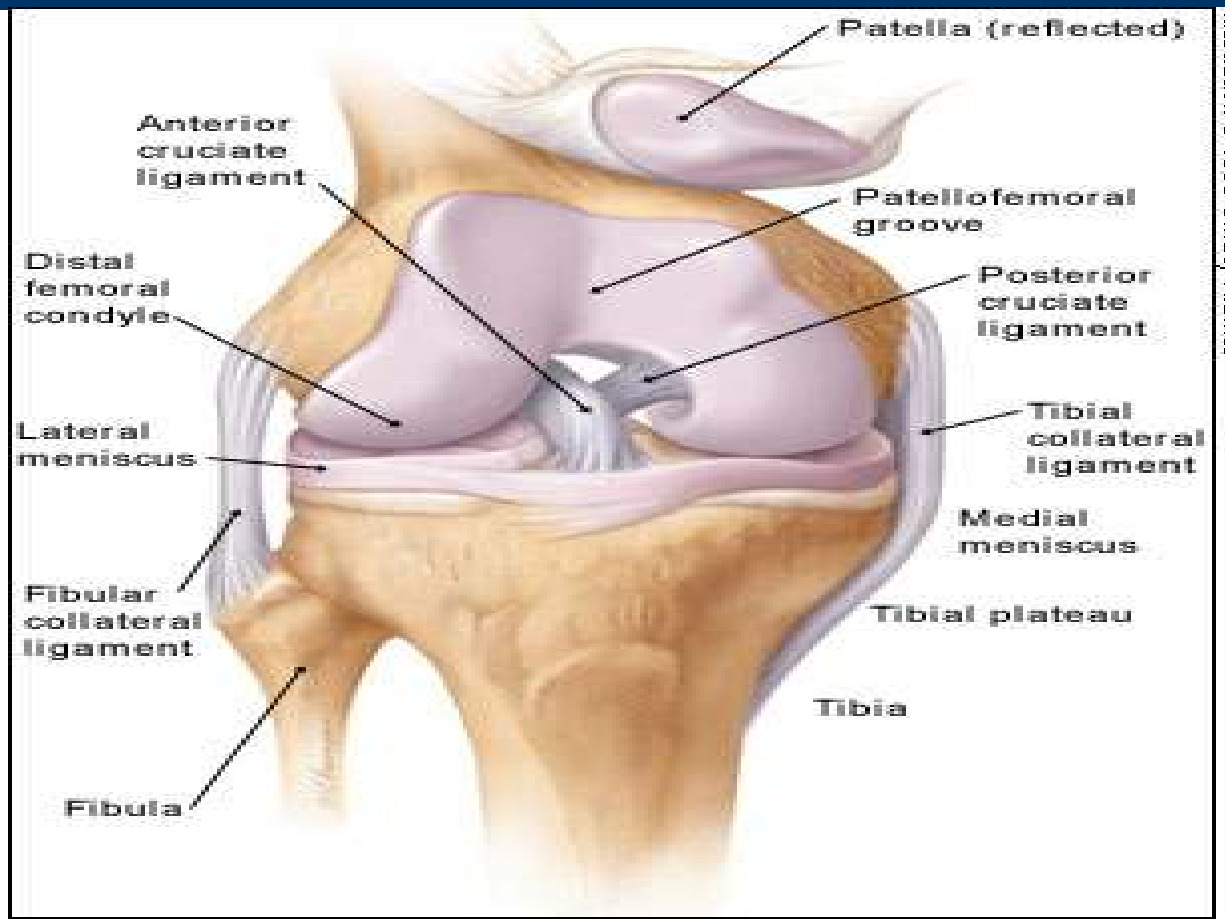
Common Injuries of the Knee & Lower Leg

Akhtar Rasul

Knee Anatomy



Patella Fractures

- Result from direct blow such as knee hitting dashboard in MVA, fall on flexed knee, forceful contraction of quad. Muscle.
- Transverse fractures most common

