Hip Pain in Adults: Evaluation and Differential Diagnosis

Director: Dr. Ghasemi
Presented by: Amirreza Ebrahimian

Outline

Here’s what you’ll find in this presentation:

1. Epidemiology
2. Introduction
3. Anatomy
4. Differential diagnosis
5. Clinical manifestation and physical examination
6. Diagnosis and paraclinic

Epidemiology

28-45%

Nonelite adult soccer player (Women)

49-55%

Nonelite adult soccer player (Men)

(of All injuries)

Epidemiology

6.7-9.7%

adults older than 45 years

(Osteoarthritis of hip)

41%

nonelite male soccer players

17%

male nonathletes

(Cam deformity)

Introduction

Adults commonly present to their family physicians with hip pain, and diagnosing the cause is important for prescribing effective therapy. A focused history and physical examination can help differentiate the causes of hip pain.

History should include:

- Personal history of developmental dysplasia of the hip
- Slipped capital femoral epiphysis
- Sports activities and injuries
- Family history of hip problems
- The location and quality of pain
- Aggravating and alleviating factors and mechanical symptoms

Physical examination should include:

- gait analysis with particular attention to antalgic or Trendelenburg gait
- evaluation of the range of motion in the hip joint and associated pain
- strength testing of the muscles overlying the hip joint
- palpation of the painful area, and special tests (if indicated)

The initial imaging study is anteroposterior hip and pelvic radiography.
MRI and Ultrasonography can be helpful depending on history and physical examination findings.

Anatomy

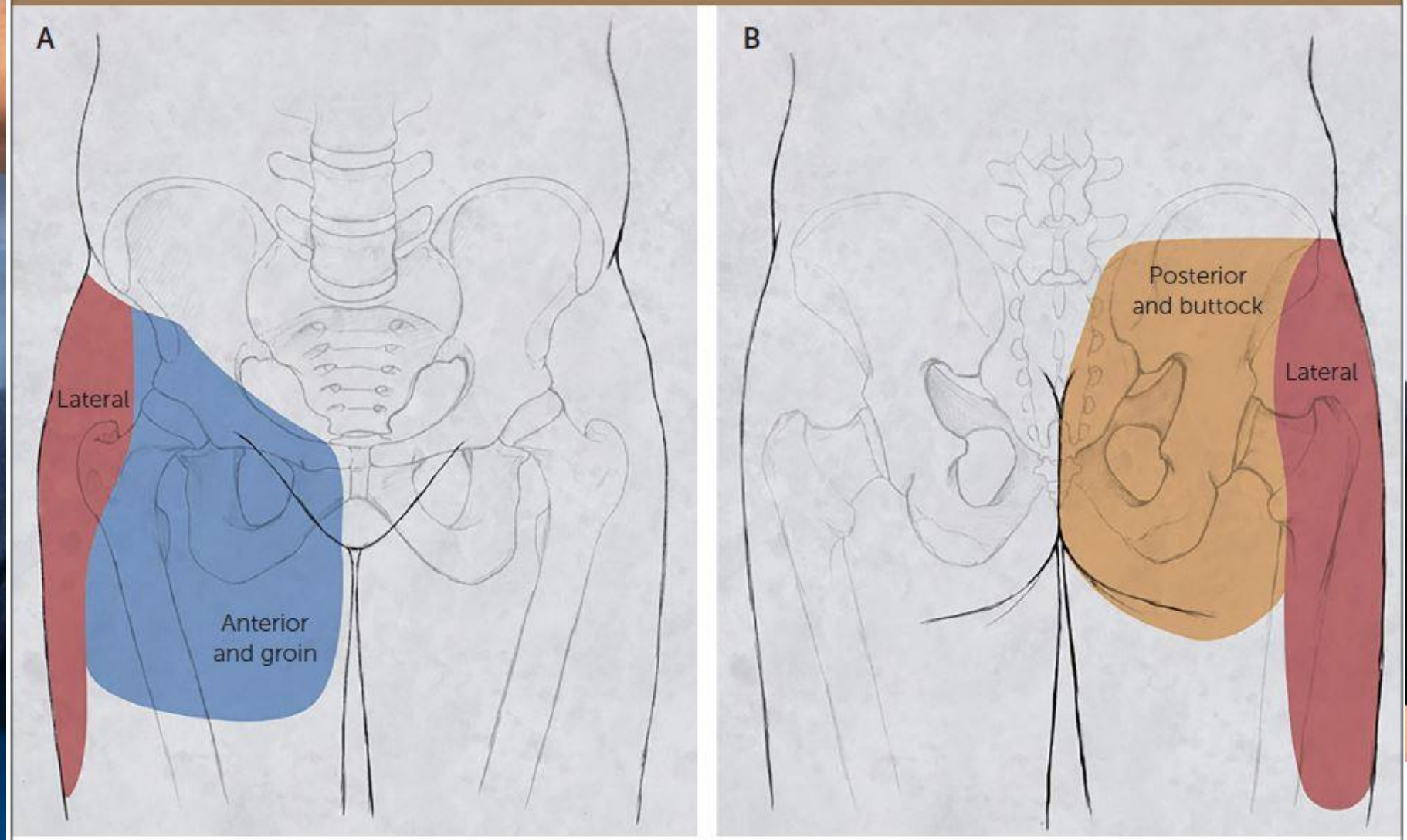
Hip pain is usually located anteriorly, laterally, or posteriorly.

