Dual-mobility Constructs Versus Large Femoral Heads in Revision Total Hip Arthroplasty: A Systematic Review

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Introduction:
Dislocation remains a leading cause of failure after revision total hip arthroplasty (rTHA). Dual-mobility cups (DMCs) and large femoral heads (LFHs) are commonly used to mitigate instability, but their comparative effectiveness in the revision setting is uncertain. We conducted a systematic review with the objective of comparing postoperative dislocation, re-revision, and complication rates between DMC and LFH constructs in rTHA.

Methods:
Following PRISMA guidance, we searched PubMed, Embase, and Scopus for comparative studies (2017–2025) reporting outcomes after rTHA using DMC or LFH (≥36 mm). Nine retrospective cohorts met inclusion criteria. Primary outcome was postoperative dislocation during the index revision episode. Secondary outcomes were all-cause re-revision and cause-specific re-revision (instability, aseptic loosening, periprosthetic joint infection, and periprosthetic fracture). We summarized raw events and calculated relative risk (RR), absolute risk reduction (ARR), and number-needed-to-treat (NNT). Sex and sample size: N = 3,095 rTHAs (1,204 DMC; 1,891 LFH). Sex distribution was inconsistently reported across cohorts; based on reported proportions, approximately 1,723 were female and 1,372 were male.

Results:
Across nine studies comprising 3,095 rTHAs, postoperative dislocation occurred in 37 of 939 DMC hips (3.9%) and 87 of 1,504 LFH hips (5.8%), yielding RR 0.68, ARR 1.9 percentage points, and NNT 54. All-cause re-revision was lower with DMC (6.3% vs 9.2%; ARR 2.9%; NNT 35), driven by fewer re-revisions for instability (3.1% vs 5.5%; RR 0.56; ARR 2.4%; NNT 42). Re-revision for aseptic loosening was 2.2% with DMC versus 3.5% with LFH (RR 0.65). Re-revision for periprosthetic joint infection (3.4% vs 3.3%) and for periprosthetic fracture (0.7% vs 1.2%) were infrequent and showed no meaningful between-group differences. Weighted mean follow-up was approximately 48 months (range 24–92).

Discussion:
In comparative cohorts of rTHA, DMC constructs were associated with lower dislocation rates and fewer re-revisions overall compared with LFH liners. While absolute risk reductions were modest, these differences are clinically relevant given the morbidity and resource use associated with instability and repeat surgery. Interpretation is limited by the retrospective design of all included studies and heterogeneity in reporting and follow-up.

Significance/Clinical Relevance:
In rTHA, DMC use was linked to a one-third relative reduction in postoperative instability versus LFH (RR 0.68), equating to approximately two fewer dislocations per 100 procedures (ARR 1.9%; NNT 54) and fewer re-revisions overall, without a signal of increased infection or fracture revisions. These findings support considering DMCs for patients at elevated risk of instability in the revision setting.

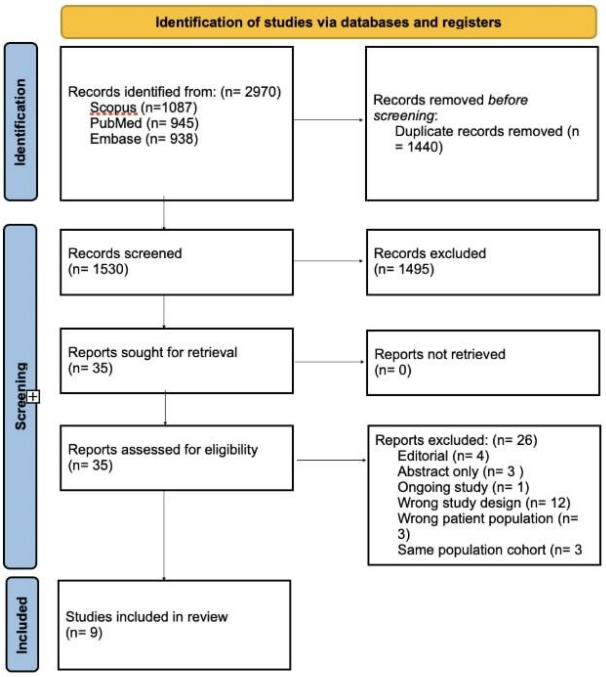

Figure 1. PRISMA flow diagram illustrating the study selection process. A total of 2,970 records were identified through database searches (Scopus, PubMed, and Embase). After removing duplicates and screening titles/abstracts, 35 full-text articles were assessed for eligibility, with 9 studies meeting the inclusion criteria for this systematic review

