Hip Pain

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Apophysitis

- Apophysis – site of tendon attachment prior to skeletal maturity
- Apophysitis – inflammation from repetitive microtrauma from traction by tendon
- Avulsion – traumatic contraction of tendon on apophysis

- Clinical diagnosis based on location of pain in an adolescent
- Hurts to stretch or contract
- XRs used to confirm widening to help with prognosis & RTP more than diagnosis

Hip Pain

- Stovak
  - Apophysitis
  - DJD
  - Hip Impingement
  - Labral tear
  - Sports Hernia

- Porter
  - Stress Fractures
  - Bursitis
  - Tendinopathy
  - Snapping Hip
Apophyses

- Iliac Crest: abdominal (internal/external oblique and transversus abdominis)
- ASIS: sartorius
- AIIS: rectus femoris
- Greater Trochanter: glut med/min
- Lesser Trochanter: iliopsoas
- Ischial Tuberosity: hamstring
- Inferior pubic ramus: adductors

Hip Apophyses

Pelvic Avulsions
Treatment

- Avoid vigorous stretching
- Relative rest
- Crutches if needed
- NSAIDS/Prednisone?
- RTP as long as no pain to stretch, good strength, and pass a functional progression without limping
- Risk is avulsion

DJD/Osteoarthritis

- Rapidly Progressive
- Loss of IR > ER
- Pain with passive end ROM
- Anterior hip/groin pain (not lateral hip, posterior hip, or buttock pain)
- Pain may radiate down thigh

Hip DJD

- Joint Space Narrowing
- Cysts
- Sclerosis
- Osteophytes
- Coxa Profunda
- Protrusio Acetabulae
Hip DJD Treatment

- NWB Exercise – the best
- The Rest
  - Acetaminophen
  - NSAIDS
  - Prednisone
  - Injections – Steroid, Viscosupplementation, ABI, PRP

Not Helpful
- Glucosamine/Chondroitin
- Physical Therapy

Hip Impingement

- Anatomical Issue
- Incongruity leads to early labral tears and chondral injury
- Theoretically – fixing these issues will prevent early DJD
- Pain with activity
- ANTERIOR groin pain
- Pain with FADIR or IR log roll or scour test

FADIR vs FABER
Cam vs Pincer Impingement (or both)

- Cam
  - Head-neck junction offset issue
  - Physis injury
  - Near-SCFE

- Femoral neck bump
- Pistol grip deformity

- Pincer
  - Acetabular retroversion
  - Coxa Profunda
  - Protrusio Acetabulae

- Crossover sign

PLAIN XR

- Supine Pelvis AP
- Frog Leg Lateral
- Cross Table Lateral with leg in 15 degrees IR
- Dunn views – 45 & 90 degrees

AP

- Well centered pelvis with the distance from the coccyx to the to pubic symphysis – 1cm
- OR
- Sacrococcygeal joint to pubic symphysis 3-5cm
- Tilt of pelvis underestimates the crossover (Retroversion)
- Arch can overestimate crossover
- Rotation also matters
  - To right will overestimate right retroversion & underestimate left

AP – Tilt vs Arch
Frog Leg Lateral / X-Table Lateral

Pistol Grip Deformity

Crossover
- Anterior rim over posterior rim (retroversion)

Os Acetabuli
- Considered normal variants of secondary ossification of acetabulum
- Now considered suspicious for underlying labral tear
**Synovial Herniation Pit**

- Normal variant 5% population
- Now considered c/w FAI

**MRI (MRA)**

- Screening Pelvis – R/O AVN, stress fx., tendon avulsion, tumor (IV contrast), osteitis pubis
- MRA unilateral hip – more sensitive 90% vs 30% for intra-articular pathology – labral tears, cartilage lesions
- Anesthetic helpful clinically during injection
- T2 fat sats
- 1.5 Tesla magnet or greater
- Ligamentum teres tears still undetected (3rd most common in athletes)

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**Labral Tears**

**Labral Tear**
Does the pain match the imaging?

- High percentage of asymptomatic athletes have radiographic changes of cam & pincer impingement
- Many labral tears are asymptomatic
- Thus the anesthetic injection

Impingement Treatment

- Pain but No Intra-articular Pathology
  - NSAIDS
  - Prednisone
  - Steroid Injection

- Pain and Chondral lesion or Labral tear
  - Arthroscopic Bony Debridement & Labral Repair
  - Coxa Profunda & Protrusio Acetabulae not amenable to arthroscopic surgery

Sports Hernia (Athletic Pubalgia, Gilmore’s Groin)

