in the absence of hard evidence.
Results
Consensus statements were produced for diagnosis of osteoporosis, risk factors for fragility fractures, assessment of fracture risk, intervention thresholds for pharmacological intervention, non-pharmacological intervention, pharmacological intervention, monitoring and systems of care. The working group also produced a priority list of research questions and perspectives.
Conclusion
This statement aims to inform the care of patients with CKD 4/5 to reduce their risk of fragility fractures. Evaluation of patient outcomes and clinician experience following the implementation of the consensus is now needed.

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CSA-OC3
MAXIMISING FUNCTION THROUGH POST-FRAC-TURE REHABILITATION

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The International Osteoporosis Foundation formed the Rehabilitation Working Group in 2018 and this group was tasked with conducting a scoping review on the current evidence base for rehabilitation strategies post fragility fracture. Exercise post fragility fracture to the spine and hip is strongly recommended to improve quality of life, reduce pain and improve physical function. Outpatient physiotherapy post hip fracture has a stronger evidence base than outpatient physiotherapy post vertebral fracture. Education increases understanding of osteoporosis and may improve other health outcomes such as pain. Appropriate nutritional care after fragility fracture provides a large range of improvement in morbidity and mortality. Future research is considering transitions of care and continuity of care for the patient post fragility fracture.

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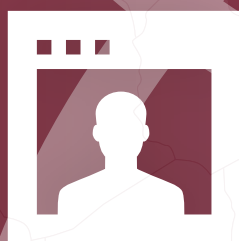
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NSS1
GUIDELINES FOR HORMONAL APPROACH ON TRANSGENDER PATIENTS

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Gender dysphoria refers to the condition in which a person experiences incongruence between their gender identity and the biological sex designated at birth, leading them to persistent discomfort with the expected social role and functional deterioration in different areas of daily life (1). In adults, it is defined by the criteria included in the DSM-V manual (2) (3). They are categorized as transgender women or trans / female women (change from man to woman: MtF / man to woman) and transgender men or trans man / man (change from woman to man: FtM / woman to man) (1) (4). With respect to the prevalence of gender dysphoria, the data varies in the publications over time (changes in the definition and criteria of diagnosis varies over time), however, a systematic review and meta-analysis of observational studies conducted between 1945 and 2014, of which 85.7% were conducted in Europe, found a global prevalence of 4.6 in 100,000 individuals, 6.8 and 2.6 for transgender women and men, respectively (5). Once the diagnosis is confirmed, the process of gender affirming therapies can be initiated ideally in a center that has multidisciplinary care (Endocrinology, Psychiatry, Urology, Gynecology, Plastic Surgery) and management experience (2,4). The gender affirmation process is achieved through several steps that include: continuous support therapy by Psychiatry, use of hormonal therapy and, in some cases, gender affirmation surgery (2). The goal of gender affirmation hormone therapy is to reduce endogenous sex hormone levels and secondary sexual characteristics of biological sex and replace hormone levels consistent with gender identity, mitigating discomfort related to incongruity. (6). For hormonal therapy, different schemes are used (dose, administration and periodicity) that are chosen according to the individual characteristics and preferences of the patients, testosterone (FtM) and estrogens (in association or not with antidrogenic agents) (MtF) being the most used medications. Periodic follow-up sessions include anamnesis, exploration of physical signs of virilization/feminization, serum hormone levels and surveillance of complications associated with hormone administration (4) (6) (7) (8). Through the measurement of testosterone and estrogen levels, the biochemical response to hormonal treatment is evaluated. In transgender women, the biochemical goal is obtained with levels of total testosterone <50 ng / dl and serum estradiol in the normal physiological range of cisgender women (between 20-200 pg / ml) and for the group of transgender men with a level of estradiol <50 pg / ml and total testosterone levels within the physiological range corresponding to cis men (350-700 ng / dl) (6). The intentional use of supraphysiological doses or the use of inadequate doses to maintain the serum concentration of crossed sex hormones within the physiological range of the gender affirmed, may constitute a risk factor for the development of some complications, such as osteoporosis (especially in cases of patients with genital

affirmation surgery / gonadectomy and who have suspended the affirmative hormonal substitution), increased cardiovascular risk, thromboembolic disease, increased risk of cancer, among others. (2) (6) (9)

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NSS2
FROM MAN TO WOMAN AND FROM WOMAN TO MAN: DOES IT MATTER?

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It has been described that as long as a transgender individual is on standard gender affirming hormone treatment bone mass density (BMD) should not decrease, however the opposite is true in case of periods of hypogonadism or bad compliance to hormone therapy (HT). The Z score of transgender individuals should be calculated using the gender conforming the individuals identity. (1). Androgens have a special role on trabecular bone health and both testosterone and estradiol are important for cortical bone health (3). Reports have discovered that transgender women have

lower bone density compared to cisgender men before HT which has been hypothesized to be due to low physical activity, Vitamin D deficit and cigarette smoking (1,2,3). In transgender women an statistical significant increase has been described on lumbar spine bone mass density (BMD), to opposite is true for hip BMD (2). In transgender men similar bone composition at baseline has been found compared to cisgender women. Hormone therapy has shown to preserve or increase bone density which hypothesized to be due to the aromatization of testosterone to estradiol, which has been reported specially in transmen of postmenopausal age. In addition, there is an increase in both muscle mass and strength (2,3,5). It is important to conclude that HT has not been associated with a negative effect on BMD, indicating bone safety in transgender individuals (4). The story is different in cohorts after gonadectomy where a decreased has been observed, which could be due to periods of hypogonadism (6).

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NSS3
DENSITOMETRIC ACQUISITION, ANALYSIS AND REPORTING

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The International Society for Clinical Densitometry (ISCD) issued a Position Statement paper addressing steps to be followed once performing densitometric procedures that should be followed for the transgender patints. One of the recommedations is that the T-scores should be used to diagnose osteoporosis, according to age. Routine baseline BMD testing is not indicated in transgender women, who have lower BMD than cisgender men in 3 months before receive gender affirming hormone treatment - GAHT - (1). Baseline BMD testing is indicated for TG women and men individuals if they have any of the following conditions: history of gonadectomy or therapy that lowers endogenous gonadal steroid levels prior to initiation of HT, hypogonadism with no plan to take GAHT, existing ISCD indications for BMD testing, such as glucocorticoid use and hyperparathyroidism (1). About T- and Z-Score calculation in TG individuals, T-scores should be calculated using a uniform Caucasian (nonrace adjusted) female normative database for all TG individuals of all ethnic groups; ISCD (2019) recommends using a T-score of <2.5 for diagnosis of osteoporosis in all TG individuals >50 years old, regardless of hormonal status. Z-scores should be calculated using the normative database that matches the gender identity of the individual according to the ISCD 2013 guidelines (2). Transgender men have been reported to have favorable BMD measurements compared to cisgender women (3). Other ISCD recommendations are to evaluate both transgenders - male and female - according to the Z-score derived from the cisgender when they have received at least 3 months of hormone therapy. Another very important point is that BMD testing should be done as closest as possible to gonadectomy (if present), and preferably prior to the initiation of hormone therapy (1). The male database is better for calculation of the Z score in transgender men because the BMD in transgender men is higher than in cisgender women; on the other hand, the review of the literature suggests that using the female database to calculate Z scores in transgender women is more valid than using the male database. The ideal situation would be to have a database of transgender women and men (2). Transgender male have a larger bone size and studies report a maintained BMD (4,5).

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NSS4
RECOMENDATIONS TO MAINTAIN BONE HEALTH ON TRANSGENDER PATIENTS

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The International Society of Clinical Densitometry (ISCD) published in 2109, the recommendations in transgender (TG) patients based on indications for baseline Bone Mineral Density (BMD) testing, follow-up BMD testing and T- & Z-Score calculation, FRAX and DXA reports parameters (1). The Follow-up BMD testing is not indicated in TG individuals on Hormone Therapy (HT) because gender affirming hormone treatment (GAHT) increases or maintains BMD unless there is low bone density as defined by current ISCD guidelines or another reason to suspect bone loss (treatment to suppress puberty, such as GnRH analogs, no therapeutic adherence or inadequate doses of GAHT, plan to discontinue GAHT, and presence of other risks for bone loss or fragility fracture). BMD testing intervals should be individualized (every 1- 2 yr until BMD is stable (1). Routine baseline BMD testing is not indicated in transgender women, who have lower BMD than cisgender men in 3 months before receive gender affirming hormone treatment (GAHT), maybe due to lower mean duration of sports activity than cisgender male controls, leading to lower muscle strength resulting in the lower BMD. Over the long term GAHT, the BMD is stable and there is no evidence of a higher imminent fracture risk (2,3,4,5). On the other hand, transgender men have been reported to have favorable BMD measurements compared to cisgender women (6), and testosterone therapy increases or maintains BMD in transgender men, on a long time (4). For Fracture Risk Assessment Tool (FRAX) there is no scientific basis to recommend which gender to use in calculating fracture risk in TG individuals (7). The parameters to be included in the DXA report for transgender individuals are the same as are included in reports for the general population, but, the report should include both male and female Z-scores databases.(7)

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NSS5
GLOBAL IMPACT OF BONE HEALTH TELEECHO: THE PROTOTYPE FOR TECHNOLOGY ENABLED COLLABORATIVE LEARNING FOR SKELETAL HEALTHCARE

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Bone Health TeleECHO (Extension for Community Healthcare Outcomes) was established at the University of New Mexico Health Sciences Center (UNM HSC) through collaboration of the ECHO Institute and the Osteoporosis Foundation of New Mexico. It is the prototype for technology enabled collaborative learning to expand capacity to deliver best practice skeletal healthcare worldwide. The ECHO model of learning uses videoconferencing to link participants located anywhere there is an electronic connection. Learning is focused on interactive case-based discussions that recapitulate familiar learning strategies of postgraduate medical training programs. Since the launch of the first Bone Health TeleECHO, additional programs have been started in other US states and other countries. This is a report of the progress and challenges in the global development of Bone Health TeleECHO.

The proof-of-concept Bone Health TeleECHO program at UNM HSC was launched on October 5, 2015. Weekly (excluding holidays) videoconferences have been held since that time. Other Bone Health TeleECHO programs are based at locations that include Grand Blanc, Michigan; Washington, DC; Chicago, IL; Galway, Ireland; and Moscow, Russia. More are anticipated. Challenges for initiating and maintaining these include funding, staffing, recruitment of participants, and bureaucratic barriers.

Bone Health TeleECHO uses state-of-the-art communication technologies to connect participants to advance their level of knowledge, with the goal of making them better equipped to manage patients with bone diseases. It offers educational

opportunities with minimal disruption to office routines and relieves professional isolation that commonly occurs in a wide range of practice settings. Through replication and innovation in many global locations, Bone Health TeleECHO leverages scarce resources and expands capacity to provide better bone health care for more patients closer to home, with greater convenience and lower cost than referral to a specialty center.

NSS6
NATIONAL UNIVERSITY OF IRELAND GALWAY BONE HEALTH TELEECHO

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Ireland has a long history of using telemedicine for the care of patients with musculoskeletal diseases. It has been found that patient care delivered remotely with electronic technology is concordant with in-person visits for assessment, diagnosis, and patient satisfaction. Online learning has subsequently been expanded to educate primary care physicians in the care of musculoskeletal diseases. When virtual clinics were included as part of a fracture liaison service (FLS), osteoporosis treatment rates rose to over 80% for patients admitted to hospital for a hip fracture.

In 2012, staff at National University of Ireland, Galway (NUIG) traveled to the ECHO Institute at University of New Mexico Health Sciences Center in Albuquerque, New Mexico, USA. Intensive on-site training in the ECHO model of learning was provided at no cost in anticipation of launching NUIG Bone Health TeleECHO in 2012. The program was subsequently discontinued due to limited funding and loss of key staff, then reestablished in 2018. The program is now doing well, but challenges remain with limited sources of funding, limited time of participants, uncertain administrative support, and scheduling logistics.

NSS7
BONE HEALTH TELEECHO MOSCOW

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The ECHO model of learning and care management was developed at the University of New Mexico Health Sciences Center (USM HSC) in 2003. Project ECHO has since expanded to address many diseases and to include other countries. Bone Health TeleECHO was developed at the USM HSC with the aim to improve osteoporosis care and serve as a model for replication in other states and countries. Bone Health Tele ECHO Moscow has replicated the ECHO model to improve osteoporosis care in Russia. Each Russian TeleECHO session includes a short didactic presentation and discussion of clinical cases in a monthly 75-minute videoconference. Since the Russian continuing medical education system does not have the option to provide CME credits with teleECHO zoom based programs, all TeleECHO sessions are available as simultaneously recorded webinars.

Over the first 11 months of Bone Health TeleECHO Moscow there were 701 participants with the mean number 64 participants per session from all parts of Russia and other countries (Belarus, Kazakhstan, Armenia). In addition to this 1543 participants watched the simultaneously recorded webinars. Physicians' self-confidence in osteoporosis care was assessed with a questionnaire which incorporated the 20 domains of osteoporosis care. The results showed substantial improvement with ECHO intervention among 131 participants who confirmed that they attended from 3 to 11 Bone Health TeleECHO clinics. The respondents (125 women and 6 men, mean age 41 (23-70), mainly endocrinologists (n=116) and other physicians) represented all the Federal Districts of Russia (19 from Southern; 61 from Central; 11 from Northwestern; 13 from Volga; 11 from Urals; 15 from Siberian and 1 from Eastern Federal Districts). There was a statistically significant (p<0.01) overall improvement in confidence of care for osteoporosis patients from slight to average or from average to competent with an effect size of 0.75 as classified according to the method of Cohen and Sawilowsky.

In conclusion, Bone Health TeleECHO is effectively replicated in Russia with similar self-confidence outcomes, allowing access in local time zone and language.

NSS8
RARE BONE DISEASE TELEECHO

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The management of rare bone diseases is challenging due to lack of knowledge for many of them, the scarcity of experienced experts, and often long distances between specialty centers and patients who could benefit from care. To address these unmet needs, Rare Bone Disease TeleECHO was established in 2019. The program is based with the Osteogenesis Imperfecta Foundation in Gaithersburg, Maryland, USA, with collaboration of the Rare Bone Disease Alliance. It is funded by grants through the Osteoporosis Foundation of New Mexico and directed by Laura Tosi, MD. The goal is to expand capacity to safely and effectively diagnose and treat rare bone diseases and disorders worldwide. Healthcare professionals interested in participating can register online at https://www.surveymonkey.com/r/rareboneECHO. Continuing medical education (CME) credits are offered at no charge.

In each monthly one-hour interactive videoconference, faculty members or guest speakers present a brief didactic presentation, followed by participant-led case presentations and discussions. The faculty encourages participants to present case studies related to rare bone diseases at each session. The experience to date has been extremely favorable, with a broad range of specialties participating from locations worldwide. There are typically at least 50 individuals attending each month.

Project ECHO is an innovative educational program developed at the University of New Mexico Health Sciences Center. This collaboration assists in expanding access to specialty care by

increasing capabilities of primary care providers, improving the health of the beneficiary population, decreasing costs associated with rare bone disease care, and ensuring a ready medical force.

NSS9
PRINCIPLES OF DEEP LEARNING AND MACHINE LEARNING

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Picture archiving and communications systems (PACS) are the information system paradigm used to transmit, store, retrieve and view large amounts of medical imaging data. The transition from the "lightbox paradigm" to the "workstation paradigm" provides an opportunity to electronically explore the significant determinants of image interpretation, develop optimal workflow patterns and create an ideal "person-machine" interface.

Artificial intelligence (AI) algorithms, particularly deep learning, have demonstrated remarkable progress in image-recognition tasks such as detection, characterization and monitoring of diseases. In addition, AI can impact of the organizational structure on the delivery, quality, cost, and access to health care resources.

AI has recently received attention in medical imaging in part because of substantial improvements in image recognition performance, based largely on a class of algorithms known as deep learning. Deep learning is a class of machine learning algorithms that uses multiple layers to progressively extract higher-level features from the raw input. Machine learning carries the connotation that it is extremely complex. While it is methodologically rigorous it is more simple when expressed in mathematical terms. This presentation will describe the concepts common to all machine learning and provides a description of deep learning methods and components.

NSS10
ARTIFICIAL INTELLIGENCE IN VARIOUS MODALITIES OF MUSCULOSKELETAL IMAGING (RADIOGRAPHY, DXA, CT, MRI)

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[1]Diagnostic Radiology Department, Imaging Biomarkers and Computer-Aided Diagnosis (CAD) Laboratory, NIH Clinical Center, Bethesda, United States

There has been explosive growth recently in research on artificial intelligence in musculoskeletal imaging. This growth is attributable to advances made in machine learning by researchers in the fields of computer vision and medical image analysis. The potential clinical applications of artificial intelligence in musculoskeletal imaging are many, including fully-automated screening for osteoporosis, fracture detection, bone age assessment, degenerative disease quantification and oncology applications. The potential benefits to the patient are also many, including a reduction in diagnostic errors and interobserver variability, dissemination of expert knowledge through algorithms trained on relevant populations, and timelier image interpretation.

This presentation will highlight these applications and benefits, and will attempt to put these novel developments in artificial intelligence in musculoskeletal imaging in perspective.

NSS11
AUTOMATED KNEE OSTEOARTHRITIS ASSESSMENT BY AI INCREASES PHYSICIANS' AGREEMENT RATE AND ACCURACY

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[1]Center for Regenerative Medicine and Center for Health Sciences and Medicine, Medical Faculty, Danube University Krems, Krems, Austria

Objective: The diagnosis of knee osteoarthritis depends on the identification and classification of several radiographic features, such as presence and degree of osteophytes, sclerosis, and joint space narrowing. Here, we assess the impact of a computerized system on physicians' accuracy and agreement rate, as compared to unaided diagnosis.

Methods: A set of 124 unilateral knee radiographs from the OAI study were selected and analyzed by a deep learning-based method with regard to Kellgren-Lawrence (KL) grade, as well as Joint Space Narrowing, Osteophytes and Sclerosis OARSI grades. Physicians were instructed to score all images, with respect to these features, in two modalities: being shown simply the image of a radiograph (unaided) and when presented with the report from the computer assisted detection system (aided). The two reading sessions were separated by an appropriate washout period. The readers were blinded to each other's grades and to the ground truth grading (OAI consensus grades). Agreement rates (Intra-Class Correlation - ICC) between the physicians were calculated for both modalities. Furthermore, the physicians' performance was compared to the ground truth grading (OAI consensus), and accuracy, sensitivity and specificity in both modalities were calculated for each feature.

Results: Agreement rates (ICC) for KL grade, sclerosis, and osteophyte OARSI grades, were statistically increased in the aided modality vs the unaided modality. Readings for Joint Space Narrowing OARSI grade did not show a statistical difference between the two modalities. Readers' accuracy for detection of any abnormality (KL>0), osteoarthritis (KL>1), sclerosis (sclerosis OARSI grade > 0), and osteophytosis (osteophyte OARSI grade > 0) was significantly increased in the aided modality. These increases in accuracy were driven by significant increases in specificity, with no statistical difference in sensitivity.

Conclusions: These results show the use of an automated knee osteoarthritis software increases consistency between physicians when grading radiographic features of OA. Furthermore, the use of a software solution increases specificity with no losses in sensitivity.

NSS12
CURRENT CHALLENGES FOR PRIMARY CARE OSTEOPOROSIS MANAGEMENT

Z. Paskins[1]

[1]Senior Lecturer and Honorary Consultant Rheumatologist, Primary Care Centre Versus Arthritis, Keele University, Keele, United Kingdom

The context for this symposium will be set using findings of a synthesis of qualitative research which provides some insight into the challenges primary care clinicians report in managing people with osteoporosis. Findings from empirical qualitative research which investigated the barriers and facilitators to incorporating fracture risk assessments in integrated primary care reviews will also be presented.

NSS13
WHAT OSTEOPOROSIS CARE LOOKS LIKE IN CURRENT UK GENERAL PRACTICE

E. Cottrell[1]

[1]General Practitioner and Senior Lecturer in General Practice, Keele University, Keele, United Kingdom

Using existing literature, findings from ongoing studies and real world audit data, the current primary care provision of osteoporosis management will be outlined.

NSS14
PRIMARY CARE AND THE MANAGEMENT OF SPECIAL GROUPS AT RISK OF FRACTURE

E. Cottrell[1]

[1]General Practitioner and Senior Lecturer in General Practice, Keele University, Keele, United Kingdom

Using real world audit data practical decision making and dilemmas encountered in primary care for special populations (e.g. those with eating disorders, chronic pancreatitis and previous bariatric surgery) will be highlighted.

NSS15
HOW PRIMARY CARE OSTEOPOROSIS MANAGEMENT CAN BE IMPROVED

J. Edwards[1,2]

[1]General Practitioner and a Senior Lecturer in General Practice, Keele University, Keele, United Kingdom, [2]Member of the UK National Osteoporosis Guidelines Group and the Royal Osteoporosis Society Bone Academy Clinical Effectiveness Working Group, Keele, United Kingdom

A practical approach to the roles of primary care in the management of fracture risk, using the best available evidence and available primary care resource will be outlined. Through a worked example, the means by which quality of primary care for fracture risk management can be measured will be demonstrated.

NSS16
SUMMING UP: CHALLENGES AND OPPORTUNITIES FOR BETTER INTEGRATION OF PRIMARY AND SECONDARY CARE

Z. Paskins[1]

[1]Senior Lecturer and Honorary Consultant Rheumatologist, Primary Care Centre Versus Arthritis, Keele University, Keele, United Kingdom

The implications for clinical practice and future research will be set, incorporating findings from the previous sessions.

NSS17
COLLABORATION FOR BETTER PATIENT OUTCOMES IN VERTEBRAL FRACTURE

J. Griffin[1]

[1]Clinical Lead- Quality improvement, Royal Osteoporosis Society, Bath, United Kingdom

Vertebral fragility fractures are associated with increased fracture risk, morbidity and mortality and only come to clinical attention in approximately 30% of cases. A large unmet need to identify those with high fracture risk who have not previously had vertebral fractures recognised is well understood and the Royal Osteoporosis Society (ROS) places high importance on this activity.

In 2017 the ROS published a clinical guidance to support the identification of vertebral fragility fractures within imaging departments and direct people with these fracture to appropriate secondary fracture prevention services.

The guidance served also to inspire the Royal College of Radiologists (RCR) audit programme to collaborate with the ROS in developing a national audit on the radiological reporting practice of vertebral fragility fractures as incidental findings on computed tomography (CT) scans in the UK.

Working together with the support from the Royal College of Physicians Falls and Fragility Fracture Audit Programme the ROS and RCR developed audit questions to evaluate adherence to the ROS standards set out in the guidance.

The questions also interrogated the use of outsourcing reporting, infrastructure and clinical pathways.

This unique collaboration also paved the way for RCR members to access quality improvement support and advice from the ROS and make links between radiology and secondary fracture prevention services which rarely interact.

NSS18
NATIONAL AUDIT ON THE REPORTING OF INCIDENTALLY FOUND VERTEBRAL FRACTURES IN ROUTINE RADIOLOGY PRACTICE

N. Mahmood[1]

[1]Royal College of Radiologists, London, United Kingdom

Objectives: To evaluate organisational reporting infrastructure and patient-related reporting data in the diagnosis of vertebral fragility fractures (VFF's) as demonstrated on computed tomography (CT).

Methods: Ethical approval for this type of study is not required in the UK. All UK radiology departments with an audit lead registered with The Royal College of Radiologists (RCR) were invited to participate in this retrospective audit. Organisational and patient specific questionnaires were completed with CT reporting data acquired from 50 consecutive non-traumatic studies including the thoracolumbar spine.

Results: 127 out of 202 departments (63%) supplied data to the study, with inclusion of 6357 patients. There was a lack of compliance with all audit standards: 79% of reports commented on bone integrity (target 100%), fracture severity was mentioned in 26.2% (target 100%), the recommended terminology 'vertebral fracture' was used in 60.3% (target 100%) and appropriate onward referral was recommended in 2.6% (target 100%).

Conclusions: The findings from this study should be used to improve the diagnosis and care for patients with osteoporotic VFF's. Solutions are multifactorial, but radiologist and FLS engagement is fundamental. This audit forms the baseline for further evaluation and a springboard for quality improvement work in the field, with RCR faculty, members and beyond.

NSS19
EVALUATION OF THE IDENTIFICATION OF VERTEBRAL FRACTURES WITHIN FRACTURE LIAISON SERVICES- LOOKING TO THE FUTURE

M. K. Javaid[1]

[1]Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, United Kingdom

The RCR audit has provided a foundation for relationships between Radiology and FLS and a baseline for further quality improvement work, around VFFs, across Radiology, the ROS and within the Royal College of Physicians Falls and Fragility Fracture Audit Programme (RCP FFFAP). The FFFAP manages the UK wide Fracture Liaison Service Database (FLSDB)- an audit of 71 FLS' practice against key performance indicators evidencing efficacy of these services with over 220,000 patient records to date.

In 2020 FLSDB is auditing the ability, effectiveness and resource required for FLS' to identify VFFs though radiology reporting. From a preparatory audit, 68% of FLS' planned to use CT and 60% MR to identify vertebral fractures however less than 60% would report their expected weekly number of scans. 26% FLS' felt unable to search radiology reports for specific phrases and 8 separate radiology reporting systems were in use across all the FLS'. 65% of FLS' would need training on VF identification and only 50% had identified a local radiologist.

The findings will be used to run a pilot of the main audit in January 2020 and then run the main RCP audit in September 2020. The finding of the audit will contextualise the effect of RCR reporting practice in clinical practice and builds an evidence base for the development of resourcing tools to support business case development for FLS'.

NSS20
EVALUATING THE DEMAND ON FRACTURE LIAISON SERVICES WITH EFFECTIVE IDENTIFICATION OF VERTEBRAL FRACTURES

H. Glenn[1]

[1]Royal Osteoporosis Society, Bath, United Kingdom

The ROS clinical guidance and RCR audit has raised the profile of identifying vertebral fragility fractures (VFFs) through routine clinical practice in the UK. This additional scrutiny has driven the need to understand the additional demand for FLS capacity where effective systems are in place to identify VFFs.

To address this the ROS has developed a demand model.

The demand model is informed by radiology audit data inputted at a local level based on the centre's demographics and specialisms. The model then proportions data depending on specific clinical criteria that maps to the ROS decision tree for VFFs referral to FLS. The final output being the number of new FLS referrals per number of radiology examinations routinely undertaken in a given period of time. E.g. per month.

This estimated demand is used to support services in understanding their local demand and to inform FLS business cases for resource to manage that demand.

NSS21
INTRODUCTIONS AND WELCOME/AIMS AND METHODS

E. Harding[1]

[1]The Health Policy Partnership (HPP), London, United Kingdom

The lecturer will provide background information on Osteoporosis and fragility fractures: a policy toolkit – a comprehensive resource for European policymakers which was launched online in January 2020. The policy toolkit was developed based on a pragmatic, evidence-focused literature review and expert interviews. Feedback and input was provided by an informal multidisciplinary group of expert stakeholders working at European and national level, including a Parliamentary Forum comprising former parliamentarians. The toolkit includes a call to action with specific asks for policymakers working at the European, national and regional levels. It has been endorsed by pan-European and national organisations. In addition, it includes ten country profiles (Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Romania, Spain, the UK).

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

NSS22
CRITICAL CHALLENGES IN OSTEOPOROSIS AND FRAGILITY FRACTURE CARE

C. Cooper[1,2,3,4]

[1]President, International Osteoporosis Foundation, Nyon, Switzerland, [2]Professor of Rheumatology and Director, MRC Lifecourse Epidemiology Unit, Southampton, United Kingdom, [3]Vice-Dean of Medicine, University of Southampton, Southampton, United Kingdom, [4]Professor of Epidemiology, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, United Kingdom

The lecturer will summarise key challenges in osteoporosis and fragility fracture care across Europe. This includes an absence of clear guidance for screening; gaps in early diagnosis and treatment of osteoporosis in primary care and post-fracture; a general lack of awareness and knowledge about osteoporosis and fragility fractures and low prioritisation at policy level, often leading to restricted reimbursement structures and little attention at care delivery level.

NSS23
POLICY ACTIONS NEEDED TO IMPROVE PREVENTION AND CARE OF OSTEOPOROSIS AND FRAGILITY FRACTURES

J. Bowis[1,2,3]

[1]Honorary Patron, Health First Europe, Brussels, Belgium, [2]Former Health Minister, London, United Kingdom, [3]Member of the European Parliament for the UK, Brussels, Belgium

The lecturer will present the core policy 'asks' contained in the toolkit. These are directed to European, national, and regional-level policymakers. The lecturer will also present five building blocks identified in the toolkit as essential for an effective policy response. These include: 1. Building a system that works: policies for scrutiny, accountability and investment, 2.Catching it early: detection and management in primary care, 3. Getting people back on track: facilitating multidisciplinary care post-fracture, 4. Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life, 5. Engaging patients and public: Awareness, activation and self-management.

NSS24
RANKL INHIBITION IMPROVES MUSCLE STRENGTH AND INSULIN SENSITIVITY AND RESTORES BONE MASS FROM MICE TO HUMANS

N. Bonnet[1], L. Bourgoin[1], E. Biver[1], E. Douni[2], S. Ferrari[1]

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Receptor activator of NFκB ligand (RANKL) activates, while osteoprotegerin (OPG) inhibits, osteoclastogenesis. In turn a neutralizing Ab against RANKL, denosumab, improves bone strength in osteoporosis. OPG has also been shown to improve muscle strength in mouse models of Duchenne's muscular dystrophy (mdx) and denervation-induced atrophy, but its role and mechanisms of action on muscle weakness in other conditions remains to be investigated. We investigated the effects of RANKL inhibitors on muscle in osteoporotic women and mice that either overexpress RANKL (HuRANKL-Tg+) or lack Pparb and concomitantly develop sarcopenia (Pparb-/-). In women, denosumab over 3 years improved appendicular lean mass and handgrip strength compared to no treatment, whereas bisphosphonate did not. HuRANKL-Tg+ mice display lower limb force and maximal speed, while their leg muscle mass is diminished, with a lower number of type I and II fibers. Both OPG and denosumab increase limb force proportionally to the increase in muscle mass. They markedly improve muscle insulin sensitivity and glucose uptake, and decrease anti-myogenic and inflammatory gene expression in muscle, such as myostatin and protein tyrosine phosphatase receptor-γ. Similarly, in Pparb-/-, OPG increases muscle volume and force, while also normalizing their insulin signaling and higher expression of inflammatory genes in skeletal muscle. In conclusions, RANKL deteriorates, while its inhibitors improve, muscle strength and insulin sensitivity in osteoporotic mice and humans. Hence denosumab could represent a novel therapeutic approach for sarcopenia.

NSS25
OLD AND NEW ROLES OF AMINO ACIDS AND AMINO BUTYRIC ACIDS IN MUSCULOSKELETAL DISEASES

M. Brotto[1], Z. Wang[2], L. Bian[3], C. Mo[2], H. Shen[4], L. J. Zhao[4], K. J. Su[4], M. Kukula[3], J. T. Lee[5], D. W. Armstrong[6], R. Recker[7], J. Lappe[7], L. F. Bonewald[8], H. W. Deng[4]

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The World Health Organization Burden of Disease Report informed that musculoskeletal diseases afflict 1/3 of the world's population with tremendous burden on societies and individuals. Osteosarcopenia (defined as combined osteoporosis and sarcopenia) affects older adults around the world and many times has devastating complications that affect their well-being and quality of life. During the last decade, we proposed to look at bone and muscle from a different view, particularly looking at its interactions. We referred to this phenomenon as bone-muscle crosstalk. Others and we discovered that bone and muscles secrete a number of molecules (myokines and osteokines) that are necessary for reciprocal optimal function. We now also have new evidence showing that amino acids, their metabolites, and aminobutyric acids may play an important role in bone-muscle crosstalk. Furthermore, we started exploring the potential utilization of some of these molecules for the diagnosis of musculoskeletal diseases. Specifically, we have developed a new metabolomics approaches to quantify these molecules. We recently applied these metabolomics approaches along with RNAseq and Bioinformatics to investigate their associations with bone mineral density in young and older women and in women with and without bone fractures. We will present and discuss these exciting new findings and propose the utilization of aminobutyric acids as a new class of molecules that holds great potential to improve early diagnosis and treatments of musculoskeletal diseases, particularly osteosarcopenia.

NSS26
FAT AS A THERAPEUTIC TARGET IN OSTEOSARCOPENIA

G. Duque[1,2], B. Kirk[1,2], A. Al Saedi[1,2]

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Fat infiltration is one of the hallmarks of sarcopenia and osteoporosis, thus of osteosarcopenia. High levels of marrow adipose tissue (MAT) are associated with bone loss and osteoporosis. MAT secretes adipocytokines and free fatty acids (FFAs), which are toxic to the cells in the vicinity of adipocytes, decreasing bone formation and increasing bone resorption. Similarly, fat infiltration in muscle fibers is associated with cell dysfunction. Amongst those MAT-secreted factors, FFAs (and predominantly palmitic acid), have demonstrated the stronger toxic effect on bone and muscle cells thus allowing us to propose that inhibition of fatty acid synthase in MAT could have an anabolic effect on muscle and bone. Our previous evidence in oophorectomized (OVX) mice has confirmed this hypothesis[1]. Treatment with an inhibitor of fatty acid synthase attenuated bone loss in OVX mice. In addition, cerulenin-treated OVX mice showed an increase in muscle mass and function. Overall, this preliminary evidence suggests that MAT-derived products could become a novel therapeutic target with dual anabolic effect on muscle and bone. A hypothesis that deserves further exploration.

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NSS27
DIVERSITY OF THE PATHOPHYSIOLOGY OF INCREASED BONE FRAGILITY IN RARE BONE DISEASES

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Objective: To increase awareness for the diverse pathophysiological mechanisms contributing to increased bone fragility in different rare bone diseases.

Methods: Overview of the different factors contributing to poor bone quality, decreased bone strength and increased bone fragility in various rare bone diseases.

Results: Determinants of bone strength include the structural (bone microarchitecture) and material (collagen and mineral) properties of bone, also determined by the cellular activities of bone modeling and remodeling, the disturbance of any of these components, potentially contributing to bone fragility, and increased fracture risk, in addition or independently of changes in bone mineral density. Insight is provided into the diversity of factors which may variably contribute to increased bone fragility by disrupting bone microarchitecture and geometry, altering the composition of bone tissue, altering bone remodeling and altering bone mineralization. Examples used to illustrate the contribution of these diverse mechanisms to increased fracture risk in rare bone disorders are the abnormal or decreased synthesis of type I collagen in osteogenesis imperfecta, the abnormal mineralization due to phosphate wasting in X-linked hypophosphatemic rickets (XLH), the failure of osteoclast development or function in osteopetrosis or the deficient activity of cathepsin K in pyknodysostosis, despite increased bone density in both disorders, the monostotic or polyostotic focal abnormal bone formation and mineralization in fibrous dysplasia/McCune

Albright syndrome, and the mineralization defect associated with loss of function mutation of the tissue non-specific isoenzyme of alkaline phosphatase (TNSALP) gene in hypophosphatasia.

Conclusion: Unravelling the diverse cellular and molecular pathophysiology of these rare bone diseases has paved the way for the development of therapies specifically targeting the abnormalities responsible for the pathophysiology of at least two of these disorders: the monoclonal anti-FGF23 antibody burosumab in XLH, and the recombinant TNSALP enzyme replacement therapy asfotase alfa in pediatric-onset hypophosphatasia.

NSS28

BONE QUALITY IN OSTEOGENESIS IMPERFECTA AND EFFECTS ON BONE FRAGILITY LUCA SANGIORGI

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Objective: to describe briefly the bone properties in Osteogenesis Imperfecta (OI) and its relationship with bone fragility observed in the disease.

Methods: Overview about bone quality, architecture and fragility in OI and related pathogenic mechanisms.

Results: Bone fragility leading to recurrent fractures is the main clinical feature in OI, for this reason it was also named "brittle bone disease". A number of factors contribute to this features.

Most cases of OI are related to mutations in *COL1A1* and *COL1A2* genes, causing abnormalities in collagen molecules and fibers. In OI bone we observe an abnormal bone matrix with hypermineralization. The brittleness is related to both bone matrix and architectural abnormalities. The lower trabecular number and thinner cortices, increase cortical porosity and the fracture risk, due to a reduction of the capacity of energy dissipation in bone for a modification of the mechanical properties of the OI bone.

OI type V and VI represent particular cases. In OI type V, histological examination shows bone lamellation is coarse or mesh-like and no alteration in mineralization rate. In OI type VI hystological appearance is typical fish-scale pattern of bone lamellation under polarized light, unmineralized osteoid, primary mineralization defect.

To monitor therapy effects and bone density, X-ray absorptiometry (DXA) is used, but it doesn't give detailed information about bone architecture. To quantify the geometric, microstructural, densitometric, and mechanical properties of human cortical and trabecular bone other methods should be applied, but they are not employed in standard clinical practice, as we can see in the few studies performed to study the microstructural properties of bone.

Conclusion: in OI lower trabecular number and connectivity as well as lower trabecular thickness and volumetric bone mass contribute to bone fragility; methods to study bone architecture could help to understand mechanisms of bone fragility and have new parameters related to fractures risk.

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NSS29

VITAMIN D DEFICIENCY AND AUTOIMMUNITY

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Vitamin D is a hormone involved in the regulation of musculoskeletal health. It regulates intestinal calcium absorption and it is involved in muscular integrity. Vitamin D also has extraskeletal functions which are in the center of research activities. One of the main extraskeletal functions of vitamin D is the regulation of the immune system.

Various cells of the immune system express the vitamin D receptor (VDR) and harbor 1α-hydroxylase and are therefore capable of locally producing active $1,25(OH)_2D_3$. Thus, cells of the immune system respond to vitamin D and activate vitamin D in a paracrine or autocrine fashion. Cells of the immune system which express the VDR and harbor 1α-hydroxylase include macrophages, T cells, dendritic cells, monocytes and B cells. Vitamin D is involved in the regulation of the innate immunity as it enhances the defense system of the organism against microbes and other pathogenic organisms and it modulates the adaptive immune system through direct effects on T cell activation and on the phenotype and function of antigen-presenting cells particularly dendritic cells. $1,25(OH)_2D_3$ suppresses T cell receptor induced T cell proliferation and changes cytokine expression. The overall shift is away from T helper Th1 phenotype toward a more tolerogenic Th2 response. Additionally, $1,25(OH)_2D_3$ suppresses autoimmunity and tissue destruction by inhibiting the Th17 response at several

levels. Vitamin D also appears to have a direct effect on B cells by inhibiting immunoglobulin production and interrupting B cell differentiation. $1,25(OH)_2D_3$ has effects on dendritic cells. Physiologic levels of $1,25(OH)_2D_3$ inhibit maturation of dendritic cells and maintain an immature and tolerogenic phenotype with inhibition of activation markers and up-regulation of inhibitory molecules.

Vitamin D is a potent immunomodulator and it has multiple and diverse effects on the immune system. It appears that the vitamin D status of an individual may have important immunologic consequences. In animal models of autoimmunity, it may prevent or ameliorate the expression of autoimmune disease. In the human, autoimmune diseases may be prevented or their clinical profile may be modulated by vitamin D.

NSS30
VITAMIN D DEFICIENCY AND RHEUMATOID ARTHRITIS

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Vitamin D is vital for calcium homeostasis and it is involved in the regulation of the immune system. Deficiency of vitamin D is associated with autoimmune diseases. Vitamin D deficiency is associated with an elevated risk for rheumatoid arthritis (RA).

A meta-analysis showed that low vitamin D intake is associated with the development of RA. Thereafter, several studies performed in various areas all over the world showed that vitamin D deficiency is observed in patients with RA and that vitamin D deficiency is associated with disease activity. A meta-analysis of the good quality studies performed regarding the association between vitamin D deficiency and RA showed that vitamin D deficiency is observed in RA patients significantly more than in a control group and that vitamin D levels are inversely correlated with disease activity, meaning that low vitamin D levels are associated with high disease activity. Moreover, RA incidence is increased in vitamin D deficient subjects and an inverse relationship exists between serum vitamin D levels and RA activity.

More studies are needed to explore the exact association between vitamin D deficiency and RA and to determine the best method of vitamin D supplementation and whether it may be used for the prevention of RA or for the best management of the disease. It has been proposed that vitamin D may contribute to the management of pain in RA and may be used supplementary to TNF-α inhibitors in RA treatment.

NSS31
VITAMIN D DEFICIENCY AND SYSTEMIC LUPUS ERYTHEMATOSUS

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Vitamin D has emerged as a potent immunomodulator. It may induce tolerance to self-antigens. On the contrary, vitamin D deficiency may induce loss of tolerance to self-antigens leading thereafter to the development of clinical autoimmune disease. Systemic lupus erythematosus (SLE) is a systemic autoimmune disease involving multiple systems and organs. Vitamin D deficiency has been observed in SLE patients and it may be implicated in disease pathogenesis.

In SLE the inflammatory milieu drives the development of T cells into proinflammatory pathways, defective function of Tregs and survival and activation of B cells which produce autoantibodies. Patients with SLE have lower $25(OH)D_3$ levels compared to controls, suggesting that vitamin D deficiency may be a risk factor for SLE. Most of the studies have also found higher SLE disease activity associated with lower levels of $25(OH)D_3$. As patients with SLE often have photosensitivity and are advised to avoid direct sun exposure, detecting vitamin D deficiency and replacing $25(OH)D_3$ with oral supplementation is critical and may have an impact on disease activity.

It appears that vitamin D deficiency may be observed in patients with SLE, a systemic autoimmune disease and it may be related to disease severity. Vitamin D supplementation along with standard immunomodulatory treatment may be critical for the long-term management of the disease in SLE patients.

NSS32
VITAMIN D RECEPTOR POLYMORPHISMS AND AUTOIMMUNE DISEASES

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The vitamin D receptor (VDR) is present in the T lymphocyte population increasing in the presence of $1,25(OH)_2D_3$. Thus, VDR seems to be implicated in the immune regulating action of vitamin D. VDR polymorphisms may modulate the action of vitamin D and its immunoregulatory activity.

VDR is the intracellular receptor of vitamin D. It is encoded in chromosome 12 and it consists of 427 amino acids. VDR is implicated in vitamin D action and may be implicated in the immunoregulatory action of the hormone. In animals, in which the VDR was inactivated increased activity of the immune system was observed, mainly due to modulation of regulatory T cells. More than 60 single nucleotide polymorphisms of the VDR have been observed. *Fok*I, *Bsm*I, *Apa*I and *Taq*I have been more extensively studied. *Fok*I polymorphism alters the structure of the receptor. The presence of *Taq*I increases the risk for the development of rheumatoid arthritis (RA). The presence of *Fok*I

increases the risk for RA. VDR polymorphisms have been studied in the context of systemic lupus erythematosus (SLE). *Taq*I and *Apa*I polymorphisms have not been found to be associated with the development of SLE. The *Fok*I polymorphism has not been shown to be associated with SLE in Caucasians and Asians, having, however, been found to have such an association in the Arabic population. The expression of *Fok*I has been shown to be related to the development of lupus and lupus nephritis in the Egyptian population. VDR polymorphisms have been studied in the context of multiple sclerosis. *Fok*I, *Bsm*I, *Apa*I and *Taq*I have been investigated. The presence of *Taq*I has been shown to be related to increased risk for the development of multiple sclerosis, while the presence of *Bsm*I has been found to be associated with multiple sclerosis in the Asian population.

It appears that vitamin D receptor polymorphisms may modulate vitamin D action. In particular, VDR polymorphisms may alter its immunoregulatory action, thus modulating the expression of autoimmune diseases.

NSS33
EVIDENCE-CARE GAP IN OSTEOPOROSIS AND OSTEOARTHRITIS

J. Edwards[1,2]

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An overview of published and clinical experience of gaps between evidence and care resulting from inadequate, misaligned and/or insufficient communication will be provided. These include low levels of uptake of and persistence with bisphosphonate therapy in osteoporosis, as well as low levels of recommendation and uptake of the core treatments (information provision, exercise and weight loss, when needed) for osteoarthritis.

NSS34
WHAT DO WE ALREADY KNOW ABOUT HOW TO FRAME EXPLANATIONS?

Z. Paskins[1]

[1]Senior Lecturer and Honorary Consultant Rheumatologist, Primary Care Centre Versus Arthritis, Keele University, Keele, United Kingdom

In this session, the Necessity Concerns Framework will be introduced as a simple psychological theory that helps us understand how patients make decisions about medicines and therefore helps frame explanations to support informed adherence.

NSS35
TARGETING COMMUNICATION IN THE CLINICIAN-PATIENT CONSULTATION TO IMPROVE UPTAKE OF FRACTURE PREVENTION TREATMENTS: EARLY FINDINGS FROM THE IFRAP STUDY

Z. Paskins[1]

[1]Senior Lecturer and Honorary Consultant Rheumatologist, Primary Care Centre Versus Arthritis, Keele University, Keele, United Kingdom

iFraP is a 5-year study to design and test an intervention including a computerised decision aid, to use in the consultation, to promote informed decision making and informed adherence of osteoporosis drugs. Early findings from the iFraP study will be presented including an evidence synthesis of existing patient information resources, and views of stakeholders. These early findings provide a foundation of how to talk about osteoporosis, fracture risk and need for drugs, while addressing patient concerns.

NSS36
WHAT PATIENTS WITH OSTEOARTHRITIS WANT AND NEED TO KNOW TO SUPPORT THEM TO UNDERTAKE SELF-MANAGEMENT: EARLY FINDINGS FROM THE PEP-OA STUDY

E. Cottrell[1]

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First outlining existing knowledge about patient interpretation of words and current explanations of osteoarthritis, this lecture will develops previous understanding by focusses on the need to deliver osteoarthritis explanations with a purpose. That is to support both understanding of the condition but to do so in such a way that it prompts understanding of the mechanism of benefit and value of self-management (undertake exercise and weight loss, when necessary). Evidence from stakeholder and patient engagement in an empirical study (PEP-OA) designed to develop an osteoarthritis explanation that is relevant to all affected patients. We will present our learning about how words and concepts are interpret and what is acceptable and appropriate within an osteoarthritis explanation.

NSS37
LESSONS FOR CLINICAL PRACTICE AND RESEARCH

J. Edwards[1,2]

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This section will review the evidence for the importance of considering behaviour change principals when undertaking clinical and academic activities relating to explanations of osteoporosis and osteoarthritis in order to increase uptake of and adherence to best evidence treatments.

NSS38
PRESENTATION OF THE GETTING TO GOLD PROGRAMME FRAMEWORK AND MILESTONES

K. Javaid[1]

[1]NIHR Musculoskeletal Biomedical Research Unit, University of Oxford, Oxford, United Kingdom

During this presentation we will review the key elements of the programme including the learning objectives, learning design and delivery.

NSS39
EVALUATION OF THE MENTORSHIP PROGRAMME

M. Calo[1]

[1]LATAM Region at International Osteoporosis Foundation, Buenos Aires, Argentina

The Getting to Gold Mentorship programme was the first of its kind and required close evaluation. During this presentation, we will review the methods, results and conclusions from running the programme in Mexico.

NSS40
EVALUATION OF THE MENTORSHIP PROGRAMME-MENTEES PERSPECTIVE

A. Olascoaga[1]

[1]Instituto Nacional de Rehabilitación, Mexico City, Mexico

The Getting to Gold Mentorship programme was the first of its kind and during this presentation, a mentee will review the strengths, weaknesses, threats and opportunities of the programme as well as following results after the first phase of the programme.

NSS41
NEXT STEPS FOR GETTING TO GOLD

K. Javaid[1]

[1]NIHR Musculoskeletal Biomedical Research Unit, University of Oxford, Oxford, United Kingdom

During this presentation we will review future plans for the globalisation of the programme at the policy, mentor and scalability perspectives.

NSS42
THE BURDEN OF OSTEOPOROSIS AND FRAGILITY FRACTURES IN ASIA PACIFIC

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[1]Deputy Medical Director, Head of Department of Orthopedic Surgery and Consultant Orthopedic Surgeon, Beacon International Specialist Centre, Petaling Jaya, Malaysia, [2]Co-Chair, Asia Pacific Fragility Fracture Alliance (APFFA), Petaling Jaya, Malaysia

Of the global population of 7.6 billion people, 4.5 billion live in Asia, representing 60% of the world's inhabitants. As compared with the beginning of the century, the number of people aged ≥ 65 years in Asia will more than quadruple by 2050 and increase by almost six-fold by 2100.

This presentation will review the ongoing major shifts in the demography of the Asia Pacific region and summarise the epidemiology of osteoporosis and fragility fracture in countries across the region. This will include findings from the 2018 Asian Federation of Osteoporosis Societies (AFOS) study which updated hip fracture projections in Asia to mid-century, and recent estimates and future projections included in Asia Pacific regional audits undertaken by the International Osteoporosis Foundation.

The WHO has designated 2020-2030 the Decade of Healthy Ageing. A significant component of our response to the longevity miracle must be to ensure that our older people remain mobile and independent throughout old age. This presentation will highlight the need for major coordinated efforts to improve the quality of care provided to people who are living with osteoporosis, such as the Asia Pacific Consortium on Osteoporosis and Asia Pacific Fragility Fracture Alliance, descriptions of which will follow in this symposium.

NSS43
ASIA PACIFIC CONSORTIUM ON OSTEOPOROSIS: DEVELOPMENT OF THE FRAMEWORK

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The Asia Pacific (AP) region is comprised of 71 countries with vastly different healthcare systems. By 2050 it is predicted that more than half the world's hip fractures will occur in this region. **The Asia Pacific Consortium on Osteoporosis (APCO)** was set up in May 2019 with the vision of reducing the burden of osteoporosis and fragility fractures in the Asia Pacific region. It brings together clinical experts from countries and regions across AP to develop solutions to challenges facing osteoporosis management and fracture prevention in this highly populous region of the world. APCO currently has 39 experts from 19 countries in the region. APCO aims to achieve this vision by engaging with relevant stakeholders including health care providers, policy makers and the public to help develop and implement country and region-specific programs for research and

the prevention and treatment of osteoporosis and its complication of fragility fractures in the Asia Pacific. The initial APCO project is to implement a Framework for the development of Pan-Asia Pacific minimum clinical standards for the screening, diagnosis and management of osteoporosis. A comparative analysis will be conducted on osteoporosis and fracture prevention guidelines, published in the last five years in this region. A template for comparison of guidelines will be based on a modified 5IQ approach, which will evaluate recommendations made concerning patient identification, investigations, information, initiation of pharmacological treatment, integration with primary care and quality measures of the service provided. Informed by the analysis, a Delphi process will facilitate development of Framework standards that are appropriate for the Asia Pacific region. This Framework will serve as a platform upon which country-specific guidelines can be developed or existing guidelines be revised, in a standardised fashion. It is hoped that APCO will serve as an impetus for development of other such alliances world-wide.

NSS44
ASIA PACIFIC FRAGILITY FRACTURE ALLIANCE: WORKING GROUP OUTPUTS

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The **Asia Pacific Fragility Fracture Alliance (APFFA)** was launched in November 2018 and is comprised of the following regional and global member organisations:

- Asian Federation of Osteoporosis Societies
- Asia-Oceanian Society of Physical and Rehabilitation Medicine
- Asia Pacific Geriatric Medicine Network
- Asia Pacific Orthopaedic Association
- Fragility Fracture Network
- International Osteoporosis Foundation
- International Society for Clinical Densitometry

The APFFA member organisations signed a multiparty Memorandum of Understanding (MoU) in late 2018. The primary purpose of APFFA is to drive policy change, improve awareness and change political and professional mindsets to facilitate optimal fragility fracture management across the Asia Pacific region. The clinical focus of APFFA is to improve acute care for people in the Asia Pacific region who sustain fragility fractures, subsequent patient rehabilitation and secondary fracture prevention.

Three working groups have been established to develop initiatives concerned with hip fracture registries, education and evidence generation. This presentation will describe current and planned outputs from the working groups.

NSS45
INFLUENCE OF INITIAL PROTEIN INTAKE ON BONE DENSITY AND ARCHITECTURE IN DYNAPENIC-OBESE OLDER ADULTS

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Normal aging is associated with muscle mass (sarcopenia) and strength (dynapenia) declines but also with fat mass gain (obesity) which lead to loss of physical performance. Nevertheless, dynapenia combined with obesity increased the risk of falls and loss of mobility than one of these conditions alone. In addition, normal aging leads to bone density loss which is well known to also increased the risk of falls, decline of mobility and fractures. Furthermore, bone architecture seems to be a better predictor of fractures than bone density alone. One potential avenue to counteract these phenomena is to intake a sufficient amount of proteins since protein intake appears to be associated with maintenance of bone density and architecture but also muscle function. More importantly, it seems that the presence of dynapenia, sarcopenia or obesity exacerbate the loss of bone density and architecture and its consequences. However, to our knowledge, the impact of protein intake on OD and bone structure in elderly dynapenic-obese patients is not known. Objective: To compare the influence of protein intake on bone density and architecture in dynapenic-obese older adults.

Methodology: secondary analysis from an observational study. Population: 26 men (M) and women (W) aged (> 60 years), obese (fat mass (%): M> 25; W> 35) and dynapenic (grip strength (kg)/ body weight (BW, kg)):M <0.61; W <0.44) were studied. They were divided a-posteriori into 2 groups according to their initial protein intake: 1) Prot- (intake<1g/kgBW/d): n = 13 (age: 66.5±3.3years) vs. 2) Prot+ (intake>1.2 g/kgBW/d): n = 13 (age: 67.2±2.7 years). Body composition (DXA & pQCT), femur bone architecture (pQCT), grip strength (lafayette ©), lifestyle habits (Physical activity (7d amrband sensewear©) & nutrition intake (3-d dairy records using nutrific©)) were evaluated.

Results: No significant difference was observed on sexe, age, physical activity level but also on muscle, adipose or bone parameters assessed by DXA between our groups. However, the Prot- group has a marrow area (139±54 vs 91±38 cm2, p = 0.049), a total bone area (650±69 vs 579±91 cm2, p=0.045) but also a compressive loading force (SSI: 3019±465 vs 2604±560 cm2, p=0.048) significantly greater than the Prot + group.

Conclusion: Surprisingly, lower protein intake appears to protect the bone architecture but not the density in dynapenic-obese older adults. These results must be confirmed in a study conducted for this purpose, with a larger sample and an older and / or more fragile population.

NSS46
PRESERVING BODY & MUSCLE COMPOSITION IN OBESE-OSTEOPENIC OLDER WOMEN: HIGH-INTENSITY INTERVAL TRAINING A POTENTIAL INTERVENTION ?

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Age-related muscle and bone loss alongside an increase in fat mass can lead to functional decline, an increased risk of falls and fractures, and even, mortality. High-intensity interval training (HIIT) is a promising and time-efficient intervention strategy for maintaining muscle quality and body composition with aging. However, the efficacy of HIIT to improve lean-related muscle mass and adipose tissue distribution in obese-osteopenic older adults is unclear.

Aim: To evaluate the effect of HIIT compared to moderate-intensity continuous exercise training (CONT) on body & muscle composition in obese-osteopenic older women.

Methods: Nineteen obese and osteopenic older women (mean±SD age 67.5±2.7 years; percent body fat 43.0±1.3%; number of steps per day 6463±2619; areal bone mineral density T-score <-1 SD) were randomly allocated to a 12-week HIIT group (n=9; elliptical exercise for 30 seconds at 85% of age-predicted maximal heart rate [MHR] and 90 seconds at 65% MHR, 3 times per week for 30 minutes) or a 12-week CONT group (n=10; treadmill exercise at 65-75% MHR, 3 times per week for 60 minutes). Body composition (fat-free and fat masses), and muscle composition (Calf muscle cross-sectional area (cm2) and density (mg/cm3; density of tissue within the muscle compartment excluding intramuscular fat and bone areas) and intramuscular and subcutaneous fat areas (cm2)) were measured by DXA and pQCT respectively at baseline and after 12 weeks. Independent t-test analyses compared the mean differences (MD) and 95% confidence intervals (95% CI) for DXA and pQCT outcomes between the HIIT and CONT groups.

Results: On body composition, HIIT improved significantly hip circumference (112±15 to 109±14cm) whereas CONT improved leg (12.6±2.8 to 11.7±2.6kg) and appendicular fat (15.3±3 to 14.5±3.1kg) masses. Calf muscle area (MD = -13.99 cm2, 95% CI: -25.31, -2.67, p=0.020) and subcutaneous fat area (MD = -22.06 cm2, 95% CI: -34.96, -9.16, p=0.002) improved in the HIIT group relative to the CONT group. However, there were no between-group differences for calf muscle density (MD = -3.00 mg/cm3, 95% CI: -6.27, 0.27, p=0.069) and intramuscular fat area (MD = -1.31, 95% CI -3.81, 1.19, p=0.283). Percent adherence was 86% and 97% in the HIIT and CONT groups, respectively.

Conclusions: HIIT may represent a promising intervention strategy for improving lean muscle and adipose tissue properties in obese-osteopenic older adults compared to traditional continuous exercise training approaches. Further investigation is needed to confirm the clinical relevance of our pilot trial results for falls and fracture prevention.

NSS47
PHYSICAL PERFORMANCE IN OBESE-OSTEOPENIC ELDERLY WOMEN: HIGH-INTENSITY INTERVAL TRAINING MORE EFFICIENT THAN CONTINUOUS AEROBIC TRAINING ?

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Ageing is associated with functional incapacities which lead to falls, loss of autonomy and mortality. Being obese and osteopenic seems to worsen physical health more than each of these conditions alone. Physical activity (aerobic training) is recognized to be an efficient strategy to improve many health-related outcomes.

Objective: We aimed to compare the effect of high-intensity interval training (HIIT) and moderate-intensity continuous training (CONT) on physical performance in obese-osteopenic elderly women.

Methods: Nineteen inactive (<10,000steps/d) elderly (67±3y), obese (fat mass: 43±6%) and osteopenic (BMD<-1T-score) women were randomly divided into 2 groups and completed a 12week exercise intervention: HIIT (n=9, elliptical device; cycle: 30 sec at 85% and 90sec at 65% of maximal age-predicted heart rate; 3x30min/week) and CONT (n=10, treadmill at 65-75% maximal age-predicted heart rate; 3x1h/week). Upper (hand dynamometer) and lower (KES) muscle strength, muscle power (leg power rig) and functional capacities (4m and 6min-6MWT-walking test, chair and step tests) were measured pre and post-intervention. p <0.05 was considered significant.

Results: On physical performance, HIIT improved significantly leg power (102±26 to 137±30Watt), step test (28±3 to 34±3) and chair test (19±3 to 16±4s) whereas CONT improved handgrip strength (21.6±4.4 to 24.2±5.4kg). Only 6MWT was increased in both groups (+16% in HIIT and +6% in CONT).

Conclusion: HIIT, at half the training volume, seems more effective to improve physical performance in inactive obese-osteopenic elderly women than CONT aerobic exercise. Clinicians should consider HIIT as a strategy to prevent physical disability in obese-osteopenic women, although further investigations with larger sample sizes are still needed to confirm our findings.

NSS48
ROLE OF ZINC IN OSTEOPOROSIS AND VASCULAR CALCIFICATION: KILLING 2 BIRDS WITH 1 STONE?

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Bone mineralization and vascular calcification share many common pathways in pathophysiology. This creates a calcification paradox: patients with low bone mineral density are more likely to have vascular calcification and calcium supplementation used

to treat osteoporosis may worsen vascular calcification. Zinc, an essential mineral, has been shown to prevent osteoporosis by stimulating osteoblastic and inhibiting osteoclastic activity. Recently, zinc has also been shown to protect against vascular calcification. Thus, zinc supplementation is a potential therapeutic strategy for both osteopor osis and vascular calcification. Furthermore, research on zinc, bone mineralization and vascular calcification can provide insights into the calcification paradox.

Learning objective:

1. To understand calcification paradox in bone and vascular disease and associated therapeutic dilemma

2. To discuss the relationship of zinc with osteoporosis and vascular calcification

3. To examine the mechanisms of zinc in preventing osteoporosis and protecting against vascular calcification

4. To discuss the potential therapeutic value of zinc for both osteoporosis and vascular calcification

NSS49

BONE, SKELETAL MUSCLE, AND SARCOPENIA IN CHRONIC KIDNEY DISEASE

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Patients with chronic kidney disease (CKD) experience not only bone disease but skeletal muscle dysfunction as well. Sarcopenia, defined as low muscle mass and poor physical function, is common in CKD, and is associated with poor outcomes, including increased risk of fractures . A number of metabolic and hormonal alterations in CKD affect skeletal muscle health; many are factors that also cause bone pathology. Furthermore, there is substantial overlap between the disturbances seen in CKD and those in aging. This presentation will focus on the mechanisms and clinical impact of sarcopenia in adults with CKD.

Learning objectives:

1. To understand the common factors affecting both bone and skeletal muscle in patients with CKD.

2. To recognize CKD as a state of accelerated aging.

3. To understand the impact of sarcopenia on clinical and patient-oriented outcomes in CKD.

4. To discuss well-recognized and newly identified mechanisms of skeletal muscle dysfunction and physical function impairment in CKD.

NSS50

TREATING BONE DISEASE IN THE WOMAN WITH CHRONIC KIDNEY DISEASE

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Women are especially vulnerable to bone disease. There is a natural decline in bone preserving hormones with age leading to osteoporosis. Women with Chronic Kidney Disease are further subjected to added stress on their bone health. Hyperparathyroidism with ensuing calcium and phosphorus derangements will decrease the quality of bone. If the woman undergoes renal transplantation, another layer of bone stressors is added attributable to immunosuppressive agents. The end result is a decrease in bone mineral density and increased risk of bone fractures. Standard of care treatment in the general population with osteoporosis may not necessarily benefit these women.

Learning objectives.

1. To review the types of metabolic bone disease that can develop in the woman with CKD, and suggestions to tailor treatment that enhance bone quality.

2. To review the role of DEXA, FRAX modeling, biochemical bone turnover parameters and bone biopsy in diagnosing underlying bone disease.

3. To review the effects of immunosuppression used to treat underlying renal disease and renal transplantation on bone health of women.

4. To discuss the treatment of osteoporosis in the woman with CKD: the roles of antiresorptive and anabolic therapies.

NSS51

QUALITY OF LIFE IN SARCOPENIA : AN UPDATE

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The association between sarcopenia and quality of life became a topic of high interest in the past 10 last years. The prospective and generalized loss of muscle mass, muscle strength, physical performance and muscle quality resulting from sarcopenia could emerge as mobility impairments, malnutrition, disability and increased sedentary behaviour. These symptoms could themselves lead to a loss of independence, a higher risk of falls, fractures, hospital or nursing home admissions and/or an impaired ability to perform daily activities. All of these factors contribute to a lower QoL in sarcopenia. Evidence from the literature, issued from a literature review performed in July 2019, underlines that age-related sarcopenia seems to be related to poorer quality of life. Across the 35 original studies identified throughout our review, a large majority of studies showed a lower quality of life,

in specific domains or as a whole, for sarcopenic individuals compared to non-sarcopenic ones. Quality of life seems mainly to be impacted on physical and functional domains, suggesting that specific QoL questionnaires for sarcopenia could be of interest.

NSS52
OVERVIEW OF GENERIC AND SPECIFIC PATIENT REPORTED OUTCOME MEASURES (PROMS) IN SARCOPENIA

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To measure patients' experiences and perspectives in sarcopenia, valid and reliable outcome measures are needed. Unfortunately, few PROMs have been validated for use in sarcopenic subjects, and even fewer have been specifically designed to capture the impact of sarcopenia on the patients' own experience. There are two instruments that fit these criteria: the Age-Related Muscle Loss Questionnaire (ARMLQ, also referred to as SarcoPRO®) which measures the functional impacts of reduced muscle strength, and the Sarcopenia Quality of Life (SarQoL®) questionnaire which evaluates health-related quality of life. A project is also currently underway to obtain FDA recognition for the PROMIS® Physical Functioning item bank as a qualified clinical outcome assessment in sarcopenia. Generic measures, i.e. those not specifically designed for use in sarcopenia, can also provide valuable information, because the data they provide can be compared across populations. Popular measures in this category are the Short-Form 36-item (SF-36) questionnaire and the EuroQoL 5-dimension (EQ-5D) and the associated visual analogue scale. However, no investigations of the psychometric properties of both questionnaires have been performed for use in sarcopenia. In conclusion, few tools are available that have demonstrated to be appropriate, valid and reliable for sarcopenic samples. Because of this, generic measures are often used.

NSS53
VERTEBRAL FRACTURE FOLLOWING D-MAB DISCONTINUATION: SUPPORTING DATA

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Denosumab (DMAB), is a fully human monoclonal antibody that exerts its potent antiresorptive action via neutralization of RANK ligand to effectively inhibit bone remodeling. It has been marketed for treatment of osteoporosis since 2010. DMAB reduces bone resorption and improves bone mineral density (BMD)[1]. DMAB inhibits bone resorption in a potent manner, as evident from a profound drop (up to 80%) in bone turnover markers (BTM). Unlike bisphosphonates (BP), DMAB is not incorporated into bone. Therefore, it's effect on bone resorption ceases rapidly after treatment discontinuation[2]. BTM suppression vanishes away after 6 months past one single injection, demonstrating DMAB reversibility. Furthermore, upon medication discontinuation, a remarkable rebound rise of BTM occurs[3]. It has been widely demonstrated that the rebound effect magnitude might be influenced by prior bisphosphonate treatment, with a lesser degree of C-telopeptide elevation upon DMAB discontinuation in patients previously treated with BP. There is limited information from clinical trials about fracture risk upon stopping DMAB therapy. Brown and colleagues reported no increase in vertebral fracture incidence in 1001 patients who discontinued DMAB or placebo in the FREEDOM and FREEDOM Extension trials. However, among subjects off-treatment there was an excess of multiple vertebral fractures in DMAB Discontinuers (DD) compared to those that discontinued placebo[4]. In the real world data publication, a total of 1,500 DD (92% females, age 71.8 ± 9.5 y.o.) was compared to 1,610 persistent users (91% females, age 71.7 ± 8.8 y.o.). At baseline, the groups were comparable in fracture history, BP exposure, smoking, and bone mineral density (BMD). Multiple vertebral fracture (MVF) occurred in 12 (0.8%) DD compared to 02 (0.1%) patients who were persistent users (p = 0.006). The overall rate of fractures per 100 patient-years of follow-up was significantly higher in DD than persistent users (RR 3.2, 95% CI 2.2−4.8), as well as the rate of vertebral fractures (RR 4.7, 95% CI 2.3−9.6) and MVF (RR 14.6, 95% CI 3.3−65.3)[5]. Conclusion: relevant data supports the high risk of MVF after stopping treatment with DMAB.

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NSS54

PATHOPHYSIOLOGY OF THE OSTEOCLASTIC "FLARE" AFTER DISCONTINUATION

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Denosumab (DMAB) is a human monoclonal antibody that specifically binds to receptor activator of NF-kB ligand (RANKL) reversibly blocking bone resorption, leading to decreased bone turnover markers (BTMs), increasing bone mineral density (BMD), and reducing fracture risk. The activation of the receptor activator of NF-kB (RANK) by its ligand (RANKL), leads to maturation from pre-osteoclasts, activity, and survival of osteoclasts[1]. After two years of continuous treatment with DMAB every 6 months, or 30 mg every 3 months, for postmenopausal women, it was observed an increased BMD at the lumbar spine (9.4% to 11.8%) and total hip (4.0% to 6.1%). BTMs were consistently suppressed over 48 months. Discontinuation of DMAB was associated with a BMD decrease of 6.6% at the lumbar spine and 5.3% at the total hip within the first 12 months. Serum C-telopeptide (CTX) levels increased to twice the placebo and returned to values near baseline[2]. Possible explanations for the rebound effect could be that an increased pool of osteoclast precursors which were dormant during the treatment period with DMAB, become activated after its discontinuation, also there is a high RANKL/osteoprotegerin ratio after DMAB, that is cleared from circulation, leading to a rapid rebound in remodeling rates[3]. Following the biomechanical of skeleton, individuals that have a preset level of bone density and remodeling that have been influenced by external conditions, in this case, a medication (DMAB), tend to return to baseline level, increasing bone turnover and decreasing BMD[2]. In the case of BTMs, the rebound effect is more prominent as the duration of DMAB treatment increases, and the reversal of changes in BMD may be related to the duration of DMAB therapy and the magnitude of bone loss may be related to the amount of BMD gained during treatment; although it is necessary to prove this by extension trials[1-4]. The multiple vertebral fractures in the reported cases are the result of the high level of bone remodeling after withdrawal of reversible antiresorptives like DMAB, which leads to bone resorption in a tissue that was continuously exposed to low accumulation of fatigue damage but without repair during therapy, then, high rate of bone turnover and bone loss developed during the rebound would lead to a high rate of damage accumulation and a shortened vertebral fatigue life, nevertheless, there is little information about the effects of withdrawal after longer-term DMAB treatment when BMD gains on therapy[5]. The association between vertebral fractures and high resorption and decreased BMD, is observed in early menopause, where there is a rapid bone loss that will impact in older postmenopausal women who are losing bone less rapidly, with more rapid destruction of trabecular microarchitecture, so the fracture risk is directly related to bone turnover in untreated postmenopausal women who are losing bone mass at a modest rate[5]. Other antiresorptive therapies that do not persist in bone, including estrogen therapy and estrogen receptor agonists/antagonists, have the same reversible effect on BMD and BMT when discounted as DMAB, returning to pretreatment levels of BMD and BTM. Despite returning to pretreatment levels, large observational studies of postmenopausal estrogen therapy discontinuation have not shown an increase in fracture risk as it occurs with DMAB. Reversibility of BMD and BTM levels have also been observed with teriparatide[6]. In the Frost mechanostat theory based on Wolff's Law, the bone tends to return to the basal condition after removing the agent that changed it[7].

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WCO IOF-ESCEO

VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

NSS55
BIOCHEMICHAL AND IMAGING ASSESSMENT: UPS AND DOWNS

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Treat-to-target approach has helped clinicians to plan osteoporosis treatment for their patients[1].

This approach is also applied to other chronic diseases like hypertension[2] diabetes mellitus[3] and rheumatoid arthritis[4].

Osteoporosis treatment usually begins with an oral bisphosphonate (alendronate) if there is no contraindication. The patient is monitored and the response to treatment is often defined as stability or an increase in bone mineral density (BMD) and decrease in bone turnover markers (BTMs) in the absence of fractures[5]. Treatment failure was addressed by The International Osteoporosis Foundation and three different situations were defined: 1) two or more incident fractures during treatment; 2) one incident fracture with elevated bone turnover marker at baseline without significant decrease with antiresorptive therapy and/or a significant decrease in BMD; 3) no significant decrease in bone turnover marker and a significant decrease in BMD[6]. If the patient is responding adequately to bisphosphonates, the treatment can be maintained for 3–5 years if the fracture risk is low. Then, a drug holiday can be proposed[7]. If fracture risk is high after therapy for 3–5 years, treatment may be continued up to 10 years. There is no evidence strong enough to support treatment beyond that period of time. The drug holiday is possible due to long-lasting bisphosphonate effect within the skeleton. But the holiday approach is not appropriate with non-bisphosphonate drugs, because they lose their effectiveness very rapidly after discontinuation[8]. This is critically important for DMAB therapy. In the absence of fractures to define who must continue under treatment or not, surrogate markers of fracture risk shall be used. The most reliable ones are: bone turnover markers (BTMs), fracture risk assessment algorithms and BMD[9]. Continuing alendronate therapy in women with low risk (femoral neck T-scores ≤ −2.5 and no prevalent vertebral fractures) reduced the incidence of nonvertebral fractures. But no further reduction of nonvertebral fracture risk was observed in women with femoral neck T-scores above −2.0[10]. Similar results were found with another bisphosphonate: zoledronic acid. Post-hoc analysis of the HORIZON-PFT found that women having a femur T- score ≤ −2.5 were at greater risk of morphometric vertebral fractures and nonvertebral fractures when treatment was discontinued, compared with continuing treatment up to six years[11]. For patients under osteoporosis treatment, larger BMD increases reflected in greater reductions of risk for nonvertebral fractures. Different analyses demonstrated that it is true not only for denosumab (DMAB) patients in the FREEDOM extension study[12], but also for other agents as well[13]. More recently, an Official Position

paper from International Society for Clinical Densitometry recommended that serial BMD testing should be used to monitor individuals following cessation of osteoporosis pharmacologic therapy[14]. All the information above can lead us to - at least - two major conclusions regarding DMAB and BMD monitoring: 1) BMD measured by DXA is still the most accurate imaging diagnostic surrogate marker for initiating or stopping therapy in the absence of fractures, 2) as treatment stops, BMD falls much more rapidly for patients on DMAB than for those under bisphosphonate therapy.

Bone Turnover Markers (BTMs)

Discontinuation of DMAB therapy is followed by a transient increase of bone turnover markers (BTMs) above pretreatment values, together with accelerated bone loss, and potentially an increased risk of multiple vertebral fractures[15].

Even if drug holiday is not recommended for DMAB patients, those experiencing BMD gains and at low risk of developing osteoporotic fractures after 5 years of therapy; a decision to discontinue DMAB could be made. If that is the case, bisphosphonate therapy should be considered to reduce or prevent the rebound increase in bone turnover[16].

BTMs (CTX) at 9 and 12 months after the last injection of DMAB showed a significant increase values above pretreatment values and a progressive decrease thereafter; showing a significant correlation between the time since last DMAB injection and serum CTX values in all patients who were treated with denosumab independently of the presence of vertebral fractures. This assumed initial increase in RANKL is responsible for the dramatic increase in osteoclastogenesis evidenced by the 13-fold increase in levels of RANKL mRNA followed by an increased activity of osteoclasts demonstrated by the upregulation of cathepsin K mRNA[17].

Although the optimal bisphosphonate regimen post-DMAB is currently unknown, cessation of DMAB do happen on real world population and should be tightly monitored once the risk of multiple fractures after discontinuation has been documented on quite a few settings. BMD measurements performed by DXA are not widely covered by healthcare providers for assessment intervals shorter than one year. Therefore, BTMs arise as early surrogate markers of a potential osteoclastic rebound before BMD changes can be assessed.

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NSS56

BONE LOSS AFTER D-MAB DISCONTINUATION IN 150 PATIENTS

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DMAB discontinuation is associated with the reversal of the effects attained with treatment. Bisphosphonates administration has been recommended to avoid rapid bone loss but few studies have addressed this question. Preliminary clinical experience will be presented on BMD and bone turnover markers between postmenopausal women (n=98) who received bisphosphonates after stopping DMAB and those who not. There were no significant differences in age, height, weight or BMI between the groups. Mean treatment time with DMAB was 2.33 years. In the non-treated group we observed a significant reduction in LS BMD (- 4.1 ± 6 %; p < 0.01) and FN BMD (- 3.3 ± 5.4 % (p <0.01). In the treated-group, LS BMD was significantly lower than baseline (3.3± 4.5%, p=0.05) but FN BMD was non-significantly lower (0.1 ± 4.3 %, p=0.25). After stopping DMAB, bone turnover markers (CTX and osteocalcin) increased significantly in both groups but to a much lesser extend in the treated-group, these differences between groups were statistically significant. No patients in the treated-group had fragility fractures during follow-up but two patients in the non-treated group had vertebral fractures. We observed that bisphosphonates ameliorated bone loss, especially in the hip, and prevented the high rebound of bone remodeling markers after DMAB discontinuation. It is essential to enhance physicians' awareness of the need to start bisphophonates after discontinuing DMAB.

NSS57

D-MAB PATIENT MANAGEMENT IN THE CLINICAL SETTING: STEPPING ON THE RIGHT FOOT

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The first aspect to consider is when to start treatment with DMAB, specially in treatment-naïve osteoporotic women. Most guidelines recommend oral bisphosphonates as first-line medications and consider DMAB as an alternative initial therapy, in particular for patients at high risk of non-vertebral and hip fractures[1-3]. Moreover, in certain countries DMAB is reimbursed only when used after a bisphosphonate[1]. However, the patient

profile to whom DMAB would be a better first line choice it is still unclear. Some clinical situations in which DMAB can be considered instead of bisphosphonates are patients with severe renal impairment or when these medications have been ineffective or are not well tolerated[4, 5]. Before starting DMAB, certain considerations must be taken. DMAB can lead to a reduction in serum calcium concentration. For this reason, it is important to ensure that vitamin D levels and calcium intake are adequate[5]. Osteonecrosis of the jaw is a serious adverse event of some antiresorptive medications like DMAB. A dental evaluation should be performed routinely before initiating therapy and implement a dental care plan while on the drug is also recommended[6, 7]. Continuous administration of DMAB is associated with gain of bone mineral density (BMD) over 10 years and reduced risk of fractures[8]. Discontinuing the drug specially after the second dose is associated with a "rebound effect" characterized by increase in bone turnover, loss of BMD and increased risk of vertebral fractures, so that certain considerations must be taken before the DMAB discontinuation[9, 10]. Prevalent vertebral fractures are considered the most important risk factor for the development of new clinical vertebral fractures following DMAB cessation and it is wise to at perform a spine x-ray at the time of discontinuing DMAB[11, 12]. It has been proposed that the use of a potent bisphosphonate (zoledronic acid or alendronate) after discontinuing DMAB could prevent or mitigate the rebound effect[9-12]. However, the timeframe for initiation and duration of treatment are not yet clarified. This review will further discuss the available current evidence regarding the specifics of using bisphosphonates in the setting of discontinuing DMAB.

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NSS58
INTRODUCTION "WHEN A DXA IS INDICATED, A VFA IS ALSO RECOMMENDED"

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There are world-wide large diagnostic and treatment gaps in the field of osteoporosis, leading to a low percentage of patients adequately diagnosed and treated for osteoporosis versus the total number of osteoporotic patients. One of the most powerfull instruments to diagnose osteoporosis is the Fracture Liaison Service (FLS), in which elderly patients with a recent fracture are screened for underlying low BMD of the lumbar spine and/or hips with a DXA. In this minisymposium we will discuss the clinical consequences of additionally testing for vertebral fractures by systematically performing Vertebral Fracture Assesment (VFA) in all patients visiting the FLS. In elderly patients with a recent fracture and a BMD in the osteoporotic range, the finding of a vertebral fracture does usually not influence the start of anti-osteoporotic drug-treatment, while diagnosing one or more vertebral fractures in an elderly patient with osteopenia can be an indication for initiating anti-osteoporotic drug-treatment. Thus, it is plausible that this will lead to less underdiagnosis in patients at high risk for future fractures, and as a consequence, more adequate treatment in patients visiting the FLS.

The IOF Capture the Fracture (CtF) initiative helps clinicians to understand that in elderly fracture patients visiting an FLS, a DXA should be made. Thus, adding a VFA, or another imaging technique when VFA is not available, is fully in line with the IOF CtF programme and other programmes, and it can be a substantial step forward in optimizing patients care in osteoporosis.

The learning objectives of the minisymposium are:

- to recognize the clinical relevance of vertebral fractures;

- to be able to make a reliable radiological diagnosis of vertebral fractures with VFA;

- to understand the pros and cons of vertebral fracture assessment.

At the end of the mini-symposium, your questions are very welcome during the discussion.

NSS59
CLINICAL SIGNIFICANCE OF VERTEBRAL FRACTURES

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Previous studies have identified spine X-ray and vertebral fracture assessement (VFA) to detect prevalent vertebral fractures that improve prediction of future vertebral fractures and non-vertebral fractures. Moreover, more severe or greater number of vertebral fractures were associated with higher fracture risk than milder or fewer vertebral fractures. The risk of sustaining subsequent vertebral fractures is a phenomenon often referred to as "vertebral fracture cascade".

Vertebral fractures have many potential consequences for the individual beyond economic cost; these risks include functional limitation, loss of independence, pain, impaired quality of life, higher inpatient healthcare utilization and diminished lifespan. Health-related quality of life (HRQL) has become an important tool used to assess the burden of vertebral fractures. The severity and number of vertebral fractures are related to HRQL. Moreover, studies investigating time since onset of vertebral fracture, and its effect on HRQL, have shown that a residual effect lasts for up to 7 years post-fracture.

NSS60
RADIOLOGICAL DIAGNOSIS OF VERTEBRAL FRACTURES WITH VFA

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The burden of vertebral fractures (VF) is a global epidemic effecting between 30-50% of people over the age of 50 years. However, the accurate description of the epidemiology of vertebral fractures is complicated by a significant proportion that are clinically 'silent', and the existence of various definitions of vertebral fractures. Approaches to definition of vertebral fractures include morphological, morphometric, qualitative and quantitative.

Vertebral fracture assessment, VFA, has been proposed as an alternative approach for the identification of VF. The current conventional practice for initial assessment is the use of the spinal radiographs, which has remained as the (gold) standard that VFA images are compared to in studies establishing the validity, and reproducibility of VFA.

VFA is currently under-utilised globally and this can be due to a number of factors including its accuracy, cost and utility of the procedure been unclear to healthcare providers and payers. However, VFA has shown added value to clinical diagnosis of osteoporosis and its subsequent management. The use of VFA enhances the assessment especially for those in the normal and osteopenic BMD range, where, without the detection of VF through VFA, medication is unlikely to be commenced. VFA should be performed at the point of bone density measurement as part of a broader strategy to close the treatment gap.

NB I collaborated in this work with Nicholas Fuggle, Elaine Dennison, Cyrus Cooper

NSS61
ADVANTAGES AND LIMITATIONS OF VERTEBRAL FRACTURE ASSESSMENT (VFA)

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Vertebral fracture assessment (VFA) refers to lateral spine imaging done concurrently with axial bone densitometry. It has been shown to identify moderate to severe prevalent vertebral fractures accurately. Identification of prevalent vertebral fractures at the time of bone density measurement improves estimates of patients' risk of subsequent fractures and can help to identify appropriate candidates for pharmacological therapy.

Other imaging modalities, including conventional Spine X-rays, MRI, CT, and nuclear bone scans, can identify vertebral fractures. CT and MRI provide improved resolution, a better picture of overall anatomy, the ability to evaluate the acuity of the fracture, and to differentiate between osteoporotic and non-osteoporotic (e.g. malignant) fracture. These modalities however require a separate visit and /or location to perform the study and result in significantly higher radiation exposure and/or cost. Another advantage of VFA is that the it provides a single image of both thoracic and lumbar spine and the images have less parallax distortion compared to conventional spine radiographs.

VFA however is associated with certain limitations. It cannot determine the acuity of the fracture nor can it elucidate its aetiology. It, as with Spine X-rays and other imaging modalities relies upon the experience of the technician performing the study and the expert interpreting it. The agreement between spine radiography and VFA for mild fractures (grade 1) is lower than that

seen for more moderate or severe (grade 2 and 3) fractures, with VFA having lower sensitivity to detect milder fractures. The image quality and resolution are superior with conventional radiographs compared to VFA, particularly at the upper thoracic regions (above T6 or T7). Despite these limitations, VFA is an excellent imaging modality to evaluate for the presence of most vertebral fractures and should be considered if resources permit as part of routine axial densitometry.

NSS62
TRENDS IN FRACTURE INCIDENCE IN HIGH-INCOME COUNTRIES

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Background

Epidemiological information allowing for calculation of fracture rates have been available at a nationwide level in many high-income countries since in 1980s, while regional data collections have been taking place in some areas like Rochester Minnesota since 1928 and in the Malmo area of Sweden since 1950. The quality of the information is particularly strong for hip fractures due to the nature of the surgical intervention while the information on fractures that are treated in an outpatient setting can be prone to incomplete or duplicate recording at least in some healthcare systems. As will be discussed, the information on spine fractures is particularly uncertain due to a low diagnostic effort and suboptimal standards of reporting. The general expectation is that increased industrialisation and a longer lifespan in high income countries should be accompanied by an absolute increase in fracture burden, especially for fractures that are linked to a more sedentary working life.

Methods

Narrative review of published epidemiology studies for high-income countries.

Findings

For hip fractures, most but not all high-income countries saw a reversal of the increasing trend in both men and women during the past two decades, albeit with the inflection point differing by country. The age at hip fracture appears to be slightly increasing in the Nordic countries and the female:male ratio is beginning to decrease. It is unclear whether this is driven by period or cohort effects but studies for Sweden and Denmark suggest that younger birth cohorts will increase their hip fracture rates. In accordance with this, Swedish data suggest that forearm fractures may also be reverting to an increased risk, with the increase being particularly prominent for the 50-60 age group.

Conclusion

Despite a reassuring trend of diminishing hip fracture rates in high-income countries over the past two decades, the incidence of sentinel osteoporotic fractures such as forearm fractures show signs of potentially being on the rise in accordance with predictions that we may be approaching a reversal with a new increase in hip fracture rates based on APC models.

NSS63
BREAKING THE MYTH IN SUB-SAHARAN AFRICA – WHAT DO WE KNOW ABOUT FRAGILITY FRACTURE?

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Objective

The number of older adults (aged ≥60 years) in Sub-Saharan Africa (SSA) is two times higher than in northern Europe and that number is rising exponentially. As SSA undergoes an epidemiological transition as a result of rapid urbanisation, the burden of non-communicable diseases, including osteoporosis, is increasing yet osteoporosis is often undiagnosed until a fragility fracture occurs [1]. The risk factors for fragility fractures in this context include high HIV prevalence, under- and over nutrition, high trauma rates and marked socioeconomic inequalities. The objective is to review the current and emerging evidence from African countries at differing stages of the epidemiological transition.

Methods

Narrative review of published epidemiology studies in SSA countries

Findings

There are limited data from SSA, with studies often retrospective, small and based in a single-hospital setting. The first study of hip fracture incidence in South Africa has been conducted in a multi –centre, multi-ethnic population[2]. Ethnic- and gender specific hip fracture rates will be reviewed in this symposium, together with the findings of 12-month mortality. The prevalence of vertebral fractures was assessed in an opportunistic sample in a small study from South Africa, showing similar frequencies in black (9%) and white (5%) women[3]. A similar vertebral fracture prevalence (9%) was observed in The Gambian Bone Ageing Study of 488 Gambians aged 40+ residing within 10 survey villages in rural Gambia; 3% women, 0.4% men self-reported hip fracture/fracture-like deformities and 10% women, 0.4% men an arm fracture[4].

Conclusion

Increasing evidence is now dispelling the outdated myth that fragility fractures are not a problem in SSA. There is limited evidence from across the regions, particularly in the most resource poor countries. There is an urgent need to act to determine the burden of fragility fractures, preparedness of healthcare systems and to identify risk factors for fracture. Only then can prioritisation for prevention of this rising burden begin.

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NSS64
UPDATE ON MANAGEMENT OF LOW BONE MASS IN YOUNG WOMEN

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Although low bone mass and accelerated bone loss can occur early in life, osteoporosis is usually considered a disorder of postmenopausal women. To reduce the risk of osteoporosis, all women regardless age, should be encouraged to maintain a healthy lifestyle, regular physical activity and a balanced nutrition and knowledge about risk factors for bone loss. Gynecological perspectives to prevent osteoporosis consist in primary care during routine gynecological and obstetric assistance for women of all age groups. This presentation addresses the most relevant situations where adequate medical assistance may interfere positively on the purpose of preserving bone health during women´s lifespan.

Certain groups of premenopausal women are at high risk of osteoporosis, including those with disease states, hormonal impairment and exogenous influences that promote accelerated bone loss. Osteoporosis prevention, diagnosis and therapy specified peak bone mass in children and secondary osteoporosis in young adults are important issue that needs to be addressed by Gynecologists, as a woman´s primary physician. The diagnosis of osteoporosis should only be considered in premenopausal women with existing fragility fractures, diseases or treatments known to cause bone loss or fractures. Secondary causes of osteoporosis should be corrected or treated if possible. The women should be recommended sufficient intake of calcium and vitamin and physical activity. In women with recurrent fractures or secondary causes that cannot be eliminated, for example glucocorticoid or cancer treatment, pharmacological intervention with bisphosphonates or teriparatide may be considered.

NSS65
BONE MASS AND FRACTURE RISK DURING PREGNANCY AND LACTATION

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OBJECTIVES: To summarize our current state of knowledge about the pathophysiology, incidence, and treatment of osteoporosis that presents during pregnancy, puerperium, and lactation.

MATERIALS & METHODS: In this presentation, we review our current understanding of the pathophysiology of fragility fractures that occur for the first-time during pregnancy and lactation, and provide guidance on appropriate investigations and treatment strategies. Most affected women will have had no prior bone density reading, and so the extent of bone loss that may have occurred during pregnancy or lactation is uncertain. During pregnancy, intestinal calcium absorption doubles in order to meet the fetal demand for calcium, but if maternal intake of calcium is insufficient to meet the combined needs of the mother and baby, the maternal skeleton will undergo resorption during the third trimester. During lactation, several hormonal changes, independent of maternal calcium intake, program a 5–10 % loss of trabecular mineral content in order to provide calcium to milk. After weaning the baby, the maternal skeleton is normally restored to its prior mineral content and strength. This physiological bone resorption during reproduction does not normally cause fractures; instead, women who do fracture are more likely to have additional secondary causes of bone loss and fragility. Transient osteoporosis of the hip is a sporadic disorder localized to one or both femoral heads; it is not due to generalized skeletal resorption. Case reports have used anti osteoporotic drugs to treat pregnancy-associated osteoporosis; however, the need for such treatments is uncertain given that spontaneous skeletal recovery that normally occurs after pregnancy-weaning.

RESULTS: These relatively rare fragility fractures result from multifactorial causes, including skeletal disorders that precede pregnancy, and structural and metabolic stresses that can compromise skeletal strength during pregnancy and lactation. Further study is needed to determine when pharmacological or surgical therapy is warranted instead of conservative or expectant management.

CONCLUSION: Pregnancy-associated osteoporosis is a rare syndrome affecting women during late pregnancy and the early postpartum period; notwithstanding, clinicians should be aware of this condition as a recognized complication of pregnancy. The condition should be especially considered in women presenting with new onset back pain in pregnancy or the postpartum period.

NSS66
EVALUATION AND MANAGEMENT OF OSTEOPENIA AND OSTEOPOROSIS IN BREAST AND GYNECOLOGICAL CANCER SURVIVORS

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Cancer is the second cause of death among female in worldwide, with breast cancer being leading cause and accounting for 25% of cancer cases and 15% of cancer-related deaths. The overall cancer death rate dropped continuously from 1991 to 2016 by a total of 27%, translating into approximately 2,629,200 fewer cancer deaths than would have been expected if death rates had remained at their peak. New pharmacological approaches and treatment improvements are the cornerstone for this scenario, but they come with a price. Invariable, cancer-treatment strategies are harmful to bone and associated with increased risk for osteoporosis and fragile fractures. Coalescence of cancer survivors and osteoporosis is becoming a health problem of near-epidemic proportions.

Cancer treatment-induced bone loss (CTIBL) are chemotherapy, radiotherapy, chemical or surgical castration, and hormone therapy. Bone loss that occurs with these therapies are more rapid and severe than postmenopausal bone loss in women and rates of bone loss can be more than seven-fold higher than in normal aging. The primary cause of CTIBL is estrogen decrease. Other mechanisms include direct or indirect effects of cancer therapies or malignancy on bone metabolism, inactivity, and inadequate intake of calcium and vitamin D. Also, there is a lack of awareness how cancer itself can impact negatively bone tissue, for example, RANKL increase is related to breast carcinogenesis and bone loss, suggesting that women with breast cancer may have loss bone mass.

Since CTIBL causes bone fragility and an increased susceptibility to fractures; prevention, early diagnosis, and treatment of CTIBL are essential to decrease the risk of fracture. Clinicians must recognize which patients with cancer are at risk and which should undergo screening and surveillance and at what frequency. Generally, in postmenopausal women diagnosed with cancer fracture, risk assessment and treatment intervention are based on bone mass density and clinical risk factors for osteoporosis. Some guidelines recommend pharmacological intervention with cutoff of T-score < -2.0sd, instead common T-score of <-2.5sd. In contrast to postmenopausal women, there is no specific guideline to recognize premenopausal women with high risk to osteoporosis before initiate CTIBL use. Considering lower incidence of low bone mass and scarce evidence of benefits outweigh harms, almost none are screened before receive chemotherapy, GnRH analogs and tamoxifen. Personalized instead one-size-fits-all approach are mandatory in these cases.

Clinicians should actively encourage patients to follow lifestyle measures which benefit bone health. Pharmacological intervention is recommended in women with high risk for osteoporotic fracture.

The current evidence suggests oral bisphosphonates, intravenous bisphosphonates, and subcutaneous denosumab are each efficacious option. The choice of which bone-modifying agent to offer should be based on several important considerations, including patient preference, potential adverse effects, quality-of-life considerations, adherence, safety for that population, cost, and availability.

NSS67
SARCOPENIA. DIAGNOSIS AND EVALUATION

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Sarcopenia is defined as an age associated decline in skeletal muscle mass and muscle strength. The pathophysiology of sarcopenia is multifactorial, with decreased caloric intake, muscle fiber denervation, intracellular oxidative stress, hormonal decline, and enhanced myostatin signaling, which are all thought to contribute. Prevalence rates are high in elderly community dwelling and long-term care populations with advanced age, low body mass index, and low physical activity as significant risk factors. Sarcopenia shares many characteristics with other disease states typically associated with risk of fall and fracture, including osteoporosis, frailty, and obesity. Sarcopenia is a syndrome characterized by progressive and generalized loss of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, poor quality of life and death. The presence of both low muscle mass and low muscle function (strength or performance) is required for the diagnosis of sarcopenia. Low muscle mass and low muscle strength or low physical performance are the criteria for the diagnosis of sarcopenia.

Diagnosing sarcopenia requires assessment of muscle mass, muscle strength, and physical performance. Muscle mass may be estimated by computed tomography (CT), magnetic resonance imaging (MRI), dual energy X-ray absorptiometry (DXA) or bioimpedance analysis (BIA). Muscle strength may be estimated by handgrip strength. Physical performance may be measured by the usual gait speed, the get-up-and-go test or the timed get-up-and-go test.

Screening for sarcopenia is recommended for elderly patients and those with conditions which reduce physical function. The diagnosis of sarcopenia will lead to the recognition of the problem and its proper management. Various agents are in the pipeline which will contribute to the treatment of sarcopenia and will lead to what is the aim in modern medicine, i.e. healthy aging.

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NSS68
SARCOPENIA AND NUTRITION

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Healthy aging is the aim of modern medicine. The maintenance of independence and quality of life is crucial for the aging population, which increases dramatically. One of the threats to independent life is the loss of muscle mass and muscle function, which is called sarcopenia. Sarcopenia is one of the main factors which contribute to frailty. It can lead to functional impairment and mobility limitation.

Resistance training and adequate protein and energy intake are the key strategies for the management of sarcopenia. Management of weight loss and resistance training are the most relevant protective countermeasures to slow down the decline of muscle mass and muscle strength. The quality of amino acids in the diet is an important factor for stimulating protein synthesis. Additionally, it appears that the use of certain foods, such as milk, cheese and yoghurt may have beneficial effects on sarcopenia, more than the nutrients these foods contain. The use of dairy matrix is important for the management of sarcopenia, as it has been shown that certain foods may have more beneficial effects than their nutrient content. It is important to note that the nutritional content of certain food items may vary dramatically according to the geographical area of the patients' residence. Therefore, these factors should be borne in mind and taken care of. The daily amount of protein and dairy products should ideally be divided in the meals consumed over the day as it appears that the amino acid intake may be a stimulus for muscle formation.

In conclusion, adequate energy and protein intake and physical activity are the main anabolic stimuli for muscle protein synthesis and for the management of sarcopenia.

NSS69
SARCOPENIC OBESITY. DEFINITION AND PATHOPHYSIOLOGY

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The simultaneous presence of sarcopenia and obesity is called sarcopenic obesity. Sarcopenic obesity has been defined as a distinct entity. It is characterized by a vicious cycle between muscle and fat tissue incorporating proinflammatory cytokines, oxidative stress and insulin resistance and may contribute to frailty and the risk of death.

A dramatic change associated with human aging is the progressive decline of skeletal muscle mass. Sarcopenia is an age-related loss of muscle mass and decline in muscle strength. Sarcopenia is defined as "appendicular skeletal mass divided by body height squared in meters (muscle mass index)" two standard deviations or more below reference values from young healthy individuals measured with dual X-ray absorptiometry.

More recently criteria for sarcopenia have been proposed which are based on the amount of lean mass being lower than expected for a given amount of fat mass. Both muscle mass and muscle strength decline with aging but the decline in strength is greater than that expected based on the decline in mass. At the cellular level sarcopenia is accompanied by a loss of innervation and adaptive changes in the proportions of slow and fast motor units, as well as in the cross-sectional area of muscle fibers. Obesity is an important health threat that is a major risk factor for metabolic and cardiovascular morbidity and mortality. There is a world-wide increase in the prevalence of obesity in middle-aged and older adults. The major age-related changes in body composition include an increase in body fat and a decline is skeletal muscle. Sarcopenic obesity refers to the simultaneous presence of sarcopenia and obesity. The complex interplay of common pathophysiological mechanisms such as increased proinflammatory cytokines, oxidative stress, insulin resistance, hormonal changes and decreased physical activity underlie the close relationship between sarcopenia and obesity. A vicious cycle may take place between the accumulation of fat and the loss of skeletal muscle mass since they have a reciprocal influence on each other. Sarcopenia reduces physical activity, which leads to decreased energy expenditure and increases the risk of obesity. An increase in visceral fat induces inflammation, which contributes to the development of sarcopenia. Both sarcopenia and obesity are associated with metabolic disorders, morbidity and mortality. Nowadays, exercise along with proper adaptation in nutrition to promote weight loss without accompanying further muscle loss may be used for the prevention and treatment of sarcopenic obesity.

It appears, that sarcopenic obesity is a common entity which may contribute to frailty and the risk of death.

NSS70
SARCOPENIC OBESITY. MANAGEMENT

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Sarcopenic obesity is a common entity. Inactivity and improper dietetic habits contribute to the increase in the prevalence of this entity in the population.

There are recommendations for sarcopenia and / or weight loss. Strength exercise combined with proper diet have demonstrated positive effects on muscle function and a combination of dietary weight loss intervention and additional protein supplements may reduce body fat. However, there is a lack of studies with interventions and their outcome to deal with sarcopenic obesity. Nutrition is a common factor in both entities: sarcopenia and obesity, although interventions differ due to different pathophysiological mechanisms causing the problem: inadequate nutrition vs. excess consumption is the case. The problem is how to increase muscle mass in a situation of energy deficit, while during weight loss, which is effective in reducing fat mass, skeletal muscle mass may also be lost and consequently reduced. Higher protein intake prevents muscle mass loss, especially

when combined with an exercise intervention. Exercise programs containing strength and aerobic exercise in combination with a dietary weight loss program may possibly have positive effects on sarcopenic obesity.

It appears that the management of sarcopenic obesity requires a program of both exercise and proper diet interventions.

NSS71
TOWARDS A UNIFORM LANGUAGE OF FRAILTY

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Objective: The objective is to assess how the available frailty instruments operationalize frailty in comparison to an internationally standardised framework of health and its positive (function) and negative consequences (disability) called the International Classification of Functioning, Disability and Health (ICF).

Material and methods: A systematic review on frailty instruments using the search terms ("Aged"[Mesh] OR "Frail Elderly"[Mesh] OR "Aged, 80 and over"[Mesh]) AND Frailty AND ("Diagnosis"[Mesh] OR "Risk Assessment"[Mesh] OR "Classification"[Mesh]) was carried out in PubMed, Web of Knowledge and PsycINFO. Using the established Cieza's ICF linking rules each item of the identified frailty instruments was linked to the most detailed ICF code.

Results: The literature search generated 1,984 potential articles. Sixty-seven articles were included in this systematic review. Seventy-nine original or adapted frailty instruments were identified and subdivided into single- (physical n=24; co-morbidities n=1) and multi-domain (n=54) categories. Only 5 frailty instruments (indexes) were linked to all 5 ICF components. The most frequently linked ICF components were *Activities & Participation* (n=522) and *Body Functions* (n=507). *Body Structures* (n=55), *Environmental* (n=21) and *Personal factors* (n=64) were sparingly represented - mainly in the multi-domain frailty instruments. 60 frailty items could not be linked to an ICF code. One hundred and twenty-four frailty items represented co-morbidities and so were not given an ICF code but designated the term 'health condition'.

Conclusion: This review highlights 4 salient points. First, there is heterogeneity in current frailty operationalization. A common frailty language is crucial to facilitate clear communication and comparability in research as well as in clinical practice. Secondly, certain domains of frailty e.g. social factors which hinder or facilitate the individual's intrinsic frailty status (social frailty) and assessment of advanced activities of daily living which capture subtle decline in function associated with mild cognitive impairment (cognitive frailty) are underrepresented. Thirdly, environmental (e.g. relationships) and personal factors (e.g. gender) are depreciated despite evidence that they contribute to frailty. Finally, this review showed inconsistency among the frailty instruments regarding whether co-morbidity and frailty are separate entities. In conclusion, this systematic overview and ICF translation can be a cornerstone for future standardization of frailty assessment.

NSS72
THE OPERATIONALIZATION OF FATIGUE IN FRAILTY SCALES

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Objectives: Fatigue is a common complaint among older adults and is a strong predictor for the onset of disabilities, loss of independence, mortality and other adverse health outcomes. Because of the common biomedical determinants for muscle fatigue and frailty and because of the established relationship of fatigue with the core elements of frailty, fatigue could be an important clinical feature in the early stages of frailty. This presentation aims to give an overview of the different fatigue items that are used in the existing frailty scales.

Material and Methods: PubMed, Web of Knowledge and PsycINFO were systematically screened for frailty scales (last search on September 30th, 2018). 133 articles were included, describing 158 frailty scales. Fatigue items were extracted and categorized in 4 fatigue constructs: "mood state related tiredness", "general feeling of tiredness", "activity based feeling of tiredness" and "resistance to physical tiredness".

Results: 120 fatigue items were identified, of which 100 belonged to the construct "general feeling of tiredness" and only 9 to the construct "resistance to physical tiredness". 49,4% of the frailty scales included at least 1 fatigue item, representing 15±9,3% of all items in these scales. Fatigue items have a significantly higher weight in single domain (dominantly physical frailty scales) versus multi domain frailty scales (21±3.2 versus 10.6±9.8%, p=<0,05).

Conclusion: Fatigue is prominently represented in frailty scales, covering a great diversity in fatigue constructs and underlying pathophysiological mechanisms by which fatigue relates to frailty. Although fatigue items were more prevalent and had a higher weight in physical frailty scales, the operationalization of fatigue leaned more towards psychological constructs.

NSS73
THE DISABILITY PARADOX IN THE FRAILTY CONSTRUCTS

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Background and Objectives: The relationship between frailty and disability in activities of daily living (ADLs) can be seen in different ways, with disability being—to varying degrees—a characteristic, negative outcome, or predictor of frailty. This conflation of definitions is partly a result of the different frailty tools used in research. Aiming to provide a comprehensive overview, a systematic literature search analyzed (i) if, (ii) to what extent, and (iii) how ADLs are evaluated by frailty instruments.

Research Design and Methods: A search was performed in PubMed, Web of Knowledge, and PsycINFO to identify all frailty instruments, followed by categorization of the ADL items into basic (b-), instrumental (i-), and advanced (a-) ADLs.

Results: In total, 192 articles described 217 frailty instruments, from which 52.1% contained ADL items: 45.2% b-ADLs, 35.0% i-ADLs, and 10.1% a-ADLs. The most commonly included ADL items were bathing (b-ADLs); using transportation (i-ADLs); and semi-professional work engagement in organized social life or leisure activities (a-ADLs). These instruments all had a multidomain origin (χ^2 = 122.4, p <0.001).

Discussion and Implications: Because 52.1% of all instruments included ADL items, the concepts of frailty and disability appear to be highly entangled. This might lead to circular reasoning, serious concerns regarding contamination, and invalid research results.

NSS74
MEASURES OF COGNITION IN THE FRAILTY CONSTRUCTS

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Objective. Advancing age is associated with both physical frailty and cognitive decline. The aim of this systematic review is to make an inventory of the inclusion and the operationalization of cognition in frailty instruments.

Material and methods. Pubmed, Web of Knowledge and PsychINFO were screened systematically until December 2016 using the keywords aged; frail elderly; aged, 80 and over; frailty; diagnosis; risk assessment and classification.

Results. Seventy-nine relevant articles encompassing 94 frailty instruments were included. Two instruments were excluded because they were insufficiently described. About half (46%) of the identified frailty instruments included cognition. Of these, 85% were published after 2010, with a significant difference for publication date (X2=8.45, p < .05), indicating a shift in the weight of cognitive measures in more recent frailty instruments. Seven methods of cognitive assessment were identified: dementia as co-morbidity; objective cognitive-screening instruments; self-reported; specific signs and symptoms; delirium/clouding of consciousness; non-specific cognitive terms and mixed assessments.

Conclusions. Although the concept of cognitive frailty has increasingly emerged in recent frailty instruments, it has been operationalized in many different ways. Future studies should focus on the identification of the cognitive domains affected in cognitive frailty, followed by the standardization of the operationalization of cognitive frailty. This could constitute the groundwork for the development of preventive interventional strategies for late-life functional decline.

NSS75
ACUTE AND CHRONIC PAIN: THE DIFFERENCE BETWEEN DIAGNOSTIC APPROACHES

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Pain is a complex experience that cannot be unambiguously perceived by the patient and easily diagnosed by the doctor. The variety of clinical forms of pain makes us look for additional approaches to the diagnosis of this syndrome. The report will consider various types of pain syndromes and will discuss various diagnostic methods that are most suitable for each specific type of algic disorder. The proposed diagnostic algorithms may be useful to doctors of various specialties in the management of patients with different diseases.

NSS76
PAIN AND BIOMECHANICS

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Chronic pain syndromes have a multimodal origin, which is based on morphofunctional interactions, emotional, behavioral and social aspects. When creating an algorithm for diagnosing chronic pain syndromes, it is necessary to study the state of the body in a complex. Special role in this report is given to a little-studied topic - biomechanics and the interaction of psychoemotional and social

aspects on it. Formation of cascade of biomechanical changes is discussed: dysregulation of muscle tone, visceral abnormalities in the spinal segment, dystrophic spinal disorders.

Especially important for patients with high risks (heavy physical work, static work postures and another).

NSS77
FEATURES OF CLINICAL DIAGNOSIS OF CERVICOGENIC HEADACHE

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The prevalence of cervicogenic headache in the population is as high as 14-20%. Pathological changes in the upper three cervical spinal segments form the basis of the neuroanatomy of CGH. Diagnosis is based on the criteria of the International Classification of Headache Disorders. But it is challenging to diagnose clinically and must include the neurological, vertebroneurological and manual examination. The most common risk factors for the development of CGH are lasting static load, forced posture, a sedentary lifestyle, obesity, chronic stress. A violation of the musculoskeletal system which leads to abnormalities in the cervix increase in patients with risk factors.

NSS78
DIAGNOSIS OF TEMPOROMANDIBULAR DISORDERS IN PATIENTS WITH CHRONIC FACIAL PAIN

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Pain related to temporomandibular disorders (TMD) is a common problem in modern societies. The aim of the report is to present the modern methods for diagnosing TMD in patients with chronic pain. The effectiveness and possibility of using the developed methods of visual diagnostics in neurological patients with chronic myofascial pain syndrome will be presented. The report will demonstrate the possibilities of using this technique for myofascial facial pain. The report will consider the possibilities of conservative treatment including exercises, occlusal splint therapy, massage, manual therapy and others as the primary treatment for TMD pain.

NSS79
THE AWARENESS AND KNOWLEDGE OF OSTEOPOROSIS AND RISK FACTORS IN A GROUP TURKISH GERIATRIC PATIENTS

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Objectives: Awareness about osteoporosis is still a concern in geriatric patients. The aim of this study was to evaluate the awareness and knowledge about osteoporosis and risk factors in a group of Turkish elderly.

Materials and Methods: A survey was conducted and performed by the members of 'Living with Osteoporosis' Foundation, in hospital settings, between 2018 October and 2019 April. The participants aged 60 and over were asked to answer a 10-minute survey, including 23 questions. In addition to their demographical properties, the questionnaire elicited data on knowledge and awareness about osteoporosis and risk factors.

Results: Four hundred and twenty seven female and 44 male elderly completed the survey. The mean age of the subjects was 65.2+4.6 years. 71% of the participants were aged between 60-70 years. 68% of the elderly was graduated from lycee, 13% from university and 20% from primary school. 69% of individuals declared that they heard about osteoporosis however only 19% were aware of the risk factors. There was a positive correlation between knowledge about osteoporosis and education level of participants. 15% of the patients had osteoporosis and the presence of osteoporisis was related with family history and clothing style. Majority of the osteoporotic patients were female and using biphosphanate and VitD+calcium therapy.

Conclusion: Although awareness about osteoporosis is relatively high, elderly subjects had not enough knowledge about risk factors. In conclusion educational activities are needed for information on risk factors of osteoporosis and preventional methods in elderly subjects in order to increase quality of life.

NSS80
THE KNOWLEDGE ABOUT OSTEOPOROSIS IN A GROUP OF TURKISH FEMALES: RELATIONSHIP WITH QUANTITATIVE ULTRASONOGRAPHIC SCORES

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Objectives: Osteoporosis has become a major medical problem and is associated with an increased risk of fracture. Awareness and education about ostoporosis is low among the population especially in developing countries. The purpose of this cross-sectional study was to evaluate the knowledge in osteoporosis, symptoms, risk factors, treatment effects and to screen osteoporosis in a group of Turkish female subjects.

Materials &Methods: Eligible candidates who attended to the educational meeting of ostoporosis on World Osteoporosis Day (20th October 2019) were recruited to the study. Demographic data regarding educational level,occupation, menopausal status, body mass index (BMI), fracture history, smoking, exercise and clothing style was recorded. Facts on osteoporosis quiz (FOOQ) detecting the knowledge about op, symptoms, risk factors and

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treatment was performed and quantitative ultrasonographic (QUS)densitometry from calceneus was evaluated before the educational program. Descriptive statistics were used for clinical variables and frequency of applied interventions. The females were graded as normal, osteopenic, and osteoporotic based on the QUS scores obtained.

Results: 68 peri/postmenopausal females with a mean age of 53.58±9.83 years were recruited. Majority of the patients were married, housewies, having more than 1 child, and postmenopausal with a mean BMI of 29.76±4.44 kg/m^2. 8.8% had a history of steroid prescription, 19% were smoking, 2.8% were on regular exercise (walking) and 81% had islamic clothing style. 19.1% had previous low energy fracture (mostly Colles fx). Of those nobody were assessed for op. The QUS scan revealed 33.8% were osteopenic and 20.6% were osteoporotic. No female had used any anti-osteoporotic drug. The most common belief was the increasement of fracture risk by presence of osteoporosis. The attendants had little knowledge about the symptoms and risk factors of osteoporosis and duration between menopausal status and osteoporosis. There was no association between QUS scores, and demographical properties and FOOQ scores of the subjects.

Conclusions: In conclusion knowledge on osteoporosis and risk factors is not sufficient among Turkish females. Osteoporosis may be more common than estimated in postmenoapusal females but assessment and and treatment rates are low despite the presence of low-energy fracture history. Screening for ostoporosis, early diagnosis and treatment are of importance. Therefore, increasing awareness among doctorsand educational activities for population are suggested to reduce the burden of this global epidemic condition.

NSS81
LABORATORY OVERVIEW OF BONE TURNOVER MARKERS

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The measurement of biochemical markers of bone turnover may reflect either enzymatic activities characteristic of the bone-forming or resorbing cells or bone matrix components released into circulation during resorption. None of the currently available bone markers have shown to be advantageous over others with regard to their clinical utility. In our different studies, we mainly focused on patient groups of osteoporotic hip fractures and their serum biochemical markers in order to discuss the risk assessments. A commonly used method to predict fracture risk is the FRAX tool developed by World Health Organization (WHO) since 2008 the method was released, no biomarker information has been incorporated into the prediction model. This tool and questions does not include any biochemical markers. The FRACTURK study was completed and estimated the current and future hip fracture risks and the prevalence of osteoporosis in Turkey. Besides FRAX-based intervention thresholds in men and women from Turkey were determined for our population. The use of biochemical biomarkers to diagnose and to monitor treatment effectiveness

for early/silent states shall have economical and healthcare benefits. To be correlated the clinical state and biomarkers will help us to improve our expectations for the patients. Throughout our studies, along with common bone turnover markers, cytokines, trace elements, Vit D, antioxidants/oxidants, bone morphogenetic proteins, tryptophan and kynurenine pathway markers were evaluated for osteoporotic hip fractures. Biochemical markers were discussed within the fracture groups as intertrochanteric fractures or collum femoris fractures. And nowadays there has been a new approach which bases on our understanding of bone physiology. Related with that cathepsin-K, periostin, dickkopf-, sclerostin, sfingozine-1-phosphate and microRNAs can be considered as new biomarkers. Our fractured group studies had been included these new markers too. Amoung them local inhibitor factors of bone formation behaviour has been followed (patent pending TR/2019/20272). The clinical use of those biochemical markers are not fully established, their relationship with fracture risk has still have question marks and their use as treatment monitoring tools needs to be studied.

All those new mentioned markers can tell us about the osteocyte activities and distinguish the bone compartments that they might be helpful for exploring the pathological and physiological links between the bone, bone healing and other organs. Discovery of reliable biomarkers and development of efficient risk-predicting methodology are in great need to prevent the occurrence of osteoporotic fractures.

NSS82
RISK FACTORS OF OSTEOPOROSIS AND OSTEOPOROTIC FRACTURES

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All over the world osteoporosis is known as a common metabolic bone disease which is characterized by a decrease in bone mass and deterioration of bone microarchitecture. The most important complication of osteoporosis is fragility fractures. These fractures, which are usually seen in the elderly, are the most important complications that cause morbidity and mortality while putting a great burden to the economy. Peak bone mass in youth and bone loss rate at the beginning of bone loss can determine the risk of progressing osteoporosis. While increasing the awareness of osteoporosis especially in women, preventive studies should be worked, preventive training should be given and by surveillance studies risk groups should be identified. One of the important goals in the management of osteoporosis is to determine the probability of fracture risk.

Briefly the risk factors in osteoporosis are; geriatric age, female gender, genetic factors, early menopause calcium and vit D deficiencies related with poor diet, insufficient sunlight, smoking, excessive consumption of alcohol, coffee, and fizzy beverage, overuse of sodium, sedentary lifestyle, long-term immobilization, nulliparous or multiparous, long-term use of corticosteroids, antiepileptic and antacid drugs and chemotherapy. In addition, endocrinologic disorders, inflammatory bowel disease,

malabsorption, multiple myeloma, diseases of the central nervous system, and chronic inflammatory rheumatic diseases may increase the risk of osteoporosis. Although the risk factors of osteoporotic fractures are also eligible for the risk factors of osteoporosis, there can be additional risk factors like; low body mass index, sarcopenia, hip geometry, osteoporotic hip fracture history in family, impared vision and balance and neuromuscular disease, for fracturess. Apart from all these environmental factors and drugs should also be considered. In conclusion complete evaluation and preventive rehabilitation approaches are needed in order to desrease the risk of osteoporosis and osteoporotic fractures.

NSS83
URIC ACID - FRIEND OR FOE ?

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Uric acid is the final step of nucleic acids metabolism only for humans and great apes, because the rest of the mammals are able to produce uricase (urate oxidase), an enzyme that metabolizes uric acid to allantoin, which in turn, is highly soluble so easily excretable through urine. This situation is the consequence of a silencing mutation of uricase gene during evolution. As a result of it, the average serum level of uric acid is 3 to 5 times higher in humans and great apes in comparison with other mammals. Uric acid has antioxidant properties, it is maintaining blood pressure and is augmenting the capacity of fructose to induce fat stores, and all these features were providing survival advantages during evolution. However, increased level of uric acid (more than 7 mg/dl) is associated with gout, metabolic syndrome and cardiovascular conditions, especially in developed countries. Uric acid seems to have some neuroprotective effects in Parkinson disease and Alzheimer. Humans and uric acid have a long common history and we need more data to decide if uric acid is a friend or a foe for the 21th century human being.

NSS84
ASYMPTOMATIC HYPERURICEMIA - THE HIDDEN REALM (IMAGING CLUES)

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Musculoskeletal ultrasound imaging method represents a major step forward on the journey to expose the intimate structure of this system and the pathophysiology of rheumatic diseases. One of the major advantages of using musculoskeletal ultrasound (MSK-US) is the possibility to discover abnormalities before they become clinically significant, thus symptomatic. That is, actually detection of pre-clinical disease. And this is the major target in rheumatology, as the early diagnosis is key to maintaining structure and function of the joints. In gout, there are some specific findings that intensely suggest the diagnosis. Besides ultrasound examination, in a person with hyperuricemia, the use of another developing imaging technique, the dual energy computed tomography (DECT), can lead to visualization of some abnormalities that may represent the consequence of urate deposits in the musculoskeletal system. Having said that, why could we not define, on the basis of imaging only, a new entity, pre-clinical gout, that we might as well call asymptomatic gout?! And this, might be the answer to the definition of therapeutic window of opportunity in gout, also.

NSS85
BONE MINERAL DENSITY IN HYPERURICEMIA AND GOUT - COLLATERAL DAMAGE?

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Uric acid (UA) is related to bone health through its antioxidant properties, or through the vitamin D–parathyroid hormone axis. Serum UA accounts for about 50% of extracellular antioxidant activity, suggesting that hyperuricemia may have a protective role in osteoporosis - disease characterized by high levels of oxidative stress.

Oxidative stress has a potential to attenuate osteoclastogenesis and bone formation. Whereas, antioxidants reduce osteoclastic activity, decrease bone resorption and increase differentiation of osteoblasts and mineralization process. Elderly osteoporotic women have lower antioxidant defenses as compared to normal age-matched population. When UA exists at supersaturated concentrations, such as in gout, its antioxidant properties could be overcome by its prooxidant effects, thus creating an environment of high oxidative stress despite the presence of high UA levels in the serum. The prooxidant role of UA may contribute to increased levels of circulating proinflammatory cytokines.

Clinical studies indicate controversial associations between the serum UA level and the bone mineral density (BMD), depending on gender, age, and the place of measurement of bone mineral density. A recent study demonstrated a significant positive association between high serum UA level and BMD at both femoral neck and spine in elderly men and women. Furthermore, UA levels between 4 to 4.99 mg/dL decrease the risk of osteoporosis in the elderly people aged 60 years and more.

Despite the protective effect of high serum UA on BMD, clinical implication of high serum UA in the elderly subjects remains to be determined, because, both high and low levels of UA are associated with metabolic, cardiovascular, renal and neurological diseases.

NSS86
GOUT TREATMENT - AS EASY AS IT SEEMS?

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Gout treatment involves two elements: treatment of the gouty arthritis (attack) and treatment of hyperuricemia per se – urate lowering therapy (ULT); the scope of the latter is to restore the normal level of serum uric acid (sUA).

When treating the attack, there are three options from which to choose: colchicine, non-steroidal anti inflammatory drugs, and cortisone. When choosing between them we take into account the efficacy and safety of each of them, as well as the fact that colchicine is still as effective as when it was first used, one hundred years ago.

The ULT is also base on three therapeutic drug classes: inhibitors of uric acid synthesis, promotors of uric acid excretion (uricosurics) and synthetic uricase. When choosing between them, we have to questions to answer to: how do we choose the class and when do we initiate the treatment. To this day, the most used class of ULTs is xanthine oxidase inhibitors. There are two drugs that are part of this class: allopurinol, which is well known and widely used and febuxostat which, lately, seems to not be the "wonder drug" that it seemed to be in the beginning. Uricosurics are difficult to use drugs because of their complex posology but mostly because of the numerous adverse reactions they can elicit. In this class of drugs, lesinurad might "make a career".

NSS87
ANGIOGENESIS AND BONE

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Until recently vasculature of bone has not been in the focus of research, but accumulating evidence has shown that bone is a highly vascularized tissue. Vasculature plays an important role in physiological processes, like osteogenesis, and the dysregulation of vasculature is associated with many bone diseases such as osteoporosis or osteoarthritis. Vascular endothelial growth factor-A (VEGF) is one of the most important growth factors for regulation of vascular development and angiogenesis. VEGF influences skeletal development and postnatal bone repair and bone regeneration, but also regulates bone remodeling. Osteoblasts not only respond to VEGF stimulation, but also express and synthesize it. Normal and pathological osteoblasts produce and express VEGF. 1,25 dihydroxy-vitamin D3 treatment increases protein and m-RNA VEGF levels. Pathological osteoblasts induce a strong angiogenic response, greater than observed of normal cells, suggesting the involvement of osteoblast-derived VEGF in the pathogenesis of bone diseases.

Studies of the functions of osteoblast-derived VEGF in healing of a bone defect indicate that osteoblast-derived VEGF plays critical roles at several stages of fracture healing and bone repair

Exercise or mechanical loading regulates bone vascularization in bone microenvironment via the modulation of angiogenic mediators (angiogenic and osteogenic coupling). The cross talk between osteoblasts and endothelial cells plays a pathophysiologic role in the response of the endothelium to unloading during disuse osteoporosis. This explains the underlying mechanisms of exercise and its role for osteoporosis prevention.

NSS88
VASCULAR PATHOLOGY AND OA. IMAGING OF MICROCIRCULATION

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Continuous growing evidence is stipulating a role to vascular pathology both in earliest stages and in OA progression. Besides, the crosstalk between endothelium, cartilage, and subchondral bone is probably another central feature in this process. The reduction of interstitial blood flow through the small vessels in the subchondral bone at the ends of long bones due to venous occlusion and stasis or presence of microemboli in subchondral bone vessels compromise the nutrient delivery and gas exchange in cartilage. This becomes a possibly initiator of cartilage breakdown in OA. Osteocyte apoptosis in subchondral bone would start osteoclastic bone resorption reducing almost temporarily, the bone support to the cartilage. Since the cartilage is avascular tissue, evidence accumulated shows that vascular problems may underlying the OA development. On the contrary, bone is a high vascular structure. The vasculature is involved in bone growth, repair and metabolism. The blood supply serves the bone marrow and calcified bone tissue, both tissues functionally interdependent regarding to hematopoesis, bone modelling and remodelling. Blood flow responsible for oxygen and nutrients exchange, metabolic waste with the interstitial fluid becoming very important for osteocytes located in the bone matrix, although osteoclasts and osteoblasts play a clear role in remodeling. Besides, osteocytes are the most numerous cells in bone and its adaptation to loading forces is clear, giving to these cells a role in bone mechanical sensing mediated by interstitial flow along osteocyte lacunae, driven by both mechanical loading of bone and pulsatile blood flow. Pathophysiology of OA is the venous stasis resulting in intraosseous hypertension and hypoxia. In response, osteoblast (OB) change their cytokine expression by accelerating bone remodeling and cartilage breakdown in OA. Animal models characterized the circulatory kinetics in OA bone with dynamic contrast enhanced MRI (DCE-MRI) and 18 F-PET studies demonstrated venous stasis and reduced perfusion. OB uptake of 18F is consistent with the abnormal perfusion, bone remodeling and severity of OA. Circulatory kinetics with DCE-MRI in human knee OA exhibit similar venous outflow obstruction. Venous stasis is associated with hypoxia in subchondral bone. In OA exposed to hypoxia in vitro, there is upregulation of fibrinolytic peptides and deficiency in the regulation of PAI-1, leading to the generation of plasmin by human OA osteoblasts. Plasmin is

a serine protease that has been shown to degrade cartilage in OA. Abnormal circulatory kinetics by DCE-MRI may be an image biomarker of OA. Pharmacologic modulation of venous stasis would have a positive venous effect on the physicochemical microcirculation of subchondral OB.The significant molecular interplay between subchondral bone vasculature and cartilage need further investigation particularly when increasing vascularity in subchondral bone is associated with OA severity. Regarding imaging of the microvasculature UTE (ultrashort echo time) MRI sequences with TEs particularly 100 times or less than the conventional clinical gradient echo sequences, can detect signal from cortical bones. DCE in cortical bone, perfusion parameters for cortical bone would be feasible. The relationship between bone perfusion, bone remodelling and fracture repair, increased bone turnover and inflammation is associated with increased blood flow. There is also a strong correlation between bone perfusion and bone mineral density (BMD). It is difficult to investigate perfusion with MRI because MRI in most soft tissue studies is not effective when applied to bone. UTE type sequences directly evaluate perfusion in cortical bone by reducing TEs from the several milliseconds of conventional sequences down to milliseconds for 2UTE sequences. Cortical bone perfusion can also be assessed with 18F-fluoride positron emission tomography (PET). However, 18F-Fluoride PET has a low spatial resolution and subjects exposed to ionizing radiation. MRI has an advantage because it can provide much higher spatial resolution without ionizing radiation.

NSS89
THE MICROCIRCULATION ABNORMALITIES IN OSTEOPOROSIS AND OSTEOARTHRITIS

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Background: The microcirculation and endothelial dysfunction play significant role in osteoporosis and osteoarthritis. Since the bone blood vessels are comprised only from endothelium, it is means that endothel pathology influence and trigger humoral cascade between osteoblasts and osteoclasts in order to enhance bone remodeling.

The failure of microcirculation in bone blood supply leads to osteopenia and osteoporosis.

Objectives: To investigate the scope of microcirculation abnormalitities in osteoporosis and osteoarthritis **Methods:** The open prospective parallel group study was designed. The following parameters will be observed. The coronary calcium score, arterial stiffness, the central and peripheral blood pressure, cardial output, augmentation index, peripheral resistance, mean arterial pressure, pulse pressure, cardiovascular risk factors, capillaroscopy, osteoporosis and osteoarthritis severity.

Result: The microcirculation and vascular abnormalaties have the great importance in a pathogenesis of osteoporosis and osteoarthritis. The arterial stiffness and rarefication of the capillaries has been detected in these degenerative rheumatic diseases. Vascular age, coronary calcium score is more prominent in osteoporosis and osteoarthritis compared to healthy controls. This is more significant when cardiovascular risk factors are applied.

Keywords: Microcirculation, Arterial stiffness, Osteoporosis, Osteoarthritis

NSS90
NON-PHARMACOLOGICAL APPROACHES IN THE MANAGEMENT OF OSTEOPOROSIS. HOW TO MODIFY LIFESTYLE?

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Non-pharmacological measures for osteoporosis prevention and treatment starts with the intervention and elimination of modifiable risk factors, and lifestyle and dietary measures should be taken into consideration seriously.

Calcium: The recommended calcium intake is 1000 and 1200 mg daily, preferably through nutritional intake. Use dietary supplements only when calcium assumption is insufficient. In postmenopausal women and older men receiving bone protective therapy for osteoporosis, Ca supplementation should be given if the dietary intake is below 700 mg/day. It is not recommended to exceed 500-600mg per dose. Supplementation is not recommended in older, noninstitutionalized adults.

Vitamin D: Sources of Vit D in foods are extremely limited. Although the main source of Vit D is sunlight exposure (UVB), it is not possible to achieve adequate Vit D levels exclusively from sunlight.Vit D supplementation considered in patients at risk of, or showing evidence of, Vit D insufficiency. In postmenopausal women and older men (≥50 years) at increased risk of fracture a daily dose of 800 IU cholecalciferol should be advised. The objective is to reach a circulating concentration of 25 (OH) D of between 30 and 50 ng/mL (75−125 nmol/L), that is stable over time. In elderly and the chronically ill, doses between 800 and 2000 IU are recommended (Safe upper level for Vit D is 4000 IU/day).

Concerns: High doses of Vit D, particularly with calcium supplementation, can cause hypercalcemia, hypercalciuria, and kidney stones. Vascular calcification may contribute to the cardiovascular events observed in calcium supplement users.

Protein: Sufficient dietary protein, ideally achieved through dairy products in postmenopausal woman and man over 50 years of age (1.0−1.2 g/kg/day with at least 20−25 g of proteins per meal).

Smoking and alcohol and caffeine: It is recommended to smoking cessation and to limit the consumption of alcohol to no more than 2 units per day. Intake of caffeine by limiting the consumption of no more than 4 cups of coffee per day is recommended.

Prevention of falls: A validated multifactorial assessment of fall risk that evaluates the history of falls and risk of fragility fracture is recommended in patients over 75 years of age, to decide on whom interventions are indicated. A national fall prevention program needs to be structured and implemented in order to prevent institutional and at home falls.

Exercises: A structured exercise program tailored according to the needs and abilities of the individual patient that includes walking, weight training, balance exercises, posture, and flexibility should be incorporated into the routines of the elderly.

Physical medicine and rehabilitation can reduce disability, improve physical function, and activities of daily living and lower the risk of subsequent falls in patients with osteoporosis.

Fracture Liaison Services which is a coordinated care system that ensures individuals with fractures receive appropriate and multidisciplinary care should implemented nation-wide is recommended.

NSS91

THE ROLE OF EXERCISES: WHAT TYPE OF EXERCISE, WHEN?

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Bone is a dynamic tissue and exercise is an important physical stimulus for the development and maintanence of optimal bone mineral density (BMD) and bone strength . In order to expect adaptive responses from bone a-) Loading must be dynamic intermittant rather than static loads. b-) High magnitude loads should be applied rapidly. C-)Loads must be applied in unusual and diverse loading directions and patterns. D-) Few repetitions of loading cycles are preferred if an adequate load intensity is performed. It's also recommended that, the general muscle strength improving principles (spesificity , reversibility,diminished returns etc…) should be considered when designing any exercise program to increase muscle and bone health. Optimal type and dose of exercise session ; in other words , magnitude , rate ,number of repetitions , frequency , sessions or days per week must be arranged according to patient's general health status and comorbidities. Walking and other forms of aerobic exercise , progressive resistance training. (PRT), high velocity power training ,weight-bearing impact exercise. (WBI) and balance mobility training activities are the alternatives of training methods. WBI-exercise applied as 3-5 sets of 10-20 jumps, 4-7 days / week with multidirectional movement patterns are recommended to prevent bone loss in older adults. PRT is also effective to maintain BMD in postmenopausal women (2-3 sets of 8-12 repetitions at 70-85% maximal muscle strength) if prescribed at least 2-3 times per week. According to some reports, regular brisk walking has no effect on preventing age-related bone loss although some authors recommend brisk walks at intensities around 75% or greater of maximum oxygen update with combination of other forms of exercise. Because of some confusing results , our purpose is to evaluate appropriate exercise modalities, together with the colleagues in this session.

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NSS92

ARE ORTHOSES AND PHYSICAL MODALITIES EFFECTIVE FOR OSTEOPOROSIS AND/OR OSTEOPOROTIC FRACTURES?

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Orthoses and physical modalities are administered among the non-pharmacological treatment approaches for osteoporosis. The aim of this presentation is to make an overview of the use and effectiveness of orthoses and physical modalities for people having osteoporosis and/or fractures.

Spinal orthoses are commonly used for the conservative management of osteoporotic vertebral fractures. The goals of orthotic management may be any combination of limiting motion, improving posture, reducing pain and fatigue, and promoting activities and participation. Various types of orthoses, e.g. thoraco-lumbo-sacral, thoraco-lumbal or lumbosacral according to the level of fracture can be prescribed. They can be either rigid, semirigid or flexible. Various systematic reviews evaluated the effectiveness of spinal orthoses. Current evidence is mixed and inconclusive due to the insufficiency of the size and methodological quality of the studies. Weak to moderate evidence suggests the use of semirigid backpack thoracolumbal orhosis for women with vertebral osteoporosis and/or subacute vertebral fractures for improving strength, pain, posture, and quality of life. Weighted kypho-orthosis is also promising as part of the exercise program and postural reeducation.

Physical modalites such as electrical stimulation, pulsed-electromagnetic field therapy and therapeutic ultrasound can also be applied after osteoporotic fractures due to possible positive effects on pain relief, bone metabolism and fracture healing.

Beneficial effects of whole-body vibration on bone mass and musculoskeletal pain have been documented. It has been reported to provide improvement in reducing bone loss in the lumbar spine of postmenopausal women. It may also be used as an intervention for fall prevention.

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NSS93
NON-PHARMACOLOGIC TREATMENT OF OSTEOPOROSIS IN THE LIGHT OF TWO CASES

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Two cases with osteoporosis, one without any fracture and the other with one vertebral fracture is discussed within this context. The first case is a 59 year -old woman who was diagnosed as osteoporosis according to the bone densitometry. She doesn't have any clinical or morphometric osteoporotic fracture. Other than anti-hypertensive treatment, she is not on any other medical agent. Her mother has experienced a hip fracture at the age of 78. She smokes 5 cigarettes / day which she was told to quit. She is a social drinker. She is determined not to follow a diet rich in calcium although the dietary intake is below 700 mg/day. Therefore, Ca supplementation was given in addition to the bone protective therapy she has been receiving. She was recommended not to exceed 500-600mg per dose. She was told to have 800 IU of vitamin D3 on a daily basis as the circulating concentration of 25 (OH) D was 35 ng/mL. Exercise with weight, balance and resistance load was recommended, to improve mobility, strength and physical performance. The other patient is a 75 year-old lady who has fractured T12 vertebra when she bent down to take a key which was on the floor. After a short period of immobilisation, the patient was carefully remobilised with an orthesis and the pain gradually subsided with analgesic treatment. As the circulating concentration of 25 (OH) D3 was 9 ng/mL, 50 000 IU was given orally weekly for 8 weeks as a loading dose and followed by a maintenance dose orally. Calcium intake of 1000 to 1200 mg daily, preferably through nutritional intake was suggested. She is also a heavy coffee consumer. She is on a diet with low quantities of protein . Maintenance of an adequate protein intake is important for the preservation of musculoskeletal function. A validated multifactorial assessment of fall risk that evaluates the history of falls and risk of fragility fracture was applied. Then, hip pads were also prescribed as she had a high risk of falls. Specific exercises for this patient profile is also discussed. The recommendations given to these two cases address integrating interventions to modify their lifestyle, mainly calcium and vitamin D intake, and exercise. Other recommendations include maintaining adequate protein intake, identification and treatment of risk factors for falls, and limiting the consumption of coffee, alcohol and tobacco.

NSS94
ASSOCIATION OF BODY COMPOSITION WITH DISEASE ACTIVITY IN RHEUMATOID ARTHRITIS

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Rheumatoid arthritis (RA) is a chronic form of inflammatory arthritis characterized by multiple joint involvement and significant disability. The term "body composition" refers to the quantification of the different structural components of the human body, which can be estimated at the atomic, molecular, cellular, organ-tissue and whole body levels. Several studies showed that RA is associated with considerable changes in body composition, lipid profile, adipokines and insulin sensitivity. Overweight and obesity are increasing the risk of metabolic, neoplastic and cardiovascular diseases, but can be considered states of inflammatory activation, since the hypertrophic adipocytes of individuals with body compositions of these types are activated and release a number of soluble mediators known as adipocytokines or adipokines. The most important adipokines in terms of their proinflammatory activity are leptin, visfatin, interleukin 1 and tumor necrosis factor α. The latter 2 cytokines are relevant in the pathogenesis RA, as they are crucial for the onset and persistence of the destructive synovitis that characterize this disease. Several studies have evaluated the association between changes in body composition in terms of measurements of overweight or obesity and the level of disease activity in RA patients are contradictory. The reasons for this controversy very probably lie in the heterogeneity or weakness of the evaluation tools used both for body composition and the level of disease activity associated with RA, as well as weaknesses in the design and quality of the sample selection. The modulation of RA clinical status by body fat mass is suggested because a significant association was found between body mass index (BMI) and inflammatory activity in those reports with a trend toward higher statistical power. The body composition is already altered in patients with early RA with more fat and less lean mass, with or without an increase in the BMI. Various studies describe the association between high BMI categories and poorer clinical outcomes, a lower chance for remission, and a higher probability of comorbidity but less radiographic joint damage. Body compositions such as body fat mass and skeletal muscle mass are significantly associated with pain and disability in RA patients. The relationship between body composition and clinical activity in RA requires be approached with further studies with higher methodological quality.

NSS95
RELATIONSHIP OF BODY COMPOSITION WITH OSTEOPOROSIS

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Osteoporosis is a skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue with a consequent increase in bone fragility and susceptibility to fracture. Osteoporosis was defined by the World Health Organization (WHO) in 1994 as a bone mineral density of less than 2.5 standard deviations below the sex-specific young adult mean and this characterization has been adopted globally. The term sarcopenia was first coined in 1989 by Irwin Rosenberg who used it to define/describe the loss of muscle mass with age and it is associated with increased rates of disability, poor mobility, frailty and hospitalization. Since then it has been known that muscle function, in addition to muscle mass, is necessary to describe sarcopenia. Osteoporosis and sarcopenia are common diseases in older age and are associated with significant morbidity and mortality. They represent two major health problems with an increasing prevalence in the elderly population. The correlation between these diseases has been widely reported, leading to the development of the term "osteosarcopenia" which is used to diagnose those patients suffering from both diseases. A universal definition was established for osteoporosis in 1994. but for sarcopenia there is still ongoing debate regarding how best to define it. Human body composition measurements are objective methods of nutritional assessment and area of interest to health professionals. Despite many clinical trials and epidemiological studies, we still didn't define how changes in human body composition affect clinical and functional status in both patients with osteoporosis and sarcopenia. Reasons for that are often found in poorly available diagnostic methods and low motivation of health professionals in relationship of body composition and osteoporosis. CT and MRI represent the gold standard for evaluating body composition (BC), but are costly and time-consuming. Bioelectrical impedance analysis (BIA) is emerging as a popular alternative to DXA due to its easy installation and superior cost-effectiveness. BIA measures tissue impedance by circulating a weak alternating current through the body.

Using BIA, we tried to define the relationship of body composition in patients with osteoporosis during the pilot study in cohort of Croatian patients with osteoporosis.

NSS96
IMPACT OF DISABILITY ON BODY COMPOSITION IN MULTIPLE SCLEROSIS

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Multiple sclerosis (MS) is a chronic disease of the central nervous system, more prevalent in women than in men, leading to impairment of motor function and cognitive dysfunction with deterioration of body composition. Significant differences in body composition between body mass index-matched men with and without MS have been reported, although this was not observed in women. According to recent research cognitive function does not correlate to body composition parameters in MS patients. Disability and inactivity varies widely between four different clinical profiles: clinically isolated syndrome, relapsing-remitting MS (RRMS), primary and secondary progressive MS. Impact on body composition has been mostly researched in RRMS. More disabled MS patients present with higher body fat and lower bone tissue content and density than those with milder disability. Physical inactivity in MS patients is associated with changes in body composition. Non-drug-based symptomatic treatment approach in MS encompasses physical therapy with positive effects that include symptom reduction and enhancement of mobility, however there have been contrary results on the impact of body composition. Matusik et al. found that physiotherapy had a significant impact on functional mobility and it was related to body composition.[1] Whereas, Silveria et al. did not find a correlation between symptoms and body composition in MS patients that underwent physical activity intervention.[2] Furthermore, pilates has not been shown to impact body composition. High intensity exercise therapy in milder patients seems to have an effect on fat mass, fat percentage and fat-free mass over time. Further research is needed to explore differences in body composition between genders and MS clinical profiles, and develop potential strategies to address changes in body composition in MS.

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NSS97
OSTEOSARCOPENIA

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In older persons, the combination of osteopenia/osteoporosis and sarcopenia - known as osteosarcopenia - has been proposed as a subset of frailer individuals at higher risk of institutionalization, falls, and fractures. Osteosarcopenic patients have very particular clinical, biochemical, diagnostic, and functional characteristics that could be identified in clinical practice.

In this presentation, a clinical definition of osteosarcopenia aiming to describe the clinical, functional, and biochemical features that are unique to these patients will be presented. The use of imaging combined with functional assessments for the diagnosis of osteosarcopenia will be discussed. We will go over the translational aspects of sarcopenia and osteoporosis research and highlight expected outcomes from different interventions for both conditions. In addition, new therapies targeting both muscle and bone are being developed.

NSS98
NEUROGENIC OSTEOPOROSIS DUE TO SARCOPENIA IN POST POLIOMYELITIS PATIENTS

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Muscle mass, -strength and -density, sarcopenia, exercise and physical activity are correlated with bone mass, bone density and osteoporotic fractures. Bone and muscle decay and dysfunction are seen in ageing, but in neurological disorders with muscular atrophy, bone loss can be seen also at younger ages. The pathophysiology of osteosarcopenia in neurological diseases is complicated. One factor is unloading of affected skeletal muscle, and consequently deconditioning which occurs in any muscle that is not active. In 30 subjects with post poliomyelitis syndrome (mean age of 56,3 years) femoral neck and lumbar spine bone mineral density (BMD) were measured using dual X-ray absorptiometry Low femoral and lumbar bone mass was found in 80% and 63%, respectively. Six patients had osteoporotic femoral BMD-scores and 3 (1 man and 2 women) had osteoporotic lumbar BMD. Femoral and lumbar osteopenia had 18 and 16, respectively. The lowest BMD scores were present in patients with visible and clear lower limb muscle atrophy. The correlation found between low muscle mass and BMD, can be explained by neurogenic bone loss, both due to muscle atrophy and disturbed regulation of bone by the central nervous system.

NSS99
OSTEOSARCOPENIA SCHOOL

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Finally, the new holistic concept called Osteosarcopenia school will be presented. Preventive measures and therapeutic interventions that can benefit both muscle and bone simultaneously will be analyzed. This new concept is based on counselling and education of patients as part of a rehabilitation program. Includes a specific pathway to stop the vicious cycle, not only of social isolation, but also of falls and fractures in this population, which are all leading to disability. Rehabilitation uses interventions such as counselling and re-education on how to prevent falls. According to the concept, the focus is mainly shifted on muscle strengthening, balance improvement and reducing all causes of instability (i.e. neurogenic, iatrogenic etc.). To this end, specific exercise programmes combined with a review of drugs, is essential in these patients. Re – education includes interventions targeting to increase functionality of the subjects through social reintegration and improvement in activities of daily living.

NSS100
GENERAL PROFILE OF THE BUTTERFLY PARTICIPANTS

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Objectives

Longitudinal studies have shown that with aging most individuals tend to develop a chronic low-grade inflammatory profile (CLIP) in which chronic diseases may play an important modifying role, and that such a state is a strong risk factor for frailty and death. (1) Our aim is to identify which amount of health burden is predictive to frailty status as those elderly might profit from early interventions.

Materials and methods:

494 participants of the "BrUssels sTudy on The Early pRedictors of FraiLtY" (BUTTERFLY) were categorized according to health status: A1(completely healthy), A2 (Healthy but lifestyle-related risk), B1 (Only Musculoskeletal comorbidity), B2 (Non-cardiovascular comorbidity) C1 (arterial hypertension) C2 (Cardio-vascular comorbidity) D (Inflammatory pathology or anti-inflammatory drugs). Frailty status was assessed by the Groningen Frailty Indicator, the Rockwood Frailty Index and the adapted version of the Fried Frailty Index. We distinguished 3 groups: robust (R, n=218), physically prefrail (PF, n=193) and frail (F, n=77).

Results

After dividing for sex: Age, CRP-level, smoking history, medication/alcohol -intake, MMSE and Rockwood Score were evaluated. F men had a higher (p=0,01) medication intake (5±3) than PF (4±3) and R (3±2). The same results for medication intake (p<0,001) between F (5±3), PF (2±5) and R women (3±2) was detected. When divided in to health categories we observed a higher number of C2 and D in F men (50% & 12%) when compared to R (40% & 3%) and PF (30% & 11%) peers. In F elderly woman C1 (47%) was more prevalent than in PF (29%) and R (34%).

Conclusion(s)

Our cross-sectional data suggests a higher prevalence of arterial hypertension, cardiovascular events and chronic inflammatory conditions in frail elderly compared to robust and prefrail peers.

NSS101

A NEW BIA EQUATION FOR DETERMINING APPENDICULAR LEAN MASS IN COMMUNITY-DWELLING PERSONS AGED 80+

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Objective: We aimed to evaluate the agreement between dual energy X-ray absorptiometry (DXA) and BIA equations to determine lean mass in the oldest old (80+), as well as their suitability to identify sarcopenia.

Materials and methods: 174 well-functioning persons (mean age: 83,3 ± 3,0; mean BMI: 26,8 ± 3,5) were included. 1) Appendicular lean mass (ALM) was predicted using BIA-based equations available in literature (Kyle et al. 2003, Sergi et al. 2015, Scafoglieri et al. 2017), and compared to DXA outcomes 2) A new ALM-formula was generated suitable for this population 3) Prevalence and agreement for sarcopenia based on BIA-equations was calculated (compared to the standard reference cut-offs for proposed by EWGSOP)

Results: 1) Literature-based BIA equations systematically overestimate ALM 2) The new prediction formula that we propose for the 80+ is: ALM = 0,827 + (0,19*Impedance Index) + (2,101*Sex) + (0,079*Weight); R^2 = 0,888; SEE = 1,450 kg. 3) BIA equations underestimate sarcopenia regardless the EWGSOP cut-off used. Sarcopenia classification based on our new BIA equation for ALM shows better agreement with DXA (k ≥ 0,454) compared to literature-based BIA equations (k < 0,368).
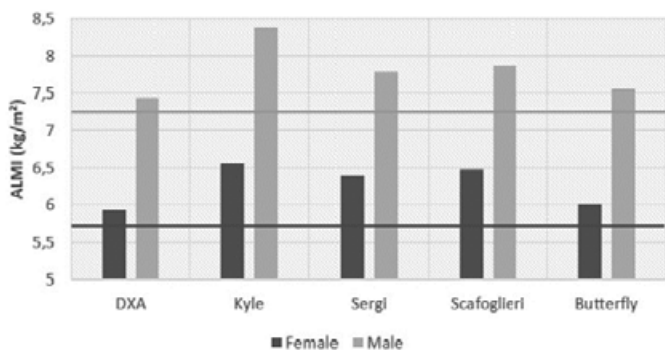
Fig. 1 ALM index according to DXA and BIA-prediction formulas. The horizontal lines represent EWGSOP cut-offs for sarcopenia proposed by Delmonico et al. 2007 (Men < 7.25 kg/m², Women < 5.67 kg/m²)

Conclusions: Despite the high correlation between both methods, literature-based BIA equations consistently overestimate ALM compared to DXA in persons aged 80 and over. We propose a new equation for ALM, reaching higher agreement with DXA and thus improving the accuracy of BIA for this specific age group.

NSS102

IMMUNOSENESCENCE SIGNATURES IN PRE-FRAILTY

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Objective

In the present study, we sought to investigate the association between markers of cellular immunosenescence and the risk of pre-frailty in community dwelling older persons.

Material and methods

One hundred and seventy-three older persons aged 80 years and over, who presented no active pathology, were enrolled in the study after informed consent. Pre-frailty was defined -using the Fried et al. criteria- as the presence of 1 or 2 out of the following frailty indicators: unintentional weight loss, self-reported exhaustion, weakness, slow walking speed, and low physical activity. The surface markers of senescence were determined using flow cytometry. Cytomegalovirus (CMV) serostatus and serum IL-6 were measured using Architect iSystem and Luminex, respectively.

Results

The pro-inflammatory cytokine IL-6 was significantly higher in pre-frail compared to robust individuals (p<0.001). When considering the entire cohort, there were no significant differences in the expression of senescent surface markers, CD4−/CD8+ ratio or CMV-seropositivity between pre-frail and robust individuals. However, in the CMV-seronegative population as well as the CD4−/CD8+ ratio > 4 group, we found a significantly higher proportion of the highly differentiated memory and senescence-like phenotypes and a lower proportion of the naive subset in pre-frail compared to robust (all p < 0.05).

Conclusion

These findings indicate that the presence of pre-frailty is independent of CMV infection in very old persons. Moreover, higher concentrations of IL-6, age and sex were independently predictive of pre-frailty. Whether IL-6 might facilitate the identification of people at risk of developing pre-frailty deserves further investigation

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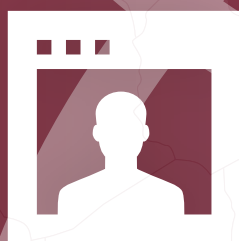
Abstract Book
Poster Abstracts

P101
VALIDATION OF THE QUALITY OF LIFE QUESTIONNAIRE OF THE INTERNATIONAL OSTEOPOROSIS FOUNDATION (QUALEFFO-41) IN BAHASA INDONESIA

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Objective: Vertebral fractures due to osteoporosis could lead to reduced life functioning and quality of life. It is important to examine the changes in health-related quality of life (HRQOL). International Osteoporosis Foundation recommends using QUALEFFO-41 questionnaire to assess the quality of life in osteoporosis patient. Unfortunately, no available QUALEFFO-41 in Bahasa Indonesia version. Therefore, the authors conducted a validation study for QUALEFFO-41 in Bahasa Indonesia. This study aims to translate, culturally adapt and validate the Indonesian version of QUALEFFO-41 for patients with vertebral fractures.

Methods: Forward and backward translations from Indonesian were done. Seven female patients with osteoporosis enrolled in the prevalidation study. A validation, case-control study included two groups of female patients: one group of 30 female patients with osteoporotic vertebral fracture, and another group of 30 control patients with osteoporosis without fractures. They completed the QUALEFFO-41 and EQ-5D (for comparison). The validation study examined internal consistency, concurrent validity, sensitivity, and specificity.

Results: No change of items of analysis both in prevalidation and validation study. All domains had a reliable result, the values were >0.70, indicating a good internal consistency (total QUALEFFO-41 score $\acute{a}$=0.93). QUALEFFO-41 also showed a higher reliability compared to EQ-5D (0.93 vs. 0.881). The AUC values indicated that QUALEFFO-41 had a moderate power to discriminate HRQOL domain scores of patients with and without vertebral fractures (AUC=0.717). The AUC value of QUALEFFO-41 total score was higher (0.717 vs. 0.596) and significantly different (0.002) than EQ-5D. Therefore, QUALEFFO-41 has more power to predict quality of life in patients with vertebral fractures.

Conclusion: The Indonesian version of the specific osteoporosis questionnaire, QUALEFFO-41, has been well accepted by the patients. The questionnaire has an appropriate internal consistency, reliability, sensitivity, and specificity. Thus, the Indonesian QUALEFFO-41 version possesses sufficient general psychometric characteristics. It can be used in clinical studies on patients to assess their quality of life. As spine surgeons, we need to know about osteoporosis, including a patient's quality of life.

P102
VALIDATION OF THE INDONESIAN VERSION OF THE ECOS-16 QUESTIONNAIRE IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES

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Objective: Osteoporotic vertebral fractures would impair patient's health-related quality of life (HRQOL). Thus, the Quality of Life Questionnaire of the European Foundation for Osteoporosis (ECOS-16) was developed as a brief and convenient tool for measuring the quality of life in postmenopausal women with osteoporosis. ECOS-16 has been validated in many countries but not in Indonesia. Hence, the aim of this study was to conduct a translation and validation of ECOS-16 as a measure of the functionality and quality of life in patients with osteoporotic vertebral fractures in Bahasa Indonesia.

Methods: Forward and backward translations from Indonesian were done. Seven female patients with osteoporosis were enrolled in the prevalidation study. A validation, case-control study included two groups of female patients: one group of 30 female patients with osteoporotic vertebral fracture, and another group of 30 control patients with osteoporosis without fractures. They completed the ECOS-16 and EQ-5D (for comparison). The validation study examined internal consistency, concurrent validity, sensitivity, and specificity.

Results: No change of items of analysis both in prevalidation and validation study. All domains had a reliable result, the values were >0.70, indicating a good internal consistency (total ECOS-16 score $\acute{a}$=0.845). ECOS-16 also showed a higher reliability compared to EQ-5D (0.845 vs. 0.881). The AUC values indicated that ECOS-16 had a moderate power to discriminate HRQOL domain scores of patients with and without vertebral fractures (AUC=0.618). The AUC value of ECOS-16 total score was higher (0.618 vs. 0.596) and not significantly different (p=0.1) to EQ-5D. Therefore, ECOS-16 has the same power to predict quality of life.

Conclusion: The Indonesian version of the specific osteoporosis questionnaire, ECOS-16, has been well accepted by the patients. The questionnaire has an appropriate internal consistency, reliability, sensitivity, and specificity. Thus, the Indonesian ECOS-16 version possesses appropriate general psychometric characteristics. It can be used in clinical studies on patients to assess their quality of life.

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P104

ANOTHER ALTERNATIVE IN CUT-OUT TREATMENT IN OSTEOPOROTIC PATIENTS WITH PERTROCHANTERIC FEMORAL FRACTURE

N. Pardina Lanuza[1], M. Angulo Tabernero[2], I. Puyuelo Jarne[1], A. C. Laga Cuen[1], A. Aguirre Etxebarria[1], P. Sevilla Ortega[1]

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Pertrochanteric hip fractures are extracapsular fractures of the proximal femoral joint. The incidence is higher in elderly osteoporotic patients and is more frequent in women. They represent 50% of hip fractures. Most require urgent surgery to reduce the fracture and place a proximal intramedullary nail. The confluence of some factors (osteoporosis, fracture line, inadequate focus reduction, repeated motorizing, etc.) can hasten a cut-out in gamma nails, showing a prevalence of 2-4% of the diverse series. We present a patient with osteoporosis who presented a cut-out after being operated on pertrochanteric fracture with a gamma nail. One month postsurgery she had pain and functional impotence, x-ray was performed and a cut-out was diagnosed. The patient was reoperated using the new RC head screw system with extendable U-clip of the Gamma 3 nail. This device is specially designed for patients with poor bone quality due to severe osteoporosis. The evolution of the patient was correct, she can walk without pain at the present time. Osteoporosis is a risk factor for developing complications in this type of fracture, such as cut-out. The U-clip system of Gamma 3 nail show encouraging results in osteoporotic patients with pertrochanteric femoral fracture. Therefore, we should consider the use of this device in all patients with osteoporosis and pertrochanteric femoral fracture to avoid cut-out failure.

P105

OSTEOSYNTHESIS FAILURE IN OSTEOPOROTIC PATIENT WITH COMPLEX DISTAL RADIUS FRACTURE

N. Pardina Lanuza[1], M. Angulo Tabernero[2], I. Puyuelo Jarne[1], A. C. Laga Cuen[1], A. Aguirre Etxebarria[1], P. Sevilla Ortega[1]

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Osteoporosis is a systemic disease whose incidence is increasing in recent years, especially due to the increase in life expectancy. Likewise, the incidence of osteoporotic fractures also increases. The main osteoporotic fractures are vertebral fractures, hip fractures and distal radius fractures. Distal radius fractures have an incidence of 280/100,000 patients per year, and is more frequent in women than in men. We present the case of a 82-year-old female patient who suffered a casual fall and was diagnosed with a Barton-type distal radius fracture with anterior subluxation of the palmar articular fragment and the carpus. Surgical intervention was performed by osteosynthesis with anatomical plate of distal radius and blocked screws; during the intervention a poor bone quality was observed, due to osteoporosis. Two weeks later, a control radiograph was performed, in which osteosynthesis failure was seen, with subluxation of the fracture. The patient was reoperated, the plate and screws were removed, and further reduction and osteosynthesis was performed with Kirshner wires. She was immobilized for 4 weeks, blocking pronosupination. For the moment, the patient is satisfied with the result, with an acceptable range of mobility and with little pain on the visual analog scale. The distal radius fracture has been considered a fracture of low morbidity, nevertheless these fractures are not free of complications, for example increased surgical difficulty due to poor bone quality. Also the chances of failure are higher. In addition, this fracture, mainly in the woman, must alert to us and start up the necessary studies and mechanisms for the valuation of a bony metabolic disease.

P106

A REVIEW OF THE ASSOCIATION BETWEEN SARCOPENIA AND HIP FRACTURE: PREVALENCE, PATHOPHYSIOLOGY AND OUTCOMES

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Objective: Patients with hip fracture frequently have sarcopenia and are at great risk of loss of mobility; however, few studies have investigated the effects of sarcopenia on osteoporotic hip fractures. This report describes current evidence for prevalence, pathophysiology and outcomes of sarcopenia in geriatric hip fracture.

Methods: The data were obtained according to the result of original and review articles associating sarcopenia in hip fracture patients. Online database PubMed and Google Scholar were searched using the keywords "hip fracture", "sarcopenia", "mortality", "outcome". We chose the relevant free access full texts and reviewed the appropriate articles in the English language with no restrictions for the dates.

Results: Sarcopenia is a multifactorial geriatric syndrome first reported by Irwin Rosenberg in 1989 to characterize an age associated decrease in skeletal muscle mass. A meta-analysis in 2014 showed prevalence rates from 1-29% in elderly community dwelling populations.

Prevalence of sarcopenia was high in geriatric hip fracture patients: Di Monaco et al. reported 64% in females and 95% in males; Hida et al. reported 44.7% in males and 81.1% in females. Pathophysiology of sarcopenia is multifactorial, combining effect of sarcopenia and osteoporosis from aging and endocrine-immune dysregulation results in falls and fragility fractures (Fig. 1).

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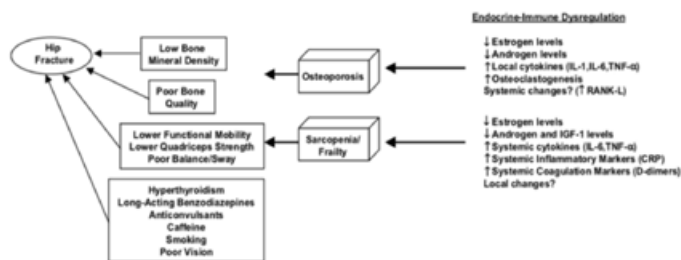
Figure 1. Role of endocrine-immune dysregulation in osteoporosis, sarcopenia, frailty and fracture risk.

Recent studies revealed worse functional outcomes and higher mortality in hip fracture patient with sarcopenia. Yoo et al. reported higher one-year mortality of sarcopenia (10.3% vs. 7.8%). Kim et al. showed much higher 5-year mortality rate (82.7%). Steihaug et al. reported sarcopenia was associated with lower mobility and greater risk of institutionalization or death. Landi et al. reported sarcopenia was significantly associated with worse overall functional status among 127 patients under in-hospital rehabilitation programs.

Conclusion: The prevalence of sarcopenia was very high in geriatric hip fracture patients. Among patients sustained hip fracture, sarcopenia was highly associated with lower mobility, worse functional outcomes and higher mortality rate.

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P107
BARIATRIC SURGERY: CAUSE OF A PATIENT'S BILATERAL INSUFFICIENCY HIP FRACTURE

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[1]Hospital Universitario Miguel Servet, Zaragoza, Spain

Morbid obesity has become in one of the most prevailing illnesses of the 21st century. Bariatric surgery with gastric by-pass has been one of the most used treatments of the last decades. This kind of surgery has caused complications such as alterations of metabolism, namely phosphocalcic and vitamin D kind. This metabolic bone disease might trigger bilateral insufficiency hip fracture. Nevertheless, it is an uncommon complication since there is only one more reported case of this kind.

Its infradiagnosis implies a late fracture detection with a greater displacement, being necessary in this case to carry out a total hip arthroplasty, encountering important limitations, above all in young patients. Thus, it is advisable to monitor patients who have undergone bariatric surgery in a long-term basis. Besides, it would be also recommended to keep a high suspicion index on these fractures so as to treat them nonaggressively. A pertinent example of this would be the present case, whose treatment has been an early bilateral screw connection. This is due to the fact that the mentioned patients usually attend to the emergency services alleging an insidious and uncontrollable pain; situation in which reaching a correct diagnosis may be delayed for months.

P108
ALKAPTONURIA: CASE REPORT

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Alkaptonuria is a rare inborn error of metabolism. It is a disorder in the catabolic pathway of tyrosine in which the liver enzyme homogentisic acid oxidase is missing resulting in accumulation of homogentisic acid. It is a condition characterized by the triad of homogentisic aciduria, ochronosis and arthritis. Excess homogentistic acid is deposited in the joints, acid polymerizes in joint and lead to early joint arthritis.

Alkaptonuria is a rare metabolic autosomal recessive disease. It is a condition which is present at birth, but is associated to morbidity years later. It arises from total inhibition of homogentisic acid oxidase enzyme which will result in accumulation of homogentisic acid. Its excess is deposited mainly in cartilaginous tissue, mucous, skin, bone surface and internal cardiac structures, as well as excreted in biological solutions (urine, sweat and semen). The main complications of alkaptonuria are valvular calcifications and osteoarthritis, mainly in spine and lower limb large joints, besides dark pigmentation of skin, cartilage, sclera and other connective tissues. Its diagnosis is done through the association of clinical history, histopathological exam and dosage of homogentisic acid in the urine.

Case details: 55 years old male Sudanese patient, presented to orthopedic clinic complaining of right knee pain and decrease range of movement and decrease walking distance. X-ray of right knee showed sever osteoarthritis which is not responding to conservative treatment in form of analgesia and physiotherapy. So he was booked for total knee replacement. Intra-op there was strange finding of blackish discoloration of the bone, cartilage and all soft tissue including synovial membrane and patellar tendon. So specimens were sent for culture and histopathology exam. The patient gave history of frequent visits to orthopedic clinic, as a case of spine and lower limp joints osteoarthritis for which he had multiple surgeries. He had open synovectomy & removal of loss bodies from right knee in 2015, left total knee replacement in 2016 and left total hip replacement in 2017. There is positive family history of same problem in patient's brother he had severe knee osteoarthritis and he underwent total knee replacement and his surgeon mentioned intra-op findings of blackish discoloration of bone and soft tissues of the knee.

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On examination:

Eyes: Pigmentation in the scleral.

Urine exam: No much change in urine colour after rest for long time in environmental air, but the urine turned black within 1 hour of adding NaOH, urine analysis showed acidic urine.

X-ray of vertebral column showed calcification of lumbar intervertebral discs and reduction of disc spaces.

Intra-op specimen sent for culture showed no growth.

Histopathology report showed: Destruction and fragmentation of the cartilage in the articular surface with fragments of cartilage showing dark brown pigmentation, these fragments are surrounded by foreign body giant cells reaction, chronic inflammatory cells infiltrate and pigment lade macrophages. The synovium lining is showing reactive changes in form of increased cellularity and multilayering along with chronic inflammation. Focal granulation tissue formation seen.

Discussion: Alkaptonuria is a rare autosomal recessive metabolic disorder caused by deficiency of homogentisic acid oxidase, the only enzyme capable of catabolizing homogentisic acid (HGA). The homogentisic acid is part of the metabolic pathway of phenylalanine and tyrosine by which phenylalanine and tyrosine are normally degraded into fumaric and acetoacetic acid. The deficiency of the enzyme that metabolizes homogentisic acid leads to its accumulation, that will be polymerized in a melanin-like pigment that presents high affinity for connective tissue, especially cartilage, resulting in an ocher color (for this reason it carries the name of ochronosis). This deficiency results in accumulation and deposition of HGA in cartilage, causing the characteristic diffuse bluish black pigmentation. IL-6 has demonstrated involvement in the pigmentation process of chondrocytes. These affected connective tissues become weak and brittle with time, leading to chronic inflammation, degeneration, and osteoarthritis. The deposition of pigment in alkaptonuria is observed in joints that suffer great pressure, like in the lumbar column and large articulations. This occurs because the ochronosis pigment has high affinity for the collagen fibers of articulations. In children, its main symptom is the darkening of the urine after a long period of rest or in contact with the environmental air or alkali, as well as blackened spots in babies' diapers, whereas in adults, after the fourth decade of life, the main manifestation is osteoarthritis, followed by changes in eyes, ears, skin and in the genitourinary, cardiovascular and musculoskeletal systems.

Manifestations in Alkaptonuria: Outer ear bluish coloration of outer ear cartilage, more common after age 30, which may be accompanied by blackened coloration of earwax. Ocular pigmentation of sclera, cornea, conjunctiva, eyelids. Brownish coloration is common in the temporal and nasal corner of the sclera after age 40. Skin brownish coloration in the malar and axillary regions, where there is a great number of sweat glands. There may be also papules and blackened blue vesicles in the palmar and plantar regions, due to friction of movements. Genitourinary system: The initial symptom is the alteration of urine coloration, which is blackened in environmental air. It is predominant in males, for the prostate is frequently involved. Patients may have renal, prostatic lithiasis and in other organs also, like the gallbladder and salivary glands. Cardiovascular system calcification of the aortic and mitral valve, besides deposition of pigment over valves, endocardium, aorta and coronary arteries. About 40% over 40-50 years of age will have some degree of cardiovascular involvement. Skeletal system cases of arthropathy by ochronosis are common after 40 years of age, and sometimes surgeries for articulation substitution are needed. The large articulations, which receive a great load of stress are the most affected, such as: hip, knee, shoulders. In the lumbar column there may be narrowing and calcification of intervertebral spaces. Rupture of ligaments and tendons.

HGA is colorless in solution but darkens on exposure to air, especially in the presence of alkali. Individuals with acidic urine may not demonstrate the very dark-colored urine characteristic of this condition. Up to 25% of patients with alkaptonuria do not have the characteristic dark urine staining.

The diagnosis is done through the clinical history and physical exam manifestation, X-ray findings in spine and large joints and lab test characterized by high amount of HGA found in the urine using gas chromatography-mass spectroscopy. Other simple urinary studies include darkening of urine with the addition of sodium hydroxide, black reaction with $FeCl_3$, and blackening of photographic emulsion paper with alkali added to urine.

Up to the present moment, there is no pharmacological treatment which cures the disease. Some have advocated diets low in tyrosine and phenylalanine, thereby reducing the toxic by product (HGA. Additionally, a diet high in vitamin C might prevent oxidation of homogentisic acid. Dietary changes have been advocated by some authors. One possible hope is that nitisinone proves effective. The US FDA has approved this drug for the treatment of tyrosinemia type 1. It significantly lowers the urinary excretion of HGA by inhibiting 4-hydrophenylpyruvate dioxygenase and, theoretically, would reduce HGA accumulation. Testing presently is assessing safety and long-term results. Vitamin E and N-acetyl cysteine have been examined as novel potential therapies to prevent damage to articular cartilage. Ochronotic arthropathy is treated with physiotherapy, analgesia, rest, and prosthetic joint replacement when necessary.

The follow-up with other specialties is needed as follows: cardiology with electrocardiogram, for possible rhythm alterations; echocardiography to observe calcification of the aortic and mitral valve; thorax computed tomography to observe calcification of coronary arteries; orthopedics for the study of the musculoskeletal system; in addition to monitoring by an ophthalmologist and otorhinolaryngologist, to observe visual acuity and auditory acuity, respectively.

Conclusion: The results indicate that adult with poor sleep quality and woman over 50 years old with short sleep durations are associated with a higher risk of osteoporosis.

Distribution of the T-score in proximal femoral area in both genders.
- Our study reveals the T-score drop with ageing and decline of sleep hours.
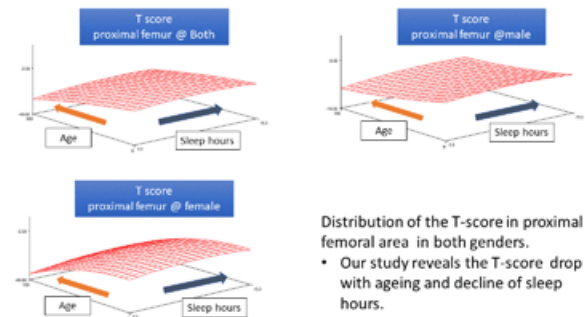
Association of the T-score in different proximal femoral area and sleep quality
- the T-score significant lower in poor sleep quality
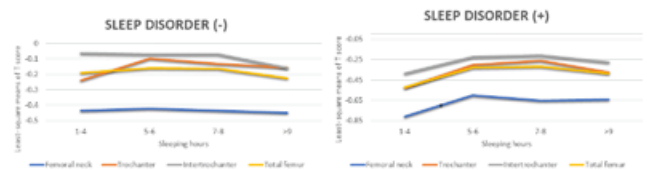
P109
ASSOCIATION BETWEEN SLEEP DURATION AND OSTEOPOROSIS RISK IN ADULT FROM A CROSS-SECTIONAL ANALYSIS USING NHANES

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Objective: To assess bone health in assessing different sleep duration, hours slept, presence of insomnia with BMD was quantified.

Methods: We extracted information from the database of the National Health and Nutrition Examination Survey (NHANES), 2005-2010. We have basic variables, metabolic diseases, and bone density in proximal femoral area by DXA technique and segregated them according to different sleep duration (1-4 h, 5-6 h,7-8 h, and >9 h/d) and sleep quality.

Results: A total of 1,2793 subjected were analyzed. Our result revealed that women who were over 50 years old with sleep duration less than 5 h /d and whom with poor sleep quality had significantly lower BMD/T-score than other groups (p<0.0125).

P110
PSEUDOCALCINOSIS CUTIS IN A CASE OF PSORIASIS

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This is a case of a male with psoriasis and presumed psoriatic arthropathy (PSA) who was treated with anti-TNF blockade by other facility but with modest response though. The patient had what appeared to be a soft tissue calcinosis-like shadows of the right wrist with a presumptive relation to the psoriatic arthritis. After a careful review of the case we determined that the multiple dense soft tissue shadows were induced by old bullet shrapnels and not due to a true calcinosis cutis. Clinical examination of the hand was essentially normal. The finding safeguarded against considering unnecessary additional treatment.

Case report: A 50-year-old male Pakistani driver treated by other facility from psoriasis (Image 1) and PSA with anti-TNFα blockade for long time. He came to our service recently seeking renewal of his prescription for anti-TNFα therapy. As part of the evaluation, photos and X- rays were taken. PASI score was 6%. No convincing PSA was detected. There was no muscle wasting, contractures or skin changes detected in the rest of examination. Nonetheless, reviewing the case carefully and the radiology as well, has indicated that the calcified spots in fact were foreign bodies due to bullet shrapnels leading to what appears to be resembling calcinosis cutis (pseudo calcinosis cutis) is being

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(Image 2).Indeed, the patient had accidently received a gun shot in the right hand more than 25 years ago and a tiny scar could be seen when the volar aspect of the wrist is being carefully examined (encircled area on the image of the R hand) (Image 3).Repeated autoimmune profile of (ANA, ENAs, ds DNA Abs) was negative.

Discussion: Agreeably, that within the context of inflammatory disease, it is likely that the clinicians tend to consider the positive clinical or radiological finding /s as being part of the underlying condition until proven otherwise.

Calcinosis cutis is well known to be related to number of autoimmune inflammatory disorders in most instances. It is can also be caused by other several non –inflammatory conditions including trauma to the anatomical site or even can be idiopathic as well (1). The condition exhibits variety of shapes, sizes and calcification density as well. The treatment can be a complex too, with several agents or lines of therapy that can be considered including surgery (1). Psoriasis on the other hand is a common inflammatory disorder and may lead to a significant arthropathic in between (6 – 42%) and other complications (2,3). Its association with calcinosis cutis nonetheless, has been scarcely reported. In fact in surveying the pertinent literature, only one case of such association was found. This was of a patient who developed psoriasis and dactylitis years after having juvenile dermatomyositis (JDM) associated with calcinosis cutis (4).

Conclusion: Settling the issue over the dense shadows which appeared as calcinosis cutis-like in this case of presumed PSA, has indeed reflected the good collaboration between clinicians and radiologists. It also safeguarded against considering unnecessary medications or intervention on this patient.

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Image 1 (A, B &C): Psoriasis plaques are seen over the knees, feet and other sites of the body forming a PASI score of 6%.t
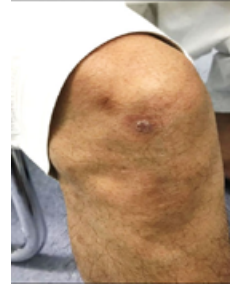
Image 2 : Dense opacities in almost linear pattern in the right hand
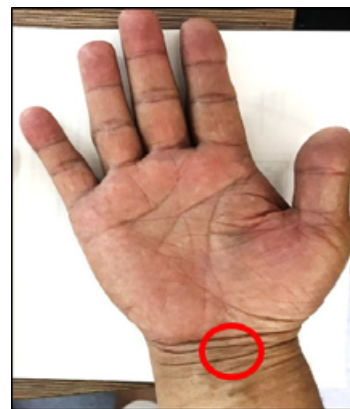
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P111
FEMORAL FOOTPRINT VISUALIZATION USING A TRANSTIBIAL PORTAL IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Objective: Inadequate visualization of the femoral footprint through a lateral portal may frequently cause surgical errors. Although various portal locations have been reported, no article has identified ideal locations for specific portals in relation to ACL reconstruction. We present the new transtibial portal technique, i.e., the use of an already-made tibial tunnel.

Methods: 30 primary ACL reconstructions were performed using a 30° arthroscope and the new transtibial portal, where the telescope is inserted through the tibial tunnel, and the anteromedial portal is used as the working portal. The average age of patients was 20 years old, there were 25 men and 5 women, and 19 left and 11 right knees were involved. The surgical procedure lasted an average of 50 min.

Results: Using the quadrant method according to Bernard et al. on the postoperative radiographs, the distance from the posterior contour of the lateral femoral condyle to the center of the femoral tunnel was on average 15 mm, and the ratio with respect to the lateral femoral condyle was 28.46%. The distance between the center of the femoral tunnel to Blumensaat's line was on average 5 mm, and the ratio with respect to the lateral femoral condyle height was 20%. None of the patients had an anterior position of the tunnel, broken posterior wall, infection, or nerve or vascular injuries.

Conclusion: This technique provides excellent direct visualization of the femoral ACL footprint without the need to create additional portals. It allows dynamic visualization of the relationship of the future graft with posterior cruciate ligament and bone structures.
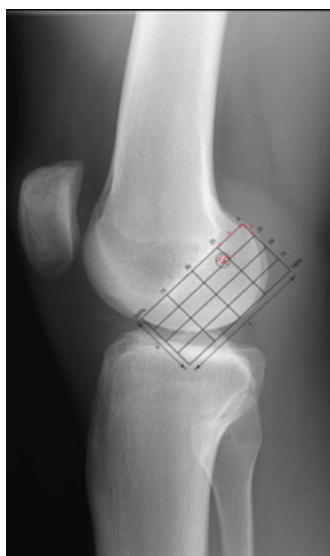
P112
DISTAL RADIUS FRACTURE MANAGEMENT: COMPLIANCE WITH BOAST AND BSSH GUIDANCE

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Objective: We aimed to establish current regional practice managing adult distal radius fractures auditing collaboratively against specific criteria from publications from BOA, BSSH and NICE.

Methods: Data was collected retrospectively on 20 operatively and 20 nonoperatively managed adult distal radius fractures in 2017 from each of 4 hospitals in Devon and Cornwall. Specific audit standards assessed were: timings of fracture clinic review and surgery, radiographic follow-up practice, duration of immobilisation and provision of patient information.

Results: 78 patients with 80 fractures managed operatively, and 78 patients with 78 fractures managed nonoperatively were analysed. No hospital met all the criteria with regard to timing of surgery. For intra-articular fractures the overall hospital mean delay to surgery ranged from 3-8 d. For extra-articular fractures it ranged from 2-4 d. Radiographic follow-up practice also varied considerably within hospitals as well as across the region, ranging from 0-5 follow-up radiographs per patient. Duration of immobilisation was fairly consistent within the region, however provision of information was poor in some hospitals and excellent in others.

Conclusion: This audit demonstrates many of the published standards are not being met and elements of management vary greatly within and between hospitals. We have not attempted to determine whether failing to meet these new standards has a detrimental effect on patient outcome. Despite these audit findings, there is lack of appetite regionally to adhere to these guidelines, which would involve restructuring of trauma services to enable distal radius fractures to be prioritised over other injuries. This is in part due to a lack of a robust evidence base used to create certain aspects of these guidelines, such as timing of surgery. A comparative study measuring patient outcomes may help inform decisions in this regard.

P113
IMPLEMENTATION OF OSTEOPOROSIS RISK ASSESSMENT TOOL IN THE PRIMARY CARE OFFICES

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Objective: Today, a major obstacle is that primary care providers fail to identify warning signs of OP, and inform patients that DXA scans are one of the best procedures to assess bone health. This project addressed the issue of low rate of referrals for DXA scans. In the short term (4 weeks), to start and increase DXA scans referrals by 20% in patients 50-89 years old who have appropriate risk factors. We aimed to establish an immediate diagnosis of OP or osteopenia in a timely matter. To detect secondary causes which would indicate limitations for an effective screening.

Theoretical Framework: the Knowledge-to-Action model was used to guide this study. Intervention: implementation of osteoporosis risk assessment instrument.

Methods: This includes pre-implementation phase, patients' charts were reviewed; post-implementation phase, the number of people referred to have DXA scans were analyzed; the evaluation phase, results compared to the previous data. The project focus exclusively on women and men ages 50-89 years old in two primary care offices in New Jersey. Descriptive analyses concentrated on whether or not ORAI was the tool to increase DXA scans.

Results: The data analysis reflected that the highest baseline referral rates increased from 1.3% to 42% and patients who scored high on the risk assessment instrument have been referred more often than not. Moreover, patients who are at risk and younger than 65 years of age, risk assessment tools led to a positive referral for a DXA scan.

Conclusion: If this project is to be applied at other clinics, more and more patients would be referred, raising awareness of the medical benefits of early detection. Reasonably, covering a broader section of patients, earlier in their lives, will increase clinical income, bringing more patients to primary care offices.

P114
LEAD POISONING PREVENTION FOR PRESCHOOL SETTINGS: A PROGRAM TEMPLATE

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Lead is a naturally occurring metal that has been linked to neurological impairments and insanity since ancient times. It has been used in many products such as paint, pipes, and ceramics and still remains a public hazard. Young children between the ages of 6 months and 6 years with lead-contaminated housing are at the greatest risk for cognitive, neurological, and behavioral health problems. Briefly, lead exposure is around us and it correlates with learning deficits and violent behaviors as these children become adults. It also can cause anemia, abdominal pain, seizure, and death.

P115
HOW MUCH DOES BONE MINERAL DENSITY INCREASE AFTER SHORT-TERM TERIPARATIDE TREATMENT (≤ 12 MONTHS) IN PATIENTS WITH SEVERE OSTEOPOROSIS ?

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Objective: Among various osteoporosis medications, to date, bone forming agent such as PTH is considered as one of the most potent medication for the increase of BMD and fracture prevention in patients with osteoporosis. However, its application is limited due to its discomfort for use and high cost. Accordingly,

that was applied during a short period in real clinical field with a lack of evidence. The aim of this study was to evaluated effects of short-term teriparatide on changes increase of BMD.

Methods: Total 116 patients (mean age: 74, female: 108) that underwent short-term teriparatide treatment (<12 months) in orthopedic department for severe osteoporosis were reviewed. Both spine and hip BMD were measured at baseline and 1 year after teriparatide treatment. Correlation between duration of teriparatide usage and BMD change was evaluated. According to duration of teriparatide treatment, changes of the BMD were also analyzed.

Results: Mean duration of teriparatide treatment was 3.5 months (range, 1-12). Mean spine and hip BMD were 0.638±0.111 and 0.660±0.104 g/cm^2 at the baseline, respectively. After teriparatide treatment, mean total increments of spine and hip BMD were 8.1±8.4 and 0.6±5.2% at 1 year after the treatment, respectively. Although the increment of hip BMD was not correlated with duration of the teriparatide usage, the increments of spine BMD showed significant positive associations with the duration of teriparatide treatment (r=0.329, p=0.002). Amount of the spine BMD increment were 8.79±8.07, 8.63±8.48, 10.76±9.09, 12.8±9.4, 13.4±9.84% when the teriparatide treatments were continued during more than 1, 2, 3, 4 and 5 months, respectively.

Conclusion: After short-term teriparatide treatment (≤12 months), although hip BMD did not show any changes, significant increments were shown in spine BMD. The amounts of the BMD increments were proportional to longer duration of teriparatide usage.

P116
SPONDYLOEPIPHYSEAL DYSPLASIA CONGENITA (SEDC) IS AN UNCOMMON CAUSE OF OSTEOPOROSIS

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Objective: SEDC is a rare congenital disorder of skeletal system which is basically characterized by multiple abnormalities including short stature, dysplastic vertebrae and epiphysis of the long bones and other somatic anomalies. Coexistence of SEDC and osteoporosis rarely reported in the scientific literature. We aim in this report to present this patient with severe form of SEDC and focusing on osteoporosis pathogenesis of the case.

Case report: A 33-year-old wheelchair bound female has been under our care for years. According to the first assessment, her height was 123 cm and had several deformities including retarded ossification of vertebral bodies, trunk, pelvis and extremities (Fig A: multiple skeletal deformities). Other features including, short neck, myopia, high pitched voice, hypertrophic ear auricles, hypotonia of the limbs, and talepus varus. Secondary sexual characters and mentation were normal. Two of her siblings were affected as well, one of whom had already expired. She has also been suffering for years from bronchial asthma for which she was admitted to hospital several times receiving intensive

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therapy, therefore was kept on bronchodilators and inhaled corticosteroids. Further investigation for the asthma has shown the presence of extensive Tracheobronchopathia osteochondroplastica (TO) which is characterized by a calcified nodular disease involving the respiratory tract (Fig B). Moreover, she was found to have Barrett esophagus and was on regular proton pump inhibitor (PPI) therapy. Urinary glycosaminoglycan repeatedly tested negative thus excluded Morquio's disease. Data relevant to investigations of osteoporosis revealed 25(OH)D was only 13 ng/ml (normal >30 ng/ml), normal serum PTH (44 pg/ml, N=15-65 pg/ml) and normal serum total calcium of 9.44 mg/dL, calculated Z score was -3.4 in right femur, -2.7 in left femur and -2.3 in lumbar spine. Treatment with denosumab, vitamin D supplementation and calcium was initiated.

Figure A: X-rays showing severe kyphoscoliosis, barrel chest , dysplastic vertebrae, dysplasic pelvis ,coxa vara ,short deformed tubular bones of the arm and enlargement of epiphysis.

Figure A: X-rays showing severe kyphoscoliosis, barrel chest , dysplastic vertebrae, dysplasic pelvis ,coxa vara ,short deformed tubular bones of the arm and enlargement of epiphysis.

Conclusion: The condition SEDC is familial and transmitted as autosomal trait. It is related to mutation in the COL2A1 gene which interferes with the assembly of type II collagen molecules, hence prevents bones and other connective tissues from developing properly. Cases of associated osteoporosis were rarely reported and only one case could be traced in the literature (1). In addition to the presumed underlying abnormality of type II collagen that could contribute to the thinning of the bone, there are other cofactors. The case is unique in the sense that SEDC is associated with another rare yet a significant condition, the TO. The latter is known to lead to bronchial obstruction thus asthma-like disease may develop. The latter subsequently is increasing the risk of osteoporosis.. The lack of mobility which is there since childhood, hypovitaminosis D, chronic usage of PPI and skeletal dysplasia are also likely to be contribute for the low BMD in this patient. Thus SEDC may primarily raise the risk for osteoporosis, yet another coexisting risk factor(s) should also be sought.

Reference: 1. Elbasan O et al. Endocrine Abstracts 2016;41;EP104.

P117
APPLICATION OF 3D PRINTING COMBINED WITH MINMICS SOFTWARE IN ELBOW FRACTURE

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Objective: To explore the application of 3D printing combined with Minmics software in the elbow fracture.

Methods: 20 patients with elbow fracture were randomly divided into 3D printing combined with Minmics software group and routine operation group, each group included 10 cases. 3D printing combined with Minmics software group accurately prints the fracture site, understands the situation of the broken end. Uses the Minmics software to simulate reduction and fixation, and determines the operation plan. The routine operation group determines the operation plan according to the imaging data. The incision length, bleeding volume, operation time, fluoroscopy times, hospital stays, Mayo score and elbow motion were compared between the two groups.

Results: There was no statistical difference in incision length [(13.1±1.65) cm *vs.* (13.9±1.27) cm] and hospital stays [(14.7±.0.6) d *vs.* (15.1±1.1) d] between the two groups, but there was statistical difference in bleeding volume [(153.3±23.9) mL *vs.* (246.3±34.7) mL], operation time [(2.1±0.3) h *vs.* (2.9±0.4) h] and fluoroscopy times (8.7±1.6 *vs.*11.1±1.2). Mayo score of the two groups increased significantly at 3 months (67.7±6.4 *vs.* 56.7±4.1), 6 months (87.6±4.3 *vs.* 71.9±5.1) and 12 months (89.2±2.7 *vs.* 74.4±3.9) after operation, and there was statistical significance compare to pre-operation (33.2±3.7 *vs.*31.7±6.7). Compared to the routine group, Mayo score in 3D printing combined with Minmics software group were higher than routine group at each time point after operation, which is the same as elbow motion at aspects of flexion (120.7±3.2 *vs.* 104.5±4.6)°, straighten (9.4±3.1 *vs.* 17.3 ±2.79)°, pronation (73.6±2.9 *vs.* 64.3±4.2)° and supination (76.4±2.1 *vs.* 67.2±3.3)° at 12 months after operation.

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Conclusion: 3D printing combined with Minmics software group can make individualized operation plan according to different people. It can shorten the operation time, reduce the amount of bleeding, reduce the number of fluoroscopy, and improve the elbow function after operation. It is worthy of clinical application.

P118

EFFECTION OF 3D PRINTING COMBINED WITH LATERAL RECTUS ABDOMINIS MINI-INCISION IN THE TREATMENT OF ACETABULAR FRACTURES IN THE ELDERLY PATIENT

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Objective: To investigate the effection of 3D printing combined with lateral rectus abdominis mini-incision in the treatment of acetabular fractures in the elderly patient.

Methods: 48 cases of acetabular fractures were randomly divided into two groups: 3D printing combined with lateral rectus abdominis mini-incision group (Experimental group) and lateral rectus abdominis mini-incision group (Control group), 24 cases in each group. In the Experimental group, CT scan the acetabular fractures side before the operation to provide image in the software in order to build the 3D printed physical model which is helpful in selecting the steel plate of appropriate length, whose local angle can also be adjusted and preset, whereas the control group only made a surgical plan based on imaging data. The incision length, bone fracture healing time, operation time, bleeding volume, fluoroscopy times, Matta criteria (evaluating fracture reduction) and Harris score (evaluating hip function in patients after surgery) were compared between two groups.

Results: Between Experimental and Control group, there was no significant difference in aspects of incision length [(9.21±1.03) cm vs. (8.93±0.98) cm], bone healing time [(3.6±0.4) months vs. (3.4±0.7) months]. There were significant differences in aspects of bleeding volume [(521.4±97.2) mL vs. (754.1±63.2) mL], operation time [(2.7±0.3) h vs. (3.7±0.3) h], fluoroscopy times (7.9±1.1) vs. (11.3±1.7), Matta imaging excellent and good rate 93.5% vs.82.1%. Harris criteria excellent and good rate 80.4% vs.70.1%, *P<0.05*.

Conclusion: 3D printing combined with lateral rectus abdominis mini-incision has great significance in the treatment of acetabular fractures in the elderly patient. It is helpful the doctor to select the appropriate length of anatomic plate before operation and to prebend and adjust it. It is also helpful the surgeon to clearly know the expected operation reduction and understand the expected effect. So as to shorten the operation time, reduce the amount of bleeding and reduce the number of fluoroscopy, increase the Matta imaging and Harris criterial excellent and good rate. It is worthy of clinical application.

P119

ALLIANCE BETWEEN SELECTIVE SEROTONIN REUPTAKE INHIBITORS AND FRACTURE RISK: AN UPDATED SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: In the past few years, several fracture-related events have been reported with chronic use of selective serotonin reuptake inhibitors (SSRIs) throughout the globe. Hence, an updated systematic review and meta-analysis was necessary to ascertain the risk involved. The present work evaluated the association of SSRIs with the risk of fracture in adults.

Methods: We systematically searched PubMed, Cochrane library, and Google Scholar for observational studies on the same from inception to April 2019. Screening, data extraction, and risk of bias assessment were conducted independently by 2 authors.

Results: We assessed 69 studies out of which 37 (14 case-control, 23 cohorts) were included. Our results showed that SSRIs were significantly associated with an increased fracture risk (relative risk of 1.62, 95%CI: 1.52-1.73; P<0.000: I^2=90.8%). The relative risk values for case-control and cohort studies were found to be 1.80 (95%CI: 1.58-2.03; P<0.000: I^2=93.2%) and 1.51 (95%CI: 1.39-1.64; P<0.000: I^2=88.0%), respectively. Subgroup analysis showed that association of risk of fracture persisted regardless of geographical location, study design, risk factors, site of fracture, period of study and after adjusting for depression, physical activity, and gender. Meta-regression analysis revealed that age was significantly associated with fracture risk and cohort study design and studies adjusted for depression showed 15% and 18% lesser risk of fracture respectively.

Conclusion: Our findings confirm that SSRIs are associated with an increased fracture risk hence bone health should be taken into consideration while prescribing this class of drugs.

P120

DISC SPACE NARROWING IS ASSOCIATED WITH CLINICAL SYMPTOMS MORE IN WOMEN THAN MEN: THE WAKAYAMA SPINE STUDY

Y. Ishimoto[1], C. Cyrus[2], G. Ntani[2], H. Yamada[3], H. Hashizume[3], M. Teraguchi[3], S. Muraki[4], S. Tanaka[5], N. Yoshimura[6], M. Yoshida[3], K. Walker-Bone[2]

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

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Objective: Disc space narrowing (DSN) has been the most commonly used specific finding to indicate degenerative disc in the lumbar imaging, DSN might be a clear sign of pathology in the lumbar disc. However, there were few studies to assess DSN by MRI in a population-based cohort. Low back pain (LBP) and leg symptoms due to degenerative lumbar spinal stenosis (LSS) is associated with impaired walking and other disabilities in the elderly. To date however, there has been no report about the association of leg symptoms due to LSS with structural changes in the spine as investigated MRI including DSN. Our study aim was to clarify the prevalence of DSN and its association of the symptoms including LBP and leg pain with DSN assessed by MRI in a large population-based cohort.

Methods: This was a cross-sectional observational study of adults based in Wakayama, Japan using general population. All participants underwent lumbar spine MRI in a mobile unit (Excelart 1.5 T; Toshiba; Tokyo, Japan). DSN on MRI scan was assessed by one experienced orthopaedic surgeon (MT), who was blinded to participants' clinical status. The disc height was measured quantitatively at the midpoint of disc on the T2 sagittal images using the imaging software OsiriX (http://www.osirix-viewer.com/). All participants were asked the following question by the experienced orthopedic surgeon (YI): "In the past month, have you had pain that last on most days?" Those who answered "yes" were identified as having LBP. The diagnostic criteria for leg pain were based on the LSS definition from the North American Spine Society guidelines.

Results: Complete data were available for 962 participants (321 men, 641 women, mean age 66.3 y, range: 21-93 y). DSN at most levels were advanced at older age in total and disc height at L4/5 in women dropped dramatically after their menopause as compared to males. And disc height did not changed so much in their young in both genders. Age and BMI were significantly related to DSN at L2/3, 3/4, and 4/5, but smoking and alcohol was not. In current study, about 40% of all participants had chronic LBP and 10% had leg symptoms. Regarding those symptoms, DSN at any levels were not significantly associated with LBP in men, whereas, DSN at all levels other than L1/2 was significantly higher risk for LBP after adjustment for age, BMI, alcohol and smoking. Only DSN at L3/4 in women was significantly associated with leg symptoms after adjustment for all the same confounders.

Conclusion: Our data highlighted the prevalence of DSN in both genders and the association of DSN with clinical symptoms. Estrogen deficiency may influence over the difference of trend of prevalence of DSN in both genders. Our findings also suggested that DSN in women was significantly higher risk for clinical symptoms.

P121
MODESTLY DEGRADED MICROARCHITECTURE AND UNEXPECTEDLY LOW PREVALENCE OF OSTEOPOROSIS IN SWEDISH FEMALES WITH ANOREXIA NERVOSA

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Objective: Anorexia nervosa (AN) is characterized by low fat mass, often complicated by impaired bone structure, reduction of bone mass, and fractures. An often cited study of adult women with long-time AN (Grinspoon *et al* 2000) found osteopenia (T-score ≤ 1.0) in 93% and approximately 40% with osteoporosis (T-score ≤ 2.5). More recently evidence of degraded bone microarchitecture has been demonstrated in adolescent girls (Donaldsson *et al* 2015), but to our knowledge not in adult patients with AN. The aim of this study was to evaluate the microarchitecture by analysing trabecular bone score (TBS) in a group of adult Swedish females with AN.

Methods: 20 female patients with AN (DSM IV), aged 27.6±4.6 y, BMI 16.6±0.7 and a duration of illness of 8 y (0.5-21) had previously been included in a vitamin D study (Wanby *et al* 2018) at an outpatient clinic specializing in the treatment of eating disorders and had been evaluated with DXA (GE Lunar iDXA). TBS measurements were now obtained, using iNsight software, from spinal DXA images.

Results: Patients with AN had low values of hip BMD (0.8±0.1 g/cm^2, Z-score −1.0±1.1, T-score −1.3±1.1), and lumbar BMD (1.0±0.1 g/cm^2, Z-score −1.2±0.8, T-score −1.8±0.8). 53 and 84% were osteopenic in the hip and lumbar spine respectively, 16 and 11%, respectively were osteoporotic. TBS (mean 1.35±0.06; median 1.36 (1.23-1.44)) was in the lower normal range (≥1.35). 40% of patients showed partially (>1.20 and <1.35) but none a degraded microarchitecture. TBS was associated with BMI (p=0.04), BMD of the hip (p=0.03), hip Z- and T-scores (p=0.01 and p=0.03) but only with Z-scores of the lumbar spine (p=0.03).

Conclusion: In adult patients with AN, microarchitecture, in this group for the first time evaluated by TBS, was only modestly compromised. This is in accordance with a surprisingly low incidence of osteoporosis. These findings may represent a new trend in bone health of patients with AN, but the findings merit further and larger studies.

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P122
TIPS AND TRICKS IN HAIR TOURNIQUET SYNDROME (HTS)

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Objective: HTS is a condition in it a body appendage is tightly and circumferentially wrapped by hair or similar material. Commonly affected sites include fingers, toes and genitals. Prompt diagnosis and treatment of this condition is vital to attain good outcome and prevent even a catastrophic consequence of auto amputation in affected body part.

Methods: Searching on PubMed and take 100 paper previously published related to the topic in multiple sites of the body in 3 months. We search about HTS of fingers, toes, penis and female genital tract with presence of multiple tips and tricks from these 100 papers and there is not one paper completely fill this topic, but we collect the information from all papers.

Results: We found that the sites of incisions in the fingers at 3, 6, 12 o'clock, this was the safest sites to prevent occurrence of iatrogenic injury and sites of incision of penis at 4 & 8 o'clock, away from corpora structures to prevent iatrogenic injury.

Conclusion: HTS may lead to tissue loss if not recognized and intervened urgently. Making a wrong diagnosis like infection without a careful physical examination may lead to deterioration of the patient's condition so; we wished to increase awareness of this syndrome and sites for incision.

P123
PREOPERATIVE MUSCLE MASS AFFECTS PREOPERATIVE LOW BACK PAIN SCORE AND IMPROVEMENT OF SCIATICA IN PATIENTS WITH LUMBAR CANAL STENOSIS

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Objective: The proportion of aging people has increased rapidly. The number of lumbar spinal surgical procedures performed on lumbar spinal stenosis (LSS) patients is therefore likely to increase. Only a few studies have evaluated the relationship between muscle mass and the outcome of LSS surgery. The aim of this study was to investigate the relationship between preoperative muscle mass and clinical outcomes in patients with LSS who underwent surgical treatment.

Methods: A total of 86 patients were included in the current study. We evaluated skeletal muscle mass using bioelectrical impedance analysis and calculated the skeletal muscle mass index (SMI), corrected by the square of height. The following indices were measured before and 3 weeks after each operation: the Japanese Orthopedic Association Back Pain Evaluation Questionnaire (JOABPEQ) score which consists of five factors (low back pain, lumbar function, walking ability, social life function and mental health), visual analogue scale (VAS) scores for lower back pain, lower extremity pain, and lower extremity numbness. The recovery rate for each score following surgery was also evaluated. In order to assess the impact of muscle mass on the clinical score of LSS surgery, the patients were divided into two groups (sarcopenia group and nonsarcopenia group). Sarcopenia was defined as a SMI of ≤7 kg/m^2 in males and ≤5.7 kg/m^2 in females. The various scores were then compared between the sarcopenia and nonsarcopenia groups.

Results: The pre-operative VAS score for lower back pain was significantly higher in the sarcopenia group compared with the nonsarcopenia group ($p<0.05$). Although there was no statistical difference in the VAS score for lower extremity pain before surgery between the two groups, the recovery rate in this score was significantly higher in the nonsarcopenia group ($p <0.05$).

Conclusion: This study showed that some preoperative low back pain scores were worse in the sarcopenia group compared with those in the nonsarcopenia group. In addition, there was less improvement in lower extremity pain following surgery in the sarcopenia group compared with the nonsarcopenia group. These findings indicated that preoperative muscle mass may affect preoperative low back pain score and the improvement in sciatica in patients with LSS.

P124
THE ASSOCIATION OF HOMOCYSTEINE AND ITS DETERMINANTS METHYLENETETRAHYDROFOLATE REDUCTASE (MTHFR) C677T POLYMORPHISM, FOLATE AND VITAMIN B12 LEVELS WITH VERTEBRAL FRACTURE IN MOROCCAN HEALTHY POSTMENOPAUSAL WOMEN

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Objective: A potential role of homocysteine (HCY) in bone metabolism has been considered from the observation of high prevalence of osteoporosis in subjects with homocystinuria about 50 years ago. But the mechanism linking the increased level of HCY to increased fracture risk is not clear. The main objective of this study was to examine the association of MTHFR C677T polymorphism with BMD, prevalence of vertebral fractures (VF), levels of plasma HCY, folates and vitamin B12 on Moroccan postmenopausal women.

Methods: 122 healthy postmenopausal women gave their informed consent to participate in this cross-sectional study. Women were recruited through advertisements and mouth to ear between January 2017 and May 2017. BMD was determined by a Lunar Prodigy Vision DXA system. Vertebral fracture assessment image was inspected visually by 2 clinicians.

Results: There was no significant difference in the percentage of VF between the three groups (normal, osteopenia and osteoporosis). Also, no significant difference was found between the levels of HCY, vitamin D, vitamin B12, folates, PTH, osteocalcin

between the three groups. The osteoporotic group is older, with low BMI and high number of years since the menopause. The MTHFR C677T polymorphism was determined in 43 women with osteopenia, 22 women with osteoporosis, and 55 normal women. Except for the HCY, we didn't find any significative differences in demographic and measured analytes according to MTHFR C677T genotype. Stepwise regression analysis showed that BMD was independently related to vitamin B12 and the age in years.

Conclusion: We found that the MTHFR C677T polymorphism, the high level of HCY or low level of folate and vitamin B12 are not a risk factor for osteoporosis and VFs in healthy postmenopausal women. Likewise, our study demonstrated that increasing age and low vitamin B12 level were the most important independent factors associated with the presence of a low BMD.

P125
SUPPRESSION OF CHONDROCYTE INFLAMMATION BY LACTOBACILLUS CONDITIONED MEDIA

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Objective: Studies reported that *Lactobacillus casei Shitora* consumption was associated with reduced pain and decreased joint damage in OA knee patients but barely suggested mechanisms underlying this therapeutic effect. We aimed to investigate the anti-inflammatory effect of *L. casei* (LC) in a model of inflammation induced by lipopolysaccharide (LPS) in human chondrocytes through cytokine analysis.

Methods: Human osteoarthritic chondrocytes harvested from the articular cartilage of knee OA patients undergoing total knee replacement were stressed by the addition of 20 ng/ml LPS with cotreatments of 0%, 5% and 10% *Lactobacillus* conditioned media (LCM). The levels of TNFα, IL-6 and IL-8 in the supernatants were determined using ELISA after 6 h. Cell viability was evaluated by trypan blue dye exclusion assay.

Results: Baseline TNFα, IL-6 and IL-8 levels detected in unstimulated chondrocytes from OA donors were minimally detectable. In response to 20 ng/ml LPS stimulation, TNFα, IL-6 and IL-8 levels were significantly increased. Treatment with 5% and 10% LCM resulted in the significantly dose-dependent reduction ($p < 0.05$) of IL-6 and IL-8 levels. Treatment with 5% LCM had no effect in reducing the level of TNFα level but treatment with 10% LCM significantly reduced the level of TNFα ($p < 0.05$). Cell viability was >80% in all experiments.

Conclusion: Our data demonstrated the anti-inflammatory effect of LC in a model of LPS-induced inflammatory cytokine production in human chondrocytes. This finding supports the potential of LC to alleviate articular cartilage degradation in knee.

P126
THE EFFECT OF LONG-TERM THERAPY OF TUMOR NECROSIS FACTOR INHIBITORS ON MINERAL BONE DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Rheumatoid Arthritis (RA) is a chronic inflammatory systemic disease. Proinflammatory cytokines play a major role in initiating and maintaining inflammation, among which the most important is TNFα, which has an effect on the change in BMD. Biological agents from the group of TNF inhibitors are used in RA treatment. We aimed to investigate the change in BMD in long-term use of TNF inhibitors in patients with RA.

Methods: The study was conducted as a prospective-retrospective study on 50 female patients that were treated with TNF inhibitors for a period of 3 years in the Special Hospital for Rheumatic Diseases in Novi Sad. Based on the electronic database of the Lunar device osteodensitometric findings, which were made prior to inclusion, were collected after 1 and 3 years of treatment of the TNF inhibitors. Statistical analysis was done in the computer program SPSS ver. 24 (Statistical Package for the Social Sciences).

Results: The study included 50 female middle age patients of 55.3 y on average. 37.8% of patients received eterancept, 39.6% adalimumab and 22.6% received golimumab. Based on the BMD results, patients who had a normal finding after the first year and after 3 y of treatment were still in the normal zone. Of those who had osteopenia after the first year, 15.9% had an improvement after the third year and entered the normal zone, while 1.2% of the patients had a worsening and entered the osteoporosis zone. Patients who had osteoporosis after the first year of therapy, 38.5% of them went to osteopenia zone, while 61.5% remained in the osteoporosis zone.

Conclusion: Long-term drug administration from the TNF inhibitor group led to an improvement in BMD measured on the lumbar spine and hip.

P127
ORAL BISPHOSPHONATE USE IN OLDER PATIENTS WITH REDUCED RENAL FUNCTION: CHALLENGES AND OPPORTUNITIES IN CLINICAL PRACTICE

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Objective: Oral bisphosphonates are not recommended in patients with reduced renal function, although not supported by post hoc analyses of pivotal bisphosphonate studies. It is important to determine the safety of oral bisphosphonates in older patient with osteoporosis and renal impairment, as prevalence of both increases with age. We aimed to determine the safety of alendronate in older patient with osteoporosis and renal impairment.

Methods: Patients with reduced renal function [creatinine clearance (CrCl) <35 ml/min] on alendronate (Group A, n=98), with reduced renal function on conservative management (Group B, n=96) and with competent renal function (CrCl ≥35 ml/min) on alendronate (Group C, n=96) were followed for up to 22 months. Primary outcomes were the mean change in CrCl from baseline in Group A compared to Groups B and C, respectively. Secondary outcomes were the incidence of osteoporotic fractures and adverse events between groups.

Results: There was no significant change in CrCl from baseline when comparing Group A (-1.53±6.83 ml/min) with Group B (0.59±5.17 ml/min) (p=0.075), and Group A with Group C (-3.71±7.54 ml/min) (p=0.163). There was no significant increase in incidences of osteoporotic fractures in Group A compared with Group B [adjusted relative risk (aRR): 2.02, 95%CI: 0.64-6.37] and Group A compared with Group C (aRR: 1.15, 95%CI: 0.46-2.89). There was no significant difference in incidences of acute kidney injury (AKI) in Group A compared with Group B (aRR: 0.48, 95%CI: 0.20-1.12). Although, statistically nonsignificant, there was an increase in AKI incidence in Group A compared with Group C (RR: 7.84, 95%CI: 0.98-62.66).

Conclusion: The use of alendronate in older patients with reduced renal function was not associated with any significant changes in renal function or increase in complications.

P128
TRABECULAR BONE SCORE IN OSTEOGENESIS IMPERFECTA: IS IT USEFUL?

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Objective: Trabecular bone score (TBS) is a novel gray-level textural analysis measurement that can be applied to DXA images to estimate trabecular microarchitecture and has been shown to be related to direct measures of bone microarchitecture and fracture risk. Osteogenesis imperfecta (OI) is a congenital bone disease characterised by a low BMD and poor bone quality and strength. The usefulness of TBS in OI has been scarcely evaluated. We aimed to analyse the clinical usefulness of TBS determination in patients with OI and its relation with anthropometric and clinical features, especially concerning skeletal fractures and BMD results.

Methods: 24 patients (18F:6M) with OI with a mean age of 38±15 y (19-63) attending a Metabolic Bone Disease Unit were included. The clinical reports of the patients were reviewed, with special attention to the clinical features (weight, height and BMI), previous fractures, disease severity, associated mutations and treatments received. Lumbar spine (LS), total hip (TH), and femoral neck (FN) BMD were measured using DXA equipment (Lunar) in all patients. TBS was analysed in LS, and the results were classified into three categories[1]: TBS >1.310 (normal), TBS 1.230-1.310 (partially degraded microarchitecture), TBS <1.230 (degraded microarchitecture). TBS values were compared with a healthy control group of similar age and gender.

Results: 5/24 patients (21%) had a degraded microarchitecture, 4 (17%) a partially degraded microarchitecture and 15 (63%) normal TBS. All patients with TBS<1.230 were over 40 years old. 21/24 patients had a previous history of multiple fractures. Regarding BMD, 54% of the patients had osteoporosis, 42% osteopenia and one had normal values. Most patients had a mutation in the COL1A1 gene (63%). A correlation was observed between TBS and age (r=-0.5, p=0.006) and LS BMD (r=0.5, p=0.014), showing a trend to significance with BMI (r=-0.4, p=0.058). No significant differences were observed on comparing TBS in patients and controls (1.321 vs. 1.391, p=N.S.).

Conclusion: TBS measurement does not seem to be useful for evaluating bone strength in patients with OI. Despite most patients presenting a history of multiple fractures, only 21% showed degraded microarchitecture with TBS.

Reference: [1] McCloskey EV et al. J Bone Miner Res 2016

P129
RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF FRACTURES IN GLUCOCORTICOID TREATED PATIENTS: THE ROLE OF HYPOGONADISM

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Objective: Glucocorticoid-induced osteoporosis (GIOP) is a common form of secondary osteoporosis (OP). Fractures in GIOP frequently occur with higher BMD than expected and typically at

treatment initiation, complicating the identification of patients at risk for fracture. We aimed to identify risk factors associated with GIOP and fragility fracture development in glucocorticoid (GC)-treated patients.

Methods: 127 patients (aged 62±18 y, 63% women, 46% postmenopausal) on GC treatment (prednisone ≥5 mg/d, >3months) were included. Clinical data collected included: risk factors for OP and fractures, dose and GC-treatment duration, previous fractures and disease activity, anthropometric data, bone metabolism parameters (including gonadal axis study), BMD analysis (DXA; considering OP: T-score ≤-2.5), TBS (considering degraded microarchitecture [DMA]: <1.230), dorsolumbar X-ray (assessing vertebral fractures [VF]) and FRAX risk (GC-adjusted)[1].

Results: Most patients received GC treatment for vasculitis or polymyalgia rheumatica during 47.7±69 months (mean daily dose: 14.5 mg). 17% had VF, 28% had fragility fracture (VF + non-VF), 29% OP and 71% DMA. Patients with VF received more GC-boluses (57.1% vs. 29.5%, p=0.03), were older (68±13 vs. 60±19 y, p=0.02), postmenopausal (100% vs. 67%, p=0.015) and/or men with testosterone <250 ng/dL (57% vs. 11%, p=0.017) and had lower TBS values (1.100 vs. 1.220, p<0.001) and higher FRAX risk (17 vs. 9, p=0.003); patients with fragility fractures showed higher accumulated GC-doses (6.1±13 vs. 8±18g, p=0.046). On multivariate analysis, hypogonadism (OR 14.3; 95%CI 2.2->100, p=0.01) and having received GC-boluses (OR 3.40; 95%CI 1-11.8, p=0.01) were the principal factors associated with VF. Hypogonadism (OR 7.1; 95%CI 1.5-38.7, p=0.01) and having a FRAX >20 (OR 6.97; 95%CI 1.3-51.7, p=0.02) were factors related to the presence of fragility fractures. Men with testosterone <250 ng/dL had higher BMI (29.4 vs. 26.3, p=0.005) and disease activity (ESR 23 vs. 12, p=0.005) and lower TBS (1.050 vs. 1.210, p<0.001); age, daily and cumulated GC doses were similar to subjects with normal testosterone levels.

Conclusion: Hypogonadism is a major risk factor for developing fractures in GC-treated men and women, whereas receiving GC-boluses is related to VF, indicating the importance of evaluating the gonadal axis in these patients.

Reference: [1]Buckley L et al. Arthritis Care Res 2017

P130
PREVALENCE OF VERTEBRAL FRACTURES IN AN URBAN MALAYSIAN POPULATION

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Objective: Asymptomatic vertebral fractures (VFx) are a common consequence of osteoporosis and are regarded as one of the classical osteoporotic fractures. The prevalence of VFx has not been previously studied in a Malaysian population. This study aimed to determine the prevalence of VFx in a healthy, urban, Malaysian population.

Methods: In this cross-sectional study, a random sample of the population aged between 44-90 y from 3 residential areas in the Klang Valley, Malaysia, was invited to participate through brochures with details of the research project that were distributed house to house by hand, via posters in the areas' community centres and via post, to attend for a free bone health checkup. Subjects with diseases known to affect bone metabolism, had a history of spinal fracture, or were on treatment for osteoporosis were excluded. All subjects had a lateral lumbar spine x-ray and their BMD)measured with DXA.

Results: 386 subjects were studied. Mean age of the whole group was 60.67 y ±9.99 (1 SD) years. 44 (11.4%) had VFx which were all asymptomatic. Of these, 21 (47.7%) had multiple fractures. The most common vertebrae to have a fracture was T12 (31.8%), followed by both L1 and L5 (22.7% each). There were more fractures in Chinese (31/188, 16.5%) compared to Malay (8/86, 9.3%) and Indian (5/112, 4.5%) subjects, with no difference between men and women. When fracture and nonfracture groups were compared, the fracture group were significantly older (59.75 vs. 69.64 y, p<0.001), had significantly lower levels of L femoral neck (p<0.001), L total hip BMD (p<0.001) and trabecular bone score (p=0.011). There was no difference between groups in lumbar spine BMD. Both groups had similar number of diabetic subjects.

Conclusion: The prevalence of asymptomatic vertebral fracture in an urban Malaysian population is 11.4%. Subjects with fractures were significantly older and had lower BMD at the hip. More of these fractures occurred in Chinese compared to Malay or Indian subjects.

P131
OSTEOSEE: A NOVEL TABLETOP DEVICE FOR SCREENING AND DIAGNOSING OSTEOPOROSIS

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Objective: Osteoporosis is underdiagnosed and undertreated, in part due to various barriers to DXA screening. OsteoSee system is a novel tool for BMD measurement, based on bio-impedance technology. The aim of the present study was to compare BMD results by OsteoSee @Clinic (OS@C) to those by DXA.

Methods: OS@C uses parametric electrical impedance tomography (pEIT), to measure spatial electrical conductivity distribution within the organ (Figure). Five electrodes around the wrist serve as current flow origin and electric potential meter. Using a body model and solving the inverse volume conductor problem, the bone dielectric properties can be calculated. The result is classified similarly to BMD measurement by DXA.

study and were measured by OS@C. We used a multidimensional discriminant analysis (MDA), a machine learning algorithm, to calculate 2x2 and 3x3 confusion matrices that provided the accuracy of the OS@C system relative to the gold standard DXA. The final diagnosis (normal, osteopenia, osteoporosis) based on the full DXA scan was used for comparison.

Results: Results of 87 subjects were analyzed. OS@C identified patients with osteoporosis/osteopenia&osteoporosis with sensitivity of 82% and 91%, respectively. The congruence of the system to DXA classification for normal, osteopenia and osteoporosis was 91%, 76% and 74%, respectively.

Conclusion: OS@C system results correlate well with the gold standard DXA-based classification. The point-of-care tabletop system enables BMD measurement within a few minutes, does not require special training, spares exposure to ionizing radiation and may be used for screening and diagnosis at the primary or secondary care facilities.

Funding: OsteoSee Ltd., Israel

P132
PAGET'S DISEASE IN PATIENT WITH VALOSIN-CONTAINING PROTEIN (VCP) MUTATIONS

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Inclusion body myopathy associated with Paget's disease of bone (PDB) and frontotemporal dementia (IBMPFD) is a rare, progressive, fatal genetic disorder with variable penetrance, predominantly affecting three main tissue types: muscle (IBM), bone (PDB), and brain (FTD). PDB is observed in half the patients, typically with an early onset in the 30s to 40s. Muscle biopsies reveal rimmed vacuoles and inclusions that are ubiquitin-and TAR DNA binding protein-43 (TDP-43)-positive.

Case report: A 42-year-old, Chilean male presented with a 1-y history of back pain radiating to the anterior region of the right tight and ipsilateral hip pain with limping. Past medical history was significant only for hypertension. He was overweight, and had a right limp, was unable to walk on tip toes, had a slightly positive right Trendelenburg sign, and had a muscular strength M4 of the triceps surae. No hypoesthesia was present. Electromy-

ography showed myopathic involvement, and a whole body muscle MRI revealed fatty infiltration in all muscular segments, with more severe involvement of lumbar paraspinal muscles, and an asymmetric involvement of the lower extremities compromising the vastus, sartorius, gracilis and the head of the gastrocnemius; findings compatible with limb-girdle muscular dystrophy. In addition, it has serum alkaline phosphatase: 218 U/L (35-104), LDH: 254 U/L(135-214), TGO: 137U/L (10-32) Ca: 9.8 (8.8-10.2). Radiographs spine and MRI spine show incipient anterolistesis of L5 over S1.Discrete degenerative changes of bilateral lumbosacros and L4-L5 facets. VCP gene mutation study came back positive and a diagnosis of VCP-related progressive tetraparesia was made. Since this disease is associated with PDB, a directed bone study was performed, with a cervical x-ray showing osteochondrosis, a lumbar x-ray revealing degenerative changes with a normal BMD measured by DXA. Bone scintigraphy showed diffuse increased activity of moderate intensity in the femoral head, the midproximal thirds of the left femur; with mild intensity in the proximal right femur and skull shell; findings suggestive of polysegmented Paget's disease. The patient was started on bisphosphonates and referred to the hospital's pain management unit.

Conclusion: The correlation between the phenotype and the genotype is difficult to establish due to the small number of cases studied. It is important to identify and recognize this disease due to its high morbidity and mortality, which can cause spinal cord compression, cranial nerve involvement and risk of fracture.

P133
AUGMENTED CERCLAGE WIRE IMPROVES THE FIXATION STRENGTH OF THE TWO-SCREW CONSTRUCT FOR HUMERAL GREATER TUBEROSITY FRACTURE: A BIOMECHANICAL STUDY

C.-J. Chang[1], W.-R. Su[1], K.-L. Hsu[1], C.-K. Hong[1], F.-C. Kuan[1], C.-H. Chang[1], C.-.. L. Lin[1]

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Objective: A two-screw construct is commonly used for the surgical treatment of a greater tuberosity (GT) fracture. However, loss of reduction is still a concern after surgery. The purpose of this biomechanical study was to analyze the effect of a simple modification of the two-screw construct for the fixation of GT fractures.

Methods: 16 fresh-frozen human cadaveric shoulders were used in this study. The fracture models were randomly assigned to one of two fixation methods. Group A (n=8) was fixed with two threaded 6.5-mm cannulated screws with washers. In group B (n=8), all screws were set using methods identical to group A, with the addition of a cerclage wire. Horizontal traction was applied via a stainless steel cable fixed directly to the myotendinous junction of the supraspinatus muscle. Displacement of the fracture fixation under a pulling force of 100 N/200 N and loading force to construct failure were measured.

Results: The mean displacements under 100 N and 200 N traction force were both significantly decreased in group B than in group A. (100 N: 1.06±0.12 mm vs. 2.26±0.24mm, p<0.001; 200 N: 2.21±0.25 mm vs. 4.94±0.30 mm, p<0.001) Moreover, the failure load was significantly higher in group B compared with group A. (415±52 N vs.335±47 N, p=0.01).

Conclusion: The current biomechanical cadaveric study demonstrated that the two-screw fixation construct augmented with a cerclage wire has higher mechanical performance than the conventional two-screw configuration for the fixation of humeral GT fractures.
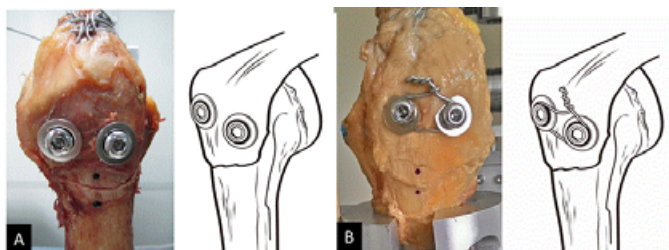
Figure 1. In group A: two threaded cancellous screws with washers were placed directly anterior and posterior to the central area of the fracture fragment. In group B: both screws were set using methods identical to group A, except for the addition of a cerclage wire.
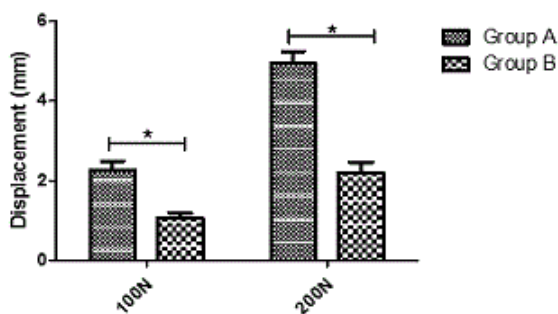
Figure 2. The mean displacement under a 100 N traction force was 2.26±0.24 mm for group A, and 1.06±0.12 mm for group B (p<0.001). The mean displacement under a 200 N traction force was 4.94±0.30 mm for group A, and 2.21±0.25 mm for group B (p<0.001).

P134
HOW MUCH BONE CEMENT SHOULD BE INJECTED IN INTRAVERTEBRAL REDUCTION DEVICE

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Objective: To identify the minimum quantity of cement necessary while still sufficiently stabilizing the restored fractured vertebra in the SpineJack system.

Methods: Between June 2017 and June 2018, patients receiving treatment with SpineJack system in NCKUH by single senior orthopedic surgeon were retrospectively reviewed in this study. Peri-operative radiologic images were documented. Back pain intensity (visual analog scale) and Oswestry Disability Index (ODI) scores were recorded postoperatively. All available X-ray images during their outpatient department follow-up were collected to assess the evolution of vertebral kyphotic angle and vertebral body height.

Results: The ODI score was significantly higher in patients with double cross sign than other controls (80.3±7.2 vs. 68.8±8.2; p<0.001). Significantly more postoperative regional kyphotic angle correction was noted in positive double cross sign groups (11±8.8° vs. 5.3±3.2°; p=0.001). Moreover, more postoperative local kyphotic angle correction was found in patients with double cross sign (11.7±6.2° vs. 6.6±4.1°; p=0.001). Anterior vertebral body height change was significantly higher when double cross sign was reached in the surgery (155±159% vs. 40±47%; p<0.001). Patients with double cross sign also have more middle vertebral body height change after the operation compared with controls (156±132% vs. 84±82 %; p<0.05).

Conclusion: We found that patients having double cross sign in their images after the surgery immediately are likely have better clinical symptoms and well vertebral body shape maintenance.
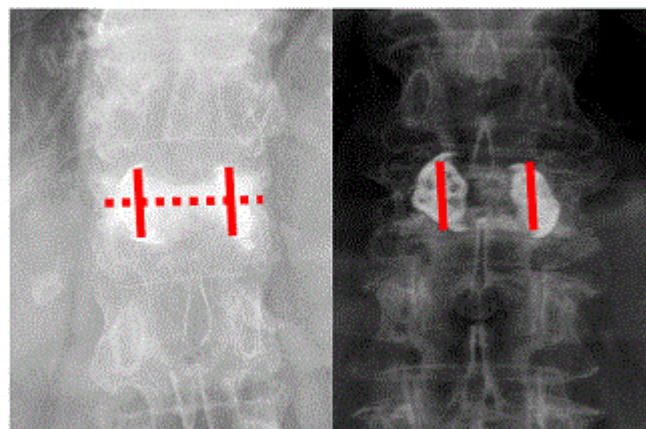
Figure 1. Left: Positive double cross sign. Bone cement not only expand vertically along the bilateral SpineJack system, but also spread across the midline of vertebral body in the AP view of radiographic image. Right: Negative double cross sign. Bone

cement expand vertically along the bilateral SpineJack system without spreading across the midline of vertebral body in the AP view of radiographic image.

Table 1

	positive double cross sign (n=45)	negative double cross sign (n=20)	p value
age (years)	75.5 ± 7.3	72.4 ± 10.6	-
follow-up (months)	6.2 ± 3.6	4.4 ± 3.1	-
ODI	80.3 ± 7.2	68.8 ± 8.2	p<0.001
lumbar spine BMD (g/cm2)	0.86 ± 0.1	0.91 ± 0.1	-
lumbar spine T-score	-2.3 ± 1.2	-1.7 ± 1.0	-
injected cement amount (ml)	7.7 ± 2.9	6.6 ± 2.3	-
△ regional kyphotic angle (degrees)	11 ± 8.8	5.3 ± 3.2	p<0.001
△ local kyphotic angle (degrees)	11.7 ± 6.2	6.6 ± 4.1	p<0.001
△ anterior VBH (%)	155 ± 159	40 ± 47	p<0.001
△ middle VBH (%)	156 ± 132	84 ± 82	p<0.05
△ posterior VBH (%)	15 ± 19	14 ± 12	-

ODI=Oswestry Disability Index; VBH=vertebral body height; regional=T11-L3 level; △=difference before and after the surgery; -=p>0.05; all data stand for mean±SD

P135
PREVALENCE AND CHARACTERISTICS OF A SPINAL SAGITTAL IMBALANCE IN PATIENTS WITH OSTEOPOROSIS

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Objective: Patients with osteoporosis often report intermittent low back pain (LBP). We hypothesized that a spinal sagittal imbalance, due to vertebral fractures in patients with osteoporosis, induced LBP. The aim of the current study was to elucidate the prevalence of spinal sagittal imbalances, relationships between a spinal sagittal imbalance and vertebral fractures, as well as the characteristics of patients with osteoporosis and a spinal sagittal imbalance.

Methods: 260 patients with osteoporosis were included in this study. Sagittal vertical axis (SVA), pelvic tilt (PT), and pelvic incidence minus lumbar lordosis (PI-LL) were measured in addition to the number of vertebral fractures using whole spine lateral radiographs. According to the SRS-Schwab classification of adult spinal deformity, SVA>40 mm, PT>20°, or PI-LL>10° defined a spinal sagittal imbalance. The prevalence of a spinal sagittal imbalance was evaluated by the number of vertebral fractures. In patients without vertebral fractures, we assessed BMD, bone turnover markers, including BAP and TRACP5b, the Controlling Nutritional Status (CONUT) score, and LBP scores including the Japanese Orthopedic Association Back Pain Evaluation Questionnaire (JOABPEQ) 5 functional scores and visual analogue scale (VAS) scores. A comparison was made between the spinal sagittal imbalance group and the normal alignment group for each measurement.

Results: 205/260 (78.8%) patients had a spinal sagittal imbalance. The prevalence of a spinal sagittal imbalance in patients with 0, 1, or >1 vertebral fractures was 71.5%, 86.0%, and 86.3%, respectively. The CONUT scores and the VAS score for LBP in patients without vertebral fractures was significantly higher in the spinal sagittal imbalance group than in the normal alignment group (p<0.05). All 5 JOABPEQ functional scores in the spinal sagittal imbalance group were significantly lower than those in the normal alignment group (p<0.05). No significant differences were observed between the spinal sagittal imbalance group and the normal alignment group for BMD and bone turnover markers (p>0.05).

Conclusion: In the current study, the majority of patients with osteoporosis had a spinal sagittal imbalance, and >70% of them had osteoporosis but no vertebral fractures. Patients with osteoporosis and a spinal sagittal imbalance had low nutrition status, LBP that was independent of BMD and bone turnover markers in this study. These findings suggest that a spinal sagittal imbalance is one potential risk factor for LBP in patients with osteoporosis. In addition, we should pay attention to nutrition status in osteoporosis treatment.

P136
MUSCULAR ENDURANCE, EXPLOSIVE STRENGTH AND SUPPLENESS: INFLUENCE OF TAEKWONDO DRILLS ON MALE SUBJECTS

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Objective: To find out impact of taekwondo skills on muscular strength (MS), explosive strength (ES) and flexibility (F) of male subjects. Taekwondo is a Korean martial art involving the style of hand-to-hand fighting which develops discipline, leadership, self-confidence, self-esteem and flexibility (Song & An. 2004).

Methods: 64 college students of taekwondo courses at KFUPM were subjects. The height, body mass and BMI were measured before and at the end of study. A pre- and post-test was conducted for all before and after training in the MS, ES and F. The items were sit-ups, standing long jump and sit & reach. The training was for 12 weeks, twice a week, 40 min/session. The training program was footwork, hand attacks, kicks (Chagi), blocks (Makgic burat), patterns, Poomsae, Hyung, Tul and self-defense. The training also included separate flexibility, cardio and strength exercises. Mean, standard deviation and paired t-test were used for data analysis with the level of significance at 0.005.

Results: The results indicated a significant difference in standing long jump, sit-up & flexibility from pre to post-test with the mean and SD of 178.95±42.43 & 196.38±28.12; 23.266±4.462 & 27.156±3.781 & 27.17 ±8.99 & 27.156±3.781 (p>0.05), respectively. The percent improvements were 9.74, 16.72 & 26.17 for standing long jump, sit-up and flexibility respectively.

Conclusion: It was concluded that 8 weeks of taekwondo skill training will improve the health related fitness components of MS, ES and F. Where to next: inclusion of taekwondo training in the curriculum of schools at gross root level.

P137
VITAMIN D, A NEW INFLAMMATORY ACTIVITY MARKER FOR SPONDYLARTHRITIS?

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Objective: Spondylarthritis is the name given to a family of chronic inflammatory diseases affecting the axial skeleton and/or peripheral joints. Spondylarthritis is characterized by a significant prevalence of below-normal vitamin D levels that may correlate with disease activity. We aimed to determine the association between vitamin D deficiency and level of disease activity in patients suffering from spondylarthritis.

Methods: Observational, descriptive and transversal study. Retrospective review of patients with spondylarthritis under treatment at the Rheumatology Department of Hospital General Universitario de Ciudad Real between September 2016 and September 2018. The association between vitamin D deficiency and levels of disease activity was calculated using odds ratio (OR) with a 95%CI.

Results: Initial study developments are reported. A group of 147 patients was analyzed. The average disease activity was 4.31 (according to BASDAI) and 11.35 (according to DAPSA). 27.9% of patients showed increased levels of acute phase reactants, and 81.93% exhibited vitamin D deficiency/insufficiency. Analysis of the association between vitamin D deficiency/insufficiency and BASDAI/DAPSA activity degree revealed an OR of 7.87 (95% CI: 2.92-21.23, p≤0.0001).

Conclusion: In this study, a correlation was found between those patients with spondylarthritis who had a vitamin D deficiency and disease activity. Despite these results, a 1-y follow-up of these patients using two or more measurements of activity and vitamin D levels would be needed to corroborate these data.

P138
BONE AND MINERAL METABOLISM IN SPONDYLARTHRITIS

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Objective: Spondylarthritis is the term for a group of inflammatory chronic diseases primarily affecting the axial skeleton, as well as the peripheral joints. Regarding bone metabolism in these patients, several studies have reported higher levels of inflammatory activity (BASDAI, BASMI, SGA and CRP) in patients with osteoporosis compared to those without this disease, although no correlations were found. We aimed to describe clinical, serological and biological characteristics, as well as bone and mineral metabolism, according to analytical and densitometric criteria in a patient cohort with spondylarthritis.

Methods: Observational, descriptive and cross-sectional study. A retrospective review was conducted of a database of patients with spondylarthritis treated during outpatient visits at the Rheumatology Department of Hospital General Universitario de Ciudad Real between September 2016 and September 2018. Variables are described using measures of frequency and of central tendency and dispersion.

Results: Cohort of 147 patients (85 men and 62 women). Average age 46.04 y (±13.50 SD). Nonradiographic axial spondylarthritis in 19 patients, ankylosing spondylitis in 67 patients, psoriatic arthropathy in 32, spondyloarthropathy associated with inflammatory bowel disease in 9 and other types of spondylarthritis in 15. Regarding treatment, 39.46% of patients received disease modifying drugs (methotrexate, sulfasalazine, etc.) and 45.58% received biologic drugs (85.07% anti-TNF alpha, 13.43% anti-IL-17 and 2.99% anti-IL-12/23). Moreover, 54.42% had received corticosteroids during some phase of their disease. Vitamin D levels were 23.72 (± 9.68 SD) and 81.63% of patients had a vitamin D deficiency/insufficiency. Of the total cohort, 33.1% presented osteopenia and 4.8% osteoporosis (T-Score and Z-Score).

Conclusion: In this study, patients with spondylarthritis show high percentages of osteopenia and osteoporosis, undiagnosed until this time, along with vitamin D deficiency. This data suggests higher prevalence of these metabolic bone diseases. Osteoporosis prevention is essential due to the risk of developing early fractures resulting from increased bone fragility.

VARIABLE	FREQUENCY	MEAN	PERCENTAGE	STANDARD DEVIATION
Vitamin D level		23.72		± 9.68
Vitamin D deficit (<20 ng/ml) Vitamin D insufficiency (21-30 ng/ml) Vitamin D normal (>30 ng/ml)	59 61 27		40.7% 42.1% 17.1%	
PTH (pg/ml)		55.77		± 24,8
PTH level: Low Normal High	0 120 27		0% 81.63% 18.37	
Calcium (mg/dl)		9.42		± 0,35
Calcium level: Low Normal High	2 143 1		1.36% 97.28% 0.68%	
Phosphor (mg/dl)		3.3		± 0.57
Phosphor level: Low Normal High	10 135 2		6.80% 91.84% 1.36%	
Alkaline phosphatase (mmol/l)		72.31		± 32.05
Alkaline phosphatase level: Low Normal High	6 136 5		4.08% 92,52% 3,40%	
T-score femoral neck: T-score lumbar spine: Z-score femoral neck: Z-score lumbar spine:		-0,5 -0,358 0,008 0,105		± 0,91 ± 1,46 ± 0,85 ± 1,46
BMD Normal Osteopenia Osteoporosis	90 48 7		62.1% 33.1% 4.8%	

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P139
FRACTURE LIAISON SERVICE AND OSTEOPOROSIS IN TRINDADE-GOIÁS- BRAZIL 2013-2016: REASONS OF CONCERN?

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Objective: The aging of the world's population brings major challenges to health systems. The bone fragility caused by osteoporosis increased the occurrence of fractures, representing a serious public health problem, since it increases the risks of new fractures, morbidity, mortality, and also impacts treatment costs. *We aimed to* study was to describe and evaluate the implantation of an osteoporotic fracture coordination service in Trindade-Goiás-Brazil.

Methods: It was a retrospective study, by analysis of medical records, convenience sample, with descriptive analysis of the data. After the implantation of the Osteoporotic Fracture Coordination Service (SCFO) known as Fracture Liaison Services (FLS) at the Clinical Diagnosis of Trindade (CDT) located in the State of Goiás at the end of 2012. The evaluation period occurred from January 2013 to December 2016 (4 y).

Results: The mean age was 70 y, ranging from 45-95 y. Regarding the location of the first fracture, the vertebral column was the most frequent site representing 50% of the fractures, followed by the ribs 17%, proximal humerus, distal radius, proximal femur and other sites with 8.25% each. Regarding the type of medication used, unused ibandronate, calcitonin 1 case (2%), raloxifene 1 (2%), strontium ranelate 3 (5%), risedronate 5 (8%), sodium alendronate 6 (10%), teriparatide 9 (15%), denosumab 15 (25%), and zoledronic acid 20 cases (33%). Initially, the goal for 4 years would be to avoid 6 fractures (50%) of an expected total of 12, but 9 osteoporotic fractures (75%) were avoided, with only 3 patients fractured during treatment.

Conclusion: The implementation of the program provided significant data for the design of specific health actions aimed at maintaining quality of life, prevention and nonrecurrence of osteoporotic fractures. The program is effective in reducing the number of future fracture, after a previous osteoporotic fracture in the evaluated patients.

P140
THE IMPACT OF RHEUMATIC COMORBIDITIES TO SHORT-TERM MORTALITY IN PATIENTS HOSPITALIZED WITH HEART FAILURE

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Objective: While several noncardiovascular comorbidities in heart failure (HF) have been studied, few studies have looked at the issue of rheumatic conditions (RC), which contributes to chronic inflammation in HF. This study aimed to investigate the prevalence and the impact of concomitant RC on short-term and long-term survival outcomes in patients with HF

Methods: This is a retrospective study of patients who were hospitalized at a tertiary care hospital in Thailand between March 2017 and July 2018 due to HF. The case was identified by ICD coding. Medical records were reviewed to obtain cardiovascular and noncardiovascular comorbidities including RC. Primary outcomes were length of stay (LOS) and in-hospital mortality (IHM). Secondary outcomes were 30-, 90- and 180-d mortality and readmission rates. The Pearson chi-square test and the independent t-test were used for analysis.

Results: Of 344 patients with a mean age of 68.4±13.3 y (50.9% men), 96 patients (27.9%) had at least 1 RC. Of these, the prevalence of gout was 46.9%, followed by osteoarthritis (38.5%), CPPD (9.4%), osteoporosis (3.1%) and other musculoskeletal conditions (3.1%). Patients with RC had significantly longer LOS (13.4±13.1 d vs. 8.9±9.6 d, p=0.001) and higher IHM rate (9.5% vs. 3.2%, p=0.017) but no significant difference in 30-, 90- and 180-d mortality and rehospitalization rates. In subgroup analysis, gout and osteoarthritis were the significant contributors for higher LOS (15.1±4.1 d vs. 9.5±10.3 d, p<0.001 and 12.8±13.8 d vs. 9.8±10.7 d, p=0.036, respectively). Trends for 30-, 90- and 180-d mortality and readmission rates in subgroup analyses were similar to that of the overall studied population.

Conclusion: A clinical history of RC was associated with worse in-hospital outcomes in patients with HF. Proper management of RC could lower length of stay and in-hospital death rates in these patients.

P141
OUTCOMES OF HIP FRACTURE SURGERY IN VERY OLD PATIENTS (AGE OF 90+)

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Objective: Osteoporotic hip fractures are a major cause of morbidity and excess mortality in older age. Surgery for fracture fixation or joint replacement is the treatment of choice in this patients, with the goal to return to prefracture level of activity. One of the questions is whether surgery and subsequent rehabilitation are tolerated well by the very old patients. The objective of this study was to report outcomes of hip fracture surgery in patients older than the age of 90.

Methods: About 2862 patients of ages 65-107 were operated between 2011-2017 in our medical center. Baseline data included age, gender, time of surgery after admission, comorbidities, chronic anticoagulation treatment. Outcomes included duration of hospitalization, need for blood transfusions and pulmonary embolism. Survival analysis was performed to compare the risk of mortality with patients of younger age.

Results: During the study period, 585 (20%) patient above the age of 90 (mean 92.2) were operated. Compared to younger patients (ages 65-89), the very old had similar duration of hospital stay (22.7 vs. 22.5 d), similar rate of blood transfusions (6.5% vs. 5.2%, p=0.25) and similar rate of pulmonary embolism (1.7% vs. 1.3%, p=0.61). Mortality was higher at one month (8.4% vs. 4%, p<0.001) and one year (28.5% vs. 16.1%, p<0.001). Survival analysis demonstrated a substantial increase in hazard of death among the very old compared to younger patients (HR=1.98, p<0.001).

Conclusion: The immediate postoperative course of the very old patients following hip fracture surgery is similar to that of younger patients. Nevertheless, this group experiences higher risk of short- and long-term mortality. A detailed analysis of postoperative course is required to elucidate causes of this difference.

P142
QUANTITATIVE COMPUTED TOMOGRAPHY AS DIAGNOSTIC APPROACH FOR MALE OBESE INDIVIDUALS

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Objective: 3D BMD provided by central QCT could add diagnostic value over DXA when soft tissue within the abdomen is specially dense. Although Guidelines have approved the clinical use of QCT, the method has a higher radiation exposure than DXA, therefore its use should be opportunistic or when the investigator suspects that conventional DXA does not reflect what is expected from the clinical interview/examination of the patient. We present a case of a young man wrongly diagnosed as having osteoporosis at the spine but his clinical findings suggested no secondary cause of osteoporosis. QCT was used to separate surrounding soft tissue from the bone studied and the diagnostic of osteoporosis done by DXA was not confirmed by QCT. O other clinical finding of site studied suggested osteoporosis.

Methods: Male, Caucasian, 42 y.o., 170 cm, 106.9 kg, BMI 36.98, back pain. No evidence of fractures on MRI, CT or plain X-ray. History of high trauma fractures (car accident and sports): clavicles, left tibia, ribs, fingers. No diabetes. No family history of osteoporotic fractures. All exams were normal. Patient starting alendronate use.

Results:
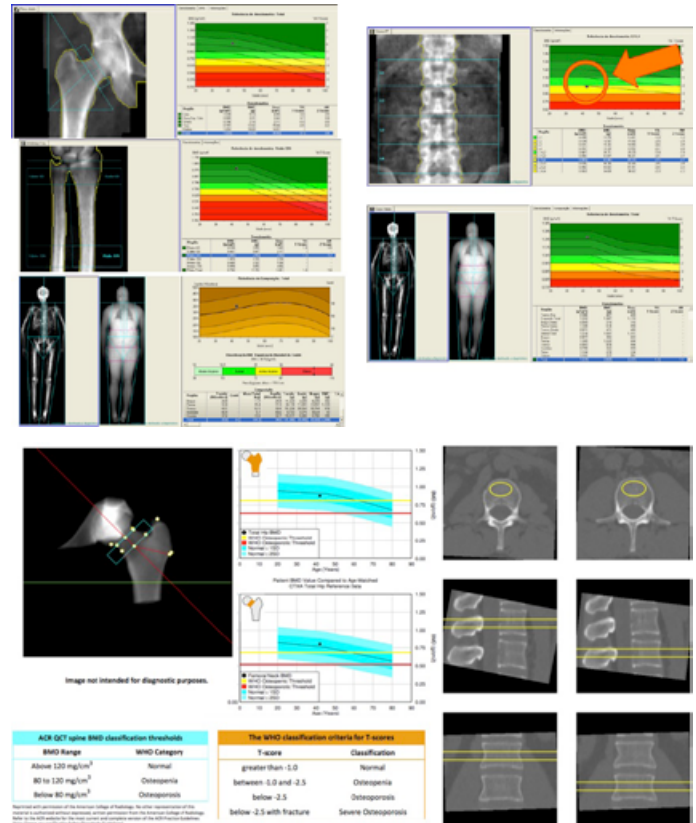
FRAX: Major Fx=1.5; Hip Fx=0.1.

Biochem: liver, renal and thyroid, cortisol, testosterone, 24h urine calcium, serum minerals (Pi, Mg, Na, Ca, Cl), vitamin D >35 ng/mL, CBC and others=normal.

DXA: PA+ 41985 - GE Lunar

	T-score	Z-score
L. Spine L1-L4=0.904 g/cm²	-2.6	-2.6

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Sex: Male   DOB: 6/13/1971   ID: 393056   Radiologist: ???
Age: 42   Date: 4/3/2014   Exam: 24768   Referring Physician:
Comments:

Analysis Results

ROI	BMD (mg/cm³)	T-Score	Z-Score
T11	-	-	-
T12	-	-	-
L1	126.5	-1.8	-1.1
L2	129.6	-1.7	-1.0
L3	-	-	-
L4	-	-	-
Average:	128.0	-1.78	-1.06
Age Matched Normal (UCSF):	157.8 ± 28		
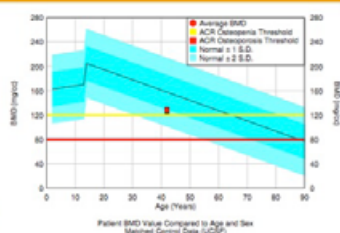
Interpretation: A spine bone density value above 120 mg/cm3 is usually indicative of normal bone density with minimal risk for osteoporotic fractures.

Femoral neck 1.075 g/cm²   0.0   -0.1

Total femur 1.065 g/cm²   -0.3   -0.5

L.Rad. 33% 0.791 g/cm²   -0.2   -0.2

QCT: L1-L2 - QCT Pro 5.1 – Mindways - Normal

TBS: L1-L4 Medimaps - 1,41 Normal

L1	L2	L3	L4	Mean Spine
1.396	1.444	1.453	1.378	1.418

Conclusion: DXA bone results are artificially affected by excessive or dense abdominal fat tissue. QCT discriminates fat from bone tissue and offers true volumetric BMD results. These properties may explain why QCT has a better correlation to forearm and femur DXA results on this case presented. Normal TBS results at lumbar spine L1-L4 reassuring normal status. 3D QCT is effective on removing the effect caused by soft tissue concentration over lumbar spine DXA. Male obese subjects may benefit from QCT additional screening when DXA of the lumbar spine is the only site with osteoporosis. Larger studies may address more precisely whether male obese patients might benefit from a central QCT evaluation after a diagnostic of osteoporosis on the lumbar spine only.

P143
CAN HIGH BMI BE CONSIDERED A RISK FACTOR FOR HAND OSTEOARTHRITIS DEVELOPMENT?

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Objective: Although the risk of osteoarthritis is heightened in overweight individuals, the link between high BMI and hand osteoarthritis (HOA) remains unclear. Thus, the study aim was to determine whether high BMI can be utilized as a HOA predictor in menopausal women.

Methods: This prospective cross-sectional study included 100 postmenopausal women aged 60-70 treated at the Special Hospital for Rheumatic Diseases Novi Sad, Serbia. Based on radiograph assisted HOA diagnosis, the sample was separated into the experimental group (Kellgren-Lawrence Grade ≥2), and the control group (KL Grade <2), with 60 and 40 participants, respectively. Height and weight of all patients was measured at intake and BMI (kg/m²) was calculated. Between-group BMI comparison was conducted using independent samples t-test, which was performed in SPSS ver. 25.

Results: Mean age for the entire sample was 65.89±3.67 y, while 77.23±12.95 and 74.44±14.40 y was obtained for the experimental and the control group, respectively, whereby the difference was not statistically significant (t=1.008, df=98, p>0.05). Similarly, mean height for the two groups (160.52±7.19 cm vs. 160.96±5.79 cm) was not statistically significantly different (t=0.327, df=98, p>0.05), and the BMI ranged from 16.18 kg/m² to 47.09 kg/m², corresponding to the mean of 29.45±4.89 kg/m². The difference between the mean BMI values obtained for the experimental (30.00±4.96) and the control (28.62±4.72) group was not statistically significant (t=1.369, df=98, p>0.05). Moreover, no significant between-group differences could be established when the BMI was transformed from numerical to categorical variable (χ^2=3.220, df=3, p>0.05). Nonetheless, it is worth noting that majority of the patients in both groups were either obese (40% vs. 25%) or overweight (46.7% vs. 35%).

Conclusion: Study findings suggest that BMI cannot serve as a predictor for the development of HOA.

P144
POSSIBILITIES OF JOINT PRESERVING SURGERY IN PATIENTS WITH THE DEVELOPING DYSPLASTIC COXARTHROSIS

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Objective: The significance of pelvic and femoral osteotomies in the condition of developed arthrosis is still disputable. Early osteoarthritis and incongruency of the articular surfaces are evaluated by many specialists as contraindication for the joint preserving operation. We aimed to review middle term results of reconstructive treatment in adolescents and young adults with dysplastic coxarthrosis

Methods: Treatment outcomes of 32 patients with dysplastic coxarthrosis were analyzed. Mean age at intervention was 17 y (14-32). The grade of arthrosis in joints were assessed according to Tonnis: I- 19, II- 10, III- 3. The type of congruence of articular surfaces were assessed according to Coleman: I- 8, II- 5, III- 7, IV- 12. 24 subjects underwent extra-articular hip reconstruction with the Ilizarov apparatus included pelvic and femoral osteotomies. In 8 observations made additionally intra-articular interventions (osteochondroplasty, heilectomy)

Results: Outcomes were followed from 3-12 y. Functional outcomes according to Merle d'Aubigne-Postel were: pain 4.7±0.1 points. ROM 4.1±0.2 points. Walking ability 4.6±0.1 points. Radiographic findings according to Severin were: IIa- 11, IIb- 17, III- 4. The grade of arthrosis was unchanged in 25 cases, progressed one grade in 3 joints, reduced in 4 cases. Considering clinical and radiological picture the positive outcomes made up 82%.

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Conclusion: Application of reconstructive operations with Ilizarov frame allows to extend fairly the indications for extra-articular reconstructive invasions in dysplastic coxarthrosis. Improved congruence of the articular surfaces in conditions of osteoarthritis in most cases leads to a slowing of progression.

P145
CLINICAL PROFILE OF PATIENTS SEEN BY THE FRACTURE LIAISON SERVICE IN A PRIVATE TERTIARY HOSPITAL IN CEBU

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Objective: It is estimated that the number of osteoporotic hip fractures among Filipinos will reach 65,000 by 2020 and 175,000 by 2050. In an attempt to improve the identification, diagnosis and treatment of osteoporosis in the province of Cebu, the Fracture Liaison Service (FLS) was started. This study aims to evaluate the implementation of this program for targeting these high-risk groups and improving secondary fracture prevention. We aimed to describe the profile and outcome of patients enrolled in the FLS program in a private, tertiary hospital in Cebu City.

Methods: All patients enrolled in the FLS from September 2018 to May 2019 were included in this study. A total of 103 patients, above 50 y of age were interviewed and followed up. Utilizing the Fracture Liaison Assessment Form, the following data were collected: demographics, comorbidities, presence of fragility fracture or osteopenia, compliance to DXA scan, treatment compliance, refracture rate and incidence of falls. Descriptive statistics using frequency count and percentages were used.

Results: Majority of patients were within the 70-79 years old age group (33%) and majority were females (73%). Among the 103 enrollees, 32% had osteopenia while 68% had a fragility fracture involving the hip in 27.18%. While under the FLS care, 90.9% of patients were compliant with prescribed medications (calcium, antiosteoporotic drugs) and 98.86% were adherent to fall prevention exercises. No incidence of secondary fractures or falls after discharge.

Table 1. The Comparative analysis of adherence to treatment among patients with fracture and with osteopenia.

Pharmacologic Treatment	With Fracture, n_1=60		Osteopenia, n_2=28		Z-value	P-value
	Frequency	Percentage (%)	Frequency	Percentage (%)		
Calcium	41	68.33	15	53.57	1.32	0.187
Calcium with Antiosteoporosis	18	30.00	6	21.43	0.88	0.380

Note: ** Significant at 0.05, n=88

Conclusion: The FLS care has enhanced the identification, assessment and initiation of treatment in patients at high risk for osteoporotic fracture. This approach has improved the pharmacologic compliance of patients and has helped prevent secondary fractures and falls in all patients enrolled in the program.

P146
ASSESSMENT OF CALCIUM INTAKE AND PERCEPTION OF CALCIUM RICH FOOD AMONG HEALTHCARE STUDENTS AT KING SAUD BIN ABDULAZIZ UNIVERSITY FOR HEALTH SCIENCE (KSAU-HS)

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Objective: Calcium is an essential mineral compound for humans and one of the most abundant minerals in the human body as well. A long-term low calcium intake predisposes the bones to fractures, osteopenia, and osteoporosis. This study was conducted to assess calcium intake, knowledge of calcium related information among healthcare students in King Saud bin Abdulaziz University for Health Sciences (KSAU-Hs).

Methods: This cross-sectional survey was conducted using a self-administered questionnaire that has been distributed as a soft copy of 289 participants aged 19 y or older and studied at KSAU-Hs. The questionnaire had three sections assessing demographical data, calcium knowledge, and calcium intake. The knowledge outcome variables were good and poor based on the answer of more than 11 (=60%) of the 18 questions. While the intake outcome variables were sufficient and insufficient intake based on the recommended daily allowance of 1000 mg.

Results: Amongst all variables, 91.7% of the participants were found to be having an insufficient intake and 74% were classified to be poor knowledge. As for knowledge, the highest score under the 'good' category were females (=32.7%) compared to males (=22.2%) with a P-value of 0.05. The average intake among the sample size was (497 mg/d) of calcium. Also, males scored (11.9%) compared to females who scored (1.9%) in terms of sufficient calcium intake in the gender variable with a P-value of 0.00.

Conclusion: The results of this study have shown that there are significantly insufficient calcium intake and poor knowledge about calcium among healthcare students. The results indicate the urge to improve calcium intake and calcium knowledge among healthcare students.

P147
ASSOCIATION OF SERUM ADIPONECTIN, VITAMIN D, IL-6, AND PHYSICAL PERFORMANCE IN OSTEOARTHRITIS PATIENTS

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Objective: Obesity is a major contributor to deterioration of physical function towards sarcopenia in osteoarthritis (OA) due to its effect mediated through adipokine-derived molecules that have pro-/anti-inflammatory properties. The present study aimed to evaluate the associations of serum adiponectin, 25-hydroxyvitamin D (25(OH)D), IL-6, and physical performance in knee OA subjects.

Methods: A total of 175 knee OA subjects and 52 healthy controls were recruited. Serum adiponectin, 25(OH)D, IL-6, biochemical markers, knee pain and functional scores, muscle strength, physical performance, metabolic parameters, and body composition were analyzed.

Results: Serum adiponectin levels were significantly higher in knee OA subjects than in healthy controls, while its serum levels were decreased in obese OA patients, especially those with sarcopenia exhibiting low grip strength and poor physical performance. Further analysis showed that there were independent relationships of serum adiponectin with body composition parameters, knee pain scores, physical function tests, and metabolic parameters in knee OA subjects. Besides, serum adiponectin levels were positively associated with 25(OH)D levels, and negatively correlated with C-reactive protein and IL-6 levels in knee OA. Additionally, low serum adiponectin could be used to distinguish knee OA subjects with sarcopenic obesity from those without sarcopenic obesity. Reduced circulating adiponectin levels were associated with declined 25(OH)D levels, increased inflammation, and poor physical performance in knee OA subjects with obesity and sarcopenic obesity.

Conclusion: These findings indicate that adiponectin could serve as a noninvasive biomarker for exacerbated physical function in knee OA subjects, particularly the obese OA patients.

P148
EFFECT OF HOMEBASED YOGA THERAPY INTERVENTION ON CHRONIC NONMALIGNANT PAIN IN OLDER ADULTS

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Objective: Due to age-related physical and mental changes and comorbid conditions, elderly population have high prevalence of chronic and neuropathic pain. chronic pain is associated with poor health and mobility along with sadness, loneliness and tiredness which makes chronic pain one of the most common reasons for health care visits. Finding safe and efficacious treatments for chronic pain remains a critical public health concern, especially considering the poor control of pain in elderly population. Yoga has been effective in chronic pain condition. However, the yoga intervention in older adults with chronic nonmalignant pain has not been investigated. We aimed to evaluate pain, functional capacity, and quality of life of older adults with chronic nonmalignant pain, after homebased yoga therapy.

Methods: 30 individuals of both genders, 60 years and older, performed the proposed yoga practices given by yoga therapist at home every day, for 8 weeks. Yoga group (N=18) performed the yoga sessions after a single supervised session at the yoga clinic. Group B (N=19) followed usual care. Both groups received information booklets, and questionnaires to evaluate pain, functional capacity and quality of life. Assessments were taken at initial visit and after 8 weeks of intervention.

Results: There was a significant improvement in pain and functional capacity between the initial evaluation and week 8 in yoga group (p<0.001). In the quality of life evaluation, physical, psychological and social domain had better improvement in yoga group but not the environment. There was no significant change observed in usual care group.

Conclusion: Homebased yoga therapy using once a week session with therapist was found effective for improving pain, functional capacity, and quality of life in older adults with nonmalignant chronic pain.

P149
THE USE OF A SELF-RETAINING RETRACTOR SYSTEM IN TOTAL HIP ARTHROPLASTY

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Objective: Total hip arthroplasty (THA) is one of the most common interventions in orthopaedic surgery. Since its introduction various techniques and approaches have been described. This study aims to investigate the use of self-retaining retractor system instead of a second assistant to save manpower while performing THA.

Methods: Patients with primary or secondary hip osteoarthritis who were consecutively treated with primary uncemented THA were included in this retrospective single center study. All pa-

tients were operated by one surgeon. Patients were positioned supine and the anterolateral approach to the hip joint was used. THA was either performed by the support of a second assistant (resident) or a self-retaining retractor system (Thompson Surgical Instruments Inc., USA). Time of surgery (skin incision to wound closure) in minutes (min) was documented in both groups and mean values compared by two-sided student's t-test.

Results: 62 patients with a mean age of 51.4 y of age (SD 11.0 y) were included. In 31 patients the self-retaining retractor system was used whereas in 31 patients a second assistant supported the surgery. In the self-retaining retractor group the mean time of surgery was 79.2 min (SD 14.4 min) and in the group with a second assistant 73.6 min (SD 14.8 min) (p=0.12).

Conclusion: The results of the study show that THA with support of a self-retaining retractor system does not prolong the time of surgery. The process of THA can be optimized in respect to manpower by the use of a self-retaining retractor system instead of a second assistant.

P150
POSTOPERATIVE RADIOLOGICAL ASSESSMENT OF TOTAL KNEE REPLACEMENT USING PATIENT SPECIFIC INSTRUMENTATION TECHNIQUE

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Objective: The treatment of osteoarthritis with total knee replacement (TKR) is a standard treatment method that allows reduction of pain and improvement of function as well as quality of life. The implant survival after 10 y is above 90%. Various factors including implant positioning and alignment influence the implant survival. Patient specific instrumentation is a promising new method that might allow optimized implant positioning and joint alignment due to individualized preoperative planning of cutting blocks. The aim of the study was to analyze postoperative X-rays of patients with TKR using a patient specific instrumentation technique.

Methods: Patients who were treated at our hospital between January 2018 and January 2019 due to primary or secondary osteoarthritis of the knee with TKR with patient specific instrumentation technique were included. Patient specific instrumentation blocks (MyKnee) were produced on a CT base by the Medacta company (Medacta, Castel San Pietro, Switzerland). Patients received conventional X-rays including knee ap and lateral, skyline view and whole leg standing. Patient with missing whole leg standing X-rays were excluded.

Results: 50 Patients (32 female, 28 male) with a mean age of 71 y (±7) were included in the study. The mean preoperative deviation from a physiological alignment was 6.7° (±4.5). The mean postoperative deviation was 2.7° (±1.9). The correction of the alignment was statistically significant (p≤0.05).

Conclusion: The results of the study show that TKR using patient specific instrumentation technique allows an exact reconstruction of the alignment.

P151
COMPARING DIFFERENCES IN RESULTS BETWEEN CLINICIAN SCREENINGS FOR VITAMIN D VERSUS PATIENT REQUESTS FOR TESTING

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Objective: *Despite overwhelming evidence that vitamin D deficiency is common in UAE, the vitamin D testing for the general population has not been justified in economic terms. Hence population-based screening is not possible and the vitamin D testing for the patients has been limited to those at highest risk for the vitamin deficiency, patients with medical insurance coverage for the test and others who are capable to pay for it. We aimed to compare the differences in the results of 25(OH)D estimation among patients in whom the clinician requested the test as part of the management, vs. others that been directly requested by the patients irrespective to the presence of the indication for it or not.*

Methods: *This study included 141 adults who attended the clinic of internal medicine & rheumatology for variety of symptoms. 126 patients (89.5%) were without history of vitamin D supplementation and 15 (11.5%) were on supplementation thus required follow-up assay only. The former patients were divided into two groups. Group A (73 patients) comprised of those who requested the testing themselves and group B (53 patients) in whom the screening was requested by the clinician. Data of laboratory interest were 25(OH) D, serum total calcium and serum PTH. Special attention been paid to the differences in skin color typing too. Patients with history of malabsorption, chronic renal and liver failure were not included. This work focuses mainly on the differences of characteristics of groups A & B.*

Results: *Both groups were female gender dominant (49:24, 2:1 in group A and 31:22, 1.4:1 in group B). Arab nationals formed the majority (86.5%) both groups (87.5% & 85%, respectively). Patients in group A were younger (37.1±13.5 y) than patients in group B (45.1±12.5 y), p=0.0026.*

Table 1. Showing all data of the study with the comparisons between the two groups.

	Group A (n 73)	Group B (n 53)	P
Mean of 25 (OH) D(ng/ml)	18.9±7.31	23.0 ±9.6	0.007
Prevalence of hypovitaminosis: <30 ng/ml	69 (94%)	44 (83%)	0.042
Mean of hypovitaminosis	17.9±6.05	19.7±5.62	0.12
Vitamin D deficiency : <10 ng/ml	10/73 (13.5%)	1/54 (2%)	0.024
Secondary hyperparathyroidism (SHPTH): >65 pg/ml	10/56 (18%)	8/35 (23%)	0.59
Mean of PTH levels 15-65 pg/ml	52.0 ±17.7	53.4±25.8	0.75
Mean of total calcium(8.4-10.2 mg/dL)	9.62 ±0.446	9.54±0.434	0.35

Table 2. Showing the skin color types of the two groups which did not reveal significant differences in the groups.

Skin color type	Group A, n (%)	Group B, n (%)	P
Type 1	0	0	
Type 2	20 (27%)	13 (25%)	0.83
Type 3	32(43%)	24 (46)	1.000
Type 4	12 (16%)	11 (21%)	0.48
Type 5	10 (13.5%)	2 (4%)	0.078
Type 6	0	2 (45)	0.175

Conclusion: Certainly there is a wide awareness about vitamin D and its relation to the human health in general among the public. This has led some patients to request their vitamin D level assays whenever they seek medical care by the clinicians. However, the patients who requested the testing here have shown significantly higher prevalence of hypovitaminosis D including higher degree of deficiency for the vitamin as well and a lower mean for the 25(OH)D too. Analysis of skin color types however did not contribute to the differences. Overall, the result were to great extent exciting and challenge to the wide scale notion of limiting population-based screening for selected populations at highest risk for vitamin insufficiency. Finally, while encouraging other researchers for conducting similar work we are aiming to study larger number of patients in the future.

P152
EVALUATING BONE QUALITY AND BONE MASS IN PATIENTS WITH TYPE 2 DIABETES AND ORAL GLUCOCORTICOID THERAPY: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: Trabecular bone score (TBS) is a novel texture parameter that measures pixel gray-level variations within the spine DXA image and provides surrogate measures of bone microarchitecture. TBS is predictive of fracture in patients with secondary osteoporosis, including glucocorticoid-induced osteoporosis, and patients with type 2 diabetes mellitus whose fracture risk is often underestimated by BMD.

Methods: The present study was conducted within the framework of the Bushehr Elderly Health (BEH) programme, a population-based prospective cohort study being conducted in Bushehr, a southern province of Iran. Participants(n=2246) were divided into 4 groups including controls, subjects with a diagnosis of diabetes but not taking glucocorticoid as DM group, subjects who had taken glucocorticoid for >3 months but who did not diabetic were included in the GC group, and Subjects with both diabetes and glucocorticoid use were included in the GC+DM group. TBS scores were categorized into three categories indicating the quality of the bone microarchitecture according to the following thresholds (degraded [≤1.23], partially degraded [>1.23 to <1.35], and normal [≥1.35]). Between-group comparison was done using 1-way analysis of variance; *dunnett test* was used to compare the TBS and BMD of control with other groups.

Results: There were 684 subjects in the control group (282 women and 400 men), 436 subjects in the GC group (277 women, 159 men), 746 subjects in the DM group (326 women, 420 men), and 548 subjects in the GC+DM group (366 women and 186 men). Lower TBS values was observed in GC and GC+DM groups compared to the control group and participants in DM group had highest BMD. Out of 1596, participants who were considered as normal regarding BMD, 928(58%) classified as non-normal (partially or completely degraded) regarding TBS. nearly 55% and 66% of participants with normal BMD in DM and DM+GC groups categorized as degraded, respectively.

Conclusion: Prevalence of subjects with normal BMD was higher in DM group and regarding TBS diabetic participants who take glucocorticoid showed a higher percentage of degraded compared to control group.

P153
BODY COMPOSITION AND IMAGE ANALYSIS FOR SMALL ANIMALS USING DXA INSTRUMENT

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Clinical trials using small animals such as rats and mice are being conducted in various fields to verify the efficacy and side effects of drugs in the new drug development process, the effects of certain foods on the body, and physical changes caused by exercise or disease. The most accurate method designed to measure body composition can be considered as a chemical analysis method, which requires the sacrifice of animals at the time of implementation. Another method is the use of NMR instrument using the nuclear magnetic resonance principle, which has the advantage of measuring the animal alive, but the disadvantage is expensive to build and specific values such as bone density can't be obtained. An alternative to these methods is the DXA technology, which is not only accurate enough to be regarded as the gold standard in measuring body composition such as bone density and fat percentage in humans, but also inexpensive compared to NMR instrument. In addition, DXA technology enables fast measurement speed and X-ray image acquisition. We conducted a clinical trial using rats to verify the performance of the iNSiGHT VET DXA (OSTEOSYS Corp.), a high

resolution body composition measurement instrument for small animals of the DXA technology. A total of 20 rats of 12-week-old male rats fed a high fat diet and a normal diet were measured with iNSiGHT VET DXA. And the accuracy comparison with the weight of body compositions extracted through the anatomical experiment and the reproducibility verification in the repeated measurement were conducted. In addition, the characteristics and utilization methods of the acquired high resolution images were examined.
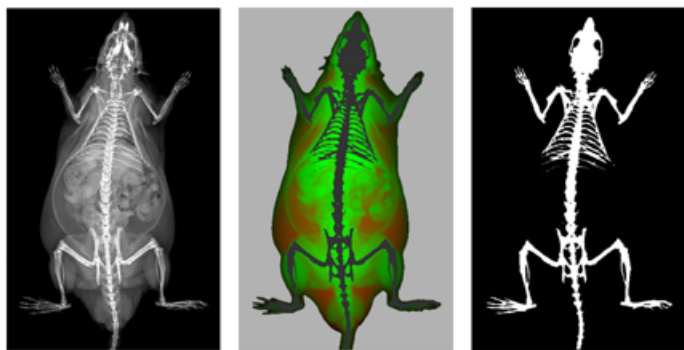
P154
ADRENOCORTICOTROPIC HORMONE MODULATES BONE MINERAL DENSITY AMONG POSTMENOPAUSAL SAUDI WOMEN WITH TYPE 2 DIABETES MELLITUS IRRESPECTIVE OF OSTEOPOROSIS STATUS

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Objective: The pituitary gland secretes several hormones known to regulate the activity of other endocrine glands, hence the name "master gland". Neuroendocrinology of bone is a new and emerging field based on the theory that pituitary hormones can directly affect bone remodeling and metabolism. Therefore, the present study aims to determine for the first time in a homogenous Arabian cohort, the associations of the major hormones of the anterior pituitary gland and other hormones with indices of BMD among known type 2 diabetes mellitus (T2DM) and postmenopausal Saudi women, with or without osteoporosis.

Methods: In this cross-sectional study, a total of 363 postmenopausal Saudi women [N=161 without osteoporosis, age (y) 54.7±7.6, BMI (kg/m^2) 34.6±5.7; N=202 with osteoporosis, age 59.0±8.7, BMI 32.3±6.4] were randomly selected from the Osteoporosis Registry database of the Chair for Biomarkers of Osteoporosis (CBCD) in King Saud University, Riyadh, Saudi Arabia. Serum calcium was measured routinely. PTH, FSH, TSH, ACTH, testosterone, estrogen, prostaglandin and IGF-1 were measured using commercially available assay kits following manufacturers' instructions. Serum 25(OH)D was measured using electrochemiluminescence assay. BMD and corresponding T-scores were assessed using DXA.

Results: Age- and BMI-adjusted comparisons revealed that levels of testosterone and estrogen were significantly lower in the osteoporosis group than those without (p-values 0.05 and 0.02, respectively). Circulating ACTH levels were significantly higher in the osteoporosis group than their counterparts (p=0.002). In all subjects, FSH was inversely and significantly associated with T-Score (spine) (R=-0.27; p<0.05) and BMD (femur) (R=-0.35; p<0.05). Poststratification, ACTH was significantly associated with BMD (spine) (R=0.62; p<0.05). No significant associations between hormones and BMD were seen in the non-osteoporosis group. In all subjects and using stepwise linear regression, ACTH and IGF1 predicted 32% of the variance in T-Score of the spine (p=0.002). Furthermore, ACTH and TSH predicted 29% of the variance in T-Score of the femur (p=0.002). Lastly, ACTH and IGF1 predicted 37.4% of the variances observed in BMD (femur) (p=0.001).

Conclusion: Among the anterior pituitary hormones, the stress hormone regulator, ACTH, seems to influence BMD the most, at least among Saudi women with T2DM, irrespective of osteoporosis status. An imbalance of this hormone may predispose T2DM individuals to decreased BMD and subsequent osteoporosis. Whether these findings apply to the non-T2DM population needs further investigation.

P155
DECREASING PREVALENCE OF VITAMIN D DEFICIENCY IN THE CENTRAL REGION OF SAUDI ARABIA (2008-2017)

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Objective: Widespread prevalence of serum 25-hydroxyvitamin D [25(OH)D] deficiency in all groups, including elderly, women, men, pregnant women, neonates, school children, and toddlers in Saudi Arabia have been documented. So far, no time trends have been documented to establish where the prevalence is headed. This study is an assessment of 25(OH)D deficiency in Saudi Arabian population spanning 10 years conducted between 2008-2017.

Methods: This series of cross-sectional studies were conducted in the central region of Saudi Arabia from 2008-2017. Blood samples from participants across all ages were taken from 2 master databases: Biomarkers Riyadh Cohort (2008-2010) (N=10000+) taken from different households and the Vitamin D School Study (2011-2017) (N=8000+) taken from different primary and secondary schools. A total of 7360 participants were randomly selected for each consecutive year.

Results: Results showed that deficiency of 25(OH)D is still a public health issue in Saudi Arabia, with a 10-y overall prevalence of 73.2%. Nevertheless, an increasing trend of 25(OH)D levels between 2008-2017 across all groups was observed, although less prominent in Saudi adolescents. Regression analysis showed an

overall increment of 2.2±0.1 nmol/l in serum 25(OH)D along with seasonally adjusted increment of 1.3±0.2 every year from 2008-2017. The average serum 25(OH)D in participants aged between 18-40 y increased from 27.9±18.7 nmol/l in 2008 to 46.5±26.0 in 2017. Similarly, the average serum 25(OH)D in participants aged above 40 y increased from 34.8±21.7 in 2008 to 60.1±31.8 in 2017. The average serum 25(OH)D in 2008 was 36.1±19.9 and 24.6±15.7 nmol/l in males and females respectively. In 2017, the average serum 25(OH)D increased to 45.5±25.3 and 55.2±30.5 nmol/l in males and females respectively.

Conclusion: This year-on-year decreasing trend in 25(OH)D deficiency in the Saudi urban population may indicate successful public health awareness campaigns over time. As many nonchronic, noncommunicable diseases have also been linked to vitamin D deficiency in this population, it will be interesting to see whether the general improvement in the vitamin D status at the community level also translated in lesser incidences of such diseases over time.

P156
AN ARTIFICIAL NEURAL NETWORK MODEL FOR PREDICTING THE RISK OF HYPERURICEMIA WITH DIETARY FACTORS IN CHINESE ADULTS

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Objective: Risk of hyperuricemia (HU) has been shown to be strongly associated with dietary factors. However, there is scarce evidence on prediction models incorporating dietary factors to estimate the risk of HU. The aim of this study was to develop a prediction model to predict the risk of HU in Chinese adults based on dietary information.

Methods: Our study was based on a cross-sectional survey, which recruited 1488 community residents aged 18-60 y in Beijing from October 2010 to January 2011. The eligible participants were randomly divided into a training set (n1=992) and a validation set (n2=496) at the ratio of 2:1. We developed the prediction model in three stages. We first used a logistic regression model (LRM) based on the training set to select a set of dietary risk factors which were related to the risk of HU. Artificial neural network (ANN) was then used to construct the prediction model using the training set. Finally, we used receiver operating characteristic (ROC) curve analysis to assess the accuracy of the prediction model using training and validation sets.

Results: In the training set, the mean age of participants with HU and without HU were 39.3 (standard deviation [SD]: 9.65) and 38.2 (SD: 9.38) years, respectively. The subjects with HU consisted of 101 males (77.7%) and 29 females (22.3%). The LRM found that food frequency (vegetables (odds ratio=0.73), meat (0.72), eggs (0.80), plant oil (0.78), tea (0.51), eating habit (breakfast (1.28)) and cooking salty (1.33)) were associated with risk of HU. In the ANN analysis, we selected a 3-layer backpropagation neural network (BPNN) model with 14, 3, and 1 neuron in the input,

hidden, and output layers, respectively, as the best prediction model. The areas under the ROC of the training and validation sets were 0.827 and 0.814, respectively. HU would occur when the incidence probability is greater than 0.128. The indicators of accuracy, sensitivity, specificity and Yuden Index suggested that the ANN model in our study is successful and valuable.

Conclusion: This study suggests that the ANN model could be used to predict the risk of HU among Chinese adults. Further prospective studies are needed to improve the accuracy and to generalize the use of the model.

P157
VISCERAL FAT METABOLIC ACTIVITY EVALUATED BY ^{18}F-FDG PET/CT PREDICTS OSTEOPOROSIS IN HEALTHY POSTMENOPAUSAL KOREAN WOMEN

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Objective: Traditionally, obesity is believed to be protective against osteoporosis. However, recent accumulating evidences suggest that visceral obesity increases the risk of osteoporosis and obesity-driven dysfunctional metabolic activity in visceral adipose tissue (VAT) is considered as a possible underlying mechanism for the development of obesity-related osteoporosis. ^{18}F-fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F-FDG PET/CT) is an established method to assess the degree of VAT metabolic activity. We aimed to investigate the predictive role of VAT metabolic activity evaluated by ^{18}F-FDG PET/CT for osteoporosis in healthy postmenopausal Korean women.

Methods: A total of 115 postmenopausal women who underwent routine health check-up between January 2016 and December 2018 were enrolled in this study, retrospectively. They all underwent DXA and ^{18}F-FDG PET/CT. Osteoporosis was defined as BMD T-score ≤ -2.5 at either lumbar spine or femoral neck. Metabolic activity of VAT was defined as the maximum standardized uptake value (SUVmax) of VAT divided by the SUVmax of subcutaneous adipose tissue (V/S ratio).

Results: The participants with osteoporosis showed significantly higher V/S ratio than the participants without osteoporosis. V/S ratio of 1.33 was proposed as an optimal cut-off value for predicting osteoporosis (sensitivity; 93%, specificity; 43.1%, area under the curve; 0.716, p<0.001). Furthermore, V/S ratio was significantly associated with osteoporosis in postmenopausal woman by uni-and multivariate analyses. Interestingly, V/S ratio showed significant positive correlation with high sensitivity C-reactive protein, which is a surrogate marker of systemic inflammatory condition.

Conclusion: VAT metabolic activity as measured by V/S ratio predicts osteoporosis in healthy postmenopausal Korean women.

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P158
BONE HEALTH IN WOMEN UNDERGOING THYROID STIMULATING HORMONE SUPPRESSIVE THERAPY AFTER THYROIDECTOMY FOR CANCER

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Objective: The appropriate treatment of postoperative osteoporosis is critical for the successful management for women undergoing TSH suppressive therapy after thyroidectomy for cancer. However, previous studies showed differential effects of TSH suppressive therapy on postoperative bone density. We conducted a systematic review and meta-analysis of existing studies (1) to identify the effect of thyroidectomy with TSH suppression therapy on postoperative bone density and (2) differentiate the effect of extent and duration of TSH suppressive therapy on bone density in women undergoing thyroidectomy for cancer.

Methods: Relevant studies published before April 2019 were selected by searching Medline, EMBASE, and Cochrane Library. We included studies which provided the data for bone density in women undergoing thyroidectomy with TSH suppressive therapy. Of 145 potentially relevant studies, 32 met the inclusion criteria. Data were combined by means of a random-effects model.

Results: TSH suppressive therapy showed detrimental effect for postoperative bone density in postmenopausal women (SMD, -0.34; 95%CI, -0.58 to -0.11, I^2=76.4%), while no significant effect in premenopausal women. The subgroup with long term follow-up (>10 y) presented significant decrease of bone density in both premenopausal and postmenopausal women. In subgroup analyses considering two factors simultaneously [TSH level (<0.1 mlU/L or 0.1-0.44 mlU/L or ≥ 0.45 mlU/L), and follow-up time (<10 y or ≥10 y)], detrimental effect for bone density was identified in 2 subgroups; 1) postmenopausal women with TSH level 0.1-0.44 mlU/L and <10 y follow-up after thyroidectomy, 2) ≥10 y follow-up studies after thyroidectomy regardless of TSH suppression.

Conclusion: These findings do not support the detrimental effect of TSH suppressive therapy after thyroidectomy in premenopausal women, and postmenopausal women except for the subgroups above mentioned. The risk and benefit of TSH suppressive therapy for postoperative bone health should be newly assessed by healthcare professionals based on the results of current meta-analyses.

P159
TRABECULAR BONE SCORE IS ASSOCIATED WITH BONE MINERAL DENSITY, AND MARKERS OF BONE TURNOVER IN NON-OBESE SUBJECTS: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: Obesity is associated with greater BMD and is considered protective against hip and vertebral fracture. Obesity results in low bone turnover and improves bone microarchitecture parameters. We aimed to determine if there are differences in TBS, BMD, or bone turnover markers between obese and non-obese older adults.

Methods: The present study was conducted within the framework of the BEH programme, a population-based prospective cohort study being conducted in Bushehr, a southern province of Iran. In brief, 400 persons (186 men and 214 women) from participants of the second stage of BEH program were randomly selected and serum bone turnover markers including bone-specific alkaline phosphatase (bALP), N-terminal procollagen propeptides of type I collagen (P1NP), osteocalcin (OC), and tartrate-resistant acid phosphatase isoenzyme 5b (TRAP) were measured using chemiluminescence method. BMD was measured through DXA (Discovery WI, Hologic, Bedford, Virginia, USA). Obesity was defined as BMI of ≥30. Nonparametric Spearman's rho was used to assess the correlation between different measurements. Between-group differences were checked by independent t-test or Mann-Whitney U test, where applicable.

Results: The mean (SD) age of participants were 69.5(6.4) and 69.1(6.3) among men and women, respectively. The mean (SD) values of TBS and BMD were 1.3(0.1) and 0.9(0.2), respectively.

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Obesity was found in 118(28%) of study participants 48(25%) among men and 66(31%) among women (P=0.21). TBS values greater than 1.35 considered to indicate a low risk of microarchitectural damage were present in 100(35%) and 28(25%) of non-obese and obese subjects, respectively (P=0.051). TBS was significantly positively correlated with bone mass in both groups, but the association was stronger in non-obese group (r=0.74 vs. r=0.57). In non-obese subjects all BTMs (both bone formation including OC, and bALP and bone resorption including CTX and TRAP) were significantly negatively correlated with TBS. Surprisingly, comparing to obese group, non-obese group had higher BMD and TBS values, although a difference of BMD was not significant (p=0.09).

Conclusion: Obesity was associated with a lower TBS values, predictive of increased microarchitectural damage, and higher bone turnover markers.

P160
EFFECT OF STRETCHING EXERCISES IN INDIVIDUALS WITH PIRIFORMIS SYNDROME

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Objective: Piriformis syndrome (PS) is a disorder of sciatic type pain, tingling and numbness that occurs when the sciatic nerve is trapped in the infrapiriformis canal and descends down the hip and sciatic nerve pathway (1,2). Stretching exercises are used to increase joint range of motion and muscle pain while increasing flexibility (3-5). The aim of this study was to evaluate the effect of stretching exercises on pain and range of motion of the hip joint in addition to classical therapy to patients with sciatic pain due to PS.

Methods: Twenty volunteers aged 20-40 y with PS were included in the study. The subjects were randomly divided into two groups; nonsteroidal anti-inflammatory drugs + hip strengthening exercises to control group and as addition stretching exercises to subject group. Visual analog scale was used for questioning the severity of pain and goniometer for hip range of motion (ROM). All measurements were repeated by the same person on the day of diagnosis, on the 10th day and 6th week of the exercises. Hip strengthening exercises 5 d/week, 10 repetitive 3 sets of hip isometric strengthening exercises were taught to the patient and asked to do home exercise. The flexion, adduction and internal rotation in the most tight position of the piriformis muscle, which provides the most effective stretching, were shown and a figured brochure was given. Three sets of 10 repetitions, 3 sets per day and a rest period of 1 minute between sets were given.

Results: There was no difference in demographic characteristics and baseline pain and range of motion between control group and subject group. After stretching exercise, a significant difference was found in favor of the subject group at the 6th week pain evaluation (p<0.05). The adduction, extension and flexion of hip ROM were significantly increased in the subject group (p<0.05) and there was no significant difference between the groups in the other hip ROM movements (p>0.05).

Conclusion: Stretching exercises given in addition to general medical treatment in PS made a significant difference in pain and range of motion values. Clinically improvement can be achieved by patients doing stretching exercises.

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P161
CHALLENGING REFRACTORY HYPERCALCEMIA IN PARATHYROID CARCINOMA: CASE REPORT

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Parathyroid carcinoma (PC) is a rare endocrine neoplasm that constitutes an estimated 1% of all primary hyperparathyroidism cases. Refractory hypercalcemia of PC remains a formidable challenge to managing clinicians. Mortality is due to metabolic complications of protracted hypercalcemia as opposed to tumour itself.

Case report: A 61-year-old Indian lady, presented with classical symptoms of hypercalcemia. Baseline investigations revealed iPTH dependent hypercalcemia with corrected calcium of 3.6 mmol/L, low phosphate 0.73 mmol/L and markedly raised iPTH 267 pmol/L (normal 1.3-6.9). Concordant findings on ultrasound and Sestamibi scans localized a left inferior lesion. Proceeded with en bloc resection of tumour with left hemithyroidectomy. Intraoperative reduction of iPTH to 11.1 pmol/L (>90%) with restoration of normocalcemic milieu post operatively. Tumour recurrence detected 1-y post-operative, with re-emergence of hypercalcemia and tumour bed lesion. Underwent completion thyroidectomy and resection of tumour, however complicated by inability to excise lesion abutting oesophagus. HPE revealed no clear margins of resection with multiple cervical node infiltration. Staging CT revealed local recurrence with no distant metastasis. Hypercalcemia remained refractory, with progressive shorter interim between treatment despite various options of treatment including aggressive hydration, calcitonin, bisphosphonates, denosumab and cinacalcet. Hypercalcemia remained intractable despite highest tolerable dosing of cinacalcet, with onset of complications including cardiac arrythmias, nephrocalcinosis and progressive decline in ECOG status. Patient succumbed 4 years from initial diagnosis.

Conclusion: PC is a disease which lacks effective systemic therapy. En block resection remains only curative option with poor data on radiotherapy and chemotherapy. Treating intractable hypercalcemia remains the penultimate challenge in managing advanced PC.

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P162
INTEGRATING TRANSCRIPTOME-WIDE ASSOCIATION STUDY AND MRNA EXPRESSION PROFILING IDENTIFIES DCAKD AS A NOVEL GENE FOR OSTEOARTHRITIS

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Objective: Osteoarthritis is the most prevalent musculoskeletal disease and the most common form of arthritis with up to 50% of risk due to genetic factors. Although genome-wide association studies (GWAS) for osteoarthritis have identified about 30 risk regions, most of them reside in the noncoding regions of the genome, leading to enormous challenges in deciphering their biological mechanisms. Our objective is to identify potential susceptibility genes by integrating the risk variants at these regions with genetic variants impacting gene expression.

Methods: The transcriptome-wide association study (TWAS) was conducted by FUSION using gene expression weights of four tissues combined with a large-scale GWAS dataset of osteoarthritis with 37,782 cases and 414,482 controls from UK Biobank. We used the GEO dataset to check whether the TWAS identified susceptibility genes were differentially expressed between osteoarthritis patients and healthy controls.

Results: Of the 15,917 genes evaluated, TWAS identified 11 transcriptome-wide significant associations for 8 unique genes associated with osteoarthritis risk at a Bonferroni-corrected threshold of $P < 3.14×10^{-6}$. Among these identified genes, 6 genes were located near (±500 kb) at least one GWAS single nucleotide polymorphisms and the remaining 2 genes implicated novel osteoarthritis-associated genes, which are *DCAKD* (TWAS $P=2.48×10^{-6}$) and *NMT1* (TWAS $P=2.62×10^{-6}$). The differential expression analyses identified that only *DCAKD* is significantly upregulated in osteoarthritis patients ($P=8.25×10^{-6}$).

Conclusion: Overall, our findings highlight the power of integrating transcriptome-wide association study and mRNA expression profiling to identify novel genes for osteoarthritis. We identified *DCAKD* as a novel gene for osteoarthritis, providing clues for understanding the genetic mechanism of osteoarthritis.

P163
THE IMPORTANCE OF MEASUREMENT OF P1NP IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS

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Objective: Type I collagen with N-terminal propeptide (PINP) is used to investigate bone formation in adult with osteoporosis especially due to cancer disorders, but a lack of appropriate reference data has hampered use of P1NP in pediatrics. We aimed to determine the importance of P1NP for patients with juvenile idiopathic arthritis (JIA).

Methods: The study included 10 patients with JIA within 9-18 years old, there were 60% of female and 40% of male. Assessment of children was based on physical, laboratory examination and instrumental tests. ECLIA method was used for the measurement of P1NP. For statistic processing of the material Stagraphics 3.0 and Student-Fischer test were done.

Results: Investigated patients had JIA, there were 50% of children with polyarthritis and negative rheumatoid factor (RF); 20% of patients had polyarthritis with positive RF; another 20% of cases were classified as oligoarticular form and 10% enthesitis-related arthritis. Disease duration ranged within 8-96 months. All patients has been treated with "basic" therapy, such as NSAID, its average duration of taking was (56.00±39.19) months; average duration of methotrexate taking was (21.00±35.94) months. Some patients were treated with immunobiological preparation during (1.67±2.25) months. Despite treatment radiological changes III degree by Steinbrocker score in 50% of cases and IV degree in 30% of kids were determined. The rate of P1NP depended on age and gender; 77.8% of patients represented normal range of P1NP, 11.1% with increased and 11.1% of kids had decreased level of P1NP. The mean level of P1NP was 378.78±370.80 ng/ml), serum calcium 2.34±0.07 mmol/L and phosphorus 1.58±0.36 mmol/L, which were within normal range. Patients with JIA had positive correlation between level of P1NP and TRAP 5b (r=0.76; p=0.01). Negative correlations were found between total level of IgM and P1NP (r=-0.65; p=0.02).

Conclusion: Patients with JIA had osteoporosis and radiological changes due to inflammation despite treatment. Measurement of P1NP is not sensitive for determination of osteoporosis in children with JIA.

P164
THE EFFECT OF VITAMIN D SUPPLEMENTATION ON HYPERTENSION IN A POSTMENOPAUSAL WOMEN

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Objective: Low serum levels of vitamin D have been associated with hypertension worldwide. Inconsistent findings from epidemiological studies have continued the controversy over the role of oral vitamin D supplementation in reducing blood pressure in normotensive or hypertensive populations. The aim of our study was to investigate the vitamin D supplementation on blood pressure control in population of postmenopausal woman.

Methods: Trial included vitamin D supplementation in normotensive or hypertensive postmenopausal women, with blood pressure measurements at beginning of study, and after 6 months of continuous supplementation and reaching the normal levels of vitamin D. This is a descriptive and cross-sectional study with normotensive or hypertensive postmenopausal women, the anthropometric data, biochemical profile, blood pressure and

serum vitamin D dosage were analyzed. The chi-squared test for verification of association and Student's t-test to compare medians between variables were used.

Results: Total 917 women were included and treated with vitamin D for 6 months. Levels of vitamin D were measured at the beginning of study and after 6 months. There was high frequencies of hypovitaminosis D (34%) and hypertension (43.3%) in postmenopausal women. We observed an inverse correlation between serum vitamin D levels and BP (r=-0.28, p=0.005). Patients with desirable serum vitamin D had systolic blood pressure (120 mm Hg vs. 127.6 mm Hg; p=0.007).

Conclusion: High frequency of vitamin D deficiency is associated with increased BP in study group. Further studies are required to confirm the magnitude of the effect of vitamin D on blood pressure reduction and define the optimum dose, dosing interval, and type of vitamin D to administer.

P165
THE EVALUATION OF BONE MINERAL COMPONENT IN PATIENTS WITH TYPE 2 DIABETES MELLITUS USING DIFFERENT HYPOGLYCEMIC DRUGS

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Objective: Diabetes mellitus is a metabolic disorder that has reached worldwide epidemic proportions and is increasingly being recognized as a risk factor for fracture. DXA is the primary method for measuring bone mineral content (BMC) and BMD because of its high precision, accuracy, and low radiation exposure. Several investigators have identified metabolic health outcomes associated with insulin action as negative predictors of bone mass content and density. The aim of the study was the examination of the bone mineral content distribution in type 2 diabetes mellitus patients depending on prescribed hypoglycemic drugs.

Methods: 75 postmenopausal women with type 2 diabetes mellitus (53 woman injected insulin and 22 woman received oral antidiabetic drugs (metformin+ sulfonylurea) were examined. Patients were matched for age (U=582.0; p=0.986), height (U=545.0; p=0.662), weight (U=453.5; p=0.133), and BMI (U=444.5; p=0.108). Body composition was performed by body composition software option for GE Lunar DXA bone densitometers.

Results: We did not reveal the differences in the total BMC mass 2357.0 (2176.0-2603.0) vs. 2512.0 (2371.0-2757.0) g U=427.5; p=0.071. The analysis of region distribution revealed the differences in BMC in android and gynoid regions. Patients received oral antidiabetic drugs have higher BMC values 57.5 (46.0-64.0) vs. 50.0 (42.0-58.0)g, U=348.5; p=0.006 in android region and 280.0 (236.0-307.0) vs. 249.0 (231.0-283.0) g, U=377.0; p=0.016 in gynoid region, respectively.

Conclusion: We revealed the differences in BMC distribution in patients with type 2 diabetes mellitus received different antidiabetic therapy.

P166
FAT DISTRIBUTION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS MEASURED USING DXA

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Objective: Visceral fat plays a key role in the development of metabolic and cardiovascular diseases. The evaluation of changes in body fat depots by DXA conveys additional information over changes in standard anthropometric indices. Body composition analysis can accurately show changes in fat mass and fat percentage in different regions of the body. Measurement of fat distribution is important for patients with metabolic syndrome and impaired glucose tolerance. The aim was to determine the differences in fat mass distribution in postmenopausal women with type 2 diabetes depending on prescribed hypoglycemic drugs.

Methods: A sample of 75 postmenopausal women with type 2 diabetes mellitus (53 woman injected insulin and 22 woman received oral antidiabetic drugs (metformin+ sulfonylurea) were recruited to the research. Patients were matched for age (U=582.0; p=0.986), height (U=545.0; p=0.662), weight (U=453.5; p=0.133), and BMI (U=444.5; p=0.108). The age of the participants was 62.6 (59.6-66.4) years, BMI 32.7 (29.3- 35.6) kg/m^2. Fat content and distribution were measured using DXA.

Results: We did not revealed the differences in the total amount of body fat in grams 35703.0 (30502.0-40387.0) vs. 41580.0 (29686.0-46580.0), U=420.0; p=0.058 and percent of body fat 43.8 (40.9-47.2) vs. 42.8 (40.2-47.7)%, U=429.0; p=0.074 but we documented the variability in FMI: 13.5(11.5-15.5) vs. 15.4 (12.6-16.9), kg/m^2 U=411.0;p=0.045. The analysis of fat distribution revealed the highest amount of fat in legs (U=371.0; p=0.013 and U=376.0; p=0.016) in patients received antidiabetic drugs without no differences in trunk fat mass (U=501.5; p=0.345) or trunk/legs ratio1.99 (1.59-2.37) vs. 1.99(1.46-2.45), U=440.0; p=0.097 and android/gynoid ratio 1.06 (0.99-1.15) vs. 1.11 (0.94-1.18), U=542.0; p=0.637.

Conclusion: The documented variability of FMI in patients received different antidiabetic drugs was due to different amount of fat in legs region.

P167
ACUTE EFFECTS OF IL-6 BLOCKADE, TNFα INHIBITOR OR GLUCOCORTICOIDS ON BONE TURNOVER MARKERS AND WNT INHIBITORS IN EARLY RHEUMATOID ARTHRITIS

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Objective: Wnt signaling is an important regulator of bone remodeling and it is involved in the pathogenesis of focal and systemic bone loss in rheumatoid arthritis (RA) patients. The aim of the present study is to investigate the short-term effects of three different anti-inflammatory therapies on Wnt inhibitors and bone turnover markers (BTMs) in patients with early RA.

Methods: We performed a retrospective analysis of prospectively collected data. We enrolled women affected by early RA (<12 months) according to 2010 ACR/EULAR criteria who started treatment with certolizumab pegol (200 mg SC weekly), tocilizumab (162 mg SC weekly) or methylprednisolone (8 mg daily). Women enrolled in the study were required to have positive RF and/or positive ACPA and active disease (DAS28 ≥2.6) despite stable treatment with subcutaneous methotrexate (10-15 mg/week) for at least 6 months. Clinical parameters and blood samples were collected at baseline, week 1 and week 4.

Results: Data were obtained for 14 patients treated with certolizumab pegol, 14 patients treated with tocilizumab and 20 patients treated with methylprednisolone. Mean DAS28 at baseline was 4.0±0.7 No difference in any of the tested parameters was found at baseline. The percent changes of the serum levels of bone turnover markers, Dkk-1 and sclerostin are reported in Figure 1. CTX-I, Dkk-1, and sclerostin decreased abruptly after 1 week of treatment with certolizumab pegol (-27%±21.5%, -50%±13.2% and -30%±30.4%, respectively), and similar results were found after 4 weeks. Methylprednisolone induced comparable changes, albeit less evident, on CTX-I and Wnt inhibitors. We found an increase in PINP serum levels after treatment with anti-TNFα, while we observed a decrease with methylprednisolone. Tocilizumab did not significantly affect BTMs or Wnt inhibitors.

Conclusion: TNFα inhibition seems to have a strong and quick effect on BTMs and Wnt inhibitors, which was not observed with IL-6 blockade, at least in the short-term. Glucocorticoid treatment exerts similar, though less prominent, changes, potentially linked to the suppression of inflammation, nonetheless it still show some undesired effects on bone metabolism (i.e., suppression of bone formation).
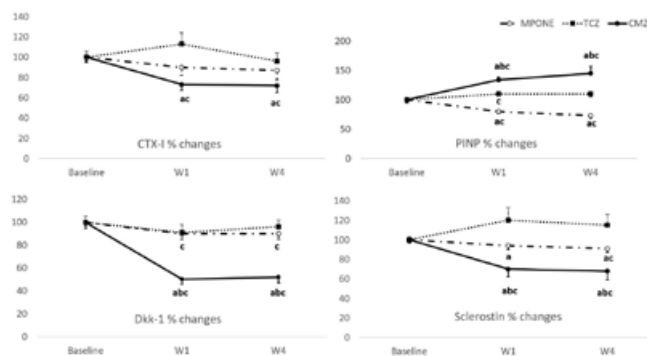
Figure 1. Bone turnover markers and Wnt inhibitors changes after 1 and 4 weeks of treatment with methylprednisolone (MPONE), tocilizumab (TCZ) and certolizumab pegol (CMZ).

P168
CHANGES IN DKK-1, SCLEROSTIN, AND RANKL SERUM LEVELS FOLLOWING DISCONTINUATION OF LONG-TERM DENOSUMAB TREATMENT IN POSTMENOPAUSAL WOMEN

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Objective: The positive effects of denosumab (DMAb) on BMD are quickly reversible after its discontinuation. We investigated whether this rebound was associated with dysregulation of the Wnt canonical pathway and/or by the increase in RANKL serum levels.

Methods: The study included patients (n=15) with postmenopausal osteoporosis to whom DMAb was administered for 78 months and then discontinued. We collected BMD data at baseline/month 0 (M0), M60, M84 (6 months after last DMAb administration, coinciding when the next DMAb dose would typically be due), and after 3 and 12 months of follow-up (FU-M3 and FU-M12, respectively). Serum C-terminal telopeptide of type 1 collagen (CTX-I), Dickkopf-1 (Dkk-1), and sclerostin were measured at M0, M60, M84, FU-M3, and FU-M12. Serum N-terminal propeptide of type 1 procollagen (PINP) and RANKL were dosed at M60, M84, FU-M3, and FU-12.

Results: We found a significant decrease in the T-score at all sites at FU-M12, when compared to M84 (-0.51±0.91 at the lumbar spine; -0.72±0.33 at the total hip; and -0.42±0.27 at the femoral neck, p<0.05). After DMAb discontinuation (M84 vs. FU M12) CTX-I, PINP increased already at FU-M3 (+0.921±0.482 ng/mL, +126.60±30.36 ng/mL, respectively, p<0.01), RANKL increased at FU-M12 (+0.041±0.062 ng/mL, p<0.05), while Dkk-1 and sclerostin decreased at FU-M12 (-10.90±11.80 and -13.00±10.52 pmol/L, respectively, p<0.01). The overshoot in RANKL serum levels was positively associated with the BMD gains from baseline to M84 (R2=0.53, p=0.002).

Conclusion: RANKL serum levels progressively increased after discontinuation of long-term DMAb while Dkk-1 and sclerostin serum levels decreased. The increase in RANKL serum levels and its association with BMD levels at discontinuation supports the hypothesis of a sudden loss of inhibition of an increased pool of resting osteoclasts after DMAb clearance, with hyperactivation of these cells. Our results suggest that the changes in serum Wnt inhibitors after DMAb suspension might represent a mere feedback response to the increased bone turnover.
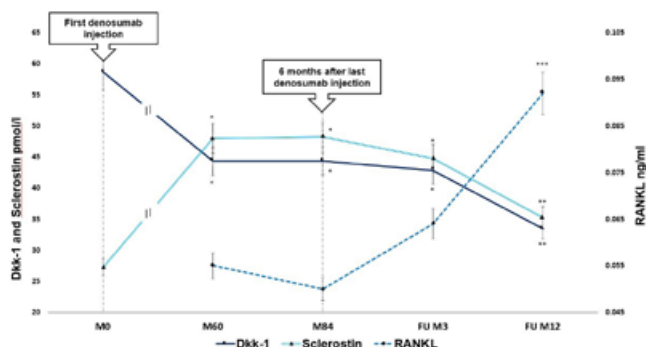
Figure 1. Absolute values of Dickkopf-1 (Dkk-1), sclerostin and RANKL before denosumab administration and following discontinuation. *p < 0.01 vs. M0; **p < 0.01 vs. M84; ***p < 0.05 vs. M84.

P169
DIFFERENT BASELINE PROFILE OF RISK OF FRACTURE IN PATIENTS TREATED WITH ANTIOSTEOPOROTIC DRUGS IN REAL LIFE

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Objective: Real life superiority of teriparatide and denosumab over oral bisphosphonates in reducing fragility fractures incidence is still unclear, possibly in relation to a different profile of risk of fracture of the treated patients. In the present study, we seek to investigate the profile of risk of fracture in patients that started treatment with different anti-osteoporotic medications.

Methods: We retrospectively analyzed the 10-y risk of major osteoporotic fracture calculated with the DeFRA tool in postmenopausal women aged over 50 y that were initiating an anti-osteoporotic treatment from 2010-2017. We enrolled women seen at the osteoporosis outpatient clinic of 10 medical centers in Italy that were prescribed with an antiosteoporotic treatment. Patients with an incomplete collection of data were excluded from the analysis. DeFRA is a web-based, open-source, FRAX™ derived tool to assess the 10-y risk of fracture. DeFRA was shown to better define the individual absolute risk of fracture by including into the algorithm graduated variables instead of dichotomous variables.

Results: We retrieved data for 12,040 women prescribed with an antiosteoporotic treatment. Figure 1 shows the mean 10-y fracture risk estimated with DeFRA tool at the time of the treatment initiation. Teriparatide users had the highest 10-y risk

of fracture (82.1% standard deviation [SD] 66.5%). We found that in 2247 patients that were starting denosumab, the 10-y baseline risk of fracture (54.3%, SD 46.5%) was significantly greater than in 7288 patients initiating alendronate (24.9%, SD 34.6%) and in patients initiating risedronate (23.9%, SD 24.1%). Patients starting zoledronic acid had a similar 10-y risk of fracture to denosumab (47.0%, SD 42.0). P values between oral bisphosphonates, zoledronic acid, denosumab and teriparatide were <0.01. Similar results were found for the 10-y risk of femoral fracture (data not shown).

Conclusion: Teriparatide, denosumab and zoledronic acid are prescribed to patients with greater risk of fracture, that are more likely to experience a bone fracture, for this reason, the treatment effectiveness of these medications might be not comparable with other antiosteoporotic medications. In the future, comparative studies on the effectiveness of various antiosteoporotic medications should consider the different risks of fracture profiles. An accurate, integrated, assessment of risk factors is recommended.
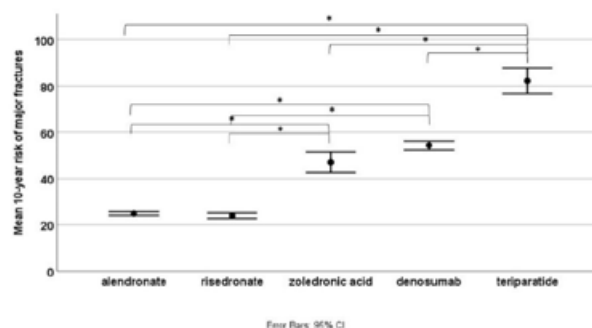
Figure 1. Mean 10-y risk of fracture estimated with DeFRA tool at the time of treatment initiation, *p<0.01

P170
FACTORS ASSOCIATED WITH IMPROVED READINESS FOR ADOPTING OSTEOPOROSIS TREATMENT

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Objective: We previously developed an innovative and tailored educational intervention to improve uptake of osteoporosis treatment in women at high risk for fracture.[1] Understanding factors associated with change in readiness to initiate treatment after exposure to a behavioral intervention may help inform the design of future behavioral interventions for osteoporosis treatment.

Methods: U.S. women with prior self-reported fractures and who were not using osteoporosis therapy previously enrolled in the Global Longitudinal Study of Osteoporosis (GLOW) were eligible to participate in the Activating Patients at Risk for OsteoPOroSis (APROPOS) clinical trial. Participants' readiness for behavior change was assessed using a modified form of the Precaution

Adoption Process Model (PAPM) at baseline 18 months post-intervention. We defined three categories of behavior change: 1) precontemplative stage includes individuals who self-classified in the unaware and unengaged stages of PAPM, 2) contemplative stage includes individuals in the undecided, decided not to act, and decided to act stages of PAPM, and 3) action stage comprises individuals who started osteoporosis treatment. The primary outcome was improved readiness for adopting osteoporosis treatment based on advancing category of behavior change between baseline and 18-month. We used multiple regression to study the association between baseline characteristics and improved readiness for adopting osteoporosis treatment observed 18 months postintervention.

Results: A total of 1273 women were included in the analysis. 950 and 323 women were in the precontemplative and contemplative stage at baseline respectively. 190 (14.9%) women were categorized as having improved readiness for osteoporosis treatment between baseline and 18 months. In multivariable analysis the baseline factors associated with improved readiness to adopt osteoporosis treatment between baseline and 18-month were: having had prior osteoporosis treatment (aOR 2.0, 95%CI 1.4, 2.9), having been told they have osteoporosis (aOR 2.8, 95%CI 1.8, 4.5), or having been told they have osteopenia (aOR 2.3, 95%CI 1.5, 3.5). Similar results were found among patients who advanced into action stage at 18 months and among patients with an appreciable exposure to the education intervention. In the latter subanalysis, we found a trend to significance towards the primary outcome for the intervention exposure (aOR 1.4, 95%CI 0.8, 2.3).

Conclusion: Among women at high risk of future fracture, having had a prior osteoporosis treatment and being told you have osteoporosis or osteopenia were independently associated with improved readiness for adopting osteoporosis treatment after the intervention. Our results suggest that the direct disclosure of osteoporosis and osteopenia diagnosis is an important factor to consider when designing behavioral interventions for chronic diseases, such as osteoporosis.

Reference: 1. Danila MI et al. J Bone Miner Res 2018;33:763.

P171
REAL LIFE RISK OF FRACTURE AND TREATMENT PREVALENCE IN DRUG-INDUCED OSTEOPOROSIS

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Objective: Glucocorticoid-induced osteoporosis and osteoporosis induced by adjuvant hormone therapy for breast cancer are the most common form of secondary osteoporosis. Bisphosphonates and denosumab are approved for the treatment and prevention of both. Teriparatide is contraindicated in women with breast cancer. The exact risk of fracture and real life prevalence of treatment in women with drug-induced osteoporosis is not known.

Methods: We retrospectively analyzed the profile of risk of fracture and the prevalence of prescription of antiosteoporotic medications in postmenopausal women with drug-induced osteoporosis. We estimated the 10-y fracture risk with DeFRAcalc79 tool (https://defra-osteoporosi.it/). This is a subanalysis of cross-sectional observational study to validate and further develop the DeFRA algorithm for the estimation of the risk of osteoporotic fractures, promoted by Verona hospital with the unconditional support of Amgen Srl.

Results: Among 208 women, 116 (55.8%) were treated with adjuvant hormone therapy for breast cancer and 92 (44.2%) were on glucocorticoid ≥5 mg/d. Women on glucocorticoids had a greater mean 10-y risk of fracture compared to women on adjuvant hormone therapy for breast cancer (67.0% vs. 39.1%). 50.7% of women on adjuvant hormone therapy for breast cancer used denosumab, 28.0% zoledronic acid and 17.3% alendronate. In glucocorticoid-induced osteoporosis, 17.6% of the women used teriparatide, 37.3% alendronate, 29.4% zoledronic acid and 13.7% denosumab.

Conclusion: Treatment with adjuvant hormone therapy for breast cancer was slightly more common than glucocorticoids. Women with glucocorticoid-induced osteoporosis had a greater risk of fracture compared to patients treated with adjuvant hormone therapy for breast cancer. Half of the patients on adjuvant hormone therapy for breast cancer used denosumab. One-fifth of the patients with glucocorticoid-induced osteoporosis were treated with teriparatide.

P172
INTRA-ARTICULAR, SINGLE SHOT HYLAN GF 20 HYALURONIC ACID (SYNVISC ONE) AND TRIAMCENALONE ACETONIDE INJECTION IN KNEE OSTEOARTHRITIS

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Objective: To find out the effect of Hylan GF 20 (Synvisc One) 6 ml in knee osteoarthritis.

Methods: A prospective study was conducted on 1 January 2017 to 31 December 2018 at Popular Diagnostic Center, Shantinagar, Dhaka, Bangladesh. 60 patients were selected among those who were diagnosed as osteoarthritis knee (grade 2 & grade 3) clinically and confirmed by X-ray of the affected knee joint. Intra-articular inj Hylan GF 20 (Synvisc one) 6 ml was given in each knee and inj Triamcenalone acetonide 40 mg was given before. Pt was followed up after first and 4th week following injection. Only VAS was used to determine the pain intensity. SPSS version 22 was used for data analysis.

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Results: In this study total respondents were sixty, among them 66.7% were female. Minimum age of the respondents was 48 y and maximum age of them was 72 y. Maximum of the respondents belong to age 58 y, 60 y and 64 y (5 in each). Most of the respondents were household worker (66.7%) followed by official job holder (33.3%). BMI of maximum respondents were found 30 (20%) followed by 28 (15%), although BMI ranges varied from 22-40. Maximum respondents were diagnosed osteoarthritis grade 2 (73.3%) followed by grade 3 (26.7%). Following intervention, VAS score was improved in all patients at first week and that remained static, somewhere found better at 4th week of follow-up and that was found statistically highly significant (p<0.005).

Conclusion: Hylan GF 20, 6 ml single shot has promising effect on knee osteoarthritis grade 2 and 3 to ameliorate pain.

P173
HOW TO RESTORE ROTATION CENTER IN TOTAL HIP ARTHROPLASTY FOR DEVELOPMENTAL DYSPLASIA OF THE HIP BY RECOGNIZING THE PATHOMORPHOLOGY OF ACETABULUM AND HARRIS FOSSA?

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Objective: To restore rotation center exactly in total hip arthroplasty (THA) is technically challenging for patients with endstage osteoarthritis due to developmental dysplasia of the hip (DDH). The technical difficulty is attributable to the complex acetabular changes. In this study, we investigated the pathomorphology of acetabulum and Harris fossa of Crowe type I to IV and discussed the method of restoring rotation center of hip.

Methods: This study retrospectively reviewed 44 patients (50 hips) who underwent cementless THA caused by endstage osteoarthritis of DDH. The pathomorphology of acetabulum and Harris fossa were observed during operations. Using the preoperative and postoperative pelvic radiographs, the vertical and the horizontal distances of hip rotation center were measured in order to evaluate the effects of reconstruction of the rotation center.

Results: Adult DDH acetabulum were classified into four basic pathological types which includes the shallow cup shape, the dish shape, the shell shape and the triangular shape. Adult DDH Harris fossa were classified into four pathological types, including the crack shape, the closed shape, the triangle shape, and the shallow shape. The vertical and horizontal distances of hip rotation center on the pelvic radiographs before and after surgery were as follows: the preoperative vertical distance of hip rotation center was (37.8±5.2) mm, the postoperative one (13.7±2.4) mm; the preoperative horizontal distance of hip rotation center (41.6±6.3) mm, and the postoperative one (24.4±4.7) mm.

Conclusion: The acetabulum and Harris fossa can display different pathological types on account of different degrees of dislocation and osteophyte hyperplasia in the endstage osteoarthritis of adult DDH. The hip rotation center can be accurately restored by locating acetabular center with Harris fossa and acetabular notch as the marks.

P174
MIDTERM AND LONG-TERM RESULTS OF RESTORING ROTATION CENTER IN HIP REVISION ARTHROPLASTY

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Objective: To discuss midterm and long-term clinical efficacy of restoring hip rotation center in revision hip arthroplasty according to Harris fossa and acetabular notches.

Methods: From July 2004 to January 2012, 45 cases (48 hips) were performed with revision hip arthroplasty, in which 35 cases (35 hips) were available for complete follow-up. There were 18 males and 17 females with an average age of 57 y (range 34-79). Among 35 hips, 23 hips involved in left side and 12 hips involved in right side. The average interval between the primary total hip arthroplasty and the revision was 137 months (range 36-288). The causes of revision included osteolysis and aseptic loosening. Among these cases, 30 hips for the first time revision, 4 hips for the second time and 1 hip for third time. According to Paprosky classification, 7 hips were type Ⅱa, 9 hips were type Ⅱb, 5 hips were type Ⅱc, 8 hips were type Ⅲa, 6 hips were type Ⅲb. The rotation center of acetabulum was located at the side of Harris fossa which was closed to the lunate cartilage surface.   During the operation, morselized bone graft were used for bone defect, acetabular prosthesis were installed according to the center which was located in the site which was about 28.7 mm above in line with perpendicular bisector of acetabular notch line. Clinical and radiological evaluations were performed for each patient. Using the preoperative and postoperative pelvic radiographs, the vertical and the horizontal distances of hip rotation center were measured in order to evaluate the effects of reconstruction of the rotation center. The clinical efficacy was assessed according to the Harris hip score, Charnley hip score, gait analysis, strength of gluteal muscle and prothesis position in pelvic radiographs at final follow-up.

Results: The mean follow-up period was 8.2 y (range 6-14).The average Harris hip scores were improved from 32.8 points preoperatively to 80.3 points at final follow-up. The average Charnley hip scores were improved from 4.3 points preoperatively to 14.6 points at final follow-up. The average myodynamia of gluteus medius was improved from (2.77±0.65) level preoperatively to (4.03±1.01) level at final follow-up. Spatiotemporal parameters of gait of patients had improved significantly compared with the preoperative parameters. The vertical distance of hip rotation center were restored to normal or near normal range (14.32+3.45) mm (13.4-15.2) mm. The average loss of vertical distance of hip rotation center was (2.8±1.7) mm (range 2.8-5.2) mm.

Conclusion: By using Harris fossa and acetabular notch as the anatomical markers to locate the acetabular center, hip rotation center can be restored exactly in revision hip arthroplasty and clinical efficacy are satisfactory.

P175

AN INSTRUMENT WHICH CAN LOCATE THE ACETABULUM CENTER: ANATOMY STUDY OF CADAVER ACETABULUM USING ACETABULUM CENTER LOCATOR

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Objective: To discuss the measurement method of distance between the midpoint of acetabular notch line and acetabular center point by using acetabulum center locator (ACL), which can provide the anatomical basis for restoring rotation center in total hip arthroplasty (THA).

Methods: The specimens of pelvis (40hips) from 20 normal adults were selected. The soft tissues of pelvis were peeled, and then the acetabular margin, acetabular notch and Harris fossa were exposed. The center point of acetabulum was determined according to the intersection point of vertical diameter and horizontal diameter of acetabular bone. The distance between vertical diameter and horizontal diameter was recorded. The ACL was used to measure the distance between the midpoints of line connected with acetabular notches to the acetabular center (MAC). The data were analyzed by using statistics analysis software.

Results: The vertical line and horizontal line were 45.50-55.60 mm and 44.50-52.54 mm. MAC was 26.60-33.82 mm. The mean value of MAC was 30.87 mm. The rotation center of acetabulum was located at the cephal side of Harris fossa which was closed to the lunate cartilage surface. The scatter diagram was drawn according to the length correlation among MAC, vertical line, horizontal line and the sum of vertical line and horizontal line. There was correlation between MAC and vertical diameter, horizontal diameter and the sum of vertical diameter and horizontal diameter. The Pearson coefficients (r) were 0.89, 0.81 and 0.91, respectively. The variables coefficient between MAC and the sum of vertical diameter and horizontal diameter were more close to l according to Pearson linear analysis. There were more significant linear positive correlation between MAC and the sum of vertical diameter and horizontal diameter.

Conclusion: The Pearson linear analysis suggest an obvious linear positive correlation between MAC and the sum of acetabular horizontal line and the vertical line, which means the value of the MAC can be obtained by measuring the distance between acetabular horizontal diameter and vertical diameter. Thus ACL can be used in THA and revision to restoring rotation center rapidly and accurately.

P176

A CADAVER ANATOMICAL STUDY OF USING THE ACETABULAR ANTERIOR AND POSTERIOR NOTCHES AND THE ACETABULAR BRANCH OF OBTURATOR UPPER EDGE TO LOCATE THE ACETABULAR CENTER

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Objective: Restoring rotation center play a vital role in total hip arthroplasty (THA), however, the method is still unclear and controversial. This study was designed to explore the method of locating the acetabular center by using anterior and posterior acetabular notches and the acetabular branch of obturator upper edge as the anatomical markers.

Methods: 20 normal adult dry pelvic specimens (40 hips) were selected to reveal the margin of acetabulum, anterior and posterior notches, the acetabular branch of obturator upper edge and Harris fossa. The rotation center, the acetabular center, the MAC (the distance between the midpoint of acetabular anterior and posterior notches line and acetabular center) and the AO1 (the distance between the midpoint of the acetabular branch of obturator upper edge and acetabular center) were measured, respectively. The correlations between MAC, AO1 and the sum of vertical diameter and horizontal diameter of acetabular opening plane (SVH) were analyzed and compared, respectively.

Results: The results indicated that it has a certain positive linear correlation between the SVH and MAC, AO1 by observing the changing trends of scatter diagrams. Use the SPSS software further to calculate the Pearson coefficient R=0.592, 0.615.

Conclusion: The acetabular anterior and posterior notches and the acetabular branch of obturator upper edge can be used to locate the acetabular center in THA. During the operation, the acetabular branch of obturator upper edge can be applied to locate the acetabular center quickly and accurately.

P177

MOBILITY AND BALANCE FINDINGS IN RELATION TO FALLS AND FRACTURES IN ELDERLY COMMUNITY-DWELLING WOMEN

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Objectives: The prevalence of osteoporosis increase with age and is higher in women. Osteoporosis is associated with falls and fractures. Individuals with osteoporosis have a higher risk of falls, due to muscle weakness, spine kyphosis, or decreased postural control. Low bone density due to osteoporosis is a main reason

that falls easily result in fractures. The aim of the study was to investigate differences in mobility and balance among groups of fallers and non-fallers in elderly women.

Methods: Cross-sectional design was adopted in this study. The epidemiological questionnaire designed for the purpose of the present study included the following parts: sociodemographic characteristics and data related to the fracture (number of fractures and their localization). Timed up and go (TUG), tandem standing (TS) and tandem walking (TW) tests were performed among participants. TUG test uses the time that a person takes to rise from a chair, walk 3 m, turn around, walk back to the chair, and sit down. A score of ≥14 s has been shown to indicate high risk of falls. An older adult who cannot hold the tandem stand for at least 10 s (TS test) or cannot walk eight tandem steps without losing balance (TW test) is at increased risk of falling. Differences were analyzed using χ^2 test and ANOVA test.

Results: The study included 243 community-dwelling older women residing in Belgrade. The mean age was 72.31±5.02 y and those who experienced fall were older (73.2 vs. 70.1 y; p<0.001). They were examined in DXA Center and according to the DXA findings, 53.02% of the participants had osteoporosis, whereas 59.9% experienced low trauma fracture. In group of fallers, was higher presence of low trauma fracture (78.1% vs. 46.2%; p<0.001). Women who experienced fall (29.4%) in last 12 months, had higher risk for falling, according to mobility and balance tests results (TUG: 74.3% vs. 54.2%, p<0.001; TS test: 72.5% vs. 44.3%; p<0.001; TW test: 81.4% vs. 62.3%; p<0.001).

Conclusion: TUG, TW and TS tests are associated with risk of fall among elderly community-dwelling older women. Evaluation of mobility and balance should be incorporate in fracture risk assessment in elderly women.

P178
COMPARING SHORT VS. LONG CEPHALOMEDULLARY NAILS FOR THE TREATMENT OF INTERTROCHANTERIC HIP FRACTURES

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Objective: Hip fractures are very common and osteoporosis is the most common predisposing factor. Numerous studies have proved the benefit of intra-medullary nails over extramedullary devices for their fixation. Intramedullary devices can be short or long cephalomedullary nails. Proving superiority of one over the other, has been a constant debate. Literature claims that use of long nail reduces chances of secondary fracture, on the other hand short nails reduce blood loss and operative time. The purpose of this study was to compare use of short vs. long intramedullary nail on various aspects in the treatment of intertrochanteric hip fracture of femur.

Methods: This study involved a retrospective analysis of all intertrochanteric fractures operated at a district general hospital between 2013-2016. The total number of patients included was 358; of which 272 patients were treated with short proximal femoral nail (PFN: AO synthesis) and the remaining 86 were treated with long PFN. The analysis involved assessment of patients electronic notes and picture archiving system to record various parameters like patient demographics, operative time, estimated blood loss, change in hemoglobin, complications, re-surgery, secondary fractures, etc.

Results: According to pooled data it was observed that total number of secondary fracture in the long nail group was 3.49% which was higher as compared to 1.47% for the short nail group. In terms of revision surgery, 6.98% of the long nails had resurgery vs. 1.84% of patients with short intramedullary nail. Additionally, short intramedullary nails have slightly lower incidence of postoperative complications of 0.37% vs. 1.16% for long intramedullary nails. Operative time for short nail was much lower than that for long nails. Approximately 93% of patients with short nail were operated within 1 h. Whereas in case of long nail only 36% were operated in same duration. In terms of blood loss, short nails had a postoperative change in haemoglobin levels of 1.8 gm% compared to 2.1 gm% for long nails.

Conclusion: This study showed significantly shorter operative time, fewer postoperative complications and revision surgeries, with the use of short intramedullary nails. The incidence of secondary fracture was also comparatively lower with use short nails, which was in contrast to literature available. This warrants, a shift in practice towards short intramedullary nails as choice to treat intertrochanteric fractures.

P179
SIMULTANEOUS BILATERAL FEMORAL FRACTURE IN A PATIENT WITH PARAPLEGIA

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A 64 years old male, who has had paraplegia following spinal injury, was standing on his standing wheelchair with knees strapped and he fell forward. He was brought to the ED and he was not complaining of pain. His medical history included ankylosing spondylitis and atrial fibrillation. Following the spinal injury he was wheelchair and bedbound. X-ray showed markedly osteopenic bones, fracture of the right tibial plateau/metaphysis and fracture through the lateral femoral condyle. There was also an impacted fracture through the left distal femoral metaphysis (Figures). His bilateral distal femoral fractures were conservatively managed with cricket pad splints. As part of his osteoporosis risk assessment, FRAX score was calculated and it showed that his 10-y probability of major osteoporotic fracture was 6.2% and of hip fracture was 1.2%. NOGG advised just lifestyle measures. Follow-up a year later showed that the right distal femoral fracture had healed. However the left femur fracture had did not heal.

Discussion: The femur is the strongest, bone in the human body. To sustain a simultaneous bilateral femoral fracture necessitates a high impact injury or markedly osteoporotic bones.

Movement is a strong stimulus for both muscle power and bone strength. Patients with poor mobility including those with paraplegia or hemiplegia are at increased risk of osteoporosis,

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falls and fractures. The fracture probability, using FRAX, is underestimated in patients with severe osteoporosis due to paralysis especially if they are falling. Clinical judgment should be used in these cases. These patients' risk of osteoporosis and falls need to be assessed thoroughly and they should be prescribed prophylactic antiresorptive medications if indicated.

P180
FRAILTY IN HIP FRACTURE PATIENTS AND ITS IMPACT ON THE LENGTH OF STAY

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Objective: Many hip fracture patients have multiple system chronic diseases, functional impairment and are at risk of adverse health outcomes; i.e. frail. The aim of this study was to objectively quantify the prefracture frailty of hip fracture patients and to assess whether length of stay is related to frailty.

Methods: Prospective cohort study of consecutive hip fracture patients admitted to a UK teaching hospital in an 8 months period. We collected demographics, preadmission frailty using the Clinical Frailty Scale (CFS) and prefracture mobility status and length of stay. A doctor and a physiotherapist jointly assessed frailty using the clinical Frailty Scale. Patients were classified as nonfrail (CFS 1–3), vulnerable, mildly and moderately frail (CFS 4-6) or severely frail (CFS 6-9). Data were downloaded on an excel sheet and descriptive statistics were used for analysis.

Results: 151 patients were included; 106 (70.2%) were female and 45 (29.8%) males with median age of 82.5 (IQR 78.8-89) and 83.0 (IQR 79-89), respectively. The median frailty score was 5.5 (IQR 4-6).

CFS	1	2	3	4	5	6	7	8	9
Number	0	3	13	24	36	56	19	0	0

16/151 (11%) of hip fracture patients were not frail, 24/151 (16%) were vulnerable, 36/151 (24%) were mildly frail, 56/151 (37%) were moderately frail and 19/151 (13%) were severely frail. There was no significant difference in CFS between men and women. Prefracture mobility correlated significantly (P<0.001) with CFS (0.491). The median length of stay (LOS) was 13 d (IQR 9-19). On linear regression analyses, length of stay was associated with the CFS (LOS increment of 3.1 d for each increment in CFS; P<0.001). The CFS accounted for 10.3% of the variance in LOS.

Conclusion:

11% of hip fracture patients were not frail, 16% were vulnerable, 61% were mildly to moderately frail and 13% were severely frail.

Prefracture mobility correlated significantly with CFS.

The median length of stay was associated with the CFS with 3.1 d increment of length of stay for each increment in CFS.

P181
EPIDEMIOLOGY AND EFFECT ON PHYSICAL FUNCTION OF OSTEOSARCOPENIA IN PATIENTS WITH ENDSTAGE KNEE OSTEOARTHRITIS

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Objective: This study was undertaken to investigate the prevalence of osteosarcopenia and its impact on physical function, quality of life and pain in patients with endstage knee osteoarthritis (OA).

Methods: In this cross-sectional study, we assessed a total of 578 patients (77 males and 501 females; average age 71.47±5.72 y) who were diagnosed with endstage knee OA. We divided patients into four groups according to the presence of osteoporosis and sarcopenia (defined as a loss of skeletal muscle mass by bioelectrical impedance analysis). The concept of osteosarcopenia is defined as patients with osteoporosis and sarcopenia. All patients completed performance-based physical function tests including stair climbing test (SCT), 6-min walk test (6MWT), timed up and go test (TUG), instrumental gait analysis for spatiotemporal parameters. Self-reported physical function and pain were measured using the WOMAC and VAS, and self-reported quality of life was measured using the EQ-5D questionnaire.

Results: Osteoporosis alone was diagnosed in 191 subjects (33%), sarcopenia alone in 23 (4%), and osteosarcopenia in 13 (2.2%). Among 13 patients with osteosarcopenia, 11(84.6) were females and 2(15.4) were males. In the ANOVA, osteosarcopenia group exhibited significantly higher scores in SCT-ascent, SCT-descent, TUG, and lower scores in 6MWT, gait speed, cadence and EQ-5D in other groups (P<0.05). After adjusting for age, sex, BMI by the logistic regression, SCT-descent (β=0.158, p<0.001, R2=0.13), SCT-descent (β=0.169, p<0.001, R2=0.118), 6MWT (β=0.091, p=0.027, R2=0.027), TUG (β=0.14, p=0.001, R2=0.128), EQ-5D (β=-0.14, p=0.001, R2=0.033), WOMAC pain(β=0.158, p<0.001, R2=0.13), gait speed (β=-0.138, p=0.001, R2=0.085) and cadence (β=-0.131, p=0.002, R2=0.039) were significantly associated with patients with osteosarcopenia (OR=1.040, 95%CI 1.010-1.071, p=0.010).

Conclusion: This study confirmed the prevalence of osteosarcopenia could be associated with the performance-based and self-reported physical function, and quality of life in patients with endstage knee OA.

P182
GENERALIZED GENE AND GENE-SET ANALYSIS OF GWAS DATA REVEALS FUNCTIONAL PATHWAYS FOR OSTEOARTHRITIS

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Objective: Although genome-wide association studies (GWAS) have seen great strides and invaluable utilities in revealing susceptibility genetic variants for osteoarthritis, these susceptibility loci together can only explain a relatively small fraction of the estimated heritability of osteoarthritis. Gene and gene-set analysis is considered as a potential and more effective alternative to the typical single-SNP analysis performed in GWAS. The objective of this project is to identify potential susceptibility genes and gene sets associated with osteoarthritis by gene and gene-set analysis implemented in an existing gene-set analysis tool MAGMA.

Methods: A large-scale GWAS dataset of self-reported osteoarthritis with 37,782 cases and 414,482 controls from UK Biobank was used to perform gene and gene-set analysis. First, we mapped the SNPs to genes via the annotation step and included a 5 kb upstream and 1.5 kb downstream window around each gene. Then, we compute the gene p-values according to the mean SNP association in the gene analysis step. At last, the 2199 canonical pathways from the MSigDB database were used for the gene-set analysis via MAGMA.

Results: Of the 17,793 genes evaluated, we identified a total of 22 genes significantly associated with osteoarthritis after Bonferroni corrections ($P < 2.81\times10^{-6}$), and the most significant gene is *TSPAN3* (P=2.44×10^{-10}). Four of the identified genes are associated with skeleton phenotypes in the Mouse Genome Informatics, which are *LTBP1*, *PEAK1*, *PHF20* and *TACC3*. The gene-set analysis step identified 22 gene sets ($P < 0.01$) for osteoarthritis after correcting for gene size and gene density, including 15 reactome gene sets, 3 KEGG gene sets, 3 PID gene sets, and 1 BioCarta gene set. The most significant gene set we identified is synthesis of diphthamide-EEF2.

Conclusion: Overall, by conducting gene and gene-set analysis we identified multiple genes and gene sets associated with osteoarthritis which could provide new insight into osteoarthritis pathophysiology.

P183
PERSISTENT ELEVATION OF PTH LEVELS AFTER SURGERY FOR PRIMARY HYPERPARATHYROIDISM

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Objective: Persistent elevation of serum PTH despite normocalcemia have been documented in 8-40% of patients after parathyroidectomy. We hereby report our experience from a multicentric study across India to determine clinical significance of postoperatively elevated PTH levels.

Methods: We conducted a retrospective case series study and reviewed all the patients who underwent surgery for primary hyperparathyroidism (PHPT) from January 2014 to July 2019.

Results: Total of 67 patients were diagnosed as PHPT. Out of available follow-up data of 60 patients, a total of 18 patients (30%) had persistently elevated PTH (PePTH) at 1 month. Patients with PePTH were older with higher preoperative serum calcium, iPTH, alkaline phosphatase and lower serum phosphate and 25-hydroxyvitamin D3 levels. Creatinine clearance was found to be significantly lower in patients with PePTH. Multiple linear regression analysis revealed that preoperative 25-OH D3 concentration, creatinine clearance and iPTH are the factors influencing persistent elevation of PTH levels. Significantly lower serum calcium and higher alkaline phosphatase levels were observed in PePTH patients with preoperative 25-OH D3 levels <20 ng/ml. Ten patients at 6 months, 8 patients at 1 year, 6 patients at 2 years and 3 patients at 3 years had eucalcemic PTH elevation. Three out of 42 (7%) patient with normal initial postoperative calcium and iPTH levels developed PePTH, with none culminating into recurrent hyperparathyroidism.

Conclusion: Though the pathogenesis of such a phenomenon still remains to be elucidated, a multifactorial mechanism appears to play a role. Higher prevalence in our study group further calls for proper vigilance.

P184
BONE HEALTH IN TYPE 1 DIABETES PATIENTS WITH CELIAC DISEASE

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Objective: Type 1 diabetes mellitus (T1DM) is associated with various autoimmune conditions including celiac disease (CD). Both these conditions are independently and variably associated with risk of osteoporosis. The current study intended to study bone health parameters and factors affecting it in patients with T1DM with serological evidence of CD.

Methods: A cross-sectional study including 100 T1DM patients following up in our hospitals across India were screened for CD bye IgA tissue transglutaminase (TTG) levels. Twelve patients (12%) patients tested positive. Twenty age and sex matched T1DM (IgA TTG negative) patients served as controls. After history and physical examination, biochemical parameters including serum levels of ionized calcium, inorganic phosphorus, alkaline phosphatase, PTH and 25-hydroxyvitamin D were measured. BMD were measured at total body (TB), lumbar spine (LS) and left femoral neck (FN) using DXA (Lunar DRX DPO). Similarly DXA scan was done for measurement of total body bone mineral content (TBBMC), bone area (TBBA) and body composition. All the parameters were expressed as mean±SD. Data were analyzed using online GraphPad quickcalc software and $P<0.05$ was considered statistically significant.

Results: TBBMD (0.77 ± 0.04 vs. 0.81 ± 0.05 g/cm^2) and TBBMC (801 ± 143 vs. 982 ± 196) were lower in type 1 diabetic subjects with IgA TTG positivity (p<0.05). Similarly the total body Z-score (-1.64 ± 0.56 vs. -0.46 ± 0.67), lumbar spine Z-score (-1.42 ± 0.61 vs. -0.22 ± 0.83) and femoral neck Z-score (-1.48 ± 0.52 vs. -0.34 ± 0.79) and TBBMC for age Z-score (-1.3 ± 0.8 vs. -1.0 ± 0.9) were lower in type 1 diabetic subjects with IgA TTG positivity (p<0.05). However, TBBA (1038 ± 149 vs. 1134 ± 156 cm^2) and TBBA for age Z-score (-0.9 ± 0.9 vs. -0.8 ± 0.9) did not significantly differ between the two groups.

Conclusion: Celiac autoimmunity is associated with reduced bone mineralization in T1DM patients. CD should be considered as a possible secondary cause of osteopenia in type 1 diabetic patients found to have a reduced BMD. Important impact of early identification of CD in T1DM could be to prevent this important complication.

P185
SURGICAL MANAGEMENT OF MUCOPOLYSACCHARIDOSIS-RELATED SPINAL DEFORMITIES

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Objective: Retrospective cohort study. Class IV of evidence. Spinal deformity in patients with mucopolysaccharidosis a problem requiring early treatment.

