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SAT0531 MATRIX ASSISTED LASER DESORPTION IONIZATION IMAGING MASS SPECTROMETRY APPLIED TO HUMAN OSTEOARTHRITIS CARTILAGE REVEALS THE INTRA-TISSUE METABOLIC HETEROGENEITY

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Background: Osteoarthritis (OA) is one of the most common diseases, caused by a chronic degenerative disorder of the joint. OA can be related to the metabolic syndrome or metabolic abnormalities being recently defined as a subtype of the disease[1]. Matrix-assisted laser desorption/ionization (MALDI) imaging mass spectrometry (IMS) technology allows for the investigation of the bimolecular distribution of proteins, lipids or metabolites through the in situ analysis of tissue sections. In order to better understand the metabolic OA phenotype, the study of the endogenous metabolic profiles using MALDI-IMS should be considered.
Objectives: The main goal of this study is to apply MALDI-IMS methodology to study the metabolic spatial distribution of cartilage and to reveal intra-tissue and inter-patient heterogeneity.
Methods: Human OA cartilage was obtained from donors undergoing total knee joint replacement. Samples were heat stabilized by a stabilizer system, before being snap frozen. Cartilage punches were sectioned at 12 μm thickness in a cryostat and deposited on indium tin oxide (ITO) glass slides. 9-Aminoacridine (9AA) and N-(1-Naphthyl) Ethylenediamine DihydroChloride (NEDC) matrices were sprayed on the tissues. MALDI-MS profiling and imaging experiments were performed using different mass spectrometers. Data were analyzed by different software dedicated to mass spectrometry.
Results: Results showed that 9AA and NEDC matrices were both able to extract several and different compounds. MALDI-MS/MS was employed with 9AA matrix for molecular identification, confirming for the first time the presence of several metabolites in cartilage such as adenosine triphosphate, adenosine diphosphate, uridine triphosphate or N-Acetylglucosamine. Punches from lesioned and non-lesioned areas from the same OA patient were heat stabilized and sprayed with NEDC matrix. MALDI-IMS experiments at 40-μm of spatial resolution showed a different metabolic distribution between deep and superficial areas but also between lesioned and non-lesioned regions suggesting an evidence in the existence of intra-tissue heterogeneity (figure 1).

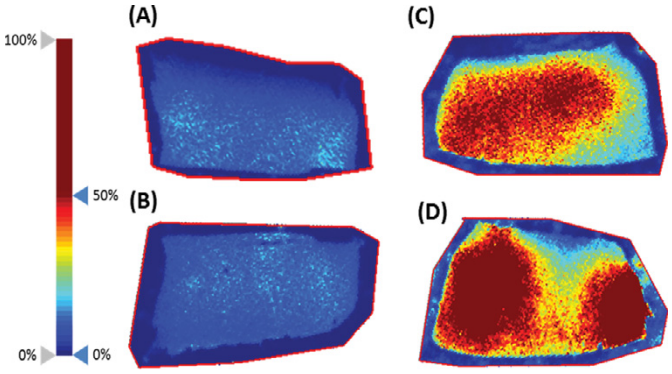

figure 1: Distribution of Hexose species (m/z 215. 03) in OA cartilage tissue sections from the same patient. (A, B) Duplicate of non-lesioned cartilage tissues sections. (C, D) Duplicate of lesioned cartilage tissues sections.

