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Advances in arthroscopy

Improving diagnosis and treatment of hip pathologies

By Mark Dietrich, M.D., and Christopher Larson, M.D.

Arthroscopic assessment and treatment of joint pathology is commonplace in orthopaedics. The past several decades have seen significant advances in the arthroscopic treatment of knee, shoulder, ankle, and wrist pathology. Knee arthroscopy is one of the most common procedures performed by orthopedic surgeons.

The past five to ten years have witnessed growing interest in arthroscopy of the hip, fostered by advances in arthroscopic techniques and instrumentation and by our improved ability to identify previously unrecognized causes of hip pain. Increasingly, hip pathologies that impair a patient's ability to participate in sports or an active lifestyle can be diagnosed and treated, allowing return to play or recreation.

Today, hip arthroscopy is used to treat a variety of conditions: loose bodies, labral tears, femoroacetabular impingement (FAI), chondral injuries, instability, iliopsoas, and iliotibial band snapping hip disorders, among others. This article reviews our experience in diagnosing and treating some of these common hip pathologies.

Hip evaluation

The first step in evaluating patients with hip pain is to attempt to differentiate between an intra-articular versus extra-articular etiology of pain. A combination of physical exam, imaging, and therapeutic/diagnostic injections help in this determination. One author concluded that clinical assessment including history, physical examination, and radiographic analysis was 98 percent accurate in determining the existence of an intra-articular abnormality (Byrd, *Am J Sports Med*, 2004). However, the exact nature of this abnormality is not well defined by clinical assessment alone.

Plain radiographs are often sufficient to make a diagnosis in the case of femoroacetabular impingement, osteoarthritis, dysplasia, and avascular necrosis. Advances in magnetic resonance (MR) imaging, in particular MR arthrography, have significantly improved pre-operative diagnosis of labral tears. Chondral injuries are still difficult to assess accurately by current imaging techniques. Relief with an intra-articular anesthetic injection has been shown to be 90 percent accurate in detecting intra-articular pathology.

Evaluating a patient with hip pain when there is no radiographic evidence of significant degenerative arthritis, it has been our practice to obtain plain radiographs (AP pelvis, cross-table lateral and frog-lateral views of the hips), and MR arthrograms in combination with an intra-articular anesthetic injection. This provides sensitive imaging of the hip and a subjective determination of whether the patient's symptoms are of intra-articular origin as determined by relief of pain with the intra-articular injection.

Hip arthroscopy may be performed with the patient in either the lateral or supine position, as determined by surgeon preference. Joint distraction is used to allow for adequate visualization and safe passage of instrumentation. Several different portal options have been proposed, and typically two portals are required for most arthroscopic hip procedures.

Loose bodies

Loose bodies within the hip joint can be debilitating. Patients often have had a traumatic event and complain of pain and mechanical symptoms such as locking and catching. Arthroscopic removal of the loose bodies relieves symptoms, and these patients have excellent outcomes.

Labrum

The acetabular labrum is fibrocartilage, much like the labrum in the shoulder, and is attached to the rim of articular cartilage on the acetabulum. Several causes of labral tears have been identified: acute trauma, femoroactetabular impingement, hip instability, dysplasia, and degenerative arthri-

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tis. As our understanding of hip pathology has grown, we have found that isolated labral tears are the exception rather than the rule. Labral tears are usually found in combination with other hip pathology, most frequently femoroacetabular impingement. The hip labrum has a peripheral vascular pattern similar to the meniscus in the knee, i.e., greater blood supply at the periphery that diminishes centrally.

Arthroscopic management of labral tears includes debridement and/or repair, depending on the type of tear and the condition of the labrum at the time of arthroscopy. Debridement removes unstable flaps that may cause mechanical symptoms and pain. Labral repair, when indicated, is performed with suture anchors in a manner similar to labral repair techniques used in shoulder surgery. Labral repair is usually combined with debridement of bony lesions on the acetabular rim (acetabular rim trimming).

The importance of the acetabular labrum has not been definitively defined. Several studies have demonstrated potential important functional roles of the acetabular labrum, including enhancing joint stability and maintaining the joint seal. Because the long-term ramifications of labral debridement have not been clearly defined, it is our practice to repair the labrum whenever possible.

