

Patients Who Undergo Bilateral Medial Patellofemoral Ligament Reconstruction Return to Sport at a Similar Rate as Those that Undergo Unilateral Reconstruction

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INTRODUCTION: Lateral patellar instability is a debilitating condition not only to athletes, but also to a wide range of highly active individuals. Many of these patients experience symptoms bilaterally, though it is unknown how these patients fair with return to sports following a second medial patellofemoral ligament reconstruction (MPFLR). The purpose of this study is to evaluate the rate of return to sport following bilateral MPFLR compared to a unilateral comparison group.

METHODS:

Patients who underwent primary MPFLR with minimum 2-year follow up were identified from 2014 to 2020 at an academic center. Those who underwent primary MPFLR of bilateral knees were identified. Pre-injury sport participation and Tegner score, Kujala score, Visual Analog Score (VAS) for pain, satisfaction, and MPFL-Return to Sport after Injury (MPFL-RSI) scale were collected. Bilateral and unilateral MPFLRs were matched in a 1:2 ratio based on age, sex, body mass index, and concomitant tibial tubercle osteotomy (TTO). A subanalysis was performed regarding concomitant TTO.

RESULTS: The final cohort consisted of 63 patients, including 21 patients who underwent bilateral MPFLR, matched to 42 unilateral patients at mean follow up of 47 ± 27 months. Patients who underwent bilateral MPFLR returned to sport at a rate of 62% at a mean of 6.0 ± 2.3 months, compared to a unilateral rate of 72% at 8.1 ± 4.2 months (n.s.). The rate of return to pre-injury level was 43% among bilateral patients and 38% in the unilateral cohort. There were no significant differences in VAS pain, Kujala, current Tegner, satisfaction, and MPFL-RSI scores between cohorts. Approximately half of those (47%) who failed to return to sport cited psychological factors and had significantly lower MPFL-RSI scores (36.6 vs. 74.2, p=0.001).

DISCUSSION AND CONCLUSION:

Patients who underwent bilateral MPFLR returned to sports at a similar rate and level compared to a unilateral comparison group. MPFL-RSI was found to be significantly associated with return to sport. This study suggests that while functional outcomes may be marginally poorer in patients undergoing bilateral MPFLR, these patients were still able to return to sport at a similar rate and had similarly high satisfaction compared to those undergoing a single procedure. For this patient population, surgeons may use the results of this study to appropriately align patient expectations for return to sport and emphasize the importance of timely and diligent adherence to physical therapy to mitigate postoperative stiffness.

TABLE 1
Patient Demographics & Intraoperative Characteristics

Demographics	Bilateral	Unilateral	p-value
N	21	42	
Sex, n (% female)	11 (52.4)	22 (52.4)	n.s.
Age (years)	24.6 ± 7.6	22.4 ± 6.0	n.s.
Body mass index	27.2 ± 5.6	26.4 ± 5.9	n.s.
Acute patellar dislocation, n (%)	2 (9.5)	3 (7.1)	n.s.
Follow-up (months)	42.2 ± 28.4	46.8 ± 29.5	n.s.
Preoperative Cartilage Status, n (%)			
Any chondral damage	13 (61.9)	26 (61.9)	n.s.
Location of lesion, n (%)			
Medial patellar facet	8 (38.1)	18 (42.9)	n.s.
Central patella	3 (14.3)	6 (14.3)	n.s.
Lateral patellar facet	0 (0)	2 (4.8)	n.s.
Trochlea	4 (19.0)	2 (4.8)	n.s.
Lateral femoral condyle	1 (4.8)	4 (9.5)	n.s.
Average lesion size (cm ²)	3.27 ± 3.42	3.36 ± 2.43	n.s.
Lesion grade*			
Grade 1-2	9 (42.9)	10 (23.8)	n.s.
Grade 3	4 (19.0)	10 (23.8)	n.s.
Grade 4	3 (14.3)	8 (19.0)	n.s.
Concomitant procedures, n (%)			
Lateral release/medial imbrication	12 (57.1)	28 (66.7)	n.s.
Tibial tubercle osteotomy (AMZ)	11 (52.4)	22 (52.4)	n.s.
Partial meniscectomy	2 (9.5)	1 (2.4)	n.s.
Chondroplasty	11 (52.4)	22 (52.4)	n.s.
Osteochondral allograft	3 (14.3)	5 (11.9)	n.s.
Cartilage biopsy	1 (4.8)	3 (7.1)	n.s.
Loose body removal	5 (23.8)	11 (26.2)	n.s.

