

Definitive Flap Coverage Within 48 Hours of Definitive Fixation Reduces Deep Infection Rate in Open Tibial Shaft Fractures Requiring Flap Coverage

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Purpose: Many factors are associated with infection in open tibia fractures requiring flap coverage. Recently, several authors have identified the time from definitive fixation to flap coverage as a strong predictor of infection. This rationale for this hypothesis is that implants may become colonized when not covered with soft tissue. This study aimed to delineate whether a “safe window” exists for timing from definitive fixation to definitive flap coverage.

Methods: We studied a consecutive cohort of patients from 15 centers in the US and UK. Patients who underwent definitive fixation and flap coverage in the same sitting (defined as 0 days) were compared to those undergoing definitive fixation followed by flap coverage on a different day. The primary outcome was deep infection rate. We used receiver operating characteristic curves to identify the time points between definitive fixation and coverage that were associated with increases in infection rates.

Results: 373 consecutive patients (270M:103F, aged 42 ± 18 years) from 15 centers were evaluated. 183 patients (49%) had their definitive fixation and coverage on the same day and 190 (51%) had delayed coverage. Infection rates for immediate (0 days), 0-2 days, >2 to 5 days, and >5 days from definitive fixation to flap coverage were 14.3%, 19.3%, 25.0%, and 31.8%. A delay of up to 2 days was not associated with an increased risk of infection (relative risk [RR] 1.12, 95% confidence interval [CI] 0.92 to 1.37, $P = 0.26$). After that, there was an average RR increase of 55% for deep infection for delays between 2 and 5 days (RR 1.55, 95% CI 0.96 to 2.50, $P = 0.09$). This risk increased to 64% for patients whose coverage was obtained more than 5 days after definitive fixation (RR 1.64, 95% CI 1.01 to 2.65, $P = 0.04$). Delays in obtaining coverage of 2 to 5 days once definitive fixation was placed were associated with an increased infection rate of 4.9% (95% CI 0.1 to 10.5%) and this increased to 9.3% (95% CI 1.7 to 20.3%) after 5 days.

Conclusion: This multicenter multinational study is the largest report to focus on the timing from definitive fixation to flap coverage in type IIIB open tibial shaft fractures. Based on our data, a “safe window” of 48 hours exists between these stages. Minimizing the delay from definitive fixation to flap coverage is critical in decreasing infection rates.