

No Difference in Rates of Radiographic Union, Total Complications, or Reoperation Between Nail Versus Plate Fibular Fixation in Adults: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

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Purpose: The purpose of this study is to examine the high-level evidence comparing nail versus plate fixation in adult patients to enhance surgical decision-making and guide future trial methodology to improve patient care.

Methods: A systematic review and meta-analysis of randomized controlled trials (RCT) was performed by searching PubMed, Scopus, CINAHL, and Web of Science from database inception until October 1, 2024. Inclusion criteria were RCTs that compared nail versus plate fixation for fibular fractures in adults. Outcome measures were the risk ratio (RR) with 95% confidence intervals (CI) for rate of radiographic union, total complications, and reoperation.

Results: A total of six RCTs were included from the 730 articles initially retrieved. Patients (n = 486) had an average age of 51.8 ± 11.3 years (87.7% of patients reported) and received either nail (n = 243) or plate (n = 243) fixation for fibular fracture. There was no statistically significant difference in the rate of radiographic union between patients treated with nail fixation (n = 201) and patients treated with plate fixation (n = 204) via meta-analysis of five RCTs (p = 0.8698; RR: 1.00 [95% CI: 0.99–1.01], 98.0% vs 97.5%). In addition, there was no statistically significant difference in the rate of total complications between patients treated with nail fixation (n = 243) and patients treated with plate fixation (n = 243) via meta-analysis of six RCTs (p = 0.1572; RR: 0.52 [95% CI: 0.18–1.44]; 17.3% vs 28.8%), although this finding was possibly underpowered because of the large absolute difference in complication rate. Finally, there was no statistically significant difference in the reoperation rate between patients treated with nail fixation (n = 156) and patients treated with plate fixation (n = 158) via meta-analysis of three RCTs (p = 0.5944; RR: 1.24 [95% CI: 0.28–5.54]; 17.9% vs 15.8%).

Conclusion: There appears to be no statistically significant difference in rate of radiographic union, total complications, or reoperation between nail and plate fixation for distal fibular fractures in adult patients based on high-level data from RCTs.