

Far Cortical Locking Screw Fixation is More Effective than Standard Cortical Constructs in Distal Femur Fracture Patients at High Risk of Delayed Union

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Purpose: Healing complications remain common after distal femur fracture fixation. Far cortical locking plate constructs do not appear to improve fracture healing for all patients, yet the technology remains promising and frequently utilized. The purpose of this secondary analysis of a multicenter randomized controlled trial (RCT) was to determine if this newer locking technology is warranted for use in certain distal femur fracture populations.

Methods: This secondary analysis of RCT data included 167 adult patients with an OTA type 33A/C distal femur fracture recruited from 15 centers. Eligible fractures were treated with a bridging construct using a lateral locked plate (NCB distal femur plate, Zimmer Biomet USA) and randomly assigned to either far cortical locking screws or standard screws. To determine if the effectiveness of the far cortical locking screws differed across the study population, we developed risk models for the primary outcome of radiographic healing at 3 months and secondary outcomes of 3-month FIX-IT score and major reoperation within 12 months. We then stratified the sample into risk tertiles to determine if the treatment effects differed according to the patient's baseline risk.

Results: Radiographic healing occurred at 3 months in 96 of 167 patients (57%). The baseline risk of delayed healing significantly modified the effect of far cortical locking screws on 3-month radiographic healing ($P < 0.001$). Specifically, far cortical locking screws increased radiographic healing by 29% in high-risk patients (64% vs 35%, $P = 0.04$) but did not improve radiographic healing rates in medium-risk patients ($P = 0.46$) or low-risk patients ($P = 0.34$). High-risk patients were uniquely characterized by a comparatively high proportion of obesity (54%), diabetes (41%), and smoking (38%). The effect of far cortical locking screws on our secondary outcomes yielded similar results.

Conclusion: Far cortical locking screw fixation improves clinical and radiographic healing in distal femur fracture patients at high risk of delayed union. The use of this newer locking technology for the most challenging distal femur fracture cases treated with a lateral locking plate appears warranted.