Supplementary data

Search protocol

Search specialist	Kirsten Birkefoss, Danish Health Authority
Search date	18.07.2022

Research question Should patients have movement precautions after hip arthroplasty?

Inclusion and exclusion criteria

Language English, Danish, Norwegian, Swedish Publication year Population Types Adults 18 and older Publication types Note RCT, non-randomized studies

- Search terms and inclusion/exclusion criterias are adapted to the different database languages.
- Duplicates have as thoroughly as possible been removed by the help of RefWorks.
- · References found has been transferred to Covidence

Search for randomized controlled trials

Medline

- # Searches
- 1 "Arthroplasty, Replacement, Hip"/
- 2 Arthroplasty, Replacement/
- 3 Hip Prosthesis/
- 4 Joint Prosthesis/
- 5 (hip and (arthroplasty or replacement* or prosthes* or prosthet* or implant*)).ti,bt,ab,kf.
- 6 (joint adj (arthroplasty or replacement* or prosthes* or prosthet* or implant*)).ti,bt,ab,kf.
- 7 (hip and alloplasti*).ti,bt,ab,kf.
- 8 THA.ti,bt,ab,kf.
- 9 THR.ti,bt,ab,kf.
- 10 or/1-9
- 11 Hip dislocation/pc, rh
- 12 Physical immobilization/
- 13 Restrict*.ti,bt,ab,kf.
- 14 precaution*.ti,bt,ab,kf.
- 15 restraint*.ti,bt,ab,kf.
- 16 ((Curb or avoid* or control* or restrain*) adj2 (movement or maneuv* or extended hip or hip extension)).ti,bt,ab,kf.
- 17 exp Assistive devices/
- 18 exp Self-help devices/
- 19 ((Assistive or self help or self-help or selfhelp or protective) adj3 (Aid*1 or Appliance* or Equipment or device*)).ti,bt,ab,kf.
- 20 or/11-19
- 21 10 and 20
- 22 limit 21 to (randomized controlled trial or controlled clinical trial)
- 23 (((random* or cluster-random* or quasi-random* or control?ed or crossover or cross-over or blind* or mask*) adj4 (trial*1 or study or studies or analy*)) or rct).ti,bt,ab,kf,hw.
- 24 (placebo* or single-blind* or double-blind* or triple-blind*). ti,bt,kf,hw.
- 25 ((single or double or triple) adj2 (blind* or mask*)).ti,bt,kf,hw.
- 26 ((patient* or person* or participant* or population* or allocat* or assign*) adj3 random*).ti,bt,ab,kf.
- 27 or/23-26
- 28 21 and 27
- 29 22 or 28
- 30 limit 29 to (yr="2013-2022" and (english or danish or norwegian or swedish))

Embase

Searches

- 1 exp hip arthroplasty/
- 2 exp hip replacement/
- 3 replacement arthroplasty/
- 4 hip prosthesis/
- 5 (hip and (arthroplasty or replacement* or prosthes* or prosthet* or implant*)).ti,ab,kw.
- 6 (joint adj (arthroplasty or replacement* or prosthes* or prosthet* or implant*)).ti,ab,kw.
- 7 (hip and alloplasti*).ti,ab,kw.
- 8 THA.ti,ab,kw.
- 9 THR.ti,ab,kw.
- 10 or/1-9
- 11 Hip Dislocation/pc, rh
- 12 Restrict*.ti,ab,kw.
- 13 precaution*.ti,ab,kw.
- 14 restraint*.ti,ab,kw.
- 15 ((Curb or avoid* or control* or restrain*) adj2 (movement or maneuv* or extended hip or hip extension)).ti,ab,kw.
- 16 exp self help device/
- 17 ((Assistive or self help or self-help or selfhelp or protective) adj3 (Aid*1 or Appliance* or Equipment or device*)).ti,ab,kw.
- 18 or/11-17
- 19 10 and 18
- 20 limit 19 to (randomized controlled trial or controlled clinical trial)
- 21 (((random* or cluster-random* or quasi-random* or control?ed or crossover or cross-over or blind* or mask*) adj4 (trial*1 or study or studies or analy*)) or rct).ti,ab,kw.
- 22 (placebo* or single-blind* or double-blind* or triple-blind*). ti,ab,kw.
- 23 ((single or double or triple) adj2 (blind* or mask*)).ti,ab,kw.
- 24 ((patient* or person* or participant* or population* or allocat* or assign*) adj3 random*).ti,ab,kw.
- 25 or/21-24
- 26 19 and 25
- 27 20 or 26
- 28 limit 27 to (yr="2013-2022" and (english or danish or norwegian or swedish))

Cinahl

Limiters - Published Date: 20130101-20220731; Language: Danish, English, Norwegian, Swedish

