

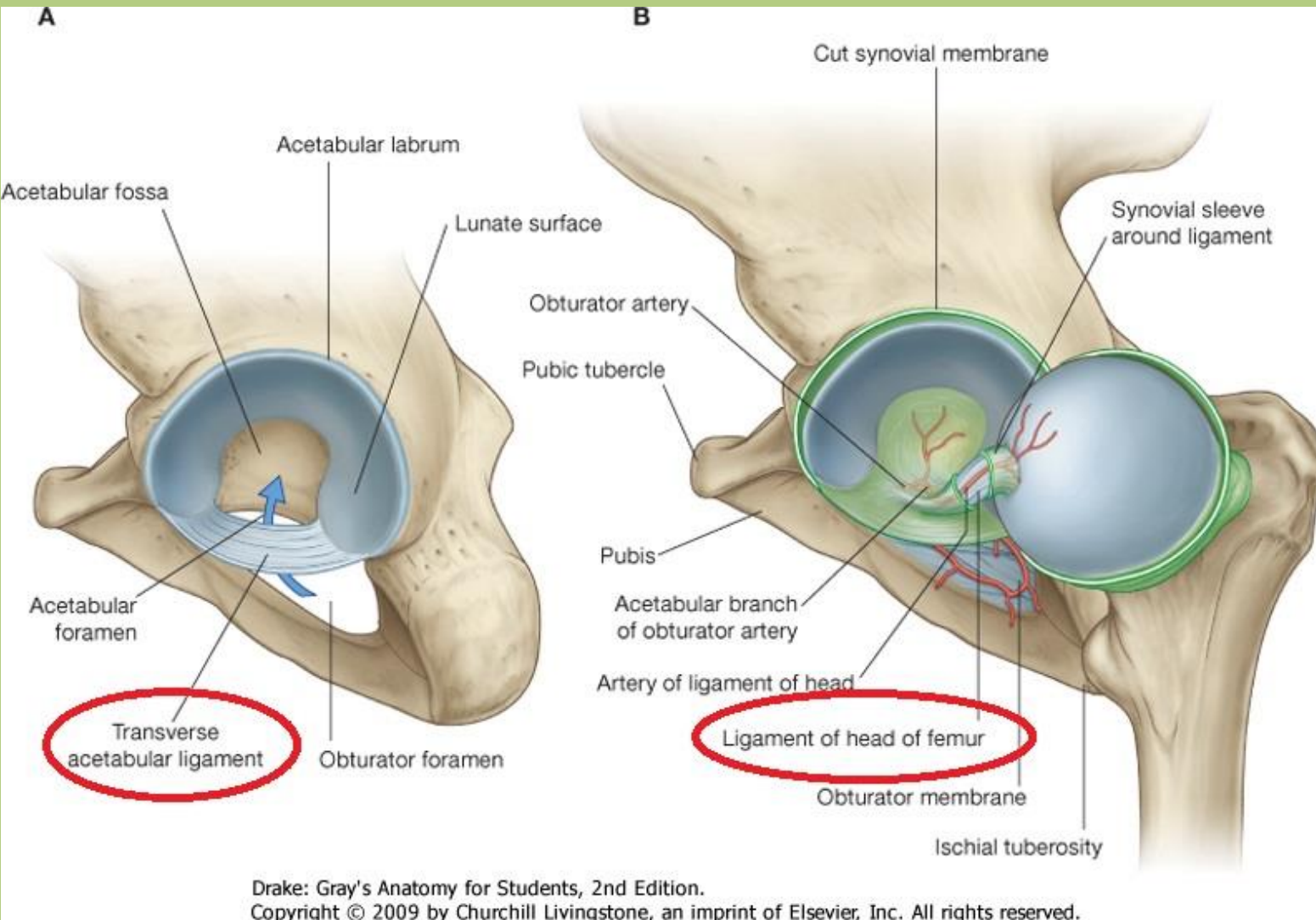


# Joints of the lower limb

Sándor Katz M.D.,Ph.D.

# Hip joint

type: ball-and-socket

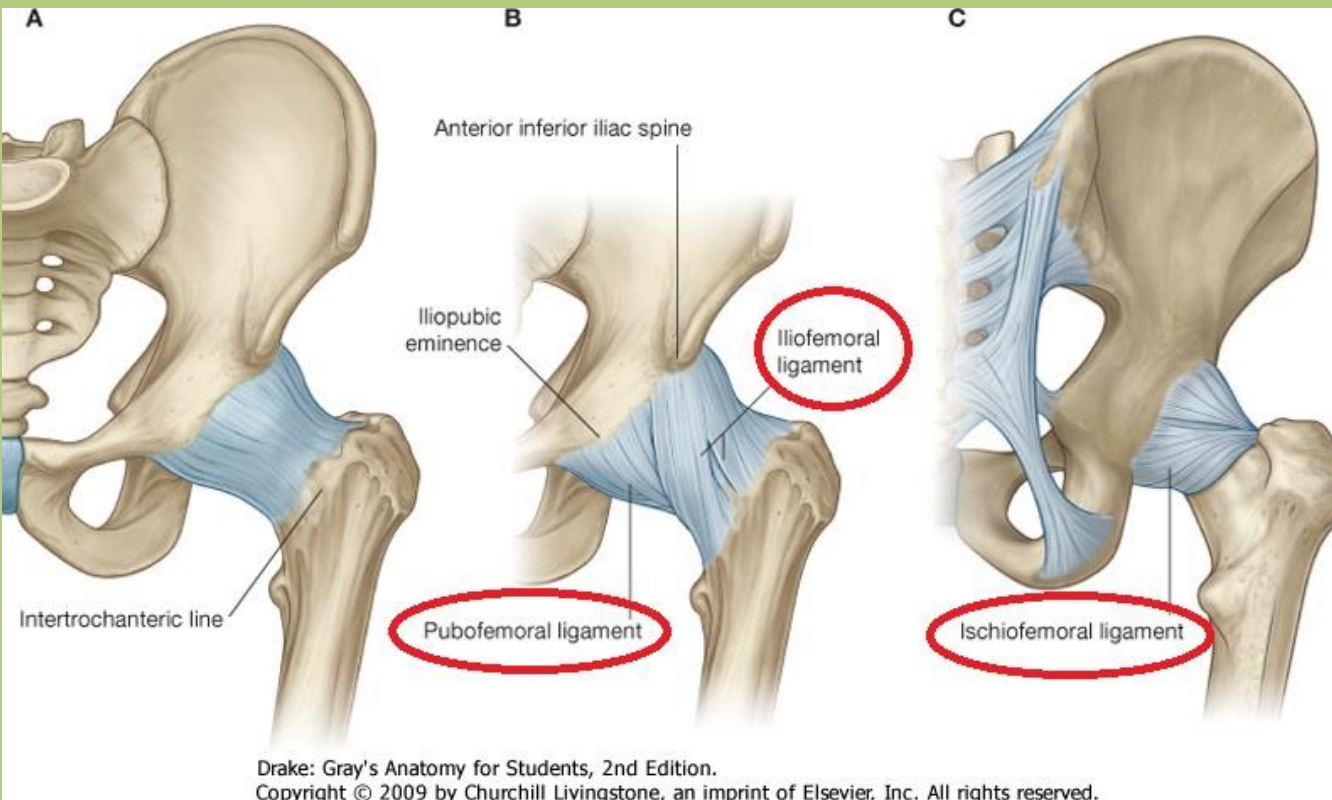


Acetabulum -  
head of femur

Intracapsular  
ligaments

Acetabular  
labrum

# Hip joint



Extracapsular ligaments:

When the hip is extended, these ligaments become twisted upon themselves, pushing the femoral head more firmly into the acetabulum (joint-stabilizing function). During flexion the ligament fibers are relaxed. (4th ligament: zona orbicularis)

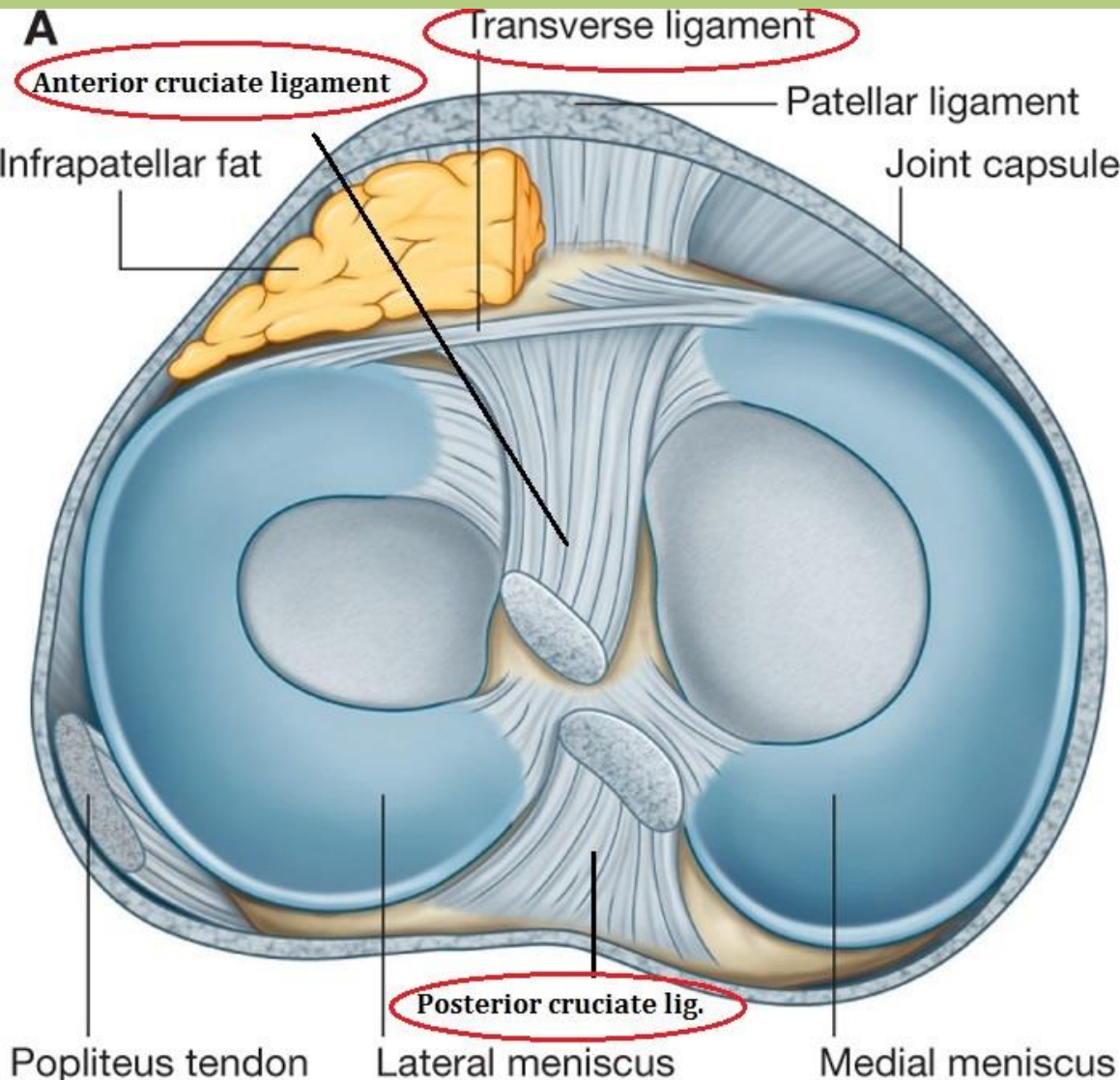
# Hip joint - movements

- Flexion:  $120^{\circ}$
- Extension:  $20^{\circ}$
- Abduction:  $40^{\circ}$
- Adduction:  $0^{\circ}$  ( $30^{\circ}$ )
- Rotation:  $90^{\circ}$

Circumduction

# Knee joint

type: trochoginglimus (hinge and pivot)



Femoral condyles - tibial condyles; patellar surface - patella.

