

**2019 Can External Fixator Use Influence Patients' Experience of Pain?**

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**Purpose:** External fixation is a helpful tool used to stabilize complex fractures before definitive fixation for multiple reasons including soft-tissue compromise, physiological status, and timing of definitive surgical procedure. However, little is known regarding the psychological effects of external fixator placement, specifically the effect on a patient's experience of pain. The purpose of this study was to determine whether the use of an external fixator is associated with alterations in patients' psychosocial profiles, which are associated with poor long-term outcomes, when controlling for both injury severity and fracture severity. We hypothesized that patients initially treated with external fixation would have worse pain catastrophizing and pain self-efficacy scores throughout their care compared to those treated without external fixation.

**Methods:** 88 subjects with lower extremity fractures requiring surgical fixation and without history of chronic pain (age  $41.3 \pm 14.6$  years; 55% M; 18 external fixator) were recruited from a Level-I trauma center. Pain Catastrophizing Scale (PCS) and Pain Self-Efficacy Questionnaire (PSEQ) were assessed at 2, 6, and 12 weeks after definitive fixation. Differences in psychosocial scores at each time point were compared between those who were and were not placed in an external fixator prior to definitive fixation with a 2 x 3 repeated-measures analysis of covariance controlling for ISS and fracture severity (determined using the AO classification system).

**Results:** Both PCS and PSEQ scores demonstrated statistically significant differences between individuals with and without external fixator placement at 2, 6, and 12 weeks after definitive fixation (PCS mean difference: 5.5; 95% confidence interval [CI]: 0.65-10.2,  $P = 0.027$ ; PSEQ mean difference: 9.2; 95% CI: 2.1-16.3,  $P = 0.01$ ). These group differences are clinically meaningful as they exceed the minimal clinically important difference of 5 for PCS and 6 for PSEQ. Interestingly, ISS and fracture severity did not predict PCS and PSEQ following injury (ISS:  $P = 0.39-0.65$ ; fracture severity:  $P = 0.32-0.78$ ).

**Conclusion:** Our results suggest that use of an external fixator may be associated with increased pain catastrophizing and decreased pain self-efficacy. Benefits of external fixator use should be weighed against these apparent effects on the patient's experience of pain, which is associated with poorer outcomes. Patients who require external fixator use may benefit from early cognitive behavioral therapy and/or pain neuroscience education to help improve their overall mental profile and long-term outcomes.