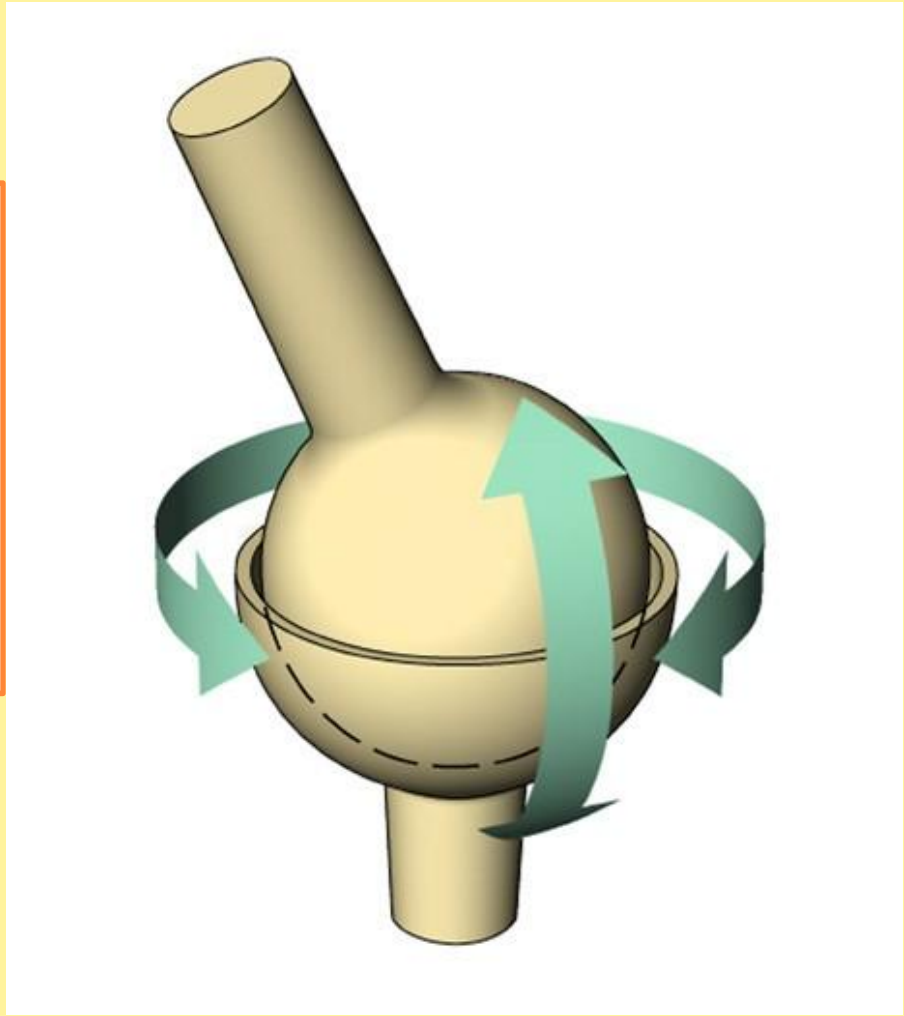
JOINTS OF THE LOWER LIMB

HIP JOINT

1-Type:

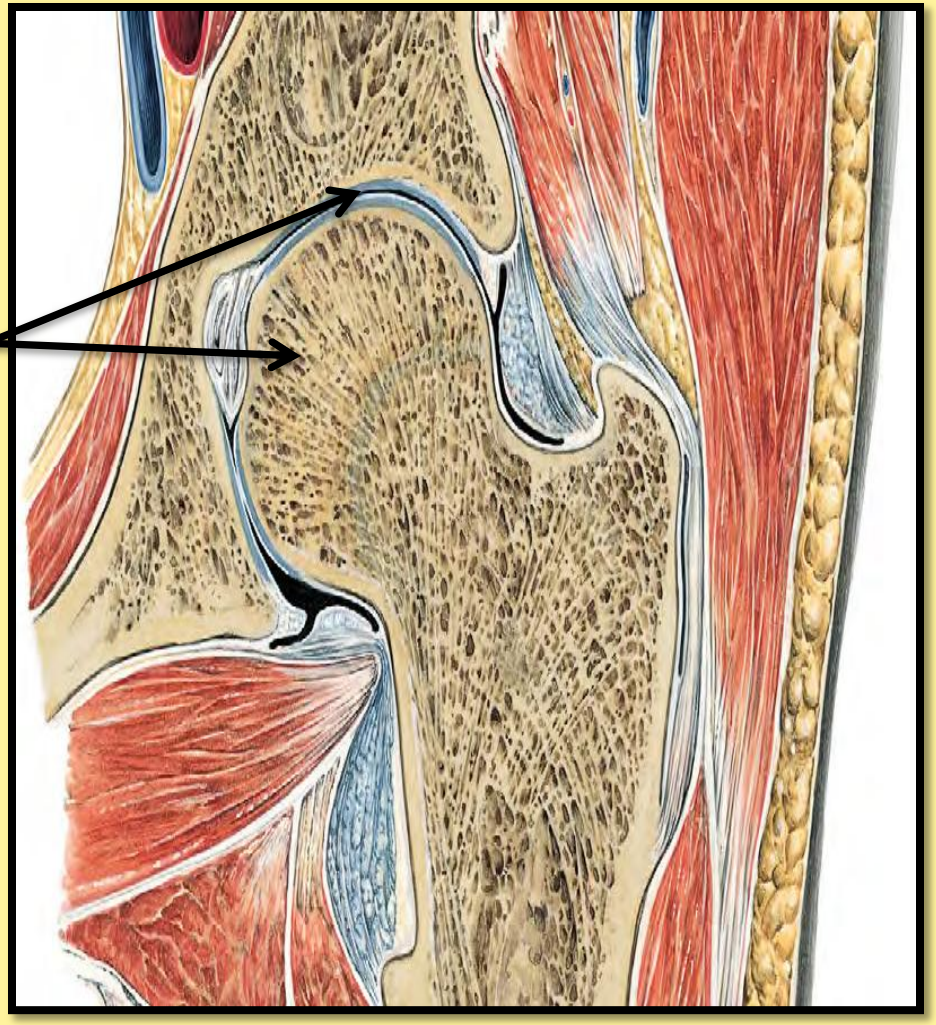
Synovial multi-axial ball-and-socket joint.



2-Articular surfaces:

a- head of femur
b- lunate surface of acetabulum

Which is deepened by the fibrocartilaginous *labrum acetabulare*



3-Nerve Supply:

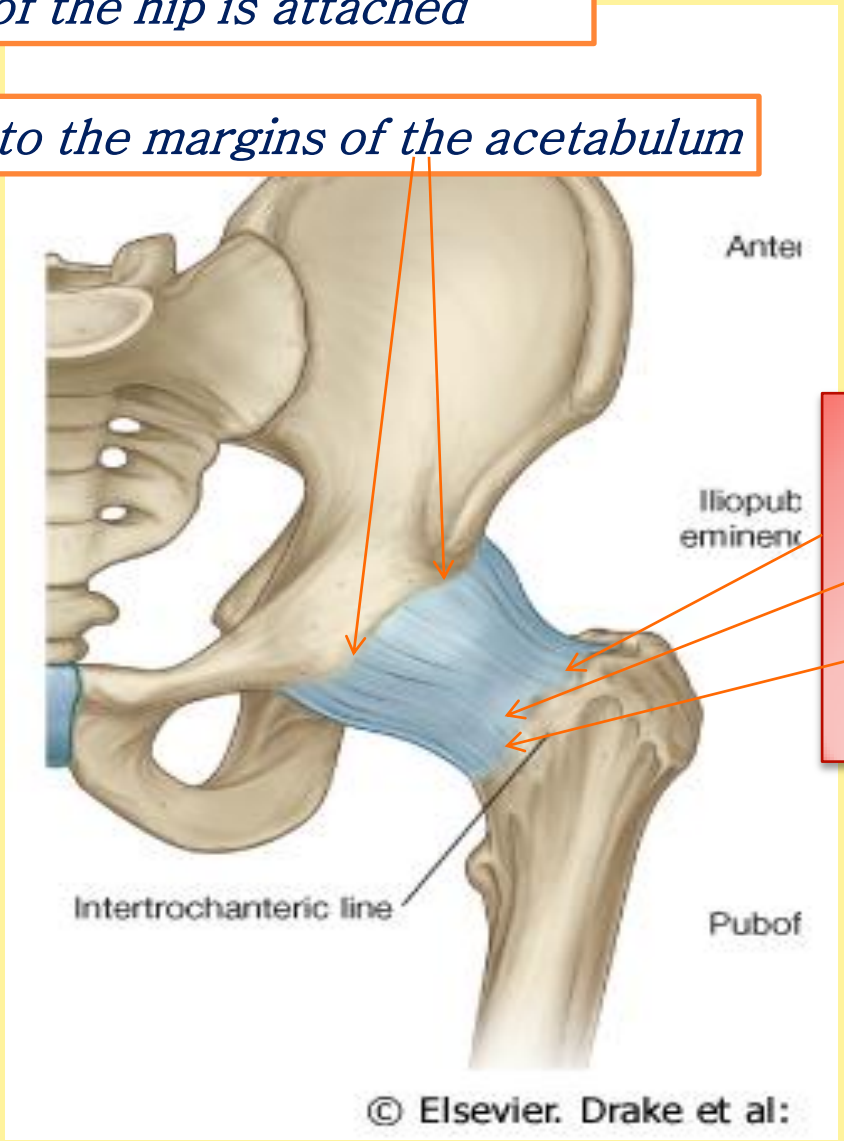
Femoral nerve
Obturator nerve
Sciatic nerve

