Diagnostic Approach to Hip Pain

Zoë J. Foster, MD
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Disclosures

I have nothing to disclose.
Objectives

• Review examination of the hip, including special tests
• Discuss differential diagnosis for hip pain
• Consider special diagnoses not to be missed
Anatomy

Images from: Sonosim
Case 1: Anterior hip pain

15yo track athlete with worsening R groin pain
   tripped and fell in her yard a year ago, now with pain x 6 months
dull constant achy pain, 4-5/10
radiation to anterior thigh
hard to get comfortable at night
hard to go up and down stairs one at a time
can’t run due to pain
better with ibuprofen
no history of hip problems prior
### Differential Diagnosis for Hip Pain

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<th>INTRA-ARTICULAR CAUSES</th>
<th>EXTRA-ARTICULAR CAUSES</th>
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<td>Labral tear</td>
<td>Adhesive capsulitis</td>
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<td>Loose bodies (including OCD lesions)</td>
<td>Snapping hip (internal or external)</td>
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<td>Tears of ligamentum teres</td>
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<td>Chondral injury</td>
<td>Sports hernia</td>
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<td>Avascular necrosis</td>
<td>Myotendinous injuries</td>
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<td>Avulsion injuries (ASIS, etc)</td>
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<td>Stress fractures</td>
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<td>Nerve compression syndromes</td>
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Locations of “Hip Pain”
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<td>Apophyseal avulsion injuries (ASIS; AIIS)</td>
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Functional Tests of the Hip

Squatting
Going up and down stairs one at a time
Crossing the legs so that the ankle of one foot rests on the knee of the opposite leg
Going up and down stairs two or more at a time
Running straight ahead
Running and decelerating
Running and twisting
One-legged hop
Jumping

Case 1: Exam

- Inspection
  - Gait
  - Muscular atrophy
  - Pelvic symmetry
- Palpation
- Range of motion
- Special tests
Types of Abnormal Gait

Coxalgic Gait

Trendelenburg Gait

Exam: Palpation of Bony Landmarks

- Iliac crest
- ASIS
- AIIS
- Greater trochanter
- Pubic tubercle
- PSIS
- SI joint
- Ischial tuberosity
Exam: Strength Testing - Flexor Muscles

Iliopsoas –
  psoas
  iliacus
Rectus femoris
Pectineus
Sartorius
Adductor longus
Adductor brevis
Gracilis

Images from Sonosim
Exam: Strength Testing - Extensor Muscles

Gluteus maximus
Hamstrings
Biceps femoris
Semimembranosus
Semitendinosus
Gluteus medius
Adductor magnus

Images from: Sonosim
Exam: Strength Testing – Adductor Muscles

- Adductor longus
- Adductor brevis
- Adductor magnus
- Gracilis
- Pectineus

Image from: Sonosim
Exam: Strength Testing – Abductor Muscles

- Tensor fasciae latae
- Gluteus medius
- Gluteus minimus
- Gluteus maximus
- Sartorius

Image from: Sonosim
Exam: Strength Testing – Internal Rotation

Adductor longus
Adductor magnus
Adductor brevis
Gluteus medius
Gluteus minimus
Tensor fasciae latae
Pectineus
Gracilis

Image from Sonosim
Exam: Strength Testing – External Rotation

- Gluteus maximus
- Obturator internus
- Obturator externus
- Quadratus femoris
- Piriformis
- Gemellus superior
- Gemellus inferior
- Sartorius
- Gluteus medius
Exam: Special Tests

Log Roll

• Passive assessment of internal and external rotation at the hip
• Positive test is pain or decreased range of motion
• Helpful for diagnosis of:
  • Osteoarthritis
  • Osteonecrosis
  • Femoroacetabular impingement
  • Stress fracture

Exam: Special Tests

FABER (Patrick’s) Test

- Passive Flexion, Abduction, External Rotation of the hip joint
- Ipsilateral pain suggests an intra-articular problem or iliopsoas strain; contralateral pain suggests sacroiliac pathology; posterior pain suggests hip impingement (FAI)

