The Conundrum of Hip Pain – An Approach and Review

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What are we covering?

- Femoroacetabular impingement
- Snapping hip
- GT pain syndrome
- Psoas tendonitis/flexor tendinitis
- Athletic pubalgia
- Osteitis pubis
- SI joint dysfunction
- Proximal hamstring injury
- AVN
- Piriformis syndrome
- Hip pointers

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Why cover it?

- It's complicated!
- Patients with intra-articular hip pathology see an average of three clinicians before establishing an accurate diagnosis
- Poor evidence, overlapping syndromes, unclear etiologies, difficulty with examination

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A quick caveat

- I’m not a surgeon
- will focus on anatomy, Dx/DDx, conceptualization of the problem, and initial conservative management
- Will stay largely clinical with a bit of imaging - trying to prep you for identifying pathology

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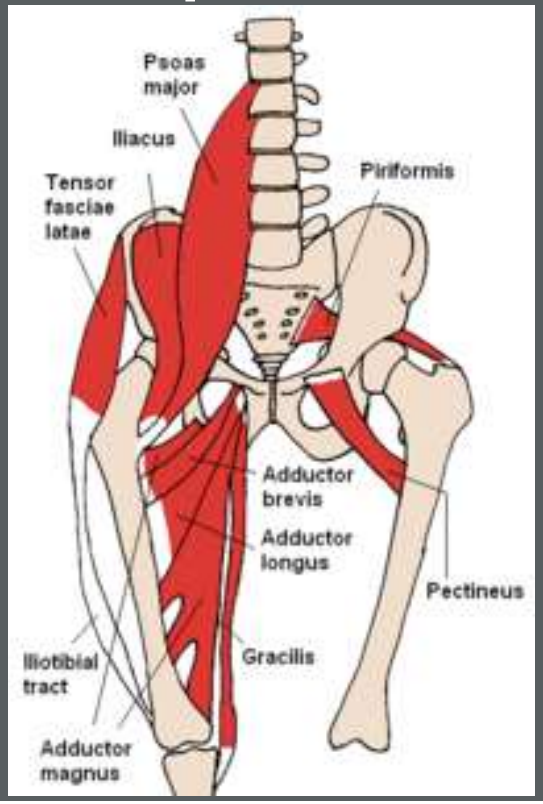
Disclosures

- None

How I think about the hip:

- **Anterior**
- Lateral
- Posterior
- Mimics
  - (will discuss tangentially)



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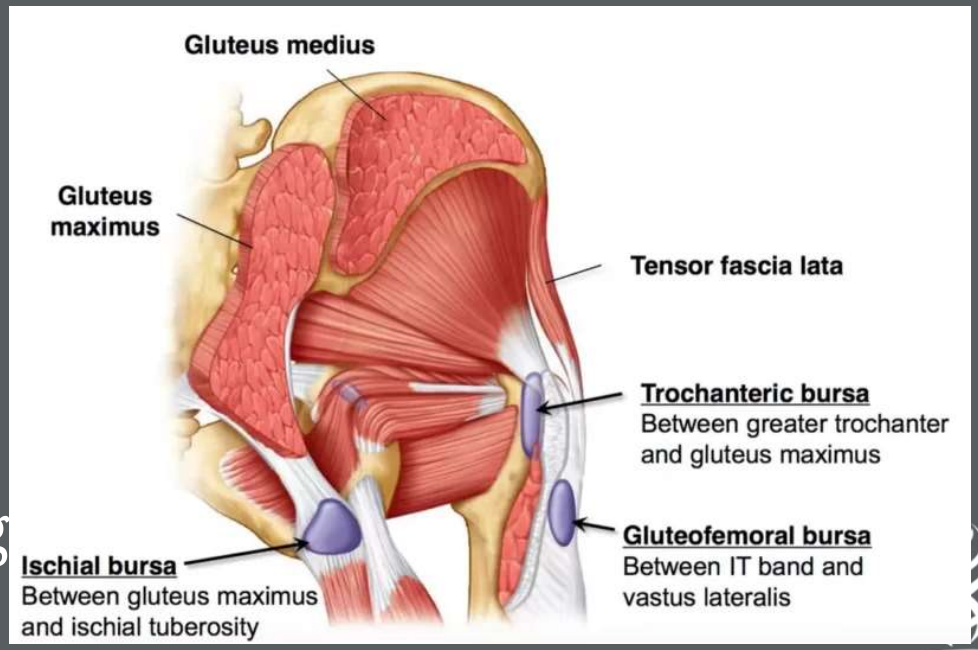

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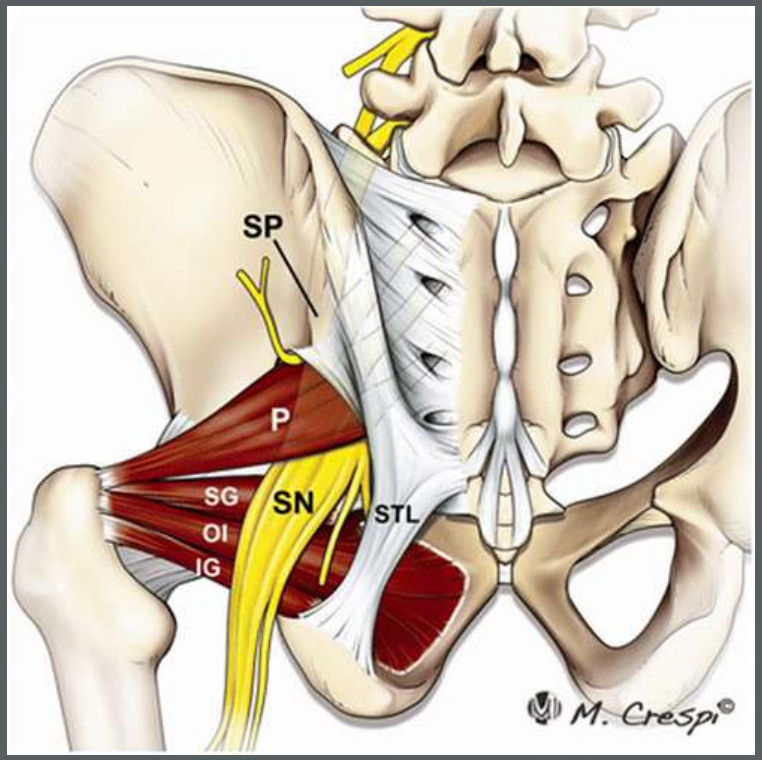

Case #1

- 31yoF former softball player, now active outdoors rec - hiking, trail running, skiing
- Had anterior hip pain/groin pain for past 4-5 years, particularly after hard activity and long backpacking trips, but self resolved
- More recently increased without clear injury, presents with C sign pain and some clicking/catching sensation with walking
- No radiation
- FADIR positive, scour modestly positive, log roll negative, some limitation in IR. Noted preference for external rotation with flexion. Unable to reproduce hip snap with flexion/ER/neutral

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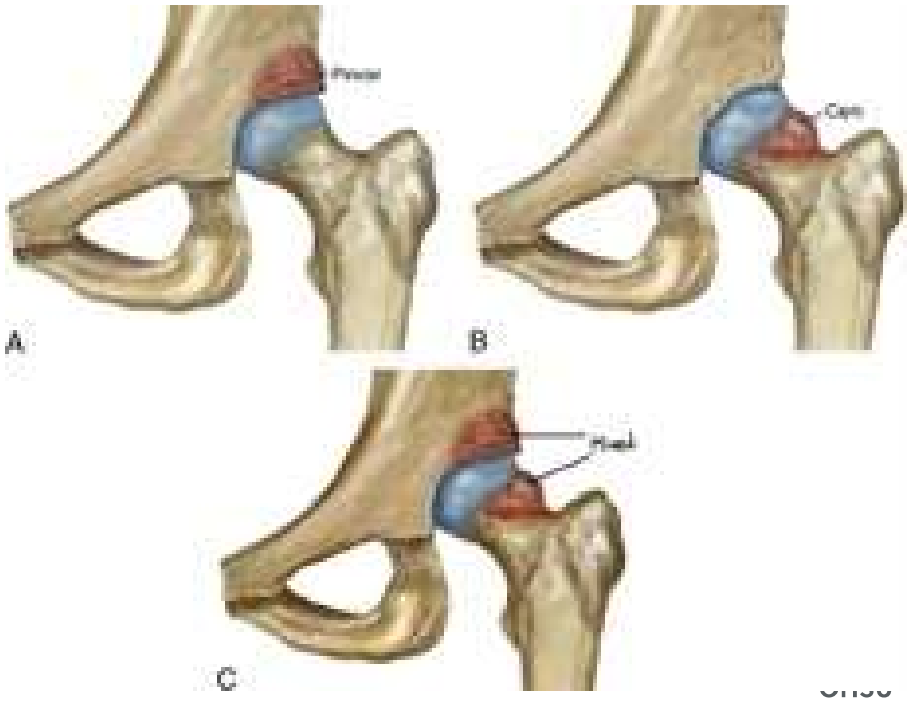
Case #1

DDx?

Femoroacetabular Impingement

- **Symptomatic contact between femoral head/prox femur and acetabulum**
- Cam
- Pincer
- Mixed



FAI - Presentation

- Usually atraumatic onset, episodic chronic pain/dysfunction; may have abrupt worsening
- **May have clicking, catching, locking**
- FADIR, internal rotation restriction, obligate ER with hip flexion; *no specific exam*
- Cam 37% and 3x more likely in athletes vs genpop, pincer 67% more common women, mixed (more common than cam or pincer in isolation)

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FAI - imaging

- Imaging: start XR with AP/modifi
  and specific than) frog leg; M
  investigation of morphology
- “pistol grip”
- alpha angle - normal <42, pa
- Lateral center edge angle (L
- crossover sign

FAI - Management

- PT up to 24mo pain and fn improvement
  - core, proprioception, dynamic stability hip, neuromuscular imbalance
  - Should be supervised, not home only
- CSI - no good evidence, but can be helpful
  - No prediction for response to surgical intervention
- Anesthetic - a nonresponse generally means poor response to surgery, but a bit mixed

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FAI – Surgical intervention

- Poorer return to sport if chondral damage, high alpha angle, mental health concern, high BMI, >2y symptoms, limp, significant hip dysplasia, increasing age, litigation, opioid use, female
- **Poorest with OA present!** <2mm joint space - bad
  - failure rate w/ OA 45.2% vs 13.2% FAI alone
- Surgical? arthroscopy
  - FASHIoN RCT PRO best with cam
  - FAIT RCT symptoms, fn better after 8mo
  - Relatively small studies
  - 87.7% return to sport

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But what about the popping/catching?

