

# LOWER EXTREMITY INJURIES



Recognizing common  
injuries to the lower  
extremity...

# Anatomy

## ○ Bones

- Femur
- Patella
- Tibia
  - Tibial Tuberosity
  - Medial Malleolus
- Fibula
  - Lateral Malleolus

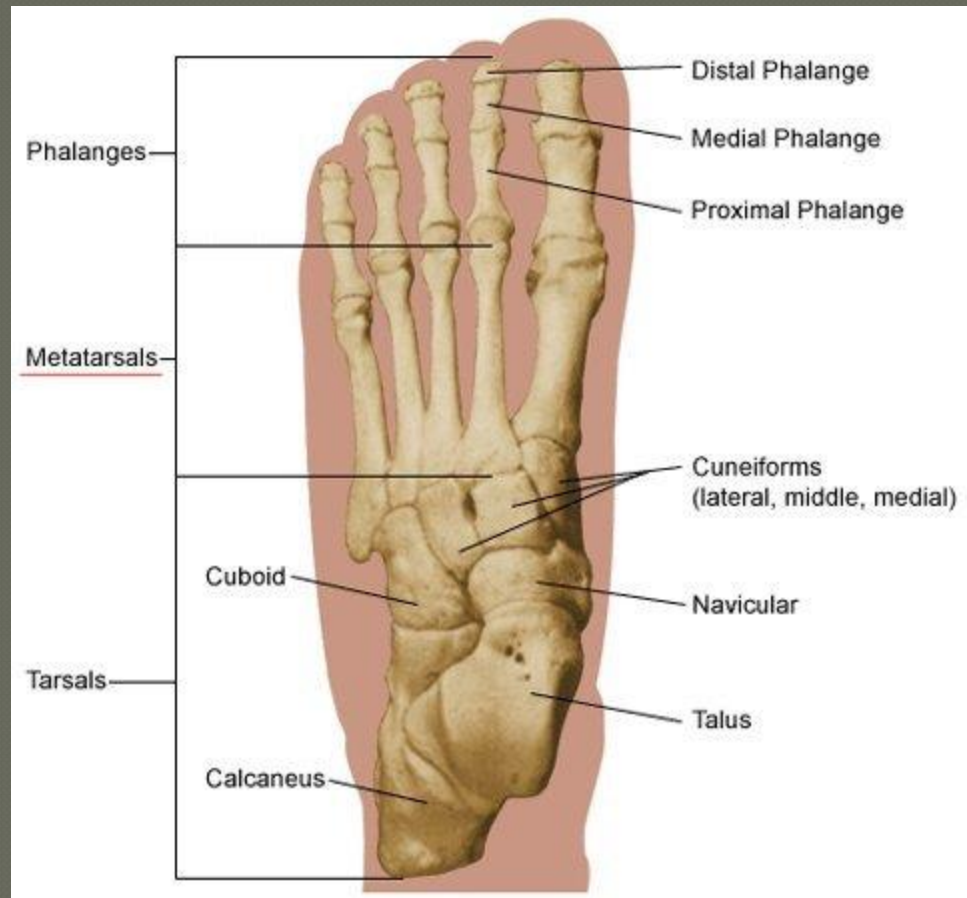




# Anatomy

## ○ Bones

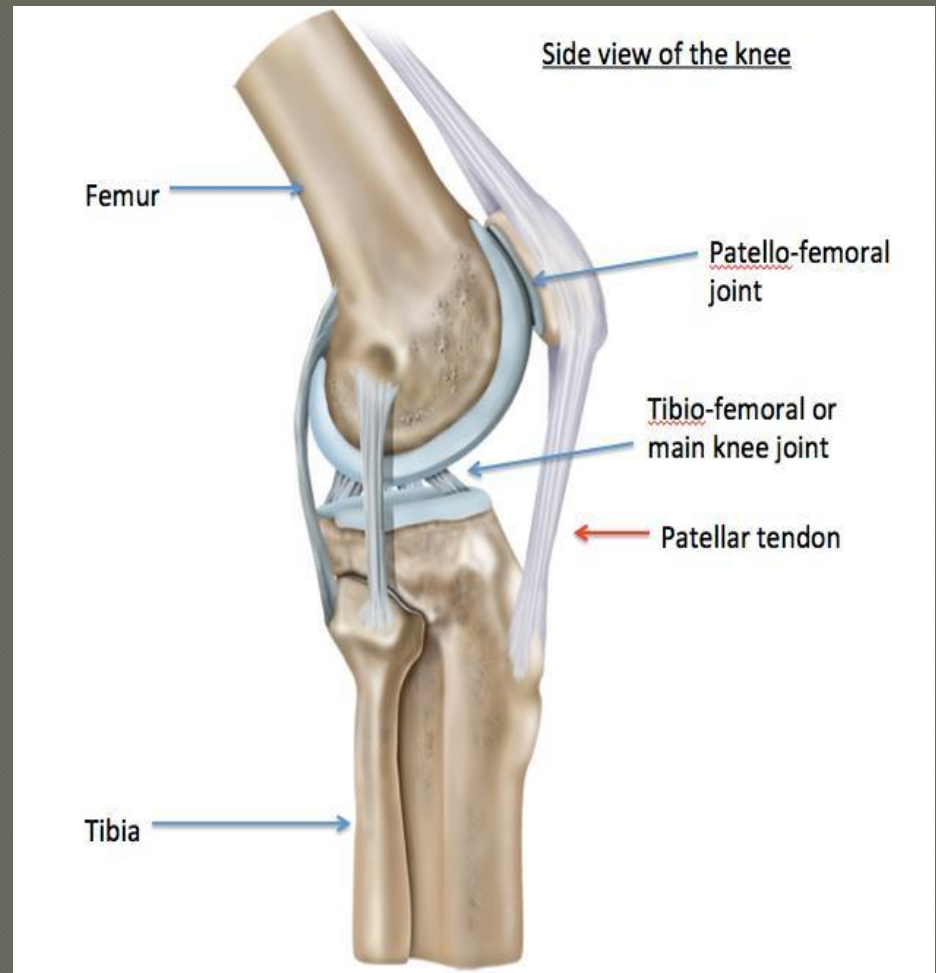
- Tarsals
  - Talus
  - Calcaneus
- Metatarsals
- Phalanges



