



Review Article

Hiplabral Tear Management In Athletics

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Abstract

Objectives

- To review the most up-to-date evidence-based literature in managing patients with labral tear, particularly athletic population
- To appraise the current understanding about labral tear management
- To suggest some future recommendations and formulate new research questions

Key words : Hip pain, groin pain, acetabular labral tear, cartilage, management, conservative management, surgery, arthroscopy, debridement, excision, and repair.

Introduction

While all the functions of the labrum of the hip are not fully understood, the labrum has many important and crucial known functions for the hip joint. These include shock absorption, pressure distribution, reducing the articular contact stresses between the opposing articular surfaces by load distribution across the hip joint, sealing the synovial fluid inside the joint, joint lubrication and hip joint stabilisation. (Groh & Herrera, 2009; Lewis & Sahrman, 2006).

Labral tear is an increasingly common condition with a prevalence of 66% among patients with mechanical hip pain (Neumann et al, 2007). Labral tears among athletes can result from an isolated traumatic event or from repetitive trauma. While considering trauma as a potential cause of labral tears, other traumatic injuries, including hip dislocations and acetabular fractures, should be excluded as these have been associated with acetabular labral tears (Bharam, 2006). Furthermore, other causes can be responsible for and

associated with the occurrence of labral tears, including femoroacetabular impingement (FAI) and hip hypermobility (Burnett et al., 2006; Groh & Herrera, 2009), and other structural/developmental disorders such as retroverted acetabulum, abnormal femoral head-neck offset and coxavalga (Wenger, Kendell, Miner, & Trousdale, 2004). These abnormalities need to be considered when planning the best management option for this case-study patient.

The athletic population are required to put their hips in different extreme positions which might predispose them to different chondrolabral injuries (Jamali et al, 2007). For instance, with hip flexion, particularly at the extreme range of this movement, more of the femoral neck comes in contact with the acetabulum medially and cranially. This contact might lead to different types of chondrolabral injuries, particularly with a repetitive type of movement (Jamali et al, 2007). These potential injuries will be

noticed more when the combination of different ranges of movements occurs such as flexion and adduction (Grant, Sala & Davidovitch, 2012; Philippon, Briggs, Yen & Kuppersmith, 2009). This discussion is consistent with the findings of Santori & Villar (2000), who state that more than 70% of labral tears are not associated with a specific cause and repetitive microtrauma is believed to be the cause.

Labral tears have been classified based on the aetiology into degenerative (48.6%), idiopathic (27.1%), traumatic (18.9%), and congenital (5.4%) (Lage, Patel & Villar, 1996). In addition, labral tears can be classified according to morphology into radial flaps (56.6%), longitudinal peripheral tears (26%), radial fibrillated tears (21.6%), and unstable tears (5.4%) (Haviv & O'Donnell, 2011). In order to investigate the validity of these classifications, Haviv & O'Donnell (2011) performed arthroscopic labral tear treatment to manage 81 hips. They also classified tears into stable (Radial, Degenerative, and Longitudinal peripheral), which were managed by arthroscopic radiofrequency ablation and shavers, and unstable, which were managed by suture anchor fixation. Postoperative outcomes were assessed using the Modified Harris Hip Score (MHHS). The researchers concluded that there is no correlation between the tear type and MHHS. This lack of correlation was also demonstrated in a cohort study conducted by Byrd & Jones (2009) who did not use these classifications. Therefore, the significance of such classifications is a questionable issue. Large studies are required to investigate any potential correlation between tear type and both best treatment option and validated postoperative outcomes such as MHHS.

Relevant Clinical Assessment

To manage patients with labral tear appropriately, a detailed history has to be taken, including patient's symptoms,

childhood or congenital abnormalities around the hip joint and any previous management options which could have been tried. Therefore, a healthcare provider might be able to select the most appropriate type of treatment for this boxer.

Secondly, a thorough clinical examination has to be done, not just to attempt to recreate the impingement position that may compress any chondrolabral pathology but also to assess for associated abnormalities such as FAI. Therefore, patients with tears might have a decreased range of movement, particularly flexion, and probably a positive FABER test (flexion abduction external rotation) (Philippon et al, 2009).

