Hip Disorders

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Hamstring Strain

- General:
  - Predisposing factors
    - Poor flexibility
    - Exercise fatigue
    - Poor conditioning
  - Normal Hamstring to quadriceps ratio: 3:5
  - Injuries occur during the eccentric phase of muscle contraction
  - Grade I (strain) to Grade III (complete tear)

Hamstring Strain

- Most common in track and gymnastic injuries

Hamstring Strain

- Clinical Presentation:
  - Pain in hamstring region after a forceful hamstring contraction or knee extension
  - Tenderness over muscle belly or origin

Hamstring Strain

- Provacative Test: Pain elicited in the ischial region with knee flexion

Hamstring Strain

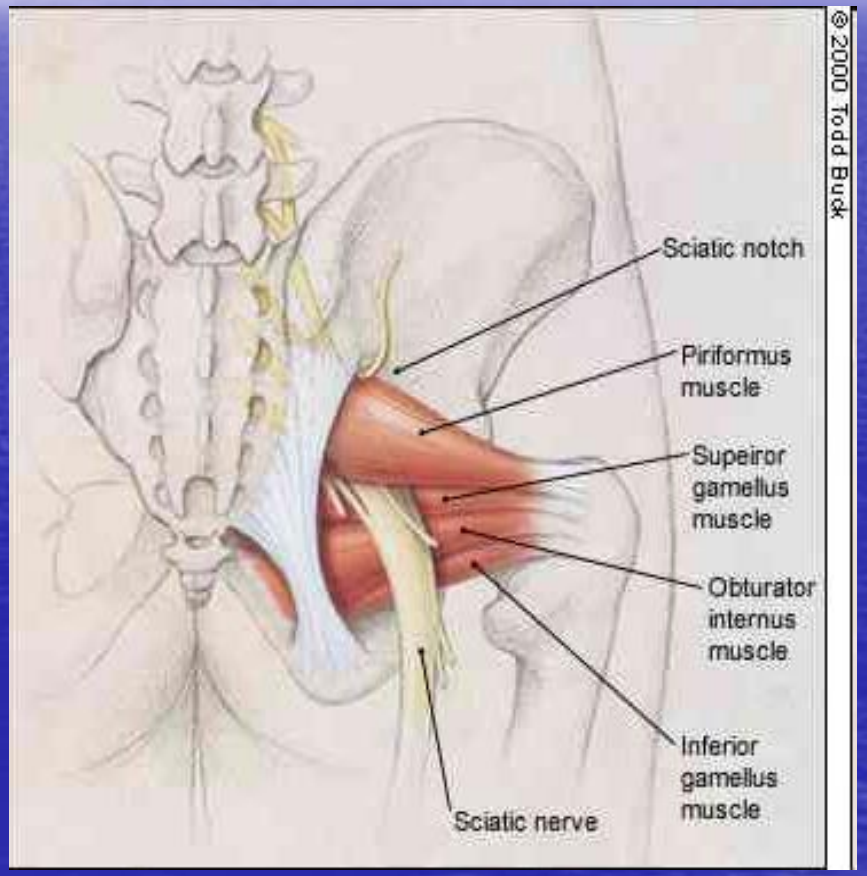
- Imaging:
  - NOT GENERALLY NEEDED

Hamstring Strain

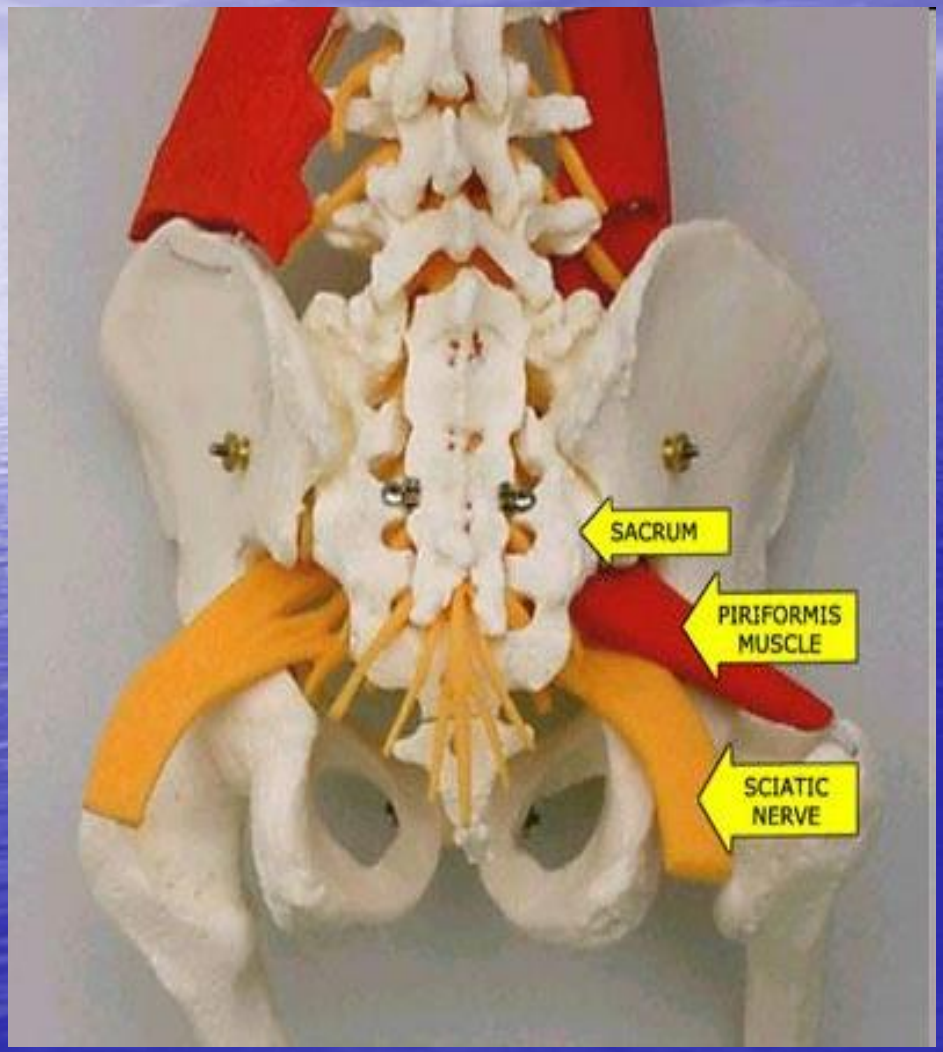
- Treatment:
  - RICE (rest, ice, compression, elevation)
  - Weight bearing reduction
  - NSAIDS
  - Gentle stretching, advancing to strengthening when inflammation is reduced

Piriformis Syndrome

- General:
  - Painful muscle contraction involving the piriformis muscle
  - External hip rotator
  - Can be stressed due to body mechanics in a chronic condition or injured acutely with forceful hip internal rotation.



Piriformis Syndrome



- Genetic Variation of muscle may cause sciatic nerve involvement
- Piriformis muscle irritates sciatic nerve. (pseudo-sciatica)
- Six times more likely to occur in women.

Piriformis Syndrome

- Clinical Presentation:
  - Pain in the lateral buttock, posterior hip, proximal posterior thigh, and SI region
  - Pain exacerbated by walking up stairs
  - Tenderness over muscle belly that stretches from sacrum to greater trochanter
  - Pain worse when sitting on hard surface or performing activities that produce hip adduction and internal rotation.
  - Possible pain with bowel movements.

Piriformis Syndrome

- Clinical Presentation continued…
  - NORMAL strength
  - Symmetrical reflexes
  - (+) Freiberg's sign- pain with passsive hip abduction and internal rotation to compress sciatic nerve
  - (+) Pace's sign- pain or weakness with contraction of piriformis, with resistance to active hip external rotation and abduction

Piriformis Syndrome

- Provacative test: Pain with internal hip rotation, adduction, and flexion

Piriformis Syndrome

- Imaging:
  - Radiographs of L/S spine to rule out other pathology.