# Anatomy

## ○ Joints - Knee

- Tibiofemoral – allows knee flexion/extension
- Patellofemoral

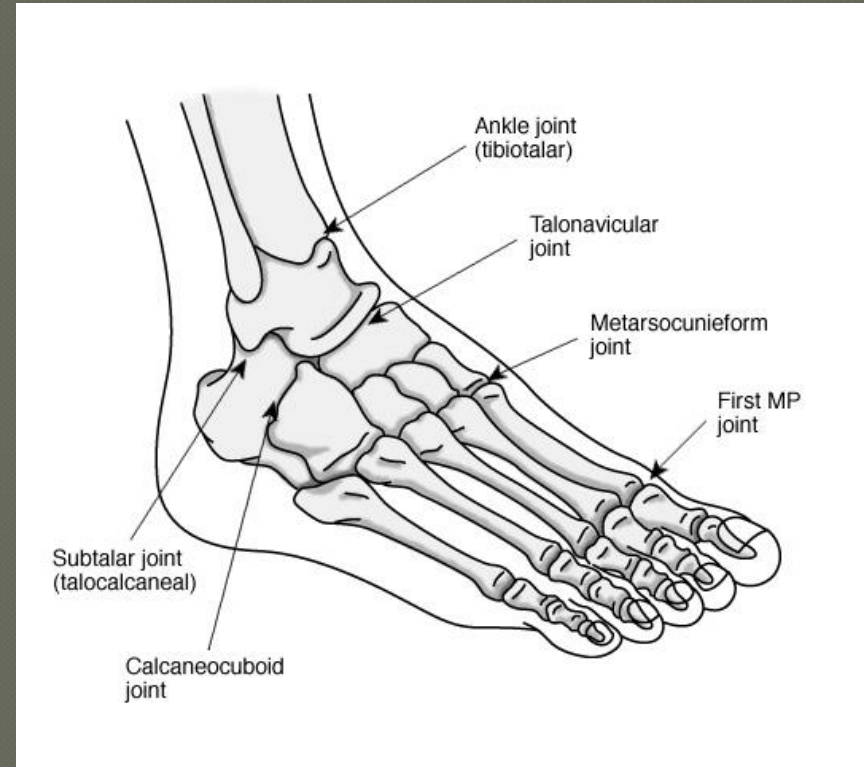




# Anatomy

## ○ Joints – Foot & ankle

- Tibiotalar (ankle joint)
  - Allows plantar and dorsiflexion
- Subtalar
  - Joint between talus and calcaneus
  - Allows inversion and eversion
- Midfoot – where tarsals meet metatarsals
- Metatarsal Phalangeal (MP)
  - Allows toe flexion and extension
- Interphalangeal
  - Allows flexion and extension of toe segments

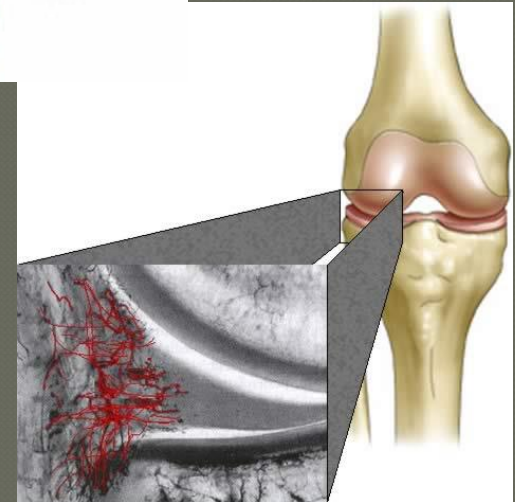




# Anatomy – Soft Tissues

## Menisci of the knee

- Lateral Meniscus – Joint cartilage that deepens the knee joint.
- Medial Meniscus – Joint cartilage that deepens the knee joint . Has a deep attachment to the MCL.
- Outer 1/3 has a blood supply.