- # Query
- S21 S15 AND S20
- S20 S16 OR S17 OR S18 OR S19
- S19 ((patient* or person* or participant* or population* or allocat* or assign*) N3 (random* or blind* or mask*))
- S18 (placebo* or single-blind* or double-blind* or triple-blind* or ((single or double or triple) N1 (blind* or mask*))
- S17 (((random* or cluster-random* or quasi-random* or control#ed or crossover or cross-over or blind* or mask*) N4 (trial* or study or studies or analy*)) or rct)
- S16 PT Randomized Controlled Trial OR MH "Randomized Controlled Trial+" OR PT "Controlled Clinical Trial" OR MH "Controlled Clinical Trial+"
- S15 S6 AND S14
- S14 S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
- S13 ((Assistive or self help or self-help or selfhelp or protective) N3 (Aid or aids or Appliance* or Equipment or device*))
- S12 (MH "Assistive Technology Devices+") OR (MH "Home Care Equipment and Supplies") OR (MH "Seating") OR (MH "Pillows and Cushions") OR (MH "Hip Protectors")
- S11 ((Curb or avoid* or control* or restrain*) N2 (movement or maneuv* or extended hip or hip extension))
- S10 restraint*
- S9 precaution*

- S8 Restrict*
- S7 MH "Hip Dislocation"
- S6 S1 OR S2 OR S3 OR S4 OR S5
- S5 THR
- S4 THA
- S3 hip and alloplasti*
- S2 hip and (arthroplasty or replacement* or prosthes* or prosthet*)
- S1 MH "Arthroplasty, Replacement, Hip"

PEDRO

Abstract & Title: hip replacement* or hip arthroplasty Method: Clinical trial Published since: 2013

Search for non-randomized studies

Medline

- # Searches
- 1 "Arthroplasty, Replacement, Hip"/
- 2 Arthroplasty, Replacement/
- 3 Hip Prosthesis/
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- 14 precaution*.ti,bt,ab,kf.
- 15 restraint*.ti,bt,ab,kf.
- 16 ((Curb or avoid* or control* or restrain*) adj2 (movement or maneuv* or extended hip or hip extension)) ti,bt,ab,kf.
- 17 exp Assistive devices/
- 18 exp Self-help devices/
- 19 ((Assistive or self help or self-help or selfhelp or protective) adj3 (Aid*1 or Appliance* or Equipment or device*)).ti,bt,ab,kf.
- 20 or/11-19
- 21 10 and 20
- 22 limit 21 to (comparative study or evaluation study or multicenter study or observational study or twin study or validation study)
- 23 exp Epidemiologic studies/
- 24 ((Épidemiologic or cohort* or perspective or prospective or longitud* or follow-up or follow up or followup or retro-spective or retrospective or case-control* or case control* or observational or cross-section* or cross section* or multi-cent* or multicent* or evaluation or comparative or intervention or provoca* or validation) adj3 (study or studies or trial*1 or analys*)).ti,bt,ab,kf,hw.
- 25 or/23-24
- 26 21 and 25
- 27 22 or 26
- 28 limit 27 to (yr="2013-2022" and (english or danish or norwegian or swedish))

Embase

- # Searches
- 1 exp hip arthroplasty/
- 2 exp hip replacement/
- 3 replacement arthroplasty/
- 4 hip prosthesis/
- 5 (hip and (arthroplasty or replacement* or prosthes* or prosthet*

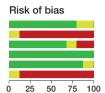
- or implant*)).ti,ab,kw.
- 6 (joint adj (arthroplasty or replacement* or prosthes* or prosthet* or implant*)).ti.ab.kw.
- 7 (hip and alloplasti*).ti,ab,kw.
- 8 THA.ti,ab,kw.
- 9 THR.ti,ab,kw.
- 10 or/1-9
- 11 Hip Dislocation/pc, rh
- 12 Restrict*.ti,ab,kw.
- 13 precaution*.ti,ab,kw.
- 14 restraint*.ti,ab,kw.
- 15 ((Curb or avoid* or control* or restrain*) adj2 (movement or maneuv* or extended hip or hip extension)).ti,ab,kw.
- 16 exp self help device/
- 17 ((Assistive or self help or self-help or selfhelp or protective) adj3 (Aid*1 or Appliance* or Equipment or device*)).ti,ab,kw.
- 18 or/11-17
- 19 10 and 18
- 20 Observational study/ or Multicenter study/ or Evaluation study/ or exp comparative study/ or exp case control study/ or intervention study/ or exp longitudinal study/ or prospective study/ or retrospective study/ or Follow up/ or validation study/ or cohort analysis/ or cross-sectional study/ or crossover procedure/
- 21 ((Epidemiologic or cohort* or perspective or prospective or longitud* or follow-up or follow up or followup or retro-spective or retrospective or case-control* or case control* or observational or cross-section* or cross section* or multi-cent* or multicent* or evaluation or comparative or intervention or provoca* or validation) adj3 (study or studies or trial*1 or analys*)).ti,ab,kw.
- 22 or/20-21
- 23 19 and 22
- 24 limit 23 to (yr="2013-2022" and (english or danish or norwegian or swedish))

