

Risk Factors for Adverse Mental Health Outcomes after Severe Open Tibia Fracture: A Secondary Analysis of the FIXIT Study

Austin R Thompson¹, Natasha Simske, Justin K Solarczyk, Lisa Reider, Eben A Carroll², Robert V O'Toole, Saam Morshed, Heather A Vallier³

¹Oregon Health & Science University, ²Wake Forest Univ School Of Medicine, ³Case Western Reserve University

INTRODUCTION: It is well established that adverse mental health outcomes are common after orthopaedic trauma, including depression and posttraumatic stress disorder (PTSD). These conditions have documented negative consequences including increased pain intensity, worse function, and complications resulting in readmissions and revision surgeries. The goal of the present study was to document incidence of adverse mental health sequelae among patients with severe open tibia fractures managed with external ring fixation versus internal fixation and to identify risk factors for depression, PTSD, and pain at 12-months after injury.

METHODS: This was a multicenter study conducted at twenty trauma centers, coordinated by the Major Extremity Trauma Research Consortium, including patients 18 to 64 years of age with severe open tibial shaft fractures treated with either modern external ring fixation (n=174) or internal fixation (n=256). Participants who were in the observation, non-randomized cohort were included in this secondary analysis (n=176, 40.9%). Outcome measures included Patient Health Questionnaire (PHQ) scores for depression symptoms, PTSD Checklist for DSM-5 (PCL-5), and the Brief Pain Inventory (BPI). PHQ score ≥ 10 signified presence of moderate to severe depression and PCL-5 score ≥ 33 signified presence of PTSD. Multivariable logistic regression was used to estimate adjusted odds ratios (aOR) representing the association between risk factors and 12-month outcomes.

RESULTS: Three-hundred-thirty-five patients completed 12-month assessments. Twelve-months after initial injury event, 28% of patients had PHQ-9 scores consistent with moderate/severe depression. Risk factors for moderate/severe depression included female gender (aOR: 2.45 [1.25-4.80]) and high school educational attainment or less (aOR: 2.69 [1.39-5.17]), whereas social support was a protective factor (aOR: 0.29 [0.11-0.77]). At 12-months, 41% of patients met criteria for PTSD. Females were at greater risk for PTSD (aOR: 2.06 [1.09-3.88]), whereas increased self-efficacy at 6 weeks post-injury was associated with lower risk of PTSD (aOR: 0.38, [0.23-0.62]). Factors associated with worse pain intensity and pain interference on the BPI included both high school educational attainment or less, and a major limb complication within 12-months. Fixation modality (external ring fixation versus internal fixation) was not associated with patient-reported measurements of pain or mental health.

DISCUSSION AND CONCLUSION: Mental health sequelae and moderate to severe pain are common one year after severe open tibial shaft fractures, occurring more often in patients with lower educational attainment, while social support and self-efficacy may be protective. Adverse mental health outcomes including depression and PTSD were not influenced by fixation modality (external ring fixation versus internal fixation).