MAYO CLINIC

KEYS TO THE PHYSICAL EXAMINATION FOR COMMON PEDIATRIC LOWER EXTREMITY SPORTS RELATED INJURIES

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OBJECTIVES

- For lower extremity sports injuries in children, learners will be able to…
  - Evaluate associated anatomic structures
  - Identify key history and exam findings for common injuries
  - Perform physical examination maneuvers
  - Apply return to sport principles

GOALS

1. Interactive!
2. Improve knowledge of physical exam

PHYSICAL EXAM OF LOWER EXTREMITY

- **Inspection**
  - Clothes off!
- **Palpation**
  - One finger and know what you are touching!
- **Range of Motion**
  - Active and Passive
- **Strength/neurovascular**
  - Understand what you are testing
- **Special Maneuvers**
  - Requires practice

WHAT ARE COMMON INJURIES TO THE KNEE/ANKLE/FOOT?

WHAT ARE COMMON INJURIES SEEN OF THE KNEE AND ANKLE/FOOT?

- **Knee**
  - Overuse
    - Patellofemoral pain
    - Osgood Schlatter/ Patellar Tendinitis
  - Traumatic
    - ACL
    - Patella Subluxation/Dislocation
    - MCL
    - Meniscus
- **Ankle/Foot**
  - Overuse
    - Calcaneal Apophysitis (Sever's)
    - Metatarsal Stress Fracture
  - Traumatic
    - Lateral Ankle Sprain
    - High Ankle Sprain

DO NOT HESITATE TO GET AN X-RAY IN PEDIATRICS

FOOT AND ANKLE

TIME FOR EXAM

1. Find a partner to allow practice of some components of exam

2. If online practice palpation on yourself

3. Observe demonstration first and then practice on your own

GAME PLAN

- We will share common aspect of history and then ask for typical physical exam findings for each condition with demonstration
- We recommend performing full exam on every joint in clinic, but we will highlight just the positive exam maneuvers
- Not all patients have exact same history and exam
- Feel free to ask us to pause if we need to explain what the condition is or what we are assessing

PATELLOFEMORAL PAIN

- History
  - Activity related pain
  - Pain with stairs, prolonged sitting
    - Level ground walking typically OK
  - No significant swelling

- Exam
  - Tenderness medial and lateral patella facets
  - Possible pain or crepitus with patella grind
  - Check for dynamic knee valgus with squat (medial collapse)
    - Hip control may be a factor

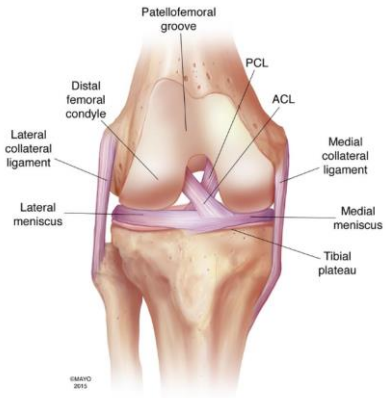
OSGOOD-SCHLATTER

- History
  - Early adolescent
  - Activity related pain
    - Running and jumping
  - Pain localized to tibial tubercle
  - May have bony prominence or soft tissue swelling (no effusion)
- Exam
  - Palpate: Localized tenderness to tibial tubercle
  - Pain with resisted extension of the knee or squats/jumps

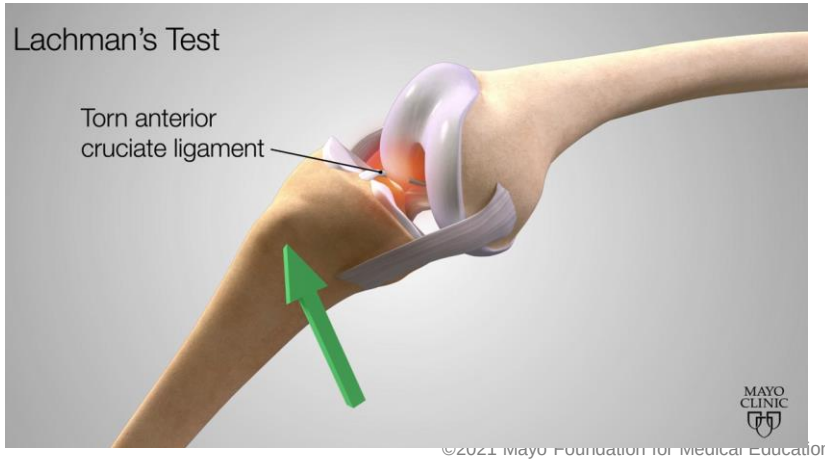
Osgood typically younger population, even younger Sinding-Larssen Johansson

ACL

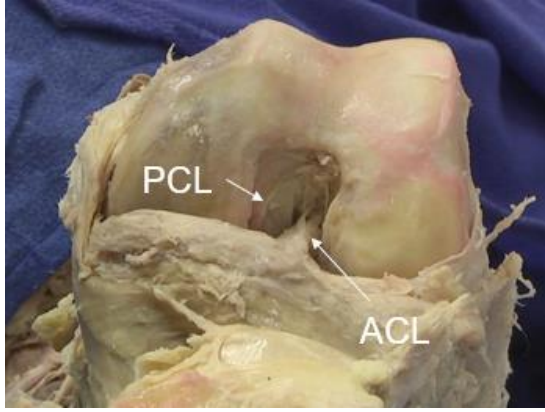
- Function
  - Resist anterior translation of tibia
- History
  - Non-contact cutting or traumatic
  - Pain
  - May have an audible pop
  - Rapid onset knee swelling/effusion



