Osteitis Pubis

• GREEN	
• **Intro:**	- Non-infectious idiopathic, inflammatory condition of the pubic symphysis & surrounding structures - Results in groin / lower abdominal px - Multiple causes, likely related to overuse / trauma - Association w/ surgery: 1st described in pts who had undergone suprapubic surgery, remains a complication of invasive procedures around the pelvis - Can occur as an inflammatory process in athletes - Incidence of 0.5-0.8% in athletes, w/ higher incidence in distance runners & athletes in kicking sports - M>F (3:1)
• **Aetiology (risk factors):**	- Fibular-acetabular impingement (FAI) - Pregnancy / childbirth - High-level of athletic activity *(athletic pubalgia)* - Urological / gynaecological surgery - Trauma - Psoriatic arthritis - Ankylosing spondylitis
• **Pathophys-iology:**	- Stress injury affecting the peri-symphyseal pubic bones due to increased strain on the anterior pelvis - Pubic symphysis, a non-synovial amphiarthrodial joint, has minimal motion normally due to a static ligamentous complex - Pubic symphysis is where rectus abdominis inserts & the adductor complex originates - Antagonistic actions of the rectus abdominis (elevates symphysis) & adductors (depressing the joint)create conditions osteitis pubis development through chronic tendinosis - Chronic muscle imbalance leads to abnormal forces on the pubic symphysis, causing instability, pubic bone stress reaction, & eventual hyaline cartilage degeneration - Alternative theory: osteitis results from increased compensatory motion across the joint due to limited motion elsewhere in the kinetic chain (*FAI*)

Osteitis Pubis (cont)

• **Clinical presentation:**	- Waddling antalgic gait or crepitus - Px localised over the symphysis & radiating outward - Anterior & medial groin px - Gradual onset - Adductor px / lower abdominal px that then localises to the pubic area - Aggravated during turning, walking, coughing, sneezing, lying on one side, & walking up or down stairs - Commonly tenderness around the pubic symphysis & pubic ramus, along w/ painful muscle spasms in the adductor region
• **Physical examination:**	+ve palpation, Spring test of pubic symphysis, Adductor squeeze test
• **Diagnosis:**	- In early stages, plain radiographs may appear normal - Chronic case: pubic symphysis demonstrates lytic changes, sclerosis, sub-chondral resorption, bony margin irregularities & widening - Dynamic instability of the pubic symphysis (>2mm of subluxation) can be observed on frog-leg view
• **Complications:**	- Chronic px - Infection - Non-union fusion - Recurrence - Scrotal / labial swelling
• **Management:**	- Approx. 3 - 6 month recovery time (conservative care) - RICE, NSAIDs, (steroid) injections - Surgery
• **Ddx:**	- Athletic pubalgia - FAI - Osteomyelitis - Adductor strain - Rectus abdominus strain - SIJ dysfunction - GU disease

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Transient Osteoporosis of the Hip (TOH)

• **YELLOW**

Transient Osteoporosis of the Hip (TOH) (cont)

• **Intro:**	- Idiopathic & self-limiting disorder that causes temporary bone loss of the proximal femur - Characterised by unexplained hip px - Associated w/ ↓ ROM, non-specific labs, & mostly uncertain radiographic findings
• **Aetiology (risk factors):**	- Mainly affects the hip joint, but can also affect knee, ankle, & foot - M>F (esp, 30-60 yrs) - Also more common in women in late stages of pregnancy (last 3 months) or who have recently given birth
• **Pathophysiology:**	- Not clear understanding - Blockage of small blood vessels that surround the hip - Hormonal changes - Abnormal stresses (external load & force) on the bone
• **Clinical presentation:**	- Sudden onset of px, usually anterior thigh, groin, lateral hip, or buttocks - Px that intensifies w/ weight bearing & may lessen w/ rest - No previous accident or injury to the hip that would trigger px - Slightly limited motion (gentle hip movement usually pxless) - Px that gradually increases over a period of weeks or months & may be disabling - Noticeable limp due to guarding
• **Physical examination:**	- ↓ ROM (AROM feels worse) - Severe px when wight bearing (min px w/ PROM)
• **Diagnosis:**	**X-ray:** - Early stage (first 6 weeks) of the disease may exhibit slight decrease in bone density (challenging to detect) - Several months later, may reveal significant loss of bone density, w/ femoral head nearly disappearing **Nuclear medicine bone scan:** - Can more clearly show changes in the bone **DEXA:** - Not useful in Dx of TOH

