

**Is There a Critical Window for Debridement of Open Fractures?***Amanda Mener, BA, BS<sup>1</sup>; Christopher Staley, BA; Mara Schenker, MD<sup>1</sup>; William M. Reisman**<sup>1</sup>Emory University School of Medicine, Atlanta, Georgia, USA*

**Purpose:** The historical “6-hour rule” for time to debridement has been refuted in the literature. Current standards prompt a timely debridement; however, in severe polytrauma, patients are often resuscitated for >24 hours, with delayed orthopaedic intervention. The purpose of this study was to determine the association between prolonged time to operative debridement (>24 hours) and infection, given their unclear association.

**Methods:** We conducted a retrospective review of patients with non-ballistic open long bone fractures that underwent irrigation and debridement (I & D) from 2008-2016. Demographic variables were collected: age, gender, body mass index, diabetes, smoking, and medications. Injury variables were collected: admission time, injury mechanism, fracture site, Gustilo-Anderson classification, time to antibiotic administration, bone loss, and time in the ICU. Operative variables were collected: time between admission and initial I & D, prophylactic antibiotic, length of initial I & D operation, time to definitive fixation, fixation type, and time to wound closure. Infection variables were collected: time from injury to infection development, cultured bacteria from infection site, and post-infection antibiotics. Chi-squared analysis and logistic regression were performed.  $P < 0.05$  was the cutoff for significance.

**Results:** 657 patients sustained non-ballistic open fractures. 56 (8.5%) developed an infection. Prolonged time to I & D was not associated with increased infection rates ( $P = 0.25$ ). 44 patients underwent I & D at >24 hours (6.7%; range, 24-296 hours). Two of these patients (4.5%) developed an infection postoperatively, with I & Ds at 31 and 296 hours post-injury. Increased infection risk was associated with Gustilo-Anderson classification (Type 1: 1.4%, Type 2: 6.9%, Type 3: 17.3%;  $P < 0.001$ ), after-hours surgery between 19:00 and 7:00 (odds ratio [OR] = 2.017,  $P < 0.001$ ), definitive fixation >24 hours (OR = 3.099,  $P < 0.001$ ), wound closure >24 hours (OR = 4.406,  $P < 0.001$ ), and >2 operations post-admission (OR = 8.498,  $P < 0.001$ ). Diabetes ( $P = 0.509$ ), smoking ( $P = 0.651$ ), and antibiotics received >1 hour post-admission ( $P = 0.454$ ) were not associated with infection. Number of operations (OR = 4.737,  $P < 0.001$ ) and time to definitive wound closure (OR = 2.782,  $P = 0.016$ ) were independent predictors of infection by multivariate analysis.

**Conclusion:** Our data suggest that there is no association between infection and prolonged debridement times. Furthermore, delaying definitive soft-tissue coverage of open wounds may be associated with higher infection rates.