Table 1
Summary of Studies

Study (Y)	Journal	Study Design	Level of Evidence	Country	Setting	Sample Size	DMC	LFH	Mean Follow-Up ± SD (Range) DMC Mean Follow-Up ± SD (Range)	Mean Follow-Up ± SD (Range) LFH	Mean Follow-Up ± SD (Range) Total
Weintraub (2023)	The Journal of Arthroplasty	Multicenter RCT	I	U.S.	rTHA	146	76	70	n/a	n/a	18.2 months (1.4 - 48.2 months)
Klemt (2020)	The Journal of Arthroplasty	Retrospective comparative study	III	U.S.	rTHA	146	42	104	n/a	n/a	4 years (2.8-8.6 years)
Chalmers (2017)	The Journal of Arthroplasty	Retrospective comparative study	III	U.S.	rTHA	29	16	13	n/a	n/a	3 years (2-5 years)
Hoskins (2022)	Clinical Orthopedics & Related Research	Retrospective observational study	III	Australia	rTHA	1295	502	793	2 ± 1.8 years	4 ± 2.9 years	n/a
Stevenson (2020)	The Journal of Arthroplasty	Retrospective review	III	U.S.	rTHA	147	48	99	n/a	n/a	55.8 months (12.1-159 months)
Hoskins (2020)	The Journal of Bone and Joint Surgery	Retrospective cohort study	III	Australia	rTHA	652	265	387	2.39 ± 2.21 years	4.88 ± 3.74 years	n/a
Di Martino (2023)	Journal of Clinical Medicine	Retrospective registry-based population study	III	Italy	rTHA	253	57	196[a]			10 years
Sonn (2021)	The Journal of Arthroplasty	Retrospective review	III	U.S.	rTHA	128	75	53	n/a	n/a	37.1 months (25.1)
Carender (2025)	The Bone & Joint Journal	Retrospective cohort study	III	U.S.	rTHA	299	123	176	n/a	n/a	7 years (2-12 years)

SD, standard deviation; rTHA, revision total hip arthroplasty; DMC, dual mobility construct; LFH, large femoral head
[a] Di Martino et al. (2023) does not explicitly state the exact within each of three femoral head size range (≤28 mm, 32mm, and ≥ 36) but does provide details on cumulative survival rates and the number of dislocations in each group

Table 2
Outcomes of re-revisions

Study (Y)	Journal	Sample Size			Re-revision Rate (%)		Re-revision Dislocation (%)		Re-revision Aseptic Loosening (%)		Re-revision PJI (%)		Re-revision Periprosthetic Fracture (%)	
		Total	DMC	LFH	DMC	LFH	DMC	LFH	DMC	LFH	DMC	LFH	DMC	LFH
Weintraub (2023)	The Journal of Arthroplasty	146	76	70	8 (10.5)	4 (5.7)	2 (2.6)	2 (2.9)	2 (2.6)	0 (0)	4 (5.3)	2 (2.9)	n/a	n/a
Klemt (2020)	The Journal of Arthroplasty	146	42	104	n/a	n/a	0 (0)	12 (11.3)	n/a	n/a	n/a	n/a	n/a	n/a
Chalmers (2017)	The Journal of Arthroplasty	29	16	13	2 (12)	1 (7)	0 (0)	1 (7)	n/a	n/a	n/a	n/a	n/a	n/a
Hoskins (2022)	Clinical Orthopedics & Related Research	1295	502	793	13 (3)	27 (3.4)	15 (3)	27 (3.4)	11 (2.2)	26 (3.3)	22 (4.4)	35 (4.4)	2 (0.4)	8 (1)
Stevenson (2020)	The Journal of Arthroplasty	147	48	99	4 (8.3)	11 (11.1)	2 (4.2)	2 (2)	n/a	n/a	n/a	n/a	n/a	n/a
Hoskins (2020)	The Journal of Bone and Joint Surgery	652	265	387	23 (8.7)	53 (13.7)	11 (4.2)	24 (6.2)	4 (1.5)	18 (4.7)	8 (3)	11 (2.8)	n/a	n/a
Di Martino (2023)	Journal of Clinical Medicine	253	57	196	9 (15.7)[a]	36 (18.3)[a]	0 (0)	11 (5.6)	4 (7.1)	11 (5.5)	1 (1.8)	4 (2)	2 (3.5)	1 (0.5)
Sonn (2021)	The Journal of Arthroplasty	128	75	53	7 (9.7)	5 (9.4)	5 (6.7)[b]	17 (9.3)	n/a	n/a	n/a	n/a	n/a	n/a
Carender (2025)	The Bone & Joint Journal	299	123	176	7 (8)	27 (16)	1 (1)	14 (9)	2 (1.6)	1 (0.6)	3 (2.4)	7 (4)	1 (0.8)	5 (2.8)

[a] Di Martino et al. (2023) includes all standard cup sizes (≤28 mm, 32mm, and ≥ 36)
[b] Sonn et al. (2021) reported overall re-revision rate for entire standard bearing group