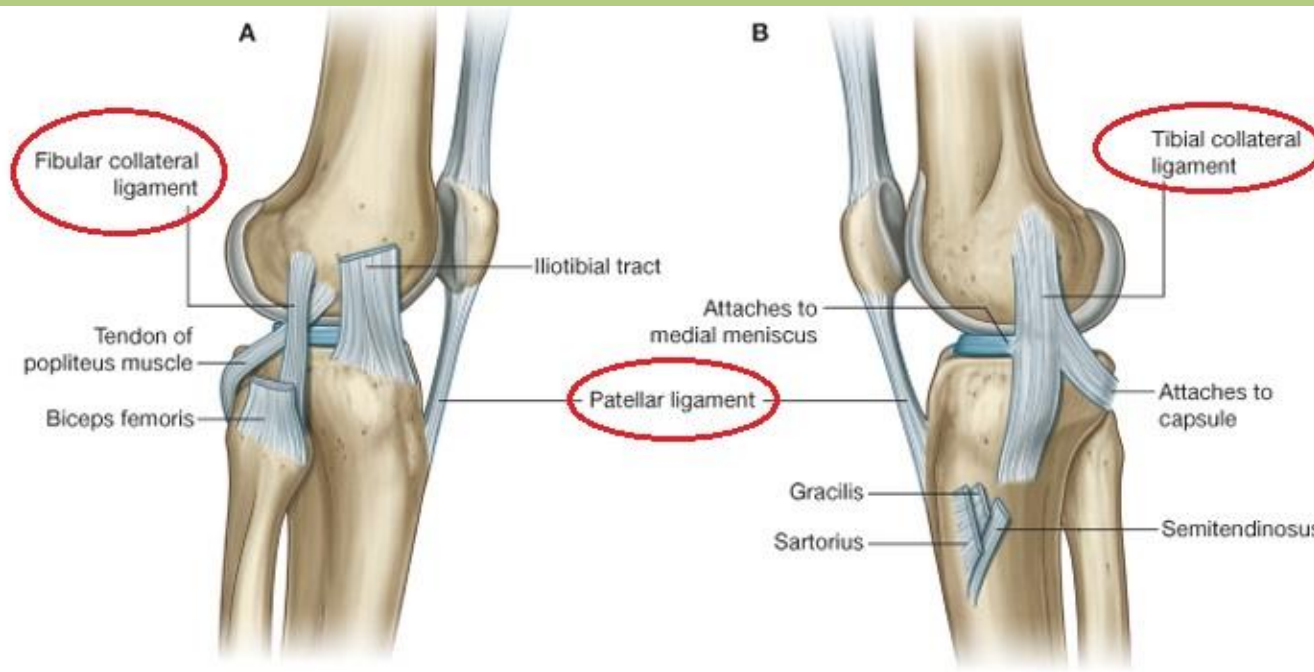
Intracapsular ligaments:

- ***Anterior cruciate lig.***
- ***Posterior cruciate lig.***
- ***Transverse lig.***
- ***Posterior meniscofemoral .lig.***

Medial meniscus: C-shaped.

Lateral meniscus: almost a complete ring.

# Knee joint

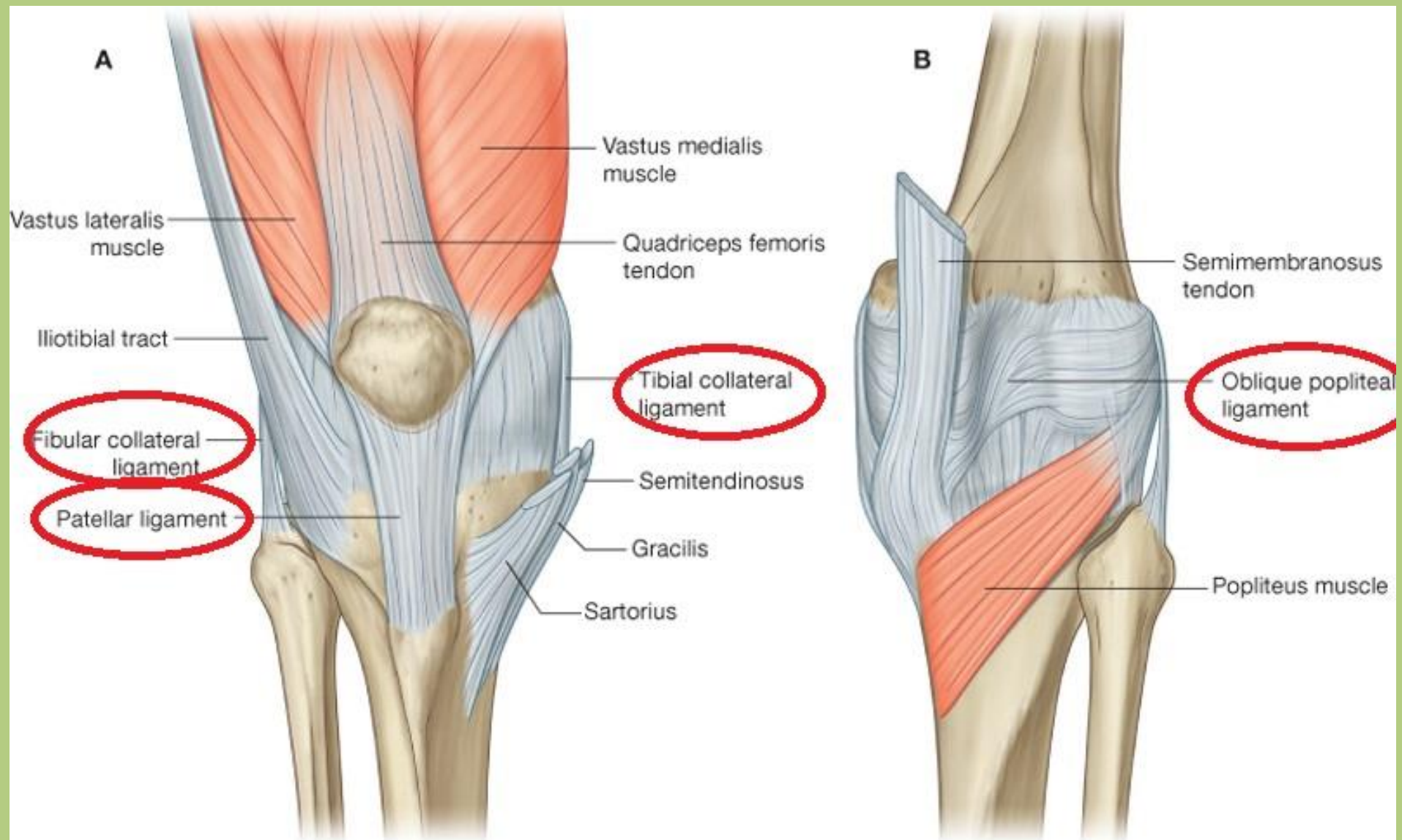


Extracapsular ligaments.

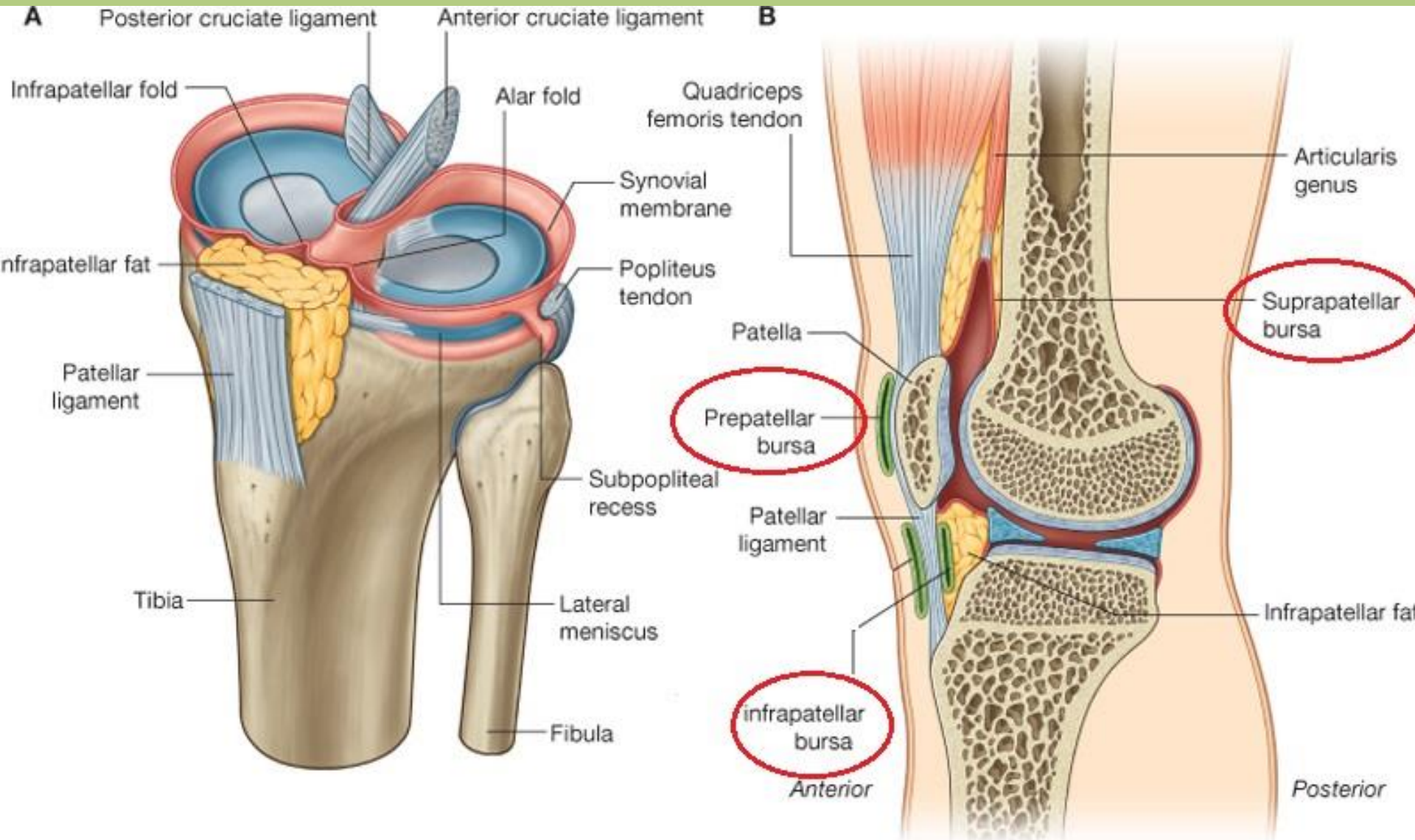
***Tibial collateral lig.*** is broader and fuses with the articular capsule and medial meniscus.

