Open Distal Tibial Shaft Fractures: A Retrospective Comparison of Medial Plate Versus Nail Fixation

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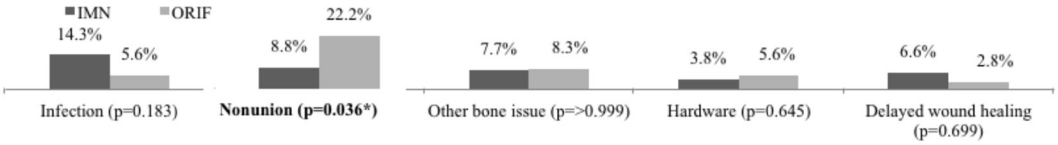
Background/Purpose: The treatment of open distal tibial shaft fractures by either open reduction and internal fixation (ORIF) or intramedullary nailing (IMN) remains controversial. The few studies that have compared IMN and ORIF for distal tibia fractures have found similar complication rates between these two methods. However, these studies focused primarily on closed distal tibia fractures and included only a small number of open distal tibias in their analyses. Therefore, it remains unclear whether IMN or ORIF is associated with better outcomes for open distal tibia fractures. The purpose of this undertaking was to conduct the largest retrospective study to date comparing complication rates for IMN and ORIF of open distal tibia shaft fractures.

Methods: Following IRB approval, patients who were treated for open tibia fractures by ORIF or IMN over a 10-year period were identified through a CPT code search at a Level I trauma center. Patient charts were reviewed for demographic information including age, gender, American Society of Anesthesiologists (ASA) score, hospital length of stay (LOS), and Gustilo grade of open fracture. Only patients who underwent ORIF with a medial plate were included in analysis. Distal tibia fractures were identified by reviewing radiographs for fractures that were 4 to 11 cm from the plafond consistent with prior studies. Patient charts were reviewed to determine if any complications leading to reoperations occurred. Complications were categorized into five groups including hardware pain/prominence, wound-healing issues, infection, nonunion, and other bone issues (segmental defect, malunion, delayed union). A multivariate analysis comparing complication rates while controlling for age, gender, ASA score, hospital length of stay (LOS), and fracture grade was performed.

Results: Of the 216 patients with open distal tibia shaft fractures included in analysis, 83.3% (n = 180: G1, 22; G2, 78; G3, 80) were treated with IMN. 16.7% (n = 36: G1, 10; G2, 16; G3, 10) were treated with medial plating. After controlling for fracture grade, age, gender, ASA score, and LOS, no significant difference in overall complication rate between IMN (31.7%, n = 57) and ORIF (44.4%, n = 16) was found (Table 1). When further breaking down the complications into the five categories mentioned above, the ORIF group was found to have a significantly higher rate of nonunion (22.2%, n = 8) when compared to IMN (8.9%, n = 16). No significant difference in the rate of infection, hardware pain, delayed wound healing, or other bone issues was found (Figure 1).

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.



	IMN (n = 180)	ORIF (n = 36)	*P* Value
Overall complication rate	31.7% (n = 57)	44.4% (n = 16)	0.175

Conclusion: This study, which is the largest retrospective comparison of open distal tibia fractures treated with IMN or medial plating, demonstrates a significantly higher rate of nonunion in the ORIF group. Our findings differ from the current literature demonstrating similar union rates regardless of the implant used. When utilizing plate fixation in such patients as compared to IMN, orthopaedic surgeons should advise their patients of the potential need for further surgeries including early bone grafting.

See pages 99 - 147 for financial disclosure information.