techniques including chemical exchange saturation transfer (CEST) can be used to visualize microstructural and biochemical changes to the cartilage matrix even before morphological damage is visible^{2,3}. CEST is a promising technique based on detecting the chemical exchange between bulk water protons and protons bound to solutes. This technique renders the possibility to function as a biomarker for glycosaminoglycan (GAG/gag) content for instance in cartilage of joints.

Objectives: The aim of the study was to compare glycosaminoglycan chemical exchange saturation transfer (gagCEST) of knee cartilage with intraoperative results for the assessment of early osteoarthritis (OA) and to define gagCEST values for the differentiation between healthy and degenerated cartilage.

Methods: Patients with cartilage lesions or moderate OA were preoperatively examined using 3T Magnetic Resonance Imaging (MRI). In this prospective study, regions of interest (ROIs) were examined by a sagittal gagCEST analysis and a morphological high-resolution three-dimensional, fat-saturated proton-density space sequence. Cartilage lesions were identified arthroscopically, graded by the International Cartilage Repair Society (ICRS) score in 42 defined ROIs per patient and consecutively compared with mean gagCEST values using analysis of variance and Spearman's rank correlation test. Receiver operating characteristics (ROC) curves were applied to identify gagCEST threshold values to differentiate between the ICRS grades.a

Results: Twenty-one patients with cartilage lesions or moderate OA were examined. The imaging assessment consisted of a total of 882 ROIs which were examined and graduated in ICRS score 0 (67.3%), 1 (25.2%), 2 (6.2%) and the merged ICRS 3 and 4 (1.0%). gagCEST values decreased with increasing grade of cartilage damage with a negative correlation between gagCEST values and ICRS scores. A gagCEST value threshold of 3.55% was identified to differentiate between ICRS score 0 (normal) and all other grades.

Conclusion: Conclusions. gagCEST reflects the content of glycosaminoglycan and might provide a diagnostic tool for the detection of early knee-joint cartilage damage and for the non-invasive subtle differentiation between ICRS grades by MRI even at early stages in clinical practice.

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OP0110

A COHORT STUDY ON THE BIDIRECTIONAL RELATIONSHIP BETWEEN PERIODONTITIS AND OSTEOARTHRITIS OVER A 15-YEAR FOLLOW-UP

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Background: Recently, osteoarthritis has been proposed to be driven by complement-mediated inflammatory cascades. That is, in addition to the conventional degenerative model, our knowledge of osteoarthritis pathogenesis has been expanded with an inflammation-dependent theory.

Objectives: To identify the relationship between osteoarthritis and periodontitis.

Methods: 144,788 periodontitis patients and 144,788 propensity score-matched controls without history of periodontitis were enrolled in this cohort study. A Cox proportional hazard model was used to estimate the risk of osteoarthritis. Survival analysis was utilized to assess the time-dependent effect of periodontitis on osteoarthritis. Age and gender were stratified to identify susceptible subgroups. A symmetrical case-control analysis was designed to determine the relationship between periodontitis and history of osteoarthritis.

Results: Patients with periodontitis had higher risk of osteoarthritis (HR =1.15, 95% CI =1.12-1.17, P < 0.001) and severe osteoarthritis that led to total knee/hip replacement (HR =1.12, 95% CI =1.03-1.21, P < 0.01) than controls, which was time-dependent (log-rank test P < 0.01). The effect of periodontitis on osteoarthritis was significant in both genders and age subgroups over 30 years old (all P < 0.001). Among them, females (HR=1.27, 95% CI = 1.13-1.42, P < 0.001) and patients aged over 51 (HR= 1.21, 95% CI =1.10-1.33, P < 0.001) with periodontitis were predisposed to severe osteoarthritis that led to total knee/hip replacement. In addition, periodontitis patients were more likely to have a history of osteoarthritis (OR = 1.11, 95% CI = 1.06 - 1.17, P < 0.001).

Conclusion: These findings suggest a bidirectional relationship between osteoarthritis and periodontitis. Patients with periodontitis presented with a higher risk of osteoarthritis, including severe osteoarthritis that led to total knee/hip replacement. Likewise, periodontitis was more likely to develop following osteoarthritis.

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OP0111

PLASMA PROTEOMICS IDENTIFIES CRTAC1 AS BIOMARKER FOR OSTEOARTHRITIS SEVERITY AND PROGRESSION

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Background: Accurate biomarkers for diagnosis and prediction of osteoarthritis (OA) are needed. In addition, biomarkers have the potential to serve as a measure of the different pathological processes underlying OA. Here, we report on a proteomics screen targeted at two important pathways thought to underlie the etiology of OA: the inflammation and metabolic pathways.

Objectives: The aim of this study was to identify a robust biomarker for OA severity and progression.

Methods: We used data from the Rotterdam Study, a population based prospective study with participants aged 45 and older. The participants in this study underwent blood measurement at baseline and radiographic measurements at baseline as well as after a mean follow-up time of 5 years. We measured 184 proteins (inflammation and cardiometabolic panel) in plasma from 3,517 participants in the Rotterdam Study using the Olink platform.

We estimated the association for all available proteomic biomarkers with OA in knee, hip and hand in 2 ways: 1) Cross-sectionally in all joints, where we analyzed severity of OA by adding up KL-scores of both joints (knee and hip OA), and all joints of the left and right hand (total amount of joints=30); 2) Longitudinally in Knee and Hip, defining cases of progression of OA as an increase with at least 1 unit in KL-grade per person, excluding progressing from KL0 to KL1. We analyzed the relationship with multivariate regression

Figure 1. Forest plot for significantly associated proteins with severity of Hand OA