Journal of Bodywork & Movement Therapies (2016) 20, 346–355

Available online at www.sciencedirect.com

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journal homepage: www.elsevier.com/jbmt

NARRATIVE REVIEW

The clinical presentation of individuals with femoral acetabular impingement and labral tears: A narrative review of the evidence

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Received 28 July 2015; received in revised form 3 October 2015; accepted 15 October 2015

KEYWORDS
Anterior;
Hip;
Pain

Summary Femoral acetabular impingement (FAI) has emerged as one of the more commonly recognized intraarticular hip pathologies and is often accompanied with a labral tear. The understanding of the clinical characteristics of individuals with symptomatic FAI has evolved over the past several years due to emerging research. As research progresses, there is often a gap in translating the current evidence to clinical practice. This manuscript presents the latest evidence underpinning the clinical presentation of FAI and labral tears. Evidence is presented within the context of bridging the latest research and clinical practice.

Introduction

The hip joint has become an emerging area of study due to the improved recognition and diagnosis of pathologies such as femoral acetabular impingement (FAI) and acetabular labral tears. The examination process can be very complex due to competing pathologies that have similar clinical

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http://dx.doi.org/10.1016/j.jbmt.2015.10.006
1360-8592/

presentations making it difficult to make a clear diagnosis. In fact, as much as 60% of hip arthroscopic patients are initially misdiagnosed (Domb et al., 2009). Misdiagnosis may lead to a delay of appropriate care as well as utilization of unnecessary healthcare resources.

Among the intra-articular pathologies of the hip, FAI has emerged as a one of the more commonly recognized pathologies and often is accompanied with a labral tear (Clohisy et al., 2013). There are three common types of FAI: cam-type, pincer-type, and mixed cam-pincer type. There is a higher predilection for mixed and cam-type FAI in younger adult males and pincer-type FAI in younger adult females (Clohisy et al., 2013; Nepple et al., 2015). Several investigations have found a correlation between FAI and osteitis pubis (Matsuda, 2010; Verrall et al., 2005), athletic pubalgia (Larson et al., 2011), and lumbosacral issues (Hammoud et al., 2014; Voos et al., 2010). Due to the growing recognition of FAI, clinicians should have a comprehensive understanding of the condition in order to provide effective management strategies.

The examination process for evaluating individuals with symptomatic FAI has evolved over the past several years providing both researchers and clinicians more insight into the clinical presentation of these patients. As the research progresses, there is often a gap in translating the current evidence to clinical practice. The lack of translational research may slow the growth of best practice rehabilitation strategies for patients with suspected or diagnosed FAI. In this review, the latest evidence regarding the clinical presentation of individuals with FAI and labral tears will be discussed with a focus on key examination findings. To enhance the translational process from research to clinical management, a series of charts will be presented to assist the clinician in examination and determining a working diagnosis.

Patient history

Patients with suspected hip FAI or labral tears often describe a deep "anterior groin related pain" and may point or cup their hand around the anterior hip region which is often called the "C-sign" and is most indicative of intra-articular pathology (Fig. 1) (Byrd, 2007; Cheatham and Kolber, 2012; Martin et al., 2010). Anterior "groin pain" that worsens with prolong standing, sitting, and walking is often related to FAI and acetabular labral tears (sensitivity 96%—100%) (Reiman et al., 2014b). If the patient's pain is related to specific hip positions (e.g. flexion, adduction, and internal rotation) and sports activity (e.g. rotation and pivoting) then femoral acetabular impingement (FAI), acetabular labral tear, or other intraarticular pathology should be suspected (Sink et al., 2008). The majority of anterior hip pain may be from articular structures since the hip is primarily innervated by the femoral and obturator nerve which innervate the anterior and medial hip joint (Frank et al., 2010). These symptoms may be accompanied by lateral or posterior hip discomfort and mechanical symptoms (Byrd, 2007). More specifically, sharp pain with clicking and giving way may be related to an intraarticular pathology such as FAI, acetabular labral tear, or cartilage defect (sensitivity 100%, specificity 85%) (Reiman et al., 2014b). Clinicians should be aware of the key signs and symptoms revealed during the patient's history in order to develop a working hypothesis to test during the objective portion of the examination.

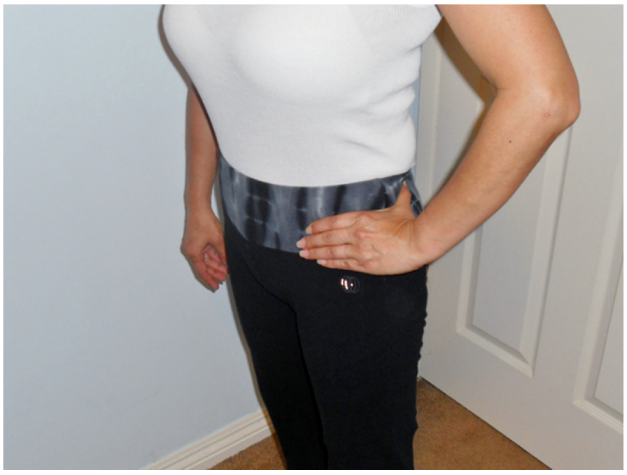

Figure 1 C-sign.

Differential diagnosis

A thorough patient history will most often help the clinician determine what test and measures are needed in order to formulate a diagnosis. During the differential diagnosis, it is important to determine if the suspected impingement is intra-articular or extra-articular as many of these pathologies have similar clinical presentations. There is a growing body of literature reporting external causes of hip impingement in younger non-arthritic patients which may include: iliopsoas impingement, subspine impingement, and ischiofemoral impingement. *Iliopsoas impingement* is an emerging diagnosis of anterior hip pain and has been linked to acetabular labral tears and is often treated with a surgical release of the tendon (Domb et al., 2011). It's postulated that the impingement may be caused by two mechanisms: (1) a repetitive traction injury by the iliopsoas tendon that is scarred on adherent to the capsule-labrum complex of the hip or (2) a tight or inflamed iliopsoas tendon that causes impingement during hip extension (Sutter and Pfirrmann, 2013). *Subspine impingement* is caused by a prominent anterior inferior iliac spine (AIIS) abnormally contacting the distal femoral neck during hip flexion (de Sa et al., 2014). This may be caused by excessive muscular activity of the rectus femoris during repetitive knee flexion with hip extension resulting in an avulsion injury of the AIIS. This repetitive traction injury is common in running sports and sports involving rapid high energy kicking such as soccer (de Sa et al., 2014). Upon healing, this often results in an enlarged bony protrusion at the AIIS that abnormally abuts the femoral neck (Sutter and Pfirrmann, 2013). Subspine impingement has been related to CAM-type FAI and may be surgically corrected with surgery (Sutter and Pfirrmann, 2013). *Ischiofemoral impingement* is characterized by a narrowed space between the ischial tuberosity and the lesser trochanter resulting in repetitive pinching of the quadratus femoris muscle (de Sa et al., 2014; Lee et al., 2013; Stafford and Villar, 2011).