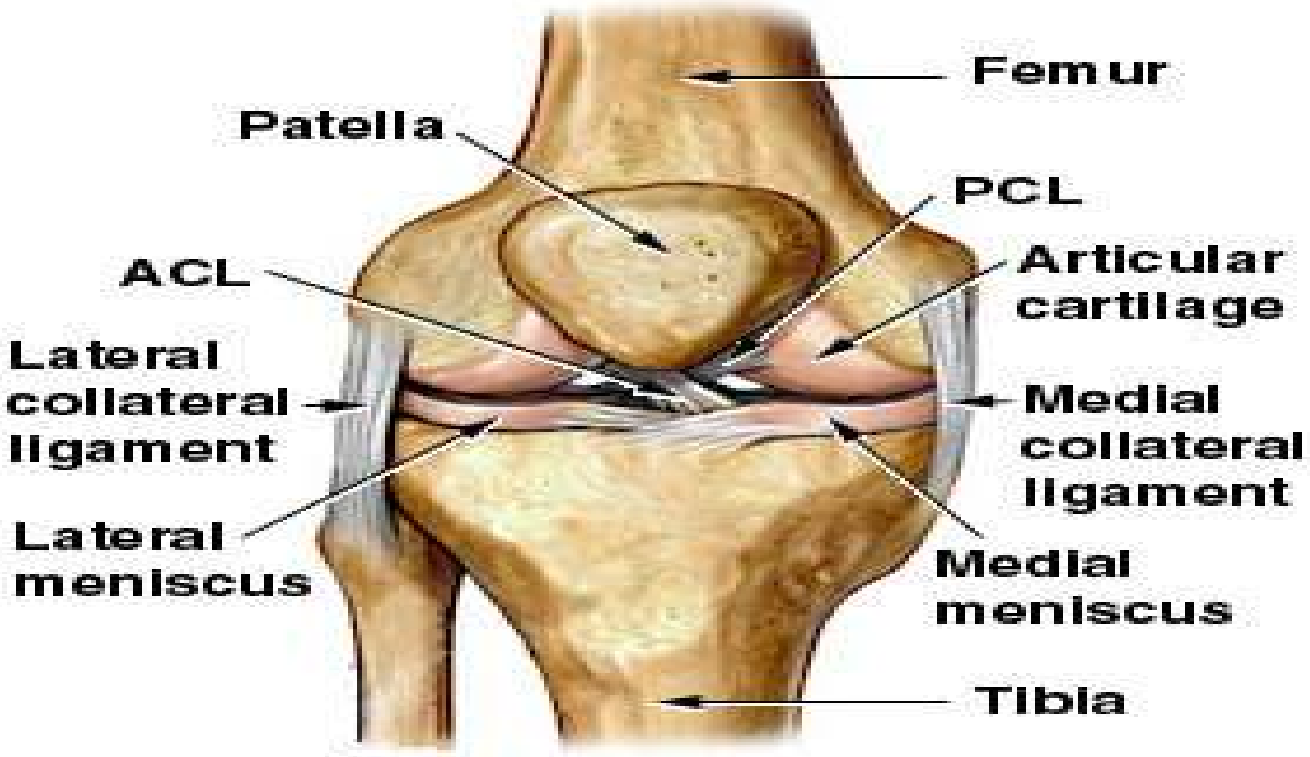
Patella Fracture:

Femoral Condyle Fractures

- These injuries secondary to direct trauma from fall w/axial loading or blow to distal femur.

Femoral Condyle Fracture:

Knee Ligaments:



Anterior Cruciate Ligament

- Mechanism is usually a deceleration, hyperextension or internal rotation of tibia on femur
- May hear “pop”, swelling, assoc. w/medial meniscal tear
- 70% in non- Contact sports
- Basketball and team hand ball
- Excessive anterior translation or rotation of femur on the tibia

- Incidence of ACL injuries is more in females
- Different hypothesis
- Notable lessening of flexion extension range of motion at the knee due to quadriceps avoiding
- Altered joint kinetics== subsequent inset of osteoarthritis

- Surgical repair through middle third of patellar tendon
- Notable weakness in quadriceps, impaired joint range and proprioception
- Muscle inhibition: inability to activate all motor units of a muscle during maximal voluntary contraction

Posterior Cruciate Ligament

- Less common than ACL injury
- Mechanism is hyperflexion of knee with foot plantarflexed
- Impact with dash board during motor vehicle accident
- Direct force on proximal anterior tibia

Medial collateral ligament injury

- Blows to the lateral side more common
- Medial side is protected by opposite leg
- Valgus stress
- Contact sports= football= MCL injury more common
- Both MCL and LCL injured in wrestling

Prophylactic knee bracing

- To prevent knee ligament injuries in contact sports
- Matter of contention
- Protection from torsional loads
- Knee braces act to change the pattern of lower extremity muscle activity
- Reduced sprinting speed and earlier onset of fatigue

Meniscus Injuries

- Mechanism is usually cutting, squatting or twisting maneuvers.
- There is locking of the knee on flexion or extension that is painful or limits activity.
- Medial meniscus more commonly damaged due to its attachment with the MCL
- Combination injuries

