

## **Preoperative Quantitative Imaging Use in Predicting Intraoperative Decision for Hip Labral Repair Versus Reconstruction**

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### **Background:**

Gold standard treatment of hip labral tears is arthroscopic labral repair; however, if the labral tissue is damaged to the extent of prohibiting repair, reconstruction is an alternative option. Despite prior efforts to correlate preoperative risk factors with repair versus reconstruction decisions, it remains that labral tissue quality is most reliably determined based on arthroscopic intraoperative inspection. T2 mapping technology has been shown to accurately evaluate tissue integrity and discriminate between healthy and damaged cartilage, with a higher T2 value corresponding to more tissue damage. The purpose of this study is to determine if quantitative MRI with T2 mapping can be utilized to predict labral repair versus reconstruction prior to performing hip arthroscopy.

### **Methods:**

This retrospective case-control study was based at a single institution between 3/2021 to 2/2023. Inclusion criteria included patients who underwent hip labral repair or reconstruction, were between 18 and 80 years of age, and had a preoperative 3.0T MRI within the institutional PACS. Patients with prior hip arthroscopy procedures, prior hip or labral trauma, inflammatory arthritis, recent intra-articular injection, or lack of appropriate T2 mapping images were excluded. Three reviewers blinded to patient information used Syngo.via T2 mapping software to each provide three separate sequencing analyses on each patient's optimal T2 sagittal cut. The average T2 mapping value was recorded for the labrum and anterior, superior, and posterior acetabular and femoral head zones. Statistical analysis was performed with inter-rater correlation coefficients (ICC) estimates and their 95% confidence intervals calculated using Procedures for Psychological, Psychometric, and Personality package version 2.3.3 based on mean-rating, consistency, 2-way mixed-effects model.

### **Results:**

60 operations qualified for enrollment into the study. Of these operations, 10 were labral reconstructions and 50 labral repairs. The participants' ages ranged from 14 to 50 years old, with an average age of 31 years. There were 33 females and 27 males. 11 patients received arthroscopic procedures on bilateral extremities at different time periods during the interval of interest in this study. The ICC for all three evaluators' T2 mapping values for the labrum was 0.75. Mean T2 value for reconstructed labrum was 76.3ms compared to 89.3ms for repaired labrums ( $p=0.1195$ ). Females demonstrated higher average T2 values for the labrum ( $p=0.0167$ ), anterior femoral head cartilage ( $p=0.005$ ), and superior femoral head cartilage ( $p=0.005$ ).

**Conclusions:**

T2 mapping with preoperative MRI does not demonstrate significant differences regarding labral repair and reconstruction. The data revealed potential sex differences in the pattern of cartilage degeneration. Our study plans to look at further differences and other possible predictors of reconstruction versus repair outcomes during hip arthroscopy that could assist with preoperative decision making.

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