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Appendix I: Search Terms and Associated Results

Database Searched: MEDLINE

Order of Search	Search Query	Results
#1	"Hip AND hemiarthroplasty"	2,161
#2	"Hip AND hemiarthroplasty AND approach"	254
#3	"Direct AND anterior AND approach AND hemiarthroplasty"	34
#4	"DAA AND hemiarthroplasty"	20

Database Searched Cochrane Central Register of Controlled Trials (CENTRAL) and Cochrane Reviews (CDSR)

Order of Search	Search Query	Results
#1	"Hip AND hemiarthroplasty"	355 trials, 14 reviews
#2	"Hip AND hemiarthroplasty AND review"	63 trials, 13 reviews
#3	"Anterior AND hip AND hemiarthroplasty"	20 trials, 1 reviews
#4	"Direct AND anterior AND approach AND hip AND hemiarthroplasty"	12 trials, 0 reviews

Database Searched: Google Scholar

Order of Search	Search Query	Results
#1	"Hip AND hemiarthroplasty"	23,900
#2	"Hip AND hemiarthroplasty AND approach"	13,300
#3	"Hip AND hemiarthroplasty AND anterior AND approach"	6,060
#4	"Direct AND anterior AND approach AND hemiarthroplasty"	671

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Appendix II: Inclusion and Exclusion Criteria