Femoroacetabular impingement

Femoroacetabular impingement (FAI) is a condition that can cause hip pain usually felt mostly in the groin; it commonly occurs in young adulthood and middle age. The concept of FAI as a source of anterosuperior labral and chondral damage was introduced by Ganz et al. (*Clin Orthop Relat Res*, 2003). With FAI, injury to the anterior acetabular labrum and cartilage results from abnormal contact between the femoral head/neck junction and the anterior acetabulum.

Two distinct bony abnormalities can be present with FAI: cam impingement and pincer impingement. Cam impingement is the result of pathologic contact in an abnormally prominent femoral head-neck junction. During hip flexion and rotation, this abnormal morphology can produce shear forces against the acetabular articular cartilage, resulting in chondral delamination and secondary labral detachment. Pincer impingement results from anterior overcoverage of the acetabulum. Relative acetabular retroversion or an abnormally deep acetabulum crushes the labrum between the acetabulum and femoral neck.

Patients with FAI often complain of a vague pain deep within the hip. Prolonged sitting and activities that involve hip flexion often cause pain. On physical exam, an anterior impingement test (hip flexion with forced adduction and internal rotation) will often reproduce a patient's symptoms.

Treatment of FAI involves increasing hip clearance by removing bony impingement and addressing associated labral and chondral injuries. Open surgical techniques involving greater trochanteric osteotomy and surgical dislocation have been used with favorable results. More recently, arthroscopic techniques have been developed to address the pathology associated with FAI with potentially less morbidity. For example, cam impingement is addressed through the use of arthroscopic burrs in a proximal femoral reshaping procedure. Shaving down the prominence at the femoral head/neck junction increases hip clearance. Pincer impingement and its associated acetabular overcoverage are addressed by removing the prominent acetabular rim. If the labrum is repairable, it is detached from the acetabular rim prior to the rim trimming and then subsequently repaired with suture anchors.

Due to our improved ability to diagnose and recognize FAI, we are addressing FAI in over half of our hip arthroscopy patients. We have found that cam and pincer lesions frequently occur in combination, so we often perform both acetabular rim removal and proximal femoral reshaping. Our short-term results have been favorable. In patients with radiographic signs of degenerative arthritis, outcomes have been less predictable and generally less favorable.

Chondral lesions

Chondral injuries in the hip may be traumatic or secondary to FAI. MRI has not been reliable in detecting chondral lesions preoperatively. When identified at the time of arthroscopy, loose chondral flaps are debrided. Micro-fracture techniques, similar to those used to treat chondral lesions in other joints, may be used for focal full-thickness cartilage lesions.

Hip instability, snapping hip disorders

Hip instability is less well understood. The capsular structures are robust and the joint is inherently stable, but patients experience pain. Occasionally hip instability is seen secondary to trauma (hip dislocation/subluxation) or the result of repetitive microtrauma or connective tissue disorders. When there are no significant bony deficiencies (developmental or post-traumatic), capsular tightening procedures (suture plication) in conjunction with management of other intra-articular pathology can result in improved outcomes. Patients whose symptoms failed to improve with nonsurgical rehabilitation return to activities relatively pain-free.

Iliopsoas and iliotibial band snapping hip disorders are rarely disabling and often respond to rehabilitation and/or selective injections. Occasionally, however, patients have significant disability, and arthroscopic releases or lengthening procedures can eliminate symptoms in recalcitrant cases.

Outcomes research needed

Hip arthroscopy is becoming increasingly popular as a safe method to diagnose and treat intra-articular hip disorders in athletes and active people. Good short-term and mid-term results have been observed after management of a variety of hip conditions. It will be important to follow long-term clinical outcomes and conduct further basic science research to better define optimal management of specific intra-articular hip disorders.

Christopher Larson, M.D., *is an orthopedic surgeon who sees patients at Minnesota Sports Medicine-Twin Cities Orthopedics Eden Prairie. He is director of education at Minnesota Sports Medicine (MSM) and faculty for MSM's Orthopedic Sports Medicine Fellowship.* **Mark Dietrich, M.D.,** *is a Minnesota Sports Medicine orthopedic sports medicine fellow.*