Snapping Hip “Coxa Saltans”

- Can be painful or painless, could be w/ or w/o trauma
- Incidental in 5-10%
- Internal snapping - iliopsoas vs joint
  - flex, IR → abduct and ER then extend
  - Thomas, Stinchfield (resisted hip flexion in supine)

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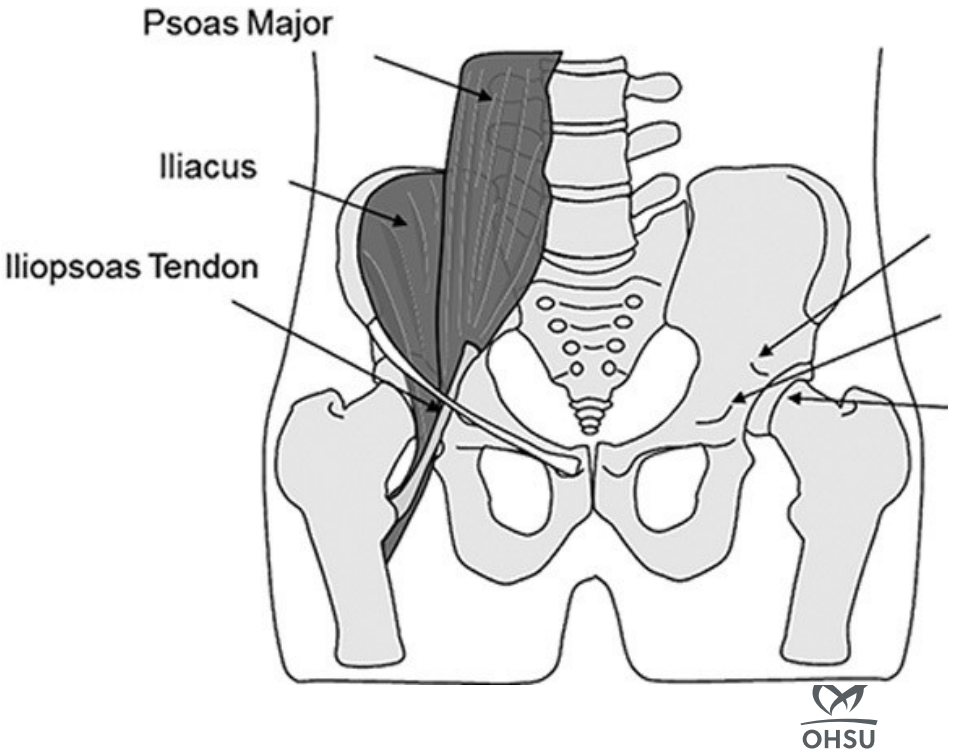
Snapping hip

- Iliopsoas snaps lateral to medial
- Most commonly snaps on femoral head or iliopectineal prominence



Snapping Hip

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- also common in obese patients

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Snapping Hip - Imaging

- XR to rule out bony pathology - like FAI, OA
- Ultrasound could be used to visualize snap
- MRI if concern for intraarticular

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Snapping Hip - Treatment

- Rest, stretch, PT, anti-inflammatories (consider injection)
- Intraarticular or iliopsoas bursa injections can be diagnostic too!
- Consider prolotherapy or PRP, but no good evidence
- If not successful (rare), could consider IT band release, endoscopic glute max release for external; fractional iliopsoas lengthening, iliopsoas release

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Case

- 21yoM occer player ll
- Notes ter games several month though hard t playing.
- Hip ex ular provo oted.

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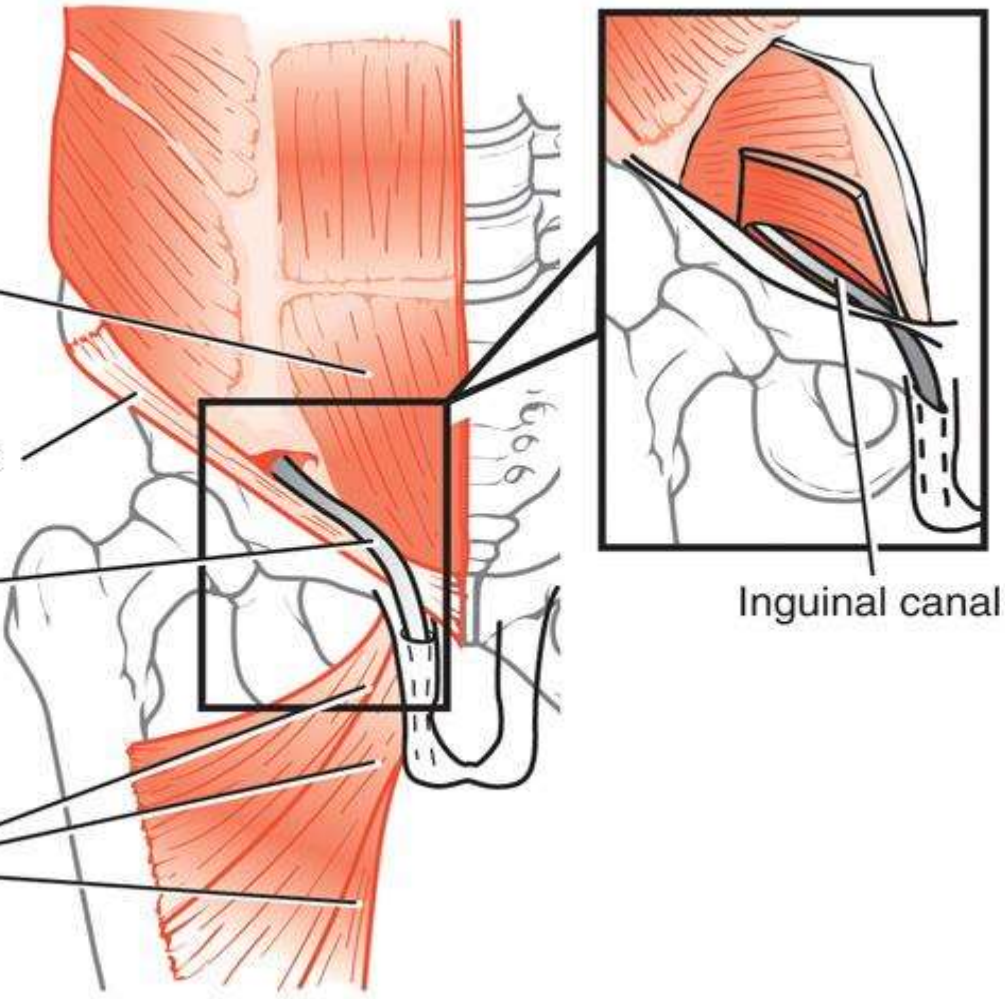
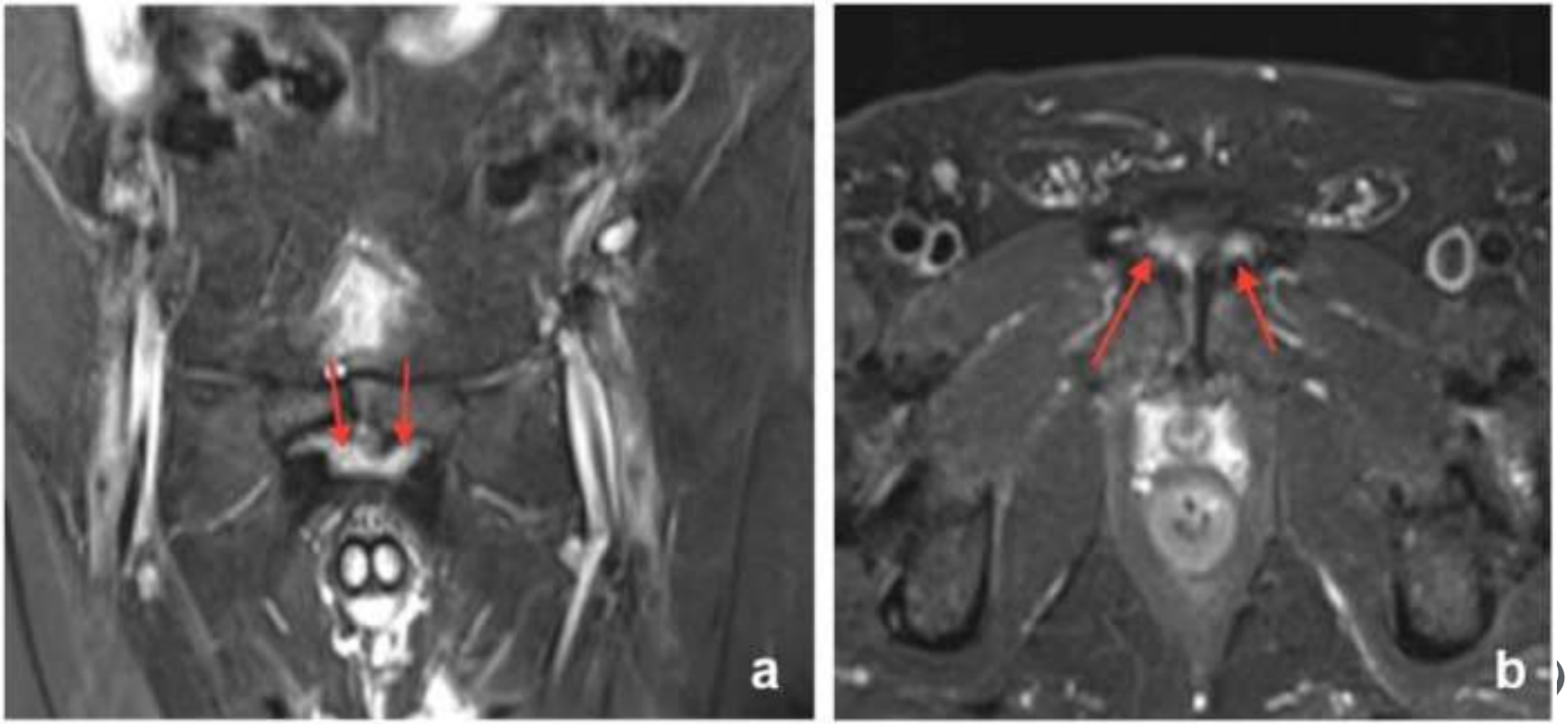
- Abdominals
- Inguinal ligament
- Inguinal canal
- Adductors



Athletic Pubalgia - Imaging



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Athletic Pubalgia - Imaging

- Maybe ultrasound? could eval posterior inguinal wall
- Intraarticular anesthetic injection to rule OUT intraarticular source
- US guided adductor and psoas injection to rule IN these diagnoses

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Athletic Pubalgia - Treatment

- NSAIDs, heat or ice, massage
- 6-8wk rest
- PT w/ progressive resistance adductor/core strengthening + stretching and sport specific tasks
- Gradual return to full activity after 10-12 weeks AND when pain free

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Athletic Pubalgia - Treatment

- Wide variety of attempted surgical intervention - open repair of muscle/tendon/fascia, mesh reinforcement, mini-open vs laproscopic, pelvic floor, adductor release
  - All are variations of standard hernia repair
  - IF suspected FAI contributing as well may do staged surgical intervention in competitive athlete to reduce downtime

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Case

- 21yoM ccer player l
- Notes er games several month though hard t laying.
- Hip ex lar provo ted.

