■ HIP

Debridement *versus* re-attachment of acetabular labral tears

A REVIEW OF THE LITERATURE AND QUANTITATIVE ANALYSIS

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We have reviewed the current literature to compare the results of surgery aimed to repair or debride a damaged acetabular labrum. We identified 28 studies to be included in the review containing a total of 1631 hips in 1609 patients. Of these studies 12 reported a mean rate of good results of 82% (from 67% to 100%) for labral debridement. Of the 16 studies that reported a combination of debridement and re-attachment, five reported a comparative outcome for the two methods, four reported better results with re-attachment and one study did not find any significant difference in outcomes. Due to the heterogeneity of the studies it was not possible to perform a meta-analysis or draw accurate conclusions. Confounding factors in the studies include selection bias, use of historical controls and high rates of loss of follow-up.

It seems logical to repair an unstable tear in a good quality labrum with good potential to heal in order potentially to preserve its physiological function. A degenerative labrum on the other hand may be the source of discomfort and its preservation may result in persistent pain and the added risk of failure of re-attachment. The results of the present study do not support routine refixation for all labral tears.

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Between 5% and 15% of injuries sustained by athletes cause pain in the hip.[1-4] Up to 55% of patients who present with mechanical symptoms from the hip have a labral tear.[5] The functions of the labrum include increasing the surface area of the acetabulum,[6] enhancing the stability of the joint,[7] reducing the forces which are transmitted to the articular cartilage,[8,9] and providing proprioceptive feedback.[8,10] Although a cadaveric study found that the debridement of a damaged labrum does not result in increased load in the anterior and superior aspects of the acetabulum,[11] this static model may not adequately represent the chronic imbalance of forces which might predispose a damaged hip to premature osteoarthritis (OA).[12]

In 2001, Ganz et al,[13] described open surgical dislocation of the hip for the treatment of femoro-acetabular impingement (FAI) and encouraging early clinical results were reported following its use.[14-17] The disadvantages of the open procedure include a longer rehabilitation time because of the necessity to perform a trochanteric osteotomy, and impairment of proprioception in the hip due to the capsulotomy and resection of the ligamentum teres. An arthroscopically assisted mini-open technique was described by Hartmann et al,[18] and arthroscopic techniques have become the standard form of treatment for FAI and associated labral tears.

Whilst generally good results have been reported for labral debridement,[19-24] several reports have shown better results for re-attachment of the torn labrum.[14,25-27] In this paper we review the current literature and compare the results of repair and debridement of the labrum.

Methods and Materials

This review was carried out in accordance to PRISMA guidelines.[28,29] Only original studies in the English language that involved treatment of labral tears were included. Review articles, case series with less than five cases and case reports were excluded.

The PubMed data base was interrogated for "labral hip tear" without any time limitation in December 2012. The search resulted in 344 articles. The titles and abstracts were reviewed and after exclusion of 324 articles, 20 full texts were reviewed and assessed for methodology, findings and conclusions. A total of 17 were finally included in the study. A cross reference research of the papers which were selected was also performed, following which a further 11 papers were added to the analysis.

Data were compiled in an Excel document (Microsoft, Redmond, Washington) including

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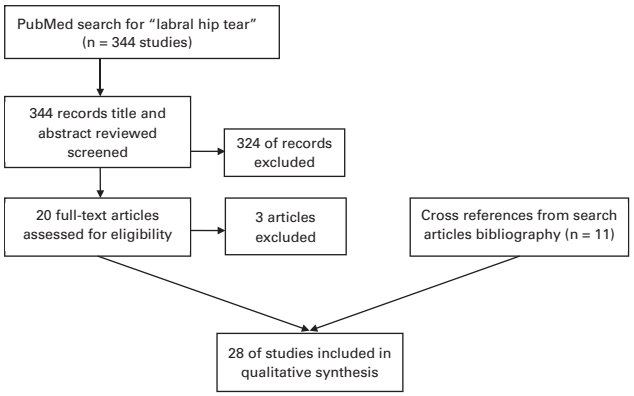

Fig. 1

Flow chart showing the process and results of PubMed search.

the type of the study, pathology, gender, age, number of cases, length of follow-up, selection criteria for labral resection or repair, exclusion criteria, management including the surgical procedure, a description of post-operative rehabilitation, results and conclusions. A Coleman methodology score (a quality scoring system validated in orthopaedic and sport traumatology settings)[30] was calculated for each study. All studies had a score of ≥ 55, with only two studies scoring < 60. No studies were excluded on this basis.

