

50% Lower Dislocation Rate with Direct Anterior Approach Compared to Posterior Approach for Primary Total Hip Arthroplasty in a Statewide Registry

Clayton Foster¹, Karl C Roberts, Ya Tuo, Brian Richard Hallstrom, Elizabeth Ann Dailey

¹Orthopedic Surgery

INTRODUCTION: Dislocation following total hip arthroplasty (THA) remains a challenging problem for arthroplasty surgeons. Previous studies from this state registry failed to show a difference in dislocation rate between the direct anterior approach (DAA) and posterior approach (PA) in primary THA. In the past 4 years, DAA utilization has surpassed that of PA. This study aimed to reevaluate if growing use of the DAA has uncovered an association between surgical approach and 90-day dislocation.

METHODS: Propensity score matching of 138,073 was performed based on age, sex, weight, and height for primary THA cases in a statewide registry from Feb 15, 2012 – July 9, 2024. This generated 61,875 matched pairs, and a logistic regression model was fit to assess the difference in 90-day dislocation between DAA and PA while accounting for clustering at surgeon level and adjusting for age, sex, BMI, insurance, smoking status, diabetes, marital status, ASA classification, dual mobility (DM) status, technology assistance (manual, robotic, navigation), and SDI (social deprivation index).

RESULTS: In a multiple logistic regression model using the matched cohorts, 113,766 patients had a total of 886 dislocations at 90 days (0.8%). Dislocation rates decreased from 1.17% in 2014 to 0.56% in 2022. Significantly lower rates were seen in DAA compared to PA (0.50% vs 1.05%; OR 0.44, p<0.001). In addition to surgical approach, dislocation was also found to be significantly associated with smoking status, marital status, insurance, ASA score, and BMI (all p<0.02). Dislocation rates were higher in patients who smoke (OR 1.45, p<0.001), were unmarried (R 1.31, p<0.0011), had diabetes (OR 1.29, p<0.0001), or were ASA III+ (OR1.73, p<0.001). No significant association was found between dislocation and DM status (p=0.42), or technology assistance (p=0.37).

Univariate logistic regression including only the non-DM cohort showed that head size <36mm had significantly higher rates of dislocation than 36mm (OR 0.69, p<0.001) and >36mm (OR 0.74, p<0.01), but there was no significant difference between 36mm and >36mm.

DISCUSSION AND CONCLUSION: This data demonstrates a 50% lower rate of 90-day dislocation in patients undergoing primary THA via DAA compared to PA. While there remain benefits of both approaches, surgeons should take this into account when risk-stratifying patients for surgery.

Table 1: Baseline characteristics of propensity score matched DAA and PA cohorts.

Characteristic	PA		DAA		SMD
	Mean	Standard Deviation	Mean	Standard Deviation	
Age at case (years)	65.6	11.3	65.6	10.5	-0.004
Weight (kg)	86.0	19.6	86.0	19.5	0.001
Height (cm)	170.0	10.4	170.1	10.3	0.007
	N	(%)	N	(%)	
Sex					
Female	33509	(54.2)	33636	(54.4)	0.004
Male	28366	(45.8)	28239	(45.6)	

PA, posterior approach; DAA, direct anterior approach; SMD, standardized mean difference.

Table 2: Logistic regression model using generalized estimating equations for 90-day dislocation (reduced model, accounting for clustering at the surgeon level).

The sample size for this analysis was 113,766 patients with 886 events

Variable	Odds ratio	95% CI	p-value	Overall p-value
Age at case (years)				
<65	1.00 (ref)			
≥65	0.86	0.69-1.08	0.20	
BMI				
Group 1: <30	1.00 (ref)			
Group 2: 30-34.9	0.94	0.81-1.08	0.35	0.02
Group 3: 35-39.9	0.67	0.55-0.84	<.001	
Group 4: 40-44.9	0.93	0.66-1.32	0.70	
Group 5: ≥45	0.73	0.36-1.47	0.38	
Sex				
Male	1.00 (ref)			
Female	1.00	0.88-1.14	0.98	0.98
Marital status				
Married or Life Partner	1.00 (ref)			
Unmarried	1.07	0.94-1.23	0.32	0.32
Primary payer				
Commercial/HD/O	0.52	0.38-0.72	<.001	
Commercial/Private	0.63	0.48-0.80	<.001	
Government	0.80	0.58-1.12	0.19	<.001
Medicaid	0.81	0.61-1.09	0.16	
Medicare	1.00 (ref)			
Medicare Advantage	0.91	0.71-1.09	0.31	
Other	0.67	0.52-0.87	<.01	
Diabetes status				
No	1.00 (ref)			
Yes	0.99	0.85-1.16	0.94	0.94
Smoking status				
Never	1.00 (ref)			
Previous	1.20	1.04-1.39	0.02	<.001
Current	1.45	1.20-1.76	<.001	
ASA score				
I, II	1.00 (ref)			
III, IV	1.73	1.53-1.96	<.001	<.001
SDI score				
Group 1: ≤SDI<25	1.00 (ref)			
Group 2: 25-≤SDI<50	0.94	0.80-1.11	0.45	0.85
Group 3: 51-≤SDI<75	0.84	0.71-1.16	0.58	
Group 4: ≥SDI≥100	0.93	0.75-1.15	0.48	
Surgical approach				
PA	1.00 (ref)			
DAA	0.44	0.35-0.56	<.001	<.001
Dual mobility status				
Non-dual Mobility	1.00 (ref)			
Dual Mobility	0.85	0.57-1.27	0.42	0.42
Special				
Robotic	1.00 (ref)			
Regular	1.25	0.91-1.70	0.17	0.37
Navigation	1.17	0.75-1.80	0.49	