

## Comparison of Infrapatellar and Suprapatellar Approaches for Intramedullary Nail Fixation of Tibia Fractures

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**Purpose:** There are reports of high rates of malunion with intramedullary nailing through an infrapatellar approach in tibia fractures. Some studies have reported a significantly lower incidence of malalignment using a suprapatellar approach. Traditionally supported in proximal tibia fractures, this has also been reported in distal fractures. The objective of this study is to review all tibia fractures treated with intramedullary fixation and compare the rate of malunion, nonunion, and patient outcome between approaches. We hypothesized that the suprapatellar approach would have a lower rate of malunion and nonunion. Additionally we expected a higher rate of knee pain and lower functional outcome associated with an infrapatellar approach.

**Methods:** A retrospective chart review of tibia fractures treated with intramedullary nail (IMN) fixation from 2008 to 2018 was performed. Patients were included if they were  $\geq 16$  years of age and had follow-up of at least 3 months. Tibia fractures were separated into infrapatellar and suprapatellar groups and compared. Primary outcome measurements included incidence of malunion, nonunion, and infection. Patient-Reported Outcome Measurement Information System (PROMIS) physical function (PF) and pain interference (PI) were used to assess outcome.

**Results:** Of 207 tibia fractures, 101 were treated with an infrapatellar approach and 106 were treated with a suprapatellar approach. The malunion rate using the infrapatellar approach was 20% (n = 20 of 101) compared to 7% (n = 7 of 106) with the suprapatellar approach (P = 0.01). There was a trend of lower malunion in distal tibia fractures treated with a suprapatellar approach when evaluated independently (P = 0.06). There was no significant difference in nonunion or infection. The mean infrapatellar PROMIS PI scores were  $62.1 \pm 6.6$  compared to a significantly lower mean PI score with a suprapatellar approach of  $53.5 \pm 9.3$  (P = 0.01). Subjectively, there was significantly less anterior knee pain associated with a suprapatellar approach (P = 0.01). There was no difference in PROMIS PF scores.

**Conclusion:** The results suggest that IMN fixation of tibia fractures with a suprapatellar approach has a significantly lower rate of malunion regardless of fracture location compared to an infrapatellar approach. Furthermore, subjectively patients have much lower pain incidence and anterior knee pain following suprapatellar IMN fixation.