Femoral Acetabular Impingement and Labral Tears of the Hip

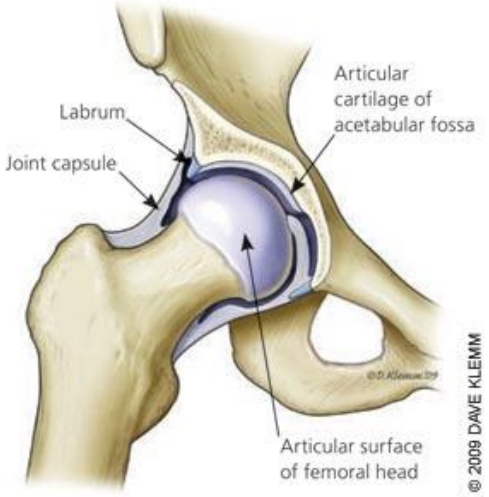


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Adapted from The University of Kansas Sports Medicine & Performance Center

What is Femoral Acetabular Impingement (FAI)?
Impingement occurs when the ball shaped head of the femur rubs abnormally or pinches (impinges) the acetabular socket. Damage to the hip joint can occur to the articular or labral cartilage.

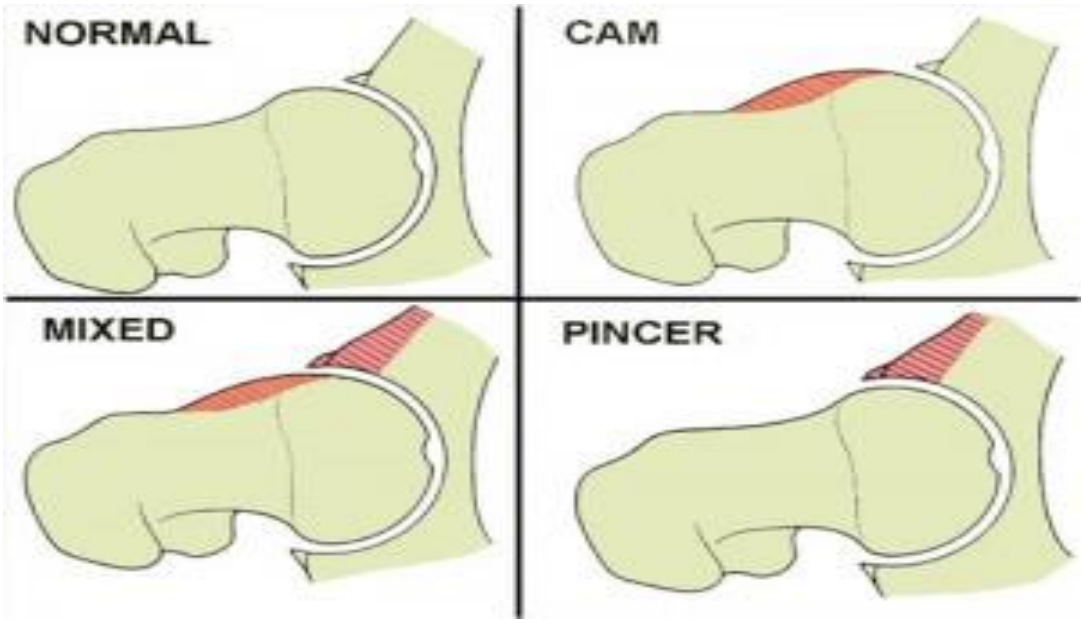
Normal Hip Anatomy



Lesions that Occur with Impingement



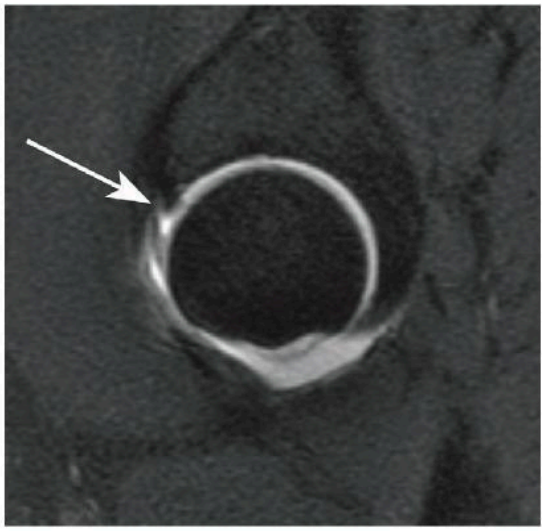
What types of FAI are there?
There are three types of FAI. The first involves an excess of bone along the neck of the proximal femur: this is known as a Cam deformity. The second is due an excessively deep socket or an abnormal tilt of the acetabular socket and is known as the Pincer deformity. The third is a mixture of the preceding two forms (most common scenario). The result of any of these deformities is increased friction between the acetabular cup and femoral head which may result in pain and loss/reduction of hip function.