Anterior hip pain
- Referred pain
- Extra-articular etiology
- Intra-articular

Lateral hip pain
- Greater trochanteric syndrome

Posterior hip pain
- Referred pain

FIGURE 1



Localization of hip pain. *(A)* Anterior view. *(B)* Posterior view.

Anterior hip pain

- **Predominantly intra-articular**
- **aggravated by hip flexion or rotation**
- **sports-related or traumatic incident:**
  - Hip flexor strains and tears
  - avulsion fractures
- **referred pain from intra-abdominal problems**
  - Mass
  - Appendicitis
  - Hernia
  - Bladder
  - Female reproductive system (e.g. ovarian cyst)

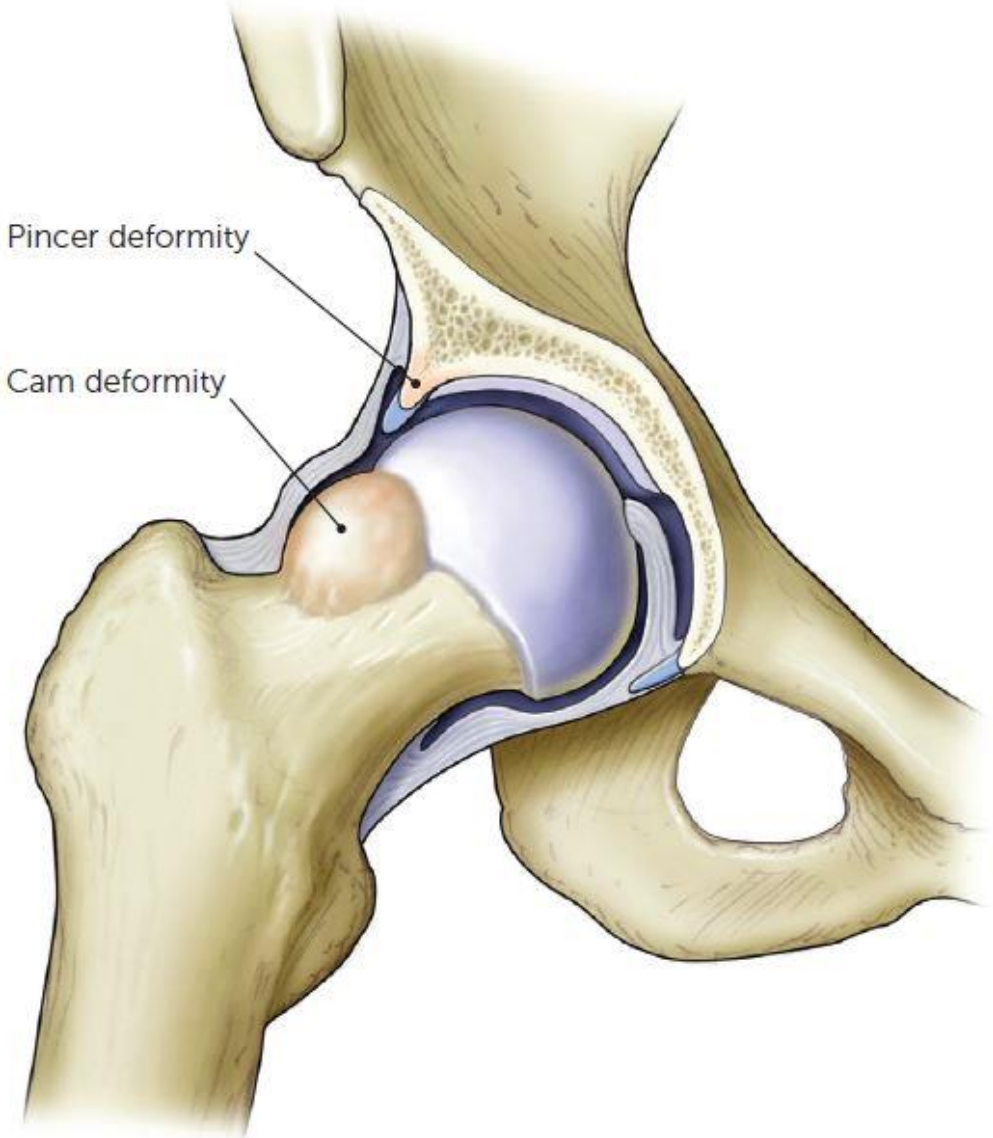
FEMOROACETABULAR IMPINGEMENT

Femoroacetabular impingement is one of the most common causes of hip pain in young adults. It can be caused by a **cam deformity**, which is bony overgrowth of the femoral head and neck, a **pincer deformity** of the acetabulum (too much coverage of the femoral head), or both.

It has a gradual onset without a specific injury. It is more bothersome to athletes whose activities require **hyperflexion** and **wide range of motion** at the hip joint.

Positive results on the **flexion adduction internal rotation** and flexion abduction external rotation tests are indicative of intra-articular hip pathology.

