

Time to Achieve the Minimal Clinically Important Difference in Primary Total Hip Arthroplasty: Comparison of Anterior and Posterior Surgical Approaches

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INTRODUCTION: Total hip arthroplasty (THA) is a commonly performed procedure for the treatment of hip osteoarthritis and other conditions that cause hip pain and dysfunction. Two of the more commonly used approaches vary considerably in their surgical technique. The anterior approach relies on accessing the joint space through an intermuscular plane, whereas the posterior approach accesses the joint space through the gluteal muscles and short external rotators. Accordingly, investigators have attempted to compare the two approaches in terms of objective outcomes, such as radiographic stability and implant survivorship, as well as subjective outcomes, such as patient-reported outcomes measures (PROMs). However, the results are mixed and inconclusive to definitively support one technique over the other. To date, no study has attempted to determine when patients can expect to notice a clinically meaningful difference following their THA, termed the minimal clinically important difference (MCID). Thus, this study aimed to determine and compare the time to achieve the MCID for the Hip Disability and Osteoarthritis Outcome Score-Physical Function Short Form (HOOS-PS) and the Patient-Reported Outcomes Measurement Information System (PROMIS) Global-Physical for patients who underwent anterior and posterior surgical approaches in primary THA.

METHODS: Following institutional review board approval, a multi-institutional arthroplasty registry containing PROM scores was queried. Patients who underwent a primary THA from January 1, 2018 to January 31, 2021 were identified by the Current Procedural Terminology (CPT) code 27130 and scores for the HOOS-PS and the PROMIS Global-Physical were collected. Patients were included if they had a preoperative and one-year postoperative PROM score and were then stratified by surgical approach. Demographic and MCID achievement rates were compared using Pearson chi-squared and Wilcoxon rank-sum tests. Survival curves with and without interval censoring were used to assess the time to achieve the MCID by approach. Log-rank tests were used to analyze data without interval censoring, and weighted log-rank tests were used for interval-censored data. Weibull regression analysis with hazard functions was performed to assess potential covariates.

RESULTS:

A total of 2,725 patients (1,054 anterior/1,671 posterior) were analyzed. Anterior THA patients had a lower body mass index (BMI, 28.0 kg/m²±5.6 vs. 28.6 kg/m²±5.8, p=0.05) and Charlson Comorbidity Index (6.1±2.8 vs. 6.6±3.1, p<0.001) than posterior THA patients. There were no significant differences in median MCID achievement times for the HOOS-PS (anterior: 5.9 months, 95% confidence interval [CI]: 4.6-6.4 months; posterior: 4.4 months, 95% CI: 4.1-5.1 months, p=0.65) or the PROMIS Global-Physical (anterior: 4.2 months, 95% CI: 3.5-5.3 months; posterior: 3.5 months, 95% CI: 3.4-3.8 months, p=0.08) between approaches (Figure 1). Interval censoring revealed earlier times of achieving the MCID for both the HOOS-PS (anterior: 1.509-1.511 months; posterior: 1.7-2.3 months, p=0.87) and the PROMIS Global-Physical (anterior: 3.0-3.1 weeks; posterior: 2.7-3.3 weeks, p=0.18) for both surgical approaches (Figure 2). Only age was found to be a significant variable for time to achieving the MCID for the HOOS-PS, however, this value may not be clinically significant given the hazard ratio (HR) was nearly 1 (HR: 1.03, 95% CI: 01.00-1.05, p=0.04) (Figure 3).

DISCUSSION AND CONCLUSION:

The time to achieve the MCID after primary THA did not differ by surgical approach. Most patients will achieve clinically meaningful improvements in physical function much earlier than previously believed. Choosing which surgical approach should be based on the patient's specific condition and the surgeon's expertise and preferences.

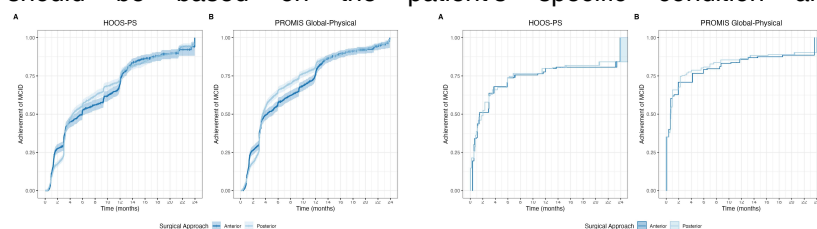


Figure 3. Weibull Regression of Potential Covariates Affecting the Time to Achievement of the MCID

Variable	Hazard Ratio	Lower Range	Upper Range	P Value
HOOS-PS				
Posterior Approach	0.93	0.58	1.50	0.75
Age	1.03	1.00	1.05	0.036
Body Mass Index	0.99	0.95	1.03	0.45
Charlson Comorbidity Index	1.02	0.93	1.10	0.72
Male Gender	1.18	0.74	1.88	0.49
PROMIS Global-Physical				
Posterior Approach	0.94	0.54	1.63	0.82
Age	1.03	1.00	1.05	0.06
Body Mass Index	1.02	0.97	1.06	0.55
Charlson Comorbidity Index	1.04	0.95	1.14	0.44
Male Gender	0.78	0.45	1.33	0.36

Bold indicates statistically significant (p<0.05).

Ranges represent the 95% confidence interval.

The categorical variables listed demonstrate the group being examined compared to its alternative category.

MCID, minimal clinically important difference; HOOS-PS, Hip Disability and Osteoarthritis Outcome Score-Physical Function Short Form; PROMIS, Patient-Reported Outcomes Measurement Information System.