Transient Osteoporosis of the Hip (TOH) (cont)

• **Complications:**	- Fractures - Joint collapse - Chronic px - 2° OA - Recurrence - Functional impairment
• **Management:**	- NSAIDs - Weight-bearing restriction - Strengthening & flexibility - Water exrcises - Mobs / drops - Proper nutrition (vitamin D & calcium)
• **Ddx:**	- Osteoporosis - AVN - RA - Stress fracture - Bone marrow oedema - Osteomyelitis - Hip lapral tear - Refered px from Lx disorders

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Transient Synovitis (TS)

• **YELLOW**	Refer to GP if pt starts showing red flags / isn't improving
• **Intro:**	- Acute, non-specific, inflammatory process affecting joint synovium - Common cause of hip pain in paediatric population - Benign, self-limiting process - Must differentiate TS from an acute infectious process - Most common in children 3- 10 yrs old - Incidence estimated to be 0.2%, w/ total lifetime risk of 3% - M>F (4:1)
• **Aetiology (risk factors):**	- Preceding upper respiratory infection (URI) - Preceding bacterial infection - Post-streptococcal toxic synovitis - Preceding trauma - Alternative theory: post-vaccine or drug-mediated hypersensitivity reactions & certain allergic predispositions

Transient Synovitis (TS) (cont)	
• **Pathophysiology:**	- Pathological cascade involves non-specific inflammation targeting synovial joint lining, leading to hypertrophic changes - Clinical Hx may reveal one or multiple risk factors
• **Clinical presentation:**	- Acute unilateral limb disuse - Non-specifc hip px, subtle limp, refusal to bear weight - Hx may show increased agitation or more frequent crying than baseline - Recent Hx of URI, pharyngitis, bronchitis, or otitis media (supports TS diagnosis)
• **Physical examination:**	- Mildly ↓ ROM, especially ABduction & INternal rot. - Pts may exhibit hip flexion, abduction, & external rotation position to alleviate intra-articular pressure - 1/3 of pts may have normal ROM - Provocative tests: +ve basic log roll or FABER test (px on ipsilateral anterior side indicates hip disorder, while px on the contralateral side around the sacroiliac joint suggests SIJ dysfunction)
• **Diagnosis:**	**Imaging:** - Radiographs: useful for excluding bony lesions unless onset of Ssx is within 3 days, no fever, child appears well, & has mildly restricted abduction w/o guarding against movement in other planes - Ultrasound: extremely accurate for detecting infra capsular effusion, doesn't help to determine the cause (used to guide hip aspiration) - MRI: useful in settings where routine aspiration is not performed to differentiate TS from septic arthritis **Labs:** - Complete blood cell (CBC) count - Erythrocyte sedimentation rate (ESR) - C-reactive protein measurement - Urinalysis & cultures
• **Complications:**	-Recurrence of Ssx, in approx. 20-25% of pts (usually between 6 months)

Transient Synovitis (TS) (cont)

• **Management:**	- Rest, NSAIDs, heat &/or massage - In case of clinical concern, pt admission fro observation is considered - General improvement after 24-48 hours - Complete resolution may take 1-2 weeks (75% of pts) - If significant Ssx last for 7-10 days, consider alternative Ddx - If Ssx last longer than a month, pt may have alternative pathology
• **Ddx:**	- Coxa magna - Osteomyelitis - Septic arthritis - 1° or metastatic lesions - Legg-Calve-Perthes disease (LCPD) - Slipped capital femoral epiphysis (SCFE) - Others: Lyme arthritis, pyogenic sacroiliitis, & juvenile RA

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Slipped Upper Femoral Epiphysis (SUFE)

• **YELLOW**

• **Intro:**	- Most common hip pathology in pre-adolescents & adolescents - Also known as *slipped upper femoral epiphysis* (SUFE)
• **Aetiology (risk factors):**	- Idiopathic w/ no Hx of trauma or injury before Ssx onset - Associated w/ endocrine disorders such as hyper/hypothyroidism, , growth hormone deficiency, renal disorders, & Down syndrome - Hypothyroidism is most common cause of non-idiopathic SCFE - Pre-adolescent & adolescent pts (10.8/100,000) - Obesity is single most significant risk factor - M>F - Periods of rapid growth - Prior hip radiation therapy - retroversion of the acetabulum or femoral head - Average age of onset is F 11.2 & M 12.0

Slipped Upper Femoral Epiphysis (SUFE) (cont)

