

## **Partial Meniscectomy is Associated with Increased Risk of ACL Revision Compared to Meniscus Repair: A Multicenter Propensity-Matched Study**

Abhinav Reddy Balu, Avani Chopra, Augustus Cooper Demanes, Peter Chenpei Shen, Rithvik R Balu, Michael A Terry, Vehniah K Tjong

**INTRODUCTION:** Whether to repair or resect the meniscus during ACL reconstruction remains a subject of ongoing debate. This uncertainty stems from limited understanding of the long-term implications of each approach, including complication rates, risk of graft failure, and joint preservation. Prior studies are often single-center, underpowered, or report conflicting outcomes, leaving surgeons without clear guidance. To address this gap, we conducted a multicenter propensity-matched study comparing meniscus repair versus partial meniscectomy at time of ACL reconstruction. To compare the rates of revision ACL reconstruction, meniscal reoperation, and total knee arthroplasty (TKA) associated with partial meniscectomy and meniscal repair performed at the time of index ACL reconstruction in patients with concurrent meniscus and ACL tears.

**METHODS:** We performed a retrospective cohort study using the TriNetX Research Network, a global database of over 130 million patient records. Patients undergoing primary ACL reconstruction (CPT 29888) between 2000 and 2022 were identified and stratified into three cohorts: (1) ACL reconstruction with meniscus repair, (2) ACL reconstruction with partial meniscectomy, and (3) isolated ACL reconstruction without meniscal injury. Patients with multiligamentous injuries or bilateral ACL pathology were excluded. To ensure accurate attribution of revision surgeries to the original operative knee, cohorts were constructed separately for right- and left-sided injuries using side-specific ICD-10 codes. We excluded all contralateral ACL pathology within 20 years before or after the index procedure to avoid conflating ipsilateral revisions with new contralateral injuries. Propensity score matching (1:1) was performed using age, sex, race, BMI, and osteoarthritis status. Primary outcomes included revision ACL reconstruction, meniscal reoperation, and conversion to total knee arthroplasty (TKA). Laterality of meniscal injury (medial vs. lateral) was also analyzed. Statistical analysis included chi-square and t-tests, with logistic regression used for matching;  $p < 0.05$  was considered significant.

**RESULTS:** A total of 39,126 patients were followed for an average of 5.02 years. Partial meniscectomy was associated with a significantly increased risk of revision ACL reconstruction compared to both meniscal repair (RR 1.28,  $p < 0.001$ ) and isolated ACL reconstruction (RR 1.39,  $p < 0.001$ ). Partial meniscectomy was also linked to a markedly increased risk of total knee arthroplasty (TKA) compared to both meniscal repair (RR 6.67,  $p < 0.001$ ) and isolated ACL reconstruction (RR 6.4,  $p < 0.001$ ). In subgroup analysis by meniscal laterality, medial meniscus injuries were associated with higher rates of meniscal reoperation compared to lateral injuries in both the repair (RR 1.31,  $p < 0.001$ ) and partial meniscectomy cohorts (RR 1.24,  $p = 0.017$ ). Notably, medial partial meniscectomy also increased risk of ACL revision compared to lateral (RR 1.28,  $p = 0.021$ ), a trend not seen with meniscal repair.

**DISCUSSION AND CONCLUSION:** In patients undergoing ACL reconstruction with concurrent meniscus tear, partial meniscectomy significantly increases risk of revision ACL surgery and conversion to total knee arthroplasty compared to meniscal repair. These results support the hypothesis that meniscal resection destabilizes the knee joint, increasing biomechanical stress on the reconstructed ACL in the short term and accelerating joint degeneration in the long term. In contrast, meniscal repair appears to better preserve joint integrity and reduce the burden of subsequent surgical intervention. Where technically feasible, meniscal preservation should be prioritized during ACL reconstruction to optimize long-term joint stability and outcomes.

ACLR with Meniscal Repair vs. ACLR with Partial Meniscectomy

