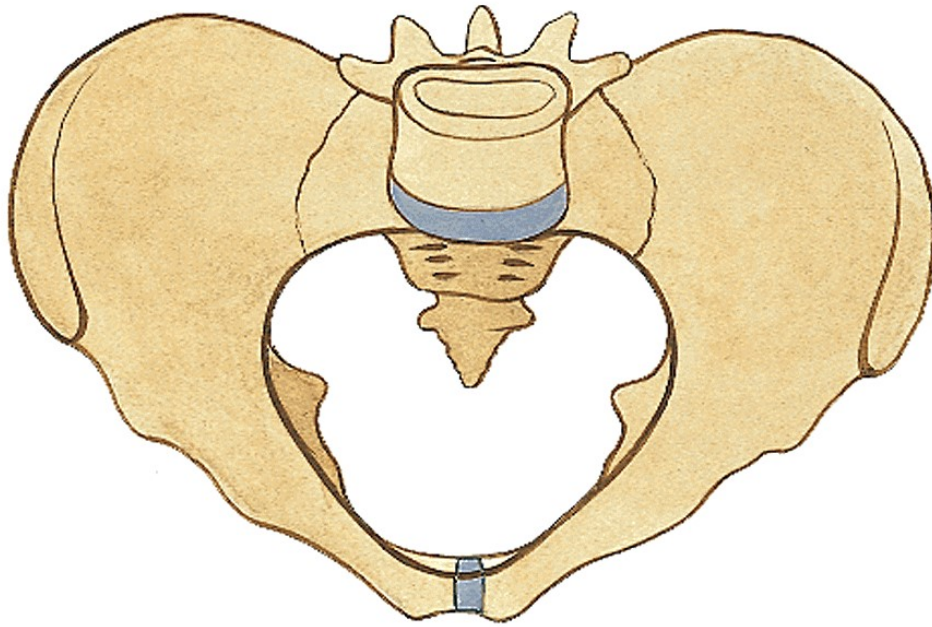


# JOINTS OF THE LOWER EXTREMITY



## Pelvis as a whole:

By connection of **os coxae** with **os sacrum** through **sacroiliac joint** and **symphysis** in the front, there is created a solid circle



## Articulatio sacroiliaca

*Type:* **tough joint- amphiarthrosis**

*Articular surfaces:*

**facies auricularis ossis sacri**

**facies auricularis ossis ilii**

*Articular capsule:* **short, tough**

*Ligaments:*

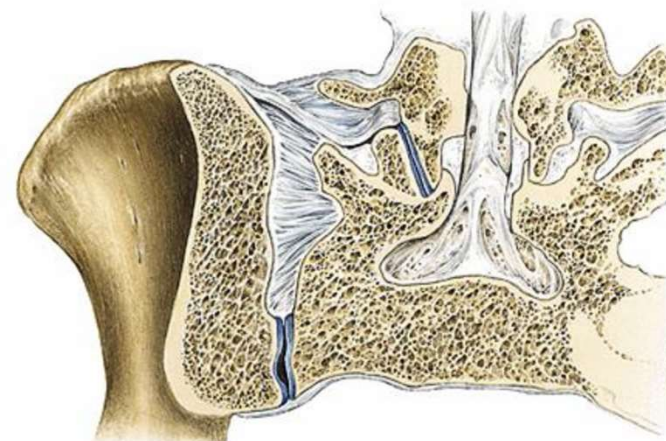
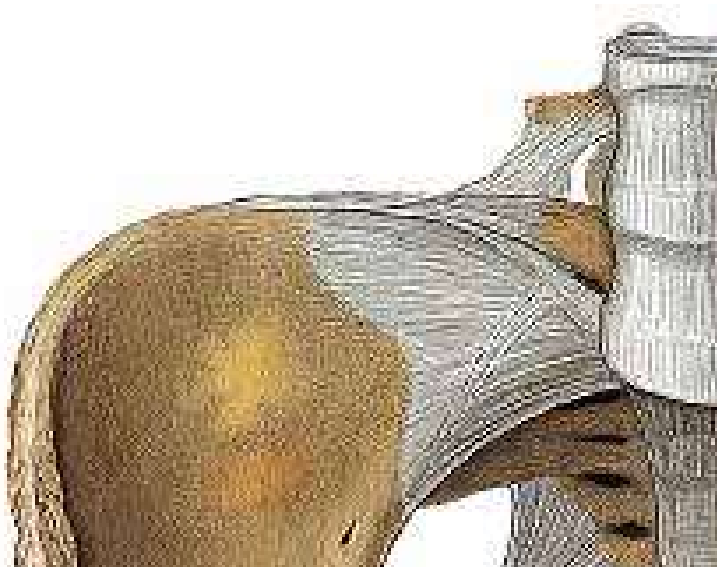
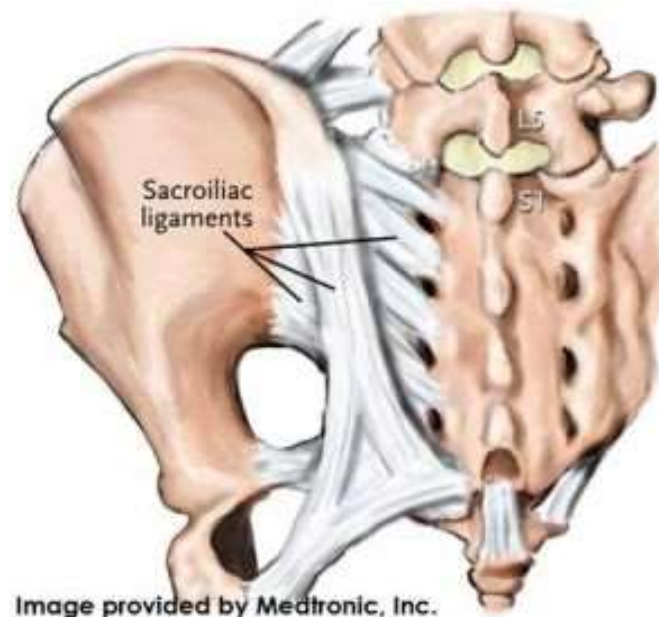
**lig. sacroiliacum ventrale**

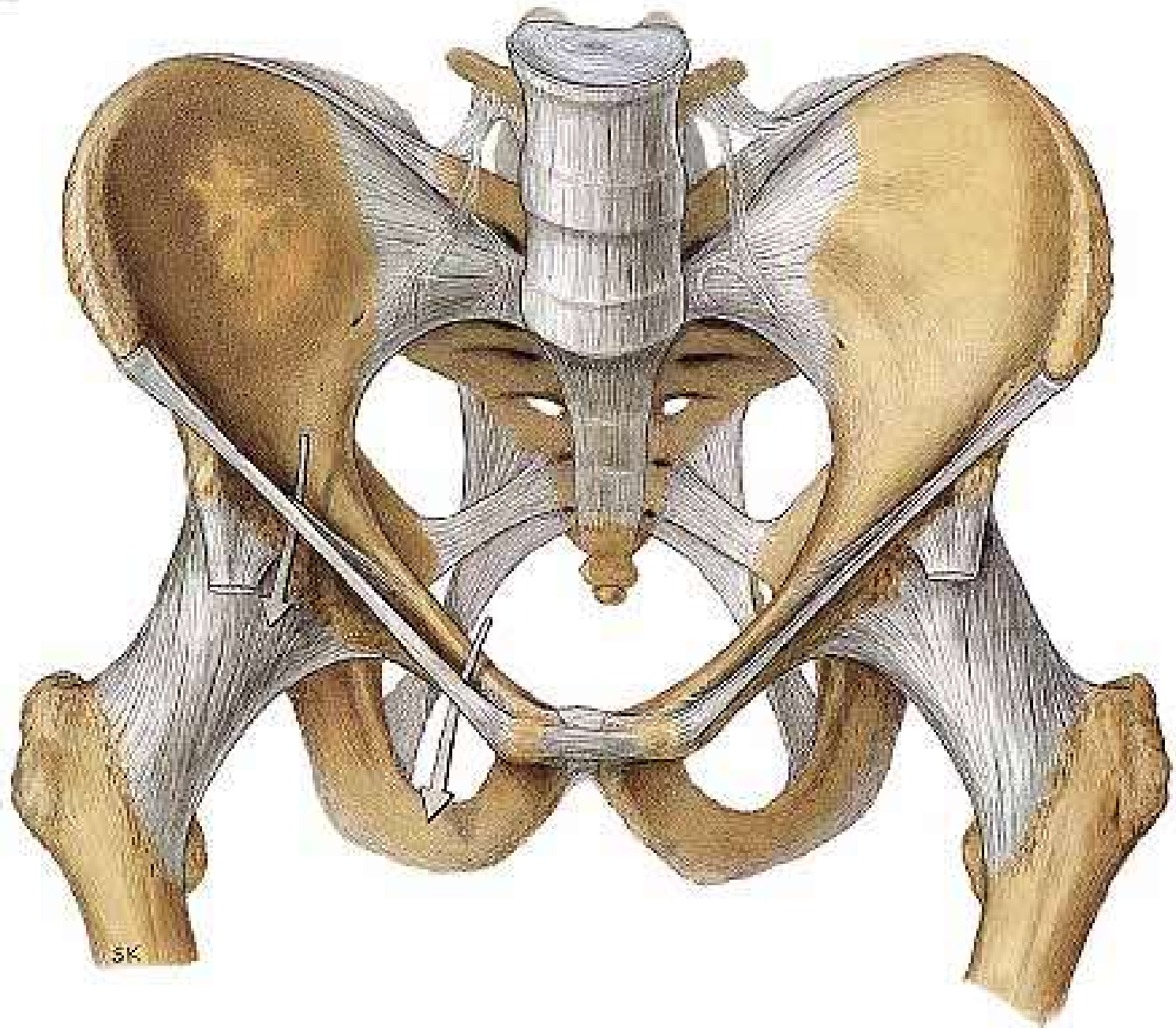
**lig. sacroiliacum dorsale**

**lig. sacroiliacum interosseum**

**lig. iliolumbale** from L4-5 to dorsal side of crista iliaca

*Movements:* **minimal**





# Articulationes cinguli

## Symphysis pubica

Type: tough, cartilaginous connection

disc

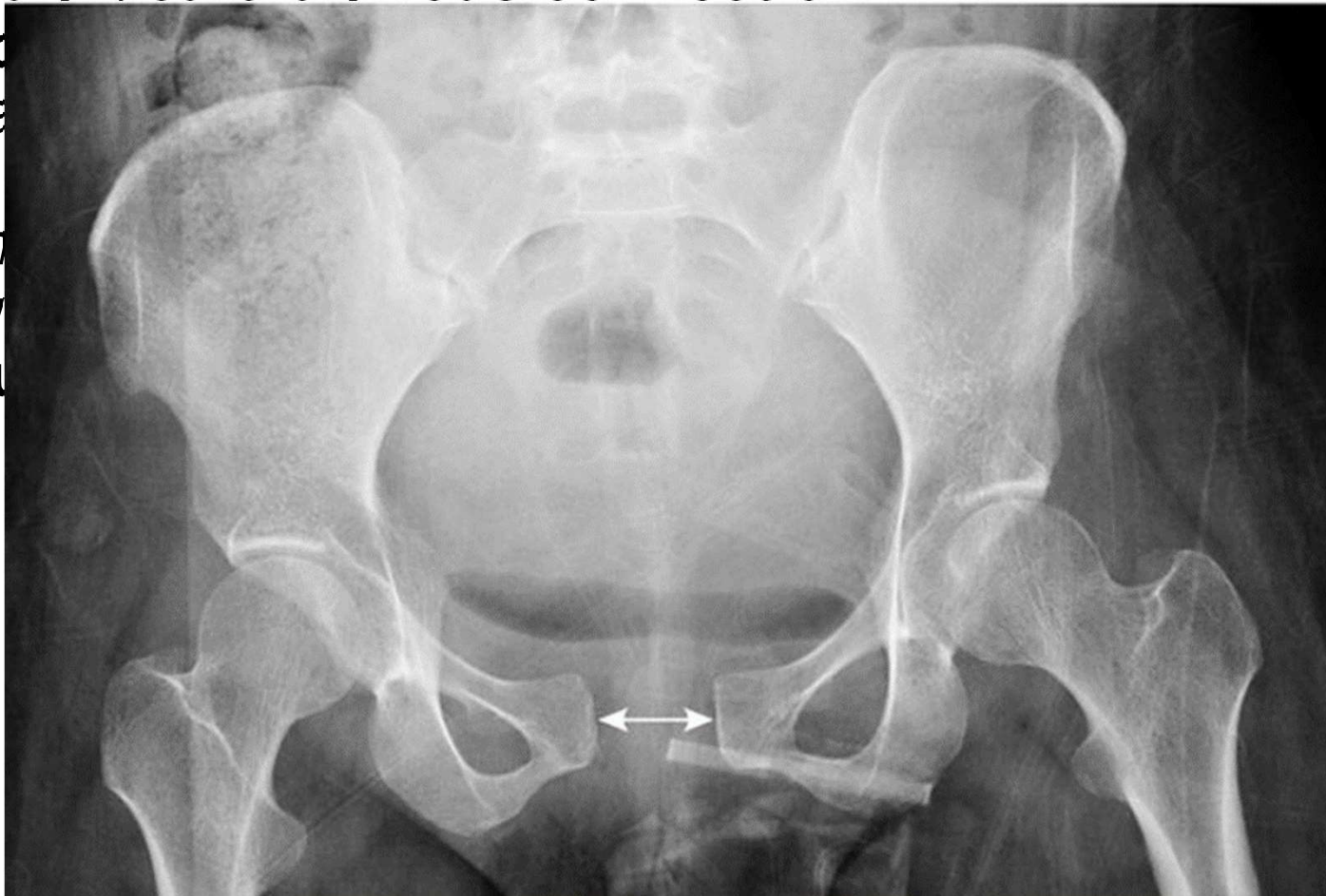
(palpa

Contact

Ligament

below

lig. pu



bica

- from  
out

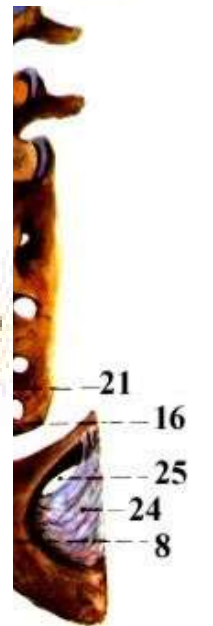
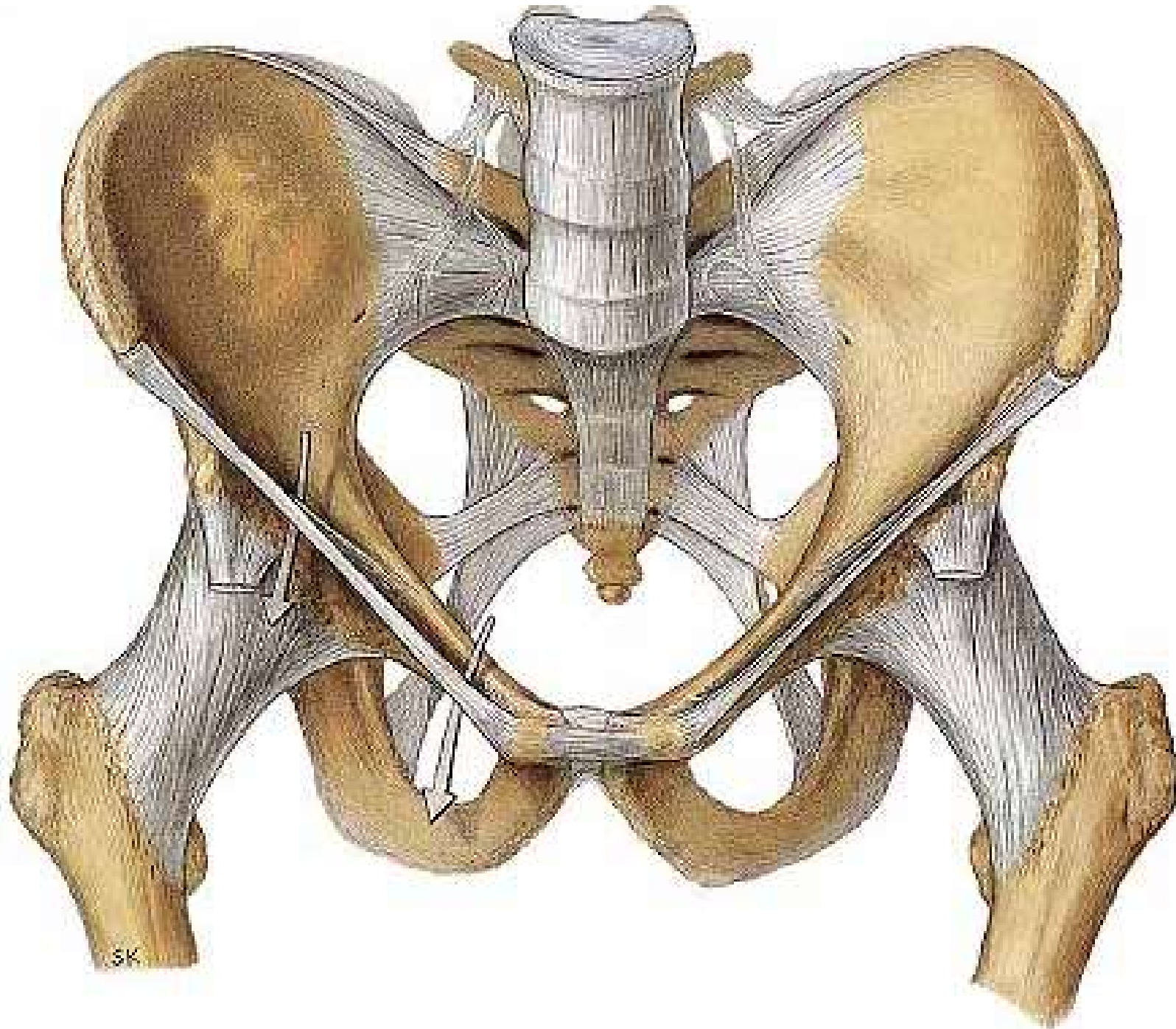