Methods: We analyzed 10 cases of mucopolysaccharidosis (MPS), treated in Ilizarov Center in 2012-2019. There were 1 patient with MPS IH-type, 6 patients with IVA-type, and 3 patients with MPS type VI. The age of the patients ranged from 6-26 years old (average age 10.3). All patients had spinal deformity with primary and/or secondary stenosis of the spinal canal. Various surgical treatments were used: 1) two staged surgery was performed in one patient with cervical myelopathy and scoliosis: C0-C7 decompression with occipitospondylodesis (OSD) firstly and dual growing rod construction secondly; 2) final fusion in 2 patients with scoliosis; 3) decompression at the stenosis level (cervical spine) with OSD in 7 patients with cervical myelopathy.

Results: Scoliosis value was from 20° to 65° Cobb, kyphosis from 15° to 80° Cobb. Four patients had vertebral stenosis and myelopathy (Frankel C). All patients had pulmonary and cardiac dysfunctions: vital capacity of the lungs was from 21% to 50%

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and abnormal ECG. Imbalance in the frontal and sagittal planes was present in 60% of patients. Through surgical treatment correction of the kyphosis was by 68% and scoliosis by 85%. In 4 (50%) patients with spinal stenosis neurologic status improved to Frankel E.

Conclusion: Patients with MPS quite often have vertebral stenosis and myelopathy, in such patients with combined stenosis of the spinal canal, it is necessary to combine decompression and fusion.

P186
CLINICAL AND IMMUNOLOGICAL FEATURES OF A SERIES OF PATIENTS WITH RHUPUS

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Objective: To describe demographic, clinical and immunological features of a series of patients with rhupus syndrome and to compare them with previously reported series in the literature.

Methods: Review of clinical records of patients attended in a Tertiary Care Rheumatology Unit that fulfil classification criteria for RA (either ACR 1987 or ACR/EULAR 2010) and SLE (either ACR 1997 or SLICC 2012). In addition, a manual search of patients with positivity for both anti-CCP (defined as >3 UI/mL) and specific SLE antibodies (either anti-DNAds by IIF+- or anti-Sm by multiplex assay) was conducted. We excluded patients with known mixed connective tissue disease, drug-induced SLE as well as RA patients with anti-DNAds+ or anti-Sm+ without clinical features of SLE.

Results: We identified 8 patients, all of them women (4 of Latin American origin, 3 Caucasians and 1 Arab) with a mean age at diagnosis of 35 y (range:19-63) and a mean duration of disease of 9 y (±10.5). RA and SLE were diagnosed simultaneously in 50% of cases (37.5% onset as RA and 12.5% as SLE, being the mean time between both diagnoses of 16.5 months in those cases). Immunological features of patients are summarized in Table 1. An erosive form of arthritis is present in 37.5%. As extra-articular involvement, 75% have skin lesions (photosensitivity, malar rash, oral ulcers and alopecia as major features) and 100% haematological alterations with lymphopenia (37.5% thrombopenia). Serositis (37.5%), renal (25% biopsy-proven lupus nephritis, 12.5% non-nephrotic proteinuria) and neurological (present only in one patient) involvement were less common findings. Most common therapies in our series were glucocorticoids (100% of cases, with a mean dose of 21.25±13.5 mg/d at onset), antimalarials (87.5%) and methotrexate (87.5%). 50% of patients required biologic therapy (2 etanercept, 1 adalimumab, 1 rituximab) for inadequate disease control with conventional synthetic DMARDs.

Conclusion: Prevalence of erosive arthritis in our patients is lower than previously reported, though as a limitation an imaging technique with a higher sensitivity for erosion detection than simple X-ray (such as US or MRI) was not available. Moreover, our series sample is small considering the low prevalence of this entity. The proportion of patients with simultaneous diagnosis of both RA and SLE is also higher (with a shorter interval between both diagnoses when this is not the case), so it is the proportion of patients receiving biologic therapy. The rest of clinical and immunological features were similar to previously described in other series.

Table 1.

	ANA (IIF titers)	Anti-DNAds (IIF titers)	Anti-Sm	Anti-chromatin	RF (UI/mL)	Anti-CCP (UI/mL)	Anti-Ro	Anticardiolipin (UI/mL)	Anti-β2GPI (UI/mL)	Lupus anticoagulant
1	1/320	-	-	+	53	2	-	-	22 (IgM)	-
2	1/640	-	-	-	810	486	-	-	-	-
3	1/1260	-	-	-	1230	310	-	25.8 (IgM)	-	-
4	1/640	1/50	-	+	588	>300	-	-	28.5 (IgA)	-
5	1/160	-	-	-	232	11,1	+ (Ro60)	148 (IgG) 121 (IgM)	160 (IgG), 111 (IgM), 42 (IgA)	+
6	1/160	1/50	-	+	230	>300	-	32.4 (IgM)	-	-
7	1/320	-	-	-	198	>300	+ (Ro52)	19.5 (IgM)	-	-
8	1/160	-	+	+	170	>300	-	-	-	-

P187
ARE ANTI-RNP-A ANTIBODIES ASSOCIATED TO DEVELOPMENT OF AUTOIMMUNITY?

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Objectives: Anti-RNP-A antibodies are included in automated multiplex immunoassays for detection of antinuclear antibodies (AAN) available in most centres, though a low specificity for auto-immune disease has been described and may be frequently present as a false positive in healthy subjects. The aim of this study is to investigate potential association between those antibodies and development of immune-mediated inflammatory diseases (IMIDs).

Methods: We perform a search for patients with at least one positive determination of anti-RNP-A antibodies in the absence of concomitant positivity for the rest of multiplex specificities (dsDNA, chromatin, ribosomal protein, SSA/Ro-52, SSA/Ro-60, SSB/La, Sm, Sm-RNP, RNP-68, Scl-70, Jo-1 and centromere B) using the BioPlex™ 2200 ANA screen assay (Bio-Rad, Hercules, CA) and also with negative AAN-IIF, from January 2012 and June 2016. Medical reports of patients were prospectively reviewed to October 2019 (minimal follow-up of 3 y up to 7 y) to find out if a previous diagnosis of IMID was present, the nature of clinical suspicion that motivated AAN determination and finally if a diagnosis of IMID was established.

Results: We found 310 patients with isolated anti-RNP+, of which 78 (25%) had already a previous diagnosis of IMID (38.5% RA, 11.5% IBD-related spondylarthritides, 9% SLE, 7.7% PsA, 6.4% PMR, 5% Sjögren's syndrome, 3.8% axial spondylarthritis, 2.5% myositis, 2.5% antiphospholipid syndrome, 2.5% systemic sclerosis, 1.2% MCTD, 3.8% IBD, 5.1% other). Among 75% of patients without an IMID (n=232), in 76 of them (33%) we could

not identify the reason for suspicion. In other 156 (67%), most frequent reason of suspicion were arthritis/arthralgia (33.3%), skin rash (9%), unexplained neurological symptoms (7.7%), myopathy/hyperCKemia (5.1%), interstitial lung disease work-up (4.5%), nephritis work-up (3.2%), sicca symptoms (2.5%), inflammatory ocular diseases work-up (2%) and Raynaud's phenomenon (2%). Of 156 patients without initial diagnosis with suspicion of IMID, a diagnosis was established in 23 of them (14.7%) but only in 9 (5.8%) it was of an AAN-related connective tissue disease (1 SLE, 1 drug-induced SLE, 2 MCTD, 2 APS, 3 Sjögren). In other 14 patients (8.9%) a diagnosis of another immune-mediated disease (5 PsA, 3 RA, 2 PMR, 1 axial SpA, 3 vasculitis) was performed.

Conclusion: Though anti-RNP-A may be present in healthy subjects without any underlying autoimmune disease, our study shows that a low percent of patients with suspicion of IMID and isolated anti-RNP-A+ can develop an immune-mediated disorder after several years. These findings could justify a periodic follow-up in patients with high clinical suspicion of IMID.

P188
IS HYPOCOMPLEMENTEMIA ASSOCIATED WITH WORSE PROGNOSIS IN RA?

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Objectives: Hypocomplementemia in rheumatoid arthritis (RA) has been associated to higher inflammatory disease activity, more erosive disease and most frequent extra-articular involvement (such as pleuropulmonary complications, vasculitis, rheumatoid nodules or infection), being all of the above associations also related to seropositivity for rheumatoid factor (RF) or anti-CCP antibodies. Our objective is to explore if hypocomplementemia in RA independently of seropositivity is associated with a more aggressive disease.

Methods: We searched for patients with RA diagnosis and RF+ (>15 UI/mL) and hypocomplementemia C3 (<84 mg/dL) in 2017, as well as patients with RF+ but normal levels of C3 (>84 mg/dL) and C4 (>14 mg/dL) in the same period as controls. Demographic (sex, age, disease duration), biochemical (RF and anti-CCP titers, CRP, ESR, C3 and C4 levels), clinical (tender and swollen joint counts, erosions, secondary Sjögren syndrome, pleuropulmonary involvement, vasculitis, rheumatoid nodules, cardiovascular comorbidity) and therapeutic (dose of glucocorticoids, use of synthetic and biologic DMARDs, number of previous lines of biologic therapy) were obtained from medical records. Differences between variables were analysed using Student-t or chi-square tests depending on their quantitative or qualitative nature.

Results: 25 RA patients with RF+ and hypocomplementemia C3 (±C4) and 50 RA controls with RF+ and normal complement levels were identified. Basal characteristics (sex, age, disease duration) were similar in both groups. All biochemical, clinical and therapeutic variables were comparable between both groups except for higher levels of CRP in patients with hypocomplementemia (Table 1).

Conclusion: The present study does not find differences between patients with seropositive RA with low complement levels and those with normocomplementemia in terms of a more aggressive disease (erosions, extra-articular features, DMARDs or glucocorticoids use), cardiovascular comorbidity or inflammatory burden (TJC, SJC, ESR), except for higher CRP levels in the first group. This findings support that clinical associations of hypocomplementemia in RA are the same as those of RF seropositivity (to which it is associated). As a limitation of our study, the sample size is relatively low and also low prevalence of extra-articular features makes conclusions difficult.

Table 1. Demographic, biochemical, clinical and therapeutic characteristics of patients.

	Hypocomplementemia (n=25)	Normocomplementemia (n=50)	p
Female (%)	92	84	0.630
Age (years)	60	56	0.199
Disease duration (years)	13.84	9.12	0.08
Anti-CCP+ (%)	84	96	0.071
CRP (mg/dl)	0.37	1.10	0.05 *
ESR (mm/h)	18.32	18.36	0.99
Hypertension(%)	28	24	0.707
Diabetes (%)	12	14	0.810
Dislipidemia (%)	12	18	0.992
Smoking (%)	28	36	0.488
Secondary Sjögren (%)	12	10	0.791
Pleuropulmonar disease (%)	4	4	1.000
Rheumatoid vasculitis(%)	0	2	0.476
Erosive disease (%)	68	60	0.499
TJC (n)	1.32	0.84	0.115
SJC (n)	2.64	2.22	0.07
Glucocorticoid dose (mg/day of prednisone equivalent)	3.6	4.6	0.621
Conventional DMARD use (%)			
Methotrexate	72	66	0.599
Hydroxychloroquine	32	50	0.139
Leflunomide	12	14	0.810
Sulfasalazine	12	6	0.367
Biologic therapy (%)	32	18	0.172
Previous biologic lines (n)	0.12	0.22	0.380

P189
AXIAL SPONDYLARTHRITIS CLINICAL AND RADIOLOGICAL SIMULATORS

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Objectives: To summarize different entities that can mimic axial spondylarthritis (axSpA) both in their clinical presentation and in imaging techniques.

Methods: A review of the literature based on a PubMed search using the keywords "axial spondylarthritis differential diagnosis", "sacroiliitis differential diagnosis", "osteitis condensans ilii", "diffuse idiopathic skeletal hyperostosis", "Paget of sacroiliac joints", "sacroiliac septic arthritis", "accessory sacroiliac joints", "sacral stress fractures", "sacral tumours" and "hyperparathyroidism" was performed and relevant articles were extracted. References of the articles obtained were also screened to find other articles that could be potentially missed in the initial approach. The literature data was critically assessed by the authors and summarized.

Results: The diagnosis of axSpA is often difficult because of clinical manifestations may be nonspecific and frequently the clinician relies on different imaging techniques such as simple radiography, MRI or CT to support the diagnosis. However, imaging findings can also be confusing and there is a lack of pathognomonic or high specific confirmatory findings. Several conditions can act as clinical and radiological mimickers of axSpA -both nonradiographic axSpA and ankylosing spondylitis- such as other inflammatory arthritides (crystalline arthropathies like gout or calcium pyrophosphate deposition disease), noninflammatory diseases (sacroiliac osteoarthritis, *osteitis condensans ilii*, diffuse idiopathic skeletal hyperostosis), metabolic disorders (Paget disease of bone, hyperparathyroidism), septic arthritis of sacroiliac joints, sacral stress fractures, sacral tumors and even anatomic variants like accessory sacroiliac joints and extra-sacroiliac disorders (lumbar disc degeneration, L5 transverse mega-apophysis). Other rare causes of sacroiliitis have also been reported such as familial Mediterranean fever, sarcoidosis, Whipple disease, pigmented villonodular synovitis, alkaptonuria and isotretinoin toxicity.

Conclusion: We list and describe the most frequent and challenging in clinical practice simulators of axial spondylarthritis. We provide a summary of their clinical and imaging features to help the differential diagnosis of these entities.

P190
EZH2 MAY UNDERLIE VARIATION OF OSTEOPOROSIS AS REVEALED BY TRANSCRIPTION FACTOR ENRICHMENT ANALYSIS

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Objective: Genome-wide association studies (GWASs) have successfully identified hundreds of loci associated with osteoporosis. Nevertheless, most of these loci are located in the non-coding regions, leading to enormous challenges in deciphering the functional variants/genes and their biological mechanisms. Since transcription factors (TF) play important roles in gene regulation via these SNPs, we aimed to identify novel genes associated with osteoporosis based on transcription factor enrichment analyses.

Methods: We collected osteoporosis-related SNPs from the GWAS catalog and annotated them to enhancer regions. We then conducted TF enrichment analyses for the osteoporosis-related enhancers to identify common TFs binding to osteoporosis-associated enhancers. Due to the limited data on TF binding sites in bone-related cell lines, we used all 690 TF binding sites available in the ENCODE database. We annotated the TF binding sites using the ATAC-seq data in bone-related cell lines to limit them in the bone-related open chromatin regions as alternatives. We also conducted the association analyses between identified TFs and spine and hip BMD in a Han Chinese population.

Results: TF enrichment analyses in 5,081 osteoporosis-associated enhancers identified 2 significantly TFs which are *EZH2* (P_{adj}=0.028) and *NRSF* (P_{adj}=0.038). We also found one SNP, rs111851041, in *EZH2* was significantly associated with BMD both at the hip and spine after multiple testing adjustments (hip BMD: P=4.32×10^{-4}; spine BMD: P=2.72×10^{-3}). The expression of *EZH2* decreased significantly from 12 to 48 h of osteogenic differentiation. And functional validation showed that *EZH2* was associated with osteoporosis-related phenotypes, increased sacral vertebrae number, in knockout mice.

Conclusion: In summary, by conducting transcription factor enrichment analyses, we identified *EZH2* as a common TF binding to osteoporosis-associated enhancers, and *EZH2* was also associated with BMD in a Chinese population. *EZH2* is functionally related to bone phenotypes. The identified gene could provide new insight into osteoporosis pathophysiology and highlight opportunities for future clinical and pharmacological research on osteoporosis.

P191
AN EPIGENETIC ELEMENT-BASED TRANSCRIPTOME-WIDE ASSOCIATION STUDY IDENTIFIED NEW CANDIDATE SUSCEPTIBILITY GENES FOR RHEUMATOID ARTHRITIS

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Objective: Most of the rheumatoid arthritis risk variants identified by genome-wide association studies (GWASs) reside in non-coding regions of the genome, leading to enormous challenges in deciphering their biological mechanisms. Previous studies have demonstrated that a large portion of genetic variants in complex diseases can be explained by modulating gene expression. Here we introduce a novel method named epigenetic element-based transcriptome-wide association study (ETWAS) to identify susceptibility genes for rheumatoid arthritis based on the interpretation of epigenetic elements, genotype, gene expression, and phenotype.

Methods: By using the data from the Genotype-Tissue Expression Project whole blood and Genetic European Variation in Health and Disease, ETWAS tests the effects of genetic variants on gene expression levels with the epigenetic features as prior and then mediates the association between predicted expression and rheumatoid arthritis. We applied our gene prediction models to GWAS summary statistics of rheumatoid arthritis with 29,880 cases and 73,758 controls.

Results: We demonstrated the incorporation of epigenetic elements, especially of the active annotations, improved prediction performance and the cross-validation performance significantly increased with the number of active annotations increasing. Of the 5,943 genes evaluated, significant associations were identified for 45 at a Bonferroni-corrected threshold of *P* <

8.41×10^{-6}. We found the contribution to rheumatoid arthritis heritability of ETWAS identified genes was consistently higher than that of randomly selected genes. Among these genes, 7 genes were not proximal (more than 500 kb from the gene) to any genome-wide-significant SNP for rheumatoid arthritis, implicating novel genes, which are *MAPK3*, *RPS23P10*, *DOK6*, *METTL21B*, *SPNS1*, *MMP23A*, and *RP4-798A10.4*.

Conclusion: In summary, we develop a gene-based method to identify novel susceptibility genes whose expression is significantly associated with rheumatoid arthritis. Our method has the advantage of considering both the genetic variants and regulatory elements in gene expression prediction models. We hope that ETWAS could provide novel insights into the identification of additional susceptibility genes and further delineate the biological mechanisms for other human complex diseases.

P192
CONDITIONAL GENE-SET ANALYSIS REVEALS NINE FUNCTIONAL PATHWAYS FOR RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is a chronic autoimmune that primarily affects joints and characterized by a significant genetic contribution. Gene-set analysis (GSA) can be used to uncover the functional and biological properties of genes involved in the genetic aetiology of RA. However, genes typically have numerous different properties that may correlate with each other if they involve many of the same genes. To address the confounding in the GSA, we carried out a conditional GSA via MAGMA to evaluate the associations of different gene properties related to RA.

Methods: We performed gene and conditional gene-set analysis to GWAS summary statistics of rheumatoid arthritis with 29,880 cases and 73,758 controls. After mapping the SNPs to 19,137 genes based on NCBI (36.3) gene definitions via the annotation step, we computed the gene p-values to RA according to the mean SNP association via the gene analysis step in MAGMA. We then performed primary GSA with the 2,199 canonical pathways from the MSigDB database. After the initial GSA, significant gene properties are conditioned on each other.

Results: We identified a total of 317 genes significantly associated with RA after Bonferroni corrections ($P < 2.87×10^{-6}$), including the well-known HLA genes (*HLA-DRB1*) and non-HLA genes (*PTPN22*) for RA. The primary GAS identified 14 gene sets significantly associated with RA after multiple testing corrections ($P < 2.27×10^{-5}$) after correcting for gene size and gene density, including 9 KEGG gene sets, 3 Reactome gene sets, and 2 BioCarta gene sets. The most significant gene set we identified is KEGG_Allograft_Rejection. Conditioning the significant associations on each other led to a reduction of 5 gene sets. We thus confirmed

and further refined nine gene set associations with multiple processes involved in RA, including KEGG_Asthma and Biocarta_MHC_Pathway.

Conclusion: Overall, by conducting conditional gene-set analysis we identified multiple genes and gene sets associated with RA which could provide new insight into RA pathophysiology.

P193
ASSOCIATION BETWEEN FRAILTY AND RISK OF FALL IN MIDDLE-AGED AND ELDERLY DIABETES PATIENTS: FINDINGS FROM THE CHINA HEALTH AND RETIREMENT LONGITUDINAL STUDY (CHARLS)

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Objective: Several epidemiological studies have demonstrated the risk factors for fall, while few studies have investigated the association between frailty and risk of fall in over-45-year-old diabetes patients.

Methods: The data were from the CHARLS. In this multicity observational cohort study, participants with type 2 diabetes aged ≥45 y were enrolled. Frailty status was measured by a frailty index (FI) of deficit accumulation. We used multivariable regression models to examine the relationship between FI and fall in diabetes. And we further estimated the associations in varied subgroup.

Results: A total of 2049 participants with type 2 diabetes were identified in our study. Our results showed a per-SD and a per-0.01 increment of FI were associated with increased risk of fall, with a fully-adjusted OR of 1.89 (95%CI: 1.50, 2.38), 1.06 (95%CI: 1.04, 1.09), respectively. The effects were magnified when frailty was considered as dichotomies, with an OR of 3.08 (95%CI: 2.18, 4.34). In further subgroup analyses, we found females, the elderly, rural residents, and individuals with no-seat toilet, had poor balance performance and in lousy health status were susceptible to fall. Especially, a per-SD increase of FI corresponded to an OR of 2.46 (95%CI: 1.68, 3.62), for risk of fall in the elderly, and when frailty was regarded as a binary variable, the effect increases to 4.62 (95%CI: 2.54, 8.38).

Conclusion: This study reveals that frailty was associated with a higher risk of fall in people with type 2 diabetes, and the association was more robust to the elderly, females, rural residents, individuals with no-seat toilet and person with poor health status and balance performance. Therefore, the evidence suggested that more attention should be paid to vulnerable groups for fall prevention.

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P194
NEGLECTED THORACOLUMBAR TRAUMATIC SPINE INJURIES: A RETROSPECTIVE STUDY OF FORTY PATIENTS AT JPNATC, AIIMS, NEW DELHI A LEVEL ONE TRAUMA CENTER

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Forty patients with neglected traumatic thoracolumbar spine injuries were included in this retrospective study from Jan 2008 to March 2014. This study was conducted at JPNATC, AIIMS, New Delhi a level one trauma center in India. Only patients with more than three weeks of traumatic thoracolumbar spine fractures were included in the study, and classified as neglected spine trauma. A total of 40 patients fulfilled the inclusion criteria and were recruited in this study. The minimum follow-up period was 12 months. There were 33 males and 07 females. The age was from 9-58 y with an average age of 26 y. Mechanism of spine injuries was, fall from height in 31 cases (2 attempted suicides) and RTA in 9 cases. There were 20 cases of burst fractures, 17 cases were fracture dislocation and one case each of soft tissues chance fracture, traumatic spondylptosis and traumatic spondylolisthesis. The patients were analysed for demographic data, mode of injury, reason for delay, treatment given, complications and pre- and post-operative neurologic status (ASIA). An anterior surgery from anterior approach was done in 9 cases (burst fractures). A posterior surgery by standard posterior mid line approach was done in 26 cases. A combined posterior and anterior surgery was done in 5 cases. The patients were mobilized with brace in wheel chair or walker depending on their neurologic status. The functional assessment was done by spinal cord Independence measure (SCIM).

Forty patients were available for final analysis in our retrospective study. Inadequate treatment at the primary treatment center (45%) was the leading cause followed by late presentation (38%) and missed injury (17%) for the delay in proper management of these neglected spine fractures. The delay in definitive treatment was 3-6 weeks in 22 patients and more than 6 weeks in 18 patients. The pre-operative neurologic status was ASIA A-17 patients, B-3 patients, C-10 patients D-5 patients and E-5 patients. The neurologic status at final follow-up was ASIA A-14 patients, C-3 patients, D-6 patients, E-17 patients. A neurologic improvement of at least one ASIA grade was seen in 48% (19 pts). There was no neurologic improvement seen in 40% (14 pts), who were all ASIA 'A' (14 pts). Five patients (12%) were neurologically intact at presentation, and remained the same at follow-up. The average SCIM score at final follow-up was 73. The most common complication was pressure sores which were present in 35% (14 cases).Other complications were urinary tract infection and respiratory tract infection.

Neglected spine trauma is common in developing country like India. A variety of surgical strategies are required to manage such cases, however with adequate treatment an acceptable outcome can be achieved.

P195
PARTIAL CORPECTOMY WITH ANTERIOR RECONSTRUCTION FOR THORACOLUMBAR BURST FRACTURES: A CASE SERIES FROM JPN APEX TRAUMA CENTRE, A LEVEL ONE TRAUMA CENTRE, AIIMS, NEW DELHI

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Objective: The optimal treatment strategy for burst fractures of the thoracolumbar junction is controversial. Combined anterior and posterior approach results in good radiological outcome, however recent studies have failed to show its clinical superiority. The morbidity associated with the additional anterior approach may account for these observations. The aim of this observational study was to evaluate the efficacy of partial corpectomy using bilateral posterolateral decompression and anterior reconstruction with interbody fusion TLIF cage or MESH cage to support the anterior column.

Methods: 15 patients with thoracolumbar burst fracture were treated with partial corpectomy with anterior reconstruction using TLIF/mesh cage. There were 9 male and 6 female patients (total 15 patients). Posterior short-segmental fixation using pedicle screw systems was performed in all patients as a first step. A complete posterior decompression (laminectomy) was done in all patients. Complete anterior decompression utilizing bilateral posterolateral approach to remove the retropulsed fragments compressing the dural sac was done in all the patients. A complete discectomy and partial corpectomy was done using posterolateral approach bilaterally and anterior reconstruction was done using a TLIF cage/mesh cage filled with local autograft. All patients were followed up for a minimum period of 12 months.

Results: There was no neurologic improvement in 2 patients, who had complete paraplegia (ASIA A). A neurologic improvement of one ASIA grade was seen in 4 patients and two ASIA grades in 8 patients. One patient was neurologically intact and remained so post operatively.

Conclusion: Partial corpectomy utilizing bilateral posterolateral decompression from a posterior only approach is a safe and adequate technique to obtain complete decompression of retropulsed fragments in thoracolumbar burst fractures. It also allows a good anterior column reconstruction without the need for additional anterior approach.

P196
POST TRAUMATIC KYPHOTIC DEFORMITY CORRECTION: EXPERIENCE AT JPNATC, A LEVEL ONE TRAUMA CENTER AT NEW DELHI

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Objective: Post-traumatic deformity, especially kyphosis, is a potentially devastating complication after injury to the spinal column. Proper understanding of spinal biomechanics is paramount for the appropriate application of surgical reconstruction and stabilization procedures. There is an increased risk of neurologic injury with surgical correction because of kyphotic deformity, prior spinal cord injury, and neural scarring. Surgical intervention is considered if the kyphotic deformity is progressive over time or there is new onset or progression of neurologic deficits. Surgical procedures include either a posterior or anterior only approach or any variation of a combined anterior or posterior procedure. The aim of this observational study was therefore to find the efficacy of various surgical strategies for post traumatic kyphotic deformity in reestablishing the integrity of the compromised spinal columns so that spinal stability and neurological status can be restored.

Methods: The study comprised 6 patients (4 women and 2 men) with average age of 32 y who had developed post traumatic kyphotic deformity at thoracolumbar junction. Two patients underwent combined posterior and anterior surgery (posteriorly pedicle screw based kyphotic deformity correction and decompression followed by removal of collapsed vertebral body and reconstruction of anterior gap with expandable cage). Three patients underwent all posterior transdiscal pedicle subtraction osteotomy for deformity correction and anterior reconstruction with TLIF cages. One patient who had progressive kyphotic deformity because of missed soft tissue chance fracture underwent bilateral transforaminal decompression and kyphotic deformity correction with TLIF cage for anterior reconstruction.

Results: All patients were followed for a minimum period of 12 months. None of the patients developed neurological deficits. All the patients were ASIA E pre-operatively and remained so postoperatively. The average pre-operative kyphotic deformity was 48°. Postsurgery, the kyphosis was corrected to an average of 12°. None of the patients developed implant failure. None of the patients developed progressive increase in kyphotic deformity or recurrence of deformity.

Conclusion: The best treatment for post traumatic kyphotic deformity is prevention, with close follow-up and early intervention when needed. This may involve an anterior, posterior, or a combined surgical approach. All kyphotic deformities cannot be treated by anterior or posterior only approach or combined posterior and anterior approach. Management for post traumatic kyphotic deformities should be individualised for each and every patient based on their clinical and radiological profile. This tailor made approach individualised for each patient with kyphotic deformity will hopefully allow a successful surgical and functional outcome.

P197
ROLE OF MINIMALLY INVASIVE SPINE SURGERY (MIS) IN TREATMENT OF THORACOLUMBAR SPINE FRACTURES: AN EXPERIENCE FROM JPN APEX TRAUMA CENTRE LEVEL ONE TRAUMA CENTER, AIIMS, NEW DELHI

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Twenty-four cases of acute thoracolumbar spine fractures were treated using minimally invasive spine surgery techniques (MIS). The average age of the patients was 28 y. There were 19 males and 5 females. The mechanism of injury was fall from height in 20 cases and road traffic accident in 4 cases. There were 14 patients who had burst fractures and 10 patients who had Chance fractures. All patients were treated using minimally invasive technique (MIS). Eighteen patients were treated by posterior only approach with percutaneous pedicle screws. In 6 patients, a mini-open anterior approach was used in addition to posterior percutaneous pedicle screws fixation, for decompression and anterior reconstruction. Anterior reconstruction was done with Expandable cages in 4 cases and a mesh cage was used in 2 cases. Eighteen patients were neurologically intact (ASIA E) and remained so postoperatively.

There were 2 patients with complete paraplegia (ASIA A). Three patients were ASIA C and one patient was ASIA D. All patients were mobilized after 48 h, postoperatively. Union was achieved in all cases. We had no case of pseudoarthrosis or implant failure. A neurologic improvement one ASIA grade was found in three patients, two ASIA grades in 2 patients and 3 ASIA grades in one patient.

Minimally invasive surgery is an excellent option for treatment of unstable burst fractures and Chance fractures in neurologically intact patients.

P198
SEX-SPECIFIC GENE-SET ANALYSIS IDENTIFIED SUSCEPTIBILITY GENES AND PATHWAYS FOR BONE MINERAL DENSITY

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Objective: Strong sexual dimorphism in bone phenotypes, including BMD, has been reported, which may explain the observed difference in fracture risk between genders. One explanation for the sex-specific predisposition to osteoporosis and fracture risk is the difference driven by genetic effects determining bone fragility. Gene-set analysis (GSA) can be used to uncover the functional and biological properties of genes involved in the genetic aetiology of bone phenotypes. We aim to identified sex-specific genes and gene sets for BMD via sex-specific gene-set analysis.

Methods: The sex-specific GWASs associations for femoral neck BMD (FN-BMD) and lumbar spine BMD (LS-BMD) including 17 GWASs (n=32,961) from the Genetic Factors for Osteoporosis Consortium (GEFOS) were used for the gene and gene-set analysis. SNPs were mapped to 19,137 genes based on NCBI (36.3) gene definitions via the annotation step, and the gene p-values to BMD were calculated according to the mean SNP association via the gene analysis step in MAGMA separately. We then performed primary GSA with the 2,199 canonical pathways from the MSigDB database and identified sex-specific genes and gene sets.

Results: We identified 3 genes associated with FN-BMD and/or LS-BMD in males after multiple testing corrections ($P < 2.61 \times 10^{-6}$) and 25 genes associated with FN-BMD and/or LS-BMD in females. Only one gene was identified to be associated with LS-BMD in males and 23 genes specifically associated with FN-BMD and/or LS-BMD in females. Gene-set analysis identified 23 and 39 gene sets associated with FN-BMD and LS-BMD in males ($P < 0.01$), and 21 and 40 gene sets for FN-BMD and LS-BMD in females ($P < 0.01$), including many well-known osteoporosis-associated gene sets. We found that only one gene set, BioCarta Malatex Pathway, that associated with FN-BMD is shared in males and females.

Conclusion: We applied sex-specific gene-set analysis to a GWAS of BMD with male and female data analyzed separated and identified novel sex-specific genes and pathways which could increase the risk of osteoporosis.

P199
UTILITY OF COMPUTER-AIDED VERTEBRAL FRACTURE DETECTION SOFTWARE

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Objective: Vertebral fractures are common, frequently asymptomatic and often present in Computed Tomography (CT) scans performed for unrelated conditions. Osteoporotic vertebral fractures are a risk factor for subsequent fractures but reporting frequency varies. Computer-aided Diagnosis (CAD) machine learning algorithms can identify fractures present on CTs and potentially improve detection and reporting of asymptomatic vertebral fractures. We tested the utility of a CAD vertebral fracture software (Zebra Medical Vision®).

Methods: Abdominal and thoracic CT scans from a tertiary hospital, in subjects over 50 years, were reviewed by a radiologist and by CAD (n=1696). All potential false positives and false negatives were reviewed by a second radiologist. Any discrepancies between radiologist 1 and 2 were adjudicated by a 3rd radiologist to establish a final diagnosis. Sensitivity and specificity of CAD, compared to the radiologists (current standard of care), were calculated for detecting any vertebral fracture (n=406), and for the detection of Genant grade 2 and 3 fractures (n=280).

Results: CAD software had sensitivity of 54% and specificity of 92% for detection of any vertebral fracture compared to radiologist review. Sensitivity was 65% and specificity 92% for detection of Genant Grade 2 and 3 fractures. Accuracy for any vertebral fracture detection, and for detection of Genant grade 2 or 3 fractures, was 83% and 88%, respectively. Review of clinical radiology reports in subjects with vertebral fractures detected by CAD, and confirmed by imaging specialist, showed a pre-study fracture reporting of 133/221 fractures (60.2%). CAD detected an additional 88 fractures (72 Genant 2 or 3) representing a 66% increase in fracture reporting rate. The number needed to screen to detect 1 additional fracture was 19 scans for all fractures and 23 scans for Genant 2 or Genant 3.

Conclusion: CAD vertebral fracture software has high specificity with moderate sensitivity, to detect vertebral fractures in CT scans. It is a potential useful tool to improve detection and reporting of vertebral fractures.

P200
NANODIAMOND-LOADED SMART HYDROGEL: A PROMISING INJECTABLE FORMULATION FOR OSTEOPOROSIS AFFECTING THE EXPRESSION OF PGC-1A AND STIMULATING OSTEOBLASTIC DIFFERENTIATION

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Objective: The problem of osteoporosis is growing and has become one of the most widespread skeletal disorders in developed countries. Nonsurgical treatment with an application of $PLGA_{1000}$-PEG_{1000}-$PLGA_{1000}$ block copolymer loaded with nanodiamonds (NDs) could be a solution to cure osteoporosis. The peroxisome proliferator-activated receptor-γ coactivator 1-α (PGC-1α) was identified as a critical switch between adipogenic or osteoblastic differentiation of murine skeletal stem cells (SSCs). The purpose of this in vivo study was to analyze the bone marrow response to ND@$PLGA_{1000}$-PEG_{1000}-$PLGA_{1000}$ smart hydrogel, following in bone injection, on PGC-1α in rat SSCs and bone marrow stromal (SCs) cells.

Methods: We used 21 female Wistar rats (2 months old), which were divided into 3 groups ▯ G1: ovariectomized group (7) subjected to bilateral ovariectomy (OVX) and treated with ND@$PLGA_{1000}$-PEG_{1000}-$PLGA_{1000}$ for 30 d; G2: control group (7) OVX animals (group with osteoporosis); G3: sham-operated animals (7, SHAM). The PGC-1α was determined by immunohistochemistry.

Results: The histomorphological analysis of femur from rats of G2 group indicated reduced areas of mineralized tissue, and a fat degeneration compared to the sham-operated G3 group, and ND@ $PLGA_{1000}$-PEG_{1000}-$PLGA_{1000}$ treated G2 group. These results confirmed that the estrogen deficiency leads to the loss of PGC-

1α, which promotes adipogenic differentiation of SCs at the expense of osteogenesis and manifests the bone marrow fat degeneration in G2 and G3 groups. We found that PGC-1α was strongly expressed in the G1 group compared to G3 and G2 ($p<0.05$) after in bone injection of ND@ $PLGA_{1000}$-PEG_{1000}-$PLGA_{1000}$. The PGC-1α induction blocks the adipogenic shift in osteoporosis and promotes bone formation after the implementation of ND@ $PLGA_{1000}$-PEG_{1000}-$PLGA_{1000}$ in G1. It is probably connected with the enhanced osteoblastic differentiation of SSCs and SCs.

Conclusion: The in bone injection of ND@PLGA1000-PEG1000-PLGA1000 thermogel has significant positive attributes for stimulating the PGC-1α triggered SSCs osteogenic differentiation.

P201
ADHERENCE TO DENOSUMAB AMONG PATIENTS WITH OSTEOPOROSIS AT A TERTIARY CARE CENTRE

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Denosumab (Dmab) is a first-line treatment option for Canadian patients with osteoporosis. The six-monthly subcutaneous dosing regimen may lead to improved adherence to therapy. Long-term adherence to Dmab is essential for ongoing clinical benefit as well as to prevent rebound increases in bone turnover and loss of bone density upon Dmab treatment discontinuation. We conducted a real world analysis of treatment uptake and adherence to Dmab at a tertiary care osteoporosis referral centre.

We evaluated uptake and adherence to Dmab during an 18-month period in 1005 consecutive patients, first evaluated between December 2012 and June 2017. Patients prescribed Dmab at baseline were divided into 3 groups by their treatment adherence at 12- 18 months. Group 1, on follow-up taking Dmab (DmabY; n=587); Group 2, on follow-up not taking Dmab (DmabN; n=91); Group 3, with no follow-up appointment in this interval (Nfu; n=327). In the DmabN group, the reasons for nonadherence were captured.

A total of 678 patients (DmabY + DmabN) were followed up within 18 months. Adherence to Dmab in patients who were seen in follow-up within 18 months was 86%. The average age was 71.3 years (± 9.6 years, not different between DmabY and DmabN). The reasons for nonadherence in the DmabN group included: did not initiate any treatment (n=29); delayed initiation of therapy (n=16); continued drug holiday (n=8); took another therapy (n=33); unable to achieve reimbursement for Dmab (n=3); started drug holiday (n=1); dental surgery (n=1). Within the group who opted taking another therapy, the other therapies included: teriparatide (n=21), alendronate (n=8), risedronate (n=2), estradiol (n=1), and zoledronic acid (n=1).

Prior publications have reported that six-monthly Dmab is preferred to weekly oral bisphosphonate; adherence to Dmab is especially important due to recent reports of Dmab discontinuation resulting in multiple vertebral fractures. In our tertiary care referral population, we have seen a high level of adherence to Dmab. There are a variety of reasons for nonadherence. Our results underscore the need for clinicians to both inform patients of the benefits of osteoporosis pharmacotherapy and encourage treatment persistence.

P202
EFFECT OF LEUCINE SUPPLEMENTATION ON MUSCLE MASS, STRENGTH AND PERFORMANCE IN ELDERLY PATIENTS WITH SARCOPENIA: A SYSTEMATIC REVIEW

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Objective: Sarcopenia is defined as an age-associated loss of skeletal muscle function and muscle mass. It is considered a disease that increases the morbidity and mortality of the sufferer and the number of cases is increasing alongside the proportion of older people globally. Nutrition plays a vital role in its development and treatment but, so far, the real effect of nutritional supplements like leucine is still controversial. Therefore, the aim of this study is to evaluate the evidence about the effect of leucine supplementation in muscle mass, muscle strength and physical performance of elderly patients with sarcopenia.

Methods: We carried out a systematic review of clinical trials. Inclusion criteria: individuals over 60 y with sarcopenia supplemented with more than 2.5 g of leucine for three or more weeks. The studies also had to evaluate the muscle mass or muscle strength or physical performance at the beginning and at the end of the intervention.

Results: We searched in BioMed Central (52), PubMed (164), Trip Database (4), CONRICyT (12) and ClinicalTrials (28) from March 2018 to April 2019. We found a total of 260 titles and 244 were excluded. Finally, we evaluated a total of 16 abstracts and 4 complete studies. Only two studies complied with all the inclusion criteria and were evaluated thoroughly. Both studies had a total of 196 participants with a median age of 78 y (the age was only reported in one study). The participants were followed between 3-18 months. Any of the studies reported a statistically significant neither clinically relevant effect in the supplemented group. With respect to the methodological quality, one study had a high risk of bias and the other one moderate risk of bias according to Cochrane risk of bias tool.

Conclusion: We concluded that, up to date, there isn't enough evidence about changes in muscle mass, muscle strength and physical performance in elderly people with sarcopenia when supplemented with more than 2.5 mg of leucine per day during 3-18 months. Also, the evidence is limited and with a methodological bias that can be improved in future studies.

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P203

5 YEARS OUTCOME ANALYSIS OF INTERTROCHANTERIC FEMUR FRACTURES: COMPARING A WAGNER CONE FEMORAL PROSTHESIS AND A DOUBLE-TAPERED RECTANGULAR CROSS-SECTION STEM

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Objective: Primary bipolar hemiarthroplasty(BPH) has been advocated as an alternative to osteosynthesis for intertrochanteric femoral fractures in the elderly. However, information on 5 y above results for the use of cementless stem in unstable intertrochanteric fractures is limited. The aim of our study was to retrospectively analyse the clinical and radiological results of the Wagner cone femoral prosthesis and a double-tapered rectangular cross-section stem in hemiarthroplasty for unstable intertrochanter femur fractures.

Methods: Patients who had been treated with a Wagner cone femoral prosthesis and a double-tapered rectangular cross-section stem for intertrochanteric femoral fracture between January 2004 and December 2013, those younger than 70 y. After 5 y, 79 patients were available for the final follow-up. As a result, the remaining 79 patients (79 hips) were divided into two groups and results compared and evaluated for during operation, clinical and radiological results.

Results: After operation no significant difference in both group was found regarding pain level until 24 months. However C2 stem showed a significant reduced pain level compared to patients treated with a cone stem from 36 months after operation. Among the patients in the group, the capacity for activity was significant differences in both group was statistically significant at last follow-up. After operation, there was no detectable difference for Harris hip score in both group until 36 months after operation. The mean HHS was not significant difference in both group until 36 months after operation. However, at 48 months, patients treated with a C2 stem showed a significant reduced Harris hip score compared to patients treated with a cone stem.

Conclusion: The ideal cementless stem design for unstable intertrochanteric fracture in elderly patients with osteoporosis should have an enough length and fixed in diaphysis and a porous coated surfaced femoral stems combined with firm fixation for a fractured proximal femoral fragments.

P204

HIP ARTHROSCOPY IN SYMPTOMATIC ILIOPSOAS TENDINITIS AFTER TOTAL HIP ARTHROPLASTY

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Objective: Persistent groin pain after total hip arthroplasty is uncommon, particularly in the absence of infection or loosening of components. Iliopsoas impingement is an under recognized cause of pain. We present our arthroscopic tenotomy technique and introduce the protrusion angle of acetabular component in anteroposterior view of pelvis as a measure of assessing this problem.

Methods: Using retrospective analysis, we evaluated the 8 patients who were managed with hip arthroscopic iliopsoas tenotomy. It was performed in supine position at lateral margin of acetabular cup and femoral neck. Mean age was 58.8 y (range 50-67) and follow-up was 19.6 months (range 9-42).

Results: Results were evaluated using VAS, mHHS and Benson outcome scores. Protrusion of cup was 9.99 mm compared to 2.41 mm in the nonsymptomatic cohort (p=0.00), inclination angle 36.05° (29.8-40.1°) to 36.63° (31.26 to 40.76°) (p=0.727), and protrusion angle 10.65° to 3.05° (p=0.00). Clinically, mHHS improved from 68.50 (51-73) to 81.12 (73-89) and VAS from 5.12(4-6) to 1.62 (0-3). Benson's outcomes reveal all are satisfactory (2 good, 7 excellent).

Conclusion: Iliopsoas impingement is a potential cause of persistent pain after THA requiring evaluation for cup protrusion amount. If conservative management fails, hip arthroscopic tenotomy is a useful choice.

P205

EXCESSIVE SLIDING OF THE HELICAL BLADE AFTER INSERTION OF PROXIMAL FEMORAL NAIL ANTI-ROTATION (PFNA) FOR INTERTROCHANTERIC FRACTURE

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Proximal femoral nail anti-rotation (PFNA) with a helical blade-shaped lag screw is an orthopedic implant typically used for the fixation of trochanteric fractures of the proximal femur. Owing to its biomechanical advantages, PFNA has been increasingly used recently. In this abstract, the cases of two patients with excessive sliding of the helical blade after AO/OTA type A2 intertrochanteric

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fracture, which was fixed with PFNA, are reported. The authors aimed to describe the dynamics of excessive sliding that occurred without problems in the locking system of the helical blade.

P206
HISTOLOGICAL GRADING OF ARTICULAR CARTILAGE AND SUBCHONDRAL BONE IN POSTMENOPAUSAL WOMEN WITH OSTEOARTHRITIS

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Objective: To investigate the relationship between the structure of articular cartilage and subchondral bone of the knee or hip joint in postmenopausal women with osteoarthrosis.

Methods: The postoperative material was obtained during the operations of total hip or knee arthroplasty of 20 women with X-ray confirmed knee (n=10) or hip (n=10) osteoarthritis, Kellgren-Lawrence III-IV. The structure of the articular cartilage was evaluated to the histological sections using OARSI scale, the structure of the subchondral bone examined using histological grading scale suggested by OM Aho et al. (2017). BMD of lumbar spine and proximal femur was measured by DXA (Explorer QDR W, Hologic).

Results: Groups of patients with knee and hip osteoarthritis did not differ in a mean age (61.3±3.36 vs. 59.0±2.66), menopause age (46.6±1.46 vs. 49.6±1.54), BMI (31.1±1.71 vs. 30.4±2.15), OARSI scale of the articular cartilage (3.8±0.33 vs. 4.4±0.31) and histological grade of the subchondral bone (2.1±0.16 vs. 2.2±0.24). According to DXA results, 7 women had normal BMD, 13 women had osteopenia. A correlation was found between the OARSI articular cartilage grades and the subchondral bone histological grades (OM Aho et al., 2017) (Spearman r=0.50; p=0.02). No correlation was found between the articular cartilage grade or the subchondral bone grade and BMD of the lumbar spine or proximal femur.

Conclusion: The structure of articular cartilage in postmenopausal women with knee and hip osteoarthrosis is associated with the structure of the subchondral bone.

P207
POOR GENERAL CONDITION, LOW TRUNK MUSCLE MASS, AND SPINAL SAGITTAL IMBALANCE AFFECT THE HEALTH-RELATED QUALITY OF LIFE IN OSTEOPOROSIS PATIENTS

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Objective: We previously reported that osteoporosis patients had severe low back pain, a low health-related quality of life (HR-QOL) score, and spinal sagittal imbalance. In this study, we performed multivariate analyses to identify factors that may affect the HR-QOL score of osteoporosis patients.

Methods: Cross-sectional data from 262 osteoporosis patients (48 men, 214 women, average age: 71.3 y) in our institution were analyzed for age, sex, BMI, lumbar spine BMD, TRACP5b as a bone resorption marker, trunk muscle mass measured by bioelectrical impedance analysis, sagittal vertical axis (SVA) for spinal sagittal imbalance, presence or absence of secondary osteoporosis, Charlson comorbidity index (CCI) for general condition, CONUT score for nutritional status, and SF36 as a HR-QOL score including physical functioning: PF; role physical: RP; bodily pain: BP; general health: GH; vitality: VT; social functioning: SF; role emotional: RE; and mental health: MH. Multivariate analyses (p<0.05) were reviewed for associations to HR-QOL scores.

Results: Trunk muscle mass was significantly correlated with PF, RP, GH, VT, MH. SVA was significantly correlated with PF, RP, BP, GH, VT, RE. Vertebral fractures were significantly correlated with PF, RP, GH. CCI with RP, GH, VT, RE, MH. Age was significantly correlated with RP, RE, MH; and TRACP5b with RP, RE. There was no significant correlation between lumbar spine BMD and HR-QOL scores.

Conclusion: Results suggest aging, high bone turnover, low trunk muscle mass, poor general condition, spinal sagittal imbalance, and secondary osteoporosis affect HR-QOL scores. We found no effect of lumbar spine BMD. We conclude that poor general condition, low trunk muscle mass, and spinal sagittal imbalance affect physical functioning, bodily pain, and vitality of HR-QOL. These findings indicate that treatment that focuses on general condition, muscle mass, and spinal sagittal imbalance might be important for osteoporosis.

P208
OSTEOARTHRITIS INFLUENCES CHEWING MUSCLES ACTIVITY AND INDIVIDUALS QUALITY OF LIFE

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Objective: To analyze electromyographic activity, habitual and nonhabitual masticatory efficiency and quality of life in individuals with osteoarthritis in the initial period of the disease.

Methods: After Ethics Committee approval of the School of Dentistry of Ribeirão Preto - USP (CAAE 55505316.8.0000.5419), individuals ranging from 40-70 years old from both genders were distributed into two groups: with osteoarthritis (n=24; mean age 53.63±1.67 y) and healthy control (n=24; mean age 52.38±1.70 y). The electromyograph Delsys Trigno TM wireless was used to measure electrical activities of the masseter and temporal muscles bilaterally, in the postural conditions of mandibular rest, right laterality, left laterality, protrusion, and dental clenching in maximal voluntary contraction and dental clenching with Parafilm

M®. The electromyographic activity of masticatory cycles was analyzed through the linear envelope integral in habitual (raisins and peanuts) and nonhabitual (Parafilm M) chewing of the masseter and temporalis muscles. Quality of life was evaluated using the OHIP-14Br and SF-36 questionnaires. Data obtained were submitted to statistical analysis using software SPSS (student t-test; $p \leq 0.05$).

Results: Electromyographic activity in mandibular rest and maximal voluntary contraction, when comparing osteoarthritis and control groups, showed significant differences for right temporal muscle (GOA=0.29±0.05; CG=0.17±0.03; p=0.05) and left masseter (GOA=1.00±0.12; CG=0.68±0.09; p=0.04). Masticatory function demonstrated significant differences for right temporal muscle, both for the chewing of raisins (p=0.02) and peanuts (p=0.05). For the unusual chewing condition (Parafilm M), no statistical difference was found between the groups. Quality of life assessment showed significant differences for the total score in OHIP-14Br questionnaire (GOA=7.12±2.02; GC=0.58±0.28; p=0.00) as well as for all domains of SF-36 questionnaire ($p \leq 0.05$).

Conclusion: Osteoarthritis promoted relevant changes in the stomatognathic system, demonstrated by morphofunctional changes both in postural conditions and during habitual chewing, besides negatively interfering in the quality of life of individuals.

P209
CONCORDANCE OF SUPERFICIAL, DEEP, AND BONE BACTERIAL CULTURES AMONG DIABETIC FOOT INFECTIONS SURGICALLY MANAGED IN CLMMRH IN JANUARY TO DECEMBER 2017

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Objective: Worldwide, 3-10% of diabetic patients have a foot ulcer. The lifetime risk of diabetic patients in developing diabetic foot ulcer (DFU) reaches 15%. We aimed to identify and compare pathogens in superficial, deep, and bone cultures in diabetic foot infections.

Methods: Study population: all diabetic patients with recent and recurrent foot complications who were admitted in CLMMRH classified as Megitt-Wagner 3 to 5 who underwent amputation. Inclusion criteria: patients diagnosed with type 2 diabetes mellitus with recent and recurrent foot complications who are admitted in CLMMRH and underwent

debridement or amputation. Exclusion criteria: nondiabetic patients with foot complications and DFI classified as grade 0-3 not needing operation was not part of this study. A cross-sectional study was done in CLMMRH. Frequencies and percentages of pathogens present in

different layers; superficial, deep or bone, was calculated to find out which pathogen is predominant. We assessed antibiotic sensitivities for all aerobic gram-positive and gram−negative bacteria using the chi-square test designating a p-value <0.05 as statistically significant.

Results: A total of 57 subjects were gathered along with their corresponding demographics and records during the time of admission. Majority of patients were diagnosed with Wagner 4 (63.2%) and Wagner 5 (21.1%). We tested our hypothesis using the Chi-square test and the result is to reject the null hypothesis with a p-value of <0.05.

Conclusion: Our study showed that there is no concordance among the sample depth types. However, taking multiple samples should be continued in order to monitor the growth of organisms as well as to know the effectiveness of the antibiotics used. A larger sample data and yearly evaluation of the concordance in diabetic foot ulcer infection will help monitor new trends of resistance and strengthen the antibiogram database of the hospital.

P210
EARLY AND MIDTERM RESULTS FOLLOWING NONOPERATIVE TREATMENT OF TUBERCULOUS MIDFOOT INFECTION

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Objective: To investigate the early and mid-term results of multidrug chemotherapy combined with immobilization in the treatment of tuberculous midfoot infection.

Methods: This study consisted of 40 patients with tuberculous midfoot infection who underwent multidrug chemotherapy combined with immobilization between March 2013 and December 2018. There were 29 males and 11 females, mean age 35.9 y (range 20−63). The left and right sides each had 20 patients. The mean period of immobilization was 4 weeks (range 3−6). All patients had radiographic assessment before and after treatment. Baseline American Orthopedic Foot and Ankle Society (AOFAS) ankle-midfoot score was 33.83±9.93, the visual analog score (VAS) was 6.58±1.12, midfoot girth in millimeters was 244.38±16.55.

Results: All 40 patients were followed up between 12-70 months (mean, 35.2 months). All attained plantigrade limbs with independent ambulation during follow-up; 28 patients had residual midfoot protuberance, 24 had unresolved skin hyperpigmentation, and 5 patients had neuropathic pain at the superficial peroneal nerve distribution. At final follow-up, average AOFAS, VAS and midfoot girth were respectively 92.5±4.73, 1.13±0.92, and 228.60±16.28, which were significantly improved compared with the preoperative data (t=35.875, p<0.001; t=20.118, p<0.001; t=14.839, p<0.001). The therapeutic effect was excellent in 30 cases, good in 9 cases and fair in 1 case, with a good-excellent rate of 97.5%.

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Conclusion: Multidrug chemotherapy and immobilization can achieve good outcomes in treating tuberculous midfoot infection. Long-term patient education includes residual bone, skin and nerve problems.

P211
GENERAL PHYSICIAN'S AND PRIMARY CARE NURSE'S CONTRIBUTION TO THE OSTEOPOROTIC HIP FRACTURE IDENTIFICATION IN THE REPUBLIC OF UZBEKISTAN

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The reliable epidemiologic characteristics of osteoporosis are currently absent in the Republic of Uzbekistan. The purpose of this research is to evaluate general physician's and primary care nurse's contribution to the identification of osteoporotic hip fracture (HP) and to assess the major osteoporotic (OP) fractures incidence in Uzbekistan

Method. We carried out a population-based cohort study in 2012-2016. At the first stage, in 2011-2012, data concerning proximal hip fractures (HP), distal forearm, and proximal humerus fractures in people older than 40 years were gathered retrospectively from trauma/orthopedic service records. During the subsequent 1-year prospective study, we collected data on patients with OP fractures from other sources including primary care physicians.

Results. In general, only 34% of patients with HF were hospitalized, and 26% received outpatient trauma care. An additional 29% of patients with HF were detected only with the use of GPs. GP nurses, in collaboration with community leaders, uncovered an additional 11% of cases (the rest of the patients) who remained at home without receiving any medical attention. The preliminary annual standardized incidence of hip fractures in people over 40 amounted to 357.7 for women and 190.2 for men per 100,000 of the population. However, demographic data provided by the Uzbekistan Statistics Service are extremely unreliable; therefore, the actual HF rate can be much lower.

Conclusion. The gathering of comprehensive epidemiological information on the incidence of HF in Uzbekistan only became possible with the help thanks to the GPs and GP nurses as basic contributors to primary health care. After clarifying the demographic data, our epidemiological indicators would be incorporated into the future original Uzbek national FRAX model.

P212
POSSIBILITIES OF ARTHROPLASTY IN BILATERAL KNEE OSTEOARTHRITIS

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Objective: Total knee arthroplasty is a high tech and effective method for the treatment of knee osteoarthritis (OA) in its final stage. Currently, surgical approaches in the treatment of bilateral knee OA remain poorly understood. The epidemiological and pathogenetic aspects of the restoration of functional activity in bilateral knee OA also need further study. Objective is the study of functional activity in patients in the perioperative period after arthroplasty with bilateral knee OA.

Methods: The results of treatment of 124 patients with knee OA using arthroplasty technology of department of trauma at the clinic of the BSMU was carried out from 2018-2019 were analyzed. 32 patients underwent arthroplasty of both knee joints, 92 patients with bilateral gonarthrosis underwent arthroplasty of one of the most decompensated joints. The results were evaluated using the KSS scale, as well as using radiography in the intervals 1, 3 and 6 months after surgery. The average age of the patients was 61.78 y.

Results: As a result of the analysis, it was found that immediately after surgery, patients have 52.4 points±4.8 SD on the KSS scale. By the end of 4 weeks of observation, functional activity increased to an average level of 69.1±5.2 SD, with a significance level of differences $p<0.05$. It was revealed that the studied parameter decreased to 62.2±6.7 SD by 3 months of observations, in the absence of significant changes compared to the previous time range.

Analysis of a similar indicator on the opposite knee joint shows negative dynamics throughout the observation period. A significant decrease in the contralateral joint function ($p<0.05$) was detected 3 months after arthroplasty, with a decrease from the initial values from 78.6 to 70.2±4.3 SD, followed by a decrease by 6 months to 60.7±4.9 SD.

Conclusion: Thus the analysis reflects the restoration of functional activity in patients in the postoperative period; nevertheless, decreasing of the opposite limb function was revealed, which in turn reduces the effectiveness of both rehabilitation and therefore, necessitates second joint replacement.

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P213
LOWER SERUM URIC ACID IS ASSOCIATED WITH HIGHER RISK OF OSTEOPOROSIS AMONG HEALTH CHECKUP POPULATION: A 12-YEAR LONGITUDINAL DATA ANALYSIS IN CHINA

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Objectives: Previous studies on the association between serum uric acid (SUA) and BMD yielded conflicting results. Hyperuricemia may have a protective role in osteoporosis, which was independently associated with BMD. The objective of the study was to examine the relationship between SUA and BMD in Chinese health checkup population.

Methods: The analysis was based on the Second Provincial General Hospital of Guangdong Province between January 2007 and December 2018. A total of 525,341 participants with 686,553 records were recruited in our analysis. Anthropological parameters, including BMD, SUA, gender, age, repeated measures of years or times of health checkup and other characteristics were obtained from the health checkup system. Stratified chi-square tests were used to compare the prevalence of osteoporosis between normal SUA and high SUA groups in each gender and age category. Multivariable logistic regression and generalized estimation equation (GEE) model were conducted to estimate the risk of osteoporosis incorporating risk factors among health checkup population.

Results: In total, our study found that higher SUA level had significantly higher BMD. The logistic regression model showed a higher osteoporosis risk in female with an odds ratio (OR) of 2.453 (95%CI: 2.083,2.890), the elderly with OR of 2.695 (95%CI: 2.462, 2.950) and the higher SUA level with OR of 0.840 (95%CI:0.837,0.865). The GEE models showed that the female, elderly and lower SUA level had higher osteoporosis risk in our analysis when considered the repeated measures of years or times.

Conclusion: Our study found higher SUA level is associated with higher BMD among health checkup population in China. Further research is needed to elucidate the underlying mechanism.

P214
UNDEREVALUATION OF FRACTURES BY SELF-REPORT: AN ANALYSIS FROM THE FRISBEE COHORT

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Most prospective cohort studies with fracture outcomes rely on participant self-report as the main source of information on fracture event. This approach leads to biases in the classification of fracture status as a significant proportion of fractures are underreported.

The purpose of the present study was to assess the rate of non-reported fractures in a well characterized population-based cohort of 3560 postmenopausal women, aged 60-85 y, included in the Fracture Risk Brussels Epidemiological Enquiry (FRISBEE) study.

The global false negative rate for all fractures was 21.6%, with a percentage of 23.1% for MOFs, 13.9% for other major fractures and 25.2% for minor fractures. The rate of nonreported fractures varied by fracture site: for MOFs, it was 3% (n=2/66) at the hip, 5.5% at the proximal humerus (n=5/91), 7.5% at the wrist (n=11/146) and 47.9% at the spine (n=100/209). For other major fractures, the highest rate of false negatives was found at the pelvic bone (21.3%), followed by the elbow (19.2%), long bones (11.8%), knee (7.1%) and ankle (6.5%).

In a multivariate analysis, older subjects and subjects with a lower education level were more likely to underreport a fracture event.

In conclusion, underreporting of a substantial proportion of fracture events could influence any model of fracture risk prediction and decrease statistical power when estimating the associations between candidate risk factors and incident fractures.

P215
OSTEOPOROSIS TREATMENT GAP IN A PROSPECTIVE COHORT OF VOLUNTEER WOMEN

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Despite the availability of efficient drugs to prevent osteoporotic fractures, only a minority of women receive osteoporosis therapy after a fragility fracture, with a treatment gap around 80%. To the best of our knowledge, treatment gap has been evaluated in cohort studies, primary care or referral centers, but not so far in a population of volunteer participants where we would expect to have a higher rate of treated patients.

In this study based on longitudinal data from the FRISBEE (Fracture RIsk Brussels Epidemiological Enquiry) cohort of 3560 volunteer women aged 60-85 y, we evaluated the 1-y treatment gap after a first major incident fragility fracture.

During the first 5-10 y after inclusion, there were 386 first validated fragility fractures, 285 major osteoporotic fractures (MOFs) and 101 "other major" fractures. In agreement with other types of studies, the treatment gap was 85.0% (82.8% for MOF vs. 91.0% for "other major" fracture sites) (p=0.04), with a lower rate for spine (70.5%) and hip (72.5%) vs. shoulder (91.6%) and wrist (94.1%) (p<0.0001). Treatment gap by age categories was 87.9% for women 60-70 years old, 88.2% between 70-80 y and 77.8% above 80 y (p=0.03), with a greater difference between women who were younger or older than 80 y at inclusion: 88.1% vs. 77.8% (p=0.009). A diagnosis of osteoporosis at study entry (p=0.01) and age (p=0.03) were the only clinical risk factors significantly associated with treatment initiation. There was no significant difference in the treatment gap according to the fact that fractures were declared by participants (n=293) or only found in their medical records (n=93).

Our observations decrease the responsibility of patients in the treatment gap and draw attention to the essential role of the medical practitioner who is not proactive enough in the management of the osteoporosis.

P216
LYCOPENE INFLUENCES BODY WEIGHT AND CALVARIA BONE REPAIR IN OVARIECTOMIZED RATS

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Objective: To verify the influence of lycopene intake in body weight and in calvaria bone repair in ovariectomized rats.

Methods: There were selected 18 rats Wistar Hannover female rats (200 g), from which 12 were submitted to bilateral ovariectomy and 6 were just submitted to ovary exposition (sham, n=6). Ovariectomized animals were randomly divided into two groups: ovariectomized (Ovx) and ovariectomized+lycopene (OvxL). The animals were weighed and group OvxL received daily intake of 45 mg/kg lycopene by gavage starting 24 h after ovariectomy until euthanasia, while sham and Ovx groups received water. After 90 d of ovariectomy there were created 5-mm calvaria bone defects and after 30 d the rats were euthanized. The samples were removed for histological processing and quantitative analysis of neoformed bone was performed by means of Image J software. Data were submitted to normality test followed by ANOVA and Tukey post hoc test (p<0.05).

Results: Ovariectomized group presented weigh increase when compared to control. The values observed for sham, Ovx and OvxL groups were respectively: 267.1g±30.5; 364.8g±28.0 and 336.6g±36.45, with statistical difference between sham and

Ovx (p<0.0001) and sham and OvxL (p=0.0036). There were no differences between Ovx and OvxL (p=0.3234). The group that received lycopene showed increased bone formation (mm) when compared to other groups. The values observed for sham, Ovx and OvxL were respectively: 5.69±3.61, 5.62±2.48 and 13.52±3.38. There were no statistical differences between sham and Ovx groups (p=0.9989), nevertheless significative differences were found between sham and OvxL groups (p=0.0011) and between Ovx and OvxL groups (p=0.0010).

Conclusion: The concentration of 45 mg/kg lycopene benefits bone systemic conditions, suggesting its utilization as a coadjuvant in the treatment and prevention of bone loss in osteoporosis.

P217
MICROTOMOGRAPHIC EVALUATION OF BONE NEOFORMATION IN CALVARIA BONE DEFECTS AFTER THE ASSOCIATION OF PVDF MEMBRANE AND PHOTOBIOMODULATION THERAPY IN OVARIECTOMIZED RATS

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Objective: Polytetrafluoretilene membranes (PTFE) are considered the best for guided bone regeneration, but photobiomodulation therapy (PT) and polyvinylidene fluoride (PVDF) membranes associated to barium titanate may represent good alternatives. Thus, this study evaluated bone architecture by means of computerized microtomography after the association of PT with PTFE and P(VDF-TrFE)/BT membranes in calvaria bone defects of ovariectomized rats.

Methods: There were selected 25 Wistar Hannover rats (300 g), from which 20 were submitted to bilateral ovariectomy (OVX) and 5 just submitted to ovary exposition (sham). After 90 d, there were performed 5-mm calvaria bone defects in all animals. Ovariectomized rats were distributed in the following groups: 1) OVX (n=5); 2) OVX + P(VDF-TrFE)/BT membrane (n=5); 3) OVX + P(VDF-TrFE)/BT membrane + PT (n=5); and 4) OVX + PTFE membrane + PT (n=5). There were performed 12 sessions with gallium-aluminum-arsenate diode (780 nm) laser with energy density of 30 J/cm^2. Thirty days after euthanasia, samples were fixed and analyzed by means of µCT SkyScan 1172 (SkyScan, Belgium) for bone volume (BV/mm^3), bone surface (BS/mm^2), trabecular number (TN/1/mm), trabecular thickness (TT/mm), trabecular separation (TS/mm) and connectivity density (CD/1/mm^3).

Results: There was observed a significant increase in the values of BV, BS, TN and CD when comparing the groups 2, 3 and 4 with sham and group 1 (p<0.05). Groups 3 and 4 showed higher values of CD when compared to group 5. Trabecular separation

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was decreased in groups 3, 4 and 5 when compared to sham and group 1 (p<0.05). There were no statistical differences either between groups 3 and 4 or for trabecular thickness parameter.

Conclusion: It is suggested that all treatments with the membranes improved bone architecture when compared to sham and OVX animals, regardless the association with PT.

P218

THALASSEMIA INDUCED OSTEOPOROSIS AND FRACTURE INCIDENCE: AN OBSERVATIONAL STUDY FROM THALASSEMIA GROUP IN GREECE

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Objective: Thalassemia Major (TM) is a hereditary disease caused by defective globin synthesis. Patients with TM have benefited from a significant increase in life expectancy during the last years. However, they may eventually face many comorbid health conditions, including endocrinopathies and low BMD, usually observed in the aging general population. The aim of the present study was to evaluate the fracture incidence regarding their markers of bone metabolism and T-score.

Methods: 64 patients with TM (32 men and 32 women) participated in an observational study design. The patients were recruited from Thalassemia Unit in Aghia Sofia Children's Hospital. They evaluated using DXA of the lumbar spine and femoral neck and with markers of bone remodeling including RANKL, osteoprotegerin, CTX, and sclerostin.

Results: Our study revealed no statistical significance between markers of bone metabolism and fractures. However, statistical analysis of BMD and markers of bone metabolism in relation to fractures was also not significant.

Conclusion: According to our study, fractures in TM patients are not related to BMD. Maybe some other conditions, such as hemosiderosis, drugs, comorbid conditions, are the cause.

P219

QUANTITATIVE GENE EXPRESSION IN CALVARIA BONE CELLS AFTER PHOTOBIOMODULATION THERAPY ASSOCIATED WITH MEMBRANES IN OVARIECTOMIZED RATS

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Objective: Research has shown bone neoformation using the membrane obtained by the combination of polyvinylidene trifluoroethylene polymer and barium titanate ceramic (P(VDF-TrFE)/BT) compared to polytetrafluoroethylene (PTFE) membrane, which is considered the gold standard. Photobiomodulation therapy (PT) has increase new bone formation too. This study evaluated the gene expression of osteoblastic and osteoclastic markers when associated with low-intensity laser therapy with PTFE and P(VDF-TrFE)/BT membranes in bone defects in rat calvaria with an experimental model for osteoporosis.

Methods: Wistar Hannover rats (300 g) underwent bilateral ovariectomy surgery (n=15). After 90 d, bone defects (5-mm) were made at the calvaria and the animals were divided into three groups: Group 1 - P(VDF-TrFE)/BT membrane (n=5); Group 2 - P(VDF-TrFE)/BT membrane + PT (n=5); Group 3 - PTFE membrane + PT (n=5). A gallium-aluminum-arsenide semiconductor diode device (MM Optics Twin Laser, São Carlos, SP, Brazil), wavelength of 780 nm and an energy density of 30 J/cm^2 (12 sessions) was used in this study. Thirty days after bone defect creation, the animals were euthanized and a real-time PCR assay was performed to detect Runx2, Alp, Bsp, Bglap, Opn, Sp7, Rankl and Opg, Rank, Ctsk, Mmp-9 and Calcr.

Results: Runx2, Alp, Bsp, Bglap, Opn, Sp7, Rankl and Opg gene expression were affected by laser application and different membrane types (p<0.05). The results indicated higher levels of mRNA in cells of animals treated with the PTFE membrane and PT for Runx2, Alp, Bsp, Bglap, Sp7, Rankl, Rank and Calcr and higher levels of Opn, Opg, Ctsk and Mmp-9 for the group that received only the PVDF membrane and was not treated with laser (p<0.05).

Conclusion: PT when associated with the PTFE membrane acts synergistically, increasing the expression of osteoblastic markers, but when used with the PVDF membrane does not cause significant changes.

P220

THE COMPARATIVE EFFICIENCY OF DENOSUMAB TREATMENT IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS, PRIMARY HYPERPARATHYROIDISM AND GLUCOCORTICOID-INDUCED OSTEOPOROSIS IN REAL CLINICAL PRACTICE

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Objective: To estimate the comparative effects of denosumab to treat postmenopausal osteoporosis (PMO) and osteoporosis caused by primary hyperparathyroidism (PHPT) or glucocorticoid-induced osteoporosis (GIOP) in postmenopausal women in routine clinical practice.

Methods: This is a retrospective study based on the medical card records registered in the Department of Neuroendocrinology and Bone Disease. Patients over 45 years of age with verified

osteoporosis (based on a BMD T-score ≤ -2.5 SD and/or low trauma fracture), who had at least 2 injections of denosumab were included in the study.

Results: 162 patients were enrolled into the study. The patients were divided into 3 groups according to the etiology of osteoporosis. The first group consisted of PMO women [(N=85); median age 70 [64;78]]. Patients with GIOP were enrolled in the second group [(N=16); male to female ratio=1:15; median age 60 (57;66)]. The third group consisted of patients with PHPT and osteoporosis [(N=61); male to female=2:59; median age 68 (63;75)]. Among all patients denosumab treatment significantly increased BMD and decreased serum levels of calcium and CTX compared to baseline evaluation. PMO: the median increase in BMD according to the T-score was L1-L4 0.6 (p<0.001), femoral neck 0.2 (p<0.001); radius 33% 0.2 (p<0.003); serum calcium -0.04 (p<0.004). PHPT: the median increase in BMD according to the T-score was L1-L4 0.6 (p<0.001), femoral neck 0.2 (p<0.001); radius 33% 0.25 (p<0.002), serum calcium -0.11 (p<0.001).In patients with GIOP, denosumab increased BMD in the lumbar spine L1-L4 0.5 (p<0.004). There was no difference in BMD increase or in the levels of bone turnover suppression between the groups (PMO, PHPT, GIOP). A marked decline in levels of serum calcium was noted among patients with GFR <60 ml/min/1.73m^2 (median Δ Ca serum=0.24, p<0.001), compared to patients without CKD (median Δ Ca serum=0.08, p<0.001).

Conclusion: Denosumab treatment is similarly effective for increasing BMD and decreasing bone turnover markers in patients with PMO and PHPT among postmenopausal women. The hypocalcemic effects of denosumab are most significant in subjects with PHPT and CKD.

P221
HYPOPARATHYROIDISM WITH FAHR'S SYNDROME: A CASE REPORT

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Hypoparathyroidism with basal ganglia calcification is clinically rare. Here, we report a case of Fahr's syndrome due to post thyroidectomy hypoparathyroidism.

Case report: In June 2019, a 49-year-old man showed up at our office with a 6-month history of speech difficulties, irritability, gait disorders and insomnia. His past medical history was insignificant except for subtotal thyroidectomy 25 years previously, he was on levothyroxine 125 μg/d. His examination showed normal vital signs and a normal neurological system without any focal deficits, and cranial nerve abnormalities were not observed, Chvostek's and Trousseau's signs were positive. The laboratory examinations are shown in Table 1.

Table 1. Biochemical values

Laboratory examinations	Value	Normal range
PTH	< 1	6.0-70.0 ng/L
Calcium	5.2	8-10.5 mg/dl
Phosphate	6.6	2.3-4.7 mg/dl
Creatinine	1.2	0.7-1.3 mg/dL
TSH	43.35	0.3-4.44 mIU/L
25(OH)D	32.3	20-40 ng/ml
Urea	21	10-52 mg/dl

A noncontrast CT scan revealed massive calcifications involving the basal ganglia, thalamus, dentate nuclei, putamen, globus pallidus and caudate nucleus. On the basis of clinical, laboratory and neurological findings, the patient was diagnosed with Fahr's disease secondary to post thyroidectomy hypoparathyroidism. He was started on oral calcium and vitamin D and the dose of levothyroxine was adjusted which resulted in some improvement

We recommend paying close attention to the recommendations given after surgery, so that patients do not suspend treatment with calcium and vitamin D.

P222
PREVALENCE OF SARCOPENIA AND ITS COMPONENTS IN COMMUNITY-DWELLING OUTPATIENT OLDER ADULTS AND THEIR RELATION WITH FUNCTIONALITY

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Objective: Sarcopenia is recognized with its adverse functional outcomes. We aimed to report the prevalence of EWGSOP defined sarcopenia and its individual components in community dwelling outpatient older adults and study the correlations of EWGSOP defined sarcopenia, muscle mass, muscle strength, and physical performance with functional status.

Methods: The subjects were prospectively recruited from the geriatrics outpatient clinics of our university hospital. Body composition was assessed with bioimpedance analysis. Muscle strength was assessed by measurement of hand grip strength with hydraulic hand dynamometer, physical performance was assessed by 4-m usual gait speed (UGS). Impaired muscle function was defined as presence of low muscle strength and or slow gait speed. As a measure of functionality, modified version of Katz activities of daily living (ADL) and Lawton instrumental activities of daily living (IADL) were assessed.

Results: A total of 242 community dwelling outpatients with mean age of 79.4±5.7 y were enrolled. 31.8% were male. Prevalence of low muscle mass was 2.1% and impaired muscle function was 71.1%. Prevalence of EWGSOP defined sarcopenia was 0.8% (1.3% in men and 0.6% in women). Most correlated parameter

with ADL and IADL was the usual gait speed (r=0.49, r=0.63; p<0.001, respectively). Grip strength was also correlated with ADL and IADL (r=0.28, r=0.35; p<0.001). However, the skeletal muscle mass index (SMMI) was not correlated with ADL, IADL (p=0.22, p=0.22, respectively). In regression analysis, both ADL score and IADL scores were most related to UGS (β=0.5 and 0.6, p<0.001), age (β=-0.25 and -0.2, p<0.001) and then sarcopenia (β=0.1 and 0.1, p<0.05) but was not related to hand grip strength or SMMI.

Conclusion: The prevalence of sarcopenia was low as 0.8% albeit the presence of impaired muscle function in more than 2/3 of the cases. We have found that EWGSOP defined sarcopenia had association with ADL and IADL. The gait speed component of sarcopenia had the strongest associations with functional measures but SMMI component did not have any relation. We suggest that although low muscle mass may be a parameter related to worse functionality, it should not be regarded prerequisite for presence of sarcopenia analogous to low BMD for osteoporosis.

P223
LOW GLOMERULAR FILTRATION RATE AS AN ASSOCIATED RISK FACTOR FOR SARCOPENIC MUSCLE STRENGTH: IS CREATININE OR CYSTATIN C-BASED ESTIMATION MORE RELEVANT?

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Objective: To evaluate the association of a decreased glomerular-filtration-rate (GFR <60 ml/min/1.73m^2), estimated using Modification of Diet in Renal Disease (MDRD), creatinine- and cystatin C-based (CKDEPI-CR and CKDEPI-CC) Chronic Kidney Disease Epidemiology Collaboration equations with handgrip strength (HGS).

Methods: Community-dwelling males aged ≥60 y admitted to outpatient clinic were included. We used MDRD, CKDEPI-CR, and CKDEPI-CC formulas for GFR estimation and corrected these for body surface area. Muscle strength was assessed by HGS.

Results: 209 men (mean age 67.8±6.4) were enrolled. 62 patients (29.7%) had sarcopenic HGS. Subjects with sarcopenic HGS were older, had higher rate of a GFR <60 ml/min/1.73m^2, had lower mid-upper arm circumference; tended to have lower creatine kinase, albumin, CKDEPI-CC-GFR levels; and higher BUN/creatinine ratio and cystatin C. Multivariate logistic regression analysis revealed a CKDEPI-CC lower than 60 ml/min/1.73m^2 as the only independent factor underlying sarcopenic HGS. Higher age tended to have an independent association. Only higher age was independently associated with low HGS when other estimations were used (p=0.013 and p=0.021 when MDRD and CKDEPI-CR were used, respectively).

Conclusion: There is a strong association of a GFR level of <60 ml/min/1.73m^2 with sarcopenic HGS, when CKDEPI-CC formula is used.

P224
FREQUENCY OF DEFICIENCY AND INSUFFICIENCY OF VITAMIN D IN 547 PREGNANT BULGARIAN WOMEN (SCREENING OF BULGARIAN SOCIETY OF ENDOCRINOLOGY)

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Objective: Population screening data are available in Bulgaria on the prevalence of vitamin D deficiency and its distribution by gender, age, place of residence, as well as its seasonal dynamics. Our aim was population screening for vitamin D level in pregnant women in Bulgaria.

Methods: 547 pregnant Bulgarian women from 10 regions of the country or a total of 84 settlements (large, small towns and adjacent villages) were surveyed. The mean age of pregnant women is 30±5 y, median-30 (18-47). Pregnant women are also distributed according to the duration of pregnancy: first trimester 111 (20.3%), second trimester 275 (50.4%), third trimester 161 (29.3%). We investigated: height, weight at the time of pregnancy and pre-pregnancy; BMI is calculated; the level of 25(OH)D was determined by chemiluminescent immunoassay. Statistics – characteristics of quantitative variables, frequency distributions of qualitative variables by age groups, nonparametric correlation.

Results: The mean BMI before pregnancy was 23.57±6.9 kg/m^2; and at the time of screening the mean BMI was 26.15±7.28 kg/m^2. The mean level of 25(OH)D for the whole group of pregnant women was 25.86±9.46 ng/ml, i.e., vitamin D deficiency is present among Bulgarian pregnant women. According to the level of 25(OH)D, pregnant women were divided into 4 groups: 1 – severely deficient <10 ng/ml, 2 – moderate deficient 10-20 ng/ml, 3 – insufficient 20-30 ng/ml, 4 – with sufficient >30 ng/ml. It was found that 72.94% of pregnant women are deficient or insufficient of vitamin D (27% are deficient and 45.88% are insufficient). Only 27% of pregnant women have normal level of vitamin D. There is a significant correlation of vitamin D with age [Spearman's rho=0.151, p<0.0001], with pre-pregnancy BMI [Spearman's rho=-0.142, p<0.001] and BMI at present [Spearman's rho=-0.171, p<0.0001], but not correlation with gestational week (NS).

Conclusion: The population of pregnant Bulgarian women should be adequately supplemented with cholecalciferol.

P225

DISCONTINUATION OF DENOSUMAB RESULTS IN RAPID INCREASE OF BONE RESORPTION AND LOSS OF BONE MINERAL DENSITY GAIN

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Objective: Denosumab acts as the strongest known inhibitor of bone resorption. It significantly reduces the risk of all types of osteoporotic fractures. Unlike bisphosphonates, it does not bind to the bone, therefore its effect is completely reversible. Duration of treatment with denosumab should be 10 y for high risk patients and 4-5 y for the rest. Discontinuation of denosumab results in rapid increase of bone resorption and loss of BMD gain.

Methods: Denosumab is a fully human monoclonal antibody against RANKL, a cytokine playing a crucial role in osteoclast formation, therefore functioning as the strongest inhibitor of bone resorption. For treating postmenopausal osteoporosis, it is administered as a subcutaneous injection every 6 months. Discontinuing denosumab in clinical trials resulted in a rapid increase of bone resorption and loss of BMD, which was only slightly higher after a year than in the group receiving placebo.

Results: Therefore, it seems likely that discontinuing denosumab increases the risk for multiple vertebral fractures due to sudden and excessive growth of bone breakdown. In our 9 patients, who discontinued taking denosumab, lumbar BMD decreased for 15.3% on the hip to 9.1% in 1 year. Based on baseline values, lumbar BMD decreased for 4.5% on the hip to 2.4%.

Conclusion: Denosumab effectively prevents osteoporotic fractures. After its discontinuation treatment should continue with antiresorptive therapy, preferably bisphosphonate, to prevent fast bone breakdown and loss of BMD gain as well as potentially increased risk for vertebral fractures.

P226

CLINICAL SIGNIFICANCE OF MRI DERIVED FEMUR BONE SHAPE IN YOUNG ADULTS

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Objective: The femur bone shape derived from MRI of the knee is associated with the incidence and progression of knee osteoarthritis (OA), and predicts total knee replacement in older adults. However, the clinical significance of the femur bone shape has not been studied in a population-based young adult sample. This study aims to describe whether 3D femur bone shape derived from knee MRI is associated with knee symptoms in young adults.

Methods: Participants (n=180, age 31-41 y) were selected from the Childhood Determinants of Adult Health (CDAH) Knee Cartilage Study, which was a follow-up of the CDAH study. Participants' knee symptoms were assessed using the WOMAC questionnaires, and participants underwent a 1.5T MRI scan of their knee. T1-weighted, fat suppressed, 3D SPGR MRI sequences were segmented with an active appearance model (AAM) previously constructed and validated in an Osteoarthritis Initiative study. The femur bone shape found by AAM is projected orthogonally onto a femur shape vector to obtain a vector score. The femur shape vector defined 0 as the average healthy femur shape and higher values in the positive direction portray more likeness to OA with each unit representing one standard deviation. Logistic regressions were used to describe the associations between the highest quartile of femur shape vectors (OA-like shape) with demographic factors and WOMAC knee symptoms.

Results: Participants had a mean age of 35.5±2.8 years, mean BMI of 25.1±4.1 kg/m^2, were 51% male and largely asymptomatic (34% with any knee pain). The highest quartile of femur vector scores–the group considered to have an OA-like femur shape–had vector scores higher than +0.40. OA-like femur shape was not associated with age (OR 0.96, 95%CI 0.85 to 1.09), gender (OR 1.93, 95%CI 0.95 to 3.93), or body-mass index (OR 1.05, 95%CI 0.97 to 1.14). There was no association between OA-like femur shape and total WOMAC pain (OR 1.06, 95%CI 0.97 to 1.15), total WOMAC stiffness (OR 1.08, 95%CI 0.93 to 1.25) and total WOMAC dysfunction (OR 1.02, 95%CI 0.98 to 1.06) (Figure 1A). However, in symptomatic young adults, OA-like femur shape was associated with higher knee pain scores (OR 1.33, 95%CI 1.07 to 1.66) (Figure 1B).

Conclusion: OA-like femur bone shape is not associated with knee symptoms in population-based young adults. However, OA-like femur bone shape is associated with higher pain scores in young adults experiencing any knee pain.
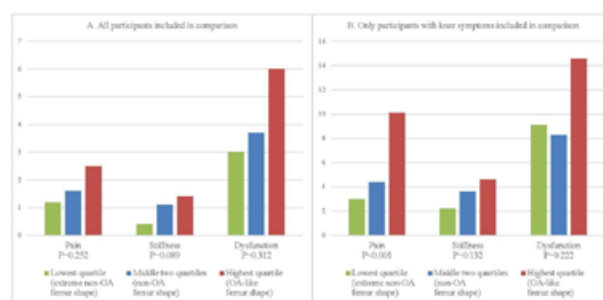
Figure 1. Comparisons of WOMAC knee symptoms among young adults in different quartiles of femur shape vector scores
* bar graphs show the average total WOMAC pain, stiffness and dysfunction scores for each group

P227
ACTIVITY CRITERIA OF DEMYELINIZATION

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Objective: 396 multiple sclerosis patients from 15-33 years old were examined. **Methods:** Clinical methods, immunoassays, myelinotoxic activity (MTA), CT and MRI of cerebrum and spinal cord, myelinotoxic activity (MTA). **Results:** A latent phase (the first group, 79 patients, 19.9%) is characterized by slight increase in MTA of blood serum (7.6±1.2 units; control group – 3.9±0.82 units; p<0.001), decrease of CD4+ in blood (34.8±1.64%, control group – 40.1±2.4%; p<0.001) and by large increase in CIC levels (92.56±3.1 optical units compared to 69.32±4.28 in control group; p<0.001). A slow pro-gradient phase of MS (second group, 156 patients, 39.4%) is distinguished by moderate evident (apparent) increase in MTA of blood serum (22.3; p<0.01 in comparison with 1st group), significant decrease of T-lymphocyte in blood serum by 32.4%, CD22+ by 71.1%, CD4+ by 33.9%, CIC levels by 12.4%, along increase in CD8+ by 1.3 times, weak induction of TNFα at 84.3%; IL-8 at 4.8% patients. An acute phase (third group, 144 patients, 36.3%) coupled with significant increase in MTA of blood serum (40.4±1.22 units) in comparison with 1st and 2nd groups. Acute condition of MS distinguished by significant increase in blood CD8+, IL-2P+, Ig G,A,M, CIC level along decrease of T-lymphocyte (51.7%±1.56%) and CD22+ levels. Increase in IL-2P+ at 64.1% patients coupled with significant increased TNFα и IL-8. **Conclusion:** Measurement of blood serum MTA and immune reactivity in combination with clinical and MRI findings helps to correctly estimate the rate of demyelinization in multiple sclerosis patients.

P228
DIFFERENTIAL DIAGNOSIS AND TREATMENT OF MYOTONIC AND MYOFASCIAL SYNDROMES OF NECK PAIN

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Objective: The dynamic monitoring of 195 patients with myotonic and myofacial syndromes of neck pain was done against the control group of 45 people.

Methods: MRI of cervical and vertebrocranial areas of spinal column, electromyography of 7 to 9 relevant muscles, finding of the "key" muscle and the overall computer aided assessment of osteomuscular, cardiorespiratory and oxygen transport system disorders.

Results: Clinical and electromyographic criteria for diagnosis of myotonic and myofascial syndromes of neck pain were identified based on the occurrence rates. The role of major system disorders in pathogenesis of neurological manifests of neck pain was studied. New therapeutic approaches to stopping pain and myotonic syndromes were developed; the effectiveness of early rehabilitation measures was demonstrated. The prevailing myotonic syndromes were identified which were the musculus obliquus capitis inferior syndrome (in 68, or 39.4% patients); superscapular area syndrome (33% of patients); musculus scalenus anterior and musculus scalenus medius syndromes (18.9%); musculus pectoralis minor syndrome (9.7%). Hypodynamia caused system disorders were noted in 78.3% patients including excessive body mass and fat content; reduced blood circulation rate and heartbeat volume and the pronounced decrease of PWC_{170}. The most informative spondylographic findings were reduced thickness of posterior areas of intervertebral disks from CI to CVII (52.3 to 77.9% of patients), cervical lordosis impression (76.4%) and uncovertebral arthroses (58.2%).

Conclusion: The most seriously affected ("key") muscles in neck pain patients were found. Diagnosis and treatment strategies for neck pain patients were developed.

P229
REHABILITATION TECHNOLOGY OF PATIENTS WITH SYMPTOMATIC EPILEPSY

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Objective: 220 patients with symptomatic epilepsy were examined

Methods: Neurological examination, MRI, EEG

Results: Prepared technology rehabilitation of patients with symptomatic epilepsy caused by organic diseases of the central nervous system. The technology is intended for use by inpatient and outpatient offices rehabilitation, medical and rehabilitation expert committees, clinics, health resorts organizations in order to improve the outcome of the disease, prevent the development of disability or reduced the severity of violations, disability formed under disability. The technology includes: selection of the object and the subject of rehabilitation of rehabilitation; expert rehabilitation diagnostics; evaluation of rehabilitation potential, rehabilitation prognosis; medical examination (with evaluation categories and the degree of disability, the risk of disability); formation and practical implementation of individual rehabilitation programs; evaluation of the effectiveness rehabilitation and formation of further rehabilitation of the route.

Conclusion: With the formation of medical rehabilitation measures provided by the integrated use therapy, medical physical training, medication correction, physical therapy, dietetics, the organization "School of the patient."

P230
SOME CLINICAL AND ELECTROMYOGRAPHIC CRITERIA FOR DIAGNOSIS OF MYOTONIC AND MYOFASCIAL SYNDROMES OF NECK PAIN

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Methods: The dynamic monitoring of 195 patients with myotonic and myofacial syndromes of neck pain was done against the control group of 45 people. An extended neurological examination was carried out which included roentgenometry of cervical and vertebrocranial areas of spinal column, electromyography of 7 to 9 relevant muscles, finding of the "key" muscle and the overall computer aided assessment of osteomuscular, cardiorespiratory and oxygen transport system disorders. **Results:** Clinical and electromyographic criteria for diagnosis of myotonic and myofascial syndromes of neck pain were identified based on the occurrence rates. The role of major system disorders in pathogenesis of neurological manifests of neck pain was studied. New therapeutic approaches to stopping pain and myotonic syndromes were developed; the effectiveness of early rehabilitation measures was demonstrated. The prevailing myotonic syndromes were identified which were the musculus obliquus capitis inferior syndrome (in 68, or 39.4% patients); superscapular area syndrome (33% of patients); musculus scalenus anterior and musculus scalenus medius syndromes (18.9%); musculus pectoralis minor syndrome (9.7%). Hypodynamia caused system disorders were noted in 78.3% patients including excessive body mass and fat content; reduced blood circulation rate and heartbeat volume and the pronounced decrease of PWC_{170}. The most informative spondylographic findings were reduced thickness of posterior areas of intervertebral disks from CI to CVII (52.3 to 77.9% of patients), cervical lordosis impression (76.4%) and uncovertebral arthroses (58.2%). **Conclusion:** The most seriously affected ("key") muscles in neck pain patients were found. Diagnosis and treatment strategies for neck pain patients were developed.

P231
SOME ASPECTS OF REHABILITATION FOR PATIENTS WITH LOW BACK PAIN

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Objective: Examination of 78 patients with myotonic (MT) syndrome of lumbar osteochondrosis.

Methods: Patients went through the clinical estimation of neurologic status, manual testing of muscles, CT and MRI of back bone lumbar department, interferential and needle electromyography of the most damaged muscular groups, dosed loading veloergometry, revasography of feet, and shins.

Results: It was established for the first time, that among MT-syndrome patients 54 (69.2%) an associated damage of two or more muscles prevailed. The most damaged ("key") muscles appeared to be gastrocnemius muscle (43; 55.1%), gluteus medius (42; 53.82%), quadriceps femoris (36; 46.2%), rectus abdominis and external oblique (32; 41.1%), peroneal muscle (29; 37.2 %), piriform muscle (29; 37.2%), lumbar quadrate muscle (28; 35.9%), gluteus maximus (19; 24.3%), gluteus minimus (16; 20.5%), adductor (14; 17.9%) and abductor (9; 11.5%) thigh muscles. Medical rehabilitation complex on damaged extremity was approbated in 27 patients with MT syndrome. The complex included oral reception of katadolon (100 mg 3 times a day for 10 d), tractions on Fintrac-471 table (with force from 3-55 kg, a course of 8-10 sessions) and also acupuncture with use acupuncture points of general action with vascular autonomic nervous system orientation (G14, MJ6, E36, RP6, TR5, V40) and locally segmented points on the most damaged muscular groups (AT60, VB30 with deep introduction to piriform muscle; VB 34, VB41, F3).

Conclusion: After treatment damaged extremity pain has completely disappeared in 19 patients.

P232
ACUPUNCTURE TREATMENT FOR PATIENTS WITH LOW BACK PAIN

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Objective: 78 patients with myotonic (MT) syndromes of lumbar osteochondrosis surveyed in dynamics for the purpose of their early diagnostics, studying of frequency, search of the most interested muscles with revealing of a "key" muscle for applying differentiated acupuncture.

Methods: The complex of methods including dynamics of the neurologic status, manual testing of muscles, CT, MRI, electromyography of 5-6 muscular groups, reovasography of feet was used.

Results: Most clinically pronounced were the following syndromes: transverse muscle(23; 29.4%), oblique muscle (32; 41.1%) abdominal muscles, stomach, lumbar quadrate muscles (28; 35.9%), big (19; 24.3%), large (42; 53.8%) and small muscle(16; 20.5%), gluteus, piriform (29; 37.2%), and also adductor (17; 21.8%), abductor (19; 24.3%), quadriceps femoris (41; 52.6%)muscles, gastrocnemius (43; 55.1%) and peroneal (29; 37.2%). In 54 (69.2%) patients prevailed associated (two and more) syndromes. Acupuncture points of general action (GJ4, MJ6, E36, RP6, TR5, V40) and local muscular points were used to stop pain muscular spasm, taking into account the revealed MT-syndromes. Katadolon was additionally prescribed for stable pain syndrome (100 mg/ds, 10 d) for powerful analgesic, muscle relaxing effects, deleting of "painful memory", preventing of pain chronification. Complex therapy appeared to be effective in 75 (96.2%) patients.

Conclusion: Timely diagnostics of associated MT-syndromes of lumbar osteochondrosis allows to validate adequate therapy methods.

P233
SOME TECHNICAL MEANS OF REHABILITATION FOR PATIENTS WITH LOW BACK PAIN

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Objective: 78 patients with myotonic (MT) syndrome of lumbar osteochondrosis in the age group of 21-60 years old was conducted. Out of them men – 40 (51.3%), women – 38 (48.7%).

Methods: Patients went through the clinical estimation of neurologic status, manual testing of muscles, CT and MRI of back bone lumbar department, interferential and needle electromyography of the most damaged muscular groups, dosed loading veloergometry, revasography of feet, and shins.

Results: It was established for the first time, that among MT syndrome patients 54 (69.2%) an associated damage of two or more muscles prevailed. The most damaged ("key") muscles appeared to be gastrocnemius muscle (43; 55.1%), gluteus medius (42; 53.82%), quadriceps femoris (36; 46.2%), rectus abdominis and external oblique (32; 41.1%), peroneal muscle (29; 37.2%), piriform muscle (29; 37.2%), lumbar quadrate muscle (28; 35.9%), gluteus maximus (19; 24.3%), gluteus minimus (16; 20.5%), adductor (14; 17.9%) and abductor (11.5%) thigh muscles. Medical rehabilitation complex on damaged extremity was approbated in 27 patients with MT syndrome. The complex included oral reception of katadolon (100 mg, 3 times a day for 10 d), tractions on Fintrac-471 table (with force from 3-55 kg, a course of 8-10 sessions) and also acupuncture with use acupuncture points of general action with vascular autonomic nervous system orientation (G14, MJ6, E36, RP6, TR5, V40) and locally segmented points on the most damaged muscular groups (AT60, VB30 with deep introduction to piriform muscle; VB 34, VB41, F3).

Conclusion: After treatment damaged extremity pain has completely disappeared in 19 patients, pain essentially decreased and increased tolerance of physical activity in 6 patients. It is established, that katadolon shows not only analgesic and neuroprotective, but also myorelaxing action on muscles of pelvic girdle and feet in patients with acute and chronic pain syndrome.

P234
METHODS OF REHABILITATION OF PATIENTS WITH SYMPTOMATIC EPILEPSY

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Objective: 220 patients with symptomatic epilepsy were examined

Methods: Neurological examination, MRI, EEG

Results: Prepared technology rehabilitation of patients with symptomatic epilepsy caused by organic diseases of the central nervous system. The technology is intended for use by inpatient and outpatient offices rehabilitation, medical and rehabilitation expert committees, clinics, health resorts organizations in order to improve the outcome of the disease, prevent the development of disability or reduced the severity of violations, disability formed under disability. The technology includes: selection of the object and the subject of rehabilitation of rehabilitation; expert rehabilitation diagnostics; evaluation of rehabilitation potential, rehabilitation prognosis; medical examination (with evaluation categories and the degree of disability, the risk of disability); formation and practical implementation of individual rehabilitation programs; evaluation of the effectiveness rehabilitation and formation of further rehabilitation of the route.

Conclusion: With the formation of medical rehabilitation measures provided by the integrated use therapy, medical physical training, medication correction, physical therapy, dietetics, the organization "School of the patient."

P235
THE LONG TERM RESULTS OF THERAPY AND REHABILITATION OF MULTIPLE SCLEROSIS PATIENTS

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Long term results of treatment of multiple sclerosis were studied. The dynamic monitoring of 110 patients over the period of 1-1.5 y following the successful in-hospital treatment of MS was carried out. Clinical methods, CT and MRI of cerebrum and spinal cord, and a patented radioimmunobiological assay of the myelinotoxic activity (MTA) of blood serum were used.

Four groups of patients were distinguished: group 1 (36 patients; 32.7%) – patients with low MTA level (4.56*0.7 units) after successful hormone therapy. No rehabilitation was required out afterwards. Group 2 included 41 patients (37.3%) with low MTA level (3.76*0.81) after hormone and corrector therapy; a rehabilitation course was carried out at a later stage. Group 3 consisted of 22 patients (20.0%) that required long term immunomodulating therapy due to a higher rate of demyelinisation (MTA=19.2*0.43). The remaining 11 patients (group 4, 10.0%) with moderate rate of demyelinisation (16.4*0.52) were prescribed general health improvement therapy and rehabilitation based on intensive motional activity and physical exercise.

Hormone therapy helps to reduce the demyelinisation rate to acceptable level within 2 to 4 months. The subsequent rehabilitation helps to achieve the extended remission period. However, long time after treatment of acute MS the hormone therapy is not justified.

P236

PHASE I/III STUDY TO CONFIRM BIOEQUIVALENCE AND SAFE SWITCHING OF PROPOSED BIOSIMILAR DENOSUMAB IN POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Phase I/III study design to evaluate equivalent efficacy, pharmacodynamics, pharmacokinetics and also comparable safety and immunogenicity of a proposed biosimilar 60-mg denosumab (bsDMAB; GP2411) and its marketed reference biologic (refDMAB) in postmenopausal osteoporosis (PMO).

Methods: PMO was chosen as a sensitive indication to confirm bioequivalence of bsDMAB with its reference. ROSALIA (NCT03974100) is a multinational, randomised, double-blind, parallel arm study enrolling 522 patients 55-80 years of age with an absolute lumbar spine BMD (LS-BMD) T-score between -2.5 and -4.0. In Treatment Period 1, patients are randomised to bsDMAB or refDMAB (60 mg subcutaneous at day 1 and week 26) (Figure 1). In Treatment Period 2 when patients receive third dose at week 52, half of the women receiving refDMAB will be switched to the biosimilar. All other patients continue their treatment up to week 78. Primary endpoints for equivalence as aligned with regulatory authorities are percent change from baseline in LS-BMD at week 52, the area under the effect vs. time curve of bone resorption marker CTX, and standard pharmacokinetic parameters. Adverse events and the development of antidrug antibodies will be monitored throughout the study, with evaluations between weeks 52 and 78 to evaluate the safety of the switch.

Results: Study completion is expected in 2022.

Conclusion: The ROSALIA study design allows the comparison of proposed biosimilar denosumab GP2411 with its reference in terms of efficacy, pharmacodynamics, pharmacokinetics, safety, and immunogenicity. The safety of a single switch will be investigated.
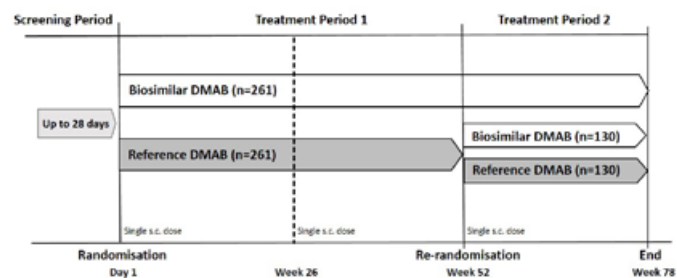
Figure 1. Study design

P237

IDENTIFICATION OF CALCIUM-SENSING RECEPTOR ANTAGONIST FROM HERBAL MEDICINE AND STUDY OF ITS OSTEOPRESERVE EFFECTS

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Low BMD is consistently observed in type 1 diabetes mellitus (T1DM), and recent meta-analyses and cohort studies confirmed that higher fracture risk was associated with T1DM and T2DM. Fructus Ligustri Lucidi (FLL), the fruit of *Ligustrum lucidum* Ait, is a commonly prescribed herb to nourish endocrine and renal systems and to strengthen bones based on principle of traditional Chinese medicine (TCM). Our previous studies revealed that the crude extract from FLL could improve calcium balance by regulating transcellular calcium absorption in intestine and calcium reabsorption in kidney [1-3], consequently exerting bone-sparing function in aged female rats and aged osteoporotic rats with estrogen deficiency [4]. Our recent *in vivo* studies demonstrated that the active fraction from FLL extract exerted beneficial effects on trabecular bone of diabetic mice [5] and rats [6] by decreasing hyperglycemia-induced urinary calcium excretion via down-regulating renal CaSR expression. The chemical work in our lab explored that ligustroflavone (LF) was one major compound in the active fraction from FLL extract. The present study aimed to clarify the *in vivo* and *in vitro* regulation of LF on PTH release and calcium metabolism by acting on tissue CaSR, and to elucidate the protective effects of LF against bone loss caused by hyperglycemia. LF interacted well with the allosteric site of CaSR shown by molecular docking analysis, increased PTH release of primary parathyroid gland cells from rats and suppressed extracellular calcium influx in HEK-293 cells. The serum level of PTH attained peak value at 2 h and maintained higher during the period of 1 h and 3 h than that prior to treatment in mice after a single dose of LF. Trabecular BMD and micro-architecture were markedly improved in diabetic mice upon to LF treatment for 8 weeks. LF reduced CaSR mRNA and protein expression in kidney of diabetic mice. Taken together, ligustroflavone could transiently increase PTH level and regulate calcium metabolism via acting on tissue CaSR as well as prevent osteoporosis in diabetic mice, suggesting that ligustroflavone might be an effective antagonist on CaSR.

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P238
NORMOCALCEMIC HYPERPARATHYROIDISM: STUDY OF THE PREVALENCE AND NATURAL HISTORY

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Objective: Normocalcemic hyperparathyroidism (NHYPER) is characterised by persistently normal calcium levels and elevated PTH values, after excluding other causes of secondary hyperparathyroidism. The prevalence of the disease in the literature varies significantly, and the data on the natural history of this disease are sparse and inconclusive. We aimed to identify the prevalence of NHYPER and study the variability of serum calcium and to compare this with a group of patients with primary hyperparathyroidism (PHPT)

Methods: We retrospectively evaluated data from 6280 patients referred for a BMD measurement.

Results: We identified NHYPER patients using data from the day of the BMD measurement. We excluded the ones having low eGFR and vitamin D, or no measurements available. Based on the evaluation of their medical files, we identified 13 patients with NHYPER (prevalence 0.21%). Only 4 patients had consistent normocalcemia throughout their follow-up with only two also having consistently high PTH. None had consistently normal eGFR or vitamin D.

The mean adjusted calcium was found to be significantly lower in the NHYPER group compared with the PHPT group but higher than the normal group (p<0.001). PTH was similar for NHYPER and PHPT, but higher than the normal group. These two groups had similar variability in calcium.

Conclusion: NHYPER patients often have episodes of hypercalcemia. We believe that NHYPER is a mild form of PHPT.

P239
STUDY OF THE RELATION BETWEEN ECTOPIC CALCIFICATION (VERTEBRAL AND VASCULAR) AND THE SCANOGRAPHIC BONE ATTENUATION COEFFICIENT OF THE FIRST LUMBAR VERTEBRA (SBAC-L1) IN 70 PATIENTS WITH SYSTEMIC SCLERODERMA

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Objective: The objective of this study was to evaluate the relation between the scanographic bone attenuation coefficient of the first lumbar vertebra (SBAC-L1) and the presence of ectopic calcifications: vascular and spinal.

Methods: This monocentric retrospective study included systemic scleroderma patients, according ACR/EULAR 2013 criteria, followed from 2000-2014 and who underwent a computed tomography scan (CT) included L1 during their follow-up. On the CT, the SBAC-L1 was measured in the trabecular bone, in a region of interest (ROI) in Hounsfield units (HU). A fracture threshold was defined as a SBAC-L1 ≤145 HU. Predictive factors for the SBAC-L1 under the fracture threshold were also studied.

Results: A total of 70 patients were included (mean age: 62.3 (±15.6) y, women 88.5%, diffuse scleroderma 22.9% (n=16)). The mean SBAC-L1 was 157.26 HU (±52.1), and 35 patients (50%) presented a SBAC-L1 ≤145 HU. In univariate analysis, vascular and spinal calcifications were associated with a SBAC-L1 ≤145 HU with an OR of 8 and 13.6, respectively. The association with valvular calcifications was not significant. The reproducibility of ectopic calcification evaluation were very good, with kappa coefficient varying between 0.63 and 1.

Conclusion: In systemic scleroderma, 50% of the patients presented a SBAC-L1 ≤145 HU. Interestingly, the presence of ectopic calcifications, vascular and spinal, were associated with a lower SBAC-L1.

P240
WHAT ARE THE CONSEQUENCES OF SPINAL ANKYLOSIS ON THE BONE TRABECULAR FRAGILITY ASSESSED ON COMPUTED TOMOGRAPHY SCAN IN PATIENTS WITH ANKYLOSING SPONDYLITIS?

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Objective: The principal objective was to characterize the scanographic bone attenuation coefficient (SBAC) from lumbar vertebrae (L1-L5) on normal lumbar spine or spine with partial or total ankylosis on computed tomography scan (CT) from patients with ankylosing spondylitis (AS).

Methods: This monocentric retrospective study included patients with AS followed from 2009 to 2017 at Nancy University hospital, fulfilling New York criteria and who underwent a CT and X-rays (spine, pelvis) within 2 y. Clinical characteristics were collected. Modified stoke ankylosing spondylitis spinal score (mSASSS) was scored on X-rays. Presence of at least one syndesmophyte defined mSASSS+ (mSASSS ≥2). The SBAC was measured in Hounsfield Units (HU) for each lumbar vertebra (from L1-L5) in a region of interest drawn in the trabecular bone, avoiding cortical bone, on CT. The fracture threshold was defined at £145 HU.

Results: 73 AS patients were included (mean age: 60.3 (±10.7) y, 8 women (11%)). Sixty patients (82.2%) have a mSASSS ≥2, with a mean score of 20.7 (±21.2). The SBAC for each lumbar vertebra was not significantly different between patients with mSASSS <2 vs. mSASSS ≥2 (p=0.24-0.99). However, the SBAC of each vertebra was lower for patients with mSASSS ≥2 and bone bridge than for patients with mSASSS ≥2 without bone bridge

(p=0.02-0.0001). Total ankylosis on at least one lumbar vertebra and partial ankylosis of L3 and L4 impaired the SBAC with higher risk to have a SBAC ≤145 HU.

Conclusion: AS patients with ankylosed vertebra presented lower values of SBAC. We showed that complete ankylosis of any lumbar vertebra and partial ankylosis of L3 and L4 were associated with lower values of SBAC, suggesting deterioration of the trabecular bone structure ankylosed.

P241
RELATIONSHIP BETWEEN STRUCTURAL SPINE INVOLVEMENT AND THE SCANOGRAPHIC BONE ATTENUATION COEFFICIENT OF L1 IN A POPULATION OF 73 PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: To evaluate the correlation between the bone fragility risk measured by the scanographic bone attenuation coefficient of the first lumbar vertebra (SBAC-L1) and spine structural involvement severity assessed by the modified stoke ankylosing spondylitis spinal score (mSASSS) in ankylosing spondylitis (AS) patients.

Methods: This retrospective study included AS patients, followed from 2009-2017 at the university hospital of Nancy, who fulfilled the New York or ASAS 2009 criteria with radiographic sacroiliitis and who underwent a computed tomography (CT) and X-rays (spine, pelvis). The definition of structural spine involvement is retained for a mSASSS ≥2 (at least one syndesmophyte). Vertebral fractures (VF) were studied on sagittal spine radiographies according to Genant classification. The SBAC-L1 was measured in Hounsfield Units (HU) on axial L1 section on CT. A SBAC-L1 ≤145 HU (fracture threshold) was used to define patients at risk of VF.

Results: 73 AS patients were included (age median: 60 (53-68.5) y, 8 women (11%)), mean disease duration: 24.6 y (±13.9)). Sixty patients (82.2%) have a mSASSS ≥2, with a mean score of 20.7 (±21.2). Partial ankylosis was observed in 37 patients (50.7%). Thirteen VF were detected in 9 patients (12.3%), without difference between the groups. The mean SBAC-L1 was 141.1 HU (±45) in the whole population, 138.1 HU for mSASSS + and 154.8 for mSASSS, respectively. Patients with bone bridge had a lower SBAC-L1 (123.96±41.1 HU) than patients mSASSS + without bone bridge (160.4±41.9 HU) (p=0.02) and more often SBAC-L1 ≤145 HU (73% vs. 41.9%, p=0.006).

Conclusion: There is no relation between the risk of bone fragility measured by the SBAC-L1 and spine structural severity assessed by the mSASSS in patients with AS. However, patients with bone bridge had significantly decreased SBAC-L1 and an increased probability of being under the fracture threshold compared to patients without bone bridge.

P242
EFFECT OF CALCIUM AND VITAMIN D SUPPLEMENTATION WITH AND WITHOUT COLLAGEN PEPTIDES ON BONE MINERAL DENSITY AND BONE TURNOVER IN POSTMENOPAUSAL WOMEN WITH OSTEOPENIA

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Objective: The mainstay of treatment of osteopenia and osteoporosis includes among others calcium and vitamin D supplementation. Collagen peptides (CPs) have been shown that may have a role as a treatment option. In the present randomized prospective study, we examined the efficacy, as expressed by changes in BMD and bone turnover markers, of supplementation of calcium, vitamin D with or without bioactive CPs.
Methods: 51 females, postmenopausal women with osteopenia were allocated in: Group A who received a sachet containing 5 mg CPs, 500 mg calcium lactate and 400 IU vitamin D3; and group B who received a chewable tablet containing 500 mg calcium carbonate and 400 IU vitamin D3 per day.
Results: In group A and B, baseline mean P1NP was 60.4 ng/ml and 59.1 ng/ml, respectively, and baseline mean CTX was 395 pg/ml and 418 pg/ml, respectively. After one year of supplementation, in group A, the P1NP significantly decreased by 17.3% (p<0.001), and CTX changed nonsignificant by 8.5% (p=0.267) and, in group B, P1NP changed by 4.8% (p=0.267) and CTX increased significant by 22.9% (p=0.004). In group A and B, baseline mean BMD was 1.033 and 0.986 g/cm^2 at the lumbar spine (LS) (mean T-score -1.21 and -1.61, respectively), and 0.83 and 0.824 g/cm^2 at the total hip (TH) (mean T-score -1.43 and -1.46, respectively). After one year of supplementation, group A had a mean BMD slight increase of 0.95% at the LS and 0.65% at the TH and group B slight decrease of 0.73% and 0.47 %, respectively. The 12-months BMD and its change within a year at the LS were statistically significant between the two groups (p=0.009 and 0.032, respectively). In group A and B, 91% and 77% of patients were fully adhered and 0% and 18% of patients were nonadhered, respectively. There was no serious adverse event in either group.
Conclusion: These findings may reflect that the addition of CPs in a calcium and vitamin D supplement may enhance its already known positive effect on bone metabolism.

P243
CONSENSUS STATEMENT ON INTRA-ARTICULAR INJECTIONS OF PLATELET RICH PLASMA FOR THE MANAGEMENT OF KNEE OSTEOARTHRITIS

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Objective: The use of intra-articular injections of platelet rich plasma (PRP) for knee osteoarthritis has dramatically increased over the last years. Several randomized controlled trials and meta-analysis have been conducted, showing a superiority of PRP injection as compared to placebo and at least a similar efficiency as compared to hyaluronic acid and corticosteroid injections. However, the heterogeneity of protocols limits the extrapolation of these results. The aim of our task force group including physicians with a large experience in PRP use was to provide the first clinical practice recommendations based on systematic review of the literature and Delphi process.

Methods: 15 physicians (10 rheumatologists, 4 specialists in rehabilitation and sport medicine and 1 interventional radiologist) from different countries were selected given to their expertise in the fields of PRP and osteoarthritis, forming the GRIP (Groupe de Recherche sur les Injections de PRP, PRP Injection Research Group). Twenty-five recommendations were finally retained after several meetings using the modified Delphi method to establish clinical consensus. All experts voted their agreement or not for each recommendation using a score between 1 (totally inappropriate) and 9 (totally appropriate). Depending on the median value and extreme scores, recommendations were judged as appropriated or unappropriated with a strong or relative agreement but could also be judged as uncertain due to indecision or absence of consensus.

Results: The main recommendations are listed below:

Intra-articular injections of PRP constitute an efficient treatment of early or moderate symptomatic knee osteoarthritis. Median=8 [6-9] – Appropriate. Relative agreement.

Intra-articular injections of PRP may be useful in severe knee osteoarthritis (Kellgren-Lawrence grade IV). Median=7 [6-7] – Appropriate. Relative agreement.

– Intra-articular injections of PRP in knee osteoarthritis should be proposed as second-line therapy, after failure of non-pharmacological and pharmacological (oral and topic) symptomatic treatment. Median=9 [5-9] – Appropriate. Relative agreement.

– Intra-articular injections of PRP should not be performed in osteoarthritis flare-up with significant effusion. Median=7 [5-9] – Appropriate. Relative agreement.

– Intra-articular PRP treatment may include 1 to 3 consecutive injections. Median=9 [7-9] – Appropriate. Strong agreement.

– Leukocyte-poor PRP should be preferred for knee OA treatment. Median=8 [5-9] – Appropriate. Relative agreement.

– PRP injections should be performed under ultrasound or fluoroscopic guidance. Median=8 [3-9] – Uncertain. No consensus.

PRP should not be mixed with injectable anesthetic or corticosteroid. Median=9 [6-9] – Appropriate. Relative agreement.

Conclusion: 25 recommendations were discussed by an international multidisciplinary task force group in order to provide a basis for standardization of clinical practices and future research protocols.

P244
REOPERATIONS FOLLOWING ANKLE FRACTURE FIXATION: 3-YEAR FOLLOW-UP STUDY

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Objective: Reoperations following ankle fracture fixation expose patients to added surgical risks, and have associated financial costs to patients and the health service, so reoperations should be avoided where not clinically necessary. We reviewed all operatively fixed ankle fractures between 2009-2014 at our district general hospital to determine the number of reoperations; the proportion that could have been avoided; and lessons that could be learnt to help minimize reoperations. All procedures reviewed had at least 3 years follow-up.

Methods: We carried out a retrospective review of the radiographs and clinical notes all ankle fracture fixations performed at our institution between 2009-2014 to determine whether they had a secondary operation on their fixed ankle before 01/01/2018. We reviewed the clinical notes and radiographs of all patients who had undergone reoperations to determine the reason for their secondary procedure, and whether it could have been avoided.

Results: Of the 352 ankle fracture fixations carried out, there were 121 reoperations over the follow-up period. 62% (75/121) of these reoperations were avoidable - 46% (56/121) were 'potentially avoidable'; and 16% (19/124) of the repeat procedures were 'completely avoidable'.

Conclusion: All 'potentially avoidable' reoperations in this study were routine removals of syndesmosis screws. A review of the literature shows that there is no difference in functional outcome between syndesmosis screw removal and retention. The two main reasons for 'completely avoidable' reoperations in this study were suboptimal initial fixation, leading to failure; and removal of metal that was left prominent at the initial procedure. These results show that morbidity and cost of reoperations can be minimised by adhering to AO fracture fixation principles, to ensure that the fixation adequately maintains fracture reduction; ensuring that no metalwork is left prominent during ankle fracture fixation; and avoiding routine syndesmosis screw removals.

P245
1,25 DIHYDROXYVITAMIN D LEVELS ARE LOWER SUBJECTS WITH RENAL DYSFUNCTION: A CASE-CONTROL STUDY

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Objective: Not many studies have studied the relationship of 1,25(OH)2D, with calcium and 25(OH)D in subjects with renal dysfunction. To compare the relationship between 25(OH)D, 1,25(OH)2D with calcium in healthy and subjects with renal dysfunction.

Methods: A cross-sectional study was conducted at section of Chemical Pathology, Aga Khan University during the period of Feb 2015-Dec 2018. Total 189 patients were enrolled in this study with 153 healthy and 36 renal dysfunction patients with high serum creatinine (>1.3 mg/dl) were included. Serum samples were collected for markers of bone metabolism calcium, creatinine and vitamin D metabolites (25OHD and 1,25OHD). Serum calcium, creatinine were analyzed on ADVIA 1800, while 25OHD and 1,25OHD analyzed on Liaison-XL by electrochemiluminescence immunoassay. Means of vitamin D metabolites and marker of bone metabolism- calcium were compared between the two groups by Kruskal-Wallis test and association was assessed by Spearmen's correlation.

Results: The median (Q3-Q1) age of study participants was 35 y (52-16.6) with majority being females (60.6%). For all subjects, 1,25(OH) VitD levels were found to correlate significantly with creatinine (Spearman r-0.254, p 0.002<0.001), 25OHD (Spearman r 0.249, p 0.03<0.001) and calcium (Spearman r 0.198, p 0.006<0.0001). On comparison of healthy and subjects with renal dysfunction, mean comparison showed that 1,25(OH) vitD and calcium were significantly lower, while creatinine was significantly higher in patients with renal dysfunction. In patients with renal dysfunction 1,25(OH) vitD was significantly correlated with calcium.

Conclusion: 1,25(OH)$_2$ VitD was significantly correlated with calcium. Circulating 1,25(OH)2D was significantly lower in renal dysfunction patients with 25OHD deficiency. This shows that routine replacement of 1,25(OH)2D (calcitriol) in renal dysfunction patients is not required for maintaining calcium homeostasis. Replacement with 25(OH)D (cholecalciferol/ergocalciferol) in renal dysfunction patients can increase 1,25(OH)2D.

P246
THE INTRINSIC MECHANISM OF BIOMECHANICAL CHANGES DURING WALKING IN HIGH HEELS

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Objective: Although, a number of researchers have studied the effect of wearing high heels (HH) on human biomechanics during the gait, data regarding the association between high heeled shoes and knee osteoarthritis (OA) are limited to explain the specific mechanisms. Therefore, the purpose of this study was to investigate the foot kinematics of high heel wearers and compare any differences with barefoot individuals using the Oxford Foot Model (OFM).

Methods: The OFM is a multisegment model and provides comprehensive foot movement details to be used to measure biomechanics characteristic for subjects during the HH gait compared with barefoot. The parameter included the hallux, forefoot, and hindfoot change in three planes.

Results: 15 healthy women (mean age: 22.5±1.8) were included. Based on an independent sample t-tests analysis, participants wearing HH demonstrated larger hallux dorsiflexion (22.55±1.62° vs. 26.6±2.33° for the barefoot; P=0.001), and less hallux plantarflexion during the initial stance phase (−4.86±2.32° vs. −8.68±1.13°; P<0.001). There were also greater forefoot adduction (16.15±1.37° vs. 13.18±0.79°; P<0.001). The hindfoot demonstrated a larger dorsiflexion in the horizontal plane (16.59±1.69° vs. 12.08±0.9°; P<0.001), greater internal rotation (16.72±0.48° vs. 7.97±0.55°; P<0.001), and decreased peak hindfoot extension rotation (−5.49±0.69° vs. −10.73±0.42°; P=0.001).

Conclusion: The intrinsic detailed mechanism of wearing HH has been recorded, and provides details of how the foot is affected. This dataset on foot kinematics during walking gait is an important basis for the explanation of foot deformity, foot disease and knee OA in relation to wearing high heeled shoes.

P247
PHENOMENON OF ALEXITHYMIA AND LOCUS OF CONTROL IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: To examine the role of alexithymia phenomenon and locus of control in the formation of psychosomatic personality traits in patients with ankylosing spondylitis (AS).

Methods: The group consisted of 45 patients suffering from AS. The selection of patients for the study was conducted in accordance with the recommendations of the group of experts working on AS (1). The patients' average age 44.94±13.8 y and average duration of the disease - 3.02±3.69 years. 89% of AS patients were males. We used Toronto Alexithymia Scale (TAS) (2), and the study of locus of control was conducted by "level of subjective control" questionnaire (3).

Results: A high level of alexithymia (77.35±1.8 points) was noted in AS patients. The level of alexithymia didn't depend on sex, age, duration and activity of the disease, but inversely correlated with the level of education (r=-0.37 with p=0.028) and internality in relation to the disease (r=-0.64, p=0.031). AS patients showed a significant trend towards external locus of control in common sphere (3.81±1.387), as well as on the scale of failures (3.51±0.64), family relations (4.18±0.55), professional relations

(2.74±0.98) and in relation to health (4.66±1.94). Correlation between the levels of locus of control with other clinical and psychological characteristics, such as age, activity, duration of disease and the level of neurotic disorders in patients hasn't been revealed.

Conclusion: Certain correlation between the alexithymia and some clinical and psychological characteristics is forming in AS patients. Characteristics of locus of control in AS patients can be predetermined by the peculiarities of personal relationships and the choice of certain behavioral strategies. These changes may influence on efficacy of therapeutic interventions and need for psychological adjustment in time.

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P248

THE EFFECT OF INTRA-ARTICULAR HYALURONIC ACID IN PATIENTS WITH GONARTHROSIS

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Objective: Gonarthrosis is one of the most prevalent disorders in patients with generalised osteoarthritis, and especially in overweight patients. It is an important cause of invalidity or immobility in these patients, which contributes in a more urgent need for knee surgery. Intra-articular hyaluronic acid is an emerging alternative in patients that don't want or cannot undergo such surgery treatment. The aim of this study was to evaluate the effect of intra-articular hyaluronic acid injection in progression or relieving pain in patients with knee osteoarthritis.

Methods: This is a prospective study that included 72 patients with gonarthrosis undergoing intra-articular injection of hyaluronic acid to the aforementioned joint. The sample consisted in 49 female (68.1%) and 23 male patients (31.9%). Every patient was completed with a knee radiograph which diagnosed the grade of osteoarthritis according to Kellgren-Lawrence grading system, and a complete blood count in order to exclude other concomitant disorders. Intra-articular hyaluronic acid injection was performed according to all protocol rules, and a re-evaluation was appointed 3 months after the injection. Re-evaluation consisted in a new knee radiograph and a questionnaire about pain and joint functionality before and after injection.

Results: After gathering and evaluating all data, it resulted that in 43 patients (59.7%) had no progression on radiographic changes: 37 females (86%) and 6 male patients (14%). Forty-nine patients (68%) had a significant improvement in pain score 3 months after injection, of which 38 patients (77.6%) were females and 11 male patients (22.4%). Forty-five patients (62.5%) had a better function of the injected joint, of which 36 (80%) were females and (20%) male patients.

Conclusion: From this study there were shown good short-term results in radiographic progression, pain and joint function after hyaluronic acid injection in gonarthrosis. This treatment may be a good choice in patients with gonarthrosis who are not suitable or don't want to undergo knee surgery, that can improve their symptoms and life quality, and slow-down its progression.

P249

MIR-181A-5P INCREASES AGGRECAN EXPRESSION VIA SILENCING ADAMTS-5 IN NP CELLS

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Objective: To explore the effects of miR-181a-5p on aggrecan expression in nucleus pulposus (NP) cells and the underlying mechanisms.

Methods: NP cells were cultured and then treated with 40 nM of miR-181a-5p mimic/inhibitor for 48 h. The expression of aggrecan and a disintegrin-like and metalloproteinase with thrombospondin type 1 motif-5 (ADAMTS-5) was detected by qRT-PCR and western blot. Bioinformatics were used to validate the binding ability of miR-181a-5p and 3'-untranslated region (3'-UTR) of ADAMTS-5. Based on the binding site in ADAMTS-5, pGL3-ADAMTS-5 3'-UTR (wildtype) and the corresponding mutant plasmids were constructed. These constructs were cotransfected into HEK293T cells with miR-181a-5p mimic (40 nM). Luciferase activity was detected following 48 h. In addition, NP cells were pretreated with ADAMTS-5 small Interfering RNA (siRNA) for 48 h, which was followed by treatment with miR-181a-5p inhibitor (40 nM) for another 48 h. Subsequently, both qRT-PCR and western blot were used to measure aggrecan expression.

Results: miR-181a-5p mimic markedly increased aggrecan expression but decreased ADAMTS-5 expression ($P<0.01$); however, an opposite effect appeared in response to its inhibitor ($P<0.01$). Bioinformatics prediction showed that there was one binding site for miR-181a-5p in ADAMTS-5 3'-UTR. Transfection with miR-181a-5p mimic reduced the luciferase activity of wildtype ADAMTS-5 3'-UTR ($P<0.01$), but not its mutant ($P>0.05$). Moreover, pretreatment with ADAMTS-5 siRNA almost fully reversed the inhibitory effects of miR-181a-5p inhibitor on aggrecan expression ($P<0.01$).

Conclusion: miR-181a-5p can upregulate aggrecan expression in NP cells, which is associated with decreased ADAMTS-5 expression.

P250

DELIRIUM AFTER SPINE SURGERY IN OLDER ADULTS: A PROSPECTIVE STUDY

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Objectives: To characterize the incidence, risk factors, and consequences of delirium in older adults undergoing spine surgery.

Methods: Postoperative delirium and delirium severity were assessed using validated methods, including the Confusion Assessment Method (CAM), CAM for the Intensive Care Unit, Delirium Rating Scale-Revised-98, and chart review. Hospital-based outcomes were obtained from the medical record and hospital charges from data reported to the state

Results: 25 participants (21.2%) developed delirium after spine surgery, with 8 patients having purely hypoactive features. Independent predictors of delirium were lower baseline cognition, higher average baseline pain, more intravenous fluid administered, and baseline antidepressant medication. In adjusted models, the development of delirium was independently associated with higher quintile of length of stay (OR=3.17, 95%CI=1.98-7.04, P=0.005), higher quintile of hospital charges, and lower odds of discharge to home. Severity of delirium was associated with higher quintile of hospital charges and lower odds of discharge to home.

Conclusion: Delirium is common after spine surgery in older adults, and baseline pain is an independent risk factor. Delirium is associated with longer stay, higher charges, and lower odds of discharge to home. Thus, prevention of delirium after spine surgery may be an important quality improvement goal.

P251

COMPARATIVE STUDY OF WEEKLY ALENDRONATE VS. YEARLY ZOLEDRONIC ACID INJECTION IN TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS IN TERMS OF EFFICACY, COMPLIANCE AND BONE MARKERS ESTIMATION

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Objective: To compare the evaluation of bone turnover markers between the patients receiving either alendronate (AL) or zoledronic acid (ZA) at baseline, 3 and 12 months of treatment and compare the efficacy and compliance of two drugs. Rationale: Before this study, there was no comparative study available analyzing the efficacy of oral AL and injectable ZA together for the treatment of postmenopausal osteoporosis on a large scale in Indian population. Additionally, we were also interested to correlate the effects of these antiosteoporotic drugs with bone turnover markers (BTMs). Since both of antiosteoporotic drugs (AL and ZA) has different mode of actions and different mode of administration too, therefore we were interested to see the best anti-osteoporotic drug which can prevent fracture event and improve bone health by enlarge. Therefore, this study has been planned.

Methods: A total of 122 postmenopausal women with osteoporosis who visited to outpatient department (OPD) of Orthopaedics, All India Institute of Medical Sciences, New Delhi during the period from July 2015 to September 2017, were recruited followed by approved of the institutional ethics committee (IEC) of the college and informed written consent (Hindi & English) was obtained from all patients prior to inclusion, with approximately similar number of patients in both the groups. Computer generated random number table was used to randomized the patients into two arms i.e. either AL or ZA. All study patients were also given patient information sheet both in Hindi & English for their education, benefit and understanding of this study proposal. All patients were subjected to detailed history and clinical examination using a predesigned Performa including patient's background, age, gender, past history of illness, present illness, and history of current and previous medication. Exclusion criteria included male patient, any thyroid illness, pregnant women, patients taking drugs that can affect bone mineral metabolism, such as glucocorticoids and antitubercular therapy. Patients having cancer or fractures unrelated to metabolic bone diseases were also excluded. Fasting venous samples of all study patients were drawn at time 08:00-09:00 without venostasis in calcium free tubes. Serum was separated in refrigerated centrifuge at 2000-3000 Xg for 15 min at 37°C and stored in multiple aliquots. Samples were protected from light while processing. Urine samples were stored in sterile 10 ml falcon bottle and stored at 4°C. All serum and urine samples were used for BTMs (βCTx, NTx, BSAP and P1NP) using commercial kits (Yehuna, GenxBio, New Delhi) in the biochemistry laboratory of AIIMS, New Delhi. BTMs for bone resorption were measured by ELISA. Below mentioned is the summary of the study:

1. 200 patients were assessed for eligibility, out of which 78 patients were excluded in view of not meeting the criteria (50), declined to participate (20) and other reasons like personal issues and travelling (8)

2. Total of 122 patients were randomized into two groups, 63 in AL group and 59 in the ZA group

3. A total of 18 patients could not be contacted

4. Eleven patients did not want to follow-up because of travelling issues

5. Two patients in the AL group discontinued intervention in view of the side effects of gastric irritation

6. A total of 50 patients in the AL group and 41 patients in the ZA group were analyzed for final statistical analysis. Hence a total of 91 patients have been followed up for entire one year.

Considering a large number of patients who dropped out or could not be followed up, we included more patients (a total of 122) to balance the original sample size of 100.

Results: The mean age, height and weight of patients were 60.40±6.98 y, 147.56±6.55, and 58.45±8.58, respectively. The median baseline BMD, PTH, vitamin D, calcium, ALP and phosphorous were - 3.7 g/cm^3, 46.27 pg/ml, 33.60, 9.33, 180.88 Ka/IU and 3.94 mg/dl, respectively. While comparing the data in AL and ZA arms, we analysed values in between groups at baseline, and at 3 months and 1 year follow-up. The value of different bone markers were statistically compared between the two groups. The bone resorption markers: βCTx shows p value of 0.4296 and 0.5208 between the two groups at 3 months and 1 year follow-up respectively, and NTx shows p value of 0.9206 and 0.1580 between two groups at 3 months and 1 year, respectively. Additionally, the bone formation markers: P1NP and BSAP shows p values of 0.6988 and 0.4227, 0.9174 and 0.5028 at 3 months and

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1 year between two groups respectively. The patient's satisfaction and overall preference was also assessed using a questionnaire, in which ZA was found to be superior compared to AL.

Conclusion: As seen from the final statistical analysis, the p values calculated between the two groups at 3 months and one year follow-up is not significant in any of the bone markers calculated. Hence, it is clear that there is no difference between the 2 groups in terms of efficacy of treatment. It may be noted that the compliance rate in treatment with ZA group was 100% as the injection was only given once under supervision, making it a superior drug in terms of convenience. In our study, two patients dropped out of the AL group in view of side effects experienced. However, the ease of treatment with AL once a week makes it an equally accepted alternative treatment for treatment of osteoporosis. It should also be noted that the overall preference for the ZA i.v. infusion was much higher and patients were willing to take injection for a longer period of time as compared to weekly oral alendronate. A longer term follow up, however, is desired to adequately compare the difference in outcomes between these two drug groups. The preference in our study was similar for each group in our study.

P252
TO CORRELATE VITAMIN D LEVELS WITH LOW TESTOSTERONE LEVELS IN YOUNG MALES

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Objective: To assess the levels of vitamin D in young males with low testosterone levels (total and free).

Methods: A retrospective study was done with 300 patients. 150 of which had low testosterone levels and 150 normal. The vitamin D levels were compared using CLIA method on Diasorin XL.

Results: On analyzing the data, we found a significant correlation between the two parameters with Pearson's correlation strengthened to a significant positive association (r=0.001; P=0.006 and a CI of 97%). The incidence of low vitamin D levels was **79%** in patients with low testosterone.

Conclusion: Vitamin D is typically associated with maintaining bone health and helping the body absorb minerals such as calcium and magnesium. Vitamin D stimulates muscle growth, increases power and cuts unnecessary body fat. In both men and women, testosterone helps increase bone strength, stimulates the development of muscle mass and strength, and improves libido and mood. Low testosterone in men is linked to infertility, irritability, and erectile dysfunction. In both men and women, low testosterone can lead to a variety of cardiovascular diseases and mental health concerns such as depression. Testosterone is critical for performance because it facilitates anabolic (recovery) processes. Studies have found serum vitamin D concentrations to be a significant, positive predictor of total testosterone. This result suggests that highly active people, such as military personnel and athletes, may remedy low testosterone by optimizing their vitamin D levels. In a randomized controlled study, researchers found men who were given a daily high dose vitamin D supplement significantly increased their total testosterone, whereas there were hardly any changes in testosterone concentrations in the group given a placebo. These findings suggest that men deficient in vitamin D who take a proper vitamin D supplement may fix low levels of low testosterone.

P253
EFFECT OF SELECTIVE SEROTONIN REUPTAKE INHIBITORS AND SEROTONIN NOREPINEPHRINE REUPTAKE INHIBITORS ON BONE MINERAL DENSITY IN EGYPTIAN PATIENTS WITH PRIMARY FIBROMYALGIA

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Objective: Fibromyalgia is characterized by chronic widespread musculoskeletal pain that often co-exists with sleep disturbances, fatigue, cognitive dysfunction, stiffness and tenderness to palpation at specific tender points. Selective serotonin reuptake inhibitors (SSRIs) represent a class of commonly used antidepressants. They act by preventing the reuptake of 5-hydroxytryptamine (5-HT) (serotonin) through the inhibition of the 5-HT transporter (5-HTT) which is located on the presynaptic neuron, thereby increasing levels of 5-HT within the synaptic cleft and modulating neurochemical signaling. Usage of SSRIs was significantly associated with lumbar spine BMD reduction, particularly for old people. This study aimed to determine the correlation between SSRIs and serotonin norepinephrine reuptake inhibitors (SNRIs) usage and BMD and trabecular bone score (TBS) changes in primary fibromyalgia patient.

Methods: The present cross-sectional study was conducted on 100 Egyptian patients diagnosed as primary fibromyalgia divided according to drug medication into 2 groups, 50 patients on SSRIs and 50 patients on SNRIs, recruited from Rheumatology, Physical Medicine and Rehabilitation Departments at AlHussein and Sayed Galal, Al-Azhar University Hospitals. In addition to another 50 age matched the control group subdivided into 25 primary fibromyalgia patients not on those drugs and 25 healthy individuals selected by nurses and medical staff, after an informed consent from all subjects from June 2018 to December 2018. An approval was obtained from the medical ethics committee of Al-Azhar University before starting this study. All the patients were informed about the study procedures and a written consent was obtained from all of them. The subjects were categorized into three groups. Group A: 50 1ry fibromyalgia patients on SSRI. Group B: 50 1ry fibromyalgia patients on SNRI. Group C: 50 individuals as a the control group subdivided into: group C-1: 25, 1ry fibromyalgia patients non SRIs-users and group C-2: 25 healthy individuals.

Results: DXA and TBS revealed that usage of SSRIs and SNRI was significantly associated with low BMD (osteopenia and osteoporosis) specially spine BMD reduction with low TBS (partially degraded and degraded) particularly for old people.

Conclusion: The present study provided evidence that usage of SSRIs or SNRI was significantly associated with low BMD (osteopenia and osteoporosis) specially spine BMD reduction with low TBS (partially degraded and degraded) particularly for old people and despite low BMD was found in the SRI users; it also found in 1ry fibromyalgia not on SRIs so 1ry fibromyalgia should also be considered as a contributing factor for low BMD.

P254
THE ROLE OF MACROPHAGES MIGRATION INHIBITORY FACTOR IN ANKYLOSING SPONDYLITIS ACTIVITY

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Objective: Ankylosing spondylitis (AS) has been afflicting humankind as far back as ancient Egypt. The disease is recognised as part of the spondyloarthropathy group of rheumatic diseases. Macrophages migration inhibitory factor (MIF) is a potent proinflammatory cytokine implicated in several diseases. It plays a key role in the development of chronic colitis in mouse models. Elevated serum MIF levels have been reported in AS. Although the role of MIF in bone formation has been a subject of controversy, high levels of MIF transcripts have been found in murine neonatal calvaria, and CD74- knockout mice show enhanced osteoclastogenesis. The purpose of this study is to determine the role of macrophage migration inhibitory factor in ankylosing spondylitis activity and if has a role in prediction of spinal progression.

Methods: This cross-sectional case-control study were concluded upon 70 randomly selected people from internal medicine department in Kobry El-Kobba Military Hospital and from rheumatology and rehabilitation department in El-Hussein university hospital.

The population study were divided into two groups:

Group A: 50 Patients with Ankylosing Spondylitis (AS) who met the modified New York criteria for AS.

Group B: 20 Healthy controls, not known to be AS, psoriatic, enteropathic, rheumatoid arthritis, SLE, nor any other autoimmune disease.

Results: The mean age of all patients was (38.2±8.4) y. Regarding gender of the patients, the majority (65.7%) of patients were males; while (34.3%) were females. the mean disease duration of AS patients was (15.5±6.7) years; while the mean BASDAI score was (3.5±2.17). Regarding smoking, (40%) of AS patients were smokers. We also found that, (18%) od AS patients had HTN, (16%) had DM, (54%) received NSAIDs, (88%) received DMARDs, (14%) received TNFi. Regarding radiological data, (88%) of AS patients had cervical erosion or sclerosis, (46%) had dorsal erosion or sclerosis, (92%) had lumbosacral erosion or sclerosis, with m-SASS score of (11±6.1). Regarding musculoskeletal U/S, (72%) had evidence of inflammation and erosion. highly significant increase in ESR and MIF levels in progressor AS group; compared to nonprogressor AS group; with highly significant statistical difference (p<0.01 respectively), highly significant increase in m-SASS score, dorsal erosion or sclerosis and effusion and inflammation in (U/S), in progressor AS group; compared to nonprogressor AS group; with highly significant statistical difference (p<0.05 respectively). By using ROC-curve analysis, MIF level at a cutoff point (>51) predicted patients with progression, with fair accuracy (74%), sensitivity=53% and specificity=94% (p=0.0056).

Conclusion: MIF appears to have the unique ability to drive both inflammation and new bone formation and could play an important role in the pathogenesis of AS. Serum MIF levels were predictive of progressive spinal damage in AS patients.

P255
SARCOPENIA AND HEALTH-RELATED OUTCOMES: AN UMBRELLA REVIEW OF OBSERVATIONAL STUDIES

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Objective: The clinical relevance of sarcopenia has increasingly been recognized. However, whether it is associated with the development of other medical conditions is still unclear. Therefore, we aimed to capture the scale of outcomes that have been associated with the presence of sarcopenia and systematically assess the quality, strength, and credibility of these associations using an umbrella review methodology.

Methods: A systematic review in several databases was carried out, until 20 February 2019. For each association, random-effects summary effect size, 95%CIs, heterogeneity (I2), evidence for small-study effect, evidence for excess significance bias, and 95%-prediction intervals were estimated. We used these metrics to categorize the evidence of significant outcomes (p<0.05) from class I (convincing) to class IV (weak), according to pre-established criteria.

Results: From 358 abstracts, 6 meta-analyses with 14 associations were included. Sarcopenia was associated with higher risk of other comorbidities and mortality in 11 of 14 outcomes explored. However, only 3 outcomes (i.e., association between sarcopenia and increased risk of death in community-dwelling older people [odds ratio, OR=3.60; 95%CI 2.96-4.37; n=14,305], disability [OR=3.04; 95%CI 1.80-5.12; n=8569], and falls [OR=1.60; 95%CI 1.31−1.97; n=12,261]) presented a highly suggestive evidence (class II). Other association was classified as having only a weak evidence.

Conclusion: Sarcopenia is associated with several adverse health-related outcomes in older people, and its associations with mortality, disability, and falls are supported by a highly suggestive evidence. The effect of interventions on sarcopenia to improve these outcomes needs to be investigated.

P256

EFFECTS OF TERIPARATIDE OR DENOSUMAB IN ELDERLY WOMEN WITH SEVERE OSTEOPOROSIS AND HIP FRACTURES: A 2-YEAR RETROSPECTIVE, SINGLE CENTRE, OBSERVATIONAL STUDY

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Objective: In patients with severe osteoporosis (OP), the presence of a fracture represents the most important risk factor for subsequent fractures. This risk is high immediately after the event and declines thereafter. In these patients teriparatide (TPTD) and denosumab (DMAB) treatments increase BMD and bone strength through different mechanisms of action. The aim of this retrospective study was to evaluate the effects of TPTD vs. DMAB on BMD, and functional outcomes in patients with severe OP and hip fractures.

Methods: 180 patients with severe OP, mean age 77 y (71-83), referred to our hospital for an intertrochanteric fracture (AO 31 A2.2/31 A2.3) were treated with an intramedullary locking nail. After surgery patients were divided in 3 groups of 60, and treated with TPTD 20 µg sc daily, DMAB 60 mg sc every 6 months, and calcium and vitamin D, respectively. All patients received calcium and vitamin D for 2 y, and were OP treatment naive before the surgery. BMD was measured at lumbar spine, contralateral femoral neck and total hip. Time up and go (TUG), SF-36, and self-reported back pain were measured at 3, 6, 12, and 24 months after treatment.

Results: After 2 y, BMD at lumbar spine and femoral neck were significantly increased more in the TPTD group than in DMAB group. No differences were observed in the total hip. TUG test was significantly better in the TPTD group. Patients treated with TPTD reported less self-reported back pain and SF-36 score compared to patients treated with DMAB.

Conclusion: In this 2-y retrospective observational study, in elderly women with pertrochanteric femoral fractures, TPTD treatment showed better increase of BMD at lumbar spine and femoral neck, and better beneficial effects on early functional recovery parameters compared to DMAB treated patients.

P257

SARCOPENIA: PREVALENCE AND PROGNOSTIC SIGNIFICANCE IN COMMUNITY-DWELLING PATIENTS WITH ACUTE ILLNESS

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Objective: Sarcopenia is characterized by progressive loss of skeletal muscle mass and strength with associated increased risk of adverse outcomes. An acute illness is a stress for an elderly person with sarcopenia, mainly due to the inflammatory and catabolic state, but there is not enough data about its prevalence and prognostic significance in elderly persons hospitalized for acute state. We aimed to evaluated the prevalence and prognostic significance of sarcopenia in elderly patients hospitalized for acute illness.

Methods: This cross-sectional study included 150 community-dwelling elderly patients hospitalized for acute disease. The patients were evaluated for cognitive state, comorbidities, smoking status, fall frequency, anthropometric data, BMI and basic activity daily living (BADL). Sarcopenia was defined as low muscle mass, estimated by low skeletal mass index (SMMI <8.9 kg/m^{2} for men and SMMI <6.37 kg/m^{2} for women) and poor physical function, estimated using the SARC-F questionnaire (SARC-F ≥ 4 taken as positive for sarcopenia).

Results: The study included 150 patients. The mean age was 85.7±5.4 y. Sarcopenia was prevalent in 74.2% patients aged ≥83 y. Patients with sarcopenia had more concomitant diseases and had significantly longer length of hospitalization. Patients with sarcopenia needed more hours per week of assistance in the basic everyday functions and had more recurrent hospitalizations (24% vs. 15.6% in the patients without sarcopenia).

Conclusion: Our findings demonstrate the importance of screening for sarcopenia among elderly patients with acute disease.

P258

SECONDARY FRACTURE PREVENTION IN HIP FRACTURE PATIENTS: 6-YEAR IMPACT OF A FRACTURE LIAISON SERVICE

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Objective: Osteoporotic hip fractures are associated with increased morbidity, mortality and subsequent fractures. Fracture liaison services (FLS) are recommended as a model of best practice for organizing patient care and preventing subsequent fracture for hip fracture patients. We report the impact of an FLS strategy on the management of patients after hip fracture.

Methods: 1870 patients with hip fragility fracture ≥50 years were identified by the FLS from the orthopedic surgery department in a large Belgian university hospital from 2012-2018.

They were invited through a written and personal invitation at the outpatient department, for a DXA measurement and visit to our FLS. Patients who did not respond were contacted by telephone.

Results: Of the 1870 patients who were identified, 230 (12.30%) were already followed for osteoporosis. 227 patients (12.14%) died, between the diagnosis and hip fracture invitation to participate in our program. Our target population was 1413 patients. Out of them, 381 (26.97%) visited our FLS clinic. The main reasons given by the nonparticipating individuals were lack of interest or not reachable (n=766; 54.21%), primary care doctor refus-

al (n=57; 4.04%), physically unable to attend the clinic (n=208; 14.72%). Among the 381 patients (273 women, 71.65% - mean (SD) age: 79.25 (11.01) y), the following risk factors were highlighted: low BMI (n=41; 10.76%), early menopause (53 women, 19.41% of women), prior fragility fracture (n=136; 35.70%), prior family fragility fracture (n=52; 13.64%), taking corticosteroids (n=24; 6.30%), alcohol consumption (n=22; 5.77%), active smoking (n=72; 18.89%). Within the population who attended the clinic, 246 patients (64.57%) were receiving calcium and/or vitamin D supplementation. 8.92% (n=24) were treated at the time of consultation by an inhibitor of bone resorption and 7.61% (n=29) had been previously treated.

After DXA, and according to the WHO criteria, 18.52% of patients (n=70/378) had trabecular osteoporosis and 46.80% (n=154/329) had cortical osteoporosis. Using the FRAX algorithm, 44.88% (n=171) and 39.90% (n=152) of patients, respectively, were considered at increased 10-year probability of hip fracture or major osteoporotic fracture based on the normative data for Belgium.

Conclusion: In a population with a non-traumatic hip fracture, only 8.92% of patients having sustained a hip fracture were receiving an anti-osteoporosis medication. With the implementation of a FLS, in close collaboration with the Department of Orthopedic Surgery, 359 additional patients (25.41% of our sample) were screened for osteoporosis and were offered an appropriate treatment to prevent subsequent fracture.

P259

IDENTIFICATION, THROUGH A FRACTURE LIAISON SERVICE, OF UNDIAGNOSED VERTEBRAL FRACTURES IN PATIENTS HOSPITALIZED FOR A PREVALENT HIP FRAGILITY FRACTURE

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Objective: The prevalence of undiagnosed vertebral fragility fracture (VFF) is high in elderly people. This study aims to identify through a Fracture Liaison Service (FLS), the prevalence of undiagnosed VFF in patients presenting with a hip fragility fracture.

Methods: Patients with hip fragility fracture were identified by the FLS of a large Belgian university hospital from 2012-2018. A subset visited our FLS and benefited from a DXA measurement and of a spinal x-ray.

Results: A total of 381 patients were assessed (273 women, 71.65% - mean (SD) age: 79.25 (11.01) y). During the anamnesis, 143 patients (37.53%) reported a history of other fragility fracture including only 17 patients (4.46%) reporting spinal fracture. After spinal X-ray, 171 patients (44.88%) were identified as presenting a VFF, 97 (56.73%) of them having multiple fractures. Within those, DXA identified 25.15% of patients with trabecular osteoporosis

and 47.95% of patients with cortical osteoporosis following the WHO diagnostic criteria. Mean (SD) age was nonsignificantly higher in those with vertebral fractures compared to those without: 75.64 (10.54) y vs. 74.66 (10.92) y (p-value=0.38). The age category (based on the median age of 77) did not increase the risk of having multiple fractures (p=0.51).

Conclusion: The implementation of a FLS allowed us to identify 154 patients, out of a sample of 381 patients with hip fragility fracture, presenting with undiagnosed vertebral fracture. They were offered a management strategy to prevent subsequent fractures. Age was not related to an increase in the presence of multiple fractures.

P260

INTERLIMB MUSCULOSKELETAL ABNORMALITIES IN PATIENTS IN RECOVERY FROM A UNILATERAL RUPTURE-REPAIRED ACHILLES TENDON

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Objective: Our previous study has found kinematic and kinetic gait asymmetries after an Achilles tendon rupture (ATR). The purpose of this study was to compare the interlimb joint kinematics, joint moments, muscle forces and joint reaction forces in patients after an ATR during walking, jogging and running via subject-specific musculoskeletal modeling.

Methods: Six patients recovering from a surgically repaired unilateral ATR were included in this study. The bilaterally Achilles tendon (AT) lengths were evaluated using ultrasound imaging. The three-dimensional marker trajectories, ground reaction forces and surface electromyography (sEMG) were collected on both sides during self-selected speed walking, jogging and running. Subject-specific musculoskeletal models were developed to compute joint kinematics, joint moments, muscle forces and joint reaction forces. One-dimensional statistical parametric mapping (SPM1d) with a two-sample t-test was conducted to assess differences over a stance phase on the variables of interest between the involved and uninvolved sides.

Results: AT lengths were significantly longer in the involved side. The side-to-side triceps surae muscle strength deficits were combined with decreased plantarflexion angles and moments in the injured leg during walking, jogging and running. However, the increased knee extensor femur muscle forces were associated with greater knee extension degrees and moments in the involved limb. Greater knee joint moments and joint reaction forces vs. decreased ankle joint moments and joint reaction forces in the involved side indicate elevated knee joint loads compared with reduced ankle joint loads that are present during normal activities after an ATR. In the frontal plane, increased subtalar eversion angles and eversion moments in the involved side were demonstrated only during jogging and running.

Conclusion: After an ATR, the elongated AT accompanied by decreased plantarflexion degrees and calf muscle strength deficits indicates ankle joint function impairment in the injured leg. In addition, increased knee extensor muscle strength and

knee joint loads may be a possible compensation mechanism for decreased ankle function. These data suggest patients after an ATR may suffer from increased knee overuse injury risk.

P261
VITAMIN D RECEPTOR ATTENUATES MUSCLE ATROPHY BY SUPPRESSING THE RENIN-ANGIOTENSIN SYSTEM

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Objective: Vitamin D deficiency is associated with a range of muscle disorders, including muscle atrophy, but its functional role and the underlying mechanism in muscle physiology remain unclear. We investigated the effect of vitamin D receptor (VDR) deletion on skeletal muscle using a mice model with dexamethasone-induced muscle atrophy.

Methods: The wildtype and VDR(-/-) mice were treated with vehicle and dexamethasone (i.p., once daily) for 10 consecutive days. The murine myoblast cell line C2C12 was used as an *in vitro* model in this study.

Results: After challenging to dexamethasone, VDR-null mice exhibited more severe amyotrophy compared with wildtype counterparts, manifested by marked weight loss and significant decrease in muscle wet weight coefficient of the tibialis anterior muscle and gastrocnemius as well as the reduction of limb grip and weight-loading swimming time. Similarly, dystrophin fluorescence staining and haematoxylin eosin staining showed the decrease in cross-sectional area of skeletal muscle in the VDR-null mice. VDR knockout mice significantly accelerated protein degradation and inhibited protein synthesis in skeletal muscle tissue. MAFbx and MuRF1 are two E3 ubiquitin ligases that are important regulators for ubiquitin-mediated protein degradation in skeletal muscle, while myogenic differentiation-1 (MyoD) and myosin heavy chain (MHC) are necessary to maintain muscle proliferation and differentiation. In addition, we further assessed whether increased angiotensin II (Ang II) in VDR knockout muscle accelerated the muscle injury, since the deletion of VDR activated RAS, giving rise to the accumulated of Ang II in skeletal muscle. Treatment with the angiotensin type 1 receptor blocker olmesartan eliminated Ang II-induced atrophy of myotube cells, reflected by alleviating myotube cell atrophy via MHC fluorescent staining as well as suppressing the protein degradation and promoting of protein synthesis, suggesting that Ang II could aggravate atrophy of skeletal muscle cells.

Conclusion: These results provided evidence that VDR attenuated dexamethasone-induced skeletal muscle atrophy at least in part by suppressing the renin-angiotensin system.

P262
GAIT ANALYSIS USED IN ATHLETES RECOVERY FROM ACHILLES TENDON RUPTURES

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Objective: To develop and validate a workflow that will allow noninvasive characterization of Achilles tendon (AT) properties in terms of its geometry, material properties, and nonuniform displacement and based on these allow to select appropriate rehabilitation exercises that will deliver the optimal strain distribution in the tendon to optimize the recovery process.

Methods: Six subelite male athletes who had undergone surgical repair of a unilateral AT rupture (ATR) within the past 18-24 months participated in this study. Then subjects were asked to walk and run at their self-controlled and comfortable speeds on a 16-m track. The three-dimensional marker trajectories were captured using a VICON motion analysis system (Oxford Metrics Ltd, Oxford, UK), with 8 cameras and sampling at 200 Hz. Ground reaction forces (GRFs) were collected using a 600×400 mm AMTI force platform (AMTI, Watertown, MA, USA) at a sampling frequency of 1000 Hz. Visual-3D (Version 3.26.0, C-motion, USA) gait analysis software was used to calculate the kinematics and joint moments.

Results: Gait analysis indicates that the athletes with a history of surgically repaired ATR have increased ankle dorsiflexion and decreased knee flexion during the stance phase of walking and running on their injured limb compared with the uninjured limb. Increased impact peak and loading rate was accompanied by higher hip and knee adduction angles, angular velocities and moments on the injured limb, which have been previously associated with chronic knee pain tibia stress fracture.

Conclusion: The kinematic results may be explained by a compensation mechanism, which is against the functional deficit in the elongation of AT and muscle-tendon complex of the triceps suare. However, the compensation mechanism during movements has been previously linked to knee osteoarthritis and knee overuse injury. Overall, many of the biomechanical variables were found to be asymmetric during walking and running associated with previous ATR.

P263
THE EFFECT OF BISPHOSPHONATE USE PRIOR TO WEEKLY TERIPARATIDE TREATMENT IN OSTEOPOROSIS PATIENTS

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Objective: Bisphosphonate (BP) use prior to daily teriparatide (d-TPTD) treatment may reduce the increase in BMD. The impact of prior BP treatment on weekly (w) TPTD has not been reported. This study aimed to determine the effect of BP prior to w-TPTD on the efficacy of osteoporosis treatment.

Methods: This study included 103 patients with severe osteoporosis (8 men and 95 women, mean age: 73.9 y). Of these, 46 had primary osteoporosis and 57 had secondary osteoporosis, including glucocorticoid-induced osteoporosis. We reviewed bone turnover markers (BAP, TRACP 5b) and BMD (lumbar spine [LS] and femoral neck [FN] using DXA) every 6 months and calculated the ratio of change from baseline. We also reviewed medical records for new osteoporotic fragility fractures. We divided subjects into a prior BP treatment group (prior BP(+): n=32) and others (prior BP(-): n=71), and compared all reviewed factors.

Results: BAP and TRACP 5b changes from baseline in the prior BP(+) group and prior BP(-) group were 16.2% and -1.7%, and 1.6% and -6.3% at 6 months, 19.1% and -5.8%, and -7.5% and -4.8% at 12 months, 9.4% and -10.6%, and -13.9% and -11.7% at 18 months, respectively. Changes in BAP were significantly higher than those in the prior BP(+) group at every time points (p<0.05). BMD changes in the LS and FN at 18 months were 4.1% and -2.3%, respectively in the prior BP(+) group, and 6.0% and -1.3%, respectively in the prior BP(-) group. There were no significant differences between groups (p>0.05). However, in secondary osteoporosis patients, BMD changes in the LS and FN BMD in the prior BP(+) group and prior BP(-) group were 1.5% and -2.8%, and 2.3% and 0.5% at 6 months, 1.9% and -3.5%, and 5.2% and 1.3% at 12 months, 4.5% and -2.3%, and 5.9% and 1.2% at 18 months, respectively. BMD changes tended to be low in the prior BP(+) group. Further, FN BMD changes at 12 months in the prior BP(+) group was significantly lower than those in the prior BP(-) group. New fragility fractures were observed 8 cases in prior BP(-) group and 8 cases in BP (+) group.

Conclusion: Similar to previous reports of d-TPTD treatment, BP use prior to w-TPTD treatment also might induce less effect on BMD, especially in secondary osteoporosis patients. In addition, BP use prior to w-TPTD treatment induced high BAP changes from baseline. The trend of bone formation marker might affect to this mechanism.

P264
SCIENTOMETRIC STUDY OF OSTEOPOROSIS MANAGEMENT BY TRADITIONAL HERBAL MEDICINES IN THE MIDDLE EAST COUNTRIES

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Objective: Prevalence of osteoporosis is increasing worldwide. Recently there is an increasing demand for usage of traditional herbal medicines in management and care of osteoporosis due to their access, safety, and low-cost. The purpose of this bibliometric study is to assess the global scientific production analysis in field of traditional herbal medicines and osteoporosis in the Middle East countries.
Method: Some of search terms were "osteoporosis"," herbs", "traditional medicine", in Scopus web database, limited in Middle East countries up to 30 December 2019. Our extracted data were publication year, main journal, geographical distribution, documents' type, subject area, and h-index of citations. Data was analyzed using analysis tools provided by Scopus database, and SPSS version 11 software.
Results: Among 215 global publications in studied field, more than 85.5% of the published papers were original articles. A significant time-trend was shown in number of papers (P<0.001) with a highest number of productions in 2018 (27 papers). Subject areas in nearly 80% of papers were medicine followed by pharmacology. The first to third rank in number of publications in the region were belonged to Iran, Turkey, and Egypt, respectively with 175 papers (81.4% of total papers). The documents were cited totally 2438 times with average citation/article 8.82, and h-index 25. The highest cited paper (161 times) was an original article from Turkey entitled "Lipid peroxidation levels and total oxidant status in serum, saliva and gingival crevicular fluid in patients with chronic periodontitis". The second rank of high cited paper (139 times) was belonged to a review article from Iran entitled "A review of therapeutic effects of curcumin". The first three top sources were "Journal of Planar Chromatography Modern TLC", "Phytotherapy Research" and "Comparative Clinical Pathology". Among "key words", the highest rates were observed for "oxidative stress", "drug effect", and "antioxidants".
Conclusion: Good position of Middle East countries in producing scientific publications for management of osteoporosis by herbal medicines especially by antioxidative herbal medicines would be helpful for researchers to conduct better researches and for policy makers to arrive at evidence-based decisions.

P265

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CORRELATION BETWEEN REACTIVE OXYGEN SPECIES (ROS) AND CANCER (CR)

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Objective: It has been demonstrated a strong correlation between ROS and CR heterogeneity which may contribute to modulate therapy. Heterogeneity, which is a hallmark of CR, is one of the main factors related to resistance to chemotherapeutic agents.

Methods: It is known that heterogeneity is affected by increasing levels of ROS. Tumor cells express increased levels of antioxidant proteins to detoxify from ROS, suggesting that a delicate balance of intracellular ROS levels is required for CR cell function. CR comprises a group of several malignancies characterized by distinguishing hallmarks of CR which may correspond to several parameters: hyperproliferation, angiogenesis, insensitivity to antigrowth factors, resistance to apoptosis, escape from destruction by the immune system, inflammation and genome instability.

Results: Although the breakthroughs in CR therapy experienced recently have clearly improved the quality of life of the patients, statistically, many of them still succumb. The information about CR statistics have shown that, the majority of tumors exhibit a substantial sensitivity to current traditional therapies, but often, these tumors relapse and anticancer drug resistance is established. Resistance to chemotherapy is closely related to tumor heterogeneity. ROS are pleiotropic molecules of free radicals generated by several complex mechanisms of which the most relevant is the incomplete oxidative phosphorylation that occurs during biomolecule catabolism, especially in the electronic transport chain. Under homeostasis, the cells are protected from the deleterious effects of ROS because they prevent enzymatic systems responsible for dismantling these highly reactive molecules or even antioxidant substances capable of inactivating excessive ROS and in turn reducing their toxicity. ROS overproduction, failures in the scavenging mechanisms, or even the insufficiency of antioxidants may lead to ROS accumulation culminating in oxidative stress, state of a cell which is characterized by the oxidation of essential biomolecules.

Conclusion: It has been clearly suggested that ROS are important and pleiotropic signaling molecules actuating as a double-edged sword in physiologic and pathologic processes such as several diseases, carcinogenesis and even CR heterogeneity.

P266
THERAPEUTIC POTENTIAL OF MOLECULAR HYDROGEN (H2) VIA REACTIVE OXYGEN SPECIES (ROS)

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Objective: Formation of ROS is strongly related to the emergence of several human pathologic conditions such as atherosclerosis, neurodegenerative diseases, and aging as well as certain types of human cancers including lung, breast, and colon. ROS are generated in organisms by γ, X, and UV radiation, biotransformation of dietary chemicals, some diet components, for example, transient metal ions and inflammatory reactions during normal cellular metabolism [1].

Method: Clinical and preclinical studies have reported a broad range of applications for molecular hydrogen. H_2 can permeate into bio membranes, cytosol, mitochondria and nuclei and can be dissolved in water. H_2 reduces oxidants of the detrimental ROS including hydroxyl radicals (OH^-) and peroxynitrite ($ONOO^-$), which serve a causative role in the promotion of tumor cell proliferation, invasion and in particular situations metastasis but do not disturb metabolic oxidation-reduction reactions in cell signalling.

Results: H_2 selectively quenches detrimental ROS and it has become an interesting molecule due to its anti-apoptotic, anti-inflammatory, antioxidant and anti-allergy effects. Cancer is a multi-stage process defined by initiation, promotion and progression. ROS can increase tumor cell proliferation, survival and cellular migration in animal models and humans by inducing cellular signal transduction pathways. Tumor cells generate ROS more abundantly than normal cells and cause elevated oxidative stress. Oxidative stress is an imbalance in the body where harmful uncharged oxygen atoms (free radicals) are not being efficiently neutralised by antioxidants. This is known to contribute to cancer development. H_2 is a powerful antioxidant and can counteract free radicals and therefore help in the fight against cancer.

Conclusion: Damage to DNA by ROS is involved in chronic inflammatory diseases and in a wide variety of cancer types, including bladder cancer brain tumors and breast cancer.

Reference: 1. Tudek B et al. Am J Transl Res 2010;2:254

P267
HIP ARTHROPLASTY FOR FAILED INTERNAL FIXATION OF INTERTROCHANTERIC FRACTURES

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Objective: To analyze the clinical and radiological results of hip arthroplasty following the failed internal fixation of intertrochanteric fractures of the femur.

Methods: We analyzed the reasons for failure in 29 cases of hip arthroplasty from January 2007 through December 2018 in which the hip arthroplasty was necessary due to failed internal fixation of an intertrochanteric fracture of the femur. Furthermore, we tried to find pitfalls encountered when performing the operations. We assessed those patients and drew both clinical (Harris hip score, HHS) and radiological results. The follow-up period was 34.2 months (12-96 months), on average.

Results: The average operating time was 174 min (115-205 min) and the mean amount of perioperative bleeding was 1335 ml (759-2450 ml). The amount of packed RBC transfusion was 2.8 units (0-10 units) on average. We could see prolonged operation time and a large amount of blood loss as we performed both the removal of the previously fixed implant and reduction of the displaced bone fragment simultaneously. The mean Harris hip

score of the patients was improved from the preoperative score of 43 to the postoperative score of 85.7. No cases showed any radiological signs of loosening of acetabular cups or femoral stems, although an articular dislocation and a postoperative joint infection occurred.

Conclusion: Although hip arthroplasties performed because of a failure in internal fixation could provide relatively satisfactory outcomes, as they result in extended surgery time and greater blood loss, a requirement for higher-level surgical skills, and greater consideration required for the systemic conditions of patients before performing surgery.

P268
THE IMPACT OF DOME HEIGHT OF THE FIRST METATARSAL HEAD ON HALLUX VALGUS DEFORMITY

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Objective: Hallux valgus (HV) is a progressive foot deformity in which the first metatarsophalangeal (MTP) joint is affected. In our study, we aimed to investigate a possible relation of the dome height of the first metatarsal head and articular alignment with the hallux valgus angle (HVA) which is frequently used to evaluate HV.

Methods: A total of 129 feet of 68 patients were included in the study. Anteroposterior digital X-ray images of the foot taken in a weight-bearing, standing position were used to assess the HVA, dome height, and shape of the first metatarsal bone and the alignment of the MTP joint.

Results: A statistically significant, positive correlation was found between the HVA and the dome height of the first metatarsal head (p=0.001; p<0.05). The dome height was significantly less in the patients with a normal HVA than those with a high HVA. The dome height of the first metatarsal head was found significantly higher in feet with subluxation, compared to feet aligned and deviated (p1=0.001; p2=0.0089; p<0.05, respectively).

Conclusion: Our study results suggest that the measurement of the dome height of the first metatarsal head can be used to evaluate an anatomic tendency toward HV development and the dome height may be a novel marker in addition to current diagnostic measurement tools.

P269
PHARMACOLOGICAL INHIBITION OF CCN1 SIGNALING MITIGATES REPLICATIVE SENESCENCE, CARTILAGE MATRIX DEGENERATION AND OSTEOARTHRITIS

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Objective: Osteoarthritis(OA) is an aging-related disease presenting as **senescence-associated secretory phenotype**(SASP), matrix degradation, structural disorientation, functional pain and loss of mobility in the synovial joint. However, how the chondrocyte senescence is initiated and regulated remains unclear. Cellular communication network factor 1 (**CCN1**) is an extracellular matrix protein functioning as a master regulator of cartilage hypertrophy during limb embryogenesis, but the second peak of CCN1 occurring in **cartilage aging** and OA pathogenesis has not been well defined yet. In this study, we investigated the role of CCN1 in cartilage inflammaging and OA in isolated primary human chondrocytes *in vitro*, cartilage explants *ex vivo* and a preclinical mice model targeting on CCN1-induced replication senescence.

Methods: Human cartilage samples were collected from 18 patients (66.75±2.169 y) with unilateral Kellgren-Lawrence grade 3-4 confirmed by radiography post total knee arthroplasty. Young cartilage samples (n=3) were donated from the Musculoskeletal Transplant Foundation. Cell proliferation was measured by CCK8 assay (Thermo Sigma). Cell senescence was determined by beta-galactosidase staining kit (Cell signaling Technology). RNA was extracted to quantify catabolic targets and pro-inflammatory genes (QiaGen), the protein was probed with specific antibodies (Abcam), IL-1β and IL-6 were determined by ELISA kit (R&D system). Immunohistochemistry (IHC) was performed to evaluate CCN1, hypertrophic makers COL10 and MMP13. Intra-articular injection of Tanshinone IIA (Tocris Bioscience) was performed in the right knee in 14 months old C57BL/6J mice. Safranin O and fast green staining were performed to evaluate the histological change. Semiquantification analysis was included to evaluate the cartilage condition by using the OARSI scoring system.

Results: To determine whether CCN1 was involved in cartilage aging, we collected, processed and incubated human cartilage samples with CCN1-specific antibody. It revealed that CCN1 expression increased in aged cartilage compared to young cartilage samples. Consistent with our observation, an elevated expression of CCN1, COL10 and MMP13 were detected at RNA and protein level, indicating that CCN1 involved in the cartilage matrix degeneration during aging. To further understand the role of CCN1 in OA pathogenesis, we examined the distribution of CCN1 and receptor using dual immunofluorescence staining and immunohistochemistry. It showed that CCN1 and its corresponding receptor integrin α6β1 increased in the lesion area compared to normal-looking area, which is parallel with the enhanced expression of COL10 and MMP13 and augmenting cartilage damage illustrated by histological assessment. Thus CCN1 axis contributed to cartilage aging and OA. To determine the direct effect of CCN1 on chondrocytes, we treated human

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OA chondrocytes for 48 h. It stimulated cell proliferation at 24 h and 48 h, and promoted cellular senescence which was confirmed by β-Gal staining. We next measured p16[Ink4a], a key marker of replicative senescence, IL-1β, MMP13 and ADAMTS5, key hallmarks of matrix degrading enzymes. Our data showed increased p16INK4a, IL-1, and MMP13 production in chondrocytes in the presence of recombinant human CCN1. On the other hand, knocking down CCN1 abolished stimulation effects on MMP13 synthesis and rescued senescence by suppressing p16[INK4a] and IL-1β release. Therefore, CCN1 is sufficient and essential to stimulate chondrocyte senescence, cartilage degeneration and SASP release. Overexpression of CCN1 promoted chondrocyte senescence, while downregulation of CCN1 by small interfering RNA reduced CCN1 and limits SASP release, which suggested that CCN1 was novel target to treat OA. Given the role of CCN1 in cartilage inflammaging and OA development, we utilized Tanshinone IIA (TanIIA) to delay CCN1-driven cartilage damage in aging and OA. Human OA chondrocytes were isolated from cartilage samples, incubated in growth medium and treated with TanIIA. Our data showed that TanIIA inhibited CCN1 synthesis, p16[INK4a] expression and SASP markers a time-dependent fashion and dose-dependent manner. We further investigated the effect of TanIIA on human cartilage explants *ex vivo* for 14 d, which showed decreased CCN1, COL10, MMP13 and SASP markers including IL-1β and IL-6. Thus, TanIIA treatment provided a promising cartilage-protective effect in organ-like culture *ex vivo*. To determine whether TanIIA serves as a senostatic drug *in vivo*, TanIIA was weekly injected into the right knee joint in aged mice for 8 weeks. Our results demonstrated increased Sox9 and Col2 (anabolic markers), downregulated Col10 (OA marker), MMP13 and ADAMTS5 (catabolic markers), suppressed p16[INK4a], p21, IL-1β, IL-6, Cxcl1, Mmp3 (SASP components) at a RNA level. Consistent observation showed in IHC staining. Therefore, TanIIA preserved the cartilage integrity, decreased COL10 and MMP13 expression and restored aging cartilage homeostasis in a preclinical model *in vivo*.

Conclusion: This is the first study to show that CCN1 signaling aggravates cartilage inflammaging and matrix degradation. Collectively, our findings shined new insight to translate Tanshinone IIA into slowing down OA pathogenesis in human and mice by targeting CCN1 axis.

P270
GENE-SET ANALYSIS SUGGESTS MULTIPLE DIFFERENT GENES AND PATHWAYS FOR BONE MINERAL DENSITY AT DIFFERENT SKELETAL SITES

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Objective: Osteoporosis is a common disease characterized by decreased bone mass and increased tendency of fragility fractures. BMD, which is the most widely used predictor for osteoporosis, is highly heritable with heritability estimates between 0.5-0.85. However, the onset and rate of bone loss at various skeletal sites are quite different, and bones commonly break include the vertebrae in the spine, the bones of the forearm, and the hip. One explanation for this is the difference driven by genetic effects determining bone fragility. In this study, we aim to identified different genes and gene sets for BMD at different sites by using gene-set analysis.

Methods: The GWAS summary data from the GEFOS Consortium for three DXA-derived BMD at different sites are included in this study, which are the femoral neck (FN) BMD, lumbar spine (LS) BMD, and forearm (FA) BMD. We first mapped SNPs in the GWAS summary data to 19,137 genes based on NCBI (36.3) gene definitions through the annotation step in MAGMA, then the gene p-values to BMD at different sites were calculated based on the mean SNP association. Finally, we performed a primary gene-set analysis with the 2199 canonical pathways from the MSigDB database and identified genes and gene sets for BMD at different sites.

Results: We identified 32, 25 and 6 genes significantly associated with BMD after multiple testing corrections at FN, LS and FA separately ($P < 2.61×10^{-6}$). Only *CCDC170* associated with BMD at all three sites ($P_{FN}=9.19×10^{-17}$, $P_{LS}=8.09×10^{-20}$, $P_{FA}=7.10×10^{-7}$). 21, 14 and 5 genes associated with BMD only at FN, LS or FA. There are eleven genes associated with BMD at both FN and LS, such as *ZBTB40*, *SCN1A*, and *SHFM1*. Gene-set analysis found 21, 45 and 26 gene sets associated with BMD at FN, LS, and FA separately ($P<0.01$). Among the identified gene sets, only CREB3_factors_activate_genes associated with BMD at both LS and FA ($P_{LS}=3.80×10^{-3}$, $P_{FA}=1.69×10^{-3}$), other gene sets were only associated with BMD at one specific site, which demonstrated the difference of the genetic effect for BMD at different sites.

Conclusion: We applied gene-set analysis and identified different genes and gene sets for BMD at different sites.

P271
EVALUATION OF THE CAUSAL ASSOCIATION BETWEEN PROTEIN LEVELS AND OSTEOPOROSIS: A MENDELIAN RANDOMIZATION STUDY

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Objective: Osteoporosis is a common disease in which bone weakening increases the risk of a broken bone. Large prospective epidemiological studies show that high protein intake is associated with the increase of bone mineral mass and the decrease in the incidence of osteoporotic fractures. However, little is known about the causal relationship between plasma protein levels and

osteoporosis. In this study, we explored the causal associations between plasma protein levels and osteoporosis via Mendelian randomization (MR).

Methods: The summary-level genome-wide association studies (GWAS) for 3263 plasma protein levels were used as exposures. The genetic statistics for osteoporosis with a large sample size were acquired from UK Biobank. We selected independent GWAS SNPs for each exposure using the clumping algorithm in PLINK at a suggestive threshold (r^2 threshold=0.001 and window size=1 Mb) with the 1000 Genomes Project data as the reference for linkage disequilibrium estimation. The genome-wide significant *P-value* for protein levels was set as 1×10^{-5} to get enough instrumental variants for MR analyses. We then removed horizontal pleiotropic SNPs using RadialMR. We conducted four two-sample MR methods, including Inverse-Variance Weighted (IVW), Weighted-median, Weighted mode, and MR-Egger regression. The final results considered the directional consistency of estimate for all methods and all these analyses were performed with R package (TwoSampleMR).

Results: The fixed-effect IVW meta-analysis demonstrated a risk effect of protein PSAPL1 on osteoporosis after multiple testing corrections (OR=1.348, 95%CI: 1.196-1.519, *P*=9.77×10^{-7}). MR-Egger regression analysis did not produce evidence of directional horizontal pleiotropy (OR=1.002, 95%CI: 0.951-1.056, *P*=0.943), and identified a similar causal effect of PSAPL1 level on osteoporosis (OR=1.334, 95%CI: 0.988-1.801, *P*=0.079). Sensitivity analysis also demonstrated similar causal effects using the weighted median (OR=1.297, 95%CI: 1.095-1.535, *P*=2.60×10^{-3}) and weighted mode (OR=1.261, 95%CI: 1.003-1.586, *P*=0.0649), respectively.

Conclusion: We investigated the causal effect of plasma protein levels on osteoporosis using two-sample MR methods. Our results suggest the risk effect of protein PSAPL1 on osteoporosis.

P272
TAPENTADOL IN AN OF COMPLEX PAIN SYNDROME IN OSTEOPOROTIC VERTEBRAL FRACTURES

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Objective: Severe neuropathic pain, which does not allow rehabilitation, can join acute pain in osteoporotic vertebral fractures. We aimed to evaluate the effectiveness of using tapentadol with poor tolerance to nonsteroid drugs, tramadol, gabapentin/pregabalin.

Methods: 19 patients with poor tolerance of standard drugs were given tapentadol tablets 50 mg, 2 times a day. After 3 days, 1 week, 1 month and 3 months, YOUR pain level, the number of tablets taken and the tolerance of the drug were evaluated.

Results: At the time of administration of tapentadol, pain according to YOUR more than 80 mm. By day 3, pain reduction by YOUR 30% (up to 51.8±12.5 mm). By day 7, 11 patients had reduced the rate of taking tapentadol by 32%, by the end of 1 month only 6 patients had continued taking tapentadol. The level of pain in the 1st group was 39.3±10.6 mm, in the 2nd - 58.7±8.3 mm. 17 out of 19 patients reported regular exercise recommended for muscle building. Vertebroplasty was performed on 2 patients with neuropathic pain syndrome and the pain syndrome was stopped. By the 3rd month of therapy, all patients stopped taking tapentadol due to lack of need, took simple analgesics on demand. The average pain level for YOUR was 37.5±16.4 mm for YOUR.

Conclusion: The use of tapentadol allows you to effectively stop mixed pain with poor tolerance of other drugs. Adequate analgesia contributes to the early activation of patients with AKI, favorably affects rehabilitation, and improves the quality of life of patients.

P273
PATHOLOGICAL FRACTURES IN WOMEN IN MENOPAUSE WITH TYPE 2 DIABETES AT NORMAL MINERAL DENSITY

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Objective: To assess the incidence of pathological fractures in menopausal women with type 2 diabetes mellitus with normal BMD.

Methods: The study included 50 menopausal women aged 50-75 y. The average age of the patients is 62.2±5.7 y. Gr 1 with newly diagnosed type 2 diabetes - 15 people, Gr 2 with type 2 diabetes for more than 10 y - 20 people, Gr 3 control - 15 people, not suffering from diabetes, comparable in age and BMI. The average T-criterion detected during osteodensitometry in the 1st gr (-0.8)±1.1; in gr 2 (-0.7)±1.7; in gr 3 - (-0.7)±1.8. Osteodensitometry was performed on a DPX bone x-ray densitometer Lunar, GE (USA). According to WHO recommendations, the assessment of bone tissue was carried out according to the T-criterion, a 10-y risk of fractures was evaluated using the FRAX.

Results: A history of low-traumatic fractures was observed in 5 from the 1st group (33%), 13 from the 2nd (65%) and 3 out of 3 (20%). Moreover, out of 50 women with normal BMD in the presence of one or more pathological fractures, a high risk of major osteoporotic fractures was identified only in the group under 68 y of age, provided that a femoral neck fracture occurred in blood relatives, and a high risk of femoral neck fracture in patients older than 73 y, in the absence of a history of fractures, a high risk of a femur fracture was revealed in a 75-year-old patient, which is determined by the age criteria of the evaluated group.

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

Conclusion: Low-traumatic fractures in the group with newly diagnosed type 2 diabetes are observed 2 times more often than in healthy individuals, and in patients with type 2 diabetes more than three times more than 10 y, which indicates a negative effect of type 2 diabetes on bone mass with its normal mineralization.

P274
FRAILTY AND SARCOPENIA IN INFLAMMATORY RHEUMATIC DISEASE

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Objective: The incidence of rheumatoid arthritis (RA) and spondylarthritis (SpA) increases with age. In the ageing population, therefore, it is expected that the number of patients with RA and SpA will grow proportionally and more patients will have co-morbidities but also so called geriatric syndromes (GS). GS are clinical and multifactorial conditions in older persons that are associated with poor health outcomes, do not fit into disease categories (comorbidities) and require a multidimensional treatment approach. Limited awareness of the risk for GS in patients with inflammatory rheumatic disease among rheumatologists may lead to ineffective management of RA and SpA. Sarcopenia, the loss of skeletal muscle mass, is associated with adverse individual physical and metabolic changes contributing to morbidity and mortality. Sarcopenia is a core component of physical frailty that together impact negatively on an individual's capability to live independently. Sarcopenia and frailty are important problems among elderly individuals. Although relationships between sarcopenia and various chronic inflammatory diseases have been shown, the role in rheumatologic disease is currently unknown. The aim of this study was to assess the prevalence of sarcopenia and frailty syndrome in patients with RA and SpA.

Methods: Cross-sectional, observational and descriptive study in patients with RA and SpA (ACR and ASAS criteria) older than 50 y. We measure sarcopenia and frailty in each patient..

Sarcopenia was defined as per EWGSOP definition as Skeletal muscle mass index (SMI) $\leq$ 8.87 kg/m^2 in men and $\leq$6.42 kg/m^2 in women. Body composition analysis was performed using bioelectrical impedance analysis (BIA): fat mass, fat-free mass and predicted skeletal muscle mass were collected. Skeletal muscle mass index (SMI) was calculated by appendicular skeletal muscle mass (sum of predicted muscle mass in all 4 limbs) divided by height squared. Fragility was measured according to the 5 criteria proposed by Fried, using the Frail scale, and it was considered fragile to the patient who met at least 3 and prefragiles to those who met at least 2. Frail scale: Based on 5 items, reflecting performance, self reports and common comorbidities (1).

Results: 523 consecutive RA and SpA patients were included, 79.3 %) were female. Mean age was 55.4 y. Patients with SpA were 39.3% ankylosing spondylitis, 31.6% psoriasis arthritis, 20.1% undifferentiated SpA, 9% SpA associated with inflammatory bowel disease.

Mean number of comorbidities was 1.47, with systemic hypertension and obesity as the most frequent ones (32.6% and 27.1%, respectively). Polypharmacy was found in 94.2% and 63.9% received more than five drugs simultaneously. RA patients: 21.5% met frailty criteria (42% in $\geq$65 years old patients). SpA patients:18.9% met frailty criterion (37% in $\geq$65 years old patients).

Conclusion: Prevalence of frailty in this study was high. Sarcopenia and frailty is significantly higher in our patients with RA and SpA over 50 y of age than in the general population of the same age and sex. Rheumatologists should make an early detection of signs of frailty. The screening and early detection of frailty can spur reforms to make routine care less hazardous, can focus on outcomes most relevant to patients and can aid in understanding effectiveness of health care interventions, including at the population level.

In the European population over 50 years of age, the prevalence of prefrailty in women is 25.8%, and that of frailty is 7.8%, while in the male population, the prevalence of prefrailty is 14.6%, and of fragility 3.1% (2). Sarcopenia and frailty in our series are significantly more frequent than in the general population of the same age and sex.

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P275
HYBRID FIXATION THAT METAL PLATE WITH BIORESORBABLE SCREWS AND WIRES FOR ROBINSON TYPE 2B CLAVICLE FRACTURES IN OSTEOPOROTIC PATIENTS

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Shaft fracture of clavicle is well union and less complication even with conservative treatment. Nonunion or malunion often occur in displaced clavicle fractures or comminuted shaft fractures. The treatment of clavicle shaft fractures with these displaced comminuted fractures is performed by holding the free fragments with interfragmentary screws or wires and then fixing the clavicles with a plate. Therefore, we performed interfragmentary fixation using open reduction and internal fixation with bioresorbable screws (Resomet™ Bioresorbable bone screw, U&I Corporation, Gyeonggi-do, Korea) and bioresorbable wires (Resomet™ Bioresorbable K-wire and pin, U&I Corporation, Gyeonggi-do, Korea) for the displaced comminuted clavicle fractures (Robinson Type 2B) in osteoporotic patients and additionally using a metal plates. We report those 4 cases that were treated in this way.

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

P276
INVESTIGATION OF MICRORNAS RELATED TO THE SKELETAL FRAGILITY IN TYPE 2 DIABETES MELLITUS

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Objective: T2DM is known to increase the risk to fragility fractures [1]; however, the exact underlying mechanism is still elusive. Recently, growing numbers of novel miRNAs have been verified to play vital roles in the regulation of osteogenesis, osteoclastogenesis, and adipogenesis. The objective of this study is to identify the changes in the expression levels of the miRNAs, which are related to the bone remodeling cycle in the bones of type 2 diabetic rats.

Methods: The approval was obtained from the animal ethical committee, UAEU for this study. Three-month-old female Wistar rats (n=24) were divided into control/experimental groups. Animals (n=12) were fed with a high-calorie diet (D12492 diet; Research Diets, Inc, USA) for 3 weeks followed by injection of two lower doses of STZ (30 mg/kg intraperitoneally) which was administered at weekly intervals. Rats having blood glucose >15 mmol/L were considered as diabetic and were used for the study. The animals were sacrificed after 8, 10 and 14 weeks of the onset of diabetes. The tibia was dissected out and used for the extraction of miRNAs using the mirVana™ miRNA isolation kit provided by Ambion (AM 1560). Expression of miRNAs related to bone metabolism was assayed by quantitative RT-PCR using Taqman probes and primers (4427975, Thermofisher Scientific). MicroRNAs' expressions were normalized with U6 small nucleolar RNA (U6snoRNA) controls and plotted.

Results: Changes in the expression of miR-20A, miR-21, miR-155, miR-29, miR-31 and miR-155 at the different duration of diabetes were analyzed and compared with the control specimens. MiR-20 A and miR-155 were downregulated p<0.05 after eight weeks followed by up-regulation after 12 weeks of the onset of diabetes. miR-21 levels were significantly reduced compared to controls after 8 weeks of the onset of T2DM.

Conclusion: MicroRNAs' are important modulators of bone remodeling in T2DM and additional studies are required to explore their potential as diagnostic biomarkers or therapeutic targets for diabetic osteopathy.

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P277
EVALUATION OF BONE MINERAL DENSITY AND BONE TURNOVER MARKERS IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: Ankylosing spondylitis (AS) is a complex, potentially debilitating disease that is insidious in onset, progressing to deformity in spine over several years. Men are more often affected than women. Osteoporosis and vertebral fractures are now well recognized features in patients with advanced AS. The aim of this study was to compare BMD of lateral lumbar spine and hip in male patients with AS and control group.

Methods: 27 consecutive AS patients with a mean disease duration of 9.9 y and 23 age, height and weight-matched healthy controls were recruited for the study. The mean age of the AS patients was 39.31±12.13 and the mean age of the control group was 40.90±8.41. In both patients and control groups, BMD was evaluated for the lumbar spine and hip. Serum osteocalcin and urinary N-telopeptide (NTx) were measured as bone turnover markers in both patients and control groups.

Results: Osteoporosis was detected 1(4.3%) of control group and in 5(18.5%) of AS patients. The femoral neck and femur total T-scores, lateral lumbar 3 T-score values were significantly lower in AS patients compared with the control group (p=0.035 and p=0.03, p=0.001, successively). Osteocalcin and NTx levels were significantly higher in patients with AS compared with the control group (p<0.05).

Conclusion: The incidence of osteoporosis is high in AS patients compare control group. The monitoring of bone turnover markers may help to prognostic of development osteoporosis in AS patients. The risk of vertebral fractures can increase in AS patients with osteoporosis. The fractures of AS patients are atypical that may be caused morbidity and in some case mortality. The patients with AS must be assessed for osteoporosis and must be treated for osteoporosis, so severe complications such as fractures can be prevented in AS.

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

P278
BONE DISEASE IN A CYSTIC FIBROSIS COHORT: DESCRIPTIVE ANALYSIS

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Objective: Cystic fibrosis (CF) is the most common autosomal recessive lethal genetic disorder in the Caucasian population. Long-term survivors of CF have a dramatic increase in the risk of osteoporosis (OP) and incident fracture. Risk factors include nutritional deficiency, poor physical activity, chronic inflammation and chronic use of glucocorticoids. The objective of this work is to characterize a cohort of CF patients who have been evaluated in our reference center.

Methods: We conducted a descriptive study of all patients over the age of 18 with the diagnosis of CF. We collected data regarding age, age at diagnosis, sex, genotype, BMI, forced vital capacity% predicted (CVF), forced expiratory volume% predicted (FEV1 1), serum 25-hydroxyvitamin D (25OHD), BMD and BMD Z-score evaluated by DXA of the femoral neck, femur and lumbar spine, presence of fractures at low impact and treatments.

Results: We included 32 patients, 56.3% (n=18) of men and 43.8% (n=14) of women, the current median age of 32.0 y [26.8-43.0] and median age at diagnosis 19.5 y [14.0-26.3]; 31.3% were homozygous for the F508del mutation (n=10) and 34.4% were heterozygous for this mutation (n=10). The median CVF was 90.7% [71.9-110.0] and the median FEV1 was 63.3% [42.5- 84.2]. Among the known risk factors described, we highlight hypovitaminosis D found in 45.2% (n=14), while 75% (n=24) of the patients received a high dose cholecalciferol supplementation; corticosteroid therapy present in 18.8% (n=6); a low BMI in 25.0% (n=8) and a lung transplant in 21.9% (n=7) of them. A BMD lower than the expected range for age (Z-score of - 2.0 or less) was found in 5 patients (5/32) and at least one prevalent fragility fracture was found in 2 patients (2/32): 1 patient presented with a vertebral fracture and 1 patient presented with vertebral fractures and both hips. Anti-osteoporotic treatment was started in 6 patients: 3 patients were on alendronic acid; 2 patients were on zoledronic acid and 1 patient on denosumab; this with a median duration of treatment of 5.50 y [2.00- 6.25]. We found an upward trend in the Z-score in treated patients, in the lumbar spine (initial median Z-score of -2.20 [-2.98 - -0.93] vs. current of -1.00 [-1.80 - -0.48]), of the femur (Z initial median score of -2.30 [- 3.42 - -1.60] vs. current of 0.60 [-1.10 - 0.40]), and of the femoral neck (Z median score initial of -1.95 [-2.95 - -1.18] vs. current of -0.90 [-1.55 - 0.05]).

Conclusion: Despite the young middle age and according to previous data, we found a high prevalence of low BMD in patients with CF. Although our sample is small, we have seen a tendency to improve BMD levels with an effective regimen. Early recognition and treatment are the most effective strategies for reducing the morbidity due to osteoporosis in these patients.

P279
THE IMPACT OF OSTEOARTHRITIS ON STOMATOGNATHIC SYSTEM FUNCTION

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Objective: This study investigated the effects of osteoarthritis on masseter and temporal muscles by ultrasound analysis, maximal molar bite force and mandibular mobility.

Methods: This study was approved by the Research Ethics Committee (permit number 55505316.8.0000.5419). 48 individuals, aged between 40-70 y, of both genders, distributed in two matched groups, subject to subject, participated in this study: with osteoarthritis (n=24; mean age 53.6±1.6 y; weight 28.6±0.9 kg/m²) and healthy control (n=24; mean age 52.3±1.7 y; weight 28.1±0.7 kg/m²). Muscle thickness was measured by the image obtained from the SonoSite NanoMaxx ultrasound, under mandibular rest and dental tightening conditions in maximum voluntary contraction. In the analysis of the maximum molar bite force (right and left) the Kratos digital dynamometer was used. For the mandibular mobility exam, the Mitutoyo digital caliper was used, under the conditions of mouth opening, protrusion, right and left laterality. Data were tabulated and statistically analyzed (t-test, p<0.05).

Results: No significant differences were found in ultrasound data and maximum molar bite force. In mandibular protrusion mobility, right and left laterality, the mean values obtained were lower for the osteoarthritis group when compared to the control group, with a significant difference for the right laterality (p=0.04).

Conclusion: Osteoarthritis promotes changes in the stomatognathic system affecting mandibular mobility.

P280
DUAL MOBILITY CONSTRUCTS IN TOTAL HIP ARTHROPLASTY REDUCED DISLOCATIONS IN HIGH RISK SPINAL FUSION PATIENTS: OUR INSTITUTIONAL EXPERIENCE

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Objective: Prior lumbar spinal fusion significantly increases the risk of dislocation in patients following total hip arthroplasty (THA) with dislocation rates reported as high as 10%. Due to these high risks, many surgeons prefer to utilize dual mobility articulations (DM) in these patients in order to optimize hip stability. However, there is a paucity of data on the outcomes of DM articulations in patients with prior lumbar fusions. As such, the current study analyzed the outcomes of DM constructs in patients with prior lumbar arthrodesis, specifically 1) dislocations, 2) other complications, and 3) patient reported outcome measures.

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Methods: We retrospectively identified 80 patients (86 THAs) who underwent a lumbar arthrodesis and a subsequent posterior approach THA with a DM construct, both performed at a single tertiary care academic institution. Fifty-seven (71%) patients were females. Mean age was 69 years and the mean BMI was 28 kg/m^2. The median number of levels fused was 4 levels with 59 patients (74%) having 2 or more levels fused; additionally, 50 patients (63%) were fused to the sacrum. Twenty-seven (31%) THAs were computer navigated. 90% and 55% of THAs were within the Lewinnek safe zone for inclination and anteversion, respectively. Mean follow-up was 3 y (range, 1-7 y). The cohort was evaluated for any episode of hip instability, readmission, or complication related to the hip surgery. In addition, clinical outcomes were assessed at the latest postoperative visit and included the HOOS, Jr and Veterans Rand 12 Scoring (VR-12).

Results: No patients sustained a postoperative dislocation (0%); as such, survivorship free from dislocation was 100% at both 2 and 5 y. Further, no patients sustained an intraprosthetic dislocation (0%). Overall, there were 6 (7.5%) complications during the study period leading to reoperation in 3 patients (4%), none related to the acetabular component or instability. HOOS Jr scores significantly improved from a mean of 50 preoperatively to 87 postoperatively (p< 0.001) and the VR-12 physical score improved from a mean of 31 preoperatively to 44 postoperatively (p<0.001).

Conclusion: In a high risk cohort of patients with prior lumbar arthrodesis, including 74% with 2 or more levels fused and 63% fused to the sacrum, posterolateral primary THA with a DM construct demonstrated no dislocations at mean 2 y follow-up. While this early data is clearly encouraging, more patients with longer term follow-up are needed.

P281
"BRONCHOPNEUMONIA" AS PRESENTING FEATURE OF ANTISYNTHETASE SYNDROME

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Objective: Reporting an unusual presenting feature of a rare disease

Methods: We report the case of a 51-year-old female, presenting in March 2019 for dry cough, dyspnea, sweating and fever. After a computed tomography she was diagnosed with bronchopneumonia and empirically treated with antibiotics. She evolved into acute respiratory failure, treated with antibiotics and cortisone, with a slowly favourable evolution. In May she developed lower and upper limbs myalgias and multiple arthralgias, followed by the occurrence of "mechanic's hands" type lesions with bilateral second and third metacarpophalangeal erythematous-squamous lesions and the reappearance of the dry cough and dyspnea. A new computed tomography reveals augmentation of the previous interstitial lesions. She is then diagnosed as rheumatoid arthritis and started on levofloxacine,

prednisone 0.5 mg/kg and leflunomide 10 mg/d. In October the myalgias and arthralgias reappear, she stops leflunomide and is sent to our department.

Results: We find a cooperant lady, with proximal myopathy of the limbs, with erythematous-squamous lesions on the dorsum of the metacarpophalangeal joints 2 to 5, bilateral, with "mechanic's hands", bilateral basal crackles, normal heart rate, blood pressure, liver and kidney clinical examination. The patient didn't have elevated ESR or CRP, but had elevated muscular enzymes and high titers of anti-Jo1 and anti-Ro antibodies. Pulmonary functional testing revealed restrictive dysfunction. We diagnosed antisynthetase syndrome with polydermatomyositis and interstitial lung disease. The patient also had a muscular biopsy that confirmed the autoimmune inflammatory myopathy. A malignancy screening was performed; no cancer was revealed.

Conclusion: Any pulmonary interstitial disease that does not respond to usual antibiotic treatment, must be evaluated for autoimmune in nature. The antisynthetase syndrome, a rare autoimmune disease, may be causative for such a lung involvement.

P282
CORRECTION OF ANTITHYROID ANTIBODIES IN PATIENTS WITH RHEUMATOID THYREOPATHY USING IMMOBILIZED MAGNITOSORBENTS

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Objective: Thyroid hormones affect all types of metabolism in the human body. They intensify the resorption and synthesis of bone tissue and regulate the development of glycosaminoglycans and proteoglycans in connective tissue. The increase of antibodies content towards thyroid hormones in the patient's blood indicates that the autoimmune process progresses clinically. We aimed to develop a method to eliminate antibodies from the blood and its usage for diagnostic and therapeutic purposes.

Methods: 10 patients with rheumatoid arthritis and thyroid gland involvement were enrolled in Volgograd Clinical Hospital of Emergency Care №25 and their sera and native heparinized blood samples were collected for further research. Blood treatment was performed using magnetic-driven polyacrylamide beads with immobilized T3 and T4, which were synthesized by emulsion polymerization technique. Ten samples of normal sera were used as controls.

We compared our results with the previously published prototype [1]. As a prototype we used a method eliminating antithyroid antibodies from the blood by passing it through an immunosorbent (thyroid hormone), which was activated by cyanogen bromide sepharose. The specified method has a number of drawbacks: extremely high cost of reactants, toxicity, and a rather small sorption reservoir. Due to the low molecular weight of hormones, we covalently bound them to the carrier by glutaric aldehyde to achieve a higher antigen concentration on the bead surface. After this process chemical groups of the active centers of a hormone remain free to link with antibodies. Concentration of anti-T4

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and anti-T3 antibodies in serum before and after the perfusion was determined by ELISA. Sorption of the antibodies in the heparinized blood samples was made using the column equipped with magnetic beads suspender [2]. After the procedure the beads were washed and regenerated. We determined the serum concentrations of anti-T4 and anti-T3.

Results: The previously synthesized polyacrylamide beads were used for sorption of antithyroid antibodies from the blood of patients with RA and thyreopathy. Perfusion caused antithyroid antibodies to decrease by 99.5%; however by means of the prototype the decrease was achieved only by 93% of the original amount. In a percentage ratio the content of antibodies before carrying out the sorption, both in the prototype, and in the declared sample, constituted 100%. However, after the perfusion the mean concentrations of anti-T3 in the specified samples were decreased by 7% in our method compared to 0.5% with the prototype; the same thing was with anti-T4: 8%, and 0.4%, respectively [1,3].

Conclusion: The immobilized T3 and T4 produced by our method were suggested to have numerous advantages compared to the cyanogen bromide activated prototype in both sorption capacity and blood cells preservation.

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P283
WORKING WITH PAIN: PREVALENCE AND RISK FACTORS OF MUSCULOSKELETAL PAIN AMONG CONSTRUCTION INDUSTRY WORKERS IN A LOW INCOME COUNTRY

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Objective: Musculoskeletal pain (MSP) is one of the commonest occupational health problems among construction workers. MSP is an indicator for future disability and incur a huge loss of productivity for individual and society. An understanding of burden and risk factors of MSP is essential for developing appropriate preventive measures among construction workers. We sought to determine the prevalence and risk factors of MSP among construction workers in Karachi, Pakistan.

Methods: We carried out a cross sectional study among 321 construction workers who were recruited from five construction companies in Karachi, Pakistan. We administered Extended Nordic Musculoskeletal questionnaire (NMQ-E) to determine frequency of MSP and inquired about associated socio-demographic characteristics, occupational and ergonomic risk factors. Age adjusted logistic regression analysis was carried out to identify factors that were associated with outcome variable MSP.

Results: The mean age of participants was 29.6 (±10.6) y. The lifetime prevalence of MSP was 50.8% while point prevalence was 20.6%. Lower back pain was the commonest (27.8%) reported pain. The MSP risk was higher in poorest strata (monthly income <15000 Rs), and those exposed to vibrations during their work activities. Moreover, the unmarried participants and the Punjabi workers had a protective effect for developing MSP.

Conclusion: This study found a high burden of musculoskeletal pain in construction workers in Pakistan. Irrespective of occupation, workers reported difficulty working due to MSP. There's a need to design contextualized occupational health and safety interventions with focus on workers at higher risk of MSP (certain ethnic groups, married and poorer workers). Primary, secondary and tertiary prevention strategies and few workplace changes, with improving working conditions can optimize health of the workers.

P284
THE SPECIFIC FEATURES OF ANTIBODY GENESIS TO HORMONES OF THE THYROID GLAND IN RHEUMATOID ARTHRITIS

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Objective: It is known that in the course of rheumatoid arthritis (RA), present form articular and shape are distinguished with a lesion of the internal organs. And a significant role in the course of the disease in the second case has an endocrine system. The purpose of our work is to assess the extent and nature of the damage to the thyroid gland, to determine the specific features of antibody genesis to its hormones in RA.

Methods: 75 patients with RA were examined, including 61 women (81.4%) and 14 men (18.6%) aged 25-78 y. All patients were determined the amount of thyroid hormones and antibodies to T3 and T4. The articular form was noted in 55 people (73%), and 23 of them (41.8%) had a polysustavnaya form of the disease and 20 patients (27%) had viscerites. In these patients, thyroid pathology was observed in 6.97% with 0.4-2% in the general population. The most common form of thyroid damage is Hashimoto autoimmune thyroiditis with hyperthyroid syndrome.

Results: Almost all patients with RA have an increased titer of antibodies to thyroid hormones: 0.135±0.03 units of optical density to triiodothyronine (T3) vs. 0.084±0.05 in healthy individuals and 0.160±0.05 units of optical density thyroxin (T4) vs. 0.079±0.05 in donors.

Conclusion: Thus, the findings suggest that the thyroid gland plays a significant role in the development of metabolic and clinical syndromes in RA. Methods for determining thyroid hormones and antibodies to them can serve as additional criteria for assessing the nature of RA. Their use also provides information for assessing the patient's condition, choosing the method of treatment and monitoring the therapy being conducted.

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

P285
HOW MUCH WE HAVE TO DO FOR THE EARLY DIAGNOSIS OF OSTEOPOROSIS AND PROPHYLACTIC OF FRACTURES?

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Objective: Osteoporosis is the most common metabolic disease of the skeleton, the only clinical manifestations of which are fractures. The consequences of osteoporosis: physical disability and reduced life expectancy. We have set a goal to study how patients who have had typical osteoporosis fractures were covered by the diagnosis of this disease and received therapy before the fracture. It was also planned to study the risk factors of osteoporosis and concomitant diseases in the group of patients with fractures.

Methods: The case histories and questionnaires of 197 patients (146 women and 51 men, mean age 64.5±12.1 y) with low trauma fractures of different localization were analyzed.

Results: Femoral fractures accounted for 46.2% of all fractures. Of these cases, 32% patients had fractures of the femoral neck, 8% fractures of the femoral diaphysis, 7% transversal fractures. At the same time, in the groups of male and female patients, the proportion of patients with femoral fractures almost did not differ. The second most common (28%) fractures that caused hospitalization were fractures of leg. In third place (12%) fractures of the shoulder and forearm bones. Low energy fractures of the vertebrae, collarbone, pelvic and tibial condyles are included in the fractures of "other localization" (13%). The main risk factors for osteoporosis and fractures were identified: female sex, postmenopausal period, history of falls, smoking, alcoholism and treatment with corticosteroid drugs. The disorders of the cardiovascular system were prevalent in patients with low trauma fractures. Nearly one-third of respondents reported low impact fractures in previous years. 90% of patients, despite the obvious risk factors for osteoporosis and previous fractures, were not examined and did not receive therapy to prevent repeated fractures.

Conclusion: Despite the availability of information, doctors and patients are not fully aware of the seriousness of osteoporosis as a disease. There is still much to be done along the way, and we hope that our study will serve as another step towards that goal.

P286
PERCENTAGE FAT FRACTION IN MRI: UPGRADING THE OSTEOPOROSIS DETECTING PARAMETER

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Objective: Osteoporosis (OP) is a common metabolic bone disorder and orthopedic imaging approaches were commonly used with some limitations. The aim of this study was to explore the diagnostic value of magnetic resonance 1-H MRS and m-Dixon-Quant in the evaluation of osteoporosis.

Methods: We enrolled 76 subjects and used a quantitative computed tomography (QCT) technique to determine the subjects' BMD. Those with a BMD >120 mg/cm^3 were categorized as the normal control; those with a BMD ranging from 80-120 mg/cm^3 were classified as having osteopenia; and those with a BMD <80 mg/cm^3 were diagnosed as having OP. The following parameters were recorded for each patient: sex, age, body height, body weight, waist circumference, and hip circumference. Simultaneously, the FF% values from 1-H MRS examinations and m-Dixon-Quant scans were acquired.

Results: In both 1-H MRS and m-Dixon-Quant MRI, the FF% exhibited a negative correlation with BMD. Among the different groups, the OP patients had a significantly higher FF% compared to healthy subjects. In addition, the FF% in the m-Dixon scans exhibited a positive correlation with age, while BMD showed a negative linear relationship with age. Further, females had a higher FF% compared to males, and body height was correlated with BMD but not with FF%.

Conclusion: MRI investigations (especially FF% in the m-Dixon-Quant imaging system) are useful in OP assessments. Also, parameters such as sex, age, and height are important factors for predicting and diagnosing OP.

P287
FAT FRACTION QUANTIFIED VIA MAGNETIC RESONANCE SPECTROSCOPY IN THE DIAGNOSIS OF OSTEOPOROSIS: A META-ANALYSIS

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Objective: Given the global prevalence of osteoporosis and its associations with morbidity, mortality and deterioration in overall quality of life, significant research has been devoted to the diagnosis of this bone disease. This study presents a meta-analysis of published research regarding one emerging diagnostic technique: magnetic resonance spectroscopy (MRS), a noninvasive method of determining the concentrations of various chemical components in tissues.

Methods: Previous studies investigating the pathology of osteoporosis have established a statistically significant link between increases in the bone marrow fat fraction (FF%), measured via MRS, and decreases in BMD, the primary predictor of bone strength. Relevant literature was reviewed, and over 1000 data points were collected from past studies on osteoporotic, osteopenic, and/or healthy control subjects. Data points were then grouped based on MRS location (lumbar spine, femoral neck, calcaneus, and femur). Analysis of variance tests, followed by Tukey's post hoc tests, were performed to evaluate the ability of MRS FF% scores to differentiate between osteoporotic, osteopenic, and healthy subjects. Welch's t-tests were performed to further validate these findings, accounting for the inconsistencies in variation between subject groups.

Results: Results demonstrated the existence of statistically significant differences between osteoporotic, osteopenic, and healthy groups for measurements of the lumbar spine (P<0.0001), as well as between osteoporotic and healthy groups at the femoral neck. No such differences were found in measurements at the femur and calcaneus, potentially due to the low number of studies and subjects reported for the latter two categories.

Conclusion: MRS FF% scores appear to hold great potential clinically as a noninvasive, early diagnostic tool for osteoporosis; however, further research is required before these findings can be generalized beyond well studied bone areas.

P288
LUMBAR DISC DEGENERATION AND VERTEBRAL FRACTURE AT THORACOLUMBAR JUNCTION ARE RISK FACTORS FOR CHRONIC LOW BACK PAIN WITH DISABILITY: 7 YEARS' FOLLOW-UP OF THE WAKAYAMA SPINE STUDY

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Objective: Disc degeneration (DD), vertebral deformity due to osteoporotic fracture, and spinal stenosis have been reported as possible causes of chronic low back pain (CLBP). However, these degenerative changes are often coexisting and may confound each other as the cause of CLBP. The purpose of this study is to elucidate the risk factors of CLBP among degenerative changes on MRI in a general population

Methods: This is a longitudinal study using an established population-based cohort in Japan. A total of 1009 subjects who participated in the baseline survey (AD 2008-9) were subjected to the MRI evaluation. Lumbar DD (Pfirrmann's classification: grade 1-5), and morphometric fracture of the vertebral bodies (Genant's grade 0-3) were evaluated on the sagittal MRI. Lumbar spinal stenosis (Suri's classification: grade 0-3) was evaluated on the axial MRI. In the third survey (AD 2015-6), we followed-up 663 subjects (men 219, women 444, age at the baseline 62±13 years old) and got the information on the presence of CLBP (continued more than 3 months) and Oswestry Disability Index (ODI). The relationship between the degenerative changes at the baseline and the presence of chronic LBP with disability (ODI% ≥21) after 7 y was determined using multiple logistic regression analysis including mental component summary scale of the SF-8, smoking habit, age, sex, and BMI as the explanatory variables.

Results: The prevalence of disabled CLBP was 91/663 (13.7%). Significant risk factors at baseline for the disabled CLBP after 7 y were age (+1 y, odds ratio 1.07 [95%CI 1.03-1.10]), sex (female, 3.69 [1.83-7.44]), BMI (+1 kg/m^2, 1.11 [1.02-1.20]), sum of the

lumbar disc degeneration grade (L1/2 – L5/S, +1 point, 1.14 [1.01-1.30]), and sum of the SQ grade at the thoracolumbar junction (T11-L1, +1 point, 1.32 [1.10-1.60]).

Conclusion: Lumbar DD and vertebral fracture at thoracolumbar junction were risk factors for CLBP with disability in the general population. There are several limitations due to cross-sectional study design and lack of some confounding factors. However, we consider the results of this study extremely important both epidemiologically and clinically, because there are few longitudinal studies on spinal degeneration and related disability.

P289
ASSOCIATIONS BETWEEN OSTEOARTHRITIS AND SELF-REPORTED PHYSICAL ACTIVITY IN ADULTS OVER 50 YEARS

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Objective: Osteoarthritis (OA) is a major risk factor affecting daily performance in the elderly. The aim of this study was to evaluate the association between OS and self-reported physical activity in adults over 50 y.

Methods: Cross-sectional data from 8816 participants (3833 men and 4983 women) over 50 y in the Korea National Health and Nutrition Examination Surveys were analyzed. The mean age of 8816 participants was 62.17 y. The mean age of 3833 men was 61.23 y and 4983 women was 63.02 y. Self-reported physical activities of participants over 50 y were classified into three physical activity levels (low, moderate and high activity group), using International Physical Activity Questionnaire scoring protocol which was developed to measure health-related physical activity (PA) in populations. Radiographic changes relating to OA in hip or knee were assessed using the Kellgren–Lawrence (KL) grading scale. OA was defined with presence of both pain and radiographic changes (KL grade ≥2) in knee or hip. The association of OA and self-reported physical activity was analyzed using the general linear models adjusted for clinical confounders.

Results: OA was associated with physical activity levels (pooled OR 2.37, 95%CI 1.59–3.52 in low activity group, pooled OR 1.65, 95%CI 1.06-2.56 in moderate activity group) before adjusting for confounders. In multivariate logistic regression analysis, OA was not associated with PA levels (P>0.05). OA were significantly associated with female (pooled OR 3.87, 95%CI 2.75–5.44), low income (pooled OR 1.78, 95%CI 1,30–2.42), obesity (pooled OR 2.50, 95%CI 1.21–5.17).

Conclusion: OA may be associated with physical activity levels. However, symptomatic osteoarthritis affecting daily performance may be associated with potential factors such as demographic, social and environmental factors.

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remaining in the study was 78.4± 5.7 y and the number of female patients was 16 (69.6%). There was no significant change in skeletal muscle mass measurements performed at 1 and 3 months and Katz ADL scale at 1 and 3 months (p>0.05). Short Physical Performance Battery, Berg Balance Test, Time Up and Go Test, and 5-Chair Test were found to improve significantly in the first month, but it continued to develop significantly in the third month (p<0.05).

Conclusion: Although the combination of aerobic and resistive exercise in osteosarcopenic patients did not lead to a significant increase in skeletal muscle mass, physical performance and balance tests developed considerably. It can be foreseen that this will increase the independence of the person while reducing the risk of falling.

P293
AVASCULAR NECROSIS OF BONE IN PATIENTS WITH LUPUS NEPHRITIS

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Objective: Avascular necrosis of bone (AVN) is an important complication of systemic lupus erythematosus (SLE) and often causes serious physical disability. The aim of this study was to investigate the risk factors for symptomatic avascular necrosis of bone (AVN) in lupus nephritis (LN) patients.

Methods: The records of 374 patients (43 males, 331 females) with kidney biopsy proven LN were reviewed retrospectively. Symptomatic AVN cases were defined as those with at least one diagnosis of AVN. The patients with LN who did not have AVN were evaluated as a control group. To determine risk factors for AVN, clinical, laboratory and therapeutic variables were analyzed by logistic regression.

Results: Symptomatic AVN was present in 17 patients (4 males, 13 females, mean age of 27.4±6.7 y). Among the 17 patients, 28 joints presented AVN. 12 occurred in hips (2 bilateral), 6 in ankles, 4 in knees, 3 in shoulders and 1 in lumbar spine. In 9 patients AVN involved 2 or more joints. 14 patients were on corticosteroids (CS) at the time of presentation of AVN. 2 patients were not on CS and 1 patient did not has documentation of steroid use. Meta-analysis demonstrates a significant increased risk of AVN in patients with high disease activity and class IV LN (p<0.005). LN patients with AVN showed an earlier onset age (p<0.05) and received significantly higher total cumulative CS dose. AVN was not significantly associated with use of immunosuppressive agents. Serositis, coagulation disorders, vasculitis, cigarette smoking were higher incidence in male with LN and AVN. Raynaud's phenomenon, autoimmune thyroiditis, arthritis, Sjögren's syndrome, IgM anticardiolipin antibodies, antiphospholipid syndrome were higher incidence in female with LN and AVN.

Conclusion: Many risk factors have been involved in the development of AVN in LN patients. AVN is prevalent in class IV LN and in younger patients. Corticosteroids are the principal risk factor, although some cases of AVN occur in relatively steroid naïve patients. Early detection of AVN is important because the prognosis depends of the stage and location of the lesion. An individual risk assessment for AVN development should be made prior to and during treatment for LN, especially in patients high dose CS.

P294
CENTRAL SENSITIVITY SYMPTOMS IN PATIENTS WITH KNEE AND HIP OSTEOARTHRITIS

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Objective: Many chronic painful conditions including osteoarthritis are associated with central sensitization (CS). The Central Sensitization Inventory (CSI) is a recently developed instrument for screening patients with symptoms that are suspected to be related to CS.

Methods: In the present study 106 subject were recruited (average age 53.9±13.4 y, 73 (68.9%) females): 46 (43.4%) with chronic pain due to knee osteoarthritis (group 1), 13 (12.3%) with chronic pain due to hip osteoarthritis (group 2) and 47 (44.3%) healthy subjects (group 3). Patients reported pain intensity on the Numerical Rating Scale (NRS). CSI was used for the evaluation of the presence of central sensitivity symptoms.

Results: In group 1 and group 2 average duration of pain was 32.61±43.25 months. The average pain intensity on NRS was 4.31±2.70. There were significantly higher CSI scores in the group 1 and group 2 compared to group 3 (28.24±12.13 vs. 29.46±16.39 vs. 18.64±11.78, F=8.139, p=0.001). CSI scores between group 1 and group 2 were not significantly different.

Conclusion: Patients with hip and knee osteoarthritis in the present study scored significantly higher on CSI compared to healthy painless subjects. This could indicate the contribution of the CS to the chronic pain in knee and hip osteoarthritis.

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P295

AVASCULAR NECROSIS OF WEDGE COMPRESSION FRACTURE OF OSTEOPOROTIC VERTEBRAE: POSTERIOR DECOMPRESSION AND PEDICLE SCREW FIXATION - PROSPECTIVE STUDY

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Objective: To investigate the treatment of avascular necrosis of wedge compression fracture of osteoporotic vertebrae (Kümmell's disease) without neurological deficits and to determine whether intravertebral clefts are a pathognomonic sign of Kümmell's disease.

Methods: A total of 16 patients who had initially been diagnosed with Kümmell's disease were admitted, two patient was excluded from this study. Transpedicular posterior decompression for the affected vertebrae were conducted. Pedicle screw fixation, MESS cage and posterolateral bone grafts were performed two level above and one level below the affected vertebrae. Vertebral tissue was extracted for histopathological examination.

Results: The mean time of follow-up was 22 months (range, 18-42 months). The anterior and middle vertebral heights were measured on standing lateral radiographs prior to surgery, one day postoperatively and at final follow-up. The Cobb angle, the visual analog scale (VAS) and the Frankel classification were used to evaluate the effects of the surgery. The VAS, anterior and middle vertebral heights and the Cobb angle were improved significantly one day postoperatively and at the final follow-up compared with the preoperative examinations (P<0.05). No significant differences were observed between the one-day postoperative results and those at final follow-up (P>0.05). The neurological function of all patients was improved by at least one Frankel grade. All patients in this study exhibited intravertebral clefts, and postoperative pathology revealed bone necrosis.

Conclusion: Posterior decompression with short-segment fixation and fusion combined is an effective treatment for Kümmell's disease.

P296

THE HIGH PREVALENCE OF SARCOPENIA AND ITS ASSOCIATED OUTCOMES FOLLOWING HIP SURGERY IN TAIWANESE GERIATRIC PATIENTS WITH A HIP FRACTURE

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Objective: Sarcopenia, which is a common risk factor for falls and fractures, affects the functional outcome and mortality in geriatric populations. However, the prevalence of sarcopenia among geriatric Taiwanese patients with a hip fracture is unknown, nor is the effect of sarcopenia on the outcome of hip surgery.

Methods: From December 2017 to February 2019, geriatric patients who underwent surgery for a hip fracture were prospectively enrolled. Basic demographic data, responses to questionnaires for dementia screening and quality of life (QoL) and daily living activities (ADL) before the injury were analyzed to identify any association with sarcopenia. The QoL and ADL were monitored at six months after the operation to determine the difference between hip fracture patients with or without sarcopenia.

Results: Of 139 hip fracture patients, 70 (50.36%) were diagnosed with sarcopenia. Accounting for all confounding factors in the multivariate logistic regression, lower BMI, male gender and a weaker handgrip are the risk factors that are most strongly associated with a diagnosis of sarcopenia in geriatric patients with a hip fracture. Hip fracture patients with sarcopenia also have poor ADL and a lower QoL than patients without sarcopenia before the injury and six months after the operation.

Conclusion: A high prevalence of sarcopenia among geriatric hip fracture patients is associated with a poor midterm outcome following hip surgery. Clinicians must recognize the risk of sarcopenia, especially for male hip fracture patients with a lower BMI and a weaker handgrip.

P297

PREVALENCE AND LOCAL SUSCEPTIBILITY OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS MUSCULOSKELETAL INFECTIONS IN A TERTIARY CARE CENTER FROM THAILAND

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Objective: The incidence of community-acquired Methicillin-resistant *Staphylococcus aureus* (MRSA) isolated from musculoskeletal infections has been increasing over the past years worldwide including Thailand. This not only was associated with increased mortality and poorer survival outcomes but also affected the strategy of antibiotic use for these conditions. We aimed to determine the prevalence of MRSA isolates from *S. aureus* musculoskeletal infections, and to investigate the susceptibility of these isolates to routine antibiotics commonly used in our center.

Methods: We retrospectively collected data of *S. aureus* isolated from patients who attended King Chulalongkorn Memorial Hospital, Thailand during January to December 2017. The cases of osteomyelitis, pyomyositis and septic arthritis were identified by ICD coding in medical records which were reviewed by two independent investigators. MRSA were identified by cefoxitin disk diffusion test. Susceptibility to oxacillin, vancomycin, teicoplanin, clindamycin, linezolid and trimethoprim/sulfamethoxazole (TMP-SMX) was performed.

Results: Of 890 patients (mean age, 51.0±25.3 y; 50.1% males) who were enrolled due to *S. aureus* infections, there were 18 cases of musculoskeletal infections. Of these, 9 were septic

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arthritis, 7 were osteomyelitis and 2 were pyomyositis. 16 in 18 isolates were community acquired. All isolates were methicillin-sensitive *S. aureus* and susceptible to vancomycin, teicoplanin and linezolid. Only 2 isolates were resistant to clindamycin and one to TMP-SMX.

Conclusion: Our hospital antibiogram showed 100% susceptibility to oxacillin of all *S. aureus* isolates. Oxacillin is still among the proper choices to be used empirically to cover all musculoskeletal infections in our center.

P298
INTRA-ARTICULAR INFLAMMATORY RESPONSE OF HUMAN OSTEOARTHRITIC CHONDROCYTES INDUCED BY BACTERIAL DNA

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Objective: Osteoarthritis (OA) is now recognized as an inflammatory condition and certain immunopathological phenomena have been implicated in the disease. One of the contributory factors is impaired gut permeability and translocation of bacterial components to the joints through circulation. Discovery of bacterial DNA in synovial tissue supported this assumption but its role in OA pathophysiology has not yet been elucidated. We aim to investigate immunostimulatory effects of human osteoarthritic chondrocytes in response to bacterial DNA.

Methods: We isolated primary chondrocytes from articular cartilage of knee OA patients undergoing total knee replacement. As representatives of gram-positive and gram-negative bacteria, DNA of *Escherichia coli* DNA (EC) and *Lactobacillus spp.* (LB) was used to stimulate the chondrocytes. Lipopolysaccharide was used as a positive control. Cytokines in the supernatants were assayed using ELISA.

Results: TNFα was significantly increased in response to EC and LB, when compared to the baseline level of unstimulated chondrocytes. A significant increase in IL-6 by LPS stimulation was observed but there was no significant difference of IL-6 when stimulated by EC or LB.

Conclusion: Both EC and LB are able to provoke overwhelming TNF-a secretion from osteoarthritic chondrocytes but hardly affect IL-6 secretion, suggesting that TNFα might play an important role in intra-articular bacterial DNA-mediated inflammatory response in OA.

P299
PELVIC FRAGILITY FRACTURES: A DEBILITATING FRACTURE THAT OCCURS IN ELDERLY AMBULATORY PATIENTS WITH MONOCLONAL GAMMOPATHY OF UNCERTAIN SIGNIFICANCE, PERNICIOUS ANEMIA, HYPONATREMIA AND IS ASSOCIATED WITH HIGH MORTALITY

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Objective: To study the clinical characteristics and course of a cohort of patients presenting with pelvic fragility fractures (PFF).

Methods: A retrospective chart review of 36 patients with PFF seen over a 4-y period in a community based outpatient fracture clinic was conducted. A complete history and physical, review of medical records and x-rays was performed. A CBC, chemical profile, TSH, urinalysis, vitamin B12, 25-OH vitamin D, PTH, and immunofixation was done in all patients. Antiparietal cell antibody (APA), intrinsic factor antibody (IFA), and serum protein electrophoresis was done in select patients. Comorbidities including history of solid tumor, diabetes, COPD, cardiac, and neurologic were tabulated.

Results: There were 32 females and 4 males ranging in age 55-95 y (mean 82.5). 19 patients had a previous major osteoporotic fracture and 8 a total hip replacement. 35 patients were living at home and 18 were still driving prior to the fall causing the PFF. Patients had an average of 0.86 comorbid conditions: COPD-9, cardiac-8, history of cancer-6, neurologic-5, and diabetes-3. 2 patients had previous radiation therapy to the pelvic area. The BMI was <20 in 8 patients and 15 had peripheral neuropathy. Among 25 of 31 patients who had a CT scan or MRI fractures of the sacrum-16, acetabulum-6, sacrum and acetabulum-3 were identified in addition to pelvic rami. Monoclonal protein (MCP) was found with immunofixation in 15 (42%) patients: IgG-6, IgM-5, and light chains-4. M-spike was found in 6. 5 (14%) patients had low vitamin B12 levels with either APA or IFA. 2 patients had vitamin D levels <20 ng/mL and 5 had hyponatremia. 24 patients required rehabilitation in a nursing home. During follow-up (mean 20.7 months) 11 (31%) patients died, 9 within 1 year after PFF from causes unrelated to the fracture.

Conclusion: PFF occurs predominantly in female, elderly, independent and active patients with few comorbid conditions and is associated with significant morbidity. PFF may be a prelude to mortality within 1 year of occurrence. CT or MRI scans are necessary to define the full extent of injury to the pelvis. Although demographics may differ between PFF, hip, and vertebral fracture patients, they all share age related conditions such as MCP, pernicious anemia, and hyponatremia that predispose to falling and bone fragility.

P300

CHRONIC HIGH-DOSE ALCOHOLISM MEDIATED NECROPTOSIS BY ACTIVATING TNF-A CONTRIBUTES TO ALCOHOL-INDUCED OSTEOPOROSIS

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Objective: To confirm RIP1/3/MLKL-dependent necroptosis participates in the pathogenesis of alcohol-induced osteoporosis in mouse bone tissue and explore its possible mechanisms.

Methods: 8-week-old male C57/BL6 mice were randomly divided into normal control group, necrostatin-1 drug control group (Nec-1), chronic high-dose alcohol group (High EtOH), and chronic high-dose alcohol add on necrostatin-1 treatment group. After 22 weeks, measured the BMD, morphology and microstructure of the distal femur; and detected the expression of inflammatory factor TNFα and the specific marker of necroptosis.

Results: A 3D reconstruction of distal femur showed that BMD, BV/TV, Tb.Th and Tb.N were decreased, and HE staining showed a decrease in the number of trabecular bone, and looseness, uneven thickness, and trabecular bone fracture with high-dose alcohol in mice. Bone formation increased and tissue microstructure degeneration was reduced after necrostatin-1 intervention. The content of TNFα in serum increased, while the bone formation index BALP decreased. The percentage of Runx2-positive bone cells in the alcohol group decreased, and the RIP1-positive bone cells increased detected by immunofluorescence. The mRNA and protein expression of RIP1, RIP3 and MLKL were significantly higher, while Runx2 was lower in chronic high-dose alcohol group, and can be controlled and reversed with necrostatin-1, bone formation increased, and tissue microstructure regression became relieved after necrostatin-1 intervention.

Conclusion: 1) Necroptosis in bone cells participates in the pathogenesis of alcohol-induced osteoporosis in mice. 2) TNFα may be a trigger for necroptosis in bone cells. 3) Necrostatin-1 can effectively inhibit RIP1/3- dependent necroptosis in bone cells of alcohol-induced osteoporosis mice and delay the progression of bone structure lesion.

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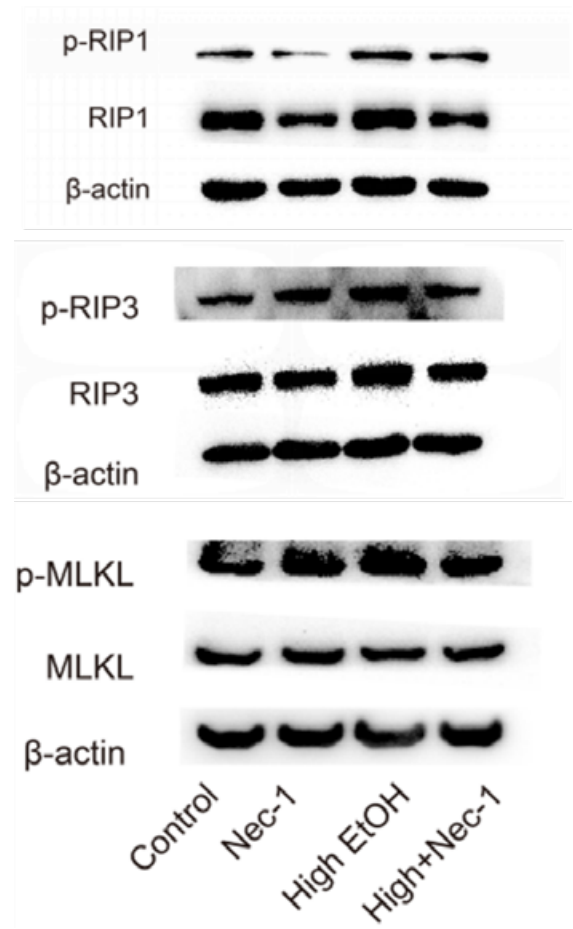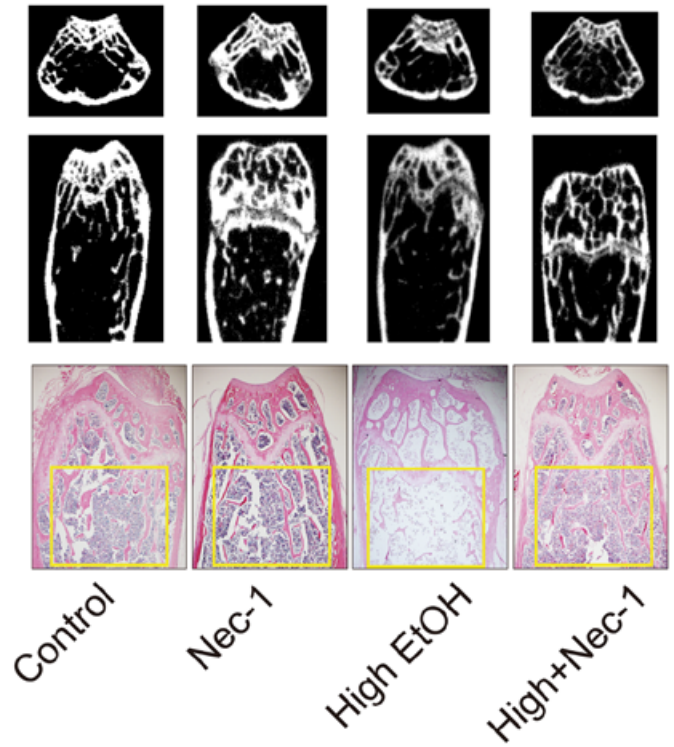
P301

FREQUENCY OF VERTEBRAL FRACTURES IN PATIENTS WITH REDUCED MINERAL BONE DENSITY

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Objective: Osteoporotic bones have reduced bone density and are prone to fracture. Spine fractures are usually not recognized, but are common and associated with increased morbidity - they can be prevented with appropriate therapy. We aimed to determine the incidence of vertebral fractures in patients with reduced bone density and their association with risk factors.

Methods: A prospective analysis included 1442 patients. BMD was determined in all subjects on the lumbar spine and hip bone, as measured by DXA on a Hologic Discovery device. Patients whose T-score of the hip and lumbar spine was greater than -1 SD were excluded from the study, so the study sample was 852 patients.

Results: Of 852 patients, 91.2% were women and 8.8% were men. The majority of respondents were aged 62-73 and on average 65 y. Of the 852 subjects, 61 (7.1%) had vertebral fractures and 191 (22.4%) had nonvertebral fractures. Most patients with vertebral fractures also had osteoporosis (42), which is related to the frequency of occurrence of vertebral fractures, so one vertebral fractures had 24 subjects, 2 vertebral fractures 9 subjects, 3 vertebral fractures 5 and 4 fractures 4 subjects. In the osteopenia zone: 26 subjects had 1 vertebral fracture, 2 vertebral fractures 11 subjects, 3 vertebral fracture 5 and 4 vertebral fracture had 4 subjects. Considering the frequency of risk factors in patients with vertebral fractures, the leading place belongs to low BMI, i.e., 41 patients (67.2%), previous fractures 29 (47.5%), early menopause in 13 (21.3%) subjects, smoking in 12 patients (19.7%), glucocorticoid uptake 10 (16.4%), autoimmune diseases in 8 of them (13.1%), fractures in the family and alcohol consumption in 4 patients (6.5%).

Conclusion: The results indicate that osteoporosis complicated by vertebral fractures is more common in women, older, reduced bone density (at the level of osteoporosis) and is associated with risk factors. The results of the analysis unfortunately also indicate a small number of registered vertebral fractures, which confirms the fact that most vertebral fractures are not recognized, suggesting the need for early detection of predisposing factors for osteoporosis and for vertebral fractures.

P302

ASSEMBLY LOOSENING AND SUBSEQUENT CUT-OUT IN A PATIENT WITH OSTEOPOROTIC HIP FRACTURE

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Objective: One complication of intramedullary nails used to treat hip fractures is the assembly loosening. The confluence of some factors (osteoporosis, fracture line, inadequate focus reduction, repeated motorizing, etc.) can hasten a cut-out, showing a prevalence of 2-4% of the diverse series, and further assembly loosening. The objective of this study is to show the management of a patient with an assembly loosening and posterior nail´s cut-out.

Methods: The present case illustrates an 83-year-old female patient with a right femur pertroncanterhea fracture who, after undergoing intramedullary nailing by a gamma nail, suffers the loosening of the assembly and subsequent cut-out. The postoperative X- ray show the progressive loosening of the captive screw until the cut-out of the nail occurs.

Results: The patient was operated for her complication by placing another gamma nail in a lower position. The postoperative controls were correctly with functional recovery of the patient.

Conclusion: We concluded that assembly loosening and posterior gamma nail´s cut-out is a potential complication of intramedullary nails used to treat hip fractures, mainly in patients with osteoporosis. This complication requires a reintervention in which one of the possible option is the replacement of the nail in a lower position.

P303

THE STRESS-HORMONE OSTEOCALCIN IS UPREGULATED IN BONE AND IL-6 IS DIFFERENTLY MODULATED IN SOLEUS AND TIBIALIS ANTERIORIS MUSCLES AFTER THERMOGENIC CHALLENGE IN MICE

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The bone-derived hormone osteocalcin (Ost) enhances several physiological process exerting a protective function on bone, reproduction and cognition. Ost is also required for muscle regeneration, triggering the increase of IL-6 in myofibers. The exposure of various types of stressors in mice leads to a rapid and selective surge of circulating bioactive Ost. In line with this finding here we explored the signaling triggered by Ost regulating bone and muscle response to CS. The mRNA levels of *Ost,* its receptor *Gprc6a*, and *Il-6* in bone, soleus (SOL) and tibialis anterioris (TA) muscles from 3 months-old mice exposed to CS were investigated. The expression of different Myosin heavy chain *Mhc2b* (fast-glycolytic), *Mhc1* (slow-oxidative), *Mhc2x* and *Mhc2a* (fast-glycolytic-oxidative*)* were also investigated*.* Mice (n=15) were divided into: controls maintained at room temperature (RT=23°C), exposed to CS at T=4°C for 6 h and 5 d. *Il-6* genes were upregulated respectively by 1- and 1.5-fold after 5 d CS in SOL. *Ost* increased by 16-fold in bone after 5 d CS, but was downregulated in SOL by 0.9-fold at 5 d and unaffected in TA, *Gprc6a* was unaffected in bone and TA/SOL. *Mhc2b* was

significantly downregulated in SOL respectively by 0.96- and 0.88-fold after 6 h and 5 d CS vs. controls; *Mhc1* only by 0.32-fold after 5 d CS in SOL. *Mhc2a* was significantly downregulated by 0.88-fold after 5 d CS in TA. *Mhc2x* was not affected following CS. In sum, Ost is highly expressed in bone after 5d CS. Thermogenic challenge induced a marked shift of SOL muscle toward the slow-twitch phenotype which is in line with the metabolic need of the slow-twitch oxidative muscle following thermogenic challenge increasing the ratios *Myhc1/Myhc2b*. CS induced a mild shift of the TA muscle toward the fast-twitch phenotype. IL-6 upregulation in muscle after CS is consistent with the concept of a coordinated axis between bone and muscle.

P304
VERTEBROPLASTY IN VERTEBRAL FRACTURES WITH PERSISTENT BACK PAIN: A CASE REPORT

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Patients with persistent back pain after suffer a vertebral fracture are a large part of the pathology in outpatient trauma consultations. This patients are typically elderly and frail and have osteoporosis. No clear consensus exists regarding the optimal management strategy because there is limited high quality research. Management options for this patients is vertebral augmentation, especially in an acute phase, but its use is controversial.

In our experience vertebroplasty has been shown to be an effective technique for the control of refractory pain in vertebral fractures regardless of cause and time of evolution. We aimed to evaluate the fracture cause, efficacy and results of vertebroplasty used in a female patient aged 70 years, after a spontaneous fall, she suffered a vertebral fracture with orthopedic fracture management in first place. After two months with persistent back pain we decided realised a vertebroplasty with good control of refractory pain.

P305
TBS REFERENCE CURVE IN ALGERIAN FEMALE POPULATION

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The diagnosis of osteoporosis can be anticipated, before the first fracture, thanks to the analysis of risk factors and the measurement of BMD, however many patients at risk are not detected and many fractures are not explained. This is where the FRAX tool has an interest. We do not have an age appropriate FRAX in Algeria. TBS which reflects the structural state of bone microarchitecture can be of great help, hence the usefulness of a national curve. This is a cross-sectional study carried out from May to August 2019 in two Douéra and CHU centers in Tizi Ouzou in women aged 20 y and over. At least 35 subjects per decade by central agency in order to establish a national curve for TBS.

Noninclusion criteria are early menopause, surgical menopause, osteoporotic fracture, osteoporosis treatment, cortisone treatment, treatment with aromatase inhibitors, diabetes, hyperthyroidism, hyperparathyroidism, lumbar scoliosis and intervention on the lumbar spine.

Results: 427 women were recruited, aged on average 50.9±16.03 y

Average BMD at spine (L1-L4): 0.884±0.159 g/cm² (0.478-1.446)

The average value of the GER is: 1.259±0.110 (0.772-1.364)

Correlations of TBS with weight, size and duration of menopause is significant

The values obtained for TBS (L1-L4) decreased with age from 45 y. The decline in TBS between 45-85 y was on average 13.5%.

P306
AUTOMATIC OPPORTUNISTIC CT BASED RISK ASSESSMENT OF OSTEOPOROTIC FRACTURE: RESULTS FROM A 48,744 SUBJECT, 5-YEAR RETROSPECTIVE COHORT STUDY

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Methods for identifying patients at high-risk for osteoporotic fractures, including DXA and risk predictors like FRAX, are underutilized. We assessed the feasibility of automatic opportunistic fracture risk evaluation based on routine abdomen or chest computed tomography (CT) scans. A CT-based predictor was created using three automatically generated bone imaging biomarkers (vertebral compression fractures, simulated DXA T-scores, and lumbar trabecular density) and CT metadata of age and sex. A cohort of 48,227 individuals (51.8% women) aged 50-90 with available CTs prior to 2012 (index-date) were assessed for 5-y fracture risk using FRAX with no BMD input (FRAXnb) and the CT-based predictor. Predictions were compared to outcomes of major osteoporotic fractures (MOF) and hip fractures during 2012-2017 (follow-up period). Compared to FRAXnb, the MOF CT-based predictor presented better area under the receiver-operating-characteristic curve (AUC), sensitivity and positive predictive value (PPV) (+1.9%, +2.4% and +0.7%, respectively). The AUC, sensitivity, and PPV measures of the hip fracture CT-based predictor were noninferior to FRAXnb at a noninferiority margin of 1%. When FRAXnb inputs are not available, the initial evaluation of fracture risk can be done completely automatically based on a single abdomen or chest CT, which is often available for screening candidates.

P307
SENIOR PHYSICAL ACTIVITY CONTESTS IN NURSING HOMES: A FEASIBILITY STUDY

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Objective: Competition has been shown to improve motivation and physical performance in young people. This method has been rarely studied in older people. Our primary objective was to evaluate the feasibility of senior physical activity (PA) contests between two nursing homes. Our secondary objectives were to assess changes in the motivational level and physical performance of the residents over time.

Methods: Residents from two Belgian nursing homes were invited to participate in PA contests. A pretest and three contest sessions were organized over a period of 3 months. The activities proposed were body balance, gait speed, sit-to-stand performance, arm curl and address tests. Feasibility was measured by contest session adherence (expected score >80%), difficulty scores (expected score<40%) and appreciation scores (expected score>80%). Motivational questionnaires were administered: the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2) (assessing amotivation, introjected regulation, identified regulation, intrinsic motivation and external motivation) and the Abbreviated Perceived Motivational Climate in Exercise Questionnaire (A-PMCEQ) (assessing ego- and task-involving climates). Friedman's analysis of variance was performed to evaluate the changes in physical performance and motivational levels.

Results: Of the 24 participants, 7 did not complete all sessions because of medical or personal reasons not related to the study. During the 3 sessions, the adherence was 86%, the mean difficulty score was 30.8% and the satisfaction score was 87%. After three sessions, residents experienced a significant decrease in amotivation (p=0.03), external motivation (p=0.03) and ego-involving climate (p=0.02) and a significant improvement in gait speed (p<0.001), sit-to-stand performance (p<0.001) and arm curl scores (p<0.001).

Conclusion: In nursing home settings, senior PA contests are feasible and may improve the motivational climate and physical performance.

P308
MOTIVATIONAL CLIMATE OF GROUP EXERCISE SESSIONS IN NURSING HOMES

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Objective: We examined the motivational climate among nursing home residents who were involved in group exercise sessions.

Methods: This cross-sectional study was conducted in 10 nursing homes of Liège area that offer group exercise sessions. Sociodemographic data (age, sex, BMI), cognitive status (by the Mini Mental State Examination) and independence in activities of daily living (by the Katz Scale) were retrieved in the medical records. The "Abbreviated-Perceived Motivational Climate in Exercise Questionnaire" was translated into French and then administered face to face with a clinical researcher. This is composed of 6 ego-involving climate items (corresponding to rivalry, comparison and favoritism) and 6 task-involving climate items (corresponding to valorization, individual efforts, self-improvement and cooperation). Each item is ranged on a 5-point Likert scale ranging from 1 (not at all focused on ego or task) to 5 (totally focused on ego or task). Each subscale has a total score expressed as an average.

Results: A total of 102 subjects of exercise group sessions were included (84.3±7.7 y and 83 (81.4%) women). The mean score of task-involving and ego-evolving motivational climate was respectively 3.57 (SD=0.67) and 1.52 (SD=0.49), suggesting that the motivational climate was more focused on the task-involving climate than on ego-involving climate. Some items results were of particular interest: 55.9% of the respondents found that the instructor doesn't remark/reward when they try hard, 63.7% said that the instructor doesn't encourage mutual aid and 38.2% found that instructor doesn't encourage to do new exercises.

Conclusion: Participants tended to perceive motivational climate as more task-involving than ego-involving. The absence of individual positive feedback, new exercises and mutual aid were also highlighted.

P309
INFLUENCE OF BONE MINERAL DENSITY ON HEALTH-RELATED QUALITY OF LIFE IN HEMODIALYSIS PATIENTS

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Objective: Chronic kidney disease (CKD) is associated with impaired health-related quality of life outcomes. The measurement of health-related quality of life by EuroQol five-dimensional questionnaire (EQ-5D), has become important tool for the assessment of health care in a wide range of diagnoses. BMD is one of the objective characteristics of the health state in dialysis patients. The aim of our study was to analyze influence of BMD on quality of life of hemodialysis patient.

Methods: A common EQ-5D questionnaire and EQ-VAS (visual analogue scale) were used to assess the quality of life of 343 patients (male - 174, female - 169, middle age 45.0±13.8) with CKD stage 5, receiving hemodialysis. BMD (lumbar spine, hip, and distal arm) was analyzed in all patients with QDR Hologic Discovery W. As a control, we used the results of a survey of 250 people with normal kidney function, from 20-68 y (average age 43.5±12.7).

Results: In patients with CKD, there was a decrease in the EQ index scores in comparison with the control group. Respondents with CKD reported more problems in the dimensions 'mobility', 'pain' and 'usual activities' than in the dimensions 'self-care' and 'anxiety/depression'. The mean EQ-VAS scores in CKD patients was 62.4±19.3 comparing with the 80.6±15.6 in control group (p<0.01). Respondents with low BMD of the hip and distal arm assessed by indexes T and Z had significantly more problems with 'mobility', 'pain', 'anxiety/depression'. The patients with low BMD in lumbar spine had more problems with 'self-care'. Rank correlation (Spearman's) confirmed the negative association of low BMD with worse self-assessment of respondents. The strongest negative influence on EQ index scores had BMD of the hip.

Conclusion: The results of the study of quality of life indicate a significant deterioration of some of its parameters in hemodialysis patients with low BMD compared with patients with normal BMD. The worst results of self-assessment obtained in patients with low BMD of the hip.

P310
COLLAGEN TYPE I ALPHA1 GENE POLYMORPHISM DOES NOT PREDICT BONE MINERAL DENSITY BUT CAN BE ASSOCIATED WITH HIGHER RISK OF FRACTURES IN FEMALE HEMODIALYSIS PATIENTS

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Objective: Previous works have shown that polymorphism that affects at *Sp1* binding site in the *COL1A1* gene could be associated with reduced BMD and an increased risk of osteoporotic fracture in several populations. The aim of the study was to analyze the influence of collagen type I α1 (COLIA1) gene polymorphism on BMD and risk of fractures in female patients with chronic kidney disease on hemodialysis.

Methods: To test the relationship between COLIA1 gene polymorphism, BMD and fractures, 86 female patients, middle age 38.7±11.4 y, treated on hemodialysis for 4.1±1.2 y, have been studied. 22 (25.6%) patients had typical osteoporotic fractures. BMD was measured by DXA (Hologic W Discovery). To analyze BMD we used Z-score and considered two diagnostic categories: normal BMD – Z-score >-1.0 and deficit BMD – Z-score ≤1.0. Genotypes SS, Ss and ss have been considered.

Results: Patient with fractures had higher levels of intact PTH, alkaline phosphatase and longer received hemodialysis (p<0.01). We did not reveal difference in age, years of menopause, levels of serum phosphorus and calcium in patients with and without fractures. The relative distribution of COLIA1 alleles was S - 83.7%, and s - 16.3%. The COLIA1 genotype SS was revealed in 67.4% patients, Ss – 32.6 %. No one studied patient had genotype ss. There were no remarkable differences in genotype SS and Ss groups in laboratory results, including intact PTH, ionized calcium, phosphates and alkaline phosphatase and BMD. Among 22 patients who had typical osteoporotic fractures, 28,6% had genotype Ss, and 24,1% - SS.

Conclusion: We did not find obvious association of COLIA1 gene polymorphism with BMD in studied population of hemodialysis patients. However, we suggested the hypothesis that people with allele "s" could be more inclined to fractures.

P311
AGE-RELATED CHANGES IN FEMORAL HEAD BONE DENSITY AND VOLUME OF HIP FRACTURES

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Objective: Little is known about the femoral head bone changes with aging. The aim of this study is to provide reference data for volume BMD (vBMD) and size of the femoral head and to explore the associations of bone density and size of femoral head and neck with age.

Methods: MIAF (medical image analysis framework) - femur was used for the analysis of CT datasets from 319 females with incident hip fractures age 50-98 y. Integral BMD and volume of the head and neck were assessed. The femoral head can be divided into four quadrants to address differential vBMD and volume responses of its superior, inferior, posterior and anterior parts. Areal BMD (aBMD) of femoral neck was obtained.

Results: Integral vBMD in the head in 90-98 y group was 48.0 mg/cm^3 lower than that in 50-59 y group, which accounts for nearly 30% decrease in vBMD with 40 y increase. Age-related vBMD changes in the head quadrants were similar to that in total. With age, the trend line correlation coefficients for vBMD in quadrants were relatively small, but significant (p<0.001) for all. The femoral head integral vBMD correlates well with neck vBMD and FN aBMD. FN aBMD explained 45% of head integral vBMD variance (p<0.0001).

Conclusion: This study established age-specific reference values for femoral head BMD and size for Chinese women aged 50-98 y. Elderly women had relative preservation of femoral head bone volume from 50 y over four decades but markedly lower integral BMD of proximal femur.

P312
D VITAMIN VALUES IN DOWN SYNDROME PATIENTS

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Objective: D vitamin plays an important role in the metabolism of tissue structures of various organic systems, being extremely important for both physical and mental statuses of an individual. Insufficient values of D vitamin considerably reduce capacities of human organic systems in their mutual balances in order to achieve the best possible functional status of each individual. We aimed to establish D vitamin and calcium values in Down's syndrome patients' blood.

Methods: The research covered 31 patients with trisomy of 21 chromosome pair in the period from 01.01.2019 to 30.06.2019. They were followed within the basic disease at University of Sarajevo Clinical Center. All patients were established the level of vitamin D and calcium in serum.

Results: The targeted group consisted of 31 patients of the 19.9% average age, and variables ranging from 16-26. Average vitamin D level amounted to 10.9 ng/ml with variables ranging from 3-23.5. Average calcium value in serum amounted to 2.25 mmol/L variables ranging from 1.98-2.6. The targeted group consisted of 17 women (54.8%) with average age amounting to 19.7 y variables ranging from 17-24. Average D vitamin value in the female group amounted to 11.7 ng/ml variables ranging from 3-20.3. Average calcium values in serum amounted to 2.28 mmol/L variables ranging from 2-2.6. The targeted group consisted of 14 men (45.2%) average age amounting to 20.4 y variables ranging from 16-26. Average D vitamin value amounted to 10.0 ng/ml variables ranging from 3-20.3. Average value of calcium in serum amounted to 2.28 mmol/L variables ranging from 2-2.6.

Conclusion: The research proved that individuals with trisomy of 21 chromosome pair have very low values of D vitamin in serum. Establishment and follow-up of D vitamin values in serum should be a part of the protocol concerning follow-up of Down's Syndrome patients. Potential achievement of referential D vitamin values should be strictly planned, adjusted and followed up in accordance with the needs of each individual patient.

P313
THE INFLUENCE OF LIFE CHANGE ON THE QUALITY OF THE EVERYDAY LIFE OF PERSONS WITH OSTEOPOROSIS

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Objective: In recent times, osteoporosis has "come in" like an epidemic. A disorder that is present in the age of industrialization and the application of new technologies in ever younger people. As a disease, it is a major medical, social and economic problem.

Methods: The survey was conducted in Vukovar, Croatia from 01.07.2018. to 01.07.2019. The study included subjects treated at the Physical Therapy Department of the County General Hospital and the Veterinary Hospital Vukovar. 92 respondents participated in the study. The sample was divided into study group A (46 subjects) and control group B (46 subjects). At the beginning and at the end of the study, densitometry (DXA), laboratory tests for calcium (CA) in blood and urine, phosphorus (P) and vitamin D, and bone markers for the construction of PINP, ALP and bone breakdown markers ß-CrossLaps performed in the laboratory of hospital Vukovar. Based on the results of densitometry at the beginning and at the end of the study, a 10-y risk of fracture was performed using the FRAX questionnaire and a quality of life questionnaire was conducted for the subjects with osteoporosis-QUESTIONO 31 questionnaire.

Results: Comparing Group A and Group B FRAX results, strictly speaking both groups show a suboptimal level of statistical significance, but as analyzed earlier, Group A results have a

strong indication of significance. Also, visually when comparing the results, it can be seen that in group A there is a definite positive progress compared to group B. Analyzing the results of vitamin D among groups, the level of improvement is more than 1/3 better in group A than the values in group B. However, due to the somewhat uneven level of improvement in group A, standard deviation (scatter measurements) with this improvement in vitamin levels D essentially increased, pulling the "p" value slightly higher. In the case of vitamin D in group A, the distribution is asymmetric (a big jump for some women and no progress for others), which pulls the p value higher. Analyzing the answers (QUALEFFO 31 questionnaire) obtained at the end of the survey among the respondents, it can be observed that in the category of mental functions of nine answers, eight show a statistically significant change, in both groups, with the difference in the question; "Do you feel full of energy?" There was a statistically significant change at the end of the study in the subjects who practiced Tae Bo, whereas no such change was observed in the walking subjects.

Conclusion: At the end of the study, the subjects of group A who practiced Tae Bo were asked to comment on their impressions related to Tae Bo exercises. Group A respondents indicated that the medical exercises they performed during the rehabilitation procedure seemed to them to be ineffective in terms of their age (especially in the 55-60 year old women, given that they were all working women), and that their exercises seemed monotonous, and as such did not find a strong enough motive for them to continue practicing in their own home. Unlike medical exercises, they rated Tae Bo exercises as the type of exercise that allowed them to have a better quality of life over two months of exercise, is through 24 exercise sessions. Group A respondents indicated that after several encounters, they felt more mobile and were surprised by their greater range of motion, and by some of the movements they had been unable to perform for years (At the beginning of the survey of 46 women, only five of them could to sit down without the aid of hands or other movement patterns, and at the end of the study, only one respondent could not sit down from the lying position). Furthermore, exercising in a group of women with similar problems showed them that they were not alone, and that osteoporosis as their problem, through exercise, brought socializing, meeting other people with similar problems, sharing experiences, and above all, brought about a life with much less pain. a dream not interrupted by pain and days that were not filled with fears of some uncertainty and fear of falls and fractures. And something that is by no means negligible, and this is certainly the case that this category of women-women with osteoporosis, found their place where they regularly felt exercised under professional supervision. They identified their workouts with healthy lifestyle training rather than illness and medical exercises. Perhaps the best confirmation of how much better their quality of life was compared to the quality of life that respondents had before attending Tae Bo's exercise, that after completing the study, they continued to exercise three times a week the way they did exercises conducted during the research.

P314
BONE MINERAL DENSITY IN CEREBRAL PALSY PATIENTS WITH VARIOUS MOTOR SEVERITIES

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Objective: To determine the BMD of children and adolescents with cerebral palsy (CP) in relation to the degree of functional disability.

Methods: This cross-sectional study analyzed the BMD of 82 children and adolescents of both sexes suffering from CP, with an average age expressed as a median of 10.8 y (range 5-19.4). The BMD was measured in the lumbar spine region with DXA and results are determined as Z-score. The degree of functional disability was assessed on the basis of the Gross Motor Function Classification System (GMFCS levels I-V). The Pearson correlation has been used to establish the link between the variables, with statistical significance p<0.05

Results: Of the total number of participants, 42.7% were immobile (GMFCS IV-V)), 29.3% were moving with an aid (GMFCS III) and 28% were independently mobile (GMFCS I-II). Lower bone density, defined as BMD Z≤-2, was present in 45.2% participants. Immobile participants (GMFCS IV-V) showed a high prevalence of lower bone density (80%) compared to 13% of the independently mobile (GMFCS I-II). The average BMD Z-score in participants was -1.72±1.05. The average BMD Z-score for participants with immobility (GMFCS IV-V) was -2.46, for mobile participants with a handheld mobility device (GMFCS III) it was -1.38 and the score for independently mobile patients was -0.96, which has shown a statistically significant correlation between BMD and the level of functional disability (p<0.0001).

Conclusion: About 45% of children and adolescents with CP have lower bone density, especially those with most the severe disabilities. Movement limitation represents one of the most important reasons for decreased BMD. Increased physical activity should be the basis for bone heath support in people with functional disabilities.

P315
COMPLEX SUPPLEMENTATION WITH CALCIUM AND VITAMINS D3 & B6 CAN PROLONG EFFECT OF MEDICAL REHABILITATION IN PATIENTS WITH OSTEOPOROSIS AND HIGH FRACTURE RISK

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Objective: To evaluate the effect of complex food supplement with calcium and vitamins D_3 and B_6 intake on muscle strength and balance function during 1-y follow-up after rehabilitation course in patients with osteoporosis and high fracture risk.

Methods: The study comprised 119 men and women aged 50-80 y initiating 3-week course of medical rehabilitation and with established osteoporosis or high (>30%) 10-y probability of major osteoporotic fracture by FRAX® model. 41 patients who had already received antiresorptive therapy made up the studied group 1 (SG1), and 78 patients who did not receive antiosteoporotic therapy were included in SG2 (n=39) or SG3 (n=39). The food supplement containing vitamin D_3 7.5 mg and vitamin B_6 as pyridoxine hydrochloride 1 mg, calcium as calcium citrate 80 mg and HDBA organic complex 100 mg in a pill was administered in dosage of 4 pills a day to patients in SG1 and SG2 for 12 months. Changes in dynamometry, stabilometry and functional tests were evaluated after 3 weeks, and also in 6 and 12 months as follow-up.

Results: Achieved higher levels of muscle strength during the rehabilitation course were maintained for up to 12 months in the back extensors and flexors in SG1 and SG2, and up to 6 months in the lateral back flexors in SG1. The effect of medical rehabilitation completely disappeared in SG3 after 6 months. Improved vs. baseline stabilometry data in balance coefficient and pressure center deviation speed were registered only in SG1 and SG2 in 6 and 12 months. Achieved during rehabilitation positive result of balance control measured with One-leg-standing test was maintained only in SG1 for 12 months, but it significantly worsened in SG3 at follow-up

Conclusion: Long-term intake of food supplements containing calcium with vitamins D_3 and B_6 can help to maintain the rehabilitation effect on muscle strength and balance function in patients with osteoporosis and a high risk of fractures.

P316
MUSCLE STRENGTH DEFICIENCY AND BALANCE FUNCTION IMPAIRMENT IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES

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Objective: To estimate the change of static and dynamic balance function and the lack of trunk muscle strength in osteoporotic patient with vertebral fractures (VFs).

Methods: 90 patients aged 43-80 with primary osteoporosis (BMD T-score in lumbar spine or femoral neck <-2.5 measured by DXA) were enrolled. Study group comprised of 60 subjects (56 women, 4 men) with at least 1 VF confirmed by X-ray. Control group included 30 subjects (28 women, 2 men) without any osteoporotic fracture. The examination program consist of stabilometry, back muscles tensodynamometry, balance tests (Fukuda-Unterberger and one-leg-standing tests), functional tests (up-and-go test, 10-m walk test, back and abdomen static and dynamic endurance tests).

Results: According to stabilometry study group was characterized by lower balance coefficient vs. control group (77.0% vs. 85.65%, p=0.002), greater pressure center media-lateral (PC ML) deviation

(1.2 vs. -1.2 mm, p=0.025) and PC ML displacement (6.8 vs. 4.8 mm, p=0.01). Patients with VFs lose their balance faster during one-leg-standing test with open eyes (5.0 vs. 7.5 s in control group, p=0.05) and with closed eyes (2.0 vs. 3.5 s, p=0.05). Fukuda-Unterberger test showed greater side dislocation in study group (40°) vs. controls (30°, p=0.02). Muscle strength deficiency was estimated in study group in trunk flexors (TF) -40.93% and in trunk extensors (TE) -18.12% with an adequate function of the left lateral flexors (LLF) and in right lateral flexors (RLF). Patients with VFs had the lower muscle strength vs. controls of TF (-27.73 kg, p=0.000), TE (-21.28 kg, p=0.000), LLF (-24.06 kg, p=0.005) and RLF (-24.26 kg, p=0.000). No significant difference between results of functional tests were registered (p>0.05).

Conclusion: VFs in osteoporotic patients negatively affect static and dynamic balance function and are associated with reduction of trunk muscles strength.

P317
RISK FACTORS FOR OSTEOPOROSIS AND PROBABILITY OF OSTEOPOROTIC FRACTURES IN PATIENTS UNDERGOING MEDICAL REHABILITATION

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Objective: To evaluate the risk of osteoporosis and related fractures in the patients treating in in-patient rehabilitation department.

Methods: The survey was conducted by means of questionnaire of 600 patients aged >50 y.o. ordinary treated in inpatient department of rehabilitation center. Risk factors for osteoporosis were assessed using IOF "One-minute osteoporosis risk test". 10-y probability of major osteoporotic fracture was calculated using Russian scale of FRAX® online calculator.

Results: Assessment of osteoporosis risk factors revealed that 58.2% of responders had no risk factors, 6.8% had one risk factor, 3.8% - two, 0.6% - three, 9.1% - four, 21.5% - five or more risk factors. 45.8% of responders had experienced nontraumatic fractures in past, and a fractures occurred during rehabilitation procedures in 4.6% of ones. High probability of major osteoporotic fracture was revealed in 38% of all respondents, in particular in 45.7% of women and in 16.6% of men. The average 10-y risk for major osteoporotic fractures was 13.7% [1.6; 48.0] and for the hip fracture - 3.2% [0;16]. 8.6% of patients had 10-y absolute risk for major osteoporotic fractures more than 30%. 42.5% of respondents performed bone densitometry in the past. Osteoporosis was already diagnosed in 34.1% of respondents but only in 56.6% (n=127) of high fracture risk group. Among those who never undergo densitometry there were 43.1% of patients with a high fracture risk. Antiosteoporosis treatment received just 31.0% among osteoporotic patients and 12.4% among subjects with high fracture risk.

Conclusion: 45.7% of women and in 16.6% of men aged >50 y.o. ordinary treated in in-patient rehabilitation department have high risk of osteoporotic fracture, 41.2% patients had osteoporosis risk factors and 45.8% experienced nontraumatic fractures in past. Data indicate a high probability of nontraumatic fractures in those patients due to concomitant insufficient prescription of antiosteoporotic medication.

P318

THE USEFULNESS OF STANDARD ABDOMINAL COMPUTED TOMOGRAPHY DATA FOR DECREASED VERTEBRAL BONE DENSITY SCREENING IN THE MIDDLE AGE AND ELDERLY PATIENTS

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Objective: The study aimed to evaluate: (1) whether standard abdominal CT performed for other clinical indications might be a useful screening technique to identify patients with low bone density; (2) to determine reference values of CT HU for osteopenia and osteoporosis compared to DXA assessed BMD values.

Methods: 108 patients (7 men, 101 women) at age 50-82 y (mean age 63.9 y, standard deviation [SD]=8.9), who underwent an abdominal CT examination as well as lumbar spine DXA test within 90 d at the Riga East Clinical University Hospital between 2012-2019 were included in the retrospective study. The exclusion criteria were lumbar spine implants, spinal inflammation, and malignancies. Lumbar spine trabecular bone radiodensity values were measured in CT scans from L1-L4 levels. Circular ROI (ø 20 mm) was drawn in the axial plane, in the middle of the vertebral body excluding the cortical margins. DXA T-score of the lumbar spine served as the reference standard. Linear regression analysis and Kruskal-Wallis tests were applied to obtained data.

Results: Linear regression with moderate correlation was found between mean lumbar vertebral body CT HU measurements and mean DXA BMD estimates (correlation coefficient [r]=0.63), however, it was different at L1, L2, L3 and L4 level as 0.69, 0.64, 0.58, 0.50, respectively. CT values for normal bone density (DXA T-score ≥ -1.0) was of 140 HU and above (CI=95%). The statistically significant difference (p<0.05) was not found between osteopenia (DXA T-score between -1.0 and -2.5) and osteoporosis (DXA T-score ≤-2.5) for CT values below 140 HU. The sensitivity, specificity, positive predictive values, negative predictive values, and accuracy of CT HU for diagnosing low bone density were 0.89, 0.69, 0.85, 0.76 and 0.82, respectively.

Conclusion: Standard abdominal CT scans data can be used as the first screening method to differentiate normal and low bone density, avoiding additional irradiation and costs.

Patients with lumbar spine trabecular bone radiodensity below 140 HU have to undergo additional radiological examination (quantitative CT) to evaluate the severity of bone density decrease.

P319

SUBACROMIAL IMPINGEMENT SYNDROME: EVALUATION OF 60 PATIENTS BASED UPON OXFORD SHOULDER SCORE AFTER ARTHROSCOPIC SUBACROMIAL DECOMPRESSION SURGERY

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Objective: Subacromial impingement syndrome represents a wide spectrum of pathologies ranging from subacromial bursitis to rotator cuff tendinopathy and full thickness rotator cuff tears. Etiology of this diagnosis is multifactorial, it is referred to both extrinsic and intrinsic factors. Management of this condition consists of conservative therapy, physical therapy and when unsuccessful in surgical treatment. Our aim was subjective patients' evaluation on the basis of Oxford Shoulder Score before surgery, 3 and 6 months after surgical intervention.

Methods: Our research group involved 60 patients who underwent surgery for subacromial impingement syndrome from 1 March 2016 until 1 March 2019 at the Department of Orthopaedics in Nove Zamky, Slovakia, filled out Oxford Shoulder Score questionnaire before surgery, 3 months and 6 months after surgery.

Results: In total 53 patients (88.3%) after 6 months after surgical intervention mentioned no or mild difficulties, with middle difficulties suffered 7 patients (11,7%). In patients with continuing difficulties was done a cervical spine X-ray with degenerative changes findings. We did not experience any post-surgical complications, nor surface or deep infection, osteonecrosis, fracture, neurovascular damages, or deep vein thrombosis were noted.

Conclusion: Our findings showed arthroscopic surgery on the bases of patients' subjective evaluations proved positive in shoulder burden elimination in a relative short amount of time and stays as a method of choice at our workplace.

P320

JUVENILE DERMATOMYOSITIS

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Case presentation: Dermatomyositis is an idiopathic myopathy with characteristic cutaneous manifestation including; heliotropic rash, Gottron papules, peripheral telangiectasias, photo distributed erythema, piokilo-Derma, & alopecia. Although heliotropic rash and Gottron papules are specific cutaneous features, calcinosis of skin muscles is unusual in Adult with DM. It may occur upto 40% (3x more) of children or adolescent. Calcinosis is divided in 4 groups: 1).dystrophic.2).metastatic.3).idiopathic.& 4).iatrogenic. In juvenile connective tissue disease; calcinosis is mostly of the dystrophic type and it seems to be localized process rather

than an imbalance of calcium homeostasis. Ca deposition may be {cutaneous, subcutaneous, fascial, or intramuscular. Several theories has been suggested to explain dystrophic calcinosis, nut etiology remains unknown. Dystrophic calcinosis in JDM is challenging and there are no controlled studies in treatment of established calcinosis. Calcinosis in children can be prevented ONLY by aggressive treatment. But it is difficult to treat when established. Many agents can be tried such as colchicines, probenecid, warfarin, MTX, MMP, CYC, alendronates and biologics. Calcinosis in some patients remains a debilitating and disfiguring problem, and yet no treatment has been proven to be effective. Further investigations and therapeutic trials are important.

P321
FOREARM FRACTURE IMPACT ON ADOLESCENT QUALITY OF LIFE

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Objective: Forearm fractures represent the commonest fracture in adolescents aged 13-18 y affecting their everyday activities. We wanted to evaluate how adolescents perceive their quality of life after sustaining a forearm fracture treated conservatively.

Methods: After obtaining the Hospital Ethics Committee approval, we distributed the European Quality of Life (Euro-Qol) questionnaire to a total of 72 adolescents aged 13-18 y diagnosed with a forearm fracture treated conservatively and presented in Outpatients Department from January to December 2019. The questionnaires were answered voluntarily and anonymously by all the participants. The Euro-Qol (EQ-5D) is a self-administered instrument of quality of life measurement which was previously validated into Greek. The EQ-5D is considered a quick and easy to use questionnaire. For assessing the everyday quality of life which values 0-100, it has 2 parts: a descriptive system and a visual analogue scale. The highest value represents the best quality of life. In our study we evaluated the patient related outcomes regarding their quality of life after sustaining a fracture of the ulna and radius, taking into account the answers given of the visual analogue scale values. We used the Microsoft® Office Excel and the IBM SPSS Statistics System for the statistical analysis and the statistical importance was set at p<0.05.

Results: 67 patients finally participated in the study as 5 patients did not return the questionnaires. The EQ-5D average score was 64 ranging from 40-80/100. P values ranged between 0.01-0.37.

Conclusion: The participated adolescents aged 13-18 y in our study, considered that their injury of a conservatively treated forearm fracture had in important impact on their everyday quality of life.

P322
PAEDIATRIC SCOLIOSIS AND PERCEIVED LEVELS OF PAIN

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Objective: Scoliosis is a major health problem for the human growing skeleton.

In this study we wanted to evaluate how children diagnosed with scoliosis following conservative treatment with Boston type orthosis, perceive their disease related musculoskeletal pain.

Methods: In this study were included 21 patients (16 girls) aged 6-16 y diagnosed with idiopathic or secondary scoliosis of the thoracic or/and the lumbar spine following a conservative treatment with Boston type orthosis. The scoliosis diagnosis was based on both clinical and radiological evaluation of the child and the inclusion criteria were set at scoliosis Cobb radiological angle of 20-40°. Each and every participant filled anonymously and voluntarily the visual analogue pain scale (VAS) which was administered to them on their attendance at the outpatient department during their regular follow-up. VAS is a straight horizontal line of fixed length, usually 100 mm. The ends are defined as the extreme limits of the pain orientated from the left (worst) to the right (best). We used the Microsoft® Office Excel and the IBM SPSS System for the statistical analysis and the statistical importance was set at p<0.05.

Results: Finally, 20 patients (4 boys) returned their questionnaires and were considered at the data analysis. The mean level of musculoskeletal pain related to scoliosis in our cohort was 76 ranging from 52-96. P values ranged from 0.01-0.45.

Conclusion: Scoliosis has an impact on perceived levels of disease related musculoskeletal pain in children treated conservatively with Boston type orthosis.

P323
BONE HEALING AND WEIGHT BEARING MANAGEMENT IN TIBIAL DIAPHYSIS FRACTURE UNILATERAL EXTERNAL FIXATION

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Objective: Tibial diaphysis fracture represents the commonest long bone fracture and is a major cause of professional and social absenteeism for the patient. Its management is included in the everyday practice of an Orthopaedic surgeon having various available treatment options. We wanted to evaluate the time to bone healing in tibial diaphysis fractures treated with unilateral external fixator regarding the weight bearing management.

Methods: After obtaining the hospital ethics committee approval, we retrospectively reviewed the x-rays and case notes of 54 patients who underwent an Orthofix unilateral external fixator after sustaining a tibial diaphysis closed fracture. Our primary outcome was the time to clinical and radiological bone healing and the secondary outcome of our review was the different weight bearing postoperative management. The patients were separated in 3 groups regarding the commencement of post-op weight bearing. Group 1 contained patients who started weight bearing from day 1 to day 30, in group 2 were patients who started bearing weight from day 31 until day 60 and group 3 had patients who commenced bearing weight on the affected limp after 61 days post-op.

Results: The mean time to clinical and radiological bone healing was 21 weeks after the application of the tibial diaphysis fracture unilateral external fixator. Group 1 achieved the shortest mean time to bone healing with 15 weeks.

Conclusion: The weight bearing management regarding its early commencement could favor the time to bone healing in tibial diaphysis fracture unilateral external fixation.

P324
THE ROLE OF AQUAPORIN-4 ANTIBODIES ON BONE HEALTH IN PATIENTS WITH NEUROMYELITIS OPTICA SPECTRUM DISORDERS

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Objective: Neuromyelitis optica spectrum disorders (NMOSD) is an uncommon disorder of the central nervous system mainly affecting the optic nerves and spinal cord. NMOSD is frequently associated with IgG antibody binding to aquaporin 4 (AQP4) that triggers astrocyte and axon loss. AQP4 is also expressed in skeletal muscle and effects on regulatory trends of bioenergetic pathways and $Ca2^+$ handling. We aimed to gain better insight into the skeletal health in patients with NMOSD and the role of AQP4 in bone, we investigated association between AQP4 and bone loss in NMOSD patients.

Methods: In our association study, we have enrolled 35 women with NMOSD (21 AQP4-IgG[+], 14 AQP4-IgG[-]) as a case group (with mean age (SD): 37.3 (11.9)) and 35 age match women as a control group (with mean age (SD): 35.0 (9.4)) who haven't had history of any kind of neurological disorders. Patients with NMOSD were diagnosed based on the criteria of Wingerchuck. AQP4 was measured by ELISA. None of participants were postmenopausal women. DXA was used to assess the BMD at 3 bone sites: total hip, femoral neck, and spinal lumbar vertebrae (L1-L4). Each person was categorized based on the WHO osteoporosis criteria in at least one skeletal region.

Results: Among NMOSD patients, 60.6% had osteoporosis and 15.2% osteopenia at least in one region (total hip, femoral neck or lumbar) compared to 11% osteopenia in control group

(p-value=0.03). None of the subjects in control group had osteoporosis. The T-score in hip (mean (SD): -0.7 (1.2), vs. -0.09 (0.7), p=0.011) and femoral neck (mean (SD): -1.2 (1.1), vs. 0.4 (0.9), p=0.007) was lower in NMOSD patients compared with control group. In univariate analysis, after adjusting for age, BMI, and using corticosteroids; serological positive AQP4-IgG was independently associated with lower T-score of total hip (p=0.001) and femoral neck (p=0.005).

Conclusion: The results of the study will be helpful in preventing and treatment osteoporosis and bone loss in NMOSD patients with serological positive AQP4-IgG and preventing disability in these patients.

P325
EFFICACY AND SAFETY OF TREATMENTS FOR HAND OSTEOARTHRITIS: AN UMBRELLA REVIEW OF INTERVENTION STUDIES

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Objective: Hand osteoarthritis (OA) is common, but the efficacy/safety of treatment interventions aimed to improve health outcomes in this population are not well understood. Therefore, the aim of this study was to map and grade the effect of interventions for health outcomes in hand OA.

Methods: Umbrella review of systematic reviews with meta-analyses of randomized controlled trials (RCTs) using placebo/no intervention as control group. For outcomes with a p-value <0.05, the certainty of the evidence was evaluated using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) assessment.

Results: From 189 abstracts, 9 meta-analyses (24 outcomes) were included, with eight reporting significant summary results. The use of splints was associated with reduced pain at medium term in thumb carpometacarpal OA (standardized mean difference, SMD=-0.70; 95%CI: -1.05 to -0.35; low certainty), reduced pain in long follow-up RCTs in symptomatic hand OA (SMD=-0.80; 95%CI: -1.16; -0.45; moderate certainty), and better function (SMD=0.42; 95%CI: 0.08; 0.70; low certainty). The use of resistance training (SMD=-0.27; 95%CI: -0.47; -0.07) or physical exercise (SMD=-0.23; 95%CI: -0.42; -0.04) in improving hand pain and in improving finger joint stiffness (SMD=-0.36; 95%CI: -0.58; -0.15) was supported by a moderate certainty of evidence. The use of intra-articular hyaluronic acid in improving function (MD=1.12; 95%CI: 0.61; 1.64; moderate certainty of evidence) was the only pharmacological intervention statistically significant.

Conclusion: Only some nonpharmacological interventions are effective in improving health outcomes in hand OA and this evidence is supported by a moderate/low certainty, indicating the necessity of further intervention research.

P326

A METHODOLOGICAL QUALITY APPRAISAL OF CURRENT CLINICAL PRACTICE GUIDELINES FOR PRIMARY OSTEOPOROSIS DIAGNOSIS AND TREATMENT

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Objective: To assess (investigate) the quality of published guidelines on osteoporosis, as part of a clinical guideline adaptation process for the Mexican context, being undertaken through the ADAPTE process, using the Guidelines International Network and considering GRADE-ADOLOPMENT model. An adaptation process is a systematic approach to the consideration of the use or modification of a clinical guideline produced for a different context for local implementation.

Methods: A systematic review of literature following PRISMA statement methodology for clinical practice guidelines was conducted. Assessment of selected clinical practice guidelines with the AGREE-II methodological quality instrument was performed, reliability analysis was performed with Cronbach´s alpha and ICC. Those graded over 60 points were selected. The protocol was registered in PROSPERO: CRD42019138548

Results: 305 references were identified through databases search, and 273 were excluded that were not clinical guidelines (e.g., guidance, reviews of literature, randomized controlled trials). Of the 33 selected guidelines, 21 were eliminated as they were classified as S1 and S2 by the AWMF criteria. Of the remaining 12, AGREE-II score rigour of development average 53 (±18.7) with range from 22-74 and overall guide assessment 52.2 (±18.8) with range from 22-78. Reliability analysis demonstrated a substantial degree of agreement. Considering the overall guide assessment and rigour of development 6 guides were excluded as scored under 60**%.**

Conclusion: Six guidelines were considered with a high quality methodology. Clinicians should consider the assessment of methodological quality before implementing the recommendations drawn from a clinical practice guideline for osteoporotic patient care.

P327

CONSERVATIVE OR SURGICAL TREATMENT IN QUALITY OF LIFE PERCEPTION OF PATIENTS AFTER 3 YEARS OF VERTEBRAL OSTEOPOROTIC FRACTURE

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Objective: To assess the quality of life in patients who had clinical vertebral fracture due to osteoporosis who received conservative and surgical treatment after 3 y.

Methods: Comparative cross-sectional analytical study. Considering the patients who had osteoporotic vertebral fractures during 2015, 51 patients who received conservative treatment and 51 patients with surgical treatment (arthrodesis, vertebroplasty/kyphoplasty) were randomly selected. The specific quality of life scale for vertebral fractures due to osteoporosis QUALEFFO and WHODAS were applied. Statistical analysis: synthesis of quantitative data with measures of central tendency, qualitative data frequencies. Qualitative comparisons using chi-square, quantitative according to type of distribution T-student, Mann-Whitney U, Pearson and Spearman correlation, ANOVA analysis of variance with Welch test, Brown-Forsythe and post-hoc analysis with Gamos-Howell. Significance level p=0.05. Protocol was registered in the institutional research committee.

Results: We included 51 patients in the conservative group and 51 in the surgical group (arthrodesis=27 and vertebroplasty/kyphoplasty 24). The average age was 70.4 (9.8) range from 53-96 and 71.6 (9.1) from 53-96 y, respectively. No significant difference between both groups by age (p=0.53, student t). However, when dividing by intervention, a significant difference was observed for the conservative (0.019) and arthrodesis (0.001) treatment groups in relation to the average vertebroplasty group. When we analyzed the two groups, a better quality of life was observed in the conservative group (X=32.5±16.9) than in the surgical group (X=38.3±17.4; p=0.08). When analyzing by subgroups, a better perception of quality of life was observed in the arthrodesis group (29.03±13.83) in comparison with conservative and vertebroplasty (X=48.76±15.11; vs. conservative p=0.003; vs. arthrodesis p=0.001). The same behavior was observed for pain, mobility, social and leisure time domains. 17 patients had second fractures, pharmacological osteoporosis treatment was given to 43 patients (11 with second fractures). Hypertension was associated with second fractures (n=42 patients; p=0.03). Age was positively correlated with the perception of quality of life (r=0.809; p=001).

Conclusion: A better perception of quality of life was observed in patients who underwent arthrodesis and conservative management in relation to patients who were treated with vertebroplasty 3 years after the event. The reported performance was better for the domains of the scale in relation to pain, activities of human daily life, housework, mobility, social and leisure time, general health. Age was associated with the perception of quality of life. Hypertension was linked to the incidence of second fractures.

P328

THE EFFECT OF WEIGHT REDUCTION IN THE QUALITY OF LIFE IN PATIENTS WITH GONARTHROSIS

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Objective: Gonarthrosis is an important cause of disability and low-life quality all over the world. It's well-known the relation that gonarthrosis has with overweight and obesity, as the more the

weight, the more severe the disease. The aim of this study was to evaluate the impact that weight reduction has on the quality of life in patients with gonarthrosis.

Methods: This is an observational study in which were included 71 patients with bilateral gonarthrosis. It consisted in 49 females and 22 males. Every patient was asked to reduce the weight, as an integral part of their treatment. Weight was measured in every patient at the beginning of the study and 1 year after. It was taken as significant weight reduction >10% reduction of basal weight. Every patient was asked about their perception of quality of life (QoL). The Short Form(36) Health Survey (SP-36), was completed in every patient as a well known patient-reported survey of patient's health. According to SP-36, all patients were divided into 3 stages: low, moderate and high SP-36, which corresponded in a poor, average and good health status.

Results: Significant weight reduction was achieved in 22 patients (31%), 24 patients (33.8%) had a moderate weight reduction (5-10% of the basal weight) and 25 patients (35.2%) had no weight reduction or had an increase in weight in comparison with their first measure. After completing SP-36, it was found that 13 patients (59.1%) of the first group had a significant improvement of SP-36, 8 patients (33.3%) of the group with moderate weight reduction had a significant improvement of SP-36, while only 5 patients (20%) of the group with no weight reduction had an improvement of their life quality.

Conclusion: From this study was found that weight reduction has an important impact on improvement of the quality of life in patients with bilateral knee osteoarthritis. Weight reduction should be considered as an important part of treatment and prevention of sequels in every patient with osteoarthritis and especially in obese patients. All patients with osteoarthritis should be incited to have an optimal weight in order to have a good quality of life.

P329
ISOKINETIC STRENGTH PROFILE OF SUBJECTS WITH PROXIMAL PATELLAR TENDINOPATHY

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Objective: Proximal patellar tendinopathy is relatively common among sportsmen. However, the strength profile of subjects with proximal patellar tendinopathies is poorly described. We aimed to determine the isokinetic strength profile in order to estimate the difference of muscular performance between the healthy and pathological limbs of subjects suffering of this chronic pathology.

Methods: Cohort study. Participants: 43 subjects with chronic proximal patellar tendinopathy were involved. Interventions and main outcome measurements: It has been based on the evaluation of the quadriceps and the hamstrings muscular performance of the healthy and pathological member on isokinetic dynamometer at the speed of 60°/s (C60) and of 240°/s (C240) in concentric mode and at the speed of 30°/s (E30) in eccentric mode. A visual analogic scale of pain (VAS) has been also realized after each isokinetic test.

Results: The results of the isokinetic tests comparing the healthy to the pathological limb are meaningful for the different conditions of contraction and test speeds, just like the results of the VAS associated to those tests (p<0.01). Indeed, pathological knees had a maximum peak torque for the quadriceps in C60 lower than healthy.

Conclusion: In our study, the isokinetic results show a significant difference in performance isokinetic between the healthy and the pathological limb as well as VAS associated with these tests. However, the diversity of outcomes recorded in the patients suggests us that an individualized treatment is the case of patellar tendon pathology. Finally, it would seem that an isokinetic test in eccentric in some patients is, in addition to a test of provocation of the tendon, a pain assessment tool.

P330
WHAT ARE THE MAIN RISK FACTORS FOR LOWER-EXTREMITY RUNNING-RELATED INJURIES? A RETROSPECTIVE SURVEY-BASED ON 3669 RESPONDENTS

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Objective: Many studies attempt to identify the risk factors for running-related injuries (RRI), but these are not yet established. We aimed to investigate the risk factors of RRI.

Methods: Design: Retrospective online survey-based study among population of runners injured and noninjured. Setting: Leisure road and trail runners. Patients: Participants have to be at least 18 years old and have to practice running at least for 12 months. 3669 runners reported information which were included for statistical analysis. Assessment of risk factors: The online survey included 41 questions with 5 main categories: personal characteristics, daily lifestyle, training and running characteristics, practice of others sports activities, and prevention habits. Main outcome measurements: Occurrence of running-related injury over the last 12 months.

Results: Amongst the 3669 runners, 1852 (50.5%) reported at least one injury over the last 12 months. Overuse injury were largely represented (60.6%). The variables associated with RRI which remained significant in the fully adjusted model were: previous injury (OR=1.63, IC 95%=1.42-1.47), competition running (OR=1.62, IC 95%=1.26-2.09), more than 2 h running per week (OR=1.30, IC 95%=1.03-1.65), mileage (>20 km/week) (OR=1.25, IC 95%=1.01-1.55) and speed training (OR=1.23, IC 95%=1.06-1.48). Univariate analysis revealed other variables associated with more RRI: Trail runners (vs. road runners, p<0.001), men (vs. women, p<0.001), higher age (p<0.001), >2 running session /week (p<0.001).

Conclusion: Previous injury remains the most relevant RRI risk factor according to the current study and previous data. Many training characteristics seem to be involved but still have to be confirmed in view of conflicting data in literature. Trail runners are more at risk of RRI. Further research would help to understand better RRI and to prevent them.

P331

A STUDY OF EARLY DROPOUT PATIENTS FROM TREATMENT WITH OSTEOPOROSIS MEDICATION (ANTI-SCLEROSTIN ANTIBODY)

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With the advent of PTH and anti-sclerostin antibodies (romosozumab [Romo]), bone mass in osteoporotic patients can be restored to normal levels within 2 y (recommended by the academic society). The health insurance coverage of Romo began in March 2019 in Japan. Unlike PTH preparations, the use of Romo also results in the increase in bone mass at the proximal end of the femur. In clinical practice in Japan, many elderly patients have comorbidities, and Romo has a problem of calcification. We studied the background of patients who discontinued treatment early, including the cardiovascular events of concern.

We studied patients who received Romo for osteoporosis at three affiliated hospitals of the Kinki University 10-y Graduate Association and extracted the data of patients who discontinued treatment.

There were 69 patients in total (62–94 y; 11 men and 58 women; BMI, 12.6-33.3; YAM before treatment, 30-86). Comorbidities included cardiovascular disease (n=30), renal impairment (n=19), osteoporosis (n=13), diabetes mellitus (n=11), dementia (n=9), rheumatoid arthritis (n=5), and cancer (n=3). Prior medications were bisphosphonates in 30 patients, PTH in 19, anti-RANKL antibody in 11, and others in 9. Patients with a history of cerebral infarction or a cardiovascular event within 1 y were excluded. All patients received Romo within 1 y; bone mass was not assessed during this period. Among patients transferred to another institution, only those who could be followed up ≥3 times (6 patients) were included, but those who were followed up ≤2 times (5 patients) were excluded. Among the 69 patients, 10 discontinued treatment (14.4%; 70-92 y; 1 man and 9 women; BMI, 17.1-26.8; YAM, 38-69). The reasons for discontinuation included feeling sick (n=4), fluctuating blood pressure (n=2), and eczema, concomitant pneumonia, injection site reaction, and cost increase (to approximately 500 USD/month in Japan) (n=1 each). In all 10 patients, Romo was discontinued between the first and third administration; it was not readministered after the resolution of adverse reactions. During the study period, a 73-year-old woman with RA fell, resulting in a fractured olecranon. However, there were no new evident vertebral fractures, fragility fractures, or serious cardiovascular adverse drug reactions.

P332

BONE MINERAL DENSITY IN PATIENTS WITH SPONTANEOUS KNEE OSTEONECROSIS (SPONK)

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Objective: Osteonecrosis of the condyles of the femur and tibia is the second most common localization of aseptic necrosis (AN) after the femoral head. The rapid progression of the disease and the high risk of total arthroplasty make this problem especially relevant. Spontaneous osteonecrosis of the knee (femoral condyle and tibial plateau) is more common in women over 60 y of age, occurs spontaneously and has no significant injury to the knee in history. A special role in the development of the disease has recently been given to bone tissue metabolism, the state of the subchondral bone, and the presence of microfractures in it. One of the factors affecting the development of osteonecrosis is the general loss of BMD and concomitant osteoporosis. We aimed to study the prevalence of total BMD loss among patients with AN of condyle of the femur and tibia.

Methods: The study included 61 patients (50 women and 11 men, age 22-77 y, the average age was 59±13.2 y) with a AN diagnosis of the condyles of the femur and tibia. All patients underwent DXA of lumbar spine (L1-L4) and proximal femur on a Hologic densitometer. Depending on the BMD indicators, patients were divided into 3 groups (according to the T-criterion, patients older than 50 y, according to the Z-criterion, younger than 50 years old). In the first group, the loss of IPC was (up to -1.5 SD), 2-group (from -1.5 to -2.5 SD), 3-group (-2.5 SD and more).

Results: According to the results of the research, it was found that in 22.95% of cases, patients had a loss of BMD from -1.5 to -2.5SD; in 8.19% of cases, -2.5SD or more.

Conclusion: Loss of BMD of varying severity in a third of patients with AN of the condyles of the femur and tibia once again confirms the underestimation of osteoporosis in the development and course of AN, and requires a broader examination, followed by long-term osteotropic therapy.

P333

THE CORRELATION BETWEEN LONG-TERM USE OF ORAL FUROSEMIDE AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Objective: Evaluating BMD during long-term use of oral furosemide in postmenopausal women and their correlation.

Methods: This is a retrospective cohort study that included 132 postmenopausal patients screened for osteoporosis. In order to minimize the impact of other factors, we selected patients that

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haven't done hysterectomy, ovariectomy; doesn't suffer from diabetes, hyperthyrosis, autoimmune diseases, chronic renal disease; they didn't use hormonal therapy, chemotherapy. We measured the lumbar spine bone density with DXA test reported as a T-score and compared the values between the patients that used oral furosemide for 2-4 y and those who didn't.

Results: 21.97% of the patients had osteoporosis, 33.33% had osteopenia and 44.70% of the patient had normal bone density in the lumbar part of the spine. 48.39% of the patients that were taking oral furosemide had osteoporosis, 41.93% had osteopenia and 9.68% had a normal T-score. 13.86% of patients that were not taking oral furosemide had osteoporosis, 30.69% had osteopenia and 55.45% had a normal T-score. Through the Pearson's correlation coefficient we found an association between the T-score values and the number of patients that were taking (r=-0.7264, p=0.01135) or not (r=0.9381, p=0.00002) long-term oral furosemide treatment.

Conclusion: There is a significant correlation between the T-score values and the number of patient that were taking long-term oral furosemide treatment. The T-score values had a moderate negative correlation with the number of patients who were taking oral furosemide and a strong positive correlation with the number of patients who were not. In our study long-term oral furosemide treatment correlates with lower lumbar spine bone density.

P334
ASSOCIATION BETWEEN DIETARY INTAKE AND BONE HEALTH AMONG NONSUPPLEMENTAL SAUDI FEMALE USERS

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It is known that poor dietary intake may lead to low bone density that play important role in developing osteoporosis in later life among female[1]; effect of dietary intake on bone health among Saudi is not fully understood. The purpose of this study is to investigate the association between dietary intake on BMD and vitamin D level among females. 341 Saudi females including 204 PreM (premenopausal) and 137 PostM (postmenopausal) women aged between 20-82 years old filled the dietary food questionnaire and demographic data. Anthropometric, blood test, and BMD using DXA were measured. Food frequency questionnaire were used and have been converted to serving size and amount in grams using USDA food composition database[2].

Table. Results of measurements for PreM and PostM groups.

	Premenopausal women N=204	Postmenopausal women N=137
25(OH)D nmol/l	17.8 (8.7)**	21.2(9.1)
PTH pmol/l	9.7(3.9)	9.3(3.3)
Calcium serum mmol/l	2.4(0.2)*	2.5(0.2)
BMI	26.1(5.4)**	32.6(5.6)
Waist circumference cm	75.4(11.6)**	92.8(11.0)
Total calories intake	2011.3 (768.5)	1965.3(693.6)
calcium intake	1345.2(649.2)	1427.0(683.9)
Vitamin D intake	96.7(81.6)	91.1(81.6)
Magnesium intake	118.2(55.5)**	137.9(67.4)
Fat intake	95.4(36.5)**	80.1(32.1)
Cholesterol intake	173.9(87.1)**	144.6(82.2)
Caffeine intake	110.0(90.2)**	68.8(66.0)
Total femur BMD	0.93(0.1)**	0.88(0.1)
Total body BMD	1.09(0.1)* n=79	1.05(0.1) n=38

*Data expressed as the mean (SD)   **<0.01; *<0.05*

Although PreM Saudi Women has significantly lower vitamin status than PostM Saudi women, their total body BMD and total femur BMD is significantly higher and denser than PostM Saudi women. This fact may due to their healthier intake attention where PostM consume lower calories but higher calcium intake (differences is not significant).

There is significant positive correlation between total vitamin D intake and vitamin D body level (r=0.14, p=0.01). (this sig correlation has been lost when PreM/PostM group were separated). Another positive correlation between vitamin D intake with every nutrients intake measured including total calories, total calcium, total magnesium, total fat and cholesterol (r=0.47, 0.71,0.31, 0.67, 0.62 respectively) p=0.00 (the significant correlation stayed sig even after separating the PreM/PostM groups); no correlation were found between BMD and vitamin D. Further investigation is required regarding pre and post Saudi women diet related to bone health.

References:

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P335
COMPARISON BETWEEN LUPUS PATIENTS WITH AND WITHOUT NEPHRITIS IN BONE MINERAL DENSITY

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Objective: Osteoporosis is a very important comorbidity occurs in patients with systemic lupus erythematosus (SLE) especially in last decades due to long survival rates. The causes are multi-factorial either due to disease itself or its treatment. The aim of this work is to measure BMD in SLE patients within the first year of diagnosis and to compare the difference between patient with and without nephritis.

Methods: In this cross sectional study 50 subjects are included 40 SLE patients during their first year of diagnosis (20 lupus nephritis and 20 without nephritis all were recruited from Tanta University hospitals, Tanta, Egypt) and 10 sex and age matched persons as a control group, for all of them routine investigations, systemic lupus erythematosus disease activity index (SLEDAI) score for disease activity and DXA scan were done for hip, spine and forearm and the results were compared in all groups.

Results: There was statistically significant decrease in BMD only in T-score and Z-score of the forearm between all studied groups and after the post hoc tests this decrease was mainly between lupus nephritis and lupus without nephritis groups, and between

lupus nephritis and control group and the overall osteopenia, osteoporosis and fracture risks were higher in lupus nephritis than lupus without nephritis patients.

Conclusion: Lupus nephritis patients have a higher risk of osteoporosis and fracture risk and they may need methods for earlier detection and prophylaxis.

Table 1. Comparison between the studied groups according to DXA scan

| | DXA scan | Lupus | | Control (n=10) | H | p |
		With nephritis (n=20)	Without nephritis (n=20)			
Femur	T-score					
	Min. − Max.	-2.50 − 1.50	-2.30 − 3.0	-1.70 − 2.10	1.601	0.449
	Median	-0.50	-0.75	0.05		
	Z-score					
	Min. − Max.	-2.50 − 1.50	-2.30 − 3.10	-1.70 − 2.10	1.678	0.432
	Median	-0.25	-0.80	0.10		
Forearm	T-score					
	Min. − Max.	-4.40 − 1.90	-3.0 − 3.40	-2.80 − 4.70	9.056*	0.011*
	Median	-1.35	0.25	0.0		
	Sig. bet. Grps	p_1=0.004*, p_2=0.043*, p_3=0.753				
	Z-score					
	Min. − Max.	-4.30 − 2.20	-3.0 − 3.40	-2.70 − 4.90	9.879*	0.007*
	Median	-1.15	0.35	0.10		
	Sig. bet. Grps	p_1=0.003*, p_2=0.032*, p_3=0.032*				
Spine	T-score					
	Min. − Max.	-2.90 − 0.20	-3.40 − 3.20	-2.40 − 1.20	1.694	0.429
	Median	-1.90	-1.45	-1.30		
	Z-score					
	Min. − Max.	-2.70 − 0.50	-3.50 − 3.30	-2.50 − 1.40	0.842	0.656
	Median	-1.45	-1.40	-1.25		

H, p: H and p values for Kruskal Wallis test, Sig. bet. Grps(significance between groups) was done using post hoc test (Dunn's multiple comparisons test)

p_1: p value for comparing between with nephritis and without nephritis

p_2: p value for comparing between with nephritis and control

p_3: p value for comparing between without nephritis and control

*: Statistically significant at p≤0.05.
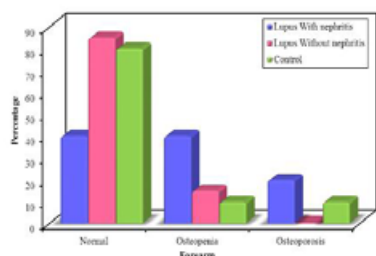
Figure (1): Comparison between the studied groups according to degree of bone mineral density in forearm DEXA scan.

P336
PLACENTAL VOLUME AT 11 WEEKS' GESTATION IS NOT ASSOCIATED WITH OFFSPRING BONE MASS AT 8 YEARS: FINDINGS FROM THE SOUTHAMPTON WOMEN'S SURVEY

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Objective: We have previously described positive associations between first trimester placental size and offspring bone indices at birth. However, it has yet to be determined if this association persists through subsequent growth. We therefore investigated the associations between placental volume (PLV) at 11 weeks' gestation and bone outcomes at 8 y.

Methods: The Southampton Women's Survey is a longitudinal mother-offspring, with recruitment preconception. 3D ultrasound scanning was used to assess 11 week PLV in a subset of mothers (n=236) using a Kretz Voluson 730 scanner with a 3D curvilinear multi-frequency transducer (GE Medical Systems Ktreztechnik). Maternal anthropometric measures and lifestyle information, via questionnaire, were obtained before pregnancy and at 11 weeks' gestation. DXA scanning (Hologic Discovery) performed at age 8 y was available in a subset. Linear regression was used to assess the associations between PLV and bone outcomes. A directed acyclic graph model was constructed to identify potential confounders and adjustment was made for offspring sex and age at DXA and maternal age, height, smoking status, walking speed and triceps skinfold thickness.

Results: In fully adjusted models, we observed modest evidence for positive associations between 11 week placental volume (SD) and bone area (SD) [n=85, β=0.13 (95%CI=-0.09, 0.36)], bone mineral content (SD) [n=85, β=0.14 (95%CI=-0.08, 0.35] and bone mineral content adjusted for bone area, offspring height and weight (SD) [n=71, β=0.19 (95%CI=-0.05, 0.42)].

Conclusion: Associations between placental volume at 11 weeks' gestation and offspring bone mass appear attenuated at 8 years compared with our previous findings at birth. These results are consistent with those for mid-gestation and term placental size, and a potential role for placental function, rather than placental size, in mediating gestational influences on postnatal skeletal development.

P337
LUMBAR DISC HERNIATION AND VITAMIN D RECEPTOR GENE POLYMORPHISMS IN TURKISH PATIENTS

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Objective: Lumbar disc herniation (LDH), has a high prevalence and multifactorial etiology with genetic factors like vitamin D receptor (VDR) genes, playing possibly a critical role. There may be an association between the vitamin D pathway and LDHs. In this experimental study, we investigated two of the VDR polymorphisms, effective on clinical findings and vitamin D levels in patients with LDH.

Methods: VDR polymorphisms, Taq-l (rs731236) and Fok-I (rs2228570) were studied by PCR restriction fragment length polymorphism (PCR-RFLP) in patients diagnosed as LDH and healthy controls. The analysis was performed in the İstanbul University Scientific Research Projects Department. Diagnosis of LDH was based on clinical examination as well as MRI findings.

Results: A total of 72 LDH patients (32 female, 40 male) and 81 healthy controls (47 female, 34 male) were included. Mean age of LDH patients and control group was 44.75±15.63 and 47.22±10.63 y, respectively. The frequency of LDH patients who had VDR Taq-l Tt genotype was significantly higher than those of controls. Carriers of Taq-l Tt genotype and t allele also had an increased risk for LDH, respectively (P=0.002) (OR: I.688, %95CI: I.206-2.360); (p=0.006) (OR: 1.420, %95CI: 1.104-l.825). VDR Fok-I genotypes did not differ significantly between LDH and control cases. (p=0.079). But, Ff genotype and f allele carriers had increased risk for LDH compared to those with other genotypes (p=0.025) (OR: I -594, %95C1: I.052-2.414); (p=0.037) (OR: 1.514, %95CI:l.019-2.250), respectively. Clinically VDR Taq-l polymorphism, was correlated with straight leg raising test in TT genotype.

Conclusion: Cellular effects of VDR genes may be associated with cell proliferation of intervertebral disc cells, expression rates of matrix genes and protein production. The identification of genetic risk factors for specific subgroups of patients with LDH is important and VDR polymorphisms maybe used in the evaluation or treatment in these patients. There was a positive correlation between VDR Taq-l gene variants and LDH, so VDR Taq-l Tt genotype might affect development of LDH in Turkish patients.

P338
COMPARISON OF 24-HOUR URINE HYDROCORTISOL LEVEL IN FIBROMYALGIA SYNDROME AND CONTROL PATIENTS

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Objective: Fibromyalgia syndrome (FMS) is a chronic generalized pain syndrome with somatic symptoms and still not completely explained etiology. Differential diagnosis including laboratory investigation for widespread pain is warranted but until now there are no specific diagnostic tests available for FMS. Hypothalamic-pituitary-adrenal axis abnormality is suggested to play an important role in the etiopathogenesis. The aim of this study was to implement a useful biochemical test in the diagnosis of FMS.

Methods: In this study we included patients who were diagnosed as FMS according to ACR2010 criteria. All patients included complained of generalized (widespread) pain, were female, over 25 y of age, with pain a duration of longer than three months. Patients were evaluated by demographic findings, clinical examination, VAS and laboratory analysis to rule out other diseases associated with generalized pain. CBC, CRP, RF, ESR, TSH, renal, liver function tests, uric acid and 25(OH) vitamin D levels were assessed. 24-h urine hydrocortisol levels were measured. Fibromyalgia Impact Questionnaire was performed in FMS patients.

Results: A total of 100 female patients were included. Fifty patients were diagnosed as FMS and fifty control patients were diagnosed with acute, localized pain syndromes. Mean age in the FMS group was 45.56±9.205 y. Mean age in the control group was 46.86±10.554. VAS score was 7.32±2.196 in the FMS group and 6.84±1.754 in the control group. There were no significant differences with regard to age and VAS between the two groups. 24-h urine cortisol levels were found to be significantly lower in the FMS group as compared to the control group (p<0.006). There were no significant differences between groups with regard to the other laboratory parameters, CBC, CRP, RF, ESR, TSH, renal, liver function tests, uric acid and 25(OH) vitamin D levels. Fibromyalgia Impact Questionnaire revealed that 34% of FMS patients were mildly, 32% moderately and 34% severely affected from FMS.

Conclusion: Levels of 24-h urine hydrocortisol in FMS patients were statistically significantly lower compared to the control group. This finding was in accordance with the suggested hypothalamic-pituitary-adrenal axis abnormality in FMS and could be important in the diagnostic workup.

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P339
ASSOCIATION OF OSTEOPOROTIC FRACTURES ABSOLUTE RISK (FRAX®) WITH TOTAL CARDIOVASCULAR RISK (SCORE) AND CLINICAL MANIFESTATIONS OF ATHEROSCLEROSIS

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Objective: To estimate associations of absolute risk (AR) of fractures, total cardiovascular risk (CVR) and atherosclerotic cardiovascular diseases (CVDs) among the urban population of the Russian Federation.

Methods: Representative sample of Russian urban population was analyzed. In total 9143 Russian residents aged 40-69 y participated in the study. AR of fractures was calculated on the basis of the Russian model FRAX without BMD using the batch data processing. Total CVR was assessed by Euro Heart SCORE scale for countries with a high risk of CVDs in people under 65 y. The associations between the AR of fractures and the following CVDs: coronary heart disease (CHD), myocardial infarction (MI), stroke, heart rhythm disturbance (HRD) were studied. Epidemiological criteria and anamnesis data were used for diagnosis.

Results: A high AR of fractures was detected in 16% of participants and a high CVR – in 36%. Women and men with a high AR of fractures significantly more often had high CVR (60% and 64.5% respectively). A moderate and strong positive correlations between AR of fractures and CVR were found: for AR of major fractures and CVR in women r=0.47, p<0.0001 and in men r=0.21, p<0.0001; for AR of hip fractures and CVR in women r=0.54, p<0.0001 and in men r=0.59, p<0.0001. The prevalence of the all CVDs in women and men with a high AR of fractures was higher in comparison with those who had a low risk, but in men the differences were not statistically significant: for women – CHD 23.4% vs. 18.4%, p=0.001, MI 2.4% vs. 1.4%, p=0.02, stroke 3.8% vs. 1.5%, p=0.05, HRD 40.1% vs. 25.3%, p=0.001; for men – CHD 20.2% vs. 16.8%, p=0.08, MI 7.6% vs. 5.3%, p=0.06, stroke 4.0% vs. 2.9%, p=0.2, HRD 25% vs. 19%, p=0.3.

Conclusion: The AR of fractures was positively correlated with CVR in both men and women. A high AR of fractures was associated with high CVR in men and women, as well as with the presence of CVDs in women, while this association in men was determined as trend. For early prevention of complications of osteoporosis and atherosclerosis in people over 40 years old with a high CVR (SCORE) it is advisable to assess AR of fractures (FRAX) and, conversely, in people with a high AR of fractures (FRAX) assess CVR (SCORE) using simple scales FRAX and SCORE.

P340
BONE HEALTH RESEARCH IN PATIENTS WITH TYPE 1 DIABETES

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Objective: Diabetic osteopathy in patients with type 1 diabetes (T1DM) is obvious. However, approaches to its diagnosis are still ambiguous. Thus, the aim was to study the features of serum osteospecific parameters and DXA data in T1DM patients.

Methods: 157 patients with T1DM (105 women, 52 males) (mean age: 32.5 (25.5-41.6) y, duration of DM: 13 (7-20) y, age of manifestation: 19 (14-23) y, BMI: 23.43 (21.55-25.70) kg/m^2; HbA1c: 8.2 (7.6-8.9) %) and 98 (67 women, 31 men) controls, comparable in sex, age and anthropometric data. The research involved general clinic examination, serum bone-specific parameters, DXA (BMD) and trabecular bone score (TBS) of lumbar spine performed on Prodigy Lunar. Z-score of −2.0 or less was regarded as low BMD.

Results: There were no significant differences in L1-L4 BMD and TBS in women compared with men: 1.16 (1.08-1.16) vs. 1.15 (1.08-1.27) g/sm^2; (U=5597; p=0.727) and 1.40 (1.35-1.46) vs. 1.44 (1.37-1.49) (U=3230; p=0.097). Similar results were obtained in subgroups of T1DM patients and controls. Lower L1-L4 BMD and TBS were significantly found in T1DM compared to controls: BMD 1.14 (1.04-1.22) vs. 1.23 (1.13-1.33) g/cm^2; U=3685; p<0.001; and TBS 1.39 (1.33-1.46) vs. 1.45 (1.39-1.48); U=2775; p<0.001. Detailed assessment in lumbar spine showed the largest decline in the first lumbar vertebra as T1DM patients as a control group, but more pronounced reduction was proved in T1DM patients – BMD L1 1.02 0.94-1.13) vs. 1.12 (1.03-1.24) g/cm^2; U=3439; p<0.001; and TBS L1 1.29 (1.22-1.39) vs. 1.34 (1.29-1.42); U=2898; p=0.002). In T1DM patients was established decreased alkaline phosphatase (77.98 (67.78-85.18) vs. 93.4 (75.58-110.8) U/l; U=698; p<0.001) and osteocalcin (10.58 (8.08-15.70) vs. 19.73 (15.16-26.30) ng/ml; U=545; p<0.001) compared with the control group. There were an increased osteoprotegerin levels (4.44 (3.38-5.77) vs. 2.74 (2.15-3.54) pmol/l; U=94; p<0.001) and a decreased the RANKL/osteoprotegerin ratio (0.03 (0.02-0.06) vs. 0.05 (0.04-0.07), U=155; p=0.017).

Conclusion: T1DM patients have decreased bone formation markers (alkaline phosphatase, osteocalcin) and elevated resorption markers (osteoprotegerin), which can lead to impaired mineralization (low BMD) and microstructure (low TBS).

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P341

ABSOLUTE RISK OF OSTEOPOROTIC FRACTURES (FRAX®) AND TOTAL CARDIOVASCULAR RISK (SCORE) AMONG THE URBAN POPULATION OF THE RUSSIAN FEDERATION DEPENDING ON THE CLIMATIC AND ECONOMIC CONDITIONS

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Objective: To estimate associations of absolute risk (AR) of fractures and total cardiovascular risk (CVR) with the climatic and geographical features of cities, basic economic characteristics of cities and parameters of healthcare availability to the citizens.

Methods: A representative sample was formed from the population of 8 Russian cities: Vologda, Ivanovo, Volgograd, Tyumen, Kemerovo, Krasnoyarsk, Vladivostok, Vladikavkaz. In total 9143 Russian residents aged 40-69 y participated in the study. AR of fractures was calculated on the basis of the Russian model FRAX without BMD. Total CVR was assessed by Euro Heart SCORE scale for countries with a high risk of CVDs. The associations between the risks and the following indicators: total regional product (TRP) per capita, mean individual income (MII) and mandatory state health insurance (MHI) were studied on the base of official data of the Russian State Statistical Agency (Rosstat 2013).

Results: AR of major fractures (MF) and hip fractures (HF) were higher in the most northern city – Vologda compared to that in the most southern city – Vladikavkaz (for MF: 8.15% vs. 7.72%, p<0.05; for HF: 0.8% vs. 0.7%, p<0.05). However, no clear north-to-south gradient in AR was observed. CVR was higher in Vologda than in Vladikavkaz (4.28% vs. 2.53%; p<0.0001) and gradually decreased from north to south. The negative correlation between welfare indicators and mean AR of fractures in each city were quite high, but cannot be deemed statistically significant due to the relatively small number of cities included in the study. However, low negative correlations between the economic parameters of the cities, including MHI, the individual AR of MF (p=0.0001) and the individual AR of HF (p=0.0001) were statistically significant. The individual CVR negative correlated with all welfare indicators of the population (p=0.0001).

Conclusion: The contribution of the economic conditions of the region and the level of welfare of the population to the formation of both AR of fractures and CVR was shown, while climatic and geographical features played a role only in increasing the CVR.

P342

DXA ANALYSIS OF FAT DISTRIBUTION IN PATIENTS WITH TYPE 2 DIABETES

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Objective: The central distribution of body fat has been identified as a significant risk factor for the development of cardiovascular disease in general, and the development of macrovascular complications in type 2 diabetes mellitus (T2D) in particular. The aim of the study was the features of fat mass distribution in T2D patients.

Methods: We studied 256 T2D patients with insulin in therapy (58 men and 198 women; mean age 52.4$\pm$8.22 y; disease duration 5.80$\pm$1.33 y; BMI 30.45$\pm$2.16 kg/m^2; HBA1c was 8.21$\pm$0.83%; total daily dose (TDD) of insulin – 0.84$\pm$0.18 U; duration of insulin using - 3.64$\pm$0.82 y) and 83 matched for age and BMI controls. The research involved anthropometry of patients, general clinic examination, DXA performed on Prodigy Lunar using a program "Total body" and "Body composition".

Results: There were significant differences in fat component in general group of T2D patients and controls: Total Body 39.62±8.60% vs. 37.02±6.85%, p<0.05; Android: 45.62±8.17% vs. 43.15±7.23%, p=0.323; A/G Ratio: 1.17±0.23 vs. 1.10±0.12, p<0.05; Trunk/Total: 0.61±0.06 vs. 0.56±0.06, p=0.055. In the subgroups of women (T2D vs. controls) the following features were established: Total Body 41.12±6.82% vs. 41.96±6.38%, p=0.391; Android: 46.72±7.68% vs. 46.24±7.15%, p=0.814; Gynoid,%: 43.18±6.65% vs. 46.67±5.14%, p=0.018; A/G Ratio: 1.11±0.12 vs. 1.02±0.14, p=0.031; Trunk/Total: 0.58±0.06 vs. 0.52±0.07, p=0.001; (Arms+Legs)/Total 0.68±0.27 vs. 0.84±0.22, p=0.001; Legs/Total: 0.27±0.04 vs. 0.36±0.08, p=0.001. Increasing A/G Ratio and Trunk/Total, at the same time, a decrease (Arms+Legs)/Total and Legs/Total in patients with diabetes evidence of fat redistribution in the trunk towards the extremities. Android (central) fat distribution was positively correlated with the age of T2D women (r=0.20; p=0.017), however no correlation was found with the duration of the disease, level HbA1c, the TDD insulin dose.

Conclusion: There are differences in the distribution of fat in men of women with T2D. Women are characterized by a redistribution of fats with an increase in sediment in the trunk region.

P343
OACTIVE: ADVANCED MULTISCALE COMPUTER MODELS PREVENTING OSTEOARTHRITIS

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Objective: The OActive scientific and technological objectives focus on the development of patient-specific computer models and simulation in order to develop appropriate osteoarthritis prevention interventions or treatments.

Methods: The OActive project is a European project that studies knee osteoarthritis. It intends to make a significant leap forward through adopting a multiscale holistic analysis where patient-specific information from various levels, including molecular (e.g., biochemical/inflammatory biomarkers), cell, tissue and whole body, will be integrated and combined with information from other sources, such as environmental, behavioural and social risk factors, to generate robust predictors for new personalised interventions for delaying onset and/or slowing down progression of osteoarthritis. OActive targets patient-specific osteoarthritis prediction and interventions by using a combination of mechanistic computational models, simulations and big data analytics. Once constructed, these models will be used to simulate and predict optimal treatments, better diagnostics, and improved patient outcomes, overcoming the limitation of the current treatment interventions, augmented reality empowered interventions will be developed in a personalised framework allowing patients to experience the treatment as more enjoyable, resulting in greater motivation, engagement, and training adherence. The augmented reality element will also be helpful for therapists when validating patients' progress and will allow them more adaptive rehabilitation therapy in terms of flexible interactive content.

Results: Recruitment so far of 91 subjects at our center, performing clinical evaluation, collection of samples, study of some blood parameters in our center, and sharing the biological samples (blood, urine, faeces) for the study of biomarkers. Also, gait analysis has been performed.

Conclusion: The OActive project is expected to offer the medical care sector a solution that will predict, delay onset and slow down the progression of osteoarthritis offering patients increased quality of life.

P344
A NEW INDEX OF BONE STRENGTH TO PREDICT FRAGILITY FRACTURES: THE BONE STRAIN INDEX

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Objective: For a proper assessment of osteoporotic fragility fracture prediction, both bone mineral density and bone structure and strength information are necessary. Data regarding bone strength are not yet available.
To evaluate bone resistance to strain a new dual X-ray absorptiometry (DXA)-derived index based on the Finite Element Analysis (FEA) of a greyscale of density distribution measured on a lumbar spine scan, namely Bone Strain Index (BSI), has been developed. BSI includes local information on density distribution, bone geometry and loadings and it differs from bone mineral density (BMD), and trabecular bone score (TBS), which are based on the quantification of bone mass and distribution averaged over the scanned region.

Material and Methods: Porcine vertebrae were used to validate the FEA algorithm describing bone strength.
In vitro and in vivo reproducibility was calculated by a DXA phantom and in a cohort of postmenopausal women, respectively, according to the International Society for Clinical Densitometry Guidelines. The prediction capability of fragility refracture was tested in a group of fractured osteoporotic women and men. Distribution among age classes was evaluated in patients with secondary osteoporosis. Response to osteoporosis' pharmacological treatment was tested in fractured postmenopausal women.

Results: A higher correlation between BSI and ultimate mechanical stress in porcine vertebrae was observed respect to BMD and TBS. In vitro and in vivo reproducibility is lower than that of BMD, and decreases proportionally to body mass index and waist circumference. BSI results to be the parameter nearest to the statistical significance in order to predict a fragility refracture respect to BMD and TBS. BSI behaviour in secondary osteoporosis is similar to that of BMD and TBS.

Conclusion: BSI is useful to measure local deformations and to better describe mechanical bone resistance to fragility fracture respect to BMD and TBS alone.

P345
ARE VERTEBRAL 3D-DXA PARAMETERS USEFUL TO DISCRIMINATE VERTEBRAL FRACTURES?

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Objective: Evaluate the characteristics of 3D DXA-parameters at the lumbar vertebrae in patients whose had suffered vertebral fracture comparing to non-fractured subjects. Instead evaluate differences between thoracic and lumbar fractures.

Methods: We compared Fx patients – 82- (thoracic or lumbar Fx) NonFx (185) - people matched by age, sex and WHO Classification (Fractured population -Fx- normal (11); low bone mass −LBMD- (39) and osteoporosis −OTP- (33)). BMD at L1-L4 segment was measured by StratosDr (DMS Apelem), excluding fractured vertebra. DMS Apelem has integrated 3D reconstruction software for the lumbar spine (Eurostars project. Galgo Medical V4.1) estimates the vBMD and 3D shape of the lumbar spine from an AP DXA image by registering a statistical model onto the 2D-DXA image The analyzed variables: Cortical parameters: global volumetric bone density throughout the vertebra [GvBMD],], cortical bone [CvBMD] and average thickness of cortical [Th], trabecular parameters: trabecular bone [TvBMD]. L1 to L4 results were analyzed in thoracic fractured. In lumbar fractures we excluded fractured vertebra. Statistical analysis: t-test for mean values. Sensitivity/specificity of the measurements by means of receiver operating characteristic (AUC).
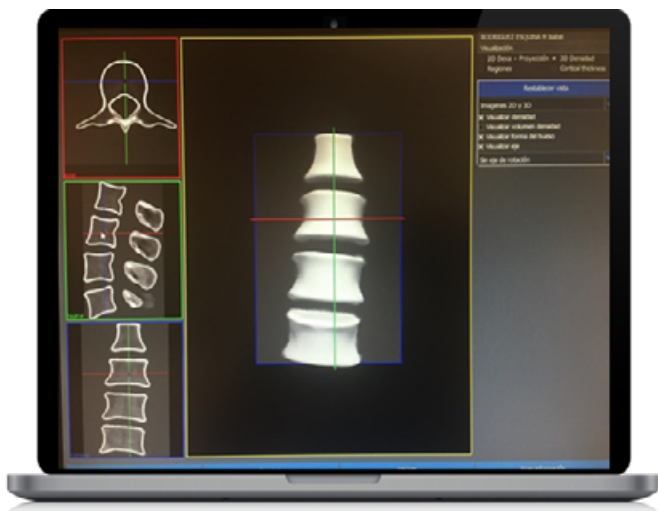
Results: All parameters were significantly lower at Fx compared to NonFx. Stratified by WHO classifications: Normal BMD. Not differences were found at BMD or TBS; GvBMD and Th was significant lower in Fx (GvBMD: 235.6 vs. 254.1 mg/cm³; p: 0.04; Th: 0.625 vs. 0.677 mm, P: 0.023). LBMD showed a lower BMD (0.862 vs. 0.896 g/cm²; P: 0.036); TvBMD (117.16 vs. 127.2 mg/cm³; p: 0.031) CvBMD (555.9 vs. 569.4 mg/cm³; p:0.03) and GvBMD (217.4 vs. 231.6; p: 0.02). OTP fx patients (had significant low measurements at areal BMD (0.675 vs. 0.731 g/cm²: p: 0.000);

CvBMD (508.0 vs. 532.2 mg/cm³; p: 0.002); GvBMD (175.8 vs. 192.0 mg/cm³; p: 0.005) and Th (0.533 vs. 0.570 mm; p: 0.001). GvBMD showed the best AUC from 3D parameters analyzed, discreetly above to BMD (0.738 vs. 0.729).

Conclusion: DXA- based 3D modeling parameters are associated in a way similar to classic 2D measurements. Cortical parameter seems be the best parameter to discriminate Fx.

P346
CIRCULATING CLUSTERIN AS AN EARLY BIOMARKER FOR KNEE OSTEOARTHRITIS

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Objective: Clusterin (CLU) plays regulatory roles in inflammatory and apoptotic processes, possibly implicated in the pathogenesis of synovial inflammation and chondrocyte apoptosis contributing to cartilage degeneration in knee osteoarthritis (OA). The objective of this study was to determine whether circulating and synovial fluid CLU levels are associated with knee OA severity and could be employed as possible biomarkers for the disease progression.

Methods: 100 knee OA patients and 20 healthy controls were recruited. The disease severity was evaluated by radiographic imaging in accordance with the Kellgren-Lawrence (KL) classification. Plasma and synovial fluid CLU levels were quantified using enzyme-linked immunosorbent assay. Relative mRNA expression of *CLU* in inflamed synovium of knee OA (*n*=10) and noninflamed synovium of knee OA (*n*=10) was determined using real-time PCR.

Results: Knee OA patients exhibited significantly lower circulating CLU levels than healthy controls (*P*<0.001). Plasma CLU levels were significantly greater than paired synovial fluid samples of knee OA patients (*P*<0.001). Subsequent analysis revealed that both plasma and synovial fluid CLU levels were positively associated with KL grading of knee OA patients (*r*=0.54, *P*<0.001; *r*=0.51, *P*<0.001, respectively). Moreover, a significantly direct correlation between plasma and synovial fluid CLU levels was found in knee OA patients (*r*=0.56, *P*<0.001). Receiver operating characteristic curve analysis uncovered that the optimal cutoff value of plasma CLU as a biomarker for discriminating knee OA patients with early stage (KL grade 2) from healthy controls was projected to be 265.75 mg/mL, which yielded a sensitivity of 95.8%, a specificity of 80.0%, and an AUC of 0.94 (95%CI: 0.90-0.99; *P*<0.001). Additionally, relative *CLU* mRNA expression was significantly upregulated in inflamed synovium of knee OA, compared with non-inflamed synovium of the patients (*P*<0.001).

Conclusion: Alterations in transcriptional and translational levels of CLU in the systemic and local joint environments would reflect the severity of knee OA − especially synovial inflammation. All findings collectively suggest that CLU could emerge as a novel

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biomarker for early onset of knee OA. Further longitudinal and prospective studies are highly desirable to enable more precise estimates and a better understanding the role of CLU in knee OA.

P347
CLINICAL SIGNIFICANCE OF SERUM IRISIN CONCENTRATION AS A MARKER OF OSTEOPOROTIC FRACTURE

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Objective: To study the dependence of the frequency and localization of pathological fractures in osteoporosis in patients with rheumatoid arthritis (RA), depending on the level of serum irisin.

Methods: We examined 110 patients with a reliable diagnosis (RA). The age of the examined was from 18-69 y, all patients were female. The diagnosis of RA was established on the basis of the 2010 EULAR diagnostic criteria ("2010 American College of Rheumatology / European League Against Rheumatism Rheumatoid arthritis classification criteria", developed by ACR and EULAR (2010)). As a comparison group, 60 practically healthy women were examined. Serum irisin levels were determined using an enzyme-linked immunosorbent assay by the commercial Irisin ELISA kit.

Results: As a result of measurements in the group of healthy individuals, the average serum irisin level was 20.49±4.82 µg/ml (µ±σ). By calculation, a reference interval of 10.85-30.13 µg/ml was determined, defined as µ±2σ. Subsequently, all patients were divided into groups with reduced and normal levels of irisin. Osteoporotic fractures in the group of patients with normal irisin levels (above 10.85 µg/ml) were recorded in 5 (7.58%) patients, in the group with low irisin levels in 9 (20.45%) patients ($\chi2=3.942$, p=0.047). Fractures of the spine in the group of patients with normal irisin levels were recorded in 3 (4.55%) patients, in the group with reduced irisin levels in 3 (6.82%) patients, femoral neck fractures in 0 (0.00%) and in 2 (4.55%) patients, forearm fractures in 5 (7.58%) and 6 (13.64%) patients ($\chi2=6.472$, p=0.166, the difference is not significant).

Conclusion: Thus, serum irisin levels can be used to predict the incidence of pathological fractures in osteoporosis in patients with RA. However, the location of the fractures does not depend on the concentration of irisin in the blood serum. Some authors consider that irisin can be used as a predictor of osteoporotic fractures and even as a potential drug for the treatment of osteoporosis [1, 2].

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P348
BONE MINERAL DENSITY AND WEIGHT STATUS IN FLAMENCO DANCERS

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Objective: Early onset in dance, along with the somatic gracility of dancers, can be considered risk factors in adolescence peak of bone mass as well as in their maintenance. However Spanish dance demands strong hell, one of the best exercise to promote bone regeneration nothing was known about BMD situation Study aim is to know bone status of young adult, men and women, professional flamenco dancers

Methods: Cross-sectional study of body composition and BMD was performed in 100 Spanish dancers Data collection took place in dance high school of Madrid, at the last year of study (professional level). University student, with same age range and gender ratio constitutes the control population. International Biological Program and the ultrasound technique were used for the determination of anthropometric characteristic and the BMD.

Results: Dancer´s normal weight are registered in 95.2% of men and 86.7% of women, underweight suppose 13.3%. Overweight category only is represented in control sample (27.3% males and 23.7% females). Table shows BMD and T-scores values in control and dancers. Significant differences have been found (p<0.001) in both sexes related with bone status between dancers and control. T-score of women dancers shows the strong differences.

Group and Bone status	Men Dancer	Women Dancer	Men Control	Women control
Height	174.1±5.3	160.2±4.4	179.2±6.9	163.1 ±5.7
Weight	68.8±7.3	53.4 ±5.8	78.1±8.3	57.9±7.4
BMD	0.86±0.074	0.83 ±0.060	0.67±0.14	0.63±0.12
T-score	0.99 ±0.85	1.1 ±0.99	0.88 ±1.14	0.65±1.17

Conclusion: Early begin in Spanish dance before puberty and relative gracility have nor negative repercussion in bone status conversely the hell practice of this dance reverberate in a healthy bone. Women´s benefits was higher and shows high differences with control.

P349

IS MYOSTATIN A PROMISING BIOMARKER TO MONITOR MUSCLE MODIFICATIONS IN HIP FRACTURE PATIENTS UNDERGOING THERAPEUTIC EXERCISE AND AMINO ACIDS SUPPLEMENTATION?

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Objective: This preliminary study was to characterize the role of myostatin as a promising biomarker of sarcopenia and skeletal muscle modifications in older adults with osteoporotic hip fracture undergoing a multidisciplinary rehabilitation and nutritional treatment.

Methods: We recruited a sample of osteoporotic hip fracture patients (age >65 y at 3 months after hip fracture) undergone total hip replacement. Study participants were divided into 2 groups: group A, that received a 2-month amino acid supplementation, two sachets of 4 g daily, and group B, without any nutritional treatment. All patients performed a physical exercise program, consisting of 5 sessions of 40 min each per week for 2 weeks under the supervision of an experienced physical therapist, and, subsequently, a homebased exercise protocol. Moreover, participants were also divided into sarcopenic and nonsarcopenic patients, according to EWGSOP criteria. At the baseline (3 months after hip fracture) and at the end of 2-month treatment, the myostatin serum levels were measured using the ELISA Kit (human myostatin ELISA Kit MyBioSource®, number MBS703668).

Results: The 20 participants (mean aged 75.9±2.4 y) were randomized into 2 groups: group A (n=10; mean age 76.1±2.2 y) and group B (n=10; mean aged 75.7±2.6 y), with a similar prevalence of sarcopenia (group A: 70% vs. group B: 80%). Serum myostatin levels significantly decreased after 2 months of treatment in both group A (1.2±0.2 vs. 0.9±0.3 ng/mL; p=0.01) and group B (1.3±0.3 vs. 1.1±0.4 ng/mL; p=0.03). A significant reduction of serum myostatin levels was observed in the sarcopenic patients of group A (1.3±0.3 vs. 0.9±0.5 ng/mL; p=0.04) but not in those in group B (1.2±0.6 vs 1.0±0.7 ng/mL; p=0.12). There were no significant differences between groups in terms of serum myostatin levels.

Conclusion: Although on a small sample, we showed that a 2-month combined nutritional and rehabilitative intervention could reduce serum myostatin levels in older adults undergone total hip replacement, suggesting its potential role as a promising circulating biomarker to monitor sarcopenia in older adults.

P350

SAFETY AND SHORT-TERM EFFECTS ON PAIN AND DISABILITY OF ULTRASOUND-GUIDED RADIOFREQUENCY ABLATION OF GENICULAR NERVES IN PATIENTS AFFECTED BY KNEE OSTEOARTHRITIS

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Objective: To evaluate safety and short-term effects of ultrasound-guided radiofrequency (RF) ablation of genicular nerves on pain and disability in patients affected by knee osteoarthritis (KOA).

Methods: In this retrospective study, we included patients aged between 50-80 y, with a diagnosis of KOA (Kellgren−Lawrence grade II or III), with knee pain (numeric pain rating scale, NPRS, ≥4, lasting more than 3 months, not responders to other conventional conservative treatments. All patients were treated with RF of the superolateral, superomedial, and inferior-medial geniculate nerve. The correct positioning of the needle was assessed both by ultrasound guidance and by sensory and motor electrostimulation. Primary outcome was intensity of pain, measured by NPRS. Secondary outcomes were: disability, assessed Knee Injury and Osteoarthritis Outcome Score (KOOS), and safety measured recording adverse events. All these outcomes were assessed at the baseline (T0) and at 2 weeks after the procedure (T1).

Results: 47 patients (mean age: 68.8±13.7 y) were included in the study. There was a statistically significant reduction of pain at rest, as showed by NPRS (7.48±1.74 vs. 3.63±1.68; p<0.001). Moreover, all patients showed a statistically significant reduction of disability, as showed by KOOS score (21.45±7.33 vs. 44.97±10.77; p<0.001). All adverse events were recorded in order to assess safety; we did not collect major adverse events, but there were minor adverse events, such as vagal reactions (n=2), minor bleeding (n=17) and temporary local hypoesthesia (n=29).

Conclusion: Our results suggested that US-guided RF ablation of genicular nerves might be considered as a safe and effective technique to reduce pain and disability in patients affected by KOA not responders to conventional treatments. Further prospective studies are mandatory to confirm these data.

P351
MUSCULOSKELETAL ULTRASONOGRAPHY IN ROUTINE RHEUMATOLOGY PRACTICE OF ALGERIAN RHEUMATOLOGISTS

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Objective: Musculoskeletal ultrasound (MSUS) is becoming more and more essential in routine rheumatology practice and becomes an essential tool for the diagnostic and certain therapeutic procedures of many musculoskeletal problems. The aim of this work is to document perceptions and use of MSUS in the Algerian rheumatology community, and better appreciate its use in current rheumatological practice. Despite an inherent bias in the survey which probably overestimates interest in MSUS, this study remains useful as a first in order to document this trend among Algerian rheumatologists.

Methods: We sent an anonymous electronic survey to the Algerian rheumatologists in a large contact network developed since 2011 and which includes more than 80% of rheumatology practitioners in Algerian territory. This survey consisted to know the status of the doctor, his clinical and ultrasound experience in the specialty, interest in this type of diagnostic tool and indications of its use.

Results: A total of 93 rheumatologists distributed over the 4 corners of the Algerian territory had answered to the survey. 45% (42/93) of them claiming to regularly use MSUS with an average of 5.6 examinations per week, performed for diagnostic purposes (95%), especially in patients with chronic inflammatory rheumatism (CIR), musculotendinous pathologies or osteoarthritis (69.0-93.5%). The most common diagnoses were rheumatoid arthritis and ankylosing spondylitis (28.7 and 9.5% of cases, respectively). 78% (33/42) of them who perform MSUS use it for monitoring CIR, while 88% (37/42) used this tool for echo-guided procedures. 11% of physicians with performed ultrasound training don't have this tool in their place of exercise.

Conclusion: The MSUS knows a certain craze in the daily practice of Algerian rheumatologists, with an important interest for the diagnosis and for echo-guided procedures. It remains to expand the use of this tool and especially its availability in all Algerian rheumatologists for better patient management.

P352
ESSENTIAL KNOWLEDGE FOR PATIENTS RECEIVING BDMARDS IN CHRONIC RHEUMATIC DISEASES

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Objective: Biological treatments (BT) have become common in rheumatology and in management of chronic inflammatory rheumatic diseases. As these drugs are more widely prescribed, it has become common to experience incidents inherent in their taking. We sought to assess the knowledge and handling skills of these treatments in patients.