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Osteitis Pubis

- High stress/insult to pubic symphysis
- High stress force transfer to pelvis - kicking, rapid acceleration/deceleration
  - Sometimes seen w/ child birth, MVA
- Pain at pubic symphysis w/ tenderness on direct palpation

Osteitis Pubis - Imaging

- XR may show osteolysis w/ irregularity, sclerosis, widening BUT very often present in asymptomatic patients
  - Clinical diagnosis primarily
  - Bone scan maybe helpful
  - MRI only to rule out other causes (such as athletic pubalgia)

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Osteitis Pubis - Treatment

- Treat w/ conservative (rest, ice, NSAIDs, PT @ rotators, flexors, adductors)
- May take up to 6mo to resolve/return to activity
- CSI can be considered if recalcitrant, but long term results maybe 50% resolution
- Surgery RARELY indicated, only if failed all treatment
  - curettage vs wedge resection +/- plate arthrodesis

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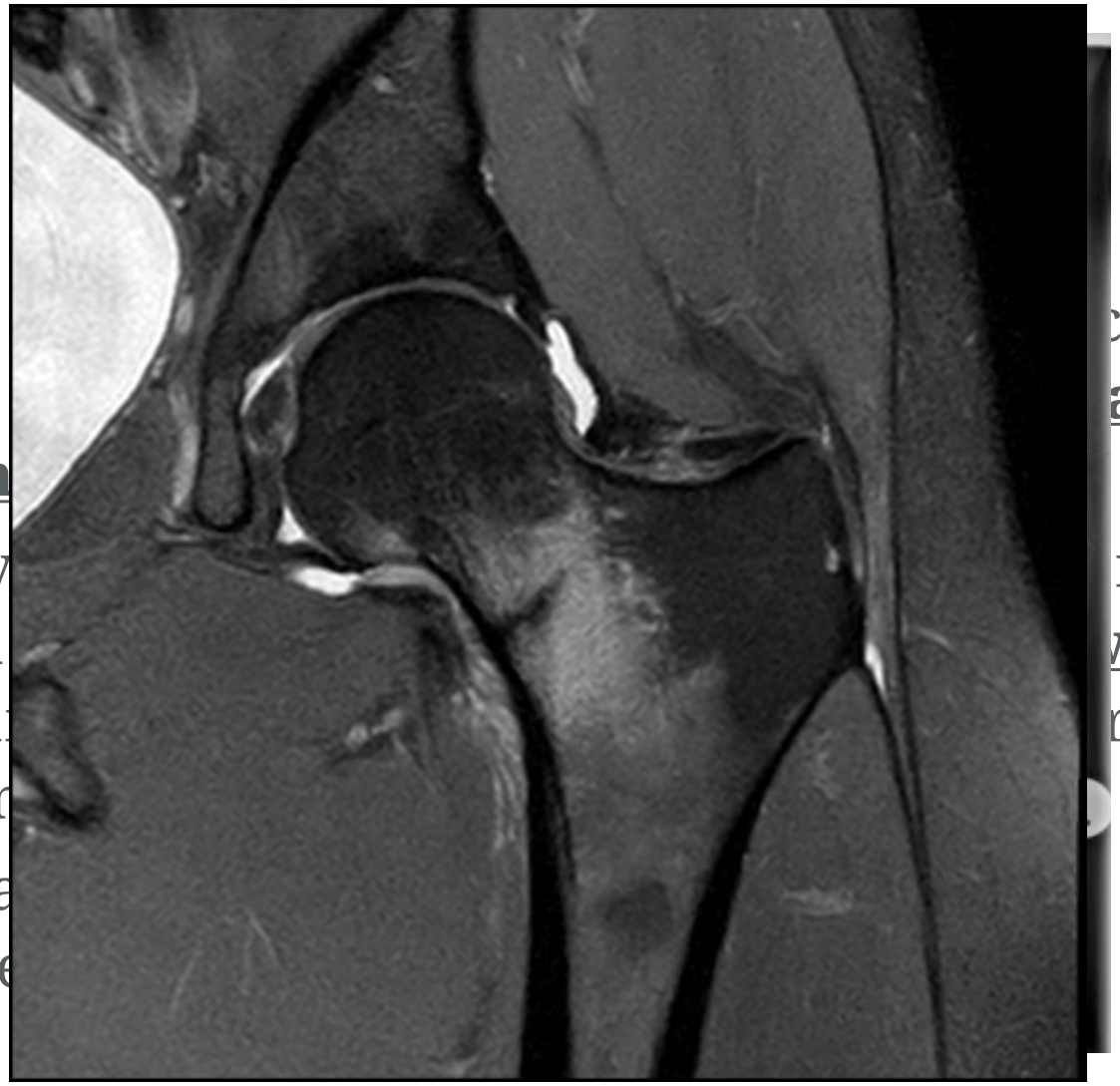

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Femoral Neck Stress Fracture

- Gradual onset thigh/groin pain, **improves with rest**
- History of sudden change in training regimen
- Common in long distance runners, military recruits
- 3-5% of sports related stress fractures
- Increased association with FAI, particularly pincer - likely due to altered loading
- PE nonspecific, though may have antalgic gait or positive hip provocation maneuvers or pain with ROM

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Femoral Neck Stress Fracture

Initial workup:

- XR hip endosteal callous formation, sclerotic line traversing trabeculae, radiolucent fracture line; “gray cortex sign”
- **XR negative up to 90% initial, 50% repeat at 4-6wk**
- Bone scan has classically been used for evaluation
- MRI superior
  - Particularly because it can also eval other pathology well
  - Picks up stress reactions AND fractures
  - Decreased T1 signal in a line perpendicular to cortex w/ corresponding T2 and STIR high intensity in the area

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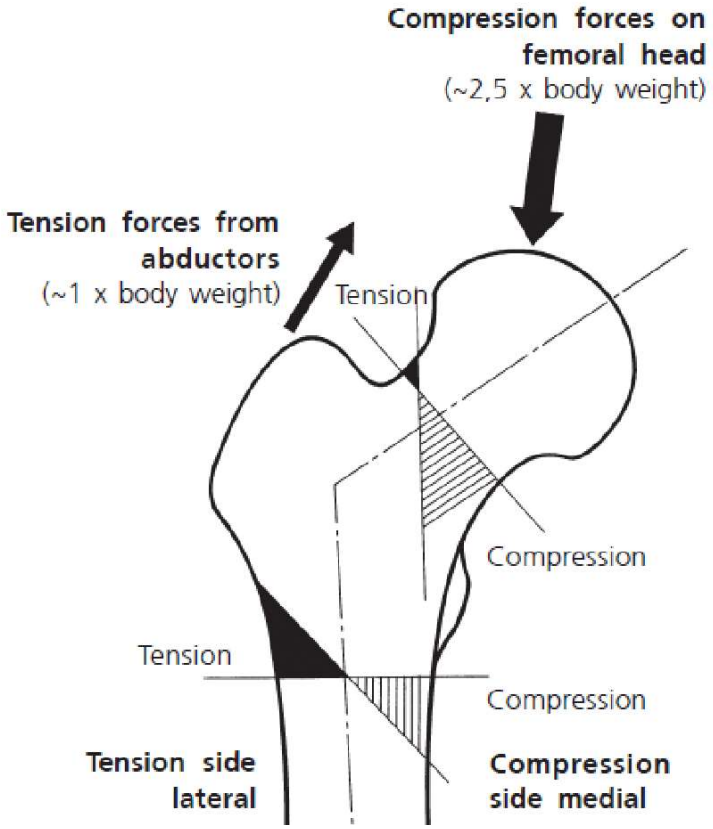
Femoral Neck Stress Fracture

- Stress fracture classification:
  - Type I: compression sided
  - Type II: tension sided
  - Type III: displaced



Femoral Neck Stress Fracture

- Rohena Quinquilla
  - Low grade I endosteal edema </= 6mm
  - Low grade II endosteal edema >6mm no fracture line
  - High grade III macroscopic fracture <50% neck width
  - High grade IV >50% neck width
- Steele
  - compression sided:
    - No fracture
    - Fracture <50% w/o effusion
    - Fracture <50% w/ effusion
    - Fracture >50% +/- effusion
  - tension sided

