Generalizability and Validation of PROMIS Scores to Predict Surgical Success in Foot and Ankle Patients: A Tale of Two Academic Centers

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Introduction/Purpose: Patient-reported outcomes are advancing clinical care by improving patient satisfaction and engagement. A recent publication reported preoperative PROMIS scores to be highly predictive in selecting patients who would and would not benefit from foot and ankle (F/A) surgery. Although this publication used the data from 5 fellowship trained foot and ankle surgeons at one institution, the generalizability to other patient populations and geographic areas is unknown. This validation study assesses the pre-operative PROMIS physical function (PF) and pain interference (PI) t-scores as a predictor of post-operative success from a separate geographic area.

Methods: Prospective consecutive patient visits to a multi-surgeon tertiary F/A clinic were obtained between 1/2014-11/2016 resulting in 18,565 unique visits and 1,408 new patients. Patients undergoing elective operative intervention for F/A were identified by ICD-9/10; CPT code. PROMIS PF and PI were assessed at initial and follow-up visits (minimum 6 months, mean 7.8 months). Two-way ANOVA was used to determine differences in PROMIS PF and PI from pre to post surgery with age and gender as co-variates. The distributive method of estimating a minimal clinical important difference (MCID) was used. Receiver operator curve (ROC) analysis was used to determine cut offs for achieving and failing to achieve MCID. To determine the validity of previously published cut offs, 1) they were compared to cut offs for this data set and 2) the percentage of patients achieving and failing to achieve MCID based on previous cut offs were evaluated using a chi-square analysis.

Results: There were significant improvements in PROMIS PF scores (mean=6.0; sd=11.6; p<0.01) and PI scores (mean=-7.0; sd=8.4; p<0.01). The AUC for PROMIS PF (0.77) was significant (p < 0.01) and the cut offs for achieving MCID (current data = <23.8 versus previous study= <29.7) and failing to achieve MCID (current data=>41.1 versus previous study=>42) were comparable (Figure 1). Of the patients identified as unlikely to achieve MCID, a significant proportion (88.9 %) failed to achieve an MCID ((Chi square=4.7; p=0.03). Of the patients identified as likely to achieve MCID, a significant proportion (84.2 %) achieved MCID ((Chi square=17.8; p<0.01). This validates the prior preoperative PROMIS PF thresholds for patients undergoing F/A surgery who will and will not demonstrate MCID improvement in PROMIS PF. The AUC for PROMIS PI was not significant.

Conclusion: PROMIS PF cut offs from published data were successful in classifying patients who would improve in PF with surgery from a different geographic area and academic institution with a broad unique array of surgical procedures, diagnoses, and a diverse patient population. This study provides validation evidence to support using the PROMIS PF as a potential tool for surgical selection to help identify patients who would benefit from surgery as well as those who would not. This can allow for appropriate utilization of healthcare dollars and manpower resources to benefit our patients.
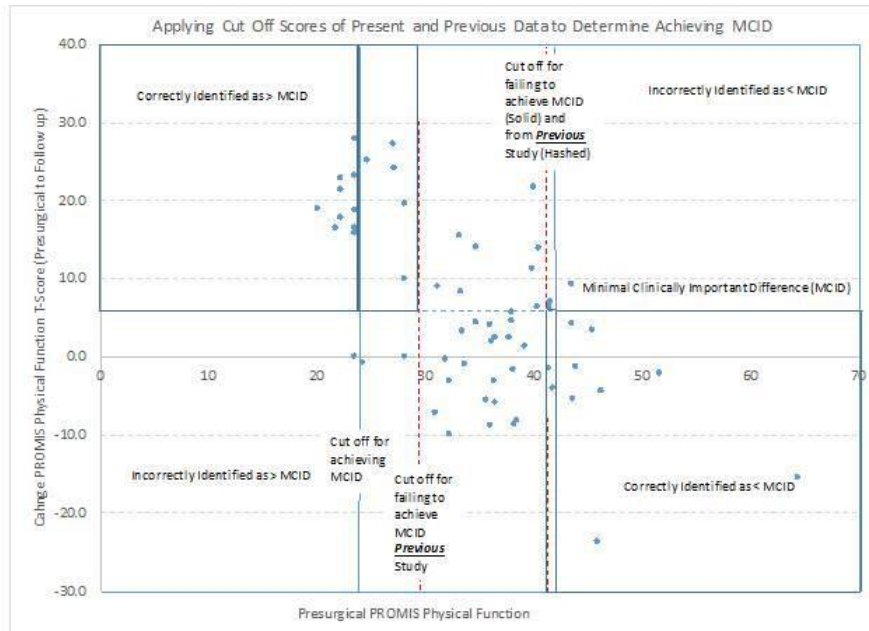
Figure 1. Patients identified as achieving and failing to achieve a minimal clinically important difference (MCID) using pre-surgical PROMIS physical Function based on the present data (shaded blue) and a previous study (shaded red and blue) are displayed.