Piriformis Syndrome

- Treatment:
  - Since the piriformis is an external rotator of the hip, treatment commonly includes:
    - Inward-rotation stretches for the piriformis muscle
    - Strengthening of the internal rotator muscles
  - NSAIDS first, then Tri-cyclics, Neurontin if neuropathic sx's continue
  - Ultrasound, TENS, and other PT modalities
  - Local corticosteroids
  - Correct leg length discrepancy

Piriformis Syndrome

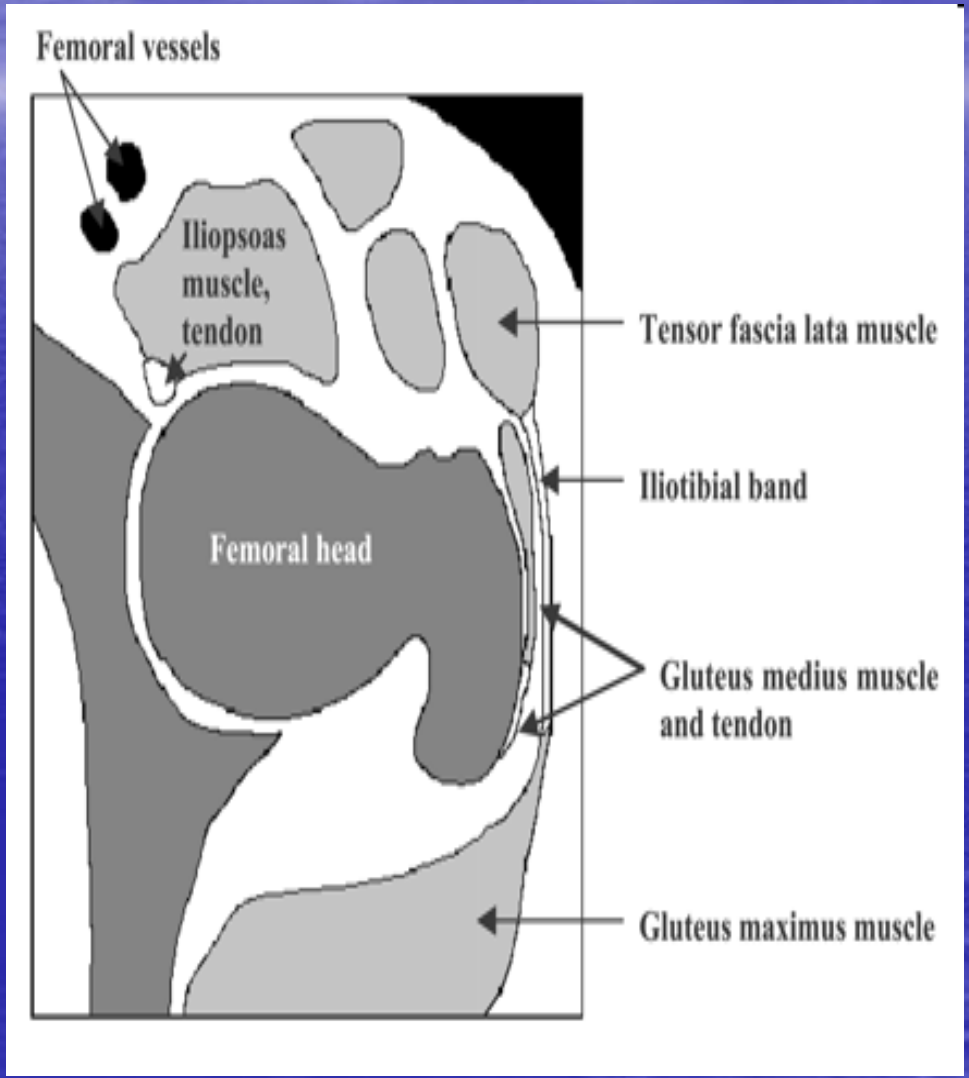
- **OMT!!!**

Iliopsoas Bursitis and tendonitis

- General
  - A.k.a. Iliopsoas snapping-tendon syndrome
  - Well-recognized, poorly understood
  - Can be caused by overuse or trauma
  - Injury causes inflammation of muscle tendon and bursa causing muscle tightness and imbalance

Iliopsoas Bursitis and tendonitis

- Audible snap due to iliotibial band snapping over greater trochanter or the iliopsoas tendon subluxing over the pectineal eminence of the pelvis.



Iliopsoas Bursitis and tendonitis

- Clinical presentation:
  - Hip snapping with flexion, often causes pain
  - Tenderness over the iliopsoas muscle

Iliopsoas Bursitis and tendonitis

- Provacative test:
  - Pain on hip flexion

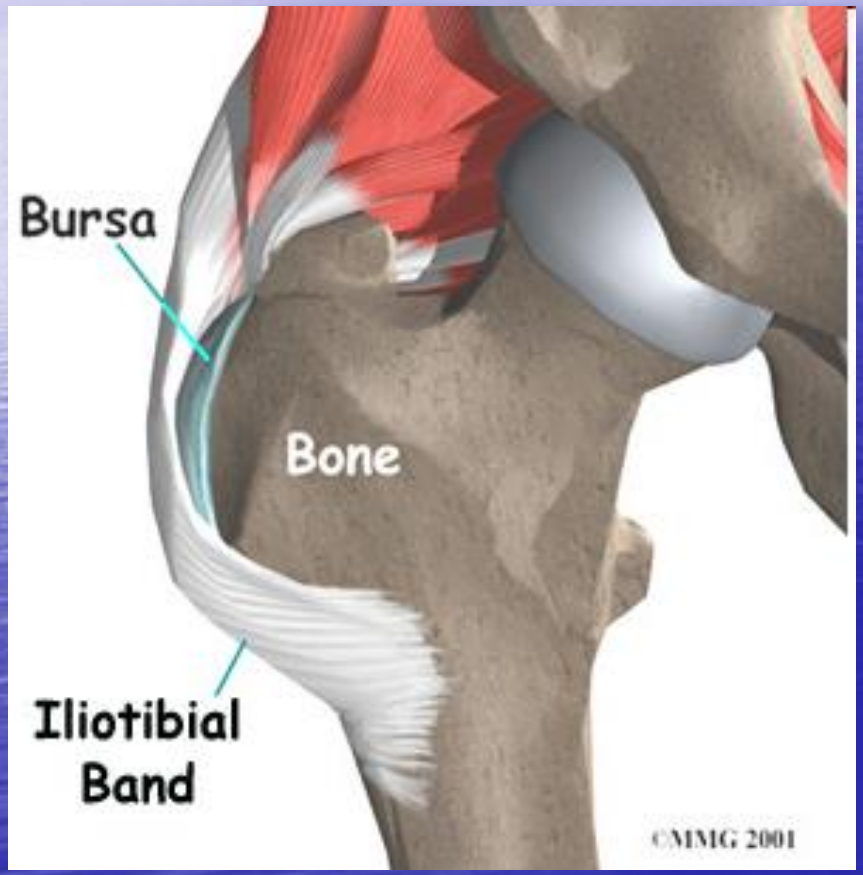
Iliopsoas Bursitis and tendonitis

- Imaging:
  - Useful to rule out other pathology only.

Iliopsoas Bursitis and tendonitis

- Treatment:
  - Ice, NSAIDs, stretching and strengthening
  - Corticosteroid injection if conservative measures fail.

Greater Trochanteric Bursitis



- General:
  - Inflammation of bursa located over greater trochanter
  - Condition may cause hip snapping
  - My cause altered gait mechanics, muscle imbalance, and reduced flexibility
  - Usually middle aged to elderly, F>>>M

Greater Trochanteric Bursitis

- Clinical Presentation:
  - Pain is worse at night and with activity
  - Unable to lie on the affected side
  - Snap palpable over greater tubercle
  - Pain may radiate down lateral thigh.

Greater Trochanteric Bursitis

- Provacative Test:
  - Pain over the greater trochanter during movement from full extension to flexion

Greater Trochanteric Bursitis

- Imaging
  - Radiographs to rule out other bony pathology

Greater Trochanteric Bursitis

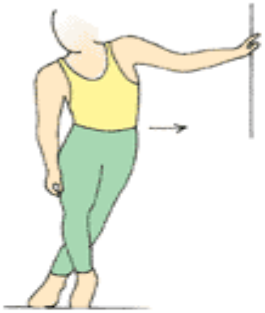
- Treatment:
  - NSAIDS
  - SAC for assistance with ambulation
  - Strengthening of the hip adductor groups
  - Local corticosteroid injection for resistant cases
  - Deep Heating PT modalities (TENS, etc.)
  - Correct Heel length discrepency
  - ITB Stretching

- **Iliotibial band stretching**

Trochanteric Bursitis Exercises

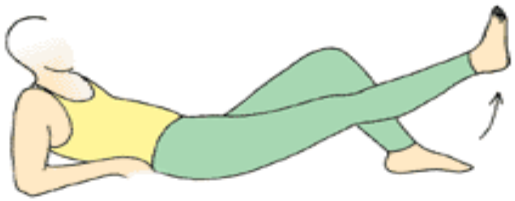
Piriformis stretch

Standing



Side-leaning

Iliotibial band stretch



Straight leg raise

Wall squat with a ball

Prone hip extension

Greater Trochanteric Bursitis

- Corticosteroid injections
  - 2 to 4 cc mix of corticosteroid and local anesthetic
    - (ex: 1cc 2% lidocaine with 2 cc betamethasone)
  - No more than 3 injections over 6 month period
  - Use 22 gauge 3 ½ inch needle to ensure bursa is reached

Posterior Hip Dislocation

- General:
  - Most common hip dislocation
  - Avascular necrosis occurs in 10-20% of patients

  -Sciatic nerve often compressed or stretched

  -Often occurs during MVA when hip is flexed, adducted & medially rotated

Posterior Hip Dislocation

- Clinical Presentation:
  - Hip appears flexed, adducted, and internally rotated
  - *Affected leg appears shorter because the dislocated femoral head is higher than normal side.*
  - Pt will be unable to abduct affected hip

Posterior Hip Dislocation

- Imaging: Hip radiographs

- Treatment: Orthopedic surgery- this is emergency due to potential vascular compromise and sciatic nerve injury.

