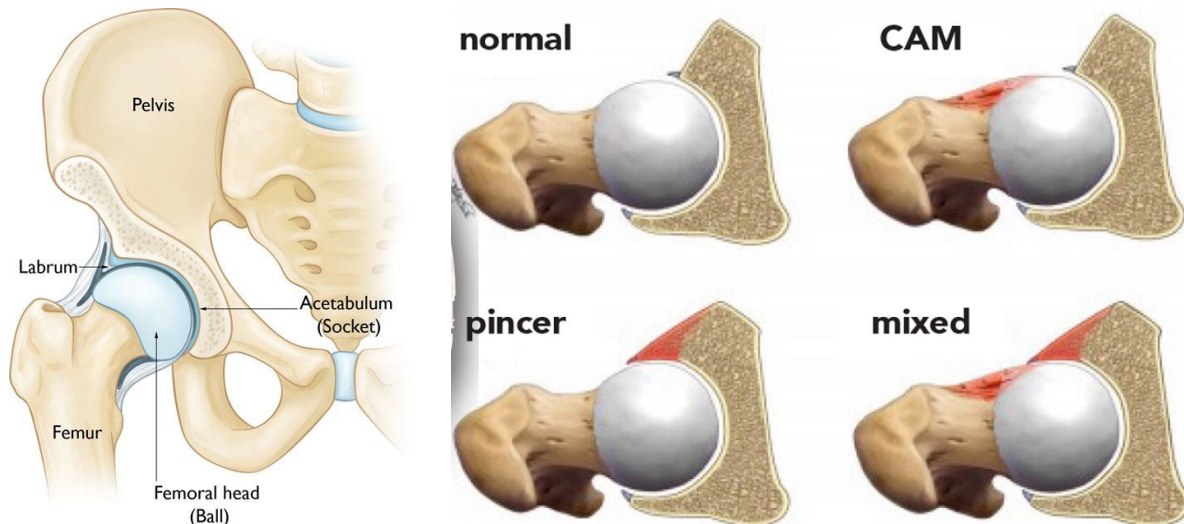


## Femoroacetabular Impingement (FAI)

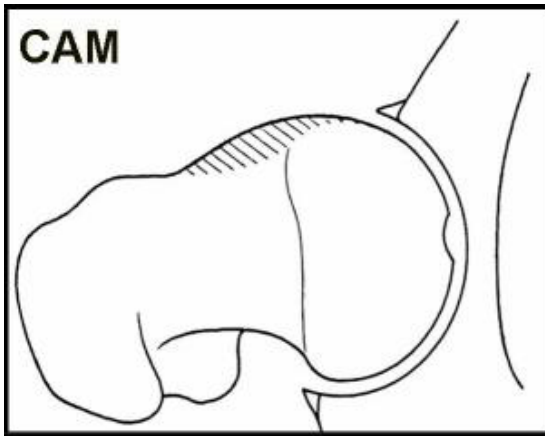
### What is Femoroacetabular Impingement (FAI)?

- The hip is a ball (femur) and socket (acetabulum) joint. Hip impingement or FAI is the abnormal contact due to the shape of the femur ball and socket which prevents the hip from moving smoothly during activity. Over time, this can result in progressive hip pain, labral tearing, and the breakdown of articular cartilage (osteoarthritis).