Remember referred pain

4-The *capsule of the hip is attached*

proximally to the margins of the acetabulum

Capsule



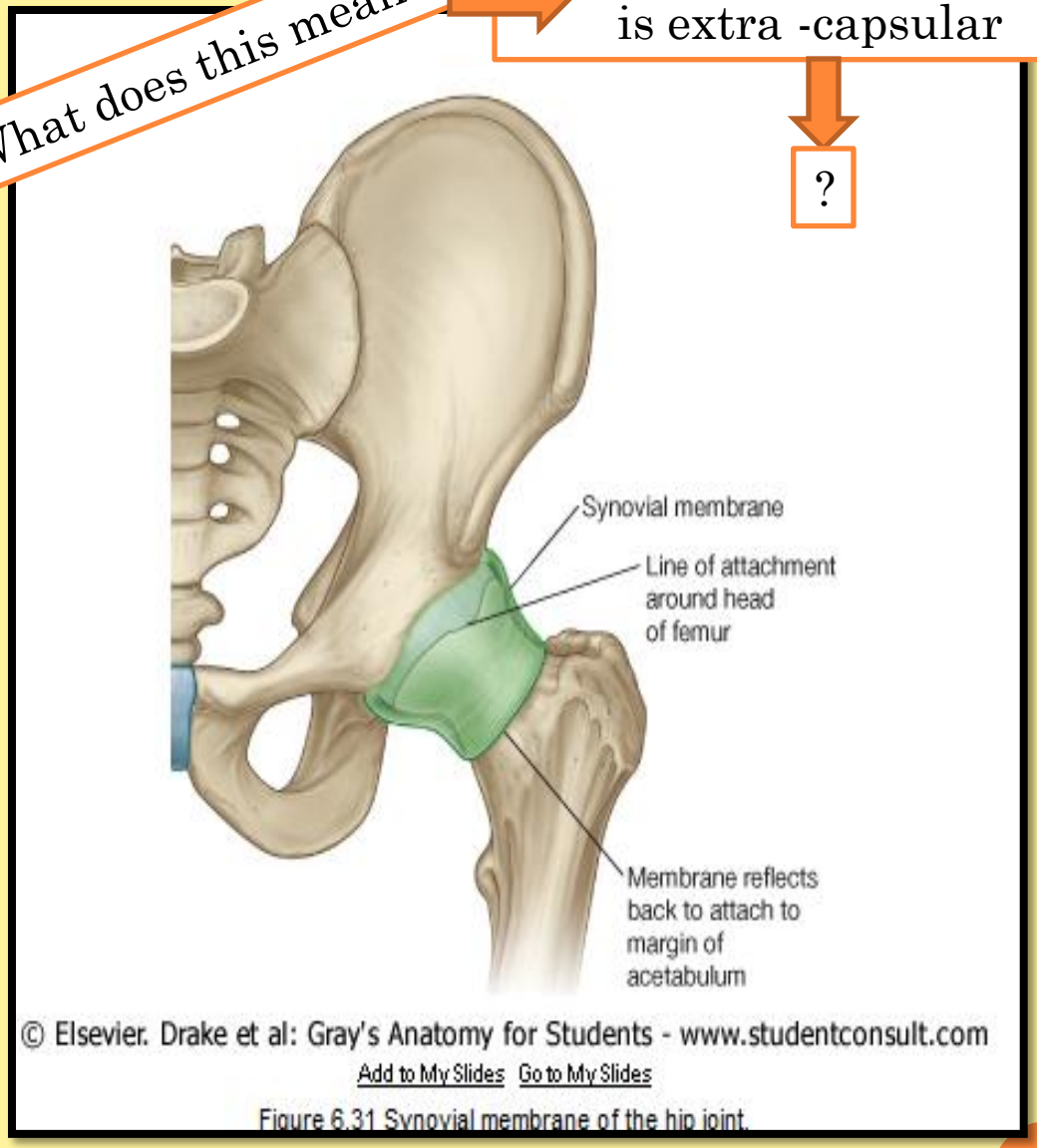
Distally, it is attached along the trochanteric line, the bases of the greater and lesser trochanters

posteriorly, to the femoral neck about 0.5 in (12mm) from the trochanteric crest. From this distal attachment, capsular fibres are reflected on to the femoral neck as *retinacula and provide one pathway for the blood supply to the* femoral head

What does this mean?

Part of the neck posteriorly is extra -capsular

?



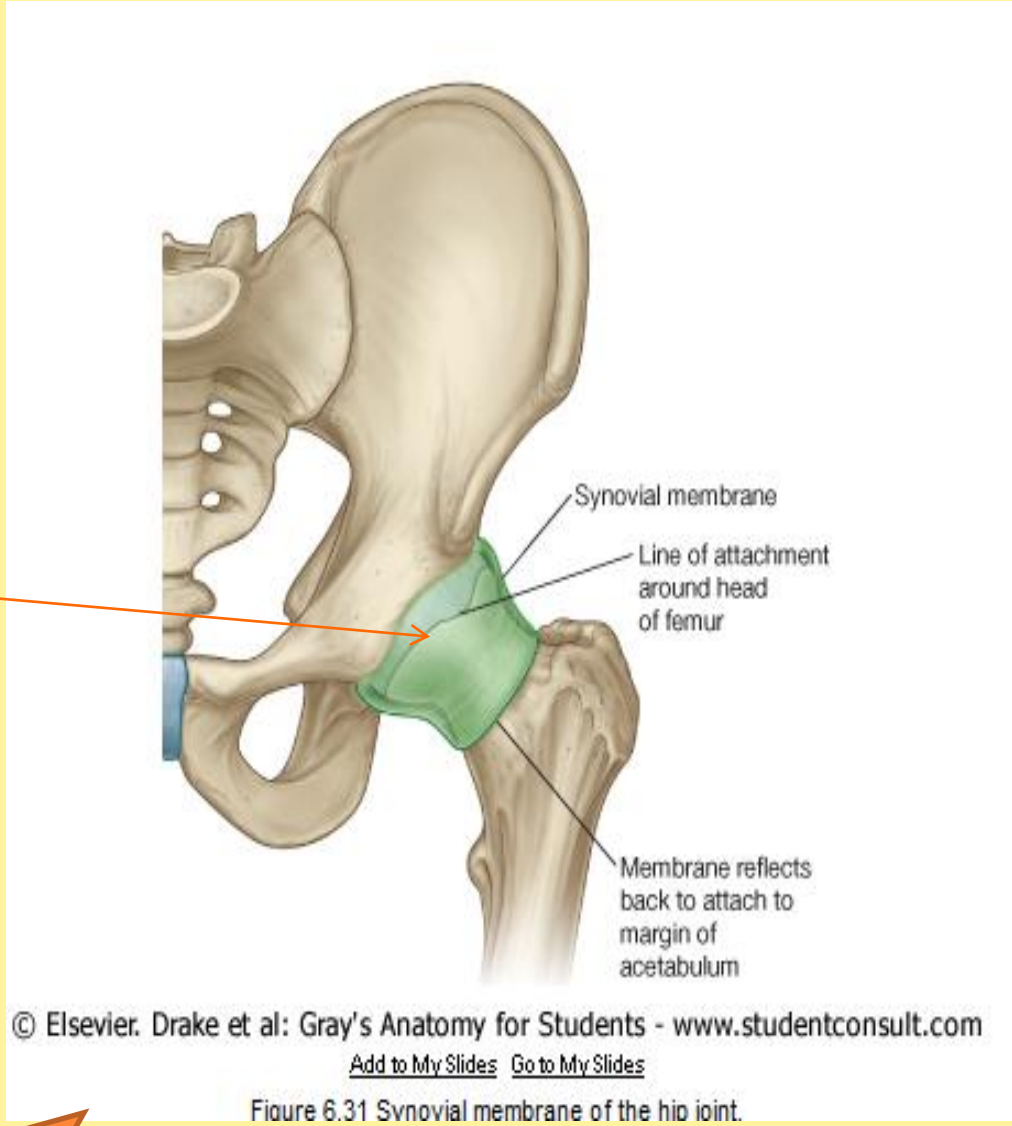
5-The **synovial membrane of the hip joint**

lines the fibrous layer as well as any intracapsular bony surfaces not lined with articular cartilage

Thus, where the fibrous layer attaches to the femur, the synovial membrane reflects proximally along the femoral neck to the edge of

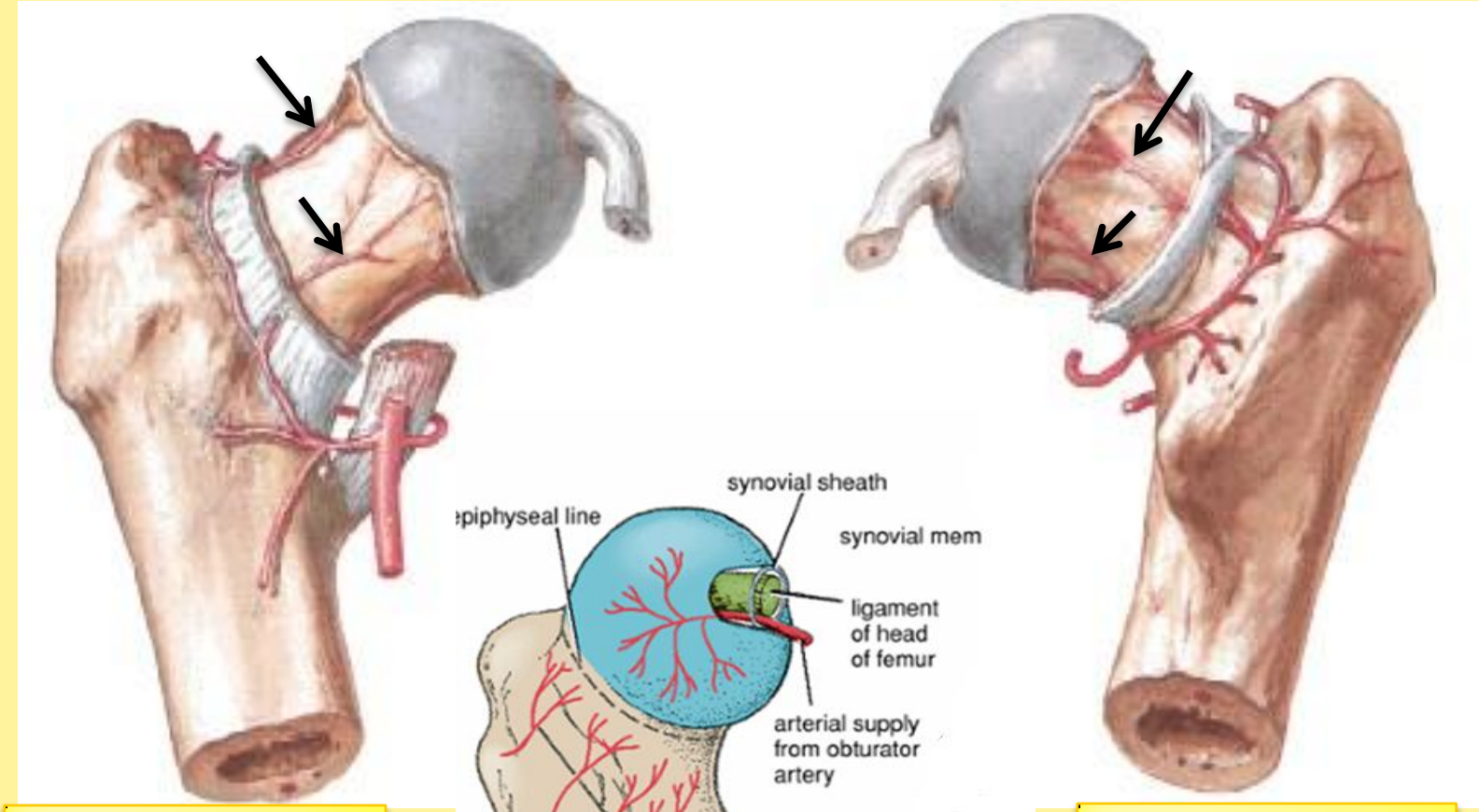
the femoral head. The **synovial folds (retinacula), which reflect superiorly along the femoral neck as longitudinal bands, contain subsynovial ret inacular arteries (branches of the medial and a few from the lateral femoral circumflex artery), which supply the head and neck of the**

femur



important

6-Subsynovial retinacular arteries (branches of the medial and a few from the lateral femoral circumflex artery), which supply the head and neck of the femur