FIGURE 2

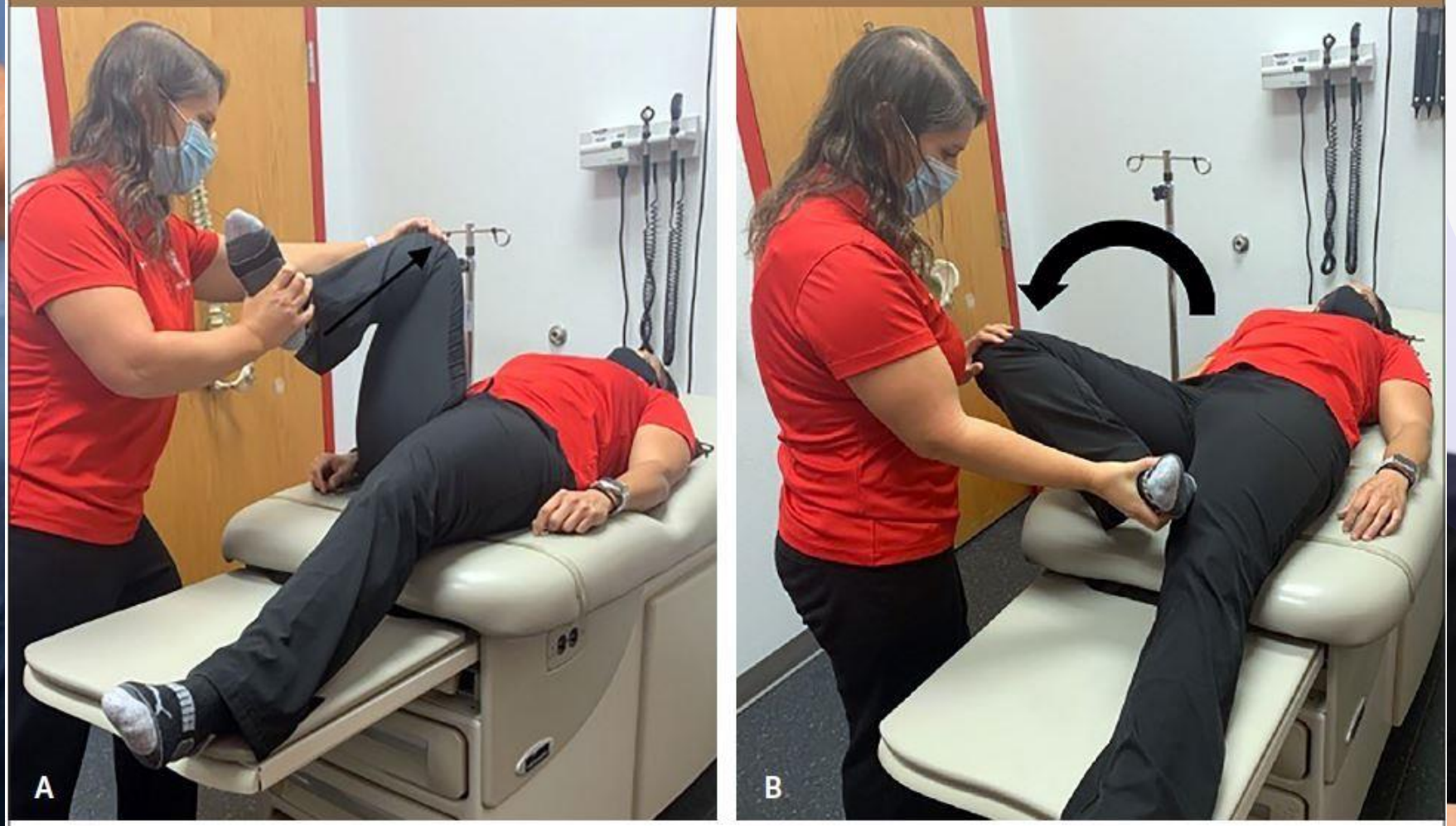


A pincer deformity results from excessive overhang of the acetabulum, which causes the labrum to be impinged between the acetabulum and femoral head when the hip is flexed. A cam deformity occurs when exostosis along the femoral head and neck impinges the labrum against the acetabulum.

FIGURE 3

Flexion adduction internal rotation test. The examiner *(A)* passively flexes then *(B)* adducts and internally rotates the hip. The result is positive if pain is reproduced in the anterior hip/groin area. This test has been shown to have a sensitivity of 59% to 100% and specificity of 4% to 75% for intra-articular hip pathology.[4,7]

FIGURE 4

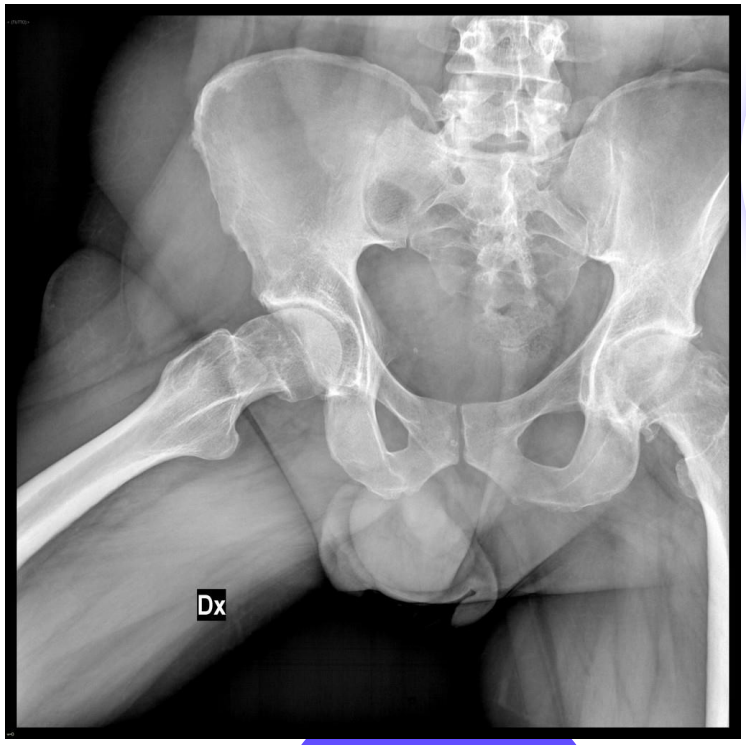


Flexion abduction external rotation test. The examiner *(A)* passively flexes and then *(B)* abducts and externally rotates the hip. The result is positive if pain is reproduced in the anterior hip/groin area. This test has been shown to have 42% to 81% sensitivity and 18% to 25% specificity for intra-articular hip pathology.[4,7]

Diagnosis

Radiography (the preferred radiographic views may vary)

Anteroposterior radiographs are most helpful for **pincer deformity**
Meyer lateral and 90-degree Dunn views are most helpful for **cam deformity**



LABRAL TEARS

A history of a sports-related or traumatic injury. They may also be associated with repetitive motions. Labral tears may cause a popping, catching, or clicking sound associated with activities such as dance, gymnastics, hockey, basketball, and soccer.

Physical examination for labral tears should include flexion adduction internal rotation and flexion abduction external rotation tests.

Labral tears and femoroacetabular impingement are often comorbid conditions in young active patients. Athletes are more likely to require surgical intervention for these conditions, especially those with both conditions.

Diagnosis

Standing Radiography (initial test)

Previously, magnetic resonance arthrography (1.5 tesla) with gadolinium injection of the hip was the diagnostic standard for labral tears. However, with recent advances to 3-tesla MRI and specialized hip protocols, noncontrast 3-tesla MRI is as sensitive and specific as magnetic resonance arthrography and does not require a procedure for contrast injection.

Physicians should consult with a local radiologist to determine the most appropriate test in their area.

FEMORAL NECK STRESS FRACTURES

Stress fractures of the femoral neck are typically associated with overuse and may also be associated with energy imbalance in athletes.

Femoral neck stress fractures are more common in women than men but should not be excluded in men with a history of overuse.