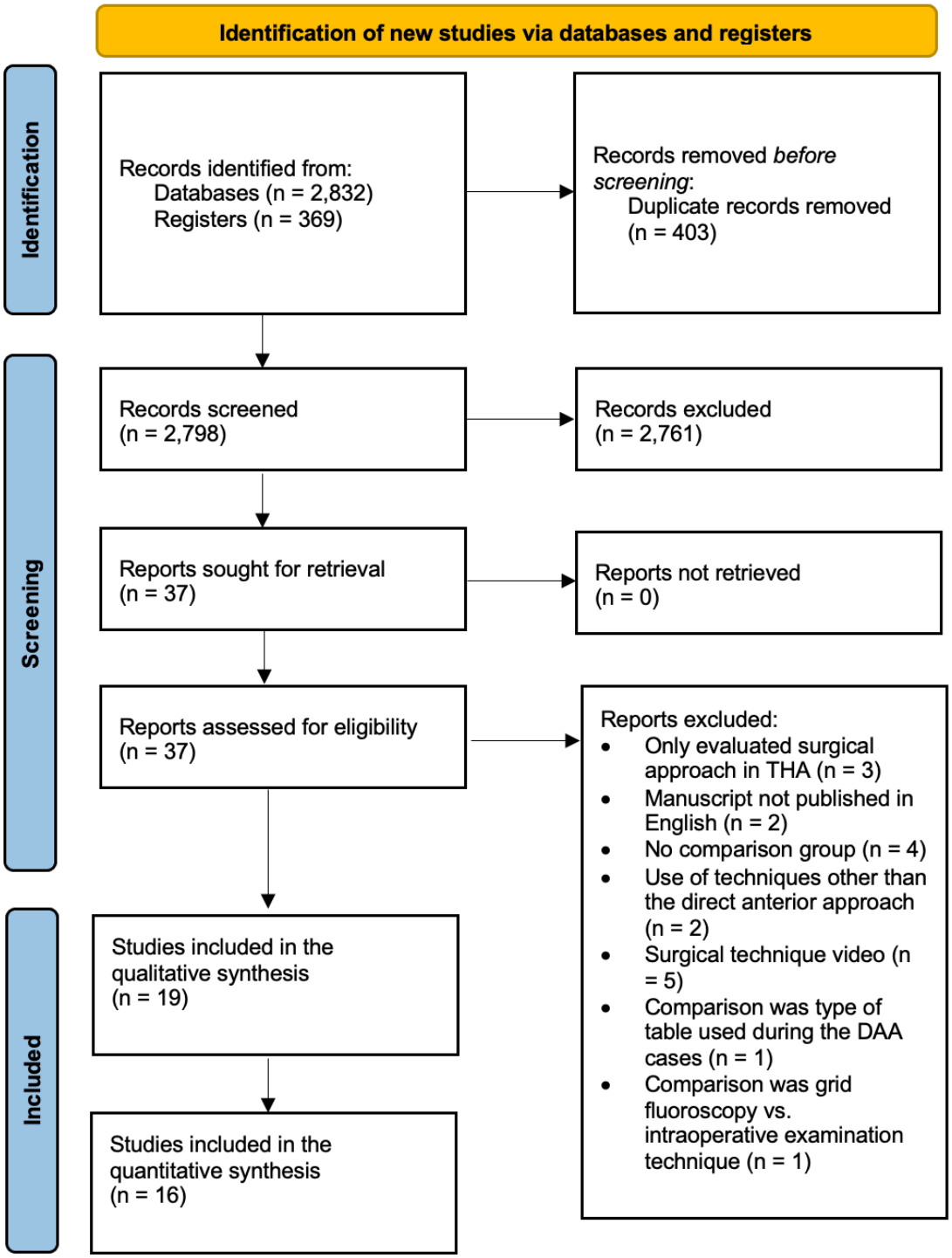
Inclusion Criteria

- Randomized clinical trials (RCTs), observational trials, or retrospective chart review studies comparing the direct anterior approach to at least one other type of approach for patients undergoing hemiarthroplasty for femoral neck fracture
- Outcomes of interest must be presented quantitatively

Exclusion Criteria

- Published meeting abstracts, editorials, letters to the editor, commentaries, narrative reviews, and systematic reviews and/or meta-analyses
- Studies evaluating approaches in joints others than the femoroacetabular joint
- Studies not conducted in humans that are alive, such as cadaveric-based studies
- Studies not published in English
- Studies published in journals that do not provide access to the full article or in journals that are not peer-reviewed

Appendix III: 2020 PRISMA Study Flow Diagram



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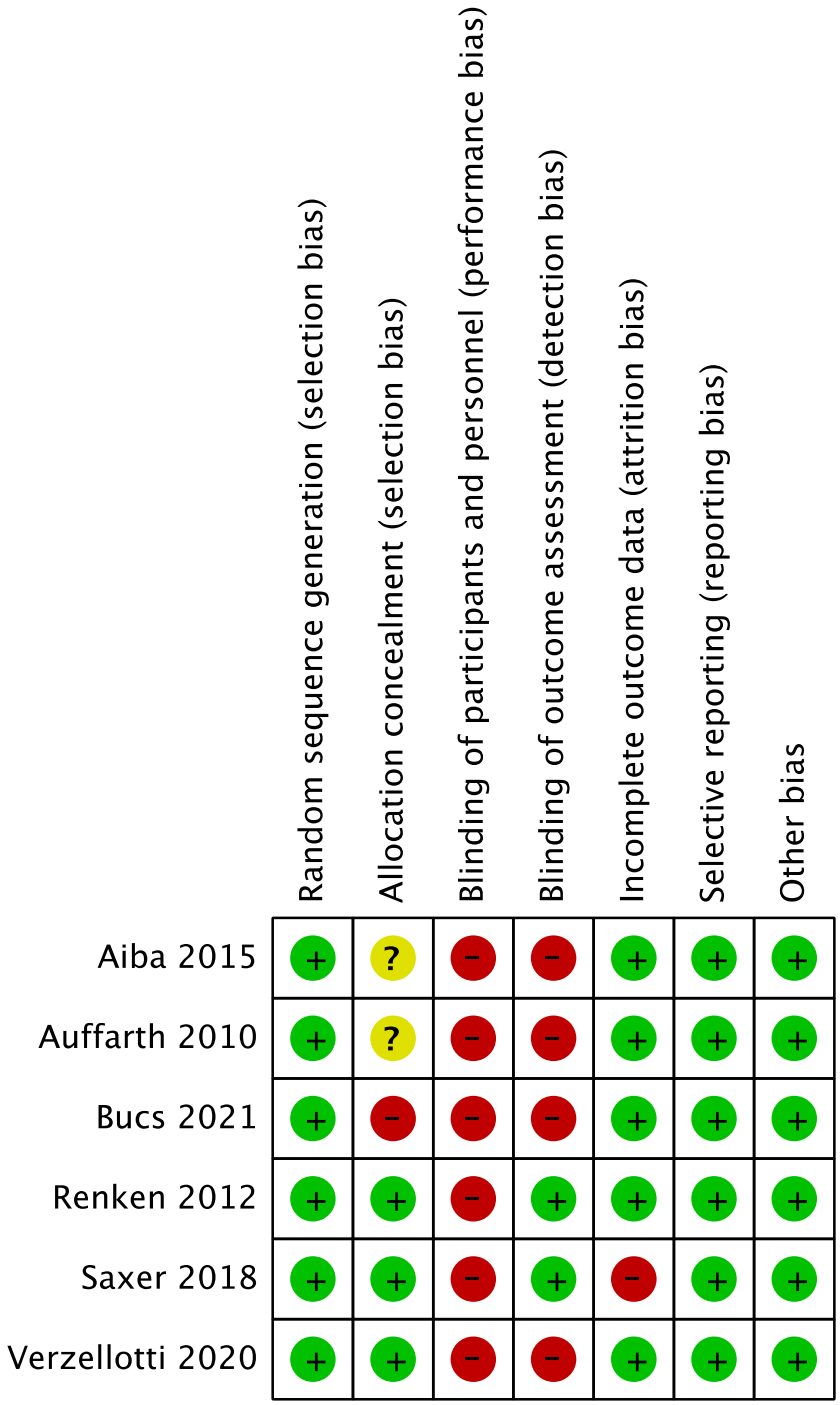
Appendix IV: Risk of Bias in RCTs (Cochrane Risk of Bias Assessment Tool)



