

## Effect of Patellar Tunnel Placement on Fracture Risk after MPFL Reconstruction- A Cadaveric Study

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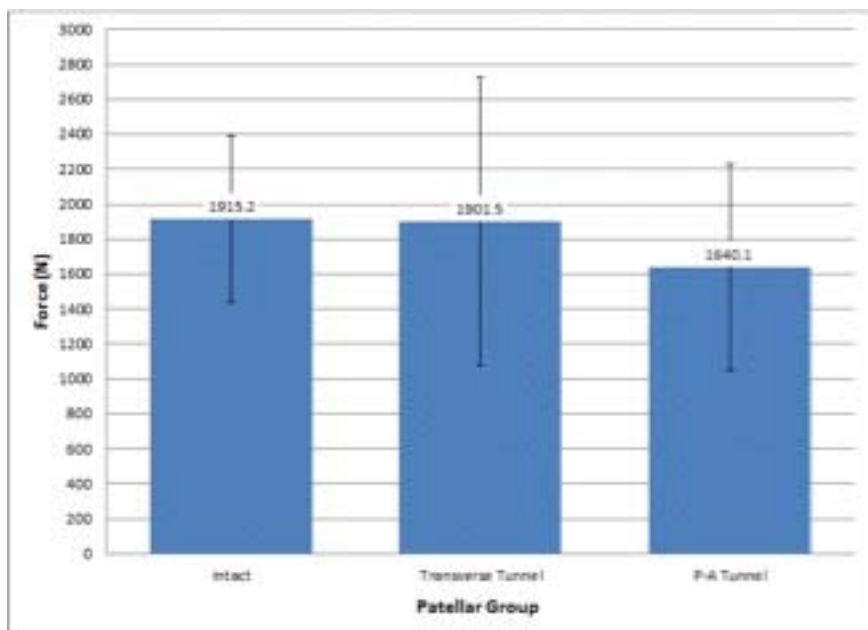
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**Objectives:** Patella fracture is a rare complication after medial patellofemoral ligament (MPFL) reconstruction. Though many of the cases in the literature have been precipitated by trauma, the surgical factors that may lead to a higher risk of fracture are not well understood. The purpose of our study was to determine if transosseous tunnels that exit through the anterior cortex of the patella, and transverse bone tunnels have lower tensile load to failure as compared to control, and may predispose to post-operative patellar fracture.

**Methods:** Fresh-frozen cadaveric human patellas were randomized to one of three groups: a control group with unmodified intact patellas, a group with two transverse tunnels (TT) drilled in the superior third of the patella that did not violate the anterior cortex, and a group with two transversetunnels that breach anterior cortex of the patella (PA). Patellas were connected to a freeze clamp mechanism via the remaining quadriceps and patellar tendons. A load cell was connected in series with the quadriceps clamp to measure maximum load to failure with a maximum load of 9000N. The angle of pull was fixed at 45 degrees, with the patella set in the trochlear groove of a composite synthetic femur. Patellas were cyclically loaded to 500 N for a total of 100 cycles. Specimens that did not fail during cyclic loading were then loaded to failure defined as fracture or tendon rupture. At failure, fluoroscopy was used to confirm a fracture if present and maximum load was recorded. The mean and standard deviation (STD) for each group were recorded. ANOVA and Student-T tests were used to identify significant differences between groups.

**Results:** A total of 26 patellas were randomized and tested in this study. There were 12 male and 14 female patellas ranging in age from 37-95 years. There was no significant difference in the average age among the groups (Mean = 71.4 years, STD = 11.5 years,  $P = 0.96$ ). None of the patellas failed during cyclic loading alone. Control, TT and PA groups failed at 1915 N (STD= 508N), 1901 N (STD= 884N), and 1640 N (STD= 625N) respectively. This represents a 14% difference in means between Control and PA and Control and TT tunnels. There was no statistically significant difference between control and TT ( $p = .969$ ), control and PA ( $p = .321$ ), and TT and PA ( $p = .488$ ). Subset analysis of fractures only through bone tunnels did not affect the significance.

**Conclusion:** Our results show that breaching of the anterior cortex and transosseous tunnels that do not breach the anterior cortex during MPFL reconstruction do not significantly decrease the load to failure when compared to native patellas and, thus, may not pose an increased risk for patellar fracture. Further research is needed to analyze if other surgical factors may predispose to this complication.



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