Quantifying Patient Resilience Following Trauma Using the Short Musculoskeletal Function Assessment

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Purpose: Psychological factors have established effects on outcome after orthopedic trauma. Tools exist for quantification of these factors but involve extensive questioning and prospective use. The purpose of this study was twofold: (1) to propose a retrospective technique to measure patient resilience using the Short Musculoskeletal Function Assessment (SMFA) and (2) to demonstrate that poor resilience is associated with worse functional outcome in patients undergoing operative fracture repair, both acutely and in cases of nonunion.

Methods: From separate prospective registries, patients were identified who underwent repair of either acute tibial plateau fracture or long bone fracture nonunion (these cohorts were chosen as representative samples of orthopaedic trauma). Patients had visual analog scale (VAS) pain scores and SMFA data available at 3, 6, and 12 months postoperatively. Resilience refers to a patient's ability to adapt to adverse conditions or pain. To quantify resilience for each cohort, a linear trend line was calculated from a scatterplot of SMFA Bothersome Index (BI) versus VAS pain score at 3 months postoperatively. Using this trend line and each patient's true BI at 3 months, patients were split into 3 groups: patients whose BI was >20 points above expected for their pain level were said to have poor resilience, patients whose true BI was between 0 and 20 points above expected were said to have adequate resilience, and patients whose BI was less than expected were said to have excellent resilience. Univariate and multivariate analyses were performed to evaluate the effect of resilience on functional outcome. Outcome was assessed using SMFA Function Index, which does not overlap with SMFA BI.

Results: 215 tibial plateau patients were included. Of these, 39 had poor resilience (18.1%), 65 (30.2%) had adequate resilience, and 111 had excellent resilience (51.6%). 255 nonunion patients were included. Of these, 49 had poor resilience (19.2%), 30 had adequate resilience (11.8%), and 176 had excellent resilience (69.0%). In both cohorts, SMFA Function Index at 6 and 12 months postoperatively was significantly different among resilience levels ($P < 0.0005$). Furthermore, worse resilience was associated with worse SMFA Function Index at 6 and 12 months postoperatively when controlling for age, sex, Charlson comorbidity index, tobacco use, injury pattern, and Workers' Compensation status ($P < 0.0005$).

Conclusion: Poor resilience is associated with worse functional outcome following operative fracture repair. Surgeons can use this method to identify patients at risk for poor outcomes and intervene early in the recovery.

See the meeting app for complete listing of authors' disclosure information.