

Comparison of Functional Outcomes Following Isolated MPFL Reconstruction and MPFL with Bony Procedures: A Matched Cohort Analysis

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INTRODUCTION: Patellar instability is a complex condition, driven by multifactorial osseous and soft tissue abnormalities. The primary surgical treatment of recurrent lateral patellar instability is medial patellofemoral ligament reconstruction (MPFLr), however, the threshold for addressing other bony malalignments or trochlear dysplasia remain unclear. At present, the impact of the performance of additional bony procedures on the rate and absolute change in functional outcomes postoperatively, rates of recurrent instability, complications, and reoperations remain unclear. Therefore, the primary objective was to compare these outcomes between a matched cohort of patients undergoing isolated MPFLr and a cohort undergoing MPFLr with concomitant bony realignment procedures.

METHODS: A retrospective review was performed to identify patients who underwent MPFLr between 2015 and 2023 at a single academic institution. Patients were excluded if they presented with a “jumping J-sign,” underwent concomitant trochleoplasty, or had less than two years of clinical follow-up. Patients were differentiated into two cohorts based upon having undergone (1) isolated MPFLr, and (2) MPFLr with concomitant tibial tubercle osteotomy (TTO) or distal femoral osteotomy (DFO). The cohorts were propensity score-based matched based tibial tubercle–trochlear groove (TT-TG) distance, Caton-Deschamps Index (CDI), and trochlear bump height. Patient charts were reviewed for demographic variables, including age at the time of surgery, sex, body mass index (BMI), and skeletal maturity. Preoperative radiographs and magnetic resonance imaging (MRI) were evaluated for matching criteria and additional variables of interest. International Knee Documentation Committee (IKDC) score, KOOS Jr., and Kujala score were assessed for mean values and change from baseline at 6 months, 1 year, 2 years, and at final follow-up. Clinical failure was defined as any recurrent subluxation or dislocation event following surgery. Complications and additional procedures were recorded for all patients.

RESULTS: 31 patients who underwent isolated MPFLr and 31 patients who underwent MPFLr with a concomitant bony alignment procedure (MPFL+) were compared for final analysis. Isolated and MPFL+ demonstrated no significant difference between baseline PRO values. No significant differences were found between groups for raw scores or change from baseline at all follow up time points. At final follow-up (Isolated MPFLr: mean 2.77±1.23 years; MPFL+: 2.97 ± 1.24 years) both groups experienced significant improvements ($P<.001$) from baseline for all three surveys. Postoperatively, four patients in the isolated MPFL group experienced recurrent dislocation or subluxation events. No patients in the MPFL+ group reported recurrent instability; however, two patients experienced peri-implant tibia fractures requiring open reduction and internal fixation.

DISCUSSION AND CONCLUSION: In a matched cohort of patients undergoing surgery to address recurrent patellar instability, the performance of concomitant bony realignment procedures, when indicated, resulted in no significant differences in functional outcomes postoperatively, decreased rates of recurrent instability, and increased rates of complications. Surgical treatment should be individualized to address the primary contributing anatomic risk factors, while balancing the morbidity of additional procedures.

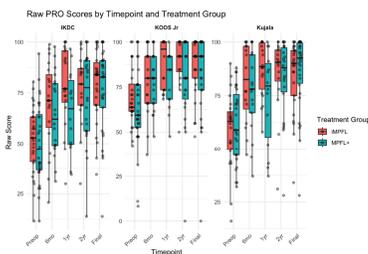


Figure 1: Comparison of average patient reported outcomes scores at baseline, 6 months, 1 year, 2 year, and final follow-up

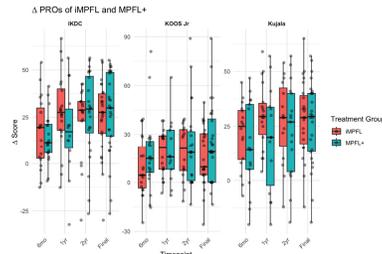


Figure 2: Comparison of average change in patient reported outcomes scores from baseline to 6-month, 1-year, 2-year, and final follow-up.

	IKDC		KOOS JR		Kujala	
	MPFL	MPFL+	MPFL	MPFL+	MPFL	MPFL+
Pre-Operative	51.57 ± 16.93	49.94 ± 19.31	68.67 ± 15.92	63.28 ± 22.62	58.79 ± 17.27	61.19 ± 17.42
6-month	69.99 ± 22.08†	63.97 ± 19.40†	78.64 ± 18.54†	78.13 ± 15.28†	80.94 ± 18.23†	76.47 ± 19.26†
1-year	78.28 ± 19.90†	65.52 ± 20.21	87.86 ± 13.45†	78.28 ± 15.92	87.23 ± 13.91†	73.86 ± 22.30
2-year	76.43 ± 18.25	73.06 ± 22.01	88.46 ± 13.60	79.24 ± 24.15	84.69 ± 18.23	82.59 ± 18.47
Final	78.03 ± 18.25	76.22 ± 21.30	86.28 ± 15.89	82.97 ± 23.19	84.32 ± 16.75	86.05 ± 17.51
	Δ IKDC from Baseline		Δ KOOS JR from Baseline		Δ Kujala from Baseline	
	MPFL	MPFL+	MPFL	MPFL+	MPFL	MPFL+
6-month	16.67 ± 18.64	13.86 ± 13.28	9.64 ± 18.13	17.56 ± 23.18	21.25 ± 15.18	15.82 ± 20.17
1-year	27.88 ± 20.38	17.90 ± 23.39	18.21 ± 14.39	19.36 ± 19.92	29.72 ± 14.93	19.14 ± 24.00
2-year	22.73 ± 20.00	26.17 ± 22.71	18.59 ± 16.87	22.46 ± 23.37	27.33 ± 18.97	22.94 ± 21.69
Final	24.92 ± 19.35	27.82 ± 21.86	16.05 ± 18.49	23.95 ± 24.63	28.43 ± 17.58	26.60 ± 19.29

† Mean final time-point (MPFL: 2.77±1.23 & MPFL+: 2.97 ± 1.24 years after surgery); IKDC, International Knee Documentation Committee Subjective Knee Form; KOOS JR, Knee Injury and Osteoarthritis Outcome Score for Joint Replacement; † Significant improvement from previous timepoint.