

Supplementary files

Supplementary table 1. Electronic databases and search terms

Databases	Search terms
EMBASE Medline SportsDiscus CINAHL Cochrane Library	"Femoracetabular Impingement"[Mesh] OR ("femoroacetabular" OR "femoracetabular" OR "femoral acetabular" OR "femoro-acetabular" OR "labrum" OR "labral" OR "hip" OR "coxa" OR "hip joint" OR "acetabulofemoral joint" OR "Hip"[Mesh] OR "Hip Joint"[Mesh]) AND ("impingement" OR "impingement syndrome") AND ("arthroscopy" OR "arthroscopic" OR "arthroscopies" OR "Arthroscopy"[Mesh]).
PEDro	"Femoracetabular Impingement" OR "Femoro acetabular Impingement" OR "Femoroacetabular impingement".

Supplementary table 2. Methodological quality assessment according to the instrument developed by Yang *et al.*

Study	Dimension scores				Total score (0 to 13)	Study quality
	Study aims and design (0 to 2)	Description of treatment (0 to 3)	Description of methods (0 to 2)	Study conduction (0 to 6)		
	Dippmann <i>et al.</i> 2014	2	3	1		
Fabricant <i>et al.</i> 2012	1	3	2	4	10	High
Frank <i>et al.</i> 2014	2	3	2	4	11	High
Gicquel <i>et al.</i> 2014	2	3	1	4	10	High
Horisberger <i>et al.</i> 2010	2	3	1	3	9	High
Javed <i>et al.</i> 2011	1	3	2	2	8	Moderate
Krych <i>et al.</i> 2013	2	3	1	4	10	High
Larson <i>et al.</i> 2012	1	3	0	4	8	Moderate
Larson <i>et al.</i> 2014	1	3	0	3	7	Moderate
Lerch <i>et al.</i> 2015	2	3	1	3	9	High
Malviya <i>et al.</i> 2012	1	2	1	2	6	Moderate
Martinez <i>et al.</i> 2014	1	3	1	2	7	Moderate
Nielsen <i>et al.</i> 2014	2	3	0	3	8	Moderate
Palmer <i>et al.</i> 2012	2	3	0	2	7	Moderate
Park <i>et al.</i> 2014	1	3	2	3	9	High
Philippon <i>et al.</i> 2009	2	3	1	4	10	High
Philippon <i>et al.</i> 2012	1	2	0	3	6	Moderate
Philippon <i>et al.</i> 2010	1	3	1	4	9	High
Polat <i>et al.</i> 2013	1	3	0	4	8	Moderate
Polesello <i>et al.</i> 2014	1	3	1	4	9	High
Redmond <i>et al.</i> 2015	1	3	0	2	6	Moderate
Singh <i>et al.</i> 2010	1	3	1	4	9	High
Skendzel <i>et al.</i> 2014	2	3	0	1	6	Moderate
Stahelin <i>et al.</i> 2008	2	3	1	4	10	High
Thomee <i>et al.</i> 2014	2	0	1	4	7	Moderate
Zingg <i>et al.</i> 2013	2	3	2	3	10	High

Supplementary table 3. Inclusion criteria, co-existing hip joint disease and surgical treatments

Study	FAI		Number of patients at recruitment	Co-existing hip joint disease		Hip surgical techniques
	Inclusion criteria	Included type		Preoperative	Intra-operative	
Dippmann <i>et al.</i> 2014	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Anterior impingement test; hip ROM <p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle $>55^\circ$ (cam morphology); crossover sign (pincer morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology 	. All	92	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Articular joint space >2 mm 	. NR	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming . Labrum repair . Chondroplasty; microfracture
Fabricant <i>et al.</i> 2012	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Anterior impingement test; reduced hip IR ROM <p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Decreased femoral head neck offset (cam morphology); crossover sign (pincer morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology <p><i>CT scans</i></p> <ul style="list-style-type: none"> . α angle $>55^\circ$ (cam morphology) 	. All	21	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Tönnis grade ≤ 1 	. NR	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair
Frank <i>et al.</i> 2014	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle (cam morphology), center edge angle (pincer morphology) 	. All	64	. NR	. NR	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming . Labrum repair
Gicquel <i>et al.</i> 2014	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle $>50^\circ$ (cam morphology); crossover sign; center edge angle $>25^\circ$. All	56	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Tönnis grade 0: $N=35$ hips . Tönnis grade 1: $N=18$ hips 	. NR	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming

	<p><i>MR images</i></p> <ul style="list-style-type: none"> . Bony morphology; chondrolabral pathology <p><i>CT scans</i></p> <ul style="list-style-type: none"> . Bony morphology; chondrolabral pathology 					<ul style="list-style-type: none"> . Labrum debridement; labrum repair . Chondroplasty; microfracture
Horisberger <i>et al.</i> 2010	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Anterior impingement test; hip IR and flexion ROM <p><i>MR images</i></p> <ul style="list-style-type: none"> . α angle $\geq 50^\circ$ (cam morphology), chondrolabral pathology 	<ul style="list-style-type: none"> . Cam . Mixed 	88	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Tönnis grade 0: $N=1$ hip . Tönnis grade 1: $N=76$ hips . Tönnis grade 2: $N=28$ hips 	<ul style="list-style-type: none"> . Outerbridge grade ≤ 2 limited to the impingement zone: $N=34$ hips . Outerbridge grade >2 in the impingement zone and grade 1-2 in the rest of the hip: $N=55$ hips . Outerbridge grade >2 in the impingement zone and in the rest of the hip: $N=16$ hips 	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement . Chondroplasty; microfracture
Javed <i>et al.</i> 2011	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Anterior impingement test; reduced hip IR ROM <p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Loss of femoral head sphericity; reduced head-neck offset (cam morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology 	<ul style="list-style-type: none"> . Cam 	40	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Tönnis grade ≤ 1 	<ul style="list-style-type: none"> . NR 	<ul style="list-style-type: none"> . Femoral osteoplasty . Labrum debridement . Chondroplasty; microfracture

Krych <i>et al.</i> 2013	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Anterior impingement test <p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle $>45^\circ$ (cam morphology); crossover sign; ischial spine sign; coxa profunda; protrusio acetabuli; pincer divot at the femoral head-neck junction (pincer morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology 	<ul style="list-style-type: none"> . Pincer . Mixed 	36	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Tönnis grade ≤ 1 	<ul style="list-style-type: none"> . NR 	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair
Larson <i>et al.</i> 2012	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle $>55^\circ$ (cam morphology); crossover sign; posterior wall sign; coxa profunda; protrusio acetabuli; center edge angle $>25^\circ$ (pincer morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology 	<ul style="list-style-type: none"> . All 	96	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Tönnis grade 0-1: $N=90$ hips . Tönnis grade 2: $N=4$ hips 	<p><i>Femoral head</i></p> <ul style="list-style-type: none"> . Outerbridge grade 0: $N=73$ hips . Outerbridge grade 1: $N=1$ hip . Outerbridge grade 2: $N=14$ hips . Outerbridge grade 3: $N=6$ hips . Outerbridge grade 4: $N=0$ hips <p><i>Acetabulum</i></p> <ul style="list-style-type: none"> . Outerbridge grade 0: $N=8$ hips . Outerbridge grade 1: $N=4$ hips . Outerbridge grade 2: $N=7$ hips 	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair . Chondroplasty; microfracture

						. Outerbridge grade 3: N=48 hips . Outerbridge grade 4: N=27 hips
Larson <i>et al.</i> 2014	. NR	. All	220	<i>Radiographs</i> . Tönnis grade <1	. NR	. Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair . Chondroplasty; microfracture
Lerch <i>et al.</i> 2015	<i>MR images</i> . α angle (cam morphology); chondrolabral pathology	. Cam	40	<i>MR images</i> . No hip OA	. NR	. Femoral osteoplasty
Malviya <i>et al.</i> 2012	<i>Physical examinations</i> . NR <i>Radiographs</i> . NR <i>MR images</i> . NR	. All	122	. NR	. NR	. Femoral osteoplasty and/or acetabular rim trimming . Labrum repair . Chondroplasty; microfracture
Martinez <i>et al.</i> 2014	<i>Physical examinations</i> . Anterior impingement test <i>Radiographs</i> . α angle (cam morphology); crossover sign; ischial spine sign (pincer morphology) <i>MR images</i> . Chondrolabral pathology	. All	41	<i>Radiographs</i> . Tönnis grade 0: N=25 hips . Tönnis grade 1: N=13 hips . Tönnis grade 2: N=3 hips <i>MR images</i> . Cartilage lesion: N=1 hip	. Mahorn type 2: N=2 hips . Mahorn type 3: N=2 hips . Mahorn type 4: N=8 hips . Mahorn type 5: N=11 hips	. Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair . Chondroplasty; microfracture
Nielsen <i>et al.</i> 2014	<i>Physical examinations</i> . Anterior impingement test; reduced hip ROM	. All	117	. Articular joint space: 3.6 mm (SD: 0.6)	. ICRS grade 0: N=8 hips . ICRS grade 1: N=17 hips	. Femoral osteoplasty and/or acetabular rim trimming . Labrum repair

