Failure and Complication Rates Following Meniscal All-Inside and Inside-Out Repairs: A Systematic Review and Meta-Analysis

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INTRODUCTION: Meniscal tears, occurring at an incidence of 60 per 100,000 persons, disrupt knee kinematics, leading to cartilage degeneration and arthritis. Current treatment modalities aim to preserve as much meniscal tissue as possible, with meniscal repair gaining popularity in recent years. Within meniscal repair strategies, all-inside and inside-out techniques predominate. Therefore, the authors aim to examine patient reported outcome measures (PROMs), failure and complication rates upon comparison of meniscal all-inside (AI) versus inside-out (IO) repair techniques.

METHODS: A search was conducted using 3 databases (PubMed, EMBASE, CINAHL) in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines. Article inclusion, and subsequent data extraction, were dependent upon meeting of predetermined inclusion criteria. The primary outcome of interest regarded failure rate. Secondary outcomes included PROMs and complication rate. Quality assessment was performed using the GRADE tool for randomized controlled trials and the MINORS criteria for cohort studies. A meta-analysis was conducted for outcomes reported by more than three comparative studies.

RESULTS: A total of 24 studies (13 studies and 912 menisci for AI vs. 17 studies and 1,1117 menisci for IO) were included. The mean follow-up ranges were 22-192 months (AI) and 18.5-155 months (IO). The overall reported failure rate within the AI group ranged from 5- 35% compared to 0- 25% within the IO group (Figure 1). When comparing meniscal repair failure rates in the specific setting of concomitant ACLR, the AI group had a failure rate ranging from 5- 34% versus 0-12.9% in the IO group. The complication rate ranged from 0-40% for AI and 0-20.5% for IO (Figure 2). Upon pooling of 6 direct comparative studies, a significantly lower failure rate favoring the inside-out technique was observed (15.9% AI vs. 11.1% IO; OR=1.77, 95%CI: 1.09-2.89, p=0.02, I^2=0%) (Figure 3). Moreover, no significant differences were found regarding complication rates between treatment arms after pooling of the results (7.3% AI vs. 4.8% IO; OR=0.77, 95%CI: 0.04-15.39, p=0.86, I^2=81%) (Figure 4).

DISCUSSION AND CONCLUSION: The present study underscores comparable clinical success between AI and IO meniscal repair techniques, with both demonstrating similar complication rates. However, it is noteworthy that the IO repair technique was associated with lower odds of failure compared to the AI repair technique.

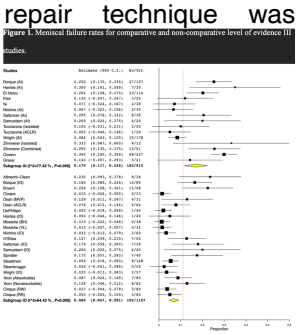

Figure 1. Meniscal failure rates for comparative and non-comparative level of evidence III studies.

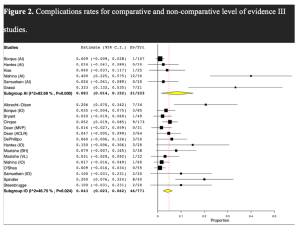

Figure 2. Complications rates for comparative and non-comparative level of evidence III studies.

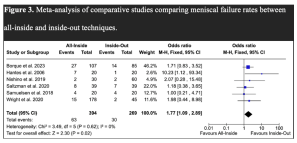

Figure 3. Meta-analysis of comparative studies comparing meniscal failure rates between all-inside and inside-out techniques.

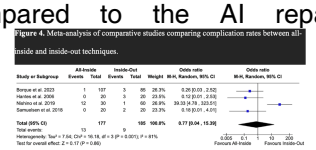

Figure 4. Meta-analysis of comparative studies comparing complication rates between all-inside and inside-out techniques.