• **Pathophysiology:**	- Uncertain mechanism - High physiological axial load on a weak physis - Obesity increase mechanical weight & force, while endocrine / renal disorders may weaken the physis - Slippage occurs at the hypertrophic zone of physis - Epiphysis stays in the acetabulum, & metaphysis EX rots w/ anterior translation - SCFE is a Salter-Harris type I fracture
• **Clinical presentation:**	- Atraumatic Hx - Hip, thigh, groin, knee px - Limping & inability to WB - 4-5 months Ssx prior to Dx - Sitting w/ affected leg crossed over the other relieves px
• **Physical examination:**	- ↓ ROM (esp. IR, FLEX, ABD) - Drehmann sign - Trendelenburg sign - Atrophy. of surrounding muscles
• **Diagnosis:**	- Recent studies suggest US may be more sensitive that radiographs - **X-rays:** Epiphysis widening or growth plate lucency & blurring of proximal femoral metaphysis due to overlap on the displaced epiphysis
• **Complications:**	- AVN - Chondrolysis - FAI - Slip progression
• **Management:**	- Mainly operative - NSAIDs (px management) - Strengthening
• **Ddx:**	- Septic arthritis - Osteomyelitis - Traumatic fracture - Sprain - Strain - LCPD - Osgood Schlatter disease

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Snapping Hip / Coxa Saltans

• GREEN

• **Intro:**	- Audible or palpable snapping sensation during hip joint movement - Affects 5-10% of the population - F>M - Common when engaging in repetitive extreme hip motions, e.g. ballet dancers (in 80%), weight lifters, soccer players, & runners **Extra-articular snapping hip:** - Iliotibial band moving over the greater trochanter during hip flexion, extension, & rotation - Proximal hamstring tendon rolling over the ischial tuberosity - Fascia late or anterior aspect of gluteus Maximus rolling over the greater trochanter - Psoas tendon rolling over the medial fibres of the iliac muscle - Combination of defects, e.g. thickening of both the posterior iliotibial band & anterior glute max **Intra-articular snapping hip:** - Iliopsoas tendon snapping over iliopectinal eminence or anterior femoral head - Parabola cysts - Partial or complete bifurcation of the iliopsoas tendon - **Differentiation from intra-articular pathology:** close physical exams & imaging; approx. 50% of internal snapping hip cases also have an additional intra-articular hip pathology identified
• **Aetiology (risk factors):**	- Often caused by overuse but can also be triggered by trauma, e.g. intramuscular injection or surgical procedures - Coxa vera after total hip arthroplasty is linked to external snapping hip syndrome - Anatomical variations: increased distance between greater trochanters, prominent greater trochanters, & narrow bi-iliac width - Iliotibial band tightness, shorter muscle or tendon lengths, muscle tightness, or inadequate muscle relaxation

Snapping Hip / Coxa Saltans (cont)

• **Pathophysiology:**	**External:** - Caused by iliotibial band snapping over the greater trochanter of the femoral head - During movements like flexion, extension, & external rotation **Internal:** - Caused by iliopsoas tendon snapping over bony prominences - Bone prominences include the iliopectinal eminence or the anterior aspect of the femoral head
• **Clinical presentation:**	- Prevalence of snapping hip - Location of the snap - Timing of the snap - Age/duration of onset - Px / disability - Impact on ADLs
• **Physical examination:**	**External:** - +ve Ober's test: tight iliotibial band - FABER test: iliotibial band snapping **Internal:** - FABER test: iliopsoas snapping - Stinchfield test: anterior groin px - Thomas test: tight hip flexors - Iliopsoas stress test: abdominal px
• **Diagnosis:**	- Plain radiograph (not acurate), used to rule out anatomical variations, developmental dysplasia, or other hip pathology **External:** - T1 weighted axial MRI: thickened ITB or thickened anterior edge of glute max - Dynamic ultrasonography (if not visible on exam): demonstrates snapping of ITB over the greater trochanter, & can also reveal associated *tendonitis, iliopsoas bursitis, or muscle tears* **Internal:** - Magnetic resonance orthography: comprehensively identifies both the SHS & accompanying pathologies - Iliopsoas bursography - Fluoroscopy - Dynamic ultrasonography

Snapping Hip / Coxa Saltans (cont)