***Fibular collateral lig.*** is cord-like and separates from the articular capsule.

# Knee joint - extracapsular ligaments



# Knee joint - bursae



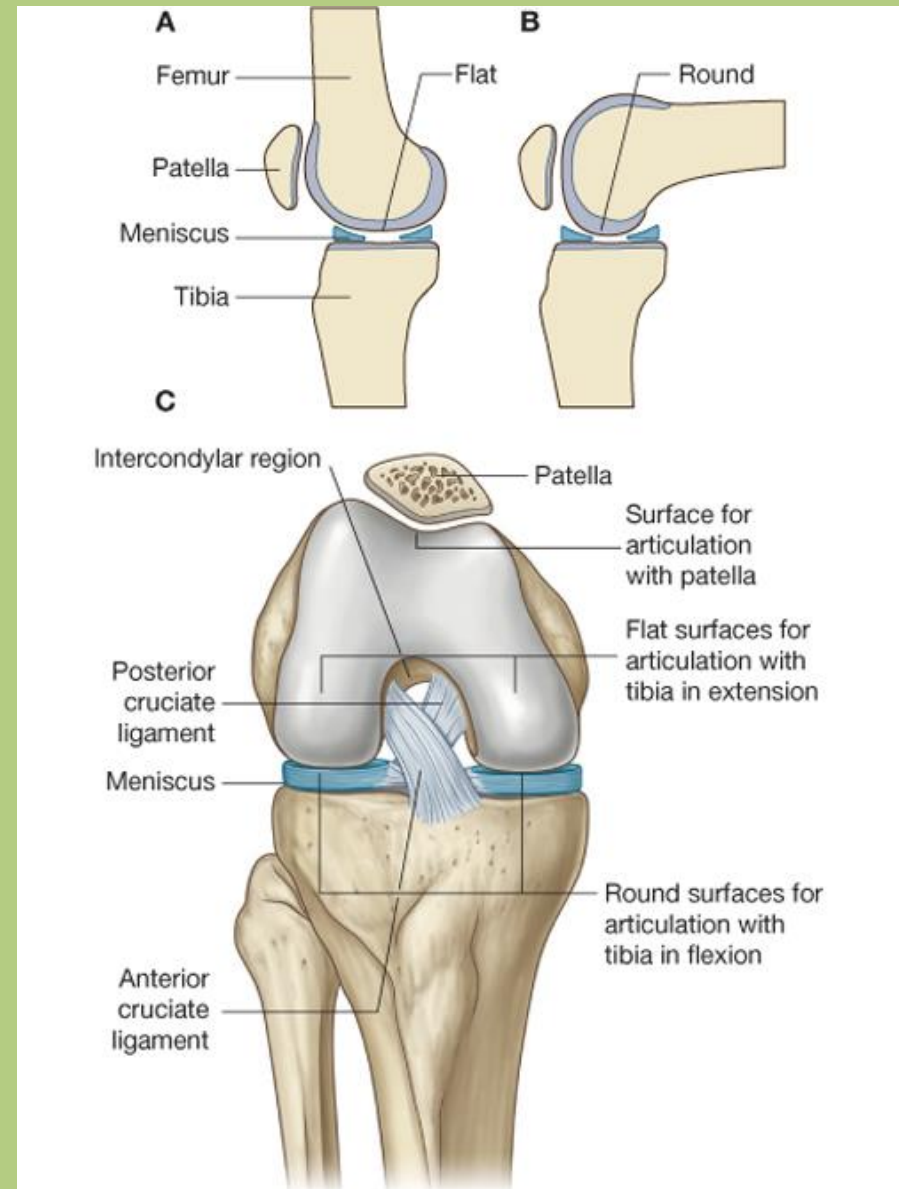
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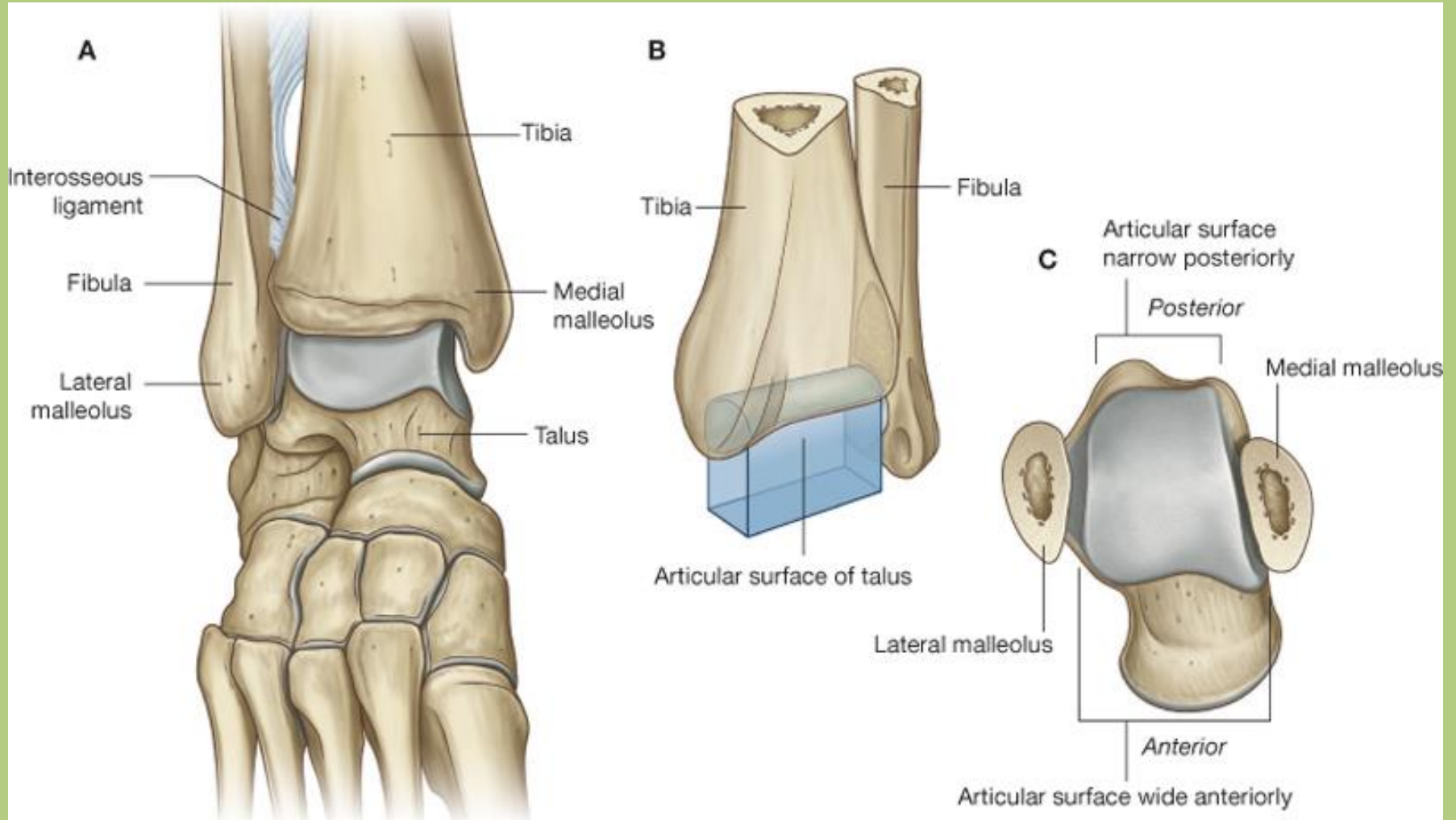
# Knee joint - movements

- Flexion: 120-130°
- Hyperextension: 5°
- Voluntary rotation (knee is flexed):  
medially: 10°,  
laterally: 30-40°
- Terminal rotation (knee is extended): 10°



