Physical Examination of Posterior Hip Pain

Myung-Sik Park, MD,
Sun-Jung Yoon, MD
Department of Orthopedic Surgery,
Biomedical Research Institute of Chonbuk National University Hospital, Jeonju,
Korea

Contents
Evaluating Physical Examinations for Posterior Hip Pain
The Latest Korean Research on Hip Arthroscopy

Hip Arthroscopy in Korea Today
In 2010, 2.44 hip arthroscopies were performed per 100,000 persons in Korea. The absolute number and the age-adjusted rate of hip arthroscopy more than doubled from 2007 to 2010. The age-adjusted rates of hip arthroscopy for men and women significantly increased by 22.6% and 29.5% respectively during the study period. When stratified by age, numbers of hip arthroscopies performed showed a double peak for men (20 to 24 years and 45 to 49 years) and a single peak for women (50 to 54 years)

Total Number of Hip Arthroscopies in Korea
Number of Hip Arthroscopies for Men and Women in Korea

- Why Focus on Posterior Hip Pain?

So many patients complain about posterior hip pain while watching TV, sitting on the floor (especially Asian people) and on chairs. The same happens when driving, engaging in sports, and sometimes after spine surgery.

Evaluating Hip Pathology

1. The patient history
2. Physical examination
3. Radiological assessment

- History
- Radiology
- PE

Essential tools for Drs. & TVs
Physical Examination (PE)

Currently, 60% of intra-articular disorders are initially misdiagnosed.

The PE techniques are dependent on the examiner's experience and efficiency.

The most efficient order of examination begins with a standing test followed by seated, supine, and lateral tests, ending with prone tests.

"MAHORN" group
(Multicenter Arthroscopy of the Hip Outcomes Research Network)

- In the standing position:
  Gait analysis, single-leg stance phase and laxity

- In the supine position:
  Range of motion (ROM) of hip flexion, IR & ER, FABER, FADDIR, DILI, DEXRIT, palpation; straight leg against resistance, muscle strength; passive supine rotation, and posterior rim impingement test.

- In the lateral position:
  Palpation, passive adduction tests & abductor strength

- In the Prone position:
  Femoral antversion test (was commonly performed)

PE: Standing

Usually, the patient shows the surgeon where the pain is by pointing to the relevant spot.

"A characteristic sign is the "C sign" indicated by intraarticular hip pain" – Byrd.

"Posterior-superior pain" requires a thorough evaluation differentiating hip and back pain. The shoulder and height and iliac crest heights are noted to evaluate the leg length discrepancies. And the general body habitus is assessed and issues of ligament laxities are determined.

Gait abnormalities often help to detect hip pathology (6-8 stride lengths).
Gait Evaluation Helps Hip Pathology

- Gait antalgic, shortened stance phase / Trendelenburg gait (Abductor lurch)
- Body habitus and laxity examination
- Single-leg stance phase: testing for weakness of abductors or proprioception disruption

PE: Seating

The seated hip examination consists of a thorough neurologic and vascular examination. The posterior tibial pulse is checked first, any swelling of the extremity is noted, and inspection of the skin is performed at this time.

A straight leg raise test is then performed by passively extending the knee into full extension – this test is helpful in detecting radicular neurological Sxs.

The loss of Int Rotation is one of first signs of intraarticular disorder: therefore one of the most important assessments is Int Ro and Ext Ro in the seated position.

Seated Examination

- Rotation: evaluates rotation at 90° of flexion
- Record differences in rotation between sitting, supine and prone positions
- Piriformis test
Supine Examination

- Leg length
  - True discrepancy
  - Is there any contracture?
- Log roll
  - Sensitive to intra-articular hip pathology but non-specific
- ROM
  - Rotations with hip neutral
  - Flexion and rotations (impingement)
- Straight leg raise
- Abductor and abductor strength

PE: Supine

- "FABER test" *(Patrick Test)* = flexion/abduction/ER anterior/deep lateral pain
  - Intrarticular Psoas pathology
  - Increased distance from the table to the lateral knee = impingement/tight psoas
- "DIRI test" = Dynamic Rotatory Impingement Test
  - Hip flexed and brought through wide arc of IR/ADD/extension
    - Typical groin pain
    - Intraarticular pathology
- "DEXRIT" = Dynamic External Rotatory Impingement Test
  - Hip flexion and brought through wide arc of ER/ABD/extension
    - Typical groin pain
    - Intraarticular pathology
    - Psoas snapping