Early in the disease process, stress fractures are typically not visible on radiographs and therefore MRI is required for definitive diagnosis.

Early diagnosis of a femoral neck stress fracture is important because conversion to a complete fracture can be a devastating injury.

AVASCULAR NECROSIS

Avascular necrosis of the femoral head most commonly presents in middle-aged to older adults.

Risk factors

- alcohol use
- smoking
- systemic corticosteroid use
- hemoglobinopathies
- chemotherapy
- metabolic syndrome
- Obesity

Early detection of avascular necrosis can be joint sparing, but no physical examination finding is specific for this diagnosis.

Late-stage disease may be visible on a radiograph, but earlier diagnosis often requires MRI or computed tomography.

OSTEOARTHRITIS

In older adults, osteoarthritis of the femoroacetabular joint is the most common cause of anterior hip pain.

It can lead to significant morbidity and decrease in physical activity.

Osteoarthritis of the hip typically has a gradual onset, but some patients recall a specific injury or fall.

Patients with this condition may have pain with sitting and ambulating for long periods and may have an antalgic gait.

Physical examination maneuvers such as flexion and internal and external rotation may reproduce pain, and range of motion may be decreased.

Diagnosis

Standing anteroposterior Radiography (joint space narrowing and osteophyte formation)

presence of these findings does not always correlate with symptom severity!

Ultrasound-guided anesthetic injection of the hip joint may help differentiate an intra-articular cause of pain from other causes.

Corticosteroid injection may be therapeutic for intra-articular pain.

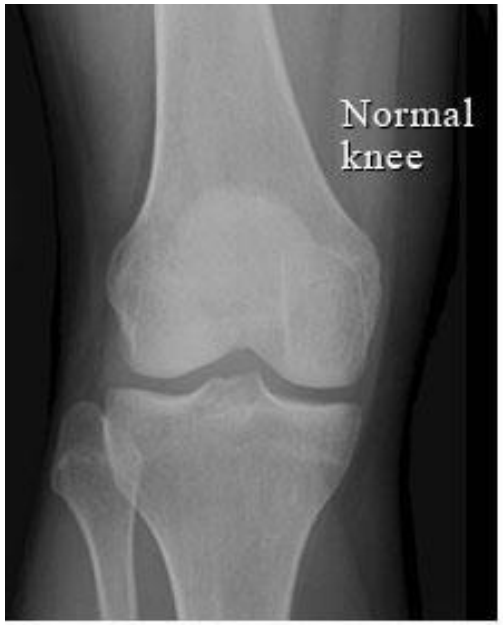


Figure 1

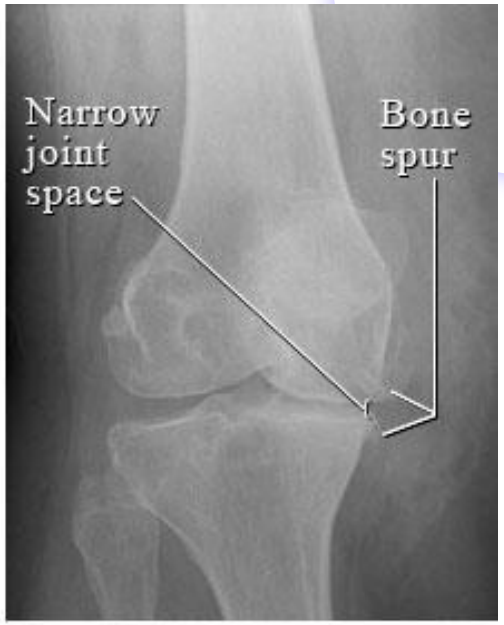


Figure 2

HIP FRACTURES

Hip fractures are more common in older adults and often present after a fall or other trauma or may be associated with osteoporosis.

Physical examination usually reveals an inability to walk on the affected limb and a shortened, externally rotated, abducted leg while in the supine position.

Most hip fractures are visible on a radiograph and require surgical fixation.

Lateral Hip Pain

Greater trochanteric pain syndrome (previously called greater trochanteric bursitis):

Although this syndrome may be associated with bursitis, gluteus medius tendinopathy or tears are now thought to be more common. Iliotibial band friction and external snapping hip can contribute to greater trochanteric pain syndrome

It presents as lateral hip pain aggravated by ambulation or other physical activities, sitting for long periods, and sleeping on the affected hip.
It most commonly affects women 40 to 60 years of age. There is typically no inciting injury.

The patient may walk with a Trendelenburg gait or have positive findings on the Trendelenburg test or resisted external derotation test.