What is a labral tear?
The acetabular labrum is a fibrous structure which forms a gasket seal around the femoral head. The labrum may be damaged or torn as part of an underlying process such as FAI or may be injured directly by a traumatic event. Damage to the labrum can produce either groin pain or pain in the distribution of a "C" around the hip joint. If left untreated, both FAI and labral tears may progress to arthritis of the hip joint requiring a total hip replacement.

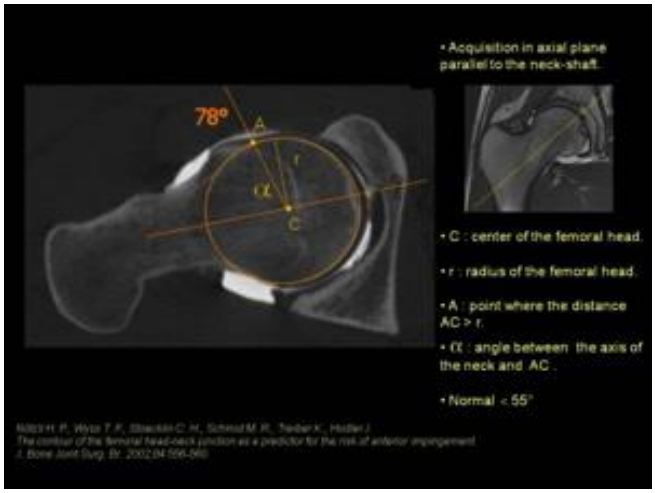
Evaluation for labral tear
The labrum is typically evaluated using advanced imaging with a MRI arthrogram, which includes an injection of contrast directly into the hip joint. The injection of contrast aids in the diagnosis of labral injury.





The arrows in the above picture highlight an anterior-superior labral tear. The bright white area in the images is the MRI contrast (or fluid from the injection). The arrows indicate an area where contrast is flowing between the labrum and the acetabulum indicating a tear.

An MRI may also be utilized to measure the severity of bony abnormalities in FAI. This defect is often described as the alpha angle of the hip. The alpha angle helps to determine the size of cam impingement; the larger the alpha angle, the larger the cam impingement lesion (generally > 50 to 55 degrees indicates a cam lesion).



How are FAI and/or a labral tear treated?
Non-operative treatment options available for FAI and labral tears include: formal physical therapy, activity modification and steroid injections which may lead to a decrease in pain and improved function.



Surgical intervention may become necessary depending on the activity and lifestyle demands of the patient. In the past, FAI and labral repairs were performed in an open surgical fashion. Advancements in arthroscopic techniques have recently become available that can repair the acetabular labrum and treat FAI while minimizing the surgical morbidity to the patient.

The use of intra-operative fluoroscopy (live x-ray) allows precise placement of arthroscopic portals as well a determination of the amount of bony resection necessary to fully treat the underlying condition of the hip. Using 2 to 4 portals, with and without traction on the hip joint, the surgeon can gain access to different regions of the hip joint. This allows the surgeon to treat both cam and pincer impingement, fix or even reconstruct labral tears, fully evaluate and treat conditions affecting the joint lining of the hip, and even repair instability cases in the hip.

The results

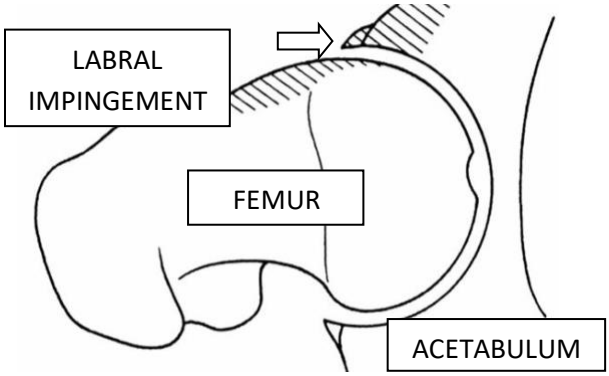
A recent study by Dean Matzuda compared traditional open surgery versus arthroscopic hip surgery and found: "The arthroscopic method had surgical outcomes equal to or better than the other methods with a lower rate of major complications when performed by experienced surgeons."