Avascular Necrosis

- General:
  - A.k.a. “osteonecrosis”, “aseptic necrosis” (Ischemic necrosis”
  - Traumatic (more common) vs. Atraumatic
  - Condition characterized by death of osteocytes without sepsis.
  - Interruption of vascular supply is the defining common pathway of the disease process
  - Male:female= 4:1

Avascular Necrosis

- In children aged 2-12, this condition is known as Legg-Calve-Perthes disease

Avascular Necrosis

- Causes:
  - Corticosteroid use (100% bilateral involvment)
  - Alcohol Abuse (>400mL per week)
  - Idiopathic
  - Many others….

Avascular Necrosis

- Most common causes in adults is steroid use and alcohol use

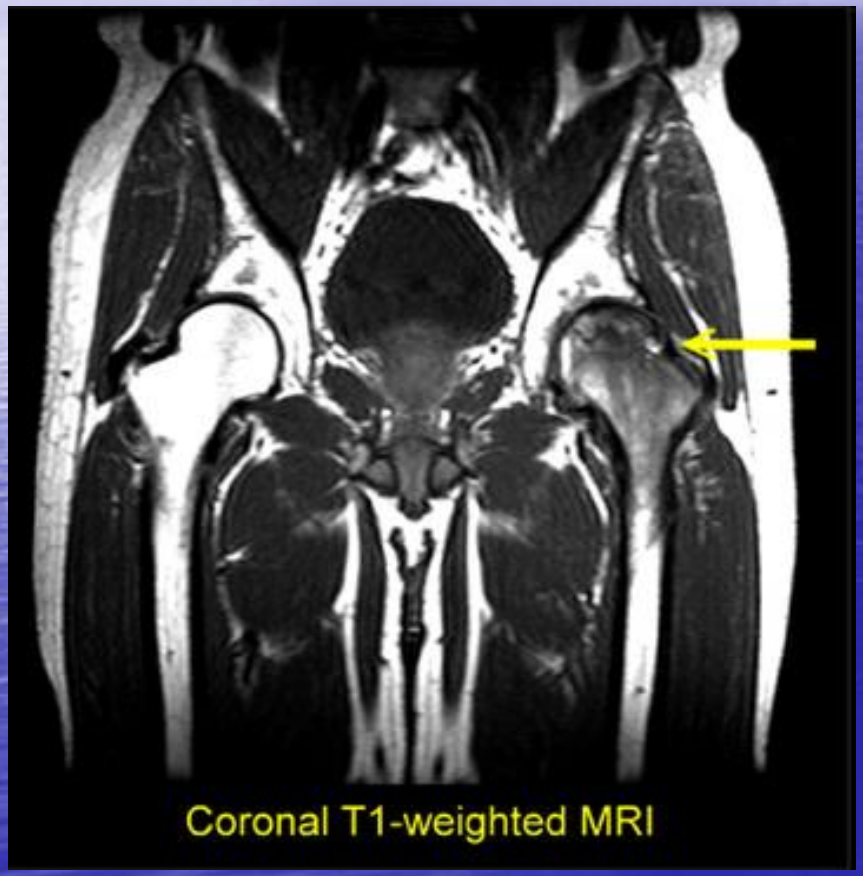
Avascular Necrosis

- Clinical Presentation:
  - Pain present in the groin, anterior thigh, or even the knee
  - Insidious onset
  - Short swing and stance phase on the affected side during gait
  - Loss of external and int rotation of the hip
  - Pain elicited with ROM
  - Hip externally rotates with hip flexion

Avascular Necrosis

- Imaging:
  - Plain X-rays:
    - Irregular or mottles femoral head on plane films

Avascular Necrosis



- Imaging: MRI
  - Gold standard for AVN (90% sensitive)
  - Indicated for both hips if sx's apparent (50% of atraumatic cases have bilateral involvement
  - Low signal intensity on T1 imaging

Avascular Necrosis

- Treatment
  - Objective: maintain femoral head with within acetabulum while healing and re-modeling occurs
  - Pediatric Population: Bracing and casting to retain femoral head within acetabulum
  - Osteotomy may be used to treat symptomatically
  - THA
  - Meds: Pain control (no medical treatment effective)

Hip Fractures

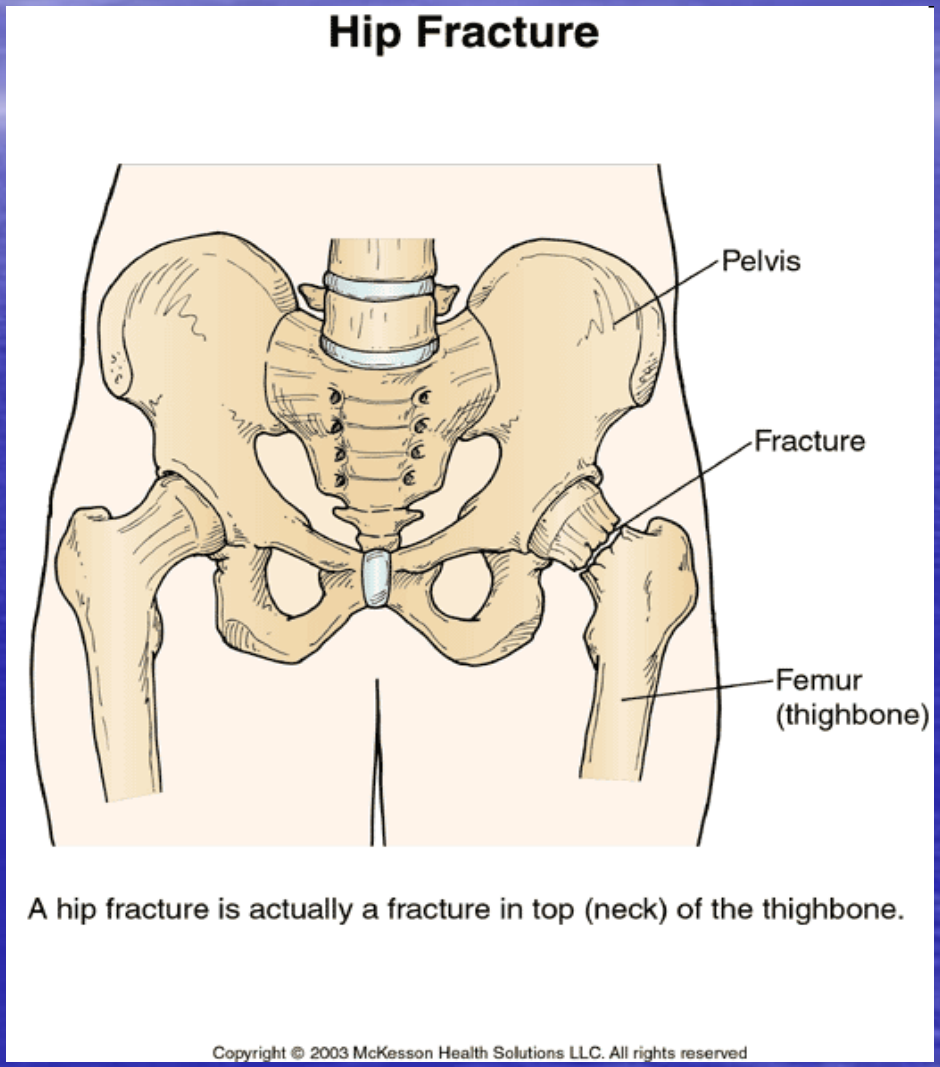
- General:
  - Increased risk with Osteoporosis
    - 90% occur in patients >50 years old
    - 60% occur in patients >75 years old
  - Fixed risk factors: age, sex (F>M), race
  - Modifiable risk factors:
    - Alcohol, caffeine consumption
    - Smoking
    - Meds (benzo's, antipsychotics)
    - Malnutrition

Hip Fractures

- General cont…
  - DVT occurs in >50% unprotected patients (highest PE risk during 2nd & 3rd week post-operatively
  - Incidence of heterotopic ossification (>50%) after total hip replacement, but <10% lose ROM
  - Survivor mortality rate post fx 20-30% after 1 year, and 40% after 2 years.