Iliotibial band friction syndrome

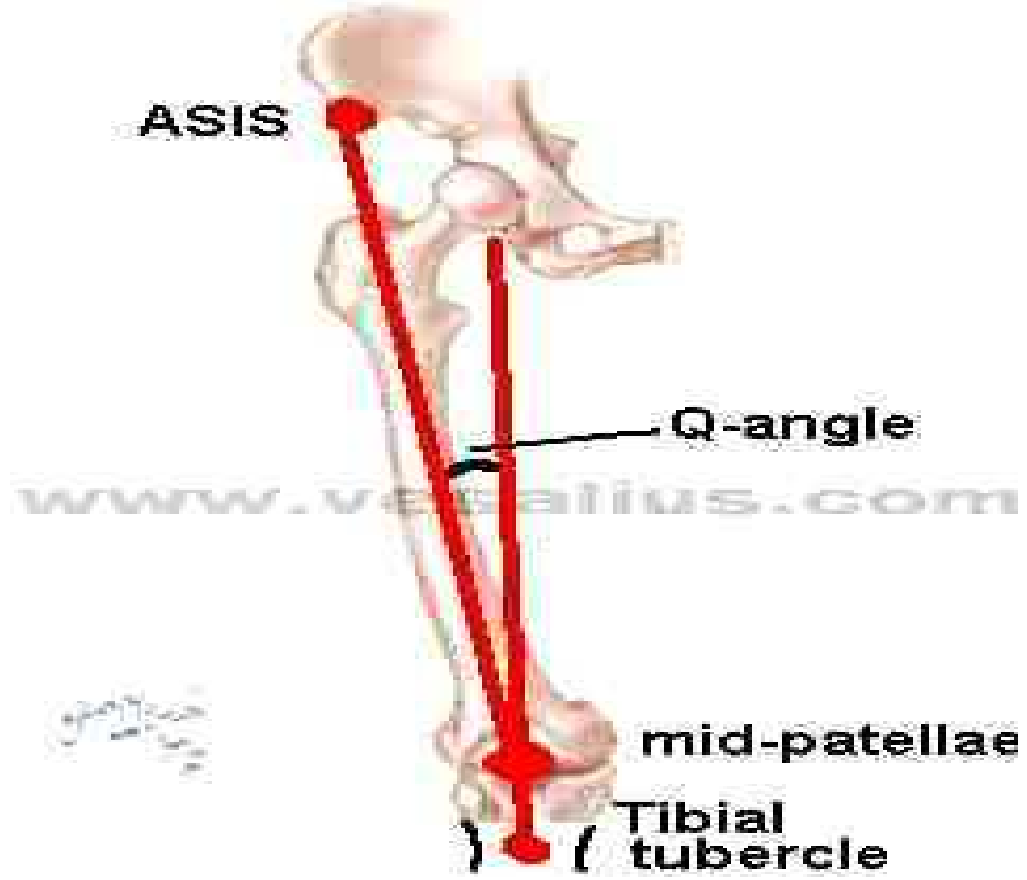
- Friction of posterior edge of Iliotibial band against the lateral condyle of the femur during foot strike
- Very common in distance runners, hence referred as runner's knee
- Training errors and anatomical malalignments
- Excessive tibial lateral torsion, femoral anteversion, genu valgum, genu varum, increased Q angle etc,