If a patient with greater trochanteric pain syndrome does not improve with anti-inflammatory medications and physical therapy, a gluteus medius tendon tear should be considered.

FIGURE 5

Tests for gluteal tendinopathy. *(A)* Modified Trendelenburg test. Patients are instructed to stand on the affected leg/hip and lift the other leg for 30 seconds. The result is positive if the iliac crest falls below the standing side, showing weakness in hip abductors (gluteus muscles). A positive finding on the Trendelenburg test has been shown to have 23% to 97% sensitivity and 77% to 96% specificity for gluteal tendinopathy.[4,7] *(B)* Resisted external derotation test. While the patient lies on a table, the hip is passively flexed to 90 degrees, then externally rotated. The patient is asked to return the leg to the same axis as the table (0 degrees rotation), pushing against the examiner's (resisting) hand. The result is positive if pain is reproduced over the lateral hip. This test has been shown to have 88% sensitivity and 97% specificity for gluteal tendinopathy.[7]

Diagnosis

MRI and musculoskeletal ultrasonography performed by an experienced sonographer are sufficiently sensitive and specific for diagnosing a gluteus medius tendon tear.

Referral to an orthopedic hip specialist is often indicated for large partial or complete tears because surgery is typically associated with good outcomes in patients with this condition.

Posterior Hip Pain

- **Difficult to diagnose.**
- **Differential diagnosis:**
  - musculoskeletal causes
  - referred pain from intrapelvic and gynecologic issues

*** Patients with intrapelvic problems may have a history of cyclic pain associated with menses or urinary or bowel symptoms.**

PIRIFORMIS AND DEEP GLUTEAL SYNDROME

Piriformis syndrome is thought to be a result of the piriformis muscle entrapping the sciatic nerve, causing hip and buttock pain and sciatica (burning pain shooting down the leg).

Piriformis syndrome is a subset of deep gluteal syndrome, which includes entrapment of the sciatic nerve and/or pudendal nerve by the piriformis muscle, gemelli-obturator internus, or proximal hamstrings.

Patients with deep gluteal syndrome have deep buttock pain that is aggravated by sitting and sciatica symptoms. The seated piriformis stretch test may

FIGURE 6

Seated piriformis stretch test. The patient is seated with 90 degrees of hip flexion. The examiner extends the knee and passively moves the hip into adduction and internal rotation while palpating just lateral to the ischium. The result is positive if pain is reproduced at the piriformis muscle. This test has been shown to have a 91% sensitivity and 80% specificity for deep gluteal syndrome.

Diagnosis

Although conservative treatments are often helpful, MRI may be needed to identify pathology in the deep gluteal muscles or sciatic and pudendal nerves.

Additionally, electrodiagnostic nerve testing can help localize the area of nerve entrapment.

ISCHIOFEMORAL IMPINGEMENT

Ischiofemoral impingement is impingement of the quadratus femoris muscle and nerve between the proximal femur at the level of the lesser trochanter and the ischial tuberosity.

Patients with ischiofemoral impingement have gradual onset of deep buttock pain that is worsened with activities requiring a long stride, such as running.

The long-stride walking test is the most sensitive and specific test for this condition.

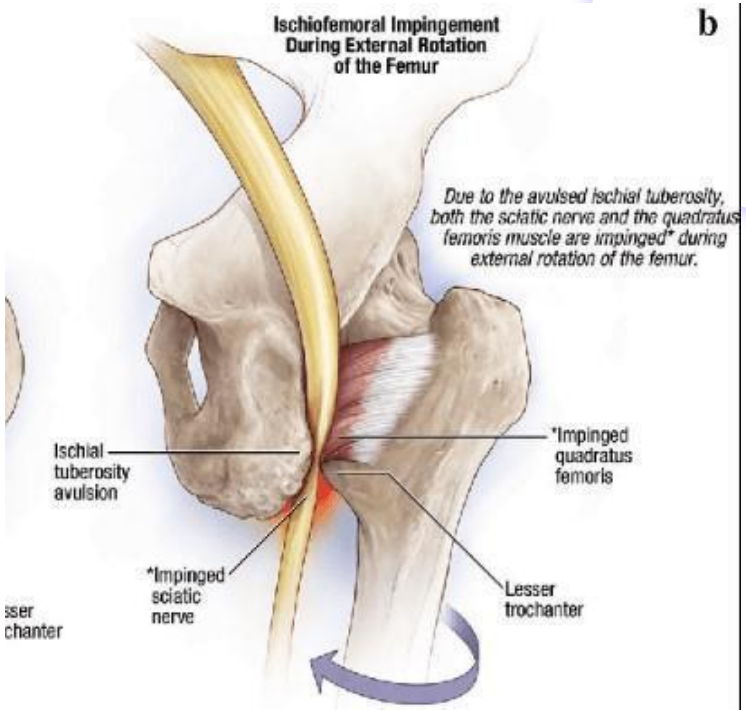


FIGURE 7

Long-stride walking test. The patient is instructed to take a long step on the unaffected leg with the hip pointed forward. This narrows the space between the lesser trochanter and ischium on the posterior (affected) hip, which can reproduce pain caused by ischiofemoral impingement. This test has been shown to have a sensitivity of 94% and specificity of 85% for ischiofemoral impingement.

