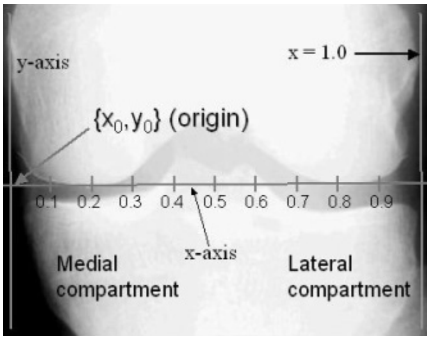
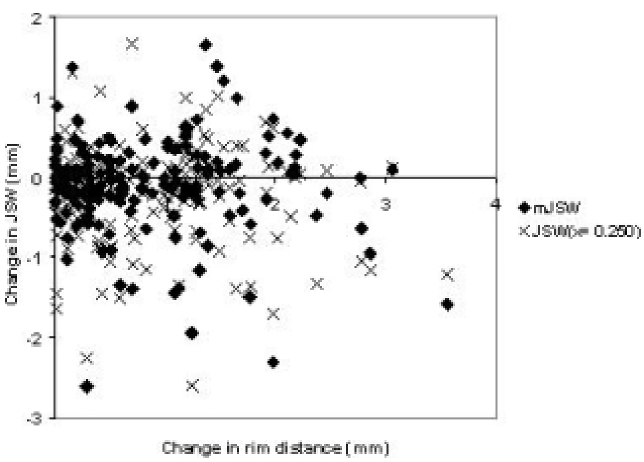
measurements, using the fixed flexion technique and the positioning frame, are robust to changes in subject positioning and beam angle.





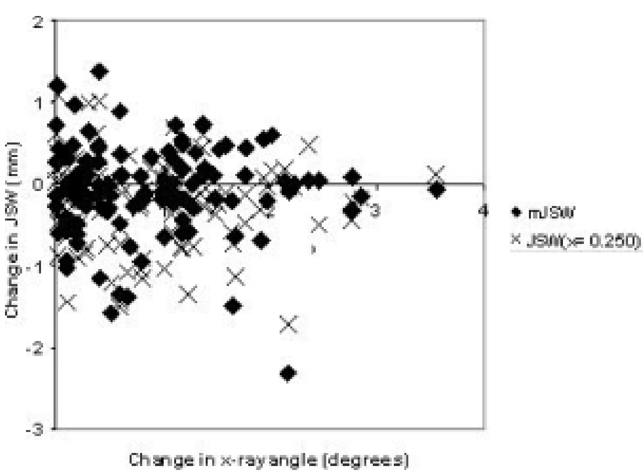


Table 1

	R	Significance
Change in mJSW vs rim alignment	0.053	p = 0.25
Change in JSW (x = 0.25) vs rim alignment	0.053	p = 0.025
Change in mJSW vs beam angle	0.003	p = 0.49
Change in JSW (x = 0.25) vs beam angle	0.075	p = 0.21

389 STUDY OF LOCATION SPECIFIC LATERAL COMPARTMENT RADIOGRAPHIC JOINT SPACE WIDTH FOR KNEE OSTEOARTHRITIS PROGRESSION: ANALYSIS OF LONGITUDINAL DATA FROM THE OSTEOARTHRITIS INITIATIVE (OAI)

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Purpose: To study the performance of location-specific radiographic joint space width (JSW) in the lateral compartment. Lateral compartment JSW is a potentially important measurement for subjects with lateral compartment OA, and as a measure of pseudowidening for medial compartment disease.

Methods: Baseline and Year 1 knee radiographs of 50 subjects from the Progression Cohort of the Osteoarthritis Initiative (OAI) were analyzed using a software technique that measured the radiographic joint space width (JSW). The data were a subset of OAI Image Releases 0.1.1, 0.B.1, and 1.B.1. Radiographic JSW and the baseline varus-valgus anatomical alignment angle was measured on a single indexed knee for each subject. Measurements of lateral and medial compartment JSW at fixed locations were facilitated by the use of automated software that delineated the femoral and tibial margins of the joint. Measures of JSW were defined as the distance from the tibial margin to the femur margin at fixed locations on the coordinate system shown in Figure 1. JSW was measured at nine fixed locations (x = 0.7, x = 0.725, x = 0.75, x = 0.775 x = 0.8, x = 0.825, x = 0.85, x = 0.875, and x = 0.9) A subset of 22 subjects were defined as having lateral compartment OA based on an anatomical angle of greater than 3 degrees valgus. Lateral compartment minimum JSW (mJSW) was measured for this subset.

A human reader operated custom software to verify and correct the software-drawn margins where necessary. Paired images were displayed with the reader blinded to the time point. The average and standard deviation of the JSW loss, and the standardized response means (SRMs) are reported.