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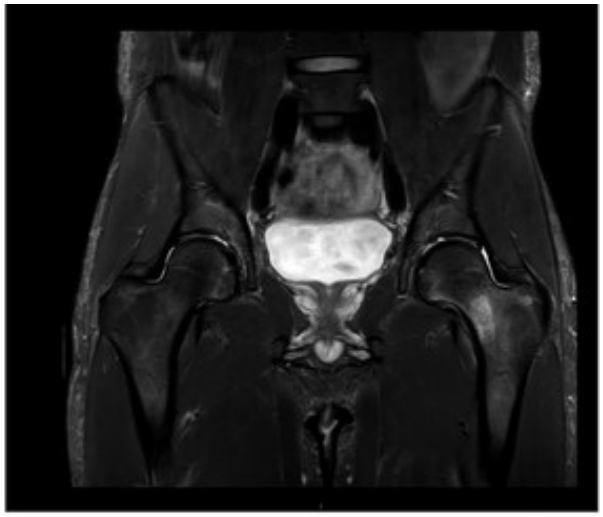

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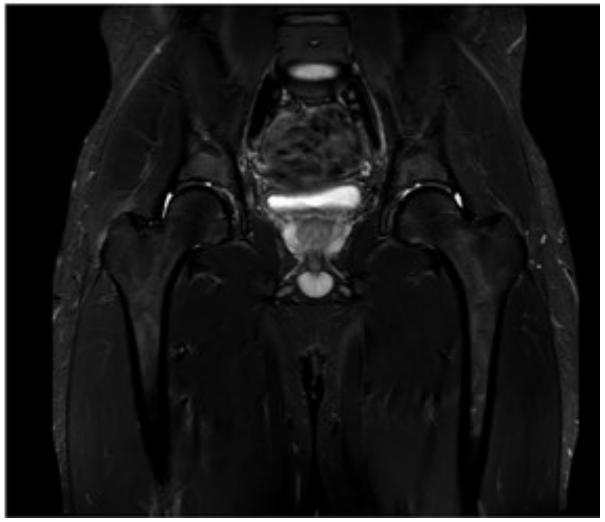

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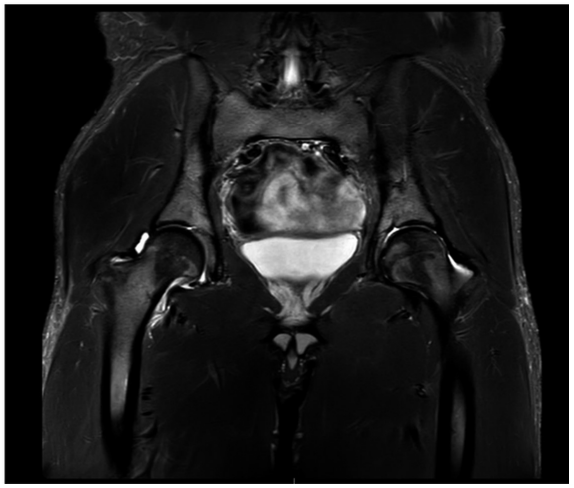

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Femoral Neck Stress Fracture

- Tx goals to arrest progression, prevent completion (which can lead to nonunion, osteonecrosis)
  - stress injury only OR fracture line <50% nonop 6wk NWB or TTWB, then gradual return 25% weight per week, then walk-to-run program unrestricted at 4mo
    - Repeat MRI 6wk
  - if >50% OR if effusion present, consider operative management
  - Tension sided? probably surgical, though MRI is important, stress reaction only can be managed conservatively
  - Complete nondisplaced urgent fixation
  - Displaced emergent

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Case #3

- 35yoM, histor presents with atraumatic on
- Anterior in lo last 3-4 months rapidly. Now tion, has significant pai ring
- XR unremarka ead “some mild degenerative j ”

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Avascular Necrosis

- Local ischemia 2/2 compromised blood flow
- Alcohol and steroid induced compartment syndrome type pathology 2/2 mesenchymal stem cell → adipose differentiation compressing venous sinusoids
- Multifactorial, ?genetic component
- Once reparative zone forms, lesion is irreversible; stress fracture -> collapse -> arthritic changes

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Avascular Necrosis - RFs

- Alcohol
- Steroid use
- Smoking
- SLE
- Pelvic radiation
- Chemo for leukemia, myelogenous disease
- Sickle cell
- Gaucher's
- HIV/antiretroviral treatment
- Pancreatitis

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Avascular Necrosis

- ent of

ARCO stage		Image findings
I		X-ray: normal
		MRI: low-signal band on T1-weighted MRI
II		X-ray: abnormal
		MRI: abnormal
III		Subchondral fracture on X-ray or CT
	IIIA (early)	Femoral head depression ≤ 2 mm
	IIIB (late)	Femoral head depression > 2 mm
IV		X-ray: osteoarthritis

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Avascular Necrosis

- Staging?
- No clear agreement for validity
- Larger lesions -> more likely to collapse

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Avascular Necrosis – Surgical

- osteotomy
- vascularized bone graft
- resurfacing arthroplasty
- THA

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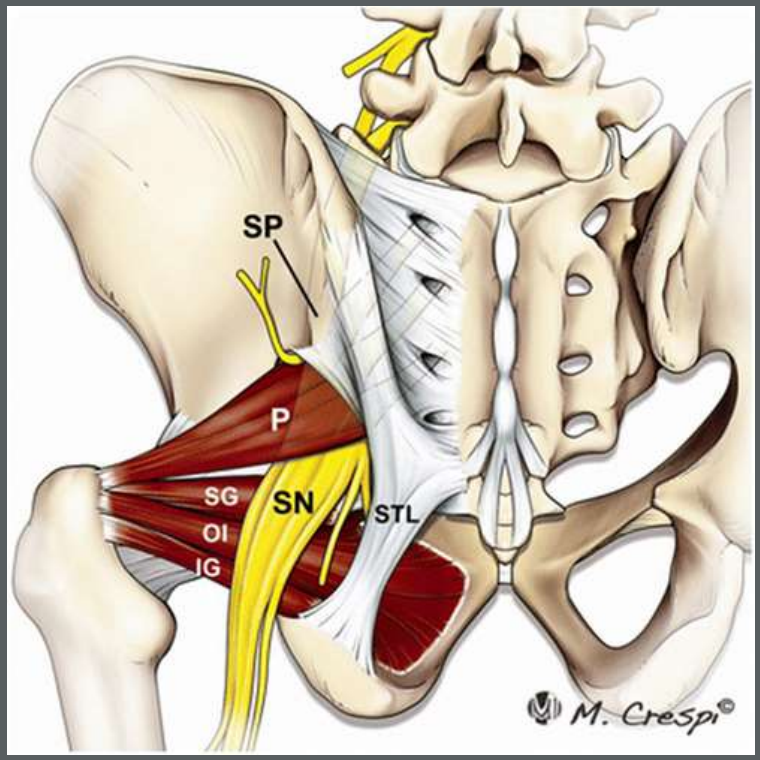

Case #4

- 63yoF, obese w/ minimal activity, who presents with chronic (>1y) history of low back pain with insidious onset.
- Pain is mostly right sided, paraspinal, with radiation into the buttocks and lateral thigh (but not to knee) with activity.
- Mostly aching, sometimes sharp. Improves a bit with rest.

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SI Joint “Dysfunction”

- **<u>Abnormal motion</u>**
- Hypomobile
  - Sedentary
  - Injury
- Hypermobile
  - Pregnancy
  - hEDS
- Degenerative
- Secondary
  - Lumbar fusion; increased SPECT/CT after fusion +/- lami
  - Scoliosis
  - Leg length discrepancy

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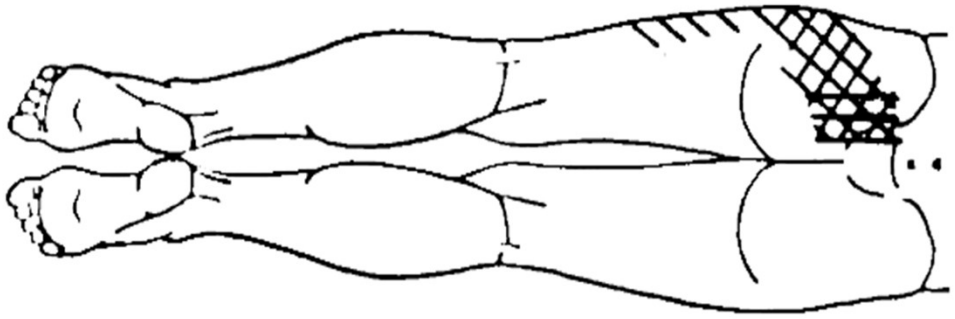
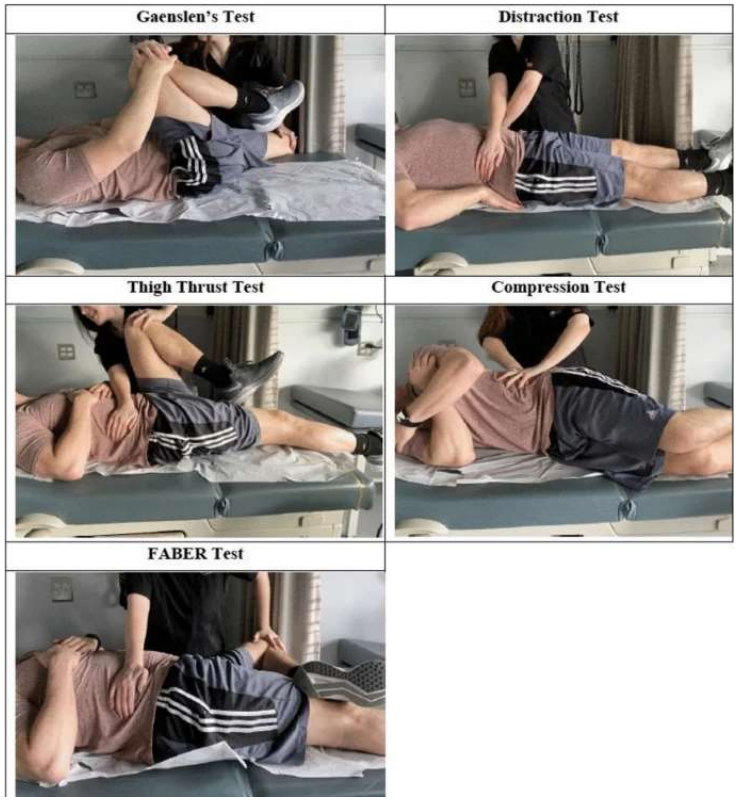
Presentation