Conclusions: MALDI-IMS methodology is a useful technique for metabolite profiling of cartilage and could be employed to study OA patient heterogeneity. This fact will be especially relevant for OA patients suffering of metabolic syndrome.
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Disclosure of Interest: None declared
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SAT0532 SLEEP QUALITY IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: The aim of this study was to investigate sleep quality in patients with knee osteoarthritis (OA).
Methods: One hundred patients with knee OA and age and gender-matched 75 healthy controls were enrolled into the study. Demographic characteristics of the participants were recorded. All patients was examined by a single physician, the findings were recorded. Knee radiographs of the patients were staged according to the Kellgren-Lawrence grading. In addition, to evaluate the clinical status and quality of life of patients was performed Western Ontario ve McMaster Universities Osteoarthritis Index (WOMAC) and Nottingham Health Profile (NHP). The sleep quality of two groups with MOS sleep scale and polysomnography (PSG) were subjectively and objectively evaluated.
Results: All scores of MOS sleep scale were significantly lower in patients with knee OA than controls ($p<0.001$). When PSG outcomes of the patients compared with the controls,waketime during sleep period (WTSP) (37.2±35.9, 13.1±19.4 p=0.012 respectively) and number of awakeness (NOAW) (9.2±18.2, 2.6±3.5, p=0.05 respectively) were significantly higher, sleep efficiency (SE) (84.2±21.1, 96.7±4.6 p=0.009 respectively) was significantly lower in patients with knee OA. There were significantly positive correlations between MOS sleep scale and PSG (sleep period, sleep onset, REM duration and REM latans) outcomes of the patients (r:0.44–0.59 p=0.04–0.006).
In addition, MOS sleep scale scores of patients were negatively related with both NHP (pain, emotional reaction, sleep and social isolation subgroup scores) and WOMAC (total and functional) scores (r:-0.20–0.47, p=0.04–0.0001).
Conclusions: The sleep quality of patients with knee OA was worse compared to healthy controls. The poor sleep and sleep quality in knee OA had adversely affected the clinical status and quality of life.
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Disclosure of Interest: None declared
DOI: 10.1136/annrheumdis-2017-eular.2158

SAT0533 ASSOCIATION OF OSTEOARTHRITIS AND PERIODONTITIS BASED ON THE KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY

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Background: Osteoarthritis (OA) is a chronic joint disease with complex etiologies characterized by synovial inflammation, subchondral bone remodeling, and the formation of osteophytes, which leads to cartilage deterioration. Periodontitis (PD) is also a chronic inflammatory disease characterized by loss of periodontal ligament and alveolar bone. Recently, the association between OA and metabolic diseases has been proposed, and the association between several systemic diseases such as rheumatoid arthritis, metabolic syndrome and periodontitis has been also revealed.
Objectives: The aim of this study was to investigate the association between OA and PD in South Korea using data from the Korea National Health and Nutrition Examination Survey (KNHANES) during 2010–2014.
Methods: Cross-sectional data of 7,969 adults who completed the KHANES, and participated in both a periodontal examination and a knee imaging were analyzed. OA of knee was defined when a participant had knee arthralgia and showed radiographic change of Kellgren-Lawrence (KL) grade over 1. OA patients were grouped into mild (KL grade 1–2) and severe (KL grade 3–4) OA. The periodontal status was assessed by the Community Periodontal Index. Binary logistic regression analysis was performed according to the OA and PD status, severity of OA, and subgroups (age, gender) adjusting for the socio-demographics, oral health behaviors and status, smoking, and drinking.
Results: Of the 7,969 participants, 1408 (17.7%) had OA and 2987 (37.5%) had PD. OA and PD showed no significant association in overall analysis. However, in subgroup analysis, female patients with severe OA were more likely to have PD (adjusted odd ratio (OR) 1.377, P=0.0316); likewise, OR for severe OA in female patient with PD was 1.367. (P=0.0.54)
Conclusions: Severe OA and PD were associated with each other especially in

female in the Korean population. Further prospective and experimental studies are necessary to identify the impact and mechanisms of association between severe OA and PD in female.