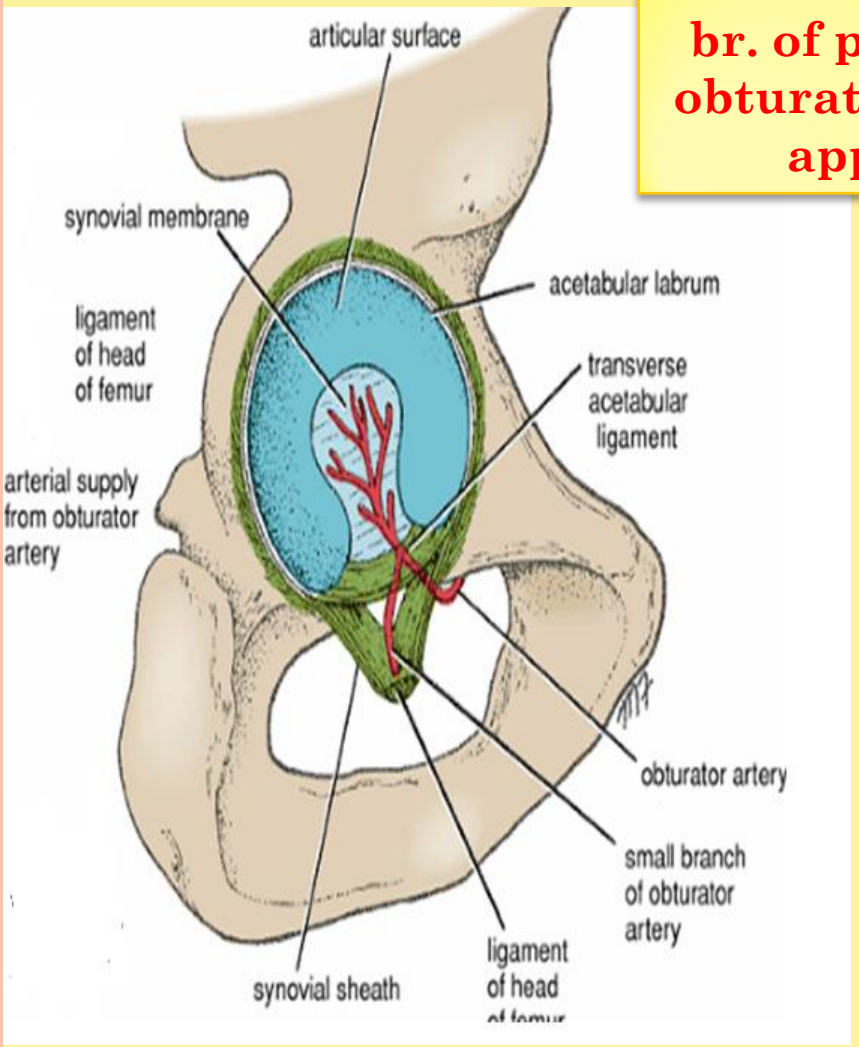


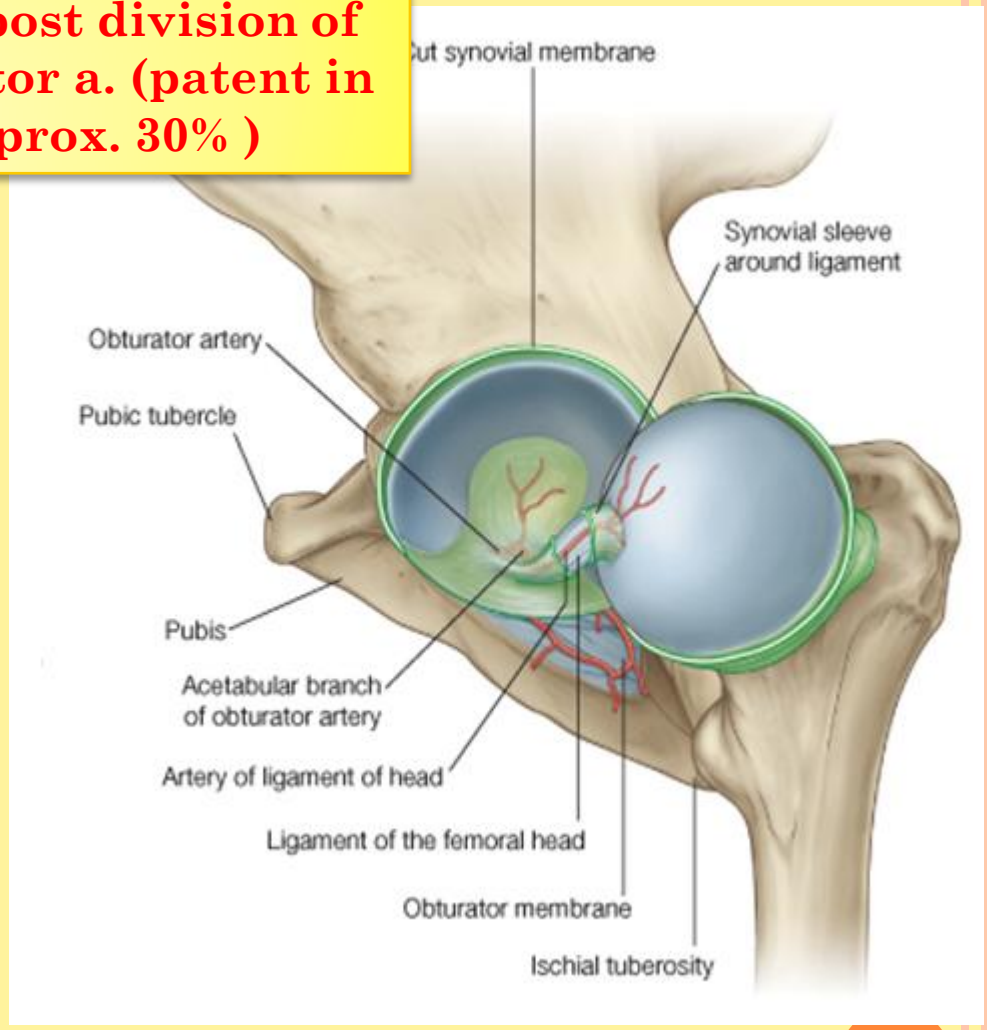
Anterior view

Posterior view

Blood supply of the head of the femur

-Acetabular (foveolar) br. of post division of obturator a. (patent in approx. 30%)

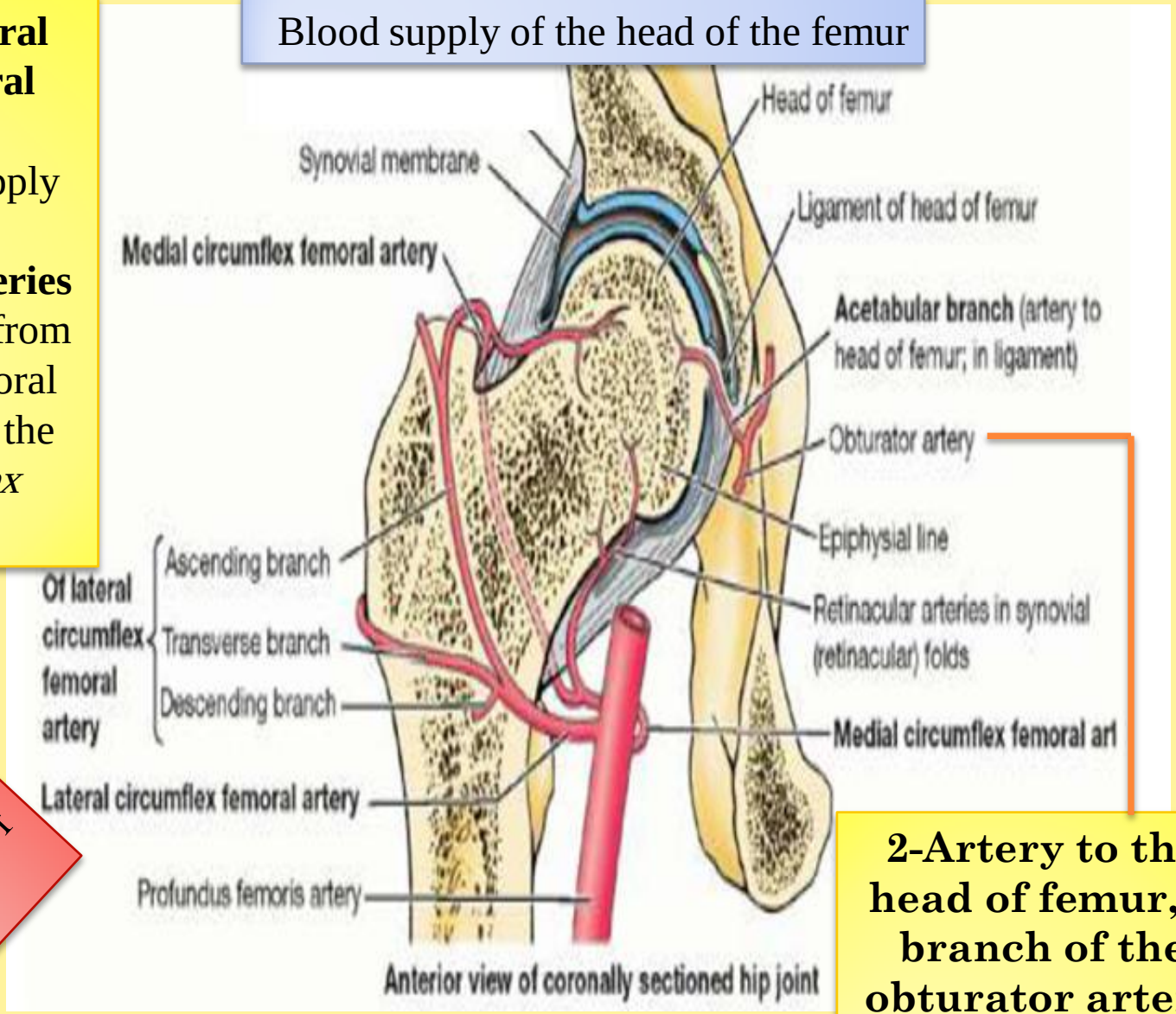




1-Medial and lateral circumflex femoral arteries

The main blood supply is from **the retinacular arteries** arising as branches from the circumflex femoral arteries (especially the *medial circumflex femoral artery).*

