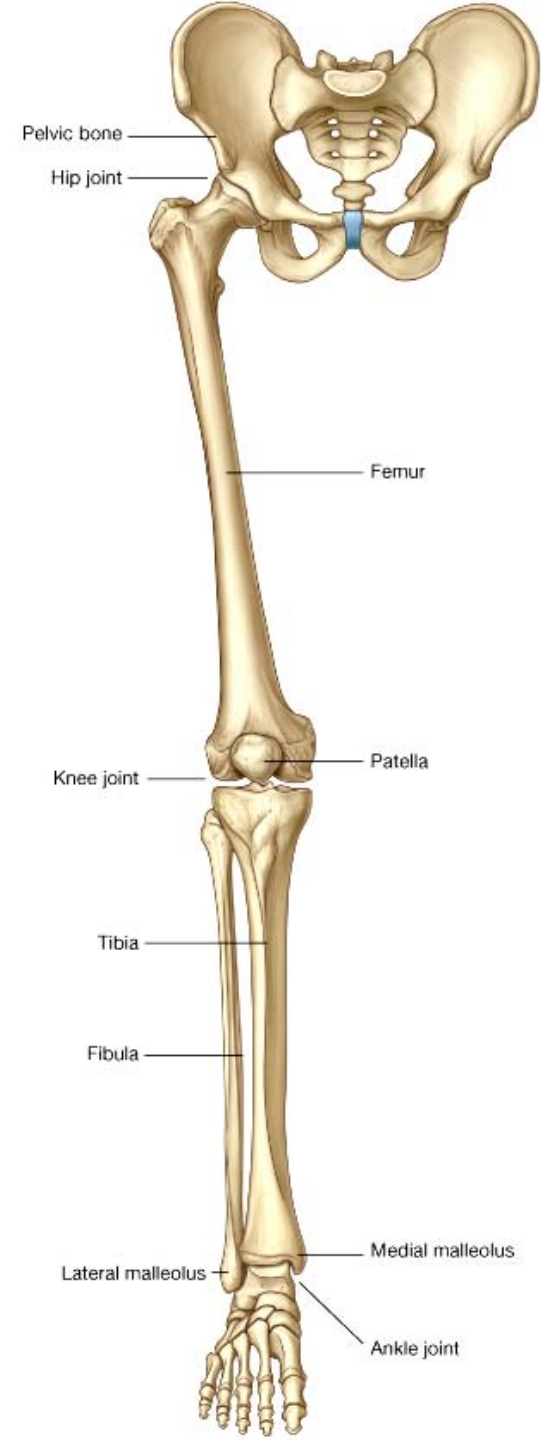


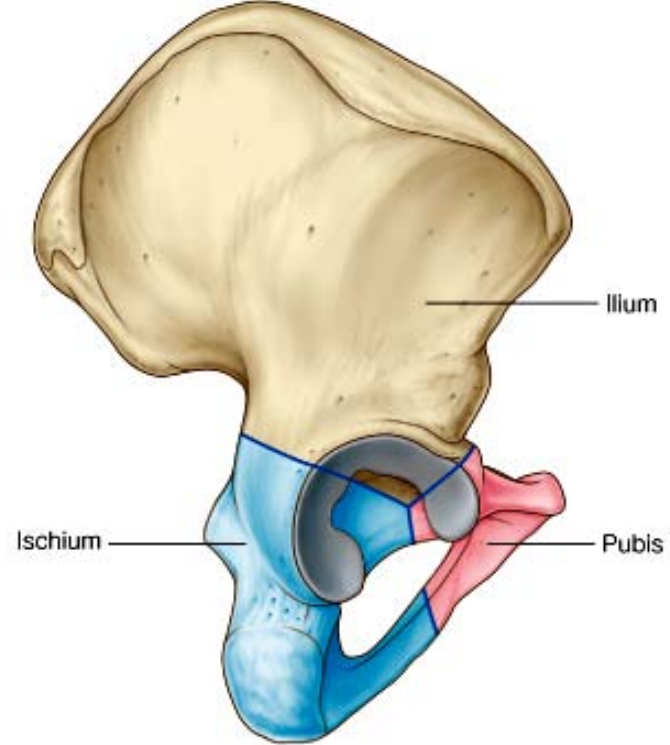
Bones of lower limbs

- Including bones of pelvic girdle (hip bones) and lower limb
- compared with upper limb
 - no equivalent movements to pronation and supination in upper limb;
 - more stable in lower limb, for weight-bearing

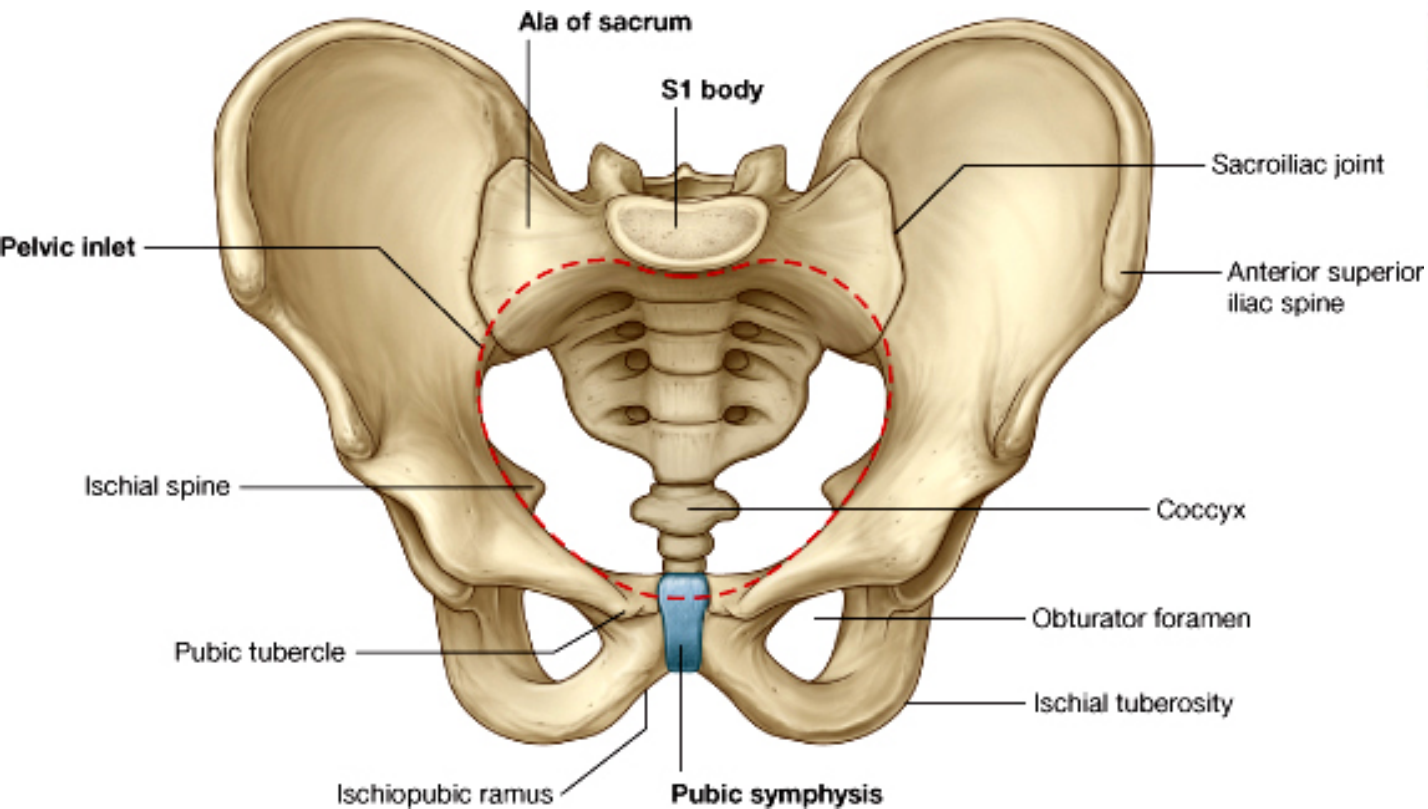


Bony pelvis

- Ilium
- ischium
- pubis



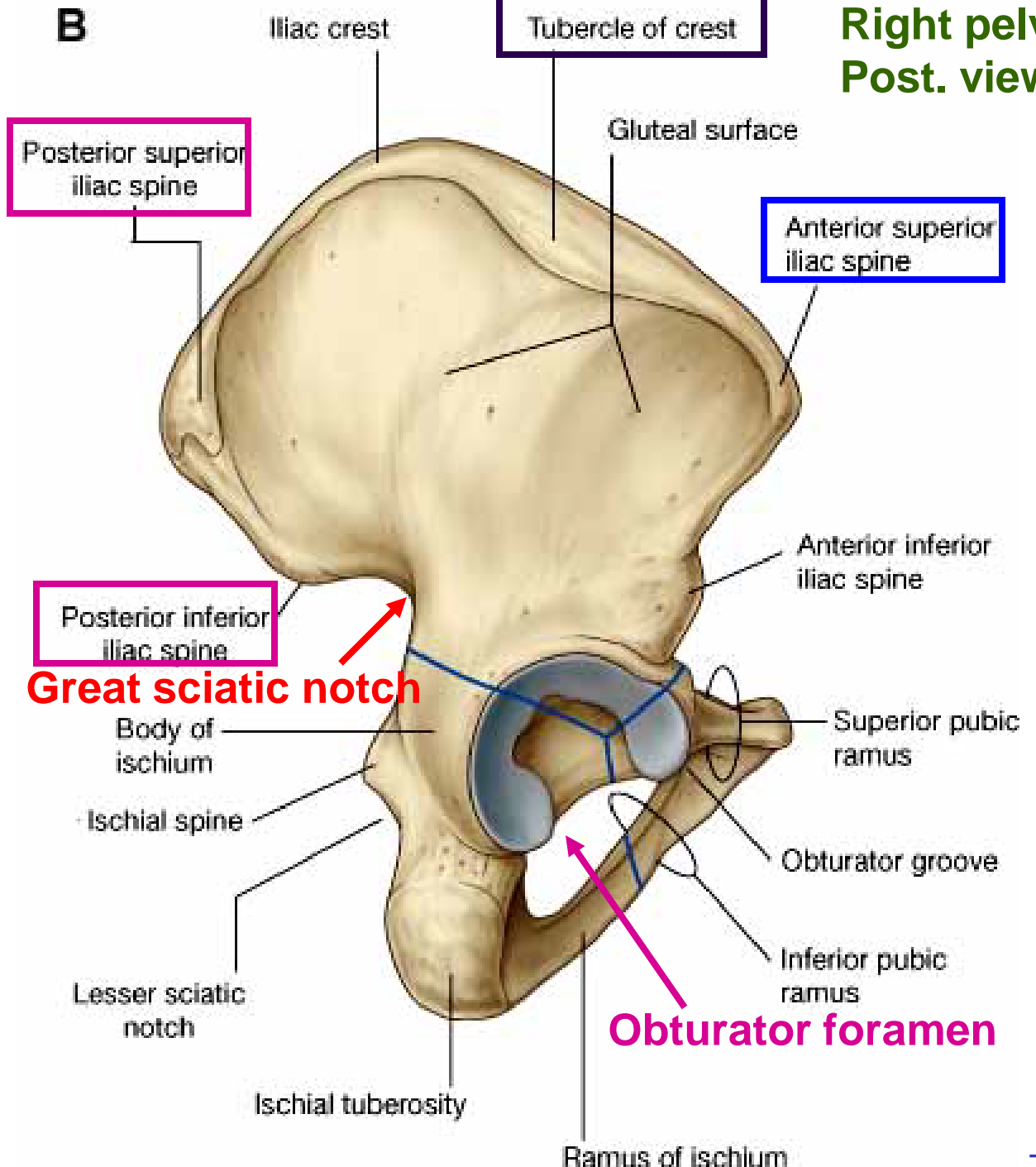
**Right pelvis
Post. view**



Ilium (lateral surface)

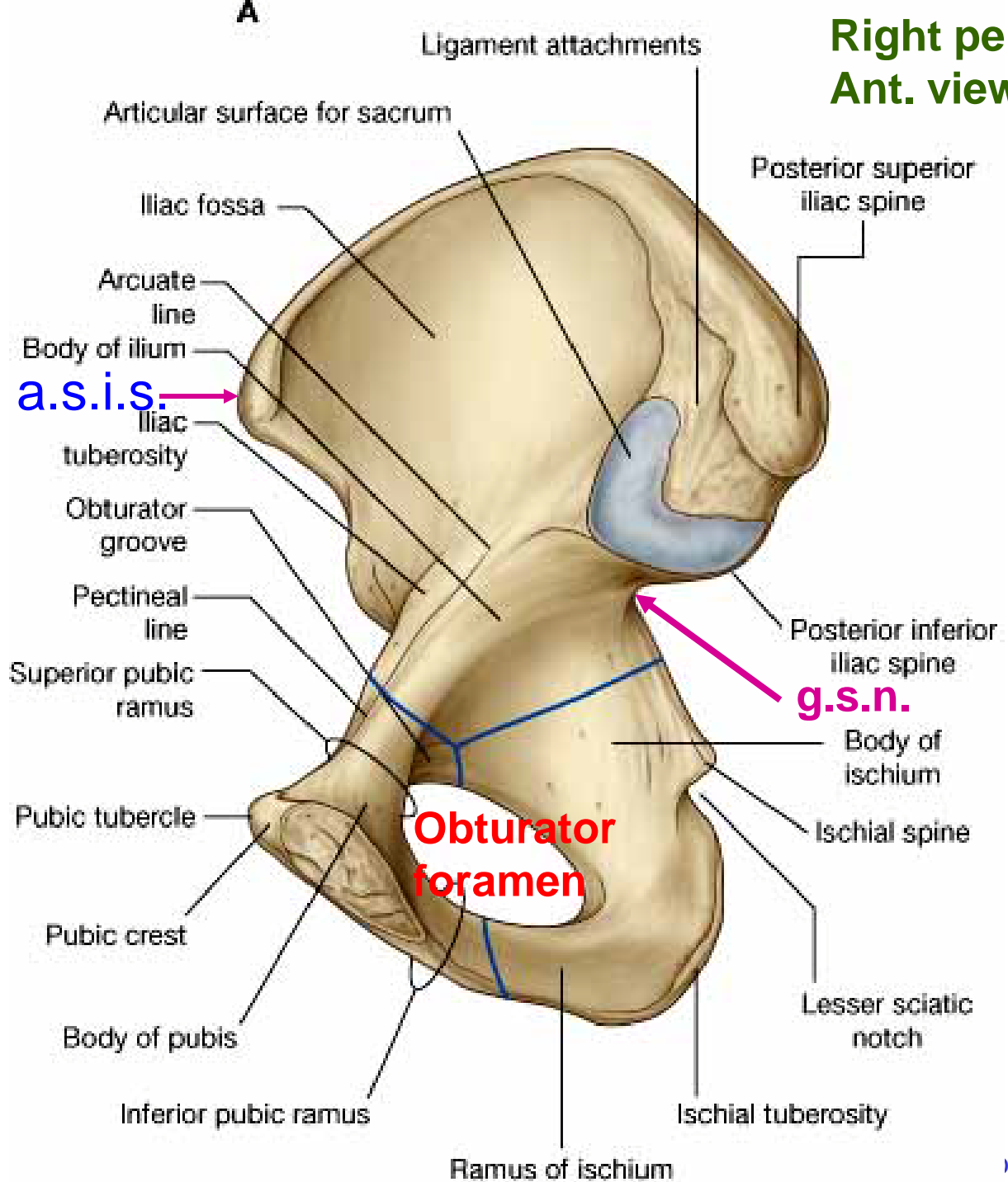
Right pelvis
Post. view

- ant. sup. iliac spine: a.s.i.s.
- post. sup. iliac spine: p.s.i.s.
- Iliac crest: a.s.i.s. – p.s.i.s.
- tubercle of crest
- ant. inf. iliac spine: a.i.i.s.
- post. inf. iliac spine: p.i.i.s.
- greater sciatic notch
- gluteal surface



Ilium (medial surface)-1

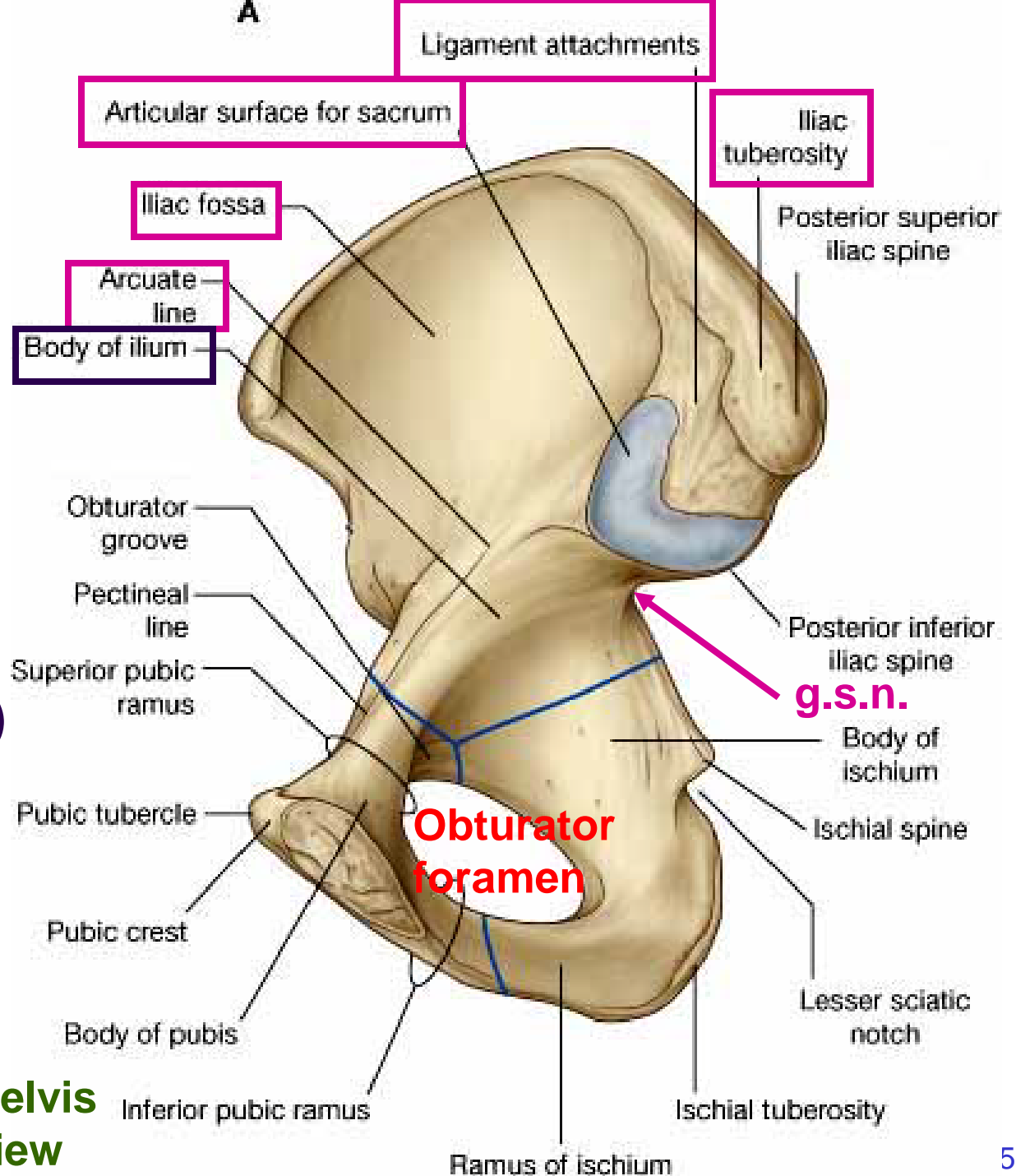
Right pelvis
Ant. view



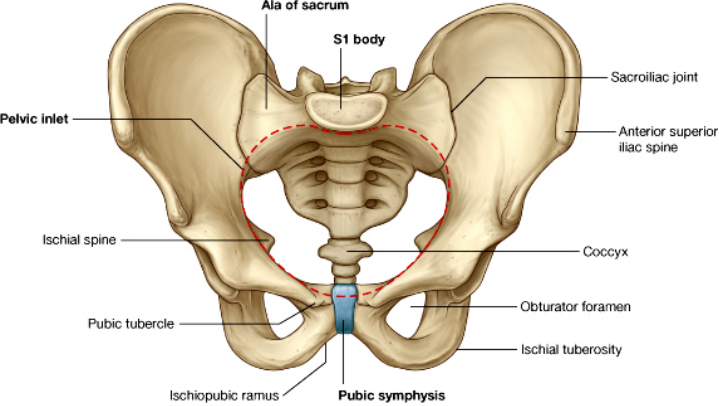
- obturator foramen
- iliac fossa
- a.s.i.s.; p.s.i.s.
- iliac crest: a.s.i.s. – p.s.i.s.
- greater sciatic notch (g.s.n.)

