

Utility of Fibular Fixation in Same-Level Tibia and Fibula Fractures: A Randomized Controlled Trial

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Purpose: Treatment with load-sharing reamed intramedullary nailing (rIMN) allows for minimal soft-tissue dissection, early weight-bearing, and preservation of the extraosseous blood supply. For distal one-third fractures of the tibia and fibula, fracture reduction can be more difficult to obtain and maintain with tibial malalignment rates of 20 to 50% being reported. Plating a fibula at the same level as a tibia with a fracture may increase healing times, but has been reported to reduce rates of malalignment increased rotational stability. This study aimed to prospectively quantify union, malreduction rate, and functional outcomes in same-level distal tibia and fibula fractures treated with either fibular plating or not, in combination with tibial rIMN.

Methods: This is a single-center, randomized controlled trial at a Level-I academic trauma center. Adult patients with closed or Gustilo-Anderson Type I-IIIa fractures of the distal third tibia and a same-level or more distal fibula fracture (AO-OTA 42 and 43) were enrolled. All patients underwent tibial rIMN, with randomization to either operative fibular plating (FP group) or nonoperative treatment (NFP group) of the fibula, using computer-generated block randomization with stratification by ASA (American Society of Anesthesiologists) classification. Outcome measures included pain visual analog scale (VAS), Short Form 36 (SF-36), the Ankle-Hindfoot Scale, Hospital for Special Surgery (HSS) Knee Disability Scale, fracture healing, tibial alignment, and adverse events. Independent sample t tests or χ^2 analysis were used for between-group comparisons.

Results: 30 adult patients with a mean age of 37.4 years (SD [standard deviation] = 13.7; 15 female) were included. There was no difference between the groups for age (FP group = 34.8 [SD=15.0] vs NFP group = 40.3 [SD=12.2]; $P = 0.29$), sex (8 females in FP group, 7 females in NFP group), or open fracture incidence (3 in each group). Total operative time was significantly longer for the FP group (mean = 105.5 minutes [SD = 37.4]) compared with the NFP group (mean = 65.8 minutes [SD=17.9]; $P = 0.002$). Mean duration required for fibular plating was 28.1 minutes (SD = 11.9). Significantly less time was required to pass the tibial guidewire in the FP group (4.5 minutes [SD=3.4]) compared to the NFP group (11.8 minutes [SD = 8.7]; $P = 0.01$). There was no significant difference in VAS between treatment groups at any follow-up time point. At 6-month follow-up, tibial union was higher in the FP group (92.3%) compared with the NFP group (76.9%). Higher rates of malalignment were found in the NFP group.

Conclusion: In patients with same-level distal third tibia and fibula fractures, total operative time is longer to add initial fibular plating, but this approach resulted in significantly shorter time to pass the tibial guidewire and lower rates of malalignment. There was no increased patient-reported pain with fibular plating and time to tibial union may be expedited with fibular plate fixation.