Statistical analysis. Statistical analysis was performed using the Excel software (Microsoft). Descriptive statistics were calculated for variables of interest. Continuous measures were summarised with the use of means, whereas categorical data were summarised with the use of counts and percentages.

Results

The process of the PubMed search is shown in Figure 1 and the Coleman methodology score for each included paper is given in Table I.[1,6,12,18,20,21,24,25,27,31-49]

The studies were published between 1995 and 2012. All reported outcomes of treatment of a labral tear by re-attachment, debridement or both. The number of patients varied from eight[31] to 112[32] for a total of 1609 patients (1631 hips). Of these, 889 hips were in male patients and 742 hips were in female patients.

Not all selected papers contained complete information in terms of signs and symptoms. The mean time between the onset of symptoms and diagnosis was 24.3 months (12.4 to 34.6). Data regarding the aetiology of tears were available in 762 patients: 271 (36%) remembered an acute injury to the hip and in 491 patients (64%) the onset was insidious without injury. In total 205 of 495 patients (41%) reported mechanical symptoms. Location of pain was reported in 285 patients, and pain was reported in the groin in 179 (63%), in the greater trochanter and thigh in 68 (24%), and in the gluteal region in 38 patients (13%). Impingement tests were positive in 97% of hips (529 of 545). The FADIR (flexion–adduction–internal rotation) test was more likely to be positive than FABER (flexion–abduction–external rotation) test (100% and 91% *vs* 71% and 79%, respectively).

Table I. Coleman methodology score[30]

Author/s	Coleman score
Fitzgerald[21]	63
Farjo et al[20]	61
Hase and Ueo[31]	55
Santori and Villar[24]	60
O'Leary et al[40]	71
Potter et al[41]	59
Burnett et al[48]	67
Freedman et al[42]	64
Espinosa et al[25]	70
Larson and Giveans[39]	95
Larson and Giveans[27]	77
Byrd and Jones[45]	85
Streich et al[43]	87
Philippon et al[32]	75
Hartmann and Günther[18]	81
Kamath et al[12]	67
Laude et al[36]	80
Haviv[38]	77
Philippon et al[1]	74
Schilders et al[37]	80
Meftah et al[34]	62
Nho et al[49]	69
Haviv and O'Donnell[6]	75
Byrd and Jones[44]	95
Klingenstein et al[47]	74
Wang et al[35]	71
Larson et al[33]	80
Kalore and Jiranek[46]	80

Only 12 studies reported associated FAI lesions, comprising 833 hips (Table II). There were 284 (34%) cam lesions, 254 (31%) pincer lesions and 295 (35%) mixed lesions. A total of 20 studies reported the incidence of associated chondral lesions in a total of 1242 hips. Although reporting methods were variable, the mean incidence of chondral lesions was 59% (2% to 100%), and a mean of 27% (0% to 86%) of these lesions were significant (i.e., Outerbridge grade III or IV[50] or cleavage and full-thickness defects). Only five studies comprising 317 hips commented on the presence of lesions of the ligamentum teres. The incidence of an associated lesion of the ligamentum teres in these studies was 13% (10 of 75[27]), 84% (94 of 112[32]), 93% (26 of 28[36]), 17% (14 of 81[6]) and 19% (4 of 21[35]), respectively. Rehabilitation protocols were variable.

The status of the labrum was discussed in four studies [18,35,37,38] comprising 231 patients (231 hips). In 129 hips (56%) it was normal, in 86 (37%) it was degenerative, in eight (3.5%) contused and in eight (3.5%) ossified. The location of the tear was reported in 11 studies[6,20,21,24,31,35,40-43,48] comprising 442 patients (443 hips). Of these, 387 (88%) were in the anterosuperior position and 55 (12%) were located posteriorly. In total, 12 studies presented data for the type of labral tear but the

Table II. Prevalence of associated lesions (FAI, femoroacetabular impingement; LT, ligamentum teres; -, data not reported)