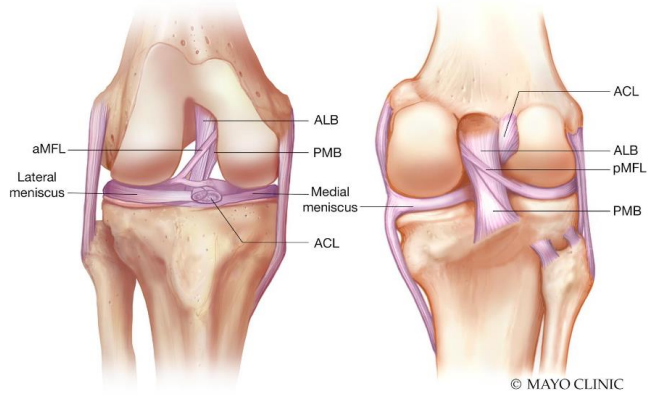
- Exam
  - Palpate - knee effusion
  - Positive Lachman or modified Lachman (skip anterior drawer)
  - May have limited ROM
  - Note: often associated injuries



PCL

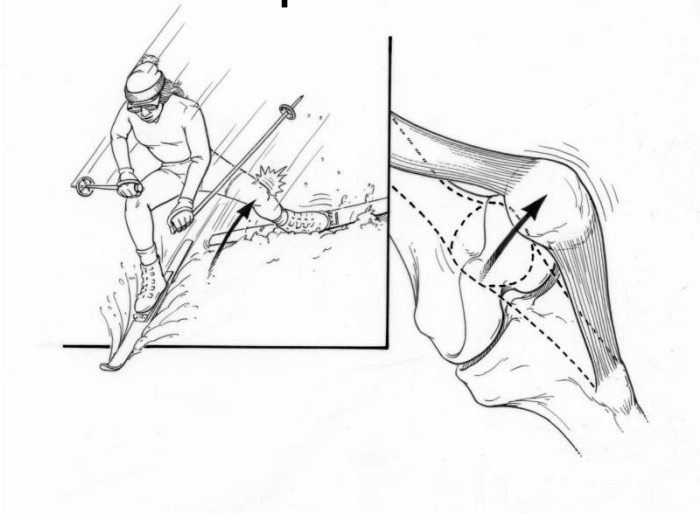


- Function
  - Resist posterior translation of tibia
- History
  - Trauma
  - Posterior force to anterior tibia
  - Hyperflexion – fall onto a flexed knee
- Physical Exam
  - Possible swelling/effusion
  - Posterior Sag
    - Note: Important as PCL injury may be confused as an ACL injury
  - Posterior Drawer

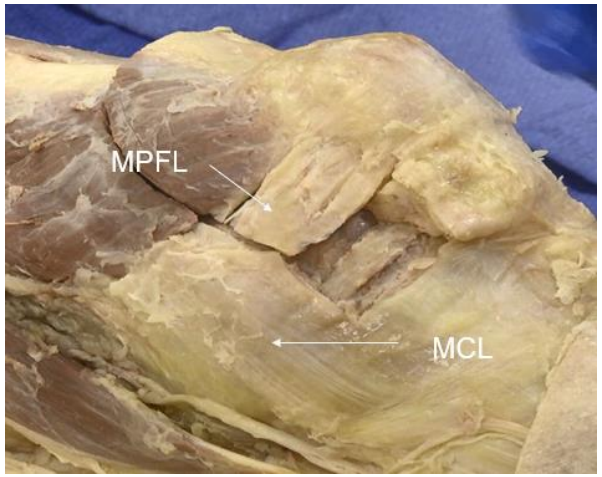


PATELLA DISLOCATION/SUBLUXATION

- History
  - Traumatic
  - Immediate pain
  - Possible audible pop
  - Knee swelling/effusion
- Note: similar presentation as ACL

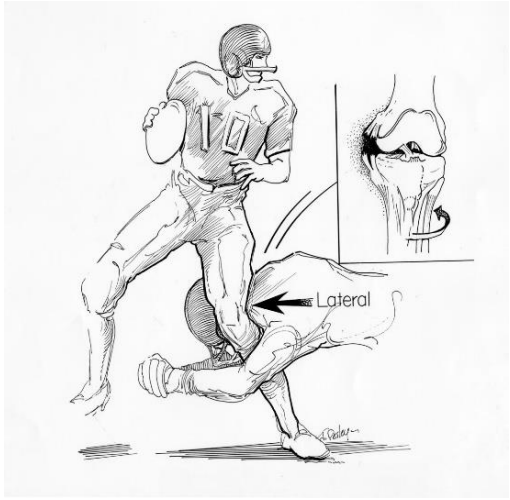


- Exam
  - Palpate effusion
  - Tenderness over MPFL
  - Patella apprehension
  - Normal Lachman

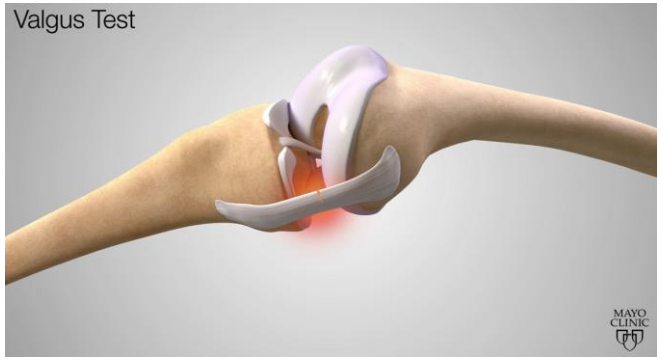


MCL

- Function
  - Resist valgus rotation
- History
  - Traumatic
    - Knee valgus mechanism
  - Immediate pain
  - Pain medial

