

Long-Term Trajectory of Recovery Following Pilon Fracture Fixation

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Purpose: Our objective was to describe the trajectory of recovery following surgical treatment of pilon fractures from baseline up to 5-year follow-up and to establish the level of long-term disability related to these injuries.

Methods: Patients with pilon fractures (OTA 43 B/C) treated with open reduction and internal fixation (ORIF) were enrolled as a prospective cohort at a single Level-I center. Functional outcome was measured at baseline, 6 months (mo), 1 year (y), and 5 y using the Short Form 36 (SF-36), Short Musculoskeletal Function Assessment (SMFA), and the Foot and Ankle Outcome Score (FAOS). The change between time points was tested for significance using paired t tests. The trajectory of isolated injuries (ISS = 9) and more significantly injured patients (ISS >9) were compared using 2-sample t tests. The proportion of patients experiencing clinically relevant change between time points was determined using the calculated minimal clinically important difference (MCID)

Results: 102 patients were enrolled—70 patients (69%) were male and the mean age was 43 y. Most (88%) of these patients had an ISS of 9 (isolated injuries). The trajectory of recovery of physical function shows a dramatic decline between baseline and 6 mo, with significant improvement between 6 mo and 1 y, and ongoing but slower improvement between 1 and 5 y. Results are presented as: baseline->6 mo->1 y->5 y (significance for each interval). For SF-36 physical component summary (PCS): 56.2->41.0->45.1->50.1 (all, P = 0.001); SMFA-function index (FI): 45.3->56->53.5->49 (respectively, P = 0.004, 0.006, 0.001); and FAOS: 98.5->79.1->80.1->88.4 (respectively, P = 0.001, 0.7, 0.02). Only 64% of patients return to baseline SF-36 PCS at 5 years, defined as returning to within 1 MCID of baseline status. The FAOS pain measure indicates that pain is a persistent issue, with a similar trend to function, and remains significantly worse when compared to baseline at 5 y (P = 0.001), and only 39% of patients reach a pain score within 1 MCID of baseline. In contrast, psychological well-being (SF-36 MCS [mental component summary]) indicates that the pain and physical disability is well tolerated in the long term with no significant change from baseline at 5 y (P = 0.181). The group with ISS >9 reported a significantly greater decline in their mean SF-36 PCS scores from baseline to 6 mo (P = 0.007), but a faster trajectory of improvement from 6 mo to 1 y (P = 0.013) compared to patients with ISS = 9. Similar scores were seen at other time points.

Conclusion: Functional recovery following ORIF of pilon fractures was characterized by an initial decline in function from baseline, followed by a sharp improvement between 6 mo and 1 y. This improvement continues from 1 y to 5 y. Function does not return to baseline despite the high proportion (>50%) of patients achieving an MCID at all time points when examining SF-36 PCS and SMFA FI. Pain is a persistent issue although mental well-being (SF-36 MCS) shows no statistically significant change from baseline at 5 y. This information is useful when counseling patients on their expected trajectory of recovery.