

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,

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 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 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 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 - fibrocartilaginea 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 - fibrocartilagineae 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