- LBP below L5; unilateral vs bilateral
- Worst standing from seated, running, climbing laying on ipsilateral side
- Often with inciting event*
  - Rotational or axial strain
- Athletes: no inciting -> due to microtrauma
- Inflammatory -> systemic sx, AM stiffness, improves with movement
- Fortin et al w/ 10 normals



Physical Examination

- In total, at least 13 described
- FABER
- Posterior shear/provocation
- Gaenslen
- Shear/compression
- Distraction
- Fortin Finger



Physical Examination

- None particularly good in isolation
- Combination?
  - Broadhurst et al: FABER, posterior shear, REAB
  - Individually not useful
  - All 3 pos yields 77-87% sensitivity
- Dreyfuss et al
  - 20% asymptomatic had positivity on at least 1 of 3 testing
- Does it matter?
  - Gold standard is injection
  - For research, x2
- Large, poorly mobile joints without clear way to stress

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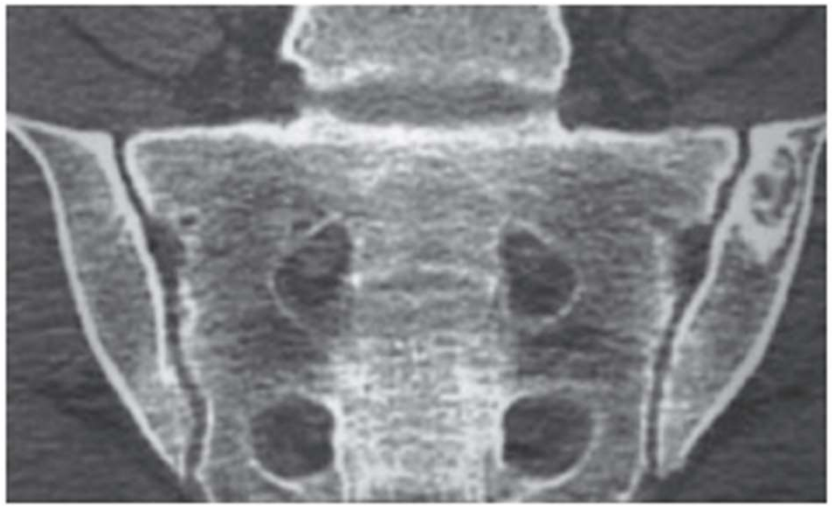
Imaging

- XR
  - Useful to eval for frank erosions, fractures
  - Included with lumbosacral XR
  - Good place to start

Imaging

- CT
  - Great at identifying degenerative change/bony changes
  - Negative in 42.5% symptomatic patients
  - Findings present 31% of normal
  - SN 57.5%, SP 69%



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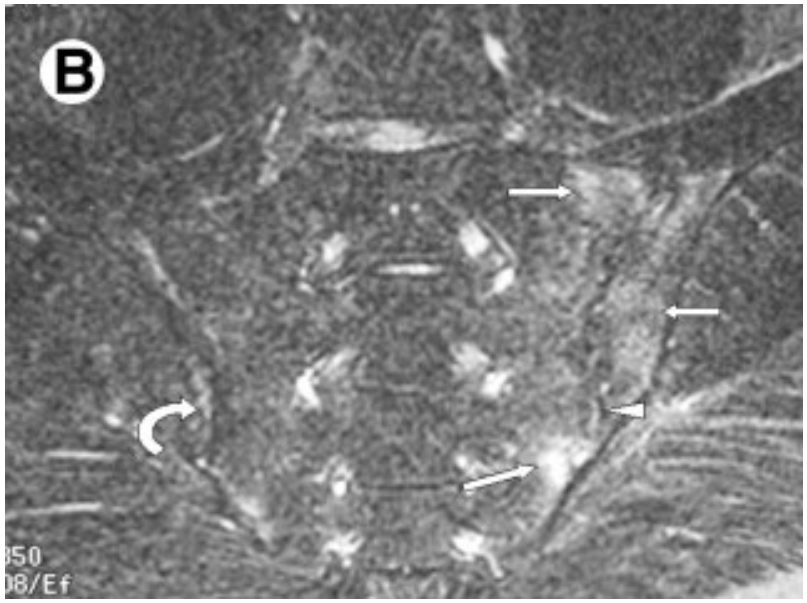
Imaging

- MRI
  - Good to eval SpA
  - STIR preferable -> early edema identification
  - Does not predict response to injection
  - Can eval lumbar spine, radic



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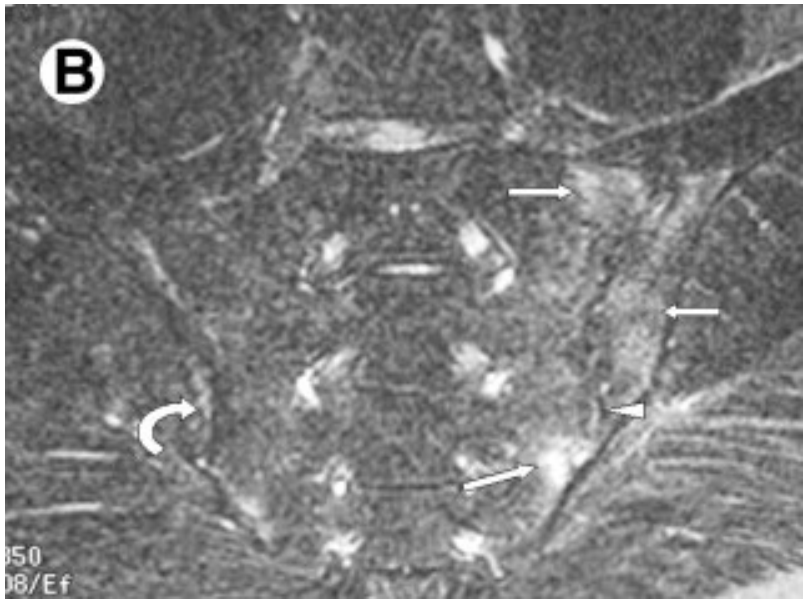
Imaging

- Bone scan?
  - Not great, sensitivity 12.9-46.1%
- SPECT/CT
  - Can be helpful
  - Can help to rule in/out spondylolysis
  - Can't use post-fixation



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Labs

- Really only indicated if concerned for inflammatory pathology
- 85-95% with AS and 75-85% other SpA are HLA B27 +
- ESR/CRP increased in 30-50% axial SpA
- Typically imaging is more specific
- Make sure you get STIR!

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Treatment

- PT with HEP shows 95% improvement in function
  - No standardized protocol
  - Core, pelvic stabilization
  - Address muscle imbalance, posture, proprioception
- NSAIDs
- Chiro
- Osteopathic
- Acupuncture
- Massage
- CBT
- SI belt

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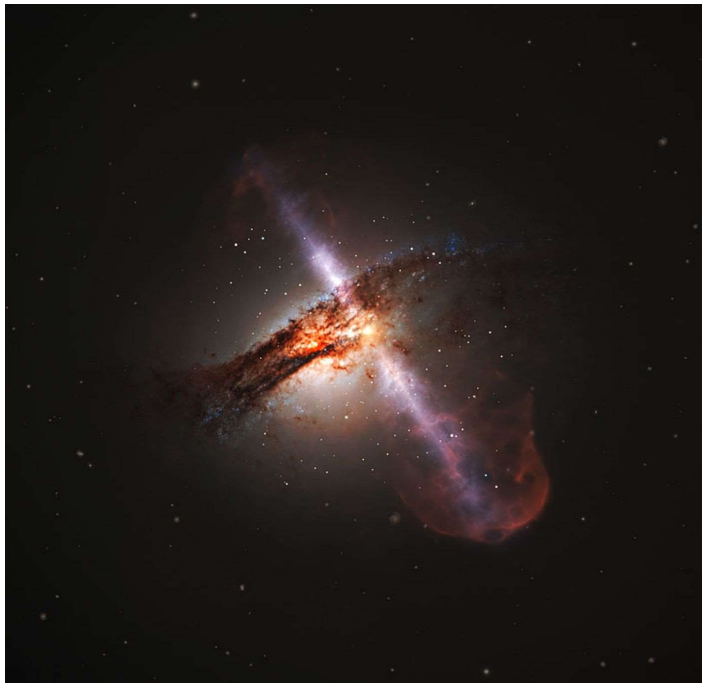
Injections

- Double block is gold standard
- Single block 20% false positive
  - But should consider false negatives
- Limited quality evidence RF
- Limited quality evidence CSI
- PRP? Prolotherapy?



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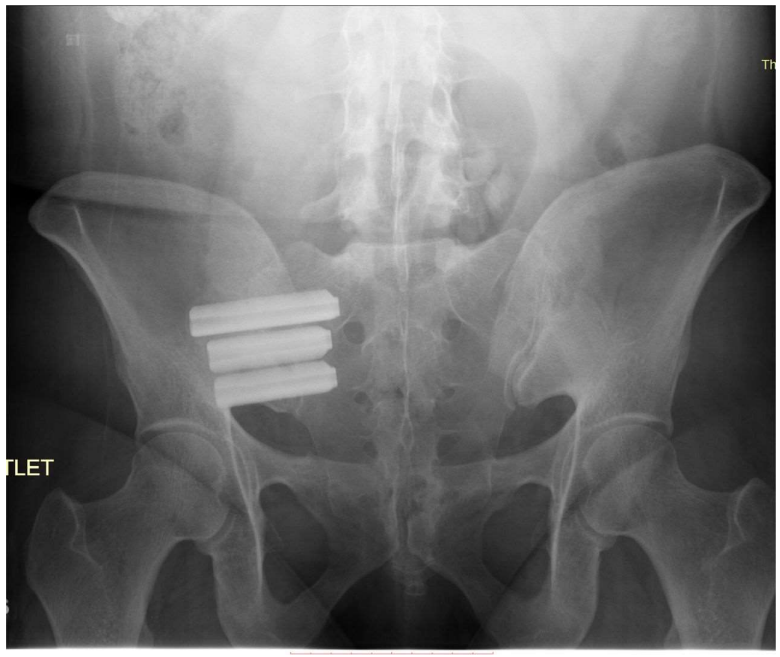
Surgical Fixation

- Only consider if:
  - No other cause
  - Pain dramatically reduced x2 blocks
  - Disabling sx not responsive to exhaustive conservative care



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Case #4 - AGAIN

- **42yoF, w/ modest physical activity,** who presents with chronic (>1y) history of low back pain with insidious onset.
- **Pain is mostly right sided, in the buttocks, with radiation into the posterior thigh, sometimes beyond the knee**
- Mostly aching, sometimes **electric/shooting.** Improves a bit with rest.
- Hip XR normal, lumbar with mild degenerative changes.

