# Changes in Patellar Height Following Isolated MPFL Reconstruction is Largely Related to Post-Operative Quadriceps Dysfunction

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**Disclosures:** Divesh Sachdev (N), Cade Smelley (N), Christopher Song (N), Daniel Shinn (N), Nicolas Lemme (N), Adam Yanke (N) (Information for disclosures can be taken from the online abstract system after entering ALL authors.)

INTRODUCTION: To assess whether isolated medial patellofemoral ligament reconstruction (MPFLR) affects patellar height, measured via the Caton-Deschamps Index (CDI), and determine association with preoperative patella alta and quadriceps dysfunction.

METHODS: We performed a retrospective review of 81 knees (30 males, 51 females; mean age 21.0 ± 8.7 years) that underwent isolated MPFLR (2016–2022). Inclusion criteria included ages 13–62, patellofemoral instability, no prior ipsilateral surgery, and no bony procedures. Caton-Deschamps Index (CDI) was measured from standardized lateral radiographs using JOINTS software. Patella alta was defined as CDI >1.2. Quadriceps function was assessed via straight leg raise (SLR). Analyses included Wilcoxon signed-rank, Mann-Whitney U, Kruskal-Wallis, and linear regression. Institutional review board approval was obtained.

RESULTS SECTION: Postoperative X-rays were obtained an average of 38.04 ± 55.53 days after surgery. Following isolated MPFLR, the mean CDI significantly decreased from 1.14 to 1.06 ($\Delta = -0.079 \pm 0.092$, $p < 0.001$). Patients with patella alta showed greater reduction (1.32 to 1.20, $\Delta = -0.121 \pm 0.092$, $p < 0.001$) than those without (1.06 to 1.00, $\Delta = -0.059 \pm 0.085$, $p < 0.001$), with a significant group difference ($p = 0.004$). A weak but significant correlation existed between pre-op CDI and CDI change ($R^2 = 0.113$, $p = 0.002$). CDI reduction varied by quadriceps status: SLR without lag ($\Delta = -0.047 \pm 0.072$), SLR with lag ($\Delta = -0.094 \pm 0.094$), and no SLR ($\Delta = -0.162 \pm 0.082$), all $p < 0.001$; between-group differences $p < 0.05$. Among normal SLR patients, a CDI >1.12 (median) had a larger, non-significant reduction (–0.086 vs. –0.027, $p = 0.07$). Among SLR with lag, CDI >1.12 yielded significantly greater reduction than CDI <1.12 (–0.141 vs. –0.033, $p < 0.001$).

DISCUSSION: Isolated MPFLR produces a slight but consistent reduction in patellar height. Larger decreases were observed in patients with patella alta and quadriceps inactivation, suggesting both anatomical and functional factors contribute. These results highlight the importance of accounting for quadriceps activation when interpreting early postoperative radiographs.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): Isolated MPFLR results in modest distalization of the patella, particularly in patients with patella alta. Surgeons should consider quadriceps activation when assessing radiographs to avoid overestimating distalization.

| Cohort | N | Preoperative CDI | Postoperative CDI | p-value (Pre vs. Post) | Mean Change in CDI (± SD) |
|---|---|---|---|---|---|
| **SLR** | 30 | 1.12 ± 0.13 | 1.07 ± 0.13 | **0.001** | -0.047 ± 0.072 |
| **SLR with LAG** | 32 | 1.160 ± 0.17 | 1.07 ± 0.15 | **< 0.001** | -0.094 ± 0.094 |
| **No SLR** | 10 | 1.099 ± 0.15 | 0.94 ± 0.13 | **< 0.001** | -0.162 ± 0.082 |