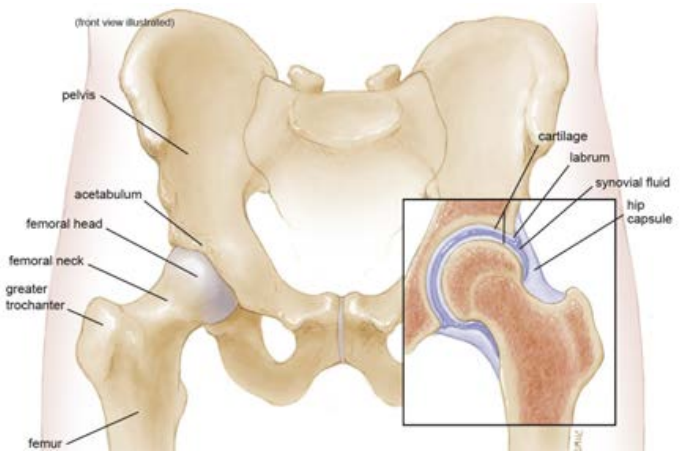
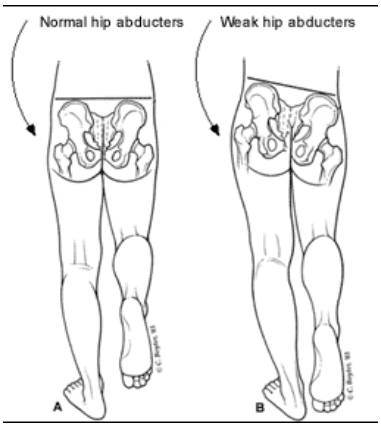
Lower Extremity – Hip

Anatomy





Exam Pearls + Special Tests

- Hip pain can refer to groin, thigh, or knee - or present as a limp/refusal to walk w/o complaint of pain
  - Pain from intra-articular pathology often localizes to groin
- **Barlow/Ortolani**: remember to apply gentle anterior pressure to the trochanter during abduction (Ortolani test)
- **Trendelenburg test**: Positive when patient stands on one leg and the contralateral hip drops, indicative of gluteals/ hip abductor weakness
- **Log roll test**: patient on back w/ leg fully extended and relaxed, examiner passively rotates leg and hip internally and externally
  - Pain should yield high suspicion for intra-articular pathology

Common Diagnoses

Legg Calve Perthes

Description/ Mechanism	Avascular necrosis of the hip, most common age 5-7, M > F
Signs/ Symptoms	Activity-related hip pain and/or limp (acute or chronic)
Diagnosis	• **Exam**: Trendelenburg gait, decreased hip abduction and internal rotation • **Imaging**: XR often normal early in course, bone scan or MRI more suggestive of dx
Management	• Non-weight bearing and restoration of motion - crutches, NSAIDS, PT, aquatherapy • Severe cases may require spica casting or surgery

SCFE

Description/ Mechanism	Displacement of the capital femoral epiphysis from the femoral neck through the physeal plate; commonly ages 10-16, M > F
Signs/ Symptoms	Groin pain, knee pain, limp

Lower Extremity – Hip

Common Diagnoses

SCFE

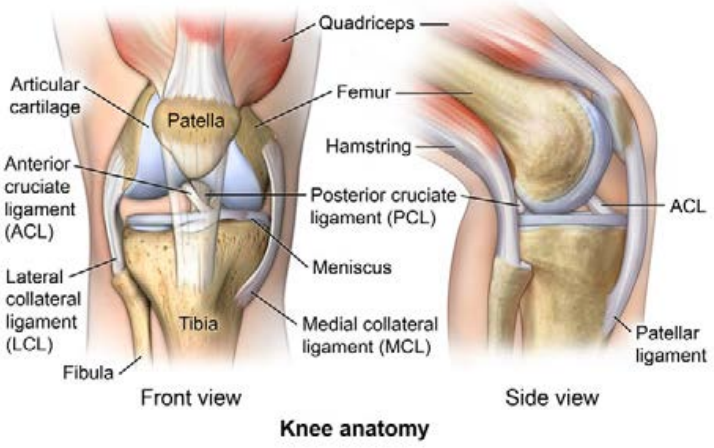
Diagnosis	• **Exam**: decreased hip ROM, hip externally rotated at rest, leg length discrepancy • **Imaging**: AP and frog leg lateral hip XR • Look for "ice cream scoop falling off the cone	

