

Comparing the Suprapatellar and Infrapatellar Approach for Intramedullary Nailing of Tibial Diaphyseal Fractures: Improved Nail Insertion-Point Accuracy But No Difference in Functional Outcome with Suprapatellar Nailing

Navnit S. Makaram, MBChB; James Joe Blater Sheppard, BS; Jun Min Leow, MBChB; John F. Keating, FRCS (Ortho)

Edinburgh Orthopaedics, Edinburgh, UNITED KINGDOM

Purpose: The most common operative management for tibial diaphyseal fractures is intramedullary nailing (IMN). There remains controversy regarding which surgical approach (suprapatellar [SN] or infrapatellar [IN]) is associated with optimal outcomes. The primary objective of this study was to evaluate the radiographic outcomes (nail insertion-point accuracy [NIPA] and incidence of malalignment) of these approaches. Secondary outcomes included clinical and functional outcomes in patients undergoing IMN for tibial diaphyseal fracture treated with SN and IN approaches.

Methods: A retrospective review of our trauma database was performed to identify patients who underwent IMN for tibial shaft fractures between 2012 and 2020 with a minimum of 1-year follow-up. Intraoperative and postoperative radiographs were reviewed to assess NIPA and malalignment. Clinical records and postoperative radiographs were reviewed to evaluate incidence of malunion, nonunion, and other postoperative complications. Functional outcomes were recorded via postal questionnaire.

Results: 214 patients who satisfied our inclusion criteria were identified; 154 (72.0%) patients were treated with IN and 60 (28.0%) treated with SN. The SN and IN groups did not vary significantly in demographic or injury-related variables. At minimum follow-up of 1 year postoperatively SN was associated with significantly improved NIPA compared with IN ($P < 0.001$, 95% confidence interval [CI]: 1.60-3.84). There was no difference in incidence of malalignment ($P = 0.517$), delayed union ($P = 0.235$), or nonunion ($P = 1.00$). Functional outcomes were available for 109 patients (28 with SN and 81 with IN), at mean follow-up of 3.1 years (range, 1.2-6.5). There was no significant difference between SN and IN approaches for mean Lysholm score (67.8 vs 72.3, $P = 0.484$, 95% CI -8.25 to 17.1), Oxford Knee Score (OKS) (35.1 vs 39.0, $P = 0.186$, 95% CI -1.96 to 9.74) or satisfaction (82.0 vs 79.5, $P = 0.604$, 95% CI -12.0 to 7.0). The location of fractures in proximal, middle, or distal third also had no influence on either complication rate or functional outcome (Lysholm, $P = 0.072$; OKS, $P = 0.153$; satisfaction, $P = 0.696$).

Conclusion: SN of tibial diaphyseal fractures is associated with significantly improved NIPA compared with IN. However, this did not translate into any significant observed differences in the incidence of malalignment, healing rates, or overall functional outcome. Both techniques are comparable in outcome and suitable for the majority of tibial fractures. Larger studies of proximal or distal tibial fractures may determine if either technique has an advantage for these fracture locations.