



Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

World Expert Meeting in Arthroplasty 2024

Is There a Role for Isolated Femoral Head and Liner Exchange in Patients Who Have Instability of the Hip?



Amir Human Hoveidaei, MD, MSc^a, Sina Esmaeili, MD^b, Alireza Azarboo, MD^c,
Kerem Başarır, MD^d, Luigi Zagra, MD^e, Ye Ye, MD^f, Michael A. Mont, MD^a,
Mustafa Citak, MD, MBA^{g,*}

^a Rubin Institute for Advanced Orthopedics, LifeBridge Health, Sinai Hospital of Baltimore, Baltimore, Maryland^b Sina University Hospital, Tehran University of Medical Sciences, Tehran, Iran^c School of Medicine, Tehran University of Medical Sciences, Tehran, Iran^d Department of Orthopedics and Traumatology, Private Orthopedic Surgeon, Ankara, Türkiye^e Hip Department, IRCCS Istituto Ortopedico Galeazzi, Milano, Italy^f Sichuan Provincial Orthopedic Hospital, Hip and Knee Joint Department, Chengdu City, China^g Department of Orthopaedic Surgery, ENDO-Klinik Hamburg, Holstenstr, Hamburg, Germany

ARTICLE INFO

Article history:

Received 20 September 2024

Received in revised form

9 October 2024

Accepted 11 October 2024

Available online 18 October 2024

Keywords:

acetabular malpositioning

femoral head exchange

hip instability

liner exchange

total hip arthroplasty

Is There a Role for Isolated Femoral Head and Liner Exchange in Patients Who Have Instability of the Hip?

Response/Recommendation: Although isolated femoral head and liner exchange has been employed to treat hip instability following total hip arthroplasty, this procedure carries a notable prevalence of persistent dislocation (15.4%) and re-revision (16.9%). Thus, we recommend that this surgical option be used only in select circumstances and when the acetabular component malpositioning is not the culprit for instability.

Level of Evidence: Moderate.

Agreed vote: 166 (89.7%).

Rationale

We conducted a systematic review to retrieve all articles related to femoral head and liner exchange for the treatment of recurrent instability after total hip arthroplasty (THA). After screening the retrieved articles and abstracts, nine articles were included for the final analyses and review (Table 1) [1–9]. Studies specifically addressing hip revisions with constrained, bipolar, or dual-mobility bearings were excluded from the review. The reviewed articles,

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to <https://doi.org/10.1016/j.arth.2024.10.045>.

* Address correspondence to: Mustafa Citak, MD, MBA, Department of Orthopaedic Surgery, Helios ENDO-Klinik Hamburg, Holstenstrasse 2, Hamburg, Germany 22767.

<https://doi.org/10.1016/j.arth.2024.10.045>

0883-5403/© 2024 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

published between 2004 and 2024, were predominantly conducted in the United States, with three additional studies from Australia and Taiwan. The prevalence of postoperative dislocation and re-revision in these patients was analyzed through proportion analysis, employing the inverse variance method, utilizing R software. Egger's regression test was used to evaluate publication bias.

In the nine reviewed articles, all studies had at least 1 year of follow-up. A total of 1,594 patients who underwent isolated femoral head and liner exchange were included. Among these, 189 patients experienced redislocation (pooled prevalence [95% confidence interval (CI)] = 15.4 [10.78 to 21.52], $I^2 = 75\%$), and 164 patients required re-revision (pooled prevalence [95% CI] = 16.9 [14.68 to 19.40], $I^2 = 32\%$). No publication bias was detected in any of these outcomes.

There were six studies that also investigated the functional outcome of these patients using the Harris Hip Score, Hip Disability and Osteoarthritis Outcome Score, visual analog scale, and similar

Table 1

Baseline Characteristics of Reviewed Articles and Revision Outcomes.

Author, Year	Country	Total Number of Hips, n	Age, Years	Sex (m:w)	Dislocation, n	Re-Revision, n	Follow-Up
Berlinberg et al. 2022 [1]	USA	7	/	/	4	/	43 (24 to 110) months
Biviji et al. 2009 [2]	USA	48	69.2 (51 to 87)	20:28	13	10	4.7 (1.2 to 9.4) years
Cheng et al. 2024 [3]	USA	52	71.4 ± 11.8	26:26	12	12	55.0 (24.2 to 85.9) months
Robertson et al. 2022 [4]	USA	248	64.9 (28 to 88)	123:123	30	/	2.3 ± 2.3 years
Wetters et al. 2013 [5]	USA	321	/	/	41	/	2 years
Hoskins et al. 2020 [6]	Australia	722	69.1	280:442	67	124	5.7 years
Stevenson et al. 2020 [7]	USA	141	/	/	16	15	55.8 months
Wade et al. 2004 [8]	USA	35	60.5 (28 to 85)	16:19	2	/	2.6 (2 to 3.5) years
Wang et al. 2020 [9]	Taiwan	20	61.3 (40 to 93)	12:8	4	3	45.7 (12 to 128) months

measures. All reported significant improvements in function and reductions in pain scores following isolated femoral head and liner exchange.