Methods: We conducted a cross-sectional survey carried out in 2018. The form which was made of 20 questions with an overall score out of 10 was developed to measure knowledge and skills concerning the handling of BT, the aim is to assess the degree of knowledge of our patients.

Results: We interviewed 121 patients of mean age 43±11 y; 52 (43%) were women; the indications for BT were mainly rheumatoid arthritis in 51 cases, ankylosing spondylitis in 37 cases, 21 for rheumatism with bowel disease and 12 for psoriatic arthritis; 97 patients (80%) had mainly received information about their treatments from their doctor, via internet research in 24 (20%) while therapeutic education sessions were carried out in just 12 (10%). We classified the different patient responses into three groups: with a high, moderate and low level of competence. A total of 28 (23.4%) patients had a low level of competence; 74 (61.2%) a moderate level of competence and 19 (15.4%) a high level of competence. The factors associated with a low level of knowledge were: bad intellectual level (p=0.023) and unemployment (p=0.034).

Conclusion: BT are known to cause significant and non-negligible risks. Patients must have safety skills to take care of themselves in order to develop appropriate behavior in risky situations. Health professionals should develop more therapeutic education workshops in this direction.

P353
RELATIONSHIP BETWEEN BMI AND FRAGILITY FRACTURE IN BOSNIAN POSTMENOPAUSAL WOMEN

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Objective: The association between BMI and fragility fracture is controversial. The objective of this study was to examine the relationship between BMI and fragility fracture in Bosnian postmenopausal women. **Methods:** A total of 100 postmenopausal women living in BiH were included in the study. In the study group (n=50) were women with a fragility fracture, and in control group (n=50) women without a fragility fracture. There was no statistically significant difference (p>0.05) in average age between the study (64.4±6.0) and control group (64.7±5.1). BMD was measured on the lumbar spine and on the proximal femur using DXA. **Results:** The women in the study group (with a fragility fracture) had lower BMI (22.2±2.0 kg/m^2) then the women in the control group (31.2±4.3 kg/m^2). The difference in BMI between the two groups was statistically significant (p<0.0001).

BMI ≥25 kg/m^2 had 6 (12%) women in study group and 39 (78%) women in the control group (p<0.0001). BMD was statistically significantly lower in the women with a fragility fracture then in the women without fragility fracture (p=0.0001). **Conclusion:** The results of the study indicate that BMI has the influence on bone quality in Bosnian postmenopausal women. Our results showed that BMI ≥25 kg/m^2 has a protective role with regards to bone strength. Lower BMI is associated with osteoporosis and with fragility fracture in Bosnian postmenopausal women.

P354
EFFECT OF THERAPEUTIC EXERCISE IN PATIENTS WITH LUMBAR DISC HERNIATION

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Objective: This study aimed to examine the effects of therapeutic exercise on the back function parameters, in patients with lumbar disc herniation without neurologic complications, was applied, as an intervention method that can be used for clinical improvement of the patients.

Methods: 255 patients with lumbar disc herniation underwent the intervention of therapeutic exercise, 20 min/d, 3 times per week for 6 months. The evaluation screening tools for the patients were: The keele STar Back screening Tool, Roland-Morris Disability Index, Oswestry Disability Index ODI), HADS (Hospital Anxiety and Depression scale). These parameters were remeasured and analyzed.

Results: There was a significant pre- vs. post-intervention difference in all the parameters after biofeedback spine stabilizer therapeutic exercise. The keele STar Back screening Tool improved 32%, Roland-Morris Disability Index improved 43%, ODI 44%, and HADS 29%. 220/255 patients were very satisfied after the therapeutic exercise programme.

Conclusion: The lumbar stabilization exercise programme, which controls balance, using pelvic movements, improves mobility and stability of the sacroiliac joint; therefore, it increases pelvic and back movements. These kinds of movements not only improved proprioception sense, they also had positive clinical effects on lumbar disc function recovery. Therefore, the consideration of interventions, such as spinal manipulation and therapeutic exercise, as used in these cases where there is no neurological compromise, the symptomatology is significantly enhanced.

P355
ASSOCIATION OF 1, 25(OH)D WITH 25 (OH) D AND KIDNEY FUNCTION AMONG SAUDI ARABIAN WOMEN

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1,25(OH)D is the active form of vitamin D made in kidney that is not be routinely measured to diagnose vitamin D deficiency but can be key measure in patient with kidney disease[1-2]. This study investigates the relationship between 1,25(OH)D with kidney measurements among Saudi women.

355 Saudi Arabian females aged 20-82 years old were included in the study; anthropometric measurements and blood samples were assessed. 25(OH)D level ranged from 4-150 nmol/L where subjects have been divided to <25nmol/L and >25 nmol/L group.

Table. The mean and (SD) of variables and independent t-test among the cut off points groups.

	<25(OH)D N=204	>25(OH)D N=151
BMI	28.5(5.7)	29.0(6.2)
1,25 (OH)D pmol/l	81.2(32.7)**	100.2(46.1)
PTH pmol/l	9.7(3.8)*	8.2(2.9)
Albumin g/L	42.0(3.3)	42.1(3.2)
ALP U/L	70.2(17.8)**	73.9(21.8)
ALT U/L	18.0(7.0)	19.8(8.0)
AST U/L	19.8(7.0)	23.1(7.6)
GGT U/L	17.0(8.1)*	22.3(12.6)
Urea mmol/L	3.9(1.1)	4.5(1.3)
Creatinine serum umol/L	55.4(12.8)	60.0(15.0)
Creatinine urine mmol/L	162.7(71.7)	140.7(70.8)
Uric acid umol/L	244.0(68.2)	253.8(60.9)

**<0.01, *<0.05

Data expressed as the mean (SD); Abbreviations: ALP, alkaline phosphate; ALT, alanine aminotransferase; AST, aspartate aminotransferase; GGT, gamma-glutamyl transferase; ACR, albumin to creatine ratio.

The average 25(OH)D of the subjects' samples was 28.2 nmol/L (SD26.6). 1,25(OH)D level is significantly lower among subjects who have 25(OH)D <25 nmol/L than the group who have 25(OH)D >25 nmol/L (reference normal range of 1,25(OH)D is 120 pmol/L). ALP and GGT measurements are significantly lower among deficient group than nondeficient group which still within the normal range (ALP 44-147U/L) (GGT 0-30U/L) although it is know that high level indicates liver disease.

There is a positive correlation between 1,25(OH)D and 25(OH)D r=0.19 p=0.0. Negative correlation between 1,2(OH)D and serum creatinine r=-0.15 p=0.004. These finding indicate relationship between 1,25(OH)D and kidney measurement and require further analysis.

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P356
THE ROLE OF PLATELET RICH PLASMA (PRP) IN OSTEOARTHRITIS

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Platelet-rich plasma (PRP) is one of many new developments within the expanding field of regenerative medicine. Specialists in areas such as orthopedics, sport medicine, physical medicine and rehabilitation, and rheumatology have been exploring the benefits of this novel therapy. The use of orthobiologics such as PRP continues to advance as patients seek nonsurgical approaches to acute and chronic Joints problems and diseases. Advancements in this novel bioactive therapy have occurred during the past 2 decades. Recently, the body of literature has grown and we are learning a great deal about the potential for this regenerative therapy. Applications in physiatry, orthopedics, rheumatology and sports medicine are currently being developed, and regenerative biomedicine is rapidly becoming an exciting and promising treatment option in musculoskeletal medicine. However, much remains to be learned in this emerging field. In this I will focus on my own personal experience and outcomes of PRP in management of mild to moderate osteoarthritis (specially knee joints) for the past 5 y for more than 200 patients.

P357
BBD OPTIMIZED SELF NANOEMULSIFYING ABILITY OF PEG-200 AND T-80 TOWARDS DISODIUM PAMIDRONATE HYDRATE FOR OSTEOPOROSIS

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Osteoporosis is the leading cause of fracture and morbidity in the elderly population. Worldwide, osteoporosis causes more than 8.9 million fractures annually, resulting in an osteoporotic fracture every 3 seconds. It is estimated that osteoporosis affect 200 million women worldwide. In India, a high prevalence of osteopenia (52%) and osteoporosis (29%) thought to be due to inadequate nutrition. An oral self nanoemulsifying drug delivery system (SNEDDS) of disodium pamidronate hydrate (DPH) was prepared and optimized according to Box-Behnken Design (BBD). The concentration of surfactant and cosurfactants with respect to oil were finalized on the basis of higher nanoemulsion area obtained by the construction of the pseudoternary phase diagram. Selection of oil was done on the basis of solubility and Timur seed oil shows higher drug solubility of 12.65 mg/ml. Different ratio of oil to Smix were constructed 1:9, 1:8, 1:2, 1:3, 1:3.5, 2:8, 1:5, 1:6, 1:7, 3:7 and 4:6. Out of which 1:3.5 shows a higher area of nanoemulsion in ternary plot constructed by Chemix school software. The ratio of surfactant and cosurfactants were also concluded on the basis of its ability to form stable and transparent nanoemulsion. T-80 and PEG-200 in the ratio of 2:1 show higher phase stability and transparent nanoemulsion and particle size in the range of 30-112 nm. Self nanoemulsification ability was performed as per protocol and found to be 04 s. without sonication and mixing. The SNEDDS shows a sustained release pattern as compared to DPH suspension. Finally, a kinetically stable SNEDDS of DPH with a particle size of 47.50 nm and self emulsification time of 04 was obtained after optimization with response surface methodology. The study demonstrated that a Timur oil-based SNEDDS was a promising strategy to enhance the self-emulsifying ability of disodium pamidronate hydrate.

P358
THE PREVALENCE OF SARCOPENIA IN OLDER PEOPLE NORTHWEST REGION OF THE RUSSIAN FEDERATION

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Objective: Assessment of functional status and analysis of the prevalence of sarcopenia in people over 65 living in community.

Methods: 230 people were included in the cross-sectional study (average age 74±6.5 y; 96.5% women). EWGSOP2 criteria were adopted. Skeletal muscle strength was determined by grip strength and chair stand test (5-times sit-to-stand). Skeletal muscle mass was calculated by appendicular skeletal muscle mass (ASMM) by DXA. Muscle function was evaluated by short physical performance battery (SPPB).

Results: Muscle strength in sarcopenics is lower than in nonsarcopenics (p<0.001). The overall score for SPPB tests was reduced in both groups, but the sarcopenic level was lower than the nonsarcopenic level (p=0.035). The prevalence of sarcopenia is 30% for older people living in the community, aged 65-74 y at 21.4%, 85+ y at 52.9%. Men have a risk factor for sarcopenia of 2.64 (95%CI: 1.68-4.15, p<0.0001). Sarcopenia was statistically significantly less in patients with obesity 3.0% (95%CI: 0.4-10.4, p<0.0001) and metabolic syndrome 7.0% (95%CI: 2.6-14, 6, p<0.0001). Sarcopenia is greater in patients with chronic anemia (95%CI: 2.3-14.6, p=0.015). The risk of sarcopenia is 14.30 (95%CI: 6.39–31.98) times higher in patients with a BMI of less than 25 kg/m^2.

Conclusion: Sarcopenia is a common problem in older people, especially men. Low BMI, chronic anemia increased the risk of sarcopenia.

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P359

THE ASSOCIATION OF OSTEOPOROSIS AND BASIC AND INSTRUMENTAL ACTIVITIES OF DAILY LIVING AMONG ELDERLY PEOPLE IN IRAN, BUSHEHR ELDERLY HEALTH PROGRAM

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Objective: To assess the effect of osteoporosis on the dependency in instrumental and basic activities of daily living (IADL and BADL) among people ≥60 y in southern Iran.

Methods: A total of 2426 people from the second stage of the first phase of a prospective cohort, the Bushehr Elderly Health (BEH) program [1, 2] were included in the analysis. BMD was measured using the DXA method by a Hologic Discovery machine. Osteoporosis was defined as T-score ≤ -2.5 (in any sex compared to the ideal BMD of a young healthy white person of the same sex) at any site (total hip, spine or neck of femur). Dependency in activities of daily living was determined by the questionnaires of BADL and IADL using Barthel [3] and Lawton [4] scales, respectively. Demographic characteristics, as well as the history of diabetes and other chronic diseases and smoking, were measured using standardized questionnaires. Anthropometric measurements, as well as laboratory tests, were performed under standard conditions. Multiple logistic regression analysis was performed to investigate the associations adjusted for potential confounders. The covariates were selected using directed acyclic graphs.

Results: Mean (standard deviation) of the participants' age was 69.34 (6.4) y (range: 60-96), and 48.06% of the participants were men. Prevalence (95% CI) of the dependency were 67 (63-70)% and 49 (46-52)% in the IADL and 31 (28-34)% and 18 (16-20)% in the BADL, among osteoporotic and non-osteoporotic participants, respectively. In all, osteoporosis increased the odds of dependency in IADL and BADL by 24% (OR=1.24 (1.01-1.53)) and 33% (OR=1.33 (1.06-1.68)), respectively (Table 1).

Conclusion: Adjusted for potential confounders, osteoporosis was associated with dependency in BADL and IADL among older people.

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Table 1.: The association of osteoporosis and other risk factors with dependency in IADL and BADL, results multiple logistic regression analysis

Risk Factor	IADL Adjusted POR[a] (95%CI)	P value	BADL Adjusted POR (95%CI)	P value
Osteoporosis	1.24 (1.01-1.53)	0.04	1.33 (1.06 - 1.68)	0.01
Age (y)				
60-64	1	-	1	-
65-69	1.05 (0.83 - 1.33)	0.68	1.23 (0.93 - 1.64)	0.15
70-74	1.33 (0.99 - 1.80)	0.06	1.83 (1.30 - 2.57)	0.001
75-79	1.88 (1.31 - 2.68)	0.001	2.81 (1.95 - 4.05)	<0.001
80-84	3.49 (2.09 - 5.83)	<0.001	1.83 (1.14 - 2.93)	0.01
≥85	5.99 (2.27- 15.84)	<0.001	6.07 (3.39 - 10.86)	<0.001
Sex (Male)	0.52 (0.42 - 0.65)	<0.001	0.46 (0.35 - 0.59)	<0.001
Education				
No education	1	-	1	-
Primary school	0.62 (0.49- 0.79)	<0.001	0.78 (0.62 - 0.99)	0.04
Guidance school	0.35 (0.24 - 0.50)	<0.001	0.69 (0.46 - 1.05)	0.08
High school	0.29 (0.21 - 0.40)	<0.001	0.45 (0.30 - 0.68)	<0.001
Academic	0.27 (0.18 - 0.40)	<0.001	0.42 (0.24 - 0.74)	0.003
Diabetes mellitus	1.32 (1.09 - 1.59)	0.004	1.28 (1.04 - 1.57)	0.02
Corticosteroid indicated diseases [b]	1.86 (1.43 - 2.43)	<0.001	-	-
Chronic disabling diseases [c]	-	-	1.34 (1.04 - 1.74)	0.02
Low HDL cholesterol [d]	1.24 (1.02 - 1.50)	0.03	-	-
Smoking [e]				
Never	1	-	-	-
Past	1.04 (0.83 - 1.29)	0.75	-	-
Current	0.75 (0.58 - 0.99)	0.04	-	-
BMI				
<18.5	-	-	1	-
18.5-24.9	-	-	0.61 (0.29 - 1.26)	0.18
25-29.9	-	-	0.81 (0.39 - 1.68)	0.57
≥30	-	-	1.22 (.58 - 2.57)	0.60

a: Prevalence Odds Ratio

b: History of rheumatoid arthritis, osteoarthritis or chronic lung disease

c: History of Parkinson, Alzheimer, chronic renal failure, chronic liver disease, cancer, seizure, depression, hyperthyroidism or hypothyroidism

d: In males <35 and in females <45

e: Cigarettes, hookahs or pipes

P360

PERSIAN TRANSLATION AND VALIDATION OF THE SARQOL®, A QUALITY OF LIFE QUESTIONNAIRE SPECIFIC TO SARCOPENIA

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Objective: Recently, the Sarcopenia Quality of Life (SarQoL) questionnaire, a quality of life (QoL) questionnaire specific to sarcopenia, was successfully developed. For practical reasons, there is a great interest in validating this questionnaire in other populations. The aim of this cross-sectional study was to translate the SarQoL into Persian and validate the psychometric properties of this new version.

Methods: The translation part was carried out in five stages: (i) two initial translations from English to Persian; (ii) synthesis of the two translations; (iii) backward translations; (iv) expert committee to compare the backward translations with the original questionnaire and (v) test of the pre-final version. To validate the

Persian SarQoL, we assessed its validity, reliability and floor/ceiling effects in a cross-sectional study of older Iranian women dietary patterns and quality of life. The diagnosis of sarcopenia was based on a combination of low muscle mass (ASM <5.5 kg/m²) with low grip strength (max grip strength <20 kg) and/or low gait speed (<1 m/s). These cut-off values are based on the European Consensus put forth by the EWGSOP.

Results: The five stages of the translation process were successfully carried out, and no major linguistic issues were encountered. To study the psychometric properties of the Persian version of the SarQoL questionnaire, a total of 48 Iranian women with a mean age of 61.17±6.80 y were enrolled. The mean quality of life scores were lower in the sarcopenic group for all domains and the overall score (58.46±18.73 vs. 66.22±12.09). However, the differences in QoL did not reach statistical significance, except for domain 7 (p=0.022).The questionnaire demonstrated a high level of internal consistency with a Cronbach's alpha of 0.790. No floor or ceiling effects were found for the overall SarQoL score.

Conclusion: The SarQoL questionnaire was successfully translated into Persian. In this sample no discriminative power was found, which could be because of the relatively young age of the participants and the small sample size. We hope future studies can confirm the Persian SarQoL questionnaire is equivalent to the original version.

P361
TOWARDS SEVERE SARCOPENIA: PREDICTORS OF WORSENING IN THE CHAIR-STAND-TEST IN OLDER MEN – THE PROSPECTIVE STRAMBO STUDY

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Objective: The five-time chair-stand-test (CST) is a measure of lower body strength in the elderly. We aimed to assess the risk factors of incident worsening in CST in older men.

Methods: Men aged 60-87, able to perform CST (n=801) were followed up prospectively for 8 years. During this period, 641 men had at least one follow-up test. The worsening in CST was defined by an increase in the time necessary to perform CST by >1s/y or an incident incapacity to perform CST.

Results: The worsening, found in 147 men, increased with age (OR=1.39 per 5 y, 95%CI: 1.18-1.63, p<0.001). Compared with men having BMI 21-25 kg/m², worsening was more frequent in the 9 men with BMI <21 kg/m² (OR=6.22, 95%CI: 1.36-28.47, p<0.05) and in the 43 men with BMI >33 kg/m² (OR=2.59, 95%CI: 1.06-6.30, p<0.05). Higher leisure physical activity (>2 h/wk) was associated with lower risk of worsening (OR=0.48, 95%CI: 0.28-0.82, p<0.01). Longer time to perform a 10-step tandem walk (>16 s, upper quartile) was associated with higher risk of worsening (OR=2.29 vs. three lower quartiles jointly, 95%CI: 1.48-3.54, p<0.001). The risk of worsening was higher in men self-reporting fragility fracture of the lower limbs (OR=3.77, 95%CI: 1.37-10.33, p=0.01) and of upper limbs (OR=3.33, 95%CI: 1.36-8.17, p<0.01). It increased with the number of limb fractures (trend p<0.001) being the highest in men with ≥2 fractures (OR=16.08 vs. no fracture, 95%CI: 2.42-180.94, p<0.05). The risk of worsening was higher in men self-reporting stroke (OR=3.35, 95%CI: 1.13-9.93, p<0.05) and in men with PTH level >72 pg/mL (>mean+3SD in young men) vs. men with PTH <36 pg/mL (<mean in young men): OR=2.33, 95%CI: 1.13-4.79, p<0.05. The worsening in CST was not related to other lifestyle factors, other comorbidities, or testosterone deficit.

Conclusion: In older men, worsening in CST is predicted by higher age, extreme BMI, poor dynamic balance, prior fracture of the limbs, prior stroke and high PTH levels.

P362
INVESTIGATION OF THE PREVALENCE OF SARCOPENIA AND ASSOCIATED FACTORS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: To estimate the prevalence rate of sarcopenia in chronic obstructive pulmonary disease (COPD) patients and to determine the factors associated with sarcopenic patients living in western Greece.

Methods: EWGSOP criteria were applied to 69 outpatients with COPD. Body composition (BMI; muscle mass; skeletal muscle mass index-SMMI; fat mass), exercise capacity, muscle strength (hand grip strength-HGS), functional performance (4-m test; gait speed), physical activity and health status (comorbidities, number of drugs) were also assessed. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) was used to evaluate COPD severity (COPD stage). Participants were recruited from the regions of Achaia and Ileia, in the mainland of western Greece. The assessment procedure was all carried out at the University of Patras (University Hospital of Patras and Physiotherapy Department). The study protocol was approved by the Ethical Committee of the Technological Educational Institute of Western Greece.

Results: The sample comprised 69 patients (59 women and 10 men), with a mean age of 71.33±7.48 y. Prevalence of sarcopenia was 24.6% (n=17). Most of the participants were ex-smokers (79.7%; n=55). A high percentage (82.6%; n=57) of the 69 Greek participants were not engaged in regular exercise. There were seven factors positively associated with sarcopenia using regression analyses: age (OR=0.9; 95%CI 0.91-1.06), COPD (OR=0.8; 95%CI 0.41-1.54), BMI (OR=I2.94; 95%CI 1.52-5.69), number of drugs (OR=0.66; 95%CI 0.46-0.94), SMMI (OR=28.6; 95%CI 32.53-251.7), HGS (OR=1.67; 95%CI 1.02-2.73) and 4m test (OR=0.52; 95%CI 0.29-0.93).

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Conclusion: Although causal relationship cannot be determined, there is a 24.6% prevalence of sarcopenia in patients with COPD. Further research with larger sample is indicated in order to clarify the precise association of specific characteristics of patients with sarcopenia and COPD.

P363

RELATIONSHIPS OF DNA METHYLATION, METHYL-DONOR RICH DIET, VITAMIN D DEFICIENCY AND BONE STATUS IN POSTMENOPAUSAL WOMEN

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Objective: Eating a healthy and balanced diet builds and maintains healthy bones. Dietary exposures may influence on bone hemostasis via genome DNA methylation. We investigated dietary methyl donors, serum levels of vitamin D and physical activity in postmenopausal women related to bone status and global DNA methylation.

Methods: The 5-methyl cytosine content was assessed by reverse phase high pressure liquid chromatography of peripheral blood leukocytes obtained from 150 postmenopausal women to determine individual global DNA methylation status (Cm%). DXA densitometer was used to assess BMD. Osteocalcin and CTX, and vitamin D (25(OH)D) were measured using electrochemiluminescence assay. Dietary intakes were assessed by a validated semiquantitative 146-item food frequency questionnaire (FFQ). Linear regression model was used to investigate association between global DNA methylation levels and bone status independent of confounding factors such as age, menopausal age, BMI, methyl-donor components and vitamin D levels.

Results: In all participants, there was not significant correlation between DNA methylation and the methyl-donor components, even after adjusting for age, menopausal age and BMI. In univariate model, after adjusting for age, and BMI there was independent association between global DNA methylation and serum vitamin D levels (p=0.003). To assess the role of vitamin D levels in relation to global DNA methylation levels and bone status, all participants were classified into two groups based on 25(OH)D optimal levels (≥30 ng/mL). As confounding factors, the dietary intake of vitamin B12, folate, vitamin B6, choline and methionine (modifier factors of DNA methylation), were analyzed in women with and without vitamin D deficiency (VDD). The data showed no significant differences between 2 groups. In linear regression model after adjusting for age, BMI, and menopausal age, the analysis showed that a constant negative association between global DNA methylation and T-score L2-L4 (β=-0.45, p=0.006), and BMD-L2-L4 (β=-0.41, p=0.01) only in subgroup VDD.

There were significant mild positive correlations between global DNA methylation levels with CTX (r=0.18, p=0.03) but not after adjusting for serum vitamin D levels (p=0.071).

Conclusion: The findings of this study show vitamin D levels independent of methyl-donor components associate with bone status.

P364

IMPROVEMENT OF BALANCE FUNCTION AFTER THE PHYSICAL REHABILITATION COMPLEX IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES

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Objective: To evaluate effect of complex physical rehabilitation on postural function in patients with osteoporotic vertebral fractures (VFs).
Methods: Study comprised of 90 osteoporotic patients aged 50-80 (65.4±9.1) with VFs who were randomized as 2:1 into intervention group (group1, n=60) and control group (group2, n=30). Patients in group1 received intensive rehabilitation course including back muscle training #10; sensorimotor training on unstable platform #10; kinesohydrotherapy in a pool #15; physical exercises in a gym #10. Group2 was prescribed only physical exercises in a gym #15. All patients undergo stabilometry, one leg standing test and Fukuda test at baseline, at the end of rehabilitation and a month after the rehabilitation.
Results: Baseline examination showed no significant differences between groups in stabilometric parameters and coordination tests (p>0.05). There were significant changes in group1 after the rehabilitation course vs. baseline in balance function coefficient (BFC) with opened eyes from 77.0±7.6 to 84.1±8.6% (p=0.008) and with closed eyes from 67.1±9.7 to 73.8±9.6% (p=0.007), at the area of statokinesiogram (ASKG) from 176.8±170.2 to 131.9±131.9±210.4†mm^2 (p=0.04), pressure center velocity (PCV) from 9.5±4.4 to 12.2±10.1 mm/s, (p=0.0004), displacement in Fukuda test from 41.4±21.3 to 32.8±14.5, (p=0.03) and in One leg standing test on both legs with open eyes from 9.7±21.7 to 17.8±31.8 s and from 9.5±15.3 to 17.1±30.1 s, respectively (p=0.001). In group2 there was improvement in PCV from 9.2±4.7 to 10.1±3.9 mm/s (p=0.05). Positive dynamics in balance tests (BFC with open and closed eyes, PCV, ASKG, displacement in Fukuda test, time for both legs in one leg standing test) were maintained in group1 in month after the rehabilitation treatment. All the postural control parameters were significantly better in group1 vs. group2 after 1 month of follow-up (p<0.01).
Conclusion: The complex physical rehabilitation aimed for trunk muscles and coordination trainings improve the postural function in patients with osteoporotic VFs.

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P365
IMPROVEMENT OF CORE MUSCLE STRENGTH AFTER THE PHYSICAL REHABILITATION COMPLEX IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES

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Objective: To estimate the effect of new complex physical rehabilitation program on core muscles strength in patients with osteoporotic vertebral fractures (VFs). **Methods:** Study comprised of 90 osteoporotic patients aged 50-80 (65.4±9.1 y) with low-traumatic VFs who were randomized as 2:1 into intervention group (group1, n=60) and control group (group2, n=30). Patients in group1 received an intensive rehabilitation course including back muscle training with mechanical loads #10; sensorimotor training on double unstable platform #10; kinesohydrotherapy in a pool #15; physical exercises in a gym #10. Group2 was prescribed only physical exercises in a gym #15. All patients undergo tensodynamometry on Back-Check diagnostic unit (Dr. Wolff, Germany) at baseline, at the end of rehabilitation course and a month after the rehabilitation. **Results:** After a rehabilitation course muscle strength increased significantly in trunk extensors (TE) from 15.8±10.1 to 21.7±13.1 kg (p<0.0001), trunk flexors (TF) from 14.5±9.1 to 18.9±10.2 kg (p<0.001), left lateral flexors (LLF) from 12.8±7.2 to 17.5±9.6 kg (p<0.01) and right lateral flexors (RLF) from 13.2±7.1 to 17.8±9.2 kg (p<0.01). The maximal improvement of muscle strength was registered in TF +6.5±57.5% above recommended values (p<0.001). TE strength deficiency significantly decreased (p<0.001), but did not reach the recommended values -15.8±25.8%. After the 1-month muscle strength in all examined muscles didn't significantly diminished vs. results just after rehabilitation course completion (p>0.05). The strength of all the studied muscles were higher (p<0.01) and the muscle deficiency was less in TE (p<0.05) and TF (p<0.001) in group1 vs. group2 in a month of follow-up after rehabilitation course. **Conclusion:** A new complex physical rehabilitation program leads to increase of muscle strength and elimination of muscle strength deficiency in patients with osteoporotic VFs, and these effects are not attenuate for at least a month after the treatment completion.

P366
ENHANCED RATE OF KETOPROFEN DISSOLUTION BY SOLID DISPERSION APPROACH: A DRUG USED IN MANAGEMENT OF RHEUMATOID ARTHRITIS

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Objective: Ketoprofen (KETO) is effectively used in moderate to severe pain associated with rheumatoid arthritis. It is a BCS class-II drug bearing poor water solubility, and therefore shows low dissolution rate and systemic absorption. Aim of the present study was to improve the solubility and dissolution rate of KETO by solid-dispersion approach.

Methods: Solid dispersions were prepared by using polyvinylpyrrolidone K30 (PVP K30) and D-mannitol in different drugs to carrier ratios. Dispersions with PVP K30 were prepared by kneading and solvent evaporation techniques, whereas solid dispersions containing D-mannitol were prepared by kneading and melting techniques. These formulations were characterized in the liquid state by phase-solubility studies and in the solid state by differential scanning calorimetry (DSC), Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD) and scanning electron microscopy (SEM).

Results: The aqueous solubility of KETO was favored by the presence of both carriers. The negative values of Gibbs free energy illustrate the spontaneous transfer from pure water to the aqueous polymer environment. Solid state characterization indicated KETO was present as fine particles in D-mannitol solid dispersions and entrapped in carrier matrix of PVP K30 solid dispersions. In contrast to the very slow dissolution rate of pure KETO, dispersions of drug in carriers considerably improved the dissolution rate. This can be attributed to increased wettability and dispersibility, as well as decreased crystallinity and increase in amorphous fraction of drug.

Conclusion: Solid dispersions prepared with PVP K30 showed the highest improvement in dissolution rate of KETO. Even physical mixtures of KETO prepared with both carriers also showed better dissolution profiles than those of pure KETO.

P367
BURDEN OF TREATED AND UNTREATED OSTEOARTHRITIS PAIN IN OLDER ADULTS IN SPAIN

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Objective: Osteoarthritis (OA) pain is highly prevalent in aging people, contributing to live with disability. The objectives were to ascertain OA pain prevalence in older adults 65+ years, and to determine whether burden differs by pain severity and treatment status.

Methods: The National Health Survey, a cross-sectional, large, nationally representative, trained interviewer administered general health survey including 23,089 adults, was used to abstract data on subjects with self-reported physician diagnosis of OA, both sexes, 65+ years. Those who completed the survey were cross classified according to pain severity in last 4 weeks (mild, moderate, severe as assessed in the SF-36v2) and analgesic treatment during last 2 weeks (Yes/No). DALE (Disability-adjusted-life expectancy) lost was used as a summary measure of the disability burden and expressed as the number of expected years of healthy life lost due to disability. It was calculated with the equation: $\sum W_h * HE_{hx}$, where weight W_h for state h is independent of age and represent individual preferences for his/her health state, and HE_{hx} is the health state expectancy at age x for years lived in state h. Individual preferences were revealed by using the preference-based measure DEP-6D.

Results: 3389 completed surveys were analyzed: 73.3% women, 77.4 (SD:7.5) y.

Table. Prevalence of pain by severity and treatment and mean (95%CI) adjusted DALEs lost in years and as percentage over life expectancy.

		Pain					
		No / mild (N=1382)		Moderate (N=1157)		Severe (N=850)	
		Treated (19.9%)	Untreated (20.9%)	Treated (27.5%)	Untreated (6.6%)	Treated (22.8%)	Untreated (2.3%)
DEP-6D score		0.68‡ (0.63-0.73)	0.81 (0.77-0.86)	0.50† (0.46-0.54)	0.65 (0.57-0.73)	0.09† (0.05-0.14)	0.34 (0.21-0.47)
DALE lost	years	2.8† (2.3-3.2)	1.7 (1.2-2.1)	4.8† (4.4-5.2)	3.6 (2.8-4.3)	9.0§ (8.6-9.4)	7.2 (6.0-8.5)
	% over life expectancy	32.2‡ (27.5-36.9)	18.8 (14.5-23.2)	50.0† (46.0-54.0)	35.3 (27.5-43.0)	90.9† (86.5-95.3)	66.2 (52.9-79.5)

‡=p<0.001; †=p<0.01; $=p<0.05 treated vs. untreated.

Conclusion: In a representative sample in Spain, older adults with treated moderate-to-severe OA pain were associated with substantial burden in term of both DALE lost due to disability and as a percentage over life expectancy. Treated and severe pain showed more significant burden, meaning that OA older adults have considerable unmet need despite existing analgesics.

P368

A NOVEL INDEX TO ASSESS LOW ENERGY FRACTURE RISKS IN PATIENTS PRESCRIBED ANTIEPILEPTIC DRUGS

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Objective: To develop an index for assessing low energy fracture (LEF) risks in patients prescribed antiepileptic drugs (AED) based on five previously known risk factors (age, gender, AED-type, epilepsy diagnosis and BMI).

Methods: This population-based retrospective open cohort study used real world data collected from the electronic health register (EHR) in Region Kalmar County, Southeast Sweden. Patients prescribed an AED at any time from 1 January 2008 to 1 January 2018 were included. Participants were followed from first registry in the EHR until first documented LEF, disenrollment (including due to death) or until the end of study period, whichever came first. Data was analyzed using Cox regression and an index was developed using a linear combination of the statistically significant variables multiplied by the corresponding regression coefficients (the natural logarithm of the hazard rate ratio).

Results: Data from 23 209 patients prescribed AED with 2084 documented LEF during a mean follow-up time of slightly more than 100 months resulted in the NEFRI (Fig. 1).

Women aged 75 y or older treated with an inducing AED against epilepsy and BMI below 25 kg/m^2 had 48 times higher LEF rates compared to men aged 50 y or younger, treated with a noninducing AED for a condition other than epilepsy and BMI above 25 kg/m^2. The quartile of patients prescribed AED with a NEFRI-value below 0.93 had a 10-y LEF risk of 3%, while the quartile of patients with a NEFRI above 2.06 had a 27% risk (Fig. 2).

Conclusion: Using real world data from 23 209 patients the NEFRI was developed to predict low energy fractures in patients prescribed antiepileptic drugs. This index could serve as a feasible guide within clinical practice.

Figure 1. The NEFRI including 5 risk factors for low energy fractures in patients prescribed antiepileptic drugs.
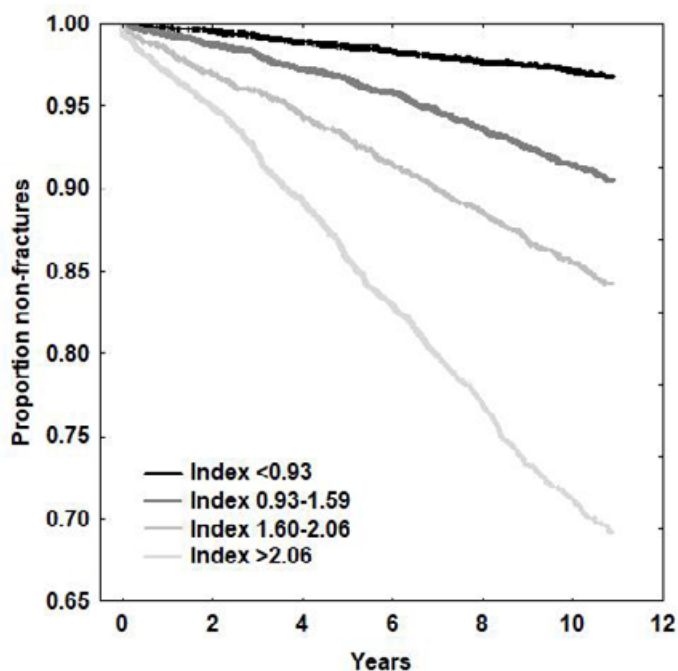
Figure 2. Kaplan-Meier proportion of patients prescribed antiepileptic drugs (stratified into quartiles according to NEFRI) with no documented low energy fractures in electronic health register over time.

P369

HUMAN UMBILICAL CORD MESENCHYMAL STEM CELLS PREVENT EARLY KNEE OSTEOARTHRITIS IN MICE

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Objective: At present, the treatment methods for OA were aiming at reducing pain, correcting deformities, restoring joint function, and improving quality of life. There are no effective solutions in curing cartilage damage. Umbilical cord mesenchymal stem cell (UC-MSC) is a kind of multifunctional stem cells existing in newborn umbilical cord tissues. However, few studies had focused on the stem cells in preventing the occurrence and development of early stage of OA.

Methods: The anterior cruciate ligament in left knee of SPF C57/BL6J male mice were cut off to generate the mouse knee osteoarthritis model. One week after surgery, hUC-MSCs mice were injected into the left knee joint. The amount of stem cells injected was 2×10^5 cells/joint. All mice were injected 3 times, with an injection interval of 1 week. Different groups received 3 hUC-MSCs injections, 2 hUC-MSCs injections+ 1 menstruum injection, 1 hUC-MSCs injections+ 2 menstruum injections, and 3 menstruum injections respectively. The sham group took skin incision. Six weeks later, the mouse knee were obtained for µCT scan, and then stained with HE and sarranine/fast green, immunohistochemical analysis and immunofluorescence analysis.

Results: All knees were free of swelling, fever and other adverse reactions, and there was no death occurred. µCT showed that the phenomenon of osteophyte formation and ectopic ossification occurred in OA group was significantly reduced in groups injected with hUC-MSCs. HE staining and saffron/fast green suggested that the femoral cartilage of mice injected with hUC-MSCs was significantly thickened, and the cartilage of those 3-times hUC-MSCs injection mice was the thickest. Immunohistochemical results suggested that the expression of TNF-α, MMP-9, and MMP-13 was significantly reduced in mice injected with hUC-MSCs. The results of immunofluorescence staining showed that the expression of Sox9 and aggrecan in the tibial cartilage in OA group was significantly reduced.
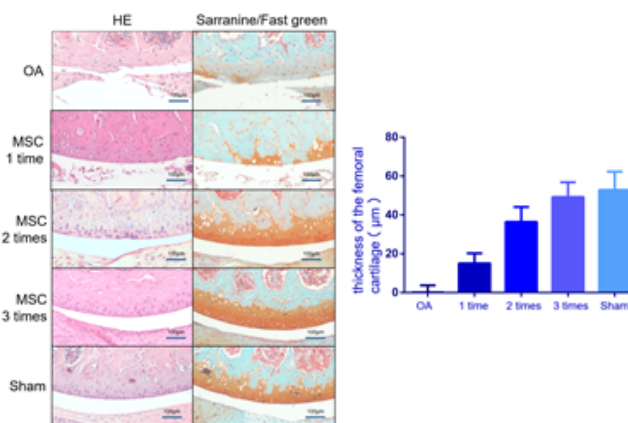
Conclusion: HUC-MSCs treatment of mouse knee joint OA model can significantly reduce cartilage damage, reduce local inflammatory response, promote cartilage matrix synthesis, reduce osteophyte formation without causing adverse reactions. It may become a promising treatment of knee OA.

P370

SHOULD OSTEOPENIA BE TREATED OR NOT?

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Objective: The reduction of the skeletal bone mass occurs over the age especially after menopause when the risk for osteopenia is increased significantly. Osteopenia as a health condition presents a risk for osteoporosis. The effectiveness of treating osteopenia in postmenopausal women with medication is still a controversial issue. We aimed to study the efficacy of bisphosphonate use in the inhibition and treatment of osteopenia in postmenopausal women.

Methods: 100 postmenopausal women of age 53.1±3.6 y diagnosed with osteopenia (T-score -1 to -2.5 SD) were included in the study. The first group of patients (50) were treated with clodronate - a first generation bisphosphonate - (100 mg/3.3 ml i/m every 2 weeks for 12 months). The second group of patients

were treated with vitamin D 1000 daily and 600 mg calcium. Bone density value was measured with DXA in the lumbar and coxofemoral joint region at the beginning, in end of the first and second year of study.

Results: Initially, mean value of the bone density in the first group was -1.35±0.34 for spine t-score; -1.88±0.25 for femur t-score and in the second group was -1.39±0.29 and -1.92±0.21 respectively, with no statistically significant difference. Both groups did not have statistically significant differences in mean age. In the lumbar region, the bone density increased on average by 0.15% in the first year and 0.4% in the second year; in the coxofemoral joint region an increase on average by 0.2% and 0.5% respectively. In the second group, there was a reduction of bone density average by 0.2% in the lumbar region in the first year and 0.3% on average in the coxofemoral joint region. At the end of the study, the reduction was on average by 0.6% in the lumbar region and 0.8% in the coxofemoral region.

Conclusion: Treatment with clodronate among postmenopausal women with osteopenia is an effective way to prevent osteoporosis.

P371
DESCRIPTIVE ANALYSIS OF GERIATRIC ASSESSMENT AND REVIEW OF PREVIOUS FRACTURES IN A POPULATION OF 75 TO 90 YEARS OLD IN THE COMMUNITY SETTING

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Objective: Analyze physical and other characteristics associated with: gait parameters, strength, balance and previous fractures, in a population of the western Mediterranean area between 75-90 years of age.

Methods: Random sample extracted from total population of 234,730 people. 19,221 between 75-90 years. Comprehensive geriatric evaluation is performed based on history of fractures and falls, biological variables and risk of fractures.

Results: Demographic: 309 cases. 174 (56.3%) women. Mean age 80.9 y. 192 (62.1%) married and 168 (54.%) live as a couple. 26% suffered falls on the previous year, 19% use mobility aids. Gait, strength and balance: Average gait test result in m/s: 1.05 men and 1.06 women. Jamar Force (dominant hand): men 29.5 kg and women 18.4 kg. Encoder (power): 567.7 W men and 411.5 W women. Average value of the Falls Efficacy Scale (FES) 23, Brief Physical Activity Assessments Tool 3, timed up and go (TUG) scale: men 8.8, women 10.5. Tinetti composite scale: men 27.3, women 26.9. The Barthel Index presents an average of 96, Lawton and Brody 7. Cephalic instability in 37% of the sample and 51% of the cases had acceptable vision. There is auditory limitation in 70% of cases. Psychocognitive Assessment: Yessevage 0.8. Mini Nutritional Assessment 14.

Conclusion: The average age of 80 years is like other international studies of the elderly population in the community. The fall rate in the previous year is lower than in other international studies. Regarding the parameters of gait and force, this population-based cohort has low risk values for falls compared to other studies. Regarding equilibrium parameters: TUG and Tinetti also presents a low risk of falls. Other characteristics associated with falls show a low risk of falls, a slight dependence for activities of daily living and almost total independence in instrumental activities. In summary, this population shows a low risk of falls.

P372
SEASONAL VARIATIONS AND ASSOCIATED FACTORS OF GOUT ATTACKS: A PROSPECTIVE MULTICENTER STUDY IN SOUTH KOREA

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

Objective: To evaluate the seasonality and associated factors of the incidence of gout attacks in Korea.

Methods: We prospectively enrolled patients with gout attacks who were treated at 9 rheumatology clinics between January 2015 and July 2018 and followed them for 1 year. Demographic data, clinical and laboratory features, and meteorological data including seasonality were collected.

Results: 205 patients (males, 94.1%) were enrolled. The proportion of patients with initial gout attacks was 46.8% (n=96). The mean age, BMI, attack duration, and serum uric acid level at enrollment were 50.5 y, 26.1, 10.2 d, and 7.3 mg/dL, respectively. Gout attacks were most common during spring (43.4%, $P<0.001$) and in March (23.4%, $P<0.001$). A similar pattern of seasonality was observed in the group with initial gout attacks. Alcohol was the most common provoking factor (39.0%), particularly during summer (50.0%). The mean diurnal temperature change on the day of the attack was highest in the spring (10.3°C), followed by winter (9.1°C), summer (8.1°C), and fall (8.0°C) ($P=0.027$). The mean change in humidity between the 2 consecutive days (the day before and the day of the attack) was significantly different among the seasons (3.4%, spring; 0.2%, summer; 0.4%, fall; -3.9%, winter; $P=0.015$). 125 (61%) patients completed 1-year follow-up (51% in the initial attack group). During the follow-up period, 51 gout flares developed (18 in the initial attack group). No significant seasonal variation in the follow-up flares was found.

Conclusion: In this prospective study, the most common season and month of gout attacks in Korea were spring and March, respectively. Alcohol was the most common provoking factor, particularly during summer. Diurnal temperature changes on the day of the attack and humidity changes from the day before the attack to the day of the attack were associated with gout attack in our cohort.

P373
FALLS & FRAILTY PREVENTION: IS IT A BLOODY WASTE OF MY TIME?!

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Objective: Falls prevention programs are run 4 times a year in Fairfield District Hospital. Results of such a program are a reduction of further falls. Previous studies indicated no reduction and in some cases increase fear of falling following completion of the program. In past 10 years there is more interest in frailty and its prevention which is more global than just focusing on falls. Is the program of value for the participants? We aimed to assess the outcome of falls prevention program from both the clinical outcome and from the patient perspective.

Methods: Various clinical measurements on patients who completed a 9 week falls prevention program including demographics; sit to stand; tandem stance; timed up & go; grip strength and fear of falls were collected. In this study we also examine the patients' perspective using the Consumer Satisfaction Survey CSQ8.

Results: There were 75 participants over a 12-month period. Following the program there was improved strength, balance and reduction of further falls.

- Rate quality of service received: 83% excellent; 17% good
- Did you get the kind of service you wanted?69% definitely yes; 27% yes generally; 4% no, not really
- To what extent the service met your needs? 47% almost all needs met; 47% most needs met; 5% only few needs met;1% none of the needs met
- If a friend has similar needs would you recommend this service? 85% definitely yes; 15% yes I think
- How satisfied are you with the amount of help received? 75% very satisfied; 21% mostly satisfied; 4% quite satisfied
- Did the service help you deal more effectively with your problems? 69% yes a great deal; 29%yes somewhat
- Overall satisfaction with the service? 87% very satisfied; 13% mostly satisfied
- If you were to seek help again would you come back? 84% yes definitely; 16% yes I think

Conclusion: No, the results from the clinical perspective as well as patient perspective showed it is not a waste of time

P374
VITAMIN D AND MUSCULOSKELETAL HEALTH IN MIDLIFE: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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Objective: Vitamin D insufficiency is common in later life, and is often reported in older institutionalised adults, but fewer data are available in midlife. Circulating 25-(OH) vitamin D (25(OH)D) has been linked to both low BMD and osteoarthritis (OA) progression, but most studies have reported findings in cohorts with severe vitamin D deficiency. In this study we report circulating levels of serum 25(OH)D in a community cohort of adults in midlife.

Methods: Participants were recruited from the Hertfordshire Cohort Study, an established longitudinal cohort study of community-dwelling adults, and were seen at baseline and follow-up 9-12 years later. Lumbar spine and total femur BMD were measured at baseline using a Hologic QDR 4500 instrument. OA was defined by radiographs of the knees and hips graded according to K&L at both time points. Serum 25(OH)D concentrations were measured using a DiaSorin Liaison chemiluminescent assay.

Results: 820 subjects (397 men, 423 women) participated at baseline, and 377 subjects participated in a follow-up study of OA progression (182 men; 195 women). The median (IQR) age of participants at baseline was 64.1 (62.0-66.6) and 65.7 (63.4-

67.7) for men and women, respectively. Median circulating levels of 25(OH)D were 44.6 (35.0-63.0) nmol/l and 41.3 (29.8-53.5) nmol/l in men and women, respectively. Season of blood testing was strongly associated with circulating 25(OH)D (p<0.001) and with supplement use (p=0.04). Higher total femoral BMD was observed in men with higher baseline vitamin D status, after adjustment for age, season, BMI, smoker status, alcohol consumption, physical activity, social class (p=0.01). There were no associations between circulating 25(OH)D and radiographic OA at either time point or with clinical hip or knee OA at follow-up in either sex after adjustment for confounders and duration of follow-up.

Conclusion: Mild vitamin D insufficiency is common in community-dwelling adults in midlife, and seasonal fluctuations in levels are also observed. Circulating 25(OH)D was associated with hip BMD in men, suggesting that consideration of how to maintain an adequate vitamin D level over the winter months should be considered, as already advised nationally in the UK.

P375
PATIENT FUNCTIONING IN TREATED AND UNTREATED OSTEOARTHRITIS PAIN IN OLDER ADULTS IN SPAIN

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Objective: Osteoarthritis (OA) pain is highly prevalent in aging people, and a meaningful factor impairing patient´s normal functioning in key domains of daily living. The objective was to determine whether patient´s level of functioning in key domains of daily living differs by OA pain severity and treatment status in older adults 65+ years in Spain.

Methods: The National Health Survey, a cross-sectional, large, nationally representative, trained interviewer administered general health survey including 23,089 adults, was used to abstract data on subjects with self-reported physician diagnosis of OA, both sexes, 65+ years. Those who completed the survey were cross classified according to pain severity in last 4 weeks (mild, moderate, severe as assessed in the SF-36v2) and analgesic treatment during last 2 weeks (Yes/No). Daily living functioning assessment included basic and instrumental activities of daily living, mental, social, and cognitive domains. Scores were rescaled to a 0%-100% standardized metric: 0% indicates no limitation (independence), 100% complete limitation (full dependence).

Results: 3389 completed surveys were analyzed: 73.3% women, 77.4 (SD:7.5) y.

Table. Means (95%CI) adjusted scores in functioning domains showing a linear significant association with pain severity (p<0.001) but not with treatment status, except for basic/instrumental activities that were higher in treated than in untreated patients.

Domain	Pain					
	No / mild (N=1382)		Moderate (N=1157)		Severe (N=850)	
	Treated	Untreated	Treated	Untreated	Treated	Untreated
	(19.9%)	(20.9%)	(27.5%)	(6.6%)	(22.8%)	(2.3%)
Basic activities	10.2† (8.6-11.7)	6.5 (5.0-8.0)	15.9* (14.6-17.2)	11.7 (9.0-14.3)	31.5* (30.1-32.9)	24.6 (20.0-29.1)
Instrumental activities	13.6* (11.7-15.4)	9.0 (7.2-10.8)	20.5† (18.9-22.1)	14.3 (11.1-17.5)	34.1† (32.3-35.8)	24.4 (18.9-29.8)
Mental	30.0 (28.7-31.2)	29.1 (27.9-30.3)	34.6 (33.5-35.6)	34.0 (31.9-36.1)	45.0 (43.9-46.2)	42.1 (38.5-45.8)
Social	6.7 (4.2-9.1)	3.0 (0.6-5.4)	19.4 (17.3-21.5)	14.8 (10.5-19.1)	42.2 (39.9-44.5)	33.5 (26.2-40.8)
Cognitive	14.7* (12.9-16.4)	10.9 (9.2-12.6)	18.2 (16.7-19.7)	17.0 (14.0-20.1)	23.4 (21.8-25.1)	20.8 (15.6-25.9)

†=p<0.01; *=p<0.05 treated vs. untreated by pain severity.

Conclusion: Severity of pain was a major driver of functionality impairment in main patient´s functioning domains in older adults with OA. Treatment status was unrelated with degree of functioning except for basic and instrumental activities which were significantly poorer in treated OA pain. Despite using existing analgesics, older adults with OA have still considerable unmet needs in Spain.

P376
THE 2018-2019 RUSSIAN ALGORITHM FOR THE MANAGEMENT OF KNEE OSTEOARTHRITIS

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Association of Rheumatologists of Russia (ARR) published a treatment algorithm for management of knee osteoarthritis, which provides practical guidance for the prioritization of interventions. In October 2018 (Saint-Petersburg) and September 2019 (Moscow) the group of Russian experts including rheumatologists, orthopedists, neurologists, and others, basing on the obtained lately results of epidemiological studies, data of actual clinical practice and national and foreign literature introduced changes in the treatment algorithm. Basic principles remain adaptable and consist of combination of nonpharmacological and pharmacological methods of treatment. In the connection with insufficient efficacy reaction on pain and absence of effect on functional ability of joints as well as very infrequent prescription of paracetamol by practicing therapists in Russia (from 5.6% to 8.6 %) and in 99.3% of NSAID using, experts already in Step 1 recommend using oral and topical NSAIDs on the background of using chronic symptomatic slow-acting drugs (prescription glucosamine sulfate and/or chondroitin sulfate and/or diacerin). Paracetamol only at-need. Step 2 consists of advanced pharmacological management in persistent symptomatic patients on the using of oral non-selective or COX-2 selective chosen based on concomitant risk factors. Therapy SYSADOA is continued. For further symptom relief if insufficient, intra-articular corticosteroid or hyaluronate are added. The last pharmacological attempts – Step 3, before surgery using short courses of tramadol or central analgesics-duloxetine (cymbalta)

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by prolonged courses are recommended. Opioids are practically not prescribed. In Russian practice opioids are prescribed very infrequently in 0.7-1.6% of cases. Step 4 includes the end-stage disease management – total joint replacement and correcting conditions with wide indications.

ARR considers that ESCEO algorithm is an orienting point for developing further recommendations with possible additions depending on the peculiarities of rheumatologic practice in this or that country.

P377

LP2, A HUMAN LACTOFERRIN-DERIVED PEPTIDE AS A NOVEL CLASS OF SYSTEMIC BONE GROWTH ENHANCER FOR NONUNIONS/DELAYED UNIONS AND FOR THE TREATMENT OF OSTEOPOROSIS: ACTIVATION OF BONE MORPHOGENETIC PROTEIN SIGNALING

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Objective: Milk provides nutrition to neonates during the time of their rapid skeletal growth. Hence it was considered a source of anabolic factors for bone development. Lactoferrin or lactoferricin (Lf), found in milk is a multifunctional iron-binding glycoprotein. Along with antimicrobial and immunomodulatory activities, Lf showed positive skeletal effects. The present study was aimed at identifying a small peptide from human Lf having an osteogenic effect so that it could be used as a systemic bone growth enhancer (SBGE) for nonunion/delayed unions and as a potential new class of therapy for treating osteoporosis.

Methods: Adult Sprague Dawley rats were used for femur osteotomy and OVX-induced osteopenia models. New Zealand rabbits were used for critical-size defects. Rat calvarial osteoblast and bone marrow stromal cell cultures were used to study in vitro effects of LP2. To study the role of BMPs in mediating LP2's osteogenic effect bone marrow stromal cell line was derived from a tamoxifen-inducible ubiquitously expressed Cre recombinase, *Rosa26CreER(T) to conditionally delete both Bmp2* and *Bmp4*.

Results: We designed 3 small peptides from human Lf and assessed in vitro osteogenic effect and found one of these, LP2 (an 18 residue fragment from the N-terminus of C-lobe of Lf) had more potent osteoblast differentiation effect than the whole protein. LP2 was stable in human plasma and non-hemolytic and noncytotoxic in several human cells. LP2 significantly enhanced the expression of BMP-2 (p<0.001), runt-related transcription factor 2 (Runx2) (p<0.001), osteoprotegerin (OPG) (p<0.001), and increased in vitro nodule formation in bone marrow stromal cells compared to control cells. Noggin (a BMP2 inhibitor) completely blocked the differentiation-inducing effect of LP2 and OPG expression (p<0.001). In a mouse bone marrow stromal cell line devoid of BMP-2 and 4 expressions, LP2 failed to stimulate osteoblast differentiation and OPG expression. The induction of

OPG by LP2 was downstream of increased BMP-2 production by osteoblasts. Together, these data established a BMP-2-dependent osteogenic effect of LP2. As BMP signaling is critical for fracture healing, we studied the effect of LP2 in suitable models in rats and rabbits. In a rat femur osteotomy model LP2 at 6 µg/kg dose enhanced new bone formation at the callus compared to control (p<0.01). In a rabbit model of critical size defect made in the tibia, LP2 at 3 µg/kg increased bone volume at the defect size over the control (p<0.01). In OVX)rats rendered osteopenic, LP2 (6 µg/kg) showed an osteoanabolic effect that was comparable to teriparatide (40 µg/kg). Given its OPG inducing effect, LP2 also showed an antiresorptive effect in OVX rats. In acute toxicity study in rats, LP2 was well tolerated and there was no mortality at 90 µg/kg dose (15X above the minimum effective dose), suggesting the safety of the peptide.

Conclusion: LP2 has a significant osteogenic effect in two species and displays bone regeneration on a par with teriparatide. We suggest LP2 be a novel class of SBGE.

P378

VITAMIN D LEVELS AND PREVALENCE OF VITAMIN D DEFICIENCY IN CARPATHIAN REGION

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Objective: To evaluate the vitamin D levels in persons attending outpatient department of the Chernivtsi regional endocrinology center.

Methods: This cross-sectional study was conducted at the Chernivtsi regional center of endocrinology situated at western part of Ukraine (Carpathian region). Patients aged from 19-81 y who attended this center were eligible to participate. We have assembled information on age, gender, and prevailing symptoms and known medical disorders such as type 2 diabetes mellitus, obesity and arterial hypertension.

Results: Under the supervision of 810 patients, it was found that the incidence of vitamin D deficiency (<20 ng/ml) was observed in 569 (70.2% 95%CI: 63.4-73.8) and insufficiency (20-29.9 ng/ml) was observed in 189 (23.3%) persons. Mean vitamin D level was 19.43 ng/ml with a standard deviation of 5.08 and was nonnormally distributed. Vitamin D median was 15.17 ng/ml (25th percentile 10.20; 75th percentile 23.10), minimum level 6.20 ng/ml, maximum level 59.7 ng/ml. We compared vitamin D level across age group, gender, age, the place of residence above the sea level, in the radiation-polluted area by using Kruskal-Wallis or Mann-Whitney tests appropriately. Vitamin D levels were significantly lower is age group below 30 y, those who have the place of residence above the sea level (200-350 m), and in the radiation polluted area. In the univariate analysis, vitamin D levels were statistically significantly lower in the younger age group and in excessive body weight. After multiple linear regression analysis the place of residence in the radiation polluted area, the presence of type 2 diabetes mellitus were identified as statistically significant predictors of the development of vitamin D deficiency.

Conclusion: The incidence of vitamin D deficiency (<20 ng/ml) was observed in 569 (70.2% 95%CI: 63.4-73.8) and insufficiency (20-29.9 ng/ml) was observed in 189 (23.3%) persons. In the univariate analysis, vitamin D levels were statistically significantly lower in the younger age group and in excessive body weight. After multiple linear regression analysis the place of residence in the radiation polluted area, the presence of type 2 diabetes mellitus were identified as statistically significant predictors of the development of vitamin D deficiency.

P379
SINGLE VS. MULTIPLE HIGH-DOSE EXPOSURE TO GLUCOCORTICOIDS EFFECT ON BONE MASS DENSITY IN YOUNG PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Objective: Patients with inflammatory bowel disease are exposed to high dose of glucocorticoids during their life to a better control of disease or during the active disease. The aim of the study was to see the effect of different exposure to high dose glucocorticoids regimens on BMD in premenopausal women and men <50 y.

Methods: 52 patients with inflammatory bowel disease (33 with Crohn disease and 18 with ulcerative colitis, 29 men and 23 women), mean age 33 y +8 SD, mean age at diagnostic 27+10 y, mean duration of the disease 6+4 y SD were included. DXA was performed, with measurement of BMD at the spine and hip, including trabecular bone score (TBS). According ISCD, low mineral density was defined as Z-Score<-2 SD.

Results: From the 52 patients, 2 (3.8%) patients had vertebral fracture and 17 (32.6%) of them were diagnosed with low mineral density. 19 (36.5%) of them had more than one cycle of 3 months exposure of high dose glucocorticoids (starting from 32 mg/d), 20 (38.4%) had only one exposure and 13 (25%) had no exposure. Exposure to multiple cycles of high dose glucocorticoids vs. no exposure can have impact on spine BMD (p=0.006), with influence on the quality of the bone TBS (p=0.018). Hip BMD was lower in the group with the glucocorticoids exposure (p=0.066). On the contrary, single time exposure vs. no exposure (>7.5 mg/d, 3 months) did not seem to influence BMD, on the spine (p=0.842), or the quality of the bone measured by TBS (p=0.478), nor the hip (p=0.650).

Conclusion: Multiple dose exposure to glucocorticoids can increase the risk of metabolic bone disease in young patients with inflammatory bowel disease, especially on the spine; single exposure did not seem to affect bone mass density. Further studies on larger cohorts should be conducted.

P380
BONE MASS DENSITY AND DISEASE ACTIVITY IN A YOUNG PATIENT WITH CROHN DISEASE

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Objective: Patients with inflammatory bowel disease (IBD), especially Crohn disease, have a great risk to develop low BMD. Well known factors, such as glucocorticoid excess, malabsorption, endocrine disfunction are involved, but in young patients, disease activity can also have an impact on it.

Case report: 38-year-old, male, nonsmoker, diagnosed with Crohn disease in 2016 was admitted in our department. In 2018, his clinical activity score Harvey Bradshaw index (HBI) was 9 (moderate active disease), a DXA scan revealed low bone mass density, BMD L1-L4 spine=0.938 g/cm^2, Z score=-2.3 DS and left hip BMD=1.141 g/cm^2, Z score=0.3 DS. Blood tests showed deficit of vitamin D (25 hydroxyvitamin D=18.2 ng/ml), testosterone in the lower range for his age. He was prescribed vitamin D supplements to maintain 25 hydroxyvitamin D ≥30 ng/ml and encouraged to practice weight-bearing physical exercises.

In 2019, he had a better control of the disease, HBI was 1 (remission). DXA revealed BMD spine 1.086 g/cm^2 (with an increase of +14.6%), Z score=-1.2 DS and left hip BMD 1.145 g/cm^2 (0.3%), Z score=0.9 DS. Blood tests showed normal level of vitamin D and testosterone for his age.

Conclusion: Long term follow-up should be offered to young patients with inflammatory bowel disease, as the active periods of the disease can have a great impact on BMD, due to several factors as malabsorption, immobilization, endocrine dysfunctions.

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

P381
OCULAR FINDINGS RELATED TO ORAL BISPHOSPHONATE USE

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Objective: Case reports have been reported in the literature about various ocular inflammations such as conjunctivitis, iritis, episcleritis, scleritis and uveitis after parenteral bisphosphonate use in the treatment of osteoporosis. In this study, we aimed to investigate the findings of ocular inflammation in patients receiving oral bisphosphonate therapy for postmenopausal osteoporosis.

Methods: 51 female patients aged 50-75 y who received oral bisphosphonate treatment for at least 1 y due to postmenopausal osteoporosis were included in the study. The duration of bisphosphonate use and the used bisphosphonate group were questioned. Patients with nonosteoporotic systemic diseases such as diabetes, hypertension, thyroid disease, patients with a history of nonbisphosphanate systemic drug use that may cause inflammation in the eye and patients who were followed for eye inflammation or retinal disease were excluded from the study. Biomicroscopic examination, tear break-up time determination, intraocular pressure examination, fundus examination and anterior chamber flare meter measurements were done in all cases and findings were recorded.

Results: The mean age of the patients was 66 y. The mean duration of bisphosphonate use was 3.96 (range: 2-5) y. Pathological findings were detected in 7 of 102 eyes. 19 of the cases were using alendronate, 24 were using ibandronate and 8 were using risedronate. The mean usage durations for alendronate, ibandronate and risedronate were 3.78, 4.29 and 3.37 y, respectively. Meibomian gland dysfunction was detected in one of the patients receiving alendronate (5%), one of the patients receiving risedronate (12.5%) and two of the patients receiving ibandronate (8.3%). Flare (protein increase in the anterior chamber) was detected in one eye of a patient using alendronate and in both eyes of a patient using ibandronate. Conjunctivitis, episcleritis, uveitis, scleritis or iritis were detected in none of the patients.

Conclusion: Eye pathologies such as gland dysfunction and anterior chamber protein increase may occur in postmenopausal osteoporosis patients after oral bisphosphonate use. Ophthalmologic complaints of the patients should be questioned for the detection of specific pathologies such as protein increase in the anterior chamber.

P382
EVALUATING THE RELATIONSHIP BETWEEN CIRCULATING OSTEOPROTEGERIN AND BONE MINERAL DENSITY IN BRCA MUTATION CARRIERS

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Objective: Women with a germline *BRCA1* or *BRCA2* mutation may be at risk for skeletal bone loss, as endogenous osteoprotegerin levels are dysregulated specifically in this population, and OPG plays a critical role in conserving bone strength.[1] This project cross-sectionally evaluates the association between circulating osteoprotegerin (OPG) levels and BMD in the *BRCA* population.

Methods: The study population included women who underwent prophylactic surgery at the University Health Network (Toronto, Canada) between January 2000 and May 2013. Eligibility criteria included being between the ages of 30-70 and having a documented *BRCA* mutation. Consenting participants were invited to provide a baseline blood sample and BMD measurement prior to surgery. BMD was assessed using DXA at the lumbar spine. Serum OPG levels were quantified using ELISA. Multivariate models were used to assess the relationship between serum OPG levels and lumbar spine BMD.

Results: A total of 32 premenopausal and 18 postmenopausal women had a baseline blood sample and BMD measurement available. The mean serum OPG level across the entire cohort was 98.2 pg/mL (SD 32.5), and 20 (40%) women had osteopenia or osteoporosis at the lumbar spine according to WHO guidelines. Among all women, those with low serum OPG levels had a significantly lower mean BMD lumbar spine T-score compared to those with high serum OPG levels after adjusting for age, time between blood and DXA, and breast cancer history (-1.1 vs. -0.3; *p*=0.04).

Conclusion: These preliminary findings suggest that OPG levels are positively associated with BMD. This work is the first to assess how dysregulation of the OPG/RANKL system is a determinant of poor skeletal health among *BRCA* mutation carriers and provides novel insight into the mechanisms behind bone loss in this population.

Reference: 1. Widschwendter M et al. EBioMedicine 2015;2:1331.

P383
FRAGILITY FRACTURES IN COLOMBIA: EXPERIENCE OF 10 FRACTURE LIAISON SERVICES (FLS)

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Objective: Fragility fractures (FF) are those caused by low-energy traumas or falls from standing height, and their incidence increases after the fifth decade of life. Mortality after the first year of suffering a hip fracture ranges from 15-30%. This problem has been addressed through the creation of interdisciplinary programs for early diagnosis and prevention of fragility fractures. We aimed to describe the clinical characteristics of a cohort of patients diagnosed with fragility fractures of 10 FLS in Colombia.

Methods: Study led by the Asociación Colombiana de Osteoporosis y Metabolismo Mineral (ACOMM), cross-sectional descriptive, in patients with a fragility fracture diagnosis of 10 FLSs from 4 cities in Colombia. Demographic and clinical variables were described for one year since the fracture diagnosis.

Results: A total of 1699 fracture records of patients 32-101 y of age were analyzed, with a female representation of 1334 patients (76.5%). 581 (39.1%) had previous FF, 570 (35.7%) had a previous diagnosis of osteoporosis, and of these, 70 (7.4 %) received pharmacological treatment for osteoporosis (antiresorptives and anabolic therapy) before FF, and after hospital discharge, 311 (43.6%) received treatment. Of the total records with information (n=707), 65 (9.2%) died one year after the fracture.

Conclusion: FLS in institutions, allow them to detect fragility fracture as a public health problem and to take measures to prevent a second fracture in patients with osteoporosis, in addition to strengthening the conditions of a national registry, centralized, based on the parameters of the *IOF - Capture the Fracture program,* through strategies with multidisciplinary group to achieve the FLS goals.

P384
HEALTHCARE RESOURCES UTILIZATION IN TREATED AND UNTREATED OSTEOARTHRITIS PAIN IN SPAIN

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Objective: Osteoarthritis (OA) is highly prevalent and it is associated with considerable healthcare resources utilization (HRU). The objective was to estimate HRU in subjects with OA pain in Spain, and to determine whether frequency of HRU differs by pain severity and treatment status.

Methods: The National Health Survey, a cross-sectional, large, nationally representative, trained interviewer administered general health survey including 23,089 adults, was used to abstract data on subjects with self-reported physician diagnosis of OA. Those who completed the survey were cross classified according to pain severity in last 4 weeks (mild, moderate, severe as assessed in the SF-36v2) and analgesic treatment during last 2 weeks (Yes/No). HRU per patient per year included computing medical visits, other healthcare professional visits, diagnostic/laboratory tests, days of hospitalization, days in hospital-day facilities, and percentage of subjects with OA related surgical procedures.

Results: A total of 5234 OA patients were analyzed: 70.8% women, 69.9 (SD: 13.1) y. Lineal associations (p<0.001) were observed between severity of pain and adjusted mean (95%CI) use of medical visits, days of hospitalization and diagnostic tests, with higher HRU in treated than in untreated patients. Treated severe pain subjects had more days in hospital-day and other healthcare professionals visits than untreated patients. OA related surgery utilization showed a trend toward significance with severity of pain, but not with treatment status (Table).

HRU	No pain/mild pain (N=2276)		Moderate pain (N=1717)		Severe pain (N=1241)	
	Treated	Untreated	Treated	Untreated	Treated	Untreated
	(19.7%)	(23.8%)	(25.6%)	(7.2%)	(21.2%)	(2.5%)
Medical visits (units)	10.7‡ (10.1-11.4)	7.9 (7.5-8.4)	12.9 (12.2-13.7)	12.1 (10.9-13.4)	20.2‡ (19.0-21.5)	13.6 (11.4-16.2)
Diagnostic/laboratory tests (units)	1.7 (1.6-1.8)	1.6 (1.5-1.7)	1.8 (1.7-2.0)	1.8 (1.5-2.0)	2.2 (2.1-2.4)	1.9 (1.5-2.3)
Hospitalization (d)	1.1‡ (1.0-1.2)	0.5 (0.4-0.5)	1.3‡ (1.2-1.4)	0.9 (0.8-1.0)	2.0† (1.9-2.2)	1.4 (1.1-1.8)
Hospital-day facility (d)	2.6† (2.0-3.2)	4.8 (4.0-5.9)	2.7 (2.3-3.3)	3.1 (2.2-4.3)	4.0† (3.4-4.6)	1.5 (0.8-3.0)
Other healthcare professionals, %	39.3† (36.3-42.3)	32.2 (29.6-34.8)	42.1 (39.5-44.8)	41.7 (36.8-46.7)	52.5† (49.6-55.5)	36.8 (29.1-45.3)
Surgical procedures (%)	6.3 (5.0-8.0)	5.2 (4.1-6.6)	7.4 (6.1-9.0)	5.6 (3.7-8.5)	9.6 (8.0-11.5)	9.0 (5.2-15.2)

‡p<0.001, †=p<0.01 treated vs. untreated by pain severity.

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Conclusion: HRU burden was clearly related with severity of pain in patients with OA in a representative nationwide sample in Spain. These findings seems to be more evident in patients treated with analgesics than in untreated.

P385
CROSSTALK IN CHONDROGENESIS: ADIPOSE-DERIVED MESENCHYMAL STEM CELLS COCULTURED WITH ARTICULAR CHONDROCYTES FROM OSTEOARTHRITIC PATIENTS EXHIBIT INCREASED CHONDROGENICITY

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Objective: Cell-based therapies have the potential to treat focal chondral lesions at early stages. This has the advantage of preventing the progression to more generalised osteoarthritic changes, and the ultimate need for joint arthroplasty. Although the intra-articular injection of Mesenchymal stem cells (MSCs) for chondral and osteochondral lesions in clinical trials has demonstrated pain reduction, the extent of cartilage repair has been variable.

Methods: We utilized an *in vitro* autologous coculture of early passage (p0) adipose-derived MSCs (AD-MSCs) and articular chondrocytes derived from Grade III or IV osteoarthritic patients. The AD-MSCs were assessed using a panel of MSC cell surface marker in flow cytometric phenotyping, and allowed to differentiate down the chondrogenic, osteogenic and adipogenic pathways using established culture conditions. Gene expression following *in vitro* coculture was quantified by RT-qPCR with a panel comprising COL1A1, COL2A1, COL10A1, L-SOX5, SOX6, SOX9, ACAN, HSPG2, and COMP for chondrogenesis.

Results: The AD-MSCs expressed CD105, CD73, CD90, and CD34, but not CD45, CD14, CD19, and HLA-DR in flow cytometric phenotyping. The AD-MSCs also demonstrated trilineage differentiation potential. We demonstrated that chondrogenic gene expression profiles from co-cultures with juxtacrine crosstalk were greater than would be expected from an expression profile modelled on chondrocyte and AD-MSC only monocultures. Additionally, there was a decrease in chondrogenic gene expression with increasing initial MSC-to-chondrocyte seeding ratios.

Conclusion: These findings provide insight into the mechanisms underlying clinical MSC injections and demonstrate the bidirectional MSC-chondrocyte crosstalk in inducing MSC chondrogenesis. Moreover, this signifies that preconditioned MSCs by chondrocyte coculture has improved chondrogenic potential for cartilage repair. This model can be used to further understand adipose-derived MSCs in osteochondral repair and the chondrogenic pathways involved.

P386
SYNOVIUM-DERIVED MESENCHYMAL STEM CELL TRANSPLANTATION IN CARTILAGE REGENERATION: A PRISMA REVIEW OF IN VIVO STUDIES

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Objective: Articular cartilage damaged through trauma or disease has a limited ability to repair. Untreated, focal lesions progress to generalized changes including osteoarthritis. Musculoskeletal disorders including osteoarthritis are the most significant contributor to disability globally. There is increasing interest in the use of mesenchymal stem cells (MSCs) for the treatment of focal chondral lesions. There is some evidence to suggest that the tissue type from which MSCs are harvested play a role in determining their ability to regenerate cartilage in vitro and in vivo. In humans, MSCs derived from synovial tissue may have superior chondrogenic potential.

Methods: We carried out a systematic literature review on the effectiveness of synovium-derived MSCs (sMSCs) in cartilage regeneration in in vivo studies in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol. Twenty studies were included in our review; four examined the use of human sMSCs and 16 were conducted using sMSCs harvested from animals.

Results: Most studies reported successful cartilage repair with sMSC transplantation despite the variability of animals, cell harvesting techniques, methods of delivery, and outcome measures.

Conclusion: We conclude that sMSC transplantation holds promise as a treatment option for focal cartilage defects. We believe that defining the cell population being used, establishing standardized methods for MSC delivery, and the use of objective outcome measures should enable future high quality studies such as randomized controlled clinical trials to provide the evidence needed to manage chondral lesions optimally.

P387
HIP AREAL BMD BY DXA (ABMD) AND HIP VOLUMETRIC BMD BY 3D MODELING OF HIP DXA (VBMD) ARE HIGHLY CORRELATED IN BOTH FRACTURE PREVALENT AND FRACTURE NONPREVALENT OSTEOPOROSIS PATIENTS

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Objective: Hip fractures are the most serious fragility fracture, accounting for the greatest morbidity, mortality, and health care expense. There is a need to investigate clinically available tools designed to improve estimates of fracture risk, to better evaluate patients who may be candidates for osteoporosis pharmacotherapy. This may complement prevalent fragility fracture, aBMD, and fracture risk assessment tools. We investigated the correlation of hip aBMD with hip vBMD derived from modeling hip DXA data in patients with and without prevalent fragility fractures.

Methods: We retrospectively reviewed treatment-naïve osteoporosis patients prior to initiating osteoporosis therapy, from an osteoporosis referral centre. Patients were clinically determined to be candidates for osteoporosis therapy. Patients were divided into fracture prevalent and fracture non-prevalent groups defining prevalent fracture as hip, spine, pelvis, humerus, clavicle, rib, forearm, and lower leg fractures. Total hip aBMD was evaluated by DXA (Hologic Discovery) and integral hip vBMD by 3D-SHAPER (v2.7.3, Galgo Medical SL, Spain). 3D-SHAPER registers a 3D appearance model of the femoral shape and density onto the DXA projection to obtain a 3D subject-specific model of the femur and can quantitate vBMD at various regions. Correlations were evaluated by Pearson tests.

Results: We included 133 patients (115 females, 18 males). Mean age was 70.66$\pm$10.4 y; mean total hip (TH) aBMD was 0.69 mg/cm^2; mean femoral neck (FN) aBMD was 0.57 mg/cm^2. There were 76 patients with a prevalent fracture (57%) of whom 11 had a hip fracture. We observed a high correlation between hip integral vBMD and TH aBMD in both fracture (r=0.85 p<0.0001) and nonfracture (r=0.72 p<0.0001) prevalent groups. FN aBMD also correlated well with hip integral vBMD in fracture (r=0.79 p<0.0001) patients. There was a lower FN aBMD correlation with hip integral vBMD in nonfracture patients (r=0.41 p=0.0017).

Conclusion: The validation of software modeling hip strength or volumetric BMD from routine hip DXA scans may prove to be an important and clinically available technology to improve the clinical evaluation of fracture risk. Further studies are required to evaluate fracture risk prospectively with this technique.

P388
DEFICIENCIES IN DXA REPORTING IN A COMMUNITY SETTING

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Objective: Informative DXA reports are critical for clinical decision-making. The International Society of Clinical Densitometry (ISCD) has published widely accepted minimal reporting standards for DXA[1]. In addition, the provincial physician licensing body oversees a Diagnostic Accreditation Program which required education and ISCD certification of densitometrists. Our study investigated the adherence to ISCD reporting standards in DXA reports from facilities in British Columbia, Canada.

Methods: Consecutive new consultation requests to an osteoporosis centre from June to August 2019 were sampled to determine DXA report adherence to ISCD standards.

Results: 100 DXA reports from 17 facilities, reported by 44 radiologists were evaluated. There were 54 initial DXA reports and 46 follow-up reports. There was great diversity in reporting quality. Overall, in initial reports, 28% of reports included less than 50% of ISCD minimal criteria; in follow-up reports 26% of reports included less than 50% of minimal criteria. The most frequent omissions included a statement that medical evaluation for secondary osteoporosis may be appropriate (97%), recommendations for further DXA studies (92%), information on technical quality and limitations (59%), documentation of clinical risk factors (53%), inappropriate use of T- and/or Z-scores (41%), absent indication for DXA (35%), omission of reporting one or more skeletal sites (33%), absent DXA instrument identification (22%), absent WHO diagnostic criteria (21%), absent reporting of absolute fracture risk (FRAX or CAROC) (14%) and absent BMD in g/cm^2 for each site (7%).

Many reports included inappropriate statements; 5% indicated a separate diagnosis for different regions of interest, 3% reported "mild", "moderate", "severe" or "marked" osteopenia or osteoporosis, 3% reported change in BMD when a statistically significant change was not present. Only 20.5% of radiologists were ISCD certified clinical densitometrists, despite this being a provincial requirement.

Conclusion: DXA reports from community radiology facilities commonly lack the minimum reporting parameters recommended by ISCD and required by provincial oversight groups. This is likely to have significant adverse impact on patient care. Published recommendations suggest a benefit from educational programs for clinical densitometrists to help close this care gap.

Reference: 1. The International Society of Clinical Densitometry. *2019 ISCD Official Positions-Adult.* [Internet] Middletown, CT; ISCD [June 2019; cited September 4 2019]. Available from: https://www.iscd.org/official-positions/2019-iscd-official-positions-adult/

P389
VERTEBRAL FRACTURE REPORTING IS SUBOPTIMAL IN THE COMMUNITY

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Objective: Vertebral fractures (VFx) are strong predictors of future fracture events. If VFx are present, most osteoporosis guidelines would recommend treatment regardless of bone density. Therefore the accurate reporting of VFx is essential to osteoporosis patient care. The International Society for Clinical Densitometry (ISCD) has published guidelines for reporting vertebral fracture assessment (VFA) and these reporting guidelines[1] could be applied to both DXA VFA and plain radiographic assessment of VFx by radiologic morphometry in the spine x-ray report. We examined clinical spine radiograph reports to determine adherence to ISCD VFA reporting guidelines.

Methods: We reviewed vertebral x-ray reports accompanying osteoporosis consultation requests at an osteoporosis referral centre. 100 vertebral x-ray reports between 2011-2019 were scored for adherence to each of the 10 ISCD vertebral morphometry guidelines criteria.

Results: Overall, no report included all criteria and only one report included >60% of criteria. 56 reports included 30-60% of criteria and 43 reports included <30% of criteria. The most commonly omitted criteria were: comment on technical quality, omitted in 94% and comment on unevaluable vertebrae, omitted in 97%. In follow-up studies (34 of 100 reports), clinical significance of changes was reported in all of the reports. Frequently, reports included comments non-specific for VFx such as "minimal wedging of vertebrae" and "decreased vertebral height <20%".

Conclusion: Radiology reports of vertebral radiographs frequently do not include sufficient information for the diagnosis of or exclusion of VFx, required for appropriate clinical decision making. Knowledge translation of criteria for definitive reporting of VFx in osteoporosis patients should be a priority for radiologists.

Reference: 1. The International Society of Clinical Densitometry. *2019 ISCD Official Positions-Adult.* [Internet] Middletown, CT; ISCD [June 2019; cited September 4 2019]. Available from: https://www.iscd.org/official-positions/2019-iscd-official-positions-adult/

P390
RISK OF OSTEOPOROSIS IN DIABETIC RAT MODELS: FTIR SPECTROSCOPY STUDY

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Objective: Diabetes mellitus is a metabolic disease, which is characterized by high glucose levels in the blood (hyperglycemia). Hyperglycemia can affect osteoblasts, osteocytes, and osteoclasts, thus affecting bone quality. This can increase the risk of bone or fracture osteoporosis. Bone quality can be used ATR-FT-IR spectroscopic method by measuring minerals (hydroxyapatite), carbonate minerals, and crystal indexes.

Methods: Rattus novergicus acclimated for 1 week. After that, injected STZ 50 mg/kgBW intraperitonially. After that, mice were dissected and femur was taken at 0.4, 6, and 8 weeks. The bones are crushed until smooth, then the spectra are measured with ATR-FTIR. Measurements made at wave numbers 400-4000 cm⁻¹. The calculated parameter is Mineral (M): A900-1200 ratio with A1660, Christianity index (CI): A1030 to A1010 ratio, and Mineral CO3 (min CO3): A1405 / A900-1200 ratio. Data analysis used ANOVA test a=0.05.

Result: Blood glucose increases with time. Minerals (hydroxyapatite) (p=0.032; p <0.05); crystal index (CI) (p=0.042; p <0.05), and CO3 minerals (p=0.033; p <0.05) decreased significantly with time.
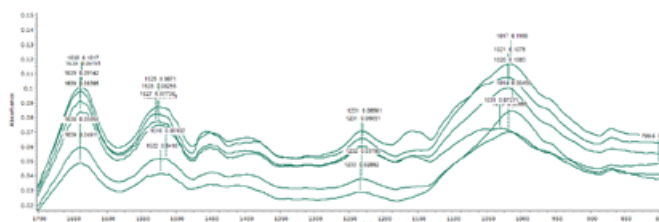
Figure 1. ATR-FTIR spectra of diabetic rat bone

The risk of osteoporosis in the bones of diabetic rats is caused by glycation reactions. This reaction causes collagen maturation which results in a decrease in the crystal index. This reduction will be followed by a reduction in hydroxyapatite and carbonate.

Conclusion: The risk of osteoporosis due to diabetes can be detected by FTIR spectroscopy. FTIR can be used to determine the apatite hydroxy structure that plays a role in osteoporosis.

P391
METABOLISM OF LOCOMOTOR SYSTEM: A KEY TO SELF-SUFFICIENT LONGEVITY (RELEVANT TO OSTEOPOROSIS, SARCOPENIA, OBESITY)

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Contemporary older generations very often suffer from obesity, osteoporosis, and sarcopenia which are often accompanied with diabetes, oncological or heart diseases. These health issues are pathologically interconnected and commonly appear along each other. They considerably lower the life quality. Thanks to technological advances our population lives longer, on the other hand there are more and more medical issues. These factors extremely increase economic expenses of the society. It is important to find a way how to lower the therapy costs and the main emphasis must be placed on the prevention. The main medical purpose of modern treatment must target the long-lasting independence of an individual. So far there has not been implemented a complex societal project in our country. This is the reason why we have started a preventive program with the main stress on a physical load, Mediterranean diet with hormetic effect, resistance exercises, sufficient intake of whey proteins enriched with Leucin, and regular check-ups for vitamin D intake. This program does not

pertain only to our patients, we consider it necessary to coordinate health authorities and social institutions of our region. This concerns East Moravia, 2.5 mill. inhabitants, with 55 000 osteological issues patients in our registry.

The program is composed of the following:

I Education

Educational lectures at three levels: A) general practitioners, B) nursing personnel in medical facilities, C) patients and their family members

II Diagnostic part – a screening

Completion of a questionnaire SarQol (it takes 10 min to complete the form, it provides evaluation of patient's subjective health state). Examination of Hand Grip (M <30 kg, F <20 kg).

III Diagnostic part – a complex program

Completion of a questionnaire SarQol (it takes 10 min to complete the form, it provides evaluation of patient's subjective health state). Evaluation of basic objective examinations. Examination of oxygen in blood. Examination of Hand Grip + Romberg test (5 times in a row under 10 s + tandem standing position-–<10 s a risk warning, tandem walking with more than 8 steps – half a risk of falling, age dependent. Speed of walking <1.0 m/s), speed of walking in 400 m. DXA (Lunar iDXA apparatus) program total body for sarcopenia – examination

Protocol about Lunar iDXA – total body sarcopenia protocol (M <7.26 kg/m^2, F <5.45 kg/m^2).

IV Therapeutic part

Recommendation of a rehabilitation program – recommended 150 min of physical load per week, 1/3 of isometric load. Recommendation of a Mediterranean diet within the hormesis, with the stress on whey proteins enriched with Leucin, plus vitamin D doses.

A follow check-up is scheduled, its date recommended.

Each patient receives a brochure with examination results and a recommendation provided in a form of graphic and photo materials to illustrate isometric physical exercises, so to ensure maximum clarity.

The first results and outcomes of this program will be reported and used in a negotiation with the state organs towards the general implementation. Currently, the program is financed with private sources.

P392
ZBTB20 POSITIVELY REGULATED TITANIUM PARTICLE-INDUCED MACROPHAGE INFLAMMATORY RESPONSE AND OSTEOLYSIS

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Objective: To verify that ZBTB20 (Zinc finger and BTB domain-containing 20) is a vital regulator in macrophage activation and wear-particle-induced osteolysis.

Methods: H&E staining and IHC on clinical synovial membrane specimens, then RNA-Seq transcriptome data of RAW264.7 macrophages stimulated with Ti particles was generated. Cluster analysis and protein interaction network were performed. shRNA and overexpression lentivirus were constructed, and expression of TNFα, IL-6, IFN-β, IRF-3 as well as NF-κB pathway was determined. Local lentivirus injection, local macrophage injection and BLI imaging were performed on calvaria of mice, and bone resorption was assessed.

Results: TNFα and IL-6 were upregulated in synovial membranes around aseptic loosening prosthesis. RNA-Seq transcriptome analysis of RAW264.7 revealed that ZBTB20 may be a vital regulator. Immunofluorescence and flow cytometry showed that ZBTB20 positively regulates NF-κB pathway and M1 polarization in RAW264.7. sh-ZBTB20 lentivirus combining with Ti particles were injected on C57BL/6J mouse crania, and TNFα, IL-6 and TRAP staining were suppressed by sh-ZBTB20 lentivirus. Besides, RAW264.7 with luciferase tag were injected on crania of nude mice, and BLI signals can be detected. Ti particles induced obvious osteolysis, which was exacerbated by additional NC/Vector RAW264.7 injections. sh-ZBTB20+ Ti group caused less osteolysis effect than NC+ Ti group, while the osteolysis effect in OE-ZBTB20+ Ti group was more severe compared with Vector+ Ti group.

Conclusion: We demonstrated that ZBTB20 positively regulated IRF-3 and NF-κB pathway, playing a positive role in macrophage activation and osteolysis induced by Ti particles. Thus, we identified ZBTB20 as a potential therapeutic target for aseptic prosthesis loosening.
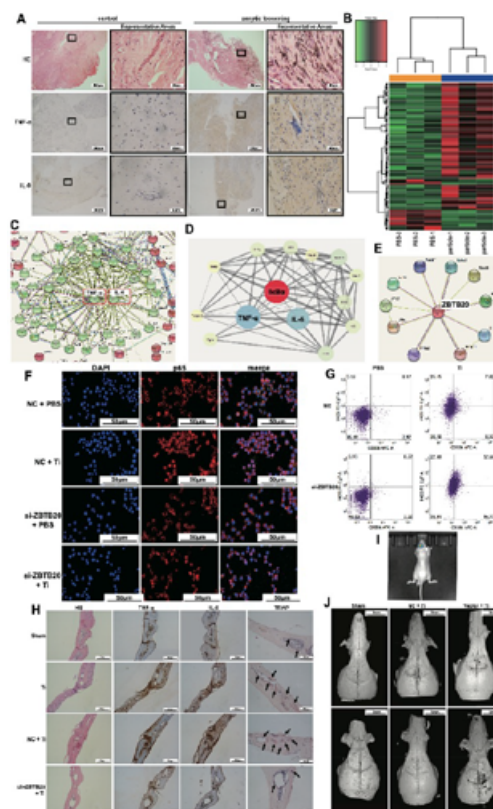
P393

EPIDEMIOLOGY OF OSTEOPOROTIC FRACTURE IN KAZAKHSTAN AND DEVELOPMENT OF A COUNTRY SPECIFIC FRAX MODEL

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Objective: This study describes the epidemiology of osteoporotic fractures in Republic of Kazakhstan that was used to develop a country specific FRAX® tool for fracture prediction.

Methods: We carried out a retrospective population-based survey in Taldykorgan in the Republic of Kazakhstan representing approximately 1% of the country's population. Hip, forearm and humerus fractures were identified retrospectively in 2015 and 2016 from hospital registers and the trauma centre. Hip fractures were prospectively identified in 2017 from the same sources and additionally from primary care data. Age- and sex-specific incidence of hip fracture and national mortality rates were incorporated into a FRAX model for Kazakhstan. Fracture probabilities were compared with those from neighbouring countries having FRAX models.

Results: The difference in hip fracture incidence between the retrospective and prospective survey indicated that approximately 25% of hip fracture cases did not come to hospital attention. The incidence of hip fracture applied nationally suggested that the estimated number of hip fractures nationwide in persons over the age of 50 years for 2015 was 11690 and is predicted to increase by 140% to 28,000 in 2050. Hip fracture incidence was a good predictor of forearm and humeral fractures in men but not in women.

Conclusion: The FRAX model should enhance accuracy of determining fracture probability among the Kazakh population and help guide decisions about treatment.

P394

EPIDEMIOLOGY OF HIP FRACTURES IN BULGARIA: DEVELOPMENT OF A COUNTRY SPECIFIC FRAX MODEL

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Objective: To describe the epidemiology of hip fractures in Bulgaria, which was then used to develop the country-specific fracture prediction FRAX® tool.

Methods: We carried out a retrospective population-based survey in Stara Zagora, Bulgaria representing approximately 4.6% of the country's population. We identified hip fractures occurring in years 2015, 2016 and 2017 from hospital registers and primary care sources held by the regional health insurance agency. Age- and sex-specific incidence of hip fracture and national mortality rates were incorporated into a FRAX model for Bulgaria. Fracture probabilities were compared with those from neighbouring countries having FRAX models.

Results: The incidence of hip fracture applied nationally suggested that the estimated number of hip fractures nationwide in persons over the age of 50 years for 2015 was 9322 and is predicted to increase to 11,398 in 2050. FRAX-based probabilities were higher in Bulgaria than in Serbia or Romania, lower than probabilities for Turkey, and similar to those for Greece. The remaining lifetime probability of a hip fracture from the age of 50 years was 11.2% in women and 4.4% in men. These probabilities were similar to those in Spain (12.6 and 4.2%, respectively) but markedly lower than those in Sweden (25.6 and 11.0%, respectively).

Conclusion: The FRAX model should enhance accuracy of determining fracture probability among the Bulgarian population and help guide decisions about treatment.

P395

EPIDEMIOLOGY OF OSTEOPOROTIC FRACTURE IN MOLDOVA AND DEVELOPMENT OF A COUNTRY-SPECIFIC FRAX MODEL

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Objective: This study describes the epidemiology of osteoporotic fractures in Republic of Moldova that was used to develop the country-specific fracture prediction FRAX® tool.

Methods: We carried out a retrospective population-based survey in 2 regions of Republic of Moldova (Anenii Noi district and Orhei district) representing approximately 6% of the country's population. We identified hip, forearm and humerus fractures in 2011 and 2012 from hospital registers and primary care sources. Age- and sex-specific incidence of hip fracture and national mortality rates were incorporated into a FRAX model for Moldova. Fracture probabilities were compared with those from neighboring countries having FRAX models.

Results: The incidence of hip fracture applied nationally suggested that the estimated number of hip fractures nationwide in persons over the age of 50 y for 2015 was 3911 and is predicted to increase by 60% to 6492 in 2050. Hip fracture incidence was a good predictor of forearm and humeral fractures. FRAX-based probabilities were higher in Moldova than neighboring countries (Ukraine and Romania). The remaining lifetime probability of a hip fracture from the age of 50 y was 5.8% in women and 4.2% in men. These probabilities were similar to those in Romania (7.0 and 3.8%, respectively) but markedly lower than those in Sweden (25.6 and 11.0%, respectively).

Conclusion: The FRAX model should enhance accuracy of determining fracture probability among the Moldavian population and help guide decisions about treatment.

P396
EFFICACY OF HYDROTHERAPY ON PHYSICAL FUNCTION AND QUALITY OF LIFE IN PATIENTS WITH RHEUMATOID ARTHRITIS (RA)

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Objective: There are a few clinical trials that studied the benefits of hydrotherapy, especially galvanic baths, in patients with rheumatoid arthritis, most of them often report improved pain and other studies report no effect on pain or disease activity. Galvanic baths combine the effects of warm water with continuous current, reduce excitability and conductivity of the nerve with pain relief and decreasing muscle spasm. This randomized controlled trial tried to evaluate the effects of galvanic baths on physical function and quality of life in patients with RA.

Methods: We randomized 32 patients with RA into two groups: the Interventional Group (17 patients) that followed galvanic baths and took stable doses of disease modifying antirheumatic drugs (DMARDS) and nonsteroidal anti-inflammatory drug (NSAID) for at least 1 month prior to the screening visit, and the control group that received only medication (DMARDS, NSAIDS) that will remain unchanged during participation. The galvanic baths were applied 20 min at 36°C every day, 5 times/week and the intensity was determined by the patient's tolerance. The assessment was made at baseline and at the completion of the study, after 2 weeks, using the following parameters: Health Assessment Questionnaire (HAQ), patient reported pain on a visual analogue scale (VAS) and patient global assessment, a self-rated global impression of treatment effect on a 10-point scale ranging from 1(very much worse) to 10 (very much better).

Results: HAQ scores and patient reported pain improved after two weeks treatment in both groups, with slowly better results in Interventional Group. 63.5% patients from the hydrotherapy group were much better than the patients treated with medication (22.6%).

Conclusion: The study demonstrated that patients with RA that followed galvanic baths and took medication significantly report feeling much better than patients taking only similar DMARDs and NSAIDs reflected also by self reported pain and HAQ scores.

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P397
THE EFFICACY OF AN EXERCISES PROGRAMME ON ALGIC AND FUNCTIONAL CAPACITY IN HAND OSTEOARTHRITIS PATIENTS

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Objective: Hand osteoarthritis (HOA) is one of the most common joint disorder in an adult population with bad consequences on ability to grasp and hold objects. Clinical guidelines for HOA management include physical modalities and hand exercises that may help increase fingers range of motion and strengthen hand muscles. We designed this clinical study to find if the effects of a hand exercises programme specially designed will improve hand pain, range of motion and strength to patients with hand osteoarthritis.

Methods: We included 30 outpatients from Physical Medicine and Rehabilitation Department randomly assigned into two groups: the Exercise Group (16 patients, followed a 30-min exercise program performed 5 times/week, once daily, bilaterally, which involve active range-of-motion, hand and finger flexion and extension and ball resistance) and the Control Group (14 patients followed just usual care). The patients are assessed at baseline and after 4 weeks, at the completion of the study using the parameters: intensity of hand pain on a ten point visual analogue scale and hand function test with short administration time, the Moberg Picking-Up Test (MPUT).

Results: There was no significant difference between the two groups at baseline for any of the clinical outcome measures. In patients with HOA the pain was reduced by 41.3% in the Exercise Group compare to 21.5% in the Control Group. Physical exercises also significantly improved hand function (better times to one month MPUT, 13.8 s vs. 15.88 s).

Conclusion: The hand exercise program produces positive functional outcomes for patients with HOA, is cost effective and without side effects.

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P398
MIRNAS SIMULTANEOUS REGULATES ERα AND ERβ MEDIATED OSTEOGENIC DIFFERENTIATION IN BMSCS

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Objective: It is well known that estrogen secretion deficient is the main reason which causes postmenopausal osteoporosis. The effects of estrogen receptor α (ERα) on bone metabolism have been explained explicitly, but the role of estrogen receptor β (ERβ) still exists various controversial, as well the role of microRNA (miRNA) in this process is little known. **Methods:** In this study, we constructed an ERβ knockdown bone mesenchymal stem cells (BMSCs) model, evaluating the alternation of osteogenic differentiation of BMSCs, as well as using RNA-Seq to detect the different expression miRNAs in this process.

Results: The mRNA expression of osteogenic differentiation-related factor (alkaline phosphatase, BMP-2 and collagen Ⅰ) were enhanced, while runt-related transcription factor 2 was decreased, and above all protein expression were weakened in ERβ knockdown BMSCs, together with a series of miRNAs expression alternation, including 27 upregulated, and 69 downregulated. Then we combined the results that we previously reported about the differently expressed miRNAs in ERα knockdown BMSCs (1), there are 11 miRNAs differently expressed in both ERα and ERβ knockdown group, including 7 miRNAs (miR-351-5p, miR-503-3p, miR-293-5p, miR-193-5p, miR-292-5p, miR-331-5p, miR-210-3p) downregulated, and 4 miRNAs (miR-6325, miR-10a-5p, miR-99a-5p, miR-139-5p) behaved the opposite trend. Then we analyzed the GO annotation and target gene of those 7 miRNA, it revealed that miR-503-3p and miR-210-3p involved in bone development and absorption, and our previous study have proved that over-expression miR-210-3p stimulated bone formation, while the expression of miR-503-3p was decreased in lipopolysaccharide-induced BMSCs.

Conclusion: This research indicating the mechanism that miR-503-3p and miR-210-3p may simultaneous regulates ERα and ERβ mediated osteogenic differentiation in BMSCs, and provides a new strategy about the therapeutic and prevents estrogen receptor related bone disease.

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P399
MULTIPLE FRAGILITY FRACTURES IN A FATHER AND SON WITH OSTEOGENESIS IMPERFECTA

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Objective: Osteogenesis imperfecta (OI) is an inherited connective tissue disease with different phenotypes characterized by increased bone fragility and low bone mass. Diagnosis can usually be made in people with fragility fractures and positive family history or a few extraskeletal findings. In this case report, we aimed to present a male adult with multiple fractures due to osteoporosis and his father with multiple fractures caused by OI.

Methods: A case report of a male patient and his father with multiple fractures and surgical interventions was presented. We discussed clinical features, DXA, laboratory analysis, X-rays, MRI, diagnosis and treatment of OI.

Results: OI can be underdiagnosed in adults because of different phenotypes. A detailed history of our adult male patient and family history, examination of his father and investigation like X-ray and MRI leaded to diagnosis. Our male patient, 26 y, 175 cm, 75 kg, experienced fractures in left metatarsal bone, 8th left costa, left humerus collum and left hip acetabulum in 3 y. DXA was performed in June 2018 with Z-score: L1-L4=-3.6, femur neck Z-score=-2,5. 25-OH D: 12.3 ng/ml (>30 ng/ml normal range). Our second patient reported bilateral hip arthroplasty following fracture, multiple lumbar vertebral fractures and severe kyphoscoliosis. DXA was performed in July 2018 with T-score: L1-L4=-3.5. Zoledronic acid infusion and vitamin D replacement were performed in both patients. DXA of the first patient was repeated in June 2019 with Z-score: L1-L4=-3.2, femur neck Z-score=-2.1. DXA of the second patient was repeated in September 2019 with T-score: L1-L4=-2.6. Sequencing analysis of cDNA (skin biopsy required for fibroblast culture) or genomic DNA testing for mutations in COL1A1 and COL1A2 is also helpful in diagnosis but could not be performed because the patients refused.

Conclusion: OI can be diagnosed in adults and its treatment requires a multidisciplinary approach. In patients with low BMD, early initiation of anti-resorptive treatment with bisphosphonates or denosumab, as well as vitamin d and calcium replacement, significantly increases BMD and reduces fracture risk. Fractures require orthopedic approach and rehabilitation for improved outcome.

P400

EVALUATION OF THE CAUSAL ASSOCIATION BETWEEN PROTEINS CONCENTRATION AND RHEUMATOID ARTHRITIS: A MENDELIAN RANDOMIZATION STUDY

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Objective: Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by uncontrolled joint inflammation and destruction of bone and cartilage. Many studies have shown that plasma proteins play key roles in the pathogenesis of RA. However, it's still lacking of an systematic study to evaluate the causal relationship between plasma proteins and RA. In this study, we explored the causal associations between plasma proteins and RA using two-sample Mendelian randomization (MR) method. **Methods:** We used the genome-wide association studies (GWAS) data which contain 3263 plasma protein levels involved in 50,000 individuals as exposures, and the genetic statistics of RA was computed from meta-analysis in a total of 103,638 subjects. We chose independent GWAS SNPs for each exposure using the clumping algorithm with the 1000 Genomes Project data as the reference for linkage disequilibrium estimation. Then the horizontal pleiotropic SNPs were removed using RadialMR analysis. Four two-sample MR methods were used in this study comprising of Inverse Variance Weighted (IVW), Weighted-median, Weighted mode and MR-Egger regression. The final results considered the directional consistency of estimate for all methods. **Results:** We identified a total of 240 proteins with potential causal effect on RA at a suggestive threshold of P-value ($P<0.05$). Furthermore, 4 of these proteins showed strong effects on RA with a significant P-value after Bonferroni corrections ($P<1.53×10-5$). The fixed-effect of IVW method demonstrated that FCER2 (OR=0.542, 95%CI: 0.486-0.605, $P=9.68×10-28$) has positive role on RA, and ICOSLG (OR=1.131, 95%CI: 1.077-1.187, $P=6.89×10-7$), GPNMB (OR=0.863, 95%CI: 0.808-0.921, $P=1.05×10-5$) and FCGR3B (OR=1.120, 95%CI: 1.064-1.180, $P=1.50×10-5$) have risk impact with multiple testing corrections. The intercept of MR-Egger regression did not produce the evidence of directional horizontal pleiotropy. Among these 4 proteins, ICOSLG has been reported be involved in inflammatory diseases such as Crohn's disease and ulcerative colitis. The protein FCGR3B also has been identified as a potential biomarker for RA. **Conclusion:** We investigated the causal effects of plasma proteins on RA using two-sample Mendelian randomization analyses based on GWASs. Our results have identified four candidate proteins with causal effects on RA. **Acknowledgment:** This study is supported by National Natural Science Foundation of China (31970569); Natural Science Basic Research Plan of Shaanxi Province (2019JM-119).

P401

MENDELIAN RANDOMIZATION STUDY IDENTIFIED THE CAUSAL EFFECTS OF PLASMA PROTEINS ON OSTEOARTHRITIS

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Objective: Osteoarthritis (OA) is a prevalent chronic joint disease which the incidence is rising because of the ageing population and the epidemic of obesity. So far, there are some evidence showed the development and progression of OA is regulated by several proteins. In order to better understand the mechanism of OA and involving proteins, we explore the causal associations between plasma proteins concentration and OA via two-sample Mendelian randomization (MR). **Methods:** The summary-level GWAS data for 3263 plasma proteins concentration including 50,000 individuals were used as exposures, and the genetic statistics of GWAS data for OA was from UK Biobank in a total of 108,039 subjects. We selected independent GWAS SNPs for each exposure using the clumping algorithm in PLINK with the 1000 Genomes Project data as the reference for linkage disequilibrium estimation, which employed $1×10-5$ as a genome-wide significant threshold of P-value for exposures in order to sufficient instrumental variants. Then we deleted horizontal pleiotropic SNPs using RadialMR. We performed four two-sample MR methods which include Inverse Variance Weighted (IVW), Weighted-median, Weighted mode, and MREgger regression. The final results considered the directional consistency of estimate for all methods. **Results:** We identified a total of 295 proteins showed suggestive causal evidence on OA with threshold of $P<0.05$. However, there is only one protein, TEX29, revealed significant causal effect on OA after Bonferroni corrections with P-value, and the IVW estimate showed TEX29 has a protective effect on osteoarthritis (OR=0.923, 95%CI: 0.891-0.955, $P=5.03×10-6$). In addition, there is no evidence showed this MR estimate has directional horizontal pleiotropy (MR-Egger regression intercept=-0.0026, 95%CI: -0.018-0.013, P=0.75), and we identified a similar causal effect of TEX29 on osteoarthritis using MR-Egger regression model (OR=0.903, 95%CI: 0.843-0.967, P=0.007). **Conclusion:** We demonstrated the causal effect of plasma proteins concentration on osteoarthritis using two-sample MR methods. Our study suggested that TEX29 has protective effect on osteoarthritis. **Acknowledgment:** This study is supported by National Natural Science Foundation of China (31970569); Natural Science Basic Research Plan of Shaanxi Province (2019JM-119).

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P402
EFFICACY OF ANTIRESORPTIVE TREATMENT IN OSTEOPOROTIC OLDER ADULTS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CLINICAL TRIALS

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Objective: A systematic review will be carried out to evaluate the efficacy of antiresorptive treatment regarding the prevention of osteoporotic hip fractures in older adults with osteoporosis.

Methods: The Population, Intervention, Comparator and Outcomes (PICO) question used to inform the literature search query was: For older adults (above 65 years old) with osteoporosis with or without present of frailty fracture (P), what are the benefit of antiresorptive treatment in randomised clinical trials (RCTs) (I) compared to placebo and/or calcium/vitamin D treatment (C) on the rate of hip fracture (O). Secondary outcomes were rate of all fractures, vertebral fracture, nonvertebral fracture, BMD, bone turnover markers (BTMs), all-cause mortality and any adverse clinical outcome. The intervention of at least one study group included the following drugs: alendronate, etidronate, ibandronate, risedronate, clodronate minodronate, pamidronate, tiludronate, zoledronic acid or denosumab. We restricted our review to English, Spanish, German and Portuguese studies, owing to translation difficulties and lack of resources for review. Basic science articles, comments, and letters were all excluded. When a published, updated study involving the same cohort of patients was identified, only the latest update was included in the analysis

Results: Antiresorptive drugs are usually the first-line treatment in older adults[1]. These drugs have been shown to increase BMD and reduce fragility fractures in osteoporotic patients[2]. Besides this pharmacological prevention has proven to be cost-saving in clinical practice[3]. However, there is no clear evidence in older adults[4]. A study based on screening for osteoporosis in older women did not reduce the incidence of osteoporosis-related fractures[5]. Also, bisphosphonate treatment was not associated with reduced overall mortality according to a recent meta-analysis[6]. Furthermore, older adults used to be excluded from clinical trials[7]. Also, the previous studies used to compare pharmacological interventions vs. placebo, and nonpharmacological interventions (comprehensive assessment with multicomponent exercise, assessing risk of falls, preventing polypharmacy, healthy diet, smoking cessation, avoiding alcohol) must be the first approach to fracture prevention[8].

Conclusion: The purpose of our update study will be to determine actual evidence of antiresorptive treatment in this specific population.

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P403
DEVELOPMENT AND VALIDATION OF A FOOD FREQUENCY QUESTIONNAIRE TO ASSESS CALCIUM INTAKE OF MEXICAN POSTMENOPAUSAL WOMEN

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Objective: The status of calcium intake, the main mineral of the bone has no suitable biomarker to assess it. Its evaluation is relevant in clinical practice as in research. Postmenopausal women should be evaluated for risk factors for osteoporosis, including poor calcium intake. We aimed to o develop and validate a food frequency questionnaire (FFQ) to assess the calcium intake of Mexican postmenopausal women.

Methods: After obtaining approval from the institutional ethics committee, a pilot study was performed including 25 Mexican women whose calcium intake was assessed through a 3-day food diary (3DFD). The FFQ was designed including the foods reported by the participants of the pilot study that provided more than 1.5% of the calcium requirement and that were reported by at least 2 participants. The FFQ was tested through a validation study that included 86 postmenopausal whom also completed the 3DFD. The validity of the FFQ was assessed with the interclass correlation coefficient (ICC) alongside a Bland-Altman analysis.

Results: 84 postmenopausal women were assessed from June 21, 2019 to January 18, 2020. Participant's characteristics are shown in the Table 1. The FFQ underestimated mean calcium intake compared to 3DFD (-210 mg±141.28, P<0.60). The two methods were strongly correlated by the *ICC* (ICC=0.8204, CI 0.72-0.88). The FFQ could identify individuals who consumed ≥1200 mg/d with a high sensitivity, and a reasonable specificity (Table 2).

Table 1. Characteristics of the study subjects

	Mean	Std. Deviation
Age	53.27 Years	7.084
Weight	75.61 Kg	15.842
Height	1.58 m	.05935
BMI	30.11 Kg/m2	6.214
Ca intake	865.82 mg	337.438

Table 2. FFQ Sensitivity and Specificity

	Value of index	C.I. 95%
Sensitivity	89.83%	78.5 - 95.8%
Specificity	60%	38.89 - 78.19%
PPV	84.13%	74.28 - 91.72%
NPV	71.43%	47.69 - 87.81%

Figure 1 shows the agreement between the 3DFD and the FFQ were plotted against the average of the two measurements, the mean (solid line) and the 95%CI (broken lines) of the difference are shown.
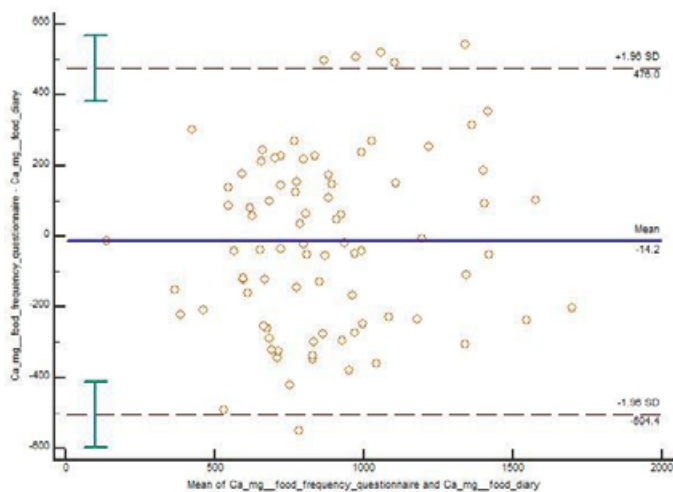
Figure1. Bland-Altman plot of agreement between the FFQ and the 3DFD

Conclusion: The FFQ´s good sensitivity in identifying low calcium intake in postmenopausal women makes it useful also as an educational tool in diet counselling and for identifying subjects in need of supplementation. The difference between methods limits its utility as an epidemiological tool.

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P404

PROSPECTIVE OBSERVATIONAL STUDY IN REAL LIFE TREATMENT IN LATIN AMERICAN PATIENTS WITH DENOSUMAB QUERY DATABASE (ROSELA DATABASE): 1700 PATIENTS PRELIMINARY REPORT

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Objective: Preliminary report of a real life experience in treatment of postmenopausal osteoporosis (PMOp) with denosumab (Dmab) in Latin American (LatAm) countries, using a web-based database (DB). **Methods:** A multicenter prospective, descriptive-cohort study conducted in 6 countries (Mexico, Argentina, Peru, Colombia, Ecuador, Uruguay) with up to 5 y of clinical records of patients treated with Dmab. A online DB was used to collect data in 32 centers. **Results:** 1700 patients, age at baseline (BL) 66±9.8 y, 62.3% with > 60 y. The main reason for using Dmab: Hip Op (37.8%) in bone densitometry (DXA); lack of BMD gain (33.8%). Dmab was used as the first anti-Op drug in 694 (40.7%) patients and 59.3% had used prior anti-Op medication. The average BMD in lumbar spine increased from BL 4.4 to 9.5%.In femoral neck, BMD increased 2.4 to 5.2%. In total femur BMD increased 2.7 to 5.7% after 5 y. The 10 y FRAX level was 8.8± 5.9 for major OP fracture (Fx) at BL and for hip Fx 3.1± 3.3. A total of 357 (20.9%) prevalent Fx were detected at BL; 116 patients (6.8%) with >1 Fx. Only 76 patients (4.4%)

developed Fx during treatment with Dmab. Vertebral and nonvertebral Fx increase during 2nd & 3rd year of treatment, related with a decrease in persistence. Adverse events (AE) were reported in 90 patients (5.2%) and SAE in 50 (2.9%), including 1 ONM and 2 AFF cases. Adherence (compliance+persistence) to treatment is not optimal, mainly in years 2 to 4. The patient loss of follow-up (55.6%) is very high. Most patients received no treatment after discontinuing DMAb. Risedronate and zoledronate are the most used after stop DMAb. Only 1 case of post-Dmab vertebral Fx has been reported.

P405
THE IMPACT OF PHYSICAL THERAPY IN PATIENTS WITH LUMBOSACRAL RADICULOPATHY

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Objective: Lumbosacral radiculopathy occurs in approximately 3-5% of the population, men and women are affected equally and 10-25% develop symptoms that persist for more than 6 weeks. Pain from lumbosacral radiculopathy is an area of high unmet medical need, with no medication currently indicated specifically for this type of neuropathic pain, with other pain medication with limited efficacy and poor tolerability. Physical therapy may provide pain relief. The primary objective of the study was to evaluate the impact of physical therapy on quality of life.

Methods: The 25 subjects with lumbosacral radiculopathy group received exercise that consisted of a core stability class including both specific and global trunk exercises. Every exercise session took about 30 min to complete, five times a week and the patients were encouraged to follow the same exercises programme at home every day. The endpoints that relate to the study objective were: change from baseline to week 4 on the Oswestry Disability Index (ODI), on the EuroQoL 5-Dimension 5-Level Questionnaire health index (EQ-5D-5L) and on the Short Form 36 Questionnaire (SF-36).

Results: There was a statistically significant improvement from baseline to week 4 on ODI% score (47.23%, p=0.024). At the end of the study, the group showed a significant improvement from baseline in the EQ-5D-5L health index (37.56%). The group displayed a highly significant increase in the scores for both Physical and Mental condition SF-36 scale between baseline and week 4 evaluations (p=0.014).

Conclusion: Physical therapy has an important contribution mostly in the emotional area, but it also has benefits on most of the other symptoms and quality of life. The reality that most of the improvements were still significant after four weeks of intervention is an indicator that the patients had properly acquired an important part of the techniques they were supposed to learn and included them in their own lifestyle.

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P406
AMELIORATIVE EFFECT OF PROTOCATECHUIC ACID ON DISEASE PROGRESSION AND SUBCHONDRAL BONE CHANGES IN RAT MODEL WITH MONOSODIUM IODOACETATE INDUCED OSTEOARTHRITIS

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[1]Sam Higginbottom University of Agriculture Technology & Sciences, Prayagraj, India**Objective:** Over recent years, osteoarthritis (OA) is a degenerative disorder of joints associated with localized inflammation, hypofunction, damaging of joints and cartilage which further commonly causes morbidity in elderly patients. Protocatechuic acid (PCA) is an important natural phenolic bioactive compound, a member of catechols having strong anti-inflammatory potential and utilized in rheumatoid arthritis. Its effect on osteoarthritis via targeting the cartilage cells is still not known. Therefore, the current work was designed to explore the antiosteoarthritic and chondroprotective potential of PCA against osteoarthritis induced by monosodium iodoacetate.

Methods: Male albino rats were selected for the study and intrapatellarly injected with monosodium iodoacetate at the knee joint to induce OA. PCA was administered by oral route at two different dose (200 and 400 mg/kg) once in a day for consecutive 28 d. For the assessment of antiosteoarthritic activity of PCA, μCT, expression of protein as well as mRNA of pro-inflammatory IL-1β, TNFα, and chondrogenic genes, evaluation of different biomarkers of clinical importance along with behavioral tasks (Open-field and Rota rod test) were performed.

Results: Data of *in vitro* cell free and cell based assays revealed PCA has significant antioxidant and an anti-inflammatory potential. Histological study also supported the protective effect on knee joints observed with safranin O and toluidine blue dye. Rats treated with PCA at higher dose showed significantly improved effect (p<0.05) by acceleration in bone volume to tissue volume which leads to reduction in trabecular pattern factor (about 200%) as compared to control group when assessed with μCT assay. A significant improvement (p<0.05) in the joint space and the articular, as well as atrophied femoral condyles irregularity along with tibial plateau, was also observed with PCA during radiological assessment. In addition, PCA elevated the gene expression of chondrogenic marker along with decrease in level of pro-inflammatory markers. PCA treated group also exhibited accelerated protein expression of Sox-9 and Col-II within the articular chondrocytes. Regarding serum and urine assay, group treated with PCA was observed with a significant reduction in glutathione S-transferase (GST) activity, clinical related markers of OA such as cartilage oligomeric matrix protein (COMP) and C-telopeptide of type II collagen (CTX-II) when compared to control group. Behavioral assessment of PCA group exhibited significant progression in locomotion as well as balancing task.

Conclusion: PCA has the ability to act as a potential chondroprotective agent against monosodium iodoacetate induced OA via downregulation of inflammation.

P407
FRAX-BASED PREDICTION OF OSTEOPOROTIC FRACTURE RISK IN ECUADORIAN POPULATION

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Objective: With the development of FRAX models to estimate the probability of fracture specific to each country, it is now necessary to establish the clinical impact on the population of the application of intervention and assessment thresholds. We aimed to predict the risk of osteoporotic fractures in men and women with the specific FRAX of the Ecuadorian population, and assess the clinical impact of age-specific intervention and assessment thresholds obtained with this model.

Methods: 671 patients, 225 women, 446 men were included. In all patients, BMD was measured in the lumbar spine (LS) and femur neck (FN) with an Hologic Discovery W® bone densitometer. We calculate the risk of mayor osteoporotic and femur neck fractures with the FRAX model (version 4.1) specific to the Ecuadorian population.

Results: The average age of the sample is 64.31 (8.86); women 64.41 (8.99), 64.29 men (8.80). On average 2.68% of the sample qualified for intervention and 32.64% for assessment with BMD. The proportion of the population potentially eligible for treatment is about 2.68%, but ranged from 0.93-7.14% depending on age. On average, the proportion eligible for assessment with BMD is 32.64%, but it varied from 17.85-45.54% depending on age.

Table 1. Men and women potentially eligible for intervention and BMD assessment.

age (years)	above an IT			between an AT	
	N	n	%	n	%
50-54	107	1	0.93	35	32.71
55-59	101	3	2.97	46	45.54
60-64	156	2	1.28	58	37.17
65-69	140	7	5.00	48	34.28
70-74	71	2	2.81	14	19,71
75-79	53	1	1.88	10	18.86
80-84	28	2	7.14	5	17.85
85-89	12	0	0	3	25.00
90-94	3	0	0	0	0
≥50	671	18	2.68	219	32.64

IT Intervention threshold; AT assessment threshold

Conclusion: On average 2.7% of the sample qualified for intervention and 33% for assessment with BMD. The application of these thresholds avoids unnecessary treatment of individuals at low risk of fracture and direct treatments to individuals at high risk. In addition, it allows us to avoid the unnecessary cost of routinely measuring the BMD.

P408
MUSCULOSKELETAL DISORDERS AMONG GREEK COMPETITIVE KARATE ATHLETES

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Objective: To record the musculoskeletal symptoms in each anatomical body region in Greek competitive karate athletes.

Methods: The Greek version of the Standardized Nordic Questionnaire[1] (SNQ) was administered to participants during the scheduled karate tournaments of the 2018-2019 season. Participants in SNQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulders, elbows, wrist/hands, uppers back, lower back, hips/thighs, knees, and ankle/foots) during the preceding 12 months and if those symptoms impeded their normal activity during the last year as well as the 7 previous days. Analysis consists of descriptive statistics.

Results: 70 (48 male & 22 female) karate athletes (age: 22.0±7.3 y, height: 1.74±0.09 m, weight: 69.9±15.4 kg, BMI: 22.5±3.5 kg/m^{2}, training age: 13.3±6.9 y, training h/week: 8.5±6.1, completed the SNQ. The 12-month prevalence rate of pain/discomfort was 54.3% in knees followed by the lower back pain (45.7%), neck (40.0%), shoulders (38.6%), wrist/hands (35.7%), hips/thighs (32.9%), ankles/feet (30.0%), upper back (27.1%) and elbows (12.9%). Those symptoms impeded athletes normal activity (functionality) during the last 12 months with different prevalence rate per anatomical body region (lower back: 20.0%, knees: 15.7%, hips/thighs 12.9%, wrist/hands: 10.0%, shoulders: 8.6%, neck: 7.1%, ankles/feet: 4.3%, elbows: 2.9, and upper back: 0.0%).

Conclusion: The high prevalence of region-specific musculoskeletal pain/discomfort in competitive karate athletes, highlights the need for specific injury prevention programs.

Reference: 1. Antonopoulou M et al. Eur J Gen Practice 2004;10:35.

P409
MUSCULOSKELETAL DISORDERS AMONG PROFESSIONAL SOCCER PLAYERS

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Objective: To record the musculoskeletal symptoms in each anatomical body region in soccer athletes who compete in Greek leagues.

Methods: The Greek version of the Standardized Nordic Questionnaire[1] (SNQ) was administered to participants during the scheduled soccer games of the 2018-2019 season. Participants in

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SNQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees and ankles/foots) during the preceding 12 months and if those symptoms impeded their normal activity during the last year as well as the 7 previous days. Analysis consists of descriptive statistics.

Results: 120 soccer athletes (age: 24.7±5.5 y, height: 1.82±0.09 m, weight: 77.2±8.0 kg, BMI: 23.4±2.4 kg/m^2, training age: 14.5±4.5 y, training h/week: 9.8±3.3) competing in 2 different categories (Super League and Football League) completed the SNQ. The 12-month prevalence rate of pain/discomfort was 29.2% in ankles/feet followed by neck (25.0%) and knees (25.0%), lower back (23.3%), shoulders (16.7%), hips/thighs (15.8%), wrists/hands (14.2%), upper back (9.2%) and elbows (3.3%). Those symptoms impeded athlete's normal activity (functionality) during the last 12 months with different prevalence rate per anatomical body region (ankles/feet: 19.2%, knees: 13.3%, lower back: 10.8%, hips/thighs: 9.2%, neck: 8.3%, shoulders: 5.0%, wrists/hands: 5.0%, upper back: 3.3% and elbows: 1.7%). The 7-d prevalence rate of pain/discomfort was 10.8% in ankles/feet followed by lower back (10.0%), knees (8.3%), neck (7.5%), hips/thighs (5.8%), shoulders (3.3%), elbows (2.5%), upper back (2.5%) and wrists/hands (1.7%).

Conclusion: The high prevalence of region-specific musculoskeletal pain/discomfort in competitive soccer athletes, highlights the need for specific injury prevention programs.

Reference: 1. Antonopoulou M et al. Eur J Gen Practice 2004;10:35.

P410
EPIDEMIOLOGICAL ANALYSIS OF PAINFUL MUSCULOSKELETAL SYMPTOMS AMONG PROFESSIONAL SOCCER PLAYERS OF DIFFERENT CATEGORIES

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Objective: To record and compare the musculoskeletal symptoms in each anatomical body region in soccer athletes who compete in Greek leagues.

Methods: The Greek version of the Standardized Nordic Questionnaire[1] (SNQ) was administered to participants during the scheduled soccer games of the 2018-2019 season. Participants in SNQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees and ankles/foots) during the preceding 12 months and if those symptoms impeded their normal activity during the last year as well as the 7 previous days. Analysis consists of Pearson's chi-square test. The level of statistical significance was set at p<0.05.

Results: 61 Super League (SL) players (age: 25.4±5.4 y, height: 1.80±0.10 m, weight: 76.0±7.6 kg, BMI: 23.5±3.2 kg/m^2, training age: 14.3±5.0 years, training h/week: 9.6±2.2) and 59 Football League (FL) players (age: 23.9±5.5 y, height: 1.83±0.07 m, weight: 78.4±8.3 kg, BMI: 23.4±1.3 kg/m^2, training age: 14.6±4.0 y, training h/week: 10.0±4.2) completed the SNQ. There were no significant differences among the two categories in most of the 12-month prevalence rate of pain/discomfort, prevalence rate of functional 12-month problem and the 7-d prevalence rate of pain/discomfort. There was an exception to the 12-month upper back pain, where there were significant differences between the two categories (SL: 14.8% and FL: 3.4%, p=0.031), and to 7 days lower back pain (SL: 16.4% and FL: 3.4%, p=0.018).

Conclusion: According to results there was significant difference between Greek SL and Greek FL only in 12-month upper back pain and in 7 d lower back pain.

Reference: 1. Antonopoulou M et al. Eur J Gen Practice 2004;10:35.

P411
THE EFFECT THE TOBACCO SMOKING CAUSES ON OSTEOPOROSIS

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Smoking tobacco causes an imbalance in bone turnover, which results in lower bone mass and makes the bone susceptible to osteoporosis and fracture. Tobacco smoke indirectly affects the bone mass by changing body weight, PTH- vitamin D rash, adrenal hormones, sex hormones and increases oxidative stress on bone tissue. Tobacco smoke affects as well the bone mass through a direct effect on bone osteogenesis and angiogenesis. Aside from the effect the tobacco smoke makes on bone loss, evidence clearly shows that smoking causes premature death, cancer and a variety of chronic diseases, such as coronary heart disease and chronic obstructive pulmonary disease. Smoking was identified as a risk factor for osteoporosis and fractures. 30 female patients aged 52-65 y with osteoporosis were observed, out of which 15 were nonsmokers and 15 were smokers for >20 y. All patients were with postmenopausal osteoporosis with no comorbidities and no fractures, with a T score of -2.5 to -3.1 L1-L4. The patients were placed on oral bisphosphonates and monitored for 3 y, once a year with densitometry.

Out of the 15 nonsmoking patients, 9 patients underwent a significant improvement in the T-score and 5 patients underwent osteopenia and no fractures occurred within the three years of monitoring. While none of the 15 active smoker patients showed any improvement in T-score during the same time, 4 patients experienced low energy fractures but no significant effects. Smoking tobacco has been associated with reduced bone mass and increased risk of fracture through its direct or indirect effects on osteoblast and osteoclast activities.

P412

DECREASING IN THE FALL RATE IN A POPULATION OF 75-90 YEAR OLDS LIVING IN THE COMMUNITY AFTER A 12-WEEK SPECIFIC EXERCISE PROGRAM (OTAGO) WITH NURSING SUPPORT

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Objective: Analyze the effects of a training program based on specific exercises (OTAGO) on the rate of falls over the course of a year and quarterly loyalty monitoring by nursing during this year.

Methods: A randomized controlled trial (RCT) of a intervention group (IG) compared with control group (CG). IG: Phase 1: OTAGO exercise program consisting of 12 sessions over 6 weeks. Phase 2: Quarterly motivational interviews with a nurse for 1 y. Variables of (1) gait, (2) strength and (3) balance. (4) Rate of falls in groups stratified by age and sex, (5) Percentage of participants with previous falls who fear further falls. In both groups blind external monitoring is performed.

Results: Of the total 309 participants: Gait velocity: males 1.21 m/s, female 1.02 m/s. Strength: (Hamer): males 29.5 kg, female 18.4 kg, (Encoder): males 249.48 W, female 178.56 W. Balance: (Tinetti composite): males 27.27, females 26.85. Overall rate of falls: CG 28.1% IG 22.6%, (p=0.245). In those aged 80-84 the rate of falls was: CG 32.4% IG 16.9%, (-47.8%) (p=0.028). There was no significant (NS) difference between groups IG and CG in those aged 75-79 and those aged 85-90. Rate of falls by sex: males: CG 16.2% IG 22.8% (p=0.306) (NS), females: GC: 37.6%, GI 22.5%, (-40.2%)(p=0.026). Those with fear of further falls: CG 51.1%, IG 24.0%, (-53.0%)(p=0.027) in the group who completed more than 10 sessions.

Conclusion: This RCT shows that the OTAGO exercise program (based on exercise program of 12 sessions), combined with motivational follow-up from the public health nurse, reduce the rate of falls and the percentage of patients with fear of further falls in a sample of the elderly population living in the community. That reduction is most markedly in females. This could be explained because women perform worse on different parameters of strength, balance and gait analysis. This would justify specific intervention programs in the elderly population, in particular with elderly females.

P413

MEDICAL CARE AND FOLLOW-UP OF PATIENTS WITH OSTEOGENESIS IMPERFECTA IN RUSSIAN FEDERATION

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Objective: Development of an algorithm and methodology for working with patients with osteogenesis imperfecta in the project "Mobile rehabilitation service", as well as updating problems related to the organization of medical care for patients with osteogenesis imperfecta

Methods: The patients with osteogenesis imperfecta registered in the "Fragile People Charity Foundation": 403 children and 109 adults from Russian Federation, 46 children from the Union of Independent States.

Results: The mobile rehabilitation service project is being implemented within the framework of the Fragile people Foundation. The specialist of the mobile rehabilitation service evaluates impairment of the body structure and function of the patient relying on the international classification of functioning, disability and health. Patients divided into the following categories:

1. With minor activity limitation, capable of moving and serving themselves independently;

2. Capable of moving with the help of technical devices, sitting independently but not fully serving themself.

3. Bedridden patients who require constant care.

Main directions of work within the project:

1. Home visits of patients and consultations on physical rehabilitation at home.

2. Training of parents in rehabilitation methods at home.

3. Consultations on physical rehabilitation for children in Health Care institutions of the Ministry of Health Care of the Russian Federation.

4. Drawing up an individual rehabilitation plan for three months for each patient.

5. Keeping a diary of observation of changes in the physical, mental and emotional

6. development of children.

7. Participation in the preparation of brochures on physical rehabilitation of patients.

8. Conducting online consultations.

9. Conducting training seminars on patient rehabilitation.

Conclusion: Treatment of children and adults with osteogenesis imperfecta is a complex process. Despite all the difficulties, it is important to continue developing evidence-based recommendations for improving the organization of medical care for patients with osteogenesis imperfecta. An interdisciplinary approach to treatment is most appropriate if attention paid not only to treatment, but also to maximizing the quality of life of patients.

P414

TREATMENT AND MANAGEMENT OF OSTEOPOROSIS BY MEASURING AND CORRECTING THE PARAMETERS OF BONE DENSITY, 25(OH)VITAMIND3 AND CALCIUM

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Objective: To examine the improvement of primary health care patients diagnosed with osteoporosis, by measuring not only the parameters of the bone density, but also the levels of 25(OH) vitamin D3 and calcium in blood, in the span of a year, while adjusting them with the necessary medication.

Methods: This research included 100 female patients, between the ages of 50-70, suffering from osteoporosis during the year 2018-2019, diagnosed in Primary Health Center No.3, in Tirana, Albania. Diagnosis of osteoporosis was based on the history of the disease, physical examination, laboratory findings and radiological findings, especially the results from DXA – in line with the criteria of the American College of Rheumatology. We have also treated osteoporosis with the adequate medication, which includes antiresorptive drugs. What we have put emphasis on has been the comparison between the results of DXA (bone density), the level of 25(OH)D3 and calcium in blood from 2018 to the equivalent data after medication in 2019.

Results: During this survey, we noticed that patients, whose calcium and 25(OH)D3 levels were corrected at the same time with the appropriate medication for osteoporosis, had a real improvement of the bone density. 70% of the patients had an increasing level of the bone density. At 20% of them, it remained the same and 10% of them had a minor decrease in the level of the bone density. Moreover, 85% of these patients had an increase in the level of 25(OH)D3 in blood and only 15% of them had a decrease. It resulted that 65% of these patients had an increasing level of calcium in the blood. At 6% of them, it remained unchanged and 32% of them was noted to have a lower level of calcium in their blood.

Conclusion: This study provides valuable evidence about the association of 25(OH)D3 and calcium levels with osteoporosis. The correction of 25(OH)D3 and calcium levels have not only had positive results in the improvement of the bone density level (DXA), but also in the improvement of life of the patients diagnosed with osteoporosis, 60% of whom have had a progression on a three-parameter level.

P415

EFFECTS OF CITRULLINE ALONE OR COMBINED WITH EXERCISE ON MUSCLE MASS, MUSCLE STRENGTH AND PHYSICAL PERFORMANCE AMONG OLDER ADULTS: A SYSTEMATIC REVIEW

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Objective: To establish the potential of citrulline supplementation (CIT) combined or not with exercise on muscle function and physical performance via a systematic review of randomized controlled trials (RCTs) in humans aged 50 years and older.

Methods: The Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) statement has been followed. Medline (via Ovid), Cochrane central register for controlled trials (CENTRAL via Ovid) and Scopus databases Medline (via Ovid) have been searched. Studies selection and data extraction have been performed by two researchers independently. Methodological quality of each included studies was assessed using the Quality Assessment of Diagnostic Accuracy Studies-2 (QUADAS-2) tool

Results: Based on PRISMA guideline, 103 references have been identified. Among this number, only 6 RCTs (250 participants) matched the inclusion criteria and were included in the present systematic review. Among the included studies, 5/6 reported beneficial effects of CIT on muscle mass. Then, 4/6 studies reported CIT effects on muscle strength but also that CIT when combined to exercise results in further improvements in upper muscle strength. Finally, 3/6 studies reported beneficial CIT effect on physical performance and suggested that CIT with exercise displayed greater improvements in walking speed than exercise alone. The overall quality of studies was rather high.

Conclusion: CIT supplementation seems to be able to improve muscular and physical factors in frail elderly people (malnourished, hypertensive, obese, dynapenic-obese) compared to placebo. More importantly, CIT combined to exercise is more efficient than exercise or CIT alone. However, due to the small number (6) and heterogeneity (dose, duration, population) of the studies realized in older adults, further studies are needed to confirm its promising potential.

P416
THE EFFECTS OF GAMOTION (A GIANT EXERCISING BOARD GAME) ON PHYSICAL CAPACITY, MOTIVATION AND QUALITY OF LIFE AMONG NURSING HOME RESIDENTS: A RANDOMIZED CONTROLLED TRIAL

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Objective: In 2017, Mouton *et al.* highlighted promising results of a giant exercising board game on ambulatory physical activity and a broader array of physical and psychological outcomes among nursing home residents. However, some limitation of this game should be acknowledged (e.g., too long, too bulky, exercises too simple). Taking into account these weaknesses, we decided to develop and validate a new version of a giant exercising board game: the GAMotion. The aim of this study was to evaluate the impact of GAMotion on physical capacity, motivation and quality of life among nursing home residents.

Methods: A one-month randomized controlled trial was performed in two comparable nursing homes. Eleven participants (71.63±8.15 y; 7 men) meeting the inclusion criteria took part in the intervention in one nursing home, whereas 10 participants (84±7.57 y; 4 men) were assigned to the control group in the other institution. The GAMotion required participants to perform strength, flexibility, balance and endurance activities. The assistance provided by an exercising specialist decreased gradually during the intervention in an autonomy-oriented approach based on the self-determination theory (*Ryan & Deci, 2002)*. Physical capacity (i.e., quantitative evaluation of walking using Locometrix; grip strength using Jamar dynamometer; knee extensor isometric strength using MicroFET2; fall risk using Tinetti test; dynamic balance using timed up and go test (TUG) and physical abilities using SPPB test), motivation (i.e., using Behavioral Regulation in Exercise Questionnaire-2) and quality of life (i.e., using EQ-5D questionnaire) were assessed at baseline and at the end of the intervention. A two-way repeated-measure analysis of covariance (ANCOVA) was used to assess time*group (intervention vs. control group) effects.

Results: Globally, during the intervention period, the experimental group displayed a greater improvement in symmetry of steps (p=0.04), Tinetti score (p<0.0001), TUG (p=0.02), SPPB (p<0.0001), knee extensor isometric strength (p=0.04), grip strength (p=0.02), 3 domains of the EQ-5D (i.e., mobility, self-care, usual activities: p<0.0001) and intrinsic motivation (p=0.02) compared to the control group.

Conclusion: The effects of GAMotion on physical capacity, motivation and quality of life of nursing home residents confirm the results obtained with the previous version of the giant exercising board game.

P417
HEME OXYGENASE-1-MEDIATED AUTOPHAGY PROTECTS AGAINST OXIDATIVE DAMAGE IN RAT NUCLEUS PULPOSUS-DERIVED MESENCHYMAL STEM CELLS

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Objective: Although endogenous nucleus pulposus-derived mesenchymal stem cells- (NPMSCs-) based regenerative medicine has provided promising repair strategy for intervertebral disc (IVD) degeneration, the hostile microenvironments in IVD, including oxidative stress, can negatively affect the survival and function of the NPMSCs and severely hinder the endogenous repair process. Therefore, it is of great importance to reveal the mechanisms of the endogenous repair failure caused by the adverse microenvironments in IVD. The aim of this study was to investigate the effect of oxidative stress on the rat NPMSCs and its underlying mechanism.

Methods: NPMSCs were isolated and subjected to different treatments. Cell viability, apoptosis and the production of reactive oxygen species (ROS) were detected.

Results: Our results demonstrated that oxidative stress inhibited cell viability, induced apoptosis and increased the production of ROS in NPMSCs (Fig. 1). In addition, the results showed that the expression level of heme oxygenase-1 (HO-1) increased at an early stage but decreased at a late stage when NPMSCs were exposed to oxidative stress, and the oxidative damages of NPMSCs could be partially reversed by promoting the expression of HO-1 (Fig. 2-3). Further mechanistic analysis indicated that the protective effect of HO-1 against oxidative damage in NPMSCs was mediated by the activation of autophagy (Fig. 4-6).

Conclusion: Taken together, our study revealed that oxidative stress could inhibit cell viability, induce apoptosis and increase ROS production in NPMSCs, and HO-1-mediated autophagy might act as a protective response to the oxidative damage. These findings might enhance our understanding on the mechanism of the endogenous repair failure during IVD degeneration and provide novel research direction for the endogenous repair of IVD degeneration.
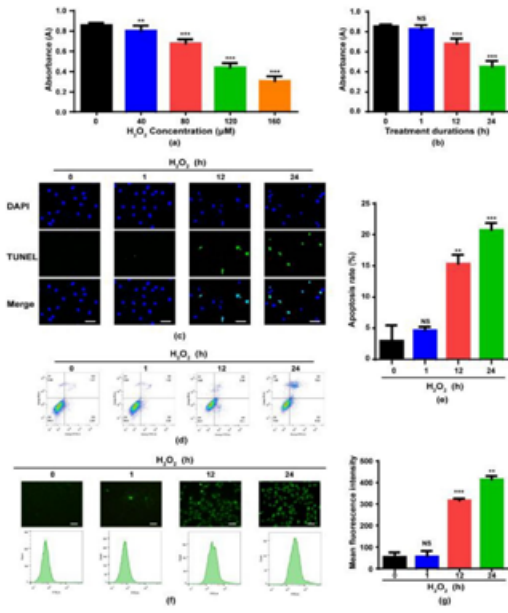
Figure 1
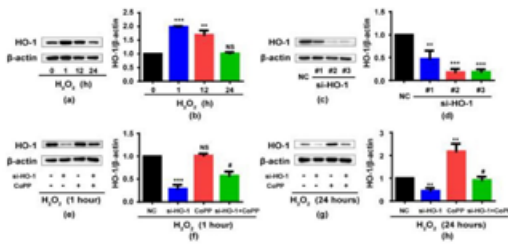
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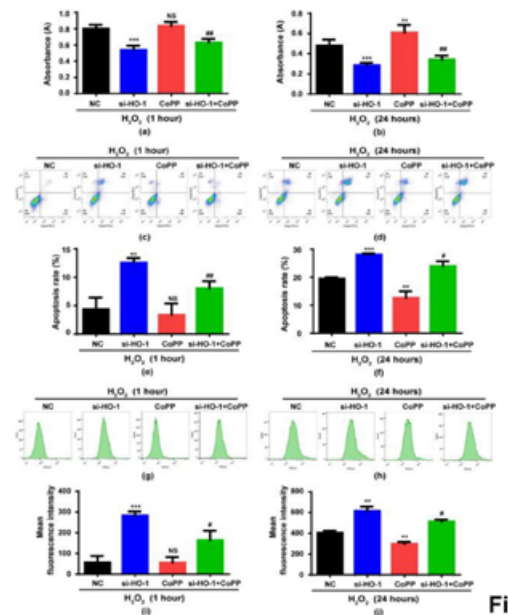
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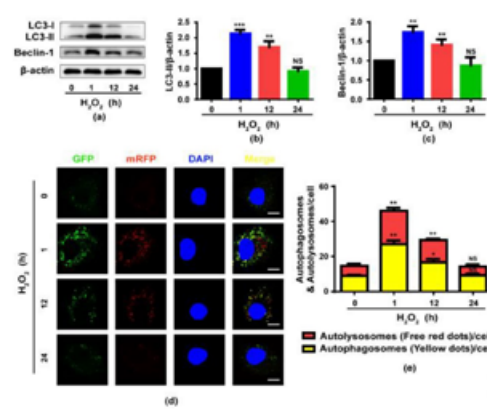
Figure 4

Figure 5

Figure 6

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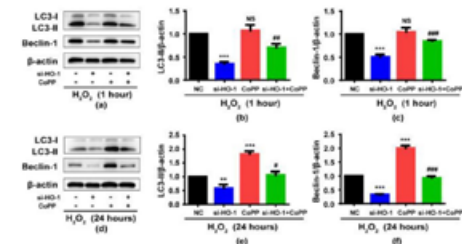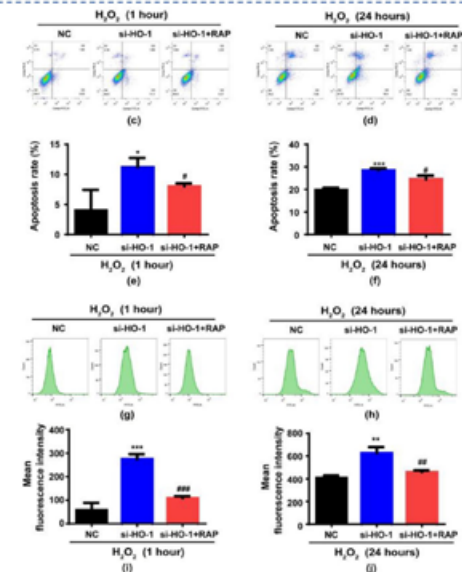
P418
FLUID SHEAR STRESS REGULATES EXTRACELLULAR MATRIX HOMEOSTASIS THROUGH IFT88-DEPENDENT AND HEME OXYGENASE-1-MEDIATED AUTOPHAGY IN NUCLEUS PULPOSUS CELLS

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Objective: To investigate the regulation effects of fluid shear stress (FSS) on extracellular matrix (ECM) homeostasis in nucleus pulposus (NP) cells and its molecular mechanism.

Methods: An immortalized rat NP cell line was subjected to FSS treatment at indicated times by Streamer® System, followed by assays for the sGAG content and expression of several key ECM proteins (Col2, Aggrecan, ADMATS5, MMP13). To further investigate the underlying molecular mechanism, RNA sequencing analysis was performed, and heme oxygenase-1 (HO-1) inducer cobalt protoporphyrin IX (CoPP) and rapamycin (RAP) were used.

Results: We found that FSS could increase the synthesis of ECM and inhibit the degradation of ECM, which was beneficial for the maintenance of ECM homeostasis in NP cells (Fig. 1). By means of RNA sequencing analysis, we identified HO-1, which was upregulated and played an important role in the process of FSS-induced ECM regulation (Fig. 2). Further mechanistic analysis demonstrated that HO-1 mediated autophagy activation and participated in FSS-induced ECM regulation (Figs. 3-4). Moreover, our data showed that disruption of intraflagellar transport (IFT) 88, a core trafficking protein of primary cilia, abolished HO-1-meadiated autophagy activation and FSS-induced ECM regulation, which indicated that NP cells could sense FSS and convert it to downstream molecular signals via primary cilia (Fig. 5-8).

Conclusion: Taken together, our results revealed that FSS could maintain ECM homeostasis through IFT88-dependent and HO-1-mediated autophagy in NP cells. The findings help us understand the effect of FSS on ECM homeostasis, and provide us with novel and early preventive and therapeutic strategies for intervertebral disc degeneration.
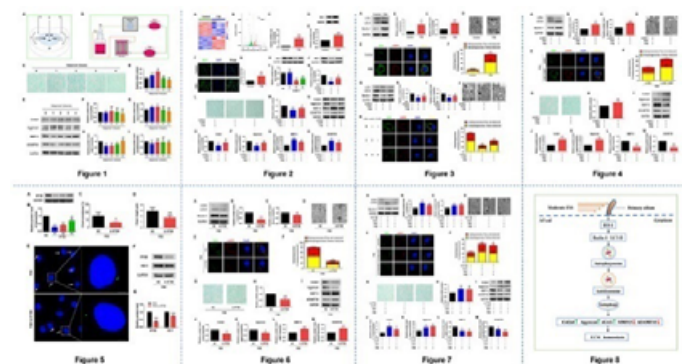
P419
THE IMPACT OF FEMUR FRACTURE ON PROGNOSIS OF COLORECTAL CANCER PATIENTS RECEIVING CHEMOTHERAPY

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Objective: Glucocorticoids are one of the most important drugs used as premedication against chemotherapy induced nausea and vomiting and are recommended for patients receiving chemotherapy. Persistent glucocorticoid use is especially associated with osteoporosis. To our knowledge, there have been few studies of mortality related to osteoporosis and bone fractures in colorectal cancer patients who received chemotherapy. We conducted a retrospective cohort study to analyze the patients who had a bone fracture during cancer chemotherapy and to identify the association between survival time and bone fracture events.

Methods: We analyzed the patients who had a bone fracture during cancer chemotherapy by reviewing clinical records and identified the association between survival time and bone fracture events. In total, 221 colorectal cancer patients who received chemotherapy between January 2008 and December 2017 in our institution were enrolled. Associations of baseline characteristics with fracture during the minimum 1-y follow-up period were analyzed using COX proportional hazard regression.

Results: We investigated the prognosis of the 32 patients who suffered bone fractures after chemotherapy induction. Patient characteristics were as follows; female/male 19/13, median age 72 (range 57-82), femur/vertebral/pelvic/radial fracture/others 6/12/5/6/3, and premedication glucocorticoids present/absent 24/8. Median overall survival after fracture was 32 months in all fracture cases. The subgroup analysis of fracture site, the survival time of femur fracture cases were significantly shorter than other sites (HR=3.853, 95%CI: 1.108- 13.4, p=0.0192), and median overall survival time was 5 months in femur fracture cases. There were no significant differences in amounts of glucocorticoids between femur fracture and other sites (p=0.77).

Conclusion: We found that femur fracture after induction of chemotherapy is associated with shorter survival compared to other fractures.

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P420
THE PATIENT'S FEELINGS DURING THE ANNOUNCEMENT OF A CHRONIC RHEUMATIC INFLAMMATORY DISEASE (CRD)

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Objective: To study the patient's feelings during a CRD announcement (ann.) and if necessary, adjust the approach's rheumatologist (Rh).
Methods: 39 Rh, 212 CRD including 56% rheumatoid arthritis (RA), 27% spondylarthritis (SPA), 10% others. Mean age 59 y. 52% women (W) 66% having an working status. Only RA & SPA are analysed. Their distribution is: RA/SPA: W 78/52%, mean age 58/48 y, age at diagnosis (Dg) 50/34 y, disease duration 8/13 y.
Results: The ann. is given 80% by the Rh (whatever CRD) in 10% by the general practitioner, in the following conditions: face/face with the patient alone 80%, during a longer consultation 40%, with feeling 80%, with frankness 80%, nevertheless with vague words 70%, in a brutal way 30%. The context allows the verbalization by the patient 70% to listen to him 85%, to comfort him 63% and the Rh being reassuring 84%. The patient says understanding the Dg 89%, the explanations 86%, the treatment 83%, the follow-up 80%, the course 76% and asks questions 72%. His emotional reactions are: acceptance 84%, absence of doubt 84%, relief 80%, expected confirmation 67%, anxiety 58% and taking a 2d opinion 20% or an internet research 50%. The perceptions are: patient in confidence 82%, receiving enough explanations 76%, or too much 83%, a physician being comfortable 88% who push to participate 80%, explains the follow-up 82%, the course 72%, the impact on life quality 64%, the treatment 87%, the aim of it 87%, the compliance 84% and the side-effects 63%, but gives few documents 66%, rarely mentions patient leagues. It is same in gender for relief, doubt or refusal of the Dg but the state of mind is different between RA/SPA patients for, in %: anxiety 60/48, destabilization 62/40, being diminished 64/53, being depressed 51/60, but same acceptance 88/83. There are some discordances in perceiving between physicians/patients concerning the explanations 100/76, the time spent 90/73.
Conclusion: The patient is relieved as soon as he knows the Dg, is informed and taken care of. The Rh answers his questions with kindness, ease and knowledge. An effort must be done by the Rh about outside management. So, the ann. is burdened by anxiety, felt more by RA patients and W, while a certain degree of confidence is established with SPA patients, men. To notice few discordances between the Rh/patient's perception.

P421
PERCEPTION OF TELEMEDICINE IN ITS BEGINNING BY PATIENTS IN RHEUMATOLOGY

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Objective: 25 private practice rheumatologists launched in 2018 a survey in order to have a better understanding of the interests, demands, fears surrounding of telemedicine (TM).

Methods: 194 patients: 63% of women (W). 4 groups age related (A, B, C, D). 45%: 50-69 yo (A), 26%: 70-93 yo (B), 24%: 30-49 yo (C), 5%: 20-29 yo (D). 63% with high sociocultural (SC) level. 25 questions asked.

Results:

83% think that medicine will be connected: this is the average of 4 groups especially if high SC

88% (B), 85% (A) 66% (C), 63% (D) heard about TM

What do they know about TM? 43% don't answer, 22% nothing

65-80% expect in order: reactivity, less waiting period, nothing 20%, fewer travel, reliability

Their fears: 11% don't have, 45% fear loss of human contact, 30% fear misdiagnosis, no difference gender related

Will they use it? Rather no (C and D: 55%) or refusal (W>M)

The family doctor is chosen in 50% to share their TM management

Are they confident in TM? Yes, for A and B 67%, no for C 55% and D 70%

Ware more confident, high SC level too.

Do they trust TM conclusions? Yes, for A, B 60/55%, No for C/D 56%

Disparity in trust/acceptance for 4 groups, M are more reluctant.

What is attracting in TM? Reassuring 72%, less waiting in the emergency room 68%, faster appointments: 67%, less travel to do

Of the 4 items: A >B>C>D, mostly M

What scares them? Less human contact, 88%, the control by groups who want to organize the health business, misdiagnosis 72%, Uber-like medicine 71%, data non -traceability, lack of data protection 55% and threatened medical confidentiality 50%

Conclusion: Rheumatology practice cannot overcome the human contact that is lacking in TM. Though patients say they are confident, they are more skeptical when it comes to the conclusions. SC level, gender, age have an influence depending on the question. Even though 8/10 patients heard about TM only 1/2 can define it. 1/4 expect reactivity from it and 1/5 have no expectation at all. Patients see the TM as a help for a common or harmless pathology. The hope of being reassured prevail over the quickness of getting an appointment, on the other hand the loss of human contact 9/10 and the fear of misdiagnosis 7/10 emerge while the medical confidentiality matters for 1/2 patients.

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P422
IS AGE A RISK FACTOR FOR HYPOVITAMINOSIS D AMONG ELDERLY IN A SUNNY MEDITERRANEAN REGION?

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Objective: Vitamin D (VD) deficiency is a major public health problem worldwide. In spite of its high prevalence, particularly among elderly people, VD deficiency is still underestimated. This study was conducted in order to confirm age as an independent risk factor for hypovitaminosis D among elderly with and without hip fracture.

Methods: The study included 61 hip fractured with a mean age of 83.39 y (group A) and 60 patients, with an average age of 72.98 y (group B), who were hospitalized and underwent surgery due to degenerative orthopedic diseases (knee/hip osteoarthritis or lumbar spondylosis). 25(OH)VD levels and age were recorded. Subjects that were excluded from our study concerned: obesity (BMI>28), prior VD intake, age (<65), history of metabolic disease, primary hyperparathyroidism and known history of chronic kidney disease.

Results: In group A, patients were older with a mean age of 83.39±6.59 in comparison with group B, in which the mean age was 72.98±6.65. Although, this difference wasn't statistically significant, since the p-value was 0.429 (unpaired t-test). The biggest age difference was in women, since the mean age in group A was 83.94±6.31, while in group B the mean age was 72.63±6.15. The results for men were respectively 80.6±7.64 for group A and 73.59±7.53 for group B. These differences in women and men weren't statistically significant, since the p-value (unpaired t-test) was 0.304 and 0.607 respectively. VD deficiency rates (<30 ng/ml) were 96.7% for group A and 81.7% for group B. The correlation between age and VD levels in both groups was found to be statistically significant. More specifically, Pearson equation revealed p-value 0.043 for group A and p-value 0.04 for group B.

Conclusion: Age is an independent risk factor for VD deficiency among elderly in both groups. Based on our results sunshine should not be considered as a criterion of VD adequacy and the supplementary dose of VD should be precisely defined to achieve the optimal serum 25(OH)VD level in elderly people, to avoid all possible adverse effects of hypovitaminosis D.

P423
VITAMIN D DEFICIENCY IN ELDERLY PEOPLE IN SUNNY WESTERN GREECE

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Objective: Greece is characterized by its sunshine; however, this should not be considered as a criterion of vitamin D (VD) adequacy. The purpose of this study was to evaluate VD levels of elderly people in western Greece, as well as to provide criteria for recognition of those with increased risk of hip fracture.

Methods: The study included 61 hip fractured patients over 65 years old with a mean age of 83.39 y (group A). In addition, 60 patients over 65 years old, with an average age of 72.98 years, who were hospitalized due to knee/hip osteoarthritis or lumbar spondylosis (group B), were also included in the study as the control group. PTH and 25-hydroxyVD were measured by the enzyme-linked immunosorbent assay.

Results: VD deficiency rates (<30 ng/ml) was 96.7% for group A and 81.7% for group B. Elderly men of group A have statistically significantly (unpaired t-test, p-value=0.017) lower vitamin D levels than older men of group B. This finding can be used as criterion to identify older men who are at increased risk of hip fracture. Elderly women of group A have also lower vitamin D levels (8.75± 7.56) than women of group B (18.68±9.15), but this difference wasn't statistically significant (unpaired t-test, p-value=0.854). However, it is also observed that elderly women of group A have a statistically significantly (Spearman r=0.381, p=0.018) higher incidence of secondary hyperparathyroidism than women of group B. This finding can be also used as a criterion to identify elderly women who are at increased risk of hip fracture. It is noteworthy that only four patients from group B performed blood tests for VD and PTH levels.

Conclusion: The incidence of hypovitaminosis D (<30 ng/ml) is high among hip fractured patients (96.7%). However, we did not expect the increased incidence (81.7%) of hypovitaminosis D among elderly without hip fracture. We suggest VD and PTH measurements to identify elderly with increased risk of hip fracture and avoid perioperative complications (general and implant-related) in patients who undergo elective orthopedic surgeries. These disappointing results are probably due to the lack of vigilance of physicians and population on this public health issue.

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P424
POLYPHARMACY AND FALLS OF ELDERLY WITH HIP FRACTURE: A RETROSPECTIVE STUDY AND LITERATURE REVIEW

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Objective: Polypharmacy is closely related with elderly's falls, while falls are associated with increased morbidity, mortality, undesirable events, unplanned admissions to emergency departments, whereas fear of falling leads to isolation and resignation. The aim of the study is to investigate the possible association of polypharmacy and falling among older patients.

Methods: We randomly selected 61 elderly patients (51 women, 10 men) with an average age of 83.39 years old, who were hospitalized in our clinic due to hip fracture from falling. As a control group, we randomly selected 60 patients (38 women and 22 men) with an average age of 72.98 years old who were hospitalized in our department for degenerative diseases.

Results: In the hip fracture group we had 4.77±2.9 drugs per day per patient, while in the control group the average was 3.6±1.85. It is worth saying that only 31.1% of patients with hip fracture received less than four medications, while from the patients with degenerative diseases only 41.7% of them received four or more medications. Hip fractured patients are closely related with falls, as the hip fracture is a consequence of at least one fall. It is worth noting a trend we have seen for polypharmacy of all patients. The correlation of the number of drugs consumed of each group showed a p-value of 0.085 (unpaired t-test), a value very close to statistical significance and this should be noted.

Conclusion: Several studies have linked polypharmacy with falls and for this reason polypharmacy until 2000 was considered as an independent risk factor for falls. However, the type of drugs like anticholinergics or sedatives seems to be more important that potentially can cause falls. Our study also shows the increased use of drugs in the group of patients with falls and hip fractures. Elderly people who receive more than three drugs or drugs that induce falls should be considered as "candidates" for fall and should be properly recognized and consulted. Evaluation of elderly's medication is mandatory when physicians manage such patients.

P425
HYPOVITAMINOSIS D AS A RISK FACTOR OF HIP FRACTURE SEVERITY IN A SUNNY MEDITERRANEAN REGION

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Objective: Several studies support that vitamin D levels are associated with hip fracture severity.

Methods: This cross-sectional study included 61 consecutive individuals over 65, with mean age 83.39, admitted to authors hospital for osteoporotic hip fracture over a year. Demographic data, fracture type, fracture severity were evaluated, while 25-hydroxyvitamin D was measured by the enzyme-linked immunosorbent assay. We defined the severe subcapital fractures those with grade 3 or 4 according to Garden classification, while severe intertrochanteric fractures were defined those with grade A2.2, A2.3 and all A3 fractures according to AO/OTA classification.

Results: Intertrochanteric hip fractures predominated, specifically 44, while subcapital hip fractures were 17. The vast majority of men had intertrochanteric fracture (9/10), while women in 30% of cases had subcapital (15/50) fractures. We found out that intracapsular fractures (8.09±4.74 ng/ml) are associated with more severe vitamin D deficiency compared with the intertrochanteric fractures (9.3±8.5 ng/ml). The severe hip fractures were 40 of 61, to wit 65.6%. The vitamin D levels in patients with severe fracture were 8.1±7.6 ng/ml, while in cases with not comminuted fractures, the vitamin D levels were higher (10.7±7.4 ng/ml). It is noteworthy that 31 out of 40 cases (77.5%) of severe comminuted fractures revealed vitamin D levels <10 ng/ml and only 9 cases had vitamin D levels more than 10 ng/ml. On the other hand, the group with stable hip fractures had 47.6% of cases with vitamin D >10 ng/ml and only 52.4% <10 ng/ml. Correlation between fracture severity and status of vitamin D levels according to Horlick classification (<10 ng/ml, 10-20 ng/ml, 20-30 ng/ml, >30 ng/ml) with Spearman's equation is very close to statistical significance, as the p-value was found to be 0.059.

Conclusion: Although vitamin D levels are not so different between patients with intracapsular or extracapsular hip fractures, a more severe vitamin D deficiency seems to be associated with more severe osteoporotic hip fractures. A prior vitamin D supplementation could restrict the severity of these fractures. Comminuted fractures are associated with fixation difficulties and functional disability.

P426

CORRELATION BETWEEN VITAMIN D AND ESTIMATED GLOMERULAR FILTRATION RATE IN GREEK ELDERLY POPULATION

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Objective: Patients with kidney disease have reduced activity of the enzyme 1-α hydroxylase and characterized by increased prevalence of hypovitaminosis D.

Methods: The study included 61 hip fractured patients with mean age of 83.39 years (Group A) and 60 patients, with mean age of 72.98 years (Group B), who were hospitalized due to degenerative orthopedic diseases (knee/hip osteoarthritis or lumbar spondylosis). 25(OH) vitamin D levels and estimated glomerular filtration rate (eGFR) were recorded.

Results: In group A the eGFR levels were 65,18±20,14 mL/min/1.73m², while in group B the results were respectively 79,48±16,14. Taking into consideration the fact that as age increases, normal eGFR values decreases, we found 23 cases (38,3%) of abnormal eGFR and 37 cases of normal values (61.7%) in the group B, while the results in group A were 62.3% and 37.7% respectively. In patients of group A with chronic kidney disease (CKD) grade 1 the average value of vitamin D levels was 8,24 ng/ml, with grade 2 the vitamin D was 8,6ng/ml, with grade 3 the vitamin D was 9,96 ng/ml and in grade 4 the vitamin D was 8,06 ng/ml. In both groups there wasn't any case with grade 5 CKD and hemodialysis. The results for group B were respectively 19,63 ng/ml, 20,78 ng/ml, 19,63 ng/ml and 12,13 ng/ml. Grade 4 CKD in both groups is associated with the lower levels of vitamin D, while significant differences are obvious between the two groups concerning the eGFR level, the cases of pathologic CKD cases and the values of vitamin D.

Conclusion: Elderly with hip fracture have lower eGFR levels comparing with elderly without hip fracture. This result can be used in daily clinical practice in order to distinguish elderly with increased risk of hip fracture. Elderly with increased risk of hip fracture have lower levels of vitamin D and e GFR and this group should be recognized, counseled and treated properly. Patients with grade 4 CKD are associated with significant decline of vitamin D levels in both groups. Physicians should be aware for the correlation between vitamin D levels and CKD.

P427

PREDICTING BMD RESULT: VALIDATION OF OSTEOPOROSIS RISK INDICES IN A LARGE DXA DATABASE

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Objective: BMD screening is recommended for men and women above age-based cutoffs but is underused. Presence of risk factors for fracture lowers the proposed screening age. Several risk indices (OST, ORAI, OSIRIS and SCORE) were developed to identify subjects with high probability for osteoporotic range BMD, testing of whom should be further reinforced. We aimed to validate BMD risk indices in Israeli population.

Methods: Retrospective cross-sectional study. Institutional BMD database was utilized. Information on risk factors was derived from routine pre-BMD questionnaires. Patients receiving bone-deteriorating or osteoporosis medications were excluded. Accuracy of indices in predicting T-score ≤-2.5 was calculated.

Results: A total of 4492 patients were eligible for analysis. The Osteoporosis Self-Assessment Tool (OST) displayed sensitivity and specificity of 84% and 41% vs. 68% and 54% with negative predictive value (NPV) of 85% and 87% in women and men, respectively. ORAI, OSIRIS and SCORE performed with sensitivity of 76-94%, and specificity of 22-55% in women. In a subgroup of younger patients (50-60 y), OST displayed sensitivity and specificity of 67% and 55% vs. 33% and 86%, with NPV of 84% and 85% in women and men, respectively. ORAI, OSIRIS and SCORE performed with sensitivity of 53-88%, and specificity of 31-75% in women.

Conclusion: Simple risk indices for prediction of BMD in the osteoporotic range have high sensitivity in our population, consistent with previous population studies. Self-applied OST may be a useful tool for pretest indication stratification due to its high negative predictive value at younger age.

P428

MULTIPLE BILATERAL HIP FRACTURES IN A YOUNG PATIENT WITH DYSKERATOSIS CONGENITA DUE TO A NOVEL MUTATION IN THE PARN GENE

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Objective: Dyskeratosis congenita (DC) is characterized by a triad of symptoms: skin pigmentation disorders, leukoplakia and dysplastic nails. Additional symptoms may include bone marrow failure, stenosis of the esophagus, developmental anomalies and high risk of cancer. The clinical presentation of DC is highly variable due to different ages of onset, varied clinical features

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and genetic heterogeneity. We report a 24-year-old male patient referred to our clinic due to multiple bilateral low traumatic hip fractures.

Methods: Whole exome sequencing was performed to identify the congenital disease.

Results: Clinical examination showed the presence of reticulate skin pigmentation, hyperkeratosis of palms and soles, nail dystrophy, joint deformities and premature alopecia. The patient had progeria-like facial features, microcephaly. Height 164 cm, weight 40 kg. The first low traumatic fracture of the wrist occurred at the age of 5. Since 14 years old the subject suffered from four low traumatic hip fractures, the last being at the age of 22. Laboratory investigations revealed severe thrombocytopenia with other parameters, including calcium, phosphate and alkaline phosphatase within the reference range; DXA measurements showed normal BMD L1-L4 − 0.3 Z-score and radius 33% -0.3 Z-score. Considering the skin symptoms, a provisional diagnosis of DC was made. Whole exome sequencing identified a previously unreported novel frameshift variant (NM_002582.3: c.1652delA; p.His551fs) in *PARN* gene. This variant was predicted as probably damaging using software analysis tools. Novel heterozygous mutation causes 1-bp deletion at codon 1652, which results in a frame shift and a premature termination of codon amino acid downstream *PARN*. This variant was not found in the genome Aggregation Database Data Viewer and absent in the Single Nucleotide Polymorphism Database and in any of the other population specific databases.

Conclusion: This is the first reported case of a patient with DC and multiple hip fractures due to novel heterozygous mutation in the *PARN* gene. This case further adds to the existing scientific literature and has implications for the clinical and molecular characterization of the disease.

P429

PREDICTION OF FRACTURE RISK WITH AND WITHOUT BMD IN THE ECUADORIAN FEMALE POPULATION

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Objective: BMD has been basic in the management of osteoporosis. In predicting the absolute risk of fracture, clinical risk factors are also important. Fracture risk assessment and treatment thresholds based on the FRAX instrument are of particular importance, especially in the female population. We aimed to predict the risk of osteoporotic fractures with and without BMD in Ecuadorian women with the FRAX model specific to the population of the country and evaluate the clinical impact of the age-specific intervention and assessment thresholds obtained with this model.

Methods: 225 women aged 50-94 were included. In all patients a measurement of BMD was performed in the lumbar spine (LS) and femoral neck (FN) with a Hologic Discovery W® densitometer. We calculated the risk of major osteoporotic fractures and femur neck with the model FRAX (version 4.1) specific to the Ecuadorian population.

Results: The average age is 64.41 (8.99). With the inclusion of BMD, the potentially eligible proportion for treatment on average is 5.78% but ranged from 4-22.2% depending on age, and the proportion eligible for BMD evaluation is 56%, but it varied from 38-64.5% depending on age. Without the inclusion of BMD, the proportion eligible for BMD evaluation is 59.55%, but ranged from 20-100% depending on age.

Conclusion: The application of these thresholds is expected to avoid unnecessary treatment of people at low risk of fracture and direct treatment to people at high risk. The use of FRAX thresholds would reduce to 50% the current number of references to the DXA scan in our usual classic practice.

Table 1. Women potentially eligible for intervention and BMD assessment

age (years)		above an IT		between an AT			
		with BMD		without BMD		with BMD	
	N	n	%	n	%	n	%
50-54	36	0	0	14	44.44	18	50.00
55-59	31	0	0	22	70.97	20	64.52
60-64	50	2	4.00	35	70.00	31	62.00
65-69	51	6	11.76	33	64.71	31	60.78
70-74	21	2	9.52	14	66.67	10	47.62
75-79	21	1	4.76	10	47.62	8	38.10
80-84	9	2	22.22	4	44.44	5	55.56
85-89	5	0	0	1	20.00	3	60.00
90-94	1	0	0	1	100	0	0
≥50	225	13	5.78	134	59,55	126	56.00

IT Intervention threshold; AT assessment threshold

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P430
THE RISK OF OSTEOPOROTIC FRACTURES AMONG INDIVIDUALS WITHOUT CARBOHYDRATE METABOLISM DISORDER IN A POPULATION SAMPLE

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Objective: To study the association between fractures and their potential risk factors in a population-based sample without carbohydrate metabolism disorder (CMD) aged 50-69 y.

Methods: A representative population sample was examined in the frame of the HAPIEE Project, Novosibirsk in 2003-2005 (9360 men and women aged 45-69 y). Current analysis included 5120 subjects aged 50-69 without CMD (2435 men, 2685 women; among women only postmenopausal were selected). Registered history of osteoporotic fractures in the last 12 months, medical history of chronic diseases, history of falls during the last 12 months, behavioral and sociodemographic characteristics, blood pressure, anthropometry (height, weight, BMI, waist and hip circumference and ratio (WC, HC, WHR)), serum lipids and plasma glucose were measured by standard methods. Statistical analysis was carried out by SPSS package (v.13.0).

Results: Among studied 5120 subjects 3.7% (3.5% in men, 3.9% in women) had a history of fractures during the last 12 months. Among men, those with fractures had higher levels of high-density lipoprotein cholesterol (HDLC): 1.6±0.5 mmol/l vs. 1.5±0.4 mmol/l (p=0.002), more often fell during last 12 months: 62,4% vs. 3.0% (p=0.001), more often consumed alcohol ≥30 g of ethanol per 1 session: 80.0% vs. 64.0% (p=0.002) and had smaller HC: 97.2±7.7 cm vs. 99.0±7.3 cm (p=0.024) compared to men without fractures. Among women, those with fractures fell more often than their counterparts: 78.1% vs. 4.3% (p=0.001).

In multivariable adjusted analysis, the risk of fracture associated with a history of falls in men and women. In men, the risk of fracture was also associated with an elevated HDLC value (OR=2.05; 95%CI=1.23-3.43), TG (OR=1.48; 95%CI=1.03-2.14) and with amount of alcohol intake higher than 30 g of ethanol per session (OR=2.12; 95% CI=1.22-3.66). In women, we did not reveal other factors associated with fractures except of falls.

Conclusion: In studied Siberian population sample aged 50-69, among men without CMD, the risk of fractures was directly associated with alcohol consumption higher than 30 g of ethanol per session, the history of falls, elevated HDLC and TG independent of other factors. Among women without CMD, the risk of fracture was associated with a fall during the last 12 months.

P431
CLINICAL PROFILE OF PATIENTS WITH OSTEOPOROSIS TREATED WITH ZOLEDRONIC ACID

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Objective: Zoledronic acid is an intravenous, highly potent amin-obisphosphonate and the first once yearly treatment to have been approved for use in patients with postmenopausal osteoporosis or at high risk of fracture. The aim of this work is to study the clinical profile of patients with osteoporosis treated with zoledronic acid.

Methods: 10-month prospective study including patients with osteoporosis treated with zoledronic acid. Indications for treatment are: postmenopausal osteoporosis (PMO), corticoid-inducted osteoporosis (CIO), severe osteoporosis with or without hip fracture. Osteoporosis is defined by a femoral neck T-score and/or lumbar spine ≤-2.5 by DXA. Zoledronic acid is administered as an annual infusion of 5 mg with premedication. A pretreatment assessment including serum creatinine and serum calcium and oral assessment was performed prior to infusion of zoledronic acid.

Results: We collected 14 patients treated with zoledronic acid with good clinical tolerance including 11 women; the average age is 61 y. Among women, there were 04 cases of PMO, 01 case of hyperparathyroidism and 06 cases of CIO: the underlying pathologies were rheumatoid arthritis (RA) in 03 patients, one case of Gougerot-Sjögren syndrome and 02 cases of sarcoidosis. All men had CIO: a 23 years old man with lupus, a 74 years old man with RA, and a 47 years old man with Still's disease. 08 patients had a T-score ≤-3 and 7 patients had at least one fracture: severe in 4 patients including 3 fractures of the upper end of the femur, nonsevere in 4 patients.

Conclusion: Zoledronic acid is indicated for the treatment of postmenopausal osteoporosis, osteoporosis in man at high risk of fracture, particularly in patients who have had a recent hip fracture secondary to moderate trauma; osteoporosis associated with long-term systemic corticosteroid therapy in postmenopausal women, in men at high risk of fracture, and treatment of Paget's disease in adults (2). In our series of patients treated with zoledronic acid the indications were osteoporosis complicated by fracture or severe osteoporosis with T-score≤-3. The majority of our patients treated with zoledronic acid have severe osteoporosis complicated with fractures. Intravenous zoledronic acid 5 mg once a year is a convenient and effective treatment option especially in our patients at high risk of fracture.

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P432
TBS WORSE THAN BMD IN NONOSTEOPOROTIC ELDERLY INDIVIDUALS IN IRAN: BUSHEHR ELDERLY HEALTH PROGRAM

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Objective: BMD and trabecular bone score (TBS) are moderately correlated. TBS is sometimes used as an adjuvant to BMD in the fracture risk assessment. Some individuals with normal BMD or osteopenia, have more degraded TBS. We aimed to identify factors associated with TBS worse than BMD in nonosteoporotic elderly population.

Methods: The study subjects included 2384 elderly women and men participating in the second stage of the Bushehr Elderly Health program, a population-based prospective cohort study. The BMDs of the lumbar spine, total hip and femoral neck and the lumbar spine texture were measured using DXA and the TBS algorithm, respectively. Subjects were categorized based on their BMD and TBS status. Logistic regression was performed to identify the factors associated with "TBS worse than BMD" in nonosteoporotic individuals after adjustment for potential confounders.

Results: Of 1398 nonosteoporotic elderly women and men included in the study, 38.6% of 510 women, and 11.7% of 888 men had worse TBS than BMD. In multivariable analysis, after adjusting for potential confounders, TBS worse than BMD in women, was statistically significantly associated with age (OR: 1.06 (1.01-1.11)), waist circumference (OR: 1.07 (1.03-1.10)), and past smoking (OR: 1.72 (1.07-2.76)). However, in men, the condition was statistically significantly associated with waist circumference (OR: 1.10 (1.03-1.17)), smoking, both past (OR: 2.11 (1.06-4.20)), and current (OR: 2.40 (1.05-5.49)) and HDL-C (OR: 1.03 (1.00-1.07)).

Conclusion: The results of the study show that higher waist circumference, and smoking are associated with more degraded TBS than BMD in both men and women. Considering these factors when interpreting normal and osteopenic BMDs may help identify individuals with degraded bone microstructure.
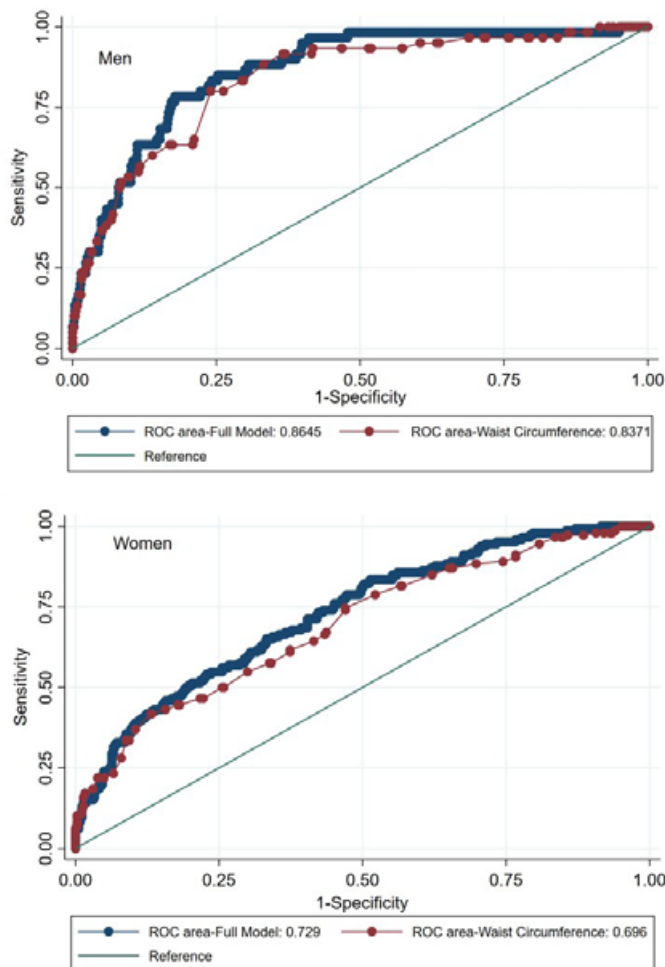
P433
DISCORDANCE BETWEEN BMD AND TBS IN ELDERLY INDIVIDUALS IN IRAN: BUSHEHR ELDERLY HEALTH PROGRAM

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Objective: BMD and trabecular bone score (TBS) are two determinants of bone health. While BMD determines bone mass, TBS is a surrogate of bone microstructure and bone quality. BMD and TBS are moderately correlated. However, some individuals have more degraded TBS compared to BMD, whereas others have a better TBS than BMD. We aimed to evaluate the frequency of discordance between different BMD and TBS categories in elderly women and men.

Methods: The study subjects included 2384 elderly women and men participating in the second stage of the Bushehr Elderly Health program, a population-based prospective cohort study. The BMDs of the lumbar spine, total hip and femoral neck and the lumbar spine texture were measured using DXA and the TBS algorithm, respectively. Subjects were categorized based on their lowest BMD T-score to three groups of normal, osteopenia, and osteoporosis. They were also categorized according to their TBS to three groups of normal, partially degraded and degraded. Concordance was defined as either normal/normal, osteopenia/partially degraded, or osteoporosis/degraded. Discordance was defined as "TBS worse than BMD" and "BMD worse than TBS" based on different categories.

Results: Distribution of the 1230 women in the different BMD and the TBS categories showed that 11.87% had a "TBS worse than BMD", 52.28% had concordant BMD and TBS, and 38.85% had a "BMD worse than TBS". However, "TBS worse than BMD", concordance, and "BMD worse than TBS" were observed in 5.2%, 37.6%, and 57.2% of 1154 men, respectively.

Conclusion: The results of the study show that discordance between TBS and BMD is frequent, especially in men who tend to have worse BMD than TBS. However, TBS worse than BMD, is observed more commonly in women compared to men. Considering these factors when interpreting BMDs, especially in women, may help identify individuals with degraded bone microstructure.
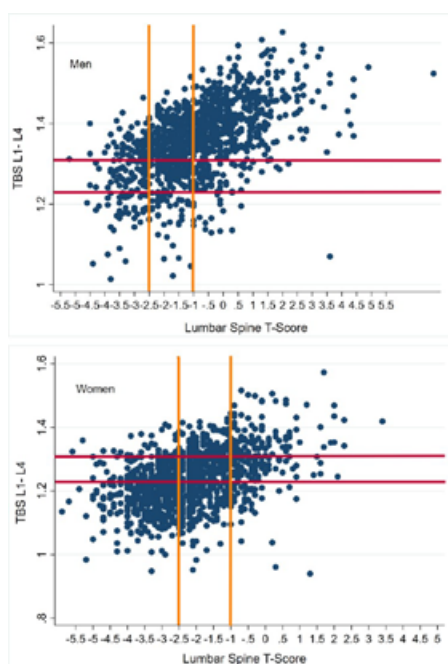
P434
EVALUATION OF THE THERAPEUTIC EFFECT OF PHYSICAL AGENTS IN COMPLEX REGIONAL PAIN SYNDROME BY INFRARED THERMOGRAPHY

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Objective: In complex regional pain syndrome (CRPS), sympathetic dysfunction to being responsible for hyperthermia, that might be detected by infrared thermography. The aim of our study was to evaluate the effects low-level laser therapy (LLLT) and interferential current (IFC) in the treatment of CRPS type I after ankle fracture, by infrared thermography.

Methods: The prospective randomized study included 24 patients with unilateral CRPS type I after ankle fracture, that had been diagnosed clinically on the basis of the modified research diagnostic criteria defined by the Budapest consensus group. In all patients, radiographic findings were shown a localised demineralization of the bone in the affected extremity. LLLT and kinesitherapy were applied in group A (n=13), whereas group B (n=11) was treated with IFC and kinesitherapy. LLLT (power of 70 mW, wavelength of 810 nm, modulated mode frequency of 70 and 5000 Hz) was applied on eight points along joint line and painful zone of the affected area with 1.5 J/cm^2. Bipolar IFC was applied, with 90 Hz frequency, for 15 min with electrodes positioned locally on the painful and swollen part. For assessment of the therapeutic effect, temperature asymmetry between the symmetrical regions of interest was detected by infrared thermography (Varioscan high resolution 3021). Temperature asymmetry was calculated as the temperature difference in maximal temperature values, between ROIs of unaffected and affected lower extremity (ΔT_{max}).

Results: The quantitative analysis of the thermograms, before the applied therapy, in group A was measured the mean ΔT_{max} 1.86±1.09°C, which after the applied therapy was statistically significant reduced to 0.81±1.01°C (t=4.891; p<0.001). In group B, before the applied therapy was measured the mean ΔT_{max} 1.38±1.06°C, which after the applied therapy was statistically significant reduced to 0.68±0.96°C (t=6.185; p<0.001).

Conclusion: The results of this study show that both physical procedures are efficient in the treatment of CRPS type I.

P435

DOES AGE AND SEX MATTER AMONG THE RELATIONSHIP BETWEEN HISTORY OF PHYSICAL ACTIVITY LEVEL AND FUNCTIONAL CAPACITIES AND BODY COMPOSITION IN ELDERLY PEOPLE?

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Objective: Being active and history of physical activity (PA) habits are nowadays recognized as important predictor to prevent physical aging. However, it is unclear if sex or age influence this relationship and if a subtype of voluntary PA is more efficient to maintain healthy aging. Thus, we aim to assess the impact of the last 5 years of PA level and functional capacities and body composition among elderly people.

Methods: Functional capacities using different validated tests (i.e., grip strength, timed up and go, sit-to-stand, muscle power, alternate step test, leg extension, VO2 max), body composition (fat & fat-free masses) using DXA were assessed. Last 5 years of global (total) and specific (aerobic, resistance or body and mind) PA levels (duration) were obtained through a questionnaire. Multiple regressions, adjusted on age, sex and BMI, were performed to assess the relationship between past PA level and body composition or functional capacities. Subgroup analysis, according to the sex and age (<65 y vs. ≥65 y) were also performed using Pearson Correlations.

Results: 525 subjects (61.7±8.1 y; women: 68.9%; BMI=26.4±4.8 kg/m²) were enrolled. After adjustment on confounding factors, past level of PA has no impact on functional capacities and body composition, regardless of sex. Among people under 65 y, there is no relationship between time spent on total physical activity and functional capacities or body composition. However, our study found a significant correlation between total physical activity and balance (r=0.19; P=0.01), alternate-step test (r=0.24; P=0.02) and VO2 max (r=0.19; P=0.02) in people aged 65 and over. More precisely, the time spent on cardio and resistance activities influence balance (r=0.16; P=0.03 and r=0.15; P=0.04, respectively) in in this age category.

Conclusion: Our results highlight that PA history has little or no influence on functional capacities and body composition in healthy aging population.

P436

SERUM VITAMIN D LEVELS AND MORTALITY IN MEXICANS: RESULTS FROM THE MEXICAN HEALTH AND AGING STUDY

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Objective: The population in Latin America is aging. Elders face several obstacles for good health, including an elevated frequency of vitamin D deficiency[1]. Identification of patients at high risk to develop its negative consequences should be a priority. We aimed to determine if levels of vitamin D lower than 15 ng/ml are associated with high mortality in Mexican elderly population, from the database of the Mexican Health and Aging Study (MHAS).

Methods: Prospective, population study in Mexico, that included subjects of 50 y and older who were evaluated for serum vitamin D levels during the year 2012 (third wave of the MHAS). Serum 25(OH)D was measured with a chemiluminescent microparticle immunoassay (Architect Abbott Laboratories. Abbott Park, IL, USA). Its levels were categorized into four groups, based on cutoff points used in previous studies on vitamin D and frailty: <15, 15-<20, 20-<30 and ≥30 ng/ml. Mortality was evaluated during 2015 (fourth wave of the study). Hazard ratio was calculated (for mortality) through Cox regression model, adjusted for covariates.

Results: We included 1626 participants, and those with lower levels of vitamin D were older, more often women, required more aid for activities of daily living, reported higher number of chronic diseases, and lower scores on cognition. The relative risk of death was 5.421 (95%CI 2.465-11.92, p<0.001) for the participants with vitamin D levels <15, which after adjusting for covariates, remained statistically significant (Table 1).

Conclusion: Vitamin D levels 15 or below, are associated with an increase in the mortality rate in community-dwelling senior Mexicans.

Table 1. Vitamin D status and mortality in the Mexican Health and Aging Study (n=1625)

Variable	Hazzard ratio (95%CI)*	p
<15 ng/ml	3.276 (1.401-7.66)	0.006
15-20 ng/ml	0.923 (0.357-2.393)	0.87
20 to <30	1.015 (0.447-2.302)	0.972
≥30	1	

Reference: 1. Carrillo-Vega MF et al. Arch Osteoporos 2017;12:8.

P437

ASSOCIATED RISK FACTORS OF VITAMIN D INADEQUACY IN OSTEOPOROTIC HIP FRACTURE AT POLICE GENERAL HOSPITAL, THAILAND

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Objective: To identify the risk factors of vitamin D inadequacy and to investigate the prevalence and mean of vitamin D inadequacy in patients with fragility hip fracture at Police General Hospital, Thailand.

Methods: A case-control, single-center study was conducted in 274 patients who were at least 50 y of age, presented with a hip fracture caused by a low energy injury and were admitted to Police General Hospital from April 1, 2014 to April 30, 2018. Patients were divided into 3 groups according to serum 25(OH)D level. Demographic data and factors associated with vitamin D inadequacy were analyzed.

Results: Among 258 patients with a hip fracture included for analysis, the majority of them (74.81%) were female. The average age of patients was 78.76 years old. While the mean of vitamin D level was 19.64 ng/ml, the prevalence of vitamin D inadequacy was 86.05%, consisting of vitamin D insufficiency (28.69%) and vitamin D deficiency (57.38%). BMI ≥23 kg/m^2 and fall ≥2 times were found to be the associated risk factors for vitamin D inadequacy. Meanwhile, the factors associated with vitamin D deficiency include female gender, BMI ≥23 kg/m^2, fall ≥2 times and serum PTH level >65 pg/ml.

Conclusion: Patients with fragility hip fractures had lower vitamin D levels and a higher prevalence of vitamin D inadequacy compared to that of the healthy Thai population. Serum 25(OH)D level examination and vitamin D supplement are recommended in this patient group, especially those with risk factors, i.e., female gender, obesity and high risk for falling.

P438

FEASIBILITY, SAFETY AND EFFECTIVENESS OF A 16-WEEK HOMEBASED HOPPING AND JUMPING PILOT EXERCISE INTERVENTION IN POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY

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Objective: High impact exercise is recommended to improve bone health, but the feasibility and efficacy of home-based exercise in postmenopausal women with low BMD is unclear. We aimed to determine feasibility, safety and changes in BMD, bone microarchitecture, physical function, and bone turnover markers, following a pilot 16-week home-based high-impact exercise intervention in postmenopausal women with osteopenia or osteoporosis.

Methods: 50 community-dwelling postmenopausal women with BMD T-scores < -1.0 participated in 16 weeks of homebased exercise progressively increasing to 50 multidirectional unilateral hops on each leg for 7 days per week. Bone density and structure were assessed by lumbar spine and total hip DXA, 3D modelling algorithms (3D-SHAPER) of hip DXA scans, and distal tibial HR-pQCT scans. Physical performance was assessed by repeated chair stand time and stair climb time.

Results: 44 (88%) women (mean±SD age 64.5±7.5 y) completed the intervention, with adherence to exercise sessions of 84.7±18.0%. Six (12%) women withdrew from the study due to related soreness (n=2), unrelated injury (n=1) and loss of interest (n=3). Femoral neck areal BMD significantly increased by 1.13±3.76% (p=0.049). Trabecular volumetric BMD of the total hip and femoral neck estimated by 3D-SHAPER significantly increased by 2.27±7.03% (p=0.038) and 3.20±5.39% (p<0.001), respectively. Additionally, femoral neck integral (trabecular plus cortical) volumetric BMD increased by 1.81±4.33% (p=0.010). At the distal tibia, total volumetric BMD significantly increased by 0.32±0.88% (p=0.032) and cortical cross-sectional area significantly increased by 0.55±1.54% (p=0.034). Chair stand and stair climb time significantly improved by -2.3±1.88s (p<0.001) and -0.27±0.49s (p<0.001), respectively.

Conclusion: A homebased 16-week high impact exercise intervention was feasible and effective in improving femoral neck areal BMD, total hip and distal tibial volumetric BMD, and physical function in postmenopausal women. Homebased high impact exercise interventions may reduce risk factors for fracture in older populations with limited access to clinic- or gym-based programs.

P439

THE RELATIONSHIP BETWEEN THE CONCENTRATIONS OF MARKERS OF BONE REMODELING IN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOPOROSIS

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Objective: To study the relationship between the concentration of bone remodeling markers in the blood serum of patients with rheumatoid arthritis (RA) and the presence of osteoporosis (OP) according to osteodensitometry.

Methods: We examined 88 patients with a reliable diagnosis of RA. Age of the patients ranged from 18-69 y. The diagnosis of RA was made on the basis of the 2010 EULAR diagnostic criteria (2010 American College of Rheumatology/European League Against Rheumatism Rheumatoid arthritis classification criteria). The diagnosis of OP was made on the basis of WHO criteria (for women over 50 in the postmenopausal period) and the Recommendations of the International Society of Clinical Densitometry. All patients underwent DXA. All patients measured levels of markers of bone remodeling: the C-terminal telopeptide of

collagen type I, N-terminal propeptide of procollagen type I, 25-OH vitamin D, calcium blood using commercially available kits. **Results:** After measuring BMD using DXA, all patients were divided into 2 groups depending on the diagnosis of OP: group 1 - patients with RA having OP (n=22) and group 2 - patients with RA not having OP (n=66). The level of the C-terminal telopeptide of type 1 collagen in the blood serum of patients of the 1st group was 0.85±0.54, in the 2nd group - 0.62±0.27 ng/ml (F=6.95, p=0.009); the level of P1NP 88±4.35 and 49.8±4.29 ng/ml, respectively (F=11.02, p=0.001); the level of 25-OH vitamin D 41.47±3.7 and 52.9±7.77 ng/ml (F=7.58, p=0.007); blood calcium levels of 2.39±0.13 and 2.45±0.23 mmol/l (F=0.69, p=0.41). **Conclusion:** Patients with RA suffering from OP have a significantly higher level of C-terminal telopeptide of type 1 in blood serum (p=0.009), P1NP (p=0.001) than in patients without OP. In patients with RA suffering from OP, a significantly lower level of 25-OH vitamin D was detected than in patients without OP. Significant change in blood calcium concentration when comparing the two groups were observed.

P440
SOCIOECONOMIC DEPRIVATION INCREASES SECONDARY CARE HEALTH COSTS IN THE YEAR FOLLOWING HIP FRACTURE IN ENGLAND

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Objective: Deprivation predicts poorer health outcomes. We quantified differences in hospital costs post hip fracture (HF) between those living in higher and lower deprivation areas of England and investigated potential mediators of such differences.

Methods: We used English Hospital Episodes Statistics linked to the National HF Database (04/2011-03/2015) and national mortality data to identify patients admitted with HF aged 60+ years. Hospital care was costed using 2017/18 national reference costs, by Index of Multiple Deprivation quintile. Three generalised linear model regressions estimated associations between deprivation and costs, and the pre- and post-fracture variables that mediate this relationship.

Results: We identified 213,607 hospital admissions with an index HF; mean (SD) age 83 (8.4) y, 73% female. The total mean inpatient care cost in the year post HF was £12,949 per patient (95%CI £12,931, £12,984). Of this £9445 (£9424, £9465) was incurred during the index admission and £3504 (£3471, £3530) through readmission costs. Patients from the most deprived areas had higher hospital costs in the year post-HF (£1120 [£993, £1247]) than those from the least deprived areas. The National Health Service (NHS) would save £28.8 million annually in hospital costs alone if all patients had the same costs as those in least deprived areas. Pre-HF characteristics, particularly comorbidities and anaesthetic risk grade, accounted for ~50% of the association

between deprivation and costs. Post-HF factors, e.g., early mortality/transitions in care, did not explain the association between deprivation and costs.

Conclusion: Socioeconomic inequalities are associated with substantial NHS costs after HF. Much of the association between deprivation and health cost is explained by poorer preexisting health in patients living in deprived areas. Findings have implications for public health provision addressing lifestyle factors, physical activity patterns and social isolation. Research addressing in-hospital decision making as applied to individuals with varying deprivation backgrounds is warranted.

P441
STRUCTURAL RESONANCE" ELECTROMAGNETIC THERAPY IN PATIENTS SUFFERING FROM RHEUMATOID ARTHRITIS

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Objective: To study the comparative effectiveness of structural resonance electromagnetic (SREM) therapy and conventional methods for treating patients with RA. SREM therapy is the technique based on exposure to an organism with an alternating electromagnetic field, the parameters of which correspond to the frequencies of spontaneous biopotential activity of organs and tissues of a healthy organism.

Methods: We observed 70 patients with RA including 52 women (74.3%), and 18 men (25.7%). The average age of patients was 42.5 y and average duration of the disease was 7 y. Patients were divided into two groups, comparable in clinical characteristics of the disease. 40 patients of main group received 10-15 daily sessions of SREM therapy on the REMATERP™ device on the background of pharmacotherapy. The control group of 30 people received similar medication. The analysis of the effectiveness of therapy was carried out by studying the dynamics of required clinical and laboratory indicators of treatment effectiveness and their comparison in patients of the main and control groups before and after treatment.

Results: The treatment results were significantly better in the main group of patients with RA (χ^2=7.57; p<0.01), where there was a significant positive trend: a decrease in the inflammatory index, articular count, morning stiffness, a decrease in ESR, C-reactive protein, and seromucoid. Therefore, in the group of patients who received structural resonance therapy, not only analgesic, but also a more pronounced anti-inflammatory effect was observed (χ^2=4.44; p=0.05). It can be assumed that low-frequency electromagnetic fields influence on activation of regulation of local blood flow, increase of tissue resorption capacity, which leads to a weakening of muscle tonus, an increase in the excretory function of the skin and a decrease in edema in the focus of inflammation. In addition, the compression of painful conductors is reduced due to electroosmosis.

Conclusion: Structural resonance electromagnetic therapy is an effective and safe therapeutic technique that affects various links of RA pathogenesis.

P442
LOCUS OF CONTROL IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: The study of the characteristics of the locus of control is an essential component of the study of the psychological traits of patients with ankylosing spondylitis (AS). The aim of our study was to investigate the locus of control parameters in AS patients.

Methods: The average age of patients with AS was 40.14±13.8 y, and the average duration of the disease was 4.22±3.69 y. A locus of control (of subjective control) was studied according to the Rotter's Locus of Control Scale in E.F. Bazhin adaptation, 1987, using a statistical analysis of clinical and psychological data from 23 patients with AS.

Results: Patients with AS show a marked tendency to externality in the general sphere (3.6±2.58), as well as in the field of failures (3.2±2.6), in family relationships (3.9.2±2.4), relations of production (3.7±1.14) and in relation to health (4.3±2.2). Internality trends are observed in the sphere of interpersonal interactions and on the scale of internality in the field of achievements (6.8±2.24 and 5.9±2.41, respectively). A correlation between the indicators of the level of subjective control and other clinical and psychological characteristics, such as the age of AS patients, the activity and duration of the disease, the level of neurotic traits of the patients has not been established. The exception was the significant negative correlation between "Denial" psychological defense mechanism and the index of internality in relation to the disease (r=-0.83 at p=0.028).

Conclusion: The role of the patient, assimilated by most AS patients, and the symptomatology of the disease itself, form a feeling of helplessness in patients, the need for empathy and care of significant others, the hope that relief of the condition will be the result of exposure to external factors independent of the patient. These changes can impede the implementation of adequate therapeutic measures and are the goal of psychotherapeutic intervention themselves.

P443
CATHEPSIN S GENE EXPRESSION MEASURED IN THE PERIPHERAL BLOOD OF OSTEOARTHRITIC PATIENTS PRIOR TO SURGERY AS A BIOMARKER OF POSTOPERATIVE PAIN DEVELOPMENT

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Objective: Osteoarthritis (OA) is a chronic rheumatic disease, which involves pain, limited inflammation and local destruction of the knee joint. OA pain is a prerequisite for joint replacement in the endstage OA. However, chronic postoperative pain represents a major adverse result of surgery, which is observed in 10-40% of OA patients. Therefore, identification of patients potentially capable of developing chronic postoperative pain prior to surgery could significantly improve therapy outcome. We hypothesized that genes related to pain sensitization whose expression is up-regulated in about 10-40% of the examined endstage OA patient cohort might be responsible for postoperative pain. We aimed to examine the validity of our hypothesis.

Methods: We examined peripheral blood of 26 healthy volunteers (aged 55±8.3 years old) and 40 endstage OA patients (aged 56.5±8.9 years old) undergoing knee joint replacement surgery. Patients were examined before and 6 months after surgery. Pain indices according to VAS of 30% and higher were considered. Total RNA isolated from whole blood was used in gene expression studies performed with quantitative real-time RT-PCR for caspase 3; metalloproteinase (MMP)-9; tissue inhibitor of metalloproteinase TIMP1; cathepsins K and S.

Results: After 6 months' postsurgery pain complaints were obtained from 9 patients (22.5%). Prior surgery all the examined genes were significantly higher in the patients who developed postoperative pain compared to healthy controls and those subjects who did not develop pain after surgery. ROC curve analyses confirmed significant associations (p<0.05) between expressions of the examined genes prior surgery with the possibility of pain development after surgery. The cut-off values for the examined gene expressions were 11.34 for cathepsin S (sensitivity of 0.89 and specificity of 0.76), 10.11 for caspase 3 (sensitivity of 0.86 and specificity of 0.65), 9.64 for TIMP1 (sensitivity of 0.89 and specificity of 0.57), 10.09 for cathepsin K (sensitivity of 0.86 and specificity of 0.78). Cathepsin S expression was the most informative predictor of postoperative pain development [AUC=0.857, 95%CI (0.708-1.000)].

Conclusion: High cathepsin S gene expression in the peripheral blood of the endstage OA patients measured prior to joint replacement surgery could serve an important biomarker of postoperative pain development.

P444
EFFICACY AND SAFETY OF AMTOLMETIN GUACYL (AMG) IN THE MANAGEMENT OF KNEE OSTEOARTHRITIS AND ASSOCIATED DYSPEPSIA IN ROUTINE CLINICAL PRACTICE: AGATA STUDY

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Objective: Non-steroidal anti-inflammatory drugs (NSAIDS) remain the mainstay of therapy to reduce pain and disease activity. However, their impact on gastrointestinal (GI) safety is a major cause of concern which jeopardizes their therapeutic role. The annual incidence of dyspepsia is approximately 25-50% in patients taking non-specific NSAIDS. We aimed to evaluate the efficacy and safety of AMG in the management of osteoarthritis (OA) of knee and associated dyspepsia in a routine clinical practice.

Methods: 219 out patients (M-37, F-182) with knee joint (KJ) ≥40 mm on VAS and dyspepsia were included. AMG was administered in doses 600 mg twice daily. Patients were examined at baseline, day 14±3, and at day 28±3 for severity of pain on VAS, WOMAC pain and stiffness, and severity of dyspepsia assessment (SODA).

Results: Of 219 OA patients. approximately 72.5% of patients reported a decrease in pain in the target KJ by 40% at the end of the study. Main pain reduced from 65 mm at baseline to 27 mm at the end of the study. A significant decrease in WOMAC pain score (from 239 to 120), morning stiffness (from 100 to 58), decrease in functional limitations in all the domains of the WOMAC questionnaires statistically significant (p=0.001). A significant decrease in SODA score and an increase in satisfaction was observed. AMG tolerability was comparatively better than previously used NSAIDs.

Conclusion: AMG is effective and safe in OA patients with associated dyspepsia and has comparatively better tolerability than other NSAIDs.

P445
DNASE AND HYALURONIDASE SERUM ACTIVITY IN DIFFERENT CLINICAL SUBSETS OF ANKYLOSING SPONDYLITIS

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Objective: Clinical heterogeneity of ankylosing spondylitis (AS) as requires further investigation. The study of catalytic serum activity as biomarkers of disease activity for distinct disease subsets are needed. We aimed to make a comparative assessment and establish the clinical significance of DNAse and hyaluronidase activity of blood serum in various subsets of AS.

Methods: The study was performed in accordance with the ethical principles of biomedical research. All patients signed an informed consent. 173 patients with diagnosis of AS according to the modified criteria of the New York classification of 1984 were examined (153 men (88.44%), 20 women (11.56%)). The average age of patients was 39.66±10.09 y (95%CI: 38.15-41.17). The control group consisted of 33 healthy volunteers, men 28 (84.85%), women 5 (15.15%). The average age was 36.46±9.18 y (95%CI: 33.75-39.80). There were no significant differences in age and gender between patients with as and healthy individuals (p>0.05). DNAse and hyaluronidase serum activity was determined by rivanol clot prevention test.

Results: Based on a comprehensive assessment of the clinical picture of the disease, analysis of medical documentation, laboratory examination data and visualization, clinical subsets of as were identified: with isolated axial lesion (n=94), with coxitis (n=31), and with peripheral joint involvement (n=48). Serum DNAse activity in AS patients was significantly higher (3.21; 95%CI: 3.06-3.37) compared to healthy individuals (0.00; 95%CI: 0.00-1.00). The highest level of DNAse activity of blood serum was detected in patients with coxitis (3.71; 95%CI: 3.38-4.04), it significantly exceeds the levels in patients with axial isolated process (3.21; 95%CI: 2.99-3.44; p=0.024), as well as peripheral joint involvement (2.92; 95%CI: 2.67-3.16; p=0.0002). In the case of AS with peripheral joint involvement, the level of DNAse activity of the blood serum was the lowest. Serum hyaluronidase activity in AS patients was significantly higher (2.74; 95%CI: 3.06-3.37) compared to healthy individuals (0.00; CI: 0.00-1.00). Serum hyaluronidase activity was higher in patients with coxitis (3.07; 95%CI: 2.77-3.36, p=0.0097) and peripheral joint involvement (2.96; 95%CI: 2.70-3.22; p=0.017) compared to patients with the axial variant of the disease (2.54, 95%CI: 2.34-2.75).

The relationship between serum DNAse activity and ESR and CRP was found in all patients with AS (0.36; p<0, 001 and 0.39; p<0,001, respectively), in patients with coxitis (0.56; p=0.001 and 0.55; p=0.001, respectively), and AS with peripheral joint involvement (0.33; p=0.023 and 0.51; p<0,0001, respectively). In isolated axial lesions, the relationship of DNAse activity with ESR and CRP levels was established (0.26; p=0.011 in both cases).

The relationship between serum hyaluronidase activity and CRP was established in patients with peripheral joint involvement (0.39; p=0.061).

Conclusion: DNAse and hyaluronidase activity of blood serum differ in clinical subsets of AS. The highest level of DNAse activity was detected in patients with coxitis. Serum hyaluronidase activity is higher in patients with coxitis and peripheral joint involvement compared to patients with the axial subset of the disease. The significance of serum DNAse and hyaluronidase activity in AS additional laboratory markers of activity of extra-axial manifestations of the disease is confirmed by the identified relationships between DNAse and hyaluronidase activity of blood serum and levels of acute phase indicators (ESR, CRP) in clinical subsets of AS.

P447

ASSOCIATIONS OF CAROTID PLAQUE CALCIFICATIONS WITH CAROTID INTIMA-MEDIA THICKNESS AND CARDIOVASCULAR RISK IN PATIENTS WITH OSTEOPOROSIS AND OSTEOPENIA

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Objective: Changes in the extracranial vessels can serve as pre-dictors of future cardiovascular events. Plaque calcifications and measures of carotid intima-media thickness (CIMT) are indirect indicators of high cardiovascular risk in patients with different rheumatoid diseases. We aimed to examine the connection of carotid plaque calcifications and carotid intima-media thickness (CIMT) with cardiovascular risk (GRACE risk score) in patients with osteoporosis and osteopenia.

Methods: The study involved 71 women of age range between 60-85 y, categorized into three groups: 1) 24 patients with osteoporosis; 2) 24 patients with osteopenia; 3) 24 clinically healthy controls. Sonographic assessment of carotid plaques was performed through the ultrasound system ESAOTE MyLab 7, following the standard methodology. The three groups of participants were compared on cardiovascular risk (GRACE risk score) and CIMT through ANOVA and Bonferroni's post hoc test. Kruskal-Wallis test was used to compare the three groups on the number of carotid plaque calcifications, followed by Mann-Whitney test for post-hoc pairwise comparisons. The associations of carotid plaque calcifications and CIMT with GRACE risk score were examined through the Spearman rank-order correlation.

Results: The osteoporosis and osteopenia patients had similar mean GRACE risk scores (osteoporosis group GRACE score=147.21±11.07; osteopenia group GRACE score=145.95±12.40), with no significant difference between them (p=0.728). Both patient groups were significantly different from the healthy controls with GRACE risk score=120.58±9.44: osteoporosis groups vs. healthy controls (p<0.001); osteopenia group vs. healthy controls (p<0.001). The highest CIMT mean value (1.16±0.11 mm) was observed in the patients with osteoporosis vs. 1.12±0.14 mm in the group with osteopenia and 1.05±0.12 mm in the healthy controls. A significant difference was found between the osteoporosis group and the healthy controls (p=0.036), whereas the other two comparisons were not significant: osteoporosis group vs. osteopenia group (p=0.771); osteopenia group vs. healthy controls (p=0.159). The median number of carotid plaque calcifications was the same in the patient groups with no significant difference (p=0.866) vs. a median of zero in the healthy controls (p<0.001). Carotid plaque calcifications showed a significant positive correlation with GRACE risk score (r_s=467, p<0.001). A significant correlation was also observed between CIMT and GRACE risk score (r_s=367, p=0.002)

Conclusion: Both osteoporosis and osteopenia patients showed an increased risk of cardiovascular events, higher CIMT measures and higher number of carotid plaque calcifications in comparison to the healthy controls. Plaque calcifications and CIMT were associated with increased cardiovascular risk in rheumatoid patients with osteoporosis and osteopenia.

P449

DIFFERENCE IN BONE LOSS IN PATIENTS WITH EROSIVE AND NONEROSIVE HAND OSTEOARTHRITIS: A TWO-YEAR LONGITUDINAL STUDY

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Objective: Hand osteoarthritis (OA) and its more severe subset erosive hand OA are common causes of pain and morbidity. Some metabolic factors were suggested to be implicated in erosive disease. Few studies investigated differences in systemic bone loss between erosive and non-erosive hand OA. We aimed to o compare the change of BMD between patients with erosive and nonerosive hand OA in a 2-year longitudinal study.

Methods: Consecutive patients with symptomatic HOA fulfilling the American College of Rheumatology (ACR) criteria were included in this study. Erosive hand OA was defined by at least one erosive interphalangeal joint. All patients underwent clinical assessments of joint swelling and radiographs of both hands. DXA examination of lumbar spine, total femur and femur neck was performed at the baseline and after 2 y.

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Results: Altogether, 144 patients (15 male) with symptomatic nodal HOA were included in this study and followed between April 2012 and January 2018. Out of these patients, 82 had erosive disease after two years. The disease duration (p<0.01) was significantly higher in patients with erosive compared with nonerosive disease at baseline.

Osteoporosis (T-score <-2.5 SD) was diagnosed in 12.5% (9/72) of patients with erosive hand OA and in 8.06% (5/57) of patients with non-erosive hand OA. BMD was significantly lowered in patients with erosive compared with nonerosive disease at baseline (lumbar spine: 1.05 g/cm^2 vs. 1.13 g/cm^2, p<0.05, total femur: 0.90 g/cm^2 vs. 0.97 g/cm^2, p<0.01 and femur neck: 0.86 g/cm^2 vs. 0.91, p<0.05). T-scores of lumbar spine (-0.96 vs. -0.41 SD, p<0.05), total femur (-0.69 vs. -0.33 SD, p<0.05) and femur neck (-1.14 vs. -0.88 SD, p<0.05) were also significantly lowered in patients with erosive compared with non-erosive disease.

Furthermore, we found significant decrease in BMD in patients with erosive compared with nonerosive disease over 2 y (lumbar spine: -3.30% vs. 1.06%, p<0.05, total femur (-1.58% vs. 0.82%, p <0.05) and femur neck (-3.2% vs. 0.02%, p <0.05). The decrease in T- score of lumbar spine (-3.66% vs. 15.52%, p<0.01) and total femur (-4.29% vs. 7.68%, p<0.05) was also significantly higher in erosive compared with non-erosive hand OA.

Conclusion: These results suggest that patients with erosive hand OA are at higher risk for the development of general bone loss.

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P450
VITAMIN D DEFICIENCY IN GEORGIAN MALES WITH MUSCULOSKELETAL DISORDERS. GEORGIAN NATIONAL OSTEOPOROSIS ASSOCIATION

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Objective: Traditionally Vit D is the central figurant for the calcium and phosphorus metabolism, for the accrual and maintenance of bone tissue. As the biochemical evaluation of Vit D status became available, it is valuable to assess Vit D levels in patients with osteoporosis, CVD, endocrine disorders, CNS and neurocognitive disorders.

Methods: We have evaluated 90 men, age range 35-75; 38 Patients diagnosed for RA, 40 males with OS and 12 men with hyperuricemia polyarthritis. Vit D status (25OH D) was measured with radioimunoassay (normal range >20 ng/ml) 60 patients went under measurement of bone mass DXA HOLOGIC-1000.

Number of Patients n=90	25OH D (>30 ng/dl)	T-Score n=60
RA n=38	10.2±6.2	- 2.9±1.2
OA n=40	23.8±2.7	-1.7±0.39
PA n=12	18.9±5.2	1.4±1.08
Total n=90	19.2±4.71	-1.9±1.36

Results: From the study population (n=90) 76 patients (85%) Vit D status was below normal (19.2±4.71). The lowest indicators of 25OH D was detected in men with RA from 35-55 y. Lowest BMD was detected in patients with RA. Hyperuricemic patients were diagnosed for normal BMD. Correlation between Vit D levels, OP – bone mass decrease degree and clinical manifestations was not established.

Conclusion: Study population number cannot be generalized on Georgian male population in whole, but we can link following:

1. If we focus on age of vit D deficiency, could this serve as a reason of infertility
2. Is vit D deficiency in connection with pharmacotherapy of RA
3. How vit D hormonogenesis is linked with RA pathology mechanism

It is important to continue research towards directions mentioned above In order to establish an evidence for use of Vit D preparations and correction of biochemical deterioration of Vit D status

P451
IMPLEMENTING MOBILE HEALTH TECHNOLOGY IN THE PATIENT-CENTERED MEDICALLY ORIENTED GYM SETTING TO ACTIVATE PATIENTS WITH LOW BONE MINERAL DENSITY: A FEASIBILITY STUDY

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Objective: To evaluate the feasibility of implementing osteogenic loading (OL) technology and mobile device applications to promote consumer activation through health literacy on the minimum dose-response of multiple-of-bodyweight (MOB) compressive forces.

Methods: Twenty subjects from a medically oriented gym were recruited. Inclusion/Exclusion: 45 years of age or older with osteopenia, sarcopenia and multiple chronic conditions. Forces that compress bone via impact activity can stimulate adaptive response of BMD growth beyond 4.2 MOB.[1, 2] Loading using an OL modality are higher than those seen conventionally: 1.26 to 1.54 MOB in the hip.[3] Recent findings suggest that adding an OL modality 1 x/wk to standard therapy can have positive effects on outcomes in elderly populations with multiple chronic conditions.4 Standard therapy included high-intensity strength training, Tai Chi for balance, and functional mobility 2-3 x/wk. Participants received an OL session in which they were trained to use integrated mHealth applications to record impact through the lower extremities. These applications were also used to facilitate intervention adoption and fidelity which included holding the smartphone against the hip joint while absorbing impact.

Results: Tests showed 40 consistent results (20 heel and 20 hip) of 4.34 MOB at the heel, and 3.20 MOB at the hip (ANOVA p<0.0001). Post-intervention survey results showed participants: 1) strongly agree that integrated technology influenced their

satisfaction and decision to continue post-discharge; 2) strongly agree that OL therapy impacted confidence/functional mobility; and 3) agree that adoption and scalability are feasible with adaptations. No adverse effects were reported.

Conclusion: This feasibility study provides preliminary evidence on whether patients and their caregivers can learn to use a post-discharge monitoring smartphone app and assess patient and provider satisfaction. These data also reflect the known level of deceleration seen with the musculoskeletal system when reviewing the difference between heel and hip loading events. Health systems and communities are dedicating efforts to knowledge translation and quality improvement programs. We leveraged widespread consumer access to mobile technology to address gaps in knowledge and adherence on dose-response to osteogenic adaptation. These data support the preliminary feasibility of implementing mHealth in community-based primary care settings for patient activation with individuals at risk for fracture. Consistent with previous findings, these data support integrative use of standard care OL technology as an effective part of comprehensive bone health program. The data also reflect the known level of deceleration between the heel and hip loading events.

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P452
RANGE OF MOTION OF THE KNEE IN PATIENTS WITH OSTEOARTHRITIS AFTER REHABILITATION

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Objective: Physical therapy and rehabilitation may have a favorable effect on the range of motion in patients with knee osteoarthritis (OA). The aim of this study was to establish the effect of the physical therapy and rehabilitation on the range of motion of the knee (flexion and extension) in patients with knee OA.

Methods: The study was designed as a retrospective study that included 40 consecutive knee OA patients (32 female and 8 male), the average age of 66.4±8.1 y with the diagnosis of knee OA according to American College of Rheumatology, that were hospitalized and treated in a rehabilitation center. The average duration of the rehabilitation was 18.3±5 d. The program that consisted of kinesitherapy, occupational therapy, balneotherapy as well as procedures of the physical therapy was performed in all patients. The instrument used for measurement of the range of motion of the knee in these patients was a goniometer. Flexion and extension of the knee were measured and registered at the

beginning and at the end of the rehabilitation for each patient as well as the duration of rehabilitation and age of the patients. Student t-test was used to analyze numerical data.

Results: The average value of the knee flexion was 97.9±13.4 and of knee extension -1.9±3.9° at the beginning and 108.5±10.8° of flexion and -0.75±2.1° of knee extension at the end of rehabilitation. The values of the knee flexion and extension of the patients with knee OA at the end of the rehabilitation were significantly higher than at the beginning (t=-8.648, p<0.001, t=-3.365, p<0.01 respectively).

Conclusion: Results of our research show that the range of motion at the end of the rehabilitation of the knee OA patients is significantly higher in relation to the amplitudes of knee flexion and extension at the beginning of the rehabilitation. These findings can be important for planning of early rehabilitation of these patients.

P453
POTENTIAL EFFECTS OF REACTIVE OXYGEN SPECIES (ROS)

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ROS are radicals, ions or molecules that have a single unpaired electron in their outermost shell of electrons.

Interaction with inflammatory processes: ROS produced in vivo by endothelial, inflammatory and immune cells by various cellular pathways have two actions. The first one is its role in oxidative stress and tissue injury and second one is its participation in redox signalling.

Inflammation encompasses both these aspects of ROS function. The onset of the inflammatory cascade is the coordinated event that occurs in part via redox signalling events that cause the recruitment and adherence of immune cells to the site of infection or injury. Indeed immune cells, dendritic cells, epithelial cells and endothelial cells all produce ROS upon activation during either infectious or sterile tissue damage. ROS are critical effectors that participate in a plethora of redox-regulated cellular events eventually leading to the resolution of inflammation. Excessive ROS generation, however, results in inflammatory tissue damage, organ failure and the development of a variety of chronic inflammatory diseases [1].

Complementary data: Hydrogen peroxide (H_2O_2) is produced by reduction of superoxide (O_2^-) through dismutation. Hydroxyl radical (OH^-) arises from electron exchange between O_2^- and H_2O_2 via the Harber-Weiss reaction or it is also generated by the reduction of H_2O_2 by the Fenton reaction. When generated under strictly regulated conditions, these ROS, in particular O_2^- and H_2O_2, may act as signalling molecules that mediate physiological processes, such as cell growth, differentiation, metabolism, and survival of cardiomyocytes. This type of intracellular signalling

pathway is termed "redox signalling". On the other hand, excess production of ROS damages DNA, protein, and lipids, thereby cell death in the heart [2]

Conclusion: Studies over the past two decades in various organisms, tissues and cell types have led to a shift in our understanding of ROS: we no longer view them just as molecules that invoke damage but now also appreciate their role in regulating signalling pathways that impinge on normal physiological and biological responses.

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P454
QUALITY OF LIFE IN OSTEOARTHRITIS: ASSOCIATION WITH DEMOGRAPHIC AND CLINICAL VARIABLES

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Objective: Osteoarthritis (OA), a major cause of musculoskeletal pain and physical disability, might have a negative impact on quality of life (OA). The aim of this study was to investigate the relationship of QoL with various demographic and clinical variables in OA.

Methods: 156 patients (mean age 56±10 y, 79.5% female, mean disease duration 7.2±6.4 y) with knee, hip, foot and/or hand OA referring to the outpatient clinic of physical medicine & rehabilitation department of a university hospital were assessed. A needs-based OA-specific QoL scale, Osteoarthritis Quality of Life Scale (OAQoL) was used to evaluate the perceived QoL. Other assessments included severity of pain by 0-10 numeric rating scale, Health Assessment Questionnaire (HAQ), WOMAC, and the Nottingham Health Profile (NHP).

Results: Median OAQoL score was 10.5, showing a medium level of perceived QoL. Moderate significant correlations (Spearman r: 0.50-0.70) were found between QoL and pain, fatigue, emotional functions, physical mobility and physical function. QoL was not related with the number of joints affected by OA. Linear regression model was performed to determine the factors which together explain the variability in QoL. Potential factors, found to be statistically significant in univariate linear regression analyses were used in stepwise regression procedure to select the final multivariable model. Final model included Pain, HAQ, NHP_Energy and NHP_Social Isolation with an adjusted R^2 of 0.645.

Conclusion: QoL was related with pain, fatigue, emotional status and physical function. Regression model including pain, physical function, fatigue and social isolation explained most of the variance in QoL of persons with OA.

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P455
OSTEOSARCOPENIA AND SEVERE OSTEOSARCOPENIA IN COPD PATIENTS

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Objective: To assess the frequency of the development as well as the main risk factors for osteosarcopenia and severe osteosarcopenia in COPD patients.

Methods: This cross-sectional study included 132 patients with stable COPD (102 males/30 females, mean age 67.6±8.2 y). The patients were assessed according to GOLD 2019. Sarcopenia and its severe stage were diagnosed according to the algorithm developed by the EWGSOP2. The muscle mass was assessed using DXA. We used a semiquantitative assessment method for vertebral fractures (VF) identification on DXA spine images or/ and conventional radiographic. Key risk factors were evaluated using multiple logistic regression analysis.

Results: Osteosarcopenia was detected in 38.6% of COPD patients (n=51). Osteoporotic fractures were present in 26.5% (n=35) of patients. Asymptomatic VF (2-3 grades) were newly diagnosed in morphometric analyses in half of the cases (n=17): 10 patients had multiple VF. The main sites of VF were the levels of Th7-Th9, L1-L3. Severe osteosarcopenia (severe sarcopenia+osteoporotic fractures) was detected in 9.9% of patients (n=13). Osteosarcopenia was found at any severity of COPD. However, very severe airflow obstruction, intake of systemic glucocorticoids, low BMI, group D by GOLD (heavy symptoms and frequent exacerbations) were the main risk factors (p 0.05).

Conclusion: Osteosarcopenia is a frequent pathology in COPD patients. In our study one of the four osteosarcopenic patients had the severe stage of the disease, characterized by osteoporotic fractures, including multiple VF. The risk of osteosarcopenia increases in patients with severe COPD. VF assessment during routine densitometry should be widely used in such patients, as the most osteoporotic vertebral fractures are asymptomatic.

P456
VITAMIN D DEFICIENCY IN COPD PATIENTS

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Objective: To estimate serum vitamin D levels in patients with varying severity of COPD.

Methods: This cross-sectional study included 75 patients with stable COPD (63 males/12 females, mean age 67.4±8.7 y). The patients were assessed according to GOLD COPD 2019. The following procedure were performed in all studied subjects: detailed history (especially symptoms assessment, exacerbation rate, tobacco use), post-bronchodilator spirometry, evaluation of respiratory muscle strength (maximal inspiratory pressure - MIP and maximal expiratory pressure - MEP); assessment of 25(OH)D serum was carried out using chemiluminescent immunoassay on microparticles according to international standards.

Results: The median (25%; 75% percentiles) serum 25(OH)D concentration (ng/ml) for all patients was 13.2 (12; 18.7). A total of 96% of patients have reduced levels of vitamin D. 13.3% (n=10) have vitamin D insufficiency (defined as 20-30 ng/ml), 68% (n=51) have vitamin D deficiency (10-20 ng/ml) and 14,7% (n=11) have severe vitamin D deficiency (< 10 ng/ml). The level of 25(OH)D progressively decreased with increasing severity of the disease according to A, B, C, D assessment tool. The lowest serum 26OHD concentrations were observed in patients of group D, which was characterized by severe symptoms and frequent exacerbations (p=0.01). Vitamin D levels correlated significantly with smoking index (r=-0.34), duration of the disease (r=-0.42), MIP (r=0.48) and MEP (r=0.40), FEV1 (r=0.32).

Conclusion: Vitamin D deficiency and insufficiency are typical for the most COPD patients with any severity of the disease. However, vitamin D serum level is associated with the severity of bronchial obstruction, respiratory muscle strength, disease duration, smoking index. It decreases progressively as the course of COPD becomes severe.

P457
OSTEOPOROSIS ASSOCIATED WITH SYSTEMATIC MASTOCYTOSIS: CASE REPORT

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Mastocytosis a rare disease characterized by abnormal mast cell proliferation and a broad spectrum of manifestations among mastocytosis-related osteoporosis (MRO) is one of the most common. Its pathogenesis has been attributed either to neoplastic infiltration or local release of mast cell mediators that increase osteoclast activity. The more frequent site of involvement is lumbar spine compared to hip. First-line treatment for MRO are bisphosphonates followed by denosumab.

We describe a 33-year-old female with urticaria pigmentosa who was presented with backpain in third trimester of pregnancy. Pain gradually worsened in postpartum-period. MRI revealed a compression fractures of the thoracic spines (Th 9,10,11) and lumbar spines (L1, L4). Laboratory tests revealed low 25-hydroxyvitamin D concentration with normal level of PTH, calcium, phosphorus, serum cortisol, IGF-1, thyroid and sex hormones, liver and kidney parameters. A DXA demonstrated bone density below the expected range for age (Z-score of - 4.9 in spinal and of -2.5 and -2.9 in the hip and femoral neck areas). Subsequently, treatment with calcium (1000 mg/d), vitamin D3 (1500 IU/d) and teriparatide (20 µg/d) was initiated. Further testing initiated by suspicion of MRO revealed a high serum tryptase level of 20.0 µg/L (reference range <11.4). Bone marrow biopsy confirmed aggressive form of systemic mastocytosis. KIT D816V mutation was detected. Multitargeted protein-kinase inhibitor (midostaurin) treatment (2x50 mg/d) was initiated. After 1 year of treatment by teriparatide control DXA was preformed within creased in bone density (23.3% - lumbar spine, 10.3% - hip and 6.2% - femoral neck). After the initial 18 month of teriparatide treatment we continued with denosumab 60 mg s.c. every 6 months. After 1 year of treatment by denosumab control DXA showed another increase in bone density (13.4% - lumbar spine, 5.8% - hip and 7.0% - femoral neck), without new onset vertebral compression fractures.

P458
EFFECT OF LIFESTYLE/OCCUPATION ON LOW BACK PAIN IN NIGERIAN ADULTS

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Objective: Low back pain (LBP) refers to pain and muscle stiffness experienced between the lower margin of the 12th rib and gluteal folds (buttocks) with or without associated pain in the legs or thigh. LBP is the most prevalent musculoskeletal condition and one of the most common causes of disability in the world. Studies focusing on the relation between back pain and physical activity have produced results addressing the detrimental effect of both sedentary behavior and strenuous levels of physical activity[1]. We aimed to determine the effect of lifestyle/occupation on LBP in Nigerian adults.

Methods: 400 respondents with LBP were interviewed using examiner administered questionnaire to obtain their age, occupation/lifestyle, date of onset of back pain, duration of back pain, gender, smoking history and dietary history. The weight and height of these patients were measured and used to calculate BMI. Data collected was analyzed using (SPSS) version 20.0.window software.

Results: The age range of the 400 respondents used for this study was between 18-109 y. Age prevalence is 51-60 y with a frequency of 92 respondents (23%). The mean age of the studied population was 63.5 y. Of the 400 sampled population, 234 (58.5%) were female and 166 (41.5%) male. Higher populations of LBP respondents were overweight, 138 (54%) did nonsedentary jobs while 118 (46%) were sedentary workers. LBP occurs mostly within the age of 51-60 y. Both chronic and acute LBP occurs within the same age bracket of 48-49 y. Higher populations of LBP respondents are overweight (64%). It was then accepted that overweight was a major risk factor for LBP.

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Conclusion: Both sedentary and nonsedentary lifestyle/occupation poses risk factors for LBP. Onset of LBP in sedentary workers is seen in the younger age when compared to an older age in nonsedentary work, a pattern in our environment needing urgent attention.

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P459
KNOWLEDGE OF SARCOPENIA BY HEALTH CARE PROFESSIONALS AND THE ROLE OF ULTRASOUND IN ITS DIAGNOSIS

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Objective: Sarcopenia results in falls, reduction in function, frailty as well as increased morbidity and mortality. Preventive strategies are advised during active years to reduce its effect. Knowledge of sarcopenia is limited in our environment and there is also paucity of research in this subject. We aimed to sensitize healthcare personnel in Enugu on the subject of sarcopenia and alert them on the use of ultrasound in its diagnosis, in order to avoid future preventable morbidity and mortality.

Methods: A total of 510 questionnaires were distributed randomly to healthcare professionals (doctors, physiotherapists, dieticians, nurses and paramedics) by field workers who happen to be resident doctors. The field workers were trained to approach the respondents in a convenient time to fill the questionnaires on site, thereby eliminating the chance of the respondents making reference to study materials. In the end 375 health care professionals filled and completed their questionnaires.

Results: Of the 375 respondents, 192(51.2%) were female while 183(48.8%) were males, with a mean age of 36.0±8.0 y. They included 190(50.7%) nonradiology medical doctors and 14(3.7%) radiologists, amongst others. The result showed that 201(53.6%) of the respondents had heard about sarcopenia and 51(13.6%) of these respondents indicated that sarcopenia meant loss of muscle mass and strength. 229(61.1%) felt that age is a risk factor, 185(49.3%) indicated reduced quality of life while 103(27.5%) being majority of the respondents felt there was loss of muscle reflexes in sarcopenia. 105(28.0%) of the respondents indicated that ultrasonography was fairly relevant in diagnosing Sarcopenia while 54(14.4%) indicated great likelihood to refer patients for ultrasound. Radiologists multiple response questions (14 radiologists): Regarding the Ultrasound parameter for assessment of suspected sarcopenia; 2(15.4%) indicated fascicle length, 8(61.5%) muscle thickness, and 1(7.7%) indicated Pennate angle. 11(84.6%) of the radiologists indicated increased muscle activity as a treatment measure for sarcopenia.

Conclusion: There was minimal knowledge of sarcopenia and mostly only Radiologists were certain that ultrasound scan was a good investigative modality. Many respondents made oral confessions that they would go back to read up sarcopenia after filling the questionnaire. It was really like an awareness study.

P460
CAPTURE THE FRACTURE: EXPERIENCE OF OUR FLS IN ARGENTINA

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Objective: Capture the Fracture is a global program that facilitates the implementation of coordinated, multidisciplinary models of care to reduce subsequent fractures in patients with a recent fragility fracture. At the Endocrinology Department (ED) of Sanatorio Las Lomas, Buenos Aires, Argentina, we built a Fracture Liaison Service (FLS) in September 2017.The purpose of this retrospective observational study is to describe how the FLS works and to introduce preliminary outcomes showing how the program can improve patients care and reduce spiraling fracture-related healthcare costs.

Methods: Our FLS started to work in September 2017. The orthopedics are requested to refer fractured patients to the ED, which are seen with priority. The inclusion criteria require the presence of a fragility fracture in the past 18 months. In a single medical visit, we make a complete medical history including diagnosis of primary and secondary causes of Osteoporosis, health and lifestyle evaluation, clinical exam with patient´s height, DXA study with FRAX and TBS score, complete blood and urinary work. In the light of the results a treatment is decided. We first focus on fall prevention, nutrition, physical activity and habits counseling. Those patients already receiving pharmacologic treatment are reevaluated to define it, those without prior treatment are initiated. An appointment is scheduled one month ahead to monitor treatment. A phone follow-up counseling is programmed at 6 months. The data is entered and stored in a database.

Results: During the last 2 y, 450 patients have been included, 90% women and 10% men, ages between 48-80 y. The prescribed medical treatments were bisphosphonates, denosumab or teriparatide, plus specific treatment of secondary causes of osteoporosis; adjusting calcium and vitamin D supplementation.

Conclusion: The FLS implementation in our Institution achieved a reduction in 30% for second and 50% for subsequent fractures and improved the rates of treatment compliance. The program demonstrated to be cost effective for the patient and for health care providers. Further work is needed to be done in order to identify patients, especially those with vertebral fractures.

P461
SUGAR AND ARTIFICIALLY SWEETENED BEVERAGES AND THE RISK OF FRACTURE RISK: A SYSTEMATIC REVIEW AND META-ANALYSES

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Objective: Sugar and artificially sweetened beverages have been reported to decrease BMD in children and adults. We aimed to assess whether this effect is significant enough to increase fracture risk levels and to study possible differences among types of beverages since to the best of our knowledge no systematic reviews have been conducted to date.

Methods: This systematic review and meta-analysis sought to investigate the impact that sugar and artificially sweetened beverages have on BMD and fracture risk. A systematic search was conducted in PubMed, Scopus, and Science Direct, covering the period from the respective start date of each database to January 2020. Inclusion criteria (original studies in children and adults, written in English or Spanish comparing those consumers of sugar-and artificially sweetened beverages with non-consumers with BMD information for the whole body, lumbar spine, or femoral neck and/or the number of fractures as the outcome). The quality assessment tool for observational cohort and cross-sectional studies is used to assess the quality of the studies.

Results: Preliminary results show that drinking sugar-and artificially sweetened beverages, especially those containing phosphoric acid and caffeine, may increase the fragility of bones in children and adults with a dose-response effect.

Conclusion: Drinking sugar and artificially sweetened beverages can reduce BMD and increase the risk of fractures. Those suffering from osteoporosis or osteopenia should avoid them.

P462
IN YOUNG WOMEN WITH LOW BONE MASS, CAN BONE MICROARCHITECTURE DISCRIMINATE BETWEEN THOSE WITH AND WITHOUT FRACTURES?

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Objective: Low BMD evaluated by DXA in young women, may be related to low peak bone mass or small bone size and may not reflect abnormal bone quality with the possibility of overestimating the risk of fractures. In vivo evaluation of bone microarchitecture by HR-pQCT has been shown to predict the risk of fragility fractures regardless of DXA. We aimed to evaluate if HR-pQCT parameters in premenopausal women with low bone mass (Z-score ≤ -2), can discriminate between those with and without fragility fractures.

Methods: We retrospectively evaluated a group of premenopausal women in which bone microarchitecture was assessed by HR-pQCT of the distal radius and tibia (XtremeCT; Scanco Medical AG, Bassersdorf, Switzerland). All patients underwent DXA at lumbar spine (LS) and total hip (TH), and clinical evaluation for osteoporosis risk factors, fractures and concomitant treatments. Patients with secondary causes of osteoporosis and those who received antiosteoporotic medications were excluded. We compared 3 groups of premenopausal women: low bone mass with fragility fractures (group 1), low bone mass without fractures (group 2), and bone mass within the expected range for age without fractures (group 3 or control group). The comparisons between groups were made using ANOVA of one factor, and by the non-parametric Kruskal-Wallis test, according to data distribution.

Results: 18 women with low bone mass (7 with and 11 without fragility fractures) and 20 women in the control group were included. The number of fragility fractures was 11: 4 wrist, 3 vertebral, 2 rib and 2 tibia (2 patients had more than one fracture). All three groups were similar in age, weight, height and BMI (p=NS). The age (mean±SD) for groups 1, 2 and 3 was: 29.4±9.3; 35.7±7.6; and 35.9±6.9 respectively (p=NS). DXA Z score (mean±SD) for LS was: -2.1±0.8; -2.4±0.6; -0.2±1.0 (p <0.01), and TH: -2.0±0.1; -2.1±0.3; -0.6±1.1 for groups 1, 2 and 3 respectively (p<0.01). Regarding radius HR-pQCT, in group 1 there was lower total and cortical density, and lower cortical and trabecular thickness compared to group 2 (p<0.01), as well as compare to control group, without significance difference between group 2 and control group. For tibia, although group 1 had lower total and cortical density, and lower cortical and trabecular thickness compared to group 2 and 3, it only reached statistical significance with respect to control group (p<0.01).

Conclusion: In this group of premenopausal women with low bone mass, those with fragility fractures showed predominant involvement of the cortical compartment, both in volumetric density and bone microarchitecture. We continue working on the study of a greater number of this population, to establish the extent of these alterations both in the risk and type of fractures, and thus allow identification and early intervention.

P463
HORMONE THERAPY REDUCES THE RISK OF FRACTURE REGARDLESS OF BASELINE FRACTURE RISK: RESULTS FROM THE WOMEN'S HEALTH INITIATIVE HORMONE THERAPY TRIALS

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Objective: To determine if the anti-fracture efficacy of hormone therapy (HT) was dependent on baseline FRAX fracture probability in a combined analysis of the two WHI HT trials.

Methods: 27,346 postmenopausal women aged 50-79 years were randomized to receive HT (n=13,816) or matching placebo (n=13,530). At baseline, clinical risk factors were recorded in all women using questionnaires and FRAX scores for the 10-year probability of major osteoporotic fracture (MOF) were calculated without using BMD. Incident clinical fractures, other than fractures of the fingers, toes, ribs, sternum, skull, face and cervical vertebrae, were verified using medical records. An extension of Poisson regression was used to investigate the relationship between treatment and fractures in the whole cohort, with an interaction term for baseline FRAX MOF probability and treatment.

Results: Over 8.2±1.5 years (mean±SD), HT significantly reduced the risk of any clinical fracture (Hazard Ratio [HR] 0.77 [95%CI, 0.72-0.82]), MOF (HR 0.71 [95%CI, 0.66-0.78]) and hip fracture (0.76 [95%CI, 0.62-0.92]). Treatment was similarly effective in reducing the risk of any fracture (Figure 1), MOF and hip fracture in women regardless of baseline FRAX MOF probability, with no significant interaction between HT and FRAX probability for any of these fracture outcomes (p>0.30).

Conclusion: Our results indicate that the efficacy of HT on fracture risk reduction is not dependent on baseline fracture probability in postmenopausal women.
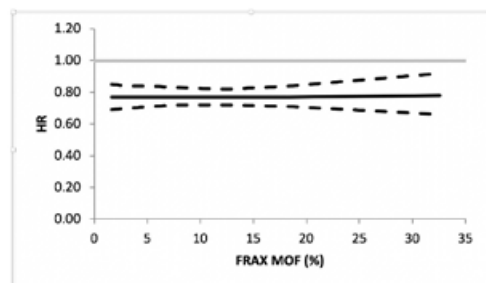
Figure 1. Effect of HT on the risk of any fracture according to FRAX MOF probability.

P464
AN UPDATE ON THE ASSOCIATION BETWEEN METABOLIC SYNDROME AND OSTEOARTHRITIS AND ON THE POTENTIAL ROLE OF LEPTIN IN OSTEOARTHRITIS

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Objective: Metabolic syndrome (MetS) has been associated with osteoarthritis (OA). Leptin, which is one of the markers of MetS, has been associated with OA pathophysiology. This study aimed to provide an update on the association between MetS and OA and on the potential role of leptin in OA.

Methods: In this review, we summarized the current knowledge of the association between MetS and OA and updated the evidence on the potential role of leptin in OA.

Results: Clinical studies have investigated the epidemiologic association between MetS or its components and OA. Results suggested strong epidemiologic associations between MetS and OA, especially in the Asian population. Animal studies also indicated that metabolic dysregulation may lead to OA pathogenesis. The systemic role of MetS in OA pathophysiology is associated with obesity-related inflammation, the beneficial role of n-3 polyunsaturated fatty acids and deleterious role of cholesterol, physical inactivity, hypertension-induced subchondral ischemia, dyslipidemia-induced ectopic lipid deposition in chondrocytes, hyperglycemia-induced local effects of oxidative stress and advanced glycation endproducts, low-grade systemic inflammation, and obesity-related adipokines by inducing the expression of proinflammatory factors. Leptin levels in serum/plasma and synovial fluid were associated with joint pain, radiographic progression, bone formation biomarkers, cartilage volume, knee OA incidence, and total joint arthroplasty in OA patients. Elevated leptin expression and increased effect of leptin on infrapatellar fat pad, synovium, articular cartilage, and bone were also involved in the pathogenesis of OA.

Conclusion: Current knowledge indicates a convincing epidemiologic association between MetS and OA, especially in the Asian population. Animal studies have also shown that metabolic dysregulation may lead to OA pathogenesis. Accumulating evidence suggests that leptin may play a potential role in OA pathogenesis. Therefore, leptin and its receptor may be an emerging target for intervention in metabolic-associated OA.

P465
EFFECTS OF A DENTAL EDUCATIONAL LECTURE ON THE PERCEIVED RISK OF OSTEONECROSIS OF THE JAW AND DENTAL CARE IN PATIENTS ON TREATMENT FOR OSTEOPOROSIS

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Objective: Fear of rare side effects such as medication related osteonecrosis of the jaw (MRONJ) remains one of the main reasons for poor compliance and low osteoporosis treatment rates, with some of these fears generated by the dental community refusing to treat osteoporosis patients on medications. We assessed the understanding of osteoporosis treatments and its risks in dental professionals pre- and post-educational lecture.

Method: 60 dental professionals in Singapore attended an educational lecture on osteoporosis treatment. They were invited to complete a knowledge survey about osteoporosis and MRONJ pre- and post-educational lecture. Knowledge score differences were compared pre- and post- educational lecture using the independent sample t-test.

Results: 47 (78.3%) respondents completed both surveys. 74.5% were experienced dentists with more than 11 y of practice. 44.5% had experience in treating patients with MRONJ, with 90.5% of these having fewer than 10 cases over 15 y. Majority of respondents (59.6%) stated no to slight confidence in treating patients who are on osteoporosis treatment prior to the educational lecture. Prelecture, only 21.3% of respondents accurately identified MRONJ risks in patients on osteoporosis treatment; many tended to inflate risk as much as 10-100 times the reported risk in the literature. 23.4% of respondents were aware of the latest American Association of Oral and Maxillofacial Surgeons (AAOMS) guidance for invasive dental surgery in patients on osteoporosis treatments, Posteducational lecture, 87.2% were able to accurately identify MRONJ risk (p<0.001) and 72.3% were able to correctly identify the main points of the AAOMS guidance for invasive dental surgery in patients on treatment for osteoporosis, including how to prevent MRONJ (p<0.001). 70.0% of respondents quoted moderate to high degree of confidence in treating patients on osteoporosis treatment posteducational lecture.

Conclusion: In the dental community in Singapore, there is a significant knowledge gap and low confidence in treating patients who are on osteoporosis treatment. A dental educational lecture was able to significantly increase the level of confidence and knowledge in osteoporosis treatment. Further similar educational interventions should be broadened to the wider dental community.

P466
HIGH IL-34 EXPRESSION REFLECTS THE SEVERITY OF SYNOVITIS OF KNEE OSTEOARTHRITIS

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Objective: IL-34 possesses an inflammatory action and has been reportedly implicated in activation and differentiation of myeloid lineage cells, especially osteoclasts, thereby representing a possible mediator for synovial inflammation-induced cartilage degeneration in knee osteoarthritis (OA). Herein, the present study aimed to investigate whether transcriptional and translational levels of IL-34 in the systemic and local joint environments are associated with degree of synovitis in knee OA patients.

Methods: Transcriptional and translational expressions of IL-34 in 15 inflamed synovial tissues and 10 noninflamed synovial tissues were determined using real-time PCR and immunohistochemistry, respectively. Plasma IL-34 levels in 20 knee OA patients and 20 healthy controls were quantified using enzyme-linked immunosorbent assay.

Results. Relative mRNA expression of *IL-34* was significantly upregulated in inflamed synovial tissues of knee OA, compared with non-inflamed synovial tissues of the patients (*P*=0.001). Subsequent analysis revealed that relative *IL-34* mRNA expression was directly associated with severity of synovitis in knee OA patients (*r*=0.85, *P*<0.001). Immunohistochemical staining unveiled that IL-34 protein overexpression was positioned in the lining and sub-lining layers of inflamed synovial tissues, which was inconsistent with its analysis in non-inflamed synovial tissues demonstrating the absence of IL-34 protein expression. Beside overexpressions of IL-34 mRNA and protein in knee OA synovitis, plasma IL-34 levels were significantly higher in knee OA patients than that in healthy controls (*P*=0.002). Compared with knee OA patients without synovitis, plasma IL-34 levels were remarkably elevated in the patients with synovitis (*P*=0.002). Interestingly, receiver-operating characteristic curve analysis uncovered clinical usefulness of plasma IL-34 as a diagnostic biomarker for progressive synovitis of knee OA (AUC=0.94, 95%CI: 0.85 to 1.00, *P*=0.002), with a sensitivity of 86.7% and a specificity of 100.0%.

Conclusion: Increases in transcriptional and translational expressions of IL-34 would reflect progression and development of synovitis in knee OA, and its circulating levels could be employed as a non-invasive biomarker for the disease progression – particularly knee OA synovitis.

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P467
MUTUAL ASSOCIATION BETWEEN HIP OSTEOARTHRITIS AND OSTEOPOROSIS AT THE FEMORAL NECK: THE RESEARCH ON OSTEOARTHRITIS/OSTEOPOROSIS AGAINST DISABILITY (ROAD) STUDY

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Objective: To investigate the mutual association between radiographic hip osteoarthritis (OA) and osteoporosis (OP) at the femoral neck in Japanese patients using the Research on Osteoarthritis/osteoporosis Against Disability (ROAD) study, which is a nationwide population-based large-scale cohort study.

Methods: From the baseline survey of the ROAD study, 1690 participants (596 men and 1094 women; mean age, 65.2 y) were followed-up with hip radiography and DXA at 3, 7, and 10 y. Radiographs were scored using the Kellgren/Lawrence (KL) grading system, and radiographic hip OA was defined as a KL score ≥2. OP at the femoral neck was defined based on WHO criteria. Furthermore, the definition of OP included participants who were taking the following four medicines for OP: bisphosphonate, selective estrogen receptor modulator, PTH, and denosumab.

Results: The incidence rates of radiographic hip OA were 5.4/1000 and 8.8/1000 person-years in men and women, respectively. Additionally, the incidence rates of OP at the femoral neck were 8.8/1000 and 31.5/1000 person-years in men and women, respectively. The presence of OP at the femoral neck at baseline was not significantly influenced by the occurrence of hip OA (hazard risk [HR], 1.37; 95%CI, 0.71-2.51). Furthermore, the presence of hip OA at baseline was also not significantly associated with the occurrence of OP at the femoral neck (HR, 0.78; CI, 0.56-1.07).

Conclusion: The 10-y observation of the ROAD study showed no mutual association between the presence and occurrence of radiographic hip OA and OP at the femoral neck in Japanese men and women.

P468
THE RESEARCH RESULTS OF CHANGES IN THE STRUCTURAL STATE OF BONE TISSUE IN PATIENTS WITH VARIOUS FORMS OF FIBROUS DYSPLASIA

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Objective: The relevance of the research was caused by need to study changes in the structural state of bone tissue in fibrous dysplasia, depending on the form which will improve the medical correction of this disorder. **Methods:** The research of bone tissue was performed in 24 patients (11 men and 13 women) aged from 5-30 y (with monoosal form - 13 patients, with polyosal - 5, with Albright syndrome - 6) by studying the X-ray densitometric parameters of the lumbar spine according to two-energy x-ray densitometry on DXAs GE Medikal System, LUNAR. Z - or T - criteria were evaluated depending on the patient's age. **Results:** Changes in the structural state of bone tissue with deviation beyond the reference values were detected in 9 (37.5%) patients (T/Z-criterion from -1.1 SD to -3.9 SD): among them, with a monoosal form, changes were detected only in one patient (11%); with polyosal - in 3 patients (33%); with Albright syndrome - in 5 (56%). Absence of changes or minimal changes in patients with monoosal form and maximal changes in polyosal forms of lesions indicate different degree of genetic damage in patients. X-ray densitometric examination of BMD in patients indicates systemic changes in bone tissue in polyosal forms of the disease, which have the character of reactive changes in healthy bone tissue, in contact with altered bone sections in the form of enhanced osteoresorption, which results in its development. In support of this statement indicates that the changes are more characteristic of patients with polyosal lesions when a significant number of bones are damaged. Also, immobilization disorders or those associated with a decrease in patient activity or their immobility play an important role in the development of osteoporosis. **Conclusion:** Changes in the structural state of bone tissue, namely the reduction of its mineral density in patients with fibrous dysplasia depend on the form of the disease and in cases of polyosal lesions require medical correction with bisphosphonates.

P469

MICRORNA-495 ENHANCES CHONDROCYTE APOPTOSIS, SENESCENCE AND PROMOTES THE PROGRESSION OF OSTEOARTHRITIS BY TARGETING AKT1

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Osteoarthritis (OA) is a common multifactorial degenerative articular disease among the aging population. The current investigation aimed to elucidate the function of microRNA-495 (miR-495) in the development of OA. We found that miR-495 was upregulated in the cartilage of OA patients. Transfection of a miR-495 mimic into rat primary chondrocytes, human chondrocytes (HC) and SW1353 chondrosarcoma cells inhibited AKT1 expression, proliferation and scratch wound closure and induced apoptosis. Transfection of a miR-495 inhibitor produced an opposite effect. Furthermore, the production of cartilage degeneration-related substances was modified by miR-495. Luciferase reporter gene assay revealed that AKT1 is directly repressed by miR-495. Moreover, the levels of AKT1, p-S6 and p-mTOR diminished in chondrocytes overexpressing miR-495. AKT1 overexpression amplified p-S6 and pmTOR levels as well as abolished miR-495 mimic-induced apoptosis and inhibition of proliferation. In the surgically induced rat OA model, apoptosis of chondrocytes and cartilage degeneration were remedied by the administration of a miR-495 antagomir. Moreover, there was an increased expression of AKT1. These findings indicate that miR-495 induces OA by targeting AKT1 and regulating the AKT/mTOR pathway. Therefore, miR-495 may be a prospective target for OA treatment.

P470

SPINAL BONE METASTASES - STAR - RADIO FREQUENCY ABLATION FOR SAFE THERAPY AND STABILIZATION OF TUMOR OSTEOLYSIS

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Objective: Osseous metastatic lesions are the most frequent complication of malignant tumors and associated with severe pain and pathologic fractures. The use of radiofrequency ablation (RFA) is an alternative to local radiotherapy and provides the advantage to augment the destroyed bone by cement during the same procedure.

Methods: 52 patients were treated at 2 academic centers in the Rhein-Main Area. C-Arm controlled t-RFA was performed with the STAR tumor ablation system (Merit Medical, USA), which includes a robust bipolar joint electrode containing two active thermocouples (TC) positioned to allow real-time monitoring of the peripheral edge of the ablation zone determine the size of the ablation. Preoperative planning was performed based on cross-sectional imaging to determine the number of targeted ablations based on lesion size and heat distribution curves. The treatment was controlled by adjusting the power while monitoring the TC temperature in situ. All patients received vertebral body augmentation with RF-heated high-viscosity cement after using radiofrequency through the same guide cannula. Pain was assessed by visual analogue scale (VAS) in all patients preoperatively, 1 week after surgery and 6 months after treatment.

Results: The etiology of the lesions included a variety of metastatic lesions (lung, renal cell, breast, lymphoma, multiple myeloma, bladder, prostate melanoma, liposarcoma). Fluoroscopically controlled RFA procedures were successfully performed in all 52 patients. All patients reported pain relief. The mean VAS improved from 7.8 down to 4.4 one weeks after the procedure (p<0.05) and to 3.0 after 6 months after the procedure (p<0.05). No device-related adverse events were reported. Histology after ablation confirmed that metastatic lesions in the ablation zone were necrotic.

Conclusion: The STAR tumor ablation system, an innovative bipolar RF device specifically designed for targeted ablation of malignant lesions of the spine, was used safely and effectively for navigation and targeted RFA of bone metastases of the spine.

P471

LOW-ENERGY NONVERTEBRAL FRACTURES IN PATIENTS WITH YOUNG ONSET RHEUMATOID ARTHRITIS

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Objective: Chronic inflammation, long RA disease duration and glucocorticoids use lead to damage of bone tissue and increased risk of low-energy fractures. The study of low-energy fractures in patients with young onset rheumatoid arthritis (YORA) have a great interest, especially in age associated with the formation of a peak in bone mass (from 18-30 y). We aimed to establish the frequency of low-energy nonvertebral fractures in patients with YORA.

Methods: We included 505 patients with RA, 18-78 years old, including 248 patients in the RA onset between the ages of 18-44 y. Patients were divided in 2 groups, group I - 217 patients with RA onset at 25-44 y, group II- 85 patients with RA onset at 18-30 y. The mean age at the RA onset in group I - 35.0±4.1, II − 25.1±3.7 y. The mean age at the time of study − 50.4±8.6 and 44.1±11.8 y, respectively; RA duration - 14.4±5.4 and 18.5±11.6 y, respectively; glucocorticoid use of more than 3 months- 109 (50%) and 57 (67%) patients respectively.

Results: Low-energy fractures occurred in 18% patients in both groups. Among patients with fractures glucocorticoids for >3 months used 23 (58%) and 11 (73%) patients, respectively. Refractures occurred in 16 (40%) patients of group I and 5 (33%) of group II. Hip fracture was noted in 4 patients in group I and 2 patients in group II. The mean age at the moment of hip fracture occurrence in group I-50.7 y, the ages at the moment of hip

fracture in group II was 34 and 48 y. The mean disease duration in patients with hip fracture-20.8 y. All patients with hip fracture had the IV radiological stage of RA.

Conclusion: Every fifth patient with YORA had low-energy nonvertebral fractures associated with long RA duration and probably long glucocorticoids use. More than a third of patients with fractures had low-energy refractures.

P472

BONE EFFECT OF WEIGHT LOSS AFTER GASTROPLASTY IN MORBID OBESITY

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Objective: Vertical band gastroplasty (VBG) and Roux-en Y gastric bypass (RYGB) are successful surgical interventions for management of morbid obesity, begetting a dramatic improvement in its complication such as type 2 diabetes mellitus (T2DM). However, bone metabolic changes can ensue.

Methods: BMD (by DXA) and biochemical markers of bone resorption (CTx) and formation (bone-specific alkaline phosphatase (BALP), iPTH and 25OHD were measured at baseline, 12 months (mo) and 5-6 y after VBG in 12 women (baseline A, 23-55; weight (w) 115 (4.1) kg; BMI 43 (1.1), and in another woman (A45; w 107 kg; BMI 42) after RYGB.

Results: Mean w loss amounted to 29.4% in the VGB group and to 39.4% in the RYGB patient. The w assessed by DXA by the whole body (WB) body composition system were not statistically different from those measured on the balance scale. Fat mass loss amounted to 28.0 (2.7) and 30.3 kg, and total lean mass to 5.6 (1.0) and 4.9 kg, in the group and the patient, respectively. In the VBG group, WBBMD lessened 4% vs. 19.9% in the RYGB patient. BMD diminished 4.1 and 6.2% (VGB) vs. 17.9 and 19.7% (RYBG) at the total hip and femoral neck, respectively after 5-6 y, most of the decrease observed between 3 and 12 mo (VGB) vs. a more continuous loss in RYBG). L-BMD decreased 24.4% in the RYBG patient, but not significantly in the group. Bone loss was accompanied by an increased bone resorption (CTx 2-fold in VBG vs. 5-fold the upper limit of normal in RYBG). 25OHD levels dramatically decreased while iPTH increased only in the RYBG patient, difficult to manage in spite of vitamin D3, calcifediol and calcium supplementation. 5-6 y after VBG, WBBMD was no longer different from baseline values, but lower of 20% in the RYBG patient. A trend to augment with BMD values was observed in the RYGB patient after 2 y of annual IV zoledronic acid infusions (L-BMD +4.2; FN +7.4; TH +2.7, and WBBMD +2.7%). On the other hand, no spontaneous increased was observed before ZOL therapy.

Conclusion: VBG provoked after 12 mo a modest, but significant bone loss at the hip and WBBMD. RYGB begot a much larger BMD loss accompanied by a dramatic increase in iPTH and CTx and decrease in 25OHD, favoured by a malabsorption syndrome.

P473

USING ANGIOPOIETIN-LIKE PROTEIN TYPE 3 TO ASSESS THE LIKELIHOOD OF OSTEOPOROTIC FEMORAL NECK FRACTURES IN WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: To study the role of angiopoietin-like protein type 3 (ANGPTL3) in metabolic disorders associated with the risk of femoral neck fractures in women with rheumatoid arthritis (RA).

Methods: 88 women with a reliable diagnosis of RA were under observation (mean age – 54.19±11.97 years old, disease duration – 11.21-8.65 years old). The content of ANGPTL3 in blood serum was determined by enzyme immunoassay using a commercial test system Human Angiopoietin-like Protein 3 ELISA (Bio Vendor). Osteodensitometry was performed on a bone X-ray densitometer Lunar DPX (GE, USA). In accordance with the WHO recommendations, the evaluation of the state of the bone tissue of the proximal femur was carried out according to the T-criterion. A decrease in the T-criterion from -1.0 to -2.4 was regarded as osteopenia, a value below -2.5 was considered as a diagnostic sign of osteoporosis.

Results: A reliable positive correlation was established between the level of ANGPTL3 and the presence of osteoporosis (r=0.36, p=0.039) (confirmed clinical diagnosis at the time of the study), as well as a negative relationship with the age of patients (r=-0.83, p=0.006). The study of BMD, showed a close relationship of ANGPTL3 and osteoporotic changes in the femoral neck (especially in the Wards zone): with BMD Total r=-0.33 (p=0.042), BMD Troch r=-0.36 (p=0.038) and BMD Wards r=-0.44 (p=0.009). No significant associations were found between the level of ANGPTL3 and a decrease in BMD in the spine (L1-L4) (p>0.05). The level of ANGPTL3 in patients with RA with a confirmed clinical diagnosis of osteoporosis (OP) at the time of the study (osteoporotic changes in the spine and femoral neck) (n=36) was 747±266.3 ng/ml, and without signs of OP (n=52) – 670.5±258.8 ng/ml (p=0.181). However, in patients with an increased level of ANGPTL3 (>445 ng/ml), osteoporotic fractures in the femoral neck occurred in 33.8% of cases, and at a low level (<248 ng/ml) in 5.9% (the difference is statistically significant, χ^2=5.257, p=0.022). A patient with RA and ANGPTL3 values in the range of 248-445 ng/ml should be included in the biochemical monitoring group for further monitoring (at least once in 3 months) regarding the risk of femoral neck fractures.

Conclusion: The determination of the serum concentration of ANGPTL3 allows one to evaluate the activity of resorptive processes in bone tissue in women with a confirmed diagnosis of RA with high reliability without large-scale expensive densitometric studies.

P474

DIAGNOSTIC ROLE OF ANGIOPOIETIN-LIKE PROTEIN TYPE 3 IN ASSESSING THE ACTIVITY OF RESORPTIVE PROCESSES IN BONE TISSUE IN WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: As a rule, existing methods for determining markers of bone synthesis and resorption are uninformative for establishing the relationship of immune inflammation and osteoporotic processes in bone in rheumatoid arthritis (RA). It is known that angiopoietin-like protein type 3 (ANGPTL3) is able to activate the processes of angiogenesis and bone resorption. We aimed to study the role of ANGPTL3 as a binding marker of immune inflammation and osteoporotic processes in bone in RA.

Methods: There were 88 women with a reliable diagnosis of RA under observation. The average age of the patients was 54.19±11.97 years old; the duration of the disease was 11.21-8.65 y. Moderate RA activity was established in 59.1% of cases. 64 people (72.7%) were seropositive in the presence of rheumatoid factor (RF) in blood serum, and 59 (67%) people – in terms of the level of the cyclic citrullinated peptide antibodies (anti-CCP). The content of APPB3 in blood serum was determined by enzyme immunoassay using a commercial test system: Human Angiopoietin-like Protein 3 ELISA (Bio Vendor, Czech Republic). Osteodensitometry was performed on a bone X-ray densitometer Lunar DPX, GE (USA).

Results: The development and progression of RA is characterized by significant immunological and metabolic changes. Bone tissue is also a target of inflammation: the enhancing the production of a wide range of cytokines leads to bone erosion and systemic bone loss. Increased values of ANGPTL3 (more than 445 ng/ml) were detected in 71 (80.7%) patients with RA. There was no significant relationship between ANGPTL3 and the level of the RF (p=0.072), anti-CCP (p=0.128), and activity of the RA according to the DAS28-ESR index (p=0.135). A medium strength correlation (p=0.037) was noted between the level of ANGPTL3 and disease activity when using the DAS28-CRP index. A significant positive correlation was also established between the level of ANGPTL3 and the presence of osteoporosis (r=0.36, p=0.039) (confirmed clinical diagnosis at the time of the study), and the closest relationship was noted with osteoporotic changes in the femur neck (BMD Total, r=-0.33, p=0.042).

Conclusion: ANGPTL3 can act as an indicator of pathological processes associated with rheumatoid inflammation and bone resorption in women with RA.

P475

LOSS OF METAPHYSEAL BONE QUALITY AFTER A FRACTURE OF THE FEMUR IN AN ANIMAL MODEL

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Objective: In the international literature, hip fracture is considered a very high risk for subsequent osteoporotic fractures. The risk of sustaining a fracture of the contralateral side in the first year is 5-7 times higher. (Lee S-H et al. 2016). The question arises whether the cause is always systemic bone mass loss or whether posttraumatic changes also lead to local changes in bone. To our knowledge no animal model have been described in the literature to date that reflects the problem of local and regional bone density loss after fracture.

Methods: The female Sprague Dawley rat was used. The animals of the osteoporosis groups (n=15) were ovariectomized at the age of 12 weeks, the control group (n=15) only sham-operated. All animals were operated according to the fracture model of Bonnarens/Einhorn and a femoral shaft fracture was created. The animals were sacrificed after 28 d and the bones were harvested. The µCT examinations were performed using a µCT 80 (Scanco Medical, CH). The whole bone was scanned in 250 layers with a thickness of 20 µm. A cylinder with a height of 0.8 mm and a volume of 1.5 mm³ was then manually defined and placed in the proximal metaphysis of both sides. The bone density (mgHA/cm³), the number of trabeculae (1/mm) and their thickness (mm) and the intertrabecular meshwork (1/mm³) were evaluated.

Results: Evaluation of the unfractured femur shows a significant decrease in bone density after ovariectomy (-24.2; p<0.05). Also significant was a decrease in the number of trabeculae (-27.1%; p<0.05). The reduction in trabecular thickness (-12.0%) and trabecular meshwork (-20.4%) after ovariectomy were not significant. Comparing the fractured and nonfractured side, a significant decrease in bone density in the proximal metaphysis of the femur was observed in the nonovariectomized animals after fracture (-26.1%; p<0.05). The remaining changes within the non-fractured group are not significant. Number of trabeculae and inter-trabecular connectivity show non-significant higher values on the fractured side. After ovariectomy and fracture, the decrease in bone density is highly significant (-28.3%; p<0.001). A significant reduction is shown for the number (-22.9%; p<0.05) and thickness (-20.7%; p<0.001) of trabeculae and for intertrabecular meshwork (-20.1%; p<0.001).

Conclusion: A reduction of bone density at the ipsilateral limb after fracture has been described in the literature for some time. However, it has not been described on the contralateral side. In addition, the influence of pre-existing osteoporosis has not been considered in animal experiments or clinical observation. In our study, an animal model was established that reflects the influence

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of generalized osteopenia on the metaphyseal changes following diaphyseal fracture. A fracture appears to have far-reaching negative consequences on bone quality.

P476
HOW BMD ADJUSTMENT AFFECTS DIFFERENCES BETWEEN BMD OF PEDIATRIC THALASSEMIC PATIENTS WITH BMD OF NORMAL CHILDREN

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Objective: Reduction of bone density and its associated morbidity is recognized in young adults with β-thalassaemia major. Gold standard for bone densitometry is DXA. However, the use of this method in childhood have some pitfalls specially in chronic disease children that bones are smaller than normal children. Use of and bone mineral apparent density (BMAD) is a method for averting this problem. So we compared BMD and BMAD of Iranian thalassemics with BMAD of normal Iranian children.

Methods: Thalassemic patients (90 cases) ages 3-18 entered this study. Female to male ratio was 30/60. BMD of femoral neck and spine L2-L4, measured by DXA and BMAD calculated. All measurements did by one operator and one device (by Hologic Discovery machine). Height and weight also measured by the same operator. BMDs and BMADs of 9-18 y/o patients compared with BMDs and BMADs of 9-18 y/o normal Iranian children that is the reference data obtained by Shiraz University of Medical Sciences.

Results: Mean age of patients was 9.3±4.2 y/o. Mean height was 128±21. Short stature prevalence found 11% (10/90). Mean of femoral BMD and BMAD, spinal BMD and BMAD was 0.571± 0.137 g/cm^2, 0.159± 0.047 g/cm^3, 1.656 g/cm2±0.351 and 0.107±0.015, respectively. When BMD of 9-18 patients compared with BMDs and BMADs of normal Iranian children, BMD of femur and BMD and BMAD of spine of patients found significantly lower than normal controls (P-values, 0.02, <0.001, <0.001 respectively). BMAD of femur of patients was not different significantly from normals.

Conclusion: We found that when BMD of femur adjusts by BMAD formula, the significant difference between BMD of normal patients and thalassemic patients disappears, so we think use of BMAD for averting the problems of interpretation of femoral DXA results in chronic patients at least in thalassemics is useful. As the results of spine BMD, after adjustment is significantly different between normal and thalassemic patients, we can't recommend BMAD for above goal in thalassemic patients.

P477
OSTEOPOROSIS SECONDARY TO PRIMARY HYPERPARATHYROIDISM NOT DETECTED WITH THE TRADITIONAL METHODS: THE ROLE OF INTEGRATED F-CHOLINE PET/4D CONTRAST ENHANCED CT IN DIAGNOSIS

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Objective: To evaluate if integrated F-choline PET/4DCeCT could be considered as an effective tool to detect primary hyperparathyroidism (PHPT) in patients with secondary osteoporosis, with negative or inconclusive first line imaging.

Methods: The study period was between December 2018 and December 2019. Five patients (mean age 75.6 years old), referred to our Bone Disease Center for suspected primary hyperparathyroidism, not confirmed by the standard diagnostic methods (neck ultrasonography US and TC sestamibi imaging), were examined. BMD using DXA of the lumbar spine and femur has been done in order to assess the extent of skeletal bone involvement. Bone metabolism blood exams were performed and all of them underwent F-choline PET/4DCeCT. The images were interpreted by a nuclear medicine physician and a radiologist.

Results: All patients presented osteoporosis, diagnosticated by DXA. High levels of PTH (ranging from 90.6-204 pg/ml) and calcium (ranging from 10.2-12.4 mg/dl) were detected. Vitamin D levels were low (17-24.5 ng/ml) and bone alkaline phosphatase levels were normal. After correcting for vitamin D levels, high levels of PTH persisted and all of them underwent F- choline PET/4DCeCT. F-choline PET/4DCeCT allowed the hyperfunctioning parathyroid glands to be distinguished from thyroid gland as a result of parathyroid tissue enhancement and confirmed our suspect for PHPT in all of them.

Conclusion: The results of this study support the use of second-line imaging integrated F-choline PET/4DCeCT to detect patients with PHPT and previous negative conventional evaluation.

P478
SECULAR TRENDS IN SHOULDER SURGERY IN THE UK BETWEEN 2000-2018

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Objective: Recent RCTs have demonstrated little efficacy of certain shoulder surgeries. To investigate the trend in shoulder surgery incidence over time overall and by surgery type.

Methods: Data were obtained from UK primary care electronic healthcare records (CPRD GOLD) linked to English hospital admissions data. Shoulder surgeries in patients aged 35+ were identified using OPCS-4 codes and categorised into 5 hierarchical groups: Decompression (D), Rotator cuff repair (RCR), Stabilising surgery (SS), Arthroplasty (A) and Other (O). Crude incidence rates and 95%CIs of each type of shoulder surgery were calculated per 10,000 person-years for each calendar year. Jointpoint regression was used to identify changes in trends of surgery over time.

Results: 32,557 shoulder surgeries were identified of which 35.4% were D, 21.5% RCR, 5.7% SS, 15.2% A and 24% O. The number of shoulder surgeries rose from 444/1,263,315 in 2000 (3.51 per 10,000 [3.20, 3.86]) to 3,063/1,672,517 by 2014 (18.66 per 10,000 [17.97,19.38]) before decreasing to 725/544,903 by 2018 (13.31 per 10,000 [12.35, 14.31]). Figure 1 shows the secular trends for the 5 types of shoulder surgery, where dramatic changes in D and RCR were particularly observed. The incident rate for D surgeries was peaked at 7.47 (95%CI: 7.07, 7.87) per 10,000 in 2011, as identified by jointpoint regression. Similarly, RCR's incident rate rose and was peaked at 4.61 (4.27, 4.97) per 10,000 in 2014. By contrast, rates of A and SS continue to rise.

Conclusion: Shoulder surgeries increased in the UK between 2000-2014 to then decrease for the following 4 y. This decrease was led by D, RCR and O surgeries, potentially due to uncertainty of D and RCR by trial evidence.
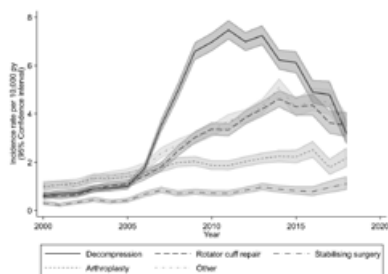
Figure 1. Incidence rates of different surgery types over time.

P479
ASSOCIATION BETWEEN FALL RISK ASSESSMENT AND PHYSICAL FITNESS TESTS: A COMMUNITY-BASED STUDY IN BANGKOK METROPOLIS

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Ageing society is emerging worldwide. The proportions of older people aged 60 y and over are increased. Advanced and new technologies in medical care contribute to survive and longevity. Thailand health report expected that ageing population will project to over 20 million by 2035 and account for more than 30% of total population. For community-dwelling older people, their physical functional performance declined in physiological attributes that can bring to increase risk of falls. Older people should be investigate and encourage to improve for active aging.

A cross-sectional observational study was conducted to assess the physical functional performance of older people with senior fitness test and assessed the Falls Risk for Older People in the Community (FROP-Com). Participants were recruited from urban communities of the Dusit District of Bangkok City were collected data.

A totally of 33 male and 107 female older people were recruited and completed FROP-Com. Mean age was 68.05±2.23 y. Average BMI was 24.58±3.21 kg/m^2. Fall risk assessment by the FROP-Com score was 17±2.51 score. Strength of biceps curl was 19.57±4.66 times and chair-raise test 30-second-sit to stand was 18.21±5.23 times. The flexibility consisted of back scratch was 7.08±6.89 cm. and chair and reach was 3.80±10.32 cm. The endurance used 2- minute step test was 83.93±21.05 times. Time-up and go test (TUG) was 8.76±3.32 s. We found that endurance performance could be predicted with the strength of lower limb (β=0.772; p value=0.001) and TUG (β=-3.355; p value<0.001) after adjusted the age and gender effects.

To compare with senior fitness norms of Thailand, most results of this study was less than 50 percentile, that means should be improved. We also find the strength of lower limbs and TUG could be predictors of lifestyle in moderate-to-vigorous physical activity. While advanced age and poor mobility test are the strongest predictor of increasing falls risk. In clinical implications, healthcare professionals should focus on functional mobility and strength training in older people for falls prevention.

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P480
A COMPARATIVE STUDY OF SURGICAL MANAGEMENT OF OSTEOPOROTIC VERTEBRAL FRACTURES: ANTERIOR SPINAL FUSION, ANTERIOR-POSTERIOR COMBINED SURGERY AND POSTERIOR CLOSING WEDGE OSTEOTOMY

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Objective: To clarify the differences among the three major surgeries for osteoporotic vertebral fractures based on the clinical and radiological results. Minimally invasive surgery like balloon kyphoplasty has been used to treat osteoporotic vertebral fractures, but major surgery is necessary for severely impaired patients. However, there are controversies on the surgical procedures.

Methods: The clinical and radiographic results of patients who underwent major surgery for osteoporotic vertebral fracture were retrospectively compared, among anterior spinal fusion (group A, 18 patients), single-stage combined anterior-posterior procedure (group AP, 16 patients) and posterior closing wedge osteotomy (group P, 18 patients). Patients who underwent revision surgery were evaluated just before the revision surgery, and the other patients were evaluated at the final follow-up examination, which was defined as the end point of the evaluations for the comparison.

Results: The operation time was significantly longer in group AP than in the other two groups. The postoperative correction of kyphosis was significantly greater in group P than in group A. Although the differences were not significant, better outcomes were obtained in group P in: back pain relief at the end point; ambulatory ability at the end point; and average loss of correction.

Conclusion: The posterior closing wedge osteotomy demonstrated better surgical results than the anterior spinal fusion procedure and the single-stage combined anterior-posterior procedure.

P481
GREATER INCREASE OF HIP TRABECULAR VBMD BY 3D MODELING OF HIP DXA IN PATIENTS TREATED WITH DENOSUMAB AS COMPARED TO BISPHOSPHONATES

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Objective: Both trabecular and cortical bone contribute to bone strength. While previous studies have demonstrated superior efficacy of denosumab over alendronate therapy on hip cortical bone, our study aims to investigate the response of denosumab vs. bisphosphonates on hip trabecular bone. 3D-SHAPER is software which provides a 3D model of femoral compartments from hip DXA scans and allows the study of trabecular bone contribution to integral bone changes.

Methods: We retrospectively reviewed 262 consecutive patients treated for osteoporosis at a tertiary referral clinic (236 females, 26 males; mean age 71.5 y ±10). They were divided into three treatment groups: treatment-naïve initiated on bisphosphonate (TnBP, n=56), treatment-naïve initiated on denosumab (TnD, n=97), or switch from bisphosphonate to denosumab (Sw, n=109). We determined hip trochanteric areal BMD (aBMD) by DXA and hip trabecular volumetric BMD (vBMD) by 3D-SHAPER (v2.7.3, Galgo Medical SL, Spain) at baseline and after one year of therapy.

Results: Trochanteric aBMD increased significantly in TnD (mean increase 0.0174 mg/cm^2, 6.7%, $p<0.005$) and S (mean increase 0.0086 mg/cm^2, 1.8%, $p<0.005$) but remained stable in TnBP at one-year (increased 0.0056 mg/cm^2, 1.1%, $p=0.05$). Greatest increases were seen in TnD as compared to Sw and TnBP. Similar changes were observed in trochanteric aBMC. Trabecular vBMD improved significantly among all groups; greater increases observed in TnD group (mean increase 4.9 mg/cm^3, 14%, $p<0.005$) and Sw (increased 2.02 mg/cm^3, 9.2%, $p<0.005$) compared with TnBP (mean increase 2.3 mg/cm^3, 3%, $p=0.02$). TnD showed greater increases in trabecular vBMD as compared to TnBP ($p=0.05$); there was no significant difference between Sw and TnBP ($p=0.57$).

Conclusion: These data indicate superiority of denosumab in increasing trabecular BMD compared to bisphosphonates. The greater increases in trabecular vBMD observed with denosumab may result in increased mechanical strength of the hip. Moreover, trabecular vBMD may be superior to trochanteric aBMD in the evaluation of trabecular compartment treatment response. Studies evaluating the effects of these changes on fracture are required.

P482
CLINICO-RADIOLOGICAL OUTCOME OF OSTEOPOROTIC BURST FRACTURE POSTERIOR APPROACH SURGERY WITH ARTHROSCOPE ASSISTED TRANSPEDICULAR DECOMPRESSION

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Objective: Surgery in osteoporotic fractures is often met with complication due to associated comorbidity and potential of instrumentation failure. Anterior decompression with posterior approach in osteoporotic burst fracture is difficult and controversial.

Methods: 40 patients with delayed presented osteoporotic vertebral collapse managed by posterior approach surgery (Arthroscope Assisted Transpedicular decompression + posterior decompression + instrumentation+ transpedicular bone graft + Sublaminar Mersilene tape augmentation) with similar demographic data (age, sex, mode of injury, severity of osteoporosis, duration of delay in presentation), clinical

parameters (visual analog scale [VAS], Oswestry Disability Index [ODI], Frankel grade), radiological parameters (local kyphosis), and surgical variables (blood loss, surgery duration, intra-operative problems) were recorded. Neurological worsening/improvement, complications, and implant loosening/failures were noted and compared.

Results: Significant improvement was noted in VAS (pre- operative, 8.20±0.65; postoperative, 4.1±0.64) and ODI(preoperative, 76.54±6.96; postoperative, 30.5±6.56). Complete neurological recovery noted in 37 patients (Frankel grade E) and three patients remained non ambulatory (Frankel grade C). Significant improvement was noted in local kyphosis angle (preoperative, 21.80±2.70; postoperative, 11.40±1.80) with 10% loss of correction (2.5±0.90) at final follow-up. Symptomatic implant failure was noted in two patients and proximal junctional failure in one patient requiring revision.

Conclusion: Burst osteoporotic fracture can be managed with single posterior surgery with significant improvement in neurology and functional scores of patient. Aggressive kyphosis correction is often not required and significant correction of kyphosis is noticed due to positioning alone. Arthroscopic transpedicular decompression with grafting is safe and simple alternative to cement augmentation or anterior surgery for collapsed vertebrae.

P483
BONE DENSITY AND VITAMIN D STATUS IN CHILDREN DURING GROWTH SPURT

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Methods: 102 children aged 9-17 y presented to University Pediatric Clinic for routine examination. All were healthy, normal weight, normal development, and usual activity for age. All families agreed for child to be included in study. Children were divided into two groups. Group I included 32 children whose height increased 10 cm or more in current year; Group II, 70 children with <10 cm growth in current year. Group II could be either before or after growth spurt. The examination included evaluation of the physical development (recommended by WHO "Child Growth Standards," 2007), sexual development (Tanner, 1969), serum level of 25OHD by enzyme-linked immunosorbent assays methodology, ultrasound densitometry (Sonost-2000, Korea), and DXA (Hologic QDR W Explorer, USA). Z-score < -2.0 considered significantly low bone density in immature skeleton.

Results: Group I with Z-score < -2.0 had average serum 25OHD level of 39.6 nmol/l; Z-score > -2.0, 39.3 nmol/l. Group II with Z-score < -2.0 had average serum 25OHD of 29.8 nmol/l; Z-score > -2.0, 38.7 nmol/l. 25OHD deficiency was present in both groups by reference values of M.F. Holick, et al (2011). Bone function failed with long bone fractures in 28.5% (p<0.5) of Group I during

current year; 33.3% (p<0.05), Group II. All these children had had previous fractures of long bone in previous years. A Z-score < -2.0 in 40.9% of Group I; 12.5% (p<0.05), Group II.

Conclusion: This study documents deficiency of 25OHD in all children. The "transient osteopenia" during growth spurt was not associated with a greater deficiency of 25OHD than Group I with normal bone density. 25OHD replacement treatment may not be required with "transient osteopenia" for eventual normal mature skeleton; but children not in growth spurt (Group II) and with low bone density had the greatest deficiencies of 25OHD. Additional study is needed to determine the indication for 25OHD during growth spurt to maximize the eventual maximum adult bone density. The annual pediatric long bone fracture rate is some 10 times greater than expected and requires further study.

P484
EFFECT OF MOTIVATIONAL TELEPHONE INTERVIEW ABOUT EXERCISE ON THE FALL RISK IN THE ELDERLY INDIVIDUALS: FEASIBILITY STUDY

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Objective: Biophysiological changes that may occur with aging may have negative effects on the individual's activity. It is important to use motivational interview methods that support long-term behavior change in the elderly individuals in order to increase their mobility levels. This study was planned to determine the effect of motivational telephone interview on exercise on the fall risk in the elderly individuals.

Methods: In May-December 2019, 60 patients, aged 65 years or older and followed-up in the osteoporosis outpatient clinic of a university hospital were included in the study, which was planned in a quasi-experimental design. The patients in the experimental (n=30) and control groups (n=30) were informed by the research nurse about the 8-week exercise program, involving 3 d/week exercises. The patients in the experimental group were called by telephone on the morning of the exercise days and their daily exercises were explained. In addition, at the end of 1 week, a motivational telephone interview was conducted about the exercise program they needed to perform the following week. At the end of every 4 weeks, they were called to the outpatient clinic for a 30-minute interview for their exercise motivations, and their fall risks were evaluated. The patients in the control group were instructed to follow the same exercise program as the experimental group without daily and weekly telephone-based motivational interviews. On week 4 and 8, their falling risks were calculated with a Multiple Platform Dynamic Posturography Device.

Results: No differences were found between the experimental and control groups in terms of individual characteristics and factors that may affect fall (Mini-Mental State Examination, Maximal Step Length Test, Up and Go test, Barthell Scale/Index, Fear of Falling) as well as laboratory values (Ca, Vit. D, PTH) (p>0.05). The mean risk of falls in both follow-ups after the telephone interview was significantly lower in the experimental group than in the control group (score of week 4=a difference of 13 units, p=0.009; score of week 8=a difference of 19 units, p=0.001).

Conclusion: Motivational telephone interview on exercise is thought likely to have a positive effect on the level of mobility by decreasing the risk of falling in the elderly individuals.

P485
REHABILITATION PROGRAM IN FEMALES WITH KNEE OSTEOARTHRITIS AND BILATERAL KNEE REPLACEMENT

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Objective: To assess the role that a complex rehabilitation program can have in improving pain perception and functional status in female patients diagnosed with severe primary bilateral knee osteoarthritis after they underwent bilateral knee replacement.

Methods: We included in our observational study 27 females patients diagnosed with severe primary bilateral knee osteoarthritis that underwent a bilateral total knee replacement within 2 years, treated with pharmacological modalities-analgesics, and nonpharmacological modalities such as hygiene-dietary measures, lifestyle changes, complex rehabilitation program. For the assessment of pain, we used VAS scale. We also used scales for condition-specific health: WOMAC scale and Lequesne functional index. These were measured at the beginning at the study (T1), after the 6 months rehabilitation program (T2), and after 1 year (T3). Patients followed a home-workout program between T2-T3 (individuals learned during hospitalization).

Results: The patients aged between 61-75 years old, with an average age of 71.3 years. Analysing VAS scale recordings, we found highly significant differences among the three visits, the values decreasing over time (Friedman p<0.001). The post-hoc analysis showed the values from the first visit being lesser than the values from the second visit, which were significantly lesser than the values from the third visit. The finding for the WOMAC scale values and the Lequesne functional index values were similar to those for VAS, showing a highly significant decrease over time (Friedman p<0.001).

Conclusion: In female patients with bilateral advanced knee osteoarthritis and bilateral knee replacement an individualized medical treatment, the complex rehabilitation program increases the functionality and reduces pain.

P486
THE EFFECTIVENESS OF A COMPLEX REHABILITATION PROGRAM IN PATIENTS WITH RHEUMATOID ARTHRITIS AND HIP REPLACEMENT

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Objective: The hip joint is affected in 15-30% of all rheumatoid arthritis patients, however its involvement is not always readily apparent early in the course of the disease. 10-25% of all rheumatoid arthritis patients undergo total hip replacement. The objective of our study was to assess the role that medication and complex rehabilitation program may have in improving pain perception and functional status in patients diagnosed with rheumatoid arthritis and hip replacement.

Methods: Group I- 13 patients that received medical treatment and other means of conservative treatment - hygiene-dietary measures, lifestyle changes, 6 months complex rehabilitation program (massage, physical and kinetic therapy). Group II- 12 patients treated only with medication and advised about hygiene-dietary measures and lifestyle changes. Patients received only disease-modifying antirheumatic drugs and non-steroidal anti-inflammatory drugs or corticosteroids. Pain intensity evaluation was performed using the VAS analogue-visual pain scale, and the functional status was evaluated using the HAQ and WOMAC scales. These parameters were measured at the beginning of the study (T1), and after the 6 months rehabilitation program (T2).

Results: All the patients included in the study were women. The mean age of patients was 62.14 y (range 51-72 y). All patients had moderate disease activity (the median patient DAS28 was 4.18). The distribution of the studied patients by level of functional capacity was: 11 patients were in functional class ACR2, 14 patients were included in ACR3. VAS pain scale score had a favourable evolution in both groups, the improvement percent of the painful status was 42% for the first group and 20% for the second one. HAQ and WOMAC scores improved by 40%, respectively 41% in the first group and by 23.5% and 16.6% in the second group.

Conclusion: Total hip replacement is one of the most successful surgical procedure in patients with rheumatoid arthritis, with the primary goal of pain relief and restoration of function. Medical treatment and an individualized complex rehabilitation program applied after the surgery, by alleviating pain and disability improves the gait of the patients and helps them return to active life.

P487
IS IT A BARIATRIC SURGERY A CAUSE OF INCREASING OF FRACTURES?

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Objective: Bariatric surgery is the set of surgical techniques whose objective is weight reduction, and it could have complications. One of them may be the increase in the incidence of fractures, secondary to nutritional defects, among others, that could modify bone metabolism with an increase in remodeling. We aimed to carry out a retrospective observational pilot analysis of a cohort of 140 morbidly obese patients after bariatric surgery, of a total of 304, descriptive of axial and peripheral fractures, among other variables.

Methods: Data were collected from the University Hospital of Fuenlabrada of a cohort of morbidly obese people who underwent bariatric surgery from 2009 to the present. Were included as variables age in years, sex, BMI before surgery, evolution time since surgery in years, incidence of sleep apnea syndrome (OSAS), incidence and type of fracture, osteoporotic or not, and axial or peripheral. A descriptive and frequency analysis, and a chi-square contingency table between incidence of fracture, and gender, OSAS, or childhood obesity, were performed.

Results: A 48.76 years old cohort was observed, 25.7% men/74.3% women, 30.8% childhood obesity, BMI of 45.65 kg/m², and 45% with a diagnosis of OSAS. A 15% of fractures were noted: 66.66% considered as osteoporotic (40.76% axial, 50.31% peripheral, and 8.93% of both) in a time of evolution of 5.81 y, and without relationship with gender, OSAS or childhood obesity (p=0.7, p=0.15, p=0.16)

Conclusion: It is a study that highlights that bariatric surgery in Fuenlabrada area is mainly performed on morbidly obese women in adulthood. There is a high rate of OSAS, and an increase in the incidence of fractures unrelated to gender, OSAS or childhood obesity, despite the fact that in the bariatric surgery protocol densitometric osteoporosis is an exclusion criterion.

P488
HIGH IMPACT LOADING APPLIED DURING PUBERTY INTENSIFIES BONE (RE)MODELLING IN GROWING RATS

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Objective: Investigate the effects of high impact axial tibial loading applied during puberty on bone (re)modelling in growing rats.

Methods: Male Sprague Dawley rats aged 28 d.o. were randomly divided into two groups (n=6/group): sham and high impact, mimicking jumping (1250 με on tibia). An *in vivo* axial tibial cyclic (2 Hz) compression was applied 5 days/week on the impact group rats during their pubertal stage (until 84 d.o.). Sham group rats received the same experimental conditions without any load. A μCT scanner provided weekly scan of the right tibia at a voxel resolution of 18 μm [1]. Reconstructed images were registered on the cortical area using a custom-developed algorithm between consecutive scanning time points [2]. Cortical bone (re)modelling parameters including bone formation (BFR/BV) and resorption (BRR/BV) rates (%/d), mineral apposition (MAR) and resorption (MRR) rates (μm/d), mineralizing (MS/BS) and eroded (ES/BS) surfaces were further calculated at 37% proximal sites [3]. Statistical significance was analyzed using one-tailed paired t-tests (p<0.01 and p<0.05).

Results: High impact group showed significantly higher BFR/BV and MAR compared to the shams for all stages, except 56 d.o. Rats from the impact group also resulted in significantly higher BRR/BV and MRR compared to the sham rats for all ages, except 49 d.o. As for MS/BS, significant decrease was observed at 42, 56 and 70 d.o. while ES/BS showed significantly greater values at all stages except 49 and 63 d.o.

Conclusion: High impact loading intensifies bone (re)modelling, both in terms of apposition and resorption volumes, surfaces and thicknesses, at most pubertal time points. Whether this effect is biomechanically and morphologically positive or not on skeleton growth remains to be investigated. Similar experimental setup could be repeated with lower intensity of loading, to provide more insights about different loading levels on pubertal growth.

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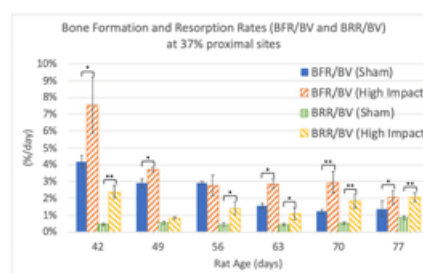
Figure 1, comparison of BFR/BV and BRR/BV between two tested groups at 37% proximal sites. N = 6 rats per group (mean value ± SD). *p < 0.05 and **p < 0.01: significant compared to sham rats.
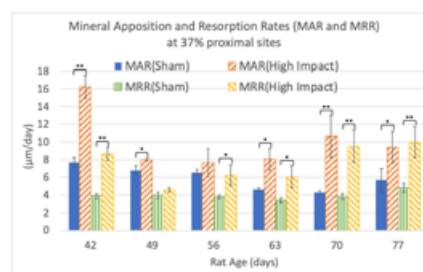
Figure 2, comparison of MAR and MRR between two tested groups at 37% proximal sites. N = 6 rats per group (mean value ± SD). *p < 0.05 and **p < 0.01: significant compared to sham rats.

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P489
EFFECTS OF REHABILITATION METHODS FOR HAEMOPHILIC ARTHROPATHY IN THE PERSON WITH HAEMOPHILIA B: CASE REPORT

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Objective: Persons with hemophilia suffer from spontaneous repeated joint bleeds, that predisposes to synovitis. Bleeding and chronic synovitis trigger progressive damage to the joint cartilage, and that results in haemophilic arthropathy. Patients with severe haemophilia often experience chronic pain and disability. Treatment of haemophilic arthropathy may be conservative or operative. Our aim is to present the effects of use of rehabilitation procedures and physical therapy modalities for treatment of ankle and elbow arthropathy in a patient with haemophilia B.

Methods: Patient D.T., 28 years old, with hemophilia B without inhibitors, with arthropathy of the right elbow and both ankles received physical therapy after bleeding episode in right elbow. For pain assessment visual analogue scale (VAS) and range of motion (ROM) in the joints were used. He had pain (in right elbow VAS was 6 points, in the both ankles VAS was 3), light swelling and restricted ROM in right elbow (flexion 100°, extension -20°) and both ankles (dorsal flexion 5°, plantar flexion 25°). He walks without walking aids. Standard radiography of the right elbow and both ankles presented signs for mild arthropathy. He received physical therapy with: dyadinamic and interferential currents, iontoforesis with Novocain, contrast baths for both feet and exercise therapy for right elbow, and both ankles during 10 d. As secondary prevention, he received Human plasma coagulation factor IX, 1000-1500IE, 3 times a week.

Results: At the end of treatment, patient had: reduced swelling and pain in right elbow (VAS 3), improved ROM in right elbow (flexion 120, extension -15°), and slightly functional limitations. At follow-up assessment 6 months later he had reduced pain and he maintained achieved ROM in all joints.

Conclusion: Usage of physical therapy modalities and exercises might reduce pain and improve the range of motion after acute joint bleeding in patients with haemophilic arthropathy.

P490
HYPOVITAMINOSIS D AND RISK FOR SUBSEQUENT DEVELOPMENT OF CANCER: A POPULATION-BASED RETROSPECTIVE COHORT STUDY

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Objective: A randomized controlled trial of vitamin D supplementation (VITAL) failed to show a lower incidence of cancer than placebo. However, in analyses excluding the first 2 years of follow-up, vitamin D supplementation was associated with a lower risk of death from cancer. Our objective was to determine if 25-hydroxyvitamin D [25(OH)D] values were associated with cancer incidence. We hypothesized that individuals with low 25(OH)D concentrations would have an increased risk of cancer.

Methods: We conducted a population-based retrospective cohort study using the Rochester Epidemiology Project. We identified all adults residing in Olmsted County, Minnesota between January 1, 2005 and December 31, 2011 with no prior history of cancer who had at least one serum 25(OH)D measurement. Cancer outcomes were retrieved until subjects' final clinical visit as an Olmsted County resident, December 31, 2014, or death.

Results: Of 8700 subjects, 761 developed cancer (skin: 360, non-skin: 401) over a median (IQR) follow-up of 4.6 (IQR 3.4-6.1) years. In an analysis adjusted for age, sex, race, Charlson Comorbidity Index, BMI, hypertension, socioeconomic status (HOUSES Index), and smoking status, serum 25(OH)D<30 nmol/L was associated with a greater incidence of non-skin cancer with a hazard ratio of 1.56 (95%CI 1.03-2.37) compared with 25(OH)D values 50-125 nmol/L (Figure). Skin cancer incidence was unrelated to serum 25(OH)D in the adjusted analysis (P=0.15).

Conclusion: Serum 25(OH)D concentrations <30 nmol/L were associated with subsequent development of non-skin cancers.

Any Non-Skin Cancer
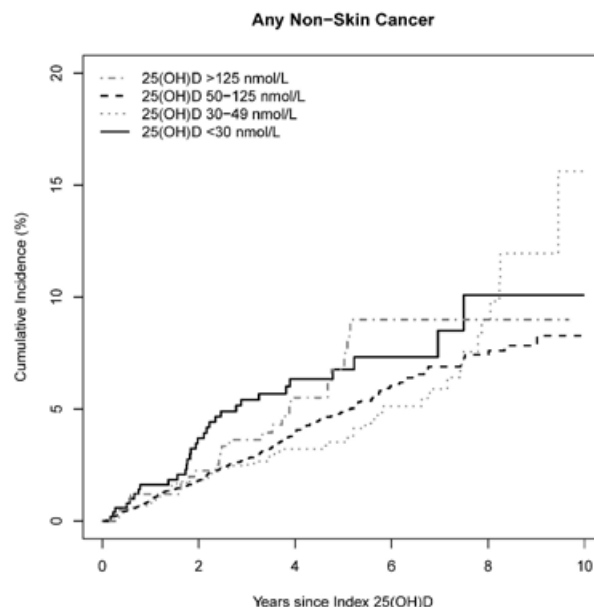
P491
GEOGRAPHIC VARIATIONS ON PRACTICE PATTERNS BETWEEN URBAN AND RURAL FRACTURE LIAISON SERVICES

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Objective: Geographic variations may exist for similar fracture liaison service (FLS) programs at different setting. We reported the medication use patterns and 1-y medication adherence for 2 related FLS models in urban and rural area.

Methods: The cohort enrolled untreated vertebral fracture outpatients (N=278 in Taipei City (urban) and N=138 in Chu-Tung Township (rural)). Care coordinators followed similar protocols adapted from the 13 best practice framework standards by the International Osteoporosis Foundation to provide baseline assessments, and telephone follow-up every 4 months for one year. The comparisons were made between cohorts. Regression analysis were performed to identify baseline correlates of selected outcomes.

Results: The mean age for this cohort was 76.8±9.8 y with 74.3% female. Patients in rural cohort were older (79.6±8.9 vs. 75.4±10.0, p<0.001), more likely to be prescribed with osteoporosis medications (96.4% vs. 85.3%, p<0.001), but less likely to adhere to their prescribed medications at one year (67.7% vs. 92.1%, p<0.001). Regression analysis revealed that older age (odds ratio [OR] 1.019, p<0.05), lower BMI (OR 0.925, p<0.05), without secondary osteoporosis (odds ratio OR 2.653, p<0.05), and rural area (OR 3.675, p<0.05) were the significant factors for medication use. Younger age (odds ratio [OR] 0.891, p<0.05), and rural area (OR 0.668, p<0.05) were significant factors for 1-y adherence.

Conclusion: Among FLS patients, rural patients were more likely to initiate osteoporosis medications but had lower medication adherence at 1-y compared with urban patients.

P492
ADHERENCE TO LIFESTYLE INSTRUCTION IN FRACTURE LIAISON SERVICE AS AN OUTCOME MODIFIED

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Objective: Significant care gap exists for those suffering from fragility fracture and osteoporosis. We reported the effect of our protocol and risk factors on 1-y mortality, falls, and recurrent fractures of a fracture liaison service (FLS) program.

Methods: Our FLS program enrolled 600 patients. Physician champions, and care coordinators followed the protocols adapted from the 13 best practice framework (BPF) standards published by the International Osteoporosis Foundation and provided baseline assessments with scheduled follow-up for 1 y. The entire cohort (N=600) was reclassified as no intervention from baseline to 1-y period (Group 1), no intervention for baseline followed by intervention for 1-y (Group 2), intervention for baseline followed by no intervention for 1-y (Group 3), intervention from baseline up to 1-y period (Group 4). Comparisons were made among 4 groups. Within group comparisons were made between baseline and 12 months data. Logistic regression analysis was performed to identify baseline correlates of selected 1-y outcomes.

Results: The mean age for this cohort was 77.5±10.5 y with 72% female. One-year mortality was 14.2%, fall rate 33.2%, and recurrent fracture rate 6%. Cox proportional hazard model revealed that older age (hazard ratio [HR] 1.016, p<0.05), less BMI (HR 0.918, p<0.05), serum albumin (HR 0.307, p<0.05), exercise group (p<0.05), protein supplement group (p<0.05), Ca supplement group (p<0.05) and Vit D_3 supplement group (p<0.05) were significant risk factors for mortality. Ca supplement group (p<0.05) was significant risk for incident fracture. Older age (HR 1.019, p<0.05), more BMI (BMI) (HR 1.080, p<0.05), exercise group (p<0.05), and Vit D_3 supplement group (p<0.05) were significant risk factors for fall.

Conclusion: This study presented the effect of different adherence to lifestyle instruction and risk factors for mortality, falls, and recurrent fracture among these patients.

P493

EXERCISE DOES NOT ATTENUATE BONE LOSS DURING CALORIC RESTRICTION IN OVERWEIGHT OR OBESE ADULTS: A META-ANALYSIS OF RANDOMIZED, CONTROLLED TRIALS

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Objective: Caloric restriction is effective for improving cardiometabolic health in overweight and obese individuals, but may result in bone loss and increased fracture risk. Caloric restriction-related bone loss may be attenuated by exercise. We performed a systematic review and meta-analysis to compare areal BMD (aBMD) changes in overweight or obese adults undertaking caloric restriction either alone, or in combination with exercise.

Methods: The Cochrane Central Register of Controlled Trials, Medline, Web of Science, EMBASE databases and ClinicalTrials.gov were searched for eligible articles from April 2019 to December 2019. A random-effects model was used to determine mean differences (95%CIs) in percentage changes in aBMD between groups.

Results: Eight randomised controlled trials (n=359) were included in the meta-analysis. Differences in aBMD changes for the caloric restriction group were similar to the caloric restriction plus exercise group at the femoral neck (-0.77% [95%CI: -1.75, 0.21], N=116), total hip (-0.55% [95%CI: -2.73, 1.62], N=68), lumbar spine (0.17% [95%CI: -0.65, 1.00], N=235), whole body (-0.27% [95%CI: -0.65, 0.12], N=259) and at any site (0.38% [95%CI: -0.29, 1.06], N=249). Sensitivity analyses also found no differences in aBMD changes at any site between groups in studies that used either resistance training (0.13% [95%CI: -1.02, 1.27], N=83) or aerobic plus resistance training (-0.65% [95%CI: -1.51, 0.21], N=152) interventions, were ≥6 months in duration (0.15% [95%CI: -0.95, 1.25], N=116), or included individuals aged either ≥60 (0.48% [95%CI: -0.31, 1.28], N=181) or <60 years (0.12% [95%CI: -1.16, 1.39] N=68).

Conclusion: Our findings suggest that exercise does not attenuate bone loss during caloric restriction. However, very few studies included appropriate exercise interventions performed at sufficient intensities and for sufficient durations required to maintain or improve aBMD. Additional long-term randomised controlled trials utilising osteogenic exercise interventions during caloric restriction, particularly in overweight and obese sarcopenic populations at risk for falls and fracture, are warranted.

P494

BONE MINERAL DENSITY ACCORDING TO MOBILITY LIMITATION STATUS AMONG U.S. OLDER ADULTS

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Objective: To examine BMD among older adults with mobility limitation.

Methods: The present analysis was based on data from subjects aged 60 y and older in the National Health and Nutrition Examination Survey cycles 2007-2010 and 2013-2014. Participants who answered affirmatively to the questions "By yourself and without using any special equipment, how much difficulty do you have walking for a quarter of a mile (that is about 2 or 3 blocks) or walking up 10 steps without resting? were defined as having mobility limitation, respectively. Osteoporosis and osteopenia were defined according to WHO criteria, using the 20-29 non-Hispanic white women from NHANES III U.S. population as the reference group.

Results: Of 4645 participants, 32.3% were defined as having mobility limitation. Moreover, arthritis and back pain were the leading causes of mobility limitation in older adults. Overall, subjects with mobility limitation were more likely to be women, non-Hispanic blacks, had less than high school education, physically inactive, reported fair to poor health, and greater number of comorbidities. Logistic regression models were assembled to examine the association between mobility limitations and BMD status stratified by gender. As shown in Table 1, the prevalence of osteoporosis was considerably higher among women with mobility limitation than those without it. In addition, after adjustment for potential confounders, older women with mobility limitation were 2.5 times more likely to have osteoporosis as compared with their non-mobility limited counterparts. Although this association was attenuated in men, overall older adults with mobility limitation had 2-fold higher rates of osteoporosis than those who did not.

Conclusion: Older adults with mobility limitation had significantly higher rates of osteoporosis than their nonmobility limited counterparts. Physical therapy interventions and treatment of osteoporosis should be considered, particularly among women reporting mobility limitation.

Table 1. Associations between mobility limitation and BMD status among older adults

BMD status	Non-limited % (SE)	Limited % (SE)	Crude OR (95% CI)	Adjusted OR (95% CI)*
Women				
Normal	34.1 (1.8)	30.7 (2.1)	1.00	1.00
Osteopenia	56.7 (1.2)	52.2 (2.3)	1.02 (0.77 - 1.35)	1.52 (1.02 - 2.26)
Osteoporosis	9.2 (1.1)	17.0 (1.4)	2.06 (1.34 - 3.18)	2.52 (1.35 - 4.70)
Men				
Normal	63.9 (1.6)	57.5 (2.5)	1.00	1.00
Osteopenia	33.5 (1.6)	38.5 (2.2)	1.27 (0.98 - 1.65)	1.36 (0.98 - 1.89)
Osteoporosis	2.5 (0.5)	4.0 (0.8)	1.77 (0.99 - 3.16)	1.46 (0.62 - 3.43)
Total				
Normal	48.8 (1.3)	41.6 (1.9)	1.00	1.00
Osteopenia	45.3 (1.1)	46.6 (1.8)	1.20 (0.99 - 1.46)	1.44 (1.10 - 1.87)
Osteoporosis	5.9 (0.6)	11.7 (0.9)	2.33 (1.67 - 3.25)	2.17 (1.35 - 3.47)

* Adjusted for age, gender, BMI, race-ethnicity, education, income, smoking, alcohol use, physical activity, comorbidities, calcium and vitamin D intake, and osteoporosis treatment

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P495
IS THE "PEDIATRIC" ORIGIN OF IDIOPATHIC OSTEOPOROSIS IN MEN POSSIBLE?

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Objective: There is a point of view that idiopathic osteoporosis begins at the age of formation of peak bone mass, but clinically (with fractures) appears at an older age. We aimed to clarify the contribution of age to the formation of a deficit in BMD in primary osteoporosis in men.

Methods: The study included 231 patients with primary osteoporosis. The basis for the diagnosis of idiopathic osteoporosis in men was the presence of low-energy fractures of the vertebral bodies or peripheral bones of the skeleton or loss of BMD corresponding to <-2.5 SD according to the T-criteria for people over than 50 years old or <-2.0 SD according to Z- criteria for people under 50 years old. Inclusion in the analysis of patients aged 17-19 years old was based on data that in the population of healthy men in Russia the formation of peak bone mass in the lumbar spine and femoral neck is completed by 15 years old. Patients with hypogonadism, osteomalacia, hypophosphatasia and pathology that could affect bone metabolism were excluded from the study. BMD in g/cm² was evaluated in L1-L4 and neck (Lunar Prodigy, NHANES database used). Statistics: Contingency tables were used to analyze interval variables. The presence of a relationship between the studied parameters was assessed using Fisher's exact test.

Results: Values of BMD in g/cm² are presented in Tables 1 and 2.

Table 1. BMD in L1-L4 of different age groups.

Age groups	Number of patients	BMD L1-L4 (g/cm²)
17-20 years old	26	0,87±0,09
21-50 years old	103	0,93±0,16
51 and older	102	0,95±0,18

Kruskal-Wallis test p=0.066

Table 2. BMD in the neck of the femur of different age groups.

Age groups	Number of patients	BMD Neck (g/cm²)
17-20 years old	25	0,84±0,12
21-50 years old	103	0,85±0,17
51 and older	95	0,79±0,12

Kruskal-Wallis test p=0,032

It was revealed that differences in the deficit of BMD in the lumbar spine (in absolute values in g/cm²) in the selected age groups are only close to reliable (p=0/032). In the femoral neck the differences were reliable (p=0.032), but only between the age group of 21-50 years old and the group older than 51 years old, while there were no differences between the groups of 17-20 years old and the group older than 51 years old.

Conclusion: The lack of a clear link between the deficit of BMD and the age of patients casts doubt on the postulate that the number of patients with osteoporosis increases with age and gives reason to consider primary forms of osteoporosis in some men older than 50 years old as a result of a timely undiagnosed juvenile form of the disease (impaired peak mass formation bones).

P496
A RANDOMISED PLACEBO-CONTROLLED CLINICAL TRIAL OF CURCUMA LONGA EXTRACT FOR TREATING SYMPTOMS AND EFFUSION-SYNOVITIS OF KNEE OSTEOARTHRITIS (CURKOA TRIAL)

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Objective: To determine the efficacy of *Curcuma longa* (CL) extract for reducing knee symptoms and effusion-synovitis in patients with symptomatic knee osteoarthritis (OA) and knee effusion-synovitis.

Methods: In this randomised, double-blind, placebo-controlled trial, participants with significant knee pain (≥40 mm on a 100-mm visual analog scale [VAS]), symptomatic knee OA (by ACR criteria) and ultrasound defined effusion-synovitis were randomised to receive CL extract (80% aqueous based extract standardised to turmerosaccharides +20% curcuminoids, 2×500 mg capsules/d) or identical placebo for 12 weeks. Knee MRI scans were obtained at baseline and 12 weeks. Coprimary outcomes were changes in knee pain assessed by VAS and change in knee effusion-synovitis volume assessed by MRI over 12 weeks.

Results: Among 70 participants (36 received CL, 34 received placebo, age 61.8±8.6 y, 56% female), CL significantly improved VAS knee pain compared to placebo (-9.11 mm, 95% CI [-17.79 to -0.44]) over 12 weeks, equivalent to a standardised effect size of 0.50. There was no significant between group difference in change in effusion-synovitis volume (3.24 mL [-0.33, 6.82]). There were significantly greater reductions in WOMAC knee pain (-47.22 mm [-81.22, -13.22]), WOMAC function (-112.26 mm [-222.79 to -1.74]) and significantly more OARSI-OMERACT treatment responders (63% treatment vs. 38% placebo [risk ratio=1.64 (1.00 to 2.70)]) in the CL group compared to the placebo group. There was no significant between-group difference in lateral femoral cartilage T2 relaxation time (-0.38 ms [-1.10 to 0.34]) assessed from compositional MRI. The incidence of adverse events was similar in the CL (n=14 (39%)) and placebo (n=18 (53%)) groups over 12 weeks (P=0.24).

Conclusion: An extract of CL significantly improved knee pain in an inflammatory phenotype of knee OA patients over 12 weeks compared to placebo but had no effect on knee effusion-synovitis

and cartilage composition assessed using MRI. The moderate effect size of the treatment supports the use of CL extracts for the symptomatic management of knee OA.
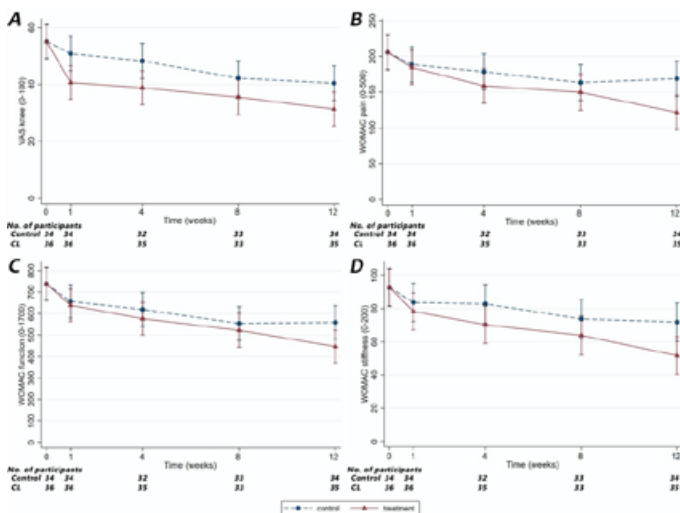
P497
USING SARC-F QUESTIONNAIRE TO IDENTIFY FRAILTY IN THE OLDER ADULTS

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Objective: The physical phenotype of frailty, described by Fried et. al, shows significant overlap with sarcopenia. EWGSOP2 recommends SARC-F questionnaire to screen for sarcopenia. Considering common features between both conditions, we aimed to investigate whether SARC-F questionnaire could also be a reliable tool to screen or evaluate frailty.

Methods: Community-dwelling older adults aged ≥65 y admitted to the geriatric outpatient clinic were enrolled to the study. Frailty was assessed by modified Fried scale and SARC-F questionnaire were performed to all participants.

Results: 447 patients were included (70.7% female, 29.3% male; mean age: 74.5±6.6 y. 93 (20.8%) were frail according to Fried index. SARC-F cut-off ≥1 had sensitivity 91.4% and specificity 44.9%. SARC-F cut-off ≥2 presented the best balance between sensitivity and specificity (sensitivity: 74.2% vs. specificity: 73.7%) to identify frailty (AUC=0.807; 95% CI: 0.76-0.84, p<0.0001). SARC-F ≥4 had high specificity 92.6% with sensitivity 46.2%.

Conclusion: We suggest that SARC-F ≥1 point can be used to screen for frailty and SARC-F ≥4 to diagnose frailty. SARC-F may be used to evaluate frailty in usual geriatric practice.

P498
GENE-SET ANALYSIS REVEALS 56 FUNCTIONAL PATHWAYS FOR OSTEONECROSIS

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Objective: Osteonecrosis is a disease caused by reduced blood flow to bones in the joints, and the genetic factors have been recognized to contribute to the individual genetic susceptibility of osteonecrosis. Genome-wide association studies (GWAS) have been used for the identification of susceptibility SNP loci, but the power of loci found by GWAS was weak. Gene set analysis (GSA) was considered as an effective complement of single-SNP based GWAS studies, that can increase the statistic power by pooling many weaker pieces of evidence into a larger, more detectable signal. The objective of this project is to identify potential susceptibility gene sets associated with osteonecrosis by GSA with a powerful tool MAGMA.

Methods: A GWAS summary data of self-reported osteonecrosis from UK biobank was used for GSA. The data contains 12,159,758 SNPs and corresponding P-values calculated from the GWAS study. Before the analysis, all the SNPs were mapped to genes defined as the range from 5 kb upstream the transcription start site to 1.5 kb downstream the transcription stop site. Then, we did the gene analysis via MAGMA and the gene P-values were gotten from a single-SNP combined test-statistic. At last, the gene analysis output and 2199 canonical gene sets from the MSigDB were used for the GSA via MAGMA.

Results: The GSA identified 56 pathways significantly associated with osteonecrosis ($P<0.01$) after correcting for gene size and gene density, including previously reported chemokine related pathway (CXCR4_PATHWAY, $P=5.79\times10^{-5}$) and B cell related pathway (reactome_signaling_by_the_B_cell_receptor_BCR, $P=6.22$ reactome_ion_homeostasis), these might reflect underlying diseases of steroid treatment. The pathways related to non-small cell lung cancer (Kegg_non_small_cell_lung_cancer, $P=2.34\times10^{-3}$) and pancreatic cancer (Kegg_pancreatic_cancer, $P=7.31\times10^{-3}$), also overlapped with findings of other osteonecrosis related studies. In addition, we found some novel pathways associated with osteonecrosis, such as reactome_ion_homeostasis ($P=7.16\times10^{-3}$) and Biocarta_PKC_pathway (5.74×10^{-3}).

Conclusion: Overall, by conducting GSA we identified multiple gene sets associated with osteonecrosis which could provide new insights into osteonecrosis pathophysiology.

P499
GENE AND GENE-SET ANALYSIS REVEALS 10 GENES AND 24 FUNCTIONAL PATHWAYS FOR OSTEOMYELITIS

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Objective: Osteomyelitis (OM) is a progressive inflammatory process usually caused by the bacterial infection, the symptoms may include pain in a specific bone with overlying redness, fever, and weakness, but little is known about its genetic basis. Gene and gene-set analysis is an effective method to explore the underlying genetic factors of OM. The objective of this project to identify potential susceptibility genes and gene sets associated with OM by gene and gene-set analysis with the MAGMA tool.

Methods: A genome-wide association study (GWAS) summary data of self-reported OM from UK biobank was used for gene and gene set analysis. Firstly, all the SNPs were mapped to genes according to the genomic coordinates, and the valid mappable region includes the 5kb upstream and 1.5kb downstream sequence of the target gene. Then, gene analysis was conducted and the gene P-value was calculated from a single-SNP combined test-statistic. Finally, the gene-set analysis was performed using 2199 pathways from MSigDB.

Results: Of the 17,739 genes contained at least one SNPs, we identified 10 genes significantly associated with OM after Bonferroni corrections ($P<2.81\times10^{-6}$). Among them, the gene *AXIN1* is associated with multiple skeleton phenotypes in Mouse Genome Informatics. The gene-set analysis identified 24 pathways significantly associated with OM ($P < 0.01$) after correcting for gene size and gene density, including 4 Kegg gene sets, 3 Biocarta gene sets, 1 PID gene set, and 17 Reactome gene sets. We found an immune-related pathway (Reactome_sumoylation_of_immune_response_proteins, $P=7.5\times10^{-3}$) associated with OM, which revealed the importance of immune function in OM progression.

Conclusion: Overall, by performing gene and gene-set analysis we identified multiple genes and gene sets associated with OM which could provide new insights into OM pathophysiology.

P500
THE PARTICULARITIES OF OSTEOPOROSIS IN MEN

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Objective: Men`s osteoporosis is a taboo subject for both doctors and patients, because the absence of menopause makes men`s bones more resistant and larger and protect them against bone fragility. With age advancement occurs the cortical bone damage. Hypogonadism is the best characterized risk factor for men's osteoporosis. The hereditary deficiency of pituitary gonadotropic hormone produces osteoporosis just before men reach skeletal maturity, here the deficiency secretion at puberty occurs. Estrogens and testosterone play a protective role on bone mass[1-5]. At the tissue level, estrogen maintains the balance between resorption and formation, and at the cellular level participate in the survival and functioning of the bone cells. At the same level, testosterone acts through the reduction of resorption and stimulating the bone formation, and at the cellular level, participates on osteoblasts and osteoclasts extension of life. The purpose of this study is to establish the levels of diagnosis and therapeutic intervention, to evaluate androgen and estrogen hormones in bone health[6-11].

Methods: The study included 53 cases of osteoporosis diagnosed in men. The patients have age between 17-69 years. To all patients laboratory investigations were made- calcemia, phosphatemia, alkaline phosphatase, total or free testosterone, estrogen, as well as paraclinical investigations - DXA.

Results: The low values of the biological samples were correlated with the low values of DXA (T-score between -2.8 DS and 4.1 DS).

Conclusion: The bone mass deficiency on men is not linked to a specific cause such as menopause at women and, with the exception of hypogonadism, the levels of the sex hormones (androgens and estrogens) are moderately reduced with age, at least before the age of 70 years.

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11. Maglaviceanu CF et al. Rev Chim (Bucharest) 2019;70:3967.

P501
NEWS ABOUT THE GENETICS OF OSTEOPOROSIS

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In the pathogenesis of osteoporosis[1-6], a major role is played by genetic risk factors, an aspect reflected by the high inheritance of many components of bone hardness. A small number of cytogenetic and monogenetic diseases which induce osteoporosis are known, but the common form of osteoporosis is generally considered to be polygenic as a result of the interaction of allele polymorphic common genes at QTL (the quantitative characteristic locus) with varied environmental factors. The first candidate genes were studied through their products, α2 HS glycoprotein, a major protein of bone structure matrix. It is the first bone gene associated with BMD. The candidate VDR gene directs the action of 1,25- (OH) vitamin D, including the effects on calcium transport as well as on homeostasis and bone resorption. Estrogen receptors are largely responsible for the increased range of action of estrogen steroids on tissues target, including bone tissue. The two genes are ER1 and ER2, estrogen being essential for closing bone apophyses on adolescents and maintaining bone mass on women. There is no relevant association between ER1 and ER2 polymorphism and bone mass phenotype. Collagen type1 α1 (COLIA 1) with collagen type1 α2 (COLIA 2) produces bone collagen, which is the main structural protein of the skeleton. Mutations in COLIA 1 and COLIA 2 produce a dominant monogenetic osteoporotic disease, imperfecta osteogenesis. At least 16 other candidate genes have been studied in association with BMD. These were selected given that their products are known to have several implications in metabolism aspects or bone structure[7-11].

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P502
WHAT DO PATIENTS WANT AND NEED FROM AN OSTEOARTHRITIS EXPLANATION: RESULTS FROM STAKEHOLDER CONSULTATION EXERCISE

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Objective: To establish what patients want and need to know about osteoarthritis (OA), and to identify appropriate language, to support self-management (SM).

Methods: Within a mixed-methods project to develop and test a patient OA explanation package (PEP-OA), an expert stakeholder consultation exercise was undertaken to inform initial development of candidate explanation statements. Informed by theory, existing statements were divided into topics within 11 groups and presented to a stakeholder group (n=10) for feedback on completeness, accuracy and preferred wording. Postdiscussion, stakeholders (n=6) red-amber-green (RAG) rated each topic (red: no clear link to supporting SM, green: clearly linked to SM). Topics unanimously RAG-rated red were removed. Remaining topics were discussed by a patient advisory group (PAG, n=6) for further feedback, exclusion and refinement.

Results: Stakeholders rejected 'degeneration'. PAG members rejected 'wear and tear', 'loss', 'not inflammatory arthritis/osteoporosis', 'normal' and technical descriptions involving joint anatomy. 'Condition' or 'disorder' and 'movement' or 'activity' were preferred over 'disease' and 'exercise' respectively. Both groups conceptualised OA as: not inevitably progressive; modifiable, and being variable between people, joints and over time. Topics portraying hope, that something can be done, sources of support, and the benefits of simple SM strategies were preferred.

Conclusion: Stakeholders preferred simple explanations which conceptualise OA as a manageable and/or modifiable long-term condition. The next step is to test the impact of the statements on SM in a conjoint survey, before finalising a core patient explanation of OA for use in consultations.

P503
THE EFFECT OF ANTIRESORPTIVE TREATMENT ON MARKERS BONE SYSTEM BALANCE

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Objective: Most antiresorptive agents induce a decrease in bone system balance with a profound diminution of bone resorption markers within 1-6 months of treatment and a delayed deficiency in bone formation markers. The percentage reduction of the markers values of bone system seems to depend on the dose and the effectiveness of the chosen drug, as well as on the markers used. Regardless of management mode, a fast and sustained decrease of markers bone mass resorption is observed during the first weeks of HRT, reaching a stabilization of the level within 3-6 months. Due to the correlation of resorption and bone formation processes, the markers of bone formation develops[1-11],usually, with a short delay. After HRT discontinuation, markers of bone resorption and, at a later stage, markers of bone formation return to menopause levels.

Methods: The were included 61 women with osteoporosis with age between 35-52 y. At all the included cases, the BMD was determined through DXA. All patients received drug therapy with mixed estrogens which use alternative routes of estrogen administration, including transdermal, percutaneous and intranasal.

Results: Thus, at premenopausal women treated with combined estrogens (0.625 mg/d), urinary NTX levels drop significantly by 23% starting two weeks after beginning the replacement therapy. After 3 months, NTX urinary levels decreased by 39 %, while the DPD urinary concentrations showed a less pronounced effect, with an average decrease of 20%. To older postmenopausal women, the response of biochemical markers of bone turnover was similar for lower or higher doses of estrogen, indicating that lower than normal doses may reduce bone resorption to the same extent and thus prevent the loss of bone mass in older women who are on postmenopausal.

Conclusion: Due to the variability of their biological meanings, the biochemical markers of bone mass balance have a high degree of inaccuracy and a signal/noise ratio comparable to DMO measurements. However, bone mass markers change much faster as a response to therapeutic interventions. In fact, the decrease of the balance of bone mass markers during antiresorptive treatment is inversely proportional to the subsequent increase on BMD.

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P504
TRANSCRIPTIONAL REGULATION OF BONE ENDOCRINE FUNCTION

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Objective: For several years now the skeleton has been identified as a dynamic, interactive organ that receives and transmits regulatory signals to and from other tissues[1-11]. These observations extended the homeostatic role of skeleton beyond the regulation of bone growth and remodeling to at least two new endocrine functions: as an important regulator of energy metabolism, but also involved in male fertility. On its first endocrine function, the skeleton regulates energy metabolism by promoting b cell proliferation, insulin secretion, insulin sensitivity and energy expenditure. Osteoblasts are the cells that orchestrate the responses by osteocalcin secretion. In its sub- or non-carboxylated form, osteocalcin acts as a hormone that promotes hyperinsulinemia and enhances insulin sensitivity. Insulin acts on osteoblasts through the insulin receptor for suppressing the activity of protein tyrosine phosphatase (OST-PTP), the product of Esp, an expression of which has been associated with decreased osteocalcin activity due to its favorable carboxylation, reduced expression of ESP, abolish osteoprotegerin expression and anti-osteoclastogenic cytokines; promotes bone resorption. In addition, compared to its homeostatic energy properties, carboxylated osteocalcin promotes male fertility through promoting testosterone synthesis and, thus, germ cell survival.

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Methods: The study was performed on 56 patients (18 men and 38 women)with age between 27-52 y. Investigations performed: hormonological - FSH, LH, estradiol, progesterone, testosterone, insulin, biochemical markers of serum bone-osteocalcin turnover, CrossLaps, and BMD was evaluated by DXA.

Results: Osteoporosis was evident on both sexes in all cases of insulin deficiency as well as in cases of estrogen deficiency.

Conclusion: It is necessary to associate the insulin regulatory therapy with the antiresorptive/proformative medication.

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P505
FROM THE GONADS TO BONES AND BACK

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Sexual steroid hormones, estrogens and androgens play central roles in controlling sexual maturity and reproduction. While both men and women have all types of hormones present in their body, women mostly produce two types of hormones, estrogen and progesterone, while men mainly produce androgens, such as testosterone. In addition to their reproductive functions, sexual steroid hormones are essential for developing the skeleton and maintaining bone health on grown life[1-4]. Testosterone and estrogen positively influence skeletal growth and maturation. Their effects are mediated by slow genomic mechanisms through nuclear hormone receptors but also by rapid nongenomic mechanisms. The biological importance of this regulation is best exemplified by the fact that decreased gonadal function triggers bone loss on both sexes. Menopause estrogen deficiency on women and androgen decrease in the elderly are major pathogenic factors in the development of osteoporosis. Sexual steroids play an important role in bone growth and reaching the bone mass peak. Are, at least in part, responsible for the differences (in terms of the female or male gender) of skeletal bone growth that occur during adolescence. Gender differences of skeleton are attributed to the androgen-stimulating action on periosteal bone formation on men, as opposed to an estrogen inhibitory action on women. Androgen deficiency due to prepubertal hypogonadism is associated with deficiency of BMD at puberty, while testosterone administration before the closure of growth cartilage leads to increases of bone mass. In addition to steroid sex hormones, several studies show that other hormones are negatively regulated by estrogen, such as growth hormone and IGF-1. IGF-1 levels are higher on men than women during early puberty, or both, showing a delayed bone growth. Estrogen deficiency is a major pathogenic factor in bone loss associated with menopause and the evolution of osteoporosis at postmenopausal women[5-11]. After menopause, bone resorption increases by 90%, while bone formation increases by only 45%.

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P506
EVALUATION OF THE POSSIBLE ASSOCIATION BETWEEN SYSTEMIC OSTEOPOROSIS AND PERIODONTAL DISEASE PROGRESSION ON POSTMENOPAUSAL WOMEN

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The immuno-inflammatory response in periodontal disease is triggered by biofilm formation and would certainly lead to the destruction of the periodontal ligament and alveolar bone. The low bone mass and the deterioration of the skeletal tissue microarchitecture typically of osteoporosis that compromise the trabecular and cortical bone material, can modify the host's response to biofilm, making it more susceptible to the development and progression of periodontitis. Different systemic reviews and meta-analyzes suggests a possible association of periodontal disease and systemic disease such as osteoporosis. Multiple

factors influence osteoporosis, including genes and hormone therapy. Osteoporosis is considered to be a physiological process estimated to be about 23% on women in Romania with age between 50-70 y. It is a systemic disease of skeletal tissue typically characterized by a low bone mass that causes deterioration of bone tissue microarchitecture and an increase of fragility[1-8]. Postmenopausal women with osteoporosis are also susceptible to an excessive response to dental plaque. The pathological effect of minerals on the bones, including the capacity to favor the inflammation, disrupting the host's inflammatory response is relevant to periodontal disease and is considered to be a primary factor in disease progression and subsequent bone loss[9-11]. Recent studies have suggested possible associations of periodontal disease with several severe systemic disorders, including osteoporosis. The systemic factors involved in the multifactorial nature of osteoporosis may interact with the local factors responsible for periodontal disease and suggest that they may act as an additional predisposing factor.

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P507

PERIODONTAL DISEASE AND OSTEOPOROSIS

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In a cross-sectional study performed on 563 postmenopausal women, systemic bone density was measured at the level of the spine, hip, forearm, and whole body by DXA[1-11]. The strongest associations were found between systemic bone density and CAL at women without subgingival calculus. The association between bone density, CAL and subgingival calculus requires further research. The lumbar BMD and metacarpal cortical thickness were compared with alveolar bone height on bitewing radiographs and clinical parameters of periodontitis on 277 women. No significant relationship was observed between bone mass measurements,

alveolar bone height and periodontal parameters. The average age of this group was relatively young, 45-58 y, which could have contributed to the lack of correlation.

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5. Albulescu DM et al. Rev Chim (Bucharest) 2018;69:3683.
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P508

INTERACTION BETWEEN NPY AND SEXUAL HORMONES IN CONTROL OF BONE HOMEOSTATION

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The level of sex hormones plays a fundamental role in maintaining bone mass and in the etiology of osteoporosis. The expression of estrogen and androgen receptors on bone cells and the response of bone cells to in vitro sexual steroid treatment highlight the importance of the direct action of these hormones on bone homeostasis[1-5]. However, much less appreciated is the indirect evidence of action, suggesting that estrogen signaling in the brain contributes to skeletal regulation. The peptides family and NPY receptors influences multiples homeostatic processes and represents a complex and extensive regulatory mechanism. Its actions in the bone, in order to modulate the activity of the osteoblasts and potentially the osteoclastic activity, seem to be consistent and powerful to changes in both aspects, central and peripheral, of this regulatory system[6-11].Obviously, at present, interactions between skeleton and energy homeostasis have been defined, thus providing a correlation between body weight and bone mass. However, ongoing studies suggest additional interactions, involving endocrine pathways, glucose homeostasis, as well as local actions in bone, such as mechanical loading. Excitingly, the constant development of pharmacological agents and analytical tools indicates a continuous analysis of NPY biology, and with it, new opportunities for biological and therapeutic insights.

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P509
ADVERSE EFFECTS OF SMOKING ON BONES

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Objective: The harmful effects of smoking, starting from 10 cigarettes/d, evolve slowly, but inexorably, eventually leading to the onset of osteoporosis symptoms. Often these are represented by a fracture of the spine, hip or forearm, when the protective role of adipose tissue and estrogen on the bones is greatly decreased[1-5].

Methods: The study was performed on 384 patients (124 men and 260 women) with age between 63-75 y. To evaluate the bone metabolism, serum values of osteocalcin and terminal C telopeptides of type I-CrossLaps procollagen were determined. Hormonal investigations performed - TSH, FT3, FT4, ATPO, LH, FSH, PRL, estradiol, progesterone, testosterone, PTH and vitamin D. Evaluation of BMD for diagnostic of osteoporosis was done by DXA and BMI was calculated.

Results: Osteoporosis was observed on 275 cases -71.6% of the total cases (158 women-57.46%, 117 men-42.56%) and osteopenia on 109 cases.

Conclusion:

1. Smoking causes menopause to set in earlier;

2. Increases the probability of being a weak person, lower body weight means reduced stimulus for bone reconstruction.

3. Destruction of natural estrogen, even when it is administered as THS, bone mass in smokers of both sexes falls to a person 10 years older.

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P510
HARMFUL EFFECTS OF ALCOHOL ON BONES

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Objective: There is a general consensus among experts that two drinks/d are not harmful to the bones, moderate consumption has an equivocal effect, while alcohol abuse is extremely harmful, a large number of men abuses alcohol suffering from back fractures[1-5].

Methods: The study was performed on 227 patients (130 men and 97 women) with age between 40-69 y. BMD assessment for the diagnostic of osteoporosis was performed by DXA and BMI was calculated. The hormonal investigations performed - LH, FSH, PRL, estradiol, progesterone, testosterone, PTH and vitamin D. For the evaluation of bone metabolism were determined: the serum values of osteocalcin and the terminal telopeptides C of the type I-CrossLaps procollagen. The biochemical profile was studied in the liver.

Results: Men are inclined to drink more, but this usually does not produce osteoporosis before age 60. Between 60-69 y the number of alcoholics with osteoporosis increases dramatically. Quite often, middle-aged women, secretly or discreetly, become reductive consumers and, being more predisposed to osteoporosis, the disorders can occur between 40-50 y.

Conclusion: Harmful effects of alcohol - liver disease, producing increased bone impairment, with direct effect on osteoblasts, leading to bone reduce renewal process, vitamin D deficiency absorption, increase risk of falls and fractures.

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P511
RESULTS OF ALPHACALCIDOLUM TREATMENT ON PRE / POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Objective: To track the effectiveness of alphacalcidolum in the treatment of osteoporosis on 52 menopause patients over 10 y. The group started from the idea[1-5] that calcium absorption

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decreases with age and many elderly patients are at risk of vitamin D deficiency due to their reduced dietary intake and reduced sun exposure.

Methods: The study was performed on 52 menopausal patients with age between 58-79 y. The evaluation of BMD for the diagnostic of osteoporosis was done by DXA. The histopathological study was performed on bone fragments collected from a number of 9 patients who were diagnosed with osteoporotic hip fracture and who required hip arthroplasty.

Results: The elderly with hip fractures show histological symptom of deficient mineralization, caused by the vitamin D deficiency.

Conclusion: Administration of calcidiolum as well as its synthetic analog, alphacaldidolum, reduces bone loss and significantly reduces the incidence of fractures on the elderly.

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P512
THERAPEUTIC ATTITUDES DIFFERENTIATED IN OSTEOPOROSIS INDUCED BY HYPOGONADAL HYPOGONADISM

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Objective: The sexualization process, viewed as a whole, is carried out in stages in time, in a strict order, according to a genetically predetermined biological program, with its own schedule and characteristics. The constructive sexualizing stages, quantitative and qualitative, are separated by periods of time in which there are no sexual changes, but the previously gained elements are associated with the general process of growth. Gonadic insufficiency can be total (agonadism) or partial (hypogonadism). Early diagnosis of gonadal insufficiency requires the implementation of prophylactic therapeutic measures of bone changes from the prepubertal stage in order to ensure a maximum bone mass corresponding to sex and age[1-5].

