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DIABETICS SHOW ACCELERATED PROGRESSION OF CARTILAGE AND MENISCAL LESIONS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Purpose: Both osteoarthritis (OA) and diabetes mellitus (DM) are conditions that are increasing in incidence and OA is one of the leading causes of musculoskeletal disability. Both diseases share a number of common risk factors and DM is reportedly present in a high proportion of knee OA subjects. However, the pathophysiological mechanisms causing the coexistence of these two diseases remains not quite clear, since only a few studies have focused on the associations between DM on OA. Some studies suggest hyperglycemia-induced systemic inflammation as a potential risk factor with severe impact on the progression of OA. Previous compositional MR imaging studies found altered cartilage composition in diabetics when compared to diabetes-free controls including a more varied, heterogeneous, and disordered cartilage composition in diabetic patients, suggesting that the cartilage microarchitecture is altered by the effects of elevated blood glucose levels. These findings suggest that DM may alter all knee joint tissues and accelerate joint degeneration. Purpose of this study was to investigate structural abnormalities in the knees of diabetics when compared to diabetes-free controls over 4 years using morphological MR imaging.

Methods: We examined the right knee of 392 subjects with (n = 196) and without DM (n = 196), selected from the Osteoarthritis Initiative (OAI) cohort. In all subjects, 3 Tesla MRI at baseline and 4-year follow-up MRI scans were obtained including a 3D dual echo steady-state gradient-echo with water excitation sequence, a coronal intermediate-weighted (IW) turbo-spin echo (TSE), and a sagittal IW TSE with fat suppression sequence. Groups were group-matched for age, sex, KL score, and BMI. Evaluation of the morphological knee structures was performed using the Whole-Organ Resonance Imaging Scoring system (WORMS), assessing the following abnormalities: cartilage lesions, bone marrow edema pattern, subarticular cysts, meniscus lesions, ligament tears, popliteal cysts, and joint effusion. All MR images were independently reviewed by two musculoskeletal radiologists, both blinded to clinical information and the DM status. Statistical analyses were performed using conditional logistic regression models.

Results: Both study groups were similar in age (63.3 years vs 63.0 years, $P = 0.76$), BMI (31.0 vs 31.2 kg/m², $P = 0.70$), sex (female 53.4% vs 53.4%, $P = 0.92$) and KL score distribution ($P = 0.93$). With respect to the WORMS score, diabetics showed a significantly higher increase of cartilage defects within 4 years when compared to the diabetes-free controls (average over all compartments: 2.66 vs 1.73, respectively; $P < 0.001$). In addition, diabetics showed also a higher increase of cartilage defects in all individual compartments, with significantly higher results at the patella ($P = 0.025$) and the lateral femur ($P = 0.015$) (Fig. 1). Furthermore, diabetics showed a significantly higher increase of meniscus lesions, increasing twice as much compared to the diabetes-free control group (1.26 vs 0.62, respectively; $P = 0.004$) (Fig. 1). Changes in bone marrow edema, subarticular cysts, ligaments, popliteal cysts, and effusion were not statistically significant between the two groups.

Conclusions: Diabetics showed a significantly higher increase of cartilage defects when compared to matched diabetes-free controls over 4 years. Additionally, a higher increase of meniscus lesions in the knees of diabetics was found. Ultimately, our study shows that diabetics are at higher risk of developing OA.

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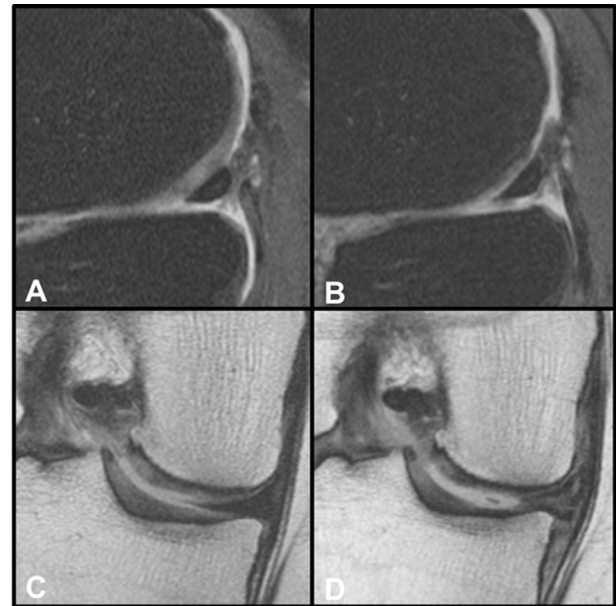


Fig. 1. Sagittal IW TSE with fat suppression of a diabetic subject shows at baseline (A) no cartilage defect on the lateral femoral condyle, whereas, the 4 year follow up scan (B) shows now cartilage thinning along the posterior aspect of the femoral condyle accompanied by partial- and also full-thickness defects. Coronal IW TSE of a diabetic subject at baseline (C) shows a normal medial meniscus with low signal intensity. The follow-up scan (D) shows a new horizontal meniscal tear along with intrasubstance, high signal intensity, abnormalities and new extrusion of the medial meniscal body.

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HIGH INTENSITY PHYSICAL ACTIVITY IMPROVED BLOOD PRESSURE OF PATIENTS WITH KNEE OA

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Purpose: Physical exercise and educational programs promote several benefits for patients with knee osteoarthritis (OA). However, little is known about their effects on blood pressure (BP) of this population. Our purpose was to assess the role of physical activity on BP of subjects under treatment for knee OA submitted to an interdisciplinary educational program.

Methods: One hundred and thirty six sedentary subjects (25/111 men/women; age = 67.6 ± 9.6, BMI = 30.6 ± 4.4 kg/m²), under treatment for primary knee OA, were submitted to an interdisciplinary educational program emphasizing the recommendation for regular practice of physical exercise, and have their BP, physical fitness (six minute walking test- 6MWT), body mass index (BMI) and daily living physical activity (International Physical Activity Questionnaire short version) assessed before (pre) and after 12 months of follow-up. Subjects were then classified, according to their physical activity status during follow-up, in sedentary-to-sedentary (SED-SED, sedentary/insufficiently active at pre and post follow-up), sedentary-to-active (SED-ACT, sedentary/insufficiently active at pre follow-up and active/very active at post follow-up), active-to-sedentary (ACT-SED, active/very active at pre follow-up and sedentary/insufficiently active at post follow-up) and active-to-active (ACT-ACT, active/very active at pre and post follow-up) groups and have their BP and physical 6MWT compared.

Results: Systolic BP increase (11 ± 3 mmHg, $P < 0.01$) and maintenance in diastolic BP were found in SED-SED, whereas tendency toward