# Ankle (talocrural) joint

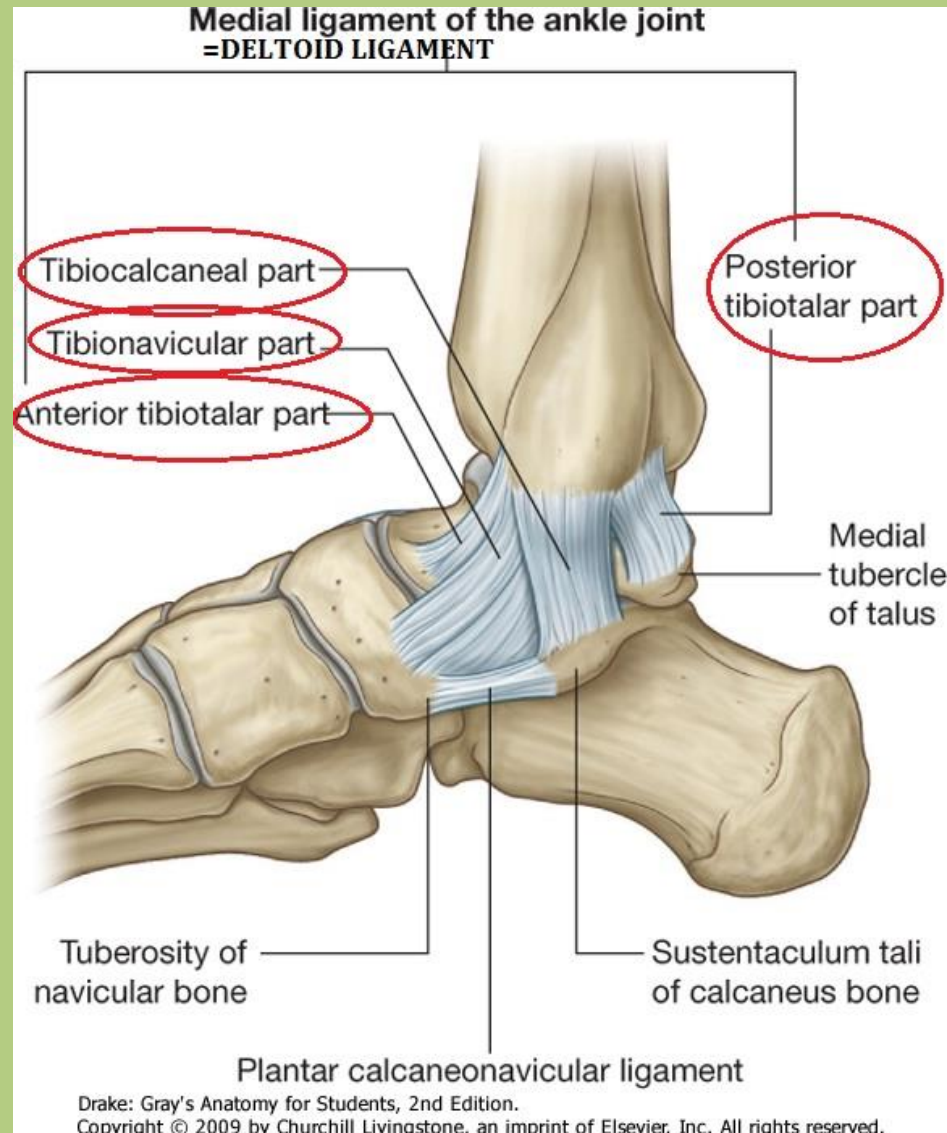
type: hinge



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# Talocrural joint - medial collateral ligament



# Medial collateral = deltoid ligament

## Tibionavicular part (1)

(partly covers the anterior tibiotalar part)

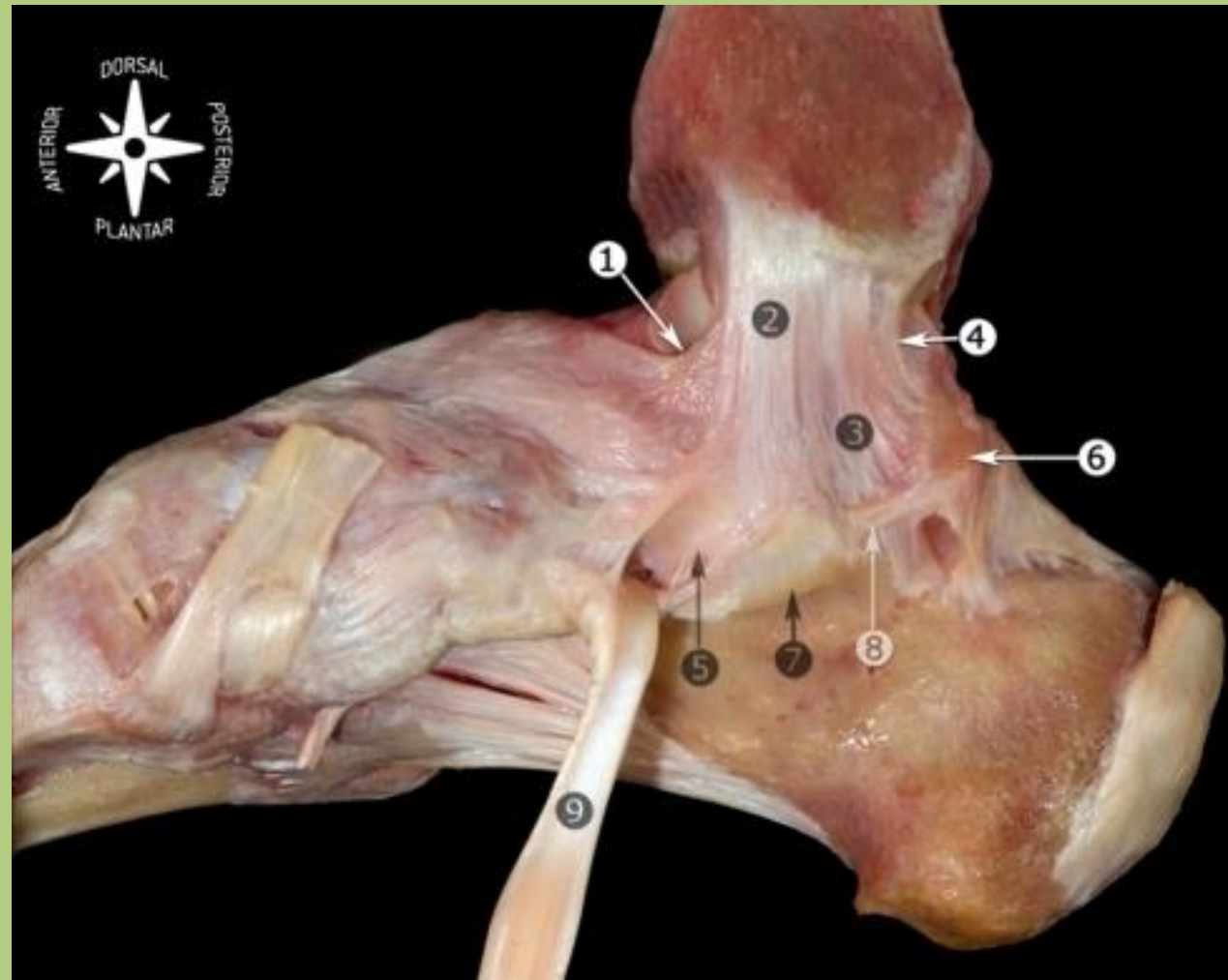
## Tibiocalcaneal part (2-3)

## Posterior tibiotalar part (4)

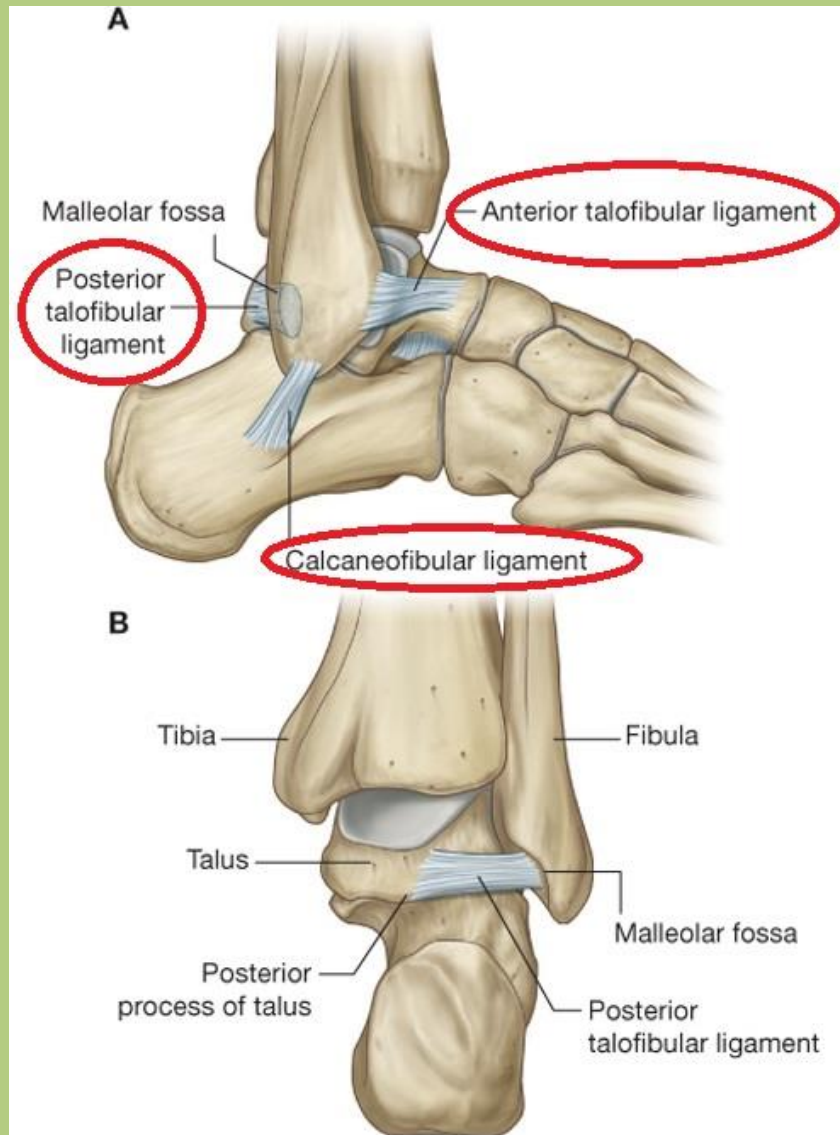
## Medial process (6)

## Sustentaculum tali (7)

## Tendon of tibialis posterior muscles (9)



# Talocrural joint - lateral collateral ligament



# Lateral collateral ligament

**Anterior talofibular ligament (5, 6)**

**Calcaneofibular ligament (10)**

Lateral malleolus (1)

Tibia (2)

Syndesmosis tibiofibularis (3, 4)

Talus (7)

Collum tali (8)

Caput tali (9)

Interosseous talocalcaneal ligament (11)