Methods: The study was performed on 38 patients of whom: late puberty (18 cases), premature ovarian failure (20 cases). Clinical and paraclinical criteria were used to establish the etiological diagnosis. In all cases, gonadotropic and gonadal hormones were evaluated., biochemical markers of bone turnover (osteocalcin, CrossLaps), BMD was evaluated through DXA.

Results: Low gonadotropic hormone values advocate for hypogonadotropic hypogonadism. Osteoporosis was observed on 27 cases (71% - 10 cases of late puberty, 17 cases of premature ovarian failure). The rest of the cases had osteopenia.

Conclusion: Early diagnosis of gonadal insufficiency is required in order to take prophylactic measures of bone changes.

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P513
THE ASSOCIATION BETWEEN ANEMIA AND SARCOPENIA AMONG OLDER ADULTS

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Objective: Anemia is associated with decreased muscle strength, instrumental activity of daily living disability, decline in physical performance, and poor mobility. Additionally, anemia, a frequent complication of chronic kidney disease, may cause an increase in the risk of sarcopenia. Therefore, the association between anemia and sarcopenia in older people is a vital issue worth exploring.

Methods: We conducted a cross-sectional observational study, which enrolled a total of 346 older residents of nursing home (201 women and 145 men, age 65 and older) (mean age±standard deviation 79.5±7.3). The participants underwent comprehensive anthropometric measures and physiological exams to determine their anemic and sarcopenic status. The subjects with lower than normal hemoglobin levels (13 g/dL as the standard for males and 12 g/dL for females) were considered to have anemia. Sarcopenia was defined as low muscle mass plus low muscle strength and/or low physical performance under the Asian Working Group for Sarcopenia (AWGS) criteria.

Results: We observed the trend of increase in the prevalence of sarcopenia in older people with anemia, especially in men. The probability of sarcopenia with anemia rose after adjustment of age and BMI in men (OR=2.67). Besides, through multinomial logistic regression models by age, grip strength, and anemia, the overall probability of sarcopenia was 82.76% (the probability of sarcopenia=0.69 x age - 1.48 x grip strength - 0.47 x anemia - 0.43) in men.

Conclusion: Although chronic kidney disease has been proved to be one of the risk factors for sarcopenia, its effect may be eliminated if there is no anemia. Briefly, the study revealed that lower levels of hemoglobin could be an independent risk factor of sarcopenia among older adults.

P514
MUSCLE STRENGTH EVALUATED USING THE HAND-HELD DYNAMOMETER MICROFET2 IN OLDER ADULTS: A RELIABILITY STUDY

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Objective: To assess the reliability of the hand-held dynamometer MicroFET2 aiming at evaluating isometric leg strength among older adults.

Methods: Participants came from the SarcoPhAge cohort (for Sarcopenia and Physical Impairment with Advancing Age), a study aiming at assessing muscle health in older adults aged 65 y and over. The isometric muscle strength of knee extension was assessed using two methods. First, using the hand-held dynamometer MicroFET2 using the user's hand counter-resistance. Second, the MicroFET2 has been fixed to a wall to stabilize it. Therefore, the counter-resistance by the investigator's hand was no longer necessary. Both handheld strength measurement and wall-fixed strength measurement were performed; 1/at baseline with investigator 1, 2/after 2 h with investigator 1 (to measure intra-observer agreement), 3/after 2 h with investigator 2 (to measure inter-observer agreement). Standardized protocol was applied and standardized instructions were given by both investigators. Intraclass coefficients (ICC) and their confidence intervals (95%CI) were computed to assess the reliability of the device.

Results: 100 community-dwelling older adults were enrolled in this study (77.0±5.7 y, 57.0% of women). For the intra-observer reliability, the test-retest with the same investigator yielded an ICC of 0.934 (0.887-0.962) with the additional device and an ICC of 0.877 (0.718-0.939) with the hand-held MicroFET2 only. For the inter-observer reliability, the test-retest with the two different investigators yielded an ICC of 0.773 (0.633-0.864) with the additional device and an ICC 0.113 (0.004-0.266) of with the hand-held MicroFET2 only.

Conclusion: The MicroFET2 used as a hand dynamometer was not reliable in our older population probably because on the strength of the counter-resistance yielded by the different investigators. The MicroFET2 wall-fixed device obtained good reliability, especially in inter-observer conditions, but requires a logistical investment.

P515
PERFORMANCE OF THE "YUBI-WAKKA (FINGER-RING)" TEST AS SELF-SCREENING METHOD FOR SARCOPENIA USING THE SARCOPHAGE, BELGIAN COHORT STUDY

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Objective: Last year, a very original and easy-to-use self-screening method for sarcopenia was introduced by Tanaka et al. The "Yubi-wakka (finger-ring)" test checks whether the maximum non-dominant calf circumference is bigger than the individual's own finger-ring circumference and is used as a screening method for sarcopenia. We aim to measure the performance of this new screening method in a Belgian study by measuring its specificity (Sp), sensibility (Se), positive and negative predictive values (PPV, NPV) against a clinical diagnosis of sarcopenia.

Methods: We applied procedure during the 5-year follow-up examination of the Belgian SarcoPhAge (Sarcopenia and Physical impairments with advancing Age) cohort, a population-based study including individuals aged 65 years and older. Sarcopenia was diagnosed according to the revised criteria of EWGSOP2. Muscle mass was measured by daily-calibrated Dual-Energy x-ray absorptiometry and muscle strength was measured using a calibrated Jamar handheld dynamometer. Participants were asked to apply a self-screening for sarcopenia using the finger-ring test. Participants were classified "bigger", "just fit" or "smaller" based on the comparison between their right calf-circumference and the right finger-ring circumference (formed by the thumb and the forefinger of both hands).

Results: 272 participants were included in this analysis (mean age of 77.5±5.37 years, 53.2% of women), with 32 participants diagnosed sarcopenia according to EWGSOP2 criteria (11.8%). Using a classification with both "just fit" or "smaller" as being at risk of sarcopenia, we found the following results: Se=68.7%, Sp=46.2%, PPV=14.6%, NPV=91.7% and accuracy=48.9%. Using the solely criteria of "smaller" as being at risk of sarcopenia, we found the following results: Se=53.1%, a Sp=78.3%, PPV=24.6%, NPV=92.6% and accuracy=75.4%.

Conclusion: The overall probability that a participant is correctly classified as sarcopenic using the "Yubi-wakka (finger-ring) test" in our population is increased when the calf-circumference is smaller than the finger-ring circumference of this same participant. This extremely practical method of self-screening of sarcopenia has been shown, for the very first time, to have a moderate sensitivity and acceptable specificity in regards of sarcopenia diagnosis. As comparison, the SARC-F questionnaire, a well-known screening test for sarcopenia has an even lower sensitivity but a better specificity[1].

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P516
ARE MATRIX METALLOPROTEINASE BREAKDOWN PRODUCTS ASSOCIATED WITH MUSCULOSKELETAL HEALTH IN OLDER MALE ADULTS? FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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Objective: Matrix metalloproteinases (MMPs), responsible for collagen degradation, have been detected in osteoblasts, osteocytes, osteoclasts, and chondrocytes in bone tissue, where they are known to perform specific functions. Furthermore, they play an important role in the homeostasis and maintenance of myofibre functional integrity in skeletal muscle. We therefore aimed to identify whether there was an association between MMP-breakdown products and musculoskeletal health in older adults from a community dwelling UK cohort.

Methods: 259 male participants in the Hertfordshire Cohort Study (HCS) attended a study clinic where a lifestyle questionnaire was administered and fasting blood samples were taken and tested for MMP breakdown products [MMP-degraded type 1 collagen (C1M), MMP-degraded type III collagen (C3M) and citrullinated and MMP-degraded vimentin (VICM)]. We investigated associations between levels of MMP breakdown products and history of previous fall or fracture. Grip strength was measured using a Jamar dynamometer. BMD at the total hip and lumbar spine was measured in a subset using a Hologic QDR 4500 instrument. Linear regression was used to examine associations in both unadjusted models and those adjusted for age, BMI, social class, smoker status, alcohol consumption, physical activity score and dietary calcium intake

Results: Mean age of study participants was 65.6 y (SD=2.9) and median BMI was 26.9 kg/m^2 (IQR=24.6-29.4). Median values of MMP breakdown products were 49.2 ng/ml (C1M), 22.0 ng/ml (C3M) and 2.20 ng/ml (VICM). There was no significant association between MMP breakdown products and BMD, or history of previous falls or fracture. A weak negative association was found between C1M and grip strength (β coefficient=-0.020 (95%CI=-0.039, - 0.002), p=0.031) but this was not maintained after adjustment for confounders.

Conclusion: We found no association between MMP breakdown products and musculoskeletal health in this male cohort after adjustments. Studies in women are, however, warranted.

P517
EPIDEMIOLOGY AND ISSUES OF THE REGISTRY OF SYSTEMIC LUPUS ERYTHEMATOSUS IN KAZAKHSTAN

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Objective: To analyze the provision of medical, including rheumatological care in Kazakhstan, to study morbidity indicators and develop questions of the registry of patients with systemic lupus erythematosus (SLE).

Methods: The study is carried out under the project AR05134328 "Development of a national registry, identification of a characteristic profile of a patient with systemic lupus erythematosus and the introduction of personalized therapy" (2018-2020). The analysis of the guidelines for the organization of medical, including rheumatological care in the republic and official statistical data of the Ministry of Healthcare of the Republic of Kazakhstan (MoH RK) for the period from 2009-2018 was carried out.

Results: The basic principles of providing medical, including rheumatological care in the republic, are presented. The data on the issues of providing patients with SLE with medicines at the outpatient and inpatient stages are presented. An analysis of overall morbidity and the dynamics of the increase of SLE of the population of Kazakhstan for the period from 2009-2018 was calculated. Patients with SLE were 2183 persons, of whom women were 1731, a comparative analysis of indicators for the period from 2009-2018 showed a dynamics of an increase in the overall morbidity by 100.9% (4387 cases). The purpose and objectives of the registry of patients with SLE are substantiated.

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P518

BONE MINERAL DENSITY AND COMORBIDITIES IN MEN WITH HIP FRACTURE

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Objective: Osteoporosis (OP) is a progressive systemic disease characterized by a decrease in BMD and damage to the bone microarchitecture, which presents an increased risk of fracture. The main consequence of OP are osteoporotic fractures and they are the cause of most fractures in the older population. Hip fracture is a significant cause of disability and mortality.

The objective of this study is to establish the frequency of comorbidities and BMD in men who had hip fracture.

Methods: The study included 100 male subjects. The subjects were divided into two groups: the study group (50 subjects) consist of the subjects with hip fractures and the control group (50 subjects) without fractures. All subjects were given a detailed clinical examination, which included taking anamnestic data and a physical examination. BMD was measured on a Hologic densitometer, using an anteroposterior scan of L1-L4 lumbar vertebrae and a hip using DXA method. The values obtained for bone density were expressed in g/cm^2 and as T -score. According to BMD findings, a normal bone has a deviation (T-score) up to -1 SD from the average maximum bone density; a deviation of -1.1 to -2.5 is defined as osteopenia, and greater than -2.5 SD as osteoporosis.

Results: Average BMD value on the lumbar spine in the investigated group was 0.830 ± 0.12 g/cm2 (T-score -2.33 ± 1.06), and on the hip 0.693 ± 0.14 g/cm^2 (T-score -2.2 ± 0.86). Average BMD value on the lumbar spine in the control group was 1.12 ± 0.12 g/cm^2 (T-score 0.35 ± 1.05) and on the hip it was 0.921 ± 0.12 g/cm^2 (T-score -0.62 ± 0.63). Statistically significant difference was found between absolute values of BMD as on the lumbar spine (p<0.001), as on the hip (p<0.001), between the investigated and control group. In male subjects with hip fracture, statistically significantly lower average values of bone density parameters were found: T-scores of both spine and hip, BMD of spine and hip with more frequent presence of comorbidity, primarily COPD and RA (p<0.001).

Conclusion: The T-score of the spine and hip, as well as the BMD of the spine and hip, were statistically significantly lower in subjects with comorbidities.

P519

INHIBITION OF OSTEOCLAST DIFFERENTIATION BY PHB1 THROUGH TRANSCRIPTIONAL REGULATION OF RANKL-INDUCED GENES

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Objective: Recent research has reported that Prohibitin 1 (PHB1) located at cell membrane regulates osteoclast differentiation by inhibiting MKK6[1.] But, because PHB1 functions in the nucleus of osteoclasts is not clarified, we investigated how PHB1 regulate NFATc1 expression in the nucleus, resulting in inhibition of osteoclast differentiation.

Methods: Overexpression or knockdown of PHB1 was performed in Bone marrow-derived macrophages (BMMs) and the cells were differentiated to osteoclasts by RANKL treatment. The expression of NFATc1 or RANKL-induced genes was measured by western blot analysis or quantitative real-time PCR. To assess whether transcription factors bind to the NFATc1 promoter, chromatin-IP (ChIP) was performed.

Results: PHB1 was located in the mitochondria and nucleus fractions in osteoclasts. In BMMs, overexpression of PHB1 inhibited the differentiation of osteoclasts and downregulated NFATc1 expression, whereas knockdown by siRNA of PHB1 elevated the formation of osteoclasts and NFATc1 expression. Also, monocyte/macrophage-specific PHB1 knockout upregulated osteoclast differentiation. PHB1 interacted with histone deacetylase 1 (HDAC1), and the complex significantly suppressed the transcriptional activity of NFATc1. Like PHB1, HDAC1 also negatively regulated osteoclast formation. PHB1 and HDAC1 bound directly NFATc1 promoter and disrupted NFATc1 binding to its own promoter, resulting in inhibition of auto-amplification of NFATc1. PHB1 also regulated expression of mitochondrial related genes, especially Nrf-2 and Tfb-2.

Conclusion: In nucleus of osteoclasts, PHB1 acts as a transcriptional corepressor by interrupting the auto-amplification of NFATc1, through HDAC1 recruitment to NFATc1 promoter. Also, mitochondrial related genes, such as Nrf-2 and Tfb-2, is regulated by PHB1. Taken together, PHB1 plays an important role in controlling transcription factors managing osteoclast differentiation.

Reference: 1. Lee CH et al. Biochem Biophys Res Commun 2015;463:1028.

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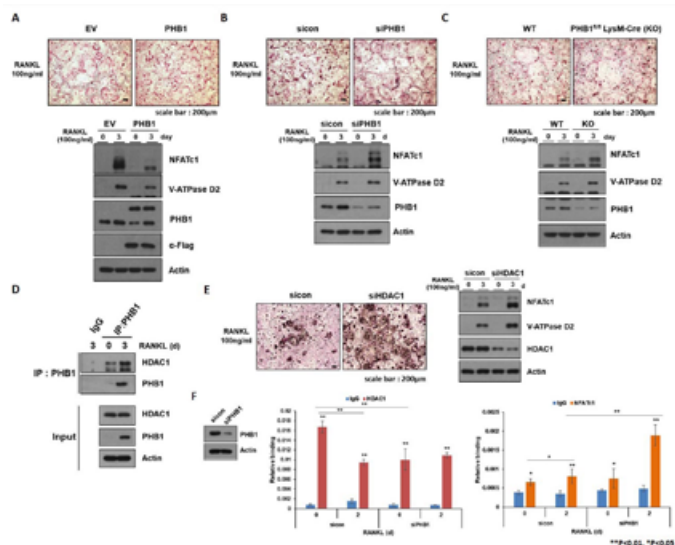
P520
MAGNETOTHERAPY DRIVES FERROPTOSIS RESISTANCE BY STIMULATING IRON EXPORT

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Objective: Osteoporosis is common in postmenopausal women, who also tend to accumulate iron, so there are more and more studies linking iron accumulation to osteoporosis. Recent years, ferroptosis, a new regulated characterized by the iron-dependent accumulation of lethal lipid reactive oxygen species, may contribute to osteoporosis, and it may be exploited for therapy. While magnetic therapy can alleviate the treatment of osteoporosis, this study explored the mechanism of osteoblastic ferroptosis, and enriched the principle that low-frequency pulse electromagnetic field can accelerate the repairing and healing of damaged bone structure: it can alleviate " iron accumulation related osteoporosis" by inducing osteoblasts secreting exosomes to resist ferroptosis. It is a new idea and theoretical basis for the application of magnetotherapy in the treatment of osteoporosis caused by "iron accumulation".

Methods: 1. Ferroptosis inducer erastin was added to osteoblasts MC3T3 and Sham group was set up, then we observed the mitochondrial morphology of osteoblasts by electron microscopy, and also compared the expression level of GPX4 by western blot. 2. Osteoblasts were divided into four groups: Sham group, Erastin (Er) group, Erastin+magnetic therapy (Er+mag) group and Erastin+magnetic therapy+GW4869 exosome inhibition (Er+mag+GW) group. Using qRT-PCR to measure osteoblast-related genes(Alp,Runx2,Sp7) and western blot to measure ALP,OCN,RUNX2 and GPX4. 3. Cell culture medium of the four groups of cells were collected, MC3t3-exos were isolated and identified, and ferritin of these MC3T3 was detected by western blot. 4. Iron assay kit was used to measure iron in the cell culture medium of these four groups. 5. RNA sequencing was used to search for differentially expressed mRNA in these four groups of cells to explore the mechanism of magnetotherapy driving ferroptosis resistance in osteoblasts.

Results: 1. After erastin was added to osteoblasts, GPX4 decreased compared with Sham group, and we found the shriveled mitochondria by electron microscopy in these osteoblasts, that is, ferroptosis occurs in osteoblasts. 2. After magnetic therapy, group (Er+mag) cells could express osteoblast-related genes, proteins and GPX4 increased relative to the group (Er) and group (Er+mag+GW). 3. Osteoblasts can secrete exosomes and can be isolated and identified. 4. There was no significant difference in the cell culture medium of the four groups osteoblasts, but the exosomes in the (Er+mag) group had higher ferritin content. 5. RNA sequencing is under way.

Conclusion: Ferroptosis occurred in MC3T3 and exosomes could be isolated and identified. With MC3T3 ferroptosis inhibited by magnetic therapy, osteogenesis can be saved. However, after using GW4869 to inhibit exosomes, the effect of magnetic therapy on saving osteogenesis was not obvious. The higher FERRITIN in exosomes in the (Er+mag) group compared with other groups suggests that magnetic therapy can induce MC3T3 secreting exosomes to excrete iron out of cells, thus resisting ferroptosis.

P521
ANEMIA DUE TO HYPERPARATHYROID OSTEODYSTROPHY: A CASE REPORT

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Anemia is a relatively rare, but very dangerous complication of primary hyperparathyroidism (PHPT). Its etiology and pathogenesis are not well studied, but several possible mechanisms have been proposed such as erythropoiesis suppression and myelofibrosis.

Case report: A 30-year old woman was admitted to our Center in October, 2019 complaining of fractures of both hips in May 2019. The laboratory tests revealed severe hypercalcemia (3.9 mmol/l) and elevated PTH level (1423 pg/ml), so the primary hyperparathyroidism was confirmed. The neck ultrasound scan and Tc-MIBI SPECT/CT showed a tumor of right inferior parathyroid gland 30x16x13 mm. Patient had severe complications of PHPT: nephrolithiasis, low BMD level (-5.2 SD in the distal radius according to Z-score) and osteitis fibrosa cystica (multiple brown tumors in the ribs, left tibial bone and vertebrae). Histological examination of these tumors revealed proliferation of fibroreticular tissue and necrotic foci.

Considering a high risk of hypercalcemic crisis, intravenous hydration and cinacalcet were started with no significant effect. Patient received denosumab 60 mg s.c. Surgery was a preferable treatment to this patient, but the microcytic hypochromic moderate anemia (Hb 73 g/l) seriously increased the risks of intervention. The main reasons of anemia such as hemorrhage sites, Vitamin B12 and erythropoietin deficiencies, intestinal disorders, CKD were excluded. These changes were regarded as a consequence of osteitis fibrosa and myelofibrosis. A multicomponent treatment with erythropoietin, ferrum and blood transfusion was administered with achieving appropriate Hb level (124 g/l). After surgery a parathyroid adenoma was confirmed, and patient developed hungry bone syndrome which required alfacalcidol and calcium carbonate administration.

PHPT may cause anemia via several mechanisms: low ferrum intake with food; blood loss through gastroduodenal ulcers; low erythropoietin levels due to chronic kidney disease and nephrolithiasis. Moreover, PTH itself can downregulate erythropoiesis with unknown mechanism, and osteitis fibrosa may lead to myelofibrosis and anemia too. The severity of PHPT should alert healthcare professionals for active screening of anemia. Further fundamental studies are needed.

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P522
THE IMPACT OF INTERVENTION AND ASSESSMENT THRESHOLDS BASED ON THE FRAX MODEL IN ECUADORIAN POSTMENOPAUSAL WOMEN

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Objective: With the recent launch of the Ecuadorian FRAX model to estimate the probability of age-specific fracture, it is now necessary to establish the clinical impact of the application of intervention and assessment thresholds in the Ecuadorian population. We aimed to evaluate the clinical impact of age-specific intervention and assessment thresholds obtained with the FRAX model in postmenopausal women of the Ecuadorian population.

Methods: 2369 women aged 60-94 were selected from the National Survey of Health, Wellbeing and Aging (SABE) conducted in Ecuador in 2009. We calculate the risk of major osteoporotic fractures and femur neck with the FRAX model (version 4.1) specific to the Ecuadorian population. And we calculate the proportion of women eligible for intervention and measurement of BMD.

Results: On average 5% of the population qualified for intervention and 72% for assessment with BMD. The proportion of the population potentially eligible for intervention varied from 1.65-6.85% depending on age. On average, the proportion eligible for assessment with BMD is 71.8%, but ranged from 58.68-77.8% depending on age.

Table 1. Women potentially eligible for Intervention and BMD assessment.

age (years)	above an IT			between an AT	
	N	n	%	n	%
60-64	618	31	5.02	481	77.83
65-69	551	27	4.90	398	72.23
70-74	482	33	6.85	349	72.41
75-79	329	17	5.17	224	68.09
80-84	230	10	4.35	155	67.39
85-89	121	2	1.65	71	58.68
90-94	38	0	0.00	24	63.16
≥60	2369	120	5.07	1702	71.84

IT Intervention threshold; AT assessment threshold

Conclusion: In the Ecuadorian women population, the application of these intervention and assessment thresholds based on FRAX, avoid unnecessary intervention in low-risk subjects and reduce in a high proportion the number of references to DXA exploration in our population.

P523
EVALUATION OF THE EFFICACY AND SAFETY OF THE USE OF ACECLOFENAC IN PATIENTS WITH UNDIFFERENTIATED PERIPHERAL INFLAMMATORY ARTHRITIS AND RHEUMATOID ARTHRITIS DEBUT

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Patients with new-onset peripheral arthritis often do not meet the criteria for a specific rheumatic disease and can be registered as having undifferentiated peripheral inflammatory arthritis (UPIA) or rheumatoid arthritis (RA) debut. Therapy for this new-onset peripheral arthritis is not yet sufficiently developed and the use of non-steroidal anti-inflammatory drugs (NSAIDs) [1,2,3]. The objective was to evaluate the effectiveness and tolerability of the aceclofenac in patients with new-onset peripheral arthritis.

We observed 120 patients (98 women and 22 men) in patients with new-onset peripheral arthritis met. They took aceclofenac 100 mg twice day for 3 weeks.

We noted significant decreasing in pain level according to visual analogue scale: in patients with monoarthritis - by 58.1 mm (p<0.001); in oligoarthritis - by 42.6 mm (p<0.001), in polyarthritis - by 29.7 mm (p<0.001). The life quality by the EQ-5D-5L index was improved to 0.52 to 0.79 (p<0.001). Adverse events of therapy were mild and not require discontinuation of therapy. Thus, the aceclofenac has good efficacy, tolerability and safety and can be recommended for mono- and oligoarthritis new-onset peripheral arthritis treatment.

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2. Zavodovsky B et al. Therap Arch 2018;90:101.
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P524
HIGH BONE MINERAL DENSITY ON ROUTINE BONE DENSITY SCANNING: FREQUENCY AND CAUSES

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Objective: A finding of high bone mass (HBM) on routine DXA scanning is not infrequent. However, epidemiological studies of HBM are few and definition thresholds variable. This study was performed to assess the frequency and causes of HBM within the general population referred for DXA scanning in a tertiary centre hospital.

Methods: DXA databases were initially searched for individuals with a BMD T- or Z-score≥+4 at any site within the lumbar spine or hip, at the Lille University Hospital (France) from April 1, 2008 to

April 30, 2018. Two Hologic scanners were available at the Lille University Hospital. Frequency of HBM was evaluated as were causes associated with HBM.

Results: At the lumbar spine, 18,229 bone density tests were performed in women and 10,209 in men. At the hip, 17,390 tests were performed in women and 9857 in men. The total number of patients who performed at least one bone density test was 14,745 with 64.2% of female. Among these patients, 211 of them had a T- and/or Z-score ≥+4 at any site, i.e., a frequency of 1.43% [1.25%-1.64%]. DXA scans and medical records of 92 men and 119 women with high BMD were screened to assess causes. An artefactual cause was found in 75% of patients with HBM (mostly degenerative disease of the spine) and an acquired cause of focal HBM was only found in 2 patients with sclerotic bone metastases from prostate cancer. An acquired cause of generalized HBM was found in 15% of patients with a vast majority of renal osteodystrophy (n=11), hematological disorders (n=9; e.g., myeloproliferative syndromes and mastocytosis) and diffuse bone metastases from solid cancer (n=5). Of the remaining causes, rare hereditary diseases (e.g., osteopetrosis...), and unexplained high BMD were found in 10 and 6 cases respectively.

Conclusion: The frequency of high BMD (T- or Z-score≥+4 at any site) was higher than expected. This study indicates that the causes of high BMD were mainly due to osteoarthritis. Further works are needed to differentiate artefactually HBM from hereditary or acquired high BMD and to investigate unexplained high BMD.

P525
MUSCULOSKELETAL COMPLICATIONS IN PATIENTS WITH HEREDITARY HEMOCHROMATOSIS: A CROSS-SECTIONAL STUDY OF 93 PATIENTS

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Objective: To determine the frequency and characteristics of musculoskeletal complications, both arthropathy and bone fragility, in hereditary hemochromatosis (HH) and related factors.

Methods: In this cross-sectional observational study of 93 patients with HH, demographic and disease-specific variables, genotype, and organ involvement were recorded and a complete rheumatologic investigation was performed. Radiographs of the hands, wrists, knees, and ankles were scored for joint space narrowing, erosions, osteophytes, and chondrocalcinosis. Prevalent (vertebral and non-vertebral) fragility fractures were recorded and BMD was systematically evaluated by dual energy x-ray absorptiometry at the lumbar spine, total hip and femoral neck. Bone fragility was defined by: (i), a T-score ≤ -2.5 at any site with or without a prevalent fragility fracture, or (ii) a T-score between −1.0 and −2.5 at any site and a prevent fragility fracture.

Results: The mean age of patients was 60.0 (11.2) years, and 58.0% were men. The frequency of MCP2-3 arthropathy was 37.6% [95%CI 0.28 to 0.48]. MCP2-3 arthropathy was independently

associated with older age (OR 1.17 [1.09−1.26] per yr, p<0.0001), male sex (OR 3.89 [1.17-12.97], p=0.027) and the presence of the C282Y+/+ genotype (OR 4.78 [1.46-15.68], p=0.010). The frequency of bone fragility was 20.4% [95%CI 0.13-0.30]. "Bone fragility" was independently associated with hepatic cirrhosis (OR 8.20 [1.74-38.68], p=0.008).

Conclusion: MCP2-3 arthropathy was found to occur in 37.6% of patients with HH. The association observed between this arthropathy, homozygosity for C282Y, male sex and older age suggests that demographic characteristics and genetic background are likely to be major determinants of this arthropathy and to be more important than severity of iron overload. Bone fragility was observed in a fifth of patients with HH, independently of the genetic background and severity of iron overload, and was strongly associated with hepatic cirrhosis.

P526
LEVEL OF TISSUE CYTOKINES AS NEW DIAGNOSTIC BIOMARKER OF BONE METABOLISM DISORDERS IN RHEUMATOID ARTHRITIS

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Objective: Currently, there is evidence that the level of hormone secretion of white adipose tissue can affect bone metabolism and BMD [1-4]. We aimed to study the clinical and diagnostic value of serum fetuin A, nesfatin, hemerin, leptin, adiponektin, resistin, visfatin determination in RA patients complicated by OP.

Methods: We examined 88 women with documented diagnosis of RA (EULAR/ARA 2010 criteria) with OP of 6.56±0.88 y and 45 healthy females aged of 25 and 59 years were included in the study. We measured cytokine levels using ELISA commercial test systems.

Results: At the first stage, the level of pro-inflammatory cytokines was studied in a group of healthy individuals. Then, the reference values of these indicators were measured as M±2d. Patients with OP and RA had significantly higher levels of serum pro-inflammatory cytokines (p<0.001). For example, mean serum Adiponectin levels in RA patients who had normal bone density and had no OP were 35.21±0.6 µg/ml. Mean serum Adiponectin levels in RA/OP patients with low BMD were 52.42±0.69 µg/ml. Adiponectin levels of 44 µg/ml and higher were associated with osteoporosis. Other pro-inflammatory cytokines have demonstrated similar dynamics of level serum.

Conclusion: Thus, we revealed that fetuin A, nesfatin, hemerin, leptin, adiponektin, resistin, visfatin levels depend on osteoporosis presence in RA patients.

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P527
VITAMIN K DEPENDENT PROTEINS AFTER KIDNEY TRANSPLANTATION: RESULTS FROM PROSPECTIVE STUDY

M. Fusaro[1], P. Khairallah[2], A. Aghi[3], M. Plebani[4], M. P. Farias[2], N. E. Cortez[5], S. Ferrari[6], M. L. Brandi[7], G. Tripepi[8], T. Nickolas[2]

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Objective: Two Vitamin K-dependent proteins (VDKPs) link bone and vasculature in CKD-MBD: Bone Gla Protein (BGP) and Matrix Gla Protein (MGP). In ESKD, vitamin K deficiency is highly prevalent and leads to increased levels of inactive VKDPs (undercarboxylated (ucBGP and dephosphorylated (dp)-uMGP), which are linked to greater risk of fractures and severity of vascular calcification. We hypothesized that kidney transplantation (KT) would improve Vitamin K status and lower levels of inactive VKDPs.

Methods: Between 2014-2017, we conducted a study in 34 patients to assess changes in VKDPs during the 1st year of KT. In a specialized lab we determined VKDPs pre- and 1-y post-KT: total BGP, uc BGP, total MGP, and dp-uc MGP. We determined the prevalence of vitamin K deficiency based on levels of uc BGP and dp-uc MGP.

Results: Our cohort had a mean±SD age of 48±14 y, 32% were female and 97% were Caucasian. 1 year post-KT, there was a decrease in the levels of all VKDPs and the prevalence of vitamin K deficiency (Table 1 and Figure 1). Patients with greatest severity of vitamin K deficiency pre-KT had the largest decreases of inactive VDKPs post-KT.

Conclusion: KT was associated with improvement in vitamin K status as manifested by decreased levels of inactive VKDPs. These are the first prospective data on VKDPs in CKD patients pre- and post-KT. Studies are needed to assess the impact of improvement in VKDP status after KT on CKD-MBD outcomes.

Table 1. Changes in circulating dp-ucMGP levels in relation to baseline values.

Variable	Pre-KT	Post-KT	p-value
uc-BGP ng/mL (median; IQR)	8.56 (5.45, 9.55)	3.41 (1.24, 4.80)	< 0.001
Vitamin K deficient by uc-BGP – n (%) (Cut-Off: uc-BGP>=4.5 ng/ml) *	26 (76.5%)	11 (32.4%)	<0.001
Total BGP ng/mL (median; IQR)	132 (79.85, 279.5)	22.55 (18.85, 30.6)	<0.001
Total MGP nmol/L (median; IQR)	29.19 (26.67, 32.30)	20.15 (14.68, 23.23)	<0.001
dp-ucMGP pmol/L (median; IQR)	910.5 (653.3, 1396.5)	637 (517, 777.5)	<0.001
Vitamin K deficient by dp-ucMGP- n (%) (Cut-Off: dp-uc MGP>500 pmol/L)	33 (97.1%)	27 (79.4%)	0.012

Figure 1. Total BGP and MGP levels in patients Pre and Post-KT.
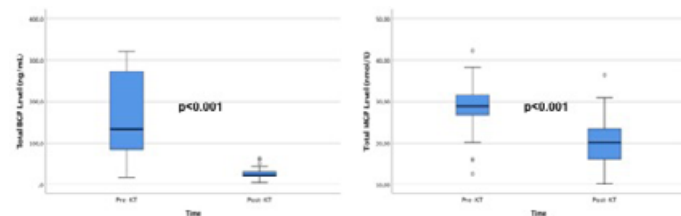
P528
THE RISK OF OSTEOPOROTIC FRACTURES IN SUBJECTS WITH DIABETES MELLITUS AND IMPAIRED FASTING GLUCOSE IN AGEING SIBERIAN POPULATION

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Objective: To study the association between fractures and their potential risk factors in a population sample of subjects over 50 years old with diabetes mellitus type 2 (DM2) and with impaired fasting glucose (IFG).

Methods: The cross-sectional study was based on a population cohort (the HAPIEE Project, Novosibirsk) examined in 2003-2005, n=9360 men and women aged 45-69 y. Analysis was limited to subsample of 2243 subjects aged 50-69 and included 871 subjects with DM2 (402 men, 469 women) and 1372 subjects with IFG (674 men, 698 women); among women only postmenopausal were included. Registered history of osteoporotic fractures (OF) in the last 12 months, medical history of DM and other chronic diseases, blood pressure (BP), anthropometry, plasma glucose behavioral and sociodemographic characteristics were assessed

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by standard methods. DM was defined by fasting blood glucose (FBG) ≥7.0 mmol/l and/or history of treated DM and IFG was defined by FBG ≥ 6.1 and <7.0 mmol/l (WHO, 1999). Statistical analysis was carried out by SPSS (v.13.0).

Results: Among 2243 subjects, the history of in last 12 months was observed in 3.4%; in women (4.2%) it was more frequent than in men (2.6%), p=0.038. Men with a history of had higher high-density lipoprotein cholesterol (HDLC) level (1.6±0.4 vs. 1.4±0.4 mmol/l, p=0.046) and more often fell during the last 12 months (57.1% vs. 2.8%, p=0.001) than men without fractures. Women with a history of fractures had lower triglycerides (TG) level (1.7±0.7 vs. 2.1±1.2 mmol/l, p=0.023), lower BMI (30.8±5.8 vs. 32.5±5.6, p=0.050), and more often fell during the last 12 months (87.8% vs. 4.6%, p=0.001) than women without fractures. In multivariable adjusted analysis, the risk of was directly associated with history of falls in both sexes, HDLC level in men (OR=2.44; 95% CI=1.09-5.87), and inversely associated with TG level in women (OR=0.43; 95% CI=0.24-0.80).

Conclusion: In studied population-based sample of the subjects with DM2 and IFG (aged 50-69), the history of fractures during 12 months was observed in 3.4%. In this sample the risk of fracture was directly associated with HDLC among men and inversely associated with TG among women. The history of falls was the main determinant of osteoporotic fractures in both sexes.

P529
SEVELAMER USE IS ASSOCIATED WITH DECREASED VITAMIN K LEVELS IN HEMODIALYSIS PATIENTS: RESULTS FROM VITAMIN K ITALIAN (VIKI) STUDY

M. Fusaro[1], A. Aghi[2], P. Khairallah[3], M. Gallieni[4], M. L. Brandi[5], S. Ferrari[6], M. C. Mereu[7], M. Ravera[8], G. Tripepi[9], T. Nickolas[3]

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Objective: Sevelamer (S) is a phosphate binding drug used to treat hyperphosphatemia in patients with CKD. We aimed to evaluate the hypothesis that the use of (S) could interfere with vitamin K absorption in hemodialysis (HD) patients of VIKI study.

Methods: We tested this hypothesis in VIKI, a cross-sectional study of 387 hemodialysis patients, we established the prevalence of vitamin K deficiency and to assessed the relationship between vitamin K status, vertebral fractures, vascular calcification.

We determined serum concentrations of vitamin 25(OH)D; alkaline phosphatase (ALP); vitamers K1, MK4, MK5, MK6, MK7; osteocalcin (BGP) and Matrix Gla Protein (MGP). We highlighted that MK4 deficiency was the strongest predictor of aortic calcification (OR, 2.82; 95%CI, 1.14-7.01) while vitamin K1 deficiency was the strongest predictor of vertebral fractures (OR: 2.94; 95%CI, 1.38-6.26).

Results: 163 of 387 patients (42.1%) were treated with Sevelamer. There were no differences in levels of 25(OH)D, K1, MK5, MK6 and MK7 among patients treated with and without Sevelamer. Remarkably, the prevalence of MK4 deficiency was higher in Sevelamer treated patients (13.5% vs. 5.4%, p=0.005). Sevelamer treated patients also had higher median levels of ALK (89 UI/L vs. 77.5 UI/L, p=0.001) and total BGP (210 µg/L vs. 152 µg/L, p=0.002) and lower median levels of total MGP (16.4 nmol/L vs. 20.3 nmol/L, p=0.037) (Table 1 and Figure 1). In multivariable logistic regression, the odds ratio of MK4 deficiency (dependent variable) in patients treated with compared to without Sevelamer was ~3-fold higher (OR: 2.64, 95%CI: 1.25-5.58, p=0.011) after adjustment for confounders of vitamin K levels, including older age, previous myocardial infarction, type of HD, ALP, PTH, MGP, BGP, cholesterol and albumin.

Conclusion: These data support the hypothesis that Sevelamer could interfere with MK4 absorption in HD patients. Longitudinal interventional studies are needed to prove the causal nature of these associations.

Table 1. Main characteristics of the patients.

Variable	Sevelamer Use N=163, 42,12%	No Sevelamer Use N=224, 57,88%	p-value
Gender, female, n (%)	66 (40.5%)	79 (35.3%)	0.295
Age, years, median	63 (51, 72)	69 (60, 76)	0.002
Weight, kg, median	68.5 (59, 80)	69.3 (60.1, 78)	0.504
Height, mean±SD	1.68±0.09	1.67±0.09	0.486
BMI, kg/cm², median	24.2 (21.4, 27.5)	24.7 (22.0, 28.3)	0.260
Alkaline phosphatase, U/L, median	89 (74, 122)	77.5 (61, 105)	< 0.001
Total BGP, mcg/L, median	210 (117, 363.2)	152 (83.58, 276)	0.002
Decarboxylated BGP, mcg/L, median	11.88 (6.27, 17.00)	10.57 (4.21, 18.75)	0.292
Total MGP, nmol/L, median	16.39 (12.00, 27.63)	20.26 (13.56, 33.29)	0.037
Decarboxylated MGP, nmol/L, median	547 (296.9, 920)	584 (265, 944.3)	0.993
MK4, ng/mg, median	0.45 (0.15, 0.67)	0.60 (0.27, 0.67)	0.010
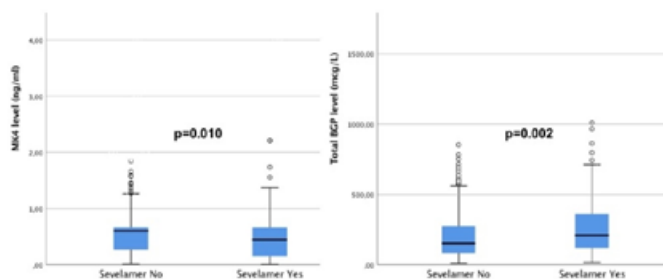
Figure 1. MK4 and BGP levels in patients treated with Sevelamer.

P530

LEVEL DEPENDENCE OF HORMONES OF ADIPOSE TISSUE ON WEIGHT LOSS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Overweight in patients with rheumatic diseases is a condition that prolongs chronic inflammation and promotes synthesis and secretion of pro-inflammatory factors [1-3]. We investigated the relationship the effect of weight loss over 5 kg on the clinical manifestations of arthritis and hormones of adipose tissue serum levels in patients with rheumatoid arthritis (RA).

Methods: We observed 80 female patients with RA (EULAR/ARA 2010 criteria) ranged in age from 39-69 y (mean age 51.72±5.83 y) and the control group (60 healthy persons). Fetuin A, nesfatin, hemerin, leptin, adiponektin, resistin, visfatin level was determined by commercial test systems.

Results: As overweight patients were recruited in the study, hypocaloric diet low in animal fats and physiotherapy has been recommended to all participants. The positive dynamics in body weight loss over 5 kg within 3 months has been achieved by 34 patients (27.2%). In RA patients with weight loss, a significant decrease in the serum level of pro-inflammatory cytokines (p<0.01) and an increase in the quality of life according to the EQ-5D-5L (p<0.001) index were observed. This fact is probably explained by the decreased activity of inflammatory process after RA therapy and weight reduction.

Conclusion: Thus, these findings suggest that there is a possible role of tissue pro-inflammatory cytokines in the pathogenesis of rheumatoid arthritis.

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P531

DYNAMICS OF THE PREVALENCE OF MAJOR RHEUMATIC DISEASES IN KAZAKHSTAN

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Objective: Diseases of the musculoskeletal system and connective tissue (DMSCT) in terms of negative impact on society are in leading positions. We aimed to study the prevalence and dynamics of morbidity of the rheumatic diseases (RD) in Kazakhstan over 10 y (2009-2018).

Methods: The analysis of official statistical data (form No.12) of the Ministry of Healthcare of the Republic of Kazakhstan was carried out.

Results: Over the analyzed period in the country, a tendency towards an annual increase in the number of patients with pathology of the musculoskeletal system was noted. In 2009, 684,396 patients with DMSCT were registered, by 2018 their number increased by 44.1% and was close to 1 million (986,339). The analysis of diseases registered in form No.12 indicated to a general trend towards an annual increase in the number of patients with rheumatic diseases, which in 2009 amounted 11,556 cases (16.3% of all DMSCT), in 2018 - 31.4%. Osteoarthritis (OA) is the most common among RD, the number of patients in 2009 was 34,513, and with rheumatoid arthritis (RA) − 33,358 cases, with ankylosing spondylitis (AS) − 2387 cases, with systemic disorders of connective tissue (SDCT) − 6872, of which with systemic lupus erythematosus (SLE) − 2183 cases. In 2018 overall morbidity of OA increased by 456.5%, of RA − by 116.4%, of AS − by 33%, of SDCT − by 43.3%, including SLE − by 100.9%. Osteoporosis (OP) was included into form No.12 only in 2012, the number of patients was 1129, and in 2018 it increased only by 10.3%. In 2009, the number of patients with a first diagnosed OA was 9990, in 2018 it increased by more than 6 times, RA - by 2.3, AS - by 1.4, SDCT - by 1.0 times, including SLE by 2.4 times. In 2018 the prevalence of OA was - 1064.9; of RA - 400.3; of AS - 17.6; of SLE-24.3; of OP - 6.9 cases (per 100 000 population).

Conclusion: The analysis revealed the persistence of the social significance of the problem of rheumatic diseases. Attention is required to an increase in the morbidity of RA and OA, which is also noted in newly diagnosed patients. The low prevalence of OP, according to official documents, apparently does not coincide with the true indicators. Further improvement of specialized care is required, greater use of innovative technology in the early diagnosis and treatment of patients within the framework of the Unified National Health System adopted in the country, aimed at ensuring the development of an efficient and sustainable system of public health protection as the basis of social welfare and economic prosperity of the country.

P532

DYSPHAGIA RISK IN OLDER PEOPLE UNDERGONE TOTAL JOINT REPLACEMENT: A CROSS-SECTIONAL STUDY

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Objective: In this cross-sectional study we aimed to evaluate dysphagia risk through Eating Assessment Tool (EAT-10) and DYsphagia in MUltiple Sclerosis (DYMUS) in older people undergone total hip (THA) or knee arthroplasty (TKA).

Methods: We included patients aged ≥65 y, undergone THA or TKA, referring to Rehabilitation Unit, divided into two groups, according to Bedside Swallowing Assessment (BSA). We assessed between-groups differences and specificity and sensitivity in terms of EAT-10 and DYMUS scores.

Results: We included 261 participants (85 male,176 female), mean aged 75.10±5.65 y, undergone a total joint replacement (131 total knee replacements and 130 total hip replacements). 21 patients (8.05%) had pathological BSA. There were significant differences (p<0.001) between groups considering all EAT-10 and DYMUS cut-offs. EAT-10 reported a high specificity (95.0% if ≥3 and 97.5% if ≥4), while DYMUS showed good sensitivity (90.5% if ≥1 and 85.7% if ≥2) and specificity (90.0% if ≥2).

Conclusion: Our findings showed that EAT-10 and DYMUS could be considered useful for screening dysphagia in older patients undergone total joint replacement. Moreover, screening for dysphagia should be always recommended in elderly in order to set up an early diagnosis and management of dysphagia.

P533
CUSTOMIZED POSTURAL REBALANCING IN OSTEOPENIC SUBJECTS WITH PAINFUL DEVIATIONS OF THE SPINE: PRELIMINARY FUNCTIONAL AND DENSITOMETRIC RESULTS

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Objective: Evaluation of the functional and densitometric effects of a personalized postural rebalancing process aimed at improving the static and dynamic postural structure in subjects suffering from osteoporosis and rachialgia. Posture is the result of the functional interaction between the biomechanical, neurophysiological, psychological and psychomotor components of the individual, and is achieved through the tonic reflex contraction of the antigravity muscles. muscle strength and work affect bone remodeling: according to Wolff's Law, the load modifies the geometric properties of the bone, inducing it to be deposited where needed and reabsorbed where useless, thus contrasting the same load [1].

Methods: Six patients affected by osteopenia, pain and deviations of the spine in kyphosis and/or scoliosis, underwent a morphofunctional examination of posture and an ultrasound bone densitometry by radiofrequency echographic multispectrometry (REMS) [2] at lumbar spine and femur. On the basis of the postural physical examination, a customized program of exercises (the "C.A.MO.® method") was proposed to each patient, aimed to remove any incongruous postural and behavioral scheme and to create a new correct one, lasting one hour to be carried out individually with bi-weekly frequency over 4 weeks. At the end of the program, a new morphofunctional exam and a new REMS analysis were performed to each patient.

Results: All the patients reported a visible improvement of postural structure, a reduction in spine deflections and complete pain relief. Furthermore, 2 subjects of 6 have curiously shown also a slight but interesting improvement of the femoral T-score at the REMS (+0.2 DS), and the maintenance of vertebral values, after just one month of postural exercise.

Conclusion: These preliminary data suggest that a customized program of postural exercise, in addition to improving body awareness and preventing the risk of falling, can provide a stimulation on the bone mass, as well as on the postural musculature, with an osteotrophic effect in the short term.

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P534
ADVERSE EFFECTS OF ANTITUBERCULOSIS THERAPY ON THE MUSCULOSKELETAL SYSTEM

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Treatment of patients with a drug-resistant form of tuberculosis (TB) is one of the main urgent problems of global TB control. The main component of their treatment is long-term co-administration of several second- or third-line anti-TB drugs [N. Stepanova, 2016]. Adverse reactions caused by second- or third-line anti-TB drugs can limit the ability to conduct a full course of chemotherapy. Adverse reactions in the form of peripheral neuropathy, arthropathy, arthralgia, arthritis, myalgia, tendonitis, tendovaginitis, tendon ruptures are classified as toxic reactions and less frequent adverse events [Ismailov Sh., 2009, Danilov A., 2015]. We aimed to determine the characteristic of the reaction of anti-TB therapy on the musculoskeletal system in the treatment of patients with pulmonary tuberculosis.

The data of 44 patients (age 19-57 y) with pulmonary tuberculosis were analyzed, of which 26 (59.0%) were men, 18 (40.9%) were women, who had reactions of the musculoskeletal system during chemotherapy. In the clinical structure of pulmonary tuberculosis: infiltrative was observed in 32 (72.7%) patients, fibro-cavernous in 10 (22.7%), disseminated in 2 (4.5%) patients. Mycobacterium tuberculosis (MbT) excretion was established in 29 (65.9%) patients, lung tissue destruction in 32 (72.7%) patients. All studied patients showed an increase in the culture of MbT and confirmed resistance to anti-TB drugs of the first, second line. The treatment was carried out in the standard mode of category 4 chemotherapy.

Analysis of the effectiveness of treatment showed that the conversion of sputum smear by the bacterioscopic method occurred in 93.1% of cases after 3 months of treatment. In a culture study after 3 months, 79.5% of patients showed abacillation. The closure of decay cavities at the end of the intensive phase of treatment was achieved in only a quarter of the studied patients. The possibility of a full course of chemotherapy was greatly influenced by adverse reactions to second and third line drugs. Adverse reactions such as arthralgia were recorded in 72.7%, in the form of limitation of movements at the major joints

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of the upper and lower extremities - in 27.2% of patients and were toxic nature. Arthralgia and limitation of movements at the joints observed while taking pyrazinamide and fluoroquinolones and in 63.6% of patients were mild. Correction of therapy led to their elimination and to continue chemotherapy.

P535
OSTEOARTHRITIS IN ELDERLY PATIENTS: EVALUATION AND REHABILITATION

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Objective: Osteoarthritis (OA), a painful and low-grade inflammatory chronic disorder involving all components of synovial joint (cartilage, subchondral bone, joint capsule and synovial), represents one of the most frequent causes of physical disability; according to the WHO, OA is on the top ten disabling chronic disorders in developed states. Older age and female gender are two of the risk factors significantly associated with the onset of OA in lower limb, in accordance with the literature data. In our study we assess the effect of a physical-kinetic program given an individually attended treatment, in terms of pain, physical function and quality of life (QOL) for elderly patients with primary lower limb osteoarthritis and knee synovitis. The synovium is the centre of the abnormality in the musculoskeletal manifestations of all diarthrodial joints.

Methods: We took into consideration 36 elderly OA patients (14 men, 22 women, median age of 74.5 y). All patients had clinical and functional evaluations and imagistic investigations (sonography, using US equipment with a high frequency linear transducer LA13A, ESAOTE AU5 and standard X-ray) and were included and randomly assigned into two groups (A and B - each of 18 patients). We took into consideration two ultrasound parameters - minimal effusion of knee (MEK) and suprapatellar bursitis (SPB). All patients were daily (14 sessions) treated with educational-pharmacological. We supplied electrotherapy, kinetic and massage methods in group B. Ultrasound findings were correlated with disease activity.

Results: Also both groups improved in pain and quality of life, the differences between mean score values (visual analogue scale score for pain and WOMAC scale score for QOL) were statistically significant better in the group B. Suprapatellar bursitis responded more rapidly at physical-kinetic treatment than minimal effusion of knee. Significant differences in clinical synovial abnormalities and were observed between the inactive and mildly active disease groups (p<0.05).

Conclusion: MEK and SPB cause variable activity limitations and participation restrictions in elderly OA patients. The regain of kinethesic awareness and knee stabilisation requires training and coordination of the muscle in the area and must be included in rehabilitation program. Sonography represents a noninvasive and relative inexpensive method used in evaluation, thus allowing an early therapy onset. Our results can be integrated into the medical literature observations that subclinical synovitis may be relatively common in both early and established inflammatory arthritis.

P536
MUSCULOSKELETAL DISORDERS AMONG GREEK CROSSFIT ATHLETES

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Objective: To record the musculoskeletal symptoms in each anatomical body region in Greek crossfit athletes. **Methods:** The Greek version of the Standardized Nordic Questionnaire[1] (SNQ) was administered to participants during the 2018-2019 season. Participants in SNQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees and ankles/foots) during the preceding 12 months and if those symptoms impeded their normal activity during the last year as well as the 7 previous days. Analysis consists of descriptive statistics. **Results:** 70 (40 male & 30 female) crossfit athletes (age: 30.6±7.0 y, height: 1.74±0.08 m, weight: 73.3±12.8 kg, BMI: 24.2±3.0 kg/m^2, training age: 2.2±1.5 y, training h/week: 5.1±2.5) completed the SNQ. The 12-month prevalence rate of pain/discomfort was 62.9% in shoulders followed by the knees (45.7%), wrists/hands (35.7%), lower back (35.7%), neck (30.0%), hips/thighs (22.9%), elbows (21.4%), upper back (17.1%) and ankles/feet (15.7%). Those symptoms impeded athletes' normal activity (functionality) during the last 12 months with different prevalence rate per anatomical body region (shoulders: 21.4%, knees: 20.0%, lower back: 18.6%, neck: 12.9%, wrists/hands: 10.0%, ankles/feet: 8.6 %, hips/thighs: 5.7%, elbows: 5.7% and upper back: 2.9%). **Conclusion:** The high prevalence of region-specific musculoskeletal pain/discomfort in crossfit athletes, highlights the need for specific injury prevention programs. **Reference:** 1. Antonopoulou M et al. Eur J Gen Pract 2004;10:35.

P537
MUSCULOSKELETAL DISORDERS AMONG GREEK KITESURF ATHLETES

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Objective: To record the musculoskeletal symptoms in each anatomical body region in Greek kitesurf athletes. **Methods:** The Greek version of the Standardized Nordic Questionnaire[1] (SNQ) was administered to participants during the 2018-2019 season. Participants in SNQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees and ankles/foots) during the preceding 12 months and if those symptoms impeded their normal activity during the last year as well as the 7 previous days. Analysis consists of descriptive statistics. **Results:** 77 (63 male & 14 female) kitesurf athletes (age: 37.3±8.1 y, height: 1.77±0.07 m, weight: 76.4±10.7 kg, BMI: 24.2±2.5 kg/

m^2, training age: 8.1±4.7 y, training h/week: 4.8±4.4) completed the SNQ. The 12-month prevalence rate of pain/discomfort was in knees 59.7% in followed by the shoulders (55.8%), neck (46.8%), lower back (39.0%), wrists/hands (29.9%), ankles/feet (24.7%), upper back (24.7%) hips/thighs (23.4%) and elbows (22.1%). Those symptoms impeded athletes' normal activity (functionality) during the last 12 months with different prevalence rate per anatomical body region (shoulders: 18.2%, lower back: 16.9%, neck: 16.9%, knees: 15.6%, wrists/hands: 11.7%, ankles/feet: 9.1%, upper back: 3.9%, elbows: 2.6% and hips/thighs: 1.3%). **Conclusion:** The high prevalence of region-specific musculoskeletal pain/discomfort in kitesurf athletes, highlights the need for specific injury prevention programs. **Reference:** 1. Antonopoulou M et al. Eur J Gen Pract 2004;10:35.

P538
ELDERLY FEMALES WITH OSTEOPOROSIS AND HIP FRACTURES: ASSESSMENT AND REHABILITATION

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Objective: Osteoporosis - a disease characterized by a decrease in the density and quality of bones - is a public health problem worldwide, affecting more than 200 million people and characterizing by an increased risk of fragility fractures. In elderly people, bones that were once strong become thin, fragile and prone to breaking. So, the risk of fractures is increased, causing various disability status, pain, immobility and reducing quality of life. Physical exercise may be an efficient option for autonomous fracture prevention and management during increasing age. We evaluated in our study the efficacy of a complex rehabilitation program, based on 10 weeks aerobic training, for reducing symptoms and improving the quality of life in 36 elderly females with primary osteoporosis and hip fractures.

Methods: The study was a randomized controlled trial including two groups (S-study group and C-control group), homogeneous in terms of biographical, clinical and functional features. All patients were complete assessed-clinical, imagistic and functional. We applied a complex rehabilitation program that covered the following compartments: hygienic-dietetic and educational (for risk factors – avoidance of tobacco use and excessive alcohol intake, adequate intake of milk derivate food and healthy diet), medication (calcium, vitamin D and bisphosphonates medications), electric measure (only one procedure of electrotherapy – TENS for pain management), kinetic, massage adapted all time for each patient

Results: Performing the Mann-Whitney and Student t-test for means, to compare initial and final parameters scores for study and control groups, we found no statistically significant difference between the two groups, for the initial evaluation, the result being p=0.43 >0.5; for the final evaluation we found a statistically significant difference between the two groups, the result being p=0.015 <0.5.

Conclusion: The rehabilitation program, based on the kinetic measures, mainly aimed at maximizing functional ability and quality of life in elderly females with osteoporosis and hip fractures. Prevention and treatment of osteoporosis involve more than simply taking medication. Physical training (weight-bearing, flexibility and balance exercises) and adequate intake of calcium and vitamin D are essential to bone health and vital to avoiding falls and fractures.

P539
FRAX ECUADOR UPDATE: IS IT DIFFERENT?

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Objective: The calculator FRAX Ecuador has been demonstrated to underestimate the risk of fracture when compared to other countries(1). Also, it has been shown that the epidemiology of fractures has changed notoriously from when the calculator was first established(2). A recent study suggested a modification in the model(3). Due to these changes, the aim of this study was to compare the FRAX from 2009-2019 to determine if there has been a revalidation of the model.

Methods: Cross-sectional study with patients seen in a rheumatology clinic between 2013-2015. We included height, weight and risk factors. Their FRAX scores 2017 were obtained from the database of the study by Maldonado et al (1). We calculated FRAX scores using the new model for Ecuador. Paired Student´s T-test was used to compare scores of each patient.

Results: We included 1000 patients: 88.5% female, 11.5% male, mean age of 61.5±10 y. Their mean weight was 65.4±12.5 kg and height 1.53±0.07 m. Regarding risk factors, 5.2% had a history of previous fracture, 0.5% family history of fracture, 1.3% smoking, 1.5% alcohol, 2.6% glucocorticoids,12.8% rheumatoid arthritis. Using FRAX Ecuador 2019, the mean for major osteoporotic fracture was 1.7±2.1 and hip fracture 0.6±1.2; using FRAX Ecuador 2009, 1.5±1.4 for major fracture and 0.5±1.2 hip fracture (Figure 1). This difference was statistically significant as the mean difference for major fracture 2019-2017 was 0.2 (CI 95% 0.1 to 0.3, p=0.000) and for hip fracture 0.1 (CI 95% 0.1 to 0.2, p=0.000).

Conclusion: There was an increase in the scores obtained from the FRAX Ecuador calculator when compared to the previous model. However, these values remain low and difficult to apply.
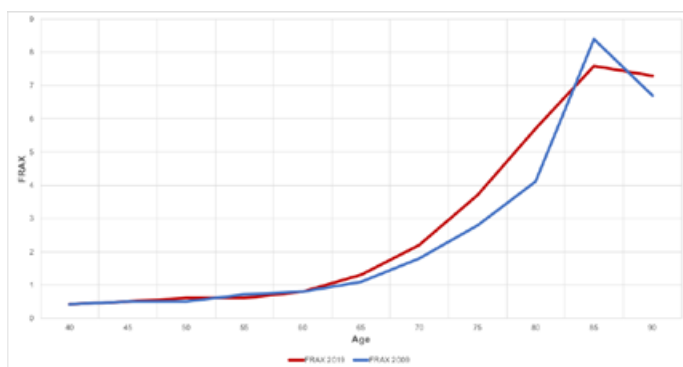
P540
THE ROLE OF THE TRAUMATOLOGIST IN THE WORK OF SECONDARY FRACTURE PREVENTION SERVICE

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Objective: The involvement of a traumatologist to identify patients with a high risk of falls and low-energy fractures in their history increases the likelihood of getting into the target group of the service for the prevention of repeated fractures (SPPF). We aimed to evaluate the best identification of patients who need to prevent recurring fractures.

Methods: According to the journal, patients of group I with low energy fractures were selected, on the recommendation of a traumatologist, patients of group II were selected with a high energy fracture, but with a history of low injury fractures.

Results: I group - 69 patients (44-95 years old; 69.66±12.06, M±σ) and 10 (70-81 years old, 75.4±4.005) - group II. High risk of fractures for FRAX in group I: serious fractures - 28 patients, y 18 - require a more accurate risk assessment for DXA, femoral risk of fracture-36, in group II - for all major fractures and femur - high. Anamnesis of low energy fractures in group I was in 42 patients, in group II - in all. Relatives of the femoral neck in relatives in group I were observed in 38 patients, in group II - in 8 people. Diseases that lead to fractures are taken into account.

Conclusion: A large percentage of patients have many risk factors for developing fractures. 12.7% do not pay attention to the SPPF coordinator due to hospitalization with a high-energy fracture. The involvement of a specialist traumatologist of the department in the work of SPPF allows increasing the frequency of detection of patients at risk of recurring fractures not included in the SPPF monitoring group.

P541
ELECTRIC MEDICAL RECORD DASHBOARD INITIATIVE FOR QUALITY IMPROVEMENT IN THE MANAGEMENT OF PATIENTS WITH OSTEOPOROSIS (ADVANTAGE OP)

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Objective: To identify gaps in osteoporosis management and improve fracture risk assessment and osteoporosis management in primary care settings across Canada with the use of an electronic medical record (EMR)-based intervention.

Methods: Physicians utilizing the TELUS PS Suite and MedAccess EMRs were invited to participate and share their practice and specifically their management of patients with osteoporosis (OP) as compared to the Canadian osteoporosis clinical practice guidelines (CPG). The ADVANTAGE OP dashboard, which provides practical EMR change management tools focused on 1) performance of bone densitometry measurement (BMD) in patients at high risk for OP according to CPG, 2) calculation of 10-year risk of fracture in those with BMD result, and 3) treatment of patients with high 10-year risk. Practice level data were collected; no patient level data were shared.

Results: 81 (53%) of 154 physicians who agreed to participate shared their practice assessment. In total there were 174,580 adult patients across all practices and 17,628 (10%) were at high risk for osteoporosis based on CPG identified risk factors. Of these patients, 32% had BMD completed, 65% did not and 3% had a reason for not performing the BMD. Patient refusal (20%), physician belief BMD was not required (19%) and intentions to order BMD later (44%) were the most frequent reason for BMD non-performance. Of those with BMD completed, fracture risk was calculated in 31% and of these 33% were at low risk, 46% at moderate risk and 21% at high risk. Of those at high risk, 67% were not treated with osteoporosis medications recommended by CPG.

Conclusion: There continue to be significant gaps in screening, risk calculation and management among high risk patients. Additional knowledge translation strategies are needed to improve osteoporosis care.

P542
INFLUENCE OF DENOSUMAB ON THE RANKL/ RANK/OPG SYSTEM IN POSTMENOPAUSAL WOMEN

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Objective: To evaluate the effect of denosumab in combination with alfacalcidol and cholecalciferol on the RANKL/RANK/OPG system and the level of vitamin D in postmenopausal women.

Methods: We examined 118 women aged 48-64 y (57.6±4.3 y) in postmenopausal women with a duration of 7.9±3.5 y. Patients are divided into 2 groups: the 1st group included 85 women with reduced BMD, the 2nd group consisted of 33 women with normal BMD. In the 1st group, 2 subgroups were allocated: 1A - 46 patients took denosumab 60 mg, alfacalcidol 1 μg and cholecalciferol 2000 IU; 1B - 39 women received denosumab 60 mg and alfacalcidol 1 μg. Clinical examination included the determination of osteoprotegerin (OPG), a bone resorption biomarker - C-terminal telopeptide (CTx) and 25-hydroxyvitamin D (25(OH)D). The BMD study was performed using ultrasonic densitometry. The dynamics of clinical parameters was performed after 6 and 12 months.

Results: Initially, the level of OPG in the 1A group was 1.19±1.26 pmol/l, in the 1B group it was 1.22±1.18 pmol/l (p>0.05). After 6 months there was an increase in the level of OPG in group 1A to 1.65±1.13 pmol/l (p 0.01), after 12 months up to 2.07±1.2 pmol/l (p 0.01); in group 1B - 1.56±1.15 pmol/l (p 0.01) and 1.92±1.17 pmol/l (p 0.01), respectively. Before treatment, CTx in the 1A group was 0.926±0.04 ng/ml, in 1B - 0.931±0.05 ng/ml (p>0.05). Against the background of the therapy, after 3 months there was a decrease in CTx in group 1A to 0.652±0.04 ng/ml (p 0.01) and 1B to 0.689±0.04 ng/ml (p 0.01). Initially, the level of 25(OH) D in the 1A group was 18.26±2.3 ng/ml, in the 1B group it was 18.04±1.86 ng/ml (p>0.05), which corresponded to a deficiency of vitamin D. After 6 months the level of 25(OH)D increased in group 1A to 28.6±2.4 ng/ml (p 0.01), in group 1B - 23.5±2.1 ng/ ml (p 0.01) and consistent with vitamin D insufficiency. After 12 months in group 1A, the level of 25(OH)D reached optimal level of vitamin D 32.7±2.5 ng/ml (p 0.01), in group 1B 27.6±2.3 ng/ml of 25(OH)D, which corresponded to insufficiency of vitamin D. The increase in BMD in patients of group 1A after 6 months amounted to 4.18% (p 0.05), after 12 months. - 8.97% (p 0.05), in group 1B, the dynamics of BMD growth after 6 months. - 3.76% (p 0.05), 12 months - 8.84% (p 0.05). A direct correlation between the level of OPG and the level of 25(OH)D (r=0.65, p 0.001), the level of OPG and the degree of increase in BMD (r=0.56, p 0.001) and the feedback between the level of OPG and level of CTx (r=-0.72, p 0.001).

Conclusion: Denosumab, in combination with alfacalcidol and cholecalciferol, has a pronounced positive effect on bone remodeling processes and reduces the risk of developing low-energy fractures in women with reduced bone density in postmenopausal women.

P543
PARASITIC INFECTIONS AND MUSCULOSKELETAL DISORDERS

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Objective: Studying the particularities of musculoskeletal impairment in parasitic infections.

Methods: We studied 38 patients who were diagnosed positively with different parasites (toxocara canis (16 subjects), toxocara cati (4), echinococcus granulosus (10), giardia intestinalis (4), ascaris lumbricoides (2) and 2 patients ascaris lumbricoides (associated with toxocara canis) in which musculoskeletal system disorders were present. The study included 17 men (44.74%) and 21 women (55.26%). The age of the patients varies from 18 to 63, the average being 39. Patients were investigated clinically and paraclinically for the exclusion of other causes of musculoskeletal impairment and for evaluation of pathological changes. Patients were re-evaluated after antiparasitic treatment.

Results: In the group of analyzed subjects 26 patients (68%) presented diffuse myalgia; 24 patients (63%) - localized muscle pain; 34 patients (89%) – joint pain of which 17.6% - monoarthritis, 58.8% - oligoarthritis, 23.5% - polyarthritis; 14 patients (37%) had swollen joints; 8 patients (21%) - reduction of joint mobility; 20 patients (53%) experienced bone pain and 95% (36 patients) had marked fatigue. Patients underwent specific treatments for the infesting parasitic agent. After treatment, the following characteristics are attested: Diffuse myalgia improved in 77%, localized muscle pain in 92%, arthralgia in 59%, swelling passed from all patients, mobility restored in 75%, bone pain improved in 80% and fatigue relieved in 83%. From the monitored laboratory tests we mention: until the antiparasitic treatment the total immunoglobulin E has values greater than 240 ng/ml in 29 (76%) of subjects, after the antiparasitic treatment values that exceed the norm are in 16 (42%) patients; C-reactive protein was greater than 5 mg/l in 32 (84%) patients and after treatment only in 6 (16%) persons; ESR was increased in 24 (63%) patients until treatment, and after treatment is greater than 10 mm/h in 4 (10.5%) cases; eosinophils with values greater than 5% are in all subjects and after treatment remain high in 23 (60.5%) patients.

Conclusion: The impairment of the locomotor system is found in parasitosis having as substrate inflammatory, immune and allergic changes with various sites of musculoskeletal pathology. In cases of musculoskeletal impairment of nonelucidated etiology, parasite investigation should be considered for promptly decision of therapeutic management.

P544
TREATING OSTEOPOROSIS HALVES THE HOSPITALIZATION RATE: RESULTS FROM A NATIONWIDE REPRESENTATIVE SURVEY

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Objective: Osteoporosis and its complications are responsible for significant part of healthcare budgets. There are several data on the cost-effectiveness of the treatment resulted from the prevention of new fractures. In contrast only a few publication is available about their effect on hospitalization rates which also plays a role in the expenditure. The aim of our study was to investigate the incidence of hospital admissions among osteoporotic patients.

Methods: In Hungary all citizens are registered in the database of National Health Insurance Fund. By the unique insurance ID every established ICD code is registered, as well as the redeemed medications for every citizens. In our survey we have chosen all females aged 55 y and above who had newly diagnosed osteoporosis and redeemed at least one osteoporosis medication between 2011-2017. By medication redeeming data we grouped patients as adherent (more than 80% persistence on medication) and nonadherent (<20% persistence). Primary outcome was the hospitalization per patient per year. Secondary measurements were time to first hospitalization, the overall inpatient duration and fracture incidence.

Results: We enrolled 1693 adherent and 9582 nonadherent patients to our survey. A significant part of the patients (97%) received bisphosphonates. The hospital admission rates did not differ prior the observation period (0.11 vs. 0.13 event/patient/year). The antiosteoporotic treatment significantly decreased chance for hospital admission (0.06 vs. 0.13 event/patient/y; p<0.001) and the duration of inpatient treatment (5.7 vs. 7.3 d/y). The time to first hospitalization was longer in the treated group (1348 vs. 1262 d). Fracture incidence proved evidence for the adherence rate: adherent patients suffered significantly fewer fractures (4.8% vs. 6.4%, RR=0.75). Taking that into account the hospitalization rates are much greater than fracture rates, we can hypothesize that the majority of hospital admissions weren't because of fractures.

Conclusion: Primary fragility fracture prevention drugs significantly reduce the all-cause hospitalization rates in a postmenopausal osteoporosis population. This also plays a role in the cost-effectiveness of these treatments.

P545
HYPOGONADISM AND BONE: A RARE CASE REPORT

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Objective: The crucial role of sex hormones in bone metabolism is well established. The deficiency of sex steroids is the primary pathophysiologic factor in one of the most frequent metabolic bone disease, the postmenopausal osteoporosis. Primary amenorrhea and primary hypogonadism lead to delayed puberty and result in abnormal bone development. The peak bone mass of these patients remains low and the fracture risk is higher during their lifespan. Premature ovarian failure also causes decreased bone mass.

Methods: We reviewed the literature on the occasion of one of our interesting case.

Results: Our patient was born with Sturge-Weber syndrome that caused symptomatic epilepsy. Due to this he was undergone to hemispherectomy at the age of 2. She was 18 years old when she first presented on our endocrinology outpatient unit. Leading complains were amenorrhea and short stature. As Sturge-Weber syndrome can lead to panhypopituitarism, first we examined the hypothalamus/pituitary axis. We found growth hormone deficiency and hypogonadotrop hypogonadism. CRH/ACTH/cortisol and TRH/TSH/thyroxin axis were normal. Osteodensitometry showed decreased BMD (Z-score -1.5/-2.1/-0.8 on spine, femur and radius, respectively). Hand x-ray showed closed growing plates. Hypogonadotrop hypogonadism was consequence of Sturge-Weber syndrome. As growing plates were closed growth hormone substitution was not indicated. Hypogonadism is managed by combined estradiol and progesterone pills. For decreased BMD calcium and cholecalciferol supplementation was initiated. By this treatment the BMD increased, menstruation cycles became regular and patient's mood significantly improved.

Conclusion: Recognition and treatment of hypogonadism is important in childhood for preventing later bone disorders. Secondary amenorrhea indicates evaluation for early ovarian failure and acquired hypogonadotrop hypogonadism. Sex hormone supplementation has favorable effects on bone parameters so recommended except when contraindication is present.

P546

ASSOCIATIONS BETWEEN BONE MATERIAL STRENGTH INDEX AND PARAMETERS OF PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY

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Objective: Bone material strength index (BMSi) is measured in vivo using impact microindentation (IMI). This study investigated if BMSi is associated with pQCT-derived bone parameters.

Methods: Participants were men (n=373, age 34-96 y) from the Geelong Osteoporosis Study. BMSi was measured using an OsteoProbe (Active Life Scientific, USA). Bone measures were obtained at both the radius (n=348) and tibia (n=342) using pQCT (XCT 2000 Stratec Medizintechnik, Germany). Images were obtained at 4% and 66% of radial and tibial length. Associations between BMSi and pQCT parameters were tested using Pearson's correlation and multivariable regression used to determine independent associations after adjustment for potential confounders (age, weight, height, prior fracture, smoking, physical activity and alcohol consumption). Models were checked for interaction terms.

Results: BMSi was associated with total bone density (radius 4%; r=+0.124, p=0.022, tibia 4%; r=+0.110, p=0.043) and cortical density (radius 4%; r=+0.130, p=0.015, tibia 4%; r=+0.130, p=0.017). The associations were independent of age, weight and height (total bone density: radius 4%; b=0.863, p=0.029, tibia 4%; b=0.757, p=0.033 and cortical density: radius 4%; b=1.223, p=0.020, tibia 4%; b=1.006, p=0.018). BMSi was associated with total bone area at the tibia (66%, adjusted; b=1.621, p=0.038). There was evidence of an association between BMSi and total bone area at the radius (66%, adjusted; b=0.355, p=0.061), and total bone mass and cortical area at the tibia (66%, adjusted; b=0.007, p=0.093 and b=0.636, p=0.086, respectively), but these did not reach significance. BMSi was not associated with other pQCT-derived parameters, including trabecular bone variables.

Conclusion: There was a moderate association detected between BMSi and some pQCT-derived bone parameters. These data suggest that IMI and pQCT are detecting related properties of cortical bone.

P547

MULTIMODAL OA TREATMENT PROGRAM REDUCES BMI

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Objective: To evaluate the results of usual care and an extended intervention program (EIP) in OA.

Methods: Prospective RCT with 116 patients with grades II and III K&L knee OA and multiple OA were randomized to: Control group (CG): usual care and 2 periods of 5 h of lectures about OA; EIP: same as the CG and group sessions of: 7 physical therapy; 7 physical fitness; 2 nutrition and 2 about engaging the program) along the first 6 months of the program, when patients were oriented to continue diet and exercise on its own. VAS, WOMAC, Lequesne, and measures of BMI, body weight (BW), lean weight (LW), fat weight (FW), percentage of body fat (PBF), hip-waist ratio (HWR), timed up and go (TUG), 30-s chair stand test (30CST), timed up and down stairs (TUDS), 6-min walk test (6MWT) and physical activity (IPAQ) were taken at baseline, 6, 12 and 24 months.

Results: Groups were similar at baseline (p>0.05). CG had 2 times more dropouts than the EIG. At 6 months, all parameters were better in the EIP (p<0.05) with the exception of HWR, TUG and LW, which did not vary. Only the EIP improved VAS from baseline to all moments (p<0.002), but both groups improved WOMAC pain (similar results at 2 y). Lequesne, TUDS, 6MWT, IPAQ results improved in all moments for both groups without difference. WOMAC function and total and the 30CST improved faster in the EIP at 6 months (at 2 y, groups presented similar results with loss of the EIG results and continued gain of the CG). Only the EIP reduced BW (p<0.001), BMI (p=0.002), FW (p<0.05) in all moments. Both groups reduced and had similar PBF at 2 y follow-up (with gain in PBF of the EIP in the second year and continued loss of the CG during the study).

Conclusion: The EIP has higher adherence, IPAQ, and improves more rapidly pain and function. Loss of BW, FW and BMI was only achieved by the EIP with partial loss of results after ceasing group interventions.

P548
FOUR-YEAR FOLLOW-UP OF A TWO DAY EDUCATIONAL PROGRAM ABOUT OA IN BRAZIL

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Objective: To analyze the 4 y results of an educational program in patients with multiple and knee osteoarthritis (KOA).

Methods: 226 patients with multiple and KOA were randomly assigned to educational (EDU, n=115) or control group (CON; n=111). All subjects were followed by medical consultation every 6 months, but the EDU participated in 2 days of lectures and workshops about OA with a multiprofessional team composed of orthopedic surgeons, nutritionist, physical therapists, physical educators, occupational therapist, social workers and psychologists. All patients respond to the WOMAC and IPAQ and were evaluated by: sit and reach test (SRT), 6-min walk test (6MWT), timed up and down stairs test (TUDST), timed up and go test (TUG), and the 5 times sit to stand test (FTSST) at baseline, 24 and 48 months follow-up.

Results: 153 patients completed the study, being 83 in the EDU. There were no differences in baseline characteristics between those who completed the follow-up and those who did not. BMI did not change, but post hoc analysis showed that those who were active lost BMI (3.5%, p<0.001, ES 0.21). All functional tests, WOMAC function and total improved in both groups over time. TUG improved at 24 (p<0.001) and 48 months (p<0.001) more in the EDU. WOMAC pain had clinically relevant improvement in the EDU (P<0.001). WOMAC stiffness was always better in the EDU, but both groups improved. At baseline CON was more active and at follow-up there is a greater number of sedentary and irregularly active B patients in the CON than in the EDU (p<0.001). In the EDU results of the functional tests, WOMAC subscales and WOMAC total and BMI improved in those that remained active and those that became active throughout the follow-up (p<0.05).

Conclusion: The results corroborates that high levels of daily living physical activity have an important role on management of multiple and KOA and that this educational program improves adhesion to the habit of exercise.

P549
OSTEOARTHRITIS OF THE HAND: THE USE OF JOINTS PROTECTION, ASSISTIVE TECHNOLOGY WITH AND WITHOUT EXERCISES

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Objective: To verify the functional and analgesic effect of joint protection and fatigue management techniques, assistive technology (orthotics and adaptations) and exercises in the treatment of patients with osteoarthritis of the hands, when compared to the group that received only the joint protection and fatigue management guidelines.

Methods: 97 participants were allocated to one of two groups. Both groups received oral and written information, but only Group 2 received orthotics with nocturnal support, aiming at the relief of the pain, stabilization of the affected joints and the prevention of the appearance/aggravation of deformities, and were instructed to perform exercises. Both groups were followed up for 2 y, evaluated with the Disabilities of the Arm, Shoulder and Hand questionnaire (DASH), Stanford Health Assessment Questionnaire (HAQ), palmar grip strength, key pinch strength, three-point pinch strength and pulp pinch at inclusion, one and two years follow-up.

Results: HAQ, DASH (no difference between the moments of evaluation in both groups), right / left hand grip strength (22.4 / 22.0 / 22.8 kg) / (22.3 / 17.7 / 20.6 kg), right / left bipolar pinch (4.2 / 4.0 / 4.5 kg) / (3.9 / 3.6 / 4.2 kg), right / left key pinch (6.5 / 5.7 / 6.5 kg) / (6.0 / 5, 6 / 6.4 kg) and right / left tripod pinch (5.5 / 4.2 / 5.1 kg) / (5.2 / 3.9 / 5.0). A decrease in the strength of the first to the second evaluations coincides with the use of the orthotics and an improvement from the second to the third evaluation that coincides with the performance of the exercises, with a slight increase in relation to some initial evaluations. There was no difference between moments in the group where the intervention was only the joint protection.

Conclusion: The use of orthotics and performing exercises appears to be a more effective treatment, at least for maintenance of strength without pain.

P550

ASSOCIATION OF CALCANEAL QUANTITATIVE ULTRASOUND WITH OSTEOPOROSIS SELF-ASSESSMENT TOOL FOR ASIANS AND FRACTURE RISK ASSESSMENT TOOL IN IDENTIFYING RISK OF OSTEOPOROSIS

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Objective: FRAX and osteoporosis self-assessment tool for Asians (OSTA) are simple questionnaires for osteoporosis screening. Calcaneal quantitative ultrasound (QUS) is an approachable tool in primary osteoporosis screening. However, QUS is not available in all health care settings. Our study explored the possibility of replacing QUS with FRAX or OSTA to identify the individual risk of osteoporosis.

Methods: Our study is a cross-sectional study which recruited a total of 426 Taiwanese male and female patients aged above 50 y from urban and rural areas. Their bone health status was assessed by QUS, FRAX, and OSTA. The prevalence of high risk of osteoporosis evaluated by three tests was listed. The association and agreement of QUS with OSTA and FRAX were calculated by Cohen's Kappa and receiver-operating curve.

Results: The correlation between QUS and OSTA was not statistically significant (Cohen's Kappa coefficient=0.043 (p-value=0.208). But QUS indices correlated significantly with FRAX (Cohen's kappa coefficient=0.478, p-value<0.05). Area under the curve, AUC is 0.818 (95%CI=0.778-0.858), p-value<0.001 in FRAX group and 0.576 (95%CI=0.518-0.633), p-value=0.011 in QUS group. These data suggest that among all the risk factors in FRAX, age and previous fracture history are strongly correlated to osteoporosis.

Conclusion: The correlation between QUS and FRAX is significant in categorizing individual osteoporosis risk. But QUS and OSTA are not statistically correlated in our study. In conclusion, QUS and FRAX might be used interchangeably in osteoporosis screening.

P551

HAMP VIA MIR-27A-ABUNDANT EXOSOMES DERIVED FROM ENDOTHELIAL CELL REGULATE BONE METABOLISM

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Objective: Nowadays it has been found that osteoporosis is caused by "iron accumulation", and Hamp is the key regulator of iron homeostasis in the body system, and can be a direction for the treatment of osteoporosis. Recent studies have also shown that vascular endothelial(EC)-secreted exosomes (EC-exos) can be internalized by bone and can reveal miRNA to inhibit osteoporosis in vivo and in vitro. In this study, a new connection between blood vessels and bone was found through a new perspective of Hamp.

At the same time, this study provides a new idea and theoretical basis for the application of Hamp in the prevention and treatment of osteoporosis caused by "iron accumulation".

Methods: 1. Overexpression and knockout plasmids of Hamp were prepared by CRISPR/Cas9 technology, and then virus coated these segments.2. Two viruses were transfected into vascular endothelial cells (HUVEC), and two new cell lines HUVEC$^{Hamp+/+}$ and HUVEC$^{Hamp-/-}$ were created.3. The cell culture medium of the transfected new HUVEC cell lines was co-cultured with MC3T3, and the osteogenic genes Alp, Runx2 and Sp7 were measured by qRT-PCR, and the proteins were detected by Western Blot.4. After EC-exos was isolated and identified, RNA-sequencing was conducted to find the target MicroRNA.5. We transferred MicroRNA-mimic into MC3T3 cells, *in vitro*, qRT-PCR and WB to measure osteogenic genes and proteins.6. Exosomes were injected into 8-week-old mice for 8 weeks, *in vivo*, and the femurs were taken for micro-CT, biomechanical experiments, immunohistochemistry.7. Plasma samples of normal subjects and osteoporosis patients would be isolated to detect differentially expressed MicroRNA in exosomes.

Results: 1. Lentivirus were successfully constructed. After transfection, two new cell lines were successfully constructed.2. The osteogenic capacity of MC3T3 cells cultured with HUVEC$^{Hamp+/+}$ exosomes were better than that of HUVEC$^{Hamp-/-}$.3. Confocal experiments showed that EC-exos entered into osteoblasts.4. The Mir-27a level was screened out by RNA-sequencing, and the osteogenic capacity of MC3T3 increased after transfecting mimic.5. Bone mass of C57BL/6 mice in animal experiments were consistent with cell experiments.

Conclusion: Experiments can prove that changes in the expression of Hamp can regulate the type and quantity of microRNA in exosomes (*in vitro*) of HUVEC, thus changing the capacity and metabolism of osteogenesis. This may affect osteogenic differentiation, and ultimately increasing bone mass. This study expounds a new idea for the research on the factors of osteoporosis related to Hamp low expression with "iron-independent osteoporosis" and provides a new method for the treatment of osteoporosis.

P552

SELF-REPORTED OSTEOPOROSIS AND MULTIMORBIDITY IN BRAZILIAN MIDDLE-AGED WOMEN: A CROSS-SECTIONAL POPULATION-BASED STUDY

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Objective: Osteoporosis is a multifactorial disease and many factors influence an individual's propensity to develop osteoporosis and suffer from its consequences. Some of these factors are nonmodifiable, while others can be avoided, ameliorated and prevented. From the perspective of the patient and their physician, this is of importance since longevity and aging process is associated to chronic conditions and multimorbidity that may affect bone health. Many of these chronic diseases

may affect women during menopause transition, so middle aged women are predisposed to develop bone loss earlier in life. So, it is important to know which of these morbidities is associated to bone fragility in order to prevent osteoporosis. We aimed to evaluate the association between self-reported osteoporosis and multimorbidity in Brazilian middle-aged women.

Methods: A secondary analysis of household survey data from a previous cross-sectional, population-based study conducted with a sample of 749 women of a population of 257,434 female urban residents in the age bracket of interest (45-60 y). Associations between self-reported osteoporosis and chronic diseases and multimorbidity (presence of three or more chronic diseases) were evaluated, as well as the prevalence association with other sociodemographic and clinical variables. Multiple Poisson regression analysis were used to identify the main osteoporosis associated factors, with forward Stepwise variable selection criteria (95%CI). Statistical significance was considered with p-value <0.05.

Results: Mean age of participants was 52.5±4.4 y. Mean age at menopause was 46.5±5.8 y. About 79% of women reported having some kind of chronic disease. The most prevalent morbidities were hypertension (36%), depression (34%), anxiety (27%), osteoarticular diseases (27%), dyslipidemia (22%), asthma (10.5%), diabetes mellitus (10.4%). Only 21.6% denied having morbidities; however, approximately half of the population studied (48.5%) reported 1 or 2 comorbidities and 30% had multimorbidity. About 30% of the women with chronic diseases did not use any type of medication. The prevalence of self-reported osteoporosis was 7.3%. According to multiple Poisson regression analysis the factors associated with osteoporosis were osteoarticular diseases (PR=2.34; 95%CI: 1.29-4.25; p=0.005), multimorbidity (PR=2.38; 95%CI:1.30-4.35; p=0.005) and time since menopause (<5y: PR=3.63; 95%CI:1.04-12.73; p=0.044/ 5-9y: PR=3.80; 95%CI:1.07-13.45; p=0.39/ >10y: PR=5.27; 95%CI:1.54-18.08; p=0.008). Strength & Limitations: The study design does not permit a causal relationship to be established between osteoporosis and factors associated with multimorbidity. However, the strength of our study is the large and representative population-based sample of middle-aged women. Population-based studies are necessary for understanding the association between osteoporosis and the most prevalent morbidities in this specific age-group of women and to design interventions to maintain and promote bone health requires knowledge of region-specific trends.

Conclusion: Multimorbidity and time after menopause was strongly associated with osteoporosis in this sample of middle-aged women. Our findings reinforce the need to address women earlier, preferably in the period before and during the menopausal transition, to promote health through lifestyle modifications, thus preventing the onset of chronic degenerative diseases at earlier ages.

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P553
THE EFFECTS OF PROBIOTICS COMBINED WITH ISOFLAVONES ON EQUOL PRODUCTION AND BONE TURNOVER IN POSTMENOPAUSAL WOMEN: RESULTS FROM A RANDOMIZED CONTROLLED TRIAL

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Objective: To evaluate the effect of isoflavone administration, either in conjunction with probiotic use or not, on equol-producing ability and bone biomarkers and compare the effects with those of hormone therapy in postmenopausal women.

Methods: A randomized clinical trial was conducted on 58 postmenopausal women aged 40-60 y, randomly assigned to receive oral isoflavone (150 mg dry extract of glycine max) alone or isoflavone plus probiotic (*Lactobacillus acidophilus, Lactobacillus casei, Lactococcus lactis, Bifidobacterium bifidum, and Bifidobacterium lactis*) or hormone therapy (1 mg estradiol and 0.5 mg norethisterone acetate). It was measured urinary equol using gas chromatography coupled to mass spectrometry. DXA densitometry of total body was performed to measure bone mineral content. Biochemical markers of bone turnover C-telopeptide of type I collagen (CTx) and bone-specific alkaline phosphatase (BAP) were measured at baseline and at 16 weeks of treatment. Statistical analysis: The variables obtained were compared between three groups using the Wilcoxon test for paired samples. Spearman's correlation analysis was performed to evaluate the correlation between equol production and biochemical markers of bone turnover.

Results: The mean age of the women was 52.41± 3.26 y, and the mean age at menopause was 48.6 y; the mean time since menopause was 46.5 months. According to densitometry results, 7.0% of the women were diagnosed with osteoporosis in lumbar spine (L1-L4); osteopenia in lumbar spine (47.4%) and 18% total hip. CTx measurement after intervention were 0.20 μg/L in isoflavone group, 0.26 μg/L in isoflavone plus probiotics and 0.18 μg/L for HT group (p<0.001). The final measure of BAP was higher in the isoflavone (17.65 μg/L) and isoflavone plus probiotics group (16.30 μg/L) compared to hormone therapy group (13.20 μg/L) (p<0.001). There was a significant higher increase in the equol and equol intermediate contents after 16 weeks in the isoflavone plus probiotic group. The cut off point for equol production in the study population was 2.13 μg/ml, and according with this criterion, 25 women (43.1%) were identified as equol-producers. In the analysis of correlation between equol production and bone biomarkers, it was observed that the increase in equol levels

correlated to an increase in bone-specific alkaline phosphatase (R=0.473 and p=007) and being negative the association with C-telopeptide of type I collagen (R=0.346 and P=0.01).

Conclusion: Although HT prevents bone resorption, isoflavones appear to be associated to bone formation through equol production. Soy isoflavones alone or in conjunction with probiotic can be an alternative to hormone therapy to maintain bone turnover in postmenopausal women. It will be of interest to assess whether isoflavones associated with probiotics can further improve bone health over a longer period of time and decrease fracture risk.

P554

ELEVATED NEUTROPHIL-TO-LYMPHOCYTE RATIO IS LINKED WITH LOWER MUSCLE MASS AND DECREASED GRIP STRENGTH

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Objective: Changes in body composition and decreased muscle strength progress with aging, a process known as sarcopenia. Sarcopenia is caused by a multifactorial pathophysiological mechanism, with chronic inflammation being one of the key mechanisms. Elevated neutrophil-to-lymphocyte ratio (NLR) has been reported as a marker of chronic inflammation. However, no studies have been carried out to investigate its association with the muscle changes occurring with increasing age. We investigated the relationship between NLR and muscle mass as well as grip strength in healthy adults in Korea.

Methods: This study included a total of 1028 men and women who underwent self-referred health screening at a university hospital in Jeju between April 2015 and January 2019. All participants underwent DXA to check body composition, while muscle strength was measured by grip strength. Decreased muscle mass and grip strength were defined using the cut-off point of the Asian Working Group.

Results: Among participants, 32.4% (n=333) showed decreased muscle mass and 18.0% (n=185) decreased grip strength. Analysis of the NLR quartile revealed that decreased muscle mass was significantly related to the progression of NLR to a higher quartile (P for trend=0.009). This trend was also found in participants with decreased muscle mass and grip strength (P for trend=0.017). In logistic regression models for decreased muscle mass as well as grip strength, participants with elevated NLR had an increased risk for decreased muscle mass and strength even after adjusting for covariates (odds ratio=1.37, 95%CI 1.05-1.80). When receiver operating characteristics analyses were performed with decreased muscle mass as well as grip strength as the result variable, NLR showed an area under the curve value of 0.588 and the optimal cut-off value of NLR was 2.084 (P<0.001).

Conclusion: Elevated NLR was related to lower muscle mass and decreased grip strength, suggesting that NLR may have potential as a marker for muscle changes occurring with age. Further longitudinal studies with larger sample sizes are needed.

P555

OPTIMAL FREQUENCY OF SONIC WHOLE BODY VIBRATION ON MUSCLE FUNCTION AND MUSCLE FATIGUE

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Objective: There are several studies that show the whole body vibration (WBV) training improved the muscle strength, postural balance. However, there is no studies done to demonstrate the relationship between vibration frequency affecting human body.

We aimed to study the effect on muscular strength, muscular fatigues and aerobic function according to frequency band of sonic WBV.

Methods: This study is a single centered and investigator-initiated trials participated by 20 healthy adult who are 20-29 years old. The participants visited total 10 times. For every visit they performed squat exercise 100 times with WBV, which frequency changed each visit (0, 4, 6, 8, 12, 16, 20, 24, 30 Hz). For measuring muscle function, spectral edge frequency of maximal voluntary isometric contraction (MVIC) assessment was done through the real-time EMG, each muscles of lower limbs and rectus abdominis. Aerobic function was evaluated by VO_2. Muscle fatigue was examined by measuring lactate measured immediately before, immediately after, and after 20 min of rest.

Results: When the frequency is varied, there was a significant difference in MVIC area of Gastrocnemius medialis (GCM) (4,12,20,30Hz p<0.001). No meaningful result was observed in other muscles. There was no significant outcome depending on frequency band for VO_2 (p=0.509). In addition, the level of lactate to measure the muscular fatigues does not present significant result (p=0.308).

Conclusion: Our investigation showed that sonic WBV have meaningful muscle function enhancement according to specific frequency on specific muscle (esp, GCM). Even though we observed frequency up to 30 Hz, further study is required to explore the effects of more diverse frequencies.

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P556
EFFICACY OF WHOLE BODY VIBRATION TRAINING FOR IMPROVING MUSCLE STRENGTH AND PHYSICAL PERFORMANCE IN THE ELDERLY

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Objective: There are many restrictions on the basic daily activities of the elderly due to muscle function decline. The whole body vibration training(WBVT) is a type of exercise that stimulates the muscle by utilizing the vibration. The aims of this clinical trial was to investigate the efficacy of WBVT for improving muscle strength and physical performance compared with stretching in the elderly.

Methods: This prospective study was conducted in elderly people over 65 years old. A total of forty subjects were randomly assigned to WBVT group (n=20) or control group (n=20). The WBVT group performed WBVT (20 min) using electrical vibrator (SW-VC15™), followed by strengthening exercise (20 min) after 10 min break. The control group performed stretching (20 min) instead of WBVT. A total of 12 training sessions were conducted for 50 min/d, 3 d/week, for four weeks. The main outcome measure was isokinetic dynamometer (peak torque, average power), Short Physical Performance battery (SPPB), 36-Item Short Form Survey (SF-36) and body composition analysis using InBody®720. These measures were assessed at 3 times: evaluation 1 (E1, pretreatment), evaluation 2 (E2, after treatment), and evaluation 3 (E3, 4 weeks follow-up after treatment).

Results: Although there was no significant difference between groups at each observation time, the WBVT group showed higher peak torque (N-M) improvement (E2−E1; control: Δ3.49±5.89, WBVT: Δ7.03±9.26). In within-group comparison, both groups showed a significant difference in peak torque (control: p=0.026, WBVT: p=0.011). There was no statistically significant difference between and within groups in SPPB, SF-36, body composition analysis.

Conclusion: Our results showed that WBVT showed peak torque improvement, but there was no statistically significant difference between stretching and WBVT for improving muscle strength and physical performance.

P557
EFFICACY OF LOW-INTENSITY PULSED ULTRASOUND FOR CARTILAGE REGENERATION, PAIN, AND FUNCTIONAL ACTIVITY IN KNEE OSTEOARTHRITIS

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Objective: Therapeutic ultrasound is a frequently used modality for the treatment of knee OA associated pain. Moreover, there are some studies about the effect of low-intensity pulsed ultrasound (LIPUS) on cartilage regeneration in patients with knee OA. The aim of this clinical trial was to investigate the efficacy and safety of low-intensity pulsed ultrasound (LIPUS) for cartilage regeneration through knee MRI, pain, and functional improvement in knee OA patients.

Methods: This study was designed prospective, single-group, home-based self-therapy trial. Each patient took an ultrasonic stimulation device (BODITREK JOINT™), underwent a 30 min/d, more than 5 sessions per week for 4 weeks, more than 20 sessions in total. The primary outcome measure was articular cartilage thickness in femoral condyle and tibial plateau. The secondary outcome measure was visual analogue scale (VAS); P1 (pain at the current moment); P2 (pain with the knee movement); P3 (pain in resting position), WOMAC, 36-Item Short Form Survey (SF-36). These measures were assessed at three times: evaluation 1 (E1, pretreatment), evaluation 2 (E2, after treatment), and evaluation 3 (E3, 4 weeks follow-up after treatment). Knee MRI was conducted twice only at E1 and E3.

Results: Seven subjects were included in the study. Although the increment of mean cartilage thickness was observed (ΔE3 - E1=0.02±0.05mm), but there was no statistically significant difference (p=0.290). There was a significant improvement in SF-36 (E2 vs. E3; p=0.019). There was no statistically significant difference in VAS and WOMAC score.

Conclusion: In this study, the clinical efficacy of LIPUS therapy is still statistically indefinite. Further study is currently in progress with more subjects.

P558
A DISCRETE-CHOICE EXPERIMENT TO ASSESS EXPERTS' PREFERENCES FOR SARCOPENIA OUTCOMES

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Objective: After evaluating patients' preference for sarcopenia outcomes[1], this study aimed to assess experts' preference for sarcopenia outcome through a similar discrete-choice experiment (DCE).

Methods: Sarcopenia experts recruited from the Special Interest Group in Sarcopenia from the EUGMS. In the DCE survey, experts were repetitively asked to choose which one of two patients (Patient A and Patient B) suffering from sarcopenia deserves the most a treatment. The two hypothetical patients presented different levels of risk for five pre-selected sarcopenia outcomes [2]: quality of life, mobility, domestic activities, fatigue and falls. The DCE included 12 choice sets. Mixed logit panel model was used to estimate the relative importance of each DCE attribute for the experts and comparison with the previous DCE including 216 sarcopenic persons was done.

Results: A total of 37 experts were included for the analysis (50% women with a median clinical experience of 8 y (3-15 y)). All five pre-selected sarcopenia outcomes were shown to be significant and thus important for experts. Overall, the most important sarcopenia outcome was falls (27%) followed by domestic activities and mobility (24%), quality of life (15%) and fatigue (10%). Compared to sarcopenic patients, experts considered falls as more important (27% vs. 18%), while fatigue (10% vs. 17%) and domestic activity (24% vs. 30%) were less important for experts.

Conclusion: Some differences in the relative importance of sarcopenia outcomes were observed between experts and persons with sarcopenia. In particular, falls was the most important outcome of sarcopenia for the expert while this outcome was only the third most important outcome for persons suffering from sarcopenia. On the other hand, fatigue was considered more important by persons with sarcopenia compared to expert evaluation. Both experts and patients seem concordant about the importance of mobility and the ability of managing domestic activities as outcomes of sarcopenia. Taking into account expert's opinion in preference studies could add an additional nuance to the results obtained from patients.

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P559
DISABILITY-ADJUSTED LIFE YEARS RELATED TO FRAGILITY FRACTURES

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Objective: The DALY (or Disability-Adjusted Life Year) is a method developed by the WHO for measuring the burden of a disease, which allows for comparison across diseases. DALY estimates are regularly updated for most diseases; however, osteoporosis or fragility fractures is not one of them. The objective was to calculate the DALY burden related to fragility fractures and compare to existing estimates for other diseases.

Methods: A single DALY can be thought of as one lost year of "healthy life" and summing the DALYs across an entire population provides the gap between the current health status of a population and an ideal disease-free population, i.e., the burden. Calculation of DALYs for fragility fractures follows the current method used and provided by the WHO. Required data were assembled for the largest five EU countries as well as Sweden (total population: 128,699,382), to calculate the per capita and total DALYs in men and women from the ages of 50-100 y, for hip fractures, vertebral fractures and a weighted average of other fractures associated with osteoporosis (rib, sternum, pelvis, shoulder, forearm, wrist, and other femoral fractures).

Results: The total DALYs related to fragility fractures in year 2016 for the EU6 (ages 50-100 y) were estimated at 2.66 million life years. In the figure below, fragility fracture DALYs are compared to DALYs for 16 other common diseases in the EU6. Among these diseases, fragility fractures are placed as the fourth most burdensome, outranked only by ischemic heart disease, dementia and lung cancer.

Conclusion: The DALY burden related to fragility fracture is high compared to many other common diseases.
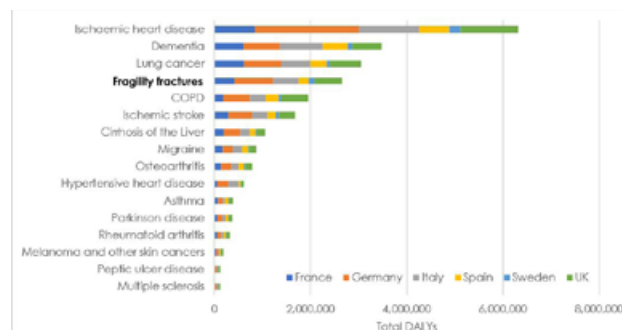
Figure. Country contribution to total DALYs by disease in EU6 for 17 selected diseases

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P560

RHEUMATOID ARTHRITIS PATIENTS WITH OVERWEIGHT ARE PROTECTED FROM THE SYSTEMIC BONE LOSS BEFORE AND DURING THE TUMOR NECROSIS FACTOR INHIBITORS TREATMENT

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Objective: In general, the BMI is related to the BMD. But the obesity is suspected to be the predictor of inferior response to anti-TNF agents in patients with some immune-mediated inflammatory diseases including rheumatoid arthritis (RA). We aimed to find out how systemic bone metabolism was affected after one-year treatment of TNF inhibitor in patients with RA.

Methods: 33 seropositive RA patients were enrolled and categorized to two groups: a group of obesity BMI: ≥25 kg/m^2) and of nonobesity (BMI <25 kg/m^2). TNF inhibitors were administered for a year. BMD at lumbar spine, femur neck, and total hip were measured at baseline and 12 months after treatment.

Results: Except four patients treated with antiresorptive osteoporosis medication, 29 patients showed decreased BMD at all sites after anti-TNF treatment. Weight was shown to be the strongest factor influencing systemic bone loss. The group of nonobesity showed significant decrease in BMD at all sites after 1 year treatment of TNF inhibitors although the group of obesity showed relatively less change in BMD at all sites. Blood samples were done at baseline, 6 months and 12 months after anti-TNF treatment and osteoclasts were cultured on bone slices. The resorption pits by osteoclasts in the group of non-obesity was shown to decrease at 6 months but increase at 12 months, although the group of obesity presented steadily decreasing trend of resorption pits at all times during the period. Receptor activator of nuclear factor kappa B ligand was significantly lesser at 12 months than baseline in the group of obesity.

Conclusion: 1-year treatment of TNF inhibitors failed to halt systemic bone loss in whole RA patients but the bone in obese RA patients are less affected.
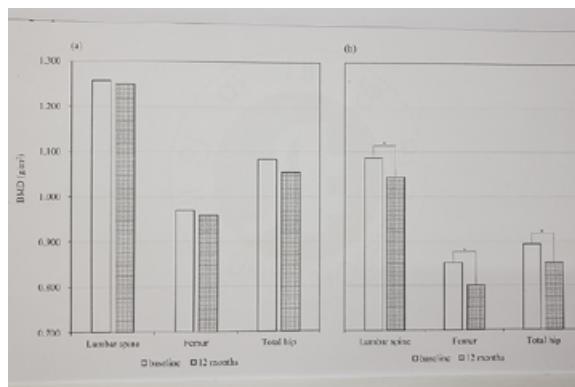
Figure. BMDs according to obesity, (a) group of obesity (BMI ≥25 kg/m^2), (b) group of nonobesity (BMI <25 kg/m^2), * statistically significant

P561

TRABECULAR BONE MICROARCHITECTURE IN PATIENTS WITH TYPE 2 DIABETES

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Objective: Patients with T2DM have an increased incidence of fracture despite having increased areal BMD. Currently available tools for the prediction of risk inadequately capture diabetic patients at increased risk of fracture. BMD does not reflect bone microarchitecture. The aim of our study was to assess trabecular bone quality using TBS in patients with T2DM.

Methods: 44 postmenopausal Caucasian women (45-71 y) with T2DM and 20 women without diabetes were enrolled in the study. Lumbar spine (LS) and total hip (TH) BMD values were obtained using DXA, TBS was calculated using TBS iNsight software.

Results: Mean LS BMD was higher in patients with T2DM compared to control group (1.145±0.161 vs. 0.995±0.115, p<0.001). In 18 patients (41%) TBS showed degraded microarchitecture (TBS ≤1.2), 26 patients (59%) had partially degraded structure (TBS >1.20 <1.35). TBS was higher in patients with good glycemic control (HbA1C ≤7.5%) - 1.223±0.137 compared to patients with poor glycemic control (HbA1C ≥7.5%) - 1.158±0.120, p<0.01.

Conclusion: Mean TBS is lower and BMD is higher in T2DM patients compared to control.

TBS is lower in patients with poor glycemic control. TBS can be used for the assessment of fracture risk in patients with T2DM.

P562

ASSESSMENT OF VERTEBRAL BODY DEFORMITY FOR THE DIAGNOSIS OF VERTEBRAL FRACTURES IN A ROUTINE CHEST CT SCAN USING ARTIFICIAL INTELLIGENCE

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Objective: To develop an algorithm for the automatic detection of vertebral body fractures based on the analysis of routine chest computed tomography (CT) by artificial intelligence (AI) based methods.

Methods: Anonymous data was used from 109 patients who underwent routine chest CT examinations (57 of whom had at least one vertebrae with fracture). Eight experts measured three sizes

of 1425 vertebral bodies at levels Th1-L2 (overall 158 vertebrae with compression fracture); the total number of annotations was 11125. The stages of creating the algorithm included: I) creating an internal guide for assessing the size of the vertebral bodies by experts, II) developing the first step of the algorithm for finding the centers of the vertebral bodies and spinal canal; III) creating the second stage of the algorithm to measure vertebrae sizes. The combined AI algorithm provides automatic morphometric analysis of vertebral bodies including detection of individual vertebrae and subsequent measurement of anterior, middle and posterior sizes. This algorithm was implemented in Python programming language using the PyTorch [https://pytorch.org] and DeepPipe [https://github.com/neuro-ml/deep_pipe] libraries. The total training time was 12 h on the Nvidia Tesla Titan X video card. The quality of the combined algorithm was evaluated using 5-fold crossvalidation on 109 CT examinations of the chest.

Results: The detection accuracy of all vertebrae was 97.1%, 95%CI 96.6-97.6%. The average absolute errors in determining the anterior, median and posterior sizes of the vertebral bodies were 0.784 (CI 0.746-0.823), 0.681 (CI 0.649-0.713), 0.692 (CI 0.661-0.725) mm. When normalized to the corresponding vertebra size, the average relative errors were 4.41 (CI 4.05-4.87), 4.45 (CI 4.05-4.92), 3.30 (CI 3.14-3.46) percent, respectively. The area under the ROC curve (AUC) to separate vertebral fracture of any severity from normal vertebra was 0.903 (CI 0.882-0.924), and specifically to identify severe vertebral deformities (stage 2 or 3) the AUC was 0.976 (CI 0.963-0.987).

Conclusion: An AI algorithm has been developed to determine the anterior, middle and posterior sizes of vertebral bodies in order to assess the degree of vertebral compression and to diagnose vertebral fractures from a routine chest CT scan.

P563
CLUSTERIN AS A NEW DIAGNOSTIC MARKER FOR MUSCLE DEGENERATION AND A POTENTIAL TARGET FOR SPECIFIC THERAPEUTIC INTERVENTION FOR OSTEOPOROSIS RELATED SARCOPENIA

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Objective: The present study focuses on the role of clusterin (CLU) in influencing the decrease of muscle mass and fiber senescence in osteoporosis (OP).

Methods: *Vastus lateralis* muscle biopsies were collected from 20 women with OP undergoing surgery for fragility hip fracture and 20 women undergoing arthroplasty for hip osteoarthritis (OA). Serial sections for immunohistochemical analysis (IHC) were obtained from tissues fixed in 4% formaldehyde and embedded in paraffin. Myoblasts were freshly isolated from the same muscle biopsies and used to study *in vitro* the effect of CLU silencing by siRNA, and were fixed in 10% formalin for immunocytochemical analysis (ICC).

Results: We found an overexpression of CLU in degenerated fibers of OP patients, while in OA patients we observed a widespread and weak expression. These results were confirmed by ICC analysis. Subsequently, we studied the effect of CLU silencing on myoblasts: only in OP condition, functional knockdown of CLU by siRNA restores proliferative myoblasts capability (p<0.05) and tissue damage repair, carried out by an upregulation of transglutaminase 2 (TGM2) gene expression (p<0.05). We also observed, by ICC analysis, the downregulation of CX3CR1 expression with consequent impairing of the inflammatory infiltrate recruitment (p<0.05). According to previous studies, CLU appears to be involved in the epigenetic regulation mechanisms of DNA. Therefore, we studied the effect of CLU silencing on histone acetylation levels: we observed that silencing caused a decrease of DNA acetylation, and consequently of gene transcription (p<0.01), only in OP cells.

Conclusion: These results suggest a potential involvement of CLU in the onset and progression of the osteoporotic pathology and associated sarcopenia, playing a key role in muscle regeneration. Moreover, CLU silencing points out its role in the modulation of tissue damage repair and inflammation, proposing it as a new diagnostic marker for muscle degeneration and a potential target for specific therapeutic intervention in OP related sarcopenia.

P564
ALTERED EXPRESSION OF LONG NONCODING RNA GAS5 IN OSTEOPOROTIC PATIENTS SERUM

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Objective: In this study we analysed the expression level of *GAS5* lncRNA in serum samples from OP patients compared to healthy controls in order identify its putative role as biomarker in osteoporosis pathogenesis.

Methods: We investigated *GAS5* serum levels from OP patients (n=56, 14 males OP_M and 42 females OP_F) and healthy controls (n=28, 8 males CTR_M and 20 females CTR_F). OP subjects were divided into three groups of analysis: 43 with fragility fractures of spine (OP_VF; n=29) or femoral neck (OP_FF; n=14) and 13 patients without fractures (OP_NF). After serum extraction, RNA was amplified through RT-qPCR and the comparative cycle threshold method was used to analyse *GAS5* relative expression levels using *GAPDH* transcript as internal control.

Results: Serum expression of *GAS5* in patients with OP was increased compared to unaffected individuals (p<0.01). Analysing only subjects with fragility fractures, there is a more

statistically significant increase in *GAS5* levels compared to controls (p<0.001). Afterwards, a gender-specific analysis was also conducted to understand if there were differences in the levels of *GAS5* expression between the two sexes Total females were analysed and no statistically significant change was found respect to controls. Subsequently, only the group of females with fracture was analysed and a significant increase in *GAS5* expression levels was observed (p<0.01). The same analysis was carried out in the male group and a statistically significant increase was found in both the total and fractured subjects (p<0.05). Furthermore, a direct correlation between *GAS5* expression level and PTH concentration was found in OP patients (r=0.2930; p=0.0389). These results are corroborated from previous studies showing that a deficiency of vitamin D in OP patients is correlated with an increase in PTH levels underlying a key role of PTH in osteoporosis development.

Conclusion: The result of the analysis suggests a potential involvement of LncRNA *GAS5* deregulation in bone homeostasis and in risk of osteoporosis-related fractures.

P565
EFFECTS OF MICROGRAVITY ON MUSCLE STEM CELLS ACTIVITY

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Objective: The study of the effects of microgravity on primary cultures of human satellite cells represents a reliable model for identifying the biomolecular processes involved in bone and muscle mass loss related to the alteration of the normal mechanic load and characterizing the main musculoskeletal disorders, such as osteoporosis, arthrosis and sarcopenia.

Methods: In order to identify the main molecules involved in the phenomena of degeneration/regeneration of muscle tissue related to the alteration of mechanic load, we performed a morphological and immunohistochemical study on 27 muscle biopsies taken from control, osteoporotic and osteoarthritic patients, underwent hip arthroplasty. For each patient, we set up primary satellite cell cultures subjected to normogravity and microgravity (110 h) regimens. Cellular functionality has been studied through a morphological evaluation performed by optical microscopy, and an ultrastructural evaluation carried out by transmission electron microscopy. Furthermore, we evaluated the expression of BMP-2 and myostatin through immunocytochemical reactions.

Results: Our results showed that in the very early phases of microgravity condition the satellite cells are more active than those subjected to the normogravity regime, as demonstrated by both the increase in the number of myotubes and the significant increase in the expression of BMP-2 in all experimental groups (p<0.001). However, with prolonged exposure to microgravity regime (>72 h), satellite cells and new formed myotubes underwent to cell death. It is important to note that, in early phases, microgravity can stimulate the formation of new myotubes from satellite cells derived by osteoporotic patients. Furthermore, we observed that microgravity is able to induce changes in myostatin expression levels by group-dependent variations (p<0.001).

Conclusion: The results obtained allowed us to hypothesize a possible molecular mechanism of response to microgravity, confirming the importance of BMP-2 and myostatin in the physiopathogenesis of muscle tissue. In addition, these data can lay the foundation for new therapeutic approached in the prevention/cure of osteoporosis.

P566
IKSAN526 RICE CALLUS EXTRACT INDUCES DEDIFFERENTIATION OF RABBIT ARTICULAR CHONDROCYTES VIA ERK1/2 AND PI-3K/AKT PATHWAYS

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The resveratrol-enriched transgenic rice line Iksan526 was first developed by the Rural Development Administration of Korea using genetic engineering techniques, which shows beneficial health effects in mitigating metabolic syndrome and obesity. However, the effects of IS526 on the differentiation of chondrocytes, and the underlying mechanism have not been investigated in detail. In this study, the effects and cellular regulatory mechanisms of IS526 on rabbit articular chondrocytes were examined. Following IS526 callus extract treatment, the expression levels of differentiation-related proteins were detected via western blotting, alcian blue staining, and immunofluorescence staining. IS526 decreased the type II collagen and proteoglycans levels in dose- and time-dependent manners. We further analyzed the effects of IS526 on skeletogenesis in zebrafish larvae using alcian blue staining, which showed a reduction in cartilage formation along with increased production of matrix metalloproteinase (MMP)-13. IS526 also increased the phosphorylation of ERK1/2 and p38 kinase but inhibited the phosphorylation of Akt. Pharmacological inhibition of MMP-13 blocked the IS526-induced decrease in type II collagen levels. Inhibition of p38 kinase or PI-3K/Akt with SB203580 (SB), and LY294002 (LY), enhanced the suppression of type II collagen but the blockage of ERK-1/2 by PD98059 rescued IS526-induced dedifferentiation. These results suggest that IS526 regulates type II collagen and MMP-13 expression via the ERK1/2 and PI-3K/Akt pathways in rabbit articular chondrocytes.

P567
BONE TURNOVER AND SERUM LEVELS OF FETUIN-A IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Secondary osteoporosis is one of the most common complications of rheumatoid arthritis (RA). It was shown, that tissue cytokines play an important role in its progression and bone turnover rate [1]. Fetuin-A (FA) is a hepatokine, which regulates bone tissue calcification and turnover rate [2], as well as associates with inflammatory diseases, such as RA. We aimed to study the association between FA serum levels and bone remodeling markers in patients with RA.

Methods: We enrolled 110 patients with RA and 30 healthy controls in our study. We measured FA and BMD in both groups. 25-hydroxycholecalciferol (25-(OH)D), N-terminal propeptide of type 1 procollagen (P1NP), C-terminal telopeptides of type I collagen (CTX-1), serum calcium and alkaline phosphatase levels were measured among patients with RA.

Results: We observed relevant difference in serum FA levels between patients with RA and healthy controls (765.67±120.66 ug/ml vs. 812.95±76.21 ug/ml; p=0.047). FA mean concentration was lower in patients with secondary osteoporosis (n=52) 733.65±135.84 ug/ml, than that with normal BMD or osteopenia (n=58) 794.37±97.7 ug/ml (p=0.0044). Serum FA levels in patients with osteoporotic fractures in anamnesis (n=24) were lower than that of the patients without them (n=86) (694.78±110.47 ug/ml vs. 785.45±116.43 ug/ml; p=0.00091). Positive correlation was observed between serum FA and 25-(OH)D levels (r=0.259; p=0.006). Negative correlation was observed between serum FA and CTX-1 levels (r=-0.203; p=0.033). There was no association between serum FA and P1NP, calcium and alkaline phosphatase levels.

Conclusion: FA low levels associate with higher rates of osteoporosis and osteoporotic fractures. Serum FA levels correlate positive with 25-(OH)D and negative with CTX-1 in patients with RA.

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P568
EXTREMELY LOW FREQUENCY MAGNETIC FIELDS ACCELERATE BONE HEALING PROCESS AND HELP FIGHT OSTEOPOROSIS

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Objective: Evaluation of the efficacy of extremely low frequency (ELF) magnetic fields for the improvement of bone remodeling through a clinical case. Currently a new arrow has been added for the treatment of osteoporosis, an electromedical device that generates information and transmits it to cellular receptors in order to activate and accelerate the endogenous processes of cell healing, repair and regeneration, produced by Limfa Technologies srl. Limfa therapy® uses multifrequency complex magnetic fields at very low frequency (1-80 Hz), with field strength from 1-100 µT, comparable to the endogenous electromagnetic forces generated by cellular activity. Unlike traditional magnetotherapy, which uses one or two pulsating signals with the same wave geometry, Limfa therapy uses up to 30 different wave geometries at different frequencies in combined sequences, able to transfer specific reparative information to the tissues that continue even after the end of the application cycle.

Methods: A patient suffering from a tarsal-metatarsal fracture following a scooter accident, came to the attention of Rehabilitation institute Centro Giusti of Florence, in order to begin a cautious and gradual recovery of mobility and load, however complaining of pain and swelling of the foot due to a delay in consolidation. Before starting the rehabilitation, she was asked to undergo a cycle of 6 sessions (2 times a week) of ELF magnetic fields treatments, setting anti-inflammatory, pain relieving and bone regeneration programs.

Results: After the first 2 sessions, she started to report a rapid and lasting benefit, with a reduction of pain both at rest and during mobilization. Over the following 4 sessions, the rehabilitation process could be undertaken, and the patient was able to support the load without pain within only 3 weeks of Limfa therapy. The radiological control of the foot performed one month after the removal of the plaster, i.e., 1 week after the end of the path with ELF, showed the complete consolidation of the fracture.

Conclusion: The clinical case, in addition to the data from clinical studies reporting an efficacy of ELF magnetic fields in the treatment of osteoporosis [1], suggests that Limfa therapy helps modulate bone remodeling in the direction of bone formation, and can be very useful as a nonpharmacological adjuvant in osteoporosis therapy and fracture healing.

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P569
LOW BONE MINERAL DENSITY IN THE EASTERN MEDITERRANEAN COUNTRIES: RESULTS FROM THE GBD STUDY 2017

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Objective: The burden of fractures is increasing in direct correlation with life expectancy and the population aging will affect developing countries more than developed ones (1). This study aims to focus on the burden of Low BMD in the Eastern Mediterranean Region (EMR) countries in comparison with the global state.

Methods: We reviewed the age-sex-region-specific point prevalence of low BMD as summary exposure values (SEV), by the regions of the WHO (2). We compared the EMR with the global state, according to the statistics of the Global Burden of Diseases (GBD) 2017 report (3).

Results: Compared with the global average, the age-standardized prevalence of low BMD in women was lower in the EMR since 1990. The same patterns were detected in women aged 50-69 and ≥70 y. The highest SEV of low BMD was detected in the African, and Western Pacific regions, respectively. In contrast, the state of low BMD in men in the EMR was worse than the figures of the global state. Although since 1990 compared to the globe, the higher age-standardized prevalence of low BMD was identified in the EMR, this pattern was more highlighted among men aged ≥70 y. Compared with other WHO regions, the EMR ranked second for SEV of low BMD. In all, the European region showed the lowest SEV of low BMD in both sexes (Figure 1).

Conclusion: The results of this study reflect that the current state of low BMD in men is critical in the EMR, which requires urgent attention and appropriate actions. Since the burden of osteoporosis will increase in the Middle Eastern countries due to the steady growth of the aging population (1), appropriate actions are needed, especially for men aged over 70 y.
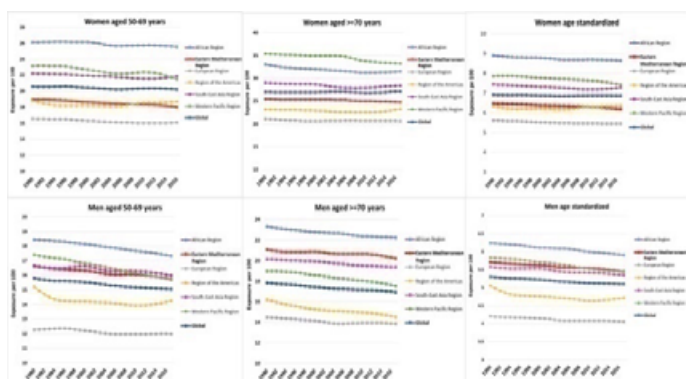
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P570
CORRELATION AMONG AGE AND HIP FRACTURE PATTERN IN ELDERLY MALES: A 5-YEAR RETROSPECTIVE ANALYSIS

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Objective: Hip fractures have been associated with osteoporosis and advance age, while they have been mainly evaluated in Caucasian females. There is a lack of studies, on elderly males' characteristics such as age and fracture pattern, especially from the southeastern Europe and Mediterranean region. The present study examined the distribution of intracapsular and extracapsular hip fractures treated surgically among males over 65 y of age.

Methods: A 5-y retrospective observational study, between the years 2018 and 2014 was conducted. Type of hip fracture among 322 male patients aged over 65, surgically treated at the Venizeleion General Hospital of Heraklion, Crete, Greece, was recorded. Patients were divided into two age groups: "younger" elderly (65-74 years old), and "older" elderly (over 75 years old). The fractures were also divided into two types: intracapsular and extracapsular. The latter were further divided into two subtypes: intertrochanteric and subtrochanteric. The correlation of type and subtype of fractures with age was evaluated.

Results: "Older" elderly were 272 or 84.5% patients. The proportion of extracapsular and intracapsular fractures were 59% and 40% respectively. A total of 128 (40%) patients suffered from an intracapsular fracture, while extracapsular-intertrochanteric fractures were observed in 178 (55%) and extracapsular-subtrochanteric in 16 (5%) males. There was a slight, nonsignificant, lower incidence of extracapsular-intertrochanteric fractures in the "older" elderly (53.8% compared to 56% in "younger" elderly; p=0.481). Furthermore, a slightly lower, nonsignificant, incidence in extracapsular-subtrochanteric fractures was found in the "older" (4.9%) compared to the "younger" male group (5.7%) (p=0.517).

Conclusion: Hip fracture type was found to differ in age groups in the present study population. The larger proportion of extracapsular (intertrochanteric and subtrochanteric) fractures in younger men may reflect a higher frequency of high energy injuries due to more intense physical activity. These findings reflect differences in nature and rate of bone loss, and frequency of falling events between age groups and indicates that the two main hip fracture types are distinct clinical entities. Complete understanding of the etiology and prevention of these fractures may require separate study of the fracture subtypes.

P571
HSV1-INFECTION AS CONTRIBUTING FACTOR FOR DISC DEGENERATION: A CLINICAL AND LABORATORY STUDY

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Objective: To investigate the plausible implication of herpesviruses in intervertebral disc degeneration.

Methods: Two research studies were undertaken. 1) At the first study, specimens from 16 consecutive patients with lumbar disc herniation were surgically obtained during discectomy. A PCR reverse hybridization assay was applied to screen for the DNA of 8 different herpesviruses in these patients. 2) At the second study human nucleus pulsposus cells (HNPC) were infected with the wildtype HSV1 laboratory strain syn 17+. The expression levels of extracellular matrix (ECM) proteins were evaluated by real-time PCR both during lytic infection as well as in the context of a nonproductive infection.

Results: 1) DNA of at least one herpesvirus was found in 13 specimens (81.25%). HSV-1 was the most frequently detected virus (9/16, 56.25%), followed by CMV (6/16, 37.5%). In two patients, co-infection by both HSV-1 and CMV was detected. No herpesvirus mRNA expression was detected in the HSV-1-positive and CMV-positive samples, verifying the absence of a productive infection. 2) HNPC are permissive to HSV-1 enabling virus to accomplish lytic infection. HSV-1 infection of HNPC yields a complex effect on host cell function resulting in a remarkable reduction of ECM proteoglycans. ECM molecules are similarly affected in HSV-1 nonproductively infected human nucleus pulposus cells.

Conclusion: Our results document the presence of herpesvirus DNA in intervertebral disc specimens of patients with lumbar disc herniation. HSV-1 infection of human NP cells induces changes in proteoglycan and collage II concentration which may affect cell-matrix interactions and lead to a dysfunctional intervertebral disc which triggers or promote the degeneration process.

P572
EVALUATION AND MANAGEMENT OF PAIN AFTER VERTEBRAL OSTEOPOROTIC FRACTURE: CASE REPORT

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Objective: Osteoporotic vertebral fracture causes pain, which is usually reduced after orthopedic intervention, whether it is surgical or conservative one. But, there are cases where pain remains, becomes chronic, and strongly influences patient's quality of life and activities of daily living. Evaluation of that chronic spinal pain is very important for decision making in its management. Duloxetine is a potent and selective inhibitor of 5-HT and NE reuptake which demonstrates very good analgesic effect in depressed patients with neuropathic pain. We aimed to demonstrate very good analgesic effect of duloxetine in patient with osteoporotic fracture.

Case report: Female patient, age 66 y was admitted to inpatient rehabilitation at the clinic for physiatry and rehabilitation - Clinical Center University of Sarajevo, in November 2019 under the following diagnosis: Spastic paraparesis. Compressive fracture of vertebrae Th6 et Th7. Hernia disci iv Th6/Th7. Osteoporosis. At the reception, clinical picture is dominated by severe pain in the thoracic spine, with the propagation in the left shoulder blade. The intensity of pain is assessed by the VAS 10/10, although she is treated with a weak opioid and NSARD. She was depressed. Pain was defined as neuropathic using Freynhagen's pain questionnaire detect, with a score of 24/38. Beside physical analgesic modalities, duloxetine tablet of 30 mg/d was introduced into analgesic therapy. This analgesic combination showed a very good therapeutic response. Patient was dismissed without pain.

Conclusion: The management of chronic pain in patients with osteoporosis and osteoporotic fracture could be very complicated. Type of pain should be distinguished as well as the mental state of the patient, in order to find best analgesic pharmacotherapy. This case report shows excellent analgesic effect of duloxetine on neuropathic pain in female patient with osteoporotic fracture and depression.

P573

WORK STRESS IS ASSOCIATED WITH HIP BMD IN WOMEN IN A RELATIONSHIP MEDIATED BY ADIPOSITY

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Objective: Individuals with high levels of self-perceived stress have been reported to have an increased risk of any osteoporotic fracture, in particular at the hip, even after adjusting for confounders. Here we consider the relationships between job stress and BMD in participants from the Hertfordshire Cohort Study (HCS).

Methods: Study participants completed a social health questionnaire which detailed lifestyle factors and employment related job demand-control (DC), and effort-reward imbalance (ERI). Femoral neck and lumbar spine BMD was measured by DXA using a Hologic QDR 4500 instrument. We compared the characteristics of men and women reporting either or both work stresses and explored the association of these with femoral neck and lumbar spine BMD.

Results: Data were available for 390 men (mean age 64.1 y) and 357 women (mean age 65.6 y), reporting on their most recent or current job. A total of 241 (61.8%) men and 211 (59.1%) women reported neither work stress whilst 52 (13.3%) men and 44 (12.3%) women reported both. Mean (SD) BMD at the femoral neck was higher in men than women (0.85 (0.12) and 0.75 (0.12) respectively). Women reporting both work stresses had significantly higher femoral neck BMD compared with those reporting neither (average difference in g/cm^2 (95%CI) 0.04 (0.0002, 0.09)). This association was attenuated after adjustment for BMI. Lumbar spine BMD was not associated with either or both work stress in either sex, before or after adjustment for confounders (age, age when ended education, marital status, smoking, alcohol and BMI).

Conclusion: Women reporting higher levels of work stress had higher femoral neck BMD, though adjustment for BMI attenuated this association, suggesting associations were mediated through increased adiposity in this group. Work stress is known to be associated with cardiovascular mortality and morbidity and it appears that metabolic changes triggered by work stress may also increase adiposity and increase femoral neck BMD.

P574

STUDY OF THE RISK OF VERTEBRAL FRACTURES AFTER THE WITHDRAWAL OF DENOSUMAB TREATMENT

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Objective: Discontinuation of treatment with denosumab (Dmab) has been associated with bone mass loss and a risk of vertebral fractures (VF) due to a reactivation of bone metabolism. We aimed to determine the incidence of VF and bone loss in patients who have withdrawn treatment with Dmab and objectify possible associated risk factors.

Methods: Retrospective study of patients treated with Dmab and monitored the last two years. We selected patients who withdrew treatment with Dmab and registered demographic characteristics, risk factors for osteoporosis and densitometries prior to treatment and during the period of suspension. We identified patients who presented fractures during treatment withdrawal period, assessing: number of fractures, time from withdrawal to fracture presence, location and if they had received osteoactive treatment in that period.

Results: Of 415 patients treated with Dmab, 83 discontinued treatment. The average age was 63.91 y, 95.2% of them women. The average duration of treatment prior to withdrawal was 2.73 years. 43.4% of the patients had previous fractures, 47.2% vertebral. The data of the previous BMD and during the follow-up are shown in Table 1. 60 patients presented risk factors for osteoporosis, the most frequent being low calcium intake (36.6%). The most frequent reason for withdrawal of Dmab was for therapeutic vacations (56.6%). 39 patients performed post-withdrawal osteoactive treatment, mostly zoledronate (51.3%). During the two years after the rest, 9 patients had fractures (10.9%), seven of vertebral location (77.7%) and ≥2 VF were observed in five of them. The average time from treatment withdrawal to fracture presentation was 15 months. None of fractured patients had received treatment after Dmab withdrawal. Although the mean BMD analyzed by DXA at the end of the treatment and that the loss of BMD during rest was higher in patients with fracture compared to those without fracture, the differences were not significant.

Conclusion: The VF incidence in patients who interrupted Dmab was 8.43%. Fractured patients had lower BMD gain despite treatment than non-fractured patients and also the BMD loss at rest was greater, without significant differences probably due to low number of patients. Neither the presence of previous fractures nor the duration of treatment could be related to the presence of VF at rest.

Table 1. BMD values and percentage of BMD change at the start of treatment with denosumab and during 2 years of withdrawal.

	Previous Stop Dmab (n=83)		Stop Dmab (n=54)		Break Dmab1 (n=28)		Break Dmab2 (n=20)	
DMO (mean)	(g/cm2)	T-score	(g/cm2)	T-score	(g/cm2)	T-score	(g/cm2)	T-score
. Lumbar spine	0,861 ± 0,1	-2,61	0,949 ± 0,1	-1,94	0,965 ± 0,2	-1,93	0,920 ± 0,2	-2,22
. Femoral neck	0,735 ± 1	-1,96	0,774 ± 0,1	-1,71	0,758 ± 0,1	-1,84	0,740 ± 0,1	-2,02
. Total femur	0,784 ± 0,1	-1,81	0,823 ± 0,1	-1,48	0,805 ± 0,1	-1,63	0,801 ± 0,1	-1,68
% change DMO								
. Lumbar spine			12,2 ± 10,3		-5 ± 7,9		-5,44 ± 7,9	
. Femoral neck			6 ± 8,5		-4,2 ± 3,9		-5,35 ± 5,8	
. Total femur			3,9 ± 4,2		-5,2 ± 4,9		-0,33 ± 19,6	

P575
DEEP LEARNING SPINE SEGMENTATION TO GET ACCURATE BMD AND TBS VALUES: THE OSTEOLAUS STUDY

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Objective: Optimal spine segmentation (SpS) is the basis for both BMD and TBS computations to be clinically accurate in relation to diagnosis and individual's follow-up. Unfortunately, SpS can be a challenging task. Therefore, SpS in clinical routine often necessitates time-consuming and difficult bone mask manual editing. The purpose of this study is to implement and optimize a deep learning (AI) method for an automatic and accurate SpS in AP spine DXA scans. We aimed at comparing BMD and TBS obtained after expert segmentation, deep learning segmentation or default automatic segmentation provided by the DXA manufacturer.

Methods: OsteoLaus is a population-based cohort of Caucasian women (50 to 80 y old) living in Lausanne, Switzerland. We used a subset of 1162 scans acquired on iDXA scanner (GEHC Lunar, Madison, WI, USA) with validated reference bone masks done by bone imaging experts. All scans were anonymized and blind from clinical details. 50% of scans were used for training, 25% for validation, 25% for test. We have adapted a U-net architecture to use both low-energy and high-energy images as inputs. Parameters included ReLU activation function, ADAM optimizer for gradient descent and minimization of Dice Coefficient (DC) as loss function. Accuracy of the segmentation was evaluated through the DC and other metrics. BMD and TBS obtained after deep learning or manufacturer segmentations were compared to the expert segmentation with the following methods: correlation coefficients, root mean square deviation (RMSD), classification of osteoporosis using BMD T-score.

Results: Deep learning segmentation yielded to accurate bone masks as shown by mean DC >0.97 in the training and test datasets. There was a very good agreement for BMD or TBS values between AI and expert segmentation by comparison to the manufacturer segmentation. Indeed, by comparison to expert segmentation AI segmentation led to better correlations, lower RMSD and higher accuracy to classify patients based on BMD T-score (Table 1).

Conclusion: We propose here a deep learning-based segmentation that performs significantly better than the segmentation proposed by the DXA manufacturer. This segmentation enables a quick (3 s), reproducible and accurate bone mask to get clinically meaningful bone scores (BMD, TBS).

Table 1

	Deep learning segmentation	Manufacturer segmentation
Correlation coefficient BMD - BMDexpert	0.991	0.987
RMSD BMD − BMDexpert (%)	0.029 (2.68%)	0.042 (3.84%)
Accuracy of osteoporosis classification based on BMD T-score	98.5%	95.7%
Correlation coefficient TBS - TBSexpert	0.996	0.946
RMSD TBS − TBSexpert (%)	0.009 (0.67%)	0.033 (2.55%)

P576
HOW DOES RADIOGRAPHIC KNEE OSTEOARTHRITIS IMPACT MUSCULOSKELETAL AGING IN MIDLIFE? FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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Objective: Osteoarthritis (OA) is the most common joint condition, and can be defined clinically or radiologically. The aim of this study was to investigate whether a diagnosis of radiological knee OA impacted involution in muscle or bone in the midlife in a group of community-dwelling older adults in the UK.

Methods: Our study comprised 220 members of the Hertfordshire Cohort Study (118 males and 102 females), a group of community dwelling older adults in the UK. Knee radiographs were performed at baseline, with osteoarthritis defined as a Kellgren-Lawrence score ≥2. At baseline and follow-up included questionnaires to assess physical activity and lifestyle factors, JAMAR dynamometry, 8-foot walk test and DXA, both of whole body and hips. Linear regression was performed to analyse associations before and after adjustment for follow-up time, lifestyle factors and anthropometry and the development of hand osteoarthritis was adjusted for grip strength outcomes.

Results: The mean age of participants at baseline was 65.0 years. Median follow-up was 16.7 y (range 15.0-18.4 y). Knee osteoarthritis was present in 75 (34%) participants.

Radiographic knee osteoarthritis status at baseline was significantly associated with grip strength (β=-3.2kg, -5.3 to -1.1, p<0.01) at follow-up in females but not in males (β=-2.9, -5.8 to 0.1, p=0.06). No significant associations between radiographic osteoarthritis status at baseline and other measures of sarcopenia (gait speed or lean mass) or BMD were found in either sex.

Conclusion: Our findings demonstrate that the presence of knee osteoarthritis in midlife can have a substantial bearing on grip strength in women over 15 y later, independent of the presence of hand osteoarthritis. Grip strength has been shown to correlate closely with lower limb strength and so the demonstrated association between grip strength and knee osteoarthritis is representative of a global weakness resulting from the disease. Thus, in order to countermand this association, it may be that concerted interventions (including physical therapy, strengthening and surgical intervention) should be recommended for those with knee osteoarthritis at this stage in the lifecourse. Of course, these findings require replication in other cohorts.

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P577
DISMOBILITY SYNDROME AND ITS ASSOCIATION WITH FALLS AND OSTEOPOROTIC FRACTURES

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Objective: Dismobility syndrome (DS) was recently described. Its identification can be used to prevent adverse health outcomes in adults at risk. It is characterized by three or more of the following criteria: osteoporosis, falls in the preceding year, low muscular mass, slow gait speed, low grip strength, and obesity or high fat mass. We aimed to assess the prevalence of DS in a population of women 60 years or older and, to determine if there is a relationship with osteoporotic fractures and falls

Methods: Cross-sectional study. A total of 250 women were recruited consecutively. Body composition and BMD was controlled by DXA. Falls and comorbidities were assessed with a questionnaire. Muscle strength was measured with hand dynamometry (JAMAR). Measures of physical performance (sit-stand and walking speed) were recorded. The diagnosis of DS was based on the criteria proposed by Binkley et al. Exclusion criteria: Women with diabetes, neurologic or oncologic conditions. Statistics: The samples with normal distribution were evaluated by Student's t and Wilcoxon tests for independent samples. Qualitative variables were analyzed using chi-square. Statistical significance is considered with a p<0.05.

Results: The average age of the population was 70.4±7.7 y. 29% (n 77) met the DS criteria; 57% met 3 criteria and 34% met 4. Women with DS were older (70 vs. 69 y), had lower BMD at the femoral neck (0.728 vs. 0.766 g/cm^2) and total hip (0.769 vs. 0.801 g/cm^2), lower muscle mass in arms and legs (IMME 5.6 vs. 5.9 kg/m^2).The strength was 19 vs. 24 kg and the physical performance tests (sit-stand and gait speed) were lower. All these differences were statistically significant. There was no difference in serum values of 25-hydroxyvitamin D (32 vs. 30 ng/ml). Women with DS had a higher prevalence of osteoporotic fractures (42% vs. 11%) and falls in the last year (60% vs. 19%); p<0.0001.

Conclusion: women with DS reported a higher frequency of falls in the last year and a higher prevalence of osteoporotic fractures. The evaluation of these criteria is a useful tool to prevent adverse health events.

P578
BURDEN OF HIP FRACTURE IN PATIENTS AGED 50 YEARS AND OLDER: DISABILITY-ADJUSTED LIFE-YEARS AND COST-EFFECTIVENESS ANALYSIS IN BELARUS

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Objective: To evaluate the number of years lost due to low-energy hip fractures (HF) in patients aged 50 years and older in Belarus and to calculate the cost-effectiveness of using zoledronic acid (ZA) for the prevention of subsequent HF.

Methods: A comprehensive assessment of health loss was carried out using the DALY analysis based on our own epidemiological for incidence of HF by 5 years age interval. Lost years of a healthy life are calculated taking into account the expert assessment of Belarusian experts and the duration after the HF and its severity, as well as the number of HF. The cost of direct economic costs for the prevention of subsequent HF included the cost of the course treatment of ZA for 2 years (generic version production of Belarus).

Results: In total, in Belarus within one year, 2873 fractures in men and 8369 fractures in women will occur according to their own epidemiological data on the HF incidence. This will lead to 16,035. Two years of life lost (8241.7 for men and 7793.0 for women), calculated on the basis of mortality rates due to HF, official survival life tables and national experts estimates. The infusion of ZA to patients with primary HF for 2 years to will prevent 151 HF in men and 440 HF in women in the future. This will prevent subsequent HF and save 1932.1 years of life (695.4 in men and 1236.7 in women) according to DALY analysis. We calculated that the direct cost of treating 1 case of HF in Belarus is $1174. The total direct costs of procuring ZA for the treatment of all patients with HF 50+ yo will be about $ 2.1 million. Thus, the cost of 1 year of life saved, taking into account the averted expenses due to subsequent HF, will be $521 US for men and $ 853 for women, which is significantly less than 3 GDP per capita in Belarus.

Conclusion: Secondary prevention of subsequent HF by infusion of generic ZA is cost-effective and can be implemented in the Belarus health care system.

P579
BONE DENSITOMETRY WORLDWIDE: A GLOBAL SURVEY BY THE ISCD AND IOF

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Objective: Whilst the use of DXA has been widely adopted worldwide for the assessment of BMD, the quality of DXA facilities is unknown. This report outlines the findings of a survey of Fracture Liaison Services (FLS) conducted by the International Society for Clinical Densitometry (ISCD) and the International Osteoporosis Foundation (IOF) assessing the quality of their DXA facilities.

Methods: A questionnaire for the accessibility and quality of DXA services was co-created by representatives of the ISCD (International Society of Clinical Densitometry) and the IOF and

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made available to institutions who participated in Capture the Fracture (CTF) Best Practice Framework (BPF). From a list of 331 contacted invitees, 124 FLS centres responded; analyses were based on 121 centres with suitable data.

Results: Over 70% of institutions reported that, for over 90% of the time, DXA access met service needs and the scanning/reporting quality was perceived as excellent. However, 25% of DXA facilities reported not being accredited by a professional/governmental organisation and adherence to some basic DXA quality assurance and reporting procedures was confirmed by <50% of services. Importantly, in excess of 50% of institutions stated that they desired ongoing education in osteoporosis and DXA for operators and interpreters.

Conclusion: There is significant variability in the access to and quality of DXA services for established FLS worldwide. Despite two decades of training initiatives in osteoporosis densitometry, many centres are falling short of the standards of the IOF-ISCD *Osteoporosis Essentials* criteria.

P580
CHANGE IN PATIENT-REPORTED OUTCOMES OF XLH REGISTRY PARTICIPANTS IN THE UK: A LONGITUDINAL STUDY

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Objective: To characterise the change over time in pain, sleep, fatigue, anxiety, depression and health-related quality of life (HRQoL) for adults with X-linked hypophosphataemia (XLH).

Methods: Data were collected from participants diagnosed with XLH and registered in RUDY, a cohort of individuals with rare diseases in the UK. Seven instruments were analysed: EQ5D-5L and SF36 physical component score (PCS) and mental component score (MCS) as measures of HRQoL, PSQI of sleep quality, PainDETECT and SF-MPQ-2 of pain severity, FACIT-F of fatigue, and HADS measuring depression and anxiety. Participants were invited to submit questionnaires every six months and we used data reported between July 2014 and August 2019 for the analysis. Change in mean scores over four time-points (up to two years) was estimated using mixed-effects linear regression models controlling for gender, age (at registry in RUDY) and time of follow-up.

Results: The sample included 48 RUDY participants with XLH, mostly female (77%) and with a median age of 46 y (range 19-85). SF-MPQ-2 and PSQI showed a slight improvement in mean scores whilst all other instruments reported fluctuating means. Mixed effects models revealed statistically significant (p<0.05) time coefficients only for FACIT-F (b=-2.135, p=0.038) and HADS-Anxiety (b=0.314, p=0.031), both reporting slightly worsening scores over time. Within FACIT-F, the functional well-being subscale was found to be the clear driver of change (b=-0.754, p=0.003).

Conclusion: People with XLH report signals of deterioration in fatigue and anxiety over two years which could impact them significantly if sustained over longer periods of time. We did not find evidence of change in all other instruments, but individual-level trends suggest more research is needed to identify subgroups more likely to worsen as well as which patient characteristics may predict deterioration.

P581
AN INTERACTIVE BENEFITS AND BUDGET IMPACT CALCULATOR TO ESTIMATE POTENTIAL EFFECTS OF FRACTURE LIAISON SERVICES

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Objective: To develop an interactive tool that models the expected clinical and healthcare resource use impact from fracture liaison services (FLS).

Methods: Model type, time horizon, patient description and schema were retrieved from a literature review of published economic models. A patient pathway was developed based on the review and multinational expert clinician and health economist input. An economic model was designed to estimate the clinical and healthcare resource impacts of implementing an FLS.

Results: After removing duplicates and screening titles and abstracts, the full text of 33 studies were reviewed and 20 included for analysis from 1173 publications. Most studies used cohort-based, Markov models with a lifetime horizon. Hip and vertebrae were the commonest fractures sites. Patient pathways varied across models and included screening, patient classification, treatment, and discharge locations. Following expert input, a single patient pathway was built where patients would attend the Emergency Room following an index fracture and then be discharged, referred to ambulatory care or admitted for treatment. Discharge destinations include their own home, that of a relative, or career-supported setting. An interactive model was developed to estimate the benefits and budget impact of FLSs. A patient-level simulation was used, considering how previous events affect re-fracture rates. Patients transit through health states for hip, spine and other fractures, fracture-free and death, over two and five years. The model generates estimates for the effects of scenarios with and without an FLS, on identifying fractured patients, running investigations, recommending treatment and monitoring. Clinical outcomes include fractures and mortality; resource outcomes include hospital admissions,

bed days, operations, theatre time, community rehabilitation, and costs of the FLS. The model is currently undergoing input parameter population and calibration for Spain and Japan and is expected to be operational for two dozen countries by 2022.

Conclusion: A novel interactive model to estimate the benefits and budget impact of FLSs has been developed. This will be a critical tool to inform decision making at the national and local levels to reduce secondary fractures, frailty and mortality in older patients.

P582
FGF-23 AS AN EARLY MARKER OF BONE AND MINERAL DISTURBANCES IN CHRONIC KIDNEY DISEASE PATIENTS

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Objective: To reveal disturbances of mineral metabolism, parathyroid glands function, vitamin D, FGF-23 concentrations in patients with various stages of CKD, establish correlation between FGF-23, PTH and BMD according to GFR and CKD stage and to reveal the predictive role of FGF23i n development of CKD - MBD.

Methods: We analyzed data on 78 adults (33 men and 45 women) with GFR less than 90 ml/min (CKD 2-5 stages) mean 48.6±14.5 years not yet on Hemodialysis. Control group 1 included 9 healthy adults, mean age 41.9±13.6 y. Control group 2 consisted of 10 patients with CKD stage 1, mean age 43.4±14.0 y. The laboratory investigations included evaluation of serum total and ionized calcium, phosphate, $25(OH)D_3$, FGF23concentrations. BMD was measured at lumbar spine and femoral neck using DXA.

Results: The concentrations of Ca, P and PTH were significantly higher in CKD 5 stage patients compared to CKD stages 2-4 ones (p<0.01). There was no difference in level of $25(OH)D_3$ between CKD 2-4 and CKD 5 patients (18.71±1.72 vs. 19.55±2.18 ng/ml, p>0.05). PTH concentration increased significantly in CKD stage 3 compared to CKD stage 2 and 1 (88.42±15.54 vs. 44.98±12.30 and 46.29±7.54 accordingly, p<0.05). FGF-23 level increased significantly beginning stage 2 (0.715±pmol/l) and increased progressively with CKD stage 3 (1.787± pmol/l), stage 4 (5.161± pmol/l) and stage 5 (18.334± pmol/l) Significant difference was established both with healthy adults (0.441± pmol/l) as well as with CKD1 patients (0.345± pmol/l), p0.05 for each case. FGF-23 correlated negatively with eGFR (r=- 0.71, p0.001) and PTH level in patients with CKD stages 2-5. (r=0.49, p0.001). BMD was decreased in 55.1% CKD II-IV stages patients Negative association between GFR and BMD (r=-0.452, p<0.05), as well as between spine BMD and FGF23 (r=-0.33, p<0.05) was established.

Conclusion: C-terminal FGF-23 is elevated already in CKD stage 2 before PTH rise. Significant correlation between c FGF-23, PTH and BMD in CKD patients confirms that FGF-23 can be used as early marker CKD – MBD.

P583
STRENGTH OF THE HUMERUS IN RATS OF VARIOUS AGE WITH STREPTOZOTOCIN-INDUCED DIABETES

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Objective: To investigate strength of the humerus in rats of various age with streptozotocin-induced diabetes.

Methods: The experiment involved 420 rats of various age: immature (with initial mass 45-50 g), mature (135-145 g), and senile (290-310 g). Each age group was separated into the following groups: group 1 - controls, group 2 - animals with streptozotocin-induced diabetes (in dosage 55 mg/kg single intraperitoneal) (Sigma Aldrich, USA). Upon expiration of observation terms (7, 15, 30, 60, and 90 d) animals were euthanized and humeri were excised and put to strength testing at bending (V.G. Koveshnikov, V.I. Luzin, 2003). The data obtained was analyzed by means of variation statistics using standard software.

Results: Streptozotocin-induced diabetes results in decrease of strength of the humeri. The alterations began manifesting from the 7th-15th day of observation and continued growing throughout the experiment. In young rats modulus of elasticity from the 7th to the 90th days of observation were lower than those of controls by 5.16%, 6.72%, 6.79%, 6.54% and 6.44% and minimum fracture energy from the 15th to the 90th days of observation were lower than those of controls by 8.52%, 9.03%, 8,17 and 9.24% respectively (p<0.05 in all cases). In mature animals the same values changed similarly by 4.04%, 4.74%, 5.24%, 4.48% and 4.20% and by 9.99%, 10.22%, 9.91% and 10.42% respectively. In senile rats modulus of elasticity and minimum fracture energy from the 7th to the 90th days of observation were lower than those of controls by 4.99%, 5.09%, 6.74%, 7.11% and 4.23%, 5.65%, 6.28%, 7.23% and 7.51% respectively.

Conclusion: Streptozotocin-induced diabetes results in age-dependent decreasing of strength of the humeri. Young and adult animals exhibit bone strength retardation in the period from the 7th-15th up to the 90th day of the experiment, yet alterations tend to stabilization. In old animals, bone growth strength is observed beginning from the 7th day of the experiment, yet alteration continue developing.

P584
PHYSICAL THERAPY AS A CONSERVATIVE TREATMENT OF PAIN RELATED TO OSTEOARTHRITIS

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Objective: Osteoarthritis is the most common joint disease affecting people. It most commonly presents in apophyseal joints of the cervical and lumbar spine, interphalangeal joints of the hands, acetabulofemoral and knee joints. Typical symptoms include pain, temporary stiffness, cracking joints, inflammation and limited mobility. Treatment is conservative and in some

cases surgical. We aimed to introduce the capability of physical factors in treating pain and other common symptoms and to evaluate their place among the complex conservative treatment of osteoarthritis.

Methods: Analysis of scientific literature from the past 16 years.

Results: The application of performed physical factors and kinesitherapy has a positive impact on symptoms: pain, stiffness and limited mobility in patients with osteoarthritis. They result in alleviation of the muscle disbalance, improve blood circulation and tissue nourishment, remove connective tissue expansions and improve the degree of mobility.

Conclusion: These factors are harmless, easy to apply and if performed biannually slow the disease progression. That allows us to recommend their application as a part of the treatment protocol for osteoarthritis.

P585

EVALUATION IN MUSCLE STRENGTH IN PATIENTS WITH NONRADIOGRAPHIC AXIAL SPONDYLARTHRITIS AND ANKYLOSING SPONDYLITIS

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Objective: Inflammatory rheumatic diseases are known as independent risk factors for secondary sarcopenia and a reason for reduction of the muscle strength. Nonradiographic spondylarthritis (nr-ax SpA) is considered to be a pre-phase of ankylosing spondylitis (AS). Many studies show no significant difference between the two phases in terms of burden of disease activity. Patients with radiographic structural changes show greater functional disability evaluated by BASMI. We aimed to investigate the level of muscular strength in patients with nonradiographic SpA and to compare it with patients with established AS.

Methods: We performed a cross-sectional analysis of 70 patients – 35 male patients with nr-ax SpA, aged 32 mean±5 SD (25-37) and 35 male patients with AS, aged 40 mean±10 SD (28-48). All patients have ASAS criteria for nr-ax SpA, respectively Modified New York 1984 criteria for AS. We evaluated the level of disease activity using level of C-reactive protein (CRP), BASDAI and ASDAS-CRP. Functional muscle strength test - sit-to-stand test and arm curl test were performed in all patients.

Results: We found that in the two groups of patients the level of disease activity was similar despite the radiological structural changes in the patient with nr-ax-SpA. In patients with long-standing disease and structural changes a general reduction in muscle strength using the both functional strength tests has been found to be significantly lower compared to patient with the pre-phase of the disease.

Conclusion: Axial spondylarthritis is serious disabling condition that is related to a significant disease activity. Despite the lack of structural changes, patients with nr-ax SpA demonstrate similar burden of the disease related disability but have preserved muscle strength. This conclusion arouses the concept that deterioration in muscle strength is due to the structural changes in the patients with AS and at same time to the duration of persistent inflammation.

P586

PRIMARY CARE CONSULTATIONS AFTER LONG-TERM FOLLOW-UP OF UNREVISED HIP AND KNEE REPLACEMENTS: FINDINGS FROM ROUTINELY-COLLECTED HEALTHCARE RECORDS IN THE UK

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Objective: To estimate annual costs of primary care consultations for unrevised knee (KR) and hip (HR) replacement patients with and without long-term follow-up.

Methods: We used data from the UK Clinical Practice Research Datalink (CPRD) GOLD dataset linked to Hospital Episodes Statistics (HES) between 1999-2016. Records for outpatient consultations in CPRD and HES outpatient were examined to generate follow-up (FU) groups. FU was defined as at least one visit to the outpatient orthopaedic department between 5- and 10-year post-primary replacement. FU exposure was defined based on presence/absence of a FU record, with index dates being date of first FU for the FU group and 6 years post-primary for non-FU. We excluded consultation records associated with nonclinical staff and included only clinically-relevant consultation types. Costs were estimated based on published average unit costs. Mean annual costs were reported by FU and age group.

Results: A total of 9856 patients with KR and 10,837 with HR were identified, 4349 and 4870 assigned to the respective FU groups. HES Outpatient records identified FU visits more accurately than CPRD. FU groups had more women (60% and 56% for FU and non-FU KR, 65% and 59% for HR) and were slightly younger (median age 69-72 for KR, 67 and 71 for HR). Mean primary care consultation costs varied between £197 (KR, Non-FU, <70 y of age, 4 y after index) and £452 (HR, FU, 70+ years of age, 1 year after index) per year (Figure 1). Mean costs were slightly higher for KR vs. HR and consistently higher for the FU group compared to those who did not have FU. FU costs were higher regardless of increasing costs with age and a downward trend over time.

Conclusion: Primary care consultation costs by unrevised joint replacement patients were slightly higher for those receiving long-term hospital outpatient follow-up compared to those who do not. This may be explained by patients being followed-up seeking analgesia or additional primary care support, or that they have more comorbidities. More research is needed to fully understand the implications of long-term FU on primary care resource use.

Figure 1

Primary care consultation costs per year, Knee replacement

Primary care consultation costs by year, Hip replacement

P587
MINERAL COMPOSITION OF THE SKELETAL BONES AFTER TIBIA FRACTURE MODELING AND INTRAVENOUS INJECTION OF MESENCHYMAL STEM CELLS AT 15TH DAY AFTER OPERATION

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Objective: To test chemical composition of the bones in rats after tibia fracture modeling and intravenous injection of mesenchymal stem cells (MSC) at 15th day after operation.

Methods: The experiment involved 98 adult rats with the body weight of 190-225 g distributed into the groups like the following: group A consisted of intact animals, group B comprised animals with 2 mm defect in both tibiae, and in group C animals with the same tibia injury received intravenous MSC in dosage of 5×10^6 at 15th day after fracture-modeling. Bone marrow cells previously sampled from the tibia were placed into Eagle's MEM with L-glutamine and 10% bovine embryonic serum and antibiotic and were cultured and phenotyped according to standard methods. The animals were withdrawn from the experiment by the 7th, the 15th, the 30th, the 60th and the 90th days. For testing purposes we selected humerus, hipbone, and Th12 vertebra. Testing of bone

mineral was performed by means of weighing. The data obtained was analyzed by means of variation statistics using standard software.

Results: Fracture modeling leads to instability of mineral composition in undamaged bones observed mostly in the period from the 7th to the 60th day of the experiment. Manifestations peak was observed by the 30th day. In the group C in comparison with the group B water content in the humerus and in the vertebra was lower by 3.34%, 5.01% and 5.81% and by 4.36%, 7.76% and 4.89% respectively (in the period from the 30th up to the 90th day) and in the hipbone by 6.35% and 6.22% by the 30th and the 60th days (p<0.05 in all cases). Share of organic substances in the hipbone was higher by 4.89% and 3.54% in the period from the 30th up to the 60th day. Further, in comparison with the group B in the hipbone and the vertebra minerals share increased by 3.25% and 4.81% (by the 60th day) and in humerus by 3.59% by the 90th day.

Conclusion: Administration of MSC on the 15th day after fracture-modeling results in rapid restoration of mineral composition in undamaged bones from the 30th day up to the 90th day after fracture-modeling.

P588
IMPACT OF PAIN IN PATIENTS WITH OSTEOARTHRITIS ON THE QUALITY OF LIFE

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Objective: Osteoarthritis is a chronic degenerative joint disease. It affects the joints and more specifically the articular cartilage with subsequent bone proliferation, osteophyte formation and subchondral bone sclerosis. It is a common disease with a great social impact. One of its main symptoms is pain which affects all aspects of patients' life. We aimed to investigate the impact of osteoarthritis and its main symptom pain on the everyday life of the patients.

Methods: This survey was conducted through the hip and knee questionnaire for a period of 6 months in Rheumatology Department of University Hospital St Marina - Varna, Bulgaria. Two groups - a patient and a control group were asked questions that aim to determine the degree of disease-related pain, the influence of medication on the pain and to what extent it intrudes different daily life aspects. We included 70 people in the study - 44 patients diagnosed with osteoarthritis and a control group of 26 people with no signs of the disease. The collected data was analyzed and comparison analysis between groups was performed.

Results: Mean age in the osteoarthritis group was found to be 51.7 y compared to 48.4 in the control group. When describing the type of pain – 73.12% of the patients reported it to be an acute pain. We found statistically significant difference in all investigated domains between the groups – total impact on daily activity (69.7% vs. 10.4%, p<0.05), low quality and duration of the sleep (62.3% vs. 9.4%, p<0.05), work productivity loss (78.4% vs. 15.4%, p<0.05), loss of independence and a need of care from family members (68.4% vs. 5.3%, p<0.05).

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Conclusion: Osteoarthritis is a condition that has a serious negative impact on patients' daily life. It limits all of its aspects – troubled sleep, impaired independence, social and personal life, work productivity. The main symptom of the disease – the pain, has a major impact on the quality of life.

P589
GUIDELINES FOR ACUTE HIP FRACTURE

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Objective: Society for Osteoporosis in Federation of Bosnia and Herzegovina (DOB) has recently published guideline for the early acute hip fracture interventions. Since the fragility fractures is epidemic problem in the world and more prevalent with advancing age, and because there is still some gap in the proper medical management, the need for the clear instructions is unavoidable. The cost and mortality of hip fracture is high. Despite already existing medical approach, the certain practical problems occurs in a multidisciplinary approach. The adequate and on time perioperative management is of extreme importance in order to provide the best management care in a decision making process. The goal of this guideline is to improve best practice in the management of acute hip fracture. The clinical use and social impact on the positive outcome is the objective of this guideline.

Methods: This guideline used evidence based medicine and recommendations for the whole clinical dilemmas regarding the appropriate interventions in acute hip fracture.

Results: The proper physical assessment and adequate intervention is crucial for the prevention of poor prognosis. This brochure provide clear input for resolving dilemmas in a certain medical decisions. Also, it provides clear and concrete step by step approach in the optimisation of the medical care for patients who suffered the fragility fracture. The guideline covers area from admission to the hospital and provide critical steps in order to avoid unnecessary delays and enable practitioners for anesthesia management, better pain control, hydration, cardiovascular evaluation, screening for urinary tract infection and thromboprophylaxis.

Conclusion: This guide will help orthopedic surgeon, anesthesiologist, internal medicine specialist and other health care professionals for the appropriate management of critically ill patient. This guideline is the first one in Bosnia and Herzegovina and it is expected to be used in the whole region.

P590
INTRA-ARTICULAR CORTICOSTEROID KNEE INJECTION INDUCES A REDUCTION IN MENISCAL THICKNESS WITH NO TREATMENT EFFECT ON CARTILAGE VOLUME: A CASE-CONTROL STUDY

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Objective: Intra-articular corticosteroid injections (IACI) are commonly used for the treatment of symptomatic knee osteoarthritis (OA). However, controversy still exists on their safety regarding the evolution of structural changes. The aim of this study was to explore the effects of IACI on the evolution of knee OA structural changes assessed by MRI.

Methods: Participants were selected from the Osteoarthritis Initiative database. In this nested case-control design study, participants who received one treatment with IACI and had MRI exams available at the yearly follow-up visits before, during, and after the IACI were defined as "cases". Each case was matched with one control for age, gender, BMI, height, joint space width (JSW), cartilage volume, bone marrow lesion (BML), meniscal extrusion, and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain. The study structural variables: MRI (cartilage volume, meniscal thickness, bone marrow lesion (BML), bone curvature), X-rays (JSW), and symptoms (WOMAC pain) were assessed at the yearly consecutive visits and changes measured within the follow-up periods.

Results: The participants (n=93) fulfilling the inclusion criteria were selected, those included participants who received one IACI were matched to controls (n=93), respectively. The control and treatment groups were balanced. Participants who received IACI experienced a significantly greater rate of loss of the medial meniscal thickness (p=0.006) and JSW (p=0.011) in the medial compartment in the year they received the IACI, compared to controls. The effect of IACI on the loss of meniscal thickness and JSW was reversible in the follow-up period. No significant effect of IACI was found on cartilage volume or WOMAC pain.

Conclusion: This study provides evidence that in knee OA, IACI were not associated with any deleterious effect on knee structures post-treatment, including cartilage volume. The increase in the rate loss of medial meniscal thickness was a transient phenomenon and its clinical relevance unknown at that time.

P591

SPORADIC INTRAMUSCULAR INJECTIONS OF GLUCOCORTICOIDS EFFICIENT TREATMENT FOR SYNOVITIS AND JOINT EFFUSION IN KNEE OSTEOARTHRITIS

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Objective: Osteoarthritis (OA) is one of the leading causes of pain and disability worldwide. The most prevalent OA localization is the knee joint. Although OA is considered a noninflammatory condition, synovial inflammation is common and could play an important role in the pathophysiology of OA. Moreover, secondary inflammation of knee is one of the most common causes of referral to doctor. The importance of synovitis in knee OA has been supported by several studies that showed an association of synovitis with cartilage deterioration and pain. Nonsteroidal anti-inflammatory drugs (NSAIDs) although effective are associated with gastrointestinal side effects. Although COX2 inhibitors have less GI toxicity, they may cause thromboembolic complications. Moreover, the risk of toxicity of NSAIDs and COX2-inhibitors increases due to necessity to use these preparations long-term to get the maximal effect. The aim of this study was to determine the efficacy of sporadic intramuscular injections of betamethasone in the treatment of synovitis and joint effusion in knee OA.

Methods: 90 patients (54 women, 36 men, mean age 54.08±6.57 y) with secondary synovitis and joint effusion in the framework of knee OA were enrolled in the study. Exclusion criteria included primary inflammatory arthritis, other chronic pain syndromes, diabetes mellitus, arterial hypertension, intra-articular injections in the previous 3 months. Patients using NSAIDs were required to undergo a 10-d washout period before enrollment. All patients received 2 intramuscular injections of betamethasone (7 mg-1 ml) with an interval of 4 d. Patients were assessed at baseline and in 1 week. The primary outcomes included the visual analogue scale (VAS, 0-100 mm) for pain, thickness of synovial layer, as well as the amount of intra-articular fluid (determined by joint ultrasound with power Doppler).

Results: The measurement of primary outcomes had shown the following results at baseline: mean VAS 73.36±12.41 mm; mean thickness of synovial layer 4.8±1.6 mm, mean thickness of intra-articular fluid 7.9±2.4 mm. All enrolled patients completed 7 d of treatment. Preparation was well tolerated, no serious adverse events (i.e., hyperglycemia, arterial hypertension, etc.) occurred. At the end of study period significant differences were found in VAS score for pain (25.83 mm [95%CI: 18.81-30.56]; p<0.01) and thickness of intra-articular fluid (4.3 mm [95%CI: 3.8-5.4];

p<0.05). There was a nonsignificant difference in thickness of synovial layer between treatment groups (2.1mm [95%CI: 0.6 to 2.6]; p=0.08).

Conclusion: Sporadic intramuscular injections of glucocorticoids (GC) without concomitant use of NSAIDs and/or intra-articular GC may reduce the pain and significantly decrease the excessive amount of inflammatory intra-articular fluid in patients with secondary synovitis in knee OA. Larger and long-term studies may find additional and greater improvements in knee OA symptoms and efficacy in OA of other localizations. Nevertheless, presence of comorbidities and potential side effects of GC should be taken into account.

P592

SYSTEMIC LUPUS ERYTHEMATOSUS REVEALED BY ACUTE LOWER EXTREMITY SENSITIVO-MOTOR DEFICIT

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Myelopathy is a rare manifestation of lupus that combines, sensory deficit, motor deficit ranging. It is exceptionally revealing of lupus.

Case report: R.A, 37 years old, the clinical history was inaugurated by paraparesis, proprioceptive ataxia and urinary disorders. The clinical examination found anesthesia D6-D10 on the left. ROT asymmetric. Lower limb muscle testing 1-2/5 bilaterally. Cerebral MRI showed T1 hypersignals with undesired and undesired demyelinating lesions without gadolinium uptake, and spinal MRI showed T2 hypersignals with demyelinating lesions disseminated in the dorsal spinal cord. The autoimmunity balance found: homogeneous FAN positive >1/1000, antiDNAn positive=145 IU. The evolution was favorable under the combination corticosteroids and immunosuppressors leading to a disappearance of paraparesis, dysesthesis and urinary disorders.

The clinical presentation of lupus myelitis is variable but the onset is usually rapidly progressive over a few hours with mild symptoms. These signs precede or accompany a motor deficit, most often of the paraplegic type but can evolve towards quadriplegia. The examinations of choice for the diagnosis of myelitis remain the lumbar puncture and the medullary MRI with gadolinium injection, which confirm the diagnosis and try to eliminate some differential diagnoses. Medullary MRI shows a T2 hypersignal with gadolinium enhancement, segmental in the case of transverse myelitis. The pathophysiology of myelitis is multifactorial

Transverse myelitis is a rare manifestation of neurolupus. Treatment with the combination of corticosteroids and cyclophosphamide immediately deserves to be evaluated, the rapid introduction of which offers the best chance of neurological recovery.

P593
NECROTIZING VASCULITIS REVEALED BY LEG ULCER

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Objective: We report the case of systemic necrotic vasculitis revealed by a leg ulcer.

Introduction Systemic necrotizing vasculitis is a rare disease. They are defined by inflammation associated with necrosis of vascular walls, mainly arteries. This case aims to describe a clinical presentation of necrotizing vasculitis and to show that an infected leg ulcer can sometimes reveal severe systemic disease.

Case report: CM, 38 years old, presented with a painless necrotic ulceration of the left leg associated with a polyarthritis evolving for 2 months, a purpura of the lower limbs and lesions Necrotic of the left index finger and the right big toe. The biology showed an inflammatory syndrome and a renal insufficiency. X-ray and chest CT revealed alveolo-interstitial syndrome associated with images of excavations; a tuberculous origin has been eliminated. The cutaneous and renal histological study confirmed necrotizing vasculitis in acute thrust. The patient received corticosteroids, and immunosuppressors.

Conclusion: The clinical manifestations of systemic necrotic vasculitis are polymorphic. The infiltrated purpura of the lower limbs remains the most frequent clinical aspect. It results from the involvement of small vessels and is most often observed during micropolyangitis only in panarteritis nodosa. The biopsy is profitable only if it relates to an affected area. In addition, micropolyangéitis is usually characterized by the presence of a rapidly progressive glomerulonephritis which is almost constant and by the pulmonary involvement which is absent in periarteritis nodosa.

P594
OVERLAP BETWEEN EJ ANTIBODY SYNTHESIS ANTISYNTHETASE SYNDROME AND RHEUMATOID ARTHRITIS: A CASE REPORT

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SAS syndrome is a group of inflammatory myopathies characterized by the presence of antibodies against RNAt synthetases. We aimed to describe an overlap between SAS with anti EJ and rheumatoid arthritis.

Case report: BM aged 52 years, who has since 03 months a polyarthritis associated with dyspnea. The immunoassay revealed antinuclear antibodies: speckled at 1/320, cytoplasmic at 1/160, Rheumatoid factor positive at 624 IU, antiCCP positive at >250 IU, the antiEJ positive at 100ui. EMG was normal, standard radiographs showed bilateral radiocarpal pinching with erosion and carpal bone geodes, thoracic CT showed fibrosing interstitial pneumonitis and pleuropericardial effusion. The patient was put on corticosteroids, methotrexate and cyclophosphamide resulting in an improvement at 06 months.

Classically, SAS combines discrete inflammatory myopathy, prognostic lung disease and non-erosive chronic polyarthritis. Patients with so called "specific" myositis antibodies are classified as overlapping myositis defined by Troyanov and Coll and therefore potentially these myositis may be associated with other connective tissue diseases, particularly for our patient with rheumatoid arthritis.. Several specificities of antibodies have been identified including the most frequent antiJo1 20-30%; antiPL7 / PL12 rarer 2% and antiEJ exceptional <0.8% and we have few studies on them. The severity of pulmonary involvement determines the prognosis of SAS anti EJ and justifies close monitoring of this disease. Our case illustrates a myositis of overlap between SAS at EJ and PR. Prolonged follow-up and the decline of other observations are necessary to evaluate the prognosis of this syndrome.

P595
FOLLOW-UP/EVALUATION OF PATIENTS WITH PSEUDORHIZOMELIC ARTHRITIS: SERIES OF 16 CASES

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Objective: Rhizomelic pseudopolyarthritis (PPR) is characterized by inflammatory painful manifestations of the belts. We aimed to follow up and evaluate patients suffering from PPR syndrome.

Methods: A study including 16 patients with a "PPR Syndrome"; all patients had 4 or more of the ACR EULAR 2012 criteria.

Results: 14 women and 2 men, the average age was 71.25 y. 11 patients reported scapular belt involvement, 1 patient had pelvic girdle involvement, and 4 patients had 2 belts, hip limitation in 31% of patients. The search the absence of peripheral synovitis in 81% of patients, as well as the negativity of the anti-CCP and the FR sought in 43% of patients.

The diagnosis retained after 18 months of follow-up: 31% of patients had progressed to PPR disease, 18% of patients were lost; 43% of patients had a PPR syndrome of which: 2 patients had progressed to a true Sjogren's syndrome, 3 PPR requiring ≥24 months of corticosteroid, 1 patient had a persistence of the biological inflammatory syndrome and a diagnostic error with discovery of a lipoma of the shoulder at 7 months; we cannot judge the evolution of 2 patients because the follow-up period was <18 months. The response to corticosteroid treatment was evaluated by the calculation of PPR DAS at 12 months: 45% had a score <7, 55% a score between 7-17.

Conclusion: The diagnosis of PPR is difficult, it is essential to define the warning signs to look for the cause responsible unlike the PPR disease which should not at the end of the follow-up, usually 12-18 months of treatment, once the patient weaned and cured.

P596
AN ORTHOGERIATRIC FLS FOR OLDER ADULTS WITH HIP FRACTURE

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Objective: Patients with hip fractures have a high risk of imminent refracture, and about 80% have disabling functional outcomes one year after the event. The Fracture Liaison Service (FLS) is a useful model of care, with a heterogeneous ability to take care of patients with fractured femurs (from 2% to 51%). To date, there are no data about the "process capability" of available FLS. The purpose of the study is to evaluate the ability of an orthogeriatric FLS, operating in a second-level hospital (600 events/year within a catchment area of 504.000 subjects), to take in charge and follow-up eligible patients.

Methods: 762 over 65s, hospitalized for hip fracture in March 2016-17, with scheduled access to the orthogeriatric service within 30-40 d after surgery. At the orthogeriatric visit, patients' radiological exams, blood, and biochemical tests are evaluated by the orthopedic surgeon and the geriatrician. A personalized care plan is activated according to the multidimensional geriatric methodology. In both courses, clinical-therapeutic management remains the responsibility of the general practitioner. A telephone follow-up at 12 months was performed.

Results: 28 subjects (3.6%) died within 40 d, 180 (23.6%) residing outside the area of competence. Of the 554 subjects in the study, 49% (n: 271) are taken care of by the orthogeriatric FLS (cases), 51% (n: 283) continue the usual course (controls). The subjects in charge of orthogeriatric FLS are mainly women (79%), average age 84 y, with a preserved functional autonomy before the fracture (51% with ADL >4), 42% with previous falls rand fractures. At follow-up, 70% of cases are under FLS charging, with 9.3% of deaths, 21% of missing; 23% of the controls died, 15% are missing.

Conclusion: Orthogeriatric FLS is effective and efficient: it ensures that half of the fractured femurs are taken care of within one month of surgery, most of which (70%) perform follow-up at one year.

P597
EFFICACY/TOLERANCE OF TNF ANTAGONISTS IN CHRONIC INFLAMMATORY RHEUMATISM IN REAL LIFE

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We report the observation of patients followed for chronic inflammatory rheumatism: spondylarthritis (SpA) and rheumatoid arthritis (RA) to study their efficacy and tolerance.

This is a monocentric longitudinal study from 2006 to 2019 of 190 patients treated with anti-TNFα. Efficacy was assessed on clinical, biological and activity scores. Our study included 176 SpA, 12 PR and 2 association cases SpA/PR. For the SpA group: 125 men and 51 women, with an average age of 29.97 at the time of diagnosis. SpA was axial in 77.84% of cases, mixed in 17.6% of cases, psoriatic arthritis in 21 patients, associated with Crohn's disease in 12 cases and in one case in 2 cases; complicated with coxite in 14% of cases. The anti-TNFα was started 7.85 y on average after the diagnosis of the condition. These were SpA treated with adalimumab (84 cases), etanercept (59 cases) and infliximab (33 cases). The primary efficacy of anti-TNFα on all clinical and biological criteria was observed in 90.6% of cases with a delay of action of 1-3 months after the start of the biotherapy. BASDAI decreased from 4.77/10 [1.2-9] to 2.52/10 [0-8.85], ASDAS decreased from 22/10 [0-6] to 1.54/10 [0-5], BASFI had increased from 6.79/10 [0-10] to 2.49/10 [0-9.1]. In these patients, there was also a disappearance of the biological inflammatory syndrome. 16 patients benefited from a switch with good evolution. Among the other undesirable effects on biotherapy, apart from allergic reactions, was the occurrence of ganglionic tuberculosis; one case of induced lupus, 2 cases paradoxical psoriasis, 3 paradoxical uveitis. For the RA group: 12 women aged on average 33.91 years old at the time of diagnosis. RA was seropositive in 83% of cases. Anti-TNFα was started 5.91 y after diagnosis; it was etanercept in 11 cases, adalimumab in one patient. The primary efficacy of anti-TNFα on all clinical and biological criteria was observed in 8 patients (66.6%) with a delay of action of one to three months after the start of the biotherapy. DAS28 decreased from 5.15 [1.89-7.47] to 3.83 [1.47-6.04]. The HAQ decreased from 1.37 [0.2-2.4] to 1, 16 [0.1-3]. In these patients, there was also a disappearance of the biological inflammatory syndrome in 6 patients after 03 months of treatment. The occurrence of a case of shingles has been noted. For the association group SpA + RA: 2 women of 26.5 y of middle age on adalimumab started at 3.5 y after diagnosis. Primary efficacy is better observed in the SpA plan with a BASDAI of 4.25 to 2.55 and DAS28 ranging from 2.8 to 3.14 without any adverse effects.

TNFα antagonists are effective and well tolerated treatments. The frequency and severity of the adverse effects of these molecules can be reduced by the respect of the pretherapeutic assessment a rigorous therapeutic education and a careful follow-up.

P598
EPIDEMIOLOGICAL CHARACTERISTICS OF A BARIATRIC SURGERY COHORT

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Objective: Bariatric surgery is the set of surgical techniques whose objective is weight reduction, which is performed in morbidly obese, with suspicion of high consumption of healthcare resources, especially the musculoskeletal system. We aimed to carry out a retrospective observational pilot analysis of a cohort of 140 morbidly obese patients after bariatric surgery, descriptive of the consumption of healthcare resources about the locomotor system (1), among others (2).
Methods: Data were collected from the University Hospital of Fuenlabrada of a cohort of morbidly obese people who underwent bariatric surgery from 2009 to the present. Were included as variables current and surgical age, gender, weight before surgery and the last weight available, height, evolution time in years since surgery, and surgical complications (greater if they require re-operative abdominal surgery). And as more specific variables assistance to locomotor, pulmonology and urology doctor`s offices. A descriptive and frequency analysis was performed.
Results: It was a cohort of 48.76 years old operated at 42.88 years old, 25.7% of men compared to 74.3% of women, weigh of 122.14 kg and height of 1.63 m, with a weight loss of 35.88 kg (last available of 86.26 kg) within a period of 5.81 y. 11.4% of patients presented major complications, 37.9% minor, and no deaths were described. 81.4% of patients went to rheumatology doctor`s office due to mechanical problems related to overweight, 3.6% of men to urology consultations due to erectile dysfunction, and 86.4% to pulmonology consultations in relation to obstructive sleep apnea syndrome (OSAS).
Conclusion: It is a study what highlights that bariatric surgery in Fuenlabrada area is mainly performed on morbidly obese women in adulthood, with an expected weight loss of 29.37% over a period of 5.81 y. As expected, there is a high consumption of hospital resources apart from those derived directly from the bariatric surgery protocol.

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P599
ORTHOGERIATRIC FLS PREVENT REHOSPITALIZATION IN OLDER ADULTS WITH HIP FRACTURES.

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Objective: Patients with hip fractures have a high risk of adverse events, causing hospital re-admissions. Hospital re-admissions are considered an indicator of the quality of care services and processes. This study aims to evaluate the impact of orthogeriatric FLS on the rate of repeated hospitalizations over 1 year period from discharge.

Methods: A case-control prospective observational study, from March 2016 to March 2017, living in the same area of health competence. Within 40 d of the surgery, the cases were taken over by the orthogeriatric FLS, and the controls carried out orthopedic checks. In both courses, clinical-therapeutic management remained with the general practitioner. Telephone follow-up at 12 months. A query of the regional administrative database for the identification of repeated hospitalizations.

Results: 271 cases managed by the orthogeriatric FLS and 283 controls in the usual care, mainly women (79%), average age 84 y, living at home, 51% with a good level of functional autonomy prefracture. The cases contributed to repeated hospitalizations with 18.2 (10.6; 29.1) events/100 people-year, while controls with 31.1 (22.6; 42.3) events/100 people-year. Regardless of age, sex, comorbidity, and pre-fracture functional status, cases tend to register a lower risk of hospitalization (HR: 0.581; IC: 0.31-1.043) within one year of the event compared to controls. Repeated hospitalization occurred on average after 176 d (interquartile range: 89-263) in cases and after 72 d (interquartile range: 38-105) in controls (p=0.0157).

Conclusion: Orthogeriatric FLS has a favorable impact on the reduction of rehospitalizations in older adults with hip fracture.

P600
EFFICACY/TOLERANCE AND THERAPEUTIC MAINTENANCE OF RITUXIMAB IN RHEUMATOID ARTHRITIS

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Objective: Rituximab (RTX) is an antiCD20 monoclonal antibody that has been shown to be effective in randomized trials in rheumatoid arthritis (RA). We aimed to evaluate the efficacity and tolerance of RTX during the first course and during reprocessing and determining the rate of therapeutic maintenance.

Methods: Monocenter observational series of 63 patients with RA. Patients received 1 g of RTX renewed at 15-d intervals, followed by 1 g after a minimum interval of 6 months defined according to the response to 1st cycle. The characteristics of RA, the EULAR response at the 3rd and 6th month to RTX, the comparison of the response according to the prior use of a biologic and the therapeutic maintenance rate after reprocessing.

Results: 54 women and 9 men aged 50.69 y with seropositive RA in 88.75%. 7 patients received at least one biologic. RTX was associated with DMARDs in 63.49% of cases. The initial DAS28 was an average of 5.16. The EULAR response to rituximab in the treatment of RA was 72% at 3 months and 75.89% at 6 months. The decrease in DAS28 was -1.26 at 3 months and -0.78 at 6 months. No significant difference in EULAR response in patients who received a biological vs. naive. Minor side effects were seen at the time of infusion (7 cases of headache/laryngeal tingling and 1 case of low blood pressure). 53.96% of the patients were retreated: The median dose of RTX administered was 2.06 g the average retreatment time is 22.27 months, i.e., a therapeutic maintenance rate of 92.79% with a good EULAR response between each cycle. The concentration of gamma globulins decreased significantly between the first and the last course of RTX (11.8 g/L vs. 8.1 g/L). Cortisone sparing could only be achieved in 17.64% of cases.

Conclusion: Our study illustrates the efficacy and tolerability of RTX in RA and shows that reprocessing is at least comparable in efficacy to initial treatment with a good therapeutic maintenance rate of about 2 y without apparent cumulative toxicity.

P601
OSTEOARTICULAR MANIFESTATIONS DURING SYSTEMIC SCLEROSIS: STUDY OF 42 CASES

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Objective: Systemic scleroderma (SSc) is an autoimmune disease characterized by vascular and fibrotic manifestations affecting the skin and lung in the foreground.

Methods: We performed a descriptive study of 42 patients with SSc followed between 2005-2019. The diagnosis of SSc was selected according to the criteria of the American Association of Rheumatology.

Results: 38 women and 4 men with a predominance of age group of 40-50 y. The disease was revealed by Raynaud's phenomenon in 71.42% of cases, complicated by trophic disorders such as pulpal ulcers in 43.33% of the cases, 69.04% of the patients had cutaneous sclerosis with a Rodnan average of 14.15. The SCS was of limited form in 45.94% cases, diffuse in 37.03% case and localized in one case. 64.28% had pulmonary involvement interstitial pneumonitis in 62.96% of cases, incipient fibrosis in 18.51% and advanced in 14.81% of cases, 4.7% had high blood pressure 58.06% had gastrointestinal involvement and 21.42% had malabsorption and no renal impairment. Osteoarticular involvement is present in 88.09% of the cases, inaugural in 45.94% of the cases and

observed during the evolution of the disease in 54.05% of cases with an average delay of 10.9 months. Polyarthralgia 72.97% of patients with primary hands / wrists and knees respectively 74.07% and 48.74% of cases. 27.02% patients had oligoarthritis of the hands/wrists. 61.53% of patients had osteoporosis and calcinosis was found in 16.66% of patients. 45.23% had functional impairment due to retraction in 17 cases, limitation and 7 cases of wrists, 33.33% of the cases had a limitation of the opening of the mouth and feeding.

Conclusion: Osteoarticular involvement during SSc is polymorphic and frequent, having a structural impact and thus potentially a major handicap.

P602
ORTHOGERIATRIC FLS IMPROVE APPROPRIATE PRESCRIPTION OF ANTIFRACTURE DRUGS AMONG HIP FRACTURE OLDER ADULTS

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Objective: A high risk of imminent refracture characterizes the elderly subjects with hip fractures. Effective diagnostic-therapeutic pathways for high-risk persons are a priority. The Fracture Liaison Service (FLS) is the proposed model. Little evidence exists about the effectiveness of an orthogeriatric FLS in ensuring the appropriate management of subjects at high refracturing risk.

Methods: a prospective case-control study, over 65s with hip fracture, enrolled from March 2016 to March 2017, living in the same area of healthcare competence. Cases were taken in charge by the FLS and receive a multidisciplinary assessment. Controls remained under orthopedic care. In both groups, clinical-therapeutic management remains under the responsibility of the general practitioner. Telephone follow-ups were performed at 3, 6, and 12 months.

Results: overall, 271 cases and 283 controls. At 12 months from surgical repair, 70% of cases are in charge of the FLS, with 9.3% of deaths, 21% of missing; 62% of controls are in charge at GPs, 23% of the controls died, 15% were missing. Compared to controls, cases have statistically significant higher rates of adherence and persistence to vitamin D, calcium supplementation, and specific antifracture treatments. Over the follow-up (at 3, 6, and 12 months from taking charge), the rates of ongoing antifracture treatments are notably higher among older adults functionally more preserved or with better functional recovery from baseline assessment.

Conclusion: Orthogeriatric FLS allows more frail older persons with hip fracture to be managed more appropriately. Further validations of the organizational-care model and evidence of effectiveness in the prevention of re-fractures are required.

P603
INFLAMMATORY AUTOIMMUNE MYOPATHIES. STUDY OF 22 CASES

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Objective: Autoimmune inflammatory myopathy (IM) is the first diagnosis to be made of acquired muscle involvement in adults. Our aim to determine the clinical and paraclinical characteristics of MI as well as the therapeutic and evolutionary modalities.

Methods: A descriptive study of 22 MI patients who met the Troyanov classification criteria.

Results: 19 women and 3 men myalgia was found in 72.72%, inflammatory polyarthralgia in 77.27% of cases Raynaud's phenomenon was present in 59.09% of patients. Cutaneous involvement was present in 54.54% of cases. Swallowing disorders in 40.90% cases, dysphagia in 36.36% of cases, dyspnea in 45.45% cases. Muscle enzymes were high in 63.63% of cases, electromyogram revealed myogenic involvement in 40.90% of cases, biopsy 40.90% of patients showed an association of necrosis / regeneration in 66.66% of cases. Pulmonary involvement dominated by interstitial lung disease was present in 66.66% of cases. The antinuclear antibodies were positive in 68.18% of cases. Specific antibodies ASM myositis was positive in 66.66% of cases, 70% of which anti MI2. The diagnosis was dermatomyositis in 45.45% of cases, polymyositis in 54.54% of cases (50% anti-synthetase syndrome) and one Necrotizing autoimmune myopathy in 1 case. Underlying neoplasia has been revealed MI in 3 patients after an average of 7 months. The treatment involved corticosteroid therapy in 81.81% for an average of 26 months, associated with an immunosuppressant in 63.63% of cases. Evolution under treatment was favorable in 59.09% of cases. A relapse was observed in 40.90% of cases with an average delay of 22 months. 1 death was reported.

Conclusion: IM is a heterogeneous group, the discovery of ASM has allowed to define new nosological frameworks. Underlying neoplasia must be sought in any MI.

P604
CLINICAL, PARACLINICAL AND PROGRESSIVE FEATURES OF SYSTEMIC LUPUS ERYTHEMATOSUS: ABOUT 67 CASES

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Objective: Systemic lupus erythematosus (SLE) is a chronic, disabling, chronic disease characterized by a large clinical and immunological polymorphism, the causes of which remain unknown. We aimed to evaluate the clinical, paraclinical, evolutionary and therapeutic profile of the patients.

Methods: We performed a descriptive study of 67 patients with SLE with at least 4 clinical and biological criteria of Systemic Lupus International Collaborating Clinics (SLICC).

Results: 64 women and 3 men, the average age was 37.44. The disease was revealed in 80.59% of cases by the association of polyarthralgies and cutaneous manifestations. The patients had dermatological manifestations (68.65%), articular (64.17%), lupus nephropathy (26.86%), respiratory manifestations (11.94%), cardiac (10.44%), neurological (7.46%). Antinuclear antibodies were positive in 74.62% of cases with fluorescence homogeneous in 64% of the cases, the native anti-DNAs in 61.19% of the cases, anti-phospholipids positive in 13.43% of cases and one complement decline in 10.44% of cases. 24 patients had complications: infectious (11.94%), cardiovascular (10.44%), renal (7.46%), neuropsychiatric (2.98%) treatment based on an antimalarial in 67.16% of cases, corticosteroids in 83.68% of patients, immunosuppressors reserved for complicated and refractory forms (19.40%) with cyclophosphamide in 23.07%cases then relay mycofenolate mofetyl in 38.46% of cases or azatioprine in 15.38%, 1 patient received rituximab.

Conclusion: Lupus is a highly polymorphic autoimmune disease that must be evoked in a clinical context suggestive to begin an early treatment. The evolution and prognosis of the disease depend on the response to treatment and the occurrence of complications.

P605
RENAL INVOLVEMENT IN SYSTEMIC LUPUS ERYTHEMATOSUS: STUDY OF 23 CASES

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Objective: Renal involvement of lupus is one of the most common manifestations of this systemic disease, but also one of the most severe sources of morbidity and mortality from chronic renal failure and its consequences, as well as toxicity of the treatment.

Methods: This is a retrospective study of 23 patients with lupus nephropathy followed between 2004-2019.

Results: All our patients were women with a mean age of 39.73 y. At the time of the initial presentation, there was an HTA in 39.13% cases, a nephrotic syndrome in 42.27% and a renal failure in 56.52%. On renal histological examination, class II was found in 3 cases, class III in 8 cases, class IV in 11 cases and class V in 1 case. 95.65% of patients received corticosteroids associated with immunosuppressants in 40.90% of cases (cyclophosphamide in induction then relay mycophenolate mofetil MMF in 6 cases and MMF from the outset in 3 cases). The outcome was marked after a mean follow-up of 64 months with remission in 43.47% of cases, worsening of renal function in 39.13% of cases with end stage renal failure in 8.6% and relapses occurred in 47.82% of cases. Age <30 y, hypoalbuminemia, and renal failure at diagnosis were associated with significant worsening of renal function.

Conclusion: Lupus glomerulonephritis is a serious disorder that, in the absence of treatment, is life-threatening and functional. However, the development of effective immunosuppressive therapies has transformed the prognosis of the disease.

P606
AUTOIMMUNE HEPATITIS IN ADULTS: STUDY OF 7 CASES

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Objective: Autoimmune hepatitis (HAI) is a rare chronic inflammatory liver disease of unknown etiology associated with the presence of autoantibodies.

Methods: We performed a descriptive study of 7 patients with HAI followed between 2007-2019. The diagnosis submitted to the international score of 1999, is established on immunological data after the exclusion of the other etiologies of chronic hepatitis. The objective of our study is to determine the clinical, immunological and evolutionary characteristics of HAI.

Results: There were 7 patients: 6 women and 1 middle-aged man aged 41.14 At the time of diagnosis. Extrahepatic clinical signs are insidious and not in 82.6% of cases. The immunological assessment makes it possible to classify 42.85% of HAI in type 1. In 71.42% of the cases the HAI are seronegative and in 28.57%cases they achieve mixed syndromes (overlap with biliary cirrhosis primitive). Liver biopsies show necrotico-inflammatory activity 85.71% of cases, extensive fibrosis and/or cirrhosis 14.28% of cases. The treatment instituted in 2 patients (28.57%) having a form active combination of corticosteroids and azatioprine. Death occur in 1 case per cirrhosis.

Conclusion: A HAI must imperatively be sought for any chronic affection of the liver supposed cryptogenetic in order to establish an early diagnosis and to improve the prognosis of the disease.

P607
SHARP SYNDROME: STUDY OF 8 CASES

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Objective: Sharp syndrome or CM connective disease is an autoimmune disease characterized by the association of clinical manifestations of systemic lupus erythematosus, systemic sclerosis, polymyositis, and the presence of antinuclear antiRNP type. The objective of our study is to determine the clinical and paraclinical characteristics of CM as well as therapeutic and progressive modalities.

Methods: We report a descriptive study of 8 patients with Sharp syndrome defined according to the criteria proposed by Kahn and followed in our department between 2007-2019.

Results: There were 8 patients: 7 women and 1 middle-aged man aged 42.25 y at the time of diagnosis. The disease was revealed by a Raynaud phenomenon in 75% of the cases, the fingers were corroded in 37.5% of the cases. Sclerodactyly was inaugural in 3 cases and manifested during the course of the disease in 1 case. Inflammatory polyarthralgia was present in 62.5% of cases interesting most often hands/wrists and knees, dry syndrome was associated in 37.5% of cases. Esophageal involvement was found in 3 cases as well as 2 cases of pulmonary involvement. No patient presented with PAH or fibrosis. Antinuclear antibodies were strongly positive (>1/1000 in 62.5% cases) of mottled fluorescence. AntiRNP were present in all cases. A Inflammatory biological syndrome was found in 50% of cases. Capillaroscopy microangiopathy showed the presence of megacapillaries for 2 cases. The prescribed treatment was a calcium channel blocker in 50% of cases associated with asynthetic antimalarial in 25% of the cases, 87.5% were on corticosteroids. During follow-up, the diagnosis of Sharp could be maintained in 6 cases, the disease seemed to evolve to another connectivity in 2 cases.

Conclusion: Sharp syndrome is rarely connective of favorable prognosis most often, however only careful monitoring will prevent the occurrence of complications.

P608
UVEITIS AND ANTI-TNF IN SPONDYLITIS: ABOUT 21 CASES

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Objective: The anti-TNF alpha have expanded the therapeutic arsenal to better control uveitis. In the event of a threat of functional prognosis or corticodependence, the use of these molecules and/or DMARD is recommended.

Methods: We performed a descriptive study of 21 patients with spondylarthritis associated with uveitis undergoing biotherapy followed between 2013-2019. The objective of our study was to evaluate the antiTNF response in patients with antecedents or active uveitis. as well as to describe the characteristics of uveitis cases occurring during a biotherapy.

Results: 21 cases of uveitis were reported (13 men, 8 women): 8 sequelae and 11 active. All were under biotherapy: 3 under etanercept, 4 under infliximab and 14 under adalimumab (including 14 in combination with DMARD). 18 uveites were anterior (including 8 bilateral), 2 posterior and 1 panuveitis. The infectious origin has not been identified in any case. 15 patients did not present any more recurrences, 6 cases of paradoxical uveitis under biological were registered (5 previous and 1 posterior): 3 patients under etanercept and 3 patients under adalimumab. The occurrence of uveitis led to the rotation of anti-TNF in 2 cases. The treatment was continued identically in 4 cases with optimization in 2 cases.

Conclusion: TNFα antagonists have been shown to be effective in the treatment of active or sequential uveitis. The presence of uveitis under biotherapy should not only evoke a therapeutic escape. The infectious origin must be discussed systematically.

P609

ALLERGY AND BIOTHERAPY IN CHRONIC INFLAMMATORY RHEUMATISM

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Objective: We report the observation of patients followed for chronic inflammatory rheumatism: spondylarthritis (SpA) and rheumatoid arthritis (RA) to study the tolerance of anti-TNFs: Main undesirable effects and causes of discontinuation of treatment.

Methods: This is a monocentric longitudinal study of 190 patients treated with anti-TNFα.

Results: Our study focused on 176 SpA and 12 PR. For the SpA group: These were SpA treated with adalimumab (84 cases), etanercept (59 cases) and infliximab (33 cases). There were 25 cases of allergic reactions in 51 adverse events on biotherapy (49.09%): 10 cases of rash-like rash, 5 cases of injection site reaction, 4 cases of dry cough, 4 cases of herpes and viruses, 1 case of allergic dermatitis, 1 case of generalized urticaria. 16 patients benefited from a switch, the molecule was stopped in 3 out of 16 patients for allergy (18.75%)

For the RA group: 12 women treated with etanercept (10 cases) and adalimumab (2 cases) There were 6 adverse reactions, 4 of which were allergic: 2 reactions at the injection site, 1 case of rash and 1 case of dry cough.

Conclusion: TNFα antagonists are generally well tolerated treatments. Allergic reactions to biologics are at the forefront of the list of adverse reactions and should benefit from an etiological investigation and careful monitoring of patients entering the biosimilar era.

P610

DYSLIPIDEMIA AND SPONDYLARTHRITIS: A STUDY OF 78 CASES

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Objective: Cardiovascular risk factors (CVF) should be routinely investigated during spondylarthritis (SpA) because they are associated with excess mortality, our objective is to take the frequency of dyslipidemia in SpA and identify the factors that associate with his presence.

Methods: This is a single-center retrospective study involving 78 patients with SpA defined according to the criteria Assessment of Spondylarthritis International Society (ASAS), compared between 2 groups: a control group SpA without dyslipidemia vs. a group SpA case with dyslipidemia, have the clinical profile of SpA was analyzed as well as the predictive factors of dyslipidemia according to the characteristics of SpA.

Results: 78 patients were included with a male predominance (n=40, 51.28%), the median age was 37.34 years and the mean duration of evolution of SpA was 9.7 y. For the SpA group without dyslipidemia: n=39 24-h patients and 15 women mean age: 35.49 y, mean diagnosis time: 5.82 y and duration of disease was 8.45 y, for the nosological form: 32 cases of SA spondylarthritis (axial in 58.97% of cases, axial and peripheral in 23.07% of cases), 4 cases of RP psoriatic arthritis, 2 cases of rheumatism of IBD enterocolopathies and 1 case of SA combination with RA rheumatoid arthritis. SpA was associated with uveitis in 20.51% of cases and complicated with coxitis in 5.1% of cases. Biologically, inflammatory syndrome was present in 48.71% of cases, mean total cholesterol CHtot was 1.24 g/L and mean triglyceride TG was 0.80 g/L therapeutically 61, 53% of the patients were on NSAIDs, the average BASDAI score was 3.90. For the SpA group with dyslipidemia: n=39 patients 16 men and 23 women mean age: 39.23 y, average time to diagnosis disease: 6.02 y and duration of evolution of the disease was 15.2 y, for the nosological form: 29 cases spondylarthritis SA (axial in 65.51% of cases, axial and peripheral in 34.48% of cases), 2 cases of RP psoriatic arthritis, 5 cases of rheumatism of IBD enterocolopathies and 3 cases of SA combination with RA rheumatoid arthritis. SpA was associated with uveitis in 7.6% of cases and complicated with coxitis in 15.38% of cases. Biologically, inflammatory syndrome was present in 61.53% of cases, mean total cholesterol CHtot was 1.98 g/L and mean triglyceride TG was 1.49 g/L therapeutically 79, 48% of patients were on NSAIDs, the average BASDAI score was 4.03. The female sex (23 vs. 15, p=0.003), the duration of disease progression (15 vs. 8 years, p=0.038), the nosological framework, axial and peripheral involvement, IBD and the presence of a coxite p=0.0042), the inflammatory syndrome (61.53% vs. 48.71, p=0.046) as well as the consumption of NSAIDs (79.48% vs. 61.53% p=0.003) were significant in patients with patients with dyslipidemia. There is no difference between patients with and without dyslipidemia regarding: Age, late onset of illness, average time to diagnosis, existence of extra-articular manifestations, disease activity score BASDAI.

Conclusion: Dyslipidemia is frequent during SpA. The female sex, a long duration of disease progression, the nosological setting, a biological inflammatory syndrome and the use of NSAIDs seem to be predisposing to the risk of dyslipidemia regardless of age or activity. Dyslipidemia must be of particular interest with regard to its involvement in the therapeutic management and prognosis of SpA.

P611

EVOLUTIONARY PROFILE OF AUTOIMMUNE INFLAMMATORY MYOPATHIES: STUDY OF 22 CASES

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Objective: Autoimmune inflammatory myopathy (IM) is the first diagnosis to be made of acquired muscle involvement in adults. The objective of our study is to determine the evolutionary modalities of MI under treatment.

Methods: This is a descriptive study of 22 MI patients followed between 2003-2019 who met the Troyanov classification criteria.

Results: There were 22 patients: Female predominance of middle age 49.2 y. The delay between diagnosis and onset of symptomatology was 2.6 y. The diagnosis was dermatomyositis in 45.45% of cases, polymyositis 54.54% of cases (50% anti-synthetase syndrome) and necrotizing myopathy autoimmune in 1 case. Treatment consisted mainly of corticosteroid at 81.81% for an average duration of 26 months, associated with an immunosuppressant in 63.63% of cases Treatment progress was favorable in 59.09% of cases. Relapse was observed in 40.90% of cases with an average delay of 22 months due on the one hand to the appearance of infectious complications in 66% of cases, worsening of pulmonary involvement in 55% of cases and inhalation pneumopathy in 14% of cases and secondly to an escape from treatment in 3 cases (2 patients under azathioprine 1 patient on micophenolate mofetil substituted with azathiprine after worsening of interstitial lung disease). 53.84% of the patients remained dependent. Underlying neoplasia was revealed by MI in 3 patients after average time of 7 months. 1 death was reported (following an infectious pneumopathy)

Conclusion: IM is a heterogeneous group, the evolutionary profile is crucial to define the prognosis of the disease. Underlying neoplasia must be sought in any MI.

P612
INVESTIGATING THE IMPACT OF A THEORY-BASED EDUCATION INTERVENTION ON PATIENTS' OSTEOPOROSIS KNOWLEDGE, HEALTH BELIEFS, AND SELF-EFFICACY AFTER DXA

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Objective: To determine the impact of a theory-based osteoporosis education intervention on osteoporosis knowledge, health beliefs and self-efficacy among patients who underwent first-time DXA compared to usual care (DXA only).

Methods: Patients 50 years and older who had no prior diagnosis of or treatment for osteoporosis and whom their primary care provider (PCP) referred for BMD screening by DXA at a hospital in Saskatchewan, Canada were randomized to an education intervention group (n=102) or usual care group (n=101). The intervention group received one-time, one-on-one multifaceted osteoporosis education based on constructs of the Revised Health Belief Model. Patients completed demographic and health history questionnaires, as well as the Osteoporosis Knowledge Test (OKT), Osteoporosis Health Belief Scale (OHBS), and Osteoporosis Self Efficacy Scale (OSES) at baseline and 6-month follow-up. Paired t-test was used for within-group analysis and linear mixed-effects model was used to test the effects of the education intervention on change in knowledge, health beliefs and self-efficacy.

Results: The education intervention group increased OKT scores from baseline to follow-up (p=0.013), while the usual care group declined (p=0.047). Compared to the usual care group, the education intervention group showed greater change in OKT scores from baseline to follow-up (p=0.002). Findings were not statistically significant for the OHBS in both within-group and interaction analysis and there were no statistically significant changes in OSES scores.

Conclusion: There was a greater increase in osteoporosis knowledge among patients receiving DXA for the first time combined with a one-on-one theory-based osteoporosis education intervention, compared to DXA only. While theory-based interventions that increase osteoporosis knowledge may help older adults make informed decisions about health behaviors for prevention and management of the disease, addressing patient health beliefs and self-efficacy are also integral and highlight an area for further research.

P613
INFECTIONS AND BIOTHERAPY IN CHRONIC INFLAMMATORY RHEUMATISM

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Objective: We report the observation of patients followed for chronic inflammatory rheumatism: spondylarthritis (SpA) and rheumatoid arthritis (RA) to study the tolerance of biotherapies: Main undesirable effects and causes of discontinuation of treatment.

Methods: This is a single-center longitudinal study of 292 patients treated with biotherapy.

Results: Our study focused on 176 SpA and 12 PR for antiTNF, 64 patients on rituximab and 38 patients on tocilizumab.

Results: AntiTNF: For the SpA group: These were SpA treated with adalimumab (84 cases), etanercept (59 cases) and infliximab (33 cases). There were 13 cases of infectious episodes out of 51 adverse effects on biotherapy (25.49%): 2 ORL infections, 3 urinary infections, 4 cases of herpes/viral infections, 1 case of ganglionic tuberculosis, 2 cases of abscess and 1 case of gastroenteritis. 16 patients benefited from a switch, the molecule was stopped in 1 out of 16 patients for infection. For the RA group: 12 women treated with etanercept (10 cases) and adalimumab (2 cases) There were 6 adverse events, 2 of which were infectious: 1 ORL infection and 1 case of shingles. Rituximab: No adverse effects of an infectious nature (due method of administration). Tocilizumab: 6 cases of infectious episodes out of 11 adverse effects (54.54%) 4 cases of ENT infection, 1 pulmonary infection and 1 case of abscess.

Conclusion: Biologics are generally well tolerated treatments. Sub-biological infectious episodes are relatively common (approximately ¼ adverse effects) and should benefit from an etiological investigation and careful monitoring of patients entering the biosimilar era.

P614
SERONEGATIVE RHEUMATOID ARTHRITIS: A STUDY OF 64

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Objective: A seronegative rheumatoid arthritis (RA) is characterized by the absence of biological markers: rheumatoid factor FR and anti-citrullinated peptides ACPA at the time of diagnosis, these markers can be negative during the early RA and then become positive during evolution. Positive ACPA confirmed their high specificity by more than 90% in order to clarify the diagnosis however 25% of the initially anti-ACPA negative RAs can be true RAs. The objective of our study is to determine the clinical and paraclinical profile of a seronegative RA and to identify the evolutionary predictors according to the presence or absence of the ACPA at the beginning of the symptomatology.

Methods: This is a retrospective single-center study involving 64 patients with RA considered seronegative and compared between 2 groups: a PR group with FR negative and ACPA not sought vs. a PR group with FR negative and ACPA negative.

Results: 64 patients were included with female predominance (n=54, 84.37%), median age was 43.10 y, and mean duration of RA was 9.4 y. For the seronegative RA group with FR and ACPA not sought: n=32 patients 8 men and 24 women mean age: 48.03 y and average delay diagnosis disease: 4.53 y. The PR was deforming in 44.37% of patients cases (including 15.62% cases of irreducible flessum) and associated with dry syndrome in 21.87% of cases, with signs of systemic disease in 25% of cases. Biologically, inflammatory syndrome was present in 40.62% of cases and ANA antinuclear factors were positive in 11.53% of cases, in terms of imaging: Nondestructive to XR in 53.12% of cases and erosive and ultrasonically active 28.12% therapeutic 50% of patients were on methotrexate and 6.25% of patients received joint infiltration. The average DAS 28 was 5.72, the HAQ 1.59. For the group seronegative RA with FR- and ACPA-: n=32 patients 2 men and 30 women average age: 38.18 y and average delay diagnosis disease: 4.43 y. RA was deforming in 31.25% of cases (including 6.25% cases of irreducible flessum) and associated with a dry syndrome in 35.29% of cases, with signs of systemic disease in 31.25% of cases. Biologically, the inflammatory syndrome was present in 43.75% of cases and ANA were positive in 18.75% of cases, in terms of imaging: nondestructive to RX in 62.5% of cases and erosive and ultrasonographically active in 25% of cases, therapeutically 68.75% of patients were on optimized methotrexate and no patients received joint infiltration. The average DAS was 4.02, the HAQ 0.76. The mean age of onset young, clinically depressant and destructive on the RX (p=0.003), the association with a dry syndrome and the positivity of the ANA (p=0.0042), the inflammatory syndrome (61.53% vs. 48.71, p=0.046), the methotrexate prescription indication (p=0.003) and the mean of the low evaluation indices (p=0.0038) were correlated with ACPA negativity.

Conclusion: An authentic RA with FR- ACPA- is possible, its clinical course and structural prognosis is less severe than a seropositive form. However it would be necessary to be able to correct the diagnosis before the absence of joint destruction and the presence of other systemic manifestations.

P615
PULMONARY INVOLVEMENT DURING RHEUMATOID ARTHRITIS

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Objective: Diffuse interstitial lung disease (ILD) is the manifestation extra-articular most commonly found in rheumatoid arthritis (RA). RA-ILD requires special attention from the rheumatologist. This one exhibits distinct characteristics of the pulmonary lesions associated with other connectivities (willingly fibrosing aspect, severe prognosis, poor response immunosuppressants). It is serious, because of its frequency, of a long phase asymptomatic and finally, a significant excess mortality. The objective of our study is to determine the clinical profile of patients as well as the predictive factors associated with severity of this impairment.

Methods: We carried out a descriptive study of 70 patients with from RA-ILD. The diagnosis of RA was retained according to the 2010 ACR Criteria.

Results: 70 patients: 45 women and 25 men, mean age 48.11 y at the time of diagnosis of RA and 57.18 y at the time of diagnosis of RA-ILD. The duration of course of the disease was 12.61 y and the time between the start of background therapy and diagnosis was 5.98 y. All of our patients had pulmonary disease, it was asymptomatic in 58.57% of cases. 68% of men were smoking 22.4 packs-years on average. 25.71% of patients had an associated Sjögren syndrome. The rheumatoid factor was positive in 71.42%, ACPA present in 58.57% of cases. The functional vital capacity was >70% in 73.08% of the cases and <70% in 26.92% of the cases, the CT scan-HR had found: frosted glass in 31.14%, 15.71% of lesions of bronchiectasis, 11.42% frosted glass + isolated nodules, 11.42% of nodules alone, 8.57% honeycomb, 5.71% fibrosis, 4.28% apical involvement, 2.85% isolated emphysema/7.14% emphysema associated with other lesions and 1 case of alveolitis lesion. RA-ILD has been classified: common interstitial lung disease in 29 cases, interstitial lung disease no specific in 26 cases and organized pneumopathy in 8 cases. 61.42% had received methotrexate 14.22 mg/week for an average of 4.64 y, 15 patients received rituximab, one patient etanercept and one patient tocilizumab. Male, advanced age at diagnosis of PR-PI, tobacco and presence of ACPA were factors correlated with the severity of RA-ILD. On the other hand

the combination of Sjögren's syndrome, taking methotrexate or biotherapy, the value of the respiratory functional exploration RFE was not significant for the severity of the pulmonary involvement.

Conclusion: RA-ILD is the most common extra-articular manifestation, it is associated with high morbidity and mortality. The main difficulty lies in identifying early asymptomatic lung disease. To date, the effects of treatments of RA, the biotherapies of which are yet to be defined.

P616
CONTRIBUTION OF ULTRASOUND TO THE DIAGNOSIS OF THE INFRA-ELECTRIC CARPAL TUNNEL

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Objective: Carpal tunnel syndrome SCC is the most common canal syndrome, most often linked to compression or irritation of the median nerve in the canal. If the diagnosis is clinical, often confirmed by the EMG electromyogram, the criteria for ultrasound diagnosis must now be known. Better tolerated, less costly, and also effective, ultrasound is well correlated with the severity of the disease and shows the anatomical variants, which makes it the first-line examination for some. The objective of our study is to assess the contribution of the ultrasound system in the diagnosis of symptomatic SCC with normal EMG and to seek correlations with certain clinical diagnostic tests.

Methods: Ultrasound was performed in 20 patients with clinical signs with normal SCC EMG. The cross-sectional area at the entrance (threshold 11 mm^2) and at the exit of the canal and the ratio of flattening of the median nerve to the carpal tunnel were measured bilaterally. The EMG of all patients did not find SCC.

Results: Right hand: The average cross-sectional area of the median nerve to the carpal tunnel was on average 9.55 mm^2 at its proximal part (pisiform and scaphoid bone landmarks) and 12.65 mm2 at its part at its distal part (bone landmarks hamatum and trapeze). The mean ratio of flattening of the median nerve in the carpal tunnel (small/large diameter ratio) was at its distal end. Left hand: The average cross-sectional area of the median nerve to the carpal tunnel was 9.75 mm^2 at its proximal part and 11.95 mm^2 at its part at its distal part. The average ratio of flattening of the median nerve in the carpal tunnel its distal part (small/large diameter contribution) was 3.05 on the right and 2.25 on the left. Ultrasound allowed the diagnosis of SCC to be made in 50% of cases: 5 bilateral and 5 unilateral (3 right and 2 left). The cross-sectional measurements were statistically correlated with the predominant side of the clinical involvement. Ultrasound signs were found to be correlated with both the Phalen test (p<0.001) and the Tinel sign (p<0.001). The sensitivity and specificity of ultrasound for the diagnosis of SCC were 87% and 98%, respectively.

Conclusion: The combination of typical clinical signs and at least one pathological ultrasound measurement of the median nerve is highly predictive of the diagnosis of SCC. A normal EMG in a symptomatic patient should lead to request an ultrasound in order to look for signs allowing to comfort the subjective discomfort and the clinical examination of this syndrome.

P617
MAP OF TREATMENTS IN A MULTIDISCIPLINARY FLS UNIT

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Objective: Osteoporosis fractures are increased. Only a minority of patients at high risk are evaluated. The implementation of FLS (Fracture Liaison Service) helps to improve patient's care. We aimed to analyze the treatments that are carried out in the reference area of a hospital that has multidisciplinary FLS.

Methods: Cross-section (June 2019) through the prescription of antiosteoporotic treatment of all ABS that depends on our center (reference population: 111,000 inhabitants). For the zoledronic has been used the prescription in the period between 1/7/18 to 1/6/19 in the hospital and the intermediate care center. Statistical study: SPSS version v22. Qualitative variables (percentage) and quantitative variables (means and standard deviation). The comparison between qualitative variables was made with chi-square.

Results: 1325 active treatments have been obtained, 1199 (90.5%) were women and 126 (9.5%) men. Average age: 74.7 (26-99 y). 1310 patients (98.9%) are older than 50 y. A total of 983 patients (74%) treated with bisphosphonate treatment (alendronate: 76.5%; zoledronic 16.5%; risedronate: 4.7%, ibandronate: 2.3%). 288 patients (22%) were treated with denosumab and 54 (4%) treated with teriparatide.

	Men	Women	Middle Age (y)
Alendronate	34	718	72 (38-98)
Ibandronate	1	22	70 (48-88)
Risedronate	26	20	72 (49-89)
Zoledronic	31	131	80 (54-99)
Denosumab	26	262	79 (26-98)
Teriparatide	8	46	75 (43-88)

The population older than 65 years old showed a higher proportion of treatment with denosumab (p<0.0001) and with zoledronate (p<0.0001). There was no zoledronate in patients older than 50 years old. A prevalence of patients under active treatment for

osteoporosis in our reference area of 1.5% in the general adult population and 5.2% in patients over 65 years of age has been established.

Conclusion: In our population, as in the general population, osteoporosis appears predominantly in women over 50 years. Most are undergoing treatment with bisphosphonates (alendronate). In older patients there is a greater number of parenteral or subcutaneous treatment in order to improve the compliance and improve the absorption. The study needs to be expanded in order to distinguish between primary and secondary prevention and analyze more data from our population.

P618
ASSOCIATIONS BETWEEN MUSCLE DENSITY AND COGNITIVE FUNCTION IN OLDER MEN

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Objective: We investigated the cross-sectional association between skeletal muscle density and cognition. A contribution of body fat mass and inflammation was explored, as these factors have been identified in muscle and cognitive deterioration. **Methods:** For 281 men (aged 60-95 y) from the Geelong Osteoporosis Study, muscle density at the radius and tibia was measured (pQCT). Cognitive function was assessed for psychomotor function (DET), visual identification/attention (IDN), visual learning (OCL) and working memory (OBK) (CogState Brief Battery). Composite scores were calculated as overall cognitive function (OCF). Higher scores represent poor performance expect for OCL and OCF. Regression analyses examined the associations between muscle density and cognition parameters before and after adjusting for age, body fat, lifestyle factors, and serum inflammation markers. **Results:** Negative associations with age were evident in muscle density and all cognitive domains (all p≤0.001). Muscle density at both the radius and tibia was positively associated with DET, OCL and OCF (all p<0.002). After adjustment for age, the association persisted at both sites only for DET (radius: B=-0.006, p=0.02; tibia: B=-0.003, p=0.04) and OCL (radius B=+0.004, p=0.02; tibia: B=+0.005, p<0.001). At the radius, further adjustment for TNFα explained the association between muscle density (B=-0.002, p=0.66) and DET; at the tibia, the association between muscle density (B=-0.003, p=0.04) and DET was independent of TNFα. There was an age-adjusted association between muscle density (radius: B=+0.004, p=0.02; tibia: B=+0.005, p<0.001) and OCL at both sites. No other potential confounders contributed to the models. No associations were identified between muscle density and IDN or OBK. **Conclusion:** We report that muscle density was associated with DET and OCL. However, there was little evidence that this was explained by inflammation or adiposity.

P619
PREDICTORS OF INCIDENT FRACTURE IN OBESE AND NON-OBESE OLDER ADULTS: THE TASMANIAN OLDER ADULT COHORT (TASOAC) STUDY

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Objective: Obese older adults demonstrate different fracture patterns compared with non-obese counterparts, and this difference may be influenced by the method used to diagnose obesity. We aimed to compare incident fracture risk and associated clinical risk factors between obese and non-obese older adults, defined by both BMI and body fat percentage (fat%).

Methods: At baseline, 1100 older adults (mean±standard deviation 63.0±7.5 y; 51.1% women) were classified as obese by BMI (≥30 kg/m^2) and fat% (≥30% for men and ≥40% for women) assessed by DXA. Clinical risk factors assessed at baseline included total hip and lumbar spine areal BMD (aBMD; DXA), falls risk score (physiological profile assessment including measures of reaction time, balance, vision, proprioception and knee extension strength) and total leg strength (dynamometer). Incident fractures were self-reported for up to 10 y.

Results: Prevalence of obesity was 27.6% and 43.0% according to BMI and fat%, respectively. Obese older adults categorised by BMI, but not fat%, had significantly higher aBMD at the total hip and spine compared to non-obese (both p<0.05). The proportion of obese adults who experienced fractures were 10.5% by BMI and 26.7% by fat%. Obese women defined by BMI, but not by fat%, had significantly lower rate of incident fractures compared to non-obese after adjusting for confounders (incidence rate ratio: 0.40; 95%CI: 0.21-0.75). This association was no longer significant after further adjustment for total hip aBMD (0.55; 0.28-1.08). Higher total hip aBMD predicted reduced fracture likelihood in obese women by fat% (p<0.05), and the association of higher leg strength with reduced fracture likelihood approached significance (odds ratio: 0.98; 0.97-1.00 per 1kg increase in leg strength). Higher falls risk score predicted increased fracture likelihood in obese men by both BMI (12.00; 2.12-67.92 per unit increase) and fat% (5.15; 1.69-15.74).

Conclusion: Incident fractures are common among obese older adults particularly when obesity is defined by fat%. In addition to aBMD, nontraditional risk factors such as physical function assessments may have clinical utility for identifying fracture risk among older adults with higher adiposity.

P620
3-STEP ANGULATION TECHNIQUE OF DYSFUNCTIONAL LOWER LIMB IN DIAGNOSTIC ULTRASONOGRAPHY FOR CONTRACTURE OF GLUTEAL MUSCLES AND ILIOTIBIAL TRACT IN 84 HIPS

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Objective: Evaluate the efficacy of a 3-step ultrasonography based dynamic imaging technique as a visualization tool for contracture induced lower limb musculoskeletal dysfunction prior to minimally invasive surgical release.

Methods: 42 patients (84 hips) with bilateral gluteal muscle contracture (GMC) included 24 male (57.1%) and 18 female (42.9%) patients with a mean age of 27.88±6.2 y (15−44 y). Anteriorly and posteriorly across the bony landmark (greater trochanter, GT) the musculature was assessed in two orthogonal (longitudinal and transversal) planes. Compared with hip joint in neutral (0**°)** position (Position I), gluteus maximus contracture (GMC) and iliotibial band contracture (ITBC) at 40°-60° hip flexion (Position II) and 5°-10° hip extension (Position III) were assessed by ultrasonography (GE LOGIQ E8/E9). In each view and position, the musculoskeletal structures (superficial to deep) were located; maximum thickness (mm) of the hyperechoic, contracture induced strips (if present) was recorded. Fibrotic band echogenicity amongst the 3 observational positions and variation in relation to any change in degree of limb angulation was analyzed. Special attention was directed at localizing the impingement point.

Results: 41 patients (82/84 hips) quoted prior gluteal injection history. In Position I, the contracture specific hyperechoic bands over GT were relatively thin. The maximum thickness of GMC and ITBC in Positions II and III was significantly greater than that in Position I (P<0.01). Additionally, in Position II, the GMC impingement point was most obvious in the transversal view for all 84 hips (Fig. 1). And the ITBC was evident in Position III. Both the positive signs and impingement region in all patients were easily identified and localized in the transversal detection in comparison to the longitudinal view.

Conclusion: The 3-step limb angulation coupled with dynamic imaging of hyperechoic contracture strips allows assessment of full thickness and strength of the contracture bands prior to the surgical release. It mimics the intra-operative fibrotic band location and allows real-time visual analysis of the functional abnormality by recreating the same abnormal symptoms when the affected lower limb is moved in 3-step diagnostic ultrasound.

red bar: thickness of GMC, *: GMC impingement on GT
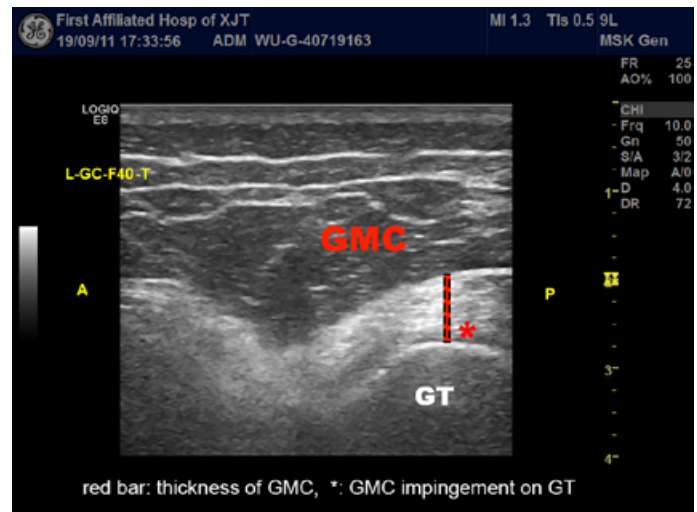
Figure 1. Ultrasonography transversal detection for GMC in Position II.

P621
PHYSICAL FUNCTION AND MOBILITY IN ADULTS WITH X-LINKED HYPOPHOSPHATEMIA

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Objective: X-linked hypophosphatemia (XLH) is a rare genetic disorder affecting phosphate metabolism. Whilst muscle weakness has been reported in adults with XLH, there is little data describing detailed physical function. We therefore examined upper and lower limb function and aerobic fitness in UK adults with XLH and assessed the relationships between physical function and mobility.

Methods: Adults with XLH were recruited as part of an ongoing UK-based prospective cohort study, the Rare and Undiagnosed Diseases Study (RUDY). Participants underwent a clinical visit and physical examination. This included grip strength and jump power assessed by mechanography, 6-min walk test (6MWT) and short physical performance battery (SPPB). Scores were compared with existing age and sex-specific normative data using t-test, whereas correlations among outcomes were processed using Pearson's correlation coefficient.

Results: Fifteen adults with XLH (9 males and 7 females), with a mean age of 47.3±16.7 y were enrolled to the study. Grip strength was 26% lower and jump power 57% lower in individuals with XLH than normative values, with greater deficits evident in the lower than upper body (all p<0.01). Aerobic fitness was 40% lower in XLH individuals when compared to reference values (p<0.001).

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Mean SPPB score was 9.0±3.2, with 5/15 individuals having a score of <10 indicating impaired mobility. Univariate correlations revealed that age (r=-0.635, p=0.011) handgrip strength (r=0.672, p=0.006), jump power (r=0.651, p=0.016) and aerobic fitness (r=0.874, p=0.001) were all highly correlated to mobility as measured by SPPB.

Conclusion: Adults with XLH had weaker lower body power appears than other components of physical function. Upper and lower limb muscle function and aerobic fitness were all strongly associated with impaired mobility in this population, which suggests that the origin of mobility deficits may be multifactorial. Further studies are required to understand underlying mechanisms, and to develop novel treatment approaches to improve physical function and mobility.

P622
ABALOPARATIDE PROMOTES BONE REPAIR OF VERTEBRAL DEFECTS IN AN OVARIECTOMIZED RAT MODEL OF OSTEOPOROSIS

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Objective: Osteoporotic vertebral fractures (OVF) are associated with morbidity and mortality. This study was examined to investigate the effects of abaloparatide, a bone anabolic agent for the treatment of severe osteoporosis, on bone repair in ovariectomized (OVX) rats with vertebral defects.

Methods: 8-week-old female Sprague Dawley rats were subjected to OVX or sham surgery. At the end of 5-week (±4 d) bone depletion period, bone defects were created in OVX animals at L4-L6 vertebral bodies using a 1.5-mm diameter dental drill. OVX animals were given once daily subcutaneous injection of abaloparatide at a dose of 30 µg/kg or vehicle for maximum 6 weeks from the day of the vertebral defect surgery (Day 0). Animals were sequentially sacrificed at Day 3, Week 1, Week 2, Week 4, and Week 6, followed by collecting defected (L4-L6) and nondefected (L3) vertebrae. BMD and trabecular structural parameters of the vertebrae were measured by DXA and µCT. Bone strength was measured by a vertebral body compression test.

Results: OVX animals showed significantly lower lumbar BMD than sham animals at the end of the bone depletion period (P<0.05). At the defected site of vertebrae, abaloparatide showed significantly higher BMC than vehicle at Week 2 (P<0.05), Week 4 (P<0.001), and Week 6 (P<0.01). Trabecular structure was improved by abaloparatide administration. Abaloparatide showed significantly greater increases in bone strength of defected vertebrae than vehicle at Week 2 (P<0.01), Week 4 (P<0.001), and Week 6 (P<0.001). Abaloparatide also showed significantly higher BMD and bone strength at nondefected vertebrae (P<0.001). There was no significant change in serum calcium concentrations by abaloparatide during the administration period.

Conclusion: Abaloparatide promoted bone repair of defected vertebrae with an increase in bone strength in OVX rats. Abaloparatide also improved BMD and bone strength at nondefected vertebrae. These results suggest that abaloparatide is a promising therapeutic option for the treatment of severe osteoporosis with OVF.

Disclosure: AM, HT, YT, and NH are employees of Teijin Pharma Limited.

P623
NASTURTIUM OFFICINALE EXTRACT SUPPRESSES RAW 264 CELL OSTEOCLASTOGENESIS VIA RANKL-RANK SIGNAL ATTENUATION

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Objective: *Nasturtium Officinale* is one of the Cruciferous plants that have antioxidant, anticancer, antibacterial, and anti-inflammatory activities. In this study, we evaluated ability of *N. Officinale* extract to suppress osteoclast differentiation.

Methods: A monocyte-derived macrophage-like cell line RAW 264 was stimulated with RANKL to induce differentiation into osteoclast in the presence of *N. Officinale* extract or vehicle (DMSO). The osteoclast formation was evaluated by TRAP staining and detected resorption pit formation by using Osteo Assay Surface 24-well plates (Corning). Expression levels of osteoclast-related genes were monitored by real-time PCR. Expression of NFATc1, the master regulator of osteoclast differentiation, and activation of MAPK and NF-κB signaling pathways were determined by immunoblot. NFκB DNA binding activity was examined by EMSA.

Results: *N. Officinale* extract significantly decreased the number of TRAP-positive multinuclear cells and inhibited pit forming activity of the RANKL-treated RAW 264 cells, indicating that the extract decreases differentiation into osteoclast and bone resorption activity. Expression of NFATc1 and osteoclast-related genes (DC-STAMP, Atp6v0d2, and CtK) were reduced. In addition, activation of MAPK and NF-κB signals at early phase of differentiation were suppressed in *N. Officinale* extract treated cells, whereas RANK expression was unchanged.

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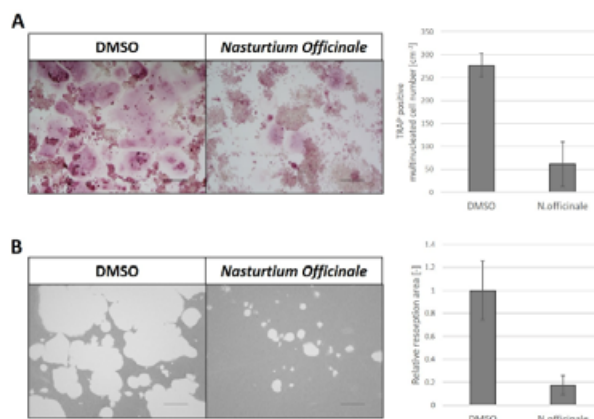
Figure. Effect of *Nasturtium Official* extract on osteoclast differentiation stimulated by RANKL(5 nM). (A) Representative microscopic images and TRAP-positive multinucleated cell number relative to DMSO-treated cells are shown. (B) Representative microscopic images of resorption pits and quantification of resorption area per view area are shown.

Conclusion: This study indicated that *N. Official* extract suppresses osteoclastogenesis by attenuating early phase activation of MAPK and NF-κB signals by RANKL-RANK stimulation.

P624
QUALITATIVE AND QUANTITATIVE MEASURES OF PREFEMORAL AND QUADRICEPS FAT PADS ARE ASSOCIATED WITH INCIDENT RADIOGRAPHIC OSTEOARTHRITIS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Objective: To determine if qualitative and quantitative measures of prefemoral fat pad (PFP) and quadriceps fat pad (QFP) are associated with incident radiographic osteoarthritis (iROA) over 4 years in the Osteoarthritis Initiative (OAI) study.

Methods: Participants in this nested case-control study were selected from the OAI study with knees that had a Kellgren-Lawrence grading (KLG)=0 or 1 at baseline. Case knees were defined by iROA (KLG ≥2) over 4 y. Control knees without iROA were matched 1:1 with case knees. Magnetic resonance images (MRIs) were read at P0 (time of onset of iROA), P-1 (1 y prior to P0) and baseline, and used to assess PFP (i.e., prefemoral hyperintensity alteration, patellofemoral hyperintensity alteration, maximum axial area) and QFP (i.e., hyperintensity alteration, mass effect, maximum axial area). Conditional logistic regression analyses were performed to assess the associations between PFP/QFP measures and iROA, after adjustment for covariates.

Results: 354 case knees with iROA were matched to 354 control knees. 66.9% of the participants were female, with an average age of 60.1 y. PFP prefemoral hyperintensity alteration measured at three time points (OR [95%CI]: 1.46 [1.18−1.82], 1.50 [1.20−1.88], 1.52 [1.22−1.89] respectively), PFP maximum axial area (OR [95%CI]: 1.07 [1.01−1.14], 1.08 [1.01−1.15], 1.08 [1.02−1.15] respectively) and QFP hyperintensity alteration (OR [95%CI]: 1.59 [1.27−2.00], 1.44 [1.13−1.82], 1.38 [1.09−1.73] respectively) were significantly associated with iROA in multivariable conditional logistic analyses. QFP mass effect measured at BL and P-1 (OR [95%CI]: 1.42 [1.11−1.82], 1.33 [1.01−1.73] respectively) were significantly associated with iROA.

Conclusion: Qualitative and quantitative measures of PFP and QFP are associated with increased iROA over 4 y.

P625
HYPERINTENSITY ALTERATION IN PFP PREDICTS PATELLOFEMORAL STRUCTURAL DEGRADATION IN OLDER ADULTS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Objective: PFP hyperintensity alteration at baseline and patellofemoral structural degradation in older adults.

Methods: A convenience sample of 708 subjects (mean 60.3 y, 67.2% female) from the incidence osteoarthritis (OA) cohort of the Pivotal Osteoarthritis Initiative MR Imaging Analyses (POMA) study were studied at baseline and 692 were followed up over 2 y (only 540 had MRI at follow-up). Sagittal intermediate-weighted (IW) fat-saturated 2D turbo spin-echo (TSE) sequence images were used to assess the presence of PFP hyperintensity alteration at baseline. Baseline and 24-month semiquantitative MRI Osteoarthritis Knee Score (MOAKS) variables for cartilage morphology and bone marrow lesions (BMLs) were measured.

Results: At baseline, PFP hyperintensity alteration was significantly associated with the presence of patellar and lateral trochlear cartilage damage as well as the presence of patellar BMLs after adjustment for age, BMI, gender, injury, surgery, knee alignment, contralateral knee radiographic status and case-control status. Longitudinally, baseline PFP hyperintensity alteration was significantly associated with worsening in lateral trochlear cartilage damage as well as lateral patellar, medial and lateral trochlear BMLs in multivariable analyses.

Conclusion: PFP hyperintensity alteration at baseline was associated with patellofemoral structural degradation cross-sectionally and longitudinally in older adults, suggesting that it may serve as an important imaging biomarker in patellofemoral osteoarthritis.

P626
PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY IS ASSOCIATED WITH PRIOR LOW TRAUMA FRACTURE IN MEN

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Objective: pQCT bone parameters provide information about fracture risk complementary to traditional techniques such as dual x-ray absorptiometry. This study aimed to determine which pQCT parameters of bone are associated with prior fracture in men.

Methods: Participants were men (n=474, age 33-96 y) from the Geelong Osteoporosis Study. Bone parameters at 4% (n=469) and 66% (n=436) of radial length were acquired using pQCT (XCT 2000, Stratec Medizintechnik, Pforzheim, Germany), and converted to standard deviation (SD) units using the sample mean and SD by variable. Low trauma prior fractures (since age 20 y)

excluding skull and digits were ascertained from self-report and radiologically confirmed. Cross-sectional associations between bone parameters and fracture were tested using stepwise logistic regression modelling adjusting for potential confounders (age, weight, height, smoking, mobility, alcohol consumption).

Results: Prior low trauma fractures were identified in 100 participants (15 spine, 16 forearm, 2 hip, 20 ribs, 16 ankle, 13 hand, 27 other). Prior fracture was negatively associated with several bone parameters at the 4% radius site: bone mass (adjusted OR 0.67; 95%CI 0.52-0.86), total density (0.60; 0.47-0.78), trabecular density (0.62; 0.48-0.79) and cortical subdensity (0.60; 0.47-0.77). At the 66% radius site, prior fracture was associated with bone mass (0.76; 0.60-0.96), total density (0.69; 0.55-0.87), cortical area (0.75; 0.59-0.96) and cortical thickness (0.68; 0.54-0.86). Prior fracture was also associated with the ratio of cortical area at the 66% site to total area at the 4% site (0.73; 0.58-0.94). There were no associations between prior fracture and other radial pQCT bone parameters.

Conclusion: Prior fracture was associated with multiple cortical and fewer trabecular parameters at the radius. This study highlights key parameters derived from pQCT measurements that may aid in the prediction of fracture risk.

P627
AGE-RELATED INCREASES IN MARROW FAT VOLUMES HAVE REGIONAL IMPACTS ON BONE CELL NUMBERS AND STRUCTURE

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The increasing levels of marrow fat evident in aging and osteoporosis are associated with low bone mass and attributed to reduced osteoblastogenesis. Local lipotoxicity has been proposed as the primary mechanism driving this reduction in bone formation. However, no studies have looked at the correlation between high levels of marrow fat volumes and changes in local cellularity. In this study, we hypothesize that areas of bone marrow with high fat volumes are associated with significant changes in cell number within a similar region of interest (ROI). Inbred albino Louvain (LOU) rats originate from the Wistar strain and have been described as a model of healthy ageing with the absence of obesity but expressing the typical features of age-related bone loss. We compared local changes in bone cellularity and bone structure in specific ROI in bone sections obtained from undecalcified bones from 20-month-old LOU rats vs. Wistar controls. Our results confirmed that, compared

with Wistar controls, LOU rats showed significantly higher fat volumes ($p<0.001$). These higher fats volume/total volume were associated with lower trabecular number ($p<0.05$) and thickness ($p<0.05$) and higher trabecular separation ($p<0.05$). In addition, osteoblast and osteocyte numbers were reduced in the similar ROI containing high levels of adiposity, while osteoclast number was higher compared to control ($p<0.01$). In summary, ROIs with a high level of adiposity were associated with lower bone mass and changes in cellularity explaining associated bone loss. Further studies assessing the levels of lipotoxicity in areas of high local marrow adiposity are still required.

P628
THE INCIDENCE AND THE IMPORTANCE OF RECOGNITION OF COMPLICATIONS AFTER A WRIST FRACTURE

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Objective: To test the incidence of complications after a wrist fracture.

Methods: This retrospective study was conducted in June-November 2019 period at the Special Hospital Vaso Cuković in Risan, Montenegro. The study included 36 patients, 33-76 y of age, who, after having undergone physical treatment of a wrist fracture, reported to a physiatrist due to a complication of the wrist and hand. Complications included intense wrist and hand pain, swelling, limited mobility and changes in surrounding tissue. The Mann-Whitney U test was used to test for differences between groups. The relationship between the two qualitative variables was examined using the Hi square test (χ^2). The probability level was set at p <0.05. Statistical processing and analysis was performed using the statistical package SPSS 24.

Results: The mean age of subjects was 59.5 years. Of the total number of subjects (N=36), 8 (22.2%) had a complication after a wrist fracture, while 28 (77.8%) subjects had no complications. There was a statistically significant difference in distribution of complications by gender (χ^2=12.48, df=1, p=*0.000*), i.e. only women had complications. Using the Mann-Whitney test, we compared the age of subjects with and without complications. There was a statistically significant difference (Mann-Whitney=87.00, p<*0.05*). The average age of subjects with complications was Me=63.0 y, while those without complications after fracture were younger (Me=59.0 y).

Conclusion: Complications after wrist fractures occurred only in women, and older ones at that. The complication itself can be the development of the complex regional pain syndrome (CRPS), a chronic neurological condition that usually develops after an injury. It is recommended that such patients should be recognized

in clinical practice and instructed to undergo physical therapy, with an emphasis on kinesiotherapy which would enable the limb function and therefore increase the patient's quality of life.

P629
HEART RHYTHM VARIABILITY IN WOMEN WITH CHD AND OSTEOPOROSIS

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Objective: To study the heart rate variability parameters in women with CHD and osteoporosis.

Methods: 128 postmenopausal women with CHD (age 67.25±9.4) were examined. The first group consisted of patients with CHD and osteoporosis – 58 women, the second group was a comparison group – 70 women with CHD. The groups were comparable in age, BMI, duration of CHD, duration of menopause. Holter monitoring with the analysis of indices of heart rhythm variability (HRV) was carried out by Cardiotechnica-04 system in the usual conditions for the patient and combined with a load ladder test. Methods of time and spectral analysis were used to study the HRV parameters. We have analyzed the indicators: power in the range of very low frequencies (0.003-0.04 Hz) - VLF, ms²; power in the low frequency range (0.04-0.15 Hz) - LF, ms²; power in the high frequency range (0.15-0.4 Hz) - HF, ms²; ratio of power in the low frequency range and power in the high frequency range (LF/HF); total power of fluctuations in the duration of the intervals R-R - TP, ms2. And also an assessment was made: SDNN, ms - standard deviation of the indicators of the R-R intervals; SDNN index (SDNN_i), ms - average value of standard deviations of R-R intervals in 5-minute sections of ECG recording; pNN50,% - the relative number of R-R intervals following each other, the difference between which exceeds 50 ms; rMSSD, ms - the square root of the average square of the differences between the values of successive pairs of R-R intervals.

Results: We found that in patients with osteoporosis, the spectral parameters of HRV were lower compared to group 2. It was noted that the LF index decreased by almost 3 times (by 64.6%). Similar changes were found with respect to HF: in patients with osteoporosis, it was lower by 62.6% compared with women with isolated coronary artery disease. A decrease in TP, the total power of fluctuations in the duration of RR, was also noted. Such changes are characteristic of reducing the effects of the sympathetic and parasympathetic nervous system. SDNN was reduced in the first group patients. We noted a decrease in rMSSD in patients with comorbid pathology by 22.7% compared with the group with isolated CHD, similar changes were detected and from the side of the pNN50 indicator was 15.3% lower. A decrease in these indicators in women with osteoporosis indicates a decrease in parasympathetic effects on the regulation of heart rhythm. Some parameters of heart rate variability were also correlated with the presence of osteoporosis. Thus, the number of osteoporotic fractures was negatively related to the LF/HF ratio at night (r=-0.38, p <0.05), the presence of fractures was inversely related to this ratio in the daytime (r=-0.4, p <0.05). The absolute ten-year risk of osteoporotic fractures was negatively correlated with the LF/HF ratio both at night (r=-0.45, p<0.05) and overall per day (r=-0.5, p<0, 05). The ten-year risk of femoral neck fractures was positively correlated with SDNN levels (r=0.32, p<0.05) and insufficient decrease in LF/HF at night (r=0.72, p<0.05). We also found that the LF index was negatively correlated with the presence of fractures (γ=-0.39, p=0.00068), HF showed a similar orientation of the connection (γ=-0.36, p=0.0056).

Conclusion: Patients with a combination of osteoporosis and coronary heart disease showed a decrease in heart rate variability. Correlation relationships of a negative nature between the history of osteoporotic fractures, their number, an absolute ten-year risk of fractures and indicators of LF, HF and their ratio (LF/HF) were revealed. A positive relationship was established between the absolute 10-y risk of a femoral neck fracture with SDNN and an insufficient decrease in LF/HF at night.

P630
CORRELATES OF RADIAL BONE MICROARCHITECTURES IN OLDER ADULTS

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Objective: Weight, dietary patterns, vitamin D, physical activity and grip strength have been suggested to be associated with bone loss in older adults. However, studies have yet been performed to investigate the associations between these factors and radial bone microarchitecture. This study aimed to describe the associations of weight, dietary patterns, serum 25-hydroxyvitamin D (25(OH)D) concentrations, physical activity and grip strength with bone measures in older adults.

Methods: Cross-sectional data on 201 older adults (mean age 72 y, female 46%) from a population-based cohort study were analysed. Weight, dietary patterns, serum 25(OH)D concentrations, physical activity (steps per day), grip strength were collected and analysed from baseline to 10-y follow-up. Areal BMD (aBMD) at spine, hip and whole body were measured by DXA. Radial cortical and trabecular bone microarchitectures were measured by HR-pQCT. Multivariable linear regression was used to analyse associations of study factors with bone measures.

Results: Weight was positively associated with radial bone area (total: β=0.18, 95%CI: 0.07, 0.29; cortical: β=0.12, 95%CI: 0.03, 0.21; trabecular: β=0.18, 95%CI: 0.05, 0.32), and was inversely associated with compact cortical volumetric BMD (vBMD) (β=-0.19, 95%CI: -0.37, -0.01) and trabecular thickness (β=-0.25, 95%CI: -0.43, -0.07). Ten year changes in weight were not significantly associated with bone measures, apart from radial trabecular separation (β=0.15, 95%CI: 0.009, 0.28). Western dietary pattern scores were inversely associated with radial vBMD (total: β=-0.17, 95%CI: -0.32, -0.01; cortical: β=-0.19, 95%CI: -0.34, -0.04; compact cortical: β=-0.19, 95%CI: -0.34, -0.04; outer transitional zone: β=-0.20, 95%CI: -0.35, -0.06), and were positively associated with

cortical porosity (cortical: β=0.18, 95%CI: 0.03, 0.33; compact cortical: β=0.19, 95%CI: 0.04, 0.34; outer transitional zone: β=0.20, 95%CI: 0.06, 0.35). Steps per day were not significantly associated with bone measures, apart from inner transitional zone area and thickness (β=0.12, 95%CI: 0.003, 0.24; β=0.19, 95%CI: 0.05, 0.33). Healthy food pattern scores, serum 25(OH)D and grip strength were not significantly associated with radial HR-pQCT measures.

Conclusion: Higher weight, but not weight change, was beneficial for the radial cortical and trabecular bone area but also associated with worse compact cortical vBMD and trabecular thickness. Higher western dietary pattern scores had adverse effects on radial vBMD and cortical porosity while physical activity had inconsistent associations.

P631
AMMONIUM HYDROGEN URATE STONES FREQUENCY IS HIGHEST IN PEDIATRIC AGE GROUP STONE FORMERS PRESENTING TO A TERTIARY CARE CENTER IN PAKISTAN

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Objective: To estimate the frequency of different types of renal stone's chemical compositions coming for analysis at clinical laboratory, AKU.

Methods: A point prevalence study was conducted at the Section of Chemical Pathology, AKU. Kidney stones coming for analysis from November 2016 to November 2017 were included. Stones were analyzed by Fourier transformed infrared spectroscopy method by Nicolet iS5 FT-IR spectrometer (Thermo Fisher Scientific Inc, USA). For large stones, core and surface were analyzed separately. The FT-IR spectra of stones were matched against a library of spectra to generate a report on stone components. The stones were categorized into pure (single component) and mixed stones and further classified as whewellite (Whe) {calcium oxalate monohydrate}, weddellite (Wed) {calcium oxalate dihydrate}, uricite (U) {uric acid}, dahllite (Dah) {carbonate apatite}, ammonium urate (AU), struvite (St) {ammonium magnesium phosphate hexahydrate}, and cysteine (Cys). The prevalence of stone was analyzed in four provinces of Pakistan; Sindh, Punjab, KPK, and Baluchistan.

Results: Total 1311 stones were tested with mean age 35±16, 84% (n=1102) being male and 8% (n=105) and majority received from province of Sindh 57% (n=744). Total 3.2% (n=42) were larger stones (≥2 cm), 8% were pure stones (n=101, Whe 59, Wed 35, Cys 7). The core was separately reported in 6% (n=83) stones and amongst these major compositions was Whe/Wed/U 39% (n=32). In stone compositions, uric acid stones were more common in Punjab (26%, 75/291) while in children (<14 y) ammonium containing stones were more common (42%, 61/143).

Conclusion: The major composition of stones was calcium oxalate and geographical differences were also observed along with the high frequency of ammonia containing stones at a younger age, reflecting infection as a common cause of this age group.

P632
OTAGO EXERCISE PROGRAM AT HOME: DEVELOPMENT OF METHODOLOGY TO MEASURE COMPLIANCE

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Objective: Wireless sensors with accelerometers and gyroscopes can be used to monitor physical exercises and daytime activities. In this study, we aimed to assess the possibility to objectively classify exercises and activities during a day by an inertial measurement unit (IMU) in (pre)sarcopenic adults.

Methods: 25 community-dwelling (pre)sarcopenic older people performed the Otago exercise program ("OEP") and daytime activities ("Daytime, non-OEP" such as sitting, standing, walking). Participants wore an IMU with a 3D accelerometer and gyroscope (Dynaport MoveMonitor+, McRoberts, The Netherlands). Two classification methods were developed and compared. First, one comprehensive algorithm was developed to assess accuracy for all classifications together (types of OEP and types of daytime activities). Second, a layered hybrid model was developed, containing a heuristic algorithm (classifying moments not wearing the monitor as "No wear") and three machine-learning algorithms, one general ("Daytime, non-OEP" – "OEP") and two detailed (what type of "Daytime, non-OEP" activity? and what type of "OEP" exercise?). Classification accuracies were assessed by comparing algorithm output with video recordings.

Results: The layered hybrid model showed higher accuracy compared to the comprehensive algorithm. The heuristic algorithm classified "No wear" with 96% accuracy. The general machine-learning algorithm classified the data into "Daytime, non-OEP" (68% accurate) and "OEP" (78% accurate). One detailed machine-learning algorithms classified strength and dynamic balance exercises of the OEP with 75% and 79% accuracy respectively, while the second algorithm classified daytime activities: standing (83% accuracy), cycling (69% accuracy), walking (86% accuracy) and sitting/lying (96% accuracy).

Conclusion: The layered hybrid model and algorithms to objectively classify OEP and daytime activities showed moderate to good accuracies. This suggests they can be used in clinical or research practice to monitor training compliance of (pre)sarcopenic older people. Monitoring daytime activities might give insight in overall physical activity and how this changes in response to exercise (e.g., decreased sedentary time).

P633
VITAMIN D LEVELS IN FEMALES WITH RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is a chronic inflammatory disorder, of unknown etiology, disease duration of patients is highly variable, affecting approximately 0.5-1% of the world population. There is a wide range of treatments depending on the severity of RA symptoms. Identification of RA at initial presentation and treatment at earlier stage can affect disease course, lifestyle changes, as well as vitamin D supplementation which is important for most people that have not had adequate dietary intake. The serum Vitamin D levels were also significantly lower in the RA patients. Vitamin D levels in RA patients have been found to be associated with disease activity. In RA patients, disease activity correlates with plasma 25 (OH) D3 values. 25(OH) D3 is the only vitamin D metabolite that is used to determine whether a patient is vitamin D deficient, sufficient or intoxicated. Vitamin D status disorder can be manifested as: insufficiency (deficiency), deficiency (insufficiency) and vitamin D toxicity usually results from taking supplements in excess. The aim of the work was to assessing the prevalence of vitamin D deficiency in RA females.

Methods: All subjects were determined: the serum levels of calcium, phosphorus and alkaline phosphatase, and a calcium urine test is done over 24 and phosphorus levels, serum EL 25-OH vitamin D levels, and the BMD in the lumbar spine and hip using DXA the preferred method for the diagnosis of osteoporosis – Hologic Discovery Bone Densitometer. The criteria for evaluating BMD in RA patients are as follows: high disease activity; age: in women over 50 years of age, in men over 60 years of age; functional state and the mobility activities defined by Steinbrocker 3 or Disability Index (*HAQ*) 1,25. The existence of two or three criteria is not only indication for BMD assessment but also indication of early aggressive anti-rheumatic treatment to prevent the onset of disability.

Results: 34 RA patients (females), mean age 45.64±11.50 y were examined, 13 patients were in a regular period (menstrual cycle), 5 in irregular period, since 16 were during menopause. The optimal value of vitamin D blood levels were found to be in normal range in 3 patients (8.8%), vitamin D deficiency was found in 20 (58.8%) patients, and insufficiency in 11 (32.4%). BMD (DXA) was measured in 21 patients, 14 had been diagnosed with osteoporosis,3 with osteopenia (low-bone density), and bone density test result was normal in 4 patients.

Conclusion: The results of our study indicated a relatively high degree of deviation (58-100%) compared to the normal value, i.e., a high prevalence of vitamin D deficiency in females suffering from RA, which is in accordance with the results of published studies to date.

P634
ANATOMICAL DISTRIBUTION OF THE DIFFERENCES IN DXA-DERIVED VBMD AT THE LUMBAR SPINE BETWEEN SUBJECTS WITH L1 VERTEBRA FRACTURE AND CONTROLS

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Objective: Evaluate the anatomical distribution of the differences in DXA-derived vBMD at the lumbar spine between subjects with vertebral fracture and controls.

Methods: We performed a case-control study including 31 postmenopausal women with osteoporotic vertebral fracture at L1 and 92 age-matched controls without vertebral fractures. Spine AP DXA scans were acquired using a Prodigy scanner (GE Healthcare). Areal BMD (aBMD) at L2-L4 segment was measured using enCORE software (GE Healthcare). Volumetric BMD (vBMD) at L2-L4 segment was assessed using a DXA-based 3D modeling software (3D-SHAPER, Galgo Medical). The software computes the 3D shape and density distribution of the lumbar spine by registering a statistical model onto the AP DXA scan. The ability of DXA-derived measurements to discriminate between fracture and control subjects was evaluated by using the area under the receiver operating characteristic curve (AUC). The mean 3D shape and density were computed for each group to visualize the differences between groups in vBMD distribution.

Results: Trabecular vBMD at the vertebral body was the measurement that best discriminated between fracture and control groups, with an AUC of 0.758, against 0.625 for aBMD. The anatomical distribution of the average differences in vBMD between groups showed more pronounced differences near the endplates (Figure 1). The AUC map associated with vBMD values computed at each voxel of the volumetric images of subjects included in the fracture and control groups showed higher AUC near the endplates (Figure 1).

Conclusion: This study shows the potential of local DXA-derived 3D measurements to discriminate subjects with and without osteoporosis-related vertebral fractures using standard AP DXA scans. Further studies including larger cohorts and other populations should be performed to determine if vBMD measurements could improve fracture risk prediction in clinical practice.
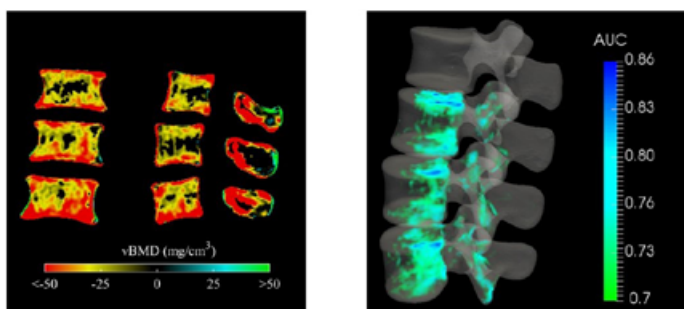
Figure 1. (Left) Anatomical distribution of the average changes in vBMD. Nonsignificant changes (unpaired two-sample t test) are left in black. (Right) AUC map of vBMD. Only AUC higher than the 80th percentile (i.e., AUC >0.709) are displayed. Maximum AUC was 0.876.

P635

DENOSUMAB TREATMENT OF OSTEOPOROSIS IN THE OLDEST OLD

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Objective: To verify the efficacy and safety of denosumab treatment for osteoporosis in the oldest old.

Methods: 87 patients aged >80 y (range 80-99 years old; mean age 84.8 y), followed by our Center of Bone Diseases for osteoporosis, in treatment with denosumab for at least 6 months, have been evaluated. Patients with renal o liver transplant were excluded. Calcium (Ca), vitamin D, PTH and C-terminal telopeptide (CTx) levels, measured 5 months after the last injection, and collateral effects, incidence of fractures and therapy compliance, during the whole treatment period have been considered.

Results: No collateral effects like hypocalcemia have been observed since they started denosumab therapy. Three of them had a femoral fracture during the treatment, but no one had an atypical fracture. Low compliance has been detected in 4 patients. CTx levels were "high" (range 328-577 pg/mL) in 2 of the patients with femoral fracture and in all patients with low compliance (3 patients) and chronic renal insufficiency (6 patients). The mean range of CTx in the other patients was 114.95 pg/mL. The mean range of vitamin D levels, Ca levels and PTH levels was respectively 36.95 ng/ml, 9.43 mg/dl and 62.82 ng/ml.

Conclusion: Denosumab treatment appears to be safe and reduces the risk of fracture in oldest old population with documented osteoporosis.

P636

SARC-F IS INACCURATE TO IDENTIFY GERIATRIC REHABILITATION INPATIENTS AT RISK FOR SARCOPENIA

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Objective: Sarcopenia is highly prevalent in geriatric rehabilitation inpatients and screening for sarcopenia by the SARC-F is recommended by expert groups. This study aimed to assess the diagnostic accuracy of the SARC-F in identifying sarcopenia according to the EWGSOP1, EWGSOP2 and Asian Working Group on Sarcopenia (AWGS) definitions in geriatric rehabilitation inpatients.

Methods: Geriatric rehabilitation inpatients completed the SARC-F when admitted to the geriatric rehabilitation unit, according to their status at preadmission (one month before admission) and at admission. At admission, muscle mass was measured by bioelectrical-impedance analysis, handgrip strength by handheld dynamometry and gait speed by the 4-m walk test. Diagnostic accuracy of the SARC-F was determined by sensitivity, specificity and the area under curve (AUC). The SARC-F was analyzed as a dichotomous (score <4 vs. score ≥4) and continuous (0-10 points) variable.

Results: Sarcopenia prevalence among the 318 included geriatric rehabilitation inpatients (median age 84.0 y [IQR 79.0 - 89.0], 57.9% female) was 41.7% (EWGSOP1), 24.9% (EWGSOP2) and 37.8% (AWGS). For preadmission status and admission status, the SARC-F identified 67.9% and 82.1% (EWGSOP1), 66.0% and 81.0% (EWGSOP2), and 67.5% and 81.6% (AWGS) inpatients at risk for sarcopenia, respectively. The SARC-F showed fair sensitivity (range 67-74%), poor specificity (range 32 - 37%) and poor accuracy (range 0.495-0.555) to identify inpatients at risk for sarcopenia at preadmission status and fair to good sensitivity (range 79-84%), poor specificity (range 17-20%) and poor accuracy (range 0.479-0.518) to identify inpatients at risk for sarcopenia at admission status defined according to the EWGSOP1, EWGSOP2 and AWGS definitions.

Conclusion: The SARC-F has poor diagnostic accuracy to identify inpatients at risk for sarcopenia in geriatric rehabilitation inpatients. In this population, assessment of sarcopenia without prior screening is recommended.

P637
PATIENT-REPORTED OUTCOMES OF X-LINKED HYPOPHOSPHATAEMIA REGISTRY PARTICIPANTS IN THE UK

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Objective: We described the patient-reported outcomes (PROs) of adults with X-linked hypophosphataemia (XLH) and examined if they are correlated.

Methods: Data were obtained from the RUDY study, which collects information from participants with rare diseases in the UK. Participant responses to nine instruments were extracted: EQ5D-5L and SF36 physical (PCS) and mental component score (MCS) as measures of quality of life, ESS and PSQI of sleep quality, PainDETECT and SF-MPQ-2 of pain, FACIT-F and FSS of fatigue, and HADS of depression and anxiety. Differences in mean scores between age groups and gender for first submitted instruments were tested using ANOVA and independent samples t-tests, respectively, and correlation between instruments examined via repeated measures correlation.

Results: The sample was comprised of 48 participants with XLH (77% females, median age 46 y). Mean scores were: EQ5D-5L=0.65, SF36-PCS=32.7, SF36-MCS=48.4, ESS=5.9 and PSQI=8.9, FSS=32.8 and FACIT-F=104.4, HADS-depression=4.7 and HADS-anxiety=6.2, SF-MPQ-2=1.9 and PainDETECT=9.3. Severe or extreme problems were reported in all instruments, with mobility (23%) and pain (23%) from EQ5D, and functional wellbeing (mean=18.2) and fatigue (mean=31.3) in FACIT-F being the most frequent. There was no statistically significant difference in mean scores by age group, or by gender except for PSQI, indicating that females (mean=9.6) experience a slightly poorer quality of sleep than males (mean=6.4). We found low to moderate correlation between instruments, few being statistically significant. The lowest correlation coefficient was between SF36-MCS and PainDETECT (r=-0.019) and highest between PSQI and FSS (r=0.579). The highest statistically significant correlations (p<0.05) were between SF36-MCS and FACIT-F (r=0.513).

Conclusion: People with XLH reported most severe problems in mobility, pain, functional well-being and fatigue. Mental health and fatigue reported the highest correlation. More research is needed to identify the PROMs that most consistently capture the main health problems and changes experienced by people with XLH.

Acknowledgement: We thank RUDY participants.

P638
ARTIFICIAL INTELLIGENCE TO IMPROVE OSTEOPOROSIS SCREENING ON X-RAY RADIOGRAPHS

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Objective: Although DXA is the tool of choice for diagnosis of osteoporosis, DXA may not be available in every medical institution, preventing DXA as an ideal screening tool for osteoporosis. The rapid development of artificial intelligence (AI) has spurred much interest in its application to medical imaging problems. Here, we developed a special AI method to screen osteoporosis on the X-ray radiographs.

Methods: In this approach, an image dataset of X-ray radiographs on hip regions form patients with concomitant DXA exams for BMD were collected for training of AI image screening system. The definite diagnosis of osteoporosis was based on the BMD of DXA exams. A controllable features layer of convolutional neural network (CNN) model cascades to XGBoost classifier for bone's textures with an enhanced textures method is utilized with an image pre-processing algorithm. Region of interest for osteoporosis on proximal femur regions of the hip X-rays is estimated by this Orthopedic specialist. Followingly, a triplet method trains this model to be a pretrained model by input after the image preprocesses of radiographs.

Results: The proposed controllable features of the CNN model was trained, evaluated and transferred by triplet loss and pre-trained model on 407 X-ray radiographs in our dataset. Our AI detection results based on the X-ray radiographs indicates excellent consistency with the diagnosis of osteoporosis defined by the DXA. (AUC to 90%)

Conclusion: The AI system for osteoporosis detection demonstrate high consistency with the diagnosis by DXA, proving its usefulness for osteoporosis screening in clinical settings. Our AI system hold tremendous promise as a screening tool to identify persons at increased risk of osteoporosis and sustaining a low-trauma fracture especially on the hip regions.

P639
SARCOPENIA AND FRACTURE RISK ACCORDING TO FRAX® TOOL IN WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: To evaluate the frequency of sarcopenia (SP), BMD and fracture risk in women with rheumatoid arthritis (RA).

Methods: 79 women (age median 60 [55; 65] y) with RA was conducted. We performed a DXA to assess body composition and BMD of lumbar spine (LS), femoral neck (FN) and total hip (TH). The 10-y probability of major osteoporotic fracture and hip fracture was calculated using the Russian version of the FRAX tool. Criteria of EWGSOP2 were used for diagnosis of SP.

Results: 20 (25,3%) patients (pts) had confirmed SP, among them 9 (12.3% of the total) – severe SP. Pts with SP did not differ from pts without SP by age, time of menopause, duration of postmenopause, calcium intake, cumulative dose of glucocorticoids (GCs) and disease activity. At the same time, pts with SP had a longer duration of RA and a lower BMI than pts without SP (p=0.006 and 0.0001, respectively). Among pts with SP the proportion of people who had long-term therapy with GCs was significantly higher than without SP (p=0.04). Median BMD in LS was 0.892 [0.772; 1.024] g/cm^2 and 0.910 [0.785; 1.028] g/cm^2 - in pts with and without SP respectively (p>0.05). We found significant difference between groups in the proximal femur BMD: there were 0.760 [0.731; 0.826] g/cm^2 in TH and 0.681 [0.607; 0.703] g/cm^2 in FN in pts with SP and 0.838 [0.735; 0.921] g/cm^2 in TH and 0.719 [0.622; 0.804] g/cm^2 in FN in pts without SP (p=0.009 and p=0.048, respectively). The 10-y probability of major osteoporotic fracture was 22% [17,0; 32,0] / 13,0% [9,7; 18,5] in pts with SP / without SP (*p*<0.05) and hip fracture - 3,1% [3,0; 7,5] / 1,4% [0,9; 2,78], respectively (*p*<0.05).

Conclusion: SP was detected in quarter pts with RA. In these pts proximal femur BMD was significantly less than in women without SP. The risk probability of major osteoporotic fracture and hip fracture was significantly higher in pts with RA and SP compared with pts without SP.

P640
OSTEOARTHRITIS, PHYSICAL ACTIVITY AND MENTAL WELLBEING IN OLDER ADULTS: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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Objective: Osteoarthritis (OA) is the most common joint disease in later life and often results in joint pain. We considered whether relationships between joint pain at different lower limb sites had differential relationships with physical activity (PA) in older adults, and studied relationships between PA and mental wellbeing.

Methods: We studied 555 men and 542 women from the Hertfordshire Cohort Study, a cohort of community-dwelling men and women. A questionnaire was administered including co-morbidities, pain in spine, hip, knee, ankle joint site affecting ability to walk, the Warwick-Edinburgh Mental Well Being Scale (WEMWBS) and current PA in the past 7 days, which was used to derive a PA summary score. Analyses were adjusted for age, BMI, number of comorbidities and analgesic use.

Results: The mean (SD) age of participants was 80.2 (2.7) years in men and 80.2 (2.6) y in women. The WEMWBS median score (IQR) for men was 55 (48-62), and 53 (47-60) for women, p=0.031.

Men reported higher PA scores than women (p=0.005). Joint pain restricted walking in 38.6% women and 29.6% men (p=0.003), with 15.7% women and 11.8% men reporting pain at multiple sites; knee pain was the most commonly affected single site (10.2% men, 8.3% women). Back pain and pain at multiple sites were associated with reduced PA levels with relationships remaining significant after adjustment at back (men: β=-0.55 z-score, (95%CI -1.03, -0.07), p=0.024, women: β=-0.60 z-score, (95%CI -0.90, -0.31), p<0.001) and multiple sites (men: β=-0.48 z-score, (95%CI -0.77, -0.19), p=0.001, women: β=-0.48 z-score, (95%CI -0.74, -0.23), p<0.001). In women, hip pain was negatively associated with PA levels after adjustment (β=-0.45 z-score, (95%CI -0.83, -0.06), p=0.023). Knee pain was also associated with PA levels, but relationships were attenuated after adjustment. In both sexes, higher PA levels were associated with a better WEMWBS score after adjustment (p<0.001).

Conclusion: The most common single affected joint to restrict PA in older adults was the knee but adjustment that included analgesic use attenuated this association. Higher PA levels were associated with psychological wellbeing. These results highlight the benefits of good pain management in treatment algorithms of knee OA in older adults.

P641
SURVIVAL OF BDMARDS IN BIO-NAIVE PATIENTS WITH RHEUMATOID ARTHRITIS (RA) DURING THE FIRST YEAR OF THERAPY

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Objective: To investigate drug survival of bDMARDs in previously bio-naive patients (pts) with RA during the first year of therapy.

Methods: 204 adult bio-naive pts (173 women, 84.8%), with active RA, despite the concomitant DMARD therapy, were included into retrospective study. All of them initiated bDMARDs: infliximab (INF) - 65 pts (31.9%), rituximab (RTM) - 39 (19.1%), adalimumab (ADA) - 30 (14.7%), etanercept (ETA) - 28 (13.7%), abatacept (ABA) - 23 (11.3%), tocilizumab (TZ) - 15 (7.4%), certolizumab pegol - 4 (1.9%). The following indicators were used as survival predictors: sex and presence of rheumatoid factor.

Results: A year later, 92 pts (45%) remained on bDMARDs and 112 pts had their treatment discontinued. The reasons of bDMARDs discontinuation during the first year of treatment were: lack of effectiveness (including primary inefficiency) - 50%, adverse events (AE) - 25%, administrative causes - 17%, clinical-laboratory remission - 6.25%, death due to reasons unrelated to the therapy - 1.75%. By the end of the observation period, the best survival was shown by PTM therapy (69.23% of patients continued treatment for a year), ETA (44.4% of patients) and ABA (43.48% of patients). Discontinuation of bDMARDs due to RA remission was achieved in 7 patients and proved to be significantly higher in the PTM group (10.26%, p<0.05) compared to the ABA group (8.7%) and ADA group (3.45%). Although the number of women continued after a

year was significantly higher than that of men (84.8% and 15.2% respectively), female sex was not a reliable predictor of drug survival. At the same time, the rate of discontinuation due to AE in women was higher (96.55%, p=0.03. Discontinuation of therapy due to inefficacy was more common in the group of seronegative RA - 59.1% (p<0.05). In the seropositive RA group 24.8% of pts had interrupted bDMARDs for this reason. Discontinuation of therapy due to remission was overwhelmingly observed in seropositive RA group (6 pts, 4%, p<0.05).

Conclusion: Female sex and RA, seronegative by RF, were associated with less survival of bDMARDs due to lack of effectiveness and/or AE, and RTM and seropositive RA - with more frequency of discontinuation of therapy due to remission.

P642
INCREASE IN THE CONCENTRATION OF METHOTREXATE METABOLITES IN PATIENTS WITH INFLAMMATORY DISEASES OF THE JOINTS

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Objective: to study the trends in the concentrations of the 7-OH-methotrexate (7-OH-MTX), polyglutamates (2-4) methotrexate (MTPG 2-4)) in the red blood cells (RBC) of patients with inflammatory joint diseases taking subcutaneous methotrexate (MTX) in the early stages of therapy.

Methods: 5 patients (two men, 3 women) with a diagnosis of rheumatoid arthritis (n=3) and psoriatic arthritis (n=2), who started therapy with methotrexate in the form of a solution for subcutaneous administration, were examined. A blood test using tandem mass-spectrometry for the concentration of MTX metabolites was performed three times, on average after 32.5, and also after 50.7 and 67 d from the MTX initiation.

Results: The concentrations of 7-OH-MTX, MTPG2, MTPG3, and MTPG4 were determined. MTPG5 in a significant concentration was not determined, most likely due to the insufficient duration of therapy. After 4 weeks of therapy, the concentration of metabolites was: 7-OH-MTX 10 [6;18], MTPG2 419 [397;426], MTPG3 76 [66;267], MTPG4 5 [3; 19] nmol/L. After 7 weeks of therapy, the concentration of metabolites was: 7-OH-MTX 5 [5;10], MTPG2 465 [408;482], MTPG3 173 [130;195], MTPG4 9 [7;12] nmol/L. After 9 weeks of therapy, the concentration of metabolites was: 7-OH-MTX 8.9 [8.8;10.3], MTPG2 425 [389;471], MTPG3 207 [170;230], MTPG4 11 [10.2;18.9] nmol/L. The level of the total number of metabolites was 20±11 nmol/L after 4 weeks, 26±7 nmol/L after 7 weeks and 22±12 nmol/L after 9 weeks of therapy. A direct correlation was revealed between the level of 7-OH-MTX and MTPG2, and MTPG3, as well as the concentrations of MTPG3 and MTPG4. There were no statistically significant changes in the level of various MTPGs during the study.

Conclusion: At 4 and 7 weeks of therapy, the highest concentration was observed in the study of the level of MTPG2. By the 9th week of therapy, a significant increase in the concentration of MTPG3 was detected.

P644
AGE-RELATED MUSCLE STRENGTH DECLINE IN MID-LATE LIFE AND ITS ASSOCIATION WITH DIET AND PHYSICAL ACTIVITY: OBSERVATIONS FROM THE HERTFORDSHIRE COHORT STUDY

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Objective: In an aging population, age-related decline in muscle strength is well recognised, and associated with functional limitation. However, there are scarce epidemiological data regarding its prevalence, or lifestyle associations at a time when intervention is still possible. We considered these issues in the Hertfordshire Cohort Study, a cohort of late-middle aged community dwelling adults.

Methods: 2987 participants were seen in 1999-2004, 1572 men and 1415 women. A questionnaire was administered including social class, physical activity (PA), diet, and comorbidities. Grip strength was measured with a Jamar dynamometer, three times on each side with the highest value used. Age related muscle strength decline was defined, according to current convention, as grip strength <30 kg in men and <20 kg in women.

Results: The median age of participants was 65.8 (IQR 63.5-67.8) years for men and 66.5 (IQR 64.5-68.7) years for women. The odds ratio (OR) for age-related muscle strength decline was 3.73 (95%CI 2.66-5.23) in women relative to men (p<0.001), with a prevalence of 3% and 10.3% in men and women respectively. Protective factors included higher PA scores in men (OR 0.97, 95%CI 0.96-0.99, p=0.003) and in women (OR 0.97, 95%CI 0.96-0.98, p<0.001) and a higher prudent diet score in women (OR: 0.74, 95%CI 0.60-0.90 p=0.003). Muscle strength decline was strongly associated with quality of life in women (p≤0.001) as assessed by SF36 and EuroQoL EQ-5D for all domains, although EQ-5D anxiety/depression (p=0.042) and SF36 role emotional (p=0.006) were less strongly associated (Table).

EuroQoL EQ-5D	Odds Ratio	95%CI	p-value
Mobility			
some problem / confined to bed vs. no problem	4.10	(2.29, 7.34)	**<0.001**
Self-care			
some problem / unable to wash/dress vs. no problem	6.62	(3.04, 14.42)	**<0.001**
Usual activities			
some problem / unable to perform vs. no problem	3.27	(1.83, 5.84)	**<0.001**
Pain/discomfort			
moderate/extreme pain/discomfort vs. no pain/discomfort	2.98	(1.60, 5.55)	**0.001**
Anxiety/depression			
moderately/extremely anxious/depressed vs. not anxious/depressed	1.89	(1.02, 3.49)	**0.042**

Conclusion: Age-related muscle strength decline was more common in community dwelling women than men, and diet and PA were associated with such decline. Further longitudinal studies are warranted to establish such causal relationships.

P645
COMPARATIVE STUDY OF PATELLAR RESURFACING VS. NONRESURFACING IN TOTAL KNEE ARTHROPLASTY IN ELDERLY AGE GROUP

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Objective: To compare the functional outcomes in resurfaced and nonresurfaced groups; to find the incidence of revision rates in nonresurfaced groups; to find the incidence of anterior knee pain in both groups postoperatively; overall outcomes in comparison with Indian Knee Society Score and comparison in anterior knee pain using visual analogue scale. Our study aimed to understand the current concepts from a detailed review of literature regarding whether the patella should be resurfaced or not routinely during primary TKA.

Methods: The study was carried out in the Department of Orthopaedic surgery, Goa Medical College and Hospital, Bambolim, Goa. All patients who were scheduled to undergo primary TKA for osteoarthritis of knee from 1 June 2011 to 31 May 2013 were included in our prospective randomised controlled study which was approved by hospital ethical committee. A total of 100 cases were evaluated, 50 each in resurfacing and nonresurfacing groups. Patients were randomised one day prior to surgery. Surgery was performed by same senior surgeon. Pre and post op evaluation was done using knee society score (KSS), which consists of 100 points scale for clinical score and 100 points scale for function score. Assessment of anterior knee pain was done using VAS pre and post operatively. Standard AP and lateral view x-rays were evaluated at immediate postop, 6 months, 1 y, 2 y and 5 y follow-up. Follow-up x-rays were evaluated for component loosening, wear and patellofemoral problems like fracture or loosening of resurfaced patella, subluxation, dislocation and wear of nonresurfaced patella.

Results: There was statistically no difference amongst resurfaced and nonresurfaced group at 2 y follow-up clinically as well as functionally as the p value was more than 0.05. The mean KSS on scale ranging from 0-200 in the resurfaced group improved from 67.76 to 174.24 and, went up from 69.72 to 178.6 in the nonresurfaced group.

Conclusion: Even after 20 y of debate, the decision to whether to resurface the patella or not, during the primary total knee replacement, still remains controversial. Both resurfaced and nonresurfaced group of patients had similar knee evaluation scores at short term follow-up. This study may be specific to some extent because of the use of same prosthesis

P646
INFLIXIMAB-RELATED ADVERSE EVENTS IN PATIENTS WITH RHEUMATOID ARTHRITIS (OWN DATA)

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Objective: To assess the tolerance of infliximab (INF) in patients (pts) with rheumatoid arthritis (RA) in real clinical practice.

Methods: The annual study included 135 pts (114 women) with active RA. 105 pts received methotrexate (MT) 7.5-25 mg/week (average 10.8 mg/week). 23 patients received other DMARDs, including leflunomide, sulfasalazine and hydroxychloroquine. To 7 pts INF was prescribed as monotherapy. 22.2% of pts dropped out of the study due to primary or secondary inefficiency of infliximab.

Results: Adverse events (AE) were reported in 28.1% of pts. Infusion reactions were often observed (15 pts, 11.1% of cases). AE that did not require cancellation of the drug were reported in 4 pts (2.9%). In 19 pts (14.1%) there were serious AE that required the cancellation of infliximab, and in one case the death of the patient was recorded for a reason unrelated to the treatment of infliximab. Among the serious AE, allergic and anaphylactoid reactions (in 8 pts) were most frequent. The second most frequent occurrence was serious infections, observed in 7 pts (5.2%). In two pts (1.5%) we observed cardiological symptoms against the background of infliximab infusion or shortly after it. In two cases (1.5%), the cancellation of infliximab was associated with skin lesion (psoriatic plaques in the area of elbow joints after the 7th infusion and symmetrical ulcers of the lower thirds of the calves after 2 infusion). We considered the frequency of AE against the background of a combination of various DMARDs and INF, as well as against the background of monotherapy with INF. A significantly higher percentage of AE was observed against the background of the combined therapy of leflunomide and INF (37.5%), both in comparison with the group receiving the combination of methotrexate and INF (p=0.01) and with the group of monotherapy of INF (p=0.06). There were no significant differences in the incidence of AE (p=0.4) between the monotherapy groups and the combination therapy (INF+methotrexate).

Conclusion: According to our study, satisfactory tolerance of INF therapy can be stated. INF is safe for use in actual clinical practice, but pts should be informed of the risks of AE and the need to be examined by a rheumatologist before each infusion.

P647

OSTEOPOROSIS, FALLS AND FRACTURES IN PATIENTS WITH SYSTEMIC SCLEROSIS

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Objective: To evaluate BMD, frequency of falls and fractures in patients (pts) with systemic sclerosis (SSc).

Methods: 191 pts with SSc were recruited: 160 women (mean age 51±13 y) including 107 postmenopausal, and 31 men (mean age 53±14 y). DXA to measure BMD of lumbar spine (LS), femoral neck (FN) and total hip (TH) was performed. Personal data and data regarding disease were collected by using a questionnaire.

Results: 68% women and 55% men had low BMD: osteopenia in 30% and 32% and osteoporosis (OP) in 38% and 23%, respectively. OP was determined in 21% premenopausal and 50% postmenopausal women. LS, FN and TH BMD associated with BMI (R (Spearman)=0.3, R=0.41, R=0.49, respectively) – for whole group, duration of postmenopause (R=-0.56, R=-0.66, R=-0.63, respectively) - for postmenopausal women. BMD of LS and FN correlated with age (R=-0.22, R=-0.23, respectively), duration of SSc (R=-0.32, R=-0.31, respectively), glucocorticoid (GC) cumulative dose for LS only (R=-0.31). 25% pts (8% premenopausal women, 35% postmenopausal women and 25% men) had osteoporotic fractures in the past. 4% postmenopausal women had two or more fractures. Fractures of distal forearm and vertebrae were the most frequent: 7% and 14% pts, respectively. 3% pts had ankle or humerus neck fractures and 4% – other localizations. None of the pts had hip fracture. 24% pts reported falls in the year previous to the study, in 4% of cases of falls - fractures occurred. Pts with low BMD had a risk of falls and fractures about 3 times greater than pts with normal BMD (OR 2.93; 95%CI: 1.11-8.01 and OR 2.58; 95%CI: 1.04-6.6, respectively).

Conclusion: 38% of women and 23% of men with SSc had OP. 25% pts had already osteoporotic fractures. Age, BMI, the duration of postmenopause, disease duration and GC cumulative dose were associated with low BMD. Pts with low BMD had an increased risk of falls and fractures.

P648

IMPACT OF DENOSUMAB ON BONE MINERAL DENSITY IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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Objective: Primary hyperparathyroidism (PHPT) is often associated with reduced BMD. Denosumab is a human monoclonal antibody that binds receptor activator of nuclear factor κB ligand and thereby reduces osteoclast-mediated bone resorption. Studies of the denosumab administration in individuals with PHPT-related osteoporosis are limited. We aimed to evaluate the effect of denosumab on BMD in patients with PHPT-associated osteoporosis compared to parathyroidectomy.

Methods: We conducted a retrospective cohort study based on medical record analysis of 16 patients with PHPT-related osteoporosis, who refused from the surgical treatment and 22 patients after parathyroidectomy. The analysis included the biochemical markers of calcium-phosphorus metabolism at the baseline and every 3 months; BMD at the lumbar spine (LS), femoral neck (FN), total hip (TH) and radius 33% (R33%) using DXA at the baseline and after 12 months. The BMD dynamics was evaluated using the Wilcoxon test (p<0,05).

Results: The patients in denosumab group (mean age=71.5 y, range 66-76) had mild PHPT (mean total calcium 2.68 mmol/l [2.61;2.73]; mean PTH 96.8 pg/mL [79.45;173.9]); normal GFR 82.5 ml/min/1.73m^2 [78;90], and all had BMD T-score ≤ -2.5 SD at least in one area. After 12 months of denosumab therapy, there was a significant increase in BMD in TH (0.8 g/cm^2 [0.69;0.85] vs. 0.8 g/cm^2 [0.69;0.88, p=0.03]) and decrease in R33% (0.55 g/cm^2 [0.5;0.6] vs. 0.47 g/cm^2 [0.44;0.53], p=0.007), while LS and FN values did not show any significant changes. Compared to conservative treatment, parathyroidectomy improved the initial values of BMD in LS (p<0.001), FN (p<0.001), TH (p<0.001), except R33% (p=0.17). Additionally, we evaluated the effect of denosumab on calcium levels at 3 months after administration, and a significant decrease was noted (2.48 mmol/l [2.39;2.59], p=0.001) with no changes in PTH and GFR levels. No new fractures were registered within 12 months in both groups.

Conclusion: Parathyroidectomy is associated with significant improvement of BMD and should be considered for all patients with PHPT in order to reduce the fracture risk. However, denosumab could stabilize and even improve BMD as well as significantly reduce the calcium level in PHPT patients. Denosumab may be a useful alternative among PHPT patients, if the parathyroidectomy has to be delayed or contraindicated.

P649

RELATIONSHIPS BETWEEN RHEUMATOID ARTHRITIS ACTIVITY AND XANTHINE OXIDASE, XANTHINE DEHYDROGENASE, AND SUPEROXIDE DISMUTASE PLASMA ACTIVITIES

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Objective: To study relationships between rheumatoid arthritis (RA) activity and xanthine oxidase (XO), xanthine dehydrogenase (XDG), and superoxide dismutase (SOD) plasma activities.

Methods: 71 adult RA patients (46 females and 25 males, mean age 43.2±3.6 y, mean disease duration 11.9±2.6 y) and 30 healthy controls were included in the study. Diagnosis of RA had been established using ACR/EULAR 2010 criteria. The RA activity was measured using the Disease Activity Score of 28 joints (DAS28).

Low RA activity (DAS28 ≥2.6 to ≤3.2.) was determined in 33,8% of patients, moderate RA activity (DAS28 >3.2 to ≤5.1) - in 57.7% of patients, high RA activity (DAS28 >5.1) - in 8.5% of patients. Plasma enzymatic activities were measured spectrophotometrically (1). Statistical comparison tests are selected in line with common guidelines, differences were considered significant when p<0.05.

Results: Reference intervals (M±2σ) for XO, XDG, and SOD activities were 2.28–5.12 nmol/min/ml, 3.96–7.24 nmol/min/ml, and 3.13–6.58 units, respectively. Enzymatic patterns in plasma of entire RA group are characterized by increase of both XO and SOD activities (p<0.001 for every enzyme). Activities of these two enzymes positively correlated with RA activity. High disease activity is conversely associated with decreased XDG activity (p<0.001), and negative correlation between the latter biomarker and DAS28 score exists.

Conclusion: The results demonstrate strong influence of active inflammation in RA on enzymatic pattern of purine metabolism enzymes, namely plasma XO, XDG, and SOD. These changes can also modulate anticitrulline autoimmunity through changes in induction of citrulline-rich neutrophil extracellular traps, thus enhancing rheumatoid autoimmunity.

Reference: 1. Martemyanov VF et al. Int J Applied Fundament Res 2015;12:1048.

P650
SARCOPENIA IN WOMEN WITH RHEUMATOID ARTHRITIS: FREQUENCY AND RISK FACTORS

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Objective: To assess the frequency of sarcopenia (SP) according to EWGSOP2 criteria and factors associated with it in women with rheumatoid arthritis (RA).

Methods: 79 women (aged 40-75 y) with RA were enrolled in the study. We analyzed clinical data: age, BMI, disease duration, methotrexate use, glucocorticoid (GCs) use, anthropometric measurements, C-reactive protein level, disease activity score in 28 joints-erythrocyte sedimentation rate, BMD of the lumbar spine, femoral neck (FN), total hip (TH) and body composition by DXA (Hologic Discovery). Also, muscle strength and functional tests were performed.

Results: 73 (92.4%) patients had probable SP, 20 (25.3%) pts had confirmed SP, including 9 (11.3% of the total group) – severe SP. There was no correlation between the patients' age and SP, while the duration of RA in women with SP was significantly greater than in pts without SP (p=0.006). There were significant correlations between appendicular lean mass and BMI, GCs use, methotrexate dose, creatinine and urea acid serum concentration, BMD and falls frequency. In univariate logistic regression analyses, BMI (OR 0.76; 95%CI: 0.64-0.91), prior fractures (OR 2.40; 95%CI: 1.07-101.1), disease duration (OR 1.10; 95%CI: 1.03-1.17), use of GCs (OR 4.08; 95%CI: 1.29-12.94), FN BMD (OR 0.61; 95%CI: 0.37-1.0),

TH BMD (OR 0.62; 95%CI: 0.38-1.0), appendicular fat mass index (OR 1.66; 95%CI: 1.45-1.97), serum creatinine level (OR 0.96; 95%CI: 0.93-1.0) were associated with SP.

Conclusion: According EWGSOP2 criteria confirmed SP was found in 25.3% RA pts, including 11.3% women with severe SP. BMI, prior fractures, disease duration, FN and TH BMD, appendicular fat mass and serum creatinine level were associated with SP in RA women.

P651
OSTEOPOROSIS AND SARCOPENIA IN WOMEN WITH OSTEOARTHRITIS

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Objective: To determine the frequency of osteoporosis (OP) and sarcopenia (SP) in patients with osteoarthritis (OA).

Methods: A cross-sectional study of 57 women (age median 63 [59; 68] y) with OA was conducted. We assessed clinical data: age, BMI, disease duration, anthropometric measurements, muscle strength and function. A DXA to measure fat mass, lean mass, and bone mass in the whole body and BMD of lumbar spine (LS), femoral neck (FN) and total hip (TH) was performed. Criteria of EWGSOP2 were used for diagnosis of SP. OP was determined in accordance to WHO criteria.

Results: Mean BMD was 0.906 ± 0.134 g/cm^2 in LS, $0.721\pm0,143$ g/cm^2 in FN and 0.854 ± 0.223 g/cm^2 in TH. Low BMD was detected in 68.3% patients: OP - in 10 (17.5%), osteopenia – in 29 (50.8%) women. 18 (31.6%) patients had normal BMD in all measurement's areas. OP in LS and FN was in 17.5% and 3.5% patients, respectively (p<0.05). According to EWGSOP2 probable SP was found in 31 (54.4%) women with OA. Mean appendicular mass index (AMI) was 7.2±0.9 kg/m^2. Only 2 (3.5%) patients had confirmed SP, one of them had severe SP and OP. 2 (3.5%) patients had low AMI, normal muscle strength and OP. BMI >30 kg/m^2 was in 22 (38.6%) women, 40 (70.2%) patients had total fat >35% by DXA measurement. Among women with low muscle strength 25 (80.7%) had overfat and only 1 (1.8%) woman with overfat had low AMI.

Conclusion: The frequency of OP was 17.5% and osteopenia – 50.8% in women with OA. Probable sarcopenia was detected in 54.5% and confirmed sarcopenia was diagnosed only in 3.5% patients. 80.7% women with low muscle strength had overfat according to DXA. Women with OA was characterized by the presence of overfat with low muscle strength without reducing muscle mass.

P652
XANTHINE OXIDASE, XANTHINE DEHYDROGENASE, AND SUPEROXIDE DISMUTASE ACTIVITIES IN RHEUMATOID ARTHRITIS WITH EXTRA-ARTICULAR MANIFESTATIONS: ENZYMATIC PROFILING OF BLOOD PLASMA

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Objective: To study xanthine oxidase (XO), xanthine dehydrogenase (XDG), superoxide dismutase (SOD) activities in plasma of rheumatoid arthritis (RA) patients with extra-articular manifestations.

Methods: We obtained samples from 71 RA patients (46 females and 25 males) and 30 healthy controls. Diagnosis of RA had been established using ACR/EULAR 2010 criteria. Extra-articular manifestations were found in 30 (42,2%) RA patients. 30% of them had cardiovascular involvement, 23.3% – pulmonary involvement, and 23.3% had renal involvement. Enzymatic activities in plasma were determined by spectrophotometric assay. Statistical comparison tests were selected in line with common guidelines, differences were considered significant when p<0.05.

Results: Reference intervals (M±2σ) for XO activity were 2.28-5.12 nmol/min/ml, for XDG activity – 3.96-7.24 nmol/min/ml, for SOD activity – 3.13-6.58 units. Significantly increased plasma XO and SOD activities dominated in the enzymatic patterns of RA patients. Articular lesions were found to be associated with elevated activity of all the enzymes: XO (p≤0.001), XDG (p=0.019), and SOD (p≤0.001). XO activity (p<0.001) are further increased in RA patients with extra-articular manifestations comparing to selective articular RA type. SOD activity (p=0.022) is lower in RA patients with extra-articular manifestations form in RA patients than with articular form.

Conclusion: RA is characterized by activation of both oxidative and antioxidant metabolic pathways including significant changes of plasma XO, XDH, and SOD activities. Overall increase of all three plasma enzymatic activities is found to be characteristic for RA patients. The difference between selective articular and visceral types of organ involvement also exists. One of eventual sources of "rheumatic" anticitrulline antigens is newly discovered neutrophil extracellular traps. Their induction is influenced by some enzymes of purine/oxidative metabolism, such as study xanthine oxidase, xanthine dehydrogenase, and superoxide dismutase.

P653
SPONTANEOUS AND INDUCED NEUTROPHIL EXTRACELLULAR TRAPS FORMATION IN RHEUMATOID ARTHRITIS PATIENTS

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Objective: To study the ability of peripheral blood neutrophils to generate extracellular traps spontaneously and after inductor exposure in rheumatoid arthritis (RA) patients.

Methods: The study included 15 patients with verified RA according to the ACR/EULAR 2010 criteria. Neutrophils were isolated with one-step centrifugation procedure using double-layer ficoll-amidotrizoate density gradient with density of upper and lower layers 1080 kg/m^3 and 1090 kg/m^3, respectively. The types of cells in the resulting fractions were identified by means of light microscopy, the extent of neutrophil activation was measured using common nitro-blue tetrazolium test. The generation of neutrophil extracellular trap (NETs) was stimulated by phorbol-12-myristate-13-acetate (PMA). The shape and size of NETs was assessed using fluorescence microscopy with SYBR green.

Results: RA disease activity assessed using DAS28 score did not exceed 2.6 in every patient. 15 healthy people were included as a control group. The mean age of RA patients was 56.2±3.4 y, mean disease duration 1.4±0.5 y. Anticitrullinated protein antibodies (ACPA) were detected in 60% of RA patients. Mean purity of neutrophil fraction in RA group was 93.3%, cell viability in every sample was above 95%. Spontaneous NET formation was observed in neutrophils isolated from RA patients and healthy controls. Spontaneous and induced NETosis in RA patients was significantly increased comparing to healthy controls. Neutrophils from ACPA-positive RA patients demonstrated increased spontaneous and induced NETs formation compared from ACPA-negative RA patients.

Conclusion: We have revealed enhanced spontaneous and induced NET formation by neutrophils from RA patients, suggesting that circulating neutrophils may be primed to NETosis through autoimmune inflammation. Thus, NETs can be used as potential biomarkers of RA.

P654

ZOLEDRONIC ACID VS. DENOSUMAB IN THE TREATMENT OF OSTEOPOROSIS AMONG MEN WITH HIV INFECTION

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Objective: Human immunodeficiency virus (HIV) infection is independently associated with lower BMD and increased fracture risk, while effective strategies to reduce bone fragility in this chronic condition have no clear directions. We aimed to compare yearly changes in lumbar spine (LS), total hip (TH) and femoral neck (FN) BMD, among men with HIV infection treated with either zoledronic acid (ZOL) or denosumab (Dmab) for their osteoporosis.

Methods: Men, under highly active antiretroviral therapy (HAART) for their HIV infection, requiring onset of osteoporosis treatment according to their BMD values and/or FRAX scores were assigned to either a single iv infusion of ZOL 5mg or two Dmab 60 mg sc injections every 6 months. BMD was measured at baseline and 12 months and adequate supplementation with calcium and cholecalciferol was given throughout the study.

Results: 23 patients matched for age, BMI, HAART, and baseline BMD values (Table 1) received an 1-y osteoporosis treatment with either ZOL (n=10) or Dmab (n=13). BMD increased significantly at all skeletal sites both within the ZOL (LS: 4.3%, TH: 3.1%, FN: 4.6%) and Dmab (LS: 5.9%, TH: 10%, FN: 2.3%) group. No adverse event was noted while a noteworthy absence of any acute phase response was recorded among the ZOL treated individuals. The comparison of Δ-changes between groups revealed no significant difference in the incremental alterations of the LS (0.043±0.03 g/cm^2 in ZOL vs. 0.059±0.03 g/cm^2 in Dmab, p=0.35), TH (0.025±0.03 g/cm^2 in ZOL vs. 0.029±0.01 g/cm^2 in Dmab, p=0.68), and FN (0.036±0.05 g/cm^2 in ZOL vs. 0.020±0.01 g/cm^2 in Dmab, p=0.33) values.

Conclusion: Among men under HAART requiring osteoporosis treatment both ZOL and Dmab are quite efficient therapeutic options with comparable BMD increases at all skeletal sites at least for the first year of treatment.

Table 1. Anthropometric characteristics and baseline measurements of the study cohort

	Patients treated with Dmab (n=13)	Patients treated with Zol (n=10)	P value
Age (y)	58.31±9.7	54.10±13.8	0.403
BMI (kg/cm^2)	23.96±4.75	23.33±3.49	0.725
Duration of HAART (y)	9.54±7.06	9.60±7.6	0.984
T-score LS	-1.892±1.33	-1.860 ±1.17	0.952
T-score TH	-2.084 ±0.39	-2.037 ±0.44	0.803
T-score FN	-2.430 ±0.35	-2.300 ±0.32	0.377
BMD LS (g/cm^2)	0.991±0.15	0.997 ±0.14	0.919
BMD TH (g/cm^2)	0.801±0.05	0.805 ±0.08	0.900
BMD FN (g/cm^2)	0.755 ±0.04	0.772 ±0.045	0.388
FRAX score MOF	6.93±1.63	4.32 ±1.86	0.002*
FRAX score HF	1.84±0.80	1.72 ±0.96	0.747

All values are presented as mean±SD

Dmab, denosumab; Zol, zoledronate; MOF, major osteoporotic fracture; HF, hip fracture

*statistical significance

P655

SELF-PERCEPTION OF FRACTURE RISK AND USE OF ANTIOSTEOPOROSIS MEDICATION AMONG PARTICIPANTS IN THE GLOW STUDY

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Objective: Self-perception of fracture risk has been associated with fracture risk independent of FRAX score. The aim of this study was to determine if self-perceived risk (SPR) of fracture is associated with the use of antiosteoporosis medication (AOM) up to the 3-y follow-up of the UK arm of the Global Longitudinal Study of Osteoporosis in Women (GLOW).

Methods: GLOW is a longitudinal study of the bone health of 60,000 female participants, aged 55 or older. At baseline, and at 1-, 2- and 3-year follow-ups, participants completed questionnaires concerning their medical history, current medication, and self-perception of fracture risk. Among 3912 participants with data on baseline SPR and AOM at one or more time-points, the association between baseline SPR and use of AOM at each time-point was examined using logistic regression. In a subsample of 331 participants taking AOM at baseline, SPR at baseline in relation to continued use of AOM up to the 3-y follow-up was also examined.

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Results: Higher SPR at baseline was significantly positively associated with taking AOM at baseline (odds ratio per higher band of SPR: 3.47, CI 95% 3.00, 4.02, p<0.001) and at each follow-up (Year 3: 2.50, CI 95% 2.16, 2.89, p<0.001); relationships were robust before and after adjustment for baseline FRAX score. Among the subsample taking AOM at baseline, participants with higher SPR at baseline were significantly more likely to have continued taking AOM over the three-year follow-up period (odds ratio per higher band: 1.33, CI 95% 1.06, 1.66, p=0.013) than those with lower baseline SPR.

Conclusion: Self-perceived risk of fracture is associated with use of anti-osteoporosis medication, with associations robust to adjustment for baseline FRAX score. GLOW participants with higher self-perceived risk of fracture were more likely to be taking antiosteoporosis medication than those participants with lower self-perceived risk.

P656
THE EFFECTIVENESS OF EXTRACORPOREAL SHOCKWAVE TREATMENT (ESWT) IN MYOFASCIAL PAIN SYNDROME: RELATIONSHIP WITH FUNCTION, QUALITY OF LIFE AND ULTRASONOGRAPHIC FINDINGS

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Objective: Myofascial pain syndrome (MPS) is a chronic pain syndrome which disrupts the quality of life and functionality. The aim of this study was to determine effectiveness of extracorporeal shock wave treatment (ESWT) on the severity of the pain at the trigger points and patients' functional status and quality of life as well as quantitative USG measurements in patients with MPS.

Methods: A total of 32 patients with MPS who were aged between 18-60 y and who had been admitted to outpatient clinic of PMR, were included to the study. Age, gender, duration of symptoms, education, BMI were recorded. The pressure pain threshold at the most painful trigger point was measured by the algometer; the same point was evaluated by ultrasonographic shearwave elastography (SWE). Patients were grouped as Group1 who received ESWT (700 pulse, 4 Hz, 1.5 bar, 5 min) and Group2 who received sham ESWT for trigger points twice a week for 2 weeks. Pain by VAS, functional status by Neck Pain and Disability Index (NPDI) and quality of life by Nottingham Health Profile (NHP) were assessed before and after therapies.

Results: There were 18 and 14 patients in Group 1-ESWT and Group2-sham groups respectively. The demographic properties were similar between the groups (p>0.05). There were significant improvements in pain, function and QoL scores in both groups but statistically significant improvements were determined only in Group 1. No significant change was observed in SWE values.

VAS-pain scores were correlated with NPDI, and pain, physical and social-subscores of NHP scores in both groups (p<0.05) but SWE and algometric scores did not correlate with any variable.

Conclusion: ESWT is effective in pain intensity of trigger points and improves function and increases quality of life. Further research is required in order to determine the long-term effects of ESWT in patients with MPS.

P657
RESULTS OF COMBINED TREATMENT OF MALIGNANT FIBROUS HISTIOCYTOMA OF BONE

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Objective: Malignant fibrous bone histiocytoma - arises from histiocytes, accounts for 2-3.4% of all malignant bone tumors, often affects long tubular bones - 80%, in 20% of cases it develops at the site of the previous benign process: Paget's disease, giant cell tumor, fibrotic dysplasia. The aim of the study was to show the advantages of a combined method for the treatment of malignant fibrous bone histiocytoma.

Methods: Combined treatment was performed in 12 patients with malignant fibrous histiocytoma of the bone. There were 8 men (66.7%), 4 women (33.3%), and the average age of the patients was 45.4±1.6 y. The tumor location was as follows: femur - 9 (75%), tibia - 3 (25%). Patients underwent polychemotherapy courses according to the treatment protocol for osteogenic sarcoma. Combination treatment included: preoperative intravenous chemotherapy of 4-5 courses with an interval of 3 weeks, subsequent surgical treatment, which consisted in the removal of the tumor and joint replacement and postoperative polychemotherapy (7-8 courses) depending on the pathomorphism of the tumor. The functional result of the operated limb was calculated according to the MSTS scale (Musculo - Special Tumor Staging/System). Assessment of the quality of life of patients was carried out according to the EORTC QLQ - C30 questionnaire (scale from 0-4 points). Patient survival was determined by the Kaplan-Meyer method.

Results: Complications in the postoperative period were noted in 1 (8.33%) patient. Tumor recurrence was detected in 2 (16.7%) patients. The functional result of the limb according to the MSTS scale was: after resection of the distal femur and knee replacement - 88.2%, after resection of the proximal tibia and knee replacement - 76.4%. The quality of life of patients after the combined treatment increased from 30 to 86 points. The overall 3-y survival of patients was: 68.2±5.5%, 5-y: 56.3±6.7%.

Conclusion: The use of a combined method of treating patients with malignant fibrous histiocytoma of the bone allows us to restore limb function, improve quality of life and increase patient survival.

P658
DESCRIPTIVE RESULTS FROM A EUROPEAN OSTEOPOROSIS SCREENING CAMPAIGN: PROTECT YOUR LIFE 2018

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Objective: To raise awareness on the significance of screening for early detection of bone health risk.

Methods: A 1-d screening event took place during Q4 2018 in Barcelona, Brussels, Munich, Nice, Zurich, and Rimini. Older passersby, or citizens who had preregistered for the event, were invited and consented to having their major osteoporotic fracture (MOF) risk and cardiovascular risk calculated using the FRAX tool (without BMD) and SCORE algorithm, respectively. Participants additionally completed a questionnaire on their perception of these risk estimates and their self-care. This abstract focuses on the MOF risk assessment, for which high risk was defined as the 10-year probability of >20%[1].

Results: 2241 citizens were assessed using FRAX; 68% were women (range: 57% [Brussels] – 75% [Barcelona]) and 67% >65 years old (range: 35% [Brussels] – 78% [Barcelona]). Approximately 16% (n=332) of the participants were at a high risk of MOF (range: 6% [Barcelona] – 33% [Zurich]). Most high-risk participants were women (95%), particularly over age 65 (93%). For 32% of the citizens the event revealed an unknown risk to their health, and two-thirds (68%) of them would discuss it further with their physician. While 42% had previously undergone a bone scan, nearly half of these (i.e., 22%) had not received a clear explanation of the results from their physician at the time. The majority of participants (87%) agreed/strongly agreed that the event would help them support their health and most (64%) would consider receiving online educational materials and advice in a follow-up program.

Conclusion: The results of this screening event suggest that a considerable proportion of older European citizens, particularly elderly women, are at high risk of fracture, which highlights the importance of self-awareness, early detection and appropriate care for osteoporosis.

Reference: 1. Kanis JA et al. Osteoporos Int 2012;23:2239.

P659
CHOLECALCIFEROL 25 000 IU: EFFECTIVE AND SAFE TREATMENT OF VITAMIN D DEFICIENCY IN LATVIA (BONORI STUDY)

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Objective: Vit.D deficiency still is an emerging problem worldwide and also in Latvia. Vit.D deficiency is up to 85% of inhabitants in the country. Various supplements of vit.D are available in Latvia. Recently cholecalciferol 25 000 IU per ampule/flapula appeared in the market.

Methods: Clinical cohort prospective study was performed from Jan-May 2019, and included 33 patients (pts) from endocrinology outpatient clinics. Exclusion criteria: age <18 y, pregnancy, hypercalcemia (hyperCa), GFR <30 ml/min/1.73m^2. Before starting cholecalciferol 25 000 IU, all pts had vit.25(OH)D, calcium (Ca) and intact PTH (iPTH) blood tests. All pts enrolled in the study for 10 weeks (wks) - in the first 4 wks they took 50 000 IU once a wk, then laboratory tests repeated (vit.25(OH)D, Ca and iPTH level). The pts continued to take vitamin D 50 000 IU once a wk for the next 4 wks and afterwards, they stopped taking vit.D for the next 2 wks and the same laboratory testing repeated again. **Results:** Mostly women (n=28) with median (Me) age 52 (63-37) y and 66.7% of the pts had BMI >25 kg/m^2. Me vit.25(OH)D level before treatment was 17.7 (23-13) ng/ml, Ca 2.39 (2.46-2.34) mmol/l and iPTH 58.9 (88.6-41.8) pg/ml. After 4 wks of the treatment, all pts had a significant increase in 25(OH)D level to 36.0 ng/ml (p>0.001). In 3 cases hyperCa appeared (2.78 mmol/l, 2.68 and 2.59 mmol/l, resp.). Laboratory testing on week 10 revealed no significant increase in 25(OH)D level if compare with results from wk 4 - 37.9 (45.6-32.2) ng/ml and no hyperCa cases developed. Higher BMI was associated with lower 25(OH)D level after treatment.

Conclusion: Cholecalciferol 25 000 IU is an effective and safe treatment of vit.D deficiency in Latvia if the dosage is 50 000 IU once a week for two months. Probably pts with higher BMI need more prolonged treatment. There is a need for a study to reveal maintenance dosage.

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

P660

COMPARATIVE STUDY OF RADIOLOGICAL AND THERAPEUTIC EFFECTS OF DIFFERENT DOSES OF RITUXIMAB IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Analysis of the clinical and anti-destructive effects of two doses of rituximab (RTX) in patients with rheumatoid arthritis (RA).

Methods: Clinical and radiological study of 60 patients (pts) with RA (mean disease duration 9+7.3 y, mean DAS28 6.4+0.95, RF-positive 89%, ACCP-positive 92%) treated with different RTX doses (1000 mg x2 or 500 mg x2). Clinical effect was assessed by EULAR criteria; radiological progression by SVH method.

Results: By the 24th week after the first course good results were registered in 23.5%; good and satisfactory results in 82.9%. After the 2nd course of treatment the corresponding figures were 29.7% and 85.3%. Antidestructive effect of RTX was also significant. After 48 weeks of treatment progression of articular destruction was absent in all pts in clinical remission, in 83% of pts with low disease activity, and in 43% of pts with moderate activity. Noteworthy, clinical and antidestructive effects often did not coincide. Thus RTX treatment slowed joint damage in 54% of pts without clinical improvement. There were no significant correlations between clinical outcomes and doses of RTX (after both the 1st and the 2nd courses). The inhibition of radiological progression was more pronounced in pts treated with higher doses of RTX.

Conclusion: The therapeutic effect of different doses of RTX (1000 mg x2 or 500 mg x2) was practically the same but the antidestructive effect of higher doses was significantly greater. Clinical and antidestructive results did not always coincide.

P661

CORRELATION BETWEEN SERUM LONG-CHAIN OMEGA-3 POLYUNSATURATED FATTY ACIDS AND BONE MINERAL DENSITY, VOLUMETRIC BONE MINERAL DENSITY AND BONE QUANTITATIVE ULTRASONOGRAPHY AT THE CALCANEUS IN SPANISH POSTMENOPAUSAL WOMEN.

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Objective: Long-chain omega-3 polyunsaturated fatty acids (LCO3-PUFAs) have been shown to have a beneficial effect on bone in animal studies, although less is known about their role in bone metabolism in humans. The objective of the present study is to investigate the presumed correlation between BMD, volumetric BMD (vBMD) and bone quantitative ultrasonography (QUS) at the calcaneus in Spanish postmenopausal women and serum LCO3-PUFAs in Spanish postmenopausal women.

Methods: This cross-sectional study was conducted among 204 healthy postmenopausal women (mean age 59±6 y). We examined BMD at the lumbar spine and femoral neck by DXA, vBMD by peripheral quantitative tomography at the radius and calcaneus QUS parameters (broadband ultrasound attenuation (BUA) and speed of sound (SOS)) as well as serum n-3 polyunsaturated fatty acids; (oleic acid (OLE), alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and n-6 fatty acids (linoleic acid (LA) and arachidonic acid (AA)). Serum levels of osteocalcin and C-terminal telopeptide of type I collagen (CTX1) were also assessed. Spearman's rank correlations between LCO3-PUFAs and BMD and bone turnover markers were estimated.

Results: Broadband ultrasound attenuation (BUA) was positively correlated to the serum ALA concentration (r=0.148, p=0.034). ALA concentration was also negatively correlated to the CTX1 concentration observed in the sample (r=-0.142,p=0.043). Similarly negative correlations were observed in the pQCT study for total vBMD with the DHA concentration (r=-0.170, p=0.049). In the pQCT bone geometry study the EPA serum concentration was negatively correlated with the total area (r=-0.226, p=0.032), trabecular area (r=-0.227, p=0.031) and the cortical+subcortical area (r=-0.229. p=0.030). No further correlations were observed with the other biochemical or densitometric parameters measured.

Conclusion: In general, the serum concentration of PUFAs does not appear to maintain any relationship with the determined bone health parameters beyond some potentially spurious relationship. Studies with larger sample sizes and subgroup analyses would be necessary to try to determine if a potential relationship could exist in different groups of women based on their densitometric classification according to the diagnostic criteria of osteoporosis since the scientific literature has shown that the potential effect of PUFAs at the dietary level could be enhanced in normal and osteoporotic women (1).

Reference: 1. Lavado-García J et al. PLoS One 2018;13:e0190539.

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2020

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P662
VOLUMETRIC BONE MINERAL DENSITY ASSESSED BY PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY AT THE RADIUS IN BREAST CANCER PATIENTS FIVE YEARS AFTER BREAST CANCER SURGERY

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Objective: Bone morbidity associated to chemotherapeutic treatment is an important health concern for postmenopausal breast cancer patients. The objective of this cross-sectional study was to use pQCT to evaluate trabecular and cortical volumetric BMD (vBMD) at the radius in healthy postmenopausal women and breast cancer patients 5 y after diagnosis.

Methods: We used pQCT to assess vBMD (mg/cm^3), bone geometry (trabecular, cortical+subcortical and total bone area, (mm^2)). Osteocalcin, C-terminal collagen telopeptide (CTX1) and bone-specific alkaline phosphatase (BALP) serum levels were also determined. A total of 213 women were recruited for this study: 95 breast cancer patients and 118 healthy control participants (matched by age and BMI). pQCT measurements were taken at the radius using Stratec XCT-2000 equipment (Stratec Inc, Germany). Height, weight, BMI, waist/hip ratio, age at menarche, years since menopause in case of postmenopausal women, history of disease and 7-d food questionnaire were recorded.

Results: There were no differences in the total BMD between the studied groups 299±56.5 mg/cm^3 vs. 309.9±50.3 mg/cm^3 (p=0.055). Also we did not observe differences in the vBMD at the trabecular level 158.1±41.6 mg/cm^3 vs. 157.9±44.0 mg/cm^3 (p=0.970) however, significantly higher cortical+subcortical BMD was observed in the patients group (435.5±70.2 mg/cm^3) vs. 411.5±84.5 mg/cm^3 (p=0.006) measured in the control group. No statistically significant differences were observed in the bone geometry parameters between groups (trabecular area (134.3±22.4 vs. 129.4±19.3 mm^2 (p=0.092); cortical+subcortical area 164.8±27.9 vs. 158.1±23.2 mm^2 (p=0.066) and total bone area, 299.0±49.8 vs. 287.3 mm^2 (p=0.066)). Significant differences were observed in the serum bone turnover markers between group. Osteocalcin (ng/ml) was higher in the control group 23.56±13.50 vs. 14.07±11.14 in the patients group (p<0.001) while CTX1 (pg/ml) was elevated in the breast cancer group 975.78±546.27 vs. 616.57±369.06 in the control group. No significant differences were observed in the BALP levels measured between the studied groups 15.48±16.87 vs. 22.81±21.76 ng/ml (p=0.055).

Conclusion: Overall, we did not observed that the breast cancer patients five years after breast cancer surgery demonstrated significantly lower values for vBMD at the radius compared with healthy postmenopausal women. We cannot conclude that this absence of differences between the groups studied is due to the presence of similar levels of bone health between the groups studied due to the relatively small sample size used. The analysis of the serum markers indicates the presence of a higher level of bone resorption in breast cancer patients, which makes us suggest that it is necessary to increase the sample size to verify that there are indeed no (or no) differences in volumetric BMD or bone geometry at the radius level between breast cancer patients five years after diagnosis and healthy controls.

P663
RELATIONSHIP BETWEEN SERUM OSTEOCALCIN, C-TERMINAL TELOPEPTIDE OF TYPE I COLLAGEN AND BONE QUANTITATIVE ULTRASONOGRAPHY IN POSTMENOPAUSAL SPANISH WOMEN

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Objective: To study serum osteocalcin, a marker of bone formation, and C-terminal telopeptide of type I collagen (CTX1), a marker of bone resorption, and to identify their relationship with bone quality measured by calcaneal quantitative ultrasonography.

Methods: 200 postmenopausal females (age=59±5.76) were included in this study. The postmenopausal subjects, with and without osteoporosis, were referred to the densitometry unit of the Metabolic Bone Diseases research group of the University of Extremadura. Height, weight, BMI, waist/hip ratio, age at menarche, years since menopause in case of postmenopausal women and history of disease, were recorded. BMD assessment was done on calcaneus by calcaneus quantitative ultrasonography. Calcaneus quantitative ultrasonography parameters, broadband ultrasound attenuation (BUA) and speed of sound (SOS) were determined. Serum levels of osteocalcin and CTX1 were also assessed.

Results: A negative correlation was found between age and calcaneus quantitative ultrasonography parameters (r=-0.316, p<0.001 and r=-0.195, p=0.005 for BUA and SOS respectively). No correlation was found between serum osteocalcin and BUA (r=-0.047, p=0.508) and SOS (r=0.037, p=0.606), suggesting that its determination limits its significance in the evaluation of its relationship with calcaneus quantitative ultrasonography parameters. No significant correlation was observed among osteocalcin and CTX1 (r=-0.045, p=0.528). A positive correlation of CTX1 with age (r=0.151, p=0.033) and a negative correlation with calcaneus quantitative ultrasonography parameters

WCO IOF-ESCEO

VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

(r=-0.291, p<0.001 and r=-0.313, p<0.001 for BUA and SOS respectively) was observed indicating increased bone resorption in the postmenopausal women investigated.

Conclusion: CTX1 appears to be a presumptive determinant of calcaneus quantitative ultrasonography parameters and may be used as a helpful element in the valuation of postmenopausal bone health.

P664
THE IMPACT OF FUNCTIONAL DISABILITY TO QUALITY OF LIFE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is an autoimmune disease characterized by chronic symmetric polyarthritis causing progressive joint destruction and disability. We aimed to investigate impact of functional disability to quality of life in patients with RA.

Methods: A perspective study included 109 patients with random sample method for patients treated in in Niška Banja Institute. The average age of patients was 58.86±9.54 and the average disease duration was 10.74±7.43 godine. Functional disability is represented with HAQ questionnaire filled in by patients themselves. Based on the obtained values they are classified in three groups: I group with HAQ value score of 0.125 to 1.000 indicate modest disability, II group with HAQ value score of 1.125 to 2.000 indicate more severe disability and III group with HAQ value score of 2.125 to 3.000 indicate a complete functional disability. Quality of life was measured by questionnaires for quality of life evaluation: MOS SF 36 (Short form Medical Outcomes Instrument) with 2 scales: MCS (Mental Component Scale) and PCS (Physical component scale) and questionnaire EQ5D. Comparison of numerical variables classified according to the type of normality was performed by ANOVA test. Statistical significance was at the level of <0.05.

Results: Average value of PCS, in the group of patients with total functional disability was 12.25±8.36, that was statistically significantly worse than in the group of patients with more severe disease and 24.55±10.29, (p<0.001) and in the group with moderate functional disability 34.89±16.82, (p<0.001). QoL estimated by PCS was statistically significantly better with the patients with moderate functional disability compared to the patients with more severe and total functional disability (p<0.001). Average value of MCS, in the group of patients with total functional disability was 21.84±18.28, that was statistically significantly worse than in the

group of patients with more severe disease and 36.52± 18.09, (p<0.001) and in the group with moderate functional disability 44.19±19.32, (p<0.001). QoL estimated by MCS was statistically significantly better with the patients with moderate functional disability compared to the patients with more severe and total functional disability (p<0.001)

Average value of EQ5D, in the group of patients with total functional disability was 2.49±0.22, that was statistically significantly worse than in the group of patients with more severe disease and 2.12± 0.25, (p<0.001) and in the group with moderate functional disability 1.73±0.22, (p<0.001). QoL estimated by EQ5D was statistically significantly better with the patients with moderate functional disability compared to the patients with more severe and total functional disability (p<0.001)

Conclusion: More difficult degree of HAQ functional disability significantly impairs both physical and mental sphere of the quality of life ana total quality of life, as well, Used questionnaires and scales for the evaluation of the functional ability and quality of life in patients with RA, complement the overall clinical picture of these patients and significantly contribute to the monitoring of the achieved results of the treatment. Our results have confirmed the hypothesis that functional disability has adverse impact on quality of life. Prompt evaluation of the quality of life and functional abilities using questionnaires and scales, make it possible to identify impaired segments and spheres, with prompt taking measures to preserve them.

P665
STUDY OF THE DEPENDENCE OF X-RAY PROGRESSION AND B-CELL LEVEL IN PATIENTS WITH RHEUMATOID ARTHRITIS TREATED WITH RITUXIMAB

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Objective: To study the impact of B-cells depleting therapy (RTM) on joint destruction in correlation with B-cells counts.

Methods: The study included 61 RA pts (average disease duration 10.1±7.7 y, mean DAS28 6.3±0.94, RF-positive - 87%, ACCP−positive 93%) undergoing RTM therapy. Clinical effect was scored by EULAR criteria, radiographic progression was assessed using Sharp/van der Heijde (SvH) modified scoring method. B-cell level was measured with flow cytometry.

Results: By week 48 after 2 RTM course good response was documented in 29.7% pts, good and satisfactory - in 85.3%; remission was achieved in 14.6% pts. There was no radiographic progression in remission pts., in 83% of pts with low disease activity and in 33% - with moderate disease activity. No significant influence of B-cells depletion on radiographic progression of the disease was noticed. Although, in RA pts achieving remission B-cell depletion was more notable as compared to pts with active disease.

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

Conclusion: Radiographic progression did not show any correlation with the degree of B-cells depletion. Most pronounced B-cells depletion was documented in pts achieving remission.

P666
WHAT FACTORS DETERMINE THE EFFECT OF DENOSUMAB ON BONE STRUCTURAL DAMAGE IN WOMEN WITH RHEUMATOID ARTHRITIS AND OSTEOPOROSIS

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Objective: RANKL is essential for osteoclast development, activation, and survival and it is a key mediator of increased osteoclast activity in rheumatoid arthritis (RA). Denosumab is a monoclonal antibody that binds RANKL. The aim of this study was to distinguish factors that determine the effect of denosumab in women with RA and osteoporosis (OP) on bone structural damage (erosions, joint space narrowing): anamnesis, clinical/laboratory markers, glucocorticoids (GC) intake, etc.

Methods: 66 postmenopausal women (mean age 59.6±7.4) with RA (mean duration 17.7±10.4 y) and OP received s/c denosumab 60 mg every 6 months pro 12 months. RF-positive were 72%, ACCP – 74% of patients. 34 (49%) patients continued GC. At baseline and after 12 months it was carried out the x-ray of hands and feet (Sharp/van der Heijde (SVH) score) and DXA at 3 sites: lumbar spine, hip neck and distal forearm. Statistica 6.0 was used.

Results: After therapy it was noted that the erosion score was increased in 12% (n=8) patients (p=0.0117), the joint space narrowing score (JSN) - in 9% (n=6) (p=0.027). In Table it is shown the most significant factors, which influence on SVH score dynamics (increase) after 12 months of denosumab therapy.

Table. The factors which influence on SVH score increase (n=66), p<0.05.

SVH score	The score increase is associated with
Erosion score	- lower BMD in L1-L4 (at baseline and after treatment) - higher cumulative GC dose - back correlates with BMD increase in DF - back correlates with bone alkaline phosphatase (BAP) base level - correlates with increase in JSN
Joint space narrowing score (JSN)	- presence at patients in anamnesis a surgical menopause - lower value of BMD dynamics (%) in DF - correlates with increase in erosion score and total SVH score.

Conclusion: There was note that the increase of erosion score is associated with either lower BMD in L1-L4 (at baseline and after treatment) or back correlation with BMD increase in DF. Also, the higher cumulative GC dose and back correlation with BAP base level were observed at patients with increased erosion score. The only factors that we could reveal in patients with increased JSN score were surgical menopause in anamnesis and lower value of BMD dynamics (%) in DF after treatment. In general, it was a direct correlation between erosion score and JSN score.

P667
CHARACTERISTICS, RISK FACTORS AND OUTCOMES OF PATIENTS WITH A HISTORY OF HIP FRACTURE

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Objective: Patients with hip fractures often have one or more risk factors for osteoporosis. We aimed to assess the relationship of these risk factors as well as patient characteristics with patient outcomes after osteoporotic hip fractures.

Methods: Patient records of our university hospital were searched to identify cases of osteoporotic hip fractures that were admitted between 1 January - 31 December 2017. Those subjects who could be reached by phone were include. Demographics, risk factors and ambulation status were questioned via phone calls. Clinical data were recorded from the patient files.

Results: 177 patients were reached by phone. Results are shown in table 1. 58.4% of patients were functionally independent before fracturing their hips and this ratio was found to decrease after the fracture.

Conclusion: More than a quarter of our patients still need assistance or are wheelchair bound 1 y after the fracture. Elderly patients with femoral fractures have an increased risk for recurring falls and fractures which may increase their mortality and morbidity.

Table 1. Characteristics of patients with hip fracture

Female sex, n (%)	128 (71.9%)
Age (mean ±SD)	79.3±11
BMI, kg/m² (mean ±SD)	25.5± 5
Age at menopause (mean ±SD)	45.2±7
Smoking, n (%)	27 (15.2)
Drinks alcohol, n(%)	12 (6.7)
Number of births (mean ±SD)	2.8±3
Currently alive n(%)	126 (70.8)
Right side femoral fracture, n(%)	92 (51.4)
Right hand dominant, n (%)	170 (92.5)
Fracture localization n (%)	
Femoral neck	55 (30)
Intertrochanteric	94 (52)
Subtrochanteric	11(6.2)
Diaphyseal	10 (5.6)
Other	7 (9)
Surgically treated n(%)	176 (98.9)
Time to surgery, days (mean ±SD)	3.3±2.3

Type of surgery n(%)	
Proximal femoral nail	97 (54.4)
Dynamic hip screw	6 (3.4)
Plate -screw fixation	15 (8.4)
Intramedullar nail	2(1.1)
Percutaneous K-wire	1 (0.6)
Total hip replacement	56 (31.4)
Days spent in hospital (mean±SD)	6.4±3.2
Previous fragility fracture n (%)	38 (21.4)
New fracture after hip fracture n(%)	16 (9.1)
Concomitant fracture n(%)	7 (3.9)
Parent with fracture n(%)	5 (3)

P668

VITAMIN D DEFICIENCY IN PERUVIAN WOMEN WITH MUSCULOSKELETAL DISEASES AND ITS ASSOCIATION WITH GRIP STRENGTH AND GAIT SPEED

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Objective: To assess the status of vitamin D in female patients with musculoskeletal pathology and its association with handgrip strength (HGS) and gait speed (GS).

Methods: We evaluated 222 women ≥50 years old and assessed the HGS (Jamar dynamometer), 6-m GS, and serum calcium, phosphorus, 25(OH)D and intact PTH levels (PTH). We excluded women taking drugs with potential to alter bone mineral metabolism and those with any limitation to perform their daily activities.

Results: The mean age was 62.6±8.6 y, most of the patients had a diagnosis of fibromyalgia (51%) and osteoarthritis (27%). The average weight and the BMI were 63.0±11.1 kg and 28.5±4.5 kg/m². The average 25(OH)D value was 20.04 ng/mL and 53% of patients has values <20 ng/mL. In patients with 25(OH)D ≥20 ng/mL dominant and non-dominant HGS were 14.3±3.9 kg and 13.8±4.1 kg and in those with 25(OH)D <20 ng/mL values were 14.1±4.8 kg and 14.5±4.8 kg respectively. GS speed were 1.03±0.19 m/s and 1.02±0.21 m/s in those with 25(OH)D ≥20 ng/mL and <20 ng/mL. In the bivariate regression analysis, we observed that 25(OH)D <20 ng/mL seems to be associated with GS difference between dominant and nondominant hands, and calcium levels. However, in the multivariate regression analysis the association is only with the HGS difference between dominant and nondominant hands (prevalence ratio=0.97; 95%CI: 0.93-0.99) (Table).

Table. Regression analysis for the vitamin D deficiency

Associated Factor	Unadjusted β (CI 95%)	p-value	Adjusted β (CI 95%)	p-value
Hand grip strength difference (kg)	0.96 (0.93, 0.99)	0.027	0.97 (0.93, 0.99)	0.044
Age (y)	0.99 (0.98, 1.01)	0.727		
BMI (kg/m²)	1.02 (0.99, 1.05)	0.079		
Dominant hand strength (kg)	0.96 (0.97, 1.02)	0.746		
Non-dominant hand strength (kg)	1.01 (0.99, 1.04)	0.250		
Gait speed (m/s)	1.08 (0.61, 1.94)	0.789		
Calcium (mg/dL)	0.68 (0.46, 0.99)	0.044		
Phosphorus (mg/dL)	1.17 (0.97, 1.59)	0.302		
PTH (pg/mL)	1.01 (0.95, 1.01)	0.292		

$β_1$, regression coefficient.

Conclusion: The prevalence of vitamin D deficiency is high in this population, and increases with a higher HGS difference between dominant and nondominant hand.

P669

IMPACT OF LONG-TERM FOLLOW-UP ON REVISION OF KNEE AND HIP REPLACEMENT SURGERY

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Objective: To investigate the impact of hospital orthopaedic outpatient follow-up on revision rates for patients with knee (KR) or hip (HR) replacement surgery.

Methods: Data from the Clinical Practice Research Datalink (CPRD) linked to Hospital Episodes Statistics (HES) records in England were used to identify patients who had a primary KR or HR between 1999-2016. Patient exposure time was classified based on whether long-term follow-up had occurred, which was defined as attendance to at least one visit to the outpatient orthopaedic department ('FU' group) between 5-10 y following primary surgery. Incidence of revision for the groups were compared in Cox proportional hazards regression models and Kaplan-Meier survival curves.

Results: A total of 9856 patients with KR and 10,837 with HR were identified. Of those, 4349 KR and 4870 HR patients were in the FU groups. The median time from primary surgery to first follow-up visit was 5.9 y (IQR: 5.3-6.9) for patients in the FU for both KR and HR. For KR, cumulative incidence of revision was 3.6% between first FU visit and 10 y after primary for the FU group and 0.6% for No FU between years 6-10 postprimary. This difference was statistically significant in the adjusted regression model (hazard ratio: 5.65 [95%CI 3.62 to 8.81]). For HR, the incidence of revision was 3.2% for the FU group and 1.4% for No FU (Figure 1), also statistically significant (hazard ratio: 2.34 [95%CI 1.71 to 3.20]).

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Conclusion: Both primary KR and HR patients receiving long-term follow-up reported higher risk for revision compared to patients not followed-up. This may reflect the effectiveness of follow-up practice detecting patients in need for revision, and potentially the tendency of patients who are unlikely to require revision to neglect follow-up.
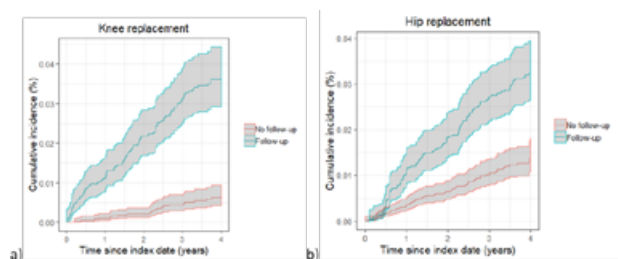
Figure 1: Cumulative incidence of revision following a) knee replacement and b) hip replacement, stratified by FU and No FU groups accounting for time-varying exposure. Index date is six years from primary surgery for the No FU group and date of first follow-up visit at least six years after primary surgery for the FU group

P670
HAND GRIP STRENGTH AND ASSOCIATED FACTORS IN HEMODIALYSIS PATIENTS

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Objective: To evaluate hand grip strength (HGS) in patients on hemodialysis (HD) and to investigate associated factors.

Methods: This was a cross- sectional study enrolled a convenience sample of patients seen in one hemodialysis center (Filoxenia Dialysis Center, Aigio, Greece) with 60 patients. Enrolled patients had to be 18 years and older, be on HD at least 2 months, and could not have physical on cognitive impairments that could influence the measurements. Measures of HGS were performed with a hydraulic dynamometer (Saehan corporation, South Korea) on the nonfistula hand before the session of hemodialysis. Demographic and clinical data (dialysis start date, comorbidities, and etiology of chronic kidney disease) were collected from the patients' medical charts. Quality of life was assessed via EuroQol (EQ-5D) questionnaire. Descriptive statistics (mean and standard deviation) were used for data analyses as well as the Student's t-test setting the level of significance at 5%. The association between variables was calculated using Pearson-r correlation coefficients. The experimental design of this study was approved by the Ethics Committee of the Technological Educational Institute of Western Greece.

Results: A total of 54 patients (male, median age of 71.25 years old, 38.8% diabetic, mean BMI of 26.34±5.2) participated in this study (response rate 90%). The average duration of hemodialysis was 4.29±6.36 y. The maximum HGS in the dominant was

19.19±12.1 kg (female 12.04±7.26 kg, male 21.82±12.52 kg, p<0.001). HGS was significantly correlated with age (r=0.46; p=0.001), BMI (r=0.29; p=0.03), sex (r=0.36; p=0.008), alcohol (r=0.41; p=0.002) and quality of life (r=0.37; p=0.006).

Conclusion: HGS was correlated with age, sex, BMI, alcohol and quality of life. The use of hand held dynamometry could be a fundamental element of the physical examination of the patients receiving hemodialysis, particularly if they are older adults.

P671
SIGNAL INTENSITY ALTERATION AND MAXIMAL AREA OF PERICRUCIATE FAT PAD ARE ASSOCIATED WITH INCIDENT RADIOGRAPHIC OSTEOARTHRITIS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Objective: To determine whether pericruciate fat pad (PCFP) signal intensity alteration and maximal area are predictive of incident radiographic osteoarthritis (ROA) over 4 y in the Osteoarthritis Initiative (OAI) study.

Methods: Participants were from the Osteoarthritis Initiative (OAI) study. Case knees (n=355) were defined by incident ROA between 12-48 months visits and were matched by sex, age and radiographic status with control knees (n=355). Magnetic resonance images (MRIs) were used to assess PCFP signal intensity alteration and PCFP maximal area at P0 (time of onset of ROA), P-1 (1 y prior to P0) and baseline. Conditional logistic regression analyses were applied to assess associations between PCPF measures and the risk of incident ROA.

Results: The mean age of participants was 60.1 y and 66.9% were women. In multivariable analyses, PCFP signal intensity alteration was significantly associated with incident ROA at baseline, P-1 and P0 (OR [95%CI]: 1.18 [1.02−1.37], 1.32 [1.14−1.54], 1.30 [1.12−1.50] respectively). PCFP maximal area was significantly associated with incident ROA at P-1 and P0 (OR [95%CI]: 1.14 [1.01−1.29], 1.18 [1.05−1.34] respectively), except for that at baseline.

Conclusion: PCFP signal intensity alteration and maximal area were associated with incident ROA over 4 y, implying that they may play roles in ROA.

P672
MEDICATION USE AND BONE HEALTH: A POPULATION-BASED STUDY IN BRAZILIAN MIDDLE-AGED WOMEN

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Objective: Medicines used to treat chronic conditions have contributed to increasing longevity and leading humankind to a new demographic era. However, some drugs can cause bone loss, some can increase the risk of a fall, and some may increase the risk of fragility fractures, especially in middle-aged women due to hormonal changes of menopausal transition and to aging itself. It has been suggested that the menopausal transition represents a time-limited window of opportunity to intervene in order to prevent rapid bone loss and microarchitectural damage to stave off osteoporosis in later years. Therefore, it is important to know which medications are most used by middle-aged women and which ones can potentially affect bone health. We aimed to evaluate the association between the use of medications for chronic diseases and its potential influence on bone loss in Brazilian middle-aged women.