Ilium (medial surface)-2

- ala (iliac fossa)
- Body of ilium
- ridge between upper and lower part of iliac
 - arcuate line
- articular surface for sacrum (auricular face)
- attachment for ligaments (sacroiliac joint)
- iliac tuberosity

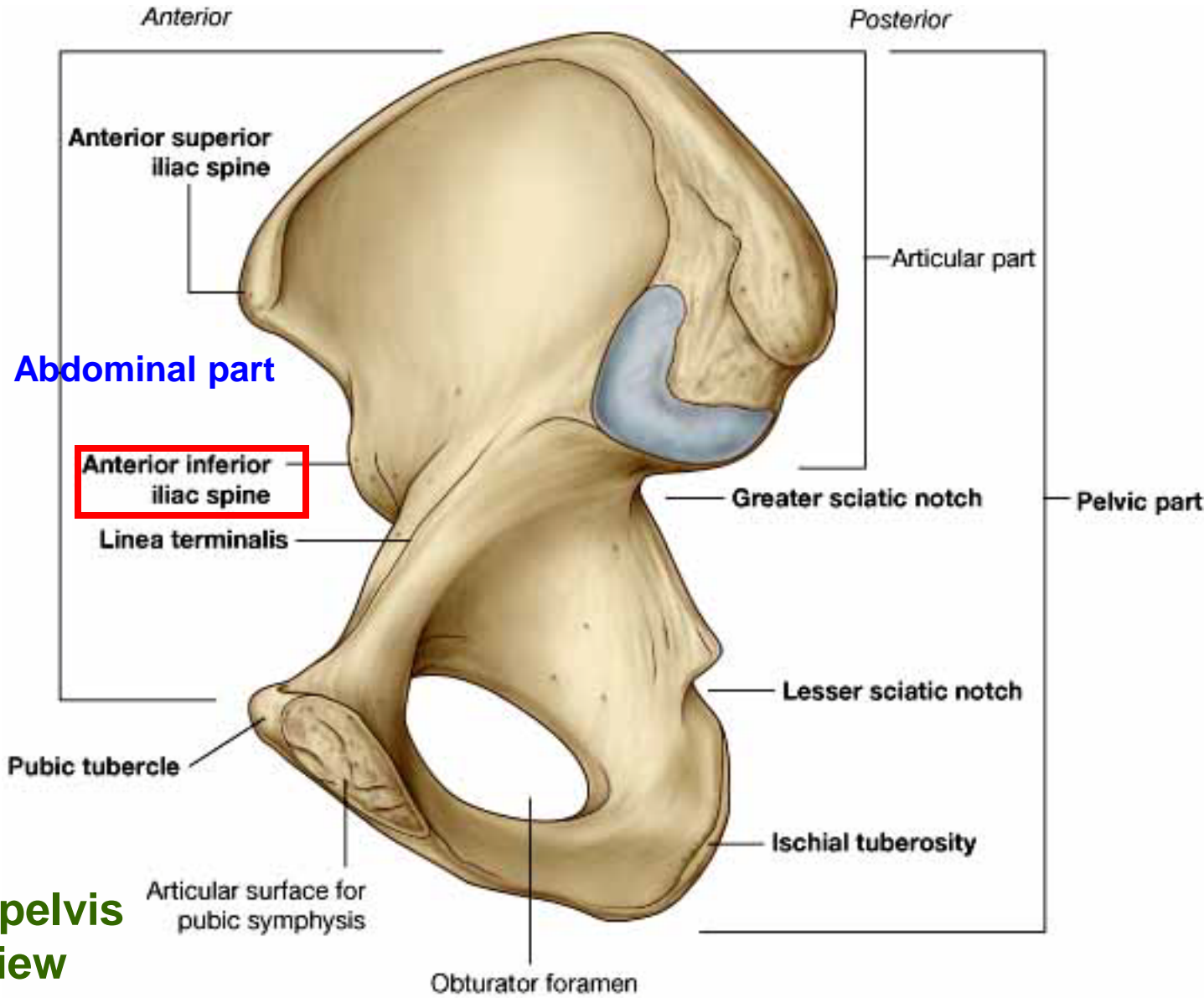


Right pelvis
Post. view

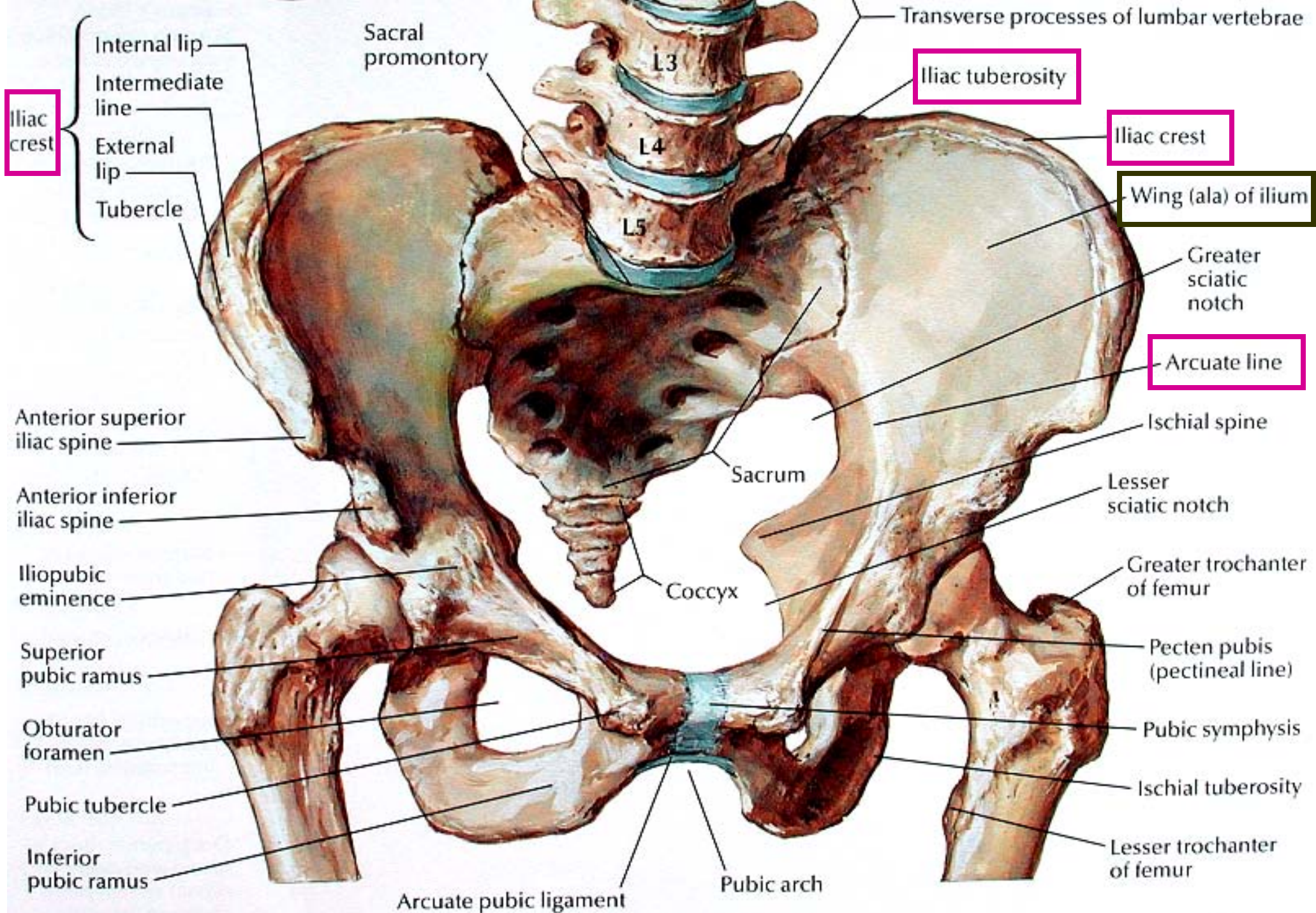


Ilium (medial surface)-3

- **arcuate line:**
linea terminalis
of pelvic brim
- **below:** pelvic
part; lesser/true
pelvis
- **above:**
abdominal part;
greater/false
pelvis

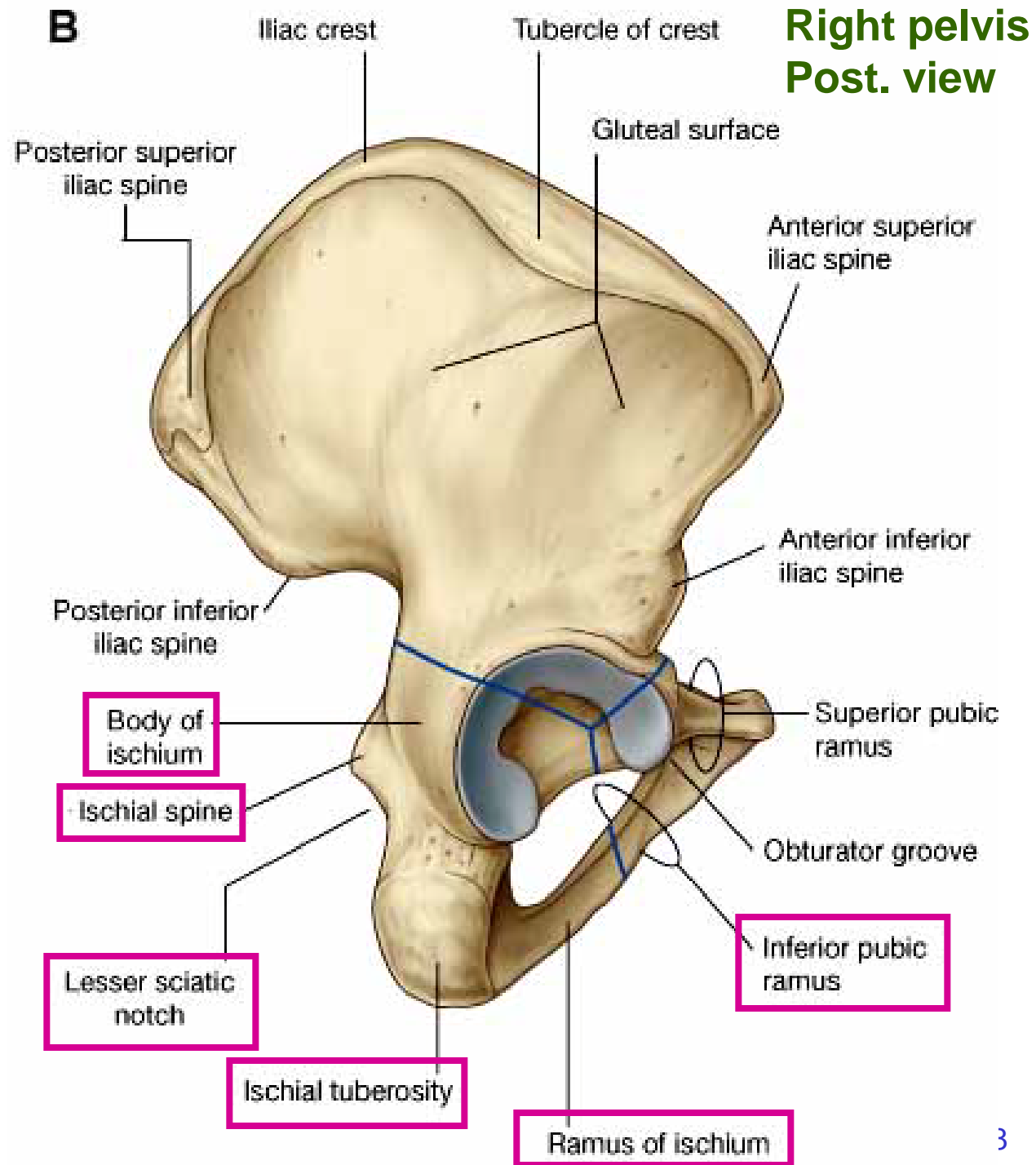


Right pelvis
Ant. view



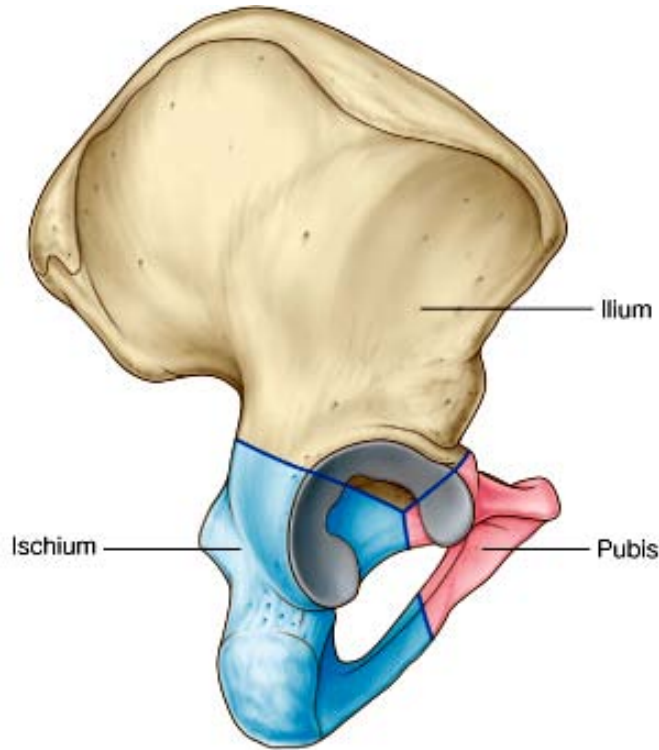
Ischium

- body of ischium
- lesser sciatic notch
- ischial tuberosity
- ischial spine
- ischial ramus: with inf. ramus of pubis → ischiopubic ramus

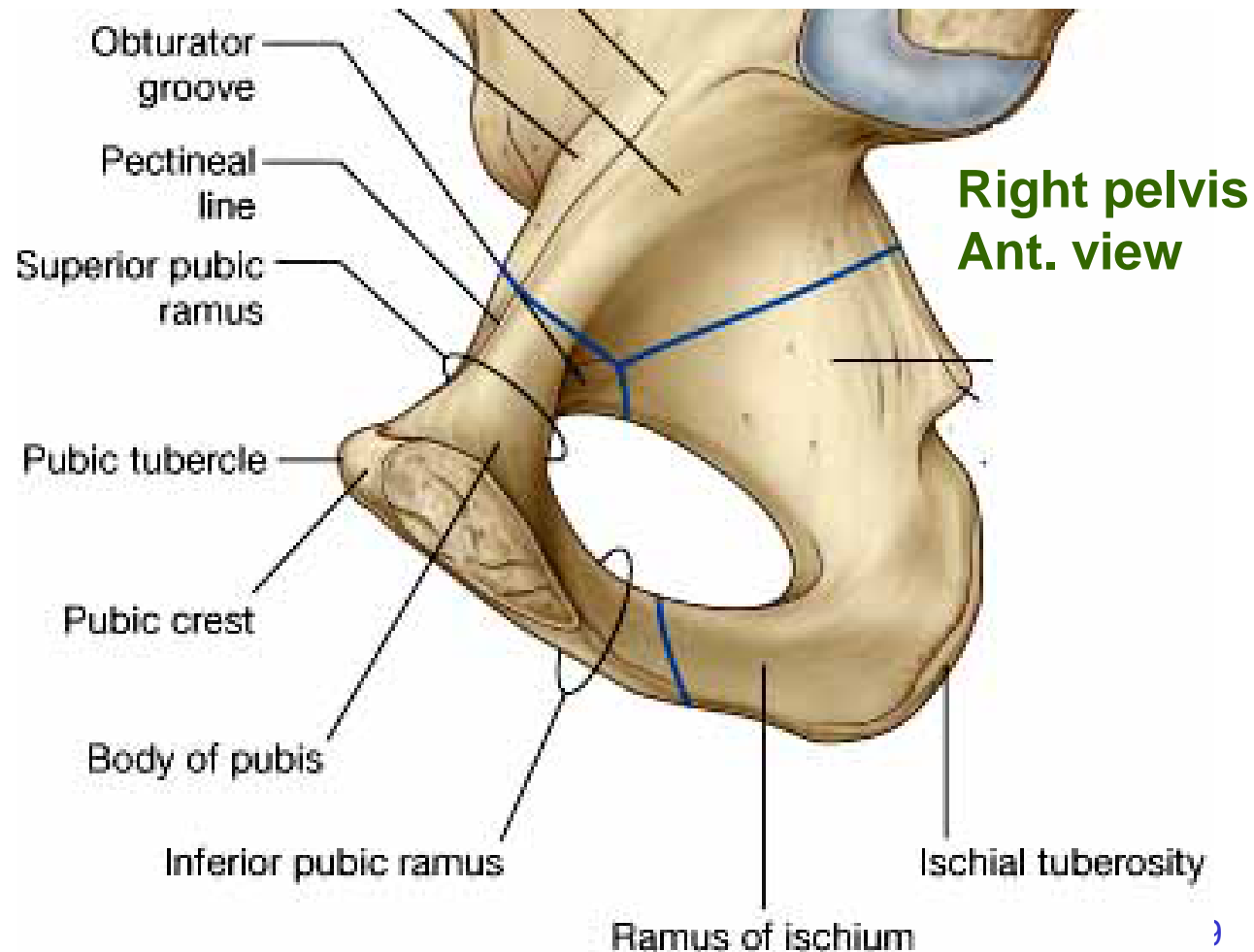


Pubis: rami

- **sup. ramus** → contribute to acetabulum
- **inf. ramus** → join ischium (ischial ramus)



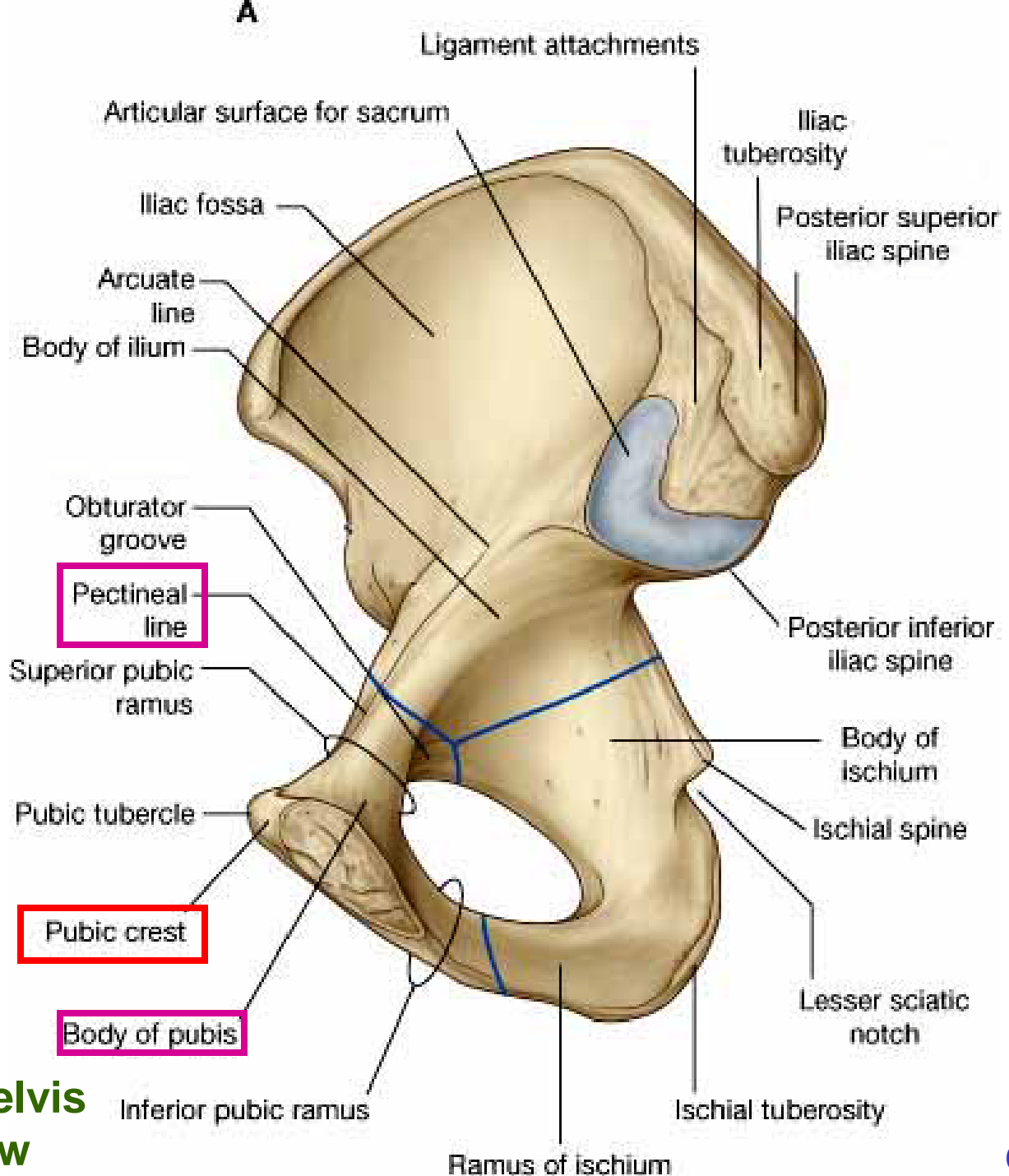
**Right pelvis
Post. view**



**Right pelvis
Ant. view**

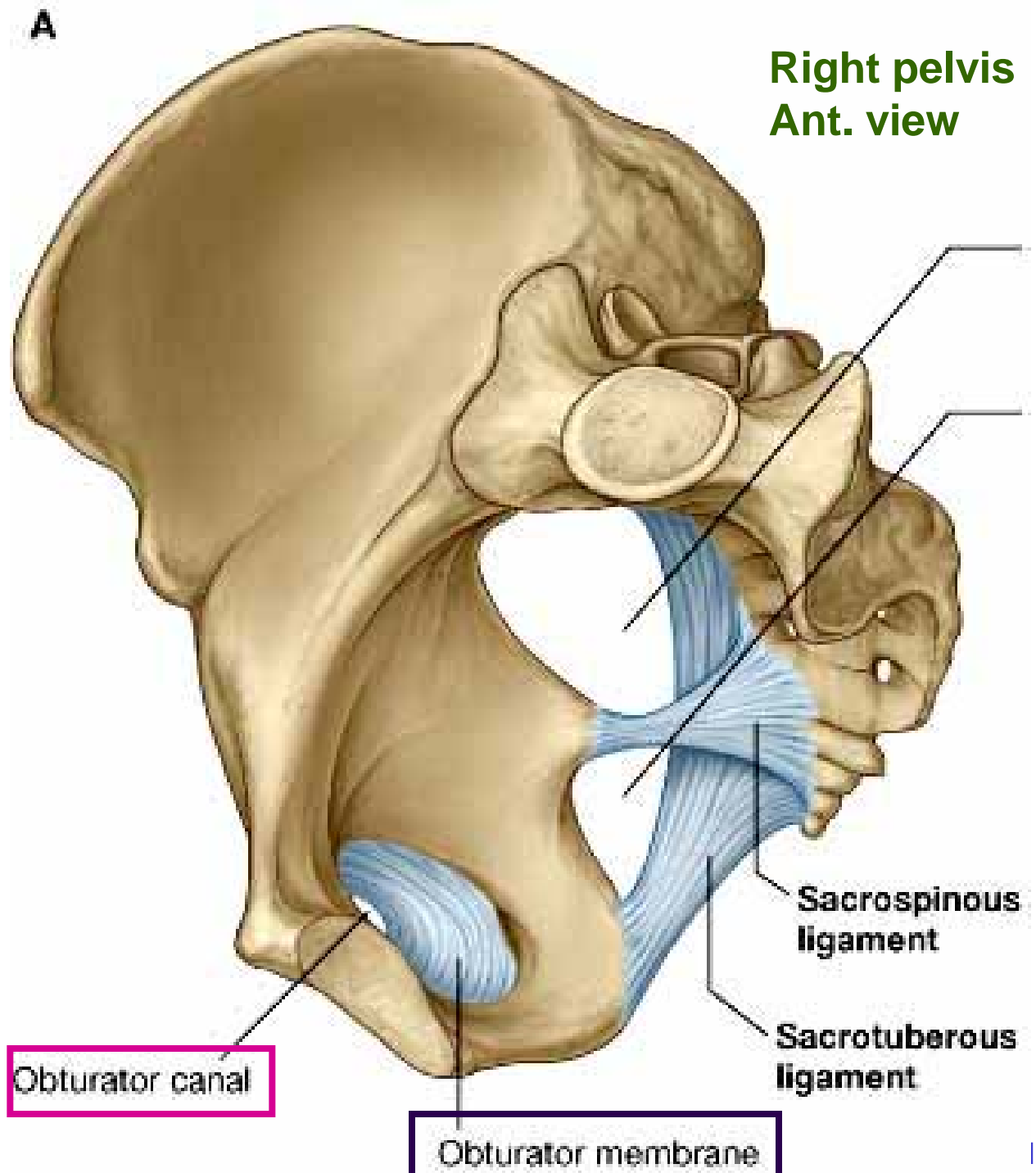
Pubis:1

- body of pubis
- **pubic crest**
- **pubic tubercle**
- sup. pubic ramus:
pectineal line on its
sup. border, continues
into **arcuate line**
- **inf. pubic ramus**
- **obturator foramen**



