Bone & Joint Research

Supplementary Material

10.1302/2046-3758.109.BJR-2020-0443.R1

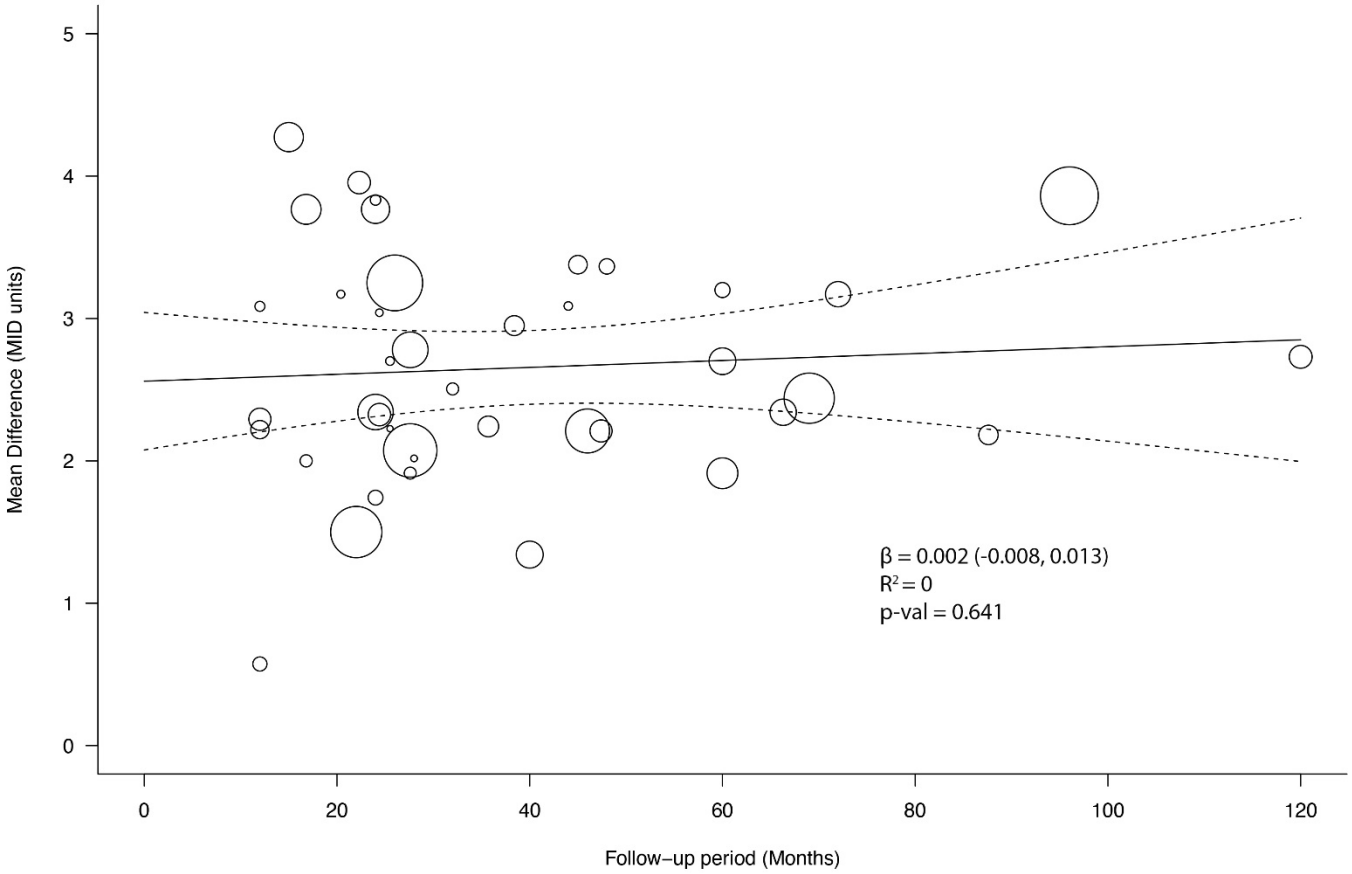

Fig a. Meta-regression with follow-up period as a covariate. R^2: heterogeneity accounted for by follow-up period. β: regression coefficient. p-val: p-value indicating the significance of follow-up period as a covariate. MID, minimally important difference.

Table i. Individual methodological index for non-randomized studies assessment of each case series included in this study.