Exam: Special Tests

**FADIR Test**

- Passive **Flexion**, **ADDuction**, **Internal Rotation** of the hip joint
- Positive for FAI if it reproduces the patient’s hip pain

Exam: Special Tests

Snapping Hip Maneuver

- Passive flexion, external rotation and then extension of the hip
- Positive test is a palpable snap/click and reproduction of the patient’s symptoms
- Can suggest iliopsoas bursitis

Exam: Special Tests

Rectus Femoris Stretch Test

• Patient actively flexes the opposite hip to the chest while the leg behind examined is flexed at the knee over the edge of the exam table
• Positive test is extension of the resting leg at the knee
• Suggests tightness in the rectus femoris muscle

Exam: Special Tests

**Thomas Test**

- Patient actively flexes the opposite hip toward the chest
- Positive test is knee flexion in the extended leg
- Suggests tightness in the hip flexors and psoas

Exam: Special Tests

Stinchfield Test

• Straight leg raise against resistance (pt lifts leg to 45 while examiner applies downward force on the thigh)

• Positive test is reproduction of the patient’s symptoms

• Helpful for diagnosis of:
  • FAI
  • SCFE

Case 1: Imaging

Case courtesy of Mark Baumeier, DO
Case 1: Diagnosis

**Slipped Capital Femoral Epiphysis (SCFE)**

- One of the most commonly missed diagnoses in children
- Most common in 8-15yo
- Most common hip disorder in adolescents (10.8/100,000)
- Associated with obesity, growth spurts and sometimes endocrine abnormalities
- Usually present with limping and poorly localized pain in the hip, groin, thigh or knee
Case 2: Anterior Hip Pain

- 22yo collegiate field hockey player with “tight hip flexor” x 3 wks
  - Anterior pain that she attributes to her hip flexor
  - Exacerbated by long training runs
  - Not better with 4 days rest when team was traveling
  - Dull, achy pain that is becoming more constant
- History of prior stress fracture in tibia
- Suspected eating disorder though BMI is in normal range
Case 2: Diagnosis

Femoral Neck Stress Fracture

- Most common location for stress fracture in the femur
- Relatively rare; account for only 1-7% of all stress fractures
- Are high risk on the lateral aspect of the femoral neck
- Should be on the differential for exercise induced pain that is relieved by rest

Case 3: Lateral hip pain

• 33yo RN with “tightness” in his L hip
  Gestures in a “c” shape to the lateral hip
  Symptoms have been present for months
  Stretching helps
  Tight sensation, not painful; no radiation
  No trauma and no h/o same prior

• Exercising daily for 1-2 hours, "sometimes more".

• No rest days. "I feel like if I stop to rest I'll lose it."
## Differential Diagnosis for Hip Pain

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Case 3: Exam

- Inspection
  - Gait
  - Muscular atrophy
  - Pelvic symmetry
- Palpation
- Range of motion
- Special tests
Exam: Special Tests

FABER (Patrick’s) Test

- Passive Flexion, ABduction, External Rotation of the hip joint
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Exam: Special Tests

**FADIR Test**

- Passive Flexion, **AD**duction, Internal **R**otation of the hip joint
- Positive for FAI if it reproduces the patient’s hip pain

Exam: Special Tests

Ober’s Test

• Side lying patient with affected hip up, examiner passively abducts and extends the upper leg, watching the knee

• Positive test is when the knee does not drop toward the exam table

• Suggests tightness in the IT band

Exam: Special Tests

(A) To evaluate the tensor fasciae latae: The hip and knee are held at 0 degrees of extension and allowed to passively adduct with gravity.

(B) The gluteus medius: The hip is held at 0 degrees of extension and 45 to 90 degrees of knee flexion.

(C) The gluteus maximus: The shoulders are rotated back toward the table, with the hip in flexion and knee in extension.