- **Management:**
  - RICE
  - NSAIDs
  - Steroid injections
  - Activity modifications
  - Release: TFL, glute medius, glute max, & adductors
  - Activate: abductors
  - STW
  - SMT
  - Mobs / drops
- **Ddx:**
  - Acetabular labral tear
  - Bursitis: greater trochanter / iliopsoas
  - Femoral head AVN
  - Hip tendonitis
  - Iliopsoas tendinitis
  - ITB syndrome
  - Intra-articular loose body of the hip
  - Synovitis

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Meralgia Paraesthetica

- **GREEN**
- **Intro:**
  - Also known as Bernhardt Roth syndrome, lateral femoral cutaneous n. (LFCN) syndrome / neuralgia
  - Associated with LFCN compression
  - Purely sensory nerve
  - Vulnerable to compression during its course from Lx-Sx plexus to inguinal ligament
  - Passes into subcutaneous tissue of anterior thigh, involving px & dysethesia

Meralgia Paraesthetica (cont)

• **Aetiology (risk factors):**	- Slightly more common F>M - Common in military - Most common 40-50 yrs - Pregnant & obese pts have increased risk - 3-4 / 10,000 - Carpal tunnel syndrome associated w/ an ↑ risk of meralgia paraesthetica **Spontaneous causes:** - Diabetes mellitus - Lead poisoning - Alcohol abuse - Hypothyroidism **Mechanical causes:** - External direct pressure from tight seat belts, belts, or restrictive clothing - Increased intra-abdominal pressure from obesity, pregnancy, or tumours - Leg length discrepancy - Degenerative changes of pubic symphysis - Rare bone tumour near the iliac crest **Iatrogenic causes:** - Surgeries of surrounding areas
• **Pathophysiology:**	- Derives from posterior divisions of L2/L3 spinal nerves - Lateral psoas → under iliac fascia → crosses anterior iliacus m. → ASIS → anterior & posterior divisions pass under / through / above the inguinal ligament - Anterior: sensory to anterior thigh-knee - Posterior: sensory to lateral thigh-greater trochanter - External compression or internal pressure (obesity, pregnancy, tumours) - Surgical injury during the nerve's passage - Metabolic causes like diabetes (injury may result from swelling due to ↓ axoplasmic transport), alcohol or lead poisoning

Meralgia Paraesthetica (cont)

• **Clinical presentation:**	- Unilateral Ssx of upper lateral thigh - Burning px, paraesthesia, hyperaesthesia - Subacute onset over days to weeks - Pts often point to or rub outer thigh (potential loss of hair from rubbing) - Ssx don't change w/ position - Aggravated by prolonged hip EX (waking, rising from seated position) - May be relieved by hip flexion (sitting) - Hx of tight clothing, trauma, weight-gain, pregnancy
• **Physical examination:**	- Pelvic compression test (side-lying on unaffected side) - Meralgia paraesthetica test - Sensory changes (pin-prick, light touch)
• **Diagnosis:**	- Radiographs are not required - May consider blood tests if metabolic etiology
• **Complications:**	- Result from surgical transection of LFCM, leading to permanent anaesthesia (sensory loss)
• **Management:**	- Benign, self-limiting - Often spontaneous remission - Pt reassurance & education - Reducing pressure & irritation (weight-loss) - Icing - SMT - NSAIDs - Abdominal exercises - Injection - Surgical decompression - **Other:** pulsed radiofrequency n, ablation, electroacupuncture, K-taping
• **Ddx:**	- Lx radiculopathy - Abdominal masses - Pelvic tumour - Metastasis of iliac crest - Avulsion fracture - Hip OA - Chronic appendicitis

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Legg-Calve-Perthes Disease (LCPD)

• YELLOW	
• **Intro:**	- Idiopathic osteonecrosis of capital femoral epiphysis of femoral head occurring in the paediatric population - Also known as *coxa plana*
• **Aetiology (risk factors):**	- Cause is unknown, possibly idiopathic or related to factors disrupting blood flow (key factor in development of LCPD) to femoral epiphysis - Bilateral in 10%-20% cases (asymmetrical due to different stages) - Causes include: trauma (macro or repetitive micro), coagulopathy (in about 75% of pts), & steroid use - Thrombophilia is found in approx. 50% of pts - 3-12 yrs old (highest occurrence at 5-7 yo) - 1 in 1200 children <15 yo - M>F (5:1) **Risk factors:** Caucasian / Asian heritage, HIV, low socioeconomic status, birth weight <2.5kg, secondhand smoke exposure
• **Pathophysiology:**	**Usually 4 phases:** **1. Necrosis:** disruption of blood supply → infarction of femoral capital epiphysis (esp. subchondral cortical bone) → growth of ossific nucleus stops → infarcted bone softens & dies **2. Fragmentation:** body reabsorbs the infarcted bone **3. Reossification:** Osteoblastic activity → femoral epiphysis reestablished **4. Remodelling:** new femoral head (enlarged & flattened) → reshaping occurs during growth → healing (if responding to conservative c.) takes 2-4 yrs
• **Clinical presentation:**	- Limp of acute / insidious onset, often painless (1-3 months) - Px (if present) localised to hip or referred to the knee, thigh, or abdomen - With progression, px typically worsens with activity - No systemic findings should be found