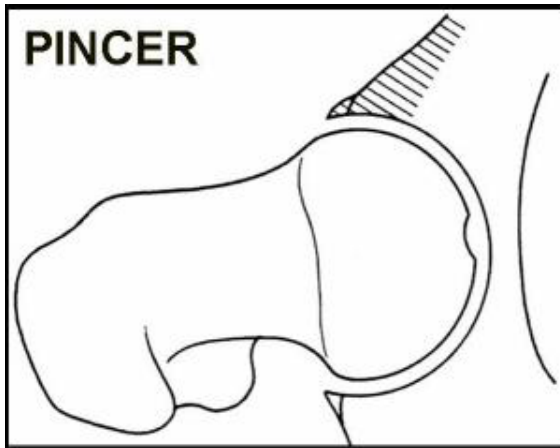


### What are types of FAI?

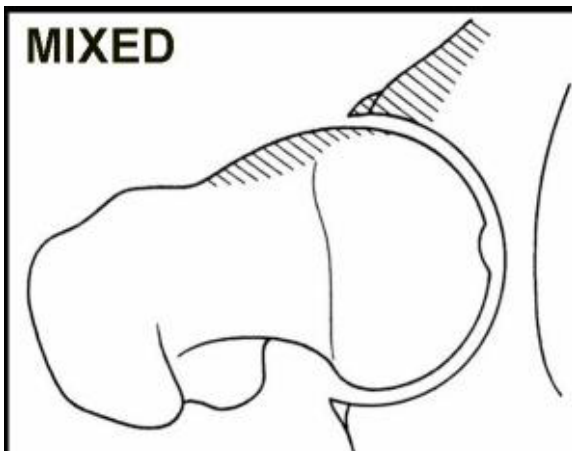
- There are three types of FAI:
  1. CAM: A CAM deformity involves overgrowth of bone along the neck of the femur. It results in an aspherical (egg shaped rather than round) proximal femur. The mismatch of a non-round ball and a round socket causes collision of the bones (impingement) and damage to the labrum and cartilage on the rim of the socket.



2. Pincer: A Pincer deformity is an excessively deep or abnormal orientation of the acetabulum (socket). This results in a “spherical” acetabulum which results in the femoral head (ball) contacting the socket in earlier degrees of flexion causing a crushing injury to the labrum.

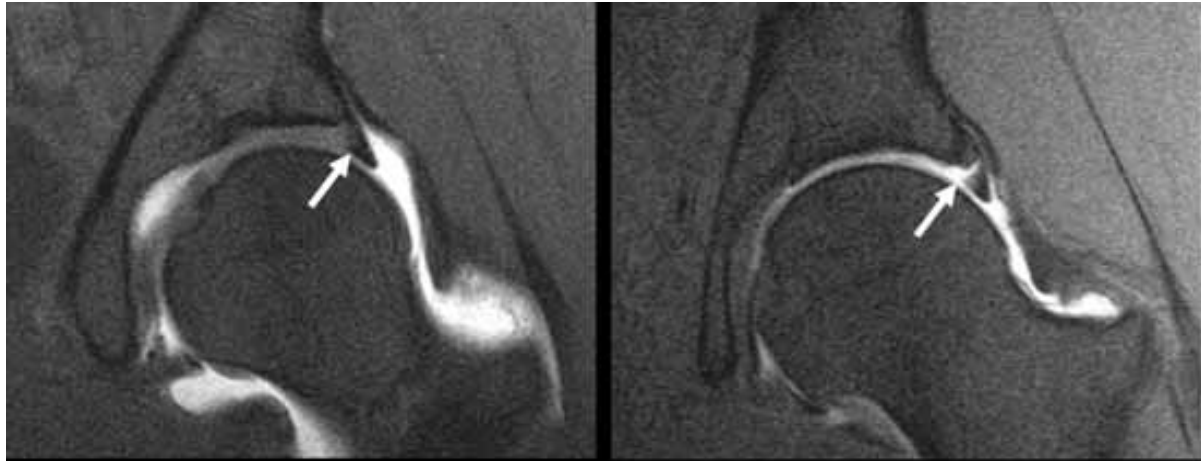


3. Combined/Mixed: This is a combination deformity of both a CAM and Pincer lesion with abnormalities of the proximal femur and acetabulum. This is the most common type of FAI.



### What is a labral tear?

- The acetabular labrum is a structure which forms “gasket” seal around the femoral head. This seal gives stability to the hip and is the main function of the labrum. Patients with FAI can damage or tear the labrum which can cause a “leak” in the seal leading to pain and instability.



- The arrows above highlight an anterior-superior labral tear. The bright area is the fluid seen on MRI. The arrows show the area where the fluid is “leaking” between the labrum and acetabulum, indicating a labral tear.

### What Are the Symptoms?

- Deep groin pain with certain activities or pain in “C” distribution about the hip
- Catching, locking, grinding sensation in hip or groin
- Pinching type pain when flexing (bending) hip past 90 degrees
- Pain with prolonged sitting
- Loss of hip range of motion can occur
- Occasional pain radiating to thigh, knee, or buttock
- Weight bearing pain (if arthritis is present)

### What Imaging Will Be Performed?

- X-ray: Standard radiographs of the hip and pelvis will be performed to evaluate the shape of the femur and acetabulum. It will also help determine the amount of arthritis present.
- MRI: This advanced imaging evaluates the soft tissues, cartilage, and labrum.
- CT scan: This imaging may be ordered to better evaluate the shape and orientation of the femur and acetabulum. 3D reconstructions will help aid in preoperative planning.

