Concomitant Anterior Medializing Osteotomy and MPFL Reconstruction Improves Patella Tilt When Compared to MPFL Reconstruction Alone: A Retrospective Case Controlled Cohort Study of Patients with Elevated TT-TG

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INTRODUCTION: Understanding how surgical procedures influence risk factors associated with patellar instability can help guide surgeons when planning treatments for individual patients. This study sought to understand the radiographic outcomes for pediatric patients undergoing medial patellofemoral ligament reconstruction (MPFLR) with or without an anterior medializing osteotomy (AMZ).

METHODS: Utilizing a prospective database of 274 patellofemoral instability patients who underwent MPFLR ± AMZ by one of two orthopedic surgeons at a single institution, those who underwent MPFLR+AMZ were identified. Patients with a history of previous ipsilateral knee surgery, obligate or fixed patellar dislocations, syndromic patients, and no pre-operative MRI were excluded. Pre-operative and post-operative MRIs were used to measure tibial-tuberosity to trochlear groove (TT-TG) distance, while radiographs were used to measure patellar tilt (tilt). Patients were matched based on age at surgery (within 2 years) and pre-operative TT-TG distance (within 2 mm) to a comparison cohort of patients who underwent MPFLR without osseous procedures (iMPFLR).

RESULTS: A total of 56 patients were included in this study (28 per group). The mean age of the cohort was 15.5±2.0 years and was similar between both groups (15.9 vs. 15.1 years, p=0.143). When comparing the two cohorts, significant pre- to post-operative improvements in tilt for both MPFLR+AMZ (6.6 degrees, p<0.001) and iMPFLR (3.9 degrees, p=0.013) were noted. Post-operatively, MPFLR+AMZ had significantly less patellar tilt than isolated MPFLR (13.2 ± 5.5 vs. 16.5 ± 4.4, p=0.017).

DISCUSSION AND CONCLUSION: This study found that post-operative patellar tilt was significantly lower in patients who underwent MPFLR+AMZ when compared to patients that underwent isolated MPFLR. These findings suggest that surgeons seeking to correct tilt in pediatric patients with patellar instability might strongly consider MPFLR with AMZ. Future studies should aim to analyze additional outcomes and patient reported measures to determine the success of these procedures.

Figure 1. Pre-operative and post-operative TT-TG and tilt values by surgical cohort. Significant differences based off paired samples t-tests are denoted with a "*".

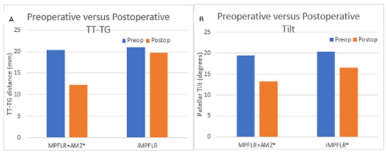

Table 1: Demographic information for MPFLR+AMZ and iMPFLR cohorts. Chi square tests were used to compare categorical variables while independent samples t-tests were used to compare continuous variables. Significant differences are denoted by "*".

	MPFLR + AMZ	iMPFLR	P-value
Total Number	28	28	
Age	15.9 ± 2.0	15.1 ± 2.1	0.143
Laterality:			
Right	12 (42.9%)	13 (46.4%)	
Left	16 (57.1%)	15 (53.6%)	0.500
Sex:			
Male	5 (17.9%)	9 (32.1%)	
Female	23 (82.1%)	19 (67.9%)	0.178
Proximal Tibial Physis:	0 (0%)	10 (35.7%)	
Open	8 (28.6%)	8 (28.6%)	**0.001***
Closing	20 (71.4%)	10 (35.7%)	
Closed			
Lateral Release	9 (32.1%)	4 (14.3%)	0.205
Post-operative Instability:	2 (7.7%)	2 (7.7%)	1.000
Future Surgery:			
Removal of Hardware	7 (25%)	1 (3.6%)	
Tibial ORIF	1 (3.6%)	1 (3.6%)	
Chondroplasty	0 (0%)	2 (7.1%)	0.146
Removal of Loose body	0 (0%)	1 (3.6%)	
ACLR	0 (0%)	1 (3.6%)	
MPFL+AMZ	0 (0%)	1 (3.6%)	

Table 2: Summary of TT-TG and tilt measurements for MPFLR+AMZ and iMPFLR. Significant differences between groups are denoted with a "*". Data presented as mean ± standard deviation.

	MPFLR + AMZ	iMPFLR	p value
Number	10	15	
Time between Pre-operative and Post-operative (months)	22.2 ± 24.7	15.2 ± 12.5	0.360
Pre-operative TT-TG (mm)	21.2 ± 3.5	21.1 ± 3.4	0.905
Post-operative TT-TG in (mm)	12.3 ± 4.1	19.8 ± 4.2	**<0.001***
TT-TG Difference (mm)	8.1 ± 4.5	1.1 ± 2.7	**0.001***
Number	27	26	
Time between Pre-operative and Post-operative (months)	5.0 ± 5.2	4.7 ± 4.2	0.841
Pre-operative Tilt (°)	19.8 ± 6.2	20.4 ± 8.8	0.761
Post-operative Tilt (°)	13.2 ± 5.5	16.5 ± 4.4	**0.017***
Tilt Difference (°)	6.2 ± 5.6	3.9 ± 7.4	0.194