Regarding factors affecting the likelihood of redislocation after revision, Robertson et al. conducted the most comprehensive investigation [4]. Their multivariate Cox regression analyses, with redislocation as the endpoint, revealed that hips with cup abduction angles greater than 48 degrees were 2.6 times more likely to dislocate ([95% CI] = 1.3 to 5.4, $P = 0.01$). No other covariates, including height, weight, sex, neck length, head diameter, cup anteversion, and revision surgical approach, were associated with an increased risk of dislocation. Other studies concurred with these findings. Also, Robertson et al. demonstrated that hips without dislocation exhibited a larger increase in femoral head diameter compared to those with dislocation (3.5 ± 4.4 versus 1.8 ± 3.4 mm, respectively, $P = 0.04$).

As a limitation of this review, it should be noted that most of the included articles examined patients who had various indications for revision surgery, rather than focusing solely on instability, and did not segregate the results based on the specific indication. Consequently, the reviewed articles encompass a broader patient group beyond those with hip instability. For more precise insights, future research should focus exclusively on patients who have hip instability.

CRedit authorship contribution statement

Amir Human Hoveidaei: Writing – original draft, Supervision, Methodology. **Sina Esmaeili:** Writing – original draft, Methodology. **Alireza Azarboo:** Writing – original draft. **Kerem Başarır:**

Writing – review & editing, Methodology. **Luigi Zagra:** Writing – review & editing, Methodology. **Ye Ye:** Writing – review & editing. **Michael A. Mont:** Writing – review & editing. **Mustafa Citak:** Writing – review & editing, Project administration, Methodology, Conceptualization.

References

- [1] Berlinberg EJ, Roof MA, Shichman I, Meftah M, Schwarzkopf R. Prior instability is strongly associated with dislocation after isolated head and liner exchange. *J Arthroplasty* 2022;37:2412.
- [2] Biviji AA, Ezzet KA, Pulido P, Colwell Jr CW. Modular femoral head and liner exchange for the unstable total hip arthroplasty. *J Arthroplasty* 2009;24:625.
- [3] Cheng R, Blevins J, Debbs EM, Chiu YF, Gonzalez Della Valle A, Lee GC. Contemporary isolated bearing exchange for the management of hip instability following primary total hip arthroplasty. *J Arthroplasty* 2024;39:S173–7.
- [4] Robertson RN, Parks NL, Ho H, Hopper Jr RH, Hamilton WG. Does approach influence the dislocation rate following head and liner exchange in revision hip arthroplasty? *J Arthroplasty* 2022;37:336–41.
- [5] Wetters NG, Murray TG, Moric M, Sporer SM, Paprosky WG, Della Valle CJ. Risk factors for dislocation after revision total hip arthroplasty. *Clin Orthop Relat Res* 2013;471:410–6.
- [6] Hoskins W, Bingham R, Hatton A, de Steiger RN. Standard, large-head, dual-mobility, or constrained-liner revision total hip arthroplasty for a diagnosis of dislocation: an analysis of 1,275 revision total hip replacements. *J Bone Joint Surg Am* 2020;102:2060–7.
- [7] Stevenson KL, Fryhofer G, Hasenauer M, Lee GC. Instability after all-cause acetabular-only revision total hip arthroplasty remains a clinical problem. *J Arthroplasty* 2020;35:3249–53.
- [8] Wade FA, Rapuri VR, Parvizi J, Hozack WJ. Isolated acetabular polyethylene exchange through the anterolateral approach. *J Arthroplasty* 2004;19:498–500.
- [9] Wang PH, Tsai SW, Chen CF, Wu PK, Chen CM, Chang MC, et al. Cementation of the highly cross-linked polyethylene liner into a well-fixed acetabular shell to treat patients with recurrent dislocation after total hip arthroplasty. *Artif Organs* 2021;45:E136–45.