Author/s	Hips (n)	Labral tear (%)	FAI lesion			Chondral lesions*	LT lesion (hips)	Complication†	Re-operation‡
			Cam	Pincer	Mixed				
Fitzgerald[21]	55	100	-	-	-	16 femoral (grades I-IV)	-	13 TB, 1 NP (MP and CRPS), 1 DVT, 1 PE	-
Farjo et al[20]	28	100	-	-	-	-	-	3 NP (2 S, 1P)	8 THR (6)
Hase and Ueo[31]	8	100	-	-	-			-	-
Santori and Villar[24]	58	100	-	-	-	28 moderate changes (acetabulum and femur, grades I-IV)	-	-	-
O'Leary et al[40]	22	20	-	-	-	4 overall (acetabulum and femur, grades I-IV)	-	-	1 THR
Potter et al[41]	33	100	-	-	-	10 overall (> Outerbridge grade III)	-	-	-
Burnett et al[48]	66	100	-	18	-	Of 3 THRs, 1 had femoral head lesion	-	CRPS 1	3 THR (3), 1 OO
Freedman et al[42]	24	96	-	-	-	4 femoral Outerbridge III-IV	-	-	-
Espinosa et al[25]	60	100	All FAI			-	-	Nil	-
Larson and Giveans[39]	100	100	17	28	55	Acetabulum: 88 grade I-II; 35 grade IV. Femur: 25 grade I-II; 1 grade IV	-	1 NP(S), 6 HO	3 THR (3)
Larson and Giveans[27]	75	100	0	75		Acetabulum: 4 grade I-II; 31 grade III-IV. Femur: 3 grade I-II; 32 grade III-IV	10	3 HO, 1 FF	3 RA, 2 AO, 1 THR
Byrd and Jones[45]	26	100	-	-	-	Unspecified site: 1 grade II, 10 grade III-IV	-	Nil	2 RA, 8 THR (7)
Streich et al[43]	50	100	-	-	-	30 grade I, 20 grade II-IV	-	8 NP (P)	-
Philippon et al[32]	112	100	23	3	86	Acetabulum: 74+29 grade I-II; 9 grade III-IV. Femur: 74+29 grade I-II; 9 grade III-IV	94	Nil	10 THR
Hartmann and Günther[18]	33	15	31	0	0	Acetabulum: Beck's M (17), DB (8), C (2), FTD (1)	-	17 NP (2 FN, 15MP), 6 HO	1 THR (1) KL grade 3
Kamath et al[12]	52	100	2 had FAI			No malacia (21), Noyes GI-II (17), GIII-IV (14)	-	4 NP (2 P, 2 MP), 1 K-wire breakage	3 THR (3)
Laude et al[36]	100	93	All FAI			-	-	1 NOF fracture, 1 HO, 2 infections, 8 FF	9 THR, 2 RHA, 13 RA
Haviv[38]	82	72	82	-	-	Acetabulum: 6 grade III-IV	-	No permanent NP	8 AO
Philippon et al[1]	28	100	1	1	26	5 grade IV	26	-	2 RA
Schilders et al[37]	101	100	56	77	-	60+27 had associated chondral lesions	-	-	0 THR
Meftah et al[34]	50	100	12 FAI			21 had OA	-	-	2 THR, 1 AO
Nho et al[49]	47	100	6	14	27	-	-	-	1 RA by another surgeon
Haviv and O'Donnell[6]	81	100	0	0	0	Acetabulum: 25 grade I-II; 6 grade III-IV	14	No permanent NP	3 THR
Byrd and Jones[44]	100	92	63	18	19	Acetabulum: 92 grade I-II; 5 grade III-IV. Femur: 1 grade I-II; 22 grade III-IV	-	2 NP (MP, 1 P), 1 HO	0 THR, 6 RA
Klingenstein et al[47]	34	100	-	-	-	-	-	-	-
Wang et al[35]	21	100	5	2	6	-	4	1 NP (MP)	-
Larson et al[33]	94	100	0	10+8	34+42	Acetabulum: 34+41 grade III-IV	-	3 HO, nil after protocol change	3 RA for HO, 2 AO, 1 THR, 1 OO
Kalore and Jiranek[46]	106	100	-	-	-	-	-	-	13 THR, 2 PAO, 3 AO, 5 RA

* THR, total hip replacement; Beck's M, malacia; Beck's DB, debonding; Beck's C, cleavage; Beck's FTD, full-thickness defect; OA, osteoarthritis
† TB, trochanteric bursitis; NP, nerve palsy; MP, meralgia paraesthetica; CRPS, complex regional pain syndrome; DVT, deep-vein thrombosis; PE, pulmonary embolism; S, sciatic; P, pudendal; HO, heterotopic ossification; FF, failure of fixation; FN, femoral nerve; K-wire, Kirschner wire; NOF, neck of femur
‡ OO, open osteoplasty; RA, repeat arthroscopy; AO, arthroscopic osteoplasty; KL, Kellgren–Lawrence; RHA, resurfacing hip arthroplasty

classifications were variable and limited our ability to draw any inferences from this data.