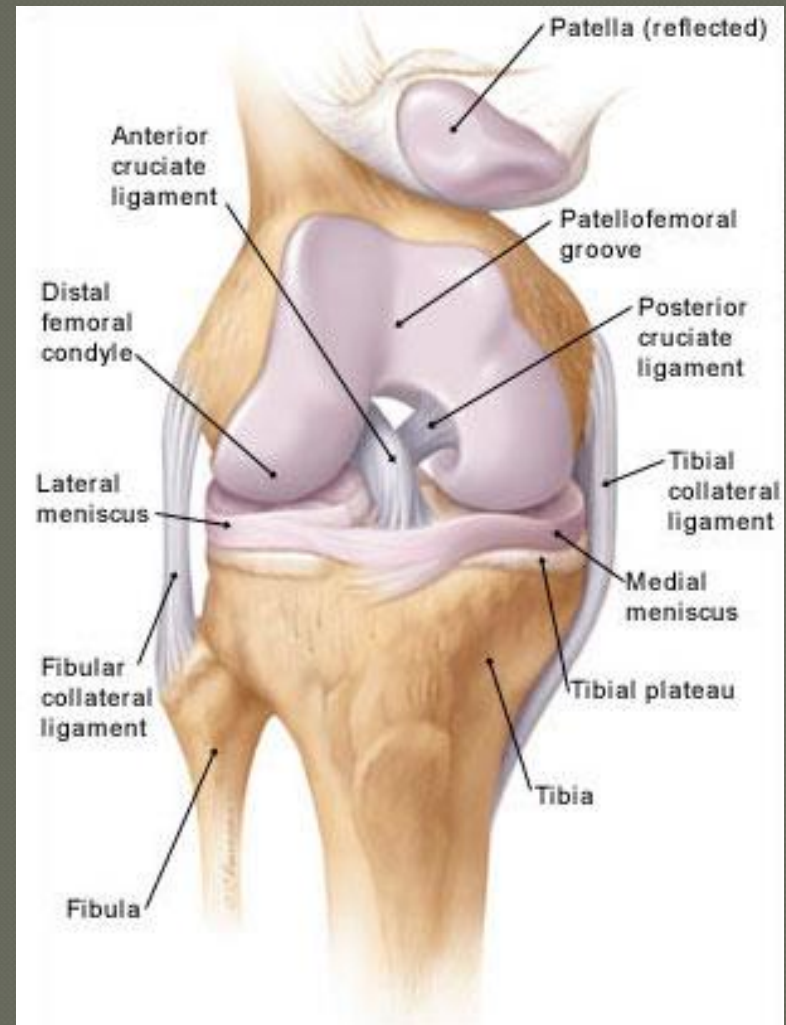




# Anatomy – Soft Tissues

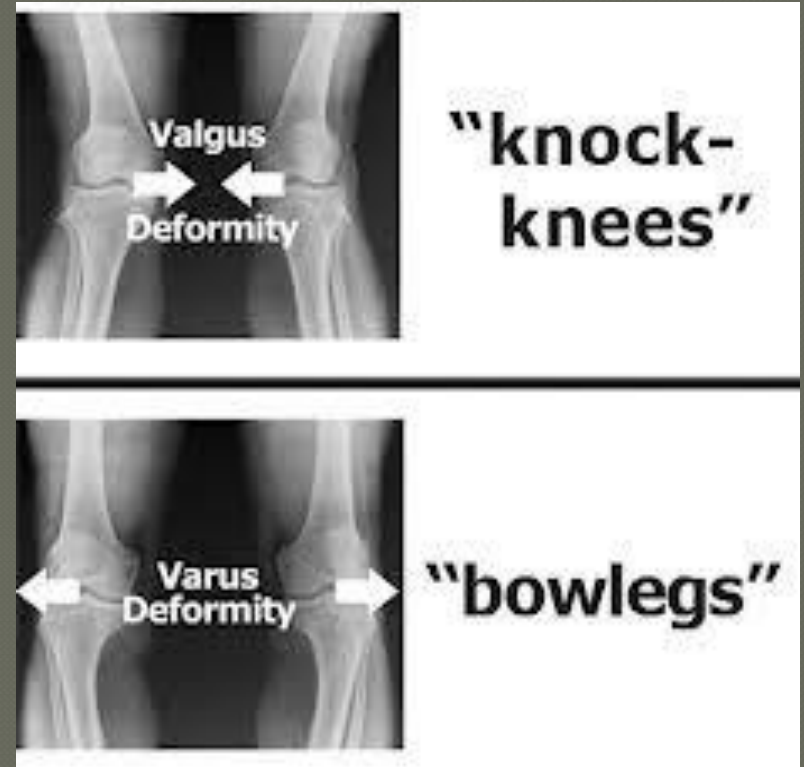
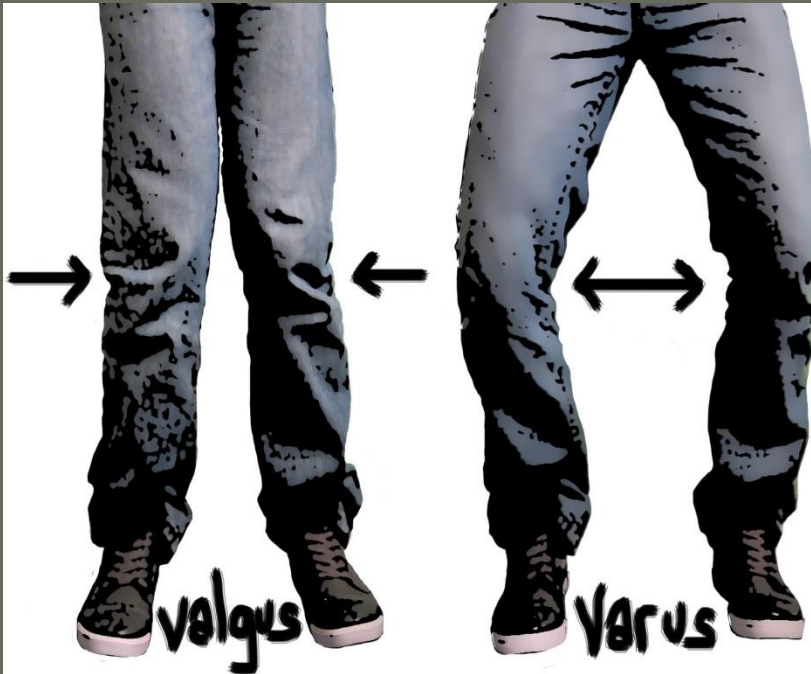
## ● Ligaments of Knee

- Medial Collateral (MCL)
  - Resists valgus forces
- Lateral Collateral (LCL)
  - Resists varus forces
- Anterior Cruciate (ACL)
  - Resists anterior translation (movement) of the tibia
- Posterior Cruciate (PCL)
  - Resists posterior translation (movement) of the tibia





# VALGUS vs. VARUS

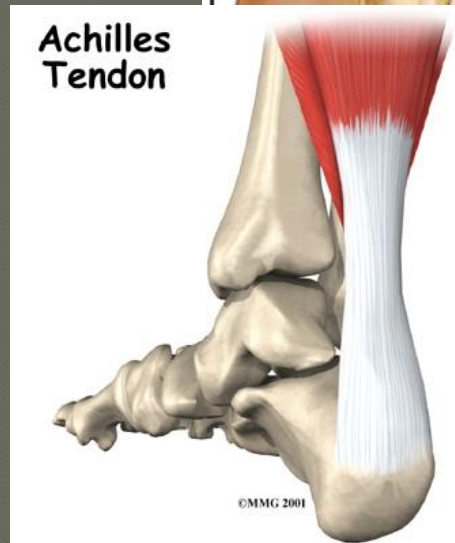
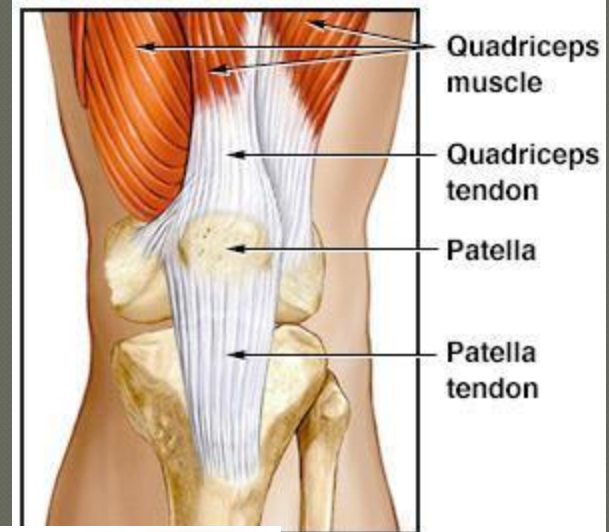




# Anatomy – Soft Tissues

## ● Major Tendons

- Patellar Tendon – attaches the quadricep muscles to the tibia
- Achilles Tendon – attaches the calf muscles to the calcaneus

