

Using Patient Global Impression of Change (PGIC) as an Anchor to Define the Minimal and Substantial Improvements in HOOS JR and KOOS JR after Total Joint Replacement

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INTRODUCTION:

Accurate interpretation of patient-reported outcome measures (PROMs) is essential for evaluating the success of total joint arthroplasty (TJA). With the Centers for Medicare & Medicaid Services (CMS) mandating the inclusion of joint-specific PROMs in the Inpatient Quality Reporting Program and Transforming Episode Accountability Model (TEAM), the need for validated, clinically interpretable change thresholds has become increasingly urgent. This study used the Patient Global Impression of Change (PGIC) scale to derive the minimal detectable change (MDC), minimal clinically important difference (MCID), and substantial clinical benefit (SCB) thresholds for the HOOS JR and KOOS JR instruments following primary total hip (THA) and knee arthroplasty (TKA).

METHODS:

We performed a retrospective cohort study using prospectively collected PROMs and PGIC data from a single high-volume orthopedic center. Patients undergoing primary THA or TKA between February 1, 2016 and July 1, 2023 were included if they completed HOOS JR or KOOS JR scores and responded to the PGIC scale 9–15 months postoperatively. The PGIC uses a 7-point scale to assess perceived overall postoperative change. MCID was defined by comparing “no change” versus “minimally improved” or “much improved” responses; SCB was defined by comparing “no change” to “much improved” or “very much improved.” MDC was derived using distribution-based methods, while MCID and SCB were determined using ROC curve analysis.

RESULTS: The final cohort included 6,743 patients (3,605 THA, 3,138 TKA). MDC values ranged from 7.5 to 12.2, depending on confidence interval. For HOOS JR, the MCID was 18.6 (95% CI: 13.0–30.5) and SCB was 26.3 (95% CI: 18.8–30.7). For KOOS JR, the MCID was 13.4 (95% CI: 8.9–21.9) and SCB was 22.6 (95% CI: 15.8–25.2). Applying these thresholds, 87% of THA patients and 81% of TKA patients achieved MCID; 77% of THA patients and 62% of TKA patients achieved SCB. In terms of direct patient-reported PGIC outcomes, 94% of THA patients and 86% of TKA patients rated themselves as “much improved” or “very much improved.”

DISCUSSION AND CONCLUSION:

To our knowledge, this study is the first to apply PGIC as an anchor to derive clinically interpretable thresholds for any orthopedic procedure. Our findings are consistent with prior work, which has reported MCID and SCB thresholds of 18/14 and 22/20 for HOOS JR/KOOS JR, respectively, using a proprietary satisfaction survey. Our updated PGIC-based values align closely with these and thus demonstrate strong face validity.

The discrepancies between PGIC ratings and SCB achievement underscores the importance of carefully selecting PROM-based performance metrics. While only 77% (THA) and 62% (TKA) met SCB thresholds based on how our model was defined, 94% and 86% of the same cohorts self-reported substantial improvement based purely on the PGIC scale. These findings suggest PGIC may better reflect patient-centered recovery and could serve as a pragmatic, single-time-point alternative to change-score-based metrics for future quality reporting.

In conclusion, this is the first study to derive MCID and SCB for HOOS JR and KOOS JR using PGIC as an anchor. Our results demonstrate the validity and clinical relevance of PGIC-based thresholds for interpreting patient-reported outcomes after TJA. PGIC represents a novel, efficient, and patient-centered method to benchmark meaningful recovery and may be ideal for PROM-based quality performance measurement in arthroplasty.

Mean Change Scores and MDC for HOOS JR and KOOS JR				
PROM	Mean Delta	MDC (CI = 95%)	MDC (CI = 90%)	MDC (CI = 80%)
HOOS JR N = 3,605	36.82	12.19	10.23	7.97
KOOS JR N = 3,138	27.60	11.52	9.67	7.54

Table 1

MCID & SCB Thresholds w/ Achievement Rates for HOOS JR and KOOS JR				
Joint	MCID (CI = 95%)	% Reached	SCB (CI = 95%)	% Reached
HOOS JR N = 3,605	18.6 (13.0 - 30.5)	87% THA Patients	26.3 (18.8 - 30.7)	77% THA Patients
KOOS JR N = 3,138	13.4 (8.9 - 21.9)	81% TKA Patients	22.6 (15.8 - 25.2)	62% TKA Patients

Table 2

Distribution of Patient Global Impression of Change (PGIC) Responses				
Joint	"Very much improved"	"Much Improved"	"Minimally improved" or "No change"	Worse
Hip N = 3,605	67%	27%	4.4%	1.4%
Knee N = 3,138	49%	37%	10%	3.8%

Table 3