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SAT0534 EFFECT OF SUSTAINED- RELEASE SYMPTOMATIC DRUGS ON PROGRESSION OF KNEE JOINT OSTEOARTHROSIS IN PATIENTS WITH LESS THAN 5 YEARS DISEASE DURATION IN A 5-YEAR PROSPECTIVE STUDY

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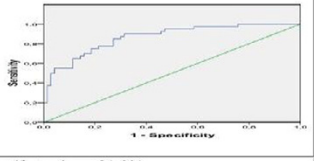
Objectives: To assess the effect of sustained release symptomatic drugs chondroitin sulfate (CS) + glucosamine hydrochloride (GH) on progression of knee OA in pts with <5 years disease duration during the 5year follow-up period (FUP).

Methods: This 5-year study included 52 female-patients with primary knee OA (ACR criteria), disease duration did not exceed 5 yrs (mean age–59,1±8,9). On each pts the individual file including 200 parameters was filled. Diagnostic modalities used in each patient included plain radiography of knee joints (gonarthrosis stage was classified using Kellgren J.- Lawrence J. scale), DEXA subchondral portions of the hip and tibia, ultrasound (US) and MRI examination of knee joints. First OA stage was documented in 22 (42,3%)pts, 2-nd - in 24 (46,2%), 3d- in 6 (11,5%). During 5 years of FUP 31 (60%) pts were administered the combined CS+GH regimen for more than 6 months a year. OA progression was documented based on radiographic criteria.

Results: During the 5 year FUP radiographic progression (upgrade in radiographic stage) of knee OA was documented in 14 pts (Group 1 - with OA progression), while in 38 pts radiographic stage remained unchanged (Group 2 - without progression). Patients from both groups were comparable in terms of age and disease duration (p>0,05). Although, pts from Group 1 with OA progression had more intense knee pain when walking: 60,4±18,3 vs 48,7±17,8mm, p=0,04; and higher BMI values: 34,5±4,6 vs 28,9±4,9 kg/m^2, p=0,001; US-findings based higher rate of synovitis:57,1% vs 18,4%, OR=5,9, 95% CI 1,6–22,5, p=0,009; bone marrow edema in medial tibia aspect 64,3% vs 13,2%, OR=11,9, 95% CI 2,8–50,3, p=0,0006 based on MRI findings. In pts with OA progression DEXA examination identified significantly higher absolute BMD values in the medial condyle of the tibia (0,9 (0,8–1,2) vs 0,8 (0,7–0,8) g/cm^2, p=0,001) as compared to pts from Group 2. Re-examination in 5yrs showed that statistically significant differences between the two groups still remained. Analysis of 5year therapy revealed, that the majority of pts without OA progression (68,4%) were taking combined CS+GH regimens for more than 6 months a year during 5-year FUP, while only 35,7% of pts who progressed (OR=4,3, 95% CI 1,1–16,3, p=0,03) managed to adhere to this regimen. Discriminant analysis showed that 5-year intake of combined CS+GH therapy for more than 6 months a year should be considered as a predictor of decreased risk of disease progression, while on the contrary, such symptoms as synovitis, bone marrow edema, and high BMD values in the medial condyle of the tibia should be viewed as predictors and risk factors for knee OA progression in pts with <5 years disease duration. Based on identified factors and their coefficients the authors designed a model (with area under the ROC curve equal to 0,93), allowing to predict the future course of the disease in an individual patient with high accuracy, i.e. 85,7% sensitivity and 84,2% specificity.

Factors	Discriminant function coefficients
US: synovitis	2,17
MRI: bone marrow edema	3,19
BMI in the medial condyle of the tibia	5,19
CS+GH	–1,03
Constant	11,83

ROC-curve (AUC=0,93)



The accuracy of prediction based on the variables (factors) was 84,6 %.

Conclusions: Use of combined CS+GH regimens for more than 6 months a year during 5 years is an important factor, decelerating the progression of knee OA in pts with <5 years disease duration by the factor of 4. While synovitis, bone marrow edema, and high BMD values in the medial condyle of the tibia are responsible for further OA progression on this group of pts.

