

**Scientific research process.**

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***Observational Study***

**T1ρ/T2 mapping and histopathology of degenerative cartilage in advanced knee osteoarthritis**

In order to investigate whether normal thickness cartilage in osteoarthritic knees demonstrate depletion of proteoglycan or collagen content compared to healthy knees, magnetic resonance images of eleven healthy knees and five knees with advanced osteoarthritis were studied using T1ρ and T2 mapping. Histopathologic samples were also taken from the five osteoarthritic knees following total knee arthroplasty. All MR studies were performed on a 3.0-T unit. A total of 20 areas of MRI of the femoral condyle from 5 patients with advanced OA were reviewed. Total knee arthroplasty was conducted as scheduled on each operative candidate, and a total of 20 specimens (bone and cartilage blocks) were histopathologically examined. Differences in T2/T1ρ values and thickness of the cartilage between normal cartilage and advanced degenerative cartilage were assessed using a nonparametric Mann-Whitney U test. All experimental data were processed. These data were used to test the single hypothesis that normal thickness cartilage or mild cartilage thinning (early staged cartilage degeneration) in advanced knee OA will demonstrate depletion of proteoglycan or collagen content, compared with similar appearing cartilage in young healthy knees. Our findings suggest that the use of T2 and T1ρ mapping in the diagnosis and management of osteoarthritis of the knee. We have uniquely shown that even though cartilage is morphologically normal or near normal, cartilage degenerative changes exist in advanced OA patients.

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A handwritten signature in black ink, appearing to read 'B. Kester', with a stylized flourish at the end.

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