Right pelvis
Ant. view

Obturator canal



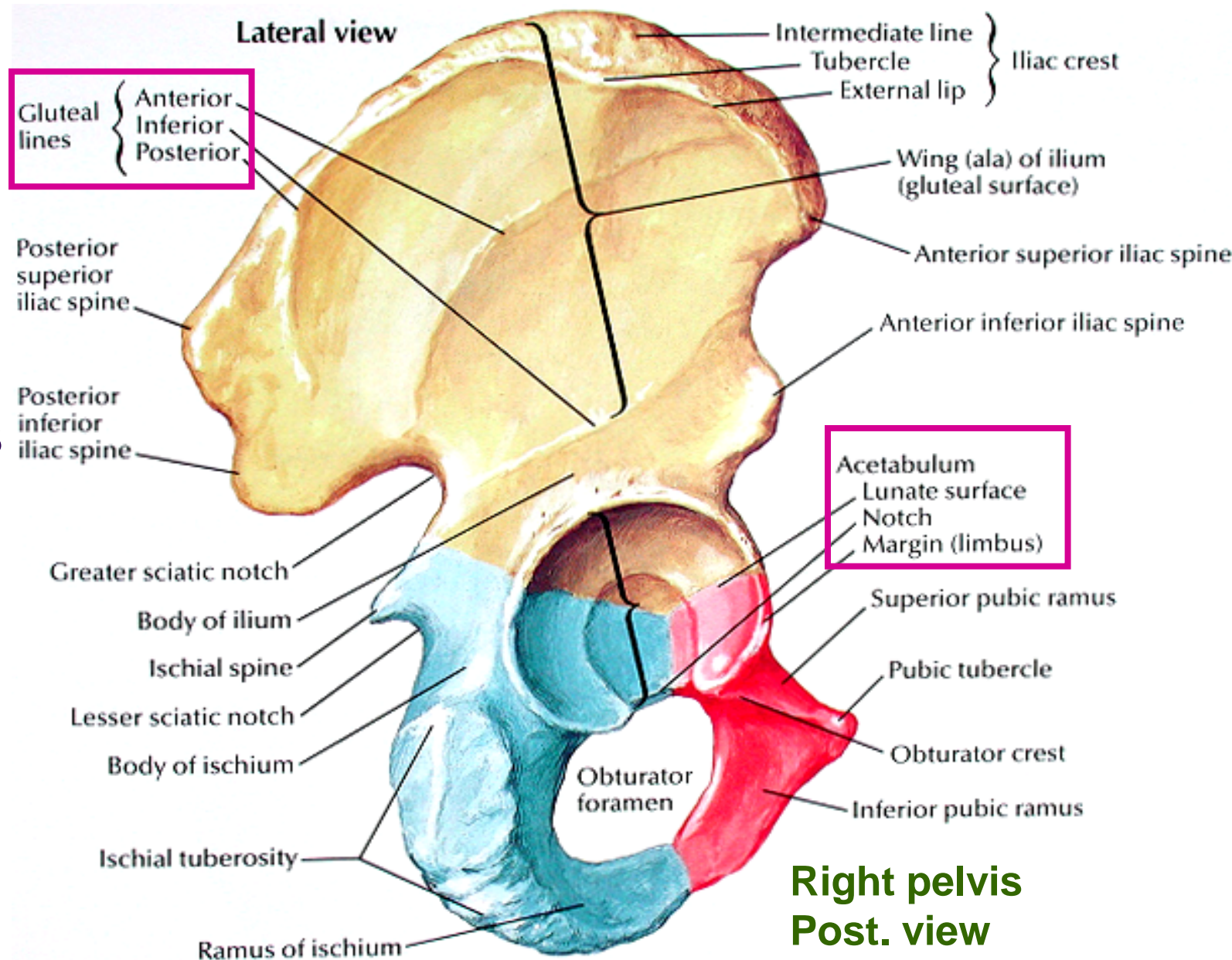
- **obturator canal:**
at the upper,
posterior angle of
obturator foramen
(obturator n.,a.,v.)

Pubis: external

- acetabulum:
acetabular
notch, limbus

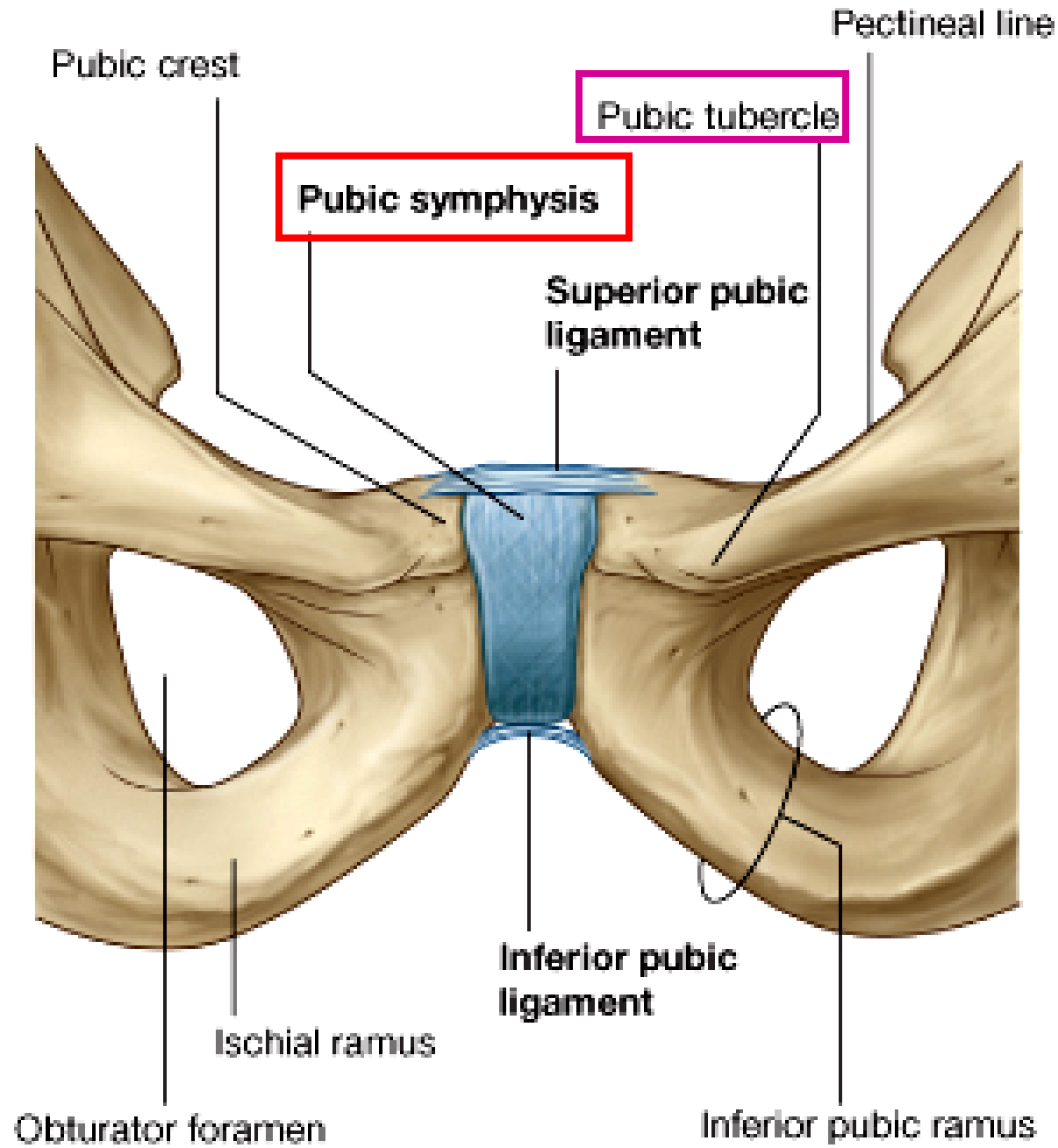
● Gluteal line

- Anterior
- Posterior
- Inferior



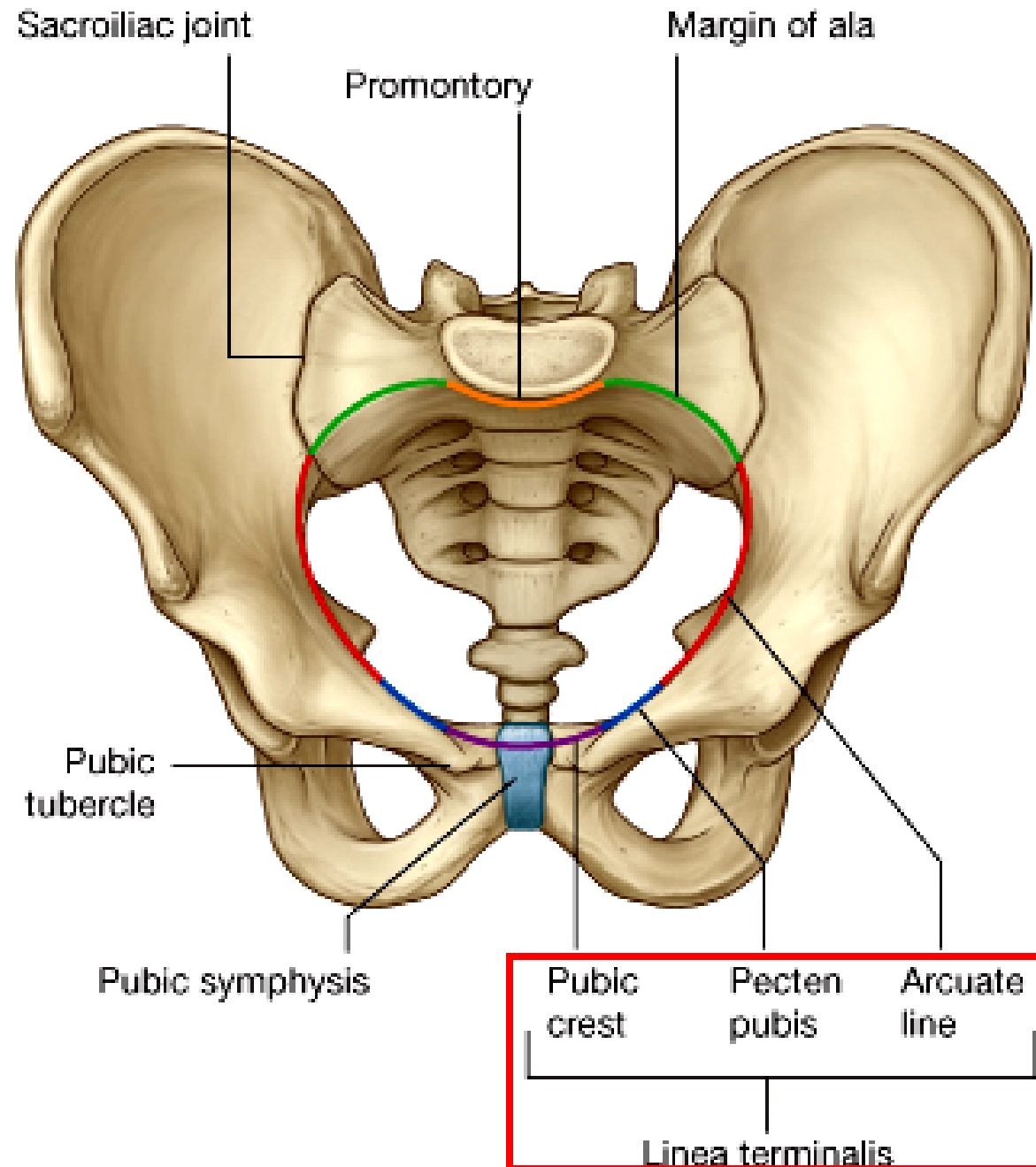
Pubic symphysis

- cartilaginous joint (fibrous cartilage)
- as a landmark of pelvic cavity



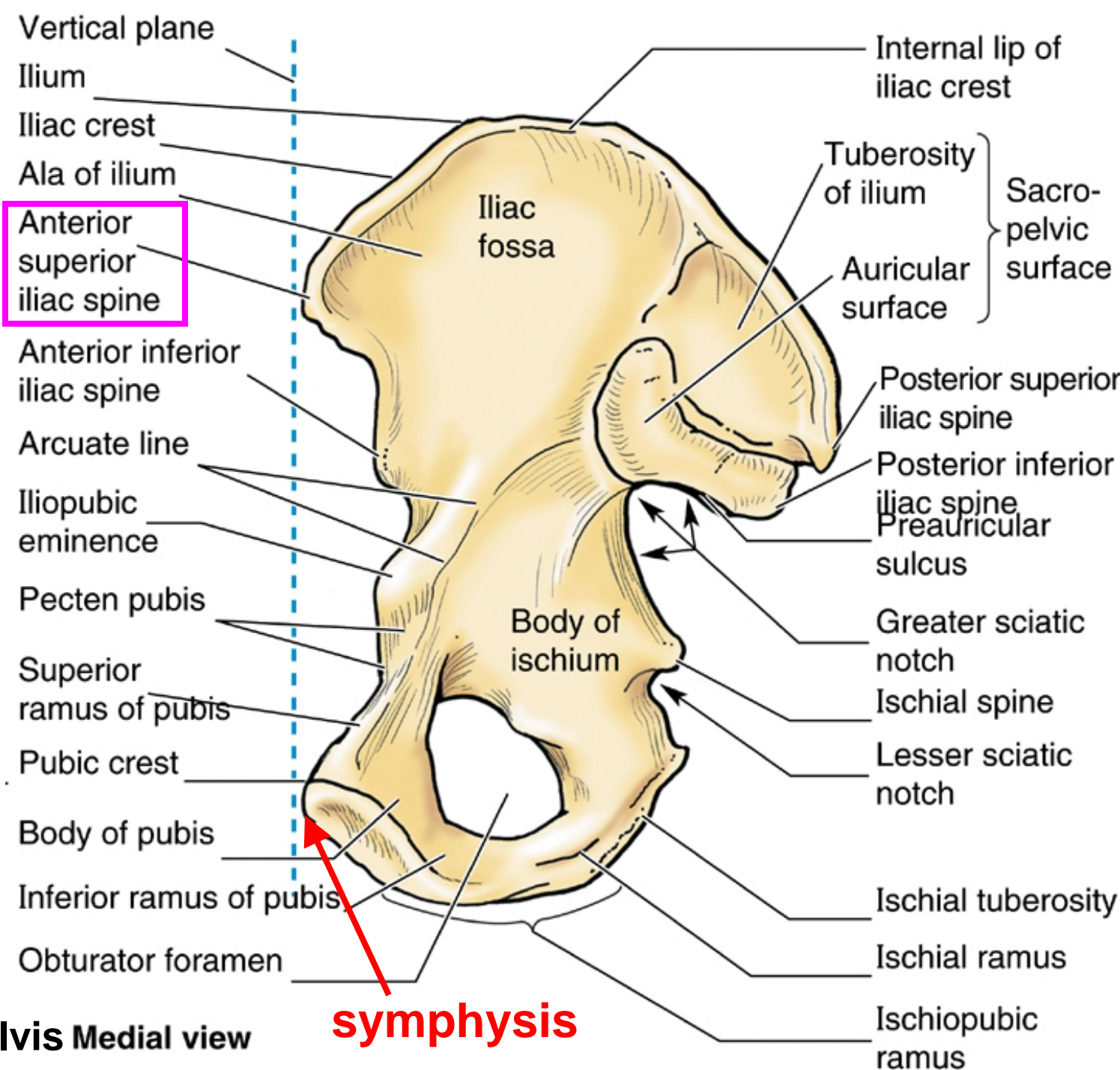
Pelvis

- The complete pelvis:
- the line (pelvic inlet) from **promontory of sacrum** -- arcuate line - - pectineal line -- pubic crest separates
- **false pelvis** and **true pelvis**
- **sacrum + linea terminalis + pubis symphysis**



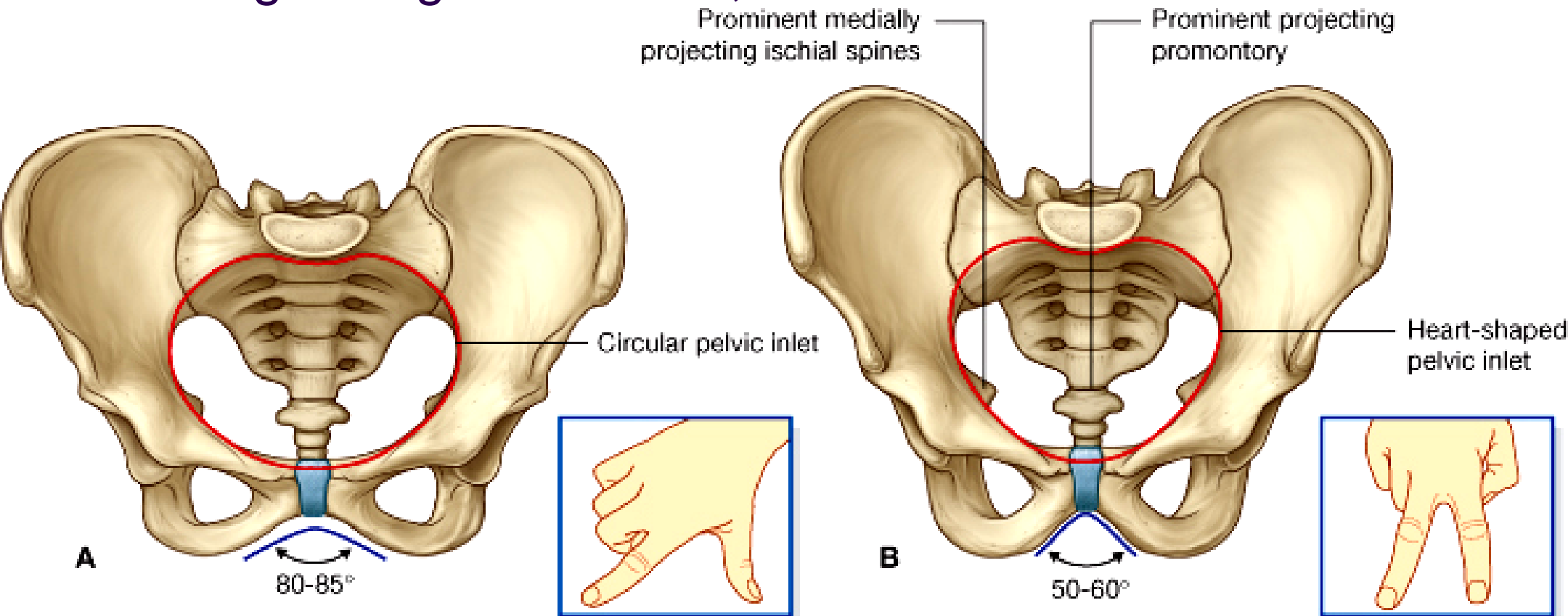
Pelvis: anatomical position

- a.s.i.s. and symphysis pubis on the same coronal plane



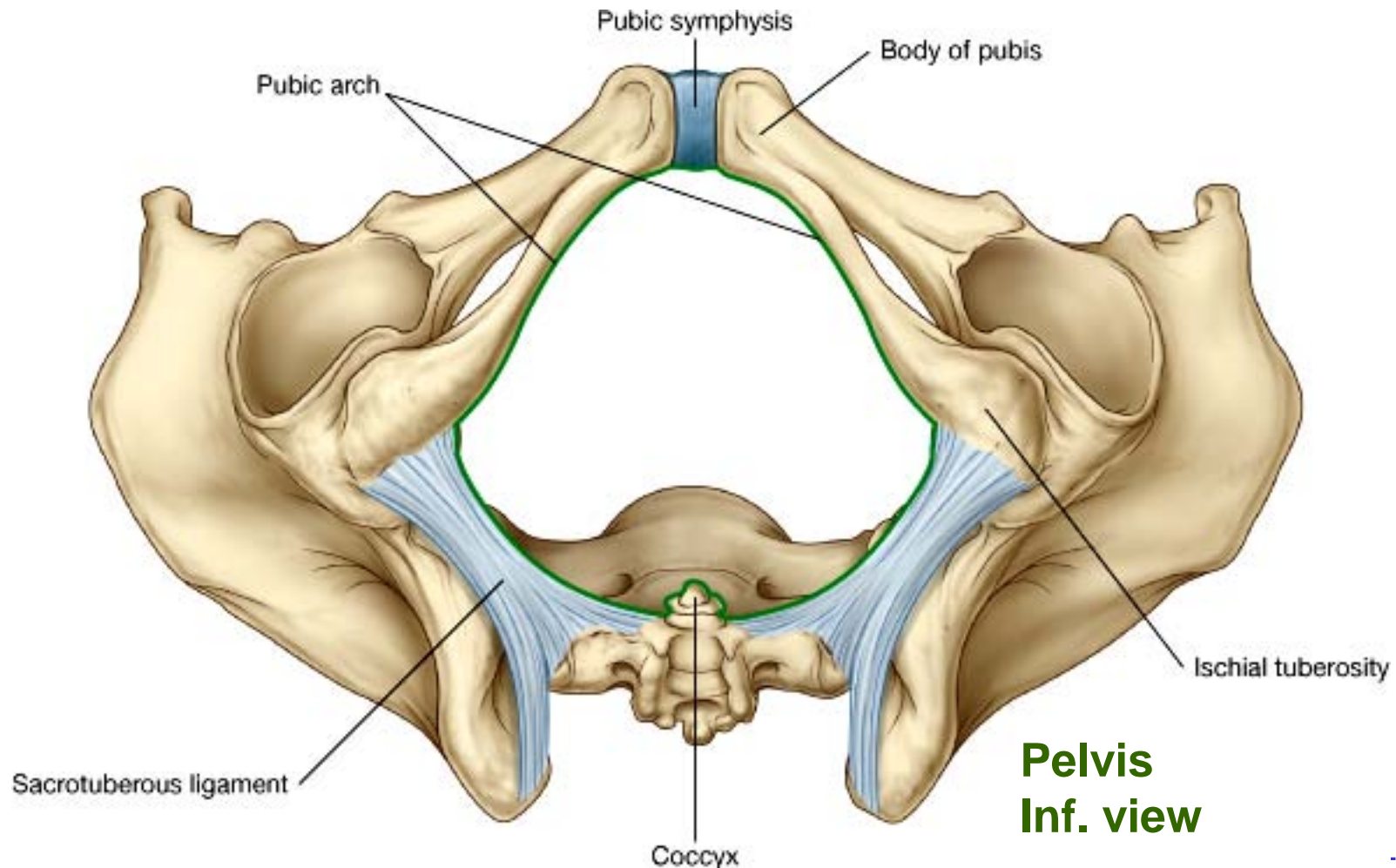
Pelvis: female vs. male

- Shape: circular in female (less distinct promontory, broader alae); heart-shaped in male
- Angle: larger in female; smaller in male