1. FABER test
2. DIRI test
3. DEXRIT test

1. FABER test: Associated with musculotendinous or osseous posterior lateral acetabular incongruence or ligamentous injury. In case of a coup-countercoup injury, in which the mechanism of injury is initiated on the posterior side, the pain will radiate to the anterior side.
2. DIRI test: Direct recreated pain at the femoral neck (acetabular congruence can be visualized in the operating theater)
3. DEXRIT test: Same as above
PE: Supine Posterior Rim Impingement Test

- Can also be performed in the supine position. The patient is positioned at the edge of the table so that the examined leg hangs freely at the hip and the patient draws up both legs to the chest, eliminating the lumbar lordosis. The affected leg is then extended off the table allowing for full extension of the hip, abducted and externally rotated. The posterior rim impingement test takes the hip into extension and assesses the congruence of the posterior acetabular wall and femoral neck.

PE: Supine (< Radiology)

- Markedly decreased IR (< 20°) and forward flexion (< 110°) =
  - structural impingement
  - FAI cam/pincer-type
  - spine impingement
  - anterior trochanteric
- Globally increased ROM and hyper-mobility
  - Structural instability/dysplasia
  - Connective tissue disorders.
- Globally decreased ROM=
  - advanced OA
  - adhesive capsulitis

Lateral Examination

- The lateral examination begins with the patient on the contralateral side. The surgeon then examines the areas of the supra sacroiliac and sacroiliac (SI) joint, the muscle of abduction, and the origin of the gluteus maximus as it runs along the lateral border of the sacrum and the posterior side of the ilium.
- The next point of palpation is the ischium to look for avulsion or bursitis.
- Finally, the piriformis and nerve are palpated for any signs of tenderness along with the abductor musculature, which includes the gluteus (maximus, medius and minimus) and tensor fascia lata.
PE: Lateral

1. Flexion extension
2. Lateral leg raise test
3. Ober Test (ITB tightness)
4. Palpated around G trochanter.

PE: Lateral

An active piriformis test is performed by the patient by pushing the heel down into the table, abducting and externally rotating the leg against resistance while the examiner monitors the piriformis.

Passive adduction test

The passive FADDIR test is performed in a dynamic manner. The examiner holds the monitoring hand in and about the superior aspect of the hip with the lower leg cradled on the forearm and the knee on the hand. The hip is then brought into flexion, adduction, and internal rotation. FADDIR is commonly performed in the supine position.

The lateral rim impingement test is performed with the hip passively abducted and externally rotated.

PE: Lateral

1. Active piriformis test (similar to Pace's sign, which is pain and weakness on resisted abduction and external rotation of the thigh in the seated position)
2. Passive Abd/adduction test
3. The Gluteus Maximus Contracture Test

PE: Prone

1. Palpation of 4 distinct areas: the supra SI, SI, gluteus maximus and spine
2. The femoral anteversion test (Craig’s test) will give the examiner an idea of femoral anteversion and retroversion
3. The rectus contracture test (Ely’s test) is performed with the patient in the prone position and the lower extremity flexed towards the gluteus maximus. Any elevation of the pelvis or restriction of hip flexion is indicative of rectus femoris contracture.
PE: Prone

1. Femoral anteversion test
2. IR test
3. Rectus contracture test

Specific Test

1. McCarthy Test: The contralateral leg is held in flexion. The examined hip is brought to 90° flexion and then abducted, externally rotated, and extended. The hip is then brought to 90° flexion, adducted, internally rotated, and examined. A positive sign is helpful for detecting anterior FAI or a torn labrum.
2. The scour test uses the same methods as the DIRI test
3. Foveal distraction test
4. Bicycle test
5. Fulcrum test

Specific Test

6. Seated piriformis stretch test
   The seated position offers a stable and reproducible platform with the hip at 90° of flexion. The examiner extends the knee and passively moves the flexed hip into adduction with internal rotation while palpating 1 cm lateral to the ischium (middle finger) and proximally at the sciatic notch (index finger). A positive test recreates the posterior pain.
   Pain in the buttocks may be caused by a trapped sciatic nerve (by the piriformis and obturator internus/gemelli complex or scar tissue)
   The straight leg raise test and the seated piriformis test and Pace’s Test will aid identification of deep gluteal syndrome (DGS)

Evaluating Hip Pathology

1. The patient history
2. Physical examination
3. Radiological assessment

History
Tools for Dx & Ts
Radiology
What can we do if radiological and EMG tests don’t identify abnormalities?