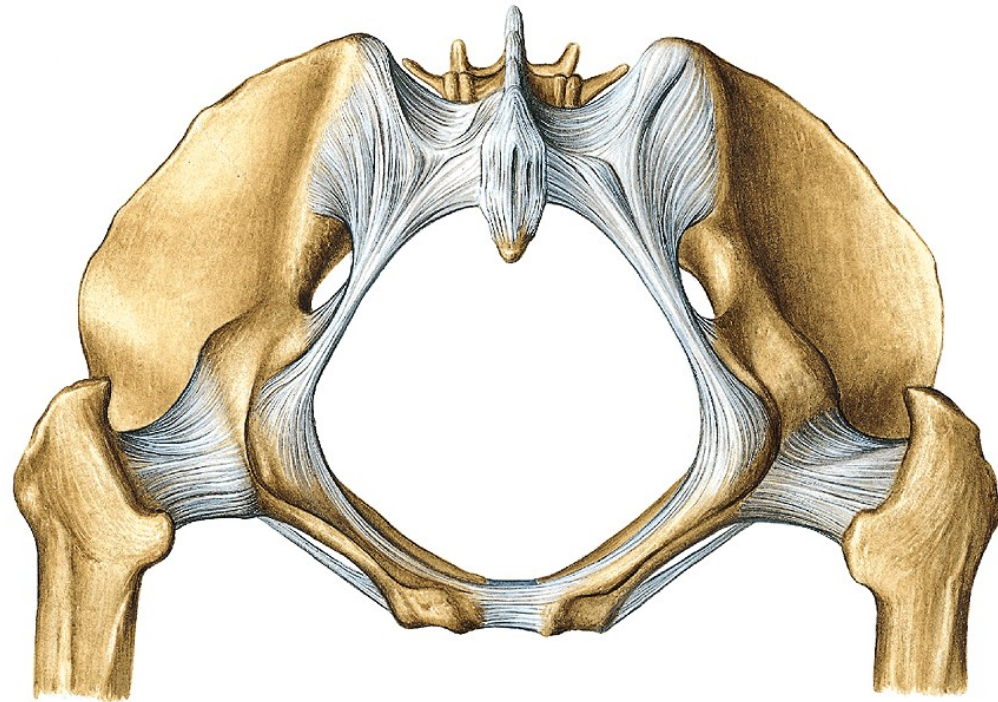
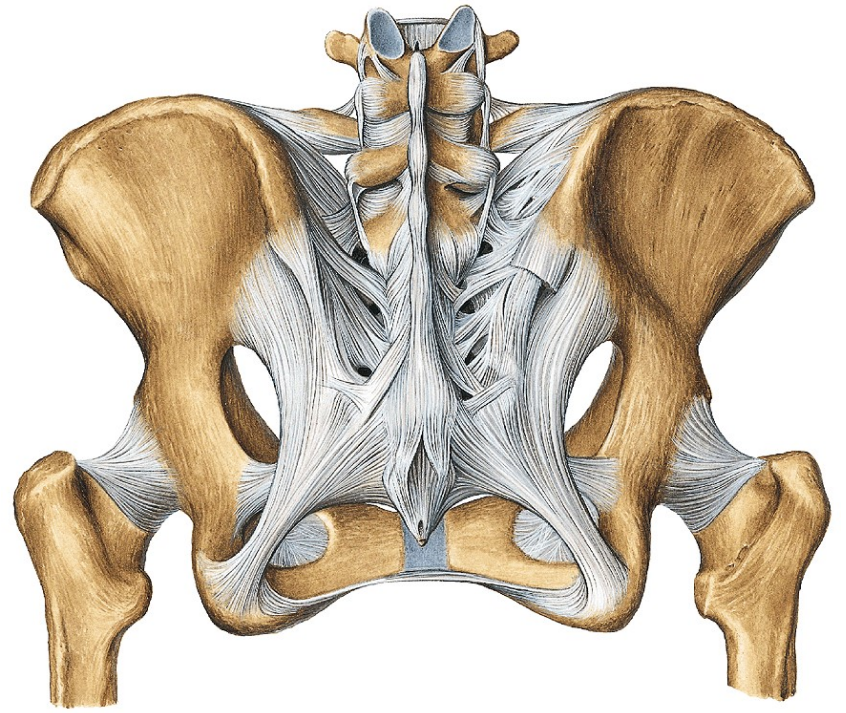
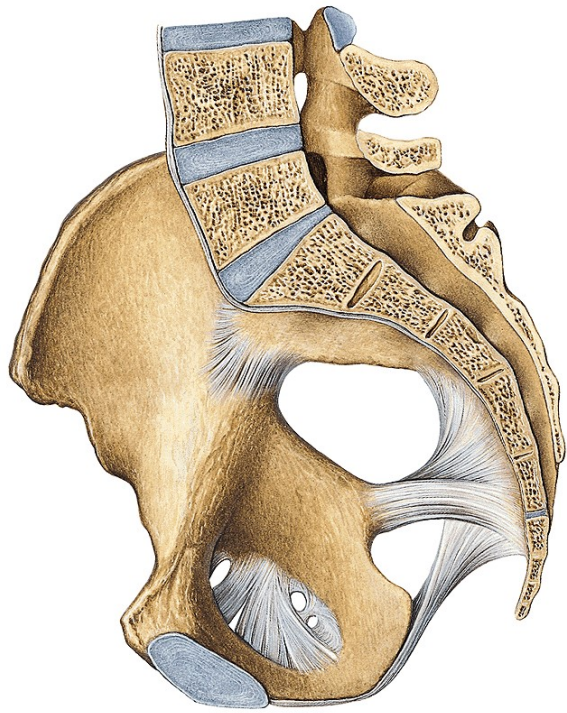
**Lig**  
**lig.**

**lig.**  
**for:**  
**(it is**  
**into**  
**lig.**  
**for:**

**lig.**  
**lig.**

**me**  
**car**





## Pelvis as a whole:

**Linea terminalis** separates the large and small pelvis from each other.

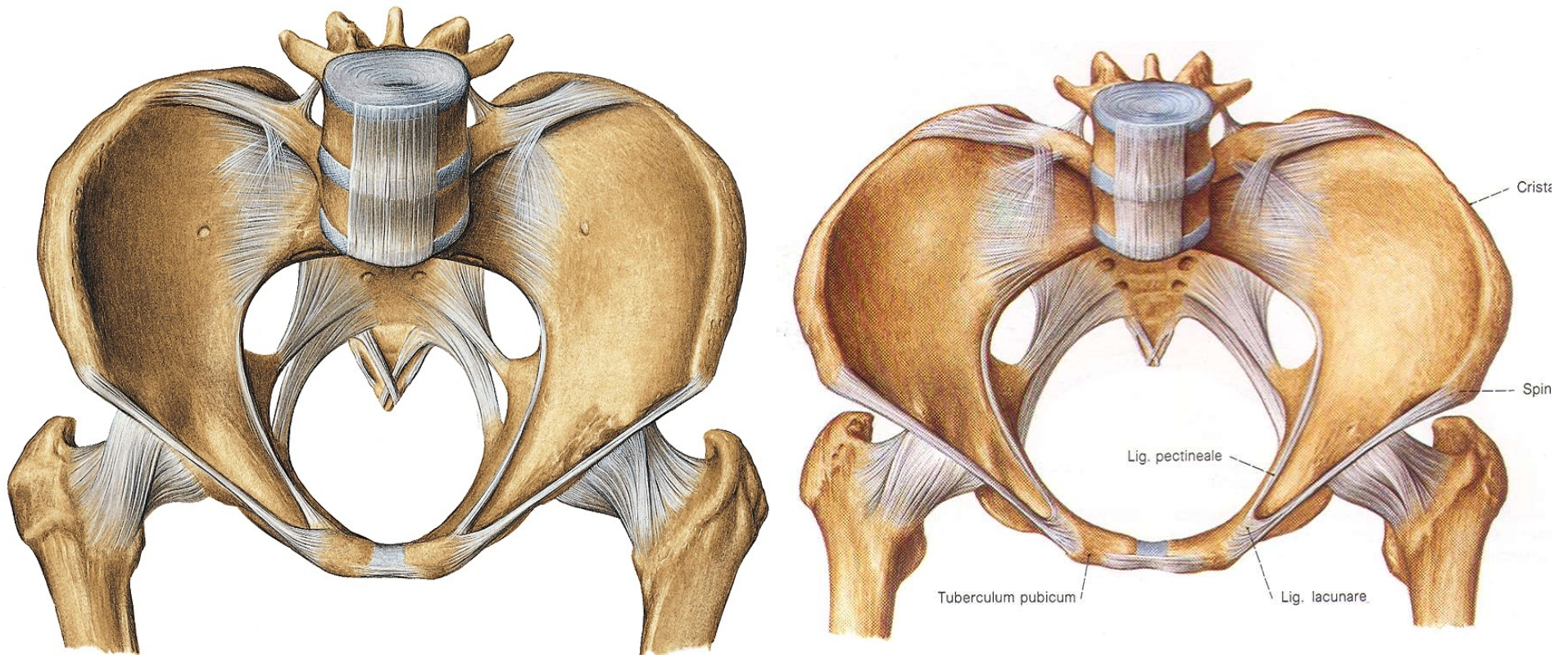
**Pelvis major** is a part of abdominal cavity

**Pelvis minor** contains a part of organs of genital and urinary systems.

The small pelvis in the woman presents important birth canal. In connection with this function, there are significant gender differences on the pelvis.

**Male pelvis** is higher and narrower

**Female pelvis** is lower and wider





## Gender differences of pelvis

### **Female pelvis:**

**sacrum** wider and shorter,

**promontorium** protrudes less into the **entrance**- oval shaped,

**coccyx** shorter and more movable,

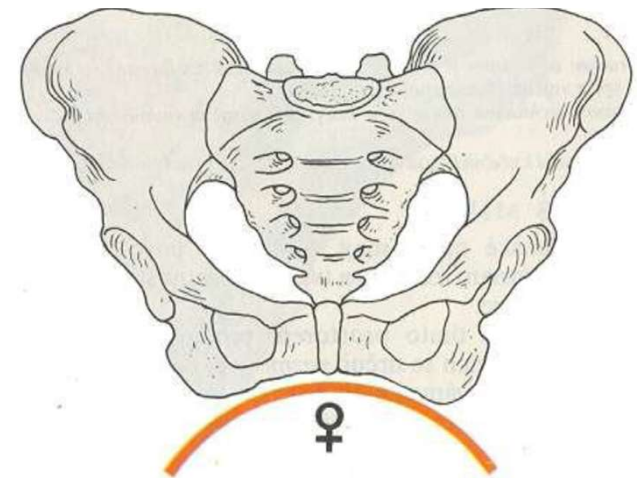
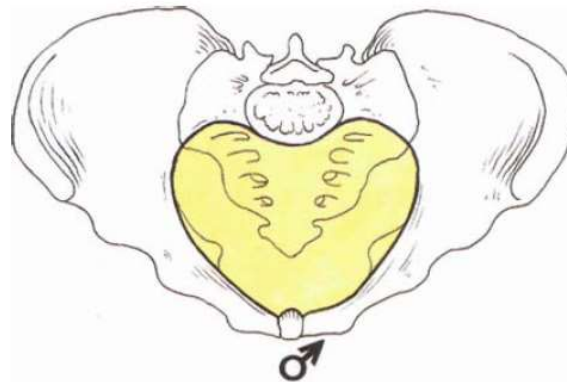
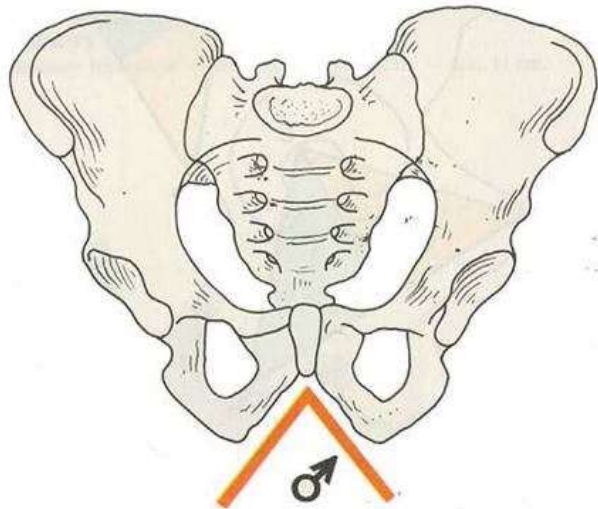
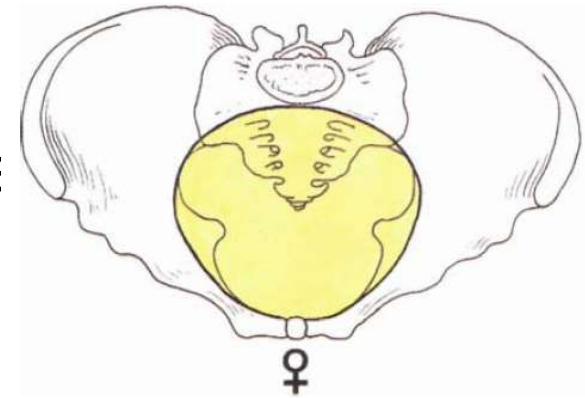
**ala ossis illii**- in the frontal plane

**arcus pubicus**

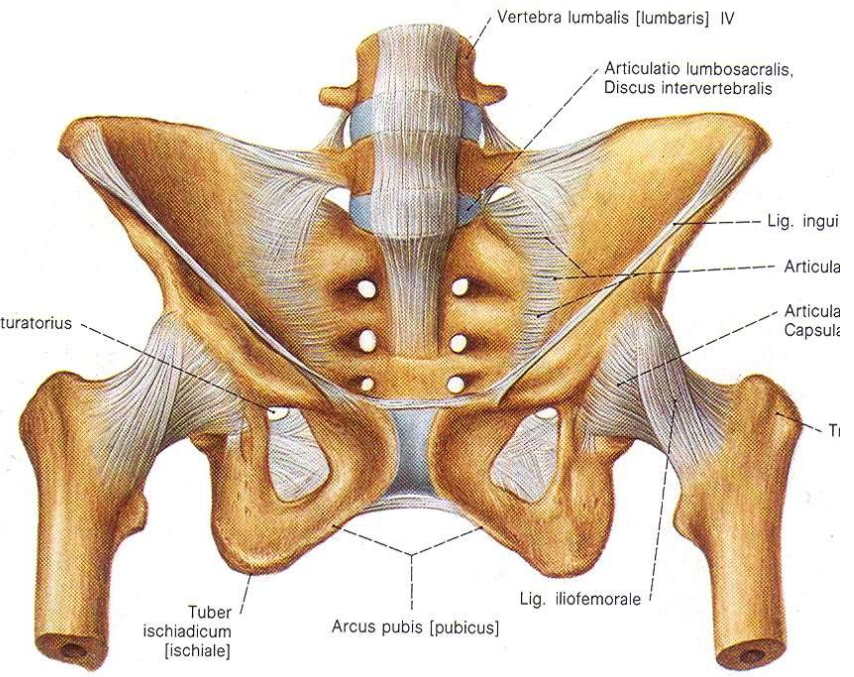
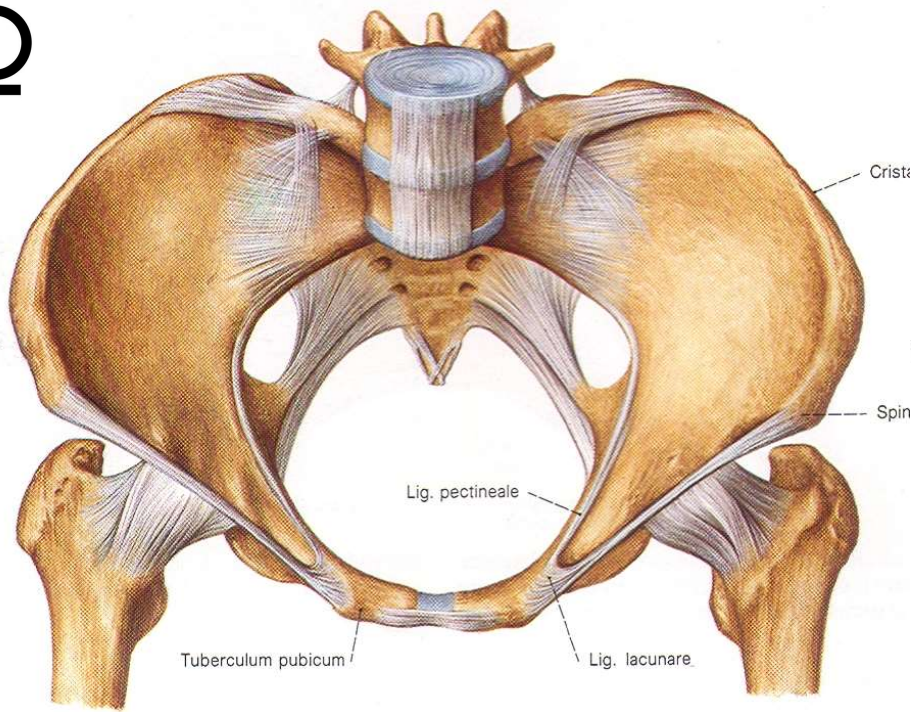
**foramen obturatum** lower – triangular shape

**tubera ischiadica**- further from each other

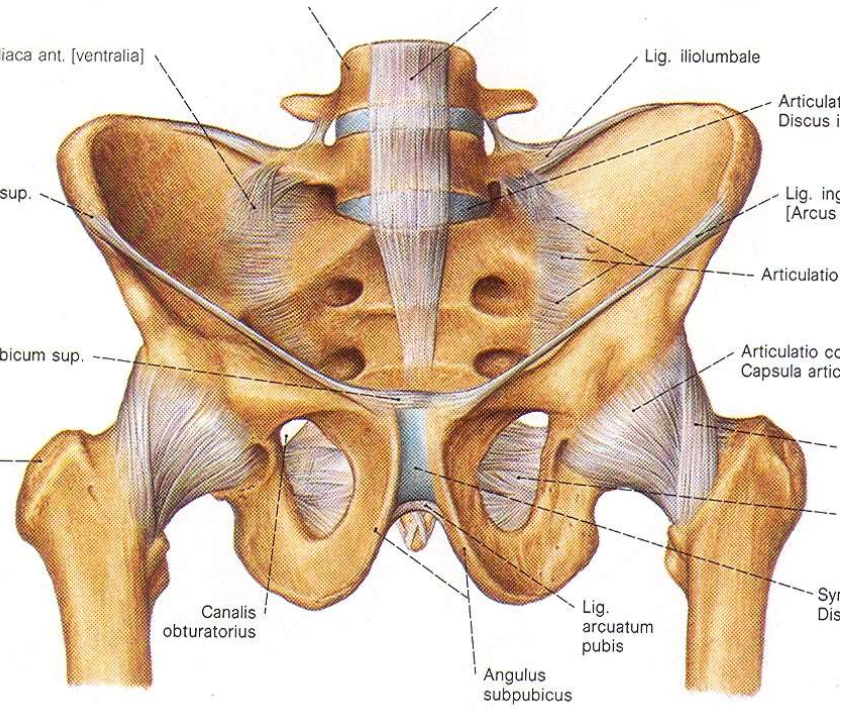
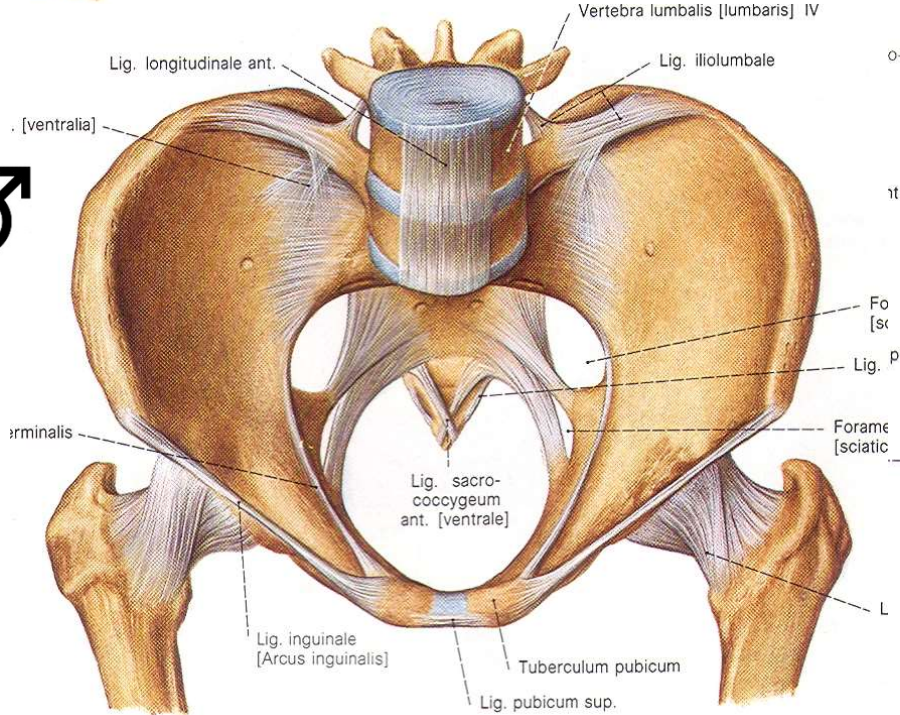
**symphysis pubica**- lower