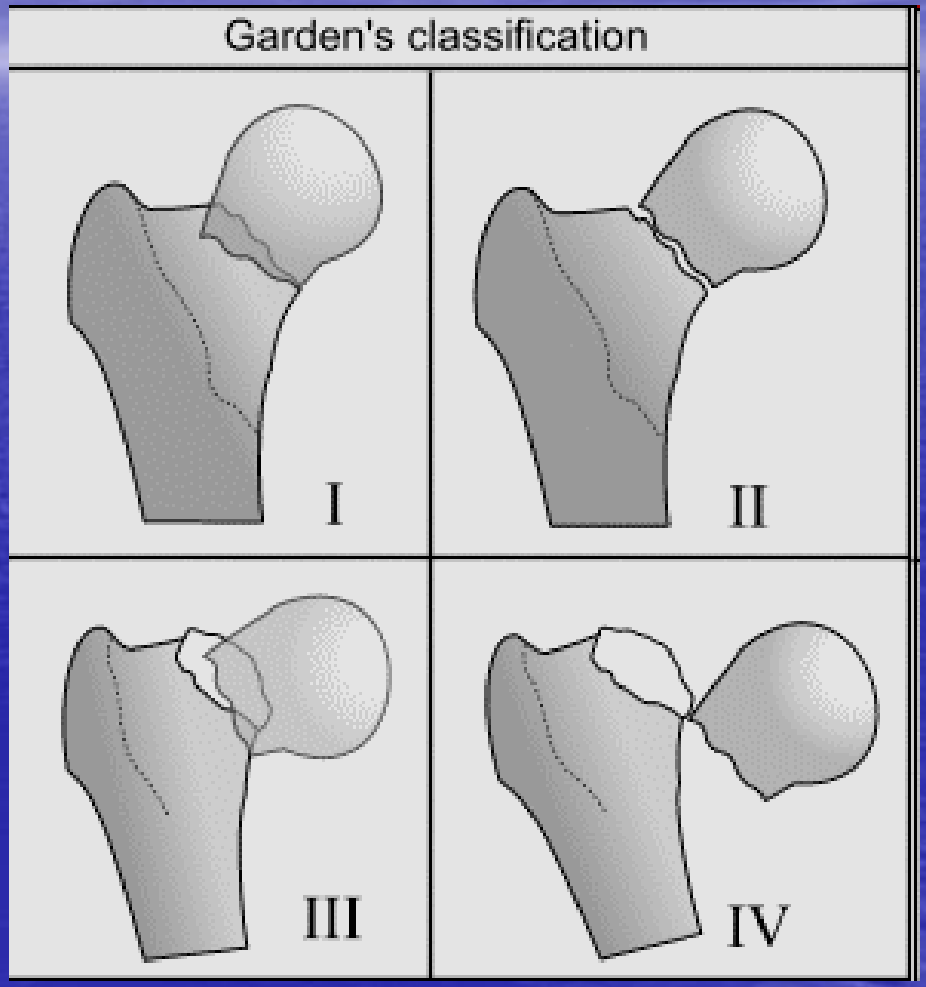
Hip Fractures

- Classification:
  - Intracapsular
  - Intertrochanteric
  - Subtrochanteric



Hip Fractures- Intracapsular

- A.k.a. Femoral Neck Fractures
- Morbidity associated with fracture involves disruption of blood vessels to femoral head causing AVN



Hip Fractures- Intracapsular

Hip Fractures- Intracapsular

- Clinical Presentation
  - Hip pain
  - Limb external rotation
  - Apparent shortened leg on affected side

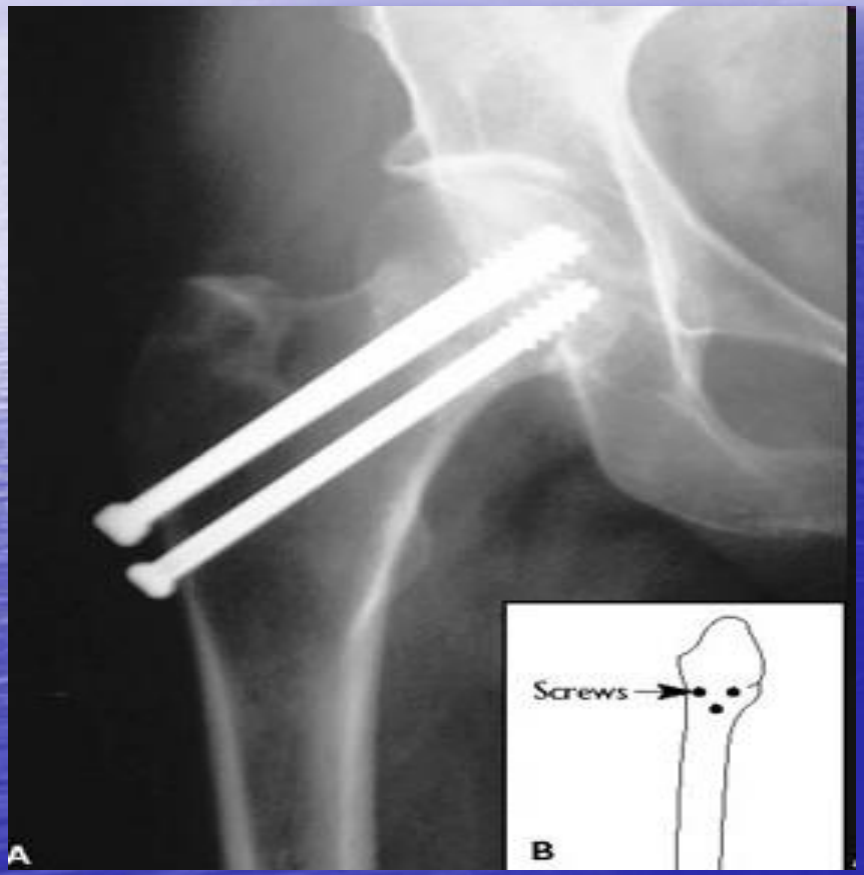
Hip Fractures- Intracapsular

- Imaging:
  - X-ray (AP & lateral)
  - Bone scan for occult fx's

Hip Fractures- Intracapsular

- Treatment: Garden Stages I & II
  - Surgical
    - Percutaneous pins across the fracture site or 3 parallel cannulated hip screw (DHS) for stabilization (younger patients)
  - Rehab early with full or partial weight bearing
  - May be treated conservatively if patient is unfit for surgery or for an old impacted fracture.

Hip Fractures- Intracapsular



Hip Fractures- Intracapsular

- Treatment: Garden Stages III & IV
  - Surgical: Hip Replacement of femoral head using cemented or non-cemented hemiarthroplasty
    - Procedure of choice in elderly patients with displaced femoral neck fractures.
  - Rehab:
    - Full WBAT if cemented
    - Partial or full WB for uncemented cases

Hip Fractures- Intracapsular

- TO CEMENT OR **NOT** TO CEMENT???

Hip Precautions following THR

- NO
  - Adduction
  - Internal Rotation
  - Flexion past 90 degrees

Hip Precautions following THR

- Do not cross your legs.
- Put a pillow between your legs if you lie on your side.
- Do not turn your leg inward.
- Do not bend over from the hips to reach objects or tie your shoes.
- An assistive device or reacher is necessary to perform activities of daily living (ADL) safely.

Hip Precautions following THR

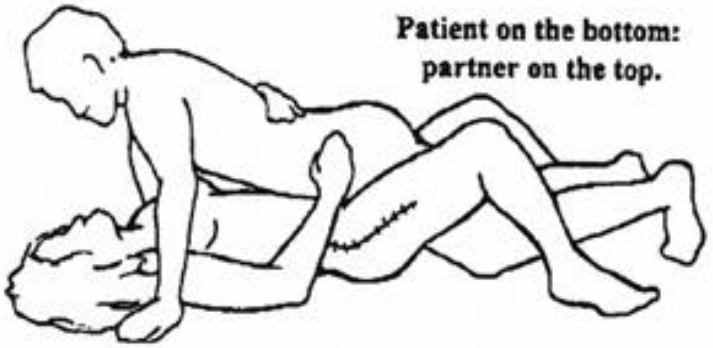
- In some patients at risk for hip dislocation, individualized precautions are necessary. The use of a hip abduction brace may be necessary in these patients.