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Appendix V: Risk of Bias Assessment Non-Randomized Studies (Newcastle-Ottawa Scale)

Author	Study Type	Selection (max ****)	Comparability (max **)	Exposure/Outcome (max ***)	Total Stars
Baba 2013	Cohort	****	*	***	8
Carlson 2017	Cohort	****	*	**	7
Ladurner 2021	Cohort	****	**	***	9
Lakhani 2021	Cohort	****	*	***	8
Langlois 2015	Cohort	****	**	***	9
Lee 2017	Cohort	****	*	***	8
Neyisci 2020	Cohort	****	*	***	8
Pala 2016	Cohort	****	*	**	7
Spina 2021	Cohort	****	*	***	8
Skowronek 2021	Cohort	****	*	***	8
Trinh 2015	Cohort	****	*	*	6
Tsukada 2010	Cohort	****	*	***	8
Yazdanpanah 2020	Cohort	***	*	*	6

Appendix VI: Study Characteristics

Study	Study Design	Control	Sample Size	Avg. Age; Years (SD)	Gender (Percent Female)	Avg. Time to Surgery; Hours or Days (SD)	Follow-Up Length	Implant Used	Bipolar Prosthesis (Y/N)	Cement Used (Y/N)
Aiba 2015	RCT	PA	DAA: 13 PA: 16	DAA: 81.5 (6.8) PA: 78.6 (7.0)	DAA: 69% PA: 69%	DAA: 3.9 (3.5) PA: 4.9 (2.8)	No follow up after hospital discharge	Taperloc TM Stem (Biomet)	Yes (All)	No
Auffarth 2011	RCT	DLA	DAA: 24 DLA: 24	DAA: 82.6 (3.4) DLA: 83.7 (4.1)	DAA: 75% DLA: 83%	No mention	6 months	Cemented Mueller Straight Stem (Zimmer)	Some	Yes (All)
Baba 2013	Prospective non-randomized	PA	DAA: 40 PA: 39	DAA: 77 (7.3) PA: 75 (7.7)	DAA: 83% PA: 79%	DAA: 2.9 (2.5) PA: 2.9 (2.0)	6 months	Centrax/Accolade TMZF Stem (Stryker)	Yes (All)	No
Bucs 2021	RCT	ALA	DAA: 51 ALA: 43	DAA: 79 (0.4) ALA: 79 (2.8)	DAA: 65% ALA: 60%	DAA: 27.3 (1.4) ALA: 26.1 (1.7)	12 weeks	Hydroxyapatite-coated or titanium-coated stem	Yes (All)	No

