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**,** it 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**
discus interpubicus- at the back **eminentia retropubica** (palpable), there is sometimes a cleft inside
Articular surfaces: **facies symphysiales (os pubis)**
Ligaments: **lig. pubicum inferius= lig. arcuatum pubis** – from below, it holds even when the pelvic bones are spread out
lig. pubicum superius

Ligaments of pelvis

lig. inguinale

lig. sacrospinale
foramen ischiadicum majus
(it is divided by the course of **m. piriformis**
into foramen suprapiriforme et infrapiriforme)
lig. sacrotuberale
foramen ischiadicum minus

lig. sacrococcygeum anterius
lig. sacrococcygeum posterius

membrana obturatoria
canalis obturatorius

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,
alla 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 newborn skull- **the length - 11,5 cm** must be consistent with dimensions of single **pelvic planes**
- The newborn head rotates during the birth so, that its largest dimension passes through the largest dimension of appropriate **plane:**

aditus pelvis

amplitudo pelvis

angustia 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 } **zona orbicularis**

lig. capitis femoris

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 infrapatelaris
b. prepatelaris 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 anterius**
- **lig. capitis fibulae posterius**

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

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

Movements: **combined**

inversion - plantar flexion, adduction and supination

eversion - dorsal flexion, abduction and pronation

Articulatio calcaneocuboidea

Type: **amphiarthrosis**

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

Ligaments:

lig. calcaneocuboideum plantare

lig. plantare longum

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

Plantar side:
ligg. metatarsalia plantaria

ligg. tarsometatarsalia dorsalia

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 - fibrocartilagines 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 - fibrocartilagines 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, aponeurosa, lig. plantare longum, m. tibialis ant. et post., m. flexor hallucis longus, m. flexor digitorum longus, short muscles of foot