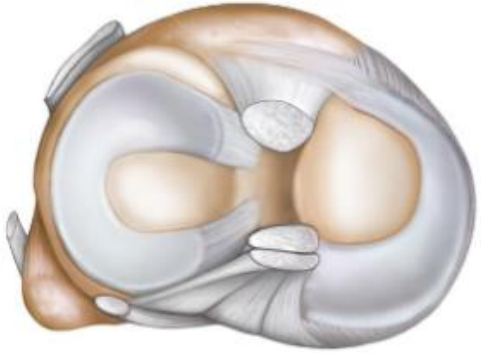


- Exam
  - Limited swelling and minimal effusion
  - Tender over MCL
  - ROM nearly full – possible end range pain
  - Pain and or laxity with valgus stress test at 30 degrees



MENISCUS

- Function
  - Load distribution
  - Joint lubrication
  - Congruity
- History
  - Can be non-contact cutting or traumatic
  - Immediate pain
  - Possible pop sensation
  - Effusion delayed
  - May have mechanical symptoms (catching and locking)



- Exam
  - May palpate small effusion
  - Joint line tenderness
  - Pain with bounce home
  - ROM – possible end range pain flexion/extension
  - Pain with Thessaly

SEVER'S DISEASE (APOPHYSITIS)

- History
  - Activity related – overuse
  - Early or pre-pubertal athlete often in soccer, football, basketball, or significant running
  - Pain localized at heel
  - No swelling or bruising
  - Worse with activity and better with rest

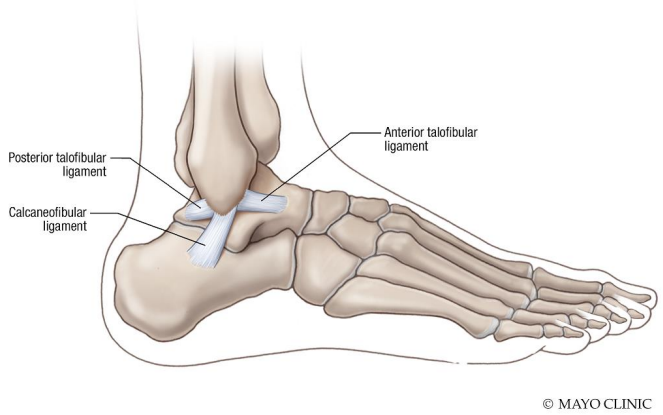
- Physical Exam
  - Normal inspection
  - Tender over medial and lateral calcaneus
  - Positive calcaneal squeeze

Note: need to have open growth plates ≈ ages 9-12

METATARSAL STRESS FRACTURE

- History
  - Repetitive activity (often runner)
  - Insidious onset of pain
  - Worse with activity
  - Localized pain
  - Consider nutritional and menstrual history (RED-S and Female athlete triad)
- Physical Exam
  - Usually, normal inspection
  - Palpate - focal tenderness
  - May have pain with hopping (hop test)

LATERAL ANKLE SPRAIN



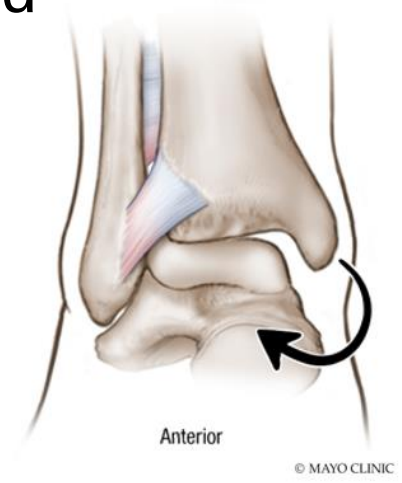
- History
  - Traumatic - Plantar flexion and inversion mechanism
  - Pain - immediate
  - Swelling and bruising often present
  - Pain over lateral ankle primarily – may be diffuse due to swelling

- Physical Exam
  - Inspection can have impressive swelling and bruising
  - Palpate - tender

    ATFL> CFL > PTFL
  - Increased laxity with anterior drawer (grade 2-3)
  - ROM painful and limited

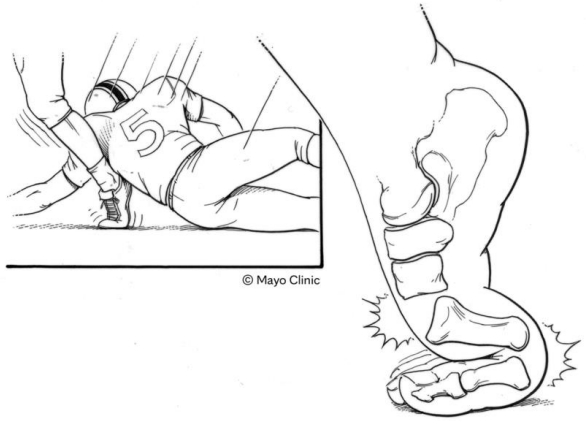
HIGH ANKLE SPRAIN

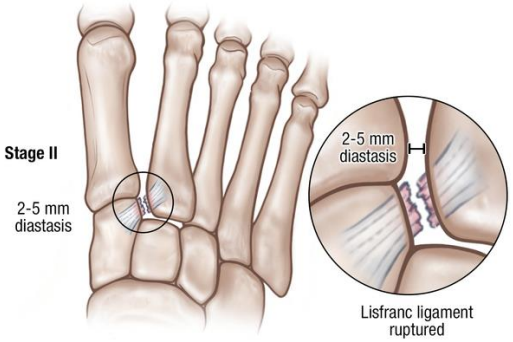
- History
  - Traumatic
    - Mechanism typically external rotation of foot relative to leg
  - Often pain is anterior/lateral
  - Can have swelling and bruising