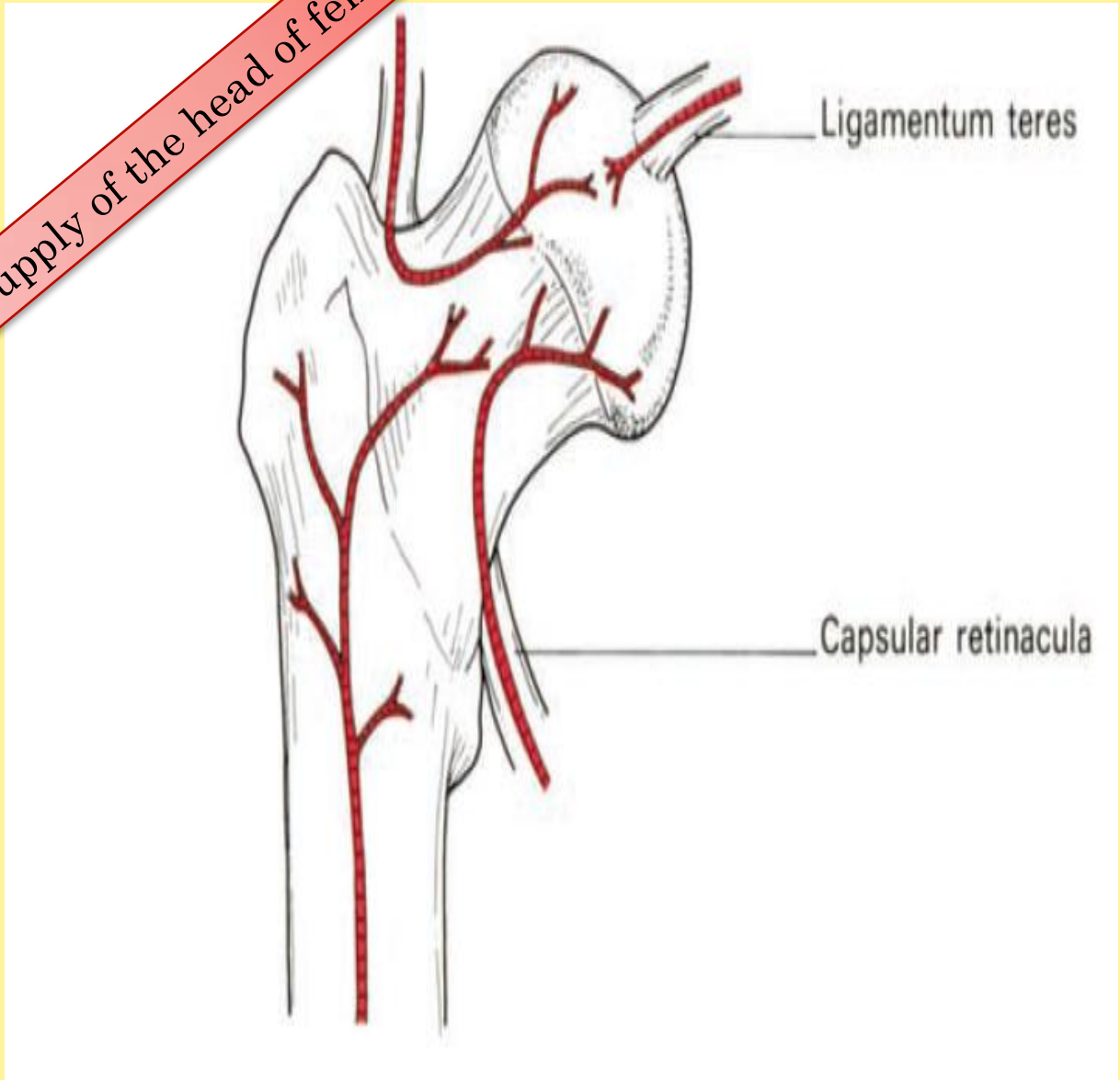
Blood supply of the head of the femur



2-Artery to the head of femur, a branch of the obturator artery that traverses the ligament of the head.

Blood supply of the head of the femur

Practice the blood supply of the head of femur



The upper end of the femur is a common site for fracture

in the elderly

The neck may break
1-immediately beneath the head

subcapital

2-near its midpoint

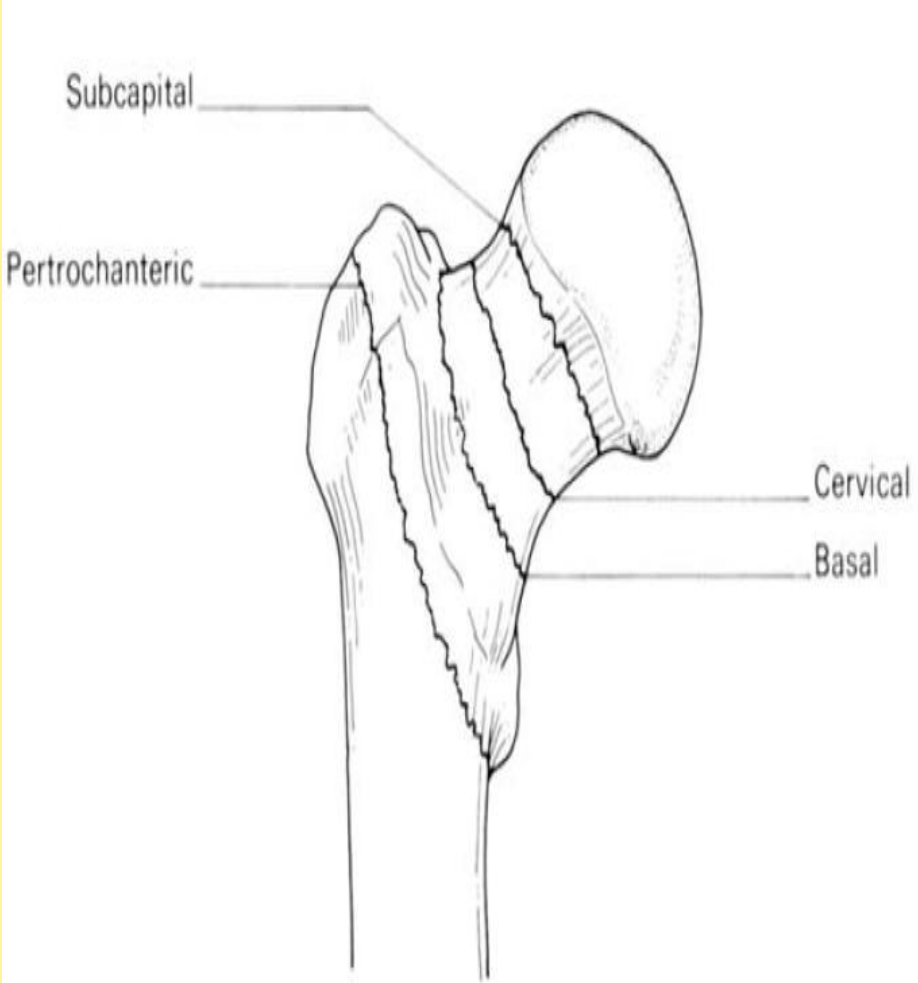
cervical

3-adjacent to the trochanters

basal

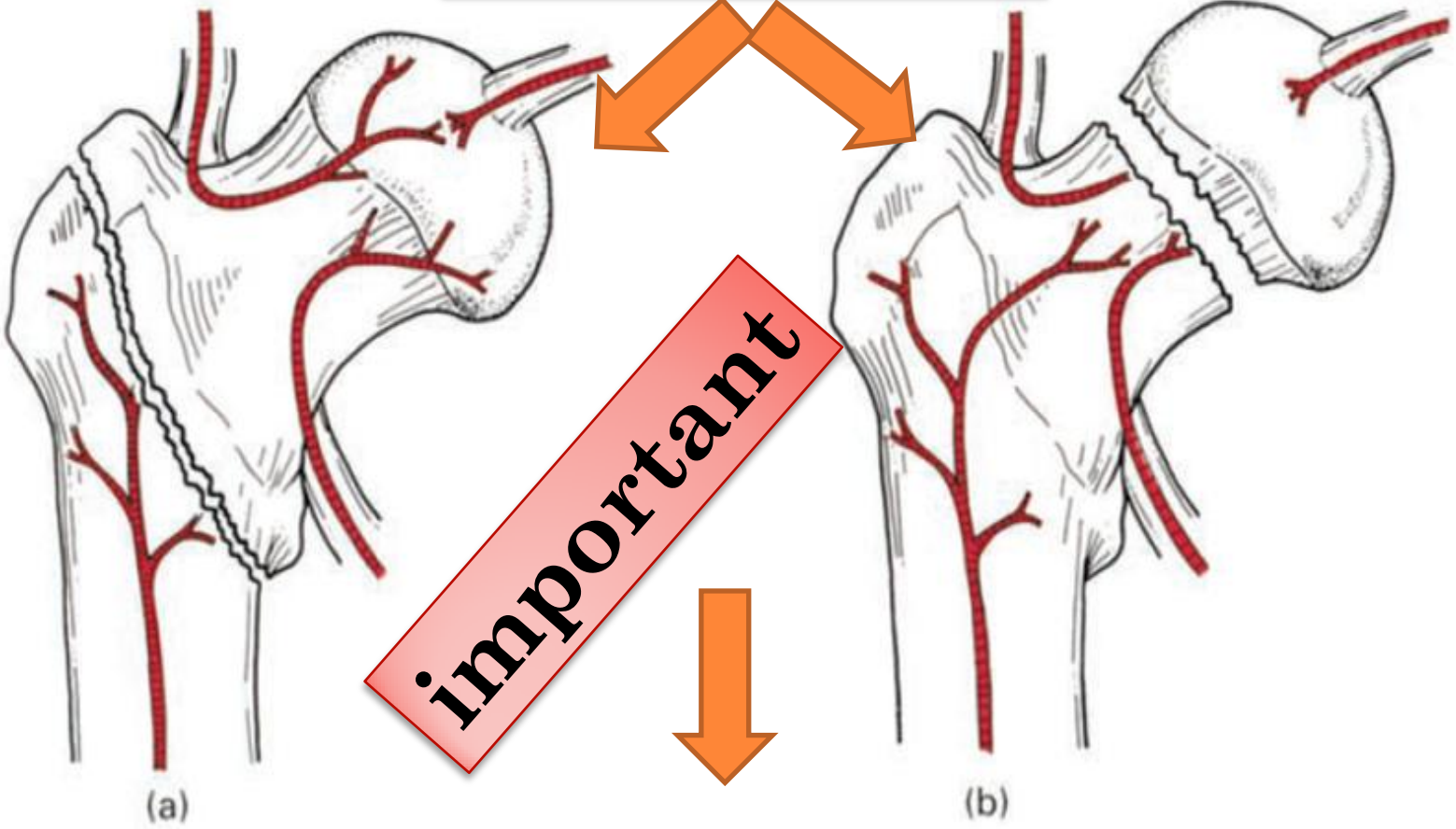
4-the fracture line
may pass between, along or just below the trochanters

