Efficacy of Root Repair, Partial Meniscectomy, and Nonoperative Management of Meniscus Root Tear on Structural Outcomes: A Systematic Review and Meta-Regression

Dustin Ross Lee, Anna Reinholz[1], Yining Lu[1], Sara E Till[1], Amber Naz Lopez, Daniel B F Saris[1], Christopher L Camp[1], Aaron John Krych[1]
[1]Mayo Clinic

INTRODUCTION: Meniscus root tears (MRTs) are a common injury that can lead to progressive osteoarthritis (OA) and the potential need for total knee replacement. A paucity remains in the literature on best practices for MRT treatment. The purpose of this study is to compile and analyze the structural outcomes after meniscus root tear treatment as currently described in the literature.

METHODS: A systematic review of the literature was conducted in Medline, Scopus and Embase to identify clinical studies published since 2011 that investigated the efficacy of root repair, partial meniscectomy, and nonoperative management in the treatment of MRTs. Patient cohorts were grouped into treatment categories; data collected included patient demographics and structural outcomes including change in joint space width (JSW), degree of medial meniscal extrusion (MME), and progression to total knee arthroplasty (TKA). Risk of bias (ROB) was assessed utilizing the MINORS criteria. Outcomes of each intervention was described utilizing a mix-effects meta-regression while adjusting for study ROB. Subgroup analysis of studies performing head-to-head comparisons were similarly analyzed.

RESULTS: A total of 56 studies were included, with a total of 3191 patients (68.5% female). Heterogeneity analysis identified significant differences via analysis of article ID as a random-effect in all single-armed evaluations of outcomes. Among the studies, 465 patients were nonoperatively managed (14.6%), while 1340 underwent meniscal repair (41.9%), and the remaining underwent meniscectomy (n=1386, 43.4%). Based on available evidence, JSW was -0.49 mm (95% CI: -0.80 – -0.19) following meniscal repair (n=295) and -0.99 mm (95% CI: -1.73 – -0.24) following meniscectomy (n=186 knees); MME was 1.75 (95% CI: 0.90-2.60) following meniscal repair (n=603) and 2.21 (95% CI: -23.20-27.62) following meniscectomy (n=66); and event rate for TKA was 0.02 (95% CI: 0.00-0.014) after meniscal repair (n=306), 0.42 (95% CI: 0.22-0.65) after meniscectomy (n=367), and 0.31 (95% CI: 0.15-0.54) after nonoperative treatment (n=93). Direct comparisons demonstrated a relative risk (RR) of 11.70 (95% CI: 0.39-348.46) for TKA following meniscectomy compared to repair and an RR of 2.73 (95% CI: 0.06-120.4) when comparing meniscectomy to nonoperative treatment.

DISCUSSION AND CONCLUSION: The literature reporting on the treatment of MRTs is heterogenous and limited to level III and IV studies. Current evidence indicates that a trend exists identifying root repair as a more effective treatment strategy than nonoperative management or meniscectomy for patients with posterior MRTs on measures of JSW, MME, and progression to TKA. Future high quality, prospective studies are warranted to further investigate the clinical efficacy of MRT repair as an alternative to both nonoperative management and meniscectomy.