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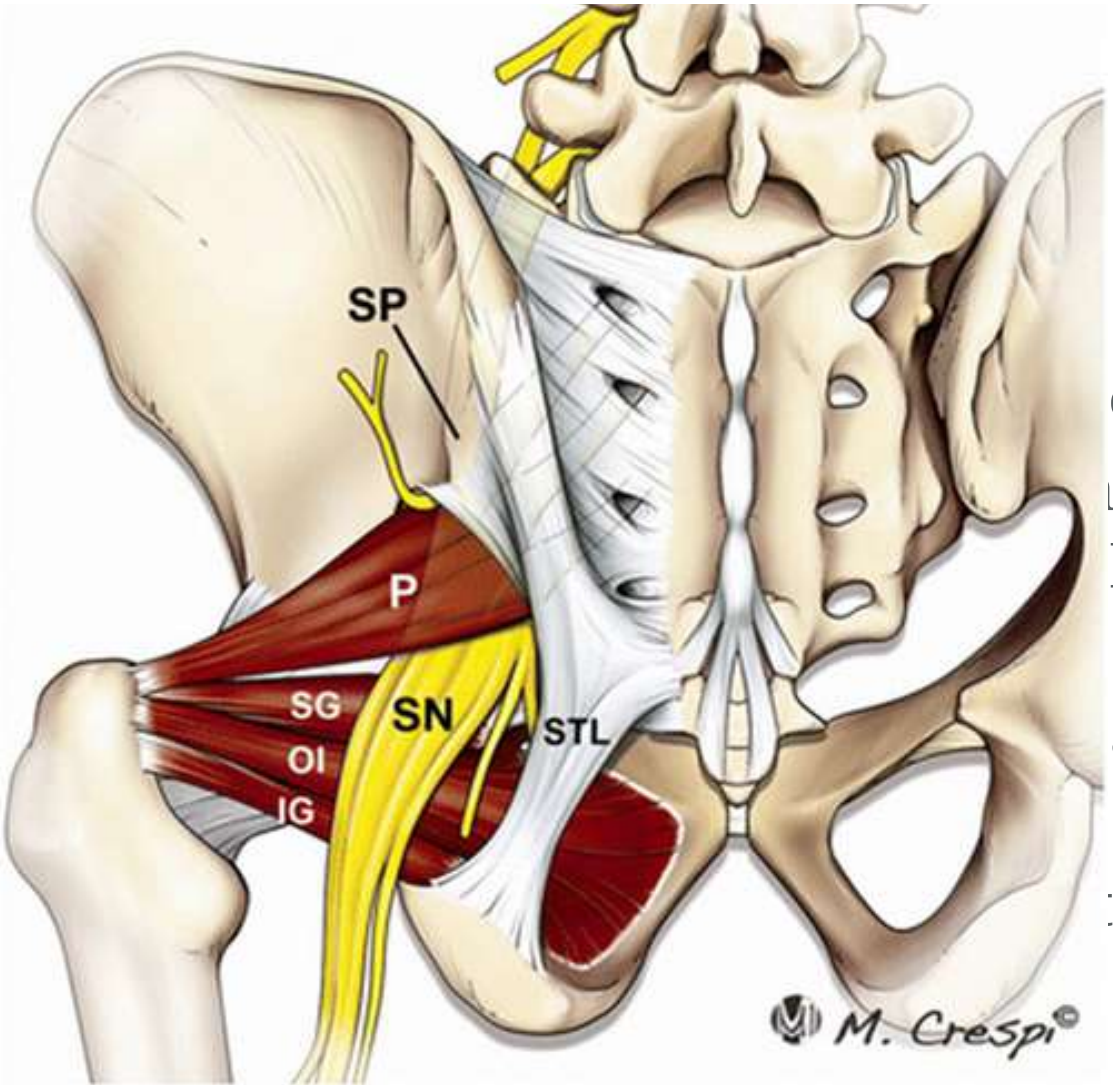

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Deep Gluteal Pain - Presentation

- Trauma to SI or gluteal region
- Pain in area, can extend down leg, can cause difficulty walking
- Worsening with stooping, lifting
  - Relieved with traction on leg
- Painful mass at piriformis
- Gluteal atrophy if chronic

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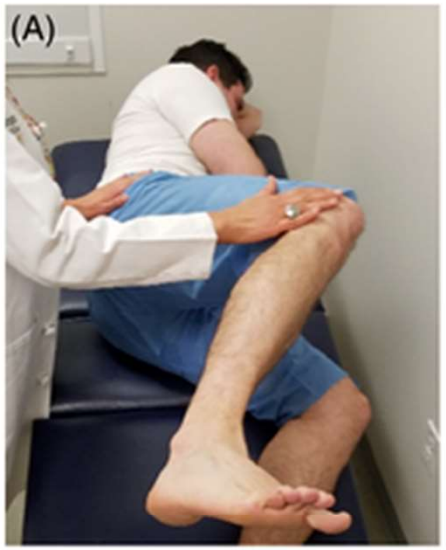

(A) Active piriformis Test

(B) Beatty Test

(C) FAIR Test

(D) PaceTest

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Deep Gluteal Pain - Workup

- EDX?
  - Almost always normal, use to rule out radic
- MRI to exclude other pathology - spine mostly, could consider pelvis
- MR neurography could potentially help down the line
- US guided injection into piriformis therapeutic and diagnostic

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Deep Gluteal Pain - Treatment

- NSAIDs
- Muscle relaxers
- Neuropathic agents
- PT (goal stretching/lengthening piriformis) and work on pelvic stabilizers, hips, spine, core)
- TPI, dry needling
- acupuncture
- Manual pressure
- Massage
- ?botox into piriformis - double blind RCT superior than lido, steroid, saline; good to very good relief in 77%
- Surgical release only if totally refractory but really never indicated and only case studies

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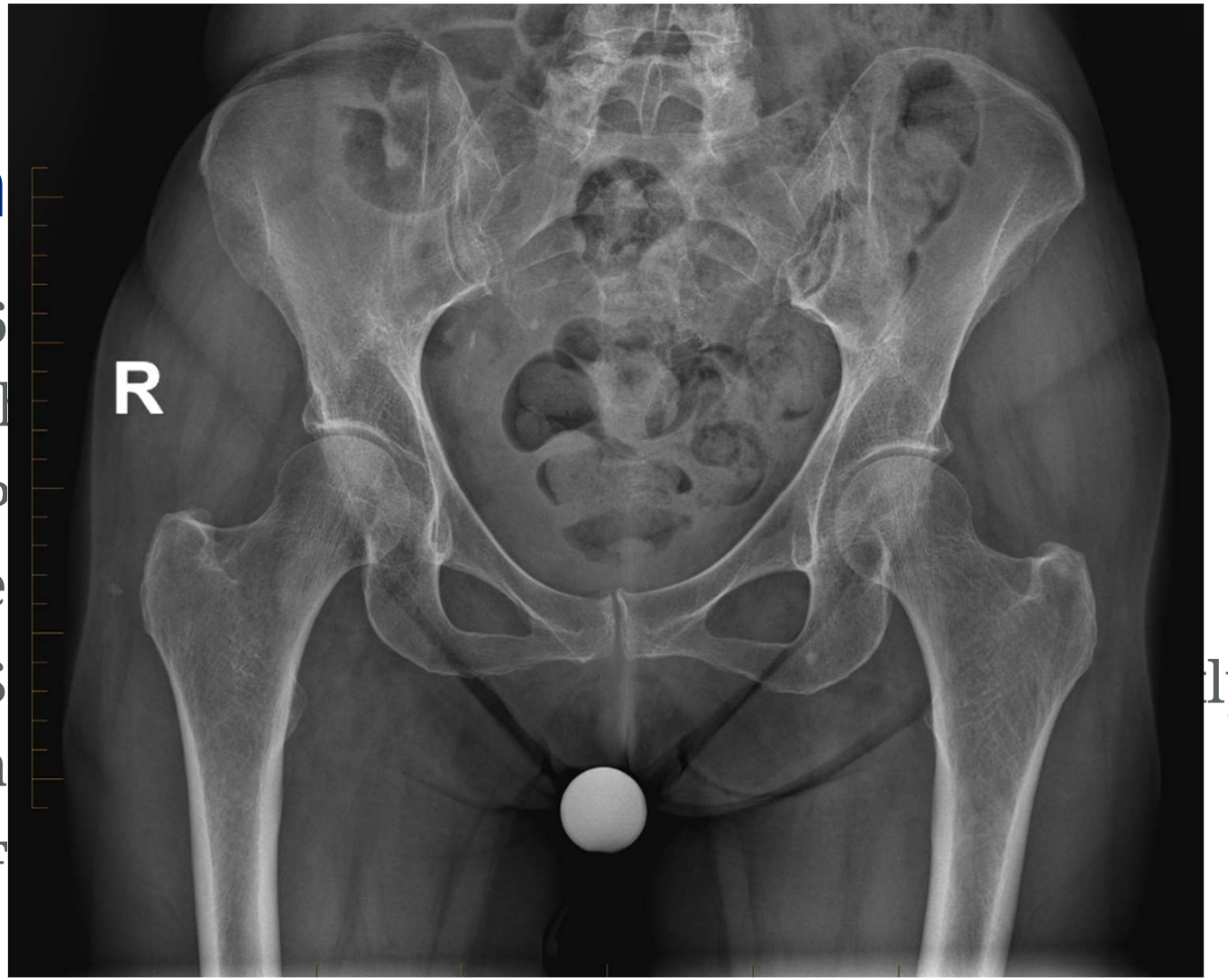