Legg-Calve-Perthes Disease (LCPD) (cont)

• **Physical examination:**	- ↓ IR & ABD of hip - Px on rot. referred to the anteromedial thigh &/or knee - Atrophy of thighs & buttock from px leading to disuse - Leg length discrepancy - Trendelenburg sign: weak abductors (glute med & min) - Antalgic gait (acute): short-stance phase 2° to px in the weight-bearing leg - Trendelenburg gait (chronic): downward pelvic tilt away from the affected hip during swing phase
• **Diagnosis:**	- Labs are used to exclude other diagnoses **Imaging:** - Early radiographs can be normal - Plain films are preferred - Standard A-P pelvis & frog-leg views - If in doubt or plain films are normal, DEXA scan or MRI **Early findings:** - Epiphyseal cartilage hypertrophy - Epiphysis appears smaller or denser - "Crescent sign" **Late findings:** - Mushroom head & snow cap - DEXA shows decreased perfusion of the femoral head - MRI shows marrow changes
• **Complications:**	- Coxa magna (widening) & coxa plana (flattening) - Damaged femoral head can result in premature physical arrest, causing leg length discrepancy - Poorly formed femoral can lead to acetabular dysplasia & hip incongruency - Hip incongruence can alter mechanics, causing labral tears - Complications like lateral hip subluxation or extrusion can result in lifelong problems - Late complication: arthritis

Legg-Calve-Perthes Disease (LCPD) (cont)

- **Management:**
  - **Goals:** px & Ssx management, restoration of ROM, & containment of femoral head in acetabulum
  - Activity restriction & protective weight-bearing until ossification is complete
  - NSAIDs
  - STW
  - Surgery
- **Ddx:**
  - Infectious etiology including septic arthritis, osteomyelitis, pericapsular pyomyositis
  - Transient synovitis
  - Multiple epiphyseal dysplasia (MED)
  - Spondyloepiphyseal dysplasia (SED)
  - Sickle cell disease
  - Gaucher disease
  - Hypothyroidism
  - Meyers dysplasia

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Acetabular Labral Tear (A/PLT) / Loose Body

- **YELLOW**
- **Intro:**
  - Involves the cartilage ring (labrum) around the outside rim of the hip joint socket
  - Labrum cushions the hip joint & acts as a rubber seal, securing the thighbone within the hip socket
- **Aetiology (risk factors):**
  - Most tears occur in anterosuperior quadrant
  - Posterosuperior tears are more common in Asian population due to hyeprflexion or squatting motions
  - Occur between 8-72 yrs (highest incidence in 50 yrs)
  - F>M
  - 22-55% pts w/ hip/groin px have an ALT
  - Up to 74% of ALTs have no specific casue
  - Trauma & sports-related causes
  - Individuals attending gym 3x/week have an ↑ risk of developing ALT

Acetabular Labral Tear (A/PLT) / Loose Body (cont)

• **Pathophysiology:**	**Five common mechanisms:** - Femoroacetabular impingement (FAI) - Trauma: mis-stepping, running w/ hyperextension, or EX rot - Capsular laxity: cartilage disorders (e.g. Ehlers-Danlos syndrome) or rotational laxity from excessive EX rot (ballet, hockey, gymnastics) - Hip dysplasia - Degenerative changes
• **Clinical presentation:**	- Anterior hip / groin px - ALT indicated by buttock px; while PLT are less common - Clicking, popping, giving way, catching, & stiffness - Dull ache often ↑ w/ activities (running, brisk walk, twisting, & climbing stairs) - Specific manoeuvres causing groin px: 1) FX, ADD, IR fro ALT 2) Passive hyper EXT, ABD, EXT rot for PLT - Functional limitations: prolonged sitting, walking, climbing stairs, running, & twisting/pivoting - Ssx can persist for long duration (average >2 yrs) - Traumatic onset associated w/ an audible pop or sensation of subluxation
• **Physical examination:**	- FX knee gait & shortened step length on affected leg - Anterior hip-impingement test (FAIR) or posterior impingement test - FABER test - Resisted SLR - Leg-roll test
• **Diagnosis:**	- MR arthrogram preferred over MRI & plain radiograph
• **Complications:**	- Recurrence **Post-surgical:** - DVT - Articular damage - Neuromuscular injury
• **Management:**	- NSAIDs - 10-12 week protocol - Reduce WB - Injection - Strengthening - SMT - Surgery