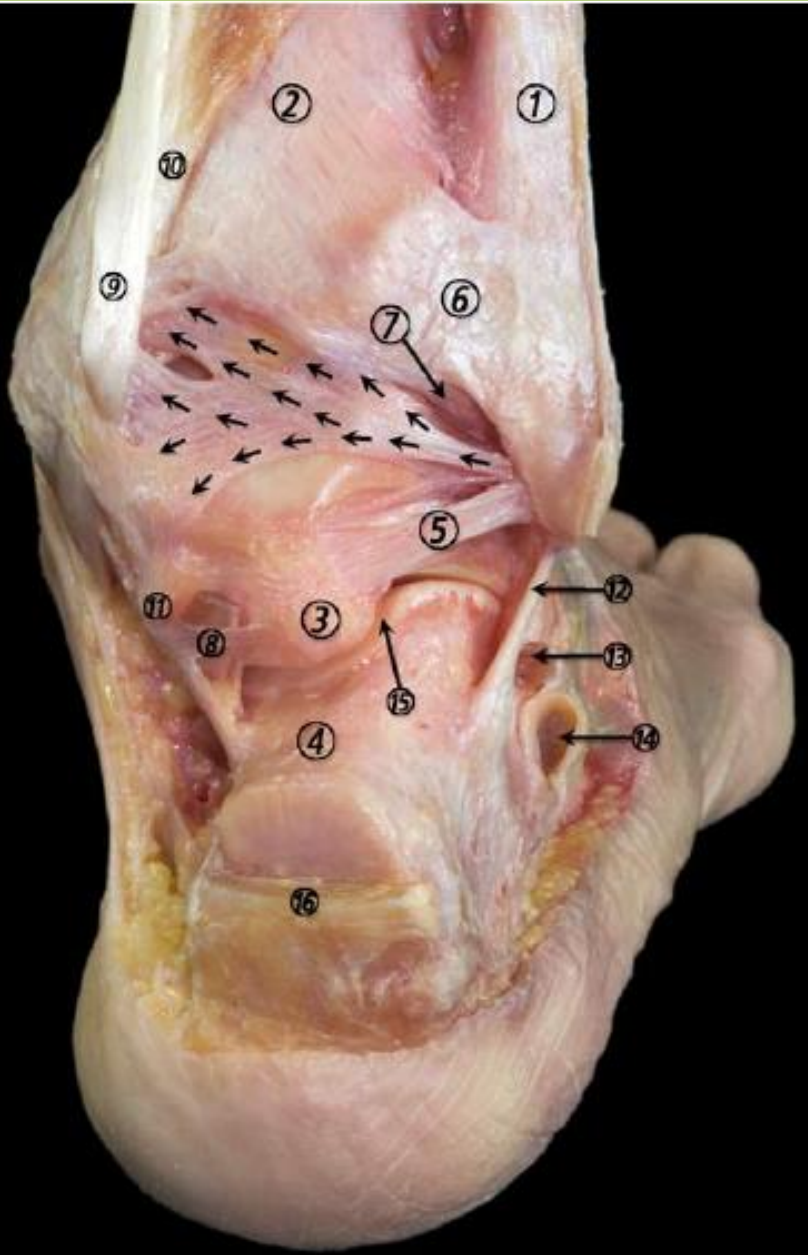
Cervical ligament (12)

Talonavicular ligament (13)

Navicular bone (14)



# Lateral collateral ligament



## Posterior talofibular ligament (5)

Fibula (1)

Tibia (2)

Proc. tali, tuberculum laterale (3)

Proc. tali, tuberculum mediale (11)

Tendo, musculus flexor hallucis longus (8)

Lig. calcaneofibulare (12)

Tendo, musculus peroneus brevis (13)

Tendo, musculus peroneus longus (14)

Art. subtalaris (15)

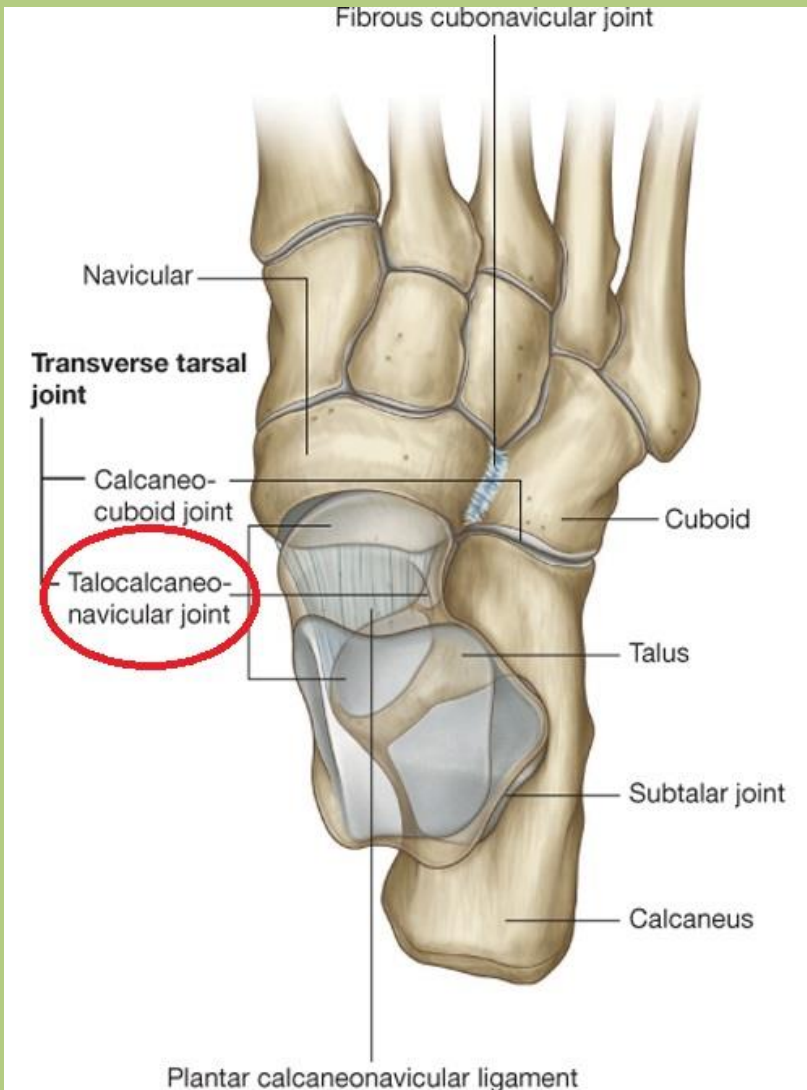
# Talocrural joint - movements

Dorsiflexion:  $15^{\circ}$

Plantarflexion:  $40^{\circ}$



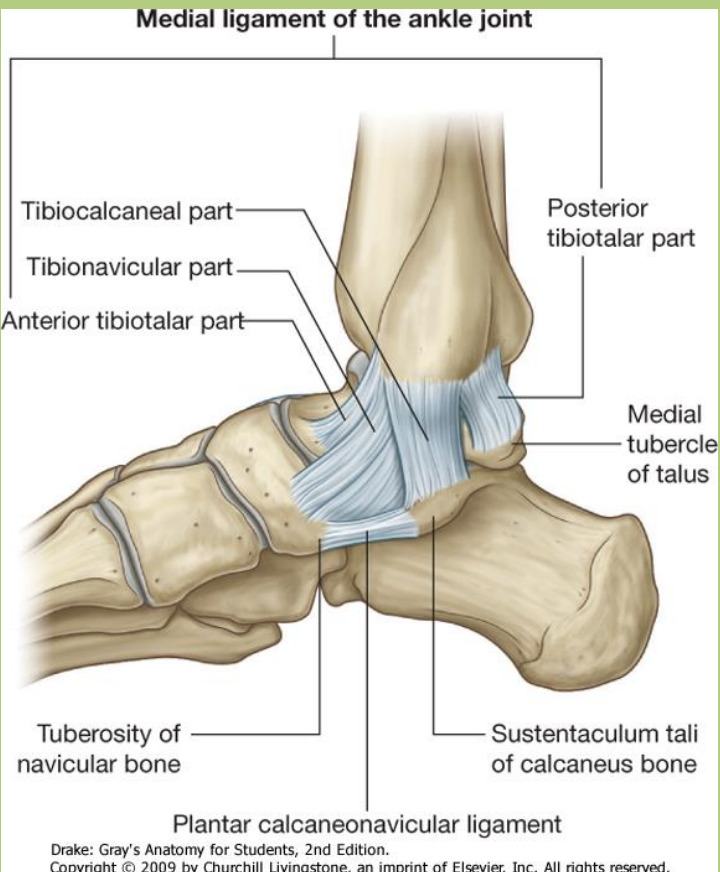
# Talotarsal joint (lower ankle joint): *talocalcaneonavicular joint* and subtalar joint



Bony surfaces: anterior and middle talar articular surfaces and head of the talus  
+  
anterior and middle calcaneal articular surfaces, navicular.