Carlson 2017	Retrospective chart review	DLA	DAA: 85 DLA: 75	DAA: 83 (9.4) DLA: 83 (9.1)	DAA: 1:5 M/F ratio DLA: 1:6 M/F ratio	DAA: 1.4 (1.1) DLA: 1.7 (1.2)	6 months	No mention	No mention	No mention
Ladurner 2021	Retrospective chart review	ALA	DAA: 79 ALA: 158	DAA: 86 (7.4) ALA: 86 (7.4)	DAA: 71% ALA: 72%	No mention	1 year	Weber cemented stem (Zimmer)	No	Yes
Lakhani 2021	Retrospective chart review	DLA	DAA: 40 DLA: 54	DAA: 85 (6.3) DLA: 86 (6.7)	DAA: 60% DLA: 74%	DAA: 39 (22.2) DLA: 40 (31)	19.2 months (SD 3.8)	H-MAX Stem (Lima), Bipolar Cup (Furlong)	Yes (All)	Yes (All)
Langlois 2015	Prospective non-randomized	PA	DAA: 38 PA: 44	DAA: 86 (8.8) PA: 85 (7.7)	DAA: 84% PA: 66%	DAA: 1.6 (1.3) PA: 1.6 (1.4)	1 year	Cementless Stem (Meije Duo), Femoral cobalt-chromium heads and bipolar cups	Yes (All)	No
Lee 2017	Retrospective chart review	PA	DAA: 13 PA: 12	Not provided for BHA specific cases	Not provided	No mention	No follow up after hospital discharge	Not provided	Yes (All)	Not provided
Neyisci 2020	Retrospective chart review	PA	DAA: 56 PA: 54	DAA: 82 (6.6) PA: 83 (7.8)	DAA: 46% PA: 46%	No mention	16 months (SD 2.1 months)	No mention	No mention	Yes; Cement (53) & Uncemented (57)

Pala 2016	Retrospective chart review	PA	DAA: 55 PA: 54	DAA: 89 PA: 87.6	DAA: 80% PA: 81%	No mention	2 years	64 Hit Medica (Lima), 31 Cittieffe (Symbios), 9 Harmony Symbios), 5 H-MAX (Lima)	Yes (All)	Yes; Cement (98) & Press-Fit (11)
Renken 2012	RCT	ALA	DAA: 30 ALA: 27	DAA: 84 (5.8) ALA: 87.5 (7.0)	DAA: 87% ALA: 89%	No mention	40 days	ABG-II Stem (Stryker), UHR Bipolar Head (Stryker)	Yes (All)	Yes (All)
Saxer 2018	RCT	DLA	DAA: 82 DLA: 99	DAA: 84.4 (6.7) DLA: 84.0 (6.6)	DAA: 77% DLA: 67%	DAA: 25.6 (14.4) DLA: 27.4 (18.9)	12 months	AMIS Stem (Medacta Intl.) & Monopolar Head (Mathys AG)	No	Yes (All)
Spina 2021	Retrospective chart review	DLA	DAA: 37 DLA: 38	DAA: 87.6 (5.2) DLA: 87 (4.3)	DAA: 68% DLA: 63%	Not specified	12 months	Not specified	Yes (All)	Not specified
Skowronek 2018	Retrospective chart review	PA	DAA: 36 PA: 61	Not provided for BHA specific cases	Not provided for BHA specific cases	No mention	3 months	Corail Stem, ECOFIT Stem	Yes (All)	No

