## Implant Selection in Distal Femur Fractures: An Analysis of Alignment and Outcomes

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INTRODUCTION: Periarticular distal femur fractures can be surgically managed with intramedullary nailing (IMN), plate fixation, or a combination of both. However, indications and outcomes of each strategy are not well-defined. This study compared alignment, outcomes, and complications among these three techniques.

METHODS: A retrospective review at a level one trauma center evaluated patients with OTA 33A-C fractures treated operatively between 2018-2022. Eligible patients (N=137) were >18 years old, fixed with IMN (N=71), plate (N=27), or both (N=39), with minimum 6 months follow-up. Anatomic angles (aPDFA, aLDFA) were measured intra-operatively and at final follow-up. Outcomes included time to union (mRUST > 10), re-operations and complications.

RESULTS: Older patients more commonly received an IMN+Plate (61 years; IQR 51-72) or plate (61 years; IQR 50-68) than IMN alone (54 years; IQR 38-62). There were no significant differences in gender, BMI, smoking status, substance abuse history, or Charlson comorbidity index. There were no significant differences in implant choice for open fractures (N=46) when compared to closed. There was no difference in the change in coronal or sagittal alignment at final follow-up based on index implant, and for healed fractures there was no difference in time to union between the three groups. Within our average follow-up period (317 days), 89.7% of IMN+Plate patients achieved union, compared to only 70.4% of IMN and 66.7% of plate patients. There was no difference in short-term re-operation rates between IMN (21.1%), plate (26%), and IMN+Plate (18%).

DISCUSSION AND CONCLUSION: A combination of IMN+Plate may lead to earlier radiographic union when compared to single implant fixation. However, there was no difference in maintenance of alignment or short-term reoperation when compared to IMN alone.