Results: Table 1 provides measurements of JSW gain for the 28 subjects defined as having medial compartment OA. Increased JSW is observed for locations in the outer portion of the joint (higher x value). Table 2 gives the results for the 22 subjects defined as having lateral compartment OA. Here, decreased JSW is evident for locations in the more central portion of the joint (lower x value). To investigate the lateral compartment widening for medial compartment OA, we examined the correlation between JSW (x = 0.2) and JSW (x = 0.8), for the 28 subjects with an anatomical angle ⩽3 degrees. A modest negative correlation was observed (R = −0.20, p = 0.15, Figure 2).

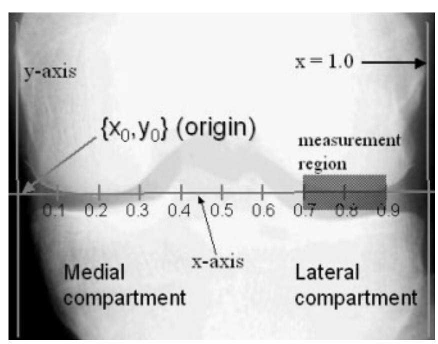

Figure 1.

Table 1

	Gain (mm)	SD (mm)	SRM
JSW (x = 0.7)	0.02	0.83	0.02
JSW (x = 0.725)	−0.03	0.75	−0.03
JSW (x = 0.75)	−0.04	0.74	−0.05
JSW (x = 0.775)	0.05	0.73	0.06
JSW (x = 0.8)	0.06	0.78	0.08
JSW (x = 0.825)	0.08	0.78	0.10
JSW (x = 0.85)	0.10	0.76	0.13
JSW (x = 0.875)	0.12	0.78	0.15
JSW (x = 0.9)	0.14	0.76	0.19

Table 2

	Loss (mm)	SD (mm)	SRM
JSW (x = 0.7)	0.50	0.86	0.59
JSW (x = 0.725)	0.41	0.85	0.49
JSW (x = 0.75)	0.36	0.87	0.42
JSW (x = 0.775)	0.29	0.86	0.34
JSW (x = 0.8)	0.21	0.79	0.27
JSW (x = 0.825)	0.24	0.78	0.30
JSW (x = 0.85)	0.23	0.86	0.27
JSW (x = 0.875)	0.26	0.93	0.28
JSW (x = 0.9)	0.27	0.89	0.31
mJSW	0.07	0.58	0.12

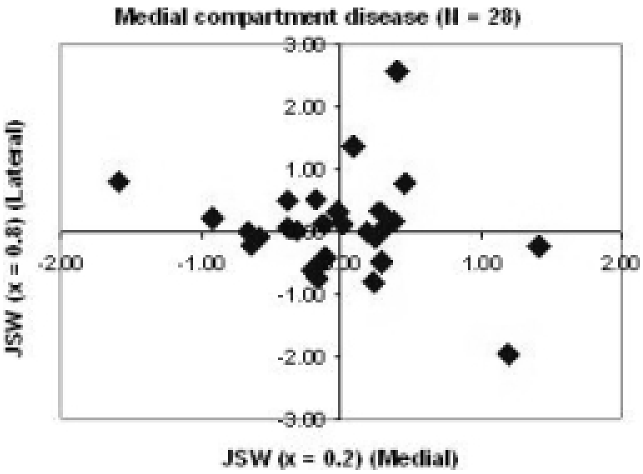

Figure 2.

Conclusions: The observation of improved performance in the central portion of the joint for lateral OA was similar to results reported for medial compartment OA. Table 2 also suggests that JSW at fixed locations may be more responsive than mJSW although the number of subjects is small. The results in Table 1 and Figure 2 also indicate that joint widening in the lateral compartment may correlate with narrowing in the medial compartment.

Radiographic lateral compartment JSW is a potentially important metric for assessing knee OA. Determining precise mJSW in the lateral compartment can be difficult due to sub optimal positioning. Location specific JSW permits a measurement of JSW for all subjects and may provide a superior measure of OA progression.

390 TAKING A CLOSER LOOK AT THE RELATIONSHIP BETWEEN OSTEOARTHRITIS OF THE KNEE AND BONE QUALITY: DATA FROM THE BALTIMORE LONGITUDINAL STUDY OF AGING (BLSA)

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Purpose: To examine the relationship between knee osteoarthritis (OA) and bone quality, and to assess the influence of physical activity on this relationship.

