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Distalization of Tibial Tubercle for Patella Stabilization: Does Length of Distalization or Residual Patella Alta Effect Outcome?

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Summary:

Distalizing the tibial tubercle up to 15mm did not increase fracture risk, however there was an increase in arthrofibrosis requiring manipulation.

Abstract:

Introduction

Distalization of the tibial tubercle (DTT) is a surgical procedure to help stabilize the patella when patella alta is present. The purpose of this study is to:

- 1) evaluate the accuracy of our operative intervention (i.e. how often is patella height normalization achieved).
- 2) correlate post-operative (residual) patella alta with recurrent patellar instability
- 3) correlate the mm of distal displacement with negative outcomes

Methods

Data was collected retrospectively on consecutive patients who underwent DTT as part of their surgical procedure for recurrent lateral patella dislocation. All patients had concurrent medial patella ligament reconstruction (MPFLR), performed by a single surgeon between 2009-2015. Data collected included demographics, pre-and post-operative imaging measurements related to patella alta and trochlear dysplasia on MRI and plain radiographs, recurrent lateral patella dislocations, and complications including fracture and knee arthrofibrosis. Surgical planning including the assessment of the Caton-Deschamps index (CD) on sagittal radiographic imaging. The surgical goal was to have a final CD between 1.0-1.2, or a maximum distance moved of 15 mm in cases of severe patella alta. When CD was within normal limits due to patellar anatomy, we used as a proxy the patellar-trochlear index (PTI), aiming for a PTI of 25% judged intra-operatively.

Results

89 patients underwent DTT over a 7-year period. There were 21 (24%) males/68 (76%) females. Mean (range): age 21 (13-45), BMI 25.8 (17-44.6). Pre-op imaging measurements were: IS ratio 1.5 (1.18-2.06), CD ratio 1.4 (1.05-1.93), lateral patella tilt 24.7° (1°-53°), TT-TG 18.6 mm (8-28), sulcus angle 158° (123-180), PTI 29% (5-70).

Post-operative mean CD was 1.09 (0.92-1.67). The amount of distalization averaged 9.8 (range 4 to 15). 13 patients had residual patella alta (CD>1.2). One patient with residual patella alta re-dislocated (CD=1.25). The most extreme residual patella alta (1.67) had a pre-op CD of 1.97 and was distalized 15mm. There was no patellar baja.

6 patients (6%) had frank recurrent patellar dislocation; postoperative patella height in this group averaged 1.11

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(1.02 -1.25), indicating that re-dislocation was not due to residual patella alta. Tibia fracture (4%) was not related to mm of distalization; mean (10) /range 8-15mm.

Arthrofibrosis requiring manipulation was needed in 11 patients (13%) whose mean distalization was 11.8 mm (9-15mm). This distance was significantly different ($p=0.009$) from those not requiring manipulation.

Conclusion

Distalization of TT leads to a high rate of normalization of patellar height measurements, with 94% patella stabilization. Residual patella alta was not associated with an increased risk of recurrence ($p=0.57$). Distalizing the tibial tubercle up to 15mm did not increase fracture risk, however there was an increase in arthrofibrosis requiring manipulation.