

## Biomechanical Effects of Mptl Reconstruction – A Comparison With Two Techniques For Mpfl Reconstruction.

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### Summary:

The medial soft tissue complex is a significant restraint against lateral patellar translation. Several reconstructive techniques have been proposed to treat patellofemoral instability. Non-anatomic techniques may adversely affect patellofemoral contact pressures and stability.

### Abstract:

Propose: To evaluate the biomechanical characteristics of MPTL reconstruction in comparison with 2 techniques for MPFL reconstruction. We evaluated restoration of patellar stability and changes in patellofemoral contact pressures.

Hypothesis: We hypothesized that a non-anatomic technique using distal tendon transfer may alter patellar tracking, leading to an increase in patellofemoral contact pressures. Conversely, anatomic reconstruction would result in patellofemoral pressures and stability that are closer to the native situation.

Methods: Experimental laboratory study in eight human cadaveric knees (mean age 46.3 years, range 41-50; 5 female). None had patellofemoral cartilage lesions or trochlear dysplasia as evaluated by XR and MRI exam. The specimens were secured in a load apparatus, and the quadriceps was loaded in line with the femoral shaft (force=178N). Contact pressures were measured using I-scan sensor (Tekscan Inc, Boston, MA) at 30, 60 and 90 degrees. The sensor was placed in the patellofemoral joint through a proximal approach between femoral shaft and quadriceps tendon. TekScan data were analyzed with TekScan software (Version 4.23, TekScan) to determine peak and mean contact pressures on the medial and lateral facets. Patellar displacement was evaluated with the knee positioned at 30 degrees of flexion and 9N of quadriceps load, then a lateral force (22N) was applied, and the lateral translation was measured using Microscribe digitizer. The same protocol was used for each condition: native, medial restraint lesion, medial patellofemoral ligament reconstruction (MPFLr) using gracilis tendon, MPFLr using quadriceps tendon transfer, and medial patellotibial ligament reconstruction (MPTLr) using patellar tendon transfer.

Results: No statistical difference was found for mean and peak contact pressures, medial or lateral, among all 3 techniques. However, while both techniques of MPFLr were able to restore the medial restraint, MPTLr failed to restore patellar lateralization to the native condition (Mean lateralization of the patella [mm]: native: 9.48; lesion: 22.05; gracilis: 8.1; quadriceps: 11.32; MPTL: 23.44) ( $p < .001$ ).

Conclusion: Both gracilis tendon MPFLr or quadriceps tendon transfer are effective in restoring medial patellofemoral instability without affecting patellofemoral contact pressures. Although the MPTLr did not increase contact pressures, it failed to restore patellar stability.