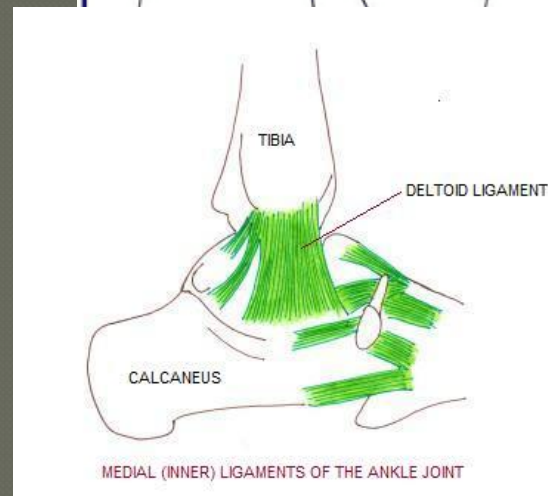
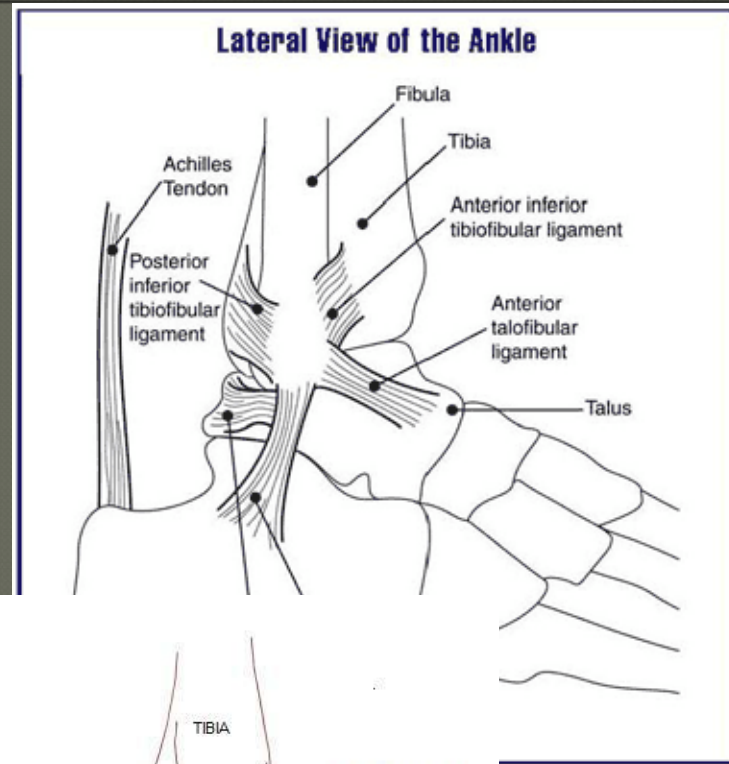




# Anatomy – Soft Tissues

## ● Ankle Ligaments

- Anterior Tibiofibular – resists forced dorsiflexion and rotation of the talus
- Anterior Talofibular – resists plantarflexion and inversion forces
- Deltoid – resists eversion forces



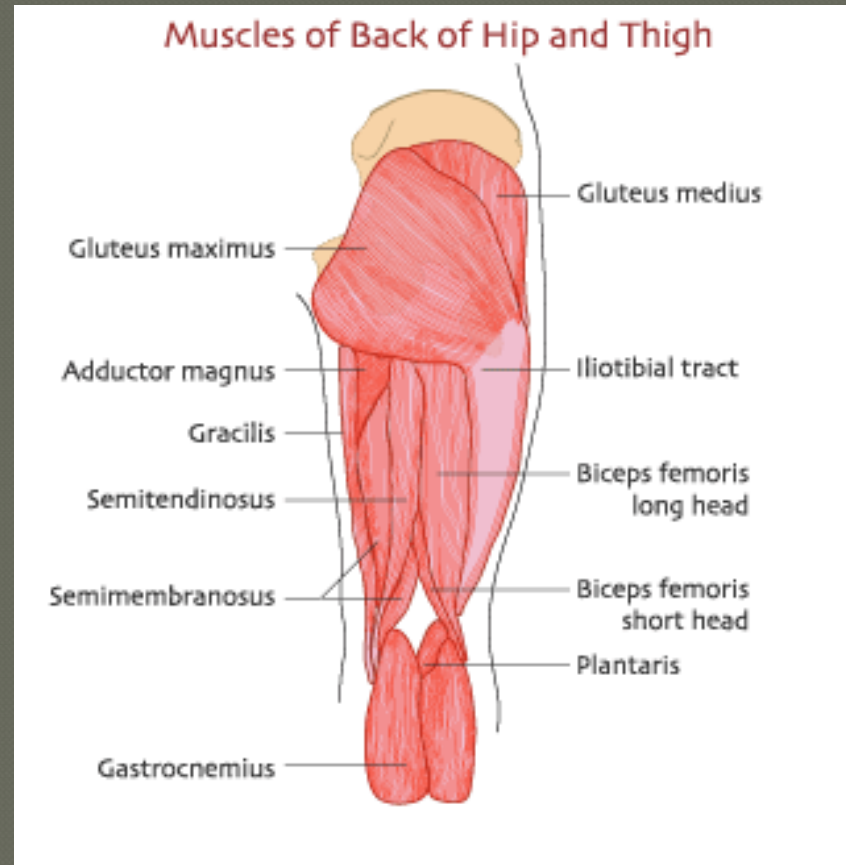
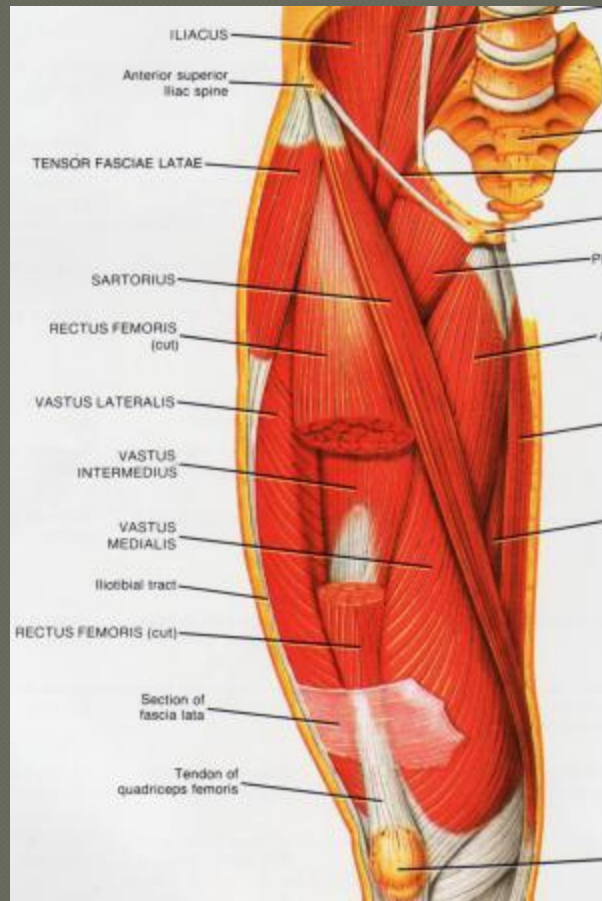