Methods: Data from 496 participants (238 women and 258 men) of a normative aging cohort study were analyzed. Participants were categorized as OA or no OA based on the American College of Rheumatology (ACR) criteria for knee osteoarthritis. Persistent and recent knee symptoms and physical activity were assessed by validated questionnaires. Axial images of the right mid-femur and the distal tibia were obtained by computed tomography (CT) and analyzed for whole, cortical and trabecular bone area (mm^2), density (BMD, mg/cc) and cortical thickness (mm) (Geanie software, version 2.1). Data was analyzed using SPSS software. Relationships between OA and bone characteristics were analyzed by univariate and multivariate techniques with age, sex, race, height, weight, co-morbidities and physical activity included step-wise. Interactions between OA∗sex and OA∗physical activity were individually added to the models.

Results: Data from 157 participants with ACR-defined knee OA and 339 without OA were analyzed. Participants with OA were significantly older, heavier, more likely to be women, and to have reported current knee pain compared to those without OA (Table 1; $p < 0.001$). In univariate analyses, mid-femur cortical and whole BMD were significantly associated with OA (Figure 1; $p < 0.05$), but not trabecular BMD or cortical thickness. These relationships persisted despite adjustment for age, sex, race, body size, co-morbidities and physical activity. The interaction between OA∗physical activity was also significantly associated with mid-femur cortical and whole BMD ($p = 0.027$; $p = 0.020$, respectively). OA was not associated with distal tibia bone characteristics ($p > 0.05$).

Conclusions: Knee OA is associated with lower bone mineral density at the mid-femur (i.e. cortical bone), but not the distal tibia. This relationship was not attributable to level of physical activity.

Table 1: Participant characteristics: mean±standard error

	No OA (N = 339)	ACR-Defined OA (N = 157)	p-value
Age (Years)	68.2±0.639	73.6±0.938	<0.001
Women N (%)	144 (42.5%)	94 (59.9%)	<0.001
Co-morbidities N	0.822±0.054	0.989±0.080	0.086
BMI (kg/m^2)	22.4±0.217	23.9±0.321	<0.001
Pain ever N (%)	0	83 (52.9%)	<0.001
Pain recent N (%)	0	47 (29.9%)	<0.001
Physical activity (kcal/week)	7628±278	8013±412	0.443

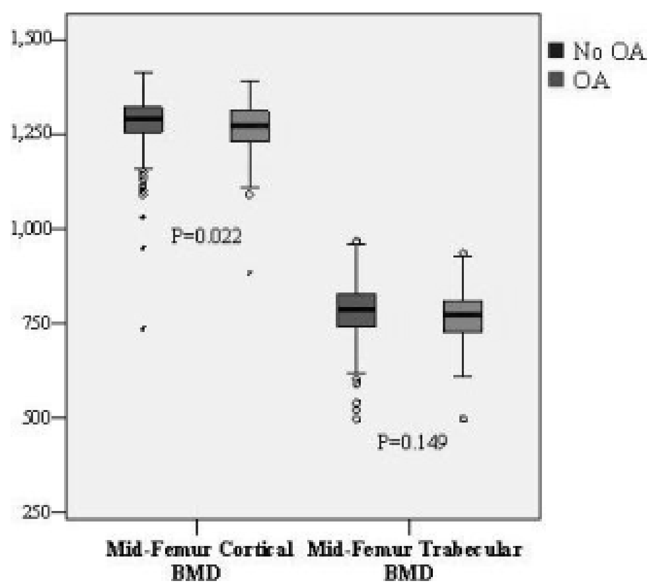

Figure 1. Mid-Femur BMD in participants with and without knee OA.

391 CLINICAL USE OF DIFFUSION WEIGHTED IMAGING AND T2 MAPPING FOR THE DIFFERENTIATION OF CARTILAGE REPAIR TISSUE IN PATIENTS AFTER MICROFRACTURE THERAPY (MFX) AND MATRIX-ASSOCIATED AUTOLOGOUS CHONDROCYTE TRANSPLANTATION (MACT): A FEASIBILITY STUDY

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Purpose: To evaluate the clinical use of diffusion weighted imaging (DWI) and T2-relaxation in the follow-up after microfracture therapy (MFX) and matrix-associated autologous chondrocyte transplantation (MACT); and to differentiate both cartilage repair procedures using clinical, MR morphological and MR biochemical assessment and to correlate these modalities.

Methods: Twenty patients underwent 3T-MRI with a morphological isotropic 3D-Double-Echo-Steady-State (DESS) sequence and biochemical T2, as well as DWI sequences, at different time points after MFX and MACT. The two cartilage repair groups were matched by age (MFX: 36.0±10.4 years; MACT: 35.1±7.7 years) and postoperative interval (MFX: 32.6±16.7 months; MACT: 31.7±18.3 months). MR observation of cartilage repair tissue (MOCART) scoring system was used for morphological evaluation, region-of-interest analysis was carried out for DWI and