pretrochanteic

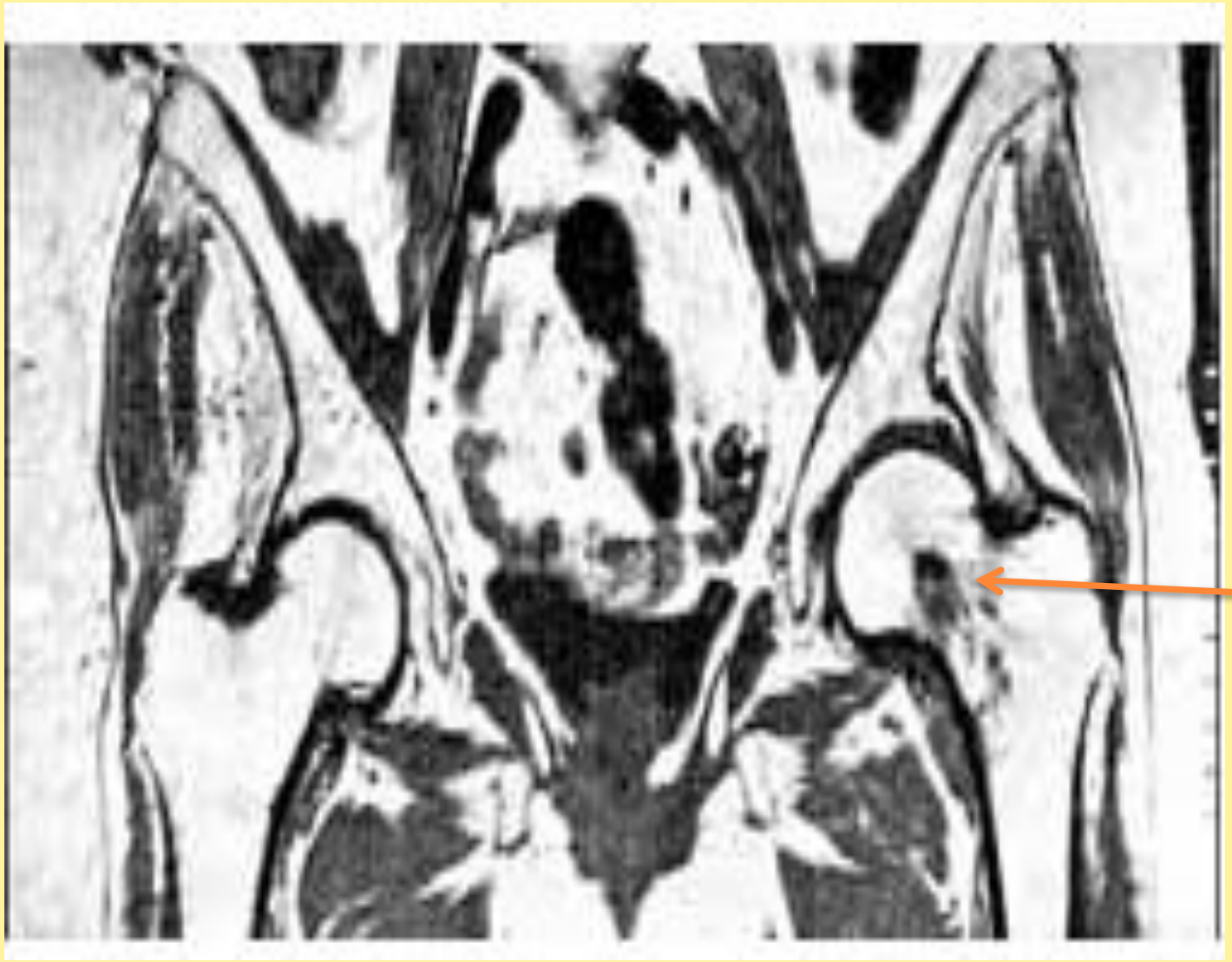


Neck fracture will result in

important



(a) A pertrochanteric fracture does not damage the retinacular blood supply—aseptic bone necrosis does not occur. (b) A subcapital fracture cuts off most of the retinacular supply to the head—aseptic bone necrosis is common. Note that the blood supply via the ligamentum teres is negligable in adult life.



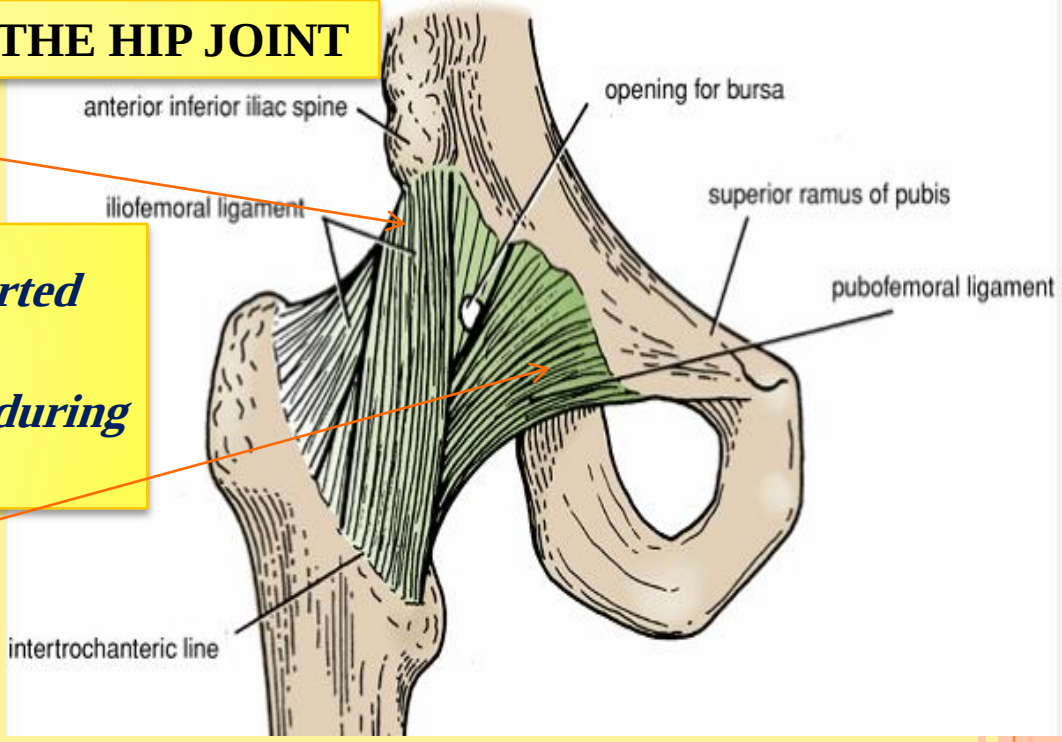
For reading only

MRI revealing Left Femoral neck Fracture

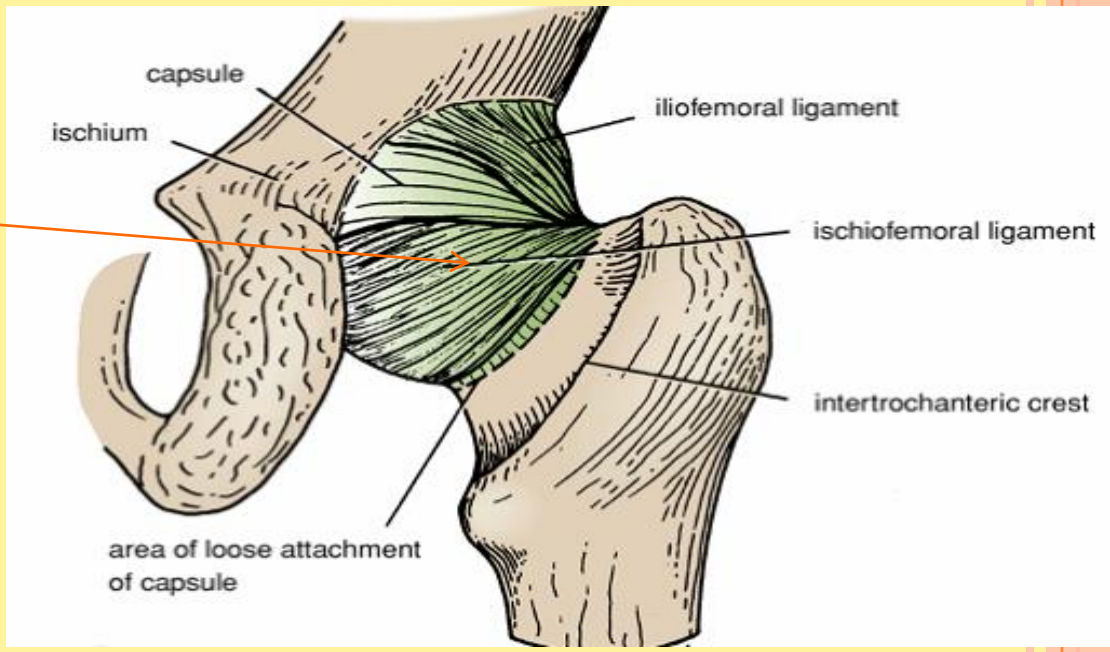
7-MAIN LIGAMENTS OF THE HIP JOINT

a-Iliofemoral: ***is a strong, inverted Y-shaped ligament. Prevents hyperextension of hip joint during standing***

b-Pubofemoral: ***limits extension and abduction***

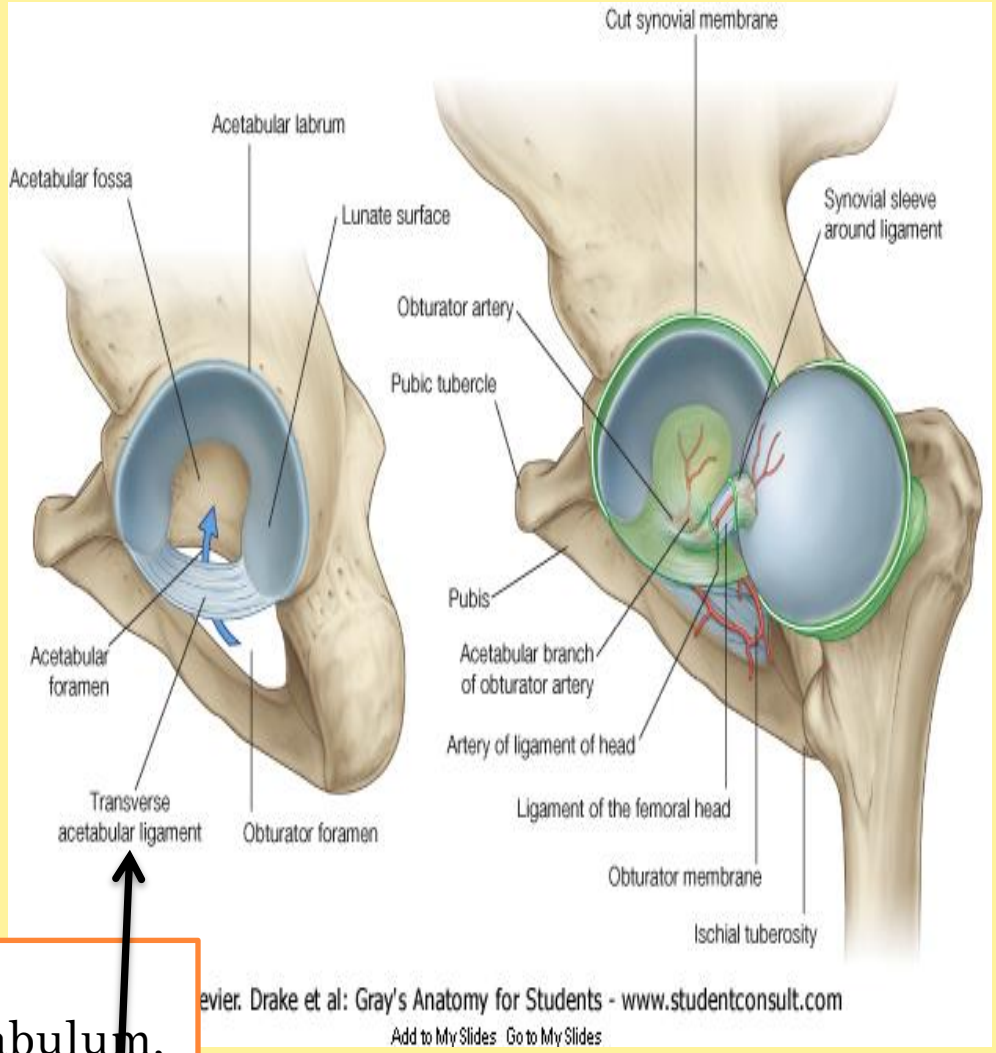


c-Ischiofemoral: ***limits extension***



D-The **ligament of head of femur *ligamentum teres* primarily a synovial fold conducting a blood vessel, is weak and of little importance in strengthening** the hip joint