# Anatomy – Muscles

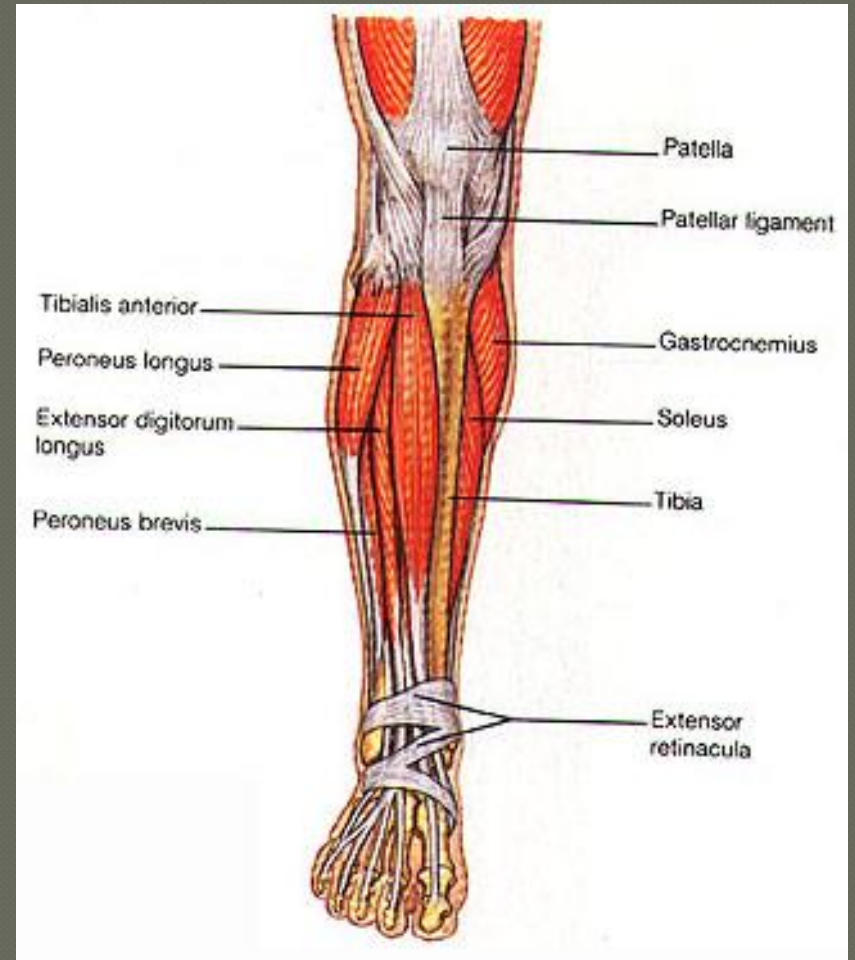
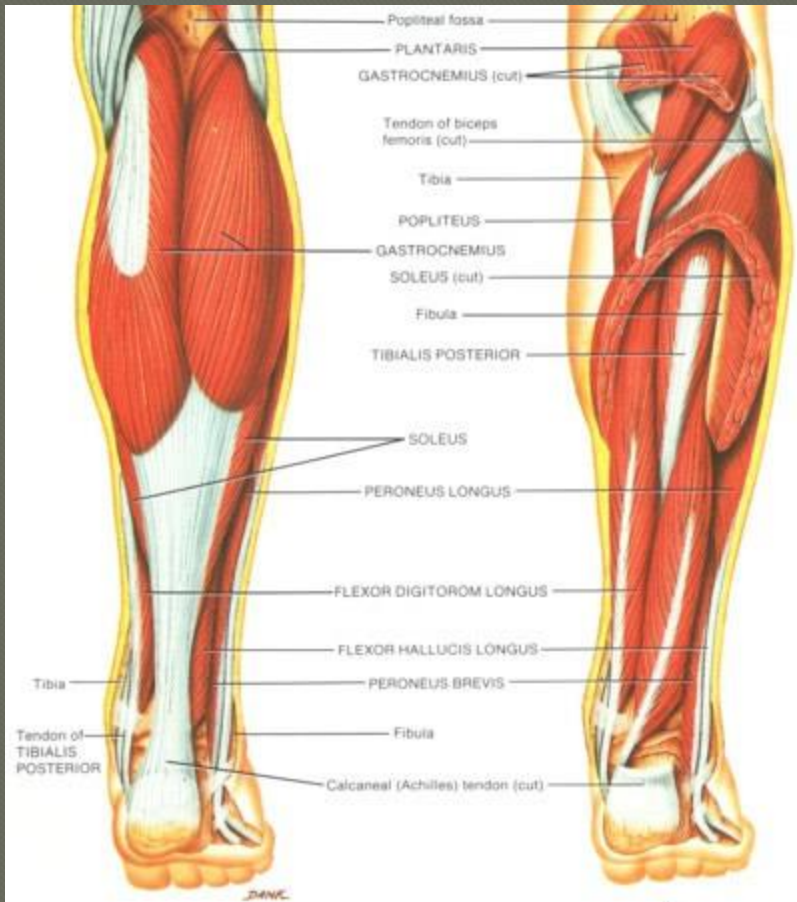
<b>Muscle</b>	<b>Location</b>	<b>Function</b>
Quadriceps Femoris <ul style="list-style-type: none"><li>• Rectus Femoris</li><li>• Vastus Medialis</li><li>• Vastus Lateralis</li><li>• Vastus Intermedius</li></ul>	Anterior Thigh	Extends the knee
Hamstrings <ul style="list-style-type: none"><li>• Semimembranosus</li><li>• Semitendinosus</li><li>• Biceps Femoris</li></ul>	Posterior Thigh	Flexes the knee
Tibialis Anterior	Anterior lower leg	Dorsiflexion of ankle
Gastrocnemius	Posterior lower leg	Plantar flexion of ankle; assists in knee flexion
Soleus	Deep to the gastrocnemius	Plantar flexion of the ankle
Tibialis Posterior	Posteromedial lower leg	Inversion of the foot/ankle
Peroneus Longus	Lateral lower leg	Eversion of the foot/ankle
Peroneus Brevis	Lateral lower leg	Eversion of the foot/ankle



