

Have Infection Rates Following Open Tibia Fractures Changed? A Review of 11,000 Open Tibia Fractures Over 4 Decades

*Isaac Castillo, BS; Jacob Anthony Heiner, BS; James F. Kellam, MD;
Stephen James Warner, MD, PhD*

University of Texas Health Science Center at Houston, Houston, TX, United States

Purpose: Open tibia fractures can be debilitating injuries with relatively high rates of complications. Since the development of Gustilo and Anderson's open fracture classification 40 years ago, much attention has been focused on methods to decrease infection associated with open tibia fractures with improved soft-tissue coverage techniques, modern fixation methods, and novel antibiotics. The purpose of this study was to review the past 4 decades of open tibia infection rates to determine if modern surgical and medical innovations have improved outcomes.

Methods: A systematic review of the literature was performed to identify published articles that reported infection rates for open tibia fractures. The initial query resulted in 647 articles. After implementing exclusion criteria, 165 articles were included in the final analysis. Studies were grouped into 1 of 4 decades based on the year(s) in which the study took place: 1977-1987, 1988-1998, 1999-2009, or 2010-2018. Demographic data, open fracture classifications, and infection rates were collected from each article. Comparisons were then made between studies in each of the 4 decades.

Results: A total of 11,297 patients were included from the 165 studies with 743 patients in the first decade, 3644 in the second decade, 4678 in the third decade, and 2232 in the most recent decade. There was an overall infection rate of 12.1% over the 40-year period with 1910 Gustilo-Anderson type I open tibia fractures, 2837 type II fractures, 2854 type IIIA fractures, 3224 type IIIB fractures, and 472 type IIIC fractures. Overall, the rate of infection following open tibia fractures did not differ between 1977-1987 (9.45%), 1988-1998 (13.12%), 1999-2009 (14.6%), or 2010-2018 (11.2%).

Conclusion: Much focus has been placed on reducing infections following open tibia fractures considering the significant morbidity and cost associated with this complication. Our data on 11,000 open tibia fractures from 1977-2017 suggest that the rate of infection following open tibia fractures has not changed. Further investigations into methods to reduce infection rates in patients with open tibia fractures, such as improved antibiotic prophylaxis, are warranted.