

THE MENISCUS REPAIR HEALING INDEX

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Background: Meniscus tears are a common injury, and studies have shown that patients report better mid- and long-term outcomes and decreased rates of early-onset knee osteoarthritis when treated with meniscus repair compared to meniscectomy. Failure to heal following a meniscus repair remains a concern and risk factors have been explored, but no scoring system exists that identify patients' likelihood of failure. The purpose of this study is to identify risk factors and subsequently develop a scoring index that predicts failure after meniscus repair based on individual patient characteristics. This tool may ultimately aid physicians in clinical decision-making and improve patient education.

Methods: The authors reviewed 518 patients that underwent meniscus repair between 2012 and 2024 by five surgeons within the CU Sports Medicine department. Patients were at least 18 years of age at the time of surgery and underwent no more than two concomitant ligamentous procedures. Preoperative data, intraoperative data, and postoperative data were assessed at a minimum of 6 months after meniscus repair. Failure was defined as a re-tear confirmed by magnetic resonance imaging. Previously known or suspected variables affecting meniscus healing were analyzed through univariate logistic regression to determine odds ratios. These factors and their estimated odds ratios will be organized into a scoring system that aims to predict failure after meniscus repair, which will then be applied to a retrospective patient population to validate the scoring system.

Preliminary Results: The mean age at time of surgery was 36 years (range, 18-76 years) and 286 patients were females (55.2%). The average follow-up was 17.6 months \pm 10.69 months. The overall healing failure rate was 13.1%. Among the variables analyzed, etiology was the only risk factor found to be a significant predictor of re-tear. Compared to a traumatic cause of meniscus injury, atraumatic causes were 1.76 times more likely to fail ($p = 0.037$). There was no statistically significant relationship for the following variables: age at time of surgery ($p = 0.928$), BMI ($p = 0.666$), smoking status ($p = 0.391$), activity level ($p = 0.718$), number of prior surgeries on affected leg ($p = 0.427$), meniscus laterality ($p = 0.057$), revision status ($p = 0.087$), and concomitant procedures ($p = 0.344$).

Conclusions & Future Directions: In conclusion, the overall rate of healing failure was low in the population studied and many of the risk factors analyzed did not show a significant influence on meniscus re-tear rate after meniscus repair surgery. Future directions of this study include increasing the sample size, using patient reported outcome measures to define subjective failures in addition to objective failures, and analyzing additional variables to identify other risk factors that significantly impact meniscus healing. To establish a scoring system once these factors are identified, they will be assigned a weight depending on their odds ratio, given a score range, and applied retrospectively to a small subset of patients to validate the scoring index.