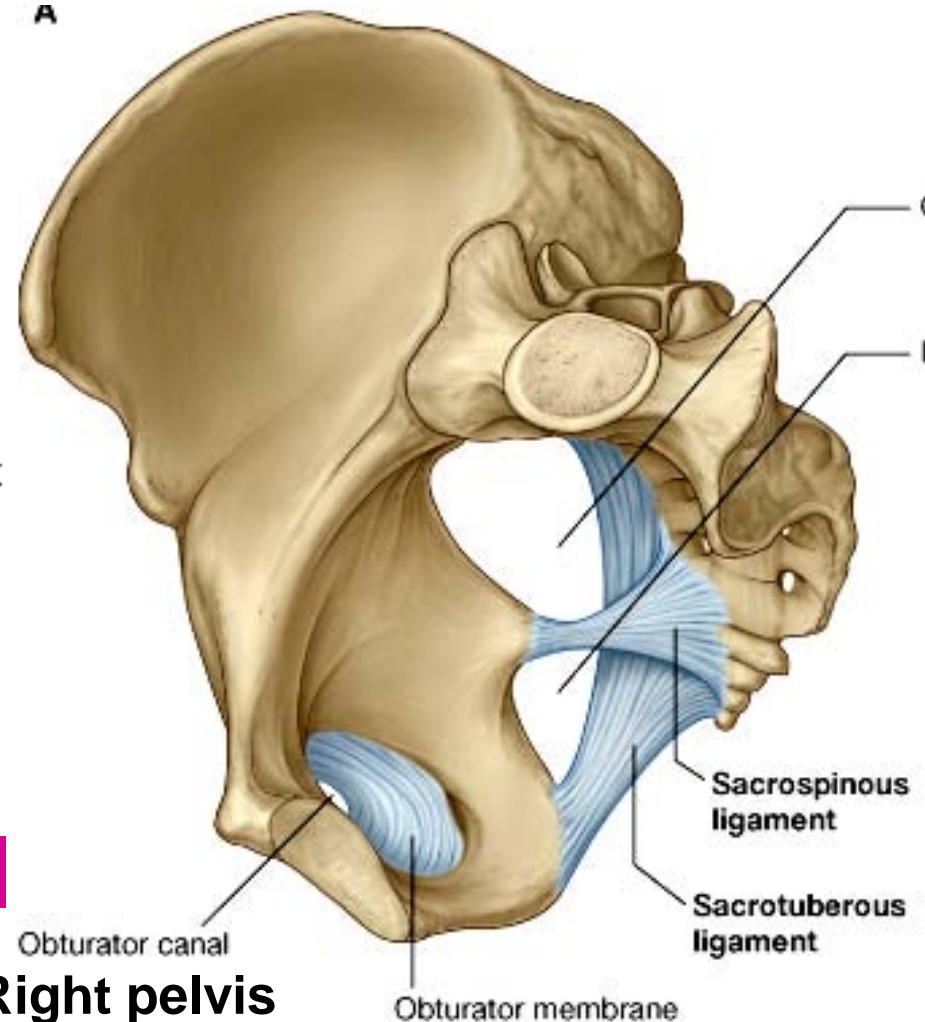
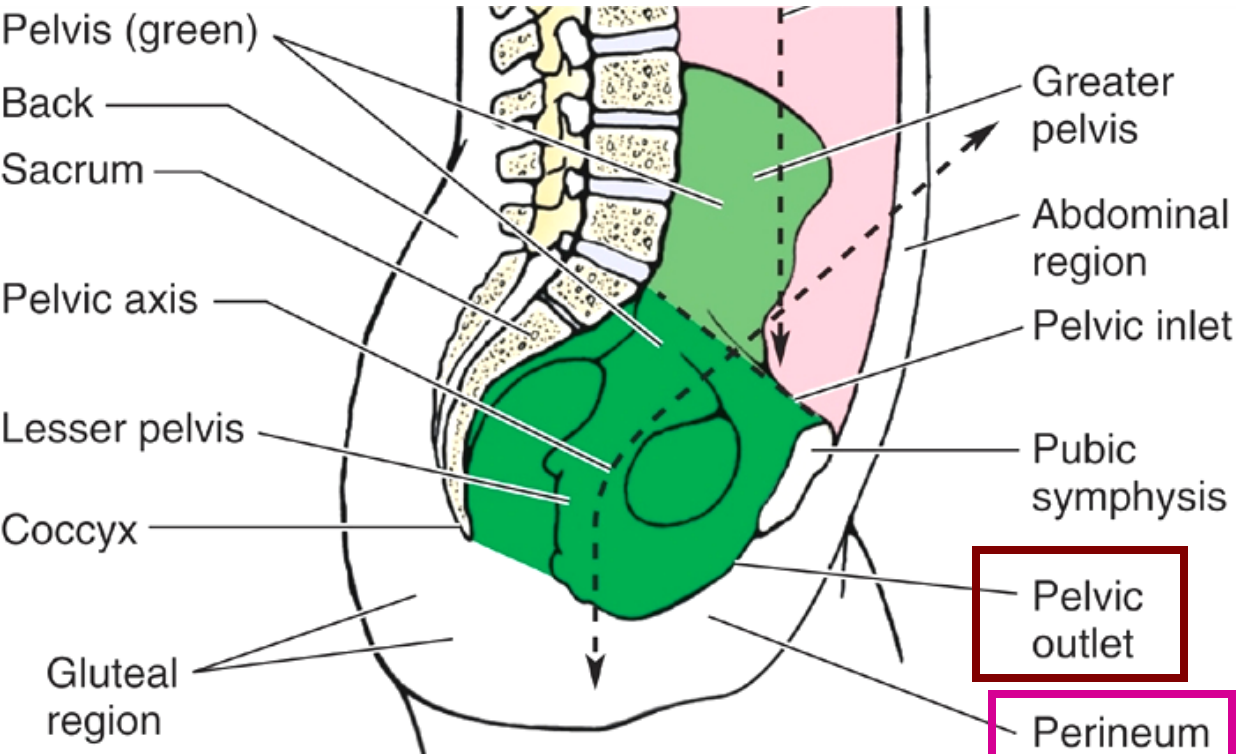
Pelvis: pelvic outlet

- bounded by symphysis pubis - ischiopubic rami - ischial tuberosity - sacrotuberous lig. - coccyx



Pelvic outlet

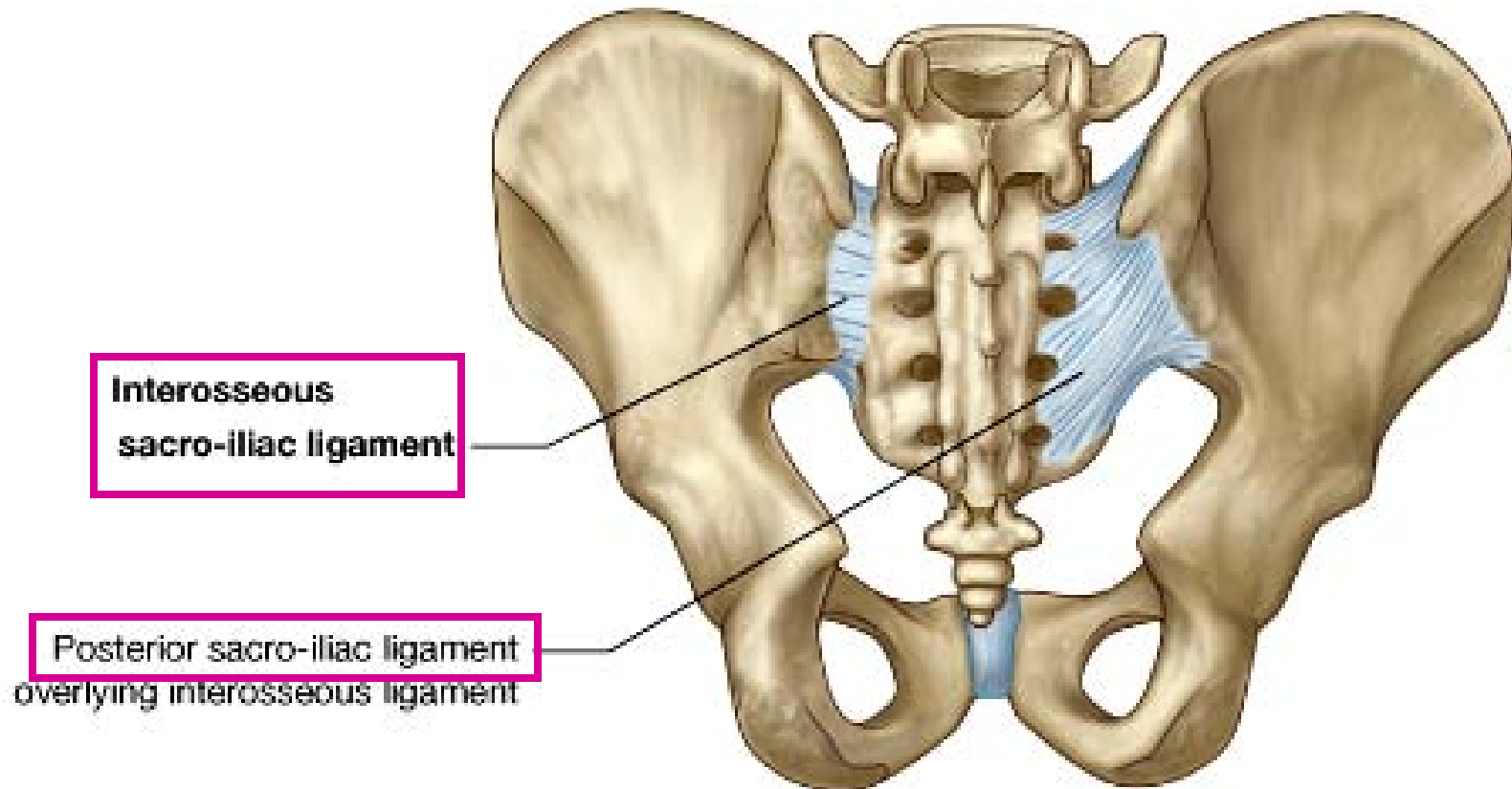
- not on the same plane; line joining the ischial tuberosities of both sides divides it into two parts



**Right pelvis
Ant. view**

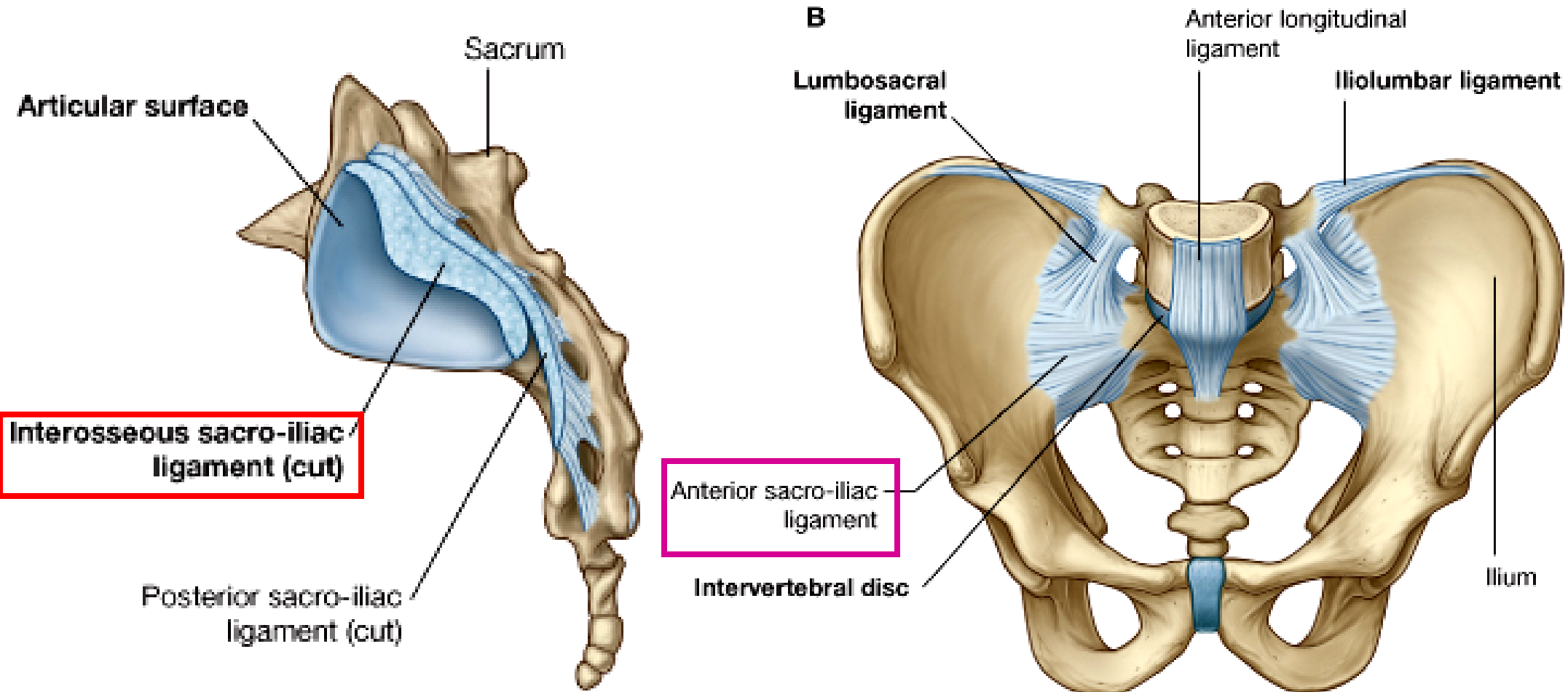
The sacro-iliac joint-1

- synovial joint in childhood; fibrous bands in joints of adult;
- > 50 years old, completely fibrous
- supported by many tough ligaments including:
- interosseous lig., ant.& post. sacroiliac lig., **sacrospinous lig.** , **sacrotuberous lig.**



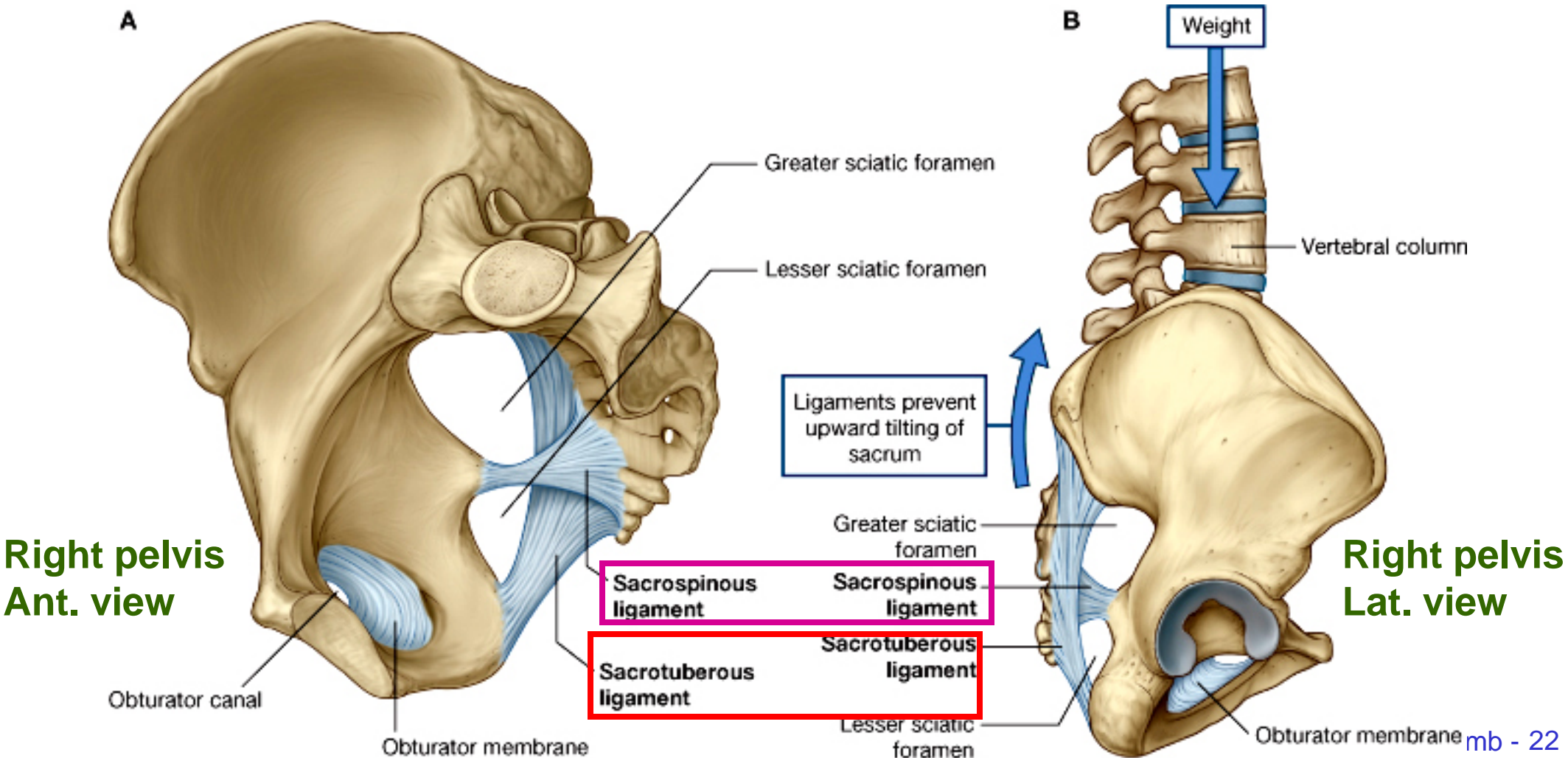
Sacro-iliac joints-2

- interosseous lig., ant. and post. sacroiliac lig.

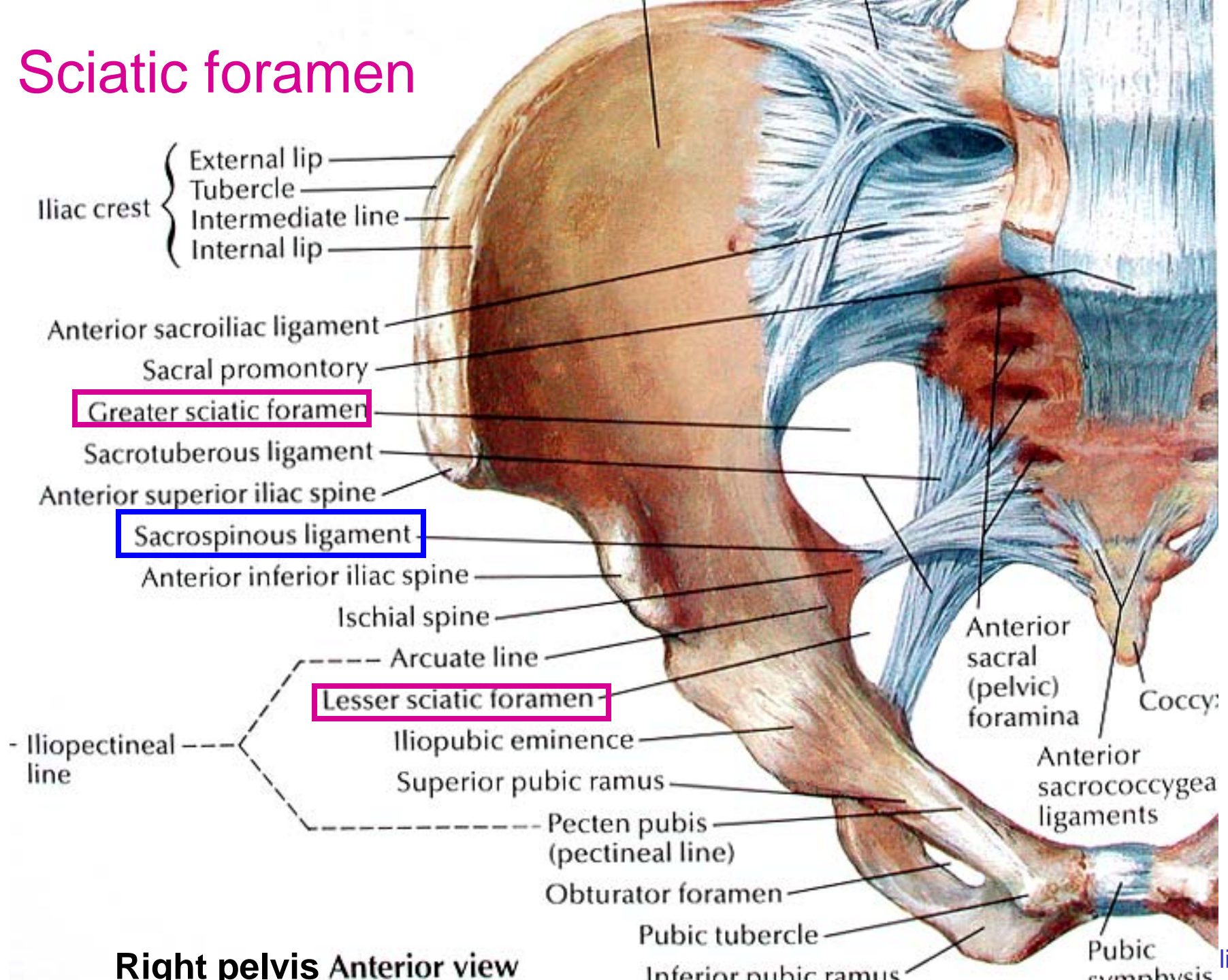


Sacroiliac joints and Sciatic foramens

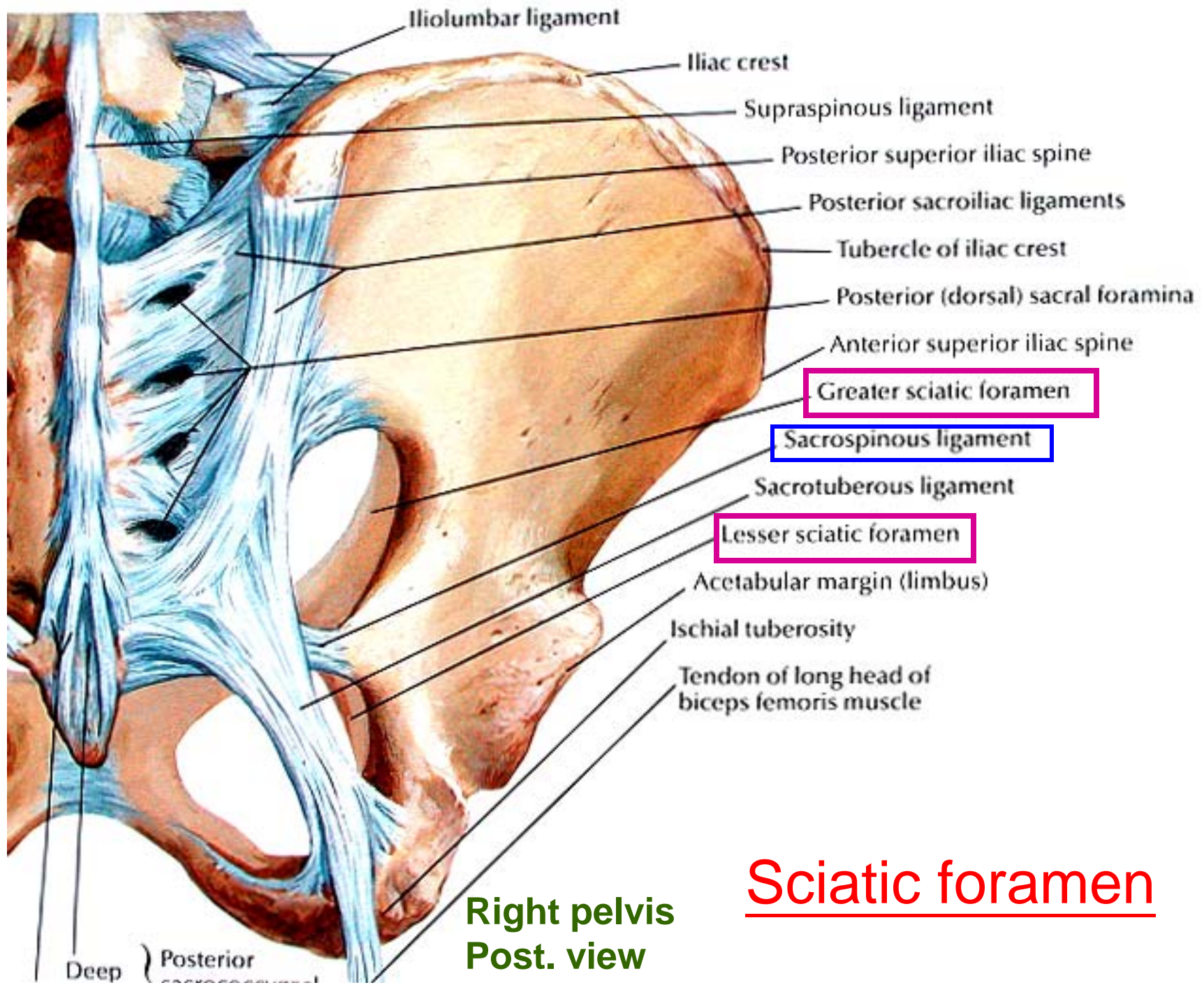
- greater sciatic foramen; lesser sciatic foramen
- *posterior aspect of joint heavily armed with ligaments (to counter body weight)



