

Femoral Nonunion Exchange Nailing: Are We Getting Better Results Now?

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Purpose: While ~90% of femur fractures treated with intramedullary nails heal, 5% to 10% of patients fail initial treatment and progress to nonunion. One approach for treating femoral nonunions is through exchange nailing with reported union rates between 53% and 100%. These studies are based on small cohorts of patients with older implants, instruments, and techniques. The goal of our study was to evaluate rates of osseous healing and outcomes in femoral nonunions with contemporary exchange nailing.

Methods: We retrospectively reviewed patients (age ≥ 18 years) from 5 academic Level I trauma centers who sustained femur fractures (AO/OTA 31, 32, 33) initially treated with intramedullary fixation that developed nonunion and were treated with exchange nailing for the index nonunion surgery. The primary outcome measure was osseous union. We further analyzed union rate by AO/OTA classification, nonunion type, implants used, time from initial procedure, and infection status at time of indexed nonunion procedure. Standard demographic data were also obtained.

Results: From a database of 1959 long bone nonunions, we identified 99 femurs in 99 patients that met inclusion criteria. 68 of 99 femurs (69%) achieved union following initial exchange nail procedure. Rates of osseous union were similar by AO/OTA classification ($P = 0.36$), nonunion type (hypertrophic, oligotrophic, atrophic) ($P = 0.58$), implant/biologic used ($P = 0.15$), and time from initial procedure until exchange nail procedure ($P = 0.18$). 59 patients had inflammatory labs (C-reactive protein, erythrocyte sedimentation) and cultures obtained at time of first nonunion surgery with no significant differences in union ($P = 0.57$) based on lab and culture results. A considerable number of complications were encountered. 29 patients underwent subsequent reoperation (most secondary to continued nonunion), 20 were readmitted, 20 had persistent nonunion, 11 experienced hardware failure, and 4 had a new infection.

Conclusion: This large, multicenter study with modern implants, instruments, and techniques for exchange nailing femoral nonunions demonstrates disappointing rates of osseous healing (31% failure) consistent with the lower end of reported data in previous literature.