Imaging studies could be performed, including standard radiographs to examine the presence of osseous abnormalities. These abnormalities can be present in up to 87% in patients with labral tears (Guevara, Pietrobon, Carothers, Olson & Vail 2006). For instance, (Philippon, Weiss, Kuppersmith, Briggs & Hay 2010) found that FAI and acetabular dysplasia are strongly associated with labral tears. They manage to treat 28 professional players with hip labral tears and found that, FAI and retroverted acetabula were present in 100% and 37% of their patients respectively on standard radiographs. FAI has not only been linked to chondrolabral pathologies such as labral tear but also the possibility of hip osteoarthritic changes later in life (Beck, Kalhor, Leunig & Ganz 2005). Based on the above-mentioned, an athlete might have one of these abnormalities, such as FAI; these bony abnormalities need to be addressed along with labral tear if a surgical option were to be chosen to manage cases with labral tears (Philippon et al, 2010). Failure to treat these abnormalities, when operating on patients with labral tear, could lead to recurrence of tear (May, Matar & Beaulé, 2007).

In addition, X-ray is also needed to measure the hip joint space for athletics with tears. Improved postoperative MHHS was noticed if joint space is more than 2 mm preoperatively (Philippon et al, 2009). The correlation between preoperative joint space measurements and the improvements in postoperative MHHS was also demonstrated in a study performed by Haviv& O'Donnell in 2011. Finally, X-ray is also required to notice any osteoarthritic changes of the hip joint. Management options such as Total Hip Replacement (THR) has to be considered in severe osteoarthritic changes, particularly after exhausting all other options available, both conservative and operative (Skendzel, Philippon, Briggs & Goljan, 2014).

Computed Tomography (CT), Magnetic Resonance Imaging (MRI), direct intra-articular injection Magnetic Resonance Arthrography (d-MRA) and indirect intravenous Magnetic Resonance Arthrography (i-MRA) can be utilised in patients with labral tears (Grant et al, 2007). D-MRA can inform clinicians with a detailed study of the labrum (Hunt, Clohisy& Prather, 2007) and it has a diagnostic sensitivity of 90% (Toomayan, Holman, Major, Kozlowicz& Vail, 2006). Nevertheless, hip arthroscopy remains the gold standard method not only for diagnosis of labral tear but also for treatment as well (Lewis & Sahrman, 2006; Haviv& O'Donnell, 2011; Garrison, Osler & Singleton, 2007).

Conservative Management

Once the diagnosis of a labral tear has been established, it is of considerable importance to discuss with patients all the management options available, including non-invasive or conservative management (Lewis & Sahrman, 2006). This discussion is important with patients as cooperation and compliance with the conservative treatment, particularly physiotherapy, is needed.

Conservative options, such as minimising physical activity and weight-bearing on

the affected side, and Non-Steroidal Anti-Inflammatory Drugs (NSAID) have been tried (Hickman & Peters, 2001). However, Binningsley in (2003) noticed that pain will recur once patients return to their sporting activity, possibly because of the limited ability of the labral tear to heal (Saw & Villar, 2004). Moreover, the duration of inactivity and the use of NSAID have not been determined for patients with labral tears. Therefore, adopting such options for patients with labral tears is not recommended as a definitive treatment option, apart from temporary pain relief. Large and long term studies are needed to investigate the possibility of labral tear healing with a prolonged period of inactivity using d-MRA which has the highest diagnostic sensitivity among the other non-invasive diagnostic modalities (Toomayan et al, 2006).

Physical therapy is one of the management options which can be offered for patients with labral tears. Although the appropriate modalities of physiotherapy to treat patients with labral tear have yet to be established, some studies have shown that by modifying muscle recruitment and movement patterns during gait and sporting activities, anterior hip pain can be reduced (Lewis & Sahrman, 2006). Patients with chondrolabral pathologies, including labral tear, can have alteration in the neuromuscular control across their hip joint (Neumann, 2010). This abnormal neuromuscular control can lead to abnormal internal rotation and reduced force contribution of major hip muscles including gluteal and iliopsoas muscles in extension and flexion respectively (Lewis, Sahrman, Moran, 2007). These abnormalities, in turn, can result in greater anterior hip forces (Ward, Winters, Blemker, 2010). If the force capacity and control of these muscles are improved by physiotherapy, then the hip pain can be reduced in patients with labral tears (Yazbek, Ovanessian, Martin, & Fukuda, 2011).

