Table 1. Muscle Strength Characteristics (mean ± SD)

	Operated leg	Non-operated leg	Controls (mean both legs)	P-value
Concentric peak torque (Nm)	2.67±0.55	2.74±0.47	2.54±0.39	0.26
Eccentric peak torque (Nm)	3.38±0.78	3.49±0.79	3.26±0.51	0.44

Correlations: Non-significant correlations (r_s= -0.03 to 0.23) were observed between concentric and eccentric muscle strength and the KOOS subscales Sport/Rec and Pain.
Conclusions: No differences were found in concentric and eccentric muscle strength between the operated and non-operated leg in patients. Furthermore, no differences in strength parameters were observed between patients compared to controls at 2 years post surgery. Self-reported outcomes were however significantly worse in patients. These results indicate that maximal concentric and eccentric muscle strength is not related to pain and function in meniscectomized patients.

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KNEE STRENGTH PREDICTS LOSS OF FUNCTION AND DECLINE IN PHYSICAL ACTIVITY IN PARTICIPANTS WITH OSTEOARTHRITIS: A 2-YR FOLLOW-UP OF THE OAI STUDY

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Purpose: To evaluate changes in strength, performance and overall physical activity over a 24-month period in participants at risk (incidence), or with knee osteoarthritis (KOA).
Methods: Data were extracted from the OAI cohort at baseline and 24-month visits (N=4607). Radiographic KOA (Kellgren-Lawrence) grade and frequency of knee symptoms were used to establish progression and incidence subcohorts during enrollment. The association of knee strength with performance and physical activity of both knees was examined longitudinally. Knee flexor and extensor strength were assessed by isometric testing and performance was determined by timed chair stands and 20-meter walk. Physical activity was scored on the physical activity scale for the elderly (PASE).
Results: The progression subcohort had the greatest decline in extensor and flexor strength over a 2-year period from 335.74 N (95% CI 326.61, 344.88) to 306.18 N (95% CI 299.08, 313.08) and 137.94 N (95% CI 132.89, 143.04) to 113.26 N (95% CI 109.78, 116.92), respectively. PASE scores for the progression subcohort showed the largest decrease from 159.83 (95% CI 154.34, 165.31) at baseline to 148.03 (95% CI 142.13, 153.93) at 24 months. At baseline and 24 months, the progression subcohort had the slowest chair stand pace of 0.48 stands/sec (95% CI 0.46, 0.50) and 0.46 stands/sec (95% CI 0.44, 0.48) and 20-meter walk of 1.29 m/sec (95% CI 1.27, 1.31) and 1.28 m/sec (95% CI 1.26, 1.28). Stratification within the incidence subcohort revealed that participants with frequent pain (most days in the last 12 months) had the greatest strength and physical activity deficits compared to their peers with no pain.
Conclusions: These findings suggest that participants with KOA and weak quadriceps are at greater risk of declining performance and physical activity over a two-year period. Frequent knee pain is a primary factor for the decline in functional measures in the incidence subcohort.

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OPTICAL COHERENCE TOMOGRAPHY (OCT) AND QUANTITATIVE MRI SHOW EARLY SUBSURFACE MATRIX DEGENERATION IN HUMAN ARTICULAR CARTILAGE

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Purpose: Osteoarthritis is a leading cause of disability. Current clinical imaging modalities do not reliably detect cartilage injury and degeneration prior to breakdown of the articular surface. Optical Coherence Tomography (OCT) and quantitative MRI are emerging technologies with potential to detect early cartilage changes. OCT is a novel nondestructive imaging technology that show changes to cartilage birefringence related to potentially reversible early cartilage degeneration (Chu et al, J Biomed Optics, 2007). The quantitative MRI techniques, T2 and ultra-short echo time (UTE) enhanced T2* may be sensitive to changes in cartilage collagen structure and tissue hydration. This study tests the hypothesis that OCT correlates with T2 and UTE-enhanced T2* MRI, and that these imaging modalities are sensitive to early cartilage matrix degeneration.
Methods: Thirty-six study areas (SA) were identified using a coring device on five human tibial plateaus obtained through institutional and IRB approved protocols. Each plateau was mounted on a plate with MRI lucent fiducial markers to allow precise spatial registration of study locations across imaging modalities. Quantitative T2 and UTE-enhanced T2* images were acquired on a clinical 3T MRI scanner and maps were generated using MRIMapper software. Study areas were imaged using a custom OCT scanner and graded as follows: A-obvious birefringence, B-no birefringence, C-subsurface voids and/or irregular surface. Cores were harvested and processed for type II collagen content, histology and polarized light microscopy (PLM) assessment using a grading scale developed by David-Vaudey, et al (Magn Reson Imaging, 2004).
Results: Cartilage matrix degeneration determined by PLM increased with increasing OCT grade ($p<0.001$), increasing T2 value (p=0.007), and decreasing UTE-enhanced T2* value (p=0.009, Fig. 1). Deep T2 values increased with increasing OCT grade (p=0.01) while deep UTE-enhanced T2* relaxation time decreased with increasing OCT grade (p=0.02). SA without OCT birefringence showed 50% higher deep T2 values (p=0.012) and 37%

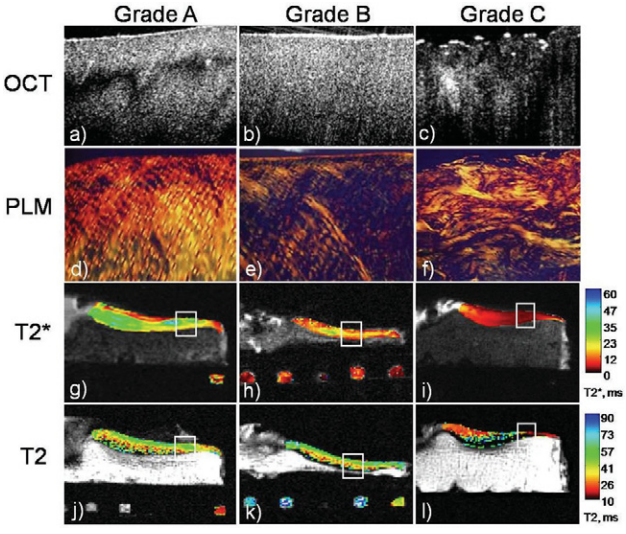

Figure 1. Comparison of OCT grade to PLM and MRI. a–c) Representative OCT images of cores with grades A–C. d–f) PLM images from OCT grades A–C demonstrating increasing matrix degeneration. g–i) UTE-enhanced T2* images showing decreasing relaxation time with increasing OCT grade. j–l) T2 images demonstrating increasing T2 relaxation time with increasing OCT grade.