Is there an association between articular cartilage changes and type of meniscal tear?

Christian Dynybil, Jiri Snel, Carsten Perka
Center for Musculoskeletal Surgery, Berlin, Germany
christian.dynybil@charite.de

Introduction: Purpose: The objective of the present study was to evaluate whether horizontal cleavage and complex meniscus tears, which supposed to be degenerative tears, are associated with an increase of specific matrix metalloproteinases and an increased incidence of cartilage damage, in comparison with patients having other patterns of meniscal injury1,2.

Materials and Methods: Materials and Methods: Data were collected prospectively from 32 knee arthroscopies, patients were assigned by intraoperative findings due to their meniscal tear to one of two groups: “degenerative meniscal lesions” (horizontal cleavage and complex tears; n=20) or “traumatic tears” (longitudinal and radial tears; n=12). Patient data (age, duration of symptoms, mechanism of injury, body mass index [BMI]), intra-articular and radiographic findings were recorded.

Samples of knee joint fluid were analyzed for the matrix metalloproteinases pro-MMP-1, MMP-3 and pro-MMP-13, which are postulated to be involved in articular cartilage degradation3.

Cartilage changes were classified intraoperative by Outerbridge (grade 0–4). Preoperative bone morphology of the knee joint was classified by Kellgren-Lawrence (Stadium 0–4).

The Knee Injury and Osteoarthritis Outcome Score (KOOS) was used to assess the patients opinion about their knee and associated symptoms and function preoperative and 1.5 years postoperative.

Results: Results: Degenerative meniscus lesions appeared predominantly at the end of fifty years of age (58.5±13.9 years), whereas other patterns of meniscal lesions happened around 30 years of age (28.7±8.1 years; P=.0001; Fig. 1 [Median]). Patients with a degenerative meniscus lesion had marginally overweight, whereas patients with a traumatic tear were in the normal range regarding the body mass index (BMI 23.7±5.3 vs. BMI 26.8±3.9; P=.044). A comparison of patients with horizontal cleavage and complex meniscal tears (“degenerative tears”) to patients with longitudinal or radial (“traumatic”) tears showed for the former increased severity of chondral lesions (Outerbridge: 2.9±1.4 vs 1.1±0.9; P=.001; Fig. 2 [Median]) and radiographic osteoarthritis (Kellgren-Lawrence: 1.9±1.5 vs 0.4±0.5; P=.004; Fig. 3 [Median]). The KOOS improved after arthroscopic treatment in the degenerative-meniscal-tear group as well as in the traumatic-tear group significantly (Total-KOOS Score preoperative: 36.5±30.7 and 38.1±24.8; Total-KOOS Score 1.5 years postoperative: 87.8±6.7 and 49.2±21.9; p=.043 and p=.012; “0” indicates extreme knee problems; “100” indicates no knee problems; Fig. 4 [Median]). The KOOS improved after arthroscopic treatment in the degenerative-meniscal-tear group as well as in the traumatic-tear group significantly (Total-KOOS Score preoperative: 36.5±30.7 and 38.1±24.8; Total-KOOS Score 1.5 years postoperative: 87.8±6.7 and 49.2±21.9; p=.043 and p=.012; “0” indicates extreme knee problems; “100” indicates no knee problems; Fig. 4 [Median]). The KOOS improved after arthroscopic treatment in the degenerative-meniscal-tear group as well as in the traumatic-tear group significantly (Total-KOOS Score preoperative: 36.5±30.7 and 38.1±24.8; Total-KOOS Score 1.5 years postoperative: 87.8±6.7 and 49.2±21.9; p=.043 and p=.012; “0” indicates extreme knee problems; “100” indicates no knee problems; Fig. 4 [Median]).

Discussion: Discussion: Complex and horizontal cleavage meniscal tears are not as benign as was previously thought and are highly associated with an increased severity of cartilage degeneration and radiographic osteoarthritis. In spite of distinct cartilage changes, arthroscopic treatment improved knee-related symptoms at least on medium-term also in patients with degenerative meniscal tears. In this study, increased concentrations of the investigated MMPs did not seem to be associated with specific patterns of meniscal lesions.

References: References:
1. Christoforakis et al., Arthroscopy, 21:1366-1369, 2005