

POSTER 47

Responsiveness of DASH and Select PROMIS Domains After Osseointegration in Transhumeral Amputees

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Background:

Historically, long-form patient-reported outcomes measures (PROMs) have presented a significant administrative burden onto patients and researchers alike. Novel, computerized adaptive testing-based PROMs, such as PROMIS, may provide a solution. We previously established concurrent validity of DASH and PROMIS in transhumeral amputees presenting for osseointegration at preoperative baseline.

Purpose:

We sought to evaluate the responsiveness of legacy (DASH) and novel (PROMIS) patient-reported outcomes measures in patients undergoing osseointegration after transhumeral amputation.

Patients and Methods:

We prospectively collected preoperative baseline and postoperative follow-up DASH, DVPRS, and PROMIS Pain Interference, Pain Behavior, and Physical Function – Upper Extremity scores in transhumeral amputees undergoing osseointegration. We analyzed responsiveness via Cohen's *d*, calculating the effect size index (ESI) at 12- and 24-months postoperatively. ESI values > 0.5 were designated as representative of a true change in patient status, as defined by previous authors. Statistical analysis was conducted in the R programming environment (R Core Team 2020).

Results:

We assessed 12 patients in total, all of whom were male, with a mean age of 38 (SD 12) years at time of surgery. Mean DASH, DVPRS, and PROMIS Pain Interference, Pain Behavior, and Physical Function – Upper Extremity scores for each timepoint are shown in Table 1. PROMIS Pain Interference and Pain Behavior domains demonstrated responsiveness at 24 months postoperatively, while the Physical Function domain did not (Table 2). The DASH score demonstrated responsiveness at 24 months, and DVPRS at both 12 and 24 months postoperatively.

Conclusions:

While the DASH, DVPRS, and PROMIS Pain Interference and Pain Behavior domains demonstrated significant responsiveness at two years' follow-up after osseointegration in transhumeral amputees, PROMIS Physical Function did not. This may have implications in collecting and interpreting PROMs in patients undergoing transhumeral osseointegration, and provide impetus for development of a novel CAT-based PROM specific to these patients.

Table 1. Mean PRO scores by time point, standard errors shown in parentheses.

	Pre- Operation	12 Months	24 Months
PROMIS – PF UE	33.59 (1.30)	34.34 (1.59)	35.30 (1.94)
PROMIS – PI	50.48 (2.08)	47.86 (2.85)	46.07 (1.49)
PROMIS – PB	50.22 (2.71)	48.37 (3.37)	42.22 (2.95)
DASH	35.78 (6.03)	30.34 (5.79)	19.17 (4.82)
DVPRS	1.82 (0.40)	0.88 (0.62)	1.00 (0.69)

Table 2. ESI values via Cohen's *d*, 95% confidence intervals shown in parentheses. Values > 0.5, representative of a true change in patient status, in bold.

	12 Months	24 Months
PROMIS		
PI	0.32 (-0.55, 1.19)	0.68 (-0.34, 1.67)
PB	0.18 (-0.69, 1.05)	0.87 (-0.16, 1.89)
PF UE	0.16 (-0.71, 1.02)	0.35 (-0.64, 1.34)
DASH		
DASH	0.27 (-0.60, 1.13)	0.86 (-0.17, 1.88)
DVPRS		
DVPRS Score	0.65 (-0.30, 1.57)	0.52 (-0.50, 1.53)