Pain and Baseline Physical Function Predict Physical Function at One Year After Severe Extremity Trauma

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Purpose: Pain, depression, and anxiety are common after orthopaedic trauma and may negatively affect patients' physical function. We hypothesize that pain, depression, anxiety, interactions among these experiences, and baseline characteristics predict patient-reported physical function following severe extremity fractures.

Methods: This is a secondary analysis of the STREAM aggregate of Patient-Reported Outcomes Measurement Information System (PROMIS) data from six prospective Major Extremity Trauma Research Consortium (METRC) studies (FIXIT, OUTLET, TAOS, VANCO, OXYGEN, and PAIN). Patients with severe fractures of the humerus, tibia, midfoot, and hindfoot and complete data including PROMIS pain, anxiety, depression, and physical function at 12 months after injury were included. The outcome of the PROMIS physical function score at 12 months was predicted using multivariate linear regression considering baseline patient and injury characteristics, as well as PROMIS pain, anxiety, and depression scores at baseline and 12 months. Iterative optimization using the Akaike Information Criteria determined change in pain as the primary contributor to the physical outcome score.

Results: In total, 708 of 1000 (70.8%) patients were included. The average age was 42 years, 477 patients (67%) were male, 539 patients (76%) identified as White, 559 patients (79%) were working or active duty prior to injury, and 309 patients (44%) never smoked. From baseline to 12 months after injury, PROMIS scores for anxiety (56–53, $p<0.001$), pain (60–57, $p<0.001$), and depression (53–50, $p<0.001$) decreased while physical function scores improved (32–41, $p<0.001$). Linear regression demonstrated that physical function at 12 months was negatively associated with baseline pain by –0.55 points per pain point (95% confidence interval [CI]: – 0.65, –0.44, $p<0.001$) and pain at 12 months by –0.66 points per pain point (95% CI: –0.71, –0.60, $p<0.001$). It was positively associated with baseline physical function by 0.24 points per physical function point (95% CI: – 0.18, 0.30, $p<0.001$).

Conclusion: Patient-reported pain at baseline and at 1 year after injury, as well as lower baseline physical function, were associated with inferior physical function at 1 year following severe extremity trauma.