Trinh 2015	Retrospective chart review	PA, DLA, ALA	DAA: 31 PA/DLA/ALA: 70	DAA: 81.5 Others: 80.4	All: 69%	No mention	All: 3.71 months	Not specified	Not specified	Not specified
Tsukada 2010	Prospective non-randomized	PA	DAA: 43 PA: 39	DAA: 80.4 (6.9) PA: 81.9 (7.9)	DAA: 82% PA: 82%	DAA: 3.7 (1.9) PA: 3.8 (2.6)	12 months	No mention	Yes (All)	No mention
Verzellotti 2020	RCT	PA	DAA: 50 PA: 50	DAA: 85.3 (6.1) PA: 85.0 (6.3)	DAA: 70% PA: 70%	No mention	6 months	ABG-II Stryker (DAA), Logica Standard (PLA)	Yes (All)	Yes (All)
Yazdanpanah 2020	Prospective non-randomized	PA	DAA: 20 PA: 40	All: 79.3 (5.7)	All: 55%	Mean and SD not provided	12 Months	No mention	Yes (All)	No mention

**Abbreviations: Avg = Average; SD = Standard Deviation; RCT = Randomized Controlled Trial; DAA = Direct Anterior Approach; DLA = Direct Lateral Approach; PA = Posterior Approach; ALA = Anterolateral Approach*

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Appendix VII: Mortality Qualitative Synthesis

Reported Outcome	High Quality										Moderate Quality		
	Auffarth et al. (2011)	Baba et al. (2013)	Carlson et al. (2017)	Ladurner et al. (2021)	Lakhani et al. (2021)	Langlois et al. (2015)	Pala et al. (2016)	Renken et al. (2012)	Spina et al. (2021)	Verzellotti et al. (2020)	Saxer et al. (2018)	Trinh et al. (2015)	Yazdanpanah et al. (2020)
Mortality													
30 days									●				
40 days								●					
3 months									↑				
6 months	●	●	●				●			●		●	●
12 months				●					●		●		
19 months					●								
21 months						●							

↑ = Better Outcomes; ↓ = Worse Outcomes; ● = Not Significant

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Appendix VIII: Operative Time Qualitative Synthesis

Reported Outcome	High Quality															Moderate Quality			
	Aiba et al. (2015)	Auffarth et al. (2011)	Baba et al. (2013)	Carlson et al. (2017)	Ladurner et al. (2021)	Lakhani et al. (2021)	Langlois et al. (2015)	Lee et al. (2017)	Neyisci et al. (2020)	Pala et al. (2016)	Renken et al. (2012)	Spina et al. (2021)	Skowronek et al. (2018)	Tsukada et al. (2010)	Verzellotti et al. (2020)	Bucs et al. (2021)	Saxer et al. (2018)	Trinh et al. (2015)	Yazdanpanah et al. (2020)
Operative Time																			
Minutes	↓	↓	●	↑	↑	●	↓	●	↑	↑	●	●	●	●	↓	●	●	●	↑

↑ = Better Outcomes; ↓ = Worse Outcomes; ● = Not Significant

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Appendix IX: Blood Loss Qualitative Synthesis

Reported Outcome	High Quality													Moderate Quality		
	Aiba et al. (2015)	Auffarth et al. (2011)	Baba et al. (2013)	Carlson et al. (2017)	Ladurner et al. (2021)	Lakhani et al. (2021)	Langlois et al. (2015)	Lee et al. (2017)	Neyisci et al. (2020)	Pala et al. (2016)	Renken et al. (2012)	Spina et al. (2021)	Tsukada et al. (2010)	Bucs et al. (2021)	Saxer et al. (2018)	Trinh et al. (2015)
Blood Loss																
Intraoperative (mL)	●				●								↓	●		●
Intraoperative (g)			●													
Intraoperative (Delta Hemoglobin)																
Perioperative (mL)														●		
Perioperative (g)															●	
Perioperative (Delta Hemoglobin)		●		↑		●	●	●		↑						●
Amount of Blood Transfusion									↑		●	●				●

↑ = Better Outcomes; ↓ = Worse Outcomes; ● = Not Significant