

Surgical Approach Does Not Influence Instability Risk in Revision Total Hip Arthroplasty

Eric Secrist, M.D.¹, Devon Pekas, M.D., M.S.¹, Daniel Neal, M.D.¹, Kelly Boutelle, M.S.³, Yingxing Wu, M.D.⁴, Murillo Adrados, M.D.^{1,2}, Joseph Moskal, M.D.^{1,2}, Benjamin Coobs, M.D.^{1,2}

¹Department of Orthopaedic Surgery, Institute for Orthopaedics & Neurosciences, Carilion Clinic, Roanoke, Virginia, ²Department of Orthopaedic Surgery, Virginia Tech Carilion School of Medicine, Roanoke, Virginia, ³Virginia Tech Carilion School of Medicine, Roanoke, Virginia, ⁴Health Analytics Research Team, Carilion Clinic, Roanoke, VA

Disclosures: Eric Secrist, M.D. (None), Devon Pekas, M.D., M.S. (None), Daniel Neal, M.D. (None), Kelly Boutelle, M.S. (None), Murillo Adrados, M.D. (None), Joseph Moskal, M.D. (None), Yingxing Wu, M.D. (None), Benjamin Coobs, M.D. (None)

INTRODUCTION: Although the direct anterior (DA) approach has increased in popularity for primary total hip arthroplasty (THA), there is limited evidence regarding its use for revision THA. It is unknown whether the dislocation benefit seen in the primary setting translates to revision cases.

METHODS: This retrospective review compared patients undergoing revision THA through DA versus PL approaches at a single institution from 2011-2021. The primary outcome was dislocation rate. Exclusion criteria included revision for instability, ≥2 prior revisions, approaches other than DA or PL, and placement of dual-mobility or constrained liners.

RESULTS: 182 hips in 173 patients met inclusion criteria. Demographics were similar. Average follow-up was 6.5 years with a minimum of 2 years. There was a trend towards more both component revisions being performed through the PL approach. Observed dislocation rates for all DA revisions were 8.1% (5/62), with 9.3% (4/43) and 5.3% (1/19) following index primary DA and PL THAs, respectively. Observed dislocation rates for all PL revisions were 7.5% (9/120), with 4.5% (1/22) and 8.2% (8/98) following index primary DA and PL THAs, respectively. The incidence of dislocation between DA and PL revisions was not statistically significant (8.1% vs 7.5%, p=0.999). Discordant approaches had a lower dislocation rate than concordant approaches (4.9% vs 8.5%), however this difference was not statistically significant (p=0.740). There was no significant difference in return to the OR between groups (17.7% DA vs 24.2% PL, p=0.422).

DISCUSSION: This study did not find a significant advantage in terms of reduced dislocation risk for either the DA or PL approach in cases of revision THA. Although certain surgeons may highlight specific benefits of one approach over the other for revision THA procedures, our current research suggests that the majority of indications and reconstructions for THA revision can be effectively addressed using either approach. Moreover, both the anterior and posterior approaches resulted in similar implant survival rates. The choice of a concordant approach, matching the original approach used for the primary THA, during revision did not show a dislocation benefit. Some surgeons propose using the same approach as the primary THA during revision to prevent overall hip instability by not destabilizing both the anterior and posterior anatomic planes. Our findings alleviate such concerns as we did not observe an increased risk of instability with discordant approaches. We noted a statistically significant reduction in length of stay (LOS) for patients who underwent a DA approach revision surgery after initially receiving a posterior primary THA. We believe this may provide DA revisions through a native plane the same expedited recovery and shorter LOS observed in primary THA. It's important to acknowledge limitations in this study, such as the potential impact of surgeon decision-making on the choice of surgical approach and the narrow focus on specific outcomes.

Overall, this retrospective study of revision THAs found that surgical approach was not correlated with instability risk – DA and PL approaches resulted in similar dislocation rates regardless of the primary approach. Dislocation rate following use of a discordant approach was lower than the concordant approach, despite not being statistically significant. This contradicts the professional opinion, held by many, that that utilization of discordant approaches for revision THA increases risks for hip instability due to the disruption of the soft tissues, circumferentially. In conclusion, based on our results, we believe that surgeons should choose their surgical approach by specific reconstruction requirements of each case and the surgeon's own personal experience rather than an attempt to minimize subsequent instability.

