score was found significantly lower in SLE patients compared with CNT (0.868±0.227 vs 1.482±0.113,p<0.001, respectively). An history of high-dose oral glucocorticoids (> 10 mg/day) was associated with the preservation of BMD at the lumbar spine but not in spinal trabecular bone as observed by TBS analysis.
Conclusion: SLE is associated with significant trabecular bone loss, which could not be caused by glucocorticoid therapy. This study confirms the role of TBS as new and safe diagnostic tool for the quantification of the bone quality in chronic and systemic inflammatory rheumatic diseases, such as SLE.

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FRI0502 CORRELATION OF THE DAILY DIETARY INTAKE OF CALCIUM WITH THE LEVEL OF BONE MINERAL DENSITY IN PATIENTS WITH HUMAN IMMUNODEFICIENCY VIRUS INFECTION

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Background: There are few studies in which the relationship between daily calcium intake and bone mineral density (BMD) in patients with human immunodeficiency virus (HIV) infection has been evaluated, as well as its correlation with other factors of risk for the development of fragility fractures in this population.
Objectives: To determine the correlation of daily calcium intake with the most predictive risk factors for fragility fracture in patients with HIV infection, as well as BMD values in a cohort of patients followed in a Tertiary Madrid hospital.
Methods: Cross-sectional evaluation of a prospective study carried out in a specialized unit in HIV/AIDS of a tertiary Madrid hospital. We included asymptomatic consecutive patients with HIV infection, older than 50 years, followed regularly between January 2014 and December 2016.
Results: A total of 128 patients were included (35 women, 27%), with a mean age of 57 years (range: 50-83) and body mass index of 23.8 kg/m2 (range: 15.6-33.5). The mean time of HIV infection was 256 months (range: 202-306) and of antiretroviral therapy (ART) 219.7 months (range: 156-247). The average calcium intake obtained by dietary calculation (without supplementation) was 563.8 g/day (462-2772). Among the risk factors for fragility fracture (included in the FRAX): 44 (34%) reported smoking, 11 (9%) family history of fracture, 54 (42%) previous history of fracture, 8 (6%) significant alcohol consumption and 25 (21%) renal tubular dysfunction. According to the WHO classification based on BMD at the level of lumbar spine (LS) 50 (39%) were classified as osteopenia and 43 (34%) as osteoporosis, while at the femoral neck level said proportions were 83 (65%) and 9 (7%), respectively. A correlation was found between higher calcium intake with a longer time of ART (rho = 0.2, p = 0.02), but not with the age or time of HIV infection. The calcium intake showed no correlation with serum calcium levels (rho = 0.05, p = 0.72), serum phosphorus levels or bone biomarkers such as alkaline phosphatase, osteocalcin or P1NP, but an inverse relationship with the levels of βcrosslaps (rho = -0.21; p = 0.02). Calcium intake was associated with greater exercise, assessed by the International Physical Activity Questionnaire (IPAQ) (rho 0.23; 0 = 0.01). The calcium intake was lower in patients with osteoporosis with respect to osteopenia or normal (hip 500 vs 580 vs 573, LS 507 vs 635 vs 585, respectively, p = 0.04 between osteoporosis/osteopenia). Although a lower calcium intake was found in patients with vertebral fractures, this was not significant (486 (236) vs 583 (317), p = 0.09).
Conclusion: Although recent meta-analyzes show that calcium intake in non-HIV population is not related to the development of fragility fractures, in our cohort (with the limitations of a cross-sectional study) a probable association of daily calcium intake with a low BMD is evidenced. These findings should be confirmed in the longitudinal analysis of the data of the cohort.

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FRI0503 USING BONE MINERAL DENSITY VERSUS THE RATIO OF BODY MASS INDEX TO BONE MINERAL DENSITY TO PREDICT FRACTURE RISK IN HYPERTHYROIDISM

