**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:** Trabecular bone texture parameters 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 (FDMEAN), fractal dimensions in the horizontal (FDH) and vertical (FDV) directions, and along the roughest part of trabecular bone (FDsta), and texture aspect ratio (Sr) were calculated. The association of tertiles of baseline fractal parameters with risk of KJR 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 FDMEAN (p = 0.04 for difference) and lower medial FDH (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 (FDMEAN), 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 (FDH), 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 (FDMEAN) 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 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.

**Results:** 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.
plus meniscal injury and osteochondral fracture as visualized on baseline MR images.

**Results:** The mean age of the participants was 26 years, 27% were female and the mean BMI was 24.8 kg/m². Over the course of 5 years the change in curvature was statistically significant in each region of the knee. In each region the values for curvature decreased (Figure). Participants randomized to early surgery as opposed to rehabilitation plus optional delayed ACL reconstruction were more likely to have flat curvature in the femur (p = 0.001), medial femoral condyle (p = 0.006) and trochlea (p = 0.003). Any meniscal injury (largely medial meniscus) was associated with a more flattened curvature in the femur (p = 0.001), trochlea (p = 0.011) and lateral femoral condyle (p = 0.038) and lateral tibia (p = 0.048). In contrast, a lateral tibial osteochondral fracture was associated with a more convex curvature in the lateral tibia (p = 0.017).

**Conclusions:** This study demonstrates that ACL injury leads to significant changes in articulating bone curvatures. These changes are measurable within a short interval (3 months) of the injury. Increased body mass index, meniscal injury and randomization to surgery (as distinct from rehabilitation plus optional delayed ACL reconstruction) all lead to decreased curvature.

**Figure.** Trajectory of bone curvature (1/mm, inverse millimeters) change over the five year follow-up period by anatomic location.

### 255 DIFFERENCES BETWEEN PATIENTS WITH HIP AND KNEE OSTEOARTHRITIS

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**Purpose:** This observational study was designed to examine the hypothesis that patients with hip osteoarthritis (OA) have a shorter duration of symptoms but more advanced radiological changes and more severe symptoms at first presentation to our clinic than similar patients with knee OA.

**Methods:** This case-comparison study compared 35 consecutive hip OA patients and 70 (age and sex matched) knee OA patients from a single tertiary osteoarthritis clinic from 2008 to 2011. BMI, total symptom duration, duration of presenting complaint, Multi-attribute Arthritis Prioritisation Tool (MAPT) scores and Modified Kellgren-Lawrence (MKL) scores were recorded for each patient’s first presentation to the clinic. The MAPT score, designed to prioritise and monitor patients who had weaker correlations with the knee-speciﬁc patient-reported outcomes but have not yet been validated among patients with symptomatic knee osteoarthritis (KOA). We evaluated the construct validity of PROMIS instruments by examining correlations with well-validated measures commonly used to assess patients with KOA.

**Results:** Our analysis included data from 154 patients with an average age of 60.5 (SD = 10.6) years and body mass index of 32.9 (SD = 7.4) kg/m². The sample was 68% female and 92.7% had a Kellgren/Lawrence grade ≥ 2. All correlations were in the hypothesized direction and can be viewed in Table 2. PROMIS Anxiety and Depression showed good convergent and discriminant validity among individuals with sym- ptomatic KOA. PROMIS HAQ and Physical Function assessed a similar construct to the SF-36 Physical Component Summary (PCS) score but had weaker correlations with the knee-speciﬁc WOMAC function score and physical function tests. Finally, PROMIS Pain Impact measured a similar construct as the SF-36 Bodily Pain (BP) score and the Chronic Pain Self-Efficacy Scale (CPSS) score but was not as strongly correlated with knee-specific WOMAC pain scores. Discriminant validity could not be confirmed for PROMIS HAQ, Physical Function, or Pain Impact.

**Conclusions:** Our results support the construct validity of PROMIS Anxiety and Depression in measuring these domains among patients with symptomatic KOA. While the construct validity of PROMIS HAQ, Physical Function, and Pain Impact is supported by their strong corre- lations with the SF-36 PCS, SF-36 BP, and CPSS, respectively, the weaker correlations seen among the disease-specific measures suggest that these PROMIS instruments reflect whole-body disease burden and not joint-specific pain or function.