- Trash-Bag Diagnosis
- Pre-hernia
- Weakening/thinning of the anterior wall of the inguinal canal
- Hurts in the groin with activity & may involve paresthesias from ilioinguinal or genitofemoral nerve irritation
- Resolves with rest
- Pain for 6 months with failed therapy

What It Is Not (but often gets lumped together)

- DDX
  - Pubic rami stress fracture
  - Osteitis pubis
  - Tendinopathy of the adductors or rectus abdominus
  - Lateral femoral cutaneous nerve entrapment
  - Iliopsoas bursitis
  - Snapping Hip Syndrome
### Imaging
- XR – Normal
- CT – Normal
- MRI/MRA – Normal
- Bone Scan - Normal
- U/S - ? Abnormality
- Clinical Diagnosis

### Treatment
- Relative Rest & Physical Therapy focused on the suspected diagnosis
- If not better & truly the correct diagnosis – referral for surgery
- No Surgeons in Wichita
Hip Pain

1st Half
- Apophysitis
- DJD
- Hip Impingement
- Labral tear
- Sports Hernia

2nd Half
- Stress Fractures
- Bursitis
- Tendinopathy
- Snapping Hip

Stress Fractures

- Stress Fractures in general
- Specific treatment recommendations
  - Femoral Neck
  - Femoral Shaft
  - Sacrum
  - Ilium

Stress Fractures

- Occur when osteoclastic activity overwhelms osteoblastic activity
- Bone injury unfolds over a continuum of time without intervention
  
  Normal Bone → Stress Reaction → Stress Fracture → Fracture

- Result from excessive stress on normal bone from overactivity
- Result from normal stress on a bone that is deficient (osteoporotic, poor nutrition, or in female athlete triad)
- Common injuries in athletes & people who are active
- Running sports account for 69% of stress fractures
- Suspect in someone who is active:
  - + bone pain
  - + performs repetitive activities with limited rest or recent increase in activity

Stress Fractures

- Physical exam
  - Tests to perform in the area of interest are palpation, the tuning fork test, the fulcrum test, & the hop test

- Palpation
  - Pain over affected bone with palpation

- Fulcrum Test
  - Pain in fracture site while applying a bending force (e.g., over exam table) to distal extremity while proximal extremity is kept relatively immobilized

- Hop Test
  - Hopping 10 times on affected leg reproduces pain at fracture site

- Tuning Fork Test
  - Vibrating tuning fork over fracture site results in pain at site
Stress Fractures

Imaging
- If a stress fracture is suspected, x-rays should be obtained
  - Takes 2 to 3 weeks for signs of stress fracture (i.e., periosteal reaction, callus formation, fracture line) to show up on x-ray
  - Often stress fractures do not show up on x-rays
- If x-rays are negative & diagnosis is needed to help guide care & return to activity a bone scan or MRI should be obtained
  - Bone scan can stay positive for up to 18 months
    - Clinical progress should not be monitored with a bone scan

Stress Fractures – Prevention

- Distribute loading forces on the bone with cross training & biomechanical adjustments
  - Orthotics, proper shoes, stretches, strengthening, running mechanics
- Consume sufficient calories to maintain adequate energy availability
  - Ensure appropriate intake of calcium and vitamin D.
- A study by Lappe of female Navy recruits showed reductions in stress fractures in those consuming 2000 mg of Calcium & 800 IU vitamin D daily (supplement or diet)
  - Tobacco should be avoided
- Women of child bearing age should try to maintain regular menses by consuming adequate calories & avoiding a negative energy balance

Stress Fractures – Treatment

Nutrition, medication, & biomechanical recommendations

Nutrition
- Optimizing energy availability in diet
- Ensuring adequate calcium & vitamin D intake
- Avoidance of tobacco exposure

Medication
- Acetaminophen PRN
- Avoidance of NSAIDs as they can slow bone healing

Biomechanical
- Offload the affected bone
- Reduce activity to pain-free functioning & pain-free cross-training
- Crutches may be needed to offload the injured area even more than a walking boot/cast or steal shank
- May require NWB
  - Goal = pain-free ambulation during the initial tx

Stress Fractures – Treatment

- Begin a rehabilitation program when tolerated
- Stretch & strengthen supporting structures
- Start a gradual increase in activity when pain free
Stress Fractures
High Risk vs Low Risk

- Because of their propensity for delayed healing & nonunion, certain stress fractures are considered high risk, necessitate prompt treatment, & may ultimately require surgical fixation
  - Femoral Neck
- Low-risk stress fractures have a lower incidence of delayed healing & nonunion
  - Femoral Shaft
  - Sacrum
  - Ilium