Methods: A secondary analysis of household survey data from a previous cross-sectional, population-based study conducted with a sample of 749 women of a population of 257,434 female urban residents in the age bracket of interest (45-60 y). Associations between self-reported osteoporosis and medication use were evaluated. Simple and multiple Poisson regression analyses (with a forward stepwise selection of variables) were performed to evaluate the significance of the factors associated with self-reported osteoporosis (95%CI for the prevalence ratio). The level of statistical significance was set at 5%.

Results: Mean age of participants was 52.5±4.4 y. Mean age at menopause was 46.5±5.8 y. The overall prevalence of medication use was 68.8%, with the drugs predominantly consisting of those used for cardiovascular diseases (34.6%), oral lipid-lowering agents (13%), anxiolytics (12%), treatment of osteoarticular diseases (12%), and treatment of diabetes (9.6%). Only 19.5% of the participants reported previous or current use of hormone replacement therapy. The overall frequency of polypharmacy was 23%. The prevalence of self-reported osteoporosis was 7.3%. Among those women with osteoporosis, 67.3% reported using specific drugs to treat bone loss. The specific intake of drugs for osteoporosis treatment correspond to 7.6% of the overall prevalence of medication use. Only 6% of the entire studied population reported using calcium and vitamin D supplementation. After multiple regression analysis, the main factors associated with osteoporosis were time since menopause (<5 y: PR=4.47; 95%CI:1.27-15.72; p=0.020/ 5-9 y: PR=5.06; 95%CI:1.44-17.87; p=0.012/ ≥10 y: PR=7.68; 95%CI:2.27-25.94; p=0.001), treatment for ischemic heart disease (PR=5.00; 95%CI: 1.54-16.23; p=0.007),

treatment for osteoarthrosis / osteoarthritis (PR=2.01; 95%CI: 1.09-3.71; p=0.025) and the use of antidepressants (PR=2.01; 95%CI: 1.07-3.75; p=0.029).

Strength & Limitations: This observational study provides an epidemiological contribution. The meticulous methodology and the representativeness of the population sample permit these conclusions to be extrapolated to the entire population of middle-aged women residing in the metropolitan region of Campinas, Brazil. Some limitations of this study must be considered, particularly bearing in mind that much of the data was self-reported, which may lead to biases.

Conclusion: The prevalence of medication use among middle-aged women was high in a relatively young population. Osteoporosis was reported by approximately 8% of women, highlighting the importance of menopause transition. However, only 2/3 of the osteoporotic women reported using specific drugs for its treatment. Furthermore, it was observed a low prevalence of calcium and vitamin D supplementation. Women with self-reported osteoporosis were more likely to use medicine for ischemic heart disease, antidepressants or drugs for osteoarticular disease, besides being longer in menopause. Clinicians should be aware of these data to screening medication intake by middle-aged women in order to approach prophylactic orientations and, also, to select drugs for the treatment of chronic conditions considering the potential side effects on bone health.

P673
FREQUENCY OF SARCOPENIA BY SARC-F SCREENING TEST AND RELATIONSHIP WITH QUALITY OF LIFE AND RISK FACTORS: PRELIMINARY REPORT OF A MULTICENTER STUDY

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Objective: Sarcopenia is a common aging-induced generalized decrease in muscle mass, strength, and function. Owing to the impact of sarcopenia on quality of life (QoL), disability and mortality, awareness is necessary in order to correctly identify sarcopenic elderly and the related risk factors. The aim

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of this study was to determine the frequency of sarcopenia by SARC-F screening test and to estimate the association between sarcopenia and QoL and risk factors.

Methods: A cross-sectional multicenter study with older adults aged 60 years or older, was conducted in Physical Medicine and Rehabilitation outpatient clinics of 7 health centers from October 2019 to January 2020. Demographic properties comprising age, gender, BMI, comorbid diseases and drug usage were recorded. Muscle strength, and physical performance were measured by handgrip strength and 4m-gait speed tests respectively. Mini Nutritional Assessment (MNA) was used for nutritional status and sarcopenia quality of life questionnaire (SARQOL) was used for QoL. SARC-F test with cut-off point of 4 was used for the diagnosis of sarcopenia. The relationships with QoL, sarcopenia and risk factors were evaluated.

Results: A total of 153 (106 female, 47 male) elderly with a mean age of 71.8 ± 5.9 y were included. According to SARC-F criteria, the frequency of sarcopenia was determined as 37%. The mean age, BMI, number of comorbid diseases and drugs were significantly higher in sarcopenic group than in nonsarcopenic elderly. The scores of SARQOL, MNA and gait speed were lower indicating impaired QoL, malnutrition and functional disability in sarcopenic elderly than in non-sarcopenic participants (p<0.001). The most related risk factors with sarcopenia were recorded as nutritional status, number of drugs, gait speed and BMI.

Conclusion: The frequency of sarcopenia screened by SARC-F was higher than expected in our study group. Mostly QoL, malnutrition, drugs for comorbidity, functional disability and obesity were related with sarcopenia. These findings highlight the relevance of the detection of sarcopenia and QoL in elderly as a part of routine clinical practice in order to impede progression towards disability and other adverse health outcomes.

P674
THE RELATIONSHIP BETWEEN GLUCOSE CONTROL AND BONE MINERAL DENSITY IN TYPE 2 DIABETICS IN ENUGU NIGERIA

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Objective: Diabetes is an increasingly prevalent disease with associated morbidity and mortality, and an increased risk for osteoporosis-associated fractures. Although type 1 diabetes is known to lead to a reduction in BMD and an increased fracture risk, the relationship between type 2 diabetes mellitus (T2DM) and BMD is uncertain. There is therefore a need for further investigation into the relationship between T2DM and osteoporosis risk and related factors. We aimed to determine any relationship between glucose control and BMD among type 2 diabetics in Enugu state Nigeria.

Methods: 90 diabetics between the ages of 30-70 were studied to determine the effect of glucose control on BMD among type 2 diabetics. They were grouped as patients with good glycemic control (controlled=7.0-9.0) and those with poor glycemic control (uncontrolled= ≥9.0) using their measured serum glycated hemoglobin (HBAIC). Those with a HBA1C of <7.0% were grouped as normal. The derived BMD was expressed in terms of standard deviation (SD) as T-score and Z-score, with values of -1 to -2.5 indicative of osteopenia and -2.5 and below as osteoporosis, and correlated to the measured HBA1C levels to determine any relationship between them.

Results: The mean age of the patients is 57.28±9.27 y. 62(68.9%) were females while 28(31.1%) are males. The mean duration of disease was 7.80±5.10 y. A statistical significant difference (p-value=0.02) was obtained for the duration of disease and effect on BMD. The mode of treatment used for majority; 63(70%) of the patients was OHA. The mode of treatment had no significance on the BMD of the respondents and did not influence their HBA1C. HBAIC of 21(23.3%) patients were <7.0% (normal), 44(48.9%) was 7.0-9.0% (good control) while 25 (27.8%) was >9.0% (poor control). There was no statistical significance of the effect of glycemic control on BMD (p-value=0.382).

Conclusion: This study has determined that glycemic control has no relationship with BMD in T2DM patients.

P675
SCLEROSTIN IS DOWNREGULATED IN ADVANCED ATHEROSCLEROTIC PLAQUES AND IS NOT ASSOCIATED WITH ARTERIAL DISEASE BEFORE OR MAJOR ADVERSE CARDIOVASCULAR EVENTS WITHIN 3 YEARS OF ENDARTERECTOMY

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Objective: Assess sclerostin expression in carotid and femoral atherosclerotic plaques and its association with cardiovascular disease.

Methods: The sclerostin antibody romosozumab increases bone formation and decreases bone resorption. In a study of romosozumab vs. alendronate (ARCH), an imbalance in adjudicated serious cardiovascular (CV) events was noted.[1] Atherosclerosis is a significant cause of morbidity and mortality, yet little is known about sclerostin expression in atherosclerotic (AS) plaques. Sclerostin was immunostained in AS plaques from the AtheroExpress biobank.[2] Association of sclerostin presence with patient-reported coronary/peripheral artery disease (CAD/PAD) prior to surgery, and major adverse CV events (stroke, myocardial infarction or CV death; MACE) during a 3-y follow-up, were assessed.

Results: Sclerostin expression was assessed in 94 carotid and 50 femoral AS plaques collected from female patients (mean patient age: 69.6 ±10.4 y). Sclerostin staining was absent in 67%

of plaques (58% carotid vs. 84% femoral). When present, staining intensity was low compared with aorta, and was restricted to deeper regions of the plaque/vessel wall; it was not observed in the superficial region or cap, or in endothelial cells. Sclerostin staining was not associated with age at endarterectomy (<75 or ≥75 y), plaque fat content, intraplaque hemorrhage, smooth muscle cell content or collagen content. Sclerostin absence correlated with dystrophic calcification of the acellular necrotic core of advanced plaques (p<0.05), but did not reflect active biomineralization. Patient-reported CAD or PAD before surgery, or MACE in the 3 years following, were not associated with sclerostin staining.

Conclusion: Sclerostin was not detected in areas of carotid and femoral AS plaques considered most relevant to plaque stability. Whilst the sample size was small, we did not observe an association between sclerostin expression and CAD or PAD prior to, or MACE in the 3 y following endarterectomy.

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P676

EFFECTS OF ARONIA MELANOCARPA FRUIT JUICE ON CARRAGEENAN-INDUCED RAT PAW EDEMA IN AN EXPERIMENTAL MODEL OF METABOLIC SYNDROME

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Objective: Metabolically triggered inflammation accompanies metabolic syndrome (MS) which affects a significant part of the world population. The aim of the present study was to investigate the effect of polyphenol-rich *Aronia melanocarpa* fruit juice (AMFJ) on carrageenan-induced acute rat paw inflammation in an experimental model of MS.

Methods: 40 male Wistar rats were allocated into four groups: MS, MS+AMFJ$_{2.5}$, MS+AMFJ$_5$ and MS+AMFJ$_{10}$. To induce MS, in the course of 10 weeks all groups were fed a high-fat high-fructose diet (regular rat chow with added lard and fructose in defined proportions) and received 10% fructose in the drinking water. During the whole experimental period, MS+AMFJ$_{2.5}$, MS+AMFJ$_5$

and MS+AMFJ$_{10}$ groups were respectively treated daily orally with AMFJ at doses of 2.5, 5 and 10 ml/kg. The MS group served as a control and received distilled water (10 ml/kg). At the end of the treatment period, rats were injected with carrageenan (1.0 mg) in the hind left paw to induce inflammation. The paw edema was evaluated by a plethysmometer on the 30th min, and on the 1st, 2nd, 3rd, 4th and 5th hour after the injection. The results were evaluated by one-way ANOVA using the GraphPad Prism statistical software.

Results: In MS group, carrageenan-induced paw edema increased gradually with time reaching the value of 0.87±0.09 ml on the 5th hour. AMFJ caused a decrease of paw edema throughout the whole 5 hour period, the effect being most pronounced and statistically significant in MS+AMFJ$_5$ group on the 2nd and 3rd hour (with values of edema 0.36±0.03 ml and 0.40±0.06 ml, respectively) and in MS+AMFJ$_{10}$ group on the 2nd hour (edema value 0.41±0.06 ml). The respective values of edema in MS group on the 2nd and 3rd hour were 0.57±0.07 ml and 0.71±0.07 ml.

Conclusion: Treatment of rats with AMFJ during the metabolic syndrome induction resulted in a decrease of carrageenan-induced paw inflammation. The effect might be attributed to the polyphenols in AMFJ which possess a wide range of activities, including anti-inflammatory.

P677

CLASSIFICATION OF RECTUS FEMORIS MUSCLE STRENGTH USING A MACHINE LEARNING APPROACH BASED ON ULTRASOUND SCANS: PILOT STUDY FOR APPLICATION IN SARCOPENIA DIAGNOSIS

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Objective: Sarcopenia is characterized by progressive and generalized loss of skeletal muscle mass and strength and/or physical performance. The aim of this study was to classify rectus femoris muscle in two classes of strength, tonic or weak, using a machine learning approach applied to longitudinal B-mode scans.

Methods: 10 healthy Caucasian volunteers (6 men, 4 women; age 21-39 y; BMI 17.3-26.75 kg/m^2) were recruited. A load cell was utilized as force transducer to measure the maximal voluntary contraction (MVC) during an isometric leg extension. For each subject, two longitudinal B-mode ultrasound scans per thigh were acquired in rest position by means of a 6-cm linear probe, thus obtaining 40 scans. The region of interest (ROI) comprising the rectus femoris muscle was segmented through an ad hoc automatic segmentation algorithm. Features based on gradients, cooccurrence matrices, pixels and histogram values were extracted from the ROI and the most informative ones

were selected. Then, the performance of 5 different supervised classification algorithms were compared, considering the MVC measures as ground truth.

Results: An MVC threshold of 29 kg was established to assign a label to each observation. In particular, subjects with an MVC value lower than 29 kg (label=0) were considered as weak and positive to the test, instead those with a higher MVCs (label=1) were considered as tonic and negative to the test. A cross validation technique was applied to the dataset in order to train and test the five classifiers. The best performing supervised classification algorithm was chosen, obtaining an accuracy of 97.5%, with sensitivity of 95% and specificity of 100% (Table 1).

Conclusion: Applying a machine learning approach to the longitudinal B-mode scans of the thigh, it is possible to estimate the level of strength from the rectus femoris muscle, classifying it as tonic or weak with an accuracy of 97.5%. These preliminary results will be further tested and validated on a larger dataset of patients.

Table. The best classifier confusion matrix about the overall cross validation performance.

Predicted strength

Measured MVC	Label	1	0
	1	19	1
	0	0	20

P678
PHYSICAL PERFORMANCE VARIABLES AND COMPOSITE INDICES OF FEMORAL NECK STRENGTH IN A GROUP OF MIDDLE-AGED MEN

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Objective: To explore the relationships between several physical performance variables and composite indices of femoral neck strength ((compression strength index (CSI), bending strength index (BSI) and impact strength index (ISI)) in a group of middle-aged men.

Methods: 35 middle-aged men participated in this study. Body composition and bone variables were evaluated by DXA. BMD was measured at the whole body (WB), total radius (TR), lumbar spine (L1-L4), total hip (TH) and femoral neck (FN). Composite indices of femoral neck strength ((compression strength index (CSI), bending strength index (BSI) and impact strength index (ISI)) were calculated as previously described by Karlamangla et al. [1]. Handgrip strength, vertical jump, maximum power of

the lower limbs (watts), horizontal jump, maximal half-squat strength, maximal bench-press strength, sprint performance (10 m) and maximum oxygen consumption (VO$_2$ max, ml/min/kg) were evaluated using validated tests. Physical activity level, daily calcium intake and daily protein intake were evaluated using validated questionnaires.

Results: Fat mass and fat mass percentage were negatively correlated to CSI and ISI. Physical activity level was positively correlated to CSI, BSI and ISI. Vertical jump, horizontal jump, maximal half-squat strength, maximal bench-press strength and VO$_2$ max (ml/min/kg) were positively correlated to CSI and ISI. 10-meter sprint performance (seconds) was negatively correlated to CSI, BSI and ISI. In the current study, 10-meter sprint performance was the strongest determinant of BSI and ISI while physical activity level (h/week) was the strongest determinant of CSI.

Conclusion: The current study suggests that sprinting performance is a strong predictor of composite indices of femoral neck strength in middle-aged men. These results may be useful for building new exercise programs for the prevention and early detection of osteoporosis or osteopenia in men.

Reference: 1. Karlamangla AS et al. Osteoporos Int 2004;15:62.

P679
MANAGEMENT OF PATIENTS WITH FRACTURED NECK OF FEMUR WHILST ON ALENDRONIC ACID OR ON A DRUG HOLIDAY

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Objective: Patients who are on alendronic acid or a drug holiday should have their response to treatment monitored and further treatment held/continued/resumed depending on response. If not, patients are at risk of atypical fractures. With respect to this we wished to see how our patients with fractured NOF were being treated if they were sustaining fractures whilst on treatment/a drug holiday. We aimed to evaluate the way the orthogeriatic and bone services currently provides treatment and monitoring to patients who fracture their neck of femur whilst on alendronic acid/a drug holiday.

Methods: Using the fractured NOF database, data was collected on patients with who were admitted on alendronic acid or not. GPs were contacted to confirm if those patients on alendronic acid to find out how long they have been on the drug for. For patients who were not on alendronic acid, we checked that they have never been on the drug and how long their current drug holiday was. Data was also collected from PACS and EDMS to check if patients had a previous DXA scan and if the patient was referred to the bone clinic.

Results: 402 patients were admitted with fracture Neck of femur in 2018. 359 patients were not on bisphosphonate and 43 patients were on bisphosphonate during admission. 34 patients were on drug holiday. Total of 77 patients were included in the studies.

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46(59%) patients had DXA at some point who were either on bisphosphonate or drug holiday and 26(33%) patients did not had DXA at any point. Further analysis showed a significant portion of those on drug holidays are not being monitored by DXA prior to # (50%). A significant proportion of those on alendronic acid are not being monitored and treatment just continued (45%). Even with rpt DXA some patients are continuing treatment without reason. Only 29 (41%) patients who had fracture on either Bisphosphonate treatment or drug holidays are being referred to bone clinic on discharge. 1232 patients were started on bisphosphonate in 2018.

Conclusion: Many patients are unmonitored in community who are either on drug holiday or treatment for osteoporosis. Less than half of the patients are referred to bone clinic for further evaluation and management of osteoporosis even after fracture. More than half of the patients were on alendronic acid with different length of time who never had DXA scan therefore there was no basis of starting or monitoring large number of patients will not have monitoring and treatment who had not yet fractured.

P680
RELATIONSHIPS BETWEEN MUSCULAR POWER AND BONE VARIABLES IN A GROUP OF YOUNG LEBANESE ADULTS

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Objective: To explore the relationships between lower limb muscular power and bone variables (bone mineral content (BMC), BMD, hip geometry indices and trabecular bone score (TBS)) in a group of young Lebanese adults.

Methods: 29 young Lebanese men and 31 young Lebanese women whose ages range between 18-32 y participated in this study. Body weight and height were measured, and BMI was calculated. Body composition and bone variables were measured by DXA. DXA measurements were completed for the whole body (WB), lumbar spine (L2–L4), total hip (TH) and femoral neck (FN). Hip geometry parameters including cross-sectional area (CSA), cross-sectional moment of inertia (CSMI), section modulus (Z), strength index (SI) and buckling ratio (BR) were derived by DXA. Trabecular bone score was also derived by DXA. Horizontal jump (HJ), vertical jump, vertical jump maximum power, force-velocity maximum power and 20-m sprint performance were measured or calculated by using validated fitness tests.

Results: In men, fat mass percentage was negatively correlated to TH BMD, FN BMD, CSA, CSMI, Z and SI. In women, weight, BMI, lean mass and fat mass were positively correlated to WB BMC, CSMI and Z. Regarding physical performance variables, horizontal jump performance and force-velocity maximal power were positively correlated to TH BMD, FN BMD, CSA and Z in men. Vertical jump maximal power was positively correlated to WB BMC in women. 20-m sprint performance was negatively correlated to FN BMD, CSA, Z and SI in men.

Conclusion: The current study suggests that force-velocity maximum power is a positive determinant of BMD and hip geometry indices in men but not in women.

P681
PATIENT REFERRALS AUDIT: SCOPE FOR QUALITY IMPROVEMENT AT LOCAL MINERAL METABOLISM CLINIC

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Objective: To audit the reason for referral and the clinic outcome of the NHS Greater Glasgow and Clyde, North Glasgow mineral metabolism clinic. A subgroup analysis was performed to evaluate the number of patients who had parenteral treatment recommended at clinic who had this as their main reason for referral.

Methods: New patient appointments between October 2018 to October 2019 were evaluated. The exclusion criteria included people who had been inappropriately programmed as a new patient for a return appointment or no referral letter was found. Referrals were from direct access dual-energy x-ray absorptiometry service (DADS) – a primary care referral method for osteoporosis and fracture risk assessment, fracture liaison service (FLS), primary care and secondary care.

Results: 181 new patient referrals were included with 86 primary care, 48 DADS, 34 FLS and 13 secondary care. The average age of patient was 70 years old and 81% were female. The mean wait time to clinic appointment was 75 days. The most common reasons for referrals were an underlying gastrointestinal condition (19%), intolerant or unsuitable for oral bisphosphonates (17%) and new or multiple vertebral fracture(s) (15%). The most common management outcome of appointment was intravenous bisphosphonates (29%), oral bisphosphonates (18%) and denosumab (11%). 8% of patients were discharged. On subgroup analysis 98 patients were referred for consideration of parenteral treatment. Of these referrals, 69% were recommended parenteral therapy: 71% intravenous bisphosphonates, 28% denosumab and 1% teriparatide. Overall, 74 patients were recommended parenteral treatment and 150 required routine follow-up appointments.

Conclusion: With a growing demand on the mineral metabolism clinic, this audit moved the focus on future clinic organisation and how to continue to improve this to provide optimum patient care. First, implement protocols for parenteral treatment prescription for osteoporosis nurse specialists at the DADS/FLS clinic which could shorten waiting time for treatment initiation. Second, as the number of return appointments to both medical and nurse-led clinic increase, consideration is required to what additional measures can be put in place such as an increase in staffing, number of clinics or other option.

P682
EVALUATION OF FACTORS ASSOCIATED WITH QUALITY OF LIFE IN OLDER PEOPLE

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Objective: Sarcopenia is likely to be associated with lower quality of life (QoL), but more data is needed to confirm this relationship. Therefore, we set out to evaluate the associations between QoL and different sarcopenia and clinical factors, in a cohort of older people in Serbia.

Methods: Participants were recruited through pensioner organizations around Novi Sad, Serbia. QoL was measured with the SarQoL® questionnaire, the physical functioning subscale of the SF-36v2, the EQ-5D-3L and the EQ-VAS. Sarcopenia was diagnosed according to EWGSOP and EWGSOP2 criteria, with muscle mass measured by DXA, muscle strength measured by Jamar hand-dynamometer and physical performance measured by gait speed. Other information included sarcopenia screening (SARC-F), depression, level of activity, cognitive functioning, nutritional status and smoking status. Binary logistic regressions were used to evaluate the associations. QoL, the dependent variable, was dichotomized into ≤25th percentile and & gt; P25. The base model consisted of age, BMI, gender, comorbidities and drugs, to which the independent variables were introduced individually.

Results: In total, 700 participants were evaluated, of which 508 (73%) were women. They had a median age of 70 (67-74) y, a median BMI of 29.4 (26.2-32.4) kg/m², had a median of 2 (1-2) comorbidities and took 2 (1-4) drugs. Thirty subject were diagnosed as sarcopenic with the EWGSOP criteria, and 8 with the EWGSOP2. We did not find significant associations between sarcopenia definitions and QoL in our sample, but we did find a significant association with the SARC-F (odds ratio between 2.9 and 12.8, depending on the QoL instrument). We also found a consistent and significant association between low grip strength according to the EWGSOP2 cut-offs and all 4 measures of QoL (ORs between 3.5-7.0). This same consistent and significant relation was also found for depression (ORs between 3.1-4.5) and low vs. high activity (ORs between 1.9-4.5).

Conclusion: Contrary to our hypothesis, low QoL was not significantly associated with sarcopenia in this sample. Grip strength seems to be a strong factor associated to QoL, as well as depression and low activity levels.

Disclosures: CB and OB are shareholders of SarQoL sprl.

P683
PERFORMANCE OF THE SARC-F SCREENING TOOL IN A SERBIAN COHORT

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Objective: The SARC-F questionnaire is a simple and easy tool to screen for sarcopenia. Previous studies have found it to have low sensitivity but high specificity, meaning that it can correctly identify subjects who do not have sarcopenia. To allow the use of the SARC-F in Serbian populations, we set out to assess its performance in conjunction with different sarcopenia definitions and components.

Methods: Participants were recruited via pensioner organizations in the region of Novi Sad, Serbia. Muscle mass was measured by BXA, muscle strength by Jamar hand-dynamometer and physical performance by 4-m gait speed. Sarcopenia was diagnosed with 5 definitions: EWGSOP, EWGSOP2, FNIH, IWGS and SCWD. The performance of the SARC-F was determined by calculating its sensitivity, specificity, positive and negative predictive value (PPV & NPV) in SAS 9.4.

Results: A total of 700 participants were included, of which 200 (29%) were identified as being at high risk of sarcopenia by the SARC-F. The median age was 70 (67-74) y, and 72.6% were women. The number of participants at risk of sarcopenia was much higher than the number of subjects identified as sarcopenic with the EWGSOP criteria (n=30; 4.3%), EWGSOP2 (n=8; 1.1%), FNIH (n=19; 2.7%), IWGS (n=43; 6.1%) and SCWD (16; 2.3%). Consequently, the SARC-F showed low sensitivity (between 6.25-57.89%) and moderate specificity (between 70.63-72.82%) for the above mentioned diagnostic criteria. This translates into a PPV between 0.52-5.82%, indicating that among those identified as being at risk of sarcopenia, between 0.52-5.82% were actually diagnosed as sarcopenic according to the 5 definitions used. The NPV was between 92.90-98.56%, indicating that for those identified as not being at risk for sarcopenia, the probability of being non-sarcopenic was between 92.90-98.56%.

Conclusion: In this cohort of older Serbian people, the SARC-F showed very low to moderate sensitivity and moderate specificity. Previous studies have also demonstrated low sensitivity, but usually show higher specificity than what was found in this study.

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P684
EWGSOP 2010 AND 2019 CRITERIA FOR SARCOPENIA IN ECUADORIAN PATIENTS

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Objective: According to the diagnostic criteria of 2010 of the EWGSOP there are four diagnostic tools, each tool has a preset cut-off value, however, for the grip test and DXA scan the values were updated in 2019. The purpose of this study was to determine the prevalence of sarcopenia using both criteria and made a comparison.

Methods: Cross-sectional study of patients who went to a rheumatology center, to whom anthropometric and densitometric measurements were made. We determined sarcopenia using the EWGSOP 2010 and 2019 criteria. Data was analyzed using the statistical program SPSS v22. The chi-square and McNemar tests were used to compare both criteria.

Results: The study included 202 patients, 89% women and 10% men. The mean age was 63.9±11.0 y. The mean BMI was 27.2±5.2. The average of the 4-m walk test was 1.00±0.94 m/s; using these criteria, 56.4% had sarcopenia. The mean SARC-F questionnaire was 2.4±2.1 with a prevalence of sarcopenia of 16.3%. The mean for the grip test measured by dynamometer was 19.7±8.1 mmHg. According to the 2010 criteria (<30 mmHg for men, <20 mmHg for women), 63% of the population presented sarcopenia, while according to 2019 criteria (27 mmHg for men, <16 mmHg for women) only 29% met criteria for sarcopenia (p=0.000). The mean appendicular skeletal muscle mass (ASMM) by DXA was 16.5±2.5 kg/m^2, appendicular skeletal muscle mass index (ASMMI) mean 6.9±1.19 and the mean total skeletal muscle mass 22.0±4.7. Using the 2010 criteria (men <7.26, women <5.45) for ASMMI,11% of the population meets criteria for sarcopenia, while with the 2019 criteria (<7.0 men, <5.5 women) 13% had sarcopenia (p=0.000).

Conclusion: It was evident that the update of the EWSOP 2019 criteria allows the inclusion of more patients with sarcopenia. The changes in the grip test allowed the exclusion of patients since with the 2010 criteria the prevalence of sarcopenia was 63% compared to 30% according to the latest update.

P685
COMPARATIVE STUDY ON PERIOPERATIVE FACTORS OF INTERTROCHANTERIC FRACTURES IN THE ELDERLY

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Objective: To explore the perioperative factors of intertrochanteric fractures in the elderly for enhanced recovery after surgery (ERAS).

Methods: 165 elderly patients (80.79±7.60 y, M/F=69/96) with intertrochanteric fractures from 2013-2018 in our center were enrolled in this study. Among them, 98.2% (162/165) were due to the fall and the other 1.8% (3/165) were caused by high-energy trauma. Their medical records, nonsurgical or surgical data, complications, nursing and recovery were investigated.

Results: All patients were admitted 1 h to 240 d (mean 5.41±20.81 d) after injury. Among these patients, 107 (64.85%) patients (79.74±8.09 years) including 41 males and 66 females were surgically treated, and their pre-admission time was 1 h to 20 d (2.16±3.92 d). On the other hand, 58 patients (35.15%) including 28 males and 30 females with an average age of 82.74±6.23 years were treated conservatively. In the nonsurgical group, the pre-admission time was 1 h to 240 d (11.55±34.35 d). In all patients, there were 142 cases (86.06%) had internal diseases, and the top five complications were cardiovascular system (43.67%), brain disease (15.20%), lung disease (13.29%), diabetes (12.03%), and urinary system disease (6.96%). Among the 58 patients receiving conservative treatment, the top five complications were poor basic physical condition (36.17%), cardiovascular disease (25.53%), pulmonary disease (14.89%), diabetes (6.38%), and urinary system disease (6.38%). The top five complications in the 107 patients surgically treated were cardiovascular system (44.53%), brain disease (17.19%), diabetes (12.5%), lung disease (10.94%), and urinary system disease (6.25%). The preoperative time after admission in groups of internal fixation (IF) and joint replacement (JR) was not significantly different (P>0.05). However, the surgical duration was significantly longer in IF group than in JR group (P<0.05). The postoperative complications included urinary retention (1/107), electrolyte disturbance (1/107), pressure ulcers (2/107), deep vein thrombosis in lower limbs (3/107) and infection (1/107).

Conclusion: With the aging of the population, hip fracture has become a major clinical focus. Although fall is a low-energy injury, it is undoubtedly the most important cause of intertrochanteric fractures in the elderly. The severity of post-fracture complications must be taken into consideration for these patients. The study also revealed that only 64.85% of the patients could be treated surgically, while 35.15% could not be operated on. Therefore, patients should be immediately evaluated after admission, and the appropriate surgical treatment should be performed as soon as the general condition permits. Finally, multiple disciplinary team and ERAS are highly practical and effective.

P686
REMS TECHNOLOGY FOR SHORT-TERM MONITORING OF DENOSUMAB THERAPEUTIC EFFECT IN BREAST CANCER PATIENTS RECEIVING AROMATASE INHIBITORS BASED THERAPY

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Objective: To monitor the short-term aromatase inhibitors (AIs) and denosumab effect on bone status in postmenopausal estrogen-receptor positive breast cancer (BC) patients using radiofrequency echographic multispectrometry (REMS) and DXA.

Methods: All patients were treated with adjuvant AIs administered yearly. Patients received 60 mg of denosumab therapy every 6 months (Group A) or not (Group B). DXA and REMS femoral scans were performed at baseline before receiving the first AI therapy (T0) and repeated for follow-up 12 months later (T1). Only REMS scans were repeated also at 18 months from AIs beginning (T2). The relative BMD change from baseline were analyzed.

Results: 210 BC patients were recruited and two age-matched groups (A and B) of 105 patients were considered. The effect of denosumab on BMD variation (shown in Figure) at each time point, the differences between Group A and B were statistically significant (p<0.001) both for REMS and DXA whereas the difference between techniques within groups were not significant at each time point. Of note, at T2 only REMS scans were performed since repeated DXA scans are not recommended for short-time intervals. As expected, the relative change of BMD showed an increasing trend for Group A and decreasing for Group B.

Conclusion: Numerous clinical studies demonstrated the effect of denosumab (60 mg/6 months) in contrasting increased risk of fracture occurring as a side effect in BC patients treated with AIs. At present, densitometric techniques are not able to assess the short-term change, since the minimum time between two measurements of BMD is 1 year [1]. REMS technology has shown high performance in terms of precision and repeatability for the measurement of BMD, T- and Z-score, [2] and might potentially overcome this issue, allowing for repeated scans at 6 months. Our results demonstrate the feasibility of short-term follow-up (less than the usual 2 y from the start of treatment) using REMS femoral neck scans to assess the effect of denosumab on BMD in BC patients undergoing AIs treatment.

References:

1. Diez-Perez A et al. Aging Clin Exp Res 2019;31:1375.

2. Di Paola M et al. Osteoporos Int 2018;30:391.
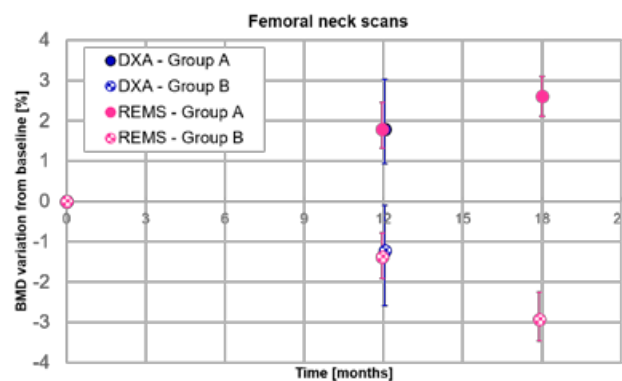
Figure. Rate of BMD change over time with respect to baseline measured with DXA and REMS at femoral neck for patients undergoing antiresorptive inhibitors and denosumab (Group A) and patients undergoing antiresorptive inhibitors only (Group B). At baseline (T0) and at 12 months (T1), patients underwent both DXA examination and REMS echographic scan, whereas at 18 months (T2) only the echographic scan was performed, since DXA is not suitable for short-term follow-up.

P687
IDENTIFICATION OF FRAIL PATIENTS USING FEMORAL RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS)

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Objective: REMS has been recently presented as a valuable approach for osteoporosis diagnosis and fracture risk prediction [1]. The aim was to investigate the effectiveness of the T-score values provided by REMS and DXA scans at femoral neck in the identification of patients (pts) with frailty.

Methods: The ability of REMS and DXA T-score values to assess the incidence and site of fractures was evaluated through an analysis of covariance (ANCOVA). Differences among groups were assessed by Kruskal-Wallis test.

Results: 721 Caucasian women were enrolled. Fracture prevalence was 13.2%. In particular, 43.2% involved the upper limb (forearm, elbow, humerus, wrist, hand), 16.8% hip, 15.8% the thorax (shoulder blade, shoulder, rib), 14.7% lower limb excluding femur

(tibia, ankle, metatarsus), 9.5% the vertebrae. No statistically significant differences were observed among subcategories of fractured pts (p=0.91, 0.6, 0.08, and 0.09 for age, height, weight and BMI, respectively). T-score values for fractured pts were lower than for non-fractured pts both for REMS (median -2.3 [IQR: -2.8 − -1.7] vs. -1.8 [-2.3 − -1.1], respectively, p<0.001) and DXA (-2.2 [-2.8 − -1.6] vs. -1.7 [-2.3 − -1.1], respectively, p<0.001). In the ANCOVA model including age, height and BMI as covariates, the difference of T-score values between fractured and nonfractured pts remains statistically significant both for REMS and DXA.

Considering the fractured subgroup, pts with fractures at femur and vertebra reported statistically significant lower T-score values than nonfractured pts both for REMS and DXA (p<0.001, Figure).

Conclusion: REMS T-score measured at femoral neck is an effective parameter to identify frail patients, in particular with fractures occurring at hip and vertebra in a population-based sample of female subjects.

Reference: 1. Diez-Perez A. Aging Clin Exp Res 2019;31:1375.
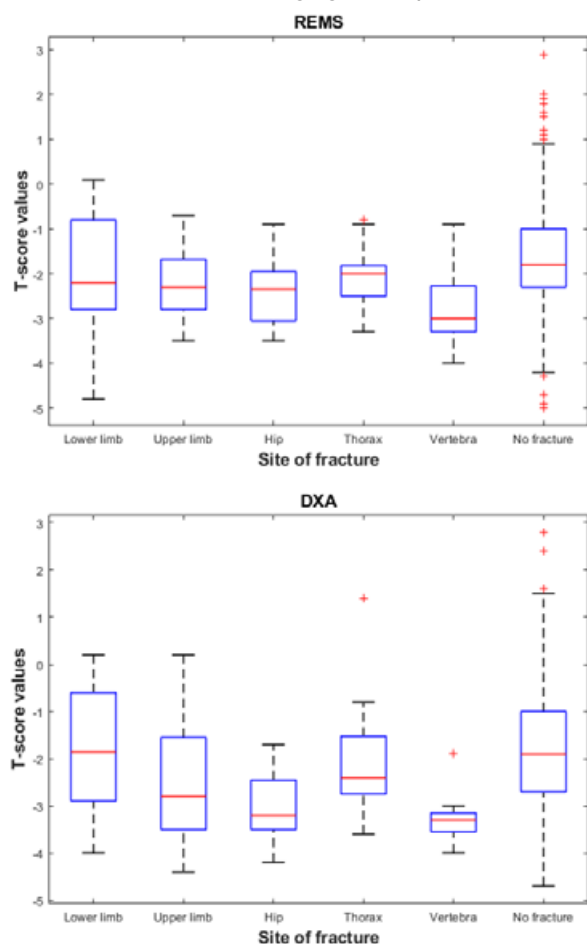
Figure 1. Boxplot of the distribution of T-score values estimated by REMS (above) and DXA (below) at femoral neck among patients with fragility fractures at different sites, i.e., lower limb (excluding femur), upper limb, hip, thorax and vertebra, and patients without fragility fracture. Statistically significant lower T-score values were found in patients with femoral or vertebral fractures with respect to patients without fractures both for DXA and REMS.

P688
A SNAPSHOT STUDY OF ASSESSMENTS OF ORTHOGERIATRICIAN IN FRACTURE NECK OF FEMUR: WHY REGULAR GERIATRIC INPUT IS NECESSARY FOR BETTER OUTCOME

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Objective: Patterns of orthogeriatric care vary between hospitals, from traditional orthopaedic care with variable geriatric input, to combined orthogeriatric care, or even geriatric care with surgical input. In all guidelines it is recognized that geriatric input should ideally start from admission and continue at regular interval. there should be a clinical pathways designed to facilitate multidisciplinary team working for better outcome. We aimed to see whether one comprehensive assessment within 72 h was enough for the medical management of the patient. Therefore this study was done to highlight the need of regular geriatric input.

Methods: A small random sample of patients with fracture neck of femur were analysed. Data of random selected patients with fracture neck of femur were evaluated for pre-operative investigation, complication and this was then compared with the postoperative investigation and also looked for any medical complication postoperative.

Results: 39 patients were included. 8 Patients had respiratory, 4 patients had renal, 3 patient had gastroenterology, 10 patients had cardiac, 4 patient had hypotension, 10 patients were confused and no medical emergency call were noted in patients preoperatively. While 14 patients had respiratory 15 patients renal, 34 patients gastroenterology, 17 patients had cardiac, 18 patients had hypotension and there were 5 medical emergency call postoperatively. There were noted to be variation in the practice due to location of the patient.

Conclusion: Most of the patients ASA score was 3, but the patients were relatively stable pre-operatively. They developed significantly more medical complication post operatively. But through regular input and interventions by orthogeriatrician postoperatively lead to good outcome. secondly by developing guideline for pre-operative and postoperative care, an unnecessary variations in practice were avoided. It is vital that geriatric input should start from admission and continue till discharge with regular multidisciplinary input.

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P689

THE EFFECTS OF TIBIA FRACTURE AND INTRAVENOUS STEM CELLS INJECTED AT THE FIRST STAGE OF BONE REGENERATION ON MORPHOMETRY OF THE HYPOTHALAMUS

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Objective: To test hypothalamus morphometry changes after tibia fracture modeling and intravenous injection of mesenchymal stem cells (MSC) at the first stage of osteoreparation.

Methods: 90 male rats with the body weight of 190-225 g were distributed into three groups like the following: group 1 - controls, group 2 - animals with tibia fracture (modeled as 2.0 mm reach-through round hole between proximal metaphysic and shaft), and group 3 for the animals with the same tibia fracture that received intravenous injections of 5 million MSC per injection at 3rd day after fracture modeling. Bone marrow cells previously sampled from the tibia were placed into Eagle's MEM with L-glutamine and 10% bovine embryonic serum and antibiotic and were cultured and phenotyped according to standard methods. Upon expiration of observation terms (7, 15, 30, 60 and 90 d) the animals were withdrawn from the experiment; the brain and hypothalamus were excised and measured by means of binocular magnifier. The data obtained was analyzed by means of variation statistics using standard software.

Results: In animals with fracture volume of the hypothalamus was bigger than that of the group 1 by 3.37%, 4.73%, 6.86%, and 4.09% (with respect to the period from the 7th to the 60th day), which may testify for compensatory hypertrophy (p<0.05 in all cases). In animals with fracture that received MSC bigger volume of the hypothalamus (by 4.65% in comparison with group 2) was found only by the 7th day while in the period from the 15th to the 60th day volume values decreased by 5.22%, 6.87% and 5.34% respectively. This may be an evidence of faster restoration of the hypothalamus functional activity under influence of stem cells in rats with tibia fracture.

Conclusion: Injury to the tibia results in hypertrophy of the hypothalamus observed nearly throughout the period from the 7th to the 60th day of observation, while MSC reduce effects of fracture on hypertrophy of the hypothalamus, which is well observed from the 15th up to the 60th day.

P690

25-HYDROXYVITAMIN D DEFICIENCY, PTH CONCENTRATIONS AND CARDIOVASCULAR RISK

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Objective: To establish the association between serum 25(OH)D, PTH and cardiovascular risk in population of Carpathian region (Ukraine).

Methods: This is an observational study conducted on the general population in 5 Carpathian villages. A total of 685 participants (42.9% men and 57.1% women, 20-78 y) were recruited during summer months. The overall population mean age was 52.1±0.9 y. Anamnesis and biochemical data regarding age, sex-specific cholesterol, HDL cholesterol, systolic blood pressure (SBP), cigarette smoking, preexisting conditions and lifestyles were used for the calculation of cardiovascular risk (CVR) according to the Framingham Cardiovascular Risk Score. Participants were divided into three age groups (20-40, 41-60 and 61-78 years old).

Results: The prevalence of CVR factors: 39.1% of arterial hypertension, 8.2% of type 2 diabetes mellitus (DM) and 34.2% of smokers. In the general population, SBP and age have a positive correlation ($r = 0.532$, p<0.01). 68.2% of participants have serum levels of 25(OH)D below 20.0 ng/ml. Cholecalciferol and PTH inversely correlate. No effect of aging was observed on 25(OH)D, whereas PTH increases along groups of age ($R^2 = 0.057$, p<0.05). The relationship between 25(OH)D and PTH remains significant at each age group. No effects of age on the relationship between 25(OH)D and PTH were observed in a multivariate analysis that included PTH as the dependent variable. CVR increases with age ($F = 126.2$, p<0.05), also PTH effect on CVR is statistically significant ($F = 24.317$, p<0.05) and independent from age. Elevated PTH (75 percentile; ≥52.7 pg/ml) levels identify a population with higher CVR (11.6±0.7 vs. 8.3±0.2, p<0.05). In a multivariate analysis, age, PTH and cholecalciferol correlate to CVR.

Conclusion: 25-hydroxyvitamin D deficiency, increased PTH might be predictors of CVR in the overall population.

P691

COSTS AND QUALITY OF LIFE ASSOCIATED WITH OSTEOPOROTIC FRACTURES IN IRAN

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Objective: Osteoporotic fractures impose significant costs on society. The aim of this study was to estimate the unit costs and quality of life of hip, vertebral and forearm fracture in the first year after fracture incidence in Iran.

Methods: We conducted a survey on a sample of 300 patients over 50 years old with osteoporotic fractures (hip, vertebral and forearm) who were admitted to four hospitals affiliated to Tehran University of Medical Sciences, Iran, during the 2017 and were

alive 6 months after the fracture. Inpatient cost data were obtained from the hospital patient records. Data regarding outpatient cost and quality of life-related to fractures were collected by questionnaires through a phone interview with patients 6 months after the fracture incidence. Quality of life was estimated with the EQ-5D questionnaire. Direct medical and nonmedical costs were estimated from a societal perspective. All cost was converted to the US dollar by using the average exchange rate in 2017 (1USD=IRR 34,214)

Results: The mean±SD age of the patient was 69.82 ±11.25 y, and 68% were female. 117 (39%) patients had hip fractures, 56 (18.67%) patients had vertebral fractures and 127 (42.33%) patients had forearm fractures. The mean direct cost (medical and nonmedical) the year after hip, vertebral and forearm fractures were estimated at USD5381, USD2981 and USD1233 respectively. The mean quality of life was estimated at 0.54, 0.55 and 0.62 for hip, vertebral and forearm fractures, respectively.

Conclusion: Our findings might be useful for the economic evaluation of preventive and treatment interventions for osteoporotic fractures as well as estimating the economic burden of osteoporotic fractures in Iran.

P692
QUANTIFYING THE PLACEBO EFFECT AFTER INTRA-ARTICULAR INJECTIONS: IMPLICATIONS FOR TRIALS AND PRACTICE

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Objective: Understanding the efficacy of intra-articular therapies (IAT) on pain implies bearing in mind the related placebo (PBO) effect. Most studies analyzing it were focused on the compound being administered rather than the route of administration. We aimed at evaluating the size of the PBO effect of IA injections.

Methods: We performed an overview of systematic reviews (SRs) of randomized controlled trials (RCTs) of frequently used IAT. SRs with a saline solution PBO arm and high confidence results according to the AMSTAR-2 tool were selected for analysis. Data on the change in pain from the PBO arms from baseline to 3-6 and 12-16 weeks (w) after the IA procedure was extracted, standardized mean differences (SMD) calculated and a meta-analysis performed using an inverse variance random effects model.

Results: Two SR were included comprising 50 RCTs; 44 of them not meeting inclusion criteria were excluded so pain, measured by visual analogue scale (VAS) and Lequesne index, was retrieved from 6 RCTs. At 3-6 w, an SMD [95%CI]=0.74 [0.47-1.00] was found. One study showing too large an effect was excluded after conducting sensitivity analysis resulting in a significant reduction of heterogeneity with an SMD=0.62 [0.45-0.79] (Fig. 1). At 12-16 w, we found a SMD=0.33 [0.14-0.52] (Fig. 2). According to the

criteria proposed by Cohen[1], the effect of IA PBO at 3-6 w was moderate to large with a reduction to a small but persistent one at 12-16 w.

Conclusion: Our results showed a moderate to large short-term effect of IA PBO that persisted on the mid-term although reduced. We suggest this effect should be considered when assessing the efficacy of IAT in RCT and also in clinical practice where it could be maximized as well.
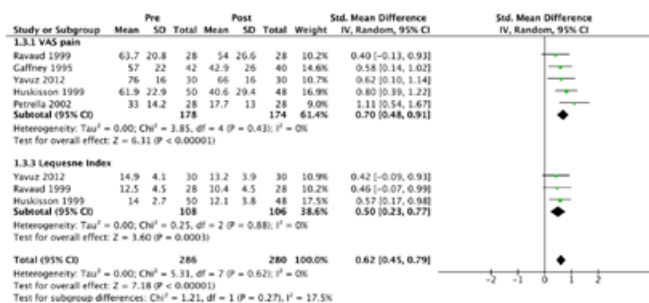
Figure 1. Forest plot for IA PBO effect at 3-6 w.
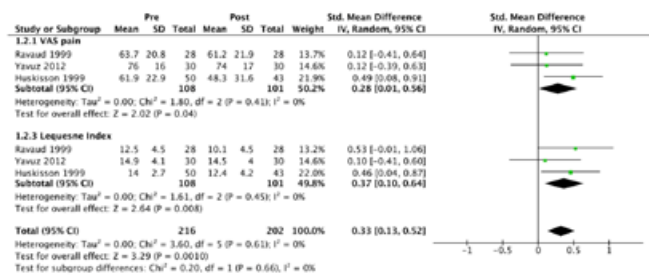
Figure 2. Forest plot for IA PBO effect at 12-16 w.

P693
ARTHRITIS AS A PREDOMINANT FEATURE IN COELIAC DISEASE

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Objective: Coeliac disease (CD) is a gluten-sensitive enteropathy characterized by a wide spectrum of clinical manifestations, such as diarrhea, weight loss, anemia and dermatitis herpetiformis. However, arthritis develops in such kind of patients in different period of time, but still there is no proper data regarding the exact incidence and prevalence of arthritis in CD patients.

Methods: We carried out a study on 400 patients with coeliac disease who were under treatment in the Simferopol Clinical Hospital in the time period from 2014 till 2019. Among them 20 patients had a manifestation of arthritis in their course of disease. The mean age of patients were 35±17. There were 120 male and 280 female patients. The diagnosis was made by clinical, laboratorial methods and was confirmed by cytological investigation with duodenal biopsy. We have used variation statistics with the program of Statistica 12.

Results: From the analysis of results, the patients were divided into two groups, the 1st group (N=6 (30%)] consists of patients who had arthritis as a first symptom of CD and in 2nd group [N=14 (70%)] patients who had arthritis after some period of time. In CD there is an increased permeability of intestinal membranes, in which the antigens enters the blood stream and immune system develops the antibodies against the antigens. CD patients have arthritis as a clinical symptom because there is a formation of antibodies against gliadin protein, which cross-reacts with the normal tissues in the joints.

Conclusion: In CD, there is a chance of development of arthritis at any period of disease. Here there is a correlation between the duration of disease and the development of arthritis. The better way to prevent or control the development of arthritis is to maintain the proper gluten free diet and treatment guided by the physician, which can decrease the incidence and prevalence of the arthritis in patients with Coeliac disease.

P694
MORPHOFUNCTIONAL STATUS OF THE PROXIMAL EPIPHYSEAL CARTILAGE OF THE HUMERUS AFTER APPLYING THE TIBIAL DEFECTS AND ORAL CALCIUM INTAKE

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Objective: To investigate structure of the proximal epiphyseal cartilage of the humerus in rats after tibia fracture modeling and consider correction of alterations with the dietary supplement "Biomin MK".

Methods: The experiment involved 126 male rats with the initial body weight of 135-145 grams. The animals were distributed in the groups as follows: group 1 comprised the controls; group 2 consisted of the animals with fracture modeling as 2.0 mm perforation between proximal metaphysis and diaphysis of the tibia; group 3 comprised the animals that received dietary supplement "Biomin MK" in dosage of 90 mg/kg after fracture modeling. Upon expiration of observation terms (the 7th, the 15th, the 30th, the 60th, the 90th, and the 180th day), HE stained frontal sections of proximal epiphyses were put to morphometry of epiphyseal cartilage zones. The data obtained was analyzed by means of variation statistics using standard software.

Results: Fracture of the tibia resulted in narrowing of proximal growth plate of the humerus in the period from the 7th up to the 90th day of observation period mostly due to osteogenic zone; primary spongiosa and osteoblasts amounts also decreased. Manifestations peak was registered by the 30th day after fracture formation. Administration "BiominMK" results in faster restoration of bone formation beginning from the 30th day of the experiment. Functionality restoration was well observed by the 30th and the 60th days of the experiment as widening of the

osteogenic zones by 7.06% and 8.38% and increase of primary spongiosa and osteoblasts amounts by 4.81% and 6.29%, and by 7.86% and 6.54% respectively (p<0.05 in all cases).

Conclusion: Fracture of the tibia causes inhibition of bone formation manifested as narrowing of the osteogenic zone beginning from the 7th and up to the 90th days of the experiment; amounts of primary spongiosa and osteoblasts decrease as well. Oral administration of "Biomin MK" after fracture modeling results in restoration of the growth plate functionality beginning from the 30th day after fracture development.

P695
LEVELS OF SERUM LINOLEIC ACID AND ITS ASSOCIATION WITH BONE MINERAL DENSITY AND CALCANEUS QUANTITATIVE ULTRASONOGRAPHY IN SPANISH POSTMENOPAUSAL WOMEN

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Objective: To determine the association between plasma linoleic acid and both BMD and bone quantitative ultrasonography (QUS) at the calcaneus in Spanish postmenopausal women.

Methods: The study population comprised of 180 healthy Spanish women (aged 58.9±5.6 y) who participated in a densitometry study conducted in 2019 at the Densitometry Unit of the Metabolic Bone Diseases Research Group of the Nursing Department, from the University of Extremadura (Cáceres, Spain). All serum and plasma samples were obtained in the fasted state. Height, weight, BMI, waist/hip ratio, age at menarche, years since menopause in case of postmenopausal women and history of disease, were recorded. Bone density assessment was done on calcaneus by calcaneus QUS. Calcaneus QUS parameters, broadband ultrasound attenuation (BUA) and speed of sound (SOS) were determined. We examined BMD at the lumbar spine and femoral neck by DXA.

Results: Participants were classified according to serum linoleic acid tertiles. There were no statistically significant differences in the DXA measurements at L2, L3, L4, total spine and femoral neck accordingly to the serum linoleic acid tertile. Levels of linoleic acid were positively correlated to BUA determination (r=0.174, p=0.020) but not to SOS (r=0.065, p=0.065) in the whole sample. Those correlations did not remain significant after further adjustment by age and BMI. However, if analyzed separately the lower and the medium tertiles correlated with both BUA (r=0.310, p=0.001) and SOS (r=0.188, p=0.048) even after further adjustment by age and BMI. There were statistically significant differences in the BUA measurement between the lower and the medium tertile (p=0.028) but not with the highest tertile of serum linoleic acid (p=0.105). After further adjustment by age and BMI

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such differences remained statistically significant (P<0.001). BUA increased up to 4.3% from the lower to the medium tertile of serum linoleic acid.

Conclusion: These results indicate that blood levels of linoleic are associated to calcaneus QUS parameters in postmenopausal Spanish women but not with BMD measured by DXA.

P696
BONE TURNOVER AND MINERAL METABOLISM IN ADULT PATIENTS (PTS) WITH PEDIATRIC-ONSET HYPOPHOSPHATASIA (HPP) TREATED WITH ASFOTASE ALFA

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Objective: Evaluate changes in bone turnover markers in adults with pediatric-onset HPP, a skeletal mineralization disorder, treated with asfotase alfa.

Methods: Observational study of pts ≥18 y with pediatric-onset HPP receiving asfotase alfa for 12 months (m) for routine care at 1 center (NCT03418389).

Results: Data from 14 pts, ages 19-78 y (median 52 y), with compound heterozygous *ALPL* mutations and histories of skeletal (at least 1 fracture) and other HPP manifestations were studied. At baseline, serum concentrations of pyridoxal 5'-phosphate (PLP) were a median of 286 ng/mL and decreased significantly (n=12, *P*=0.005) in 12 m of treatment to 8.5 ng/mL (normal: 5-30). Significant reductions occurred in urine phosphoethanolamine (PEA)/creatinine ratio (n=11, *P*=0.008), with decrease from 54.9 mmol/mol creatinine at baseline to 22.4 mmol/mol creatinine at 12 m (normal: 2.3-11.3). Temporary increase of PTH 1-84 (Table) at 3 m of treatment was not accompanied by changes in calcium or phosphate. Significant transient increases in procollagen type 1 N-propeptide (PINP) at 3 m and osteocalcin at 3 and 6 m were observed; both reverted to near baseline by 12 m (Table). Numeric increases in N-telopeptide of type 1 collagen (NTx) and tartrate-resistant acid phosphatase 5b (TRAP 5b) were not statistically significant.

Conclusion: The first systematic evaluation of bone turnover markers during asfotase alfa treatment reflects that, beyond significantly reducing PLP and PEA and improving bone mineralization, asfotase alfa facilitates bone remodeling in adults with pediatric-onset HPP.

	Markers, Median (Range)	Baseline n=14	3 m n=13	6 m n=13	12 m n=14
Bone metabolism markers	Parathyroid hormone 1-84 (pg/mL) Ref: 14.9-56.9	28.0 (13, 59)	43.7 (20, 82) P=0.06	32.6 (20, 63) P=0.08	31.0 (17, 45) P=0.78
	Calcium (mmol/L) Ref: 2.1-2.6	2.4 (2, 3)	2.4 (2, 3) P=0.68	2.4 (2, 3) P=0.43	2.4 (2, 3) P=0.47
	Phosphate (mmol/L) Ref: 0.6-1.8	1.5 (1, 2)	1.4 (1, 2) P=0.41	1.5 (1, 2) P=0.18	1.5 (1, 2) P=0.78
Bone formation markers	Osteocalcin (ng/mL)	11.8 (8, 89)[a]	20.6 (10, 41)[b] P=0.01	20.7 (10, 33) P=0.004	15.0 (9, 34) P=0.49
	PINP (μg/L)	69.5 (33, 493)[c]	97.1 (63, 176)[b] P=0.03	71.7 (48, 121)[b] P=0.21	61.1 (41, 206) P=0.39
Bone resorption markers	NTx (nM BCE/L)	12.0 (8, 51)[d]	14.7 (9, 25)[b] P=0.42	15.3 (11, 23) P=0.31	12.2 (6, 25) P=0.35
	TRAP 5b (U/L)	3.9 (2, 6)[e]	4.1 (1, 18)[a] P=0.12	3.3 (2, 8)[c] P=0.24	4.4 (1, 7) P=0.26

P values represent change from baseline
[a]n=11
[b]n=12
[c]n=10
[d]n=13
[e]n=9

P697
INFLUENCE OF AGE ON THE RATE OF RESPONDERS TO DIACEREIN TREATMENT IN KNEE OSTEOARTHRITIS: DATA FROM THE DISSCO CLINICAL TRIAL

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Objective: The DISSCO trial (6-month international, multicentre, double-blind, randomised study of the effect of diacerein vs. celecoxib in symptomatic knee osteoarthritis [OA] patients) demonstrated that diacerein had comparable efficacy to celecoxib at reducing the level of pain (WOMAC). This post-hoc study aimed to explore the influence of patient age on the extent of response to treatment with diacerein.

Methods: In the DISSCO trial, 186 patients received treatment with diacerein. In the intent-to-treat population (n=183), 105 patients were <65 years old and 78 ≥65 years old. The clinical relevance of the treatment effect was assessed by the rates of responders evaluated according to the Outcome Measures in Arthritis Clinical Trials–Osteoarthritis Research Society International (OMERACT–OARSI) criteria, minimum clinically important improvement

(MCII), and patient acceptable symptom state (PASS). The cut-off threshold for MCII was for WOMAC pain change >15 mm (scale 0-100) and for PASS 40 mm (scale 0-100 mm).

Results: After 6 months of diacerein treatment, the responder rates were numerically similar for the three criteria, notwithstanding the age group: OMERACT-OARSI (<65 years old, 58.4%; ≥65 years old, 52.0%; p=0.39), MCII (58.4%, 53.3% respectively; p=0.57), and PASS (57.4%, 50.7% respectively; p=0.48). There were also no statistically significant differences in the responder rates between the two age groups at other time points, 2 and 4 months, (OMERACT-OARSI, 50.0% and 49.2%, p=1.00; 64.7% and 62.3%, p=0.88 respectively; MCII: 58.3%, and 55.4%, p=0.77; 60.0% and 59.0%, p=1.00 respectively; PASS: 50.0% and 56.9%, p=0.40; 57.7% and 70.5%, p=0.08 respectively).

Conclusion: Data revealed no differences in terms of clinical response to diacerein treatment between knee OA patients younger or older than 65 years of age.

Disclosures: JPP has received a study grant and speaker fees from TRB Chemedica, speaker fees from Mylan, and is a shareholder in ArthroLab Inc. JPR and MD are consultants for ArthroLab Inc. JMP has received a study grant from TRB Chemedica, and is a shareholder in ArthroLab Inc. PP is an employee of ArthroLab Inc.

P699
GLUCOCORTICOID-INDUCED OSTEOPOROSIS IN TWO CHILDREN

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Objective: In developmental age, glucocorticosteroids (GKS) are used to treat autoimmune diseases, chronic diseases of kidneys, diseases of the gastrointestinal tract, and cancer, which may be associated with the occurrence of glucocorticoid-induced osteoporosis (GIO). The time of the occurrence of post-steroid osteoporosis depends on the dose, method of administration, duration of GKS use, and individual sensitivity. The aim of the study is to present two children with post-steroid osteoporosis in the course of autoimmune hepatitis (Patient 1) and acute lymphoblastic leukemia (Patient 2).

Methods: The results of studies of two children with GIO hospitalized in the Department of Paediatrics, Neonatal Pathology and Bone Metabolic Diseases at the Medical University of Lodz in the years 2018-2020 were analyzed. In both patients, due to back pain and impaired gait, spine x-ray, densitometry of the skeleton using the DXA method in the total body and spine projection were performed, the concentration of the liver metabolite of vitamin D (25-OHD) was determined by ELISA and tests evaluating calcium and phosphate metabolism were carried out. Osteoporosis was diagnosed with Z-scores below -2.0 and the presence of long bone or vertebral fractures.

Results: In both patients, based on the x-ray of the spine, fractures of the thoracic and lumbar vertebrae were found, and the densitometric examination showed a significant decrease in BMD (in patient 1, Z-score in the total body program was -2.1, while in the spine program -2,7; in patient 2, Z-score was -1.9 and -3.9, respectively). Hepatic vitamin D metabolite levels were normal. In both cases (except for hypomagnesuria found in patient 1, and increased serum osteocalcin in patient 2), the results of tests evaluating calcium and phosphate metabolism were within the reference range. In both patients, osteoporosis with spinal fractures was observed after a few months of using GKS. In both cases, an orthopedic corset was used and cyclic infusions of sodium pamidronate were administered, resulting in the patients' improved clinical status.

Conclusion: Post-steroid osteoporosis (GIO) in the treatment of chronic diseases may affect all age groups, including children and adolescents.

P700
IMPACT OF HIP FRACTURES ON FUNCTIONALITY AND QUALITY OF LIFE IN AN ORTHOGERIATRIC CLINICAL CARE CENTER

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Objective: As population grows old, the incidence of fractured hips have increased during the last decade. This have a negative impact in old peoples' quality of life because it means a loss in functionality and mobility and requires especial care to get a full recovery. The Orthogeriatric Clinical Care Centers have as main goal the provision of an inter-disciplinary management and improve outcomes such as mortality, morbidity, functionality and perception of quality of life. The aim of this study was to determine the changes in functionality and quality of life perception in geriatric patients who had fractured hip surgery using the Parker and EQ5D scales.

Methods: This study used a retrospective cohort method to compare the functional status and quality of life prior to the fracture and one year after the intervention in patients treated at the Orthogeriatric Clinical Care Centre. The patients were treated between May 2014 and June 2018 using EQ5D scales and Parker.

Results: This work considered 117 patients with an average age of 82. The results of the study showed a loss of the Parker Scale in 41% of the patients, 37.6% of the patients did not show changes and 21.4% had an improvement after one year of follow-up. On the other hand, the majority of the patients did not have changes in most of the scores evaluated regarding the EQ5S scale.

Conclusion: The interventions performed with standardized protocols and with a comprehensive patient centered care have shown better results in one year of follow-up. The results obtained showed that most of the patients manage to maintain the scores on the scales for the evaluation of functionality and quality of life. Therefore, it can be inferred that the implementation of Clinical

Care Centers focused on comprehensive patient care for the treatment of hip fractures in older adults can mitigate the impact they have on the patient.

P701

CUTOFF VALUES TO IDENTIFY LOW MUSCLE MASS BY COMPUTED TOMOGRAPHY AT L3 VERTEBRA LEVEL

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Objective: Computed tomography (CT) is considered as gold standard for evaluation of total skeletal muscle quantity. Skeletal muscle assessments at L3 vertebra level were revealed to be significantly correlated with whole body muscle measurements. Herein, we aimed to provide gender specific cutoff values for psoas muscle mass index (PMI) and skeletal muscle mass index (SMI) at the third lumbar vertebra level in Turkish population.

Methods: Preoperative plain CT images of living adult liver donors admitted our hospital transplantation center between June 2010-April 2018 were evaluated to determine psoas muscle area (PMA), PMI, skeletal muscle area (SMA) and SMI at the level of the third lumbar vertebra. Cutoff values using both 5th percentile and two standard deviations were considered to define low muscle mass in total study population, and in younger population aged 18-40.

Results: 601 patients (age 18-59; 326 male, 275 female) were evaluated; 482 (80%) were young (age 18-40; 268 male, 214 female). In patients aged 20-40 gender specific PMI and SMI by using 5th percentile were calculated as 5.40 cm²/m², 41.42 cm²/m² for males and 3.56 cm²/m², 30.7 cm²/m² for females respectively. In the same age group, gender specific PMI and SMI by using two standard deviations were estimated as 4.62 cm²/m², 38.67 cm²/m² for males and 2.66 cm²/m, 27.8 cm²/m² for females respectively. In whole study population, gender specific PMI and SMI by using 5th percentile were calculated as 5.34 cm²/m², 41.33 cm²/m² for males and 3.56 cm²/m, 31.4 cm²/m² for females respectively. In the same age group, gender specific PMI and SMI by using two standard deviations were estimated as 4.46 cm²/m², 37.84 cm²/m² for males and 2.69 cm²/m², 27.82 cm²/m² for females respectively (Table 1). In our study, cutoff values for PMI and SMI were comparable with the other cutoffs reported in so far studied populations (Table 2).

Conclusion: Our study provides cutoff values for PMI and SMI at the third lumbar vertebra level for Turkish population with different calculation methods.

Table 1.
Gender specific cutoff values of Psoas Muscle Area, Psoas Muscle Index, Skeletal muscle Mass, Skeletal Muscle Index at lumbar L3 vertebra level

	PMA cm²		L3-SMA cm²		PMI cm²/m²		L3-SMI cm²/m²	
	Men	Women	Men	Women	Men	Women	Men	Women
Aged 18-40 years								
mean±2SD	14.08	6.52	121.2	69.48	4.62	2.66	38.67	27.8
p5	16	9	132	83	5.40	3.56	41.42	30.7
Aged 18-60 years								
mean±2SD	13.45	6.67	118.9	70.17	4.46	2.69	37.84	27.82
p5	16	9	131.35	84	5.34	3.56	41.33	31.14

Table 2. Comparison of the cutoff values of PMI and L3-SMI in different populations

Population	Van der Werf et al.[a] Caucasian	Derstine et al (2017)[b] American	Derstine et al. (2018) American	Hamaguchi et al.[c] Japanese	Kim et al[d]. Korean	Our study (aged 18-40) Turkish	Our study (aged 18-60) Turkish
PMI (cm²/m²)							
Men							
p5						5.40	5.34
mean±2SD				6.36	3.31-5.92	4.62	4.46
Women							
p5						3.56	3.56
mean±2SD				3.92	1.48-4	2.66	2.69
L3-SMI (cm²/m²)							
Men							
p5	43.1					41.42	41.33
mean±2SD	39.7	44.6	45.4			38.67	37.84
Women							
p5	32.7					30.7	31.14
mean±2SD	31.2	34.4	34.4			27.8	27.82

All of the studies cited in this table were performed among healthy individuals.

[a] the cutoff values of participants aged 20-60. In this study, 94% of the participants was Dutch, %2.6 was European non Dutch and remaining 3.3% was non European.

[b] the participants were aged 18-40

[c] cutoff values were determined among age <50 years

[d] cutoff values were determined for age decades; participants were aged 20-89

P702

RELATION BETWEEN MUSCLE STRENGTH AND APPENDICULAR LEAN MASS IN MEXICAN CHILDREN AND ADOLESCENTS

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Objective: To assess the relationship between muscle strength and appendicular lean mass (ALM) in Mexican children and adolescents.

Methods: A cross-sectional study in children and adolescents aged 5-20 y, clinically healthy, residents of Mexico City, was conducted. Appendicular muscle strength was measured by dynamometry Jamar Plus digital, and Microfet2, and ALM by

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DXA (Lunar iDXA GE). Relationship between both measurements was evaluated using Pearson correlation coefficients and linear regression models.

Results: A total of 1203 children (622 men, and 581 women) were measured. The relation between right hand strength (Jamar) and age (boys r=0.89, girls r=0.88), height (boys r=0.88, girls r=0.87), weight (boys r=0.83, girls r=0.82). In upper limbs the correlation between Jamar: right hand strength and right arm lean mass (RALM) was r=0.92 in boys, and 0.82 girls. In left hand strength and left arm lean mass (LALM) was r=0.90 in boys, and 0.81 girls. With Microfet2 upper limbs: right elbow flexion (REF) with RALM was r=0.91 in boys, and 0.85 girls, in left elbow flexion (LEF) and LALM r=0.90 boys, and r=0.74 girls. In low limbs: right hip abduction with right leg lean mass (RLELM) was r=0.85 in boys, and 0.80 girls; and left was r=0.86 boys, and 0.80 girls. In right knee extension with RLELM was r=0.76 in boys, and 0.70 girls; in left; r=0.76 boys, and 0.70 girls. In right knee flexion with RLELM was r=0.83 in boys, and 0.78 girls; in left; r=0.84 boys, and 0.79 girls. All correlations were $P \leq 0.05$.

Conclusion: There is a high correlation between muscle strength and appendicular lean mass in healthy Mexican children and adolescents. These parameters could be used to assess the detection of muscle strength deficit.

P703
EFFECTS OF PHYSICAL EXERCISE PROGRAM ON QUALITY OF LIFE IN POSTMENOPAUSAL OSTEOPOROSIS WOMEN

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Objective: Osteoporosis (OP) is characterized by reduced bone mass and disruption of bone architecture, resulting in increased risk of fragility fractures which represent the main clinical consequence of the disease. The aim of this study was to investigate the effect of a variety of physical exercise programs on activities of daily living in patients with OP.

Methods: The 12 months randomized controlled study included 64 female patients with postmenopausal OP defined according to BMD criteria: T-score -2.5 on the femoral neck, and/or T -2.5 on L1-L5. Subjects were randomized in each cohort to receive specific medication or medication and physical exercise program. Regular weight bearing and muscle strengthening exercises were recommended to improve agility, strength, posture and balance. The results of the treatment were registered on the quality of life questionnaire (Qualeffo -41) devised by the International Osteoporosis Foundation. All patients were evaluated at the beginning of the study and after 6 months of treatment.

Results: 58 patients (90.62%) completed the study. Patients that followed physical exercise programs were assigned to small groups (a maximum of 5 patients in each group) and thus received individual attention and motivation. Quality of life was improved in both groups: a significantly greater improvement was registered in patients who performed physical exercise (Global score Qualeffo: p=0.002).

Conclusion: The test results confirmed the known positive effects of physical therapy on quality of life of osteoporosis patients. Exercise programs help to reduce the risk of falls and fractures; in addition, exercise may modestly increase bone density. The compliance of patients to therapy was very good: 90.62% of the patients completed the 6-month treatment period.

P704
DIETARY ACRYLAMIDE AND INCIDENT OSTEOPOROTIC FRACTURES: AN 8-YEAR LONGITUDINAL COHORT STUDY

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Objective: Increasing literature reports that acrylamide, a common component of fried foods, is associated with negative health outcomes. However, data regarding the association between dietary acrylamide and osteoporotic fractures is poorly explored. Therefore, this study aimed to investigate whether dietary acrylamide is associated with incident osteoporotic fractures in North American subjects at high risk or having knee osteoarthritis (OA) over 8 y of follow-up.

Methods: Dietary acrylamide was evaluated using a food frequency questionnaire and categorized in tertiles. Osteoporotic fractures (any site, spine, hip, wrist) were evaluated through self-reported history. A Cox's regression analysis, adjusted for baseline confounders was run and the data were reported as hazard ratios (HRs) with their 95%CIs.

Results: 4436 subjects (mean age: 61.3 years; 58.1% females) were included. Compared to participants with lower acrylamide intake (T1), those with a higher acrylamide intake (T3) reported a significant higher risk of any fracture (HR=1.27; 95%CI: 1.05-1.55; p for trend=0.048), forearm fracture (HR=1.67; 95%CI: 1.06-2.63; p for trend=0.03), spine fracture (HR=2.19; 95%CI: 1.15-4.20; p for trend=0.02), and hip fracture (HR=4.06; 95%CI: 1.34-12.29; p for trend=0.04). The association between dietary acrylamide intake and incident fractures was stronger in people with presence of an osteoporotic fracture at the baseline and in those not taking any anti-osteoporotic medication.

Conclusion: High dietary acrylamide was associated with an increased risk of osteoporotic fractures in subjects at high risk or having knee OA, over 8 y of follow-up

P705
PREDICTORS OF QUALITY OF LIFE IN WOMEN WITH OSTEOPOROSIS ABOVE THE AGE OF 50: PILOT STUDY IN CENTRAL POLAND

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Objective: To identify the factors influencing the quality of life (QoL) assessed on the QUALEFFO-41 scale in women with osteoporosis above the age of 50.

Methods: It was an outpatient survey carried out from June 2018 to May 2019. The study enrolled 198 women aged 72.31±8.59 y with clinical postmenopausal osteoporosis, in two Osteoporosis Outpatient Clinics in the city of Lodz (Poland). The criteria for selection were as follows: postmenopausal osteoporosis in the patient's history according to ICD 10 – M81.0 and lack of other chronic diseases. The scales used in the study were: Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO-41), Acceptance of Illness Scale (AIS), Satisfaction With Life Scale (SWLS), Visual Analogue Scale (VAS) and the authors' own questionnaire. Statistical analysis was performed with the Statistica 13.0 program.

Results: The mean score on the QUALEFFO-41 scale was 40.26±16.92 points. The mean life satisfaction on the SWLS was 73±7.26 points and indicated moderate life satisfaction. The mean result on the AIS was 25.9±10.19 points, which indicated a moderate level of acceptance and adaptation to the diseases in the study group. The mean VAS score was 4.87±2.39 points.

The multiple linear regression model allowed explaining 73% of the variability of the modelled dependent variable. It was shown that the quality of life deteriorated by 0.17% yearly on the QUALEFFO 41 scale in patients with postmenopausal osteoporosis. It was proved that factors determining the quality of life in women over 50 years old with postmenopausal osteoporosis were: age, VAS, AIS and SWLS scores.

Conclusion: The quality of life of chronically ill patients is an important element of the overall health assessment, which affects the ability to maintain long-term positive doctor-patient relations. Life satisfaction assessment is not common in Poland yet.

P706
FATTY DIET AND OBESITY AS A CAUSATIVE FACTOR OF FIBROMYALGIA

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Objective: The fibromyalgia is a chronic disorder which is characterized by muscle pain and tenderness. It is mostly uncertain etiology however obesity plays a central and it aggravates the disease progression. The increased amount of body fat and simultaneous decrease in muscle quantity is the main characteristic of fibromyalgia. The daily function of an individual can be affected due to development of fibromyalgia. Our study reveals the high fatty diet and the risk of development of fibromyalgia among the students from Russia and India.

Methods: Our survey consists of 500 students who were from Russia and India. There were 200 men and 300 women students. The mean age of the students were 25±8. A questionnaire consisting of 25 questions was shared through various social media platforms. Here we have used variation statistics with the program of Microsoft Excel 2013.

Results: From the survey results we have divided them into 3 groups. 1st group consists of students with BMI <18 were 14%, 2nd group consists of students with BMI 18 - 25 were 26% and the 3rd group consists of students with BMI >25. The group 3 has increased risk for development of fibromyalgia when compared to second and first group. Also when compared between group 1 and 2, the group two has increased risk for development of fibromyalgia when compared to 1st group. The symptoms of fibromyalgia were seen in 65% of students in first group, whereas in group 2 and 3 it was only 35% and 9% respectively. The consumption of more fatty foods was seen high among Russian students with 65% whereas the Indians were seen with 35%.In group 3 the patients mostly prefer non vegetarian and junk foods with 65%.

Conclusion: Russian students are more susceptible to fibromyalgia than Indian students. The fibromyalgia is one of the diseases that are easily modified with proper diet. The consumption of less carbohydrates and fatty foods and increased consumption of lean protein and fiber can effectively decrease the incidence of fibromyalgia. The regular exercises and reduction in weight is also having a positive effect on fibromyalgia patients.

P707
ADOLESCENTS WHO ARE AT RISK OF OSTEOPOROSIS AS A CONSEQUENCE OF SMOKING

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Objective: Nowadays the most faced problem among the adolescents is smoking as they made it as habitual and are addicted to it. Recent researches shows the evidence of tobacco smoking causing the imbalance in the bone metabolism, which ultimately leads to the development of osteoporosis in future. Osteoporosis is one of the main emerging problem in the recent decades, most of the time it's not diagnosed until their first fracture. Tobacco smoking influences on bone indirectly by different ways such as influencing on adrenal hormones, PTHs and also by altering the body weight. However smoking can directly affect the bone density by making changes in the osteogenesis and angiogenesis. So here there is a necessity to make a proper assessment of people who at risk and to make an awareness regarding the effects of smoking on our health, especially about osteoporosis. **Methods:** We carried out a survey of 700 adolescents who were

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from Indian republic and Russian federation. They were aged from 13-18 y. Male respondents were 370 (52.8%) and female respondents were 330 (47.2%). Questionnaire consists of 20 questions. The questionnaire was shared among adolescents through social media platforms and we have used variation statistics with the program Microsoft Excel 2013.

Results: From the survey results, 56% of respondents were from India and 44% were from Russia. Among 700 respondents 570 (81.4%) were having smoking habit. From this 81.4%, there were 61% of male respondents and 49% of female respondents. From the total males (61%) who were smoking, Russians were 57% and Indians were 43%. But in female the situation is different, out of the total women (49%) who were smoking, Russians were 89% and Indians were 11%.

Conclusion: From the analysis of results we concluded that around 81.4% of adolescents are smoking, which is a huge number. This mostly is seen in males when compared to females, and it is more in Russia when compared to India. The prevalence of smoking is more in Russian girls when compared to Indian girls. So here we have to make a proper awareness about this issue which can prevent the development of osteoporosis in future.

P708
RELATIONSHIPS BETWEEN CLINICAL PROFILE, MARKERS OF BONE METABOLISM AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Objective: To determine relationships between clinical profile, markers of bone metabolism and BMD in postmenopausal women.

Methods: A group of 76 postmenopausal women without prior treatment or supplementation for osteoporosis were included. BMI, adiposity index (Durnin & Womersley), BMD at lumbar and hip levels, markers of bone metabolism (β-CTX, osteocalcin), several serum minerals (calcium, zinc, copper, phosphate, magnesium) were measured, with further Pearson correlations evaluation.

Results: Significant correlations between the adiposity index and bone metabolism markers were found. Negative relationship with β-CTX (r=-0.564, p=0.006) and positive relationship with osteocalcin (r=0.384, p=0.067) were found. Calcium correlated negatively with the adiposity index (r=-0.534, p=0.02), while zinc (r=0.392, p=0.021) and copper (r=0.354, p=0.068) correlated positively with the adiposity index. Lumbar BMD (r=0.611, p=0.000) and hip BMD (r=0.688, p=0.000) correlated positively with the adiposity index. No significant correlations were found with BMI. β-CTX levels revealed positive correlation with calcium (r=0.745, p=0.000) and negative correlations with phosphate (r=-0.42, p=0.024), zinc (r=-0.611, p=0.001) and magnesium (r=-0.678, p=0.000). Osteocalcin correlated positively with copper (r=0.745, p=0.000) and negatively with zinc (r=-0.601, p=0.000).

Conclusion: The adiposity index (Durnin & Womersley), unlike BMI, has revealed multiple relationships with bone metabolism markers, serum mineral levels and BMD, a higher index being associated with a pro-anabolic bone profile. Serum phosphate, magnesium and copper were associated with a pro-anabolic bone profile, while serum calcium level was associated with a pro-catabolic bone profile.

Reference: 1. Womersley J, Durnin J. Br. J Nutrit 1977;*38*:271.

P709
ANALYTICAL PERFORMANCE SPECIFICATION FOR BONE TURNOVER MARKER ASSAYS ACCORDING TO CLINICAL REQUIREMENTS BASED ON A PHYSICIAN SURVEY

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Objective: C-telopeptide of type 1 collagen (CTX) is a bone turnover marker used to monitor adherence and response to oral antiresorptive treatment for osteoporosis. We set out to define the analytical performance specification in terms of assay imprecision (CVa) for serum CTX, based on clinical requirements.

Methods: A survey was administered to endocrinologists in Singapore to seek their response on the magnitude of change in sequential CTX measurement they consider as clinically significant under two clinical scenarios: 1. Response to antiresorptive therapy indicated by significant decrease in CTX, and 2. deterioration in bone resorption indicated by a significant increase in CTX. The magnitude of change, expressed as percentage, was considered the least significant change (LSC). The CVa requirement was calculated by $[(LSC^2/2Z^2) - CVi^2]^{0.5}$, where one-sided Z-value of 1.65 (for 95% probability) and CVi=within-person biological variation (11%).

Results: 66 physicians responded to the survey. The median LSC for a clinical scenario associated with negative change in serum CTX (response to therapy) was 50%, giving a CVa requirement of 18.4%. On the other hand the median LSC for a clinical scenario associated with positive change was 67%, translating to a required CVa of 26.4%. The values obtained from the clinician survey was considerably larger than the optimal CVa of 5.4%, derived as 0.5x (CVi) that ensures the analytical noise contributes no more than 12% of the total variation between sequential measurements.

Conclusion: Clinicians indicated different magnitudes of change they considered clinically significant for different clinical scenarios (positive or negative direction of change). Assay precision should cater to the lowest LSC and therefore ≤18.4%. However, the precision requirement derived from median LSC provided by clinicians was significantly larger than the optimal CVa of 5.4%, based on biological variation of CTX.

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P710

COMPARISON OF LIFE QUALITY, PAIN INTENSITY AND FATIGUE WITH PATIENTS SUFFERING FROM RHEUMATOID ARTHRITIS AND KNEE OSTEOARTHRITIS

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Objective: It is well known that chronical rheumatoid diseases have negative impact on life quality. Pain and joint swelling, limited motion, stiffness and deformity from one side, as well as fatigue, poor sleep quality and depression, on the other hand, significantly reduce life quality. We aimed to compare life quality, pain intensity and fatigue intensity of patients with rheumatoid arthritis (RA) and knee osteoarthritis (knee OA).

Methods: 150 patients have been examined: 75 patients with RA and 75 patients with knee OA. Groups were homogenous regarding gender and age. Life quality has been estimated by means of questionnaire- Short Form Medical Outcomes Instruments (SF 36) SF 36F-physical sphere and SF 36M-mental sphere. Pain and fatigue intensity was estimated by scale VAS.

Results: Average value of SF 36F with patients suffering from RA was 35.62±21.73 in regard to patients suffering from knee OA 61.72±18.85, p<0001. Average value of SF 36M with patients suffering from RA was 44.79±24.18 compared to patients with knee OA having 68.12±20.77, p<0001. Pain intensity with patients with RA was 47.79 ±24.66 compared to patients with knee OA ranging 46.08±18.82, p=0.622. Fatigue intensity with patients suffering from RA was 48.28± 25.64 compared to patients with knee OA having 29.23±15.58, p<0001.

Conclusion: Patients with RA have significantly less quality of life and greater fatigue intensity compared to patients with knee OA. Pain intensity was not statistically significantly different. Although patients with RA have poorer values of quality of life, taking into account a big number of patients with knee OA, a significant implication of this disease is recognized. Pain is significant predictor of poor quality of life.

P711

PLUMERIA RUBRA EXTRACT SUPPRESSES RANKL INDUCING NF-κB ACTIVATION AND ATTENUATES OSTEOCLASTS DIFFERENTIATION

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Objective: Osteoclasts play crucial role in osteolytic bone disease, such as osteopetrosis and rheumatoid arthritis (RA). RANKL inducing NF-κB activation controlled osteoclastogenesis in macrophage cells. Therefore, controlling osteoclasts differentiation and activation by regulating NF-κB activation has been considered a promising preventive and therapeutic strategy. Plant-derived bioactive metabolites are a treasure-trove of organic compounds having various structures and biological activities. So, we screened active plant extracts that inhibit NF-κB activation and RANKL-induced osteoclasts differentiation.

Methods: In lipopolysaccharide (LPS)-treated macrophages, nitric-oxide (NO) is produced by inducible NO synthase (iNOS) which is regulated by NF-κB. NO production can be detected by Griess assay which is cost-effective and high throughput tool. So, we used Giress assay in LPS-treated monocyte-derived macrophage-like cell line RAW264 cells as 1st screening method for identifying active plants extracts. Next, we detected iNOS mRNA expression by qPCR and its protein expression by immunoblotting as 2nd screening. In 3rd screening, we studied effect of identified active plant extracts on NF-κB activation and RANKL-induced osteoclastogenesis. Next, we analyzed effect of identified plant extracts on MAPK activation and NF-κB nuclear translocation by immunoblotting. We also detected target molecule of active plant extract by in vitro kinase assay.

Results: We identified *Plumeria rubra* as new active plant extracts for inhibiting NO production and iNOS protein expression by inhibiting NF-κB activation. *P. rubra* also inhibited RANKL-induced osteoclasts differentiations and NF-κB activation. In addition, *P. rubra* inhibited Akt phosphorylation whereas did not affect p38, ERK, and JNK activation. In addition, *P. rubra* attenuated PDK1 activity. These results indicated that *P. rubra* attenuated RANKL-induced NF-κB activation via PDK1 inhibition.

Conclusion: This is the first study demonstrating a novel pharmacological property of *P. rubra*. Excessive NF-κB activation induces inflammatory osteopetrosis in RA and NF-κB inhibitor has treatment effect on osteoclastogenesis in RA *in vivo* model. Thus, *P. rubra* may lead to the development of new preventive and therapeutic strategies for bone disease.

P712

RISK FACTORS FOR OSTEOPOROTIC FRACTURES IN PATIENTS WITH REDUCED MINERAL BONE DENSITY

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Objective: Fractures are complications of osteoporosis that have great sociomedical significance. We aimed to evaluate the risk factors for osteoporotic fractures in patients with reduced BMD.

Methods: The retrospective study included 260 patients (77% women) with 140 being osteoporotic and 120 with osteopenia. All patients were recruited from Medical Rehabilitation Clinic, Clinical

Centre of Vojvodina. BMD assessment on the Lunar Prodigy apparatus was performed using the DXA method while fracture risk assessment was performed using the FRAX questionnaire.

Results: The mean age of subjects with osteoporosis and osteopenia was 68.14±8.51 and 66.21±10.76, respectively. 70 (50%) subjects in the osteoporosis group had bone fracture, while only 40 (33.33%) had fracture in the osteopenia group. In the osteoporosis group, 18 (12.86%) patients had a positive family history of hip fracture, compared to 12 (10%) in the osteopenia group. In relation to alcohol consumption, 120 (85.71%) subjects in the osteoporosis group and 100 (83.33%) subjects in the osteopenia group reported no consumption. 34 (24.28%) patients in the osteoporosis group were smokers and 32 (26.66%) from the osteopenia group were active in some type of sports. Lower body mass was observed in subjects with osteoporosis (21.93±4.13 vs. 26.87±5.25) (t=2.646, p=0.009). The risk of major fracture in the osteoporosis group was 12.49±6.19, and in the group with osteopenia 10.21±6.30 (t=-2.217, p=0.028). There was a statistically significant difference in the risk of hip fracture among subjects in osteoporosis and osteopenia groups. Subjects with osteoporosis had a higher risk of hip fracture than subjects with osteopenia (4.92 vs. 3.67; t=-2.001, p=0.047).

Conclusion: The most significant risk factors in patients with reduced BMD and osteoporotic fractures in our study were the existence of earlier fractures and low body weight. A higher fracture risk was found for major osteoporotic fractures and hip fractures in patients with osteoporosis.

P713
EFFICACY OF PHYSICAL THERAPY IN PATIENTS WITH LATERAL ELBOW TENDINOPATHY

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Objective: To examine the efficacy of physical therapy in the treatment of patients with diagnosed lateral elbow tendinopathy (LET).

Methods: Prospective study includes 58 patients with diagnosed LET. All patients were treated with a combined physical procedures lasting 15 therapeutic days: extracorporeal shockwave therapy (once a week, the repetition frequency of shock wave pulses was 10-12 Hz, and medium energy level 0.08-0.13 mJ/mm²), low level laser therapy (once a day, wavelength of 810 nm, power 500 mW, irradiation time of 10 min), ice treatment (once a day, duration 5 min), wrist extension splinting, and rest. Patients were evaluated at baseline, and 1 month following treatment. The outcome measures were the visual analog scale (VAS), patient-rated tennis elbow evaluation (PRTEE), and Short Form-36 (SF-36) health survey questionnaire.

Results: A total of 58 patients with LET participated in the study, including 56.28% men and 43.72% women, 48±11 years old, BMI (kg/m²) 26.21±2.18, with dominant hand right/left 47/11 (81.03%/18.97%) and disease duration 29.59±8.15 d. Before the use of physical therapy, total score of VAS was 7.8±1.7, and total score of PRTEE was 61.5±21.3. One month following treatment total score of VAS was 3.6±2.4 (p<0,05), and total score of PRTEE was 42.5±17.3 (p<0,05). Quality of life measured by the SF-36 questionnaire significantly increased in all subscales, compared with the pretreatment scores (p<0.05).

Conclusion: The application of physical therapy has led to statistically significant reduction in pain and improvement in the functional status of patients with lateral elbow tendinopathy.

P714
CHANGES OF XANTHINE OXIDASE AND XANTHINE DEHYDROGENASE ACTIVITIES AFTER NSAIDS USAGE IN RHEUMATOID ARTHRITIS

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Objective: To evaluate the changes of xanthine oxidase and xanthine dehydrogenase activities in plasma, lysed lymphocytes and lysed red blood cells of rheumatoid arthritis (RA) patients related to NSAIDs treatment.

Methods: 46 RA patients and 30 healthy individuals were included in the study. The diagnosis of RA was verified using the ACR/EULAR criteria (2010). All patients have moderate DAS28 disease activity scores. RA patients were randomized into 2 groups comparable in gender, age and the principal clinical manifestations. Diclofenac sodium (Hemofarm), average dose 75 mg/d, and ketoprofen (Sandoz Novartis), average dose 100 mg/d, were administered intramuscularly in the respective groups. Xanthine oxidase (XO, EC 1.17.3.2) and xanthine dehydrogenase (XDG, EC 1.17.1.4) activities were measured in plasma, lysed lymphocytes and lysed red blood cells by spectrophotometric method as previously described [1]. The changes of these enzymes activities were studied in RA patients before and after the injection of NSAIDs. Statistical comparison tests were selected in according to common guidelines, differences were considered significant when p<0.05.

Results: Mean age of patients in diclofenac sodium group (± SEM) was 42.9±1.0 years, and mean RA duration (± SEM) was 7.5±0.25 y. Mean age of patients in ketoprofen group (±SEM) was 45.1±1.2 y, and mean RA duration (± SEM) was 7.7±0.3 y. Significant increase of XDG activity and decrease of XO activity were observed in plasma and lysed lymphocytes of RA patients just after the injection of either NSAID. However enzymatic activity did not reach the level of healthy controls. Changes of the enzymatic activities in plasma and lysed lymphocytes were more pronounced in ketoprofen group. Changes of both enzymatic activities in lysed red blood cells were conversely greater in diclofenac treated patients. Magnitude of changes of XO and XDG plasma activities was significantly higher than in lymphocytes and erythrocytes in both groups.

Conclusion: Treatment with diclofenac sodium and ketoprofen can affect the balance of XO/XDG activity and increase the antioxidant potential of the blood.

Reference: 1. Zborovskaya IA et al. Russ J Pain 2018;3:47

P715
MONOCYTE EXTRACELLULAR TRAPS IN RHEUMATOID ARTHRITIS

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Objective: To study the propensity of circulating monocytes for spontaneous and induced formation of extracellular traps in rheumatoid arthritis (RA).

Methods: The study was performed according to bioethical standards. 15 patients over 18 years old with verified RA, disease history less than 2 years, and DAS28 score not exceeded 2.6 were included in the study. The 2010 ACR/EULAR criteria were used for verification. 9 patients (60%) were positive for anti-citrullinated protein antibodies (ACPA). 15 healthy volunteers were included in the control group. RA patients and healthy volunteers were comparable by sex and age. Circulating monocytes were isolated using density gradient centrifugation of buffy coat (700 g, 15 min) over slightly hyperosmolar ficoll-amidotrizoate gradient with density 1068 kg/m^3. We induced the extracellular traps formation using 100 nM PMA in PBS. The extent of extracellular traps formation by monocytes was assessed using fluorescent microscopy. Results are expressed as percent of netting cells in the specimen. Central tendencies and variabilities are expressed as Mean (95%CI).

Results: Mean age of patients was 56.2 y, mean disease duration was 1.4 y. The average proportion of monocytes with spontaneous trap formation was significantly higher in RA patients 8.4% (6.6-12.0) comparing with the control group 5.8% (3.8-7.0) (p<0.05). The frequency of spontaneous trap formation by monocytes in ACPA-positive RA patients with RA is similar to their negative counterparts. The average proportion of monocytes with induced trap formation was significantly higher in RA patients 27% (20.1-33.2) comparing with the control group 17.6% (15.3-21.7) (p<0.05). Significant morphological differences between monocyte extracellular traps in RA patients and control group are not revealed.

Conclusion: RA is a systemic inflammatory autoimmune disorder. The pathogenesis of RA is complex. The formation of extracellular traps by the monocytes/macrophages may be one of the links in the pathogenesis of RA.

P716
DATA ANALYSIS OF THE "REGISTRO ESPAÑOL DE FRACTURAS" FLS SEIOMM (REFRA)

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Bone fragility fractures represents a major public health issue that, currently, does not have the adequate procedures of prevention, diagnosis, assessment, intervention and monitorization of the patients. The mortality associated to fragility fracture in the EU countries is higher than in many other chronic diseases. In Spain in 2017 there were around 330 000 fragility fractures, with a sanitary cost of 4 200 million euros. The ongoing and prospective Registro Español de FRActuras (REFRA-FLS SEIOMM) started in 2018. The aim was to create a multicentric register of the epidemiologic, clinic, functional and healthcare features of the fragility fracture patients, as well as their monitorization. The aim of this communication is to get to know the first preliminary descriptive data.

Attended people with fragility fracture diagnosis in some of the REFRA participant hospitals between July 2018 and December 2019, was included. In the statistical analysis was used the mean and the standard deviation or the mean and the interquartile ranks for the numeric variables; and the percentage for the categorical variables.

It was registered 1556 bone fragility fracture patients; with a mean age of 79, 80% of women and 20% of men. Only 25.89% had the osteoporosis diagnostic, and only 12.08% osteoporosis treatment; although 32.78% of the patients had a previous fracture, with the prevalence of radius distal and vertebral. Fracture index recollected is 59.14% hip, 10.30% radius distal, 12,74% vertebral, 7.91% humerus, 3.39% pelvic, 6.25% others. The average time to fracture capture is 140.9 d. Cardiovascular and endocrine diseases are the most frequent comorbidities associated. The 60.78% of the patients have a high fall risk and fracture risk, through FRAX, for fracture higher than 16.16% and for hip fracture of 9.08%.

P717
VITAMIN D STATUS IN PATIENTS UNDERGOING DXA EXAMINATION IN SOUTHWEST REGION OF THE CZECH REPUBLIC

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Vitamin D has pleiotropic effect in various human tissues. Inadequate vitamin D levels have been connected with higher risk of various chronic diseases. Data about vitamin deficiency (< 50 nmol/L; 20 ng/L) and sufficiency (>75 nmol/L, 30 ng/L) from the Czech Republic are missing. We evaluated vitamin levels in 7500 patients, older 45 y, at their first visit for DXA assessment and osteoporosis evaluation from 2009-2018. 5728 patients (5024 F, 804 M) were vitamin D nonsubstituted and 1678 (1521 F,151 M) were substituted at least 200 IU daily. 25 OH vitamin levels were measured all the time by the same chemiluminescent method from DiaSorin, Inc. We found no statistical difference by sex. We found significant seasonal variation, that was age dependent. Seasonal variation was more pronounced in non-substituted patients than in substituted and had low impact on patients older 75 y. Overall vitamin deficiency was observed in 65.6% in nonsubstituted and in 36.8% substituted. Vitamin D sufficiency was overall observed only in 8.3% nonsubstituted and 22.3% substituted patients. Looking at the lowest period (Feb-Apr) we found vitamin D deficiency in 76.8-88.3% by the age category in non-substituted patients and with only 2.4-3.5% of patients were sufficient. In February to April period there was no important impact of age in opposite to July-September period. At this period we found that vitamin D deficiency and sufficiency is age dependent. Vitamin D deficiency ranged from 28.3% in population 45-55 y to 70.8% in population above 75 y and sufficiency ranged from 27.1-3.8% respectively. Vitamin D deficiency in the Czech Republic is highly frequent and overall affects two thirds of population over 45 y. Seasonal variation and age are the two most important factors influencing vitamin D levels in nonsubstituted patients has to be taken into account when population data are evaluated.

P718
DECREASED LOWER LIMB MUSCLE STRENGTH IS ASSOCIATED WITH INCREASED FRACTURE RISK IN COMMUNITY-DWELLING POSTMENOPAUSAL WOMEN

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Objective: To determine the correlation between lower limb muscle strength and BMD or fracture risk in community-dwelling postmenopausal women.

Methods: A total of 250 postmenopausal women aged 50-85 years old were recruited. The short physical performance battery (SPPB) tool including chair stand test (CST), gait speed test (GST), and balance test (BT) were performed to determine lower extremity function. The BMD of total hip, femoral neck and spine were measured by DXA and vertebral fractures were confirmed by lateral spine X-rays radiographs. Patients' 10-y major osteoporotic risk and hip fracture risk were assessed by the Chinese population-based Fracture Risk Assessment Tool (FRAX). Multiple linear regression analysis was used to analyze the correlation between lower limb muscle strength and BMD or fracture risk.

Results: In postmenopausal women, CST score, GST score and total SPPB score were positively correlated with lumbar and femoral neck BMD, but there was no significant correlation after adjusting age. However, CST score, GST score and SPPB total score were not correlated with total hip BMD. Moreover, CST score, GST score, BT score and total SPPB score were negatively correlated with FRAX score in postmenopausal women.

Conclusion: The lower limb muscle strength in community-dwelling postmenopausal women was not significantly correlated with BMD, but negatively correlated with FRAX score.

P719
TO STUDY THE LOWER EXTREMITY DEXTERITY IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives:

1. To study the lower extremity dexterity in patients with knee osteoarthritis.

2. To evaluate the knee and hip muscles strength.

3. To check the correlation between age and strength of the hamstring, gluteus and quadriceps muscles.

4. To check the correlation between Lower extremity dexterity and strength of the hamstring, gluteus and quadriceps muscles.

Methods: Prediagnosed cases of knee osteoarthritis with grade 1 on Kellgren-Lawrence criteria. Both male and females in the age group 51-70 y were included. Patients with bilateral Osteoarthritis, any prior knee replacements, reconstructive surgeries, inflammatory arthropathies, recent ankle injury, intra-articular fracture, inert tissue injuries and lower back pain were excluded from the study.

Methods: The strength of hamstrings, quadriceps and gluteus maximus were evaluated using a dynamometer. a lower extremity dexterity [LED] test was performed with an LED test device that consisted of a 10 inch helical compression spring and screwed to a stable base with a platform affixed to the free end. It was placed

on a digital weighing scale and the person was made to stand the same slowly compress the spring without buckling so as to achieve and sustain the highest possible vertical force which was displayed on the weighing scale in kilograms. The subjects were asked to do 10 trials out of which the best 3 trials were considered for statistical analysis. The above mentioned data was collected for 200 subjects.

Statistical analysis: Continuous variables like hamstring, quadriceps, gluteus maximus strength and LED test performance was expressed as mean±SD. Correlation coefficient [µ] was calculated to assess the nature and strength of correlation between LED test and strength.

Results: There was a negative correlation seen between age and strength of the hamstring, gluteus and quadriceps muscles. There was a positive correlation seen between Lower extremity dexterity and strength of the hamstring, gluteus and quadriceps muscles.

Conclusion: LED test can be used as an effective tool to evaluate the age related loss of sensorimotor ability and predict those at risk of fall and can an adaptation to countermeasure for fall prevention. Rehabilitation has shown to restore the proprioceptive deficits, increase the proprioceptive acuity and thereby delay the progression of knee OA.

P720

EFFECTS OF PUNICA GRANATUM (POMEGRANATE) SEED OIL EXTRACT ON BONE TURNOVER AND RESORPTION INDUCED IN OVARIECTOMIZED RATS

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Objective: Postmenopausal osteoporosis is mostly caused by increased bone remodeling resulting from estrogen deficiency. Hormone replacement therapy (HRT) is used to prevent osteoporosis, but it increases the risk for breast cancer, thromboembolism, strokes, and heart attacks. Pomegranate seed oil extract (SOE) is rich in phytoestrogen and antioxidant compounds. We aimed to evaluate the therapeutic role of pomegranate SOE against bone turnover, resorption and osteoporosis induced in ovariectomized rats as a postmenopausal model and comparing the results with those from feneric CycloProgynova drug (D).

Method: The study used western albino rats undergo bilaterally ovariectomization as a model for postmenopausal. 40 female western albino rats (age: 3-4 months) weighing 150-180 g. Rats were divided into four groups, 10 rats each; SC-group: Sham control=untreated and unovariectomized rats; OVX-group=ovariectomized rats; (OVX-SOE) and (OVX-D) groups=OVX rats were treated with SOE and D, respectively. Bone markers (BMs) especially osteocalcin (BGP), alkaline phosphatase (ALP), tartrate resistance acid phosphatase (TRAcP), bone weight, bone calcium concentration and histopathological examination of bones were determined.

Results: In OVX group the activities of ALP and TRAcP and the levels of BGP, serum calcium, sodium and body weight were significantly higher (p≤0.05) than SC-group, while bone calcium concentration, bone mass, serum E2 and potassium level as well as uterus mass were significantly lower (p≤0.05). Also histopathological results revealed that the outer cortical bone became thinner, while the cancellous bone trabeculae lost their normal architecture. Treatment of OVX rats with SOE or D for 12 weeks improved both the architecture of bones as shown from the histopathological results and BMs, serum electrolytes and E2 levels (p≤0.05) which approached SC-group. Moreover after treatment of OVX rats with SOE the levels of lipid profile and uric acid were improved and approached SC-group. In contrast in (OVX-D) group the levels of lipid profile, liver and kidney functions, uric acid and INR were significantly higher (p≤0.05) than those of OVX and SC groups.

Conclusion: The results of this study show that SOE offers a promising alternative in the design of new strategies in nutritional management of age-related bone complications.

P721

ANTIOSTEOPOROTIC EFFECT OF ALLOPHYLUS SERRATUS ON OVARIECTOMISED RATS

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Objective: Leaves of Allophylus serratus, an herbal drug of India is traditionally used to prevent or treat female hormonal disturbance related disorders and assuaging symptoms of menopausal conditions. Lack of scientific data for potential use in bone loss, the present study was undertaken to investigate the effects of ethanol extract of Allophylus serratus leaves for osteoporosis in ovariectomised rats.

Methods: 30 Wistar female rats were randomly divided into five groups. One group was sham operated and other four groups were undergone dorsal ovariectomy (OVX). After 4 weeks of post-operative recovery, three OVX groups, viz. Group1, Group2 and Group3 were treated for 90 d with standard raloxifene (RLX) 1 mg/kg/d, Allophylus serratus leaves extract (ASLE) 100mg/kg/d and ASLE 200mg/kg/d respectively. Sham and OVX control groups were fed with equal 1% vehicle volume. Serum and urine biochemistry (alkaline phosphatase, tartrate resistant acid phosphatase, triglyceride, total cholesterol, calcium, phosphorous and hydroxyproline), weight of body, uterus and vagina, femur parameters, three point bending of tibia and fourth lumbar vertebra compression were examined. Furthermore, bone architecture and uterine hypertrophy were examined by histopathological studies.

Results: Application of ASLE has increased bone strength and restored bone turnover markers such as alkaline phosphatase, tartrate resistant acid phosphatase and hydroxyproline moreover, improved femur parameters indicated mineralized bones, similar to the results observed with raloxifene treatment. Histopathology studies showed fibrocartilaginous proliferation of trabecular bone and absence of uterine hypertrophy.

Conclusion: The results strongly suggest that ASLE prevents bone loss in OVX induced osteoporosis without estrogen like side effects. It might be a potential remedy like RLX for postmenopausal or estrogen deficiency caused osteoporosis.

P722
ASSESSMENT OF SERUM VITAMIN D LEVELS IN PATIENTS WITH ACUTE MULTIPLE SCLEROSIS

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Objective: Multiple sclerosis (MS), a demyelinating disease has vitamin D deficiency as one of the risk factors. Vitamin D plays important role in both immune and nervous system. Our objective is to estimate the level of vitamin D in serum of patients suffering from acute multiple sclerosis.

Methods: Patients with definite MS following acute relapse within 10 d of attack or clinically isolated syndrome following the first attack were included. The diagnosis of multiple sclerosis was done based on McDonald criteria. Those patients with duration of illness more than 10 d and those who had steroid therapy or vitamin D or calcium supplements earlier were excluded. Serum vitamin D level was measured by electrochemiluminescence immune assay method. Results obtained were compared using statistical analysis.

Results: The study group included 29 patients with 21 definite MS and 8 CIS patients; Mean age 35; 17 females and 12 males. The control group included 19 patients with Mean age 35.29; 12 females and 7 males. Serum vitamin D levels in study group ranged between 4.2ng/dl to 28 ng/dl with a mean level of 10.2 ng/dl. Vitamin D levels in controls specimens was between 4.5 ng/dl and 29.6 ng/dl with a Mean level of 21.3 ng/dl. Hence a significant difference in Vitamin D levels was observed.

Conclusion: Significantly lower levels of serum vitamin D is found in patients suffering from with acute multiple sclerosis. Further detailed studies are needed.

P723
TRABECULAR BONE SCORE IN PARKINSON DISEASE

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Objective: To evaluate the qualitative and quantitative alteration of bone in patients with early Parkinson disease (PD) according to their different physical performance and to investigate the effectiveness of trabecular bone score (TBS) as an independent predictive factor for fracture risk in the same population.

Methods: We enrolled patients affected by early PD (Hoehn & Yahr stage 2) to assess BMD at total bodyless head (TBLH), femoral neck (FN) and lumbar spine (L1-L4) using DXA (GE Lunar) and TBS. We evaluated muscle performance using the Short Physical Performance Battery (SPPB) to identify two groups: group A, "poor performance" reporting a SPPB score ≤8 and group B,

"high performance" with a SPPB score >8. Finally, we performed a statistical analysis to investigate the differences in qualitative and quantitative bone parameters across each group.

Results: We included 13 PD patients, mean aged 65.8±6.1 y. The DXA examination showed the following results: TBLH BMD=1.082±0.135 g/cm^2, T-score=-0.57±1.11 SD, L1-L4 BMD=1.19±0.160 g/cm^2, T-score=-0.67±1.23 SD; FN BMD=0.825±0.134 g/cm^2, T-score=-1.62±1.04 SD. The mean TBS was 1.311±0.14, with degraded microarchitecture (TBS <1.2) in 4 patients and partially degraded microarchitecture (1.2 <TBS> 1.350) in 3 patients. The mean SPPB score was 8.76±2.27. No statistically significant differences for quantitative densitometric values between groups (group A, 5 patients and group B, 8 patients). On the other side there was a statistically significant between-group difference for TBS (group A TBS 1.18±0.10, group B TBS 1.38±0.10, p<0.0063). Moreover, no patient in group B had a TBS <1.2, compared to group A, where microarchitecture was degraded in 4 patients.

Conclusion: In patients with early PD, worsening of physical performance may probably be related more to qualitative than quantitative bone impairment. Moreover, a bone assessment by TBS might be an useful predictive tool of fracture risk in this population.

P724
CLINICAL ASSESSMENT AND THERAPEUTIC APPROACH OF A SINGULAR CASE OF TRANSIENT OSTEOPOROSIS OF THE HIP IN A PATIENT AFFECTED BY SUBCLINICAL HYPOTHYROIDISM

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Objective: A report of a singular clinical case of a transient osteoporosis of the hip (TOH) in a patient affected by subclinical hypothyroidism.

Methods: a 46-year-old man referred to our outpatient clinic because of severe pain in the antero-medial region of the left thigh and knee with no history of trauma. Recently, he performed a radiographic assessment of the left knee with evidence of osteoarthritis of the knee with osteophytosis treated with two intra-articular injection of high molecular weight hyaluronic acid (HMWHA) with a slight improvement of pain and function. During our examination, he referred severe pain (Numeric Rating Scale 8/10), functional limitation of the left hip and walking. We recommended to perform blood chemistry and MRI examination. Laboratory tests showed an increased TSH values and normal values of triiodothyronine (T3) and thyroxine (T4) suggestive of a low-grade thyroiditis in subclinical hypothyroidism. MRI examination of the left lower limb showed the presence of marked and diffuse marrow edema of the left femur, suggestive of TOH. Patient was treated with a tailored therapeutic protocol which includes: i.m. neridronate 25 mg, for 4 consecutive days a week for 4 weeks; calcium citrate 500 mg/d for 1 month; cholecalciferol 25000 IU/week; levothyroxine 50 µg/d.

Results: A new MRI examination of the left hip showed a significant reduction of bone edema with improvement of pain and function, and TSH value returned in normal range.

Conclusion: In literature, few cases of TOH have been associated with thyroid dysfunction. However, our clinical case showed a prompt resolution of bone marrow edema of the hip after restoration of thyroid function. A multidisciplinary approach and therapy of patient with BMLs is mandatory to better investigate less common causes of this radiological finding.

P725
CLINICAL ASSESSMENT END THERAPEUTIC APPROACH OF A PAINFUL ANKLE IN A PATIENT AFFECTED BY COMPLEX REGIONAL PAIN SYNDROME TYPE 1: CASE REPORT

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Objective: To evaluate clinical and instrumental benefits in terms of symptoms and joint stability of a therapeutic approach in a patient affected by complex regional pain syndrome type 1 (CRPS-1) of the ankle.

Methods: A 72 years old man affected by CRPS-1 with right talus-calcaneal bone edema referred to our outpatient clinic. He was included in our tailored protocol of treatment with i.m. neridronate 25 mg/d for 15 d, 4 sessions of focal extracorporeal shockwave therapy (0.12 mj/mm^2, 2000 pulses), and proprioceptive exercises using stabilometric platform. At the baseline (T0) and at the end of the therapeutic intervention (T1) we evaluated passive range of motion (pROM) of lower limbs, pain severity and its interference with activity of daily living (ADL) through brief pain inventory (BPI), functional assessment using American Orthopedic Foot & Ankle Score (AOFAS), Stability Index (SI) and Average Trace Error (ATE), both of them obtained by stabilometric platform and a new MRI was performed.

Results: At the baseline, the patient showed the following scores: BPS-SI: 4,12; BPI-III: 6,71; AOFAS: 58; SI: 2,98; ATE: 153,03. After the T1, the scores obtained were BPS-SI: 2,14; BPI-III: 2,40; AOFAS: 87, SI: 2,32; ATE: 84,29. Moreover, the patient presented a significant reduction of talus-calcaneal bone edema at the MRI.

Conclusion: Improvement of ankle pain and progressive resolution of bone edema is associated with a significant improvement of joint stability suggesting that an adequate management of bone status is mandatory for patient affected by CRPS-1.

P726
FIRST PRELIMINARY MOLECULAR MIRNA CODES IN EWING SARCOMA CANCER STEM CELLS

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Objective: Ewing Sarcoma (EWS) is a malignant mesenchymal-derived tumour which usually arises in bone and rarely in soft tissues. Nowadays, the new hope for EWS patients is the development of novel and more effective therapies based on the molecular characterization of this tumour. An innovative prospect has emerged from the research on cancer stem cells (CSCs) and on the role of small non-coding RNA molecules, microRNAs (miRNAs), in tumour progression. In this study we have analysed the presence of EWS-CSCs and we have investigate the possibility of the presence of a miRNAs expression profile common to all the CSCs lines to find new molecular diagnostic/prognostic factors for EWS.

Methods: The human EWS samples have been collected at the "Unit Ortopedia Oncologica e Ricostruttiva", AOUC Careggi, Florence, with informed consent approved by the local Ethical Committee. First, the primary EWS cell lines (ES) were established. After that, the subpopulation of CSCs has been isolated from all the ES lines. Their CSCs phenotypes has been evaluated by several cellular and molecular assay and after that miRNAs expression levels have been evaluated by specific TaqMan qRT-PCR assays.

Results: Five primary ES lines and respectively CSCs lines (ES-CSCs). Their stemness was evaluated inducing CSCs towards different phenotypes, analysing specific mesenchymal end embryonic stem cells marker proteins and genes and evaluating their clonogenic capacity. We have also confirmed the neoplastic capacity of these lines through invasion assays. Finally, we have obtained a preliminary miRNAs expression profile in ES-CSCs lines.

Conclusion: In conclusion, we have settled five new *in vitro* models of ES-CSCs. The preliminary results obtained about the analysis of the miRNAs expression profile in these lines could be important because seems to identify a common "miRNA code", that could be used to develop new molecular therapies against this aggressive primary bone tumour but also to find new diagnostic/prognostic biomarkers for EWS.

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P727
OVERLAP BETWEEN OSTEOSARCOPENIA AND FRAILTY AND THEIR ASSOCIATION WITH POOR HEALTH CONDITIONS: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: Osteosarcopenia and frailty are correlates of musculoskeletal aging, with several adverse health outcomes. However, risk factors for osteosarcopenia with frailty and associated poor health conditions remain unclear. The aim of this study is to investigate the clinical characteristics and relevant factors for osteosarcopenia with frailty in the Iranian elderly.

Methods: A total of 2426 Iranian adults aged ≥60 y, participating in stage II of the BEH program, a population-based prospective cohort study; were included in this study. Osteopenia/osteoporosis was defined as a T-score ≤ -1.0 SD below the mean values of a young healthy adult. We defined sarcopenia as reduced skeletal muscle mass plus low muscle strength and/or low physical performance. Osteosarcopenia was considered as the presence of both osteopenia/osteoporosis and sarcopenia. Frailty was assessed by Fried criteria including; weight loss, exhaustion, low muscle strength, slow gait speed, and low physical activity. We assessed history of falls in the past year, health-related quality of life (HRQOL), including physical component summary (PCS) and mental component summary (MCS), history fractures and Self-reported activities of daily living (ADLs).

Results: The prevalence of osteosarcopenia with frailty was 5.0%; such participants were older and had lower protein and energy intake, and lower BMI. Osteosarcopenia with frailty participants were significantly associated with incident falls (OR: 1.66, 95%CI: 1.04-2.66), poor daily activities (OR: 2.52, 95%CI: 1.64-3.89) and poor HRQOL in full models. However, Osteosarcopenia with frailty was associated with a history of fractures, in the multivariate model this association was diluted.

Conclusion: This study showed that osteosarcopenia with frailty was associated with incidences of falls, poor daily activities, and poor HRQOL among Iranian older people. Therefore, intervention programs should take an integrated approach to strengthen musculoskeletal health as well as prevention of falls and other health conditions in older people, especially in frail participants.

P728
ASSOCIATION BETWEEN OSTEOSARCOPENIA AND DEPRESSION IN OLDER PEOPLE: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: Depression and osteosarcopenia are prevalent and associated with a range of adverse outcomes in older people such as lower quality of life, increased morbidity and mortality. The relationships between these entities are unclear. The aim of this study was to investigate the association of osteosarcopenia with depression in the Iranian elderly.

Methods: A total of 2426 Iranian adults aged ≥60 y, participating in stage II of the BEH program, a population-based prospective cohort study; were included in this study. Osteopenia/osteoporosis was defined as a T-score ≤ -1.0 SD below the mean values of a young healthy adult. We defined sarcopenia as reduced skeletal muscle mass plus low muscle strength and/or low physical performance. Osteosarcopenia was considered as the presence of both osteopenia/osteoporosis and sarcopenia. Depression was assessed using the Patient Depression Questionnaire (PHQ-9) with a score of ≥5 indicative of the presence of depressive symptoms.

Results: 212 (35.1%) participants were identified as having osteosarcopenia in depressive patients. After adjusting for age, sex, and other potential confounders, depression was found to be significantly associated with osteosarcopenia (odds ratio: 1.34, 95%CI 1.04–1.73).

Conclusion: Depression may play a key role in the development of osteosarcopenia. Pathways addressing the association between physical and mental health in older people need to be further investigated in future research.

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P729
GREEK TRANSLATION AND VALIDATION OF THE SARCOPENIA SCREENING TOOL SARC-F

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Objective: To translate and validate into the Greek language and setting the SARC-F questionnaire, a screening tool for sarcopenia.

Methods: This cross-sectional study followed two main steps. The first step consisted of the translation process (forward and backward) and the second one consisted of the psychometric evaluation of the Greek version of the SARC-F. Initially, reliability was assessed by inter-rater and test–retest analyses using the intraclass correlation coefficient (ICC) and its 95%CI. Next, validity was assessed via sensitivity (Se), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV) in a cohort of elderly Greek subjects using the diagnostic criteria for sarcopenia based on EWGSOP. For the clinical validation phase of the SARC-F, population was divided into sarcopenic and non-sarcopenic ones. The participants involved in this study were recruited from the University Hospital of Patras and the 2nd Open Care Centre of Patras for the Elderly. Ethical approval was given by the Ethical Committee of the School of Health and Welfare of the Technological Educational Institute (TEI) of Western Greece.

Results: The SARC-F was found understandable, applicable and practical in administration, as all participants filled in the questionnaire without encountering any problems. Final analysis in the clinical study included 197 elderly participants (71.64±7.83 y, 68.5% women). The translated Greek version of the SARC-F demonstrated an excellent inter-rater reliability, with an intraclass correlation coefficient (ICC) of 0.91 (95%CI 0.79-0.96), as well as excellent test–retest reliability, with an ICC of 0.93 (95%CI 0.91-0.95). The results showed that sensitivity of the tool was 93.5 %, and the specificity was 87.9%. Positive predictive value was 12.91% and negative predictive value was 97.8%.

Conclusion: The Greek version of the SARC-F is now available. The SARC-F scale was successfully adapted into Greek language and validated in community-dwelling Greek older adults.

P730
VALIDATION OF AN ELECTRONIC INDEX OF FRAILTY IN PRIMARY CARE (EFRAGICAP)

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Objective: To validate the eFRAGICAP using computerized medical records of primary care in Catalonia (Spain) and compared to other frailty outcomes: institutionalization, homecare assistance and mortality among subjects ≥65 years old.

Methods: The eFRAGICAP was based on the electronic frailty index (eFI) that includes 36 deficits based on the Rockwood model of frailty which includes medical and pharmacy information (ICD-10, ATC codes, etc.) in primary care. All subjects ≥65 attended in primary health care centers in Barcelona in 2015 were included. Subjects were classified in: Fit, Mild, Moderate or Severe frailty. Validation of the eFRAGICAP was carried out on a sample of subjects (n=333) compared with other frailty indexes (RISC and Clinical Frailty Scale). The predictive analysis was carried out in the overall population and assessed comparing results with: institutionalizations, homecare assistance and mortality (24 months). The area under the curve (AUC) was calculated.

Results: Overall 253 684 subjects had their eFRAGICAP calculated. Mean age of subjects was 76.3 years old, with 59.5% of women. 41.1% were classified as Fit, 32.2% as Mild, 18.7% as Moderate and 7.9% as Severe frailty. The mean age of the validation sample was 79 years old, with 57.7% of women and 12.6% classified as Fit, 31.5% as Mild, 39.6% as Moderate and 16.2% as Severe frailty. Regarding the detection of frail subjects and compared to the Clinical frailty Scale, the eFRAGICAP performed fairly (AUC: 0.794) and compared to the RISC the eFRAGICAP performed good (AUC: 0.848). Regarding the outcome's analyses (24 months), the eFRAGICAP performed good in the detection of subjects who were institutionalized, required homecare assistance or when analyzing mortality (AUC: 0.841, 0.853 and 0.803 respectively).

Conclusion: the eFRAGICAP has a good discriminative capacity to identify frail subjects compared to other frailty indexes and predictive outcomes.

P731
INFLUENCE OF AGE-RELATED LOSS OF MUSCLE AND BONE MASS ON THE SEVERITY OF KNEE OSTEOARTHRITIS IN AN IRANIAN POPULATION

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Objective: Osteoarthritis (OA) is one of the common causes of disability in the world that makes degenerative changes in the joint. Knee is the most common joint affected by osteoarthritis. The aim of this study was to evaluate the relationship between the severity of knee OA and muscle mass, muscle strength, muscle function and bone mass.

Methods: In this cross-sectional study, we included 119 subjects (aged ≥50) with clinical & radiologic knee OA (according to American College of Rheumatology (ACR) classification criteria & radiologic Kellgren-Lawrence criteria). WOMAC and visual analogue scale were used to measure pain and physical disability. Body composition was measured using DXA. Appendicular skeletal muscle mass (ASM) for each participant was derived as the sum of upper and lower limb muscle mass and the skeletal muscle mass index (SMI) as ASM/height^2 (kg/m^2). Handgrip strength was measured using a digital dynamometer 3 times for each hand. Usual walking speed (m/s) on a 4.57-m course was used as an objective measure of physical performance.

Results: Of 119 patients included in this study, 69.7% (n=1144) were women with an average age of 62.08±7.69 y. We found a significant inverse association between WOMAC scores and ASM, SMI, Handgrip strength, walking speed and femoral neck T-score and also direct correlation with total fat percent (all p≤0.05). After adjusting for clinical variables, decreased SMI and handgrip strength associated with moderate WOMAC scores but not with severe OA. Also, fat mass percent was a risk factor for moderate WOMAC score in the full model (OR=1.23, 95%CI 1.08-1.41).

Conclusion: Lower muscle mass, lower muscle strength, and high-fat mass were associated with severity disability of knee OA.

P732
COST-EFFECTIVENESS ANALYSIS OF SARCOPENIA SCREENING STRATEGIES IN IRAN

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Objective: Sarcopenia is an important age-related disease which can lead to an increased risk of mortality, falls, fractures, and poor quality of life. So timely detection can be effective in reducing the burden of disease. The aim of this study was to identify the most cost-effective strategy for Sarcopenia screening in Iran.

Methods: We constructed a Markov transition model over a life-time horizon based on natural history. Compared Strategies included Sarcopenia Scoring Assessment Models Iran (SarSA-Mod), EWGSOP, Mini Sarcopenia Risk Assessment (MSRA) and SARC-F. Parameters values were extracted from primary data and the literature, and the costs and quality-adjusted life-years (QALYs) were calculated for each strategy. Sensitivity analysis of uncertain parameters was also performed to determine the robustness of the model. Analysis was performed using the 2011 version of TreeAge Pro software.

Results: All four screening strategies increased lifetime QALYs. After removing the dominated strategy, the incremental cost per QALY gained for Sarcopenia screening varied from $2719 for EWGSOP to $6725 for SARC-F, compared with the next best Strategy. Our base-case analysis showed that the most cost-effective strategy was EWGSOP and 2nd best was SarSA-Mod with $26752 and $26509 net monetary benefits given one GDP per capita ($5400) as Willingness to pay, respectively. Sensitivity analysis of model parameters also showed robustness of results.

Conclusion: The results of the study, as the first economic evaluation of sarcopenia screening, showed that the EWGSOP strategy is more cost-effective than other strategies, despite the higher cost.

P733
DEVELOPMENT OF THE RUSSIAN NATIONAL REGISTRY FOR THE PATIENTS ENROLLED TO FRACTURE LIAISON SERVICES

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Objective: Fracture Liaison Services (FLS) aimed to prevent secondary fracture in fragile fracture patients, are established in many countries of the world. Since 2018, 15 new FLS have been established in health care settings in different parts of the Russian Federation. A common national FLS patients' database can provide the unified data for further analysis of FLS effectiveness, as well as to help a particular FLS to follow-up patients in a proper way according to national guidelines and to address the specific clinical situations. We aimed to create a common Russian national database of low energy fracture patients recruited to FLS.

Methods: In June 2019, the Russian Association on Osteoporosis started a project for developing a registry of low energy fractures patients recruited to FLS (Prometheus Registry). The Registry aims to include not only the patients' background demographic and clinical information but also their clinical data during the follow-up. This will help to resolve management issues and to make clinical decisions where necessary. An informational system was created for storing, searching, processing information on the Quinta platform in the remote online access mode. The RAOP working group developed a Clinical Registration Form and Informed Consent Form which were discussed with the FLS leaders at the special workshop. Only authorized FLS staff has access to the database. In October, 2019, four FLS started to enter the patients' personal data.

Results: Currently, the Prometheus database includes the data on the first 61 patients newly enrolled to FLS. Their average age was 71 y. The most common fracture was hip (39%) followed by humerus (25%), vertebral (15%) and distal forearm (20%) fractures. 48 (78.7%) patients had a previous history of fracture. In all patients the FRAX tool was used to assess the risk of subsequent fractures, and DXA was performed in 26 (42.6%). In patients with hip and vertebral fractures osteoporosis was diagnosed without DXA scan. The risk of falls was assessed in all 61 patients, and it was high in 52 (85.3%). Laboratory tests to determine the causes of secondary osteoporosis were performed in 59 (96.7%). Mild hypocalcemia was detected in 18 (31.5%) patients. Calcium and/or vitamin D supplements were prescribed in 57 (93.44%) cases, and antiosteoporotic therapy (mainly with antiresorptive drugs) was started in 33 (54.1%) patients.

Conclusion: The FLS Registry is a very important tool to improve care for patients with osteoporotic fractures. It can provide a help not only in clinical decision making but also in a quality control. With more patients included into the database it will be possible to analyze the clinical and economic effectiveness of FLS in Russia.

P734
EFFICACY OF PHYSICAL EXERCISE PROGRAM COMBINED WITH ANALGESIC MEDICATION IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: To assess the efficacy of physical exercise program combined with analgesic medication on functional status and quality of life in patients with knee osteoarthritis (OA).

Methods: The prospective study included 144 participants with knee osteoarthritis based on American College of Rheumatology diagnostic criteria that were randomly assigned in two lots: lot A- with exercise program (72 patients) and lot B- with medication and exercise program. The medication was a combination of 37.5 mg of tramadol hydrochloride with 325 mg of paracetamol. They followed a 12-d ambulatory exercise program based on increasing knee flexion, muscular strength and endurance, improving balance, coordination, respiratory exercises. The evaluation was at the beginning of the study (T0), after 2 weeks (T1) and 8 weeks (T2) using: knee mobility, pain on a visual analogue scale (VAS), functional status (WOMAC), quality of life using SF-36 Questionnaire (36-Item Short Form Survey).

Results: In lot B, knee flexion increased from 15% at T0 to 59% at T2; for the control lot joint mobility increased from 11% to 45%. Concerning pain assessment on a VAS, 66% of the patients in lot B had a score higher than 5 at the initial assessment; at T1 their number decreased at 50% and at T2 the proportion was of only 8%. At T0, 62.3% of the patients from lot A and 60.3% of the patients from lot B presented a WOMAC score higher than 2. After 8 weeks, most of the patients (90% from the lot A and all patients from lot B) presented a score of 1 (considered as low). The results after 8 weeks of treatment were statistically significant (p<0.05) for all of the SF-36 Questionnaire domains. Testing the linear correlations between SF-36, VAS (r=0.71, p<0.05) and WOMAC (r=0.83, p<0.05) demonstrates a high positive relation between indicators.

Conclusion: The physical exercise program in combination with analgesic medication improves both functional status and quality of life in patients with knee OA. Analgesic medication reduces pain and increases patient's adherence to kinetic programs.

P735
INTERPRETING CHINESE GUIDELINES FOR THE MANAGEMENT OF OSTEOARTHRITIS (2018)

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Osteoarthritis (osteoarthritis, OA) is a joint degenerative disease that seriously affects the quality of life of patients. It is expected to become the fourth disabling disease by 2020, causing a huge economic burden on patients, families and society. In 2007 The Osteoarthritis Diagnosis and Treatment Guideline issued by the Chinese Orthopaedic Association has played a huge role in guiding and standardizing the diagnosis and treatment of OA in China.

In order to timely reflect the new proceedings of evidence-based OA pharmacological and surgical treatment, and to optimize the diagnosis and treatment strategy of OA, since June 2017, the Joint Surgery Study Group of Chinese Orthopaedic Association and the Chinese Orthopedic Journal's editorial department organized domestic experts in the field of joint surgery to update the original guidelines based on the latest developments in OA pharmacological and surgical treatment in recent years, following scientific, practical, and rigorous principles of guideline development. The guideline was written and submitted by the Joint Surgery Group of the Chinese Orthopaedics Association, and the corresponding author is Professor Wang Kunzheng.

The guideline covered the OA's definition, epidemiology, diagnosis (including clinical manifestations, imaging studies, laboratory tests, diagnostic points, clinical staging), treatment (including basic treatment, medical treatment, surgical treatment).

P736
BISPHOSPHONATES OR BIOLOGICAL THERAPY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS? WHAT IS THE BEST?

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Objective: The molecular mechanisms of bone formation and resorption led to promising therapeutic targets for osteoporosis. Bisphosphonates inhibit bone resorption with relatively few side effects. In the novel biological drugs, denosumab, has been clinically applied by positive effect on BMD, preventive effect on fragility fractures and safety. We have proposed to compare the effect on the change of BMD during treatment with two powerful, parenteral antiresorptive therapies: zoledronic acid (ZOL) and denosumab (DMAb).

Methods: A randomized study, open-label in which 62 postmenopausal women with osteoporosis were randomized 1:1 to DMAb 60 mg subcutaneously every 6 months or ZOL 5mg IV once yearly for 2 y. 32 osteoporotic women received DMAb and 30 received ZOL. All patients have received supplement of 1000 mg calcium and 1 µg alfacalcidol/d. BMD was measured by DXA at baseline and to one and 2 y. The diagnosis of osteoporosis was confirmed using BMD-WHO criteria. We analyzed also: changes in serum calcium, 25-OHD, PTH and bone alkaline phosphatase (PAB) at baseline and at 1 and 2 y of treatment.

Results: At baseline mean BMD at LS was 0.727 g/cm^2 and increased at 0.811g/cm^2 after 2 y, at women treated with DMAb, a total of +5.4%. For the women treated with ZOL the baseline was 0.673 g/cm^2 and increased at 0.689 g/cm^2 a total of +2.4 %. At TH the increase of BMD was +4.0% for DMAb and 1.8% for ZOL after 2 y. For FN the change in BMD was +2, 5% for DNAb and +0.9% for ZOL. No adverse events or new fractures under the therapy. No significant change in serum calcium, 25-OHD3, PTH.

Conclusion: DMAb treatment increased more BMD at LS, TH and FN by comparing with ZOL in patients with postmenopausal osteoporosis. Both drugs were effective at 2 y of treatment.

P737
MUSCLE ELECTRICITY STIMULATION CAN LEAD TO THE RESTORATION OF THE MECHANICAL PROPERTIES OF BONE TISSUE

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Objective: It was shown that low physical activity or unloading conditions can make bone tissue worse (1,2). The quality of bone tissue can be described in mechanical terms such as orthotropic properties and ultimate strength (3) or in mathematical terms, f.e. fractal dimension (4). Previously it was investigated the role of gravitational load and musculoskeletal loads on bone tissue remodeling.

Methods: Nonlinear laboratory rats (180-200 g) were used. Antiortostatic support model was used. All experiments were performed according to bioethical standards and were approved by the local ethical committee of the Kazan Federal University. Then femoral bones were dissected from all tested rats. Bones was scanned on µCT in the diaphysis, metaphysis and epiphysis regions. Fabric tensor was used for the analysis of distribution porosity. Additionally, stress tests were performed. It was investigated different groups: control, group 1 - models for 14 and 21 days of unloading hanging, group 2 - models 14 and 21 d of unloading hanging with putting on animal's feet for 3 h every day and group 3 -models 14 and 21 days of unloading hanging with cord stimulation.

Results: In group 1 models Jung's module decreased slightly (35%), but limits of tension decreased significantly (68%). In the case of group 2 Jung's module restores its value (deviation about 9%) and limits of tension increase up to 43% (in comparison with group 1). In group 3 Jung's module restores its value (deviation about 17%) and limits of tension increase up to 37% (in comparison with group 1).

Conclusion: The results emphasize that the bone structure can be decreased by the influence of external forces. It means that a rehabilitation strategy should take into account muscle activity because muscle also helps to support bone structure. But the determination of the parameters of electrical stimulation should be investigated additionally to optimize the remodeling processes.

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P738
CHANGES OF MECHANICAL PROPERTIES OF BONE TISSUE AFTER SPINAL CORD INJURY

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Objective: It was shown a method to reduce the anisotropic properties of the bone tissue to orthotropic properties (1). Previously was shown that physical activity influences the musculoskeletal system and it can be a reason for the evolution of biomechanical structures (2). It was decided to use received methods for spinal cord injury models. All tests were conducted on nonlinear laboratory rats (180-200 g). The contusion was applied at the level Th7-Th8 so that damage to the sensory and motor axons lead to impaired hind limb function. All experiments were performed according to bioethical standards and were approved by the local ethical committee of the Kazan Federal University. Chloral hydrate was used for anesthesia (5 mg/kg, intraperitoneal, Sigma Aldrich).

Methods: Extracted femoral bones and spinal cord were scanned on µCT. µCT data was analyzed by µFEM. The spatial distribution of mechanical properties can be found in this way. Additionally, histology parameters of bone tissue were calculated (3). Statistical analysis was used to understand is orthotropic properties constant or depend on location in space. Different groups were investigated: control and injured groups with different times after injury (14, 21, 30 and 40 d).

Results: It was noticed the difference in the mechanical properties of bone tissue. The changes in orthotropic properties were as in quality and quantity. Additionally, the ultimate strength of bone tissue decreases too. The similar changes in bone tissue were noticed in previous researches of hind limb unloading.

Conclusion: These results emphasize that the bone orthotropic properties change after the spinal cord injury. Bone tissue tries to adapt to external forces in a similar manner as in the case of unloading. But the determination of these forces and clarifying the mechanism of the change is still an open question.

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P739
INFLUENCE OF DIFFERENT SCALES OF POROSITY ON MECHANICAL PROPERTIES OF BONE TISSUE

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Objective: There are different scales of porosity in bone tissue: blood vessels, osteocytes, and gap junctions (1). Nowadays it is popular to use µFEM and µCT to calculate mechanical properties. But usually, the quality of the µFEM model is limited by µCT resolution. On the other hand, the influence of other porosity levels can be significant.

Method: The one- and two-scale Menger cube were used as idealized models. µFEM homogenization was used for idealizes models for different iterations. Then the dependence between mechanical properties and Menger's cube iterations was calculated. After that µCT data from previous researches (2,3) were used for modification of the idealized models (4). And mechanical properties were clarify using restoration of other scale levels porosity and µFEM homogenization method.

Results: It was shown on the idealized model that the second iteration of Menger cube influence significantly on mechanical properties. The influence of the third iteration is not significant. The recalculation of natural models leads to significant changes in the values of mechanical properties. But the results are sensitive to topology of second scale porosity. It's mean that the method of reestablishing the spatial distribution of osteocytes can make some mistakes in the result and its role very important for bone tissue analyses.

Conclusion: On one hand, the significant influence of the second scale porosity can increase the quality of understanding the bone tissue strength, but on the overhand, determine the distribution of the osteocyte need µCT with high resolution (and they are usually very expensive) or develop new algorithms to restore the osteocyte distribution on low-resolution data.

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P740
ANNULO-NUCLEOPLASTY USING DISC-FX IN RELIEVING DISC HERNIATION PAIN

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Objective: Radicular symptoms; particularly pain, are typical of a herniated disc. Epidural corticosteroid injections are effective for this type of pain. Minimally invasive disc decompression procedures have been developed to treat radicular pain caused by disc herniation. The Disc-FX system combines percutaneous manual discectomy using forceps, nuclear ablation, and annular modification using radiofrequency equipment. Our aim is to determine the effect of Disc-FX procedures on pain relief.

Methods: We conducted our study on 100 patients. The patients, who ranged in age from 20-76 y, had all been diagnosed with lumbar radicular pain and/or axial lower back pain. The diagnosis was based on their pain distribution and MRI results which shows intervertebral disc herniation related to spinal root compression. Disc-FX procedures were performed in the operating room using local anesthesia. Outcome measures were obtained with a numeric rating scale at 1 and 6 months post-treatment.

Results: The 100 study participants ranged in age from 20-76 y (mean age, 47 y); 59 were men and 41 were women. 58 patients had pain duration of less than 3 months and 78 had pain only in the lower back. Patients' median pain scores 1 and 6 months after treatment were significantly lower than before treatment. The percentage of patients who experienced pain relief (NRS scores <3) was 66% at 1 month and 83% at 6 months after the procedure. There were no statistically significant correlations between pain relief and type of disc herniation, pain location (lower back and/or leg pain), or pain duration.

Conclusion: Disc-FX procedure is a perfect for selected patients with lower back andradicular pain of discogenic origin.

P741
INCREASING THE NUMBER OF DXA-SCANS WILL IMPROVE HEALTH CARE OUTCOME FOR PATIENTS WITH AN INCREASED FRACTURE RISK

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Objective: The objective of the National Health Care Institute of the Netherlands is to ensure appropriate care for patients with osteoporosis in the Netherlands together with the involved parties. The aim was to identify the number of patients 50 years and older with a recent fracture who underwent DXA-scans and laboratory tests. We also identified the number of patients who received antiosteoporosis treatment after a DXA-scan.

Methods: To define appropriate care we used the current multidisciplinary Dutch osteoporosis guideline. To measure the care provided, we used diagnosis-treatment-combination (DBC)-information-system (DIS), which contains declaration data of care activities for all Dutch citizens. These declaration data are provided by the Dutch Healthcare Authority. We used the data of the Medicine and Aids Information Project (GIP database), which contains extramural medication prescriptions of all Dutch citizens, to identify patients who started antiosteoporosis medication. The GIP data are provided by the health insurance companies.

Results: In 2016 only 26% of 120.509 patients 50 years and older with a recent fracture, excluding head and face fractures, underwent a DXA-scan in the year before up till the year after the fracture. 32% of the patient who underwent a DXA-scan also had laboratory testing, according to the advice in the current Dutch guideline. 37% of the patients who underwent a DXA-scan received anti-osteoporosis treatment.

Conclusion: The number of DXA-scans performed in patients 50 years and older with a recent fracture is too low. Once patients underwent a DXA-scan they received laboratory testing and treatment according to current advices in the Dutch osteoporosis guideline. The main challenge to ensure appropriate care for patients with osteoporosis, or increased fracture risk, remains the capture of patients with a recent fracture.

P742
EPIDUROSCOPIC DISCECTOMY OF CENTRAL LUMBAR DISC HERNIATION

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Objective: Epiduroscopic laser neural decompression (ELND) is one of the more invasive techniques for managing patients with herniated lumbar disc. However, ELND can be used to treat, and diagnose the epidural pathology; indications for ELND remain controversial, especially, when applied in cases of large disc extrusion and migrated disc. This study reports cases of patients that were satisfied with the ELND procedure for migrated lumbar disc herniation.

Methods: We reviewed the medical records of patients that received ELND for migrated lumbar disc in an outpatient clinic. The patients complained of low back pain with radicular pain with intensity over 5 on a numeric rating scale (NRS) that had persisted for over 1 month. The MRIs showed migrated lumbar disc herniation, and patients opted for ELND because they had previously experienced nerve blocks, and did not want to receive open surgery for their pain, even after the limitations of ELND were explained.

Results: Patients reported that their pain was dramatically reduced, and other discomfort symptoms, such as numbness, were also reduced after the procedure. In follow-up, all of the patients were satisfied with the results.

Conclusion: We applied the ELND procedure to mechanically, remove disc material that compressed the spinal nerve, and the patients were satisfied, and reported symptom relief. ELND was a sufficient treatment approach for lumbar migrated herniated disc for patients who did not want to undergo open spine surgery.

P743
SUCCESSIVE ANTIOSTEOPOROSIS TREATMENT AFTER DENOSUMAB IN THE YEARS 2011 TILL 2017

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Objective: The objective of the National Health Care Institute of the Netherlands is to ensure appropriate care for patients with osteoporosis in the Netherlands together with the involved parties. The aim was to identify the number of patients who discontinued denosumab without successive anti-osteoporosis medication, and were therefore at risk of a rebound effect.

Methods: We used the data of the Medicine and Aids Information Project (GIP database), which contains extramural medication prescriptions of all Dutch citizens, to identify patients who use antiosteoporosis medication. The GIP data are provided by the health insurance companies. We defined successive therapy as a prescription for another antiosteoporosis medication within 9 months of the last denosumab prescription. For the analysis of successive therapy we have excluded patients who died within 2 y of stopping denosumab.

Results: In 2016, 43,857 patients started with antiosteoporosis medication, of which 4969 (11%) started with denosumab. Between 2011-2016 the number of patients that started denosumab doubled from 2020 to 4969. The number of patients that stopped denosumab without successive antiosteoporosis medication also increased between 2011-2016 from 158 to 1692. In 2016, 351 (17%) patients of the total 2043 patients that stopped denosumab received successive antiosteoporosis medication: 85% received oral bisphosphonates, 11% received teriparatide and 4% received zoledronic acid.

Conclusion: The number of patients who started denosumab increased between 2011-2016. The number of patients who stopped denosumab without successive treatment also increased in these years. In 2019 the Royal Dutch Pharmacists Association together with the Dutch Association for Endocrinology and the Osteoporosis Patient Association have written a warning letter to prescribers and users of denosumab. We shall evaluate the effect during the coming years.

P744
INCREASING THE USE OF ANTIOSTEOPOROSIS MEDICATION IN PATIENTS WHO USE GLUCOCORTICOIDS REMAINS A CHALLENGE

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Objective: The objective of the National Health Care Institute of the Netherlands is to ensure appropriate care for patients with osteoporosis in the Netherlands together with the involved parties. The aim was to identify the number of patients who receive antiosteoporosis medication next to glucocorticoids.

Methods: To define appropriate care we used the current multidisciplinary Dutch osteoporosis guideline. We used the data of the Medicine and Aids Information project (GIP database), which contains extramural medication prescriptions of all Dutch citizens, to identify patients who have used glucocorticoids, prednisolone equivalent of >7.5 mg/d, continuously for more than 3 months. The GIP data are provided by the health insurance companies. Using the GIP database we also identified patients who used antiosteoporosis medication.

Results: In 2016, 26,265 patients received a first prescription for glucocorticoids, prednisolone equivalent of >7.5 mg/d, of which 15,175 patients for prednisolone equivalent of >15 mg/d. Within 3 months 7.038 (27%) of the 26.265 patients who use >7.5 mg/d prednisolone equivalent and 5162 (34%) of the 15,175 patients who use >15 mg/d prednisolone equivalent also use antiosteoporosis medication. Within 2 y, 9265 (35%) of the 26,265 patients who use >7.5 mg/d prednisolone equivalent and 6775 (45%) of the 15,175 patients who use >15 mg/d prednisolone equivalent also use antiosteoporosis medication.

Conclusion: The number of patients who receive a prescription for antiosteoporosis medication next to glucocorticoids is low in The Netherlands, despite the development of the 2011 guideline and the medical pharmaceutical decision rules for glucocorticoids used by pharmacists. Together with prescribers and pharmacist we need to explore new ways to increase the number of patients that receive anti-osteoporosis medication next to glucocorticoids.

P745
EFFICACY OF TRIDENT NEEDLES IN MEDIAN BRANCH LESION IN FACET ARTHROPATHY

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Objective: To prove the efficacy of the trident RF needles ablation to the median branch of facet arthropathy compared to the ordinary RF needles in making a wider lesion, thus; better results controlling lower back pain due to facet arthropathy in L5 - S1 facet joint.

Methods: We made a retrospective analysis for 20 patients (Group A) whom undergone a facet joint median branch ablation with the trident RF needles comparing them to another 20 patients (Group B) whom undergone the same procedure but with ordinary RF needles. and this was made in the operation room under fluoroscopic guidance and local anaethesia. with lesion the median nerve of both level above and level below on both sides.

Results: Group A patients showed a better pain relief than group B. They did sustain neither lower back pain nor its radiation to the lower limbs with satisfaction rate 90% for Group A compared with 70% Group B.

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Conclusion: Trident RF needles have a wider area in sustaining a lesion to the median branch from dorsal root ganglion supplying the lumbar facet joints, as a result; better results more than traditional radiofrequency lesion by single tip needles.

P746
DIFFERENT EFFECTS OF BEE BREAD ON CORTICAL BONE MICROSTRUCTURE OF ZDF RATS WITH DISSIMILAR STAGES OF DIABETES

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Objective: Zucker diabetic fatty (ZDF) rat is an appropriate animal model for type 2 diabetes mellitus (T2D) and its complications, including reduced bone quality. Several studies point to the significant health effects of bee products on the prevention and therapy support of T2D. Bee bread is a very recent bee product with antioxidant and antimicrobial properties. In our study, we first investigated the effect of bee bread administration on bone microstructure of ZDF rats exhibiting dissimilar stages of diabetes.

Methods: 20 adult male ZDF rats were segregated into four groups: H group received a high energy diet (20 MJ/kg), HB group received a high energy diet with bee bread (500 mg/kg bw using a gastric gavage), L group received a low energy diet (10 MJ/kg) and LB group received a low energy diet with bee bread (500 mg/kg bw) during 9 weeks. High energy diet was served to induce T2D symptoms earlier. Histology and micro-CT were used to determine bone microstructure.

Results: High energy diet immediately induced hyperglycaemia in H group by accelerating the secondary symptoms of diabetes (including "diabetic bone") as compared to L group. Bee bread administration significantly decreased glucose level in LB group. It was accompanied by a higher density of secondary osteons (increased remodelling) and increased sizes of Haversian canals (vasodilation of blood vessels) in the cortical bone. On the contrary, bee bread treatment did not beneficially affect glucose metabolism in HB group. In this group, decreased sizes of secondary osteons (higher susceptibility to microfracture accumulation) were determined. No significant changes in trabecular bone morphometry were detected among all groups.

Conclusion: Our results suggest the benefits of bee bread treatment only in early stages of diabetes including the diminishing cortical bone-related complications.

P747
THE COMBINED VACCINATION SCHEME AGAINST STREPTOCOCCUS PNEUMONIAE IS EFFECTIVE IN RHEUMATOID ARTHRITIS PATIENTS TREATED WITH DMARD: DATA FROM BIOBADASER 3.0

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Objective: Streptococcus Pneumoniae (Sp) is a frequent pathogen accountable for respiratory infections in rheumatoid arthritis (RA). For these patients, the CDC recommends a combined vaccination scheme (CVS) using two types of Sp vaccines but evidence on its effectiveness remains insufficient. We aimed to assess the impact of the CVS on the incidence of Sp infections in patients with RA treated with DMARD.

Methods: A cohort was nested in a biologics register, including patients with RA who were prescribed a bDMARD or tsDMARD -either naïve or switch- from 2000 to March 2019. The target outcomes were invasive pneumococcal disease (IPD) and all-cause community-acquired pneumonia (CAP), as defined by relevant MedDRA codes. Demographic and clinical features were also retrieved. Each participant centre informed about the date when they implemented a systematic Sp vaccination protocol and whether they were using the CVS. Those not adopting this practice were excluded from the analysis. Crude incidence rates (IR) were calculated for each outcome as well as for its combination (combined variable defined as "Sp infections"). Exposure was split into two periods, considering the date when the CVS was officially recommended in Spain (May 2015). The incidence rate ratio (IRR) comparing pre and postimplementation periods was estimated with a Poisson regression model adjusted for age, sex and comorbidities (Charlson Index).

Results: 1704 patients were included, their characteristics are shown in Table 1. All centres but one were using the CVS. Crude IRs are shown in Table 2. The adjusted IRR for the postvaccination period was 0.40 (95%CI: 0.29-0.56), p<0.001.

Conclusion: The incidence of Sp infections experienced a decrease in RA patients exposed to bDMARD or tsDMARD after the introduction of the stepwise combined vaccination scheme that is not related to age, sex or comorbidities.

Table 1. Baseline features of the cohort. *Data presented as mean (standard deviation).

Demographics	
Age, years *	60.6 (12.5)
Female	1356 (79.6%)
Current smoking	287 (16.8%)
RA clinical characteristics	
Disease duration, years*	9.1 (7.9)
RF positive	875 (74%)
ACPA positive	831 (71%)
DAS28*	4.6 (1.4)
Other clinical characteristics	
Body Mass Index*	27.5 (5.2)
Charlson index*	2.3 (1.5)
Chronic pulmonary Disease	125 (9.3%)
Diabetes mellitus	147 (9%)

Table 2. Crude IRs (95%CI) for the outcomes of interest

Overall		>65		≤65	
Pre-vac	Post-vac	Pre-vac	Post-vac	Pre-vac	Post-vac
SP-infections (all codes combined)					
33 (27.4-39.9)	12.7 (9.8-16.4)	28 (22.4-35.0)	11.8 (8.9-15.6)	60.3 (42.4-85.8)	19.5 (10.8-35.2)
IPD codes					
-	0.4 (0.1-1.6)	-	0.4 (0.1-1.8)	-	-
All cause CAP codes					
23.6 (19.0-29.3)	11.5 (8.8-15.0)	18.7 (14.4-24.4)	10.4 (7.7-14.0)	50.8(34.8-74.0)	19.5(10.8-35.2)

P748
EFFICACY OF PERCUTANEOUS RADIOFREQUENCY LESION OF GENICULAR BRANCH IN OSTEOARTHRITIS

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Objective: To prove the efficacy of the percutaneous radiofrequency lesion to the genicular branch in osteoarthritis pain, thus; helping patients in controlling mild to moderate osteoarthritis pain.

Methods: We made a retrospective analysis for 20 patients whom undergone percutaneous radiofrequency lesion to the genicular nerve in both knees' mild pain. This was made in the operation room under fluoroscopic guidance and local anesthesia with lesion to the genicular nerve of both knees.

Results: Patients showed good pain relief. They did not sustain any knee pain and they reported increased capability in living daily pain-free life.

Conclusion: Radiofrequency lesion to the genicular branch of both knees have a good effect in relieving the osteoarthritis pain.

P749
INTEREST OF VERTEBRAL FRACTURE ASSESSMENT IN THE DIAGNOSIS OF VERTEBRAL FRACTURES

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Objective: Vertebral fractures are a major risk factor for new vertebral and non-vertebral fractures, but they are often little recognized. Vertebral fracture assessment (VFA) allows the diagnosis of vertebral fractures during biphotonic X-ray absorptiometry; the technique is effective, slightly irradiating and low cost. The objective of this study is to assess the prevalence of vertebral fractures using VFA in patients admitted for nonvertebral fractures.

Methods: The study was conducted in subjects over the age of 50, admitted to orthopedics for non-vertebral fractures due to bone fragility. A search for risk factors by a questionnaire. BMD was measured by DXA; osteoporosis was defined by a T score <-2.5 at least one site (lumbar spine, total femur, femoral neck). VFA tested for vertebral fractures from T4 to L5 during DXA.

Results: Among the 130 patients admitted for nonvertebral fractures in orthopedics, evaluation by DXA and VFA was not possible for 25 patients. The reasons were: severe impairment of cognitive functions (n=6), patients not seen following the fracture (n=12), patient refusal (n=7). Data were available for 105 patients (80.5% female) the mean age was 72.8±11.2 y. 21 (20%) of the patients had a history of low trauma fracture. 10 (9.5%) patients received at the time of the calcium fracture±vitamin D and 5 (4.76%) received antiosteoporotic treatment. Wrist fractures (n=57) and those of the upper end of the femur (n=35) were the most common fractures. 55 (52%) of the patients were osteoporotic (T-score < -2.5) and 40 (38%) were osteopenic. The prevalence of vertebral fractures diagnosed with VFA was 47%; 12% of the patients had more than one vertebral fracture. 31% of patients with osteopenia had at least one vertebral fracture diagnosed with VFA.

Conclusion: Half of those hospitalized for nonvertebral fractures have undiagnosed vertebral fractures. Our results suggest that their search should be systematic, and VFA is a simple way to diagnose.

P750
BONE STATUS OF ALGERIAN EPILEPTICS

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Objective: Osteoporosis and epilepsy are two conditions commonly diagnosed in the elderly. The prevalence of epilepsy is 1% in subjects over 60 y of age and increases with age. An increased risk of fracture has been reported in subjects with epilepsy compared to the general population. We aimed to assess the prevalence of osteoporosis in epilepsy patients and to determine the risk factors for fracture.

Methods: 82 epileptic patients (56 F/26M) and 98 controls matched for age and sex were recruited. The patients were explored on the plans: clinical in search of risk factors for osteoporosis, biological with a 25OHD assay, an evaluation of the calcium ration by the Fardelonne questionnaire, an radiological evaluation by the search for fractures vertebral by VFA as well as a bone osteodensitometry by DXA (Hologic, QDR).

Results: The mean age of the patients was 47±17.2 y (15-74). The mean duration of disease progression was 13.6±7.54 y. The mean duration of treatment was 10.2±5.51 y (2-39). The average BMI was 25.12±3.2 (15.4-36.9 kg/m^2). The mean calcium ration was 736.32±148.8 (427.4-1131 mg/d) in the cases and 868.3±125.1 in the controls (P=0.037). The average rate of 25.OH.D is 17.6±6.7

(6-31) ng/ml in the cases and 19.4±5.8 ng/ml in the controls (P=0.002). Vitamin D insufficiency (rate <20 ng/ml) is noted in 59 patients in the cases, i.e., 71.95% and 47 cases, or 47.95% in the controls. The number of vertebral fractures by VFA is 11 in the cases and 4 fractures in the controls (p=0.003). Tobacco: present in 18 cases (22%) and in (28%) controls. Alcohol: present in 15 cases (18.3%) and in (12.7%) controls. The mean spinal T-Score is: 1.91±2.06 in the cases and 0.59±1.48 in the controls (P <0.001). The mean hip T-score is -1.16±1.23 in the cases and -0.45±1.02 in the controls (p<0.001). According to the IOF definition, 31 patients (38.8%) are osteoporotic and 36 patients (43.9%) are osteopenic. In our patients, BMD in the spine and hip was lower in epilepsy patients compared to controls with a statistically significant difference. The epileptics with abnormal BMD were mainly women, older, with a low calcium ration and a low rate of 25.OH.D (here you can reformulate as you feel!). BMD of epilepsy (case) correlated significantly positively with BMI and negatively with age, calcium ration, Vit D rate and number of vertebral fractures

Conclusion: There is a risk of fractures in subjects with epilepsy treated with antiepileptics. Osteoporosis is therefore common during epilepsy. Given the risk of fracture, it makes sense to propose a measurement of BMD and to perform a vitamin D test in subjects treated with antiepileptics.

P751
PROPER POSTOPERATIVE PAIN MANAGEMENT CAN REDUCE THE INCIDENCE OF CHRONIC POST SURGICAL PAIN (CPSP)

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Objective: Chronic postsurgical pain (CPSP) is pain that lasts more than 3 months after surgery and is observed in more than 10% of patients after knee arthroplasty. The purpose of this study is to investigate the relationship between this CPSP and postoperative pain after unilateral knee arthroplasty (UKA).

Methods: 292 UKA patients treated at our hospital were divided into 2 groups. Group 1 with 30 cases had CPSP and group 2 with 262 didn't have CPSP. Numerical rating scale (NRS) between day 0 and day 7 postoperative were aggregated and statistically analyzed between the two groups. In addition, the CPSP incidence rate was compared between group A (99 cases with average NRS less than 2) and group B (100 cases with average NRS <3.5 and >2).

Results: The average NRS of group 1 with CPSP was 3.2, while the average NRS of group 2 without CPSP was 2.6, and the difference between the two groups was significant. In addition, group A with average NRS <2 had less incidence of CPSP.

Conclusion: Postoperative NRS of CPSP patient group was significantly higher, and there was a relationship between postoperative pain and the occurrence of CPSP. The incidence of postoperative CPSP was low in patients who had well controlled postoperative pain, indicating that postoperative pain management is important for CPSP prevention.

P752
THE INTERACTIONS BETWEEN MRI-DETECTED OSTEOPHYTES AND BONE MARROW LESIONS OR EFFUSION-SYNOVITIS ON KNEE SYMPTOMS IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: To describe longitudinal associations between MRI-detected osteophytes (OPs) and knee symptoms in patients with knee OA, and their interactions with bone marrow lesions (BMLs) and effusion- synovitis.

Methods: This study used data from Vitamin D Effects on Osteoarthritis (VIDEO) study, a randomized, double-blind and placebo-controlled clinical trial that was originally designed to identify the effects of vitamin D supplementation on OA. Participants with symptomatic knee OA were assessed at baseline and 2 y later. WOMAC score were used to assess knee pain, stiffness, and physical dysfunction. OPs were measured using a combination of knee osteoarthritis scoring system and whole-organ MRI score system. BMLs and effusion-synovitis score were also measured from MRI images at baseline and 2 y later.

Results: Of 413 participants at baseline (mean age 63.2 y), 358 (86.7%) completed 2 y of follow- up, of whom 24.3% had increased knee pain. Statistically significant interactions were detected between OPs and BMLs or effusion-synovitis for increased weight-bearing pain (p<0.02), stiffness (p<0.01), and physical dysfunction (p<0.01). In participants with baseline BMLs, baseline OPs at total, lateral tibiofemoral and patellar compartments were significantly associated with increased weight-bearing pain, increased stiffness and increased physical dysfunction after adjustment for age, sex, BMI, intervention, and baseline serum 25-hydroxyvitamin D levels. In participants with baseline effusion-synovitis, baseline OPs at total, lateral tibiofemoral, medial tibiofemoral and patellar compartments were significantly associated with increased weight-bearing pain, increased stiffness and increased physical dysfunction, after adjustment for covariates. There were no such associations in participants without BMLs or effusion-synovitis. Baseline OPs had no significant association with non-weight-bearing pain at any knee compartments.

Conclusion: MRI-detected OPs could predict increases in weight-bearing knee pain, stiffness and physical dysfunction in participants with BMLs or effusion-synovitis.

P753
UNDERSTANDING HEALTH BELIEFS ABOUT OSTEOPOROSIS TREATMENT AMONG PATIENTS REFERRED FOR FIRST-TIME DXA

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Objective: To 1) explore the psychometric properties of a 9-item scale measuring health beliefs about osteoporosis treatment among undiagnosed and untreated patients, and 2) determine the factors associated with patients' health beliefs about osteoporosis treatment.

Methods: Patients 50 years of age and older who had no prior diagnosis of or treatment for osteoporosis, and were referred for first-time DXA by their primary care provider were eligible. Prior to discussing results of DXA with their primary care provider, patients completed a health history questionnaire and a 9-item scale based on the Health Belief Model constructs that was developed to measure health beliefs about osteoporosis treatment. Descriptive statistics were conducted for all survey items. Confirmatory factor analysis was performed to assess construct validity and internal consistency of the scale. ANOVA was used to compare patient characteristics on total and subscale scores.

Results: A total of 203 patients were recruited. Mean age was 59.7 (SD=7.1), 86.2% were female, 96% were Caucasian. All 9 items showed good variation with each spanning the full option range from 1 (strongly disagree) to 5 (strongly agree) and item means ranging from 2.5 to 3.6. A correlated three factor model measuring perceived benefits, barriers, and motivation showed good model fit (χ^2/df=2.2, CFI=0.96, SRMR=0.05) and composite reliability was also good (0.87). Patients who reported receiving osteoporosis education in the past had higher motivation to initiate treatment (p=0.010) and patients 65 years and older reported greater perceived barriers to taking osteoporosis treatment (p=0.027). No differences were found between gender, education, medication use, family history of osteoporosis, or routine medical care.

Conclusion: The scale has acceptable psychometric properties for assessing perceived benefits, barriers and motivation about osteoporosis treatment among patients who are undiagnosed and untreated. Older patients perceived greater barriers to treatment and having prior osteoporosis education increased motivation. This can help guide education interventions, physician counselling, and shared decision-making for at-risk patients.

P754
DIFFERENTIAL DIAGNOSIS OF OSTEITIS FIBROSA CYSTICA AND BONE METASTASES IN PATIENT WITH PRIMARY HYPERPARATHYROIDISM

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Objective: The differential diagnosis between bone metastases of the parathyroid cancer and osteitis fibrosa cystica (OFC) remains a challenge. «Brown tumors» as an extreme condition of OFC in primary hyperparathyroidism (PHPT) may mimic other bone diseases such as giant cell tumors or multiple metastases.

Methods: We present a clinical case of severe PHPT with brown tumors that is extremely similar to the metastatic parathyroid cancer by PET/CT with 18F-fluorodeoxyglucose (18F-FDG) and 18F-fluorocholine (18F-FCH).

Results: A 34-year-old patient applied to our center with severe weakness, loss of weight, intensive bone pains that limited her mobility. Lab tests showed: total calcium 4.09 mmol/l (2.1-2.55), ionized calcium 1.91 mmol/l (1.03-1.29), PTH 1983 pg/ml (16-65), osteocalcin 300 ng/ml (11-43), β-CTx 6 ng/ml (0.01-0.69), 24-h urinary calcium 11.49 mmol (2.5-8), GFR 71 ml/min/1.73m[2]. There were significant reduction in BMD especially in radius to -5,1 SD using Z-score. Ultrasound examination and scintigraphy with 99mTc-sestamibi detected tumors in right (30×20×18 mm) and left (12×4×4 mm) parathyroid glands (PG). Clinical data allowed to suspect the parathyroid cancer thus PET/CTs with 18F-FCH and 18F-FDG was performed. Aside from the parathyroid tumors there were multiple foci of 18-FDG uptake in the bones similar to metastases of a malignancy. There was no accumulation in other organs and soft tissues. Conservative therapy of hypercalcemia was not effective, so we decided to perform parathyroidectomy without bone biopsy. The big right PG as well as two smaller left ones were surgically removed. The intraoperative risk of the malignancy was rated as low. On the third day after surgery hypocalcemia developed (total calcium 1.89 mmol/l) that was managed with *iv* administration of calcium gluconate and alfacalcidol. Morphological examination diagnosed benign adenomas of the right and left upper, hyperplasia of the left lower PG. Mutations in the *MEN1* gene were excluded.

Conclusion: PET/CT is not able to clearly differentiate OFC and secondary bone metastases.

P755
DEVELOPMENT AND VALIDATION OF A NEW PREDICTION TOOL TO ASSESS IMMINENT HIP FRACTURE RISK IN PATIENTS STARTING ORAL BISPHOSPHONATES: A REAL WORLD COHORT STUDY INCLUDING 373,455 PARTICIPANTS FROM DENMARK, SPAIN AND THE UK

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Objective: There are different validated prediction tools that estimate long-term 10-y fracture (Fx) risk in treatment naive patients. However, there is a lack of tools evaluating imminent Fx risk amongst patients starting oral bisphosphonates (BP). We aimed to develop and externally validate a model that predicts 1-year risk of hip Fx one year after oral BP initiation.

Methods: Incident BP users (with no BP use in the previous year) at age 50 or over were identified in primary care records from Catalonia (SIDIAP), the UK (CPRD), and the Danish Health Registers (DHR). SIDIAP participants were split in a training (80%) and test (20%) datasets. A total of 46 potential predictors were identified from previous literature. LASSO was used to select key predictors and combined in a prediction tool using logistic regression. The model was internally (SIDIAP test set) and externally (CPRD and DHR) validated in terms of discrimination (area under ROC curve [AUC]) and calibration (observed vs. predicted stratified by age and gender). Intercepts were recalibrated in CPRD and DHR to account for differences in baseline Fx risk.

Results: The SIDIAP training dataset included 42,840 patients, with 207 (0.5%) sustaining a hip Fx in the following year. The test dataset included 10,709 patients with 52 (0.5%) hip Fx. CPRD and DHR included 115,896 and 204,010 participants and 1,682 and 3,982 hip Fx respectively. The final validated tool included 17 predictors (Table 1) and had an AUC of 0.83 in SIDIAP, 0.73 in CPRD, and 0.69 in DHR, with good calibration.

Conclusion: We have developed and validated a prediction tool for the estimation of imminent hip Fx risk amongst subjects who have just started oral BP therapy. The resulting tool shows great predictive power and validity (discrimination and calibration) in three real world European cohorts and could assist with identification of very high risk patients.

Predictors	OR	Low 95%CI	High 95%CI
Age (years)	1.11	1.09	1.13
Gastrointestinal ulcer	1.98	1.18	3.33
Dementia diagnosis	1.94	1.26	3.01
Prior fracture	1.68	1.26	2.24
Antiepileptics use	1.59	1.09	2.34
Renal disease	1.59	1.05	2.41
Parkinson's disease	1.49	0.82	2.72
Anxiety or Obsessive-Compulsive Disorder	1.42	0.98	2.06
Diagnosis of cancer	1.42	0.88	2.30
Diabetes mellitus II diagnosis	1.35	0.98	1.85
Anticoagulants use	1.35	0.87	2.09
Chronic obstructive pulmonary disease	1.28	0.8	2.05
Heparin use	1.23	0.79	1.92
Cerebrovascular disease	1.22	0.81	1.84
Beta-blockers use	1.13	0.78	1.63
Benzodiazepines use	0.67	0.50	0.90
Rheumatic diseases	0.41	0.17	0.99

Abbreviations: OR, Odds Ratio; CI, Confidence interval.

P756
OSTEOPOROSIS: PHYSICAL AND PSYCHOLOGICAL CONSEQUENCES

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Objective: Osteoporosis (OP) is the most common osteometabolic disease in humans, presenting a multifactorial etiology and a silent evolution. Presently, it is seen as a serious global public health problem that must be urgently fought. We aimed to promote reflection on the causes and consequences of non-adherence to therapy, through the presentation of a clinical case.

Methods: Research of clinical records and semi-structured patient interview.

Results: Caucasian woman, 71 years, diagnosed with OP (2013) and several comorbidities. The patient started anti-resorptive medication, which abandoned in less than 3 months for lack of information about the disease and complaints of gastric discomfort. Over the next 6 y, the condition worsened, with pronounced spinal deformation, marked loss of height and chronic pain, probably related to osteoporotic microfractures, as well as decreased muscle strength and balance, frequent falls, lack of appetite and dyspnea. She also developed an exacerbated fear of falling and decreased self-esteem in relation to her physical aspect, which resulted in social isolation. After being selected to integrate an investigation project on OP, she was made aware of this health problems and finally decided to resort to specialized health care. She was prescribed zoledronic acid, associated with calcium and vitamin D, in addition to physical therapy and psychiatric counseling.

Conclusion: In this case, lack of awareness about OP was the main obstacle to effective treatment, which led to an aggravation of the clinical situation. Physical limitations and body changes resulting from this condition promoted anxiety, personal devaluation, lack of self-esteem, fear and depression, hindering the adoption of healthy lifestyles. Note that an early diagnosis associated to an adequate medical follow-up and health literacy are determining factors in combating this scourge.

Disclosures: Support for research on OP: APOROS, SPODOM, SPR, Amgen.

P757
RISKS AND OPTIMAL THERAPEUTIC SOLUTIONS IN A PATIENT WITH OSTEOPOROSIS, OSTEOGENESIS IMPERFECTA AND RHEUMATOID ARTHRITIS

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Objective: Optimal treatment of osteoporosis can sometimes be difficult when several conditions of the osteoarticular system co-exists and whose treatment may interfere.

Methods: 59-year-old female patient is admitted to the Internal Medicine and Rheumatology Clinic from Dr.I.Cantacuzino Hospital in December 2016, for polyarticular pain, swelling, morning stiffness, accompanied by marked functional impotence. She is known with osteogenesis imperfecta (diagnosed in childhood), corticodependent rheumatoid arthritis (2007), diffuse osteoporosis of complex etiology, complicated, fracture of the femoral neck and right ankle (May 2016). At that time, the patient was undergoing treatment with infliximab 3 mg/kg at 8 weeks, methotrexate 20 mg sc/week, folic acid, leflunomide 20 mg/d, methylprednisolone 8 mg/d, alendronate 70 mg/week, calcium and alfa D3 0.5 µg 2 pills/d. Following the clinical, imaging and biological evaluation from December 2016, we decided to change the biological treatment for rheumatoid arthritis with adalimumab 40 mg at 2 weeks, and to discontinue methotrexate therapy, maintaining leflunomid 20 mg/d. Also at that time is performed osteodensitometric examination (DXA) which shows a T-score in the lumbar spine of -3.1 and hips - 3.2 bilaterally. After 1 y, in December 2017, during the assessments, the DXA exam is repeated and reveals worse scores than the previous ones (score for lumbar spine=-3.3 and hips=-3.5). The patient also told that, without indication, she still was undergoing cortisone therapy. Given the associated comorbidities, the aggravation of T-scores and the risks of fragility fractures, for the treatment of osteoporosis we decided to stop bisphosphonate therapy and start denosumab 60 mg at 6 months. This therapeutic option was decided, despite the potential risk of strong immunosuppression (2 associated biological molecules).

Results: In January 2019, the patient repeats the DXA exam, which shows an improvement of the T-scores, lumbar spine T-score=-2.5 and in the hips=-2.7

Conclusion: Treatment of osteoporosis can sometimes be difficult, especially among patients with multiple comorbidities, non-adherent to the recommendations of the physician. Although now, we have multiple therapeutic options for osteoporosis and rheumatoid arthritis, less for osteogenesis imperfecta, the choice of the optimal treatment must be made carefully, taking into account the risks/benefits and possible drug interactions.

P758
VITAMIN D: RELATIONSHIP WITH LIFESTYLE AND MORBIDITY

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Objective: Vitamin D (VD) has wide activity and numerous studies have shown that there is a major deficiency of this vitamin in the world population, affecting the development of bone tissue and increasing the emergence of several diseases, such as DM, cardiovascular, autoimmune and neoplastic diseases. This deficiency is related to decreasing sun exposure as well as the intake of highly processed foods. This important vitamin is essential for the intestinal absorption of calcium and phosphate and for bone metabolism. With this research we intend to reinforce the importance of VD for health and quality of life and establish links between its deficiency and certain pathologies. Assumptions to test: correlation between a) VD levels and lifestyle; b) VD levels and diagnosed pathologies.
Methods: This investigation, approved by the Ethics Committee, takes place at ULS Guarda. Data collection began in November 2018, on patients between 18-80 y, who gave informed consent. Patients answered a short questionnaire about their lifestyle and a blood test was requested. Relevant clinical information is collected.
Results: Most patients reveal VD deficiency across all age groups, with a special focus on patients over 70 years old. This study confirm the importance of VD and contribute to the decision of the responsible entities in promoting healthy lifestyles among the general population, namely controlled sun exposure and supplementation when necessary.
Conclusion: VD deficiency is an increasing public health problem and the main cause is the limitation on sun exposure. Therefore, this nonpharmacological measure should be encouraged and done responsibly to increase VD activation, once the levels obtained through food are not sufficient to meet vital needs. Several studies suggest that VD supplementation may have benefits in muscle and bone function.

Disclosures: Support for research on another project: APOROS, SPODOM, SPR and Amgen.

P759

ADMAIORA: A POTENTIALLY GROUNDBREAKING APPROACH FOR CARTILAGE REGENERATION AND OSTEOARTHRITIS TREATMENT

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Objective: Osteoarthritis (OA) is a major burden that affects millions of people, with enormous costs for the European healthcare systems. To date, intra-articular injections of therapeutics (i.e., hyaluronic acid viscosupplements [1], platelet rich plasms (PRP), and other molecules [2]) are pursued, but with rather poor clinical results. The ADMAIORA project targets inflammation reduction and cartilage regeneration, with the aim of slowing down or even stopping the degeneration process, thus delaying or avoiding surgical total joint replacement.

Methods: The project exploits key technologies, whose potential has been preliminarily demonstrated *in vitro*, which consist of: (i) nanocomposite hydrogels, (ii) adipose tissue-derived stem cells (ASCs) used to promote cartilage regeneration, (iii) controlled ultrasound stimulation, used as direct mechanical stimulus, in combination with piezoelectric materials, to trigger electrical effects known to promote stem cell differentiation in chondrocytes, (iv) *in situ* bioprinting and (v) joint monitoring through a smart brace connected in an Internet-of-Things framework (Figure 1).

Controlled ultrasound stimulation

IoT-based joint health monitoring
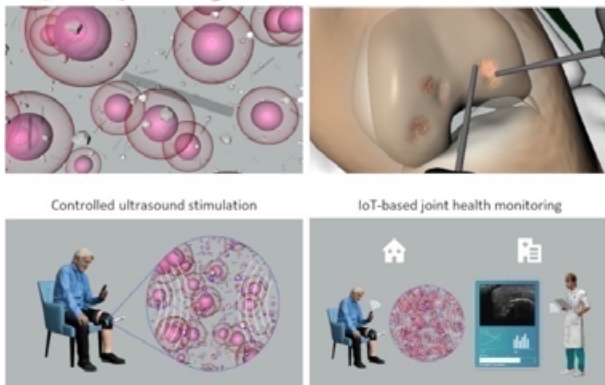
Results: Efforts are ongoing to develop different natural hydrogels based on gellan gum, collagen and VitroGel®, able to safely embed ASCs. Preliminary results highlighted good viability of ASCs encapsulated in VitroGel. The hydrogels will be doped with carbon-based nanomaterials (carbon nanotubes or graphene oxide nanoplatelets), to improve mechanical and lubrication properties, and piezoelectric nanoparticles (e.g., $BaTiO_3$ and ZnO), to make it responsive to ultrasound. A low-intensity ultrasound stimulation set-up, working at frequencies from 40 kHz to 5 MHz, has been developed to provide highly dose-controlled inputs to interact with piezoelectric materials. Beneficial effects (chondrogenesis) are expected, as previously reported on other cell types [3,4]. This could pave the way to a radically new treatment for OA, based on smart regenerative signals remotely and wirelessly provided *in vivo*. Preliminary results have been obtained also on bioprinting strategy, on smart brace and on IoT architecture.

Conclusion: Overall, ADMAIORA targets a highly interdisciplinary and potentially groundbreaking paradigm that promises to revolutionize OA treatment.

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P760

SEARCH FOR ASSOCIATIONS OF MICRORNA TARGET SITES WITH OSTEOARTHRITIS OF VARIOUS LOCALIZATION: A CASE-CONTROL STUDY

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Objective: Osteoarthritis (OA) is a multifactorial disease with still unclear molecular pathogenesis. It is relevant to make genetic studies, including the study of microRNA target sites. We conducted a case–control study to find association between the single polymorphic variants (SNP) rs1061237, rs1061947 (COL1A1), rs3128575 (COL5A1), rs9659030 (COL11A1), rs229077, rs229069, rs9978597 (ADAMTS5), rs13317 (FGFR1), rs2463018 (CHST11), rs6854081 (FGF2) located in the miRNA target sites and OA of various localization.

Methods: 417 women (51.67±11.5 y.o.) were examined, OA was diagnosed in 356 patients (hand OA - 23.83%, knee OA - 54.30%, hip OA - 21.87%). 161 healthy women made up the control group. All of them were genotyped using competitive allele-specific PCR (KASP). Statistical processing was performed using $\chi 2$ criterion. Correction for the multiplicity of comparisons was carried out by the FDR value calculating.

Results: The A allele of rs9659030 (COL11A1) was associated with hand OA (p=0.019; OR=2.0; (1.11-3.62)). The C allele of rs229069 (ADAMTS5) was associated with OA in general (p=0.018; OR=1.43; (1.06-1.93)), as well as with knee OA (p=0.042; OR=1.43; (1.01-2.03)) and hip OA (p=0.026; OR=2.039; (1.08-3.85)). The A allele of rs13317 (FGFR1) was associated with the OA in general (p=0.001; OR=1.67; (1.2-2.3)), with knee OA (p=0.004; OR=1, 74; (1.19-2.55)) and hand OA (p=0.044; OR=1.67; (1.01-2.75)). The A allele of rs13317 saved significance of association with OA in

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general (p*=0.01) and knee OA (p*=0.04) after the FDR correction. Study of the alleles and genotypes in other SNPs showed no association in OA patients.

Conclusion: The miRNA target sites rs9659030 of COL11A1, rs229069 of ADAMTS5 and rs13317 of FGFR1are associated with the development of osteoarthritis in general and its various localization.

P761
VITAMIN D AND MENTAL ILLNESS

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Objective: The importance of vitamin D (VD) in individual health is widely known, especially in bone and muscle metabolism and in calcium and phosphorus homeostasis. Several studies have also revealed an important association between vitamin D deficiency and mental health problems, namely an increased risk of anxiety, depression, suicidal ideation and suicide. Our aim was to study the relationship between VD levels and mental health, through a literature review.

Methods: Bibliographic search on reference sites (PubMed; Web of Science; Plos).

Results: VD receptors exist in various parts of the brain, including the amygdala, which is linked to the regulation of emotions and behavior. The VD regulates the intra- and extracellular calcium concentration in neurons, so individuals with subadequate levels often suffer from mood disorders. VD deficiency is also linked to severe neuropsychiatric conditions such as Parkinson's disease, schizophrenia, multiple sclerosis, Alzheimer's disease and autism spectrum disorders. As it influences neuronal growth, cell proliferation in the developing brain and embryogenesis, the VD is involved, at the CNS level, in the process of releasing neurotransmitters such as serotonin and dopamine, substances with proven influence at the level of mood, anxiety and various cognitive processes, which is why an association has been established between reduced levels of VD and mental illnesses such as depression.

Conclusion: Numerous studies establish a positive and consistent relationship between VD and Mental Health. Inadequate serum levels of VD are associated with certain psychiatric disorders. Thus, a responsible sun exposure, a balanced diet that guarantees an adequate supply of VD and, whenever justified, a correct supplementation, will be important means of achieving adequate levels of VD.

Disclosure: Support for research on another project: APOROS, SPODOM, SPR and Amgen.

P762
DIET LOW IN CALCIUM IN THE EASTERN MEDITERRANEAN COUNTRIES: RESULTS FROM THE GBD STUDY 2017

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Objective: The first step in the prevention or treatment of osteoporosis is ensuring an adequate intake of calcium and vitamin D. A negative calcium balance and a compensatory rise in PTH results in excessive bone resorption. This study focuses on the burden of a diet low in calcium in the Eastern Mediterranean Region (EMR) in comparison with the global state.

Methods: We reviewed the age-sex-region-specific point prevalence of low calcium intake as summary exposure values (SEV), by the regions of the WHO (1). The EMR was compared with the global state, according to the statistics of the Global Burden of Diseases (GBD) 2017 report (2).

Results: Compared with the global average, the age-standardized prevalence of diet low in calcium was higher in the EMR since 1990 in both women and men aged ≥50 y, especially in those ≥70 y. The highest SEV of a diet low in calcium was detected in the Southeast Asia, African, and Western Pacific regions, respectively; however, the Western Pacific region showed steady improvement since 1990. Compared with other WHO regions, the EMR ranked fourth for SEV of a diet low in calcium. In all, the European region showed the lowest SEV in both sexes (Figure).

Conclusion: The results of this study reflect that the current state of calcium intake of the diet is lower in the EMR compared to the global state, especially in the elderly aged ≥70 y. Prompt action to increase the intake of dairy products or calcium-rich foods, and if not possible, calcium supplements are mandatory in this region to improve bone health.

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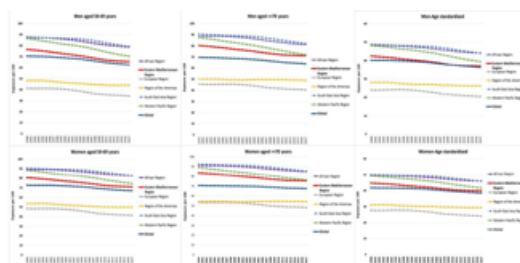
Figure 1: Diet low in Calcium in men and women in different regions of WHO, by age group

P763
RELATIONSHIPS BETWEEN RISK OF FALLING, PHYSICAL FUNCTIONS AND GAIT PARAMETERS IN ELDERLY PEOPLE

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Objective: To investigate the relations between the risk of falling, physical functions and gait parameters.

Methods: Inclusion criteria: age 60 and more years; ability to walk 4 m without any assisting device. Exclusion criteria: Mini-mental state examination (MMSE) score ≤20, terminal illness. The risk of falling was evaluated by timed up and go (TUG) test. Patients were divided into: those with TUG time >14 s (n=35) were identified as having high risk of falling (HRF), and those with TUG test ≤14 s (n=72) – as having low risk of falling (LRF). Short physical performance battery (SPPB) test, Tinetti test, Dynamic gait index (DGI), and Physical activity scale for elderly (PASE) were used to evaluate physical functions. Using 6 inertial sensors attached to the shins, thighs and feet, such parameters as gait speed, stride, stance time, swing, double support time, and cadence were evaluated. Statistical analysis was performed using independent samples T-test, chi-square test and Pearson correlation criterion.

Results: Data of 112 patients (73 women and 39 men) with average age 75±8.7 y were analysed. The average age in HRF group was higher comparing to LRF group (80.51±7.85 and 72.3±7.6 y, respectively; p<0.005). Patients with LRF had higher PASE score than those with HRF (107.45±57.8 and 76.77±47.9, respectively; p<0.05), higher Tinetti test result (23.2±2.9 and 19.6±3.5 s, respectively; p<0.05), higher BERG test score (42.7±5.5 and 35.4±6.1 respectively; p<0.05) and SPPB score (7.1±2.1 and 4.3±1.7; p<0.05). TUG test time correlated with age (r=0.44, p<0.05). Negative correlations of TUG test time were found with SPPB (r=-0.62, p<0.005), BERG (r=-0.66, p<0.05), and DGI (r=-0.57, p<0.05) tests scores. TUG test time correlated with most of gait parameters: walk time (r=0.73, p<0.05), both legs stance time (right leg r=0.49, left leg r=44; p<0.05), stride time (r=0.4 and r=0.38 respectively; p<0.05), double support time (r=0.44, p<0.05), step time (r=0.4, p<0.05), and negatively with gait velocity (r=-0.7, p<0.05), cadence (r=-0.46, p<0.05), and step length (r=-0.65, p<0.005).

Conclusion: high risk of falling was associated with older age, lower physical activity and physical functions, longer walk time, lower gait velocity and shorter step.

P764
THE IMPORTANCE OF HEALTH LITERACY IN THE CONTEXT OF OSTEOPOROSIS

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Objective: Osteoporosis is a progressive and systemic osteometabolic disease, with a multifactorial etiology. Due to its high prevalence and complications, it is seen as a serious global public health problem. The fight against this scourge must be based on early pathology prevention strategies and the adoption of healthy lifestyles throughout the life cycle. The population's health literacy has an unquestionable impact on the whole process. We aimed to study the perception of patients diagnosed with Osteoporosis about the several aspects of this pathology (conception and consequences, treatments, prevention) and to identify their information sources.

Methods: 350 patients diagnosed with OP (enrolled at UCSP-Seia) were submitted to a semistructured interview and were questioned about osteoporosis' conception.

Results: It was found a wide spectrum of conceptions, according to several factors, such as age, educational background, profession, socioeconomic conditions, place of residence, marital status, family. This population is mostly elderly, coming from rural areas, located on the highest point in mainland Portugal, marked by particular environmental conditions, such as, altitude, harsh climate, livelihoods, conditioned accessibilities, among others. High levels of health literacy allow patients to adopt healthy lifestyles, which contributes to a good evolution of their clinical condition; the opposite also occurs. The main sources of information are television, general practitioners and family members.

Conclusion: As the world's population aging is a fact, the so-called "21st century silent epidemic" can be expected to expand and continue to deepen the dire personal, family and social consequences that stem from it. So, increasing the patients' empowerment and health literacy is essential in this hard fight against osteoporosis.

Disclosures: Support for research on Osteoporosis: APOROS, SPODOM, SPR, Amgen.

P765
A COMPARISON OF BONE MINERAL DENSITY IN TYPE 2 DIABETICS AND NONDIABETICS

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Objective: Osteoporosis, a major public health problem, is a skeletal disorder characterized by compromised bone strength which predisposes the individual to an increased risk of fractures of the hip, spine and other skeletal sites. Patients with either

type 1 or type 2 diabetes are among those at increased risk for this disease. Diagnosis of osteoporosis is based on a low BMD. Evaluation of BMD is vital to early detection of osteoporosis and prevention of fractures in diabetic patients. We aimed to compare the BMD among type 2 diabetics in Enugu state Nigeria with that of a control group of nondiabetics.

Methods: Using a DXA scan, a study was carried out on 180 patients (90 diabetics (case group) and 90 nondiabetics (control group)) between the ages of 30-70 to investigate/compare the difference in the lumbar (L1-4) and femoral BMD among type 2 diabetics and nondiabetics. Data was expressed in terms of standard deviation (SD) as T-score and Z-score, with values of -1 to -2.5 indicative of osteopenia and -2.5 and below as osteoporosis.

Results: A total of 180 patients (90 in each group) were involved in this study. 62(68.9%) were females while 28(31.1%) were males. The mean duration of disease was 7.80±5.10 y. Statistical significant difference was obtained for the duration of disease and effect on BMD (p=0.02), the comorbidity of hypertension (p=0.004) and mean duration of menopause on BMD (p=0.007). There was a decrease in the BMD at the lumbar (L1-4) in the case group when compared to the control group. However the BMD at the femur obtained almost the same values with a slight increase in the control group. Comparing the BMD of the femur and lumbar (L1-4) reveals a statistically significant difference (p-value <0.001) between the case and control groups.

Conclusion: This study, in comparing the BMD of T2DM patients and nondiabetics show that diabetes has an influence on the BMD of patients.

P766
IN VITRO EFFECTS ON OSTEOGENIC DIFFERENTIATION PROCESS AND NONGENOMIC ACTIONS OF 25(OH)D3

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Objective: Several recent studies have demonstrated that one of the hormone precursors of vitamin D_3, the calcifediol [$25(OH)D_3$], through the nuclear vitamin D receptor (VDR), is able to regulate hundreds of genes involved in several cellular processes. In this study we have hypothesized that the calcifediol by binding the VDR could be have a vitamin's D activity like activating non-genomic pathways. Our aims have been to analyze *in vitro* not only the capacity of $25(OH)D_3$ to activate the non-genomic pathways, but also the effects of $25(OH)D_3$ on osteogenic differentiation and mineralization of mesenchymal stem cells derived from human adipose tissue (hADMSCs).

Methods: hADMSCs lines were prepared from adipose tissue biopsies of health donors and cultured in growth medium. The variation of intracellular Ca^{2+} levels on hADMSCs exposed to 10^{-5} M of $25(OH)D_3$ were evaluated by Laser Scanning Confocal Microscopy. Cells were exposed to several concentrations of $25(OH)D_3$ for 35 d of osteogenic induction. Alkaline phosphatase (ALP) activity and Ca^{2+} deposition were quantified by fluorometric assays up to 35 days of osteogenic induction. Statistical analysis was performed by ANOVA followed by Bonferroni's test.

Results: Our experiments have shown an increase of intracellular Ca^{2+} levels in response to 10^{-5}M $25(OH)$ D_3. hADMSCs osteoinduction with 10^{-6} M and 10^{-7} M of $25(OH)D_3$ showed a significant increase in ALP activity vs. positive control after 4 and 7 d. Regarding the mineralization process, tested $25(OH)D_3$ at 10^{-9} M resulted in an increase of the deposition of Ca^{2+} nodules vs. positive control at 14 and 21 d.

Conclusion: Our study demonstrates that $25(OH)D_3$ has the ability to activate rapid nongenomic pathways, such as an increase of intracellular Ca^{2+} levels, similarly to the biologically active form of vitamin D_3 [$1,25(OH)_2D_3$]. In addition, our preliminary results for the first time have shown that high concentrations of $25(OH)D_3$ are able to induce an early increase of ALP activity and that low concentrations reduce the time of mineralization.

P767
POLYMORPHISM OF MIRNA TARGET SITES AS A RISK FACTOR FOR FRACTURES AND OSTEOPOROSIS

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Objective: Osteoporosis (OP) is an urgent problem of our time, leading to fractures and disability. The influence of genetics in the development of the OP is high, but the mechanism is not completely clear. Thereby, the study of associations between single polymorphic variants (SNP) rs1054204 (*SPARC*), rs9659030 (*COL11A1*), rs1042673 (*SOX9*), rs11540149 (*VDR*), rs6854081 (*FGF2*), rs1061237 (*COL1A1*), rs10793442 (*ZNF239*), rs10098470 (*TPD52*), rs1042840 (*MMP13*) and rs5854 (*MMP1*) of miRNA target sites and clinical features of OP as fractures and low BMD in men and women in the Volga-Ural region of Russia.

Methods: 686 women (~47 years old) and 521 men (~57 years old) of different ethnic groups (Russians, Tartars) were examined using DXA in in standard locations. After that, several group of comparison were formed according to BMD level and the presence of fractures. All of them were genotyped using a system of fluorescent endpoint genotyping technology (KASP™). Statistical processing was performed using χ2 criterion.

Results: The A allele of rs11540149 (*VDR*) was associated with fractures (p=0.023, OR=1.76) and low BMD in men (p=0.02, OR=2.393), the GG genotype of rs6854081 (*FGF2*) was associated with fractures in the general population of women (p=0.042, OR=6.88) and Tartars ethnicity (p=0.029, OR=9,56), the T allele of rs10098470 (*TPD52*) was associated with fractures (p=0.039, OR=3.64) and allele A of rs10793442 (*ZNF239*) was associated

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with osteoporosis in women (p=0.041, OR=1.53), the GG genotype of rs1054204 (*SPARC*) was associated with fractures (p=0.04, OR=2.70) and low BMD in men (p=0.002, OR=2.39).

Conclusion: We identified the significance of polymorphism of microRNA target sites of genes involved in bone metabolism in the formation of low BMD and osteoporotic fractures in men and women from the Volga-Ural region.

P768
A SPINE PHANTOM FOR MODELING BONE MINERAL DENSITY IN QCT AND DXA: DEVELOPMENT AND TESTING

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Objective: To develop a semi-anthropomorphic phantom based on K_2HPO_4 solutions for modeling the BMD to assess the precision and accuracy of QCT and DXA methods.

Methods: We developed a semi-anthropomorphic PHK phantom (PHantom Kalium) to model the lumbar spine with a wide range of concentrations of dipotassium hydrogen phosphate. The hollow parts of the vertebrae were made using high-precision milling of hydrocarbon blanks. The vertebral "body" (50, 100, 150, 200 mg/ml) and the "cortical bone" blocks (250, 350, 450, 550 mg/ml) together made up for the following areal BMD values (aBMD): L1 (0.587), L2 (0.886), L3 (1.177), L4 (1.475) g/cm². The phantom was immersed in a tank of water. We used a removable circular wax layer with a thickness of 38 mm for fat simulation. The PHK phantom was scanned on 16-channel DXA with a narrow angle fan beam for aBMD measurement. vBMD measurement was performed on a 64-row CT scanner by asynchronous QCT method. With and w/o fat layer conditions were studied.

Results: Mean aBMD measurement precision value (coefficient variation, CV) by DXA for all vertebrae was 1.0% for "w/o fat" condition and 1.05% for "with fat" condition. Maximum CV was determined for "L1 vertebra" (2.20% with fat). The value of aBMD average accuracy (relative error, ε) measured by DXA was -7.69% for w/o fat and 0.64% for with fat. Mean vBMD CV measured by QCT for all vertebral bodies was 0.21% for w/o fat condition and 0.65% for "with fat" condition. Maximum CV was determined for "L2 vertebra" (0.68% w/o fat). The value of mean vBMD average relative error (ε) was 2.65% for w/o fat and -1.31% for with fat condition.

Conclusion: The developed phantom based on K_2HPO_4 solutions with simulation of the fat layer was able to determine precision and accuracy of BMD measurements by DXA and QCT.

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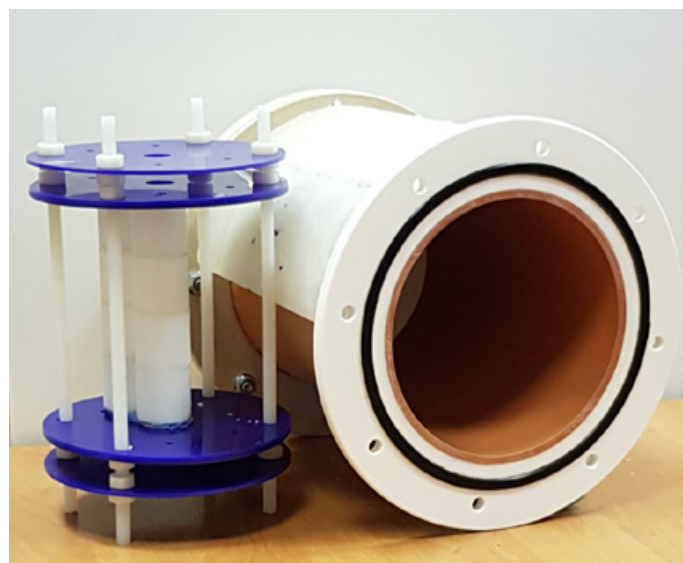
P769
COMPARATIVE STUDY CONCERNING QUALITY OF LIFE IN MEN AND WOMEN WITH SCAPULOHUMERAL PERIARTHRITIS

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Objective: Periarthritis of the shoulder joint is the most common cause of humeroscapular pain. The aim of the study was to assess quality of life in men and women with scapulohumeral periarthritis in different phases using SF-36 Questionnaire (36-Item Short Form Survey).

Methods: The study included 150 patients with scapulohumeral periarthritis, 75 men and 75 women, mean age 47.5 y (aged between18-77 y). Patients were investigated by clinical examination, radiological exam of the scapulohumeral joint, ultrasonography and MRI. During the study was used SF-36 questionnaire. Men and women were compared by age category: 18-27 y (n=8), 28-37 y (n=28), 38-47 y (n=34), 48-57 y (n=42), 58-67 y (n=22), 68-77 y (n=16).

Results: In the comparative study, the physical functioning domain in men with scapulohumeral periarthritis (38.4±10.04) was smaller than in women (41.5±5.89) (p=0.0225) and the mental health domain in men (50.8±11.31) was not much different from women (54.7±17.02) (p=0.1005). The results were statistically significant higher in men than in women for the next domains: physical role functioning (45.8±4.41 and 50.3±15.23; p=0.0151), bodily pain (45.8±13.86 and 50.3±4.2; p=0.0079), general health (46.6±9.85 and 50.8±9.12; p=0.0075), vitality (12.04±3.22 and 13.15±2.92; p=0.0285) and social role functioning (1.24±0.26 and 1.13±0.35; p=0.0305). There were no statistically significant differences between men and women with scapulohumeral periarthritis for the mental health (10.36±4.19 and 11.01±5.7; p=0.4275) and emotional role functioning (0.64±0.16 and 0.59±0.31; p=0.2165) domains.

Conclusion: In men with scapulohumeral periarthritis, comparative with female patients, physical functioning domains are the most impaired, while mental status is less affected; social activity domains are equally influenced by the disease.

P770
INTEGRATION OF A VERTEBRAL FRACTURE IDENTIFICATION SOFTWARE INTO A FRACTURE LIAISON SERVICE: A PILOT SERVICE IMPROVEMENT PROJECT

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Objective: Incidental vertebral fractures (VF) are associated with increased risk of future fractures and disability, but the majority remain undiagnosed. The integration of a specialist VF identification service based on machine-learning analysis into our fracture liaison service (FLS) was piloted.

Methods: Patients presenting for a CT scan of their chest/abdomen/pelvis, aged ≥50 y, over 3 months had their imaging concurrently analysed by Optasia Medical through reformatted sagittal spinal images to identify VFs. VFs identified were incorporated into the hospital radiology report and local FLS informed. A patient management algorithm was developed to risk stratify patients and target high-risk patients that would benefit from further FLS management in the context of high VF patient numbers identified without FLS resource expansion. Patients with VFs identified during this pilot with cancer, limited life expectancy, major trauma presentation, 1 or 2 'mild' fractures, and those under specialist osteoporosis services were not intervened by the FLS.

Results: A total of 4461 scans were analysed and 851 patients with VFs were identified. The average age was 70.9 y (50.2% female, 49.8% male). 58% of imaging had been performed as outpatients and the indication in the majority was to guide further cancer assessment and treatment. Each patient had an average of 2.1 VFs (range 1-13) with most being classified as 'mild' (39.6%) or 'moderate' (38.2%). 82.3% of the patients did not receive further intervention by FLS due to the pre-specified criteria. In those intervened, 10.1% were referred for GP assessment of osteoporosis risk (±DXA or further imaging), 3.8% were highlighted to the community osteoporosis team for review, 1.8% were referred for DXA by the FLS team, 0.5% were commenced on treatment by FLS and 0.3% were invited for review in FLS clinic.

Conclusion: It was feasible to integrate such a service to prospectively support better identification of VFs. Without FLS expansion, it was unable to cope with the increased workload. Targeted screening and clearer risk stratification would help FLS intervene in those that would most likely benefit. How this translates into increased medication prescribing and ultimately fracture risk reduction is uncertain.

P771
PERSONAL FRACTURE RISK AWARENESS AND VITAMIN D SUSTENANCE IN POSTMENOPAUSAL WOMEN

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Objective: To assess serum vitamin D (vitD) level and personal 10-y osteoporosis associated fracture risk in postmenopausal women.

Methods: Cross-sectional study included 110 postmenopausal women (median age 67; 25%-75%: 64-69). Inclusion criteria were: signed informed consent form, 5 years or more postmenopausal status. Chemiluminescent Immune "Liaison 25 OH Vitamin D Total Assay" kits were used to assess serum 25(OH)vitD level. Personal 10-y absolute fracture risk was calculated by FRAXÒ algorithm for Russia. Therapeutic intervention threshold and serum vitamin D level were assessed according to Russian Osteoporosis Association 2017 recommendations.

Results: Normal serum 25(OH)vitD level was found in 26 cases (23.6%), 25(OH)vitD insufficiency was detected in 35 persons (31.8%), and 49 patients (44.5%) had severe vitD deficiency. By the enrolment visit 90 of 110 persons (81.8%) were not receiving vitD supplementation (Group 1), 20 women (18.1%) were taking vitD with or without calcium (Group 2). Median serum 25(OH)vitD level was significantly (P=0.0001) lower in Group 1 (19.8 ng/ml) than in Group 2 (33.7 ng/ml). In Group 1 there were 34 persons who had exceeded FRAX treatment intervention threshold, while in Group 2 the threshold was exceeded in 16 of 20 cases (df=1; χ^2=11,766; p<0,001). All subject in Group 2 declared they had been previously informed of their personal fracture risk. In Group 1 all persons admitted they had been advised to initiate vitD supplementation but received no information on their personal fracture risk.

Conclusion: In advanced postmenopausal age, every 3 of 4 independently living women had moderate or severe vitD insufficiency and every other person had high 10-y fracture risk. Those who were receiving vitD supplementation had normal serum 25(OH)vitD level. Personal fracture risk awareness may be a strong motivation to increase compliance to osteoporotic fractures prevention treatment.

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P772
STRENGTHENING OF THE INTRA-ARTICULAR HYALURONIC ACID EFFECTS BY SODIUM SUCCINATE IN KNEE OSTEOARTHRITIS TREATMENT

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Objective: In OA hyaluronic acid (HA) normalizes the properties of the synovial fluid; has a chondroprotective effects; improves the signs of OA and function of the joints. Sodium succinate (the salt of the succinic acid) helps to normalize intracellular metabolism and tissue respiration in hypoxic conditions; normalizes acidic - alkaline balance; provides antioxidant defense - so is a promising compound for cartilage treatment. We aimed to study the clinical efficacy of hyaluronate and sodium succinate combination in knee OA treatment.

Methods: The study included 126 patients with knee OA exacerbation (stages I-II, mean age (54.3±2.7) y). All patients received standard OA treatment (NSAIDs, exercises, orthopedic devices) for 15 d; in addition to the standard treatment Gr.1 patients (58) consented for 5 intra-articular injections of 1.1% HA, stabilized with sodium succinate (2 ml, once a week) and patients of Gr.2 (68) – for 5 intra-articular injections of 1.1% of nonstabilized HA (2 ml, once a week). Evaluation of the results was performed at the beginning of the treatment and at week 6, 12 and 24.

Results: During the treatment all patients in showed positive changes in clinical signs and symptoms of OA which led to the lowering of the general WOMAC index (from (78.3±4.1) in Gr. 1 and (75.4±3.8) in Gr. 2 at the beginning of the study to (27.9±2.6) and (29 8±1.9) accordingly at week 12 (p<0.05 for both groups). The VAS score in both groups indicated a significant pain reduction, but the stability and duration of the clinical effect was different. In Gr.1, pain continued to decrease between week 12 and 24, whereas in Gr.2 there was no significant changes in further pain regression after week 6. The changes in Lisholm score were also significantly better in Gr.1 than in Gr. 2 (before treatment (21.7±4.6) and (22.6±5.3), (87.6±6.2) and (63.8±5.3) at week 24, p<0.05.

Conclusion: Adding of sodium succinate to HA (as intra-articular injections) allows to increase the treatment efficacy in knee OA early stages.

P773
PLASMA AGGRECAN LEVEL AND ITS CHANGES DURING TREATMENT IN PATIENTS AFTER KNEE TRAUMA AND IN ESTABLISHED POST-TRAUMATIC OA

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Objective: It is known that joints cartilage in OA has very low regenerative potential and aggrecan (A) (in plasma and joint fluid) is investigating as a marker of degenerative process in OA development and treatment. We aimed to study the level of aggrecan in plasma in early period after intra-articular knee trauma (KT) and in patients with established posttraumatic knee OA (PTOA) and its changes during treatment

Methods: The study was conducted in 2 groups of patients: 62 patients with established symptomatic knee PTOA (36.50± 2.38 y.o., disease duration 3.15±0.72 y, I-II R- stage) and 60 patients after KT (32.22±1.62 y.o., 20.15±1.72 days after MRI confirmed intra-articular knee trauma). Need in joint surgery, presence of other arthritidies or severe comorbidities were exclusion criteria. Patients in both groups received the course of standard treatment (2 weeks): NSAIDs, physiotherapy, exercises. In addition 32 patients in PTOA group and 30 patients in KT group consented to receive 3 intra-articular injections of the platelet autologous plasma (PAP). The level of A in plasma was determined by ELISA method at the beginning, in 6 and 12 months after treatment. All patients were recommended to write diary and register knee symptoms and NSAIDs use.

Results: Plasma aggrecan level in KT group was significantly higher, than in PTOA group ((7.97±1.18 ng/ml) vs. (4.2±0.49 ng/ml), p<0.05). Level of aggrecan was positively correlated with the level of joint pain (by VAS) and plasma CRP, and negatively correlated with the level of functional activity (by KOOS). Patients of both KT and PTOA groups who received the PAP injections demonstrated lower level of plasma A, faster decrease in pain, CRP level and better functional activity comparing to patients on standard treatment and had less need in NSAIDs use during the study. In PTOA patients at 6 and 12 months after course of treatment plasma aggrecan levels were lower in patients after treatment with PAP which led to less number of OA exacerbations during 12 months.

Conclusion: Aggrecan level in plasma reflects the level of cartilage degradation or traumatic destruction, correlates with functional disturbances, joint pain and inflammation intensity. Use of intra-articular PAP injections as an addition to the standard treatment promotes lowering of inflammation, cartilage loss and improves results of treatment after knee trauma and in established OA.

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P774
CAN A SPIRAL FRACTURE BE AN ATYPICAL FEMORAL FRACTURE? CASE REPORT

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Atypical femoral fractures (AFF) are rare types of fractures, which are associated with long-term treatment with bisphosphonates and denosumab. These fractures affect the femur between the subtrochanteric and supracondylar area of the femur and have a transverse fracture line through the lateral cortex and the fracture toward the medial cortex is transverse or oblique and may end in a spike on the medial end. Revised ASBMR criteria from 2013 are used to diagnose an atypical femoral fracture and 4 of the 5 major criteria must be fulfilled. The case of the female patient with postmenopausal osteoporosis who is being treated long-term with bisphosphonates and denosumab and suffered a spiral fracture of the left femoral shaft, which fulfilled 4 of the necessary ASBMR criteria of an atypical femoral fracture.

Case report: A 72-year-old female patient with postmenopausal osteoporosis manifested in bilateral distal forearm fractures was treated for 7 y with bisphosphonates (2 y alendronate, 5 y ibandronate). However, a fracture of the surgical neck of the humerus occurred for which reason there was an unsuccessful attempt to change treatment to strontium ranelate to which she was intolerable. Treatment with denosumab subsequently started. After 1.5 y, patient fell on level ground and suffered a spiral fracture of the left femoral shaft. It was evaluated as an osteoporosis fracture and the denosumab treatment continued. After 2 y, she fell again on level ground and subsequently suffered an oblique fracture of the proximal femoral shaft that completely fulfills the criteria of an atypical femoral fracture. The previous spiral left femoral fracture was additionally reviewed. Since it was a non-comminuted fracture, the fracture line in the lateral cortex was transversal, there was a presence of the thickening of the lateral cortex and medial spike, the 4 essential criteria for an atypical femoral fracture were fulfilled and the denosumab treatment should have been terminated.

This is the first published case of an atypical femoral fracture with spiral fracture line. Since the spiral fracture is not a specific radiological image, the possibility of an atypical femoral fracture is not generally considered.

P775
HEMATOLOGICAL PARAMETERS AS POTENTIAL MARKERS OF LOW BONE MINERAL DENSITY IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Objective: Neutrophil to lymphocyte ratio (NLR) and platelet to lymphocyte ratio (PLR) are the markers of systemic inflammation, but the data is scarce about their relevance as the markers of low BMD in patients with systemic lupus erythematosus (SLE). We aimed to investigate the correlation of NLR and PLR with BMD in patients with SLE.

Methods: Our cross-sectional study involved 105 patients with SLE hospitalized in the Clinic of Rheumatology, Institute Niška Banja, in whom the diagnosis was established based on the revised ACR criteria from 1997. BMD measurements at the level of lumbar vertebrae L1-L4 and hip was done using the method of DXA, and BMD values were expressed in g/cm^2. NLR and PLR were determined in all the patients.

Results: The studied group had 89.5% of women and 10.5% of men, aged on the average 45.0±10.5 y. The average disease duration in the studied group was 10.3±8.3 y. Normal BMD was found in 25.7% of patients, osteopenia in 62.9%, and osteoporosis in 11.4% of patients. SLE patients with osteoporosis had higher NLR and PLR levels than those with normal BMD (p<0.01).There was a negative correlation of NLR with BMD values at the level of vertebrae L1-L4 (r=-0.231, p<0.05), but there was not any correlation with BMD values at the hip level. PLR in SLE patients did not demonstrate any correlation with BMD values, either at the vertebrae or the hip level.

Conclusion: Neutrophil to lymphocyte ratio can be a predictor of low BMD in patients with systemic lupus erythematosus.

P776
BONE MINERAL DENSITY AND OSTEOPOROSIS IN THE LUNG TRANSPLANT CANDIDATE

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Objective: Lung transplant candidates are a unique population with potential metabolic bone disease that has not been well-characterized. Osteoporosis has not been well defined, and it is unknown whether trabecular bone score (TBS) offers increased information over standard T-scores.

Methods: We reviewed DXA studies of patients who were listed for lung transplantation from April 2019 to December 2019. Demographics, T-scores, TBS, calcium, phosphorus, vitamin D 25 were reviewed.

Results: 55 studies were reviewed, 38 males and 17 females. 19 patients were Hispanic, 12 Black, 14 White and 10 Asian. Almost all had been on glucocorticoids. There was no documented bone modulator treatment. Vitamin D 25 was 28±1.8 ng/ml. 16 patients received a lung transplant within 6 months after the DXA study. When compared, males and females showed no differences in age, chemistries and vitamin D 25. The prevalence of osteoporosis at the lumbar sacral spine (LSS), as defined by t-scores <-2.5, was 20% by standard t-score and 35% by TBS. Females exhibited lower t-scores at the hip. Both TBS and LSS scores were lower in females (TBS: -1.71±1.5 vs. -2.6 ±1.7 p<0.43;

LSS: -0.774±1.7 vs. -1.78 ±1.6 p<0.43, male vs. female). TBS, LSS, hip t-scores were not different across the ethnic groups. Forearm t-score was significantly different in the Hispanic vs. Black groups (-0.950±0.45 vs. +0.592±0.26, p<0.047).

Conclusion: Lung transplant candidates may have decreased BMD as measured by t-scores and TBS. That TBS was lower than LSS t-scores suggests that TBS may add useful information in diagnosing and treating osteoporosis in this vulnerable population.

P777
PSEUDOHYPOPARATHYROIDISM IN ADULTS: RESULTS FROM THE RUSSIAN HYPOPARATHYROIDISM REGISTRY

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Objective: Pseudohypoparathyroidism (PHP) is a rare endocrine disorder, characterized by low serum calcium due to resistance to the action of PTH. This study aims to evaluate adult patients with PHP among subjects referred for specialized care due to hypocalcemia.

Methods: The Russian registry database of consecutive adult patients with chronic hypoparathyroidism referred to our clinic was analyzed over 2 y (2017-2019).

Results: Overall, 6 adult patients (3%) with PHP out of 200 registered subjects with hypoparathyroidism were identified during the entire period. The female-to-male ratio was 1:1 (3 female and 3 male) and the mean age of patients at baseline evaluation was 26±7.22 SD years; 28 y±8.71 SD for female, and 25±7.02 SD y for male. The evaluation of the etiology showed that 5 cases of PHP were associated with PHP type 1a, confirmed by genetic testing, and 1 patient suffered from PHP type 1b. In the reported cohort all patients had clinical signs of hypocalcemia. Regarding biochemical data: the levels of serum calcium were under 8.5 mg/dl and all patients had symptoms of hypocalcemia at baseline evaluation. The level of serum phosphate was available for 5 patients; among these in 3 patients it was within the reference range, and in two patients phosphate was over 4.9 mg/dl. PHP patients did not show hypercalciuria. The level of serum magnesium was available for 1 patient (1.43 mg/dl). The level of 25 hydroxyvitamin D was available for 2 patients and was above 30ng/ml. DXA was performed on 3 patients, and demonstrated normal to high values and a low bone turnover profile. Cranial computed tomography was performed on 4 patients and basal ganglia calcifications were reported in all cases. All patients received treatment: the mean doses of calcium and alfacalcidol supplementation were, respectively, 2.6±1.29 g/d and 2.4±0.54 μg/d; cholecalciferol was additionally taken in 3 cases (1066±832 UI/d)]. Two patients needed large amounts of calcium supplementation (>2.5 g).

Conclusion: Up to 3% of adult patients with hypoparathyroidism referred to specialized care suffered from PHP and the majority of these patients had basal ganglia calcifications before the age of 30. PHP should be considered among patients with hypocalcemia and more effective treatment for these young patients needs to be developed.

P778
PARTICULARITIES OF SARCOPENIA IN PERIPHERAL ARTERIAL DISEASE

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Objective: To evaluate the association of sarcopenia and its impact on patients with peripheral arterial disease (PAD).

Methods: We conducted a prospective observational study, between January-June 2019. Were included 30 successive patients, admitted to the Clinic of Vascular Surgery from Emergency Clinical County Hospital Târgu Mureș, presenting PAD, respectively sarcopenia. Patients were divided into two groups (PAD and sarcopenia and PAD only) and were examined clinically and paraclinically (blood glucose, LDL cholesterol values) and we followed if there is a correlation between the presence or absence of sarcopenia and PAD and the correlation of the various clinical and paraclinical parameters.

Results: The mean age was 66.2±9.82, with a minimum of 42 y respectively a maximum of 87 y. Most patients were in the 6th decade of life. Old age is a factor in the occurrence of sarcopenia in patients with PAD (p<0.0001, Mann-Whitney U test). The occurrence of PAD is not directly influenced by the presence or absence of sarcopenia (p 0.8807, test χ^2). The onset of sarcopenia is not directly influenced by the presence of high blood sugar levels (p 0.1750, Mann-Whitney U test). We cannot say the same about high levels of LDL-cholesterol, since higher values were observed in patients with sarcopenia (p 0.0123, Mann-Whitney U test).

Conclusion: Sarcopenia is a growing disease worldwide. The diagnosis of this condition is difficult to make, and the management and treatment of patients with sarcopenia is not an exact one. We have shown in this study that the age of patients diagnosed with PAD plays a role in the appearance of sarcopenia. The occurrence of PAD is not directly influenced by the presence or absence of sarcopenia, a fact demonstrated by the comparison of the two groups of patients, where there was no statistically significant difference. However, sarcopenia may be associated with changes in lipid metabolism and may be related to a possible specific evolution of lipids, since the highest values of LDL cholesterol have been identified in patients with sarcopenia.

P779
VITAMIN D DEFICIENCY AND LOW GERIATRIC NUTRITIONAL INDEX SCORES ARE ASSOCIATED WITH SIMULTANEOUS UPPER LIMB FRACTURES IN WOMEN WITH HIP FRACTURE: A CROSS-SECTIONAL STUDY

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Objective: To investigate the factors associated with concomitant upper limb fractures in older women who sustained a fall related fracture of the hip.

Methods: We investigated 858 women admitted to our rehabilitation ward following a fall-related hip fracture. We evaluated 25-hydroxyvitamin D levels by an immunoenzymatic assay. For each patient we calculated the Geriatric Nutritional Risk Index (GNRI) score.

Results: In the 41 women with a simultaneous upper limb fracture both GNRI scores and 25-hydroxyvitamin D levels expressed as median (interquartile range) were lower than in the 817 women with isolated hip fractures: GNRI=85.9 (80.6-94.1) vs. 90.3 (83.4-98.0), P=0.021; 25-hydroxyvitamin D=7.0 ng/ml (4.1-12.2 ng/ml) vs. 9.3 ng/ml (5.0-16.0 ng/ml), P=0.017. After adjustment for age, height, PTH, femoral-neck BMD, cognitive impairment, neurologic impairment and type of hip fracture we confirmed that both GNRI scores (P=0.008) and 25-hydroxyvitamin D levels (P=0.016) were associated with simultaneous fractures at the upper limb. The adjusted odds ratio for sustaining concomitant fractures was 3.88 (95%CI 1.33-11.31, P=0.013) for the 190 women from the highest-risk GNRI class (GNRI <82) vs. the 213 women from the lowest-risk group (GNRI >98) and it became 4.34 (95%CI 1.51-12.46, P=0.006) for the 114 women who had both a GNRI score <82 and 25-hydroxyvitamin D levels below 12 ng/ml vs. the 255 women with GNRI ≥82 and 25-hydroxyvitamin D ≥12 ng/ml.

Conclusion: Data shows that both 25-hydroxyvitamin D levels and GNRI scores were significantly lower in the subgroup of women with hip fracture and concurrent upper-extremity fracture than in the controls with isolated hip fracture. Although caution is needed due to the cross-sectional design of the study, we suggest that vitamin D depletion and poor nutrition may have a role in the genesis of the concurrent fractures related to a single fall.

P780
NEW CASES OF OSTEOPOROSIS AND TYPICAL LOCALIZATIONS FRACTURES REGISTRATION FREQUENCY IN THE SVERDLOVSK REGION DURING YEARS 2016-2018

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Objective: To assess frequency of new cases of osteoporosis and typical fractures registration in the Sverdlovsk region, the Russian Federation, during the period of 2016-2018.

Methods: Sverdlovsk Regional Medical Information and Analysis Center (MIAC) database was used to investigate the number of postmenopausal osteoporosis primary diagnosis (ICD X codes M80-M81). Also the number of registered fractures of forearm bones (S52), ribs, sternum and thoracic spine (S22), hip (S72) was assessed.

Results: Within the year of 2016, 2017 and 2018 there were 1093, 1029 and 961 new cases of postmenopausal osteoporosis registered. There were 11397, 12485 and 10656 cases of forearm bones fractures registered, respectively. Also 3131, 2184 and 2296 hip fractures occurred within the period of 2016, 2017 and 2018. There were respectively 6643, 4657 and 4499 cases of ribs, sternum and thoracic spine fractures registered.

Conclusion: In the Sverdlosk region the number of registered cases of vertebral and peripheral bone fractures typical for osteoporosis is significantly higher than the number of new cases of osteoporosis. Current registration rules do not allow to assess the fracture causal trauma intensity, as well as an accurate indication of the exact location of the fracture. Meanwhile, the presence of low-traumatic fractures of the distal forearm, vertebral bodies, proximal femur and humerus, according to current clinical recommendations, allows for the diagnosis of osteoporosis in patients with risk factors, regardless of the availability of bone densitometry and its results. The registration of fractures is based on data provided by the MIAC by trauma service institutions, while the registration of new cases of osteoporosis is based on information received mainly from specialized osteoporosis centers, as well as from rheumatologists, endocrinologists and, to a lesser extent, outpatient clinics general practitioners. These data confirm the lack of continuity between traumatologists, primary care physicians and tertial osteoporosis clinics specialists in the management of patients who have had fractures. The number of registered fracture cases reported to be typical for osteoporosis, remains stable during the 3 y of monitoring. The number of the fractures discussed is significantly higher than the quantity of registered newly diagnosed osteoporosis cases. Thus, this discrepancy confirms the need to create a comprehensive Fracture Liaison Service to optimize secondary fracture prevention in the Middle Urals.

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P781

ACCURATE DOCUMENTATION OF FRACTURES: AN IMPORTANT ELEMENT IN DESIGNING COST-EFFECTIVE CARE PLANS AND PREVENTION

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Objective: As the population ages, the risk for fractures increases with high healthcare and social costs. The objective of the study was to identify the fractures type, causes, the gender most affected and documentation by nursing staff.

Methods: This is an observational study carried out from September to November 2019 in Vlore Regional Hospital Albania. In addition, information for the causes and documentation of cases was obtained from patient records. The study included all cases with fractures presented in the surgery ward during the study period, a total of 71 cases. A descriptive statistic was used to analyze the data.

Results: Of 71 cases presented, 45 cases were men. The average age of people with fractures was ≥60 years old and hip fracture was more frequent. November had the highest number of cases, n=33. The main causes for the fractures were falls, slips and visual impairment in the elderly. There were identified deficiencies in the documentation regarding the causes, risk factors, progress in hospital and condition at the time of discharge. For most patients, the hospital stay was up to 10 d.

Conclusion: Fractures present a serious health problem for the adult population. Accurate and complete documentation of the cases by the nursing staff especially for the causes, risk factors, and nursing plan care will help design effective preventive and care interventions reducing fractures and costs associated.

P782

A NURSE-DELIVERED FRACTURE RISK ASSESSMENT FOR PATIENTS WITH INFLAMMATORY RHEUMATOLOGICAL CONDITIONS IN PRIMARY CARE: A MIXED-METHODS STUDY

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Objective: This study investigated the feasibility and implementation of the FRAX component of the INCLUDE (INtegrating and improving Care for patients with infLammatory rheUmatological DisordErs) review.

Methods: Semistructured interviews were conducted with 20 patients, 2 INCLUDE nurses and 3 general practitioners (GPs) and audio recorded; 24 patients had their INCLUDE review audio-recorded for fidelity checking. Extracts relating to fracture risk assessment were, transcribed and anonymised. Analysis was conducted using the Theoretical Domains Framework (TDF) allowing for exploration of behaviours and associated barriers and enablers to implementation of FRAX.

Results: FRAX was appropriately calculated for 22/24 patients. Nurses reported confidence in undertaking FRAX assessments. Barriers to implementation, related to TDF domains of knowledge, skills, professional roles and environmental context. GPs reported difficulty in keeping up to date with osteoporosis guidelines and voiced differing opinions about who should conduct fracture risk assessments. Lack of integration of FRAX into GP IT systems was a barrier to use. GPs and nurses had differing views about the nurse role in communicating risk: although nurses explained the reason for calculating FRAX, explanations of the result were limited. Analysis of patient interviews revealed limited understanding of the meaning of FRAX and the subsequent review outcome.

Conclusion: Assessment of fracture risk in the context of the INCLUDE review consultation was feasible as nurses correctly calculated FRAX in 22/24 consultations. However, communication of the results and implication of FRAX assessment was limited. Barriers to implementation include beliefs about professional roles, knowledge of clinical guidance and the practicalities of conducting the assessment.

P783

POINT OF CARE FRACTURE PREDICTION FOR OSTEOPOROSIS USING A CONICAL SHELL X-RAY BEAM

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Objective: Osteoporosis is a significant and escalating worldwide healthcare burden with a high demand for accurate medical diagnostics. Unfortunately, current diagnostic tool, DXA, which measures BMD, is not without limitations and arguably a poor predictor of fracture. The National Osteoporosis Risk Assessment showed that 82% of postmenopausal women with fractures had bone of 'normal' BMD. Our work tackles the development of a new clinical

instrument to predict osteoporotic fractures within an individual that is looking into bone chemistry via X-ray diffraction and bone microarchitecture via digital tomosynthesis.

Methods: Previous work has shown successful discrimination between osteoporotic and nonosteoporotic trabeculae bone specimens using IR spectroscopy, X-ray diffraction (XRD) and µCT [1]. Current work utilises an innovative beam topology, focal construct geometry, to acquire high intensity XRD profiles and sparse-sampling digital tomosynthesis data from osteoporotic and nonosteoporotic bone specimens. This is achieved by measuring a sporadic sequence of ring-shaped projections collected during a two axes translational scan. A virtual environment, McX-trace, has been employed to assist experimental work.

Results: Simulations have informed the development and construction of a preprototype platform, which is being used to investigate various microarchitectural parameters of osteoporotic and nonosteoporotic bone samples. Sporadic sampling digital tomosynthesis has shown that projections using only 10% sampling may be used to construct optical sections with a relatively small degradation in image fidelity, achieving a 90% potential reduction in X-ray dose coupled with a reduction in scan time.

Conclusion: Successfully discrimination between osteoporotic and nonosteoporotic bone specimens based on their physico-chemical changes and microarchitecture. PICUP preprototype combines two modern techniques for point-of-care high accuracy fracture risk prediction in low exposure times.

Reference: 1. Greenwood C et al. Bone 2016;93:55.

P784
IBANDRONIC ACID AND SEQUENTIAL BILATERAL ATYPICAL FEMORAL FRACTURES WITHIN A MONTH

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Case report: A 77-year-old patient was admitted with a fall; She was in a farm shop and tripped. She felt and heard a snap and experienced severe pain. Her medical history included osteoarthritis and osteoporosis. She had no other falls in the previous six months, however she had bilateral knee pain radiating up the thighs for the previous two years. She was started on oral ibandronic acid 150mg once monthly when she was 55. She was compliant and continued on ibandronic acid for 22 y, apart from one year of a drug holiday in the middle. On admission: Her full blood count, kidney and liver functions and calcium were normal.

X-ray showed right midfemur transverse fracture (Fig R femur) most likely ibandronate related. Also there was cortical thickness in the mid-shaft of the left femur (Fig L femur 1) IMN was done and the postoperative period was uneventful and she was discharged.

A month later she was walking in her kitchen, turned and fell. She gave an almost identical description of her fall; she said that when she hit the floor she "felt and heard a snap as if a branch has been broken". She was unable to weight bear and was taken to ED. X-ray showed left midfemur transverse fracture (Fig L femur 2).

Atypical femoral fracture is a rare side effect of bisphosphonates, with an incidence between 1 in 1000 to 1 in 10000. It can be related to the dose or duration of therapy or other still unknown factors. The fracture can occur with no or low-energy trauma. It is usually subtrochanteric or diaphyseal, with the proximal fracture line under the lesser trochanter and distal fracture line above the femoral condyles. The fracture may be preceded by thigh or groin pain, which may imply a stress fracture. Cortical thickening is an early sign of bisphosphonate related fractures. Other characteristic features of bisphosphonate related fractures include transverse or slightly oblique fracture line. The fracture could be complete, crossing from one cortex to the other, with or without a medical cortical beak or incomplete fracture (or fissure) involving only the outer cortex. Fractures are noncomminuted.

Patients on bisphosphonate therapy should be advised and asked about thigh or groin pain, and if present should be assessed for the possibility of atypical femoral fractures. Both femurs should be x-rayed.

Right Femur

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Left Femur 1

Left Femur 2

P785
RISK OF FRACTURE: IMPORTANCE OF PROTEIN INTAKE

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Objective: To examine the association between protein, calcium and vitamin D (VD) consumption and its relationship with fragility fractures in postmenopausal women >50 yo.

Methods: We evaluated 489 postmenopausal women who attended a community activity at a University Hospital in Buenos Aires to evaluate osteoporotic risk. All the participants answered a questionnaire about history of osteoporotic risk factors, fragility fractures, chronic diseases, use of medication and daily intake of protein, calcium and VD, along with calcium and/or VD supplementation. The evaluation also included anthropometric measurements (height, weight and waist circumference). Daily intake was established as a percentage of amounts of the nutrients advised by the Institute of Medicine for Recommended Dietary Allowance: protein intake >1 g/kg of weight, calcium 1200 mg/d and vitamin D 15 µg/d. Statistical analysis was performed using SPSS 20.0, p<0.05 was considered significant.

Results: The mean age of the participants was 63.8±9.1 yo. (range: 50-96). A total of 77 fragility fractures was reported by 71 patients (14.5%), the most frequent being the wrist fracture (55.7 %); 5 women reported femur fracture and 3, vertebral fracture. Fractured women were older than nonfractured women (66.7±8.3 vs. 63.3±9.1, p<0.001). No differences were found in BMI, waist circumference, early menopause, chronic diseases or corticoid therapy between both groups. Regarding the food survey, we noted that calcium (890.7± 640.2 mg/d) and vitamin D (3.8±2.5 µg/d) intakes - both through diet and supplementation- were lower than the international recommendation, but similar in fractured and non-fractured women (788.2±562.4 vs. 909.3±652.3 mg/ of calcium, and 3.5±2.67 vs. 3.9±2.55 ug/d of vitamin D, respectively, p=ns). However, we found that protein intake in the fractured group was significantly lower than that in non-fractured women (101.4±59.5 vs. 123.6±67.2% of normal intake, p=0.017).

Conclusion: Although the relationship between protein intake and risk of fractures is still controversial, we concluded that dietary protein consumption should be considered an important factor for bone health.
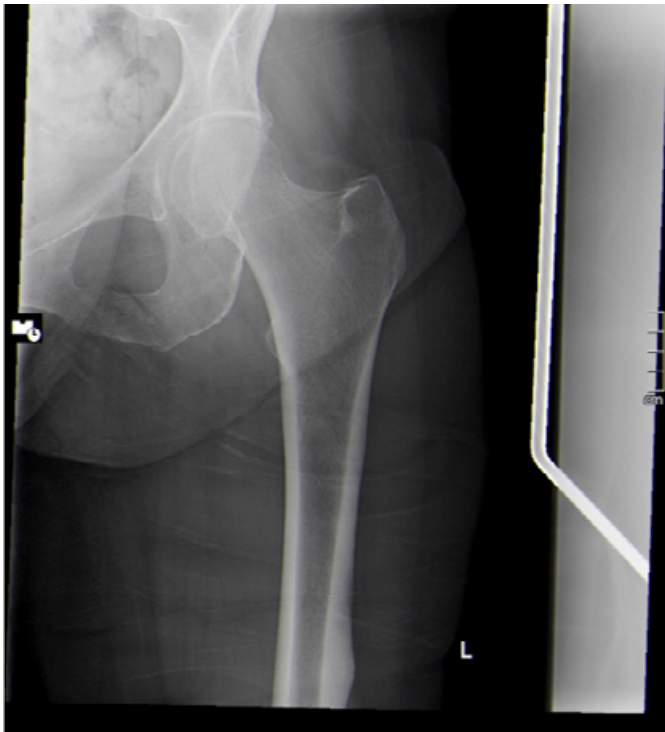
P786
HAND GRIP STRENGTH IN POSTMENOPAUSAL ARGENTINEAN WOMEN

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Objective: To evaluate age distributions and cut-off values of hand grip strength (HGS) in postmenopausal women >50 yo.

Methods: We included 704 women (66.4±8.6 yo) who attended a community activity to evaluate osteoporotic risk and muscle health in a University Hospital in Buenos Aires. All the participants answered a questionnaire about history of osteoporotic risk factors, chronic diseases, malignancy, use of medication, fragility fractures and falls in the previous year. The evaluation included anthropometric measurements (height, weight and waist circumference) and the hand grip strength by the Baseline Analogue Hand Dynamometer. The participants were seated, with their elbow by their side and flexed to a right angle of the dominant arm and a neutral wrist position. We documented the better of two trials. Women with arthritis or hand pain were excluded. To determine a cut-off value for HGS, a healthy subpopulation of the participants was selected: women <65 yo without diagnosis of diabetes, kidney disease, malignancy, corticoid therapy, malnutrition or BMI <18.5 and/or use of statins (n=148). The lower quintile point of the HGS values was used as cut-off. Statistical analysis was performed by SPSS20.0, p<0.05 was considered significant.

Results: The mean HGS for the whole group was 20.32±5.23 kg, with a significant decrease according to age after 70 (table1) with respect to the group aged 50-54 yo. The mean HGS in the healthy group was 22.08±5.13 kg. The results were divided by quintiles: 17.5, 20.6, 23.8 and 26.2 kg, quintiles 1 to 4, respectively. We established a cut-off value of hand grip strength of 17.5 kg. This cut-off value was associated with a higher risk of falls (OR: 1.64, CI: 1.18-2.28, p=0.002).

Conclusion: This study provides data of hand grip strength in a sample of women from Buenos Aires. In the absence of international normative reference values for hand grip strength, we could propose the use of this cut-off value for clinical use in the screening of sarcopenia in our country.

Table 1. Distribution of hand grip strength values according to age in postmenopausal women

age	n	HGS Media±SD (kg)	range	p
50-54	72	21.6±4.5	8.1 - 30.9	
55-59	79	19.9±5.1	5.1 - 31.45	0.029
60-64	150	21.6±5.53	8.2 - 37.8	0.33
65-69	157	21.1±5.1	5.4 - 38.9	0.36
70-74	109	19.7±4.7	7.8 - 32.7	0.007
75-80	83	18.6±4.7	5.1 - 27.8	<0.0001
>80	56	17.3±5.1	5.2 - 30.4	<0.0001

P787
NEW ONSET OF VERTEBRAL FRACTURES DURING TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS AS DIAGNOSTIC CHALLENGE: CASE REPORT

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Objective: We summarized clinical course, diagnostic procedures and clinical dilemmas during treatment of postmenopausal osteoporosis with complications - new onset of vertebral fractures.

Methods: Female patient, age of 70, menopausal age of 48, with previous radius fracture five years ago, diagnosed with postmenopausal osteoporosis 3 y ago, at age of 67, when she came to our clinic because of back pain and vertebral fracture v Th 12 seen on MR. She had no other chronic diseases.

Results: At the time of diagnosis of postmenopausal osteoporosis laboratory tests were normal. MR diagnosed vertebral fracture v Th 12, with 30% reduction in height, without bone infiltrative changes. We performed DXA- spine BMD 0.745 g/cm^{2} T-score -3,3, total hip BMD 0.810 g/cm^{2} T score -2.2. We prescribed painkillers and started treatment with oral bisphosphonates (ibandronate 150 mg/month), and vitamin D. After few months she felt no pain any more, and turned back to everyday activities. Usual laboratory tests were performed annually –normal, control markers of bone metabolism showed satisfactory suppression after two years, and BMD improvement, measured by DXA. Suddenly, nearly 3 y after diagnosis, during treatment, she came again with new onset of intensive back pain. RTG showed new vertebral fractures of Th 8 and v L1. Laboratory tests were performed and showed abnormal sedimentation rate and mild anemia, MR showed the consequences, chronicity and consolidation of fractured v Th 12 and reduction in height for 70% of vertebrae Th 8 and vL1, both with signs of bone marrow edema. Further examinations revealed radiological changes on skull and pelvic bones. We ruled out other diseases, and referred our patient to hematologist who confirmed multiple myeloma and started treatment.

Conclusion: Although onset of new osteoporotic fractures do occur during treatment, other diseases should always be considered, and in that case, we recommend additional tests, as case of or patient showed.

P788
LONG-TERM BIOAVAILABILITY OF THREE DOSES OF INTRAMUSCULAR VITAMIN D2

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Objective: Vitamin D supplementation is necessary to enhance the efficacy of antiosteoporotic drugs and intramuscular (IM) ergocalciferol (D_2) is commonly used for correcting vitamin D deficiency in some developing countries. However, the long-term bioavailability of IM administration of D_2 remains unclear. In the present study, we sought to determine long-term bioavailability of three single doses of D_2 in Chinese healthy adults.

Methods: 40 healthy volunteers with hypovitaminosis D received an IM single dose of 200,000, 400,000 or 600,000 IU D_2 or no treatment (NT). Levels of serum 25-hydroxyvitamin D_2 [25(OH)D_2] and 25-hydroxyvitamin D_3 [25(OH)D_3] were measured by LC-MS/MS. Vitamin D binding protein (DBP) and intact PTH (iPTH), bone turnover markers (BTMs), serum and urinary calcium were also measured.

Results: The average baseline of total 25-hydroxyvitamin D [25(OH)D] was 12.7 ng/mL. 25(OH)D_2 increased gradually from 2-8 weeks and then maintained a plateau for 12 weeks before falling at the 24-week follow-up in all treated groups, with median increase of 5.0 ng/mL of 25(OH)D_2 per 200,000 IU D_2. Although the intramuscular D_2 reduced endogenous 25(OH)D_3 levels in a dose dependent manner, the total 25(OH)D levels increased after each dose of intramuscular D_2. Levels of iPTH decreased in all dose groups. However, there were no significant differences in serum/urinary calcium and BTMs as well as DBP among groups.

Conclusion: Vitamin D deficiency in Chinese adults can be corrected by intramuscular D_2 at a dose of 600,000 IU and the sustained level of 25(OH)D maintains over 6 months. Moreover, large-doses of intramuscular vitamin D_2 reduce iPTH and endogenous 25(OH)D_3 levels.

P789
CAM AND/OR PINCER MORPHOLOGY HAVE FEW EFFECTS ON CROSS-BODY LUNGE BIOMECHANICS

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Objective: To compare triplanar hip and pelvis biomechanics during the stance phase of the cross-body lunge in individuals with and without cam and/or pincer morphology (CPM). **Methods:** 33 participants were recruited from an ongoing cohort (the Investigations of Mobility, Physical Activity, and Knowledge Translation in Hip Pain (IMPAKT-HIP) study) and were divided into 3 groups: CPM and hip pain (n=9): CPM+; CPM and no hip pain (n=13): CPM-; and no CPM or hip pain (n=11): controls. All participants attended a single biomechanical analysis session where the 45° cross-body lunge was performed (with their study limb as the lead limb) at a self-selected speed and distance. Hip and pelvis sagittal, frontal, and transverse plane excursions (difference (°) between peak minimum and maximum angles) during the stance phase of the cross-body lunge were assessed. One-way analyses of variances (ANOVAs) were used to calculate between-group differences, and Tukey-Kramer post hoc tests were run if the omnibus tests were significant. Welch's ANOVA and Games-Howell post hoc test were used if homogeneity of variance was violated. An alpha level of 0.05 was used for all comparisons. **Results:** No statistically significant between-group differences were found in hip kinematics or pelvis transverse plane excursion, apart from pelvis sagittal and frontal plane excursions. Specifically, sagittal plane excursion was significantly larger (p=0.026) in the CPM+ group (22.9°±9.4°) compared to the CPM- group (15.3°±4.1°), while frontal plane excursion was significantly larger (p=0.015) in the CPM+ group (9.6°±3.2°) compared to the control group (6.2°±2.4°). **Conclusion:** Pelvis and hip kinematics during the cross-body lunge were similar between groups, further demonstrating that CPM has a minimal effect on dynamic movement biomechanics. However, because statistically significant differences were found in pelvis sagittal and frontal plane excursions, future research should continue to examine the pelvis' role during lunge performance. **Acknowledgements:** This work was supported by the Arthritis Society of Canada [SOG-15-297]; and the Natural Sciences and Engineering Research Council of Canada [RGPIN-2014-05246]. The IMPAKT-HIP study was supported by the Canadian Institutes of Health Research [PAF-107513].

P790

INDIVIDUALS WITH CAM AND/OR PINCER MORPHOLOGY AND NO HIP PAIN HAVE SMALLER PASSIVE HIP FLEXION RANGE OF MOTION AND LARGER PASSIVE HIP EXTENSION RANGE OF MOTION THAN HEALTHY CONTROLS

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Objective: To compare triplanar passive hip range of motion (ROM) between individuals with and without cam and/or pincer morphology (CPM). **Methods:** Participants for this study were recruited from the Investigations of Mobility, Physical Activity, and Knowledge Translation in Hip Pain (IMPAKT-HIP) study, where data were collected from 32 individuals: CPM and hip pain (n=8): CPM+; CPM and no hip pain (n=13): CPM-; and no CPM or hip pain (n=11): controls. During a single session, passive hip flexion, extension, adduction, abduction, internal rotation, and external rotation ROM were assessed using a manual goniometer. Flexion, adduction, and abduction were assessed in supine, while extension, internal rotation, and external rotation were assessed in prone [1]. Three values for each motion were recorded to calculate mean ROM. One-way analysis of variance (ANOVA) was run to calculate between-group differences, with Tukey-Kramer as a post hoc test. Welch's ANOVA and Games-Howell post hoc test were run if homogeneity of variance was not met. An alpha level of 0.05 was used for all comparisons. **Results:** Passive hip flexion ROM (107.1°±8.6° vs. 116.8°±9.4°; p=0.043) was significantly smaller in the CPM- group compared to the control group, and passive hip extension ROM (25.2°±5.8° vs. 18.8°±4.4°; p=0.012) was significantly larger in the CPM- group compared to the control group. Passive hip abduction ROM was significantly smaller (p=0.009) in the CPM+ group (31.8°±9.5°) compared to the control group (43.9°±9.3°). No other statistically significant between-group differences were found. **Conclusion:** This was the first comparison of ROM in a population-based cohort with these three groups. Significant findings in passive hip flexion and extension ROM in the CPM- group provides novel insight into this population's clinical presentation. However, larger sample sizes are needed to confirm these results.

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P791

RESULTS OF AN ORTHOGERIATRIC UNIT IN LATIN AMERICA: FIRST YEAR OF WORK IN SOUTHWEST COLOMBIA

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Objective: Hip fractures in the elderly cause disability and mortality. Orthogeriatric units have been shown to improve the quality of care and reduce mortality[1]. In the University Hospital of the Valley in Cali, Colombia, hip fractures have represented in the past, a case of daily admission to the emergency department, prolonged hospital stays and increased mortality[2], which is why since 2017, an Orthogeriatric unit (conformed by orthopedics, geriatrics, physical therapy, psychology, nutrition and social work), which seeks to reduce complications associated with the fracture and lead patients to a safe perioperative period.

Methods: This was a descriptive study of characteristics of people over 60 admitted for hip fracture to the Orthogeriatric unit, from June 2017 to June 2018.

Results: In one year, 287 patients were treated, mostly women (70%), average age 81.7 (7.7) years. The most frequent pathologies were: High blood pressure, osteoporosis and diabetes mellitus. A quarter reported osteoporosis in the past and one in five patients had previously suffered a fragility fracture, however none of them previously received treatment for osteoporosis. A third of the patients were independent, half of them admitted to a mild dependence for self-care activities and altered their instrumental activities of daily life. The most frequent geriatric syndromes were: fragility (47.1%), sarcopenia (41.3%), polypharmacy (23.8%), malnutrition (22.6%) and dementia (14.2%). Extracapsular fractures were more frequent (73.2%). The patients were operated at 4.3 (±3.8) d after admission, and the hospital stay was 9.97 (±23.5) d. Eighteen patients were not taken to surgery, due to their poor functional status and/or mortality. Of those operated, 10.1% presented postoperative complications such as anemia, respiratory distress and hypotension. There was 11.7% mortality due to cardiovascular, respiratory failure and acute myocardial infarction. The nonoperated patients died from respiratory failure, cardiovascular and sepsis. Most of the patients discharged from the unit returned home

Conclusion: This unit is the first in the southwest of Colombia, in our first year of work we treated patients, in functional dependence, fragile, with sarcopenia and malnutrition. The time to surgery, the hospital stay was less than the reference of hospital[2], however, they are superior to national[3] and international references[4], very possibly related to the characteristics of our patients. When compared to other studies, mortality was higher[1,2]. We believe that other analyzes should be performed.

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P793
FRACTURE LIAISON SERVICE SIGNIFICANTLY IMPROVE MANAGEMENT OF OSTEOPOROSIS IN TERTIARY REFERRAL CENTER, MALAYSIA

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Objective: Fragility fractures are a major cause of morbidity and mortality across the world. Patient who had fragility fracture are at higher risk of sustaining another fracture. Fracture Liaison Service (FLS) has been implemented to improve management of osteoporosis by preventing secondary fracture. The aim of the study is to identify the efficacy of FLS in improving overall osteoporosis management among patient seen in tertiary teaching hospital, Malaysia.

Methods: It is a prospective study from January 2019 to December 2019. Patients with fragility fractures reviewed in a university teaching hospital were identified. Our hospital is the first government hospital to have FLS in the country. Patients demographic data and drug prescriptions related to osteoporosis treatment were obtained. The data was then compared with previous study from January 2016 to December 2016 before implementation of Fracture Liaison Service.

Results: There were 242 patients (male vs. female) identified. The mean age was 76 years old in comparison with 73.8 years old in 2016. There is a significant increase in patients getting antiosteoporotic treatment from 19% to 72% whereas the calcium and vitamin D prescription have also improved from 54.6% to 91.3% for calcium and 43% to 90.1% for vitamin D. With FLS, the percentage of patients having BMD assessment have also improve from 18.6% to 54.5%.

Conclusion: FLS is proven to be effective in improving management of osteoporosis in patients with fragility fractures. We suggest that FLS should be implemented in most hospital to improve osteoporosis management and to reduce the risk of secondary fracture.

P794
SHIFTING THE PERCEPTION OF OSTEOPOROSIS VIA AN EDUCATIONAL INTERVENTION

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Objective: Osteoporosis is underdiagnosed and undertreated in Australia. It is hypothesised that primary care clinicians are not prioritising osteoporosis as patients often have multiple, competing comorbidities that may be viewed as more serious and/or urgent. This study evaluates the effectiveness of an educational intervention to change clinicians' perception of osteoporosis, prompting it to be viewed as both sufficiently serious and urgent to discuss in a consultation with a patient at risk of fragility fracture.

Methods: Australian primary care clinicians were invited to participate in a 4-h continuing professional development workshop reviewing issues in the prioritisation of chronic diseases in multimorbid patients. The program also provided evidence on the consequences, diagnosis and management of osteoporosis. Both before and after attending the workshop, clinicians were asked to allocate eight common conditions, including osteoporosis, to a prioritisation matrix based on perceived urgency or seriousness.

Results: From March to November 2019, 939 clinicians participated in a total of 51 workshops conducted nationally. Figure 1 shows the total number of clinicians who placed osteoporosis in each of the quadrants before the workshop and again after attending the workshop.

Conclusion: This demonstrates that there is a need to shift clinicians' thinking about the priority of chronic diseases towards being urgent as well as serious. Attendance at a targeted educational intervention that emphasised the consequences of osteoporosis resulted in a shift in perception towards both increased seriousness, but importantly also increased urgency. Further study is needed to assess whether this shift in the perception of urgency will change patient care.
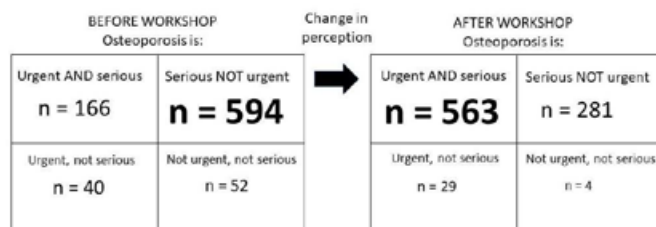
Figure 1

P796
HCV CO-INFECTION AMONG HIV CARRIERS IS ASSOCIATED WITH HIGHER FRACTURE RISKS: A FRAX STUDY

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Objective: The purpose of this cross-sectional study was to identify the 10-y probability of major osteoporotic fractures (MOFs) and hip fractures among people living with HIV (PLWH) by using FRAX™. We also analyzed the risk factors for the high probability of fractures. **Methods:** This study consisted of 288 people living with HIV who aged 40 y and above. 10-y probability of MOF and hip fractures was assessed using FRAX™ algorithm with BMD data. Logistic regression was used to determine risk factors for high probability of fractures on major osteoporotic fracture and hip fracture risk. **Results:** The median 10-y probability of fracture was 3.7% (IQR 2.2-6.2) for MOF and 0.8% (IQR 0.3-2.5) for hip fractures. In addition to old age, previous fracture history, and low T-score, HCV co-infection was associated with a higher risk of hip fractures in PLWH. (Odds ratio:4.3, 95%CI: 1.29-14.33) Old age and low T-score were also associated with high probability of MOF. **Conclusion:** HCV co-infection among PLWH Is associated with higher hip fracture risks. It requires sustained efforts in pharmacologic and nonpharmacologic interventions in PLWH to prevent osteoporotic fractures, especially those with HCV co-infection.

P797
THE ECONOMIC BURDEN OF OSTEOPOROSIS IN IRAN IN 2017

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Objective: Osteoporosis and related fractures impose a significant economic burden on societies. There are no estimates of the economic burden of osteoporosis in Iran. This study aimed to estimate the economic burden of osteoporosis in Iran in 2017. **Methods:** We used a prevalence-based bottom-up approach to estimate the annual economic burden of osteoporosis in Iran. The study was conducted from a societal perspective and included direct medical and nonmedical costs. The indirect cost (productivity losses) were not included, however, the monetary value of quality-adjusted life-years (QALYs) lost because of fractures was included. The incidence of hip fracture was estimated from a meta-analysis of published reports in Iran. The incidence of other fractures was estimated through international comparisons. We used a validated Markov model to estimate the number of prior hip and vertebral fractures. Cost data were extracted from several sources including patient records, medical services prices, and previous literature. All cost were converted to the US dollar by using the average exchange rate in 2017 (1USD=IRR 34,214)

Results: There were an estimated 173,664 osteoporotic fractures in Iran in 2017, including 24,580 hip fractures, 26,764 clinical vertebral fractures, 30,307 forearm fractures and 92,013 other fractures (i.e., fractures of the pelvis, rib, humerus, tibia, fibula, clavicle, scapula, sternum and other femoral fractures). Osteoporotic fractures resulted in a loss of 53,518 QALYs. The economic burden of the incident and previous osteoporotic fractures was estimated at 933.78 million USD. Cost of incident fractures accounted for 48% of this cost, followed by the monetary value of QALYs lost (27%), pharmacological prevention (14 %) and long-term fracture care (10%). The cost of the hip, vertebral, forearm and "other" fractures accounted for 28%, 10%, 5% and 57% of the total incident fractures costs, respectively.

Conclusion: The economic burden of osteoporosis and related fractures is significant in Iran and will dramatically increase in the future, due to increased life expectancy and the aging population. However, some cost-effective interventions such as screening and pharmacological prevention may reduce the economic burden and improve the patient's quality of life. More research is needed to identify the appropriate interventions in Iran.

P798
EXTRACORPOREAL SHOCKWAVE THERAPY TO TREAT OSTEOARTHRITIS OF KNEES: A META-ANALYSIS

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Objective: Extracorporeal shockwave therapy (ESWT) has become one of the choice to treat knee osteoarthritis (OA). However, the effectiveness and safety of this treatment are still unclear. The purpose of this meta-analysis was to determine the degree of pain reduction and functional outcomes after ESWT for knee OA. **Methods:** We systematically searched online databases. The articles comparing the outcomes between ESWT and controls

were included in the analysis. Our review team independently selected the included articles and retrieved the data for analysis. **Results:** Nine studies with 705 patients were included. The results revealed significantly lower pain scores in the ESWT groups than in the control groups within 2 weeks of treatment and 6 months after treatment (visual analogue scale, −1.59, 95%CI: −2.45 to −0.72 at 2 weeks; −1.12, 95%CI: −1.89 to -0.34 at 6 months). The ESWT group also had better functional outcomes 4 to 6 weeks posttreatment (Western Ontario and McMaster Universities Osteoarthritis Index, −11.96, 95%CI: -19.76 to -4.15). No rebound pain was noted for up to 12 months. **Conclusion:** Using ESWT to treat knee OA may reduce pain and improve functional outcomes. The effect may last 6 months to 1 year. More prospective studies are needed to investigate the settings for ESWT to optimize treatment results.

P799
COMPLIANCE TO ANTI-OSTEOPOROTIC THERAPY AFTER ONE YEAR FOLLOW-UP WITH FRACTURE LIAISON SERVICE IN TERTIARY UNIVERSITY HOSPITAL, MALAYSIA

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Objective: Adherence to medication for osteoporotic patients and those who are high risk of refracture has become a challenge as patients are required to take it for long term. Fracture Liaison Service (FLS) which is a multidisciplinary approach has been implemented to ensure osteoporotic patients are on treatment and comply to their medications. Our objective is to investigate the compliance of anti-osteoporosis medication, calcium and vitamin D supplementation among patients who are under FLS after 1 year since they have been started with their medication.

Methods: Patients under the follow-up of FLS from August 2018 to December 2018 taking their antiosteoporotic medication such as bisphosphonate, denosumab, teriparatide and supplement of calcium and vitamin D were identified. Compliance on medication were evaluated after 1 year on medication.

Results: A total of 74 patients were identified. After a year initiating antiosteoporotic treatment, 14 (19%) patients stopped taking their antiosteoporotic medication. Meanwhile, 5 (6.7%) and 7(9.5%) patients stopped taking calcium supplement and vitamin D respectively.

Several causes were identified in reduction in patient's compliance. These include patients decision's to not continue medications, financial issues, loss to follow-up, physician decision due to side effect, transportation problem and other reasons. Patients decision to stop antiosteoporotic medication became the major reason of stopping their medications at 5 (35.7%) patients followed by financial issue at 4 (29%) patients. This is due to some patients' belief in natural food intake providing sufficient

nutrient for their bones. In our hospital, patients have to buy their own anti-osteoporotic medications and this can be a burden to their expenses.

Conclusion: Patient education is the most important factor to make sure they comply with their treatment. Financial support and reduction in price of antiosteoporotic mediation to make it affordable for patients will also increase the likelihood of patients to continue with their medication.

P800
FATTY INFILTRATION IN LUMBAR PARAVERTEBRAL MUSCLE IS A RISK FACTOR FOR LOW BACK PAIN AND RELATED DISORDERS: A 3 YEARS' FOLLOW-UP OF THE GENERAL POPULATION IN JAPAN

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Objective: Fatty infiltration in lumbar paravertebral muscle (PVM) has been reported as a possible associated factor of low back pain (LBP) by cross-sectional studies. However, it is still unclear whether fatty infiltration in lumbar PVM predict LBP and related disorders. The purpose of this study is to clarify the relation between fatty infiltration in PVM and LBP in a general population by a longitudinal data. **Methods:** This is a longitudinal study using an established population-based cohort in Japan, which is named "The Wakayama Spine Study". A total of 855 subjects who participated in the second survey (AD 2013) at a seaside town were subjected to the MRI evaluation. Fatty infiltration in multifidus muscle and erector spinae were evaluated on the axial T2 MRI. In the third survey (AD 2016), we followed-up 672 subjects (men 203, women 469, age at the second survey 62±13 years old) and got the information on the presence/absence of LBP and Oswestry Disability Index (ODI) as the LBP related disorders. The relationships between fatty infiltration ratio (FIR) in PVM at L1/2 at the second survey and 1) the presence of LBP or 2) ODI (%) at the third survey were determined using multivariate regression analysis including age, sex, and BMI as the explanatory variables. **Results:** The prevalence of LBP was 260/672 (38.7%) at the third survey. Significant risk factors at the second survey for the LBP 3 y later were BMI (+1 kg/m^2, 1.05 [1.00-1.10]) and FIR in erector spinae (L1/2, +1 point, 1.07 [1.00-1.14]). The average ODI (%) was 10±12 at the third survey. Significant risk factors at the second survey for high ODI (%) 3 y later were age (p<0.0001), BMI (p<0.0031), and FIR in erector spinae (p<0.0001).

Conclusion: FIR in erector spinae was related with LBP and ODI (%) at 3 y later in the general population. There are several limitations including potential selection bias and lack of some confounding factors. However, we consider the results of this study extremely important both epidemiologically and clinically, because there are few longitudinal studies on spinal degeneration and related disability.

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P801
MULTICOMPONENT PROGRAM OF MEDICAL REHABILITATION OF PATIENTS WITH OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS

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Objective: To evaluate the efficiency of the developed multicomponent rehabilitation program in patients with osteoarthritis (OA) and rheumatoid arthritis (RA) during sanatorium-and-spa treatment.

Methods: We observed 60 patients with OA (48 women and 12 men, the average age was 57.4 [49.3: 71.1] years old, the median duration of the disease was 14.8 [5.5: 21.9] y), and 34 patients with RA (30 women and 4 men, average age - 45.2 [37.9: 60.2] years old, median disease duration - 9.6 [3.9: 14.1] years old, with low activity of the pathological process (DAS28 <3.2). The following rehabilitation technologies (RT) were used at the sanatorium-resort stage of medical rehabilitation (within 21 d): I - kinesitherapy (dosed walking from 30-60 min daily), II - hydrokinesitherapy (therapeutic swimming in a pool with seawater, 10-12 procedures for 30 min daily or every other day), III - low-frequency magnetotherapy (from 0.3-100 Hz; up to 5 mT; 10 procedures for 30 min, every other day), IV - a method of functional biocontrol with biofeedback (BFB therapy) (10-12 sessions of thermal and myographic BFB therapy, for 20-25 min daily). The intensity of pain in the affected joints (when walking) was assessed using a visual analogue scale (VAS Huskisson), swelling and pain on palpation of the joints (in absolute numbers), ESR, CRP, and general antioxidant status (ELISA test; Immundiagnostik, Germany).

Results: The combined use of RT-I and RT-II in patients with OA (n=24) reduced the intensity of pain (p=0.041) and the number of painful joints (p=0.048), and in patients with RA (n=10) reduced pain on the VAS scale (p=0.029). The combined use of RT-III and RT-IV in patients with OA (n=20) reduced the intensity of pain (p=0.017) and the number of swollen joints (p=0.044), and it reduced ESR (p=0.033) and increased the indicators of the general antioxidant status (p=0.019) in patients with RA (n=10). The use of multicomponent treatment regimens (a combination of all RTs) showed a significant decrease in pain intensity (p=0.022), the number of painful and swollen joints (p=0.034 and p=0.049), ESR levels (p=0.042) and CRP (p=0.01) in the group of patients with OA (n=16). It also led to a pain relief on the VAS scale (p=0.023), decrease in the number of painful joints (p=0.031), the level of ESR (p=0.018), CRP (P=0.038) and increase in total antioxidant status indicators (p=0.007) in the group of RA patients (n=10).

Conclusion: The dynamics of the articular syndrome index and immuno-inflammatory complex indicate a positive result of the use of a multicomponent treatment regimen (based on modern physiotherapy methods) at the stage of medical rehabilitation of patients with joint pathology.

P802
A MODIFIED TAPE TRANSFER APPROACH FOR RAPIDLY PREPARING HIGH-QUALITY CRYOSECTIONS OF UNDECALCIFIED ADULT BONES

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Objective: Histology-based analyses are important tools to dissect cellular and molecular mechanisms of skeletal homeostasis, diseases, and regeneration. The success of these efforts is highly dependent on rapidly obtaining high-quality sections of mineralized skeletal tissues suitable for various analyses. However, the current techniques for preparing such sections are still far from satisfactory.

Methods: Here, we reported the development of a modified version of tape transfer approach that can prepare cryosections of undecalcified rodent adult bones within 4 d at a low cost. This approach involved two important modifications to Cryojane Tape-Transfer System, including utilization of an optimized adhesive to prepare adhesive glass slides for improving the transfer efficiency, and a cheap conventional benchtop UV transilluminator for UV curing.

Results: Bone sections prepared by this approach exhibited good tissue morphology and structural integrity. Moreover, these sections were applicable to a variety of histological analyses, including calcein labeling, von Kossa staining, immunofluorescence, and enzymatic activity staining as well as EdU and TUNEL assays. Compared with traditional plastic sectioning that is widely used for preparing sections of mineralized tissues, our approach holds the following advantages. Firstly, we can rapidly obtain the specimen sections usually within 4 d, including one day of sample fixation, and two days of sample cryoprotection and embedding, before samples are sectioned on the fourth day. Secondly, our method has a relatively lower cost than traditional plastic sectioning, since we utilize custom-made adhesive slides (about $0.2/slide), regular disposable blades, and a cheap benchtop UV transilluminator instead of expensive Cryojane Tape-Transfer system. Thirdly, cryosectioning nature of our approach better suits preservation of antigenicity and enzymatic activity.

Conclusion: Thus, the tape transfer approach we developed provides a rapid, affordable, and easy learning method for preparing high-quality undecalcified bone sections valuable for bone research.

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P803

GENETIC ACTIVATION OF HEDGEHOG SIGNAL PATHWAY INHIBITS OSTEOCLASTOGENESIS AND ATTENUATES TITANIUM PARTICLE-INDUCED OSTEOLYSIS

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Objective: Aseptic loosening is a major long-term complication after total joint arthroplasty and has become the first cause for further revision surgery. Proinflammatory cytokines release resulting from engulfing implant debris by macrophages and subsequent stimulation of osteoclast differentiation and bone resorption are considered as the mechanism of bone loss around prosthesis. Though therapeutic approach of inhibiting osteoclastogenesis play a certain role in prevention and treatment of debris-induced osteolysis, several adverse effects and lack the capacity to promote bone repair lead to further investigation for potential agents and targets. It has been revealed that activation of Hedgehog (Hh) signaling, a critical part in skeletal development and metabolism, promoted osteogenic differentiation and impaired adipogenesis. This study aimed to explore whether genetic activation of Hh signaling by Sufu deletion exerted inhibitory influence on osteoclastogenesis and prevented bone loss induced by Ti particle-induced osteolysis.

Methods: Hh signaling activation resulted from the Cre/LoxP-mediated conditional ablation of negative regulator suppressor of fused (Sufu) specifically in bone marrow-derived macrophages/monocyte (BMMs). Firstly, we investigated the effects of Hh signaling activation on RANKL-induced osteoclastogenesis and bone resorption by tartrate resistant acid phosphatase (TRAP) staining, F-actin ring immunofluorescence and scanning electron microscope. The expressions of osteoclast-specific genes were assessed by qRT-PCR. Then western blot assay was applied to detect osteoclastogenesis transcription factor NFATc1 and c-fos expressions in protein level. In the end, Ti particle-induced osteolysis models were established to assess the effects of genetic activations of Hh signaling on osteoclastogenesis and bone resorption in vivo, and the samples were analyzed using μCT and histomorphometry.

Results: genetic activation of Hh signaling suppressed osteoclastogenesis and bone resorptive function in vitro. Meanwhile, RANKL-induced osteoclast-specific genes including *Nfatc1, C-fos, Acp5, Oscar, Ctsk, Dcstamp, Atp6v0a3 and Atp6v0d2,* and NFATc1 and c-fos expressions in protein level were inhibited after *Sufu* ablation. Micro-CT and histological data indicated that Ti particle resulted in a significant bone loss

caused by excessive osteoclast differentiation and following bone resorption. However, this process was hindered by Hh signaling activation after Sufu knockout.

Conclusion: Hh signaling activation caused by Sufu ablation inhibited osteoclastogenesis and Ti particle-induced osteolysis.

P804

PHARMACOLOGICAL ACTIVATION OF HEDGEHOG SIGNAL PATHWAY SUPPRESSES OSTEOCLAST DIFFERENTIATION AND ATTENUATES TITANIUM PARTICLE-INDUCED OSTEOLYSIS VIA JNK/C-FOS/NFATC1 SIGNALING

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Objective: Total joint arthroplasty (TJA) has been performed widely to treat arthralgia, joint instability and deformity. Although massive efforts including material modification, prosthesis design, osteotomy improvement and surgery guide system have been made to improve the efficacy of TJA, particle-induced peri-prosthetic osteolysis and following aseptic loosening are still the major long-term complications after TJA, which leads to revision surgery and consumes a lot resources. Indeed, specific agents targeting osteoclast differentiation and bone resorption provide effective treatments for these diseases, such as bisphosphonates, teriparatide, denosumab, romosozumab and estrogens. However, due to the lack of further promoting bone repair function and several side effects of these synthesized compounds or humanized antibodies including bisphosphonate related osteonecrosis of the jaws, gastrointestinal toxicity, transient fever, atrial fibrillation, increasing risk of developing cancer and high cost, screening and identifying of new compounds or targets are of great interests.

Methods: To investigate the relationship between Hh signal pathway and osteoclast differentiation, we used purmorphamine (PM) as a Hh signaling agonist to treat bone marrow-derived macrophages/monocyte (BMMs). Firstly, we investigated the effects of Hh signaling activation on RANKL-induced osteoclastogenesis and bone resorption by tartrate resistant acid phosphatase (TRAP) staining, F-actin ring immunofluorescence and scanning electron microscope. The expressions of osteoclast-specific genes were assessed by qRT-PCR. Then western blot assay was applied to detect osteoclastogenesis transcription factor NFATc1 and c-fos expressions in protein level and examine which osteo-clastogenesis-related signal pathway was involved after Hh signaling activation. In the end, Ti particle-induced osteolysis models were established to assess the effects of pharmacological acti-

vation of Hh signaling on osteoclastogenesis and bone resorption in vivo, and the samples were analyzed using micro-CT and histo-morphometry.

Results: Pharmacological activation of Hh signaling inhibits oste-oclast formation and bone resorptive function in vitro. Meanwhile, RANKL-induced osteoclast-specific genes including Nfatc1, C-fos, Acp5, Oscar, Ctsk, Dcstamp, Atp6v0a3 and Atp6v0d2 were sup-pressed after PM treatment. Micro-CT and histological data indi-cated that Ti particle resulted in a significant bone loss caused by much osteoclast differentiation and following bone resorption. However, this process was hindered by PM injection and following Hh signaling activation. Mechanistically, Hh signaling activation inhibited RANKL-induced JNK phosphorylation and suppressed downstream NFATc1 and c-fos expressions.

Conclusion: Hh signaling activation caused by PM treatment in-hibited osteoclast differentiation and Ti particle-induced osteoly-sis through suppressing JNK/c-fos/NFATc1 signaling.

P805
BARIATRIC SURGICAL INTERVENTION: RISK FOR FRACTURE

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Objective: To observe if bariatric surgery increases the risk of fractures.

Method: Our study is a retrospective case-control study for patients who underwent bariatric surgery during 2011 and 2012 and in accordance with the American Society for Metabolic & Bariatric surgery indications. Each case was matched with two controls of the same gender and age (±5 y), who were on medical weight management during the same period from Qatar Metabolic Institute. The index date is defined as the date of bariatric surgery for both groups. We reviewed patient's electronic records to identify fractures documented by radiological scans. All Patient's records reviewed during January 2020, with a mean of 8.6 y since the index date for both groups. Demographic data and pre and post-index date fractures were collected.

Results: Randomly selected 403 bariatric surgical intervention patients were matched to 806 subjects under medical weight management. 70% were females in both groups with the mean age of 36.2±10.2 for cases and 37.7±10.2 for controls. As expected surgical intervention group had higher baseline BMI (47.3±13.9) as compared to controls (36.7±6.7). The percentage of the fractures was higher in the surgical intervention group

as compared to controls (9.4% vs. 3.5%) with the odd ration of 2.89 (95%CI 1.75-4.78). The mean duration for time to event was 4.3 y for the intervention group vs. 5.2 y for controls. We found that surgical intervention groups had a more previous fracture as compared to the controls (4.9% vs. 0.9%) with P<0.0001. The most common site of fractures is feet, followed by hands. Apart from a few wrist fractures, there was no any typical osteoporotic sites fracture.

Conclusion: Bariatric surgery patients had much more fractures which occurred earlier as compared to controls. This could be explained by our finding of more pre-surgical fractures in our intervention group. Baseline BMI could contribute to this. A further prospective study is needed to assess fracture risks in this population of patients.

P806
FRACTURE LIAISON SERVICES IN HONG KONG: A 3-YEAR REVIEW

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Objective: At Hong Kong's largest Hospital, Fracture Liaison Service (FLS) was pioneered in the Department of Orthopaedics & Traumatology (O&T) with contribution of a multidisciplinary Fragility Fracture(FF) team since 2017. This comprises a comprehensive program to prevent secondary fractures among FF patients. Our Fracture Liaison Nurse (FLN) keeps ensure Fragility Hip Fracture (FHF) patients to have a smooth patient journey during hospitalization, coordinates multidisciplinary team (MDT) service and applies "3 I" protocol for osteoporosis screening and care. Our FLS do not only focus on initiating prescription of anti-osteoporotic treatment but also on reinforcing drug compliance and promoting rehabilitation. MDT members provide education for patients and carers, including bone health, nutrition, exercise and home safety. In addition, MDT members perform individualised assessment to identify patients' potential problem(s) and give relevant advice to maintain independence in Activities of Daily Living (iADL). Our 3-y data is collected and we perform a summative assessment to review the interim effect of FLS. In order to monitor its long-term effect and figure out a plan of extending FLS, a structured patient-based electronic clinical pathway is designed and a pilot electronic FF database is developed. We aimed to evaluate the outcome and performance of FLS in Hong Kong.

Methods: We evaluated the outcome and performance of FLS after the third year of introduction by reviewing all new FHF admission to O&T Department of our hospital, and patients attending Day Ward follow-up for FF between 2017-2019 retrospectively.

Results: FLS in our department provides quality FHF care and secondary fracture prevention for FF patients. FLN has provided bone health assessment and education to 2060 FF patients and 775 of them have initiated and continued anti-osteoporosis management since 2017 under the whole MDT's effort. A satisfactory treatment initiation rate (84% and 84%) was observed

in both 2018 & 2019. A high drug compliance rate (92% & 93%) was also reported. The follow-up rate at the Day ward was 92% and 93% respectively, all of them received MDT service. The rate of secondary fall was slightly lower 1.3% and reached 17% in 2019 as compared to 2017. The rate of secondary fracture dropped from the baseline of 4.67% in 2017, to 3.57% in 2018 and 2.82% in 2019.

Conclusion: FLS begins to reveal its effect on preventing secondary fracture and the interim service review demonstrates FLS is a feasible service model with encouraging results.

Identify and treat osteoporosis promptly

In-patient FLS	2017	2018	2019
Patients starting OP treatment in QEH	41	157	278

Out-patient FLS	2017	2018	2019
Patients attending FU	/	84	215
Drug adherence	/	91.67%	92.96%
Multidisciplinary assessment & education	/	91.67%	92.96%
Secondary Fall	18.17%	11.1%	16.9%
Secondary Fracture	4.67%	3.57%	2.82%

P807

TO WHAT EXTENT ARE NOVEL COMPUTER-BASED EXERCISES ADVANTAGEOUS TO URBAN SENIOR CITIZENS IN TERMS OF FUNCTIONAL MOBILITY IMPROVEMENT AND FALL PREVENTION? A NETWORK SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: To compare and summarize the effectiveness of novel computer-based exercises currently used in senior citizens on balance, functional mobility and falling with control (elderly who followed daily physical activities).

Methods: This systematic review and network meta-analysis (NMA) was conducted following the PRISMA extension for NMA and got PROSPERO registration No. CRD42017072582. We searched PubMed, SCOPUS and Medline databases for completed studies published in English using key search terms. The data was extracted using customized forms and applied the Cochrane Collaboration Risk of Bias Tool in randomized controlled trials.

Results: 25 trials with 1001 eligible subjects for the inclusion. 3 studies were comparing virtual reality (VR) with control, and 4 studies comparing Nintendo's Wii games or Wii fit (Wii) with alternative training (tai chi, ball exercises, brain fitness exercise, and postural insole-foot orthoses). Timed up and go (TUG) test was utilized to assess balance and functional activity. We, therefore, found from the meta-analyses that (i) the pooled mean difference of TUG between Wii and alternative training was 0.42 (95%CI, -0.71 to 1.54), (ii) the pooled mean difference of TUG between VR and control was -1.10 (95%CI, -2.31 to 0.11) The NMA also showed that Wii was the best training of all with pool mean differences of TUG in seconds compared to control of 1.99 (95%CI, 0.45 to 8.78). Moreover, other interventions from our NMA showed superior TUGs than that of control as follows: alternative training (1.61; 95%CI, 0.37 to 7.04), VR (1.51; 95%CI, 0.52 to 4.34), Xbox Kinect (1.39; 95%CI, 0.38 to 5.13), and standard training 0.82; 95%CI, 0.23 to 2.93).

Conclusion: We have found that Wii training tended to be the most effective intervention especially in balance and functional mobility. However, all interventions were more beneficial than no intervention applied to urban senior citizens.

P808

EXPLORATION OF THE EFFICACY OF CAREGIVERS EDUCATION IN FRAGILITY HIP FRACTURE REHABILITATION PROGRAM

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Objective: Hip fracture patients undergo lengthy recovery following hospitalization. Caregivers assumes a critical role. However, family members are often thrust into the role of caregivers with no prior preparation and knowledge of caring, which is stressful. It is the role of occupational therapists to provide support and education to caregivers. This prospective study is to evaluate whether the newly implementing education session can improve caregivers' competency in various aspects of care and relieve their stress.

Methods: Data were collected from 2017-2019 in the designated fragility services in Queen Elizabeth Hospital (QEH) with multidisciplinary approach to minimize hospital stay.

Occupational therapists conducted weekly caregiver education session on selected family through convenience sampling. Selective criteria included possibility of discharge home and availability of caregivers. Each session lasted for 45 minutes with 3-4 caregivers. Education covers four main aspects: disease information, caring skills in ADL activities, education on assistive devices and home safety. Additional and customized one-on-one education session were provided. Caregivers will be required to complete a questionnaire (5-points Likert Scale) to assess their understanding and competency before and after education session. The results of the questionnaire were analyzed. Caregivers satisfaction towards education session was rated and collected.

Results: 90 primary caregivers were selected and studied. All 90 caregivers completed the education sessions. Prior to the session, most caregivers rated themselves having limited knowledge in caregiving, and having low competency in assisting ADL activities especially bathing (average score: 2.1). This could be explained by patients' poor ADL performance. Their average MBI score

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were 50.4 before discharge. Their bathing performance was poorest (average score: 1.5). Results of questionnaire improved significantly (p<0.001) in all areas after the education session. The most competent to assist was dressing (average score: 3.8) while the least competent to assist in bathing (average score: 3.5). The greatest improvement came in the areas of bathing and toileting. Respondents claim the education was useful (45%) in equip them to take care the patients at home. Average satisfaction score was 4.7. Ultimately, most of patients (68) could discharge home as their final destination after whole rehabilitation journey.

Conclusion: The caregiver education session achieved gains in the quality and efficiency of care by improving competency of caregivers. Ongoing clinical interventions are needed to establish effective methods to empower these caregivers.

P809

IN VITRO HUMAN HYPERTROPHIC CHONDROCYTES MODELS TO STUDY RET FUNCTIONS ON BONE ELONGATION

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Objective: MEN2B syndrome, an hereditary autosomal dominant disease, characterized by pathogenic alterations in proto-oncogene RET, occurs in early childhood. Aggressive medullary thyroid carcinoma, pheochromocytoma, neuromas, skeletal abnormalities and a marfanoid habitus characterize MEN2B patients. Despite several studies on this syndrome, very few is known about RET function and the pathophysiology of marfanoid habitus. Aim of this study is evaluate the presence of RET in cellular models of human growth plate to investigate the possible role of RET in osteogenic differentiation and mineralization process for understanding the cause of the marfanoid habitus in this patients.

Methods: Growth plate (GP) cell lines were obtained by enzymatic digestion and mechanical dispersion, and cultured in growth medium. Characterization of GP cell lines as hypertrophic chondrocytes (HCs) was evaluated through several cellular and molecular analysis. After that, we have studied the osteogenic differentiation potential of HCs and the expression of RET gene and protein.

Results: GP finite cell lines were established and characterized as HCs. The osteogenic differentiation assay has shown the capacity of the HCs lines to differentiate into osteoblasts vs. the articular cartilage (AC) cell line. Finally, all the HCs lines have showed a positive expression of RET gene and the presence of RET protein vs. the AC line.

Conclusion: In this work we have established three primary cell lines of HCs, which are able to become osteoblasts, contributing to the formation of trabecular bone, of endosteum, and of mature bone. We have evaluated and discovered for the first time the presence of RET gene and protein in human *in vitro* HCs cellular models. So, since there are some scientific evidences about a possible involvement of RET pathway during the differentiation process of mesenchymal stem cells and since RET gene is involved in the pathogenic process of MEN2B, we hypothesise that this could be involved also in the osteogenic differentiation of HCs and in the endochondral ossification process also. In relation to this are now ongoing experiments to evaluate the role of RET on HCs osteogenic differentiation.

P810

TEMPORAL TRENDS OF OPIOID USE IN THE MANAGEMENT OF FRACTURE-RELATED PAIN IN CATALONIA, 2007-2016: A POPULATION-BASED COHORT STUDY

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Objective: To characterise the secular trends of opioid use within 3 months after a fracture, and to describe individual-level variation in opioid prescription.

Methods: Data was obtained from the SIDIAP (The System for the Development of Research in Primary Care) database, which contains primary care records and pharmacy dispensing data for 80% of the population in Catalonia (~6 million people). All persons aged 18 or older with an incident fracture diagnosis (any anatomical location except skull or digits) in the period 2007-2016 were included. Index date was the date of first fracture diagnosis in this period, and opioid use was studied within 3 months post-fracture. Opioids studied included codeine, tramadol, fentanyl, and morphine, with the latter three classified as strong opioids. The period prevalence of total opioid use was estimated in the whole target population, and stratified by sex, age, socioeconomic status (U1-U5, higher values equivalent to more deprivation) and residence area (rural/urban).

Results: The 3-month prevalence of opioid use among incident fracture patients was stable around 6.5% from 2007-2013. After that, this figure grew approaching 9.5% in 2016. Worryingly, the use of strong opioids started to increase earlier and doubled over time, from 4.2% in 2010 to 9.2% in 2016. The different strata followed similar trends over time, with higher use amongst women and older people, but no noticeable socioeconomic differences.

Conclusion: Opioid use in the 3 months following fractures has increased in the last few years. It is worrying that most of the increase is attributable to strong opioids used in elderly women, who are probably at highest risk of falls and refracture.

Figure 1. Trends of 1-y prevalence of opioid/s use among incident fracture patients, whole and subgroup population
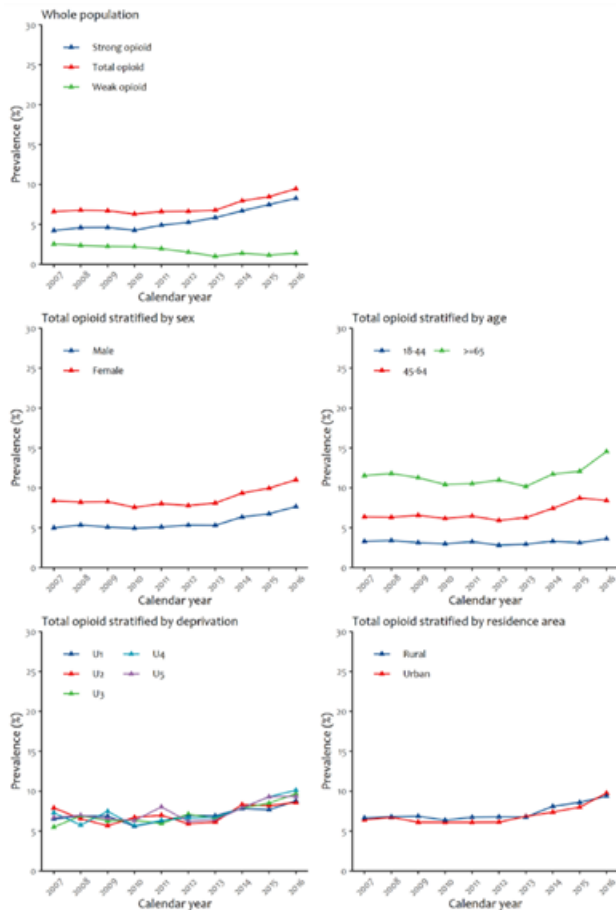
cascade was made up by compression fractures in D11, D12, and L1 treated with Vertebroplasty, and a right hip fracture treated with intramedullary nailing in 2016. At that time the patient was also treated with risedronate 35mg, once weekly. One year later, and 6 months before the current presentation, the patient presented a right humerus fracture, treated with external fixation. In the surgery theatre: on the left hip a closed reduction and an intramedullary nailing was performed. On the right humerus, the external fixation was removed, and plain x-rays as well as 3D CT scan showed atrophic nonunion, 6 months after the original external fixation. At discharge, the patient refused any further surgery and started using a brace. The treatment for the severe osteoporosis was also changed, the risedronate 35 mg once a week was replaced by teriparatide 20 µg/d, plus calcium (1000 mg) and vitamin D (800 IU). A x-ray, 6 months after teriparatide treatment, showed a complete bone healing and remodeling at the nonunion site in the right humerus.

This clinical case is suggesting that it is never too late to slow down the fracture cascade. Furthermore, in patients with multiple fractures and at imminent risk of another fracture, an anabolic agent, such as Teriparatide, should be considered as the first choice therapy.

Reference: Balasubramanian A et al. Osteoporos Int. 2019;30:79.

P812
TRABECULAR AND CORTICAL BONE MEASUREMENTS BY 3D-SHAPER IN MEN WITH HYPERTHYROIDISM

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Objective: Hyperthyroidism can increase the bone mass loss, mainly cortical, and increase the fragility fractures risk. The 3D-SHAPER software incorporates a model-based algorithm to analyze the bone in 3D from a standard DXA scan, allowing the study of both trabecular and cortical compartments of the proximal femur. We aimed to analyze both cortical and trabecular compartments of the proximal femur in men with hyperthyroidism.

Methods: A group of 21 men aged <50 y with nontreated hyperthyroidism was paired by age and height with a control group (n=21). The BMD (g/cm^2) at the lumbar spine and at the proximal femur were evaluated by DXA (QDR Discovery W, Hologic, EUA). The 3D analysis of the DXA scans was done with the software 3D-SHAPER v2.10 (Galgo Medical, Spain) and evaluated the trabecular and cortical volumetric BMD (vBMD) and the cortical thickness (Cth). Adequate statistical tests were used according to parameter normality distribution and significance was considered for P<0.05.

Results: The mean age and height were identical. The means (±SD) of the BMD, vBMD and Cth, are described in Table.

Groups	Control	Hyperthyroidism	
Variables	(n=21)	(n=21)	P
Lumbar spine BMD g/cm^2	1.093 (±0.1)	0.981 (±0.1)	0.007

P811
TERIPARATIDE IMPROVES SURGICAL AND FUNCTIONAL OUTCOMES IN A FRAIL PATIENT WITH MULTIPLE FRACTURES: CASE REPORT

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In patients with severe osteoporosis(OP), the presence of a fracture represents the most important risk factor for subsequent fractures. This risk is high immediately after the event and declines thereafter. In a very large population of over 377 000 women, recorded in a Medicare Database, presenting with a first clinical fracture, the risk of a subsequent fragility fracture was 10% within the first year, and 18% at the end of the second year (1).

Case report: In 2018, a 70 years old lady was referred to our Orthopedic Surgeon Department with a left hip pertrochanteric fracture (AO 31 A1). The fracture occurred after a fall at home during a rehabilitation exercise. Past medical history was positive for chronic obstructive pulmonary disease (COPD) in the previous 5 y, treated intermittently with glucocorticoids. The rest of the routine work up was unremarkable. Diagnosis of osteoporosis was made 2 y before the current presentation with a DXA T-score superior to -3 at both the spine and the left hip. The fracture

Proximal femur BMD g/cm²	1.094 *(±0.1)*	0.973 *(±0.1)*	*0.005*
Total cortical vBMD mg/cm³	855.9 *(±38.0)*	806.3 *(±61.3)*	*0.003*
Total trabecular vBMD mg/cm³	221.4 *(±49.9)*	197.7 *(±34.8)*	*NS*
Total Cth *mm*	2.12 *(±0.2)*	1.97 *(±0.2)*	*0.007*

In the hyperthyroidism group there was a positive correlation of the lean mass with the total cortical vBMD.

Conclusion: In this study of men with nontreated hyperthyroidism aged <50 y, we found a significant decrease of both lumbar spine and femur BMD. However, the 3D analysis of the proximal femur highlighted a predominant negative effect of the disease in the cortical compartment, which can be risk factors for the osteoporotic fractures of the proximal femur, with a considerable morbidity and mortality.

P813
FRAILTY STAGES ARE ASSOCIATED WITH MAJOR FRACTURE RISK: A POPULATION-BASED COHORT STUDY

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Objective: To determine the association between frailty and the risk of fracture in the old.

Methods: Population-based cohort study. Subjects ≥75 years old (2007-2018) with ≥1 y of valid data in the SIDIAP database were included. Follow-up: until death, transfer out of the catchment area or end of the study period. Frailty was measured with the eFRAGICAP based on deficits from the Rockwood model (ICD-10, ATC, etc.) registered in the primary care computerized medical records. Prespecified cut-off points, classified subjects as fit or having mild, moderate or severe frailty. Outcomes: incident fracture (all, hip and vertebra).

Hazard ratios (HR) and 95%CI were calculated with cause-specific Cox adjusted models (age, sex, socioeconomic status) accounting for competing risk of death for fracture risk (fit as reference category).

Results: 893.211 subjects were included. Mean age was 78.9 years old and 59.7% were women. Fracture incidence rates (IR) per 1000 persons-year (py) were 17.67 (17.46-17.87), 18.76 (18.57-18.95), 20.07 (19.73-20.42) and 22.60 (22.04-23.16) for fit, mild, moderate and severe frailty respectively. Compared with fit subjects adjusted HR for all fractures was 1.21 (1.19-1.23) for mild, 1.51 (1.47-1.55) moderate and 2.28 (2.13-2.44) severe frailty. Adjusted HR for hip fracture was 1.10 (1.05-1.14) for mild, 1.31 (1.21-1.41) for moderate and 1.83 (1.50-2.23) for severe

frailty. Adjusted HR for vertebral fracture was 1.22 (1.15-1.28) for mild, 1.66 (1.52-1.82) for moderate, 2.47 (2.01-3.05) for severe frailty.

Conclusion: Frailty as measured with eFRAGICAP independently predicts the risk of fracture and this risk is more pronounced as frailty increases.

P814
ASSOCIATION OF FAT MASS AND OVERWEIGHT OR OBESITY DURING GROWTH WITH BONE MINERAL DENSITY AND MICROARCHITECTURE IN YOUNG ADULTHOOD: A 17-YEAR COHORT STUDY

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Objective: The long-term relationship between fat during growth and bone health in adulthood is uncertain. This study aimed to describe the longitudinal associations between body fat mass (FM) and overweight or obesity at different stages of growth with bone measures in young adulthood.

Methods: Participants from a birth cohort were followed at ages 8, 16 and 25 y (n=201). At age 25 y, lumbar spine, hip and total body BMD (aBMD) were measured by DXA, and total, trabecular, cortical volumetric BMD (vBMD) and microarchitecture measures (at the distal radius and tibia) by HR-pQCT. Multivariable linear regression was used to examine associations of FM z-score (by DXA/skin fold), BMI z-score and overweight/obesity (BMI ≥85th percentile on CDC growth charts/>25 kg/m²) at ages 8, 16 and 25 y with standardised bone outcomes at age 25 y.

Results: The prevalence of overweight/obesity was 18%, 25% and 55% at ages 8, 16 and 25, respectively. FM of at least one time point had beneficial association with total and cortical vBMD, cortical porosity and trabecular number at the radius and tibia (standardised β=-0.24 to 0.31), but it was not associated with aBMD at any sites. Higher BMI and persistent overweight/obesity from age 8-25 y were associated with higher aBMD (BMI: β=0.18 to 0.31; overweight: β=0.58 to 0.73), higher cortical thickness, more trabecular number, less separation but thinner trabecular bone (BMI: β=-0.32 to 0.42; overweight: β=-0.54 to 0.97) at radius and tibia; they were not associated with vBMD.

Conclusion: Higher FM and overweight/obesity from child-to-adult may have beneficial effect to bone development until the age of peak bone mass. However, given the well-established detrimental effect of obesity on outcomes beyond bone (e.g., type 2 diabetes), our findings need to be considered with caution.

P815

NITROGEN-CONTAINING BISPHOSPHONATES ARE ASSOCIATED WITH REDUCED RISK OF PNEUMONIA IN PATIENTS WITH HIP FRACTURE

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Objective: Based on a potentially beneficial immune role of nitrogen-containing bisphosphonates (N-BPs), determining pneumonia outcomes in patients with hip fracture who receive N-BPs may be informative. This study investigated the risk of pneumonia and its associated mortality among patients receiving N-BPs, non-N-BPs antiosteoporosis medications, and no antiosteoporosis medications after a hip fracture.

Methods: This is a historical cohort study using a populationwide database. Patients with incident hip fracture (2005-2015) were identified and matched by time-dependent propensity score (PS). Pneumonia and pneumonia mortality were captured at 1-y postdischarge from hip fracture and at the end of study on 31 December 2016. Hazard ratio (HR) and 95%CI were estimated using Cox proportional hazard regression. Absolute risk difference (ARD) and number needed to treat (NNT) were calculated.

Results: 54,047 patients with incident hip fracture were identified. Of these, 5623 patients who received N-BPs medications and 15,296 without antiosteoporosis medication were matched. After 1-y follow-up, N-BPs was associated with a significantly lower risk of pneumonia compared with no treatment (6.8 vs. 12.6 per 100 person years; HR 0.53, 95%CI 0.46-0.61), resulting in an ARD of 0.06 (95%CI 0.05-0.07). The NNT to prevent one incident pneumonia was 17 (95%CI 15-20). Similar association was observed with pneumonia mortality (HR 0.35, 95%CI 0.26-0.48) and the follow-up through the end of study (pneumonia: HR 0.68, 95%CI 0.63-0.73; pneumonia mortality: HR 0.56, 95%CI 0.50-0.63). When N-BPs was compared with non-N-BPs antiosteoporosis medications, the association remained significant.

Conclusion: N-BPs was associated with a lower risk of pneumonia and pneumonia mortality after hip fracture. N-BP may be a new nonvaccine based medication that prevents pneumonia in high risk groups. The findings warrant further validation.

P816

FRAILTY IS ASSOCIATED WITH AN INCREASED RISK OF FALLS: A POPULATION-BASED COHORT STUDY

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Objective: To determine the association between the different stages of frailty and the risk of falling.

Methods: A retrospective cohort study was performed using data obtained from the Information System for Research in Primary Care (SIDIAP). SIDIAP is a database of primary care medical records, containing anonymized data of >6 million residents in Catalonia. All subjects ≥75 years old at cohort entry with ≥1 y of valid data were included from 01/01/2007 to 12/31/2015. Follow-up: from cohort entry up to death, migration, or end of the study period (12/31/2018). eFRAGICAP (a validated adaptation of the eFI electronic frailty index developed in UK) based on the Rockwood model of frailty was calculated from clinical diagnoses (ICD-10), pharmacy dispensations (ATC), clinical measurements and questionnaires registered on computerized medical records in primary care. eFRAGICAP classified subjects as: fit, mild, moderate or severely frail. All incident falls (ICD-10) registered in the SIDIAP database from cohort entry were assessed. Statistical analysis: hazard ratios (HR) and 95%CI were calculated after adjustment (age, sex and socioeconomic status) and unadjusted cause-specific Cox models to account for competing risk of death, using the fit group as the reference category.

Results: Overall 893 211 subjects were analyzed (59.7% women, 40.2% men). Mean age of the population was 78 years old. The majority of subjects (53.9%) were classified as fit, over a third as mild (33.9%), 10.2% as moderate and 1.7% as severely frail. Compared to fit subjects, increasing frailty was associated with an increased risk of falls: adjusted HR (95%CI) 1.55 (1.52-1.57) for mild frailty, 2.69 (2.60-2.78) for moderate frailty and 5.86 (5.47-6.28) for severe frailty.

Conclusion: Frailty, measured with the eFRAGICAP, is associated with a greater risk of falling (from 55% to 628%).

Figure 1. Kaplan-Meier survival curve for falls according to frailty categories.
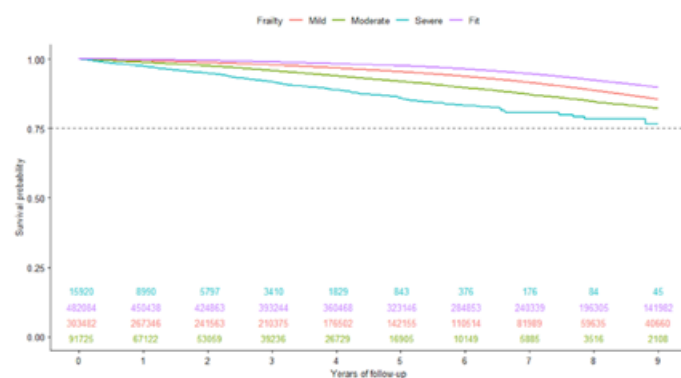
P817

SHORT-TERM RESULTS OF ROMOSOZUMAB TREATMENT IN PATIENTS WITH SEVERE OSTEOPOROSIS UNDERGOING HAEMODIALYSIS

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Objective: In March 2019, romosozumab, a new drug for the treatment of osteoporosis, became available in Japan. Romosozumab has a dual effect in promoting bone formation and inhibiting bone resorption. Furthermore, it is more effective in increasing bone density and inhibiting fractures than conventional osteoporosis drugs. However, strategies for treating osteoporosis in patients undergoing haemodialysis have not yet been established. Here, we report the short-term results of romosozumab treatment in patients with severe osteoporosis undergoing haemodialysis.

Methods: Patients with severe osteoporosis undergoing haemodialysis were treated with romosozumab at our hospital from March-December 2019. Twenty patients (6 men, 14 women; average age, 72.3 [range, 49-85] y; average dialysis period, 98.2 [range, 49-161] months) who were followed-up for 4 weeks after romosozumab treatment were included in the analysis. Levels of serum Ca, P, and Alb were measured before and every 2 weeks after romosozumab treatment. In 10 of the 20 cases, markers of bone density and bone metabolism were measured at 6 months after romosozumab treatment.

Results: The corrected serum Ca levels were 9.12, 8.15, and 8.68 mg/dL before, 2 weeks after, and 4 weeks after romosozumab treatment, respectively. Six months after romosozumab treatment, BMD increased by 12.9% in the lumbar spine and by 6.35% in the proximal femur. The level of P1NP, a bone formation marker, increased by 32.9%, and that of TRACP-5b, a bone resorption marker, decreased by 23.0%. Consideration: Patients undergoing haemodialysis showed a 12% reduction in serum Ca levels and showed increased bone density at 2 weeks and 6 months after treatment with romosozumab, respectively. In patients not undergoing dialysis, romosozumab was less likely to cause hypocalcaemia. The increase and decrease in bone formation and resorption markers, respectively, are considered to be the result of the dual effect of romosozumab.

Conclusion: Despite the decrease in serum Ca level, patients undergoing haemodialysis can be effectively treated with romosozumab for severe osteoporosis.

P818
METABOLOMICS OF MILK INTAKE AND ITS RELATIONSHIP WITH BONE MINERAL DENSITY: THE HONG KONG OSTEOPOROSIS STUDY

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Objective: Adequate dairy intake promotes bone health, but inconsistent association has been observed among Chinese due to low milk consumption. Food frequency questionnaire used in most epidemiological studies are prone to measurement error, it is suggested to accompany with metabolomics profiling to assess habitual intake. The aim of this study is to identify milk-associated metabolite and evaluate the association with bone health.

Methods: 564 Chinese adults (458 women and 106 men) from Hong Kong Osteoporosis Study visited in 2001-10 (N=329) and 2015-16 (N=235) were included. Self-reported FFQ was used to estimate their habitual milk consumption. Untargeted metabolomic profiling on fasting serum samples were obtained using liquid chromatography-mass spectrometry technique. BMD at lumbar spine, femoral neck and total hip was measured by DXA. Multivariable linear regression was used to evaluate the association between metabolites and milk intake. Multivariable robust regression was used to evaluate the association between milk-associated metabolites and BMD.

Results: 1027 metabolites were included in the regression analysis. N-trimethyl 5-aminovalerate (β=1.868, SE=0.295, p=4.95×10^{-10}) was significantly associated with milk intake after adjusting for Bonferroni correction (p<4.87×10^{-05}), and it was positively correlated with BMD at total hip (β=0.030 g/cm^2 per SD, SE=0.012, p=0.016).

Conclusion: N-trimethyl 5-aminovalerate was significantly associated with habitual milk consumption, and was associated with BMD at total hip. It could be a potential biomarker of milk consumption and reflect bone health.

P819
KNOWLEDGE, COMPLIANCE AND ADHERENCE FOR TREATMENT WITH ALENDRONIC ACID

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Objective: Alendronic acid is the first-line treatment for osteoporosis, but it has a low absorption so it should be administered following strict guidelines. The difficulty in taking the treatment may therefore limit the potential effect of the drug. We aimed to analyze the adherence and compliance to treatment in inpatients and determine the degree of knowledge about bisphosphonates amongst hospital nurses.

Methods: An observational and cross-sectional study has been designed. We included nursing staff and patients admitted to hospital who were receiving an oral bisphosphonate. An audit was carried out for patients where the variables collected were age, gender, presence of cognitive impairment, knowledge on the use of alendronic acid, how long they had been on treatment, adherence, compliance and who administers the treatment (self, dosette box, carer, family, etc.). Another audit was carried out with nurses focusing on their understanding of bisphosphonates, including administration.

Results: A total of 50 patients (82% women) with an average age of 80.36 y and 47 nurses were included. Of the patients, 48% know what a bisphosphonate is, 76% are compliant and 48% are adherent with treatment. 50% have been taking it for <5 y, 30% between 5-10 y, 12% for >10 y and the remainder do not remember. Depending on the form of administration: 58% self-administer, 8% by dosette and 36% is administered by a caregiver or relative. 32% have cognitive impairment. With reference to the nurses' results: 46.8% know what a bisphosphonate is, 42.55% how to administer it correctly. 70.2% know that it is weekly, 72.34% that it is administered in the morning and only 42.55% that it should be taken in aids and in an upright position.

Conclusion: There is little knowledge of the treatment, less than 50% of patients and nurses know its mechanism of action and among nurses there is a low percentage who know how to administer it correctly. Patients are quite compliant but not very adherent to the treatment. In view of the results, first line treatment for a disease as relevant as osteoporosis should be easier to administer and more effective.

P820
INCIDENCE AND 1-YEAR MORTALITY OF FALL-RELATED INJURY IN HONG KONG OLDER POPULATION

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Objective: Fall is the leading but preventable cause of injuries in elderly and is often presented as an unspecific geriatric syndrome for endocrine disorders, such as diabetes and osteoporosis. We aimed to study the incidence of fall-related injuries and their associated mortality in Hong Kong older population.

Methods: This retrospective cohort study was based on the populationwide electronic database Clinical Data Analysis and Reporting System (CDARS) in Hong Kong. All patients, aged ≥65, with ICD-9 diagnostic codes for accidental fall (E880-E888) between 2005-2018, were identified. Incidence of fall was age- and sex-standardized to 2011 Hong Kong census population. The trend of 1-year mortality after fall was assessed using linear regression. Control cohort was the patients admitted to Accident & Emergency (A&E) department, matching with age, sex and year of admission.

Results: A total of 190,748 patients were identified. The number of patients admitted due to fall increased from 11,330 in 2005 to 24,211 in 2018 (increased by 113.69%). The standardized incidence rate increased significantly from 15.27 per 1000 population (95%CI, 15.00-15.56) in 2005 to 19.49 per 1000 population (95%CI, 19.24-19.74) in 2018 (P_{trend}<0.001). Among all studied patients, 69.89% were admitted with fracture, with hip being the most presented fracture site (53.90%). The average 1-y mortality rate from 2005-2017 was 157.53 per 1000 cases, compared to 34.6 expected mortality per 1000 persons in the general population aged 65 or above. There was no significant change in the trend of 1-y mortality (p=0.225). Compared to the matched older population admitted to A&E, older people with incident fall had a 1.67-fold increased risk of 1-y mortality (OR:1.67; 95%CI: 1.57-1.78, p<0.001).

Conclusion: A significant elevation in fall-related incidence was observed in Hong Kong older population, and fall is associated with increased risk of mortality when compared with general population and patients admitted to A&E. Fall prevention should become the top public health priority, especially when the global life expectancy keeps increasing.

P821
DYSLIPIDEMIAS IN RHEUMATOID ARTHRITIS PATIENTS RECEIVING BASIC TREATMENT

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Objective: To study the lipid profile changes of rheumatoid arthritis (RA) patients treated with methotrexate (MT) for identification of the relationship between traditional and the disease-related factors.

Methods: The study included 20 RA patients receiving MT as the basic therapy. Patients with the concomitant conditions that can influence values of lipid biomarkers were excluded from the RA group. Statistical processing of the results was performed using SSPS 20.0 software package.

Results: 15 women and 5 men with mean age 53.8±9.4 y and mean disease duration 4.8±3 y were among the RA group. All patients had DAS28-CRP(4) score not <7.06. Seropositivity was found in 80% of cases. The average BMI in RA group was 28.3 kg/m^{2}. All patients were treated with MT 12.5-20 mg/week for more than 6 months, NSAIDs. All the patients had dyslipidemia. Total cholesterol (TC) increase was found in 80% of cases, with average TC level 5.63±1.6 mmol/L. Similarly, 80% patients had high LDL cholesterol (LDL-C) values, and mean LDL-C was 3.74±1.16 mmol/L. Triglycerides was abnormal in 40% patients, and decreased HDL cholesterol (HDL-C) in 60% cases (1.0±0.2

mmol/L). Most patients had consequently highly atherogenic type II hyperlipidemia subtypes: IIa - 60%, IIb - 40%. We also found direct correlation of TC with age, overweight. The duration of RA also has significant direct correlation with TC (r=0.189) and LDL-C (r=0.159). RA activity negatively affected HDL-C: level of CRP (r=-0.169). There was negative correlation of CRP with HDL-C (r=-0.169), meaning that RA activization was accompanied by lower HDL-C levels.

Conclusion: The most pronounced change was an increase in TC and LDL-C. The lipid profile in patients with RA is interrelated with traditional (age, increased BMI) as well as associated with the disease (activity and duration of RA) risk factors.

P822
IMPACT OF OSTEOPOROSIS TREATMENT ON QUALITY OF LIFE (QOL) AFTER FRAGILITY FRACTURE

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Objective: Osteoporotic fractures cause complex disability, significant morbidity, reduction in quality of life (QoL), functional limitations and higher risk for refractures. Beside secondary prevention of fractures, osteoporosis treatment also has been proposed to be effective in improving health-related quality of life. This study aims to assess the impact of osteoporosis treatment on QoL after a fragility fracture.

Methods: This study is based on the Austrian data of the International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS), a multinational observational study assessing the consequences after osteoporotic fractures. Recruitment was performed in 8 different trauma centers throughout Austria. Participants were included after having sustained an osteoporotic fracture, underwent follow-up analysis 4, 12 and 18 months thereafter and were interviewed regarding, inter alia, osteoporosis treatment and QoL using the European Quality of Life-5 Dimensions-3 Levels (EQ5D). This included one question for each of the five dimensions of EQ5D: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. For analysis, patients were divided into 2 groups whether osteoporosis treatment was initiated after the index fracture or not, and differences in QoL was assessed with the chi-squared test using the statistical software package IBM® SPSS® Statistics Version 23.

Results: A total of 922 patients were eligible for analysis. However, at the end of study, there was a loss of follow-up in 396 patients (43.0%). At baseline (time of fracture), the 2 subgroups were comparable except of differences regarding usual activities. At all follow-up analyses, osteoporosis treatment did not result in a significant difference in all assessed dimensions of QoL.

Conclusion: Despite multiple studies demonstrating osteoporosis treatment to be effective in improving QoL, the Austrian data of ICUROS does not support a significant difference in QoL after a fragility fracture whether receiving osteoporosis treatment or not.

P823
DYNAMIC CHANGES OF IL-10 IN PATIENTS WITH RHEUMATOID ARTHRITIS RECEIVING COMBINED TREATMENT

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Objective: To evaluate the dynamic changes of IL-10 in patients with rheumatoid arthritis (RA) treated with infliximab (IF) in combination with methotrexate (MT).

Methods: The study included 18 female patients with RA with mean age 46±8.4 y and mean duration of the disease 13.2±5.3 y. RF positive RA was detected in 83.3%, and ACPA positive - in 66.8% cases. All the patients received MT at a dose of 12.5-20 mg/week (for at least 6 months) in combination with NSAIDs. IF was administered for every patient according to the standard scheme. Measurement of ESR, CRP, IL-10 was carried out before the start of IF and at the 30th week of treatment. Serum IL-10 concentrations were measured by ELISA. Disease activity was evaluated using DAS28-CRP(4).

Results: All the patients had high RA activity based on DAS28-CRP(4) score. In most cases there was a positive shift of clinical and laboratory manifestations after 5 infusions of IF along with an improvement in quality of life. An overall decrease of all disease activity markers was also noted at this timepoint. When studying the correlation between the serum levels of IL-10 and markers of inflammation in patients with RA, the presence of weak negative relationships between an increase in the value of IL-10 and DAS28-CRP(4) (r=-0.38) was established. The partial markers of disease activity also had significant correlations with IL-10: the number of swollen joints (r=-0.22), the number of tender joints (r=-0.47), ESR (r=-0.12), CRP (r=-0.08). A tendency toward a decrease in mean serum IL-10 levels by the 30th week of treatment was revealed (which is apparently due to systemic immunosuppression effect).

Conclusion: By the 30th week of treatment with combined therapy of IF and MT a decrease in the concentration of IL-10 was found. Practical consideration of application of IL-10 as a biomarker of RA treatment needs data accumulation about entire pattern of cytokine changes.

P824
VITAMIN D DEFICIENCY IS ONE PIECE IN THE PUZZLE OF SARCOPENIA IN AGING

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Objective: An adequate level of calcitriol (1,25-dihydroxyvitamin D3) is essential for maintaining good health. Calcitriol (the active form of vitamin D) has an effect on about 200 genes (accounting for about 5% of the human genome) and on 36 different tissues. The bone and muscle are one of the target tissues of vitamin D. Insufficient vitamin D levels are associated with bone density loss and the occurrence of osteoporosis. It also has a direct effect on muscle cells via the vitamin D receptor (VDR) in muscle cell nuclei. Affects muscle cell contractility, muscle strength, and postural stability. The deficiency of this important hormone affects the occurrence of sarcopenia.

Methods: Menopausal women, 45-70 y of age, were included in the study. They were measured by DXA: BMD, skeletal muscle mass (SMM), and appendicular muscle mass (AMM). The level of 25-hydroxyvitamin D (25OHD) was determined. To assess the presence of sarcopenia, a muscle strength test was performed using a handgrip test (HGT).

Results: The mean age of women was 57.16 ± 5.71 y. The onset of menopause in the subjects was 49.59 ± 4.02 y. Menopause duration averaged 7.51 ± 4.99 y. The mean value of 25OHD was 39.43 ± 16.73 nmol/L. There were no subjects with normal vitamin D. Vitamin D insufficiency was 76.2%. Patients had osteopenia (BMD $_{L1-L4}$ 0.889 g/m²; BMD $_{neck}$ 0.686 g/cm²; BMD$_{tot-hip}$ 0.845 g/cm²). The average muscle strength was 12.44 ± 2.24 kg and was statistically significantly lower than the norms for the age (t=-21.65; p<0.001). Cut-off value for reduced muscular strength for women HGT<20 kg and dynapenia was confirmed in our patients. The skeletal muscle mass index (SMI) was 6.72 ± 0.91 kg/m². For confirmation of sarcopenia in women, the cut-off is an SMI <5.25 kg/m²,which does not confirm sarcopenia in our subjects. A positive correlation was found between 25OHD and HGT (R=0.227; p<0.022).

Conclusion: Our menopausal subjects had vitamin D deficiency associated with decreased bone density - osteopenia and decreased muscle strength - dynapenia. They had a reduced level of skeletal muscle but did not have sarcopenia. Vitamin D affects the musculoskeletal system and play important role in its preservation during menopause, but obviously not the only one that affects it.

P825
TRABECULAR BONE SCORE IN YOUNG PATIENTS WITH TYPE 1 DIABETES MELLITUS

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Objective: The possibility of predicting the risk of fractures in young patients with type 1 diabetes mellitus (T1DM) measured by BMD and trabecular bone score (TBS) as an indirect adjustment of bone quality, is discussed. Research object was to assess, the relationship of the TBS with vertebral fractures (VFx) in T1DM young patients.

Methods: We examined 127 type 1 diabetic patients, age: 32 (25–38) y, duration of DM: 12(7–20) y, HbA1c: 7.2 (6.1–8.6) %, BMI: 23 (21–26) kg/m²). The control group consisted of 98 health age- and BMI-matched people. BMD and TBS were measured with DXA (Lunar Prodigy). Vertebral fractures (VFx) evaluated by vertebral fracture assessment were classified according to the Genant's scale. Statistical analysis of the results was performed by Statistica 10.

Results: T1DM patients had lower BMD at lumbar spine (LS) (T1DM: Z–score −0.4 (−1.6−0.4) vs. controls: Z–score 0,4 (−0.7−1.0)), p<0.001, respectively), VFx (T1DM: n=24 vs. controls: n=2, p<0.001, respectively), lower values of TBS (T1DM 1.376 (1.277−1.408) vs. controls: 1,421 (1.368−1.462), p<0.001, respectively) compared to controls. More than 60% of VFx are determined in the thoracic spine in Th12, Th11, Th7. 10 patients had 2-3 VFx of different types at the same time. 8 patients had VFx despite normal BMD (Z-score > ⦰2). T1DM patients with VFx had lower TBS (T1D with VFx: 1.273 (1.119−1.311) vs. T1DM without VFx 1.379 (1.304−1.421), p<0.001, respectively) compared with T1DM patients without VFx. The threshold value of TBS was determined to be 1.279, (AUC=0.873±0.091, p=0.001; Se 91%, Sp 78%. Using the threshold value with TBS ≤1.279 it is possible to isolate individuals with a high probability of VFx. The low TBS values as an indicator of bone quality suggest the decrease of its strength characteristics.

Conclusion: This study shows that in young patients with T1DM the combination of the TBS and LS-BMD determinations may be used to identify subjects at higher risk for VFx. Larger studies are needed in order to distinguish the T1D patients at high risk of fracture.

P826
PHARMACOGENETICS OF RESPONSE TO BISPHOSPHONATE TREATMENT IN POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Treatment strategy of osteoporosis (OP) is mainly based on increase in BMD and reduction of fracture risk. Bisphosphonates (BPs) are the most commonly used first-line antiresorptive agents. However, up to 30-50% of OP patients exhibit inadequate treatment response to BPs treatment, mainly due to resistance. Use of genetic markers to predict treatment response to BPs has huge potential. The aim of this study was to develop personalized approach for the assessment of the individual response to BPs treatment of OP based on screening of genetic markers before pharmacotherapy.

Methods: In total, 201 subjects with OP treated with BPs were included in the study, mean age 64.0, mean treatment duration 2.1 y. Lumbar spine (LS) BMD was measured DXA (GE Lunar, USA). *SOST* (sclerostin, rs1234612), *PTH* (PTH, rs7125774), *FGF2* (fibroblast growth factor 2, rs6854081), *FDPS* (farnesyl diphosphate synthase, rs2297480), *GGPS1* (geranylgeranyl diphosphate synthase, rs10925503), and *LRP5* (LDLR-related protein 5, rs3736228) markers were determined using the quantitative PCR.

Results: Response to BPs therapy was evaluated according to the BMD trend in LS region. 122 patients were identified as responders (increased lumbar spine BMD that exceeded the least significant change) and 79 – as nonresponders (decrease in BMD, more detailed in [1]). No statistically significant difference was observed in baseline BMD levels between responders and nonresponders, but it was identified after treatment (Figure).

Figure. Baseline LS BMD levels in responders and nonresponders and after BPs therapy

SOST T/T, *PTH* T/T, *FDPS* G/G, *GGPS1* T/T genotypes were significantly over-represented in nonresponders (P<0.002 for all variants), suggesting their association with negative response to BPs therapy. Multiple analysis of *FDPS* and *GGPS1* genes revealed a dramatical increase in the risk of negative response to BPs therapy (OR=5.2 (95%CI 2.8-9.9, P=0.0001, [1]).

Conclusion: Our findings highlight the importance of identified genetic markers for pharmacogenetics of BPs therapy of osteoporosis as a new strategy for personalized antiresorptive therapy.

Reference: Marozik P et al. PLoS ONE 2019;14:e0221511.

P827
BMD CHANGES AFTER ONE YEAR OF ADD-ON TREATMENT WITH TERIPARATIDE AS COMPARED TO ONGOING DENOSUMAB MONOTHERAPY IN POSTMENOPAUSAL WOMEN WITH SEVERE OSTEOPOROSIS

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Objective: To study BMD changes after one year of add-on treatment with teriparatide as compared to ongoing denosumab monotherapy in women with severe postmenopausal or glucocorticoid-induced osteoporosis.

Methods: We retrospectively compared 18 postmenopausal women (mean age 73.4 (SD 9.2) years; mean 26.6 (9.1) years from menopause) with severe primary (n=14) or glucocorticoid-induced (n=4) osteoporosis who sustained new osteoporotic vertebral fracture(s) after more than one year of treatment with denosumab and were then prescribed with add-on teriparatide at our outpatient clinic (COMBO group) to 18 postmenopausal women matched by osteoporosis type, age and years from menopause who had been treated only with denosumab (DMAB group; mean age 73.5 (6.9) y; mean 25.9 (8.5) y from menopause). All patients were prescribed with vitamin D3 1000 IU daily and were instructed to ingest 1200 mg of calcium daily. BMD was measured at lumbar spine (LS), total hip (TH) and femoral neck (FN) by DXA at baseline and after 12 months of further treatment. Differences were statistically tested using paired t-test (BMI and serum 25-hydroxyvitamin D concentration) or repeated measures ANCOVA (BMD change adjusted for the number of vertebral fractures, which was higher in the COMBO group: mean 3.1 vs. 1.8 in the DMAB group).

Results: The two groups did not differ significantly in BMI (COMBO mean 26.3 (3.6) kg/m^2; DMAB mean 25.4 (4.8) kg/m^2, P=0.527) or serum 25-hydroxyvitamin D concentration (COMBO mean 74.6 (19.6) nmol/L; DMAB mean 80.9 (22.1) nmol/L, P=0.372). After 12 months, the COMBO group showed higher average BMD change (mean 0.044 (0.068), 0.020 (0.046) and 0.018 (0.032) g/cm^2 for LS, FN and TH BMD, respectively) than the DMAB group

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(mean -0.021 (0.178), 0.001 (0.038) and 0.006 (0.017) g/cm²). The difference in mean change between the groups was only statistically significant for TH BMD (P=0.036), but not for LS (P=0.117) or FN BMD (P=0.228).

Conclusion: Twelve months of add-on osteoporosis treatment with teriparatide showed tendency to a higher BMD gain than ongoing monotherapy with denosumab, particularly at total hip. Our clinical observations seem concordant with the findings of randomised controlled trials but need to be confirmed in a larger study.

P828
NOVEL MUTATIONS IN COL1A1 AND COL1A2 CODING REGIONS IN PATIENTS WITH OSTEOGENESIS IMPERFECTA

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Objective: Osteogenesis imperfecta (OI) is a heritable disorder characterized by varying degrees of bone fragility. A large number of mutations in the *COL1A1* and *COL1A2* genes, encoding the proα1 and proα2 polypeptide chains of type I collagen, were identified. The dominant mutations in these genes explain up to 90% of OI cases. The aim of this study was to analyze phenotypic, molecular and genetic background of Belarusian patients with OI.

Methods: In total, 92 patients with OI were included in the study. Genomic DNA was extracted from peripheral blood leukocytes. The sequencing of *COL1A1* and *COL1A2* coding regions was performed using Ampliseq Library PLUS custom panel for Illumina MiSeq (USA). The raw data per exome were mapped to the human reference genome hg19 using Illumina MiSeq Reporter. The variants were confirmed by Sanger sequencing using SeqStudio genetic analyser (Applied Biosystems, USA). Variants not described in OI variant database (OIVD, https://www.le.ac.uk/ge/collagen/) were considered as novel mutations.

Results: By the analysis, we have identified 35 unique pathogenic *COL1A1/2* variants (Figure) in 59 (64%) patients with type I-IV OI. The majority of the pathogenic variants were located in the *COL1A1* gene (69.5%), 22% of them were described for the first time. At the same time, 66.7% of the *COL1A2* mutations were novel. All pathogenic variants were heterozygous, suggesting dominant inheritance.

Figure. The spectrum of identified COL1A1 and COL1A2 mutations in patients with OI. Novel mutations are highlighted red, novel mutations with previously described amino acid change – orange.

The whole spectrum of mutations included 32 missense, 8 nonsense, 11 frameshift, 7 splice site and 2 intronic mutations. Glycine (Gly) substitutions were present in 19 (59.3%) of the missense variants. These substitutions are important, because each collagen chain consists of the triplets with Gly residue at every third position of triple-helical domains. Gly substitutions disrupt protein folding and structure and are usually associated with severe OI phenotypes.

Conclusion: We identified 12 novel heterozygous missense mutations, associated with OI in Belarusian patients. This study expands the mutation spectrum of the *COL1A1/2* genes and contribute toward the increased understanding of the phenotype development and genetics of OI.

P829
CHARACTERISTICS OF 21 HIV PATIENTS WITH OSTEOPOROSIS TREATED WITH DENOSUMAB

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Objective: HIV patients have a predisposition towards development of early osteoporosis compared to normal population. Bisphosphonates is the mainstay therapy but contraindications such as allergic reactions or renal impairment preclude its use. Denosumab is an alternative but there are concerns regarding risk of infection in this immunocompromised group.

Methods: The authors run a weekly HIV-Endocrinology joint clinic and have currently 153 HIV patients with osteoporosis in their database. A retrospective review of the database was made from Jan 2013 to Jun 2019 and there are a total of 21 patients treated with denosumab. Parameters analysed include demographics of patients, reasons for denosumab use, BMD values pre and post denosumab therapy, HIV viral load pre and post therapy as well as complications arising from denosumab use.

Results: A total of 21 patients (20 male, 1 female) were treated with denosumab. Their mean age was 68.4 years old (±9.68) and their mean duration of denosumab use was 23 months (±12.3). Main reasons for denosumab use was due to lack of improvement in BMD after 2 y of bisphosphonates therapy (n=10) followed by initial treatment with denosumab (n=8) due to severe osteoporosis. 3 patients were started on denosumab due to chronic kidney disease. The Hologic DXA mean BMD of the lumbar spine (LS) pretreatment was 0.863 g/cm² (±0.18), femoral neck (FN) was 0.543 g/cm² (±0.08) and total hip (TH) was 0.685 (±0.11). Post treatment, BMD at the LS was 0.91 g/cm² (±0.16), FN 0.56 g/cm² (±0.08) and TH 0.693 (±0.098).Percentage change compared to baseline was +6.03% (±7.46) at the LS, +2.3% (±4.75) at the FN and +1.3% (±4.26) at the TH. Viral load of all the patients
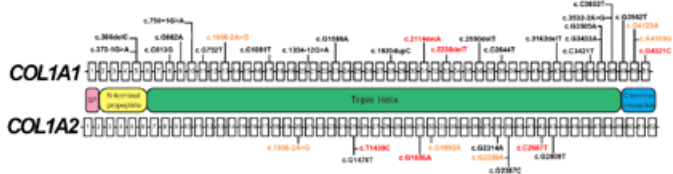
remained undetectable post treatment. There were no episodes of dermatitis or infection-related admissions in all 21 patients after denosumab was started.

Conclusion: In our case series, use of denosumab in HIV osteoporosis results in improvement of BMD at all 3 sites. It appears safe to use denosumab in the short term but it remains prudent to continue to monitor for infections.

P830
FRAX-BASED INTERVENTION THRESHOLDS IN THE FIVE COUNTRIES OF EASTERN EUROPE

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Objective: Intervention thresholds are proposed using the Fracture Risk Assessment (FRAX) tool. The aim of this study was to compute and compare FRAX-based intervention thresholds for five countries of Eastern Europe in men and women ≥50 y.

Methods: The intervention threshold (IT) was set at a 10-y probability of a major osteoporotic fracture (MOF) equivalent to a woman with a prior FF and a BMI equal to 25.0 kg/m^2 without BMD or other clinical risk factors. So, age-specific intervention thresholds were developed for five countries of Eastern Europe – Armenia, Belarus, Georgia, Moldova and Russia.

Results: The 10-y fracture probabilities for the five countries of Eastern Europe calculated using the country-specific FRAX models are shown in Figure 1. In general, in all countries evaluated in the present analysis, the 10-y probability of MOF increased with age. Particularly, for Belarus, the probability rose with age, from 4.9% at the age of 40 y to 27.0% at the age of 90 y; whereas, for Armenia women with previous fracture, but, no clinical risk factors, the probability of a major fracture increased from 2.7% at the age of 40 to 17.0% at the age of 80-85. The 10-y fracture probabilities at the age 90 y was decreased in Armenia, Moldova and Russia. For the five countries of Eastern Europe, the age-specific IT varied from 2.7 to 17% in Armenia, 2.7 to 22% in Georgia, 4.9 up to 27.0% in Belarus, 5.7 to 21.0% in Moldova, 11 up to 23.0% in Russia at the age of 40 and 90 y, respectively. The highest probabilities, from the age of 60-80, was in Russia; from the age of 85-90, was in Belarus, while the lowest probabilities were observed in Armenia.

Conclusion: In the five countries of Eastern Europe, FRAX-based IT offers a substantial advance for the detection of men and women at high fracture risk, particularly in the elderly. The heterogeneity of IT between the countries indicates that country-specific FRAX models should be developed and used.

Age	Armenia	Georgia	Belarus	Moldova	Russia
40	2,7	2,7	4,9	5,7	11,0
45	3,2	3,2	4,8	7,5	12,0
50	3,7	3,7	5,0	9,9	14,0
55	4,3	4,3	5,3	13,0	15,0
60	5,4	5,4	5,4	16,0	17,0
65	7,5	7,8	6,4	18,0	18,0
70	11,0	12,0	9,2	19,0	19,0
75	15,0	18,0	14,0	20,0	22,0
80	17,0	21,0	20,0	20,0	23,0
85	17,0	22,0	24,0	21,0	21,0
90	15,0	22,0	27,0	20,0	16,0

Fig.1. Ten-year probability of a major osteoporotic fracture (%) by age at the intervention threshold calculated with FRAX for the five countries of Eastern Europe

P831
RELATIONSHIPS BETWEEN PHYSICAL ACTIVITY, FEAR OF FALLING AND FALL RISK IN INSTITUTIONALIZED OLDER PERSONS

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Objective: To analyze relationships between physical activity (PA), fear of falling and fall risk in institutionalized elderly persons.

Methods: Residents of nursing homes for elderly people in Vilnius (Lithuania), aged 60 y and older, who were able to walk a distance of 20 m independently, were included in this cross-sectional study if their mini-mental state examination (MMSE) score was ≥21. PA was measured by the Physical Activity Scale for the Elderly (PASE), fear of falling was evaluated using the Falls Efficacy Scale-International (FES-I), and the risk of falling was evaluated by the timed up and go (TUG) test.

Results: In total, 113 subjects (37 men and 76 women) with a mean age of 80.21±9.72 y, were involved into this study. The youngest subject was 60 years old, the oldest – 95 years old. Falls in the past 12 months were experienced by 75 persons (66.37%). PASE score was significantly (p=0.02) higher in non-fallers than in fallers (33.95±28.37 and 24.54±27.51, respectively). It was found that FES-I score was significantly (p=0.01) lower in nonfallers than in fallers (32.73±12.02 and 38.8±12.56, respectively). The risk of falling (mean TUG test time) did not differ significantly between fallers and nonfallers. Weak negative correlation was found between scores of PASE and FES-I (r=-0.24; p=0.009) and also between scores of PASE and TUG test (r=-0.35; p=0.0001). Statistical analysis revealed a significant moderate correlation between fear of falling and risk of falling (r=0.43; p=0.000002).

Conclusion: In institutionalized older persons, higher physical activity was associated with lower risk of falling and lower fear of falling. Moderate significant correlation was found between fear of falling and risk of falling.

P832
A MULTIDISCIPLINARY CARE MODEL TO REDUCE FRACTURES IN HIV PATIENTS

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Objective: HIV patients, especially if they are on tenofovir disoproxil fumarate (TDF) based antiretroviral therapy (ART), have lower BMD and higher risk of fractures compared to HIV-negative subjects. We described our center's HIV-Endocrinology Clinic efforts in managing patients with osteoporosis (OP) as well as analyse the characteristics of the patients with osteoporosis on follow-up with us.

Methods: We started having case-based discussions with the Infectious disease specialists focusing on the importance of screening for OP with DXA and the effects of TDF on the bone. Vitamin D levels was checked routinely and repleted to at least 30 ng/mL. Medications used include alendronic acid (AA), zoledronic acid (ZA) and denosumab (D). The pharmacists focused on patients' education including risk factor reduction and the proper intake of AA. Dedicated nurses were assigned to recall patients who default and ensure the dose of ZA and D was given on time.

Results: From Jan 2013 to Jun 2019, there were a total of 153 HIV patients with osteoporosis of which 113 (73.8%) were on TDF. Due to Hepatitis B co-infection, 15 (13.3%) were continued on TDF while the rest were switched to alternative antiretroviral therapies. The average age of the patients was 62 (±7.7) while the mean Vitamin D level was 31.5 ng/mL (±12.1). 43 (28.1%) patients were treated with AA, 36 (23.5%) with ZA and 21 (13.7%) with D. 29 (19%) patients are currently not on any medications either because BMD improve after tenofovir was discontinued or due to patients' preferences. 24 (15.7%) patients defaulted follow-up despite efforts to recall them. Post treatment surveillance: there were no episodes of dermatitis or infection-related admissions in all 21 patients after denosumab was started. 11 (7.2%) patients have fractures of which 2 occurred while on follow-up.

Conclusion: Our HIV-Endocrine Multidisciplinary care model provides comprehensive care and may potentially reduce incidence of new fractures.

P833
VITAMIN D DEFICIENCY IN ELDERLY PATIENTS WITH ACUTE HIP FRACTURE

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Objective: Vitamin D deficiency is common in older adults. The prevalence of vitamin D deficiency is even higher in elderly patients with frailty fractures (varying from 55% to 91.6%). This study aims to describe patients with hip fracture and severe vitamin D deficiency.

Methods: We prospectively studied 50 patients, aged 75 years or older, with hip fracture and serum 25-hydroxyvitamin D (25OHD) <30 ng/mL admitted to the orthopaedic department. Data on patient demographics, comorbidities (Charlson Index), functional (Barthel Index) and cognitive status, prior falls, geriatric syndromes, frailty (Frail-VIG Index[1]) and serum 25OHD levels were collected.

Results: In 52% vitamin D deficiency being severe (serum 25OHD levels <12 ng/mL). Mean age was 88 (±4) y and 65% were women. 84% minimally dependency (Barthel Index >60/100); 46.2% no cognitive impairment; 50% no frailty. 92% polypharmacy and 96.2% high comorbidity. 84% had prior falls, adjusted for Barthel Index variables related to transfer (bed to chair and back) and mobility (around or ward) showed no statistically significant differences. Patients with lower serum 25OHD levels have higher percentage of falls (25OHD <12 ng/mL: 57.9%; 25OHD 12.1-20 ng/mL: 34.2% and 25OHD 20.1-30 ng/mL: 7.9%), no significant difference (p=0.38).

Conclusion: Patients with severe vitamin D deficiency and hip fracture are oldest women with high comorbidity, polypharmacy and previous history of falls. Considering the results we wonder if vitamin D supplementation in this group of patients could influence functional recovery and reduction of falls. To evaluate the effect of vitamin D supplementation in these patients, we are conducting a clinical trial.

Reference: 1. Amblàs-Novellas J et al. BMC Geriatr 2018;18:29.

P834
TNFα AS PREDICTION OF EFFICACY OF COMBINED TREATMENT IN RHEUMATOID ARTHRITIS

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Objective: To evaluate the benefit of TNFα measurement in patients with rheumatoid arthritis (RA) receiving methotrexate (MT) in combination with infliximab (IF) for prediction of the treatment efficacy.

Methods: 18 female RA patients were followed up for 30 weeks of treatment. Their mean age was 46±8.4 y, and mean duration of the disease was 13.2±5.3 y. RF positiveness was detected in 83.3%, and ACPA presence in 66.8% of patients. X-ray stages III and IV were most common (66.8%). Extra-articular manifestations of RA (mild anemia) were found in 66.8% of the subjects. All the patients received MT at a dose of 12.5-20 mg/week, NSAIDs were also regularly used as an additional medication on demand in every case. IF treatment was provided by the common protocol. Measurement of TNFα was carried out using ELISA kits, its upper limit of reference interval was 6 pg/ml.

Results: All RA patients had high disease activity. After the 3rd IF infusion, 88.9% of them showed marked clinical and laboratory improvement. In most patients pretreatment levels of serum TNFα did not significantly go beyond the normal range. The exception was 11.1% of patients who had elevated serum TNFα (mean level 6.96 pg/ml), all of them had more pronounced effect of therapy on the clinical and laboratory manifestations. At the same time, patients with high CRP level (more than 3 times higher than upper reference limit), higher TNFα concentrations, higher DAS28-CRP(4) scores, normal BMI (19.6-23.3 kg/m^2), and extra-articular manifestations had very good of moderate response for treatment and higher extent of decrease of all these markers at the end of follow-up.

Conclusion: The groups with a good and satisfactory response after 30 weeks of MT and IF treatment were consisted of patients with a normal BMI, a higher degree of disease activity, higher concentrations of CRP and TNFα, as well as with the extra-articular manifestations.

P835
ANGIOPOIETIN-LIKE PROTEINS AND ANTIBODIES TO MODIFIED VIMENTIN PARTICIPATE IN VARIOUS MECHANISMS OF DEVELOPMENT OF PERIARTICULAR OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To evaluate the role of immune and biochemical markers in increasing bone resorption and the development of periarticular osteoporosis (OP) in rheumatoid arthritis (RA).

Methods: Levels of angiopoietin-like protein type 4 (ANGPTL4) (RayBio Human ANGPTL4 ELISA Kit test system, RayBiotech), ANGPTL3 (Human Angiopoietin-like Protein 3 ELISA test system, Bio Vendor), ESR, C-reactive protein (CRP), IgM rheumatoid factor (RF), antibodies to cyclic citrulline peptide (anti-CCP) and antibodies to modified vimentin (anti-MCV) were determined in the blood serum of 88 patients with reliable RA. 57 patients with RA (64.8%) underwent osteodensitometry on a bone X-ray densitometer Lunar DPX (GE, USA) with an assessment of the condition of the bone tissue of the proximal femur according to the T-criterion (reduction from -1.0 to -2.4 – osteopenia; from -2.5 and below – osteoporosis).

Results: There was established a direct dependence of the level of ANGPTL3 on the presence of OP (r=0.36) as well as the level of ANGPTL4 on the presence of osteopenia (r=0.44). A negative relationship was found between the values of criterion T and anti-MCV (r=-0.673), but not anti-CCP (p>0.05). Anti-MCV has been shown to induce differentiation and activation of osteoclasts. ANGPTLs can activate the proliferation processes in the synovial membrane, and ANGPTL4 is able to regulate the activity of osteoclasts through the hypoxia/HIF (hypoxia inducible factor) system in order to enhance osteoclastic bone resorption.

A significant negative dependence of ANGPTL3 on a marker of cartilage damage - urine CartiLaps (r=-0.24) and creatinine level in urine (r=-0.28) was revealed. A negative dependence of ANGPTL4 on triglycerides (r=0.42, p=0.018), vitamin D (r=-0.417) and calcium levels in the blood (r=-0.522) and in urine (r=0.797) was found. There is no relationship between the presence of anti-MCV and the level of both ANGPTL3 (p>0.05) and ANGPTL4 (p>0.1). All these facts may indicate different mechanisms of development of periarticular OP in patients with RA positive for anti-MSV and ANGPTL proteins types 3 and 4.

Conclusion: ANGPTLs are potential markers of the destruction of major joint components in RA. The progression of periarticular OP occurs according to various development mechanisms in the groups of seropositive for ANGPTLs and anti-MCV patients with RA.