### What is the treatment?

- Initial Management
  1. **Activity changes:** This includes changes to your daily routine and avoiding activities that cause symptoms. These include avoiding flexing your hip beyond 90 degrees such as deep squats or a low seated chair.
  2. **Nonsteroidal anti-inflammatory medications (NSAIDs):** Drugs such as ibuprofen or naproxen may help reduce pain and inflammation.

3. **Physical therapy:** Specific exercises can improve the range of motion in your hip and strengthen the muscles that support the joint which can help relieve some stress on the injured labrum or cartilage.
  4. **Intraarticular Injections:** Xray or Ultrasound guided injections of steroid and local anesthetic can be performed to alleviate symptoms of FAI. This will allow more active participation in physical therapy and may improve activity. Alternative type of injections such as stem cells and platelet rich plasma can be considered to assist with hip symptoms.
- **Surgery**
    - **Arthroscopic Hip Surgery (Hip Scope):** This is a minimally invasive surgery performed through small incisions and uses a camera (scope) to evaluate the hip joint. During this procedure the surgeon can repair the labrum or use a piece of cadaver tissue (allograft) to reconstruct the labrum. The purpose of this portion of the surgery is to re-establish a “gasket” seal which improves hip stability. In addition, an osteochondroplasty (*trimming of excess bone on femoral neck-CAM type lesion*) and/or acetabuloplasty (*trimming of the excess bone on labrum-Pincer type lesion*) is performed using a burr and other specialized arthroscopic instruments. By trimming the bone, the surgeon make the femoral head round and the acetabulum the correct shape. This will remove the bony impingement and allow smooth motion. This surgery is performed by a surgeon who specializes in sports injuries and has formal training in hip arthroscopy. Patients are candidates for hip scopes if they DO NOT have arthritis.
    - **Peri-acetabular Osteotomy:** In patients who have instability, which is when the femoral head is not contained in the socket or when the orientation of the socket is unfavorable a peri-acetabular osteotomy (PAO) can be performed. This is an open surgery where cuts in the pelvic bone are made to change the position of the acetabulum (socket) which is then held in position with metal screws. This will give the femoral head more bony containment and stability. A PAO is often performed in combination (either at the same time or in a staged fashion) with a hip scope to address any conditions inside the hip joint. Patients are candidates for this procedure if they DO NOT have arthritis.
    - **Total hip replacement:** This is an operation for patients WITH arthritis. The surgery removes the femoral head, neck, and damaged cartilage in acetabulum. The bone is then replaced with metal, ceramic, and plastic bearing surfaces. This procedure is offered when FAI has led to extensive cartilage damage of this hip joint. This is the definitive treatment for FAI where arthritis has occurred and is performed by a surgeon specializing in joint replacement surgery.
  - **What are the Outcomes?**
    - If left untreated FAI can lead to progressive hip pain and damage to the hip joint cartilage and labrum. This wear and tear eventually may lead to osteoarthritis requiring a total hip replacement.
    - Multiple recently published randomized controlled trials<sup>i</sup> have shown that in patients with FAI and WITHOUT arthritis personalized physical therapy and arthroscopic hip surgery improved patient’s quality of life. In addition, they also showed that arthroscopic hip surgery had a more significant improvement in patient outcomes than physical therapy.
    - Arthroscopic hip surgery has been shown to improve pain and patient function. However, currently there is no published literature that it stops or alters the

progression of the development of arthritis. However, the thought is that the damage to the hip joint can be stopped/slowed by addressing the deformity and restoring the function of the labrum. The hope is to return patients to their baseline function and activity and to prevent the potential progression to arthritis and the need for total hip arthroplasty.

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- <sup>i</sup> 1. Palmer AJR, Ayyar Gupta V, Fernquest S, et al. Arthroscopic hip surgery compared with physiotherapy and activity modification for the treatment of symptomatic femoroacetabular impingement: multicentre randomised controlled trial [published correction appears in *BMJ*. 2021 Jan 18;372:m3715]. *BMJ*. 2019;364:l185. Published 2019 Feb 7.
2. Griffin DR, Dickenson EJ, Wall PDH, et al. Hip arthroscopy versus best conservative care for the treatment of femoroacetabular impingement syndrome (UK FASHIoN): a multicentre randomised controlled trial. *Lancet*. 2018;391(10136):2225-2235.

