00003 Comparison of Conventional and Synthetic MRI for Quantitative Cartilage T2 Mapping of the Patella

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Aims: Synthetic MRI (SynMRI) is a recently released pulse sequence licensed for neuroimaging that provides dynamic tissue and inversion recovery contrasts from a single scan. We aim to compare patellar cartilage T2 values as determined by conventional and SynMRI techniques. We hope this will yield clinically relevant quantitative information with shorter scan times.

Methodology: We conducted a prospective study of outpatients presenting for routine MRI knee examinations without a history of patellar injury, anterior knee pain or anterior knee surgery.

All scans were done on a 3.0T MRI system with a 16-channel phased array knee coil. Conventional axial T2 mapping as well as SynMRI sequences were performed in addition to routine knee examination sequences. The acquired imaging data from both scans were processed on dedicated workstations yielding quantitative cartilage T2 maps.

The patellar apex cartilage was manually segmented into full thickness, deep half and superficial half regions-of-interest by two observers and the corresponding T2 values recorded. Statistical analysis was performed using Student's T-test and Pearson correlation.

Result: ROIs from SynMRI and conventional T2 maps of thirty patients were analysed.

Mean full-thickness cartilage T2 relaxation time was significantly higher for SynMRI compared to conventional T2 mapping (44.6 vs 37.4 ms); similar findings were found for deep half of the cartilage (42.4 vs 33.6 ms) and superficial half (46.8 vs 41.2 ms).

Pearson correlation showed very strong correlations between conventional T2 mapping and SynMRI T2 measurements for full thickness and deep cartilage with moderately strong correlation for superficial cartilage.

Conclusion: Preliminary results show that T2 relaxation time measurements from SynMRI are not equivalent to those from conventional T2 mapping, but there is strong correlation between the values from both techniques, and the differences may be correctable with algorithmic adjustments. Therefore SynMRI shows promise in providing a quantitative assessment of chondral abnormalities without prolonging scan times.