Yazbek et al (2011) have developed a protocol of physiotherapy for a group of patients who participated in a study to investigate the significance of physiotherapy in the management of patients with labral tears. The protocol used by Yazbek et al (2011) was divided into three phases. Phase 1 consisted of pain control, education in trunk stabilisation, and correction of abnormal movement. Phase 2 focused on muscle strengthening, recovery of normal range of movement (ROM) and initiation of sensory motor training. Finally, phase 3 emphasized advanced sensory motor training and sport-specific functional progression. All participants in this study noticed pain reduction and function improvement, both at 4 and 6 months after the intervention. Nevertheless, this study has several limitations. The number of subjects in this study was only 4, which could affect the external validity of the study. Secondly, the researchers depended only on subjective measures such as pain level to assess the outcomes, and they did not incorporate objective measures, such as MRI evaluation to prove whether labral tears in those patients had healed or not. Similarly, Lewis & Sahrmann (2006) developed a different physiotherapy protocol to manage some cases with labral tear but this protocol was based on some experts' opinions and hence its external validity is questionable. Although the external validity of the above mentioned protocols is questionable, it might worth trying to offer patients with labral tear this mode of treatment before other more invasive measures being advised. However, studies with a large number of participants who are assessed by both subjective as well as objective outcome measures and over a longer period of time are crucial before this modality of treatment is widely adopted for patients with labral tears.

Operative Management

If the symptoms of patients with labral tears continue to persist after exhausting

all conservative options mentioned earlier, then surgical management can be considered and discussed with athletics with labral tears. (Lewis & Sahrmann, 2006; Groh & Herrera, 2009).

Arthroscopy might be the most feasible surgical management for patients with tears as it involves less tissue damage and shorter recovery time when compared with open surgery (Robertson et al., 2007). Arthroscopic intervention is the gold standard technique for definitively managing patients with labral tears (Haddad, Konan & Haddad, 2014). Arthroscopic treatment, particularly repair, aims to restore the sealing effect of normal labra (Haddad et al, 2014). Loss of this effect could lead to chondral damage and subsequent symptoms such as pain and a possibility of premature arthritis (Philippon et al, 2010; Kelly, Weiland, Schenker, & Philippon, 2005). Either labral debridement/excision or labralrefixation/repair can be performed (Larson, Giveans& Stone, 2012). This will be based mainly on type and location of the tear, the condition of the labrum, the articular cartilage of the hip joint, and the surgical skills and experience of the surgeon (Larson & Giveans, 2008; Philippon, Schroder e Souza, & Briggs, 2012; Haddad et al, 2014). For instance, Larson, Giveans& Stone (2012), said "an ideal labrum for reattachment should not have significant intrasubstance degeneration, calcification, ossification, or complex and typically located anterosuperiorly". Nevertheless, the choice to reattach or debride a labral tear is still a controversial issue among hip arthroscopy specialists, with more functional and clinical outcome data are needed to evaluate the significance of arthroscopic intervention (Haddad et al, 2014).

To evaluate the effectiveness of labral tear debridement, Robertson et al (2007) conducted a systematic review and concluded that non workers' compensation patients with isolated

labral tears, who lack associated intraarticular abnormality, can have both functional and symptomatic improvement following arthroscopic labral debridement. The satisfaction rate among patients who underwent the debridement procedure was 67-91%. However, considering the main follow up of the studies included, which was 3.5 years, some participants in the review had received other forms of treatments before and during the study. This could possibly have confounded the results achieved in this review when evaluating the outcomes gained by labral debridement. Furthermore, the authors of this review excluded studies in which their participants had associated hip pathologies. The possibility of a publication bias can be considered here, as the studies excluded could have statistically insignificant results.

Arthroscopic labral repair or reattachment has been reported to have good to excellent results (Meftah, Rodriguez, Panagopoulos & Alexiades, 2011; Ha, Kim & Shin, 2014), particularly when it is compared with the other option, debridement (Schilders, Dimitrakopoulou, Bismil, Marchant & Cooke, 2011).