DDH

Description/ Mechanism	Abnormal development of shallow acetabulum causing hip joint instability; F > M
Diagnosis	• **Exam**: positive Barlow/Ortolani - only reliable in ages <3mo; limitation of hip abduction or positive Galeazzi (asymmetric knee heights when hips & knees flexed) in ages >3 mo • **Imaging**: US until age 4-6mos, AP XR pelvis w/ hip in 20-30 degree flexion after age 4-6mos
Management	• Ortho referral • Depending on age at diagnosis/referral and severity, may be treated w/ anything from observation to harness to operative management

Lower Extremity – Knee

Anatomy

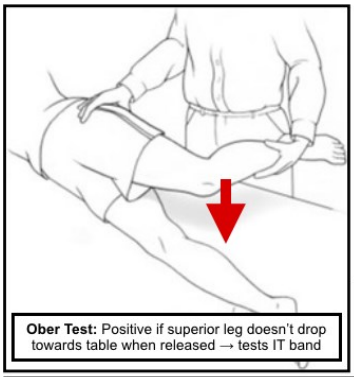


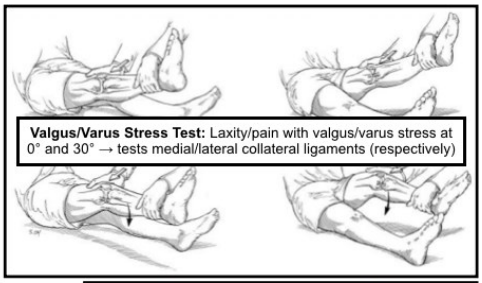
Knee anatomy

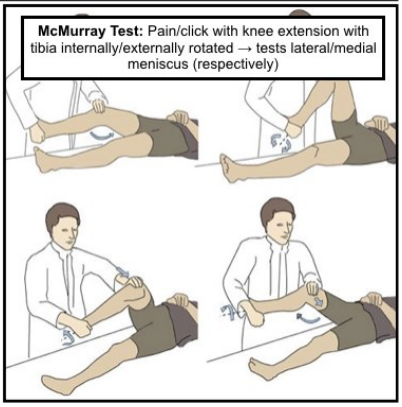
Knee continued on next page →

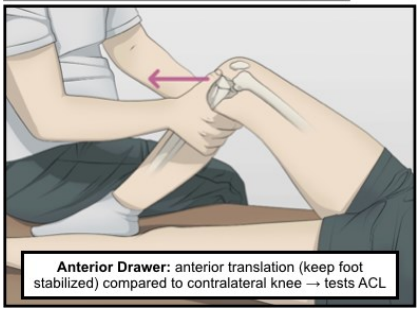
Lower Extremity – Knee

Exam Pearls + Special Tests









Common Diagnoses

Osgood Schlatter

Description/ Mechanism	• Traction apophysitis of tibial tubercle at patellar tendon insertion • Often children who play jumping sports and/or are undergoing rapid growth spurt • (Corollary process at inferior patellar pole = Sinding-Larsen-Johansson Syndrome)
Signs/ Symptoms	• Gradually worsening anterior knee pain, exacerbated by kneeling, jumping, stairs, walking uphill • Can be asymmetric or bilateral
Diagnosis	• **Exam**: prominence of and TTP at the tibial tubercle, pain w/ resisted knee extension or squatting • **Imaging**: not routinely indicated unless to rule out other dx
Management	• Usually conservative - pain management • PT for strengthening • Continuation of activity (as long as not prolonged squatting/kneeling - e.g. playing

Patellofemoral Pain Syndrome (PFPS)

Description/ Mechanism	Abnormal tracking of patella causes anterior knee pain w/o intraarticular pathology
Signs/ Symptoms	Anterior knee pain worsened w/ prolonged sitting (theater sign) or descending stairs