Cinahl

- # Query Limiters/Expanders
- S19 S15 AND S18 Limiters Published Date: 20130101-20220731; Language: Danish, English, Norwegian, Swedish
- S18 S16 OR S17
- S17 ((Epidemiologic or cohort* or perspective or prospective or longitud* or follow-up or follow up or followup or retro-spective or retrospective or case-control* or case control* or observational or cross-section* or cross section* or multi-cent* or multicent* or evaluation or comparative or intervention or provoca* or validation) N3 (study or studies or trial* or analys*))
- S16 MH "Nonexperimental Studies+" or MH "Retrospective Design"
- S15 S6 AND S14
- S14 S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
- S13 ((Assistive or self help or self-help or selfhelp or protective) N3 (Aid or aids or Appliance* or Equipment or device*))
- S12 (MH "Assistive Technology Devices+") OR (MH "Home Care Equipment and Supplies") OR (MH "Seating") OR (MH "Pillows and Cushions") OR (MH "Hip Protectors")
- S11 ((Curb or avoid* or control* or restrain*) N2 (movement or maneuv* or extended hip or hip extension))
- S10 restraint*
- S9 precaution*
- S8 Restrict*
- S7 MH "Hip Dislocation Rehabilitation" or MH "Hip Dislocation Prevention" or ((hip N3 dislocat*) N3 prevent*)
- S6 S1 OR S2 OR \$3 OR S4 OR S5
- S5 THR
- S4 THA
- S3 hip and alloplasti*
- S2 hip and (arthroplasty or replacement* or prosthes* or prosthet*)
- S1 MH "Arthroplasty, Replacement, Hip"

Risk of bias in individual studies

Dislocation

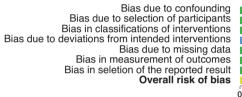


Bias arising from the randomizationprocess Bias due to deviations from intended interventions Bias due to missing outcome data Bias in measurement of the outcome Bias in selection of the reported results Overall risk of bias

									0 2	5	50	15	10
									Di	str	ibuti	on (%)
gure	3.	Weighted	summary	plot	of	the	risk	of	bias	in	rand	dom	ize

Fi ed trials, early hip dislocation. For color codes, see Table 3.

Risk of bias



25 50 75 100 Distribution (%)

Figure 4. Weighted summary plot of the risk of bias in non-randomized studies, early hip dislocation. For color codes, see Table 4.

Bias arising from the randomizationprocess Bias due to deviations from intended interventions Bias due to missing outcome data Bias in measurement of the outcome Bias in selection of the reported results Overall risk of bias

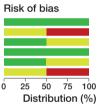
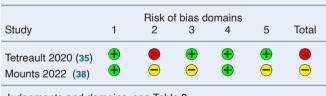


Figure 5. Weighted summary plot of the risk of bias in randomized trials, late hip dislocation. For color codes, see Table 3.

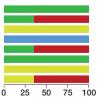
Table 5. Risk of bias in randomized trials, late hip dislocation



Judgements and domains, see Table 3.

Risk of bias

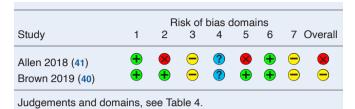
Bias due to confounding Bias due to selection of participants Bias in classifications of interventions Bias due to deviations from intended interventions Bias due to missing data Bias in measurement of outcomes Bias in seletion of the reported result Overall risk of bias



Distribution (%)

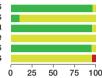
Figure 6. Weighted summary plot of the risk of bias in non-randomized studies, late hip dislocation. For color codes, see Table 4.

Table 6. Risk of bias in non-randomized studies, late hip dislocation



Patient-reported function

Bias arising from the randomizationprocess Bias due to deviations from intended interventions Bias due to missing outcome data Bias in measurement of the outcome Bias in selection of the reported results Overall risk of bias



Risk of bias

Distribution (%)

Figure 7. Weighted summary plot of the risk of bias in randomized trials, patient-reported function end of treatment. For color codes, see Table 3.

Table 7. Risk of bias in randomized trials, patient-reported function end of treatment

Study	1	Risk c 2	of bias d 3	omains 4	5	Total
Tetreault 2020 (35) Dietz 2019 (36) Peters 2019 (37) Mounts 2022 (38)	+ - + +	 ● ● ● ● 	 		+ + + -	

Judgements and domains, see Table 3.