Overall six studies reported a comparison between the two methods of fixation and debridement,[14,27,33,36,37,46] but two were updates of an earlier publication,[27,33] and we included only the latest study in our analysis.

Studies reporting results of debridement. A total of 506 patients (510 hips) underwent labral debridement across 12 studies with a mean follow-up of 44 months (16 to 120). Different outcome measures were used in the various studies. Of the rates reported in these studies, the mean rate for good or excellent outcomes (a modified Harris hip score (mHHS)[19] > 80, pain improvement, satisfaction) was 82% (67% to 100%) following debridement in the absence of any observed OA. Meftah et al[34] (50 hips in 50 patients) and Byrd and Jones[19] (26 hips in 26 patients) had a follow-up of seven to 13 years and ten years, respectively, and showed 83% and 84% good results in patients respectively in patients without OA.

Studies reporting results of reattachment. Re-attachment of the labrum is reported in 16 papers at least in some of the patients. A total of 426 repairs were performed as compared with 585 debridement cases in these 16 studies (total 1201 hips in 1180 patients). The mean follow-up was 29 months (10 to 59). It was not possible to calculate what percentage of tears the authors thought would be repairable because the inclusion criteria and reporting consistency were so variable. While the percentage of repairable tears was low in some studies (7% (2 of 21) by Wang et al[35] and 10% (8 of 73) by Haviv et al[6]), Philippon et al[32] were able to repair all tears in their 28 patients.

Of these studies only five provided a comparison between outcomes of debridement *versus* re-attachment with four favouring re-attachment. Espinosa et al[25]

reported excellent and good mHHS scores in 94% in the reattachment group (n = 35) *versus* 67% in the debridement group (n = 25). Although Philippon et al[32] did not provide actual figures for the two groups they found repair to be associated with a higher post-operative mHHS score in their multivariate analysis. Laude et al[36] reported a mean Non-Arthritic Hip Score (NAHS)[51] of 86 following re-attachment and 82 after debridement, and concluded that there was no significant difference between the two groups. In the re-attachment group (n = 69) Schilders et al[37] reported a mean improvement in mHHS of 33 *versus* 26 when compared with their debridement group (n = 32) at a mean 29-month follow-up. Finally Larson et al[33] noted 92% good outcomes in the re-attachment group (n = 50) compared with 68% in the debridement group (n = 44) at a mean follow up of 41 months. In general, in the good and excellent results, the debridement group had lower mean satisfaction scores.

Overall, further surgery was needed in 123 of the total of 1069 patients, including 68 total hip or resurfacing arthroplasties. 34% of these patients (23 of 68) of these patients had evidence of OA at the time of arthroscopy. A further 51 underwent repeat arthroscopies, 16 of which included arthroscopic osteoplasty, two open osteoplasties and two periacetabular osteotomies. A nerve palsy was the most common complication (n = 36), including 20 with meralgia paraesthetica, 12 pudendal, two sciatic and two femoral nerve palsies. The highest rate 51% (17 of 33) was reported with the mini-open technique.[18] All nerve palsies were incomplete and resolved except for two patients who developed complex regional pain syndrome. Heterotopic ossification (HO) was reported in 20 hips. Larson et al[33] reported no cases of HO after prescribing prophylactic Naproxen post-operatively. Overall there were nine cases of failure of fixation, two deep infections,[36] one undisplaced fracture of the femoral neck, which was treated conservatively, and one K-wire breakage.

Discussion

Good results have been reported both with debridement[21,31,34,40] and re-attachment of labral tears.[1,25,33,46] The decision to carry out a re-attachment or resection depends on the location and type of the tear and the status of the labrum[32,37-39] The healing potential of the labrum is greatest peripherally as its blood supply is mainly from the capsule of the hip joint.[52-54] A cadaveric study[52] showed no difference in vascularity between torn and intact specimens, favouring a healing potential for peripheral labral tears. In a sheep model all labral lesions healed by fibrovascular scar tissue to the capsule or underlying acetabular bone (or both).[55] A bleeding cancellous bony bed has been shown to be necessary for labral re-attachment because of the relatively avascular nature of the proximal labral margin.[14,55]

Whilst several studies suggest that most tears affect the antero- superior aspect of the labrum,[6,56,57] a small series from Japan found more posterior tears[31,58] and Hase and Ueo[31] suggested that this might be due to cultural differences associated with hip posture. O'Leary et al[40] suggested that anterior tears are more likely to be a result of an acute twisting injury and posterior tears more likely to result from an axial load applied to the flexed hip. Potter et al[41] also found that two of the three posterior labral tears which they observed were associated with traumatic posterior dislocation of the hip. Larson et al[27] noted that most posterior labral lesions were partially ossified and were not ideal for labral takedown and reattachment in most cases.