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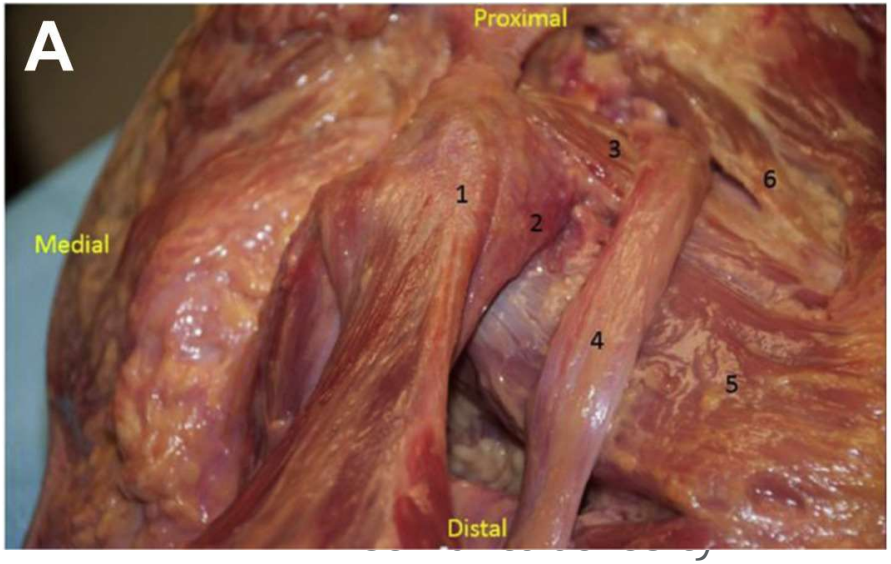
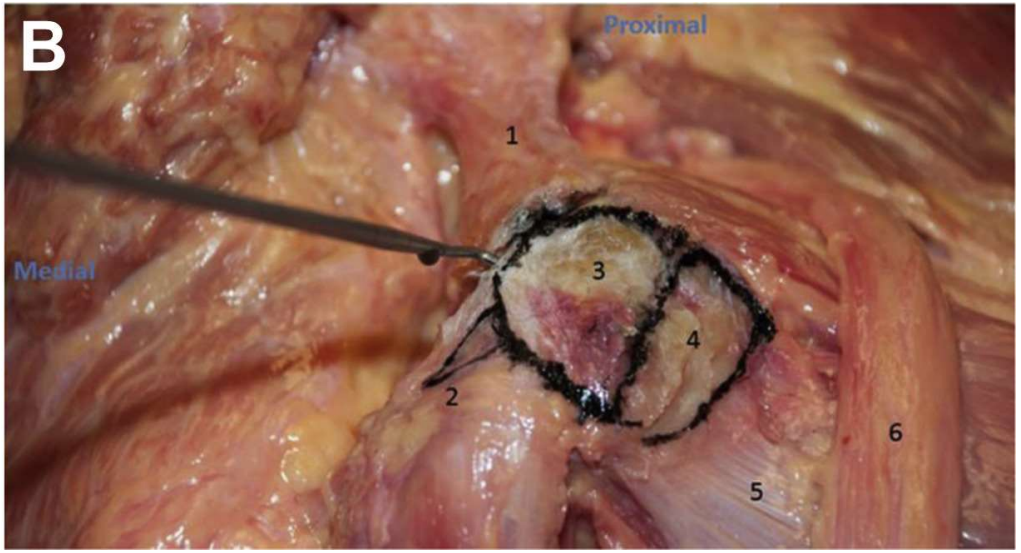
Hamstring Tendinopathy/Tear





- Risk factors for injury:
  - Weakness, reduced flexibility, fatigue, poor core, poor warm up, poor lumbar posture, and prior injury (22-34%)

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Hamstring Tendinopathy/Tear

- Grading:
  - Grade 1: tendinosis (no tearing, little/no loss of function or strength
  - Grade 2: Partial tear w/ damage to myotendinous junction, reduced strength
  - Grade 3: complete tear loss of function, may have palpable gap
- Location:
  - periosteal, bony, or apophyseal avulsion (usually in skeletally immature)
  - Tendinous avulsion
  - Myotendinous junction
  - Midsubstance

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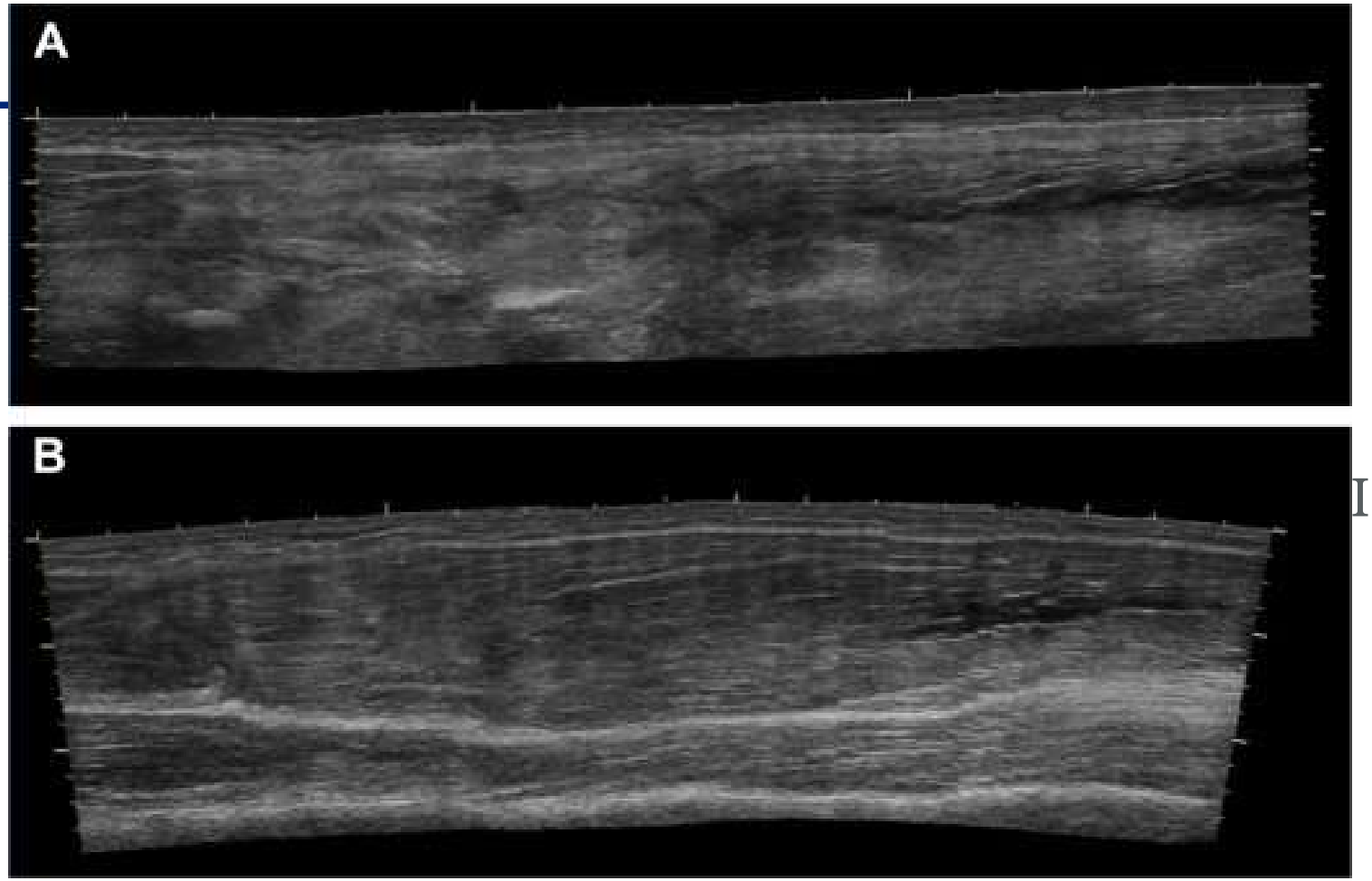
Hamstring Tendinopathy/Tear

- Exam:
  - Palpate!
  - Gait (stiff, avoids hip flexion/knee extension moment)
  - Weakness (check other L5-S1 muscles)
  - Stretch
  - Good neuro exam is key but be careful! SLR will appear +


A
B

Hamstring Tendinopathy/Tear

- Treatment
  - No clear consensus on surgical indication
  - Better indication in more active/higher grade tears; overall better function and satisfaction, same amount of pain
  - Definitely conservative for tendinosis, low-grade partial, muscle strain, etc including single tendon injury with retraction <1-2cm, rupture at myotendinous junction, ANY injury in low-demand patient or w/ significant comorbidities
    - most common deficit is weakness if higher grade tear managed nonop
  - US guided CSI can provide pain relief

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Hamstring Tendinopathy/Tear

Nonoperative mgmt

- RICE
- NSAIDs
- Graduated PT
  - eccentric loading is mainstay
  - lumbar, pelvic work as well

- CSI
- PRP
- Dry needling
- Shock wave

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Hamstring Tendinopathy/Tear

Operative mgmt

- Partial thickness after failure nonop
- 2 tendon injuries with 2+cm retraction
- Complete 3 tendon injuries

- Open primary vs endoscopic primary; augmentation or reconstruction in complete injury w/ delayed intervention
- Generally similar early and late intervention outcomes
- Open repair → 23.17% complication rate, return to sport 79.75%

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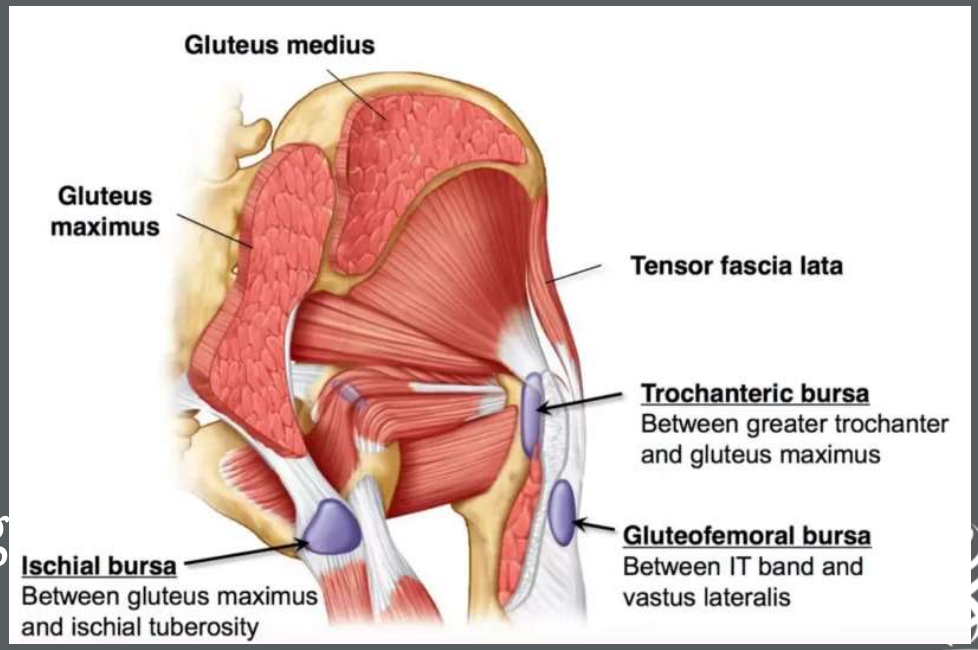
How I think about the hip:

- Anterior
- **Lateral**
- Posterior
- Mimics
  - (will discuss tang



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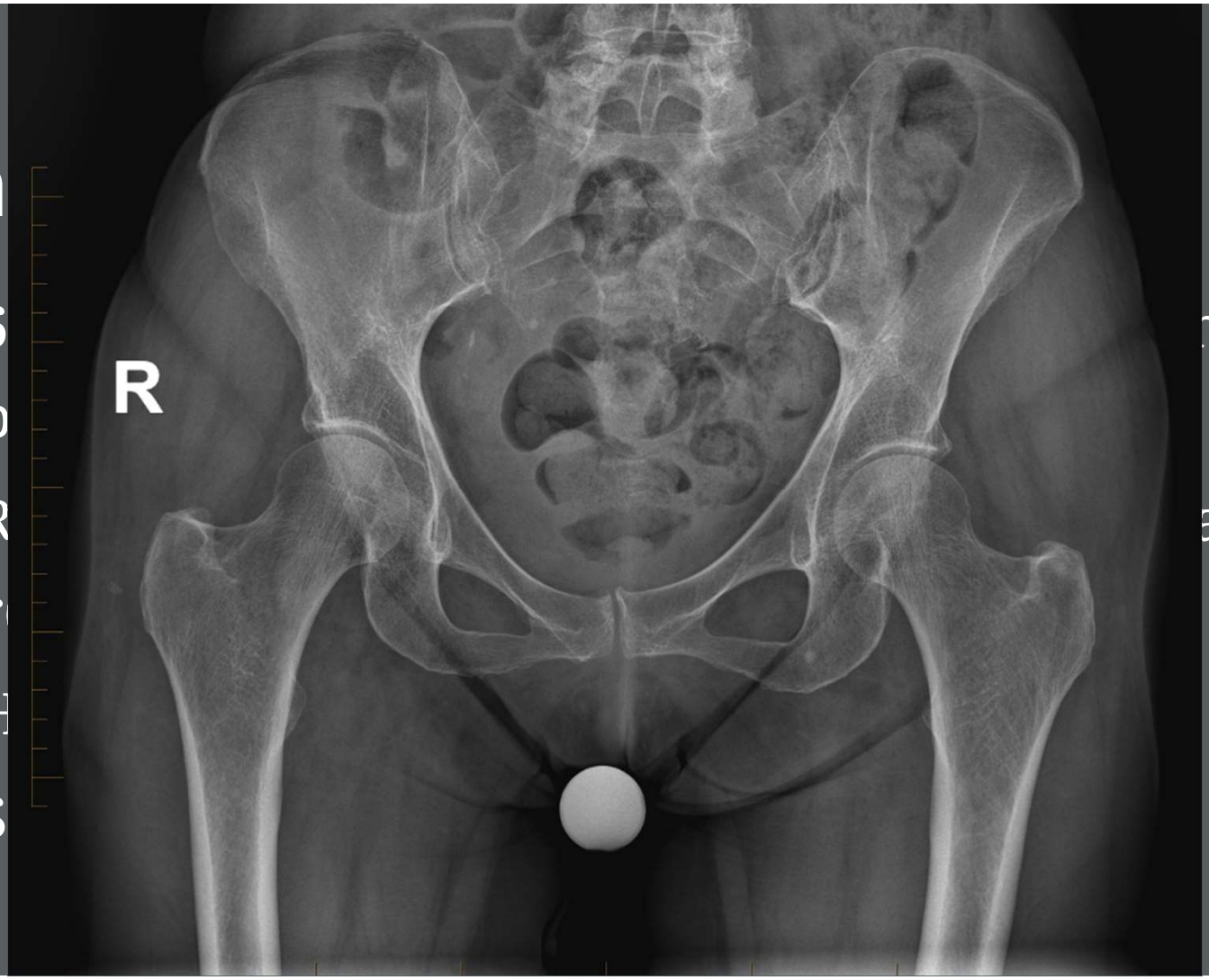
- 6 hip p
- R at r
- H
- S



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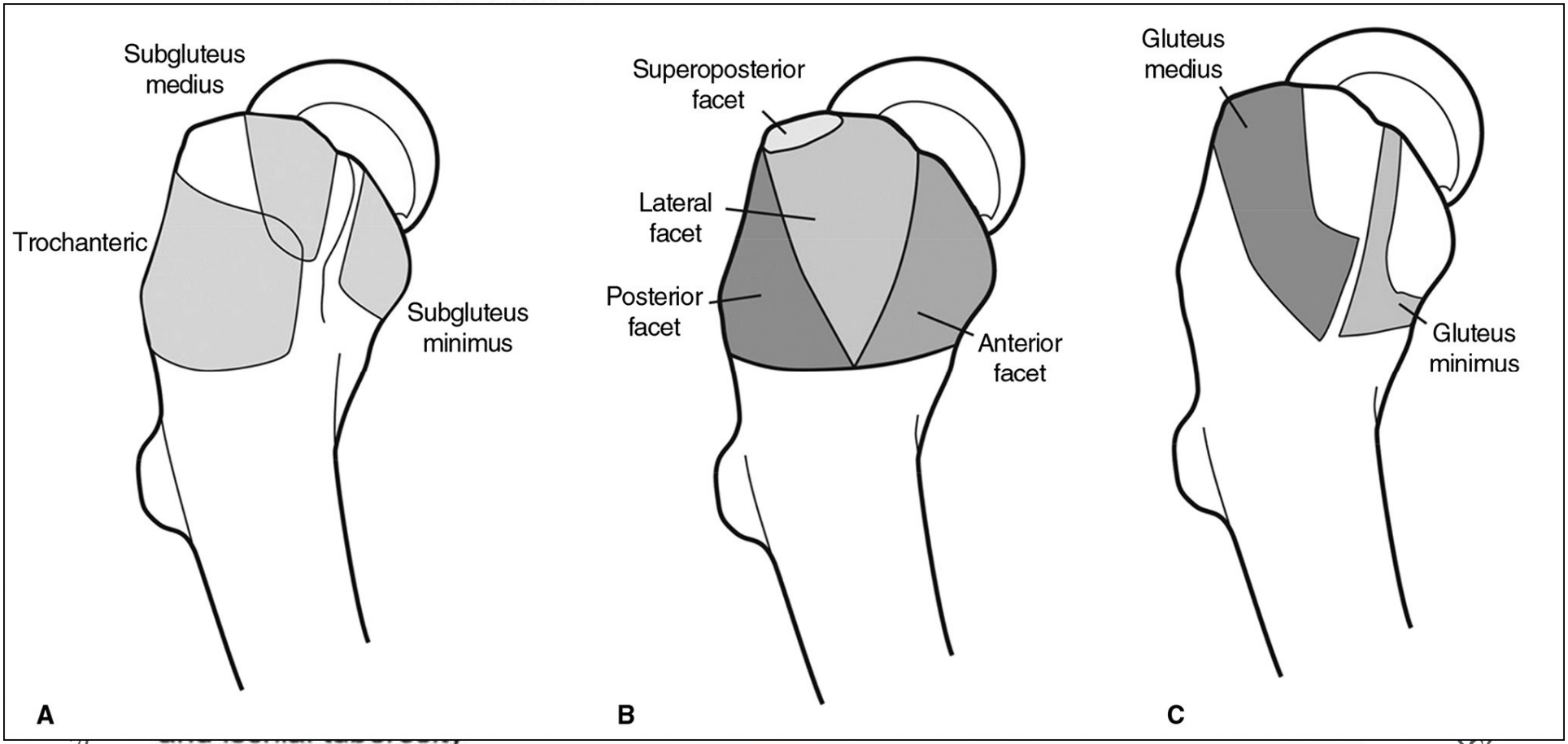
Gluteus medius



back pain

GT

- F

op

w/ PN, etc

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GT Pain Syndrome

- Imaging
  - XR - peritrochanteric calcification/bony irregularity
    - Rule out alternative diagnoses (OA, FAI, etc)
    - Consider spine imaging if appropriate
  - Ultrasound?
  - MRI is the standard
    - Rule out intraarticular
    - Eval tendons, IT band

GT Pain Syndrome

- Management
  - RICE
  - NSAIDs
  - Weight loss
  - Activity modification
  - PT (glut, hip, spine, etc - and stretch IT)

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GT Pain Syndrome

- Management
  - CSI can be helpful - US guided if high BMI
    - ?PRP
  - ESWT - may be effective in combo with PT
  - Surgical
    - Bursa debridement/IT release
    - Abductor tendon repairs

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Case #7

- Football player 17yoM took a hard tackle from the side
- You're covering sideline, athlete complains of significant pain along the iliac crest
- Able to bear weight, but limping
- No radiating symptoms, pain is all lateral at impact site

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Hip Pointer

- Contusion to iliac crest
- Subperiosteal edema/bleeding or hematoma formation
- Most common in contact sports - hockey, football, rugby
  - Can be in soccer or snow sports with fall
- XR can help rule out fracture

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Hip Pointer

- Treat with rapid compression to reduce swelling, bleeding
  - Consider aspiration if considerable hematoma
- Then NSAIDs, ice, rest
- ?lido injection if return to play is needed urgently (professionals)
- Prevent with padding

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Thank You