Risk of bias

Bias arising from the randomizationprocess Bias due to deviations from intended interventions Bias due to missing outcome data Bias in measurement of the outcome Bias in selection of the reported results Overall risk of bias



Figure 8. Weighted summary plot of the risk of bias in randomized trials, patient-reported function 1-year follow-up. For color codes, see Table 3.

Table 8. Risk of bias in randomized trials, patient-reported function 1-year follow-up

		Risk c	of bias d	omains		
Study	1	2	3	4	5	Total
Dietz 2019 (36) Mounts 2022 (38)	- +	- -	- +	— —	+	

Judgements and domains, see Table 3.

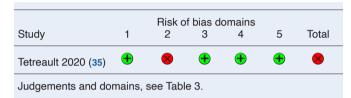
Supplementary data (4/9)

Table 9. Risk of bias in non-randomized studies, performancebased assessment of function end of treatment

Study	1		isk of 3				7 (Overall
Mikkelsen 2014 (34)	Ŧ	Ŧ	Ŧ	?	-	Ŧ	-	-
Judgements and dom	ains, s	see Ta	ble 4.					

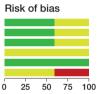
Return to work

Table 10. Risk of bias in randomized trials, return to work



Pain

Bias arising from the randomizationprocess Bias due to deviations from intended interventions Bias due to missing outcome data Bias in measurement of the outcome Bias in selection of the reported results Overall risk of bias



Distribution (%)

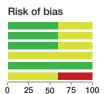
Figure 9. Weighted summary plot of the risk of bias in randomized trials, hip-related pain end of treatment. For color codes, see Table 3.

Table 11. Risk of bias in randomized trials, hip-related pain end of treatment

		Risk c	of bias d	omains		
Study	1	2	3	4	5	Total
Dietz 2019 (36) Peters 2019 (37)	- -	- +	- +	•	+ +	•
Judgements and do	omains,	see Tabl	e 3.			

Health-related quality of life

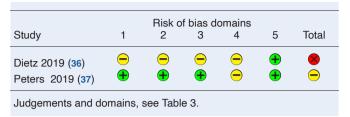
Bias arising from the randomizationprocess Bias due to deviations from intended interventions Bias due to missing outcome data Bias in measurement of the outcome Bias in selection of the reported results Overall risk of bias



Distribution (%)

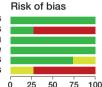
Figure 10. Weighted summary plot of the risk of bias in randomized trials, health-related quality of life. For color codes, see Table 1.

Table 12. Risk of bias in randomized trials, health-related quality of life



Reoperation

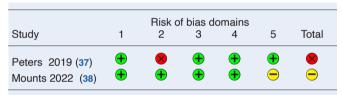
Bias arising from the randomizationprocess Bias due to deviations from intended interventions Bias due to missing outcome data Bias in measurement of the outcome Bias in selection of the reported results Overall risk of bias



Distribution (%)

Figure 11. Weighted summary plot of the risk of bias in randomized trials, reoperation. For color codes, see Table 3.

Table 13. Risk of bias in randomized trials, reoperation



Judgements and domains, see Table 3.

Risk of bias

Bias due to confounding Bias due to selection of participants Bias in classifications of interventions Bias due to deviations from intended interventions Bias due to missing data Bias in measurement of outcomes Bias in seletion of the reported result **Overall risk of bias**

Distribution (%)

Figure 12. Weighted summary plot of the risk of bias in non-randomized studies, reoperation. For color codes, see Table 4.

Table 14. Risk of bias in randomized trials, reoperation



Judgements and domains, see Table 3.

Meta-analysis forest plots

	Preca	utions	Minim no preca		Weight	Risk ratio	Risk ratio	
Study	Events	Total	Events		•	–H, random (95%C	I) M–H, random (95%CI)	
RCT								
Mounts 2022 (38)	1	174	0	172	50.0	3.0 (0.12-72)		
Tetreault 2020 (35)	0	288	1	290	50.0	0.34 (0.01-8.2)		
Subtotal	1	462	1	462		1.0 (0.10–9.6)		
Heterogeneity: Tau ² Test for overall effec				-,,	-			
Allen 2018 (41)	7	2,551	1	673	64.6	1.9 (0.23–15)		
Brown 2020 (40)	0	561	2	654	35.4	0.23 (0.01-4.9)		
Subtotal	7	3,112		1,327	00.1	0.89 (0.13–6.2)		
Heterogeneity: Tau ² Test for overall effec			f = 1 (p = 0.	3); l² = 18	8%			
							łł	
						0.001	0.1 1 10	1,000
							Favors precautions Favors minimal or no preca	aution

Figure 13. Random-effects meta-analysis on the effect of precautions on the relative risk of late dislocations after total hip arthroplasty. Abbreviations: M-H = Mantel-Haenszel, CI = confidence interval, RCT = randomized controlled trial, NRS = non-randomized study.