Its wide end attaches to the margins of the acetabular notch and the *transverse acetabular ligament; its narrow end* attaches to the femur at the *fovea for the ligament of the head of femur. Usually, the ligament contains a small artery to the head of the femur.*



The non-articular lower part of the acetabulum, the *acetabular notch, is closed off* below by the

E-transverse acetabular ligament

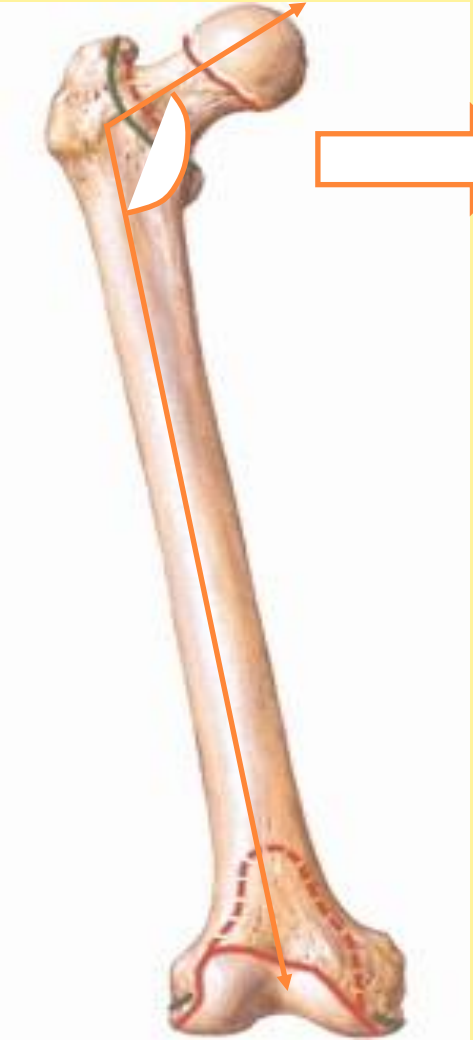
8 - Movements

- Flexion is performed by ***the iliopsoas, rectus femoris, and sartorius***
- Extension is performed by ***the gluteus maximus and the hamstring muscles.***
- Abduction is performed by ***the gluteus medius and minimus***, assisted by the sartorius, tensor fasciae latae, and piriformis.
- Adduction is performed by ***the adductor longus and brevis and the adductor fibers of the adductor magnus***. These muscles are assisted by the pectineus and the gracilis.
- Lateral rotation is performed by the short lateral rotator muscles and assisted by the gluteus maximus.
- Medial rotation is performed by **the anterior fibers of the gluteus medius and gluteus minimus and the tensor fasciae latae.**

Flexion is limited by the hamstring muscle group. Extension is limited by the ligamentous thickening of the capsule; abduction, by the adductor group of muscles; adduction, by the tensor muscle and fascia of the abductor muscles; and rotation, by the fibrous capsular

9- Angle of Inclination

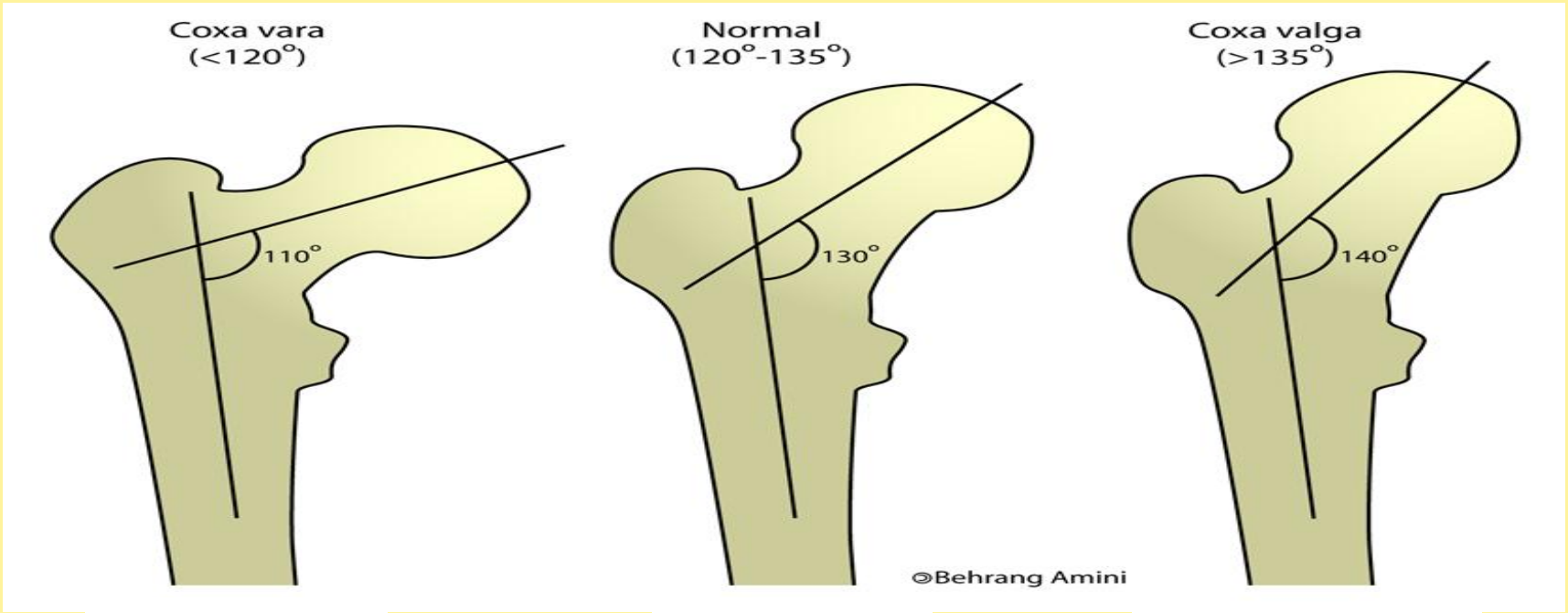
it is the angle between the neck and shaft of the femur

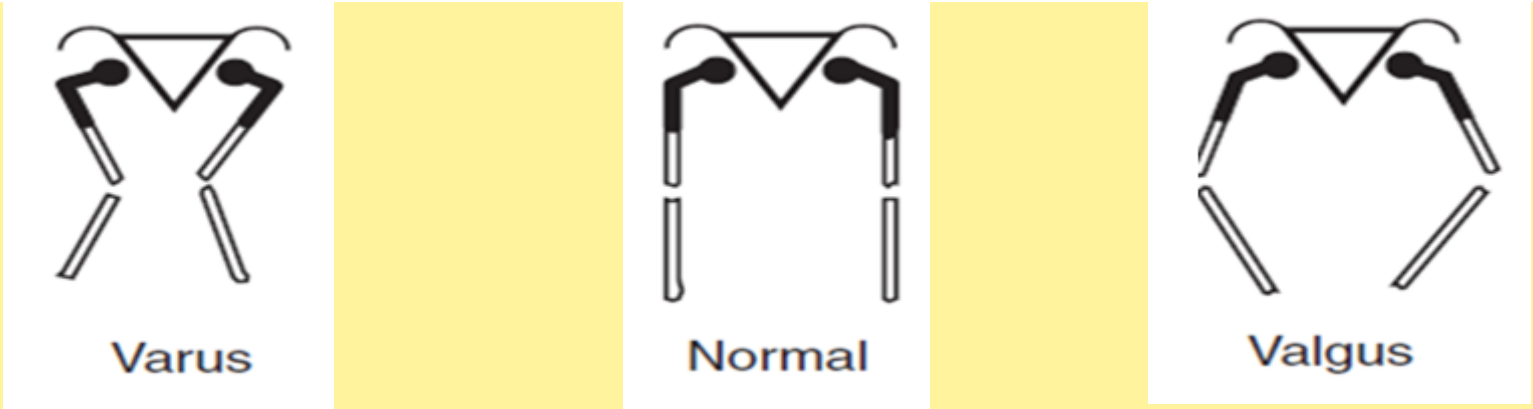


Approx. 125°

typically ranges from 115 to 140 degrees

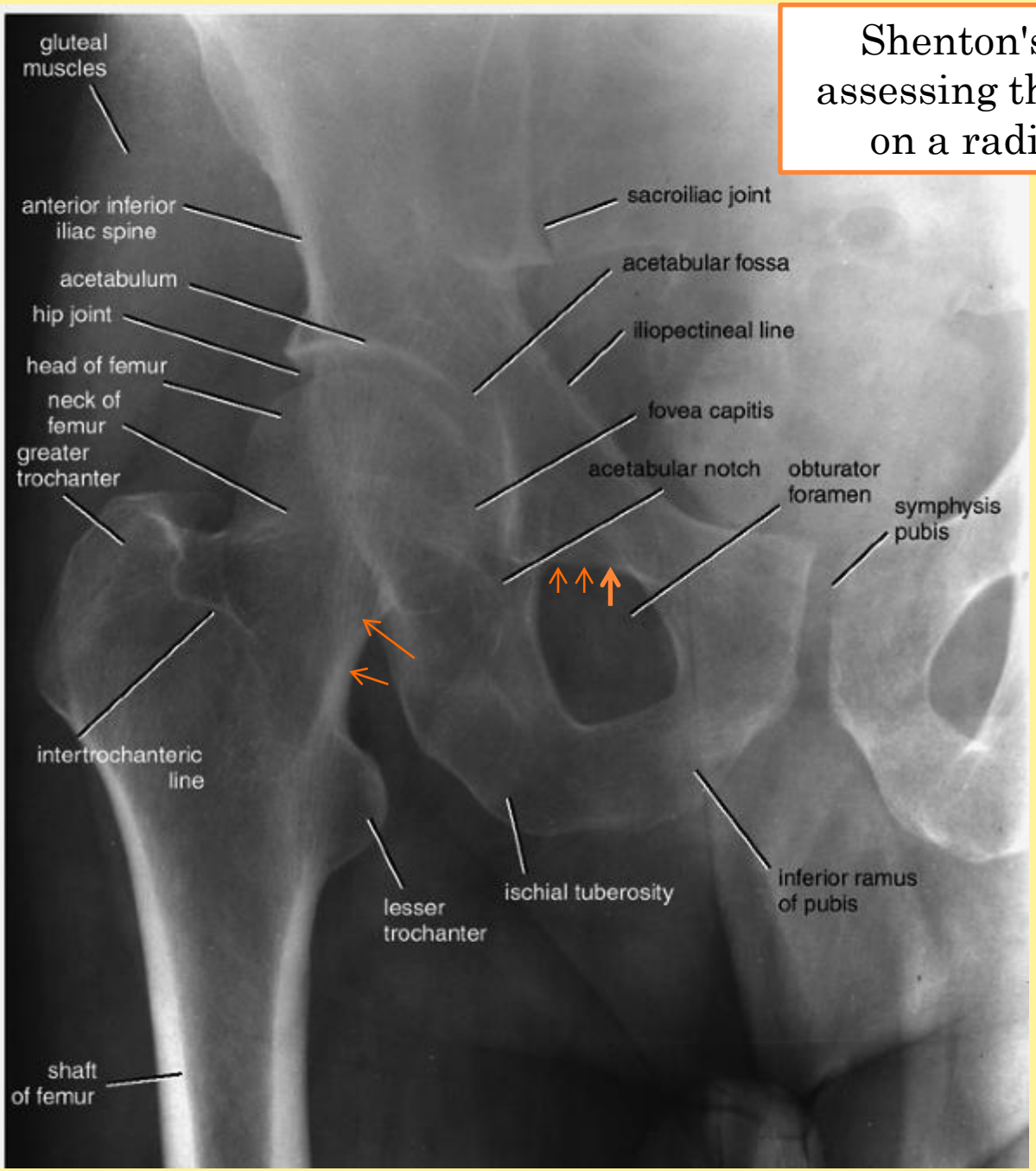
is about 160 ° in the young child and about 125° in the adult