Stress Fractures
Low Risk vs High Risk

- Biomechanical forces along the bone with activity are used to classify femur neck stress fractures as either compression-sided or tension-sided
  - When running, the femoral neck compresses inferior medially so the inferior medial aspect of the femoral neck is considered compression sided
- These variable forces on different parts of the bone affect the potential for delayed healing & nonunion

Stress Fractures – Specific Tx

- LOW-RISK STRESS FRACTURE INITIAL TREATMENT
  - Sacrum
    - WBAT 6–12 weeks
  - Ilium
    - WBAT 6–12 weeks
  - Femoral shaft
    - WBAT 6–8 weeks

- HIGH-RISK STRESS FRACTURE INITIAL TREATMENT
  - Femoral neck (compression side)
    - IF STABLE AND NONDISPLACED
      - NWB 6–8 weeks → PWB → FWB over next 6–8 weeks
  - Femoral Neck (Tension Sided)
    - NWB & Orthopaedic Surgical Referral
Femoral Neck Compression Sided Stress Fracture

Tendinopathy

- Tendinopathies
  - Tendonitis
  - Tendinosis
- Tendinitis
  - Painful overuse tendon conditions
  - Inflammation is present
- Tendinosis
  - Most common pathology in chronic painful tendons
  - Occurs after repetitive injuries to a tendon that results in intertendinous scarring, disorganization of tendon fibers & degeneration.
  - NO inflammatory component
- Bottom Line
  - Early on in a tendon injury, there is inflammation resulting in tendinitis, but after about 6 weeks this generally evolves into tendinosis

Normal Tendon

- Type-I collagen bundles packed tightly along the tendon axis with sparse fibroblasts between the collagen rows

Tendinosis

- Collagen fiber disorientation occurs with dense populations of fibroblasts & scattered vascular hyperplasia (angiofibroblastic hyperplasia)
Tendinopathy – Treatment

- Tendonitis
  - STOP the inflammation
  - NSAIDs (oral or topical)
  - Rest
  - Early activity modification
  - PT
  - Treatment may prevent the development of tendinosis

Tendinosis

- Healing is facilitated by creating an inflammatory response
- To create inflammation
  - Eccentric strengthening
  - Deep soft tissue massage with tools (e.g., gua sha, Graston®, or ASTYM®)
  - Nitroglycerin patches (Nitro-Dur)¹
  - MSK US percutaneous needle tenotomy (with or without injection of autologous blood, prolotherapy, or platelet-rich plasma)

¹ = Not FDA Approved

ASTYM Tools

Tendinosis Treatment

- Avoid NSAIDs
  - NSAIDs will prevent an inflammatory response
- Concept of tendinosis diagnosis & treatment can be utilized for tendons throughout hip & pelvis
  - Most commonly applied to the Iliotibial (IT) band, Piriformis, Gluteus Medius, Iliopsoas & Hamstrings
Bursitis

- 13 consistent bursae around the hip region
- May co-exist with other hip pain etiologies such as tendinosis or tendonitis & may be difficult to differentiate

Pelvic Bursae – most common sites

Trochanteric Bursitis

- Description & History
  - Common to see associated with IT Band Syndrome
  - More common in females
  - Common in runners
  - Lateral hip pain, usually from overuse
- Physical
  - TTP directly over bursa on greater trochanter
  - Ober test is positive if they have IT Band Tightness

Ober Test
Trochanteric Bursitis

• Imaging
  – X-rays to evaluate hip & pelvis bones
  • Rule out calcifications
  • Rule out other causes of hip pain
  • Advanced imaging only for refractory cases

Trochanteric Bursitis

• Treatment
  – NSAID’s
    • Oral &/or topical
  • Greater Trochanteric Bursa injection with Anesthetic & Steroid
    – Can use MSK US to improve accuracy
    – Lidocaine 1% without epi & 80 mg Depomedrol with 25 gauge 3.5 inch needle
  • Physical Therapy
    – Stretching of IT band, core strengthening, pelvic stabilization, iontophoresis/phonophoresis
    – Eccentric strengthening of the hip abductors & ASTYM for IT band if concomitant IT Band tendinosis
  – Activity modification
    • Cross training in non-painful activities

Iliopsoas Bursitis

• Description & History
  – Anterior Hip Pain &/or groin pain
  – Largest Bursa in the body
  – Usually associated with iliopsoas tendonitis/tendinosis
  – Overuse injury

Iliopsoas Bursitis – Physical

• Localized TTP at region of iliopsoas bursa
• Pain with resisted active hip flexion
• No significant pain with passive hip flexion & internal rotation ROM
Iliopsoas Bursitis