Approach	1. A clearly stated aim	2. Inclusion of consecutive patients	3. Prospective collection of data	4. Endpoints appropriate to the aim of the study	5. Unbiased assessment of the study endpoint	6. Follow-up period appropriate to the aim of the study	7. Loss to follow up less than 5%	8. Prospective calculation of the study size	Total	Score
Arthroscopy										
Lindmann et al. 2020	2	2	2	2	0	2	1	1	12	Fair Quality
Öhlin et al. 2020	2	2	2	2	0	2	2	2	14	High Quality
Hassebrock et al. 2019	2	2	2	2	0	2	0	0	10	Fair Quality
Ortiz-Declet et al. 2019	2	2	2	2	0	2	2	0	12	Fair Quality
Perets et al. 2019	2	2	2	2	0	2	1	0	11	Fair Quality
Kaldau et al. 2018	2	2	1	2	0	2	1	0	10	Fair Quality
Tahoun et al. 2018	2	2	0	2	0	2	0	0	8	Low Quality
Zimmerer et al. 2018	2	2	2	2	0	2	1	0	11	Fair Quality
Joseph et al. 2017	2	2	2	2	0	2	1	2	13	High Quality
Tjong et al. 2017	2	2	2	2	0	2	1	0	11	Fair Quality
Degen et al. 2016	2	2	1	2	0	1	0	0	8	Low Quality
Hufeland et al.2016	2	0	1	2	2	2	1	0	10	Fair Quality
Dippmann et al. 2014	2	0	2	2	0	2	1	0	9	Fair Quality
Gicquel et al. 2014	2	2	2	2	0	2	1	0	11	Fair Quality
Gupta et al. 2014	2	2	2	2	0	2	2	2	14	High Quality

Nielsen et al. 2014	2	2	2	2	0	2	1	0	11	Fair Quality
Palmer et al. 2012	2	2	2	2	0	2	2	0	12	Fair Quality
Philippon et al. 2012	2	2	2	2	0	2	1	0	11	Fair Quality
Byrd & Jones 2011	1	0	2	2	0	1	2	0	8	Low Quality
Haviv et al. 2010	2	2	1	2	0	1	1	0	9	Fair Quality
Horisberger et al. 2010	2	2	2	2	0	1	2	0	11	Fair Quality
Philippon et al. 2009	2	2	2	2	0	2	1	0	11	Fair Quality
								Mean	**11.1 (SD 2.16)**	**Fair Quality**
Anterior mini open approach										
Skowronek et al. 2017	1	2	1	2	0	2	0	0	8	Low Quality
Srinivasan et al. 2013	2	1	1	2	0	1	2	0	9	Fair Quality
Chiron et al. 2012	2	1	2	2	0	2	1	2	12	Fair Quality
Ribas et al. 2010	1	0	2	2	0	2	0	0	7	Low Quality
								Mean	**9 (SD 2.16)**	**Fair Quality**
Surgical hip dislocation										
Kockara et al. 2017	2	2	1	2	0	2	1	0	10	Fair Quality
İnan et al 2016	1	2	1	2	0	2	2	0	10	Fair Quality
Steppacher et al. 2014	2	2	1	2	0	2	1	0	10	Fair Quality
Jäger et al. 2011	2	2	2	2	0	1	2	0	11	Fair Quality
Naal et al. 2011	2	0	1	2	0	2	2	0	9	Fair Quality
Yun et al. 2009	2	1	0	2	0	2	1	0	8	Low Quality
								Mean	**9.7 (SD 1.03)**	**Fair Quality**

SD, standard deviation.

Table ii. Individual methodological index for non-randomized studies assessment of each comparative study included in this study.

Approach	1. A clearly stated aim	2. Inclusion of consecutive patients	3. Prospective collection of data	4. Endpoints appropriate to the aim of the study	5. Unbiased assessment of the study endpoint	6. Follow-up period appropriate to the aim of the study	7. Loss to follow up less than 5%	8. Prospective calculation of the study size	9. An adequate control group	10. Contemporary groups	11. Baseline equivalence of groups	12. Adequate statistical analyses	**Total**	**Score**
Arthroscopy														
Kunze et al. 2020	2	2	1	2	0	2	2	0	2	0	1	2	16	Fair Quality
Bolia et al. 2019	2	2	2	2	2	2	1	0	2	1	2	2	20	High Quality
Kierkegaard et al 2019.	2	2	2	2	0	1	1	1	2	2	2	2	19	High Quality
de Girolamo et al. 2018	2	2	1	2	0	2	1	0	2	2	2	2	18	Fair Quality
Mansell et al. 2018	2	0	2	2	1	2	1	1	2	2	2	2	21	High Quality
Menge et al. 2017	2	2	2	2	0	2	1	0	2	2	1	2	18	Fair Quality
Murata et al. 2017	2	2	1	2	2	2	1	0	2	2	2	2	20	High Quality
Domb et al. 2013	2	2	2	2	0	2	0	1	2	2	2	2	19	High Quality
Krych et al. 2013	2	2	2	2	1	2	2	2	2	2	2	2	23	High Quality
Malviya et al. 2013	2	1	2	2	0	1	2	2	2	2	1	2	19	High Quality
Larson et al. 2012	2	0	2	2	0	2	1	2	2	2	2	2	19	High Quality
Zingg et al. 2012	2	2	2	2	0	1	2	2	2	2	1	2	20	High Quality
												Mean	**19.3 (SD 1.72)**	**High Quality**
Anterior mini open approach														