it occurs in fractures of the neck of the femur and in slipping of the femoral epiphysis. In this condition, abduction of the hip joint is limited

for example, in cases of congenital dislocation of the hip. In this condition, adduction of the hip joint is limited



Shenton's line is a useful means of assessing the angle of the femoral neck on a radiograph of the hip region

Note that the inferior margin of the neck of the femur should form a continuous curve with the upper margin of the obturator foramen (Shenton's line)

10-There is a pattern of hip injuries;

In children may sustain greenstick fractures of the femoral neck

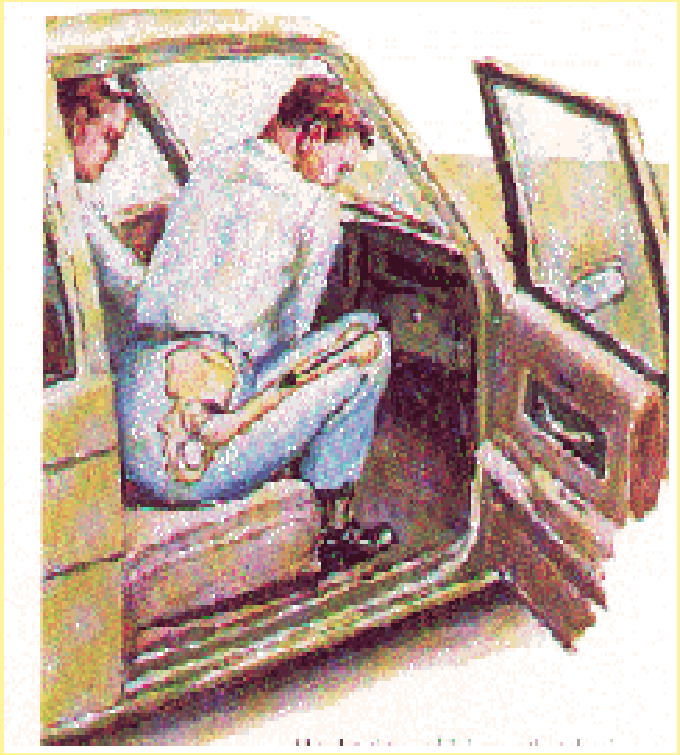
schoolboys may displace the epiphysis of the femoral head

in adult life the hip dislocates

in old age
fracture of the neck of the femur again becomes the usual lesion

Dislocation of the hip

The hip is usually dislocated backwards and this is produced by a force applied along the femoral shaft with the hip in the flexed position (e.g. the knee striking against the opposite seat or in car accedent



The sciatic nerve, is in a close posterior relation with the hip joint therefore, it is in a danger of damage in these injuries

Ankle Joint

Type

The ankle is a synovial hinge joint.

Articulation

the lower end of the tibia, the two malleoli, and the body of the talus

Ligaments

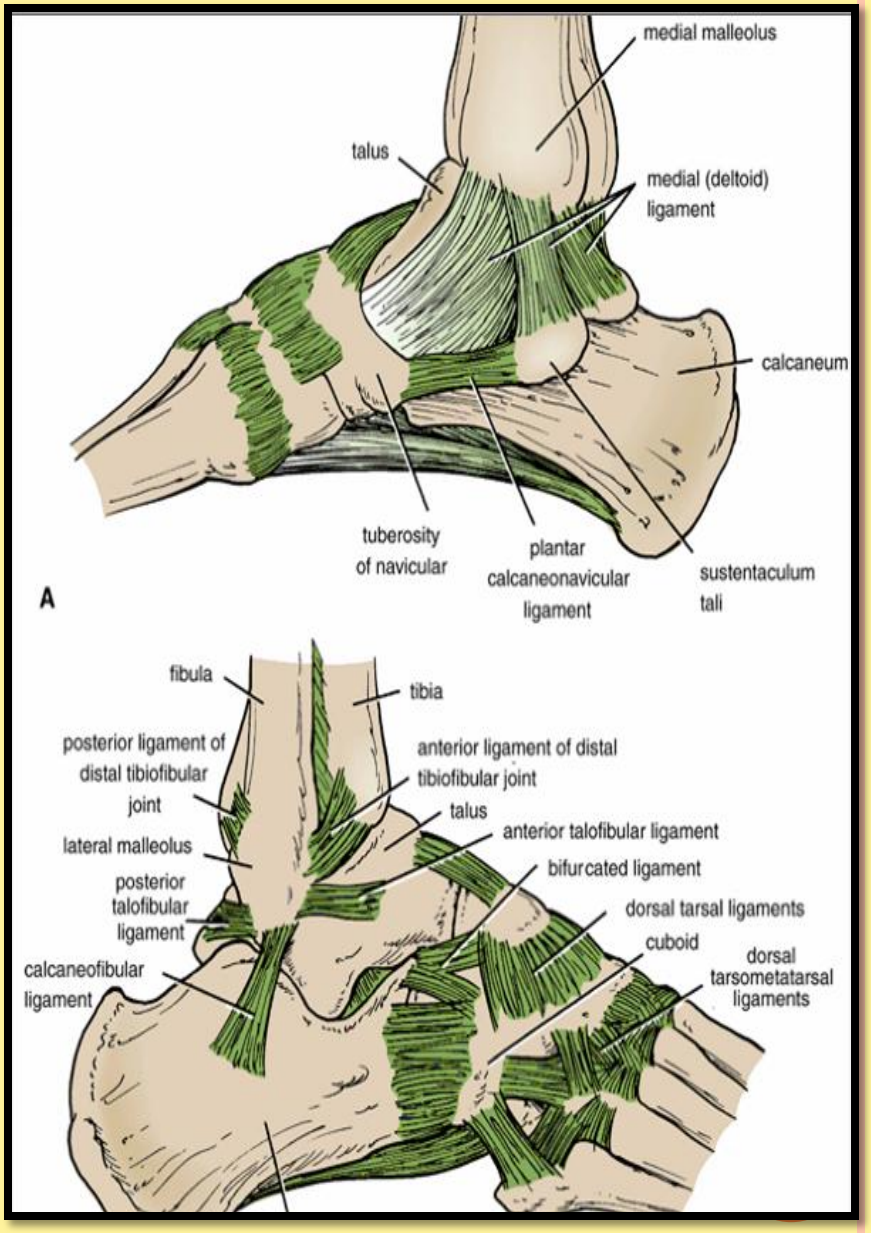
The medial, or deltoid, ligament

The lateral ligament

Movements

Dorsiflextion is performed by **the tibialis anterior, extensor hallucis longus, extensor digitorum longus, and peroneus tertius. (muscles of the anterior compartment of the leg)**

Plantar flexion is performed by **the gastrocnemius, soleus, plantaris, peroneus longus, peroneus brevis, tibialis posterior, flexor digitorum longus, and flexor hallucis longus. (all the muscles of lateral and posterior compartment except popliteus muscle)**



Proximal Tibiofibular Joint

➢ ***Articulation***

Articulation is between the lateral condyle of the tibia and the head of the fibula).

The articular surfaces are flattened and covered by hyaline cartilage.

➢ **Type**

This is a synovial, plane, gliding joint.

➢ **Capsule**

The capsule surrounds the joint and is attached to the margins of the articular surfaces.

➢ **Ligaments**

Anterior and posterior ligaments strengthen the capsule.

➢ **Synovial Membrane**

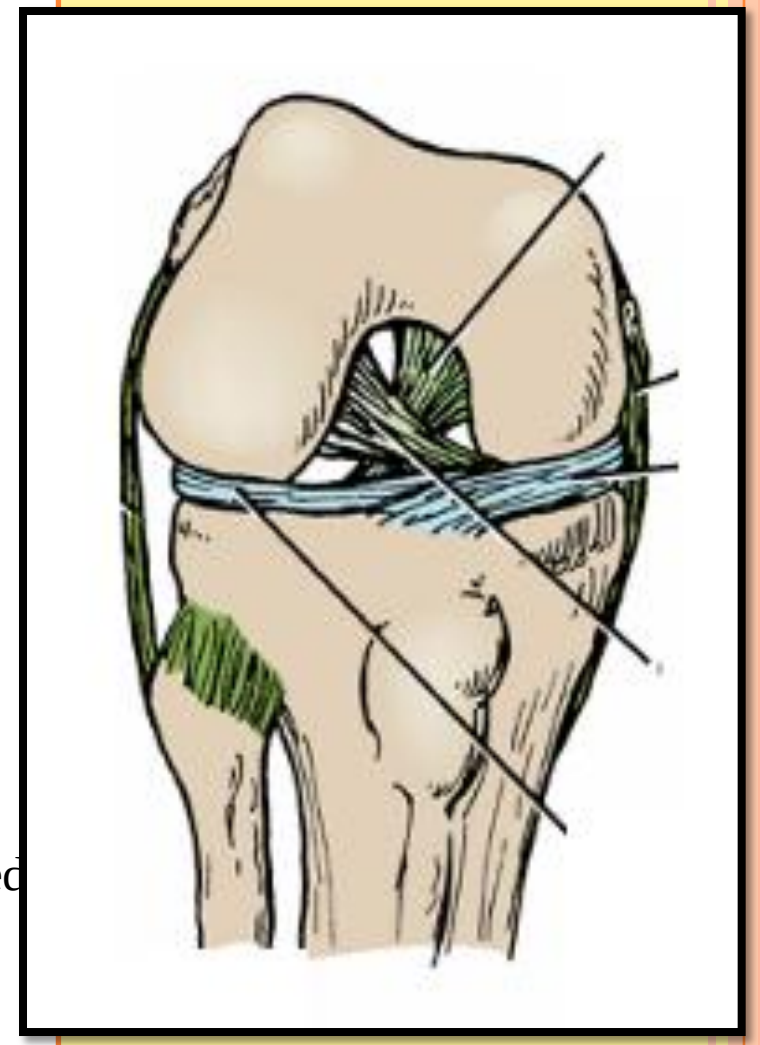
The synovial membrane lines the capsule and is attached to the margins of the articular surfaces.