SIGNIFICANCE/CLINICAL RELEVANCE: Dislocation rates following revision THA did not differ between DA and PL approaches irrespective of the primary approach. Surgeons should not choose their revision approach based solely on minimizing instability risk.

	Group 1	Group 2	Group 3	Group 4	p-value
Primary Approach	Posterior	Anterior	Posterior	Anterior	
Revision Approach	Posterior	Posterior	Anterior	Anterior	
N	98	22	19	43	
Age ± SD (years)	65.4 ± 13.4	64.5 ± 13.7	69.9 ± 10.7	66.3 ± 10.6	0.505*
Female	49.0%	54.5%	57.9%	48.8%	0.874 [^]
BMI ± SD	31.5 ± 6.7	31 ± 7.3	31 ± 6.8	29.9 ± 6	0.648 [^]
ASA ± SD	2.7 ± 0.6	2.5 ± 0.7	2.3 ± 0.5	2.6 ± 0.7	0.013*
LOS - Median (IQR)	3.3 (2.2, 6.0)	3.5 (2.5, 5.5)	2.2 (1.2, 3.3)	3.4 (2.2, 6.7)	0.021 [®]
Dislocations (%)					
Individual Group	8/98 (8.2%)	1/22 (4.5%)	1/19 (5.3%)	4/43 (9.3%)	
Posterior vs. Anterior Revision	Groups 1+2= 9/120 (7.5%)		Groups 3+4= 5/62 (8.1%)		0.999 [^]
Concordant vs. Discordant	Groups 1+4= 12/141 (8.5%)		Groups 2+3= 2/41 (4.9%)		0.740 [^]

Table 1. Baseline demographics, hospital length of stay, and dislocation rate among patients undergoing revision total hip arthroplasty by anterior or posterior approaches. SD= Standard Deviation; BMI= Body Mass Index; ASA= American Society of Anesthesiologists; LOS= Length of Stay; IQR= Interquartile Range. * = One-way analysis of variance; [^] = Chi-square test; [®] = Kruskal-Wallis test.

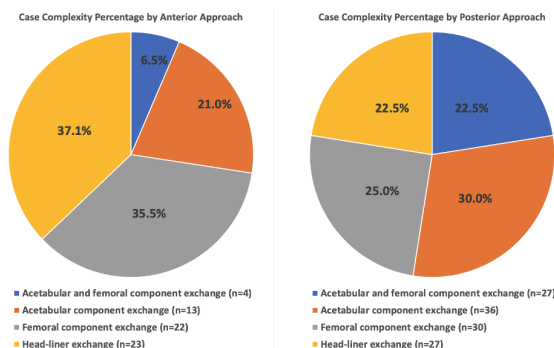


Figure 1. Procedures performed among patients undergoing revision total hip arthroplasty through the direct anterior (Left chart) or posterolateral (Right chart) approaches.

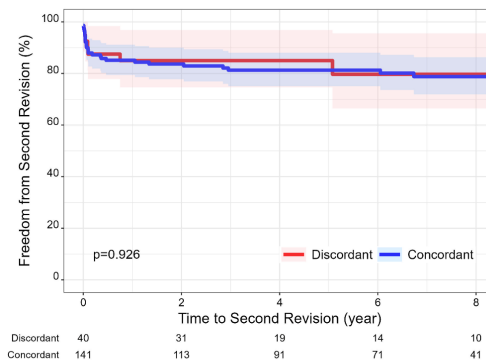


Figure 2. Freedom from second revision following discordant (Red) or concordant (Blue) approaches. The table contains the amount of qualifying patients for each approach at the respective time periods. Discordant includes 1) anterior primary and posterior revision and 2) posterior primary and anterior revision cohorts. Concordant includes 1) anterior primary and anterior revision and 2) posterior primary and posterior revision cohorts.