Study	Precautio SMD (SE)	ns Total	Minimal or no precautions Total	Weight %	sMD IV, random (95%CI)	SMD IV, random (95%CI)	
Peters 2019 (37)	0.13 (0.099)	203	205	5.5	0.13 (-0.06-0.32)		
Tetreault 2020 (35)	0.14 (0.025)	288	290	85.9	0.14 (0.09-0.19)		
Mounts 2022 (38)	0.17 (0.11)	174	172	4.7	0.17 (-0.04-0.38)	+	
Dietz 2019 (36)	0.20 (0.12)	145	139	3.9	0.20 (-0.03-0.43)		
Total		810	806		0.15 (0.10–0.19)	•	
Heterogeneity: Tau ² Test for overall effe			= 3 (p = 1); l ² = 0%			••••	0.5 1 mal/no precautions

Figure 14. Random-effects meta-analysis on the effect of precautions on patient-reported function end of treatment after total hip arthroplasty. Abbreviations: SMD = standardized mean difference, SE = standard error, IV = inverse variance, CI = confidence interval.

Study	Precauti Mean (SD)		Minim no preca Mean (SI	autions	. 3	t Mean difference IV, random (95%CI)		ean differ random (9			
Dietz 2019 (36) Mounts 2022 (38)	-87 (7) -86 (16)	145 174	-88 (8) -90 (13)	, 139 172	59.3 40.7	1.0 (-0.75-2.8) 3.9 (0.89-6.9)	,		, 		
Total		319		311		2.2 (-0.61-5.0)		-			
Heterogeneity: Tau Test for overall effe	,	,	= 1 (p = 0.1)	; l ² = 629	%	Fav	-4 ors preca	utions Fa	2 vors mir	4 imal/nc	precautions

Figure 15. Random-effects meta-analysis on the effect of precautions on patient-reported function at longest follow-up after total hip arthroplasty. Abbreviations: SD = standard deviation, IV = inverse variance, CI = confidence interval.

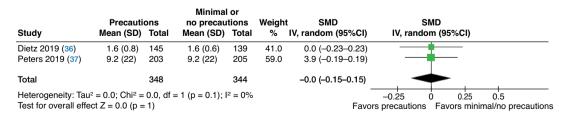
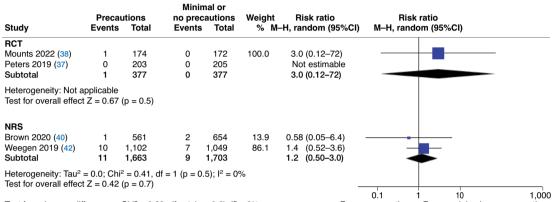


Figure 16. Random-effects meta-analysis on the effect of precautions on hip-related pain end of treatment after total hip arthroplasty. Abbreviations: SMD = standardized mean difference, SD = standard deviation, IV = inverse variance, CI = confidence interval.

	Precauti	ons	Minimal no precau		Weigh	t SMD	SM	ID	
Study	Mean (SD)	Total	Mean (SD)	Total	%	IV, random (95%CI)	IV, randon	1 (95%CI)	
Dietz 2019 (36)	-82 (5)	145	-83 (7)	139	41.0	0.16 (-0.07-0.40)	_	-	_
Peters 2019 (37)	-0.80 (0.29)	203	-0.83 (0.32)	205	59.0	0.10 (-0.10-0.29)		-	
Total		348		344		0.13 (-0.02-0.27)			
Heterogeneity: Tau Test for overall effe	,		df = 1 (p = 0.7);	l ² = 0%	%	Favor	-0.25 0	0.25 Favors min	0.5 imal/no precautions

Figure 17. RRandom-effects meta-analysis on the effect of precautions on health-related quality of life end of treatment after total hip arthroplasty. Abbreviations: SMD = standardized mean difference, SD = standard deviation, IV = inverse variance, CI = confidence interval.



Test for subgroup differences: $Chi^2 = 0.28$, df = 1 (p = 0.6); l² = 0%



Figure 18. Random-effects meta-analysis on the effect of precautions on health-related quality of life end of treatment after total hip arthroplasty. Abbreviations: M-H = Mantel-Haenszel, CI = confidence interval, RCT = randomized controlled trial, NRS = non-randomized study.