Acetabular Labral Tear (A/PLT) / Loose Body (cont)

- **Ddx:**
  - Contusion (esp. over bony prominences)
  - Strains
  - Athletic pubalgia
  - Osteitis pubis
  - Inflammatory arthritides (RA)
  - Piriformis syndrome
  - SHS
  - Bursitis(trochanteric, ischiogluteal, iliopsoas)
  - OA of femoral head
  - AVN
  - Septic arthritis
  - Fracture or dislocation
  - Tumours
  - Hernia (inguinal or femoral)
  - SCFE
  - LCPD
  - Referred px from Lx-Sx or SIJ regions

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Hernias (sports & inguinal)

- **YELLOW**
- **Intro:**
  - Protrusion of intestines through a weak spot in the abdominal muscles
  - Lump may disappear when pt lies down & can sometimes be manually pushed out
  - Coughing may cause the hernia to reappear, indicating the temporary nature
- **Aetiology (risk factors):**
  - Lifting heavy object w/o stabilising abdominal muscles
  - Diarrhea or constipation
  - Family Hx (4x more likely)
  - Persistent coughing or sneezing
  - Obesity, poor nutrition, & smoking (weaken muscles)
  - Pregnancy (low risk)
  - Injury: most sports-related hernias occur in the groin & don't appear as a bulge (if untreated, can evolve into an inguinal hernia)
  - Common surgery
  - Peaks at 5 yo & >70 yo
  - M>F (9:1)
- **Pathophysiology:**
  - Congenital & acquired component
  - Higher type III collagen compared to type I

Hernias (sports & inguinal) (cont)	
• **Clinical presentation:**	- Bulging in groin area - Px / burning / pinching sensation in groin area - Can radiate into scrotum or down the leg - Can be aggravated by activity or coughing
• **Physical examination:**	- Palpable bulge - If no bulge, ask pt to cough while palpating inguinal area
• **Diagnosis:**	- Usually used when body habits makes physical exam limited - Ultrasound - CT scan - MRI
• **Complications:**	- Hernia recurrence - Chronic px
• **Management:**	- Monitor hernia - Wearing a truss (supportive undergarment that holds it in place) - NSAIDs - Reduce pressure off the tissue (e.g. address breathing mechanics) - Strengthen supportive tissue (deep core) - Reduce aggravating activities - Surgery (very common)
• **Ddx:**	- Lymphadenopathy - Lymphoma - Metastatic neoplasm - Hydrocele - Epididymitis - Testicular torsion - Abscess - Hematoma - Femoral artery aneurysm

Hernias (sports & inguinal) (cont)

Sport hernia:

- Weakness in the inguinal canal's posterior wall
- Nerve irritation & px occur at the tendon insertion to the bone
- Expansion of the transversals fascia at its weakest point
- Enlargement of the inguinal triangle results from the fascia expansion
- Rectus abdominis moves upward & inward due to enlargement
- Increased tension on the pubis is noted, potentially leading to tears
- Bulging may compress the genital branch of the genitofemoral n.
- Contribution to chronic px

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Piriformis Syndrome

• GREEN

• Intro:

- Sciatica nerve entrapment at the ischial tuberosity, presenting w/ radicular px
- Piriformis m. is an EXT rot of the hip
- Conditions that **mimic** it: Lx canal stenosis, disc inflammation, or pelvic causes

• Aetiology (risk factors):

- Accounts for 0.3-6% of all cases of LBP &/or sciatica
- Annual incidence approx. 2.4 million cases
- Middle aged pts
- F>M (6:1)

• Pathophysiology:

Function of piriformis:

- EXT rot during hip extension
- Acts as a hip adductor during hip FX

Issues & consequences:

- Overuse, irritation, or inflammation of piriformis m. → leads to irritation of adjacent sciatica n. → sciatica n. entrapment may occur anterior to piriformis muscle or posterior to gemelli-obturator interns complex

Causes of piriformis stress:

- Chronic poor body posture

-Acute injury resulting in sudden & strong IR of the hip

Piriformis Syndrome (cont)