Hip Precautions

Sit only on elevated chairs or toilet seats.

Pillows can be used under the knees, back, and/or side for comfort and support.

Patient on the bottom: partner on the top.



Patient on the top: partner on the bottom.

Standing position for both the patient and partner.

Patient lying on side with operated leg on top.

Prognosis after THR

- Factors involved with permanent institutionalization following THR include:
  - Age >80
  - Lack of family support
  - Insufficient therapy at nursing facility
  - Pre-existing dementia

Prognosis after THR

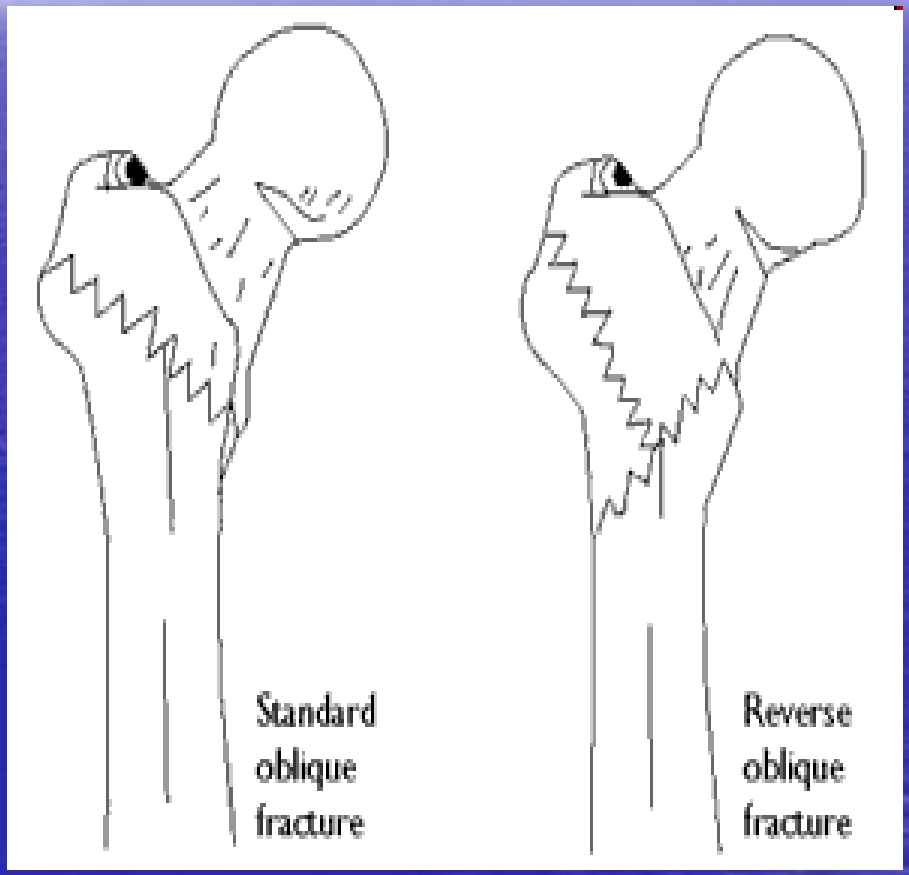
- Post-operative dislocation after THA:
  - More common when pt had previous hip replacement
  - Posterior approach more common dislocation than anterior approach.
  - Aseptic loosening usually will not occur for at least 10 years

Hip Fractures- Intertrochanteric

- General:
  - Most common type of hip fracture, mostly seen in falls
  - Highly fragmented fractures may result in significant blood loss
  - Post-operatively, leg-length discrepancy may result
  - Hospital stays tend to be the longest & are more likely to need nursing home.

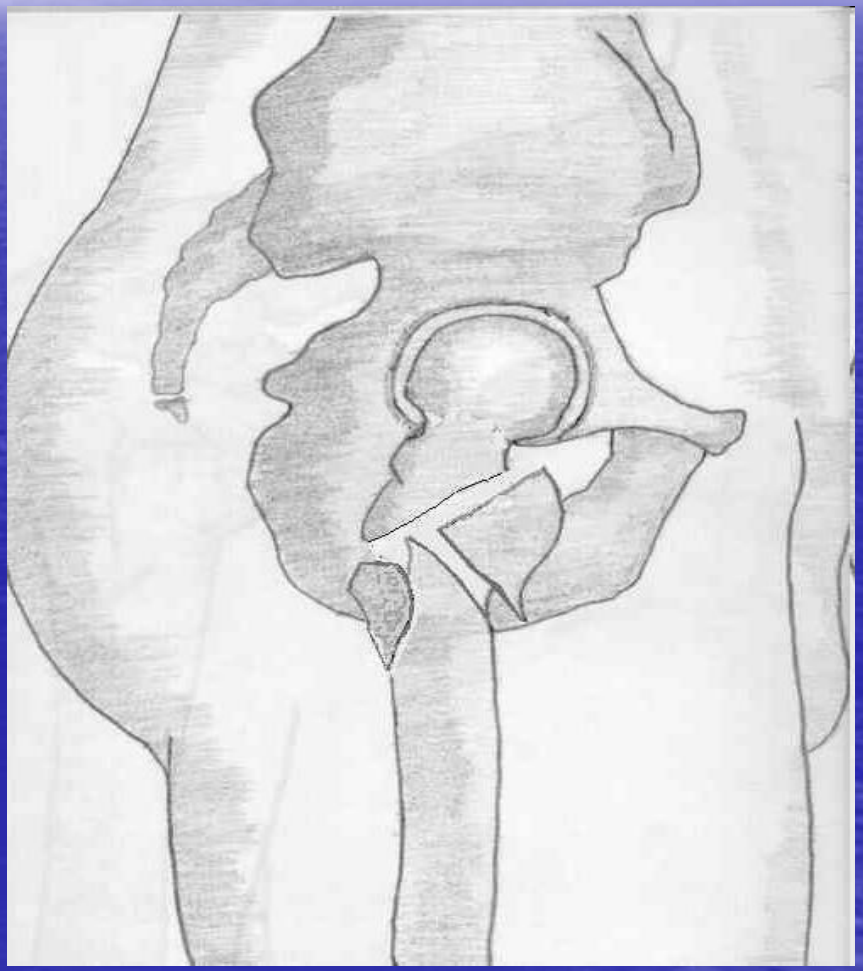
Hip Fractures- Intertrochanteric

- Classification:
  - Standard Oblique (stable)
  - Reverse Oblique (unstable)



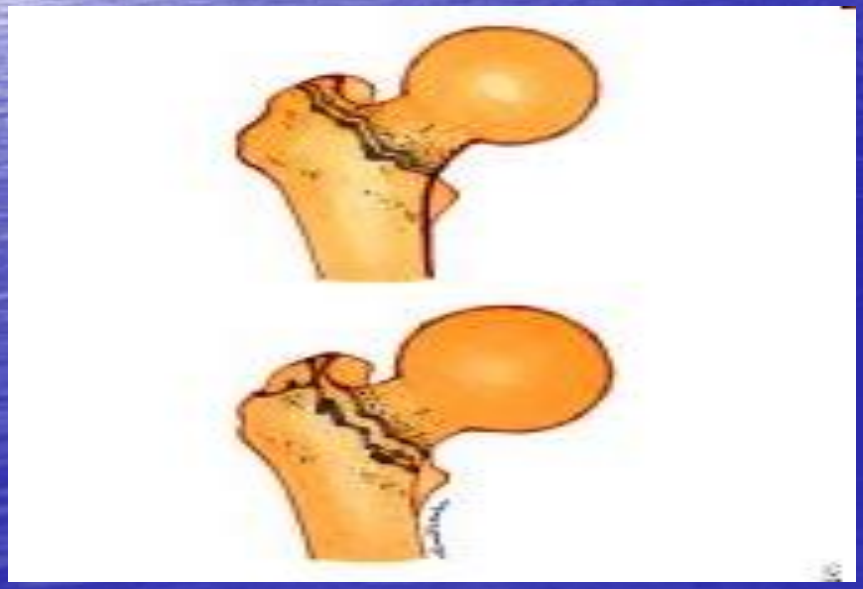
Hip Fractures- Intertrochanteric

- Clinical Presentation:
  - Hip pain and externally rotated hip



Hip Fractures- Intertrochanteric

- Imaging:
  - X-rays
  - CT
  - MRI



Hip Fractures- Intertrochanteric

- Treatment:
  - Surgical
    - CRIF if possible
    - Compression Screw (DHS)- may cause shortening and roation at the fracture site.
    - Angle nail plate may be used
    - IM rod
    - If fixation is unstable, medial displacement osteotomy of femur may be necessary

Hip Fractures- Intertrochanteric

- Rehab
  - Progressive weight bearing from partial to full
  - May need leg lifter, raised toilet seat, and elevated hip chair to take stress off the hip
  - Long term problems:
    - Poor balance
    - Shortened leg
    - Trendelenberg gait
  - Time to heal 12-15 weeks (may drive at 12 weeks)

Hip Fractures- Subtrochanteric

- Subject to very high mechanical stresses, therefore, hardest to stabilize surgically
- Fractures may be simple, fragmented, or comminuted
- Occur between the lesser trochanter and the isthmus of the diaphysis of the femur.

