



HARVARD MEDICAL SCHOOL **TEACHING HOSPITAL**

MASSACHUSETTS GENERAL HOSPITAL

The Effects of a Mental Health Diagnosis on Achieving the Minimal Clinically Important Difference in Primary and Revision Total Joint Arthroplasty

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Introduction

- There has been an increasing interest in preoperative factors that affect the success of total joint arthroplasty (TJA) as defined by patient-reported outcome measures (PROMs).
- While many studies have attempted to better understand which factors impact a patient’s ability to achieve the Minimal Clinically Important Difference for Improvement (MCID-I), few have considered the MCID for Worsening (MCID-W).
- Additionally, there remains a paucity of literature on the MCID for revision TJA (rTJA), likely owing to the high success rates of total hip arthroplasty (THA) and total knee arthroplasty (TKA).

Study Aims

1. To investigate differences in the rates of achieving MCID-I and MCID-W between THA and TKA patients.
2. To determine the influence of a preexisting mental health diagnosis (MHD) on patient outcomes.

Methods

- pTJA and rTJA patients from a multi-institutional arthroplasty registry from 2015 to 2021 were queried.
- Patients were included if they had completed a preoperative and 6-month postoperative questionnaire. The questionnaires included:
 - Hip Disability and Osteoarthritis Outcome Score-Physical Function Short Form (HOOS-PS)
 - Knee Injury and Osteoarthritis Outcome Score-Physical Function Short Form (KOOS-PS)
 - Patient-Reported Outcomes Measurement Information System (PROMIS) Physical Function Short Form 10a (PF10a)
 - PROMIS Global-Mental
 - PROMIS Global-Physical
- The threshold for achieving the MCID-I (MCID-W) was defined as one-half of the standard deviation of the mean change from preoperative to postoperative PROM scores of patients who experienced improvement (worsening).
- Mean PROM scores, rates of achieving MCID-I and MCID-W, and the presence of an MHD were compared between cohorts.
- A binary logistic regression analysis was also utilized to compare cohorts.

Table 1. Comparing MCID-I and MCID-W in Primary Total Joint Arthroplasty

	Primary THA (N = 2,032)	Primary TKA (N = 2,239)	P Value
PF10a	N = 1,838	N = 2,066	
MCID-I	1,347 (73%)	1,344 (65%)	<0.001
No Change	384 (21%)	499 (24%)	0.015
MCID-W	107 (5.8%)	223 (11%)	<0.001
PROMIS Global-Mental	N = 1,926	N = 2,149	
MCID-I	801 (42%)	961 (45%)	0.044
No Change	591 (31%)	537 (25%)	<0.001
MCID-W	534 (28%)	651 (30%)	0.072
PROMIS Global-Physical	N = 1,926	N = 2,148	
MCID-I	1,306 (68%)	1,284 (60%)	<0.001
No Change	410 (21%)	557 (26%)	<0.001
MCID-W	210 (11%)	307 (14%)	<0.001

Table 2. Comparing MCID-I and MCID-W in Revision Total Joint Arthroplasty

	Revision THA (N = 164)	Revision TKA (N = 209)	P Value
PF10a	N = 139	N = 192	
MCID-I	61 (44%)	85 (44%)	>0.9
No Change	47 (34%)	64 (33%)	>0.9
MCID-W	31 (22%)	43 (22%)	>0.9
PROMIS Global-Mental	N = 144	N = 195	
MCID-I	61 (42%)	67 (34%)	0.3
No Change	26 (18%)	74 (38%)	<0.001
MCID-W	57 (40%)	54 (28%)	0.005
PROMIS Global-Physical	N = 144	N = 195	
MCID-I	59 (41%)	99 (51%)	0.074
No Change	47 (33%)	40 (21%)	0.012
MCID-W	38 (26%)	56 (29%)	0.6

Table 3. MCID-I and MCID-W Subgroup Analysis for a Mental Health Diagnosis in Primary Total Hip Arthroplasty

	MHD (N = 890)	No MHD (N = 1,142)	P Value
HOOS-PS	N = 670	N = 946	
MCID-I	537 (80%)	809 (86%)	0.004
No Change	91 (14%)	105 (11%)	0.13
MCID-W	42 (6.3%)	32 (3.4%)	0.006
PF10a	N = 785	N = 1,053	
MCID-I	536 (68%)	811 (77%)	<0.001
No Change	197 (25%)	187 (18%)	<0.001
MCID-W	52 (6.6%)	55 (5.2%)	0.2
PROMIS Global-Mental	N = 837	N = 1,089	
MCID-I	323 (39%)	478 (44%)	0.019
No Change	263 (31%)	328 (30%)	0.5
MCID-W	251 (30%)	283 (26%)	0.052
PROMIS Global-Physical	N = 837	N = 1,089	
MCID-I	516 (62%)	790 (73%)	<0.001
No Change	200 (24%)	210 (19%)	0.014
MCID-W	121 (14%)	89 (8.2%)	<0.001

Table 4. MCID-I and MCID-W Subgroup Analysis for a Mental Health Diagnosis in Primary Total Knee Arthroplasty

	MHD (N = 937)	No MHD (N = 1,302)	P Value
KOOS-PS	N = 685	N = 954	
MCID-I	468 (68%)	645 (68%)	0.8
No Change	167 (24%)	218 (23%)	0.5
MCID-W	50 (7.3%)	91 (9.5%)	0.11
PF10a	N = 849	N = 1,217	
MCID-I	543 (64%)	801 (66%)	0.4
No Change	222 (26%)	277 (23%)	0.077
MCID-W	84 (9.9%)	139 (11%)	0.3
PROMIS Global-Mental	N = 900	N = 1,249	
MCID-I	429 (48%)	532 (43%)	0.020
No Change	211 (23%)	326 (26%)	0.2
MCID-W	260 (29%)	391 (31%)	0.2
PROMIS Global-Physical	N = 900	N = 1,248	
MCID-I	505 (56%)	779 (62%)	0.003
No Change	254 (28%)	303 (24%)	0.040
MCID-W	141 (16%)	166 (13%)	0.12

Results

- 4,644 patients (4,271 pTJAs and 373 rTJAs) were analyzed.
- Differences in the rates of achieving MCID-I and MCID-W were observed when comparing pTHA and pTKA for PF10a, PROMIS Global-Mental, and PROMIS Global-Physical.
- Almost no differences were demonstrated between the rTHA and rTKA cohorts, even when controlling for a MHD.
- For pTHA, the presence of a MHD affected rates of achieving MCID-I and MCID-W for HOOS-PS, PF10a, PROMIS Global-Mental, and PROMIS Global-Physical.
- The odds ratio (OR) further supported the effect of a MHD on failing to achieve MCID-I for PF10a (OR: 0.533, 95% CI: 0.428-0.663, p<0.001), PROMIS Global-Mental (OR: 0.424, 95% CI: 0.321-0.559, p<0.001), and PROMIS Global-Physical (OR: 0.475, 95% CI: 0.383-0.589, p<0.001).
- For pTKA patients with a MHD, only PROMIS Global-Physical demonstrated a lower rate of achieving MCID-I.

Conclusion

- Our results highlight differences in patient-perceived success and failure following pTJA and rTJA, as defined by the MCID-I and MCID-W rates.
- The presence of a MHD had a greater negative influence on pTHA patients than pTKA patients.
- Patients who underwent rTJA had lower rates of achieving MCID-I, higher rates of achieving MCID-W, and lower overall PROM scores.