Arthrofibrosis after Anterior Cruciate Ligament Reconstruction and Meniscal Repair may Lead to Quicker Meniscal Healing and Decreased Failure Rates

Larry Chen, Griff George Gosnell, Isabella B Jazrawi, Katherine Esser, Bradley Austin Lezak, Abigail L Campbell, Michael J Alaia

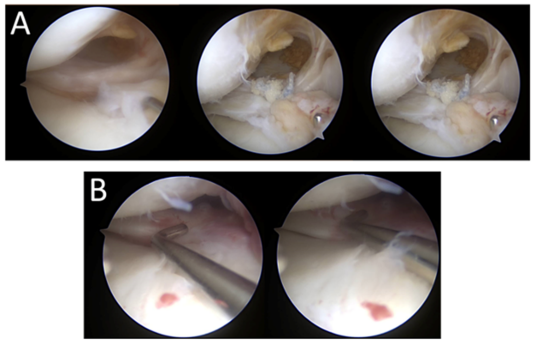
INTRODUCTION: Arthrofibrosis and knee stiffness are well-documented complications following reconstructive knee surgery. While arthrofibrosis is traditionally regarded as a negative outcome, the potential influence of this phenomenon on meniscal healing and retear rates in the setting of Anterior Cruciate Ligament Reconstruction (ACL-R) has not previously been assessed. Existing literature reports meniscus re-tear rates ranging averaging between 10-20%, depending on follow-up duration, surgical technique, and suture type. The goal of this study is to determine whether the presence of arthrofibrosis after meniscal repair influences meniscal healing capacity and retear rates, compared to patients who undergo meniscal repair without arthrofibrosis.

METHODS: A single-institution retrospective review was conducted on consecutive patients who underwent meniscal repair in conjunction with ACL-R between January 2011 and August 2024. Patients were included if they subsequently underwent arthroscopic lysis of adhesions (LOA) following initial meniscal repair. Chart review was performed to collect data on meniscus healing state during LOA/MUA, knee range of motion (ROM), occurrence of re-tear, and occurrence of revision surgery. Clinical failure was defined as the need for additional surgical intervention for meniscal retear, such as meniscectomy or revision repair. For comparison, the institutional failure rate for all meniscal repairs performed in the setting of ACL-R during the same time period was calculated.

RESULTS: Fifty-three patients, with an average age of 29.4 ± 8.8 years (52.8% male, BMI 26.08 ± 4.57), underwent meniscal repair and subsequently developed arthrofibrosis requiring LOA. LOA procedures occurred an average of 4.26 ± 2.9 months after initial meniscal repair, and the mean follow-up after the index surgery was 4.2 ± 3.4 years. All meniscal repairs were performed in the setting of concomitant knee ligament surgery. During arthroscopic LOA, all 53 patients (100%) were found to have a fully intact and healed meniscus. 3 patients (5.7%) experienced re-tears in the same location as the previous repair. Clinical failure was observed in 1 (1.9%) patient, who went on to undergo revision repair and subsequent revision meniscectomy. In comparison, the institutional failure rate for meniscal repairs performed in the setting of ACL-R over the same study period was 11.1%, indicating a lower failure rate in this subgroup of patients who developed arthrofibrosis. The average ROM at the most recent office follow-up was 0.63 ± 2.2° extension to 129.0 ± 5.9° flexion. Furthermore, patients displayed satisfactory scores on IKDC, Lysholm, and KOOS questionnaires.

DISCUSSION AND CONCLUSION: This study demonstrates a robust rate of meniscal healing following meniscal repair performed in conjunction with ACL reconstruction in patients who developed postoperative arthrofibrosis requiring LOA. Clinical failure and revision rates in this cohort were lower than those typically reported in the literature for meniscal repairs performed during ACL reconstruction and were also notably lower than our institution's own historical failure rate of 11.1% for such procedures. In this cohort, all properly assessed menisci were fully intact and healed during arthroscopic evaluation. Although the development of stiffness may require additional LOA procedures to restore proper ROM, it may also reflect an over-active pro-inflammatory response that is possibly beneficial to meniscal healing. These findings highlight the importance of further research into this topic to further delineate the potential effects of arthrofibrosis on meniscal healing, or, more importantly, a pro-inflammatory state on meniscal repair.

Figure 1. Stages of Meniscal Repair and Healing Assessment



Arthroscopic images demonstrating meniscal repair and healing assessment.

(A) Images taken throughout the primary meniscal repair, including the initial tear, the repair, and post-repair healing.

(B) Probing assessment of meniscal integrity during the lysis of adhesions procedure.

Table 1. Clinical Outcomes

Variable*	N (%)‡
Interval from Initial Surgery to LOA (months)	4.3 ± 2.9
Meniscal Healing Observed during LOA	
Fully Intact/Healed	53 (100.0%)
Not Healed	0 (0%)
Re-tear	3 (5.7%)
Clinical Failure Requiring Revision Surgery	1 (1.9%)

*Continuous Variables are reported as mean ± standard deviation; categorical variables are reported as n (%).

† % Is reported out of Total N of 53