	<i>Radiographs</i> . α angle $>55^\circ$ (cam morphology); crossover sign; center edge angle $>35^\circ$ (pincer morphology)				. ICRS grade 2: <i>N</i> =46 hips . ICRS grade 3: <i>N</i> =33 hips . ICRS grade 4: <i>N</i> =13 hips	. Chondroplasty; microfracture
Palmer <i>et al.</i> 2012	<i>Physical examinations</i> . Anterior impingement test <i>Radiographs</i> . α angle $>50^\circ$ (cam morphology); crossover sign (pincer morphology) <i>MR images</i> . Chondrolabral pathology	. Cam . Mixed	194	<i>Radiographs</i> . Tönnis grade 0: <i>N</i> =174 hips . Tönnis grade 1: <i>N</i> =25 hips . Tönnis grade 2: <i>N</i> =1 hip	. Outerbridge grade 0-3: <i>N</i> =157 hips . Outerbridge grade 4: <i>N</i> =44 hips	. Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair . Chondroplasty; microfracture
Park <i>et al.</i> 2014	<i>Radiographs</i> . α angle $>55^\circ$ (cam morphology); crossover sign; coxa profunda; protrusio acetabuli (pincer morphology) <i>MR images</i> . Chondrolabral pathology	. All	197	. NR	. NR	. Femoral osteoplasty and/or acetabular rim trimming . Labrum repair
Philippon <i>et al.</i> 2009	<i>Physical examinations</i> . Anterior impingement test; FABER test; hip flexion, IR, ER, adduction and abduction ROM <i>Radiographs</i> . α angle $>50^\circ$ (cam morphology); crossover sign; coxa profunda (pincer morphology)	. All	122	<i>Radiographs</i> . Lateral articular joint space: 3.4 mm (95%CI: 3.1 to 3.7) . Medial articular joint space: 3.1 mm (95%CI: 2.9 to 3.3) . Foveal articular joint space: 3.2 mm (95%CI: 3.0 to 3.4)	. Outerbridge grade 1 to 2 or small grade 4: <i>N</i> =74 hips . Outerbridge grade 3 or isolated grade 4: <i>N</i> =29 hips . Outerbridge diffuse grade 3 or grade 4: <i>N</i> =9 hips	. Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair . Chondroplasty; microfracture
Philippon <i>et al.</i> 2010	<i>Physical examinations</i> . Anterior impingement test; FABER test	. All	28	. NR	. Outerbridge grade 4: <i>N</i> =5 hips	. Femoral osteoplasty and/or acetabular rim trimming . Labrum repair

	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle $>55^\circ$ (cam morphology); crossover sign; coxa profunda; protrusio acetabuli (pincer morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology 					<ul style="list-style-type: none"> . Chondroplasty; microfracture
Philippon <i>et al.</i> 2012	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Hip flexion, IR, ER, adduction and abduction ROM; anterior impingement test; FABER test <p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle (cam morphology), crossover sign, coxa profunda (pincer morphology) 	. All	153	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Lateral articular joint space: 3.6 mm (range: 0.1 to 6.8) . Anterior articular joint space: 3.5 mm (range: 0.2 to 6.3) . Foveal articular joint space: 3.7 mm (range: 0.3 to 11.1) 	. NR	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair . Chondroplasty; microfracture
Polat <i>et al.</i> 2013	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle, anterior femoral offset (cam morphology), center edge angle (pincer morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology <p><i>CT scans</i></p> <ul style="list-style-type: none"> . Bony morphology 	. All	42	. NR	<p><i>Femoral head</i></p> <ul style="list-style-type: none"> . Outerbridge grade 2: N=6 patients . Outerbridge grade 3: N=6 patients . Outerbridge grade 4: N=5 patients <p><i>Acetabulum</i></p> <ul style="list-style-type: none"> . Outerbridge grade 3: N=4 patients . Outerbridge grade 4: N=4 patients 	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair . Microfracture
Polesello <i>et al.</i> 2014	. NR	. All	27	. NR	. No hip OA	<ul style="list-style-type: none"> . Femoral osteoplasty and/or acetabular rim trimming