♀

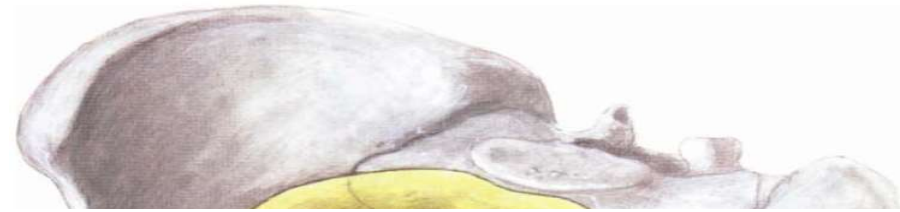


♂

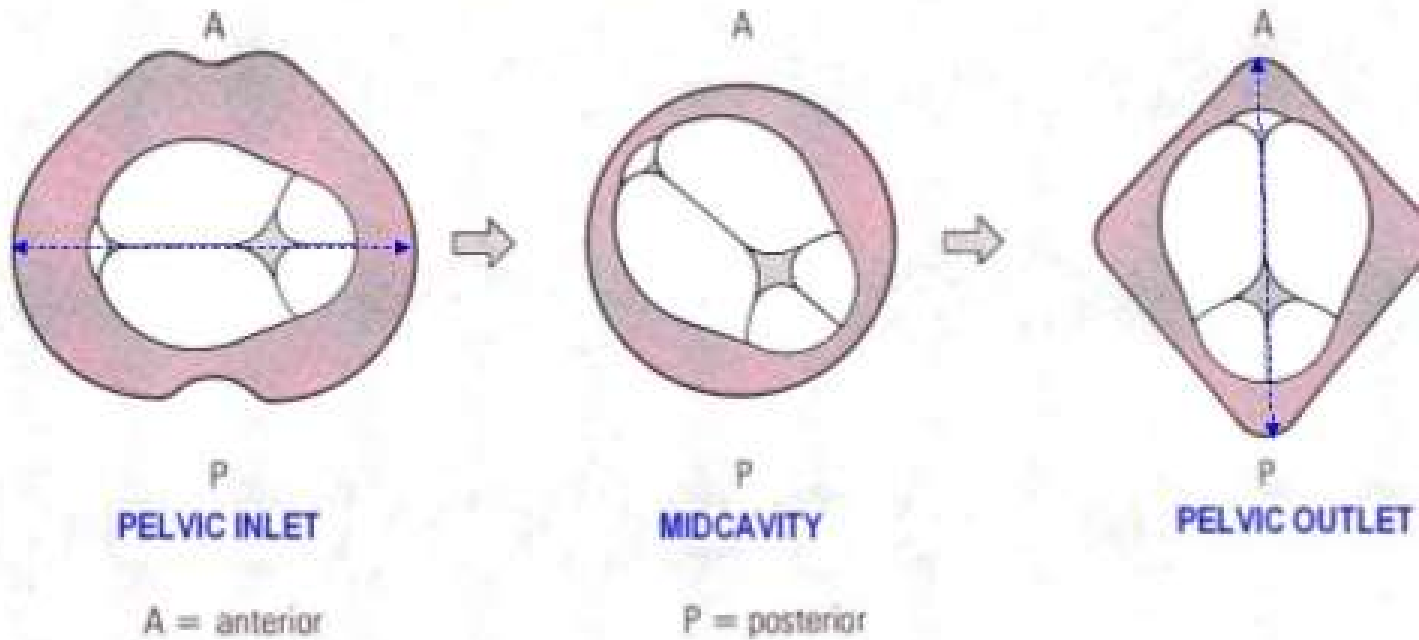


# Dimensions of the pelvis

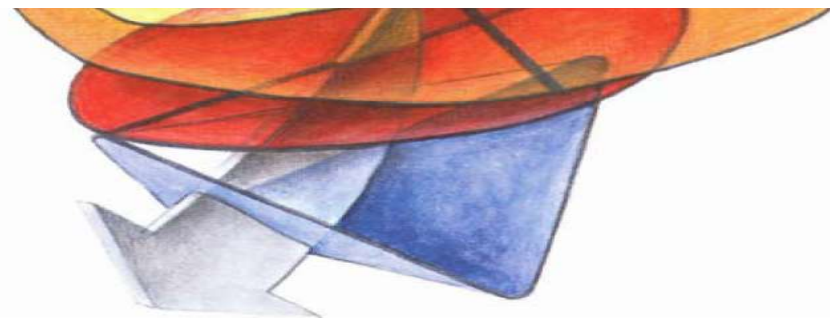
- The largest dimension of

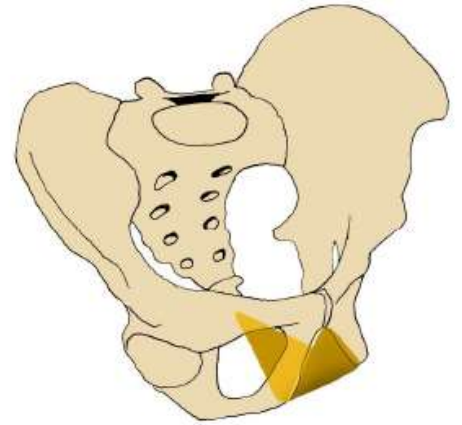
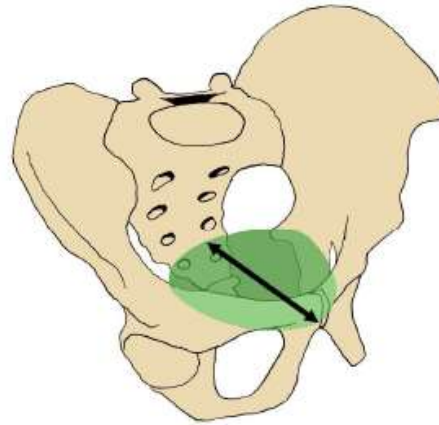
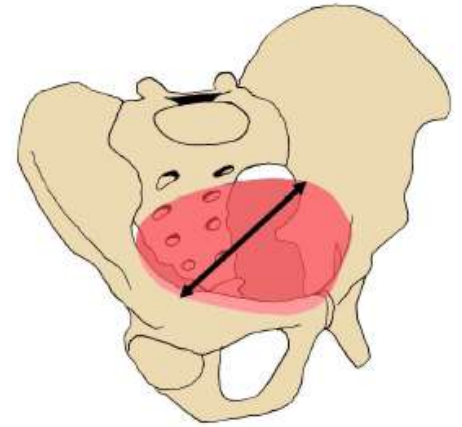
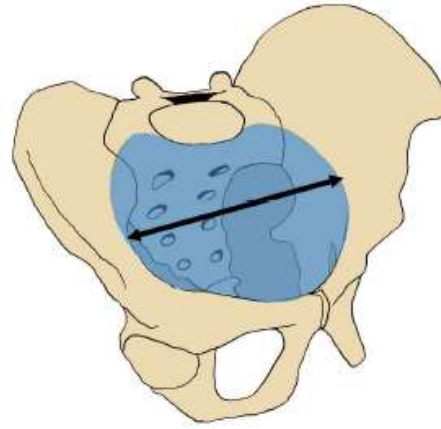
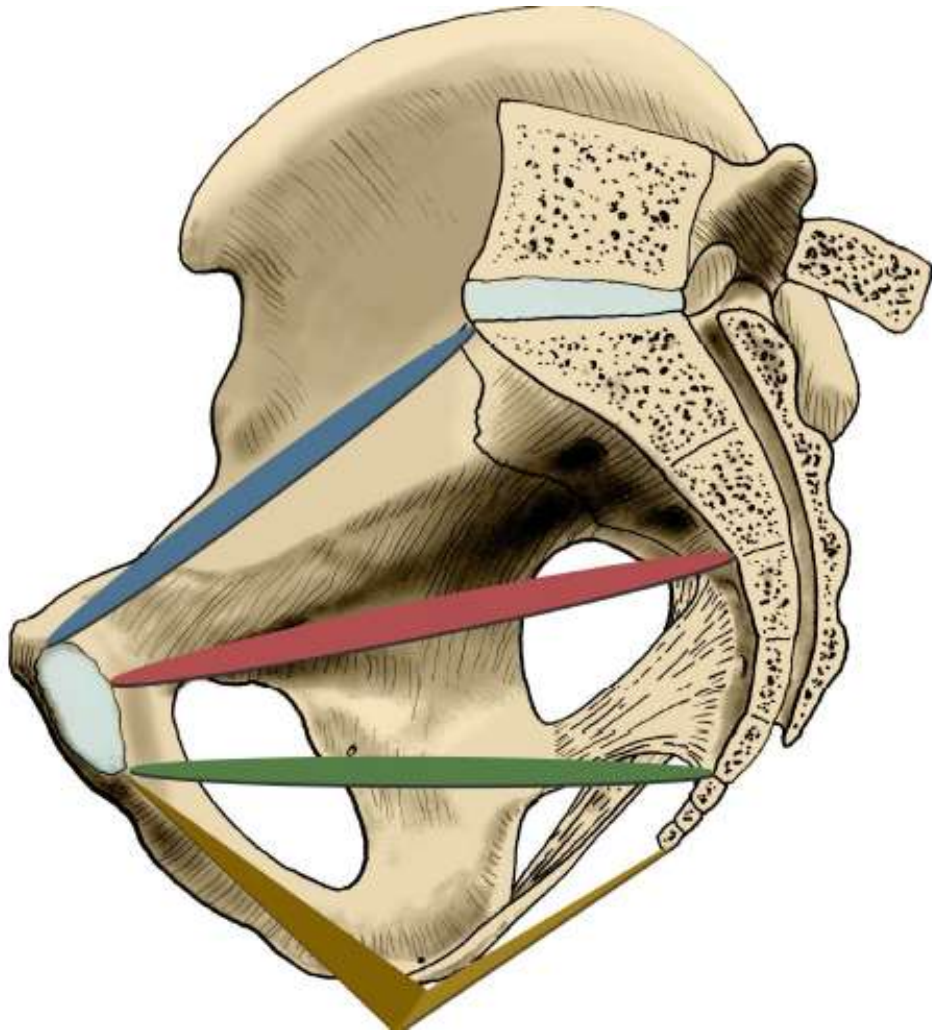


## ROTATION OF FETAL HEAD



angusta pelvis  
exitus pelvis





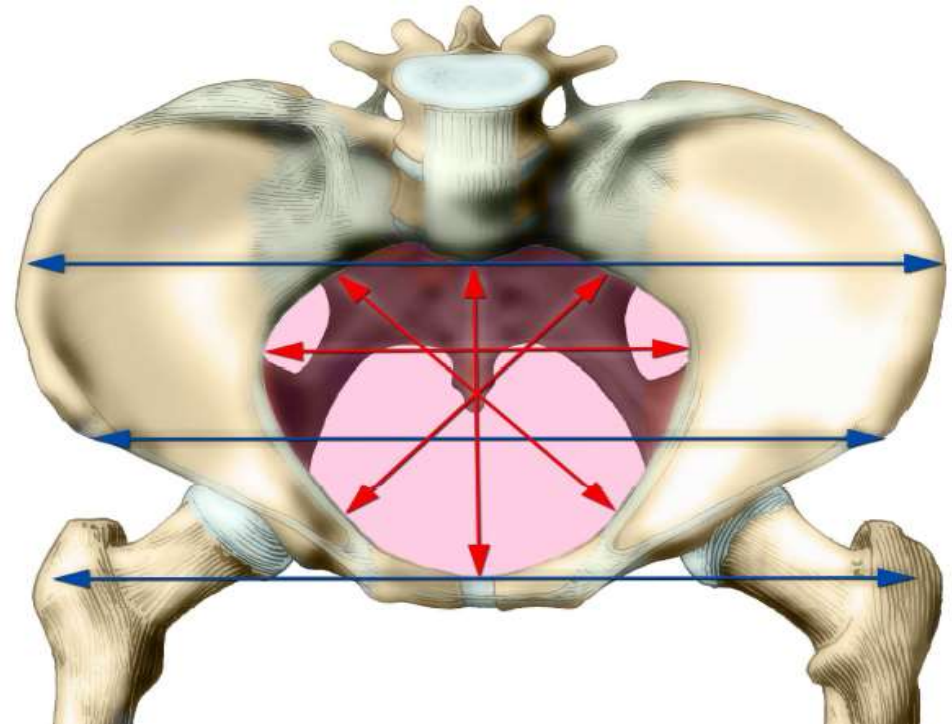
## External pelvis dimensions

**Distantia bispinalis** 26cm

**Distantia bicristalis** 29cm

**Distantia bitrochanterica** 31cm

**Conjugata externa**- upper edge of symphysis to the spinous proces of L5: 18 - 20cm



## Articulatio coxae

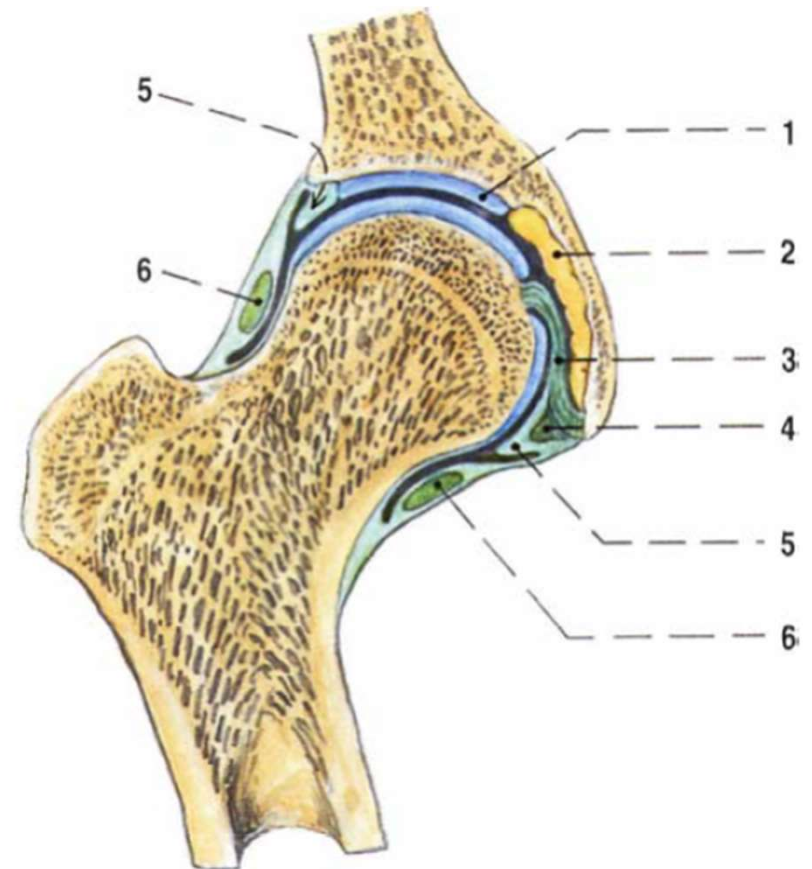
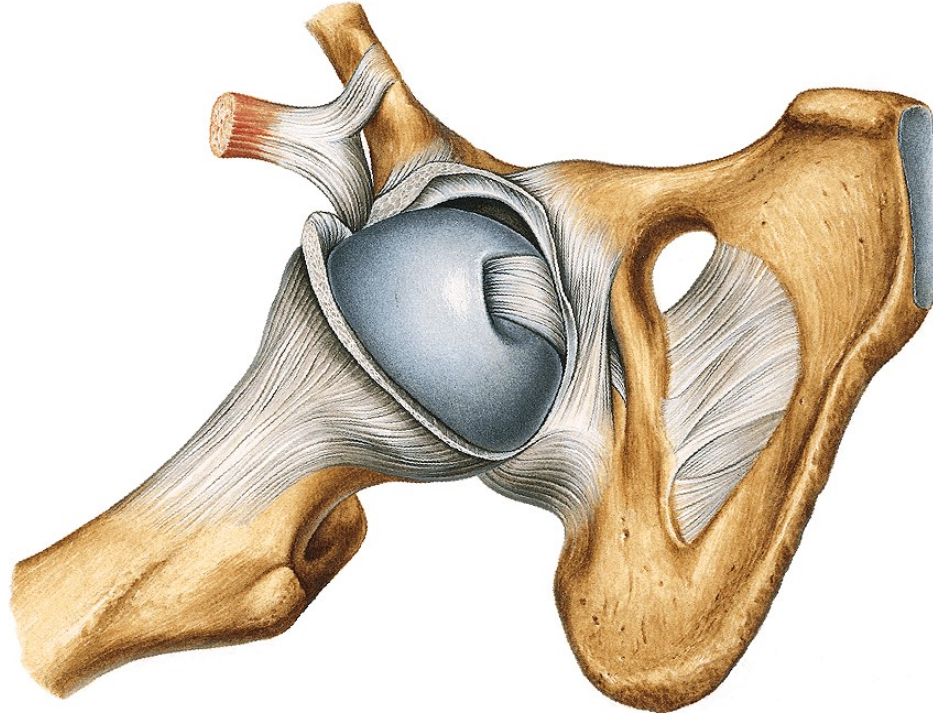
*Type:* **spherical, restricted – enarthrosis**

*Articular head:* **caput femoris**

*Articular pit:* **facies lunata acetabuli**, enlarged by **labrum acetabuli**, **pulvinar acetabuli**