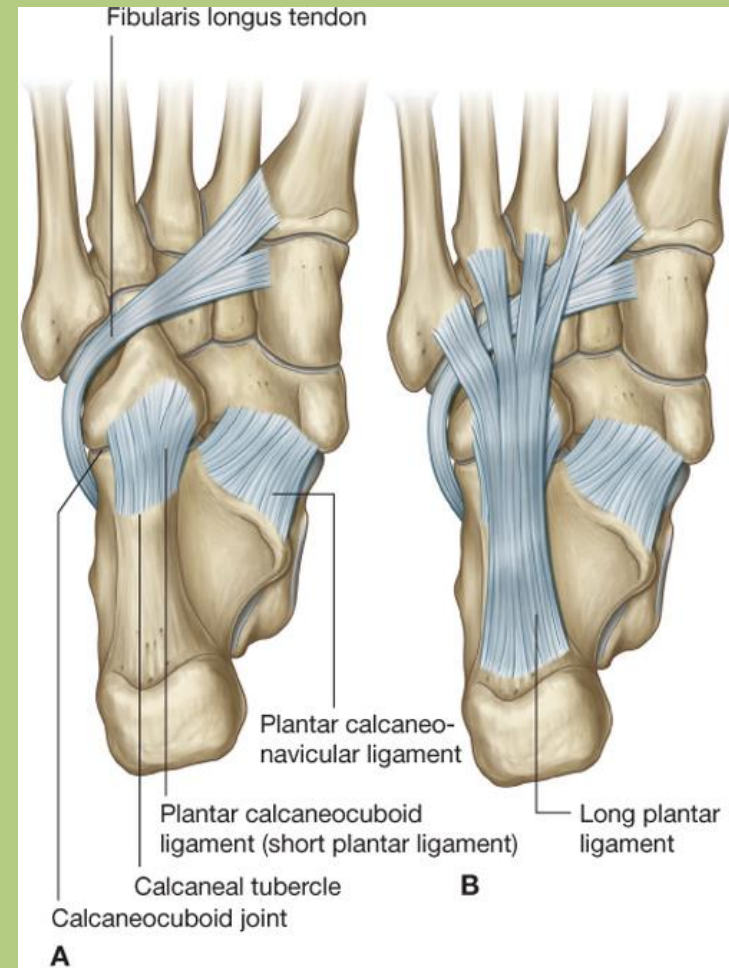
Type: restricted ball-and-socket

# Talotarsal joint (lower ankle joint): *talocalcaneonavicular joint* and subtalar joint



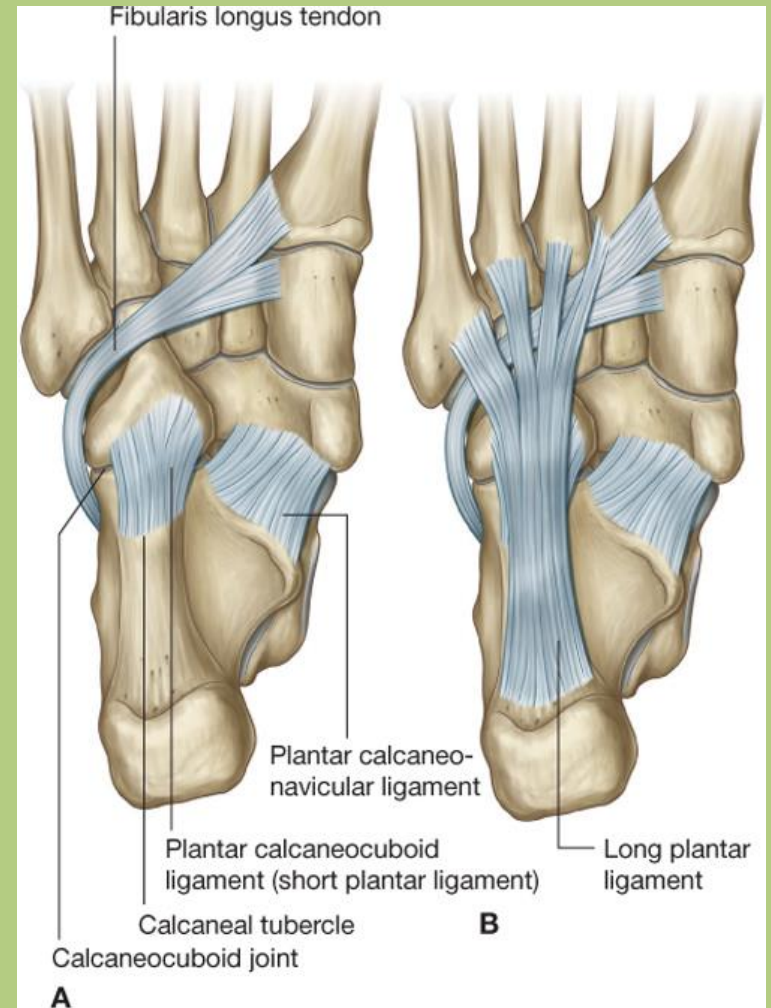
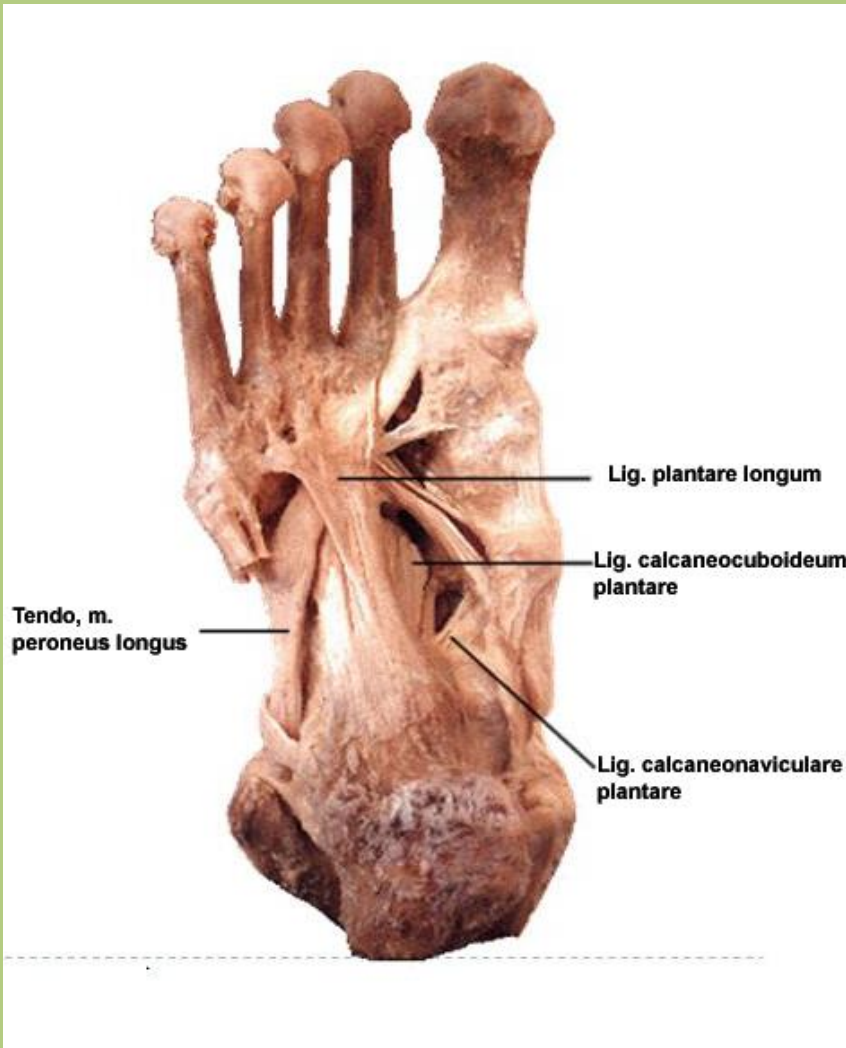
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**Plantar calcaneonavicular liament=spring ligament:**  
connects calcaneus to the navicular and keeps an articulating surface for the head of talus.

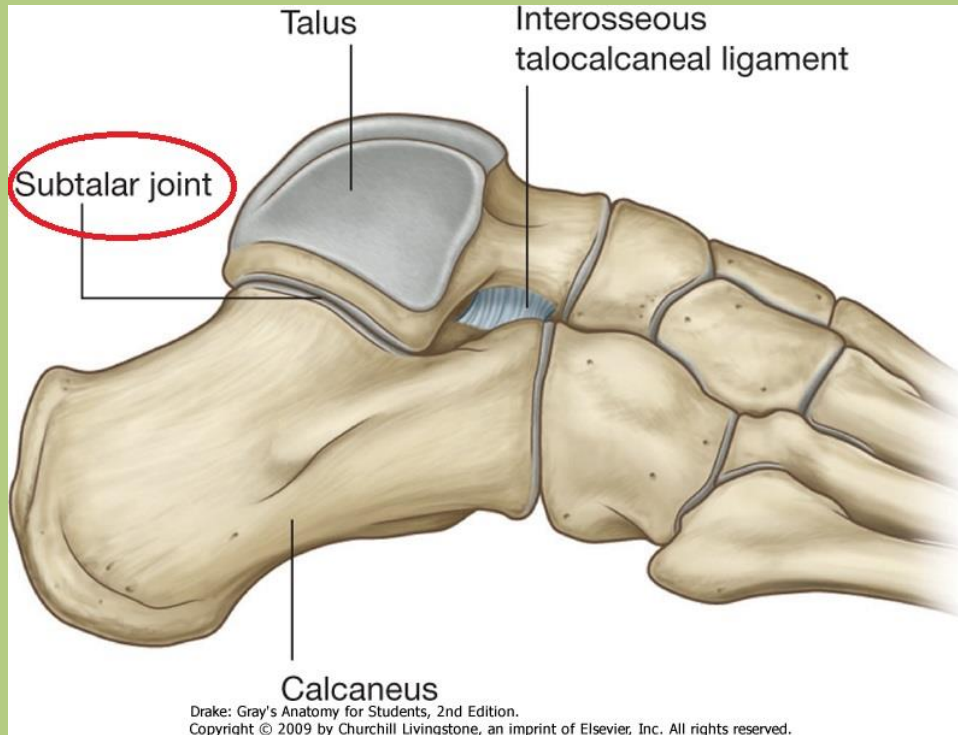


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# Talotarsal joint (lower ankle joint): *talocalcaneonavicular joint and subtalar joint*



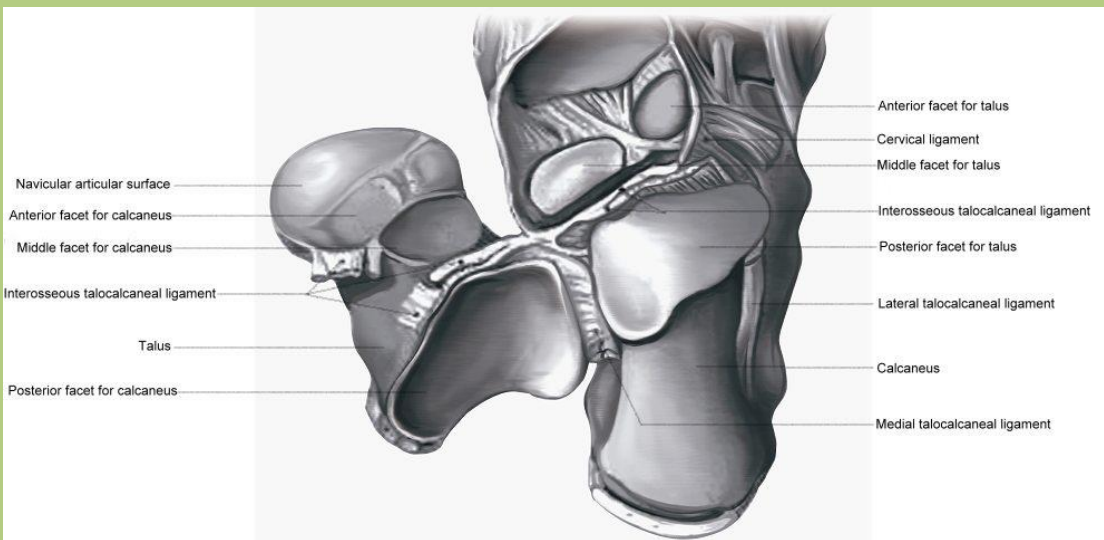
# Talotarsal joint: talocalcaneonavicular joint and subtalar joint



Bony surfaces:  
posterior talar articular surface  
+  
posterior calcaneal articular surface