Czerny et al[59] described a radiological classification of labral tears which was used in some studies[35,42] but it was not prognostic of outcome. Lage et al[60] classified tears into four morphological types; radial flap, radial fibrillated (degenerative), longitudinal peripheral and unstable (bucket handle appearance). Streich et al[43] and Haviv et al[38] used this classification. Beck et al[61] were the first to describe a classification system of labral tears that was specific for FAI.[62] Schilders et al[37] used this classification to describe the status of the labrum as normal, degenerative, contused, hypertrophic or ossified, which is more useful when considering management.

The prevalence of different types of tear and different strategies for fixing or debriding tears could be a possible confounding factor in these studies. Patients with complex tears could have had more severe pathology initially and those with labral calcification or ossification could have had the condition for a longer period of time. The improved outcomes reported by Espinosa et al[25] might have been due to improved surgical technique rather than the condition of the labrum.[27] Similar selection bias may have affected the results reported by Larson et al.[27,33]

Larson et al[27] stated "an ideal labrum for attachment lacked significant intrasubstance degeneration, calcification, ossification, or complex tearing and was typically located anterosuperiorly". Flap tears appear to be more common in the debridement group and labral detachments more common in the repair group.[37] Haviv et al[6] debrided radial, degenerative, and longitudinal peripheral (stable) tears and repaired unstable tears. In a series of 112 patients, Philippon et al[32] performed debridement for degenerative tears and for frayed, flap and small tears with enough viable healthy tissue remaining to provide function. Of the repair group (58 patients, 58 hips), 55 had a detached labrum, two a mid-substance tear, and one a degenerative labrum. Of the debridement group (54 patients, 54 hips), 20 had a flap tear, 17 a degenerative tear, 12 a frayed labrum and five a bruised labrum.[32] They identified pre-operative modified HHS, joint space narrowing ≥ 2 mm, and repair of labral pathology instead of debridement as predictors of better outcome. These observations highlight the difficulties with a randomised control study comparing the two methods of treatment as some tears might not be suitable for repair.

Labral tears are often accompanied by articular cartilage lesions in the adjacent acetabulum or femoral head that

may affect the outcome. Subtle chondral defects can be difficult to diagnose.[12] According to McCarthy et al[23] the most common initiating site for these lesions occurs at the "watershed zone" of the chondro-labral junction. The incidence of chondral lesions associated with labral tears varies from 38% to 92%.[12,22,37,63,64] These lesions are conventionally classified using the Outerbridge classification (based on the status of the status, depth and width of the articular cartilage lesion).[37] Many classification systems have been used for the description of chondral lesions in FAI.[6,12,27,32,44,61-63,65-67]

The presence or absence of associated chondral lesions is probably the most important factor that influences the outcome of treatment for labral tears. OA has been shown to be an independent predictor of a poor outcome.[6,19-21,34,43] Only 21% (3 of 14) good and 19% (4 of 21) excellent results were reported in the presence of OA[20,34] and 88% (7 of 8) of patients who had evidence of degenerative change at presentation went on to THR by ten years.[45] Patients who had microfracture at the time of operation for Outerbridge grade IV lesions on both the femoral head and the acetabulum were also more likely to undergo a THR.[32] In a group of 112 patients (112 hips), those with a joint space on radiographs of < 2 mm were 39 times more likely to progress to a THR at a mean time of 16 months.[32] However, In some studies, chondromalacia and OA were not predictors of a poor outcome.[41,42] Espinosa et al[25] did not find a significant correlation between the Tönnis grade and the overall Merle d'Aubigné score.[68] More data are needed to assess the effect of chondral lesions on the eventual clinical outcome and the subsequent need for THR.