• **Clinical presentation:**	- Chronic px in buttock & hip area - Px when getting out of bed - Inability to sit for prolonged periods - Butt px worsened by hip movements - Ssx resembling sciatica - Difficulty differentiating radicular px due to 2° spinal stenosis vs piriformis s. - Radiating px into posterior thigh, occasionally lower leg at dermatomes L5 & S1
• **Physical examination:**	- Mild-moderate tenderness around sciatica notch - FAIR test - Limited SLR - No neurological deficits - Sometimes limp when walking - Shortened & EXT rot leg when supine (*splayfoot*)
• **Diagnosis:**	- US - MRI - CT - EMG
• **Complications:**	**Related to surgery:** - Nerve injury (sciatica) - Infection - Bleeding
• **Management:**	- Diagnosis of exclusion - NSAIDs - Muscle relaxants - Injections - Mobs - SMT - STW - Stretching - Surgery

Piriformis Syndrome (cont)

• **Ddx:**	- Lx canal stenosis - Disc inflammation - Hamstring injury - Lx-Sx facet syndrome - Lx radiculopathy - Spondylolisthesis / spondylosis - SIJ dysfunction - Inferior gluteal artery aneurysm - Tumour - Arteriovenous malformation

Femoroacetabular Impingement (FAI)

• **GREEN**

• **Intro:**	- Hip px due to mechanical impingement from abnormal hip morphology - Involves proximal femur &/or acetabulum - Soft tissue damage in the FA joint results from extreme hip rotation or repetitive abnormal contact between bony prominences - Degenerative changes & OA may develop in the long-term of this abnormal contact
• **Aetiology (risk factors):**	- Still under investigation - Genetic factors may contribute to abnormal hip pathology - ↑ incidence in young athletes (males) due to ***cam deformity*** formation - Can occur in pts w/ a Hx of SCFE or LCPD -SCFE can cause a residual deformity even after surgical fixation, leading to an impingement - High prevalence in asymptomatic pts - Increased awareness → higher Dx rate throughout every. age

Femoroacetabular Impingement (FAI) (cont)

• **Pathophysiology:**	- FAI syndrome is associated w/ 3 hip joint morphology variations: cam, pincer, & a combination - **Cam:** flattening or convexity of femoral head-neck junction, common in young athletic men - **Pincer:** "overcoverage" of moral head by acetabulum, more common in women - Isolated cam or pincer morphology insufficient for FAI syndrome Dx - **Combination:** often associated w/ SCFE (85% of pts) - Cam & pincer morphologies can damage articular cartilage & labrum due to impingement, causing FAI Ssx **Other factors** contributing to FAI: - Weakness of deep hip muscles compromising stability, leading to increased joint loading - Repeated loading of labrum causing up regulation of nociceptive receptors
• **Clinical presentation:**	- Gradual onset of hip px, worsened by hip FX & IR - Activities like high-intensity sports, squatting, driving, & prolonged sitting aggravate - Acute hip px warrants workup for other potential causes **Key inquiries:** trauma, infection, SCFE, LCPD, hip dysplasia, osteonecrosis, sporting activities, & other hip pathologies - Groin & anterolateral hip px, radiating to thigh, often with a "C sign" gesture indicating px location **Associated complaints:** clicking, popping, & catching, suggesting a possible labral injury
• **Physical examination:**	- Trendelenburg air or abductor lurch suggests abductor muscle weakness or insufficiency - ↓ ROM, especially FX & IR - FABER test: often +ve due to impingement-related labrum tear - +ve FAIR & posterior impingement test - +ve IROP test
• **Diagnosis:**	- X-ray initially - CT or MR arthrogram for better appreciation of morphology of the hip / associated cartilage & labral lesions

Femoroacetabular Impingement (FAI) (cont)

• **Complications:**	- Associated w/ surgery **Major:** - Femoral neck fracture: risk increases w/ excess reaction of a cam lesion - Abdominal compartment syndrome:during hip arthroscopy - Other: PE, deep joint infection, AVN, postoperative complication **Minor:** - Hematoma - DVT - Numbness & discomfort of lateral thigh - Temporary perineal numbness - Dyspareunia - Superficial infection - Heterotopic ossification
• **Management:**	- Adaptation of ADLs to a safe ROM - Strengthening - SMT / hip distraction - Strengthening - NSAIDs - Steroid injections - Surgery
• **Ddx:**	- Trochanteric bursitis - Athletic pubalgia - Snapping hip syndrome - Flexor muscle strain - Hip subluxation - Soft tissue tumour - Femoral neck stres fracture - Septic arthritis - Osteomyelitis - Soft tissue infection - Osteonecrosis - Lx radiculopathy - Inguinal hernia - Hip OA

