Patient-Reported Outcomes Following Hallux Valgus Surgery

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INTRODUCTION: There remains a lack of uniform and relevant outcome measures in hallux valgus surgery, with historical studies citing physician-based outcome measurements over patient-reported outcome measures (PROMs) after hallux valgus surgery. Recent interest in Patient-Reported Outcomes Measurement Information System (PROMIS) has prompted the adaptation of its use across orthopaedic surgery disciplines. The purpose of this study was to evaluate radiographic and patient-reported outcomes following open and minimally invasive (MIS) hallux valgus correction, utilizing PROMIS as well as the Foot and Ankle Disability Index (FADI), a foot and ankle specific validated outcome measure.

METHODS: This was a retrospective study of adult patients who underwent hallux valgus surgery between October 2021 and December 2023 (Table 1). Charts and radiographs were reviewed for clinical course and for hallux valgus radiographic parameters of hallux valgus angle (HVA), intermetatarsal angle (IMA), and distal metatarsal articular angle (DMAA). PROMs included were the Foot and Ankle Disability Index (FADI), PROMIS Global Health (PROMIS-GH) with mental and physical health subscale components, PROMIS Pain Interference (PROMIS-PI), and PROMIS Physical Function (PROMIS-PF). Questionnaires were obtained preoperatively and at regular postoperative intervals (6 weeks, 3 months, 6 months, 1 year, and 2 years). Comparative analysis between surgical techniques utilized Mann-Whitney U tests. Radiographic change was compared pre- and postoperatively using Wilcoxon signed-rank tests. Spearman's rank correlation assessed the relationship between radiographic correction and PROM improvement. Multivariate linear regression was performed to identify independent predictors of PROM improvement. Multivariate linear regression was performed to identify independent predictors of PROM improvement.

RESULTS SECTION: Fifty-nine feet in 55 patients were included, with a mean age of 56.3 years and 86.7% female. The mean BMI was 29.0 kg/m². Seventeen (28.8%) surgeries were performed open and 42 (71.2%) were performed utilizing minimally invasive surgery (MIS) techniques. Procedures performed included Chevron Akin osteotomy (n=35; 59.3%), isolated Chevron osteotomy (n=5; 8.5%), isolated Akin osteotomy (n=6; 10.2%), combined proximal and distal osteotomy (n=7; 11.9%), or 1st MTP arthrodesis (n=6; 10.2%). Forty-nine (83%) patients completed preoperative and postoperative questionnaires at a minimum of 3 months after surgery, with an average time to final questionnaire of 399 days (range: 92–758 days). Both groups demonstrated significant radiographic improvement. The MIS group exhibited significantly greater IMA correction (p=0.002) and a trend toward greater DMAA correction (p=0.050). HVA correction was comparable between groups (Table 2). PROMs significantly improved postoperatively across both groups, with no statistically significant differences in PROM improvement between open and MIS techniques. Multivariate analysis identified MIS surgery as an independent predictor of greater FADI improvement (p=0.014). No other clinical variables, including age, BMI, A1c, diabetes, smoking status, or ASA class, were independently associated with PROM improvement (Table 3).

DISCUSSION: Both open and minimally invasive surgical techniques for hallux valgus correction resulted in significant radiographic and functional improvement as measured by PROMIS and FADI scores. MIS technique was associated with greater intermetatarsal angle correction and independently predicted greater improvement in the FADI. These findings add to the growing body of evidence supporting the use of MIS for hallux valgus correction, while also highlighting the value of incorporating both global and region-specific patient-reported outcome measures. Further prospective, randomized studies are warranted to validate these results and clarify the relationship between radiographic correction, surgical technique, and long-term functional outcomes.

SIGNIFICANCE/CLINICAL RELEVANCE: Both open and MIS hallux valgus correction result in reliable radiographic and functional improvements. MIS was associated with greater IMA correction and greater FADI improvement. These findings underscore the value of larger cohort analyses in understanding surgical outcomes for hallux valgus.

IMAGES AND TABLES:

Table 1. Demographic Summary

Variable	*All (n=59)*	*Open (n=17)*	*MIS (n=42)*	*p-value*
Age, mean (years)	56.3	57.1	56.0	0.753
Female, n (%)	51 (86.7%)	14 (82.4%)	37 (88.1%)	0.683
BMI, mean (kg/m²)	29.0	28.7	29.2	0.712
Diabetes, n (%)	7 (11.9%)	3 (17.6%)	4 (9.5%)	0.398
Smoker, n (%)	6 (10.2%)	2 (11.8%)	4 (9.5%)	0.673
ASA class ≥3, n (%)	11 (18.6%)	4 (23.5%)	7 (16.7%)	0.532

Table 2. Summary of Pre- and Postoperative Radiographic Measurements by All, Open, and MIS Cohorts

Radiographic Parameter	*All (N=59)*			*Open (N=17)*		*MIS (N=42)*		*p-value (Open vs MIS Postop)*
	Preop	Postop	p-value (Pre vs Postop)	Preop	Postop	MIS Pre	MIS Post	
HVA (degrees)	30.9	10.7	**<0.001**	31.2	11.1	30.8	10.5	0.849
IMA (degrees)	12.6	5.1	**<0.001**	12.8	6.3	12.5	4.6	**0.005**
DMAA (degrees)	18.0	4.5	**<0.001**	18.3	5.4	17.9	4.1	0.084

HVA: Hallux Valgus Angle; IMA: Intermetatarsal Angle; DMAA: Distal Metatarsal Articular Angle; SD: Standard Deviation.

*Significant p-values < 0.05 in bold

Table 3. Summary of Pre- and Postoperative PROMs†

PROM Domain	*All (N=49)*			*Open (N=14)*		*MIS (N=35)*		*p-value (Open vs MIS Postop)*
	Preop	Postop	p-value (Preop vs Postop)	Preop	Postop	Preop	Postop	
FADI	69.7	86.0	**<0.001**	70.1	85.3	69.6	86.3	0.718
PROMIS Pain Interference	60.9	55.1	**0.004**	61.2	55.9	60.8	54.8	0.457
PROMIS Global Health Physical	45.1	48.8	**0.003**	45.3	48.1	45.0	49.1	0.622
PROMIS Global Health Mental	46.0	48.2	**0.005**	45.7	48.0	46.1	48.3	0.538
PROMIS Physical Function	42.7	47.1	**0.009**	42.9	46.4	42.6	47.4	0.683

†Among patients with available PROM data at minimum of 3 months follow-up

*Significant p-values < 0.05 in bold