ICL 107

An Introduction to Hip Arthroscopy
Extra-Articular Disorders: There are lots of Comcomitant Problems
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Introduction
Hip pain in young adults is not always caused by intra-articular pathology, even in the presence of abnormal examination and imaging findings.
Extra-articular pathology review in this presentation:
- Deep gluteal syndrome and piriformis
- Ischiofemoral impingement
- Iliopsoas-related pain and impingement

Deep Gluteal syndrome

Deep gluteal syndrome (DGS) is an underdiagnosed entity characterized by pain and/or dysesthesias in the buttock area, hip or posterior thigh and/or radicular pain due to a non-discogenic sciatic nerve entrapment in the subgluteal space. Multiple pathologies have been incorporated in this all-included “piriformis syndrome”, a term that has nothing to do with the presence of fibrous bands, obturator internus/gemellus syndrome, quadratus femoris/ischiofemoral pathology, hamstring conditions, gluteal disorders and orthopedic causes.

The concept of fibrous bands playing a role in causing symptoms related to sciatic nerve mobility and entrapment represents a radical change in the current diagnosis of and therapeutic approach to DGS. The development of periarticular hip endoscopy has led to an understanding of the pathophysiological mechanisms underlying piriformis syndrome, which has supported its further classification.

Clinical examination and symptoms

- Clinical assessment of patients with DGS is difficult since the symptoms are imprecise and may be confused with other lumbar and intra- or extraarticular hip diseases.
- It is usually characterized by a set of symptoms and semiological data occurring in isolation or in combination. The most common symptoms include hip or buttock pain and tenderness in the gluteal and retro-trochanteric region and sciatica-like pain, often unilateral but sometimes bilateral, exacerbated with rotation of the hip in flexion and knee extension.
- Intolerance of sitting more than 20 to 30 min, limping, disturbed or loss of sensation in the affected extremity, lumbago and pain at night getting better during the day are other symptoms reported by patients. An antalgic position is frequently found.
Many patients have undergone lumbar spinal surgery without improvement and require high doses of narcotics to control their pain.

Physical examination tests have been used for the clinical diagnosis of sciatic nerve entrapment including the Lasègue test, Pace’s sign, Freiberg’s sign, Beatty test, FAIR test and seated piriformis stretch test. The active piriformis and seated piriformis stretch tests reveal higher sensitivity and specificity for the diagnosis of sciatic nerve entrapments than the other tests, especially when both are used in combination. The infiltration test not only has a high diagnostic but also a therapeutic value.

**Etiology**

1. Fibrous/fibrovascular bands.

Pathogenic classification

**Right:** (a,b) Compressive or bridge-type bands limiting the movement of the sciatic nerve from anterior to posterior (type 1A) or from posterior to anterior (type 1B). (c,d) Adhesive or horse-strap bands (type 2), which bind strongly to the sciatic nerve structure, anchoring it in a single direction. They can be attached to the sciatic nerve laterally (type 2A) or medially (type 2B). (e) Bands anchored to the sciatic nerve with undefined distribution (type 3).

**Middle:** Endoscopic treatment: Adhesive and lateral type-2A fibrous band in a 31-year-old female with DGS. Axial PD-weighted MR image (a) and endoscopic view (b) show a fibrous band (arrowheads) attached to the sciatic nerve (arrow) laterally from the major trochanter.

**Left:** Type-3 scarred bands in a 51-year-old female with DGS. (a) Axial T1-weighted MR image shows fibrous irregular bands (arrowheads) with undefined distribution in the perisciatic fat, anchoring the sciatic nerve (arrow) in multiple directions. (b) The endoscopic image shows the sciatic nerve decompression, more complex when this type of bands is resected.
Right: Diagrams illustrate the six variants, original described by Beaton and Anson.

(a) An undivided nerve comes out below the piriformis muscle (normal course). (b) A divide sciatic nerve passing through and below the piriformis muscle. (c) A divided nerve passing above and below an undivided muscle. (d) An undivided sciatic nerve passing through the piriformis muscle. (e) A divided nerve passing through and above the muscle heads. (f) An undivided sciatic nerve passing above an undivided muscle. (g) Diagram showing an unreported additional B-type variation consisting of a smaller accessory piriformis (AP) with its own separate tendon. SN sciatic nerve, P piriformis muscle, SG superior gemellus muscle.

Middle: Type B of Beaton and Anson piriformis-sciatic complex variation in a 34-year-old female with DGS. (a) Coronal PD-weighted MR image shows a high sciatic nerve division (arrows) with its two branches passing through and below the piriformis muscle bellies (asterisks). (b) Sagittal oblique MDCT reconstruction after performing a double infiltration test. (c) The endoscopic image confirmed this sciatic nerve variation

Left: Endoscopic piriformis release resulted in sciatic nerve decompression and complete relief of symptoms.

