

# A Comparison of PROMIS Scores of Metatarsophalangeal Joint Arthrodesis and Polyvinyl Alcohol Hydrogel Implant Hemiarthroplasty for Hallux Rigidus

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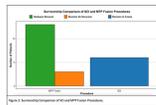
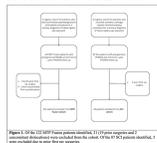
**INTRODUCTION:** The current literature shows similar clinical outcomes between first metatarsophalangeal (MTP) joint arthrodesis and synthetic cartilage implant (SCI) hemiarthroplasty in the treatment of hallux rigidus; however, prior studies have not reported validated patient-reported outcome measures (PROMs). To our knowledge, this is the first study to compare PROMs using 6 domains of the validated Patient-Reported Outcomes Measurement Information System (PROMIS) in patients treated for hallux rigidus with MTP joint arthrodesis and with SCI hemiarthroplasty. In addition, this novel study provides comparative data on the complication and revision rates for each procedure.

**METHODS:**

A single-center, retrospective registry search identified all patients with preoperative PROMIS scores who underwent MTP joint arthrodesis or SCI hemiarthroplasty for hallux rigidus between February 2016 and June 2021. The study aimed to determine if the 2 procedures showed statistically or clinically equivalent PROMIS scores in 6 domains: physical function, pain interference, pain intensity, global physical health, global mental health, and depression. A multivariable linear regression analysis was performed to compare adjusted 1-year postoperative PROMIS scores between the 2 cohorts. Complication and revision rates were also compared.

**RESULTS:** The study included 82 patients who underwent SCI hemiarthroplasty and 101 who underwent MTP joint arthrodesis. Demographic data and preoperative hallux rigidus severity showed no significant differences between the cohorts. The SCI cohort had no intra-operative or post-operative wound complications occurred; the MTP fusion cohort contained one patient with a superficial wound infection not needing operative intervention. The SCI group had six patients (7.3%) revised to MTP fusions within 3-years due to continued pain and/or implant subsidence; the MTP fusion group had 2 (2%) patients revised due to non-union and 13 (13%) patients that had symptomatic hardware requiring removal. PROMIS scores were mostly comparable between the 2 groups, except for the pain intensity domain. The patients who underwent MTP joint arthrodesis exhibited significantly better pain relief at 1 and 2 years postoperatively, which was supported by adjusted postoperative PROMIS scores. At 2 years, the SCI group had worse pain intensity scores and lower global physical health scores. There were no differences between the cohorts in additional PROMIS scores or complication data.

**DISCUSSION AND CONCLUSION:** For the treatment of hallux rigidus, the polyvinyl alcohol hydrogel implant hemiarthroplasty and metatarsophalangeal joint arthrodesis have equivalent outcomes for all PROMIS domains except the pain intensity domain. While patients in both cohorts had improvement in pain from pre-operative to post-operative time points, SCI was not as effective as a first MTP fusion at relieving pain intensity at a follow-up of 2 years. While SCI is a motion-sparing procedure, patients with a primary goal of improving pain may be better suited for first MTP joint arthrodesis. These findings, based on a large single-institution patient dataset without ties to the SCI designer, enhance study credibility. This information can guide patient counseling and decision-making when considering surgical intervention for hallux rigidus.



**Table 1. Hallux Rigidus Background Demographic Data**

Characteristic	SCI (n=82)	MTP (n=101)
Age (mean, SD)	64.1 (10.2)	64.1 (10.2)
Sex (n)		
Male	45	55
Female	37	46
Preoperative PROMIS scores (mean, SD)		
Physical Function	48.2 (10.1)	48.2 (10.1)
Pain Interference	52.1 (10.5)	52.1 (10.5)
Pain Intensity	55.3 (10.8)	55.3 (10.8)
Global Physical Health	50.4 (10.3)	50.4 (10.3)
Global Mental Health	51.2 (10.4)	51.2 (10.4)
Depression	53.5 (10.6)	53.5 (10.6)

**Table 2. Outcomes and Postoperative Patient Satisfaction**

Outcome	SCI (n=82)	MTP (n=101)
1-year PROMIS scores (mean, SD)		
Physical Function	49.1 (10.2)	49.1 (10.2)
Pain Interference	53.2 (10.6)	53.2 (10.6)
Pain Intensity	56.4 (10.9)	56.4 (10.9)
Global Physical Health	51.3 (10.4)	51.3 (10.4)
Global Mental Health	52.1 (10.5)	52.1 (10.5)
Depression	54.6 (10.7)	54.6 (10.7)
2-year PROMIS scores (mean, SD)		
Physical Function	49.5 (10.3)	49.5 (10.3)
Pain Interference	53.5 (10.7)	53.5 (10.7)
Pain Intensity	57.6 (11.0)	57.6 (11.0)
Global Physical Health	51.6 (10.5)	51.6 (10.5)
Global Mental Health	52.4 (10.6)	52.4 (10.6)
Depression	55.1 (10.8)	55.1 (10.8)

**Table 3. Revision and Complication Data**

Category	SCI (n=82)	MTP (n=101)
Revisions (n, %)	6 (7.3%)	15 (14.9%)
To MTP fusion	6	0
To other procedure	0	15
Complications (n, %)	0	1 (1.0%)
Wound infection	0	1

**Table 4. Patient Satisfaction Data**

Measure	SCI (n=82)	MTP (n=101)
Visual Analog Scale (VAS) for Pain Intensity (0-100)	45.2 (15.1)	45.2 (15.1)
Foot Function Score (0-100)	78.5 (12.3)	78.5 (12.3)
Quality of Life (QoL) Score (0-100)	65.4 (18.7)	65.4 (18.7)