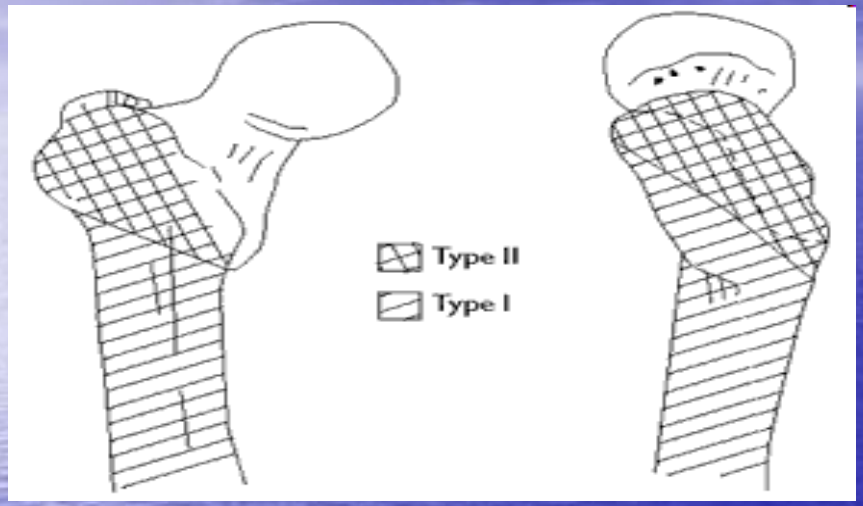
Hip Fractures- Subtrochanteric

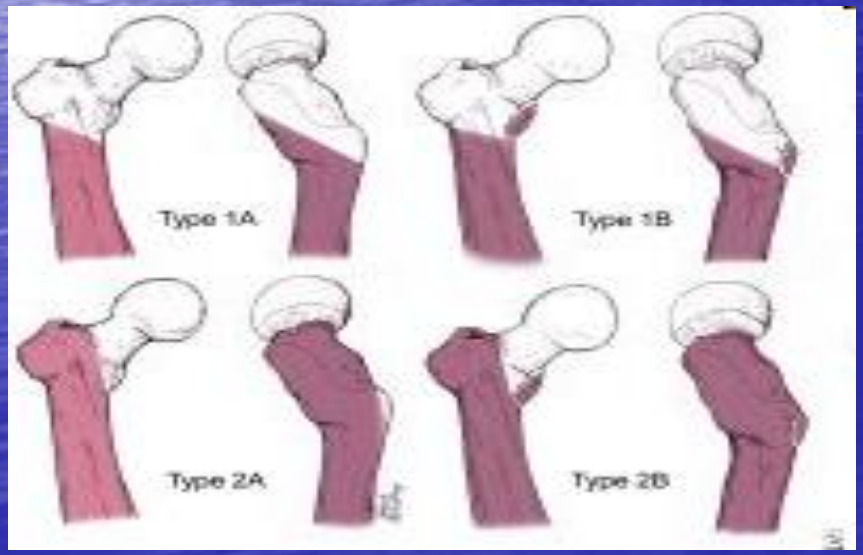
- Clinical Presentation:
  - Hip pain and externally rotated hip
  - Possible shortening and malalignment

Hip Fractures- Subtrochanteric

- Imaging: X-rays, CT

Hip Fractures- Subtrochanteric





- Russell-Taylor classification
  - Type I do not extend into piriformis fossa, thus, IM nailing beneficial
  - Type II extend into greater trochanter & involve piriformis fossa, complicating IM nailing techniques.

Hip Fractures- Subtrochanteric

- Treatment:
  - ORIF with fixation (several choices)
    - Side or Blade plate and screws
    - IM rod (makes extremely strong fixation though the proximal femur and trochanteric region)
  - Rehab: Rehab may be delayed until fracture healing is evident


Portal

Hip Fractures

Hip Fracture	**Classification Scheme**
Femoral Neck	Garden
Intertrochanteric	Evans
Subtrochanteric	Russel-Taylor

Femoral Neck Stress Fractures

- Two types: Compression type and Transverse (tension) type
- Endurance athletes most susceptible (long distance runner's military recruits)

Femoral Neck Stress Fractures

- Compression type:
  - More stable
  - Generally along inferior neck of femur (medial)

Femoral Neck Stress Fractures

- Transverse (tension) type:
  - Less stable
  - Generally along superior (lateral) region of femoral neck

Femoral Neck Stress Fractures

- Clinical Presentation:
  - Groin pain
  - Worsening of symptoms with ADL's
  - Pain at extreme ranges of internal and external rotation.

Femoral Neck Stress Fractures

- Imaging:
  - X-ray may be (-) at first, but then show periosteal thickening or radiolucent line
  - Bone scan may be (+) 2-8 days later after sx's.
  - MRI

Femoral Neck Stress Fractures

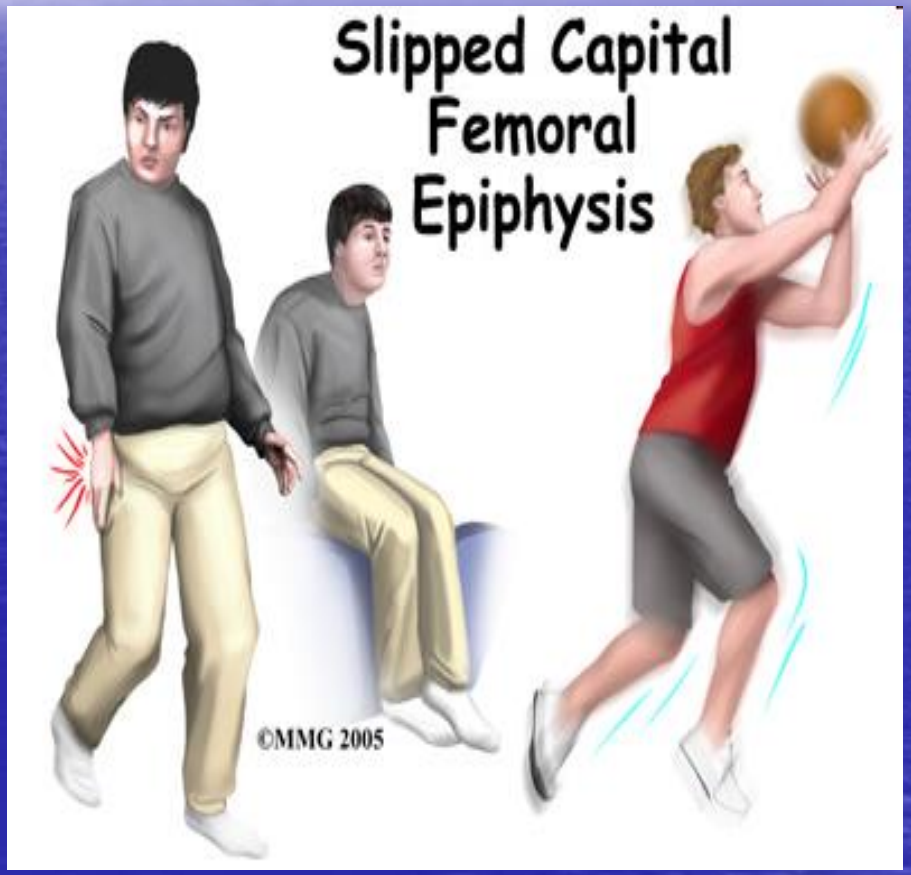
- Treatment:
  - Compression type:
    - Bed rest
    - NWB 6 weeks or until no pain at rest
  - Transverse (tension type)
    - Generally treated with internal fixation due to high risk of displacement

