Impact of Surgeon Experience on Major Complications After Ring Fixator Treatment of Severe Open Tibial Fractures

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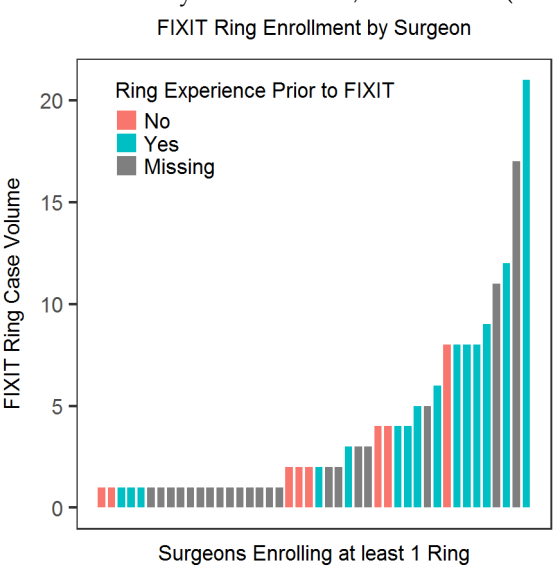
Purpose: FIXIT, a randomized trial of severe open tibial fractures treated with ring fixators versus internal fixation, included surgeons with and without significant prior experience with modern ring external fixators. We hypothesized that surgeon experience with ring fixators is related to the rate of major complications after ring fixation of severe open tibia fractures.

Methods: This FIXIT secondary analysis included patients with severe open tibial fractures initially treated with ring fixators, including randomized and observational cohorts (n = 174). "Significant" surgeon experience was defined by FIXIT as completion of greater than 5 ring cases prior to study initiation. Experience data was captured for 91% of cases (n = 158). Sensitivity analysis was performed by redefining experience as practicing at a site with a national expert in ring fixation. The primary outcome was identical to FIXIT: occurrence of a major limb complication requiring surgery or rehospitalization for 1 of 6 reasons. Logistic regressions using generalized linear models determined unadjusted impact of experience on complication rates and adjusted for patient and injury factors.

Results: Surgeons with (n = 22) and without (n = 15) significant prior fixator experience completed 81% (n = 128 cases) and 19% (n = 30 cases) of study fixator cases, respectively. At 1 year postoperatively, experienced surgeons had lower rates of: major complication (55% vs 70%, adjusted relative risk [adj-RR] 0.68, 95% confidence interval [CI] 0.38-1.00), soft-tissue problem requiring surgery (8% vs 37%, adj-RR 0.20, 0.08-0.49), pin-track infection (15% vs 27%, adj-RR 0.36, 0.12-0.93), and loss of reduction or implant failure (10% vs 30%, adj-RR 0.40, 0.16-0.90). Sensitivity analysis demonstrated a broadly consistent 13% difference (OR 0.71, 0.44-0.99) in rate of major complication at sites with and without a national expert in ring fixation. Deep infection was not significantly affected by experience (20% vs 30%, adj-RR 0.53, 0.23-1.09).



Conclusion: In the treatment of severe open tibia fractures with modern external ring fixators, surgeon experience with ring fixators had a favorable effect on complications, driven by decreases in major soft-tissue problems, pin-track infection, and loss of reduction or hardware failure. This study indicates that while deep infection outcomes may not depend on surgeon experience, other outcomes with ring fixator use are likely dependent on surgeon experience.