Several scoring systems are used for the assessment of outcomes after the arthroscopic treatment of FAI, including patient satisfaction (in form of a visual analogue scale (VAS) 0 to 10), a quality of life measure (the Short-Form 12 (SF-12)),[32,41,42] the modified Harris hip score (mHHS),[19] the Non-Arthritic Hip Score (NAHS),[51] the Hip Outcome Score (HOS)[69] and the Merle D'Aubigné score.[64] The NAHS and mHHS include limited assessment of sports-related activities and may not be able to detect change in those functioning at a higher range of ability.[34,69,70] The effect of age on outcomes have been variable. Some authors did not find age significantly affected their results.[12,41,42] Better outcomes were reported in younger patients in some studies.[36,44] Increasing age has been reported to be a predictor of the requirement to proceed to THR.[32,46] Cam impingement occurred in slightly younger patients and was more common in males[38,44] in whom the SF-36 and the mHHS outcomes were significantly better. However, this effect was not an independently significant factor because of the substantially higher number of women than men who were on medical evaluation board (MEB) status.[41]

The effect of duration of symptoms on outcome is important in deciding the timing of treatment. Kamath et al[12] found that duration of symptoms of more than 18 months was a predictor of a good or excellent outcome. In contrast, Byrd and Jones[19] noted better outcomes in patients with duration of symptoms shorter than 18 months.

The incidence of injuries to the ligamentum teres (LT) being associated with a labral tear has been reported to range from 9% to 93%.[6,27,35,64] It has been suggested that this association is found in patients with instability of the hip.[64] The general view was that capsulorrhaphy and capsular plication should be performed in addition to addressing the LT tears.[6,64] Haviv et al[6] could not find an association between a torn LT and the type of labral tear in their series of 81 patients.

Kamath et al[12] and Potter et al[41] identified secondary gain issues, such as worker compensation claims, as significant negative predictors of a good or excellent outcomes. Secondary gain issues were present in 15.4% (8 of 52)[12] and 43% (14 of 33)[41] of their patients. Other studies did not find any significant effects associated with such factors,[19,20] In a review of 40 soldiers, O'Leary et al[40] concluded that disability status may be a negative predictor of success after arthroscopy of the hip and less desirable results were achieved in patients with osteonecrosis. Karole et al[46] found acetabular dysplasia and debridement of the labrum to be independent negative predictors of the need for further surgery; however, they did not take into account the presence of chondral lesions. In contrast, Philippon et el[32] in a group of 112 patients (112 hips) showed that the preoperative mHSS, left-sided surgery and a higher preoperative activity level had positive effects on the postoperative mHHS. O'Leary et al[40] identified labral pathology, and mechanical symptoms as significant indicators of a good outcome.

We faced several limitations. The heterogeneity in study designs, surgical techniques, inclusion and exclusion criteria, post-operative rehabilitation and outcome measures severely limited our ability to perform a meta-analysis of the extracted data or to draw accurate conclusions. The learning curve might be another confounding factor. More recent studies have reported on techniques of labral reattachment and comparisons have been made with historical controls.[25,33,46] Better results in those undergoing reattachment may indicate improved surgical techniques over the years rather than the effect of re-attachment itself. In other studies where those undergoing re-attachment were compared with those undergoing repair,[32,37] there may be a selection bias due to the fact that those patients in whom repair was possible may have had less labral damage and degenerative changes. Conversely patients with more degenerative changes were more likely to have degenerative labral tears which are not repairable. Although efforts have been made to match patients by excluding those with, for instance, pre-existing OA or lesions of the articular cartilage, the retrospective nature of these studies and high rates of loss of follow-up[6] are a potential source of selection bias. The presence of associated pathologies such as ligamentum teres and chondral lesions has not been uniformly reported. The treatment of these associated lesions might be a

significant contributor to the improvement of symptoms, and better results might not be due to treatment of the labral tear itself. Although most studies have used multivariate analyses to control for these factors, they might have lacked adequate power due to the low numbers in the subgroups. Finally, few studies have reported long-term results for labral debridement or re-attachment.

More functional and clinical outcome data are needed to better evaluate the effectiveness and use of arthroscopy of the hip in the management of labral tears. The decision to re-attach or debride them depends on their type and location, the status of the labrum and of the articular cartilage of the hip joint and the surgical skills and experience of the surgeon.

Although there are insufficient data to draw accurate conclusions, it seems logical to try to repair an unstable tear in a good quality labrum when possible in order potentially to preserve its physiological functions. A degenerative labrum on the other hand may be the source of symptoms and its preservation may result in persistent pain. There is also an added risk of the re-attachment failing. Labral debridement requires shorter operative and traction times, and can result in excellent clinical outcomes.[71] The results of the present study do not support routine refixation for all labral tears.

Supplementary material

Four tables, giving the details of i) the prevalence of signs and symptoms in all studies, ii) the location of labral tears and rehabilitation protocols imposed, iii) the studies describing results of debridement and iv) the studies reporting results of labral re-attachment, are available alongside the electronic version of this article on our website www.bjj.boneandjoint.org.uk

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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