*Articular capsule:*

**From margins of acetabulum  
ventrally to linea intertrochanterica  
dorsally to collum femoris**



*Ligaments:*

**lig. transversum acetabuli**

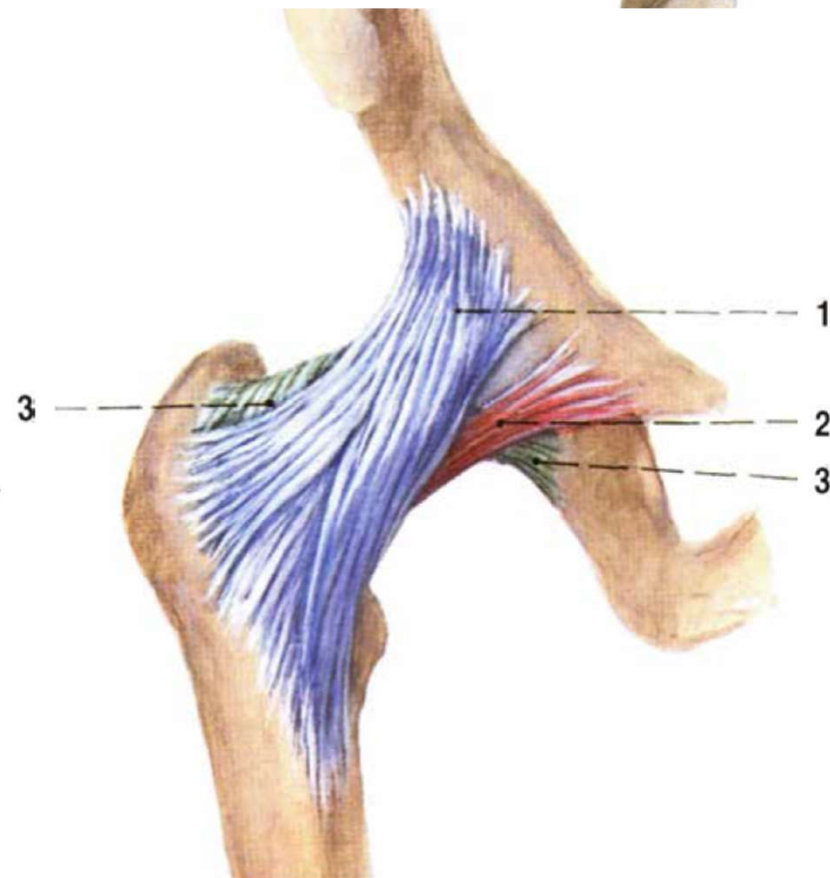
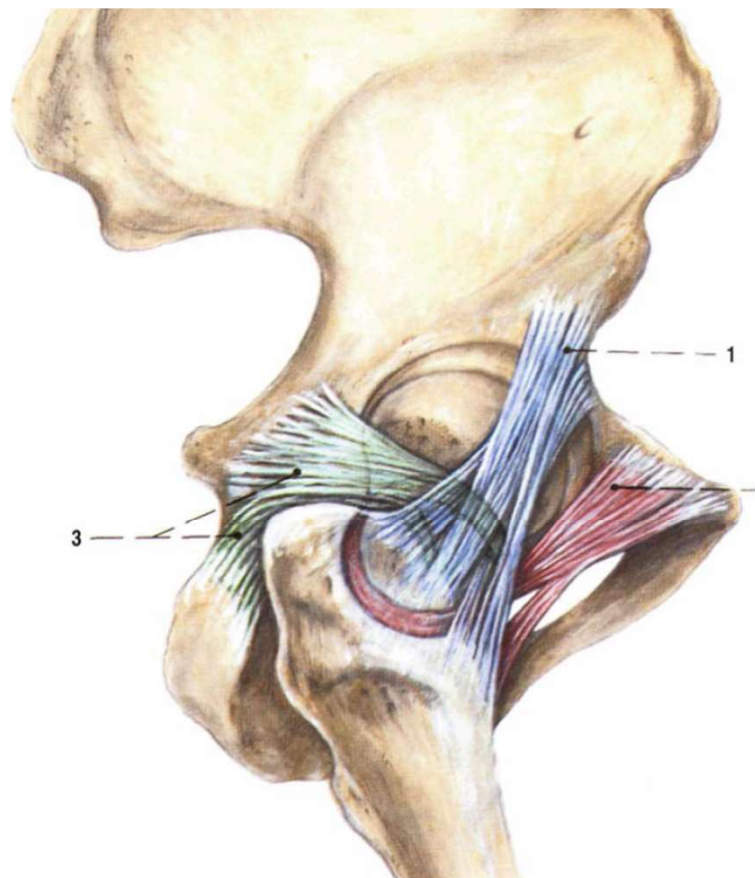
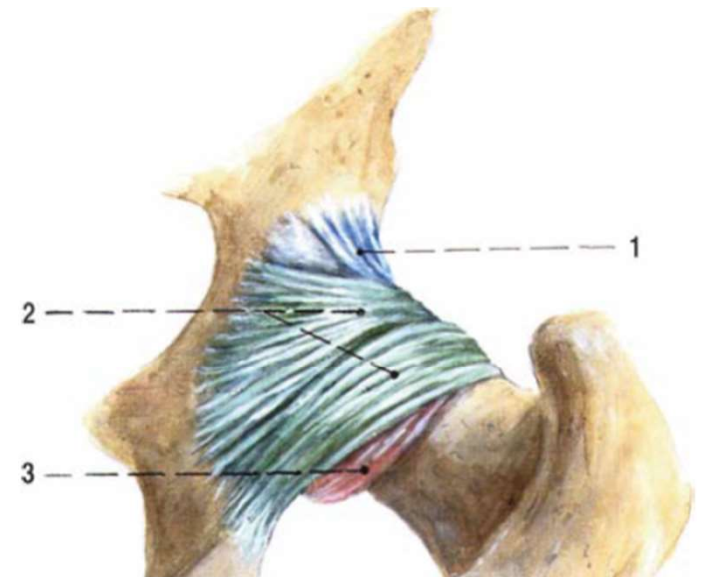
**lig. iliofemorale**

**lig. pubofemorale**

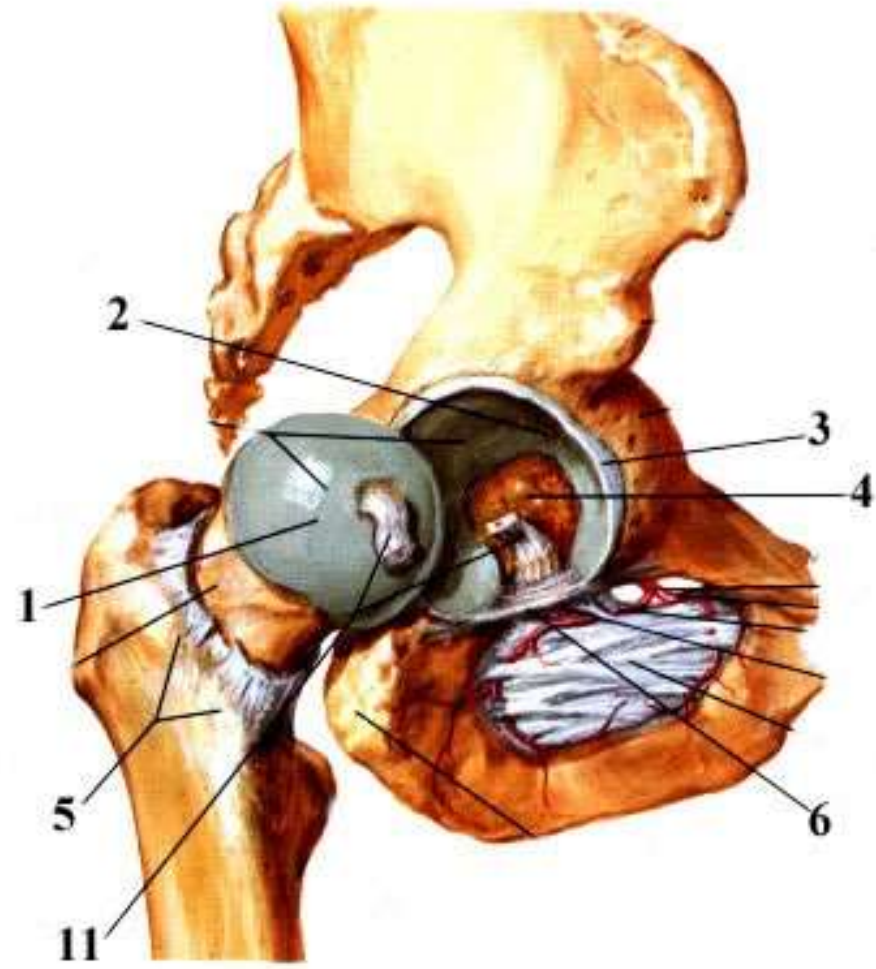
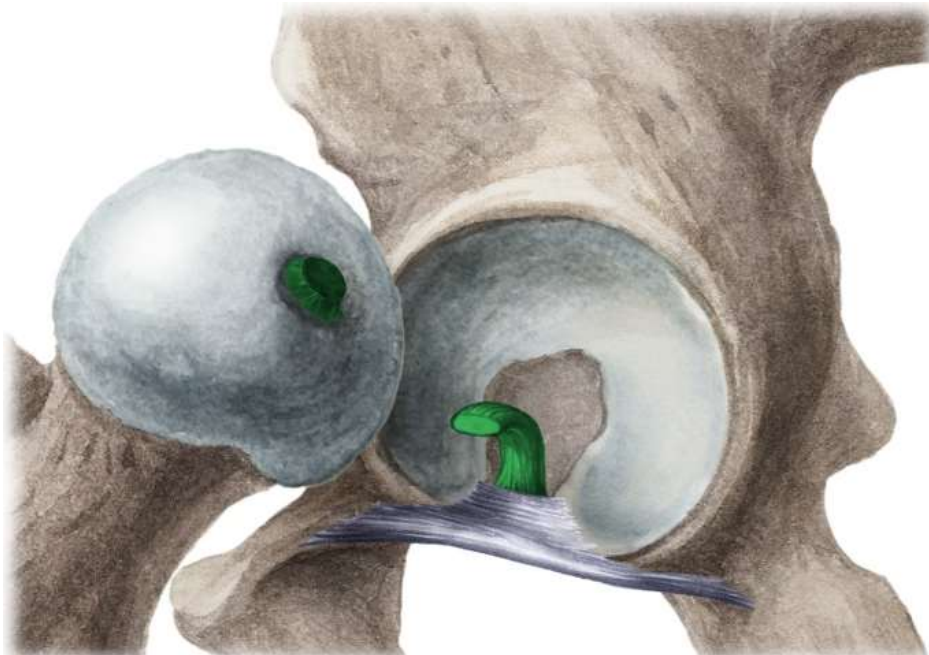
**lig. ischiofemorale**

**lig. capitis femoris**

} **zona orbicularis**



*Movements:*  
**flexion, extension**  
**abduction, adduction**  
**rotation**







## Articulatio genus

*Type:* composed joint, trochlear

### **Tibio-femoral part:**

*Articular head:* **condyli femoris**

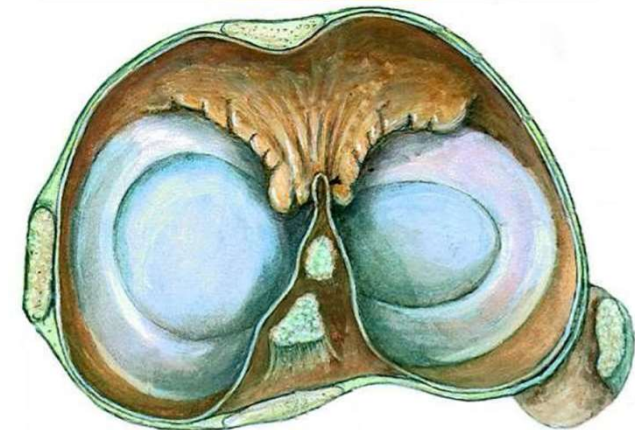
*Articular pit:* **facies articulares superiores tibiae, meniscus medialis, meniscus lateralis**

### **Patello-femoral part:**

*Articular head:* **facies articulares patellae**

*Articular pit:* **facies patellaris femoris**

*Articular capsule:* **fibrous and synovial layers**



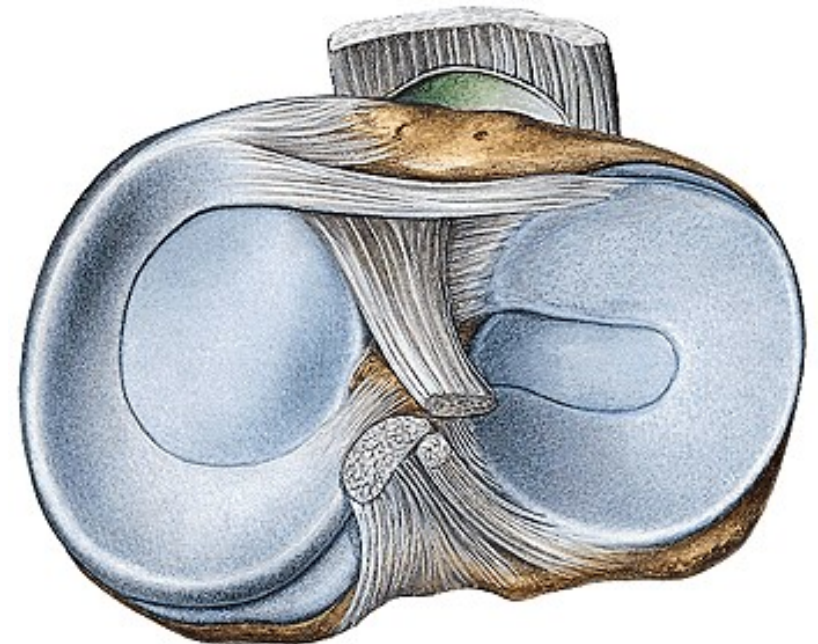
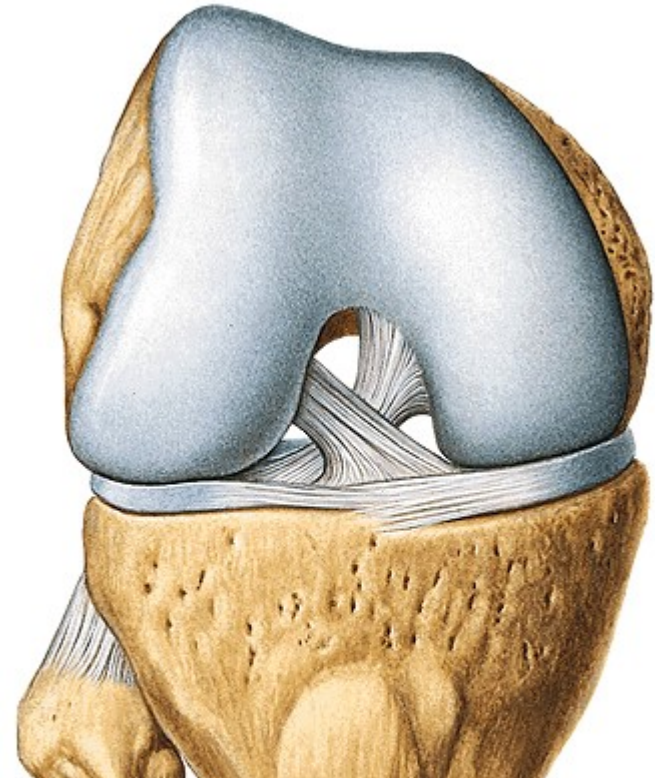
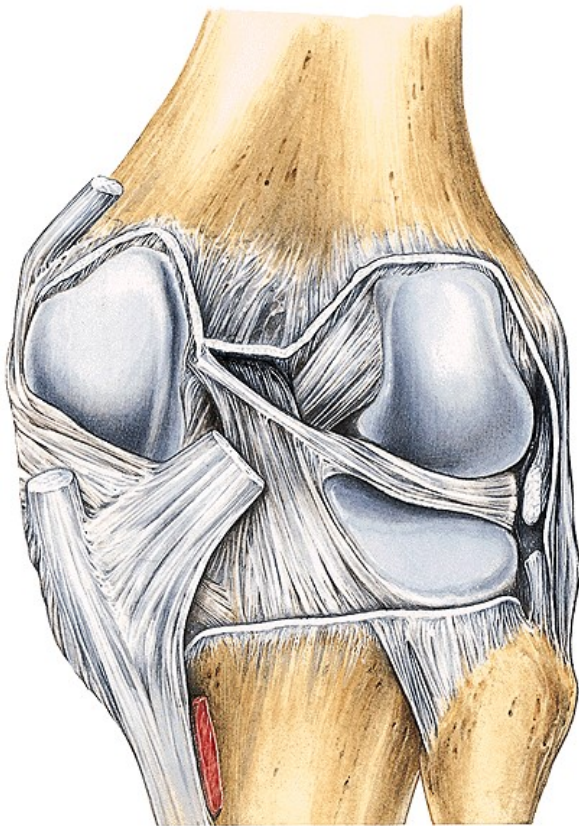
*Ligaments:*

**a) intraarticular**

**lig. cruciatum anterius**

**lig. cruciatum posterius**

**lig. transversum genus**



**b) extraarticular**

**Tendon of m. quadriceps femoris - lig. patellae**

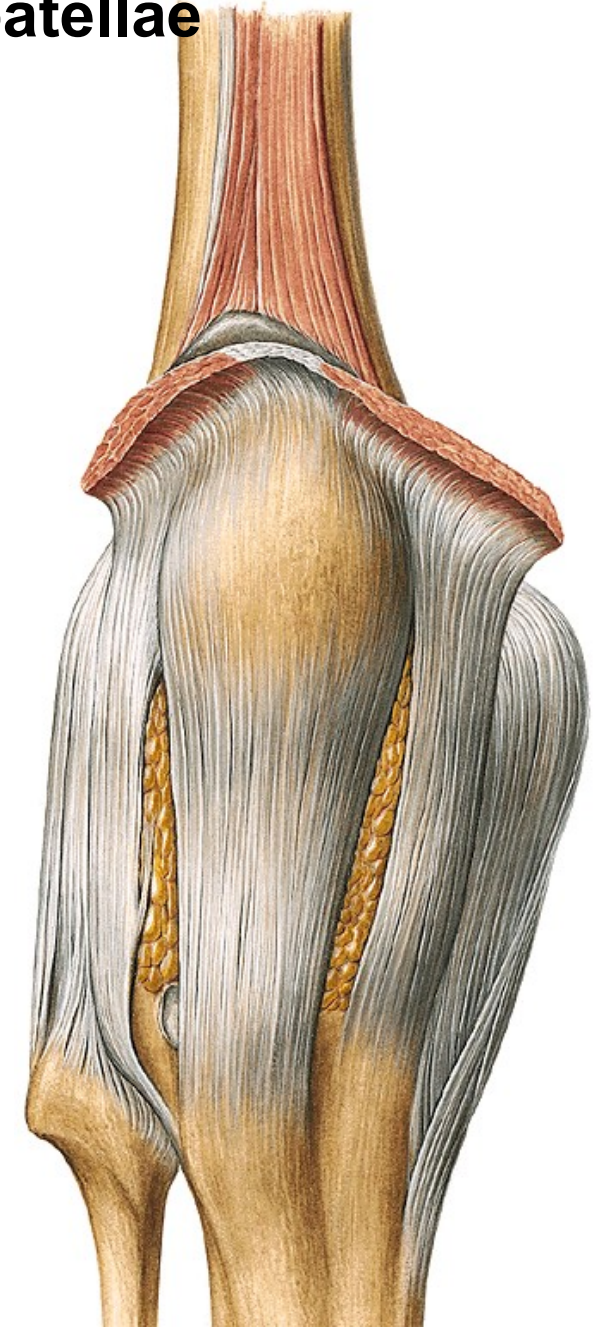
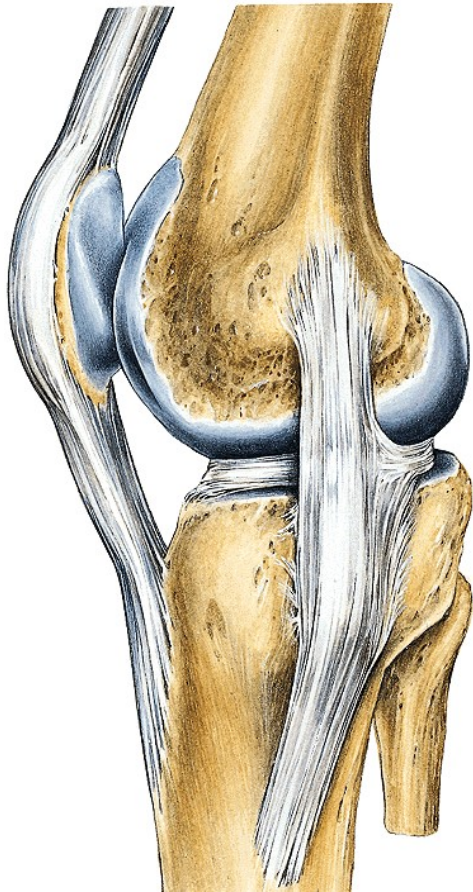
**retinaculum patellae mediale**

