Superior Long-Term Knee Function at 17.5 Years Following Lateral Meniscus Repair versus Meniscectomy in Patients Younger than 25 Years

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INTRODUCTION: The lateral meniscus provides substantial contribution in load transmission and stability in the knee. A tear in the meniscus results in a loss of hoop stress resistance and subsequent development of cartilage degeneration. Prior studies have demonstrated improvement in mid-term patient reported outcomes after lateral meniscus repair. The purpose of this study is to compare long-term surgical outcomes in young, active patients with isolated lateral meniscus tears undergoing meniscus repair versus meniscectomy.

METHODS: Patients aged 25 years or younger who underwent isolated lateral meniscus repair or lateral meniscectomy at a single institution between 2001 and 2015 were retrospectively reviewed. Patients with concomitant ligament injuries or a prior history of knee surgery were excluded. Electronic medical records were reviewed to obtain patient demographics, injury characteristics, and intraoperative details including tear pattern and location. At a minimum of 2-year and 10-year follow-up, patients were contacted to assess outcomes including return to sport, reoperations, and patient-reported outcome measures (PROMs). PROMs collected included the Visual Analog Scale (VAS) for pain at rest and with use, International Knee Documentation Committee (IKDC) score, Lysholm Knee Score, Tegner Activity Score, and a 10-point scale for surgical satisfaction.

RESULTS:

A total of 176 knees in 170 patients were included, with 50 knees in the meniscus repair group (mean age: 17.9, BMI: 25.6 kg/m^2, 74% male) and 126 in the meniscectomy group (mean age: 17.1, BMI: 26.8 kg/m^2, 74% male) (**Table 1**). There were no differences in age, BMI, sex, laterality, or activity level between groups. The average follow-up was 17.5 years (range 10-24 years).

Preoperatively, the meniscectomy group had higher IKDC scores than the repair group (76.6 ± 10.1 vs. 70.4 ± 12.9; p=0.002). At minimum 2-year follow-up, both groups showed improvement in IKDC scores, with the repair group demonstrating a greater increase in IKDC score (+26.0 ± 14.2 vs. +21.0 ± 10.0; p = 0.020, **Table 2**). At a minimum 10-year follow-up, the mean IKDC scores were 82.7 ± 16.6 in the repair group and 74.9 ± 18.2 in the meniscectomy group. Only the repair group maintained an improvement from baseline at long-term follow-up (70.4 to 82.7; p=0.017, **Figure 1**). At final follow-up, return-to-sport rates were similar between groups (repair: 78%, meniscectomy: 75%; p=0.845). There was no difference in PROMs between the meniscectomy group and meniscus repair group at final follow-up. Eleven knees (22%) in the repair group and 23 knees (18%) in the meniscectomy group underwent reoperation (p=0.568) (**Table 3**). Revision meniscus surgery was performed in 10 cases (20%) in the repair group (4 meniscus repairs, 6 meniscectomies) and 17 cases (13%) in the meniscectomy group (2 meniscus repairs, 14 meniscectomies, 1 meniscus transplant) with no difference in revision meniscus surgery rates (p=0.280).

DISCUSSION AND CONCLUSION: In patients younger than 25 years, isolated lateral meniscus repair was associated with sustained improvements in IKDC scores at a mean follow-up of 17.5 years, whereas no significant change from preoperative IKDC scores was observed in the lateral meniscectomy group. No significant differences were observed between groups in rates of return to sport or revision surgery. These results indicate that lateral meniscus repair provides durable functional outcomes over long-term follow-up in young patients.

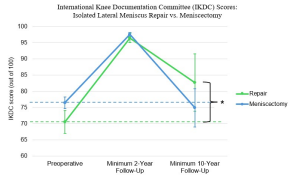

Figure 1. Comparison of International Knee Documentation Committee (IKDC) scores between isolated lateral meniscus repair and meniscectomy groups at preoperative, minimum 2-year, and minimum 10-year follow-up time points.

Table 1. Patient Demographics and Injury Characteristics: Isolated Lateral Meniscus Repair Versus Meniscectomy

	Repair (n=50)	Meniscectomy (n=126)	p-value
Age (years)	17.9 ± 3.9	17.1 ± 3.5	0.211
BMI (kg/m²)	25.6 ± 5.8	26.8 ± 5.9	0.215
Sex			1.000
Male	37 (74%)	93 (74%)	
Female	13 (26%)	33 (26%)	
Laterality			0.793
Left	21 (43%)	52 (43%)	
Right	27 (55%)	64 (53%)	
Bilateral	1 (2%)	5 (4%)	
Onset			0.655
Acute	35 (70%)	82 (65%)	
Chronic	15 (30%)	44 (35%)	
Activity Level			0.495
Sedentary	4 (8%)	5 (4%)	
Recreational	13 (26%)	30 (24%)	
Competitive	33 (66%)	91 (72%)	
Tear Pattern			< 0.001
Complex	2 (4%)	35 (28%)	
Radial	2 (4%)	31 (25%)	
Oblique flap	2 (4%)	22 (17%)	
Horizontal cleavage	0 (0%)	19 (15%)	
Bucket handle	30 (60%)	15 (12%)	
Vertical longitudinal	14 (28%)	4 (3%)	
Tear Location			0.003
Body	15 (30%)	71 (56%)	
Posterior horn	22 (44%)	26 (21%)	
Anterior horn	4 (8%)	15 (12%)	
Multiple locations	9 (18%)	14 (11%)	

Table 2. Comparison of International Knee Documentation Committee Score (IKDC) between Repair and Meniscectomy at minimum 2-year follow-up and minimum 10-year follow-up

Timepoint	Repair (n=50)	Meniscectomy (n=126)	p-value
Preoperative	70.4 ± 12.9	76.6 ± 10.1	**0.002**
Minimum 2-Year Follow-Up	96.5 ± 4.7	97.5 ± 3.7	0.175
Δ (2-Year − Preop)	+26.0 ± 14.2	+21.0 ± 10.0	**0.020**
Minimum 10-Year Follow-Up	82.7 ± 16.6	74.9 ± 18.2	0.155
Δ (10-Year − Preop)	+16.6 ± 24.7	−1.6 ± 19.8	**0.015**

Table 3. Reoperations at Minimum 10-Year Follow-Up: Isolated Lateral Meniscus Repair Versus Meniscectomy

	Repair (n=50)	Meniscectomy (n=126)	p-value
Total Reoperations	**11 (22%)**	**23 (18%)**	0.568
Revision Meniscus Procedure	**10 (20%)**	**17 (13%)**	0.280
Meniscectomy	6	14	
Meniscus Repair	4	2	
Meniscus Allograft	0	1	
Cartilage related procedures	**1 (2%)**	**6 (5%)**	0.395
Chondroplasty	1	1	
Osteochondral Allograft	0	2	
Loose Body Removal	0	1	
Arthroscopic Drilling	0	1	
Irrigation & Debridement	0	1	