Disclosure of Interest: None declared
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SAT0535 IMPACT OF THE METABOLIC SYNDROME ON THE PREVALENCE, SEVERITY INCIDENCE AND PROGRESSION OF KNEE OSTEOARTHRITIS

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Background: The contribution of metabolic factors on the development of OA has not been fully elucidated.

Objectives: The aim of this work is to analyze the influence of metabolic syndrome in the rate of radiographic incidence and progression of knee osteoarthritis, as well as its impact on the prevalence and severity of the disease.

Methods: For this work we used data from the Spanish cohort PROCOAC (PROgnostic Cohort of OsteoArthritis A Coruña). This cohort consists of subjects that visited the Rheumatology consultations at different time points and comprises 984 subjects at baseline including radiographic knee and hip KL grade, radiographic hand OA status, demographic and clinical data as well as the necessary information to assess the metabolic syndrome at baseline, that is, abdominal circumference (in cm) in addition to at least two of the following parameters: triglycerides above 200mg/dL, low HDL (<35 mg/dL), hypertension and increased glucose blood levels (>110 mg/dL). To assess the severity of the disease, the number of affected joints was coded as 0–1 and 2–3, according to the radiographic information of hands, knees and hips. Appropriate statistical analyses including Cox regression models with Kaplan-Meier survival curves and chi-square contingency tables were performed with SPSS v19.

Results: The mean age of subjects was 63,86 [32–88] years; 75,6,% were women. A total of 85% had radiographic hand OA and 11,8% suffered metabolic syndrome at baseline. In those OA patients that experienced radiographic knee OA progression over time (any KL increase from KL≥2 at baseline) the metabolic syndrome appeared as a significant risk factor (HR=3.696;95CI:1.085–14.520;p-value=0.037) (Figure 1). Similarly, in those subjects that developed incident radiographic knee OA over time (a new-onset KL grade 2), the metabolic syndrome at baseline also appeared as a significant risk factor with an increased magnitude (HR=12.931;95CI:3.037–55.051;p-value<0.001) (Figure 1). In addition, to have contralateral knee OA at baseline (HR=12.837;95CI:5.044 – 32.673;p-value <0.001) as well as radiographic hand OA (HR=5.671;95CI:0.854–37.649;p-value=0.07) associates with an increased rate of incident knee OA too. In terms of prevalence and severity of the disease, the metabolic syndrome associates with an increased risk of knee OA (OR=1.865;95% CI=1.080–3.220;p=0.024) as well as with increased number of affected joints, though in a non-significant manner (OR=1.582;95% CI=0.916–2.733;p=0.098)

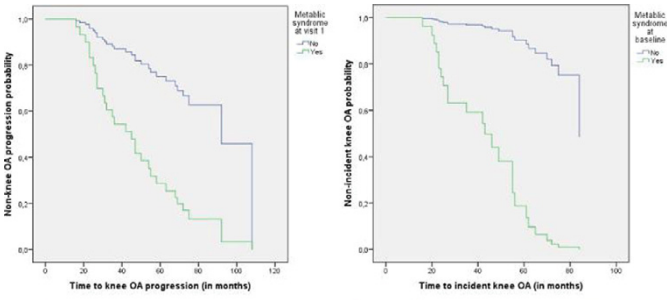

Figure 1. Kaplan-Meier survival curves showing the influence of the metabolic syndrome in the rate of radiographic knee OA progression and incidence over time

Conclusions: The alterations that underlie the metabolic syndrome condition the severity and prevalence of knee osteoarthritis, as well as the rate of incidence and progression of the disease

Disclosure of Interest: None declared
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SAT0536 AXIAL ALIGNMENT OF THE KNEE – IMPORTANCE IN CARTILAGE REPAIR? HIGH TIBIAL OSTEOTOMY VS. DISTRACTION

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Background: Opening-wedge high tibial osteotomy (HTO) is primarily indicated in treating varus gonarthrosis. The rationale behind HTO treatment of knee