**retinaculum patellae laterale**

**lig. collaterale fibulare**

**lig. collaterale tibiale**

**lig. popliteum obliquum**



*Synovial layer:*

**plica synovialis patellaris**

**plicae alares**

**corpus adiposum infrapatellare**

*Bursae:*

**b. suprapatellaris**

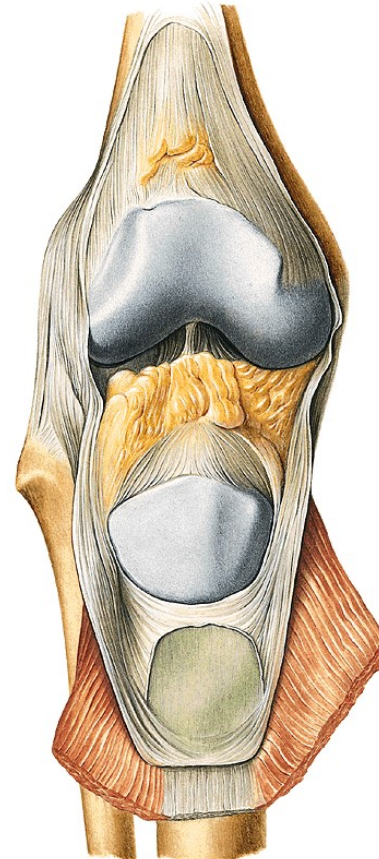
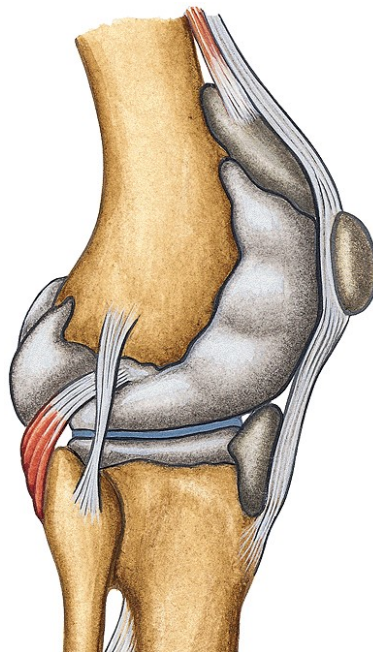
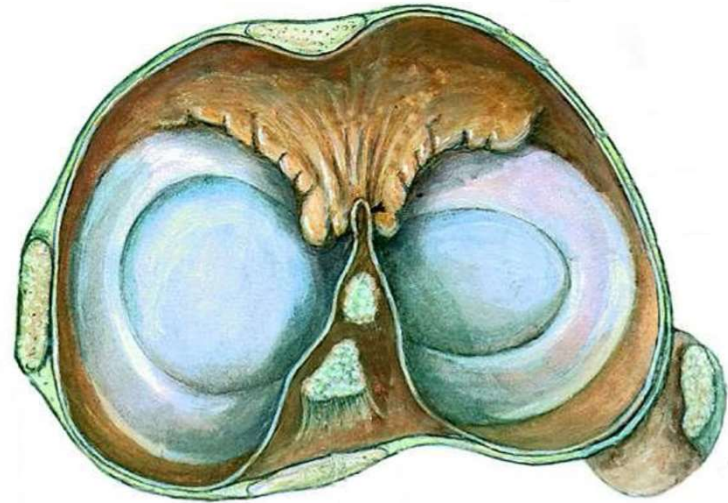
**b. profunda infrapatellaris**

**b. prepatellaris subcutanea**

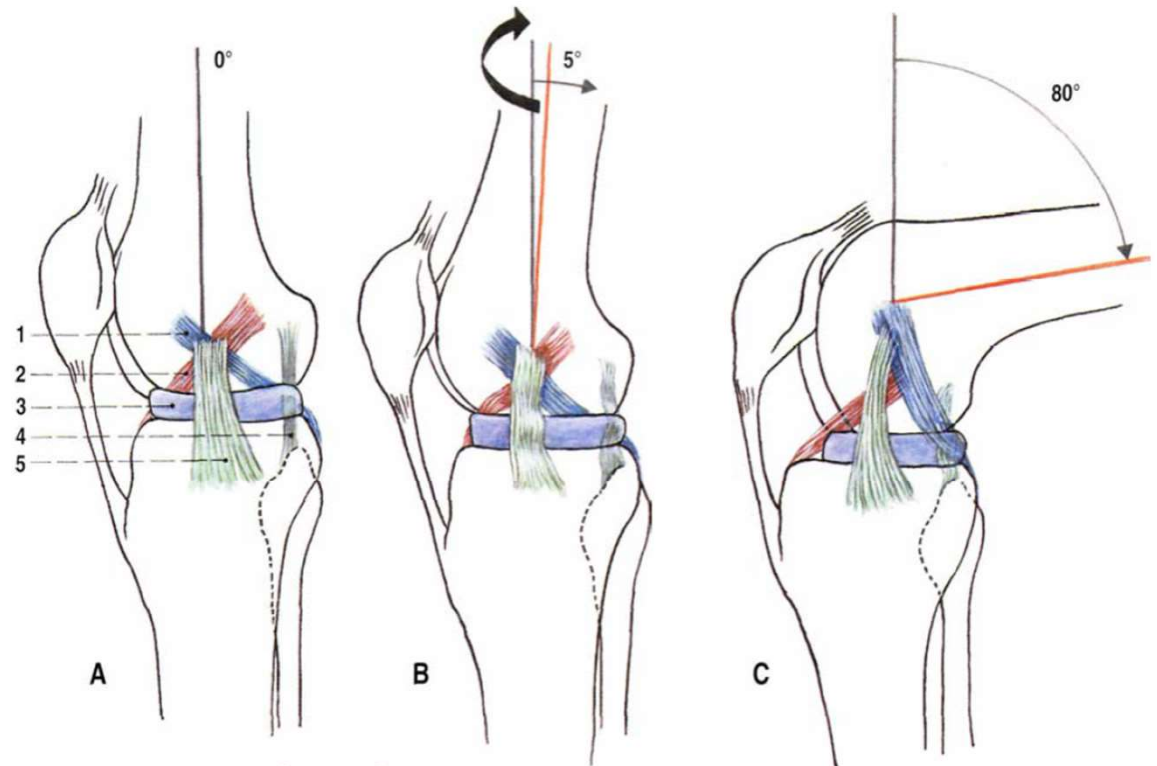
**b. infrapatellaris subcutanea**

**b. prepatellaris subtendinea**

**b. anserina**

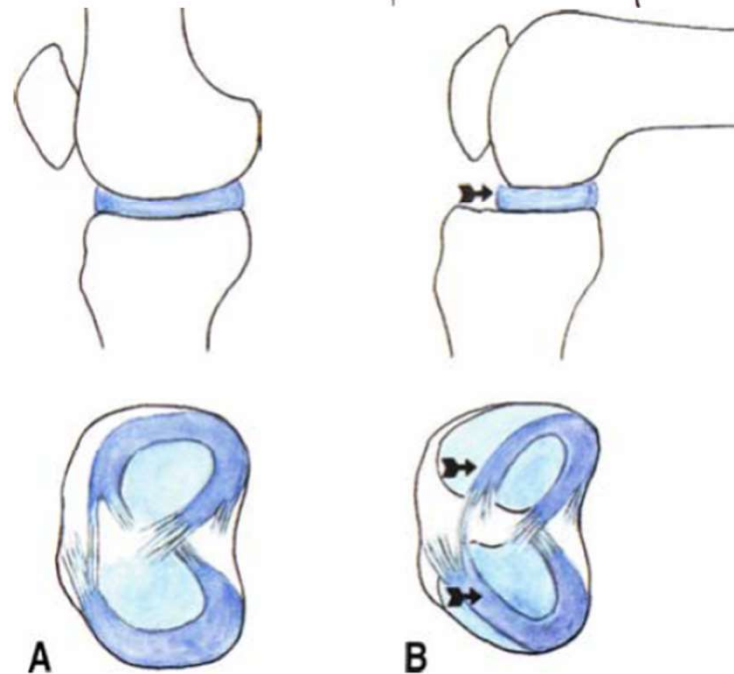


## *Movements:*



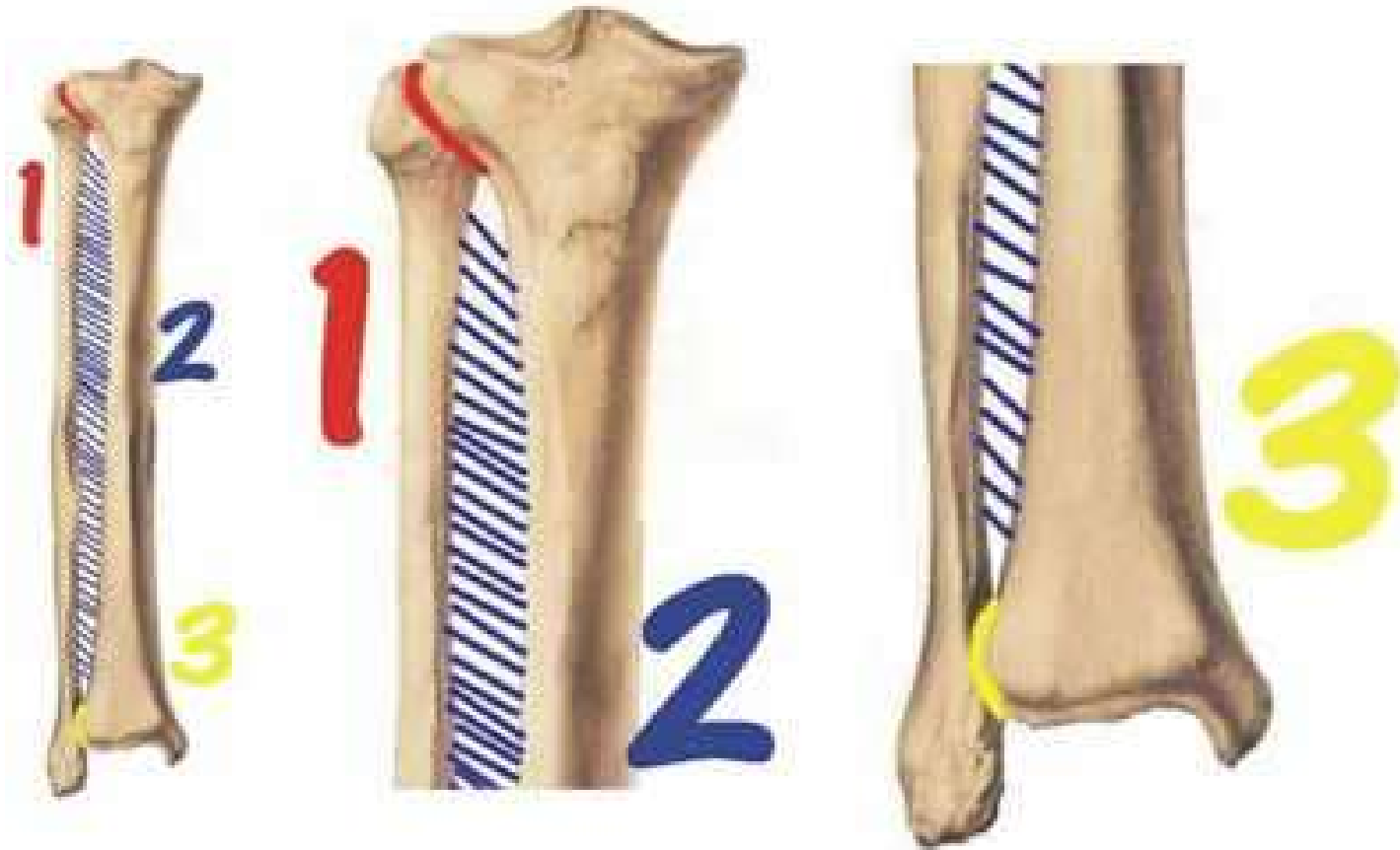
## **Flexion/extension - 4 phases:**

- 1. Initial rotation**
- 2. Rolling movement**
- 3. Slide movement**
- 4. Final rotation**





# Connections of tibia and fibula





# Articulatio tibiofibularis

*Type:* plane joint

*Articular surfaces:* **facies articularis tibiae**

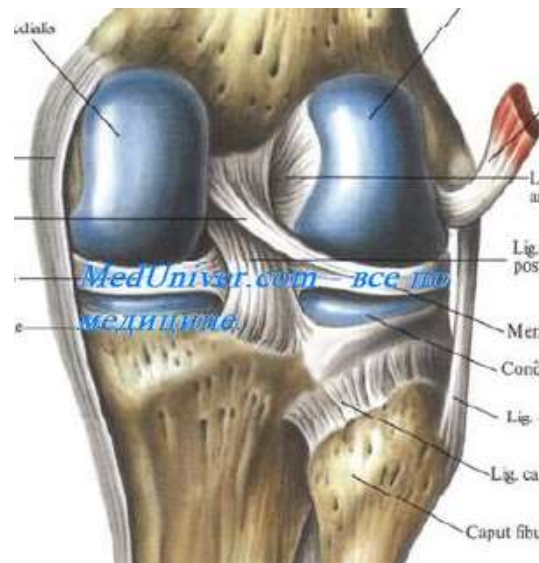
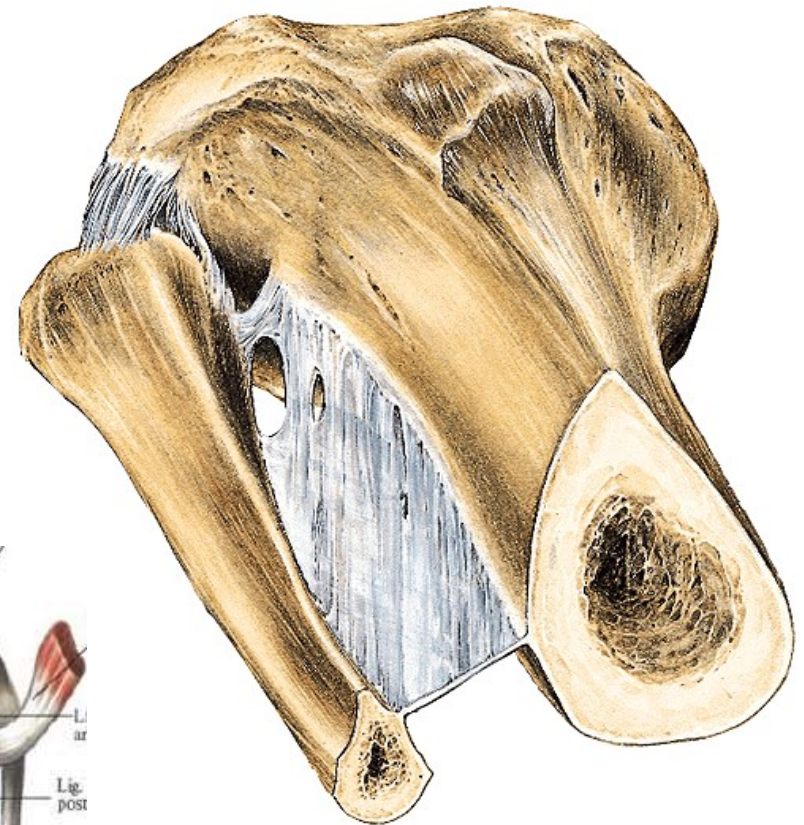
**facies articularis capitis fibulae**

*Articular capsule:* short, tough

*Ligaments:*

- **lig. capitis fibulae anterior**
- **lig. capitis fibulae posterior**

*Movements:* sliding, minimal



## Membrana interossea cruris

Fibrous membrane between **margo interosseus** of tibia and **margo interosseus** of fibula.