Although hip arthroscopy is a relatively new field, a 10-year follow-up study on 50 patients by Dr. Thomas Byrd found 87% return to sport with an improvement in the Harris Hip score of 45 points (51-96 on a 100 point scale).

Case example

Patient history:

A 22-year-old female collegiate soccer goalie dove to her left to make another spectacular save in the closing minutes of the championship game to preserve a 1-0 shutout victory. As she got up to celebrate the victory she noticed a sharp pain in her left groin and hip. Over the next few days, the acute pain slowly resolved but she continued to have a "popping" sensation with hip flexion activities and an underlying dull ache.



A week's worth of post-injury rest and treatment with analgesics, ice packs and soothing heat proved ineffective. The woman's athletic trainer and primary-care doctor both agreed she needed to be evaluated by an orthopaedic specialist. They referred her to a hip arthroscopy specialist for the highest level of care.

Her history, physical examination, and x-rays all pointed to an injury to the cartilage lip around the hip socket called the labrum. This diagnosis as well as a predisposing condition called femoral acetabular impingement (FAI) was confirmed using an MRI arthrogram. FAI is a bony incongruence of the ball (femur) and socket (acetabulum) where provocative positions of the hip can lead to pinching (impingement) of the hip labrum.

Figure 1

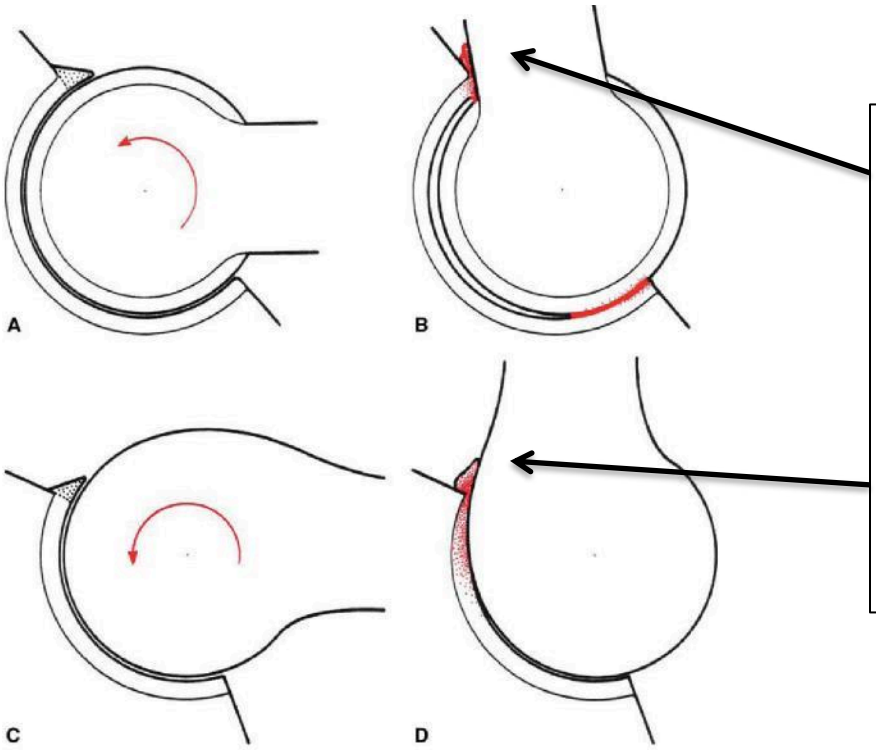


Figure 1:

(A) and (B) Normal hip - there is greater range of motion (or hip flexion) required to cause collision or impingement between the femoral neck and the acetabulum.

