Plate vs. Nail: Is there a More Effective Implant for Extreme Tibia Fractures?

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Purpose: Our objective was to determine differences in outcomes among "extreme" tibial metaphyseal fractures treated with intramedullary nailing (IMN) or plate osteosynthesis.

Methods: Two board-certified orthopaedic trauma surgeons reviewed 545 prospectively collected patients to identify extreme tibial shaft fractures (defined as most proximal or distal segments that involved or would have involved the area encompassed by the nail locking bolts). 51 patients were identified; 25 patients treated with an intramedullary nail were compared to 26 patients treated with plate and screws for similar patterns. Data collected included patient demographics, surgical details, and outcomes. Cohorts were compared using Fisher's exact test, independent T tests, and multivariable linear regression.

Results: The mean age of all patients was 46.73 years. There were no differences in American Society of Anesthesiologists (ASA) score, Charlson Comorbidity Index (CCI) score, age, male/female composition, or body mass index (BMI) between cohorts. There were no differences in low- versus high-energy mechanism of injury between cohorts; however, the IMN cohort had a greater proportion of open fractures ($p = 0.007$). When controlling for covariates, patients who underwent IMN were allowed earlier weightbearing on the operated extremity. There were no differences in ankle or knee range of motion at latest follow up. There was a greater incidence of total complications among IMN ($p = 0.029$). Single variable analysis revealed an association between IMN and nonunion ($p = 0.025$). IMN trended toward greater need for reoperation ($p = 0.084$).

Conclusion: Intramedullary nailing of "extreme tibia fractures" was associated with higher rates of total complications compared to plate osteosynthesis and trended with greater need for reoperation. However, it should be noted that there was a higher incidence of open fractures in this cohort. There were no differences in the rate of malalignment, range of motion, or time to healing between cohorts. Intramedullary nailing is associated with earlier weightbearing, which can allow patients to more readily return to pre-injury function.