## Syndesmosis tibiofibularis

*Type:* fibrous connection

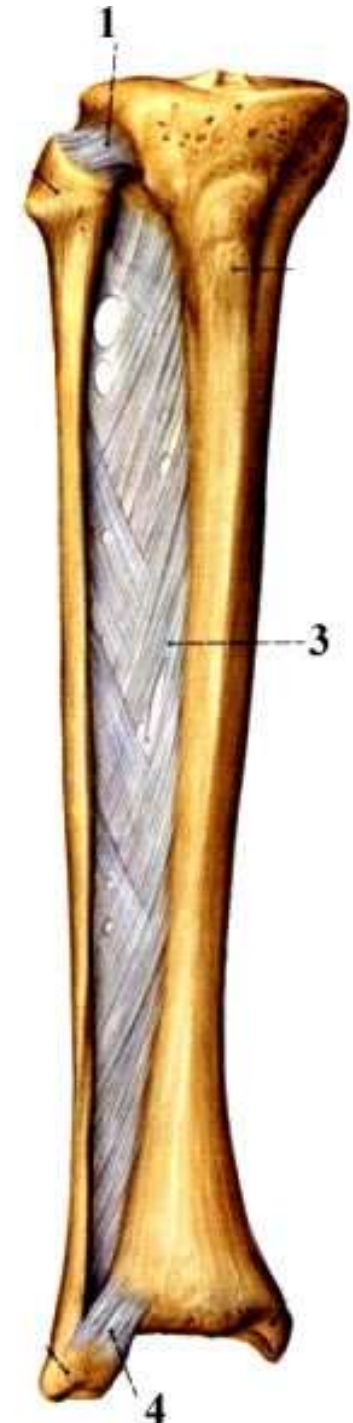
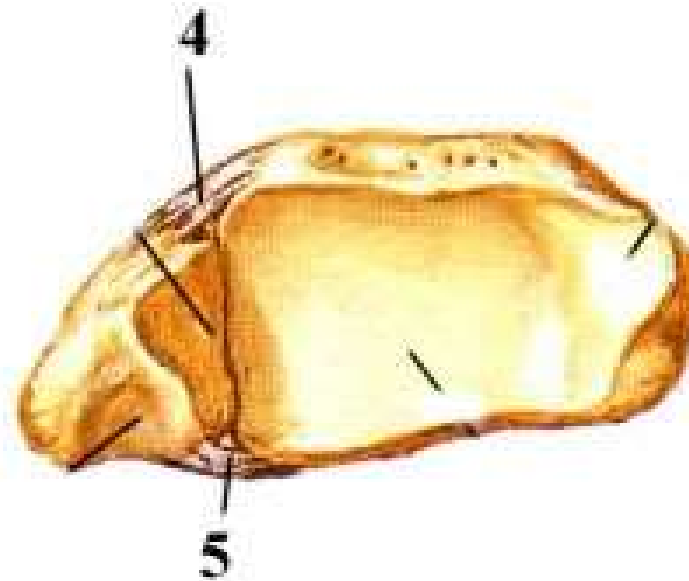
*Surfaces:* **incisura fibularis tibiae**,  
**distal end of fibula**

*Ligaments:*

**lig. tibiofibulare anterius**

**lig. tibiofibulare posterius**

*Movements:* minimal



## Articulatio talocruralis

*Type:* **composed, trochlear joint**

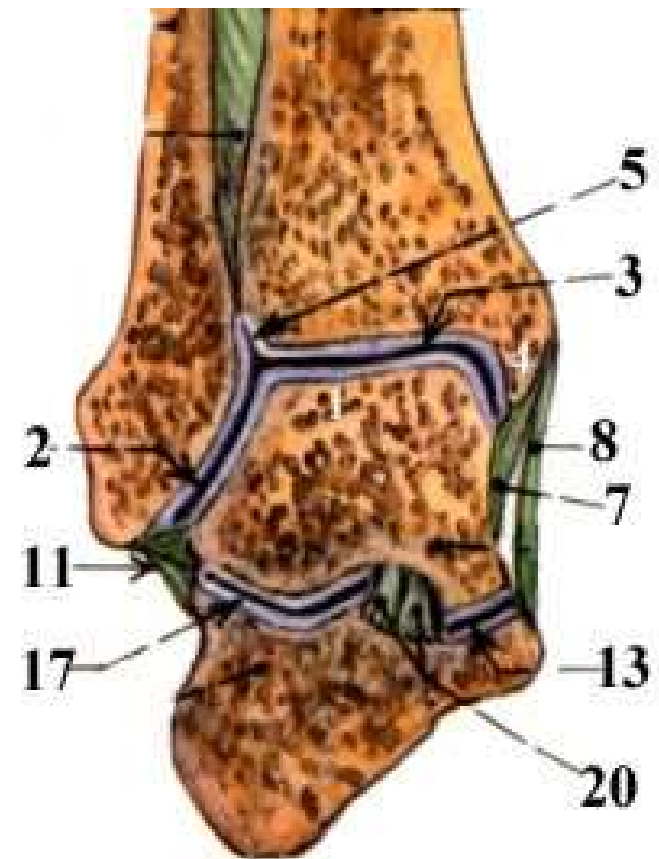
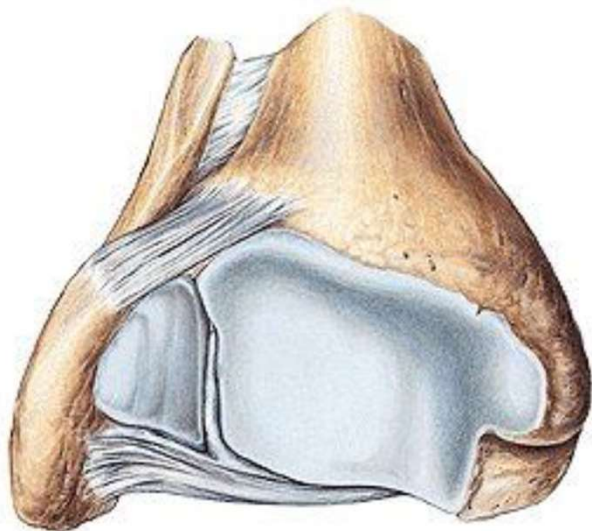
*Articular head:* **trochlea tali**

*Articular pit:* **facies articularis malleoli lateralis, facies articularis inferior tibiae et facies articularis malleoli medialis - tibiofibular fork**

*Articular capsule:* **it is attached to margins of articular surfaces**

*Movements:*

**plantar and dorsal flexion**



*Ligaments:*

**lig. collaterale mediale = lig. deltoideum**

pars tibionavicularis

pars tibiotalaris anterior

pars tibiocalcanearis

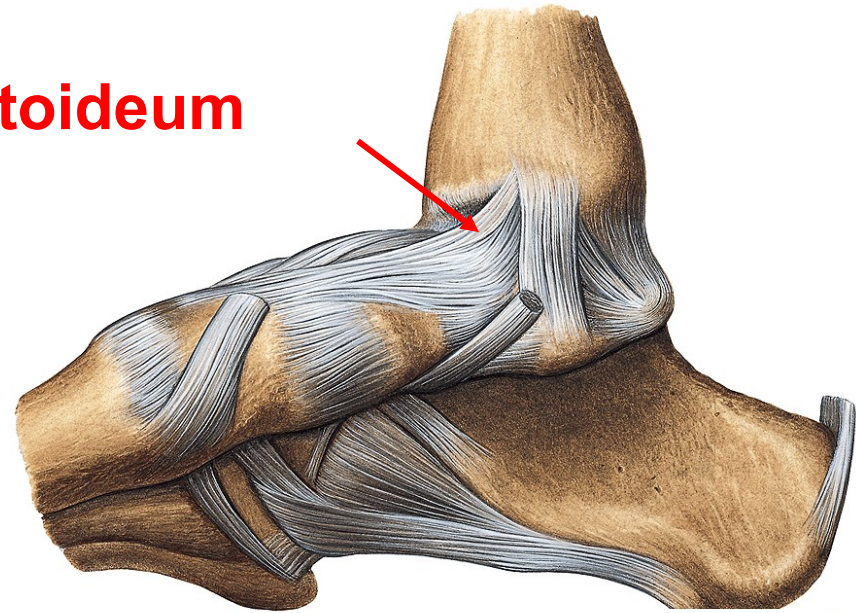
pars tibiotalaris posterior

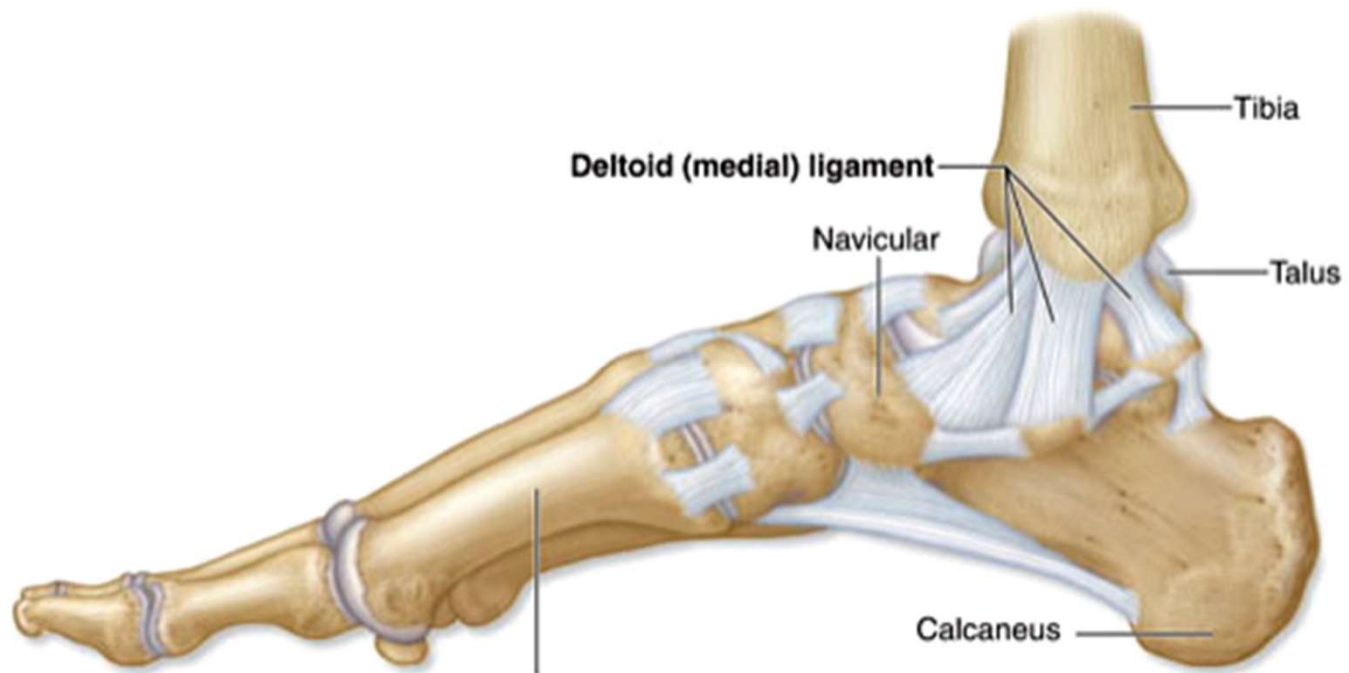
**lig. collaterale laterale**

lig. talofibulare anterius

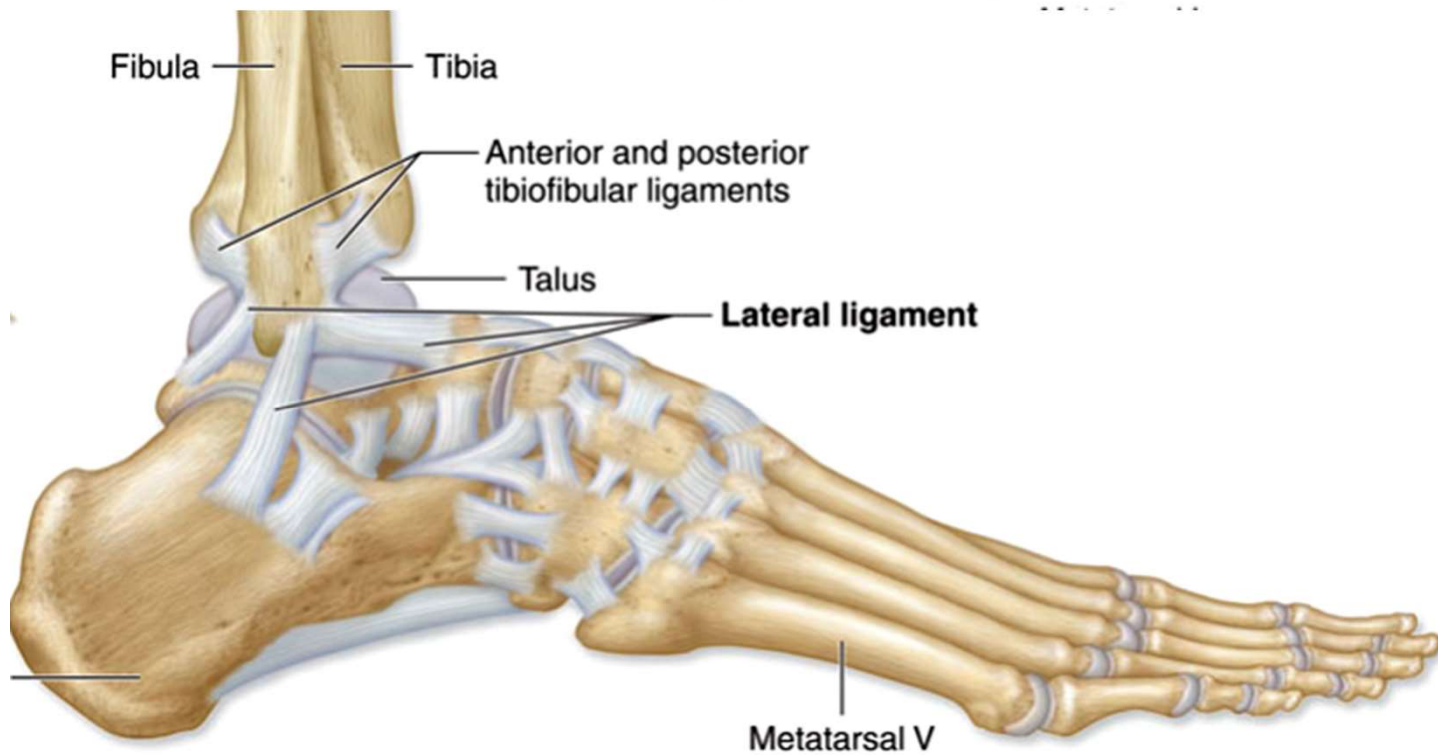
lig. calcaneofibulare

lig. talofibulare posterius





Mi



## Articulatio subtalaris (talocalcanea)

*Typ:* cylindrical joint

*Articular head:* **facies articularis talaris posterior calcanei**

*Articular pit:* **facies articularis calcanearis posterior tali**

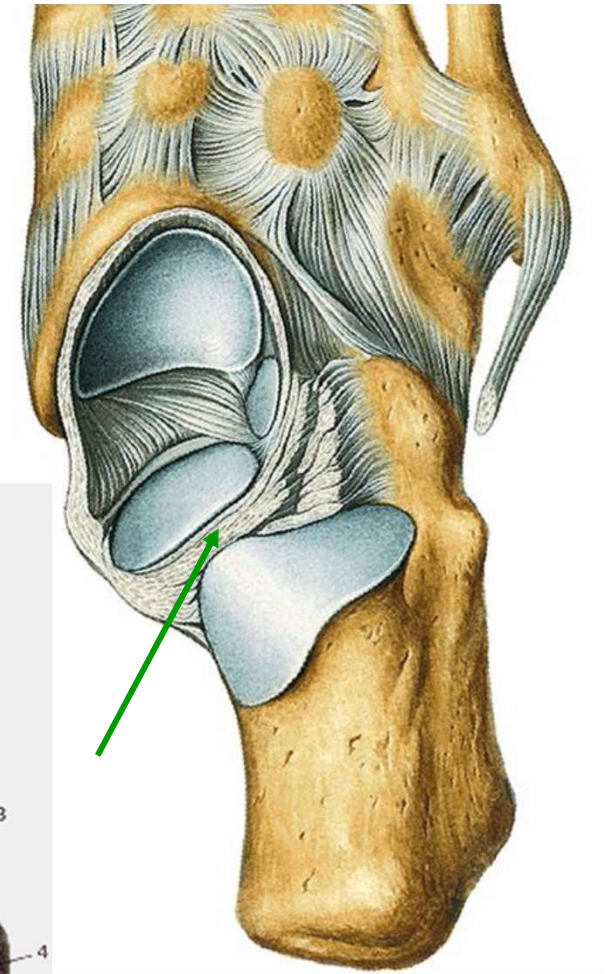
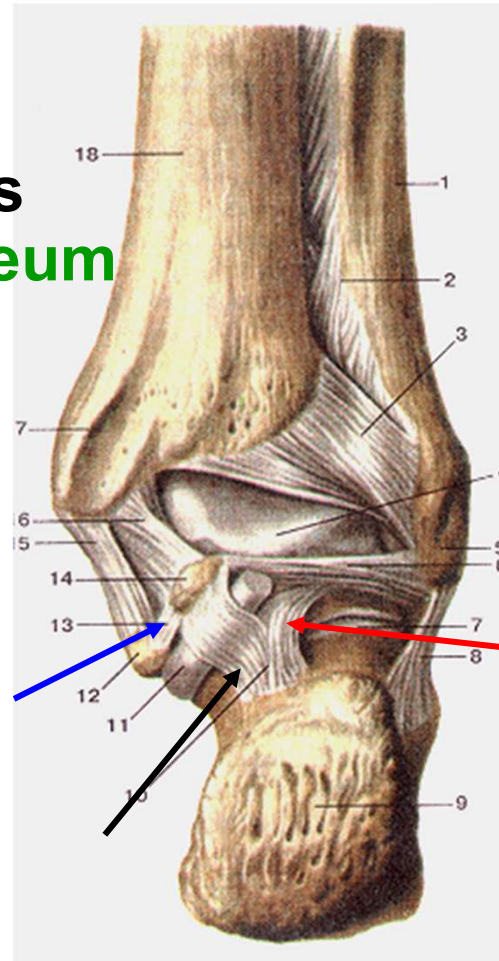
*Ligaments:*

**lig. talocalcaneum laterale**

**lig. talocalcaneum mediale**

**lig. talocalcaneum posterius**

**lig. talocalcaneum interosseum**  
(within sinus tarsi)



# Articulatio talocalcaneonavicularis

Type: spherical joint

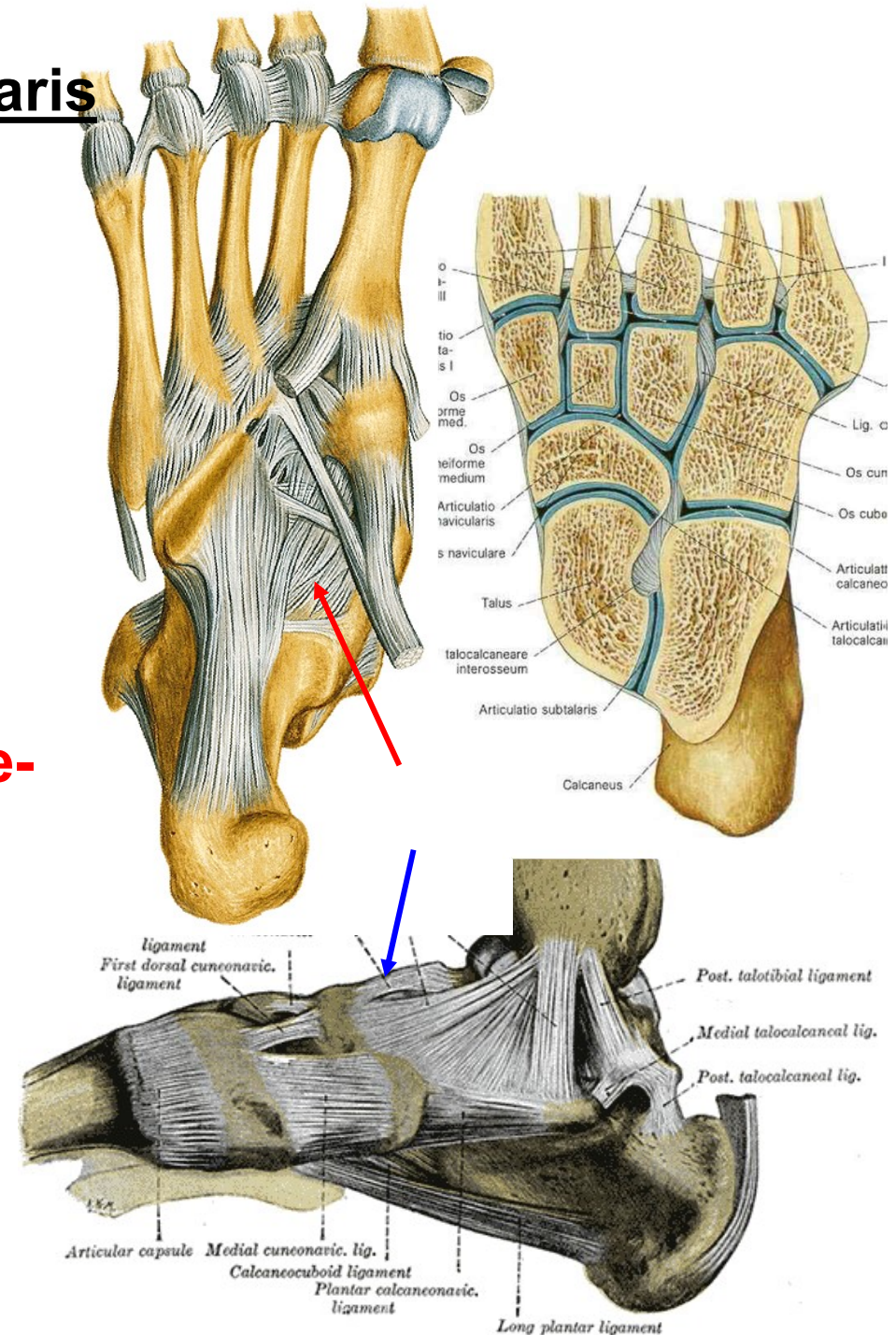
Articular head: caput tali, facies articularis calcanea media et anterior tali