Lower Extremity – Knee	
Common Diagnoses	
Patellofemoral Pain Syndrome (PFPS)	
Diagnosis	• **Exam**: positive J-sign (lateral patellar tracking during terminal knee extension), positive patella mobility test (medial glide <¼ or >¾ patella width suggesting hypo- or hypermobility) • **Imaging**: not routinely indicated unless to exclude other dx
ACL Injuries	
Description/ Mechanism	• Cutting/pivoting motion causing valgus stress on knee, can be 2/2 direct blow causing hyperextension/valgus deformation • Medial meniscus and MCL often injured at same time (Unhappy Triad)
Signs/ Symptoms	"Pop" at time of injury, swelling, feeling of knee "giving out,"
Diagnosis	• **Exam**: Joint effusion, positive anterior drawer test • **Imaging**: MRI > XR, but can get XR to evaluate for associated injury/fracture
Management	• Ortho/Sports Medicine referral • Operative management in majority of cases, ideally w/ period of pre-operative rehabilitation to optimize outcomes
Meniscus Injuries	
Description/ Mechanism	• Direction change w/ knee rotation, planted foot, and flexed knee • Commonly in sports w/ lots of deceleration and direction change
Signs/ Symptoms	• Often insidious onset of pain/swelling in 24h after injury • Pain worse w/ twisting/pivoting • Can have locking/popping/catching sensation
Diagnosis	• **Exam:** joint line tenderness, inability to fully extend/squat/kneel, positive McMurray test • **Imaging:** MRI > XR (plain films often negative)
Management	• Ortho/Sports Medicine referral • Management varies from conservative to operative (usually arthroscopic)
IT Band Syndrome	
Description/ Mechanism	Tight IT band sliding over lateral femoral epicondyle
Signs/ Symptoms	Diffuse lateral knee pain, worsened w/ activity or w/ prolonged sitting w/ knee in flexed position
Diagnosis	• **Exam:** TTP in lateral knee, positive Ober test • **Imaging:** not routinely indicated
Management	• Activity modification • NSAIDs • Stretching/strengthening regimen

Knee continued on next page →

Lower Extremity – Knee

Common Diagnoses cont.

Osteochondritis Dissecans

Description/ Mechanism	• Acquired subchondral bone lesion which can progress to involve cartilage causing separation from underlying bone; most common in knee • Can lead to osteoarthritis if not recognized/treated • Mechanism unknown. Proposed to 2/2 repetitive trauma vs. inflammation
Signs/ Symptoms	May be incidental finding on imaging vs. non-specific activity related knee pain, may have swelling or symptoms of catching/locking if lesions are unstable
Diagnosis	• **Exam**: no specific findings • **Imaging**: 4-view XR (AP, lateral, sunrise, tunnel) of knee, MRI to further delineate known OCD lesion and determine management (or if XR negative but high clinical suspicion)
Management	• Referral to ortho/sports med • May be treated conservatively (non-weight-bearing or activity limitation) vs. operatively if lesions are unstable or unresponsive to conservative Treatment

Lower Extremity – Ankle/Foot

Anatomy

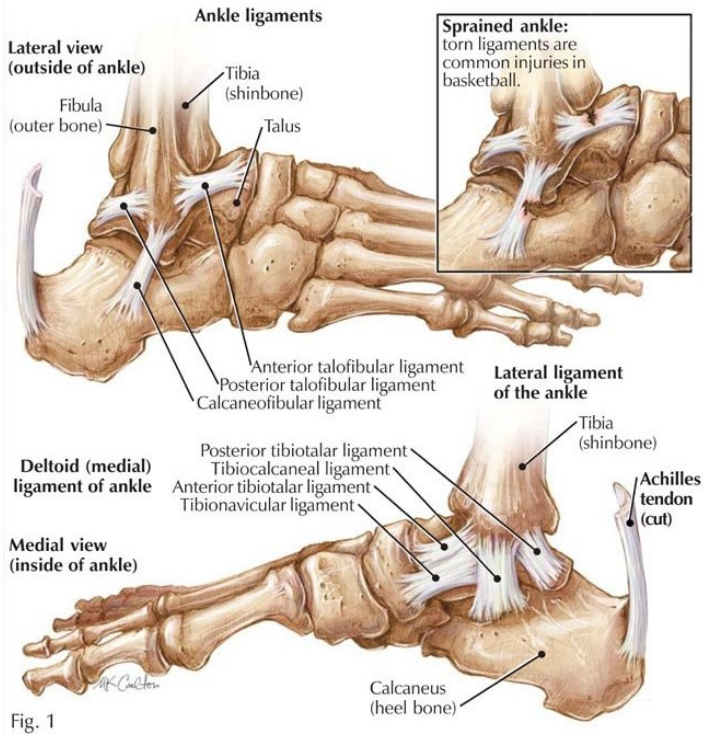
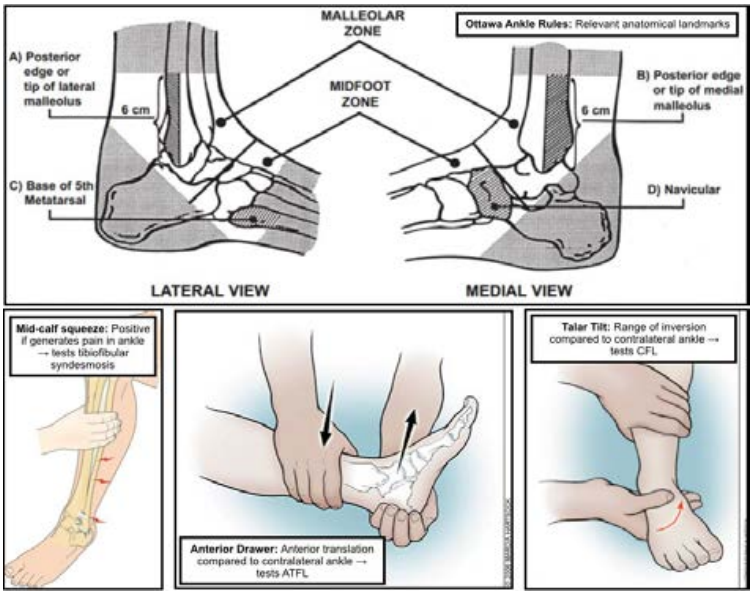