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Disordered Hip Complex

- **Hypertonic iliopsoas**

- Starts w/ a muscular imbalance
- Most likely due to sedentary lifestyle
- Creates new muscular strains, ligamentous & capsular sprains & fascial tension

- Psoas pulls femur into FX & EXT rot
- Hip joint I spilled anterior & superiorly
- Considerable increase in intracapsular pressure of the hip joint
- Directly related to degenerative changes in the hip
- Limits pelvic sway

- Hip & groin px
- Possible referral into anterior-medial thigh
- LBP

- Modified Thomas test

- Passive stretching
- TrPs
- SMT
- STW
- PIR
- Muscle relaxers

Capsulitis of the Hip

• **Intro:**	- Also known as: adhesive capsulitis & 'frozen hip' - Non-specific & painful ROM limitations
• **Aetiology (risk factors):**	- May appear as 1° condition, develops w/o underlying cause - May occur as 2° entity, superimposed on underlying joint pathology - Commonly affects middle-aged females, suggesting potential hormonal or demographic influence - Unknown triggers: initiate inflammatory response leading to a frozen hip - Nocturnal or weight-bearing aggravation
• **Pathophysiology:**	- Often begins w/ synovial membrane inflammation - Over time, inflammatory process may lead to fibrosis of the joint **Stages of frozen hip:** **1 & 2** represent acute AC, where px is typically the 1° Ssx **3 & 4** represent chronic AC, characterised by ROM limitations as the 1° Ssx
• **Clinical presentation:**	- Non-specific px - Nocturnal px or px exacerbated by weight bearing may occur - Progression of Ssx

Capsulitis of the Hip (cont)

• **Physical examination:**	- ↓ ROM - Muscle weakness due to px & stiffness: flexors, extensors, abductors, & adductors - Potential instability or laxity of joints - Soft tissue palpation: potential tenderness, swelling, or warmth - Gait alterations or compensatory movements - Sensory & motor function in LL (nerve or vascular compromise) **Special test:** - Thomas test - Ober's test - FABER test - Provocative manoeuvres
• **Diagnosis:**	- Challenging to Dx due to limited value in standard diagnostic tests & imaging techniques - Differentiate from *Arthrofibrosis*: AC is distinct from arthrofibrosis (knee, elbow, shoulder), & the initial inflammatory phase in AC progresses to capsular fibrosis AC can lead to arthrofibrosis
• **Management:**	- SMT - Pressure dilation - NSAIDs - Exercise program - Steroid injections - Surgery

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Congenital Dislocation of the Hip (CDH)

• **YELLOW**

• **Intro:**	- Also known as developmental dysplasia of the hip (DDH) - Caused by abnormal hip development & can manifest in infancy or early childhood - Multifactorial cause, involving genetic, environmental, & mechanical factors

Congenital Dislocation of the Hip (CDH) (cont)	
• **Aetiology (risk factors):**	- F>M (4:1) - Breech position in the last trimester (most significant risk) - Family Hx - swaddling in the adducted & extended position - Postmaturity (prematurity isn't associated w/ ↑ risk) - 69.5 / 1000, but most are self-limiting in approx. 6-8. weeks - Leaving 4.8 / 1000, which need further treatment
• **Pathophysiology:**	- Under-coverage of femoral head due to disrupted contact can lead to abnormal development - Swaddling in an extreme position hinders proper hip development - Acetabulum continues to grow up to age 5 - Prolonged maligned contact causes chronic changes like capsule hypertrophy, ligament teres hypertrophy, & thickened acetabular edge
• **Clinical presentation:**	- Mild hip instability - Limited ABD in infants - Asymmetric gait in toddlers - Hip px in adolescence - OA in adults
• **Physical examination:**	- Trendelenburg gait (abductor insufficiency) - Lx lordosis - Leg length discrepancies
• **Diagnosis:**	- US - X-ray
• **Complications:**	**Failure to identify & treat:** - Functional disability - Hip px - Accelerated OA
• **Management:**	- Pavlik harness - Adolescent / adult hip preservation surgery
• **Ddx:**	- Proximal femoral focal deficiency - Femoral neck fracture - Coxa vara - Residual effects of infective arthritis

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