Articular pit: os naviculare, facies articularis talaris media et anterior calcanei, fibrocartilago navicularis

Ligaments:

**lig. calcaneonaviculare plantare-fibrocartilago navicularis**

**lig. talonaviculare dorsale**



## Articulatio calcaneocuboidea

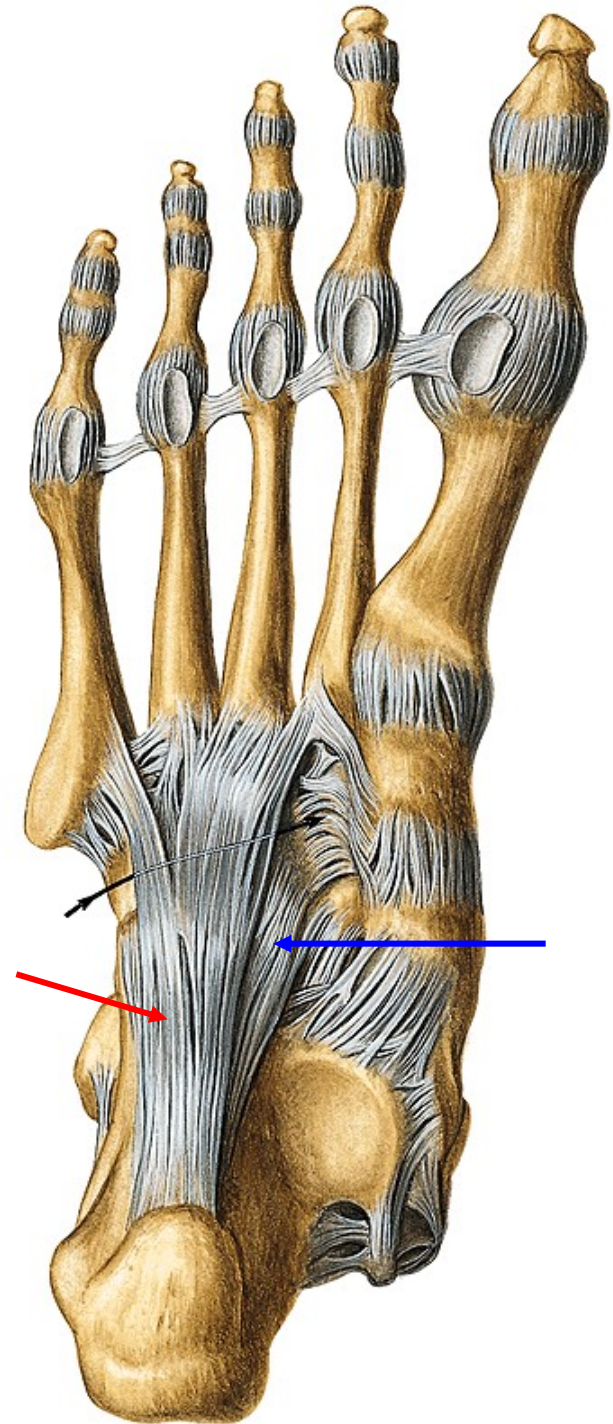
*Type:* amphiarthrosis

*Articular surfaces:* **facies articularis cuboidea calcanei, os cuboideum**

*Ligaments:*

**lig. calcaneocuboideum plantare**

**lig. plantare longum**

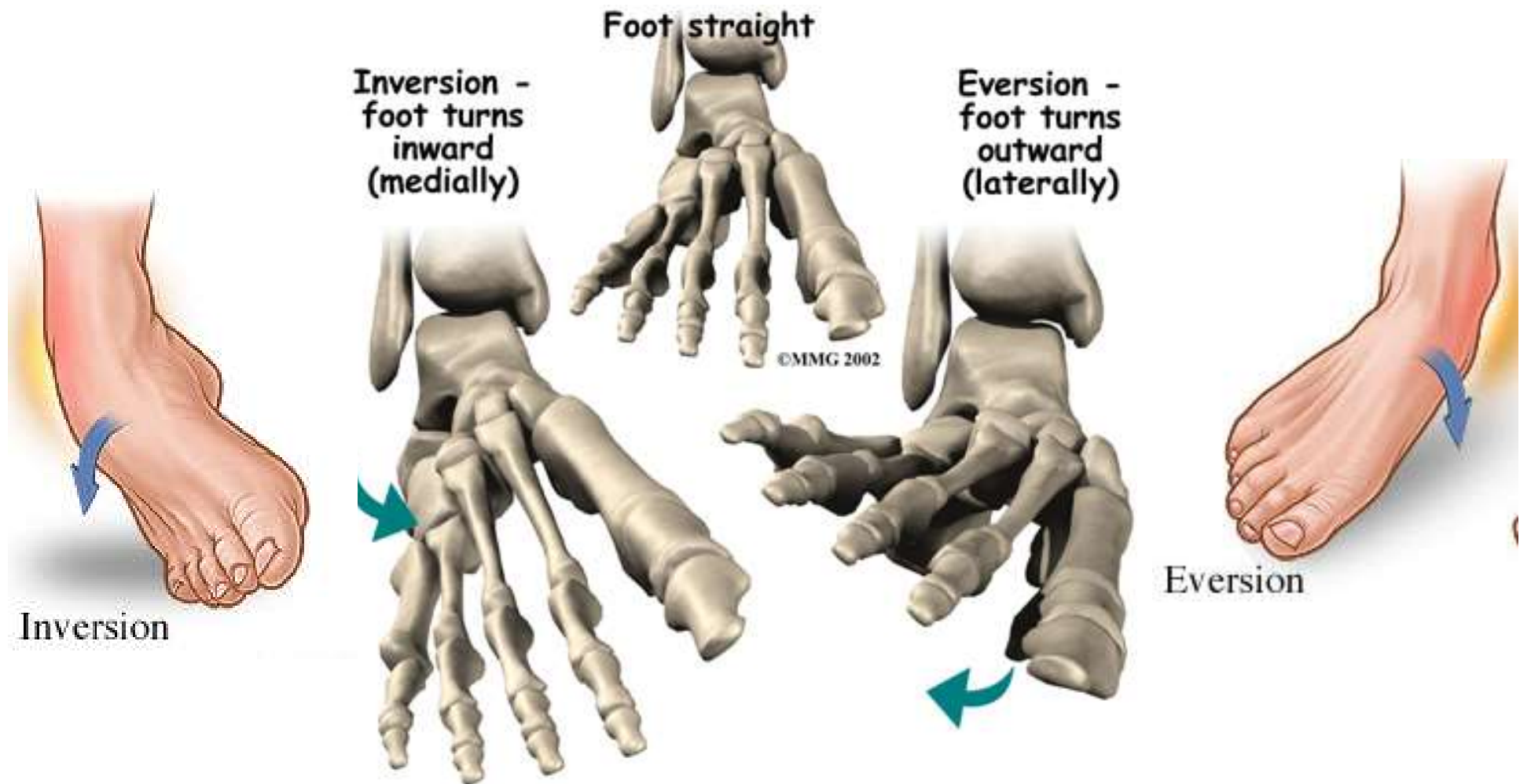


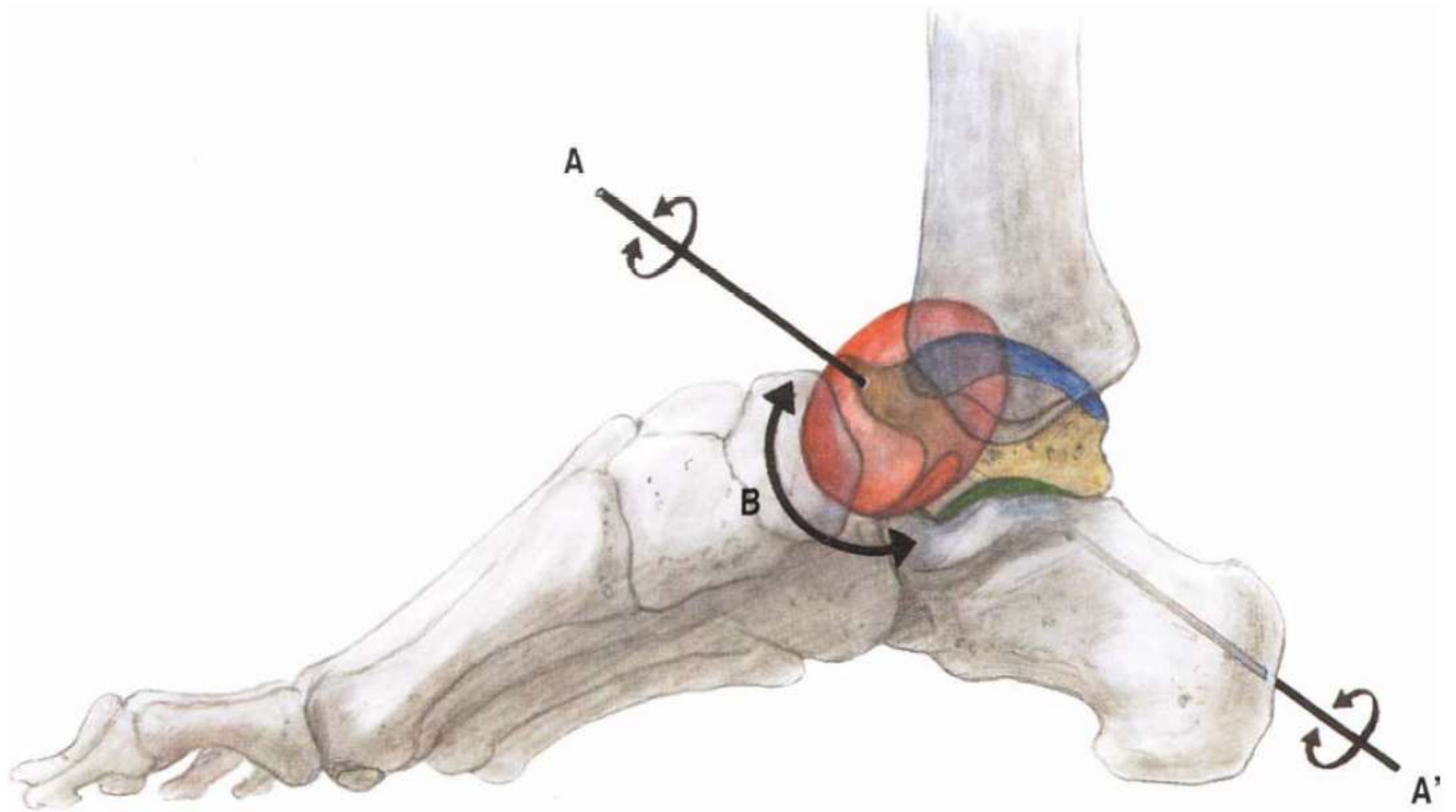


*Movements: combined*

**inversion - plantar flexion, adduction and supination**

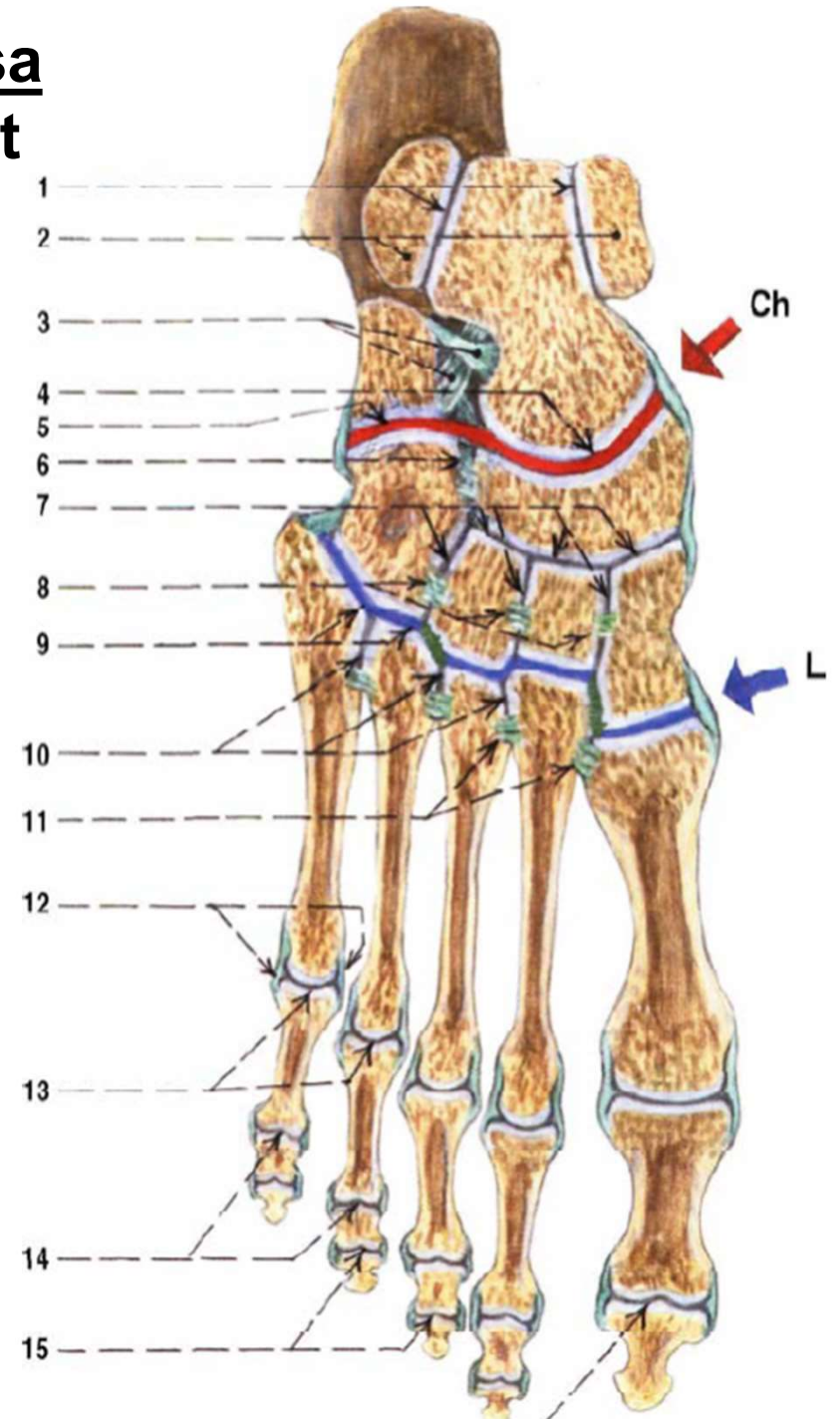
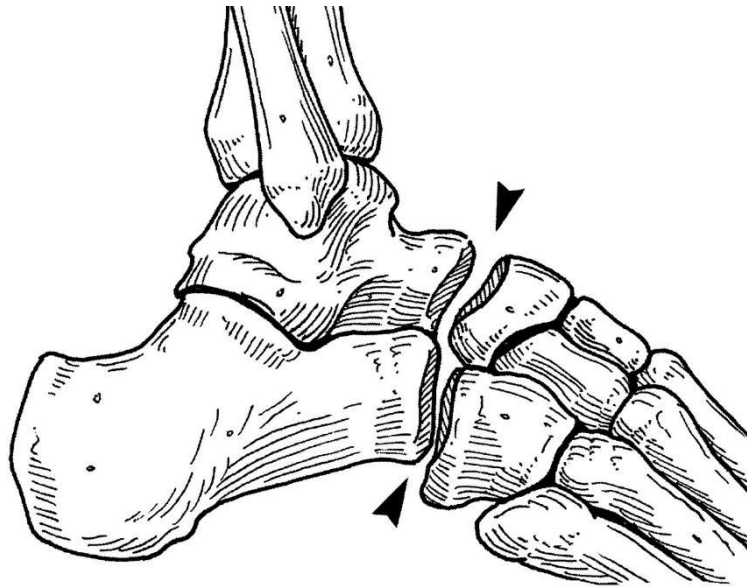
**eversion - dorsal flexion, abduction and pronation**





# Chopart's joint = art. tarsi transversa

- articular line: art. talonavicularis et calcaneocuboidea



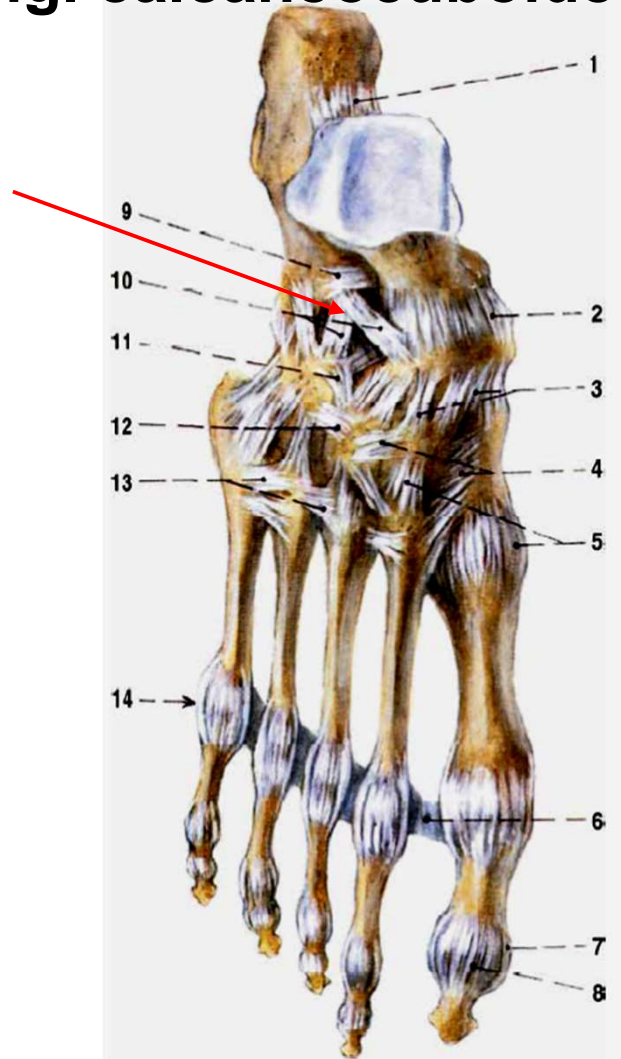
*Ligaments: dorsal side:*

**lig. talonaviculare**

**lig. bifurcatum:**

**lig. calcaneonaviculare**

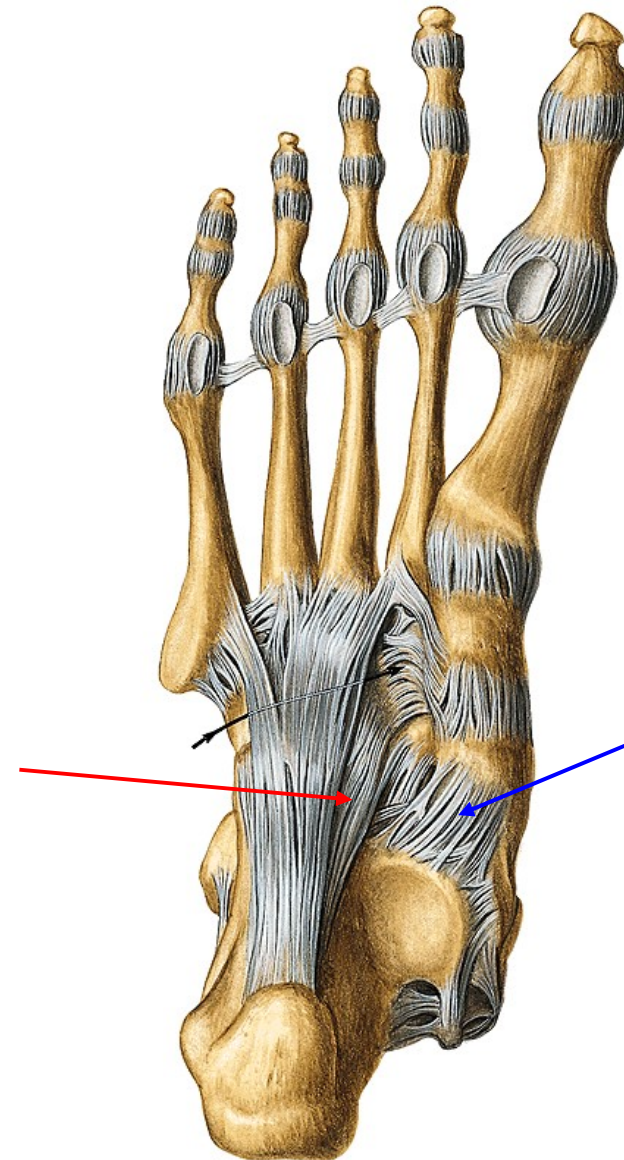
**lig. calcaneocuboideum**



**Plantar side:**

**lig. calcaneonaviculare plantare**

**lig. calcaneocuboideum plantare**



## Articulatio cuneonavicularis

*Type:* composed, tough joint

Connection of three ossa cuneiformia with os naviculare, ossa cuneiformia between each other and os cuneiforme laterale with os cuboideum