- Physical Exam
  - Palpate: tender over AITFL (or tib/fib junction distally)
  - Positive external rotation test and syndesmotic squeeze
  - Check proximal fibula (fracture)

LIS FRANC





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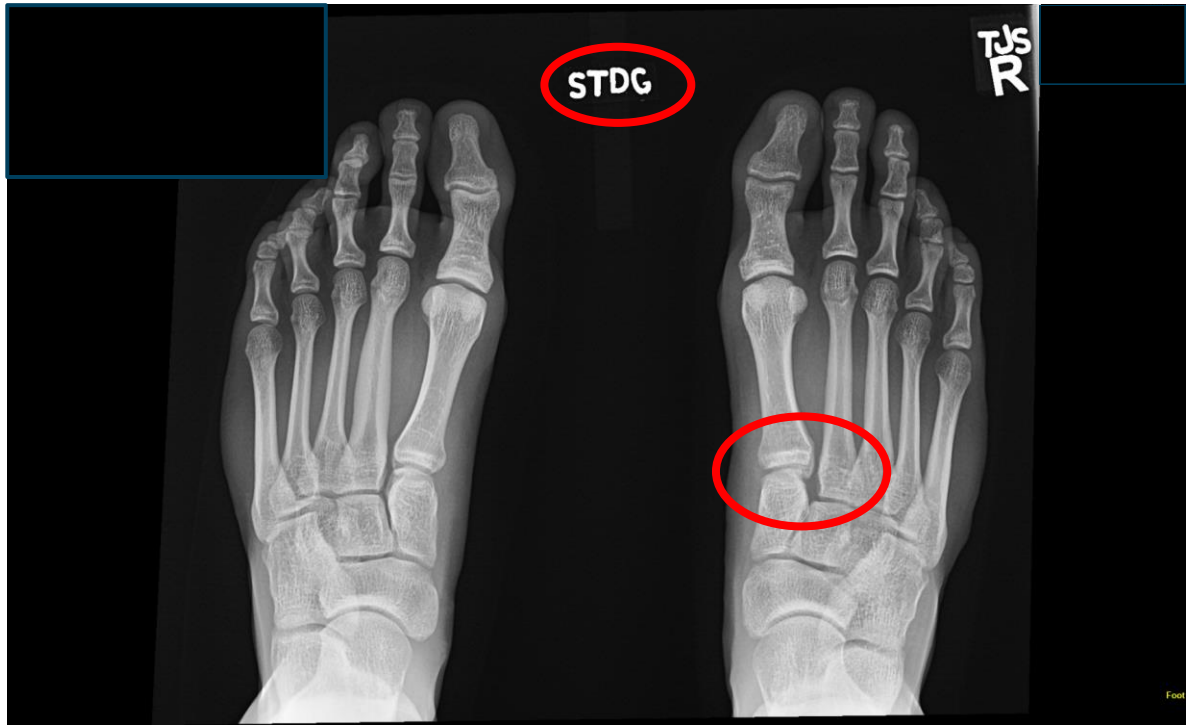
- History
  - Traumatic
  - Axial load

Examination

- Tenderness over midfoot
- Possible pain with walking and pushing off (similar MOI position)
- May have swelling / bruising



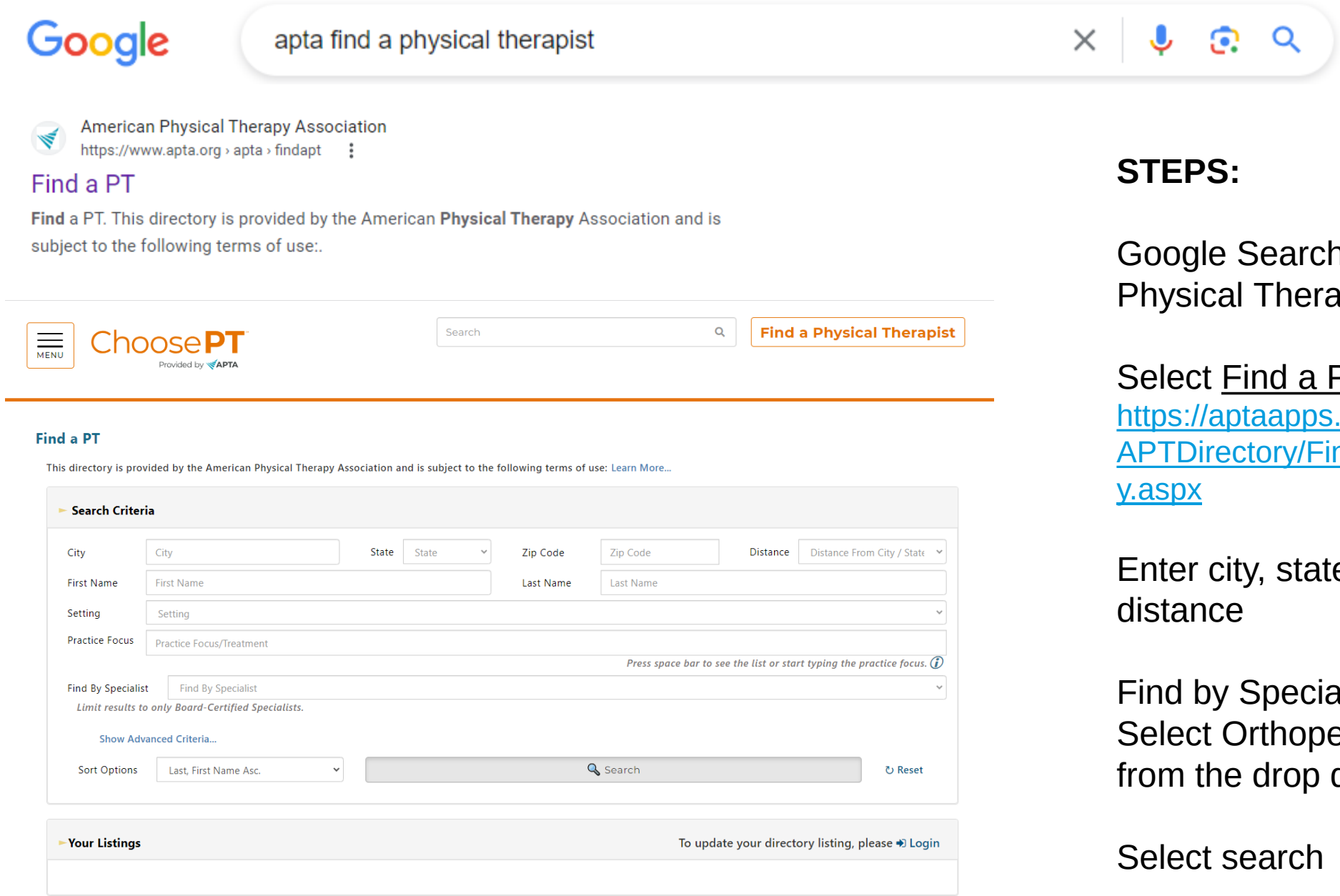
- Weightbearing radiograph is key - suspicion based on MOI
- Early identification and management important

