

# 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

- To investigate differences in the rates of achieving MCID-I and MCID-W between THA and TKA patients.
- 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.

## 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.

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

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

	Revision THA (N = 164)	Revision TKA (N = 209)	P Value
<b>PF10a</b>	N = 139	N = 192	
<b>MCID-I</b>	61 (44%)	85 (44%)	>0.9
<b>No Change</b>	47 (34%)	64 (33%)	>0.9
<b>MCID-W</b>	31 (22%)	43 (22%)	>0.9
<b>PROMIS Global-Mental</b>	N = 144	N = 195	
<b>MCID-I</b>	61 (42%)	67 (34%)	0.3
<b>No Change</b>	26 (18%)	74 (38%)	<b>&lt;0.001</b>
<b>MCID-W</b>	57 (40%)	54 (28%)	<b>0.005</b>
<b>PROMIS Global-Physical</b>	N = 144	N = 195	
<b>MCID-I</b>	59 (41%)	99 (51%)	0.074
<b>No Change</b>	47 (33%)	40 (21%)	<b>0.012</b>
<b>MCID-W</b>	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
<b>HOOS-PS</b>	N = 670	N = 946	
<b>MCID-I</b>	537 (80%)	809 (86%)	<b>0.004</b>
<b>No Change</b>	91 (14%)	105 (11%)	0.13
<b>MCID-W</b>	42 (6.3%)	32 (3.4%)	<b>0.006</b>
<b>PF10a</b>	N = 785	N = 1,053	
<b>MCID-I</b>	536 (68%)	811 (77%)	<b>&lt;0.001</b>
<b>No Change</b>	197 (25%)	187 (18%)	<b>&lt;0.001</b>
<b>MCID-W</b>	52 (6.6%)	55 (5.2%)	0.2
<b>PROMIS Global-Mental</b>	N = 837	N = 1,089	
<b>MCID-I</b>	323 (39%)	478 (44%)	<b>0.019</b>
<b>No Change</b>	263 (31%)	328 (30%)	0.5
<b>MCID-W</b>	251 (30%)	283 (26%)	0.052
<b>PROMIS Global-Physical</b>	N = 837	N = 1,089	
<b>MCID-I</b>	516 (62%)	790 (73%)	<b>&lt;0.001</b>
<b>No Change</b>	200 (24%)	210 (19%)	<b>0.014</b>
<b>MCID-W</b>	121 (14%)	89 (8.2%)	<b>&lt;0.001</b>

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

## 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 pTJA 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.