

Low-Velocity Ballistic Tibia Fractures: Are Complication Rates Similar to Closed Injuries?

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Purpose: Ballistic injuries to the extremities are common in the United States, especially among nonfatal gunshot wounds. While initially classified as open fractures in the seminal work by Gustilo and Anderson, low-energy ballistic injuries have been reported to have similar infections rates as closed blunt injuries. The purpose of this study was to evaluate the complication rates in low-energy ballistic injuries to the tibia.

Methods: A multicenter retrospective review of patients with low-energy ballistic tibia fractures from 2004 until 2018 was performed with data from 4 academic Level-I tertiary care referral centers. All patients between the ages of 16 and 80 years with minimum 3-month follow-up were included. Deep infection was defined according to the confirmatory criteria by the Fracture Related Infection Consensus Group. Multivariate analysis and 2-tailed Student t tests were used to test for statistical significance.

Results: 117 patients (107 males, 10 females) with a mean age of 32.4 years (range, 17-70) and mean follow-up of 14.3 months (range, 3-65) met inclusion criteria. Of the 117 patients included, 71 were shaft fractures, 33 were proximal fractures, and 13 were distal fractures. 69 of 71 shaft fractures were treated with intramedullary fixation, while all proximal and distal fractures were treated with plates and screws or external fixation. Overall deep infection rate was 14.5%; 11 of 71 (15.5%) with shaft fractures, 6 of 33 (18.2%) in proximal fractures, and 0 of 13 (0%) in distal fractures ($P = 0.21$). Wound complications were found in 26.5% of patients, nonunion in 12%, and revision surgery in 28.2% of patients.

Conclusion: Recent reports have suggested low complication rates for these injuries, comparable to that of closed blunt injuries. The results of this study challenge prior evidence of low complication rates with this injury, particularly with regard to infection, and suggest the possible opportunities for improved treatment strategies.