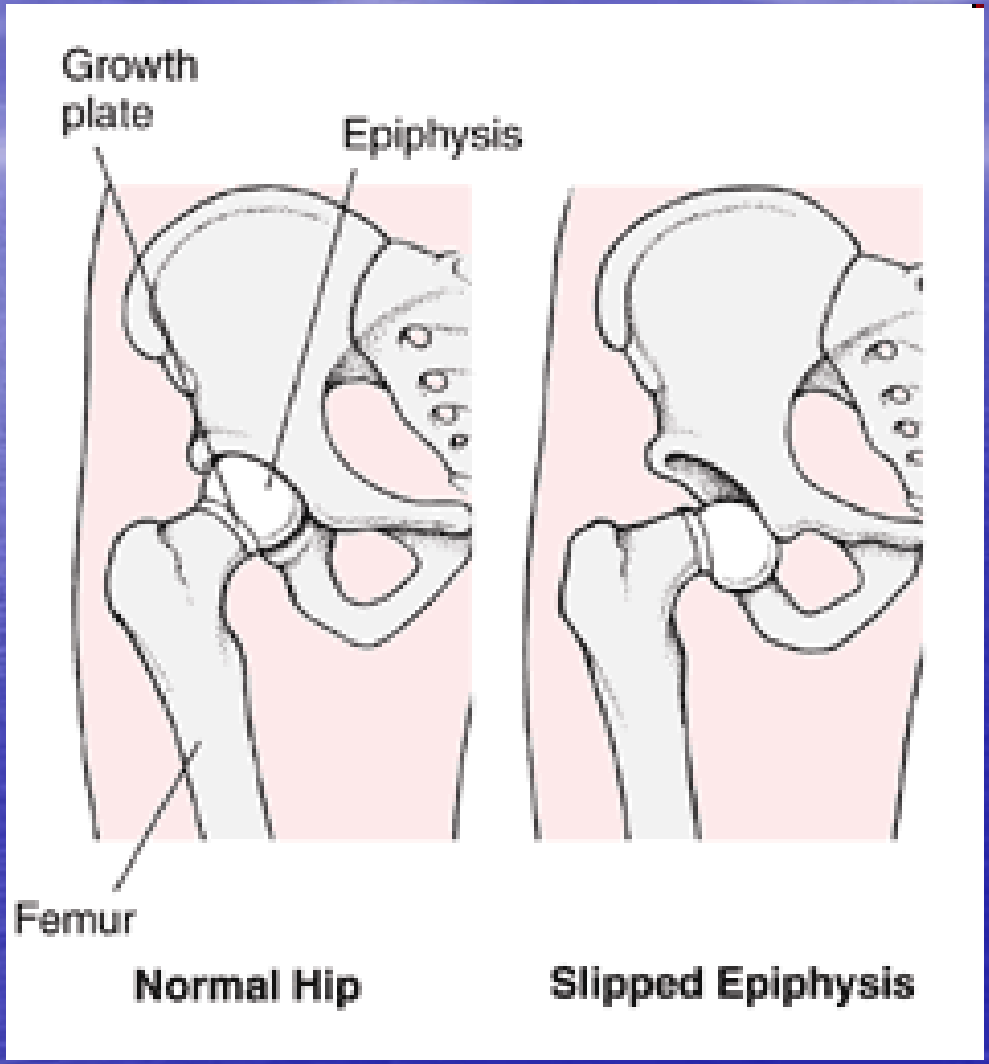
Slipped Capital Femoral Epiphysis (SCFE)

- General:
  - Injury to epiphyseal growth plate at the head of the femur causing displacement of the growth plate
  - May be associated with direct hip trauma
  - Possible association with hormones

Slipped Capital Femoral Epiphysis (SCFE)

- Common ages of incidence 11-16 yo
- Usually develops in overweight boys around puberty




Growth plate
Epiphysis
Femur
Normal Hip
Slipped Epiphysis

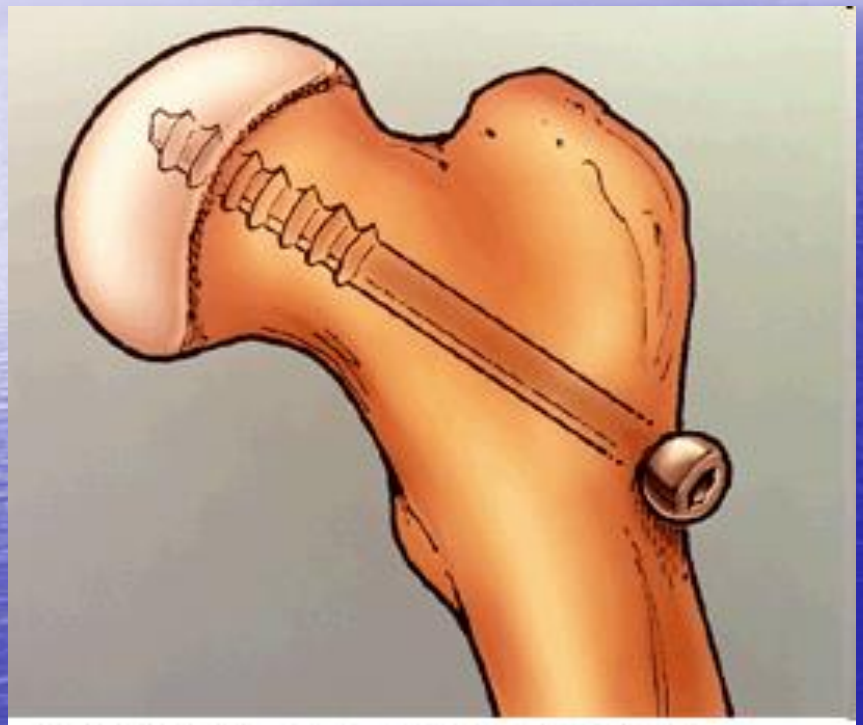
Slipped Capital Femoral Epiphysis (SCFE)

- Clinical Presentation
  - Usually groin or hip pain, but may also present as thigh or knee pain.
  - Sx's improve w/rest & worsen w/walking or moving
  - Later, a limp develops, followed by hip pain that extends down the inner thigh to the knee.
  - The affected leg is usually twisted outward.
  - Limited internal hip rotation, extremity externally rotates when hip is flexed

Slipped Capital Femoral Epiphysis (SCFE)

- Imaging: X-rays (AP and frog-leg views) or CT will demonstrate posterior displacement of epiphysis

Slipped Capital Femoral Epiphysis (SCFE)



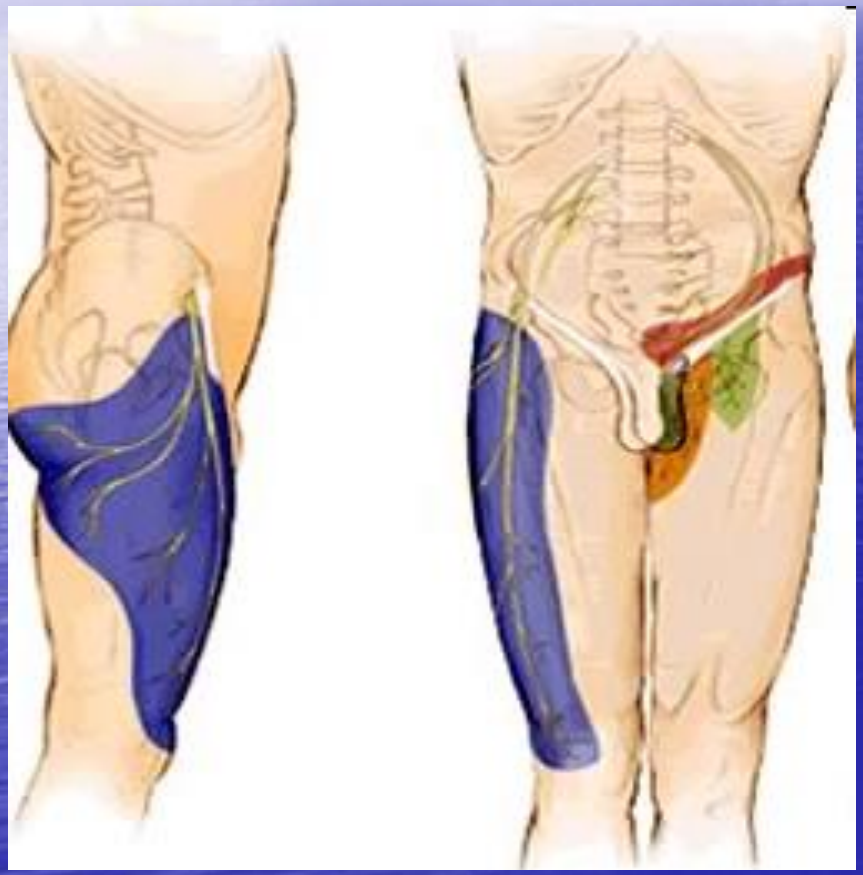
A screw is inserted to prevent any further slip of the femoral head through the growth plate.

