Can We Identify at What Point in Recovery Somatosensory Reprogramming Occurs in Patients With Chronic Pain After Surgically Treated Lower Extremity Fractures?

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Purpose: Peripheral and central somatosensory reprogramming occurs in patients with chronic pain. It is unknown if and when this reorganization occurs in patients with chronic pain who underwent surgical treatment of lower extremity fractures (LEFs). Quantitative sensory testing (QST) can be utilized to identify patients with somatosensory alterations, which often occur in patients with chronic pain. The purpose of this study was to determine if and when QST changes occur in patients who develop chronic pain following surgical treatment of LEFs.

Methods: An observational cohort study of 120 patients (43.9 ± 15.6 years) with an LEF requiring surgical fixation were recruited from a Level I trauma center. Pain pressure threshold testing (PPT) was performed in the mid-quadriceps region in the injured/non-injured limbs at 6 weeks, 3 months, 6 months, and 12 months postoperatively. At 12 months patients were assessed for the development of chronic pain using pain interference, pain severity, and NIH-defined chronic pain. Arepeated measures model assessing at least a 10% of change in PPT of the injured versus non-injured limb between interval time points (6 weeks to 3 months, 3 months to 6 months, 6 months to 12 months) and baseline was performed.

Results: 101 subjects (84%) completed this study; 52.5% of participants were female, 86.7% Caucasian. Each 10% increase in PPT between 6 and 12 months was associated with a 0.7-point increase in pain interference, a 4.0% increase in in pain severity, and a 28% increase in odds of having chronic pain at 12 months (P = 0.026, 0.038, 0.008). Increases greater than 10% in PPT between 6 weeks and 3 months or 3 months to 6 months were not associated with increased pain interference, pain severity, and the development of chronic pain (P>0.05).

Conclusion: Somatosensory reprogramming appears to occur between 6 and 12 months in patients who develop chronic pain after lower extremity fracture. These results suggest that interventions designed to prevent this reprograming should be instituted prior to 6 months. Further evaluation of QST and its association with pain types (neurogenic, inflammatory) can help guide development of targeted interventions.