

Functional Outcomes After Modern Ring External Fixation or Internal Fixation for Severe Open Tibial Shaft Fractures

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Purpose: We compared functional outcomes of patients with open tibia shaft fractures randomized to modern ring external fixation versus internal fixation. We hypothesized that there would be no treatment group differences in outcome.

Methods: The FIXIT trial randomized patients 18-64 years with Gustilo-Anderson Type IIIB and severe Type IIIA diaphyseal or metaphyseal tibia fracture to either internal fixation (n = 132) or modern external ring external fixation (n = 122). Follow-up occurred at 6 weeks, 3, 6, 12, 18, and 24 months post-randomization. Outcomes included Short Musculoskeletal Function Assessment (SMFA), Veterans RAND 12-item survey (VR-12) physical component score (PCS), use of ambulatory assistive devices, and weightbearing status.

Results: 104 patients (85.2%) in the external group and 99 (75.0%) in the internal group completed a 12-month visit. The mean VR-12 PCS was higher (better) for internal (24.9) vs external (22.2) at 3 months (mean difference 2.6 [95% confidence interval (CI): 0.5, 4.8]; P = 0.02), and for internal (27.1) vs external fixation (24.8) at 6 months (mean difference 2.3 [95% CI: -0.4, 4.9]; P = 0.10). The 6-month SMFA dysfunction scores were lower (better) for internal (40.2) vs external (44.2) (mean difference: -4.0 [95% CI -8.9, 0.8]; P = 0.10) and the Bother score was lower for internal (37.1) vs external (42.1) difference of -4.9 [95% CI: -11.1, 1.2]; P = 0.12). However, there were no differences between groups at all other time points. External fixation was associated with higher risk of using any ambulatory assistive device at 6 months (relative risk: 1.48 [95% CI: 1.21, 1.82]; P<0.0001). The proportion of patients using any ambulatory device was 42% at 1 year overall. Weightbearing status was no different at any time.

Conclusion: Modest early physical function benefits were noted for internal fixation compared to modern external ring fixation. External fixation was associated with more likely use of ambulatory devices up to 6 months, while overall impairment was high in both treatment groups.