RETURN TO PLAY (RTP)

- Things to consider…
  - Patient factors
    - assessment of health
  - Activity Risk
    - risks associated with the desired activity
  - Assessment of Risk Tolerance
    - internal and external pressures / time in season
  - Tissue Healing time
    - fracture, ligament, etc…
  - ***Role of bracing/splinting***

KEY POINTS FOR RETURN TO PLAY

- When to refer to PT?
  - Injury prevention & neuromuscular re-education
- When not to refer to PT?
- What type of physical therapist?
- How do you find one?



STEPS:

Google Search for a Physical Therapist (APTA)

Select Find a PT https://aptaapps.apta.org//APTAPTDirectory/FindAPTDirectory.aspx

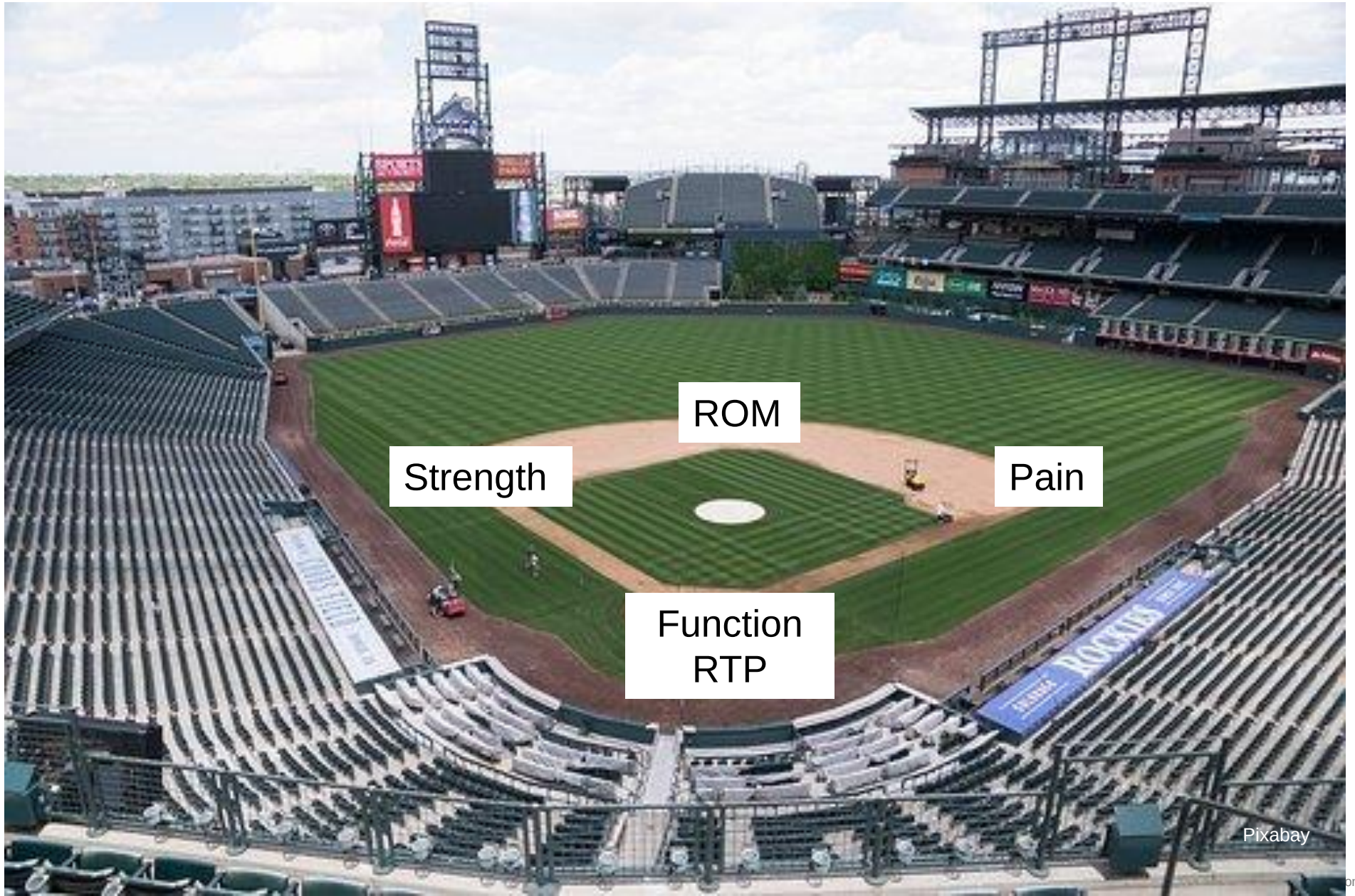
Enter city, state, and distance

Find by Specialist entry – Select Orthopedic or Sports from the drop down

Select search

BASEBALL ANALOGY

Give athletes goals and objectives not a date

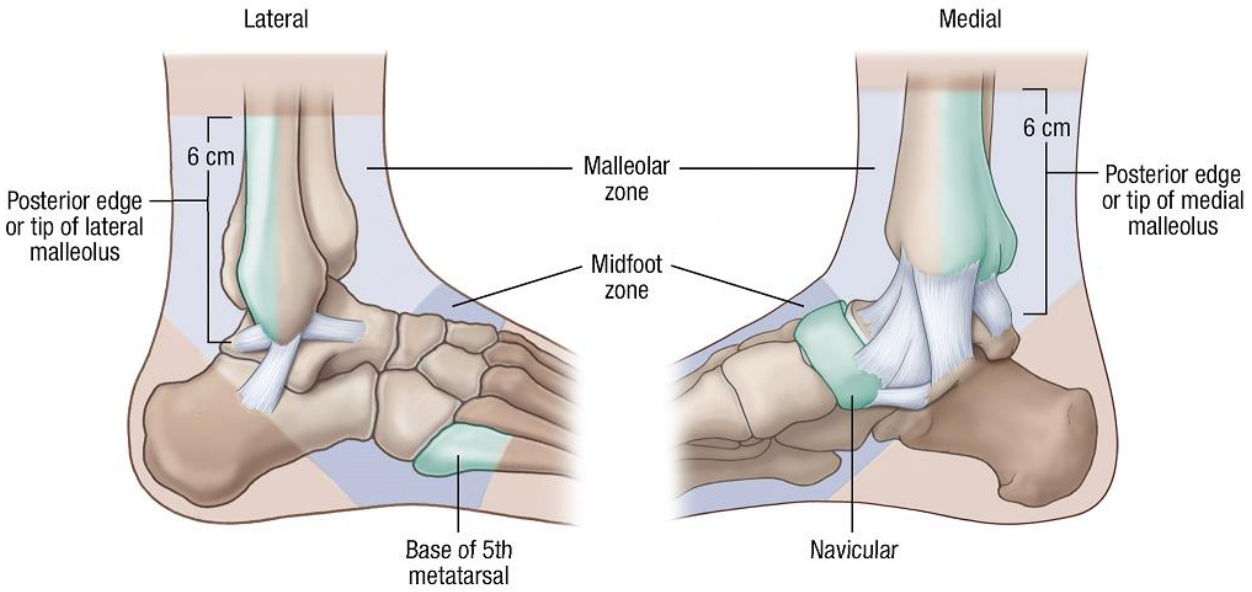


SUMMARY

- Know anatomy
- Get detailed history or watch video if possible
- Perform comprehensive exam on all patients as multiple injuries are possible
- Compare to contralateral side