I suggest the use of a scoring system such as used for rheumatoid arthritis

- Clinical history
- Clinical C-sign
- Tenderness in sciatic nerve course
- Positive piriformis sign in supine position
- Positive piriformis sign in sitting position
- Pain in sitting position (chair, driving)

etc.

Table 1.1. Standing Examination Assessment

<table>
<thead>
<tr>
<th>EXAMINATION</th>
<th>ASSESSMENT/ASSOCIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abductor Deficient Gait</td>
<td>Abductor Strength, Proprioception Mechanism</td>
</tr>
<tr>
<td>Antalgic</td>
<td>Trauma, Fracture, Synovial inflammation</td>
</tr>
<tr>
<td>Pelvic Rotational Wink</td>
<td>Intra-articular Pathology, Hip Flexion Contracture, Increased Femoral Anteversion, Anterior Capsular Laxity</td>
</tr>
<tr>
<td>Foot Progression Angle with Excessive External Rotation</td>
<td>Femoral Retroversion, Increased Acetabular Anteversion, Torsional Abnormalities, Effusion, Ligamentous injury</td>
</tr>
<tr>
<td>Foot Progression Angle with Excessive Internal Rotation</td>
<td>Increased Femoral Anteversion or Acetabular retroversion, Torsional Abnormalities</td>
</tr>
</tbody>
</table>

Table 1.2. Standing Examination Assessment

<table>
<thead>
<tr>
<th>EXAMINATION</th>
<th>ASSESSMENT/ASSOCIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Leg Limp</td>
<td>Iliotibial Band Pathology, True/False Leg Length discrepancy</td>
</tr>
<tr>
<td>Single Leg Stance Phase Test</td>
<td>Abductor Strength, Proprioception Mechanism</td>
</tr>
<tr>
<td>Spinal Alignment</td>
<td>Shoulder/iliac crest heights, lordosis, scoliosis, leg length</td>
</tr>
<tr>
<td>Laxity</td>
<td>Ligamentous laxity in other joints: thumb, elbow, shoulders, or knee</td>
</tr>
</tbody>
</table>

Data from The Hip AANA, Hal D. Martin edited 2010: 3-30

Thank you again to all attendees of ISHA!
### Table 2.1. Normal Internal and External Rotation Range of Motion

<table>
<thead>
<tr>
<th>Range of Motion Assessment</th>
<th>Normal (degrees)</th>
<th>Abnormal (degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seated Internal Rotation</td>
<td>20 to 30</td>
<td>&lt;20</td>
</tr>
<tr>
<td>Seated External Rotation</td>
<td>30 to 45</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Extended Internal Rotation</td>
<td>20 to 35</td>
<td>&lt;20</td>
</tr>
<tr>
<td>Extended External Rotation</td>
<td>30 to 45</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Supine Hip Flexion</td>
<td>100 to 100</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Adduction</td>
<td>20 to 30</td>
<td>&lt;20</td>
</tr>
<tr>
<td>Abduction</td>
<td>45</td>
<td>&lt;45</td>
</tr>
</tbody>
</table>

### Table 3. Seated Examination Assessment

<table>
<thead>
<tr>
<th>Examination</th>
<th>Assessment/Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurologic</td>
<td>Sensory nerves originating from the L2-S1 levels, DTR of patella (L2-L4 spinal nerves and femoral nerve) and Achilles (L5-S1 sacral nerves)</td>
</tr>
<tr>
<td>Straight Leg Raise</td>
<td>Radicular neurological symptoms</td>
</tr>
<tr>
<td>Vascular</td>
<td>Pulses of the dorsalis pedis and posterior tibial artery</td>
</tr>
<tr>
<td>Lymphatics</td>
<td>Skin inspection for swelling, scarring, or side to side asymmetry</td>
</tr>
<tr>
<td>Internal Rotation</td>
<td>Normal between 20° and 35°</td>
</tr>
<tr>
<td>External Rotation</td>
<td>External Rotation</td>
</tr>
</tbody>
</table>

