accounting for the systematic offset between both methods. Goniometry, in contrast, was a poor predictor for medial and lateral cartilage thickness loss. If the FTA offset is not adjusted for, the new method of measuring alignment from fixed flexion radiographs is shifted in the varus direction, and has limited ability to predict future LFTC cartilage loss.

Results: The awareness of the importance of patellofemoral osteoarthritis (PFOA) is increasing in recent years. Suggested is that PFOA is the precursor of tibiofemoral OA. Is PFOA at baseline predictive for TFOA five years later? The other way around might also be possible, so is TFOA at baseline predictive for PFOA five years later?

Methods: Of a random subsample (n=337) of the 891 females (aged 45-60) from the nested cohort of the Rotterdam Study, baseline and 5-years follow-up MRIs of both knees were assessed for knee OA with the MRI Osteoarthritis Knee Scoring (MOAKS). Based on these scored features MRI evaluation for effusion: After initial consensus training, two musculoskeletal radiologists separately scored each knee on two semi-quantitative scoring systems, and (2) the clinical implication of an effusion detected on physical examination in terms of pain and disability at presentation and the rate of use of intra-articular steroid injection over the next year.

Statistics: The confidence interval for a knee steroid injection within 1 year of baseline evaluation, and 40 that did not, matched by age, sex, and Kellgren-Lawrence (K-L) grade of radiographic OA. Age averaged 62.3 years (range: 45-78), K-L grade was 2.8±2.8 (mean±standard deviation), 78% were women, and body mass index (BMI) averaged 30.3±2.8.

Clinical data: In addition to demographics above, the variables extracted from OAI included at baseline visit (year 0) the tap and bulge signs for the presence of a joint effusion on MRI as measured by two semi-quantitative scoring systems, and (2) the clinical implication of an effusion detected on physical examination in terms of pain and disability at presentation and the rate of use of intra-articular steroid injection over the next year.

Methods: Patients: This retrospective cohort study includes knees from 40 subjects from the Osteoarthritis Initiative (OAI) that went on to have a knee steroid injection within 1 year of baseline evaluation, and 40 that did not, matched by age, sex, and Kellgren-Lawrence (K-L) grade of radiographic OA. Age averaged 62.3 years (range: 45-78), K-L grade 2.8±1.0 (mean±standard deviation), 78% were women, and body mass index (BMI) averaged 30.3±4.6.

Figure 1. Adjusted odds ratios and 95% confidence intervals for measures of alignment predicting MFTC/LFTC progressors and non-progressors from baseline to 2-year follow-up. (1.3±0.1 vs. 0.8±0.1, p=0.01) or KIMRISS (5.6±0.3 vs. 4.2±0.3, p=0.02; Figure 1). In the full data set, sensitivity for an effusion was optimal at thresholds of MOAKS 1 or KIMRISS 4, at 0.3±0.32, with specificity 0.83-1.0, and there was no significant difference in WOMAC pain or status scores between bulge+/bulge− knees. However, when analysis was limited to non-obese patients (BMI<30, n=36), sensitivity improved slightly, to 0.38-0.39, and the bulge+ knees (n=9) had substantially higher average WOMAC scores than others (pain 5.1 vs 2.1, p=0.003, status 23.8 vs 10.0, p=0.004). Within the year after initial observation, 14/18 (77%) of the bulge− group had received steroid injections in that knee, vs. 2/62 (42%) of the bulge+ group (p=0.007).