# Anatomy – Muscles











5

COMMON  
SPORT  
INJURIES



# Common Injuries

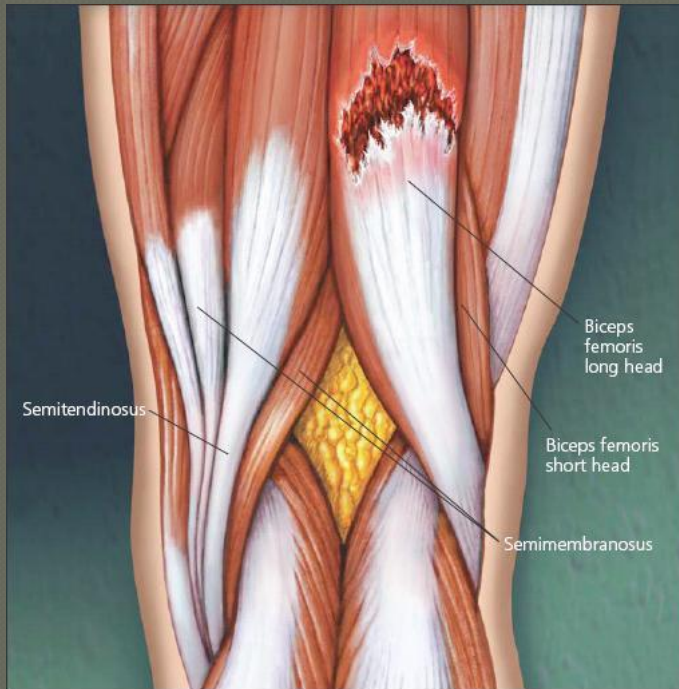
## Thigh Contusion

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Severe impact to the thigh musculature	Pain, loss of function, swelling, decreased ROM	Ice, compression with knee flexed. MUST be managed appropriately to avoid complications.	Protective equipment





# Common Injuries



## Muscle Strains – Quadricep/Hamstring

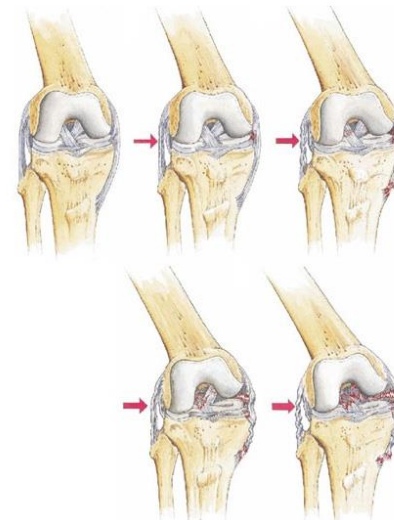
Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Sudden stretch or sudden contraction	Pain, spasm, loss of function, swelling, possible deformity.	RICE, flexibility and strengthening exercises.	Proper warm-up, stretching and strengthening.



# Common Injuries

## MCL Sprain

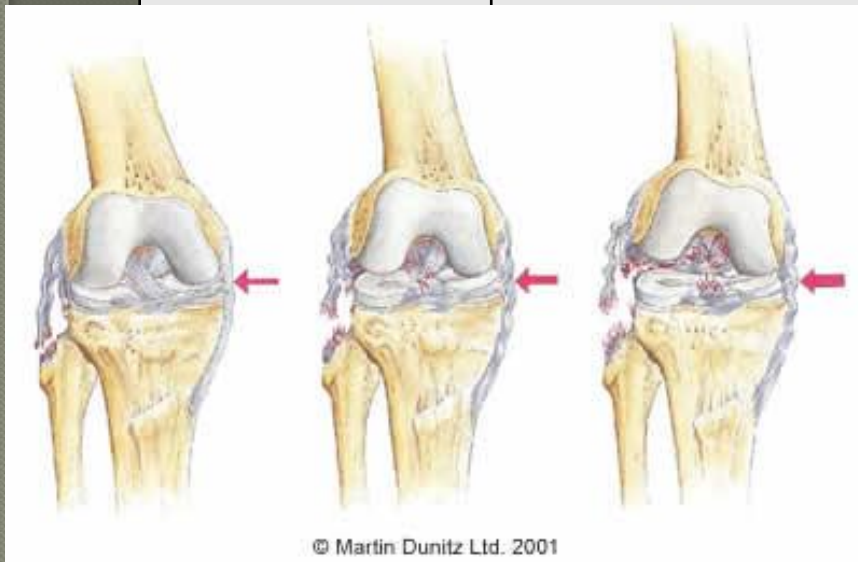
Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Valgus force or tibial external rotation	Pain medial knee, mild swelling, joint stiffness, possible joint instability.	RICE, ROM and strengthening exercises, restrict activity until asymptomatic.	Lower extremity strengthening and conditioning.





# Common Injuries

MCL Sprain Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Varus force or tibial internal rotation.	Pain lateral knee, mild swelling, possible joint laxity.	RICE, ROM and strengthening exercises, restrict activity until asymptomatic.	Lower extremity strengthening and conditioning.

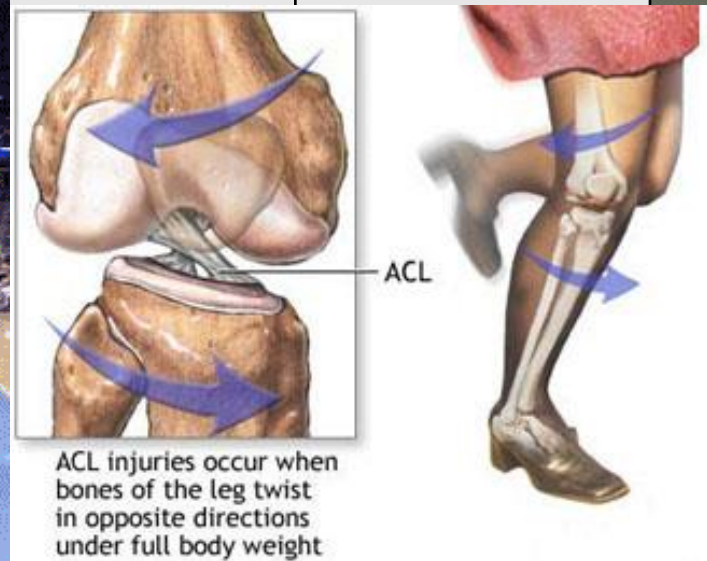
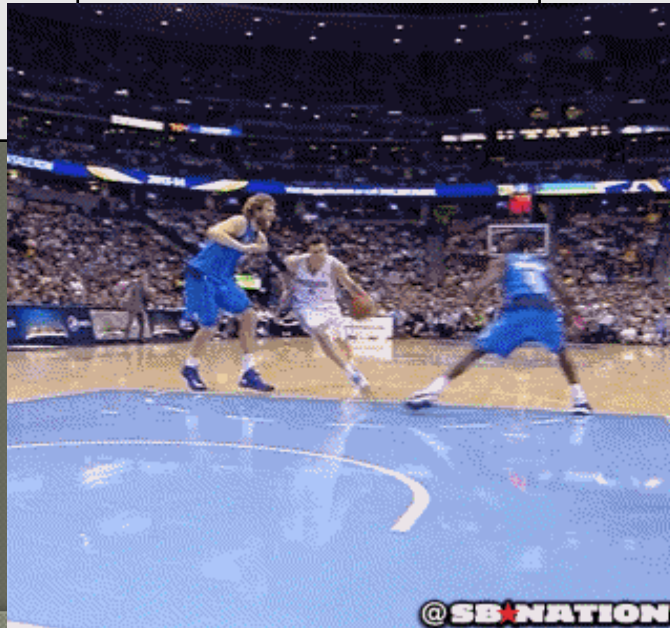




# Common Injuries

## ACL Sprain

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
<i>Noncontact:</i> <ul style="list-style-type: none"><li>- deceleration</li><li>- foot planted</li><li>- rotation</li><li>- valgus stress</li></ul> <i>Contact:</i> <ul style="list-style-type: none"><li>hyperextension w/foot planted</li></ul>	Hears or feels a “pop”, rapid swelling, joint instability.	RICE, restore ROM and strength, surgery required to reconstruct the ligament.	Lower extremity strengthening and conditioning.





