

Primary TTC Nailing vs. Open Reduction Internal Fixation for Extra-Articular Ankle Fractures in High- Risk Patients

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Purpose: Open reduction and internal fixation (ORIF) are the standard treatment of unstable ankle fractures. However, in high-risk patients, particularly those with diabetes and compromised soft tissues, ORIF is associated with a high complication rate. Primary tibiotalocalcaneal (TTC) nailing has been proposed as an alternative treatment that may reduce complication risk while maintaining stability. This study compares the complication rates between ORIF and TTC nailing in patients with diabetes with ankle fractures.

Methods: A retrospective review of patients with diabetes who underwent surgical management of an acute ankle fracture between 2017 and 2024 was performed. Patients with pilon fractures were excluded. Patients were divided into ORIF and TTC groups, then matched based on age, sex, diabetes, tobacco use, and body mass index (BMI) in a 4:1 fashion. The primary outcome was postoperative complications, including infection, wound- healing delay, fixation failure, and need for revision surgery. Multivariable logistic regression was also used to identify factors associated with complications, taking into account patient age, sex, diabetes, and tobacco use.

Results: In total, 214 patients were included. In the matching analysis, the ORIF (n = 174) group had a complication rate of 41.9%, while the TTC (n = 31) group had a rate of 38.7% (p = 0.803). Re-operations occurred in 19.6% of the ORIF group and 29.7% of the TTC group (p = 0.356). In the multivariable analysis, diabetes was associated with increased complication risk in the ORIF (n = 174) group (OR: 2.20, p = 0.054), but not in the TTC (n = 40) group (OR: 0.63, p = 0.524). Despite a higher reoperation rate in the TTC group, no individual factor significantly increased the risk of reoperation following TTC.

Conclusion: Patients with diabetes who underwent ORIF for unstable ankle fractures demonstrated a trend toward increased complication risk. Although TTC had a similar overall complication rate, it was not significantly affected by diabetes. These findings suggest that TTC nailing may be a viable alternative in high-risk patients with diabetes, potentially mitigating the impact of diabetes on postoperative complications. Further studies with larger sample sizes are warranted to confirm these findings.