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Background: Euthyroidism is important in the development of a normal skeletal system, with thyroid hormones acting as important regulators of bone homeostasis in adults[1]. Hyperthyroidism, whether current or previous, increases the risk of developing osteoporotic fractures by stimulating osteoclastic bone resorption and hence bone remodelling, which overall results in decreased bone mineral density (BMD)[2]. Generally, BMD is used as a predictor of fracture risk; however there has been recent research that suggests using the ratio of BMD to Body Mass Index (BMI) is a better marker of predicting fracture risk in obese patients than BMD alone[3].
Objectives: Our research set out to find whether BMD alone or the ratio of BMI to BMD is a better predictor of fracture risk in patients with current or previous hyperthyroidism.
Methods: Data were used from a cohort of patients with current or previous hyperthyroidism, referred for DEXA scan to a District General Hospital between June 2004 and October 2010. The following were recorded: age, sex, whether a fracture was sustained, whether they had had steroid therapy at any point, BMI, BMD at L1-L4, BMD at femoral neck (left and right) and BMD at hip (left and right). Logistic regression models were fitted using fracture as the dependent variable. The independent variables for the first set of logistic regression models were BMD at each level and for the second set BMI:BMD ratio at the same levels. Data were adjusted for sex and age at scan. The fit of logistic models were compared using area under the ROC curves (AUC).
Results: 720 patients were used in the study, of whom 643 (89.3%) were female. Mean age was 63.6 years (SD 11.6) with age range of 28.4 to 89.6 years. 120 (16.7%) were recorded to have had steroid therapy at any point. Mean BMI was 25.9 kg/cm^2 (SD 4.77). 274 (38.1%) had sustained a fracture. Odds ratios and AUC values for each level were as shown in the table. The fit of the models using the ratio was generally superior to the fit of the models using BMD alone at the hips and femurs, as AUC values were generally greater for the ratio. At each individual level of the lumbar spine the BMD alone provided a better fit, however overall the ratio gave a slightly better fit.

Table 1. – Odds ratios (age- and sex-adjusted) and AUC values

Level	Odds Ratio and CI (BMD)	AUC (BMD)	Odds Ratio and CI (BMI:BMD)	AUC (BMI:BMD)
L1	0.128 (0.0510, 0.324)	0.6277	1.07 (1.04, 1.09)	0.6305
L2	0.161 (0.0697, 0.374)	0.6277	1.06 (1.03, 1.09)	0.6250
L3	0.128 (0.0510, 0.324)	0.6418	1.06 (1.04, 1.09)	0.6307
L4	0.188 (0.0879, 0.401)	0.6282	1.06 (1.03, 1.09)	0.6249
L1 to L4	0.120 (0.0496, 0.291)	0.6282	1.07 (1.04, 1.10)	0.6309
L FEMORAL NECK	0.0988 (0.0290,0.336)	0.6219	1.05. (1.02, 1.07)	0.6285
R FEMORAL NECK	0.0450 (0.0877, 0.231)	0.6776	1.06 (1.03, 1.09)	0.6798
L TOTAL	0.0980 (0.0233, 0.412)	0.6812	1.07 (1.03, 1.10)	0.6936
R TOTAL	0.0623 (0.0136, 0.285)	0.6778	1.07 (1.03, 1.10)	0.6850

Conclusion: This study identifies that the BMI:BMD ratio does not provide better indication of fracture risk than BMD alone in our cohort of patients with current or previous hyperthyroidism. We have previously shown that the same is true for patients with rheumatoid arthritis. A limitation of this study is not stratifying by presence of other diseases or steroid use.

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Further work will be done to study the role of the ratio in predicting fracture risk in patients with other conditions.

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Cartilage, synovium and bone

FRI0504 TOCILIZUMAB CONTROLS BONE TURNOVER IN EARLY POLYMYALGIA RHEUMATICA

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Background: Tocilizumab has been proved to be an alternative to corticosteroids in treating polymyalgia rheumatica. Considering the action on interleukin-6 on bone turnover an effect of tocilizumab is supposed. Few data are available about bone turnover in rheumatoid arthritis patients treated with tocilizumab but no data are available in polymyalgia rheumatica patients.
Objectives: This study explores changes in the bone homeostasis by testing the N-terminal collagen type I extension propeptide (PINP) marker for osteo-formation and the carboxy-terminal region of collagen type I (CTX-I) marker for osteo-resorption in patients taking tocilizumab for polymyalgia rheumatica (PMR).
Methods: Twenty patients were included in the prospective open-label TENOR study (Clinicaltrials.gov NCT01713842) and received three monthly tocilizumab infusions, followed by corticosteroids starting at week (W)12. PINP and CTX-I were tested at inclusion (W0), after tocilizumab but before steroid initiation (W12), at the end of the protocol (W24) and were compared to healthy controls. Information regarding disease activity, inflammatory parameters and interleukin (IL)-6 levels were collected during the follow-up of the patients.
Results: Polymyalgia rheumatica patients were characterized by higher levels of CTX-I relative to healthy controls matched in age and sex at baseline. PINP levels increased at W12 (p=0.0008, *versus* W0) following tocilizumab introduction and CTX-I levels decreased at W24 and after steroid initiation (p=0.001, *versus* W0) (figure 1). Such modifications explain the altered correlation observed between PINP and CTX-I at W0 (r=0.255 at W0 *versus* r=0.641 in healthy controls) and its correction after treatment (r=0.760 at W12 and r=0.767 at W24). Finally, greater changes in PINP were observed in patients whose circulating IL-6 levels decreased after tocilizumab therapy.

