## Factors Predicting Satisfactory Functional Outcomes in Patients Following Humeral Shaft Fractures

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**Purpose:** This study uses validated functional outcome measures and risk-adjusted analysis to determine if specific patient characteristics, treatment modality, fracture location, or etiology predict satisfactory functional outcomes.

**Methods:** Patients treated from 2004 through 2011 for humeral shaft fractures were identified from billing records. From this cohort, patients were excluded if they were less than 18 years old at time of injury (n = 38), if their fracture predominantly affected the metaphyseal/epiphyseal region of the humerus (n = 15), or if they were deceased (n = 22). Minimum follow-up period was 12 months. Patients from the remaining cohort (165 patients) were recruited by telephone to obtain the following functional outcome scores: Disabilities of the Arm, Shoulder and Hand (DASH), the Simple Shoulder Test (SST), and general health questionnaire Short Form-12 physical component summary (SF-12 PCS) and mental component summary (SF-12 MCS). Based on previous reports of population averages and minimal clinically important differences, patients were classified as having a satisfactory outcome if their DASH was <21, SST ≥10, SF-12 PCS ≥40, and SF-12 MCS ≥40. Patient chart reviews were conducted to obtain basic demographic data. Binomial logistic regression was performed with IBM SPSS v19 (Armonk, NY). Adjusted odds ratios (ORs) were calculated after adjusting for age, follow-up length, surgical versus nonoperative treatment, body mass index (BMI), presence of associated fractures, fracture location (proximal, middle, distal third), radial nerve palsy, smoking status, Charlson comorbidity index (CCI) score, insurance type, classification as high-energy mechanism, and history of psychiatric illness. Data are presented as ± standard deviation.

**Results:** 72 patients were successfully recruited (41 surgical, 31 nonoperative). Average age was 47 ± 20 years with average follow-up period being 47 ± 29 months. The odds of obtaining a satisfactory DASH score increased with longer follow-up (OR 1.024; $P = 0.045$), but decreased with increasing age (OR 0.945; $P = 0.017$) and absence of radial nerve palsy (OR 0.117; $P = 0.047$). The odds of obtaining a satisfactory SST score increased with absence of psychiatric history (OR 11.8; $P = 0.004$), and decreased with increasing age (OR 0.947; $P = 0.017$). The odds of obtaining a satisfactory SF-12 PCS score increased with absence of psychiatric history (OR 20.9; $P = 0.027$), having Medicare (OR 77; $P = 0.029$) or private insurance (OR 131; $P = 0.016$) compared to Workers' Compensation/motor vehicle insurance, and decreased with rising CCI score (OR 0.51; $P = 0.019$). The odds of obtaining a satisfactory SF-12 MCS score increased in the absence of psychiatric history (OR 26.0; $P = 0.009$), and decreased with rising CCI score (OR 0.544; $P = 0.033$).

**Conclusion:** The reporting of functional outcome scores after humeral shaft fracture treatment must include analysis of confounding variables. Patient age, length of follow-up period, history of psychiatric illness, insurance type, and CCI scores all significantly influ-

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enced patient-reported functional outcomes following treatment of humeral shaft fractures regardless of treatment modality. Presence of radial nerve palsy immediately after injury significantly predicting less disability (DASH <21) may be due to chance or may result from these patients experiencing dramatic improvements in upper extremity function as most palsies completely resolve.