Sciatic foramen



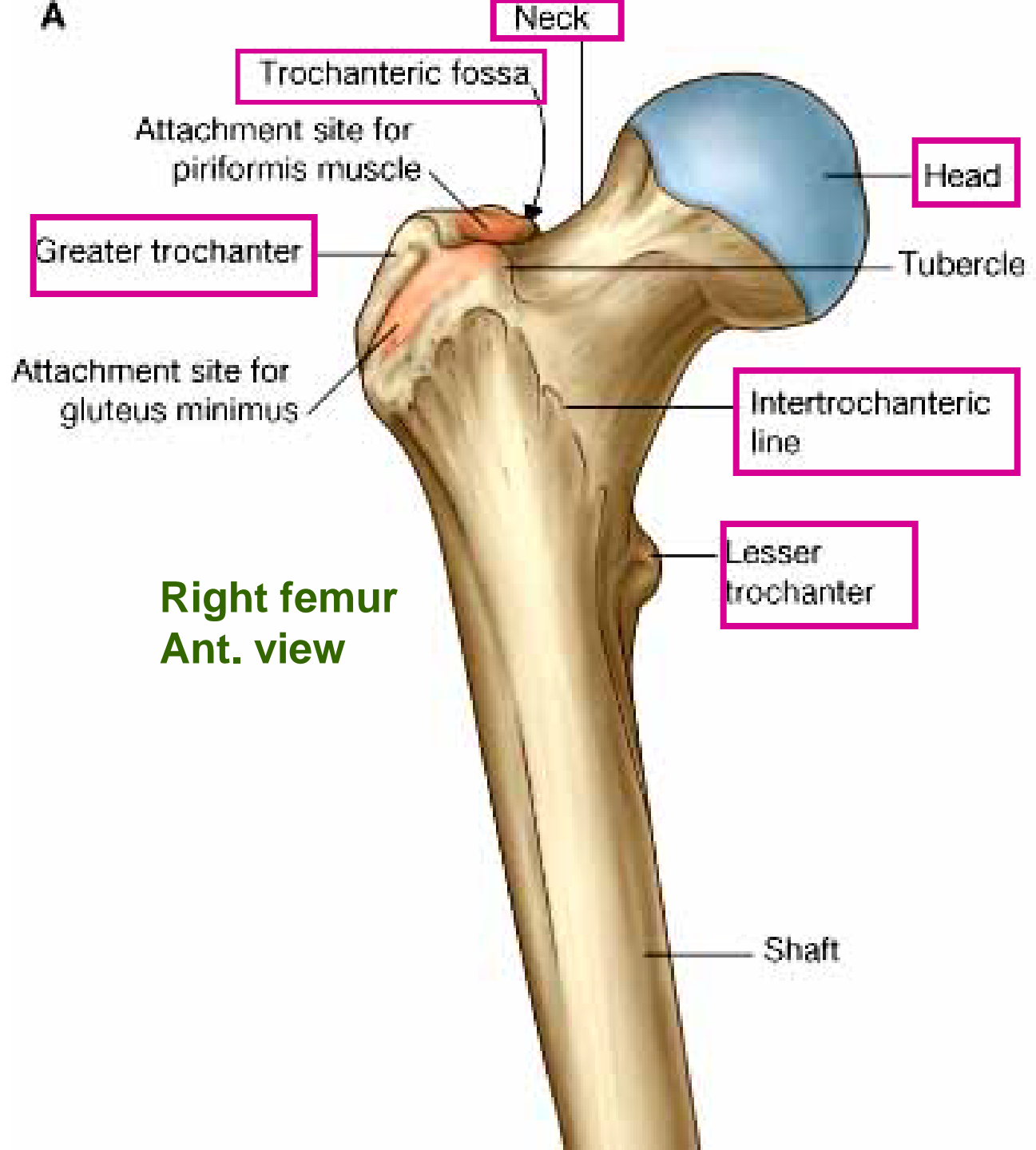
Right pelvis Anterior view



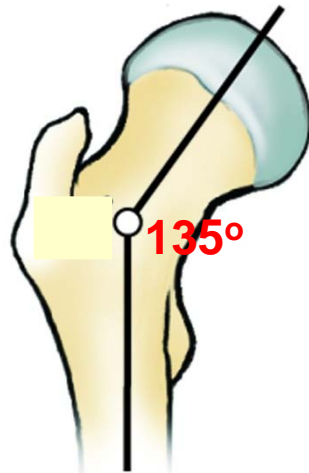
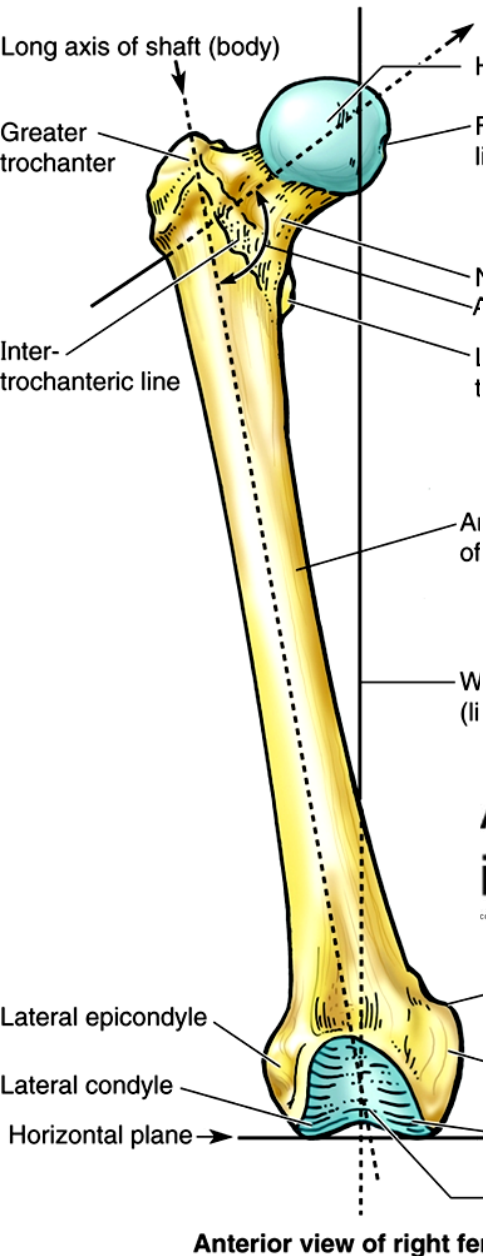
Sciatic foramen

Femur: proximal end (anterior Surface)

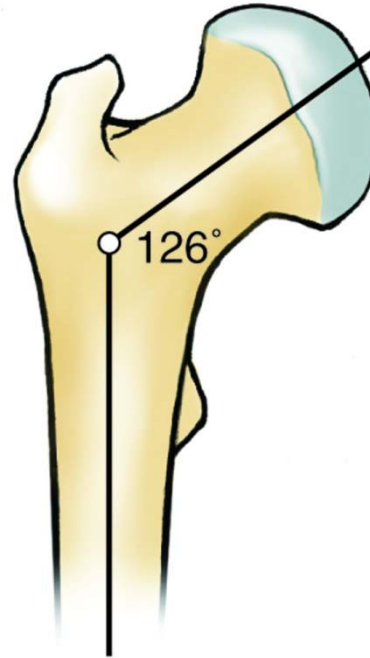
- head: faces upward, medially, slightly forward; **fovea**; neck:
- **greater trochanter**; **trochanteric fossa** (obturator internus attachment)
- intertrochanteric line
- lesser trochanter



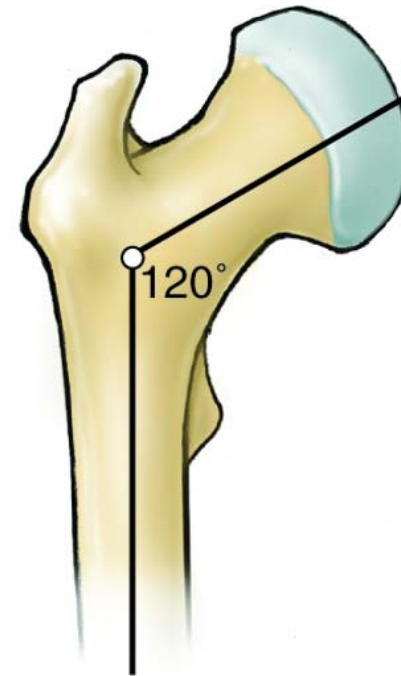
Femur: angle of inclination



Angle of inclination in 3-year-old child



Angle of inclination in adult



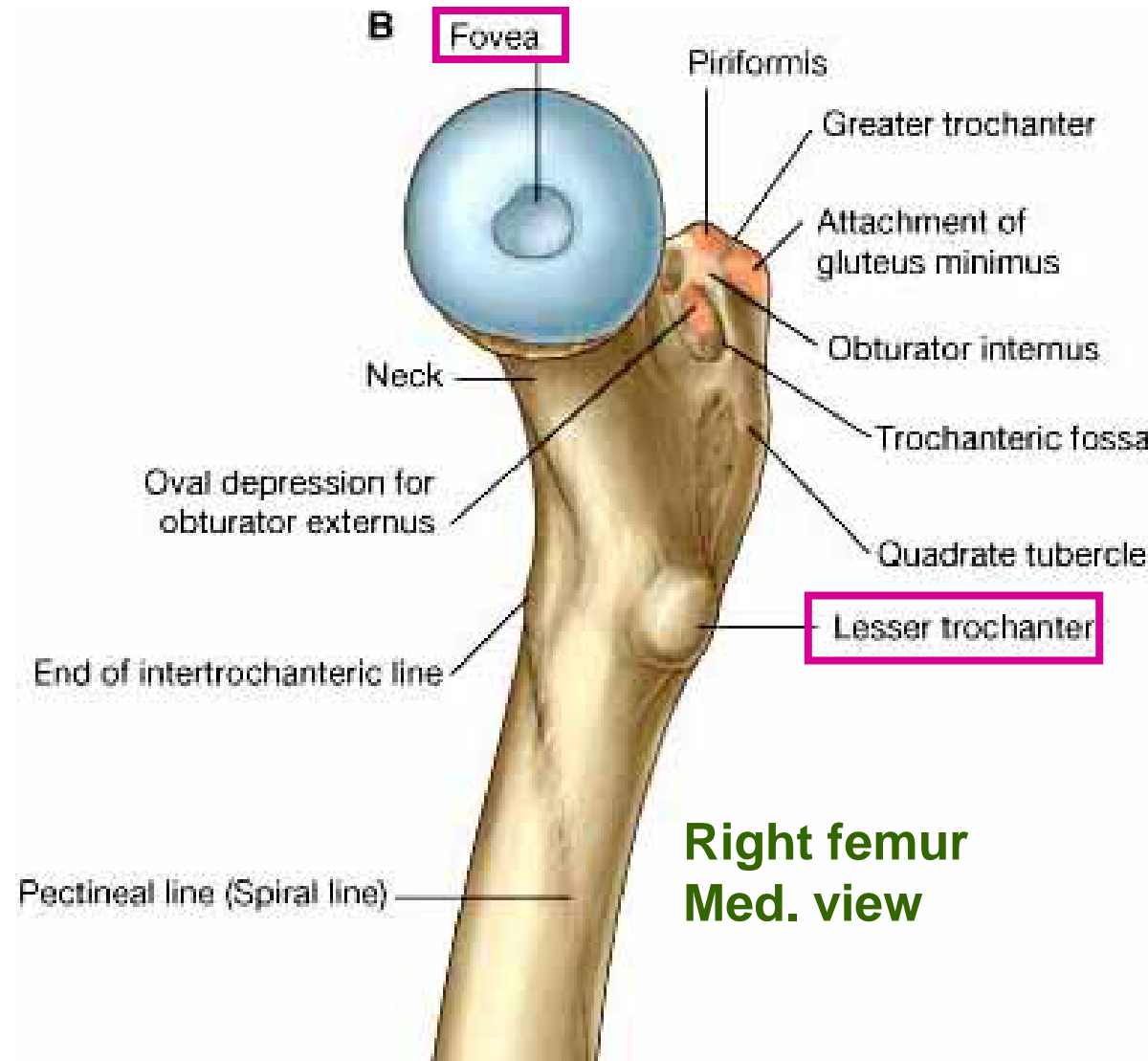
Angle of inclination in old age

Axis of femoral head ar

Right femur
Ant. view

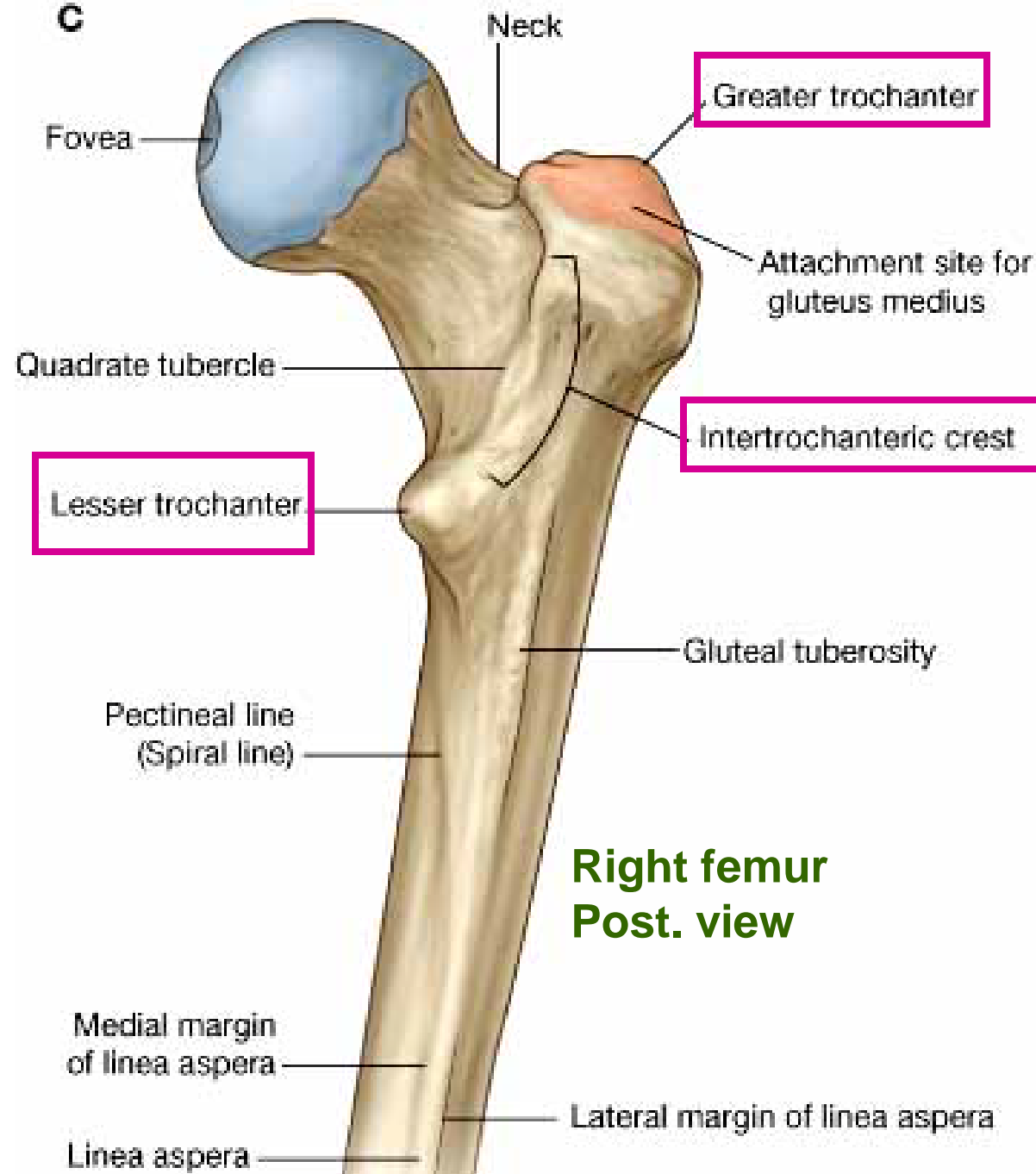
Femur: proximal end (medial surface)

- head; **fovea**; neck:
- **greater trochanter**; **trochanteric fossa**
- **lesser trochanter**: (iliopsoas inserts here): on posterior aspect of femur;
- **intertrochanteric crest**: posterior surface
- **intertrochanteric line**: anterior surface



Femur: proximal end (posterior surface)

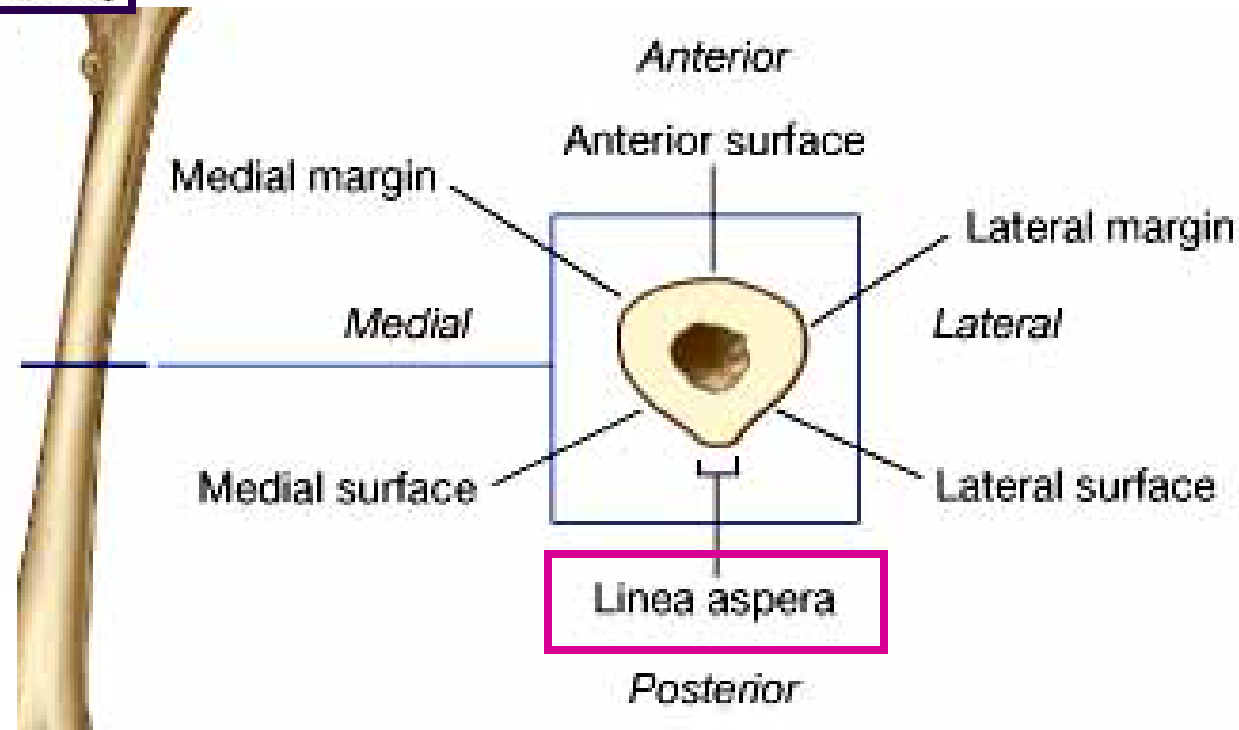
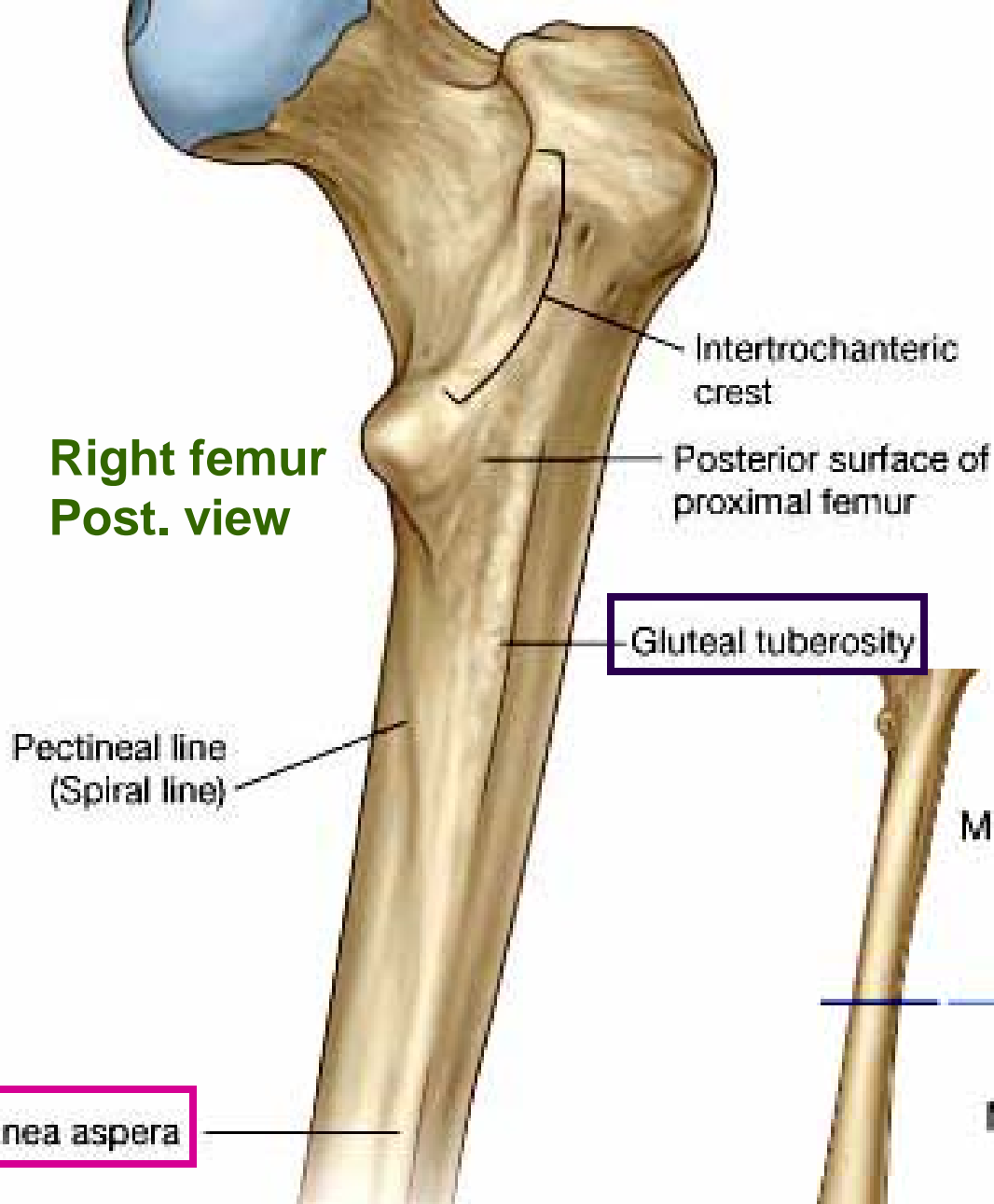
- head; **fovea**; neck:
- **greater trochanter**
- **lesser trochanter**:
(iliopsoas inserts here):
on posterior aspect of femur
- **intertrochanteric crest**:
posterior surface