- Imaging
  - X-rays
    - Important to evaluate the underlying bones of the hip & pelvis
    - AP Pelvis, Cross Table Lateral or Frog Leg Lateral Views
    - Dunn views if concerned for FAI (Femoracetabular Impingement) &/or labral tear
  - MSK US
  - Advanced imaging (MRI, CT Scan, Bone Scan, SPECT Scan) if clinically indicated is used to rule out other etiologies

- Treatment
  - NSAID's
    - Oral &/or topical
  - MSK US Guided Iliopsoas Bursa & Tendon Sheath Injection
  - Physical Therapy
    - Stretching of IT band, core strengthening, pelvic stabilization, & iontophoresis/phonophoresis
    - Eccentric strengthening & ASTYM if concomitant Hip Flexor &/or adductor tendinosis
  - Activity modification
    - Cross training in non-painful activities

Ischial Bursitis

- Description & History
  - Adjacent to hamstring tendon attachment onto the ischial tuberosity
  - Can be difficult to differentiate between hamstring etiology
  - Localized pain to the area

- Physical
  - TTP over ischium
  - Minimal to no pain with stretching of the hamstrings
  - Minimal to no pain with resisted knee flexion

- Imaging
  - X-rays
    - Important to evaluate the underlying bones of the hip & pelvis
    - AP Pelvis, Cross Table Lateral or Frog Leg Lateral Views
    - MSK US
  - Advanced imaging (MRI, CT Scan, Bone Scan, SPECT Scan) if clinically indicated is used to rule out other etiologies
Ischial Bursitis

- Treatment
  - NSAID's
    - Oral &/or topical
    - MSK US Guided Ischial Bursa Injection
  - Physical Therapy
    - Stretching of Hamstrings, core strengthening, pelvic stabilization, & iontophoresis/phonophoresis
    - Eccentric strengthening & ASTYM for hamstrings if concomitant hamstring tendinosis
  - Activity modification
    - Cross training in non-painful activities

Snapping Hip

- 2 most common causes
  - Snapping IT Band
  - Snapping Iliopsoas Tendon

Snapping IT Band Tendon

- Description & History
  - Snapping may occur after injury or trauma but most commonly develops without injury
  - Snapping occurs when the tensor fascia lata & gluteus maximus flip across the greater trochanter
  - Patients describe a snap & +/- feeling of instability
  - Snapping is not always painful
- Physical
  - Have patient re-create the snapping
  - Lateral position with affected hip up, passively extend & hip to try & reproduce the snapping
  - Ober test for IT band tightness

Snapping IT Band Tendon

- Imaging
  - Used to rule out other causes of hip pain if clinically indicated
  - Start with X-rays if suspected bone involvement or if pain has been present for extended amount of time (~4 weeks)
    - MSK US
    - Advanced imaging (MRI, CT Scan, Bone Scan, SPECT Scan)
Snapping IT Band Tendon

- **Treatment**
  - Physical Therapy
    - Stretching of IT band, core strengthening, pelvic stabilization, eccentric strengthening of the hip abductors, Iontophoresis/phonophoresis
    - ASTYM for IT Band
    - Soft tissue release techniques of IT Band
      - ART, IT band release, myofascial release
  - NSAID's
  - Greater Trochanteric Bursa Injection
  - Activity modification
- **Refractory cases – other txs to consider**
  - Percutaneous needle tenotomy +/- ABI of IT Band
  - Surgical release of IT band

Snapping Iliopsoas Tendon

- **Description & History**
  - Usually insidious onset
  - Can be after injury or trauma
  - Snapping occurs as the tendon flips across the anterior femoral head & capsule & pectineal eminence
- **Physical**
  - Re-create snapping
    - Supine position
    - Hip initially placed in flexion, abduction, & external rotation & then moved into extension with internal rotation
- **Imaging**
  - Used to rule out other causes of hip pain if clinically indicated
  - Start with X-rays if suspected bone involvement or if pain has been present for extended amount of time (~4 weeks)
  - MSK US
  - Advanced imaging (MRI, CT Scan, Bone Scan, SPECT Scan)
Snapping Iliopsoas Tendon

- **Treatment**
  - Physical Therapy
    - Main treatment
    - Stretching of iliopsoas, core strengthening, pelvic stabilization, eccentric strengthening of the hip flexors & adductors, iontophoresis/phonophoresis
    - ASTYM for iliopsoas tendon
    - Soft tissue release techniques of iliopsoas tendon
      - ART, iliopsoas tendon release, myofascial release
  - NSAID's
  - MSK US Guided Iliopsoas Tendon sheath & bursa injection
  - Activity modification
    - Cross training in non-painful activities
- **Refractory cases – other txs to consider**
  - Percutaneous needle tenotomy +/- ABI of Iliopsoas Tendon
  - Surgical release of Iliopsoas tendon

References


Questions?

Thank You