QUESTIONS

CASE - IMAGE


Lateral
Medial
6 cm
6 cm
Posterior edge or tip of lateral malleolus
Malleolar zone
Midfoot zone
Posterior edge or tip of medial malleolus
Base of 5th metatarsal
Navicular
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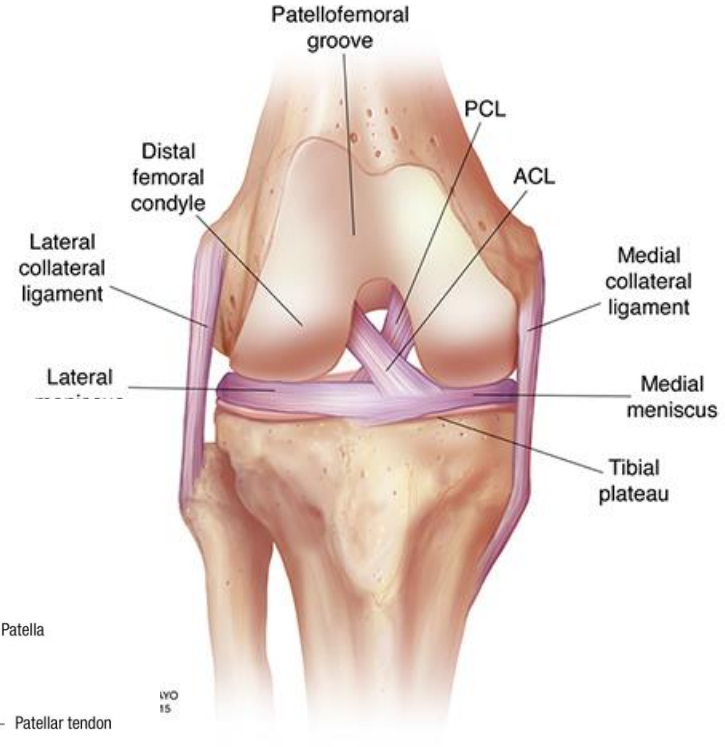