Conclusions: Signs of knee effusion on physical examination are insensitive, especially in obese patients, and the tap sign is so rarely positive as to be of little value. When an effusion is detected by bulge sign in a patient with established knee OA, it is associated with a larger knee effusion at MRI, significantly greater current pain and disability, and a significantly higher rate of steroid injections into that knee in the next year than if no effusion is detected clinically. These associations support the notion that a joint effusion reflects active synovitis, and encourage careful clinical examination for knee effusions.
595 knees of 319 women have no TFOA at baseline (25 women are in the analysis with just one knee). Of these 595 knees 30 knees have PFOA at baseline; 56 knees (9.7%) have TFOAMRI at follow up and 46 knees (7.9%) have TFOAMRI at follow up. PFOA was associated with TFOA at follow-up with an odds ratio (OR) of 7.3 (3.2-17.0; p<0.001) independent of the K&L-score (OR=3.0 (1.6-5.8); p=0.001). Pretest predictive value was 7.7% (46/595); posttest predictive value is 40% (12/30). In the knees without PF OA (n=607) at baseline 42 knees were defined with TFOA at baseline, 73 were defined with TFOA at follow-up (3 knees had a TKR) and 37 knees were defined with PFOA at follow-up. TFOA at baseline was associated with PFOA at follow-up (OR=6.5 (2.5-17.0) p<0.001) independent of age, BMI and K&L score. K&L score was not associated with PFOA at follow-up at all (OR=0.92 (0.4-2.3); p=0.85). Pretest predictive value is 6.3% (38/607) and posttest predictive value is 28.6% (12/42).

**Conclusions:** Structural PFOAMRI at baseline is predictive for structural TFOAMRI at follow-up independent of K&L score. TFOAMRI at baseline is predictive for PFOAMRI at follow-up independent of K&L score. These results will be validated in the second subsample of the cohort.

**Purpose:** The involvement of subchondral bone in knee osteoarthritis (OA) is well known, and it has been proposed that changes of bone shape may be a marker of disease progression, and contribute to an understanding of OA pathogenesis. It is not known how this new measure relates to the more established measure of cartilage thickness. This study used statistical shape modelling to study whether bone changes correlate with cartilage change within anatomical regions, and whether the same individuals change more than measurement noise using the two measures over a one-year period, a typical period for a clinical trial.

**Methods:** A convenience cohort of 88 subjects with medial knee OA was identified from the NIH-OAI dataset. Subjects had K-L scores of 2 or 3; medial JSN > lateral JSN, medial osteophytes and ≥1° of varus mal-alignment; 43 were female. Baseline and 12-month DESS images were manually segmented for articular cartilage. Segmenters were blinded to time point but not to subject, using EndPoint software (Imorphics, UK). Bone surfaces were identified by automated segmentation using active appearance models (AAMs). This methodology provides a dense set of anatomically corresponded points on each bone surface, allowing mapping of bone and cartilage in a consistent measurement frame. Average thickness (ThCtAB) of the cartilage for each major compartment of the femur, tibia and patella was calculated. Bone area (tAB) was measured using anatomical areas identified on the triangulated mean bone shape.

Population maps were prepared to display the mean change in bone and cartilage on the bone surfaces for visual comparison (Figure 1). For each anatomical region, individuals with change greater than the smallest detectable difference (SDD) were identified. SDD was calculated using a set of 29 individuals with DESS images, taken at one week apart. The number of individuals who showed change greater than SDD for both measures were calculated. Correlation between bone and cartilage change was measured using Pearson’s correlation coefficient.

**Results:** Bone area and cartilage thickness both showed significant change in one or more anatomical regions (Table 1). Both types of measure showed similar sensitivity, as judged by the standardised response mean (SRM) The pattern of change for the 2 measures was somewhat different. Change in cartilage thickness was typically negative, representing cartilage loss, and was located in the articulating surfaces of the femorotibial joint, and the lateral facet of the patella (Figure 1). Bone change was typically positive, representing increased bone area. Change was most evident around the edge of all cartilage surfaces, but was also present, at a lower rate of change, in the articulating surfaces of femur and tibia bones (the areas where cartilage showed change). There was no obvious strong pattern of spatial similarity between the 2 measures, except for this change in the articulating surfaces of femur and tibia bones (the areas where cartilage showed change). There was no obvious strong pattern of spatial similarity between the 2 measures, except for this change in the articulating surfaces of femur and tibia bones (the areas where cartilage showed change).

**Figure 1:** Spatial change of bone area (top) and cartilage (bottom), displayed on the mean bone shapes. Blue represents decrease in measure, red represents increase (see scale). Regions used in this study are shown on the bone area figures at the top, and the boundary of the medial and lateral femur regions is shown as a dotted line. This line represents the anterior edge of the menisci in the mean shape model.