# Common Injuries

## PCL Sprain

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
-Falling on bent knee - direct force to front of knee - rotational forces	Hears or feels a “pop”, minimal swelling, posterior tibial sag.	RICE, restore ROM and strength. Surgery is controversial.	Lower extremity strengthening and conditioning.



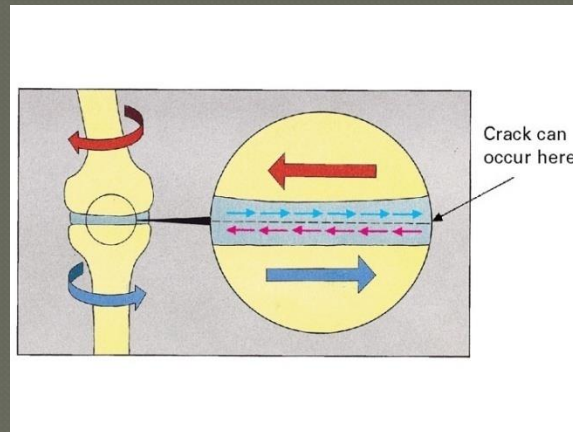
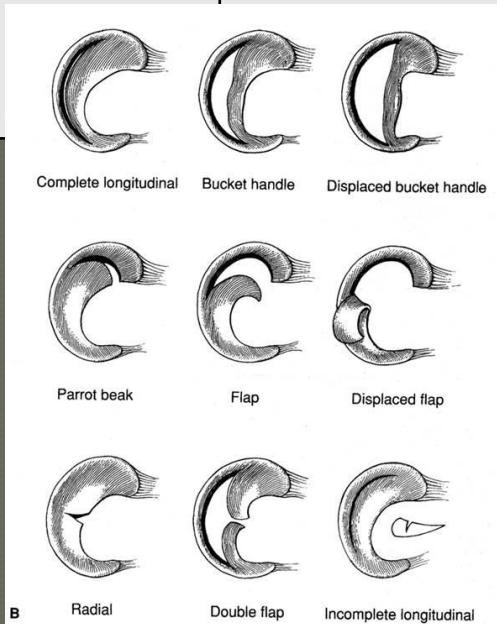


Medial Meniscus Injury and Surgery Video Link

# Common Injuries

## Meniscus Tear

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Weight bearing with rotational force.	Swelling, joint line pain, loss of motion, locking or giving way.	RICE <i>Avascular area:</i> Surgically trimmed and smoothed. <i>Vascular area:</i> Surgically repaired.	Lower extremity strengthening and conditioning.







# Common Injuries

## Patellar Subluxation/Dislocation

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Combination of foot planted, deceleration, and change of direction.	Obvious deformity, pain, swelling, limited ROM.	RICE and immobilization initially, then ROM and strengthening exercises. Taping or bracing.	Lower extremity strengthening and conditioning.



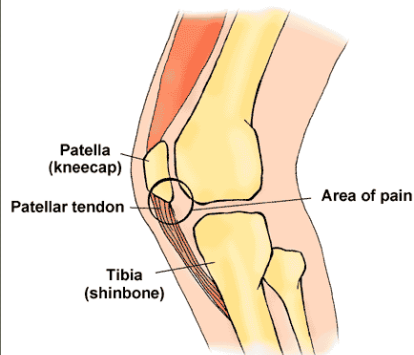


# Common Injuries

## Patellar Tendonitis – “Jumper’s Knee”

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Repetitive deceleration	Vague pain and tenderness of patellar tendon that worsens with running/jumping activities.	Rest, ice, NSAID medications, patellar strap, friction massage, and lower extremity strengthening.	Progressive increase in frequency/intensity of training. Lower extremity strengthening and conditioning.

**Patellar Tendonitis  
(Jumper's Knee)**



Side view of knee





# Common Injuries

## Patellofemoral Syndrome

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
<ul style="list-style-type: none"> <li>-Tight hamstring and calf muscles</li> <li>-Increased Q-angle</li> <li>-Weak quadriceps muscles</li> <li>-Poor foot mechanics</li> </ul>	<p>Tenderness of one or more patellar edge, dull ache, crepitus, pain with compression, positive Apprehension test.</p>	<p>NSAIDs, quadricep strengthening, sleeve with buttress and/or taping, orthotic foot insert.</p>	<p>Lower extremity strengthening and conditioning.</p>

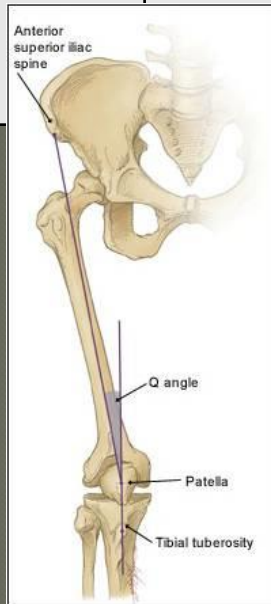
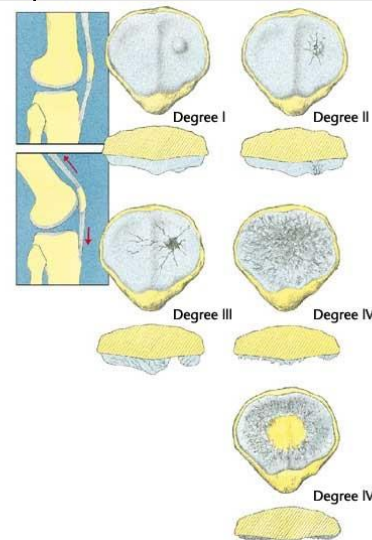


