Does the Distal Nail Position Really Impact the Rates of Misalignment and Bone Union in Distal Tibial Fractures?

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Purpose: High rates of misalignment have been reported in the treatment of distal tibial fractures with intramedullary nailing. The purpose of this study was to evaluate the impact of distal nail placement on misalignment and healing rates in distal tibial fractures.

Methods: All patients with fractures of the distal third of the tibia, treated with intramedullary nailing between 2015 and 2021, and a minimum follow-up of 12 months, were reviewed. Distal nail positioning was determined according to Triantafilou zones. These positioning zones were related to misalignments (alignment greater than or equal to 3°) and bone union disorders (delayed union, nonunion).

Results: Of the 62 patients included, 56 (90.3%) consolidated without additional procedure, 3 (4.8%) with dynamization, and 3 (4.8%) presented nonunion. 21 (33.8%) had misalignment, with valgus in the coronal plane being the most frequent (76.19%). In patients with and without misalignment, the most frequent distal nail position was 2-2 in 47.6% and 80.5%, respectively (P = 0.01). In multivariate analysis, distal nail placement in the 2-2 zone showed a significant protective effect against misalignment (odds ratio [OR] 0.18, P = 0.018), while nail placement in the 3-2 zone generated a significant risk of misalignment (OR 18.55, P = 0.009).

Conclusion: In intramedullary nailing of distal tibial fractures, distal nail placement slightly lateral in the coronal plane and slightly posterior in the sagittal plane (Triantafilou zone 2-2) allows high percentages of alignment to be obtained. Placement medial to this point in the coronal plane is associated with more significant misalignment and should be avoided.