(C) and (D) CAM lesion & labral pinching present

Figure 2

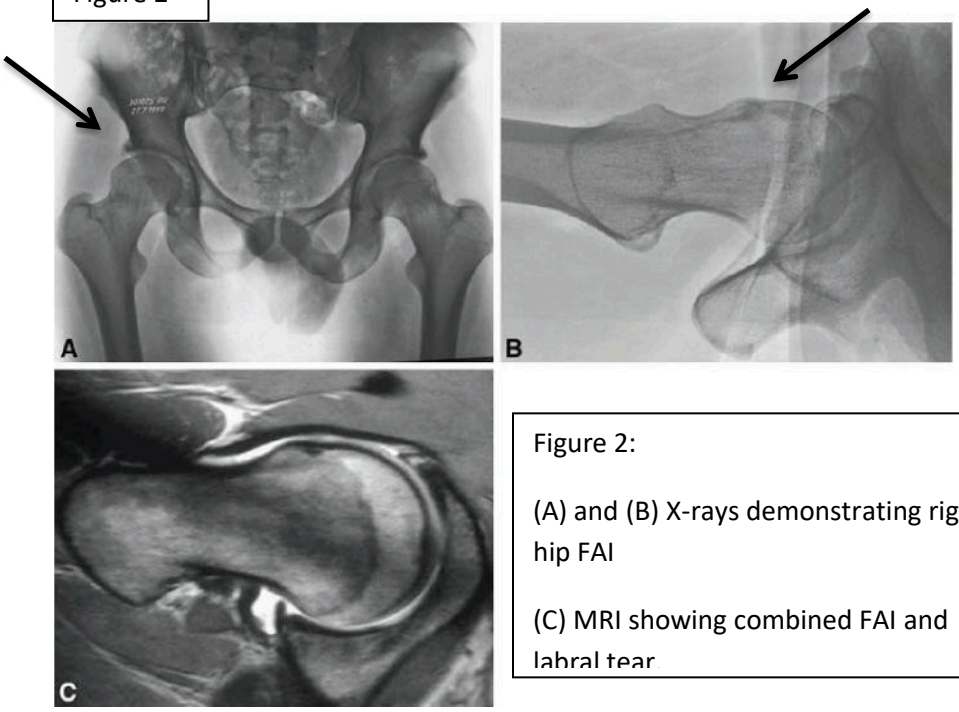


Figure 2:

(A) and (B) X-rays demonstrating right hip FAI

(C) MRI showing combined FAI and labral tear

Treatment plan:

After a course of non-operative treatment including formal supervised physical therapy proved to be ineffective, the patient elected to proceed with surgical intervention. Minimally invasive hip arthroscopy was offered to treat both the labral tear and the underlying bony femoral acetabular impingement. The underlying bony impingement needed to be address simultaneously because its presence would leave the patient vulnerable to re-injury of the hip labrum, persistent pain, and

potentially progression to hip arthritis. The two repairs were scheduled to be performed during the scheduled operation.

The procedure began with a discussion with the anesthesiologist about potentially utilizing a one-time regional anesthetic called a "block" to decrease post-operative discomfort. She elected to proceed with a combined general anesthetic and a block. The patient was then brought to the operating room where she was positioned on a well padded table and then went to sleep. The hip arthroscopy began with distending the joint with gentle traction. Through a series of "poke" holes (incision sites), a pencil sized camera and equipment entered the hip joint. This allowed the labral tear to be repaired and the bony overgrowth along both the rim of the socket and femoral head to be removed, thereby restoring her normal anatomy. She recovered from anesthesia without difficulty and felt well enough in the recovery area to be discharged home the same day following surgery.

Careful post-operative care including early range of motion and a closely supervised physical therapy regimen was essential to her recovery. By the next season she had returned to the field to lead her team on to defend their national title.

<u>Post-operative protocol:</u>
The initial phase of rehab (first 6 weeks) protects the repair and works on improving range of motion. Patients will be placed on crutches with restricted weightbearing for 2 to 6 weeks depending on what was performed during surgery. Inclusion of a stationary bike can occur as soon as the patient acquires adequate range of motion (typically within the first 2 weeks). Swimming can be initiated as early as 3 weeks. By 6 weeks, patients will usually have a normal gait without limp for intermediate distances.

The second phase of rehab focuses on regaining full range of motion and strength. By three months, patients begin functional activities (early sport specific training and drills) with therapy supervision. By 4 to 6 months, patients are allowed to return to sport if they have regained full strength, endurance and range of motion. Improvement of patient outcome may continue over the first year after surgery.

Femoroacetabular Impingement (FAI) treatment progression