Femur: shaft

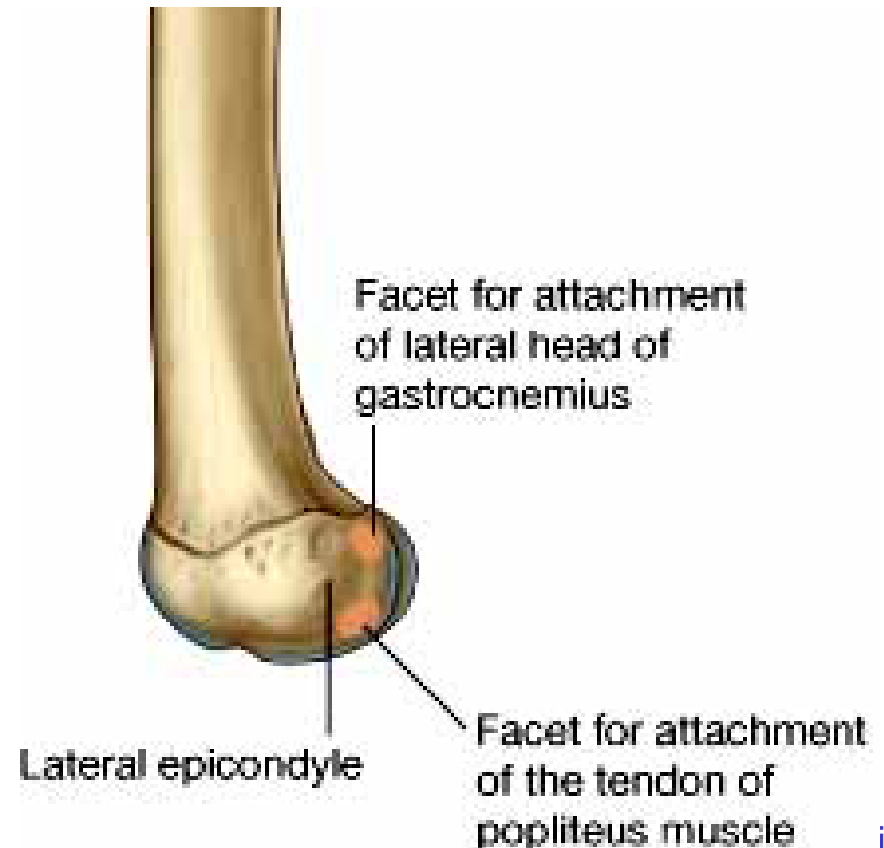
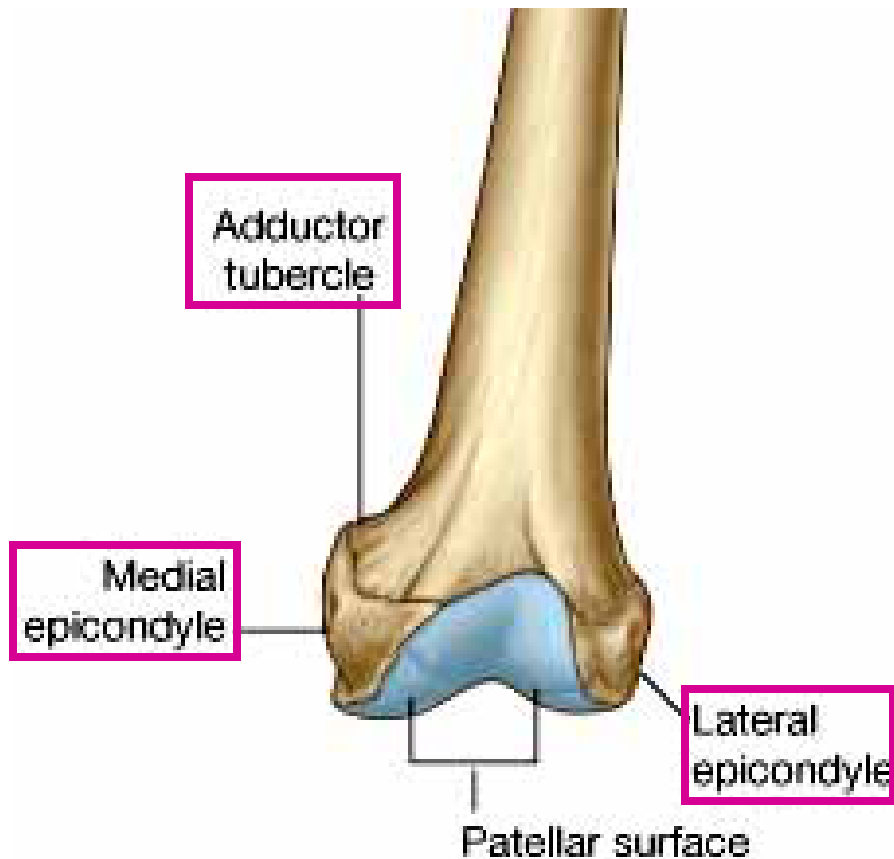
- gluteal tuberosity
- linea aspera (post. surface)

Right femur
Post. view



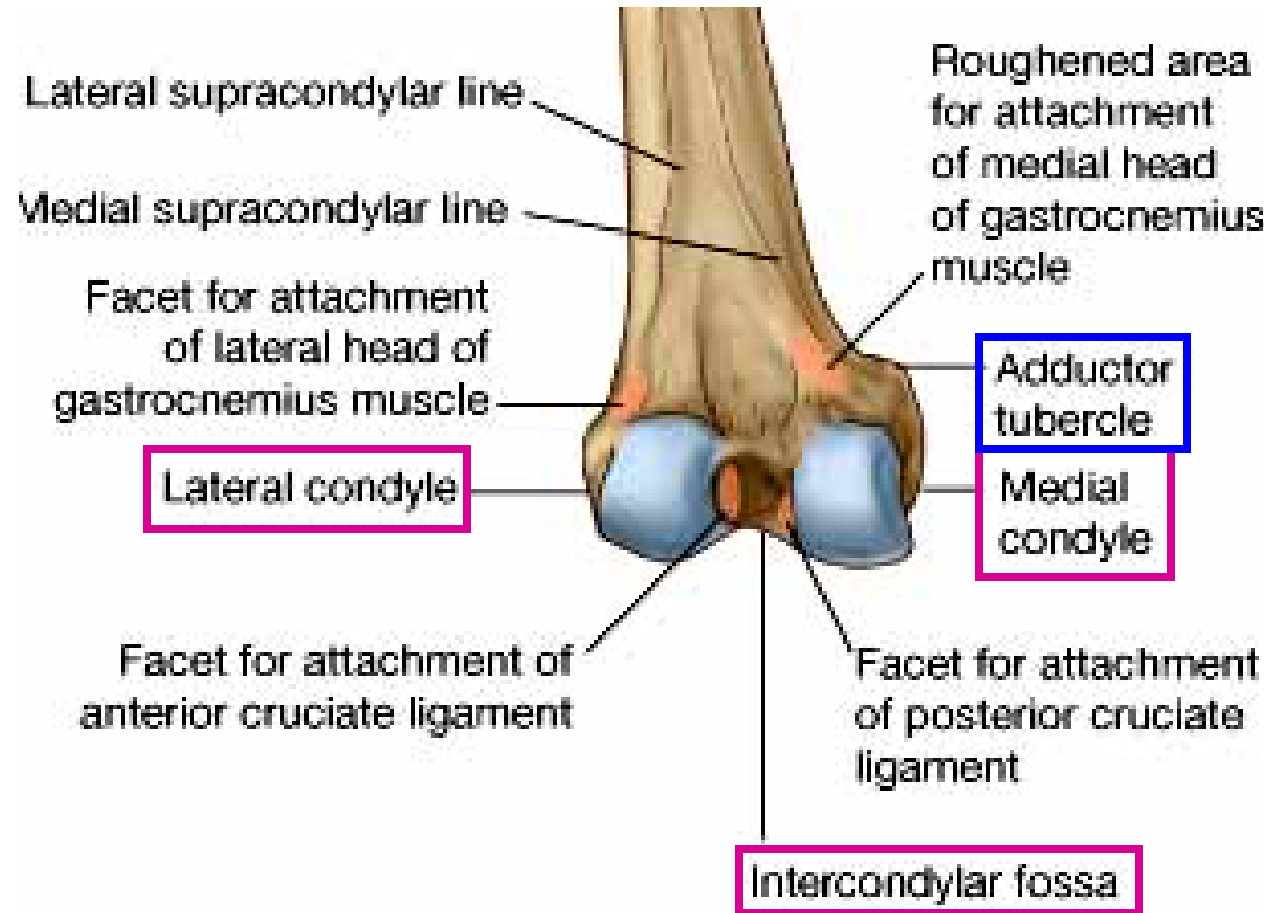
Femur: distal end-1

- **medial epicondyle; adductor tubercle** (adductor magnus m.)
- **lateral epicondyle**
- intercondylar notch (fossa): deep, posteriorly located
- articular cartilage: tibial surface; patellar surface



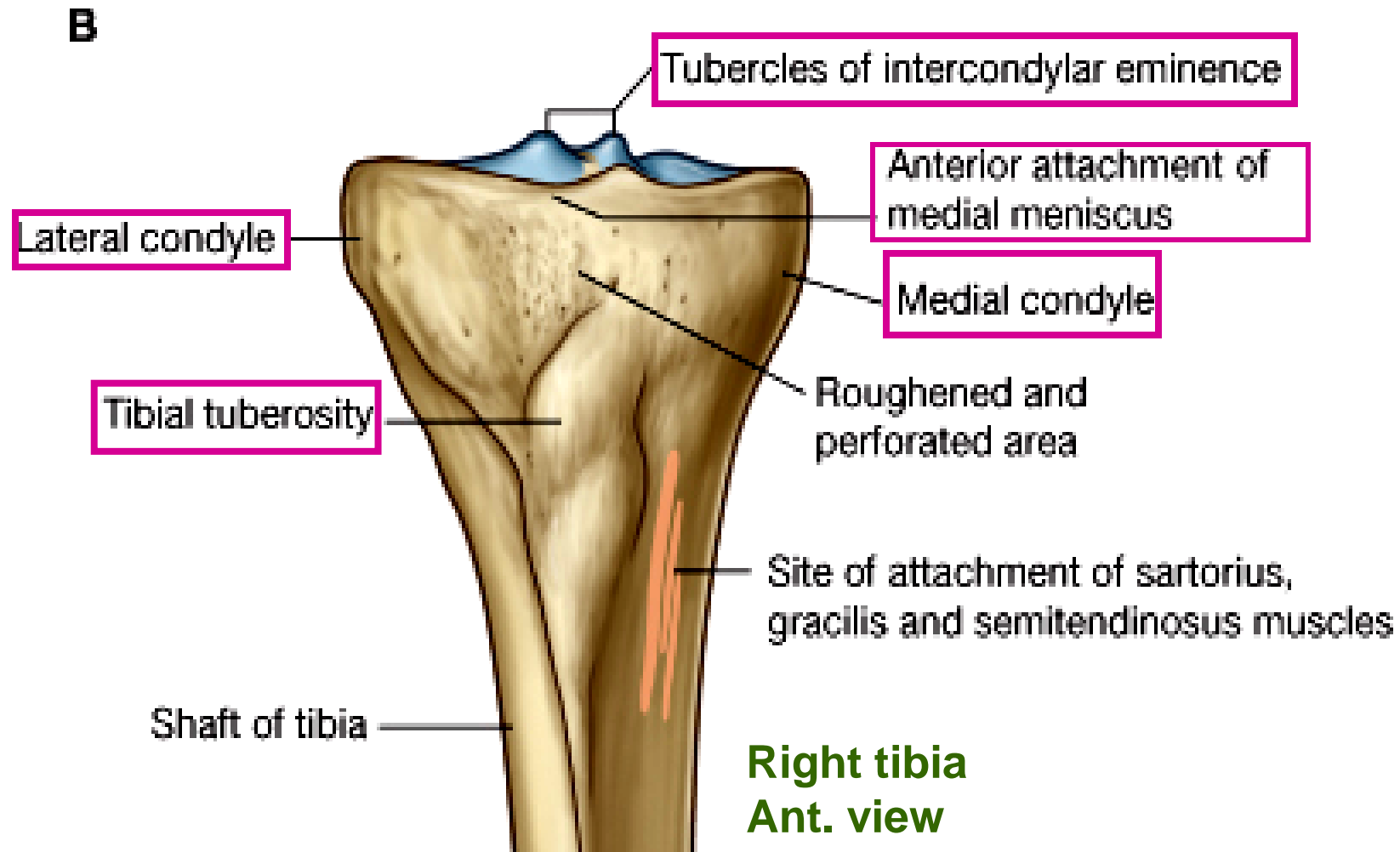
Femur: distal end-2

- medial condyle
- adductor tubercle (adductor magnus m.)
- lateral condyle
- intercondylar notch (fossa): deep, posteriorly located
- articular cartilage: tibial surface; patellar surface



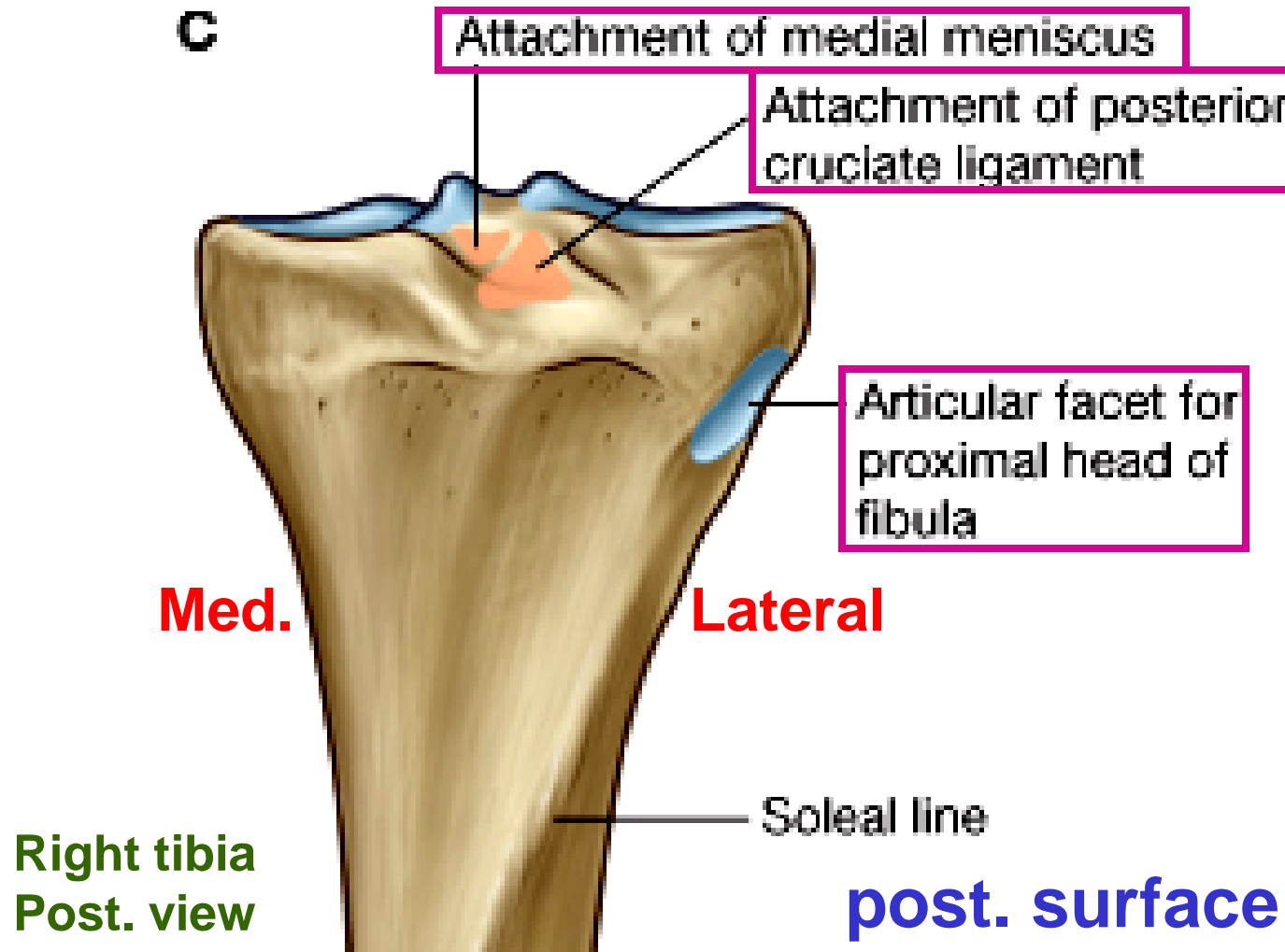
Tibia: proximal end-1

- medial condyle, lateral condyle; intercondylar area (intercondylar tubercles) for meniscus and lig.
- tibial tuberosity (tubercle): ligamentum patellae attachment



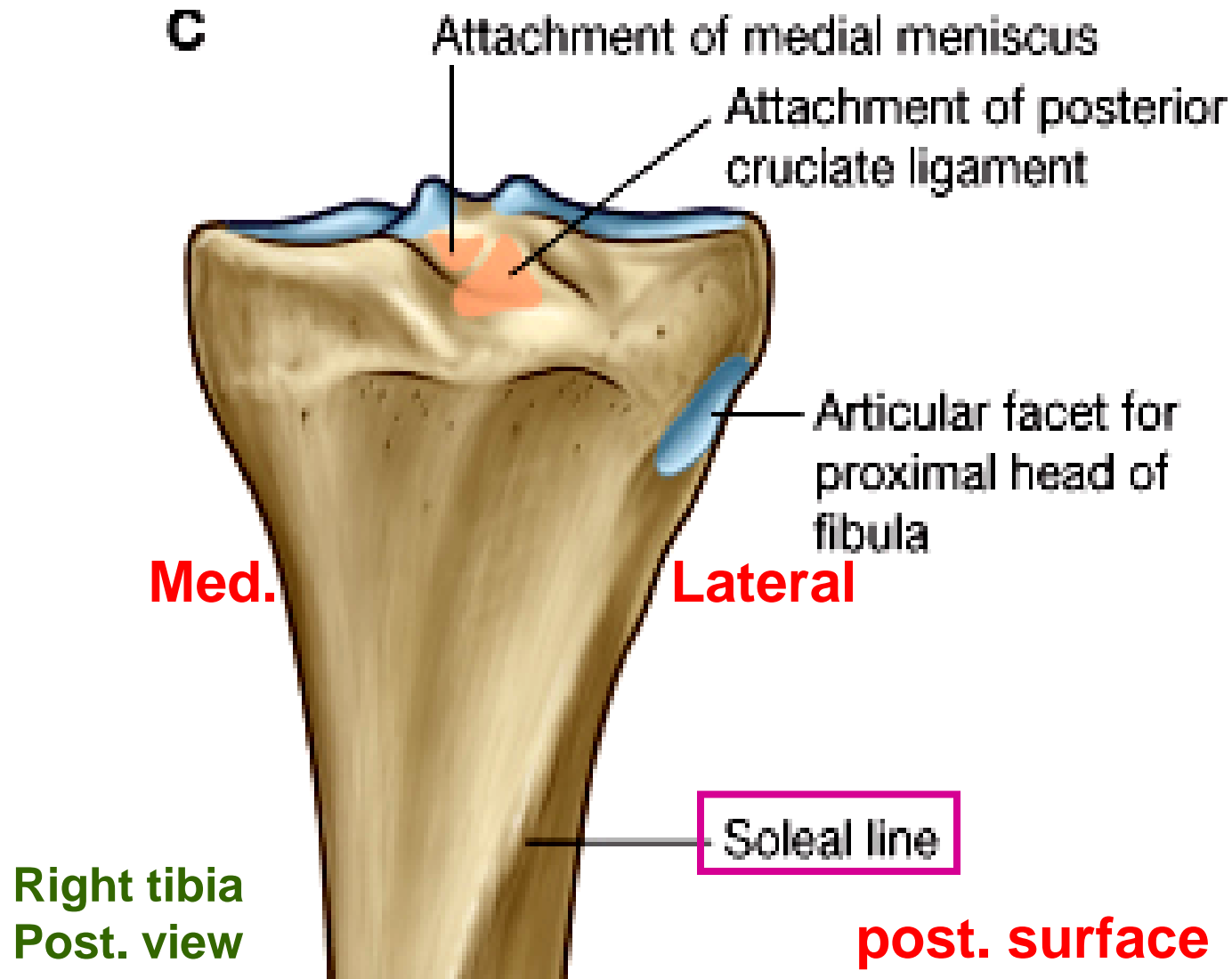
Tibia: proximal end-2

- intercondylar area (intercondylar tubercles): medial and lateral attachment of cruciate lig. & horns of med. and lat. menisci
- articular surface for head of fibula