Ezechieli et al. 2016	2	2	0	2	0	1	0	0	2	2	1	2	14	Fair Quality
Nepple et al. 2009	2	2	1	2	0	1	2	0	2	1	2	2	17	Fair Quality
												Mean	**15.5 (SD 2.12)**	**Fair Quality**
Surgical hip dislocation														
Hingsammer et al. 2015	2	2	1	2	0	1	2	0	2	2	2	2	18	Fair Quality
Domb et al. 2013	2	2	2	2	0	2	0	1	2	2	2	2	19	High Quality
Zingg et al. 2012	2	2	2	2	0	1	2	2	2	2	1	2	20	High Quality
Espinosa et al. 2006	1	2	1	2	0	2	1	0	2	1	2	2	16	Fair Quality
												Mean	**18.3 (SD 1.71)**	**Fair Quality**

SD, standard deviation.

Table iii. Pooled preoperative patient-reported outcome measure scores including between-group comparisons.

Pooled group results			**Between-group comparison**			
Subgroup	**Pooled PROM (95% CI)**	**I^2**	**Groups**	**Cochran Q**	**DF**	**p-value**
Preoperative scores						
Arthroscopy	55.25 (50.79 to 59.70)	98	AMO vs SHD	1.655886	1	0.1981598
AMO	56.54 (50.40 to 62.68)	87	Arth vs AMO	0.1111223	1	0.73887
SHD	64.30 (54.20 to 74.40)	98	Arth vs SHD	2.581113	1	0.1081456
Postoperative scores						
Arthroscopy	80.43 (77.13 to 83.74)	93	AMO vs SHD	1.08649	1	0.2972503
AMO	89.03 (84.62 to 93.44)	88	Arth vs AMO	9.348219	1	0.002232022
SHD	85.32 (79.92 to 90.72)	89	Arth vs SHD	2.286366	1	0.1305151

Arth, arthroscopy; AMO, anterior mini open approach; CI, confidence interval; DF, degrees of freedom; PROM, patient-reported outcome measure; SHD, surgical hip dislocation.

Table iv. Sensitivity analysis of mean difference between pre- and postoperative patient-reported outcome measures using standardized mean difference.

Pooled group results			Between-group comparison			
Subgroup	**Pooled SMD (95% CI)**	**I^2**	**Groups**	**Cochran Q**	**DF**	**p-value**
Arthroscopy	1.36 (1.09 to 1.63)	93	AMO vs SHD	0.258322	1	0.6112753
AMO	2.52 (1.59 to 3.44)	93	Arth vs AMO	5.562949	1	0.01834449
SHD	2.10 (0.77 to 3.43)	89	Arth vs SHD	1.152791	1	0.2829657

Arth, arthroscopy; AMO, anterior mini open approach; CI, confidence interval; DF, degrees of freedom; SHD, surgical hip dislocation; SMD, standardized mean difference.

Table v. Sensitivity analysis of pre- to postoperative change in alpha angle using standardized mean difference.

Pooled group results			Between-group comparison			
Subgroup	**Pooled SMD (95% CI)**	**I^2**	**Groups**	**Cochran Q**	**DF**	**p-value**
Arthroscopy	2.00 (1.24 to 2.77)	97	Arth vs AMO	18.22647	1	0.00001961341
AMO	3.96 (3.49 to 4.43)	44	Arth vs SHD	2.106604	1	0.1466645
SHD	2.77 (2.08 to 3.46)	66	AMO vs SHD	7.835239	1	0.005123738

Arth, arthroscopy; AMO, anterior mini open approach; CI, confidence interval; DF, degrees of freedom; SHD, surgical hip dislocation; SMD, standardized mean difference.

Table vi. Mean preoperative and postoperative patient-reported outcome measure scores and alpha angles for each study.