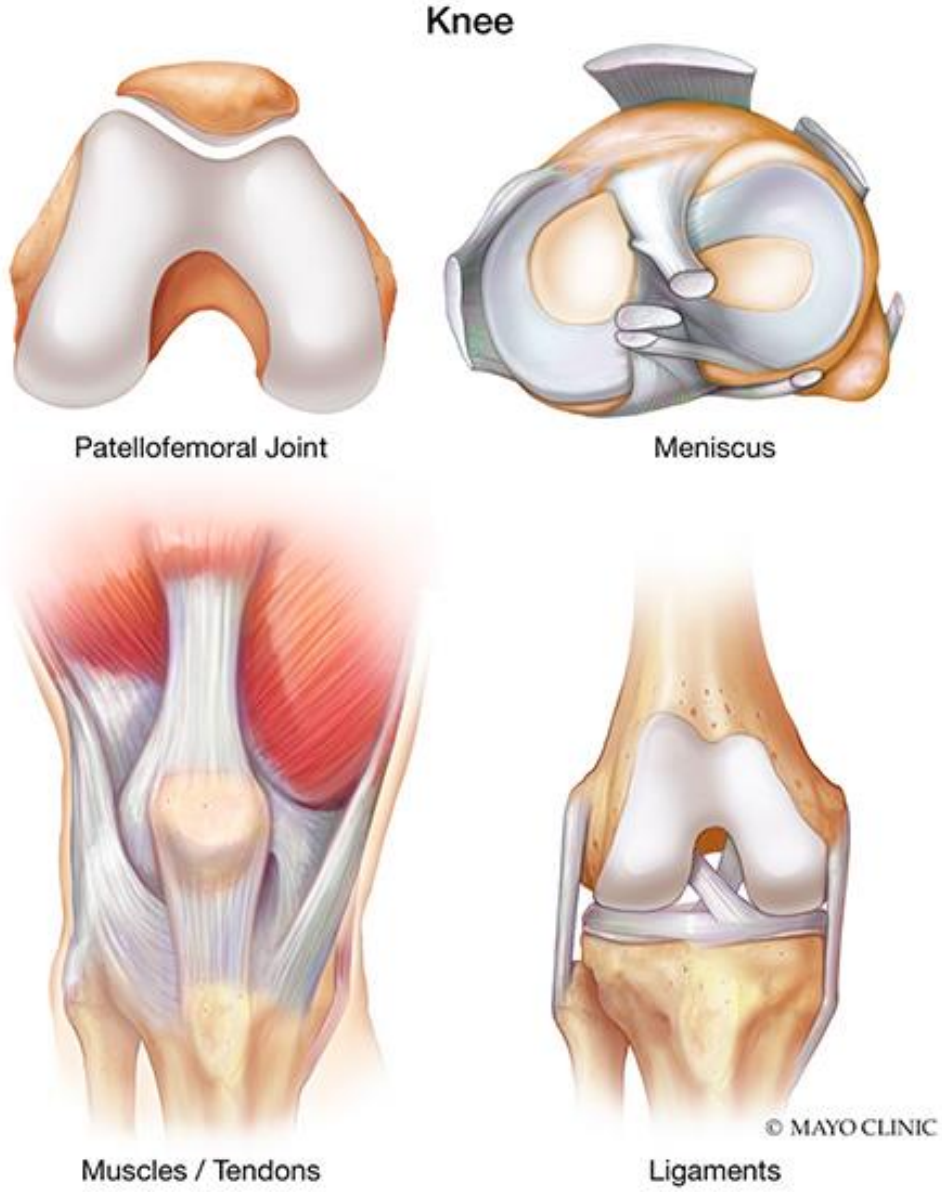
R
cm

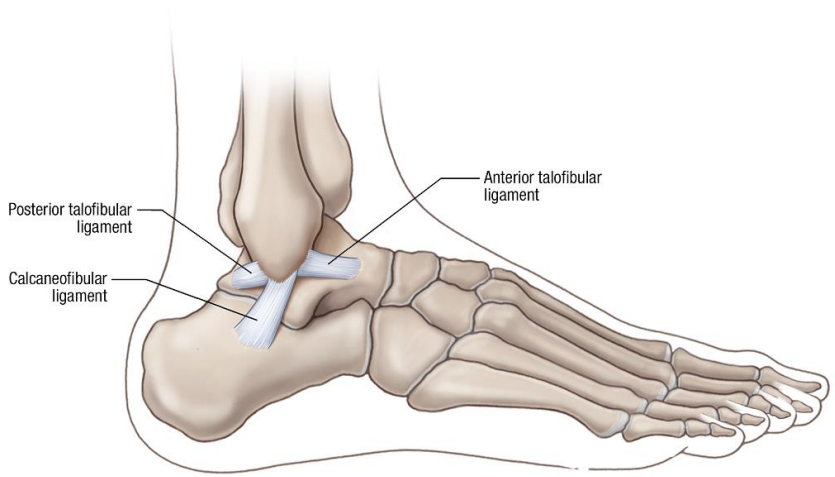
ANATOMY

The normal knee joint





ANATOMY



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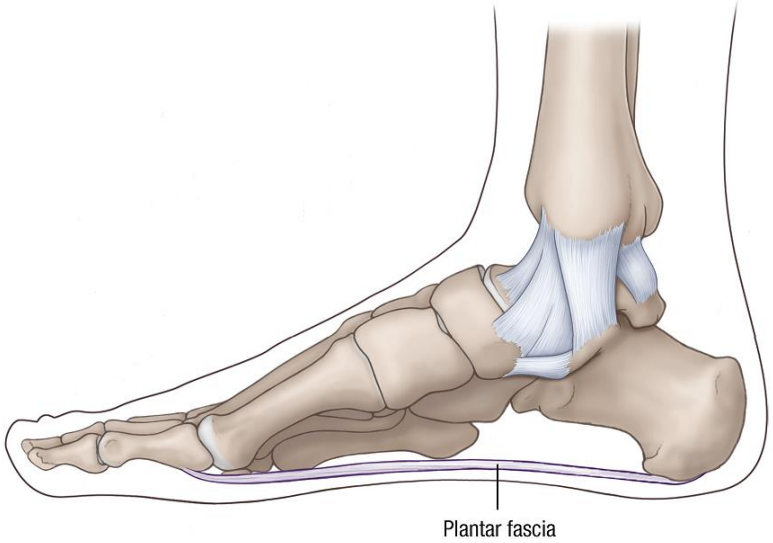

