

Timing of Definitive Fixation with Respect to Flap Coverage in Open Tibia Fractures

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Purpose: In grade 3B and C open tibia shaft fractures, authors have demonstrated that time from injury to coverage correlates with infection. We hypothesized that the time to coverage from the time of definitive fixation is more important in the overall risk of infection. The purpose of this study was to evaluate factors associated with infection in open tibial shaft fractures requiring flap coverage.

Methods: All patients with grade 3B or C open tibia shaft fractures at 14 trauma centers were retrospectively reviewed. We collected demographics, time of initial debridement, definitive fixation and coverage, type of fixation and flap, and complications. We evaluated use of temporary internal fixation, flap failure, and times from initial debridement and definitive fixation to coverage against deep infection as the primary outcome. We used Student t tests, Fisher's exact test, univariate logistic regression, and multivariate regression for data analysis.

Results: Of 296 adults (227 M: 69 F) with open tibial shaft fractures requiring flap coverage, 74 (25%) became infected. Definitive external fixation (36) had a higher incidence of infection ($P = 0.008$). Time from definitive internal fixation to coverage ($P = 0.04$) and flap failure ($P < 0.001$) were associated with infection, but time from injury to coverage ($P = 0.13$) and use of temporary internal fixation ($P = 0.6$) were not. Flap failure correlated strongly with infection ($P < 0.001$) and time from definitive fixation to coverage trended toward significance ($P = 0.09$). Time from injury to coverage ($P = 0.9$) and temporary internal fixation ($P = 0.5$) were not associated with infection.

Conclusion: In this study, definitive external fixation, flap failure, and time from definitive internal fixation to coverage correlated with infection. Time from injury to coverage was not associated with infection. This indicates that time from definitive internal fixation to coverage is more critical than time from injury to coverage and that temporary internal fixation does not increase the risk of infection.