							. Labrum debridement, labrum repair
Redmond <i>et al.</i> 2015	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Center edge angle, crossover sign (pincer morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology 	. Pincer . Mixed	174	. NR	. NR		. Femoral osteoplasty and/or acetabular rim trimming . Labrum repair . Microfracture
Singh <i>et al.</i> 2010	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Anterior impingement test; FABER test; hip IR ROM <p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Crossover sign (pincer morphology) <p><i>MR images</i></p> <ul style="list-style-type: none"> . Chondrolabral pathology <p><i>CT scans</i></p> <ul style="list-style-type: none"> . α angle $>55^\circ$ (cam morphology) 	. All	24	<p><i>CT scans</i></p> <ul style="list-style-type: none"> . Reduced anterosuperior articular joint space: $N=1$ patient 	<ul style="list-style-type: none"> . No lesion: $N=2$ hips . Cartilage loss $<30\%$: $N=13$ hips . Cartilage loss $>30\%$: $N=5$ hips . Cartilage softening at the edge: $N=2$ hips . Labral separation: $N=5$ hips 		. Femoral osteoplasty and/or acetabular rim trimming . Labrum repair . Chondroplasty; microfracture
Skendzel <i>et al.</i> 2014	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Anterior impingement test, FABER test <p><i>Radiographs</i></p> <ul style="list-style-type: none"> . α angle $>55^\circ$ (cam morphology), crossover sign, coxa profunda; protrusio acetabuli; center edge angle $>40^\circ$ (pincer morphology) 	. All	559	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Articular joint space ≤ 2 mm: $N=63$ hips . Articular joint space >2 mm: $N=383$ hips 	<ul style="list-style-type: none"> . Outerbridge grade 3-4: $N=57$ hips 		. Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair
Stahelin <i>et al.</i> 2008	<p><i>Physical examinations</i></p> <ul style="list-style-type: none"> . Anterior impingement test; hip ROM <p><i>MR images</i></p> <ul style="list-style-type: none"> . α angle $>50^\circ$ (cam morphology) 	. Cam	22	<p><i>Radiographs</i></p> <ul style="list-style-type: none"> . Tönnis grade 0: $N=14$ patients . Tönnis grade 1: $N=5$ patients . Tönnis grade 2: $N=3$ patients 	<ul style="list-style-type: none"> . Diffuse chondromalacia: $N=14$ patients 		. Femoral osteoplasty . Labrum debridement; labrum repair

						. Delaminated hyaline cartilage at the acetabular rim with exposed subchondral bone: <i>N</i> =7 patients	. Chondroplasty; microfracture
Thomee <i>et al.</i> 2014	. NR	. All	502	. NR	. NR	. NR	. NR
Zingg <i>et al.</i> 2013	<i>Physical examinations</i> . Anterior impingement test, hip IR ROM $\leq 20^\circ$ <i>Radiographs</i> . Crossover sign, coxa profunda, protrusio acetabuli (pincer morphology) <i>MR images</i> . α angle $>55^\circ$ (cam morphology), chondrolabral pathology	. All	23	<i>Radiographs</i> . Tönnis grade 0: <i>N</i> =11 patients . Tönnis grade 1: <i>N</i> =12 patients	. NR	. Femoral osteoplasty and/or acetabular rim trimming . Labrum debridement; labrum repair . Chondroplasty	

ROM: range of motion. MR: magnetic resonance. NR: not reported. IR: internal rotation. CT: computed tomography. OA: osteoarthritis. SD: standard deviation. ICRS: International Cartilage Repair Society. FABER: flexion-abduction-external rotation. ER: external rotation. CI: confidence interval.

Supplementary table 4. Postoperative satisfaction scores

Follow up time	Study	Number of patients	Postoperative score	
			Scale	Mean
< 3 mos	Zingg <i>et al.</i> 2013	23	0-100	71
	Malviya <i>et al.</i> 2012	122	0-100	74
3 to < 6 mos	Zingg <i>et al.</i> 2013	23	0-100	84
6 mos to < 1 yr	Malviya <i>et al.</i> 2012	122	0-100	79
	Gicquel <i>et al.</i> 2014	51	% satisfied	79
1 to < 2 yrs	Zingg <i>et al.</i> 2013	23	0-100	84
	Malviya <i>et al.</i> 2012	122	0-100	82
	Singh <i>et al.</i> 2010	24	% satisfied	100
2 to < 3 yrs	Philippon <i>et al.</i> 2010	26	10-100	100
	Park <i>et al.</i> 2014	196	10-100	84
	Polat <i>et al.</i> 2013	41	% satisfied	95
	Javed <i>et al.</i> 2011	33	% satisfied	75
	Frank <i>et al.</i> 2014	60	10-100	84
3 to < 4 yrs	Palmer <i>et al.</i> 2012	173	% satisfied	77
4 to < 5 yrs	Gicquel <i>et al.</i> 2014	51	% satisfied	68
≥ 5 yrs	Polesello <i>et al.</i> 2014	24	% satisfied	100

Mos: Months. Yrs: Years.