Tibia: shaft

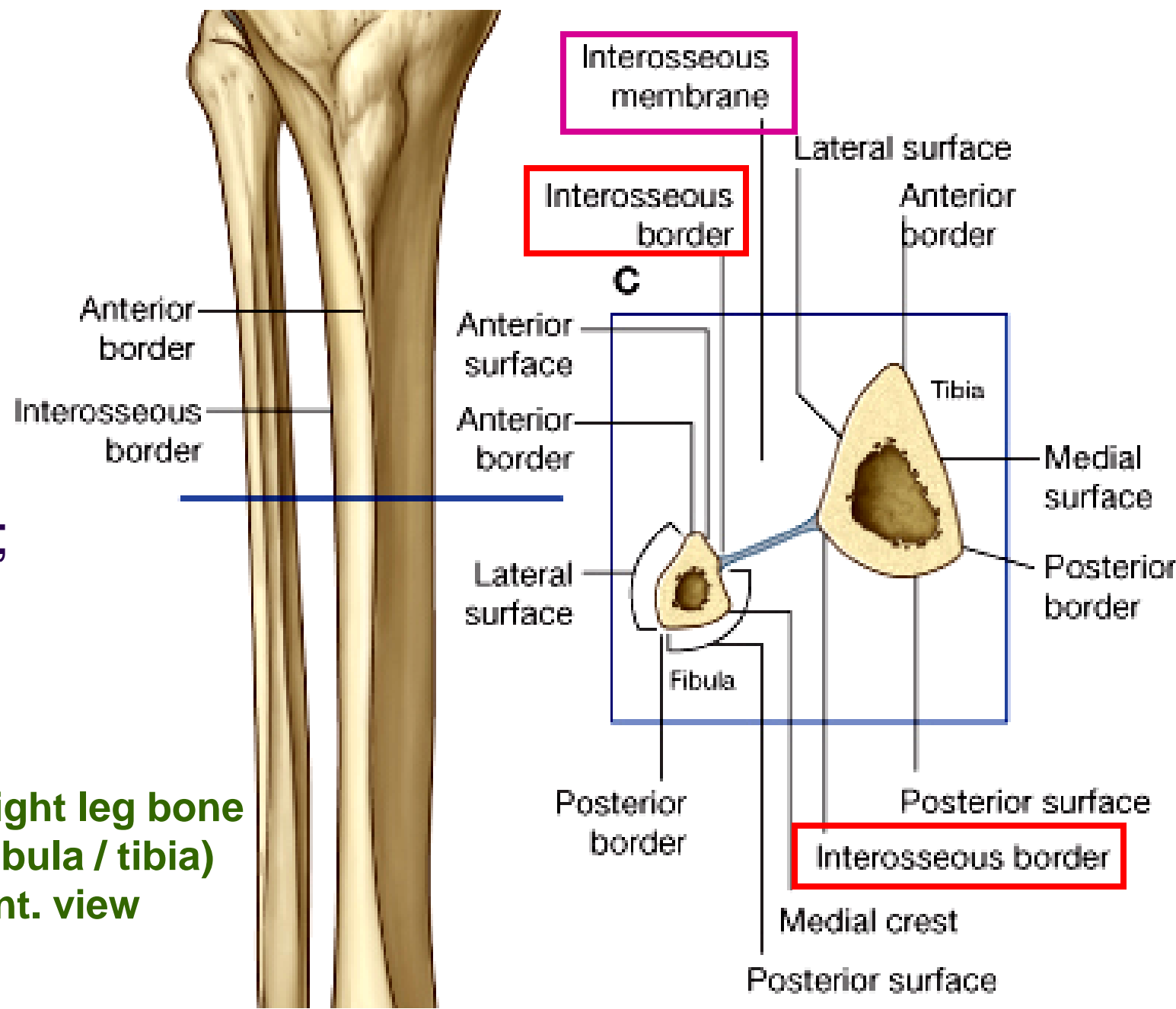
- **soleal line** (oblique line): on upper 1/3 of post. surface



Tibia: shaft (cross-section)

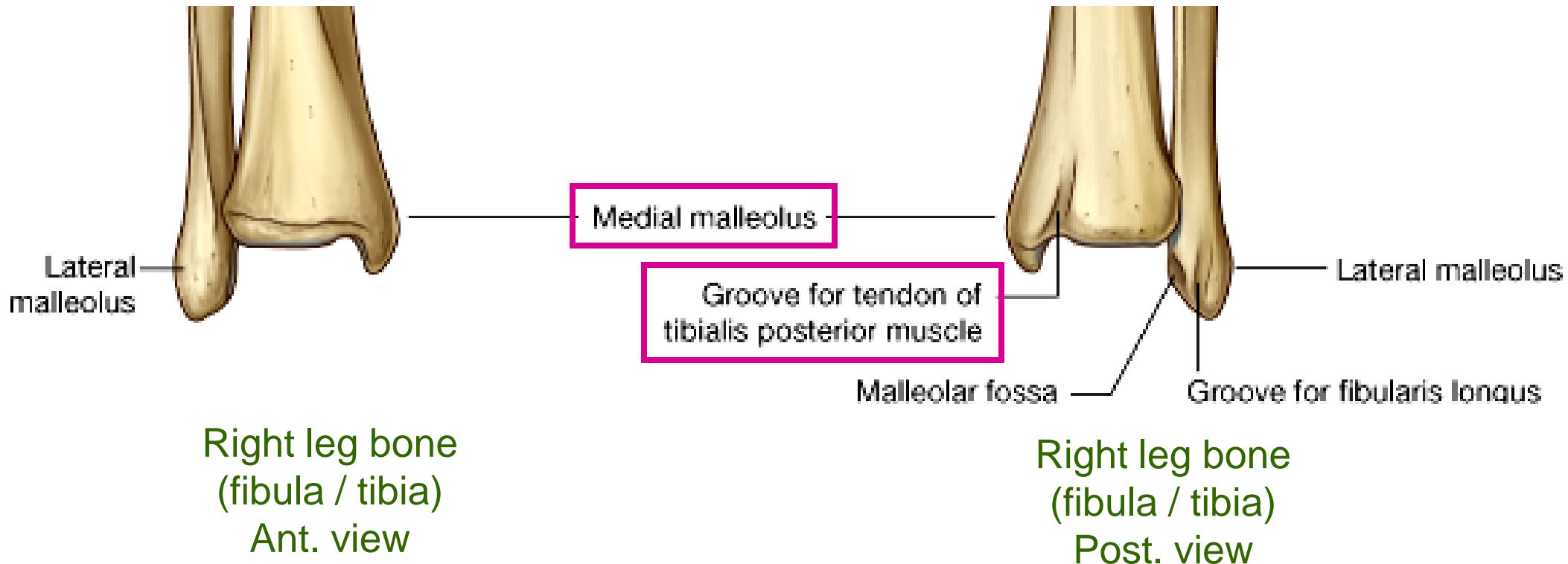
- quadrangular in cross section
- med., lat., post. surfaces
- ant. (subcutaneous); interosseous, posteromedial borders

Right leg bone
(fibula / tibia)
Ant. view



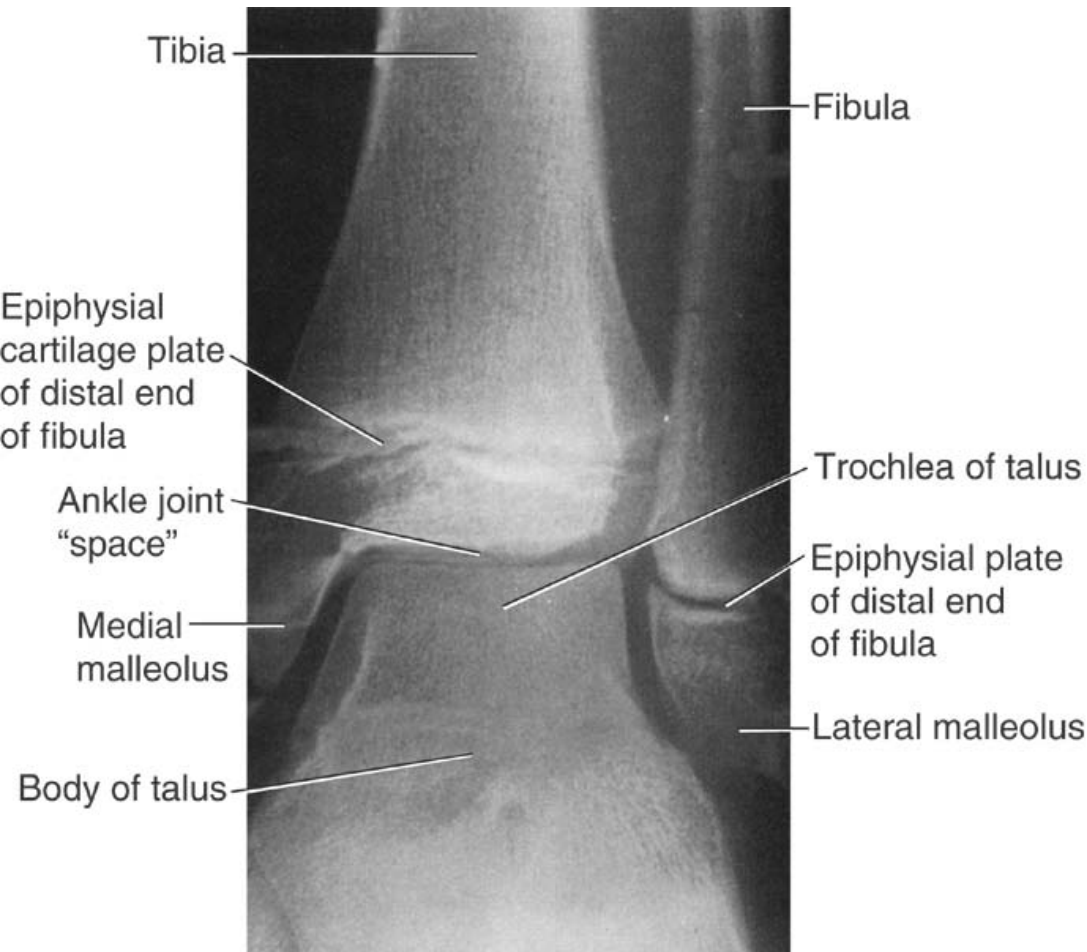
Tibia: distal end

- **medial malleolus**: groove for tibialis posterior



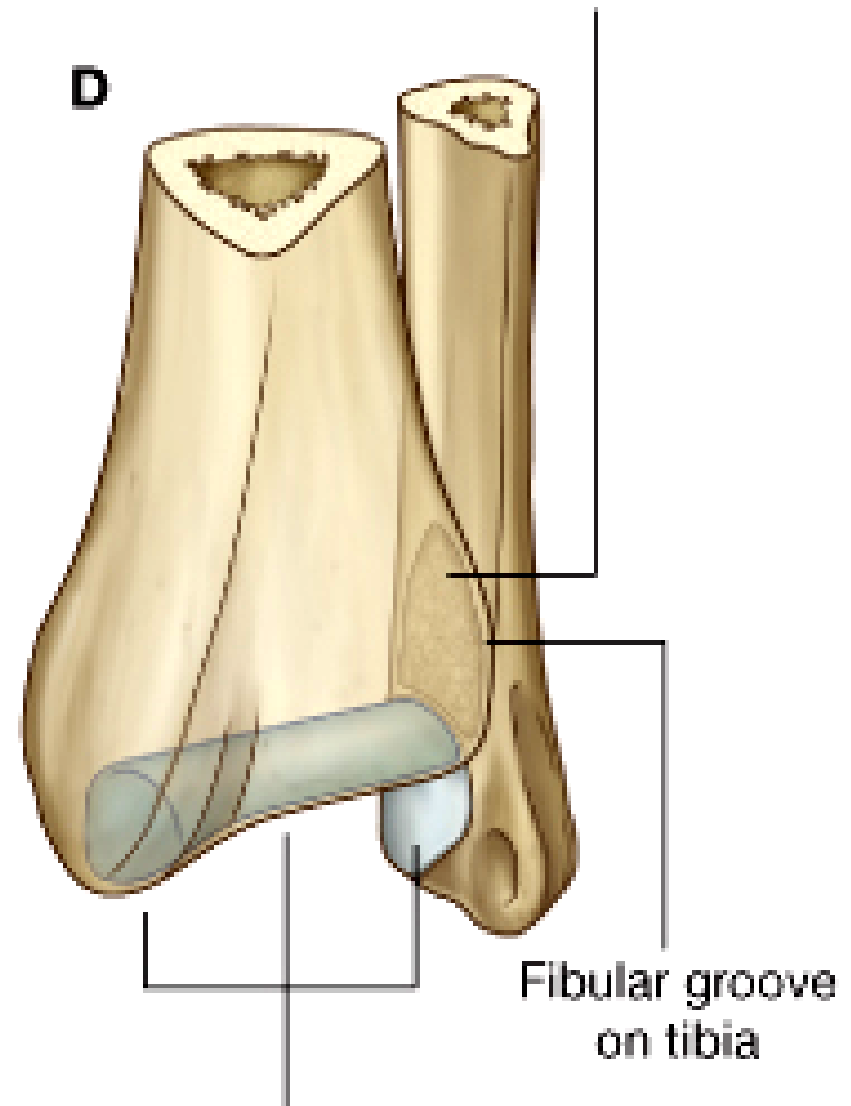
Tibia: with Talus

- inferior articular facet for talus (trochlea)



Posteroanterior view (slightly oblique)

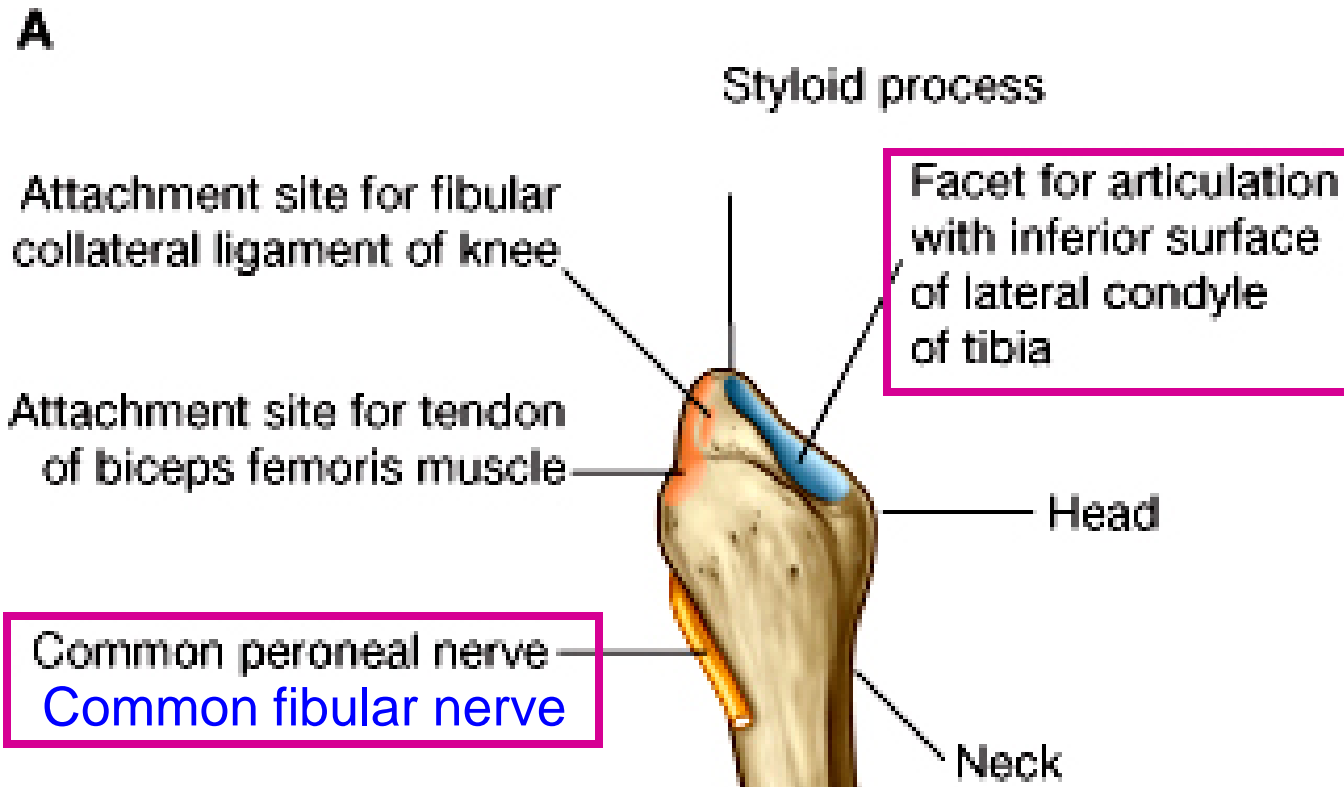
Roughened triangular area that fits into fibular groove of tibia



Articular surfaces for talus

Fibula: head

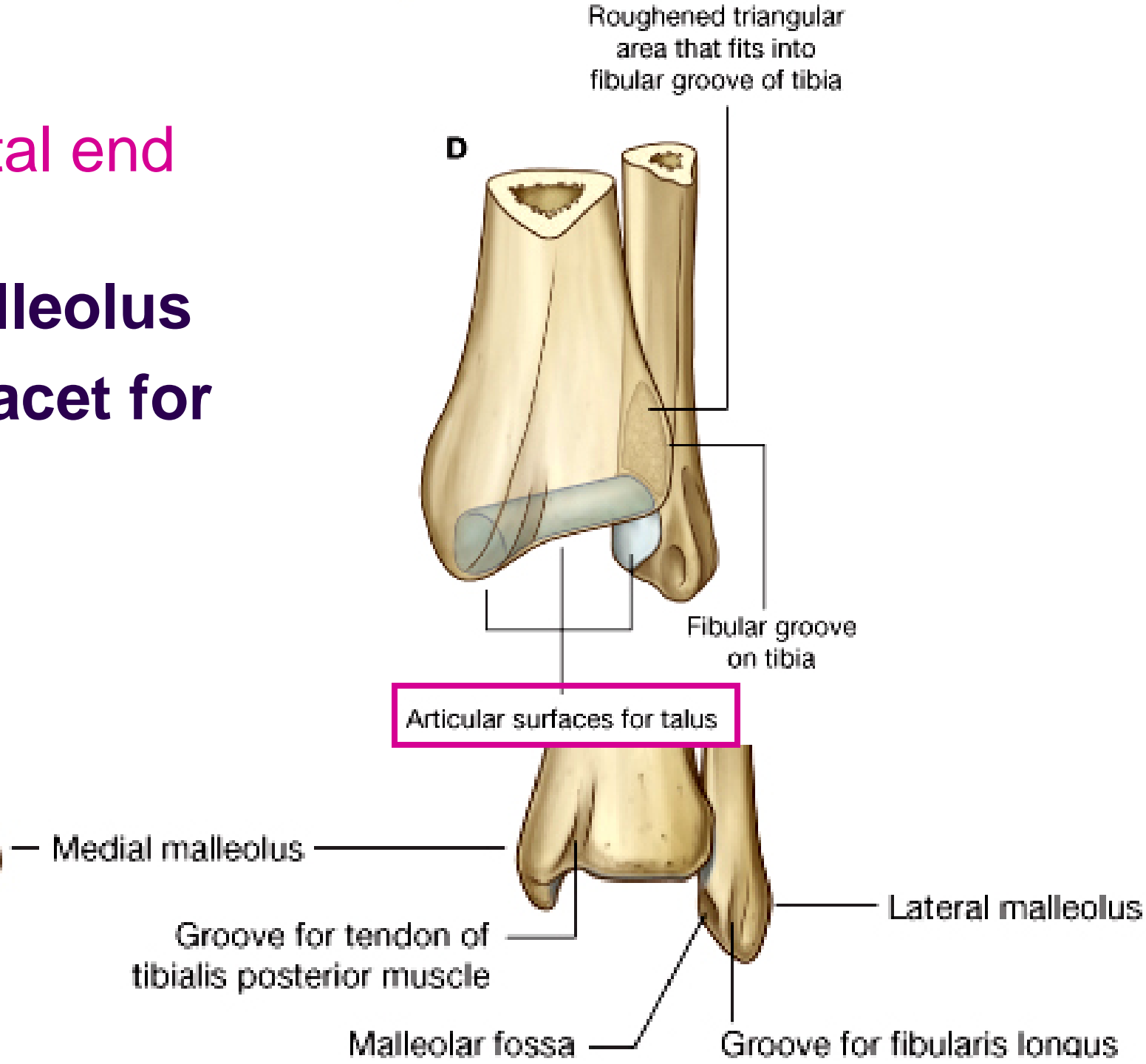
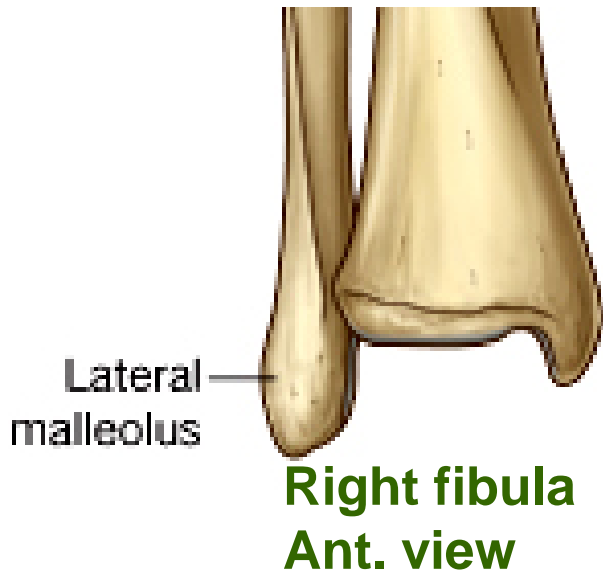
- Surface anatomy of fibular head
- Articular surface with tibia
- apex of head (styloid process)



