

Single-Stage Orthoplastic Reconstruction of Gustilo-Anderson Grade III Open Tibial Fractures Greatly Reduces Infection Rates

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Purpose: Severe open tibial fractures are difficult to treat, with the best infection rates for grade IIIB and C fractures around 17%. Most need specialist orthopaedic trauma and plastics surgical expertise. The latter is not always readily available. The standard is often to deal with the fracture then refer to the plastic surgeons for definitive cover. The hypothesis for this paper was that a single-stage combined definitive skeletal fixation and soft-tissue coverage result in an improvement in infection rate.

Methods: A consecutive cohort of 73 patients were identified who presented to a major trauma center with 74 Gustilo-Anderson grade III open tibia fractures between March 2010 and January 2013. The philosophy of the unit is to achieve single-stage definitive orthopaedic fixation and plastic surgical coverage, where possible. Postoperatively patients were followed up in a combined ortho-plastics clinic. Medical records and clinic notes were reviewed retrospectively for demographics, fracture classification, operative procedures, pharmacological intervention,s and outcomes. Infection was a clinical diagnosis; deep infection was defined by a clinical situation necessitating intravenous antibiotics or operative intervention. Study groups were analyzed using Fisher's exact test. P values <0.05 were considered significant.

Results: *Combined Single-Stage Orthoplastic Fixation and Coverage:* 48 fractures were managed with definitive orthopaedic fixation and plastic surgical coverage performed at the same time, while 26 had these performed at separate stages. Of those subjects who had definitive fixation and coverage in one procedure, 2 (4.2%) developed deep infections, compared with 9 (34.6%) deep infections ($P < 0.001$) in those who underwent definitive fixation and coverage at separate operations. *Timing of Surgery:* Of the fractures that had definitive fixation and coverage completed within 72 hours of injury, 5 (20%) developed deep infections, compared with 6 (12.2 %) deep infections ($P = 0.711$) in those whose definitive fixation/coverage was completed at later than 72 hours. 12 patients either underwent orthopaedic fixation at other hospitals and were referred for definitive coverage, or were clinically too unwell for definitive surgery and thus had operations at later than 7 days from injury. Of these 3/12 (25%) developed deep infection.

Conclusion: This study presents a safe, practical protocol for the management of grade III open tibia fractures. The infection rates presented in our single-stage group are among the lowest published in patients with these injuries. While early surgery should be strived for, emphasis should ultimately be placed on timely transfer to a specialist center, aiming for a single-stage combined definitive orthoplastic procedure.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.