

ABSTRACT

Purpose: PROM scores assess patient's perspective on their functional status and well-being. This study aims to assess recovery in patients with tibial shaft fractures treated with intramedullary nailing (IMN) using NIH's Patient Reported Outcome Measurement and Information System (PROMIS) scores and to evaluate any correlations with fracture alignment and union.

Methods: This is a multi-center, retrospective review, of prospectively collected data in patients with isolated tibial shaft fractures (OTA 41-3), treated with IMN at 3 level-1 trauma centers between 2021 and 2023.

PROMIS scores were collected at: 6 weeks, 3 months, 6 months, and 1 year. Scores included: Global Physical Health (GPH), Global Mental Health (GMH), Physical Function- Computer-Administered-Testing (PF-CAT), Pain Interference-CAT (PI-CAT), Mobility-CAT, and Depression-CAT. Patient and injury characteristics, and quality of reduction (QoR) were collected. QoR was graded as anatomic, acceptable (<5 degrees coronal and sagittal malalignment), or poor (>5 degrees coronal or sagittal malalignment).

Results: 767 patients were included. Mean age was 45.8 years (range: 18-98). A majority of the patients were male (482, 62.8%). Diabetes was prevalent in 122 (15.9%) patients and hypertension in 291 (37.9%). 180 (23.5%) patients were active smokers. 688 (89.7%) patients had a closed injury.

Alignment was excellent in 635 (82.8%), and acceptable in 130 (17%) patients. Union was achieved in 718 (93.6%) patients. All PROMs trended towards improvement over time: **GPH** ($p < 0.001$), **GMH** ($p = 0.611$), **PF-CAT** ($p < 0.001$), **Mobility CAT** ($p < 0.001$), **PI-CAT** ($p < 0.001$), and **Depression-CAT** ($p < 0.05$).

Patients with anatomic alignment and who united had better PROMIS scores at each time point. Additionally, a floor effect was seen for the Depression-CAT (not depressed) at all time points, and the PI-CAT (not painful) after 3 months.

Conclusions: PROMIS scores improve over time following tibial IMN. High Depression-CAT at any time point and high PI-CAT after 3 months merit further evaluation. Anatomic alignment correlates with improved scores, indicating that reduction quality improves outcomes. Progression to union has higher scores at each time point, indicating that patients with worse PROMIS scores or decline should be closely evaluated for healing.