

Purpose: The aim of this study was to examine the association between trabecular bone texture with occurrence of knee joint replacement (KJR) using a variance orientation transform (VOT) method.

Methods: The association of trabecular bone texture and knee joint replacement was tested in a six year prospective study of 123 subjects with symptomatic knee osteoarthritis (OA) of whom data regarding KJR was available for 114. At baseline weight-bearing anteroposterior tibio-femoral radiographs were acquired. Trabecular bone texture regions were selected from the medial and lateral tibia subchondral bone. The VOT method was applied to each bone region and five fractal bone texture parameters, i.e. mean fractal dimension (FD_{MEAN}), fractal dimensions in the horizontal (FD_H) and vertical (FD_V) directions, and along the roughest part of trabecular bone (FD_{Sta}), and texture aspect ratio (Str) were calculated. The association of tertiles of baseline fractal parameters with risk of JR was analysed using logistic regression, adjusting for gender, age, body mass index, Kellgren and Lawrence grade and WOMAC pain score.

Results: 28 participants' study knees underwent knee joint replacement over 6 years. Participants who had a knee joint replacement had lower medial FD_{MEAN} ($p = 0.04$ for difference) and lower medial FD_H ($p = 0.04$ for difference). The relationship between measures of bone texture and knee joint replacement was examined. With increasing tertile of mean fractal dimension (FD_{MEAN}), adjusted for age, gender, body mass index, Kellgren Lawrence grade and WOMAC pain score, the odds of knee joint replacement diminished significantly ($p = 0.04$ for trend). There was also a suggestion that the upper tertiles of the fractal dimension in the horizontal direction (FD_H), were associated with a significant reduction in risk of KJR compared to the lowest tertile ($p = 0.15$ for trend).

Conclusions: This study shows that the texture of medial tibial trabecular bone measured from plain radiographs is related to the risk of knee joint replacement. Specifically with increasing mean fractal dimension (FD_{MEAN}) the risk of joint replacement was reduced, independent of other clinical predictors of joint replacement. Tibial trabecular bone texture may be useful as a marker of disease progression and a target of therapy to delay knee joint replacement.

253 HIP CHONDROPATHY IS PREVALENT AT ARTHROSCOPY AND IS ASSOCIATED WITH CO-EXISTING PATHOLOGY, BUT NOT PATIENT REPORTED OUTCOMES

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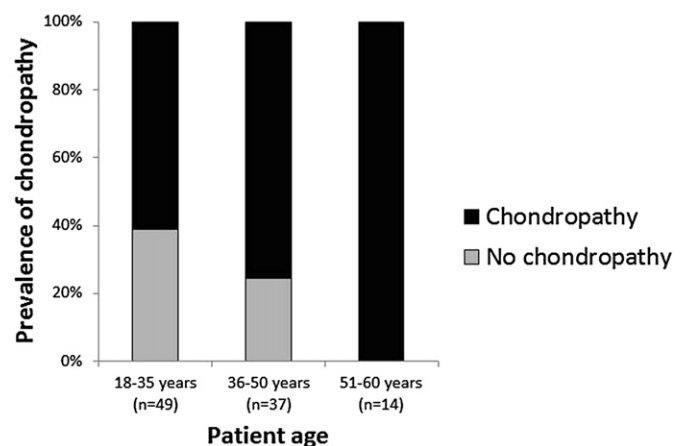
Purpose: Hip osteoarthritis (OA) is a significant cause of pain, stiffness and reduced function in adults, and is associated with substantial economic cost. Few studies have examined the prevalence of early hip OA in young and middle-aged adults, and its effect on pain and function. In addition, it has been suggested that femoro-acetabular impingement (FAI) and labral pathology are associated with greater likelihood of hip OA in later life. The clinical diagnosis of early hip OA is difficult, and hip arthroscopy may provide an opportunity for accurate diagnosis of early hip OA. The aims of this study, in people aged 18–60 years who had undergone hip arthroscopy for hip pain, were to i) describe the prevalence of chondropathy; (ii) evaluate the relationship between chondropathy and baseline characteristics; (iii) evaluate the relationship between chondropathy and pain; daily, physical and sporting activity using the HOOS and iHOT-33 PRO; and iv) evaluate the relationship between chondropathy and co-existing FAI and labral pathology.

