

# Autograft versus Allograft Medial Patellofemoral Ligament Reconstruction for Patellofemoral Instability: Data from the JUPITER Cohort

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**INTRODUCTION:** Patellar instability accounts for approximately 3% of knee injuries. Medial patellofemoral (MPFL) reconstruction is an important part of the treatment algorithm for patellar instability. MPFL reconstruction is frequently performed with either autograft or allograft tissue. While autograft may be associated with faster biologic remodeling allograft confers less donor site morbidity. Despite previous studies, there is not yet a consensus regarding the ideal graft type for MPFL reconstruction. Therefore, this study sought to investigate if graft type influences complication rates or patient reported outcomes following MPFL reconstruction.

**METHODS:** Patients in this study were prospectively enrolled in the Justifying Patellar Instability Treatment by Early Results (JUPITER) multicenter study. Patients were included if they underwent an MPFL reconstruction with or without lateral release / lateral lengthening or chondroplasty. Patients were excluded if they underwent a concomitant bone (e.g., tibial tubercle osteotomy, distal femur osteotomy, or trochleoplasty) or articular cartilage repair procedure. Patients were stratified into cohorts on the basis of MPFL reconstruction with autograft or allograft. Patient demographics and complications (subluxation/dislocation or reoperation) were reviewed and included. Patient reported outcome measures including the Knee injury and Osteoarthritis Outcome Score Jr. (KOOS Jr.), Hospital for Special Surgery Pediatric Functional Activity Brief Scale (Pedi-FABS), Pediatric International Knee Documentation Committee (IKDC Pedi) score, Banff Patellofemoral Instability Instrument (BPII 2.0), and Kujala score were included at baseline, 1 year, 2 years, and 5 years postoperatively when available. A *P*-value  $\leq 0.05$  was deemed to be statistically significant in all analyses.

## RESULTS:

A total of 671 patients were included in this study, 285 patients underwent autograft MPFL reconstruction and 386 allograft MPFL reconstruction. Autograft patients were significantly older ( $16.3 \pm 3.7$  vs.  $15.7 \pm 3.5$ ,  $p=0.03$ ), more likely to present after a first-time dislocation (25.7% vs. 18.4%,  $p=0.03$ ), and had higher rates of articular cartilage damage (70.4% vs. 48.7%,  $p<0.001$ ) (Table 1). Autograft patients had a significantly higher rate of concomitant chondroplasty procedures (53.0% vs. 32.9%,  $p<0.001$ ), while allograft patients had a higher rate of lateral lengthening's (25.9% vs. 14.0%,  $p<0.001$ ). The most common autografts were semi-tendinosis ( $n=188$ ) and gracilis ( $n=88$ ). The most common allografts were semi-tendinosis ( $n=191$ ), gracilis ( $n=85$ ), tibialis anterior ( $n=90$ ), and peroneus longus ( $n=19$ ). There was no difference in the subluxation/dislocation rate or reoperation rate between the two groups (Table 2). Patients treated with an autograft MPFL reconstruction had significantly better patient reported outcomes at two years (Kujala and IKDC Pedi) and 5 years (Kujala, IKDC Pedi, and KOOS Jr.) (Table 3). There were no differences in complications rates when stratified by allograft or autograft type (Table 4).

**DISCUSSION AND CONCLUSION:** Patients in this study treated with an MPFL reconstruction experienced similar complication profiles, irrespective of graft type. Patients treated with an autograft MPFL reconstruction demonstrated higher performance on patient reported outcomes measures at 2 and 5 years postoperatively.

