

Poor Physical Performance Measures at One Year Following Lower Extremity Fracture Surgery (LEFS) Persist and Can Predict Physical Function and Disability at Two Years

Grace Elizabeth Brooks, B.S.; Gregory Hawk, PhD; Brian Noehren, PT, Ph.D.; Paul Edward Matuszewski, MD

Purpose: Persistent disability affects more than one quarter of lower extremity trauma patients with decreased physical function playing a significant role in its development and hindering reintegration into society. Early identification of patients likely to have persistent disability and poor function is crucial to developing targeted interventions and improving long-term outcomes. The goal of this study was to evaluate the relationship between physical performance metrics at 12 months and patient-reported physical function and disability at 24 months after lower extremity fracture surgery (LEFS).

Methods: From a longitudinal cohort of 120 patients, 65 participants (45.4 ± 15.3 years) underwent physical performance testing 12 months after LEFS and completed PROMIS physical function and disability surveys at 24 months. The testing included maximal isometric hip abduction and quadriceps strength, standing single leg calf raises to failure, a 60-second step down test, and a 6-minute walk test (6MWT). The relationship between 12-month functional assessments and 24-month outcomes was assessed with linear and logistic regression models, as appropriate.

Results: At 24 months, 52% of participants reported below-average physical function (48.8 ± 8.5) and 66% reported some level of disability (median 10 [IQR: 0–20]). The 6MWT (466 ± 112 m) had the strongest predictive value for 24-month physical function ($R^2 = 0.38$, $p < 0.001$) and disability outcomes ($R^2 = 0.24$, $p = 0.002$). Hip abductor strength (1.1 ± 0.4 Nm/kg) was also significantly associated with physical function ($R^2 = 0.30$, $p < 0.001$) and disability ($R^2 = 0.22$, $p = 0.005$). Additionally, rate of torque development (4.2 ± 2.4 Nm/s) was significantly associated with physical function ($R^2 = 0.30$, $p = 0.002$).

Conclusion: A majority of patients have below average function and disability 2 years following lower extremity fracture. Walking capacity and muscle strength 12 months after LEFS predicts self-reported physical function and disability status at 2 years. This suggests that many patients could benefit from some form of intervention, even 1 year after injury. Future studies should investigate if targeted interventions at this time point can improve functional outcome and reduce disability.