P836
HIP FRACTURES IN POPULATION OLDER THAN 50 YEARS IN THE CZECH REPUBLIC: DIAGNOSTIC AND TREATMENT GAP

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Hip fracture is one of most devastating consequence of osteoporosis. Hip fracture has high mortality morbidity and disability rate and spends significant health care costs. Hip fracture represents also higher risk factor for future fractures. In past years significant diagnostic and treatment gap was identified inpatients after hip fracture different countries. Fracture Liaison Services (FLS) has been demonstrated as the most effective approach to secondary fracture prevention. Before its implementation it is necessary to know the scope of diagnostic gap on the national level. Using the data from Czech National Health Care Registry we analysed hip fracture frequency and diagnostic gap in 2016-2017 in the Czech Republic as the first step of FLS implementation. We analysed osteoporosis treatment used 12 months before and after the fracture and also the evidence of DXA assessment as marker of osteoporosis evaluation. We found 32 515 hip fractures reported in patients older than 50 y. We excluded 2235 patients with important secondary cause (haemodialysis, use of glucocorticoids, antioestrogens and antiandrogens). Further 30 280 patients were evaluated. 12 months mortality rate was 31.3%, that was age dependent. 12.7% died within first 10 d, 46.9% between 11 to 99 days and 40.4% died between 91 d to 1 y. In the group of hip fracture patients 4.3% had used osteoporosis treatment in the year before the fracture, and 3.8% within the 12 months after the fracture. DXA was done in 3.6% of patients up to 12 months before the fracture and in 3.8% after the fracture. We conclude that in the Czech Republic hip fracture has mortality rate 31% within the first 12 months, 96% did not receive osteoporosis treatment (treatment gap), 96.4% did not undergo DXA assessment within 12months after the fracture (diagnostic gap). There is a lot to improve. FLS implementation seems to be the most effective tool to success and must be regular part of paid health care costs.

P837
RESULTS OF 9 MONTHS FRACTURE LIAISON SERVICES (FLS) FOR HIP FRACTURES IN KLATOVSKA HOSPITAL, CZECH REPUBLIC

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Hip fracture is the most serious osteoporotic fracture with high mortality and morbidity. Patients suffering from hip fracture have high risk for another fracture. Osteoporosis treatment and diagnostic gap in hip fracture patients is serious problem in many countries. FLS has been demonstrated as the most effective approach to secondary fracture prevention and to lower treatment and diagnostic gap. First, we did retrospective analysis of 350 hip fractures and only 8.2% of patients had DXA (diagnostic gap 91.8%) and 8.6% had osteoporosis treatment within 12 months (treatment gap 91.4%) after the fracture. Therefore since January 2019 we have established local FLS programme for hip fractures. The idea is to assess all hip fractured patients within 3 months after the fracture by DXA and clinical evaluation and to treat them if indicated. Programme efficiency was re-evaluated every 3 months. We present data from period January to September 2019. We identified 115 hip fractures, 73 women (1 had 2 hip fractures) and 41 men. 73% had arranged appointment for DXA and clinical consultation. DXA and clinical consultation were done in 53.6% of them (39.1% of all fractures) and 68.9% of them (27.0% of all fractures) started osteoporosis treatment. Compared to our retrospective study we increased DXA and clinical consultation more than 4 times (39.1% vs. 8.2%), diagnostic gap decreased to 60.9%. Number of treated patients increased by 3 times (27.0% vs. 8.6%) and treatment gap decreased to 73.0 %. Main factors limiting DXA and clinical examination were severe disability, death and comorbidities at the time of appointment. These facts limit efficiency of FLS to 53.6% of all appointed. But if DXA and clinical consultation have been done, patient would have had 68.9% chance to get osteoporosis treatment. The rest 31.1% either had not osteoporotic fracture or treatment was delayed. Despite we expected better efficiency, FLS seems to be effective system.

P838
RECENT TREND IN THE INCIDENCE OF HIP FRACTURE IN TOTTORI, JAPAN

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Objective: We previously reported that the incidence of hip fracture in Tottori Prefecture, Japan, has been increasing from 1986-2006. The purpose of this study was to investigate the recent trend in the incidence of hip fracture in Tottori Prefecture.

Methods: Tottori Prefecture is located in midwestern Japan and its population was 599,830 and 560,517 in 2007 and 2018, respectively. The percentage of the total population aged 65 years and over was 25.1% and 31.3% in 2007 and 2018, respectively. A survey of all hip fractures in patients 35 years old and over during 2007-2018 (except 2015) was performed in all hospitals in Tottori Prefecture. Registration information included gender, age, date of fracture, type of fracture, and treatment. Patients residing in other prefectures were excluded. The age- and gender- specific incidence rates (per 100,000 person-years) were calculated based on the population of Tottori Prefecture in each year.

Results: The survey identified 838(163 men and 675 women), 1001(195 and 806), 894(202 and 692), 1089(197 and 892), 1091(249 and 842), 1177(233 and 944), 1263(248 and 1015), 1120(243 and 877), 1224(281 and 943), 1222(269 and 953), and 1260 (304 and 956) patients in 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2016, 2017, and 2018, respectively. The expected number of patients (per 100,000 person-years) adjusted for age- and gender-specific incidence in each year standardized using the 2007 population structure in Japan was 326.4, 378.9, 331.4, 388.7, 388.7, 400.3, 415.4, 368.6, 386.6, 359.3, and 379.0, respectively. The highest number of fractures occurred in January; the lowest number of fractures occurred in June, and this monthly variation was significant.

Conclusion: With these data, we can see that the incidence of hip fracture in Tottori has not increased recently.

P839
BONE MICROSTRUCTURES OF ADULT PATIENTS WITH POSTSURGICAL HYPOPARATHYROIDISM AND NONSURGICAL HYPOPARATHYROIDISM

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Objective: Due to lack of PTH, bone metabolic profiles such as turnover rates and fracture risks are altered for patients with hypoparathyroidism (hypoPT). Risk for fractures differ among patients with hypoPT due to different etiologies, including post-surgical hypoPT (ps-hypoPT) and non-surgical hypoPT (ns-hypoPT); therefore, bone structures are supposed to be different for these patients with distinct etiologies. Evidence is lacking to support such hypothesis. The current study aimed to analyze bone microstructure of patients with hypoPT of different etiologies using HR-pQCT.

Methods: Adult patients with hypoPT were recruited from a major tertiary hospital in Beijing, China between Jan, 2016 to Dec, 2017. All participants received HR-pQCT scan and biochemical assessment. Demographic information and use of hypoPT-related medications were also noted. Healthy controls were chosen from previously measured data bank of HR-pQCT, matching for gender and age±3 y.

Results: A total of 110 patients with hypoPT were recruited, including 16 patients with ps-hypoPT and 94 patients with ns-hypoPT. Mean age of ps-hypoPT patients was 57.0±9.1 years old and 94% were female, whereas ns-hypoPT patients were younger (36.2±12.5 years old) and female only accounted for 55%. There were significant increase in trabecular thickness and number for patients with hypoPT regardless of gender and diagnosis, compared to healthy control; whereas increase in vBMD were only prominent for female patients with ns-hypoPT. After controlling for gender, diagnosis and menstrual status, patients with ns-hypoPT had significantly higher vBMD (316.797±45.62 vs. 254.925±57.15 mg HA/cm^3) and trabecular number(1.374±0.25 vs. 1.166±0.13 mm) in the tibia, compared to patients with ps-hypoPT. While gender, age and BMI all influenced bone microstructures, influence of disease duration and treatment duration had on bone microstructures were inconsistent and mostly insignificant.

Conclusion: This study assessed bone microstructures of patients with hypoPT using noninvasive techniques. It provided data on bone microstructures from the largest patient cohort with ns-hypoPT so far. It is also the first study to reveal the significant differences in bone microstructures between patients with ps-hypoPT and ns-hypoPT, which provided disease-specific data on metabolic bone profiles for patients with hypoPT.

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P840
ASSESSMENT OF BONE MASS IN POSTMENOPAUSAL WOMEN

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Objective: Bone mass is one of the components of body weight found to be associated with bone status. Bioimpedance analysis (BIA) is a widely applied approach for assessment of body composition. BIA measures the electrical properties of body tissues and could estimate body composition parameters. One of those parameter is bone mass. The aim of this study is to assess the bone mass in postmenopausal women.

Methods: Bone mass has been assessed in 52 postmenopausal women. It was analyzed using BIA. We formed three groups according to the bone mass: with low, medium and high bone mass. Low bone mass was defined as bone mass 1.95-2.39 kg. Medium bone mass was defined as bone mass between 2.40-2.94 kg and high bone mass - as bone mass ≥2.95 kg. We analyzed the number of the women in the different groups and their weight.

Results: The mean age of the women was 63±1 y with range 46-83 y. The mean bone mass was 3±1.15 kg (range 1-5 kg). 19 women (36.5%) had low bone mass, 8 women (15.4%) had medium bone mass and 25 women (48.1%) had high bone mass. Women with low bone mass had mean weight 55.1±1.7 kg (range 39.4-69 kg), those with medium bone mass had mean weight 65.8±9.5 kg (range 57-85 kg) and women with high bone mass had mean weight 76.8±11.6 kg (range 49-100 kg).

Conclusion: About one third of the postmenopausal women showed low bone mass assessed with BIA.

P841
ESTIMATION OF STRUCTURAL STATE OF VASCULAR WALL OF CAROTID ARTERIES IN MEN WITH CORONARY HEART DISEASE DEPENDING ON BONE MINERAL DENSITY

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Objective: To assess the structural state of the vascular wall of carotid arteries in men with coronary heart disease (CHD) depending on BMD.

Methods: 102 of men with verified CHD aged 51-75 (60.8±6.9) were examined. All patients performed DXA (Excell XR-46, Norland, USA). On the basis of results of densitometry on value of T-criterion estimated BMD condition: normal BMD (T criterion ≥-1), osteopenia (OPe) (T-criterion from-1 to-2.5) and osteoporosis (OP) (T criterion <-2.5). The threshold value of the thickness of the intima-media (TIM) complex for men over 50 y of age was considered 0.9 mm (American Union of Echocardiography,

2008). The assessment of the expression and prevalence of atherosclerotic carotid artery (CA) lesion was carried out in accordance with the classification developed of the Russian Cardiological Scientific and Production Complex (2008).

Results: According to the results of densitometry, 21 patients (20.6%) have normal BMD, 48 (47.0%) have OPe and 33 (32.4%) - OP. Osteopenic syndrome (OPS) is found in 79.4% of men. The absolute majority of men with CHD (88 patients, 86.3%) had a TIM value above the threshold (0.9 mm). Thickening of intima-media complex is registered in men with OP in 88.0% cases, with OPe - in 87.5%, with normal BMD - in 81.0% without statistically significant differences (p > 0.050). In comparative analysis of atherosclerotic CA lesion in men with CHD depending on T-criterion, it was found that multiple ABS with stenosis less 50% occurred reliably more often in patients with OP compared to a group of men with OPe (24.2% vs. 6.3%, p=0.049). Men with OP were found to be significantly more likely to have ABS in CA (75.8%) compared to patients with OPe (43.7%, p=0.010) and normal BMD (38.1%, p=0.016). Patients with CHD and OPS showed more pronounced and common atherosclerotic CA lesion (stenosis 50% or more, multiple ABS).

Conclusion: The results of the work show in favor of a more pronounced and common atherosclerotic CA lesion in men with OPS compared to patients with normal BMD.

P842
INCLUSION OF PATIENTS IN THE PROGRAM OF PREVENTION OF SECONDARY FRACTURES: BASIC PROBLEMS AND WAYS OF THEIR RESOLUTION

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Objective: The assessment of subsequent fractures risk and the initiation of osteoporosis treatment in patients with low-energy fractures is the main aspect of the work of secondary fracture prevention service (FLS). We aimed to study the frequency of subsequent fractures risk assessment, the appointment of antiosteoporotic drugs in patients included in FLS and to determine the reasons for their failure.

Methods: We evaluated the work of the FLS which was created in the Emergency Hospital n.a. N.V. Solovyov. The service included all patients aged ≥50 y admitted with hip, proximal humerus and vertebral fractures. They were revealed and assessed by a coordinating nurse. Before their discharge patients were consulted by rheumatologists due to osteoporosis. Within 6 months, 484 patients were included.

Results: A risk assessment of subsequent fractures wasn't performed in 89 (18.39%) patients. Reasons were: death - in 11 (12.36%) people, severe condition and/or dementia - 34 (38.20%), patient's failure - 3 (3.37%), 41 (46.07%) patients were discharged prior to assessment. A specialist's consultation was carried out

in 310 (64.05%) patients. Among the reasons why some weren't consulted, we note the following: 81 (46.55%) people were discharged earlier, serious condition and dementia were in 58 (33.33%) cases, 17 (9.77%) died, 11 (6.32%) refused, 7 (4.02%) people had lack of laboratory examination. Calcium and/or vitamin D were prescribed to 288 (92.90%) consulted patients. In other cases, there were significant deviations of lab tests, severe urolithiasis, and others. Anti-osteoporotic drugs were prescribed to 219 (70.65%) patients. The reasons why the therapy was not initiated: a severe condition or dementia - 14 (15.38%), patient failure - 4 (4.40%), hypocalcemia, hyperparathyroidism and others - 63 (69.23%), and low risk of subsequent fractures - 10 (10.99%).

Conclusion: The analysis of care in the framework of the FLS allows to clarify the reasons why patients do not receive examination and/or treatment initiation. In cases where this doesn't depend on the patient's condition it's necessary to optimize the providing of medical care (improve the process of examination, minimizing the time, involve other specialists to support the idea of treating osteoporosis, patient education).

P843
RISK FACTORS FOR OSTEOPOROSIS AND OSTEOPOROTIC FRACTURES IN MEN WITH ISCHEMIC HEART DISEASE

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Objective: Study of risk factors of OP and osteoporotic fractures in men with coronary heart disease (CHD).

Methods: Risk factors of OP and osteoporotic fractures were studied in 102 men aged 51-75 (median age 61 (55; 65) y) with CHD verified by corona angiography. On the basis of result of a two-power absorptiometry on T-criterion of lumbar department of a backbone and a neck of a hip at all patients the BMD as follows was estimated: normal BMD (T-criterion ≥-1), osteopenia (T-criterion from-1 to-2.5) and OP (T-criterion ≤ - 2.5). The FRAX calculator was used to assess the risk of major osteoporotic fractures and proximal hip fracture in the next 10 y.

Results: On the BMI patients were distributed as follows: normal BMI is noted at 21.6%, raised - at 56.9%, obesity (BMI of ≥30 kg/m²) - at 21.6% of patients. The deficiency of body weight (BMI of <18.5 of kg/m²) at patients is not revealed. Of all the patients examined, 61.7% of men smoked. Previous fractures were recorded in 21.6% of cases, history of hip fracture in parents - 6.9%. According to BMD, most patients (79.4%) had osteopenic syndrome (OPS), in the structure of which osteopenia was found in 47.0% of patients, and OP - in 32.4%. A high risk of major fractures by FRAX was identified in 10.8%, a high risk of hip fractures in 3.9% of patients. Correlation analysis showed a significant negative correlation between BMI and risk of hip fracture on the FRAX scale (r=0.23; p=0.020).

Conclusion: The significant prevalence of OPS shows a high proportion of the combination of atherosclerotic process with low BMD among men with CHD aged 51-75. The increased risk of hip fracture on the FRAX scale is associated with a decrease in BMI in men with CHD over 50 y of age.

P844
VITAMIN D METABOLISM RESPONSE TO THE BOLUS DOSE OF CHOLECALCIFEROL IN THE SETTING OF LOW AND HIGH 25(OH)D LEVELS

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Objective: to study vitamin D metabolism during high-dose cholecalciferol treatment in healthy individuals with deficient and sufficient state of vitamin D.

Methods: The study included 16 young conditionally healthy individuals, divided into two equal groups: with levels of 25(OH)D below and above 30 ng/ml determined by the immunochemiluminescent method (Group A and Group B, respectively; DEQAS certified). All participants were evaluated for vitamin D metabolites (25(OH)D3, 25(OH)D2, 3-epi-25(OH)D3 and 24,25(OH)2D3) by HPLC/MS-MS (DEQAS certified); PTH by electrochemiluminescent method; free 25(OH)D and vitamin D-binding protein (DBP) by ELISA using commercial kit; blood and urine biochemical parameters of calcium-phosphorus metabolism before oral intake of 150,000 IU of an aqueous solution of cholecalciferol and 7 d after administration.

Results: At baseline we observed higher median free 25(OH)D (9.6 vs. 6.2 pg/ml, p=0.04) and lower 25(OH)D2 (0.7 vs. 1.3 nmol/l, p=0.01) in Group B with no significant differences in other studied vitamin D metabolites and DBP. In group A, strong positive correlations were observed between baseline levels of 25(OH)D3 and 3-epi-25(OH)D3 (r=0.89, p<0.05), 24,25(OH)2D3 (r=0.9, p<0.05), while in group B there were no such associations. After taking a loading dose of cholecalciferol, the groups showed generally similar changes in the studied vitamin D metabolites: a significant increase in 25(OH)D3, 3-epi-25(OH)D3 and free 25(OH)D, a decrease in 25(OH)D2 and 24,25(OH)2D3 to 25(OH)D3 ratio (VMR) and no change in DBP. However, 24,25(OH)2D3 level didn't change in group B, with a significant increase in group A. In group A among the studied metabolites D a significant correlation for an increase of 25(OH)D3 was observed only with the baseline free 25(OH)D (r=-0.86, p<0.05), while in group B - only with the baseline 25(OH)D3 (r=-0.74, p<0.05). Baseline free 25(OH)D in group A showed significant positive correlation with VMR after cholecalciferol intake (r=0.93, p<0.05). The medians of the studied biochemical parameters in blood/urine, as well as PTH, remained unchanged in both groups.

Conclusion: The observed decrease in VMR on the 7th day after bolus cholecalciferol intake in both groups indicates inactivation of 24-hydroxylase in early period. Increase of 24,25(OH)2D in the vitamin D deficient group in contrast to the sufficient patients may

be due to the initial decreased activity of the enzyme in low 25(OH)D levels. The obtained data also indicates that the effectiveness of cholecalciferol therapy is reflected by baseline 25(OH)D3 in vitamin D sufficient patients, but baseline free 25(OH)D in patients with vitamin D deficiency.

P845
PERIOPERATIVE COMPREHENSIVE GERIATRIC ASSESSMENT CAN IMPROVE OUTCOMES FOR ELDERLY FRACTURE PATIENTS

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Objective: Earlier recovery of fracture after operation in the older patients is the foremost goal for healthcare providers. This study aimed to evaluate whether perioperative comprehensive geriatric assessment (CGA) can improve outcomes for elderly fracture patients.

Methods: A total of 242 fracture patients aged 80 years or older were enrolled in the orthopedic ward of Shin Kong Wu Ho-Su Memorial Hospital (SKH), a north Taiwan medical center, from May 2018 to December 2019. We excluded subjects with serious diseases, such as end-stage disease, severe dementia, and complete activity of daily living (ADL) dependence. The contents of CGA included a comprehensive assessment of function, mind, emotion, society, economy, environment, and soul. The CGA was executed before and after operation, by an interdisciplinary geriatric assessment team, consisting of a geriatric physician, a geriatric nurse, a pharmacist, a dietitian, a rehabilitation team (physical, occupational, and speech therapists), a health psychologist, a geriatric social worker, and a religious teacher.

Results: The outcome measures were categorized to primary and secondary types. The primary outcomes were evaluated by mobility (timed up and go test), decline of ADL function, and mortality rate. Secondary outcomes were assessed via postoperative complication rates (e.g., infection, delirium, pressure sore, and vascular complications), length of stay, readmission rate, and discharge destination to the original place of residence or a higher level of care, such as a long-term care facility. We compared the outcomes of elderly fracture patients in SKH from 2016-2017, before the implementation of perioperative CGA. The statistical analyses were adjusted for age, BMI, smoking, alcohol intake, and socioeconomic status. Both primary and secondary outcomes improved with statistical significance (P-value<0.05) after perioperative CGA.

Conclusion: Perioperative CGA can improve outcomes for elderly fracture patients. Building an interdisciplinary geriatric assessment team to carry out CGA perioperatively is suggested when dealing with fracture in older adults.

P846
COMPARISON OF VITAMIN D LEVELS IN PATIENTS WITH VARIOUS ENDOCRINOPATHIES

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Objective: To provide a comparative assessment of vitamin D levels in patients with diabetes mellitus type 2, primary hyperparathyroidism (PHPT), central hypercortisolism (Cushing's disease; CD) and acromegaly.

Methods: The study included 16 patients with diabetes mellitus type 2, 23 patients with PHPT, 68 patients with CD, 22 patients with acromegaly, and 163 apparently healthy patients. Total 25(OH)D was determined using the immunochemiluminescent method (the laboratory participates in the DEQAS program). All patients had GFR >60 ml/min, no history of use of vitamin D supplementation within previous month.

Results: Significantly low levels of vitamin D were found in patients with diabetes (15.3 ng/ml), acromegaly (15.7 ng/ml), CD (16.6 ng/ml) compared with a group of healthy patients (19.9 ng/ml). In the PHPT group, vitamin D levels were not statistically different from the main group.

Conclusion: The results of the study demonstrate a high prevalence of vitamin D deficiency not only in groups of patients with chronic diseases, but also among practically healthy patients. The absence of significant deviations in the concentration of vitamin D in patients with PHPT may be due to the use of vitamin D preparations in the complex treatment of osteoporosis, which is one of the main manifestations of the disease. Further studies are needed to address the causes of high vitamin D deficiency in the described endocrine diseases.

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P847
THE DEVELOPMENT OF FRACTURE LIAISON SERVICES IN HONG KONG: FROM VIEW OF A FRACTURE LIAISON NURSE

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Objective: Global aging causes increase Fragility Fracture (FF), demands more hospital services worldwide. Secondary fracture prevention is utmost essential to allocate the limited resources to the high-risk group of patients. Hospital Authority (HA) launched the Fracture Liaison Service (FLS) in 3 major public hospitals with 3 Fracture Liaison Nurses (FLNs) appointed. Queen Elizabeth Hospital (QEH) is one of the hospitals to pilot this plan.

QEH FLS team was established in 2017. The 3 I protocol was advocated (Identification, Investigation & Initiation). A comprehensive secondary fracture prevention programme was launched from 2018 to all patients admitted for fragility hip fractures. Without local experience, FLS started from zero with heart and enthusiasm. I learnt and practiced FLS with reference to international literatures, reliable websites and international conferences. Discussions and meetings among colleagues to draft a local FLN service model that tailored uniquely to the hospital needs. Learning and sharing with local and international experts, visiting field trips were arranged to learn and develop local FLS model. I am graceful to have the opportunities to learn and share our FLS model with different countries. We aimed to share FLS development and review FLS day clinic service in QEH.

Methods: FF day clinic service was evaluated retrospectively from 2018-2019. The data on attendance, drug compliance, MDT assessment and education, secondary fall rate and secondary fractures were collected and reviewed.

Results: 324 FF patients were recruited over 2 y. 92.3% of FF patients continued their treatment and 98.3% had good drug compliance. All received MDT service and expressed satisfaction by patient satisfactory survey. 15.3% had subsequent fall within a year and only 3% sustained another fracture. The rate of secondary fracture 4.67% in 2017 to 3% in 2018 with 35.8% reduction. This report showed the efficacy on preventing secondary fracture. No complication of antiosteoporosis treatment reported.

Conclusion: FLS provides quality FHF care and secondary fracture prevention with encouraging results and good patient satisfaction. The awareness of osteoporosis and fall prevention was low and promulgation of bone health & FLS to the public should be reinforced. Therefore, FLNs has additional role on education and promotion of the FLS. The most treasurable moment is seeing patients with good rehabilitation and liaise with team members with positive impact on care. With successful experience of FLS development, HA is planning to implement FLS in other public hospitals. Different countries are unique and varied in their health care system but we share the same goal. We are delighted to share our experiences and liaise with other FLS coordinators worldwide.

P848
BMD DEPENDING ON THE RADIOLOGICAL STAGE OF OSTEOARTHRITIS OF THE KNEE AND HIP JOINTS IN OLDER WOMEN

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Objective: To study the state of BMD in elderly and senile women with osteoarthritis (OA) of the knee and hip joints.

Methods: The study included 124 women (mean age 73.3±8.46 y) with a reliable diagnosis of OA, verified according to the diagnostic the criteria of ACR. The assessment of the lumbar spine BMD (L^I-L^{IV}) and femoral neck. All patients underwent radiography of knees and hip joints in a direct projection with an assessment of the X-ray stage on based on the Kellgren-Lawrence classification.

Results: Total incidence of osteoporosis (OP) in the study cohort was 28%, osteopenia (OPe) - 41%. OP diagnosed in 20% of women aged 60-74 y and 38% - at the age of 75-90 y (p<0.05). OPe was detected in 41% of elderly patients and 42% of senile woman (p>0.05). When analyzing BMD indicators in the femoral neck in women with OA of the hip joints of stage I-II and III-IV in the age group 65-74 y, it was found that the absolute values of BMD were significantly higher in women with later stages of the disease (p<0.05). In the age group of 75 years and older there were significantly higher values of BMD in the femoral neck in women with OA of the hip joints of stage III and IV compared to women with stage I and II OA of the hip joints (p<0.05). At the same time in the lumbar spine later stages of hip OA were associated with lower BMD values (p<0.05). It is shown that patients with OA of the knee joints of stage III and IV had significantly higher values of BMD in the lumbar spine in the group of elderly women and senile age (p<0.05). Indicators of BMD in the femoral neck in patients with knee OA joints of stages I-II and III-IV were comparable in both age groups (p>0.05).

Conclusion: Thus, it is obvious that the relationship between BMD and OA manifestations it is contradictory and requires further study of the aspects of the coexistence of these two diseases.

P849

FRAX WITH OR WITHOUT BONE MASS DENSITY: ANY DIFFERENCE IN PREDICTING FRACTURE RISK?

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Objective: FRAX provides us with the ten-year fracture probability or absolute risk to assist us in deciding whether to initiate treatment in an untreated individual. Relying on BMD alone, patients with osteopenia who are at high risk of fracture according to FRAX will not be treated. Therefore, the use of BMD measurement alone to predict osteoporosis fracture risk is no longer appropriate. The aim of our study was to determine if FRAX calculations without BMD and with BMD would produce identical predictions for the 10-year probability of fracture risk among patients in our Hospital Canselor Tuanku Murhiz, Malaysia.

Methods: It is a prospective study from 1st November 2018 to 31st October 2019. Patients who had BMD under Fracture Liaison Service follow-up who sustained fragility fractures were identified. FRAX scores with BMD (FRAX/BMD) and without BMD (FRAX) were calculated.

Results: Total of 86 patients had BMD and 7 (8.1%), 35 (40.7%) and 44 (51.2%) patients were normal, osteopenia and osteoporosis respectively. FRAX/BMD showed 60 (69.8%) patients and FRAX showed 66 (76.7%) patients needed to start treatment to reduce risk of secondary fracture. There were no significantly different between FRAX/BMD and FRAX alone (P -0.20).

Conclusion: In most cases, FRAX alone provides the same prediction as FRAX with BMD. However, BMD still play an important role in monitoring the progress of osteoporotic treatment.

P850

A SINGLE INJECTION OF ANIMAL FREE CA-CHITOSAN PROVIDES LONG-LASTING REDUCTION OF OSTEOARTHRITIC SYMPTOMS: THE APROOVE CLINICAL STUDY

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Objective: The ability of a long-lasting bioresorbable product to help lubricate and to protect synovial from scavenging free radicals could be of interest to prevent osteoarthritic symptoms. The goal of the APROOVE [1] premarket clinical study is to evaluate the safety and performance of an innovative intra-articular device based on animal-free CA-Chitosan intended for the symptomatic treatment in patients with knee osteoarthritis.

Methods: Primary objectives of the APROOVE study were to evaluate the short-term and long-term safety of CA-Chitosan as well as the single injection performance of CA-Chitosan on knee pain as measured by change from baseline using the 5-graded Likert WOMAC pain score (n=70; 8 investigation sites).

Results: No serious adverse event or unanticipated adverse event was reported. Treatment-related adverse events and adverse device effects were local reactions reported shortly after the injection; they were self-limited and did not affect the clinical performance of the treatment. 6 months after injection, there was a significant decrease of the WOMAC pain score from 11.1±2.2 at baseline to 3.7±3.4 (p<0.0001; paired Student's t test). The effect size of 2.0 corresponds to a mean reduction of knee pain of 66.3% vs. baseline. The treatment responders' rate was 76.5% based on OMERACT-OARSI criteria. Significant improvements of WOMAC C function score were also reported. Overall the patients were satisfied to very satisfied about the treatment (86%), the investigators were satisfied to very satisfied by the clinical evolution of their knee pain (90%), function (86%) and patient's health (78%).

Evolution of WOMAC Pain Score
(PP cohort, ANOVA for repeated measures p*<0,001)
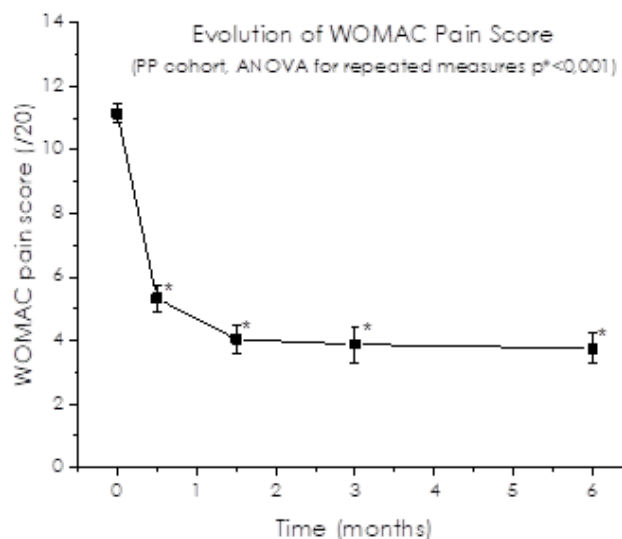
Conclusion: A clinically significant reduction of pain from the pre-injection status is obtained and lasts at least 6 months after a single intra-articular injection of CA-Chitosan; the treatment allows to decrease joint pain and improves the osteoarthritic symptoms by providing lubrication and protection of synovial joints affected by pathological changes.

P851
ASSESSMENT OF MUSCLE MASS IN POSTMENOPAUSAL WOMEN

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Objective: Muscle mass has a known impact on the bone and it belongs to the criteria for definition of sarcopenia (4). Muscle mass could be assessed with bioelectrical impedance analysis (BIA), which is noninvasive and inexpensive method for measuring body composition. Another noninvasive method – radiofrequency echographic multispectrometry has also been recently introduced for evaluation of body composition (1,2). The aim of this study is to assess the muscle mass with BIA in postmenopausal women.

Methods: 89 postmenopausal women have been assessed with BIA. Age, weight, height and muscle mass in kg/m^2 were the analyzed parameter. Low muscle mass was defined as muscle mass <5.67 kg/m^2 as per definition of sarcopenia (3).

Results: The mean age of the women was 62 ± 11 y (range 45-84 y). The mean weight was 68.1 ± 14.6 kg (range 39.4-106 kg). The mean height was 157.4 ± 8.3 cm (range 135-182 cm). The mean muscle mass was 11.4 ± 1.9 $kg/m^{2.}$ (range 5.5-15.5 kg/m^2). Two women (2.3%) had low muscle mass under 5.67 kg/m^2. 17 women (19.1%) had muscle mass between 6-10 kg/m^2, 35 women (39.3%) had muscle mass between 10-12 kg/m^2 and 35 women (39.3%) had muscle mass above 12 kg/m^2.

Conclusion: Postmenopausal women in the current study showed relatively low incidence (2.3%) of muscle mass values corresponding to sarcopenia.

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P852
ASSOCIATION OF PERSISTENT HIGH-IMPACT ACTIVITY AND FITNESS IN EARLY LIFE WITH BONE DENSITY AND MICROARCHITECTURE IN YOUNG ADULTHOOD

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Objective: This prospective study aimed to investigate whether persistent high-impact activity (HIA) and fitness during adolescence and young adulthood were associated with BMD and microarchitecture in young adulthood.

Methods: We followed 201 participants from birth to 25 y. Outcomes were areal BMD (aBMD) at the lumbar spine (LS), hip and total body (by DXA) and trabecular and cortical bone measures (by HR-pQCT) at the radius and tibia. Exposures were HIA participation (by questionnaire) and fitness (by physical work capacity (PWC_{170})) at ages 16 and 25 y. Multivariable linear regressions were used to assess associations of different HIA and fitness patterns between age 16 and 25 with bone measures at age 25.

Results: There were significant interactions between HIA/fitness patterns and sex for most bone measures. Compared to those with persistently low HIA, males with persistently high HIA (n=36) had better bone outcomes at age 25 (aBMD at all sites; trabecular volumetric density (Tb.vBMD), trabecular number, trabecular separation, trabecular bone volume fraction (Tb.BV/TV) at both radius and tibia, and cortical thickness (Ct.Th) and inner transitional zone porosity at the tibia). Persistently high fitness was also associated with higher LS and hip aBMD, higher Tb.BV/TV at the radius and higher Tb.vBMD, Tb.BV/TV, trabecular and cortical thickness (Tb.Th, Ct.Th), lower inner transitional zone porosity at the tibia compared with persistently lower fitness. For females, compared to those with persistently low HIA, participants with persistently high HIA (n=12) had higher total volumetric density and lower inner transitional zone porosity at the tibia only. Persistently high (n=28) compared to lower fitness was only associated with higher Ct.Th at the tibia.

Conclusion: Maintaining high HIA and fitness from adolescence to young adulthood appears beneficial for bone density and microarchitecture in young adulthood particularly in males. This supports health promotion messages highlighting the lifelong potential benefits of physical activity for bone.

P853
AUTOSOMAL RECESSIVE HYPOPHOSPHATEMIC RICKETS TYPE 1 CAUSED BY DIFFERENT DMP1 MUTATIONS IN THREE CHINESE FAMILIES

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Objective: To report three pedigrees with autosomal recessive hypophosphatemic rickets type 1 (ARHR1) from China and describe their change of bone microstructure and response of phosphates absorption after phosphate loading.

Methods: In this study, we summarized the clinical data, collected the serum and urine samples for biochemical test. An oral phosphate test was performed on patients. Patients were scanned by HR-pQCT to analyze the change of bone microstructure. *DMP1* gene mutation was analyzed by sanger sequencing and the pathogenicity of novel splicing mutation was proved by minigene assay.

Results: Three pedigrees presented with lower limb deformity and short stature, characterized with hypophosphatemia, elevated alkaline phosphatase (ALP), high to normal intact PTH (iPTH), high intact FGF-23 (iFGF23). Result of an oral phosphate test, compared with XLH and ADHR, revealed ARHR1 patients had

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a better gastrointestinal phosphate absorption and stronger stimulation of iPTH and iFGF23. Serum sclerostin level elevated in ARHR1. Radiographs showed short and deformed long bones, degenerative arthritis in spine and coexistence of osteomalacia and osteosclerosis in pelvis and hand. Areal BMD of axial bone by DXA was relatively high rather than decreased as expected for osteomalacia, while volumetric BMD and microstructure of distal radius and tibia detected by HR-pQCT was obviously damaged in ARHR1 patients. Mutation analysis of DMP1 revealed a novel homozygous splicing mutation c.54+1G>C in Family 1, a reported splicing mutation c.184-1G>A in Family 2, and a novel nonsense mutation c.94C>A (p.E32X) in Family 3. Minigene assay proved the pathogenicity of novel splicing mutation leading to abnormal splicing of exon 2.

Conclusion: We reported 3 unrelated pedigrees with ARHR1 from Chinese population and identified 2 novel *DMP1* mutation. We also firstly reported the bone microarchitecture features of ARHR1 patients by HR-pQCT. All these findings expanded the genotypic and phenotypic spectrum of ARHR1.

P854
HYPERBARIC OXYGEN THERAPY AND QUALITY OF LIFE IN PATIENTS WITH SYSTEMIC SCLEROSIS

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Objective: Adjunctive treatment with hyperbaric oxygen therapy (HBOT) in systemic sclerosis (SSc) patients is very limited. The aim of the study is to evaluate whether HBOT improves the health related quality of life in SSc patients.

Methods: 18 female patients aged 29-68 y (mean 57 y) with limited SSc and digital or leg ulcers were included in this work. The HBOT protocol comprised 20 sessions 5 d weekly, 60 min, 100% oxygen at 2.2 ATA. The treated patients were evaluated at baseline and after 20 HBOT sessions. Evaluation consisted of physical examination, capillaroscopy, pulmonary function tests, biochemical analyses, sociodemographic and clinimetric questionnaires for their functional status (Systemic Sclerosis Questionnaire, SySQ and Health Assessment Disability index Questionnaire, HAQ-DI); psychological status (Patient Health Questionnaire-9, PHQ-9 and General Anxiety Disorder-7,GAD-7).

Results: Mean value [before: after, mean (range)] for SySQ [15.5 (4-48) vs. 9.0 (3-31)], HAQ [0.60 (0-2.88) vs. 0.35 (0 -1.75)], PDQ-9 [7 (0-14) vs. 4 (0-10)] and GAD-7 [6 (0-11) vs. 4 (0-6)] significantly improved after HBOT sessions (p<0.001). Mean size of ulceration before HBOT was 12x11 mm, and after therapy was 4x4 mm (p<0.001). Three patients had digital gangrene. Amputation was not require for any.

Conclusion: Our results suggest that SySQ and HAQ-DI captures a range of complex health problems experienced by people with SSc. Hyperbaric oxygen therapy improved the health related quality of life as well as psychological status in these patients. Further studies are required to evaluate the protocol and to understand the duration of the clinical effect.

P855
THE SUPERIORITY OF DANCE IN IMPROVING THE FUNCTIONALITY OF KNEES WOMEN WITH OSTEOARTHROSIS

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Objective: To compare joint functionality between women with knee osteoarthritis who participate in a monitored physical activity program of stretching and resistance exercises for the elderly and among participants in a recreational dance group. **Methods:** Cross-sectional cohort study approved by the Ethics and Research Committee, all participants provided informed consent. The study included 47 women with knee osteoarthritis, over 50 years old. They all participated regularly in their groups for more than 8 weeks. One group, containing 25 women, participated in recreational dance for the elderly; the other, with 22 women, performed physical activity monitored for stretching and resistance exercises. All were interviewed and answered a sociodemographic and health questionnaire. Likewise, joint function was assessed using the WOMAC questionnaire, where the domains of pain, joint stiffness and physical dysfunction were quantified. Descriptive statistical analysis was used and the Shapiro Wilk test verified the normality of the data. Student's T and Mann-Whitney U tests were used to compare the sample characterization data. Categorical variables were compared using the chi-square test. Effect sizes were calculated in the comparison between groups regarding dependent variables. **Results:** The participants had similar sample characteristics in terms of sociodemographic and health characteristics. The participants in the physical activity group had a higher score on the WOMAC questionnaire; similarly, in relation to the dimensions, they presented higher scores both in pain (p<0.001), in stiffness (p<0.001) and in physical function (p<0.001), when compared to the dance group. **Conclusion:** These results demonstrate that women with knee OA who participate in a recreational dance group, when compared to groups that practice physical activity monitored for stretching and resisted exercises for the elderly, have less pain, less stiffness and better physical function than men knee.

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P856
PERSISTENCE TO DENOSUMAB IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS AT INCREASED FRACTURE RISK TREATED IN ROUTINE CLINICAL PRACTICE IN BULGARIA

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Objective: Estimate denosumab persistence in women with PMO treated in Bulgarian clinical practice.

Methods: This prospective observational study enrolled postmenopausal women aged ≥70 y with diagnosed osteoporosis (OP; T-score<-2.5) and high fracture risk (FRAX ≥3% for hip or ≥20% for major OP fracture), who had received at least one denosumab injection prior to enrolment. Subject follow-up was 24-month. A subject was considered persistent to denosumab at 12, 18 and 24 months if they received denosumab 6 months ± 60 d after their previous injection.

Results: 250 women were enrolled across 12 Bulgarian endocrinology/rheumatology practices, median length of follow-up was 730 d (QD=0). Mean (SD) age, 75.8 (4.2) y; mean (SD) FRAX, 13.1 (8.6) for hip and 26.1 (9.5) for major OP fracture; 47 (18.8%) women had prior PMO therapy and 104 (41.6%) had a prior fracture. Denosumab persistence was high (Figure): 98.0%, 92.4%, 84.4% at 12, 18, 24 months, respectively. 42 (16.8%) women discontinued denosumab during follow-up, mostly for financial reasons (25/42 [59.5%]) or lost to follow-up (8/42 [19.0%]). Almost one third of enrolled patients (79 [31.6%]) became osteopenic; 28 [11.2%] reached T-score≥-1.5. Five [2.0%] women experienced new fracture on denosumab treatment, including one woman with two nonvertebral (elbow and radius) fractures on the same day.

Probability of persistence based on Kaplan-Meier estimates
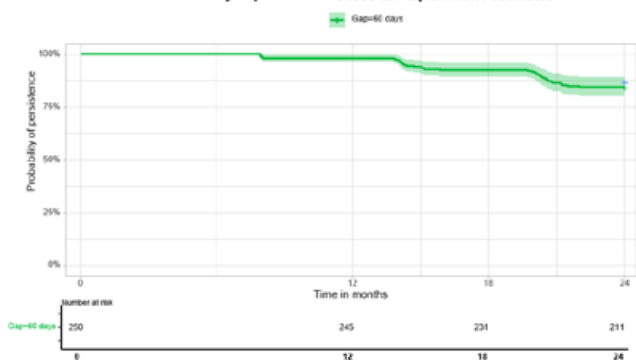
Conclusion: In our study of women aged ≥70 y at high fracture risk, denosumab persistence was high and comparable with that previously reported in a younger Bulgarian cohort (Petranova et al, Arch Osteoporos 2018). The most common reason for denosumab discontinuation was financial, reflecting a 50% co-pay by OP patients in Bulgaria.

P857
BONE MINERAL DENSITY AND ITS RELATIONSHIP WITH MUSCLE MASS AND FUNCTION IN MEN WITH CORONARY HEART DISEASE

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Objective: To study the relationship between muscle mass and function with BMD in men with coronary heart disease (CHD).

Methods: 79 men aged over 50 y with verified CHD were examined (mean age 63 (57; 66) years). The BMD and T-criterion of the femoral neck and lumbar spine (L1-L4) were evaluated using DXA. To assess muscle mass, the total area (cm^2) of the lumbar muscles of the axial section at the level of the 3rd lumbar vertebra (L3) was determined using multispiral computed tomography on a 64-slice computer tomograph. The ratio of the obtained index of the area of skeletal muscle to the square of the patient's growth index determined the "musculoskeletal index L3". The media considered the threshold value to be 52.4 cm^2/m^2. Muscle function was examined using a short physical performance battery (SPPB).

Results: A significant direct relationship between the T-criterion and the femoral neck BMD was established with the total area of skeletal muscle at the L3 level (r=0.304; p=0.006 and r=0.303; p=0.007). A negative relationship was found between the lumbar spine T-criterion and the musculoskeletal index (r=-0.240; p=0.032 and r=-0.226; p=0.044). There is no reliable relationship between the BMD and T-criterion of the femoral neck and the musculoskeletal index, the BMD and T-criterion of the lumbar spine and the total area of skeletal muscle at the L3 level. There was a significant direct relationship between the SPPB score and the area of skeletal muscle at the L3 level (r=0.249, p=0.026), the SPPB score and the musculoskeletal index (r=0.233, p=0.039). A similar relationship was established between the result of the chair lift test and the total area of skeletal muscle at the L3 (r=0.262, p=0.019) and the musculoskeletal index (r=0.220, p=0.050).

Conclusion: A decrease in muscle mass correlates with loss of BMD in femoral neck as a decrease in muscle function. The results obtained confirm the probability of common mechanisms in the development of sarcopenia and osteoporosis in patients with CHD.

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P858
EFFECT OF HIGH DOSE VITAMIN D AND WHOLE BODY VIBRATION ON BONE DENSITY OF THE DISTAL TIBIA AS MEASURED BY HR-PQCT, SERUM 25(OH)D AND PTH

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Objective: To determine the effect of whole body vibration (WBV) and vitamin D on bone density of the distal tibia as measured by HR-pQCT, on serum 25(OH)D levels and on PTH levels in male and female immigrants from the Middle East and North African (NENA) region to the UK.

Methods: This was a randomised controlled pilot trial with four parallel groups of equal numbers (40 in total; 20 males, 20 females). The four groups were: WBV+placebo group; vitamin D only group; vitamin D+WBV group and a control group (placebo only.) Vitamin D was administered as a large (150,000 IU) single oral dose of vitamin D3. The WBV regimen consisted of three vibration sessions every week for 12 consecutive weeks. Measurements (HR-pQCT scan, serum 25 (OH)D, PTH, bone profile) were collected at baseline and during week 13. CONSORT Statement guidelines were followed when analysing and presenting the study results. Ethical approval was granted.

Results: Forty apparently healthy volunteers aged between 18-38 y (median=28.1, SD=7) were recruited. The median baseline serum 25(OH)D was 23 nmol/L. The high dose of vitamin D was well tolerated. After 12 weeks, significant increases were found in total $25(OH)D$ in two groups, vitamin D group and vitamin D+WBV group in comparison with the control group (p=0.001 and p=0.007, respectively). There was a significant decrease in PTH in the group that received vitamin D only relative to controls (p=0.013). There was a significant increase in the total bone density in the group that received vitamin D only (adjusted mean difference compared to the control group=2.7 mg/cm^3, p=0.05). There were no significant effects of vitamin D+WBV on HR-pQCT parameters, PTH or bone profile.

Conclusion: The high dose of administered vitamin D was effective in increasing total bone density at the distal tibia, increasing serum 25(OH)D and suppressing PTH levels in this mostly vitamin D deficient population. The combination of WBV and vitamin D did not lead to a better outcome compared to vitamin D alone.

P859
HEALTH SEEKING BEHAVIOR AND SELF-CARE IN WOMEN WITH OSTEOPOROSIS: A QUALITATIVE STUDY

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Objective: Health information seeking behavior affects self-care and could promote quality of life and life expectancy. This study aimed at assessing health information seeking and self-care behaviors of women with osteoporosis over 50 y in Iran.

Methods: This qualitative study was conducted using content analysis approach. Data were collected through semistructured interviews with 15 women with osteoporosis over 50 y. The participants were selected by purposeful sampling. The data were analyzed by conventional content analysis method using MAXQdata software version 10. Lincoln and Guba's criteria including credibility, transferability, dependability, and confirmability were used to authorize trustworthiness. The ethical committee of Tehran University approved the study (Code: IR.UT. SPORT.REC.1398.023).

Results: From in-depth descriptions of the participants' experiences, 246 primary codes were extracted. Subsequently, constant comparison analysis was done and 35 subcategories and 6 main categories appeared from data. The main categories contain "identify knowledge gaps", "establish networking for seeking information", "information from trust-to-distrust", "information seeking inhibiting factors", "information seeking facilitating factors" and "self-care behaviors based on required knowledge". Based on the experiences of women with osteoporosis, they received limited information from the health care providers, so they were seeking reliable information sources to meet their information needs. They obtained most of their information from other patients, family members and network of friends. In the process of seeking information, they face various barriers such as lack of time in the health care team that affect their ability to self-care.

Conclusion: The results of this study can guide health policymakers, patient educators, health care providers, information specialists, as well as patients and their families.

P860
SARCOPENIC SYNDROME IN PATIENTS WITH CORONARY HEART DISEASE

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Objective: To study the relationship between BMD and muscle mass in patients with coronary heart disease (CHD).

Methods: 65 patients older than 50 y with CHD were examined (46 men and 19 women, mean age 63.16±6.71 y). The BMD of the femoral neck and lumbar spine (L1-L4) were evaluated using DXA. To assess muscle mass, the total area (cm^2) of the lumbar muscles of the axial section at the level of the 3rd lumbar vertebra (L3) was determined using multispiral computed tomography. The ratio of the obtained index of the area of skeletal muscle to the square of the patient's growth index determined the "musculoskeletal index L3". The media considered the threshold value to be 52.4 cm^2/m^2. Muscle function was examined using a short physical performance battery (SPPB). Evaluation of muscle strength was performed using a mechanical wrist dynamometer.

Results: Sarcopenia was detected in 30.7% of patients, and a combined decrease in muscle mass and BMD – osteosarcopenia - in 18.4% of patients. Sarcopenia was more common in patients with low BMD compared to patients with normal BMD (23.5% vs. 50%, respectively, p=0.009). The patients were divided into groups according to the results of DXA: 1) - 43 patients (66.1%) with normal BMD and 2) - 22 patients with reduced BMD (17 (26.1%) with OPe and 5 (7.7%) with OP). The mean BMD in the femoral neck was 1.024±0.09 g/cm^2 and 0.809±0.06 g/cm^2 (p<0.005), at the level of L1-L4 - 1260±0.14 g/cm^2 and 1154±0.16 g/cm^2 (p=0.003), respectively. The following results of SMI were obtained: 45.57±4.66 cm^2/m^2 vs. 52.78±10.24 cm^2/m^2, p=0.01 for patients with a decrease of BMD in the femoral neck compared to patients with normal BMD; 46.33±6.97 cm^2/m^2 vs. 52.76±6.74 cm^2/m^2, p=0.02 for patients with OPe/OP of the spine compared to patients with normal BMD. The correlation analysis revealed a positive relationship between the L1-L4 BMD and the total area of the lumbar muscle (r=0.373, p<0.05).

Conclusion: The decrease in BMD in patients with is associated with low muscle mass and correlates with the severity of bone loss in the lumbar spine, which suggests the possibility of common pathogenetic links between OP and sarcopenia.

P861
CLINICAL EFFICACY AND SAFETY OF GYEBUTANG GRANULE COMBINED WITH ACUPUNCTURE FOR KNEE OSTEOARTHRITIS: MULTICENTER, RANDOMIZED, ASSESSOR-BLINDED, 2-ARMED PARALLEL, CONTROLLED TRIAL

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Objective: Gyebutang Granule (GB) is a dried decoction composed of 7 crude herbs, of which formula is derived from the *Shang Han Lun*, and widely used to treat knee osteoarthritis (KOA) in East Asia Medicine. We conducted this pragmatic randomized controlled trial to evaluate the efficacy and safety of GB combined with acupuncture as a treatment for KOA.

Methods: This was a multicenter, randomized, assessor-blinded, and parallel-group clinical trial. Participants with KOA were randomly allocated into an experimental group or a control group in a 1:1 ratio. Both groups received acupuncture treatment once a week for 6 weeks; The experimental group received GB and the control group received celecoxib for the same duration. The primary outcome was 100-mm visual analog scale (VAS). The secondary outcomes were numerical rating scale (NRS), the WOMAC, patient global assessment (PGA), European quality of life five-dimension five-level scale (EQ-5D-5L), and adverse events (AEs).

Results: A total of 100 participants were assigned. Each group showed significant improvement of the pain VAS after 6 weeks treatment. The mean change of the VAS was not significantly different between two groups (experimental vs. control group: 14.53±19.96/14.04±15.68, p=0.892). There were also no significant differences in the mean changes of secondary outcomes between two groups (experimental vs. control group: 13.24±17.72/13.12±14.99 (NRS), 12.08±19.81/13.67±13.86 (WOMAC), 1.42±2.74/1.94±2.35 (EQ-5D-5L)) and eight AEs related to study were reported in each group with no statistically significant difference.

Conclusion: This study showed the feasibility of GB combined with acupuncture as a safe alternative with a similar efficacy to analgesics for patients with KOA.

P862
SPORTS ACTIVITY IN PREVENTION OF OSTEOPOROSIS

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Objective: Osteoporosis is defined as a systemic skeletal disease characterized by a decrease in bone mass and microarchitectural changes in bone tissue that result in increased bone fragility and a greater tendency to fracture. We aimed to consider the incidence of osteoporosis and the possibility of its prevention through regular physical activity.

Methods: Data from medical records and protocols for physical honey and rehabilitation of the Health Center Nis were analyzed after the screening of patients of both sexes and different ages for 4 weeks (28 d, November 2019.

Results: A total of 182 patients were examined, of which 144 (79.12%) were women and 38 (20.88%) were men. A normal T-score of 0-1 was found in 86 (47.25%) patients, of whom 22 were women and 64 were men. Osteopenia and T-score -1-2.5 had a total of 55 (30.22%), of which 42 were women and 13 were men. Osteoporosis T-score> -2.5 was diagnosed in 41 (22.52%) subjects, in 32 female and 9 male populations.

Conclusion: Osteoporosis is getting epidemic proportions. Two demographic processes contribute to this: the continuing tendency of aging populations of developed countries and the expansion of populations of underdeveloped countries. Currently, over 200 million people, predominantly older women, suffer from osteoporosis worldwide. The prevalence of osteoporosis rises from 4% in women aged 50-59 to 52% in women over 80 y. During life, the possibility of all osteoporotic fractures in women is 50%, while in men it is 25%, and has a growing trend. Physical activity is important for bone density at all ages, but we must pay particular attention to the growth period because of the important and direct effect on bone mass and the impact that period has on physical activity later in life. Exercises improve gait, balance, coordination, proprioception, reaction time and muscle strength, even at very old ones. Evidence strongly suggests that regular physical activity, especially early in childhood and adolescence, is an inexpensive and safe way to improve bone strength and reduce the risk of falls.

P863
DOES HIGH DISEASE ACTIVITY IN SYSTEMIC LUPUS ERYTHEMATOSUS (SLE) PATIENTS INCREASE THE RISK OF CANCER INCIDENCE?

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Objective: Cancer is known as one of the causes of morbidity and mortality in systemic lupus erythematosus (SLE) patients. It has been thought that SLE activity and stimulation of the immune system predisposes the risk of cancer (1). We aimed to investigate the correlation between SLE disease activity and the cancer incidence.

Methods: The study included a cohort of SLE patients, diagnosed according to the American College of Rheumatology classification criteria[2] attending the Rheumatology Department, Aswan University in the period from January 2018 to June 2019. We used a questionnaire to screen patients who were diagnosed with cancer. We collected demographic and laboratory data on all screened patients and their disease activity using the Systemic Lupus Erythematosus Disease Activity Index (SLEDAI)[3]. For the patients diagnosed with cancer, we recorded age of onset of SLE, age of diagnosis of cancer, type of cancer, treatment received, immunosuppressive regimen (dosage and duration) and cancer outcomes.

Results: The study included 117 patients (95 female, 22 male), mean age (25.6±6.5) y with mean SLE duration(7.3 ±6.3) y and mean SLEDAI (9± 8.9). 76% had lupus nephritis, 62.2% had hematological abnormalities and 17.8% had neuropsychiatric lupus. 91% were on corticosteroids (CCS), 33% on mycophenolate mofetil (MMF), 43% on azathioprine, 14% on cyclosporin. 56.8% were either receiving or had received intravenous cyclophosphamide (CYC) with a mean cumulative dose (7.5±4.7) g. We found 18 (15.3%) patients (13 female and 5 males) were diagnosed with cancer during the course of SLE with mean age at onset (31±3.7), mean age at cancer diagnosis (39.28±10.77), mean SLE duration(18.17±6.02) and mean SLEDAI (7.39±4.19). Most of SLE patients with cancer had lupus nephritis (89%) and all cancer patients were on a median dose of CCS 10 (2.5-20) mg daily for median 10 (4-24) years. 83.5% of them had received intravenous CYC prior to the development of cancer with mean total cumulative dose of (6.7±4.6) g, 67% received MMF, 33% received cyclosporine and 50% received azathioprine. Types of cancer were as follow; 22.2% lymphoma, 16.7% cancer cervix, 16.7% cancer breast, 11.1% colorectal cancer, 11.1% squamous cell carcinoma, 5.6% leukemia, 5.6% bronchogenic carcinoma, 5.6% prostate cancer and 5.6% cancer thyroid. 66.7% of them had been successfully treated, 27.8% had metastasis, 5.6% had died. There was no significant difference in SLEDAI between patients with cancer and patients without. Whereas malignancy is correlated to longer disease duration (p=0.01) and older age of SLE onset with significant difference (p=0.001).

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Conclusion: Although we have detected an increasing incidence of cancer in SLE patients in comparison to normal population, our study didn't find a significant correlation between SLE disease activity and the risk of cancer. We should closely observe SLE patients with old age at onset and/or long disease duration because of their higher risk for cancer development.

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P864
DO WE HAVE THE RIGHT SOLUTIONS FOR ALL CASES OF OSTEOPOROSIS, OR DO WE NEED MORE?

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Objective: A 70 years female patient is hospitalized in the Rheumatology Clinic in March 2018 with suspicion of rheumatoid arthritis. She also feels a low back pain, started couple of months ago, without having any trauma at this level.

Methods: The patient was diagnosed recently with multiple myeloma IgG kappa (February 2018), but without starting a specific treatment. She is guided to our clinic due to painful joint symptoms. Based on physical examination, laboratory tests (rheumatoid factor, anti-CCP antibodies and inflammation tests positive) and X-rays we confirm the diagnosis of rheumatoid arthritis. The x-ray for spinal column shows multiple vertebral compressions and spine bone densitometry (T-score) is -3. We begin treatment with bisphosphonate, calcium, vitamin alfa D3 and corticosteroids in small doses, with favorable evolution. After 6 months of treatment the joint symptoms are remitted, the tests for inflammation are negative, but T-score now is -3.5. The haematologist consider myeloma controlled and recommends continuation of treatment with bisphosphonates and corticosteroids. At a patient with multiple myeloma controlled by bisphosphonate therapy with glucocorticoids, in which osteoporosis is widening, against the risk of fragility fracture, we decided to start treatment with Denosumab 60 mg every 6 months. Also we have stopped treatment with bisphosphonates.

Results: During the evaluation in March 2019, we repeated the osteodensitometric examination which showed an improvement of spine T score=-2.8.

Conclusion: Will denosumab be the right and safe treatment in cases of multiple myeloma requiring glucocorticoids for long period of times?

P865
FACTORS AFFECTING DENOSUMAB-INDUCED HYPERPARATHYROIDISM AND BMD OUTCOMES IN ELDERLY PATIENTS: 5-YEAR FOLLOW-UP DATA

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Objective: Denosumab is a human monoclonal antibody that specifically targets RANKL, decrease bone resorption and increase bone mass and strength in both cortical and trabecular bone. This drug could cause transient hypocalcaemia and increase PTH serum level especially in the first 3 months from his injection but there are no long-term study on this topic. The aim of the study was to evaluate BMD and serum PTH changes during five years of denosumab treatment in elderly patients, to point out the influence of pump protonic inhibitors, calcium and vitamin D supplementation use and to analyze the relationship between denosumab- induced hyperparathyroidism and BMD outcome.
Methods: We selected elderly osteoporotic outpatient treated by denosumab, admitted to Sant'Andrea Hospital of Rome. For each patients, we followed up for 5 y values of 25OHD, serum calcium and PTH, BMD assessed by DXA, drugs use and comorbidities.
Results: We collected data on 99 subjects, they were all females, the average age was 70.91±9.1 y. They were divided into groups: 62 took only vitamin D supplementation (group A), 37 took both vitamin D and calcium supplementation (group B). After one year the PTH in group A was significantly higher (p<0.05) than in group B (82±30.8 vs. 58±22 ng/ml). After the introduction of calcium supplementation, PTH values decreased for 5 y in all patients in group A. In addition, patients who received PPI always showed a higher PTH value than those who did not use it (p<0.05). If they stopped using PPI or use calcium citrate, the PTH values returned to the normal range. In any case, lumbar and femoral BMD has shown an increasing trend in all patients for 5 y regardless of PTH values.
Conclusion: Adequate intake and absorption of calcium seems to be important for reducing denosumab induced hyperparathyroidism. However, the increase in PTH levels does not seem to reduce the efficacy in increasing BMD of this drug.

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P866
SIMULTANEOUS APPEARANCE OF IDIOPATHIC PARKINSON'S SYNDROME (IPS) AND OSTEOPOROSIS (OPO): TEMPORARY RESULTS OF THE SCHWARZACH-GERA SURVEY

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Objective: Motivated by the results of Balzereit in 1978 that only 4.8% of 96 IPS patients also showed symptoms of osteoporosis, we realized a pilot survey where 17 of 22 IPS patients (77.3%) showed osteopenia or osteoporosis. We wanted to check this opposing result in a larger survey (Schwarzach-Gera survey).

Methods: 131 IPS patients (age 64.7±8.1 y, 67 women, 64 men, duration of illness 10±6.4 (1-30 y) years, Hoehn & Yahr stage 2.11±0.66 (1-4) underwent a clinical investigation. This included fall assessment, DXA by WHO and osteoporosis related laboratory tests.

Results: 84.7% of the IPS patients showed an osteopenia (51.9%) or osteoporosis (32.8%). Only 15.3% showed normal findings. 70.4% showed a pathological chair-rising-test and 40.1% a pathological timed-up-and-go-test. Pathological laboratory values: decreased 25-OH-D3 <30 µg/l in 83.7% of IPS-Patients (MV±SD: 17.8±13.8 µg/l), increased homocysteine >10 µmol/l (68.4%) and decreased TSH <0.3 mU/l (11.6%). The connection between the bone density value (T-score) at the lumbar spine resp. proximal femur and the severity of the Parkinson´s disease following Hoehn & Yahr and the duration of the illness was low/trivial (r<0.20).

Conclusion: The high portion of lower bone density values (77.3% resp. 84.7%) in our two surveys is corresponding to later surveys. Mollova 2014 found at 72% of 50 IPS patients an osteopenia (50%) or an osteoporosis (22%). Tornsey et al. 2014 are reporting in their meta-analysis a higher risk of osteoporosis (OR 2.61) in IPS patients. As one reason for the lowered bone density value a lack of vitamin D and/or vitamin K is not heterogeneously considered as well as an increased level of homocysteine related to Parkinson's disease medication. They can also be found in the DVO guidelines 2017. The relation between IPS and osteoporosis is, following not only our results, underestimated. With this in mind, maybe of roughly 300 000 to 400 000 IPS patients in Germany 254 000 to 338 000 also have an osteopenia or osteoporosis and are to a high extend in danger of falling. This leads us to stating that there is a high demand for action and the necessity of osteological diagnosis (incl. DXA measurement) following the DVO-guidelines 2017 in which IPS is explicitly mentioned as an OPO risk factor. This should activate the neurological colleagues as main actors in the battle against IPS.

P867
SECONDARY HYPERPARATHYROIDISM: CASE REPORT

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Secondary hyperparathyroidism is a condition in which a disease outside of the parathyroid glands causes all of the parathyroid glands to become enlarged and hyperactive. The most common causes of secondary hyperparathyroidism are kidney failure and vitamin D deficiency. In kidney failure, the kidney is no longer able to make enough vitamin D or remove all of the phosphorus that is made by the body, which leads to low calcium levels. These low calcium levels stimulate the parathyroid glands to make more PTH. Over time, this constant stimulation causes the parathyroid glands to grow and become hyperactive and patients can progress to develop secondary hyperparathyroidism. Patients with kidney failure and secondary hyperparathyroidism can often have PTH levels in the hundreds and even thousands.

Case report: Patient B.M., male, age 51. The first problems in the form of pain and limited spinal began in 2017. He also had pain in his hips, knees and ankle. Examined by an orthopedist and indicated left hip surgery. March 2018 the patient was examined for the first time by a rheumatologist. Laboratory analyzes done. Verified high values of alkaline phosphatase (ALP=1074) and low values of vitamin D (25(OH)D=10 nmol/l) and calcium (Ca=1.75). Phosphorus was within the reference limits (P=1.69). Started vitamin D and calcium therapy (vitamin D 2000 IU and calcium 1200 mg). Patient instructed to do PTH. Findings of PTH showed high value (PTH=576.4). Diagnosis of secondary hyperparathyroidism. Bone densitometry done and verified osteoporosis (lumbar spine T-score: -5.7; left hip T-score: -3.8). Continued vitamin D and calcium therapy (vitamin D 2000 IU and calcium 1200 mg). At the one-month follow-up, an increase in blood calcium (Ca=1.82) and a decrease in ALP (ALP=418) were recorded. Done parathyroid gland scintigraphy: focal zones of enhanced radiopharmaceutical accumulation are likely to indicate hyperactive parathyroid glands. Control laboratory in June 2018 registers further increase of calcium (Ca=1.93) and decrease of ALP (386) and PTH (398). Consulted endocrinologist and advised continuation of rheumatologist therapy: vitamin D and calcium supplementation. September 2018 the patient feels subjectively better, negating the pain in the peripheral joint and spine. Control laboratory: Ca=2.2, P=1.0; ALP=306; PTH=189, 25(OH)D=25 nmol/l. Dg: Osteoporosis generalisata; Secondary hyperparathyroidism; Coxarthrosis. Parenteral bisphosphonate was also introduced into therapy and continued with calcium and vitamin D. We presented a patient with a secondary hyperparathyroidism. The management is multidisciplinary, and therapeutic options should target the underlying cause.

P868
OSTEOPOROSIS AND MANAGEMENT IMPLICATIONS ON CARDIOVASCULAR DISEASE

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Objective: Osteoporosis and cardiovascular pathology are common age-related health issues associated with a higher rate of disability, morbidity and mortality. Although this two conditions were considered to be independent and completely unrelated comorbidities, today there is a large evidence that proves how low mineral bone density has been related to accelerated subclinical atherosclerosis calcification, increasing the risk for myocardial infarction and stroke.

Methods: We report the case of a 67 years old, female patient, known with severe osteoporosis and systemic arterial hypertension grade 2. This patient is a nonsmoker, alcohol-free and doesn't have any other comorbidities. The patient presents in our clinic for her annual follow-up, complaining about dizziness, fatigue and generalized pain. At presentation BP=100/60 mmHg (on chronic medication for BP control), HR=74 bpm, SO2=98%, walking impairment and partially muscle hypotrophy. Blood work was unremarkable, except for low calcium and vitamin D. We also performed a standard ECG and an transthoracic echocardiography, without pathological parameters regarding the other visits.

Results: Neurological and rheumatological exams were both negative, so we concluded that the patient symptoms (dizziness and fatigue) were related to low BP and we adjusted her treatment appropriate for her actual status. To her next visit symptoms improved, but BP described important fluctuation related to her physical activities, which needed further treatment adjustment.

Conclusion: Osteoporosis has many clinical implications on systemic arterial hypertension management as we showed in our case. To treat this two major conditions can be sometimes very challenging to prevent the worst clinical scenario.

P869
IRISIN DETERMINATION FOR FRACTURES FORECASTING IN RHEUMATOID ARTHRITIS PATIENTS: RESULTS OF 3 YEARS FOLLOW-UP

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Objective: There is evidence that, in response to muscle contraction, a panel of cytokines and proteins called myokines are secreted. Myokines perform an autocrine function in regulating muscle metabolism and a paracrine (endocrine) function for distant organs and tissues such as bones, adipose tissue, liver and brain. Exercise stimulates the expression of a fibronectin type III domain containing gene 5 (FNDC 5) of irisin protein. With rheumatoid arthritis, a decrease in the level of irisin (IR) is

detected, leading to the occurrence of secondary osteoporosis. There is a violation of the microarchitectonics of bone tissue, which leads to the development of low-energy bone fractures. Some studies show that serum IR level inversely correlated with vertebral fractures in postmenopausal patients. We aimed to study relationship between low-energy bone fractures in rheumatoid arthritis (RA) patients and serum IR level.

Methods: We have studied 170 people: 110 RA patients (mean age 53.58±12.32; hereinafter M±SD) and 60 healthy controls. All patients with RA were examined using DXA using Lunar DPX-Pro densitometer. Serum IR level was measured once at the beginning of the study by indirect solid-phase enzyme immunoassay (BioVender, Cat No. RAG018R). After 3 y of control period, 22 patients were excluded from the trial because of lost contacts. History of low-energy fractures was obtained from remaining 88 patients. Low-energy fractures were confirmed by X-ray examination and/or by anamnesis data.

Results: The mean concentration of IR in RA group was 14.48±7.07 μg/ml, which was significantly lower than in healthy donors – 20.49±4.82 μg/ml (p<0.001). After 3 y of follow-up we divided the RA patients into two groups: the first group (n=11) included patients with low-energy fractures, the second group (n=77) consisted of patients without low-energy fractures in anamnesis. In 1st group IR level was lower than in 2nd one (9.957±3.775 μg/ml and 15.109±7.189 μg/ml accordingly, p=0.022). To study prognostic value of IR determination in RA for fractures forecasting we performed ROC-analysis. Area under the receiver operating characteristic curve was 0.702, 95%CI 0.596-0.795. Optimal decision threshold of IR was equal 11.45 μg/ml (sensitivity 81.82%, specificity 61.04%).

Conclusion: We suppose serum IR determination may be prognostic laboratory test for low-energy fractures forecasting in RA patients.

P870
INFLUENCE OF SMOKING ON THE VITAMIN D STATUS AND INCREASE OF BONE MINERAL DENSITY IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective: Smoking was identified as a risk factor for osteoporosis and fractures and was included in the Fracture Risk Assessment Tool. The tobacco smoking causes an imbalance in bone turnover, leading to lower bone mass and making bone vulnerable to osteoporosis and fracture. Tobacco smoke influences bone mass indirectly through alteration of body weight, PTH-vitamin D axis, adrenal hormones, sex hormones, and increased oxidative stress on bony tissues. Also, tobacco smoke influences bone mass through a direct effect on osteogenesis and angiogenesis of bone. The aim of this study is were to compare vitamin D levels in smokers to nonsmokers in women with newly diagnosed

postmenopausal osteoporosis and to investigate the influence of cigarette smoking on the increase BMD after 12 months of bisphosphonate therapy.

Methods: The research included 104 women with newly diagnosed postmenopausal osteoporosis and who haven't taken vitamin D as prevention of osteoporosis. Average age of the examinees was 63.56±7.35, average duration of menopause was 13.74±8.35 y and average value of 25(OH)D was 47.46±10.52 nmol/L. All examinees were divided into two groups according to their smoking status: smokers and nonsmokers. The examinees were prospectively followed for 12 months, during which they were at the following therapies: bisphosphonate (alendronate 70 mg weekly or ibandronate 150 mg monthly), vitamin D 800 IU daily. All the examinees were determined with the level of 25(OH)D by ELISA method. All of the examinees were defined with their BMD on the lumbar spine and hip, measured with dual energy x-ray absorptiometry on the Hologic Discovery machine.

Results: The examined group consisted of 33 (31.7%) smokers and 71 (68.3%) nonsmokers. Vitamin D levels were significantly lower in smokers than in nonsmokers (40.44±16.02 vs. 48.10±17.16; p<0.05). A normal vitamin D status was found in 12 examinees (11.54%), deficiency of vitamin D in 81 (77.89%) and insufficiency of vitamin D in 11 (10.57%).

In the group of 11 examinees with vitamin D insufficiency (I group), smokers was 5 of them (45.05%); in the group of 81 women with vitamin D deficiency (II group) smokers was 26 (32.10%); in the group of 12 women with normal vitamin D (III group) smokers was 2 of them (16.67%). Fisher's test confirmed that the difference between compared groups was statistically significant (p<0.05). In the smokers group, before therapy, the average T-score value was lowest in patients with vitamin D insufficiency (-3.60±0.25); in patients with vitamin D deficiency T-score value was -3.50±0.28 and in the group with normal vitamin D status was -2.92±0.44. The difference between compared groups was not statistically significant. After 12 months of treatment, the T-score value increased statistically significantly in all three groups. (I group: -3.60±0.25 vs. -3.30±0.28, p<0.01; II group: -3.50±0.28 vs. -3.15±0.28, p<0,01; III group: -2.92±0.44 vs. -2.61±0.46, p<0.01). In the nonsmokers group, before therapy, the average T-score value was lowest in patients with vitamin D insufficiency (-3.06±0.22); in patients with vitamin D deficiency T-score value was -2.98±0.59 and in the group with normal vitamin D status was -2.71±0.18. The difference between compared groups was not statistically significant. After 12 months of treatment, the T-score value increased statistically significantly in all three groups. (I group: -3.06±0.22 vs. -2.65±0.21, p<0.01; II group: -2.98±0.59 vs. -2.44±0.25, p<0.01; III group: -2.71±0.18 vs. -2.31±0.21, p<0.01). The increase BMD was statistically significantly lower in the smokers patients compared to the non-smoker, in all three compared groups with different vitamin D status, after 12 month therapy (0.30 vs. 41, p<0.05; 0.35 vs. 0.54, p<0.01; 0.31 vs. 0.40, p<0.05).

Conclusion: Cigarette smoking was associated with lower vitamin D levels. Our results has shown that the increase BMD was statistically significantly lower in the smokers patients compared to the nonsmoker, in all three compared groups with different vitamin D status, after 12 month bisphosphonate therapy.

P871
EFFECT OF METFORMIN USE ON RISK OF TOTAL KNEE ARTHROPLASTY IN PATIENTS WITH KNEE OSTEOARTHRITIS COMBINED WITH DIABETES AND/OR OBESITY

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Objective: To examine whether metformin (MET) usage was associated with reduced risk of total knee arthroplasty (TKA) in diabetes and/or obesity individuals combined with knee osteoarthritis (OA).

Methods: Participants with knee OA who were also diagnosed obesity (BMI ≥30 kg/m^2) and/or diabetes between 10/6/2000 to 15/7/2019 were selected from Hospital Information System of Zhujiang Hospital. Participants were classified as MET users if they were recorded using MET following the doctor's advice or self-reported regular MET users. Nonusers of MET were defined as participants who did not report the use of MET. TKA status was assessed using the operation notes. Effusion and meniscus status were assessed using MRI reports. Logistic regression models were used for statistical analyses.

Results: A total of 895 participants were included in current study, with 486 MET users (54.3%). No significant differences between groups were found in terms of age gender, BMI, sodium hyaluronate, steroid, effusion and meniscus status. The rate of TKA was significantly lower in MET users compared with nonusers (7.2% vs. 13.9%), with odds ratio of 0.42 (95%CI, 0.26-0.68, p<0.01), after adjustment for age, gender, BMI, celecoxib, etoricoxib and tramadol uses. Compared with MET and celecoxib non-users, MET alone was associated with reduced risk of TKA (OR=0.28, 95%CI, 0.15-0.51, p<0.01), combination MET and celecoxib was associated with reduced risk of TKA (OR=0.29, 95%CI, 0.18-0.53, p<0.01).Compared with MET and etoricoxib nonusers, MET alone was associated with reduced risk of TKA (OR=0.43, 95%CI, 0.26-0.69, p<0.01), combination MET and etoricoxib was associated with reduced risk of TKA (OR=0.04, 95%CI, 0.01-0.32, p<0.01).

Conclusion: These data suggest that using MET alone as well as combination of MET and COX-2 inhibitor may attenuate the risk of TKA in those with knee OA and diabetes and/or obesity. Randomized controlled trials are required to confirm whether MET could be a potential disease-modifying drug for knee OA.

P872
BODY COMPOSITION AND PROBABILITY OF MORTALITY IN HIP FRACTURE PATIENTS

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Hip Fracture is one of the most important causes of mortality and functional state impairment in the elderly and it could be a consequence of the patients frailty. We investigate the presence of osteosarcopenic obesity syndrome (OSO) by body composition analysis in hip fracture elderly patients to evaluate the correlation with mortality. We selected over 65 fractured patients in the post-operative phase, admitted to Sant'Andrea Hospital of Rome. For each patient we collected basic blood analyses and body composition measurement by BIA ACC®, this device evaluates sarcopenia (S-score), BMD (T-score), IMAT (intramuscular adipose tissue) and HPA axis index, too. To estimate the mortality probability, we administered to all patients the Nottingham Hip Fracture Score (NHFS). We recruited 46 patients over 65 yrs old, the results obtained by the BIA ACC are summarized in the Table below:

	Results	Range
TBW (%)	39,91 ± 5,87	50-65%
ECW (%)	57,25 ± 6,05	40%
FFM (%)	63,59 ± 5,77	min 75%
FM (%)	36,41 ± 5,77	min 12% - max 30%
HPA axis index (PA°)	0,164 ± 0,64	> 3,5
S-SCORE	-2,19 ± 1,51	> -1
IMAT %	2,74 ± 0,33	≤ 2
T-SCORE	-1,6 ± 1,09	> -1
NHF SCORE	4,91 ± 0,98	Max 10

The results show that 75% of patients were affected by OSO, while the remaining 25% had aging-related body composition changes, nobody was normal. The very low HPA axis index value suggests the presence of chronic and acute stress too. The statistical analysis demonstrates a positive linear regression between mortality and IMAT (p=0.018). In conclusion, IMAT could be used as a prognostic factor of mortality in hip fracture patients; moreover the fracture seems to be a consequence of the patients' frailty in which bone, muscle and adipose tissue are involved.

P873
KINESIOTAPING IN THE CORRECTION OF MYOFASCIAL PAIN

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Objective: To evaluate the clinical effectiveness of kinesiotaping in patients with acute myofascial pain in the back area.

Methods: To evaluate the effectiveness of the restoration of biomechanics and reduce pain syndrome the following were used: visually analog scale and visual analysis diagnostic. In the study 75 patients with myofascial back pain were examined. Average age of patients was 43.4 years (ranging from 18-55 y). All patients were divided in two groups. The First group included 37 patients with standard treatment + kinesiotaping. The Second group included 38 patients on standard treatment. The system of visual diagnostic was developed on the basis of the Department for Neurology in Volgograd State Medical University. The basic principle is that the whole body static is optically analyzed. With the help of the computer program on the main lines of the body, we determine the disturbance of statics and the disturbance of symmetry.

Results: According to the results of the study, it was found that the intensity indicant of pain due to VAS was significantly decreased in the first group in comparison with the second group. In the first group pain indicant decreased almost twice from 8.1 to 2.9. The second group in pain indicant changed from 7.9 to 5.7. All this indicants changes were proved by electromyography study of paraspinal muscle. The recovery of the center of gravity shift was more dynamic in the first group compared to the second group. The angle first group changed from 13.5 to 6.9. The angle second group changed from 13.9 to 7.8. Similar results were observed when restoring the indicator of violation of parallel alignment of different locomotorium parts.

Conclusion: Kinesiotaping techniques in combination with pharmacotherapy can effectively deal with pain in the lower back. A strong correlation was found between the decrease in the intensity of the pain syndrome and the recovery of the biomechanics of the spine as a result of using kinesiotaping compared with traditional pharmacotherapy.

The disposition of locomotorium parts — dislocation of parallel alignment of different locomotorum parts — pathological rotation in the shoulder — Before application

The recovery of locomotorium parts — reduction of dislocation — physiological position recovered — After application
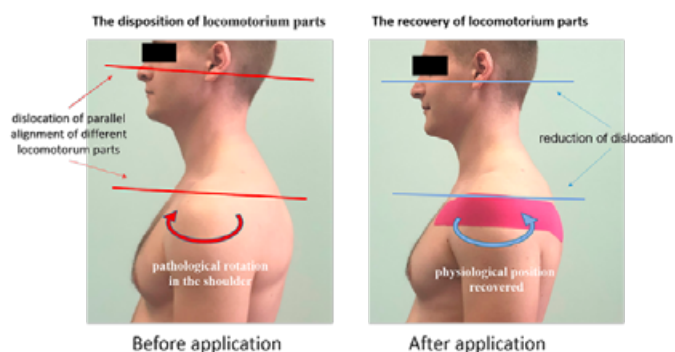
P874
EVALUATING QUALITY OF LIFE IN FRAILTY: APPLICABILITY AND PSYCHOMETRIC PROPERTIES OF THE SARQOL® QUESTIONNAIRE

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Objective: The SarQoL questionnaire was specifically designed to measure quality of life (QoL) in sarcopenia. Frailty and sarcopenia have areas of overlap, notably weak muscle strength and slow gait speed, which may mean that the SarQoL could provide a measure of QoL in frailty. This study therefore aimed to evaluate the psychometric properties of the SarQoL questionnaire in physical frailty using the Fried criteria.

Methods: Analyses were carried out on data from the 2nd year (and the 5th year for responsiveness) of the SarcoPhAge study. Frailty was assessed with the Fried criteria, QoL with the SarQoL, the SF-36 and the EQ-5D. We evaluated discriminative power (ANOVA), internal consistency (Cronbach's alpha), construct validity (hypotheses testing), test-retest reliability (ICC), measurement error (SEM and SDC), and responsiveness (hypotheses testing and standardized response means).

Results: In total, 395 subjects were included for the validation and 117 subjects for the responsiveness evaluation. Subjects had a median age of 73 (69-79) y, took 5 (3-8) drugs and had 4 (3-5) comorbidities. There were more women (n=231; 58.5 %) than men, and, in total, 175 nonfrail, 174 prefrail and 46 frail subjects. Discriminative power was confirmed when significantly lower (p<0.001) Overall QoL scores were observed between nonfrail [77.1 (64.35-85.90)], prefrail [62.54 (53.33-69.57)] and frail [49.99 (40.45-56.06)] participants. Six of the domains performed likewise, with significantly lower scores according to frailty status, domain 7 (fears) being the exception. Internal consistency was good (α=0.866). Convergent (using SF-36 and EQ-5D) and divergent construct validity (using EQ-5D) was confirmed. Test-retest reliability was excellent [ICC=0.918 (0.834-0.961)], with a SEM of 4.34 and an SDC of 12.03 points. We found moderate responsiveness when 5/9 hypotheses were confirmed, coupled with a large effect size for the Overall QoL score (Corrected SRM of -1.44).

Conclusion: The SarQoL questionnaire has adequate psychometric properties for use with frail patients in clinical practice and trials, and could provide data that is more appropriate and detailed than the generic questionnaires currently used.

Disclosures: OB, CB and J-YR are shareholders of SarQoL® sprl.

P875
DEVELOPMENT OF A SHORT VERSION OF THE SARCOPENIA QUALITY OF LIFE (SARQOL®) QUESTIONNAIRE

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Objective: The SarQoL questionnaire has been available since 2015 and is currently the only PROM measuring quality of life that is specifically designed for use with older, sarcopenic people. It has 55 items categorized into 7 domains of health-related dysfunction and takes about 15 minutes to complete. A shorter version of the SarQoL questionnaire would reduce the response burden and provide a quicker and easier way to measure QoL in sarcopenia. Therefore, the aim of this study was to develop a short version of the SarQoL questionnaire which preserves, as much as possible, the content validity and psychometric properties of the original questionnaire.

Methods: The item reduction process was carried out in two phases. In the first phase, a panel of experts was asked, through a 2-round Delphi method, to indicate which items could be included or excluded. Patient priorities were also evaluated, by calculating item-impact scores in data gathered during 7 previous validation studies and 2 observational cohort studies. In the second phase, a meeting of experts was organized, who made the final decision on which items to include in a short form SarQoL questionnaire, with priority given to preserving content validity. Additionally, information on the factor structure and the psychometric properties of the original SarQoL questionnaire were also taken into account.

Results: In the first phase, the 18 experts participating in the Delphi method found consensus on the inclusion of 13 items from 4 domains and the exclusion of 23 items from 6 domains. A ranking of the items in terms of importance to patients was established per domain. In the second phase, the panel participating in the meeting combined the expert and patient preferences, and the available psychometric information, and decided on the inclusion of 14 items. The factor structure of the questionnaire was altered slightly when one of the original 7 domains (D7: fears) was eliminated because of its subpar psychometric properties.

Conclusion: A preliminary Short-Form SarQoL questionnaire composed of 14 items was developed. It should now be submitted to independent samples of older, community-dwelling people to evaluate its psychometric properties.

Disclosures: OB, CB and J-YR are shareholders of SarQoL® sprl.

P876
ASSOCIATION BETWEEN SARC-F AND QUALITY OF LIFE MEASURED WITH THE SARQOL® QUESTIONNAIRE IN OLDER, COMMUNITY-DWELLING SUBJECTS FROM THE SARCOPHAGE COHORT

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Objective: The SARC-F questionnaire is recommended by EWGSOP as a convenient method for identifying people at risk of sarcopenia. Its ease of administration makes it an ideal tool for clinical practice. The aim of this study was to investigate the relationship between quality of life (QoL) and elevated risk of sarcopenia indicated by the SARC-F questionnaire, as well as the relationship between QoL and the 5 indicators within the SARC-F.

Methods: This is a cross-sectional analysis of data gathered during the 2nd year of the SarcoPhAge study, which recruited older, community-dwelling people in Belgium. QoL was measured with the SarQoL questionnaire. A high risk of sarcopenia was indicated by a score of ≥4 points on the SARC-F. Binary and multinomial regression analysis was employed to establish statistical significance between sarcopenia risk (SARC-F) or level of difficulty (none, some, or a lot) on the 5 indicators in the SARC-F (strength, assistance with walking, rise from a chair, climb stairs, and falls), and QoL. All models were adjusted for gender, age, BMI, number of drugs and number of comorbidities.

Results: Data was available for 331 participants, of which 57 were classed as being at a high risk of sarcopenia. There were 197 (59.5%) women and the median age was 73 (70-80) y. Sarcopenia risk status was significantly associated with the SarQoL overall QoL score with participants at high risk of sarcopenia having worse QoL compared to those not at high risk [49.91 (39.79-56.43) vs. 67.73 (58.17-79.44); p<0.001]. Significantly lower QoL was also found when participants indicated that they had some or a lot of difficulty on 4 of the 5 SARC-F indicators, compared to no difficulties (all p<0.003). The fifth indicator (falls), was not statistically different for QoL between the three response options.

Conclusion: Older people with a high risk of sarcopenia, or difficulties in terms of strength, walking, rising from a chair or climbing stairs, had lower QoL scores. These results highlight the importance of early screening for sarcopenia.

Disclosures: OB, CB and J-YR are shareholders of SarQoL® sprl.

P878
DEPRESSION AND CLINICAL OUTCOME FOR OSTEOPOROSIS AND CARDIOVASCULAR DISEASES

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Objective: Depression, osteoporosis and cardiovascular diseases are major public health problems for modern society. Research have established a clear connection between them, but the exact mechanism remains unclear. In other words, low BMD, accelerated atherosclerosis, hormonal/chemical imbalance associated with depression and antidepressants medication per se are closely related with patient clinical outcome.

Methods: We present the case of a 56 years old active male patient, on chronic medication, with a history of major depression, osteoporosis, systemic arterial hypertension, heart failure with preserved ejection fraction, dyslipidemia and obesity. He has no other comorbidities or risk factors. Lab values, standard ECG, transthoracic echocardiography and BMD test all confirmed the above mentioned diagnosis.

Results: At this point we considered necessary a ECG stress test to evaluate the myocardial functional reserve, which was positive for ischemia. The patient needed further evaluation by coronary angiography in a specialized center. Also we performed a BMD test that showed no improvement and we changed his medication for osteoporosis.

Conclusion: Patient was atypical regarding osteoporosis because he lacks classical recognized risk factors(menopause, low BMI, smoking, alcohol, physical inactivity), so we propose depression and antidepressants medication as risk factors for osteoporosis as we noticed their negative impact in this particular case. Poor quality of life as a cause and clinical negative prognosis of osteoporosis and cardiovascular diseases, as well as chemical imbalance, immune and endocrine mechanisms appear to be induced by depression/antidepressants medication. Further clinical evidence is needed to outline the biological mechanism on bone density, myocardial tissue and endothelial lesions of major depression and which class of antidepressants are related to this pathological changes.

P879
GLOBAL BALANCE OF THE SPINE, AN INDEPENDENT CONTRIBUTOR TO PHYSICAL FUNCTION, AND FALLS IN OLDER ADULTS: THE SAFE COHORT STUDY

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Objective: Falls are common among older adults and remain the leading cause of fractures. They may result from several intrinsic and extrinsic risk factors. Among them, the role of the global balance of the spine has never been fully established. We conducted a preliminary cross-sectional analysis to determine the association between global balance of the spine, physical function and falls in community-dwelling older adults. **Methods:** The SAFE study is an ongoing prospective, longitudinal cohort study conducted in Geneva (Switzerland) among community-dwelling adults aged ≥65 y without history of instrumented spinal surgery. All subjects underwent a comprehensive assessment battery including: full skeleton 2D/3D radiographs in the standing position by EOS® low-dose biplane X-ray imaging system, DXA imaging, clinical examination, fall history in the past 12 months, and physical function tests. Spino-pelvic parameters collected included, among others, the spino-sacral angle (SSA) and the C7-central sacral line (C7-CSL) distance for sagittal and coronal balance, respectively. **Results:** In this preliminary analysis, 50 subjects (mean age, 74 y; 76% female) were included. Among them, 18 (36%) reported one or more falls in the past 12 months, 19 (38%) reported a history of low-trauma fracture, 15 (30%) were osteoporotic, while 12 (24%) had a Short Physical Performance Battery (SPPB) score ≤9. Global sagittal balance was independently associated with physical performances after controlling for potential confounders (adjusted regression coefficient for SPPB score and SSA=0.09, 95%CI [0.03, 0.16]; p=0.007), as well as some sagittal pelvic and lumbar curve measures. After controlling for age, sex, comorbidities, vertebral fractures and SPPB score, increased C7-CSL distance was independently associated with increased fall risk (OR=2.28, 95%CI [1.06, 4.92]; AUC=0.79, 95%CI [0.65, 0.92]). **Conclusion:** The findings of this study suggest that global balance of the spine is an independent contributor to physical impairments and falls in older adults. Further analysis from this longitudinal cohort study will reveal the role of compensating mechanisms in the sagittal plane, and should help to clarify whether global balance of the spine relates to incident falls and fractures in older adults.

P880
SARCOPENIA ACCORDING TO EWGSOP2 IS ASSOCIATED WITH GLOBAL SAGITTAL IMBALANCE OF THE SPINE IN OLDER ADULTS: THE SAFE COHORT STUDY

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Objective: Aging is typically associated with degenerative processes affecting all structures of the spine, leading to the risk to develop a sagittal imbalance. Whether the loss of skeletal muscle mass and function that accompanies ageing, or sarcopenia, contributes to global sagittal imbalance has never been fully established. In this study, we aimed to investigate the association between sarcopenia, as defined based on the recent EWGSOP2 definition, and global sagittal balance of the spine in community-dwelling older adults. **Methods:** A preliminary cross-sectional analysis was conducted on the first 50 subjects enrolled in the SAFE study, an ongoing prospective, longitudinal cohort study recruiting community-dwelling adults aged ≥65 y without history of instrumented spinal surgery. Global sagittal balance of the spine was assessed by full skeleton 2D/3D radiographs in the standing position by EOS®, a low-dose biplane X-ray imaging system. Muscle mass was assessed by DXA, and muscle strength using handgrip strength and five-times chair stand tests. Sarcopenia was defined according to EWGSOP2 criteria. Global sagittal balance was measured

through the newly described OD-HA (odontoid-hip axis) angle [1]. Univariate and multivariate regression models, and the area under receiver operating characteristic curves (AUCs) were computed. **Results:** Subjects had a mean age of 74.3±6.1 y and 76% were female. Prevalence of EWGSOP2-defined low muscle mass was 48%, low muscle strength was 20% and sarcopenia was 12%. Sarcopenic subjects were more likely to present global sagittal imbalance (83% vs. 24%; p=0.004). In multivariate regression analysis controlling for age, sex, comorbidities and vertebral fractures, sarcopenia was independently associated with global sagittal imbalance (p=0.011). The adjusted AUC was 0.82, 95%CI [0.67, 0.96]. **Conclusion:** These results indicate that sarcopenia, as defined based on EWGSOP2 definition, is associated with global sagittal imbalance of the spine in older adults. Longitudinal analysis will be required to elucidate the temporality and causality of this association. **Reference:** 1. Le Huec JC et al. Eur Spine J. 2019;28:1889.

P881
AGE-RELATED CHANGES IN VOLUMETRIC BONE MINERAL DENSITY AND BONE GEOMETRY IN RURAL GAMBIANS AGED 40-75+: THE GAMBAS STUDY

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Objective: To explore the pattern of age-related bone loss in the peripheral skeleton among rural Gambian men and women.

Methods: Longitudinal pQCT data (radius 4%, 33% sites, tibia 4%, 38% sites) were collected from rural Gambian men and women aged 40-90 y at baseline (n=246). Time to follow-up was randomised to 1.5-2 y. Outcomes were: distal sites, total vBMD (TotBMD, mg/cm³), trabecular vBMD (TrBMD, mg/cm³), total area (TotAd, mm²); proximal sites, total area (TotAp, mm²), cortical vBMD (CrtBMD, mg/cm³), cortical area (CrtA, mm²). Multiple regression models adjusting for baseline age and height were used to explore changes in pQCT bone outcome measures in men and women separately. Data are presented as mean±SEM.

Results: Mean baseline ages for women and men were 61.2 SD 11.1 and 60.0 SD 12.7 y respectively. In women TotBMD and TrBMD decreased at the radius (-6.75±1.73 mg/cm³, 3.06±1.28 mg/cm³, both p<0.05) and tibia (-2.97±0.83 mg/cm³, -3.43±0.81 mg/cm³, both p<0.001). TotAd decreased at the distal tibia only (-7.43±2.67 mm², p<0.01). CrtA decreased at the proximal radius (-1.24±0.27 mm², p<0.001), however, loss was greater at the tibia where CrtBMD (-7.43±1.22 mg/cm³), CrtA (-2.09±0.41 mm²) decreased (both p<0.001). In men TotBMD decreased at

the radius and tibia (-7.23±2.24 mg/cm³, -3.95±0.83 mg/cm³, both p<0.01), TrBMD fell at the tibia only (-2.71±0.77, mg/cm³, p<0.001). CrtBMD decreased at the tibia (-2.77±0.82, p<0.01 mg/cm³). While CrtA and TotAp decreases at the radius only (-5.59±1.23 mm², -0.89±0.27 mm², both p<0.01).

Conclusion: In rural Gambian women the pattern of age-related bone loss was similar at the distal radius and tibia, with decreases in both total and trabecular vBMD. However, in women greater cortical bone loss and thinning occurred at the proximal tibia. In men decreases in total vBMD were found at the radius and tibia, however, in contrast to women cortical bone loss was greatest at the forearm. This suggests that there may be site- and sex-specific in age-related bone loss in Gambian older adults.

P882
FACTORS RELATED TO EARLY COMPLICATION AND PROLONGED HOSPITALISATION OF OSTEOPOROTIC HIP FRACTURE PATIENTS

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Objective: Complication after surgery and prolonged hospitalization led to unfavourable results after treatment for osteoporotic fracture. In this study we want to determine the factors that relate to complications after surgery such as urinary tract infection, pneumonia, pressure sores and hospitalization time after surgery, in elderly patients of Bangkok Metropolitan Administration hospitals. **Methods:** In this retrospective descriptive study, we reviewed 270 elderly patients that underwent surgery of osteoporotic hip fracture with low energy trauma from October 2018 to October 2019 in the hospital under medical services Department of the Bangkok Metropolitan Administration. Demographic data, method of treatment, hospitalization time before and after surgery, and early complications after surgery were all collected and analysed to determine the factors related to poor outcomes (early complications and prolonged postoperative hospitalization time) by using descriptive statistics to analyse relative between variables. **Results:** We found that urinary tract infection was the most common complication in patients who underwent hip surgery 19.63% (53/270), followed by pressure sores, pneumonia, pulmonary embolism (3.7%, 3.33%, 2.96% respectively) and factors related to these poor results have a negative correlation with age, time before admission, time to surgery and prolonged hospitalization time(p<0.05). Mean days of hospitalization were 13.69 d and a significant factor for this longer time was the age of the patients (p<0.05).

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Conclusion: The age of the patient and time taken for them to be treated were the most significant factors that led to poor early outcomes in hip surgery patients.

P883
LOW LEVEL OF ALKALINE PHOSPHATES: PREVALENCE AND CHARACTERISTICS OF MINERAL METABOLISM

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Objective: Determining the prevalence of low levels of alkaline phosphatase and evaluating markers of bone metabolism (calcium, phosphorus, vitamin 25 (OH) D) in individuals with a low level of alkaline phosphatase.

Methods: We analyzed the level of alkaline phosphatase, calcium, phosphorus, vitamin 25 (OH) D in subjects tested at one of the largest private laboratories in Russia "Helix". The test subjects which were analyzed ranged in ages between 19-90 y of age. The database includes test results from 2012-2017.

Results: During a 5-y period blood tests for alkaline phosphatase were performed on 296,142 patients. In 0.76% of patients (n=2242, men 243, women 1999) alkaline phosphatase decrease below 30 U/l was detected once (average age 28±5.32 y). In 135 people who passed the analysis twice, alkaline phosphatase levels below 30 U/l were detected. Their average age was 26.4±3.38 y. There was no correlation between the indicators of total calcium, phosphorus, vitamin D and the level of alkaline phosphatase in patients with a decrease in alkaline phosphatase less than 30 U/l, detected once. In the group of patients in whom the level of alkaline phosphatase was less than 30 U/l and detected twice, there was a correlation between low alkaline phosphatase and vitamin D deficiency (p=0.013, ρ=0.644).

Conclusion: The frequency of detecting a low level of alkaline phosphatase (less than 30 U/l) in a random sample was 0.76%. There was no significant correlation between total calcium, blood phosphorus, vitamin D and low alkaline phosphatase. A correlation was found between the level of alkaline phosphatase which was <30 U/l and a vitamin D deficiency (<30 ng/ml) among patients in whom the alkaline phosphatase level was <30 U/l measured twice.

P884
VITAMIN D STATUS OF AFRICAN-CARIBBEAN POPULATIONS: A GLOBAL PERSPECTIVE

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Objective: To investigate the vitamin D status (measured by 25(OH)D or dietary intake) of the African-Caribbean population globally; including the effect of vitamin D deficiency on musculoskeletal and other chronic health conditions in this population.

Methods: A systematic review was conducted by searching key databases (PubMed, Web of Science, Scopus) from inception until October 2019. Search terms included 'Vitamin D status' and 'African-Caribbean'.

Results: The search yielded 19 papers that included n=5471 African-Caribbean's from 6 countries. A strong inverse association (Pearson correlation) was found between 25(OH)D status and distance from the equator (r=-0.894, p<0.0001) (Figure). For those living at low latitudes 'insufficient' 25(OH)D levels were found only in participants with type 2 diabetes and those undergoing haemodialysis. Suboptimal dietary vitamin D intake was reported in all studies at high latitudes (UK recommended nutrient intake: 10µg/d), compared to studies at lower latitudes, with smaller recommended intakes (Caribbean recommended dietary intake: 2.5 µg/d), which found 'sufficient' intake in 2 out of 3 studies.

Conclusion: In African-Caribbean populations, vitamin D deficiency and low dietary vitamin D intake is more prevalent at higher latitudes. Further research is needed on the relationship between vitamin D and musculoskeletal outcomes in this minority ethnic group and a meta-analysis is currently underway to explore specifically the relationship between mean 25(OH)D concentration and latitude.

Disclosure: SLN is Research Director of D3Tex Ltd which holds the UK and GCC Patent for the use of materials for vitamin D prevention in populations who dress for cultural style.
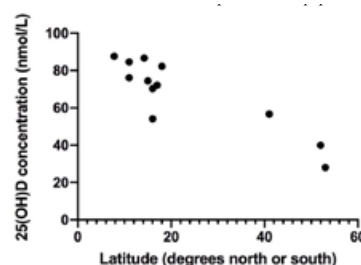
Figure: Relationship between vitamin D concentration [25(OH)D] and latitude in the African Caribbean population.
Note: Mean 25(OH)D concentration of 12 papers included in the meta-analysis. Latitude reported by author or estimated. Note additional unpublished data was provided by some authors.

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P885
VIDEOCAPILLAROSCOPY: A VALUABLE TOOL IN EARLY DIAGNOSIS OF DIGITAL ULCERS IN PATIENTS WITH SYSTEMIC SCLEROSIS

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Objective: Systemic sclerosis (SSc) is a connective tissue disorder characterized by microvascular dysfunction, considered to be a key element in the pathogenesis of SSc and its complications. Digital ulcers (DUs) are a manifestation of the underlying vasculopathy and fibrosis that characterizes SSc, often causing persistent and recurrent pain, severe complications such as tissue loss, infections, gangrene, autoamputation or even septicemia. We aimed to establish the correlations between digital ulcers and videocapillaroscopic patterns in the two subsets of SSc.

Methods: The study included a total of 53 patients with definite diagnosis of SSc, 34 patients with lcScS and 19 with dcSSc. The mean disease duration was 15 y. Digital ulcers were analyzed in comparison to the two subsets of SSc and capillary nailfold changes.

Results: The results showed that 21 patients had DUs, more frequently in the dcSSc group (12 patients – 57.14%) than in the lcSSc (9 patients – 42.85%). The videocapillaroscopic report identified an active scleroderma pattern characterized by multiple giant capillaries, hemorrhages in 9 patients - 2 from lcSSc (22.2%) and 7 from dcSSc group (58.33%). The late pattern characterized by capillaries loss, multiple angiogenesis areas and microarchitecture capillary disorganization was also identified in 9 patients, but in 7 (77.7%) in the lcSSc group and in 2 patients (16.6%) in the dcSSc group. The early pattern was observed in the remaining 3 patients from cdSSc group.

Conclusion: Early diagnosis of digital ulcers accurately determine the underlying lesion subtype and its correlation with the capillaroscopic pattern can provide valuable items for the diagnostic and therapeutic modulation of the patient with systemic scleroderma.

P886
INFLUENCE OF MENOPAUSE ON VOLUMETRIC BONE MINERAL DENSITY (VBMD) AND BONE GEOMETRY IN THE PERIPHERAL SKELETON OF URBAN BLACK SOUTH AFRICAN WOMEN AGED 40-60 YEARS: BT20+ CAREGIVERS

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Objective: To describe menopause-related bone changes in South African women, in whom the prevalence of HIV is relatively high.

Methods: pQCT scans (radius (4,66%) and tibia (4,14,38%)) for 437 women (mean±SD, 49.4±5.3 y) were analysed. Outcomes were: distal sites total area (TotA,mm^2), total and trabecular vBMD (TotBMD, TrBMD, mg/cm^3); proximal sites total and cortical area (CrtA, mm^2), BMC (mg/mm), cortical vBMD (CrtBMD, mg/cm^3). STRAW+10 criteria defined 4 menopause stages (late-reproductive, early- and late-menopause transition, early postmenopausal, and late postmenopausal (PM)). Multiple regression was used to test differences between menopause groups, adjusting for HIV status, with late-reproductive as the referent group. Data are presented as mean difference±SEM.

Results: The proportion of women by menopause group was 33%, 17%, 29%, 21%, respectively. Of these groups 15%, 16%, 10% and 12% were HIV+. No differences were found between the menopause transition and late-reproductive groups. Early-PM was associated with lower radius TotBMD (-18.23±6.79 mg/cm^3), CrtA (-2.68±1.23 mm^2), BMC (-5.02±1.56 mg/mm) and CrtBMD (-30.69±5.48 mg/cm^3) (all, p<0.05). Late-PM participants also had lower TotBMD (-32.94±7.42 mg/cm^3), TrBMD (-21.62±5.74 mg/cm^3), CrtA (-3.53±1.35 mm^2), BMC (-5.64±1.17 mg/mm) and CrtBMD (-23.51±6.00 mg/cm^3) (all, p<0.05). At the distal tibia late-PM but not early-PM was associated with lower TotBMD and TrBMD (-17.50±5.43 mg/cm^3,-10.63±4.92 mg/cm^3) (both, p<0.05). At the 14% tibia early-PM was associated with lower BMC (-6.34±3.09 mg/mm), CrtBMD (-19.78±4.57 mg/cm^3) vs. late-reproductive. Late PM was associated with lower CrtA (-5.28±2.64 mm^2), BMC (-9.45±3.35 mg/mm), CrtABMD (-25.85 ±4.96 mg/cm^3) vs. late-reproductive (all, p<0.05). At the 38% tibia early-PM and late-PM participants had lower CrtBMD (-19.09±3.94 mg/cm^3,-21.44±4.27 mg/cm^3) vs. late-reproductive (both p<0.001). This pattern remained with and without adjustment for HIV status.

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Conclusion: At the non-load bearing radius early- and late-PM status was associated with lower vBMD, mass, and geometry at distal and proximal sites when compared to women who had not reached menopause. At the tibia lower total and trabecular vBMD were only associated with late-PM, though deficits in cortical bone begin at from early-PM.

P887
CASE OF OSTEOPOROSIS IN A PATIENT WITH NEWLY DIAGNOSED ACUTE LYMPHOBLASTIC LEUKEMIA

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Objective: There are cases of osteoporosis at the time of diagnosis of leukemia.

Methods: A young man aged 19 had complained of pain in thoracic spine for several months, on examination osteoporosis was revealed. Analyses were carried out using immunochemiluminescent method: Vitamin D 18.9 ng/mL, PTH 58 pg/mL (10-65); and enzyme immunoassay: alkaline phosphatase 105.0 (38-126 U/l), total calcium 2.1 mmol/L (2.1-2.5 mmol/L), phosphorus 1.29 mmol/L (0.81-1.45 mmol/L), ALT 29 U/L, AST 35 U/L, CKD (CKD EPI) 126 mL/min/1.73m^2. X-ray densitometry (Lunar): Z score -3.2.

Results: Since osteoporosis was complicated with compression fracture of the body of the 8th thoracic vertebra, the patient underwent surgery: intralaminar disc hernia removal of 4-5 lumbar vertebrae on the left and percutaneous vertebroplasty of the 8th thoracic vertebra with bone cement on both sides. At the same time, patient was diagnosed anemia, and hematological tests showed acute lymphoblastic leukemia. Patient was prescribed chemotherapy. For osteoporosis treatment, patient was prescribed vitamin D 120,000 IU/d for 4 d in a row, calcium carbonate 1000 mg/d for 1 y, zoledronic acid 5 mg, once. A week later, after taking vitamin D, the level increased to 55.0 ng/mL, then the patient took vitamin D at 1000 IU/d, without interruption, for 1 y. In 1 y after treatment patient's general condition improved significantly, alkaline phosphatase was 126.0 (38-126 U/l), total calcium 2.5 mmol/L (2.1-2.5 mmol/L), phosphorus 0,94 mmol/L (0.81-1.45 mmol/L), vitamin D 48.9 ng/ml, PTH 34 pg/ml (10-65), ALT 19 U/L, AST 14 U/L, CKD (CKD EPI 2009) 133 mL/min/1.73m^2. Densitometry X-ray (Lunar): Z score -2.4.

Conclusion: There are cases of osteoporosis at the time of diagnosis of leukemia in the literature described. Risk factors for the development of musculoskeletal complications are poor nutrition, limited mobility and male gender. We believe that in this patient, vitamin D deficiency should be regarded as an additional risk factor for osteoporosis.

P888
PROGNOSIS OF THE GROWTH OF THE NUMBER OF OSTEOPOROTIC FRACTURES OF PROXIMAL PART OF FEMUR IN UZBEKISTAN

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Objective: To determine the growth of the incidence of low energetic (osteoporotic) fractures of the proximal part of femoral bone (FPPF) among the people above 40 years old in Uzbekistan.

Methods: We performed a research in the framework of multicenter international population study called EVA in Eurasian countries including Russia, Armenia, Belarus, Moldova, Kazakhstan, and Uzbekistan. In the research we studied the incidence of FPPF among men and women above 40 during one year taking for example the residents of Pap district of the Republic of Uzbekistan.

Results: Within the period 2016-2017 we revealed 88 cases of FPPF in women and 52 cases in men above 40 years old. Among the women the incidence rate was almost 1.5-fold higher than among the men. Total incidence of femoral neck fractures among the people above 50 reached 513.4; 315.1 and 418.4 per 100000 women, men, and all people respectively. Rated incidence of standardized parameters of annual morbidity rate (per 100000) of the fractures of proximal part of femoral bone in people above 40 in the whole Uzbekistan was equal to 357.7 in women, 190.2 in men, and 294.6 for both genders. Among people above fifty it was equal to 567.1 for women, 355.3 for men, and 469.5 for both genders. Supposing that osteoporosis morbidity rate in Pap district was similar to that over the whole country, we calculated standardized rates of annual morbidity of femoral fractures (per 100000) among the people above 40 for the whole Uzbekistan population. These numbers were equal to 357.7 in women, 190.2 in men, and 294.6 for both genders. Rated incidence among the people above 50 was equal to 567.1 for women, 355.3 for men, and 469.5 for both genders. According to WHO prognosis in 2050 in Uzbekistan population the part of those above 40 and elder will be 2.8 folds greater than in 2015 due to the number of very old people. On the basis of UN prognosis taking into account the estimated birth rate for Uzbekistan population, annual growth of the number of hip joint fractures among women above 40 will increase more than three times from 14936 in 2015 to 26103 in 2030, and 52357 in 2050 due to the strong link between femoral fracture high prevalence and old age. Among men relative risk of femoral fracture will increase from 8606 to15326 in 2030 and up to 29422 a year in 2050. Annual number of FPPF for both genders will rise from 23542 in 2015 to 81779 in 2050. In relation to those above 50 it is prognosed that the prevalence of hip joint fractures in that age group will increase from 14211 in 2015 to 25003 in 2030, and 51306 in 2050 for women, and from 7870 to 14152, and 28270 for men, respectively.

Conclusion: It was estimated, that the prevalence of femoral fractures in Uzbekistan in 2050 will increase more than three times; and that is the highest growth rate among all countries participating in EVA project.

P889
INCIDENCE OF OSTEOPOROTIC FRACTURES OF PROXIMAL PART OF FEMUR IN UZBEKISTAN

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Objective: To determine the incidence of low energetic (osteoporotic) fractures of the proximal part of femoral bone (FPPF) among people above 40 by means of prospective study.

Methods: Men and women with osteoporotic fractures of the proximal part of femoral bone in the age above 40 were observed within a year in Pap district of Namangan region of the Republic of Uzbekistan. The subject of the study is a common clinical status of patients, R study results, and history data. Research methods were a poll, clinical, epidemiological, and statistical studies.

Results: Within the period from 1 April 2016 till 31 March 2017 we studied all new cases of FPPF. According to the obtained results we determined 88 FPPF in women, 52 in men above 40 (ratio 1.7/1). Among these cases only 33.6% of old people, who applied due to fracture of hip joint, were hospitalized. Results of FPPF incidence analysis showed that the character of the curve was directly dependent on the age. Comparative analysis of FPPF incidence dependence on the age demonstrated that the curve in men and women constantly rose with exclusion in the age of 90+. In women the incidence parameters were almost 1.5-fold higher than in men. Total incidence of femoral neck fractures among the people above 50 reached 513.4; 315.1 and 418.4 per 100000 women, men, and all people respectively. Rated incidence of standardized parameters of annual morbidity rate (per 100000) of the fractures of proximal part of femoral bone in people above 40 in the whole Uzbekistan was equal to 357.7 in women, 190.2 in men, and 294.6 for both genders. Among people above 50 it was equal to 567.1 for women, 355.3 for men, and 469.5 for both genders.

Conclusion: The incidence of osteoporotic fractures of proximal part of femoral bone dependent on the gender and age was calculated for the first time; its high rate was revealed compared to other Eurasian countries.

P890
PREVALENCE OF 25(OH)D DEFICIT AMONG WOMEN OF PERIMENOPAUSAL AGE

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Objective: To assess the amount of 25(OH)D in women of perimenopausal age.

Methods: We performed a study of 79 women in the age from 40-50 years old, the average age of whom was equal to 46.1±3.28 years old. The level of vitamin D and PTH was determined by means of electric chemoluminous analysis using Elecsys and cobas e(Roche) automatical analyzers.

Results: According to the obtained results vitamin D deficit was diagnosed in 41.8% of the women out of 79 examined (average 7.31 ng/mL), insufficient amount of vitamin D in 39.2% (average 13.2 ng/mL), sufficient amount in 19.0% (average 30.2 ng/mL). In 81% of the women the amount of 25(OH)D varied from 2.5 and 90 percentiles within 3.0-19.25 ng/mL range. The amount of 25(OH)D was below 5 percentile in 5.1% of the examined women, while the amount above 93.5 percentiles was determined in 7.6% of them. Analysis of PTH amount in women of perimenopausal age showed that the average amount of PTH was equal to 61.93±25.0 ng/mL (Me 55.9; IQR 43.3-73.1). The amount of PTH in women with low concentration of 25(OH)D (<30 ng/mL) was higher than in those with 25(OH)D >30 ng/mL. The amount of 25(OH)D had a negative correlation with PTH amount (r=-0.32; p<0.05). Average BMD of femoral neck was $0.976±0.133$ g/cm^2, while average values of T-criterion was 0.09±1.10. Average BMD of L1-L4 vertebrae was 1.111±0.16 g/cm^2, while T-criterion was 0.14±1.20. According to the results of double energetic absorption metering one (2.9%) out of 34 women had osteoporosis (T-criterion -2.70; BMD of femoral neck 0.730 g/cm^2). The amount of vitamin D was 8.29 ng/mL; in compliance with the classification it corresponds to expressed element deficit. Five (14.7%) women had osteopenia (average T-criterion -1.46±0.31; BMD of femoral neck 0.888±0.09 g/cm^2). Vitamin D amount was 8.18±2.65 ng/mL, in compliance with the classification corresponding to expressed element deficit. It should be noted that in 16 (47.1%) out of 34 women we revealed expressed vitamin D deficit had (range 3.0-9.73 ng/mL), in 15 (44.1%) vitamin D concentration varied from 10.2 to 17.3 ng/mL. That also testified the deficiency of the element.

Conclusion: Thus, average amount of 25 (OH)D (13.95±9.41 ng/mL) in women of perimenopausal age testified expressed deficit. Amount of 25(OH)D below 20 ng/mL in 81.0% of the studied population testified that the majority of the examined women had various stages of vitamin D deficit. One of the probable explanations of that fact is that Uzbekistan is Southern country where most people have relatively dark skin.

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P891
CASE REPORT OF LARGE JOINT SEQUENTIAL REPLACEMENT IN A PATIENT WITH OCHRONOSIS

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Objective: Ochronosis is a rare hereditary disease caused by congenital disturbance of tyrosine metabolism associated with selective accumulation of homogentisic acid (HGA) in the peripheral blood followed by HGA- derived dark-brown pigment deposition in tissues and their calcification. Disturbances in muscular skeletal system in ochronosis patients is usually developed by the age of 30-40 years old. The disease initially involves the lumbar spine similar to deforming spondylosis. This is followed by slow progression of knee osteoarthritis. Hip and shoulder joints are affected later. We aimed to provide a case report of large joint surgery in a patient with ochronosis.

Methods: A patient N. born in 1953 with primary diagnosis of ochronosis (alkaptonuria) was subjected to sequential replacement of knee and hip joints in 2013-2018 in Nasonova Research Institute of Rheumatology.

Results: In the course of surgery, deposition of black pigment was observed in the subchondral bone as well as articular cartilage thinning or its absence. Standard rehabilitation techniques were applied. Both early and remote results according to HAQ, EQ-5D questionnaires and Harris Hip Function Scale were satisfactory.

Conclusion: Joint replacement represents an appropriate therapeutic approach for the patients with the late stage of ochronosis associated with development and progression of secondary osteoarthritis.

P892
CALCIUM INTAKE IN UKRAINIAN ADULTS OF DIFFERENT AGE

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Objective: Low calcium (Ca) consumption is a worldwide problem; however, the data regarding Ukrainian population are insufficient. The aim of this research was to study the level of Ca intake from daily rations of Ukrainian adults depending on age and sex.

Methods: We included 1650 persons aged 20-89 years old (men (29.4 %) and women (70.6 %)) from various regions of Ukraine who fully completed the nutritional questionnaire, 92% of them had valid results. The Ca consumption was evaluated by the method of 24-h dietary recall (24HR) by a trained dietitian using photograph models to estimate portion size. Mean daily intake of foods and drinks in daily rations was calculated from 3 records and then processed with the computer program (Rational Nutrition Test TRP-D02, VIRIA, Ukraine).

Results: The Ca intake was significantly higher in males compared to the same index in females (for all groups (Me [Q25 − Q75]: 591.3 [363.18−947.4] and 514.0 [298.28−759.7] mg/d, accordingly). The Ca consumption in subjects aged 50 years and more consisted, respectively, 600.2 [396.0−904.1] mg/d in men and 515.3 [309.0−751.4] mg/d in women, Also, it was revealed that 66.9% of men and 77.7% of women consumed less than 800 mg/d Ca, and 77.2% of men and 90.3% of women − <1000 mg/d Ca. Only 15.5% of men and 4.1% of women consumed 1200 mg/d Ca and more. Low Ca intake was established in all age groups independently of sex.

Conclusion: This study demonstrated low Ca level in daily rations in Ukrainian adults, that can have a negative impact on risk of osteoporosis and fractures that require forehanded correction.

P893
EFFICIENCY OF VITAMIN D IN THE SUPPORT TREATMENT OF METABOLIC SYNDROME

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Objective: Metabolic syndrome (MS) is a multifactorial disorder which includes insulin resistance, hyperglycemia, hypertension, hypertriglyceridemia, abdominal obesity. Pathogenesis of the MS is mainly conditioned by obesity and insulin resistance. The potential influence of vitamin D homeostasis includes the presence of specific vitamin D receptor in pancreatic B cells. The purpose of this study was to demonstrate the efficiency of vitamin D in the support treatment of MS.

Methods: 90 patients (ages 19-45, 30 men and 60 women) with MS were enrolled in the study. All of them had mild hypertension (BP ≤160/90 mm Hg), abdominal obesity (men 120 cm, women 88 cm), hyperinsulinism, dyslipidemia and family history of type 2 diabetes mellitus. The patients were split into 2 groups. 43 patients in the main investigation group were prescribed vitamin D 6000 IU/d without concomitant prescription of statins, antihypertensives, metformin, but they were told to lead healthy lifestyle: quit smoking, avoid sugar and stay physically active throughout the day. 47 patients in control group did not receive any treatment, but also led healthy lifestyle. Patients were investigated twice − at baseline and in 6 months.

Results: 32 out of 43 patients in main group showed statistically significant positive effects, particularly, patients had lost 15-20% of their initial body weight.

Conclusion: Taking into account all above mentioned, we conclude that administration of vitamin D as a support treatment has a distinct positive influence on patients with MS.

P894
ROLE OF VITAMIN D IN THE TREATMENT OF POLYCYSTIC OVARY SYNDROME

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Objective: Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women or reproductive age. PCOS is mainly characterized by ovulatory dysfunction, hyperandrogenism, insulin resistance, hyperinsulinemia, dyslipidemia and central obesity.

Vitamin D deficiency has been described in patients with PCOS. The potential influences of vitamin D on glucose homeostasis include the presence of specific vitamin D receptor in pancreatic B cells. We aimed to evaluate the efficiency of vitamin D in the support treatment of PCOS.

Methods: 60 female patients (ages 19-34) with PCOS where enrolled in the study. All of them had sufficient serum level of vitamin D. The patients were divided into 2 groups, 30 individuals in each. Patients in I (main) group received standard treatment for PCOS with additional prescription of vitamin D (2000 IU/d). The II (control) group was prescribed standard treatment without vitamin D. After 6 months of therapy laboratory examination was performed. All patients were informed about the potential aim of the study and expectations from the treatment with vitamin D.

Results: The patients in the main group showed statistically significant ($p<0.05$) positive effects after the treatment. 12 out of 30 patients showed significant efficiency, 6 of them became pregnant in the further 3 months.

Conclusion: Taking into account all above mentioned, we conclude that administration of vitamin D as a support treatment has a distinct positive influence on patients with PCOS.

P895
OSTEOPOROSIS AND ADDISON'S DISEASE

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Addison's disease is a condition caused by the chronic secretory deficiency of glucocorticoid, mineralocorticoid and androgen hormones, due to the destruction of the parenchyma of the adrenal gland. Causes are multifactorial, contributed by underlying adrenocortical hormonal deficiency, associated autoimmune endocrinopathies, electrolyte disturbances and supraphysiologic glucocorticoid replacement in rare cases. Treatment consists of the replacement of hormonal deficits: glucocorticoid, mineralocorticoid and androgen and should be followed throughout life.

Case report: A 19-year-old patient, known for 10 y with type I autoimmune polyendocrinopathy (Addison's disease and hypoparathyroidism), treated in other hospital only with mineralocorticoid (fludrocortisone 0.1 mg) and high-dose calcium preparations. The diagnosis of Addison's disease was confirmed 8 y ago but the treatment was recommended only with fludrocortisone and not with hydrocortisol. Clinically, the patient presents marked fatigue and adinamia, skin hyperpigmentation, muscle weakness, hypotension, weight loss, decreased appetite. Laboratory investigation: plasma cortisol <0.50 μg/dl, negative Synachten stimulation test, ACTH=1240 pg/ml (V.N: <46), Na=132 mEq/l, K=5.98 mEq/l. Adrenal computer tomography shows reduced dimensional adrenal glands. The evaluation of BMD using DXA reported a Z-score of −5.2 at the lumbar vertebrae (L2−L4) and −3.1 at the femoral neck. Treatment with glucocorticoids was initiated, in combination with mineralocorticoids and androgens with favorable clinical evolution.

Correct glucocorticoid substitution is essential in patients with Addison's disease. Our case demonstrated that in Addison's disease is important to evaluate the BMD. Our case shows that osteoporosis in patient with adrenal insufficiency is a complication that correlates not only with the chronic treatment with glucocorticoids but also with the androgen deficiency present, our patient being without treatment with glucocorticoids and sex steroids, only with fludrocortisone. Attention to bone preservation in Addison's disease is very important even in young patients.

P896
THE GRIP STRENGTH THRESHOLD OF 16 KG DISCRIMINATES SUCCESSFUL REHABILITATION IN 258 WOMEN WITH HIP FRACTURE: A PROSPECTIVE SHORT-TERM STUDY

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Objective: External validation of the handgrip strength threshold of 16 kg to predict the functional recovery in activities of daily living after a fragility fracture of the hip in older women.

Methods: We performed a prospective study of 258 women who were consecutively admitted to our rehabilitation hospital because of a subacute fragility fracture of the hip. We assessed handgrip strength by a hand-held Jamar dynamometer at admission to inpatient rehabilitation. The grip strength data were dichotomized (either <16 kg or ≥16 kg) according to the criterion released in 2019 by EWGSOP. Functional ability in activities of daily living was assessed by the Barthel index at the end of the rehabilitation course and successful rehabilitation was defined with a Barthel index score ≥85/100.

Results: Grip strength was below the threshold of 16 kg in 151 of the 258 women (58%; 95%CI from 52% to 65%). A grip strength <16 kg significantly predicted unsuccessful rehabilitation: χ^2 (1, n=258)=23.5, P<0.001. We correctly classified 60 of the 73 women with unsuccessful recovery and 94 of the 185 women with successful rehabilitation (sensitivity=82%, specificity=51%, pos-

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itive predictive value=40%, negative predictive value=88%). The odds ratio to gain successful rehabilitation was 2.68 (95%CI from 1.19 to 6.04) for the women with a grip strength ≥16 kg, after adjustment for age, Barthel index scores before rehabilitation, hip-fracture type, cognitive impairment and circulating levels of 25-hydroxyvitamin D.

Conclusion: We supply an external validation of the 16 kg cut-off point for grip strength released by the EWGSOP in 2019: dichotomization according to the 16 kg threshold significantly predicted the short-term recovery in ability to function after hip fracture in older women.

P897
COST-EFFECTIVENESS OF FRAX® BASED INTERVENTION THRESHOLDS FOR MANAGEMENT OF OSTEOPOROSIS IN SINGAPOREAN WOMEN

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Objective: FRAX-based intervention thresholds (ITs) have recently been identified for osteoporosis management in Singapore[1]. The aim of this study was to estimate the cost-effectiveness (CE) of major osteoporotic fracture (MOF) age-dependent ITs in women >50 y.

Methods: A previously validated Markov-microsimulation model was adapted to the Singaporean healthcare context to estimate the lifetime costs (expressed in SGD2019) per quality-adjusted life-years (QALY) of generic alendronate (assuming full as well as real world adherence), and of denosumab. Age-dependent FRAX MOF ITs were derived from Chandran et al [1] and were 2.87% (50y), 4.84% (55y), 8.09% (60y), 13.01% (65y), 18.37% (70y), 23.98% (75y), 26.07% (80y), 28.39% (85y) and 28.21% (90 y). Fracture incidence and costs data were obtained from the Ministry of Health and from Chandran et al[2]. We used CE threshold of SGD65,000 per QALY gained, based conservatively on 0.7 times the Singapore GDP per capita.

Results: Generic alendronate was shown to be cost-effective at age-dependent FRAX MOF ITs from the age of 60 y. Cost-saving was shown in women aged 80 years and older. Denosumab was shown to be cost-effective from the age of 70 y. Treatment with the above osteoporosis medications was not shown to be cost-effective at age-dependent FRAX ITs below 60 y.

Conclusion: This study suggests that treatment of Singaporean women with alendronate and denosumab is cost-effective at age-dependent FRAX intervention thresholds at ages more than 60 and 70 years respectively. Cost-effective access to therapy for elderly patients at high fracture probability based on FRAX could

contribute to reduce the growing burden of osteoporotic fractures in Singapore. However, further work is needed to investigate ITs that would lead to cost-effective use of osteoporosis medications in younger postmenopausal Singaporean women.

References:

- Chandran M et al. Arch Osteoporos 2018;13:130

- Chandran M et al. Arch Osteoporos 2019;14:114

P898
EFFECTS OF ANDROGEN DEPRIVATION THERAPY ON BONE QUALITY (TBS) IN PATIENTS WITH PROSTATE CANCER

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Objective: Androgen deprivation therapy (ADT), by inducing severe hypogonadism, leads to a loss of BMD and an increased risk of fragility fractures after 6 months of treatment in men with prostate cancer[1]. However, its effect on bone quality has not been described. We aimed to evaluate the changes on bone microarchitecture (bone quality) assessed by TBS (trabecular bone score) in male patients with prostate cancer after one year of treatment with ADT.

Methods: All patients diagnosed with prostate cancer candidates for long-term ADT admitted to Urology Department of Hospital Universitari Parc Tauli (reference population of 450,000 inhabitants) between April 2017 and December 2019 were included. Patients who received chemotherapy, previous hormonal therapy or specific treatment for osteoporosis in the last year or those who had a very impaired functional capacity (Barthel index <30) were excluded.

Demographic, clinical and analytical data (testosterone, calcium, phosphorous, alkaline phosphatase, 25-hydroxyvitamin D, PTH) were collected in all patients. A bone densitometry (GE-Lunar Prodigy) including the measurement of lumbar spine TBS (L1-L4) using Medimaps Software was performed at baseline and at 12 months of treatment with ADT.

Results: 78 patients were included. Mean age 77.9±8.3 y. The median Gleason score was 7.88±1.05. Three patients had previous fragility fracture (one sacral fracture, one fibula and one multiple vertebral fracture). Baseline analytical values in patients were the following: testosterone11.6±74.9 nmol/L.; 25-hidroxyvitamin D 20.8±10.4 ng/ml; PTH 51.8±23.0 pg/ml; CTX 0.58±0.66. The daily calcium intake was 573±207 mg/d. According to BMD, 17 patients (21.8%) had osteoporosis before starting ADT, with the following average T-score values: lumbar spine +0.15±1.85, femoral neck -1.75±1.00, and total hip -1.19±1.16. Mean baseline TBS value of the entire cohort was 1.279±0.122. 30.5% of the patients showed very degraded microarchitecture (TBS<1.230), 28.8% had partially degraded microarchitecture (TBS 1.230-1.310) and in

40.7% showed normal microarchitecture (TBS >1.310). After one year of ADT treatment, TBS mildly worsened in this cohort, with a median value of 1.256±0.131 (p=NS). However up to 43% of patients reached highly degraded microarchitecture, 27% partially degraded and only 29.5% had a normal TBS (p=NS).

Conclusion: Most patients with prostate cancer have an altered bone quality before starting ADT. After 12 months of treatment, the percentage of patients with highly degraded bone microarchitecture increases, although not significantly. More studies are needed to confirm this trend and to evaluate if these patients present more long-term fractures.

Reference: 1. *Lee R et al. Bone 2011;48:88.*

P899
DEVELOPMENT AND ASSESSMENT OF A MULTICOMPONENT ADHERENCE INTERVENTION IN OSTEOPOROSIS PATIENTS WITH A RECENT FRACTURE AT THE FRACTURE LIAISON SERVICE: THE IMPROVEMENT OF CARE FOR OSTEOPOROSIS ORGANIZED BY NURSES (ICOON)-STUDY

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Objective: To develop and evaluate the feasibility and (cost-)effectiveness of a multicomponent adherence intervention (MCAI), consisting of combination of a decision aid (DA) and a nurse-led adherence support program and to compare antiosteoporosis medication adherence with usual care in patients attending the fracture liaison service with a recent fracture.

Methods: A DA was developed by using focus groups with professionals and patients, and nurses were trained in motivational interviewing. A sequential study in two FLSs in the Netherlands, including 248 consecutive patients of 50 y or older (n=124 receiving usual care, followed by n=124 receiving a MCAI), is ongoing. Primary outcomes of the study include medication persistence and adherence, decision quality, cost-effectiveness and process evaluation. Secondary outcomes include health status, quality of life and health literacy.

Results: The final version of the DA includes 4-pages with information on osteoporosis, osteoporosis medications, both general and personal fracture risk, information on all medications for different attribute and a decisional page in which the patient can summarize their preferences and make a choice if and which treatment to start. The sequential trial is ongoing, inclusion of the usual care group is completed.

Conclusion: This project is the first where the (cost-)effectiveness of a DA developed for patients with osteoporosis combined with a nurse-led adherence support program is studied. Results of this study could provide useful information to clinicians and policy makers about the value of DA and adherence support program.

P900
EFFECT OF STRUCTURED EXERCISE PROGRAMME ON FUNCTIONAL REACH AND BALANCE IN 60- TO 75-YEAR-OLD WOMEN WITH OSTEOPOROSIS

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Objective: One major priority for health care professionals is to minimize the risk of fall in the elderly population especially with osteoporosis. While the quality of life of an individual is affected by fall accidents, management of post-fall disability in the elderly could be a huge economic burden to the society. There is lack of research published previously to assess effect of exercise on functional reach and balance in osteoporotic elderly. So the objective of the study was to study the effect of structured exercise programme on functional reach and balance in women with osteoporosis.

Methods: This quasi experimental study was conducted on 41 women with diagnosed osteoporosis. Exclusion criteria were neurological problems(e.g., stroke, parkinsonism) sensory loss, known orthopaedic problems (amputation, symptomatic lower limb arthritis, lower limb deformities, total knee/hip replacements), inability to follow commands, pacemaker, cardiorespiratory instability, arrhythmia, malignant disease, people involve in any physical exercises in past 6 months. Consent of subject was taken and the format and details of the exercise program was explained to the subjects. Outcome measured used were functional reach test (FRT) and timed up and go test (TUG).Exercise protocol was followed for 6 weeks. Assessment for post intervention data was carried out after which the collected data was statistically analysed used t-test.

Results: There was a significant difference in the mean FRT and TUG values before and after administration of Structured exercise program indicated by the p value (p value <0.0001) which is extremely significant.

Conclusion: Structured exercise program is extremely effective for improving functional reach and balance in elderly women with osteoporosis.

P901
POLYUNSATURATED FATTY ACIDS INTAKE IN BELGIAN (PRE)SARCOPENIC ELDERLY

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Objective: Omega-3 polyunsaturated fatty acids (PUFAs) are gaining an important role in sarcopenia research. Higher levels of omega-3 intake are associated with an improvement of sarcopenia defining parameters (muscle strength, mass and quality) and physical performance. Moreover, an increased omega-6/omega-3 ratio seems to be associated with various adverse outcomes. However, data about PUFA intake in the (pre) sarcopenic elderly are scarce. The objective of present study is to determine the PUFA intake of participants in the Exercise and Nutrition for Healthy AgeiNg (ENHANce) randomized controlled trial (RCT).

Methods: ENHANce is an ongoing 5-armed RCT (ClinicalTrials. gov: NCT03649698) that examines the effect of an individualized nutritional intervention (protein supplementation and/or omega-3) combined with a physical exercise program in community-dwelling (pre)sarcopenic older persons aged ≥65 y. Self-reported dietary intake is estimated through 4 day food diaries and analyzed for intake of omega-3 and omega-6. Moreover, eicosapentaenoic (EPA), docosahexaenoic acid (DHA) and α-linolenic acid (ALA) intake were calculated as the main types of omega-3. The recommended daily intakes (RDI) proposed by the Superior Health Council of Belgium were used for calculating adequate intake.

Results: As of 24 January 2020, 37 participants completed their baseline food diaries (mean age 75.02±6.88y, 43.24% female, handgrip strength 33.52±9.92 kg, gait speed 1.09±0.18 m/s). The study population consists of 33 presarcopenic and 4 (severe) sarcopenic elderly, defined according to EWGSOP1. The mean total omega-3 intake was 1.89±0.96 g/d, of which 0.06±0.09 g/d EPA, 0.10±0.13 g/d DHA, 1.51±0.83 g/d ALA and 0.22±0.20g/d of other omega-3. The mean intake of total omega-6 was 8.97±4.57 g/d, resulting in an average omega-6/omega-3 ratio of 4.96±1.33. Only 22.22% of participants had an adequate intake of omega-3, compared to 35.14% for omega-6. Considering EPA or DHA alone, respectively 8.10% or 16.21% reached RDI.

Conclusion: The minority of (pre)sarcopenic elderly in our study reached the RDI for PUFAs, certainly omega-3, EPA and DHA intake were low. As sarcopenia research is more and more focusing on nutritional interventions with PUFAs, more insights in daily dietary PUFAs intake might contribute to developing more targeted approaches.

P902
THE IMPACT OF FAT TISSUE ON QCT AND DXA MEASUREMENTS: EVALUATION WITH A DIPOTASSIUM HYDROGEN PHOSPHATE-BASED PHANTOM

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Objective: To assess the effect of the fat on the measured BMD determined by QCT and DXA using developed semi-anthropomorphing phantom.

Methods: To assess the effect of the fat on the determination of BMD we used the previously developed semi-anthropomorphic phantom PHK (Phantom Kalium). The phantom contained vertebra models filled with a solution of potassium hydrogen phosphate in various concentrations: the vertebral "body" (50; 100, 150, 200 mg/ml) and the "cortical bone" blocks (250, 350, 450, 550 mg/ml) were made up together. The fat was simulated by a circular layer of 38-mm wax. The studies were performed on two DXA scanners with a narrow angle fan and a fan beam, as well as on two 64 rows CT scanners with different kernels (FC08, FC17) and asynchronous QCT module. Each experiment was repeated 5 times.

Results: Scanning the phantom with the fat showed a systematic decrease of the aBMD by DXA study and an increase in the measured vBMD by QCT study. The difference in mean relative errors was 8.0% and 2.7% for DXA with a narrow angle fan beam and a fan beam by adding fat (compared to scanning without fat). On the contrary, adding the fat led to an underestimation of the measured volume vBMD by QCT study. The difference in mean relative errors was -3.9% and -6.3% for QCT where the FC08 kernel and the FC17 kernel were used. This underestimation of the measured values of the vBMD with fat simulation can be explained by the beam hardening effect. The opposite effect demonstrated on DXA when the fat was added to the phantom, the aBMD increased, probably due to the calculation inherent algorithms in this modality.

Conclusion: The results of phantom modeling of the fat showed a decrease in the measured vBMD values in QCT and an increase in aDXA. These opposite effects should be considered when bone densitometry is performed in patients with various BMIs.
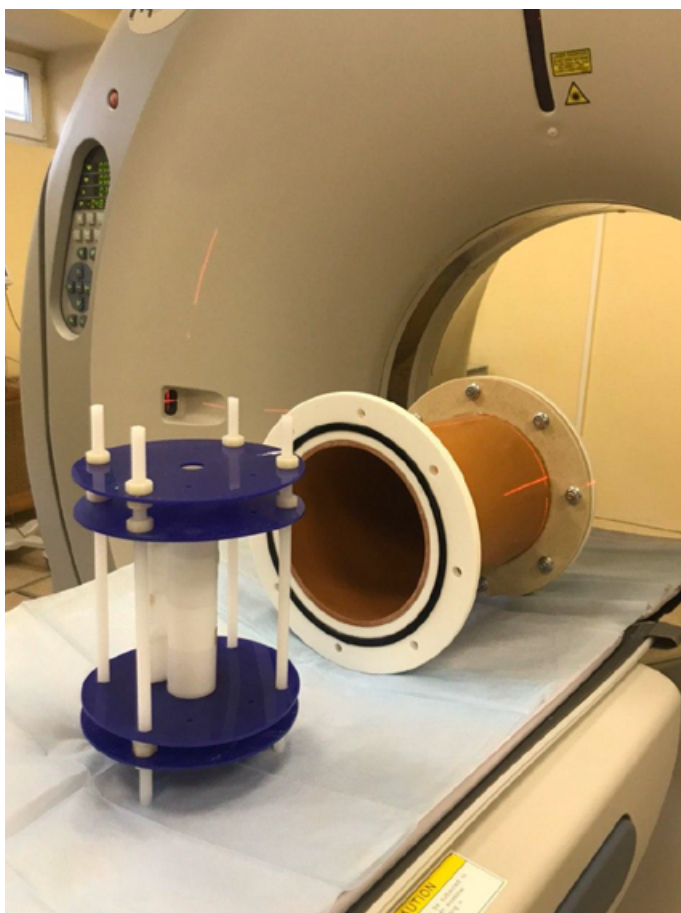
P903

OSTEOPROTEGERIN AND DICKKOPF-1 ARE SERUM BIOMARKERS THAT ASSOCIATE WITH SURVIVAL IN GERIATRIC SWEDISH PATIENTS AND CONTROLS

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Objective: Bone turnover markers relates to bone remodeling and may, at least on group level, predict fractures. Many of these markers associates also with vascular disease and mortality. This study aimed at in old individuals investigate the relationship between 5 defined bone turnover markers, incident fractures and mortality.

Methods: Serum levels of dickkopf-1 (DKK-1), sclerostin (SOST), osteoprotegerin (OPG), osteopontin (OPN) and osteocalcin were analyzed in 97 patients mean aged 85.8 y (SD 5.5) with a hip fracture, 71 patients mean aged 83.3 y (SD 5.7) with a stroke and 83 volunteers mean aged 77.4 y (SD 2.7). The samples were in the patients taken 3.8 d (0-6) after the index event. Incident fractures and mortality was then registered during the following 5.0 y (SD 0.3), were after hazard ratios (HR) were calculated in a Cox regression model (adjusted for differences in age, gender and patient group) for fracture and mortality risk in participants with bone markers in the highest quartile compared with participants with markers in the lowest quartile. Data are provided as mean (95%CIs).

Results: 56% of the patients and 6% of the controls died during the follow-up. None of the 5 markers were associated with fracture risk. HR for mortality was among patients in the highest vs. the lowest quartile for OPG 3.4 (1.4-8.1) and for DKK-1 2.0 (1.1-3.6).

Conclusion: None of the included markers was associated with fractures risk while high serum OPG and DKK-1 was associated with high mortality.

P904

OPTIMIZATION OF TREATMENT FOR POST-STROKE ARTHROPATHIES USING KINESIOTAPES

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Methods: To achieve this goal, a dynamic study was conducted on the basis of the neurological department. There were 42 patients aged 44-78 y with a verified diagnosis - acute cerebrovascular accident, which established complications in the form of post-stroke pain syndromes. In addition to the main treatment for post-stroke arthropathies, in order to reduce pain and muscle-tonic syndromes, as well as to correct biomechanical disorders, the following types of kinesiotape technique were used: muscle, fascial and lymphatic drainage overlay of kinesiotape.

Results: The study showed that most often patients complained of pain of varying intensity in the affected limbs - 14 people (33.3%), for headache - 10 (23.8%), back pain - 11 (26.2%), pain in healthy limbs - 7 (16.6%). Two groups of studied were formed:

1 - the control group consisting of 21 patients who received standard treatment for post-stroke arthropathies;

2 - the main group consisting of 21 patients who, in addition to standard treatment, used various methods of kinesiotaping

During the evaluation of the effectiveness of kinesiotaping, a significant decrease in pain syndrome was found in the main group of subjects, the intensity of which was determined using VAS, compared with the control group of patients who had a moderate pain syndrome.

Conclusion: We found that early and adequate correction of pain syndromes in patients with paretic limb pain using the kinesiotaping can reduce the severity of pain in the shoulder joint, contributes to the regression of neurological symptoms and improves the quality of life of patients.

P905
BONE MINERAL DENSITY IN CHILDREN WITH CEREBRAL PALSY

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Objective: Childhood and adolescence are critical periods for bone mineralization in healthy, and especially in sick populations. In many musculoskeletal disorders (MSD), the bone remodeling cycle is disrupted, leading to a net loss of BMD. Low BMD is found in more than 50% of adults with a variety of MSD, including cerebral palsy (CP), and in the last few years there has been significant progress in understanding of risk factors and the natural course of osteoporosis in children. The aim of this study was to assess BMD in children with cerebral palsy.

Methods: Patients were enrolled in the study according to the following inclusion criteria: (1) age 3 y and older; (2) diagnosis of CP; (3) written informed consent to participate in the study from patients, when possible, or from their parents/caregivers. The exclusion criteria were: (1) diseases primarily involving bone metabolism or familial history of bone metabolism disorders; (2) poor compliance with bone density evaluation. The study included 20 subjects (10 boys, 10 girls) with CP followed in our Center for Regeneration and Rehabilitation between January 2019 and January 2020. The control group consisted of 20 healthy children (10 boys, 10 girls). All the children were aged between 3-18 y (mean age 10.2), in both the patient and control groups, were from the same region and had similar socioeconomic status and calcium intake. Patients underwent a DXA scan of the lumbar spine (L1-L4), and the Z-scores were calculated for each patient.

Results: Abnormal BMD was found in 18 CP patients (90%), with values documenting osteopenia in 12 (66.67%) and osteoporosis in 6 (33.33%). Mean BMD Z-score was -1.92±0.63. A history of documented previous fracture was present in 4 patients (22.22%). In healthy children, 4 findings with osteopenia were noted, while osteoporosis was not diagnosed. Mean BMD Z-score was 0.61±0.93.

Conclusion: Lack of autonomous gait and less physical activity significantly correlated with abnormal BMD. DXA analysis is important since bone fractures are a frequent source of morbidity in children with CP.

P906
LONG-TERM SAFETY IN ADULTS WITH X-LINKED HYPOPHOSPHATEMIA (XLH) TREATED WITH BUROSUMAB, A FULLY HUMAN MONOCLONAL ANTIBODY AGAINST FGF23: FINAL RESULTS OF A PHASE 3 TRIAL

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Objective: Burosumab, a fully human IgG1 monoclonal antibody to FGF23, is approved in Canada and Brazil to treat XLH in patients ≥1 y of age and in the US to treat XLH in patients ≥6 months of age. Burosumab has also received conditional marketing authorization in Europe to treat XLH with radiographic evidence of bone disease in children ≥1 y of age and in adolescents with growing skeletons. We previously reported burosumab significantly improved serum phosphorus, fracture/pseudofracture healing, stiffness, and physical functioning in a phase 3, double-blind, multicenter study (CL303, NCT02526160). Here, we report final long-term safety results from this trial.

Methods: Adult subjects with XLH were randomized 1:1 to receive burosumab or placebo subcutaneously every 4 weeks. At Week 24, subjects in the placebo group crossed over to receive burosumab (total duration ≥96 weeks).

Results: Most (119/134, 89%) subjects completed 96 weeks and received 1 mg/kg burosumab; protocol-specified dose reductions were required for 11/134 (8.2%) subjects to effectively manage hyperphosphatemia (all mild [Grade 1]). Mean (±SE) baseline serum phosphorus was 1.98 (±0.03) mg/dL and was 2.97 (±0.05) mg/dL at Week 94 (midpoint of dose interval). Mean (±SE) iPTH level was 96 (±3.8) pg/mL at baseline and progressively declined to 79 (±3.3) pg/mL at Week 96. Nephrocalcinosis score at Week 96 changed by 0 in 101 subjects, -1 in 9 subjects, +1 in 10 subjects (14 subjects not available). There were no meaningful changes in ectopic mineralization. There were no neutralizing antibodies. No treatment-emergent adverse events led to study or treatment withdrawal.

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Conclusion: Serum phosphorus was maintained with long-term burosumab treatment, with no evidence of loss of effect in adults with XLH. Burosumab dose reductions effectively managed mild hyperphosphatemia. Frequency, severity, and types of AEs reported were consistent with previous burosumab trials.

P907

TRENDS IN BONE HEALTH ASSESSMENT ACCORDING TO THE GUIDELINES FOR BREAST CANCER PATIENTS RECEIVING ADJUVANT TREATMENT WITH AROMATASE INHIBITORS

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Objective: Guidelines for hormone responsive breast cancer (HRBC) patients recommend performing a baseline BMD testing at the time of starting aromatase inhibitors treatment (AIT). We aimed to evaluate bone health status and to determine whether daily clinical application of bone guidelines among HRBC patients has changed during the study period.

Methods: Postmenopausal HRBC patients receiving AIT referred to our Osteoporosis Clinic Unit (OCU) between 2013-2019 were retrospectively examined. Spine and hip BMD were measured using DXA. Clinical data were collected from the medical history and by completing the questionnaire.

Results: The study included 105 patients aged 62.2±10.01 (mean, SD) y. At initial visit in our OCU, 77 (73.3%) patients fulfilled global criteria for bone specific therapy: 66 based on BMD T-score <-2.0 criteria and additional 11 patients with a T-score between -2.0 and -1.5 and at least one conventional risk factor for bone loss (5 current and 1 ex-smoker, 4 pts aged ≥65 y, 3 fractures). According to the time period of their initial admission to our OCU, there were 48 HRBC patients processed between 2013-2016 (group A) and 57 patients examined from 2017-2019 (group B). In the group A, 37.5% patients performed DXA within first 6 months of AIT involvement as compared to group B (96.5%). Additionally, the patient group A had a higher proportion of DXA scans performed >12 months following AIT (18/48 vs.1/57 patients). A higher proportion of patients required bone specific therapy in the group A (79.2%) than in group B (68.4%). The group B patients were older (63.2±10.1 vs. 61.1±9.4 y), had longer menopause duration (15.7±9.6 vs.12.7±11.8 y) and higher BMI (BMI ≥25 kg/m^2 in 68.4% vs. 58.3%). The prevalence of nontraumatic nonvertebral fractures was equal in both groups (14%).

Conclusion: Overall, a three-quarter of our HRBC patients fulfilled criteria for pharmacological bone therapy. A better bone health status was observed among patients with shorter period to initial DXA. We recognized the trend of earlier bone health assessment in recent years which indicates a better compliance to the guidelines for HRBC patients and should be further encouraged.

P908

EVALUATION OF ASSOCIATION BETWEEN OSTEOPOROSIS/OSTEOPENIA AND TEMPOROMANDIBULAR JOINT SYNDROME

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Objective: Given the general trend of population ageing due to the improvement of quality and ease of access to healthcare, but also due to the gradual decrease of world natality, the decades to come will challenge both the medical and dental professionals with new or altered forms of chronic diseases. This is the case for temporo-mandibular joint syndrome, too.

Methods: This retrospective study was conducted in a dental private practice, investigating the female patients previously diagnosed with osteoporosis or osteopenia who presented with TMJ syndrome in the dental office in the last 2 y.

Results: During the study period, 68 female patients were diagnosed with TMJ syndrome, out of which 17 were premenopause and 51 in menopause. Out of the total, only 24 of these patients concomitantly suffered from osteoporosis (out of which 19 under treatment with bisphosphonates), and 11 from osteopenia. 69.1% of patients had occlusal problems due to edentulism/malocclusion that would alone have sufficed as causal agent of TMJSy. 64.7% of the selected patients had a decreased vertical dimension of the lower face. Five patients mentioned pathologic fractures due to osteoporosis in their medical history, whereas, three patients recalled knee/hip joint replacement surgery. In terms of treatment needs, 16.1% of patients selfmedicated at least once a week (with either NSAID, painkillers or muscle relaxants). 21 patients were identified as bruxxers and 35 patients were diagnosed with various degrees of periodontal disease.

Conclusion: Given that more than half of the patients (35 patients, 51.4%) had a osteoporotic/osteopenic background, and that over 85% of the symptoms appeared after menopause, it seems highly likely that osteoporosis/osteopenia play a major role in the initiation/aggravation of TMJSy. Although designed on a limited population, with inherent limitations, the present study may serve as a start point for a future larger study investigating osteoporosis' possible roles in the etiopathogenesis of temporo-mandibular joint syndrome.

P909

THE DEGREE OF MEDICAL INFORMATION OF ELDERLY PATIENTS IN A COUNTY EMERGENCY CLINICAL HOSPITAL

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Objective: One of the concerns of doctors in Oradea County Emergency Clinical Hospital is the efficient transmission to the patient of information that directly concerns him such as his diagnosis, the evolution of his condition, the medication and the adverse effects of the medication. The aim of this study was to compare the degree of medical information between persons under 70 years and those over.

Methods: We analyzed 1640 satisfaction questionnaires distributed to patients of the Oradea County Emergency Clinical Hospital throughout 2019. The questions analyzed were: No. 1: Have you been informed about your diagnosis? No. 2: Did you receive information on how the disease will evolve and the therapeutic plan you need to follow? No. 3: Have you been informed of the adverse effects of the medicines administered in the hospital? No. 4: Can you name a medicine that was given to you in the hospital? All four questions had two possible answers: yes or no. At the fourth question if the patient answers yes, he is asked to name at least one known drug. The first group of patients (group A) is composed of 1393 persons between the ages of 12-69 y and the second (group B) of 247 persons between the ages of 70-91 y. The statistical significance was assessed using chi-square test in the R program.

Results: The average age for group A is 49.01 years and for group B is 76.54 y. At the first question patients under 70 years old answered yes in 95.05% of cases. Patients over the age of 70 responded with yes only in 87.04% of cases. The difference observed was statistically significant (p<0.00001). Group A considers that it has received sufficient information about how the disease will evolve in 87.94% of the cases compared to group B, which responds affirmatively only in 77.33% of the cases (p<0.00001). At the question testing the knowledge of the patients related to the adverse effects of the medication received in the hospital, 73.8% in group A and 59.92% in group B answered positively, claiming to be informed. Again, the observed difference is statistically significant (p<0.00001). At the last question analyzed, only 42.21% of patients under 70 can name a drug that was administered to them in the hospital. The percentage of people over the age of 70 who can name a drug is even lower (30.77%) and the difference is statistically significant (p<0.0001).

Conclusion: All four questions show that people over 70 have a lower degree of medical information about their suffering. The difference observed compering it whit the people in the younger group is an expected one. This could be explained by a lower level of education, a longer time needed to understand the medical information received or a lack of interest for one's own health in some cases. The very low percentages observed in the fourth question are due to the fact that the patient is asked to name a drug as opposed to question No. 3 where he is asked only if he knows an adverse effect without having to name it. A more specific set of questions might be helpful. Open questions in which the patient is obliged to complete could create a more accurate picture of the level of medical knowledge of hospitalized patients.

P910

SIX-YEAR TERIPARATIDE (RHPTH 1-34) REPLACEMENT THERAPY IN A PATIENT WITH HYPOPARATHYROIDISM AND MALABSORPTION DUE TO AUTOIMMUNE POLYGLANDULAR SYNDROME TYPE 1

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Objective: Hypoparathyroidism is a rare disorder characterized by a PTH deficiency or resistance and hypocalcemia. The conventional treatment of hypoparathyroidism consists of oral calcium and vitamin D supplementation. Patients with autoimmune polyglandular syndrome type 1 (APS-1) may have malabsorption which reduces the ability to absorb medications making it difficult to achieve remission using conventional treatment of hypoparathyroidism.

Methods: We present a clinical case of a 31-year-old woman with severe hypoparathyroidism and malabsorption due to APS-1 (mutation in the gene *AIRE*:R257X), who received rhPTH (1-34) replacement therapy for 6 y.

Results: The symptoms of APS-1 appeared sequentially: chronic mucocutaneous candidiasis (from 4 y.o.), hypoparathyroidism (from 10 y.o: calcium 0.6 mmol/l (1.03-1.29), phosphate 3.61 mmol/l (0.74-1.52), PTH 2.2 pg/ml.), autoimmune adrenal insufficiency (from 10 y.o.), alopecia (from 20 y.o.), malabsorption (from 20 y.o.) and primary hypogonadism (from 21 y.o.). In spite of high doses of alfacalcidol (2-4 µg/d) and calcium supplements >2.5 g/d the compensation of hypoparathyroidism was variable. In addition to this, taking conventional therapy over ten years has caused ectopic calcifications. The development of malabsorption at 20 y of age led to a decrease in intestinal calcium absorption and severe hypocalcemia with seizures, despite taking high doses of alfacalcidol (up to 20 µg/d). At the age of 24, rhPTH (1-34) therapy was initiated at a dose of 20 µg twice or thrice a day. However, episodes of severe hypocalcemia periodically persisted, which required intravenous administration of calcium. Therefore, we used rhPTH(1-34) pump therapy (60-80 µg/d) to achieve persistent normocalcemia and normocalciuria. After 6 y of continuous rhPTH (1-34) therapy, we did not observe the progression of ectopic calcification or development of nephrolithiasis. Finally an antifungal agent led to a decrease in mucocutaneous candidiasis and improved absorption. Over the last year, the patient was able to substitute rhPTH to calcium (1-2 g/d) and alfacalcidol (1-2 µg/d) with a serum calcium level of 0.98-1.1 mmol/l, phosphate- 1.4 mmol/l.

Conclusion: In a patient with hypoparathyroidism and malabsorption, long-term teriparatide (rhPTH 1-34) replacement therapy helped to maintain adequate serum levels of calcium and phosphate, normalize urinary calcium excretion, prevent seizures and the progression of ectopic calcifications.

P911
PATIENT SAFETY IN THE OPERATING SUITE

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Objective: Patient safety is a key component of quality in the healthcare system, which seeks to reduce the occurrence and impact of adverse events to the medical act. Patient safety is in the focus of the European Union Council, the 2009 recommendations aiming at integrating patient safety into the education and training of healthcare professionals. The implementation of the quality management system in the hospital takes into account the care environment, infrastructure, logistics, technology and support services. The implemented standards guarantee the patient safety by reducing the risks, and the medical staff the possibility to develop effective solutions and interventions in case of adverse events.

Methods: The study was conducted in the County Clinical Emergency Hospital Oradea between September and October 2019, by comparative analysis of two types of patient safety checklists, in order to implement additional specific standards, in the operating suite. The introduction of additional standards comes as a requirement of the Order of the Ministry of Health no. 398/2019 for the approval of the Guidelines on patient safety in anesthesia-intensive care. The first (simple) checklist contains only the activities that are performed in the operating unit, and the second (complex) list includes the pre- and post-operative activities that take place in the departments where the patients were admitted, as well as the activities performed in the operating rooms. For the comparative analysis, the two lists are distributed separately by operating rooms (five rooms for each list - one emergency room and 4 scheduled intervention rooms).

Results: In July-September 2019 the checklists for the operating suite were designed, lists that standardize all the activities performed by the medical personnel / the operating team (surgeon, anesthesiologist, anesthesiologist, instrumental assistant) involved in the preparation and deployment procedure. of the surgery. The analysis after the first month of implementation of the two lists shows a good completion of the simple list, however in the complex list there are a number of unmarked fields (e.g., hip prosthesis, patient preparation) or marked fields, not correlated with data in the worksheet observation (e.g., laboratory analysis). Two months after implementation, the analysis of the completion of the two types of checklists identifies a good completion of both lists.

Conclusion: The surgical intervention involves an integrated activity, which starts in the department where the patient is admitted, with the patient's preparation for the surgery, which is continued in the operating suite (preoperative, operative and postoperative) and is completed in the admitted department (patient monitoring and specific therapeutic indications). The implementation of the complex checklist of the activities performed for the surgical intervention is agreed by the medical personnel, and ensures a complete follow-up of the patient during the entire period of the surgical intervention.

P912
SKELETAL MANIFESTATIONS OF MAFFUCCI SYNDROME: A CASE REPORT

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Objective: Little attention was paid to bone changes in Maffucci syndrome. We herein to report the special skeletal manifestations of a 26-year-old woman with this rare disease.

Methods: We reported the clinical appearance and auxiliary examination of present patient. A detailed bone examination of the patient was performed, including conventional X-ray and *(99m)Tc-MDP* bone scan. We also obtained vBMD and microarchitecture using HR-pQCT.

Results: The patient presented with a large area of sclerosis of the scalp and lower limbs. Multiple nodules were on the forehead, face, trunk, and extremities. She had no history of fracture or accepted any treatment. Bone turnover makers showed a normal range of β-CTX, P1NP, PTH and higher ALP(164U/L). Other bone metabolic markers presented a mild hypophosphatemia(0.75 mmol/L) and lower 25(OH) vitamin D(7.3 ng/ml). Serum calcium, 1,25(OH)vitamin D, and 24-h urine calcium were all within the normal range. The normal shape of the left hand, wrist, ulna, radius and feet disappeared in the X-rays, multiple morphological abnormal osteophytes could be seen near the bone and under the skin. Expansive changes were observed in the bones of the feet, other changes including multiple diffuse loofah, worm-like bone destruction, and multiple sclerosis. The bone scan showed a decrease of radiation intake overall but an increase radiation uptake in areas of abnormal calcification (craniofacial, bilateral shoulders, chest, back, hip subcutaneous tissue). Due to deformation of the lower limbs, the patient only completed the of HR-pQCT examination of the radius. Total BMD, trabecular BMD and cortical BMD of radius were significantly lower than the normal population(87.7 mg/cm^3, 31.7 mg/cm^3 and 416.0 mg/cm^3 respectively). Cortical thickness of the radius was 0.685 mm, far below the upper limit of reference.

Conclusion: We report the special bone performance of a patient with Maffucci syndrome. The microstructure of the cortical bone and trabecular bone are both damaged. This is the first time to describe the microstructure of bone in this rare disease. The mechanism of bone change needs to be further clarified.

Figure1. Enchondroma of the proximal phalanx(arrow)and angioliths (arrowhead)of the left hand.

Figure 2. Expansive changes in the bones of the feet.
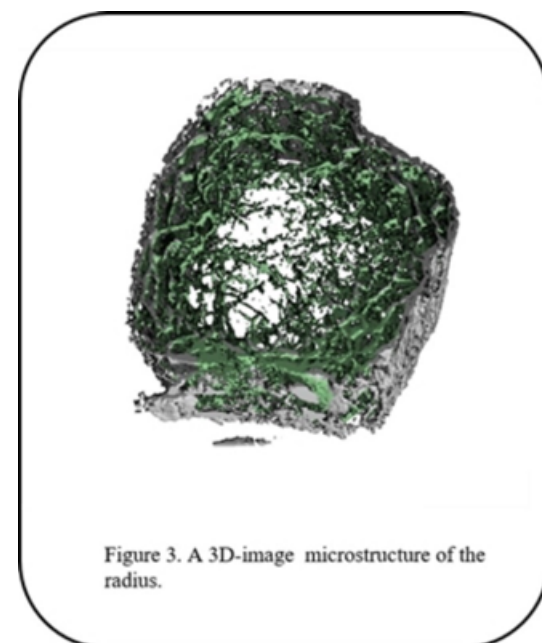
Figure 3. A 3D-image microstructure of the radius.

P913
OSTEOPOROTIC HIP FRACTURES IN ELDERLY PATIENTS: A FIVE-YEAR REVIEW

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Objective: A significant number of elderly patients diagnosed with fragility hip fractures were patients admitted to the Orthopedics and Traumatology Department of the emergency county hospital, thus justifying the need for a comprehensive study on this pathology.

Methods: A 5-y retrospective study was carried out, analyzing the statistical data regarding the patients admitted to the Orthopedic and Traumatology Department I of the County Clinical Emergency Hospital Oradea with hip fractures associated with osteoporosis during the period 01.01.2014-31.12.2018. 225 patients were included in the study from a total of 7580 patients admitted to the department during the studied period. The exclusion criterion was age <60 y.

Results: Of the 225 patients over 60 years old, diagnosed with fragility hip fractures, 86% were women, comorbidities such as high blood pressure being present in 48%, obesity and diabetes being present in 11% of the patients. Most cases were registered in the 70-80 age group, representing 39% of the cases, but a similar percentage (37%) was registered in the 80-90 age group. The intertrochanteric fractures accounted for 48% of the total fractures, followed by the fractures of the head and femoral neck (41%) and the subtrochanterian ones (11%). The surgical treatment was chosen based on the location of the fractures, the most common surgical technique being the closed reduction of the fracture with internal fixation with plate and DHS-type screws in the cases of intertrochanteric fractures, respectively hip arthroplasty in the case of head and neck fractures. Late postoperative complications such as migration of osteosynthesis material were present in 11% of patients, respectively intolerance to osteosynthesis material was present in 6% of patients.

Conclusion: Patients with the highest risk of hip fracture on the background of osteoporotic bone tissue are represented by patients aged 70-90 years, the female being the most exposed. The presence of hypertension in a significant number of patients increased the cardiovascular risk but there were no intraoperative cardiovascular complications. The presence of osteoporosis has increased the risk of migration of the osteosynthesis material and a surgical reintervention was necessary in these cases, increasing the healing time and the social-economic burden.

P914
LIMITED SYSTEMIC SCLEROSIS, TRANSITION TO DIFFUSE SYSTEMIC SCLEROSIS: CASE REPORT

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Objective: Systemic sclerosis is an auto immunologic disease caused by excessive collagen deposition in vessels, skin, subcutaneous tissue, muscles, joints, internal organs.

Methods: We have a case report of a 56 years old woman presented for palpable, hard, subcutaneous nodules, multiple painful leg ulcers, bilateral, that drain a white chalky substance: cutaneous calcinosis; history for 4 y accompanied by Raynaud phenomenon, sclerodactily, esophageal dysmotility, telangiectasia, association defined as CREST Syndrome. General examination reveals also areas of skin hyper and hypopigmentation, pinched nose, facial amimia, retraction of the lips, telangiectasia, tight skin over the fingers with limited mobility, functional impotency.

Results: We need more investigations for differentials with idiopathic, metastatic calcinosis, metastatic carcinoma, chronic renal failure calciphylaxis, Mixed connective tissue disease, systemic vasculitis, eosinophilia myalgia syndrome. No drug intake as: bleomycin, pentazocine, cocaine, vitamin K, paclitaxel. Laboratory tests reveal elevated ESR (113/h) and C-reactive protein, normocytic-normochromic anemia, thrombocytosis, localized infection of ulcers, secondary infected; serum calcium, phosphorus, alkaline phosphatase levels are normal; The diagnosis of calcinosis is confirmed with plain radiographs demonstrating dermal radiodense deposits. Capillary microscopy highlights enlarged capillaries at the edge of the nail fold, adjacent avascular areas. No signs for neoplasms, renal insufficiency are detected. Chest radiographs show Pulmonary Fibrosis, important criteria for including the case in systemic sclerosis. Presence of ANA and Anticentromere antibodies confirm CREST Syndrome, limited systemic sclerosis, but Anti-Scl-70 (anti-topoisomerase I) antibody is positive, specific test associated with diffuse systemic sclerosis, early internal organ involvement and worse prognosis.

Conclusion: We find interesting this case because has a lot of elements for diffuse systemic sclerosis except renal, cardiac, low gastrointestinal tract involvement; disease is in transition, in evolution as detection of Anti-Scl-70 (anti-topoisomerase I) antibody confirms. We draw attention to importance of immunological changes in different phases of systemic sclerosis evolution, early detection of Anti-Scl-70 antibodies in patients who do not have yet clinical signs of internal organs involvement, as well as initiation of immunosuppressants in the right phase, to avoid complications as renal, cardiac, pulmonary insufficiency.

P915
OBESITY IS ASSOCIATED WITH LOWER DSMQ QUESTIONNAIRE SUM SCALE SCORE AND WORSE GLYCEMIC CONTROL AMONG TYPE 2 DIABETES MELLITUS PATIENTS

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Objective: Obesity is highly prevalent among type 2 diabetes mellitus patients being a risk factor for a worse glucose control as a consequence of severe insulin resistance and also alteration of beta-cells activity given the negative effects of circulating adipokines on their function. At the same time body-mass index and glycaemic control are reflections of the self-care activities of the diabetic patient implying the efforts he engages in for respecting nutritional and physical activity related recommendations. In our study we wanted to determine the degree of glucose control and the quality of diabetic self-care activities assessed by Diabetes Self-Management Questionnaire (DSMQ).

Methods: 167 patients with type 2 diabetes mellitus were evaluated in the Clinical County Emergency Hospital of Oradea, Romania between 01 June and 01 October 2019. BMI was calculated, Hba1C was determined and every patient completed the DSMQ, a validated questionnaire for assessing the level of self-care activities of diabetes mellitus patients. Sum – Scale Score that results as a summation of sub scores that evaluate the quality of glucose monitoring, diet, physical activity and healthcare use was calculated for every patient after the completion of the questionnaire. The study was approved by the Ethical Commission of the hospital.

Results: The mean age of the patients was 62.11±10.44 y. 46.10% of patients were female while 53.90% of patients were male. The prevalence of obesity among the included patients was 67.06% (112 patients) while 32.94% (55 patients) had a BMI <30 kg/m^2. Obesity was associated with statistically significant higher values of HbA1c compared with patients with normal weight or overweight, 8.27±1.3% vs. 7.58±1.1% (p<0.01). DSMQ Sum-Scale Score had a mean value of 6.8±1.1 points among overweight and normal weight type 2 diabetes mellitus patients, statistically significantly higher compared to a mean value of 6.15±1.9 points among obese type 2 diabetes mellitus (p=0.02), reflecting a better quality of diabetes self-care activity among nonobese type 2 diabetes mellitus patients.

Conclusion: In our study presence of obesity was associated with worse glucose control and with a lower quality of self-care activities compared to non-obese patients, which emphasis the need for therapeutically education measures especially among obese patients with diabetes mellitus.

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P916
CHANGES IN DUAL-ENERGY X-RAY PARAMETERS OF POSTMENOPAUSAL WOMEN AFTER AT LEAST 12 MONTHS DENOSUMAB USE: REAL LIFE DATA

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Objective: To evaluate patient demographics and DXA results of the patients with postmenopausal osteoporosis before and after denosumab treatment.

Methods: History of fractures, age of menopause, BMI values, history of antiresorptive and/or anabolic drug treatments, L1-L4, femoral neck, total hip t-score and BMD values before and after denosumab treatment were retrospectively analysed. IBM SPSS Statistics 22 program was used for statistical analysis.

Results: A total of 49 postmenopausal women were included in the study. The mean age was 68.63±8.27 (48-92 y). The menopause ages ranged between 27-78 and the mean age was 47.22±8.07. 32.7% of the patients had vertebral compression fractures, 4.1% femur fractures, 24.5% nonvertebral nonhip fractures. No fracture were observed in 23 patients. 93.9% of the patients had used antiresorptive drugs and 20.4% of the patients had anabolic and antiresorptive drug history. The mean DXA screening time after denosumab treatment was 23.85±12.3 months (12-54 months). Statistically significant improvements were observed in L1-L4 t-score, total hip t-score and BMD values after denosumab treatment (Table 1).

Conclusion: Denosumab treatment in postmenopausal osteoporosis provided significant improvements in vertebra and total hip t-score and BMD values and a follow-up study with a larger sample size and/or longer follow-up duration is required for femoral neck results.

Table 1. Evaluation of DXA parameters before and after denosumab use

| | | Pre denosumab | | After denosumab | | |
		Min-Max	Ort±SS	Min-Max	Ort±SS	p
L1-L4	t-score	-3,8-(-0,8)	-2,6±0,66	-3,7-(-0,1)	-2,26±0,77	0,000*
	BMD	0,68-(1,05)	0,82±0,08	0,6-(2,08)	0,89±0,21	0,028*
Femoral neck	t-score	-3-(-0,6)	-1,99±0,63	-3,2-(0)	-1,87±0,62	0,056
	BMD	0,51-(0,87)	0,71±0,08	0,56-(0,95)	0,72±0,08	0,138
Total hip	t-score	-3,1-(-0,5)	-1,79±0,68	-3,1-(-0,5)	-1,71±0,65	0,002*
	BMD	0,6-(0,91)	0,76±0,09	0,61-(0,91)	0,77±0,08	0,002*

Paired Samples t Test *p<0.05

P917
BONE MINERAL DENSITY IN UKRAINIAN WOMEN WITH OBESITY AND METABOLIC SYNDROME

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Objective: Osteoporosis is one of the most common metabolic disorders of the skeleton in postmenopausal women. The reduction of BMD could escalate fracture risk and mortality. The metabolic syndrome (MS) which is common at the same population is associated with cardiovascular morbidity and mortality. The association between MS components and bone disorders has been researched, but results are contradictory. The purpose of the study was to determine the BMD in Ukrainian women with obesity and MS.

Methods: The study involved 1605 women in postmenopausal period. Patients were compared into three groups. 1-st group included women without obesity (800 people), 2-nd group involved patients with obesity (572 person), which was exhibited by the classification of overweight and obesity (WHO, 1998). The MS (according to the ADF criteria, 2015 yr.) was diagnosed in women of the 3-d group (233 people). BMD of lumbar spine and femoral neck was measured by dual-energy X-ray absorptiometry, (Prodigy, 2005 yr.). Women were considered to have normal or decreased BMD according to criteria of the Official Positions of the ISCD, 2007 yr (revised in 2015 yr.). Data were analyzed using Statistical Package 6.0.

Results: BMD values of lumbar region (L1-L4) and femur were significantly lower in the women of the 1-st group (p<0.001) in compare with the patients of another two groups. BMD values of the same regions did not differ between the patients of the 2-d and 3-d groups (p>0.05). The prevalence of the lumbar region (L1-L4) osteoporosis was estimated in the first group patients (32.58%) in compare to patients of the 3-d (11.60%), and 2-d (8.22%) groups.

Osteoporosis of the femur region was twice more frequent in the patients of the 1-st group (21.07%), in compare with 3-d group patients (11.59%) and three times more frequent than in patients of the 2-d group (7.52%).

Conclusion: It was found that osteoporosis and low BMD are significantly much rarer in patients with obesity and metabolic syndrome compared to those without obesity. Our study estimated significant positive association of metabolic syndrome and obesity with BMD in Ukrainian women.

P918
ASSESSMENT OF KNOWLEDGE ABOUT OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN

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Objective: To evaluate the knowledge about osteoporosis in postmenopausal women.

Method: A prospective cross-sectional study included 30 postmenopausal women, aged ≥55 y, who had been referred to BMD (g/cm^2) measurement using DXA at the Special Hospital for Rheumatic Diseases Novi Sad, Serbia, between December 15, 2019 and January 15, 2020. Prior to the trial, consent was obtained from the Hospital Ethics Committee and all patients signed informed consent. Everyone was given the same demographic questionnaire and the Osteoporosis Knowledge Assessment Tool (OKAT) questionnaire. The OKAT questionnaire consists of 20 questions assessing knowledge of prevention measures, risk factors and consequences of osteoporosis, with a maximum score of 20 (highest knowledge about osteoporosis). Statistical processing and analysis was performed using the SPSS 25.0 statistical package.

Results: The sample consisted of postmenopausal patients with an average age of 69.9±6.37 y, 60% of whom lived in the rural and 40% in the urban settlements; 33.3% had a degree of education <8 y, 53.3% of 8-12 y and 13.3% >12 y. Average BMD values at the spine were 1.066±0.216, BMD at the hip 0.8871±0.137, BMD at the femoral neck 0.829±0.104. One third of patients had previously diagnosed osteoporosis and have been prescribed medications: 55.6% for more than 3 y, 22.2% from 1-3 y, 22.2% for 1 y, while calcium supplementation is only taken by 16.7% of patients, and vitamin D by 63.3% of them. The average OKAT score is 11.3±2.45. There were no respondents who knew the answers to all the questions, nor those who did not know at least one correct answer. There is no statistically significant correlation between the results on the OKAT test and BMD, or any other variables (p>0.05).

Conclusion: The average knowledge of postmenopausal women about osteoporosis is at the level of about the half the correct answers. The results of the study show the need to improve the knowledge of postmenopausal women about the prevention, risk factors and treatment of osteoporosis.

P919
ENHANCED OSTEOBLAST ADHESION AND DIFFERENTIATION BY POROUS TI SCAFFOLDS

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Objective: The use of commercially pure Ti (titanium grade IV) to manufacture bone implants is widely recognized. However, they present two important problems that compromise their clinical success: 1) The implant micro-movements and the potential loosening of the implant are generated in the interface (titanium is bioinert), and 2) Titanium has a high elastic modulus (100-112 GPa) compared to the rigidity of cortical bone (20-25 GPa) and trabecular bone (1-2 GPa) [1]. This marked difference produces a strain shielding effect (all the load falls on the implant). Bone tissue is regulated based on mechanical loads and in the absence of loads it is reabsorbed. The use of porous implants is considered as the solution to these problems. Our main goal was to reach the balance among biomechanical and biofunctional characteristics. To make porous titanium substrates by space holders technique for bone total/partial substitution to Reduced Young's Modulus and to reach a good tribomechanical behavior. To test different pores size and their wall roughness to improve bone in-growth and cellular adhesion (osseointegration improvement).

Methods: Grow the MC3T3 cell line with pure Ti, and with 40% porosity and two pore size ranges (100-200 μm and 355-500 μm). Rate at 4, 7, 14 and 21 days: cell proliferation (Alarm Blue), alkaline phosphatase activity (ALP) (spectrophotometry), Runx2, Osterix, ALP, OPG and RANKL gene expression (real time PCR) and morphological study using scanning electron microscope (SEM). All determinations were made in duplicate. T-Student statistical analysis (SPSS 25.0) and p <0.05 to consider significant differences.

Results: Porous samples had no cytotoxicity effect and reaching in both samples more than 80% cell viability. SEM images show a growth throughout the surface of the sample, being greater in the pores cavities. The adhesion and connection of the osteoblasts was greater in the sample 40% (100-200 μm). ALP activity improved in osteoblasts grown in porous samples, also observing these differences at the level of gene expression.

Conclusion: The biomechanical (stiffness and yield strength) and biofunctional (bone in-growth) equilibrium is achieved by space-holders technique. In vitro testing revealed that the surface treatment is biocompatible allowing cell adhesion and proliferation

Reference: 1. Rho et al. J Biochem, 26:111-119,19

P920
CURRENT SITUATION ON SHARED DECISION MAKING IN OSTEOPOROSIS: PATIENT DECISION AIDS AND DECISION DRIVERS

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Objective: To identify currently available Patient Decision Aids (PDA) for patients with osteoporosis (OP) and treatment characteristics influencing decision making from patients and physician perspective.

Methods: A narrative review in Medline (no time restriction) and grey literature was conducted to identify publications in English and Spanish related to PDAs for OP. Additionally, a systematic review in Medline, ISIWOK, Cochrane, MEDES and IBECS in the last 10 years (closing date: December 20th, 2018) was conducted to determine treatment attributes relevant in decision-making for physicians and patients.

Results: Eleven PDAs were identified in the narrative review. None of them includes all the therapeutic options available for OP treatment: 7 only consider one treatment option (bisphosphonates), 3 consider most of the options, and 1 does not present therapeutic options. The acceptability (α-test) of the PDAs has been evaluated in 5 of them and the utility (β-test) in 4. Both, α and β test, have been assessed only in one PDA. Only 5 could be considered a PDA per se, since they are the only ones that provide information, explore patients' preferences and facilitate physician-patient discussion. None of them was designed or adapted to Spanish population. In the systematic review 26 publications were selected: 23 explored patients' preferences, 2 assess physicians' preferences, and 1 gathers both perspectives. Although heterogeneity regarding decisions drivers has been observed between studies, treatment attributes such as efficacy, adverse events and way of administration are the most relevant. Other aspects such as time in the market, generic vs. brand or adherence have less impact on treatment choice.

Conclusion: Several PDAs are currently available; however, no PDA has been developed for Spanish patients with OP. The information regarding decision drivers is key in order to develop an effective PDA that facilitates Shared Decision-Making.

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P921
CAUSES OF POSTURAL CHANGES IN ELDERLY WOMEN

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Objective: The changes in the body posture of women occurring with age are most often associated with osteoporosis. We aimed to identify the causes of kyphosis in elderly women in order to identify proper therapeutic interventions.

Methods: The study included 52 elderly women (≥65 y) with functional autonomy and kyphosis; demographic data (years of formal education, BMI), comorbidities, locomotor pain and dysfunction were recorded. Pain was measured by visual analogue scale (VAS 0-10). For diagnostic purpose posture changes were clinical evaluated and standard X-rays and DXA were performed.

Results: More than half of the elderly women were overweight and obese, and with cardiovascular diseases. The level of locomotor pain was medium (5, 2 on VAS). Besides kyphosis, most of the patients had forward head posture, rounded shoulders, hyper lordosis, limited spine and hips mobility. In general the back pain increased in standing and more when walking. DXA revealed osteopenia and osteoporosis in 32% of the women; X-rays revealed spondylarthritis in most of the cases and confirmed the postural changes from clinical exam; vertebral compression fracture was present in one patient. Back pain was mostly correlated with long term muscle imbalances and back muscle insufficiency due to work position with upper limbs in front of the body and also to spine degenerative diseases and less to osteoporosis.

Conclusion: In order to prevent and to limit the women body postural changes occurring with age and particularly in the presence of osteoporosis, regular physical exercise should be taken into account. Posture correction and balance exercises should begin early in life and regular exercise might be important to be included in the individual's lifestyle.

P922
ANALYSIS OF PHYSICAL CAPACITY, HEALTH-RELATED QUALITY OF LIFE AND SUBJECTIVE WELLBEING OF ELDERLY PERSONS LIVING IN RESIDENTIAL HOMES

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Objective: To evaluate physical capacity, health-related quality of life (HRQOL) and subjective wellbeing of elderly people living in residential homes.

Methods: This study included people aged 60 and over, living in residential homes in Vilnius (Lithuania). Their mental state was assessed by the Mini-mental State Examination (MMSE) test, and score <21 was an exclusion criterion. Physical capacity was determined using a Short Physical Performance Battery (SPPB) test. The EuroQoL Quality of Life (EQ-5D) questionnaire was used in order to assess the HRQOL. Subjective well-being was tested using Center for Epidemiologic Studies - Depression scale (CES-D), Control Autonomy Self-realization Pleasure questionnaire (CASP-19), and Positive and Negative Affect Schedule (PANAS) questionnaire.

Results: The analysis involved 76 women (mean age 77.3±9.8 y) and 37 men (mean age 81.6±9.5 y). It was found that anxiety score was significantly higher (p=0.02) in women with secondary education than in those with higher education. No differences were found in men with different level of education. In order to evaluate the influence of age, all subjects were divided into three groups: aged 60−69 y (n=20), 70−79 y (n=23), and 80+ y (n=70). In women aged 70-79, EQ-5D score was higher than those aged 80+ (9.6±1.68 and 8.0±2.25 respectively; p=0.04). No significant differences were determined in men for all age groups. Statistical analysis showed the weak association of female physical capacity with positive emotionality (r=0.28, p<0.01), autonomy (r=0.30, p<0.05), and pleasure (r=0.23, p<0.05). Analysing men, the weak correlation between physical capacity and autonomy (r=0.30, p<0.05) was found. Statistical analysis showed negative correlation between negative emotionality and health state (r=-0.73, p<0.01) and positive relationship between negative emotionality and depression (r=0.71, p<0.01) in men. Higher male physical capacity was also associated with better HRQOL (r=0.43, p<0.01).

Conclusion: In institutionalized older persons, higher physical capacity was associated with better subjective well-being in both genders and better health-related quality of life in men. Women with lower education experienced more anxiety.

P923
SEXUAL DYSFUNCTION IN FEMALES WITH FIBROMYALGIA

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Objective: To assess sexual dysfunction in female outpatients with fibromyalgia.

Methods: The main group consisted of 48 women aged from 18-55 who sequentially applied for rheumatologist consultation. All subjects fulfilled ACR 2016 Fibromyalgia criteria and signed informed consent form. The comparison group included 100 healthy women adjusted by age who came for a scheduled health checkup and signed the informed consent form. FSFI questionnaire was used to assess sexual dysfunction, and Hospital Anxiety and Depression questionnaire (HADS) was used to screen for affective disorders. The data are presented as means and standard deviations.

Results: 26 (54.2%) fibromyalgia patients reported no sexual activity during the previous 4 weeks. Fibromyalgia group had significantly lower values of all FSFI domains than those of the comparison group: "sexual desire" 2.02±1.31 and 3.13±1.11, "arousal" 2.03±1.92 and 3.77±1.45, "lubrication" 2.44±2.28 and 4.41±1.71, "climax" 1.81±2.13 and 4.1±1.65, "sexual satisfaction" 2.35±1.97 and 3.99± 1.61, "no pain" 2.55±2.37 and 4.37±1.91, respectively. In General, total FSFI score was 13.2±11.1 on fibromyalgia group vs. 23.8±8.2 in the healthy group (maximum possible being 36 points, P<0.0001). Unexpectedly, the minimal scores for all FSFI domains were in the fibromyalgia subgroup of 8 women with no anxiety and depression: "sexual desire" 1.5±1.11, "arousal" 1.35±1.12, "lubrication" 1.84±2.28, "climax" 1.15±1.22, "sexual satisfaction" 1.60±1.49; "no pain" 2.01±2.39 points and the total FSFI score was 9.44±10.14. According to the psychological profile, these women had a "hysteroid" (egocentric) phenotype, searching for the disease related benefits, manipulating relatives and friends in order to evoke sympathy and attention.

Conclusion: Thus, a significant sexual function decrease was detected in female fibromyalgia patients, the most severe dysfunction being associated with the hysteroid phenotype, possibly related to seeking for the disease secondary benefits.

P924
CHIKUNGUNYA VIRAL ARTHRITIS MIMICKING MUSCULOSKELETAL MANIFESTATIONS IN SERONEGATIVE RHEUMATOID ARTHRITIS

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Objective: Chikungunya virus is an arthritogenic arbovirus infection transmitted through the mosquitoes. Globalization of the world is increasing the chances of infection spreading outside known endemic areas.

Methods: A clinical case of a patient with Chikungunya virus mimicking musculoskeletal manifestations in rheumatoid arthritis demonstrates the management of difficult to diagnose disease.

Results: A 40-year-old Caucasian patient reported his first complaints in June 2019, two days after returning from vacation to the Maldives. The patient has chills and fever up to 39.5°C, polyarthralgia, polymyalgia, diarrhea. After 24 h, the patient's symptoms subside and the temperature drops to 37.2C over a period of 3 d, after which no manifestations of infection are detected. Two weeks later, a worsening of the general condition occurred, with enlarged cervical lymph nodes left submandibular and bilateral in the inguinal region, arthritis in both ankles, arthralgia in the right shoulder and in both knee joints. A few days later, metacarpophalangeal joints II, III, IV bilaterally, and both wrists were with symmetric arthritis. The patient reports stiffness throughout the day. Outpatient studies revealed slightly elevated acute-phase reactants and monocytosis, with no evidence of anemia. There are no deviations in biochemistry and urine test. The microbiological urine test showed no bacterial growth. Normal microflora were isolated from the throat culture, and from the microbiological study of faeces for the carrier of Shigella, Salmonella, Yersinia and Candida spp. a negative result was found. The patient was diagnosed with reactive arthritis and a condition after pre-existing mononucleosis. Treatment with nonsteroidal anti-inflammatory drugs for 10 d and Inosine pranobex was performed. Due to a suspected rare infection related to the patient's trip to the Maldives, he was tested for the Chikungunya and Zika viruses. Treatment with ketoprofen 150 mg - 2x1 tablets daily and sulfasalazine 500 mg - 2x2 tablets daily was started. Two weeks later, a positive result was obtained for Chikungunya Ig M: 1.4 virus and Chikungunya Ig G: 5.8 (up to 1.1). Zika Ig M and IgG is negative. The patient has a significant improvement in his condition after the treatment.

Conclusion: Successful treatment improves the quality of life of the patient and allows to avoid unnecessary treatments.

P925
ULTRASOUND-GUIDED PERINEURAL INJECTION WITH DEXTROSE FOR TREATMENT OF FROZEN SHOULDER: A CASE REPORT

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Objective: This 58-year-old male patient suffered from the right frozen shoulder with painful range of motion limitation in flexion, abduction, and external rotation for two months. The VAS was 7. He received physical therapy for one month, but in vain. He visited our clinic for further treatment. Because he denied intra-articular steroid injection and pain killer use, he received ultrasound-guided perineural injection with 5% dextrose on the right suprascapular and axillary nerves

Methods: Initially, the patient complained of right frozen shoulder with painful range of motion limitation in flexion, abduction, and external rotation for two months and the VAS was 7. His X-ray showed no obvious fracture and no OA change. *His* sonogram showed no other tendon, ligament or muscle injury. He has no gout, no diabetes, no cardiovascular disease, and no rheumatic immune disease. He has received physical therapy for one month,

but in vain. Because he denied intra-articular steroid injection and pain killer use, he received ultrasound-guided perineural injection with each 15cc 5% dextrose on the right suprascapular and axillary nerves. Two sessions of ultrasound-guided perineural injection with total 30cc 5% dextrose with an interval of 1 month were performed 2 months after symptom onset.

Results: One month later after first perineural injection with 5% dextrose, his right frozen shoulder got better range of motion in flexion, abduction, and external rotation and the VAS decreased to 4. Then he received second perineural injection and still did physical therapy. One month later after second perineural injection with 5% dextrose, his right frozen shoulder got nearly complete resolution in the range of motion in all directions and the VAS decreased to 2.

Conclusion: We demonstrated for the first time that ultrasound-guided perineural injection with 5% dextrose may be a novel intervention for frozen shoulder and studies with larger sample sizes were necessary to further explore the present study results.

P926
A SERIES OF FGF23-PRODUCING TUMOR-INDUCED OSTEOMALACIA CASES

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Objective: Tumor-induced osteomalacia (TIO) is a rare paraneoplastic syndrome of abnormal phosphate metabolism caused by tumoral overproduction of FGF23. High levels of the FGF23 leads to hypophosphatemia, renal phosphate wasting and osteomalacia. Diagnosis of TIO is difficult due to nonspecific symptoms and the small size of the FGF23-secreted tumor. The goal of this report is to describe the prevalence of symptoms and to analyze the effectiveness of somatostatin receptor scintigraphy with 99mTc-Tektrotyd-HYNIC-TOC to detect FGF23-secreting tumors.

Methods: We analyzed the data from 18 patients (12 women and 6 men) with TIO diagnosed in our clinic from 2015-2019. We used somatostatin receptor scintigraphy (SRS) with 99mTc-Tektrotyd-HYNIC-TOC to detect FGF23-secreting tumors.

Results: The mean age of disease onset was 38(29;47) and the mean duration of the disease was 8 years(6;11). Twelve out of 18 patients had low-traumatic hip fractures, with all having multiple vertebral fractures, 2 patients had severe nephrolithiasis disease, 2 patients had tertiary hyperparathyroidism and 2 patients had

severe deformations of long bones. Of the concomitant diseases, two patients had type 1 diabetes, one had lupus vulgaris. The TIO patients demonstrated hypophosphatemia - 0.5mmol/L(0.43;0.58), elevated serum alkaline phosphatase 304 U/L(174;434), reduced tubular reabsorption of phosphate 0.57mmol/L(0.51;0.62), two patients had moderate hypocalcemia. We conducted the SRS with 99mTc-Tektrotyd-HYNIC-TOC in 14 patients; in 11 of them (79%) a tumor was identified. The size of tumor was more than 2 cm in 82%(n=9). However, in 3 patients a tumor was not detected, nor was it detected in the additionally performed 68Ga-DOTATATE-PET/CT. In one patient, the tumor was removed by a dentist due to discomfort in the gum. Among the identified tumors, only 3 were located in bone (2 in the femur, 1 in the ethmoid bone), the rest were in the soft tissues of the legs and 1 in the groin. After surgery phosphate levels were restored to the reference range within a month in 10 out of 12 patients operated on. Local relapses and metastases developed in 2 patients.

Conclusion: SRS with 99mTc-Tektrotyd-HYNIC-TOC can be used to localize a FGF23-secreting tumor. Complete surgical removal of the tumor usually leads to a full recovery, but in a minority of cases metastases occur

P927

REHABILITATION AND MEDICAL THERAPY: APPROACHES, CHALLENGES AND OUTCOMES IN END STAGE RENAL DISEASE

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Objective: The link between end stage kidney disease and osteoporosis is well established. Chronic kidney disease-associated bone disorder develops secondary to hyperparathyroidism as phosphorus accumulates, leading to multiple bone fractures and cardiovascular diseases.

Methods: We will present the case of a 38 years old male patient, known with endstage chronic renal failure (autoimmune etiology), with secondary hyperparathyroidism and subtotal parathyroidectomy, chronic hepatitis B infection, secondary osteoporosis and bilateral recent spontaneous fracture on pathologic femoral neck. The patient is admitted in our Hospital for walking impairment and generalized chronic pain. At presentation: BP=130/80 mmHg, HR=70/min, SO2=96%. The patient was completely immobilized and dependent for his daily activities. Also he described significant pain at passive joint mobilization associated with generalized hypotrophy. Lab work revealed: low calcium and magnesium, high levels of phosphorus and creatinine. We also performed X-rays and bone density scan to evaluate the actual status of his skeleton.

Results: Our goal for this young patient was to develop a number of strategies to improve his quality of life. Therefore we provide him appropriate treatment adjustment for the management of osteoporosis and pain according to his dialysis program and drugs pharmacokinetic properties, antalgic electrotherapy, neuromuscular stimulation, occupational therapy, exercise therapy considering that renal patients have low exercise tolerance and only in stable state and also psychological support.

Conclusion: This case highlights the impact of the end stage kidney disease on the management of chronic kidney disease-related osteoporosis, discusses the appropriate antalgic and antiosteoporotic treatment options and the rehabilitation program challenges in severe clinical status. Adapted rehabilitation and medical therapy could be an effective clinical option for maintaining renal function, to control pain and to provide some degree of independence especially in young patients.

P928

HISTOLOGICAL STRUCTURE OF TIBIAL SHAFT IN RATS OF VARIOUS AGES AFTER EXCESSIVE PALM OIL INTAKE AND ADMINISTRATION OF GARCINIAE CAMBOGIA EXTRACT

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Objective: To analyze histological structure of tibial shaft in rats of different ages after excessive palm oil (PO) intake and administration of Garciniae cambogia extract (GE) as medication.

Methods: The experiment involved 216 rats of three ages: immature, mature and senile. The animals were split into the groups as follows: the 1st group comprised control animals; the 2nd group comprised the animals that received intragastric PO in dosage of 30 g/kg daily, and the 3rd group - PO and intragastric GE in dosage of 0.25 g/kg daily. The animals were withdrawn from the experiment by the 1st, the 10th, the 30th and the 60th day after 6-week PO intake. The middle fragments of tibiae shafts were fixed in 10% solution of neutral formalin, decalcified and embedded into paraffin using routine technique. Bone sections were stained with routine hematoxylin and eosin technique. The data obtained was analyzed by means of variation statistics using standard software.

Results: In immature rats with excessive intake of PO by the 1st day of observation osteon canals and bone marrow cavity were wider than those of the controls by 5.31% and 5.56% respectively, and osteons diameters and osteon layer were narrower by 4.20% and 5.03%. In mature animals the same values changed similarly − by 5.87%, 6.41%, 5.28% and 6,07% respectively, and in senile rats − by 6.60%, 6.89%, 4.74% and 4.37% respectively (p<0.05 in all cases). The alterations began manifesting from the 1st day of observation and continued growing throughout the experiment. In immature rats osteons diameters and osteon layer were narrower by 5.85% and 6.87%, in immature rats − by 6.88% and 9.04%, and in senile rats − by 8.44% and 9.95% respectively. After GE administration, by the 60th day, in immature rats osteons diameters and osteon layer were wider as compared to the 2nd group by 5.52% and 7.96%, in mature rats - by 4.65% and 6.04%, and in senile rats - by 4.08% and 4.65% respectively.

Conclusion: Thus, excessive intake of PO results in histological structure of tibial shaft in rats of different ages. Terms and intensity of alterations depend on age of animals. Administration of GE reduces adverse effects of PO on the histological structure of tibial shaft in rats of different ages.

P929
PRACTICAL APPLICATION OF THE LUMBAR SPINE SCAN DXA FOR WOMEN OVER 50 YEARS OLD

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Objective: To establish the age of limitation of analysis results of DXA scans in women older than 50 years.

Methods: 365 women aged over 50 y (n=365, mean age 77 [73:81] y) were examined. BMD was assessed with DXA by Lunar Prodigy Advance, GE, USA, 2017 in the lumbar spine (LS) and femoral neck (FN). Standard radiography of the LS in the lateral projection carried out as necessary. Statistical processing was performed using the program MedCalc Software reg. number is BE 0809344640. Win pro №X18-45392. Work order №162000450.

Results: Vertebral deformities of the LS, based on the standard radiography scans or vertebral morphometry scans, were detected in 103 (28.2%) women; degenerative and focal changes processes lead to additional pathological ossification – diffuse idiopathic skeletal hyperostosis (DISH or Forestier`s disease), osteochondrosis of the lumbar spine, spondyloarthropathy were detected in 120 (32.8%) women. The quantity of artifacts (osteoarthritis, congenital or acquired hip dislocation, aseptic necrosis of the femoral head) in the DXA scans of the femoral neck was significantly less and was diagnosed in 10 (2.7 %) women. With the help of ROC analysis, there was determined the age of limitation of using LS DXA: associated criterion 72,14, +PV (positive predicted values) 97,4; -PV 12,9.

Conclusion: Femoral Neck DXA is more preferable and reliable for women over 72 y than LS DXA. DXA of the LS is recommended to complement vertebral morphometry or standard radiography in order to visualize artifacts and improve the reliability of the analysis. Carrying out DXA of the femoral neck allows more accurately interpreting the results of BMD measurement in women over 72 y for the verification of osteoporosis. Frequent presence of artifacts at LS in the elderly makes it difficult to adequately assess the BMD`s changes in time and reduces cost-effectiveness of clinical screening and BMD testing.

P930
COMPLIANCE AND EFFICACY IMPROVEMENT WITH GASTRORESISTANT FORMULATION OF WEEKLY ORAL RISEDRONATE VS. IMMEDIATE RELEASE ORAL BISPHOSPHONATES CAN BE ESTIMATED BY A SIMULATION MODEL

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Objective: There is poor compliance with oral bisphosphonates (OBPs) in the treatment of osteoporosis (OP), partly due to their fasting requirements[1]. This low compliance is associated with an increased fracture risk for both vertebral and nonvertebral fractures (included hip fractures). Weekly gastroresistant risedronate (GR RIS) has demonstrated to improve persistence, compared with the immediate release (IR) formulations of OBPs[2]. However, its effect on improved compliance and its relationship with fracture risk reduction is unknown. We aimed to estimate both treatment compliance improvement and consequent fracture risk reduction with the weekly GR RIS formulation compared with IR formulations of OBPs using a simulation model.

Methods: We have designed a simulator to estimate improvement in compliance and efficacy (fracture risk reduction), with weekly GR RIS compared with IR RIS using published evidence data on compliance and efficacy. For compliance the model used the proportion of patients compliant, noncompliant, and noncompliant due to fasting conditions[2]; and for efficacy the model used data on hip and vertebral fracture risk reductions from HIP and VERT-MN clinical trials, respectively. Improvement in compliance with GR RIS due to avoiding fasting restrictions was estimated with a second order Monte Carlo probabilistic simulation. Likewise, we used the Monte Carlo modeling approach to estimate the fracture risk associated to the compliance rates. Hip and vertebral fracture risk reductions with GR RIS were predicted with their estimated increased compliance and their associated fracture risks, according to the following formulas: Estimated% of improved compliant patients with GR RIS=% of IR RIS non-compliant patients for fasting restrictions-% of GR RIS noncompliant for fasting restrictions (Monte Carlo simulation). According to the source, this value would be close to 18%[2]. **Estimated fracture risk in noncompliant patients**=A value between the fracture risks of the placebo and the active groups (Monte Carlo simulation). Estimated Fracture risk with GR RIS=(% of IR RIS compliant patients + estimated% of improved compliant patients with GR RIS) x estimated fracture risk in compliant patients + (1-(% of IR RIS compliant patients + estimated% of improved compliant patients with GR RIS)) x estimated fracture risk in noncompliant patients.

Conclusion: A simulation model based on probabilistic results would be a valid and useful approach to estimate both increased compliance and reduced fracture risk with the weekly GR RIS formulation.

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P931
TRADITIONAL CHINESE MEDICINE SUBSIDE THE HUGE BAKER'S CYST

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Objective: This 65-year-old male patient presented to the clinic complaining of right knee painful range of motion limitation with posterior swelling and VAS=8. His right knee X-ray and sonogram showed right OA knee with huge Baker's cyst. He has regularly done sonoguided aspiration about 80-100 cc yellowish serous fluid from the right Baker's cyst every two months and taken celecoxib 200 mg QD for about 6 months. Due to the right huge Baker's cyst persisted in spite of the above medical treatment, he visited our Traditional Chinese medicine clinic in May 2019 for further medical treatment.

Methods: Initially, the patient complained of right knee painful range of motion limitation with posterior swelling and VAS=8. His X-ray showed right OA knee. *His* sonogram showed right huge Baker's cyst with much hypoechoic fluid accumulation and no other tendon, ligament or muscle injury. He has no gout, no hypertension, no diabetes, no cardiovascular disease, and no rheumatic immune disease. He has taken celecoxib 200 mg QD and regularly done sonoguided aspiration about 80-100 cc yellowish serous fluid from the right Baker's cyst every two months for about 6 months. Due to the Baker's cyst persisted, he visited our clinic for Traditional Chinese medicine treatment. The concept of traditional Chinese medicine of the patient's symptom is "Dampness-*heat* Impeding" and this treatment is adjusting the meridian system through "Clear Heat, Drain Dampness" formula by "Dang Gui Nian Tong Tang".

Results: After 3 months of Traditional Chinese medication, the formula of "Dang Gui Nian Tong Tang" treatment, the follow-up results revealed that he stopped celecoxib, the VAS decreased to 3 and the right knee range of motion improved. In November 2019, the right Baker's cyst became smaller and the sonoguided aspiration yellowish clear fluid from the above cyst was only 10 cc. No obvious side effect was found after these treatments.

Conclusion: The knee arthritis with Baker's cyst may cause the knee painful range of motion limitation. Thus, some medical therapies for treating this painful range of motion limitation was proposed, such as COX-2. Through the positive report in this case, we suggest traditional Chinese medicine may be a safer, simpler, cheaper and more effective treatment for knee arthritis with Baker's cyst and painful range of motion limitation.

P932
MICROELEMENTAL COMPOSITION OF THE TIBIA IN OLD RATS UNDER EFFECTS OF EXCESSIVE DIETARY CHOLESTEROL AND CORRECTION DRUGS

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Objective: Investigation of effects of excessive dietary cholesterol on microelemental composition of the tibia in old female rats and considering efficacy of Osteocare, Calcemin, and Calcemin Advance as correction drugs against adverse effects of cholesterol on bone formation.

Methods: for the experiment purposes we selected 175 female rats with body weight of 330-345 g. Animals of the group 1 received standard food, animals of the group 2 received 2.5% of pure cholesterol and 10% of lard as the replacement of removed carbohydrates. In the groups 3 through 5 animals on the same cholesterol diet received per os Osteocare, Calcemin, and Calcemin Advance in therapeutic dosage calculated for a rat basing on human dose. Animals were withdrawn from the experiment upon expiration of observation terms (the 7th, the 15th, the 30th, the 60th, the 90th, and the 180th day). Upon expiration of observation terms right tibiae were prepared for chemical analysis.

Results: Cholesterol excess led to in destabilization of the microelemental composition of tibiae. Alterations became evident beginning from the 15th day and progressed throughout the experiment: copper share decreased as compared to the 1st group values from the 15th to the 180th days by 7.49%, 8.14%, 9.54% and 8.83% respectively and manganese share − by 5.26%, 6.70%, 8.41% and 8,58% ($p < 0.05$ in all cases). Calcium drugs we used reduced adverse effects of cholesterol on microelemental composition of tibiae − by the 180th day zinc and copper share in the group 3 increased by 6.49% and 6.75%, in the group 4 − by 7.58% and 8.07% and in the group 5 − by 10.82% and 8.82% (all in comparison with the group 2).

Conclusion: Dietary cholesterol excess produces marked adverse effects on microelemental composition of tibiae. These effects grow with time in absence of treatment. Third generation calcium drugs reduce adverse effect of cholesterol on microelemental composition of tibiae. Calcemin Advance appeared to be the most effective medication among those we considered.

P933
RISK OF DEVELOPING OSTEOPOROSIS IN PATIENTS WITH PSORIATIC ARTHRITIS AND RHEUMATOID ARTHRITIS

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Objective: Psoriatic arthritis (PsA) and rheumatoid arthritis (RA) are inflammatory arthritis that alters the biomechanical properties of the bones and leads to changes in bone components through increased production of proinflammatory cytokines [1,2]. In patients with RA it is statistically proven that age and low body weight are risk factors for the development of osteoporosis, but the risk factors for the development of osteoporosis in patients with psoriatic arthritis have been studied [3,4] **The aim** of this study was to investigate osteoporosis by measuring BMD at the hip and lumbar spine measured by DXA in patients with PsA and RA, as well as evaluating some risk factors for the development of osteoporosis in patients with inflammatory joint disease.

Methods: 65 patients with PsA and 65 patients with RA were recruited and evaluated for osteoporosis as part of a prospective study from January 2019 to January 2020. All patients met the ARA/EULAR criteria for RA and CASPAR criteria for PsA and received no biological anti-cytokine therapy. The patients were treated and monitored at the Rheumatology Clinic Sveti George Hospital, Plovdiv and Kaspela Hospital, Plovdiv. An extensive data collection was performed including demographic data and measures reflecting disease activity and health status. Statistical data processing was performed using the SPSS 18.0 statistical program, with a p value >0.05.

Results: The mean age in the RA group was 49.8 y and 71% were women. The mean age of patients with PsA was 52.3 and 43% were women. Median disease duration in patients with RA was 8.1, in patients with PsA was 11.3 y. The proportion of patients with low BMD (defined as Z score ≤ -1.0 SD) was comparable to the expected value of 19%, according to the normal distribution of the Z score in the population. In RA patients, osteoporosis was found in 37.2% (95%CI 32% to 42%), in PsA patients in 7.1% (95%CI 4% to 11%) of the patients. No significant associations were found between BMD and disease activity measures in patients with PsA.

Conclusion: RA patients were significantly more likely to have osteoporosis than PsA patients (p>0.05). Risk factors for osteoporosis in RA patients have been confirmed to be symptom duration, low body weight, and use of corticosteroids as part of treatment. No reliable risk factors have been identified to predict the development of osteoporosis in patients with PsA.

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P934
THE ACCURACY OF DIGITAL TEMPLATING IN PRIMARY TOTAL HIP ARTHROPLASTY: A RETROSPECTIVE STUDY OF 125HIPS

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Objective: Preoperative planning forms an important part of total hip arthroplasty (THA) to determine the size and the position of the prosthesis. Accurate preoperative templating improves procedure's precision, shortens its duration and reduces the incidence of complications (e.g., dislocation, limb-length difference, periprosthetic fractures). Electronic picture and communication system (PACS) and templating system (Advanced Case Plan2.2/Stryker) were introduced into our hospital in April, 2010. We have started to use digital preoperative planning in THA from June, 2010. We retrospectively reviewed all the plans of 115 consecutive patients (125hips) who underwent THA from June, 2010 to June, 2013. There were 12 males and 103 females with a mean age at surgery of 67.1 (45 to 87). The original disease is 94 osteoarthritis, 9 rheumatoid arthritis, 6 rapidly destructive coxarthropaty, 4 osteonecrosis and 2 femoral neck fracture. Three patients had had previous pelvic osteotomies.

Methods: The Anteroposterior and lateral hip radiographs were generated with the patient in the supine position. A 25.4mm metallic sphere was used as a calibrating marker and placed in a standardized location for all patients. The marker was taped to the inner thigh at the level of the femoral shaft proximally. These radiographs were digitally templated preoperatively and compared to the actual size of the implants at the time of surgery.

Results: A prediction of within 1 size was reached in 98.4% for acetabular components and 80.0% for femoral components. In 2 case (1.8%) the implanted stem was 3 sizes larger than the digital template, and in 2 cases(1.8%) the implanted stem was 4 sizes smaller than the digital template.

Conclusion: The introduction of digital templating has significant benefit in preoperative planning for THA.

P935
PREVALENCE OF MISDIAGNOSED SEVERE OSTEOPOROSIS IN INPATIENTS OF AN INTERNAL MEDICINE AND RHEUMATOLOGY UNIT

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Objective: Osteoporosis (OP) is often misdiagnosed and associated to different diseases. There are few scientific studies about inpatients, that highlight an underestimate of this problem with consequent limited access to therapies, elevate risk of worsening the main disease. The aim of this study was to evaluate the prevalence of a misdiagnosed OP in inpatients of an Internal Medicine Department, admitted for diseases other than OP.

Methods: We evaluated inpatients of a Medicine and Rheumatology Unit between January 2019 and December 2019 who had a spinal imaging (CT, MRI or X-ray). For each patient we collected demographic data, above all previous or current OP treatment, and presence/number of vertebral fractures detected by radiologists. Descriptive data were presented by medians (interquartile range [IQR]) for continuous data or as numbers (percentages) for categorical data. Differences between groups were analyzed with a chi-square test. Statistical analyses were performed using Medcalc statistical software, version 18.2.1.P values 0.05 were considered statistically significant.

Results: 793 subjects were admitted in the inpatient clinic; among them 239 patients (138 females [57.7%], median of age 76.0 [64.3-83.0] y) were enrolled because they had a spinal imaging: 166 (69.5%) underwent an X-ray, 44 (18.4%) a CT and 45 (18.8%) a MRI. We found at least one vertebral fracture in 73 (30.5%); almost half of them (35/73 [48 %]) had at least 2 vertebral fractures. OP was already diagnosed in 17/73 (23%) patients with a vertebral fracture, while seven patients without vertebral fracture had a previous diagnosis of OP. The prevalence of single vertebral fractures was higher in patients with previous diagnosis of OP than in those ones without (6/17 [35%] vs. 32/56 [57%]), (p=0.1).

Conclusion: In daily clinical practice, most of inpatients of an Internal Medicine and Rheumatology Unit had misdiagnosed vertebral fractures. In particular, we found that 87% of inpatients with vertebral fractures didn't know to have osteoporosis. More attention should be given to this comorbidity, which is known to be an additional factor of disability and mortality.

P936
STRUCTURAL RESONANCE MEDIATED ELECTROMAGNETIC THERAPY FOR OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS TREATMENT: NEW OPPORTUNITIES AND FUTURE DIRECTIONS

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Objective: Comparative investigation of the structural resonance mediated electromagnetic therapy (SRMET) and commonly used treatment protocols of osteoarthritis (OA) as well as rheumatoid arthritis (RA). SRMET technique is a subtype of electrotherapy based on effect of specific alternating electromagnetic field of low energy, parameters of which correspond to the spontaneous bioelectric activity of healthy tissues.

Methods: The research was carried out in agreement with the WMA Declaration of Helsinki principles. 44 OA patients were randomized into 2 groups. 27 patients of the 1st group were treated with 10 daily 43-min sessions of SRMET using Rematerp equipment (MOKB Mars, Moscow, Russia) in combination with common OA treatment. Another 17 control patients received only drug treatment. Therapeutic efficiency was assessed by means of laboratory markers, Lequesne index, the visual analog scale, Spielberger's test, and Beck's scale. 70 RA patients were also randomized into SRMET subgroup (37 patients) and the control group without SRMET, both groups received standard antirheumatic therapy. SRMET courses were the same as for OA treatment. We assessed treatment effects by DAS28 index, the visual analog scale, as well as by the same psychological tests.

Results: In SPMET OA patients there was more prominent decrease of ESR, CRP, Lequesne index and VAS than in control group (p<0.001 for every parameter). Anxiety and depressive disorders also reduced significantly in SRMET treated patients as opposed to OA controls. Somewhat lower but clear positive effect was observed in SRMET treated RA patients. We also detected higher decline of VAS and DAS28 scores in SRMET subgroup comparing to RA controls (p<0.001, p=0.05, respectively). Differences in anxiety and depression were not significant.

Conclusion: SRMET is efficient and safe accessory method of OA and RA treatment. It can enhance overall treatment and rehabilitation results as well as improve the quality of life in both diseases.

P937
BONE MINERAL DENSITY AND TRABECULAR BONE SCORE IN POSTMENOPAUSAL WOMEN WITH OBESITY AND OSTEOARTHRITIS

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Objective: Due to the global ageing of the population, the number of chronic diseases has increased noticeably. This is particularly relevant in the context of musculoskeletal system disorders, mostly affecting postmenopausal women. The aim of the study was to examine BMD and trabecular bone score (TBS) of postmenopausal women with obesity and OA.

Methods: We have observed 359 postmenopausal women (50-89 years old) and divided them into groups by age decades: 50-59, 60-69, 70-79 and over 80 years old. According to the ACR Clinical classification criteria for knee and hip OA, we have further divided them into 2 groups: group I – 117 females with symptomatic OA (89 patients with knee OA, 28 - with hip OA) and group II –242 women with a normal functional activity of knee and hip joints. Analysis of data was performed taking into account their BMI, classified by WHO where obesity was established when BMI was above 30 kg/m^2.

Results: There were observed no differences between age and height across all groups. However, women with OA had a significantly higher BMI and weight compared with a group of women without weight problems. Symptomatic OA was detected in 41% of postmenopausal women with obesity (44 women) and normal functional activity of joints - in 58.9% (63 women with obesity). There were found no significant differences for both groups in BMD of femoral necks (p=0.07 and p=0.33 respectively) and TBS (p=0.06). However, women with symptomatic OA had

significantly higher level of lumbar spine BMD compared with woman without OA (p=0.000068). In the age group of 50-59 years OA was detected in 31.8% of women with normal BMI and in 68.2% of those without OA. In the next group of 60-69 y, OA was diagnosed in 27.2% of women with normal BMI and in 72.8% of those with a normal functional activity of large joints. Among the 70-79 year-old women, 25.0% of cases had OA with a normal BMI while 75.0% had no OA and normal BMI. In the oldest group of subjects over 80 y, the distribution was 43.8% vs. 56.2% with a normal functional activity of large joints. Chi-square ($\chi2$) test showed that postmenopausal women with OA had a significantly higher BMI ($\chi2=5.05$, p=0.02).

Conclusion: In the OA patients, the frequency of obesity is significantly higher compared to persons without OA. Women with OA had a significantly higher BMD of lumbar spine. At the same time, in our study, there were no significant differences of right and left hip BMD and TBS in women with OA.

P938
AGE, BMI, BODY COMPOSITION IN POSTMENOPAUSAL WOMEN WITH CHRONIC VENOUS DISEASE

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Objective: Chronic venous disease (CVD) is one of the common, though controversial problems in modern medicine. In the Western world, CVD occurs approximately in 25-30% of women and 10-40% of men. According to the literature data, besides female sex, its main risk factors are age, eating behavior etc. The role of excessive weight nowadays is still debated. Today in Ukraine, we have no studies that describe the relationship between CVD, obesity and other risk factors. The aim of our study is to determine the association between age, body composition, obesity and CVD in postmenopausal women.

Methods: We have examined 96 postmenopausal women aged 46-85 y (mean age − 66.19±0.96 y). The study was conducted at D. F. Chebotarev Institute of Gerontology, NAMS Ukraine, and Ukrainian Scientific-Medical Center of Osteoporosis Problems. In accordance with CVD presence, all women were divided in two groups. The diagnosis of CVD was established according to the C-category of clinical, anatomical and pathophysiological (CEAP) classification and vascular surgeon's consultation. All patients underwent clinical and ultrasound (if necessary) examinations of the lower extremities and DXA with Hologic (Discovery WI, USA, 2015).

Results: We have detected increases of CVD frequency with age in postmenopausal women (from 72% in those aged 45-59 y to 84% in those aged 75-89 y). The CVD was diagnosed in 71% of patients with a normal body weight (12 out of 17), in 85% of patients with excessive weight (23 out of 27) and in 77% with obesity (40 out of 52). In the group of 75-89 y with and without CVD, there were found significant differences in the parameters of body weight (p=0.009), BMI (p=0.005), total fat mass (p=0.024), total lean mass (p=0.003) and lean legs' mass (p=0.002).

Conclusion: A significant correlation between the total fat mass and age was determined in postmenopausal women with CVD. We have also observed a significant correlation between the lower extremities' fat mass and age in both groups. A significant correlation between BMI and age was revealed only in postmenopausal women without CVD. Significantly, higher values of body weight, BMI, total body fat, and lower extremity body fat were found in the oldest group with CVD compared to patients without CVD.

P939
LOCAL THERAPY OF KNEE OSTEOARTHRITIS, RESEARCH OF KETOPROFEN EFFICIENCY

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Objective: Pain of a varying intensity is the principal complaint of patients with osteoarthritis (OA), and, for its alleviation, the nonsteroidal anti-inflammatory drugs (NSAIDs) are most frequently used. The European and American medical societies (the European League against Rheumatism (EULAR), the Osteoarthritis Research Society International (OARSI), the American College of Rheumatology (ACR), the National Institute for Health and Care Excellence (NICE)) publish recommendations and clinical guidelines emphasizing the necessity of local NSAIDs as the first-line drugs for the patients with knee OA. The aim of this study was to evaluate the safety and efficacy of Ketoprofen therapy, as well as its impact on the severity of pain and quality of life in patients with knee OA of Grade I-II.

Methods: The study included 23 males and females aged 50-69 years old with knee OA of Grade I-II. The diagnosis was based on X-ray Kellgren-Lawrence classification grades. Patients were divided into two groups: I group - 13 patients treated with Ketoprofen applications to their knees twice a day for 10 d, and II group - 10 patients treated with petroleum jelly applications to their knees twice a day for 10 d. The study consisted of three stages: screening, visit after 10 d of therapy and visit on the 20th day after discontinuation of therapy. We evaluated the results of the *Lequesne index*, WOMAC scale (pain, stiffness, daily activity subscales), and the15-m test.

Results: On the 10th day of therapy, the I group registered reduction of the pain intensity by 41.7% (t=3.81, p=0.002), stiffness by 35.2% (t=3.75, p=0.003) and osteoarthritis-associated daily activity by 34% (t=4.98, p=0.0003), according to the WOMAC questionnaire. The duration of 15-meter test conducted in the I group on the 10th day of the study significantly decreased by 12.9% (p=0.02). In the II group, there were detected no significant differences. There were no adverse reactions among patients who used the ketoprofen during the whole observation period

Conclusion: Using ketoprofen led to a significant reduction of pain and improvement of the daily activity in patients with knee OA. Thus, ketoprofen is an effective and safety agent of local therapy in patients with knee OA.

P940
WHAT DO WE KNOW ABOUT THE EFFECTIVENESS OF ELECTRICAL STIMULATION IN IMPROVING CLINICAL OUTCOMES AFTER HIP FRACTURES? A SYSTEMATIC REVIEW WITH AN EXPERT CONSULTATION PROCESS

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Objective: Regaining independent mobility after hip fracture surgery is often delayed by pain and muscle weakness. Electrical stimulation may relieve pain and improve muscle strength. The aim of this study was to systematically review available literature examining the effectiveness of using electrical stimulation to promote better health outcomes after hip fractures.

Methods: Two researchers independently searched Medline, CINAHL, EMBASE, Web of Science, Cochrane Reviews, Physiotherapy Evidence Database, and PsycInfo from inception to July 1, 2018, with no restrictions. The quality of the included studies was assessed, and expert consultation was conducted to help interpret the results.

Results: 432 records were identified through database searching. Initial screening indicated that 24 articles were appropriate for full-text review, while only four articles met the inclusion criteria. Although evidence is limited, it seems that electrical stimulation (specifically TENS) may reduce pain, improve range of motion, and accelerate recovery immediately after hip fracture. Conflicting evidence exists when using neuromuscular electrical stimulation to improve muscle strength; however, nine experts advised that longer-term interventions might be necessary to elicit strength gains.

Conclusion: Electrical stimulation is an inexpensive treatment that shows a promise to improve some health outcomes, including pain after hip fracture. More high quality studies investigating the effectiveness of electrical stimulation after hip fractures are needed, especially to study its effect on muscle strength.

P941
BONE STATUS DURING THE MENOPAUSE TRANSITION

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Objective: Perimenopause, or the menopausal transition, represents a period of time in which women are vulnerable to bone loss, due to hormonal changes. It is estimated that one in two Caucasian women will experience an osteoporotic fracture during her lifetime. We intended to evaluate the changes of BMD and quality among women in perimenopausal age, unlike most studies based only on postmenopausal status.

Methods: We retrospectively analyzed a total of 153 women aged between 45-55 years old, from authors' DXA database, with no other medical records, divided in two groups (pre- and postmenopause). Data were obtained at baseline, and, in few cases, at the next presentation of the same patient. Using DXA scan with Lunar IDXA, we obtained bone composition parameters and compared trabecular bone score (TBS), spine and hip Z-score, spine BMD and hip BMD between those two groups. Inclusion criteria were: age between 45-55 years old, clinically healthy subjects, menopause onset after 45, no more than 10 y of menopause. We analyzed the obtained data using IBM SPSS Statistics 20.

Results: A total of 156 scans, of which 35 exams of healthy, middle-aged, premenopausal women (mean age 48.846±2.6614) and 121 scans of early-postmenopausal women (mean age 51.256±2.7936) were included in our study. Age negatively correlated with both spine BMD (p=0.000, r=-0.339) and with hip BMD (p=0.007, r=-0.216). Menopausal status correlates negatively with spine Z-score (p=0.015, r=-0.195) and also with hip Z-score (p=0.043, r-0.163) and also decreases TBS (p=0.05, r=0.646). After calculating the period of time for each postmenopausal women with no estrogen exposure, we found a negative correlation with TBS (p=0.03, r-0.230), but also with spine BMD (p=0.002, r=-0.275) and hip BMD (p=0.007, r=-0.244)

Conclusion: The presence of menopause seems to be an important contributor to bone mineral loss independently of age, considering the significant difference of Z-score between the two study groups that have a small difference in mean age (approximately 2 y). Also, bone mineral quality, expressed by TBS, seems to be impacted by menopausal status.

P942
ASSESSING PHYSICAL FUNCTION OF KNEE OSTEOARTHRITIS USING WOMAC INDEX-(MODIFIED CRD PUNE VERSION) IN GERIATRIC POPULATION

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Objective: Everyone talks of arthritis but considering its implications; no one wants to suffer from it! The term arthritis is derived from a Greek word "artho" meaning joint and "itis" meaning inflammation. Arthritis foundation of India has cited an interesting Chalo Chalein (come we will move) test that most of us can understand. Today, arthritis has become one of the common causes of disability and functional limitation. But it does not affect all types of functional activities equally. Activities like walking, squatting and stair climbing are the ones affected most. Hence a need for standardized assessment tool becomes very important. Very rarely have the patient's preferences for outcomes been used to evaluate treatment. We aimed

to assess the physical function of knee OA using WOMAC CRD. **Methods:** A diagnosed case of knee osteoarthritis fulfilling the ACR criteria, age >60, Secondary arthritis of knee or due to inflammatory condition like rheumatoid arthritis, Presence of any hip or ankle pathology, subjects who had a surgical procedure/injury on either lower limb in past six months were excluded. WOMAC CRD is recently a new outcome measure suitable for Indian Asian use has been validated against WOMAC. It consist of scale for pain, scale for stiffness and a modified function scale to suit Indian conditions and activities. **Results:** Data were analyzed. The mean was 65.9, SD 9.43. **Conclusion:** WOMAC CRD PUNE is useful outcome measure for Indian population.

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P943
QUALITY OF LIFE IN OSTEOPOROTIC POSTMENOPAUSAL WOMEN WITH SARCOPENIA

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Objective: Menopause has an adverse impact on long-term health. Among musculoskeletal disorders sarcopenia and osteoporosis are important risk factors for physical impairment, limitation of mobility, increased risk of falls, hospitalization, consequently decreasing the quality of life. The purpose of this study was to evaluate the quality of life in postmenopausal women diagnosed with sarcopenia and osteoporosis.

Methods: The study included 141 osteoporotic postmenopausal women diagnosed with sarcopenia. Participants for this observational study were recruited from the postmenopausal women admitted to Medical Rehabilitation Clinical Hospital Baile Felix, Romania. The quality of life was assessed using the standardized, validated Romanian version of SarQol questionnaire. This is a specific self-administrated questionnaire, which consists of 55 items translated into 22 questions which address seven domains of dysfunction: Physical and mental health (D1), Locomotion (D2), Body composition (D3), Functionality (D4), Activities of daily living (D5), Leisure activities (D6) and Fears (D7). Each domain is scored from 0 to 100 and an overall score is calculated.

Results: Mean age of the patients was 67.12±8.55. The mean value of total scores was 55.08±13.71. D1 mean score was 59.41±15.67; D2 mean score was 53.46±20.02; D3 mean score was 57.66±15.33. For D4, mean score was 62.02±13.99, for D5 it was 49.65±18.94, while for D6 it was 23.30 ±23.59 and for D7 was 83.15±15.13.

Conclusion: 1. The quality of life in osteoporotic postmenopausal women with sarcopenia was reduced to almost half, as reflected by the total score and the scores of the different dimensions of the SarQoL questionnaire. 2. Leisure activities domain (D6) was the most affected domain of health-related quality of life questionnaire and Fears (D7) was the less affected one.

P944
THE LEVEL OF VITAMIN D (25-OH) IN YOUNG ADULT WOMEN WITH JUVENILE IDIOPATHIC ARTHRITIS

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Objective: Juvenile idiopathic arthritis is a chronic inflammatory disease of autoimmune etiology which can lead to joint disability and to the loss of mineral bone density (MBD). Vitamin D plays crucial role in MBD in young patients. It is well known that patient with chronic inflammatory joint disease had loss of BMD. That is why **the aim** of our study was to investigate the level of Vit D 25(OH) in young adult women with JIA.

Methods: 104 women, aged 19-39 y (45 - with a history of JIA and 59 practically healthy women as the control group) were observed. The exclusion criteria – any fractures in the anamnesis. The JIA was diagnosed according ILAR-criteria. Disease duration, disease activity according DAS-28, VAS, articular and extra-articular damages (JADI-A, JADI-E), the received therapy (glucocorticoids (GC), s-DMARDs) were evaluated. BMD (MBD) was evaluated by X-ray densitometry, serum Vit D 25(OH) level was evaluated in the spring period during 2015-2019 years.

Results: Young female patients with JIA had lower BMI (20.34±3.01) vs. healthy female (23.53±5.33; p<0.01). The average onset of JIA was at the age of 11.16±4.34 y, delay in the diagnosis - 23.52±21.37 months, the disease duration - 11.9±9.4 y. Distribution by ILAR-variants: persistent oligoarthritis - 17 (42,5%), RF (-) polyarthritis - 10 (25%), RF(+) polyarthritis 5 (12.5%), systemic JIA - 5 (12.5%), enthesitis-arthritis - 7 (17.5%), psoriatic arthritis - 1 (2.5%) pts. Disease activity measured by DAS-28 was 3.6±1.5, VAS- 32 [21; 57] mm. The cumulative dose of GC was 1090.0 [0; 9680,0] mg, average duration of GC treatment – 3.0 [0; 62.5] months. The level of vitamin 25- (OH) D was 23.4±13.2 ng/ml.

Vitamin 25- (OH) D in adult patients with JIA had correlation with the need of prosthetics (r=0.301, p<0.05), functional disability in adulthood (r=-0.307, p<0.05), duration of morning stiffness in childhood (r=0.656, p<0.05), JADI-A (r=-0.342, p<0.01), JADI-E (r=-0.308, p<0.05), presence of aseptic necrosis (r=-0.448, p<0.01). Vitamin 25- (OH) D correlated with the mean dose of GC (r=0.667, p<0.05), duration of GC treatment (r=-0.349, p<0.05) and GC cumulative dose (r=-0.308, p<0.05), duration of DMARD therapy (r=-0.330, p<0.05), the need for intensification of therapy (r=-0.791, p<0.05). Vitamin 25- (OH) D had negative correlation with total body BMD (r=-0.7, p<0.05) and T-score (r=-0.886, p<0.05) and ultradistal ulnar BMD (r=-0.857, p<0.05).

Conclusion: Young adult woman with JIA had low levels of Vit D 25(OH). The deficit of vitamin 25-(OH) D is associated with functional disability, articular (JADI-A) and extra-articular (JADI-E) damages in female with JIA. Level of Vit D 25(OH) correlated with cumulative dose and duration of GC and s-DMARD therapy.

P945
HYPERURICEMIA, COMPONENTS OF METABOLIC SYNDROME AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Objective: To determine uric acid level in blood serum of women in the postmenopausal period and its association with some components of metabolic syndrome (BMI, triglyceride, cholesterol, systolic and diastolic pressure) and BMD.

Methods: We examined postmenopausal women at the Ukrainian Scientific-Medical Center of Osteoporosis (n=412). They were divided into the following groups: I group (BMI=18.5-24.9), II group (BMI=25.0-29.9), III group (BMI=30.0-34.9), IV group (BMI>35). Average age of the examined patients was 64.3±0.8 y. Uric acid level in blood plasma was determined by uricase-peroxidase method.

Results: The higher level of uric acid was found in patients with the maximal BMI (>35). In the I group it was 277.52±8.40; II group − 286.81±7.79; III group − 291.81±7.56; IV group − 327.17±12.17 (F=4.19; P<0.05). We determined that the highest level of triglyceride (F=18.62, p<0.05), cholesterol (F=3.64, p<0.05), atherogenic coefficient (F=22.64, p<0.05), systolic (F=10.5, p<0.05) and diastolic pressure (F=4.30, p<0.05) was in women with hyperuricemia. Significant correlation was determined between uric acid and BMD at the trochanter level (r=0.31, p<0.05).

Conclusion: It was determined that uric acid level in women during a postmenopausal period depended on BMI. The highest level of triglyceride, cholesterol, atherogenic coefficient, systolic and diastolic pressure was observed in women with hyperuricemia. There was an interdependence between an uric acid level and BMD at the trochanter level.

P946
BONE MINERAL DENSITY AND TBS IN MEN WITH HYPERURICEMIA

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Objective: To determine uric acid level in blood serum in men and its association with BMD and TBS.

Methods: We examined 140 men at the Ukrainian Scientific-Medical Centre of Osteoporosis. Average age of the subjects was 58.2±1.3 y. According to the levels of uric acid in the blood serum, all patients were divided in four quartiles: Q1 − <281 mkmol/l, Q2 − 281-342 mkmol/l, Q3 − 343-404 mkmol/l, Q4 − >404 mkmol/l. Uric acid level in blood plasma was determined by the uricase-peroxidase method.

Results: The incidence of osteoporosis in men with hyperuricemia was lower compared with men who had a normal level of uric acid (4% and 17% at the level of the lumbar spine, 4% and 15% at the level of femoral neck mean). BMD was significantly higher in men who had the highest levels of uric acid at the lumbar spine (F=2.78; p=0.04), radius 33% (F=3.96; p=0.01) and total body (F=2.70; p=0.04). TBS was significantly higher in the patients who had the lowest levels of uric acid compared with the patients who had the highest level of uric acid (Q1=1.17±0.02, Q4=1.04±0.02; p<0.05).

Conclusion: BMD was significantly higher in men who had the highest levels of uric acid at the lumbar spine, radius 33% and total body. TBS was significantly higher in the patients with lowest levels of uric acid.

P947
SARCOPENIA AND RHEUMATOID ARTHRITIS

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Objective: Nowadays in the field of syndromes and diseases associated with age, scientists focus especial attention on the problem of sarcopenia, which combines an increased risk of falls, deterioration of life quality, impaired functional activity, reduced life expectancy and increased mortality of patients. In 2016, sarcopenia has been included in the International Classification of Diseases. There are the primary and secondary forms of sarcopenia. **The aim of this study** was to evaluate the BMD, lean mass, frequency of pre-sarcopenia and analyze correlation among the activity parameters, duration of the disease, life quality and lean mass indices in women with rheumatoid arthritis

Methods: 461 women aged 40-87 y (age - 57.17±0.71 y) were examined, among them 71 patients with rheumatoid arthritis and 390 controls. We conducted the clinical and laboratory examination. Pain intensity was evaluated by the visual analogue scale, the quality of life − by the HAQ questionnaire. Lean mass, BMD were measured by the X-ray absorptiometry (Prodigy, GEHC Lunar, Madison, WI, USA). Pre-sarcopenia was determined when an appendicular lean mass index was less than 5.72 kg/m^2 (V. Povoroznyuk, N. Dzerovych, 2016).

Results: Patients with rheumatoid arthritis had a significantly lower femoral neck mineral density (p=0.002), lean mass of the total body (p=0.01) and appendicular lean mass (p<0.01). We didn't find any significant connection among the activity parameters (C-reactive protein, ESR, pain VAS, DAS-28), duration of the disease, life quality and lean mass indices in patients with rheumatoid arthritis. However, a significant correlation was found between the number of swollen joints and lean mass of upper limbs (r=0.67; p=0.02).The frequency of pre-sarcopenia in women with rheumatoid arthritis was 49 %, in the control group − 18 %.

Conclusion: Patients with rheumatoid arthritis had not only bone tissue, but also skeletal muscle tissue disorders, resulting in a significant deterioration of functional capacity and quality of life. Given the significant medical and social significance of the problem, further studies into the mechanisms of pathogenesis, development of diagnostic methods, prevention and treatment of sarcopenia in patients with rheumatoid arthritis are required.

P948
PHYSICAL PERFORMANCE IN FALLER OLDER OSTEOPOROTIC POSTMENOPAUSAL WOMEN

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Objective: To evaluate the physical performance in older osteoporotic women.

Methods: 52 osteoporotic postmenopausal women were included in the study (71.98±5.29 y). They were divided into two groups according to the history of falls - the fallers group (n=35, 71.34±4.97 y, BMI 29.06±4.77 kg/m^2) and nonfallers (n=17, 73.29±5.85 y, BMI 28.11±5.09 kg/m^2). Physical performance was assessed with the time-up-and-go test (TUG), gait speed and hand grip strength.

Results: No age differences were found between groups. The fallers group need a significant higher time to perform the TUG test compared to nonfallers (33.8±15.84 s vs. 22.57±9.77 s). No significant differences for gait speed were found (0.8±0.22 m/s for fallers and 0.82±0.19 for nonfallers).Hand grip strength was <16 kg in both groups.

Conclusion: Both groups showed a low physical performance as evaluated with the TUG, and hand grip strength. The TUG performance was significantly lower in osteoporotic postmenopausal women with a fall history. No significantly differences were found for gait speed and hand grip strength.

P949
ROLE OF ALENDRONATE/TERIPARATIDE IN STEROID INDUCED OSTEOPOROSIS IN DEVELOPING COUNTRY

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Objective: To assess the role of alendronate/teriparatide in steroid induced osteoporosis in developing country.

Methods: This is double-blinded randomized controlled trial that was conducted in tertiary care hospitals of developing country from January 2015 to June 2017. In this study comparison of alendronate with teriparatide in 214 women and men with osteoporosis (ages, 22-65 y) who had received glucocorticoids for at least 3 months. A total of 107 patients received 20 μg of teriparatide, and 107 received 10 mg of alendronate once daily.

Results: Significant difference between the groups was reached by 6 months (P<0.001). At 12 months, BMD at the hip had increased more in the teriparatide group. Fewer new vertebral fractures occurred in the teriparatide group than in the alendronate group (6.0% vs. 0.4%, P=0.004).

Conclusion: Patients with osteoporosis who were at high risk for fracture, BMD increased more in patients receiving teriparatide than in those receiving alendronate.

P950
ORGANIZATION OF PRIMARY MEDICAL CARE FOR PATIENTS WITH OSTEOPOROSIS IN THE RUSSIAN FEDERATION

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Objective: Osteoporosis is inadequately treated in primary care settings. Fractures caused by osteoporosis remains a major public health burden on contemporary populations because fracture is associated with a substantial increase in the risk of mortality. Early identification of high-risk individuals for prevention is a priority in osteoporosis research. Advances in osteoporosis management over the past two decades include development of effective low-cost treatments and easily accessible fracture risk assessment tools, such as the Fracture Risk Assessment Tool (FRAX). To reduce the burden of osteoporotic fractures, we need a system of medical care based on the interaction of primary care doctors, specialists and fracture liaison services (FLS).

Methods: We have organized a system of care for patients with osteoporosis in the one city polyclinic of the St. Petersburg. This polyclinic serves 60 thousand adults. All primary care physicians were trained to evaluated FRAX. If a high risk of fractures was detected, primary care doctors prescribed antiosteoporotic therapy or referred the patient to the rheumatologist of the district center of osteoporosis. In addition, FLS was organized in this clinic. Identification of patients at high risk of fractures with the primary care doctors and FLS was initiated in 2018.

Results: In 2018-2019 11116 residents were calculated risk FRAX, and the risk of fractures was higher the age-dependent intervention threshold (IT) in 1149 patients. 567 patients with fractures from the FLS were identified in 2018-2019 years. The incidence of osteoporosis increased more 10 times in 2018. So, in 2017, it was 28.3 per 100 000 of the population, and in 2018 - 333.1 per 100 000. A high incidence of osteoporosis was also noted in 2019.

Conclusion: Long-term follow-up is needed to determine whether these initial results are followed by actual reductions in osteoporotic fractures.

P951
DXA FOR ASSESSMENT OF BONE MINERAL DENSITY OF WOMEN WITH LUMBAR SCOLIOSIS

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Objective: Scoliosis is defined as a lateral deviation of the normal vertical line of the spine and is measured by Cobb angle. Usually Cobb angle has been assessed from lumbar radiography. However, several studies evaluated lumbar scoliosis from DXA. Some of those studies showed a strong correlation between the Cobb angle from DXA and lumbar radiography. The aim of this study is to assess lumbar scoliosis and BMD from DXA scans.

Methods: 86 women underwent DXA scans. We evaluated lumbar scoliosis from DXA images by measuring Cobb angle using DICOM software. Scoliosis was defined as Cobb angle ≥5° according to Chaklin's classification. Age, weight, height and BMD were assessed among the women with- and without scoliosis.

Results: The mean age of the women was 62±9 y. (range 45-82 y). The mean height was 160±11 cm (range 145-171 cm) and mean weight was 73±18 kg (range 43-160 kg). 39 of the women (45.3%) were with scoliosis and 47 of the women (54.7%) were without scoliosis. Subjects with scoliosis were significantly older (66 yrs.) than those without scoliosis (60 y), (p=0.04). Weight and height were not statistically significant between the groups with and without scoliosis. Total BMD of the lumbar spine of the women with scoliosis (0.794 g/cm^2) was significantly lower than those without scoliosis (0.898 g/cm^2), (p=0.026).

Conclusion: Women with scoliosis are significantly older and have significantly lower BMD than those without scoliosis.

P952
ROLE OF TERIPARATIDE IN DISTAL RADIUS OSTEOPOROTIC FRACTURE IN DEVELOPING COUNTRY

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Objective: Osteoporotic distal radius fractures result in serious health problems and may predict future risks of both hip and vertebral bone fractures subsequently, as on average 15 y earlier distal radius fractures occurs in life than hip fractures. Faster time-to-union is important for early return to daily activities and reduction of complications. Teriparatide has been shown to accelerate fracture healing, but the literature is deficient at time of study on osteoporotic distal radius fracture. The aim of this study is to assess whether teriparatide accelerates fracture healing.

Methods: Double-blinded randomized controlled trial that was conducted in tertiary care hospital Karachi Pakistan from January 2015 to June 2017, patients with osteoporotic distal radius fractures extra articular managed in casting are included. Group 1 included patients who were not on any osteoporosis medication prior to fracture and who postoperatively received only calcium and vitamin D; patients in Group 2 were not on any osteoporosis medication prior to fracture, and received teriparatide and calcium and vitamin D postoperatively. A total of 100 patients received 20 μg of teriparatide, and 100 received placebo once daily. Demographics, time-to-union, radiographic and functional outcomes between two groups were analyzed.

Results: A significantly shorter time-to-union was found in the teriparatide group (mean, 12.3, and 10.6 weeks, respectively (P=0.005). Significant difference in time to union and functional outcome between the groups was reached by 6 months (P<0.001). Complications were also markedly reduced in the teriparatide group.

Conclusion: Postfracture use of teriparatide for 6 months appears to be an effective adjunct therapy in the treatment of patients with osteoporotic distal radius fractures. However, because of the limited power of the study, a prospective, randomized, large-scale cohort study is still required for determining the efficacy of teriparatide.

P953
FRAX BASED INTERVENTION THRESHOLDS FOR UKRAINE

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Objective: This study presents guidelines for the assessment of fracture probability and for BMD testing based on fracture probability in Ukraine. The guidelines are applied to a referral cohort from Ukraine.

Methods: The population sample used to determine the impact of intervention and assessment thresholds was a referral population of 3790 women from the Ukraine aged 40-90 y. The 10-y probabilities of hip fracture and major osteoporotic fractures were calculated using the Ukrainian FRAX model (version 4.1). Guidelines for the assessment of fracture probability and for BMD testing based on fracture probability was determined using the approach similar to that adopted by the National Osteoporosis Guideline Group in the UK and more recently in European guidelines.

Results: The intervention threshold in women (set at the age specific fracture probability equivalent to women with a prior fragility fracture) rose with age from a 10-y probability of 6.7% at the age of 50 y to 11% at the age of 85 y. The prevalence of

previous fracture increased with age, as did the proportion eligible for treatment. The proportion of the referral population eligible for treatment ranged from 44-69%. In contrast, the requirement for BMD testing decreased with age.

Conclusion: The present study has shown that it is possible to apply FRAX-based assessment guidelines using the same principles that have been applied to guidelines elsewhere but tailored to the epidemiology of Ukraine. It will be important to underpin these guidelines with an economic assessment.

P954
FRACTURE RISK SCREENING USING FRAX IS EFFECTIVE FOR SECONDARY FRACTURE PREVENTION: A POST HOC ANALYSIS OF THE SCOOP TRIAL

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Objective: The Screening for Osteoporosis in Older Women for the Prevention of Fracture (SCOOP) Trial demonstrated that primary care fracture risk screening leads to a reduction in hip fractures. In this post hoc analysis we investigated whether the screening intervention was effective in the context of individuals with a prior fracture.

Methods: In SCOOP, women aged 70-85 y were randomised to either screening (n=6233) using FRAX, with antiosteoporosis therapy recommended for those at high risk of hip fracture, or usual care (n=6250). Participants were followed for 5 y and incident fractures validated. Here, using Cox regression, we analysed differences by randomisation group in the incidence of fracture outcomes [major osteoporotic (hip, clinical vertebral, wrist or humerus) or hip fracture] in the subgroup of women who were found to have had a prior fracture (since age 50 y) at baseline.

Results: 2862 (n=1399 screening; n=1463 usual care; 22.9% of the total randomised) women [mean (SD) age 76.3 (4.3) y] had a history of prior fracture. Of this subgroup, during follow-up 32.6% (n=456) randomised to screening and 18.9% (n=277) randomised to usual care received antiosteoporosis medications. There were 286 incident fractures in the screening arm (173 major osteoporotic, 43 hip) and 332 in the usual care arm (241 major osteoporotic and 80 hip) during the five year follow-up. The screening intervention was associated with a 26% lower risk of a major osteoporotic fracture and 44% lower risk of hip fracture over the study duration compared to usual care: major osteoporotic fracture, [hazard ratio (HR)=0.74, 95%CI: 0.61 to 0.90; p=0.002]; hip [HR=0.56, 95%CI: 0.38 to 0.81; p=0.002].

Conclusion: In a secondary prevention setting (i.e., in those with a prior fracture), assessment and treatment of osteoporosis guided by FRAX effectively reduces the risk of incident fractures.

P955
CLINICAL PATTERNS OF FIBROMYALGIA IN THE URBAN POPULATION OF THE RUSSIAN FEDERATION

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Objective: To describe clinical features of fibromyalgia (FM) in a sample of urban population of the Russian Federation.

Methods: Cross-sectional study included 92 patients (84 females, 8 males) aged from 18-86 (mean age 50.5). FM was diagnosed according to 2016 ACR criteria. Somatic symptoms were assessed according to ACR 2010 criteria. Hospital Anxiety and Depression score (HADs) was used to screen for affective disorders. Inclusion criteria were FM and signed informed consent. Exclusion criteria were rheumatoid arthritis, spondyloarthritides, diffuse connective tissue diseases, hypothyroidism, GMG-CoA inhibitor (statin) consumption related symptoms, cognitive dysfunction and language issues.

Results: There were no significant differences in severity of FM symptoms between patients of different age groups (under 45, 45-60, and over 60), except for a greater degree of anxiety and depression in patients under 45. The frequency somatic symptoms (headache, numbness, dizziness, dry eyes, constipation, abdominal pain, depression, nausea, loss of appetite, and painful urination) in the oldest group (aged over 60) was significantly lower than in the younger groups. Only frequent urination occurred most frequently in the oldest group and this was not unexpected

due to physiological reasons. Headache, lower abdominal pain, and depression as the 2016 ACR criteria were present in 60.9%, 41.3%, and 40.2% respectively, their frequency being the lowest in the subject older than 60: 37.5%, 20.8%, and 33.3%.

Women had a greater spread of diffuse pain and the severity of cognitive and somatic disorders than men. Maximal severity of FM signs was found in patients with high HADs scores: the fatigue index was 2.64 points (88.0% of the maximum), nonrefreshing sleep – 2.57 points (86.7%), general somatic symptoms – 2.73 points (91.0%), which significantly distinguished them from patients without affective disorders. In the absence of professional employment, there was a high prevalence of pain, fatigue, cognitive dysfunction, and low overall health indicators compared to working individuals. Overweight and obesity were protective factors in terms of feeling a full night's rest. The severity of anxiety among people with normal body mass was significantly higher than in the group of people with overweight or obesity (11.22±3.22 and 9.79±3.62 points, respectively, p=0.049). Only 21 subjects (22.8%) reported having daily physical activity. These patients had significantly lower levels of pain and fatigue. Physical activity had a protective effect on depression: the HADS score was 5.85±2.89 points compared to 7.87±3.98 points in the subgroup of physically passive patients, p=0.02.

Conclusion: In the Russian Federation FM is characterised by the highest prevalence of symptoms of muscle pain, muscle weakness, irritable bowel syndrome, fatigue and nervousness. Headache, lower abdominal pain, and depression were not very frequent in the Russian urban patients.

P956
SARCOPENIC OBESITY IN POSTMENOPAUSAL WOMEN AGED 65-74 YEARS

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Objective: Sarcopenic obesity is defined as a combination of sarcopenia and obesity. The prevalence of obesity has rapidly increased worldwide, as did the prevalence of sarcopenia, which was estimated between 9.9% and over 40% depending on the definitions used. The aim of our study was to identify the frequency of sarcopenic obesity in postmenopausal women aged 65-74 y.

Methods: We evaluated 67 female patients, aged between 65-74 y, hospitalized at the Medical Rehabilitation Clinical Hospital Baile Felix, Romania. They were all postmenopause, also diagnosed with osteoporosis and fulfilled the EWGSOP2 inclusion criteria for the diagnosis of sarcopenia. Exclusion criteria were severe mobility disorders of the weight-bearing joints, inflammatory diseases, neurological conditions, malignancies, cases with associated with organ failure in advanced stages, endocrine diseases, secondary sarcopenia, malabsorption, gastrointestinal disorders or use of medications that cause anorexia. According

to EWGSOP2 definitions, we divided the study lot into probable sarcopenia (group 1), confirmed sarcopenia (group 2) and severe sarcopenia (group 3).

Results: Mean age of the patients was 68.41 y, with 20.73 mean years of menopause. Mean BMI was 27.52, ranging between 17.48-39.73. 47.76% of cases had probable sarcopenia, 29.85% had confirmed sarcopenia and 22.38% had severe sarcopenia. 74.62% of the patients had BMI>25. Out of these, 64% had probable sarcopenia, 24% confirmed sarcopenia and 12% severe sarcopenia. In group 1 mean BMI was 30.27%, ranging from 25.71-39.73. In group 2 mean BMI was 25.85, ranging from 17.48-32.48 and in group 3 mean BMI was 25.74, ranging from 19.43-35.84. All patients from group 1 and 60% from group 2 were overweight or obese. 26.66% patients from group 3 had obesity or overweight.

Conclusion: Sarcopenic obesity was very frequent in postmenopausal women aged 65-74 y. All patients with probable sarcopenia were overweight or obese. There were no significant differences regarding mean BMI between cases with confirmed and severe sarcopenia. More attention must be given in the future to obese women to detect hidden muscle wasting.

P957
OSTEOPOROSIS: INFLUENCE OF THE LIFESTYLE IN THE PRE- AND POST-DIAGNOSIS IN PATIENTS OF THE UCSP SEIA

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Objective: Reaching over 200 million individuals, Osteoporosis (OP) is the most worldwide common metabolic bone disease. Due to its high prevalence and devastating consequences, this silent and pernicious disease has been treated as a serious global public health problem. We aimed to study the influence of lifestyle on the emergence and evolution of OP; promote patients' empowerment and health literacy.

Methods: This research, approved by Ethics Committee of ULS Guarda, takes place in this health unit, with collaboration of Coimbra's University and Center for Research in Anthropology and Health. It's a retrospective analytical cross-sectional observational study, which target population consists of 370 patients diagnosed with OP. Patients answer 2 questionnaires and are submitted to a semi-structured interview, after signing an informed consent. The family physicians compile data, that will be analyzed statistically: fragility fractures; comorbidities; DXA results; analytical assays results (calcium; vitD; PTH); FRAX; therapy; therapeutic adherence; reassessment data.

Results: Inadequate lifestyles increase the risk of the emergence and progression of OP; healthy lifestyles work as an adjunct to a good prognostic. The majority of patients don't have regular exercise habits neither expose to the sun; a large percentage consume green vegetables and dairy products daily. Most claim to know the disease, but don't master the correct conception of the pathology. The therapeutic non-adherence is a serious issue: patients gave many reasons for this behavior.

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Conclusion: This research allowed "to draw" the history of each patient and to understand the progression of the disease, considering the family, socioeconomic, cultural and geographical context in which one is inserted. Simultaneously, it served as an instrument to raise patients' awareness of the importance of health literacy and adoption of healthy behaviors.

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P958
EVALUATION OF SCOLIOTIC WOMEN WITH OSTEOPOROSIS OF THE LUMBAR SPINE THROUGH DXA

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Objective: Lumbar scoliosis and osteoporosis are common problems in the elderly population and usually occur simultaneously. It has been suggested that low BMD could be a potential risk factor for formation of degenerative lumbar scoliosis. The aim of this study is to evaluate the characteristics of scoliotic women with osteoporosis of the lumbar spine through DXA.

Methods: We assessed 70 postmenopausal women with osteoporosis. DXA was done to analyze total lumbar spine BMD and total lumbar spine T-score, respectively. Osteoporosis was defined as T-score ≤-2.5 standard deviations (SDs). DXA scans were also used to measure Cobb angle and scoliosis was defined as Cobb angle ≥5°

Results: 28 women (40%) were with scoliosis and 42 women (60%) were without scoliosis. The mean age (67.1 y) of the women with scoliosis was significantly higher than the mean age of the women without scoliosis (60.6 y), (p=0.000). Mean weight of the women with scoliosis was significantly lower (61.88 kg) compared to the mean weight without scoliosis (79.92 kg), (p=0.000). Women with scoliosis had also lower mean height (157.8 cm) than the women without scoliosis (160.42 cm), but this difference was not statistically significant (p=0.069).

Conclusion: Osteoporotic women with scoliosis are older, have lower weight and height.

P959
CORRELATION OF THE HIP FRACTURE 10-YEAR RISK SCORE (FRAX TOOL) WITH DIAGNOSIS OF OSTEOPOROSIS BY DXA SCAN IN FRAGILITY FRACTURE PATIENTS AT A NHS SECONDARY CARE FRACTURE LIAISON CLINIC

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Objective: To demonstrate the effectiveness of the 10-y hip fracture risk score (FRAX tool) in predicting osteoporosis by BMD of the neck of femur by DXA scan in patients with fragility fractures.

Methods: It was a retrospective analysis of 1-y database of all patients attending the Fracture Liaison service at a NHS secondary care centre. The patient cohort were aged 40-90 y with recent fragility fracture. All had the 10-y hip fracture risk score (by FRAX) and then a DXA scan as per NOGG guidance. Data being not normally distributed: Median values were compared by Mann-Whitney test; correlation was tested by logistic regression and a ROC was constituted to assess whether the 10-y hip fracture risk score in FRAX tool can discriminate between a BMD of osteoporotic level from that of normal range. Stat-Direct software was used for analysis.

Result: 48 patients were diagnosed with osteoporosis while BMD was normal in 41 patients. Patients with osteoporosis were significantly older (median age: 71 vs. 66 y; p=0.01) with significantly lower BMI (25.4 vs. 28; p=0.007). 44 (91.6%) in osteoporotic group and 34 (82.9%) in patient with normal BMD were female (not significantly different). Median 10-y hip fracture risk score (FRAX) was significantly higher in patients with diagnosed osteoporosis on DXA scan (6.9 vs. 2.5; p<0.0001). On univariate analysis, only BMI (p=0.01) and the FRAX 10-y hip fracture risk score (p=0.04) significantly correlated with the diagnosis of osteoporosis. A ROC demonstrated that FRAX score could fairly discriminate between osteoporosis and normal BMD with an AOC of 0.75. At a cut-off value of 2.6, it had 69.2% positive and 87.5% negative predictive value for osteoporosis. It was found to be a highly sensitive (93.7%) tool at the cost of specificity (51.2%).

Conclusion: In fragility fracture patients 10-y hip fracture risk score (FRAX) can predict the diagnosis of osteoporosis with a high sensitivity and correlates well with the DXA scan.

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P960
10-YEAR SURVIVAL AFTER HIP FRACTURES IN PATIENTS OF OLDER AGE

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Objective: Nowadays, it is well known fact that hip fracture is most dangerous complication of systemic osteoporosis, which exaggerates the risk of further low traumatic fractures, increases the risk for death in early and late postfracture periods. The aim of this study was to assess the 10-y survival after hip fractures in men and women of older age group.

Methods: We have studied the data from Lviv City Clinical Emergency Hospital about 255 patients aged 40-87 y old after hip fractures (100 males and 155 females) at the time of the fracture and 10 y later. The information was gathered from hospital and outpatient sources, interrogations of patients and their relatives and data from official statistics. The mean age (M±SD) of patients at the time of the fractures consisted 62.8±12.5 y for men and 73.0±9.7 for women, respectively.

Results: 60% of men and 64% of women were dead in 10 y after hip fractures, the mean time till the death consisted (Me [25-75%Q]) 3.6 [1.0-6.0] y for males and 3.0 [1.0-5.0] y for females, respectively. The age (M±SD) at the time of death was 69.1±11.6 y for men and 79.2±9.7 for women. 25.7% of males and 31.3% of females died till one year after the fracture and 71% males of males and 84% from all dead persons died in first 5 y after the fractures. Also, it was revealed the insufficient rate of in-time surgery in patients of both sexes and higher rate of death (60% in men and 74% in women) in nonoperated patients.

Conclusion: Our study confirms the high rate of early and late mortality in patients after hip fracture. Nondelayed surgery and early rehabilitation can be helpful to reduce these parameters and can have important economic effect.

P961
OVERALL FRACTURE INCIDENCE IN MULTIPLE MYELOMA PATIENTS RELATIVE TO GENERAL POPULATION CONTROLS: A PARALLEL COHORT STUDY OF THE UK CPRD

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Objective: To describe fracture rates within one and two years before and after the diagnosis of multiple myeloma (MM) and compare this to patients without MM.

Methods: The Clinical Practice Research Datalink (CPRD) GOLD was used to identify a cohort of MM patients (1995-2017) in primary care, along with a non-MM cohort matched (1:4) on age, sex and GP practice at date of MM diagnosis (index date). Exclusion criteria were: prior fracture as assessed in year before cohort entry, prior Paget's disease, prior cancer (excluding MM), less than 3-year look-back period prior to index date, and having no remaining matched patients due to other exclusions. Patients were followed from two years prior to index date and up to two years after index date for all non-open fractures excluding those of skull, face and digits. Repeat fractures at same site were only counted after a 6 month wash out to address repeat coding of index event. Sex stratified age-standardised incidence ratios were estimated assuming a Poisson distribution to compare total fracture counts in MM vs. non-MM cohorts in each year of follow-up. Incidence rates of first fracture were likewise generated.

Results: Analyses included 3,424 MM and 10,983 non-MM patients, at average age of 69 (SD: 11.2) years and of whom 55% were male. Among the MM cohort, 239 (15.5%) females and 174 (9.3%) males had at least one fracture during follow-up. This compared to 283 (5.8%) females and 116 (1.9%) males in the non-MM cohort. Mortality during follow-up was 491 (14.3%) and 295 (2.7%) in MM and non-MM cohorts, respectively. Total fracture counts and standardised incidence ratios during each year of follow-up are shown in table. Total fracture rate was 2.72 (95%CI: 2.26-3.27; p<0.001) and 5.38 (95%CI: 4.22-6.84; p<0.001) higher in MM compared non-MM, for females and males respectively. Overall absolute incidence rates of first fracture (per 1,000 person years) were significantly higher in MM compared to non-MM (p<0.001) for both females (42.9 [95%: 37.8-48.8] vs. 15.0 [95%CI: 13.3-16.8]) and males (24.9 [95%CI: 21.5-28.9] vs. 4.92 [95%CI: 4.10-5.90]).

Conclusion: MM is associated with a significantly elevated fracture risk, especially in males (although absolute rate still higher in females), and this is observable at least two years prior to diagnosis.

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Disclosures: Amgen provided funding to the University of Oxford. The funder was provided interim reports but had no other influence.

Table: sex stratified osteoporotic fractures in the 2 years before and 2 years after multiple myeloma (MM) diagnosis/matching date

Time point from index date	MM cohort (n=3,424)		Non-MM cohort (n=10,983)		Standardised incidence ratio			
	Number contributing to follow-up	Total fracture count	Number contributing to follow-up	Total fracture count	Estimate	Lower 95% CI	Upper 95% CI	P-val
Females								
year -2	1,542	27	4,926	53	1.63	0.94	2.83	0.084
year -1	1,542	102	4,926	90	3.62	2.67	4.91	<0.001
year 1	1,542	98	4,926	90	3.48	2.52	4.81	<0.001
year 2	1,526	62	4,924	115	1.83	1.26	2.67	0.002
Males								
year -2	1,882	22	6,057	24	2.95	1.59	5.48	0.001
year -1	1,882	72	6,057	34	6.82	4.47	10.39	<0.001
year 1	1,882	66	6,057	31	6.86	4.41	10.64	<0.001
year 2	1,871	50	6,053	39	4.52	2.86	7.15	<0.001

P962
IMMINENT FRACTURE INCIDENCE AMONG INDEX FRACTURE PATIENTS WITH MULTIPLE MYELOMA RELATIVE TO GENERAL POPULATION CONTROLS: A PARALLEL COHORT STUDY OF THE UK CPRD

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Objective: To describe the imminent fracture rate within one and two years after an index fracture among multiple myeloma (MM) patients compared to patients without MM

Methods: The Clinical Practice Research Datalink (CPRD) GOLD was used to identify a cohort of MM patients (1995-2017) in primary care, along with a cohort of non-MM patients, matched (1:4 ratio) on age, gender and GP practice at date of MM diagnosis (index date). Exclusion criteria applied to initial cohorts were: prior fracture as assessed in year before cohort entry, prior Paget's disease, prior cancer (excluding MM), less than 3-y look-back period prior to index date, and having no remaining matched patients due to other exclusions. These cohorts were then sampled for patients diagnosed with an index non-open fracture (excluding skull, face and digits) from between two years prior to index date and up to 2 y after. Patients were followed from date of first fracture to the earliest of either subsequent fracture at a major site (hip, spine, forearm & humerus), death, transference out of practice or two years after first fracture. Cumulative incidence at one and two years from index fracture were estimated accounting for the competing risk of death, along with associated subhazard ratios adjusted for age and gender.

Results: This analysis of index fracture patients included 413 patients from the MM cohort (at average age of 72 [SD: 11.5] years and of whom 58% were female) and 399 from the non-MM

cohort (at average age of 75 [SD: 10.2] years and of whom 71% were female). The mortality at 2 years from index fracture was 21% and 7% in MM and non-MM, respectively.

Imminent major fracture risk among index fracture patients stratified by multiple myeloma (MM) status

Imminent fracture outcome	MM cohort (n=413)		Non-MM cohort (n=399)		Age & sex adjusted sub hazard ratio			
	Number	Cumulative Incidence: % (95%CI)	Number	Cumulative Incidence: % (95%CI)	estimate	Lower 90% CI	Upper 95% CI	P-value
within 1 year of index fx	17	4.2 (2.5 to 6.4)	11	2.8 (1.5 to 4.9)	1.60	0.78	3.32	0.20
within 2 years of index fx	33	8.3 (5.9 to 11.3)	19	5.1 (3.2 to 7.7)	1.73	1.00	3.00	0.052

Conclusion: In addition to increased mortality, MM may confer a significantly increased risk of imminent subsequent fracture following an index fracture. Further work is needed to confirm these findings.

Disclosure: Amgen provided funding to the University of Oxford. The funder was provided interim reports but had no other influence.

P963
RISK OF FRAGILITY FRACTURE IN A COHORT OF PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is associated with low bone density and high risk fracture compared to general population. The aim of this study is to assess the effect of some variables on fragility fractures in patients with RA.

Methods: We perform an observational study in a cohort of patients diagnosed of RA according to 1987 and 2010 ACR criteria, to determine the frequency of osteoporotic fractures and associated clinical and densitometric variables. All patients diagnosed of RA were invited to participate in the study between 2013 and 2019, and to perform BMD DXA (GELunarProdigy®). SPSS25 was used to compare variables between patients with fracture and without fracture.

Characteristics	Patients with fractures (n=47)	Patients without fractures (n=327)	OR (IC 95%); p value
Females	43 (14.7%)	250 (85.3%)	2.9 (1.1-7.8); p=0.02
Age	67.7 (±10.6)	62.7(±11.6)	P=0.005
Height	152.4 (±9.4)	157.3 (±8.8)	P=0.001
Weight	66.2 (±16)	73.3 (±14.4)	P=0.003
Smokers	8 (12.1%)	58 (87.9%)	0.9 (0.4-2.1) p=0.89
RF (+)	35 (12.2%)	252 (87.8%)	0.9 (0.4-1.7) p=0.66
ACPA+	30 (12.3%)	213 (87.7%)	1.3 (0.6-2.8) p=0.44
Steroids	36 (14.4%)	214 (85.6%)	1.7 (0.8-3.5) p=0.13
Biologics treatment	16 (16.2%)	83 (83.8%)	1.5 (0.8-2.9) p=0.22
BMD in lumbar spine<-1	34 (16.8)	168 (83.2)	2.6 (1.3-5.2) p=0.006
BMD femoral neck CF<-1	43 (17.8)	198 (82.2)	9.0 (2.7-29.6) p<0.001
BMD lumbar spine<-2.5	17 (26.6)	47 (73.4)	3.4 (1.7-6.7) p<0.001
BMD femoral neck<-2.5	20 (29.4)	48 (70.6)	4.4 (2.3-8.5) p<0.001
Major osteoporotic risk (FRAX)	37 (23.6)	120 (76.4)	7.4 (3.2-17.2) p<0.001
Hip fracture risk (FRAX)	34 (24.5)	105 (75.5)	5.9 (2.8-12.5) p<0.001

Results: 376 patients with RA were included (78.7% women), mean age 63.3 (±13.2) years old and a mean of evolution of the RA of 118.7(±96.7) months at the moment the BMD was performed. We found bone fracture in 47 (12.6%) patients. Fractures were associated to female gender (OR: 2.93 (1.08-7.93); p=0.02), lower height and weight (p<0.05) and older age (p=0.007). Table 1 shows the characteristics and differences between patients with and without fragility fractures. Women presented high risk

of osteoporosis in lumbar spine [OR=3.89 (1.46-10.37); p=0.002] than men, but any differences between gender were found in BMD of femoral neck. Of the fractured patients, BMD T-score was normal in 2 (4.3%), <-1 in 45 (95.7%) and <-2.5 en 25 (54.3%). In the multivariate analysis, the values of T score <-1 and <-2.5 of the hip were associated with fragility fracture, but not the value of T-score in lumbar spine. The risk of fracture decreases 0.008 with each mg/cm2 that increases BMD. The use of corticosteroids was associated with the development of femoral osteopenia [OR 2.04 (1.3-3.2); p=0.002] but not with an increased risk of fractures. No significant association was found between fractures and the presence of RF, ACPAs, smoking, or treatment with biological therapy.

Conclusion: Women with RA present higher risk of fracture than men. The most sensitive indicator for fracture risk seems to be MBD in femoral neck.

P964
SYNOVIAL FLUID ANALYSIS IN PATIENTS WITH ACTIVATED GONARTHROSIS

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Objective: Osteoarthrosis (OA) is the most common cause of joint pain, accompanied to varying degrees by functional deficits and reduced quality of life. OA affects 12-15% of the adult population, 46% of people develop gonarthrosis at some stage in their lives. The relative share of gonarthrosis will increase in the future, as the current trend is to increase the number of elderly people. Despite the pandemic nature of OA, OA therapy is not yet fully effective. Joint edema is due to the proliferation of the joint capsule and/or joint effusion. However, the patient often reports one due to osteophytosis or fatty tissue hypertrophy. The swelling resulting from a synovial fluid outflow most often leads to a loss of movement in the affected joint. **The aim** of the study is to analyze the synovial fluid obtained by aspiration of synovial fluid in patients with activated gonarthrosis. **Methods:** 210 patients with activated gonarthrosis were consecutively recruited and evaluated for crystals as part of a prospective study from January 2018 to January 2020. All patients met the ARA criteria for activated gonarthrosis. The patients were treated and monitored at the Kaspella University Rheumatology Clinic, Plovdiv, Bulgaria. An extensive data collection was performed including demographic data and measures reflecting disease activity and health status. Prior to aspiration of the joint fluid, all patients had ultrasonographic evidence of colonic outflow. The synovial fluid was viewed with a polarization microscope. Statistical data processing was performed using the SPSS 18.0 statistical program, with a p value >0.05. **Results:** Mean age in the group of patients with activated gonarthrosis 69.2 y and 53.2% were women. Median disease duration in patients with activated gonarthrosis was 10.5 y. 41.3% of patients lacked crystals, 32.5% had crystals of calcium pyrophosphate, 8.2% had cholesterol crystals, 4% had

crystals of basic calcium, 7.3 had crystals of monosodium urate, 6.7% of patients had a combination of two types of crystals - cholesterol and calcium pyrophosphate crystals. Patients who had crystals in their synovial fluid had a significantly higher class of structural damage according to the Kellgren-Lawrence semiquantitative scale and synovial proliferation, as evidenced by ultrasonographic examination. **Conclusion:** Patients with activated gonarthrosis have significantly more crystals in their synovial fluid, which is associated with a more severe clinical course and higher grade of structural impairment. The presence of crystals in the synovial fluid can be used as a biomarker for disease activity and treatment effects.

P965
FUNCTIONAL OUTCOME AND CURRENT PRACTICE IN THE MANAGEMENT OF TWO-STAGE REVISION FOR INFECTED KNEE ARTHROPLASTY

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Objective: There are no set protocols for the management of prosthetic joint infection (PJI) in the UK (UK). Great variation exists in practice, there also is a need to assess functional outcome of the patients that undergo two-stage revision. There is a need to improve quality of care and to establish a management protocol. We aimed to find out the functional outcome of two-stage revision of infected knee replacement. The study aimed to collect data on current practice of aspiration, drug holiday, rate of re-aspiration.

Methods: A retrospective analysis of patients that underwent two-stage revision knee replacement, from existing data was carried out between January 2015 to December 2017. Data was collected electronically using the picture archiving system, electronic patients results and records. Two-stage revision secondary to aseptic causes was excluded. The patient's functional outcome was based on standards set by the International consensus meeting of PJI 2nd edition, Philadelphia 2018.

Results: The study involved 26 patients that met the inclusion criteria. Majority of the patients (88.5%) had tier 1 outcome, which is control of infection with no further antibiotics continued. It was observed that 85% of the patients had joint aspirations before stage one of the two-stage revisions. 62% of the patient's had a positive culture. 89% of the patients underwent re-aspirations before stage two. 86% of the patients were given an antibiotic holiday before their stage two of the two-stage revision. Unavailable and inaccessible electronic data posed one of the limitations in observing results. 1 patient had amputation and 1 patient had lifetime suppression with antibiotics.

Conclusion: This study showed a favourable outcome after two-stage revision of infected knee prosthesis in majority of the patients. The study emphasised the need of diagnostic and therapeutic guidelines in the management of prosthetic joint

infections for favourable outcome, based on the recommendation of the 2nd international consensus meeting of PJI, Philadelphia 2018.

P966
RISK FACTOR OF REDUCED BONE MINERAL DENSITY IN JUVENILE IDIOPATHIC ARTHRITIS

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Objective: Juvenile idiopathic arthritis (JIA) is the most frequent cause of chronic inflammatory rheumatic disease in children. The assessment of JIA focuses on disease centered outcomes especially articular damage. Osteoporosis caused by chronic inflammation as well as corticotherapy is a source of bone weakness that alterates functional status. Thus, the aim of this study was to identify factors associated with low BMD during JIA.

Methods: This retrospective study included patients with a history of JIA according to the International League of Associations for Rheumatology (ILAR). Inclusion criteria were an onset of the disease at an age <16 years old and a follow-up of at least 6 months. The characteristics of the disease were transcribed including sociodemographic data, different forms of the disease, disease activity score (DAS28) as well as osteoarticular manifestations. A loss in BMD was measured using DXA in the lumbar spine and the femur according to standard protocols. Patients were diagnosed as having bone mineral loss when the measured Z-score was < -2 SD. We compared the different parameters between the two groups: group1 (with BMD loss) and group 2 (no BMD loss).

Results: The study included 54 patient with a male predominance: sex ratio was 1.07. The mean age was 22 years old [10,37] years old. The mean age of the onset of the disease was 7 years [1,15]. The mean duration of the disease was 14 years and 11 months [2,28] years. The average dose of corticosteroids was 8mg/d [2,5,40] mg/d. BMD loss was found in 67% of patients with a predilection for the systemic form (86% of cases). The psoriatic form was not associated with BMD loss. There were more men suffering from bone loss than women (44.1% in group 1 vs. 11.8% in group 2) with no statistical significance. Moreover, BMD loss was associated with an earlier onset of the disease as well as a longer duration of follow-up (p=0.037, p=0.05 respectively). Acute phase reactants as well as disease activity were similar between the two groups. Regarding osteo-articular manifestations, JIA patients with BMD loss had more coxitis, destructions and deformities (61% in group 1 vs. 27% in group 2; 83% vs. 73%, 65% vs. 45% respectively). However, there was no statistically significant correlation (p=0.07, p=0.51, P=0.27 respectively). Similarly, There were more patients treated with corticosteroids in group1 than in group 2 (44.4% vs. 25%, p>0.05).

Conclusion: This study showed that low BMD during JIA was associated with an earlier age of onset of the disease as well as a longer follow-up period. Joint complications were also more frequent without reaching the significance level.

P967
THE ROLE OF KINETOTHERAPY IN REDUCING THE FALL RISK IN ELDERLY PATIENTS WITH OSTEOPOROSIS

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Objective: The elderly patient has a reduction in walking speed and balance through the sarcopenia process related to age. For this purpose we aim to evaluate the role of kinetotherapy in the elderly in order to improve the balance and the risk of falling.

Methods: There are includes in our study 90 patients divided into two groups. The first group included 45 patients over 70 y of age and osteoporosis with a T-score < -2.5 who followed an initial balance improvement program under control for 14 d, followed by 6 months at home. The second group included 45 patients over 70 y of age and osteoporosis with a T-score < -2.5 who did not follow a kinetotherapy program. All patients received bisphosphonate treatment and vitamin D3 supplementation.

Results: Group A had a reduction of the major imbalances, an average of 2.5% major imbalances per patient during the 6 months, without any serious incident, without any fractures. Group B had 4.6 major imbalances, of which 4% with hip and hip fracture, which means 2 patients, one hip fracture and one radius fracture.

Conclusion: Kinetotherapy for improving the balance in the elderly and osteoporosis patients significantly reduces the risk of falling and increases the quality of life.

P968
OSTEOPOROSIS-RELATED CHRONIC PAIN: CLINICAL IMPLICATIONS AND MANAGEMENT

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Objective: Chronic pain is a subjective pluridimensional experience that comprises of sensory, motor, emotional and rational features. BMD alterations trigger osteoporotic fractures and acute/chronic pain, mainly affecting elderly with multiple comorbidities.

Methods: We report the case of a 81 years old female patient, presenting with: chronic pain in her spinal cord and joints, walking impairment, lower limb numbness and tingling and generalized muscular hypotrophy. Her medical records pointed out: severe osteoporosis, surgical treatment of the complex fractures of the 1 and 2 lumbar vertebrae (approx. 1 y ago) and second degree systemic arterial hypertension on chronic BP lowering treatment. We performed clinical evaluation, lab work, pain assessment using the Oswestry Disability Index and the Roland and Morris Disability Questionnaire (RMDQ), lumbar spine MRI and bone densitometry scan.

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Results: ODI and RMDQ scales revealed severe chronic pain with great impact on her daily activities, quality of life, emotional status and relatives quality of life. The medical evidence has shown that chronic pain in osteoporotic patients, especially elderly, appears to have sensory neuropathic features. Based on this findings we considered pain management in a holistic approach, as follows: pharmacological treatment (adapted to her glomerular filtration rate), educational and psychological measures, antalgic electrotherapy, neuromuscular stimulation, thermotherapy, occupational therapy and adapted kinetotherapy.

Conclusion: The management of chronic pain in osteoporotic elderly women is complicated because of comorbidities (BP fluctuations and CKD). Unfortunately there is no consensus or paper statement regarding specific rehabilitation and medical therapy effects perhaps because this special group of population is undermotivated and further research is needed.

P969
FEATURES OF OSTEOARTHRITIS IN OBESE PATIENTS

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Objective: To identify the features of the course of osteoarthritis (OA) in overweight patients.

Methods: The 52 patients with an established diagnosis of OA were examined: women - 84.6%, men - 15.4%, average age - 60.9±8.9 y (32-78 y). The duration of OA was 8.75 [2.58; 26 y]. The distribution of patients according to the radiological stage of OA (by Kellgren-Lawrence): I - 9.6%, II - 57.6%, III - 26.9%, IV - 5.9% of patients. There were collected and examined: medical histories, clinical and laboratory data, determination of BMI, the severity of pain according to visual analog scale (VAS); index WOMAC was used to evaluate pain, stiffness and physical function; evaluation of the quality of life - EQ-5D. Ultrasound examination of the knee joints was performed to determine synovitis.

Results: The BMI range was from 21-43 kg/. A BMI <30 kg/ was found in 22 patients: 17.3% - normal weight, 25% - excess body weight. Thirty patients has BMI more than 30 kg/: I degree - 38.4%, II degree - 15.3%, III degree - 4%. Obese patients rated pain according to the VAS scale of 1.3 the score is more intensively than patients with a BMI <30 kg/m² (p<0.001). With increasing of body weight, there also was increasing of difficulties in daily activities according to the WOMAC (p<0.05). Synovitis of the knee joints was detected in 25 (48%) patients. The frequency of synovitis in patients with a BMI <30 kg/m² is 27%, with a BMI >30 kg/m² is 68%. Patients with obesity of 1st degree had synovitis in 65%, 2nd degree - 75%, 3rd degree - 84% of cases (p<0.05). A high degree of correlation between the x-ray stage of osteoarthritis and BMI (r=0.74; p<0.001) was revealed. According to the EQ-5D questionnaire, patients with a first degree of obesity (2.31±1.3) were very anxious, but patients with 3rd degree of obesity has decreased levels of anxiety (1.44±0.9) and it's equal to that in individuals with normal body weight (1.33±0.8).

Conclusion: The existence of obesity in patients with OA is associated with an increase in pain, a significant decrease in functional ability, the presence of synovitis of the knee joints, deterioration of the radiological stage of OA, and the appearance of anxiety and depression. However, with further progression of obesity the levels of anxiety falls.

P970
FEATURES OF OSTEOARTHRITIS IN PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: To identify the features of the course of osteoarthritis (OA) in patients with arterial hypertension.

Methods: The 52 patients with an established diagnosis of osteoarthritis were examined: women - 84.6%, men - 15.4%, average age - 60.9±8.9 y (32 to 78 y). The X-ray stage of OA (by Kellgren-Lawrence) was defined as: I - 9.6%, II - 57.6%, III - 26.9%, IV - 5.9% of patients. Arterial hypertension (AH) was present in 36 (69.2%) patients. *Articular syndrome and quality of life were evaluated using visual analogue scale (VAS), physical function measurement index (WOMAC) and quality of life assessment questionnaire (EQ-5D).*

Results: AH of the first degree was in *24 (66,6%) patients, the second in 11 (30.5%), the third degree in 1 (2.9%) people.* A direct correlation was found between the X-ray stage of OA and the degree of AH (r=0.5121; p<0.01). With an increase in the degree of hypertension, pain was increased according to VAS and difficulties in everyday activities were increased according to WOMAC (r=0.559; p<0.01). Patients with OA and AH had a higher level of anxiety compared to patients with normal blood pressure, but with an increase in degree of arterial hypertension a gradual decrease in the level of anxiety and depression in the questionnaire was revealed (r=−0.58; p<0.05).

Conclusion: The existence of AH in patients with OA correlates with an increase in pain, a significant decrease in functional ability, a deterioration of the radiological stage of OA and the appearance of anxiety and depression. With a high degree of AH, the level of anxiety for their condition decreases, this group may have a weak adherence to treatment and increase of cardiovascular risk factors.

P971
RISK OF SECONDARY KNEE OSTEOARTHRITIS IN THE PATIENT WITH HEMIPARESIS

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Objective: Hemiparesis causes a series of gait dysfunctions with modification of the knee biomechanics. We want to specify the risk of knee osteoarthritis in patients with hemiparesis after stroke.

Methods: We included 150 patients with hemiparesis in whom the degree of knee injury was evaluated. The patients were divided into three groups. Group A included patients no older than 1 y of hemiparesis. Group B included patients with a stroke onset between 1-3 y, and Group C included patients with a hemiplegia more than 3 years. All patients followed an appropriate kinetotherapy program and a home training program. Evaluation included WOMAC score and knee ultrasound. The knees were evaluated bilaterally.

Results: We noticed 15.3% of the occurrence of secondary knee osteoarthritis with hemiparesis in group A, 39.4% in group B and 78.3% in group C. There was no classification of the degree of severity of knee osteoarthritis; additional changes were compared with the nonhemiparetic knee. Cases with knee osteoarthritis before strokes were excluded.

Conclusion: The degree of knee injury on the hemiaparesis side is a reality, and the impairment is evident as the time factor increases.

P972
PERSISTENCE WITH TERIPARATIDE (LY333334) IN OSTEOPOROSIS: THE EXPERIENCE OF THE RHEUMATOLOGICAL DEPARTMENT OF THE HOSPITAL OF PARMA

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Objective: To evaluate treatment persistence rate in patients with osteoporosis who started teriparatide (LY333334).

Methods: In this retrospective observational study, we selected patients with a diagnosis of osteoporosis, treated with teriparatide between January 2011 and January 2020 in our Rheumatological Department. Descriptive data were presented by medians (interquartile range [IQR]) for continuous data or as numbers (percentages) for categorical data. Drug survival distribution curve were computed by Kaplan-Meier method. P values 0.05 were considered statistically significant.

Results: A total of 125 patients were enrolled (110 [88%] females), median age of 77 (IQR 71-82). The patients were treated with teriparatide because of more than two "major fractures" [defined as vertebral or hip fractures] (88 patients [70.4%], 73 [82%] females), one major fracture and BMD [vertebral o hip] equal to or less than -4 DS (10 patients [8%], all females), one major fracture in patients receiving at least 5 mg/d of prednisone or a steroid equivalent for 12 months (22 patients 17.5%, 19 [86%] females), one major fracture in patients receiving a bisphosphonate for at least one year (24 patients [19,2%], all females). There were patients (19, 15.2%) who had more than one criterion to access to teriparatide treatment. The retention rate of teriparatide were 79.2% at 6 months, 72% at 12 months, and 70.2% at 24 months. 32 (25.6%) patients discontinued the treatment with teriparatide. The most common cause of treatment discontinuation was death due to elderly/other diseases (9 patients [28.1%]), lack of compliance

(8 patients [25%]), asthenia (5 patients [15.6%]), gastrointestinal adverse events (3 patients [9.4%]), lost to follow-up (3 patients [9.4%], arthralgia [2 patients [6.3%]), and suspected lung cancer [1 patient [3.1%]). A cox proportional hazards regression analysis stratified by sex, reasons of treatment and age was performed. No significant associations were found.

Conclusion: Teriparatide treatment appeared to be well tolerated in most of patients. Only a small group of patients discontinued the treatment, mainly in the first year of treatment. The most common cause of discontinuation was lack of compliance.

P973
ROLE OF THE PHYSICAL KINETIC PROGRAM IN THE RECOVERY OF VERTIGO IN THE PATIENT WITH CERVICAL SPONDYLOSIS

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Objective: To highlight the role of the kinetic program in patients with peripheral vertigo.

Methods: 40 patients with peripheral vertigo and balance disorders objectified by the Romberg test and clinical signs of vertigo with lateral nystagmus were taken into the study. They were divided into two groups, all patients benefited from anti-vertigo medication- betahistinum, in appropriate doses. Group A also received a kinetotherapy program, vestibular rehabilitation for 10 d.

Results: After 10 d, the patients in the two groups were evaluated by Romberg test and clinical signs. The results showed the improvement of the balance until the absence of dizziness in the patients from the group receiving recovery treatment, the results being better as the program was started as early as the beginning of the vertigo.

Conclusion: The application of the specific programs of vertigo to this category of patients demonstrates their usefulness both in the clinical aspect and in the socioprofessional reintegration of these patients.

P974
PHYSICAL AND COGNITIVE STATUS OF ELDERLY PATIENTS WITH FRAGILITY SYNDROME IN THE REPUBLIC OF MOLDOVA

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Objective: Fragility is a complex geriatric syndrome characterized by decreased vitality and increased vulnerability, affecting up to 25% of the population over 60 y. With the increase of life expectancy and the tendency of demographic aging, an increase in the prevalence of fragile patients is estimated. We need to develop effective methods of prevention, diagnosis and

treatment of frailty in order to maintain the autonomy process in the elderly population. A good management of polypathology in elderly can lead to the improvement of the quality of life and decrease of the number of patients with fragility syndrome. It has an increased prevalence and is the main risk factor for falls, invalidity, hospitalization in medical institutions, need for social care or mortality. Aim of the study was assessment of physical and cognitive status in frail elderly patients.

Methods: The study included 1158 patients, men - 41.45% and women 58.54%, aged between 65-96 y, the mean being M 71.74±ES 0.17, admitted to the Department of Geriatric Chronic Diseases, from 2015-2017. The standardized geriatric evaluation was applied to all patients in the study. Freid criteria were used to establish the fragility syndrome. Physical status was assessed by Katz and Lawton score, balance and gait evaluation by Tinetti test. Cognitive status was assessed using the MMSE scale. The data obtained were subjected to statistical analysis, StatSoft Statistica 7.

Results: The fragility syndrome was established in 27.20% of patients. Fragility was diagnosed more frequently in women - 58.73% of cases. Patients with frailty had lower autonomy and cognitive function (ADL - 9.23±0.18; IADL - 10.77±0.24), MMSE - 22.62±0.28. Disorders of walking and balance (Tinetti - 20.43±0.29) but also a higher frequency of fall syndrome 40.3% with traumatic consequences 14.6%, psychological consequences 11.42% and total loss of autonomy post-drop 7.30%.

Conclusion: Fragility syndrome is a condition commonly found in the elderly, with ageing a person changes the cognitive and physical state to the one of fragile patient. It has a high prevalence in elderly patients Eastern Europe countries, having a high social impact.

P975
BREAST CANCER CHEMOTHERAPY-INDUCED OSTEOPOROSIS: A MEMORY REFRESH

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Objective: Premature menopause as a consequence of breast cancer chemotherapy, with increased risk of osteoporosis, might be an understated factor and action should be taken. For this, we assessed and categorized the existence of osteoporosis/osteopenia in women after breast cancer hormone therapy.

Methods: This is a retrospective observational study of 11 patients referred to a secondary hospital's Rheumatology Department for musculoskeletal complaints after breast cancer chemotherapy. Other osteoporosis risk factors were searched and a BMD test was performed. Clinical features were collected by chart review.

Results: Patients' mean age was 64.0±12.8 years old and the mean age of breast cancer diagnosis was 53.7±10.8. The most common therapy was anastrazole (54.5%), followed by tamoxifen (45.6%), goserelin (18.2%) and letrozole (9.1%). 4 patients (36.4%) suffered a low impact fracture (vertebral, femoral, tibiotarsal and rib), from which 2 suffered more than one fracture. Median 10-year risk fracture (Portuguese FRAX) was 5.4% for major fracture and 1.7% for hip fracture. 4 patients (36.4%) had a BMD test compatible with osteoporosis, 5 (45.5%) had osteopenia and 2 (18.2%) had a normal bone density. Within the 4 patients with osteoporosis in the BMD test, the fracture risk assessment tool was <11% for a major fracture and <3% for a hip fracture in 3 (75%) women.

Conclusion: Although FRAX proved already to be an invaluable tool for the general population, it seems insufficient to assess the risk fracture in women with breast cancer chemotherapy-induced osteoporosis. When this important factor is present, other elements should be accounted for in order to decide whether or not to start osteoporosis' therapy, rather than using the FRAX alone.

P976
ANTI-INFLAMMATORY EFFECT OF SAFFRON IN KNEE OSTEOARTHRITIS: A DOUBLE BLIND CLINICAL TRIAL

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Objective: Osteoarthritis is the most common disease of the joints and a major cause of the pain and disability in the world. Its prevalence increase with age. non-steroidal anti-inflammatory drugs are the most common treatment for the disease. These drugs could cause gastrointestinal and cardiovascular problems. So due to the analgesic properties and anti-inflammatory effects of saffron, we decided to assay the saffron impact on the inflammatory markers in knee osteoarthritis.

Methods: 66 patients were entered into the study. for all patients WOMAC, IL-1β and TNFα. were assessed at the beginning of the study. The patients were treated by saffron pills (100 mg daily 12 weeks) or placebo in a double-blind and randomized manner. During the study, patients were followed and the usage number of NSAID, WOMAC and inflammatory markers level were compared between two groups at the end of study.

Results: The average age of patients was 57/32±5/96 years old. 59 of them were female. WOMAC score (activity and pain)was significantly different for both groups at the end of the study in compare to the beginning. We see significant reduction in the amount of NSAID consumption in the intervention group in the second 6 weeks compare to the first 6 weeks. IL-1β and TNFα level changes were not significant difference between the groups.

Conclusion: Saffron usage could cause reduction in the amount of NSAID consumption and better WOMAC score (activity and pain)in the knee osteoarthritis patients.

P977

EVALUATION OF PLATELETS (P), MONOCYTES (M) AND NEUTROPHILS (N)/ LYMPHOCYTES (L) RATIO IN OSTEOPOROTIC FRACTURE POPULATION OF A FRACTURE LIAISON SERVICE (FLS)

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Objective: In literature N/L, M/L and P/L ratios are increased in osteoporotic patients compared with general population, reason why some authors have been described them as independent predictors of osteoporosis in postmenopausal woman. So, we evaluated these ratios and haemoglobin level in a population with osteoporotic fracture

Methods: This is an observational study of patients referred to a FLS from October 2017 until May 2019. Inclusion criteria were all orthopaedic ward inpatient, age over 50 years, admitted with low impact fractures and recovery potential at discharge. Demographic and clinical data were recorded. Means and median values, respectively for normal and non-normal distributed data, are presented and were compared with Student's t-test, one-way ANOVA or Mann-Whitney U test, as appropriate.

Results: 81 patients attended the appointment, 88.9% were female with a mean age of 77.1±11.3 y and BMI of 25.5± 4.7 kg/m^2. 50% of the patients had osteoporosis in the lumbar and 48.9% in the femur, using T-score definition. We identified 169 fractures, 63% femur, 21% vertebrae, 8.6% femur and vertebrae fractures and other sites in 7.4%. 33 (40.7%) patients had only one fracture and 48 (59.3%) patients had more than one fracture. BMD didn't show an association with the ratios or Hb level (p>0.05). However all the ratios are increased in osteoporotic patients, however without statistical significance. We found a relation between haemoglobin and fractures site (p=0.01). Finally, a reduced M/L ratio showed a statistical significance correlation with the level of PTH (p=0.04).

Conclusion: In this study, we conclude that high levels of PTH, related to low vitamin D, are associated with a lower M/L ratio. A key physiological function of 1α,25-dihydroxyvitamin D$_3$ is the defense against pathogens, that involves the modulation of the monocyte transcriptome. Haemoglobin showed a relation with the type of fracture, being lower in the femur fractures, easily explained by major surgery patients underwent. In our opinion, if our sample was bigger we could have a statistical significance of these ratios in osteoporosis patients, defined by BMD.

P978

DIFFERENTIAL DIAGNOSIS OF SEIZURES IN A PATIENT WITH PSYCHOGENIC CONVERSION DISORDER AND POSTSURGICAL HYPOPARATHYROIDISM

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The main symptom of hypoparathyroidism is seizures, that develop due to uncompensated hypocalcemia. However, in some cases, the differential diagnosis of convulsive syndrome in such patients can be more difficult. We present the clinical case of a patient with severe seizures due to psychogenic conversion disorder and compensated chronic postsurgical hypoparathyroidism.

Case report: A 50 years old woman was admitted to the hospital with severe seizures – carpopedal, laryngospasm and generalized seizures. Considering the early diagnosed hypoparathyroidism (due to thyroidectomy around 3 y ago) and a history of repeated hypocalcemic tetany, 40 ml of 10% solution of calcium gluconate was infused intravenous before receiving the result of serum calcium level by *Cito*. However, the elimination of generalized seizures and systemic spasm was achieved only by the injection of diazepam. The level of ionized calcium by *Cito* was 1.1 mmol/l (1.03-1.29). During hospitalization her therapy was: alfacalcidol 2 µg/d, calcium carbonate 3000 mg/d, magnesium salts up to 200 mg/d, hydrochlorothiazide 25 mg/d, teriparatide 20 mg/d, levothyroxine sodium 75 µg/d.

Then, episodes of convulsive activity were observed daily during the hospitalization despite stable normal blood calcium values (1.0-1.26-1.22). Each time the seizures were managed by the injections of diazepam. Differential diagnosis excluded such causes of seizures like basal ganglia calcification (Fahr's disease), epileptiform brain activity, electrolyte imbalance, cardiovascular morbidity, febrile convulsions, etc. The patient also got a consultation from a neuropsychiatrist, who diagnosed a dissociative disorder evoked by somatogenic disease, proceeding with depressive, somatized, motor, somatovegetative, asthenic presentations. The therapy prescribed included clomipramine 12.5-50 mg/d, mirtazapine 15 mg/d, clonazepam 1.5 mg/d for a month, and 0.5 mg in case of an attack. Significant improvement was noted on treatment including seizures reduction.

A long-term uncompensated hypoparathyroidism can cause the development of a exogenous mental disorder because of somatic disease effects on the central nervous system, and stimulate a psychogenic disorder arising because of the personality's reaction to its own somatic disease. Patients have excessive activation of the prefrontal cortex and limbic system by the influence of chronic accumulative stress (in this case, recurrent acute hypocalcemia), which can lead to a lack of control over their own sensory and motor functions. Thus, in case of severe seizures differential diagnosis is required to eliminate other causes apart from hypoparathyroidism.

P979
VALUE OF KINETOTHERAPY PROGRAM IN GAIT AND BALANCE REHABILITATION IN PATIENTS WITH OSTEOPOROSIS AND PARTIAL HIP REPLACEMENT FOR FEMORAL NECK FRACTURE

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Objective: The study follows the efficiency of physical-kinetic therapy for correcting static and dynamic balance and improving gait in patients with osteoporosis and partial hip replacement.

Methods: The study, included 43 patients, is a descriptive type. The criteria were: female, age over 60, diagnosis of osteoporosis (T score below -2.5 SD), hip fracture, partial hip replacement. Patients were included in functional rehabilitation programs. The functional evaluation was performed at the beginning of the recovery program and after one month and included: assessment of the balance using the Berg scale; appreciation of walking on the Tinetti scale for walking; assessment of functional capacity and impact on quality of life was achieved through the FIM scale. The functional rehabilitation program consisted of kinetotherapy techniques and methods.

Results: We found an improvement in gait, the average value of the score on the Tinetti scale increasing from 7.29 to 9.92 after one month of therapy. The evolution of the values of the score calculated with the Berg scale for the balance between the two evaluations showed the improvement of the average values from 19.85 to 23.36. The FIM score, was calculated at the beginning of the study and at the end of the first month of recovery treatment, increased by 114 to 124.

Conclusion: The study highlighted the efficiency of the individualized kinetotherapy program for patients with partial hip replacement, being elderly patients with physiological and pathological particularities, and where even in the condition of an impeccable operative technique, the painful and functional sequelae that require recovery programs remain.

P980
LIVER X RECEPTOR ACTIVATION PROTECTS FROM SURGICALLY-INDUCED KNEE OSTEOARTHRITIS IN MICE

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Objective: The nuclear receptors liver X receptor α (LxRα) and β LxRβ) play important roles in lipid metabolism and inflammatory signaling. While recent studies suggest that LxRs are expressed in articular cartilage, it is not known whether LxRs play a role in the development of osteoarthritis (OA). Here we aimed to investigate the effects of pharmacological LxR activation on the development of OA in a surgically induced OA mouse model in *vivo* and the effects on chondrocyte metabolism in *vitro*.

Methods: The synthetic LxR agonist T0901317 (Cayman Chemical) was used to investigate the effects of LxR activation on the development of OA in a surgically induced model of knee OA in mice (DMM, MLI). C57Bl6 mice were fed chow diet or chow supplemented with T0901317 (25 mg/kg/d). After 10 weeks, histopathological assessment of coronal joint sections was performed using the Osteoarthritis Research Society International (OARSI) scores. *In vitro*, primary immature murine articular chondrocytes (iMACs) as well as a human chondrogenic cell line (Cl-huChon) were used to test the effects of LxR activation on the expression of chondrocyte hypertrophy and degradation markers. Human cartilage explants from patients undergoing total knee replacement were used to analyze the expression of LxRs chondrocyte hypertrophy and degradation markers.

Results: OARSI scores of mice treated with T0901317 on a chow diet were significantly reduced compared to placebo treated mice both in medial femoral (1.8 vs.3.9, p=0.01) and medial tibial cartilage (1.4 vs.4.8, p=0.001). Histomorphometry revealed significantly increased Safranin O staining density in the medial tibial cartilage (57024 vs.42921, p=0.03). *In vitro*, LxR treatment reduced the hypertrophic cartilage markers Adamts4 and Adamts5 in human chondrocytes. Cartilage explants of OA patients revealed that both LxRα and LxRβ expression correlated significantly with the expression of the degradation marker Adamts5.

Conclusion: Pharmacological LxR activation represents an effective means of inhibiting the development and progression of murine knee OA *in vivo*. Further studies will be required to delineate the molecular mechanisms of this effect and to explore the potential of this pathway for the treatment of human OA.

P981
DIETARY COMPOSITION AND RISK OF OSTEOPOROTIC FRACTURES IN WOMEN OF DIFFERENT AGE GROUPS FROM THE REPUBLIC OF MOLDOVA

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Objective: Food composition and nutrient value of the diet represents one of the key points in the healthy lifestyle. In the Republic of Moldova some studies showed imbalance between consumption of nutrients with low percentage of the most valuable products and tendency to basic – cereal nutrient use. Personalized approach to the diet composition is necessary in order to provide optimal recommendations for the patient and decrease the risks of certain malnutrition. Our study was focused on the evaluation of food composition in different age groups and appreciation of risks related with some food deficiencies. We aimed to determine food energy value, essential macro element and vitamin D content of the diet in women from the Republic of Moldova

Methods: We interviewed 500 women that agreed to participate in the study. Women younger than 57 were interviewed at their places of work, and those who retired were interviewed by outpatient physician consultant. A special questionnaire, including general data and osteoporosis risk factors was filled in at the day one. Food ratio in the day following to primary interview was recorded by participants (measuring food in grams, ml and mentioning fat composition of some foods where applicable). Recorded data were presented to the study stuff. All the data were analyzed using web based platform "My healthy diet", as well as FRAX was calculated in persons over 40 y.o. All the data were analysed statistically.

Results: Mean age of interviewed women was 50.01±12.5 y.o., [18-80], aged 18-30 y.o. 25.1%, 30-45 y.o. – 302%, 45-60 y.o – 28.5%, over 60 y.o. – 17.3%. Mean BMI constituted 23.5±4.6 kg/m^2 [17.1-48.7]. Mean food energy intake value was 1516.58±382.54 kcal, proteins made 61.37±25.12 g, lipids made 66.7±21.52 g, carbohydrates - 176±63.6 g, fibers – 22.05±10.72 g. Mean calcium food consumption was 387.63±296.86 mg [160.96-592.1], mean vitamin D food consumption was very low 0.92±0.7 µg. Mean Fe food level was 11.2±3.12 mg, P food level was 627.7±168.24 mg, Mg food level was 175.0±51.1 mg, I was 22.5±16.2 mg. In persons over 40 y.o. mean total fracture risk by FRAX made 5.34±3.8%, hip fracture risk was 0.97±1.7%. We found moderate negative correlation between calcium food intake and BMI, R=0.42; and moderate negative correlation between calcium food intake and hip fracture risk by FRAX.

Conclusion: Mean calcium as well as other micronutrient food intake was rather low, showing deficiency while comparing with recommended values up to 50%. At the same time vitamin D food intake was extremely low, being in average about 10% from recommended daily value. All this raises the question of food quality and food fortification necessity.

P982
LEMON JUICE IMPACTS BONE METABOLISM IN OSTEOPENIC POSTMENOPAUSAL WOMEN

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Objective: Citrus fruits were previously associated with bone health; nevertheless, the effect of lemon juice on bone metabolism have not been explored yet, thus We aimed to address this issue.

Methods: Postmenopausal osteoporotic women without history of clinical fractures were recruited. Participants agreed to enrich their diet with lemon juice (Acti Lemon, Polenghi) and to be observed over a 2-month period. The daily juice dose of 30 ml was equivalent to one Sicilian organic lemon. P1NP and CTX, as surrogate bone formation and resorption markers respectively, RANKL, OPG, RANKL/OPG ratio and sclerostin were considered at baseline (before lemon juice administration) and then after 30 and 60 d. A placebo group consisted of age-matched postmenopausal women served as control.

Results: 47 participants [mean age 60.2±4.1 y] completed the study. Change at day 30 of sclerostin (vs. baseline) has been positively associated with change at day 30 and day 60 of CTX (r=0.46, p=0.01 and r=0.43, p=0.01, respectively). Change at day 30 of OPG was positively associated with change at day 30 of P1NP (r=0.49, p=0.006). Change at day 30 of RANKL/OPG has been related with variation at day 30 of P1NP (r=-0.44, p=0.013). Variation of P1NP at day 30 was related with sclerostin variation at day 30 (r=-0.56, p=0.02) and day 60 vs. baseline value (r=0.44, p=0.017) and with sclerostin variation between day 30 and day 60 (r=0.69, p<0.001). Variation of P1NP between day 30 and day 60 was associated with RANKL change at day 30 (r=-0.35, p=0.05), with sclerostin change at day 30 (r=-0.49, p=0.008) and with sclerostin change between day 30 and day 60 (r=0.41, p=0.028). At a multiple regression analysis the change of P1NP between day 30 and day 60 was independently predicted by the change of sclerostin at day 30 (ß=-1.5, SE 0.5, p=0.006), after correcting for age, BMI and change of RANKL and CTX levels at day 30. No significant data raised from controls.

Conclusion: In osteoporotic postmenopausal women, the intake of lemon juice provokes bone metabolic changes involving modulation of both bone resorption and formation.

P983
AN UPDATED SYSTEMATIC REVIEW OF COST-EFFECTIVENESS ANALYSES OF DRUGS FOR OSTEOPOROSIS

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Objective: Considering the limited healthcare resources, the ongoing aging population and economic burden of osteoporotic fractures, as well as the recent availability of new but costly agents for osteoporosis management, there is an increasing interest for economic evaluation studies. Accordingly, several studies on the cost-effectiveness of drugs for osteoporosis have been performed in recent years. We aimed to systematically identify and review recent economic evaluations on drugs for osteoporosis and to critically appraise their quality.

Methods: A systematic literature search was undertaken using PubMed, Embase(Ovid), the National Health Service Economic Evaluation database and the Cost-Effectiveness Analysis Registry to identify original articles containing economic evaluations of anti-osteoporosis drugs published between July 1, 2013 and December 31, 2019. A recent ESCEO-IOF guideline providing recommendations for the conduct and reporting of economic evaluations in osteoporosis was used to assess the quality of included articles.

Results: The database search retrieved 3860 records, 28 studies fulfilled the inclusion criteria. These studies were conducted in 17 different countries and 11 active drugs were assessed, including various traditional pharmacological treatments such as bisphosphonates, raloxifene, strontium ranelate, denosumab etc., and new agents (abaloparatide and gastro-resistant risedronate). Three studies assessed the cost-effectiveness of sequential therapies (e.g. abaloparatide/ teriparatide followed by alendronate), suggesting they are cost-effective and can lead to extra benefits (larger QALYs gained compared with no treatment). In addition, nine economic evaluations were conducted to compare denosumab with other active interventions, 6 studies showed that denosumab was cost-effective. As for quality assessment, although several studies followed several recommendations of the guideline, room for improvements was observed for most studies. Quality of reporting was also suboptimal especially regarding treatment side effects, transition probabilities and medication adherence.

Conclusion: This review provides an overview of economic evaluation of drugs for osteoporosis in the past 6 years. The updated economic evidence could be useful to help decision makers prioritize health interventions and identify gaps of osteoporosis drugs. The outcome of quality appraisal indicates there is still a room for improvement of economic evaluations on drugs for osteoporosis, which would further help the development of economic evaluations in the future.

P984
EVALUATION OF PROFESSIONAL PRACTICES IN THE PREVENTION OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS

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Objective: The evaluation of professional practices is an assessment whose the main purpose is to improve the quality of care. Despite the guidelines and papers published to prevent glucocorticoid-induced osteoporosis (GIO), it remains one of the most frequent complication of long term use of glucosteroid. The purpose of our work was to evaluate the degree of adherence of physicians to the American College of Rheumatology recommendations of 2010 or to the French Society of Rheumatology recommendations of 2014 of prevention of GIO in an internal medicine department in Tunisia.

Methods: It was a single monocentric retrospective study (2004-2016) including records of patients who received glucocorticoid therapy ≥7.5 mg/d for ≥3 months. Depending on the year glucocorticoid treatment was prescribed, our practices were evaluated with reference to the American guidelines of 2010 or the French guidelines of 2014. Information regarding calcium, vitamin D and antiosteoporotic treatment prescription and BMD measurements were recorded and evaluated.

Results: We included 350 prescriptions. Systemic erythematosus lupus was the disease for which corticosteroid was prescribed in 28% of patients. Patients were aged between 14-85 y. The mean duration of corticosteroid therapy was 24±22 months and cumulative dose was 8.8 g. The prescriptions were evaluated 381 times with reference to the recommendations adopted during the year of prescription. Physicians' practices was in line with the American College of Rheumatology recommendations of 2010 and the French Society of Rheumatology recommendations of 2014 respectively in 0% and 3.7% for calcium supplementation, 1% and 0.5% for vitamin D supplementation, 20.6% and 24.6% for the initial bone densitometry measurement, 26.8% and 18.9% for antiosteoporotic treatment and 56.7% and 54.5% for fragility fracture detection. Prescription of antiosteoporotic treatment

was higher in patients with a bone densitometry measurement (p<0.0001) and a longer duration of corticosteroid treatment (p=0.023, p=0.004).

Conclusion: The evaluation of our practices allowed us to identify the gap between current practice and the recommendations int the prevention of GIO and it allowed us to propose the adapted measures in order to improve the adherence to the current guidelines.

P985
CHANGE OF VITAMIN D STATUS IS PREDICTIVE OF BONE MINERAL DENSITY VARIATION AFTER DISCONTINUING ALENDRONATE

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Objective: Since vitamin D has been consistently associated with fracture risk and bisphosphonates (BPs) efficacy, We aimed to investigate whether change of vitamin D status may contribute to the tail effect of alendronate (ALE) on BMD.

Methods: A retrospective analysis of postmenopausal women previously exposed to ALE was carried out. Cholecalciferol or calcifediol have been administered (during ALE treatment and after ALE discontinuation) as vitamin D supplementation at the recommended doses. BMD was evaluated by DXA at lumbar spine and femoral site. Vitamin D status has been evaluated by measuring 25(OH)D serum levels through HPLC. Surrogate bone formation and resorption markers were also measured. The 10-y fracture risk for major osteoporotic and hip fracture was assessed by Fracture Risk Assessment Tool (FRAX).

Results: 88 participants (age 61.14±6.96 y) were selected. The 10-y probability of major and hip fractures was 18.31±11.51 and 8.60±10.55 %, respectively. ALE was previously used for 31.27±20.69 months and then stopped for 33.33±18.97 months. Change of BMD was inversely related to drug holiday (r=-0.27, p=0.005). Modification of 25(OH)D was inversely associated with change of ALP (r=-0.22, p=0.018) and CTX levels (r=-0.3, p=0.06). By allocating participants in tertiles according to variation of 25(OH)D levels, women with greater increase of 25(OH)D showed a 5.7% BMD gain that was two times larger in comparison with participants with lower increase of 25(OH)D. After correcting for ALE treatment duration, bone turnover marker modifications, BMI and age at menopause, BMD change at lumbar spine was significantly associated with time since menopause (ß=2.28, SE 0.44, p<0.0001), FRAX score (ß=-0.65, SE 0.29, p=0.03), drug holiday duration (ß=-2.17, SE 0.27, p<0.0001) and change of 25(OH)D levels (ß=0.15 SE 0.03, p=0.0007).

Conclusion: After ALE discontinuation, improving vitamin D status may boost the ALE tail effect on bone leading to more favourable BMD response.

P986
TALES OF THE UNEXPECTED: MYOPATHIC SYNDROME (CASE SERIES AND LITERATURE REVIEW)

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Objective: Although the myopathic syndrome is not a frequent medical condition, it is often a diagnosis challenge, faced in various clinical circumstances. Clinical presentation and accompanying signs can be misleading, and rare etiologies can be overlooked. Accurate and undelayed diagnosis is of major importance since it decides the patient treatment, follow-up and outcome. Our case series aims to reveal some clinical clues for unusual presentations, causes and treatment responses of myopathies. Particularities in our cases and literature review are also discussed.

Methods: In a single rheumatology center we admitted during 10 month 6 patients (3 males and 3 females) with rhabdomyolisis. Patient history, physical exam and work-up are registered in the clinical files. We made a 6 case series presentation of different myopathic syndromes followed in our department. All patients signed an informed consent to allow the use of their data in a scientific/educational purpose.

Results: One patient presented as Quincke edema, and it turned out to be a paraneoplastic dermato-polymyositis with rapid worsening and severe, lethal thrombotic and infectious complications. The other patients had a good course of disease, despite severe neuro-muscular involvement and poor prognosis, as it was in one patient with HMG-glutaryl-Co a reductase-antibodies myopathy. Diabetic neuropathy as well as binge drinking with acute renal failure were other causes of myopathy. Viral (hepatitis C) and bacterial infections (Lyme disease) also induced rhabdomyolysis with good outcome.

Conclusion: Sound clinical judgment, together with appropriate treatment and careful follow-up are mandatory for the best outcome in different myopathic syndromes.

P987
CONSOLIDATION OF BILATERAL FEMUR FRACTURES USING ALPHA ASPHOTASIS IN AN ADULT PATIENT WITH CHILD HYPOPHOSPHATASIA

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Hypophosphatasia (HPP) is a rare genetic slowly progressive disease caused by mutations in the ALPL gene, encoding a non-specific tissue isoenzyme of alkaline phosphatase (ALP) TNSALP, which is also manifested by violations in the mineralization of the bones of the skeleton and teeth, neurological pathology, secondary systemic complications. Pathogenetic therapy for HPP is a lifelong enzyme replacement therapy with alpha asphotasis. The use of this medication (according to the instruction) by

child-patients with **HPP** enables to improve the quality of life of the patients significantly. Experience in the use of the Asfotase Alpha among adults is extremely limited in the world. We would like to present the experience of treating an adult patient with a child form of HPP complicated by fractures of the femur who was diagnosed with HPP 39 years after the first symptoms appeared and was assigned pathogenetic treatment.

Patient B., born in 1978, addressed for consultation to the research center of osteoporosis 21.12.2017 with complaints of progressive pain in the right hip, deformation of the lower extremities, weakness. When collecting anamnesis, according to the patient and his parents, it was found that the onset of the disease was noted at the age of 1.1 years, when there was a valgus deformity of the lower extremities, lameness. The loss of deciduous teeth with roots began in 1.2 years.

Rickets was diagnosed, but conservative treatment, including vitamin D, did not bring any effect. The deformities continued to progress.

At the age of 2-7 years, the patient repeatedly underwent prosthetics of deciduous teeth.

At the age of 9, in the Department of pediatric bone pathology, in September 1986, operations were performed: axillary corrective osteotomies of both tibia by Renka, osteotomy of the fibula.

Due to the recurrence of the deformity, an operation was performed in October 1989: axillary osteotomy of the bones of both shins with fixation with plaster bandages. Four years later, in (1993), a recurrence of lower limb deformity due to the femoral segments was detected. In March 1993, operations were performed: supramondylar osteotomies of both femurs with fixation with spokes and plaster bandages.

According to the patient's parents, the formation of bone corns in the postoperative periods occurred at a later date, and therefore, it was necessary to perform plaster immobilization for a longer time compared to the usual consolidation periods.

For the first time, the level of the alkaline phosphatase was detected in 1993 and was-264 (448-896) nmol/SL, which was two times lower than the age norm. However, these data were not taken into consideration.

Molars appeared on time, were of poor quality with thin enamel, yellowish color, fragile. From the age of 20, the loss of permanent teeth, with roots, the remaining 12 fixed due to the mucosa, and external structures.

Repeated appeal to our clinic in December 2017 with complaints of progressive pain in the b \ 3 area of the left hip, weakness. The pain appeared gradually, without previous trauma, starting since June 2017.

The identified decrease of the ALP in blood in 1993: decreased to ALP - 5 (40-135) E\l in 2017.

In X-ray, according to CT, MRI, and CT scans, fractures of both femurs were detected.

According to x-ray densitometry, there was no decrease in BMD. QST exceeds the age norm.

A genetic analysis of the blood of proband and his relatives for the ALP mutation was performed. The patient, his mother, and son had a mutation (MIM 171760 transcript RefSeq:NM_000478), hypophosphatasia disease (OMIM 146300). A variant of the nucleotide sequence of p.182 G>A (p.G61E) in a heterogeneous state in exon 4 was identified. Bioinformatic analysis of the prediction of pathogenicity of gly61glu replacement was performed: Mutation Taster, PolyPhen-2, SIFT, PROVEAN programs-pathogenic variant.

In addition, proband and his father had a mutation (MIM 171760 transcript RefSeq:NM_000478)), hypophosphatasia disease (OMIM 146300). A variant of the nucleotide sequence of p. 571 G>A (p. Glu191lys) in a heterogeneous state in exon 6 is described in the databases ALPL-SESEP and HGMD (CM920019).

The patient's sister and paternal uncle have no ALP gene mutations.

Based on the anamnesis of the disease, the level of ALP in the blood, the bilateral fractures of the femur, and data from genetic blood tests, the diagnosis was verified - HPP, a childhood form, complicated by fractures of both femurs. Varus deformity of the lower extremities.

From February 2019, the patient began receiving the medication for replacement therapy of asphotase alpha 80 mg. 0.8 ml. in combination with alfacalcidol and a diet rich in calcium.

During the control examination for a period of 8 months. therapy revealed almost complete consolidation of fractures.

Results: Starting with a month-long course of therapy, the patient showed a progressive improvement in health, increased load tolerance, and walking speed.

P988
PREVIOUS OSTEOPOROSIS TREATMENTS IN VERTEBRAL FRACTURES: EXPERIENCE OF A NEW FLS

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Objective: Fracture Liaison Services (FLSs) are the most effective secondary fracture prevention method to ensure fracture patients receive the osteoporosis care they need to prevent additional fractures. Patients are referred to the FLS by different medical specialties when fractures are evidenced, so it is interesting to know if these doctors start any treatment before being evaluated by the FLS. We aimed to know if patients referred to our new FLS, on their first visit, have received any treatment for osteoporosis, whether they are calcium and vitamin D supplements or pharmacological treatment options.

Methods: observational study in which data from patients referred to a new FLS due to vertebral fracture were reviewed. It was analyzed how many patients were currently treated or had been previously taken pharmacological treatment at some time in their life. The frequency of each drug was also analyzed.

Results: The study includes 83 patients, 72 women and 11 men. 55.4% of the patients had not been previously treated. Among the patients who had received any treatment, the most prescribed were vitamin D and calcium with vitamin D supplements. Only 22.8% had received pharmacological treatment and the most frequent was denosumab (Table 1).

Table 1: previous treatments.

	FREQUENCY	PERCENTAGE
SERMs	1	1,2
ALENDRONATE	7	8,4
RISEDRONATE	3	3,6
IBANDRONATE	2	2,4
ZOLEDRONATE	5	6
TERIPARATIDE	1	1,2
DENOSUMAB	9	10,8
CALCIUM WITH VITAMIN D 500 UI	11	13,3
CALCIUM WITH VITAMIN D 1000 UI	13	15,7
VITAMIN D	19	22,9

Conclusion: In our FLS more than half of the patients have not received any treatment before being assessed. The most commonly used treatments were vitamin D and calcium with vitamin D supplements followed by denosumab.

P989
CORRELATION BETWEEN VITAMIN D LEVELS, BONE MINERAL DENSITY AND CAPILLAROSCOPIC CHANGES IN PATIENTS WITH SYSTEMIC SCLEROSIS

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Objective: To investigate whether patients with systemic sclerosis (SSc) have an increased risk of osteoporosis and whether there is an association between this aspect and nailfold capillaroscopic changes compared with a healthy control group.

Methods: We analysed the correlation of 25-hydroxyvitamin D (25OHD) serum levels with clinical parameters, BMD and nailfold capillaroscopy (NC) in 25 patients with SSc and 45 healthy subjects. Raynaud's phenomenon (RP) was noted in all SSc patients. BMD (femoral neck and lumbar spine) was measured by DXA scan. Normal BMD is a T-score of −1.0 or higher, osteopenia is defined as between −1.0 and −2.5 and osteoporosis is defined

as −2.5 or lower. 25OHD levels were considered optimal when ≥30 ng/mL, insufficient when between 10 and 30 ng/mL, and deficient when under 10 ng/mL. NC patterns were analysed.

Results: Among the patients included in both groups, 93% (65) were women and 7% (5) were men. The average age of the patients was 50±4.6 y. In SSc group the mean vitamin D level was 15.04±7.05 ng/dL. Only 16.8% of the patients had optimal vitamin D levels; 58% of them had insufficient 25OHD levels, while 25.2% had deficient levels. Vitamin D serum levels were positively correlated with BMD. 31.4% of patients had osteoporosis, 42.2% osteopenia, and 26.4% had a normal T-score. We also observed a negative correlation of low vitamin D levels with NC patterns like a decrease in capillary density and avascular areas (p=0.023).

In the healthy group of patients, the mean vitamin D level was 23.05±6.2 ng/dL. 46.5% of the patients had optimal vitamin D levels; 35,5% of them had insufficient 25OHD levels, and 18% had deficient levels.

Conclusion: Low levels of vitamin D are common in patients with SSc. The results showed significantly lower BMD in SSc patients compared with healthy controls. The correlation with severe NC patterns suggests a possible role of 25OHD in the SSc vascular involvement.

P990
PIONEERING FRACTURE LIAISON SERVICE IN THE WORLD'S TOP LONGEVITY CITY: FROM "1I" TO "4I" IN HONG KONG

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Objective: Hong Kong has the longest life expectancy in the world. With an increasing aged population, fragility fractures (FF) have hit us as a tsunami. These fractures will reach epidemic proportions in the near future, presenting increasing challenges to health care professionals worldwide, unless rapid action is taken to prevent them and avoid their devastating consequences. As Orthopaedic Surgeons, we have taken the lead to start fracture liaison service (FLS) at the largest hospital in Hong Kong, in order to prevent secondary fractures and achieve cost savings at the societal perspective. Our primary aim was to identify the barriers in launching FLS and to describe how to overcome them; and also to describe the workflow, the scope of service, as well as the role of the members of the multidisciplinary team (MDT). Our secondary goal was to assess the outcome, using recognized key performance indicators, of our pioneering fracture liaison service three years after it was first launched.

Methods: Clinical, patients, and system barriers were identified. The scope of service was defined, with the detailed workflow and different role of the individual members of the MDT developed. Outcomes were assessed by the one year mortality, time to bone health assessment, time to osteoporosis treatment initiation and adherence, future fracture risk reduction, and the potential cost savings. The 13 key domains of the International Osteoporosis Foundation (IOF) were also used as a benchmark.

Results: Clinical barriers included the development of Leadership and Guidelines. Patient barriers included access to care, compliance and adherence, while system barriers comprised policy prioritisation, funding and other resources. The scope of service was defined as coordinating and collaborating with the MDT to enhance the knowledge of secondary fracture prevention of FF patients and their carers, as well as to effect behavioral changes, with the goal to build up a FF database and to achieve quality assurance. Our fracture liaison nurse was the leader of the team, being the main resource person and the facilitator of the FF patients journey, while individual members have their complementary roles. From 2017-2019, FLS with our MDT has provided bone health assessment and education to 1895 FF patients, and 774 of them have initiated antiosteoporosis management, after excluding those with contraindications. A high acceptance rate for antiosteoporosis treatment rate (84%) was observed. A very high drug compliance and adherence rate (92 and 93%) was recorded in 2018 and 2019. The rate of secondary fall dropped from 18% in 2017 to 11% in 2018, but climbed back to 17% in 2019. The rate of secondary fracture kept decreased from 4.67% in 2017 to 2.82% in 2019, with significant cost saving implications that outweighed the drug cost. For the IOF domains, we still lack effective means in identifying vertebral fragility fractures, and also a complete database of all fragility fractures.

Conclusion: The first FLS in Hong Kong begins to reveal its beneficial effect on preventing secondary fractures and this interim service review demonstrates that our FLS model is a feasible one with encouraging early results. Our future direction is to extend this to all FFs.

P991
TYPE 2 DIABETES MELLITUS IS ASSOCIATED WITH INCREASED RISK OF SARCOPENIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: Both type 1 and type 2 (T2DM) diabetes mellitus (DM) are associated with increased risk of fractures, mainly due to impaired bone architecture and microvascular complications. Whether T2DM is also associated with increased risk of sarcopenia is not yet known, with studies yielding inconclusive results. The aim of this study was to systematically review and meta-analyze the best available evidence on the association between DM and sarcopenia risk.

Methods: A comprehensive search was conducted in PubMed, CENTRAL and Scopus databases, up to January 9, 2020. The risk of sarcopenia in subjects with or without DM was expressed as odds ratio (OR) with 95% confidence intervals (CI). The I^2 index was employed for heterogeneity.

Results: 24 observational studies were included in the quantitative analysis (5946 patients with T2DM, 7689 cases with sarcopenia). Increased risk of sarcopenia was found in patients with T2DM compared with euglycemic subjects (OR 1.60, 95%CI 1.16-2.21, $p<0.004$; I^2 92.9%). After excluding studies that had not implemented at least two of the three criteria for sarcopenia diagnosis (low muscle mass, muscle strength and muscle performance), the risk of sarcopenia remained significantly increased in T2DM patients (16 studies, OR 1.60, 95%CI, 1.30-1.98, $p<0.001$; I^2 32.6%). Subgroup analysis showed that the risk of sarcopenia was affected by age [OR for <60 y: 1.41 (95%CI 0.41-4.87; $p=0.58$); OR for >60 y: 1.62 (95%CI, 1.27-2.05, $p<0.001$)]. However, it was not affected by hemoglobin A_{1c} (HbA_{1c}) concentrations [OR for HbA1c <7.5%: 1.68 (95%CI 1.17-2.42; $p=0.005$); OR for HbA1c >7.5%: 1.56 (95%CI, 1.11-2.21, $p=0.011$)] or duration of T2DM [OR for duration >10 y: 2.69 (95%CI 0.93-7.77, $p=0.067$; OR for duration <10 y: 0.88 (95%CI 0.33-2.38, $p=0.813$)].

Conclusion: Patients with T2DM have an increased risk of sarcopenia compared with euglycemic subjects, independently of HbA1c concentrations and T2DM duration. Older age further increases this risk.

P992
THE PREVALENCE OF VERTEBROGENIC AND ARTHROGENIC PATHOLOGY IN PARKINSON'S DISEASE

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Objective: To study the structure, prevalence and influence of vertebral and joint pathologies in Parkinson's disease (PD) in Volgograd and the Volgograd region. **Methods:** A retrospective analysis of 221 outpatient records of patients with PD (98 men and 123 women), registered at the Extrapyramidal Pathology and Paroxysmal Conditions Center in the Volgograd Regional Clinical Hospital №1, was carried out. The inclusion criterion of the study was the presence of comorbid vertebral and joint pathologies information in medical cards (patient's complaints, narrow-focus specialist's examination, the data of MRI and X-ray vertebra and joints investigations). **Results:** The mean age of men and women with PD was 65.82±6.46 and 68.95±6.25 y, respectively, and the mean duration of the disease was 7.63±3.8 y. I and II range of Hoehn-Yahr scale were diagnosed in 31.2%, III range - in 54.8%, IV range - in 14% of patients. Akinetic rigid form was observed in 41.6%, rigid-tremulous - in 14.1% and mixed form - in 44.3% of the patients. Cervicalgia, cervicocranialgia and cervicobrachialgia were described in 61.1%, thorac- and scapulalgia in 42.6%, lumbalgia and lumbar ischialgia in 35.3% of patients and joint pain of upper and lower limbs - in 41.2% of cases. The next X-ray and MRI changes were revealed more in the cervical and thoracic regions (71%), less than in the lumbosacral region (49.3%): kyphoscoliotic deformation (66.1%), vertebral instability segments (38.9%), spondylolisthesis (23.5%), spinal stenosis (18.6%), compression fractures (13.1%), clinically manifested mainly by chronic pain syndrome (64.3 %%). Signs of osteoarthrosis in upper and lower

extremities were found in 38.9% and 43.4% of cases respectively. Levodopa was prescribed to 61,1%, dopamine agonists (DAs), amantadine and MAO-B inhibitors - to 41.4% patients. To relieve pain 57% and 9.9% of respondents used NSAIDs and chondroprotectors respectively. It was noted that a greater percentage of various vertebrogenic and arthrogenic changes was noted in akinetic-rigid and mixed forms of the PD, the severity of which increases with the course of the underlying disease (r=0.71). The presence of motor dyskinesia, painful dystonia were also combined with more expressed vertebrogenic changes (r=0.63). The treatment of most patients was based on the selection of specific antiparkinsonian therapy without taking into account vertebrogenic comorbid pathology. At the same time, chronic pain was more often regarded as a manifestation of increasing rigidity and was treated by increasing dosages of levodopa and DAs. **Conclusion:** This study revealed a significant prevalence and influence of vertebrogenic and arthrogenic pathologies, aggravating the course of Parkinson's disease. The results can be used in choosing a more rational therapy in patients with PD for adequate control over the symptoms of the underlying and comorbid pathologies.

P993
ANTIBIOTICS USE AS A PROXY FOR MICROBIOME ALTERATION AND HIP FRACTURE RISK: A POPULATION-BASED CASE-CONTROL STUDY

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Objective: Mechanistic studies suggest an association between dysbiosis and bone metabolism. However, data on the association between microbiome alterations and fracture risk are scarce. Long-term and high dose antibiotics cause microbiome alterations. We therefore aimed to assess if there is an association between antibiotics use and hip fracture risk.

Methods: Population based case-control study using electronic medical records data from SIDIAP, covering >80% of the population of Catalonia. Incident hip fractures with 2+ years data available were matched to up to 5:1 controls of same age, sex, and GP practice, and similar follow-up. Antibiotic use in the previous 2 y was ascertained using ATC codes based on pharmacy dispensation data, and categorised in terms of recency of use and quartiles of cumulative dose. Adjusted odds ratios were estimated according to antibiotic use (yes/no) and by recency (current, recent, past, no use) and cumulative use (quartiles of daily defined doses in the previous years) using conditional logistic regression. All analyses were adjusted for age, BMI, smoking, comorbidity, socioeconomic deprivation and number of GP visits as a proxy for healthcare resource use.

Results: A total of 41,651 hip fracture cases and 123,543 matched controls were included. In all, 54.4% of cases and 38.0% of controls had taken antibiotics in the previous 2 y. Many antibiotics appeared associated with fracture risk, with adjusted OR 1.16 [95%CI: 1.13-1.19] for β-lactams, OR 1.07 [95%CI: 1.04-

1.11] for quinolones, OR 1.16 [95%CI: 1.11-1.21] for fosfomycin, and OR 1.23 [95%CI: 1.03-1.46] for tetracyclines. Although a clear temporal pattern was noticed, with higher ORs associated with current use, a counter-intuitive inverse dose-response was seen, where lowest cumulative use appeared associated with highest ORs [Figure 1].
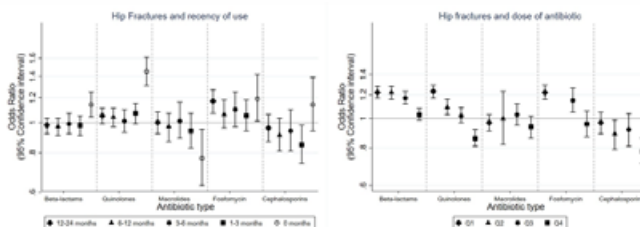
Conclusion: Our data demonstrate an association between certain (but not all) antibiotics use and hip fracture risk. However, this association is present only when taking them shortly, and with no dose-response gradient. Our findings support an association between the underlying treated infection and hip fracture rather than the involvement of microbiome alterations caused by chronic/cumulative antibiotic/s use. More research is needed to unravel the role of the microbiota on fracture risk in humans.

P994
VERBAL WORKING MEMORY AS A PREDICTOR OF BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN ASSESSED FOR OSTEOPOROSIS

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Objective: Cognitive impairment has been associated with bone fragility and muscle weakness. The aim of our research was to further explore the association between neuropsychological features, physical performance and fracture risk in a sample of postmenopausal women.

Methods: To investigate executive functions, Trial Making Test-B, Digit Span Backward and Digit Span Forward were administered. Psychological features were assessed by Beck Depression Inventory (BDI) and Hamilton Anxiety (HAM-A) scale. Physical performance and handgrip strength were respectively explored through the Short Physical Performance Battery and a Jamar dynamometer. The 10-year probability of major and hip fractures was assessed by Fracture Risk Assessment tool (FRAX); the BMD at lumbar spine and femoral site was evaluated by DXA.

Results: 60 women [mean age 66±7.99 y] with a Mini Mental State Examination (MMSE) score ≥24 were recruited. FRAX score for major fractures was associated with Trial Making Test B score (r=0.25) and with Digit Span backward (r=-0.34) (p>0.05 for all), while FRAX score for hip fracture was associate with handgrip strength (r=-0.39, p=0.002). Lumbar BMD was significantly associated with Digit Span Backward (r=-0.32) and with depression (r=-0.33). After adjustment for age, BMI, MMSE score, handgrip strength, Digit Span Forward score, Verbal Fluency

score, Trial Making Test-B score, a multiple regression analysis showed that BMI (ß=0.09, SE 0.03, p=0.013), BDI score (ß=-0.09, SE 0.06, p=0.04) and Digit Span Backward score (ß=0.55, SE 0.17, p=0.002) were independently predictive of lumbar BMD.

Conclusion: Assessment of verbal working memory could have a determinant role in fracture risk prediction in postmenopausal women.

P995
MANAGING CHRONIC MUSCULOSKELETAL PAIN IN THE WORLD'S TOP LONGEVITY CITY: A NEW MODEL OF CARE CLINIC

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Objective: Hong Kong has the longest life expectancy in the world. Musculoskeletal (MSK) conditions in the aged are amongst the most costly illnesses because of the long-term care and support they require. Current gaps in specialist outpatient clinic for these conditions included a long waiting list for new cases with no initial treatment, due to an inefficient triage system at the points of entry, resulting in delayed diagnosis of the underlying conditions and complications, as well as very little patient or carer education and prevention effort, with underemphasis of the psychosocial component. Due to our geographically scattered treatment and rehabilitative services, there was also lack of Integration with community. Our primary aim was to pilot a new model of care clinic for MSK conditions, in order to ensure early access to care for these conditions, in turn to minimise their physical and psychological impact. Our secondary goal was to ensure that all individuals with chronic MSK conditions receive treatment & management that is appropriate, timely and, where possible, locally accessible, and in turn to ensure that people with MSK conditions are partners in their care and are able to better self-manage their condition to maximise independence at daily living. This study describes such a model of out-patient care, its pilot implementation and the initial results.

Methods: Comprehensive Information and education materials were developed to help general practitioners (GP) and other primary care professionals know when and where to refer to an orthopaedic specialist, with new opportunities to refer patients to a GP with special interest in MSK conditions (wsi MSK), supported by agreed referral protocols and guidelines. A holistic approach was emphasised to help people with symptoms cope with the physical, social and wider aspects of their condition in their everyday lives. Integrated care pathways (ICPs) were jointly developed and delivered by members of a multidisciplinary team (MDT) based on identified needs, with strong emphasis on self-management at all stages of the care pathway. Experienced nurses and therapists were trained as extended scope practitioners (ESPs) to take greater responsibility for managing chronic MSK conditions and acting as case managers. Orthopaedic surgeons provide members of the multidisciplinary team with appropriate support and clinical leadership, which in turn was supported by formal accountability and clinical governance arrangements.

Patient satisfaction, objective functional improvement by appropriate scores, changes in health belief, as well as the impact on new case waiting time were documented.

Results: New referral protocols and guidelines were implemented and GP with special interest in MSK conditions were trained in Hong Kong. ICPs and ESPs helped to free specialists' time in clinics and helped to reduce waiting times for new case appointments from 93 to 78 weeks. A high rate of patient satisfaction and significant improvement in clinical outcome scores were also reported. This was observed to be due to a change in health belief and also coping behavior for chronic pain.

Conclusion: Access to appropriate self-management information and training play an important role in empowering individuals to become active partners in their care for chronic MSK conditions. This new model of care clinic is feasible with predefined guidelines, ICPs, and a MDT including ESPs and GPs wsi MSK, resulting in reduction of new case waiting time, making better use of health and social care resources.

P996
BONE MINERAL DENSITY AND FREQUENCY OF BONES FRACTURES IN PATIENTS WITH ALKAPTONURIA

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Objective: To assess BMD of the skeleton using the Hologic Discovery A DXA, determine the frequency of low-energy peripheral skeletal bone fractures among adult patients with alkaptonuria (A).

Methods: A is a rare genetic disease (1 case per 250,000), associated with severe problems of a spine and large joints and decrease in BMD may occur. We included 40 patients with a reliable diagnosis of A: 23 men (M) and 17 women (W), aged 33 to 68 y (60.3±9.1). Densitometry of the lumbar spine was performed in 40 patients; of the forearm in 34; of the proximal femur in 32 (8 were not examined due to bilateral hip replacement).

Results: Normal values of spinal BMD were found in 26 (65%), osteopenia in 12 (30%), and osteoporosis in 2 (5%) patients. In the proximal femoral regions, osteoporosis detected in 12 (37.5%), osteopenia in 13 (40.6%), and normal in 7 (21.9%) patients. In the forearm, osteoporosis was found in 22 patients (64.7%), osteopenia – in 8 (23.5%), and normal – in 4 (11.8%) patients. Fractures of the bones of the peripheral skeleton in anamnesis were diagnosed in 15 (37.5%) patients, aged 33 to 69 y (55.93±9.46). The localization of fractures was as follows:

femur – in 8 patients (20%), forearm – in 6 (15%), shin bones – in 1 (2.5%) patients. In patients with osteoporosis, fractures of the femur (5 M and 1 W), and the forearm (1 M) were recorded. In patients with osteopenia, fractures of the bones of the forearm (in 1 W) and lower leg (in 1 W) were found. In normal BMD, fractures of the forearm bones were recorded (in 2 M).