*Kujala lesion were assessed intraoperatively using an arthroscopic probe and was graded according to the Outerbridge classification [11].
Abbreviations: AMZ anteromedialization

TABLE 2
Reasons for Lack of Return to Sport at the Same or Higher Pre-Injury Level

Cohort	Reason for Lack of Return	No Return, n (%)	Lower Level, n (%)	Overall, n (%)
Bilateral	Physical Symptoms	4 (19.0)	3 (7.0)	7 (16.0)
	Pain	1 (4.8)	-	1 (4.8)
	Fear of Re-Injury	3 (14.3)	-	3 (14.3)
	Lack of Confidence	-	1 (2.0)	1 (4.8)
Unilateral	Physical Symptoms	4 (9.6)	5 (11.3)	9 (21.6)
	Pain	1 (2.4)	-	1 (2.4)
	Fear of Re-Injury	3 (7.1)	6 (14.0)	9 (21.6)
	Lack of Confidence	3 (7.1)	3 (6.8)	6 (14.3)
Lifestyle Factors	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-

TABLE 3
Clinical Outcomes

Variable	Bilateral	Unilateral	p-value
VAS pain	1.5 ± 2.0	1.1 ± 2.1	n.s.
VAS pain during sport	2.8 ± 2.3	2.4 ± 3.0	n.s.
Satisfaction (%)	85.1 ± 19.6	85.4 ± 26.5	n.s.
Willing to repeat, % (n)	85.7 (18)	78.6 (35)	n.s.
Kujala	78.1 ± 18.0	86.5 ± 16.1	n.s.
Tegner [†] -pre-injury	6 (2-10)	6 (2-10)	n.s.
Tegner [†] -current	5 (1-7)	5 (2-10)	n.s.
MPFL-RSI	50.9 ± 27.4	60.6 ± 29.8	n.s.
Recurrent instability, % (n)	28.6 (6)	21.4 (9)	n.s.
Subsequent MUA, % (n)	19.0 (4)	11.9 (5)	n.s.

[†]Tegner scores are reported as median (range).
*Assessed using question #11 of the Kujala questionnaire [11].
Abbreviations: VAS visual analog score, MPFL-RSI Medial Patellofemoral Ligament Return to Sport after Injury Score, MUA arthroscopic under anesthesia

TABLE 4
Comparison of Patient Reported Outcomes for Return to Sport, Sex, Concomitant Tibial Tubercle Osteotomy, and Tegner Pre-Injury

Cohort	Subgroup	n (%)	Rate of Return*	Kujala	Tegner Pre-Injury	Tegner Current	MPFL-RSI
Bilateral	Return to Sport	13 (61.9)	62%	78.1	5	5	50.9
	Did not return to sport	8 (38.1)	38%	78.1	5	5	50.9
	Female	6 (28.6)	62%	78.1	5	5	50.9
	Male	7 (33.3)	62%	78.1	5	5	50.9
Unilateral	Return to Sport	30 (71.4)	72%	86.5	6	6	60.6
	Did not return to sport	12 (28.6)	28%	86.5	6	6	60.6
	Female	15 (35.7)	72%	86.5	6	6	60.6
	Male	15 (35.7)	72%	86.5	6	6	60.6

*Return to sport defined as the return to a higher level of sport than pre-injury. Patients who returned to a lower level of sport were considered as not returning to sport.
†Concomitant tibial tubercle osteotomy. MPFL-RSI Medial Patellofemoral Ligament Return to Sport after Injury Score