	Precau	tions	Minim no preca		Weight	Risk difference	Risk difference	
Study	Events	Total	Events	Total	% M	I–H, random (95%CI)	M–H, random (95%Cl)	
RCT								
Mounts 2022 (38)	1	174	0	172	26.7	0.01 (-0.01-0.02)		
Peters 2019 (37)	0	203	0	205	73.3	0.0 (-0.01-0.01)		
Subtotal	1	377	0	377		0.0 (-0.01-0.01)		

Favors precautions Favors minimal/no precautions

Figure 19. Random-effects meta-analysis on the effect of precautions on the risk difference of reoperation at longest follow-up after total hip arthroplasty. Abbreviations: M-H = Mantel-Haenszel, CI = confidence interval, RCT = randomized controlled trial.

Funnel plot

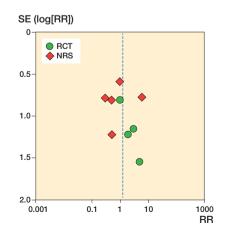


Figure 20. Funnel plot from the random-effects meta-analysis on the effect of precautions on the relative risk of late dislocations after total hip arthroplasty. early dislocation

Sensitivity analysis

	_			nal or			
0	Precau			autions	Weigh		Risk ratio
Study	Events	Total	Events	Total	%	M–H, fixed (95%CI)	M–H, fixed (95%Cl)
RCT							
Peters 2019 (37)	3	203	3	205	54.3	1.0 (0.21-4.9)	
Dietz 2019 (36)	2	145	1	139	18.5	1.9 (0.18-21)	
Tetreault 2020 (35)	3	288	1	290	18.1	3.0 (0.32-29)	
Mounts 2022 (38)	2	174	0	172	9.1	4.9 (0.24–102)	
Subtotal	10	810	5	806		1.9 (0.68–5.3)	-
NRS							
NRS							
()	2	561	8	654	33.9	0.29 (0.06-1.4)	
()	2 2	561 146	8 6	654 219	33.9 22.0	0.29 (0.06–1.4) 0.50 (0.10–2.4)	
Mikkelsen 2014 (35)						· · · ·	
Mikkelsen 2014 (35) Lightfoot 2020 (39)	2	146	6	219	22.0	0.50 (0.10–2.4)	
Mikkelsen 2014 (35) Lightfoot 2020 (39) Allen 2018 (41)	2 1	146 118	6 2	219 119	22.0 9.1	0.50 (0.10–2.4) 0.50 (0.05–5.5)	
Brown 2020 (40) Mikkelsen 2014 (35) Lightfoot 2020 (39) Allen 2018 (41) Weegen 2019 (42) Subtotal	2 1 10	146 118 866	6 2 4	219 119 334	22.0 9.1 26.5	0.50 (0.10–2.4) 0.50 (0.05–5.5) 0.96 (0.30–3.1)	
Mikkelsen 2014 (35) Lightfoot 2020 (39) Allen 2018 (41) Weegen 2019 (42) Subtotal	2 1 10 10 25	146 118 866 508 2,199	6 2 4 2 22	219 119 334 606 1,932	22.0 9.1 26.5	0.50 (0.10–2.4) 0.50 (0.05–5.5) 0.96 (0.30–3.1) 6.0 (1.3–27)	
Mikkelsen 2014 (35) Lightfoot 2020 (39) Allen 2018 (41) Weegen 2019 (42) Subtotal Heterogeneity: Chi ² =	2 1 10 10 25 = 8.9, df =	146 118 866 508 2,199 4 (p = 0.0	6 2 4 2 22	219 119 334 606 1,932	22.0 9.1 26.5	0.50 (0.10–2.4) 0.50 (0.05–5.5) 0.96 (0.30–3.1) 6.0 (1.3–27)	
Mikkelsen 2014 (35) Lightfoot 2020 (39) Allen 2018 (41) Weegen 2019 (42) Subtotal	2 1 10 10 25 = 8.9, df =	146 118 866 508 2,199 4 (p = 0.0	6 2 4 2 22	219 119 334 606 1,932	22.0 9.1 26.5	0.50 (0.10–2.4) 0.50 (0.05–5.5) 0.96 (0.30–3.1) 6.0 (1.3–27)	

Figure 21. Fixed-effects meta-analysis on the effect of precautions on the relative risk of late dislocations after total hip arthroplasty. Abbreviations: M-H = Mantel-Haenszel, CI = confidence interval, RCT = randomized controlled trial, NRS = non-randomized study.