Conclusion: There is a high incidence of osteoporosis, mainly in the proximal femur and forearm bones in adults with A. In the lumbar spine (due to the development of calcification of the intervertebral discs and ligamentous apparatus), osteoporosis is rarely detected, but the frequency of osteopenia is quite high. More than a third of patients (37.5%) had a history of peripheral skeletal bone fractures. The occurrence of fractures is related to the BMD of the proximal femur.

P997
RELATIONSHIP BETWEEN VERTEBRAL FRACTURE AND BMI

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Objective: Bone fragility fractures are associated a with high mortality rate. A low BMI is one of the risk factors of osteoporosis. In our current population, the overweight and obesity rate is increasing, so it is interesting to assess BMI in patients with vertebral fractures. Our aim is to analyze the relationship between BMI and vertebral fractures in patients referred to a Fracture Liaison Services (FLS).
Methods: This is a prospective observational study in which data from 83 patients with vertebral fracture referred to an FLS were reviewed. The BMI of 55 patients was obtained, as well as the age, sex, BMI and location of vertebral fracture. This study considered patients that are underweight to a BMI below 18.5 kg/m^2, normal weight (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2) and obese (>30 kg/m^2).
Results: Of the 83 patients, 72 were women and 11 were men. 38.2% of patients with vertebral fractures had a BMI equivalent to being overweight. Of the remaining patients, 30.9% had normal weight, 29.1% were obese and only 1.8% were underweight (Table 1).

Table 1. BMI

BMI	Frequency	Percentage
Underweight	1	1.8
Normal weight	17	30.9
Overweight	21	38.2
Obese	16	29.1
Missing	28	NA

Conclusion: Our study indicates that overweight and obese patients represent most patients who have vertebral fractures. Only 1.8% of patients were underweight.

P998
CURRENT PRACTICE OF MANAGEMENT OF DISCITIS AT A DISTRICT GENERAL HOSPITAL COMPARED TO RECOMMENDED GUIDELINES

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Objective: Discitis being the infection of the intervertebral disc classically presents with fever and back pain. However, varied presentation and lack of adherence to definite guidelines leads to a great variation in its management causing a rise in inadequately resolved disease. We aimed to assess the current management protocol for discitis at a district general hospital and to compare it against recommended guidelines. Additionally, we also planned to formulate a management protocol to improve quality of care.
Methods: A retrospective study was conducted at Ashford & St Peter's NHS Hospital, Chertsey. The study finally included patients who had MRI of the spine reported as discitis with some clinical relevance, performed between January 2017 - September 2019.
Results: Out of the 305 spine MRI's included, 152(35%) were reported to have discitis purely based on imaging. However, only 38(55%) of them had clinical correlation and were managed for the same. Back pain (47.3%) was the most common presenting complaint followed by fever. The commonest site of involvement was the lumbar vertebrae (70.4%) and 87% of patients had, only a single site involved. All patients had a baseline C-reactive protein (CRP) and 34(92.11%) had blood cultures tested for. Out of the patient with negative blood cultures 70.5% further had a computer tomography (CT) guided biopsy to aid diagnosis. Staphylococcus Aureus was the most common causative organism isolated on microbiology. Treatment was commonly with intravenous Flucloxacillin with 63% of the patients being treated for 6 weeks or more.
Conclusion: Compared to the recommended guidelines we should aim to reach a 100% target in the number of blood cultures prior to starting antibiotics and CT guided biopsies if blood cultures remain negative. Additionally, we need to work towards a minimum of 6 weeks of treatment and follow a structured follow-up protocol. Following a checklist based on guidelines can be a step towards achieving higher success rate in outcome of discitis

P999

WHY DO BONES BREAK? THE RELATIONSHIP BETWEEN SIZE AND SHAPE OF MICRODAMAGE AND FRAGILITY FRACTURES

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Objective: Bone is constantly exposed to varying levels of tensile and shear stress forces, leading to microcrack production to prevent fracture. This microdamage is repaired by bone's dynamic remodeling process and intrinsic toughening mechanisms. When these mechanisms fail, microcracks can accumulate, leading to fragility fractures. However, the type of microdamage accumulated can vary markedly and have a significant effect on fracture incidence. This study aimed to investigate the relationship between the size and shape of microdamage and bone fragility.

Methods: Synchrotron X-ray μCT imaging was carried out on 15 trabecular bone samples of femoral heads from 3 patient groups (healthy ageing, untreated fracture control and bisphosphonate treated fracture). Analysis was carried out using VGStudio-Max, where microdamage was identified and classified into the following shape categories: linear, irregular, flat, cuboid and joined. Size of microdamage was also quantified using voxel counts and mechanical strength was measured through calculations of normalised Young's Modulus and max material stress of each of the samples. Nonparametric statistical analysis was conducted.

Results: Bone from bisphosphonate-treated fracture patients displayed significantly higher amounts of all but linear microcracks than nonfracture patients. Additionally, the bisphosphonate-treated bone exhibited a reduced max material stress and normalised Young's Modulus. However, unlike shown in previous literature, the volume of microdamage did not demonstrate any significant differences or affect mechanical bone characteristics between patients. These findings suggest that the accumulation of nonlinear microcracks gives rise to reduced mechanical bone strength and stiffness, ultimately leading to fragility fractures.

Conclusion: The novel classification system devised from this research highlights the complexity of the nature of microcracks. Fragility fractures seem to be a result of the accumulation of microdamage and more specifically, the interaction of specific types of microcracks, which need to be further investigated in 3D, at this scale.

P1000

CAN WE PREDICT FRAGILITY FRACTURES? THE RELATIONSHIP BETWEEN SIZE AND SHAPE OF MICRODAMAGE AND FRAGILITY FRACTURES

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Objective: Bone is constantly exposed to varying levels of tensile and shear stress forces, leading to microcrack production to prevent fracture. This microdamage is repaired by bone's dynamic remodelling process and intrinsic toughening mechanisms. When these mechanisms fail, microcracks can accumulate,

leading to fragility fractures. However, the type of microdamage accumulated can vary markedly and have a significant effect on fracture incidence. This study aimed to investigate the relationship between the size and shape of microdamage and bone fragility.

Methods: Synchrotron X-ray αCT imaging was carried out on 15 trabecular bone samples of femoral heads from 2 patient groups (healthy ageing and untreated fracture control). Analysis was carried out using VGStudio-Max, where microdamage was identified and classified into the following shape categories: linear, irregular, flat, cuboid and joined. Size of microdamage was also quantified using voxel counts and mechanical strength was measured through calculations of normalised Young's Modulus and max material stress of each of the samples. Nonparametric statistical analysis was conducted.

Results: Bone from fracture control patients displayed a significantly higher number of microcracks than nonfracture patients (p=0.00604); individual differences in microdamage shape varied but the number of irregular (p=0.018) and nonlinear cracks (p=0.006) were significantly higher in the fracture control groups. Additionally, the fracture control bone exhibited a significantly reduced max material stress (p=0.000254). These findings suggest that the accumulation of nonlinear microcracks gives rise to reduced mechanical bone strength and stiffness, ultimately leading to fragility fractures.

Conclusion: The novel classification system devised from this research highlights the complexity of the nature of microcracks. Bones that have undergone fragility fractures seem to have resulted from the accumulation of microdamage and more specifically, the interaction of specific types of microcracks, which need to be further investigated in 3D, at this scale. Following further research, these varying shapes of microdamage could act as predictors of fragility fractures, possibly surpassing DXA.

P1001

ADVANCED PLATELET-RICH PLASMA IN TREATMENT FOR HIP OSTEOARTHRITIS

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Objective: Platelet-rich plasma treatment (PRP) contains numerous cytokines and growth factors that potentially assist in the healing of multiple musculoskeletal issues, including hip osteoarthritis (HOA). In recent years the procedure itself has been enhanced by previously stimulation a low-level laser (LLL) and electromagnetic field (EMF). We wanted to examine whether advanced PRP (aPRP) could improve the functioning of HOA intermediate-grade patients.

Methods: PRP was isolated from peripheral arterial blood of 54 persons ranging in age from 18 to 65 years, during the first half of 2019. All samples were LLL- and EMF-treated, as in our earlier scientific papers. After that instillation of aPRP were done. Patients were examined for range of motion, improvements in VAS scale, ambulation speed, and medical outcomes study 36 shortform health survey (SF-36) 1, 3 and 6 months after intra-articular application of aPRP. Also, the diameter of the articular cartilage was measured

ultrasonically at 3 points before and after the intervention. **Results**: 39 patients (72.22%) showed a significant improvement in all parameters compared to the period before the application (p<0.05). Changes in range of motion, ambulation speed, and the SF36 in patients were recorder after three and 6 months of the procedure. Cartilage thickness measurements were similar before and after aPRP, although there was a statistical tendency toward enlargement in the intercondylar part (p=0.06). There were no aPRP-related adverse events during and after the interventions. **Conclusion:** aPRP treatment had positive effects on pain, functioning, and quality of life of patients with HOA, but the results showed no effect on cartilage thickness. Future trials should be sufficiently large and include a placebo group.

P1002
SECONDARY FACTORS FOR BONE FRAGILITY INDEPENDENTLY OF BMD IN A FRACTURE LIAISON SERVICE: A PROSPECTIVE COHORT STUDY

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Objective: Secondary factors for bone fragility are commonly present in patients with low impact fractures and osteoporosis. However, fragility fractures also occur in patients with osteopenia and normal BMD test. Other factors might be contributing for these patients' fractures. We aim to compare the prevalence of secondary factors among patients with osteoporosis, osteopenia and normal BMD test.

Methods: In a prospective cohort study, we selected consecutively all patients referred to our Fracture Liaison Service from January 2017 to January 2019, after a recent fragility fracture. We assessed the presence of secondary factors, such as tobacco and alcohol use, corticotherapy, premature menopause and rheumatoid arthritis. Chi-square and Fisher's exact test were used to determine associations and a p value of <0.05 was considered as having statistical value.

Results: 102 patients were included, with a mean age of 76.5±11.3, from which 89.2% were female. 63.3% had osteoporosis, 23.3% osteopenia and 13.3% a normal BMD. As for the secondary factors: 5.1% tobacco, 7.9% alcohol, 7.8% corticotherapy, 24.5% premature menopause and 4.0% rheumatoid arthritis. Median 10-y risk fracture tool (Portuguese FRAX) was 20% for major fracture and 13% for hip fracture. All risk factors were compared among patients with osteoporosis, osteopenia and normal BMD and no difference was found between the three groups (p=0.07, p=0.30, p=0.64, p=0.84, p=1.00).

Conclusion: Secondary factors contribute for the fractures, independently of the BMD. Patients with osteopenia and normal BMD seem to have a combination of factors which worsen their risk for fractures. To improve the secondary prevention, these secondary factors should be actively searched and treated.

Moreover, this study reinforces that they are also important in the primary prevention of osteoporosis, since they are independent of the BMD.

Disclosure statement: the authors have declared no conflicts of interest.

P1003
VALIDATION OF A BIOMEDICAL QUANTITATIVE IMAGE ANALYSIS SOFTWARE FOR MUSCULOSKELETAL DISEASES

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Objective: Musculoskeletal research, especially in osteoporosis and sarcopenia fields, relies on the quantification of bone and muscle, and their components such as the infiltrated fat.

Currently, the quantitative 3D image analyses of bone, muscle, and free or infiltrated fat is time-consuming, arduous and user-dependent. This invention is a biomedical quantitative image analysis software to analyze medical images from major medical imaging systems such CT scan and MRI.

Methods: A standalone software (ImagEZ) was developed on MATLAB (by MathWorks) platform. The measurements of the software were validated using histomorphometry of 10 rat femora µCT scans. Also, measurements of bone, hematopoietic marrow and marrow adipose tissue of hip and L1&2 spine CT scans of 34 patients (in total and in smaller regions of interest (ROIs)) were used to validate the software against leading commercial software (SliceOmatic by TomoVision).

Results: The new software proved to be 5-10 times faster in quantifying bone, marrow fat and red marrow in CT, µCT and MRI images. It also provides adjustable semitranslucent (see-through) 3D images of the structures that is unique among all similar software, which enables studying the 3D proximity of various tissues, topography and spatial association and their interfaces (Figure 1a). Validation against SliceOmatic for 34 patients' CT scans showed a perfect correlation (r^2=1.000) in both hip and spine (L1) ROIs (Figure 1c). Further histomorphometric validation against 10 rat femoral histomorphometry (r^2=0.879) (Figure 1b) and µCT images (r^2=0.999) against commercial software (SliceOmatic) measurements showed strong to almost perfect correlations.
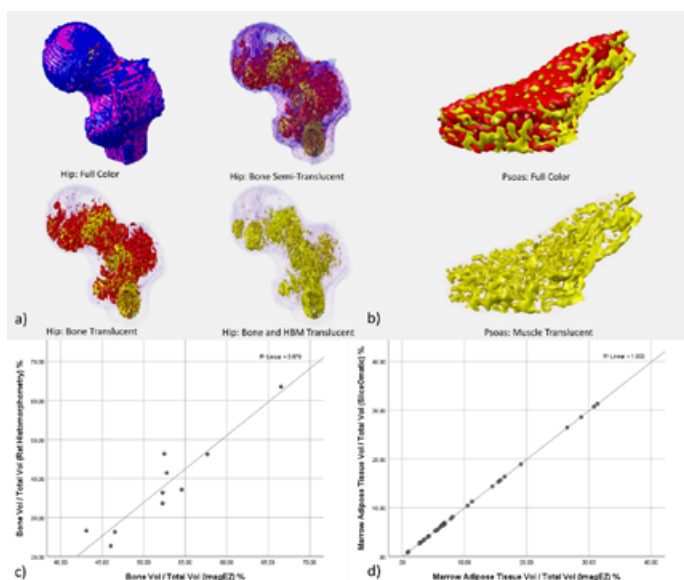
Figure 1. a) Proximal femur of a human tagged with ImagEZ presented in different stages of transparency, b) Human Psoas muscle tagged with ImagEZ presented in two different stages of transparency c) Scatter plot of the association between ImagEZ and histomorphometry for rat femora, d) Scatter plot of the association between ImagEZ and SliceOmatic for human hip bone.

Conclusion: The presented semiautomatic volume-calculation and -rendering software provides easier, faster and more consistent tool to quantify musculoskeletal tissues and their components.

P1004

THIGH AND FOREARM AS POTENTIAL REGIONS OF INTEREST TO DIAGNOSE OSTEOSARCOPENIA BY DXA

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Objective: Osteosarcopenia, defined as the synchronic loss of muscle and bone mass, is highly prevalent (~37%) in older populations. Diagnostic methods for this syndrome, which is considered an important risk factor for fractures, disability, frailty and mortality, are not well-defined. Assessment of bone, muscle and fat mass using a 13 cm thick mid-thigh slice of whole body DXA has been shown to be a good alternative for a combination of hip, spine, forearm and whole body scans; as the region's tissue masses correlate well with the conventional measures, and also show as good or stronger correlations with outcomes such as falls, fractures, muscle strength and performance. In this study, we explored whether the whole thigh and forearm regions also show strong associations with falls, fractures and performance/strength tests.

Methods: n=365 older subjects referred to Falls and Fractures Clinic underwent whole body, hip, spine and forearm scans (Hologic, Horizon A). Spearman's correlations were used to assess the associations between indices of tissue masses in the whole-thigh region of interest (ROI; from pubic brim to the distal femoral condyles) and whole forearm ROI (from olecranon to styloid process), corrected for height (h), h^2, h^3 and BMI, vs. conventional indices. Also, correlations were calculated between the new and conventional tissue masses and grip strength, walking speed, short physical performance battery (SPPB) and TUG tests, falls and fractures.

Results: The new indices and conventional indicators of tissue mass were well correlated (r_s=0.443-0.841; p<0.001). Whole-thigh BMD (r_s=-0.305; p<0.001) and forearm BMD (r_s=-0. 210; p<0.001) produced similar associations with fractures compared to hip (r_s=-0.314; p<0.001) and femoral neck (r_s=-0.245; p<0.001) BMDs; however, mid-thigh BMD associations with fractures were less vigorous (r_s=-0.183; p<0.001). Corrected for BMI (not height), all muscle indices produced better associations with performance. Whole thigh, mid-thigh and whole forearm lean mass results were comparable to appendicular lean mass when correlated with hand grip strength, gait speed, SPPB and TUG (Table 1).

Table 1. Coefficients of variation (p-values) between indicators of muscle mass and performance tests. R: right and L: left.

	Handgrip strength	SPPB Total	Gait speed	TUG
Mean R+L forearm lean mass /BMI	0.400 (<0.001)	0.164 (<0.001)	0.207 (<0.001)	-0.218 (<0.001)
Mean R+L thigh lean mass/BMI	.387 (<0.001)	0.136 (=0.015)	.273 (<0.001)	-0.247 (<0.001)
Mean R+L midthigh lean mass/BMI (13 cm thick slice)	0.369 (<0.001)	0.209 (<0.001)	0.284 (<0.001)	-0.264 (<0.001)
Appendicular lean mass/BMI	0.435 (<0.001)	0.118 (=0.030)	0.239 (<0.001)	-0.203 (<0.001)
Appendicular lean mass/h^2	0.321 (<0.001)	0.044 (<0.422)	0.081 (<0. 081)	-0.064 (<0.247)

Conclusion: Whole thigh, mid-thigh and forearm are valid and useful regions of interest to quantify bone, muscle and fat masses in a single scan to predict outcomes in osteosarcopenic older people.

P1005
MACHINE PREDICTS RATE OF CARTILAGE LOSS: DATA FROM THE OSTEOARTHRITIS INITIATIVE (OAI) AND THE MULTICENTER OSTEOARTHRITIS (MOST) STUDIES

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Objective: The rate of cartilage loss can vary widely between patients at risk of or suffering from knee osteoarthritis (OA) but its causes remain unknown. We investigate whether quantitative and semi-quantitative radiographic features, measured at a single time point, can be used to predict the rate of future joint space width (JSW) loss.

Methods: We collected bilateral knee radiographs from the Multicenter Osteoarthritis (MOST) study from 2651 patients (1079 female, 1572 male) acquired at several time points. These images were analyzed by automated software to obtain readings for joint space narrowing (JSN), osteophyte and sclerosis OARSI grades, as well as Kellgren-Lawrence (KL) grade and joint space width. Linear regressions of JSW were performed per individual knee to estimate the rate of JSW loss. Individuals were classified as fast progressors if the rate of JSW loss was higher 10% of baseline JSW. A logistic regression model was trained to predict the fast progressor phenotype with KL and OARSI grades at baseline as independent variables. This model was then validated on an independent dataset of 1900 individuals (1079 female, 821 male) from the OAI public use data set. Performance was characterized by the area under the ROC curve (AUC). Confidence intervals were calculated by bootstrapping.

Results: The logistic regression classifiers achieved AUCs of 0.84 (0.82; 0.87) at classifying individual knees as fast progressors on the validation dataset (OAI). Analysis of the individual coefficients of the classifiers reveals that KL and sclerosis OARSI grades are the main predictors of rapid cartilage loss.

Conclusion: Our results show that it is possible to predict future rapid cartilage loss from quantitative and semiquantitative readings from a single plain radiograph. Osteophytes OARSI grade did not contribute greatly to this prediction; however, Sclerosis OARSI grade was shown to be a major predictor of rapid cartilage loss, suggesting a noncanonical mode of OA progression.

P1006
THE EFFECT OF VITAMIN K ON THE INCIDENCE OF BONE FRACTURES IN CHILDREN AND ADOLESCENTS: A PILOT STUDY

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Objective: Vitamin K has a pleiotropic effect on the body. In the skeletal system it plays an important role in the process of gamma carboxylation of bone matrix proteins, leading to their activation and mineralization of the skeleton. It also affects the transcriptional regulation of gene expression such as MGP, TSK, MANT2. The aim of the study was to assess vitamin K serum concentration and its possible influence on the frequency of bone fractures in developmental age.

Methods: The study was conducted on 143 children aged 5-17 y hospitalized in the clinic in 2017-2019. The assessed children were divided into three groups: with bone dysplasia (n=35), with bone fractures (n=46) and the reference group (n=62). In all groups basic indicators of calcium and phosphate metabolism, vitamins K and D (25OHD) concentration, PTH, osteoprotegerin and osteocalcin were assessed. Statistical calculations were made in the Statistica program.

Results: In the first group - in children with bone dysplasia - the concentration of vitamin K was the highest and amounted to 4.56 ng/l. In children and adolescents with bone fractures (group II), the average vitamin K concentration was the lowest - 3.11 ng/l, and the BMD was the lowest too. In the control group, the average vitamin K concentration was 4.0 ng/l. There was no statistically significant correlation between densitometric test results and vitamin K concentration in the whole group of patients. There was also no relationship between vitamin K concentration and the number of fractures in the examined children. A statistically significant, positive correlation between vitamin K and osteoprotegerin levels was demonstrated.

Conclusion: In the studied group of children and adolescents from central Poland, the occurrence of bone fractures may be related to vitamin K concentration, and the studies require continuation on a larger group of patients.

P1007
BONE MINERAL DENSITY CHANGES AFTER ALLOGENIC STEM CELL TRANSPLANTATION

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Objective: Osteoporosis is a complication after allogenic stem cell transplantation (alloSCT). Our objective was to assess the evolution of BMD 6 months and 3 years after alloSCT, as well as the predictive factors of bone loss.

Methods: We performed a longitudinal, prospective and monocentric study at the University Hospital of Lille between 2005-2016. Assessments were done at baseline (pretransplant, V0), at 6 months (V1) and 3 y (V2). They comprised clinical, biological, radiologic (thoracic and lumbar spine) and densitometric (DXA) evaluations. Patients with myeloma were not included.

Results: 258 patients were included (144 men). 39.5% of them had acute myeloid leukemia and 15.1% of them, acute lymphoblastic leukemia. At respectively V0, V1 and V2, 17%, 22.8% and 17.5% of patients had osteoporosis according to DXA evaluation, mainly located at the femoral neck. 8 (7.5%), 53 (21.5%) and 38 (16.7%) patients received an antiosteoporotic treatment at V0, V1 and V2. Between V0 and V1, BMD decreased significantly (p<0.0001) at the lumbar spine (-3.6±0.8%), femoral neck (-4.3±0.7%) and total hip (-5.3±0.7%). Between V1 and V2, a significant increase was solely observed at the lumbar spine (+3.1±0.6%, p<0.0001). BMD changes did not differ at the 3 sites for patients who were and those who were not receiving antiosteoporotic treatment between V1 and V2. Incident fractures were found in 4.1% of patients at V1 and 5.3% at V2. We found that bone loss at every site between V0 and V1 was associated with corticosteroid intake. At the total hip, 13.7% of the decrease in BMD was due to an active hematological disease (p=0.036) and a bone marrow source graft (p=0.015).

Conclusion: Our study found evidence of bone fragility in alloSCT patients. There was persistence of low BMD at the hip 3 years post-transplant due to a slower improvement at this site.

P1008
BONE MINERAL DENSITY IN PATIENTS WITH HUMAN IMMUNODEFICIENCY VIRUS INFECTION: EVALUATION AND ASSOCIATED RISK FACTORS

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Objective: In patients with HIV infection, the prevalence of osteoporosis is higher in comparison with the general population. Antiretroviral therapy (ART) use seems to be a possible risk factor. We aimed to describe BMD status in HIV-infected patients as well as its associated risk factors.

Methods: Retrospective observational study with a sample of 107 HIV infected patients who underwent BMD evaluation.

Results: Baseline population results are summarized on the following Table:

	N (%), media (DS)
Males	79 (73.83%)
Age	55 ± 7.3 (y)
Weight	70.74 ±14.03kg
BMI	25.23 ±4.6 kg/m²
Smokers	47 (43.9%)
Time since HIV-infected diagnosis	17.3 ±7.3 y
Antiretroviral therapy:	
• Tenofovir disproxil (TED)	91 (85%)
o Treatment years	9.9±5.04
• Tenofovir alafenamide (TAF)	15 (14.01%)
o Treatment years	1.83±2.12
• Protease inhibitors (PI)	31 (28.97%)
o Treatment years	7.41±5.3
PTH (PTH)	47.5±26.5 ng/dl
Serum 25-OH-vitamin D (25-OH-VitD)	27±12.6 ng/ml
• Insufficiency (20-30 ng/ml)	43(40.1%)
• Deficiency (<20ng/ml).	29 (27%)
Femoral neck	
• T-score	-1.3 ±0.9
• Z-score	-0.5±0.9
Hip:	
• T-score	-0.8±0.8
• Z-score	-0.3±0.9
Lumbar spine:	
• T-score	-1.4±1.2
• Z-score	-0.8±1.25
Osteopenia:	
o Femoral neck:	74 (69.1%)
o Lumbar spine:	45 (42%)
Osteoporosis:	
o Femoral neck:	10 (9.3%)
o Lumbar spine:	20(18.6%)
Osteoporosis treatment	6 (5%) solo bisphosphonate

A statistically significant association was found between combined treatment with TED+PI and lower femoral neck and hip BMD and femoral neck osteopenia. Longer duration of treatment was associated with femoral neck osteopenia and lower BMD at the femoral neck and lumbar spine. 25-OH-VitD deficiency was associated with overall lower BMD at the femoral neck and hip.

Conclusion: HIV infected patients show a high prevalence of osteopenia and osteoporosis. Combined use of TED+PI, longer duration of ART treatment and long-standing HIV infection could be possible risk factors for this finding.

P1009
ASSOCIATION OF LOW GENERAL HEALTH STATUS, MEASURED BY EUROQOL (EQ5D), WITH OSTEOPOROSIS AND OSTEOPENIA

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Objective: Osteoporosis can be associated with physical, psychological and social disability in addition to skeletal fracture and musculoskeletal pain. The aim of this study is to clarify the possible relationship between health-related quality of life (HR-QOL) and BMD.

Methods: Observational study of 174 postmenopausal women, who completed Euroqol (EQ5D) questionnaire, which provides a profile of self-reported description using dimensional classification (EQ5D profile) and a visual analogue global self-reported health assessment (EQ5D VAS). Among them, 132 had osteoporosis (T-score <-2.5) and 42 had osteopenia (-1.0 ≤ T-score <-2.5). The mean age (64±8.9 vs. 61±8.1, p: 0.06) and the postmenopausal years (17.98±9.33 vs. 17.29±9.281, p: 0.677) were comparable between two categories. Patients with osteoporosis had significant lower BMD in both measured skeletal sites, lumbar spine (LS) and femoral neck (FN), than those with osteopenia (BMD LS: 0.855±0.114 vs. 0.904±0.086, p: 0.011, BMD FN: 0.693±0.133 vs. 0.806±0.084, p<0.0001).

Results: Generic HR-QOL was measured using EQ5D questionnaire. Patients with osteoporosis had 1) lower EQ5D profile (0.667±0.299 vs. 0.724±0.213, p: 0.2561) and 2) slightly higher EQ5D VAS (66.6±27.5 vs. 65.13±32.74, p: 0.779) than patients with osteopenia. In both cases there was no significant difference between two groups.

Conclusion: Women patients with postmenopausal osteoporosis and osteopenia had quite similar reduced HR-QOL.

P1010
EVALUATION OF PROFESSIONAL PRACTICES IN THE PREVENTION OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS: A QUESTIONNAIRE-BASED SURVEY

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Objective: Glucocorticoid-induced osteoporosis (GIO) is the most common secondary cause of osteoporosis and the resulting fractures. Despite the availability of recommendations and effective treatments, the GIO is undertreated. The purpose of our work was to evaluate the estimated level of adherence of physicians to recommendations on the prevention of GIO.

Another Goal was to identify the reasons of their low adherence and barriers to the use of preventive therapy in order to propose solutions to improve our practices.

Methods: An electronic survey was sent to physicians prescribes of long-term corticosteroid therapy assessing their adherence to the recommendations and their perception on the possible limits of their practices.

Results: 46 doctors responded to the questionnaire. 37 of them (80.4%) were internal medicine physicians. 25 physicians (54%) estimated that their overall adherence to the recommendations was greater than 50%. 22 physicians (47.8 %) estimated that they are evaluating the fall risk assessment to more than 50% of their elderly patients. 42 (91.3%) physicians estimated that their adherence to recommendations in vitamin D and calcium supplementation was greater than 50%. For 34 physicians (74%), the level of vitamin D is measured for less than 50% of their patients and for 26 of them (56.5%), less than 50% of their patient had a BMD measurement. Patients receiving anti-osteoporotic treatment is estimated less than 50% for 69.5% of physicians. 18 prescribers (39.1%) correctly answered that anti-osteoporotic treatment is indicated for patients aged more than 50 years and who are receiving corticosteroid ≥7.5 mg/d for ≥3 months, while 60.9% of them revealed that the decision is dependent on the BMD measurement. The difficulty in obtaining antiosteoporosis treatment by the health insurance system was the main reason for the low compliance to the recommendations.

Conclusion: The study revealed a low estimated level of adherence to the recommendations for prevention of GIO. Lack of knowledge likely led to the undertreatment patients. The limits of this prevention are often related to the difficulty of obtaining antiosteoporotic treatments through the health insurance system.

P1011
EFFECT OF BMI, 25-HYDROXYVITAMIN D (25-OH-D) AND HBA1C ON MYOSTATIN

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Objective: Diabetes type 2 is associated with increased fracture rates. This is not the case in adipositas. This might be influenced by vitamin D status and myostatin. Recently, Amor and coworkers reported increased levels of myostatin in obese patients and an association with insulin resistance (Amor et al. ECED 2019; 127:550). We wanted to evaluate myostatin levels in obese patients with diabetes mellitus type 2 and investigate if there is an association to vitamin D levels.

Methods: We investigated serum levels of myostatin and 25-OH-D in 27 individuals with a BMI <25 and normal HbA1c levels (<6.0%) (22 females, 5 males; group 1), 27 individuals with a BMI >35 and normal HbA1c levels (19 females, 8 males; group 2) and 28 individuals with BMI >35 and elevated HbA1c levels (>6.0) (15 females, 13 males; group 3). Serum acquisition was from July to September, thereby avoiding seasonal variations. HbA1c levels were determined with the Afineon system (Alere), 25-OH-D (total)

levels with an Elisa (Roche, Cobas 411) and myostatin levels with an ELISA (Immundiagnostik, Bensheim). Group differences were evaluated with ANOVA.

Results: As expected, 25-OH-D levels declined with increasing BMI and were significantly higher in individuals with normal body weight (group 1) than in the obese persons with and without diabetes. Myostatin was slightly higher in obese individuals without diabetes (not significant) than in individuals with normal body weight. However, in diabetic obese persons myostatin levels were significantly lower. Myostatin levels were negatively correlated with HbA1c levels (r=-0.39, p=0.00). Age was also correlated negatively with myostatin levels (p=0.03). The correlation between 25-OH-D levels and Myostatin exhibited also a trend (r=-0.24, p=0.08). There was no influence on the results by sex.

Conclusion: Obese patients with diabetes mellitus present with significantly lower myostatin levels than obese individuals without Diabetes mellitus. HbA1c levels seem to influence myostatin levels. 25-OH-D levels showed only a weak association to myostatin levels.

P1012
REFERENCE VALUES OF THREE-DIMENSIONAL PROXIMAL FEMUR PARAMETERS FROM BONE DENSITOMETRY IMAGES IN HEALTHY SUBJECTS FROM ARGENTINA

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Objective: New methodologies for the assessment of bone mass from by DXA have been developed in the last years. The three-dimensional analysis of the proximal femur by (3D-DXA) allows the evaluation of cortical and trabecular bone separately and has shown a good correlation with computed tomography. We aimed to obtain reference values in a healthy population of both sexes in Argentina.

Methods: Adults female and male subjects (n=992) from four cities from Argentina were included. BMD (g/cm^2) was measured by DXA on the femoral neck and total hip. The 3D analysis was performed with 3D-Shaper software (v2.9, Galgo Medical, Spain).

The cortical BMD (sDens - mg/cm^2) and trabecular volumetric BMD (trab vBMD - mg/cm^3) were consider. The distribution of the data was evaluated with the Shapiro-Wilk test and parametric or non-parametric tests were used as appropriate. Data were expressed as mean±SD and p<0.05 was considered significant.

Results: 75.5% women (n=749) and 24.5% men (n=243) were included. The mean age was 54.8±16.8 y and BMI was 27.3±5.4 kg/m^2. The data according to each decade and a comparison with a references group (decade 20-30) are shown in the following table (*indicates significant differences compared to decade 20-30):

	D20-30	D40	D50	D60	D70	D80
Women	n=137	n=79	n=212	n=186	n=95	n=40
Trab vBMD	208.8±40.2	197.1±37.9*	174.7±38.2*	165.5±41.9*	155.6±40.4*	161.7±40.3*
sDens	161.8±22.2	163.2±18.2	156.5±22.3*	156.1±24.3*	153.1±24.6*	156.7±29.8*
Men	n=89	n=29	n=28	n=41	n=33	n=23
Trab vBMD	216.5±39.8	225.1±42.8	201.4±32.9	182.0±43.4*	190.0±44.4*	178.2±21.7*
sDens	173.9±20.8	190.9±21.9*	181.5±21.3	173.7±20.8	179.6±28.2	179.4±21.7

Conclusion: A significant decrease in trabecular vBMD from D40 was observed in women, while in men this decrease was observed later (D60). The cortical parameter sDens was observed decrease from D50 in women and in men, an increase in D40 and cortical bone maintenance according to age was found.

P1013
MUSCLE MASS AND PREVALENCE OF SARCOPENIA IN RHEUMATOID ARTHRITIS PATIENTS

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Objective: Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by symmetric polyarthritis that can lead to joint deformity and disability. In addition, bone and muscle are also affected. We aimed to evaluate the muscle mass and the prevalence of sarcopenia in patients with RA.

Methods: Adults RA patients (n=105) of both sexes and 100 subjects as control group (CG) matched by age, sex and BMI were included. Sarcopenia was defined according to the new consensus of the EWGSOP2 as low muscle strength plus low muscle quantity. If low physical performance was also found, sarcopenia was considered severe. The whole body composition was measured by DXA (Hologic Discovery Wi). Muscle strength was evaluated by hand-grip strength (Baseline Hand Dynamometer, USA) in the dominant hand. The physical performance was evaluated by sit to stand, timed up and go and 8-foot walking test. The distribution of

the data was evaluated with the Shapiro-Wilk test and parametric or non-parametric tests were used as appropriate. Data were expressed as mean±SD and p<0.05 (*) was considered significant.

Results: No differences in age (CG: 52.1±12.6, RA: 53.3±13.4 y), sex (CG: 84 female and 16 male, RA: 87 female and 18 male) and BMI (CG: 26.0±5.1, RA: 27.8±4.6) were found between groups. Significantly lower percentage of lean mass was found in RA patients (CG: 59.5%, RA: 57.0%*). In addition, significantly lower muscle strength and physical performance in RA were found (handgrip strength=CG: 26.4±8.3 kg, RA: 17.7±8.9* kg; sit to stand test=CG: 12.8±5.9 s, RA: 16.5±5.9* s; timed up and go test=CG: 7.5±2.0 s, RA: 10.3±3.5* s; 8-foot walking test=CG: 1.07±0.27 m/s, RA: 0.79±0.23* m/s). Therefore, a significantly higher prevalence of sarcopenia in RA group was found (CG: 1%; RA: 18%*; RR: 21.8). While in the CG no there was no case of severe sarcopenia, in the RA group 7.6% were found. Moreover, a higher percentage of total fat (GC: 37.3±7.2%, RA: 40.9±6.8%*) and visceral fat (GC: 566.2±305.8 g, RA: 692.7±350.0* g) were found in RA patients.

Conclusion: A higher prevalence of sarcopenia was found in the RA group with an increase in total and visceral fat.

P1014
DIAGNOSIS DELAY AMONG ANKYLOSING SPONDYLITIS PATIENTS IN EGYPT: FACTORS, SOCIAL, ECONOMIC AND CLINICAL OUTCOME

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Objective: Ankylosing spondylitis (AS) is a destructive inflammatory disease which was reported to have the longest diagnostic delay among the inflammatory rheumatic disease. This lag period have a great impact on the clinical outcome and socioeconomic state of the patients. With the advent of TNFα inhibitors, early diagnosis in AS has become important[1]. We aimed to evaluate the period from symptom onset to diagnosis of AS in Egyptian patients and to examine possible reasons for delayed diagnosis and its impact on the economic and social life of the patients.

Methods: The study included 87 AS patients diagnosed according to the Assessment of Spondylarthritis international Society (ASAS) criteria [2]. A face-to-face interview was applied to take medical history, and a questionnaire that contains some clinical aspects of disease was used. Diagnosis delay was described as the gap between first AS symptom and correct diagnosis of AS. Clinical and functional assessment of axial SpA measured by Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Bath Ankylosing Spondylitis Functional Index (BASFI), Bath Ankylosing Spondylitis Metrology Index (BASMI). The direct medical cost during years of delay (including costs of medical consultations, medications, investigations, physiotherapy and surgical treatment) had been estimated by Egyptian pound.

Results: The study included 87 AS patients with mean age (30.03±8.3), 70 male (80.5%) and 17 female (19.5%). Mean delay in diagnosis was(5.7±4.9) y. Mean of diagnostic delay for patient diagnosed before 2010 is (14±4.4) and that of patients diagnosed after 2010 is (3.5±1.8) with significant difference between both (p value<0.0001). The main cause of delay was incorrect diagnosis as follow degenerative disc disease (43/87, 49.4%), nonspecific back pain (31/87, 35.6%), rheumatoid arthritis (10/87,11.5%), rheumatic fever (2/87, 2.3%) and tuberculosis of spine (1/87, 1.1%). The mean of the medical visits was (6±5.4). Most incorrect initial diagnoses were made by orthopedicians (57.9%), followed by neurologists (22.2%) followed by rheumatologist (10%) and general physicians (9.9%). Absence of extra-articular manifestations, negative family history and juvenile age are significantly associated with diagnostic delay. Delay in diagnosis is significantly associated with higher disease activity index (BASDAI), functional index (BASFI), and damage index (BASMI). The mean of the costs during years of delay is (15671.3±546.1) with the mean of cost per each year delay (660.9±6.6) with high significant association between the cost and longer delay in diagnosis (<0.0001). Regarding work ability, we found that (32.2%) are fit for work, unfit (29.9%), partially fit (37.9%) with high significant difference between ability of work and shorter delay. Regarding social effect, 40.2% of patients developed negative effect on social life with significant association to diagnostic delay (0.004).

Conclusion: Our study confirmed the importance of early diagnosis of AS due to its impact on patient's health outcome and socioeconomic state. We recommend to increase the awareness about the disease among healthcare professionals in our region.

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P1015
SCREENING CALCANEAL BONE MINERAL DENSITY AMONG JORDANIAN WOMEN

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Objective: Osteoporosis is the most common systemic skeleton illness that is characterized by reduction in bone density and increased risk of fracture. The diagnostic sensitivity of ultrasound measurement of the calcaneus in the prediction of hip fracture has been shown by recent large prospective studies to be similar to hip BMD measured with DXA and superior to spine BMD. For each standard deviation decrease in the measurement, the risk of fracture increases approximately 2-fold. The aim of this study was to screen BMD among different age groups of the Jordanian women in different parts of Jordan using a Hologic Sahara Bone Densitometer Machine.

Methods: BMD of the calcaneal Jordanian Women screen had been executed by the National Woman's Health Care Centre in collaboration with the Jordanian Osteoporosis Society (JOPS) through woman's health awareness campaign using an easy and painless procedure; an osteoporosis screening measures the calcaneal T-score by placing the (Lt) foot in a Hologic Sahara Bone Densitometer Machine for all ladies attended the campaign and were elder than 20 y.

Results: 776 women have been screened from different parts of Jordan, their age was 20-87 y. Using estimated BMD by heel ultrasound, few patients have T-scores below -2.5, whereas most women fall above this level. There were no relation between result and location.

Conclusion: In areas with poor accessibility to DXA, Screening Calcaneal Bone could be used as an effective screening tool for early detection of osteoporosis. An early detection would allow preventive measures to be taken to hinder the progression of the osteoporosis.

P1016
WHO FALLS AFTER A STROKE?

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Objective: Falls are an important factor for acute stroke mortality[1]. Previous studies have found that depression[2], poor vision and inability to perform activities of daily living[3] are risk factors for falls post-stroke. However, such studies in Asian countries are few. We aim to describe self-reported falls 1-y post-stroke and its associated risk factors in Singapore, a multi-ethnic Asian country.

Methods: Data comes from the Singapore Stroke Study, a prospective study on stroke-caregiver dyads. Stroke patients were interviewed during their hospital admission, 3 months and 12 months post-stroke. Data collected include demographic information, stroke characteristics, function, day rehabilitation service use and self-reported health-related quality of life by EQ5D. We examined the subset of this population that had 12 months of modified Rankin score (mRS) data (n=281). Fallers are defined as patients who fell at least once 1-y post-stroke. T-test and chi-square test were used to compare continuous and categorical variables between fallers and nonfallers respectively.

Results:
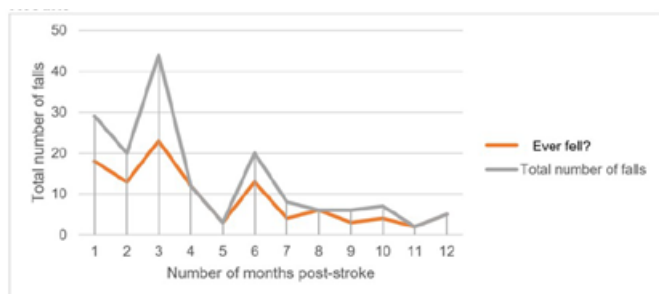
Prevalence of falls was 31.9% (n=68), and this declined with time. Comparing falls vs. nonfallers, mean age was similar, 62.2±1.2 y vs. 63.2±0.7 , a third were females (82.4% vs. 83.1%) and most had infarcts (92.4% vs. 86.4%).

Risk factors assessed during the admission that were predictive of a fall within 1-y post-stroke were mRS (3.19±0.16 vs. 2.58±0.10, p=0.0014) and recommendation for day rehab (70.6% vs. 47.9%, p=0.0008). However, service uptake is low (17.8% vs. 5.6%). Those with left sided weakness were less likely to fall (upper limb UL: 50% vs. 70%, p=0.019; lower limb LL: 38.2% vs. 64.8%, p=0.0053); no association was seen with right sided weakness. mRS was also predictive at 3 months for falls during the subsequent 9 months (2.31±0.18 vs. 1.46±0.10, p=0.035). Poor vision, not significant during admission, was significantly different at 3 months and correlated with more subsequent falls (5.9% vs. 2.4%, p=0.036). EQ5D domains including mood were not predictive of falls. With multivariate analysis of significant variables, only day rehab recommendation at admission was significant for falls 1-y post-stroke (p=0.002).

Conclusion: Prevalence of falls 1-y post-stroke is high. Inpatient stroke teams accurately identify high risk fallers who need post-discharge day rehab. However, more work is needed to promote uptake. It is important to retest mRS and vision, particularly at 3 months, to target fall interventions. Interestingly, our study shows a protective effect of having left sided weakness for falls. Further investigation is needed to crystallise this relationship.

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P1017
EFFICACY OF LOW DOSE DENOSUMAB IN MAINTAINING BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: A REAL WORLD, PROSPECTIVE OBSERVATIONAL STUDY

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Objective: Denosumab, a fully human monoclonal antibody to RANKL, has been shown to increase BMD and reduce the risk of hip, vertebral and nonvertebral fractures in postmenopausal women with osteoporosis (1-3). Varying doses of denosumab including 30mg/3months have demonstrated a decrease in bone remodelling in a dose-dependent manner (2,4-6). The primary objective of this study is to evaluate the efficacy of low dose denosumab (30mg/6 months) in postmenopausal women with

osteoporosis who are reluctant to consider or continue the full dose of denosumab due to adverse events (AE) or concerns of potential AE.

Methods: Following informed consent, postmenopausal women with a T-score of ≤ -2.5 at the lumbar spine (LS) or at the total hip (TH) received denosumab 30mg/6months. Patients with an additional skeletal disorder, prior fragility fracture, or on oral steroids (daily in the past 12 months) were excluded. The primary endpoint was the percent change in BMD at the lumbar spine (LS), total hip (HP), femoral neck (FN) and 1/3 radius (1/3R) at 12 months. Secondary outcomes were 1) percent change in BMD at the LS, TH, FN, and 1/3R at 24 months and 2) AE.

Results: We enrolled 183 patients. The mean age was 69 y (SD=7.07), 80% of patients had a moderate fracture risk (CAROC tool), 3% were current smokers and 9% consumed alcohol daily. 14.4% of patients were on SSRI/SNRI, 9.6% were on PPI, and no patient was on an aromatase inhibitor. At 12 months (n=125), the mean BMD significantly increased by +2.0% (95%CI 2.8%-1.3%) at the LS (p<0.001). There was no significant change in BMD at the FN, TH, AND 1/3R. At 24 months (n=65), the percent change in BMD was +3.4% (95%CI 4.8%-2.0%: p<0.001) at the LS, +1.5% (95%CI 2.9%-0.15%: p=0.031) at the FN, +1.9% (95%CI 3.5%-0.24%: p=0.025) at the 1/3R. There was no significant change in BMD at the TH.

Conclusion: Low dose denosumab appears to be effective in maintaining BMD in postmenopausal women with a moderate fracture risk and may be of benefit in individuals who are experiencing side effects or concerns of side effects. This may also be of value following 10 y of therapy in order to maintain BMD.

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P1018
IMPACT OF CROSS HORMONAL THERAPY IN PATIENTS WITH GENDER DYSPHORIA

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Objective: We present an analysis in the impact of hormone replacement therapy on BMD in patients with gender incongruity who attend a program with a multidisciplinary approach in a reference center in Bogotá Colombia. We aimed to describe the changes in BMD in a population with gender dysphoria that are receiving affirming gender hormone therapy.

Methods: The impact of hormone affirmation therapy on BMD within a period of one year after its start was evaluated. A series of cases of eight patients with gender dysphoria, of MTF (male to female) and FTM (female to male) dysphoria is described determining changes in BMD.

Results: A significant change in BMD in both groups MTF and FTM was not documented, however, there is a trend in the increase in BMD in patients receiving affirmative androgen therapy.

Conclusion: Gender affirmation therapy in the described population does not seem to have a significant impact, although a slight increase in BMD is documented towards the group of FTM patients. More studies are needed to elucidate this effect.

P1019
HEALTH SERVICE USE AND RECOVERY OF QUALITY OF LIFE 12 MONTHS POST-FRACTURE: LATENT CLASS ANALYSES OF THE INTERNATIONAL COST AND UTILITIES RELATED TO OSTEOPOROTIC FRACTURES STUDY (ICUROS)

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Objective: To identify specific combinations of health service use that facilitate the recovery of health-related quality of life (HRQoL) 12-months following major osteoporotic fracture (MOF).

Methods: The analyses included 4126 adults aged ≥50 y with a MOF (1657 hip, 1354 wrist, 681 vertebrae, 434 humerus) participating in the International Cost and Utility Related to Osteoporotic Fractures Study (ICUROS) – a multinational observational study (Austria, Australia, Estonia, France, Italy, Lithuania, Mexico, Russia, Spain, UK). HRQoL, pre-fracture and 12 months post-fracture, was measured using the EQ-5D-3L survey. Health service use data was collected by patient interviews and medical record reviews including in-hospital care; outpatient care (e.g., allied health); community services (e.g., home help, home modifications) and medication use. Latent class analyses were applied to identify different combinations of health service use ("classes") that were statistically distinct and clinically meaningful to best represent health service use. Logistic regression was used to assess effects of classes on HRQoL recovery adjusted for age, sex and pre-fracture HRQoL.

Results: The number of classes ranged from 2-5 across countries, with several classes being associated with improved HRQoL recovery. The greatest recovery in HRQoL was seen in Italy for the combination of ED presentations, outpatient department visits, phone counselling, informal home help, vitamin D/calcium supplementation and non-opioid analgesic use (n=163; OR=4.44; CI 2.91-6.78, p<0.001). Greater HRQoL recovery across countries was commonly associated with a combination of

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services that included ED presentations (no hospitalization); outpatient department visits; allied health; vitamin D/calcium supplementation and/or nonopioid analgesic use.

Conclusion: The results identify different health service use pathways that can be utilized by clinicians worldwide to improve HRQoL post-MOF.

P1020

IMPLEMENTATION OF AN ELECTRONIC CARE PATHWAY FOR HIP FRACTURE PATIENTS: A BEFORE AND AFTER STUDY

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Objective: Paper-based care pathways can cause communication failures between multidisciplinary teams, potentially compromising patient safety. Computerized care pathways (e-pathways) may facilitate better communication between clinical teams. This study aimed to investigate whether an e-pathway reduces delays in surgery and hospital length of stay compared to a traditional paper-based care pathway (control) in hip fracture patients.

Methods: A single-center evaluation with a retrospective control group was conducted in the orthogeriatric ward, Nepean Hospital, Australia. We enrolled patients aged ≥65 y that were hospitalized for a hip fracture in 2006 (control group) and 2011-2012 (e-pathway group). The e-pathway included a 'Fractured Neck of Femur Checklist' that provided the essential steps in the care of patients with hip fracture, guiding a multidisciplinary team on examinations, tests and treatment to be carried out. Main outcome measures were delay in surgery and hospital length of stay; secondary outcomes were in-hospital mortality and discharge location. Outcomes were analyzed using logistic and liner regression models and adjusted for age.

Results: 181 patients were enrolled in the study (129 control; 54 e-pathway group). There was a significant reduction in delay to surgery in the e-pathway group compared to control group in unadjusted (OR=0.19; CI 0.09-0.39; p<0.001) and adjusted (OR=0.22; CI 0.10-0.49; p<0.001) models. There were no significant differences between groups for length of stay (median 11 vs. 12 days;), in-hospital mortality (1 vs. 7 participants; p=0.206) or discharge location (p=0.206).

Conclusion: Compared to a traditional paper-based care pathway, implementation of an e-pathway for hip fracture patients results in a reduction in total number of delays to surgery, but not hospital length of stay. Further evaluation is warranted using a larger cohort investigating clinical and patient-reported outcome measures.

P1021

ASSOCIATIONS BETWEEN OSTEOPOROSIS, SARCOPENIA AND FRAGILITY FRACTURES IN COMMUNITY-DWELLING OLDER ADULTS

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Objective: To investigate the association between BMD and the severity of sarcopenia using the revised EWGSOP2 definition.

Methods: BMD (DXA), appendicular lean mass (DXA), handgrip strength (hydraulic dynamometer) and gait speed (over 4-metres) were used to screen for osteoporosis and sarcopenia. Participants were categorised as osteoporotic according to the WHO definition (T-score ≤-2.5), and classified with probable sarcopenia, confirmed sarcopenia or severe sarcopenia according to the EWGSOP2 criteria. Fasting biochemistry profile, fragility fractures, malnutrition index, geriatric depression scale and fear of falling, were also measured using validated procedures.

Results: A total of 484 community-dwelling older adults (69.6% women) with a median age of 76 y [Interquartile range (IQR): 70-81] were included in this study. Osteoporosis prevalence increased from 47.6% in nonsarcopenia to 65.5% in probable sarcopenia and 78.1% in those with confirmed sarcopenia ($p<0.05$). After adjusting for age, sex and vitamin D in multivariate models, osteoporosis was associated with a greater risk of confirmed sarcopenia [odds ratio=2.885, 95%CI: 1.155, 7.204, $p=0.023$]. The number of fragility fractures were also higher in those with sarcopenia vs. those without ($p=0.013$).

Conclusion: Prevalence of osteoporosis increased across the severity of sarcopenia, and osteoporosis was associated with a greater risk of sarcopenia. As such, health care professionals should screen for sarcopenia in those with low BMD.

P1022

PREVALENCE OF FRAX RISK FACTORS IN PRIMARY CARE FROM 8 EUROPEAN COUNTRIES

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Objective: To assess patterns of FRAX risk factors among European countries that participated in a study in the primary care setting evaluating OP diagnosis and treatment patterns in women ≥70 y.

Methods: Eligible patients were community-dwelling women aged ≥70 who visited their primary care physician for any reason and provided consent. Data were collected from self-reported questionnaires and medical records, with medical records taking precedent in cases of discrepancies. The primary objective was to assess the treatment gap in patients at increased risk of fragility fracture and these results have been reported previously

[McCloskey et al, ESCEO 2019]. This analysis reports prevalence of FRAX risk factors across the 8 participating countries (Belgium, France, Germany, Ireland, Poland, Slovakia, Switzerland, UK).

Results: 3798 patients were enrolled between Mar-Oct 2018, with over 500 women per country except Switzerland (n=205). Prior fracture was the most commonly reported risk factor with relatively similar prevalence across 7 of the 8 countries (range 27.3% in France to 33.3% in Slovakia) with a higher prevalence in the smaller cohort from Switzerland (46.8%). Parental history of hip fracture was the second most common factor, ranging from 7.0% in Ireland to 13.8% in France. Current smoking was a more prevalent risk factor (range 4.7% in Slovakia to 7.0% in the UK) than an alcohol intake of 3 or more units daily (range 0% in Poland to 3.8% in the UK). The 10-y probability of hip and major osteoporotic fracture (without BMD) was similar across most countries, but was notably lower in Poland and higher in Switzerland. Despite comparable rates of prior fracture in most countries, the prevalence of osteoporosis diagnosis varied two-fold from 15.0% in Poland to 30.2% in Switzerland.

Conclusion: FRAX risk factors appear to vary by geography, though some of the variability is perhaps less than expected. There was no clear relationship between osteoporosis diagnosis and the prevalence of risk factors, suggesting the need for better awareness of osteoporosis in primary care.

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Disclosures: Eugene McCloskey: Grants/research support from ActiveSignal, Amgen, AR UK, AstraZeneca, Consilient Healthcare, GSK, Hologic, I3 Innovus, Internis, IOF, Lilly, Medtronic, Merck, MRC, Novartis, Pfizer, Roche, Sanofi-Aventis, Servier, Synexus, Tethys, UCB, Unilever, and Warner Chilcott. Consultant for ActiveSignal, Amgen, Consilient Healthcare, Fresenius Kabi, GSK, Synexus, and UCB. Speaking fees from Agnovos, Amgen, AstraZeneca, Consilient Healthcare, GSK, Hologic, Internis, Lilly, Pfizer, Roche, Servier, and UCB. Martin Coyne: speaking fees from Amgen. Pankaj Tiwari: funded by Amgen. Robert Stad, James O'Kelly: Amgen employment and stock ownership. Socrates Papapoulos: Consulting/speaking fees Amgen, Axsome, Gador, Radius Health, UCB.

	Belgium (N=505)	France (N=543)	Germany (N=506)	Ireland (N=500)	Poland (N=505)	Slovakia (N=534)	Switzerland (N=205)	UK (N=500)
Mean age	78.6	79.4	78.2	77.1	77.3	76.4	79.0	78.0
BMI <18.5 kg/m^2 – %	2.0	1.5	1.6	2.0	1.4	0.7	3.9	1.8
Prior fracture – %	31.5	27.3	29.8	31.0	30.9	33.3	46.8	31.4
Parental hip fracture %	10.5	13.8	8.3	7.0	8.1	8.2	13.2	9.8
Current smoking – %	6.7	5.0	6.9	6.6	5.5	4.7	6.8	7.0
Glucocorticoids use - %	3.6	3.1	4.5	6.6	4.2	1.7	6.8	8.2
Rheumatoid arthritis - %	3.6	5.0	4.9	3.2	3.2	3.9	3.4	4.2
Alcohol 3 more units per day - %	1.2	0.6	0.8	1.8	0.0	0.4	3.4	3.8
10-y probability of fx w/o BMD - %								
hip	8.8	8.8	7.6	7.8	3.7	6.1	12.2	7.2
major	18.3	18.3	16.6	18.0	9.5	14.5	29.3	18.3
OP diagnosis – %	24.8	19.7	16.2	25.8	15.0	27.0	30.2	15.8

P1023
THE IMPACT OF CLINICAL RISK FACTORS FOR FRACTURE ON TREATMENT OF OSTEOPOROSIS (OP) IN PRIMARY CARE

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Objective: To assess levels of treatment for OP in European primary care among subgroups of women aged ≥70 with clinical risk factors for fracture.

Methods: Eligible patients were community-dwelling women aged ≥70 who visited their primary care physician for any reason and provided consent. Countries included Belgium, France, Germany, Ireland, Poland, Slovakia, Switzerland, and the UK. Patient demographics, treatment history and clinical risk factors were collected via self-reported questionnaires and medical records. The primary objective was to assess the treatment gap in patients at increased risk of fracture (defined as prior fracture, T-score ≤-2.5, or exceeding country-specific FRAX thresholds) and these results have been reported previously [McCloskey et al, ESCEO 2019]. This analysis reports the treatment gap according to the presence of specific risk factors for fracture.

Results: From the total population of 3798 patients, 55% met the definition of increased risk of fracture, 21% were diagnosed with OP, 48% exceeded the FRAX threshold, 25% received a DXA, 8% had a T-score ≤-2.5, and 32% had a prior fracture (including 4% hip and 5% spine). Patients were evenly distributed across age groups (70-74, 34%; 75-79, 30%; 80+, 36%) and most BMI groups (<18.5 kg/m^2, 2%; 18.5-24.9, 31%; 25−29.9, 37%; 30+, 29%). A large majority of patients were untreated for osteoporosis in most risk groups, but a smaller treatment gap was found in patients with an OP diagnosis or a recorded T-score ≤-2.5 (Figure). The proportion of untreated patients was similar across age groups and increased with higher BMI (<18.5, 73%; 18.5-24.9, 76%; 25−29.9, 86%; 30+, 89%).

Conclusion: Large treatment gaps exist in primary care populations with different risk factors. Treatment rates were improved vs. overall when OP was diagnosed or a low T-score was identified.

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Disclosures: Eugene McCloskey: Grants/research support from ActiveSignal, Amgen, AR UK, AstraZeneca, Consilient Healthcare, GSK, Hologic, I3 Innovus, Internis, IOF, Lilly, Medtronic, Merck, MRC, Novartis, Pfizer, Roche, Sanofi-Aventis, Servier, Synexus, Tethys, UCB, Unilever, and Warner Chilcott. Consultant for ActiveSignal, Amgen, Consilient Healthcare, Fresenius Kabi, GSK, Synexus, and UCB. Speaking fees from Agnovos, Amgen, AstraZeneca, Consilient Healthcare, GSK, Hologic, Internis, Lilly, Pfizer, Roche, Servier, and UCB. Martin Coyne: speaking fees from Amgen. Pankaj Tiwari: funded by Amgen. Robert Stad, James

O'Kelly: Amgen employment and stock ownership. Socrates Papapoulos: Consulting/speaking fees Amgen, Axsome, Gador, Radius Health, UCB.

Figure: Proportion of women not receiving OP treatment by risk group
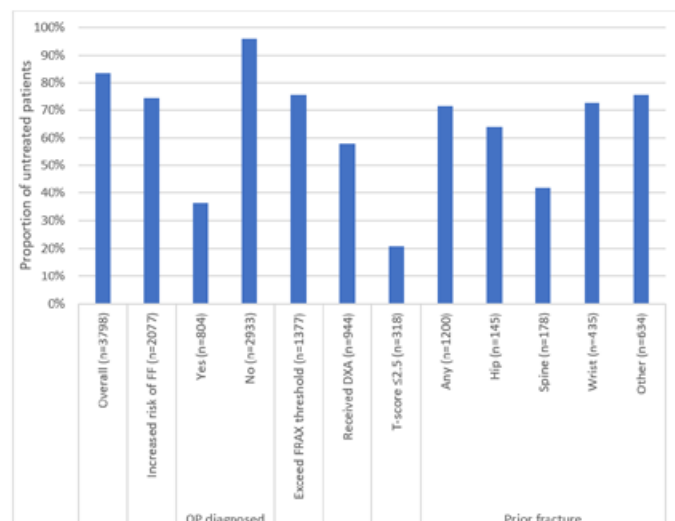
P1024

C-TELOPEPTIDE LEVELS ARE ASSOCIATED WITH MUSCLE STRENGTH AND PHYSICAL PERFORMANCE IN COMMUNITY-DWELLING OLDER ADULTS

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Objective: RANKL and terminal telopeptide (CTx) are markers of bone catabolism. RANKL was recently associated with muscle wasting conditions such as sarcopenia. Whether CTx is also associated with these conditions remains unknown.

Methods: Lean body mass [LBM (DXA)], muscle strength (hydraulic dynamometer) and physical performance [short physical performance battery (SPPB)] were assessed by validated procedures, and cut-points by EWGSOP1, its revised edition (EWGSOP2), and the Foundations for the National Institutes of Health (FNIH) were used for classifications. Fasting CTx, vitamin D, and PTH concentrations were measured by immunoassays.

Results: After excluding 90 participants on osteoporosis medications (bisphosphonates: n=53; denosumab: n=37), a total of 254 (73% women) community-dwelling older adults (median age, 78 y; IQR, 73-83) were included in this cross-sectional analysis. After adjusting for clinical covariates (age, sex, vitamin D, PTH) in multivariate models, higher quintiles of CTx were associated with lower grip strength [EWGSOP1: β=1.392, 95%CI: 1.092, 1.775, p=0.008; FNIH: β=1.377, 95%CI: 1.071, 1.770, p=0.013] and poorer SPPB scores (β=1.298, 95%CI: 1.005, 1.677, p=0.045). However, CTx was not associated with LBM (p>0.05).

Conclusion: Higher concentrations of CTx were adversely associated with lower muscle strength and physical performance in older adults, highlighting potential use of this biomarker in the sarcopenia field. Nevertheless, longitudinal trials are needed to examine the efficacy of CTx in predicting sarcopenia, and accurate measures of muscle mass should be included.

P1025

USP14/NLRC5 DOWNREGULATED TITANIUM PARTICLE-INDUCED OSTEOLYSIS IN MICE THROUGH NF-κB AND PI3K/AKT PATHWAYS

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Objective: Wear particles-induced osteolysis limits the long-term survivorship of total hip arthroplasty (THA). Monocyte/macrophage lineage cells are the key players in the response to wear particles, in which NF-κB and PI3K/Akt signaling pathways had been proved to be the most important pathways. And ubiquitin-specific protease 14(USP14) specifically removes the polyubiquitin chains from NOD-like receptor family CARD domain containing 5(NLRC5) and enhances the NLRC5-mediated inhibition of NF-κB signaling. In this study, we aimed to clarify the role of USP14/NLRC5 in wear particles-induced osteolysis in vitro and in vivo.

Methods: In vitro, titanium particles were prepared to stimulate the murine macrophage cell line J774A.1. The TLR4 agonist LPS were used as positive control. A recombinant lentivirus vector directed targeting the mouse Usp14 and Nlrc5 gene with knockdown and overexpression effect were designed, chemically synthesized and stably transfected into J774A.1 cells. After stimulated by titanium particles, the mRNA and protein expression of target genes (Usp14, Nlrc5, TNFα) was detected by real-time PCR and expression of NF-κB and PI3K/Akt pathways was western blotting. Cell supernatants were harvested and used for TNFα measurement by mouse TNFα Instant ELISA Kit. Macrophage cell subpopulation marker iNOS was analyzed by flow cytometry to evaluate the M1 phenotype. Mice were divided into 4 groups and murine reporter macrophage cell line transfected with different lentiviral vector ((Sham, Ti+Vector, Ti+NLRC5-overexpressed, and Ti+USP14- overexpressed) were injected respectively at the midline sagittal of the calvaria before suture. Mice calvaria were collected for μCT imaging for the evaluation of BMD, total volume (TV), bone volume (BV) and BV/TV.

Results: Proinflammatory cytokine TNFα production and NF-κB pathway activation induced by titanium particles were inhibited respectively by the overexpression of NLRC5 and USP14, as well as the M1 polarization of macrophage and the underlying PI3K/Akt pathway activation. Furthermore, cranial osteolysis induced by titanium particles in mice model was significantly attenuated by the overexpression of NLRC5 and USP14.

Conclusion: Our study demonstrated that USP14/NLRC5 play a negative role in osteolysis induced by titanium particles through the suppression of NF-κB and PI3K/Akt pathways in vitro and in vivo.

P1026
A NEW BICYCLE DESIGNED TO BRING A REVOLUTION IN THE BICYCLE STYLE AND REDUCE CHRONIC STRAIN ON SPINE

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Objective: Low back pain is reported by more than half of cyclists (61%). The pathomechanics and association of risk factors of lumbar spine and overuse injuries in typical bicycle, produce Low Back Pain in cycling. A new bicycle designed by C. Matzaroglou and D. Kouzoudes which aims to bring a revolution in the bicycle style and improve the stresses in lumbar spine.

Methods: This type of new bicycle introducing an extra mechanical support at the height of the chest of the ride. The typical bicycle rider is currently supported mainly at a single support point (the saddle) (Figure 1), which results in stresses with finite element model that reach up to 10 MPa, a number which can cause a chronic strain on spine on a regular bicycle user and produce low back pain (Figure 2).

Results: The single support is causing a forward rotation of the bicyclist in the case of an accident, leading to a quick ejection of him/her towards the impact point with obvious injuries. By adding a wider support at the bicyclist chest, the following advantages can be gained for the bicyclist: (a) a reduce of the saddle stresses by at 60% (b) a reduce of the lumbar spine stresses by at 65% and (c) the creation of an impact – safe structure, which will be able to maintain the bicyclist in his upright position in case of an accident and providing him/her with a corresponding shield against the impact objects. On the other hand, this bicycle can be used for rehabilitation purposes, by patients who have lost their muscular mass due to a long term inactivity after an injury or a disease, by helping them to regain this mass through exercise as it is safer to use compared to the classical bike designs.

Additionally, the proposed mechanical support can be used as an extra platform to attach respiratory and cardiological sensors and perform a real-time, in situ health monitoring of the rider.

Conclusion: The new designed bicycle with an extra mechanical support at the height of the chest of the ride, because of the relieve of the lumbar spine stresses avoid the overuse injuries, of the typical riders and may be avoid the low back pain which is the most prevalent symptom of the bicyclists.

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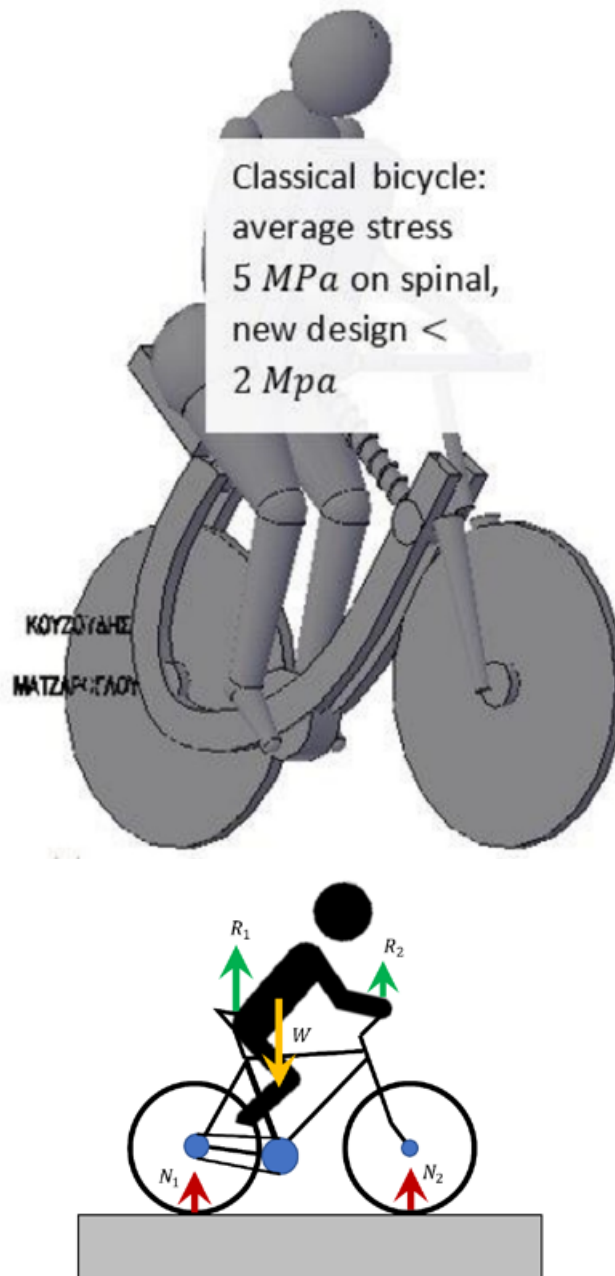
The forces on the bike are shown in Figure 1, the is the bicyclist's weight and for a typical mean male mass of and approximate (gravitational constant). This force is reacted by the bike at two points, at the saddle and the hand handles, with corresponding forces and, with being the (symmetric) sum of the two handle forces. Because of the classic bicycle design, most of the load is on the cell.

P1027
ATYPICAL FRACTURES IN PEDIATRIC PATIENTS WITH OSTEOGENESIS IMPERFECTA TREATED WITH ZOLEDRONIC ACID

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Objective: The osteogenesis imperfecta (OI) syndrome, is a pathology with autosomal dominant inheritance (in some cases recessive), caused by the mutations of genes that code the formation of type I collagen. This condition is characterized by bone fragility, deformity and predisposition to fractures. Bisphosphonates have been the pharmacological therapy used based on the fact that children with OI have "osteoporosis secondary". The objective of pharmacological therapy is to reduce the frequency of fractures, maximize mobility, improve the function and quality of life. The complication of the chronic use of bisphosphonates (3-8 y) is the presence of atypical fractures, located in the femoral diaphysis. However, some authors recently describe the presence of atypical fractures from the subtrochanteric region to the distal femoral metaphysis and there are some reports in other bones such as tibia, humerus. These fractures usually appear after a low energy trauma equivalent to sitting in a chair or in the WC., but can appear spontaneously. The literature of atypical fractures in children with osteogenesis imperfecta and treatment with zoledronic acid is limited. The incidence reported in the few series in OI condition indicates a higher incidence compared to the cohorts of patients with osteoporosis

Methods:

Ambispective one cohort study.

Retrospective cohort sice 2008-2016

Prospective cohort sice 2017-2021

Prognostic variable: duration of treatment with zoledronic acid

Outcome variable: presence of atypical fracture.

Eligibility Criteria:

•Patients with a clinical diagnosis of osteogenesis imperfecta treated with zoledronic acid.

•Complete radiographic file, control densitometry, complete clinical history, including a description of bone health and initial laboratories of vitamin D and serum calcium alkaline phosphatase.

Monitoring methods:

•X-rays in anteroposterior and lateral view of the thigh and hip, arm and elbow, densitometry and laboratory studies serum calcium, albumin, vitamin D, alkaline phosphatase every 6 months.

•Consultation with pediatric orthopedist

Results:

Prospective Phase: 30 patients are followed up. 17 patients with OI type I with middle age 9.8, 9 patients with OI type III (middle age 11.3) and 4 patients OI type IV (middle age 9.25). Found 13

fractures in 12 patients (1 bilateral), in femoral, humerus and ulna diaphysis. The 25 OH-D analysis show middle levels 26.8 (IC95% 21.7-31.95)

Retrospective Phase: From the search of 38 files. OI type I: 18 patients, OI Type III: 15 patients and OI type IV: 4 patients. We found 8 atypical fractures, in 7 patients.

Conclusion: We followed 68 patients with OI, finding 15 atypical fractures with total incidence of 14%, being more frequent in men 1.14:1. The majority of atypical fractures occur at the beginning of adolescence, with 6 (SD 2) dose of zoledronic acid. These fractures rarely show pain.

P1028
CASE REPORT: ROLE OF YTRIUM IN THE TREATMENT OF REFRACTORY SYNOVITIS IN OA

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Objective: The histological changes observed in the synovial membrane in OA generally include characteristics indicative of an inflammatory "synovitis"; such as hyperplasia, infiltration of macrophages and lymphocytes, neoangiogenesis and fibrosis of synovial membrane. The synovial reaction pattern varies with the duration of the disease and associated metabolic and structural changes in other joint tissues. The presence of synovitis in OA is associated with more severe pain and joint dysfunction, and may be predictive of faster rates of cartilage loss in certain patient populations.

Methods: A 55-year-old female patient with osteoarthritis of the right knee and synovitis refractory to treatment, including 6 infiltrations with corticosteroids, underwent ytrium radiosynovectomy. The patient was evaluated for pain, by VAS, and by functional tests TUG and FTSST, before and after radiosionionectomy.

	VAS	TUG	FTSST
Pre	10	10'10	22'05
1m	7	5'96	9'95
3m	5	7'31	14'23
6m	2	8'55	14'02
12m	0	9'83	14'08

At 18 months the patient worsened pain in the right knee, with USG confirmed synovitis. She underwent a new radiosynovectomy.

	VAS	TUG	FTSST
Pre	6	6'35	10'23
1m	5	08'35	15'71
3m	2	06'29	11'21
6m	0	5'97	10'38
12m	0	06'03	12'28

Results: Radiosynovectomy was able to improve pain and TUG and FTSST results, but it was necessary to repeat the procedure. Despite the progressive worsening of functional tests after the

second radiosynovectomy, the patient no longer has pain or limitations in her activities until 12 months after the second radiosynovectomy.

Conclusion: This case demonstrates that ytrium can be a useful tool in the control of OA-related synovitis.

P1029
OSTEOGENIC LOADING SAFETY AND FEASIBILITY WITH INDIVIDUALS OF LOW BODY MASS

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In 1896 Julius Wolf hypothesized that bones increase density when exposed to increased force demand and decrease in density in less demanding conditions. Numerous studies have confirm this hypothesis that maximal loading of the skeletal system can increase BMD and prevent and or reverse osteoporosis. Mechanical loading has been shown to both inhibit bone resorption and increase bone formation.

While osteogenic loading for improved bone health has been demonstrated in "heathy and/or mature adults", there are no studies where subjects have a history of extremely low body weight due in part to concerns regarding possible bone weakness and injury risk. Can individuals with low BMD participate in high force low volume exercise?

The purpose of this study was to examine if osteogenic loading was safe (no injuries with exercise stimulus) for individuals presenting with low BMI and investigate the capacity of subjects with low BMI to safely produce compressive forces which are of sufficient magnitude to prompt bone formation in DXA scores for L1-L4 and femur.

Subjects were drawn from a pool of adults participating in an osteogenic loading program from 2009-2018. The database was de-identified for the purposes of this study to protect privacy. Participants age, gender, number of exercise exposures, type of exercise and degree of force produced in each of 4 unique activities were chosen that have been shown to result in bone formation. Adults 18-68 y of age who completed at least 24 osteogenic loading sessions within a period of 30 weeks (one session/week) with a presenting body mass of 14.0-18.5 (low BMI) were selected.

Of the individuals with low BMI, (n=289, female 206, male 83) met or exceeded the loading forces reported in previous studies associated with changes in DXA scores. These included multiples of body weight (1.5x chest press, 4.5x leg press, 1.0x core pull and 1.5x vertical lift). The low BMI group were able to achieve greater force production than observed in "normal" BMI, overweighted BMI and higher BMI - obese. Within the 289 participants who collectively participated in 6936 exercise sessions, there were no acute injuries as a result of the high force production/low duration as well as no long term or chronic injuries were reported.

These data demonstrated that underweight adults have sufficient capacity to safely create compressive forces associated with bone formation. Osteogenic loading may have restorative potential and low injury risk in an underweighted population. These results may have implications for (more research is required) individuals dealing with bone mineral loss observed in patients with eating disorders, as a result of certain cancer treatments and other medical diagnoses where exercise may be beneficial but the individual may not have the energy or capacity for traditional exercise prescription.

P1030
PERIODONTITIS AND OSTEOPOROSIS: A DANGEROUS COEXISTENCE?

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Periodontitis is a serious medical condition which may lead to edentulousness in middle aged patients. It is a chronic inflammatory systemic disorder which affects the oral cavity, the maxilla and mandible. It may be associated with osteoporosis. It presents unique problems in the management of osteoporosis. The patients are in the imminent danger of losing teeth. Some of the antiosteoporotic agents may induce osteonecrosis, while they may pose problems in the implantation of dental implants.

The aim was to describe the management of osteoporosis in patients with periodontitis.

A group of patients, 10 female and 1 male presented to the outpatient osteoporosis clinic. They had a T score of -2.8 to -3.6. They also had periodontitis. A group of 4 patients had already lost 1 to 4 teeth, and were in the process of dental implant installation. An extensive laboratory and clinical examination was performed.

Within the group of patients with osteoporosis and periodontitis, patients with osteoporosis were managed with anticatabolic treatment. The patients who were in the process of dental implant installation were managed conservatively with calcium and vitamin D until the installation of the implant was complete and a period of 3 months after installation. Thereafter, antiosteoporotic agents were administered.

Periodontitis is a chronic systemic medical disorder which affects patients in the middle age group. Postmenopausal women are particularly vulnerable. The management of osteoporosis in this group is particularly challenging. They are in danger for the development of osteonecrosis of the jaw. Patients should be managed conservatively while in the process of dental implant installation. They should be managed with caution while care should be exercised in oral hygiene.

P1031
MANAGEMENT OF OSTEOPOROSIS IN THE EDENTULOUS PATIENT

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Periodontitis is a common medical disorder which if left untreated may lead to edentulousness. It is characterized by systemic inflammation and may be accompanied by osteoporosis. Osteoporotic patients on treatment with anticatabolic agents may develop osteonecrosis of the jaw. The aim was to present the management of osteoporosis in an edentulous patient with severe periodontitis who developed multiple foci of osteonecrosis of the jaw.

A patient, female aged 67, presented with osteoporosis, T-score being -2.6 in the left hip. The patient also had severe periodontitis having already lost teeth in the maxilla. Anticatabolic treatment was administered. A year later the patient presented with severe dental problems and was completely edentulous. An extensive laboratory and clinical evaluation was performed. Osteoporosis improved and T-score in the left hip was -2.4. Examination of the oral cavity revealed multiple foci of osteonecrosis of the jaw.

Vitamin D and calcium were administered. Oral hygiene was taken care of and performed with the use of chlorhexidine solution. The patient was followed-up for a period of 6 months. Six months later examination of the oral cavity did not reveal foci of osteonecrosis. Thereafter, anticatabolic treatment was administered for the management of osteoporosis.

In conclusion, management of osteoporosis in the edentulous patient presents unique problems. The patients are in the danger of developing osteonecrosis of the jaw. Additionally, dental implant installation may be impossible. Therefore, patients should be managed with caution. Oral examination should be performed in parallel with osteoporosis follow-up and oral hygiene should be taken care of.

P1032
ACYLOXYACYL HYDROLASE (AOAH) DEFICIENCY PROMOTES OSTEOCLAST FUNCTION BUT INHIBITS OSTEOBLAST FUNCTION

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Objective: Acyloxyacyl Hydrolase (Aoah) is a lipase that inactivated lipopolysaccharide (LPS) and regulates immune inflammatory responses. Aoah is well known for reducing LPS-induced acute lung injury and hepatosplenomegaly. Our preliminary data showed that Aoah was highly expressed in mouse spleen and bone. In addition, Aoah mRNA and protein were significantly increased during osteoclast and osteoblast differentiation. However, the role of Aoah in bone metabolism is not clear.

Methods: We created Aoah knockout mice (Aoah^{-/-} mice) and their bone mass, bone tissue morphology parameters, bone formation parameters, and osteogenic and osteoclast-related gene expression were analyzed. The bone marrow-derived mononuclear macrophages (BMMs) and bone marrow-derived mesenchymal stem cells (BMCs) from Aoah^{+/+} and Aoah^{-/-} mice were isolated and cultured and their osteoclast and osteoblast differentiation abilities were measured. Additionally, we investigated TLR4/NF-κB signaling pathway during osteoclast differentiation using qPCR and western blotting.

Results: Our results showed that the BMD, BV/TV, Tb.N, Tb.Sp of Aoah^{-/-} mice was significantly lower than that of Aoah^{+/+} mice. Aoah^{-/-} mice has meaningfully less bone mass and higher rate of bone resorption than Aoah^{+/+} mice. The osteoclast related marker genes CTR, DC-STAMP and ACP5 were significantly increased in forearm bones of Aoah^{-/-} mice than those of Aoah^{+/+} mice. However, osteoblast related marker genes were not significantly changed. Aoah^{-/-} BMMs demonstrated reduced osteoclast differentiation and resorption, and Aoah depletion did alos affect MSCs-induced and Skul-sourcing pre-osteogenesis osteoblast differentiation and bone formation. Finally, we found that the TLR4 and NFATC1 genes and NF-κB signaling pathway activation were significantly elevated in Aoah^{-/-} osteoclasts than Aoah^{+/+} osteoclasts.

Conclusion: Our findings suggests Aoah depletion in osteoclasts promotes osteoclast function and bone resorption but inhibits osteoblast function, and TLR4 signaling pathway may play a part in related mechanism.

P1033
TRANSLOCASE OF INNER MITOCHONDRIAL MEMBRANE 9 (TIMM9) PROMOTES MIGRATION AND INVASION OF OSTEOSARCOMA CELLS VIA EMT PATHWAY

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Objective: Osteosarcoma as a primary malignant bone tumor is most common in children and adolescents. Translocase of inner mitochondrial membrane 9 (TIMM9), which mediates the import and insertion of hydrophobic membrane proteins into the mitochondrial inner membrane, is associated with mitochondrial energy metabolism. Here, we aimed to investigate the effects of TIMM9 on migration and invasion of osteosarcoma and its expression in human osteosarcoma tissues.

Methods: The proliferation, migration and invasion capacity of HOS and MG63 osteosarcoma cells were compared. The protein expression HOS and MG63 cells was analyzed by SILAC proteomics and representative proteins (TIMM9) then verified by qPCR and Western blot. In addition, TIMM9 in HOS cells was silenced by lentivirus. The biological characteristics, mRNA and protein expression levels of N-cadherin, E-cadherin and vimentin in these cells were measured. Finally, we collected ten human osteosarcoma tissues with different degrees of malignancy. The TIMM9 expression in osteosarcoma and adjacent tissues was investigated by qPCR and immunohistochemistry.

Results: HOS cells demonstrated significantly higher proliferation, migration and invasion, and TIMM9 expression than MG63 cells. TIMM9 depletion in HOS cells showed reduced migration, invasion, but not proliferation ability. Moreover, N-cadherin gene and protein was decreased and E-cadherin and vimentin expression was increased in TIMM9 depleted HOS cells, which supports the role of EMT pathway. Finally, mRNA and protein of TIMM9 were highly expressed in high degree osteosarcoma tissues (higher malignant and poorly differentiated) than low degree osteosarcoma tissues and adjacent tissues.

Conclusion: We identified that TIMM9 promotes migration and invasion of osteosarcoma cells via EMT pathway. These findings strongly suggest that TIMM9 may serve as a novel therapeutic target and prognostic indicator for osteosarcoma.

P1034

OSTEOPOROSIS AS PRESENTING MANIFESTATION OF A CORTISOL SECRETING ADRENAL ADENOMA

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Adrenal adenomas are nowadays frequently diagnosed in the context of abdominal imaging. Osteoporosis may be a presenting manifestation of a cortisol producing adrenal adenoma. The aim was to present two cases of patients diagnosed and treated for osteoporosis who later in the course of the disease were diagnosed with a cortisol producing adrenal adenoma.

Two patients, female aged 53 and 56 years, respectively, presented with osteoporosis. T-score was -2.8 and -3.0 in the left hip respectively. Bisphosphonates were administered. During follow-up the first patient developed gastritis and vague abdominal pain. An abdominal CT scan was performed which revealed an adrenal adenoma in the left adrenal gland measuring 1.8x2.6

cm. An extensive laboratory investigation revealed increased 24-h urinary cortisol levels, marginally decreased morning ACTH levels and normal morning cortisol levels. Cortisol levels were not suppressed after midnight dexamethasone administration. The diagnosis of a cortisol secreting adrenal adenoma was made. The second patient developed anemia during follow-up and an upper abdominal MRI was performed. The MRI revealed an adrenal adenoma measuring 1.2x1.8 cm. Laboratory evaluation revealed decreased morning ACTH levels, marginally increased urinary cortisol levels while morning cortisol levels were not suppressed after a low dose dexamethasone suppression test. Both patients did not have evidence of clinical Cushing's syndrome.

Both patients were treated surgically for the adrenal adenoma. A year later laboratory evaluation revealed normal cortisol, urinary cortisol and morning ACTH levels. Osteoporosis improved after the excision of the adrenal adenoma. Bisphosphonates were discontinued.

In conclusion, cortisol secreting adrenal adenomas may be a silent cause of osteoporosis. Osteoporosis resolves after surgical treatment of the adrenal adenoma.

P1035

LACTOBACILLUS RHAMNOSUS ENHANCES BONE HEALTH IN OSTEOPOROTIC MICE VIA MODULATING HOST IMMUNE SYSTEM

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Objective: Probiotics are defined as viable microorganisms that upon administration in adequate amount confer various health benefits by inducing alterations in composition of gut microbiota (WHO). Very few bacterial strains have been studied till date in relation to their effect on bone health. The imbalance of Treg-Th17 cell axis leads to various inflammatory conditions of the bone such as osteoporosis, rheumatoid arthritis, etc. Based on these facts we were interested in investigating the effect of probiotics intake on the modulation of bone health via its effect on cytokine network via Treg-Th17 axis. Thus, in present study we selected *Lactobacillus rhamnosus* (LR) strain to examine its effect on bone health in ovariectomy (Ovx) induced osteoporotic mice model. We were interested in investigating the effect of LR intake on modulation of bone health via its effect on Treg-Th17 axis. We thus hypothesized to study the effect of LR on bone health in Ovx induced osteoporotic mice model.

Methods: Female BALB/c mice were divided into three group's viz. Sham, Ovx and Ovx+LR. LR was administered orally (10^9 CFU/ml) and after 45 d, mice were sacrificed and tissues were analyzed for accessing the role of LR on bone health via various cutting-edge technologies such as SEM, AFM, μCT, FACS and ELISA.

Results: We observed that oral administration of LR protected mice from Ovx-induced bone loss which was confirmed by SEM, AFM, FTIR and μCT analysis of bone samples. We further observed that LR-intake enhanced bone density in both cortical

and trabecular bones of Ovx mice. Interestingly, it was observed that LR-intake induces in vivo differentiation of Foxp3^{+}Treg cells along with simultaneously inhibiting differentiation of Rorγt[+]Th17 cells in bone marrow, the prime sites of osteoclastogenesis.

Conclusion: Taken together our results for the first time establish an osteoprotective role of LR on bone health via modulation of Treg/Th17 cell axis in host immune system.

P1036

USEFULNESS OF 3D-DXA IN ASSESSING FRACTURE RISK IN 104 MALE PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: Patients with COPD (chronic obstructive pulmonary disease) have a high risk of vertebral fracture. Conventional bone densitometry (2D) does not always help to predict this risk, as many patients fracture with normal or slightly low BMD. We aimed to assess the volumetric BMD in trabecular and cortical bone from hip DXA scan in a cohort of men with COPD, and to analyse if it is useful in predicting the risk of fracture in this population.

Methods: From a hip DXA scan of 104 male patients with COPD, a 3D reconstruction (3D-SHAPER® v2.10.1, Galgo Medical, Spain) was performed from a specific software to generate specific 3D models similar to QCT, and from here calculate trabecular volumetric bone density (trabecular vDMO), and cortical volumetric bone density (cortical vDMO).

Z-score from healthy population of the same age and sex, was used to compare results.

Results: COPD patients had a Z-score of -1.2±1.5 in the lumbar spine, -0.4±0.9 in the femoral neck, and -0.3±0.9 in the total hip. Trabecular vDMO Z-score was -0.4±1.0 and cortical vDMO -0.1±1.1. No differences were observed between the 27 patients who had previously suffered a vertebral fracture and the 74 without previous fractures neither in the lumbar spine BMD Z-score (-1.3±1.4 vs. -1.09±1.5; p=NS), nor in femoral neck (-0.6±0.9 vs. -0.4±0.9; p=NS) nor in total hip (-0.6±0.9 vs. -0.2±1, 0; p=NS). Although no significant differences were observed in the volumetric parameters of BMD, patients with fractures tended to have lower Z-score values in cortical vDMO (-0.4±0.9 vs. 0.01±1, 1; p=0.06), but not in trabecular vDMO (-0.5±0.8 vs. -0.3±0.9; p=0.23).

Conclusion: 3D-DXA assessment seems to be more useful than conventional bone densitometry predicting fracture risk in COPD male, as fractured patients tend to have a worse volumetric BMD in cortical compartment.

P1037

CYANOTOXIN "MC-LR" INDUCES BONE LOSS BY MODULATING TREG-TH17 IMMUNE CELL AXIS

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Objective: MC-LR is one of the most abundant cyanotoxins causing severe toxicity to both animals and humans. Primarily being a hepatotoxin, MC-LR damages various organs, but no study had ever linked MC-LR with Bone health. The current study aims to dissect the role of MC-LR on bone loss via modulation of Th17 and Tregs cells through both *in vitro* and *in vivo* studies.

Methods: 12 BALB/c male mice of 10-12 weeks' age were divided equally into two groups as normal and MC-LR which received doses of 0.9% saline (i.p.) and 10 mg/kg bw/d of MC-LR (i.p.) respectively. At the end of 15th day of dose administration, mice were sacrificed for harvesting different tissues and organs to elucidate the role of MC-LR on bone health by using various cutting technologies such as SEM, AFM, μCT, Flow cytometry, CBA along with independent *in vitro* osteoclast culture assays.

Results: From *in vitro* osteoclast culture study we found that MC-LR enhances osteoclastogenesis. Interestingly, we found that MC-LR intake induces enhanced bone loss when analysed by SEM, AFM and μCT *in vivo*. Both the cortical and trabecular bone histomorphometric parameters and bone mineral densities of MC-LR treated group were significantly reduced in comparison to normal group. Since Th17 cells are the main culprits for enhanced osteoclastogenesis we looked at these cell populations in both primary and secondary lymphoid organs. We observed that MC-LR treatment significantly induces the differentiation of RoRγt^{+} Th17 cells and inhibit the differentiation of Foxp3^{+} Treg cells in (bone marrow) and secondary (spleen) lymphoid compartments. Also MC-LR treatment leads to enhanced production of osteoclastogenic cytokines (IL-6, IL-17 and TNFα) and inhibits the induction of anti-osteoclastogenic cytokines (IL-10 and IFNγ) in blood serum.

Conclusion: Altogether, our study for the first time elucidates the role of MC-LR in impairing bone micro-architecture via enhancing Th17 cell population and inflammatory cytokines with simultaneous reduction in Tregs population along with reduced secretion of anti-inflammatory cytokines.

P1038
MANAGEMENT OF NONALCOHOLIC FATTY LIVER DISEASE IN THE CONTEXT OF AUTOIMMUNE MUSCULOSKELETAL RHEUMATIC DISEASES

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Nonalcoholic fatty liver disease has an increased worldwide prevalence due to obesity and the use of various drugs affecting the liver. Systemic autoimmune rheumatic diseases require chronic systemic treatment with various agents, which may affect liver function. Therefore, the management of non-alcoholic fatty liver disease attains importance. Prunus mume, the Asian plum of the rosaceae family, has been studied for its antioxidant, anti-inflammatory, and liver protecting properties. The aim was to describe the use of a Prunus mume extract in patients with nonalcoholic fatty liver disease and autoimmune musculoskeletal rheumatic diseases.

In a group of 50 patients, 25 male and 25 female, with non-alcoholic liver disease in the context of autoimmune musculoskeletal rheumatic diseases, an extract of Prunus mume 300 mg (Prunus mume extract 150 mg, choline bitartrate 82.5 mg, oleanolic acid 1.3%, ursolic acid 1.7%) was administered once daily. In this group the levels of alanine aminotransferase, aspartate aminotransferase, gamma-glutamyl transferase, cholesterol, HDL, LDL and triglycerides were measured before, 1, and 3 months later. Observations were also performed in a control group of 50 patients. A liver ultrasound was performed.

In this group of patients with non-alcoholic fatty liver disease in the context of autoimmune musculoskeletal rheumatic diseases after 3 months of treatment with the Prunus mume extract 300 mg daily the levels of alanine aminotransferase decreased significantly by 35.1% ($p<0.01$), those of aspartate aminotransferase decreased by 8.2% ($p<0.01$) and those of gamma-glutamyl transferase decreased by 12.4% ($p<0.01$). The LDL/HDL ratio decreased by 10.9% ($p<0.05$), HDL levels increased by 11.5% ($p<0.05$) and triglycerides decreased significantly by 7.2% ($p<0.05$).

The diagnosis of nonalcoholic fatty liver disease in the context of autoimmune musculoskeletal diseases presents a problem, as the administration of various drugs is necessary for the management of the systemic disease. The management of nonalcoholic fatty liver disease with a Prunus mume extract has beneficial effects on various metabolic parameters as it has antioxidant, anti-inflammatory and liver protecting properties and may contribute to a good quality of life.

P1039
SIX LEARNINGS FROM BUILDING A REAL WORLD MEDICAL AI X-RAY APP TO DETECT OSTEOPOROSIS

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Implementing a real world, dependable AI solution in the realm of Medical Science is fraught with difficulties on both fronts: programming and clinical. We discuss Six major issues and their solutions as we build an AI app that could detect Osteoporosis.

o **Data Issues**: Quality and quantity of x-rays were two challenges that were met by a combination of free, anonymised, good quality datasets in public domain. This was then supplemented with anonymised and cropped x-rays from real world patients and medical camps in rural areas.

o **Tasks**: Supervised learning was used to classify data and was used to detect Osteoporosis / Fracture / Chest abnormalities using X-rays. Handy visualizations and intuitive understanding of what happens when tensorflow pipeline runs against an X-Ray image is demonstrated.

o **Loss Reduction and Curation**: We discuss a distinctive **curation technique** we used to generate an accuracy of over 85%. We hit upon the idea of clinical curation first, where the clinician who ultimately delivers care classifies the x-ray. This is then re-verified by another Internal Medicine trained clinician and a qualified Radiologist, who are not directly involved in care. We supplement this with transfer learning (Inception V3) to accelerate learning time. The model generated by the treating surgeon, the clinician and radiologists were compared for the accuracy of the results and the more sensitive one chosen for implementation. We deliberately stay away from adding to the existing jargon on deep learning algorithms and describe our method in this verbose way.

o **Selecting a tech stack: We chose Tensorflow, Django Web Framework with Dojo toolkit & Bootstrap (factors influencing choice: learning, development, testing, security, building, deploying, scaling, maintaining, sharing). Django was more suited to agile development. For Deployment we chose Google Cloud Platform and tested various scaling strategies from appengine to kubernetes to managed stacks and evaluated their ease of use, pricing and auto-scale features. We benefited from the Django Pluggable app architecture that enabled early integration, explore adjacencies to our core product and helped remote teams work easily.**

o **Team Composition Mix:** Our team had a unique blend of three members to start with: a software engineer, a surgeon cum Python hacker, and a clinician. The combination was a

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winning bet for us as it impacted many facets of development and enabled crucial conversations in the adoption of AI and clinical workflows: from UX, to curation, and dog-fooding the app.

o **Serving different medical systems: Finally, we share an "ah" moment, how the** *AYUSH (*Ayurveda, Yoga, Unani, Naturopathy, Siddha and Homoeopathy) **Practitioners depend on X Rays and other doctors for a second opinion. This enabled us to penetrate alternative medical systems in rural areas where 70% of India lives with no access to DXA.**

So, let us walk you through our journey on how we built a X-Ray based system that can detect osteoporosis, fractures and chest anomalies and cater to rural areas that have poor access to healthcare.

https://www.medtatva.com/homepage/
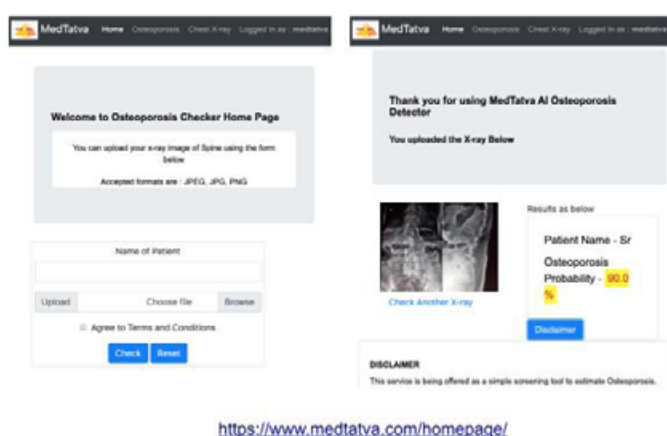
P1040
STATE OF BONE MINERAL DENSITY IN MEN WITH PRIMARY HYPOTHYROIDISM

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Objective: The issue of hypothyroidism effect on bone tissue is underinvestigated, due to the small number of studies. In addition, it's not easy to determine the effect of reduced thyroid function on bone strength due to the fact that these patients are usually elderly and have many additional factors for the development of osteoporosis. The purpose of the study is to assess the status of BMD in men with hypothyroidism.

Methods: We have examined 35 men with primary hypothyroidism aged 28-69 y. Duration of disease (from the time of diagnosis and initiation of thyroid hormone replacement therapy) was 3-26 y. The average daily dose of levothyroxine was 125.5±16.5 μg. Patients were in a state of compensation (no complaints and a normal level of thyroid-stimulating hormone on the background of hormone therapy). The control group consisted of 25 healthy, clinically euthyroid men aged 25-49 y.

Results: Osteopenia of varying severity was detected in 11 (31.4%), osteoporosis in 8 (22.9%) patients, and in the remaining 16 (45.7%) persons, BMD was within normal limits. When comparing bone density graphs in patients of different age groups, it was found that with age, the frequency and severity of bone loss increases. Duration of disease has the most significant negative effect on the BMD in patients with hypothyroidism. Although the incidence of osteopenia in the group of patients with disease duration from 5-15 y is greater (55.0%) than in persons with disease duration of more than 15 y (41.7%), but osteoporosis is 2.5 times more likely in patients with longer duration of disease than in people with disease duration of 5-15 y.

Conclusion: Violations of BMD, which are manifested in the development of osteopenia and osteoporosis, are observed in 54.3% of men with primary hypothyroidism. Severity of changes in BMD is directly proportional to the age, duration of thyroid hormone replacement therapy and inversely proportional to the BMI.

P1041
OSTEOPOROSIS AWARENESS AND INITIATION OF TREATMENT IN AN ELDERLY POPULATION IN IRAN: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: Effective treatments for osteoporosis are available. However, many patients do not receive these services for various reasons. The objective of the present study was to investigate the osteoporosis awareness and initiation of treatment in an elderly population in Iran.

Methods: The baseline data of 2409 participants, aged ≥60 y (1161 men), of BEH program, a population-based, prospective cohort were analyzed. BMD was measured using DXA method and T-score≤-2.5 in either of the femoral neck, total hip or spinal sites was defined as osteoporosis. The participants were asked if a physician has ever diagnosed osteoporosis for them and, if yes, if they have received any treatment for their condition. The awareness proportion was calculated by dividing the number of those who were already aware of their condition by the total number of osteoporotic patients and the initiation of treatment proportion was defined as the proportion of the osteoporotic patients who started to receive treatment.

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Results: The mean (SD) age of the participants was 69.3 (6.4) y. A total of 146 (29.7%) and 140 (28.2%) of osteoporotic men and women, respectively, were aware of their condition and the initiation of treatment proportions were 15 (3.05 %) and 13 (2.6 %) among men and women, respectively. Figure 1 illustrates the awareness and treatment proportions by sex.

Conclusion: The awareness of osteoporosis and initiation of treatment was very low among the studied elderly population in Iran. Further research is needed to investigate the causes and extensive interventions at the population level should be taken to fill the gap and raise awareness on osteoporosis as a growing public health concern and provide access to the treatment of the disease.
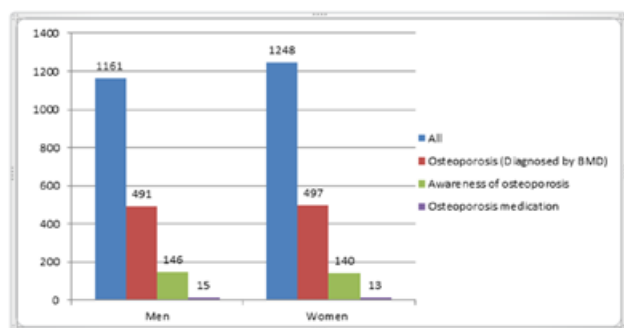
Figure1: The treatment gap of osteoporosis among older people in Bushehr Elderly Health (BEH) program by sex

P1042
EVALUATION OF SARCOPENIA BY SARQOL QUESTIONNAIRE IN POSTMENOPAUSAL OSTEOPOROTIC PATIENTS

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Objective: Sarcopenia, an age related decline in muscle mass and function, is one of the most important health problems in elderly people. The aim of this study was to determine if sarcopenia in the presence of osteoporosis increased the risk of decreased quality of life (QOL) in postmenopausal osteoporotic elderly women compared to women with osteoporosis alone. The sarcopenia specific Sarcopenia Quality of Life Questionnaire (SarQoL®) was performed to assess the impact of sarcopenia on QOL.

Methods: We included 84 community dwelling older women, 65 years of age and over with diagnosed osteoporosis. According to EWGSOP, sarcopenia was defined by presence of low muscle mass, muscle strength and physical performance. Low muscle mass and fat free mass (FFM) were measured by bioimpedance analysis (BIA) device. From FFM, skeletal muscle mass (SMM) and skeletal muscle index (SMI) were calculated. Therefore SMM was divided by height² (kg/m²). Two standard deviations (SD) below the sex specific mean for young adults was accepted as low muscle mass. Muscle strength was assessed by handgrip strength evaluated with hand dynamometer. Physical performance was evaluated with timed get up and go test. Sarcopenia specific,

self administered SarQoL questionnaire was used to assess health related quality of life. Osteoporosis was diagnosed by a T-score=-2.5 SD or below at lumbar spine or femoral neck regions on DXA evaluation performed in the Nuclear Medicine Department of the University Hospital.

Results: Sarcopenia was diagnosed in 28 out of 84 osteoporosis patients. We found that women with a combination of both osteoporosis and sarcopenia had poorer QOL compared to women with osteoporosis only. The SarQoL questionnaire and all domains had significantly lower scores in patients with combination of sarcopenia and osteoporosis. Separate components of sarcopenia, like handgrip strength and physical performance were found to be independently correlated with QOL.

Conclusion: A combination of sarcopenia and osteoporosis was related to a poorer QOL. We found that positive results in handgrip strength and timed get up and go tests were independently associated with better QOL.

P1043
SEX DIFFERENCES IN THE ASSOCIATIONS BETWEEN PERIPHERAL CALCIFIED VESSELS, BONE MINERAL DENSITY AND BODY COMPOSITION IN AGEING ADULTS FROM THE GAMBIA, WEST AFRICA

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Objective: Osteoporosis and cardiovascular disease (CVD) both share common risk factors; both often remain undiagnosed until a major life-threatening event occurs. Populations of African ethnicity have a higher risk of developing hypertension compared to Caucasians. Over the years, large studies from The Gambia show a high and increasing prevalence of hypertension. Characterisation of the association between hypertension and bone fragility in the ageing population may help identify shared aetiologies and the formulation of preventative strategies for bone and heart health in Sub-Saharan African countries such as The Gambia. We investigated the differences in the associations between peripheral calcified vessels, areal BMD (aBMD) and body composition in Gambian men and women.

Methods: The Gambian Bone and Muscle Ageing Study (GamBAS) recruited 249 women and 239 men aged 40-75+ years. Body composition (fat and lean mass) and aBMD were measured using DXA. Presence of calcified vessels was determined from pQCT scans at the 66% tibia. Differences between those with and without calcified vessels were tested by sex. Results are presented as group mean±SD and group proportions (%).

Results: There were no sex differences in the proportion of participants with evidence of calcified vessels (men: 26.6% vs. women: 22.5%). There were no differences in men, yet women with calcified vessels showed worse cardiac parameters (SBP: 132±21 vs. 145±24, hypertension prevalence: 31.3% vs. 51.8%; all p<0.01) and lower aBMD at all sites (total hip: 0.85±0.2 vs. 0.72±0.1; femoral neck 0.84±0.2 vs. 0.71±0.1; lumbar spine: 0.89±0.2 vs. 0.77±0.1; radius: 0.52±0.1 vs. 0.42±0.1; all p<0.0001). There were no sex differences in total fat mass in those with and without calcified vessels. Total lean mass was lower in those with calcified vessels compared to those without in both men (50.0±6.4 vs. 46.6±4.8, p=0.002) and women (35.4±4.4 vs. 33.9±4.2, p=0.029).

Conclusion: As the incidence of non-communicable diseases in sub-Saharan African populations are rapidly rising, identifying shared aetiologies between CVD and bone fragility will contribute to formulating prevention strategies and co-management in low resource settings.

P1044
ASSOCIATION OF GENETIC POLYMORPHISM OF VITAMIN D RECEPTOR WITH BONE MINERAL DENSITY IN MENOPAUSAL WOMEN

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Objective: Biological effects of calcitriol are mediated by interaction with vitamin D receptor (VDR). Structure and functional activity of VDR is determined by *VDR* gene. The aim of this work is to identify the association of polymorphic variants of *VDR* with BMD in postmenopausal women.

Methods: Study group consisted of patients with postmenopausal osteoporosis (PMO) (n 66, mean age 58.3±6.2 y), control group (CON) consisted of 170 women with normal BMD (mean age 56.7±7.42 y). BMD of lumbar spine (L_1 - L_4) and femoral necks was studied using DXA with GE Lunar Prodigy X-ray densitometer. BMD assessment was carried out on the basis of the T-criteria in accordance with WHO recommendations. Total genomic DNA from buccal epithelium using Nucleosorb-A kits (ODE "Primetech", Belarus) was used as biological material for genotyping. Polymorphic variants *VDR* ApaI (rs7975232), *VDR* BsmI (rs1544410), *VDR* TaqI (rs731236) and *VDR* Cdx2 (rs11568820) were analyzed using TaqMan® primer sets and probes from Applied Biosystems (USA). Statistical processing was performed using R program (http://www.r-project.org/) for Windows and additional packages for the analysis of genetic data "SNPassoc" (version 1.9-2).

Results: For carriers of *VDR* ApaI C/C genotype, risk of PMO was higher compared to individuals with A/A genotype (OR 2.7 [95% CI: 1.5−4.7], *p* 0.002). Allele *A* was associated with reduced risk of disease (OR 0.6 [95% CI: 0.4−0.8], *p* 0.001). For individuals with unfavorable *VDR* BsmI G/G-genotype, risk of PMO was higher when compared to the carriers of A/A-genotype (OR 2.1 [95% CI: 1.0−4.4], *p* 0.02). In bearers of A-allele, risk of PMO was lower (OR 0.6 [95% CI: 0.4−0.9], *p* 0.007). Among carriers of *VDR* ApaI C/C-genotype, BMD was 13.7% lower compared to carriers of *VDR* ApaI A/A-genotype (0.767 and 0.872 g/cm², respectively, *p* 0.04); among individuals with TaqI C/C-genotype, BMD was 13,8% lower compared to TaqI T/T-genotype bearers (0.803 and 0.914 g/cm², respectively, *p* 0.03).

Conclusion: *VDR* gene polymorphism plays an important role in susceptibility to PMO and is significantly associated with BMD level in postmenopausal women.

P1045
COBALD CHROMIUM MOLYBDENUM SURFACE MODIFICATIONS ALTER THE OSTEOGENIC DIFFERENTIATION POTENTIAL OF HUMAN MESENCHYMAL STEM CELLS

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Objective: Surface roughness on orthopedic implant materials has been shown to be highly influential on the behaviour of osteogenic cells. Soon after implantation, mesenchymal stem and progenitor cells (MSPCs) migrate to the bone-implant interface and participate in the matrix remodeling.

Methods: In this study, 5 surface topographies on cobald chromium molybdenum (CoCrMo) were engineered to examine the influence on human primary MSPCs. Elemental analysis of CoCrMo discs coated with titanium nitride (TiN), polished and porous coated surfaces, and pure titanum (cpTi) surfaces was performed using EDX. The modified morphology of the surfaces was determined using SEM. Human primary MSPCs were expanded from tissue samples of spongiosa bone and characterized according the criteria for defining multipotent mesenchymal stromal cells of the International Society for Cellular Therapy using flow cytometry and multilineage differentiation analysis. Osteogenic differentiation potential and the bone metabolism were analysed using qRT-PCR and Luminex® technology.

Results: The SEM microscopic images revealed significant differences in morphology of the uncoated CoCrMo discs and their modifications. TiN and cpTi coatings fundamentally changed the composition of the chemical elements. Flow cytometry and differentiation into the osteogenic, adipogenic, and chondrogenic lineage confirmed the phenotype of MSPCs. ALP and osteopontin expression increased significantly in all groups about 5-fold respectively 10-fold compared to the undifferentiated controls. Compared to the uncoated CoCrMo surface the porous coated surface showed a reduced expression of osteogenic markers. Due to the osteogenic differentiation the expression of integrin α5β1, which is particularly important for cell-material contact,

increased 4-7-fold. In the dynamic process of bone metabolism, a high increase of IL6 expression in undifferentiated MSPCs on porous coated and cpTi discs was measured. Using the 13plex Luminex bone metabolism assay, the expression of ACTH, insulin, TNFα, IL1β, PTH, and FGF23 were below the detection limit. The Leptin release increased highly significantly due to osteogenic differentiation. Especially high in cpTi samples. DKK increased due to osteogenic differentiation, but showed no differences between the different surfaces

Conclusion: With regard to the osteogenic differentiation potential, the coating with pure titanium (cpTi) in particular had a positive effect, whereas the porous coated surface showed poor results.

P1046
MANAGEMENT OF GREATER TROCHANTERIC PAIN SYNDROME: A SYSTEMATIC REVIEW OF RANDOMISED CONTROLLED TRIALS

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Objective: Greater trochanteric pain syndrome (GTPS) is a condition characterised by gluteus medius and/or minimus tendinopathy, with or without coexisting bursal pathology. The optimal management remains unclear due to the lack of evidence, with previous studies on this topic limited by poor methodological quality and risk of bias. The present study aims to evaluate the evidence for the treatment of greater trochanteric pain syndrome (GTPS).

Methods: Systematic review of randomised controlled trials (RCTs) evaluating treatment for GTPS. Medline, Embase, Scopus and Cochrane Central Register of Controlled Trials (CENTRAL) were searched from the date of inception to 23 December 2019. Inclusion criteria: individuals aged 16 y and older, with no previous surgical procedures of the hip joint, and history of inflammatory joint disease. Exclusion criteria: non-English, nonhuman, and unpublished studies were excluded.

Results: A total of 13 RCTs enrolling 864 patients to treatment arms including education, physiotherapy/exercise therapy, corticosteroid injections, platelet-rich plasma (PRP) injections, hyaluronic injections, and shockwave therapy were included. There is moderate quality evidence supporting the role combined education and physiotherapy and the limited benefit of corticosteroids in the management of GTPS. Limited evidence is available regarding the effects of alternative treatments including PRP injections, hyaluronic acid injections, and shockwave therapy in treating this condition.

Conclusion: There is an increasing number of high quality research into the treatment of GTPS. The present findings advocate for the use of combination therapy with education and physiotherapy as the mainstay of treatment, with no role for corticosteroids.

P1047
THE EFFECT OF A KINETOTHERAPY REHABILITATION PROGRAM ON KNEE OSTEOARTHRITIS IN PATIENTS WITH DIFFERENT PAIN LEVELS

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Objective: To evaluate the effect of kinetotherapy rehabilitation program on knee osteoarthritis in patients with different pain levels.

Methods: We performed a cross-sectional study with patients with moderate knee osteoarthritis from a University Rehabilitation Center. All patients underwent a standard kinetotherapy program. Pain intensity, knee range of motion were evaluated using the visual analogue scale, universal goniometer, and Knee Injury and Osteoarthritis Outcome Score (KOOS) with five domains. Patients were classified into three groups according to pain intensity: mild, moderate, and severe pain groups. The evaluation was performed before (T0) and after a 1-week rehabilitation program (T1).

Results: In the study were included 82 patients (19 men and 63 women) the mean age 61.8±9.2 y and, the disease duration was 5.96±4.2 y. Group 1 mild pain VAS (5-39mm) 10 patients, group 2 with VAS 40-69 mm -39 patients, and group 3 with severe pain -33 patients. All groups showed significant differences in pain intensity, knee range of motion, and knee function. The VAS score change in mild (p=0.01) and moderate pain (p=0.002) groups and were significantly greater than those in severe pain group (p=0.43). The pre-intervention KOOS score of the mild pain group was higher than those of the groups 2 and 3 (p=0.05). There were significant improvements in the KOOS scores after 1-week rehabilitation program. At T1 KOOS score of the Group 1 was significantly higher than those of the moderate and severe pain groups (p=0.001), and that of the Group 2 group exceeded significantly group 3 (p=0.010).

Conclusion: Pain intensity is one of the most important factors that are responsible for the improvement of knee osteoarthritis. The intensity of the pain should be taken into consideration during individual selection of the kinetotherapy program in knee osteoarthritis patients.

P1048
BASELINE AND CHANGE IN LEG MUSCLE STRENGTH AND BALANCE ARE NOT ASSOCIATED WITH THE INCIDENCE OF FALLS IN MIDDLE-AGED WOMEN: A 5-YEAR POPULATION-BASED PROSPECTIVE STUDY

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Objective: Muscle strength and balance are major modifiable factors of falls in older adults, but their associations with falls in middle-aged adults are poorly studied. We aimed to examine the association of baseline and change in leg muscle strength (LMS) and balance with the incidence of falls in a cohort of middle-aged women. **Methods:** This was a 5-y follow-up of a population-based sample of 347 women aged 36-57 y at baseline (2011-2012). Data on LMS (by dynamometer) and balance (timed up and go test [TUG], step test [ST], functional reach test [FRT], and lateral reach test [LRT]) were obtained at baseline and 5 y later (2017-2018). Falls were recorded monthly for one year by questionnaire between 2017-2019. Negative binomial/Poisson regression and log binomial regression were used to assess associations of baseline and change in LMS and balance with any falls, injurious falls and multiple falls as appropriate. **Results:** Over one year, 115 participants (42%) reported at least one fall. There were no statistically significant differences in either baseline and 5-y change in LMS and balance measures between fallers and nonfallers (P>0.05 for all) except that LRT increased by a mean of 0.2 cm in fallers compared to a decline of 0.9 cm in nonfallers (P=0.02). Neither baseline nor 5-y change in LMS and balance were associated with the incidence rate of any falls or injurious falls, or the risk of multiple falls 5 y later, with or without adjusting for confounders (IRR or RR ranging from 0.91-1.14, 0.94-1.16, and 0.88-1.23, respectively; P>0.05 for all). **Conclusion:** Baseline or change in LMS and balance measures are not associated with incident falls among middle-aged women. These findings suggest that risk factor profiles for falls in middle-aged women may be different from those in older adults, and different preventive strategies for falls in midlife may be needed.

P1049
MULTIPLE INTRA-ARTICULAR INJECTIONS OF PLATELET-RICH PLASMA IMPROVE CLINICAL FUNCTION IN EARLY KNEE OSTEOARTHRITIS

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Objective: Osteoarthritis (OA) is a common degenerative joint disease worldwide. Platelet-rich plasma (PRP) intra-articular injection has been hypothesized to increase knee function in OA patients. Growth factors and cytokines have been proposed as effective proteins for decreasing pain and improving function. However, the effect of multiple PRP injection in knee OA patients remains unclear. The purpose of this study was to compare the outcomes of single PRP injection vs. multiple (three) PRP injections in patients with early knee OA.

Methods: A total of 60 patients with early stage of knee OA (Kellgren-Lawrence grade I-II) were recruited. The patients were evaluated before the injection and investigated prospectively at 6 weeks ((immediately prior to the second injection)), 12-, 18- and 24-week (6 weeks after the third injection)) follow-up with WOMAC, visual analog scale questionnaires, and Short-Form Health Survey (SF-12) assessed health-related quality of life, including physical health composite score (PCS) and mental health composite score (MCS). Physical performance of knee OA patients were determined using five-time sit-to-stand (5Xsts), timed up and go test (TUG), and the 3-min walk test (3MWT).

Results: There was no significant difference in mean age and BMI between two groups. There was a statistically significant improvement in the WOMAC, visual analog scale, and SF-12 scores in the 6-week post PRP intra-articular injection group compared with no intra-articular injection group (*P*<0.05). The physical performances of OA patients treated with three PRP intra-articular injections were significantly better than those patients of the single injection groups (*P*<0.05). In the early knee OA, significantly better clinical results were achieved in the knee OA patients treated with three PRP intra-articular injections.

Conclusion: PRP is a safe and efficient therapeutic option for treatment of knee osteoarthritis. Intra-articular injections of PRP were demonstrated to ease the pain, reduce the stiffness, and improve quality of life in patients with knee OA. Triple PRP injections are applicable to achieving better clinical outcomes in patients with early knee OA.

P1050
FREQUENCY OF DEFICIENCY OF BONE MINERAL DENSITY IN PATIENTS OF YOUNG AND MIDDLE AGES WITH PSORIASIS AND PSORIATIC ARTHRITIS

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Objective: To assess the frequency of deficiency of BMD in the proximal femur and lumbar spine in patients with psoriasis and psoriatic arthritis

Methods: 104 patients were examined: group 1 included 66 patients with psoriatic arthritis (PsA) (mean age 46.6 (9.31) y, 33 men and 33 women), group 2 - 38 patients who had only skin manifestations of psoriasis (Ps) (mean age 45.2 (8.6) y, 18 men and 20 women).

BMD was measured by DXA (Lunar Prodigy Advance (USA)) at lumbar spine (anterior-posterior projection of L1-L4) and femoral neck. Statistical data processing was carried out in the program Statistica 10.

Results: The incidence rate of osteoporosis in individuals with PsA is statistically significantly higher than in the Ps group ($\chi2$=6.45, p<0.05), in contrast to osteopenia, which was more often observed ($\chi2$=6.25, p<0.05) in patients with Ps. In men with Ps and PsA, the proportion of individuals with BMD deficiency was statistically significantly higher than in women - 64% (n=34) vs. 33% (n=17), respectively ($\chi2$=3.99, p<0.05). Low BMD in men with Ps and PsA was recorded in all examined skeletal regions (lumbar spine and proximal femur); in women with PsA - in the lumbar spine; in women with (Ps) – in L1 only.

Conclusion: (Ps) and (PsA) is an indication for DXA in young and middle-aged people in order to detect low BMD and develop a set of preventive measures.

P1051
INFLUENCE OF SERIC URIC ACID ON BONE MINERAL DENSITY IN RHEUMATOID ARTHRITIS

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Objective: Hyperuricemia is a risk factor for both metabolic syndrome, renal and cardiovascular disease. Uric acid plays an important role in oxidative stress, which in turn is an important factor in bone mass loss. Some studies have shown a low level of uric acid that correlates with a decrease in bone mass for patients with primary osteoporosis. In patients with rheumatoid arthritis, the risk of osteoporosis is increased due to several factors: glucocorticoid medication, sedentarism caused by joint dysfunction, menopause. We aimed to establish a correlation between uric acid and BMD determined by DXA in patients with rheumatoid arthritis.

Methods: We conducted an observational study in which there were included 131 patients with rheumatoid arthritis diagnosed in the period 2011-2016. Subsequently, they were divided into 2 groups: the first group included patients who associate hyperuricemia, and in the second group patients with normal seric uric acid values were included. The BMD and uric acid determinations were considered at the time of rheumatoid arthritis diagnosis and the values determined at the 2019 assessment.

Results: The people included in the study were 79.38% postmenopausal women (n=104) and 20.62% men (n=27) with an average age of 64.39 y. Within the group that included hyperuricemia, 65 cases were included, of which 40% (n=26) developed osteoporosis with a T score between -4.6DS and -2.5DS (RR=0.54; OR=0.28) in contrast to the other group which included 66 people and in which 69.69% (n=46) had a T-score <-2.5DS.

Conclusion: Patients with asymptomatic hyperuricemia have been found to have a lower incidence of osteoporosis, thus proving the protective role of uric acid on BMD, most likely through the antioxidant and neutralizing effect of oxygen reactive species.

P1052
GROWTH FACTOR AND CYTOKINE LEVELS IN PLATELET-RICH PLASMA ARE INFLUENCED BY DONOR VARIABLES IN KNEE OSTEOARTHRITIS

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Objective: Platelet-rich plasma (PRP) has been applied in clinical usage, especially in osteoarthritis (OA). However, the PRP efficiency still varies because of several factors, including PRP preparation and donor condition. This study aimed to quantify and compare cytokine and growth factor (GF) concentration in plasma and PRP from knee OA patients and determined the correlation of cytokine and GF levels with various factors.

Methods: 40 female patients with knee OA were enrolled (mean age 67.10±9.17 y). A total of 30 ml of peripheral blood was drawn from each subject. The PRP preparation procedure consisted of 2 centrifugation steps. The initial centrifugation at 1000 rpm for 10 min separates and eliminated red blood cells. The buffy coat and the upper layer were transferred to an empty sterile tube and centrifuged at 2000 rpm for 10 min for PRP collection. The PRP and plasma were sonicated for 30 min at frequency of 20 kHz. The sample lysates were centrifuged and supernatants were collected. Cytokine and GF levels were evaluated using Bio-Plex Pro™ Human Cytokine 27-plex Assay. Cytokine and GF levels in plasma and PRP sample were determined and correlated with age, BMI. Platelet count in the peripheral blood and PRP was analyzed using coulter counter.

Results: The PRP preparation in this study produced at least two folds baseline levels of platelets ($2.67\pm0.75 \times 10^5$ cells/µl in blood vs. $4.46\pm1.13 \times 10^5$ cells/µl in PRP) ($P<0.001$). Levels of IL-1, IL-2, IL-5, IL-7, IL-8, IL-9, IL-10, IL-12, IL-17, IFNγ, TNFα, IP-10, MIP-1β, bFGF, VEGF, and PDGF-BB were significantly higher in the PRP than in the paired plasma. Moreover, we found that donor age was positively correlated with platelet number, IL-8, IL-9, and IL-17 levels in PRP ($P<0.05$). Also, BMI was positively correlated with IL-1ra level but negatively correlated with IL-15, G-CSF, and VEGF levels in PRP ($P<0.05$).

Conclusion: Several cytokines and growth factors in PRP from female knee OA patients are significantly higher than those in peripheral blood samples. Besides, age and BMI of may affect cytokine and growth factor levels in knee OA patients.

P1053

NONCALORIC ARTIFICIAL SWEETENER-ASPARTAME (NAS-A) INTAKE AND BONE HEALTH: ROLE OF TH17-TREG CELL AXIS

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Objective: Noncaloric artificial sweeteners (NAS) are commonly used food supplements for combating weight gain and diabetes. Aspartame isone of the most commonly used NAS in various foods. But its potential ability to promote metabolic derangements and clinical implications such as headaches. Alzheimer's disease, multiple sclerosis, cancer and bone health had been a topic of debate worldwide. Also, no study had ever explored the role of Aspartame intake on osteo-immune system. Thus, the present study for the first time dissects the nexus between Aspartame and bone health via the role of host immune system.

Methods: 9-10 weeks old female BALB/C mice were divided into 3 groups with 8 mice/group *viz.* Sham operated, Ovariectomized and Ovariectomized+Aspartame (40 mg/kg.b.w). After 45 d, mice were sacrificed for harvesting different tissues and organs to elucidate the role of aspartame on bone health by using various cutting technologies such as SEM, AFM, µCT and flow cytometry.

Results: Interestingly, we found that aspartame intake induces enhanced bone loss when analyzed by SEM, AFM and µCT *in vivo*. Both the cortical and trabecular bone histomorphometric parameters and BMDs of aspartame treated group were significantly reduced in comparison to normal group. Since Th17 cells are the main culprits for enhanced osteoclastogenesis we looked at these cell populations in both primary and secondary lymphoid organs. We observed that aspartame treatment significantly induces the differentiation of RoRγt^{+} Th17 cells and inhibit the differentiation of Foxp3^{+} Treg cells in (bone marrow) and secondary (spleen) lymphoid compartments

Conclusion: Our present study for the first time elucidates the role of aspartame in bone loss via modulating Th17-Treg cell populations.

P1054

IDENTIFICATION AND ASSESSMENT OF OSTEOPOROSIS TREATMENT DECISION AIDS: AN ENVIRONMENTAL SCAN

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Objective: Decision aids (DAs) facilitate the accuracy of patient-clinician risk communication and support informed patient decision-making whilst increasing patient knowledge and uptake of preventative treatments. This study aimed to identify existing osteoporosis treatment DAs and assess their quality.

Methods: We used an environmental scanning method to identify osteoporosis treatment DAs. Environmental scans allow researchers to systemize knowledge from a variety of different data and sources. DAs were identified using 1) systematic review of 7 databases, 2) searches of an existing DA database, 3) social media search (Facebook, Twitter and Instagram), 4) Google search. Each DA was quality assessed independently by two authors, using International Patient Decision Aids Standards (IPDAS). IPDAS criteria are grouped into three domains; whether the tool meets requirements for a DA, certification criteria and quality criteria.

Results: Searches identified 10 DAs, however only one (HealthDecision) met the IPDAS minimum criteria to be classified as a DA. Most tools did not describe the physical, social and psychological consequences of having a fracture. No DA met all the certification criteria, without which a DA is judged to have a high risk of harmful bias; most common deficiencies of existing DAs included not describing an update policy, not providing information about the levels of uncertainty around probabilities or failure to describe benefits and harms in equal detail. No DA fulfilled the quality criteria, with many not being reviewed by patients or evaluated during development.

Conclusion: High quality DAs are recommended to improve informed patient decision-making when initiating new medicines. However, existing tools fail to meet minimum classification criteria. The need to develop high quality osteoporosis treatment DAs with patients and other key stakeholders remains.

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P1055
RECOMMENDATIONS TO IMPROVE QUALITY OF PATIENT INFORMATION MATERIALS IN OSTEOPOROSIS: RESULTS FROM A QUALITATIVE STUDY AND STAKEHOLDER CONSULTATION

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Objective: To identify inaccuracies, and contradictory statements in web-based patient information relating to osteoporosis and to produce recommendations for improvements.

Methods: Nine commonly accessed patient information websites were selected from a range of different organisations. Textual descriptions of osteoporosis and drugs were extracted and an inductive and deductive thematic analysis conducted using Leventhal's common sense model of disease. Descriptive words/phrases were identified within themes and presented to a stakeholder group of clinicians and patients, including a health literacy expert and Royal Osteoporosis Society representatives.

Results: Osteoporosis was described variably as fragile, spongy, honeycomb, or weaker than average bones. Stakeholders felt the term 'fragile' may invoke fear, comparing to 'average' was unhelpful and 'weaker bones' was preferable. Stakeholders identified i) inconsistencies in the way symptoms were described, e.g., a statement 'osteoporosis has no signs or symptoms' followed by the statement 'signs of osteoporosis', ii) a predominance of medical language and iii) a focus on harms of treatment rather than benefits. Claims medication could 'prevent' fracture were felt to be misleading, and optimal language about drug benefits were discussed as to 'strengthen bone and lower chance of broken bones'.

Conclusion: Recommendations are to improve accuracy and consistency in patient information, using key terms our stakeholder group prioritised, and address information gaps relating to treatment benefits.

P1056
DIABETES: DOES IT ACCELERATE BONE MASS LOSS IN RHEUMATOID ARTHRITIS?

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Objective: Diabetes and obesity are associated with a low degree of chronic inflammation, which can act as a trigger or maintain the autoinflammatory process such as rheumatoid arthritis. There are also studies that prove that patients with type 2 diabetes are prone to developing other inflammatory or autoimmune conditions. Rheumatoid arthritis is the most common autoimmune disorder, characterized by the presence of systemic inflammation and chronic synovitis with destructive and disabling potential. The present study is aimed at establishing whether the presence of diabetes and obesity negatively influences the evolution of rheumatoid arthritis, by maintaining the inflammatory process and accelerating bone mass loss.

Methods: An observational cohort study was conducted in which 127 patients with rheumatoid arthritis diagnosed during 2010-2014 were included. Subsequently they were divided into 2 groups: the first group included patients who associate diabetes type 2, and in the second group patients without diabetes were included. The BMD, glucose, VSH determinations at the time of the diagnosis of rheumatoid arthritis and the values determined at the 2018 evaluation were considered.

Results: The people included in the study were exclusively postmenopausal women, with an average age of 64.39 y. In the group with diabetes association there were included 76 cases of which 63.15% (n=48) developed osteoporosis with a T score between -4.9DS and -2.5DS (RR=1.7) as opposed to the other group which included 51 people and in which only 31.3% (n=16) had a T-score <-2.5DS. It was also found that the average BMI in the first lot was 31.6 kg/m^2 respectively 33.2 mm/1h for ESR, and in the second lot BMI=25 kg/m^2 respectively 18.7mm/1h ESR.

Conclusion: Patients with rheumatoid arthritis who associate diabetes have a higher risk of developing osteoporosis (RR=1.7), which shows that the imbalance of glucidic metabolism negatively influences BMD, favoring bone resorption by maintaining a low but persistent level of systemic inflammation.

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P1057
IMPROVED STATISTICAL METHODS FOR MONITORING KNEE OSTEOARTHRITIS DISEASE PROGRESSION

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Objective: Knee osteoarthritis (KOA) disease progression is usually monitored by calculating the crude differences between baseline and end of study knee joint space width (JSW) measurements. Such differences are small and sensitive to measurement error, and participants who have dropped out get excluded. We aimed to assess the utility of two alternative statistical modelling methods for monitoring KOA progression.

Methods: We used JSW on radiographs from both the control arm of the Strontium Ranelate Efficacy in Knee Osteoarthritis trial (SEKOIA), a 3-y multicentre, double-blind, placebo-controlled phase 3 trial, and the Osteoarthritis Initiative (OAI), an open-access longitudinal dataset from the USA comprising participants followed over 8 y. Frequentist linear mixed effect (LME) and Bayesian hierarchical modelling outputs were compared with annualised crude difference. All 3 estimates of JSW change were assessed for their utility in predicting change in WOMAC pain.

Results: Mean annualised changes in JSW were comparable for all estimates, a reduction of around 0.14 mm/y in SEKOIA and 0.07 mm/y in OAI. The standard deviation (SD) of change estimates was lower with LME and Bayesian modelling than crude change (SEKOIA SD=0.12, 0.12 and 0.21 respectively; OAI SD=0.08, 0.08 and 0.11 respectively). Estimates from LME and Bayesian modelling were statistically significant predictors of change in pain over the duration of SEKOIA (LME β=-0.97, p-value=0.04, Bayes β=-0.93, p-value=0.04), while crude change did not predict change in pain (β=-0.43, p-value=0.10).

Conclusion: Implementation of LME or Bayesian modelling in clinical trials and epidemiological studies, would reduce sample sizes required by enabling all study participants to be included in analysis regardless of incomplete study follow-up, and the precision of change estimates would improve. Also they provide increased power to detect associations with other measures.

P1058
ACCEPTABILITY OF BISPHOSPHONATE TREATMENT REGIMENS FOR OSTEOPOROSIS: A QUALITATIVE SYSTEMATIC REVIEW

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Objective: To investigate the acceptability of different bisphosphonates treatment regimens for osteoporosis among patients and clinicians.

Methods: A systematic review of qualitative research exploring patients' and clinicians' views of the acceptability of bisphosphonates was conducted (PROSPERO [CRD42019143526]). Seven databases were searched. Article screening used eligibility criteria. Eligible full-text articles underwent data extraction and quality appraisal (CASP) by two independent reviewers. The Theoretical Framework of Acceptability (TFA) informed a framework analysis.

Results: 25 studies were included, the majority were conducted in North America or Europe, 12 studies explored patient views, 7 clinicians and 6 explored both. Only two studies mentioned intravenous bisphosphonates. Acceptability was described according to TFA domains of sense-making, emotions, opportunity costs, burden, perceived effectiveness and self-efficacy. There were limited data relating the TFA domain of ethicality. Patients and clinicians made sense of bisphosphonates by considering a risk-benefit analysis, informed by perceived-need balanced against concerns and fears. Both need and concern changed over time and were influenced by the doctor-patient relationship, personal and vicarious experience and competing priorities. Patients and clinicians wanted evidence of effectiveness and expressed uncertainty about how treatment worked. Patients' self-efficacy was enhanced by routinisation (e.g., weekly tablet taken whilst reading the Sunday paper).

Conclusion: By utilising the TFA, the findings demonstrate that a whole-system, theoretically informed approach is necessary to both understand and improve acceptability. Additionally, there is a need to clarify what constitutes bisphosphonate treatment success and a need to explore views of patients receiving IV bisphosphonates.

P1059
CR4056 EFFICACY IN THE METABOLIC OA PHENOTYPE: ADDITIONAL ANALYSIS FROM THE FIRST PHASE II TRIAL IN KNEE OA PATIENTS

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Objective: CR4056 is a selective imidazoline-2 (I2) receptor ligand with potent analgesic activity in animal pain models. An exploratory phase 2 trial showed that CR4056 might be an effective analgesic against knee OA pain, especially in overweight patients representing the metabolic OA phenotype [1]. To further confirm the results observed in this phenotype, an additional analysis on primary and secondary outcomes was conducted and is presented here.

Methods: The study was a multicenter, randomized, double-blind, placebo-controlled trial. Knee OA patients with moderate to severe pain received CR4056 (women 100 mg bid; men 200 mg bid) or placebo (both genders) for 14 d. The primary efficacy outcome was the change from baseline in WOMAC pain score (0-100 scale) compared to placebo. The additional analysis presented here is based on the calculation of the percentage change from baseline in WOMAC pain score. Values were then compared between each active group and placebo by the Wilcoxon rank-sum test, as in the main analysis. The same approach was applied to the WOMAC pain first question (Q1).

Results: In line with the main analysis results, the percentage change from baseline in WOMAC pain showed a consistent improvement with CR4056 vs. placebo, with median differences ranging between 22-28 points between groups (Table). Also the analysis on WOMAC Q1 provided results that are in agreement with the main analysis and showed a statistically significant difference in pain reduction in the active groups compared to placebo.

Conclusion: The additional analysis presented here, based on the calculation of a percentage change from baseline in WOMAC pain, confirm the relevance of the results obtained in patients with the metabolic OA phenotype.

Table. Percentage change in WOMAC pain and Q1 after 14-day treatment in ITT patients with BMI ≥ 27.5 kg/m^2

	Placebo (N=51)	CR4056 women (N=68)	CR4056 men (N=37)	CR4056 pooled (N=105)
WOMAC pain				
Mean (SD)	-18.2 (26.6)	-27.0 (31.8)	-33.1 (31.3)	-29.2 (31.6)
Median (range)	0 (-100; 16)	-22.3 (-100; 28.2)	-28.1 (-93; 6.9)	-23.1 (-100; 28.2)
P-value		0.047	0.009	0.013
WOMAC pain Q1				
Mean (SD)	-12.9 (25.6)	-25.1 (36.7)	-22.1 (40.1)	-24.0 (37.7)
Median (range)	0 (-100; 40)	-18.4 (-100; 60)	-20 (-88.9; 100)	-20 (-100; 100)
P-value		0.028	0.045	0.018

Reference: 1. Rovati LC et al. Osteoarthritis Cartilage 2020;28:22.

P1060
HIGH BONE MINERAL DENSITY ON ROUTINE BONE DENSITY SCANNING: FREQUENCY AND CAUSES

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Objective: A finding of high bone mass (HBM) on routine DXA scanning is not infrequent. However, epidemiological studies of HBM are few and definition thresholds variable. This study was performed to assess the frequency and causes of HBM within the general population referred for DXA scanning in a tertiary centre hospital.

Methods: DXA databases were initially searched for individuals with a BMD T- or Z-score ≥+4 at any site within the lumbar spine or hip, at the Lille University Hospital (France) from April 1, 2008 to April 30, 2018. Two Hologic scanners were available at the Lille University Hospital. Frequency of HBM was evaluated as were causes associated with HBM.

Results: At the lumbar spine, 18,229 bone density tests were performed in women and 10,209 in men. At the hip, 17,390 tests were performed in women and 9,857 in men. The total number of patients who performed at least one bone density test was 14,745 with 64.2% of female. Among these patients, 211 of them had a T- and/or Z-score ≥ +4 at any site, i.e., a frequency of 1.43% [1.25%-1.64%]. DXA scans and medical records of 92 men and 119 women with high BMD were screened to assess causes. An artefactual cause was found in 75% of patients with HBM (mostly degenerative disease of the spine) and an acquired cause of focal HBM was only found in 2 patients with sclerotic bone metastases from prostate cancer. An acquired cause of generalized HBM was found in 15% of patients with a vast majority of renal osteodystrophy (n=11), hematological disorders (n=9; e.g., myeloproliferative syndromes and mastocytosis) and diffuse bone metastases from solid cancer (n=5). Of the remaining causes, rare hereditary diseases (e.g., osteopetrosis, etc.), and unexplained high BMD were found in 10 and 6 cases respectively.

Conclusion: The frequency of high BMD (T- or Z-score≥ +4 at any site) was higher than expected. This study indicates that the causes of high BMD were mainly due to osteoarthritis. Further works are needed to differentiate artefactually HBM from hereditary or acquired high BMD and to investigate unexplained high BMD.

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P1061
THE IMPACT OF DENOSUMAB ON VERTEBRAL DEFORMATIONS CHANGES AND SEVERITY OF PAIN IN SPINE IN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOPOROSIS

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Objective: Denosumab is a monoclonal antibody that binds RANKL - a key mediator of increased osteoclast activity in rheumatoid arthritis (RA). The aim of this study was to evaluate the impact of denosumab on vertebral deformations changes and severity of pain in thoracic and lumbar spine in patients with RA and osteoporosis (OP).

Methods: 66 postmenopausal women (mean age 59.6±7.4) with RA (mean duration 17.7±10.4 y) and OP received s/c denosumab 60 mg every 6 months pro 12 months. RF-positive were 72%, ACCP − 74% of patients. 34 (49%) patients continued GC. 27 patients continued taking the denosumab (mean age 58.4±7.4 y, mean duration of RA 19.5±11.8 y) for 1 year more. At baseline, after 12 and 24 months it was carried out the x-ray of hands and feet, DXA and X-ray morphometric analysis of deformations in thoracic and lumbar vertebrae (Genant method). The severity of pain was evaluated using visual analogue scale (VAS). The Statistica 6.0 was used.

Results: After 12 months of denosumab therapy there was no significant change in the index of vertebral deformations in the thoracic and lumbar spine. It was 0.76±0.08 in the thoracic and 0.78±0.05 in the lumbar both initially and after 12 months. Besides, the intake of GC also had no significant effect on the dynamics of the index of deformations: in the group GC+ in the thoracic spine it amounted 0.77±0.08 both before and after 12 months of denosumab treatment, in the lumbar - 0.78±0.04. In the group GC-: 0.76±0.09 and 0.77±0.06 respectively, unchanged during the observation period. After 24 months of treatment the index of vertebral deformations also did not change: 0.76±0.04 - at thoracic site and 0.79±0.01 - at lumbar site of spine without changes (p>0.05), respectively. After 12 months there was a significant reduction in VAS pain in the thoracic and lumbar spine, as well as a significant decrease in the number of patients with pain in thoracic site (Table 1).

Table 1. VAS pain in the thoracic and lumbar spine in patients with RA and OP after 12 months of denosumab therapy (n=66)

Patients with pain in spine	Baseline	After 12 months	p
Thoracic spine, n (%)	28 (42.4%)	9 (13.6%)	<0.001
VAS, mm (M±δ)	47.5±19.2	38.3±12.9	0.002
Lumbar spine, n (%)	42 (63.6%)	32 (48.4%)	>0.05
VAS, mm (M±δ)	50.6±20.4	38.4±13.4	<0.001

After 24 months there was a tendency to reduce of VAS pain in the thoracic and lumbar spine, as well as a significant decrease in the number of patients with thoracic pain: 13 (48.1%) vs. 4 (14.8%) patients (p<0.01) (Table 2).

Table 2. VAS pain in the thoracic and lumbar spine in patients with RA and OP after 24 months of denosumab therapy (n=27)

Patients with pain in spine	Baseline	After 12 months	p
Thoracic spine, n (%)	13 (48.1%)	4 (14.8%)	< 0.01
VAS, mm (M±δ)	41.1±16.9	38.3±12.9	> 0.05
Lumbar spine, n (%)	15 (55.5%)	8 (29.6%)	>0.05
VAS, mm (M±δ)	44.3±23.3	35.6±14.7	>0.05

Conclusion: During the observation period after both 12 and 24 months of denosumab therapy the index of vertebral deformations in thoracic and lumbar sites remained stable (didn't change). After the first year of denosumab administration a significant reduction in VAS pain was observed both in the thoracic and lumbar spine. After another 1 year, the tendency to reduce of VAS pain continued. A significant decrease in the number of patients with pain in thoracic site was observed both after 12 and 24 months of denosumab therapy.

P1062
LACK OF CONVINCING KNOWLEDGE AND APPRECIATION AMONGST TOP CLINICIANS OF ALL CONCERNED SPECIALTIES IS THE REASON OF UNDERDIAGNOSIS AND UNDERESTIMATION OF SARCOPENIA IN INDIA

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Methods: 100 older adults (OD) were selected for the study with complaints of fall, fear of fall, history of fractures, loss of weight, weakness in limbs, weakening of hand grip strength, difficulties, locomotion, restriction of activities (including ADL) etc. The age group was from 60-91 y. The various tests which were employed like TUG, Chair Stand Test, SPPB, measurement of circumferences of their thigh, biceps and calf muscles was done. Record of their weight and height was also maintained on fortnightly basis over last 2 y. The study was conducted from 1 Jan 2018 to 31 Dec 2019. Out of 100, 56 were females and 44 were males. Each one was contacted by home visit every fortnight by the trained nursing staff and once a month by the principal investigator (PI). SarQoL Questionnaire was filled by each participant in Marathi/ Hindi/ English. Hands grip strength (HGS) was judged by PI during every visit by asking the participant to press his hand maximally during handshake. Each one was taught the exercises (endurance, stamina, balancing and flexibility) and were also provided a

'stump-stick', innovated by the PI for the exercises of pectoral girdle. Weight cuff, stress relief balls, and other portable devices were also used. A preliminary examination like ECG, BP, blood sugar was done and suitable deprescribing was done by PI to reduce polypharmacy. All medical files of each participant and prescription of each relevant consultant was studied by PI in depth. There was no mention of any diagnosis of sarcopenia or the Me.

Results: All medical files of each participant and prescription of each relevant consultant was studied by PI in depth. There was no mention of diagnosis of Sarcopenia in any participant's any medical file by any consultant like orthopaedic surgeon, neurologist,

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psychiatrist, cardiologist, endocrinologist, ophthalmologist etc. But PI found significant improvements in physical activities, ADL, HGS, SPPB, TUG, chair stand test after the daily exercising of at least for 5 d/week over 2 y for minimum 30 min and maximum of 60 min/d. The confidence level was increased and fear of fall decreased significantly in all participants.

Conclusion: The lack of convincing knowledge and appreciation about sarcopenia amongst the top relevant specialties was the root cause of under diagnosis leading to underprescription of exercises in older adults.

P1064
BONE MINERAL DENSITY AND FREQUENCY OF OSTEOPOROSIS IN HEART TRANSPLANTED PATIENTS

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Objective: Organ transplantation is a significant risk factor for disorders of bone metabolism, which has a multifactorial nature. The aim of this work was to investigate BMD in the lumbar spine and femoral neck and the incidence of osteoporosis in patients who underwent heart transplantation (HT) in state institution «Republican Scientific and Practical Centre Cardiology, Minsk, Belarus

Methods: 65 heart transplanted patients were enrolled in the study, 61 men and 4 women, mean age 54.4±9.1 y, mean period after HT 11.7±7.6 months. All subjects received standard immunosuppressive therapy, 14 of them (21.5%) were taking methylprednisolone (mean dose 8.0±3.8 mg/d) at the moment of the enrollment in the study. BMD of lumbar spine (L_1 - L_4) and femoral necks was studied using DXA with GE Lunar Prodigy X-ray densitometer. BMD assessment was carried out based on the T-criteria in accordance with WHO recommendations.

Results: 15 (23.1 %) patients after HT had decreased BMD, corresponding to OP, 15 (23.1%) had osteopenia and 35 (53.8%) patients had normal BMD. Low BMD was recorded in lumbar spine in 21 cases (70%) and both in lumbar spine and proximal femur in 9 patients (30%). Only 13% of the HT patients received calcium, vitamin D, and/or bisphosphonates after HT

Conclusion: Patients undergoing HT should be considered as having high risk of osteoporosis and fractures. Identification of risk factors and diagnosis of osteoporosis should ideally be carried out in all candidates for transplantation in order to timely prescribe preventive and therapeutic measures and to improve the quality of life of these patients.

P1065
PUBLICISE DENOSUMAB AS A 'BONE VACCINE' JUST TO SPREAD AWARENESS ABOUT THE MOLECULE AMONGST THE BENEFICIARIES TO INCREASE THE ACCEPTABILITY AND ADHERENCE

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Methods: The Principal Investigator is a consultant geriatrician and is expert of geriatric immunisations. He is doing immunisations extremely successfully since last 3 decades and follows recommendations of Advisory Committee On Immunisations Practices (ACIP). He is also an expert in prevention, diagnosis and treatment of osteoporosis. He has observed around 12 interesting similarities between denosumab as antiosteoporosis medication (AOM) and other vaccination medications. By looking at the nonacceptance, nonadherence of AOM by the sufferers, the PI is of the strong opinion that as immunisations are widely accepted and practiced globally, the Denosumab should be publicised as 'bone vaccine'. Every vaccine has some contraindications and accompanied by adverse events following immunisations, so will be the case with DMAB. Since last two and half years PI is giving DMAB to around 20 persons on 6 monthly (QIV?) basis. All these people diagnosed with osteoporosis are otherwise recipient of immunisations as per the recommendations of ACIP. When they were selected for denosumab as their regular AOM, they were worried about many issues like benefits vs. risks, future fractures in case of denosumab discontinuation and finally the cost. But when, PI explains the beneficiaries that it's like a bone vaccine, the acceptance and adherence became relatively easy and faster.

Results: For acceptance and adherence Dmab, may be promoted as 'bone vaccines;', as immunisations are very well accepted globally and adherence due doses of the immunisations is established clinical fact.

Conclusion: The stakeholders in the field of osteoporosis prevention, diagnosis and treatment should consider to publicise DMAB as a 'bone vaccine' just to multiply the acceptance and adherence to the molecule on merit basis.

P1066
PURMORPHAMINE INHIBITS BONE MARROW MESENCHYMAL STEM CELLS ADIPOGENIC DIFFERENTIATION AND PROMOTED OSTEOGENIC DIFFERENTIATION VIA HEDGEHOG/WNT/β-CATENIN SIGNAL PATHWAY

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Objective: The age-dependent shift of osteogenic differentiation to adipogenic differentiation of bone marrow mesenchymal stem cells (BMSCs) is an important cause of age-related osteoporosis. However, its underlying molecular mechanism and prevention are still under investigation.

Methods: To investigate the relationship between Hedgehog (Hh) signal pathway and osteoblast and adipocyte differentiation, we used purmorphamine (PM), a small-molecule agonist directly bound and activated Smoothened, to treat BMSCs. Firstly, the effects of PM on adipogenic and osteogenic differentiation were initially assessed by Oil Red O staining, ALP and von Kossa staining in vitro. Then the expressions of osteoblast- and adipocyte-specific genes were investigated by qRT-PCR. To further identify which target or signal pathway was involved during PM treatment and Hh activation, transcriptome sequencing (RNA-Seq) was performed. In the end, IWP-2, a selective inhibitor of Porcn-mediated Wnt secretion, was used to rescue the effect of PM and further confirm the mechanism.

Results: 2 μM PM upregulated *Gli1* and *Ptch1* expressions in mRNA level significantly, which used as readouts of Hh signaling activity. Then the Oil Red O staining and following OD_{520} of red deposits dissolved by isopropanol revealed PM inhibited adipogenic differentiation. ALP and von Kossa staining showed that PM stimulated osteogenic differentiation from BMSCs. qRT-PCR showed PM hindered adipocyte-specific genes including *Fabp4*, *Pparg*, *Cebpa*, *Adipoq*, *Plin1*, *Cd36*, and promoted osteoblast-specific genes such as *Alp*, *Sp7*, *Col1a1*, *Ibsp*. To further explore the mechanism underlying the above results, RNA-Seq showed primarily that the expression of *Porcn*, porcupine O-acyltransferase required for the acylation and secretion of all 19 Wnt ligands, was remarkably upregulated during PM treatment. At last, the dual functions of PM in adipogenic and osteogenic differentiation were rescued partly by selective inhibitor of Porcn-mediated Wnt secretion IWP-2.

Conclusion: PM inhibited adipocyte differentiation and promoted osteoblast differentiation from BMSCs through Hedgehog/Wnt/β-catenin signal pathway.

P1067

EFFECTIVENESS OF TWO DIFFERENT QUADRICEPS STRENGTHENING EXERCISES ON PAIN AND FUNCTIONAL ACTIVITY IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: To compare the effectiveness of quadriceps strengthening exercises and modified quadriceps strengthening exercises with biofeedback on pain and functional activity in patients with knee osteoarthritis

Methods: It was an experimental study conducted on 40 osteoarthritic knee patients aged from 50-75 y taken from NDMVP hospital and physiotherapy clinic in and around Nashik and they were divided into 2 subgroups and each group consisted 20 patients.

Inclusion criteria:

- Male/female patients between the age group of 50-75 y
- x-rays showing osteophytes, joint space narrowing (grade ii, iii).
- Patients with complain of unilateral knee pain, stiffness, difficulty climbing stairs, in walking and sitting crossed leg

Exclusion criteria: Patients with knee OA surgery, recent knee injury, psychological, neurological, cardiac, vascular and sensory problems

Group 1 (quadriceps sets with biofeedback): Ask the patient to sit on plinth place inflated sphygmomanometer cuff below the distal end of femur then patient is asked to maintain mercury level by holding an isometric contraction of quadriceps.

Group 2 (modified quadriceps sets with biofeedback): Ask the patient to sit on plinth with knee flexed to 60-85⁰ place inflated cuff between thigh and press on the cuff from thigh and asked to perform isometric contraction of quadriceps.

Demographic data, VAS and functional activity by WOMAC scale was obtained and consent was taken. Protocol was followed for 2 weeks after first 3 d, 1 d of rest was given and treatment was followed for 2 weeks. Pulsed ultrasound was given with a frequency of 1 MHz, power-2 W/cm^2 with pulsed mode duty cycle-1:4.

Results: Unpaired t-test was used for comparison between two groups

Table. Intergroup comparison of difference of mean (pre rx-post rx) for group 1 & group 2.

Parameter	Follow-Up	Group 1	Group 2	T Value	P Value
WOMAC	Difference between pre Tx and post Tx	28±1.10	31.85±4.44	2.8477	0.007 (significant)
VAS	Difference between pre Tx and post Tx	2.95±1.05	4.40±1.35	3.7	0.0005 (significant)

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Conclusion: When compared between two groups modified quadriceps sets with biofeedback is more effective in reducing pain and improving functional activity in patients with knee osteoarthritis.

P1068

THE INFLUENCE OF RESISTANCE BAND EXERCISE ON LUMBAR SPINE BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Objective: To examine the effect of 6 months progressive resistance band training on lumbar spine BMD in postmenopausal women.

Methods: Healthy postmenopausal women aged 60-80 y were recruited who were not taking medication that affects bone. Participants were randomised to either an exercise group or control group. The exercise group were asked to attend a supervised exercise session once a week and exercise twice weekly at home. The exercise programme involved three resistance band exercises: squat, deadlift and overhead press, as well as spinal extension exercises. The programme was progressive with emphasis on increasing intensity. DXA was performed at baseline and after 6 months to measure BMD of lumbar spine. Repeated measures ANOVA was conducted to determine whether changes differed between groups.

Results: 41 participants were recruited, age (mean$\pm$SD) 67.2±4.9 y. 18 exercisers and 12 controls have completed the study so far. Exercisers completed an average of 19.7±6.1 of the prescribed 24 supervised exercise sessions and reported an average of 39.7±7.1 of 48 prescribed home sessions. Lumbar spine BMD decreased similarly from baseline to follow-up in the exercise group (from 1.14±0.12 to 1.12±0.13 g/cm^2) and control group (from 1.03±0.17 to 1.02±0.17 g/cm^2). The decline over time was statistically significant (P<0.0005) but did not differ between groups (P=0.517).

Conclusion: A resistance band exercise programme did not influence lumbar spine BMD in postmenopausal women. Although resistance band exercise was feasible, a greater duration or magnitude of loading may be needed to increase BMD.

P1069

ASSESSING TRABECULAR BONE SCORE BEFORE ACUTE VERTEBRAL COMPRESSION FRACTURES IN NONOSTEOPOROTIC PATIENTS

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Objective: The gold standard for estimating vertebral compression fracture (VCF) risk is osteoporosis diagnosed using DXA, but only half have BMD T-scores not exceeding -2.5. Thus, the trabecular bone score (TBS) was used as another predictor of VCF risk in nonosteoporotic scenarios. In this study, we aimed to determine whether a low TBS is characteristic of nonosteoporotic older adults with VCFs.

Methods: After institutional review board approval, a retrospective study was performed using 223 consecutive postmenopausal women and 81 age-matched men who had undergone multiple-site BMD (lumbar spine, right and left femurs) and vertebral TBS measurements using DXA and spine MRIs with VCFs between February 2010 and March 2015. All DXA scans were performed less than 2 y before the MRI studies. Only lumbar spine BMD (g/cm^2) was used in all analyses. The T-scores were calculated using BMD reference values for the USA/Northern Europe population. A low TBS was defined as one below 1.2. Acute VCFs were classified by a skeletal radiologist, blinded to the DXA results, based on vertebral bone marrow edema visible on the fat-saturated T2-weighted spine MRI.

Results: In this sample, 89 women (39.9%) and 52 men (64.2%) with VCFs were classified as non-osteoporotic, and among these, 23.7% of the women and 40.8% of the men had low TBSs. Overall, acute VCFs occurred in 62 women (27.8%) and 33 men (40.7%), and among these, four female (11.1%) and 9 male (75%) non-osteoporotic patients had low TBSs. Taken together, 16.2% of the women and 23.4% of the men with VCFs were not osteoporotic and did not have low TBSs.

Conclusion: Particularly in men with acute VCFs, the TBS can be a helpful alternative for characterizing non-osteoporotic older patients with VCFs.

P1070

INCIDENCE AND SEVERITY OF OSTEOPOROSIS IN LIVER AUTOIMMUNE DISEASES

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Objective: Osteoporosis is a frequent complication in liver autoimmune diseases that evolves with prolonged cholestasis. The aim of the study was to identify the incidence of osteoporosis

in patients with autoimmune hepatitis, primitive biliary cirrhosis, sclerosing cholangitis and the severity of it reported to the duration of liver diseases

Methods: We did a retrospective study in 5 y on 40 patients including 20 of them diagnosed with autoimmune hepatitis, 10 patients with primitive biliary cirrhosis and the rest of 10 patients with sclerosing cholangitis.

Results: The patients were assessed by bone density test (DXA) and MRI scan to diagnose and evaluate the extension of osteoporosis through T-score at the beginning of our study and its background. The hepatic function was evaluated every 6 months using biochemical tests mainly focused on cytolysis syndrome and cholestasis.

Conclusion: We found a highly statistically significant correlation between the osteoporosis degree and the severity of cholestasis syndrome which was influenced in evolution by immunosuppressive therapy given in liver autoimmune disease.

P1071
VITAMIN D VALUES IN PATIENTS WITH OSTEOPOROSIS

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Objective: Osteoporosis is the most common metabolic disease of bone, with progressive flow. 8-10% of the world's population suffers from osteoporosis. It is characterized by a decrease in BMD, damage to the bone structure, which reduces its firmness, increases bone fragility and a tendency for fracture to occur. Vitamin D is known as an antirickets vitamin and is used to osteoporosis treatment. The main physiological role of vitamin D is to regulate the concentration of calcium and phosphate in the blood.

Methods: A retrospective study was conducted on 862 patients, 27-93 years old, with diagnosed osteoporosis. The research was conducted at the Clinic for Orthopedic Surgery and Traumatology of the Clinical Center of Vojvodina, in Novi Sad.

Results: Average BMI was 24.72, hip BMD 0.7675, vertebral BMD 0.8369. Vitamin D median value was 39nmol/L and average 42.05 nmol/L. Based on the results of the Spearman test there is a significant correlation between BMD spine and height, weight, and BMI. Vitamin OH2D correlated significantly only with patient age (r=-0.109 p=0.005). There was no significant correlation between BMD hip and spine values with vitamin D (p>0.05).

Conclusion: Our analysis didn't find a significant correlation between BMD and vitamin D.

P1072
THE IMPACT OF NUTRITIONAL STATUS ON BONE METABOLISM IN PATIENTS WITH ALCOHOLIC LIVER DISEASE

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Objective: The impairment of bone metabolism in patients with chronic liver disease is well known and has multiple causes. The nutritional status of these patients can decisively influence the degradation of bone structure.

Methods: We included in the study a number of 100 chronic alcohol users, with varying degrees of hepatic impairment. We evaluated their nutritional status by BMI, arm circumference and tricipital skin fold and also assessed the degree of osteoporosis by DXA.

We also structured a scale from 0 to 10 to evaluate the severity of malnutrition, including the severity of impairment of the muscular mass of the lower limbs, fat loss on the abdomen and face (Richat). Liver function was assessed by biochemical analyzes including aminotransferase levels, sideremia, serum albumin level and total proteins.

Results: The statistical analysis of the mentioned parameters revealed a highly statistically significant correlation between the alteration of the nutritional status of these patients and the severity of osteoporosis. We also found that restoring muscle mass under the careful guidance of a dietitian who allowed the correction of nutritional deficits led to the improvement of osteoporosis even without the administration of a specific treatment.

Conclusion: Nutritional status in patients with alcoholic liver disease directly influences the degree and evolution of osteoporosis.

P1073
BONE DENSITY IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Objective: Impaired phosphocalcial metabolism and bone structure in patients with Crohn's disease or ulcerative colitis have mainly three causes: ileum resections, malabsorption and glucocorticoid treatment. We studied the incidence in patients with inflammatory bowel disease in correlation with the type of disease, the duration of corticosteroid therapy and the onset of malabsorption.

Methods: We structured the patients in two study groups of 15 subjects each, who were diagnosed by colonoscopy with ulcerative colitis and Crohn's disease (extended form). Patients` age was between 20-40 y, so the results will not be altered by

the initialization of age-related osteoporosis. We did not include patients with bowel resection for Crohn's disease because their small number in our clinic would not have provided us with a conclusive statistic.

Results: The incidence of osteoporosis and osteopenia was 28% higher in patients with Crohn's disease compared to those with ulcerative colitis. Routine biochemical exploration has shown high levels of serum calcium and magnesium levels, associated with increased alkaline phosphatase levels let aside that this biomarker was not significantly correlating with osteoporosis. Also the incidence of fractures on the pathological bone was triple in the patients from the group with Crohn's disease.

Conclusion: Osteoporosis and osteopenia are commonly found in patients with chronic inflammatory bowel disease, especially in Crohn's disease, and influence patients` life quality through the complications they can cause.

P1074
INCIDENCE OF OSTEOPOROSIS IN PATIENTS WITH CHRONIC PANCREATITIS

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Objective: The impact of excessive amounts of alcohol consumption on long periods of time is manifested on several organs of the body and has adverse consequences on the integrity of the metabolism of the human body.

Methods: We performed a retrospective study on a group of 30 patients diagnosed with chronic alcoholic pancreatitis on whom we studied osteoporosis using osteodensitometry (DXA). All patients were male aged between 38-60 years old. We also structured a control group of 30 patients with chronic pancreatitis of different etiologies than the alcoholic one.

Results: The incidence of osteoporosis in the studied group was 82% and was directly correlated with the presence and severity of the malabsorption process objectified by the biochemical study of lipid, carbohydrate and protein metabolism. In comparison, at the control group, we identified the presence of osteoporosis in 21% of the subjects whose T-score was at the limit between osteoporosis and osteopenia.

Conclusion: The influence of chronic and excessive alcohol consumption on the structure and function of the exocrine pancreas is directly correlated with the presence and severity of osteoporosis in studied patients.

P1075
THE COMBINED INACTIVATION OF PROCALCITONIN AND CALCITONIN GENE-RELATED PEPTIDE INHIBITS EXPERIMENTAL RHEUMATOID ARTHRITIS IN VIVO

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Objective: Calcitonin gene-related peptide (CGRP) and procalcitonin (PCT) are both coded by their common gene, *Calca*. CGRP, a nociceptive neuropeptide, and PCT, a sepsis biomarker, have both been shown to play a relevant and potentially synergistic role in anabolic bone remodelling. We were previously able to show a distinct pro-inflammatory role of CGRP in experimental rheumatoid arthritis (RA) *in vivo*, while the role of PCT beyond its diagnostic value, remained unclear.

Methods: To evaluate the impact of *Calca*-derived peptides on experimental RA, three genetically-modified mouse lines were employed in combination with the collagen antibody-induced arthritis (CAIA) model. CAIA was induced by an intraperitoneal injection of collagen II antibodies and boosted by an injection of lipopolysaccharide in 10-12 week-old male mice, deficient for *Calca* (Calca$^{-/-}$), αCGRP (αCGRP$^{-/-}$), calcitonin receptor (Calcr$^{-/-}$) and their wildtype littermates. Control animals received phosphate-buffered saline, respectively. Over a course of ten days, disease progression was investigated daily through a semiquantitative clinical arthritis score and ankle size measurements. Wrist and ankle joint samples were histologically evaluated.

Results: Fulminant arthritis developed in WT and Calcr$^{-/-}$ mice in the same fashion, with no significant difference between the groups, indicating that CT has little to no effect on the development of arthritis. The inactivation of αCGRP however led to significantly less clinical and histological signs of arthritis in αCGRP$^{-/-}$ mice compared to their WT littermates, which indicates a relevant pro-inflammatory role of αCGRP within experimental RA. While αCGRP$^{-/-}$ mice still showed some level of arthritis activity, Calca$^{-/-}$ animals showed no signs of arthritis at all. Therefore, PCT proved to be an independent pro-inflammatory mediator of experimental RA and the combined inactivation of CGRP and PCT led to a complete amelioration of experimental RA.

Conclusion: In this study we were able to show that the combined inactivation of CGRP and PCT led to an attenuation of murine antibody-mediated arthritis. This underlines the importance of Calca-derived peptides far beyond the nociceptive role of CGRP and the diagnostic value of PCT.

P1076

CORRELATIONS BETWEEN THE DEGREE OF LIVER FIBROSIS QUANTIFIED THROUGH TRANSIENT ELASTOGRAPHY AND OSTEOPOROSIS IN PATIENTS WITH LIVER CIRRHOSIS

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Objective: Osteoporosis and osteopenia are relatively frequent in patients with alcoholic liver disease but less studied in viral-related liver disease. We wanted in this study to have a comparative analysis between two equally groups of patients diagnosed with viral hepatitis complicated with cirrhosis and alcoholic liver disease in which we tried to have correlation between the effect of chronic alcohol ingestion on BMD assessed by bone density test (DXA) and the severity of hepatic fibrosis evaluated through transient elastography (FibroScan).

Methods: The patients were divided in two groups: 120 of them with chronic infections with hepatitis viruses and the other group of 120 patients with alcoholic liver disease. All patients were investigated biochemically and imagistic (ultrasound with or without CT) transient elastography (FibroScan)and by bone density test (DXA).

Results: The incidence of osteoporosis was with 26% larger in patients with alcoholic liver disease corresponding to the severity of cholestasis syndrome (increases of the bilirubin and alkaline phosphatase). Also the severity of osteoporosis assessed with T-score was related with high statistical significance with a bigger score in elastography.

Conclusion: We determined a linear correlation between the degree of liver fibrosis and sternness of osteoporosis in patients with alcoholic liver disease.

P1077

HOW MUCH DO YOU KNOW ABOUT OSTEOPOROSIS? A SURVEY AMONG PATIENTS REFERRED TO THE DXA EXAM BY GENERAL PRACTITIONERS IN ITALY

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Objective: International osteoporosis guidelines recommend that physician provide an adequate education to patients. Despite this, health professionals often fail to provide it. We aimed to verify if patients diagnosed with osteoporosis received an adequate information on risk factors and lifestyles at the time of diagnosis, and therefore they have better knowledge concerning osteoporosis than those who are not diagnosed with osteoporosis.

Methods: We carried out an observational prospective study among patients who were referred to the densitometry examination in our Osteoporosis Service by their general practitioner between April and July 2019. Age, education, current job, height and weight, awareness of suffering from osteoporosis, BMD and FRAX score were recorded. The modified Italian version of Facts on Osteoporosis Quiz (FOOQ) was administered. It consists of 21 sentences concerning osteoporosis. The tool aims to investigate patients' knowledge about prevention strategies, non-modifiable risk factors, and modifiable risk factors for osteoporosis. A higher score indicates better knowledge about the disease. The patient were asked to indicate for each sentence whether this was true, false or if he/she doesn't know.

Results: 138 patients were enrolled (response rate 93.3%). Mean age was 65.9±10.5, 95.6% were women, mean BMI was 25.7. FRAX mean risk within 10 y was 10% for every fracture and about 4% within 10 y for hip fracture. There weren't differences in total score obtained at FOOQ questionnaire in subjects who know to suffer from osteoporosis and others (12.2±3.4 and 12±3.5, respectively, p=0.772). Only 24.7% of respondents knew that low-weight women have osteoporosis more than heavy weight women; 34% knew that after menopause, women not on estrogen treatment need about 1200 mg of calcium (i.e., 5 glasses of milk) daily. A linear regression model demonstrated that there aren't patient's characteristics associated with knowledge concerning osteoporosis.

Conclusion: Patients who undergo the DXA exam are poorly informed about osteoporosis, regardless of whether they have the disease and sociodemographic characteristics. It is mandatory to improve the education that is provided to the patient, since there are effective interventions and lifestyles in the prevention and treatment of osteoporosis.

P1078

MANAGEMENT OF OSTEOARTHRITIS OF THE KNEE AND OTHER JOINTS IN RURAL INDIA

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This is a retrospective review of patients who presented to the senior author's orthopaedic camps in Ranchi, Jharkhand, East India. The aim of this study is identify the obstacles in educating the patients in management of their joint pain and then getting their consent for the appropriate treatment. During a period of 10 y (from July 2009 to December 2019) over 2000 patients were assessed, investigated and counselled for various treatment options. 185 patients underwent knee joint Arthroplasty, 6 patients required hip joint arthroplasty, 36 patients underwent arthroscopy of the knee joint, 3 required metal work removal from previous surgery. The others underwent non operative management. Follow-up has revealed wound dehiscence in one case, no deep infections or loosening of the prosthesis. One patient has had to undergo revision knee replacement due to late presentation of quadriceps tendon rupture.

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Arranging follow-up of these patients was difficult for many reasons.

P1079

A RETROSPECTIVE OBSERVATIONAL STUDY TO ESTIMATE PREVALENCE OF FRAGILITY FRACTURES IN SPANISH PRIMARY CARE (PC) (PREFRAOS STUDY): RESULTS FROM THE FIRST PATIENTS AND PARTICIPATING CENTERS

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Objective: Estimate the prevalence of fragility fractures among subjects ≥70 years old seen in Spanish PC and describe risk factors, and OP diagnosis and treatment in subjects with at least one fragility fracture.

Methods: Observational, retrospective chart review in Spanish PC centers. The study comprises of two phases (A and B). Phase A includes subjects ≥70 years old listed in the participating center´s medical records from November 2018-January 2020. Phase B selects approximately 20 consecutive consented subjects per center with a recorded fragility (osteoporotic) fracture (defined as a 'low energy' trauma) and prior consultation at the center for any reason. Phase A will estimate the prevalence of fragility fractures in the PC setting. Phase B will describe the main characteristics of OP (risk factors, diagnosis and non-pharmacological / pharmacological interventions) in subjects with at least one fragility facture. We will report interim data from the study.

Results: 37 PC centers in 15 Spanish Regions will participate. As of 2 December 2019, 26 centers had started the study. Of 37,984 medical records reviewed in Phase A, 20.9% (7944) subjects were ≥70 years old and the majority were women (4787 [60.3%]). Among all subjects ≥70 years old, 17.8% (1412/7944) had a fragility fracture and were eligible for Phase B. The majority of eligible patients (1172/1412 [83.0%]) were women. 367 (45.9%) of the planned 800 subjects have been enrolled into Phase B (303/367 [82.6%] women).

Conclusion: This observational, retrospective, chart review will estimate the prevalence of fragility fractures in subjects ≥70 years old seen in Spanish PC centers, and provide data on the sociodemographic characteristics, risk factors, OP diagnosis and treatment after a fragility fracture in this population.

Disclosures: DML: personal fees from Amgen, Lilly, Novartis, Ferrer, Rubió and Italfarmaco. MB and LC: Amgen employees.

P1080

ASSOCIATION OF SERUM FETUIN-A LEVELS AND RHEUMATOID ARTHRITIS CLINICAL AND IMMUNOLOGICAL FEATURES

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Objective: Rheumatoid arthritis (RA) is one of the most common rheumatic diseases. In order to improve the understanding of RA pathogenesis and diagnostic and therapeutic approaches numerous studies are performed [1]. In recent years the role of tissue cytokines, such as fetuin-A (FA), is thoroughly investigated [2]. This study aimed to determine the association between serum FA levels and RA clinical and immunological features.

Methods: This study included 140 patients, who were divided into 2 groups including 110 patients with RA and 30 healthy individuals. Serum FA was measured in each group using an ELISA. C-reactive protein (CRP), rheumatoid factor (RF), antibodies against cyclic citrullinated peptides (anti-CCP), urines cartilaps and creatinine were measured in group with RA. All data performed

Results: The references for FA were 653.55-972.19 µg/ml determined from healthy controls. All patients were divided into two subgroups. Subgroup 1 consisted of 23 patients with low FA levels (≤653.55 µg/ml). Subgroup 2 included 87 patients with normal level of FA (>653.55 µg/ml). Patients with low FA were more often positive on anti-CCP (95% vs. 58%, $\chi^2=10.63$; p=0.0049), had higher disease activity ($\chi^2=19.39$; p<0.001), x-ray stages ($\chi^2=9.43$; p=0.023), functional status ($\chi^2=12.384$; p=0.0061) and complications ($\chi^2=18.56$; p<0.001). These data was obtained by using chi-square analysis. Patients with low FA level had significantly higher concentration of CRP (31.1±24.8 vs. 13.4±16.7 mg/l respectively; F=16.4; p<0.001) and urine CartiLaps/creatinine (598.9±223.7 vs. 481.1±226.9 respectively; F=4.924; p=0.028).

Conclusion: The low FA level associates with the presence of anti-CCP, higher disease activity, x-ray stages, functional status and complications of RA, as well as higher serum CRP levels and cartilage destruction rate.

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P1081
THE BELGIAN BONE CLUB 2020 GUIDELINES FOR THE MANAGEMENT OF OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN

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Objective: To provide updated evidence-based guidelines for the management of osteoporosis in postmenopausal women in Belgium.

Methods: The Belgian Bone Club (BBC) gathered a guideline developer group. Nine "Population, Intervention, Comparator, Outcome" (PICO) questions covering screening, diagnosis, non-pharmacological and pharmacological treatments, and monitoring were formulated. A systematic search of Medline, the Cochrane Database of Systematic Reviews, and Scopus was performed to find network meta-analyses (NMA), meta-analyses (MA), systematic reviews (SR), guidelines, and recommendations from scientific societies published in the last 10 years. Manual searches were also performed. NMA were considered as the highest level of evidence. Summaries of evidence were provided, and recommendations were further validated by the BBC board members and other national scientific societies experts.

Results: Of the 3840 references in the search, 333 full texts were assessed for eligibility, and 129 met the inclusion criteria (11 NMA, 79 MA, 12 SR, and 27 guidelines). Osteoporosis screening using clinical risk factors should be considered. Vertebral, pelvis, hip, femur, humerus, radius/ulna, and age-dependent wrist fracture were considered as major osteoporotic fracture (MOF). Patients with a recent (<2 years) major osteoporotic fracture were considered at very high and imminent risk of future fracture. A DXA BMD T-score ≤-2.5 or a threshold for 10-year risk of MOF ≥20% and of hip fracture ≥3% (<70 years) or ≥5% (≥70 years) was used to categorize patients as high risk. Patient education, the combination of weight-bearing and resistance training and optimal calcium intake and vitamin D status were recommended. Antiresorptive and anabolic osteoporosis treatment should be considered for patients at high and very high fracture risk,

respectively. Follow-up should focus on compliance, and patient-tailored monitoring should be considered. Expert voting results: 12 strong and 13 weak recommendations were formulated.

Conclusion: The BBC 2020 guidelines provide updated algorithms for evidence-based clinical management of osteoporosis in postmenopausal women.

P1082
HOW USEFUL IS TBS FOR FRACTURE RISK ASSESSMENT IN CLINICAL PRACTICE?

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Objective: TBS (trabecular bone score) is a simple method that estimates fracture risk based on a determination of bone texture (an index correlated to bone microarchitecture). The predictive ability of TBS is independent of FRAX (fracture risk assessment tool) clinical risk factors and femoral neck BMD values. We analyzed the difference of low/high-risk groups assessment by comparing FRAX with BMD and FRAX adjusted for TBS.

Methods: we retrospectively analyzed a total of 168 scans of women aged between 65-75 years old, from authors' DXA database, with no other medical records. Using DXA scan (with Lunar IDXA) we extracted bone composition parameters: spine and hip T-score, FRAX with BMD and FRAX after TBS for major osteoporotic fracture (MOF) and hip fracture. We analyzed the obtained data using IBM SPSS Statistics 20.

Result: A total of 168 scans of postmenopausal women (mean age 69.72±2.993) were included in our study, from which 57 of them (33.92%) had spine/hip T-score consistent with osteoporosis diagnosis (T score ≤ -2.5 DS), 78 (46.42%) with osteopenia and 33 (19.64%) had normal osteodensitometric parameters. We considered high-risk patients those whom 10-year probability of hip fracture was ≥3% and ≥20% for MOF. In the high-risk for hip fracture group there were initially 39 patients but after the FRAX with TBS analyze, 3 of them were considered low-risk; meanwhile no changes were seen for 10-y MOF risk between FRAX with BMD and FRAX with TBS in the 4 high-risk patients. Among the 130 patients that were considered low-risk for hip fracture by FRAX with BMD, 4 of them (3.07%) entered the high-risk group after TBS FRAX adjustment. Regarding the low-risk MOF fracture, no patient crossed between the two risk groups after the analyze of the two risk assessment tools.

Conclusion: In our study, TBS provided more valuable information on hip fracture probability rather than on MOF. The relatively small number of patients that crossed the 3% threshold may be justified by the fact that we only included patients with primary osteoporosis, which generally involves lower impact on bone quality.

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P1083

MUSCLE STRENGTH REDUCTION IN PATIENTS WITH COMBINED COURSE OF DIABETES MELLITUS AND OSTEOPOROSIS

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Objective: Among patients with diabetes mellitus (DM), the prevalence of osteoporosis (OP) reaches almost 35%, which increases the risk of complications and impairs the quality of life. Modern ideas about the mechanism of development of this comorbidity are the influence of prolonged hyperglycemia and insulin resistance on the function and quantity of osteoblasts, vitamin D metabolism and accumulation of AGE-products that are embedded in the bone matrix and thus damage it. At the same time, patients with a combined course of DM and OP, have normal values of BMD index. Therefore, predicting the development of low-traumatic fractures for this category of patients remains an important problem and requires finding new and sensitive markers. **The purpose** of the study was to observe the lower limbs muscular strength and to determine the prognostic importance of its decrease in patients with combined course of DM and OP.

Methods: 45 postmenopausal women with type 2 diabetes were examined, among them 25 had concomitant OP (main group). The remaining patients were included in the control group (20 people). The average age of the main group was 66±2.8 y, the duration of diabetes was 6.8±1.2 y. By age and duration of disease the groups under comparison were statistically equipotent. The lower limbs muscular strength was measured by a dynamometer; glucose level, HbA1c and insulin resistance index (HOMA-IR) by standard biochemical techniques; BMI by the ratio of weight to twice the height; BMD was measured according to the results of X-ray densitometry; 10-y risk of low-traumatic fractures by FRAX scale. The statistical analysis included the determination of the Mann-Whitney criterion and Spearman rank correlation.

Results: The lower limbs muscle strength of patients in the main group was significantly lower than of the control one, and was 55.6±15.4 kg (p≤0.05). Glucose and HbA1c did not show a statistical difference between the groups, but the HOMA-IR was significantly higher in the group of patients with OP and was 2.4±0.6 (p≤0.05). Patients of the main group showed a decrease in BMD, which had a trend pattern (p=0.059). There was no significant difference among the two groups under the survey in terms of the 10-y risk of low-traumatic fractures. At the same time, patients in the main group had a moderate negative correlation between the lower limbs muscle strength and the HOMA-IR (r=-0.6, p=0.04).

Conclusion: Osteoporosis and high insulin resistance are likely to reduce the postmenopausal women lower limbs muscle strength, which should be taken into account when creating personalized prevention and treatment programs for this category of patients.

P1084

PROSPECTIVE STUDY ASSESSING BONE MINERAL DENSITY AND RISK FACTORS FOR OSTEOPOROSIS IN PATIENTS WITH ANDROGEN DEPRIVATION THERAPY

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Objective: To assess risk factors for osteoporosis (OP), bone turnover markers (BTM) and BMD in a cohort of patients with deprivation therapy (ADT), as well as the duration of ADT and previous treatments received for prostate cancer (PC).

Methods: Prospective study including patients with ADT for PC. Risk factors for OP, BTM (total ALP, bone ALP, CTx), spinal X-Ray and BMD (Lunar, DPX) were assessed yearly since inclusion in the study (April 2018). Patients with known OP or antiosteoporotic treatment were excluded. The study was approved by the ethics committee. Herein we present the preliminary cross-sectional study at inclusion.

Results: 75 patients were included with a mean age 75±8 y and median duration of ADT of 1 year. Adjuvant ADT treatment was: radiotherapy (n=18) and docetaxel (n=7). When assessing risk factors for OP: 28% had previous fragility fractures, 24% had current alcohol intake. Mean 25OHD at inclusion was 19±9 ng/ml (73% <30ng/ml). Mean testosterone was 82±162 ng/dL (75% <50 ng/dl). All patients had increased values of CTx and 9% had increased bone ALP levels. Additionally, 14% had morphometric vertebral fractures at X-ray. After BMD assessment: 28% had OP and 56% osteopenia. Patients with OP were older (p=0.021), had lower testosterone levels (p=0.004), lower BMD (at spine, proximal femur and distal radius) and had more previous fragility fracture (p=0.022). Up to 16% had high bone mass (HBM) mostly affecting spine BMD (in 6 patients with femoral osteopenia). All patients with HBM had high bone metastatic disease (p=0.03), however no differences were observed between patients with/without HBM when comparing BTM or calcium-phosphate metabolism.

Conclusion: Low bone mass and previous fragility fractures are frequent in patients with ADT. Up to 16% had high bone mass, mostly in patients with bone metastatic disease. All patients with ADT should undergo a bone health assessment.

P1085

COMPARATIVE EFFICACY OF PARATHYROIDECTOMY AND CONSERVATIVE MANAGEMENT IN PATIENTS WITH MILD PRIMARY HYPERPARATHYROIDISM: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED-CONTROLLED STUDIES

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Objective: Whereas parathyroidectomy (PTx) has an established benefit in patients with symptomatic primary hyperparathyroidism (PHPT), its efficacy in patients with mild (asymptomatic) PHPT has not been proven. The aim of this study was to systematically investigate and meta-analyze the best available evidence from randomized-controlled trials regarding the efficacy of PTx on fracture risk (primary endpoint), as well as BMD, serum calcium concentrations, nephrolithiasis risk and quality of life (QoL) (secondary endpoints) compared with conservative management (non-PTx; pharmaceutical intervention or active surveillance) in patients with mild PHPT.

Methods: A comprehensive literature search was conducted in PubMed, Scopus and Cochrane, from conception to January 11, 2020. Data were expressed as percentage mean differences with 95%CI. The I^2 index was employed for heterogeneity.

Results: Five studies (four with active surveillance, one with etidronate) fulfilled the eligibility criteria [334 patients, mean age 66.5±5.6 y, mean follow-up time 25.2 (range 6-60) months]. There was no difference in fracture incidence between non-PTx and PTx patients [relative risk (RR) for total fractures 2.93 (95%CI 0.91, 9.49), I^2=0%; RR for vertebral fractures 5.66 (95%CI 0.68, 47.31), I^2=0%; RR for nonvertebral fractures: 1.32 (95%CI 0.31, 5.67), I^2 not applicable)]. Lower BMD values were demonstrated in non-PTx compared with PTx patients [mean difference in lumbar spine BMD -4.53% (95%CI -6.25, -2.81), I^2=98%; femoral neck BMD -2.89% (95%CI -5.71, -0.06), I^2=100%; total hip BMD -3.44% (95%CI -5.49, -1.39), I^2=99%; forearm BMD: no difference]. With respect to serum calcium concentrations, PTx patients demonstrated a mean reduction of 10.8% (95%CI 9.1, 12.6, I^2=98%) compared with non-PTx patients. No difference was observed between the groups in the risk for kidney stone formation or the QoL indices (physical and social function, physical and emotional role function, mental health, vitality and bodily pain; general health higher in the non-PTx group).

Conclusion: PTx is not a first-line treatment option in patients with mild PHPT, as it does not improve fracture, nephrolithiasis risk or QoL, compared with conservative management; however, PTx does improve BMD and serum calcium concentrations.

P1086

PREVALENCE AND CHARACTERISTICS OF DOUBLE PERIPHERAL FRAGILITY FRACTURES IN AN OSTEOPOROTIC POPULATION TREATED IN A DEDICATED FRACTURE LIAISON SERVICE

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Objective: The number of prevalent osteoporotic fractures reflects the severity of osteoporosis (OP). The occurrence of a double peripheral fragility fracture (DPFF) in one event might occur in circumstances of most severe OP and frailty and therefore would represent a very high risk situation of imminent further fractures and disability. We took the opportunity of a large database related to a dedicated fracture liaison service (FLS) to explore the phenotype of these patients.

Methods: We conducted a retrolective cross-sectional study of postmenopausal women, visiting the FLS between January 2010 and December 2019 after a peripheral fragility fracture located either at the wrist [W], the hip [H] or the upper end of the humerus [Hu]. All women had a biology assessment, BMD measurement by DXA, vertebral fracture (VF) assessment, or imaging of the spine. All values were expressed in mean±SD.

Results: Among the 997 women aged 77.8±11.8 y, visiting the FSL during the study period, 19 women aged 78.1±10.8 y had a DPFF, which represents 1.9% of the population. The mean number of falls over a 3-y period was 3±1. The BMI was 23.4±4.3 kg/m^2. At least one risk factor for secondary OP was present in only 52.6% of the cases. Six of those subjects (32%), aged 85±3.5 y, were living in elderly institutions. The following combinations of DPFF were identified, W-W, n=3, W-Hu, n=4, W-H, n=7, and Hu-H, n=5. Except W-W, all other DPFF affected the same side, 5 right and 11 left. Eleven women (56%) had ≥1 [1-5] prevalent fragility VF. The values of BMD and T-score were respectively 0.819±0.12 g/cm^2, (T-score -2.4±1.2) at the spine; 0.644±0.093 g/cm^2, (T-score -2.6±0.7) at the hip, and 0.647±0.094 g/cm^2, (T-score -2.5±0.8) at the femoral neck. Mean serum 25OHD level was 49.5±26.3 nmol/L with no elevation in serum PTHi, 46±16.1 ng/L.

Conclusion: The occurrence of a DPFF appears to be very infrequent. The mechanism of the fall could explain the occurrence of DPFF always on the same side. No particular clinical, biological, and densitometric profiles of those patients were noted.

P1087

DEVELOPMENT OF A METHOD OF CORRECTION OF BIOMECHANICAL DISORDERS OF THE CERVICAL REGION TO REDUCE CLINICAL MANIFESTATIONS OF CERVICOGENIC HEADACHE

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Objective: To develop a method of correction of static-dynamic disorders in patients with clinical manifestation of cervicogenic headache.

Methods: 49 patients with cervicogenic headache (CGH) were examined using criteria of ICHD-3 beta, flexion-rotation test and manual examination. Posturographic platform with an additional autovisualization channel to correct biomechanical disorders.

Results: In 81.6% of participants, the flexion-rotation test was positive on the side of headache. Increased severity of muscle-tonic syndrome (index of muscle-tonic syndrome - IMT): 9±1.8 points, mainly in the suboccipital, posterior lower oblique, sternocleidomastoid, belt, trapezoid muscles. After treatment: 63.3% of patients relapse of CGH occurred a month later after pharmacological treatment(first group), 42.8% - after pharmacological treatment and treatment on the posturographic platform(second group) (p<0.05). IMT averaged 7±1.2, and the flexion-rotation test was positive in 57.1% of participants in the first group. IMT in the same muscles and the index of the flexion-rotation test: 4±1.5 and 4.5%, respectively (p<0.5) in the second group.

Conclusion: Clinical manifestations of cervicogenic headache are mainly associated with biomechanical disorders in the cervical region, rather than with degenerative-dystrophic changes. The posturographic platform helps to identify disorders of the musculoskeletal system and expands the possibilities of treatment and rehabilitation of cervicogenic headaches.

P1088

SARCOPENIA AND MUSCLE MASS IMPROVED AFTER LP-PRP INJECTION IN PATIENTS WITH KNEE OSTEOARTHRITIS: A MULTICENTER STUDY

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Objective: Osteoarthritis (OA) is a combination of joint disorders that leads to pain, disability and loss of independence. Knee OA are extremely prevalent, and their occurrence increases with ageing. Similarly, loss of muscle mass and function sarcopenia, occurs during the duration of the degeneration of the knee.

Methods: Exercise is essential for health because it increases muscle mass, reduces body fat, and improves muscle strength, endurance, immune function, and the cardiovascular system. Accordingly, exercise should be considered an essential feature of therapeutic strategies targeting age-related sarcopenia. seems aerobic exercise has a protective effect. We assessed 164 elderly (102 women, 62 men aged 74.17±6 y) six months after LP-PRP injections. Body composition was determined by bioelectrical impedance analysis, calf measurement with inelastic tape and strength assessments (grip and knee muscle strength) via hand-held and isokinetic dynamometers. Functional assessments included 4-m, timed-up and go (TUG) and chair stand (CS) tests. QoL was assessed with Sarcopenia Quality of Life (SarQoL) questionnaire. Outcomes were assessed at baseline, and 6 months postintervention (week 24).

Results: Significant improvement (p<0.001) were observed in QoL, calf circumference, TUG, CS, and 4 m tests, grip and knee muscle strength after six months period. Also significant improvements (p<0.05) also observed in muscle mass index, CS and 4-m tests, calf circumference, muscle strength at 24 weeks too. Our results supports that the use of LR-PRP injection for osteoarthritis of the knee enhance the pain and walking distance of these patients. Therefore we observed the improvement in muscle mass after LP-PRP injections.

Conclusion: Multiple studies have indicated that PRP is superior to hyaluronic acid and corticosteroids in terms of improving patient-reported pain and functionality scores in knee OA. Unfortunately, there are many variations in PRP preparation, and lack of standardization in factors, such as speed and duration of centrifugation, leads to wide ranges of platelet and leukocyte concentrations. But PRP injection results in significant clinical improvements, so the age related sarcopenia improved, because reduce the pain and enhance the functionality and walking distance of the patients.

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Skeletal muscle mass index	≤0.001	≤0.001	≤0.001	NS
Calf circumference	≤0.001	≤0.001	≤0.001	NS
Chair stand test	≤0.001	≤0.05	≤0.001	NS
Handgrip strength	≤0.001	≤0.001	≤0.05	NS
Right knee extension 90°/s	0.005	NS	≤0.05	NS
Right knee extension 180°/s	≤0.001	NS	≤0.001	NS
Right knee flexion 90°/s	0.004	NS	≤0.05	NS
Right knee flexion 180°/s	≤0.001	≤0.001	≤0.001	NS
Left knee extension 180°/s	0.01	NS	0.02	NS
Left knee flexion 90°/s	0.004	0.02	≤0.05	NS
4m test	≤0.001	0.003	≤0.001	≤0.001
TUG	≤0.001	NS	≤0.001	≤0.001
Gait speed	≤0.001	≤0.001	≤0.001	≤0.001
Quality of life (SarQoL)	≤0.001	NS	≤0.001	≤0.05
Physical and mental health (Domain 1)	≤0.001	NS	≤0.05	NS
Locomotion (Domain 2)	0.014	NS	≤0.05	NS

P1089
THE DETERIORATION OF BONE AND MUSCLE IN OLDER AGE: WHICH IS MORE PROMINENT?

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Objective: There is a gradual and progressive deterioration in both BMD and muscle mass in the aging process. We aimed to investigate the slope of such deteriorations in bone and muscle and compare them in different age categories, by sex.

Method: The data of 2426 individuals, participating in the Bushehr Elderly Health (BEH) program was used. Using the DXA method, a Hologic Discovery machine was used to measure the BMD and muscle mass. Appendicular skeletal muscle mass (ASM) was defined as the sum of muscle mass in bilateral lower and upper limbs. The lumbar spine texture was estimated using the TBS iNsight™ algorithm. The study population was categorized into four age categories (60-64, 65-69, 70-74 and ≥75 y). The mean values of the lumbar spine BMD, TBS, and ASM were calculated and compared across different age categories. The percent of decrease was calculated in men and women, separately. A linear regression model was used to assess the interaction of sex and age categories.

Results: In all, 2349 participants (1138 men) with complete data were included. Compared with men, women showed the lower values of TBS, BMD and ASM in different age categories (all p<0.001). Considering the age group of 60-64 years as the reference, a gradual and significant loss of TBS was detected in men aged 65-69 years (P=0.048) and ≥70 y (P<0.001); while the association was not significant for BMD (p for trend=0.240). Considering ASM, a significant loss was shown over the age of 70 years (P<0.05). In women, the higher slope of deterioration was found in the spinal BMD and ASM in age categories of 70-74 years and ≥75 y (P interaction <0.05); however for TBS, the interaction was detected for women aged ≥75 y (P interaction=0.008). The highest slope of deterioration was detected in ASM in women.

Conclusion: The greater slope of deterioration was detected in women across age categories for both muscle and bone measures. Although the age-related loss of bone and muscle is expected, special attention is needed for the population aged over 70 y, especially in women.
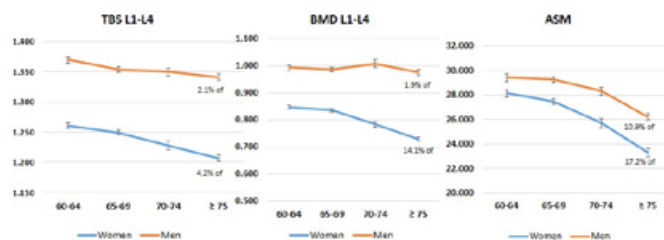
P1090
FALLS AND FRACTURES IN THE ACUTE CARE SETTING: A RETROSPECTIVE COHORT STUDY

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Objective:

- To determine the characteristics of patients who suffer falls with fractures in hospital
- To examine if outcomes in this cohort differ from those of patients who fall without sustaining a fracture during their in-patient stay

Methods: This retrospective study was compiled using coding data. Records pertaining to a six-year period (2012-2017) were perused. All patients coded as having suffered a fall in hospital during this period were identified. These patients were divided into those who did and did not suffer fractures as a result of their fall. Patient demographics and comorbidities were compared between those who did and did not sustain fractures. Outcome measures examined included length of stay (LOS) and inpatient mortality. Descriptive statistics were performed. Chi-square and t-tests were conducted to facilitate inter-group comparisons. More detailed analysis of outcome measures was conducted using binary and linear logistic regression.

Results: 722 falls were recorded, 128 of which were associated with a fracture. Neck of femur fractures represented the most common fracture type (29%). Patients who suffered a fracture were older (76.8 vs. 72.8 y, p-value=0.009) and more likely to be

female (53.1% vs. 43.7%, p-value=0.01). A higher incidence of delirium (29.7 vs. 21.1, p-value=0.035) and dementia (23.4% vs. 13%, p-value=0.003) were noted in the fall with fracture cohort.

Comparison of unadjusted outcome measures demonstrated a longer LOS (27.9 vs. 18 d, p-value=0.000) and a higher incidence of inpatient mortality (13.3 vs. 6.9%, p-value=0.016) in the fall with fracture group. Logistic regression demonstrated that an inpatient fall with fracture was a significant predictor of inpatient death (OR 2.4, 95% C.I. 1.26-4.66). Linear regression analysis demonstrated that a fall with fracture added 9.5 d to length of stay (p-value=0.000)

Conclusion: In this study, delirium, dementia, female sex and older age were associated with falls and fractures in hospital inpatients. Falls with fractures were associated with longer LOS and were an independent predictor of inpatient mortality. Greater understanding of the characteristics of patients at risk of these events, as well as knowledge of the considerable associated morbidity and mortality will help to prognosticate when these events occur.

P1091
HYPOPARATHYROIDISM: BONE TISSUE CONDITION TO COMPARE WITH NORMAL CONTROL

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Objective: Hypoparathyroidism (HypoPT) is an endocrine disorder characterized by deficient PTH (PTH), the key regulator of bone metabolism. HypoPT is associated with low bone turnover linked to normal or increased BMD and distorted bone microarchitecture. We aimed to estimate the bone turnover in patients with HypoPT compared to healthy volunteers using the noninvasive methods.

Methods: 16 patients with chronic postsurgical HypoPT (women/men - 14/2) were enrolled in the study. The average duration of the disease was 9 y (3-21 y). The control group included 11 healthy volunteers matched on sex-, age- and BMI. All participants in were younger than 50 y. We evaluated following bone turnover markers: alkaline phosphatase (ALP, 50-150 IU/l), osteocalcin (Osc, 11-43 ng/ml); C-terminal telopeptide of type 1 collagen (CTX, 0.01-0.69 ng/ml). BMD (g/cm^2) by DXA was measured at the lumbar spine (L2–L4), total hip (TH), femoral neck (FN), radius total (RT) and radius 33% (R33%). The data are presented as median (Me) and quartiles [Q1; Q3]. For statistical analysis we used the Mann-Whitney U test (p<0.006 after Bonferroni correction).

Results: All patients with HypoPT had decreased bone markers: ALP 56 [45; 66]; Osc 10.56 [8.73; 16.17], CTX 0.17 [0.12; 0.25] significantly lower than in the control group (P < 0.001). The L2-L4 and FN BMD in the study group were, 1.31 [1.2; 1.34] and 1.0 [0.91; 1.12] respectively and did not differ from the control. However, patients with HypoPT had significantly higher BMD at the RT and R33% than in healthy controls (0.71 [0.67; 0.76] and 0.89 [0.84;

0.93] vs. 0.58 [0.55; 0.62] and 0.69 [0.64; 0.74] respectively), P<0.001. No significant correlation between BMD, bone markers and the HypoPT duration was obtained.

Conclusion: There are no clear markers of the bone impairment in HypoPT. However, the various non-invasive methods may be applied for assessment of these changes. Dynamic observation of patients with HypoPT is needed to evaluate the fracture risks and to determine the starting points of therapy with recombinant human PTH.

P1092
CALL TO ACTION FOR SECONDARY PREVENTION OF OSTEOPOROTIC FRACTURES IN SPAIN

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Objective: To establish a multidisciplinary expert-consensus on secondary prevention of fragility fractures in Spain.

Methods: A 2-round-Delphi-consensus about secondary prevention of fragility fractures was developed and sent to 102 bone experts. An on-line questionnaire including 43 items was designed according to a literature review and a multidisciplinary discussion group with experts (n=12), supervised by a Scientific Committee (n=5). All items were assessed from three perspectives: current (present situation), wish (optimal situation) and prognosis (feasibility of implementation), and scored on a 7-point Likert scale. Consensus (wish and prognosis) was defined as ≥75% disagreement (slightly/mostly/strongly disagree) or agreement (slightly/mostly/strongly agree). Items for which consensus was not achieved in the 1st round were included in a 2nd round. Current perspective was not subjected to consensus.

Results: 75 experts answered the 1st Delphi round (response rate 73.5%), and 69 answered the 2nd round (response rate 92.0%). Participants mean age was 51.8 y [standard deviation (SD): 10.1 y], with 24.0% being rheumatologists, 21.3% primary care physicians and 14.7% geriatricians. Consensus was achieved for 100% of items from wish perspective and 58,1% of items from prognosis perspective. Participants expressed strongly current disagreement (C) and slightly prognosis agreement (P) in 4 items, identified as the main gaps to be improved in the future for an effective secondary fracture prevention strategy: clinical report homogeneity (C: 86.7%, P: 33.3%); effective hospital-primary care communication (C: 78.7%, P: 47.8% telephone/mail; C: 84.0%, P: 47.8% case managers); use of health-related quality of life questionnaires (C: 85.3%, P: 18.8%); and systematic treatment adherence monitoring (C: 80.0%, P: 55.1%).

Conclusion: A multidisciplinary consensus was achieved regarding several strategies to be implemented to optimize secondary fracture prevention in Spain. Clinicians and policy makers efforts should focus on those issues with greatest divergences between current application and prognosis and highest likelihood of success after implementation.

P1093
EFFECT OF 17β-ESTRADIOL ON ACTIVE FGF23 AND DMP1 LEVELS IN MLO-Y4 IN THE PRESENCE OF OXIDATIVE STRESS: INVOLVEMENT OF TYROSINE KINASES AND NF-κB

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Objective: Previously we observed that active FGF23 levels increase in starved osteocyte cells, MLO-Y4, in the presence of oxidative stress. Therefore, the aim of study is to evaluate, in this experimental condition, 17β-estradiol (17β-E2) effect on FGF23 and dentin matrix protein-1 (DMP1) levels and the involvement of tyrosine kinases and NF-κB. FGF23 and DMP1 are related to the mineralization process.

Methods: Murine osteocytes (MLO-Y4) undergone starvation, a condition that induces apoptosis related to oxidative stress, were used. Cells, stimulated or not with 5-10 nM 17β-E2 were pretreated or not for 1 h with 25 μm SP600125 (JNK inhibitor), 5 μm U0126 (ERK1/2 inhibitor), 25 μm SB203580 (p38 inhibitor), 50 μM PDTC (NF-κB inhibitor). Active intra- and extracellular FGF23 levels and intracellular DMP1 were measured with ELISA kits. IkB-α, and phosphorylated IKK kinase were determined by western blot.

Results: 17β-E2 inhibited the increased levels of active FGF23 due to oxidative stress in starved MLO-Y4 and it regulated also DMP1 levels. 17β-E2 effect on these factors occurred trough the specific inhibition of MAP kinases such as JNK and ERK1/2 which are activated by oxidative stress. 17β-E2 effect was also mediated by NF-kB, one of the transcriptional factors activated by ERK1/2. A correlation between DMP1 levels and 17β-E2-related down-regulation of FGF23 in starved osteocytes was also demonstrated.

Conclusion: The results of this study in MLO-Y4 osteocytes highlight the involvement of JNK, ERK1/2 and NF-κB in the protective effect of 17β-E2 against abnormal increases of active FGF23 due to oxidative stress and/or apoptotic processes. Moreover, they indicate that 17β-E2 is able to restore a normal balance between FGF23 and DMP1 levels through the involvement of JNK and NF-κB. These data may clarify the molecular mechanisms that modulate FGF23 levels and osteogenic activity of osteocytes.

P1094
INCIDENCE OF MORPHOMETRIC VERTEBRAL FRACTURES AND PREDICTION OF HEALTH-RELATED QUALITY OF LIFE IN JAPANESE MEN AND WOMEN: THE ROAD STUDY THIRD AND FOURTH SURVEYS

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Objective: Although vertebral fracture (VF) is a major cause of low back pain and disability in elderly individuals, few epidemiologic studies of VF have been conducted in Japan. Furthermore, the clinical significance of mild deformity of the vertebrae is unclear. This study aimed to estimate the incidence of morphometric VF in Japanese men and women, and to clarify whether the presence of mildly-deformed vertebrae predicts a decline in health-related quality of life (QOL), using a longitudinal population-based cohort of the Research on Osteoarthritis/osteoporosis Against Disability (ROAD) study.

Methods: We used data from 1163 participants (373 men and 790 women) in the third and fourth surveys of the ROAD study (performed in 2012−13 and 2015−16, respectively), all aged ≥40 y. All participants underwent whole spine X-ray examination. Vertebrae from T4-L5 were assessed for VF, using the Genant semiquantitative (SQ) method, where vertebral deformity was graded as 0 (normal), 1 (mild), 2 (moderate), or 3 (severe). VF was defined as SQ≥2, and mild deformity was defined as SQ=1. Incidence of VF was defined as occurring when a participant who

had no VF at the third survey (the baseline) had at least one VF at the fourth survey (the follow-up). QOL was measured using the EuroQOL (EQ-5D) and the Oswestry Disability Index (ODI).

Results: Among the 1163 participants, 361 men and 736 women (mean age: 65.6 y and 63.8 y, respectively) had no VF at the baseline. These individuals made up the population at risk of the present study. At the follow-up, 9 men and 26 women had at least one incident VF. The incidence of VF was 1.06%/y (0.83%/y in men and 1.18%/year in women). Multiple regression analysis revealed that, in comparison to SQ=0, the presence of mild deformity at the baseline was an independent predictor for QOL decline according to both the EQ-5D and the ODI, after adjustment for sex, age, BMI, and each QOL score at the baseline (adjusted regression coefficients: -0.25 [95%CI: -0.05−-0.003], and 2.26 [95%CI: 0.54−3.98], respectively).

Conclusion: We estimated that the incidence of VF was 0.83%/y in men and 1.18%/y in women.

P1095
EVALUATION OF THE ATORVASTATIN EFFICIENCY IN THE TREATMENT OF OSTEOPOROSIS IN RHEUMATOID ARTHRITIS

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Objective: Osteoporosis (OP) often occur in rheumatic diseases, such as rheumatoid arthritis (RA). Certain role in development of OP in RA scientists allocate to presence of chronic immunoinflammation, hypogonadism, decreasing of vitamin D 1α-hydroxylase activity in kidneys, development of hyperparathyroidism, restriction of mobility and insolation of patients, early and long immunodepressants therapy [1,2,3]. We aimed to study atorvastatin efficiency in treatment of osteoporosis in RA patients.

Methods: We observed 130 RA patients (98 women (75.4%) and 32 men (24.6%)). The age of patients was from 24-75 y. Concentration of osteocalcin in serum and cross laps in urine was determined by ELISA test. 38 RA patients with osteoporosis and osteopenia received Atorvastatin in dose 20-40 mg daily during 6 months (1st group), 29 – calcium in dose1000 mg daily for 6 months (2nd group).

Results: Decreasing of BMD has been founded in 67 RA patients. Osteoporosis was revealed in 9 cases (6.9%), osteopenia - in 58 (44.6%) (chi-square=34.56, p<0.001). The concentration of osteocalcin in serum was lower and crosslaps level in urine was higher than in control group. We revealed positive dynamics after 6th month of therapy with atorvastatin in majority of patients: increasing of muscles strength, BMD, normalization of crosslaps concentration.

Conclusion: The results of the study allow to recommend atorvastatin in complex therapy for correcting of BMD decreasing in RA patients.

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P1096
OSTEOCHONDROMATOSIS

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Synovial osteochondromatosis, is a rare benign disorder, with a global incidence of 1:100000 with no precise data due to the rarity of the disease. It is characterized by the formation of multiple intra-articular cartilaginous nodules within the synovial membrane. These nodules can be detached and continue to grow as free loose bodies, while in advanced disease calcification and ossification of the free particles may occur. Treatment of synovial osteochondromatosis is open or arthroscopic free body surgical removal with or without synovectomy.

Case report: A 47-year-old female was referred to our department with persisting right hip pain progressively worsening, affecting her walking. Clinical examination revealed limitation of the motion range of the affected hip due to pain. Magnetic resonance showed pathological intra-articular effusion of the right hip, with thickening and papillary limbs. After orthopedic consultation, hip arthroscopy was decided, as hip synovial osteochondromatosis was suspected. Hip arthroscopy was applied, synovectomy and removal of free loose bodies. The patient's symptoms disappeared after four months and she regained full range of hip motion.

Hip osteochondromatosis is rarely reported in the literature. Usually it appears with nonspecific symptoms, although total limitation of the range of movement of the hip can occur. MRI is the gold-standard for the diagnosis. Arthroscopic surgery and removal of the loose bodies is effective for the diagnosis and treatment of the disease. Recurrence of the disease may take place at 10% within 5 years. In the case of recurrence additional surgery is required.

P1097
MANAGEMENT OF HYPOPARATHYROIDISM AND PSEUDOHYPOPARATHYROIDISM DURING PREGNANCY: A RETROSPECTIVE OBSERVATIONAL STUDY

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Objective: The co-existence of endocrine disorders such as hypoparathyroidism (HypoPT) or pseudo-HypoPT and pregnancy makes calcium-phosphate homoeostasis complex and may cause maternal and/or foetal clinical complications, unless the calcium demands are met by adequate calcium and calcitriol

supplementation (1). Only few case reports or case series on hypoparathyroid women during pregnancy and breastfeeding have been published (2-4). Given the limited data published, a retrospective study conducted on women with HypoPT or pseudo-HypoPT, who had one or more pregnancies, was created in order to investigate retrospectively the clinical course, pharmacological management and eventual adverse events related to HypoPT or pseudo-HypoPT during pregnancy and lactation.

Methods: This was a retrospective-observational, multicentric, no profit study coordinated by University Hospital of Florence ("Bone and Mineral Diseases Unit" research center). This project involved eight Italian referrals centers for endocrinological diseases, affiliated with the Italian Society of Endocrinology (SIE), in addition to the coordinating center.

Results: This study identified a large cohort of 40 women, mostly affected by postsurgical HypoPT, followed by some cases of pseudo-HypoPT, and idiopathic and autoimmune HypoPT forms. Most women have an uncomplicated pregnancy and give birth to healthy babies maintaining serum calcium concentrations within the low-to-mid normal reference range during pregnancy. The main described complications included: preterm birth, abortion, and neonatal respiratory distress and transient hypocalcaemia. The doses of calcitriol and calcium supplements were variable in our study group. No bone fragility was reported during these specific physiological conditions.

Conclusion: In the future, an accurate biochemical monitoring will need to be improved in hypoparathyroid women during these specific conditions, also in the light of the new guidelines regarding the management of HypoPT in pregnancy. Prospective investigations in women with HypoPT and pseudo-HypoPT during pregnancy and breastfeeding will be necessary in order to enhance the knowledge about biochemical alterations, maternal and fetal clinical manifestations, bone complications, and to improve the quality of care available today.

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P1098
LABORATORY CRITERIA FOR CLARIFYING THE TIME OF THE SECOND STAGE OF SURGICAL TREATMENT OF THE SPINE TO REDUCE THE RISK OF INCOMPLETE CONSOLIDATION OF THE BONE

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Objective: It is known that complications may occur in different embodiments osteosynthesis spinal injuries, and two-stage surgery increases the likelihood of this. The aim of this study was to establish a prognostic indicator of the incomplete consolidation of the bone tissue of the number of common laboratory tests in the clinic.

Methods: The study involved 111 patients with uncomplicated fractures of the thoracic and lumbar spine in the course of a two-stage surgical treatment: osteosynthesis with external fixation and anterior fusion. Activation of patients after the first operation carried out for 2-3 d, after the second – 5-7 d. Patients with normal bone consolidation had time interval between operations average 1.3±0.2 months formed through bone block 4.2±0.3 months after the fixation of the damaged spine in the apparatus. According to the results of observation in terms of up to 10 y showed no treatment complications. In 14 patients (12.6%) after an average of 58.2±5.7 d after anterior fusion in the cores external fixation there is an inflammation of soft tissues. To reduce the risk of osteomyelitis rods removed the device, and fusion of bone in the vertebral segment in the time frame (4-5.5 months) and further (up to 7 months of observation) did not occur. These patients were the group with complicated bone formation - the incomplete consolidation of the bone tissue. Laboratory studies were performed in the dynamics of the pre- and postoperative follow-up. They include immunophenotyping of lymphocytes, evaluation of activity NADPH-oxidase system of neutrophils, estimate protein composition of blood. Statistical data processing was carried out using software Statistica for windows (v.6.1), StatSoft Inc, USA and BioStat (v.6), AnalystSoft Inc, USA. In order to identify the prediction criteria used to modify the theory T.Bayes with the calculation of the diagnostic value of the value obtained.

Results: Features of the dynamics of immunological parameters studied variants of bone regeneration enabled based on Bayes' theory allocate prediction criteria and incomplete bone formation in the osteosynthesis spinal injuries unit for external fixation and anterior fusion. We were able to establish a laboratory test to determine the exact times of the second stage of surgery in order to avoid complications - unfinished consolidation of the bone tissue. In particular, before planned surgery anterior fusion in a two-stage surgical treatment of spinal injuries with clinic-radiological assessment of the patient in the blood is determined by the concentration of C-reactive protein (CRP). Based on the obtained metabolite concentration values set indications for reducing the risk of an incomplete spinal consolidation. Level range CRP from 0-5 mg/L inclusive suggests lower risk of bone incomplete consolidation in the spinal motion segment, the level

exceeds the value of 5 mg/L indicates a high risk of complications and the need to postpone the second phase for the adoption of additional measures to stabilize the patient's condition.

Conclusion: It developed an immunological test to refine the time of the second stage of the surgery in the recovery of spinal injuries.

P1099

COMBINATION OF SERUM ADIPOKINES/RELATED INFLAMMATORY FACTORS AND RATIOS AS PREDICTORS OF INFRAPATELLAR FAT PAD VOLUME IN KNEE OSTEOARTHRITIS PATIENTS: USAGE OF A COMPREHENSIVE MACHINE LEARNING APPROACH

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Objective: One of the hurdles in osteoarthritis (OA) drug discovery and the improvement of therapeutic approaches is the early identification of patients who will progress. In a first step toward this goal, this study aimed to determine, in OA individuals, the optimum combination of serum levels of adipokines/related inflammatory factors, their ratios, and the three main OA risk factors for predicting knee OA infrapatellar fat pad (IPFP) volume, as this tissue has been associated with knee OA onset and progression.

Methods: Serum and magnetic resonance images (MRI) were from the Osteoarthritis Initiative at baseline. Variables (48) comprised the 3 main OA risk factors (age, gender, BMI), 6 adipokines, 3 inflammatory factors, and their 36 ratios. IPFP volume was assessed on MRI with a neural network methodology. The best variables and models were identified in Total cohort (n=678), High-BMI (n=341) and Low-BMI (n=337), using artificial intelligence selection approaches. Reproducibility was done using 80 OA patients from a clinical trial (female, n=57; male, n=23).

Results: For the three groups, 8.44E+14 subvariables were investigated and 48 models were selected. The best model for each group included five variables: the three risk factors and adipsin/C-reactive protein combined for Total cohort, adipsin/chemerin; High-BMI, chemerin/adiponectin high molecular weight; and Low-BMI, IL-8. Further investigation indicated that gender improved (13-16%) the prediction results compared to the BMI-based models. For each gender, we then generated a pseudocode (an evolutionary computation equation) with the 5 variables for predicting IPFP volume. Reproducibility experiments were excellent (correlation coefficient: female 0.83, male 0.95).

Conclusion: This study demonstrates, for the first time, that the combination of the serum levels of adipokines/inflammatory factors and the three main risk factors of OA could predict IPFP volume with high reproducibility and superior performance when accounting for gender separation.

P1100

PATIENT WITH PRIMARY BONE CITED HODGKIN LYMPHOMA HOSPITALIZED AS PERSISTENT FEVER

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Objective: Primary Hodgkin lymphoma in bone tissue is a rather unusual condition even if though secondary bone sited localization may be possible. We present a case of a 68 years old female patient admitted for a fever of unknown origin (FUO). The complete work up presented multiple osteolytic lesions. The patient before the work up conclusion left hospital on her own will, readmitted after a 15 months period for persistent beta symptomatology fever.

Methods: A 68 years old female with a history of atrial fibrillation, hypertension and dyslipidemia was hospitalized due to persistent fever of unknown origin. Complete work up for infectious, autoimmune, autoinflammatory and rheumatological diseases were performed without revealing any specific findings. The CT scan showed the existence of small lymph nodes posterior to trachea and trachea's dissection. Osteolytic lesions were also found at the Tc99 bone scan. The PET-CT scan confirmed the osteolytic lesions giving the fact that we had to do with a hematology disease or secondary malignant lesions. A bone marrow biopsy was also performed as we suspected T – LGL, although the results were not clear, but the patient left the hospital on her own will. She was disappeared and 15 months later she was readmitted for a one month period persistent fever with beta symptomatology. After the usual workup an iliac bone CT guided biopsy was performed.

Results: Histological and immunochemical examination set the diagnosis of bone sited Hodgkin lymphoma CD30 +, CD15 +, CD20- and CD3-.Patient was transferred to Hematology Division.

Conclusion: Statistically, 3% of all bone neoplasms are lymphomas with non Hodgkin lymphomas with large b cells lymphomas being the most common. In a percentage of 9-35%, lymphomas tend to affect bones especially in the closing stages of the disease. A biopsy and an histological examination are required in order

to differentiate bone lymphomas from other primary neoplasms of the bones such as Langerhan's histiocytosis or gross cell neoplasm. When physicians investigate cases of FUO should include lymph node diseases, as Hodgkin lymphomas, located as primary neoplasm in uncommon sites such as bone lesions.

P1101
ACUTE PNEUMONIA AT ENDOPROSTHESIS OF LARGE JOINTS: QUESTIONS OF FORECASTING

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Objective: It is known that a number of factors - blood loss, postoperative immobilization - form the background to the emergence in the early postoperative period when endoprosthesis large joints of acute pneumonia. Its incidence varies from 0.34-15%. A promising direction in solving the problem becomes the use of laboratory methods that are widely available and expressed a reaction to changes in the homeostatic equilibrium. Based on data about the important role of the immune system in the development of other complications of hip replacement, one can assume the existence of the possibility of using these tests in solving this problem. The aim of the study was the development of immunological criteria for predicting acute pneumonia in the early postoperative period when endoprosthesis large joints.

Methods: The study of 110 patients with primary hip arthroplasty with coxarthrosis various etiologies stage III (76 patients), aseptic necrosis of the femoral head (15 patients), hip pseudarthrosis (19 patients). In 9 patients (8.2% of total) in the early postoperative period, an average of 11 d, developed acute pneumonia. Laboratory studies were performed before surgery and in the dynamics of up to 3.5 y after the conference. In patients with acute pneumonia, the study was stopped at the time of the onset of complications. The study included determining the number of T-lymphocytes (CD45^{+}CD3^{+}), B-lymphocytes (CD45^{+}CD19^{+}), the functional activity of these cells, the absorptive and functional-metabolic activity of phagocytes, concentrations of immunoglobulins and acute phase proteins. Statistical data processing was performed using Statistica v.6.1 software. Test of the hypothesis of normal distribution, as well as the consent of the distribution of the total population was performed using Pearson's χ2-test. To evaluate the results obtained are applied nonparametric methods involving determination of the median and quartile span. At a value of $p < 0.05$ the null hypothesis (no differences between samples) was rejected. To establish criteria for predicting applied Bayes' theorem, determined the diagnostic significance of the values obtained.

Results: Patients with pneumonia in the postoperative period was marked leukocytosis: increase amounted to 10 d in 66.9% of the preoperative level, while in uncomplicated - 34.7%. Increasing the pool of phagocytic cells in patients with pneumonia were detected just before the development of complications - to 10 d of observation, while in uncomplicated similar reaction was observed on the 3rd day after the operation. In patients with a complication on the 3rd day after the surgery, a decrease superoxide production

by neutrophils with an increase in the activity of cationic proteins. Percentage of CD19 + cells in the postoperative period with acute pneumonia did not undergo significant changes as opposed to increasing the number of these cells by 24.8% (p<0.01) on day 3 after surgery at a favorable treatment outcome. IgA levels before operation was somewhat lower in the subsequent development of pneumonia than in the group with a favorable course arthroplasty. As in the control group, at the stage of development of an acute pneumonia, postoperative levels of IL-1β (p<0.01) and TNFα (p<0.01) in all patients was increased. Using Bayes' theorem made it possible to establish the immunological criteria for predicting acute pneumonia in the early postoperative period. Prior to surgery, this increase myeloperoxidase activity of neutrophils to 2.9 units or higher (the coefficient of determination on the learning sample 91.7%, accuracy of detection on the test sample - 93.0%). On day 3 after the operation criterion has been to increase the activity of cationic proteins neutrophils to 1.7 units or higher (the coefficient of determination on the learning sample 82.4%), the recognition accuracy for test sample - 87.1%).

Conclusion: Laboratory indicators have been established to predict acute pneumonia.

P1102
GENETIC ACTIVATION OF HEDGEHOG SIGNALING BY SUFU ABLATION INHIBITS BONE MARROW MESENCHYMAL STEM CELLS ADIPOGENIC DIFFERENTIATION AND PROMOTED OSTEOGENIC DIFFERENTIATION

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Objective: Bone marrow mesenchymal stem cells (BMSCs) have multiple differentiation potential, and the age-dependent shift of osteogenic differentiation to adipogenic differentiation of BMSCs is an important cause of age-related osteoporosis. Hedgehog (Hh) signal pathway plays a critical part in skeletal development, repair and disease processes. As an evolutionarily conserved Hh signaling component, Sufu is a core intracellular regulator of mammalian Gli proteins. Without Hh ligands binding to Ptch1, Sufu combines with Gli proteins and anchors them in the cytoplasm preventing subsequent transcription factor activation. However, the role of Sufu in BMSCs multi-directional differentiation and bone metabolism has not been investigated.

Methods: To investigate the relationships between Sufu, Hedgehog signaling and BMSCs multi-directional differentiation, we established *Sufu[flox/flox]/Sp7-Cre* (*Sufu[CKO]*) mice to ablate *Sufu* expression specifically in BMSCs. Meanwhile, we used Cre-GFP adenovirus (Ad-Cre-GFP) to infect *Sufu[flox/flox]*-BMSCs to knock down *Sufu* expression. The adipogenic differentiation potential was evaluated by Oil Red O staining, and the osteogenic

differentiation potential was investigated by ALP and von Kossa staining. During the adipogenic and osteogenic differentiation, specific genes expressions were detected by qRT-PCR.

Results: Both two methods to knock out *Sufu* in BMSCs decreased *Sufu* expression and stimulated *Gli1* and *Ptch1* expressions in mRNA level, indicating the *Sufu* knock down and Hh signaling activation models were established successfully. After *Sufu* ablation by endogenous Cre recombinase or Cre-GFP adenovirus, adipogenic differentiation and lipid droplet formation were hindered compared with the control group. Besides, osteogenic differentiation and mineralization were stimulated. Furthermore, qRT-PCR showed the consistent specific-genes regulations as staining in vitro (*Fabp4*, *Pparg*, *Cebpa*, *Adipoq*, *Plin1*, *Cd36* were inhibited in *Sufu* knock down groups during adipogenic differentiation and *Alp*, *Sp7*, *Col1a1*, *Ibsp* were promoted in *Sufu* knock down groups during osteoblast differentiation).

Conclusion: Genetic activation of Hedgehog signaling by *Sufu* ablation inhibits BMSCs adipocyte differentiation and stimulated osteoblast differentiation.

P1103
INADEQUATE RESPONSE TO DENOSUMAB TREATMENT: DOES THIS EXIST?

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Objective: Denosumab (Dmab), an anti-RANKL monoclonal antibody, has proven effectiveness increasing lumbar and femoral BMD. Nowadays, the incidence and factors related to an inadequate response to Dmab treatment remain unclear. **We aimed to** describe clinical, analytical and densitometric characteristics of patients with inadequate response (IR) to Dmab in clinical practice. IR was defined as the presence of a new fracture [fxs-IR] or a significant decrease in BMD (≥5% lumbar or ≥4% femoral)[BMD-IR].

Methods: retrospective study of patients with IR to Dmab treatment. Data of demographic variables, risk factors for osteoporosis, history of fractures, previous antiosteoporotic treatment, densitometric and analytical parameters were collected before and after IR.

Results: 21 patients were included (18W:3M) with mean age of 74±9 y. The causes of osteoporosis were: postmenopausal (52%), induced by glucocorticoids (24%), alcoholic (10%) and multifactorial (14%). Most patients were previously treated with bisphosphonates (57%, duration 5.4±2.7 y) and had previous vertebral fractures (57%, median 3). During Dmab treatment, 10 patients presented a BMD-IR (with a mean bone loss up to -3.5% at femur and -5.8% at lumbar spine) and 11 had fxs-IR (vertebral

[n=8], humerus [n=1], tibia [n=1]). No significant differences were observed in duration of Dmab between both IR groups (Fxs-IR: 3.1±1.9 y vs. BMD-IR: 2.4±1.2 y). In the BMD-IR, the BMD loss was higher at lumbar spine than at total hip (-6.6%±3.7 vs. -1.9%±4.8). Only 1 patient of the fxs-IR had a secondary cause of IR (myeloma multiple). In the fxs-IR group, most patients started combined treatment with teriparatide (n=4), 1 changed to teriparatide and 6 remained with Dmab. In the BMD-IR group, most maintained Dmab treatment (n=8) and 2 switched to zoledronate.

Conclusion: Most patients who developed IR to Dmab had been previously treated with bisphosphonates and had previous fragility fractures and appears within the first 3 y of treatment. BMD loss seems to be more marked at spine than total hip. Only one patient had a secondary cause of IR.

P1104
EPIGENOME-WIDE ASSOCIATION STUDY IDENTIFIES ASSOCIATION BETWEEN 5' WNT5B CPG DNA METHYLATION AND BONE MINERAL DENSITY AT THE FEMORAL NECK IN OLDER UK ADULTS

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Objective: DNA methylation is indicative of cell-type and can also influence the expression of surrounding genes. We aimed to investigate the methylation of CpG sites associated with BMD across the epigenome in the Hertfordshire Cohort Study, a group of community-dwelling older adults who were born and lived in Hertfordshire at the time of the study.

Methods: Questionnaires recorded information on lifestyle, medical history and physical activity. BMD at the femoral neck was assessed using DXA. Whole blood samples were taken, DNA extracted from whole blood leukocytes and subjected to bisulphite conversion. Methylation was assessed using the EPIC DNA methylation (850k) microarray (Illumina™). Quality control measures were assessed and technical replicates removed. Analyses were performed using the Meffil pipeline and R version 3.5.1. Leukocyte cell constituents were calculated using Houseman's method. Epigenome wide association was investigated in unadjusted models and those adjusted for age, sex, blood cell counts and surrogate variable analysis (SVA). Significant results were required to pass the Mansell threshold [1] ($p < 9 \times 10^{-8}$).

Results: 345 participants were included in the analyses (173 men and 172 women) with a mean age of 65.1 y (SD 2.8 y). Mean BMD at the femoral neck was 0.97 (SD 0.15). With adjustment for age and sex (λ=1.46±0.00334), a significant association was present with cg16017420 at position 1,642,879 on chromosome 12 (build hg19) (p=3.3x10^{-8}, coefficient=-0.10) which persisted after adjustment for confounders including cell count (p=8.3x10^{-8}, coefficient=-0.10) and SVA (p=7.6x10^{-8}, coefficient=-0.10).

Conclusion: An epigenome-wide association study of total femoral neck BMD identified a significant CpG, which is located in a CpG shore-region, 5' of the *WNT5B* gene. *WNT5B* is part of the noncanonical Wnt signaling pathway and genome-wide analyses have previously demonstrated an association with BMD. A potential explanation for our findings would suggest that increased methylation at this CpG site could reduce expression of Wnt5B leading to reduced BMD at the femoral neck. These findings serve to emphasise the role of noncanonical Wnt signaling in bone homeostasis.

P1106
EOSINOPHILIC FASCIITIS: MUSCULOSKELETAL MANIFESTATIONS AND MANAGEMENT

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Eosinophilic fasciitis is an extremely rare disorder characterized by diffuse fasciitis, hypergammaglobulinemia and eosinophilia. It is characterized by abrupt onset, bilateral edema in the limbs, peau d'orange appearance of the skin, linear depression along the veins, known as groove sign and tenderness. The induration is progressive and may lead to joint contractures. The aim was to describe the case of a patient with eosinophilic fasciitis.

A patient, male aged 63, presented with scleroderma like lesions in the upper extremities and the lower limps bilaterally, which did not affect the face, hands and feet. On examination linear depression along the veins - groove sign - was observed in the upper extremities. Raynaud's phenomenon was absent. Initial laboratory examination revealed CRP 1.1 mg/dl (normal range <0.5 mg/dl), eosinophilia, WBC 8080/mm^3, eosinophils 1930/mm^3 − 23.9%, ANA (-), anti-ENA (-), anti-Scl70 (-). The diagnosis of eosinophilic fasciitis was made. A thigh MRI was performed which showed edematous visualization of muscular fascia in the middle and lower third of the thighs. A deep skin-muscle-fascia biopsy was performed which revealed infiltration with lymphocytes and rare eosinophils.

The patient received pulse therapy with methylprednisolone 500 mg iv - total dose 1500 mg - followed by methylprednisolone 32 mg/d orally. Laboratory improvement was noted immediately following treatment as WBC was 9290/mm^3, eosinophils 50/mm^3 − 0.67% and clinical improvement of the skin hardness and the feeling of pressure occurred within a week.

In conclusion, eosinophilic fasciitis is a rare entity, which may be underdiagnosed. The disease should not be mistaken for systemic scleroderma since treatment and prognosis are different. Careful clinical investigation, histopathology, eosinophilia in peripheral blood, and MRI allow confirmation of diagnosis. Key drugs for treatment are systemic corticosteroids and methotrexate, although other compounds have also been used occasionally. Rituximab has also been used in refractory cases.

P1107
HOW DOES THE PERFORMANCE OF SARC-F CORRELATE WITH THE SARQOL SCORE?

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Objective: In the process of translation and cross-cultural adaptation of the SarQol questionnaire into the Slovenian language, the SARC-F questionnaire was used as a screening tool for sarcopenia. SARC-F assesses five domains: strength, independent walking, rising from a chair, climbing stairs and history of falls. The maximum score is 10 points and a score of ≥4 indicates a risk for sarcopenia. SarQol is a sarcopenia specific quality of life questionnaire that assesses 7 domains: physical and mental health, locomotion, body composition, functionality, activities of daily living, leisure activities and fears. The aim of the study was to establish the strength of the correlation between the two scores.

Methods: For the evaluation of the correct understanding of the Slovenian version of the SarQol questionnaire, 10 patients (all female) aged ≥65 y and scoring ≥4 on the SARC-F questionnaire were included in the study. The patients were recruited from the outpatient rehabilitation clinic and were willing to participate in the study. The SARC-F score was obtained during an interview and if they scored ≥4, they completed the SarQol questionnaire by themselves in the presence of a doctor. Any doubts regarding the questions in the questionnaire were immediately discussed. The statistical analysis was performed with the SPSS 22.0. The Spearman's correlation coefficient was used for analysis due to the nonparametric distribution of the SARC-F and a small number of subjects in the study.

Results: The average age was 77.9 (SD 6.06) y. Moderately strong negative correlation was determined between SARC-F and SarQol (r=-0.681, p=0.03), whereas age did not statistically significantly correlate with the SARC-F and SarQol score (r=-0.079, p=0.828, r=0.437, p=0.207, respectively).

Conclusion: Even though SARC-F only assesses items that fall mostly into the category of functionality of the SarQol questionnaire, the correlation between the two scores was strong. This could indicate the importance of the functionality for the overall wellbeing of the elderly and the effect it has also on other domains of one's quality of life, including physical and mental health, leisure activities and fears. Age cannot be considered a factor for a lower quality of life or lower functionality.

P1108

MUSCLE FUNCTION AND QUALITY BUT NOT MASS PROTECT AGAINST MORE SEVERE KNEE PAIN TRAJECTORIES

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Objective: Evidence suggests that periarticular muscles have a role in the pathogenesis of pain, but results have not been consistent. We recently reported that pain population is heterogeneous and consists of different subgroups of which the causes and mechanisms differ. The aim of this study was to examine the association of muscle mass, leg strength, knee extensor strength, low-limb muscle quality with knee pain trajectories.

Methods: Data on 975 participants (mean±SD: age 62.8±7.4 y, 51% of females) from a population-based older adult cohort study were utilised. DXA was used to assess muscle/fat mass. Leg strength in both legs and dominant knee extensor strength were measured. Low-limb muscle quality was calculated (i.e., leg strength divided by lower-limb muscle mass). The WOMAC pain questionnaire was used to measure knee pain at each time point. Radiographic knee osteoarthritis (ROA) was assessed by X-ray. Group-based trajectory modelling was applied to identify pain trajectories. Multinominal logistic regression was used for the analyses.

Results: Three distinct pain trajectories were identified: 'minimal pain' (53%), 'mild pain' (34%) and 'moderate pain' (13%). In multivariable analyses, total and low-limb fat mass and low muscle mass percentage were associated with an increased risk of 'mild pain' and 'moderate pain' compared to the 'minimal pain' trajectory group. leg strength, knee extensor strength and quality were associated with a reduced risk of being severe pain trajectories relative to the 'minimal pain' trajectory group. Similar results were observed in those with ROA.

Conclusion: Muscle percentage, strength and quality, but not muscle mass itself are associated with a reduced risk of being more severe pain trajectories, suggesting that improving muscle composition, muscle function and power are of more clinically relevance to preventing the development and maintenance of worse pain trajectories.

P1109

ANTIDEPRESSANTS USE AND INCIDENT FRACTURE RISK: A 10.7-YEAR FOLLOW-UP STUDY

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Objective: Prior studies have reported an increased risk of fracture in patients taking antidepressants drug, and antidepressant use is associated with bone loss and increased risk of falls; however, whether increased incident fracture risk associated with antidepressant use is independent of falls risk and BMD remains unclear. We sought to examine the association between antidepressant use and incident fracture risk over a mean follow-up of 10.7 y, and whether the association is independent falls risk and BMD.

Methods: Data from a longitudinal population-based study of older adults (mean age 63 y) were utilised. Follow-up was performed at 2.6, 5.1 and 10.7 y later, respectively. The reported use of antidepressants drug was collected at baseline. Fractures were self-reported at each time-point. BMD was measured by DXA. Fall risk was calculated based on the short form Physiological Profile Assessment. Log-binomial regression was used for the analyses.

Results: Among 1012 participants, 159 reported the use of antidepressants at baseline. A total of 153 reported new fractures during a mean follow-up of 10.7-y, of whom 20 experienced a vertebral fracture, 134 a nonverterbal fracture and three a hip fracture. In multivariable analysis with adjustment for age, sex, physical activity, smoking history, comorbidities and emotional problems, antidepressant use was associated with an increased risk of incident fracture at any site [relative risk (RR) 1.87, 95%CI 1.25-2.78], vertebral (RR 5.88, 95%CI 2.32-14.88) and major (including the femur, radius, ulnar, vertebral, rib and humerus) (RR 2.22, 95%CI 1.21-4.09). After further adjustment for hip BMD and falls risk, these associations remained statistically significant. There was no significant association for nonverterbal fracture, and hip fracture risk cannot be estimated due to only three incident hip fracture.

Conclusion: Antidepressant use is associated with increased risk of incident fracture, independent of falls risk, BMD and confounders highlighting that optimal management of antidepressant use may prevent fracture.

P1110

ATYPICAL FRACTURES OF THE FEMUR AND DENOSUMAB THERAPY: A SYSTEMATIC REVIEW

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Objective: Atypical femur fractures (AFFs) are uncommon insufficient fractures and highly debilitating complication associated with the prolonged use of bisphosphonate (3.2-50 cases per 100,000 person-years among users)[1], and denosumab (sporadic cases)[2]. This systematic review aimed to review updated relationship between AFFs and denosumab therapy for osteoporosis.

Methods: We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines in this report. We searched Medline and PubMed databases

for studies examining the linkage between AFFs, as well as subtrochanteric and femoral shaft fractures, and denosumab use before November 2019.

Results: There were 11 research studies of various sizes, recruiting 13,944 patients and follow-up 1-10 y. Only 2 cases were reported in the FREEDOM trial and its extension study. There was considerable heterogeneity among results of studies.

Conclusion: In contrast to bisphosphonate-related AFFs, denosumab is unlikely associated with AFFs for treatment of osteoporosis.

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P1111
PREDICTION INFLAMMATORY COMPLICATIONS IN EXTRAFOCAL OSTEOSYNTHESIS BY IMMUNOLOGICAL BLOOD TESTS

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Objective: Extrafocal osteosynthesis of fractures of different locations has become one of the most common methods of surgical treatment. One of the most significant problems is the risk of inflammation of soft tissues in the area of steel structures used for osteosynthesis, up to the formation of osteomyelitis. Unfortunately, a problem addressed inflammatory changes only begins when the first clinical signs. The most reasonable approach to solving this issue becomes the prevention of this type of complication. Thus, the aim of this study was to develop a method of laboratory prediction of inflammatory complications of osteosynthesis with external fixation.

Methods: Immunological monitoring performed in 280 patients with injuries of the tibia bone, spine and mandible treated by extrafocal osteosynthesis. The diagnosis was verified on the basis of clinical-ray studies. Laboratory studies were performed on admission of the patient to a clinic, and after the operation for 3, 10 d, 1, 2, 5 and 6 months. We investigated the cellular immunity, phagocytosis factors, plasma proteins. Statistical methods of research performed using the computer program Statistica for windows, v.6.1 (StatSoft Inc, USA), they included basic statistical multiple linear regression analysis. Pretested the equality of variance and normal distribution model used in the signs. Used step by step method of incorporating variables. Were studied residues schedule.

Results: Given the values of the identified characteristics and dynamics of immunologic indices, comprising determining the status of the cellular and humoral immunity, nonspecific resistance system, the cytokine profile, acute phase reaction method using stepwise multiple linear regression equation was obtained prediction inflammatory complications. For prediction is performed to determine the concentration of immunoglobulins of classes A and M (g/l) determining the number of leukocytes (10^9/l), neutrophils (10^9/l), eosinophils (%), index ratio of

leukocytes and erythrocyte sedimentation rate, the number of neutrophil phagocytes (10^9/l), cationic protein activity (mean cytochemical factor), haptoglobin concentration (g/l) and the regression equation is determined prediction coefficient (PC) of the formula: $PC = -10.62 + 8.41X1 - 5.74X2 + 2.18X3 - 2.57X4 + 1.33X5 - 11.95X6 - 1.62X7 + 4.86X8 - 1.20X9$, where X1 - absolute neutrophil count, X2 - leukocyte count, X3 - the level of immunoglobulin A, X4 - eosinophils, X5 - number of phagocytes, X6 - active cationic proteins, X7 - ratio index leukocytes and erythrocyte sedimentation rate, X8 - concentration of haptoglobin, X9 - the level of immunoglobulin M. At values PC>0 predicted inflammatory complication in the postoperative period, for values predicted PC≤0 uncomplicated postoperative course.

Conclusion: Application of the proposed method allows to predict inflammatory complications when applying an external fixator. Clinical efficacy prediction of inflammatory complications of 91.1%. On the basis of preoperative prediction is possible to use a set of preventive measures aimed at the prevention of soft tissue inflammation and the development of osteomyelitis.

P1112
USE OF REMS TECHNOLOGY IN PATIENTS WITH SPINE ARTIFACTS: A NEW TECHNOLOGY TO ASSESSED BONE HEALTH

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Objective: Bone Densitometry performed by DXA technology is the gold standard in the evaluation of BMD. It is well known that some conditions (arthritis, vertebral collapses, vertebroplasty) can result in an overestimation of spine's BMD measured with DXA. The purpose of this work is to evaluate the radiofrequency echographic multispectrometry (REMS) technology in patients with spine artefacts.

Methods: 86 female patients (mean age 70.44±9.1), with vertebral abnormalities were considered. These patients, after obtained informed consent, underwent a DXA and REMS examination on the reference sites (proximal femur and lumbar vertebrae).

Results: The BMD assessed by REMS technology showed lower values for the spine compared to the densitometric test performed by DXA for both BMD (0.772±0.065 vs. 1.067±0.210) and T-score (-2.5±0.6 vs. 0.2±1.8). These values did not correlate with each other. The BMD and T-score values measured with REMS and DXA performed on the femoral neck were highly correlated and this correlation reached statistical significance (p<0.01). Furthermore, a high correlation between BMD and T-score measured with the DXA technology on the femoral sites (FN and TH) and those measured on the spine with REMS technology (p<0.01), was present.

Conclusion: The high correlation between femoral BMD, T-score FN and T-score TH values in the two technologies confirms that REMS technology is a highly reliable examination in BMD and

fracture risk evaluation. In addition, data obtained on spine lumbar scans show that this technology is able to evaluate BMD more accurately in patients with conditions that can make the DXA exam less reliable. These data open new possible scenarios both for the research and for the clinical approach to fracture prevention of osteoporotic patient.

P1113
BONE COMPLICATIONS IN GAUCHER DISEASE: A RETROSPECTIVE OBSERVATIONAL STUDY

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Objective: Gaucher disease (GD) is an autosomal recessive rare disorder characterized by an accumulation of β-glucocerebroside in lysosomes (1). This disease is caused by deficiency or absence of lysosomal glucocerebrosidase enzyme activity mostly due to mutations in the *GBA* gene (β-glucosidase gene). The main clinical manifestations include: hematological, visceral, and bone alterations. Bone manifestations affects up to 90% of GD patients, mainly present in type 1 and type 3 forms. (1). Given the rarity of the pathology and the few data in the literature described on bone complications and their pharmacological treatments, a research collaboration was created between the "Bone and Mineral Diseases Unit" research center and the "Hemorrhagic Diseases and Coagulation Center", Regional Reference Center for adult Gaucher disease, at University Hospital of Florence.

Methods: A retrospective observational project on twenty patients affected by GD was created. The cases were retrospectively reviewed in order to analyze the progress of bone manifestations, the biochemical and instrumental examinations performed and the use of pharmacological treatments.

Results: The main bone manifestations related to GD reported in study group included: bone pain, bone crises episodes (typical manifestation of the disease), osteoporosis/osteopenia, and recurrent osteonecrosis. Biochemical exams performed were mainly: serum calcemia, 25OH vitamin D and bone alkaline phosphatase levels. The levels of 25OH vitamin D and bone alkaline phosphatase tended to be below the reference range. The patients were treated with calcium carbonate or citrate supplements and cholecalciferol when required. Routinely, patients underwent to BMD assessment by DXA at the femoral neck or spine and nuclear magnetic resonance to study bone marrow infiltration and its consequences.

Conclusion: Bone involvement occurs frequently in GD, and is one of its most debilitating features, reducing the quality of life of these patients. Up to now, the evaluation of bone metabolism and treatment with bisphosphonates have been poorly performed and investigated. In the future, prospective studies will be needed in order to investigate bone metabolism, biochemical markers of bone turn over, instrumental tests evaluating both bone mass and bone quality and effects of osteoporosis medications.

Reference: Marcucci G et al. Calcif Tissue Int 2014;95:477.

P1114
STRONTIUM TREATMENT IMPROVES CARTILAGE QUALITY

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Clinical study clearly demonstrates positive effects of Strontium on osteoarthritis evolution. Strontium positively influences bone material quality and potentially cartilage quality. Strontium treatment reduces articular cartilage degeneration through enhanced anabolic activity of chondrocytes. We hypothesize that Strontium treatment improves cartilage quality by a physicochemical and metabolic effect.

To verify this hypothesis, distal femurs were harvested from nine 11-month-old rats and bio-indentations performed at the level of the medial condyle before and after an overnight incubation in SrCl solution, Hyaluronic acid (HA) or PBS (control) (ex vivo protocol). In the second series of investigation (in vivo protocol), intact female rats were treated with strontium ranelate (SrRan, 625 mg/kg day po, n=10) or with vehicle (n=10) for 8 weeks. Bio-indentations were performed at the level of the medial condyle at three different area submitted physiologically to different mechanical loading. Elastic modulus (MPa) and maximal force (uN) were recorded. Indentation depths were located in the upper part of the hyaline cartilage. Values are mean±SEM; significance of differences was obtained using an ANOVA.

Ex vivo incubation in SrCl solution results in a modulus increment by 20-32% (p<0.01) and in HA solution by 15-25% (p<0.05). No effect is detected in the control samples incubated in PBS. This effect was observed and significant in all the three investigated regions. Thus, we demonstrate a physicochemical transient improvement of cartilage quality after exposure to Sr. The importance of this effect is comparable to that of HA used for visco-supplementation. In vivo treatment with SrRan was associated with significant increment of modulus 6.79±0.20 vs. 5.37±0.17 and indentation Force 7.52±1.08 vs. 4.75±0.73. Thus in vivo administration of Strontium improves cartilage quality.

These studies clearly demonstrate the improvement of cartilage quality under Strontium treatment. The positive effects could be related to a physico-chemical effect after a long term Sr exposure; a cellular effect is also possible through modulation of cartilage metabolism.

P1115
CHARACTERIZATION OF COMORBIDITY IN X-LINKED HYPOPHOSPHATAEMIA: A PROSPECTIVE PARALLEL COHORT STUDY USING THE UK CPRD

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Objective: To describe comorbidity in patients with X-linked hypophosphataemia (XLH) and compare to general population controls without XLH.

Methods: The Clinical Practice Research Datalink (CPRD) GOLD was used to identify a cohort of XLH patients (1995-2016), along with a non-XLH cohort matched (1:4) on age, gender and GP practice at date of first XLH diagnosis (index date). Previously published phenotyping algorithms openly available from the online CALIBER portal were used to identify the first primary care diagnosis (and associated age) of 273 defined comorbid conditions during any eligible (i.e., up-to-standard) patient follow-up. For primary analysis, the individual conditions were merged into 15 major disease categories and the proportion of patients having ≥1 diagnosis in each category was compared between cohorts using univariable logistic regression. In secondary analysis individual conditions were compared. Only categories/conditions affecting ≥10% of either cohort were included in these comparisons. Bonferroni corrected P-values were used.

Results: 64 patients graded as likely or very likely XLH were included along with 256 patients without XLH. Of these, 45% were aged over 16 years at index date and more were female (70.5%). Recorded comorbidities (categorized) are presented in table. In secondary analyses of individual conditions, four were at least twice as likely to be present in XLH, but only depression met the Bonferroni threshold: odds ratio=2.95 [95%CI: 1.47 to 5.92]; p=0.0023.

Table: Counts, age and odds ratios of having at least 1 diagnosis of a comorbid condition within major condition categories

Condition category [1]	XLH cohort (n=64)			non-XLH cohort (n=256)			Odds Ratio	95% CI		
	Number with ≥1 condition	%	Mean age at earliest diagnosis	Number with ≥1 condition	%	Mean age at earliest diagnosis	Estimate	Lower	Upper	p-value [2]
Circulatory/CV System	8	12.5	50.8	25	9.8	56	1.32	0.57	3.08	0.5211
Digestive System	10	15.6	45.8	49	19.1	35.5	0.78	0.37	1.64	0.5173
Endocrine System	10	15.6	38.8	13	5.1	49.5	3.46	1.44	8.31	0.0054*
Genitourinary System	15	23.4	43.1	49	19.1	41	1.29	0.67	2.49	0.4429
Mental Health Disorders	17	26.6	35.4	41	16	37.7	1.90	0.99	3.62	0.0527
Musculoskeletal Conditions	13	20.3	47.3	36	14.1	46.3	1.56	0.77	3.15	0.2169
Neurological Conditions	13	20.3	32.6	20	7.8	34.5	3.01	1.41	6.44	0.0046*
Respiratory System	21	32.8	26.7	63	24.6	22.2	1.50	0.83	2.71	0.1839
Skin Conditions	23	35.9	20.8	108	42.2	18.7	0.77	0.44	1.35	0.3639

[1] Only including categories affecting ≥10% of either XLH cases or controls
[2] An astrik (*) indicates p-value was below the Bonferroni corrected threshold, which was p=0.0055556

Conclusion: Findings suggest XLH patients have elevated levels of comorbidity broadly defined as endocrinological and neurological, in addition to nearly three times the occurrence of depression, raising awareness of the multisystem effects of this rare bone disease.

P1116
REMS TECHNOLOGY IN DAILY PRACTICE: CLINICAL CASES

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Objective: Radiofrequency echographic multispectrometry (REMS) allows us to obtain the evaluation of BMD by performing an echographic scan on spine and hip. In our daily practice, it can be applied in clinical situations in which DXA could have limitations.

Methods: We present some clinical cases.

Results:

Case 1. A 73-year-old woman arrived to our clinic for follow-up. She presented a complete collapse of L1 and a vertebral wedge of D12 with accentuation of kyphosis. Bone densitometry showed osteoporosis at femoral neck and osteopenia at lumbar spine; the evaluation with REMS technology showed osteoporosis at both site. In this case probably the presence of vertebral collapses and the presence of artefacts due to arthritis results in an overestimation of the BMD performed by DXA which does not occur with REMS exam.

Case 2. We received a 79-year-old woman affected by spontaneous fracture of the left hip for evaluation of BMD. The patient underwent osteosynthesis with an endomedullary rod. The densitometric examination performed by DXA on spine and right hip (DXA scan on left hip cannot be performed due the presence of the endomedullary rod) shows an osteoporosis on both sites. The REMS examination performed on spine, right and left hip shows a diagnosis of osteoporosis on all analyzed sites, comparable to the DXA results. This case shows how REMS technology is able to automatically remove artefacts.

Case 3. A 76-year-old woman affected by osteoarthritis, with a double hip prosthesis, underwent DXA examination on the spine and on the wrist for the first time. The exam showed a diagnosis of mild osteopenia on the spine and a diagnosis of osteoporosis on the wrist. The exam performed on spine by REMS technology showed a diagnosis of osteoporosis totally comparable to the examination performed with DXA on the wrist.

Conclusion: These clinical cases show how REMS technology can be useful in the management of particular patients assuring an accurate evaluation of bone densitometry.

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P1117
TIME SINCE PRIOR FRACTURE IS ASSOCIATED WITH SUBSEQUENT FRACTURE RISK: AN ANALYSIS OF REAL WORLD DATA

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Objective: To assess impact of time since prior fracture on subsequent fracture risk in postmenopausal women with osteoporosis.

Methods: Female patients (pts) aged 55-90 who had a fracture (fx) identified by ICD-10 code during the 5 y prior to or on index date (01Jan2014) were identified from the Swedish National Patient Register. Pts with Paget's disease/malignancy were excluded. Prescription data were from the Prescribed Drug Register and deaths from the Cause of Death Register.

Pts were followed for occurrence of new fx for 24 months from index date; cumulative incidence of fx from 0-12 and 0-24 months was calculated, accounting for competing risk of death. Time since prior fx (y) was assessed categorically and continuously; impact on subsequent fx risk was estimated using multivariable Cox regression modeling.

Results: We identified 131,440 pts (mean age: 72.7 y) with previous fx in the 5 y prior to index date. 75.8% had 1 prior fx; mean (SD) time since most recent fx was 2.3 (1.4) yrs. 11,644 pts (8.9%) experienced a subsequent fx within 2 y of index date. Cumulative incidence was 4.88 at 12 months and 8.86 at 24 months. 9606 pts died before subsequent fx during follow-up. In the continuous analysis, the risk of subsequent fx decreased with increasing yrs since prior fx: hazard ratio (HR)=0.95 (95%CI 0.94-0.97, p<0.001). In the categorical analysis, pts whose most recent fx was in the last 2 y had greater risk compared to those whose most recent fx was 4-5 y before (Table).

Table. Risk of subsequent fragility fracture by time since prior fracture

Risk model[a]	HR	95%CI	p value
Years since prior fx (reference: 4−5)			
0−1	1.17	1.10−1.24	<0.001
1−2	1.13	1.07−1.21	<0.001
2−3	1.05	0.98−1.12	0.150
3−4	1.01	0.94−1.08	0.753

[a]Estimates from Cox regression modeling on the cause-specific hazard of fx, adjusted for age; number of prior fxs; prior fx location; osteoporosis treatment, glucocorticoid use, assisted drug dispensing, and/or exposure to drugs that increase the risk of falls within the last 12 months; and Charlson-Quan comorbidity index=(0/1/≥2). HR: hazard ratio

Conclusion: Time since prior fx is an independent predictor of new fx. Recent fx should be considered in fx risk assessment.

P1118
A PRIMARY CARE AUDIT OF FRACTURE RISK MANAGEMENT IN PATIENTS WITH A HISTORY OF BARIATRIC SURGERY

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Objective: To establish whether patients with a history of bariatric surgery have had appropriate fracture risk assessment and management.

Methods: This audit was undertaken in a general practice with a list size of 11,314 on 31 October 2019. The population for this audit were patients who had had type 1 bariatric surgery (Roux en Y, laparoscopic sleeve gastrectomy, gastric bypass). Referring to the American bariatric guidelines the audit standards were:

- A DXA scan should be performed within two years postsurgery (and after this time according to recommendations based on DXA report) (standard 80%)
- Number on fracture prevention treatment if indicated (standard 100%), of whom are taking oral bisphosphonates (standard 0%)

The primary care electronic medical record system (EMIS Web) was used to identify patients and establish whether they had been offered or had undergone a DXA scan within 2 y postsurgery (or were up to date in accordance with relevant recommendations) and to establish which fracture prevention treatment the patient was receiving if appropriate. Re-audit was undertaken on 25 January 2020.

Results: 28 relevant patients were identified at baseline (after excluding those with malignant indications), of whom, 22 were two years postsurgery. 3/22 (14%) patients had a recorded DXA scan 2 y after their surgical procedure. The remaining patients did not have a record of being offered DXA or been identified as requiring fracture prevention treatment. Where relevant, DXA due codes were applied and an invitation letter was sent to patients to ask if they wanted a DXA referral. Subsequently the re-audit identified 26 relevant patients, of who 20 were over 2 y postsurgery. The same 3 (15%) had record of DXA, all the remaining 17 had been invited for DXA referral, of which 7 had been referred since baseline. At baseline and follow-up no patients had been identified as requiring treatment.

Conclusion: Once patients are made aware of the need for a DXA scan, many do engage. Identification of patients with higher risk bariatric procedures in primary care could be improved by

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systematically coding bariatric surgical procedures, the surgical procedure itself and test due dates with supporting search, report and recall processes.

P1119

EFFECT OF OTAGO EXERCISE ON IMPROVING LOWER LIMB FUNCTIONAL PERFORMANCE AND FALL EFFICACY IN POSTMENOPAUSAL OSTEOPOROTIC ELDERLY WOMEN

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Objective: To study effectiveness of Otago exercise program in improving lower limb functional performance and fall efficacy in postmenopausal osteoporotic elderly women.

Methods: A quasi experimental pretest and post-test design was used for the study. Elderly postmenopausal women in the age group of 60- 80 diagnosed cases of osteopenia and osteoporosis, independent, mobile were included in the study. Subjects were excluded if having any impairments in visual, auditory and vestibular system, history of fractures in the past one year, any neurological diseases affecting balance and cognitive function. Based on the inclusion and exclusion criteria 30 subjects were selected and consent was obtained and Otago exercise program (OEP) was administered for 8 weeks thrice a week and advised to ambulate twice in a week for half an hour. The exercises comprised of balance training, strength training and progression was done. Data collection tools in the study included the fall efficacy scale (FES) and short physical performance battery.

Results: There was a statistically significant difference between the mean FES and short physical performance battery scores of pre-test and after 8 weeks post-test, as the computed p value is <0.001.

Conclusion: The OEP is seen to have a positive change in the postmenopausal osteoporotic elderly women by improving their balance, gait speed and lower limb strength.

P1120

A PRIMARY CARE AUDIT OF FRACTURE RISK MANAGEMENT IN PATIENTS WITH A HISTORY OF CHRONIC PANCREATITIS

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Objective: To establish whether patients with a history of chronic pancreatitis have had appropriate fracture risk assessment.

Methods: This audit was undertaken in a research ready, teaching practice with a list size of 11,377 on 18 November 2019. Referring to the National Institute for Health and Care Excellence Pancreatitis guidelines (1), the criterion set for this audit was that among patients with a history of chronic pancreatitis, bone density scanning (DXA) should have been offered in the last two years. Index patients were defined as patients who have ever had chronic pancreatitis recorded as a problem code. The primary care electronic medical record system (EMIS Web) was used to identify patients eligible for the audit. Medical records were interrogated to establish whether patients had been offered DXA or had a DXA performed in the last two years. The standard set for eligible patients being offered a DXA in the last two years was 80%. A re-audit was undertaken on 20 January 2020.

Results: Nine patients were identified as having chronic pancreatitis; one had an existing diagnosis of osteoporosis. Of the remaining eight patients, none had been offered a DXA within the last 2 y. A letter was sent to patients due to have a DXA to invite them to have this performed. Subsequently the re-audit showed 10 patients with chronic pancreatitis, two with an existing diagnosis of osteoporosis. Of the remaining 8, 7 had been offered a DXA, of which 3 had been referred.

Conclusion: Once patients are made aware of the need for a DXA scan they did engage. Improved coding of when a DXA is due, when DXA is offered, when DXA referral is made, and coding incoming results in the medical record would facilitate a more systematised search, report and recall function for fracture assessment which could be led by administrative staff with clinical input when action is required.

P1121

RELATION BETWEEN ASYMPTOMATIC ULTRASONOGRAPHIC CHANGES OF THE ANTERIOR CHEST WALL JOINTS AND PULMONARY FUNCTION TESTS IN ANKYLOSING SPONDYLITIS PATIENTS

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Objective: Anterior chest wall (ACW) joints may be involved during the course of ankylosing spondylitis (AS), and this can affect the chest expansion and Pulmonary Function Tests (PFTs) to a various degree. Ultrasonography can detect subclinical changes in ACW. We aimed to detect the relation between asymptomatic ultrasonographic changes of ACW joints and PFTs in AS patients.

Methods: The study included 88 sternoclavicular joints (SCJ) and 44 manibrusternal joints (MSJ) in 44 subjects (22 AS and 22 control).None of the participants had a history of respiratory complaints such as dyspnea, chronic cough, or chest pain. High resolution computed tomography (HRCT) was done on the chest to exclude interstitial lung problems that may affect chest expansion and PFTs. Ultrasound (US) assessments were performed to detect synovitis, erosions, ankylosis, osteophytes, or Doppler signals. Chest expansion was measured. PFTs was done and included measurement of the forced expiratory volume in 1 s (FEV1), forced vital capacity (FVC), and the ratio of forced expiratory volume in 1 s to the forced vital capacity (FEV1/FVC). In AS group, Ankylosing Spondylitis Disease Activity Score (ASDAS),

Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and Bath Ankylosing Spondylitis Functional Index (BASFI) were recorded.

Results: US detected subclinical changes of ACW joints in (77.3%) of AS patient with significant difference between total US changes in AS(77.3%) and control (21.2%) (p<0.001). MSJ ankylosing was highly associated with limited chest expansion in AS group(P <0.001). PFTs were found to be restrictive in 14 AS patient (63.6%) with mean of FVC (70.3±9) %, FEV1 (55.2±15.9) %, FEV1/FVC (80.1±2) and these restrictive PFTs were associated with SCJ synovitis (p=0.03),SCJ PD activity (p=0.03), SCJ erosions (0.05) and highly associated with MSJ ankylosing (p<0.001). All AS patients (100%) with ankylosed MSJ by US had limited chest expansion and restrictive PFTs. In AS group, ultrasonographic changes and restrictive PFTs were found to be higher with older age, male sex, smoking, longer disease duration and high BASDAI and BASFI.

Conclusion: Our study demonstrated that Ankylosing of the MSJ is highly associated with limited chest expansion and restrictive PFTs in AS patients. Our data suggest that US is a highly valuable tool as well as PFTs for detecting early changes in ACW joints before being clinically manifested.

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P1122
MORTALITY AFTER HIP FRACTURE SURGERY: RETROSPECTIVE COUNTRY-WIDE COMPARISON BETWEEN DIFFERENT SURGICAL PROCEDURES

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Objective: The study aimed to assess hazard of mortality in patients after hip fracture who have or have not underwent a surgery from this reason.

Methods: This retrospective study was part of the project entitled *Maps of Health Needs: A Systemic and Implementation Analyses Base,* cofinanced by the EU and carried out by the Analyses and Strategies Department of the Ministry of Health. Data regarding hip fractures and mortality were obtained from the register of National Health Fund, a public payer financing most of medical procedures in Poland. All first fractures and deaths in the population of Poland in the years 2010-2015 were identified. Only patients aged 50 and more have been included in the analysis. Patients diagnosed at any time with malignant neoplasm (any of ICD-10 diagnosis with a code beginning with C) have been excluded, as such diagnosis may influence mortality. Mortality was described as a percentage of patients with a defined kind of fracture who died after it. The comparison of mortality after different procedures after fracture was performed using a χ^2 test, hazard ratio was calculated.

Results: During the 60-month long observation 32285 subjects after hip fracture underwent no surgical procedure, 48604 underwent hip fracture replacement, 39199 an open, and 38266 a closed surgical procedure. Respectively, 19177, 18845, 15977 and 15872 of those patients died during this period. Probability of survival was almost twice as high (1.97) after hip replacement as compared with medical treatment (no procedure). Probability of survival after open and closed procedure was 1.90 and 1.72, respectively.

Conclusion: Mortality risk after hip fracture is greatest in patients who do not undergo any surgical procedure. However, in 60 months after surgical procedures mortality rate it is also very high, and the difference between the particular procedures with regard to later mortality is rather small.

P1123
RHEUMATOID ARTHRITIS AND ECTOPIC PANCREATIC TISSUE - COINCIDENCE OR CAUSALITY?!

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We present the case of a 56 years old woman, referred to us from our gastroenterology department for the assessment of a polyarticular pain syndrome that had started in 2016 involving the wrist, knee, proximal interphalangeal joints, in a symmetric way. We found a patient with swelling of the aforementioned joints, with a scar at the level of the anterior thorax and some bilateral basal crackles. Lab tests showed high inflammation with the presence of anti-CCP antibodies and rheumatoid factor, which, along with the previous mentioned data, allowed us to establish the diagnosis of active, seropositive rheumatoid arthritis, which, in turn, precluded the initiation of methotrexate therapy. It is worth saying that the patient has had aortic and mitral valve replacement in 2006 (post rheumatic fever valvular disease) and an esofago-gastro-duodenoscopy in 2015, that revealed the presence of a duodenal polyp, which proved to be ectopic pancreatic adenocarcinoma. All these comorbidities, complicated the therapeutic approach, as the articular manifestation can be appreciated as possible paraneoplastic.

P1124
MODIFIED EXERCISE PROVIDES COMPRESSION FORCE ON BONE RESULTING IN INCREASED BONE MINERAL DENSITY

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Wolff's Law describes the relationship between bone geometry and mechanical influences. This suggests when significant force is applied to bone, the compression will stimulate an adaptive response. Traditional exercise has not been able to create the forces needed to stimulate bone growth in a safe and effective manner. A new exercise modality focusing on high force production and short duration has been suggested as a nonpharmaceutical option to improve bone health.

The purpose of this study was to examine if subjects using this exercise apparatus were able to produce enough force resulting in increased BMD within individuals previously diagnosed with osteoporosis.

Twenty six women ranging in age from 48-69 y drawn from three separate clinics volunteered for the study. Each individual used the same model of exercise equipment as well as followed the same exercise protocol. All subjects were previously diagnosed with osteoporosis based upon the WHO criteria. Subjects completed at least 48 sessions within a year (once a week) with each session consisting of 4 unique exercises lasting approximately 15 min. With all subjects, the first 4 exercise sessions were recorded but not used as part of the statistical analysis as the force production improvements in the first 3-4 weeks appeared to be due to learning changes - learning how to create large force and having the confidence to create great forces safely. After 4 weeks, there was a steady state response to the exercise protocol and all analysis therefore was conducted on sessions 4-48. DXA scans were conducted at the same testing location for both pre- and post-assessment.

14 subjects demonstrated significant improvement in DXA scores for L1-L4. Five subjects had no significant change in L1-L4 after participating for one year and 7 subjects had further decreases in DXA values. On measures of the femur 16 subjects had significant improvements in femur values in at least one leg and of the 16 subjects, 10 demonstrated improvements in both femur measurements. With improvements of the femur and L1-L4 improvements ranged from 1.8-14.6%.

Within the four exercise movements (chest press, leg press, core pull (abdominal crunch) and vertical lift), forces generated were viewed as multiples of body weight (MOB's). Forces observed ranged from 2x body weight to 11x body weight depending on the movement and muscle groups involved. There was no significant relationship between multiples of body weight and changes in BMD. All subjects were under the guidance of their personal medical advisors. No attempt was made to control use of or restriction of prescriptions for bone health or changes in nutritional approaches to bone health. However, with all subjects a record was maintained of what medications if any were prescribed and taken on a regular basis.

This study demonstrated that a nonpharmacological exercise solution (one exercise session a week for at least 48 weeks consisting of high force volume and low duration) is available and reasonable option to individuals diagnosed with osteoporosis as demonstrated by increases in T-scores. Further study is required with larger sample size and control of prescribed drugs and exercise/diet routines not associated with the new exercise protocol.

P1125
HISTOLOGIC OSTEOPENIA OF THE FEMORAL HEAD ASSOCIATED WITH SHORT-TERM COMPLICATIONS FOLLOWING TOTAL HIP ARTHROPLASTY FOR ARTHRITIS

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Objective: To compare short-term outcomes of arthritic patients diagnosed with histologic osteopenia of their femoral head total hip arthroplasty (THA) specimens to a matched cohort of patients without histologic osteopenia. To test the hypothesis that osteopenia would correlate with: 1) a clinical diagnosis of systemic osteoporosis, 2) increased rates of previous osteoporotic fracture, and 3) increased post-operative early complication rates.

Methods: A single center, retrospective study of 1795 patients undergoing THA from 5/4/2015-12/29/2017. Osteopenia, defined as thin and isolated trabecular elements in H&E stained sections of femoral heads, was diagnosed in 260 (14.5%) of patients without post-traumatic arthritis (OP cohort). 260 of the remaining 1529 patients (170 females & 90 males) without histologic osteopenia (OA cohort) were 1:1 matched, based on gender, age (±2 y), BMI (±5), and follow-up length (±1 y). Preoperative radiographs, assessed using the Bombelli classification (hypertrophic, normotrophic, atrophic) of hip arthritis. Preoperative health status (Charlson comorbidity index, cancer history, corticosteroid use, osteoporosis diagnosis, DXA history, fracture history) and postoperative outcomes (re-operation, post-op fracture, infection, or loosening), determined from patient chart review.

Results: The OP cohort had higher rates of rheumatologic disease (14% vs. 5%; p=0.004), global osteoporosis, osteoporotic fractures and atrophic osteoarthritis, but not of smoking, corticosteroid use, or DXA exam than the OA cohort. 200 (77%) of the OP cohort had no prior DXA exam or history of osteoporosis. The OP cohort had higher rates of re-operation (4.6% vs. 1.5%; p=0.04) and intra- or post-operative hip or pelvis fractures (3.1% vs. 0.4%; p=0.02). Revision rates in the OP cohort (2.7% vs. 0.7%; p=0.09) were not statistically significant.

Conclusion: Our findings support our hypothesis that histologic osteopenia of the femoral head is associated with global osteoporosis and increased fracture rates. They suggest that

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pathologists should examine all hip arthroplasty specimens histologically for osteopenia and recommend referral to a metabolic bone clinic for evaluation of BMD, overall bone health, and fracture risk when they make this diagnosis.

P1126
TEMPORAL FEATURES OF GAIT IN ELDERLY PERSONS WITH FRAILTY: A CROSS-SECTIONAL STUDY

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Objective: To investigate the temporal gait parameters in frailty.

Methods: The community-dwelling women and men aged 60 y and older participated in a cross-sectional study. Frailty was defined using the frailty phenotype according to Fried et al. (2001) criteria. Gait was assessed under usual pace by 4 meters walking test using the inertial sensors (Shimmer research, Dublin, Ireland) fixed on each lower limb segment and each able to measure linear acceleration, angular velocity and magnetic heading in three dimensions. Based on extracted gait events, eight temporal gait parameters were calculated using validated technology: stance phase time, swing phase time, stride time, on right and left leg, accordingly, double support time, cadence (steps/min). Statistical analysis was performed using ANOVA with post hoc Bonferroni multiple comparison test.

Results: The data of 112 subjects was analysed, 65.2% of them were women. Mean age of all participants was 75.19±8.7 y. Subjects were divided into three frailty status groups: frailty (37 participants), prefrailty (66 participants) and robust (9 participants). There was statistically significant difference at the p<0.05 level in stance phase time, stride time (right and left), double support time, cadence for three groups. Post hoc comparisons using Bonferroni test indicated that stance phase time, stride time, double support time for frail subjects was significantly longer compared with prefrail and robust groups (p<0.05). There was no statistically significant difference in these parameters between prefrail and robust subjects. Statistical results showed significant differences in cadence in all groups (p<0.05). Cadence in frail subjects was 46.39±6.52, in prefrail subjects - 50.77±6.21, in robust subjects - 58.44±6.53 steps per minute. No statistically significant differences were found between three groups for swing phase time.

Conclusion: The results of this study suggest that the longer stance phase time, stride time, double support time is characteristic to frailty. Additionally, cadence assessed with body-worn sensors significantly differs between all frailty status groups.

P1127
PLACENTAL CELL THERAPY FOR THE TREATMENT OF MUSCLE TRAUMA AND POSTOPERATIVE STRESS IN HIP FRACTURE PATIENTS: FROM PRECLINICAL MODELS TO CLINICAL PHASE III

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Objective: Hip fractures result from falls in elderly patients suffering from sarcopenia and osteoporosis. Almost all patients need surgery in order to enable further mobilization. Despite modern hip arthroplasty techniques, which would allow total weight bearing, mobility is a critical and difficult to achieve issue. This is due to the second hit of the surgical procedure after the suffered trauma and the additional muscle injury needed for joint exposition in the frail patients. To date, there is no effective therapy to address skeletal muscle injuries and surgery related stress. Our studies have explored therapy with mesenchymal stromal cells (MSC) for skeletal muscle injuries and transferred this therapy from preclinical tests to the patient.

Methods: First, we established an animal model, mimicking a clinically relevant crush trauma of the soleus muscle, and tested several applications of autologous MSC transplantation. Following this, we tested the efficacy of an allogeneic approach in the same trauma model, using human placenta-derived mesenchymal like adherent stromal cells (PLX-PAD). We then translated this therapy into the clinics by using acute iatrogenic muscle damage after total hip arthroplasty (THA) as a model system and conducted a prospective, randomized, double blind, placebo-controlled phase I/II study. 20 patients undergoing THA via lateral approach were included and received a transplantation of 300x10^6 (300M), 150x10^6 (150M) PLX-PAD or placebo into the injured gluteus medius muscles (GM).

Results: Preclinical experiments showed improved muscle healing with increased force generation after autologous and allogeneic MSC therapy vs. placebo. Patients of the phase I/II study were followed for 2 y. No relevant AEs have been observed during this period The primary efficacy endpoint, change of GM strength after 6 months, showed a significant increase in the 150M group (p=0.0067) compared to placebo, which was accompanied by an increase in muscle volume (p=0.004). The change of strength and volume in the 300M group showed a similar pattern as in the 150M group but was not statistically significant. Histology indicated faster healing after PLX-PAD therapy. Interestingly, our biomarker studies showed a reduction of the postoperative immunological stress reaction due to the cell therapy. Based on these results we designed a phase III study (The HIPGEN study) treating hip fracture arthroplasty patients (N=240) with an intramuscular injection of 150M PLX cells to improve muscle healing, mobility and mortality. Our consortium received funding from the European

Union Horizon 2020 program (Grant No 779293) and is currently enrolling patients in 20 sites in Germany, England, Denmark, Israel and the US. Partners are among others the universities of Charité, Oxford, Odense, the Biotech Company Pluristem and the International Osteoporosis Foundation. The patients are followed for function, biomechanics, quality of life, lean muscle volume and immunological biomarkers. We further look into the mechanism of action by additional in vitro experiments on the effect of PLX cells on muscle cells of healthy donors and patients.

Conclusion: Our data showed consistent positive results of MSC therapy for skeletal muscle regeneration in different preclinical application modes and finally in patients, where we are currently conducting a phase III study. Treatment with allogeneic cells could be a game changer not only in the treatment of the analyzed injuries but also for other traumatic or iatrogenically induced muscle injuries. Particularly hip fracture patients are promising candidates for the seen benefits of placental cell therapy.

P1128
PAIN SYNDROME CORRECTION AMONG POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Objective: Osteoporosis is a serious problem characterized by decreasing of the BMD resulting in bone fragility and fractures. Mostly osteoporosis firstly appears as a slight pain syndrome among female patients. We did this study on the base of our department clinical experience as we deal with this problem on the regular basis. The goal was aimed to provide the best rout of the pain syndrome correction among postmenopausal women with osteoporosis.

Methods: 126 patients signed informed consent for the study participation and study was approved by Local Ethics Committee. All patients underwent all the necessary clinical, laboratory and instrumental investigations to exclude other chronic pathology, including rheumatological (but not limited to osteoporosis). For osteoporosis determination we used BMD as a T-score with the help of DXA. All Patients were assessed according to the Osteoporosis Risk Score with the help of simple calculated osteoporosis risk estimation and all the patients respond to the moderate risk criteria (with a range between 7-15 points). For pain assessment we used visual analogue scale (VAS). Patients were divided into two groups. 1st group included 65 patients (mean age 57.3±3.9), they were managed with nonpharmacological treatment, including physical exercise (aqua gym on the regular basis), rehabilitation procedures and physical therapy and pharmacological treatment (including calcium, vitamin D supplements and alendronate in the average dosage), 2nd group included 61 patients (mean age 57.4±3.9) − those who refused physical therapy (mostly due to the lack of time) and were underwent of only pharmacological correction of the osteoporosis.

Results: Before treatment VAS scale for the 1st group was 3.92±0.26 cm, after 6 months of treatment −1.19±0.16 cm, for the 2nd group − 4.07±0.16 cm, 1.69±0.19 cm respectively. We admitted significant improvement of the pain syndrome among patients of both group (p=0.035), however still among patients of the 1st group, VAS scale results were notably lower compare to the 2nd group (p=0.048). Mean T-score for the 1st group before treatment was − -3.3±0.17 and after 6 months of treatment − -3.08±0.13 (p=0.944), for the 2nd − -3.4±0.18 and -3.09±0.16 respectively (p=0.647). Although, it was slight increase of BMD, however it was not significant due to the short course of treatment (6 months).

Conclusion: Pharmacological treatment as bone-targeted drug therapy in patients with osteoporosis is very important as it influence on the increase bone strength and decrease fractures risk however due to our results it is necessary to consider nondrug treatment as a physical exercise (in our case − special aqua gym program) it significantly improve pain syndrome and further - patients quality of life.

P1129
CARDIOVASCULAR RISK FACTORS AND INCIDENCE OF CARDIOVASCULAR EVENTS IN POSTMENOPAUSAL WOMEN AT HIGH RISK OF FRACTURE

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Objective: Evidence on cardiovascular (CV) risk in osteoporosis patients with increased fracture risk is limited. In order to best characterize the CV risk profile in postapproval safety studies this information is key. To fill this knowledge gap, we analysed CV risk factors and 1-y incidence rates (IR) of MACE1 (composite of myocardial infarction (MI), stroke, CV mortality) in a cohort of women with incident fracture at osteoporotic sites (any but skull, face and digits).

Methods: The cohort was identified from CPRD GOLD, a primary care database including >10 million UK people, as described elsewhere[1]. In this preliminary analysis, we evaluated prevalence of CV risk factors and crude IR (/1000 person-years) of MACE1 (using validated definitions[2, 3]) in 1 y after cohort entry. CV death was obtained from linked mortality registry (Office for National Statistics) and defined as death due to a CV event.

Results: The baseline characteristics and prevalence of CV risk factors for the cohort of 61,793 women are provided in Table 1. Missing data for some variables was significant (i.e., 64.7% for smoking, 82.7% for alcohol drinking, 74.2% for BMI). The crude IR of MACE1 was 47.29/1000 patient years [95%CI 45.43-49.14]. This incidence included patients with a history of MI and stroke.

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Conclusion: More research is needed to understand predictors of increased CV risk in postmenopausal women with osteoporosis/increased fracture risk. This knowledge will enable the right methods to control for potential confounding in future CV safety studies.

References:

1. http://www.encepp.eu/encepp/viewResource.htm?id=24100

2. Herrett et al. BMJ 2013;346:f2350.

3. Zhou et al. PDS 2013;22(S1):1.

Table 1. Baseline characteristics	N= 61,793
Age - years (mean (SD))	79.9 (10.9)
Smoking^	
Current+former	10012 (16.2)
No	11800 (19.1)
Missing	39981 (64.7)
Alcohol^	
Current+former	6971 (11.3)
No	3686 (6.0)
Missing	51136 (82.7)
BMI$ (mean (SD))^	24.87 (5.75)
Missing	45859 (74.2)
Heart failure*	2915 (4.7)
Angina*	2286 (3.7)
TIA*	2829 (4.6)
MI or stroke*	5671 (9.2)
Established CV disease*^	9656 (15.6)
Atrial fibrillation*	4171 (6.7)

Results are presented as numbers and percentages, unless stated otherwise; * any time before cohort entry; $ 1 year before cohort entry; ^ it includes history of MI, stroke, angina, transient ischaemic attacks, peripheral arterial disease.

P1130
MANAGEMENT OF TUMOR INDUCED OSTEOMALACIA: A MONOCENTRIC EXPERIENCE ON 16 PATIENTS

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Objective: Tumor-induced osteomalacia (TIO) is a rare paraneoplastic syndrome due to a mesenchymal phosphaturic tumor that can be anywhere in the body. Localization is critical and a long delay between onset of symptoms related to Osteomalacia and diagnosis has been reported. To retrospectively evaluate management of patients affected by TIO, focusing on diagnostic procedures and disease outcomes.

Methods: Data on TIO patients were collected in a tertiary Rheumatology Center between September 2000 and January 2020.

Results: We included 16 patients with definite diagnosis of TIO (mean age±standard deviation 62.4±14.6 y, 56.2% females, mean age at symptoms onset 48.0±14.3 y and at diagnosis 53.8±13.1 y, mean diagnostic delay between symptoms onset and tumor detection was 6.8±6.4 y). Lab works were: mean s- Phosphorus (PS) 1.4±0.4 mg/dL [reference range (RR) 2.5-4.6], mean s-Calcium 9.4±0.7 mg/dL (RR 8.4-10.2), mean s-1,25(OH)$_2$D$_3$ 30.5±23.4 ng/L (RR 25-86), intact-FGF-23, when dosed, resulted increased [mean 396.6±707.3 pg/mL (RR 25-45)]. By calculating renal phosphate wasting by tubular reabsorption of phosphate, PU resulted increased in all patients. Since the introduction in

routinely clinical practice of ^{68}Ga-DOTATATE-PET-CT scan in 2013, the diagnostic delay reduced from 8.6±8.3 y to 4.5±2.6 y. The use of ^{68}Ga-DOTATATE-PET-CT scan reduced the number of patients undergoing to closed biopsy from 71.4% to 22%, avoiding a more frequent relapse. 75% of patients underwent surgery, 19% were maintained in Phosphorus and calcitriol because the impossibility of tumor removal, 1 patient undergo to CT-guided radiofrequency ablation. Seven patients had a complete remission while 3 experienced an overtime relapse. After surgical tumor removal, PS significantly increased (1.36±0.39 vs. 2.9±1.1, p=0.0001), while i-FGF-23 levels tended to rapidly decreased (396.6±707.3 vs. 62.8±78.4).

Conclusion: This is the widest European cohort of patients affected by TIO in the last two decades. The introduction of ^{68}Ga-DOTATATE-PET-CT scan reduced the diagnostic delay. Closed biopsy is not recommended for the risk of tumor cell spilling. Surgery is considered the only definitive treatment, aiming to a wider excision. Active surveillance is needed, due to the possible relapses.

P1131
THE QUALITY OF SYSADOAS MAY INFLUENCE THEIR THERAPEUTIC ACTIVITY IN THE TREATMENT OF OSTEOARTHRITIS

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Objective: Osteoarthritis is a major cause of disability and among the most frequent forms of musculoskeletal disorders. SYmptomatic Slow-Acting Drugs in osteoarthritis (SYSADOAs) are natural compounds that reduce pain and slow structural disease progression. However, their use in medicine is controversial. SYSADOAs include agents that are licensed for use as medications and nutritional supplements and possess a heterogeneous structure and physical-chemical profile depending on their origin. Mixes of sources extraction and purification processes may introduce modifications of their structure and properties leading to variable grades of purity, limited biological effects, and presence of contaminants. We revised the literature on the quality and purity of SYSADOAs to support medical practitioners, pharmaceuticals, and patients to understand which factors have to be considered to choose the more effective and safer molecule available in the market.

Methods: We reviewed the breadth of the literature regarding the efficacy and safety of oral SYSADOAs up to 2019. We identify articles in Medline, EMBASE, using relevant keywords as SYSADOAs, chondroitin sulfate, glucosamine, diacerein combined with molecular weight, quality assessment, purity, origin, extraction, quality control. Additional relevant articles were manually added to the search. All articles were reviewed by 2 independent reviewers.

Results: We included 30 articles. The majority of the studies focused on chondroitin sulfate, followed by glucosamine and diacerein. Pharmaceutical-grade formulations of SYSADOAs were found of high and standardized quality, purity and properties, due to the strict regulations to which this drug is subjected. Instead, the quality of several nutraceuticals was found poor due to the absence of regulations governing the ingredients in nutraceuticals. In several nutraceuticals, chondroitin sulfate and glucosamine content were lower than the declared ones. Others showed a mixed animal origin chondroitin sulfate and multiple molecular weight species. Few nutraceuticals had an effective action in vitro almost comparable to the pharmaceuticals.

Conclusion: The effects of SYSADOAs could vary according to the characteristics of the raw material employed, including source, purity, or structural organization. Food supplements and pharmaceutical-grade SYSADOAS do not undergo the same regulatory controls. This results in strong differences in efficacy and safety which may influence their therapeutic activity.

P1132
SECULAR CHANGES IN PAGET DISEASE OF BONE IN ITALY? A RETROSPECTIVE ANALYSIS ON 391 PATIENTS

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Objective: To retrospectively evaluate clinical characteristics of a contemporary cohort of patients affected by Paget disease of bone (PDB), compared with one of the previous decade[1].

Methods: Demographics, diagnostic mode (by chance or by investigations requested for symptoms), extent, and biochemical data were retrospectively extracted from a monocentric registry of PDB patients at their first evaluation in a tertiary Rheumatology Center, between August 2007-November 2019 (Group 1), comparing with a historical series (January 2000-July 2007)[1] (Group 2). T-test and chi-square were used for comparisons; logistic regression was used to analyze the association between disease extent and other variables.

Results: Overall population included 391 patients [males (M) 58.1%, mean age at diagnosis± standard deviation 61.9±12.4 y]. Diagnosis was made by chance in 42.5% cases, 57.5% patients had symptoms at diagnosis; 50.3% was monostotic, mean serum total alkaline phosphatase (sALP) at presentation was 140±165 UI/L, Coutris Index was 9.75±9.1.

Group 1 included 167 subjects (M 60.5%): mean age at diagnosis 64.0±11.3 y, 39.6% diagnosed by chance, 60.4% symptomatic at diagnosis, 58.6% monostotic, mean sALP 123±116 UI/L, and Coutris Index 8.3±6.9. Group 2 included 224 patients (M 55.4%): mean age at diagnosis 61.0±11.6 y, 44.7% diagnosed by chance, 55.3% symptomatic at diagnosis, 43.3% monostotic, mean sALP 168±130 UI/L, and Coutris Index 10.8±10. With unchanged recruitment features, fewer patients/y were enrolled in Group 1 (13.6) compared to Group 2 (28.9). At diagnosis, patients in

Group 1 were older (p=0.01), less poliostotic (p=0.02), and the odd to have a polyostotic disease was lower in Group 1 [OR 0.54 (95% IC 0.35-0.83)]. sALP was significantly lower in Group 1 (p<0.001) as well as the Coutris Index (p=0.006). No differences were found in sex, positive family history of PDB and diagnosis by chance or for clinical signs.

Conclusion: Despite previous reports, our data confirm the reduction of the incidence and clinical severity of PDB over time also in Italy. The reduction of the disease burden is consistent with a number of other series from all over the world.

Reference: 1. Varenna M, J Rheum 2010.

P1133
DOES ENDOGENOUS INFLAMMATION EXPLAIN ETHNIC VARIATION IN BONE MINERAL DENSITY? RESULTS FROM THE SABRE COHORT STUDY

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Objective: The Southall and Brent Revisited Study (SABRE) presents a unique opportunity to explore BMD differences in a tri-ethnic cohort; the objective of this study was to determine whether ethnic differences in BMD were associated with markers of inflammation, adiposity and BMI.

Methods: SABRE consists of men and women from the UK of European, South Asian and African Caribbean descent. The 435 men (204 European, 160 South Asian and 71 African Caribbean) and 350 women (129 European, 104 South Asian, 117 African Caribbean) included in this study had DXA measurements of lumbar spine (LS), femoral neck (FN) and whole body. Linear regression was used to determine ethnic differences in BMD and associations between BMI, estimated visceral adipose tissue (VAT) mass, inflammatory markers (C-reactive protein (logCRP) or IL-6 (logIL-6)) and BMD, adjusting for age and height. Europeans were the referent group; results are presented as (β coefficient (95%CI)).

Results: Mean(SD) age was 72.7(6.5) y and mean BMI was 27.6(4.4) kg/m^2. African Caribbean men and women had significantly higher FN-BMD (men: 0.147 (0.107, 0.186); women: 0.098 (0.068, 0.127)) and LS-BMD (men: 0.064 (0.002, 0.126); women: 0.091 (0.046, 0.136)); the differences were robust to adjustment. LS-BMD was significantly lower in South Asian women (-0.046 (-0.093, 0.000). No significant differences in BMD were found between South Asian and European men. Regression models explained a greater proportion of variance in FN-BMD than LS-BMD (R^2 men: 19.3-24.8% and 5.5-9.1%; R^2 women: 25.2-31.7% and 13.7-16.4%, respectively). In women, the association between VAT and BMI and LS-BMD differed significantly by ethnicity (p value for overall interaction 0.002 and 0.006, respectively). In men, no interactions between ethnicity and VAT, CRP, IL-6 or BMI were found at either site.

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Conclusion: Compared to Europeans, BMD was higher at both sites in African Caribbeans and LS-BMD was lower in South Asian women. No differences were found in the relationship between inflammatory markers and BMD by ethnicity, however, in women associations between VAT and BMI with LS-BMD differed by ethnicity. Relationships differed by site, indicating possible metabolic vs. mechanical roles of skeletal sites.

P1134
PREVALENCE OF SARCOPENIA IN OSTEOPOROSIS AND OSTEOPENIA PATIENTS: STUDY IN A TERTIARY LEVEL HOSPITAL IN BANGLADESH

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Objective: Sarcopenia is progressive reduction in muscle mass and muscle strength which is strongly associated with osteoporosis (OP) with new proposed nomenclature osteosarcopenia and causes significant late life disability. Sarcopenia has an approximately 5-fold increased risk of concomitantly developing OP as there is dynamic relationship between impaired muscle and bone health. As pathophysiology is closely integrated osteopenia have relation with sarcopenia. This observational study was done to see the association of sarcopenia with OP and osteopenia in small fraction of Bangladeshi population.

Methods: Total.313 osteoporosis and osteopenia patients were included in this study. Study place was medicine and Orthopaedic Department of Central medical college hospital, Cumilla, Bangladesh. OP and osteopenia was assessed by BMD estimation with DXA using GE Healthcare Lunar Prodigy densitometer, considering T-score < -2.5 and -1 to -2.5. Sarcopenia was determined by measuring appendicular lean mass (ALM) by DXA (≤ 7.23 kg/m^2 for men and ≤ 5.67 kg/m^2 for women) hand grip strength (<30 kg in males, <20 kg in females) by Jamar dynamometer. Other aspects of sarcopenia was assessed by gait speed (<0.8m/s), timed up and go test (TUG) (>20 s).

Results: Among total 313 patients, 264 (84.35%) patients were osteoporotic and 49 (15.65%) were osteopenic. In osteoporotic group 14 (5.30%) were male and 250 (94.70%) were female. In osteopenic group 8 (16.33%) male and 41 (83.67%) were female. Mean age of all patients was 61.08±11.06 y. Among osteoporotic patients sarcopenia was found in 206 (78.03%) patients and 25 (51.02%) in osteopenic group (p=0.00009). Mean BMD T-score of osteoporotic patients in vertebrae and neck of femur was -3.59±1.11 and-3.27±1.36 respectively. Mean BMD T-score 0f osteopenic patients in vertebrae and neck of femur was -1.704±0.98 and -1.535±0.51 respectively. In male osteoporotic group sarcopenic patients mean ALM, both right and left hand grip strength, gait speed and TUG was 5.90±1 kg/m^2, 22.31±7.08 and 20±7.2 kg, 0.64±0.14 m/s and 14.08±3.75 s respectively. (p=0.00032). In female osteoporotic group sarcopenic patients mean ALM, both right and left hand grip strength, gait speed and TUG was 4.94±0.56 kg/m^2, 15.91±4.69 and 14±4.6 kg, 0.63±0.11 m/s, 14.82±9.25 s respectively (p=0.000093). In male osteopenic group sarcopenic patients mean ALM, both right and left hand grip strength, gait speed and TUG was 6.07±0.53 kg/m^2, 23.6±10.14 and 21±9.7 kg, 0.70±0.22 m/s and 13.60±6.43 s respectively. (p=0.16). In female osteopenic group sarcopenic patients mean ALM, both right and left hand grip strength, gait speed and TUG test was 5.25±0.43 kg/m^2, 22.26±5.04 and 20.00±4.7 kg, 0.75±0.12 m/s and 11.58±2.63 s respectively (p=0.00002).

Conclusion: Sarcopenia is very much prevalent in osteoporotic patients and albeit less in osteopenic patients. Comparatively osteoporotic patients had more sarcopenia than osteopenic patients assessed with multiple parameters in small section of Bangladeshi population.

P1135
INFLUENCE OF SARCOPENIA ON BONE HEALTH PARAMETERS IN A GROUP OF ELDERLY LEBANESE MEN

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Objective: Sarcopenia is a disease characterized by the loss of muscle mass and strength. The aim of the current study was to explore the influence of sarcopenia on bone health parameters in a group of elderly Lebanese men. To do so, we compared bone health parameters (bone mineral content (BMC), BMD and femoral neck geometry indices) in a group of elderly men with sarcopenia and a group of elderly men with normal skeletal muscle mass index (SMI).

Method: 23 sarcopenic men (SMI <7 kg/m^2) and 23 men with normal SMI (>7 kg/m^2) participated in our study. Body composition and bone variables were measured by DXA. DXA measurements were completed for the whole body (WB), lumbar spine (L1–L4), total hip (TH) and femoral neck (FN). Hip geometry parameters including cross-sectional area (CSA), cross-sectional moment of inertia (CSMI), section modulus (Z), strength index (SI) and buckling ratio (BR) were derived by DXA. Age and height were not significantly different between the two groups.

Results: Weight, BMI, lean mass, fat mass, appendicular lean mass, SMI, WB BMC, TH BMD, FN BMD, CSA, CSMI and Z were significantly higher in non-sarcopenic men compared to sarcopenic men. In the whole population, lean mass was the strongest determinant of bone health parameters. After adjusting for lean mass, there were no significant differences regarding bone health parameters between the two groups.

Conclusion: The present study suggests that sarcopenia negatively influences bone health parameters in elderly Lebanese men.

P1136
THE CONUNDRUM OF AN INFLAMMATORY ARTHRITIS: A CASE REPORT

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Objective: Discuss the differential diagnosis of inflammatory arthritis in an elderly patient.

Methods: A 75-year-old man, with a medical history of arterial hypertension, type 2 diabetes, and hyperthyroidism, was admitted to the rheumatology department in early 2020. His symptoms started gradually 3 months prior to hospitalization, and included pain and morning stiffness in the shoulder and pelvic girdle with limited range of motion, tenderness and swelling in his right wrist, low-grade fever, and fatigue. He had no new-onset headache, jaw claudication or ocular manifestations. Biological profile showed elevated C reactive protein (CRP=4.8 mg/dl) and erythrocyte sedimentation rate (ESR=65 mm/h), but with negative immunology for rheumatoid factor, antinuclear and anti-cyclic citrullinated peptide antibodies. Free thyroxine and thyroid-stimulating hormone were in normal range.

Ultrasonography (US) findings suggested polymyalgia rheumatica (PMR) with images of longhead bilateral biceps tenosynovitis, right glenohumeral and bilateral coxofemoral synovitis, trochanteric bursitis. Incidentally, it revealed a calcification image within humeral cartilage and acromioclavicular left joint, peri-articular and intra-articular hip and knee calcifications, bilateral distal quadriceps insertion enthesopathy, consistent with a mixture of calcium pyrophosphate and hydroxyapatite depositions. Radiology confirmed these changes.

Knee and shoulder effusion made possible fluid analysis from ultrasound-guided aspiration, with a negative result for crystal.

Results: Patient met ACR/EULAR criteria for PMR (pain distribution, morning stiffness, negative immunology, US findings) associated with crystal arthropathy. Secondary causes of chondrocalcinosis were investigated, but PTH, magnesium, calcium, iron and ferritin were normal; urine test for alkaptonuria was negative. Oral methylprednisolone, 12 mg/d, was administered with a rapidly decrease in CRP (2.59 mg/dl), azathioprine 50 mg/d as corticosteroid-sparing therapy and colchicine 1 mg/d.

Conclusion: Both calcium pyrophosphate deposition disease (CPPD) and PMR are common disorders in senior patients and a variable proportion of them diagnosed with CPPD may present with proximal involvement (1). In this patient, synovial fluid analysis had a negative result for crystals and it is important to note the absence of any symptomatology that predates this episode. The final diagnostic was PMR and asymptomatic CPPD.

Reference: Pego-Reigosa JM et al. Arthritis Rheum 2005;53:931.

P1137
ECONOMIC AND CLINICAL BURDEN OF TREATING PRIVATELY-INSURED OSTEOARTHRITIS PATIENTS WITH PRESCRIPTION OPIOIDS

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Objective: Use of prescription opioids ("RxOs") within chronic pain populations has been a growing concern among providers and policymakers, yet little is known about the potential negative consequences of treating pain with RxOs among subpopulations such as osteoarthritis ("OA"). The goal of this research is to estimate potential negative clinical outcomes and associated economic burden of commercially-insured patients diagnosed with OA of the hip and/or knee before and after treatment with RxOs.

Methods: The Optum Healthcare Solutions, Inc. data (1/2012-3/2017) were used to identify patients ≥18 years old with ≥2 diagnoses of hip and/or knee OA, and ≥90 d supply of RxOs during the 3-year period from first RxO (*index date*) after the first OA diagnosis. Patients were required to be continuously-enrolled during the six months before (baseline period) and 36 months after (follow-up period) the index date. Selected demographic and negative clinical outcomes were compared between the baseline and follow-up periods. Selected drivers of these costs and opioid abuse-related events were also evaluated. Costs and resource use comparison were normalized over the time periods.

Results: Data for 14,491 patients (62.8% female, average age of 63) with hip and/or knee OA were analyzed. On average, patients were prescribed opioids for 462 days during the follow-up period. All-cause healthcare costs increased by 45% ($19,531), with prescription and hospitalization costs increasing 324% ($11,248) and 24% ($8,283), respectively. Opioid abuse/misuse diagnoses was reported in 3.9% of patients during the follow-up period. Additionally, other opioid-related events increased between baseline to follow-up, including falls (1.6% to 8.3%), fractures (4.6% to 17.7%), constipation (2.6% to 13.7%), fatigue (10.0% to 35.6%), and nausea (4.0% to 19.4%).

Conclusion: These findings suggest that, as with a broader chronic pain population, use of RxOs among OA patients is associated with an increase in the economic burden on payers. Some of these cost increases are consistent with increased negative clinical outcomes associated with RxOs. This suggests that new treatment options outside of the opioid class are needed.

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P1138

PTH, BONE ALKALINE PHOSPHATASE AND 25-HYDROXYVITAMIN D STATUS IN A LARGE COHORT OF BELGIAN CHILDREN AND TEENAGERS

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25-hydroxyvitamin D (25VTD), PTH and bone alkaline phosphatase (BALP) are essential biomarkers of calcium/phosphate metabolism and bone turnover. Because routinely measured and widely used for bone follow-up, optimal references ranges are required. Yet, although vitamin D deficiency is a well known cause of secondary hyperparathyroidism, few studies are considering vitamin D status to establish reference ranges. In this study, we report BALP and PTH levels according to the Vitamin D status in a large cohort of 1200 Belgian children and we provide BALP and PTH pediatric reference values by taking age and 25VTD status into account. To do so, serum samples from 1200 children (from 5 months to 20 years old, mean age: 12±5.5 y) who underwent a blood sampling for allergy exploration were used to quantify 25VTD, PTH and BALP. We observed that the percentage of vitamin D deficient children (<20 ng/ml) progressively increased during childhood starting from 7% in the 0-2 y subgroup to reach a mean of at least 50% during teenage years. Additionally, PTH levels inversely mirrored 25VTD concentrations for all age and gender subgroups and 25VTD deficient children presented systematically higher PTH levels than nondeficient counterparts. In the nondeficient 25VTD population, we observed a small PTH peak at beginning of puberty (11 years old for girls compared to 14 years old for boys). Looking at BALP results, we observed a slight increase during childhood followed by a constant decrease of BALP values during teenage years starting from 12 years old for female and 14 years old for male. Our results highlight the inverse relationship between PTH and 25VTD in children and the need of a well characterized 25VTD population to establish pediatric reference ranges for PTH.

P1139

JOINING FORCES FOR BONE HEALTH: LESSONS FROM A BONE HEALTH CAMPAIGN WITH SUSAN G. KOMEN

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Objective: To extend the reach of bone health messages beyond a traditional audience by collaborating with a larger advocacy organization in a mutually beneficial education and awareness campaign.

Materials: The campaign was designed to 1) determine the extent of participants' bone health knowledge, and 2) empower walkers with information to develop a personal bone health plan as measured by post-event surveys and focus groups.

American Bone Health provided content, tools and resources for use by Susan G. Komen, the world's leading breast cancer charity, at its 3-Day walks and races. The material was used to educate and empower participants to take steps to protect their bone health, particularly during and after treatment for breast cancer. This educational campaign included:

- A digital phase of emails, blog posts and online articles about a variety of bone health topics.
- An onsite phase with learning experiences. The races included a personal bone health quiz and the American Bone Health Fracture Risk Calculator, and the 3-Day walks also had an interactive game.

Results:

Total Reach: >58,000 digital; 17,050 onsite

Total Activations:

Digital: 292

- Those 292 users account for 532 sessions on the landing pages.
- The average duration of sessions was 434% longer than the average session on American Bone Health webpages during the same time.
- The largest traffic spike corresponds with the blog post and email around the topic of exercise and bone health.

Onsite: 1,157

- 798 people (age 45+) used the American Bone Health Fracture Risk Calculator to learn their risk in the next 10 years: with 39% being at moderate or high risk.
- 359 (people under 45) people took Bone Health Quiz.

Conclusion: Collaborating with a larger advocacy organization can amplify bone health messages and provide bone health awareness to an audience not traditionally reached.

Acknowledgements: American Bone Health thanks the Susan G. Komen for their enthusiastic support.

Disclosure: The educational campaign between American Bone Health and Susan G. Komen was made possible in part by the financial support of Amgen Inc.

P1140

GLOBAL MANAGEMENT OF PATIENTS WITH KNEE OSTEOARTHRITIS BEGINS WITH QUALITY OF LIFE ASSESSMENT: A SYSTEMATIC REVIEW

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Objective: Knee osteoarthritis (KOA) is a prevalent form of chronic joint disease associated with functional restrictions, morphological changes and pain. Pain and disability from KOA negatively impact social connectedness and psychological well-being, reducing patients' quality of life (QoL). Assessing QoL is key to evaluate wellbeing, disease progression, and intervention efficacy. The purpose of this review is to provide an international resource summarizing available studies, reporting individual factors affecting QoL in KOA patients. Our results aim to prompt the incorporation of psychosocial assessment in management strategies.

Methods: We conducted a systematic review examining the literature up to JAN/2017 available at Medline, EMBASE, Cochrane, and PsycINFO using KOA and QOL related keywords. All articles were reviewed by 3 independent reviewers. QoL domains and items relevant to patients with KOA were extracted. The quality of included studies was assessed using a quality appraisal tool. Inclusion criteria were: original article, QOL compared to at least one demographic factor (age, gender), lifestyle factor, or comorbidity factor (diabetes, obesity) and a control group. Analytical methods were not considered as part of the original design.

Results: A total of 610 articles were reviewed, of which 62 met inclusion criteria. SF-36 and EQ-5D were the commonest instruments used to measure QoL. All studies reported worse QoL in KOA patients when compared to a control group. When females were compared to males, females reported worse QOL. Obesity, and lower levels of physical activity associated with lower QoL scores. Knee self-management programs delivered by healthcare professionals improved patients' QoL. High educational level improves QoL whereas poverty, psychological distress, depression and lacking familial relationships reduce it. Surgical KOA intervention outcomes depended on patients' individual factors.

Conclusion: KOA has a substantial impact on QoL. In KOA patients, QoL is also influenced by specific individual factors including gender, body weight, physical activity, mental health, and education. KOA studies routinely include pain and function scores yet haven't routinely included psychosocial variables assessing QoL. Ensuring a standard QoL assessment is implemented, as routine care globally is imperative for healthcare professionals to gain a better understanding of OA disease whilst ensuring the most optimal management

P1141
IMPACT OF REHABILITATION THERAPY FOCUSED ON THE MUSCULOSKELETAL CAPACITY IN CUSHING AND OSTEOPOROTIC-DIABETIC PATIENTS

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Objective: Multiple comorbidities such as osteoporosis, diabetes, Cushing syndrome and cardiac pathologies affect the quality of life of the patient, outlining negative aspects of the bone microarchitecture. Rehabilitation therapies must be part of the therapeutic management in these cases, after a detailed clinical and paraclinical assessment, including cardiologic, endocrinologic, diabetologic and functional evaluation.

Methods: We want to present the case of a female patient, age 53, physician as a profession, known with diabetes (with low control), ICC NYHA II, hypertension, severe osteoporosis, a hip fracture and obesity, who suffered in the last years with a decrease in the muscular-skeletal strength, that was diagnosed on late stage with Cushing syndrome. Our patient followed a rehabilitation program including physical therapy, antalgic electrotherapy and manual therapy in INRMFB 3rd Clinic.

Results: Among our 2 weeks of medical treatment and physical therapy the musculoskeletal pain reduced significantly (from VAS=8/10 to 4/10) and also the lower functional level was increased with almost 15%. The functional level was increased due to improving the strength in muscles. The main key is of treatment is the long time association with medication that can improve the bone microarchitecture and mineralization.

Conclusion: Multidisciplinary approach is required for an optimal result, especially for this patients with severe comorbidities. Understanding the pathophysiology of the illness provides the key to establish the proper therapeutic management and can provide the quality of life for these patients.

P1142
SUBCLINICAL ATHEROSCLEROSIS IN PRIMARY SJÖGREN´S SYNDROME: CROSS-SECTIONAL STUDY FROM SPANISH POPULATION

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Objective: Some autoimmune diseases, including rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE), are considered to be independent risk factors for vascular morbidity and mortality. These pathologies present accelerated atherosclerosis, partly because of chronic sustained inflammation, greater prevalence of cardiovascular risk factors (CVRFs) and

pharmacological therapy. However, regarding primary Sjögren's syndrome (pSS), available data are heterogeneous and proceed from small case series. For this reason, the aim of this study was to provide further information on the identification of atherosclerosis in pSS and its possible association with clinical and analytical parameters of the disease. We aimed to assess presence of subclinical atherosclerosis by means of carotid ultrasound in patients with pSS and to analyze clinical, analytical and CVRF along with their potential association with the presence of subclinical cardiovascular affectation.

Methods: This is a cross-sectional study of 38 patients with pSS and 38 age and sex matched controls. Demographic variables, disease characteristics and CVRFs were collected, and the presence of subclinical atherosclerosis was assessed by carotid ultrasound with carotid intima-media thickness (CIMT) measurement and determination of the presence of atheromatous plaques. Statistical analysis: To evaluate differences between patients and controls T-test or Wilcoxon test with continuity correction were used for quantitative features and Fisher test for categorical variables. In order to test the presence of pSS as an independent risk factor for subclinical atherosclerosis, from other features as classic CVRFs or analytical data, first we adjusted logistic binomial regression in a bivariate analysis, to select possible predictors to be included in a multivariate analysis. Statistical significance was p<0.05, and OR CI 95% vas calculated.

Results: Subclinical atherosclerosis presence was higher in patients with pSS than in controls [OR=4.17, 95%CI (1.27-16.54), p<0.001], as well as CIMT values (0.79±0.43 mm vs. 0.66±0.27 mm; p=0.02). As for classic CVRFs, no differences were found between both groups. An association of subclinical atherosclerosis with erythrocyte sedimentation rate (ESR) and rheumatoid factor (RF) was observed in patients with pSS.

Conclusion: This cohort showed a greater prevalence of subclinical atherosclerosis in patients with pSS, indicating this disease as an independent risk factor for presence of early vascular damage.

P1143
REAL-LIFE APPROACH TO THE MANAGEMENT OF BONE PATHOLOGY IN THE ITALIAN CITBL (CANCER TREATMENT INDUCED BONE LOSS) POPULATION: PRELIMINARY DATA OF THE HEQUOBIP STUDY

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Objective: The Hequobip Study (health and quality of life in oncological patients: management of bone pathology in the Italian population) is an ongoing National Survey and multicentric Observational Study that analyses the clinical approaches to bone diseases in breast cancer patients. The aim of the study is to provide an overview of the population characteristics and of the current clinical management of bone pathology in breast cancer patients.

Methods: Initial analysis of data is collected from one center of the study. 61 patients with breast cancer, in natural and stable menopause or having secondary amenorrhea, that arose after the initiation of oncologic treatment were included. We evaluate age, BMI, age at the breast cancer surgery, the timing of DXA examination in relationship to the oncological diagnosis, the DXA screening, the physician prescriptions and the appropriateness of bone management.

Results: The mean age and the BMI of patients at recruitment was 52.3±9.2 and 23.1±4 respectively. The mean age at surgery was 50.3±9.3. 74% of patients were prescribed aromatase inhibitors (current or previous treatment). We found that 70% of patients performed a DXA evaluation: 29.5% within 6 months of the surgery and 41% after 6 months. The mean T-score for spine DXA examination was -1.5±0.9 while the total femur T-score was -1.1±0.9. 86% of patients received a treatment for bone diseases: 80% received only vitamin D supplementation and 19.3% antiosteoporotic therapy. Three patients received oral BPs and 11 patients were prescribed denosumab. The main indication followed by clinicians to prescribe therapy was the presence of a T score <-2.5. Very few patients in AI treatment were screened for osteoporosis risk factors, or were prescribed with bone therapy independently from the T-score of the bone screening.

Conclusion: Clinicians adhered to the bone screening best practice method but despite extensive scientific literature and supporting international guidelines frequently failed to follow the specific indications on the treatment of bone health.

P1144
THE EXPRESSION OF CALCIFICATION OF HEART VALVES IN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS ACCORDING TO ECHOCARDIOGRAPHY

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Objective: To assess the severity of calcification of heart valves according to echocardiography and the possibility of using this criterion to predict the progression of valvular lesions in patients with rheumatoid arthritis (RA) and osteoarthritis (OA).

Methods: 60 people were examined: the main group - 30 patients with RA with moderate activity (26 women and 4 men aged 32-66 y; average disease duration 7.42±4.12 y), comparison group - 30 patients with OA knee joints (22 women and 8 men aged 38-64 y; the average duration of the disease is 8.25±5.39 y). The study of morphological and functional changes in the heart and its valves was performed by echocardiography using the Accuvix V10 ultrasound diagnostic system (Medison, Korea). The following

gradations were used in assessing the grade of calcification of the aortic valve (AV) and mitral valve (MV) of the heart: 0 -no calcification, 1st degree -unexpressed calcification, 2nd degree -moderate calcification, 3rd degree -pronounced calcification of heart valves.

Results: In the main group, ultrasonic signs of calcification of the heart valves (AV and / or MV) were significantly more frequent compared with patients from the comparison group (53.3% of cases vs. 20%; p<0.004). There is a high prevalence of AV calcification of varying severity (in 40% of cases vs. 13.3% in the comparison group; p=0.01) and slightly less detectable calcification of MV (in 33.3% of cases vs. 6.7% in comparison group; p=0.005) in patients with RA. In the main group, the prevalence of patients with a 2-3 degree of calcification (AV and MV in comparable proportions) of heart valves was observed (stage 1 in 2, stage 2 in 9, stage 3 in 5 people), and in the comparison group the prevalence of patients with a 1st degree of calcification (mainly AV) of heart valves (stage 1 - in 5, stage 2 - in 1 person) was observed. A combined calcification of AV and MV was recorded in 20% of cases in the main group. There were no patients with this pathology in the comparison group.

Conclusion: The presence of an autoimmune chronic inflammatory process causes the greatest risk of developing cardiovascular complications in patients with RA and accelerates the processes of calcification of heart valves. To assess valvular lesions can be used a simple and effective test - determining the severity of calcification of heart valve according to echocardiography.

P1145
SERUM PERIOSTIN LEVELS IN FIBROUS DYSPLASIA: ITS USEFULNESS AS DISEASE BIOMARKER - AN EXPLORATORY STUDY

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Objective: Fibrous dysplasia (FD) is a rare, non-hereditary bone disease caused by a somatic mutation of GNAS gene. Periostin (Postn) is a new marker, linked to bone repair processes. We aimed to assess Postn sensitivity as disease activity marker of FD.

Methods: An exploratory case-control study was led, with 15 FD patients, paired by age and gender with healthy subjects (controls). Postn serum levels were gauged in FD patients and controls, also according to clinical manifestation. In the same assay, with serum samples stored at -80°C, Postn was measured by the ELISA method (Sigma Aldrich; St. Louis, USA), [coefficient of variation (%CV) intra-assay <10% and interassay

<12%]. Statistical analysis: an R Core Team 2018 processor was used (https://www.R-project.org). A nonparametric test (Mann-Whitney)was used to compared Postn serum levels between the groups. ROC curves were used to find optimal cut-off points and analyze Postn sensitivity (predictive value).

Results: 15 FD patients (polyostotic 40%, monostotic 33% and McCune-Albright syndrome 27%), with an average age (X±DS) of 44.3±10 y. In our FD patient cohort, no statistically significant differences were observed between Postn and control group (FD: 51.1±10 ng/ml vs. control: 44.2±15 ng/ml; p=0.15) nor by FD clinical form (polyostotic: 51.8±9.1 ng/ml vs. monostotic: 49.6±13 ng/ml; p=0.66). Figure 1 shows the ROC curve obtained and optimal cut-off points.

Conclusion: Postn serum levels did not show statistically significant differences compared to control group or by clinical manifestation, showing low sensitivity as disease activity marker of FD.
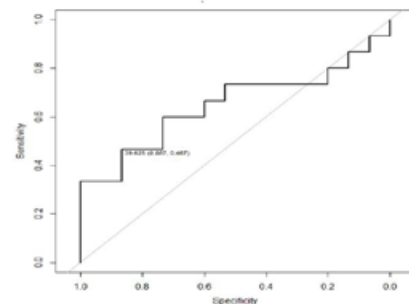
Figure.1: ROC curve graph with the respective optimal cut-off points, showing Postn low sensitivity as FD activity marker.

P1146
BONE BENEFITS FROM PUBERTAL EXERCISE ARE SUSTAINED AFTER DETRAINING IN MALE RATS

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Objective: During the adolescent period, rapidly growing bones react to induced mechanical stimuli. Mechanical loadings, such as daily physical activities, can positively contribute to skeletal development. However, it is still unclear whether the effects induced by mechanical loading during adolescence remains in adulthood. The current study investigated the effects of *in vivo* low (LI), medium (MI), and high (HI) impact loadings applied during puberty on longitudinal bone development, morphometry and biomechanics at adulthood using an animal (rat tibia) model.

Methods: 4-week-old rats were randomized into control, sham, LI, MI, and HI groups (n=42). Rats underwent a 41-week detraining period after 8 weeks of cyclic (2 Hz) loading on the right tibia with 5 d/week loading regime (1200 cycles/d). Rats were sacrificed at 52-week-old. Bone microstructure and strengths were investigated using micro-computed tomography and mechanical testing, at the end of puberty and during detraining (Fig. 1). Statistical analyses were performed to compare the groups for any significant change due to the pubertal loadings (p<0.05).

Results: HI loading increased BMD, bone volume fraction, trabecular thickness, trabecular number and decreased trabecular spacing right after loading (11 w.o.). At the end of the detraining period (52 w.o.), all trabecular bone benefits gained from HI loadings were maintained, except BMD. Moreover, cortical bone area, periosteal perimeter and moment of inertia were enhanced at the end of puberty due to HI loading and remained till the end of 52nd week. In terms of bone strength, HI loading increased ultimate force and stress as well as stiffness compared to the sham group.

Conclusion: Overall, our findings suggest that even though age-related changes occurred in the bone microstructure, controlled high impact loading during adolescence benefitted both bone microstructure and biomechanics, which remained at adulthood.

P1147
AN EXPERT CONSENSUS ON THE APPROPRIATE USE OF ORAL SYSADOAS FOR THE TREATMENT OF THE OSTEOARTHRITIC PATIENT WITH COMORBIDITIES

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Objective: Osteoarthritis pain is linked to disability and low quality of life (QoL). The therapeutic modalities in the treatment of osteoarthritis are numerous and agreement on treatments is lacking. Symptomatic Slow-Acting Drugs for Osteoarthritis (SYSADOAs) are at the center of a debate on their utility in clinical practice. Our objective was to create a consensus document on the appropriate use of oral SYSADOAs: chondroitin sulfate (CS), glucosamine(G), diacerein(D) and the combination of CS plus G for OA management in primary care (PC) as a support instrument to health professionals.

Methods: We applied a Delphi technique of two rounds, where 24 clinical questions were evaluated and 206 specific consultations formulated. The questionnaire was validated by the expert committee. A panel of 14 experts in OA and SYSADOAs responded to the two rounds of consultation through an online platform. The results were analyzed and discussed in a face-to-face meeting with the coordinators and scientific committee and were classified in terms of Unanimity, Consensus, Majority, and Discrepancy. Items that reached consensus by at least 80% across both panels were included in the guidelines. The fieldwork of the study lasted 4.5 months.

Results: A total of 162 concrete questions were agreed upon regarding the perception of the clinical-therapeutic usefulness, the evidence and the appropriate use of the SYSADOAs. Consensus statements emerged: (1) patient phenotypes affect SYSADOAs action; (2) SYSADOAs are effective in primary and secondary OA and not in erosive hands, shoulder, spine, and ankle OA; (3) CS, G and association can reduce pain, inflammation, improve QoL and functional capacity having a chondroprotective effect; (4) CS and G can reduce synovial membrane inflammation, all oral SYSADOAs, except D, can decrease cell death and the enzymes responsible for cartilage destruction; (5) the maximum therapeutic efficacy is reached after 3/6 months; (6) SYSADOAs can be prescript to patients having comorbidities.

Conclusion: This work is the first available tool on the appropriate use of oral SYSADOAs. The dissemination of these results will contribute to improving management protocols and support doctors' decisions in uncertainty situations by ensuring a personalized treatment to OA patients.

P1148
PSORIATIC ARTHRITIS PROGRESSION IS ASSOCIATED WITH ACTIVATION OF ANGIOPOIETIN-LIKE PROTEIN TYPE 3

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Objective: In psoriatic arthritis (PsA), increased angiogenesis underlies synovial proliferation in the joints. Recent studies have noted the pro-angiogenic activity of an angiopoietin-like protein type 3 (ANGPTL3), which can activate the proliferation processes in the synovial membrane in inflammatory joint diseases. We aimed to assess the possibility of using ANGPTL3 as a predictor of PsA progression.

Method: The study included 63 people: 30 PsA patients aged 38-68 y (women - 83.3%, disease duration - 10.47±6.02 y) and 33 healthy donors aged 24-58 y (women - 75.8%). The concentration of ANGPTL3 in blood serum was determined by enzyme immunoassay using a commercial test system Human Angiopoietin-like Protein 3 ELISA (Bio Vendor, Czech Republic).

Results: The average level of ANGPTL3 in PsA patients was 469.63±130.51 ng/ml. These results significantly exceeded those of healthy individuals (p<0.001). In 17 (56.7%) patients with PsA, the ANGPTL3 determination was considered positive (range from 453.59-809.69 ng/ml), in 13 (43.3%) people this indicator

was negative (values from 253.06-419.44 ng/ml). The sensitivity of the test was 56.7%, specificity 90.9%. The level of ANGPTL3 positively correlated with the activity of PsA by the DAS index (r=0.62). Statistically significant differences were found in the content of ANGPTL3 in PsA patients with high disease activity (12 people, DAS>3.7) compared with low / moderate activity (18 people, DAS≤3.7) of the disease (p<0.001).

Conclusion: The role of ANGPTL3 in the development of an imbalance between inhibitors and stimulators of neovascularization in PsA is subject to detailed consideration. ANGPTL3 may claim to be a diagnostic marker for PsA.

P1149
BROWN TUMOURS: THE PLAYLIST OF PTH

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Objective: PTH is a major contributor to skeletal health and other metabolic pathways. (1,2) Severe osteoporosis and especially brown tumors secondary to persistent osteolysis are rarely encountered in primary hyperparathyroidism. parathyroidectomy remains the main therapeutic option followed by the correction of biochemical and hormonal parameters.

Method: This is a case report regarding bone changes induced by a severe form of primary hyperparathyroidism. The patient was followed in different tertiary centres of endocrinology. The informed consent was obtained.

Case report: This is a 43-year-old male without significant pathological history diagnosed with primary hyperparathyroidism in the context of weight loss of over 15 kg within 1 year associated with generalized bone pain and decreased muscle strength with walking difficulties. Preoperative chest CT examination described mediastinal and paraesophageal lump tissue mass of 38/26/40 mm, diffuse osteoporosis lesions, and osteolytic imaging in the C2 and C6 vertebrae suggestive of brown tumors. Severe hypercalcemia of 14 mg/dL (normal: 8.8-10.6 mg/dL) required preoperative treatment with zoledronic acid 4 mg and diuretics. Postoperatively, "hungry bone syndrome" appeared (total calcium of 7.50 mg/dL, ionic calcium of 3.89 mg/dL- normal: 4.4-5,4 mg/dL, low 25-hydroxyvitamin D of 23.8 ng/mL- normal: 30-100 ng/mL) and regressive doses of calcium and vitamin D were administered. Bone MRI performed 3 months postoperatively confirmed the presence of suggestive lesions for brown tumors. The slow involvement of bone changes secondary to primary hyperparathyroidism requires periodic monitoring by bone scintigraphy, DXA examination and by the biochemical and hormonal parameters involved in bone metabolism.

Conclusion: Brown tumors due to PTH excess are an exceptional finding nowadays. At diagnosis the differentiation with bone metastases is critical while after parathyroid surgery the bone

recovery is intense and needs special care. Real life medicine includes such challenging cases and adequate recognition is crucial.

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P1150
SPECIFICITY AND SENSITIVITY OF TBS-OSTEO 3.0 IN PATIENTS WITH VERTEBRAL FRACTURE: CASE AND CONTROL STUDY

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Objective: To describe the specificity and sensitivity of the trabecular bone score (TBS-osteo ver 3.0) in postmenopausal women with vertebral fractures.

Methods: We performed a case-control study that identified 76 postmenopausal women with vertebral fracture (VF) detected by vertebral fracture assessment (VFA) by DXA. They were compared with 76 controls, matched by age, sex, and size, without VF. A GE-Prodigy Advance DXA device was used and the value of TBS-osteo 3.0 was obtained in both groups. T-test was used to analyze the differences. The specificity and sensitivity were calculated with a confusion matrix.

Results: There were no differences between cases and controls in anthropometric measurements, except for height, 4.35cm taller in controls (p=0.0). TBS-osteo 3.0 values in partially degraded range did not show significant differences (p=0.18). Significant differences were observed in normal and degraded range (Table 1). The fractured patients presented a risk of very high (16.4%), high (17.7%) and medium (10%) for VF. Only 5.2% of patients with VF were classified as low risk (Table 2). The sensitivity obtained through the confusion matrix was 65% with a specificity of 66% and an accuracy of 65%. When analyzing the odds ratio, it was found that the population at high risk of VF with TBS-osteo is 3.71 times more likely to present a VF than the population at medium or low risk.

Conclusion: The combined use of TBS-Osteo 3.0 and BMD by DXA improves the risk assessment of VF. Most of our population with VF is found within high or very high risk in TBS- Osteo 3.0 parameters. Patients without VF present medium and low VF risk ranges.

TBS Osteo	Table-1 Osteo TBS features		
	Patients without fracture (n=76)	Patients with fracture (n= 76)	P value*
Normal	29 (38.16%)	17 (22.37%)	0.034
Partially Degraded	22 (28.95%)	15 (19.74%)	0.186
Degraded	25 (32.89%)	44 (57.89%)	0.002

* T student test of independent groups

Table-2	DMO T-score					
	Normal		Osteopenia		Osteoporosis	
	Case	Control	Case	Control	Case	Control
Normal	8	17	4	8	5	4
Partially Degraded	3	5	5	10	7	7
Degraded	4	8	15	9	25	8

8 (5.2%)	17 (11.1%)	16 (10.5%)	31 (20.4%)	27 (17.7%)	20 (13.1%)	25 (16.4%)	8 (5.2%)
25		47		47		33	
Low Risk		Medium Risk		High Risk		Very High Risk	

P1151
THE EFFECT OF PILATES EXERCISES ON LUMBOSACRAL ALIGNMENT AND FUNCTIONAL CONDITIONS IN WOMEN PATIENTS WITH CHRONIC NONSPECIFIC LOW BACK PAIN: A PILOT STUDY

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Objective: Pilates has benefits in different population groups, including patients with low back pain. Low back pain is one of the causes that disrupt lumbosacral alignment. The aim of this study is to investigate the effectiveness of pilates exercises on lumbosacral alignment, pain, range of motion, flexibility and physical activity level in patients with chronic nonspecific low back pain.

Methods: The study included 15 patients with chronic nonspecific low back pain. Ultrasound, Transcutaneous Electrical Nerve Stimulation, hot pack and pilates exercises were applied to the patients. The exercises were specially selected to increase core muscle strength and lumbosacral stabilization: Toe taps, shoulder bridge preparation, the hundred, double leg stretch, swimming, swan, breast stroke preparation. All physiotherapy techniques were applied 2 d/week, 8 weeks, for a total of 16 sessions. Patients were evaluated before and after treatment. MRI to evaluate lumbosacral angle changes, goniometric measurement to assess joint range of motion, Numerical Pain Scale to assess pain, Modified Schober Test to evaluate flexibility, and International Physical Activity Questionnaire-Short Form to determine physical activity level was used. Statistical analysis of the data was done with SPSS 20.0.

Results: Significant improvement was found in pain and lumbosacral angle parameters of the patients included in the study (p<0.05). Significant change wasn't observed in other evaluation parameters.

Conclusion: According to the results of our study, it can be said that pilates exercises effectuate positive changes in patients with chronic nonspecific low back pain. It is concluded that further studies with larger sample sizes would give better opinion regarding effectiveness of pilates exercises.

P1152
RELATIONSHIP BETWEEN BODY COMPOSITION AND SELF-PERCEIVED FATIGUE IN COMMUNITY-DWELLING ADULTS AGED 80 AND OVER

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Objective: Fatigue is a common complaint among older adults and is a strong predictor for the onset of disabilities, loss of independence, mortality and other adverse health outcomes. Body composition, self-perceived fatigue and muscle weakness are thereby important characteristics of frailty at higher age. This study observed whether the interrelationship among self-perceived fatigue, muscle fatigability and body composition can be observed in community dwelling older adults aged 80 and over.

Methods: 479 participants (252 men, and 227 women) of the BUTTERFLY-study, a cohort study in well functioning older adults aged 80+, were assessed for self-perceived fatigue (multidimensional fatigue index MFI), physical activity, handgrip strength, muscle fatigability, grip work (GW=0.75 * maximal grip strength * time for maximal grip strength to decrease to 50% during sustained contraction) and body composition (measured by DXA). Data were analyzed using independent T-test to evaluate the difference in gender and a mixed linear regression model to calculate the effect of body composition on fatigue.

Results: Female older adults show significantly more (appendicular) fat mass% (p<0.001), more visceral fat mass (p<0.001), less (appendicular) lean mass (p<0.001), and higher levels of muscle fatigability compared to male older adults. More appendicular fat mass measured DXA was significantly related to higher levels of self-perceived fatigue (B1,84 (p<0.001)) and to muscle fatigability (B -1000,10 (p<0.001)), no significant relationship regarding visceral fat was found. Opposite results showed that more appendicular lean mass was related to lower levels of self-perceived fatigue (B -1,596 (p<0.001)) and muscle fatigability (B 1000,09 (p<0.001)). Gender had no effect on the size of the relationship between body composition and fatigue.

Conclusion: These analyses provide interesting insights regarding the underlying pathways that are involved in developing fatigue at older age. Higher prevalence of not functional (appendicular mass) (i.e., higher fat mass) is related to higher levels of

self-perceived fatigue and muscle fatigability. Since higher (appendicular) fat mass was related to higher levels of fatigue, metabolic and inflammatory processes are likely to be involved.

P1153

SEVERE OSTEOPOROSIS FOLLOWING PREMATURE OVARIAN FAILURE

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Objective: Premature ovarian failure without hormone replacement therapy is a contributor to cardio-metabolic and fracture risk. (1,2) Other factors like vitamin D deficiency or hyperprolactinemia increases the bone loss risk. (2,3) Menopausal estrogens deficiency is associated with increased fracture risk in the context of decreased BMD. The treatment involves, besides the elimination of risk factors, the increase quality of the bone mass by antiresorptive therapy.

Methods: A case of postmenopausal osteoporosis associated with pathological fracture is introduced. Bone was evaluated by central DXA. Phosphocalcic metabolism assay including bone turnover was performed. The informed consent was obtained.

Case data: A 59 years old female was diagnosed with osteoporosis 2 y ago in the context of a double fracture of the tibia and fibula, which appeared by falling from the same level. Her medical history reveals early menopause, at the age of 38, hypertension from age of 18 and multiple ischemic strokes in the context of bilateral carotid atheromatosis. No estrogens substitution was offered to the patient because of cardio-metabolic risk. Initial DXA showed decreased BMD of 0.660 g/cm^2 with a T-score of -3.6 SD measured at AP spine L1-L4. The BMD measured at femoral neck was markedly low of 0.506 g/cm^2, with a T-score of -3.1 SD. Therapy with risedronate 75 mg, 2 doses per month and vitamin D 2000 UI daily was introduced. Two years later an improvement of lumbar BMD of 0.826 g/cm^2 with a T-score of -3SD is registered. The biochemical parameters revealed normal alkaline phosphatase of 68 U/L (normal: 30-120 U/L), normal levels of ionized and total calcium and decreased levels of circulating osteocalcin of 10.2 ng/mL (normal: 15-46 ng/mL) with normal ß-CrossLaps of 0.111 ng/mL (normal: 0.104-1.008 ng/mL). Hormonal profile showed normal PTH of 48.3 pg/mL (normal: 12-88 pg/mL) and slightly low level of 25-hydroxyvitamin D of 24.6 ng/mL (normal: 30-120 ng/mL). It was decided to continue treatment with ibandronic acid 3 mg every 3 months intravenously and vitamin D due to a newly diagnosed gastritis.

Conclusion: Early menopause/premature ovarian failure without hormone replacement represent an important risk factor for osteoporotic fractures. Choosing the optimal therapy is often difficult due to the associated systemic pathology.

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P1154

IMPACT OF THE SERUM CIRCULATING 25-HYDROXYVITAMIN D LEVELS AND LEAN BODY MASS ON CORTICAL AND TRABECULAR BONE AT THE PROXIMAL FEMUR OF ADULT MEN USING 3D ANALYSIS

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Objective: Vitamin D, lean body mass and BMD decline with age and low vitamin D levels and lean body mass are associated with increased falls number and subsequent osteoporotic fractures. The 3D-DXA technology analysis bone density distribution (both cortical and trabecular compartments) from hip DXA scan, without more scans and or radiation doses. Nevertheless, the role of vitamin D and lean body mass in both cortical and trabecular bone at the hip remain unknown. Our aim was to study the effects of serum circulating 25-hydroxyvitamin D [25(OH)D] levels and lean body mass on the cortical and trabecular bone compartments at the proximal femur using DXA-based 3D modeling.

Methods: A group of 79 men (mean age=64.5±10.7 y, BMI 27.4±3.1 kg/m²) was divided in 31 with vitamin D deficiency [25(OH)D <20 ng/ml], 31 with vitamin D insufficiency [25(OH)D 21-29 ng/ml] and 17 with normal vitamin D levels [25(OH)D >30 ng/ml]. All participants had DXA exploration (Discovery W, Hologic Inc, USA) at the proximal femur and at the whole body (lean body mass measurement). The 3D DXA modeling was performed using a software algorithm (3D-SHAPER® v2.10.2, Galgo Medical, Spain) in order to derive QCT-like subject-specific 3D models from the hip DXA scans. Several 3D parameters were measured. The serum 25(OH)D (ng/ml) levels were measured. Adequate statistical tests were used (statistical significance P<0.05).

Results: In the deficiency vitamin D group the mean BMD at the total femur (P=0.031), the neck cross-sectional area (CSA, P=0.039), the neck cross-sectional moment of inertia (neck CSMI, P=0.046), and the neck modulus (neck Z, P=0.028), the cortical thickness (Cth, P<0.05) were decreased, as compared to the other groups. The lean body mass correlated with Cth (P=0.028), neck CSA (P=0.028), neck CSMI (P=0.000) and neck Z (P=0.000).

Conclusion: Several bone parameters, measured either by conventional 2D DXA or using 3D DXA-based modelling, were impaired in presence of vitamin D deficiency. This 3D analysis highlighted the possibility of a more prominent negative effect of low vitamin D levels on the cortical thickness and neck CSMI,

reducing global strength at the hip. Further studies must be performed to evaluate effect of vitamin D supplementation on the two bone compartments.

P1155
HISTOLOGICAL ANALYSIS OF FEMORAL HEADS IN PATIENTS WITH A HIP FRACTURE AND CORRELATION WITH VITAMIN D LEVELS

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Hip fractures are a major health issue as they need surgical management and they may lead to death or inability and loss of independence. Hip fractures have been found to be related to vitamin D deficiency. The aim was to perform histological analysis of the femoral head in patients with a hip fracture after surgical management and to correlate the results with vitamin D levels.

In a group of 10 patients, who had undergone surgery after a hip fracture the femoral head was histologically studied. Blood levels of $25(OH)D_3$ were also measured. All patients had also a DXA scan for the diagnosis of osteoporosis.

Histological analysis of the femoral heads revealed thinning and loss of bone trabeculae. In 2 patients extreme thinning of bone trabeculae was observed. In 3 patients extreme loss of bone trabeculae was observed. Patients with low vitamin D levels had extreme thinning and loss of bone trabeculae.