Case 3: Imaging

Case 3: Diagnosis

Femoroacetabular Impingement (FAI)

• Common etiology of pain in athletes, adolescents and adults

• Abutment of the acetabular rim and the proximal femur
  • Causing injury to labrum and articular cartilage
  • Can lead to osteoarthritis of the hip if left untreated

• Worse with pivoting, prolonged sitting, getting in/out of a car, leaning forward

• Treated with arthroscopic surgery
Case 4: Posterior hip pain

• 13yo male sprinter with sudden onset of R buttock pain
  Started as he came out of the blocks in practice
  Soreness posteriorly with radiation into hamstrings
  Better somewhat with taking days off to rest
  Stretching doesn’t seem to help
  No h/o problems like this before
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Case 4: Exam

- Inspection
  - Gait
  - Muscular atrophy
  - Pelvic symmetry
- Palpation
- Range of motion
- Special tests
Exam: Special Tests

**Leg Length Assessment**

- Direct assessment – ASIS to medial or lateral malleolus
  - Lateral malleolus is
- Apparent leg length: umbilicus to medial malleolus

Exam: Special Tests

Piriformis Muscle Testing

- Piriformis syndrome is a debated diagnosis in sports medicine
- Numerous tests purported to diagnose it

<table>
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<tr>
<th>Name of test</th>
<th>Date first described</th>
<th>Description</th>
<th>Attributed to</th>
</tr>
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<tbody>
<tr>
<td>Freiberg</td>
<td>1934</td>
<td>The patient lies prone with knees flexed and then rotates the hip</td>
<td>Freiberg and Vinke [1]</td>
</tr>
<tr>
<td>Pace</td>
<td>1976</td>
<td>The clinician provides resistance to hip abduction by holding the sitting patient’s knee</td>
<td>Pace and Nagle [2]</td>
</tr>
<tr>
<td>Tonic external rotation of hip</td>
<td>1981</td>
<td>Visible sign, hip externally rotated while patient at rest in supine position</td>
<td>Solheim [3]</td>
</tr>
<tr>
<td>FAIR = flexion abduction internal rotation of hip</td>
<td>1981</td>
<td>Maintaining the hip in flexion abduction and internal rotation.</td>
<td>Solheim [3]</td>
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<td>Beatty</td>
<td>1994</td>
<td>The patient holds the flexed hip in abduction against gravity while lying on the unaffected side</td>
<td>Beatty [4]</td>
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<tr>
<td>Heel–contralateral knee maneuver (HCLK)</td>
<td>2013</td>
<td>The patient externally rotates, flexes the hip, and places the heel on the contralateral knee, and then, the examiner flexes the contralateral hip</td>
<td>Michel et al. [5]</td>
</tr>
<tr>
<td>Active piriformis</td>
<td>2013</td>
<td>The patients actively abducts and externally rotates the hip in the lateral position against resistance by the examiner</td>
<td>Martin et al. [6]</td>
</tr>
<tr>
<td>Seated piriformis</td>
<td>2013</td>
<td>The examiner internally rotates the hip and palpates the sciatic notch with the patient seated</td>
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Exam: Special Tests

Trendelenburg Test

• Assessment of the hip abductors
• Positive test is when the pelvis drops on the unsupported side
• Helpful for diagnosis of:
  • Contusion of abductor mass
  • Impending stress fracture of the femoral neck

Exam: Special Tests

**FABER (Patrick’s) Test**

- Passive *Flexion, ABduction, External Rotation* of the hip joint
- Ipsilateral pain suggests an intra-articular problem or iliopsoas strain; contralateral pain suggests sacroiliac pathology; posterior pain suggests hip impingement (FAI)

Case 4: Diagnosis

**Ischial apophysis avulsion**

- Apophysis avulsion is not uncommon in adolescents prior to closure of growth plates
- Usually seen in 14 – 25yo age group
- Sudden forceful muscular contraction causes avulsion of the apophysis to which the tendon attaches.

https://radiopaedia.org/cases/ischial-tuberosity-avulsion-1
Apophyses of the Pelvis

Image courtesy of Dr Andrew Ho, Radiopaedia.org, rID: 28884
References


• Verrill MM, Hall MN, Loven B. Evaluation of Hip Pain in Older Adults. American Family Physician. 2012; 86(4)