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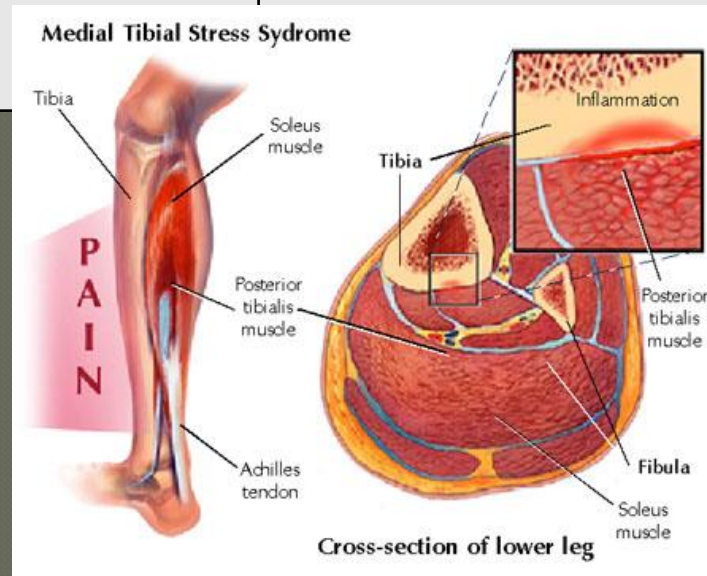




# Common Injuries

## Medial Tibial Stress Syndrome – “Shin Splints”

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Repetitive running activities.	Diffuse pain in distal medial tibia, increasing with activity.	Correct faulty foot mechanics with footwear, or orthotic foot insert, calf stretching	Appropriate footwear for activity, lower leg flexibility and strengthening, orthotic foot inserts.



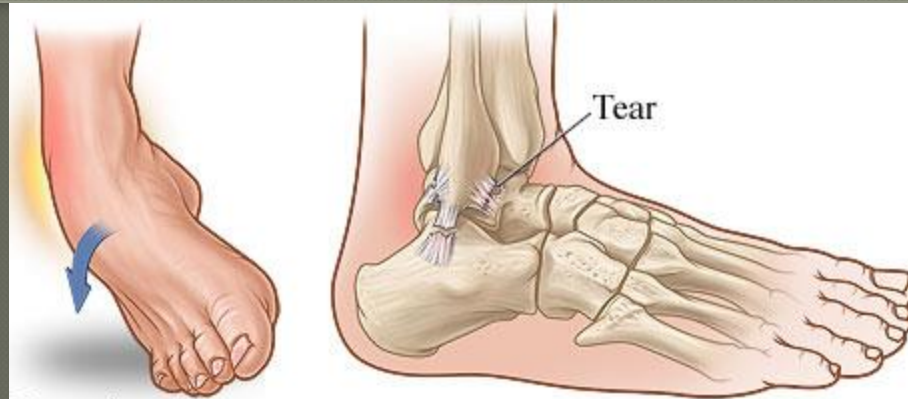


# Common Injuries

## Ankle Sprains – Lateral/Medial

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
<p><i>Inversion:</i> forced inversion and plantar flexion “rolling”</p> <p><i>Eversion:</i> forced eversion of ankle – high risk for fracture.</p> <p><i>Syndesmosis (high):</i> forced inversion with rotation of the talus.</p>	<p>Pain, swelling, decreased ROM, possible joint laxity.</p>	<p>RICE, symptomatic modalities, taping and/or bracing.</p>	<p>Appropriate footwear for activity, lower leg strengthening, proprioceptive training, taping and/or bracing of joint.</p>

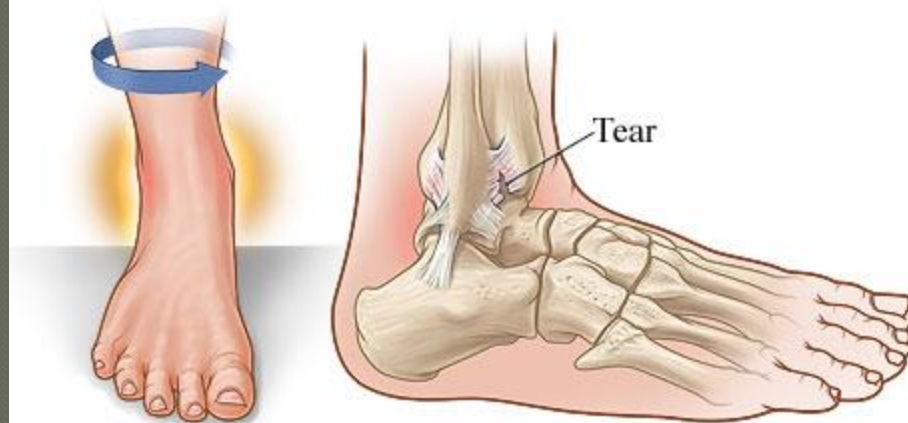




Inversion



Eversion



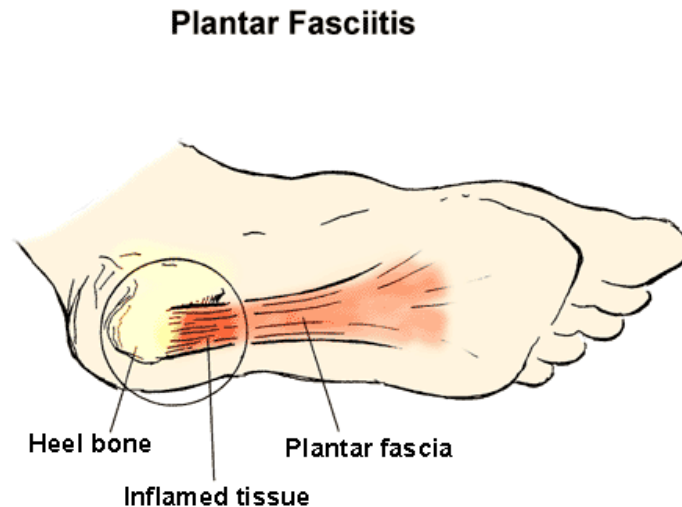
High ankle sprain



# Common Injuries

## Plantar Fasciitis

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Tight calf muscles, poor arch support, possible leg length discrepancy, over striding while running.	Medial heel pain, particularly in the morning; pain with forced dorsiflexion of the toes.	Calf stretching, plantar fascial stretching, heel cup, orthotic foot inserts.	Calf flexibility, correction of faulty foot mechanics.



# Common Injuries

## “Turf Toe”

Mechanism of Injury	Signs and Symptoms	Treatment	Prevention Strategies
Hyperextension sprain of the great toe. MP joint. Can be related to either trauma or overuse.	Pain at MP joint of great toe, increasing with extension of the joint.	Steel toe insoles or taping, symptomatic modalities.	Appropriate footwear, correction of faulty foot mechanics.