Larson & Giveans (2008) managed to operate on 100 hips with other hip pathologies such as FAI beside labral tears. Labral debridement or repair/refixation, proximal femoral osteoplasty, or acetabular rim trimming were performed. They achieved good to excellent results in 75% of hips at a minimum 1-year follow-up, and conclude that refixation resulted in better clinical outcomes, using Visual Analogue Score (VAS), when compared to debridement group. Nevertheless, these results could be attributed to enhancement in arthroscopic techniques over time rather than the repair technique itself (Haddad et al, 2014). Secondly, there could have been a possibility of selection bias because surgeons would have repaired those tears which have less damage and

degeneration, and debrided those tears with calcification or ossification (Haddad et al, 2014). In addition, the long term effects of the repair group have not been assessed to observe any possible alteration in the natural progression to osteoarthritis. Therefore, large studies with long term follow up that investigate both types of operations, debridement and repair, are required (Haddad et al, 2014).

As mentioned previously, labral tear could be associated with bony changes (mainly FAI with cam and pincer lesions); chondral or articular damage to both the acetabulum and the head of femur; ligamentum teres injury; and loose bodies (Philippon, Arnoczky, & Torrie, 2007; Wang, Yue, Zhang, Hong & Li, 2011; Haviv & O'Donnell, 2011). Patients with labral tears can have one or all of these abnormalities, and all of them have to be addressed if an arthroscopic intervention used as a management option. This is because, these changes could either be the cause of the tear, particularly atraumatic tear, or one of the consequences of labral tear such as cartilage damage (Philippon et al, 2007; Larson et al, 2012). For instance more than 60% of hips scoped for tears by McCarthy, Noble, Schuck, Wright, & Lee in (2001) had articular damage, the articular damage and the labral tear were observed at the same place in more than 80% of these cases. Failure to address a chondral lesion during hip arthroscopy can lead to joint osteoarthritis with time (Grant et al, 2012).

Postoperative Complications

Patients with labral tears could suffer a variable range of complications if the surgical option were chosen; different studies have shown a different range of complications. Philippon et al in 2009 scoped 112 patients and nothing significant was reported. However, in the review done by Haddad et al, (2014), for 28 previous studies looked at labral tear management; nerve palsy was the most

common complication particularly the lateral cutaneous nerve of the thigh. This complication was reported more with mini-open technique (Hartman & Gunther, 2009). Other less frequent complications are deep infection, failure of fixation, avascular necrosis, fracture neck of femur and heterotopic ossification. Heterotopic ossification can be minimized by prescribing prophylactic Naproxen postoperatively (Larson et al, 2012). In addition, analgesic and antibiotic prophylaxis have to be considered if surgical option was offered to patients with labral tears (Philippon et al, 2007). The uncertainty of the long term impact with either repair or debridement and the possibility of THR later on in life have to be mentioned to patients with labral tears if surgical option was chosen (Haddad et al, 2014).

Postoperative Rehabilitation

Patients with labral tears can start again their sporting activity in 3 to 4 months' time if the arthroscopic management were selected as an option for treatment (Philippon et al, 2009) provided that he/she has not reported any complications on the postoperative period. It seems there is no universal agreement among different studies on the physiotherapy sessions (Haddad et al, 2014). However, Philippon et al (2007) developed a protocol based on their personal experience to manage postoperative cases with labral tears and also what procedures have been done for patient apart from labral tear. For instance, weight bearing should be restricted to 20 pounds and flat foot for 4 weeks if FAI was decompressed. Future studies are needed to adopt a universal programme, including physiotherapy, for postoperative patients with labral tears.

Conclusion

Acetabular labral tears are an increasingly recognised source of hip pain particularly in the athletic

population, and its link to future joint derangement and degeneration has been established.

Once labral tear has been confirmed, medical treatment and/or physical therapies can be tried first. If conservative management has failed, arthroscopic labral repair or debridement, depending on the labral condition, has to be offered. It has shown good to excellent mid-term results. Therefore, it seems the best and might be the definitive option available for patients with labral tears particularly after exhausting other conservative options. Furthermore, any associated conditions have to be treated along with the tear, such as FAI or chondral lesion.

Long-term outcomes of the arthroscopic management with either repair or debridement are still unknown, most notably the potential risk for the development of hip osteoarthritis. Future studies with a large number of cases are warranted to investigate the long term effects of arthroscopic treatment, which will assist clinicians in developing a management plan for patients with labral tears.

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