Study	Precau Events	tions Total	Minim no preca Events		Weight % M-	Risk ratio H, random (95%Cl)	Risk ratio M–H, random (95%Cl)
-			Lventa	iotai	70 IVI		
Precautions in con					45.0		
Peters 2019 (37)	3	203	3	205	45.2	1.0 (0.21–4.9)	
Subtotal	3	203	3	205	45.2	1.0 (0.21–4.9)	
Heterogeneity: Not a	applicable						
Test for overall effec		p = 1)					
No precautions in o	control gro	oup					
Dietz 2019 (36)	2	145	1	139	20.0	1.9 (0.18–21)	
Mounts 2022 (38)	2	174	0	172	12.4	4.9 (0.24–102)	
Tetreault 2020 (35)	3	288	1	290	22.4	3.0 (0.32-29)	
Subtotal	7	607	2	601	54.8	2.9 (0.68–12)	
Heterogeneity: Tau ² Test for overall effec			f = 2 (p = 0.9	9); l² = 0º	%		
Total	10	810	5	806		1.8 (0.61–5.2)	•
Heterogeneity: Tau ² Test for overall effec Test for subgroup dif	t Z = 1.1 (p	= 0.3)	u ,			— Favors	0.1 1 10 1,000 precautions Favors minimal/no precaution

Figure 22. Subgroup analysis of randomized controlled trials with hip precautions in control group or no precautions. Random-effects meta-analysis on the effect of precautions on the relative risk of late dislocations after total hip arthropasty. Abbreviations: M-H = Mantel-Haenszel, CI: confidence interval.

	Precau	utions	Minim no prec		Weight	Risk ratio	Risk ratio
Study	Events	Total	Events		•	I–H, random (95%CI)	M–H, random (95%Cl)
Precautions in cont	rol group	1	~				
Mikkelsen 2014 (34)	2	146	6	219	20.1	0.50 (0.10-2.4)	
Weegen 2019 (42)	10	508	2	606	21.0	6.0 (1.3–27)	
Subtotal	12	654	8	825	41.0	1.8 (0.15–20)	
Heterogeneity: Tau ² =	= 2.5; Chi ²	$^{2} = 4.9, df$	= 1 (p = 0.0)	3); l ² = 80	0%		
Test for overall effect			u u	,,			
No precautions in c	ontrol gro	oup					
Brown 2020 (40)	2	561	8	654	20.6	0.29 (0.06-1.4)	
Lightfoot 2020 (39)	1	118	2	119	12.7	0.50 (0.05-5.5)	
Allen 2018 (41)	10	866	4	334	25.7	0.96 (0.30-3.1)	
Subtotal	13	1,545	14	1,107	59.0	0.61 (0.26–1.5)	-
Heterogeneity: Tau ² = Test for overall effect			= 2 (p = 0.5); l ² = 0%	•		
	, i	,					
Total	25	2,199	22	1,932		0,89 (0.31–2,5)	-
Heterogeneity: Tau ² =			f = 4 (p = 0.	06); l² = 5	55%	_	
Test for overall effect							0.1 1 10 1.0
Test for subgroup diff	erences: (Chi ² = 0.6	4, df = 1 (p :	= 0.4); l ²	= 0%	Favors	s precautions Favors minimal or no precautions

Figure 23. Subgroup analysis of non-randomized studies with hip precautions in control group or no precautions. Random-effects meta-analysis on the effect of precautions on the relative risk of late dislocations after total hip arthroplasty. M-H = Mantel-Haenszel, CI: confidence interval.

Study	Precautio SMD (SE)	ns Total	Minimal or no precautions Total	Weight %	SMD IV, fixed (95%CI)	SMD IV, fixed (95%CI)	
Peters 2019 (37)	0.13 (0.099)	203	205	5.5	0.13 (-0.06-0.32)		
Tetreault 2020 (35)	0.14 (0.025)	288	290	85.9	0.14 (0.09–0.19)		
Mounts 2022 (38)	0.17 (0.11)	174	172	4.7	0.17 (-0.04-0.38)	+	
Dietz 2019 (36)	0.20 (0.12)	145	139	3.9	0.20 (-0.03-0.43)	+	
Total		810	806		0.15 (0.10–0.19)	•	
Heterogeneity: Chi ² Test for overall effe	,	u //	l ² = 0%	— –0 Favors ہ		1 Il/no precautions	

Figure 24. Fixed-effects meta-analysis on the effect of precautions on patient-reported function end of treatment after total hip arthroplasty. Abbreviations: SMD = standardized mean diffeence, SE = standard error, IV = inverse variance, CI = confidence interval.