- Treatment:
  - Immediate cessation of weight bearing
  - Surgical stabilization to align the separated ends of the thighbone and fasten them together with pins.
  - The hip is immobilized in a cast for several weeks to 2 months.

Slipped Capital Femoral Epiphysis (SCFE)

- Endocrine testing to rule out:
  - Growth hormone deficiency
  - Hyper/hypo thyroidism
  - Panhypopituitarism
  - Multiple endocrine neoplasia

Nerve Entrapments at the Hip



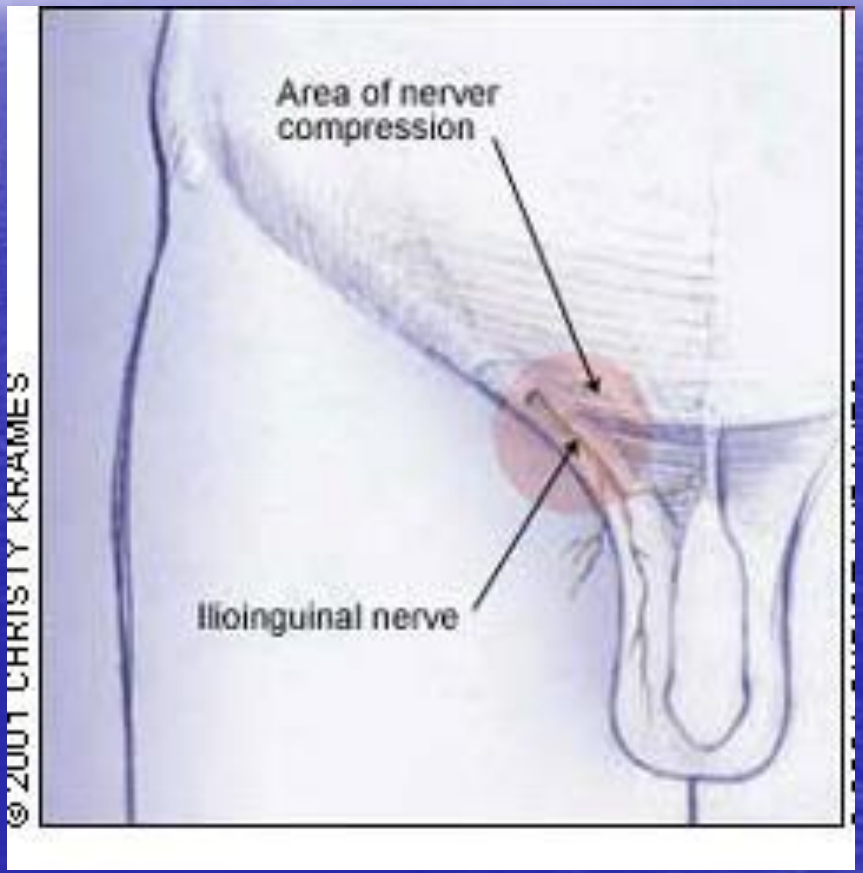
- Iliohypogastric Nerve
  - The distribution of the cutaneous sensation is a small region just superior to the pubis.

Nerve Entrapments at the Hip

- Iliohypogastric nerve:
  - Most commonly injured during surgery
  - Rarely injured alone
  - Idiopathic iliohypogastric syndrome- rare, occurs in pregnant women with rapidly expanding abdomen
  - Sports traumas a major cause

Nerve Entrapments at the Hip

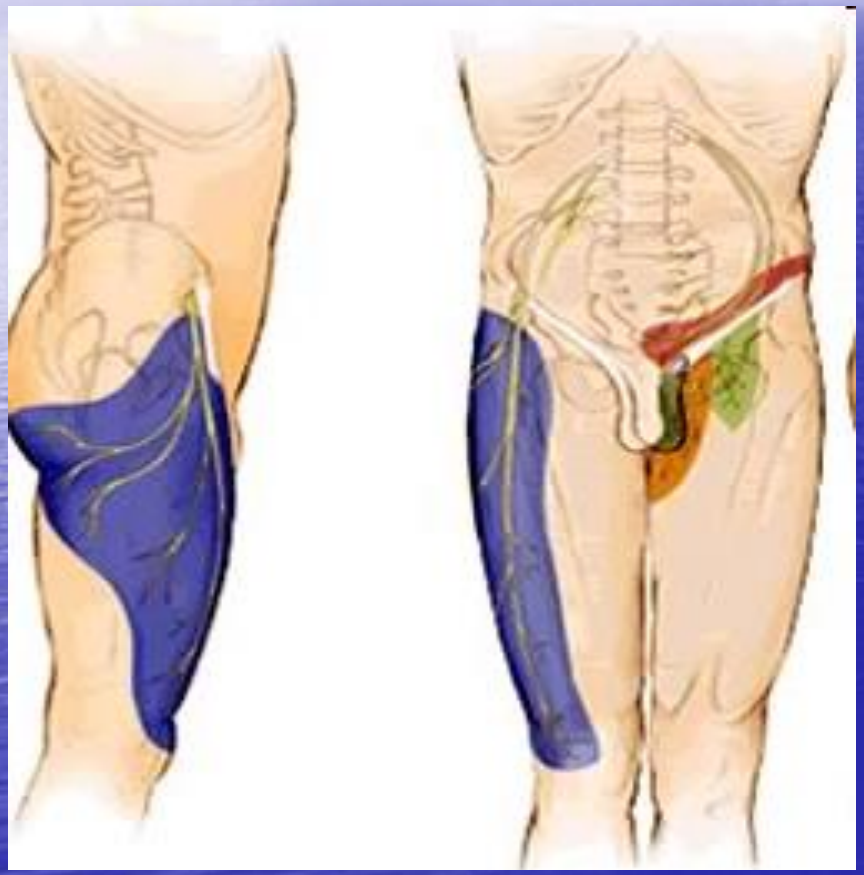
- Ilioinguinal nerve
  - supplies sensory branches pubic symphysis, superior and medial aspect of the femoral triangle and either the root of the penis and anterior scrotum in the male or the mons pubis and labia majora in the female.



Nerve Entrapments at the Hip

- Ilioinguinal nerve causes:
  - lower abdominal incisions (Pfannenstiel)
  - Pregnancy
  - ileac bone harvesting
  - Appendectomy
  - inguinal lymph node dissection
  - femoral catheter placement
  - Orchiectomy
  - total abdominal hysterectomy
  - abdominoplasty

Nerve Entrapments at the Hip



- Genitofemoral Nerve
- supplies the proximal portion of the thigh about the femoral triangle just lateral to the skin that is innervated by the ilioinguinal nerve.

Nerve Entrapments at the Hip

- May result from: hernia repair, appendectomy, biopsies, and cesarean delivery.
- Injury may also occur due to intrapelvic trauma to the posterior abdominal wall, retroperitoneal hematoma, pregnancy, or trauma to the inguinal ligament

Nerve Entrapments at the Hip

- Lateral Femoral Cutaneous Nerve
  - Branch of femoral nerve
  - Anterior branch supplies cutaneous sensation to the lateral thigh including just proximal to the patella
  - posterior branch pierces the fascia lata posterior and lateral and divides into multiple small branches that supply the skin from the greater trochanter to the mid thigh

Nerve Entrapments at the Hip

- Intrapelvic causes: pregnancy, abdominal tumors, uterine fibroids, diverticulitis, or appendicitis.
- Extrapelvic causes: include trauma to the region of the ASIS (eg, a seatbelt from a motor vehicle accident), tight garments, belts, girdles, or stretch from obesity and ascites.
- Mechanical factors: prolonged sitting or standing and pelvic tilt from leg length discrepancy. Diabetes can also cause this neuropathy in isolation or in the clinical setting of a polyneuropathy. extrapelvic causes, or mechanical causes

Thank you for your attention