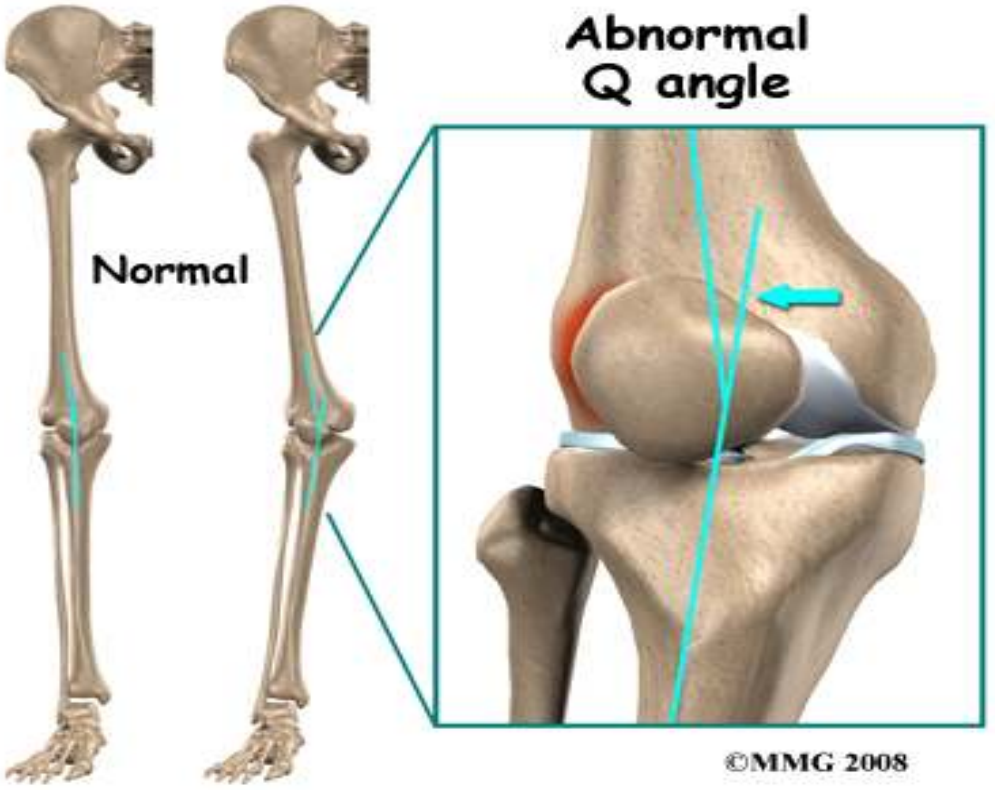
Breaststroker's knee

- Forceful whipping together of the lower leg produces propulsive thrust
- Excessive abduction of the knee
- Irritation of the MCL and medial border of the patella
- Hip abduction less than 37 or greater than 42 degree == increased onset of knee pain

Patellofemoral pain syndrome

- Painful Patellofemoral joint motion involving anterior knee pain after activities requiring repeated flexion at the knee
- Anatomical malalignments
- Vastus Medialis Oblique and Vastus Lateralis in strength
- Large Q angle responsible
- Patellar maltracking


ASIS
Q-angle
mid-patellae
Tibial
tubercle


Abnormal
Q angle
Normal
©MMG 2008

Chondromalacia Patellae

- Overuse syndrome of patellar cartilage
- Caused by patello-femoral malalignments which leads to tracking abnormality of patella putting excessive lateral pressure on articular cartilage
- Seen in young active women, pain worse w/stair climbing and rising from a chair

Shin Splints

- Generalized pain along the anterolateral or posteromedial aspect of the lower leg is commonly known as shin splints
- Overuse injury often associated with running

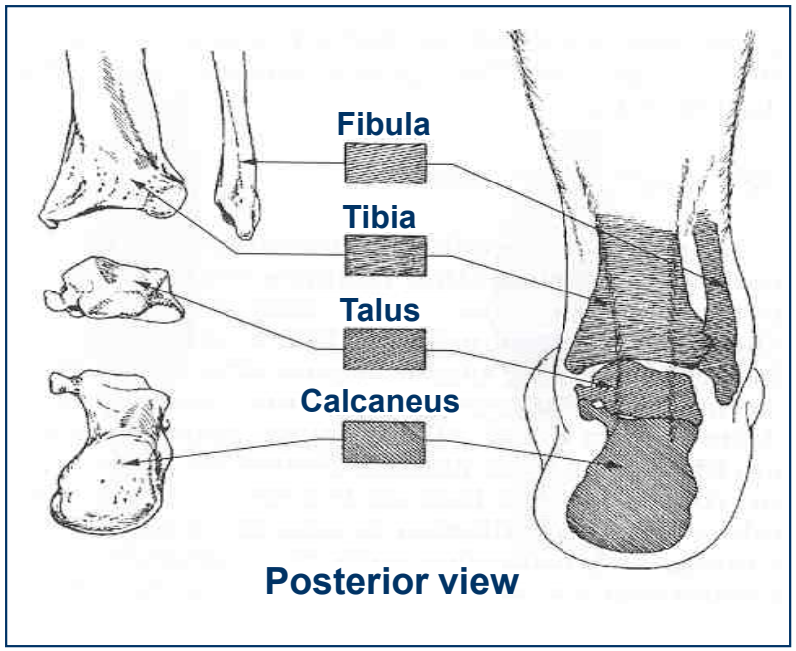
, dancing on the hard surface and running uphill

Structure of the Ankle

Tibiotalar joint

- Hinge joint where the convex surface of the superior talus articulates with the concave surface of the distal tibia
- considered to be *the* ankle joint

Structure of the Ankle



The bony structure of the ankle.