**Table 2. Complications**

Variables	Autograft	Allograft	Total	<i>P</i>
Subluxation/Dislocation (%)	41 (14.4)	48 (12.4)	89 (13.3)	.49
Revision Procedure (%)	11 (3.9)	15 (3.9)	26 (3.9)	.99

**Table 1. Demographic Data**

Variables	Autograft	Allograft	Total	<i>P</i>
Age (years ± SD)	16.3 ± 3.7	15.7 ± 3.5	15.9 ± 3.7	.03
Sex				
Female (%)	173 (60.7)	246 (63.7)	419 (62.4)	.49
Male (%)	112 (39.3)	140 (36.3)	252 (37.6)	
BMI (± SD)	24.1 ± 5.7	24.4 ± 6.8	24.2 ± 6.3	.45
First Time Dislocation (%)	72 (25.7)	70 (18.4)	142	.03
Contra-lateral Knee Normal (%)	191 (68.0)	229 (59.8)	420 (63.3)	.03
Articular Cartilage Damage (%)	193 (70.4)	171 (48.7)	364 (58.2)	<.001
Associated Procedures				
Chondroplasty (%)	151 (53.0)	127 (32.9)	278 (41.4)	<.001
Lateral Lengthening or Release (%)	40 (14.0)	100 (25.9)	140 (20.9)	<.001
Graft Type				
Semi T (%)	188 (66.0)	191 (49.5)	379 (56.5)	
Gracilis (%)	88 (30.9)	85 (22.0)	173 (25.8)	
Other (%)	9 (3.2)	110 (28.5)	119 (17.7)	

**Table 3. Patient Reported Outcomes**

Variables	Autograft	Allograft	Total	<i>P</i>
BPII 2.0				
Baseline (n=493)	43.2 ± 18.1	43.4 ± 17.7	43.5 ± 18.2	.88
1 Year (n=146)	75.9 ± 23.7	73.7 ± 21.1	74.2 ± 22.6	.57
2 Years (n=66)	78.7 ± 21.7	77.6 ± 21.9	78.0 ± 21.9	.86
5 Years (n=222)	75.5 ± 26.9	73.4 ± 25.2	74.3 ± 26.1	.57
IKDC Pedi				
Baseline (n=491)	52.0 ± 21.3	53.8 ± 19.7	53.3 ± 20.5	.34
1 Year (n=177)	85.0 ± 16.2	83.7 ± 16.6	84.3 ± 16.6	.18
2 Years (n=262)	87.4 ± 16.1	81.2 ± 17.2	84.0 ± 17.0	.002
5 Years (n=233)	86.2 ± 16.2	78.5 ± 20.5	82.9 ± 19.2	.002
KOOS Jr				
Baseline (n=464)	67.2 ± 18.3	69.1 ± 18.6	68.6 ± 17.3	.26
1 Year (n=160)	89.4 ± 13.2	87.8 ± 13.1	88.3 ± 13.6	.25
2 Years (n=275)	89.2 ± 13.9	87.6 ± 13.6	88.2 ± 13.9	.34
5 Years (n=235)	89.1 ± 13.2	85.2 ± 16.7	86.7 ± 15.5	.04
Kujala				
Baseline (n=481)	59.0 ± 23.2	61.9 ± 20.7	60.7 ± 21.8	.15
1 Year (n=164)	89.2 ± 13.8	86.0 ± 12.0	86.8 ± 14.0	.09
2 Years (n=276)	91.4 ± 12.0	88.3 ± 13.7	89.7 ± 13.0	.05
5 Years (n=242)	89.5 ± 13.1	84.6 ± 17.8	86.9 ± 15.9	.01
Pedi-FABS				
Baseline (n=481)	13.0 ± 10.2	12.1 ± 10.2	12.5 ± 10.1	.35
1 Year (n=176)	14.9 ± 9.3	15.9 ± 9.3	15.4 ± 9.3	.31
2 Years (n=275)	14.9 ± 9.0	15.3 ± 9.8	15.0 ± 9.5	.76
5 Years (n=236)	12.5 ± 8.3	11.9 ± 9.7	12.4 ± 9.1	.56

**Table 4. Complications by Graft Type**

Variables	Semi T	Gracilis	Other	Semi T	Gracilis	Other	Total	<i>P</i>
	Auto	Allo	Auto	Allo	Auto	Allo		

Subluxation or Dislocation (%)	25.0%	12.0%	10.0%	9.0%	44.7%	21.8%	30.5%	.34
Revision Procedure (%)	10.0%	0%	11.1%	9.0%	44.7%	21.8%	30.5%	.34