Type: functionally pivot joint

# Talotarsal joint: talocalcaneonavicular joint and subtalar joint



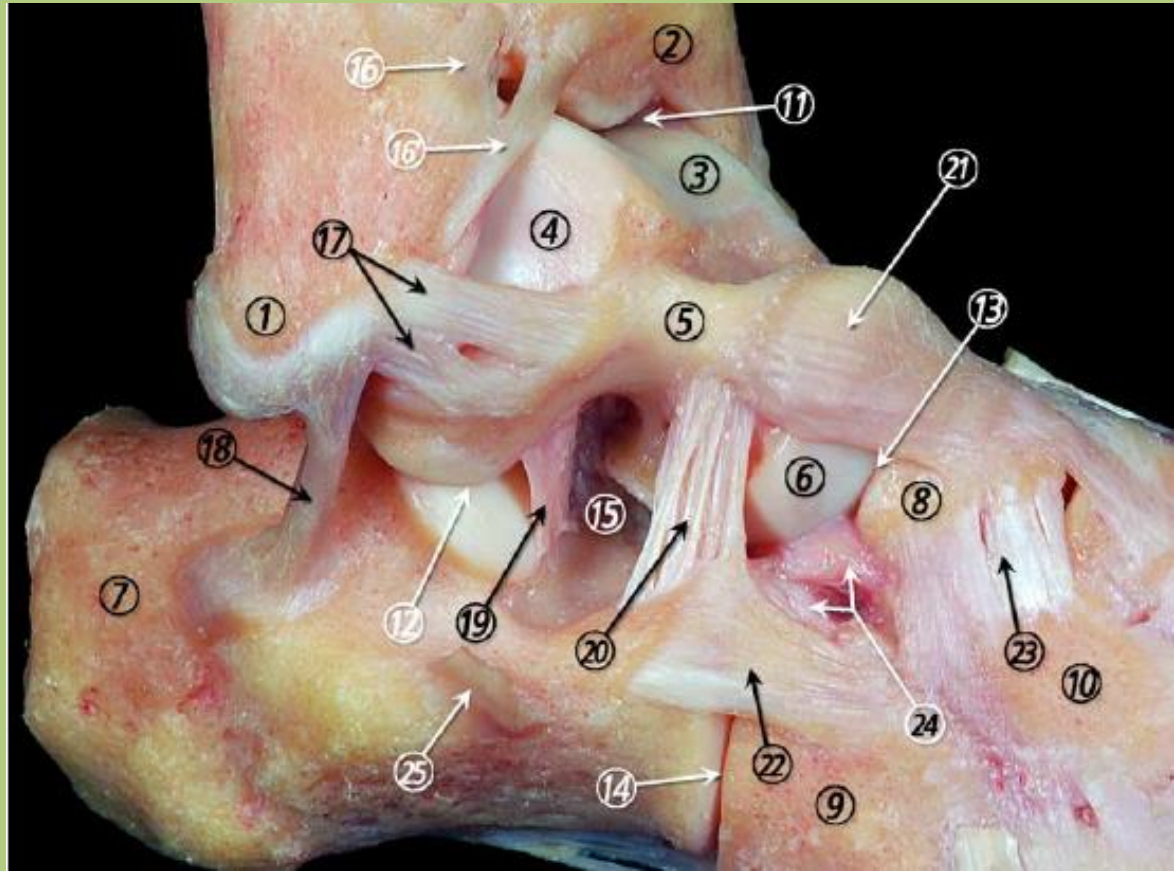
Lateral and medial talocalcaneal ligaments reinforce the articular capsule.

Type: pivot joint

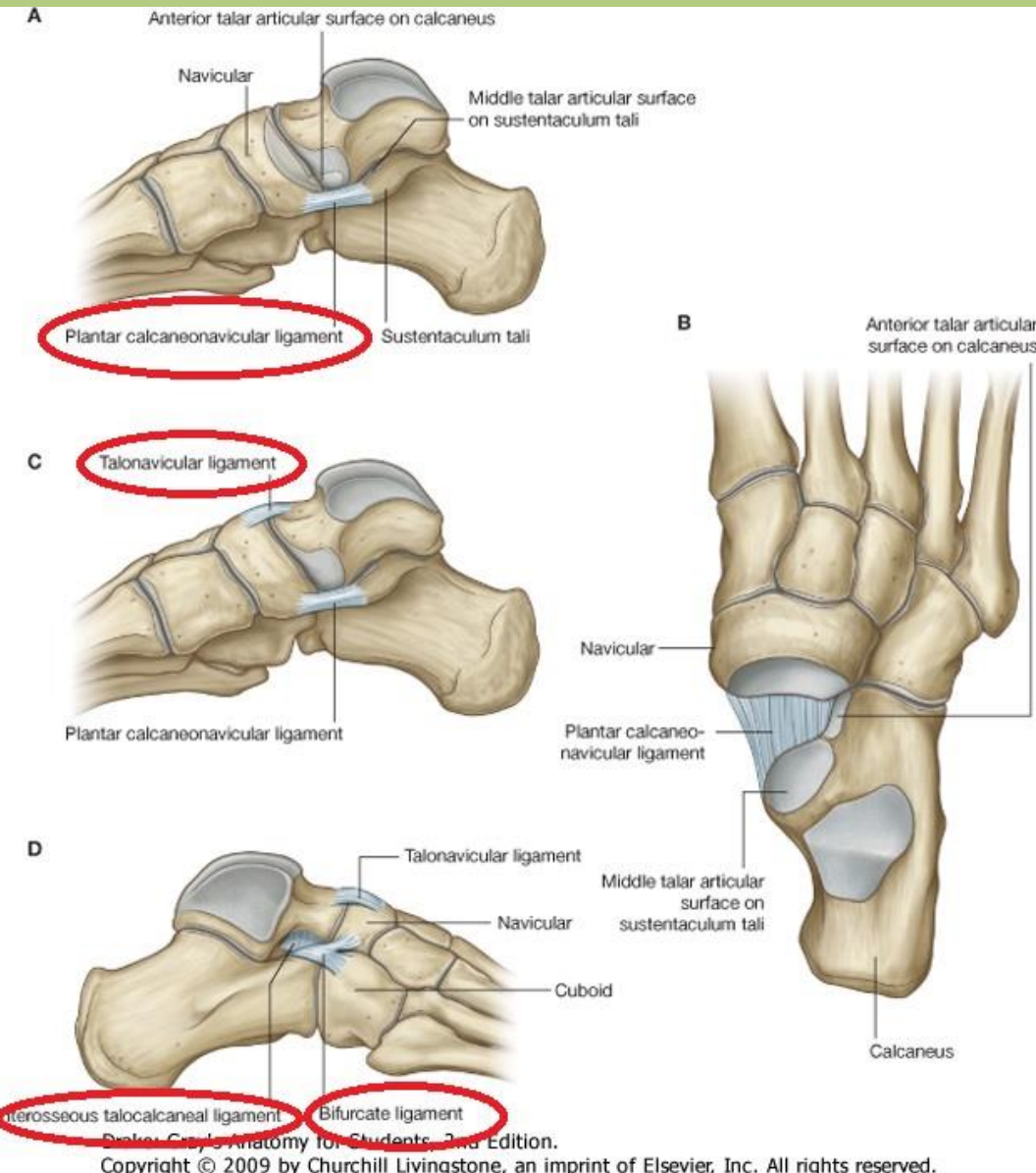
# Talocalcaneonavicular joint

- **Interosseous talocalcaneal ligament (19) – in the sinus tarsi (15)**

Lig. talofibulare anterius (17)  
Lig. calcaneofibulare (18)  
Lig. cervicale (20)  
Lig. talonaviculare (21)  
Lig. calcaneocuboideum laterale (22)  
Lig. cuneonaviculare dorsale (23)



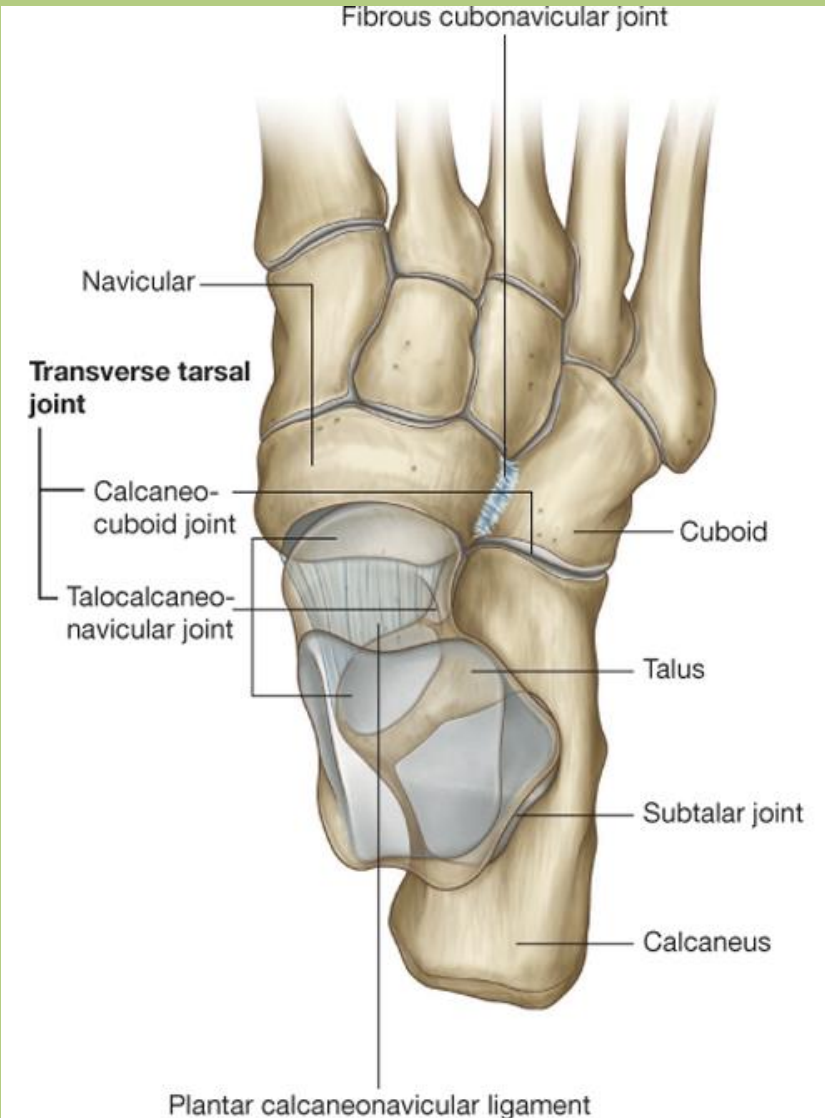
# Talotarsal joint - ligaments and movements



„PADS”:  
plantarflexion+adduction+supination  
(inversion)

„DABP”:  
dorsiflexion+abduction+pronation  
(eversion)

# Transverse tarsal (Chopart's) joint: *talocalcaneonavicular joint* and *calcaneocuboid joint*



Type:  
amphiarthrosis.

Minimal plantar and dorsal movements and rotation. Supports the longitudinal arch of the foot.

Chopart's amputation.