**3-Hamstring conditions**

The sciatic nerve can be affected by a wide spectrum of hamstring origin enthesopathies appearing either isolated or in combination: partial/complete hamstring strain (acute, recurrent or chronic), tendon detachment avulsion fractures (acute or chronic/ nonunited), apophysitis, nonunited apophysis, proximal tendinopathy, calcifying tendinosis and contusions.

Calcifying tendinosis. Endoscopic treatment

**Ischiofemoral Impingement Syndrome**

The Ischiofemoral Impingement Syndrome (IIS) is a rare clinical entity of groin pain, associated with a radiologically decreased space between the lesser trochanter of the femur and the ischium. It may manifest as an atypical groin and/or posterior buttock pain, with or without a distal radiation, due to edema of the quadratus femoris muscle and secondary inflammation of the Sciatic nerve.

**Profile**
- Female > Male
- Wide age range 11-77 y/o
- Unilateral > bilateral (25-40%)
- Medialized anterior to posterior hip pain

**Clinical Presentation**
- Hip pain: anterior, groin, posterior
- Mechanical symptoms
- Neurologic symptoms along sciatic nerve
- Gait abnormality: hip extension phase
- Radiographic narrowing of the space between the lesser trochanter and ilium
- Abnormal MRI signal of quadratus femoris muscle

**Clinical Examination**
- “Johnson Test”: THA
  - Extension
  - Adduction
  - External Rotation
Dynamic IF Impingement Test": non-THA
- Knee Extension
- Hip Extension
- Adduction
- Internal Rotation

**Imaging Findings**

**Plain Film**
- Cystic or sclerotic changes at lesser trochanter or ischial tuberosity
- IF space calcification
- IF space narrowing

**MRI**
- IF space narrowing
- Edema signal pattern within IF space
- Degenerative signal (edema, tearing, fatty change) within quadratus femoris muscle
- Tendonopathy (edema and partial tears) changes of hamstring origin
- A= IF space (nominal) >17mm
- B= QFM space (effective) >8mm

**Treatment**
- Activity modification
- Gait training
- Hip bracing
- Injection of IF Space
- Surgical Decompression: Endoscopic
Outcomes
- Level 4 & 5 (minimal clinical experience)
- Small series and case reports
- Matching indications with anatomy important

**ILIOPSOAS-RELATED PAIN AND IMPINGEMENT**

ILIOPSOAS /INTERNAL SNAPPING HIP

**Definition**
- The iliopsoas tendon can snap over the iliopectineal eminence, acetabular rim, or femoral head / femoral head-neck junction (FAI).
- A greater incidence of snapping hip has been noted in ballet dancers, although it is often not bothersome in this population. Pain or discomfort associated with internal snapping is an indication of associated iliopsoas tendonitis, either as a result of acute inflammation or more chronic degeneration and tendinopathy.

**Diagnosis**
- Patients report anterior groin pain associated with extending the hip from a flexed position, and intermittent catching, snapping, or popping of the hip. Often is associated with a hyperlordotic lumbar spine.
- Because the iliopsoas is also a flexor of the trunk on the hip, iliopsoas tendonitis may occasionally present with associated low back pain.
- Iliopsoas tendon is tender to palpation or may be painful with resisted hip flexion.
- Moving the patient from the FABER position into extension, adduction, and internal rotation often elicits a palpable snap. The snapping is felt anteriorly not laterally.
- Snapping of the iliopsoas tendon may not be seen with ultrasound evaluations since the scans are performed with the patient supine.

**Treatment**
- Typically responds to relative rest, NSAIDS, Psoas stretching / muscle relaxation, core strengthening / postural training.
- Corticosteroid bursal injection can be therapeutic and diagnostic.
- Surgical:
  - Open/Arthroscopic.
Recent studies have shown that an arthroscopic iliopsoas tendon release can effectively treat painful snapping of the tendon. (Byrd, 2005; Ilizaliturri, 2005; Flanum & Keene, 2007)

Endoscopic/Arthroscopic: Can be done three vias:

- **Endoscopic at the level of lesser trochanter:** (Byrd, Sampson, Ilizaliturri)
  - Release traction
  - Flex and externally rotate the hip
  - Localize the lesser trochanter using fluoro
  - Portals: Anterolateral inferior: 2-3 cm distal and slightly anterior to the anterolateral portal/Scope. Accessory inferior: 3-4 cm distal to the inferior anterolateral portal: Working portal.
  - Release the tendon

- **Via the peripheral compartment**
  - Release traction and flex the hip
  - The peripheral compartment can be entered while keeping the scope outside the joint with release of traction or it can be accessed by placing a spinal needle over the anterior femoral neck after release of traction and hip flexion.
  - The iliopsoas tendon can be seen through a hiatus when present or a capsulotomy can be made medial to the zona orbicularis at the level of the inferior-medial synovial fold to visualize the tendon.
  - Release the tendon until the overlying muscle is seen.

