

Nail Plate Combination Outperforms Single Device Constructs in Supracondylar Distal Femur Fractures: A Retrospective Comparative Analysis.

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Purpose: The purpose of this study was to investigate clinical, radiographic, and patient-reported outcomes following surgical intervention for distal femur fractures (DFFs) among patients undergoing fixation with a locked lateral plate (LLP), retrograde intramedullary nail (rIMN), or nail-plate combination (NPC).

Methods: We conducted a retrospective review at a single, academic, tertiary Level I trauma center. The inclusion criteria were patients with distal femur fractures (OTA/AO 33) treated surgically with LLP, rIMN, or NPC between January 2011 and December 2023 with a minimum follow up of 9 months or until reoperation. Exclusion criteria were pathologic fractures and patients younger than age 18 years. Radiographic fracture healing, complication rates, weightbearing status, length of stay, and patient-reported outcomes using the Patient-Reported Outcomes Measurement Information System (PROMIS) were investigated. Multivariable regression models were employed to identify predictors of non-weightbearing status, discharge disposition, and postoperative complications.

Results: A total of 402 patients was included, with 293 treated with LLP, 67 with rIMN, and 42 with NPC constructs. The NPC cohort demonstrated significantly higher rates of immediate postoperative weightbearing as tolerated (WBAT) ($p < 0.01$), higher rates of discharge to home ($p = 0.04$), and lower rates of gait impairment at 6 months postoperatively ($p = 0.03$) compared to LLP and rIMN cohorts. There were no significant differences in fracture union rates ($p = 0.51$) or hardware failure ($p = 0.81$) across groups. NPC constructs were associated with increased intraoperative blood loss ($p < 0.01$) and postoperative transfusion requirements ($p = 0.02$). PROMIS Physical Function scores were higher in the NPC cohort at 6 weeks postoperatively ($p < 0.01$), but no differences were observed at the 3 month to 1 year time points.

Conclusion: NPC constructs for distal femur fractures allows for earlier postoperative mobilization with improved functional recovery, especially in patients with complex fracture patterns, without compromising union or complication rates. However, compared to single device constructs, NPC was associated with longer surgical times and greater intraoperative blood loss. These findings support NPC as a valuable fixation strategy, particularly for patients who would benefit from early mobilization.