Longer-Term Outcomes Following a Humeral Shaft Fracture: Results for 291 Patients at a Minimum 1-Year Follow-Up

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Purpose: The primary aim of this study was to assess patient-reported outcomes following a humeral diaphyseal fracture. The secondary aim was to compare the outcomes of patients who achieved union after initial management (nonoperative or operative) with those who achieved union after nonunion surgery.

Methods: From 2008 to 2017, 291 skeletally mature patients with a humeral diaphyseal fracture (mean age, 55 years [range, 17-86], 58% [n = 168] female) were retrospectively identified from a trauma database and available for follow-up at a mean of 5.5 years (range, 1.2-11.0) postinjury. 64 patients (22%) were managed operatively (<12 weeks) and 227 (78%) nonoperatively. Electronic records and radiographs were reviewed to determine fracture union. The primary outcome measure was the abbreviated Disabilities of the Arm, Shoulder and Hand score (QuickDASH). Secondary outcome measures included the EuroQol 5-Dimension (EQ-5D), EQ visual analogue scale (EQ-VAS), and 12-item Short Form health survey (SF-12) scores.

Results: After initial management, 229 patients (79%) united (62 operative, 167 nonoperative) and 62 (21%) developed a nonunion (2 operative, 60 nonoperative; $P<0.001$). 52 (93%) of 56 patients achieved union after nonunion surgery. The overall mean QuickDASH was 20.8, EQ-5D 0.730, EQ-VAS 74, SF-12 physical component summary (PCS) 44.8 and mental component summary (MCS) 50.2. Patients who developed a nonunion but united after nonunion surgery reported a worse functional outcome (mean QuickDASH 27.9 vs 17.6, $P = 0.003$ and health-related quality of life [HRQoL]; mean EQ-5D 0.639 vs 0.766, $P = 0.008$; EQ-VAS 66 vs 76, $P = 0.036$; SF-12 PCS 41.8 vs 46.1, $P = 0.036$) than those who united after primary nonoperative or operative management. When adjusting for confounders, union after nonunion surgery was independently associated with poorer function (difference in QuickDASH 8.1, $P = 0.019$) and HRQoL (difference in EQ-5D –0.102, $P = 0.028$).

Conclusion: Longer-term patient-reported outcomes following a humeral shaft fracture were satisfactory. Patients achieving union after nonunion surgery reported poorer limb-specific function and HRQoL when compared to those who united after initial management, whether this was nonoperative or operative. Strategies to identify and target early operative intervention to patients at risk of nonunion may have an important role, given the potential impact of nonunion on longer-term outcome.