

Mapping Recovery in Simple and Complex Tibial Plateau Fracture Fixation

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Purpose: The purpose of this study is to determine the trajectory of functional recovery following open reduction and internal fixation (ORIF) of tibial plateau fractures between set time points (0-6 months, 6-12 months, 1-5 years) and to compare this for simple (OTA 41-B) and complex (OTA 41-C) fractures. This information would be useful for prognostication when counseling patients.

Methods: Patients undergoing tibial plateau ORIF were enrolled into a prospective database at a Level I academic trauma center between 2005-2015. Functional outcome using the Short Form-36 Physical Composite Summary score (SF-36 PCS) was collected at baseline, 6 months, and 1 and 5 years postoperatively. The proportion achieving the Minimal Clinically Important Difference (MCID) between time points was calculated. Trajectory of recovery for patients with complex fractures (OTA 41-C) was compared to those with simple patterns (OTA 41-B). Means were compared using paired t tests, proportions using Fisher's exact test. Statistical significance was set at $P < 0.05$.

Results: 188 were enrolled: 129 (68.5%) simple and 59 (31.5%) complex patterns. Mean baseline scores were similar (simple 56.2 vs complex 56.3, $P = 0.9$). Mean SF-36 PCS improved significantly in both groups between 6-12 months ($P < 0.001$) and 1-5 years (simple $P = 0.01$, complex $P = 0.008$). In both groups, the baseline scores were not reached at 5 years. For each time point except 5 years, the SF-36 PCS was significantly higher in the simple group ($P < 0.001$, 5-year $P = 0.1$). The slope of improvement in the SF-36 PCS was steeper in the complex group for both the 6-12 month and 1-5 year periods. At 6 months, there was a significant difference between the groups in the proportion of patients achieving the MCID (simple 76% vs complex 95%, $P = 0.001$) with no difference between 6-12 months (simple 66% vs complex 66%). Between 1-5 years, proportionally more patients achieved the MCID in the complex group (74% vs 60%), although not statistically significant.

Conclusion: For ORIF of tibial plateau fractures, the trajectory of recovery is characterized by an initial decline in function from baseline, a steep improvement in the subsequent 6 months, and ongoing recovery up to 5 years. In the simple patterns, patients achieve higher function by 6 months when compared to the complex patterns. However, the complex patterns demonstrate a steeper trajectory of recovery between 6-12 months and 1-5 years with comparable scores between the groups achieved only at 5 years, suggesting that for complex patterns, recovery occurs more in the later time periods. In both groups, function does not improve to baseline by 5 years.