- **Can be done via the Central compartment**
  - Can be seen at or inferior to the anterior portal if hiatus present.
  - Anatomic landmark: (Psoas facet) There is usually a groove or indentation at 2-3 o’clock in the anterior lip of the acetabulum where the psoas crosses it. Sometimes the psoas tendon indent the medial joint capsule at this point (Capsule hour-glass restriction) Needle from an anterior portal to this point.
  - Capsulotomy is made at the psoas facet (Two-three o’clock) and a motorized shaver/radiofrequency carefully removes capsular tissue exposing the tendon.
• Release the tendon until the overlying muscle is seen

TRIPLE IMPINGEMENT

Pincer-type pathology, labral pathology and internal or psoas snapping hip have been termed by Kelly as ‘triple impingement.(AANA meeting 2008)

Definition

- Pincer impingement
- Labral pathology
- Psoas snapping / tight psoas

Diagnosis

- Groin pain with associated snapping
- Physical examination reveals a positive anterior impingement sign, with psoas snapping, and or pain with resisted hip flexion
- Radiographs show evidence for pincer impingement
- Intraarticular injection may give partial relief of the presenting pain, and a psoas bursal injection may give further relief confirming this association

Treatment

- Rim resection
- Labral debridement vs Refixation
- Iliopsoas release

ILIOPSOAS IMPINGEMENT

Introduction

✓ Several authors (Kelly, Domb)(Hip and pelvic injuries in sports Medicine 2010, 196-198) have implicated iliopsoas impingement on the anterior labrum as a cause of labral tears.
✓ They have stated that a tight iliopsoas tendon could cause compression over the anterior capsulolabral complex, leading to labral lesions. Labral tears and echymosis at the 3 o'clock position of the acetabulum (see images below) are directly under the iliopsoas tendon. This labral tear is considered an anterior tear, while most labral tears caused by trauma, femoroacetabular impingement, capsular laxity/hip mobility, dysplasia or degeneration are usually found at the 11:30 to 1 or 2 o'clock position.
✓ Reportedly common reason for failed hip arthroscopy (Heyworth, Arthroscopy 2007)
✓ In a series of athletes with groin pain, iliopsoas tendonitis was the most common cause of groin pain in runners (Hölmich, Br J Sports Med 2007)

**Definition**
- Labral pathology (Torn, inflammation, echymosis or partially delaminated) at 3 o’clock position without any evidence of FAI, bony anormality or trauma.
- MRI: May demonstrate a focal adhesion of the psoas tendon to the labrum or an edema pattern deep to the psoas tendon and adjacent to the labrum
- Tight psoas / psoas adherence to capsule

**Diagnosis**
- Pain with anterior impingement testing and resisted hip flexion
- Hip snapping in some patients
- Pain or apprehension with resisted straight leg raise
- Hyperlordosis of lumbar spine sometimes noted
- Intra-articular injection variable relief (When an MRA with anesthetic does not relieve an athlete’s hip pain, consider an ultrasound-guided iliopsoas bursa injection).
- Psoas bursal injection more complete relief (Ultrasound evaluation of the tendon & injection of the psoas bursa will help in confirm that the tendon is the cause of the athlete’s hip pain).
- Radiographs show no bony deformities

**Arthroscopy**
- Central compartment arthroscopy reveals anterior / anteroinferior labral pathology at 2-3 o’clock
- Labral Morphology: Normal
- Labral lesion: Inflammation, labral tear, mucoid degeneration, echymosis.
- Scarring of psoas tendon to capsule
Treatment

- Labral debridement / repair
- Psoas release at the central compartment at the level of the anterior acetabular rim:
  - Anatomic landmark: (“Psoas facet”) There is usually a groove or indentation at 3 o’clock in the anterior lip of the acetabulum where the psoas crosses it. Sometimes the psoas tendon indent the medial joint capsule at this point (Capsule hour-glass restriction)_Needle from an anterior portal to this point
  - Capsulotomy at the “psoas facet” is made and a motorized shaver/radiofrequency carefully removes capsular tissue exposing the tendon.
  - Release the tendon until the overlying muscle is seen.

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