LUMBAR SPINE AND SACROILIAC JOINT PATHOLOGY

Lumbar spinal issues can present as posterior hip pain. Patients typically have pain in the lumbar spine or musculature and in the posterior hip/buttock area and may report previous lumbar spinal problems.

Radiography of the lumbar spine may show degenerative disease, and MRI can help identify disk herniation or nerve entrapment.

Sacroiliac joint dysfunction and/or arthritis may also present as posterior hip pain.

The most common physical examination finding is tenderness to palpation over the sacroiliac joint. Sacroiliac pain typically does not occur above the L5 level, which would indicate a lumbar spinal etiology of pain.

Radiography may show sacroiliac joint arthritis. Image-guided injections may be a helpful diagnostic and therapeutic tool. If diagnosis is uncertain, MRI can show inflammation or arthritis at the sacroiliac joint.

HAMSTRING INJURIES

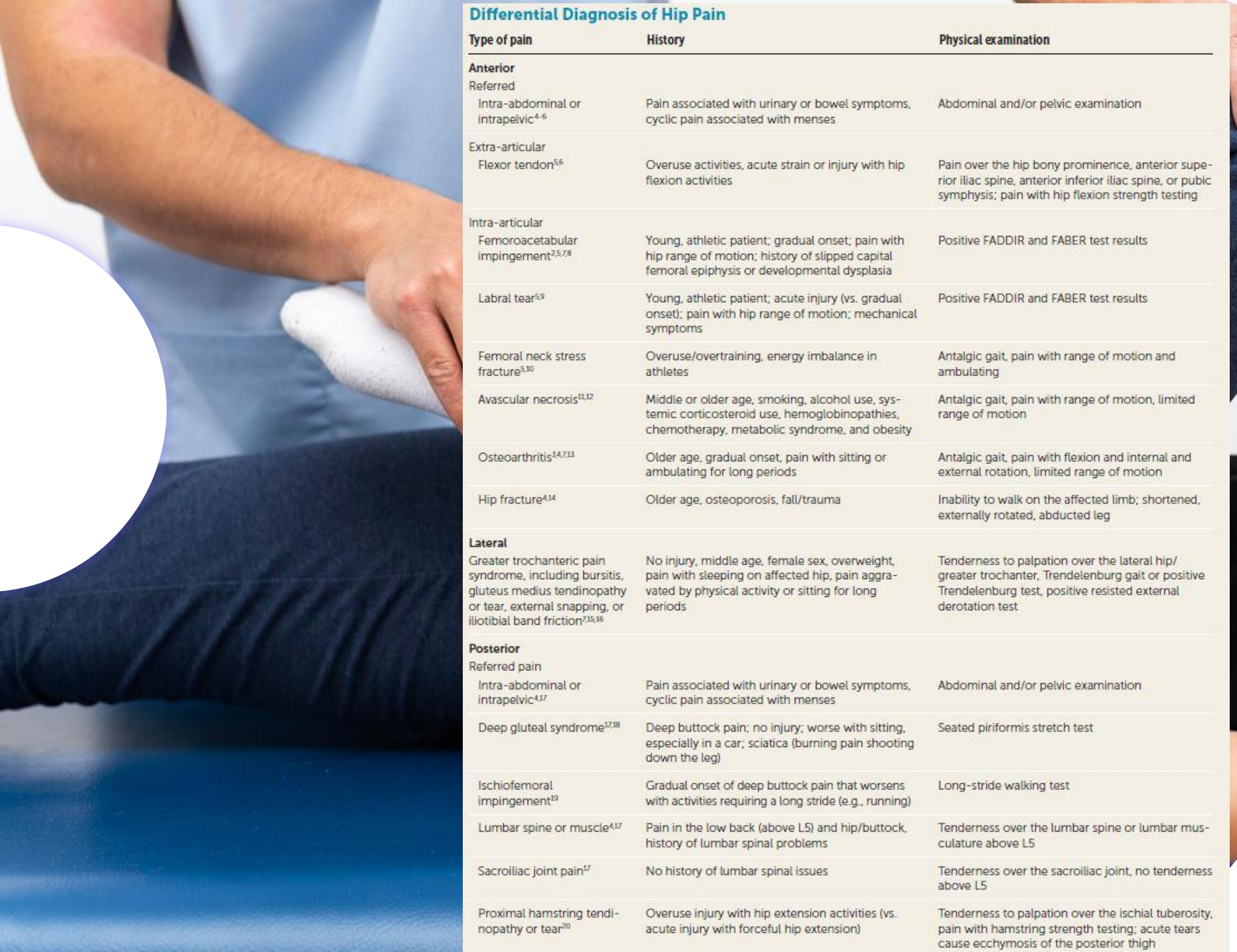
Posterior hip/buttock pain around the ischium may be indicative of a hamstring strain, tear, or avulsion.