Fig. 1

Lower Extremity – Ankle/Foot

Exam Pearls + Special Tests



Ottawa ankle rules: when to get XR of the ankle/foot (validated age >18yo)

- Ankle: pain localized to malleolar zone and EITHER of:
  - Bony tenderness at post edge of lateral/medial malleolus
  - Inability to bear weight both immediately after injury and at time of exam
- Foot: pain in midfoot zone and EITHER of:
  - Bony tenderness at base of 5th met or navicular
  - Inability to bear weight both immediately after injury and at time of exam

Common Diagnoses

Ankle Sprain

Description/ Mechanism	• Ligamentous stretching/tearing • Lateral: inversion of plantarflexed foot - injures ATFL most commonly • Medial: eversion or abduction/ external
Signs/ Symptoms	Pain, swelling (diffuse or localized), +/- inability to bear weight
Diagnosis	• **Exam**: swelling, TTP, positive anterior drawer/talar tilt (lateral sprain), positive mid-calf squeeze (high sprain) • **Imaging**: not routinely indicated unless concern for fracture (see Ottawa rules) or clinical uncertainty
Management	• Short period of complete immob. (longer depending on severity), supportive device (lace-up brace or elastic bandage) • ROM/strength exercises (can be w/ formal PT, esp in case of recurrent ankle sprains) critical to restoring function and proprioception • For HIGH ankle sprains, consult ortho/sports medicine (may need acute surgical stabilization if severe)

Ankle/Foot continued on next page →

Lower Extremity – Ankle/Foot	
Common Diagnoses cont.	
Sever's Disease	
Description/ Mechanism	• Traction apophysitis of calcaneal growth plate at site of Achilles insertion; often children who play sports w/ jumping/heel striking and/or are undergoing rapid growth spurt • Essentially Osgood Schlatter at the calcaneus
Signs/ Symptoms	Chronic heel pain w/ insidious onset, worse w/ activity or wearing non-supportive footwear
Diagnosis	• **Exam**: TTP at calcaneal apophysis or w/ "calcaneal compression test" • **Imaging**: not routinely indicated unless diagnosis unclear or to rule out fracture
Management	Painful activity → gradual return to play, use of heel cup for support, ice and stretching
Spiral/Oblique Fracture	
Description/ Mechanism	• "Toddler's fracture" in 9mo-3yr • Rotation around fixed foot → distal tibial fracture; often minimal trauma in toddlers, higher impact injury in older children • Approx 30% of tibial fractures have associated fibular fracture • Spiral fractures in NON ambulatory child → concern for NAT
Signs/ Symptoms	Limp, refusal to bear weight
Diagnosis	• **Exam**: point tenderness over distal ⅓ of tibia • **Imaging**: AP and lateral XR of the tibia and fibula; fractures may be occult (not seen on imaging)
Management	• Immobilization in long leg posterior splint/cast • Ortho referral
Congenital Clubfoot	
Description/ Mechanism	• Idiopathic vs 2/2 intrinsic (e.g. neurologic) or extrinsic (e.g. fibroids) factors • 1:1000 live births, M>F
Diagnosis	• **Exam**: fixed (e.g. not correctable) deformity of the foot w/ plantar flexion and inversion + rotation, calf atrophy • **Imaging**: usually dx on prenatal US, XR minimally useful initially
Management	Ortho referral (usually done in nursery prior to d/c), Serial casting → Achilles tenotomy → bracing