# Transverse tarsal (Chopart's) joint

- **Bifurcate ligament (24):**  
*calcaneonavicular lig. + calcaneocuboid lig.*

Lig. talofibulare anterius (17)

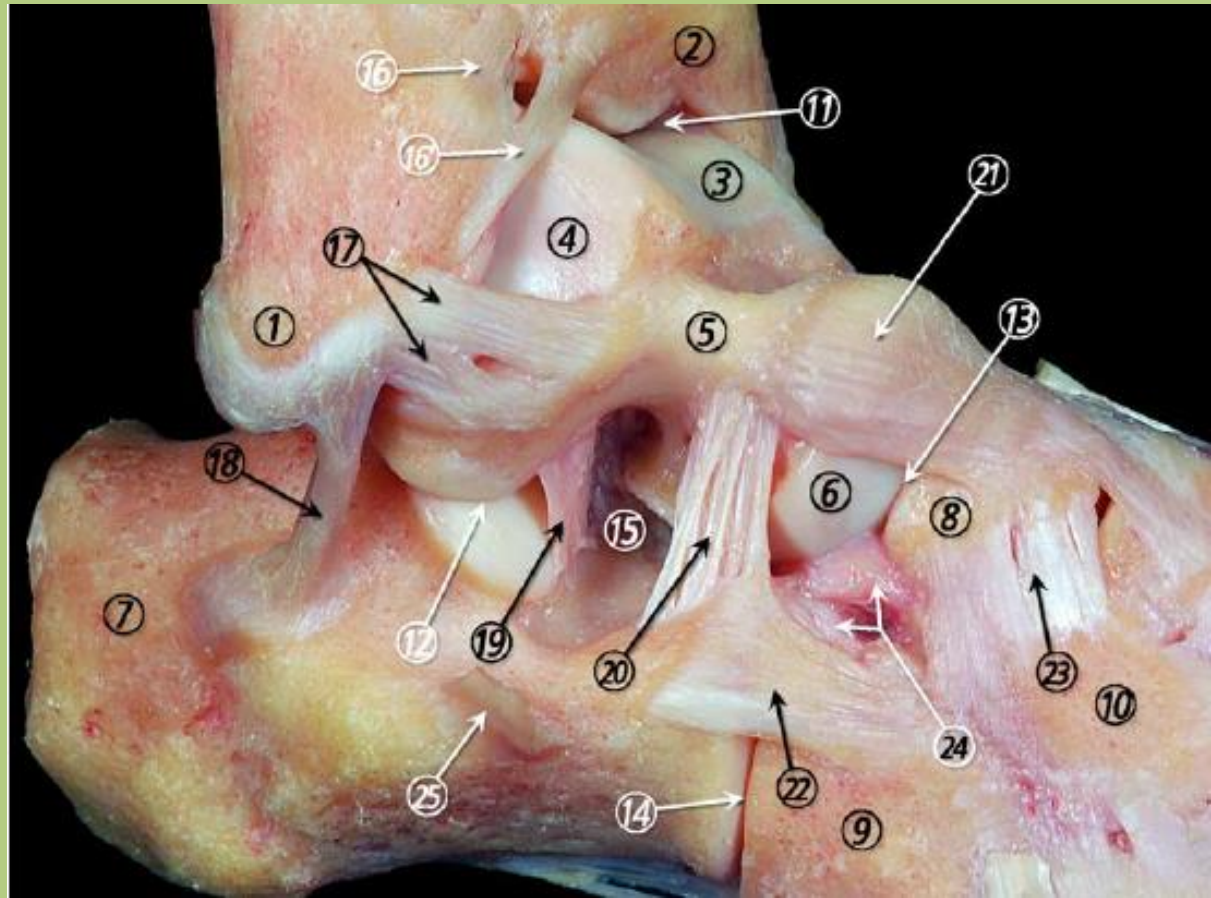
Lig. calcaneofibulare (18)

Lig. cervicale (20)

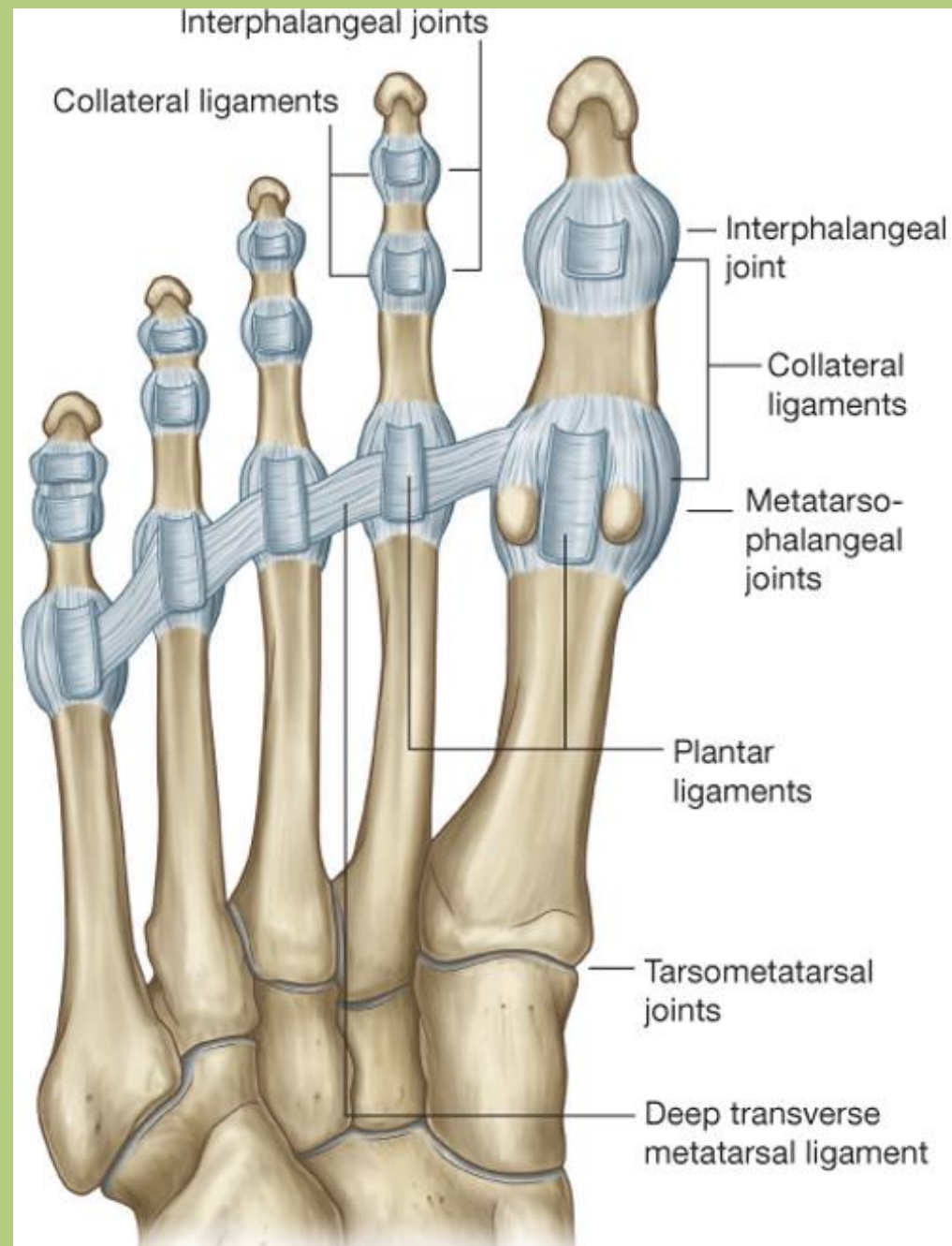
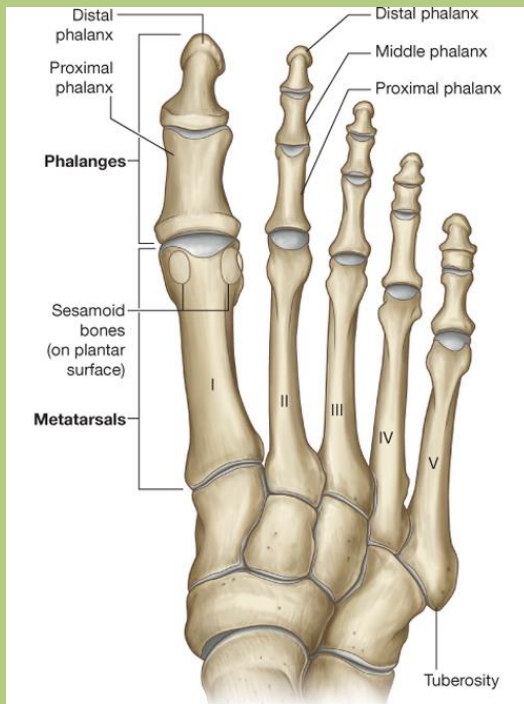
Lig. talonaviculare (21)

Lig. calcaneocuboideum laterale (22)

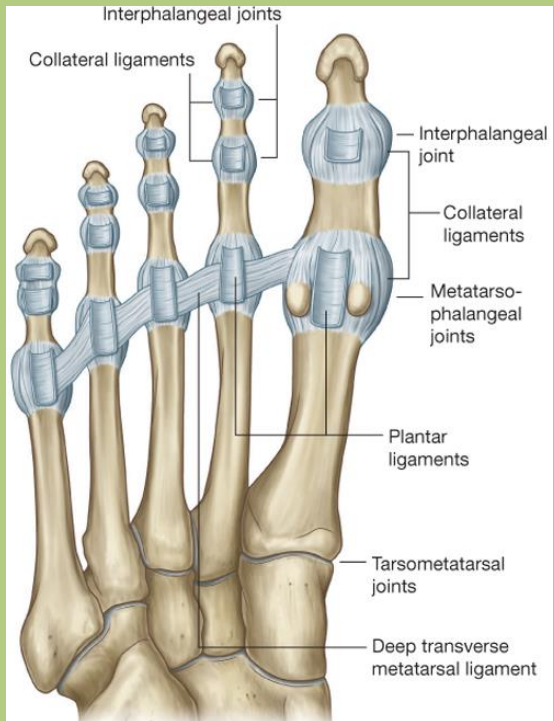
Lig. cuneonaviculare dorsale (23)



- **Intertarsal joints:** Amphiarthroses.
- **Tarsometatarsal (Lisfranc's) joints:** Amphiarthrosis. Lisfranc's amputation.
- **Metatarsophalangeal joints:** Restricted ball-and-socket. Collateral and plantar ligaments and deep transverse metatarsal ligament.
- **Interphalangeal joints:** Hinge. Collateral ligaments.



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# Thank you for your attention.



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