Movements at the Ankle

Dorsiflexion at the ankle

- Tibialis anterior
- extensor digitorum longus
- peroneus tertius
- assisted by:
  - extensor hallucis longus

Movements at the Ankle

plantar flexion at the ankle

- Gastrocnemius
- soleus
- assisted by:

  Tibialis posterior, Plantaris, peroneus longus, flexor hallucis longus, peroneus brevis, flexor digitorum longus

Structure of the Foot

subtalar joint

(the anterior and posterior facets of the talus articulate with the sustencalculum tali on the superior calcaneus)

Structure of the Foot

tarsometatarsal and intermetatarsal joints

- Nonaxial joints that permit only gliding movements
- Enable the foot to function as a semirigid unit and to adapt flexibly to uneven surfaces during weight bearing

Structure of the Foot

metatarsophalangeal and interphalangeal joints

- Condyloid and hinge joints, respectively
- Toes function to smooth the weight shift to the opposite foot during walking and help maintain stability during weight bearing by pressing against the ground when necessary

Structure of the Foot

plantar arches

- The medial and lateral longitudinal arches stretch form the calcaneus to the metatarsals and tarsals
- The transverse arch is formed by the bases of the metatarsal bones

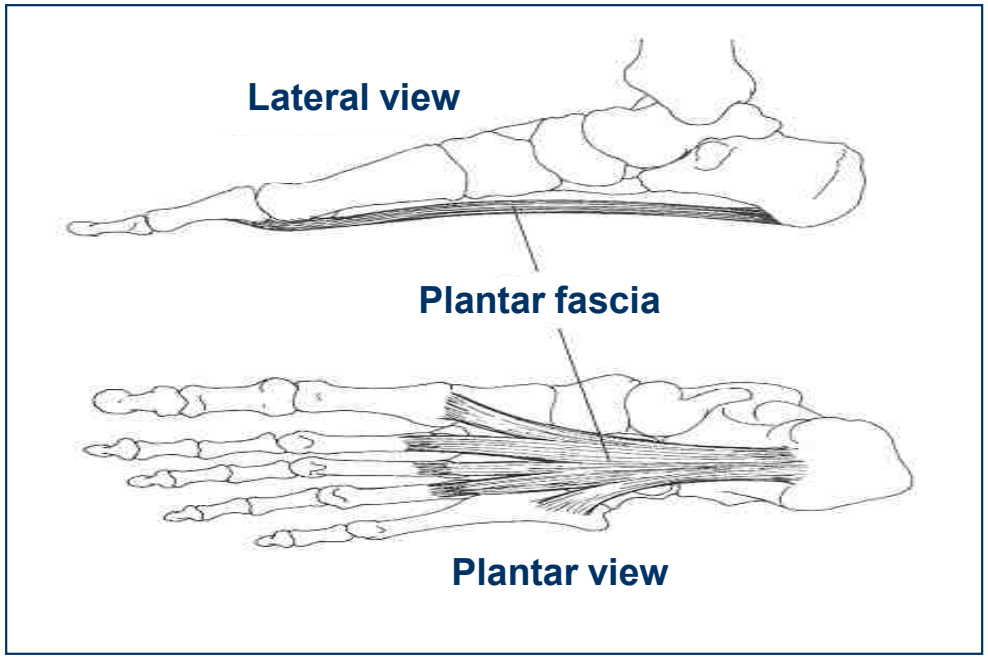
- Spring ligament = medial longitudinal arch
- Long plantar ligament supports the lateral longitudinal arch

Structure of the Foot

Plantar Fascia

- Thick bands of fascia that cover the plantar aspects of the foot
- During weight bearing= mechanical energy is stored in the stretched ligaments, tendons, and plantar fascia of the foot.
- This energy is released to assist with push-off of the foot from the surface.

Structure of the Foot



The plantar fascia.

Movements of the Foot

Toe flexion and extension

- Flexion - flexor digitorum longus, flexor digitorum brevis, lumbricals, Interossei
- Extension - extensor hallucis longus, extensor digitorum longus, extensor digitorum brevis

Movements of the Foot

Inversion and eversion

- Inversion - Tibialis posterior, Tibialis anterior
- Eversion - peroneus longus, peroneus brevis, assisted by peroneus tertius

Common injuries of the ankle and foot

- **Ankle injuries**
- Inversion sprains= stretching or rupture of lateral ligaments
- Medial = deltoid ligament very strong
- Ankle bracing or taping

OVERUSE INJURIES

- Achilles tendinitis
- Plantar fascitis
- Stress fractures
- *Dancing en pointe* = stressed second metatarsal

Alignment anomalies of the foot

- Forefoot Valgus
- Forefoot Varus
- Hallux Valgus
- Hallux Varus

Injuries related to high and low arch structures

High arches= increased incidence of ankle sprains, plantar fascitis,ITB friction syndrome, 5th metatarsal fracture

Low arches= knee pain, patellar tendinitis, plantarfascitis, patellarfascitis