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The Road to Recovery for Bunion Surgery: Data Analytic Plots to Target Patient Progress

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Introduction/Purpose: Patient reported outcomes (PROs) can provide information on individual patient's progress throughout a treatment course and additionally, with common surgeries, powerful numbers can be generated to provide data analytic curves to provide a recovery road map for patients and surgeons. Those who deviate negatively from the predicted path may have a complication and early intervention can be initiated. Those who deviate positively have the potential to need less physical therapy, early return to sports or work. Hallux valgus (HV) is a common condition of the foot with 4.4 million patients seeking care yearly and surgery is equally common. The purpose of this study was to determine if PROMIS PROs can be used to construct data analytic curves for HV surgery.

Methods: PROMIS scores were prospectively obtained from patients evaluated in a specialty foot and ankle clinic between February 2015 and November 2016. Using ICD-9/10 and CPT codes, a total of 65 patients with hallux valgus who underwent a bunionectomy by a single surgeon were identified. Those with less than two-month follow-up, multiple procedures during the follow-up period, as well as incomplete PROMIS assessment scores at any time point were excluded, resulting in 34 patients. Using a previously described method, bunionectomy-specific pre-operative cut-off values to achieve and fail to achieve minimally clinically important differences (MCID) in PF with 95% specificity and 95% sensitivity were determined. We then stratified patients based on their pre-operative PF T-scores as above or below the MCID cut-off. PF was evaluated using two-way ANOVA at 4 follow-up time periods and pre-operative cut-offs (above or below MCID cut-off) as factors to establish data analytic curves based on pre-operative scores.

Results: Bunionectomy-specific PF cut-off for 95% specificity of exceeding MCID was 39.6 and 50.2 for 95% sensitivity for failing to achieve MCID. Patients were stratified based on PF T-scores above ($n = 13$) or below ($n = 21$) the MCID cut-off of 50.2. Data analytic curves were generated for above the PF cut off and below PF cut off. (Figure 1) Pairwise comparison demonstrated that those starting with a T-score above the bunionectomy specific cut-off had significantly better PF pre-operatively ($p < 0.01$) and again at 6-12 week follow-up ($p = 0.02$). There were no differences at 1 week or 3-4 week follow-up time points.

Conclusion: This data confirms pre-operative PROMIS PF scores are significant post-operative predictors. While patients with pre-operative scores below the bunionectomy-specific cut-off met MCID changes in PF, their T-scores were significantly lower at 6-12wk follow-up than patients with high pre-operative T-scores. Although longer term follow-up is desirable, this short term follow up suggests a significant clinical impact of using PROMIS scores for pre-surgical decisions as well as provides a road map for recovery for patients and surgeons.

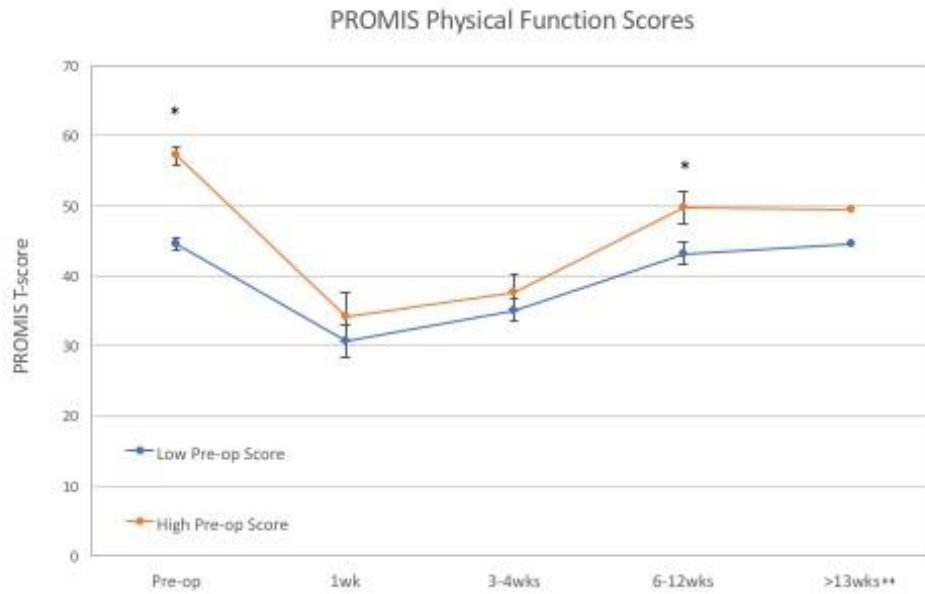


Figure 1. Trends in PF stratified based on pre-operative PF cut-offs (PF > 50.2, D > 58.1). Significant differences observed at pre-op visit ($p < 0.01$) and 6-12 weeks ($p = 0.02$). **Data points at > 13wks represent averages only and are not included in data analysis due to small sample size ($n = 5$ for high score, $n = 21$ for low score). * $p < 0.05$