Study	Precautic SMD (SE)	ons Total	Minimal or no precautions Total	Weigh %	t SMD IV, random (95%CI)	SMD IV, random(95%CI)		
Peters 2019 (37)	0.13 (0.099)) 203	205	38.9	0.13 (-0.06-0.32)			-
Tetreault 2020 (35)	0.14 (0.025) 288	290	0.0				
Mounts 2022 (38)	0.17 (0.11)	174	172	33.3	0.17 (-0.04-0.38)			
Dietz 2019 (36)	0.20 (0.12)	145	139	27.7	0.20 (-0.03-0.43)		-	
Total		522	516		0.16 (0.04–0.28)	•		
Heterogeneity: Tau ² Test for overall effe			= 2 (p = 0.9); l ² = 0 ⁴		0.5 0 precautions Favors mir	0.5 1 nimal/no precaution		

Figure 25. Random-effects meta-analysis on the effect of precautions on patient-reported function end of treatment after total hip arthroplasty. Sensitivity analysis without Tetreault et al. Abbreviations: SMD = standardized mean diffeence, SE = standard error, IV = inverse variance, CI = confidence interval.

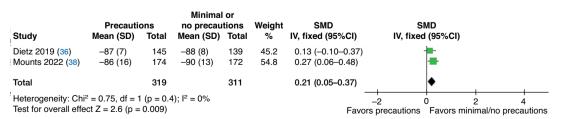


Figure 26. Fixed-effects meta-analysis on the effect of precautions on patient-reported function at longest follow-up after total hip arthroplasty. Abbreviations: SMD = standardized mean diffeence, SD = standard deviation, IV = inverse variance, CI = confidence interval.

	Precauti	ons		Minimal or no precautions		SMD	SMD		
Study	Mean (SD)	Total	Mean (SD)	Total	%	IV, fixed (95%CI)	IV, fixed (95%CI)		
Dietz 2019 (36)	1.6 (0.8)	145	1.6 (0.6)	139	41.0	0.0 (-0.23-0.23)			
Peters 2019 (37)	9.2 (22)	203	9.2 (23)	205	59.0	-0.0 (-0.19-0.19)			
Total		348		344		-0.0 (-0.15-0.15)	-		
Heterogeneity: Ch Test for overall effe	,	u //	l ² = 0%				–0.5 0 s precautions Favors m	0.5 ninimal/no	1 precautions

Figure 27. Fixed-effects meta-analysis on the effect of precautions on hip-related pain end of treatment after total hip arthroplasty. Abbreviations: SMD = standardized mean diffeence, SD = standard deviation, IV = inverse variance, CI = confidence interval.

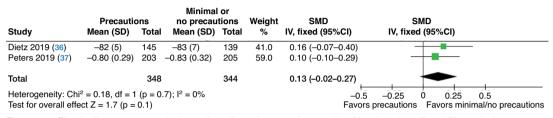


Figure 28. Fixed-effects meta-analysis on the effect of precautions on health-related quality of life end of treatment after total hip arthroplasty. Abbreviations: SMD = standardized mean diffeence, SD = standard deviation, IV = inverse variance, CI = confidence interval.

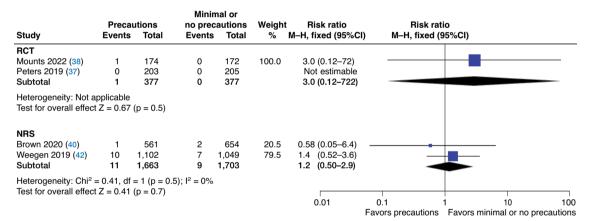


Figure 29. Fixed-effects meta-analysis on the effect of precautions on the relative risk of reoperation at longest follow-up after total hip arthroplasty. Abbreviations: M-H = Mantel-Haenszel, CI = Confidence interval, RCT = randomized controlled trial, NRS = non-randomized study.

	Dress		Minin		Walach	b Dials vatia	Dials actio
Study	Precau Events	Total	Events	autions Total	Weigh %	t Risk ratio M–H, fixed (95%Cl)	Risk ratio M–H, fixed (95%Cl)
RCT							
Mounts 2022 (38)	1	174	0	172	45.9	0.01 (-0.01-0.02)	
Peters 2019 (37)	0	203	0	205	54.1	0.00 (-0.01-0.01)	
Subtotal	1	377	0	377		0.00 (-0.01-0.01)	
NRS							
Brown 2020 (40)	1	561	2	654	36.0	-0.00 (-0.01-0.00)	
Weegen 2019 (42)	10	1,102	7	1,049	64.0	0.00 (-0.01-0.01)	
Subtotal	11	1,663	9	1,703		0.00 (-0.01-0.01)	
Heterogeneity: Chi ²	= 0.83, df :	= 1 (p = 0	.4); l ² = 0%				
Test for overall effec							
		,				_	-0.01 0 0.01 0.02
						Fa	vors precautions Favors minimal/no precautions

Figure 30. Fixed-effects meta-analysis on the effect of precautions on the risk difference of reoperation at longest followup after total hip arthroplasty. Abbreviations: M-H = Mantel-Haenszel, CI = Confidence interval, RCT = randomized controlled trial, NRS = non-randomized study