Methods: One hundred consecutive patients (49 female; mean age 36 ± 12 years; height 1.74 ± 9 metres; weight 78 ± 12 kg; BMI 26.3 ± 5.7 kg/m²) who underwent hip arthroscopy surgery for intra-articular pathology between 12–24 months previously by a single surgeon were recruited. Data collected included the HOOS and iHOT-33 patient reported outcome measures; occupation and weekly physical activity. Participants were grouped according to the presence of chondropathy \geq Outerbridge Grade I requiring surgical intervention at the time of surgery (chondropathy group) or no chondropathy requiring surgical intervention (no chondropathy group). FAI or labral pathology at the time of surgery was noted. Between-group differences in participant characteristics were compared. One way ANCOVA evaluated the relationship between the presence of chondropathy and each of the subscales of the HOOS and the iHOT-33. Logistic regression analysis

determined the odds ratio (OR) of chondropathy in the presence of co-existing labral pathology. The sensitivity and specificity of labral pathology and FAI in predicting chondropathy were determined. The *p* value for all analyses was set *a priori* at $p < 0.05$.

Results: The prevalence of chondropathy within the cohort was 72%, and increased as patients' age increased (Figure 1). Age was significantly different between groups; chondropathy group 38 ± 10 years; no chondropathy group 31 ± 10 years ($p = 0.007$). There were no significant differences between the chondropathy and no chondropathy groups for HOOS subscales or the iHOT-33 PRO ($p = 0.217$ – $p = 0.453$). Participants with labral pathology at the time of surgery had more than 3 times greater odds of having co-existing chondropathy. The sensitivity of both labral pathology and FAI in predicting chondropathy was 80%. The specificity of labral pathology and FAI in predicting chondropathy was 42% and 35% respectively.

Conclusions: Chondropathy associated with early hip OA was common in young and middle aged adults undergoing hip arthroscopy; and whilst prevalence of chondropathy increased with age, it remained high in all age categories. Whilst chondropathy was not associated with increased pain or reduced function, it appears to be associated with labral pathology and FAI. Further studies are required to identify other factors such as physical impairments associated with chondropathy to facilitate targeted interventions in young and middle aged adults with early hip OA.



254 THE EFFECT OF ANTERIOR CRUCIATE LIGAMENT INJURY ON BONE CURVATURE OVER 5 YEARS: THE KANON TRIAL

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Purpose: To investigate the 5-year longitudinal changes in bone curvature following an acute ACL tear, and to identify predictors associated with these changes.

Methods: 121 young active adults with an acute ACL tear to a previously un-injured knee were included in a treatment RCT comparing rehabilitation plus early ACL reconstruction with rehabilitation plus optional delayed ACL reconstruction. Serial MR images were acquired with use of a 1.5-T magnetic resonance imaging scanner; 106 (88%) had intact serial MR images from baseline (within 5 weeks from injury), 2 years and 5 years after injury. From these, a subset of 56 had additional intact MR images acquired at 3, 6 and 12 months after injury. Morphologic measures of articulating bone curvature were obtained from computer-assisted segmentation of magnetic resonance images. The curvature was measured using inverse millimeters with positive values for convex shapes (trochlea and femur condyles) and negative values for concave shapes (tibia plateaus). Average values were reported for the entire femur (F), entire tibia (T), Medial femur (cMF), Lateral femur (cLF), Trochlea (TF), Medial tibia (MT) and Lateral tibia (LT). Factors tested for association with bone curvature were age, sex, treatment of the ACL