Study	PROMs			Alpha angles	
	PROM	Mean preoperative score (SD)	Mean postoperative score (SD)	Mean preoperative score (SD)	Mean postoperative score (SD)
Arthroscopy					
Kunze et al.	HOS	59.6 (23.4)	80.6 (23.5)	-	-
Lindmann et al.	iHOT12	40 (18.5)	68.8 (29.3)	-	-
Öhlin et al.	iHOT12	42.9 (18.3)	67.2 (27.5)	-	-
Ortiz-Declet et al.	NAHS	67.5 (15.4)	89.6 (11.3)	-	-
Bolia et al.	HOS	58.8 (18.9)	83.2 (16)	70.67 (14.64)	41.06 (4.234)
Hassebrock et al.	iHOT12	38 (59.2)	72.4 (41.2)	61.4 (34.05)	43.1 (20.765)
Kierkegaard et al.	-	-	-	52 (10)	47 (8)
Perets et al.	NAHS	58.8 (18.9)	83.2 (16)	-	-
de Girolamo et al.	mHHS	46.2 (5.9)	77.8 (8.9)	-	-
Mansell et al.	iHOT33	28.3 (15.6)	49.2 (27.1)	-	-
Tahoun et al.	iHOT33	43.1 (14.0)	78.5 (15.6)	70.5 (6.3)	44.3 (4.9)
Zimmerer et al.	HOOS	52.4 (26.3)	75.5 (25.8)	-	-
Menge et al.	HOS	61.8 (22.3)	91.9 (14.8)	-	-
Murata et al.	NAHS	48.3 (13.5)	71.7 (11.3)	-	-
Degen et al.	iHOT33	40.7 (19.9)	85.9 (14)	68.9 (11)	38.7 (5.1)
Hufeland et al.	mHHS	67.2 (6.4)	86.4 (13.5)	57.2 (10.1)	46.3 (7.4)
Joseph et al.	iHOT33	33.2 (16.5)	61.1 (29.7)	-	-
Dippmann et al.	mHHS	59.9 (16.6)	78.7 (16.6)	-	-
Gupta et al.	HOS	52.9 (52.6)	74.4 (52.1)	70 (8.335)	42.72 (4.956)
Nielsen et al.	mHHS	72.1 (16.8)	83.1 (16.9)	-	-
Domb et al.	HOS	62.5 (24)	92.5 (8.7)	56.9 (10.126)	40.3 (14.722)
Krych et al.	HOS	57.2 (22.5)	84.8 (15.7)	-	-
Malviya et al.	NAHS	68.0 (37.7)	88.0 (37.7)	-	-
Zingg et al.	mHHS	75.2 (10.3)	94.4 (11.7)	59 (11.4)	38 (5)
Larson et al.	mHHS	64.6 (46.9)	89.9 (47.1)	-	-
Palmer et al.	NAHS	56.1 (15.9)	78.2 (15.8)	58.5 (12.2)	46.1 (8.5)
Philippon et al.	HOS	57.7 (20.2)	81.8 (18.8)	-	-
Haviv et al.	NAHS	69.8 (14.0)	84.8 (11.6)	-	-
Horisberger et al.	NAHS	56.8 (15.8)	84.6 (10.7)	72.8 (11.726)	50.3 (9.937)
Philippon et al.	HOS	60.7 (40.7)	81.3 (39.6)	72 (50.121)	46 (50.121)
Anterior mini open approach					
Skowronek et al.	mHHS	56.4 (12)	84.1 (16)	-	-
Ezechieli et al.	HOOS	60.0 (14.4)	94.3 (8.6)	83.9 (11.958)	51.1 (3.601)
Srinivasan et al.	NAHS	44.6 (13.3)	84.1 (9)	-	-
Chiron et al.	NAHS	58.9 (10.2)	91.4 (8.7)	61.8 (7.627)	36.9 (3.52)
Nepple et al.	mHHS	64.5 (26.2)	90.5 (26.2)	-	-
Surgical hip dislocation					
Kockara et al.	mHHS	58.0 (9.6)	84.0 (9.5)	-	-
İnan et al	mHHS	60.0 (8.4)	87.6 (15.6)	65.1 (5)	51.2 (3.2)

Hingsammer et al.	-	-	-	71 (15.8)	40.4 (12.5)
Domb et al.	HOS	63.5 (22.4)	86.6 (15.8)	58.4 (10.126)	39.5 (10.719)
Zingg et al.	mHHS	80.2 (8.3)	84.9 (14.0)	56.6 (6.2)	39 (2.7)
Jäger et al.	mHHS	46.6 (18.2)	71.9 (20.8)	-	-
Naal et al.	-	-	-	69.3 (9.9)	43.4 (4.6)
Yun et al.	mHHS	76.0 (2.6)	93.0 (3.2)	-	-

HOOS, hip disability and osteoarthritis outcome score; HOS, hip outcome score; iHOT, international hip outcome tool; mHHS, modified Harris Hip Score; NAHS, non-arthritic hip score; PROM, patient-reported outcome measure; SD, standard deviation.