Patients may have a history of a traumatic, sports-related, or overuse injury. A complete hamstring tear or avulsion often causes ecchymosis of the posterior thigh.

Hamstring tendinopathy or partial tears are typically exacerbated by hamstring strength testing but do not cause obvious bruising or deformity.

If it is unclear whether the patient has a hamstring injury, MRI may be helpful in determining the diagnosis.

***Patients with acute tears should be referred to an orthopedic surgeon.**



Differential Diagnosis of Hip Pain

Type of pain	History	Physical examination
Anterior		
Referred		
Intra-abdominal or intrapelvic[4-6]	Pain associated with urinary or bowel symptoms, cyclic pain associated with menses	Abdominal and/or pelvic examination
Extra-articular		
Flexor tendon[5,6]	Overuse activities, acute strain or injury with hip flexion activities	Pain over the hip bony prominence, anterior superior iliac spine, anterior inferior iliac spine, or pubic symphysis; pain with hip flexion strength testing
Intra-articular		
Femoroacetabular impingement[2,5,7,8]	Young, athletic patient; gradual onset; pain with hip range of motion; history of slipped capital femoral epiphysis or developmental dysplasia	Positive FADDIR and FABER test results
Labral tear[5,9]	Young, athletic patient; acute injury (vs. gradual onset); pain with hip range of motion; mechanical symptoms	Positive FADDIR and FABER test results
Femoral neck stress fracture[5,10]	Overuse/overtraining, energy imbalance in athletes	Antalgic gait, pain with range of motion and ambulating
Avascular necrosis[11,12]	Middle or older age, smoking, alcohol use, systemic corticosteroid use, hemoglobinopathies, chemotherapy, metabolic syndrome, and obesity	Antalgic gait, pain with range of motion, limited range of motion
Osteoarthritis[3,4,7,13]	Older age, gradual onset, pain with sitting or ambulating for long periods	Antalgic gait, pain with flexion and internal and external rotation, limited range of motion
Hip fracture[4,14]	Older age, osteoporosis, fall/trauma	Inability to walk on the affected limb; shortened, externally rotated, abducted leg
Lateral		
Greater trochanteric pain syndrome, including bursitis, gluteus medius tendinopathy or tear, external snapping, or iliotibial band friction[7,15,16]	No injury, middle age, female sex, overweight, pain with sleeping on affected hip, pain aggravated by physical activity or sitting for long periods	Tenderness to palpation over the lateral hip/greater trochanter, Trendelenburg gait or positive Trendelenburg test, positive resisted external derotation test
Posterior		
Referred pain		
Intra-abdominal or intrapelvic[4,17]	Pain associated with urinary or bowel symptoms, cyclic pain associated with menses	Abdominal and/or pelvic examination
Deep gluteal syndrome[17,18]	Deep buttock pain; no injury; worse with sitting, especially in a car; sciatica (burning pain shooting down the leg)	Seated piriformis stretch test
Ischiofemoral impingement[19]	Gradual onset of deep buttock pain that worsens with activities requiring a long stride (e.g., running)	Long-stride walking test
Lumbar spine or muscle[4,17]	Pain in the low back (above L5) and hip/buttock, history of lumbar spinal problems	Tenderness over the lumbar spine or lumbar musculature above L5
Sacroiliac joint pain[17]	No history of lumbar spinal issues	Tenderness over the sacroiliac joint, no tenderness above L5
Proximal hamstring tendinopathy or tear[20]	Overuse injury with hip extension activities (vs. acute injury with forceful hip extension)	Tenderness to palpation over the ischial tuberosity, pain with hamstring strength testing; acute tears cause ecchymosis of the posterior thigh

“The future depends on what you do today.”

-Mahatma Gandhi-

Thank you for you attention!