It appears that in patients with osteoporosis who had undergone a hip fracture thinning and loss of bone trabeculae is noted and this seems to be related to vitamin D deficiency. In the current era of effective drug treatment for osteoporosis and effective surgical management for a hip fracture the acquirement of deeper knowledge regarding the histology of the bone in patients with a hip fracture is extremely interesting and important, as it may aid into the deeper understanding of the biology of osteoporosis and fracture.

P1156
RATIO BETWEEN MUSCLE FATIGABILITY AND SELF-PERCEIVED TIREDNESS COULD BE AN IMPORTANT PARAMETER FOR CHARACTERIZING FRAILTY

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Objective: Muscle fatigability is an important indicator of reduced intrinsic capacity, and therefore potentially an early characteristic of frailty. Meanwhile, self-perceived fatigue can be considered as a symptom of reduced intrinsic capacity. The aim of this study was to investigate whether older adults with low muscle fatigability and high feelings of fatigue are more prone to frailty.

Methods: 444 robust or prefrail participants of the BUTTERFLY-study, a cohort study in well functioning subjects aged 80+, were assessed for frailty score on Frailty Index of Fried (FFI), Groningen Frailty Indicator (GFI) and the Rockwood Index (RWI). Self-perceived fatigue was assessed by the Multidimensional Fatigue Index (MFI), muscle fatigability was measured with the Martin Vigorimeter, and expressed as grip work (GW=0.75 * maximal grip strength * time for maximal grip strength to decrease to 50% during sustained contraction). Statistical analyses were corrected for age and sex.

Results: Prefrail subjects showed significantly worse muscle fatigability and feel more fatigued than their robust counterparts (p<0.001). The ratio between muscle fatigability and self-perceived fatigue (GW/MFI) was significantly related to frailty (RWI (r=0.208), FFI (r=-0.228), GFI (r=-0.100)). This relationship was higher compared to independent correlations between MFI (r=0.186) and GW(r=0.202).

Conclusion: The ratio between muscle fatigability and self-perceived fatigue seems an interesting indicator for early frailty phenotypes, especially for physical frailty is the ratio an informative marker.

P1157
QUALITY OF LIFE AFTER HIP FRACTURE IN OSTEOPOROTIC PATIENTS

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Objective: Quality of life of every individual is affected by living condition, the satisfaction level regarding live and also wealth and not at least the health status. Patients that are affected by micro or macrotraumatism have a negative effect regarding sociolife, professional activity and functional status.

Methods: We present to you the case of M. G., a 65 years old, overweight female patient, known with osteoporosis (in treatment for over 7 y), diabetes, cardiac pathologies and that suffered in youth multiple episodes of ankle and knee sprains and in September 2018 had a trauma by falling from its height which resulted with severe proximal femur fracture and with an ankle sprain. The orthopedic treatment was surgical one and then the patient was hospitalized in rehabilitation department. Her active status level was very high, before she suffered the fracture she was still working and had a very active life, to which she intended to return as fast as possible. During the last 15 months our patient performed multiple rehabilitation programmes, with a significant improvement in function level and the level of pain has reduced significantly. The patient was invited to complete visual analog scale, Marryland Foot Score and WHOQOL-100.

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Results: The patient regained the independence of daily activity and return to work. After the first 3 months she could return to work, almost as before of the traumatic event. Now, the patient follows the medical treatment that was recommended for her and she follows a prophylactic program for risk failure.

Conclusion: We intend to realize in the future a prospective study with a large group of individuals in order to analyze the long term benefits of associating rehabilitation therapy to patients with comorbidities.

P1158
PSYCHOMETRIC PROPERTIES OF THE HUNGARIAN VERSION SARQOL®, A SARCOPAENIA SPECIFIC QUALITY OF LIFE QUESTIONNAIRE

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In order to evaluate the psychometric performance of the Hungarian SarQoL, we assessed the discriminative power, construct validity, internal consistency, test-retest reliability and the floor/ceiling effects of the translated and culturally tailored version of the original SarQoL questionnaire. Results indicated a good discriminative power (sarcopenic individuals having a lower quality of life; P=0.01), high internal consistency (Cronbach's α of 0.921), consistent construct validity (high correlations found with domains related to mobility, usual activities, vitality, physical function and low correlations with anxiety, self-care, mental health and social problems), good test–retest reliability and no floor and ceiling effects. A valid Hungarian translation of the SarQoL questionnaire will be accessible to better assess the sarcopenia-related QoL among frail Hungarians.

P1159
HEALTHCARE RESOURCE UTILIZATION AND COSTS ASSOCIATED WITH MODERATE-TO-SEVERE OSTEOARTHRITIS PAIN

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Objective: We sought to estimate the annual costs and healthcare resource utilization (HCRU) in patients with osteoarthritis (OA), comparing those with moderate-to-severe OA pain ("cases") to those without moderate-to-severe OA pain ("controls").

Methods: We performed a retrospective cohort study using data from the IBM Marketscan Commercial Claims Databases (2013-2018). We included patients who were ≥45 years of age, with at least one diagnosis of hip and/or knee OA or an unspecified diagnosis of OA plus a diagnosis of pain in the knee or hip with 1 year pre-index and 2 years follow-up. The date of the first OA diagnosis was defined as the index date. A literature-based proxy was developed to define cases and were matched 1:1 with controls using age, sex, and CCI from the 12 months prior to index. HCRU and costs were analyzed 12- and 24-months post index date.

Results: A total of 546,254 patients with OA were eligible for the study, of which 342,019 (62.6%) were cases. Over 12 months, cases had significantly more outpatient visits (32.1 vs. 26.1), hospitalizations (0.3 vs. 0.1) and filled more prescriptions (31.1 vs. 25.1) vs. controls. Two years after diagnosis, cases had significantly more outpatient visits (59.0 vs. 49.2), hospitalizations (0.5 vs. 0.3), longer average hospital length of stay (1.4 vs. 1.0) and filled more prescriptions (61.7 vs. 50.7) vs. controls. At both 12- and 24-months post-index, respectively, cases had $9,072 and $14,566 greater total healthcare costs vs. controls.

Conclusion: Patients with moderate-to-severe OA pain are associated with substantially higher HCRU and significantly greater costs over two years following OA diagnosis.

P1160
INFLUENCE OF COMBINED BACKGROUND THERAPY ON ULTRASOUND SIGNS OF SYNOVIAL HYPERTROPHY IN JOINTS OF PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Ultrasonography (ultrasound) of the joints can independently characterize the severity of the inflammatory process in rheumatoid arthritis (RA) by evaluating synovitis, thickening of the synovial membrane (synovial hypertrophy) and the severity of vascularization of the synovial membrane. This diagnostic method can be used to assess the effectiveness of the therapy, the activity of the inflammatory process and the establishment of clinical remission in RA. We aimed to study the severity and dynamics of ultrasound signs of inflammatory changes in the joints of the hands in patients with RA under the influence of background therapy.

Methods: The study included 68 people (12% men, 88% women) with a documented diagnosis of RA (mean age - 42±4.5 y, duration of the disease - 7±2.8 y). Most patients had moderate disease activity and were seropositive for rheumatoid factor (RF) and/or antibodies to citrullinated peptide (anti-CCP). Depending on the type of basic therapy, RA patients were divided into two comparable groups: in group I (36 patients), patients received methotrexate in a dose of 10-20 mg/week; in the second (32 people) - methotrexate in combination with hydroxychloroquine 400 mg/d. Ultrasound of the wrist joints (ultrasound diagnostic system Accuvix V10, Samsung Medison) was conducted at the beginning of treatment (at the initial examination) and after 6 months of therapy.

Results: Assessment of the criteria for clinical remission of RA was carried out retrospectively (according to ultrasound of the hands, index DAS28, index CDAI, laboratory parameters). Initially, a thickening of the synovial membrane in the affected joints, regarded as ultrasonic signs of synovitis, was noted in 63.9% (group I) and 62.5% (group II) cases (p>0.1). After 6 months of therapy, clinical and laboratory remission was achieved in both groups (DAS28 <2.6; CDAI <2.8). However, according to the ultrasound of the hands in some patients, synovial hypertrophy was still diagnosed: in the first group in 12 patients (33.3%), in the second group in 4 patients (12.5%) (p=0.043). Thus, patients with RA corresponding to remission by DAS28 and/or CDAI may have residual inflammatory activity, determined by ultrasound signs.

Conclusion: Combined background therapy has a more pronounced effect on the activity of RA, significantly reducing synovial hypertrophy. The presence and severity of ultrasonic signs of synovial hypertrophy can be used as additional criteria for the onset of clinical remission in patients with RA.

P1161
QUALITY OF LIFE AND RESPONSIVENESS TO TREATMENT IN A GROUP OF PATIENTS WITH PLANTAR FASCIITIS AND ACHILLES TENDINOPATHY FROM ORADEA, ROMANIA

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Objective: To assess quality of life, efficacy and safety on a group of patients with plantar fasciitis and Achilles tendinopathy undergoing a physical rehabilitation therapy in Oradea, Romania.

Methods: 124 patients with plantar fasciitis and 64 patients with Achilles tendinopathy were included in a rehabilitation program for two weeks consisted in ESWT (shockwave therapy), two times per week, kinetotherapy and electrotherapy, daily. All the patients were assessed with VAS scale for pain, Roles Maudsley Index, VISA-A questionnaire and SF-36 at baseline, after finishing the treatment and 6 months later.

Results: In our group of study we noticed a lowering of pain on VAS scale at the end of the treatment and also 6 months later; the values of SF 36 questionnaire, the Roles Maudsley and VISA-A questionnaire improved statistically significant at the end of the treatment and also 6 months later.

Conclusion: The specific rehabilitation therapy on patients with plantar fasciitis and Achilles tendinopathy is efficient and safe. Due to the efficacy of the treatment in such patients, quality of their life improved also significantly.

P1162
THREE SPINE SURGERIES IN AN ADULT MALE

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Objective: PTH is a key player of mineral metabolism, also playing different roles at metabolic level and its clinical application as teriparatide is useful for severe cases of osteoporosis. **(1,2)** Similar to females, severe osteoporosis in men is associated with significant impairment quality of life and increased risk of morbidity and mortality. Choosing the optimal therapy often remains a real challenge in clinical practice.

Methods: A case of severe osteoporosis associated with multiple vertebral fractures and repetitive vertebroplasty is introduced. Bone was evaluated by central DXA and MRI. Phosphocalcic metabolism assay including bone turnover was performed. The informed consent was obtained.

Case report: A 63 years old male patient was admitted for further investigation at 2 months after vertebroplasty at level thoracic T10. His medical history revealed gastric ulcer operated at the age of 36, high blood pressure, lumbar L2-L4 osteosynthesis and L3 vertebral body fracture with vertebroplasty at the age of 55. The histopathological examination did not reveal specific elements for malignancy in the bone material collected after the two neurosurgical interventions. Hormonal profile showed normal PTH of 48.0 pg/mL (normal: 12-88 pg/mL), normal serum cortisol, normal thyroid function and low level of 25-hydroxyvitamin D of 19.6 ng/mL (normal: 30-120 ng/mL). Bone turnover revealed normal ß-CrossLaps of 0.41 ng/mL (normal: ≤0.704 ng/mL), normal circulating osteocalcin of 14.1 ng/mL (normal: 15-46 ng/mL), ionized calcium of 4.81 mg/dL (normal: 4.4-5.4 mg/dL), alkaline phosphatase of 113 U/L (normal: 30-120 U/L). MRI (Magnetic resonance imagery) examination of the dorsal-lumbar spine revealed angular dorsal kyphosis secondary to T 8 vertebral body fractures and significant reduction in height below to 70%, reduction of lumbar lordosis with L3 vertebral body fractures, and height loss of the vertebral body below to 50%. Teriparatide and vitamin D was recommended. Six months later the BMD measured at AP spine L1-L4 was 0.819 g/cm^2, with a T-score of -3.0 SD and the bone forming therapy is planned for 2 years according to national protocol. (3)

Conclusion: Teriparatide is the therapy of choice for severe forms of osteoporosis complicated with multiple vertebral fractures including in male without no apparent secondary cause of multiple vertebral fractures.

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P1163
THE ASSOCIATION BETWEEN ORAL ANTIDIABETIC MEDICATION AND HIP FRACTURE AND POST-HIP FRACTURE MORTALITY: A NATIONWIDE STUDY FROM AUSTRIA

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Objective: Diagnosis of osteoporosis in type 2 diabetes mellitus (T2DM) is difficult since BMD and bone turnover markers do not reflect the true fracture risk in these patients. However, T2DM patients have increased risk of low trauma fractures and shorter life expectancy than non-diabetic individuals. Additionally, there is not much evidence on the effect of T2DM on post-hip fracture mortality. Therefore, we aimed to assess the association of blood glucose lowering drugs (BGLD) with HF and post-hip fracture mortality risk in patients older than 50 y.

Methods: In this nationwide case-control study 56,830 hip fracture cases (HF) and 113,724 age-, sex- and region-matched non-hip fracture controls were analyzed. We identified T2DM patients based on a prescription of anti-diabetic medications (BGLD excluding insulin, ATC code A10B). We applied logistic regression and Cox regression, crude and adjusted, to explore associations.

Results: We identified 15,310 users of BGLD (alone, without combination of another antidiabetic treatment; mean age 82.2, 28.8% men) and 148,712 patients without any antidiabetic treatment (mean age 82.3, 28.4% men). Analysis adjusted for age, sex and medications associated with fracture risk showed, that users of BGLD were more likely to sustain a HF (OR 1.12, 95%CI 1.08-1.16, P<0.001) than non-users. The mortality rate after HF was higher among BGLD users compared to non-users. During 135,492.96 person-years of follow-up in BGLD users, there were 1939 deaths (14.31/1000 person-years) compared with 15,437 deaths during 1,221,946.78 person-years in reference individuals (12.63/1000 person-years). There were significant differences in overall mean survival time between BGLD and non-BGLD users (43.3 months, 95%CI 42.5-44.2 and 45.7 months 95%CI 45.4-45.9, respectively). The overall mortality hazard after HF remained significantly higher among BGLD users, even after adjustment for all confounders (HR 1.08, 95%CI 1.03-1.14, p=0.002).

Conclusion: There is a strong relationship between oral anti-diabetic medications and HF and increased risk of post-hip fracture mortality among T2DM patients. These results need confirmation from other studies.

P1164
THE ROLE OF ULTRASOUND IN DETECTING SUBCLINICAL INFLAMMATORY CHANGES IN PSORIATIC ARTHRITIS: A STUDY GROUP

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Objective: Psoriatic arthritis (PsA) is a chronic inflammatory disease, part of the spondylarthritis group, usually involving peripheral joints, associated with cutaneous psoriasis, in the absence of rheumatoid factor and anti-citrullinated protein antibodies [1, 2]. The purpose of our study was to evaluate the utility of ultrasound in evaluating hand joints and tendons in a group of patients with PsA.

Methods: The study included 28 patients diagnosed with psoriatic arthritis according to CASPAR criteria. Mandatory criteria for inclusion in the study was considered the presence of pain or swelling of the small joints of the hands and wrists. The patients were evaluated through clinical examination, laboratory tests and musculoskeletal ultrasound (MUS).

Results: The study included 28 patients with a mean age of 52.5 y and male to female ratio 8:20 with polyarticular disease (60.71%), oligoarticular disease (28.57%), arthritis mutilans (7.16%) and distal interphalangeal joint involvement (3.57%). All the patients were undergoing treatment with synthetic disease modifying drugs such as methotrexate, leflunomide and sulphasalazine. We examined a total of 840 joints from both clinical and MUS point of view. The clinical examination revealed 3.80% swollen joints and 7.02% tender joints. Dactylitis was encountered in 8.33% of examined digits. MUS provided information regarding subclinical inflammation of the joints such as grade 1 synovitis (3.7%), grade 2 synovitis (87.03%) and grade 3 synovitis (9.25%). Dactylitis of the third digit was the most frequently encountered, 5.71% of examined fingers presenting subcutaneous tissue edema, joint effusion/synovial proliferation and tenosynovitis. Regarding the presence of tenosynovitis, the flexor tendons of the fingers, followed by the extensor carpi ulnaris and flexor carpi radialis tendons were the most commonly affected.

Conclusion: Ultrasound has proven its utility in assessing joint and tendon inflammation to a higher extent that clinically expected [3]. Thus, MUS examination of hand joints may aid the clinician in diagnosing PsA, in evaluating the prognosis and the course of treatment.

References:

1. Bumbea AM et al. Farmacia 2017;65:917.
2. Braila AD et al. Rev Chim (Bucharest) 2018;69:2300.
3. Musetescu AE et al. Rev Chim (Bucharest) 2018;69:971.

P1165
THE IMPACT OF VERTEBRAL FRACTURES ON HEALTH RELATED QUALITY OF LIFE IN OSTEOPOROTIC PATIENTS ATTENDING A BONE HEATH SERVICE

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Objective: Vertebral fractures are a common complication of osteoporosis and are associated with back pain and functional impairment, which can influence mood and lead to depression. This can have a negative impact on patient health related quality of life (HRQOL). We investigated the effect of vertebral fractures on HRQOL in osteoporotic patients.

Methods: A cross-sectional study was carried out amongst consecutive patients attending a bone health service for osteoporosis assessment between June 2018 and August 2019. 165 patients with vertebral fractures and 167 patients with no vertebral fractures were included. All patients completed the Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO) on first attendance. Each patient received a DXA. Vertebral fractures were diagnosed by a lateral vertebral assessment (LVA). The QUALEFFO is a disease specific HRQOL questionnaire targeting fracture assessment specific to patients with vertebral fractures. It comprises 41 questions in 5 domains: pain; physical function; social function; general health perception and mental function.

Results: 332 community dwelling osteoporotic patients attending a bone health and osteoporosis clinic were included. 7:1 female to male ratio. Mean age 70 y (range 31-92). 81% patients had previous fractures with 58% of these taking bone health medication on presentation. 26% were on calcium and vitamin D only while 16% were treatment naive.

Patients with vertebral fractures were older (73 y vs. 67 y), had higher QUALEFFO scores in all domains and reported more pain (p=0.001) and reduced Activities of Daily Living (ADLs) (p=0.003). They were significantly less mobile (p<0.05), were more socially isolated and reported a significant reduction in perceived general health (p=0.01).

Conclusion: Our results support previous findings that HRQOL is significantly decreased in patients **wit**h vertebral fractures. It highlights the importance of preventing, diagnosing and treating vertebral fractures to reduce their negative impact on HRQOL.

P1166
ENTHESEAL AND PERIPHERAL JOINT INVOLVEMENT IN REACTIVE ARTHRITIS: AN ULTRASOUND STUDY

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Objective: Reactive arthritis (ReA) is part of the spondylarthritis group and usually occurs within 4 weeks after an infection with germs that are found on mucosal surfaces, especially urogenital or enteral infections [1, 2]. It is usually a sterile, asymmetric mono or oligoarthritis that predominantly involves the joints of the lower limbs [3]. The purpose of this study is to determine the role of musculoskeletal ultrasonography (MUS) in evaluating joint and entheses in patients with reactive arthritis (RA).

Methods: The study included 10 patients with RA who were evaluated clinically, biologically and ultrasonographically using a MyLab25 ™ Gold ultrasound equipped with a linear probe with frequencies between 6-18 MHz.

Results: The study group included 10 patients (6 men, 4 women) with a mean age of 34.5 y. Depending on the etiologic agent involved in the pathogenesis of ReA, 50% patients presented with infections with enteral tropism and 50% patients with infections of the genitourinary tract. The type of joint disease was determined from a clinical and ultrasonographic point of view, the patients presented with monoarthritis (30%), oligoarthritis (50%) and polyarthritis (20%). Inflammatory changes such as joint effusion / synovial proliferation were detected ultrasonographically at the knee, ankle, wrist, metacarpophalangeal, metatarsophalangeal and interphalangeal proximal joints in 75% of patients. Regarding tendon pathology, tenosynovitis/tendinitis/enthesitis were observed in 65% of patients, most commonly in the Achilles tendon (35%), followed by the tibialis posterior tendon (30%) and peroneal tendon (25%). MUS has proven to be useful in highlighting subclinical inflammatory changes, leading to an increase of 27% in the detection of joints involved in the inflammatory process.

Conclusion: Entheseal involvement is a feature of the spondylarthritis group, thus being encountered in patients with ReA. Enthesitis detected in 33-58% of patients with ReA and sometimes may be the only manifestation in patients whose disease was triggered by an enteral infection. MUS has proven useful in highlighting subclinical inflammation in the studied group.

References:

1. Bumbea AM et al. Farmacia 2017;65:917.

2. Musetescu AE et al. Rom J Morphol Embryol 2017;58:801.

3. Braila AD et al. Rev Chim (Bucharest) 2018;69:1558.

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P1167
ENTHESEAL AND JOINT INVOLVEMENT IN A GROUP OF PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Objective: Enteropathic arthritis is a subgroup of the spondylarthritis group, with peripheral but also axial joint involvement such as spondylitis and sacroiliitis [1], associated with inflammatory bowel disease (Crohn's disease (CD) and ulcerative colitis (UC)) [2, 3].The purpose of this study was evaluate the type of joint involvement in a small group of patients with inflammatory bowel disease (IBD).

Methods: The patients included in the study were evaluated both clinically and ultrasonographically using a MyLab25 ™ Gold ultrasound equipped with a linear probe with frequencies between 6-18 MHz. Laboratory tests were also performed including markers of the inflammatory syndrome.

Results: The group included 6 patients with IBD, either ulcerative colitis or Crohn's disease and peripheral joint involvement, diagnosed with enteropathic arthritis, aged between 20-42 y, with an average age of 26.75 y. Regarding the type of joint disease, 5 patients were diagnosed with type I, and 1 patient with type II. From the clinical point of view, the following joints were painful during mobilization and/or presented swelling knee joint (25%), coxofemoral joint (8.3%), tibiotarsal joint (16.66%), radiocarpal joint (16.33%) and metacarpophalageal joint (16.66%). The ultrasound examination of the hip, knee, ankle and small joints od the hands revealed grade 1 synovial proliferation (SP) of 1 ankle, grade 2 SP of 1 hip and ankle, 2 knees, radiocarpal and metacarpophalangeal joints and grade 3 SP in 1 metacarpophalageal joint. Joint effusion was detected in the knee and metacarpophalangeal joints. The enthesitis/entesopathy type changes were detected at the level of the Achilles, patellar, quadriceps tendon and at the level of the plantar fascia, MUS highlighting thickened tendons, hypoehcogenicity with loss of fibrillary aspect and/or fine insertional enthesophytes at the level of 4 tendons.

Conclusion: Musculoskeletal impairment is a major concern in patients with IBD, as it increases disability and worsens the quality of life. However, its prevalence is often underestimated due to the oligoarticular involvement of the joints, in most cases transient or the use of chronic corticosteroid treatment [3]. Ultrasonography is a valid tool for detecting articular and tendon involvement in patients with various rheumatic disorders. It is more sensitive than clinical examination in terms of revealing synovitis and enthesitis and can detect pathological changes even in the absence of clinical symptoms.

References:
1. Bumbea AM et al. Farmacia 2017;65:917.
2. Braila AD et al. Rev Chim (Bucharest) 2018;69:2300.
3. Musetescu AE et al. Rev Chim (Bucharest) 2018;69:971.

P1168
THE ROLE OF ENTHESEAL ULTRASONOGRAPHIC SCORES IN THE EVALUATION OF PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: Ankylosing spondylitis (AS) is a chronic inflammatory disease that is part of the spondylarthritis group, characterized by axial skeleton (spine, sacroiliac joints), entheses and peripheral joints involvement [1,2], which frequently associate extra-articular ocular, cardiac, neurological, pulmonary and renal manifestations in the presence of HLA-B27 antigen [3]. The purpose of our study is to identify enthesitis in a group of patients with AS both from a clinical and ultrasonographic point of view, but also to establish the associations between the clinical activity, ultrasonographic activity and the markers of the inflammatory syndrome.

Methods: The patients were evaluated clinically, biologically, but also ultrasonographically using a MyLab25 ™ Gold ultrasound equipped with a linear probe with frequencies between 6-18 MHz. We calculated the global activity scores such as Ankylosing Spondylitis Disease Activity Score (ASDAS) and Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and also the entheseal evaluation scores Belgrade Ultrasound Enthesitis Score (BUSES) and Spondylarthritis Research Consortium of Canada Enthesitis Index (SPARCC).

Results: The study group included 30 patients, 23 men and 7 women, with an average age of 38.36 y. According to the disease activity calculated using ASDAS, the patients were divided as follows: remission (0 patients), moderate activity (3 patients), high activity (2 patients) and very high activity (25 patients). The mean values of BASDAI were 7.46. Among the analyzed parameters, VSH and CRP values were considered of great importance for the evaluation of the global disease activity. Thus, the average values of VSH and CRP were 44.63 mm/h and 21.90 mg/l, respectively. The VSH and CRP values did not show a statistically significant association with SPARCC (p=0.619, respectively p=0.0137) and BUSES (p=0.200, respectively p=0.102). The BUSES score did not show a statistically significant association with ASDAS (p=0.738) and BASDAI (p=0.094). The SPARCC clinical score was not statistically associated with ASDAS (p=0.434) and BASDAI (p=0.130). SPARCC and BUSES scores presented a statistically significant association (p=0.018).

Conclusion: The identification of a pattern of joint involvement, as well as the use of standardized scores for monitoring the activity of the disease, is considered a fundamental element in order to group the patients according to disease activity and to initiate a treatment that induces clinical, biological and ultrasonographic remission. Studying the association between the activity of the disease and the entheseal scores is of great importance in order to establish the therapeutic conduct and prognosis of the disease.

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2. Braila AD et al. Rev Chim (Bucharest), 2018;69:2300.
3. Musetescu AE et al. Rev Chim (Bucharest) 2018;69:971.

P1169
AMONG WOMEN IN THEIR MID-THIRTIES PREGNANCY AND BREASTFEEDING DO NOT ADVERSELY AFFECT BMD

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Objective: In this study of young adult women our aims were i) to describe BMD and the association with pregnancy and duration of breast-feeding; *ii)* to determine post-partum BMD recovery at this age.

Methods: Of the population based PEAK-25 cohort (n=1061, age 25.5±0.2) 93% were nulliparous at study entry and most had at least one pregnancy by age 35. Femoral neck and spine BMD was available at both 25 and 35 y of age for n=795 women. Number of pregnancies was collected and breast-feeding duration categorized as; 1-6, 7-15 or >15 months. We analysed BMD and rate of BMD change (adjusted for physical activity, BMI, alcohol, smoking).

Results: By age 35, 618 women (77.7%) had a total of 1137 pregnancies (max 4), of which 96% reported breastfeeding (median accumulated duration 12 months). Compared to nulliparous women, BMD was higher at the femoral neck (p_{adj}=0.039) and spine (p_{adj}=0.003) in those with at least one pregnancy. BMD was not significantly different with breast-feeding duration; but women breastfeeding for >15 months had higher rate of loss at the femoral neck.

	1. Nulliparous (n=177)	2. Completed Pregnancy and Breastfed (n=594)	Duration of Breast-Feeding 3. 1-6m (n=121)	4. 7-15m (n=257)	5. >15m (n=216)	ANOVA p-adj (3 v 4 v 5)
Fem Neck BMD	1.013 (0.135)	1.015 (0.122)	1.021 (0.121)	1.012 (0.126)	1.016 (0.119)	0.267
Spine BMD	1.229 (0.154)	1.256 (0.137)	1.250 (0.140)	1.252 (0.139)	1.264 (0.133)	0.007
Fem Neck Change	-0.327 (0.539)	-0.344 (0.627)	-0.188 (0.530)	-0.337 (0.528)	-0.440 (0.759)	0.004
Spine Change	0.067 (0.517)	0.091 (0.461)	0.175 (0.494)	0.091 (0.462)	0.045 (0.436)	0.062

Conclusion: Despite the physiological demands on the skeleton from the nutritional demands of the foetus and neonate, in healthy, young northern European women with assumed calcium sufficiency, there appears to no adverse effects from pregnancy and breastfeeding; with an overall positive effect on skeletal health at the spine.

P1170
LOW ESTRADIOL AND HIGH LUTEINIZING HORMONE IN YOUNGER MEN WITH DISTAL RADIUS FRACTURE

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Objective: We have previously shown that men with distal radius fracture (DRF) are at higher risk of low BMD and osteoporosis. Most interestingly, we found that even young men had lower BMD compared to controls; a difference that was attenuated with age indicating an accelerated bone loss in men with DRF. The aim of this study was to investigate determinants underlying this observation, specifically the sex steroid hormone profile in younger men.

Methods: We performed a case-control study of 73 men with DRF (mean age 38±9; range 20-51); comparing to 194 age-matched, population controls. BMD was measured at the femoral neck, total hip and lumbar spine. Total testosterone (TT), calculated free testosterone (CfT), luteinizing hormone (LH), follicle stimulating hormone (FSH), sex hormone binding globulin (SHBG), total estradiol (E2) were assayed and E2/SHBG-ratio calculated. E2 level below 73 pmol/l was defined as 'low', since levels below this cut-off value are associated with accelerated bone loss. Using regression analysis, data was adjusted as appropriate for age, BMI and smoking.

Results: Compared to controls, men with DRF had lower femoral neck BMD (1.009 vs. 1.050 g/cm^{2}, p=0.034) and a higher proportion had T-score <-2.5 at one or more skeletal sites (6/74 vs. 2/194, p=0.002). Fracture cases had lower cFT (298 vs. 329 pmol/l; p=0.008) but not TT, compared to controls. FSH and SHBG were not statistically different. LH was almost 30% higher (5.7 vs. 4.5 IU/l; p<0.001) and a tendency towards lower E2 (80.0 vs. 87.1, p=0.098) was observed. Men with DRF had lower E2/SHBG ratio compared to controls (2.3 vs. 2.9, p=0.013). A higher proportion of the fracture group had low E2 (48% vs. 35%, p=0.044); odds ratio for fracture when having low E2 was 1.7 (95%CI 0.960-2.962).

Conclusion: Altered sex hormone profiles, with lower free testosterone and estradiol, may contribute to the pathogenesis of the lower BMD observed in younger men with DRF. Estradiol is a strong determinant of bone mass and the results suggest that as part of secondary fracture prevention management for men, assessment of sex hormones could be useful.

P1171
KNEE PAIN IN YOUNG WOMEN IS ASSOCIATED WITH LOWER MUSCLE STRENGTH AND MASS AND INCREASED ADIPOSITY

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Objective: Knee pain may be an early indicator of detrimental long-term effects for musculoskeletal health. In this longitudinal study, we investigated the association between body composition, muscle strength and knee pain in young adult women.

Methods: The population based PEAK-25 cohort comprises 1061 women, age 25.5±0.2 at inclusion; reassessed after 10 y. Information on knee pain was collected through a questionnaire based on the American College of Rheumatology criteria for clinical diagnosis of knee OA [1]. Isokinetic muscle strength in the knee extensors/flexors was measured with a Biodex dynamometer (concentric peak torque velocity 60°/s); presented as body weight adjusted strength (%). Body composition (lean mass, fat mass) for total body and legs was measured by DXA. The analyses below use data from 794 women who attended both visits.

Results: At 10-y follow-up 260 (33%) reported knee pain and knee-related functional problems during the previous month, while the proportion that were sedentary/physically active were similar in those with/without pain. The women with knee pain also reported that everyday activities (72%) and sport/leisure activities (83%) were affected. Knee strength was lower in the knee pain group, reflected by a concomitant lower thigh muscle mass and overall higher weight and total body fat.

	With Knee Pain n=260		Without Knee Pain n=534		P
Weight adjusted muscle strength					
Knee extension (%)	184.9	(39)	196.8	(34.8)	<0.001
Knee flexors (%)	96.5	(23.1)	100.9	(21.8)	0.011
Body composition					
Weight (kg)	72.2	(15)	67.8	(12)	<0.001
Fat mass - body (%)	34.7	(8.1)	33.2	(6.6)	<0.001
Lean mass - body (%)	61.5	(7.8)	62.8	(6.4)	<0.035
Lean mass - Legs (%)	20.6	(2.2)	21.0	(1.9)	0.015

Values are mean(SD)

Conclusion: We found a clear association between muscle strength, body composition and knee pain already in young adulthood. Given that concentric thigh muscle strength declines from the fourth decade, preserving muscle strength through targeted exercise may be an important component for continued mobility and musculoskeletal function.

Reference: 1. Peat G et al. Ann Rheum Dis 2006;65:1363.

P1172
RHEUMATOID ARTHRITIS, CORTICOTHERAPY, TREATED MULTIPLE MYELOMA AND PREMATURE MENOPAUSE IN ONE PATIENT: HOW ABOUT BONE MINERAL DENSITY?

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Objective: Secondary osteoporosis is a common condition for patients with systemic pathology correlated with bone loss like corticotherapy, hyperprolactinemia, rheumatologic conditions. (1,2) In cases with remitted multiple myeloma a bone loss is consecutive to the disorder itself.

Methods: This is a case report. Bone was evaluated by central DXA and plan radiography. Phospho-calcic metabolism assay including bone turnover was performed. The informed consent was obtained.

Case data: A 40-year-old female patient was admitted for evaluation 10 y after menopause (she did not receive estrogens therapy). Her medical history revealed chronic prednisone treatment for seropositive rheumatoid arthritis, multiple myeloma (which is currently in remission), arterial hypertension and pulmonary fibrosis. DXA showed decreased BMD of 0.789 g/cm^2 with a T-score of -3.4 SD measured at lumbar spine L3-L4. The biochemical and hormonal profile revealed ionized calcium of 1.1 mmol/L (normal: 1-1.30 mmol/L), alkaline phosphatase of 146 U/L (normal: 30-120 U/L), 25-hydroxyvitamin D of 20.8 ng/mL (normal: 30-120 ng/mL), PTH of 25.2 pg/mL (normal: 11-67 pg/mL), as well as normal ß-CrossLaps and osteocalcin. The myeloma was considered in remission based on oncologic evaluation. X-ray of the spine showed vertebral fractures at thoracic T4-T8 and T12 vertebras. Therapy with risedronate 75 mg, 2 oral doses per month and vitamin D 2000 UI daily was introduced. A year later a was operated for perforated peptic ulcer. BMD of 0.778 g/cm^2 with a T-score of -3.5 SD was measured at lumbar spine L3-L4. One year injection with zoledronic acid vitamin D was recommended with a mild improvement of BMD of 0.796 g/cm^2 with a L3-4T-score of -3.4 SD measured at spine L3-L4.

Conclusion: The combination of multiple risk factors and complex systemic pathology is a real challenge in choosing the optimal therapy for osteoporosis. In the case of contraindications for oral therapy injectable osteoporosis drugs represent the therapy of choice. Therapy for osteoporosis in this case was challenging. Also, the differential diagnosis with multiple myeloma needs to be done at diagnosis of osteoporosis and during years of follow-up.

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2. Poiana C et al. Maturitas 2009;62:98.

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P1173
ASSESSMENT OF OSTEOPOROSIS IN PATIENTS WITH TYPE 2 DIABETES

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Objective: Type 2 diabetes mellitus is a chronic multisystem pathology associated with increased fracture risk [1,2]. Individuals with diabetes show a higher BMD, they have a higher risk of fractures than the general population [3]. The purpose of this study is to assess the BMD in patients with type 2 diabetes.

Methods: The study included 24 patients with mean age of 54.3 y and female to male ratio of 19:5 diagnosed with type 2 diabetes treated either with insulin or with oral antidiabetic medication. We evaluated the patients through clinical examination and laboratory tests including serum glucose levels and measured BMD of the lumbar spine and hip using DXA scanner.

Results: 20.83% of patients had previous fractures either at the forearm, hip or spine levels. Serum glucose levels were within normal range in 76% of patients. Vitamin D deficiency was present in 68% of patients with nearly equal distribution in males and females (44% vs. 44%). Osteoporosis defined by T-score ≤ −2.5 SD at spine and/or hip was seen in 48.56% cases, predominantly higher in females than in males (40% vs. 28%). Osteoporosis assessed at the spine level was present in 33.3% of cases, while at hip level the values were predominantly of osteopenia (37.5%). Furthermore, osteoporosis at the spine level was more frequent in women than in men (29.16% vs. 4.14%).

Conclusion: Type 2 diabetes seems to increase the risk of fractures although BMD values tend to be more elevated than in the general population maybe due to distinct bone quality in diabetic patients.

References:

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2. Braila AD et al. Rev Chim (Bucharest) 2018;69:1558.

3. Musetescu AE et al. Rev Chim (Bucharest) 2018;69:971.

P1174
THE STRONGER AT HOME STUDY: A FEASIBILITY RANDOMIZED CONTROLLED TRIAL OF HOMEBASED PHYSIOTHERAPY PROGRAM FOR PATIENTS AFTER HIP FRACTURES

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Objective: To test the feasibility of a 12-week, homebased rehabilitation program (the Stronger at Home) vs. the standard care for community-dwelling older adults with hip fractures.

Methods: We recruited community-dwelling hip fracture patients (≥65 y) in a parallel, two-group, single-blind randomized clinical trial while they were in an inpatient rehabilitation institution and followed them for 18 weeks after discharge (~6 months postfracture on average). The intervention group received an educational toolkit with an individualized exercise program for the 12 weeks after returning home. Additionally, the intervention group received seven home visits by a physical therapist and/or physiotherapy assistant, which also included pain management education tailored to the patient's needs. Participants were asked to exercise according to the individualized program five times per week for 20-30 min. The control group received the usual care provided by the healthcare system. We collected feasibility data, including recruitment rate, intervention compliance rate and adverse events. The compliance rate and adverse events were measured with a participant self-reporting tracking calendar that the team collected biweekly. The primary functional outcome measure was the Lower Extremity Functional Scale (LEFS). Blind assessments of both groups were conducted at 6, 12, and 18 weeks post discharge to home to evaluate patients' health outcomes.

Results: 30 participants took part in this study (mean age is 82.6 y [SD:9]). The study recruitment rate was 45% of eligible patients and the compliance rate to the exercise program was 81%. The vast majority (93%) of participants reported high satisfaction with the intervention. No significant adverse events have been reported. Further, intervention effectiveness seemed promising with clinically important improvement in the LEFS at the 6-, 12, and 18-week assessments in the intervention group compared to the control group.

Conclusion: The Stronger at Home Program appears to be feasible, safe and highly satisfactory for hip fracture patients after they return home and shows a promise to improve functional outcomes. The next step is to conduct a full-scale trial.

P1175
MULTIDISCIPLINARY THERAPEUTIC MANAGEMENT OF PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: Ankylosing spondylitis (AS) is a complex pathology which requires an extensive clinical, biological and imaging evaluation [1,2], a multidisciplinary approach and both pharmacological and non-pharmacological treatment in order to improve the quality of life and range of movement of the patients [3]. The purpose of the current study is to assess the disease activity of patients diagnosed with AS before and after nonpharmacological treatment.

Methods: Our study included a number of 30 patients, 23 males and 7 females, with minimum age of 17 y, maximum age of 57 y, mean age of 38.36 y and mean disease duration of 6.7 y. Rehabilitation treatment was recommended to all the patients, especially to those with a predominantly axial form of AS. The

therapeutic protocol was performed either individually by the patient or in classes guided by a physical therapist, 3 times per week for 1 hour over a period of 3 months.

Results: The patients had either the axial form of AS (17%), peripheral form of AS (23%) or both axial and peripheral joint involvement (60%). Disease activity calculated using ASDAS-CRP was within moderate range in 10% of patients, high range in 7% of cases and very high range in 83% of the patients. BASDAI mean values were 7.46, with a minimum value of 1.6 and a maximum value of 9.7. The minimum registered value of BASFI was 1.8, maximum value was 9.2, with a mean value of 7.52. The patients were reassessed after 3 months of treatment with NSAIDs, DMARDs and physical therapy. Disease activity scores and functional indices were reevaluated, ASDAS mean values being 3.87 in contrast with 4.51 before treatment. BASDAI mean values were 6.95, with minimum and maximum values of 1.4 and 8.5, respectively. BASFI recalculated values had a minimum and maximum of 1.6 and 8.2, respectively, with a mean value of 6.8. BASFI individual and mean values decreased significantly after the 3 months of combined treatment, from a mean value of 7.52 to 6.8, minimum and maximum values also decreasing from 1.8 to 1.6 and from 9.2 to 8.2, respectively.

Conclusion: The multidisciplinary approach of patients with ankylosing spondylitis is of great importance, long and short-term studies demonstrating that both pharmacological and non-pharmacological therapies have a beneficial effect on the quality of life of AS patients.

References:

1. Braila AD et al. Rev Chim (Bucharest) 2018;69:1558.

2. Musetescu AE et al. Rev Chim (Bucharest) 2018;69:971.

3. Florescu LM et al. Rom J Morphol Embryol 2018;59:297.

P1176
CLINICAL, RADIOLOGICAL AND ULTRASOUND FINDINGS IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: Osteoarthritis is one of the most frequent medical conditions in elderly patients, pain being the most common symptom [1,2]. There are multiple methods of assessing disease severity in this particular group of patients such as clinical examination, conventional radiographs (x-rays) and musculoskeletal ultrasound (MUS).

Methods: The study included 35 patients with mean age of 65.2 y and a female to male ratio of 16:19. The mandatory criteria for inclusion in the study were the presence of mechanical joint paint lasting for more than 4 weeks. The patients underwent clinical evaluation, laboratory tests, MUS examinations and plain x-rays of the knees. MUS scans of the knee joints were performed using a MyLab25Gold machine with a multi-frequency array probe.

Results: Anamnestic features showed pain at walking in 85.71% of patients, difficulty at stair climbing in 71.42% of cases, pain at lying and standing in 28.57% and 42.85% of patients, respectively. Clinical examination of painful joints revealed tenderness at palpation in 88.57% of patients. Limited flexion and extension of the knees were frequent in 60% and 48.57% of cases, respectively. Swelling and local heat were detected in 31.42% of patients. Conventional x-rays revealed joint space narrowing (82.85%), subchondral sclerosis (65.71%), marginal osteophytes (51.42%) and altered shape of the femoral condyles (25.71%) and of the tibial plateau (28.57%). MUS showed joint effusion in the suprapatellar recess (45.71%), synovial proliferation (20%), medial and lateral osteophytes (57.14%) and meniscus protrusion (31.42%).

Conclusion: Conventional radiographs and musculoskeletal ultrasound add value to the evaluation of patients with knee osteoarthritis, revealing the underlying causes of pain in this group of patients, also allowing a better therapeutic approach of the patients with degenerative articular disease [3].

References:

1. Dinescu SC et al. Rom J Morphol Embryol 2017;58:409.

2. Braila AD et al. Rev Chim (Bucharest) 2018;69:1558.

3. Musetescu AE et al. Rev Chim (Bucharest) 2018;69:971.

P1177
LOKELMA: A NEWLY IDENTIFIED DXA CONFOUNDER

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Radio-dense artifact alters DXA results. Recently a DXA technologist noted an apparent diffuse artifact suggestive of contrast material on a spine scan. No recent radiographic procedures were performed, however the patient reported taking Lokelma 10g 1 hour before scanning. This is sodium zirconium cyclosilicate, a potassium-binding agent marketed to treat hyperkalemia in 2019. The European Medicines Agency noted *"Sodium zirconium cyclosilicate may be opaque to X-rays."* Given the chemical structure, we hypothesized that Lokelma may alter DXA results. The purpose of this study was to evaluate if Lokelma affects DXA results using an encapsulated spine and a total body phantom.

An encapsulated spine phantom and total body phantom (BioClinica) were placed on a Lunar iDXA scanner and not repositioned throughout the study. Phantoms were scanned 5 times serially in 5 configurations: a) Bare, b) Sealable plastic quart bag with 45mL of tap water, c) Sealable bag with 90mL water, d) 10g Lokelma in 45mL of water and e) 30g Lokelma in 90mL of water. Bags were folded and placed over L2-3 on the spine phantom and placed flat over the pelvis/torso of total body. The 30g dose was selected to represent 3 days treatment as this medication is not metabolized and this represents GI transit time.

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Mean L1-4 spine phantom BMD=1.077 g/cm^2 and the total body phantom mass=17kg. Tap water did not change BMD, BMC or area spine phantom measurements, but did increase (p<0.05) total body phantom lean mass; 52g and 107g with 45mL and 90mL respectively. With either 10g or 30g of Lokelma, there was an 18-110% increase (p<0.001) in L2 & L3 BMD, mean +0.295 and +0.924 g/cm^2 respectively. There was a statistical (p<0.05) but non-clinical difference in L1 & L4 BMD, <0.010 g/cm^2 with either dose. The L1-4 BMD increased (p<0.001) 14% with 10g and 43% with 30g Lokelma. There was a dose-dependent change (p<0.001) in total body phantom trunk BMC, fat and lean mass. The 10g dose increased BMC and lean mass by 1.0% and 16.8% respectively and reduced fat mass -16.6%, while 30g increased BMC 9.0%, lean 42.0% and decreased fat -42.9%.

Lokelma results in incorrect BMD and body composition measurements of phantoms. It is likely, but not validated by this study, that Lokelma affects DXA results in humans. As such, spine and total body DXA measurement in patients using Lokelma is contraindicated.

P1178
THE EFFECTS OF SHOCKWAVE THERAPY IN PATIENTS WITH CALCIFIC TENDINITIS OF THE SHOULDER

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Objective: Shockwave therapy (SWT), a noninvasive method of treatment, has multiple beneficial effects on reducing pain, improving range of motion and quality of life in patients with different pathologies such as calcific tendinitis, plantar fasciitis and epicondylitis [1,2]. Calcific tendinitis of the shoulder is an acute or chronic painful condition due to the presence of calcific deposits, usually hydroxyapatite crystals, inside or around the tendons of the rotator cuff [3]. The purpose of the study was to determine the effects of SVT on pain compared to conventional physical therapy.

Methods: Our study included 20 patients with mean age of 45.5 y and male to female ratio of 8:12. Mandatory criteria for inclusion in the study was the presence of shoulder pain lasting more than one month and limited range of motion of the shoulder joint. The patients underwent clinical evaluation, laboratory tests and musculoskeletal ultrasound (MUS) examinations of the affected shoulder using a MyLab25Gold machine with a linear multi-frequency array probe. Pain was measured on the visual analogue scale (VAS). The patients were divided into two groups: the first group received SWT and the second group NSAIDs, laser and ultrasound therapy.

Results: MUS of the shoulders revealed increased thickness and hypoechogenicity of the subscapular and supraspinatus tendons in 90% of cases, calcific deposits in 85% of patients and partial tendon ruptures in 25% of cases. The patients in the first group reported a decrease in mean VAS of 57.82%, while the patients from the second group a decrease of only 31.76%. The ultrasound aspect of the tendons improved more in the first group than in the second, the calcific deposits becoming smaller in length. Both groups showed an improvement in range of motion in 75% of patients in the first group and 50% of cases in the second group.

Conclusion: SWT can be considered a noninvasive, effective and safe therapeutic procedure with low rates of complications and few therapeutic sessions are required for the desired effect. The use of SWT in calcific tendinitis of the shoulder proved superior compared to conventional physical procedures.

References:

1. Musetescu AE et al. Rev Chim (Bucharest) 2018;69:1122.

2. Florescu DN et al. Rom J Morphol Embryol 2016;57:931.

3. Musetescu AE et al. Rev Chim (Bucharest) 2018;69:971.

P1179
TENOFOVIR DISOPROXIL FUMARATE ASSOCIATED FANCONI SYNDROME IN PATIENTS FROM A HIV-ENDOCRINOLOGY CLINIC

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Objective: Tenofovir disoproxil fumarate (TDF) is a common drug used in HIV and hepatitis B patients but has been associated with Fanconi syndrome (FS). We described the characteristics of patients referred to and on follow-up in our HIV Endocrinology clinic who developed FS.

Methods: Records of all patients who were referred to the HIV Endocrinology Clinic from January 2013 to June 2019 were reviewed. Patients were included if they have hypophosphatemia, renal phosphate wasting and/or other features such as hypokalemia, normal anion gap acidosis, glycosuria, proteinuria and aminoaciduria. Parameters studied include demographics of patients, duration of TDF use, laboratory abnormalities and BMD readings.

Results: A total of 5 patients (4 male, 1 female) were identified. Their average age was 51.4 (±3.85), all were treated with TDF and the average duration of TDF use before FS was diagnosed was 33.4 months (±11.6). The lowest potassium level noted was 2.5 mmol (3.5-4.5 mmol/L) and phosphate was 0.5 mmol/L (0.8-1.4 mmol/L). TDF was discontinued with normalisation of laboratory abnormalities in all patients. BMD was measured in 3 of the 5 patients. The average BMD of the Lumbar Spine (LS) was 0.779 g/cm^2 (±0.116) and femoral neck (FN) 0.469 g/cm^2 (±0.110). In all patients, TDF was discontinued. Repeated BMD showed improvements to 1.035 g/cm^2 (±0.149) at the LS and 0.556 g/cm^2 (±0.11) after TDF was discontinued.

Conclusion: Patients on TDF have to be monitored for possible acquired FS. Laboratory abnormalities normalise and BMD readings improve after TDF was discontinued.

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P1180

CHRONIC HIP PAIN AND BMI IN OLD PATIENTS WITH HIP OSTEOARTHRITIS

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Hip osteoarthritis (OA), a long-term disease that affects especially aged and obese persons, has a medical management who is not always effective in reducing of pain. Old patients (>65 years old) with hip OA (n:59) were involved in this study. The diagnosis of OA was based on American College of Rheumatology (ACR) criteria. Demographic data, disease duration and BMI were noted. Also, the pain was evaluated using Visual analogue scale (100mm) and the results of HAQ were noted. All the patients had medication (nonsteriodal anti-inflammatory drugs), physiotherapy and kinetotherapy. Using linear regression equation, we found moderate correlation between the pain variable and BMI for obese patients (R=0.614 and R^2=0.457); a statistically significant correlation and predictivity were obtained for men patients. The relation between pain and the HAQ results evidenced a statistically significant correlation (R^2=0.611) for obese patients. As we expected, in obese patients the pain represents an important factor for hip disability and it was even more intense for men, but other factors such as hormonal dysregulation may be as important as obesity in female patients.

P1181

TREAT-TO-TARGET IN OSTEOPOROSIS: A COHORT STUDY ON THE RELATIONSHIP BETWEEN T-SCORE AND SUBSEQUENT FRACTURE RISK IN POSTMENOPAUSAL WOMEN

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Objective: BMD T-score is a key determinant of bone strength and fracture (fx) risk, suggesting that using a target BMD as a treatment goal may be appropriate in osteoporosis (OP).[1,2] Here, we use real world data to inform on the applicability of hip BMD T-score within a treat-to-target (T2T) strategy in OP.

Methods: In this retrospective cohort study, women aged ≥55 y with ≥1 hip BMD T-score measured between 01 July 2006 and 31 December 2013 at one of three Swedish OP clinics (Linköping, Malmö, Uppsala), and without Paget's disease or a malignancy, were identified. BMDs were then linked to fx and treatment data from national health registers. Cumulative incidence of clinical fx was assessed 12 and 24 months following BMD measurement. The association between T-score and fx risk was estimated using proportional hazards regression; restricted cubic splines were then added to illustrate any potential nonlinear relationship.

Results: 15,395 women with a mean (SD) age of 69.0 (8.6) y and median (IQR) hip T-score of −1.50 (1.48) were included. At 12 and 24 months respectively, cumulative incidence (95%CI) of any clinical fx was 3.73% (3.44−4.04) and 6.76% (6.37−7.16), and of nonvertebral fx was 3.12% (2.86−3.41) and 5.83% (5.47−6.21). Within both time frames, greater hip T-score was associated with lower risk of any clinical fx (hazard ratio [95%CI]=0.61 [0.57−0.66] and 0.64 [0.61−0.68]) and non-vertebral fx (0.62 [0.57−0.67] and 0.66 [0.62−0.70]). This relationship between hip T-score and fx risk was maintained when accounting for age, OP treatment status, prior fx history, and glucocorticoid use (data not shown). Similar to recent evidence from clinical trials,[1,3] the relationship appeared to plateau around a T-score of -1.5 (**Figure**).

Figure. Relationship between total hip T-score and non-vertebral fracture risk within 12 months
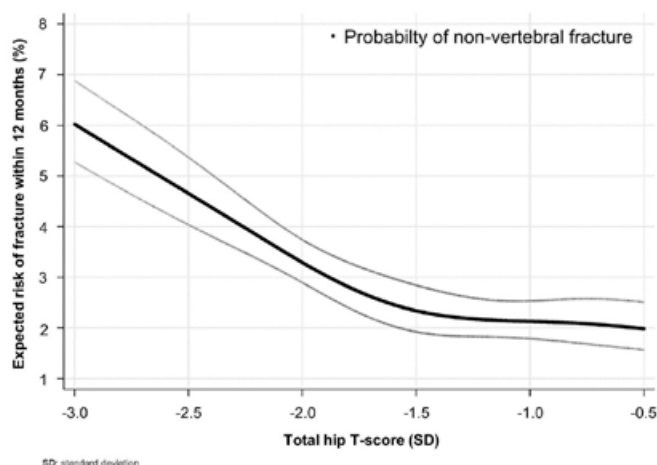
Conclusion: Hip BMD T-score is strongly associated with early fx risk in real world data, providing additional evidence which supports the potential use of hip T-score in a T2T approach for the management of patients at increased risk of fx.

References:

1. Ferrari S et al. JBMR 2019;34:1033.

2. Cummings S et al. JBMR 2016;32:3.

3. Cosman F et al. JBMR 2018;33(Suppl 1):25.

Disclosures: GO, JB: Employed by Quantify Research, a contract research organization that provides consultancy services for the pharmaceutical industry, including UCB Pharma; FL, JT, CL: Employed by and stockholders of UCB Pharma; KA: Received lecture fees from Amgen Inc., Eli Lilly, Merck and UCB Pharma; AS: Received lecture fees from Amgen Inc., Eli Lilly and Mylan

P1182
VALIDATION OF THE HUNGARIAN TRANSLATION OF SARC-F

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We aimed to assess the predictive value and the psychometric performances of the recently translated Hungarian version of the Sarc-F questionnaire. A total of 75 volunteers were enrolled in the study. Sarcopenia was diagnosed according to the algorithm proposed by the EWGSOP. To test the psychometric performance, discriminative power, internal consistency, construct validity analyses were made.

Sarcopenic subjects reported a reduced global QoL compared to non-sarcopenic individuals. Significantly (p<0.01) higher total scores for non-sarcopenic subjects compared to those of sarcopenics indicate an acceptable discriminative power of the translated questionnaire. The Cronbach's α value of 0.74 indicates a good internal consistency. Specificity, sensitivity and predictive values indicate that the Hungarian version of the Sarc-F questionnaire could be used to rapidly detect probable sarcopenia among Hungarian individuals.

P1183
LEISURE ACTIVITIES IN SARCOPENIC OSTEOPOROTIC POSTMENOPAUSAL WOMEN

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Objective: Sarcopenia is defined as progressive decrease of skeletal muscle strength and mass. In osteoporosis the density and quality of the bones are reduced. Both disorders are linked to poor quality of life.

Methods: We conducted a prospective randomized study on 138 patients hospitalized in the Medical Rehabilitation Clinical Hospital Baile Felix, Romania. They were all postmenopausal women, diagnosed with osteoporosis on the basis of the BMD values and sarcopenia using *EWGSOP* criteria. The study lot into was divided in three groups: group 1 with probable sarcopenia, group 2 with confirmed sarcopenia and group 3 with severe sarcopenia. The quality of life was assessed using the standardized, validated Romanian version of the SarQol questionnaire.

Results: 16% of patients had confirmed sarcopenia, 28% probable sarcopenia and 56% severe sarcopenia. Mean age of the cases from the probable sarcopenia group was 67.09±6.45 y. Cases with confirmed sarcopenia had a mean age of 66.5±7.09 y, while the mean age of the patients from the severe sarcopenia group was 68.17±8.94 y. The total SarQol score and each domain score are presented in Table 1.

Table 1. SarQol scores for the seven domains and total score

	D1	D2	D3	D4	D5	D6	D7	TOTAL
Probable sarcopenia n=22	52.22± 14.82	58.47± 16.3	53.47± 14.29	60.5± 13.71	47.35 ±17.8	31.75 ±25.08	81.81± 16.24	55.07± 12.77
Confirmed sarcopenia n=38	54.4 ±17.93	58.5 ±16.94	55.4 ±16.48	65.69 ±16	52.48 ±17.12	34.58 ±20.59	81.5 ±13.2	57.5 ±13.39
Severe sarcopenia n=78	57.51± 16.15	54.25± 18.69	56.93± 15.17	62.12± 14.52	49.52± 18.47	32.11± 22.07	82.89± 14.69	56.48± 12.8

`Mean value/Standard deviation

No significant differences were noted between the three groups for each domain (p>0.05).

Conclusion: The domains of SarQol questionnaire were almost equally affected in the studied patients. Leisure activities domain had the lower score and fears domain had the highest score.

P1184
EFFECTIVENESS OF STELE ORTHOSIS IN RHEUMATOID ARTHRITIS

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Objective: Lesions of the joints of the foot in patients with RA occupies one of the first places in frequency, second only to the rheumatoid wrist. The most characteristic and frequent deformation of the foot in RA is valgus deviation of the first finger, subluxation and lateralization of the second to fourth fingers, hammer-like deformations of the fingers, varus deformity of the fifth finger. Such deformations are the result of chronic arthritis of the I-V metatarsophalangeal joints against the background of progressive flatfoot and flat valgus deformity, or with a hollow foot shape [1]. The purpose of the study was to determine the effectiveness of the impact on pain, foot function and mobility restriction of patients with RA of custom-made in-foot stele orthoses in comparison with factory-made insoles.

Methods: During the 6 months under our supervision there were 76 patients (54 women and 22 men) with a diagnosis of rheumatoid arthritis, aged 52.15±5.38 y, received either custom-made insoles (G1=46 people: 36 - women, 10 - men) or factory-made standard insoles (G2=30 people: 18 - women, 12 - men). The duration of rheumatoid arthritis was no more than 1 year. 74 patients (96%) completed the protocol: 46 (100%) in G1 and 28 (94%) in G2. All patients received basic methotrexate therapy. The intensity of the pain on the VAS, the mobility restriction was measured, and the maximum walking distance were taken into account. Depending on the pathology identified, individual insoles were made both with correction of the longitudinal and transverse arches, as well as with correction of the valgus and varus position of the forefoot and hindfoot.

Results: In group G1, the pain intensity on a visual analogue scale (VAS) decreased from 6.61±0.53 to 4.01±0.36 after 120 d (P<0.05). In G2, pain decreased from 6.16±0.77 to 5.60±0.41 after 120 d (P<0.05), respectively. In all patients of the group G1, mobility restriction decreased by 32 patients (69%). In group G2, mobility improved in 14 patients (46%) The accelerated walking chronometry index improved in 70% in the G1 group, 45% in the G2 group (P <0.05). No patients experienced discomfort from the use

of insoles throughout the entire period of adaptation. Radiographs of the joints in all 76 patients did not show a deterioration in the radiological picture.

Conclusion: The manufactured individual insoles significantly reduced the pain in the participants' legs, positively influenced the functionality of the foot.

Reference: 1. Kuznetsova MI et al. Russian J Pain 2016;2:S17

P1185
PREDICTORS FOR FUNCTIONAL STATUS IN ANKYLOSING SPONDYLITIS FEMALE PATIENTS

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Objective: To evaluate the risk assessment for functional disability in female patients with ankylosing spondylitis.

Methods: We observed 27 patients with ankylosing spondylitis (AS) (14 males and 13 females) during 1 y; the mean age was 48.3±8.5 y, the age of onset was 37.9±7.8 y in males and 36±6.9 y in female and the mean disease duration 73.8 months. The patients were clinically evaluated (pain localization and intensity, joint stiffness, extra-articular manifestations) and Bath Ankylosing Spondylitis Functional Index (BASFI) were used for patients functional status assessment. The results were analysed with the medical statistics programme SPSS.

Results: The joint stiffness was almost the same as duration in male and female patients (p=0.01) while the intensity of pain showed a tendency to be higher in female (p<0.01). The functional capacity assessed by BASFI was significantly influenced by disease duration (r=0.635) and the level of pain (r=0.442) in female patients.

Conclusion: Even if there are conflicting opinions regarding the occurrence of AS in females, we can concluded: pain and duration of AS can be considered as risk factors for functional status in ankylosing spondylitis in female patients. Understanding if the gender differences influence the SA evolution may impact the treatment and future research.

P1186
LONG-TERM HYPERPROLACTINEMIA AND LARGE ADRENAL TUMOUR: BONE STATUS

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Objective: To introduce a clinical case in a young female associating low BMD for age (LBMD). Persistent hyperprolactinemia damages not only the breast and gonadal axes but also skeleton status. (1)

Methods: Case report (from an endocrine point of view)

Results: This is a 36-year-old nonsmoking female with the following medical history- 10 y ago she was diagnosed with unilateral adrenal tumour of 11 cm requiring left adrenalectomy. No endocrine data were done before surgery; histological report confirmed an adrenocortical adenoma and immunohistochemistry revealed a ki67 of 7%. She associates a small fibroadenoma which is followed by ultrasound for the last several years. Currently she has menses disturbances and a mesoprolactinoma is confirmed (a pituitary tumour of 1.1 cm); oral cabergoline was started. Mineral metabolism showed vitamin D deficiency (25 hydroxyvitamin D of 12 ng/mL, normal above 30 ng/mL), CrossLaps of 0.21 ng/mL (normal: 0.162-0.436 ng/mL), osteocalcin of 22 ng/mL (normal: 11-43 ng/mL), PTH of 62 pg/mL (normal: 15-65 pg/mL), total calcium of 9.9 mg/dL (normal:8.5-10.2 mg/dL). TSH was 0.9 µUI/mL (normal: 0.5-4.5 µUI/mL), plasma morning cortisol after Dexamethasone suppression test with adequate inhibition (below 1.8 µg/dL). Lumbar DXA (GE Lunar Prodigy) showed a Z-score <-2 SD. Vitamin D replacement was offered to the patient in addition to mentioned dopamine agonist. Further follow-up of prolactin and pituitary mass correction as well as LBMD improvement is needed.

Conclusion: No specific anti-osteoporotic drug was considered for this case since the correction of high prolactin and low 25-hydroxyvitamin D might be reflected on BMD. However, if the patient had a long term mild autonomous cortisol secretion by the adrenal tumour in addition to high prolactine the correction is to be observed. The introduction of bisphosphonates/teriparatide in women of reproduction age is limited to severe cases or with persistent secondary causes. (2)

References:

1. Poiana C et al. Maturitas 2009;62:98.

2. Radu L et al. Revista de Chimie (Buc) 2018;69:3483.

P1187
VALIDATION OF DXA BODY COMPOSITION ESTIMATED IN PEDIATRICS WITH MRI

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Objective: Body composition in children's is in constant changing, especially during puberty. There are several methods to measure body composition with high accuracy, but specifically the muscle mass is difficult to determine. The *objective* of this study was to compare the performance of lean mass (LM) measured by DXA with whole body MRI that has been appointed as the reference measure for muscle mass (MM).

Methods: Anthropometric measurements, assessment of pubertal stage with Tanner scale and total body composition by DXA (iDXA GE) and MRI: total-body skeletal-muscle, were

measured by using whole body multislice MRI. Subjects were placed on a 3.0-T scanner (Achieva 3.0T, Philips Medical Systems, Netherlands), coronal images were acquired across the whole body. Measured in 57 healthy subjects, aged 5-17 y. Values for MM by MRI and LM for DXA were compared using regression analysis. Results. The mean±standard deviation (SD) values for MM with MRI (12.78±5.47 kg) and LM by DXA (29.16±11.15 kg) were different, but there was a strong relationship between the 2 methods (R2 0.92). The intraclass correlation coefficient (ICC) was 0.863 (CI95% 0.767, 0.919). The mean difference could be explained because the LM DXA measurement take into account other tissues (i.e., visceral muscle) as lean mass in contrast with MRI that specifically measure skeletal muscle mass.

Conclusion: There is a good relationship between DXA estimation for LM and FM measurements with the MRI. The DXA consistent relationship with MRI, and their availability, place it as a tool that must be taken into account in the evaluation of pediatric subjects, including assessment in chronic disease as cancer, renal failure, metabolic abnormalities and others associated with alterations in MM.
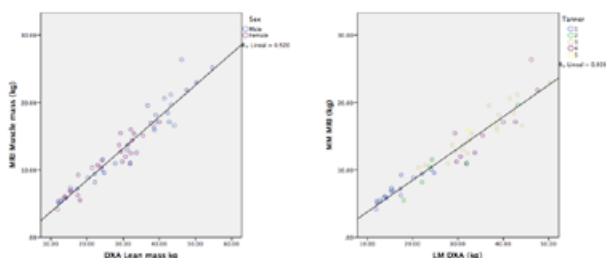
P1188
IGF-1 LEVEL AND BONE MINERAL DENSITY IN OSTEOPOROTIC POSTMENOPAUSAL SUDANESE WOMEN

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The present study was performed to investigate the role of IGF-1 in age-dependent bone loss in postmenopausal Sudanese women.

121 Sudanese women aged 45–80 y (mean age, 59.3) were enrolled in the cross-sectional study. BMD was measured at the lumbar spine and total hip by DXA, classified into three groups, osteoporotic, T-score (≥ -2.5), osteopenia, T-score (-1 to -2.5) and normal, T-score (≤ -1) as the control group. Serum levels of IGF-1 was measured by ADVIA (Siemens Healthcare Diagnostics Inc. Deerfield, IL USA). In our study, BMD at two sites as well as serum levels of IGF-1 declined with age.

According to our results Serum IGF-1 values can be used as predictor marker for determine early decreased BMD and a predictive factor for determining the risk of osteoporosis. Further study with large sample size is needed to confirm the results of our study.

P1189
SARCOPENIA IN EASTERN INDIA

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Objective: Skeletal muscles play a crucial role in humans. Sarcopenia which is a progressive geriatric disorder with an ICD -10-MC Diagnosis code is characterised by loss of skeletal muscle which results in diminished muscle strength and functional performance. This presence of this disease results in various adverse health outcomes including fracture, fall, disability, and mortality. Populations are rapidly aging and this has become a global health burden. This is particularly relevant for the Indian population which currently has 9-10% (13-14 million) of its population >60 y of age. Research in Europe (EWGSOP 2) and Asia (AWGS) have developed a consensus set of definitions and diagnostics criteria for Sarcopenia. These criteria were used to study the prevalence of Sarcopenia in the Eastern part of India.

Methods: A community-based prospective cohort study was conducted which included 960 older Indian adults aged ≥60 y. Muscle strength (Jamar hand held dynamometer) was used to assess probable sarcopenia, muscle mass (Boer's equation, skin fold measure, calf circumference) to confirm, and physical performance (SPPB) was used to measure the severity of the disease. Since cut-off values for each variable is affected by ethnicity, body size, lifestyle and culture, normative references for these were derived from healthy young adults from a similar background.

Results: 61% of the participants were females. The mean age for males was 70 (± 6.5) y, and 68 (±8.2) y for females. The prevalence of probable sarcopenia was calculated as 58% in males and 63% in females using the tailored cut-off values for muscle strength.

Conclusion: In this study, the estimated prevalence of Sarcopenia is much higher than that reported in studies from other parts of the world including Asia. The normative cut-off values too, were much lower compared to the cut-off values of other population groups. It is apparent that the choice of tools as well as the cut-offs have a significant effect on the prevalence of sarcopenia. The results have serious implications on various health issues of a nation which has the world's second largest population. This study indicates the urgent need to study sarcopenia in different parts of India to develop preventive health programs to counter the effects of sarcopenia and its association with other diseases.

P1190
3D SHAPER EVALUATION IN NORMO AND HYPERCALCEMIC PRIMARY HYPERPARATHYROIDISM

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Objective: Patients with elevated PTH and consistently normal serum calcium levels, without secondary causes of hyperparathyroidism, may represent the earliest presentation of primary hyperparathyroidism (PHP). But, it has been reported, however, that they can already have bone, renal and/or cardiovascular disorders and it would represent a new entity. Aim was to evaluate cortical and trabecular parameters differences in hip architecture in normo and hypercalcemic patients with PHP before surgery. In both groups evaluate those one year after parathyroidectomy.

Methods: We evaluated 31 patients age 66.6 y. (27.0-80.7) 29 women (2 premenopausal) and 2 males. Menopause age (MA) was 52 (37-56). Hypercalcemic (HC) 18. Normocalcemic (NC) 13, Hip with the lowest value in T-score was taken to compare DXA (Lunar Prodigy Advance) and cortical and trabecular parameters were assessed by 3D Shaper software (Galgo Medical). We included only results obtained at Total hip. Statistical: t-test and Paired t-test

Results: Calcemia differs significantly in HC vs. NC 10.9±0.56 vs. 9.82±0.33 p<0.0001. No differences were observed between HC and NC in age, MA, weight and size and DXA or 3D parameters Table1.

Table 1

Pre CX Total Hip	HC (18)	NC (13)	P
vBMD Trab. (mg/cm^3)	141.9 ±31.3	138.7±38.2	NS
sDens (mg/cm^2)	140.6±21.7	138.7±38.2	NS
Cort. Thickness (mm)	1.884±0.17	1.850±0.13	NS
BMD (mg/cm^2)	0.870±0.140	0.850±0.140	NS

The 11 parathyroidectomized patients (9 of them hypercalcemic, had higher values of presurgical parameters) experienced a significant improvement in TH g/cm^2 0.9058±0.135 vs. 0.9223±0.122 P: 0.015, and some 3D shaper measurements Table 2.

Table 2

Post Cx. Total Hip	PRE	POS	P
vBMD Trab. (mg/cm^3)	157.19±33.4	160.52±35.0	0.006
sDens (mg/cm^2)	149.32±22.6	153.2 ±19.7	0.035
BMD (mg/cm^2)	0.906±0.135	0.922±0.122	0.015

Conclusion: The normocalcemic PHP presents alterations in the architecture estimated on 3D shaper methodology similar to the hypercalcemic patients. Although all bone mass parameters evaluated improved postsurgery, the trabecular bone mass (as vBMD) showed a greater increase.

P1191
CLARIFYING THE DISABILITY-FRAILTY PARADOX IN OCTOGENARIANS: A LOGISTIC REGRESSION

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Objective: Early detection of frailty is necessary to prevent adverse outcomes such as hospitalization, falls, and early death. Relating frailty, and its many operationalizations, to disability is complex. Disability is most seen as a negative health outcome of frailty, although limitations in complex activities of daily living (ADLs) might be precursors of frailty. Therefore, a logistic analysis was applied aiming to investigate whether disability (activity limitations and participation restrictions) is associated with prefrailty.

Methods: Robust (Fried 0/4; n=214; M_{age}=82.3y (SD±2.1))) and prefrail (Fried 1-2/4; n=191; M_{age}=83.8y (SD±3.2))) community-dwelling octogenarians were included in The Brussels Study on The Early Predictors of Frailty (BUTTERFLY). Frailty marks were obtained from weight loss, exhaustion, gait speed, and grip strength according to the physical phenotype of Fried. ADLs were stratified according to difficulty and complexity in three levels: basic (b-), instrumental (i-), and advanced (a-)ADLs, and a total Disability Index (DI) expressed dependency for each level of functioning. Total participation score, being a member, total number of memberships, being a board member, level of participation, membership over time, volunteering, and formal participation represented social participation.

Results: Significantly more limitations for a-ADL-DI in prefrail men (M_{robust}=12.0; $M_{prefrail}$=15.8; p=0.01) were found compared to the robust. Logistic regression withheld age (OR: 1.224), gender (OR: 3.818), and a-ADL-DI (OR: 1.234) as significant discriminating variables of prefrailty (68.3%, χ^2=68.25, df=3, p<0.001). Education, cognition, medication, comorbidities, living together, formal participation, being a member, level of social participation, being a board member, membership over time, volunteering, b-, and i-ADL-DI did not contribute.

Conclusion: The unaccustomed personal and culturally related a-ADLs have been shown as a promising marker for early detection of frailty and possible preventive approaches. Age and a-ADLs had a modest contribution compared to being a man in the discrimination of robustness and prefrailty. This remains to be elucidated in further research.

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P1192
CHANGES IN BONE TURNOVER MARKERS FOLLOWING BISPHOSPHONATE DISCONTINUATION

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Objective: There are concerns about long term oral bisphosphonate use. A treatment holiday may be considered after five years of continuous exposure. It is unclear the best way to monitor patients once on a holiday. We aimed to evaluate changes in bone turnover markers following discontinuation of oral bisphosphonates after at least 5 years of continuous exposure in 9 community sites.

Methods: Fasting C-terminal telopeptide (CTX) (β-CrossLaps/serum, Roche Diagnostics, Basel, Switzerland), and procollagen type 1 N-terminal propeptide (P1NP) (total P1NP, Roche Diagnostics, Basel, Switzerland) were measured every 3 months for 3 years following bisphosphonate discontinuation. Least significant change (LSC) was calculated as 2.77 times CV (CV=6% for CTX and 14% for P1NP).

Results: Study participants included 49 women and 6 men, mean age 69.9 years. Within the first three months, 62% (35/55) of patients had an increase of CTX greater than the LSC. The CTX increased significantly in an additional 4 patients by month 6 (total 39/55 or 71%). CTX elevation persisted during follow-up in 56% (22/39) of these patients. Within the first three months of the holiday, 33% (18/55) of patients had an increase of P1NP greater than the LSC. At 6 months, 12 additional patients experienced a significant increase in P1NP (total 30/55 or 55%). The increase in P1NP persisted during follow-up in 67% of patients (20/30). The increase in CTX by six months exceeded the mean for healthy postmenopausal women (310 pg/ml)[1] in 35% of the female patients (17/49). The increase in P1NP by six months exceeded the mean for healthy postmenopausal women (41.3 ng/ml)[1] in 41% of the female patients (20/49).

Conclusion: Both CTX and P1NP values significantly increased in the first 3-6 months after discontinuation of bisphosphonates and remained elevated for up to 24 months. In about one-third of patients, both bone marker values exceeded the mean for a healthy postmenopausal population.

Reference: 1. Gossiel F. BoneKEy Reports 2014;3:573.

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P1193
HIP STRUCTURAL ANALYSIS AND ADVANCED GLYCATION ENDPRODUCTS IN PATIENTS WITH DIABETES

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Objective: To compare the values of metabolic parameters and advanced glycation end products (AGEs) and correlate them with values of hip structural analysis (HSA) in patients with type 2 diabetes mellitus (T2DM).

Methods: Analytical, cross-sectional, comparative study. Sample was calculated based on a previous study, obtaining a total of 156 individuals. Convenience sampling was done for patients over 55 y who attended for non-hip pathologies. Four groups were formed, divided into men and women and subdivided into with and without T2DM. Patients with hip pathology, rheumatoid arthritis, secondary osteoporosis, on glucocorticoid treatment for more than three months, hormone replacement therapy or any drug that altered bone metabolism were excluded. Patients were interviewed for data collection and measurement of weight and height and diagnosis time of T2DM and years of postmenopause. A blood sample was obtained to quantify glucose, cholesterol, triglycerides, insulin, glycosylated hemoglobin and AGEs. Bone densitometry was performed on left hip and lumbar spine, and image was reconstructed for evaluation of HSA using 3D-Shaper software. Quantitative analysis was performed according to distribution: T-student, Mann-Whitney U, ANOVA, Pearson and Spearman correlation. Significance level p<0.05. Protocol submitted to the institutional research committee.

Results: 160 patients older than 55 y were included, divided into 4 groups formed as follows: 41 women without T2DM, 40 women with T2DM, 41 men without T2DM, 38 men with T2DM. The groups of people with T2DM had higher values of: BMI, glucose, triglycerides, insulin, glycosylated hemoglobin and AGEs. In all groups, a positive correlation of HSA with weight and BMI (p<0.05) and a negative correlation of HSA with older age (p<0.05) were obtained. In patients without T2DM, a positive correlation was obtained between insulin and HSA values (p<0.05). For patients with DM2, a positive correlation was observed between triglycerides and HSA values (p<0.05). In women with T2DM, a longer period since T2DM diagnosis and menopause significantly decreased height and HSA values. AGEs increased for longer time since diagnosis of T2DM (women r=0.527, p=0.001, men r=0.397, p<0.014) and menopause (without diabetes r=0.401, p=0.009, with diabetes r=0.349, p=0.028).

Conclusion: No correlation was observed between values of HSA and AGEs. An increase of both values was observed related to time of diagnosis of T2DM, and decreased values of HSA with age and years of postmenopause, unlike AGEs which were increased. Although AGEs did not affect structural properties, increased

concentrations may affect mechanical properties of collagen which can deteriorate bone resistance. Future research should consider the effect of AGEs in risk of fracture assessment.

P1194
COMPARISON OF FRAX MODELS FOR USE IN THE SAUDI ARABIAN POPULATION

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Objective: The Fracture Risk Assessment Tool (FRAX®) software provides a method to estimate fracture probability of old men and women based on their BMD and clinical risk factors (CRFs). The study assessed which of the existing FRAX models (US, UK, Jordan and Kuwait) are most suited for temporary use in the Saudi population, in estimating fracture risk.

Methods: A total of 1035 Saudi adults (201 males and 834 females) were recruited from Primary Care Centers, Prince Salman Hospital and King Fahd Medical City, Riyadh, Saudi Arabia. Participants were divided into three groups based on T-score values; 238 had osteoporosis (19 males and 219 females), 459 with osteopenia (84 males and 375 females) and 338 normal (98 males and 240 females). This study used the FRAX models for Kuwait, Jordan, USA, and UK. 10-year probability of a major osteoporotic fracture and a hip fracture in men and women were computed. Results from all versions were tested for agreement with fracture risk.

Results: Results showed that the FRAX scores from Kuwaiti and Jordanian models predicted 10-y risk of hip fracture for 5.6% and 4.6% patients while both models predicted 10-y risk of major osteoporotic fracture for only 0.5% patients. Models of USA and UK predicted 6.2% and 6.7% patients for 10-year risk of hip fracture while 2.5% and 1.7% patients for 10-y risk of major osteoporotic fracture respectively. There was a strong significant positive correlation between Kuwait FRAX score with and without BMD for 10-year risk of hip (r=0.74, p<0.01) and major osteoporotic fracture (r=0.57, p<0.01). Both 10-year hip and major osteoporotic risk scores calculated without BMD using Kuwaiti model also had moderately inverse (r=-0.33, p<0.01) association with BMD scores.

Conclusion: Since Saudi Arabia has yet to develop its own FRAX model, physicians may use the Kuwaiti version, as it is most approximates the Saudi population geographically and ethnically.

P1195
PREVALENCE OF MUSCULOSKELETAL PROBLEMS AND OSTEOARTHRITIS IN WOMEN WITH HYSTERECTOMY

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Objective: To find the ratio of musculoskeletal problems and knee osteoarthritis in females with hysterectomy.

Methods: It was an observational study. The study was conducted after ethical approval wide letter no. ERC/101 dated 24-06-2019. Data were collected at two public and one private hospitals in Sialkot, Pakistan from July-December 2019. Nonprobability purposive sampling technique was used. Total 50 patients were recruited. Patients who undergone either hysterectomy or oophorectomy at least five years ago and who agreed to participate in study were included. Women with history of trauma, any other abdominal surgery or <5 y of their hysterectomy or oophorectomy were excluded. Self-structured questionnaire along with WOMAC scale and Nordic musculoskeletal discomfort form were used to measure the outcomes. SPSS version 22 was used to analyze the data.

Results: The mean age of the participants was 57 y. 36% female had undergone oophorectomy and 64% had oophorectomy. The causes of hysterectomy included myoma uteri (12%), retroverted uterus (5%), ectopic pregnancy (2%), prolapsed uterus (21%), hydrated form mole (30%), endometriosis (7%) and cancer (23%). The cause of oophorectomy included myoma uteri (17%), ovarian cysts (29%), ectopic pregnancy (5%), hydatid form mole (9%), endometriosis (13%) and cancer (27%). The average WOMAC score of the participants was 59. The distribution of musculoskeletal symptoms was more in neck and bilateral knee joints.

Conclusion: The removal of reproductive organs tends to set an early degeneration and fastens the normal ageing process. females who had oophorectomy presented with widespread musculoskeletal problems and a progressing osteoarthritis of knee joints.

Acknowledgment: We acknowledge the gynecology and orthopedic departments and the patients for their cooperation.

P1196
EXTREME VITAMIN D DEFICIENCY COULD NOT BE PREDICTED BY CLINICAL EVALUATION OF ITS RISKS

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Objective: Extremely low levels of vitamin D usually include levels less than 4 ng/ml, which is almost the same as undetectable. The risk groups for vitamin D deficiency have been identified, but do they allow such patients to be identified based solely on clinical

symptoms. We aimed to identify risk factors and their actual clinical determination in patients with 25(OH)D serum levels below 4 ng/ml.

Methods: The study included electronic medical record information of 72 individuals (mean age 43±3, 13 men and 59 women) with a vitamin D level of <4 ng/ml found among 5449 patients tested in 2019. Total 25(OH)D was determined using the immunochemiluminescent method (the laboratory participates in the DEQAS program).

Results: No clinical information was available for 20 patients so they were excluded from further analysis. Of the clinical risk factors among the rest 52 patients: 0 - had a dark skin tone, 13 - BMI more than 30 kg/m^2, 6 - GFR less than 60 ml/ml, 0 had liver failure, 5 - primary hyperparathyroidism, 0 were pregnant, 12 had diseases of bones or complaints of diffuse bone pain, 5 patients took drugs that violate the metabolism/absorption of vitamin D. 19 of 52 (37%) patients did not have a single risk factor for vitamin D deficiency.

Conclusion: Clinical evaluation of risk factors for vitamin D deficiency does not allow to correctly identify such patients, which may necessitate their review or be the basis for a wider biochemical screening.

P1197
MODERN THERAPIES IN REDUCING ARTICULAR PAIN IN THE NEUROLOGICAL PATIENT WITH SEVERE SPASTICITY

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Objective: The neurological patient has motor dysfunctions that cause secondary osteoarthritis in time, and the spasticity induced by the neurological disease can increase the disability. We aim to highlight that reducing spasticity improves your motor function.

Methods: 80 patients with spastic hemiparesis and shoulder injury and pain were studied. They were divided into two groups, Group A received botulinum toxin treatment on spastic muscle groups of the shoulder - deltoid muscle and latisimus dorsi, and group B was control group, without treatment of spasticity. Patients were evaluated by joint testing, and the VAS pain scale.

Results: Group A was found to improve mobility by about 34.3% more than group B, and the pain was reduced from the initial value of 5.6 to 3.2.

Conclusion: The treatment of spasticity in the neurological patient improves the joint function and increases the quality of life of these patients.

P1198
SYSTEMIC INFLAMMATION AND BONE MINERAL DENSITY IN AXIAL SPONDYLARTHRITIS

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Objective: Osteoporosis is the most common comorbidity reported in patients with axial spondylarthritis (axSpA). Apart from the classical risk factors involved in the increased risk of bone fragility among these patients, such as the axial immobilization and/or vertebral ankylosing, there have been described other potential factors, as the systemic inflammation, which may play an important role in the etiopathogenesis of the low BMD observed in these patients. Nevertheless, it is not well elucidated what is the specific effect of the sustained systemic inflammation on the BMD and on the occurrence of vertebral fractures in axSpA patients. We aimed to assess the relation between sustained systemic inflammation and BMD, as well as to evaluate the association between sustained systemic inflammation and vertebral fractures in patients with axSpA.

Methods: This is a descriptive cross-sectional study of 46 patients with axSpA (ASAS criteria). Demographic variables, disease characteristics, inflammatory markers, vitamin D levels and disease activity and function index were collected. The potential association between these variables and the BMD was studied. It was also analyzed the association of these parameters and the presence of vertebral fractures.

Results: The presence of vertebral fractures in patients with axSpA was associated with higher punctuation in all the disease activity index: Bath Ankylosing Spondylitis Disease Activity Index (BASDAI)>4 [OR: 8.273, IC 95%: 1.48-46.31, p 0.016], Ankylosing Spondylitis Disease Activity Score (ASDAS)-C reactive protein (CRP) [OR: 3.58, IC 95%: 1.22-10.22, p 0.020] and ASDAS-erythrocyte sedimentation rate (ESR) [OR: 3.10, IC 95%: 1.15-8.32, p 0.020], and with higher score of Bath Ankylosing Spondylitis Function Index (BASFI) [OR: 1.563, IC 95%: 1.12-2.18, p 0.008]. In our sample it was not found any association of disease activity index and low BMD.

Conclusion: This study showed association between vertebral fragility fractures and sustained inflammatory disease activity and functional disability in patients with axSpA.

P1199

EVALUATION OF THE EFFECTIVENESS OF COMPLEX OBESITY THERAPY FOR CLINICAL MANIFESTATIONS OF KNEE OSTEOARTHRITIS AND CYTOKINE DYNAMICS DEPENDING ON THE DEGREE OF BODY WEIGHT REDUCTION

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Objective: Assess the effectiveness of complex treatment of obesity with the use of orlistat (intestinal lipase inhibitor) on the clinical manifestations of the knee osteoarthritis (KOA) and the dynamics of CRP depending on the degree of weight loss.

Methods: 50 female patients (45-65 y.o.) with stage II-III KOA and obesity (BMI >30 kg/m²). Patients in Group 1 (n=25) took 120 mg of orlistat 3 times a day in combination with a low-calorie diet and exercise for 6 months. Patients in Group 2 (n=25) were recommended non-drug therapy for obesity for 6 months. At baseline and after 6 months, the clinical parameters of the KOA (WOMAC) were evaluated, the quality of life was assessed (EQ-5D). The CRP of peripheral blood was conducted at baseline and after 6 months.

Results: After 6 months patients in group 1 achieved a significant weight loss of 10.07% (p<0.05). Depending on the degree of weight loss in Group 1, 15 patients lost >10% and 10 patients lost 5–9.9% of the initial body weight. In the 2nd group, an insignificant weight loss of 0.84% (p>0.05) was achieved, all patients in Group 2 lost less than 5%. In patients with weight loss more than 5% better than WOMAC (pain, stiffness, functional state) (p<0.05), EQ-5D (p<0.05) compared with less weight loss. In patients with weight loss >10%, a significant decrease in CRP level was observed (p=0.03) (Figure 1) compared with baseline and patients with a 5-9.9% weight loss (p=0.03) and <5% (p=0.02).

Conclusion: The results of the study demonstrated a significant effectiveness of the complex treatment of obesity in patients with KOA, compared with the use of only nonpharmacological methods of weight loss. A decrease in body mass of >5% helps to improve the clinical manifestations of KOA and the quality of life of patients. A decrease in body weight of >10% demonstrates a decrease in the level of CRP, which suggests an effect on meta-inflammation in OA.
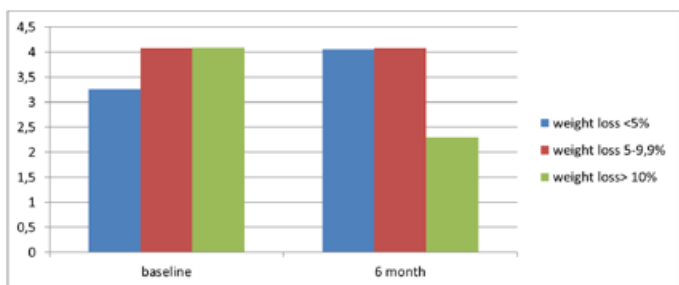
P1200

PROGRESSION OF KNEE OSTEOARTHRITIS AND AXIAL SKELETON BONE MINERAL DENSITY

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Objective: To investigate axial skeleton BMD changes during the progression of knee osteoarthritis (OA) in a long-term prospective study.

Methods: A total 110 females with primary knee OA according to the criteria of the American College of Rheumatology (ACR), were examined twice, with a 5-y interval. Mean age was 59.11±8.95 y, median disease duration−8 [3; 20] y. All patients were filled out questionnaires, which included anthropometric data, medical history and clinical data, used a visual analog scale (VAS) to assess the knee joints pain, WOMAC scores. Instrumental diagnostic methods included radiography of knee joints and bone DXA of the axial skeleton.

Results: At 5-y follow-up radiographic progression was detected in 40 patients (group 1), no differences in disease stage were in 70 (group 2). Both groups had similar age (59.2±9.5 and 59.0±8.1 y) and disease duration. However, normal lumbar spine BMD and femoral neck BMD were most frequently revealed to1st group vs. 2nd: 47.5% vs. 37.1% and 62.5% vs. 44.3%, respectively. In the majority cases in 2nd group vs. 1st were determined osteoporosis or osteopenia by measuring the BMD: 32.9% vs. 22.5% and 55.7% vs. 37.5 %, respectively. At 5-y follow-up period, were determine highly BMD values in the femoral neck (0.73±0.16 vs. 0.79±0.11; p=0.01) and in the total hip (0.84±0.25 vs. 0.93±0.14; p=0.05) in the group with disease progression vs. non progression group, differences was statistically significant. Thus, the increase in BMD in these areas can be considered as a predictor of the progression of OA of the knee joints. Higher values of BMD in the lumbar spine were detected in patients with stage IV OA compared with patients with stage I-III, (in stage I - 0.87±0.12 g/cm²; in stage II - 0.92±0.21 g/cm²; with III - 0.88±0.13 g/cm², with IV - 1.07±0.17 g/cm²), differences was statistically significant. Similar results were revealed by assessing total hip BMD: higher rates were determined in patients with stage IV than in I and III (IV - 0.98±0.13 g/cm², I - 0.85±0,10 g/cm² and III - 0.86±0.16 g/cm², respectively). There was no significant difference between the stages of the disease for values BMD in the femoral neck. Correlation analysis also confirmed a direct proportionality between the stage of OA and BMD at all sites (p<0.05).

Table 1. The absolute values of BMD of axial skeleton in both groups.

Parameters	Group 1 Visit 1	Visit 2	p	Group 2 Visit 1	Visit 2	p
BMD lumbar spine (g/cm²) (M±δ)	0.89±0.18	0.92±0.16	0.24	0.85±0.28	0.94±0.22	0.13
BMD femoral neck (g/cm²) (M±δ)	0.78±0.15	0.76±0.11	0.27	0.73±0.16	0.79±0.11	**0.01**
BMD total hip (g/cm²) (M±δ)	0.91±0.18	0.88±0.11	0.21	0.84±0.25	0.93±0.14	**0.05**

Conclusion: At 5-y follow-up period, an increase in BMD in the femoral neck and total proximal femur can increase the risk knee OA progression. High BMD values are more often observed with severe stage of OA.

P1201
ESWT: A SAFE AND EFFICIENT TREATMENT OPTION OF THE SHOULDER MUSCULOSKELETAL PATHOLOGIES

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Objective: The scapulohumeral periarthritis is a condition characterized by the triad of pain, joint redness and functional impotence at the shoulder level and which concerns the periarticular structures. From the clinical, anatomical and functional point of view of this condition, the following entities are included: impingement syndrome, supraspinatus syndrome, bicipital tendonitis, calcifying and bursitis tendon, adhesive capsulitis, pseudoparalytic shoulder. The rehabilitation program within this pathology is a complex one and the main objectives are: reduce the painful symptoms, increase the strength, diminish the redness and any possible complications that may occur (calcifications, vicious postures).

Methods: In July 2019, a patient aged 60 y is presented in the medical rehabilitation department with pain in the scapular belts with irradiation on the antero-lateral sides of the bilateral arms. The pain described by the patient has a mechanical character, of high intensity, the algal symptoms being more intense on the right side (VAS=9/10). At the local clinical examination, the patient complained of pain in the palpation of the shoulder joint, more right and the following clinical tests were positive: the painful arch test, Apley, Gerber and Neer, with no signs of acute inflammation. The patient performed a set of usual tests, an X-ray of the shoulder joint and then a musculoskeletal ultrasonography, and then according to the information obtained she followed a medical rehabilitation program.

Results: The X-ray showed multiple calcifications of approximately 10 mm adjacent to the bilateral bicipital groove, without changes of the scapula-humeral contour. The integrity of the muscular tissue and the periarticular structures were evaluated using ultrasonography, after which it was decided to initiate ESWT therapy. The patient attended 7 sessions, 1 session at 4 days, being evaluated periodically. The patient returned to our clinic for control, reperforming the radiography and ultrasonography, the calcifications being substantially reduced both in number and size, and the patient's pain is now presented as a discomfort from time to time, having a low intensity (VAS=2/10).

Conclusion: The medical rehabilitation of severe forms of scapulohumeral periarthritis is difficult and painful, ESWT representing a safe and effective variant in these situations.

P1202
3D-DXA PARAMETERS IN LUMBAR SPINE: CHANGES THROUGHOUT LIFE IN FEMALE POPULATION - PRELIMINARY RESULTS

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3D-DXA allows the evaluation of cortical and trabecular bone separately. Lumbar spine 3D reconstruction is a method developed applying the same concept for hip. Our aim was to evaluate 3D parameters changes throughout life in a female population.

We included women without vertebral fractures, and nonosteoporosis treatment (age 20.6-87.1 y). They were stratified by decade (women at 20th and 3rd decade were categorized as reference). BMD at L1-L4 segment was measured by StratosDr (DMS Apelem). It has integrated 3D reconstruction software for the lumbar spine (Eurostars Project. Galgo Medical V4.1) and estimates volumetric BMD -vBMD- and 3D shape of the lumbar spine from an AP DXA image by registering a statistical model onto the 2D-DXA image The analyzed variables: cortical parameters:], trabecular parameters: trabecular bone [TvBMD], cortical bone [CvBMD] and average thickness of cortical [Th]. The distribution of the data was evaluated with the Shapiro-Wilk test and parametric or non-parametric tests were used as appropriate. Data were expressed as mean±SD and p<0.05 was considered significant (bold).

Preliminary data show cortical thickness as parameter that is affected early. From tal parameters are affected from 6th decade. Deterioration is most important at TvBMD (-21%) while CvBMD diminution (-4%) still being significant.

	REF. (N: 30)	40 (N: 58)	50 (N: 101)	60 (N: 74)	=70 (N: 66)
TvBMD (mg/cm3)	147.2±18.9	155.2±21.9	138.8±27,1	**119.7±30.5**	**122.2±29.3**
CvBMD (mg/cm3)	586.5±23.6	596.1±22.9	576.5±32.9	**555.6±35.9**	567.2±34.6
Th	0.670±0.048	0.681±0.045	**0.645±0.055**	**0.605±0.056**	**0.614±0.057**
aBMD (mg/cm2)	1.032±0.089	1.070±0.100	0.997±0.138	**0.873±0.158**	**0.903±0.151**

P1203
THERAPEUTIC CHALLENGES IN LIVEDOID VASCULOPATHY

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We present the case of a 41-year-old female patient admitted to the Rheumatology department after developing multiple purpuric lesions on the distal part of the lower limbs, mainly around the ankle joints. The patient did not report other disease history and states and no associated clinical feature

accompanying the skin lesions. On clinical examination, she also displays mild subcutaneous oedema, some atrophic scars and hyperpigmentation. On further inquiry she states that recurrent small ulcerations have been present. Prior to admission, she was labelled with undifferentiated vasculitis and started a course of corticosteroids with no significant improvement. A thorough panel of investigations screened for the presence of connective tissue disease, including systemic vasculitis, or a procoagulation state which could explain the venous insufficiency features. The tests for autoantibodies and procoagulation markers were absent. The skin biopsy established the diagnosis of livedoid vasculopathy. It displayed multiple thrombi, fibrin deposits and necrotizing features.

The patient was diagnosed with idiopathic liveoid vasculopathy, a rare disease caused by vascular occlusions, differentiated from a vasculitic process. Initial therapy include sulodexide, colchicine, peripheral vasodilators and antiplatelet drugs. After failure to improve lesions and recurrence of ulcers, a short course of glucocorticoids, sulfasalazine, low-molecular-weight heparin and danazol were initiated with lack of clinical benefit. Ulcerations progressed and tended to merge in extensive lesion. An alternative therapeutic approach was considered using intravenous immunoglobulin. This proved to be a highly efficient and caused complete re-epithelialization of ulcers after 6 monthly doses.

This case highlights the diagnostic particularities and therapeutic challenges of a rare case of livedoid vasculopathy. It underlines the variety of therapeutic agents which should be considered and also the superior efficiency of intravenous immunoglobulin in this particular case.

P1204
GLOBAL CLINICAL EXPERIENCE DEMONSTRATES SAFETY AND EFFICACY OF THE AGN1 LOCAL OSTEO-ENHANCEMENT PROCEDURE TO REPLACE BONE LOST IN THE PROXIMAL FEMUR OF OSTEOPOROTIC WOMEN

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Objective: Assess the feasibility and safety of the AGN1 Local Osteo-Enhancement Procedure (LOEP) to treat bone loss due to osteoporosis in the proximal femur.

Methods: AGN1 LOEP was evaluated in prospective, nonrandomized, single-armed, nonblinded, cohort clinical studies in the USA (Copley), Europe (CONFIRM) and Asia (STRONG). All studies received appropriate ethics and regulatory authority approvals; all subjects provided written consent. AGN1 LOEP is a minimally invasive surgical procedure in which the proximal femur is prepared and injected with a triphasic calcium-based implant. 62 osteoporotic subjects/77 hips were treated: COPLEY, 12/12; CONFIRM, 37/52; and STRONG, 13/13. LOEP was performed in the same operative session as hip fracture repair (STRONG) or as uni- or bilateral standalone cases (Copley, CONFIRM). Follow-up

data included demographics, BMD and procedural, peri-operative and post-operative safety. Implant resorption and replacement with bone was evaluated with CT. Follow-up was Copley: 5-7 y; confirm: 2 y; and strong: 2 y.

Results: Subjects were aged 50-94 (mean=71) with femoral neck T-score of -2.9±0.42 (N=50). Skin-to-skin time was 16±4 min (N=50). BMD increased 58% (DXA) at 5-7 y (N=10)[1]. CT showed AGN1 resorption and replacement with bone (N=12). In 106 patient-years of follow-up, 2 untreated and 1 treated hip fractures were reported. Ambulation and hip fracture rehabilitation were unaffected by LOEP. No reported SAEs were device or procedure related, except two possibly procedure-related deaths. Two other deaths were not device or procedure related.

Conclusion: These data support the safety of AGN1 LOEP for patients with osteoporosis-related bone loss and suggest that the treatment may prevent hip fractures. Additional clinical research is needed to confirm these results.

Reference: 1. Howe, et al., Osteo Int, 2019

Disclosures: All: research support; J. D., B. H.: consultant; B. H.: stock (AgNovos)

P1205
CASE REPORT OF A PATIENT WITH LIVE BORN CHILD FROM THE 14TH PREGNANCY AFTER 13 SPONTANEOUS ABORTIONS, DIAGNOSED WITH SYSTEMIC LUPUS ERYTHEMATOSUS AND ANTIPHOSPHOLIPID SYNDROME

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Objective: Antiphospholipid syndrome is a systemic autoimmune disease with unclear etiology and complex pathogenesis. The presence of antiphospholipid antibodies in pregnant women is associated with an increased rate of complications during pregnancy. The most common symptoms are preeclampsia and eclampsia, early spontaneous abortions and late fetal loss.

Methods: The clinical case of a patient with 13 spontaneous abortions and live born child from 14th pregnancy, demonstrates the management of difficult to diagnose disease and the obstacles in treatment when many musculoskeletal and hematological manifestations persists.

Results: A 42 years old patient is admitted to the Clinic of rheumatology in the 27th gestational week of pregnancy due to complaints of arthritis in metacarpophalangeal joint (MCPJ), livedo reticularis on upper and lower limbs, positive anti-dsDNA, aCL, anti-B2GPI and anti-Protrombin since 2006. The patient was diagnosed with 13 spontaneous abortions from 1989 to February 2011. A cytogenetic test of the fetus from the second abortion in the 12th gestational week in 1990 revealed a normal female karyotype. Genetic abnormalities have also not been diagnosed from morphological examination of the sixth abortion fetus. Persistent thrombocytopenia due to splenomegaly has been found since 2003. Due to lack of effect of corticosteroid treatment in 2004 the patient had splenectomy. During the hospitalization at

the Rheumatology Clinic, full laboratory and imaging tests were performed, which revealed mild iron deficiency anemia, increased acute-phase reactants, arthritis of MCPJ) immunological activity (positive ANA, aCL, anti-B2GPI, anti-Protrombin), without manifestations of renal, pulmonary, neurological and cardiac involvement. The patient was treated with Methylprednisolone 40 mg / daily, Fraxiparin 0.4 ml / daily, Aspirin 100 mg - 1 tablet daily, intravenous immunoglobulin 40 ampoules per month during the last 3 months of pregnancy. Caesarean section was performed at 31 gestational week due to severe fetal distress (intrapartum asphyxia). The newborn baby is in good general condition, weight 1800 g and height 41 cm.

Conclusion: A multidisciplinary approach and regular patient consultation are key factors in the follow-up and positive outcome of pregnancy in women with SLE and APS. Timely treatment with corticosteroids, anticoagulants, antiplatelet agents and intravenous immunoglobulins repeatedly increases the chance of successful completion of pregnancy with a live birth.

P1206
CHARACTERISTICS OF OSTEOPOROTIC WOMEN IN A COHORT OF PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: The estimated prevalence of osteoporosis in lumbar spine in women over 50 y is around 22.8% of the general population. In women with rheumatoid arthritis (RA), osteoporosis (OP) is more prevalent and begins at earlier ages. The aim of this study is to assess the effect of different risk factors in the development of OP in women with RA.

Methods: This is an observational study in women diagnosed of RA according ACR criteria 1987 and 2010, in order to know the influence of different clinical features in the development of OP. Between 2013 and 2109 we offer all women diagnosed of RA to participate in the study and perform an BMD (GE Lunar Prodigy®). SPSS25 was used for statistical analysis.

Clinical features	
Age RA, years (SD)	52.54 (13.21)
Height, cm (SD)	153.72 (7.54)
Weight, kg (SD)	70.04 (14.39)
Smokers, n (%)	33 (11.3)
OH-vit D$_2$ <10 pg/ml, n (%)	21 (7.8)
RF +, n (%)	219 (76.6)
ACPA +, n (%)	187 (65.4%)
Corticosteroids, n (%)	191 (64.7%)
Biologics treatment, n (%)	75 (25.4%)
MBD normal	66 (22.4%)
MBD lumbar spine CL <-1, n (%)	175 (59.3%)
MBD femoral neck <-1, n (%)	192 (65.8%)
MBD lumbar spine <-2.5, n (%)	60 (20.5%)
MBD femoral neck <-2.5, n (%)	55 (18.8%)
Fractures, n (%)	43 (14.7%)
Major risk fracture (FRAX), n (%)	125 (49.2%)
Femoral head risk fracture (FRAX), n (%)	102 (40.2%)

Results: We enrolled 295 women with RA. Mean age 62.4 (±11.6) years old and average duration of the disease of 118.3 (±98.8) months. Table 1 shows the clinical features of the studied population. BMD was normal in 66 woman (22.4%), therefore 229 (77.6%) y 85 (28.8%) had BMD values less than -1 y -2.5, respectively in femoral neck and/or lumbar spine. Major risk fracture and hip risk fracture (FRAX DMO) was high in 49.2 y 40.2% of the RA patients, of which almost 15% had a fracture [OR 7.6 (3.1-18.9) p<0.001], mainly women over 50 years old. We found osteoporosis in 85 women, with was associated, in bivariant analysis, at lower height, weight, BMI and older age. We didn't find association with RF, ACPA, smoking, vitamin D deficiency or biological therapy. Corticosteroids were associated with BMD <1 [OR 2.1 (1.2-3.6)] (p=0.009)], as well as an increased risk of major and hip fracture [OR 4.9 (2.6-9.4)] (p<0.001)]. Women with a previous fracture were eight times more likely to have a major fracture [OR 7.6 (3.1-18.9) p <0.001] and seven times more than a hip fracture [OR 6.9 (3.1-15.2) p<0.001] than those without prior fracture. In the adjusted analysis, the OP (femoral neck and/or lumbar spine) was associated with lower weight and age along with the OP femoral neck also with the RF level. However, the fracture was mainly related to BMI and OP femoral neck.

Conclusion: OP and fragility fractures occur earlier and higher in women with RA. BD T-score in femoral neck seems to be the best predictor of fracture.

P1207
X-LINKED HYPOPHOSPHATEMIC RACHITISM: CASE REPORT

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X linked hypophosphatemia (XLH) is a rare genetic disorder, with an estimated prevalence of 1: 20,000 live births resulting from a mutation in the PHEX gene (phosphate regulatory endopeptidase), which causes increased levels of circulating fibroblast growth factor 23 (FGF23), reducing both renal reabsorption of phosphate and serum levels of 1,25-dihydroxyvitamin D3, causing chronic hypophosphatemia, rickets and osteomalacia.

Case report: A 34 years old female with a height of 1.34 m whose past medical history began at the age of 3 years old with a diagnosis of short stature, associated with genu varum and low serum phosphate levels. She received treatment with phosphate salts and calcitriol until 11 years old. During childhood, she underwent several surgical procedures to correct the genu varum. After stopping the treatment, she has presented four fractures in the lower extremities: bilateral femur, tibia and fibula that have required six surgical interventions (osteotomy, osteosynthesis and external fixation); the last surgery was performed in June of 2019; in addition, she has had multiple dental abscesses that required several oral surgeries.

Current laboratory tests report: calcium 8.89 mg/dL (8.6-10), 24-hour urine calcium 72.17 mg (100-300) with urinary volume 1470 ml/24-h, serum creatinine 0.44 mg/dL (0.51-0.95), urine creatinine 43.72 mg/dL (29-226), serum phosphate 1.78 mg/dL

(2.5-4.5), urine phosphate 17.75 mg/dL (40-136). The patient started treatment with calcitriol and dibasic phosphorus one month ago because of bone and.

We present the case of adult patient with XLH. Early treatment with phosphate is essential to avoid bone deformities. In adult patients, identifying pain, fractures or requirement of bone surgery, are indications for continuing treatment to improve quality of life, either with phosphate and calcitriol or with the new option, burosumab for pain control, improved functionality and stiffness.

P1208
FRACTURE PREVALENCE IN CHILDREN AND ADOLESCENTS 0-19 YEARS OLD IN MEXICO: A 10-YEAR CROSS-SECTIONAL ANALYSIS

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Objective: Fracture prevalence in children and adolescents appears to be changing in recent years due to variations in lifestyles and enforcement of laws that protect children within motor vehicles. However, in Mexico, such variation has not been explored so far. Hence, we obtained information about the population affiliated to the Mexican Institute of Social Security (IMSS), the largest Health System in Mexico to answer this question. We aimed to describe fracture incidence in the pediatric/adolescent population of Mexico, to detect whether or not the patterns of fractures have changed in time, between sexes and among different diagnoses.

Methods: Information regarding fractures from children/adolescents 0-19 years old who were attending at the Emergency Department or Hospital Wards at the Mexican Institute of Social Security (IMSS) were gathered for a period of 10 y (2007-2017). We use ICD10 codes to obtain the different types of fracture per year, and additional information regarding sex and age were gathered. The total number of affiliates within the same age and for every year was used as a denominator to develop the incidence rates presented per 10,000 subjects.

Results: The incident rates in the total group varied from 454/10,000 in 2007 to 344/10,000 in 2017 observing a decrease of fracture incidence over time. When analyzed by sex and age, and year to year, we observe an increase on the rate of fractures in boys as they age and a decrease rate in girls as they reach puberty and young age. Most frequent fractures were those of the upper limb, particularly forearm in boys. This region was followed by lower limb, leg and ankle.

Conclusion: Incident rates of fractures in children/adolescents have been decreasing over time, probably due to a higher rate of sedentarism, however, when analyzed by sex, fracture incidence increases with age in boys peaking at late adolescence and this trend was observed in every year covered by this analysis. Fractures in girls do not seem to peak with puberty, but instead, a slight decrease with age was observed a finding that deserves further analysis.

P1209
UNFAVORABLE PROGNOSTIC OF THE LIMITED CUTANEOUS FORM OF SYSTEMIC SCLEROSIS

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Objective: Contrary to the hypothesis that the cutaneous form of systemic sclerosis (SSc-1) has a milder progression and is devoid of life-threatening complications compared to the diffuse form, we present two clinical cases that illustrate the long-term evolution, accompanied by important comorbidities and negative prognostic factors for the SSc-l.

Methods: We present two cases, one of a 49-year-old male patient, smoker, known with polytrauma, numerous thromboembolic events and severe motor deficiency. The second one is a 53-year-old-female patient with type 2 diabetes, and chronic hepatitis B virus (HBV). The specific investigations revealed the positivity of the anticentromere antibodies, and the capillaroscopic examination a late scleroderma pattern, both patients being classified, according to the ACR/EULAR 2013 criteria with SSc-l. Cardiovascular evaluation describes pulmonary arterial hypertension and marked atherosclerosis for both patients.

Results: The male patient presented predictive markers for the development of pulmonary arterial hypertension (telangiectasias, DLCO 45%, positive anticentromere antibodies), thus the changes led to the echocardiographic evaluation that revealed PAPs=48 mmHg. Also, the antecedents of thromboembolic events (pulmonary thromboembolism, transitory ischemic attack, profound venous thrombosis) as well as the presence of pitted scars, ischemic macrovascular implications of the inferior limb, severe capillaroscopic abnormalities and HTAP led to the screening of antiphospholipid antibodies with the positivity of lupus anticoagulant. The patient represented one of the 1% cases of antiphospholipid syndrome associated with SSc-l. Regarding the female patient, the severity of the clinical manifestations (extended dermal calcinosis, digital necrosis, complex cardiac pathology) as well as the associated comorbidities (HBV and type 2 diabetes) represent difficulties in the therapeutic approach. In addition, the presence of digital ulcers was an important predictor for the development of acroosteolysis.

Conclusion: Digital ulcers (DU) – the most common skin manifestations of SCS vasculopathy, can be complicated by infections, requiring hospitalization and treatment. DUs are the strongest predictor for the recurrence of new DUs and are associated with adverse cardiovascular development. The prevalence of antiphospholipid antibodies in SCS is low, but their presence is associated with HTAP, endothelial injury and thromboembolic events.

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P1210
SMOKING IS ASSOCIATED WITH A FASTER DECLINE IN TRABECULAR BONE MINERAL CONTENT AND VBMD, BUT DOES NOT AFFECT CHANGES IN ABMD OR CORTICAL BONE GEOMETRY

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Objective: The risk of developing osteoporosis is importantly determined by peak bone mass acquisition during growth as well as by subsequent bone loss. Smoking has been associated with a disturbed acquisition of peak bone mass, but its effects on subsequent changes in bone mass and size are poorly known. We investigated whether smoking was a determinant of changes in DXA- and pQCT-derived parameters in healthy men after completion of growth.

Methods: 428 healthy men aged 25-45 y participated in a longitudinal population-based study, with a mean follow-up of 12.4 0.4 (range 11.2 13.6) y. Areal BMD (aBMD) was measured at the total body (TB), proximal femur and lumbar spine (LS) using DXA (Hologic QDR4500, Bedford USA). Trabecular volumetric BMD (vBMD) was assessed at the distal radius; cortical vBMD and geometry were assessed at the radial and tibial shafts using pQCT (Stratec XCT2000, Pforzheim). Smoking habits were assessed using a validated health questionnaire. Associations with baseline smoking behavior (smoker/nonsmoker) were assessed using mixed-effects modeling.

Results: Overall, aBMD decreased by 2.3 3.0% at TB, 1.7 5.3% at LS, 3.1 4.6% at the total hip (TH), and 6.0 5.8% at the femoral neck (FN; all p<0.001). Trabecular vBMD decreased by 1.6 6.5 %, trabecular area increased by 1.57 3.7% (both p<0.001). Cortical vBMD decreased by 0.5 2.7% (p<0.001) at the radius and 0.2 1.6% (p=0.047) at the tibia. Cortical area and periosteal and endosteal circumference increased by 1.3 6.9 %, 5.7 5.9% and 11.9 12.1% at the radius and 1.5 4.2 %, 3.3 3.1% and 6.2 7.3% at the tibia; cortical thickness decreased by 5.8 5.6% and 2.5 7.1% (all p<0.001). Smoking at baseline was associated with a smaller increase in trabecular area and larger decreases in trabecular bone mineral content (BMC) and vBMD in both unadjusted (p=0.031, p=0.012 and p=0.047, respectively) and baseline age-, height- and weight-adjusted analyses (p=0.038, p=0.009 and p=0.029). Smoking at baseline was not associated with changes in aBMD or cortical bone geometry.

Conclusion: In healthy adult men, aBMD as well as trabecular and cortical vBMD start to decrease early after peak bone mass attainment, but these changes are at least in part offset by increases in bone size. Smoking is associated with a faster decline in trabecular BMC and vBMD, but does not affect changes in aBMD or cortical bone geometry.

P1211
GEROVITAL'S IMPACT IN PAIN REDUCTION AND IMPROVING FUNCTIONAL CAPACITY AT ELDERLY

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Objective: Osteoarthritis (OA) is the most common form of arthritis. It is a disease that includes all elements from the synovial joints to the mainly affected components cartilage and subchondral bones. It is known as the most common cause of functional failure in elderly.

Methods: This interventional, cross-sectional, clinical trial aimed to evaluate the effectiveness of GH3 (Gerovital) for pain reduction and improvement of functional capacities in patients with OA. The 177 participants were randomly allocated into the GH3group (Experimental, n=76) or the control group (Control, n=101) with simple randomization method. The primary outcome was with a visual analogue scale (VAS). Other outcome the Lequesne Functional Index, ADL and IADL index and demographic characteristic. Each participant in the experimental group have receiving intra-articular injectable GH3solution (5 ml contains 100 mg procaine hydrochloride) for 10 d.

Results: The distribution according to pathology was 58% of patients with gonarthrosis and 35% with coxarthrosis. Among those with gonarthrosis, there was an improvement in pain by evaluating the analogue pain scale (df=51, p=0.0001). We can see significant difference in GH3 group: pain reduction (p=0.001), improving daily activity (df=175, p=0.0001), better Lequesne Index (df=175, p=0.0001) and a mean difference 1.9 of VAS (df=175, p=0.0001).

Conclusion: This exploratory study shows that treatment with GH3 significantly reduces pain and improves locomotor function in patients with OA of the knee and/or hip.

P1212
MYXEDEMA-RELATED CARDIAC TAMPONADE AND ADDISONIAN CRISIS: DO WE NEED A BONE ASSESSMENT?

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Objective: Chronic adrenal insufficiency - related low cortisol and weak androgens (as well as androgens excess derivate from ovaries) are not associated with bone loss unless excessive glucocorticoid substitution. (1,2) We aim to introduce a menopausal female case newly diagnosed with severe complications of untreated dual endocrine glands insufficiency who was further evaluated and confirmed with low BMD.

Methods: Case report

Results: This is a 50-year-old nonsmoking female with menopause at age of 45 y (and no hormone replacement therapy) who was admitted 2 months ago as an emergency for cardiac tamponade which required immediate cardiac surgery. Severe myxedema was diagnosed during the same admission (a TSH of 81 μUI/mL, normal 0.5-4.5 μUI/mL) and also Addisonian crisis requiring intravenous hydrocortisone and fluids replacement. She started oral daily levothyroxine 100 μg and prednisone 10 mg. Currently TSH decreased to 45 μUI/mL, FreeT4 remained low of 8.4 pmol/L (normal: 9-19), ACTH decreased to 29 pg/mL (normal: 3-66 pg/mL) while blood thyroid antibodies are not confirmed. A high FSH is suggestive for menopausal status. Thyroid ultrasound is hypo-echoic. The mineral metabolism shows high bone turnover markers like blood CrossLaps of 1.84 ng/mL (normal: 0.162-0.436 ng/mL), and osteocalcin of 56.44 ng/mL (normal: 11-43 ng/mL) with a PTH of 50 pg/mL (normal: 15-65 pg/mL). DXA showed lumbar L1-4 BMD of 0.806 g/cm^2, T-score of -2.5 SD, femoral neck BMD of 0.726 g/cm^2, T-score of -2.2 SD. The aetiology of both endocrine glands insufficiency is uncertain at this point, maybe a polyglandular autoimmune syndrome if taken into consideration the menopause age as well and considering potential TSH receptor blocking antibodies and thyroid ultrasound pattern.

Conclusion: Despite severe complications due to unrecognized and thus untreated thyroid and adrenal insufficiency, the bone loss is more likely to be caused menopausal status itself in this particular situation. The increased bone turnover may be caused by intense glucocorticoid therapy.

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P1213
USEFULNESS OF THE GRONINGEN FRAILTY INDEX IN A ROMANIAN GERIATRIC WARD

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Introduction: Frailty is a multifactorial syndrome and has a complex pathogenesis. It is found to be related to specific diseases as well as to multi-morbidity. Assessment of frailty is important because it is a predictor for dependency and mortality as well as a contra-indication for clinical interventions.

Methods: We evaluated 100 patients between January-September 2019 in geriatric ward. The objective of this study is to explore the use of such a validated instrument (i.e., the Groningen Frailty Index (GFI)) in a clinical setting. The objective is first to compare the GFI scores of these geriatric patients and GFI scores of older patients and correlation with hand grip strength, subjective health, ADL scores, and clinical morbidity.

Results: The mean age is 69±3 y. Hand grip strengths (right and left) are statistically significant correlated to frailty (Pearson's r is right respectively left -0.330 resp -0.366; p<0.01) as is subjective health (Pearson's r=-0.392 p<0.01). ADL and IADL is not statistically significant correlated with the GFI score. Patients, who were admitted more than once last year, had a statistically significant higher score of frailty (GFI score): Pearson's r=0.231 p<0.05.

Conclusion: The assessment of frailty is useful in geriatric ward but also it could be an instrument in active surveillance of geriatric population by general practitioner.

P1214
EFFECT OF BARIATRIC SURGICAL INTERVENTION ON AREAL BONE MINERAL DENSITY AFTER ONE YEAR OF FOLLOW-UP

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Objective: Compare areal BMD (aBMD) before and one year after bariatric surgical intervention.

Methods: aBMD of the patients who underwent Primary bariatric surgical intervention in Qatar Metabolic Institute in accordance with the American Society for Metabolic & Bariatric surgery indications were assessed before and one year after bariatric surgical intervention. aBMD of the lumbar spine (L1-L4) and of the femur's neck were measured by using Lunar I-DXA machine according to the standards of BMD scan. Mean aBMD difference between baseline and follow-up scan were calculated and presented as percentage. Patients who are known to have osteoporosis, secondary causes of osteoporosis including primary hyperparathyroidism, hyperthyroidism, postmenopausal females, active malignancy and chronic steroid users were excluded. Also, patients who underwent bariatric surgical intervention due to gastrointestinal cancer were not included. All DXA scans were reviewed by a certified clinical densitometrist.

Results: 27 subjects underwent aBMD assessment at lumbar spines (L1-L4) and femur's neck at baseline and one year after bariatric surgical intervention. 17 females and 10 males with mean age is 33.8±8.2 and mean baseline BMI 44.9±7. Seven subjects underwent gastric bypass procedure and the remaining sleeve gastrectomy. Two lumbar spine BMD scans and 7 hip BMD scans were excluded due to malpositioning and skin fold involvement at femur' neck. The mean difference between baseline and follow-up scan at L1-L4 is +0.002 g/cm^2 (+0.2%) and at femur's neck is -0.049 g/cm^2 (-4.9%) with P value 0.821 (95%CI -0.022- +0.018) and <0.0001 (95%CI 0.027- 0.070); respectively. The mean loss in BMI is -13.7±4.5

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Conclusion: In this small cohort, there was no significant change in aBMD at lumbar spine but there was significant reduction (4.9%) in aBMD at femur's neck after one year from bariatric surgical intervention.

P1215
EFFECT OF EMPAGLIFLOZIN (SGLT-2 INHIBITOR) ON BONE METABOLISM MARKERS IN TYPE 2 DIABETIC PATIENTS

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Objective: Sodium-glucose co-transporter 2 inhibitors (SGLT-2) drugs is widely used for type 2 diabetes (T2D) treatment, however they could effect on calcium-phosphorus metabolism. **We aimed to** assess the effect of empagliflozin on bone metabolism markers in T2D patients with normal kidney function.

Methods: 35 T2D patients on empagliflozin (10 mg/d) were included in the study. Including criteria were: male and female aged 45-65 y. with stable hypoglycemic therapy for at least 12 weeks before study. Patients with CKD-EPI GFR <60 ml/min/1.73m^2, primary hyperparathyroidism, diuretics, thiazolidinediones, insulin, glucocorticoids therapy did not include in the study. HbA1c, creatinine, phosphorus (P), total (Ca) and ionized (Ca^{++}) calcium, 25(OH)D, PTH, FGF-23, CrossLaps, osteocalcin were performed before and after 12 weeks treatment. Baseline DXA with trabecular bone score (TBS) were performed in all patients.

Results: Baseline HbA1c was 8.8±0.6%. Obesity was diagnosed in 48.5% patients. DXA data showed that only 2 patients had osteoporosis, BMD adjusted to TBS was <1.35 in 10 (28.6%) patients. Ca^{++} concentration was 1.19 mmol/l (1.06; 1.32) and didn't change after 12 weeks – 1.23 (1.12; 1.29). Also we did not find significant changes in 25(OH)D – 19.5 (12.6; 26.4) & 20.3 (13.1; 25.9) ng/ml, PTH 42.0 (33.0; 60.0) & 45.6 (32.3; 61.8) pg/ml, osteocalcin - 10.5 (9.2-13.5) & 10.7 (9.5-11.3) ng/ml levels, accordingly. Baseline CrossLaps concentrations were higher in male 256.7 (123.5; 346.4) ng/ml than female 62.3 (26.5-245.7) ng/ml (p=0.024). We found that empagliflozin therapy was associated with increase in P level from 1.02 (0.78; 1.26) to 1.17 (0.90; 1.39) mmol/l (p=0.003), as well as FGF-23 level from 1.87 (1.13; 2.65) to 2.25 (1.46; 2.99) pmol/l (p=0.002).

Conclusion: Assessment of TBS in T2D patients permitted to detect low bone quality in 28.6% of patients. 12-weeks empagliflozin therapy in T2D patients with normal kidney function was associated with increased P and FGF-23 levels without a significant effect changes in calcium, 25(OH)D, PTH and osteocalcin levels.

P1216
BONE MINERAL DENSITY IN LATE REPRODUCTIVE AGE WOMEN WITH DIFFERENT BODY COMPOSITION: THE PROSPECTIVE STUDY

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Objective: Well known that BMD in obese subjects is higher than those with normal weight. We aimed to assess the BMD dynamics in late reproductive age women with different body composition in the prospective study.

Methods: 70 female (F) 40-55 y.o. (mean age 46.2±5.0) BMD and body composition were determined using DXA (Lunar Prodigy, USA). Re-examination was carried out after 8-10 y and menopause duration was 4.7±2.3 y. The diagnosis of obesity and overweight was carried out according to the WHO criteria (1997). Serum 25(OH)D level (AbbottArchitect 8000, USA) was estimated.

Results: Initial BMI was 29.0±5.4 kg/m^2. Overweight or obesity was diagnosed in 50 (71.4%) subjects. Serum 25(OH)D level ranged from 6.25-50.1 ng/ml (20.8±9.2 ng/ml), 61 (87.1%) women were insufficient or deficient. For 8-10 years we did not find significant changes in BMI. However, we found an increase in the number of obese F by 4.8%, as well as an increased FAT by 6% and fat mass index (FMI) by 7.3%. Baseline BMD matched normal in 55 (78.6%) F. Correlation analysis showed an association BMI with BMD$_{L1-L4}$ (r=0.13, p=0.04) and BMD$_{total}$ (r=0.30, p=0.001). BMD parameters were analyzed depending on changes in BMI. Subjects were divided into two groups: Gr1 with initially normal BMI or overweight (26.2±4.0 kg/m^2, n=39) and Gr2 with obesity (n=31, 32.6±4.9 kg/m^2). We found that FAT increased in both groups: 2.4% in Gr1 (from 27.8 to 27.9 kg) and 10% in Gr2 (from 39.9 to 42.9 kg). Increased BMI was associated with increased FMI (r=0.72, p=0.001). Baseline BMD did not differ in two groups: for Gr1 BMD$_{L1-L4}$ was 1.21 g/cm^2, BMD$_{total}$ - 0.97 g/cm^2 and for Gr2 BMD$_{L1-L4}$ was 1.25 g/cm^2, BMD$_{total}$ - 1.06 g/cm^2 (p>0.05). Re-examination after 8-10 years showed a decrease in BMD$_{L1-L4}$ in Gr1 by 6%, in Gr2 by 1% (p=0.008), as well as a decrease in BMD$_{total}$ in Gr1 by 9%, in Gr2 - by 4.3% (p=0.04). It was noted that a decrease in BMD$_{total}$ was more often observed in Gr1 than in Gr2 (p=0.03).

Conclusion: Study results demonstrated that late reproductive age obese women lost BMD more slowly than in women with normal or overweight for the first 5 y of menopause.

P1217
OSTEOPOROTIC HIP MORPHOLOGY: A RISK FACTOR FOR MORTALITY AFTER HIP FRACTURES IN ELDERLY PATIENTS

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Objective: Mortality after elderly hip fractures is one of the leading issues of the geriatric medicine. In spite of increasing lifespan of the human, bone quality may not catch up the ageing.

Osteoporosis which is the leading predisposing factor of elderly hip fractures, may an indicator of high mortality rate. The purpose of this study is to investigate the association between morphologic characteristics of osteoporotic hip and mortality after hip fractures.

Methods: The patients who underwent surgery after hip fracture and admitted to a tertiary hospital in between 2011-2017 were analyzed. Demographic patient characteristics, type of fractures, type of surgery, Dorr type of patients' proximal femur anatomy, Singh indexes and mortality were investigated in these patients. Mortality in hospital stay, in 30 d, 60 d, 90 d, 6 months and 1 y were analysed and evaluated.

Results: We included 772 patients; mean age 76.32 (SD=7.32). Overall hospital stay mortality rate was 1.08%, overall one year mortality rate was %20.88. The patients who had Dorr type C and grade 1 and 2 of Singh indexed hip morphology, had statistically significant increased mortality rate(p<0.05) in 30 d, 60 d, 90 d and 6 months.

Conclusion: Osteoporotic hip morphology, like Dorr type C and, Grade 1 and 2 Singh index may be predisposing factor for higher mortality rate.

P1218
CAN THE ULTRASONOGRAPHIC SIZE AND MORPHOLOGICAL CHARACTERISTICS OF SCIATIC NERVE BE USED AS A PROGNOSTIC FACTOR IN PATIENTS WITH HERNIATED DISC?

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Objective: Ultrasonography US, has been used recently to characterize median and ulnar nerves but is seldom used to characterize the lower extremity nerves. The reference standard for normal and pathologic lower extremity nerves has not been established.

Methods: 20 healthy volunteers with 40 sciatic nerves, aged 25-84 years old, were studied with US and compared with 57 volunteers patients with 114 sciatic nerves. aged 28-74 years old, which complained for sciatica and they identified with lumbar disc prolapse in MRI. Age, sex, height, weight were recorded and the size and morphology of sciatic nerve were obtained at every predetermined sites. These data provide basic clinical data for the use of ultrasound for the future diagnosis, treatment, and prognostic evaluation of peripheral neuropathy of sciatic nerve.

Results: The mean size of sciatic nerves were 0.578 ± 0.034 cm^2 in males and 0.488 ± 0.03 cm^2 females respectively. Pearson's correlation analysis showed that the mean size were correlated with height and weight. There was no difference in mean size among the different age. Women had smaller size of the sciatic nerves than men. Also the "pathologic sciatic nerves they have morphology of "edema" and the size were smaller.

Conclusion: Peripheral nerve ultrasonography is a reliable and reproducible diagnostic method in the hands of experienced examiners. Normal values for the sciatic nerve nerves are provided by our study but with not enough statistical power. Thus, reference values of Sciatic nerve of the lower extremity can facilitate the analysis of abnormal nerve conditions and give useful information and prognostic parameters in patients with sciatica and established disc herniation

P1219
BASELINE SECONDARY FRACTURE PREVENTION IN THREE HEALTH SYSTEMS IN MEXICO: THE FLS-MX INTERINSTITUTIONAL GROUP

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Objective: Fracture Liaison Services (FLS) are recommended internationally to reduce subsequent fracture risk at the population level, improving patient outcomes. The benefit of FLS depends in part on the local baseline rate of secondary fracture. The public healthcare system in Mexico is divided between parallel institutions: IMSS for employees and their families, SS (Ministry

of Health) for those not covered by IMSS or any other Health System, and several smaller systems as ISSSTE for state workers among others. Due to this structure, medical care given in the different institutions may vary from one to another. Prior to the initiation of FLSs in Mexico, we determined the rate of secondary fracture prevention and potential implementation barriers that may be encountered

Methods: Two tertiary hospitals IMSS (518 beds) and INR (228 beds) and one general hospital ISSSTE (161 beds) were selected. We gathered the information for men and women >50 years old and over admitted with a hip fracture from January 2014 to December. ICD10 codes included: S72.0, S72.1 and S72.2, and the date of admission and discharge data were collected. Hip fracture cases were verified by either a confirmatory surgical procedure logs or radiology report. Treatment recommendations regarding AOMs were extracted from the clinical notes.

Results: A total of 7,024 hip fractures were registered in the period studied, and an increment of 4.1% was observed between 2014 and 2017. The age average was 79±9.7, 72% of cases were women and 83% of the sample came from the IMSS. Important differences were found between the institutions regarding post-fracture treatment. Nonsurgical management varied from 2.1 to 7.2% (p=0.05). No patients at the IMSS had an AOM recommended during hospital stay or discharge, 13% of patients from the ISSSTE were recommended and 42% at the INR. Of that prescribed therapy, the commonest recommended AOM were bisphosphonates with similar/ different rates between INR and ISSSTE. Potential barriers to AOM recommendations included the affordability of AOM by patients and suboptimal coordination of care post-discharge regarding bone health. Achieving 46.2% treatment with oral bisphosphonates in all three settings would be expected to result in 1135 fewer fractures over 5 y.

Conclusion: The best performing hospital recommended AOM in 42.6% of patients after a hip fracture. However, the hospital with the largest number of hip fractures had no secondary prevention due to the lack of a link between surgical facilities and primary care. There are considerable opportunity costs from FLS implementation in Mexico and successful implementation will need to address barriers in secondary and primary care.

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P1220
ENTHESEAL INVOLVEMENT IN GROUP OF PSORIATIC ARTHRITIS PATIENTS: AN ULTRASONOGRAPHIC STUDY

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Objective: Psoriatic arthritis (PsA) is a disease that requires early diagnosis and therapeutic approach, entheseal changes being the hallmark of the condition. Clinical examination of enthesis can be a challenge in clinical practice, as it can be asymptomatic or with signs attributed to other mechanical or traumatic conditions. Thus, it is highly necessary to use imagistic techniques, as ultrasonography (US), in order to detect properly the type and nature of the changes. The study aimed to analyse the type and frequency of entheseal involvement in PsA patients, by US examination.

Methods: We performed a retrospective study on 41 patients diagnosed with PsA based on CASPAR established criteria; US examination was performed by an experienced sonographer, blinded to the history, clinical findings and biology of each patient. Enthesitis was evaluated and defined according to OMERACT (Outcome Measures in Rheumatology) and MASEI (MAdrid Sonographic Enthesitis Index) definitions.

Results: Enthesitis was present for 26 of the included patients (63.41%) and we identified Achilles enthesis as the most common site, followed by DP (distal patellar), PP (proximal patellar), PA (plantar aponeurosis) and QT (quadriceps tendon). Given the fact that all patients received DMARD therapy, synthetic with/without biologic, the data obtained from our study group didn't show a high percentage of active PD enthesitis in none of the evaluated sites, excepting AT (Achilles tendon).

Conclusion: Enthesitis, the defining feature of PsA, predicts patients' outcome and future structural changes. US examination has proven to be a reliable imaging method which is clearly a mandatory part for patients' follow-up algorithm.

P1221
PREVALENCE OF VITAMIN D DEFICIENCY/ INSUFFICIENCY RISK FACTORS AND THE LEVEL OF 25(OH)D IN HEALTHY VOLUNTEERS

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Objective: To assess the prevalence of risk factors for vitamin D deficiency/insufficiency and plasma levels of 25(OH)D in young healthy volunteers.

Methods: A total of 137 healthy volunteers were examined; the average age was 20 (20;21) years, of these 33.6% (n=46) were young men and 66.4% (n=91) were girls. A questionnaire survey method was used to identify risk factors for vitamin D deficiency/insufficiency: exposure to sunlight in the summer months and/or visits to the solarium, the use of sunscreens, intake of vitamin D-containing drugs, consumption of products containing vitamin D. The level of 25(OH)D in plasma was determined by the enzyme immunoassay.

Results: The results of the questionnaire revealed a low adherence of the subjects to sunbathing which amounted to 81%; non-visits to the solarium - 98.9%; insufficient intake of preparations containing vitamin D - 92.7%. The incidence of risk factors for the development of vitamin D deficiency/insufficiency in young men and girls did not differ (p≥0.05). Moreover, the girls used sunscreen more often (p<0.05) as compared to the young men (26.4% vs. 4.3%, respectively). The level of 25(OH)D in the blood plasma of healthy volunteers averaged 23.0 (21.1; 26.8)ng/ml, and was optimal in 16.8% of the examined subjects. 25(OH)D insufficiency was revealed in 72.3% and deficiency – in 10.9% of the subjects. The level of 25(OH)D in blood plasma was higher (p<0.05) in young men (25.7 (24.7; 26.9)ng ml) as compared with girls (21.8 (20.9; 24.2) ng/ml). However, no differences were found (p> 0.05) according to the ratio of the optimal level of 25(OH)D in the blood plasma detected in girls (16.5%) and young men (17.4%); 25(OH)D insufficiency – 71.4% of girls and 73.9% of young men; 25(OH)D deficiency – 12.1% of girls and 8.7% of young men, respectively.

Conclusion: A high prevalence of risk factors for vitamin D as well as 25(OH)D level deficiency/insufficiency in young healthy volunteers was revealed, which amounted to 80% and 83.2%, respectively.

P1222
RELATIONSHIP OF BONE MINERAL DENSITY WITH HOMOCYSTEINE LEVELS IN POSTMENOPAUSAL WOMEN WITH RHEUMATOID ARTHRITIS IN THERAPY WITH ANTI-TNFα

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Objective: Osteoporosis is common in women with rheumatoid arthritis (RA) after menopause. Homocysteine (HCY) levels interferes with collagen cross-linking in bones and may affect BMD. The study followed the correlation between HCY levels, BMD, 25-OH-vitamin D levels in RA patients treated with anti-TNF-alpha agents and antiosteoporotic treatment.

Methods: We recruited 75 postmenopausal women with rheumatoid arthritis between the age group of 45-75 y. All patients were in treatment with anti-TNFα agents (adalimumab, infliximab, etanercept). We measured BMD at baseline and then at 6 months. BMD was determined by DXA scan. Based on the WHO criteria, patients were included into 2 groups as follows: patients with osteopenia and patients with osteoporosis. We followed laboratory parameters: HCY, 25-OH-D, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), serum calcium. The patients received specific antiosteoporotic treatment (vitamin D supplementation, Bisphosphonates, calcium supplementation).

Results: Among 75 postmenopausal women at baseline 65.34% (49) had osteoporosis (mean age 56.2±6.9 y) and 34.66% (26) had osteopenia (mean age 52.56±6.5 y). We found high levels of HCY in 74.7% (56) of the patients while the rest of them had normal levels. After 6 months of antiosteoporotic treatment in the group of patients with osteoporosis and high HCY level, BMD increased less compared to patients with osteoporosis and normal HCY level. Regarding patients with osteopenia, there was no significant difference in BMD between patients with elevated, respectively normal levels of HCY. Hyperhomocysteinemia was found positively associated with low levels of 25-OH-vitamin D (p=0.001) and serum calcium (p=0.005), but also with increased disease activity (increased ESR and CRP).

Conclusion: No differences were found between BMD and HCY levels depending the type of anti-TNFα agent. Low levels of vitamin D and hyperhomocysteinemia were correlated with low BMD (p=0.001). Patients with RA in postmenopausal with elevated HCY levels had a poorer response to antiosteoporotic treatment.

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P1223
A CURIOUS CASE OF VERTEBRAL FRACTURE IN A YOUNG FEMALE

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Necrotizing scleritis is the most severe and destructive form of scleritis, sometimes leading to loss of the eye from multiple complications, severe pain, or occasionally perforation of the globe. In almost half of the cases the cause is systemic and attributable to a rheumatic disease. The successful management of the ocular destruction in such instances will always require correct treatment of the underlying systemic disorder.

Case report: A 33-year-old fertile female, presented with intense acute low back pain started 1 month ago. Two years earlier, she has been diagnosed with left eye necrotizing scleritis and started on high-dose corticotherapy by the ophthalmologist (taken continuously ever since in variable doses). At the moment, scleritis was interpreted in the context of possible onset of relapsing polychondritis, but without fulfilling the diagnostic criteria. There were excluded other systemic causes: rheumatoid arthritis (no history of arthralgia, negative immunology, normal hand radiography), Sjogren's disease (negative ANA, negative anti Ro antibodies), systemic lupus erythematosus. Also, an infectious cause was excluded. In association, she was started on a 6-cycle course therapy of cyclophosphamide aiming the resolution of the active process of the eye, but also the sparing of steroids; scleral graft was then successfully performed. The present laboratory tests were in normal range (calcium, alkaline phosphatase, PTH, vitamin D, osteocalcin). Also, bone density test showed a normal density of the bone. The lumbar x-ray showed normal aspect of the lumbar bodies, but lumbar MRI showed edema and microfractures of the superior endplate at L1, L4 and L5. The patient was started on denosumab and transferred to the Neurosurgical Department for vertebroplasty.

Vertebrae may fracture secondary to long-term corticotherapy and generate fracture pain yet not result in measurable radiographic changes; long-term corticotherapy should always be a red flag for vertebral fractures, even in fertile young women, osteodensitometry not being the best option to evaluate the bone quality in this case. The case shows that in young people disproportionate back pain may be the only sign of vertebral fracture and even though corticotherapy was needed to preserve the ocular integrity and function it should be administered with caution.

P1224
ASSESSMENT OF MTOR (MAMMALIAN TARGET OF RAPAMYCIN) EXPRESSION LEVELS AND APOPTOSIS IN PATIENTS WITH KNEE OSTEOARTHRITIS AND OBESITY

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Objective: To assess the levels of gene expression, encoding major cell ontogenesis phases: proliferation activity (mTOR), apoptotic cell death (caspase 3), destruction of a cartilage (cathepsin-K), inflammation (TNFα) in serum of patients with knee osteoarthritis (KOA) and obesity.

Methods: The study included 50 female with KOA Kellgren-Lawrence stage II-III and obesity (BMI >30 kg/m²)), aged 45-65yo. The study consisted of 2 stages. At stage 1, patients were randomized into 2 groups. Group 1 (n=25) was administered orlistat at 120 mg 3 times a day for 6 month combined with low-calorie diet and physical exercise. Group 2 (n=25) was administered only no-drug therapy obesity. Anthropometry data and the WOMAC were obtained. At stage 2, RNA was extracted from patient's blood specimens for measuring genes expression in 6 months after the end of obesity therapy.

Results: After 6 months of complex treatment of obesity with the use of orlistat, patients in Group 1 achieved a significant weight loss of 10.07% (p<0.05). In the 2 group, an in significant weight loss of 0.84% (p>0.05). Patients of the 1 group showed an increase in body weight by 5.6%, significant increase in WOMAC pain by 42.63%, total WOMAC by 23.15% in 6 months after completion of obesity therapy (p<0.05). Patients of the 1 group with KOA and obesity against the background of weight gain showed increased expression of the m-TOR, caspase-3, cathepsin-K and TNF-α compared with patients of the 2 group (p<0.001). An analysis of correlations of gene expression showed that direct positive correlations with the level of pain in the knee joints according to the WOMAC (p<0.001, r=0.76) in patients of the 1 group.

Conclusion: Against the background of increased body weight expression of the m-TOR, caspase-3, cathepsin K, TNF-α are increased in patients with KOA and obesity compared with patients with stable weight, which is probably due to increased meta-inflammation with an active increase in body weight. Thus, active growth in body mass mediates an increase in inflammatory metabolic activity in the joints, which can lead to increased pain and progression of OA.

P1225
CORTICAL POROSITY DOES NOT PREDICT INCIDENT FRACTURES IN POSTMENOPAUSAL WOMEN

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Objective: Fracture risk is most frequently assessed by measuring areal BMD (aBMD) or using the Fracture Risk Assessment Tool (FRAX) that includes clinical risk factors. However, these approaches have limitations and additional bone measurements may enhance the predictive ability of these existing tools. In cross-sectional studies women with fracture have higher cortical porosity, thinner cortices and smaller cortical cross-sectional area (CSA). Furthermore, cortical porosity and thickness are associated with fracture risk independent of aBMD and FRAX. Whether cortical porosity predicts incident fractures, remains unanswered. In this prospective study, we examined whether cortical porosity of the proximal femur predicts incident fractures independent of aBMD in postmenopausal women.

Methods: We pooled 211 postmenopausal women with fractures aged 54-94 y at baseline (cases) and 232 fracture-free age-matched controls in a nested case-control study from the Tromsø Study in Norway. The cases had prevalent fractures (181 forearm, 26 proximal humerus and 4 hip). We assessed femoral neck (FN) aBMD, calculated FRAX 10-y probability of major osteoporotic fracture, and quantified femoral subtrochanteric cortical porosity, thickness, and CSA from CT images using the StrAx software.

Results: During a mean follow-up of 6.4 y, 114 (25.7 %) of all 443 women suffered at least one incident fracture (33 forearm, 11 proximal humerus, 13 hip, 10 ankle, 15 vertebral, 32 others). Per SD higher total cortical porosity, thinner cortices, and smaller cortical CSA, hazard ratio (HR) (95%CI) for fracture were 1.09 (0.91-1.30), 0.99 (0.82-1.20), and 1.08 (0.90-1.29), respectively, all p>0.100. Cortical porosity of the inner transitional zone predicted incident fractures adjusted for prior fracture, HR 1.22 (1.00-1.48), p=0.045, but not after additionally adjusted for FN aBMD, HR 1.15 (0.95-1.39), p=0.160. Per SD higher FN aBMD and FRAX, HRs were 1.42 (1.14-1.76) and 1.39 (1.14-1.68), respectively, both p≤0.001.

Conclusion: Based on this data, FN aBMD and FRAX predicted incident fractures in women, while cortical porosity did not.

P1226
HEALTH BURDEN IN COMMUNITY DWELLING ELDERLY ELDEST AND THE RELATIONSHIP WITH THE FRAILTY STATUS

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Objective: Longitudinal studies have shown that with aging most individuals tend to develop a chronic low-grade proinflammatory state (CLIP) in which chronic diseases may play an important modifying role, and that such a state is a strong risk factor for frailty and death (1). Our aim is to identify which amount of health burden is predictive to frailty status as those elderly might profit from early interventions.

Methods: Since 2015, 494 community dwelling elderly participated in our ongoing longitudinal study of the gerontopole consortium (Vrije Universiteit Brussel (Belgium)): "BrUssels sTudy on The Early pRedictors of FraiLtY" (BUTTERFLY). At baseline, participants were allocated into 7 health categories: A1(completely healthy), A2 (Healthy but lifestyle-related risk), B1 (Only Musculoskeletal comorbidity), B2 (Non-cardiovascular comorbidity) C1 (arterial hypertension) C2 (Cardio-vascular comorbidity) D (Inflammatory pathology or anti-inflammatory drugs). Frailty was assessed trough the Groningen Frailty Indicator (GFI) ≥4/15, the Rockwood Frailty Index (RFI) ≥0.25/10 and the adapted version of the Fried Frailty Index (FFI) ≥3/4. We divided individuals into 3 groups: robust (R)(n=218), physically prefrail (PF)(n=193) and frail (F) (n=77). For our analysis, men and women were evaluated for parameters such as age, CRP-level, smoking history, medication/alcohol -intake, MMSE and Rockwood Score. Kruskal Wallis and chi-square tests were used for statistical analysis.

Results: F men had a higher (p=0.01) medication intake(5.35±2.86) (mean±SD) than PF men (3.55±2.86) and R men(3.84±2.37) (p=0.01). We found similar results for medication intake between F(4.86±2.6), PF (2.38±4.86) and R women(3.15±2.15)(p<0.001). When divided into health categories, we observed a higher number of C2 and D within the F men (50%+12%) compared to their R (40%+3%) and PF (30%+11%) peers (Figure 1). In the F elderly women, C1 category (47%) was more prevalent than in their PF (29%) and R (34%) peers (Figure 1).

Conclusion: Our cross-sectional data suggests a higher prevalence of arterial hypertension, cardiovascular events and chronic inflammatory conditions in F elderly compared to R and PF peers. Our study will evaluate the mediating role of CLIP in different health categories towards a frail status.

Reference: 1. Bektas A et al. Exp Gerontol 2018;105:10

Figure 1: Distribution of health categories in elderly men and women according to frailty status.
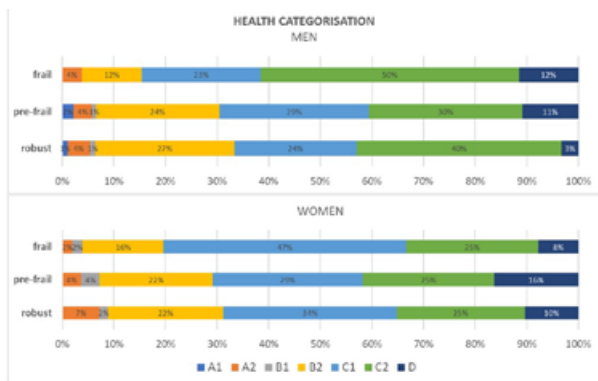
P1227
THREE METHODS FOR BODY COMPOSITION ASSESSMENT IN THE VERIFICATION OF MANIFESTATIONS OF SARCOPENIA IN OBESE PATIENTS

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Objective: To compare the effectiveness of three methods of body composition assessment such as bioimpedance analysis (BIA), air-replacement body platismography (BodPod) and DXA total body program (DXA Total Body) in the verification of reducing of skeletal muscle mass as sign of sarcopenic obesity in obese patients.

Methods: The study group included 95 patients aged 21-69 y.o. (average age 53.9±11.05 y) with BMI ≥30.0 kg/m². The control group included 37 patients aged 37-69 y.o (average age 50.73±10.6 y) of the same age without obesity with BMI 20.0-29.9 kg/m². Body composition was tested using BIA, BodPod and DXA with calculating fat, lean and skeletal muscles mass (kg) and % in all the patients.

Results: According to BIA the groups differ only in fat mass (FM) 42.75 (4.8;6.3) vs. 33.15 (28.4;35.5) kg; p=0.036 and did not differ (p>0.05) in lean (LM), skeletal muscle mass (SMM) and in % of FM and SMM. According to BodPod analyses groups differed in the FM 3.4 [36.81;69.94] vs. 31.02 [23.22;38] kg, p=0.007, % FM 45.4 [42.1;53.8] vs. 37.7 [28.6;41.1], p=0.003 and % LM - 54.6 [46.2;57.9] vs. 62.3 [58.9;71.4], p=0.003, but had statistically equivalent values of LM 55 [49.48;67.77] vs. 40.36 [33.12;49.06] kg, p=0.19. According to DXA Total Body analyses statistically significant differences (p<0.05) have been identified between the groups in FM and% FM of the hands, feet, trunk, total body (p>0.05), but not in LM and % LM (p>0.05).

Conclusion: From methods of body composition assessment, air-replacement body platismography (BodPod) is the most sensitive in the verification of skeletal muscle mass reduction in obese patients. This method shows that patients with obesity have a significantly reduced muscle mass compared with normal weight or overweight subjects.

P1228
ANALYSIS OF THE TOTAL BODY COMPOSITION IN A COHORT OF PATIENTS WITH ELDERLY ONSET ARTHRITIS

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Objective: Inflammatory arthritis in the elderly leads to greater comorbidity than that of the young patients, however, there are few data on body composition in this population. We aimed to analyze the total body composition measured by DXA in patients with arthritis in the elderly, its relationship with the activity disease scores and its evolution at 12 months.

Methods: Prospective observational study of patients with elderly onset arthritis (>65 y) (ARTIEL cohort). Patients with previous known osteoporosis and/or antiosteoporotic treatment were excluded. We collected clinical, anthropometric and total body composition measures that include fat and lean mass in grams (g), bone mineral content (BMC; g) and total BMD (g/cm²), at baseline and at 12 months.

Results: 73 patients (37M: 36V) were included, with a mean age of 75±7 y. Most were diagnosed with rheumatoid arthritis (RA; n=43) and followed by polymyalgia rheumatica (PMR; n=16).32% had densitometric OP at baseline and 31% at 12 months. When assessing comorbidities: 38% were diabetic and 33% were obese (BMI >30 kg/cm²). Total body composition data are shown in the Table 1. At the time of inclusion, patients with PMR had less lean mass than the control group, with no significant differences between the RA group and the control group. When comparing PMR vs. RA, patients with PMR had lower weight, total BMD and lean mass than patients with RA. When assessing the complete cohort (n=73), no significant changes were observed in the evolution of total body composition at 12 months. However, a significant loss of lean mass was observed in the subpopulation of RA (-1.74%, p=0.017), while patients with RA showed no changes in total body composition. In the RA group, there was a negative correlation between lean mass and activity scores (DAS28VSG: r=-0.401, p=0.009) at the time inclusion; in the PMR group, there was a positive correlation between fat mass (r=0.900; p<0.001).

Conclusion: Patients with RA in the elderly present a significant loss of lean mass at 12 months. In addition, lean mass in these patients negatively correlated with disease activity scores.

Table 1: Total body composition at baseline.

Variable	All patients	RA	PMR	Control
Age (years)	75±7	74±7	77±5	73±8
Weight (kgs)	71±12	73±12	63±14 *	73±13
Size (cms)	158±9	161±8	153±8	161±13
BMI (Kg/cm²)	28±5	28±5	28±5	28±4
Abdominal circumference (cm)	101±11	101±12	98±11	-
Total BMD (g/cm²)	1.115±0.146	1.132±0.137	1.038±0.149 *	1.124±0.159
Fat mass (g)	29044±8123	29500±8391	28364±8331	28976±7274
Lean mass (g)	39910±7170	40555±6836	34459±6361 * ‡	41669±9927
BMC (g)	2198±487	2129±460	2219±420	2319±655

*p< 0.05 compared to control groups

‡ p>0.05 compared to patients with RA

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P1229
REDUCED BONE PAIN WITH PAMIDRONATE IN A PATIENT HAVING LONG-TERM MCCUNE ALBRIGHT SYNDROME

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Fibrous dysplasia (FD) is a rare skeletal disorder in which normal bone and bone marrow are replaced by fibro-osseous tissue. It may involve one (monostotic) or multiple bones (polyostotic). The proximal femur is a frequently affected site, resulting in pain, limping, deformity and fracture, due to the bodyweight and the strong gluteal muscles loading on the weakened region. A 26-year-old female was diagnosed with FD after protracted suffering from bone pain in adolescence. At present she has "café-au-lait" spot, FD in femur pelvis and tibia. Five years before, an orthopedist performed a surgery for curettage and FD bone replacement by a bone allograft. But, during the following year bone pain relapsed, and we found a microfracture (Figure). Nails were placed in the femoral neck and trochanter. As last year bone pain returned, we decided to infuse bisphosphonate (BPs), I.V. pamidronate, at 180 mg per course, with 6-month interval. Satisfactorily bone pain reduction (60% less pain score) was achieved after the initial 2 weeks, and the treatment is being well tolerated. With frequency BPs use is neglected in cases like this. BPs are effective in FD and affordable, so they should be an option. Diagnosis uncertainties could occur during the early years of the syndrome, but deficit of information about the BP´s usage may be more likely the cause. Moreover, in relatively young subjects with polyostotic FD, many bone grafts fail, and the lesions eventually return to a dysplastic state, highlighting the BPs option as with this case.

Partially bone graft resorbed, lines microfractures

Partially bone graft resorbed, lines microfractures

P1230
KNEE SYNOVITIS IS A FACTOR OF OSTEOARTHRITIS PROGRESSION

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Objective: There is a wide variety of studies aimed at determining risk factors (RF) for knee osteoarthritis (OA) radiologic progression. The role of knee synovitis in OA progression remains a controversial topic due to contradictory trial data. We aimed to study the correlation between synovitis and risk of knee OA progression in a 5-y prospective follow-up trial.

Methods: 110 eligible female participants were included in the trial (mean age 59.11±8.95 y). The average disease duration in the study group was 8 [3;20] y, all patients were diagnosed with primary knee OA, matching the American College of Rheumatology (ACR) criteria and signed an informed consent. The trial design implied two consecutive clinical evaluations with a 5-y interval. All participants took a survey, which included anthropometric, history and clinical data blocks as well as visual analog scale (VAS) knee pain scoring. Patients also underwent a standard knee X-ray and a knee ultrasound.

Results: After 5-y follow-up 40 patients (group 1) showed radiologic disease progression, while 70 of them (group 2) retained the same stage. Both trial groups were comparable in terms of age (59.2±9.5 vs. 59.0±8.1 y, $p>0.05$) and disease duration (12.1±4.6 vs. 13.7±4.9 y, $p>0.05$), however, group 1 (V1) showed significantly higher BMI (33.2±6.05 vs. 30.51±5.63 kg/m^2, $p=0.021$) and knee pain while walking (66.23±17.98 vs. 55.13±18.24 mm, $p=0.003$). Knee swelling on physical exam was also more common in group 1 (65% vs. 34.3%, respectively, RR=1.9 (95%CI 1.3-2.8), $p=0.002$) as well as synovitis (50% vs. 18.6%, RR=2.7 (95%CI 1.5-4.8), $p=0.001$, Table 1) and ultrasound-verified articular cartilage contour defects (85% vs. 60 %, RR=1.4 (95%CI 1.1-1.8), $p=0.006$). Data obtained 5 y later during the follow-up visit also showed statistically significant superiority of group 1 patients in terms of knee pain (72.03±19.32 vs. 58.44±13.3, $p=0.001$), BMI (34.18±6.24 vs. 31.56±5.45, $p=0.024$) and synovitis, both clinically (80 vs. 48.6 %, RR=1.6 (95%CI 1.2-2.2), $p=0.025$) and ultrasonographically (62.5 vs. 34.3%, RR=1.98 (95%CI 1.2-2.7), $p=0.004$; Figure 1). Articular cartilage contour defects were also more frequent in group 1 (92.5 vs. 67.1 %, respectively, (RR=1.4 (95%CI 1.1-1.7), $p=0.003$). We have aimed to figure out possible correlations (Spearman method) between radiologic stage and OA progression factors and received the following correlation coefficients: knee pain while walking (R=0.44, $p<0.05$), BMI (R=0.32, $p<0.05$) and ultrasound-verified synovitis (R=0.49, $p<0.05$). Multiple factor analysis has confirmed synovitis as a substantial progression factor (p<0.05).

Figure 1.
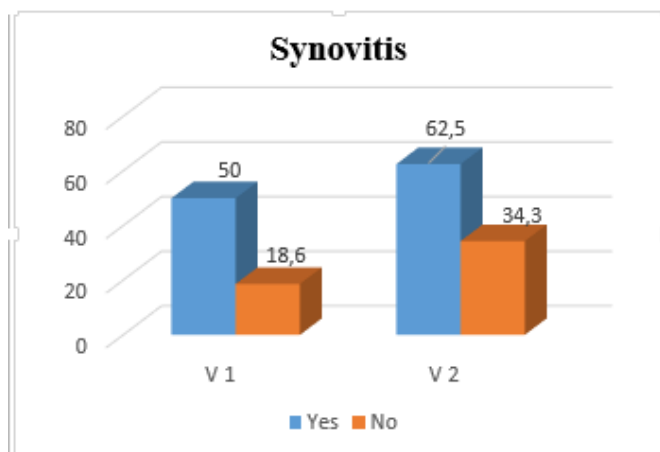
Conclusion: The 5-y study showed an increase of patients with knee synovitis by the means of ultrasound as well as clinically. The trial confirmed synovitis as a significant predictor of knee OA progression.

P1231
SARCOIDOSIS OF HANDS: UNUSUAL PRESENTATION

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Sarcoidosis is an inflammatory disease that consists of the presence of noncaseating granulomas involving multiple organs. Musculoskeletal involvement of sarcoidosis is a rare entity (1-13%). They can be of various presentation which may delay the treatment. Differential diagnosis includes tuberculosis, leprosy, Wegener granulomatosis, lymphoma and several other diseases. We describe a case of sarcoidosis with radiographic findings in phalanges.

Case report: A 65-year-old woman presented with a 5-y history of arthralgia of her fingers and feet. Physical examination revealed a sicca syndrome, dyspnea and multiple cervical lymphadenopathies. Biological tests revealed normal calcemia level, normal liver enzymes and renal function and normal calcinuria. The chest X-ray showed hand and foot radiography showed cystic bone lesions on phalanges suggestive of sarcoidosis. The CT scan showed bilateral patchy opacities in the upper lobes and lymphadenopathies. pulmonary function testing revealed obstructive syndrome. Histological analysis of subclavicular lymphadenopathy showed the presence of epitheloid granulomas with no caseous necrosis. The patient was treated with corticosteroids: 0.5 mg/kg/d. There was no pathologic fractures. The arthralgias and pulmonary lesions improved within 1 year. The patient is still followed in the outpatient department with no other flare.

In the hands, sarcoidosis can manifest with skin and bone abnormalities, of which skin involvement is the earliest to manifest and the most common, found in 20-35% of patients with sarcoidosis. Bone lesions typically affects small bones, most commonly the middle and distal phalanges. Radiographic findings include osteosclerosis, osteolysis, cystic changes, and honeycomb pattern. The diagnosis of sarcoidosis may be difficult when bone lesions are isolated. Treatment involves systemic corticosteroids, antimalarials and surgery.

P1232
THE EFFICACY OF COMPLEX KINESIOTHERAPY IN WEIGHT LOSS AND IMPROVING OF CARBOHYDRATE METABOLISM IN OBESITY PATIENTS

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Objective: To estimate the effect of complex 3-week treatment with 4 kinesiotherapy methods on body weight loss and carbohydrate metabolism in patients with obesity.

Methods: 80 people were enrolled in the study. 40 people in the first group (G1) -26-69 y old with alimentary obesity (mean age 53.7±11 y, weight 106.8±25 kg, BMI 38.3±7.4 kg/m^2, waist circumference WC 110.6±16 cm, hip circumference HC 121±15.3 cm. 40 people in the second group (G2) 21-68 years old with alimentary obesity (mean age 51.3±11 y, weight 112.7±25 kg, BMI 41.8±8.2 kg/m^2, WC 113.6±16 cm, HC 126.3±15.1 cm. Complex kinesiotherapy administered daily for 3 weeks and included interactive sensorimotor training on double platform, a special complex of physical exercises in the gym and ergocycle trainings. In addition, in 2 gr. patients additionally included kinesiohydrotherapy in a pool. Weight, WC, HC, carbohydrate tolerance test (TT HC), insulin last 3 weeks was measured at baseline and after the treatment was completed. Evaluation of the results were performed at baseline and in 3 weeks.

Results: There was a significant improve in body weight in two groups (110±24 kg at baseline vs. 107±22.5 kg in 3 weeks; p=0.000), BMI (40±8 vs. 39±7.6 kg/m^2; p=0.000), WC (112±15.9 vs. 108.1±15 cm; p=0.000), HC (123.4±15.4 vs. 119±14 cm; p=0.000) in treated obese patients. After 3 weeks, we registered statistically significant elevation in insulin levels of G2 vs. to G1. With Z=2.63 in G1, p=0.003 and Z=1.96, p=0.002 in G2, and Z=2.87 when assessing the significance elevation between G1 and G2, p=0.023. Significantly improved performance of TT HC in 1 g. Z=2.02, p=0.04, in 2 g. Z=3.004, p=0.002. When assessing the significance of differences between G1 and G2 after treatment, Z=2.3, p=0.017.

Conclusion: Complex treatment with 4 methods of kinesiotherapy helps to reduce body weight, reduce WC, HC, insulin, TT HC in obesity. However, patients who additionally received kinesiohydrotherapy in a pool showed more significant improvements in carbohydrate metabolism.

P1233
PREVALENCE AND CHARACTERISTICS OF DOUBLE PERIPHERAL FRAGILITY FRACTURES IN AN OSTEOPOROTIC POPULATION MANAGED IN A FRACTURE LIAISON SERVICE

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Objective: The number of prevalent osteoporotic fractures reflects the severity of osteoporosis (OP). The occurrence of a double peripheral fragility fracture (DPFF) in one event might occur in circumstances of most severe OP and frailty and therefore would represent a very high risk situation of imminent further fractures and disability. We took the opportunity of a large database related to a dedicated fracture liaison service (FLS) to explore the phenotype of these patients.

Methods: We conducted a retrolective cross-sectional study of postmenopausal women, visiting the FLS between January 2010 and December 2019 after a peripheral fragility fracture located either at the wrist [W], the hip [H] or the upper end of the humerus [Hu]. All women had a biology assessment, BMD measurement by DXA, vertebral fracture (VF) assessment, or imaging of the spine. All values were expressed in mean±SD.

Results: Among the 997 women aged 77.8±11.8 y, visiting the FSL during the study period, 19 women aged 78.1±10.8 y had a DPFF, which represents 1.9% of the population. The mean number of falls over a 3-y period was 3±1. The BMI was 23.4±4.3kg/m². At least one risk factor for secondary OP was present in only 52.6% of the cases. Six of those subjects (32%), aged 85±3.5 y, were living in elderly institutions. The following combinations of DPFF were identified, W-W, n=3, W-Hu, n=4, W-H, n=7, and Hu-H, n=5. Except W-W, all other DPFF affected the same side, 5 right and 11 left. Eleven women (56%) had ≥1 [1-5] prevalent fragility VF. The values of BMD and T-score were respectively 0.819±0.12 g/cm², (T-score -2.4±1.2) at the spine; 0.644±0.093 g/cm², (T-score -2.6±0.7) at the hip, and 0.647±0.094 g/cm², (T-score -2.5±0.8) at the femoral neck. Mean serum 25OHD level was 49.5±26.3 nmol/L with no elevation in serum PTHi, 46±16.1 ng/L.

Conclusion: The occurrence of a DPFF appears to be very infrequent. The mechanism of the fall could explain the occurrence of DPFF always on the same side. No particular clinical, biological, and densitometric profiles of those patients were noted.

P1234
VFX IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM

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Objective: To study the prevalence and localization of VFx in postmenopausal women with primary hyperparathyroidism (PHPT).

Methods: We studied 43 postmenopausal women with PHPT, average age 62.5±6.12. The control group were 31 postmenopausal women without PHPT, mean age 59.7±6.28 in physiological menopause. Examination: total calcium, Ca⁺⁺, phosphorus, albumin, creatinine, GFR, PTG, OPG, 25(OH)D, BMD measurements by DXA, LVA.

Results: The were no differences in the age, height, weight, BMI, GFR, age of menopause starting, duration of menopause in both group. VFx in postmenopausal women with primary hyperparathyroidism were detected in 33%, VFx in control group were detected in 6,5%. Significant differences were detected in prevalence of VFx in postmenopausal women with PHPT compared postmenopausal women without PHPT (F=0.1, p=0.005, OR: 7.25 (1.78-29.6). 91% VFx in postmenopausal women with primary hyperparathyroidism were localized in Th4-TH10, 45.5% of VFx were detected in Th6-Th7.

Conclusion: The results of the study detected the high risk of VFx in postmenopausal women with PHPT compared postmenopausal women without PHPT. Large part of VFx in postmenopausal women with PHPT was localized in Th6-Th7.

P1235
LORECIVIVINT (SM04690), AN INTRA-ARTICULAR, SMALL-MOLECULE CLK/DYRK1A INHIBITOR THAT MODULATES THE WNT PATHWAY, AS A POTENTIAL TREATMENT FOR MENISCAL INJURIES

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Objective: Meniscal damage is a common knee pathology and a frequent finding on MRI images of knee osteoarthritis (OA). Efforts to repair meniscal damage have been largely unsuccessful and do not prevent the progression of degenerative changes that lead to knee OA. The Wnt signaling pathway has been shown to be regulated during meniscal development, suggesting that manipulation of this pathway may influence the regenerative capacity of the meniscus. Lorecivivint (LOR; SM04690), an intra-articular (IA), small-molecule CLK/DYRK1A inhibitor that modulates the Wnt pathway, was evaluated in preclinical studies to determine its protective and anabolic effects in ex vivo explants and a rat model of chemically induced inflammatory meniscus degeneration.

Methods: Effects of LOR (30 nM) on matrix metalloproteinase (MMP) expression in IL-1b-treated and cultured rat menisci were measured by qPCR. In vivo, LOR activity was evaluated in a rat model of monosodium iodoacetate (MIA) injection-induced inflammatory meniscus degeneration. A single IA injection of MIA was immediately followed by a single IA injection of LOR (0.3 mg) or vehicle. Knees were harvested on Days 1, 4, and 11 and menisci were isolated. Inflammation was evaluated by qPCR for *TNFA* and *IL6* expression. Meniscus protection was evaluated by qPCR for MMPs and aggrecanase and anabolic effects by qPCR for collagens.

Results: In ex vivo meniscal explants, LOR inhibited *MMP1*, *MMP3*, and *MMP13* expression compared to DMSO ($P<0.01$). In vivo, LOR significantly decreased MMP expression and aggrecanase ($P<0.05$) and reduced inflammatory cytokine expression (*TNFA* and *IL6*) compared to vehicle in the rat model of meniscus degeneration at Day 4 after MIA injection. LOR also increased expression of collagen types I, II, and III at Day 11 after MIA injection.

Conclusion: LOR exhibited protective effects in the meniscus ex vivo and in vivo by inhibiting catabolic enzyme expression compared to control. Anti-inflammatory effects of LOR were demonstrated by reduced inflammatory cytokine expression. Compared to vehicle, LOR increased collagen expression in vivo, indicating potential meniscal anabolic effects. These data support further investigation of LOR as potential a disease modifying therapy for meniscal injuries.

P1236
UNUSUAL PRESENTATION OF RETROPERITONEAL FIBROSIS WITH OSTEOCONDENSING LESIONS: A CHALLENGING DIAGNOSIS

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Retroperitoneal fibrosis (RPF) is a rare inflammatory disorder causing increased fibrotic deposition surrounding the major vessels and organs in the retroperitoneum. Bone lesions are rare in RPF and may delay the diagnosis and the treatment. We present a case of idiopathic RPF in a 54 year-old man which presented initially as periaortitis, weight loss, renal insufficiency secondary to ureteric obstruction and osteocondensing lesions.

Case report: A 54-year-old man with history of smoking, presented with low back pain, weight loss of 10 kg within the preceding 6 months. Physical examination was unremarkable. Thoraco-abdominal CT scan revealed thickening concentrically around the abdominal aorta, both iliac arteries, the inferior vena cava, and the ureters bilaterally. There was bilateral hydronephrosis. Skeletal X-ray examination showed osteocondensing lesions of femurs, lumbar vertebral bodies and skull. The patient had elevated creatinine (182 µmol/l) from the ureteral obstruction and elevated level of inflammatory markers. Bilateral Double-J stents were placed to relieve the obstruction. Further tests were recommended to rule out an autoimmune diseases. Antinuclear

antibodies, antineutrophil cytoplasmic autoantibodies, rheumatoid factor and IgG4 immunoglobulin were negative. Idiopathic RFP was entertained at this time and the patient was treated with corticosteroids. A guided biopsy of the soft tissue mass was performed for definitive diagnosis.

The initial clinical presentation of RPF may be variable. Bone involvement is rare and should raise suspicions of Erdheim-Chester disease. Given its nonspecific clinical presentation, a diagnosis of RPF relies upon the correlation between radiographic and pathologic findings. Our case report underlines the variety of lesions associated with RPF and the significance of diverse examinations.

P1237
SM04755, A POTENTIAL DISEASE-MODIFYING TREATMENT FOR TENDINOPATHY, MODULATES THE WNT PATHWAY VIA INHIBITION OF CLKS AND DYRK1A

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Objective: Tendinopathy is associated with inflammation, tendon degeneration, and failed healing. Despite the high prevalence of tendinopathy, its underlying pathogenesis is not fully understood. The Wnt pathway is upregulated in tendinopathy, affecting inflammation and tenocyte differentiation. SM04755, a topical, small-molecule Wnt pathway inhibitor, has previously been shown to inhibit inflammation and increase tenocyte differentiation in nonclinical models.[1] The objective of this study was to identify molecular targets of SM04755 and its associated mechanism of action.

Methods: Wnt pathway inhibition was measured using a luciferase reporter assay in SW480 cells. A kinome screen (318 kinases) and kinase assays were performed. SM04755 effects on protein phosphorylation in rat tendon-derived stem cells (rTDSCs) and peripheral blood mononuclear cells (PBMCs) were measured using western blot. SiRNA-mediated knockdown of CDC-like kinases (CLKs) and dual-specificity tyrosine kinase (DYRK1A) were performed in human mesenchymal stem cells (hMSCs), rTDSCs, and rat tenocytes. Wnt pathway and catabolic enzyme (MMP) gene expression was measured using qPCR. Tenocyte marker expression was assessed by qPCR and immunostaining. Inflammatory cytokine expression in PBMCs was measured by qPCR and ELISA.

Results: SM04755 was a potent inhibitor (EC_{50}=156 nM) of Wnt signaling. Biochemical assays identified CLKs and DYRK1A as molecular targets of SM04755. SM04755 potently inhibited CLK-mediated phosphorylation of serine/arginine-rich splicing factor (SRSF) proteins compared with DMSO control. Knockdowns of CLKs and DYRK1A led to inhibition of Wnt pathway genes (*AXIN2*, *LEF1*, *TCF4*, *TCF7L*) compared with siRNA controls (siCtrl). CLK and DYRK1A knockdowns also induced expression of tenocyte markers in rTDSCs and inhibited expression of MMP1, 3, 9, and 13 in tenocytes compared with siCtrl. SM04755 treatment of LPS-

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stimulated PBMCs reduced NF-κB and STAT3 phosphorylation and inhibited inflammatory cytokine production compared with DMSO.

Conclusion: SM04755 provides a novel mechanism for modulation of the Wnt pathway through its effects on two distinct molecular targets, CLKs and DYRK1A, and thus has potential as a treatment for tendinopathy. Human tendinopathy trials are planned.

References: 1. Deshmukh et al. *Arthritis Rheum* 2016

P1238
PREDICTIVE FACTORS FOR A BETTER SYMPTOMATIC RESPONSE TO ONE-SHOT INTRA-ARTICULAR HYALURONIC ACID IN THE TREATMENT OF KNEE OSTEOARTHRITIS AND COMPARISON OF THE SENSITIVITY OF VARIOUS RESPONSE CRITERIA USED IN OSTEOARTHRITIS

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Objective: To identify predictive factors of a better symptomatic response to intra-articular (IA) hyaluronic acid (HA) in the treatment of knee osteoarthritis (OA) and to compare the sensitivity of various response criteria used in knee OA.

Methods: This was a post hoc analysis on data obtained from a randomised controlled trial demonstrating that a single IA injection of 2% non-crosslinked HA is noninferior to 0.8% hylan G-F 20 over 6 months of follow-up in patients with knee OA [1]. Uni- and multivariate stepwise regression analyses were performed on pooled data of the two treatment arms (280 patients in the full analysis set; 266 completers). The OMERACT-OARSI responder rate was determined using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) A as pain parameter, the WOMAC C for physical function and the patient global assessment (PGA) on a 100 mm visual analogue scale. The Patient Acceptable Symptom State (PASS, ≤40 mm) and the Minimal Clinically Important Improvement (MCII, ≥15 mm) responder rates were calculated for pain (WOMAC A1), physical function (WOMAC C and Lequesne index) and PGA.

Results: Responder rates were higher in patients with a higher pain at baseline (OR [95%CI]: 1.05 [1.02;1.08]), a shorter interval from diagnosis to IAHA injection (0.93 [0.88;0.99]), bilateral knee OA (2.51 [1.11;5.68]), and a better PGA at baseline (0.95 [0.92;0.98]). With about 80% of responders, the most sensitive response criteria were the MCII for pain (relative change), followed by the OMERACT-OARSI, and the MCII for pain (absolute change) criteria.

Conclusion: For the first time, several definitions of therapeutic response to IAHA in knee OA were compared. The responder rates defined by the MCII for pain and the OMERACT-OARSI were the most sensitive response criteria. Pain at baseline, a shorter time interval from diagnosis to IAHA injection, bilateral knee OA and a better PGA at baseline might be predictive factors for a better symptomatic response to IAHA.

Reference: 1. Maheu E et al. PLoS One 2019;14:e0226007.

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P1239
BONE LOSS IN KALLMANN SYNDROME: A NEW CASE REPORT

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Kallmann syndrome is characterized by the association of hypogonadotropic hypogonadism and anosmia. It was originally first described in 1856. In addition to hypogonadotropic hypogonadism and anosmia, other somatic abnormalities may be present. They include neurologic deficits, mental retardation, hearing loss, renal aplasia or hypoplasia, cryptorchidism, and midline craniofacial abnormalities. Decreased bone density has rarely been described previously as a presentation of Kallmann syndrome. We report a case of a woman with Kallmann syndrome who presented with multiple fractures.

Case report: 54-year-old Tunisian woman, presented with her third fracture of the right femur within 9 months. Further questioning revealed previously medical history of multiple fractures of the fifth dorsal vertebra, the left knee and anosmia. She was followed in the outpatient Department of endocrinology for a Kallmann syndrome. The family history was negative. Physical examination revealed no specific features. PTH, alkaline phosphatase, calcium, phosphorus, TSH, ACTH, prolactin, growth hormone, cortisol, IGF-l, and renal function were normal. BMD of the femoral neck and lumbar spine was at -3.5 standard deviations below the mean for the patient's age. She was treated with zoledronic acid: 1 perfusion/y during 3 y with no recurrence of fracture.

This report documented pathologic fractures due to osteoporosis as a presentation of Kallmann syndrome. Because decreased bone density cannot be completely recovered after estrogen replacement, Kallmann syndrome, as well as other hypoestrogenic states, should be included in the differential diagnosis of fractures in a young woman. Prompt recognition is imperative to enable these patients to delay bone loss and avoid its serious complications. Then, bisphosphonates may prevent bone destruction in Kallmann syndrome.

P1240
ADULT LANGERHANS' CELL HISTIOCYTOSIS WITH MULTISYSTEM INVOLVEMENT: A CASE REPORT

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Langerhans' cell histiocytosis (LCH) is a rare disorder with multisystem involvement. The bone is the most common site of LCH involvement, and lung, skin, lymph node, central nervous system, and liver can also be involved. Here, we report a new case of LCH that showed the involvement of multiple organs.

Case report: A 24-year-old man who had been referred to our outpatient department presented with a 5-y history of frontal bone tumor of the forehead, headache, polydipsia and polyuria. The X-ray of skull revealed several osteolytic lesions. Biological tests including routine blood examination, liver and renal function were within normal limits. Abdominal ultrasound and chest X-ray revealed no abnormal findings. A biopsy performed for the lesion on the forehead and revealed a significant number of foamy cells and epithelioid histiocytes with scattered multinuclear giant cells, and several Touton giant cells. MRI showed a thickening of pituitary stalk. Hence, a diagnosis of LCH with a diabetes insipidus was established according to the clinical and pathological findings. Thus, the patient was treated with desmopressin acetate hydrate and there was no clinical recurrence.

There are 3 clinical variants of LCH according to the involved organ: eosinophilic granuloma, the most common form characterized by a solitary bony lesion; Hand-Schuller-Christian disease, the chronic recurrent form, which classically shows the triad of skull lesion, exophthalmos, and diabetes insipidus; and Letterer-Siwe disease, the fulminant form with multiple organ involvement. Any bone can be involved, but usually LCH involves the skull, rib, spine, and long bone. In our case, although only one enhancing lesion in the frontal bone was pathologically confirmed, typical imaging findings of LCH were observed pituitary gland, without exophthalmos.

P1241
LORECIVIVINT (SM04690), A POTENTIAL DISEASE-MODIFYING TREATMENT FOR KNEE OSTEOARTHRITIS, DEMONSTRATED CARTILAGE-PROTECTIVE EFFECTS ON HUMAN OSTEOARTHRITIC EXPLANTS

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Objective: Wnt pathway upregulation contributes to cartilage thinning in knee osteoarthritis (OA). Lorecivivint (LOR; SM04690), a novel, small-molecule CLK/DYRK1A inhibitor that modulates the Wnt pathway, demonstrated disease-modifying potential for knee OA in preclinical studies.[1] This study evaluated the cartilage-protective effects of LOR on human OA explants from total knee replacement (TKR) donors.

Methods: Knee joint tissue from 22 TKR donors was collected after IRB approval was obtained from Scripps Health. Cartilage was scored using the Outerbridge classification system based on gross appearance (grade 1=least-damaged tissue, grade 4=most-damaged tissue). Cartilage explants (4 mm in diameter) with Outerbridge grades 2–3 were harvested and cultured for 48 h to reach metabolic stability. They were then treated with LOR (10 nM, 30 nM) or DMSO and stimulated with either IL-1β (10 ng/ml) or TNFα (20 ng/ml) and oncostatin M (OM) (10 ng/ml) or left unstimulated. After 72 h, supernatants and explants were collected. Gene expression of matrix metalloproteinases (MMP) 1, 3, and 13 was measured by qPCR and protein levels of MMP-1, MMP-3, MMP-13, and thrombospondin-motif-containing disintegrins/metalloproteinases ADAMTS-4 and ADAMTS-5 were measured in supernatants by ELISA. Glycosaminoglycan (GAG) and nitric oxide (NO) levels were measured in supernatants using the dimethylmethylene blue assay (DMMB) and Griess assay, respectively. One-way ANOVA was used for multiple group comparisons.

Results: Treatment with IL-1β or TNFα/OM led to statistically significant increases in gene expression of MMP1, MMP3, and MMP13 and increased secretion of GAG, MMP-1, MMP-3, MMP-13, ADAMTS-4, ADAMTS-5, and NO in supernatants compared to unstimulated control. Treatment with LOR decreased both IL-1β-stimulated and TNFα/OM-stimulated gene expression of all MMPs and secretion of GAG, MMP-1, MMP-3, MMP-13, ADAMTS-4, ADAMTS-5, and NO in supernatants vs. treatment with DMSO.

Conclusion: LOR demonstrated potent inhibition of cartilage catabolism enzyme production in human OA explants compared to controls. These cartilage-protective effects support the development of LOR as a potential disease-modifying treatment for knee OA. Human trials are ongoing.

Reference: 1. Deshmukh V et al. *Osteoarthr Cartil.* 2019.

P1242
CHARACTERISTICS OF PATIENTS WITH SUBSEQUENT DISTAL RADIUS FRACTURE AFTER INITIAL DISTAL RADIUS FRACTURE

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Objective: To investigate the characteristics of patients with subsequent distal radius fracture (DRF) after initial DRF. To identify the factors contributing to subsequent DRF, several bone frailty parameters were compared in patients with primary and subsequent DRF.

Methods: Between September 2016-April 2019, 241 patients with DRF visit our institute and underwent a DXA scan within two weeks after the fracture. Among them, 215 experienced primary DRF (primary DRF group) and 26 had a previous history of DRF (subsequent DRF group). Demographic characteristics; history of osteoporosis treatment; and bone fragility parameters, including BMD, trabecular bone score (TBS), hip geometry parameters, and bicortical thickness (BCT) of the distal radius, were compared

in patients with primary and subsequent DRF. To reduce bias, patients with subsequent DRF were propensity score matched in 1:2 manner with patients with primary DRF and additional comparison was done.

Results: The portion of patients who exposed to osteoporosis medication was significantly higher in the subsequent DRF group than in the primary DRF group (38.5% vs. 19.1%, p=0.022). Bone frailty parameters, including BMDs, TBS, hip geometry parameters and BCT were not significantly different between the two groups. Similar results were observed in comparison between propensity score matched patients with primary DRF and patients with subsequent DRF.

Conclusion: Bone frailty parameters were not significantly different between patients with primary and subsequent DRF, suggesting that the occurrence of subsequent DRF is due to multiple factors rather than bone frailty alone.

P1243
PERSON-CENTERED STANDARDIZED CARE PATHWAY FOR PATIENTS WITH OSTEOPOROSIS-RELATED FRACTURES: A NATIONAL MANDATE TO DEVELOP FRACTURE LIAISON SERVICES ACROSS SWEDEN

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Despite a high, well known fracture incidence, the care gap has only marginally shrunk over the past ten years; with annual post-fracture treatment rates consistently below 20%. Finally, this huge gap in care is being nationally recognized and addressed. Here, we describe the national mandate and work-process to develop a person-centered standardized care pathway for secondary fracture prevention to be implemented in Sweden.

Swedish health care is regionalized and politically governed and a joint commission (SKR) develops guidance and recommendations to align care. Currently, a knowledge-based system for governance is being implemented, aiming to apply best available evidence, use competencies and resources effectively and provide equal care, countrywide.

National program areas, mirroring medical specialties was a first step; osteoporosis, becoming the responsibility of the endocrinology program. Because of the large care gap and the evidence supporting coordinator-based secondary fracture prevention, osteoporosis was accepted to the pilot round for national standardized care pathways. Next, a multi-professional national working group was initiated, representing hospital-based and primary care physicians, patients, fracture nurses, DXA operators and physiotherapists. Representatives are nominated by their health care region, increasing the likelihood of successful implementation.

A national questionnaire-based inventory collated current circumstances, strengths and weaknesses. Two exemplar pathways were developed (and visually described using a decision tree, with short instructions). These were: in-hospital managed patients e.g. hip fracture and mainly out-patient managed patients, e.g., distal radius fracture. An essential element in the development of the pathway is patient participation, hence, a description of the patient experience and journey through the care system postfracture is included. National performance indicators, predominantly accessible through our national registries are also included, highlighting also those areas requiring improvement. The consequences - from analysis of benefit-risk, cost-effectiveness and requirements - are key to implementation; the decision to proceed with the final program and provide money to support it being made by the SKR.

We consider this a major step towards reducing the care gap and a good example. The presentation covers the work process, the consideration and the national pathway for secondary fracture prevention.

P1244
SARCOPENIA AND OSTEOPOROSIS IN ORTHOGERIATRICS AND OCCUPATIONAL THERAPY

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Objective: The aim of the integrated OT programme was to evaluate the prevalence of sarcopenia and osteoporosis in hospitalized patients in order to customize rehabilitation due to femoral fractures. Sarcopenia as a syndrome causes a progressive general muscle and muscle strength loss leading to increasing negative outcomes like disability and poor quality of life.

Methods: 103 elderly patients with femoral fractures have been hospitalized for 12 months in Geriatrics - Long Term Care Ward. They have been assessed through a multifaceted (orthopedic-geriatric-rehabilitative) approach using MMSE, BADL, IADL, Barthel Index. Sarcopenia and Osteoporosis were assessed through DXA Bone Densitometry. Sarcopenia presents: 1) Muscle loss; 2) Muscle strength loss; 3) Reduced physical abilities. A diagnosis descends from presence of criterium #1 plus criterium #2 or #3. 37 patients with femoral fracture and sarcopenia (M #16, F #21, aged 82±4) were included in the study

Results: The standing position recovery for 63 patients started within 3 d after prosthesis surgery due to femoral fracture. They were dismissed after a 15/25-d hospitalization. 34 elderly subjects recovering from osteosynthesis regained the sitting position in 2-3 d, load tests were made between 7-14 d and they left the unit 30/45 d after admittance. At discharge 21 patients (M #9, F #12,

aged 80±3) affected by femoral fracture and sarcopenia were moved to the Extended Care Unit for lack of assistance at home. There they followed an Occupational Therapy (OT) programme including aims like: 1) performing lower limbs mobilization through specific exercises; 2) working on muscle fibers type 2 to counterbalance the muscle loss. The group including patients following the programme was then compared to one including 8 subjects affected by femoral fracture and sarcopoenia (mean age 77±6) discharged and going home to their caregivers after femoral fractures. A 6-month individual OT programme at the Extended Care Unit showed: 1) improvement in motor skills detected through scales scores (BADL 3.3/6 > 4.5/6 - IADL 2.5/8 > 5.7/8 - Barthel Index 50/100 > 90/100); 2) improvement both in muscle mass and muscle strength.

Conclusion: Aims of orthogeriatrics were:1) improve mobilization and motor reactivation; 2) Diagnosis and treatment in case of medical complications or comorbidity aggravation; 3) Treatment of acute diseases postponing surgery; 4) Customized physical activity programme at discharge. Effectiveness of a OT programme focused on motor reactivation and muscle strengthening aimed at patients discharged after femoral fractures and osteosynthesis, was evaluated. The Occupational Therapist approach was customized so that elderly patients continuing rehabilitation in residential structures regained self-assurance and independence.

P1245
LIVER FIBROSIS IN A GROUP OF PATIENTS WITH INFLAMMATORY RHEUMATIC DISEASES

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Objective: Methotrexate (MTX) represents the first line drug for rheumatoid arthritis (RA), as well as a therapeutic choice for psoriatic arthritis (PsA), psoriasis or seronegative spondyloarthropathy. Although the conducted studies generally include small cohorts, MTX has been associated with various patterns of liver involvement, such as fibrosis, steatosis, cholestasis or even cirrhosis. Thus, investigating hepatic stiffness and prevalence of liver fibrosis in patents with inflammatory rheumatic diseases, undergoing MTX treatment, is requisite in order to establish proper diagnosis and management of such lesions. We aimed to evaluate the presence of liver fibrosis, using transient elastography, in patients with RA and PsA undergoing methotrexate (MTX) treatment.

Methods: We included 50 patients with RA (30 using MTX, 20 with other synthetic DMARDs, excepting MTX), 30 patients with PsA, with MTX treatment, and 20 controls. Liver fibrosis was evaluated by transient elastography (TE; Fibroscan, Echosens, Paris, France). A value above 7 kPa (kilopascals) is considered as hepatic fibrosis.

Results: Hepatic stiffness evaluation revealed significant different values between RA patients treated with MTX and controls (5.87±0.8 kPa compared to 4.21±0.1 p<0.005); for non-MTX treated RA patients, the values were different (4.51±0.9kPa) compared to controls, but with a lack of statistical significance. For PsA subjects we obtained statistically significant different data, compared to controls (p=0.002). Liver fibrosis was found with high values for 5 of the 30 RA patients using MTX and for 6 of the 30 PsA ones. For the latest group, liver stiffness was found to be associated with BMI (r=0.42, p=0.001) and the presence of fatty liver (r=0.55, p=0.003).

Conclusion: Our results show a positive interrelation between MTX treatment and liver stiffness in patients with RA and PsA, imposing a careful and periodic proper evaluation, in order to prevent future complications.

P1246
THE PECULIARITIES OF LIPID METABOLISM AND BONE TISSUE METABOLISM IN PATIENTS WITH OSTEOARTHRITIS AND TYPE 2 DIABETES MELLITUS

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Objective: To investigate the interaction between lipid metabolism and parameters of bone tissue metabolism in patients with osteoarthritis (OA), type 2 diabetes mellitus (T2DM).

Methods: The study involved 85 patients (20 males), aged 58.00±0.82 with OA and T2DM in Regional Hospital of Kharkov, control group (n=20). All patients were divided into 2 groups: group 1 (n=21) - with OA, group 2 (n=64) - with combined course of OA and T2DM. Baseline characteristics of patients included history of OA (1st group-8.52±0.53 y; 2nd group – 7.84±0.54 y, T2DM (2nd group – 9.22±0.90 y). The survey plan included indices of lipid metabolism (levels of total cholesterol (TC), low-density lipoprotein cholesterol (LDL), very LDL (VLDL), triglycerides (TG), high-density lipoprotein cholesterol (HDL). The level of alkaline phosphatase (ALP) was determined by colorimetric method, levels of Ca, P, Mg were determined by biochemical method. The levels of osteocalcin (OC), calcitonin (Ct) were determined by ELISA. The level of HbA1C was <7.5% in all patients. The X-ray examination of knees was performed for all patients.

Results: The level of TC in patients with OA was significantly higher in comparison with the control group, in patients with T2DM and in combination with OA it was even higher than in group with OA (p<0.05). Pair correlations between indices of lipid metabolism and bone tissue metabolism were mostly moderate or weak, no strong coupling were found. A statistically significant relations were determined that indicate a decrease of OC level with an increase in the values of TC (r=-0.60, p=0.004112<0.05)

and LDL cholesterol (r=-0.56, p=0.008210<0.05) in patients in 1st group. A significant correlation between OC and LDL (r=−0.49, p=0.004321<0.05), VLDL (r=−0.36, p=0.019259<0.05) and TC (r=−0.57, p=0.000435<0.05) was determined in 2nd group of patients. Also the correlations between Ca and HDL (r=0.54, p=0.003329<0.05), TC (r=0.41, p=0.01<0.05) and VLDL (r=0.38, p=0.01<0.05); P and TG (r=0.46, p=0.02<0.05), Ct and VLDL (r=−0.40, p=0.0307<0.05) were determined in patients with combined course OA and T2DM. Ct is moderately negatively correlated with HDL (r=−0.46, p=0.003412<0.05). The biggest number of correlations were found between level of TG and parameters of bone tissue metabolism, such as Ca (r=0.39, p=0.01381<0.05), ALP (r=0.38, p=0.03231<0.05), OC (r=−0.39, p=0.03712<0.05) and Ct (r=−0.39, p=0.03122<0.05) in patients group 2.

Conclusion: The study shows that the remodeling of the bone, which can lead to progression of osteoarticular changes in patients with in patients with OA and the comorbidity of OA and T2DM, can be connected with effect of lipid metabolism disorders on bone tissue metabolism.

P1247
AUGMENTED REHABILITATION IN YOUNG PATIENTS FOLLOWING TOTAL HIP ARTHROPLASTY (THA)

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Objective: There is an increase in THA in younger patients which may change the future rehabilitation demands for primary and revision THA surgery. A rehabilitation program geared toward younger THA candidate may be beneficial in helping them resume an active lifestyle. This study aims to determine the impact of a 6-week postoperative rehabilitation program specifically designed for THA patients ≤60 y compared to age- and sex-matched control group received usual postoperative care. Physical activity (PA) and function was assessed objectively (Sense Wear Pro Armband™ [SWA]) and subjectively (*Hip Osteoarthritis Outcome Score (HOOS))* 12-week post-THA.

Methods: In this quasi-experimental study, physiotherapist recruited a convenience sample of THA candidates during their 6-week postoperative visit at an arthroplasty Clinic in Edmonton, Alberta Canada. The augmented rehabilitation program involved 12 structured exercise classes (2.5 h/class) spread over 3 months. Each session included 1 h of land-based exercises and 1.5 h of water-based exercises with a focus on strength and gait retraining. **Assessments:** PA (step counts, sedentary time, light activity time, moderate-to-vigorous physical activity, daily energy expenditure) was assessed using a SWA which was worn for 4 consecutive days. Participants also completed the HOOS questionnaire before and immediately after the intervention.

Results: Of the 24 participants recruited (53±4.7 y, 33.3% female), 14 participants received the augmented rehabilitation and 10 were in the usual care group. *SWA Measures:* No significant between-groups differences in the activity profiles were seen at baseline or postintervention assessments. Only the intervention group took significantly more steps/d compared to their baseline (mean difference=2440 steps/d, 95%CI=167.8-4712.2). *HOOS Subscale Scores:* Post-intervention, the sport/recreation subscale was higher in the intervention (vs. controls; p=0.02). *Within the intervention group, all* HOOS subscales were significantly higher (*P*<0.05) at the postintervention compared to baseline.

Conclusion: The augmented rehabilitation program may have immediate effects on pain relief and symptom reduction for patients (≤60 y) following THA. An increase in objective and self-reported daily physical activity was also observed in this group. Further study with large sample and long-term follow-up is needed to confirm the effects of our augmented rehabilitation program.

P1248
ALCOHOL AND UNRECOGNIZED FRACTURES: A CASE REPORT

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Objective: Alcoholic beverages are widely consumed, resulting in a staggering economic cost in different social and cultural settings. Types of alcohol consumption vary from light occasional to heavy, binge drinking, and chronic alcohol abuse at all ages. In general, heavy alcohol consumption is widely recognized as a major epidemiological risk factor for chronic diseases and is detrimental to many organs and tissues, including bones. Chronic alcohol consumption impairs bone cell activity and results in an increased fragility. Regular alcohol consumption is most common following skeletal maturity, emphasizing the importance of understanding the skeletal consequences of drinking in adults.

Methods: The cases of unrecognized fractures arrived at the alcoholic rehabilitation were analyzed. The history of C.D was then analyzed as an emblem of the many patients who arrived at our rehabilitation with unrecognized fractures.

Results: The case of C.D, a 40-year-old patient who came for a cycle of detoxification and alcohol rehabilitation at the alcoholic rehabilitation Department of the Richiedei Foundation was then analyzed. The patient who arrived in a state of intoxication at our operating unit on physical examination had live pain exacerbated by palpation in the left foot, reported accidental fall in a state of alcoholic intoxication a week before for which he had not carried out investigations. Foot radiography was performed showing fracture dislocations of the 2nd-3rd-4th metatarsal bone, shoulder radiography was performed showing a suspected compound fracture of the right shoulder humerus. 5% of all patients admitted to our operating unit of alcoholic rehabilitation have orthopedic problems of these 2% had a misunderstood fracture.

Conclusion: Many fractures are related to alcohol use and abuse. Alcohol increases the number of road accidents, fights, accidental falls. This is associated with the lack of awareness about the perception of pain in the intoxicated patient. The data examined show how often hospital-based care is needed to be able to diagnose.

P1249
TEN WEEKS OF RESISTANCE TRAINING EXERCISE PROGRAM INCREASES FULL-BODY MUSCULAR STRENGTH IN PEOPLE WHO HAVE UNDERGONE A LUMBAR DISCECTOMY

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Objective: This study was two-fold: i) to determine the effects of a resistance training exercise program (strength and balance) on muscular strength recovery after lumbar surgery and ii) to determine the feasibility of monitoring the velocity of execution to quantify the training adaptations.

Methods: Eight adults (aged 39±13 y; weight 84.5±24.5 kg) who undergone a lumbar discectomy surgical procedure completed a 10-week exercise training programme (2 d/week, 1 h session, combining strength and balance exercises), specifically designed by the Functional Training Unit and the Neurosurgery Unit from the QuirónSalud Hospital in Murcia. Two months after surgery, dynamic upper- and lower-body strength was measured using a gravity gym system with adjustable incline (i.e., load was considered the body mass at different tilts: 7º, 14º and 21º) during unilateral and bilateral exercises: leg press, horizontal bench pulls and upright prone pullups. Peak (PV) and mean propulsive velocity (MPV) was monitored using a linear position transducer. Low-back pain was assessed using the Oswestry scale.

Results: After the intervention all participants except one increased their velocity movement in all the tests (average from 13% to 82% increments) with no increments in pain. More importantly, five participants who were unable to complete all the tests at the beginning of the study due to pain or weakness were able to reach the maximum load (i.e., complete all the test at 21º tilt) in all the exercises.

Conclusion: i) A 10-weekresistance training exercise program focused on strength and balance increased full-body muscular strength in people that undergone a lumbar surgical procedure, with no increments in pain or discomfort during the treatment, ii) the combination of velocity measurement as intensity parameter and the gravity gym system at different tilts were shown effective to screened and quantify changes in muscular strength in people for which weight training is contraindicated.

P1250
CLINICAL UTILITY OF TRABECULAR BONE SCORE (TBS) IN OSTEOPOROSIS PATIENT MANAGEMENT

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Objective: Trabecular bone score (TBS) is a surrogate measure of bone microarchitecture. Low TBS is associated with both a history of fracture and an increased incidence of new fracture, partly independent of areal BMD and clinical risk factors.[1] TBS has predictive value for fracture independent of FRAX.[1] TBS increases with osteoporosis treatment.[1] We aimed to study the clinical utility of TBS.

Methods: We did a retrospective chart review of 100 consecutive patients seen in a bone clinic with institutional affiliation between 2018-2019 for whom TBS was ordered in addition to BMD of spine and hip and FRAX. The mean age of the patients was 66 years old. 13 of the 100 patients were males.

Results: TBS was ordered for one of five reasons: 21% of the orders were to decide if therapy was needed, 60% to help choose an appropriate therapy, 10% to optimize bone health prior to surgery, 2% to explain a fracture in the setting of normal bone density, and 7% to decide if medication should be continued. 21% of the patients had a TBS in the top third (TBS≥1.3), 41% of the patients had a TBS in the middle third (1.2<TBS<1.3), and 38% of patients with TBS in the bottom third (TBS≤1.2). Of the patients with TBS in the top third, 43% (9/21) did not receive therapy, and 14% (3/21) received an oral bisphosphonate. Of the patients with TBS in the lower third, 47% (18/38) of patients received an anabolic therapy, 34% (13/38) received denosumab. Despite being in the bottom third TBS, 11% (4/38) of patients deferred starting osteoporosis therapy.

Conclusion: TBS has clinical utility for an osteoporosis clinician to help choose a therapy, decide whether therapy is needed, or to optimize bone health prior to surgery. However, some patients with low bone mass, despite being told that TBS also shows poor microarchitecture, chose to defer osteoporosis therapy.

Reference: 1. Harvey NC. Bone 2015;78:216.

P1251
PREVALENCE OF HYPOPHOSPHATEMIC RICKETS IN COLOMBIA: MODEL TO ESTIMATE RARE DISEASE PREVALENCE USING NATIONAL REGISTERS

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Objective: To estimate the prevalence of hypophosphatemic rickets in Colombia and its health services use.

Methods: We used a model to estimate the probability of the transitions from one health-disease state to another. The model uses a Markov chain in which the probability of each event depends only on the immediately preceding event, with succession of random and dynamic variables over time. We used WHO´s DisMod-II software for this purpose. DisMod-II uses a system of differential equations in which the probability of moving from one state to another is proportional to the number of people in each state. The software was fed with international prevalence of original studies, administrative records of SISPRO (national health information system), vital statistics and the population census. We estimated use in health services from pharmaceutical, social and specialist medical reports.

Results: The estimated prevalence for Colombia in 2018 was 1.3 cases per 100,000 people, corresponding to 602 affected people (484 women and 118 men). 2.07 and 0.52 cases per 100,000 people for women and men respectively. We estimated that approximately 11.4% of patients receive prescriptions of phosphate salts per year and 9.6% of patients receive specialized clinical care. 7% of patients are part of patient associations.

Conclusion: The estimated prevalence is consistent with international data. Although there may be under-registration, the proportion of use of health services by these patients who have a high morbidity burden is low. This information is relevant to support high impact public health decisions for rare diseases. DisMod-II is a useful model estimating the prevalence of rare and orphan diseases, which cannot have probabilistic studies made.

Disclosure: Ultragenix provided funding for this project at the beginning of the work but had no other influence on the development or reporting of the project.

P1252
SHORT- AND LONG-TERM EFFECTS OF A TAILORED MULTICOMPONENT EXERCISE PROGRAMME ON FUNCTIONAL CAPACITY IN OLDER ADULTS LIVING IN NURSING HOMES: PILOT RESULTS FROM THE HEAL STUDY

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Objective: To analyse the short- (4 weeks) long-term (12 weeks) effects of tailored exercise programme on functional capacity and frailty level in institutionalized adults ≥65 y living in nursing homes.

Methods: 20 people (aged 80±10 y; weight 78.4±22.2 kg; height 158.3±10.2 cm; 65% women) completed 12 weeks of the VIVIFRAIL multicomponent exercise training programme (3-5 d/week, 45 min to1 h session, combining strength, balance, endurance and flexibility exercises). Functional capacity measurements included isometric handgrip strength and the Short Physical Performance Battery (SPPB)test. Participants were allocated into one of the

six training routines (A, B, B+, C, C+ and D) regarding their initial level according to the SPPB scores and the VIVIFRAIL initial tests. After 4 weeks, all participants were rescreened to adjust the training programme individually.

Results: Attendance to the training sessions was over 70%. Medium to large short-term effect (Hedge's *g* between 0.45-1.38) were found in all the tests except for isometric handgrip strength (*g*<0.13). The greatest increments were found in the SPPB points (*g*=0.72) and the sit-to-stand test (*g*=1.38).While these improvements were maintained until completing the 12 weeks, no relevant changes were found compared to the acute short-term gains. All the 16 participants who completed the 12-week programme increased their functional capacity, with those starting as frail (38%) and prefrail (19%) being able to reverse their frailty and limited mobility status after the treatment. Eleven participants (69%) turned to a high training level (e.g., from A to B, from B to C) after 4 weeks.

Conclusion*:* The VIVIFRAIL multicomponent exercise programme produced short-term improvements on functional capacity and even reversed the frailty status in older adults living in nursing homes. After adjusting the training programme, these increments were maintained and even increased along the following 8 weeks.

P1253
LUMBAR VERTEBRAL FRACTURE IN A FEMALE PATIENT WITH VITAMIN D DEFICIENCY

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Vertebral fractures are common in older women with osteoporosis and are frequently asymptomatic or appear after minor trauma. The prevalence of vitamin D deficiency in adults is high and is associated with osteomalacia, osteopenia or osteoporosis, muscle strength deficiency, increased risk of falls and fragility fractures.

Case report: We present a 81-year-old woman with a L1 vertebral fracture after a minor trauma and for which vertebroplasty was performed in the neurosurgery department. After surgery the patient was admitted in Physical Medicine and Rehabilitation department for specialized treatment. Blood level of vitamin D determination revealed a severe deficiency of 8.8 ng/ml. In BMD examination utilizing DXA (Prodigy Advance TM, GE-Lunar Corp., Madison, WI, USA), osteoporosis was diagnosed with T-score -3,1 (left ultradistal radius), but the patient did not have history of diagnosis and treatment for osteoporosis before vertebroplasty. We recommended 4000 UI/d vitamin D and reevaluation after 3 months. An antiosteoporotic treatment with teriparatide will be considered after reaching the optimal blood level of vitamin D.

P1254
EFFECTS OF A SIX-MONTH SUPERVISED EXERCISE INTERVENTION ON VERTEBRAL FRACTURE INCIDENCE IN PATIENTS WITH VERTEBRAL FRAGILITY FRACTURE AND PATIENTS WITH A HIGH RISK OF FRACTURE

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Objective: Vertebral fragility fractures are associated with increased morbidity and mortality. Patients who sustain a vertebral fragility fracture have a high risk of subsequent fracture. Therapeutic exercise is a non-pharmacological intervention that potentially reduces refracture rates and restores functional movement. We aimed to assess the effects of a 6-month supervised spinal exercises of proprioceptive extension and postural strengthening on vertebral fracture rates in patients with high risk and incident vertebral fragility fracture.

Methods: We evaluated women aged 50 years or older with osteoporosis, at least one incident vertebral fracture and with high risk of fracture. Physical capabilities were evaluated and vertebral morphology was assessed with an HD-DXA morphometry at baseline and in the sixth month. Participants conducted a 30-min supervised program of physical exercises twice a week for 3 weeks. Thereafter, they were instructed to perform the exercises 5 d a week at home with periodic monthly supervision. Program consisted of static and dynamic exercises to strengthen the spinal extensor muscles, increase mobility, and improve static and dynamic posture. Loads and volumes were calculated individually. Resistance bands, and body weight were used. All patients received specific medical treatment for osteoporosis.

Results: 36 women aged 50-84 y (mean 63.7±8.2), with osteoporosis (mean T-Score -3.1; min-max, -2.5 to -5-5), and at least one incident vertebral fracture (n=18) or with a very high risk of fracture (n=18) were evaluated; 34 participants completed the exercise program and follow-up. At baseline, 61.1% of the patients presented some postural alteration. Limited range of motion (ROM) of joints were observed in 44.4% of the participants. During the follow-up, there were no new vertebral fractures, nor worsening of existing ones. No new nonvertebral or hip fractures were observed. All patients showed improvements in posture and ROM.

Conclusion: Our observations suggest that a supervised exercise program is safe in this population at risk when the usual treatment of osteoporosis is administered. In addition to that, it can provide other benefits, such as better back mobility, and perhaps contribute to the reduction of fracture risk. Controlled clinical trials designed to evaluate the contribution of an exercise-based intervention on fracture risk are required. Controlled clinical trials designed to evaluate the contribution of an exercise-based intervention on fracture risk are necessary.

P1255
EFFICACY OF SEQUENTIAL TERIPARATIDE/RISEDRONATE VS. CONTINUOUS RISEDRONATE TREATMENT IN PATIENTS WITH MULTIPLE SCLEROSIS

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Objective: The development of osteoporosis in multiple sclerosis (MS) can be related to the cumulative effects of various factors. The known effect of antiosteoporotic therapies on bone health in patients with MS is limited. The aim of this 48-month observational study was to compare the efficacy of continuous vs. sequential therapy with risedronate (RIS) after teriparatide (TPD) in patients with MS and osteoporosis.

Methods: Thirty MS patients received oral RIS (35 mg/week) continuously for 4 y and 14 patients received RIS for 2 y after 2 y of TPD treatment (20 µg sc/d). Outcomes included BMD of the femoral neck (FN), total hip (TH), lumbar spine (LS) and distal 1/3 radius, clinical vertebral and nonvertebral fractures and any adverse event. Bone remodeling was assessed using circulating concentrations of type 1 collagen crosslinked C-telopeptide and N-terminal propeptide of type I procollagen.

Results: After 24 months, the increase in BMD was significantly greater in the TPD group compared to the RIS group: LS (7.9 vs. 3.9 %), TH (2.4 vs. -0.4 %) and FN (3.8 vs. 1.0%). In contrast, radius BMD decreased in TPD group (-5.1%). Switching daily TPD to RIS showed decreases in BMD of the TH and FN (-2.6% and -2.1%, resp.), whereas LS BMD decrease was not significant (-0.9%).

Conclusion: TPD increased the BMD of the LS, FN and TH to a greater extent than RIS. Patients treated with RIS after TPD maintains BMD in the LS but not in the hip. Further studies are necessary to determine clinical relevance of these findings to fracture rate.

P1256
PREVALENCE OF SARCOPENIA IN VERY OLD ADULTS WITH HIGH COMORBIDITY

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Objective: To assess the prevalence of sarcopenia in very old community dwelling people with high comorbidity.
Methods: This is an ongoing prospective longitudinal observational study realized in a geriatric day hospital. We included patients with three or more of the following diseases: heart failure, ischemic cardiopathy, kidney or hepatic insufficiency, BPCO, asthma, diabetes, ICTUS and dementia. Patients were assessed at baseline time (between August 2017-August 2019) and reevaluated at 6, 12 and 24 months. Sarcopenia was defined by EWGSOP revised consensus definition, model (a) hand-grip strength (less than 27 kg for men and 16 kg for women), SMI by BIA (less than 7 kg/m^2 for men and 6 kg/m^2 for women) and severity with gait speed (≤0.8 m/s). For alternative diagnosis, model (b), we have utilized the following criteria: chair stand (more than 15 s for five rises), SMI as said before, and severity with SPPB (≤8 points). This study was approved by the Ethical Committee (n 148, 12th of March of 2019).
Results: Results are expressed as mean+SD or median (IQR). Here we present the preliminary results of baseline values of the 302 patients included (87.4±4.6 y, 52.3% men). The BMI was 25.6±4.6 kg/m^2, MNA-SF 10 (9-12), SPPB 5 (3-7) and Barthel index 80 (60-95). The mean of drugs for patient was 9.7±3.0, and patients had high comorbidity (CIRS-G 17, 14-20). In the six months before the inclusion 125 patients (41.4%) have suffered at least one fall. With model (a) 173 patients (57.3%) were sarcopenic without sex differences. Sarcopenic patients were older than no-sarcopenic (88.2±4.4 vs. 86.2±4.4 y, p<0.001) and presented worser nutritional status (BMI 23.3±2.9 vs. 28.7±4.7 kg/m^2, MNA-SF 9, 8-11 vs. 11, 10-13, for both p<0.001). With model (b) 140 patients (46.4%) were sarcopenic.
Conclusion: Sarcopenia is high prevalent (between 46-57%) in very old people with high comorbidity living in the community. Hand-grip strength tends to overestimate the prevalence of sarcopenia. Surprisingly, despite the population characteristics, more than 50% of participants were able to rise from the chair without using their hands in <15 s.

P1257
COMPARISON OF SHORT-TERM EFFECTS OF LOW LEVEL LASER THERAPY VS. ULTRASOUND THERAPY IN KNEE OSTEOARTHRITIS PATIENTS

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Objective: Knee osteoarthritis (OA) is a very disabling musculoskeletal disorder, with high prevalence in the general population. Its management includes various interventions, such as patient education, drug therapy, physical therapy, surgery. Although electrical therapy is largely used, studies trying to prove its benefits are very few up to now and they often have contradictory results. The objectives of this study were, therefore, to evaluate the short-term effectiveness on pain relief, mobility and functional improvement of low level laser therapy (LLLT) vs. ultrasound (US) therapy in patients with knee OA.

Methods: 58 patients with knee OA (aged between 52-77 y, 44 women and 14 men) participated in this prospective randomized clinical trial. Patients were assigned either to LLLT group (n=29), or to US group (n=29). Study participants received 10 sessions of LLLT or US therapy, 5 d/week, for 2 weeks. All patients were assessed on the first and on the last day of treatment, by: visual analogue scale (VAS) for pain, range of movement (ROM) for knee flexion and extension, WOMAC for physical functioning.

Results: There was no significant difference between groups in any of the parameters at baseline. At the end of treatment patients in both groups obtained significant improvement in all parameters: pain (VAS decreased from 8.1±1.7 to 3.2±1.2, p<0.001 in US group, and from 8.2±1.5 to 2.7±1.1, p<0.001 in LLLT group), ROM (flexion increased from 96.3±3.1 to 115.3±3.8, p=0.002 in US group, and from 104.5±1.7 to 111.1±2.7, p=0.049 in LLLT group; extension deficit decreased from 7.2±1.1 to 3.5±1.2, p=0.01 in US group, and from 6.9±1.7 to 3.3±1.0, p=0.008 in LLLT group), functioning (WOMAC decreased from 71.1±6.2 to 50.7±1.2, p=0.002 in US group, and from 65.5±7.1 to 43.3±3.2, p=0.0008 in LLLT group). No significant difference was found between the final results of the 2 groups (p>0.05) in any parameter.

Conclusion: LLLT and US therapy had similar effects in knee OA. Both were effective in relieve pain, increase mobility and reduce disability, representing promising therapeutic options for rehabilitation of knee OA.

P1258
PATIENT CHARACTERISTICS AND OUTCOMES AT TIME OF DISTAL FOREARM FRACTURE: A CROSS-SECTIONAL STUDY IN AN IRISH HOSPITAL

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Objective: To examine the characteristics and outcomes of older adults presenting following distal forearm fracture(DFF).

Methods: All patients over 50 y of age, diagnosed with DFF on XR between January and October 2018, were identified and invited to attend. Data were collected and analysed regarding clinical characteristics, DXA, bloods and validated outcome questionnaires: SF12, DASH, and PRWE. Ethical approval was granted January 2018.

Results: 133 patients attended, 124 female. Median age 69(50-92). 61(45.9%) fractured the dominant wrist. 35(26.3%) were treated operatively. 81(61.5%) scored "very fit" or "well" on the Clinical Frailty Scale. Mean TUG was 11.37 s. 75(55.6%) had osteoporosis at one or more sites on DXA. Most frequently reported risk factors for fracture include: previous fracture in 62 patients (45.9%); menopause before 45 y of age in 53(39.3%); recurrent falls in 31(23%).

There was a significant association between dominant hand fracture and all outcome measures. PCS-12 t=-2.07 p=0.04, MCS-12 t=-3.717, p<0.00, PRWE t=3.985, p<0.00, DASH t=3.7, p<0.00. Similarly there was a significant difference in all outcome scores for patients who had a previous fracture and those who had never had a fracture. PCS-12 t=-3.12 p=0.02, MCS-12 t=-2.4 p=0.018, PRWE t=2.04 p=o.044, DASH t=2.452 p=0.016. No statistically significant associations were found between other characteristics and initial outcome measures including age, frailty status, operative or non-operative treatment, BMD and other risk factors for fracture.

Conclusion: The risk factors for fracture shown frequently in our study, early menopause, previous fracture, recurrent falls, are consistent with the literature. We also showed that the majority of patients with DFFs are not frail at the time of fracture. This work also shows that poorer initial patient reported outcomes are associated with a history of previous fragility fractures and fracture of the dominant forearm. It is important to explore and consider what factors increase the risk of sustaining a DFF. It is also important to consider what factors contribute to poorer outcomes in patients following DFFs. By exploring and clarifying these factors, we may be better able to target interventions to prevent fracture and also improve fracture outcomes.

P1259
SHORT-TERM OUTCOME FOR ULTRASOUND IMAGING-GUIDED PERCUTANEOUS TREATMENT IN ROTATOR CUFF CALCIFIC TENDINOPATHY (RCCT)

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Objective: RCCT is a very common disease among adults, caused by calcium deposition around the tendons or in the subacromial-subdeltoid bursa (SASD), which may cause severe pain of the shoulder with subsequent significant mobility reduction. For most of the patients conservative treatment offers good results, but for the nonresponders more invasive approach is required. Our objective is to evaluate percutaneous irrigation of calcic tendinopathy with ultrasound-guided technique.

Methods: We performed a prospective study in which were included 14 patients diagnosed with RCCT in which conservative treatment was unsuccessful and were suitable for percutaneous irrigation technique. The patients were assessed clinically before the procedure, at 2 weeks and at 6 weeks after the procedure. The constant shoulder modified score (CSMS) was applied before and at the follow-ups. Improvement of >50% at CSMS was considered successful.

Results: At 2 weeks follow-up in 9 patients were observed released pain and significant mobility improvement. At 6 weeks follow-up all patients reported no pain and regained the shoulder mobility.

Conclusion: Double-needle ultrasound-guided percutaneous fragmentation and lavage (DNL) is an effective method of treatment for the patients with rotator cuff calcific tendinopathy, resulting in pain reduction and function improvement.

P1260
DESCRIPTIVE STUDY OF A POPULATION WITH OSTEOPOROTIC FRACTURES IN COLOMBIA

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Objective: The increase in population survival comes with an increase in fragility fractures. In Latin America there are not enough studies describing the type of population, costs, or the results of the osteoporotic fracture linkage programs. The objective of this study is to characterize the population with fragility fractures treated in a Reference Hospital, and the initial results of the implementation of a secondary fracture prevention program.

Methods: A descriptive study was conducted from June 2017-June 2019, involving 395 patients, older than 55 years old, with osteoporotic fracture who were included in a fragility fracture care program. Additionally, compliance with treatment for

osteoporosis, presence of refracture and mortality was recorded. All patients were monitored at least one year after initial management.

Results: Of the total patients, 273 cases were women (69.11%) and the average age was 78.12 y. The main fracture recorded was proximal femur (67.3%), followed by distal radius (15.6%). The fragility fracture care program registered the requested paraclinical services: extension laboratories for 71.3% of the patients, thoracolumbar spine radiography for 66.9% and bone densitometry for 9.6%. Follow-up and outcomes presented the findings: 63.8% had some type of treatment, 5.8% of the patients had new fractures and 19.4% patients died within 1 y.

Conclusion: Prevalence of osteoporotic fractures is in constant increase, resulting in high morbidity and mortality as well as costs to health systems. This makes it necessary to recognize the local epidemiology in order to focus efforts that are cost-effective and that evaluate the results of care programs of fragility fractures in order to adapt them to the particular characteristics of each population.

P1261
COMPARISON OF CLINICAL FEATURES AND OUTCOMES IN DIFFERENT OLDER AGE GROUPS WITH HIP FRACTURE

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Objective: Fragility hip fractures might have different clinical features with ageing. Centenarians and nonagenarians are rapidly growing age groups. The aim of this study was to evaluate baseline characteristics and outcomes in elderly patients over 75 years old with fragility hip fracture, divided into four groups according to age.
Methods: The Spanish National Hip Fracture Registry is a prospective, multicentric registry that included in June 2019 more than 70 hospitals in Spain. Patients were divided into four groups: from 74 to 79 years old, octogenarians, nonagenarians and centenarians. An analysis was made using the clinical-administrative database including information, from January 2017- June 2019, about the demographics, clinical, functional and cognitive features, length of hospital stay, mortality, as well as discharge destination.

Results: The study included 25,938 patients: 2888 patients were between 75-79 years old, 14,762 were octogenarians, 8035 were nonagenarians and 253 were centenarians; percentage of women (70.38% vs. 75.64% vs. 77.49% vs. 83.33%), nursing home patients (12.23% vs. 21.31% vs. 31.80% vs. 35.97%), functional dependency and advanced dementia (11.23% vs. 18.66% vs.

25.43% vs. 32.81%) increased with ageing. Percentage of intracapsular fracture decreased in older groups (43.62% vs. 40.33% vs. 36.24% vs. 31.6%). Centenarians had surgery within 48 h more often than younger patients (46.18% vs. 44.50% vs. 45.81% vs. 52.84%) and length of stay was shorter in this group (8.7 vs. 8.9 vs. 9.0 vs. 8.5). Patients discharged at nursing homes increased with ageing (19.79% vs. 30.03% vs. 38.70% vs. 42.29%), but discharge to inpatient rehabilitation units decreased in centenarians (19.48% vs. 22.18% vs. 19.64% vs. 11.86%) and also was lower antiosteoporotic treatment at discharge (48.25% vs. 43.36% vs. 31.85 vs. 14.10%). One-month mortality was higher with ageing (3.41% vs. 6.45% vs. 11.51% vs. 20.16%).

Conclusion: Descriptive analysis of different age groups in elderly with hip fracture show differences. These findings emphasize the need to improve care in very older patients and to prevent complications.

P1262
DIFFERENT ASSOCIATION BETWEEN BONE MINERAL DENSITY AND OSTEOARTHRITIS ACCORDING TO THE SITE OF OSTEOARTHRITIS

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Osteoarthritis (OA) and osteoporosis (OP) are both high prevalence at old age, and there are various reports on the association between the two diseases. Some studies have shown that high BMD is a risk factor for OA incidence, while others have mentioned the possibility of OP contributing to onset of hip OA. Recent study described that higher BMD reduce the risk of hip OA and raise the risk of knee OA. So, the relationship between BMD and OA or the effects of BMD on different OA site are not clear yet. In this study, we investigated the association between BMD and radiographic OA using representative sample data of Korean adults. The study included 6345 subjects aged 50 years or older who underwent BMD measurements using DXA and X-rays of at least one site of the spine, hip, and knee in the Korean National Health and Nutrition Examination Survey conducted in 2010-2011. OA was defined according to radiographic finding (KL grade ≥2). Weighted multivariable logistic regression was used to analyze the association between BMD and OA. Since gender differences are evident, men and women were analyzed separately. Spine OA was about 60% in both men and women, and hip OA was about 35% in men but only 1% in women. Knee OA was 76% in women and 58% in men. In men, the risk of OA increased 1.24 times as BMD increased by 1 g/cm^2. By site, knee and spine OA were statistically significant in relation to BMD, but hip OA was not statistically significant. In women, the association between BMD and knee and hip OA was insignificant. In spine OA, the risk of OA increased 1.2 times when BMD increased by 1 g/cm^2. In conclusion, high BMD increased the risk of knee and spine OA in men, but did not affect hip OA. In women, high BMD

increased the risk of spine OA. Differences in the mechanism of OA development by site are thought to be possible explanations for the differences in the association between BMD and OA.

P1263
THE ORTHOGERIATRIC FLS AND THE SURVIVAL GAIN ONE YEAR FROM THE HIP FRACTURE

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Objective: The high risk of adverse events, such as repeated hospitalizations and mortality of the elderly with hip fracture, is known. Orthogeriatric services reduce mortality, improve functional recovery, ensure a more appropriate use of resources, however at present only 10-15% of hip fractured receive complete anti-fracture treatment at hospital discharge. Therefore, the orthogeriatric FLS (Fracture Liaison Service) was activated for taking charge within 40 d of the surgery and multidimensional management of the refracturing risk. The aim of the work is to evaluate the impact of orthogeriatric FLS on mortality.

Methods: This is an observational prospective case-control study that included subjects over 65 years old, enrolled in the period March 2016-17. 40 d after the surgery, the cases were taken over by the orthogeriatric FLS, the checks carried out orthopedic checks. In both courses, clinical-therapeutic management remained the responsibility of the general practitioner. The regional administrative office provided the data about 1-y mortality.

Results: 271 cases managed by the orthogeriatric FLS, 283 controls under usual management, mainly women (79%), average age 84 y, living at home, 51% with a good level of functional pre-fracture autonomy. The mortality rate one year after fracture in cases is 18.5 per 100 people/y, in controls 35.9 per 100 people-year. Regardless of age, gender and prefracture functional status, the probability of survival is higher in cases than in controls (HR: 0.516; IC: 0.252-1.000; p 0.0465). In both groups, the peak in mortality was between 110-150 days after discharge.

Conclusion: The orthogeriatric FLS guarantees a further survival gain, compared to the acute phase orthogeriatric management, in elderly with femur fracture.

P1264
CASE PRESENTATION OF A PATIENT WITH BEHCET DISEASE AND OSTEOPOROSIS: 10 YEARS FOLLOW-UP

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Objective: The **aim** of the study is to present a case of Behcet disease associated with osteoporosis.

Methods: A 62 years old female Caucasian patient with Behcet disease presented for the first time for diagnostic examination for BMD at the University Clinic for orthopaedic surgery in Skopje 10 y ago. BMD was assessed with DXA (Hologic QDR, Hologic corp.) of lumbar spine, total hip and femoral neck. She underwent radiographic examination and MRI of thoracolumbar spine.

Results: Clinical presentation of thoracic kyphosis and scoliosis. Radiographic examination of both hips showed fracture of left femoral neck treated surgically with arthroplasty and consecutive loosening. Radiographic examination of thoracolumbar spine showed compressive fractures. DXA findings showed reduced BMD on each new examination every two years despite the treatment. MRI of the spine were also done. After ten years, the patient was obliged to use wheelchair.

Conclusion: The chronicity of Behcet disease with vasculitis background and the drugs for the treatment of BD lead to reduced BMD.

P1265
INTEGRATED SAFETY SUMMARY OF THE NOVEL, INTRA-ARTICULAR AGENT LORECIVIVINT (LOR; SM04690), A CLK/DYRK1A INHIBITOR THAT MODULATES THE WNT PATHWAY, IN SUBJECTS WITH KNEE OSTEOARTHRITIS

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Objective: Lorecivivint (LOR; SM04690), an intra-articular (IA), small-molecule CLK/DYRK1A inhibitor that modulates the Wnt pathway, is in development as a potential disease-modifying treatment for knee osteoarthritis (OA). A pooled analysis of safety data from 3 placebo-controlled studies was conducted to obtain an initial safety profile for LOR, including bone health-related adverse events (AEs).

Methods: Safety data were pooled from one Phase 1 (24-week) and two Phase 2 (26- and 52-week) randomized controlled trials evaluating 4 doses (0.03 mg, 0.07 mg, 0.15 mg, 0.23 mg) of a single IA injection of LOR in subjects with moderately to severely symptomatic knee OA. AEs, serious AEs (SAEs), and bone health AEs were categorized by MedDRA classification. Incidences of AEs and SAEs were compared between the combined LOR-treated group and a control group.

Results: The incidence of AEs were similar in LOR-treated (350/848 [41.3%]) and control subjects (138/360 [38.3%]). Incidence of SAEs was 20/848 (2.4%) in LOR-treated and 4/360 (1.1%) in control subjects. Arthralgia was the most common AE in LOR-treated subjects (treated 7.6%, control 7.2%). Target-knee arthralgia was the most common joint-specific AE (treated 6.5%, control 5.3%). No AEs in other joints exceeded an incidence of 2% in either group. In all categories, individual AEs were reported at similar rates between groups and no SAEs were deemed related to LOR by investigators. There were 16 bone health-related AEs in 9/848 (1.1%) LOR-treated and 3/360 (0.8%) control subjects. Two AEs were osteopenia/osteoporosis in 2 LOR-treated postmenopausal women. 14 were trauma-induced fractures in 10 subjects (7 LOR-treated, 3 control). All fractures (3 patellar [1 target, 2 non-target knee], 3 vertebral, 2 foot, 2 wrist, 2 rib, 1 fibula, 1 hand) were adjudicated and determined to be caused by trauma; all healed uneventfully within the expected time frame.

Conclusion: In exposure to date of 848 subjects, IA LOR appeared to be safe and well tolerated. These data support the continued evaluation of LOR as a potential treatment for knee OA.

Figure 1. Adverse event summary for events occurring in at least 1% of the treated population (N=1208).
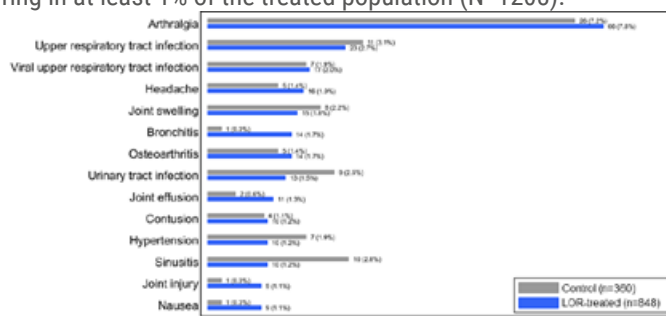
Figure 2. Joint-specific adverse event summary, subcategorized by affected joint, for events occurring in at least 1% of the treated population (N=1208).
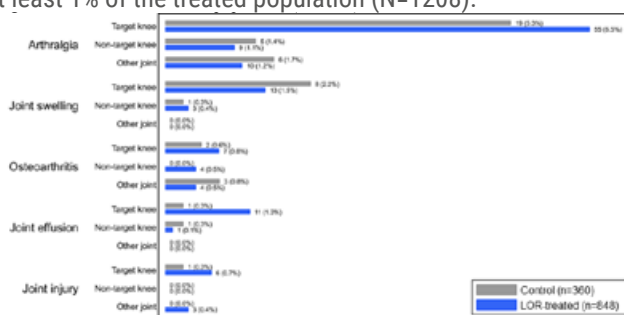
P1266
INTEGRATING SCIENTIFIC EVIDENCE, PATIENT CENTERED CARE AND PERSONALIZED MEDICINE IN OP

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The main similarity between patient centered care and personalized medicine is their intention to move from standardized, biomedical (scientific-evidence based) guidelines towards individual tailoring strategies. However, both of them aspire to focus on the person, they approach the individual differently: optimizing biological outcome parameters, or highlighting the subjective and aspiring to a holistic view of the patient.

Based on our observations in 145 ambulatory clinics on physician-OP patient interactions, we will discuss the chances to reconcile scientific evidence with personal genomics, personal values and economic considerations into an optimal medical decision.

P1267
NEW STRATEGY FOR OSTEOPOROSIS SCREENING IN YOUNGER POSTMENOPAUSAL WOMEN

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Objective: To evaluate accuracy improvement in screening young postmenopausal women for osteoporosis with the inclusion of arm, thigh and calf circumference measures to FRAX and NOGG strategies.

Methods: Postmenopausal women, over 50 years, were accessed at the "XXII Maratona da Saúde e Cidadania Dr. Claudio Zago" health fair held in 2019 at São Bernardo do Campo city. All subjects were submitted to Fracture Risk Assessment tool (FRAX), were classified according to NOGG guideline (UK National Osteoporosis Guideline Group) and screened for sarcopenia according to EWGSOP. For muscle mass (MM) calculation, Lee et al equation was used, in which MM (kg)=height x 0.00744 x arm circumference^2 + 0.00088 x thigh circumference^2 + 0.00441 x calf circumference^2) + 2.4 x sex − 0.048 x age + race + 7.8. Skeletal muscle mass index, handgrip strength, and gait speed were evaluated. The FRAX value for "major fractures" (MOF) ≥8.5 and medium-risk NOGG classification were adopted as bone mass evaluation criteria. All women underwent through calcaneal bone ultrasound (QUS), in which T-score ≤ -1.8 SD was considered risk for low bone mass and ≤ -2.5 SD a risk for fracture.

Results: A total of 198 women were evaluated, with mean of 64±7.7 y, BMI of 27.3±5.3 kg/m^2 and T-score in the USG of -1.3±1.3 SD. Women over 65 y obtained lower fat, lean and bone mass values, in addition to physical performance. The accuracy of the FRAX MOF ≥8.5 tool or midrisk or the midrisk NOGG classification to identify women with QUS T-score ≤ -1.8 SD in the population aged ≤65 were precarious with area under curve (AUC) of 0.527 (95%CI: 0.432-0.621) and 0.505 (95%CI: 0.411- 0.600), respectively. Inclusion of arm, thigh and calf circumferences measure lead to a significant statistically improvement (p<0.01), with AUC values of 0.734 (95%CI: 0.643-0.812) and 0.706 (CI: 0.614-0.787), respectively. The ability of the high-risk NOGG tool to identify USG ≤ -2.5 SD was limited with AUC of 0.512 (p 0.044).

Conclusion: Association of arm, thigh and calf measurements increased the accuracy of the FRAX for osteoporosis screening in women under 65 y.

P1268
FACTORS ASSOCIATED TO INCIDENCE AND DEVELOPMENT OF SARCOPENIA IN VERY OLD PEOPLE LIVING IN THE COMMUNITY

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Objective: To assess factors associated with develop of sarcopenia (incident sarcopenia) and impact of sarcopenia on mortality.

Methods: This is an ongoing prospective longitudinal observational study realized in a geriatric day hospital. We included patients with three or more of the following diseases: heart failure, ischemic cardiopathy, kidney or hepatic insufficiency, BPCO, asthma, diabetes, ICTUS and dementia. Patients were assessed at baseline (between august 2017 ang august 2019) and reevaluated at 6, 12 and 24 months. Sarcopenia was defined by EWGSOP2 revised consensus definition. At baseline patients were considered sarcopenic by the association of the following criteria: chair stand (>15 s for five rises), SMI (<7 kg/m^2 for men and 6 kg/m^2 for women), and severity with SPPB (≤8 points). Patients were reevaluated at 6 months and divided in 4 groups: group 1 (control), patients without sarcopenia at baseline nor at 6 m; group 2 (incident), patients without baseline sarcopenia that develop sarcopenia at 6 m; group 3 (reverted), patients with sarcopenia at baseline but not-sarcopenic at 6m; and group 4 (chronic), patients with sarcopenia at baseline and at 6 m. The study was approved by the Ethical Committee (n 148, 12th of March of 2019).

Results: Results are expressed as mean+SD or median (IQR). Here we present the preliminary results of 219 patients with available values at baseline and at 6 m. For the comparisons see the Table.

	Control n 103	Incident n 20	Reverted n 30	Chronic n 66
Age (y)	86.0±4.4	87.6±4.6	87.6±4.6	88.0±4.2
BMI (kg/m^2)	28.0±4.9	26.6±2.8	24.3±2.7	23.3±3.2
Barthel index	90 (70-100)	87.5 (75-92.5)	77.5 (65-90)	75 (60-90)
SPPB	7 (4-9)	5 (4.5-6)	4.5 (3-6)	4 (3-6)
Gait speed (m/s)	0.66±0.22	0.63±0.16	0.52±0.21	0.53±0.20
Chair stand (s)	17.1±8.0	20.7±8.8	21.7±6.6	23.2±7.2
Hand-grip (kg)				
Men (n114)	7.2±0.8	7.1±0.5	6.3±0.3	6.1±0.4
Women (n 105)	6.3±0.8	5.9±0.3	5.5±0.4	5.3±0.5
SMI (kg/m^2)				
Men	23.2±5.7	21.8±6.1	20.1±5.8	19.9±5.1
Women	13.9±4.6	15.9±3.7	12.2±3.0	12.2±4.6

During follow-up only the patients in the reverted sarcopenia group gain weight. Sarcopenia is associated to higher mortality (HR 0.623 95%CI 0.388-0.999).

Conclusion: There are a lot of factors associated to the incidence of sarcopenia. The multivariable analysis will allow us to better understand this associations. Control weight and physical exercise may counteract the development of sarcopenia.

P1269
COMORBIDITIES AMONG EGYPTIAN PATIENTS WITH PSORIATIC ARTHRITIS COMPARED TO PATIENTS WITH PSORIASIS

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Objective: Psoriatic arthritis (PsA) is an inflammatory musculo-skeletal disease that has both autoimmune and autoinflammatory features characteristically occurring in individuals with psoriasis. PsA is associated with a high prevalence of comorbidities, especially cardiovascular diseases (CVD). Reported comorbidities in PsA are CVD, gastrointestinal, infectious, malignant, and psychiatric ones. Psoriasis, in addition, can be associated with such comorbidities. Few studies compared the comorbidities between PsA and psoriasis. We aimed (1) to evaluate the prevalence of comorbidities in Egyptian patients with PsA and psoriasis (2) to compare between comorbidities of PsA and psoriasis alone.

Methods: A cross-sectional observational study including 200 patients with psoriasis according to the dermatologist. They were divided into two groups: Group A: 60 psoriatic arthritis patients & Group B: 140 psoriasis patients without PsA. Patients were collected from the dermatology and rheumatology outpatient clinic. Rheumatological, dermatological evaluation and laboratory investigations were done.
Results: The most frequent comorbidities in psoriatic arthritis were dyslipidemia (65%) and obesity (56.7%). Compared to patients with psoriasis, patients with PsA had statistically significant higher incidence of diabetes mellitus (p=0.039), COPD (p=0.029), obesity (p=0.04) and metabolic syndrome (p=0.004). Obesity (OR 7.0, 95 CI 2.61-18.85) was associated with increased risk of PsA.
Conclusion: PsA is associated with many comorbidities. PsA may add another burden of chronic inflammatory condition and more comorbidities compared to psoriasis. Systematic evaluation of comorbidities should be a part management of PsA. Weight reduction in psoriasis patients may decrease the risk of developing PsA.

P1270
RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND DIETARY INTAKE IN POSTMENOPAUSAL KOREAN WOMEN: A CROSS-SECTIONAL STUDY

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Objective: To examine the relationship between nutritional intake and BMD in postmenopausal Korean women.

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Methods: Dietary intake was recorded in postmenopausal Korean women using a semiquantitative questionnaire. The frequency of consumption of various food groups and nutrient intake were calculated. BMD T-scores were measured at the lumbar spine, femoral neck and total hip using DXA. Associations between T-scores and dietary intake were

analysed using partial correlation coefficients and multiple linear regression analysis.

Results: A total of 189 postmenopausal women were included in the study. b-Carotene intake was positively correlated with the lumbar spine T-score. Sodium and vitamin C intake were positively associated and folate intake negatively associated with the femoral neck T-score. Sodium, zinc and vitamin C intake were positively correlated and potassium intake was negatively correlated with the total hip T-score. Vegetable intake showed a positive association with the femoral neck and total hip T-scores.

Conclusion: In postmenopausal Korean women, b-carotene, vitamin C, zinc and sodium intakes were positively associated with bone mass. Furthermore, frequency of vegetable consumption was positively associated with femoral neck and total hip T-scores.

P1271
LRP5 GENE POLYMORPHISM AND OSTEOPOROSIS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASES

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Objective: Patients with inflammatory bowel disease (IBD) are more likely to develop osteopenia and osteoporosis than the general population. Relative fracture risk is 40% higher in IBD patients. In addition to malnutrition induced by inflammatory processes in the intestines or the use of steroid drugs, in the molecular background of altered BMD may also play predisposing genetic factors. Polymorphisms in the *LRP5* gene have been associated with BMD disturbances. The study aimed to examine two sequence variants in *LRP5* gene: two missense variants: rs3736228 (p.Ala1330Val, c.3989C>T) and rs4988321 (p.Val667Met, c.1999G>A), in a clinically characterized group of 188 Polish IBD patients with altered bone mass, and/or low-energy fractures in history.

Methods: The study included 94 patients with ulcerative colitis (UC) and 94 patients with Crohn disease (CD). The inclusion criteria were as follows: age between 18-50 y for women and 18 and 60 for men, diagnosis of IBD based on cross-sectional imaging and/or endoscopy with a histopathological confirmation. The control group (C) consisted of 41 healthy volunteers without IBD and with

average bone mass as confirmed by densitometry, reporting no other health problems that may influence the condition of the bone tissue, with no fractures in medical history. BMD was measured by DXA in L2-L4 lumbar spine and femoral neck. As a genotyping method pyrosequencing was performed. The normality of the distribution and the homogeneity of variable variances were conducted in the experimental groups using the Shapiro-Wilk test and Levene's test, respectively. In the case of nonconcordance with two or at least one condition, the non-parametric Kruskal-Wallis test has been used to compare the groups. In the case of statistically significant heterogeneity between groups, multiple comparisons have been conducted using Dunn's test. Hardy-Weinberg equilibrium was examined for subjected groups by chi-square distribution and Fisher exact tests. The odds ratios (ORs), 95%CIs, and p-values were calculated. Statistical significance was set at p<0.05.

Results: In CD patients c.3989T allele was more frequent than in controls (11.6% vs. 8.75%) and UC patients (8.9%) with OR=1.37 and OR=1.34, respectively. Similarly, c.1999A allele was observed with higher frequency in patients with CD, comparing to controls (7.1% vs. 5.0%, OR=1.45) and CU patients (6.3%, OR=1.28), nonetheless those results did not meet assumed statistical significance level. We observed statistically relevant differences in BMD and T-score values between CD, UC, and controls, however, regarding genotypes in analysed *loci* differences were not noticeable. Assessing low-energy fractures occurrence we did not find the relationship with genotypes in rs3736228 and rs4988321.

Conclusion: Evaluated group of CD patients presented significantly decreased bone parameters and slightly increased frequency of c.3989T and c.1999A alleles in the *LRP5* gene, but we did not confirm a correlation between *LRP5* gene genotypes and fractures risk in IBD patients.

P1272
RELATIONSHIP BETWEEN INSULIN RESISTANCE WITH BONE MINERAL DENSITY IN CHILDREN AND ADOLESCENTS

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Objective: BMD is influenced by multiple factors; some modifiable and others not.

We aimed to evaluate the relationship between insulin resistance (IR) and BMD in Mexican children and adolescents.

Methods: This was a population-based cross-sectional study in Mexican children aged 5-20 y recruited from public and private schools in Mexico City. We carried clinical history, examination, anthropometric measurements, biochemistry analysis (fasting serum glucose and insulin) and assessed BMD TBLH, L1-L4 and body composition (BC) by DXA (iDXA GE). **Statistical analysis:** We used descriptive statistics for demographic data. We defined IR as a HOMA-IR ≥3. We assessed relationships between IR and BMD with simple and multiple linear correlations adjusting for BC, sex and physical activity (h/d).

Results: We assessed 1672 children/adolescents (51% males). Nutritional status according to BMI classified 64% of subjects as normal weight, 16% overweight, 15% obese, and 5% under-weight. Prevalence of IR was 14.5%. Means of Z-score for BMD were -0.21±1.0 for TBLH and -0.01±0.98 for L1-L4. Pearson correlation coefficients between HOMA-IR and TBLH-BMD was 0.328 (p<0.001) and HOMA-IR with L1-L4-BMD was 0.288 (p<0.001). Pearson correlation coefficients between IR and Z score value of TBLH-BMD was 0.231 (p<0.001); for Z score value of L1-L4 BMD was 0.173 (p<0.001). Multiple linear regression for Z score TBLH-BMD explained by HOMA-IR and adjusted for age, sex, physical activity, BMI, fat mass and lean mass showed a beta coefficient of -0.065 (CI95% -0.065 to -0.103, p<0.001);

Model shown in Table 1.

Table 1. Associations of Z-score value of TLBH-BMD with HOMA-IR, adjusted by BC, age, sex and physical activity in children/adolescents aged 5-20 y (n=1672).

(Regression coefficients (β) with their confidence intervals)

Variable	β	CI 95%		p
(Constant)	-2.135	-2.537	-1.733	0.000
HOMA_IR	-0.06	-0.097	-0.022	0.002
Sex (male)	0.005	-0.102	0.112	0.928
Tanner pubertal stage	0.173	0.107	0.24	0.000
Age (y)	-0.168	-0.194	-0.143	0.000
BMI (kg/m^2)	0.122	0.092	0.152	0.000
Physical activity (h/d)	0.191	0.091	0.29	0.000
Fat mass kg	-0.013	-0.029	0.004	0.124
Lean mass kg	0.044	0.034	0.054	0.000

Conclusion: Isolate values of HOMA-IR correlated positively with BMD, however when we adjusted for age, sex, BMI, physical activity, and BC we found that HOMA-IR showed a negative influence in the Z-value for TBLH-BMD and L1-L4-BMD. The variable with most influence in BMD value is the physical activity in Mexican children aged 5-20 years old.

P1273
ASSOCIATED FACTORS TO FUNCTIONAL CAPACITY IN HIP FRACTURE PATIENTS AT A REFERENCE HOSPITAL

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Objective: To evaluate the personal, medical, biological and environmental factors associated with functional capacity in elderly patients with hip fractures.

Methods: Prospective cohort study in elderly patients with hip fractures. A 6 months follow-up.

Results: 152 patients with hip fractures were consecutively included in the study. With a median age of 80 y, most of them female (67.8%) and from a low to medium income. Most lived in their own home with family (52.3%) before the event and planned to return to the same after discharge (49.6%). A great number had some kind of visual (67.1%) or auditive impairment (27.6%); 47% reported having at least one fall in the previous year and 5.3% a previous hip fracture event. Before the fracture, most were independent in their basic and instrumental activities of daily living (BADL and IADL) and had life space (LS) mobility that allowed them to go out in the city (63%) although most of them not independently. At 3 months, functional capacity was significantly affected in terms of BADL with a median Barthel Index (BI) of 50 and in IADL with a median Lawton and Brody Index of one. Most of them with severe restrictions in their LS mobility. At six months, BI was in a median of 70 points while IADL remained at one. In terms of LS most patients recovered the ability to go out in the city. Two patients presented a second event in the first three months with a median time to event of 29 d, and 6 patients died. Maximal LS and access with walking aids, destination at discharge, age and sex were found to be correlated to functional recovery at three months; and systemic hypertension, satisfaction with treatment, LS and ADL at 3 months were correlated to recovery at six months post-fracture.

Conclusion: The hip fracture patients at our clinical setting have similar characteristics to the literature, being an old population with the presence of demographic and social factors that have been previously reported to be associated with a low recovery of function. Our population has a high prevalence of visual and auditive impairments, which could be a decisive factor in the functional recovery process with implications in the rehabilitation treatment, the risk of falling and a second fracture event. Confirming previous correlated factors, and finding those LS and its subscales are also correlated to functional recovery.

P1274
CHANGE IN TRABECULAR BONE SCORE AFTER DENOSUMAB IS SWITCHED TO A BISPHOSPHONATE

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Objective: Denosumab (D-mab) is effective in increasing BMD and reducing fractures. However, discontinuation of D-mab leads to a dramatic bone loss, and at times spontaneous vertebral fractures (VFx), presumably due to destabilization of bone structure. Trabecular bone score (TBS), which assesses bone structure of the vertebrae from the DXA images of the spine, predicts vertebral fracture risk independent from BMD. Bisphosphonates (BSP) have been used to prevent bone loss upon discontinuation

of D-mab, with inconsistent results. It is unclear whether they can also prevent deterioration of bone structure, and if so whether IV or oral preparations would be more effective. We aimed to explore whether there is a decrease in TBS upon transition from D-mab to BSP, and whether this change correlates with change in BMD.

Methods: Retrospective review of the electronic medical record identified 94 patients who received D-mab followed by a BSP, 19 of whom had TBS before and after D-mab discontinuation.

Results: The subjects were predominately female (90%) and white (95%), with the mean age of 60 years. 11 transitioned to alendronate (ALN) and 8 to zoledronic acid (ZA). After D-mab to BSP transition, there was a decrease in BMD, as well as TBS with numerically greater decline in the ALN group (Table). There was a trend towards a positive correlation between change in TBS and BMD at LS (r^2=0.16, p=0.09) and total hip (r^2=0.20, p=0.06), but these were not significant, possibly due to small sample size. One patient had a Vfx 229 d after last D-mab and 7 d before ZA was given, and had among the highest changes in L-spine BMD (-5.7%) and TBS (-4.7%) observed.

Conclusion: Transitioning from D-mab to BSP lead to a decrease in both BMD and TBS, with at least a trend for a positive correlation between them. Larger studies are needed to determine whether TBS can provide information about the changes in bone structure that are not captured by BMD measurement.

Table 1. % Change (mean±SD) in BMD and TBS after switching from D-mab to BSP

Change	Overall	Oral ALN	IV ZA
BMD L-spine	-3.85±5.1	-5.18±5.69	-2.02±3.74
BMD total hip	-2.15±4.1	-2.82±5.11	-1.10±1.53
TBS	-0.8 ±3.76	-1.2±4.5	-0.26±2.64

P1275
APPLICATION OF QUANTITATIVE BONE SCAN USING KBONE VALUES TO IDENTIFY REGIONAL BONE METABOLISM CHANGES IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN TREATED EITHER WITH ALENDRONATE OR TERIPARATIDE

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Objective: To compare and analyze the visual changes in the whole body with 99mTc-MDP bone scan images in patients receiving either teriparatide (TP) or alendronate (AL) at baseline (0), 3rd, 12th and 18th months of treatment. The secondary aim was to analyze the bone turnover markers level in serum to check the corresponding treatment response.

Methods: A total of 36 postmenopausal women with osteoporosis were included in this study after obtaining their written consent. Diagnosis of osteoporosis was made by DXA scan (Hologic) (T score <-2.5 or below) as per WHO criteria.

Patients were randomized in two treatment groups, i.e., (group 1 & 2) by random allocation methods. Group 1 and 2 were designated as teriparatide (TP) and alendronate (AL) arm respectively. Patients with TP and AL were treated with 20µg (subcutaneous/d) and 70 mg (oral) weekly respectively. Patients were injected with 600 MBq 99mTc-MDP and diagnostic bone scan images were assessed at 3.5 h. Additionally, whole body scans was done at (10 min, 1, 2, 3 and 4 h) and were further analyzed for 99mTc-MDP skeletal plasma clearance (Kbone). Regional Kbone differences were obtained for the whole skeleton and following six regions, i.e., (calvarium (CL), spine (S), pelvis (P),) lower extremities (LE), upper extremities (UE) and whole skeleton (WS) sites at baseline, 0th, 3rd, 12th and 18th months of therapy either with TO or AL. Bone turnover markers, i.e., NTx, BCTx BSAP and P1NP were also estimated at 0th, 3rd, 12th and 18th months of therapy to further correlation with observed regional bone scan changes. Two-sample Wilcoxon rank-sum (Mann-Whitney) test was used for statistical comparison. Data were represented in median (min-max) values and p value was considered significant as <0.05.

Results: The baseline values were comparable in both the groups. Upon comparison at different regional bone changes in two groups, values were analyzed within and between groups as per scheduled follow-ups. The values of bone scan at different skeletal sites including calvarium, spine, pelvis, lower extremity and upper extremity were not statistically significant**.** However, at whole skeleton site was found statistically significant (p.022). The p values of bone turnover markers were also not significant. However the values of P1NP was found higher in group received TP therapy.

Conclusion: Although, TP and AL provide comparable results for the treatment of osteoporosis but based on Kbone values, TP therapy appears moderately better than alendronate for the improvement at specific bone regions. Further studies with large sample size are needed to substantiate our findings.

P1276
PREVALENCE OF VITAMIN D DEFICIENCY IN PREGNANT WOMEN AND ITS EFFECTS ON PREGNANCY

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Objective: Pregnancy also known as gestation is the time during which one or more offspring develop inside a female, it represents a time of rapid change -changes in physical proportions and physiology. Vitamin D deficiency is observed worldwide in pregnant women, it is important during pregnancy because it reduces the risk of pre-eclampsia, LBW, SGA, preterm birth, gestational diabetes, neonatal hypocalcemia and neonatal asthma. The research aims to find out outcomes of low vitamin D level in pregnant females.

Methods: Study design and sampling: It was a longitudinal study. The sampling technique used was non probability purposive sampling. **Study setting and duration:** The study was conducted

in Basic Health Unit Kotli said Amir Tehsil and District Sialkot from Dec 2018-Dec 2019. **Inclusion and Exclusion Criteria:** All pregnant females were included except multigravida with previous history of C-section, pre-eclampsia, gestational diabetes and any known previous pregnancy related complication. **Data collection and analysis:** The sample was selected using non probability purposive sampling technique. Pregnant females PA, USG and baselines were checked on antenatal visits. Serum vitamin D level were checked at the time of delivery. The data was analyzed using SPSS 20.

Results: The study included 300 patients of BHU kotli Said Amir Sialkot. The age of sample ranged from 18years to 40 years with mean age of 28 y. 63% (189 females) were multigravida, 37%(111 females) were primigravida. 61% (183 females) had vitamin level below 30 ng/ml measured at the time of delivery, among them 70% (128 females) pregnant females were multigravida and 30% (55 females) were primigravida. Among vitamin D deficient pregnant females 58% (106 females) underwent C-section, 73 pregnant females (40% females) presented with preterm labour. 39 pregnant females(21%) among vitamin deficient had complain of SGA and 9% (17 females) were diagnosed as patient of pre-eclampsia. 33 (18%) baby born to vitamin D deficient females had weight below 2500 g.

Conclusion: There is a high prevalence of vitamin D deficiency among pregnant females and there is significant role of vitamin D on pregnancy as well as growth and development of fetus. This research point out the importance of regular vitamin D supplementation during pregnancy.

P1277
ORTHOKINE THERAPY FOR TREATMENT OF GONARTHROSIS

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Objective: To investigate whether application of Autologous Conditioned Serum (ACS) Orthokine has significant therapy effect in patients with degenerative knee disease.

Methods: The study involved 17 patients, 4 male and 13 female, with average age of 64.71 y, who were diagnosed for gonarthrosis based on clinical examination and X-ray imaging.

ACS Orthokine is prepared from 40 ml of patient's blood taken as per the proscribed method. The obtained five doses of the serum are kept under special conditions and by using an ultrasonography for navigation, these are instilled into the affected knee every 7 d. The following parameters were observed before and after application of the therapy: pain intensity expressed via visual analogue scale – VAS, knee motion range expressed in degrees, index of severity for osteoarthritis of the knee by Lequesne, Short Form 36 (SF-36) Questionnaires

Results: After the statistical analysis, the following results were obtained: After application of the therapy, pain intensity was reduced, delta VAS - 3.06, p<0.001, knee flexion was increased,

delta F + 9.118, p< 0.05, index of severity by Lequesne was reduced, delta IL − 4.97, p<0.001, delta SF-36 + 6.53, p<0.05 and quality of life was improved.

Conclusion: Application of ACS Orthokine, in well assessed indications, has favorable therapy effect in degenerative knee disease in terms of reducing subjective hardship in a knee, improved function of locomotor system and improved quality of life.

P1278
STATUS OF BONE HEALTH IN TRANSGENDER POPULATION OF INDIA

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Objective: To determine the status of Bone Mineral homeostasis and BMD in transgender population.

Methods: An ethical approval was obtained from the institutional ethics committee of the institute to conduct the first study of bone health assessment in transgender population of India. Transgender communities were identified with the help of NGO's working for their welfare in Delhi & NCR region. A health camp with a special emphasis on bone health was organised among the groups of TG in their communities to make them understand about the importance of bone health along with good health & hygiene practices. The purpose of the study was elaborated to TG's for their understanding and education. A total of 77 transgender (apparent TG's) were approached in this study from the different locations (ghettos) of Delhi and NCR regions between the period from October 2018-October 2019 followed by their written consent. Out of 77, 40 subjects were considered as transgender and assessed for this study. 10 ml of blood was drawn on site of health camp for the hormonal assessment along with parameters of bone mineral homeostasis. Data were recorded in the predesigned performa comprising demographics, educational, social, cultural, economical, behavioural including present and past history of illness.

Results: The mean age, height and weight of TG's were 26.01±0.70 y, 166.6±6.2 cm and 64.9±2.82 kg respectively. The baseline biochemical parameters such as haemoglobin, albumin, urea, creatinine, SGOT, SGPT, triglycerides were 14.4±1.13, 4.9±0, 24.8±4.24, 0.8±0.14, 44.19±4.9, 49.68±13.43 and 136.4±4.0 respectively. Parameters of bone mineral homeostasis such as Calcium, phosphorous and alkaline phosphatase were 9.34±0.14, 3.78±0.21 and 275.4±32.5 respectively. The mean glycemic profile, i.e., glycosylated haemoglobin (HBA1c) was 7.15±0.28%. The mean BMD at lumbar spine (L1-L4) and hip were -1.48±0.49 and -0.5±0.28 respectively. Out of 77 subjects there were 19 subjects who had a history of previous fracture before participating in this study.

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Conclusion: Transgender subjects of India have a poor bone and glycemic status even before achieving their peak bone mass. The prevalence of osteopenia appears at a much earlier age at spine region than normal existing data of male and female population. Awaited data of large set of hormonal profile would yield much light upon these findings.

P1279
COMPARISON OF VITAMIN D LEVEL AMONG RURAL AND URBAN POPULATION OF SIALKOT PUNJAB PAKISTAN

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Objective: Vitamin D is necessary for calcium absorption and bone mineralization. Too little vitamin D results in soft bones in children (rickets) and fragile, misshapen bones in adults (osteomalacia). Vitamin D deficiency is one of the leading health related problem of the world. Vitamin D is also known as sunlight vitamin so its level in body largely effected by lifestyle and sunlight exposure. Vitamin D status can be assessed by measuring concentrations of 25-hydroxyvitamin D (25(OH)D). This is a comparative study aimed to find out status of vitamin D level among rural and Urban population.

Methods: Study design and sampling: It was a cross-sectional study. The sampling technique used was non probability purposive sampling. **Study setting and duration:** The study was conducted in BHU Kotli Said Amir and Allama Iqbal Memorial Hospital Sialkot from Jan 2019-Dec 2019. **Inclusion and exclusion criteria:** All patients visited general opd having age above 18 y were included except patients with complain of bone pain, joint paint, chronic illness and those taking vitamin D supplementation. **Data collection and analysis:** The sample was selected using non probability purposive sampling, selected sample vitamin D level were checked at the time of hospital visit.

Results: The study included 2000 patients of BHU Kotli Said Amir and Allama Iqbal Memorial Hospital Sialkot out of which 1000 patients were from rural areas and 1000 patients were from urban areas. The age of sample ranged from 18-88 y with a mean age of 56. 64% (1280) were females and 36%(720) were males. 68% patients (1360 patients) had vitamin D level below 30 ng/ml among them 802 patients(40%) are from urban population and 558 patients (28%) from rural population.

Conclusion: Vitamin D deficiency is highly prevalent in the Urban population, so awareness programs regarding vitamin D supplementation and fortification of food with vitamin D should be conducted.

P1280
TREATMENT GUIDELINE FOR POSTMENOPAUSAL OSTEOPOROSIS MANAGEMENT IN PRIMARY CARE

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Objective: The development of a management strategy for postmenopausal osteoporosis (PO) in primary care (PC) allowing appropriate attention to primary and secondary fracture prevention in daily practice, taking into account today's reality of general practitioners' (GPs) time constraints during consultations in which multiple care needs are addressed, and a multidisciplinary approach required for optimal pharmacological and nonpharmacological osteoporosis management.

Methods: A literature search on evidence-based practices on PO management was performed and put together with recent western guidelines[1-5]. An evidence-based guideline, adapted to the Belgian healthcare context was developed and presented to a multidisciplinary scientific steering committee, representing key stakeholders in osteoporosis care.

Results: A one-page flowchart for long-term management of PO was elaborated, including a 2-min risk analysis and case-finding strategy for use in PC in patients with and without comorbidity. In addition, clear referral indicators for multidisciplinary collaborations with professional stakeholders in primary and secondary care were defined.

Conclusion: A feasible and unambiguous guideline was developed and is currently being implemented by 33 GPs allowing incorporation of primary and secondary fracture prevention into clinical practice.

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P1281
THE COST-EFFECTIVENESS OF AN INTEGRATED OSTEOPOROSIS CARE PROGRAMME FOR POSTMENOPAUSAL WOMEN IN FLANDERS: STUDY PROTOCOL OF A QUASI-EXPERIMENTAL CONTROLLED DESIGN

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Objective: To provide a comprehensive description of a quasi-experimental study design in which a newly developed Integrated Osteoporosis Care (IOC) programme for the management of postmenopausal osteoporosis (PO) in primary care (PC) is implemented and will be compared with Care as Usual (CAU).

Methods: A literature research was performed and expert meetings have been taking place, which have led to the development of a complex PC intervention based on the Rainbow Model of Integrated Care.

Results: An integrative approach for the management of PO in primary care was developed and will be implemented in the greater region of Ghent, Belgium. The approach consist of a complex intervention targeting patients and PC stakeholders in osteoporosis care (e.g., general practitioners GPs, physiotherapists, nurses, pharmacists). Eighty-two GPs were recruited, 33 GPs within and 49 GPs outside the implementation region, of the 220 and 314 GPs contacted, representing a participation ratio of 15% and 15.6% respectively. GPs will recruit eligible patients (noninstitutionalized postmenopausal women with osteoporosis) for participation until at least 148 and 350 patients are included respectively. In the pilot region all stakeholders receive profession-specific postgraduate education on osteoporosis management, and patients receive homebased patient-centered education and self-management support by trained nurses. These latter will actively promote seeking professional support for medication-related issues, and nutritional and exercise advice. The also safeguard communication between all stakeholders and facilitate collaborative practices through patient-informed information sharing. A comparison will be made with CAU using patients' medication possession ratios (MPR) at 12 months as primary outcome. These data will be obtained from the national health database. Secondary outcomes are physician outcomes, patient reported outcome measures and patient reported experience measures. Total study elapse time is 18 months. A cost-effectiveness evaluation will be performed if the programme appears to be effective in terms of MPR.

Conclusion: The similar participation ratios in both study groups reflect both a negative attitude towards study participation as a positive attitude towards IOC in PC.

P1282
SARCOPENIC OBESITY AS A RISK FACTOR OF OSTEOPOROSIS AND FRACTURES IN PATIENTS WITH KNEE OSTEOARTHROSIS

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Objective: To evaluate the effect of sarcopenic obesity on the degree of osteodeficiency and the probability of osteoporotic fractures in patients with knee osteoarthritis.

Methods: 63 patients with osteoarthritis of the knee joints were examined, including 38 patients with obesity. The average age of patients was 59±6.2 y. BMD was assessed using DXA. For verification of sarcopenia, dynamometry and the bioimpedance method were performed (assessment of muscle strength and mass, respectively). Short physical performance battery tests were used to evaluate muscle function. To analyze statistical data, a nonparametric method was used (calculation by $\chi 2$ criterion). The risk of osteoporotic fractures was calculated using the FRAX and QFracture tools.

Results: All patients with osteoarthritis were divided into three groups depending on the presence of obesity and sarcopenia. First group was consisted of 25 patients with knee osteoarthritis, II group - 7 people with osteoarthritis and obesity, III group - 31 persons with osteoarthritis, obesity and sarcopenia. Sarcopenia was diagnosed in 32% of patients with osteoarthritis and in 68.4% of patients with osteoarthritis and obesity. Osteodeficiency (osteoporosis and osteopenia) is observed significantly less often in the second group of patients than in the first group and most often in the third group of patients ($\chi 2$=11.638, df=1, p=0.001). The average and high risk of osteoporotic fractures is observed much more often in the III group of patients using the QFracture tool ($\chi 2$=8.561, df=1, p=0.003).

Conclusion: Sarcopenia most often occurs at a combined course of osteoarthritis and obesity. The presence of obesity and sarcopenia in patients with osteoarthritis can be considered as potential factors contributing to the development of osteodeficiency and high risk of osteoporotic fractures. A more sensitive tool for assessing risk of osteoporotic fractures at osteoarthritis, obesity and sarcopenia is the QFracture calculator.

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P1283
SOMATIC (BONE STRUCTURAL AND CELLULAR) AGEING OF ROMA WOMEN IN HUNGARY

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Roma is one of the largest ethnic minority group in Hungary. Most of the Roma population lives in poor conditions in segregated settlements, and experience higher exposure to environmental health hazards: suffer from high rate of unemployment, low wages, poor hygienic conditions. Their health status are mostly poor.

The increased prevalence of chronic illnesses in Roma adults leads to their shortened life expectancy, but it has not been studied yet whether the ageing processes in Roma people are more accelerated than in non-Roma age-peers. We aimed to study the biological status and ageing of female Roma adults (aged between 35-65, n:20; control non-Roma group for cellular ageing analysis, n:20; Hungarian reference group for body structural and reproductive ageing analysis, n:2500) living in a segregated settlement (Monor) in Hungary. The ageing of body- and bone structural parameters, reproductive- and cellular ageing and their interactions were analysed in Roma and non-Roma women.

Body structure was analysed by body composition estimation. Bone structural estimation was done by quantitative ultrasound technique of DTU-one osteometer. Reproductive ageing was estimated by collecting data on menstrual and reproductive history by questionnaires. Cellular ageing was estimated by X chromosome loss estimation (FISH probe). Data on actual health status, lifestyle factors (nutritional habits, habitual physical activity level) and the socioeconomic background of Roma families were collected by questionnaires.

The results revealed that Roma women are prone to be more obese, to have higher amount of abdominal body fat, they have worse bone structure and experience longer reproductive period than the national reference values. The evaluation of cellular ageing estimation in Roma and non-Roma women is still in progress, the results of the analysis will be presented during the congress.

P1284
BONE QUALITY IN WOMEN WITH MENSTRUAL AND REPRODUCTIVE ABNORMALITIES

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There have been few epidemiological studies examining the associations between menstrual irregularity and bone health status parameters in premenopausal women. There are several risk factors for skeletal abnormalities beside genetic factors, e.g. malnutrition in quantity and/or quality, endocrine disorders, insufficient vitamin D supply, not reaching the recommended level of physical activity. Abnormalities of reproductive functions can indicate endocrine disorders or abnormalities that presumably significantly influence bone development, maintenance and regeneration.

The study aimed to describe the associations between menstrual pattern, reproductive health status, oestrogen level and bone health (estimated by quantitative ultrasound parameters, bone mass and bone mineral content) in a population-based sample of premenopausal women.

Premenopausal women aged between 18 and 45 years were enrolled to the present analysis (subsample of women with menstrual and reproductive abnormalities – n: 30, control group of women with normal menstrual and reproductive functions – n: 370). Estrogen level was estimated from saliva samples. Bone mineral content (kg) was estimated by InBody 720 analyser. Bone structure was measured by ultrasound osteometer (DTU-One Osteometer). Broadband ultrasound attenuation (BUA, dB/MHz) was used to assess bone structure in the analysis. Bone mass (kg) was estimated by Drinkwater-Ross anthropometric method. Relative bone mass was expressed in the percentage of body mass and stature. Data on menstrual history and reproductive life events were collected by questionnaires during personal interviews.

The results revealed that abnormalities in menstrual pattern and reproductive health status can predict bone quality. This relationship emphasizes the high importance of the regular osteological examinations of women not only with severe reproductive or reproductive abnormalities, but also women with mild but chronic abnormalities of the reproductive system.

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P1285
WOMEN PARAMEDICS' MUSCULOSKELETAL DISEASES IN TUNISIAN PUBLIC HOSPITALS

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Objective: To assess the prevalence of back and upper limbs musculoskeletal disease (MSD) among women caregivers in Tunisian public hospitals and to identify their determinants.

Methods: A cross-sectional study, conducted among female paramedics providing nursing care in of two Tunisian public hospitals (n=494).Sampling was based on random selection and matching according age and work schedule (n=156). Data collection was based on the Nordic questionnaire of MSD and physical examination for screening both back and upper limbs MSD (nine specifics clinical maneuvers).

Results: The mean age was 39.63±10.83 y and mean job seniority was 5.90±06.96. Seniority of >30 y was noted among 18.3% of paramedics. Concerning work schedule, alternate rhythm was noted in 52.1% of cases and fixed night schedule in 9.2% of them. Regular physical activity was practiced by 35.91% of paramedics. Among paramedics 35.10% practiced regular physical activity and 57.70% suffered of overweight or obesity. Nordic questionnaire revealed back MSD among 76.76% of paramedics, MSD of the neck among 50.70% of them and of upper limbs in 63.33% of cases. In addition, physical examinations concluded to back MSD among about three quarters of paramedics and rotator cuff tendinitis in more than one third with significant predominance on the dominant shoulder. Statistical analysis concluded that back and upper limbs MSD among women paramedics, were correlated both with individual characteristics (age over 45y, BMI, menopause, family workloads) and occupational characteristics (physical perceived workload, psychosocial factors such as job autonomy and conflictual relationship).

Conclusion: Female paramedics are a population at high risk of both back and upper limbs MSD with needed of specific management especially in case of postmenopausal and of musculoskeletal ageing.

P1286
ITEMS DRIVING WOMAC PAIN SUBSCORE CHANGES DUE TO LORECIVIVINT, A POTENTIAL DISEASE-MODIFYING TREATMENT FOR KNEE OSTEOARTHRITIS: A POST HOC ANALYSIS OF PHASE 2B TRIAL DATA

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Objective: Knee osteoarthritis (OA) is a disease characterized by pain, loss of function, and structural deformities, causing a heterogeneous disease state that confounds patient-reported outcomes (PROs).The WOMAC Pain subscore addresses this reporting variability by capturing multiple pain items related to 'active' and 'static' subject states. We hypothesize that measurement of these may demonstrate differential effect sizes when assessing treatment benefit. Lorecivivint (LOR; SM04690), a small-molecule, intra-articular CLK/DYRK1A inhibitor that modulates the Wnt pathway, is in development as a potential disease-modifying treatment for knee OA. To test this, a post hoc analysis of Pain NRS, WOMAC Pain, and individual WOMAC PROs from a Phase 2b LOR trial was performed to examine effect size (ES) changes.

Methods: Pain was assessed using the weekly average of daily Pain NRS and WOMAC Pain subscore. Subjects treated with 0.07 mg LOR were analyzed for 'active' (walking on flat surface [A1], going up/down stairs [A2]) and 'static' (in bed [A3], sitting/lying [A4], standing [A5]) pain PROs and compared with the primary 24-week study outcomes of mean Pain NRS and summed mean WOMAC Pain subscore at Week 12. Baseline-adjusted analysis of covariance for WOMAC A1−A5 scores was conducted on LOR-treated subjects vs. placebo (PBO) in the Full Analysis Set (FAS) and a target population (TP) with fixed baseline joint space width (JSW) [2−4] mm without widespread pain (WPI ≤4, Symptom Severity Score Question 2≤2).

Results: The primary study analysis (N=231, KL grade 3 63.2%) demonstrated efficacy of LOR vs. PBO for Pain NRS and WOMAC Pain (ES: 0.450 and 0.293, respectively). In the TP, Pain NRS and WOMAC A ES increased (0.637 and 0.410, respectively). Each WOMAC A item had lower ES than Pain NRS at Week 12. LOR treatment vs. PBO showed significant improvements in ES of A1 (FAS: ES=0.315, *P*=0.028; TP: ES=0.421, *P*=0.035) and A2 (FAS: ES=0.392, *P*=0.006; TP: ES=0.510, *P*=0.011). A3−A5 did not show statistical improvement for LOR compared with PBO.

Conclusion: In this post hoc analysis, Pain NRS exhibited the greatest ES after treatment with 0.07 mg LOR vs. compared with PBO, which were enhanced in the TP. 'Active' items demonstrated greater ES than 'static' items and the full WOMAC Pain domain, providing support for the hypothesized dimensional constructs in knee OA pain assessment.

Figure: Effect sizes for 0.07 mg LOR compared with PBO for the FAS and target population at Week
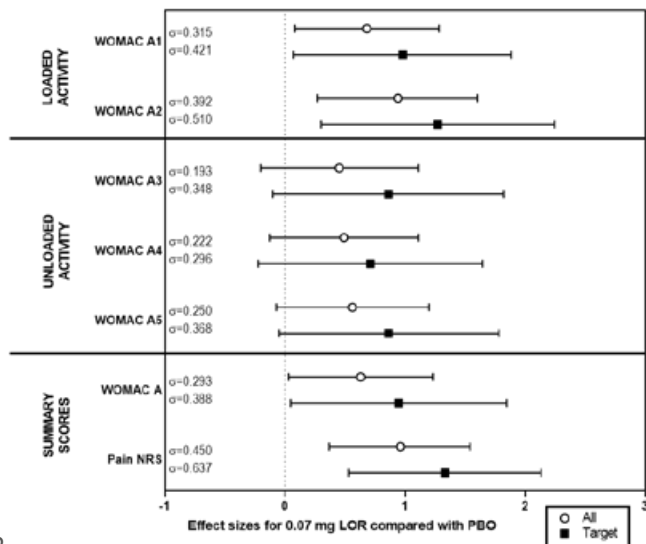
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P1287
SAPHO SYNDROME: A RARE AUTOINFLAMMATORY ENTITY WITH MUSCULOSKELETAL MANIFESTATIONS

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SAPHO syndrome (Synovitis, Acne, Pustulosis, Hyperostosis and Osteitis) is a rare autoinflammatory disease, which may be underdiagnosed. It presents with inflammatory cutaneous and articular manifestations. Immunosuppressive agents have been used in the management of SAPHO syndrome. Recently, biologic agents have been introduced in the treatment of the syndrome, if shown to be refractory to conventional agents.

The aim was to describe the case of a patient with SAPHO syndrome who presented with arthritis, osteitis and cutaneous manifestations and responded to treatment with secukinumab, an IL-17A inhibitor.

A patient, female, aged 60 years presented with anterior chest pain and a palmoplantar eruption. She had a several-year history of arthritis and a palmoplantar pustular eruption. She was taking NSAIDs for the management of arthritis. She had a 2-y history of pain and edema of the sternum. A Tc^{99m} bone scan revealed hyperostosis of the sternum. Methotrexate 15 mg/wk was administered for 3 months. As there was incomplete response, golimumab, a TNFα inhibitor was added for 8 months. However, the disease recurred with increased inflammation indices and arthritis of sternoclavicular joints. Infliximab was given. The disease recurred with morning stiffness lasting many hours, an intense pustular eruption and arthritis of the knee and ankle joints. Methylprednisolone 16 mg/d, methotrexate 15 mg/wk,

secukinumab 300 mg/month and alendronate were administered. Two months later the patient had normal inflammation indices, arthritis was in remission and there was no pain and edema in the sternum.

In conclusion, the case of a patient with SAPHO syndrome is described that was refractory to most therapeutic agents. The disease responded to the administration of alendronate, a bisphosphonate and secukinumab, an IL-17A inhibitor. IL-17 has been implicated in the pathophysiology of SAPHO syndrome, especially skin manifestations. Bisphosphonates have been shown to be effective for the treatment of bone lesions.

P1288
UPPER LIMB MUSCULOSKELETAL DISEASES AMONG TUNISIAN WEAVERS

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Objective: To assess upper limb musculoskeletal diseases' prevalence among Tunisian weavers and to identify their biomechanical risk factors.

Methods: The study was conducted over two stages: the first epidemiological and the second based on a semi-quantitative observational approach. The epidemiological survey was conducted with a pre-established questionnaire based on the Nordic MSD questionnaires among a representative sample of weavers installed in Monastir (n=5412). The semiquantitative assessment was based on biomechanical factor analysis software (posture, angulation, joint amplitude, receptivity, duration of exposure, effort, etc.) in reference to work situation video recordings.

Results: During the 12 months prior to the survey, MSD's prevalence reached 92.0% among weavers. The shoulders were the most concerned (92.4%) followed by fingers affected, especially by tendinitis (67.8%). The semiquantitative analysis revealed many constraining postures during weaving and the use of tools with high variability during specific tasks. Indeed, weavers spent 68.64% of their working time with shoulders in extreme flexion or abduction. In addition, 57.5% of active time weavers' wrist were in extension exceeding 30° and the pinch grip was spread over 83.35% of this time with moderate gestural variability (index=0.46). Overall upper limb strength is estimated as medium to strong in 71% of cases during the weaving activity. According to multivariate analysis, upper limb MSD are more common among weavers with higher daily or weekly cumulative working time ($p<10^{-3}$) or spending more time working with the upper limb in constraining posture ($p<10^{-3}$), those occupying the post of clerks (p=0.005) and those with higher family responsibilities (p=0.015).

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Conclusion: The most relevant results of the survey is the high prevalence of UL-MSD among weavers which should be managed according to recommended clinical practices and by promoting ergonomically designed hand tools

P1289
PHYSICAL ACTIVITY, SMOKING, COFFEE AND ALCOHOL DRINKING IN IBD PATIENTS AND OSTEOPOROSIS

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Objective: Restriction of physical activity (PA), smoking, coffee and alcohol drinking is a risk factor of osteoporosis in patients with z inflammatory bowel disease (IBD). The aim of the study was the assessment of BMD, frequency of osteopenia and osteoporosis occurrence in patients with IBD and its correlation with PA, smoking and coffee and alcohol drinking.

Methods: The study subjects consisted of 208 patients with IBD, 103 with Crohn disease (CD), 105 ulcerative colitis (UC). Densitometric measurements were carried out using the DXA. All patients answered a questionnaire concerning PA, smoking, coffee and drinking.

Results: The prevalence of osteopenia and osteoporosis (L2-L4) in the IBD group was 48.1%, in the CD group was 48.6% and in the UC group was 33.3%. Patients with CD who were diagnosed with osteopenia and osteoporosis showed low PA compared to patients with normal BMD who exercised regularly (p=0.0335). A similar observation was made in the group of women with IBD. Women with normal BMD exercised significantly more often than women with osteopenia and osteoporosis (p=0.0146). No differences in BMD were observed depending on coffee, alcohol consumption or smoking.

Conclusion: The incidence of osteoporosis in IBD patients is high, and may depend on PA.

P1290
A COMPARISON OF DELIRIUM CARE PRACTICES IN HOSPITALISED OLDER HIP FRACTURE PATIENTS IN AUSTRALIA AND NETHERLANDS

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Objective: Despite the guidelines giving recommendations to clinicians on early detection, prevention and management of delirium the actual practices in the various clinical settings across the globe remain vastly different. The aim of this study is to evaluate three components of delirium care guidelines as performed in day to day practice comparing an orthopaedic trauma unit in Australia with one in the Netherlands.

Methods: This was a qualitative study using direct observation. The same independent researcher observed registered nurses caring for patients with hip fractures on the orthopedic ward over a one-week period each in two medical centres one in Australia and the other in the Netherlands. The researcher made note of the environmental setup, routine nursing practices whilst undertaking normal care and responsibilities and `family engagement allowed in the care of older hip fracture patients. Descriptive analysis was used to describe and summarize the data so that direct comparison between the two medical centres could be made.

Results: Even though the delirium prevention and management guidelines in Australia and Netherlands follow the same principles of person-centred care, the actual clinical practices carried out in the two hospitals were different.

Conclusion: Practice guidelines developed in isolation without promoting the initiatives of patient-centred care, family engagement and ongoing rigorous evaluation are bound to be unsuccessful. The healthcare institutions should take into consideration how a system of constant rigorous evaluation and consequences for non- compliance is set-up for effective translation of guidelines.

P1291
STATUS OF BONE HEALTH IN TRANSGENDER POPULATION OF INDIA: A PRELIMINARY OVERVIEW

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Objective: To determine the status of Bone Mineral homeostasis and BMD in transgender population.

Methods: An ethical approval was obtained from the institutional ethics committee of the institute to conduct the first study of bone health assessment in transgender population of India. Transgender communities were identified with the help of NGO's working for their welfare in Delhi & NCR region. A health camp with a special emphasis on bone health was organised among the groups of TG in their communities to make them understand about the importance of bone health along with good health & hygiene practices. The purpose of the study was elaborated to TGs for their understanding and education. A total of 77 transgender (apparent TGs) were approached in this study from the different locations (ghettos) of Delhi and NCR regions between the period from October 2018 to October 2019 followed by their written consent. Out of 77, 40 subjects were considered as transgender and assessed for this study. 10 ml of blood was drawn on site of health camp for the hormonal assessment along with parameters of bone mineral homeostasis. Data were recorded in the

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predesigned performa comprising demographics, educational, social, cultural, economic, behavioural including present and past history of illness.

Results: The mean age, height and weight of TGs were 26.01±0.70 y, 166.6±6.2 cm and 64.9±2.82 kg respectively. The baseline biochemical parameters such as haemoglobin, albumin, urea, creatinine, SGOT, SGPT, triglycerides were 14.4±1.13, 4.9±0, 24.8±4.24, 0.8±0.14, 44.19±4.9, 49.68±13.43 and 136.4±4.0 respectively. Parameters of bone mineral homeostasis such as calcium, phosphorous and alkaline phosphatase were 9.34±0.14, 3.78±0.21 and 275.4±32.5 respectively. The mean glycemic profile, i.e., glycosylated haemoglobin (HBA1c) was 7.15±0.28%. The mean BMD at lumbar spine (L1-L4) and hip were -1.48±0.49 and -0.5±0.28 respectively. Out of 77 subjects there were 19 subjects who had a history of previous fracture before participating in this study.

Conclusion: Transgender subjects of India have a poor bone and glycemic status even before achieving their peak bone mass. The prevalence of osteopenia appears at a much earlier age at spine region than normal existing data of male and female population. Awaited data of large set of hormonal profile would yield much light upon these findings.

P1292
WHAT NONORTHOPAEDISTS CLINICIAN SHOULD KNOW ABOUT VERTEBROPLASTY AND KYPHOPLASTY?

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Objective: To review the natural history of vertebral fractures (VF), to present briefly the current treatments of VF, to discuss vertebroplasty and kyphoplasty techniques, indications, results, and controversies and to present the current ASBMR Guidelines.

Introduction: Vertebral fractures have a 25% incidence in postmenopausal female, and 40% in women > 80yr. They're less common in men. Age group 65 yrs+ are fastest growing segment of the population, and vertebral fractures are becoming a frequent finding in our clinical practice. Although the majority are asymptomatic, loss of height and stooped posture are common, 23-33% are painful, and over two-th become manageable or asymptomatic in 6-12 weeks.

Clinical Presentation: Moderate to Severe back pain up to 20% to 30%, often no history of trauma. Pain is worse upright, and reproduced by pressure over spinous process. Thoracic kyphosis is often seen, and neurological deficits are very rare. Exclude other causes of fracture, and beware of fractures proximal to T6. Complementary imaging is needed to evaluate the fracture, although the Best indicator of the age of the fracture is the history. Plain x-rays and CT scans are usually enough, but sometimes MRIs and bone scans are useful.

Current Indications: Only needed in a small cohort of patients, with High signal on MRI STIR or Increased activity on bone scan. Pain on percussion is debatable. Only T5 and below-kyphoplasty is indicated. Best results are on painful within 6 weeks of fracture.

Current Nonsurgical Treatment of Vertebral Fractures: Pain relief and early mobility to avoid deconditioning are a must. Exercises, calcium and protein-rich diet and better ADL are the next step. We'll discuss the indication for braces. Osteoporosis treatment remains the best approach to avoid vertebral fractures.

Conclusion: We'll present arguments for and against vertebroplasty/kyphoplasty and discuss the recent ASBMR Task Force Report on Vertebral Fracture Non-surgical Treatment.

P1293
COMPARATIVE FUNCTIONAL STATUS BETWEEN CENTENARIES AND OLDER ADULTS WITH HIP FRACTURE IN SPAIN: DATA FORM THE SPANISH NATIONAL HIP FRACTURE REGISTRY (RNFC)

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Objective: Fragility hip fractures might have different approach over the years because only chronological age. Centenarians functional evolution along hip fracture is unknown. The aim of this study was to evaluate functional evolution in older adults over 75 years old with fragility hip fracture, divided into four groups according to age.

Methods: The Spanish National Hip Fracture Registry is a prospective, multicentric registry that included in June 2019 more than 70 hospitals in Spain. Patients were divided into two groups: non-centenaries (75-99) and centenarians. An analysis was made using the clinical-administrative database including information, from January 2017-June 2019, about the demographics, clinical, functional and cognitive features, length of hospital stay, mortality, as well as discharge destination.

Results: The study included 25.938 patients: 253 were centenarians; rest were between 75-99 years old. The functional situation is evaluated with a mixed scale of 10 items that includes the FFN assessment and the FAC validated scale. The measurement scale is presented below (noncentenaries vs. centenaries prefracture):

1. -Independent mobility inside and outside the home without technical aids (26.76% vs. 5.93%)

2. -Independent mobility inside and outside the home, with technical assistance (20.13% vs. 14.23%)

3. -Independent mobility inside and outside the home with two technical aids or walker (7.26 vs. 5.53%)

4. -Independent mobility only inside the house without technical help (7.81% vs. 11.07%)

5. -Independent mobility only inside the house with technical help (9.07% vs. 12.65%)

6. -Independent mobility only inside the house with two technical aids or walker (10.92 vs. 18.58%)

7. -Independent mobility only inside a person's guarded house (3.3% vs. 7.11%)

8. -Mobility only inside the house with little help from one person (4.13% vs. 8.7%)

9. -Mobility only inside the house with great help from one person (4.68 vs. 5.53%)

10. -Mobility with two people or non-mobility (4.87 vs. 8.7%)

11. -Unknown (1.06% vs. 1.98%)

One month after fracture the functional status evolution is 1.(1.42% vs. 0.5%), 2.(7.74% vs. 1.49%), 3.(12.88% vs. 2.48%), 4.(2.01% vs. 2.48%), 5.(5.54% vs. 5.45%), 6.(25.82% vs. 17.82%), 7.(3.57% vs. 4.46%), 8.(5.29 vs. 6.93%), 9.(8.20 vs. 12.87%), 10.(21.28% vs. 36.63%), 11.(6.25% 8.91%)

Conclusion: Centenaries present a worse prefracture functional status and also a worse postfracture functional status. These findings emphasize the need to improve care in very older patients and to prevent complications.

P1294
DIAGNOSIS OF MALNUTRITION USING GLIM CRITERIA: VALIDITY OF 7 PRAGMATIC APPROACHES WHICH DO NOT REQUIRE THE MEASUREMENT OF MUSCLE MASS

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Objective: The GLIM criteria for malnutrition have been recently launched. Diagnosis requires at least one phenotypic criterion (weight loss, low BMI, and reduced muscle mass) AND at least one etiologic criterion (reduced food intake or assimilation and disease burden or inflammatory conditions). However, the measurement of muscle mass is not always feasible in clinical practice. Our objective was to calculate the prevalence, concordance, performance indicators, and feasibility of 7 pragmatic approaches of GLIM criteria which do not need the measurement of muscle mass, compared to the original GLIM criteria. Secondarily, we assessed the association between baseline malnutrition according to GLIM and 7 pragmatic approaches, with mortality in community-dwelling older adults from the SarcoPhAge (Sarcopenia and Physical Impairment with advancing Age) study during a 5-y follow-up.

Methods: This prospective population-based cohort was part of SarcoPhAge, which included 534 older adults in Belgium, followed up from 2013-2019. Community-dwelling healthy volunteers ≥65 years old were recruited. Baseline malnutrition was defined according to GLIM criteria and 7 pragmatic approaches: 1. Omission of muscle mass; 2. Substitution for hand-grip strength, 3. Calf-circumference, 4. Mid-arm circumference, 5. Goodman's grid, 6. Ishii's formula, and 7. Yu's formulas. Cohen-kappa coefficient, Sensitivity, Specificity, Positive (PPV), Negative (NPV) predictive values, Area under the curve (AUC), and TELOS-feasibility score were calculated. Cox-regressions (adjusted HRs, 95%CI) were used to measure the association between malnutrition (according to GLIM criteria and the 7 approaches) and the risk of mortality.

Results: Complete data to calculate GLIM were available for 373 subjects (73.07±5.96 y, 56% women). The prevalence of malnutrition with GLIM criteria was 24.4% and ranged from 13.9-20.9% in the 7 approaches. All showed high concordance (k≥0.7) with the original GLIM criteria, correct performance indicators (sensitivity≥65%, specificity≥95.4%, PPV≥85%, NPV≥88%, AUC≥0.7), and were feasible (TELOS≥3). Ishii's formula had the highest sensitivity (71.4%), NPV (91.19%), and AUC (0.735). The 7 approaches significantly predicted mortality during a 5-year follow-up [HR of 3.38 (1.89-6.09) using the original GLIM criteria and HRs ranging from 2.72 (1.51-4.91) to 3.94 (2.14-7.24) using the pragmatic approaches].

Conclusion: Our study bridged the gap between research and clinical practice and provided 7 pragmatic approaches of GLIM criteria which were highly concordant with the original ones, had correct performance indicators, predicted 3- to 4-fold mortality during a 5-y follow-up, and were feasible.

P1295
TRABECULAR BONE SCORE AND BONE MARKERS AS PREDICTORS OF FRACTURE RISK IN OBESE MIDDLE-AGED DIABETIC AND NONDIABETIC PATIENTS

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Objective: To examine a correlation between bone markers and trabecular bone score (TBS) in obese and obese diabetic patients.

Methods: 79 obese patients of both sexes and aged between 30-50 y were divided into two groups according to a diagnosis of diabetes mellitus. TBS measured by Lunar Prodigy DF + 50247 17 Health Care apparatus was compared to the values of osteocalcin, β-CrossLaps, vitamin D, PTHs, as well total calcium and phosphorus.

Results: There was a positive correlation between TBS (L1-L4, L1-L3, L1-L2, L2-L3, L2-L4, L3-L4) and PTH values (p<0.05), between TBS (L3-L4) and osteocalcin (p<0.05) and between TBS (L3-L4) and β-CrossLaps (p<0.05), based on the Pearson's correlation coefficient. According to the Student's t-test, statistically significant differences between obese with and without diabetes were in PTH and TBS values. Obese diabetics have, on average lower PTH (p-0.032)and TBS (L2-L3, L2-L4 i L3-L4, with p=0.044, p=0.036 and p=0.030, respectively) compared to obese nondiabetics. ANOVA analysis showed significant differences in PTH (p -0.017), s-Osteocalcin (p -0.046) and β-CrossLaps (p-0.03) between patients without damage in the bone microarchitecture, and subjects with initial and established impairments. Patients with no impairment have, on average, higher PTH, osteocalcin, and β-CrossLaps values than subjects with initial or established impairments.

Conclusion: Preliminary results of this study showed that bone markers and TBS could be useful in marking obesity as a risk factor for fracture frequency, regardless of the sex and the age of the patients.

P1296
SOCIAL MEDIA INFLUENCERS GIVE BAD ADVICE ABOUT OPTIMAL VITAMIN D LEVELS AND DOSES

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Objective: About 1 billion people worldwide have vitamin D deficiency. Vitamin D deficiency can lead to an array of problems, most notably rickets in children and osteoporosis in adults. Many conflicting studies are now showing an association between vitamin D deficiency and cancer, cardiovascular disease, diabetes, autoimmune diseases, and depression. Vitamin D deficiency related problems need proper patient education, and social media plays a role to disseminate such information.

Methods: 20 Russians most popular influencers, based on those who had >100,000 followers in Instagram social media and who had hashtags #vitaminD, #vitaminDdeficiency were studied.

Results: We found that 16 out of 20 of the blogs (80%) could not be considered credible sources of Vitamin D deficiency management information. These blogs have unreliable and potentially harmful recommendations: "What is the optimal vitamin D level in blood?- The upper limit of the norm - 100 ng/ml is the best. Usually it means you should take 10,000 IU of vitamin D, such dose can be used without making blood tests all year round." Or such kind of not evidence-based information: "Upper limit vitamin D levels in blood helps to treat autoimmune diseases."

Conclusion: Social media influencers blogs are not credible resources for vitamin D deficiency management. Popularity and impact of social media in this context suggests all influencers should be required to meet accepted scientifically or medically justified criteria for the provision of medical advice online.

P1297
AUTOIMMUNE GASTRITIS IN PATIENTS WITH TYPE 1 DIABETES: ROLE OF VITAMIN D

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Objective: Vitamin D is a neuro-hormone regulating calcium-phosphate homeostasis. However, vitamin D deficiency has been reported in several chronic conditions associated with increased inflammation and dysregulation of the immune system such as type 1 diabetes (T1D) and autoimmune gastritis. The role of autoimmune gastritis in the pathogenesis of nutritional deficiencies has been assumed, therefore we suggested a possible association between gastric parietal cells autoantibodies (PCA) which are usually detected in autoimmune gastritis and 25(OH)D deficiency in T1D patients. The aim of our study was to evaluate 25(OH)D levels in patients with T1D and their association with PCA positivity.

Methods: 78 T1D patients (42 females; mean age 43.5±12.8 y) were followed-up in Endocrinology research Centre from December 2018-November 2019. 25(OH)D, PTH, calcium, PCA were measured in all T1D patients. We also evaluated autoantibodies to glutamic acid decarboxylase (GAD), islet antigen 2 (IA2) and zinc transporter isoform-8 (Znt8) to confirm the autoimmune genesis of diabetes. The results were compared with a control group of 42 healthy subjects.

Results: In T1D group (n=78) 25(OH)D levels were significantly lower than in the control group 12.6 [7.2;21.0] ng/ml vs. 29.1 [24.1; 35.7] ng/ml, p<0.0001. 29 out of 78 patients with T1D were positive to PCA and Vitamin D value in PCA positive group was 11.4 [6.8;19.0] ng/ml compared 19.3 [11.9 26.8] ng/ml in patients without PCA. Only 3 out of 42 patients (7%) were positive to PCA in control group without autoimmune diseases.

Conclusion: Data from this study showed a significant reduction of 25(OH)D levels in T1D patients. There was a difference in Vitamin D status in patients with and without PCA. Possible role of impairment of vitamin D absorption in patients with autoimmune gastritis may be caused by early mucosal atrophy in PCA positive patients.

P1298
BONE MINERAL DENSITY IN LONG-LIVING PATIENTS WITH CORONARY ARTERY DISEASE

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Objective: The study aim was to investigate BMD in patients with coronary artery disease (CAD) over 90 y.

Methods: This work was cross-sectional study, which enrolled 202 patients hospitalized with a diagnosis of CAD. Most of the study patients (64.4%) were women. The age of patients ranged from 90-101 y, averaging 92.5 ($\pm$2.0) y. BMD was measured by DXA. In addition, we used standard methods for examining patients with coronary artery disease, and also conducted a comprehensive geriatric assessment, including a questionnaire "Age is not a hindrance", a scale of basic activity in daily living (Barthel index), and an assessment scale for instrumental activity in daily living (IADL).

Results: Normal BMD in the lumbar spine was noted in 40.9%, osteoporosis in 26.9%, osteopenia in 32.2% of patients. The average values of BMD in the lumbar spine reached 1071.0$\pm$260.2 mg/cm^3, varying from 576-2050 mg/cm^3. The T-score in the lumbar spine averaged -1.07 SD, varying from -5.1 SD to +6.4 SD. In the proximal femur, BMD averaged 759.8$\pm$173.0 mg/cm^3 (from 292 to 1278 mg/cm^3), and the T-score reached -1.9SD (from -5.4 to +2.8 SD). Normal BMD in the proximal femur was noted in 21.3%, osteoporosis in 39.9%, and osteopenia in 38.8% of patients. In the femoral neck, the average BMD was 679.5$\pm$154.1 mg/cm^3 (from 101-1225 mg/cm^3), and the T-score was -2.4SD (from -5 SD to 1.8 SD). Normal BMD in the femoral neck was recorded only in 10.4% of patients, osteoporosis was observed in 60.4% of patients, osteopenia in 29.2%. In women, all BMD values were significantly lower than in men (p<0.001). When conducting a correlation analysis, a highly significant positive correlation was found between all BMD values and the patient's BMI (r=0.3; p<0.001). A positive correlation was found between BMD (especially in the lumbar spine) and serum uric acid level (r=0.29; p=0.0005). In the studied group of patients, there was a significant relationship between hyperuricemia and normal BMD in the lumbar spine. The likelihood of normal BMD values with hyperuricemia increased 3.8 times, compared with patients with normal uric acid levels who often had osteoporosis (odds ratio (OR)=3.84; 95%CI=1.3-11.3; p=0.009). In the subgroup of patients with osteoporosis in the lumbar spine, the average serum uric acid level was 299.4 μmol/L, while in patients with normal BMD - 381.1 μmol/L (p=0.0004). A positive correlation was recorded between the level of triglycerides and the T-score, both in the lumbar spine and in the proximal femur (p=0.02). A negative correlation was found between the severity of frailty, estimated by the questionnaire "Age is not a hindrance", and BMD (r=0.26; p=0.01). A positive correlation was found between BMD and functional abilities of patients evaluated by the Barthel index (r=0.44; p=0.000002) and the IADL scale (r=0.36; p=0.00008). A history of fractures was noted in 27.6% of patients. Among the traditional risk factors for osteoporosis, a tendency to fall and very low physical activity were often noted. The average value of the "stand up and go" test reached 11.4 s; 23.4% of patients were not able to perform this test at all.

Conclusion: The study results indicate the features of BMD in individuals who have crossed a 90-y boundary. In the studied group of patients, a positive correlation was found between the level of uric acid and the BMD, especially in the lumbar spine. Significant relationships between the BMD on the one hand and the functional abilities of patients on the other were revealed. It is advisable to further study the bone condition in long-livers with the participation of a large sample of patients.

P1299
COMPARISON OF THE EFFICACY AND SAFETY OF TWO HYALURONIC ACIDS IN THE TREATMENT OF KNEE OSTEOARTHRITIS

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Objective: Several viscosupplement treatments are available to patients suffering from osteoarthritis (OA) but few comparative clinical trials have been conducted. The primary objective of the study was to demonstrate at 24 weeks the non-inferiority of on hyaluronic acid over a second one in terms of efficacy (pain relief) in knee OA patients (Kellgren-Lawrence radiologic stage II or III) with whom oral treatment had failed.

Methods: This was a prospective, multicenter, comparative, randomized, double-blinded study (one independent physician evaluator–one physician injector), comparing two viscosupplements: one containing a solution of hyaluronic acid (SYNOLIS VA® 80 mg hyaluronic acid and 160 mg sorbitol – Group HA1) and the other containing one of Hylan (SYNVISC ONE® 48 mg Hylan GF-20 – Group HA2) over a period of 24 weeks. At inclusion, the average VAS Pain (1-100) was 62.5. The patients were randomized in 2 parallel groups at D0 and followed until D168. They received an injection of either HA1 or HA2. Efficacy was primarily assessed using the WOMAC Pain index (daily assessed by the patient during seven days following the injection, and then at D14). During the follow-up visits (D28-D84-D168) WOMAC pain, stiffness and function scores were assessed as secondary objectives. At D168, efficacy and satisfaction were also evaluated by the evaluator and by the patient using Likert scale (7 points). Moreover, the number of responders strict each group was evaluated according to the OMERACT-OARSI criteria. According to methodology guidelines, the per protocol (PP) population has been used as primary analysis. The PP population included all patients from the intention to treat (ITT) population who completed the study without any major protocol violation.

Results: 202 patients were randomized (ITT population, 96 in the HA1 group and 106 in the HA2 group). Baseline demographic data for the PP population at the time of randomization by treatment group. Patients were predominantly female (66%). The median age of the whole population was 65 years and the median BMI of 27.4 kg/m². No statistically significant differences between the two treatment groups were observed for any demographic criteria. At D168, 197 presented no protocol violations (94 in the HA1 group and 103 in the HA2 group). This population had a decrease on the overall score of the WOMAC Pain at -29.2± 24.1 (SD) in the HA1 group and -31.6 ±25.5 (SD) in the HA2 group confirming the non-inferiority (P=0.57 for the difference between groups). Regarding the secondary endpoints, no significant difference has been observed at D14, D28, D84, D168, in the PP population for all the outcome except stiffness at D28. There was also no difference between the responders rate in two groups (79% for HA1 and 77% for HA2). In terms of safety, both products were well tolerated. No case of allergy or infection in the course of the injection was reported. Serious adverse events have been reported by 4 patients in HA1 group and 3 in HA2 group.

Conclusion: We confirmed the noninferiority of HA1 compared with HA2 in terms of both efficacy and safety.

P1300
COFFEE CONSUMPTION, BONE MINERAL DENSITY AND FRACTURE RISK IN ICELANDIC OLD ADULTS

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Objective: High consumption of coffee has been suggested to reduce the risk of some late-onset diseases and death but also to contribute to the development of osteoporotic fractures. Results of previous studies have been inconsistent. The aim of this study was to investigate associations between coffee consumption and BMD and hip fracture incidence.

Methods: A prospective study of 4831 Icelandic older adults from the AGES-Reykjavik study was conducted. Participants underwent a detailed clinical examination including BMD measurement at baseline (2002-2006). Hip-fracture cases were then identified through hospital records over a mean follow-up of 7.4 y.

Results: Mean age of the participants at baseline was 76.3 y. Frequent coffee consumption (>6 cups/d) was related to significantly lower BMD at baseline both in men (-13.2±5.4 mg/cm³) and in women (-32.2±5.6 mg/cm³) in an age corrected analysis when compared to ≤1 cup/d. Of male participants 5.7% and of female participants 11.6% suffered from hip fracture during the follow-up period. Coffee consumption was not related to fracture risk in men, but in women, high consumption (>6 cups/d) predicted increased hip fracture risk (HR=2.1; 95%CI=1.2-4.0;P=0.016) when compared to ≤1 cup/d. Statistical correction for medication, socioeconomics, nutrition and physical activity did not change the results.

Conclusion: Our study indicates that excessive coffee consumption is associated with poorer BMD in both sexes and predicts incidence hip fracture risk in woman.
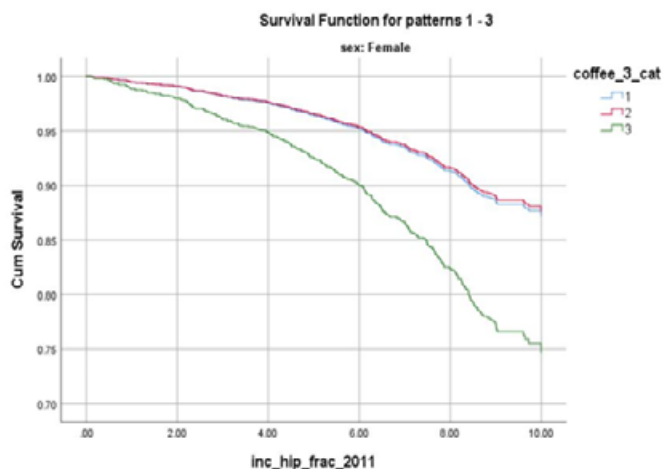
Figure. Hip fracture free survival in old female adults categorized by coffee consumption.

P1301
MANAGEMENT OF THE USE OF HERBAL PRODUCTS IN OSTEOPOROSIS

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Objective: Osteoporosis is a metabolic bone disorder which causes bone loss over time and increases the risk of fracture. The disease is often silent and known only when fractures occur. Women are more susceptible to osteoporosis. Numerous studies indicate that phytotherapy may be a complementary treatment of osteoporosis.

Methods: The purpose of the present study was to evaluate how to use herbal products in complementary treatment of osteoporosis and for the prevention of osteoporosis, in the population of the Bihor County.

Results: Our study shows that more women than men use herbal products as complementary treatment of osteoporosis. Most of the respondents use herbal products for treatment and not for the prevention of osteoporosis.

Conclusion: It has a special importance informing the patients about the therapeutic possibilities regarding the use of herbal products especially those with a role in prevention of osteoporosis. The correct informing is the role of the treating physician but also of the pharmacist.

P1302
COMPLEMENTARY AND ALTERNATIVE MEDICINE FOR LUMBAR HERNIATED INTERVERTEBRAL DISC: AN EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE

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Objective: The aim was to develop a clinical practice guideline (CPG) for Lumbar herniated intervertebral disc (LHIVD) in order to help clinicians translate best evidence to best practice on complementary and integrative medicine (CAM).

Methods: A multidisciplinary committee was organized, consisting of experts on clinical practice and methodology of the systematic review and CPG development. Based on the appraisal of previously developed CPGs and consensus of the committee, a development plan was established. After the search strategy was established based on the preliminary search, the literature search was conducted on core databases such as MEDLINE, EMBASE, Cochrane library and local databases of Korea, China, and Japan, where CAM is widely applied. Searched literature was selected with randomized controlled trials but excluded supplementary literature, and quality assessment of selected literature was performed using the risk of bias tool by independent two researchers according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Subsequently, the evidence was synthesized using meta-analysis, and the level of evidence and recommendation were determined by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) method. The draft of CPG was revised after an external review by the Guide Center for Korean Medicine (GKOM), and approved by the academic societies with a conflict of interest.

Result: 165 studies were finally selected and used for meta-analysis. Finally, the recommendations for acupuncture, moxibustion, herbal medicine, pharmacopuncture, chuna, thread-embedding acupuncture (TEA), and cupping were determined. In summary, each single treatment of acupuncture or chuna and combination of moxibustion or herbal medicine with conventional treatment was recommended, and each single treatment of herbal medicine or TEA and combination of pharmacopuncture or cupping with conventional treatment should be considered for improving overall symptoms of LHIVD.

Conclusion: The CPG was developed using an evidence-based approach by integrating all the available evidence. Although there were limitations from the low quality of evidence, it may help clinicians and patients to approach CAM interventions on LHIVD.

P1303
OSTEOPOROSIS IN ARMENIA: THE BURDEN OF DISEASE AS DETERMINED BY DXA, AND AWARENESS AMONG THE POPULATION

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Objective: Assessing current knowledge of osteoporosis and understanding of the disease among the population is needed to design programs to increase awareness. Knowing the prevalence of osteoporosis is similarly important in obtaining a more complete understanding of the disease burden in a community.

Material and Methods: W conducted an assessment of knowledge and attitudes towards osteoporosis among post-menopausal women in Armenia via questionnaire, and identified the prevalence of the disease in the same population via bone densitometry testing.

Results: As part of a larger study investigating vitamin D among women in Armenia, 591 post-menopausal women (mean age 63) completed the questionnaire, and of whom, 265 underwent DXA testing. These subsets were not different from the larger population. Of those who underwent DXA, 46% had osteoporosis as determined by a T-score < -2.5, and in 31%, T-scores were in the osteopenic range. Only 22% had normal T-scores. A majority of this population had heard about osteoporosis (69%), but only a minority could identify what it was (42%). Furthermore, most participants could not identify risk factors for the disease, and steps to prevent the disease.

Conclusions: We have established a high burden of osteoporosis in Armenia along with a substantial knowledge gap among those most affected by the disease. This information should serve as a call to action for clinicians and public health officials to raise awareness and improve preventive interventions in the community.

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

IOF International Osteoporosis Foundation

WCO IOF-ESCEO

ESCEO

Abstract Book

Satellite Symposia Abstracts

SY1

BUILDING A STRONGER FUTURE FOR POSTMENOPAUSAL WOMEN WITH SEVERE OSTEOPOROSIS

[1] UCB

[1]UCB, Brussels, Belgium

We invite you to join this landmark symposium, chaired by Serge Ferrari and Josep Blanch Rubió, to discover new perspectives on fracture risk reduction for women with severe osteoporosis.

Challenges of reducing fracture risk for patients with severe osteoporosis

Bo Abrahamsen, Josep Blanch Rubió

Risk of a subsequent fragility fracture significantly increases immediately after an index fracture,[1–4] providing a rationale for early intervention after a fracture. The possibility of further life-changing fractures in

these very high-risk patients also demands an approach with rapid effects on fracture risk reduction.[1]

To begin the symposium, we will assess current outcomes in high-risk patients, reviewing how treatments impact bone mineral density (BMD), a key determinant of bone strength and fracture risk.

A new treatment option for patients with severe osteoporosis at high risk of fracture

Bente Langdahl, Serge Ferrari

In view of evidence for faster and larger gains in BMD and greater reductions in fracture risk with bone-forming vs antiresorptive agents,[5,6] we will explore the expected impact with initial use of a bone-forming agent, to rapidly increase BMD, followed by an antiresorptive agent to extend those benefits[5].

Focusing on romosozumab – a monoclonal antibody that binds to and inhibits sclerostin, thereby increasing bone formation whilst decreasing bone resorption to rapidly increase bone mass and improve bone structure

and strength[7] – we will examine the mechanisms of action of bone-forming agents, and the efficacy and safety of romosozumab in women with severe osteoporosis at high risk of fracture.

Individualising the treatment approach for patients with severe osteoporosis: Evaluating the balance of benefits and risks

Gaetano De Ferrari, Eugene McCloskey

Finally, experts in cardiology and bone health will discuss when romosozumab might be an appropriate treatment for individual patients in clinical practice.

This symposium is sponsored by UCB.

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SY2

IMPROVING OSTEOARTHRITIS CARE: THE VALUE OF PATIENTS' PREFERENCE RESEARCH

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The patient perspective is becoming increasingly important in health research, regulatory processes and clinical decision-making. Information about what patients need and prefer, and how they value various aspects of a health intervention can be useful when designing and evaluating healthcare programs. Insights into patients' preferences and involving patients in shared-decision making process can further lead to improved adherence to therapy and ultimately result in improved care.

In line with this trend, there has been a growing interest in obtaining patients' preferences for healthcare treatments that are deemed 'preference sensitive'. In particular, discrete-choice experiment is widely used and commonly perceived as the gold standard to elicit patients' preferences. Given the significant challenges and lack of therapeutic options for osteoarthritis, several preference research have been conducted to elicit preferences for osteoarthritis treatment.

In this presentation, first, the importance and roles of patients in healthcare research and decision-making will be presented. Then, preference research and its potential value will be introduced. Finally, findings and implications from preference research in osteoarthritis will be presented. Current studies have suggested that potential benefits and risk of adverse events have to date been shown to be the most influential characteristics for both patients and physicians. Results from a recent ESCEO working Group that conducted a cross-European discrete-choice experiment in osteoarthritis will also be shown.

SY3

DRUGS SAFETY IN THE TREATMENT OF OSTEOARTHRITIS: A CRITICAL APPRAISAL

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Objective: To review international recommendations for the treatment of Osteoarthritis (OA), with particular emphasis on safety of the most commonly prescribed drugs.

Material and methods The most recent literature has been analyzed and the main safety issues identified in meta-analyses and systematic reviews will be reported for each drug treatment

Results. Paracetamol is widely recommended as the first-line analgesic for OA, but the most recent evidence suggest low efficacy for OA pain and potential safety issues, related to liver and gastrointestinal (GI) toxicity, particularly in older patients. Symptomatic slow-acting drugs for OA (SYSADOAs) include several different agents, such as glucosamine, chondroitin, diacerein, and avocado soybean unsaponifiables. Only prescription-SYSADOAs, not over-the counter products are recommended, and in particular prescription crystalline glucosamine sulfate (pCGS) and chondroitin sulfate (CS) represent a first-line treatment (not in combination), because of their efficacy on controlling pain and improving function in OA, with no significant increased risk of adverse effects (AEs) versus placebo. Safety issues related to the use of CGS in people with diabetes and CVD have been addressed in recent clinical trials, and CGS at oral recommended doses for OA treatment, showed no interference with glucose metabolism in normoglycemic subjects and in those with hyperglycemia, pre-diabetes or diabetes. Several AEs have been reported for diacerein, in particular severe diarrhea and dizziness that in older, frail patients have to be regarded as a potentially very serious AE. Only minor, local AEs have been reported for Topical Nonsteroidal anti-inflammatory drugs (NSAIDs), and they are considered safer than oral NSAIDs(non-selective NSAIDs and selective COX-1 and 2s). Topical NSAIDs are therefore recommended, particularly for older patients at higher risk for GI, CVD, and renal AEs and might be considered as cyclic add-on analgesia in patients still symptomatic after the use of pCGS or CS.

Conclusions Clear indications for which drugs are safer in the OA treatment are currently available and clinical practice should reflect the available recommendations.

SY4

WHAT MAKES A DIFFERENCE BETWEEN SYSADOAS

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ESCEO recently updated its guidelines for the management of osteoarthritis of the knee. Because of the increase in concerns about safety of Paracetamol, SYSADOAs were upgraded and are now recommended as the first-line background therapy in symptomatic patients. However, ESCEO clearly mentions that whereas micro-crystalline Glucosamine Sulfate and pharmaceutical-grade Chondroitin Sulfate have shown their ability to improve pain and function, these results cannot be extrapolated to other SYSADOAs. The assessment of the interest of the respective SYSADOAs for the management of osteoarthritis is based on three major pillars. First of all, the efficacy of the drug should be unequivocally demonstrated in double-blind randomized placebo-controlled trials assessing pain and function through primary endpoints which have been validated by the regulatory authorities. Since these drugs will be used for several years, their safety should be absolute, on all body systems and not only on the musculoskeletal tissues. Eventually, since we are living in a cost-conscious world, the cost-effectiveness of treatments against osteoarthritis should be evaluated, with a validated methodology, allowing to compare the interest of spending money for the management of knee osteoarthritis with the different therapeutic approaches that can be offered in other chronic disorders. Based on this, micro-crystalline Glucosamine Sulfate has shown its ability to reduce pain and improve function, mainly in patients with knee osteoarthritis of grade 1 – 3. No adverse events were linked to its prolonged use, even in patients with glucose intolerance. It has been shown to be cost-effective compared to placebo and compared to other preparations of Glucosamine, in the short-term as well as after many years of administration.

SY5

COULD YOUR OSTEOPOROSIS PATIENT BE HIDING ANOTHER BONE DISORDER?

M. L. Brandi[1], R. Chapurlat[2], R. Oheim[3]

[1]University of Florence, Florence, Italy,[2]Hôpitla Edouard Herriot, Lyon, France,[3]University of Hamburg, Hamburg, Germany

Guided by international experts, this interactive symposium is designed to provide attendees with specialist knowledge regarding the clinical identification of patients with rare metabolic bone disorders. Over the past 40 years, clinical practice has changed substantially because of the pivotal research and

advances in our understanding of complex regulatory pathways and bone biology.[1] Despite this progress a significant unmet need remains, given that patients with rare bone disorders often suffer delays in

diagnosis.[2,3] Early diagnosis and treatment of these disorders provide an opportunity to improve clinical outcomes while preventing lifelong complications.[3,4]

To help optimise diagnosis and clinical decision making, a panel of renowned experts will discuss challenges and provide case study-led discussion on key aspects in this field, including:

- the complexity of correct diagnosis of osteomalacia osteoporosis
- bone histomorphometry in the diagnosis of osteomalacia and its differences from osteoporosis
- fibroblast growth factor 23 (FGF23)-mediated osteomalacia

WCO IOF-ESCEO

VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

- how to correctly diagnose patients with X-linked hypophosphatemia

Attendees will have the chance to engage with the experts throughout the symposium in an interactive Q&A session and keypad voting, with open discussion focussing on patient case studies and hear

leading specialist advice. We hope attendees will increase their clinical knowledge, confidence in diagnosis of rare bone disorders and, therefore deliver appropriate patient care.

This symposium is organised and sponsored by Kyowa Kirin.

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Disclosures:

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- R. Chapurlat: Speaker and/or consultancy and/or travel and/or clinical research: Kyowa Kirin, Amgen, UCB, Arrox, Mylan, Medac, Novartis, Abbvie, MSD, Lilly, Pfizer, BMS, Chugai, Sanofi, Janssen-Cilag, Fresenius-Kabi

- R. Oheim: Travel cost reimbursement/speaker honorarium from Kyowa Kirin and Inozyme. Research grant from Kyowa Kirin

SY6
A CHRONIC DISEASE: GOING BEYOND TODAY WITH OSTEOPOROSIS

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This educational symposium will be chaired by Professor Serge Ferrari and Professor Adolfo Diez-Perez.

Dr Cristina Ojeda will focus on awareness around osteoporosis being a chronic disease, the immediate risk of new fractures following an osteoporotic fracture and the evolution of secondary prevention over time including the latest data from European registries.

Professor Eugene McCloskey will discuss the latest developments in osteoporosis guidelines and how to better address the management gaps in osteoporosis.

Professor Serge Ferrari will present the treat-to-target strategies for sequential and longterm therapy in the frame of patients evolving risks, including the role of denosumab.

The symposium will include open discussion time and voting questions to enhance audience engagement and interactivity.

Disclosures: Serge Ferrari: Consulting/speaker for Amgen, UCB, Agnovos, Galapagos. Grants from Agnovos, Alexion, Labatec, Amgen.

Adolfo Diez Perez: Speaker or advisor for UCB, Lilly, Amgen, Theramex, Sandoz.

Cristina Ojeda: Consulting/speaker for Amgen, MBA.

Eugene McCloskey: Consultant/advisor/speaker fees and research support from AgNovos, Amgen, AstraZeneca, Consilient Healthcare, Fresenuius Kabi, GSK, Hologic, Internis, Lilly, Merck, Novartis, Pfizer, Roche, Sanofi-Aventis, Servier, Synexus, UCB, Warner Chilcott. Additional research support from ARUK, I3 Innovus, MRC, IOF, Unilever.

SY7
WHAT HAPPENS IF WE DON'T FIND THE NEEDLE: UNDERSTANDING THE BURDEN OF DISEASE AND MISDIAGNOSIS IN ADULTS WITH HPP

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Hypophosphatasia (HPP) is a rare, inherited metabolic disease caused by mutations in the tissue-nonspecific alkaline phosphatase gene ($ALPL$) resulting in low levels of alkaline phosphatase (ALP) activity. HPP is clinically heterogeneous with symptoms appearing at any age, from before birth to adulthood. In adults, common symptoms include muscle weakness, pain, dental abnormalities, abnormal gait, low-trauma fractures and pseudofractures, which contribute to a high disease burden. As certain manifestations of HPP can evolve over a patient's lifetime, diagnosis of HPP in adults poses a challenge.

Adults with HPP may be diagnosed based on low age- and sex-adjusted serum ALP activity; genetic testing can sometimes confirm the diagnosis but is not required. Manifestations of HPP in adults may overlap with other more common bone disorders, resulting in misdiagnosis, diagnostic delays and inappropriate treatment. Bisphosphonates, used in bone fragility management, can result in symptom worsening in HPP patients and potentially atypical femoral fractures.[1] Vitamin D supplementation in HPP patients with normal levels of PTH can worsen hypercalcaemia and hypercalciuria.[2] Results with teriparatide, used to treat osteoporosis, are variable and may not be suitable for managing HPP patients.[2] The enzyme replacement therapy asfotase alfa is approved for the treatment of paediatric-onset HPP, reducing plasma levels of ALP substrates and improving physical function in adults with HPP;[3] however, data in this age group are more limited vs younger patients.

Improved knowledge of diagnosis and management of HPP patients is urgently needed, especially for metabolic bone specialists that are likely to encounter these patients. Using a case study to highlight distinctive symptoms that should be considered in making a differential diagnosis of HPP in adults, this presentation will set the scene for the symposium, which will focus on differential diagnosis, management and monitoring of adult HPP patients in the setting of more common bone disorders.

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SY8

FINDING THE NEEDLE IN THE HAYSTACK: DIFFERENTIAL DIAGNOSIS OF HPP IN THE SETTING OF ADULT OSTEOPOROSIS

R. Eastell[1]

[1]University of Sheffield, Sheffield, United Kingdom

Manifestations of hypophosphatasia (HPP) may be heterogeneous and can occur at any age and evolve throughout a patient's life, making HPP difficult to recognise. Lack of HPP recognition can lead to substantial diagnostic delays and poor clinical outcomes. A contributing factor to diagnostic delay in patients with HPP is misdiagnosis, often as osteoporosis in adult patients due to overlapping symptoms such as recurrent fractures, low bone mass and ill-defined musculoskeletal pain. This has important implications for patient management; treatment for osteoporosis such as bisphosphates can exacerbate HPP manifestations. Thus, an accurate and timely diagnosis is critical.

Findings from the Global HPP Registry (NCT02306720) indicate that adults with HPP often experience substantial diagnostic delay. The median age of earliest reported manifestations of HPP in adults was 37.6 years (y) (range 0.2-75.2), preceding median age at diagnosis (47.5 y; range 0.2-75.2) by ~10 y.[1] During the disease course, adult patients reported a wide range of systemic manifestations, including recurrent or poorly healing fractures and musculoskeletal pain and/or weakness. A self-reported study (NCT02751801) of adult patients with HPP evaluated patient experience, including clinical manifestations and healthcare resource use, pre- and post-diagnosis. Pre-diagnosis, patients reported multiple (mean 15.3; median 8.0; IQR 3.8-19.5) outpa-

tient visits to specialist centres with secondary care specialities, mainly radiology (82%), accident and emergency and metabolic bone clinics (each 46%). Mean (median; IQR) number of diagnostic tests reported was 6.9 (6.0; 4.0-8.5).[2] Overall, substantial diagnostic delay in adults with HPP occurs, despite high disease burden and healthcare resource use.

This session will provide an overview of the laboratory and clinical parameters that can help distinguish HPP from other more common skeletal disorders presenting at specialised bone clinics. Using case studies in adult patients with HPP, these diagnostic tools and their implementation in clinical practice will be discussed.

References:

- Högler W et al. BMC Musculoskelet Disord 2019;20:80
- Jenkins-Jones S et al. J Bone Miner Res 2018;33(S1):oral 1107

SY9

AFTER THE NEEDLE: MANAGING ADULT PATIENTS WITH HPP

L. Seefried[1]

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Clinical manifestations of hypophosphatasia (HPP) in adults include musculoskeletal symptoms such as recurrent fractures and chronic pain that may result in impaired physical function and reduced quality of life. The enzyme replacement therapy asfotase alfa restores defective bone mineralisation and is approved for the treatment of patients with paediatric-onset HPP. Limited evidence and experience regarding appropriate assessments for monitoring the effectiveness of asfotase alfa treatment is a common problem physicians face when treating adult patients with paediatric-onset HPP. During this talk, we will focus on the assessment and management of physical function and quality of life and share experience on a variety of tools, such as the 6-minute walk test (6MWT) and the Lower Extremity Functional Scale (LEFS), among adult patients with paediatric-onset HPP receiving asfotase alfa therapy.

A recent observational, retrospective and prospective study in adult patients with paediatric-onset HPP receiving asfotase alfa for ≥12 months evaluated the effectiveness of this therapy on physical function and quality of life (NCT03418389).[1,2] Significant improvements in physical function and quality of life were observed over 12 months, as determined by the 6MWT, LEFS, Short

Physical Performance Battery and 36-Item Short-Form Health Survey v2 assessment tools, demonstrating that asfotase alfa can be effective in improving patient functioning and quality of life.

Using an illustrative case study of an adult patient with paediatric-onset HPP, we will explore routine clinical practice from initial assessment and baseline results through to treatment and management for adult patients with HPP. We will touch on the importance of specific practical assessment tools for physical function and quality of life to determine the effectiveness of treatment and monitoring of adult patients with paediatric-onset HPP over time. Data from our study will be used alongside our patient story to demonstrate how these clinical findings can be implemented in routine clinical practice.

References:

- Seefried L et al. J Bone Miner Res 2019;34(S1):poster 893
- Seefried L et al. Poster 893 presented at ASBMR, Orlando, FL, USA, September 20-23, 2019

Acknowledgements:

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Disclosures:

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WORLD CONGRESS ON
OSTEOPOROSIS, OSTEOARTHRITIS
AND MUSCULOSKELETAL DISEASES

Martínez-Cruz M.	P1193
Martínez-Laguna D.	P1079
Martínez-Morillo M.	P1228
Martínez-Velilla N.	P402
María Luisa M.	P202
Masa Lasheras M. E.	P107
Mascarenhas M. R.	P812 , P1154
Masenko V.	P857
Masetti R.	P1143
Masi L.	P1097
Masoud M.	P154
Massara M.	P350
Massazza G.	P779 , P896
Massenet V.	P258 , P259
Massetti T.	P549
Mastaglia M. S.	P1145
Mastaviciute A.	P831 , P922 , P1126
Mastavičiūtė A.	P763
Mateescu B. R.	P379 , P380
Matei D.	P396 , P405 , P1180 , P1185 , P1197
Mateo L.	P1103
Mateo Soria L.	P1228
Mathold K.	P903
Matijevic R.	MTE12 , P682 , P683 , P712 , P1071 , ESCEO-WHOCC3
Matos F.	P1012
Matos L.	P977
Matsunaga T.	P135
Matucci M.	P1140
Matzaroglou C.	P354 , P362 , P408 , P409 , P410 , P536 , P537 , P670 , P729 , P1026 , P1088 , P1218
Mavroudi M.	P1030 , P1031 , P1034 , P1038 , P1096
Maxson J. A.	P490
Mayman D.	P280
Mayorga E.	P539
Mazur M.	P1047
Mazur-Nicorici L.	P1047
Mazurenko E.	P430 , P528
Mazurenko M.	P309
Mazurenko O.	P310
Mazurenko S.	P285 , P309 , P310 , P413
McClung M.	OC20
McClung M. R.	PL3 , OC2
Mccarney B.	P1177
Mccarroll K.	P1165 , P1258
McCloskey E. V.	OC12 , OC24 , OC28 , P393 , P394 , P395 , P463 , P541 , P953, P954 , P1022 , P1023, PL2 , P559 , SL1 , SY6 , ESCEO-WHOCC3 , ESCEO-WHOCC4
Mcgowan D.	P483
Mcgowan K.	P483
Mcguigan F. E.	P1169 , P1170 , P1171
Mckain L.	OC20
Mcleod K. M.	P612 , P753
Mcmillan L. B.	P438
Md-Said S.	P130
Mecocci P.	P596 , P599 , P602 , P1263
Meddeb Z.	P984 , P1010
Medeiros Domingo M.	P702
Medina A.	P383
Medina A. M.	P1207
Medina Garcia M.	P598
Medina Orjuella A.	NSS4 , NSS54
Medina-Rodriguez F.	P1219
Medioli A.	P1248
Megas P.	P354 , P1026 , P1088 , P1218
Mehan U.	P541
Mehrdad N.	P152 , P159 , OCs2
Mehsen N.	OC35
Meier C.	OC3
Melbouci M. Y.	P749
Mellström D.	OC12 , OC24
Melnichenko G.	P777 , P926
Mendez-Garcia M.	P1187
Mendoza Alvarado C.	P1249
Meneses N. L.	P1012
Meng T.	P103 , P226
Menshikova A.	P639 , P651
Meray J.	NSS91
Merchaoui M. I.	P1285
Mereu M. C.	P529
Merkulov M.	P926
Merminod F.	OC30
Mesanovic E.	P353
Mesinovic J.	P438 , P493
Messina C.	P344
Messina O. D.	SL1
Metallidis S.	P654
Mets T.	NSS102
Meyer R.	P1057
Miagkova M.	P339 , P341
Michael A.	P179 , P180
Michael C.	P784
Michalak M.	P1271
Michalak M. M.	P1289
Michalska D.	P1255
Michelet F.	P575
Micklesfield L.	P886
Micó-Pérez R. M.	P1079
Mihai G.	P1182
Mihai R. M.	P1017
Mihailova E.	P224 , OCs3

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VIRTUAL CONGRESS 2020

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

Thakur D. R.	P1067
Thakur R.	P900 , P1119
Thakur S.	P884
Thaung Zaw J. J.	OC19
Theunissen E.	OC11
Thierolf R.	P866
Thissen J.-P.	P472
Thomas T.	OC5 , OC35 , P1086 , P1233 , ESCEO-IOF6
Thompson C.	P679
Thompson C. H.	P1090
Tian J.	P1108 , P1109
Tian W.	P192 , P498 , P499
Tieranu C.	P379
Tikhomirova E. A.	P649 , P652 , P653 , P714 , P715 , P821 , P823 , P834
Tilbor I.	P131 , P427
Tillin T.	P1133
Timkina N. V.	P1215
Timoshanko J.	OC2 , P1181
Tirunellai Ramani E. T. R.	P1039
Titcombe P.	P516
Tiu K. L.	P806 , P808 , P847 , P990
Tiwari P.	P1022 , P1023
Tkachuk A.	P939
To K.	P385 , P386
Todorov S.	P676 , P951 , P958
Todorova M.	P676
Tofilovska Josifovska S. T. J.	P411
Tomai Pitinca M. D.	P1112 , P1116
Tomasevic Todorovic S.	P712
Tomasevic-Todorovic S.	P294 , P1071
Tomcuk K.	P628
Tomic Lucic A.	P713
Toniolo M.	OC3
Topolyanskaya S. V.	P1298
Torba A.	P583
Torgashin A.	P332
Torgashina A.	P332
Torgerson D.	P954
Toroptsova N.	P639 , P647 , P650 , P651
Torres R.	P371 , P412
Torres Roldan V. D.	P1054
Torres Y.	P919
Torres-González R.	P1219
Torres-Naranjo J. F.	P1254
Toth E.	OC25 , P755 , P1117 , P1129
Toujani S.	P984 , P1010
Tournis S.	P242 , P570 , P571
Tournoy J.	P632 , P636 , P901
Traistaru R.	P535 , P538 , P967 , P971 , P973 , P1070 , P1073 , P1076 , P1197

Triantafyllopoulos I. K.	P242
Tricarico D. T.	P303
Trifonov R.	P200
Tripepi G.	P527 , P529
Tripto-Shkolnik L.	P131 , P427
Trofimenko A. S.	P649 , P652 , P653 , P714 , P715 , P821 , P823 , P834 , P936
Trofimov E.	P376
Trombetti A.	PL10 , P879 , P880
Trovas G.	P242
Trujillo E.	P274
Trujillo M. D. M.	P274
Trăistaru M. R.	P485 , P486
Tsachouridou O.	P654
Tsagareli M.	P561
Tsai C.-H.	P109
Tsai T.	P638
Tsakiridis P.	P1030 , P1031 , P1034 , P1038 , P1106
Tsarenok S.	P629
Tsartsalis A. N.	P218
Tsekoura M.	P354 , P362 , P670 , P729 , P1026 , P1088 , P1218
Tsepeli M.	P1100
Tsepis E.	P362 , P729 , P1026 , P1218
Tsiridis E.	P991 , P1085
Tsitsilonis S.	P1075
Tsoriev T.	P926
Tsuchiya D. R.	P263
Tsunekage Y.	P623 , P711
Tsutsui S.	P1094
Tsvetkova E.	P444
Tuculina M. J.	P500 , P501 , P503 , P504 , P505 , P506 , P507 , P508 , P509 , P510
Tufan A.	P222 , P223
Tumwasorn S.	P125 , P298
Tuncer M.	P667
Tupea C.	P1212
Turchin N. I.	P542
Turcu Stiolica A.	P973
Turda C.	P914
Turk J.	P675
Turkic E.	P353
Turner A.	P580 , P637
Tyblova M.	P1255
Tyurin A.	P760 , P767
Tzeng H.-E.	P109
Ucb U. C. B.	SY1
Uchida D. R.	P263
Uchida K.	P135 , P207
Udeagu G. C.	P458

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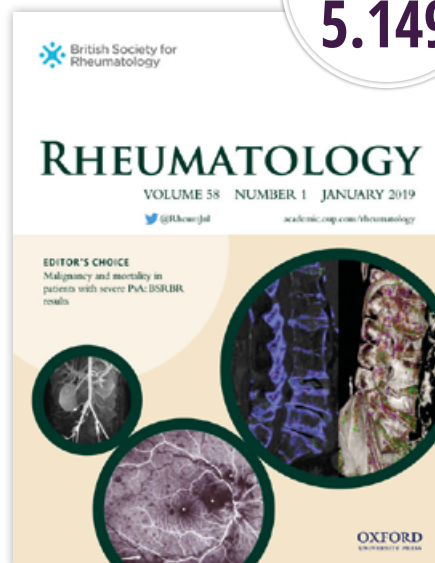
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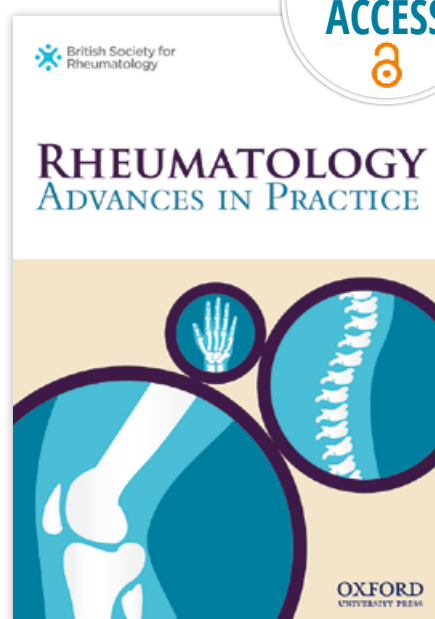
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