➢ **Nerve Supply**

The common peroneal nerve supplies the joint.

Movements

A small amount of gliding movement takes place during movements at the ankle joint.



Patellar Dislocations

The patella is a sesamoid bone lying within the quadriceps tendon. The importance of the lower horizontal fibers of the vastus medialis and the large size of the lateral condyle of the femur in preventing lateral displacement of the patella has been emphasized. Congenital recurrent dislocations of the patella are caused by underdevelopment of the lateral femoral condyle. Traumatic dislocation of the patella results from direct trauma to the quadriceps attachments of the patella (especially the vastus medialis), with or without fracture of the patella

Distal Tibiofibular Joint

➢Articulation

Articulation is between the fibular notch at the lower end of the tibia and the lower end of the fibula

➢Type

The distal tibiofibular joint is

a fibrous joint

➢Capsule

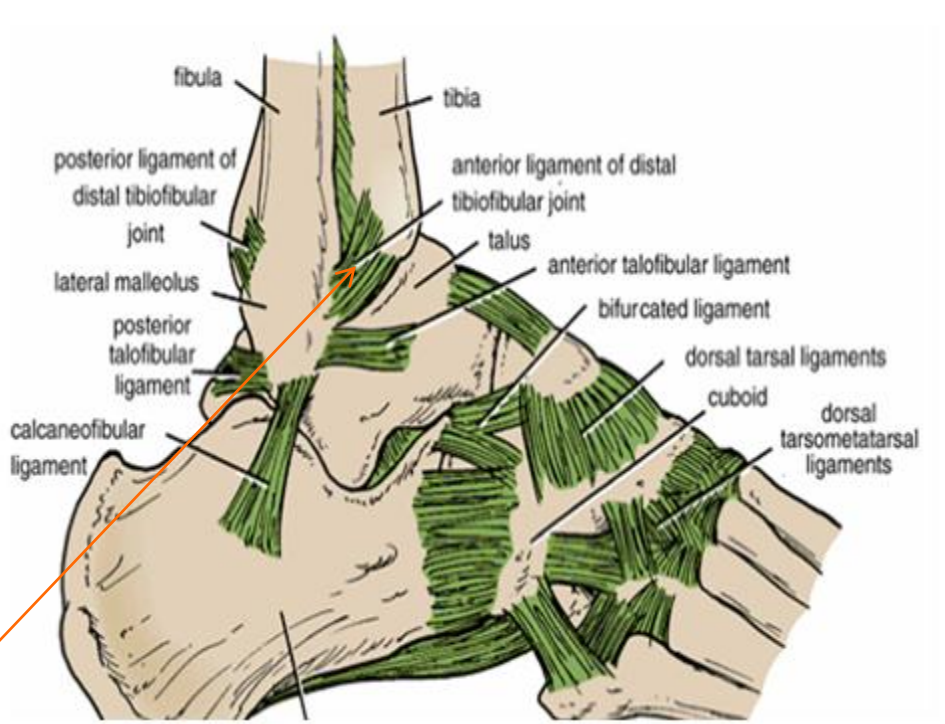
There is no capsule.

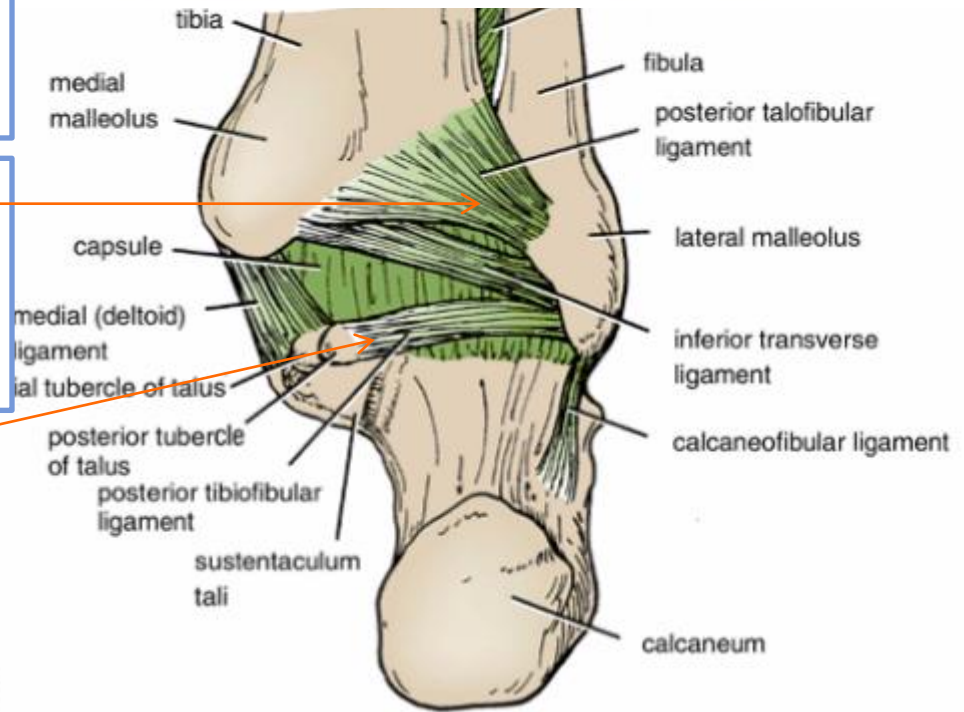
Ligaments

1-The **interosseous ligament** is a strong, thick band of fibrous tissue that binds the two bones together.

2-The **anterior and posterior ligaments** are flat bands of fibrous tissue connecting the two bones together in front and behind the interosseous ligament

3-The **inferior transverse ligament**





Tarsal Joints

1-Subtalar Joint

The subtalar joint is the posterior joint between the talus and the calcaneum.

Articulation

is between the inferior surface of the body of the talus and the facet on the middle of the upper surface of the calcaneum

Type

These joints are synovial, of the plane variety

Ligaments

Medial and lateral (talocalcaneal) ligaments strengthen the capsule.
The interosseous (talocalcaneal) ligament is strong and is the main bond of union between the two bones. It is attached above to the sulcus tali and below to the sulcus calcanei..

Movements

Gliding and rotatory movements are possible

2-Talocalcaneonavicular Joint

is the anterior joint between the talus and the calcaneum and also involves the navicular bone

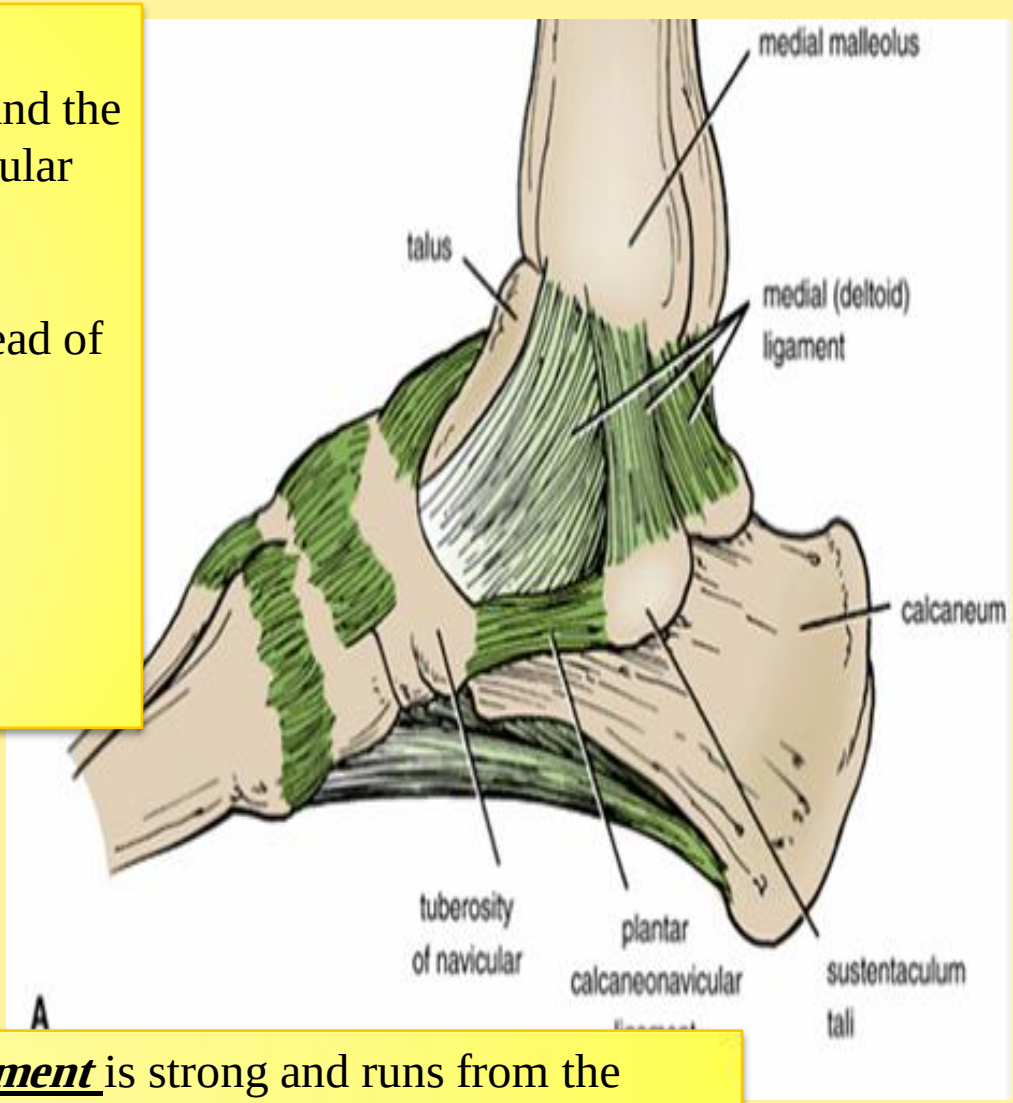
Articulation

Articulation is between the rounded head of the talus, the upper surface of the sustentaculum tali, and the posterior concave surface of the navicular bone.

Type

The joint is a synovial joint..

Ligaments.



The plantar calcaneonavicular ligament is strong and runs from the anterior margin of the sustentaculum tali to the inferior surface and tuberosity of the navicular bone. The superior surface of the ligament is covered with fibrocartilage and supports the head of the talus..

Movements

Gliding and rotatory movements are possible

3-Calcaneocuboid Joint

Articulation

Articulation is between the anterior end of the calcaneum and the posterior surface of the cuboid

The calcaneocuboid joint is synovial, of the plane variety.

The talocalcaneonavicular and the calcaneocuboid joints are together referred to as the midtarsal or transverse tarsal joints

Ligaments

The bifurcated ligament

Tarsal Tunnel Syndrome؟؟؟؟؟