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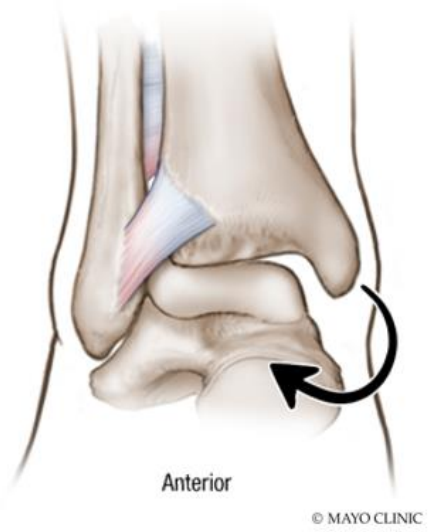

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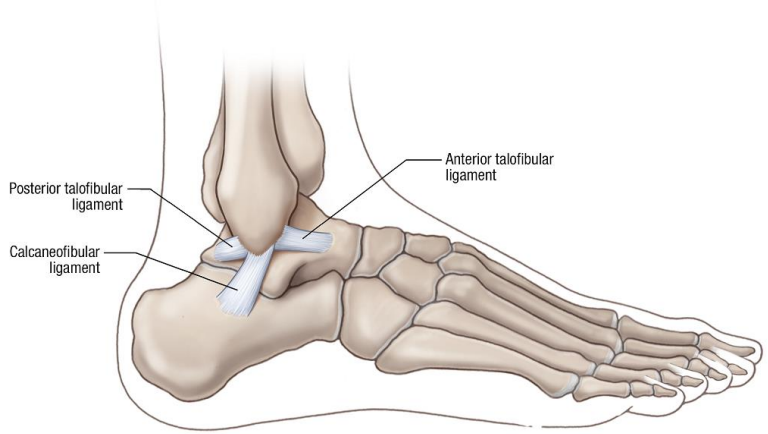

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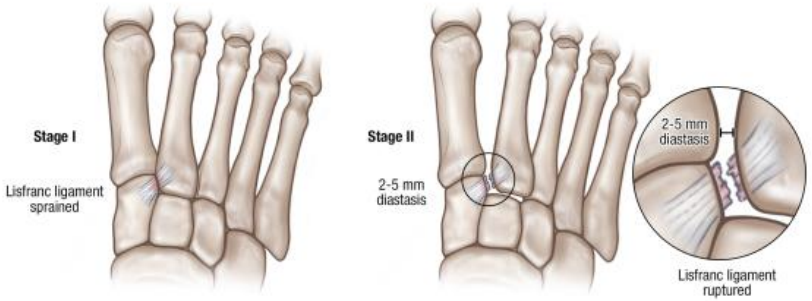

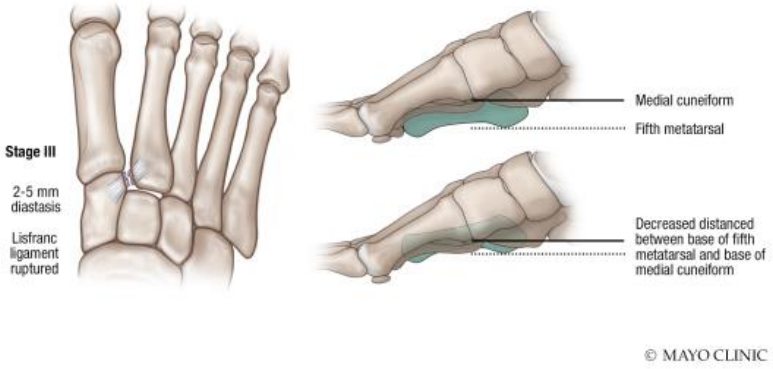

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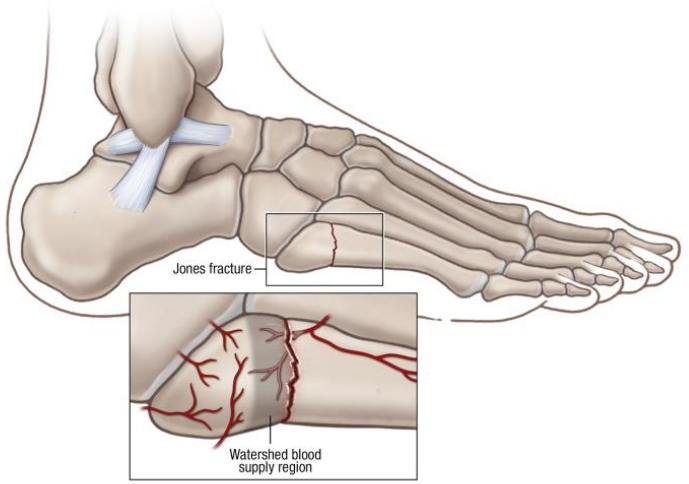

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