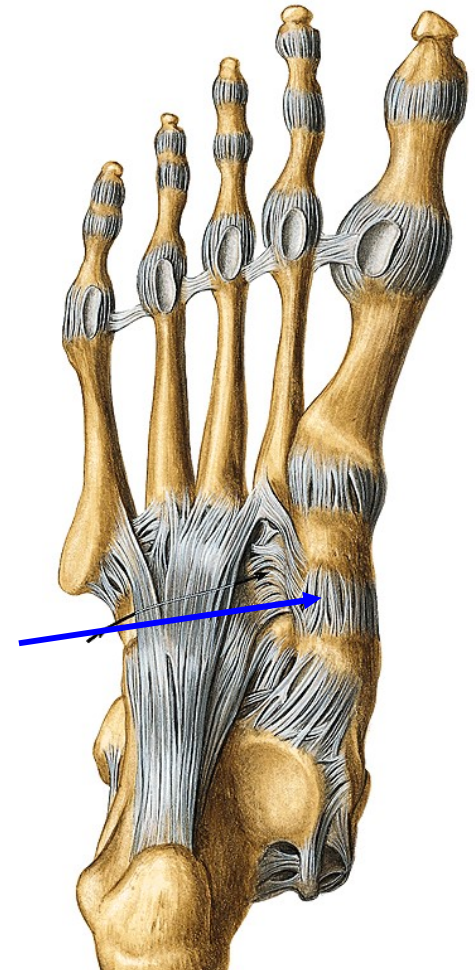
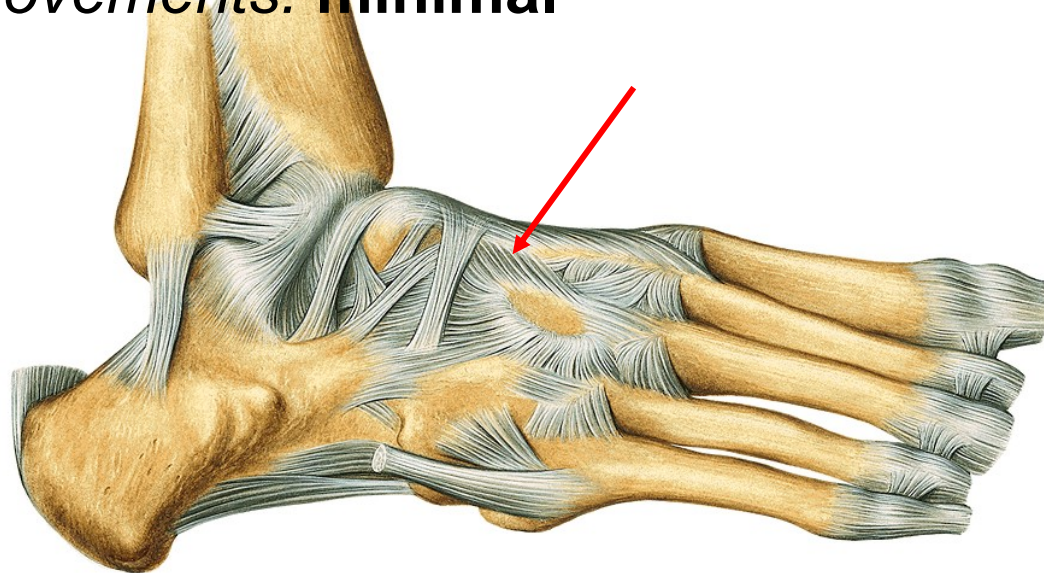
*Ligaments:*

ligg. cuneonavicularia **dorsalia** et **plantaria**

ligg. intercuneiformia dorsalia, plantaria et interossea

ligg. cuneocuboideum dorsale, plantare et interosseum

*Movements:* minimal



**Lisfranck's joint= functional unit:**

**Articulationes tarsometatarsales**

**Distal row of tarsal bones and bases of metatarsal bones**

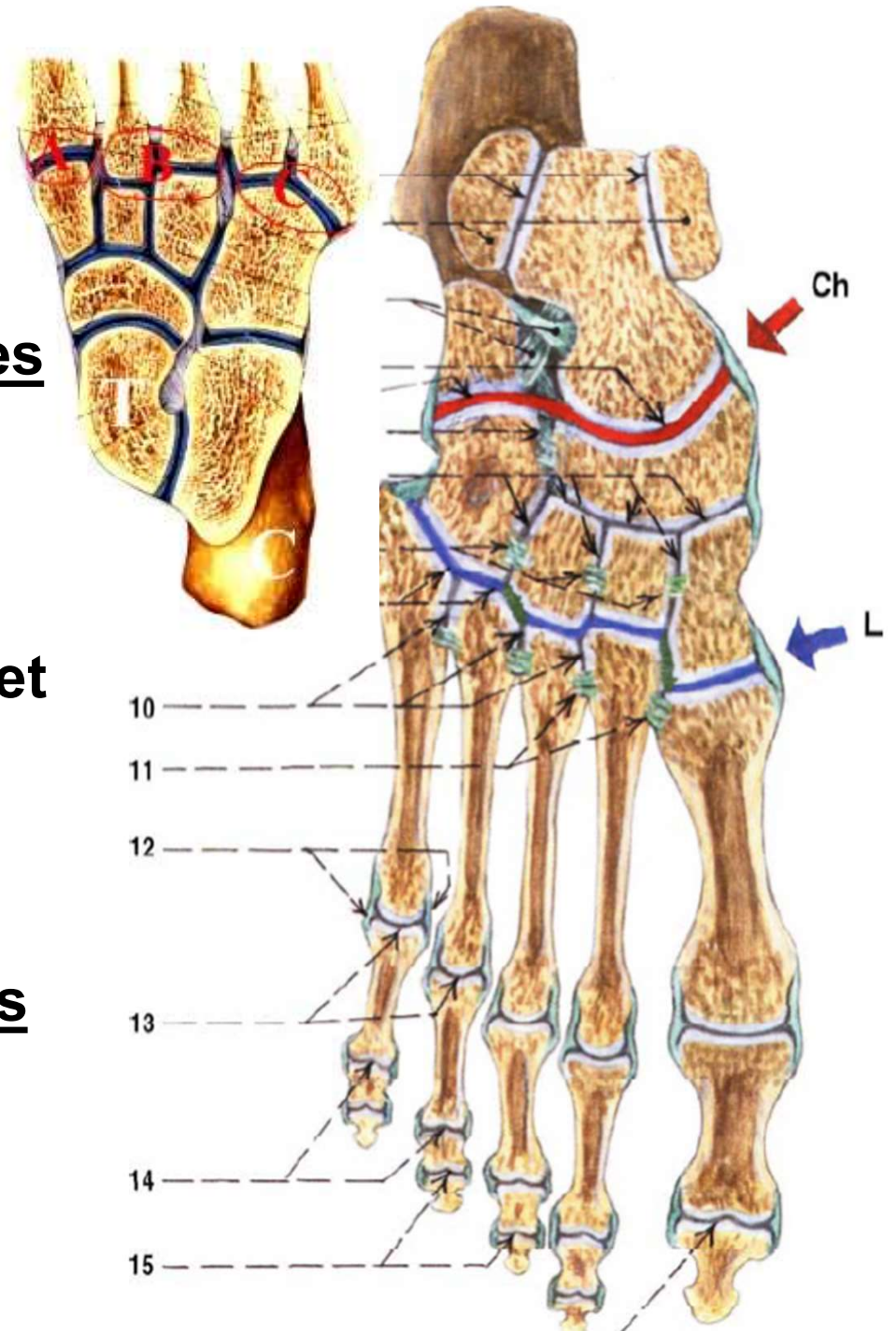
**A.** os cuneiforme mediale - os metatarsale I

**B.** os cuneiforme intermedium et laterale - os metatarsale II et III

**C.** os cuboideum - os metatarsale IV et V

**Articulationes intermetatarsales**

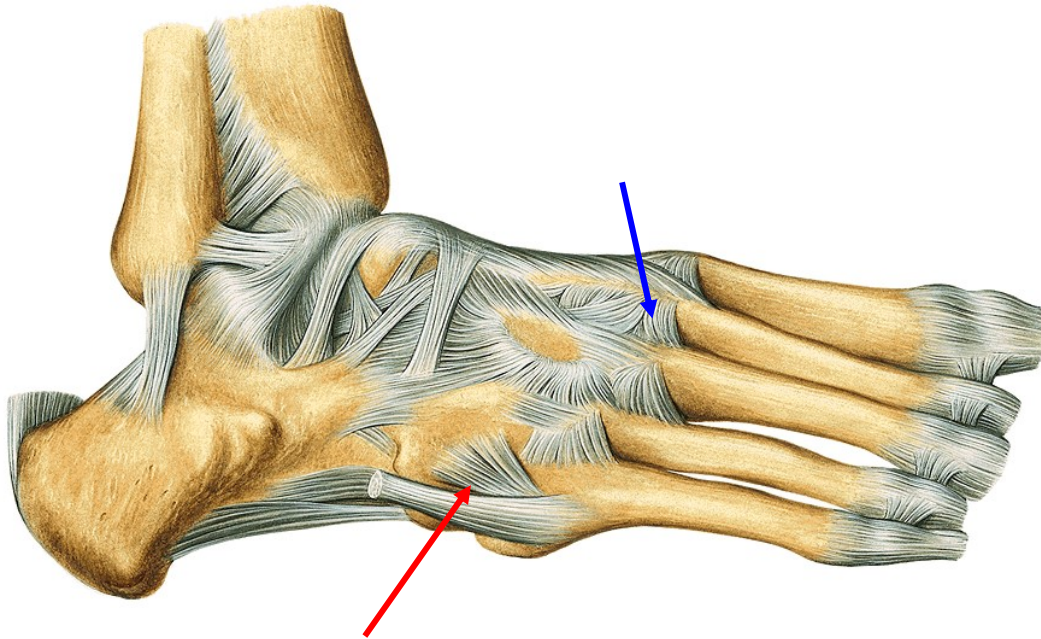
**Connections between bases of adjacent metatarsal bones.**



*Ligaments:*

**Dorsal side:**

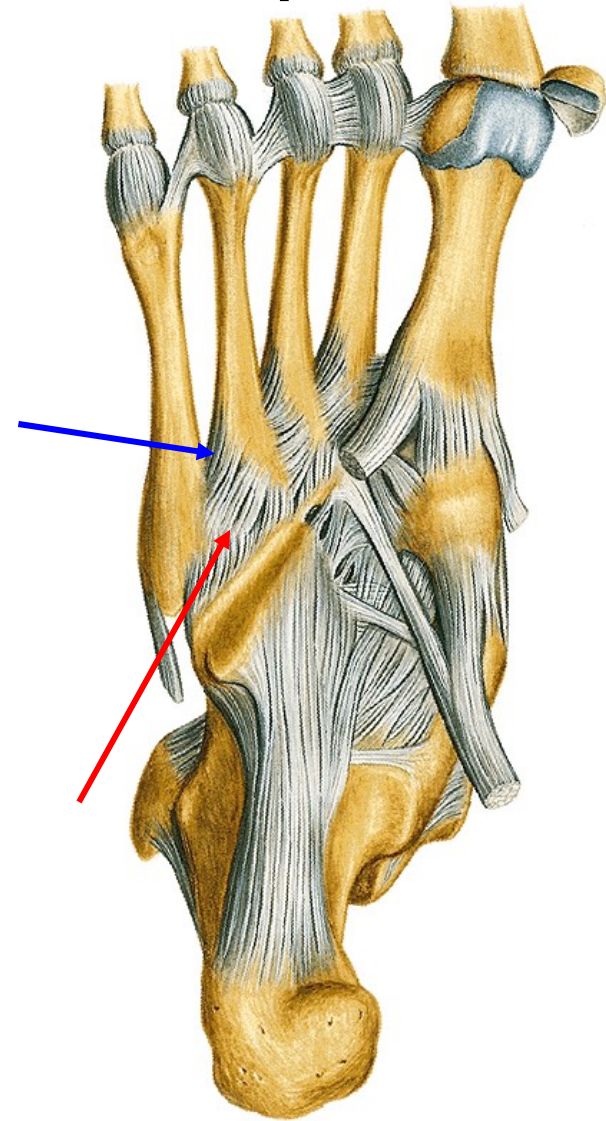
**ligg. metatarsalia dorsalia  
et interossea**



**ligg. tarsometatarsalia dorsalia**

**Plantar side:**

**ligg. metatarsalia plantaria**



**ligg. tarsometatarsalia plantaria**

## Articulationes metatarsophalangeae

*Type:* transition between cylindrical and spherical joints

*Articular head:* caput ossis metatarsalis

*Articular pit:* basis phalangis proximalis

*Ligaments:*

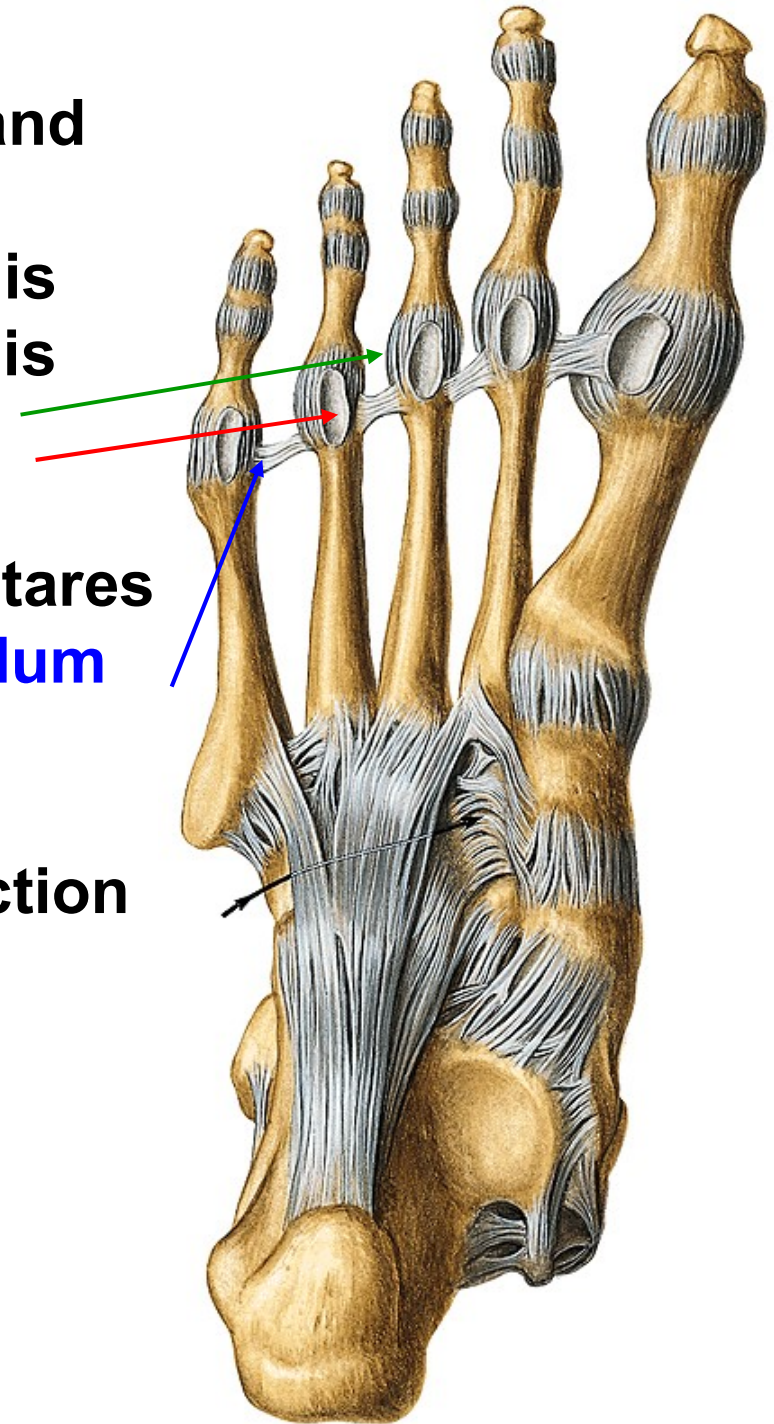
**ligg. collateralia**

**ligg. plantaria** - fibrocartilagineae plantares

**lig. metatarsale transversum profundum**

*Movements:* flexion and extension

in small range - abduction and adduction





## Articulationes interphalangeae pedis

*Type:* **trochlear joint**

*Articular head:* **caput phalangis**

*Articular pit:* **basis phalangis**

*Ligaments:*

**ligg. plantaria - fibrocartilaginea plantares**

**ligg. collateralia**

*Movements:* **flexion and extension in restricted range**



## Foot vault

- It prevents compression of soft tissues in the foot
- It allows flexibility of the foot during walking

**transversal** – it is given by arch of ossa cuneiformia, it is held by interosseous ligaments, m. peroneus longus, m. tibialis anterior, m. adductor hallucis

**longitudinal** – top is talus, aponeurosis, lig. plantare longum, m. tibialis ant. et post., m. flexor hallucis longus, m. flexor digitorum longus, short muscles of foot