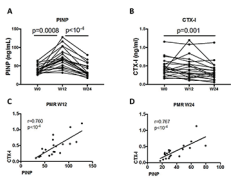

Figure 1. Evolution of PINP (A) and CTX-I (B) in polymyalgia rheumatica patients under tocilizumab therapy (W0-W12) and under corticosteroids (W12-W24). Correlation between CTX-I and PINP in polymyalgia rheumatica patients at week 12 (C) and 24 (D)

Conclusion: Control of bone turnover, in part through the inhibition of the IL-6 axis, is observed during tocilizumab and subsequent steroid treatment of polymyalgia rheumatica.

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FRI0505 CORRELATIONS BETWEEN CARTILAGE MOLECULAR COMPOSITION DETERMINED BY RAMAN SPECTROSCOPY AND MANKIN SCORE: IMPACT OF INTER AND INTRA-VARIABILITY

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Background: Osteoarthritis (OA) is an incurable disease and methods for its early diagnosis are still an unmet clinical need. Raman spectroscopy (RS) presents potential as a diagnosis technique based on the detection of peaks that can be assigned to cartilage components and molecular rearrengements during disease progression.[1]Mankin score (MS) is the main validated method to evaluate severity of cartilage degradation considering structure, cell distribution, Safranin-O staining and tidemark integrity.[2]
Objectives: To evaluate the correlations between OA cartilage RS assigned peaks and MS, considering the inter- and intra-variability of different observers.
Methods: MS analysis (Subscore-I, structure: 0-6; -II, cellularity: 0-3; and -III, safranin-O staining: 0-4; Total Score: 0-13) of human OA cartilage explants from 22 donors (age range: 32-92), obtained from lesion (n=22) and/or adjacent tissues (n=14), was performed by 3 blinded observers (O1, 2 and 3). Moreover, one of the observers performed the scoring in triplicate, with at least one month between observations. Inter- and intra-observer variability was determined by kappa and intraclass correlation (ICC) coeficients. Raman spectra were obtained with a FT-Raman Bruker RFS100 (λ=1064nm) and main peaks assigned (6 ratios related to proteoglycans, collagen, lipid index or calcium phosphate). Spearman's non-parametric correlation coefficient rho was used to compare MS and RS assigned peaks.
Results: Inter-observers variability indicated good (ICC>0.74) or moderate agreement (ICC>0.5) for all scores in lesions, whilst only a good agreeement (ICC=0.70) was found for subscore-I, in adjacent tissues, and no agreeement for the remaining parameters (subscores -II, -III, and total scoring). However, when performing analysis using kappa coefficients, a simultaneous agreement between the 3 observers was not observed. Intra-observer variability revealed good concordance (ICC>0.6) for all subscores and total scoring in cartilage for both sites, except for subscore –III, in adjacent tissues. In this case, ICC results were confirmed by kappa coefficients. Spearman's correlation coefficient between cartilage main peaks assigned by RS and MS indicated significant differences between observers(Fig.1). Correlations were found for a greater number of MS subscores in O1 (6) regarding O2 (4) or O3 (3) which could be related to the observers' experience (being O1>O2>O3). These correlations were mostly found in lesions (5, 3 and 1 for O1, 2 and 3, respectively) in comparison to adjacent tissues (2, 1 and 2 for O1, 2 and 3, respectively).
Conclusion: Eventhough inter-observation correlations for MS were in the moderate- good range, when analyzing kappa coefficients (categorical variables) these were not maintained. In addition, inter- and intra-observer variability results for adjacent tissues revealed possible limitations when characterizing early to mild OA. In view of MS-RS correlations, a reader dependency is underlined, indicating MS subjectivity and further limitations in the validation of RS using MS.

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