### Table 4.1. Summary of Supine Examination Assessment

<table>
<thead>
<tr>
<th>Examination</th>
<th>Assessment/Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of Motion</td>
<td>Flexion, Abduction, Adduction</td>
</tr>
<tr>
<td>FADDIR</td>
<td>Anterior Femoroacetabular Impingement, Torn Labrum</td>
</tr>
<tr>
<td>Hip Flexion Contracture</td>
<td>Hip Flexor Contracture (psos), Femoral Neuropathy</td>
</tr>
<tr>
<td>Test (Thomas Test)</td>
<td>Intra-articular Pathology, Abdominal Exfoliation</td>
</tr>
<tr>
<td>FABER (Patrick/Taber)</td>
<td>Distinguish between Back and Hip Pathology, Specifically Sacroiliac Joint Pathology</td>
</tr>
<tr>
<td>Dynamic Internal Rotatory Impingement Test</td>
<td>Anterior Femoroacetabular Impingement, Torn Labrum</td>
</tr>
<tr>
<td>(Similar to McCarthy’s Test)</td>
<td></td>
</tr>
<tr>
<td>Dynamic External Rotatory Impingement Test</td>
<td>Superior Femoroacetabular Impingement, Torn Labrum</td>
</tr>
<tr>
<td>(Similar to McCarthy’s Test)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4.2. Summary of Supine Examination Assessment

<table>
<thead>
<tr>
<th>Examination</th>
<th>Assessment/Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior Rim Impingement Test</td>
<td>Posterior Femoroacetabular Impingement, Torn Labrum</td>
</tr>
<tr>
<td>Passive Supine Rotation Test (Log Roll)</td>
<td>Trauma, Effusion, Synovitis</td>
</tr>
<tr>
<td>Heel Strike</td>
<td>Trauma, Femoral Fracture</td>
</tr>
<tr>
<td>Straight Leg Raise Against Resistance (Stinchfield)</td>
<td>Hip Flexor Strength</td>
</tr>
<tr>
<td>Palpation</td>
<td></td>
</tr>
<tr>
<td>1. Abdomen</td>
<td>Facial Hernia, Associated Gastrointestinal/Genitourinary Pathology</td>
</tr>
<tr>
<td>2. Pubic Symphysis</td>
<td>Osteitis Pubis, Calcification, Fracture, Trauma</td>
</tr>
<tr>
<td>3. Adductor Tubercle</td>
<td>Adductor Tendonitis</td>
</tr>
</tbody>
</table>
Table 5.1. Summary of Lateral Examinations and Assessment

<table>
<thead>
<tr>
<th>EXAMINATION</th>
<th>ASSESSMENT/ASSOCIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexion, Adduction, Internal Rotation</td>
<td>Anterior Femoroacetabular Impingement, Torn Labrum</td>
</tr>
<tr>
<td>Lateral Femoroacetabular Impingement, Torn Labrum, instability</td>
<td></td>
</tr>
<tr>
<td>Tensor Fascia Lata Contracture Test (Ober's Test)</td>
<td>Tensor Fascia Lata Contracture</td>
</tr>
<tr>
<td>Gluteus Medius Contracture Test (Ober's Test)</td>
<td>Gluteus Medius Contracture/Tear (decreased strength with knee flexion, suspect tear)</td>
</tr>
<tr>
<td>Gluteus Maximus Contracture Test</td>
<td>Gluteus Maximus Contracture, Contribution to Iliotibial Band</td>
</tr>
<tr>
<td>Palpation</td>
<td></td>
</tr>
<tr>
<td>1. Greater Trochanter</td>
<td>Greater Trochanter Bursitis, Iliotibial Band Contracture</td>
</tr>
<tr>
<td>2. Sacroiliac Joint</td>
<td>Distinguish between Hip and Back pathology</td>
</tr>
</tbody>
</table>

Table 5.2. Summary of Lateral Examinations and Assessment

<table>
<thead>
<tr>
<th>EXAMINATION</th>
<th>ASSESSMENT/ASSOCIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Maximus Origin</td>
<td>Gluteus Maximus origin tendonitis</td>
</tr>
<tr>
<td>4. Ischium</td>
<td>Biceps Femoris tendonitis, Avulsion Fracture, Ischial Bursitis</td>
</tr>
</tbody>
</table>

Data from “The Hip” AANA, Hal D. Martin edited 2010: 330