**Right fibula
Ant. view**

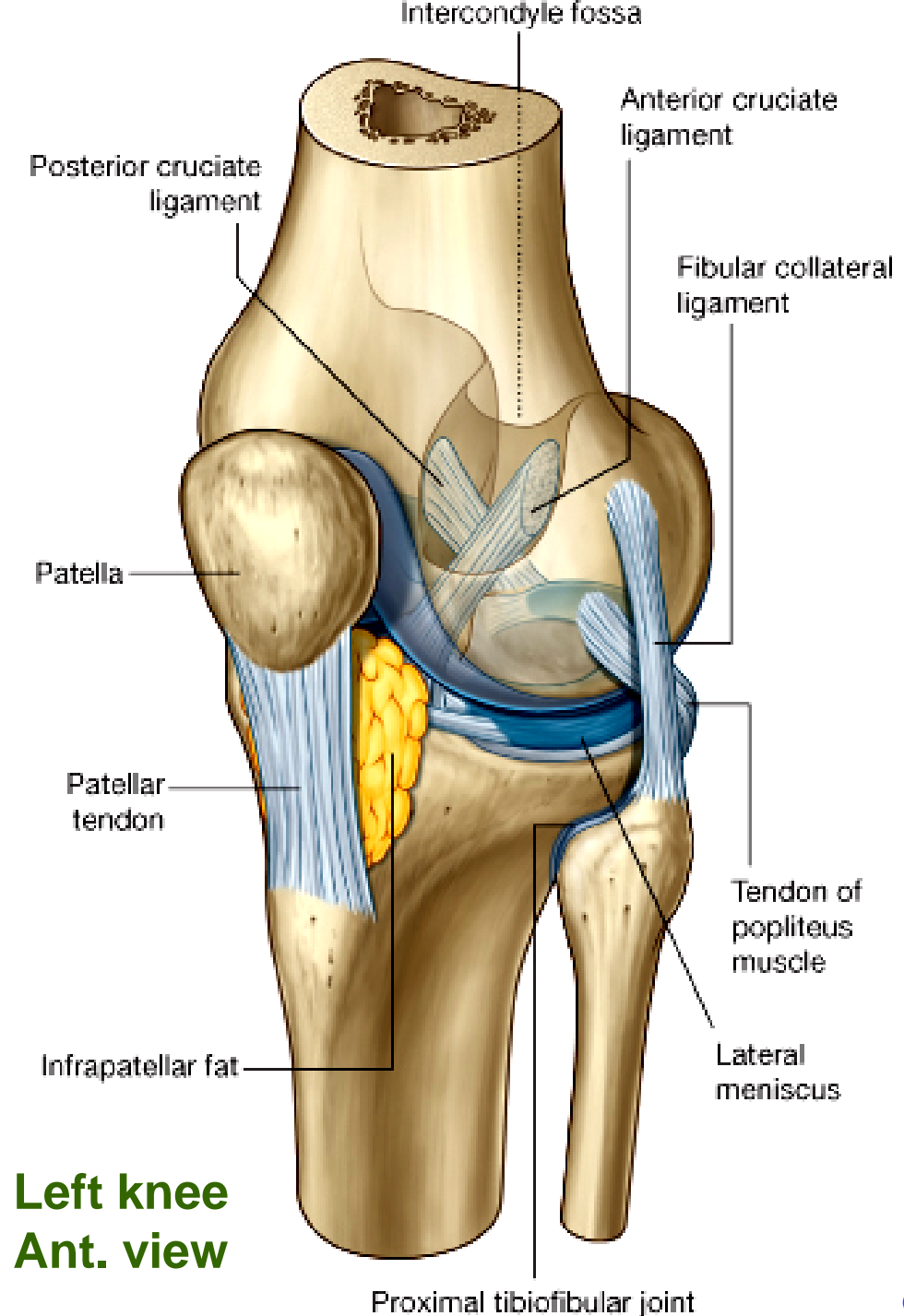
Fibula: distal end

- lateral malleolus
- articular facet for talus



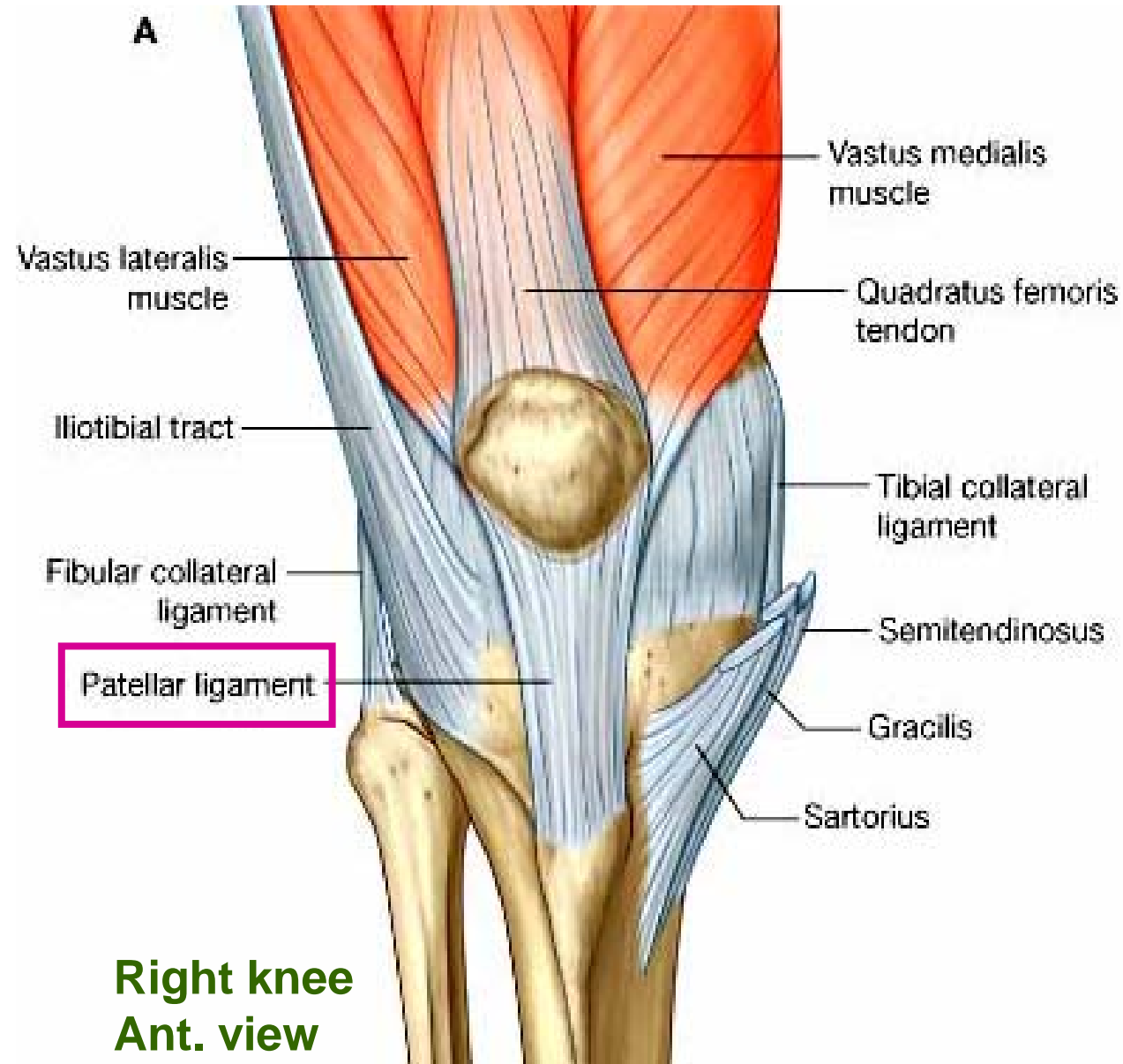
Knee Joint

- Weight-bearing
- 3 joint compartments:
- 1) medial compartment: medial condyle (femur) + tibia
- 2) lateral compartment: lateral condyle (femur) + tibia
- 3) patella + femur



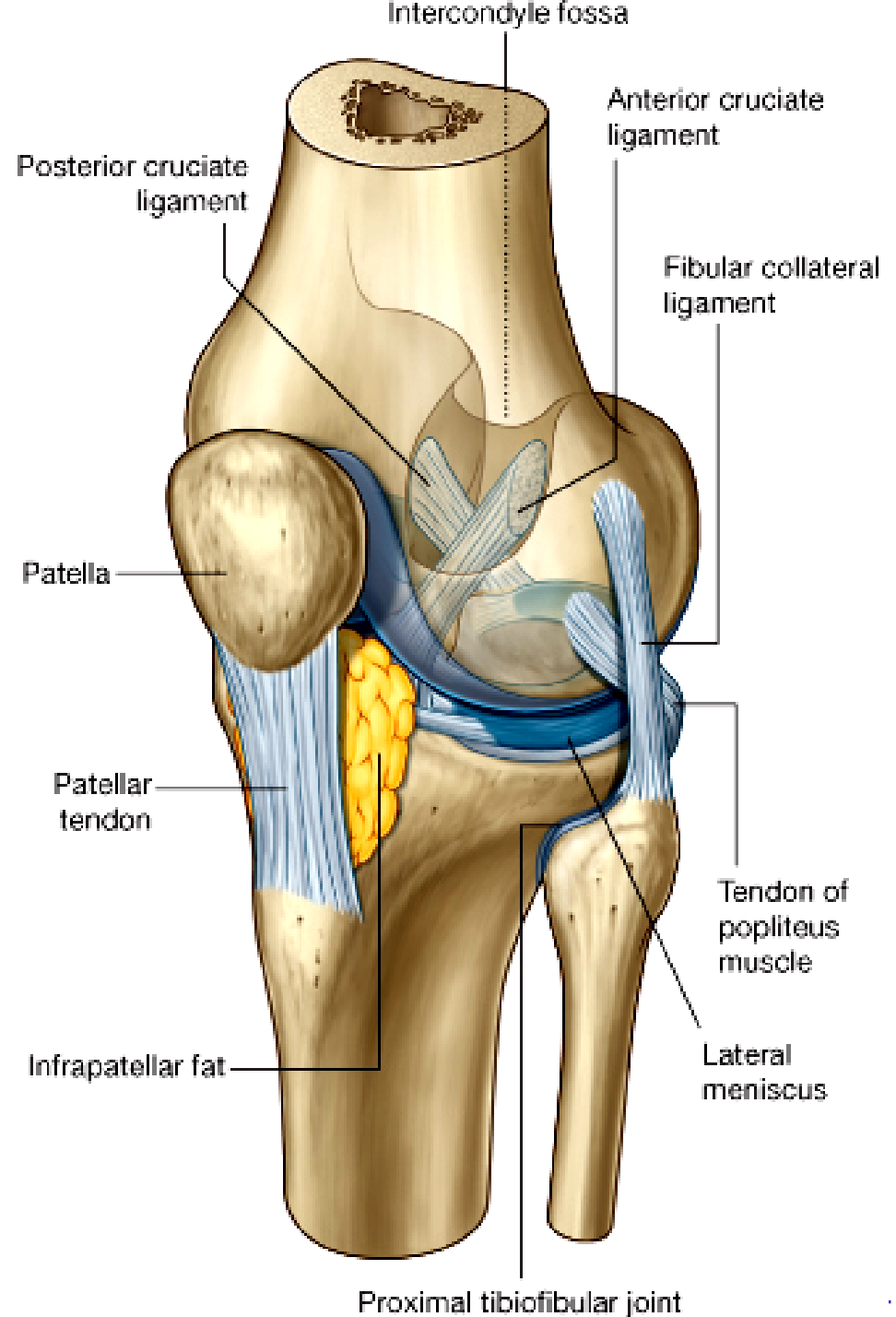
Patella

- ligamentum patellae (patellar lig.)
- Continuation of quadriceps femoris tendon above to apex of patella, below to tibia tuberosity



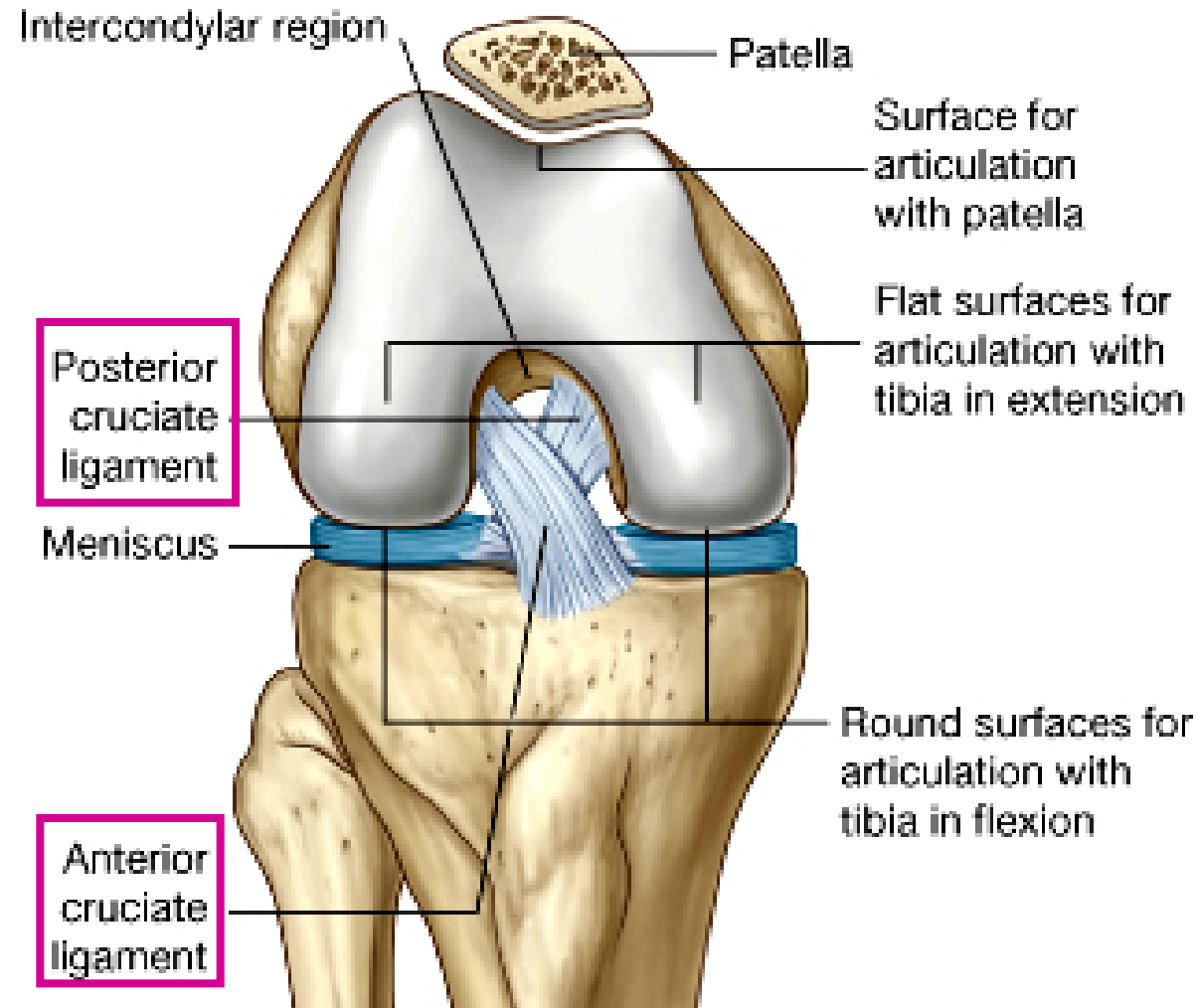
Tibio-femoral joint compartment

- 4 ligaments:
- 1) **medial (tibial) collateral lig.**
- 2) **lateral (fibular) collateral lig.**
- 3) **ant. cruciate lig.**
- 4) **post. cruciate lig.**



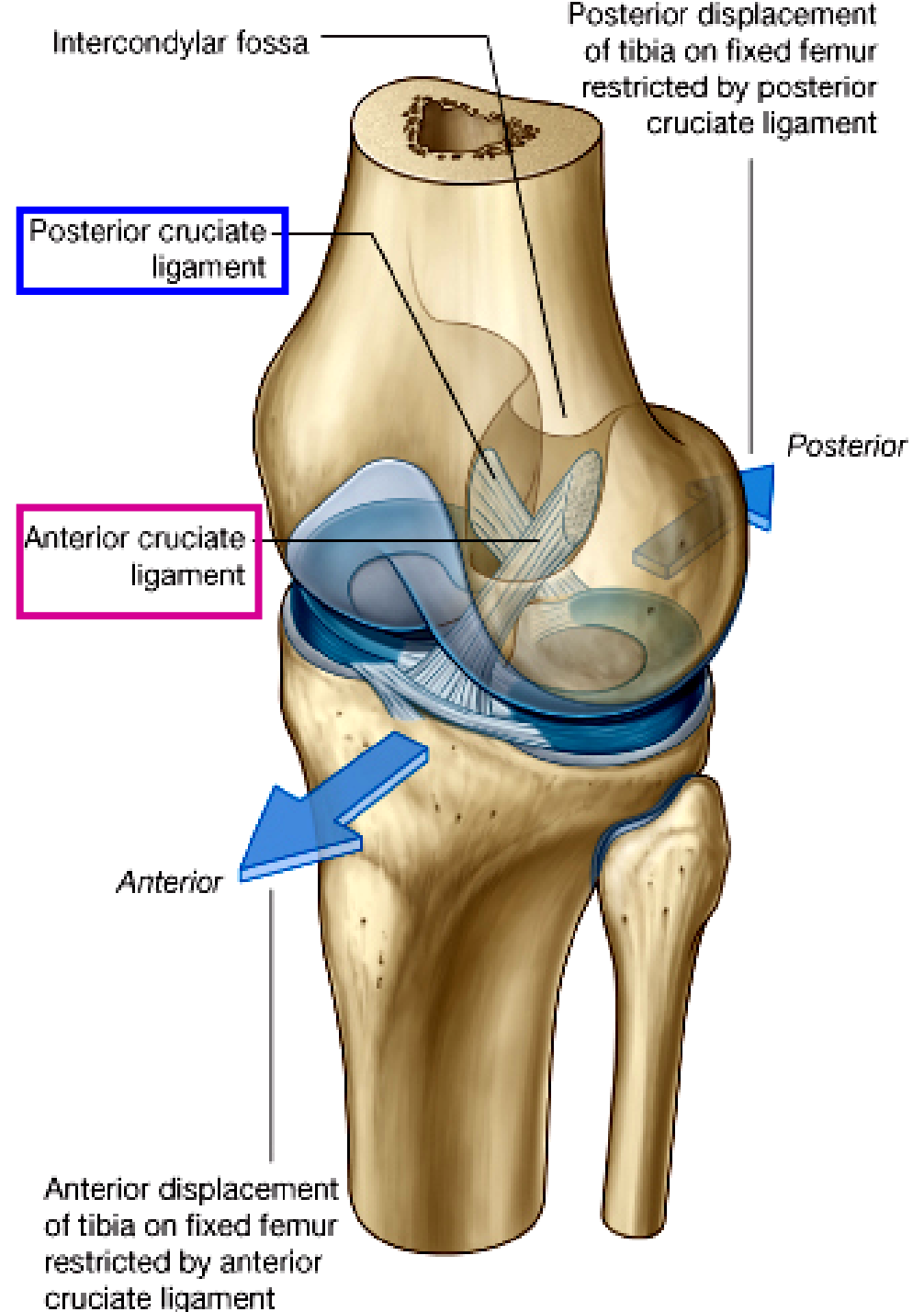
Cruciate ligaments (anterior view)

- ant. cruciate: ant. intercondylar area of tibia to lateral wall of intercondylar fossa of femur
- post. intercondylar area of tibia to medial wall of intercondylar fossa of femur
- (前外後内)

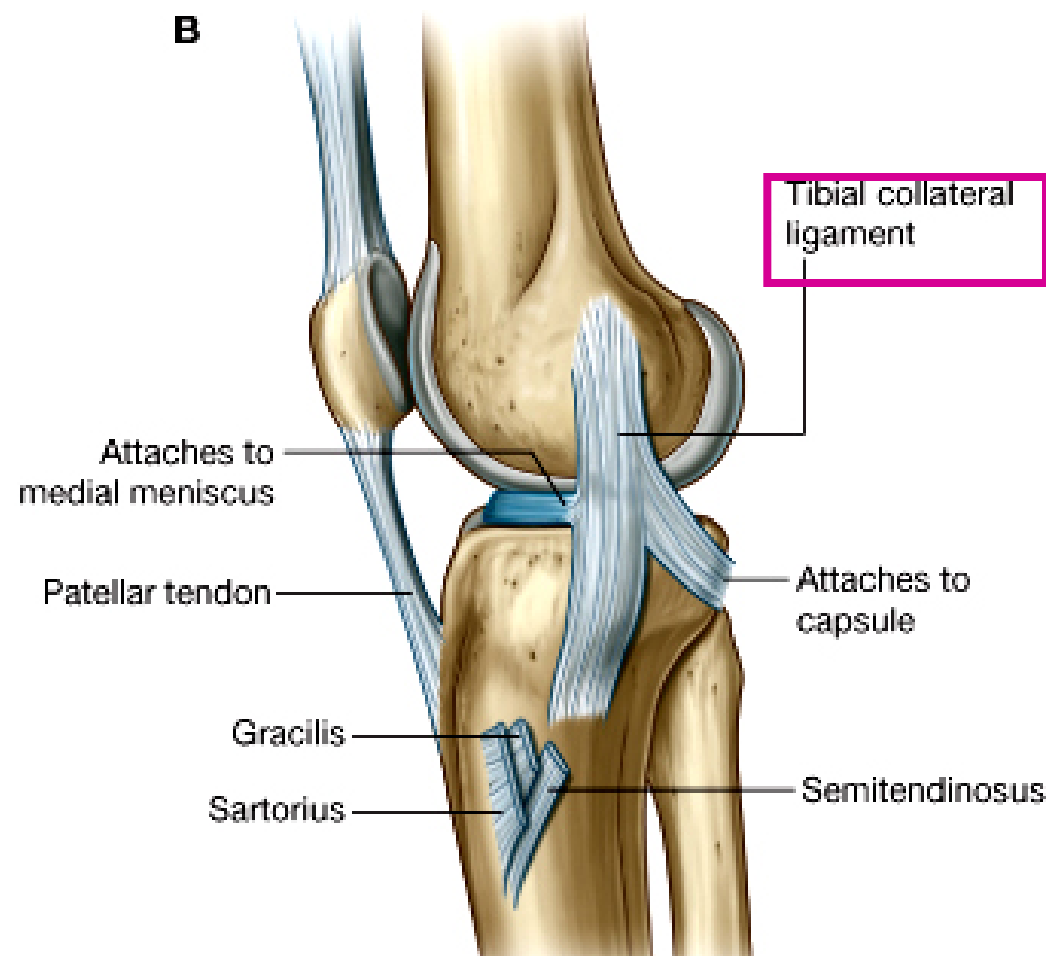
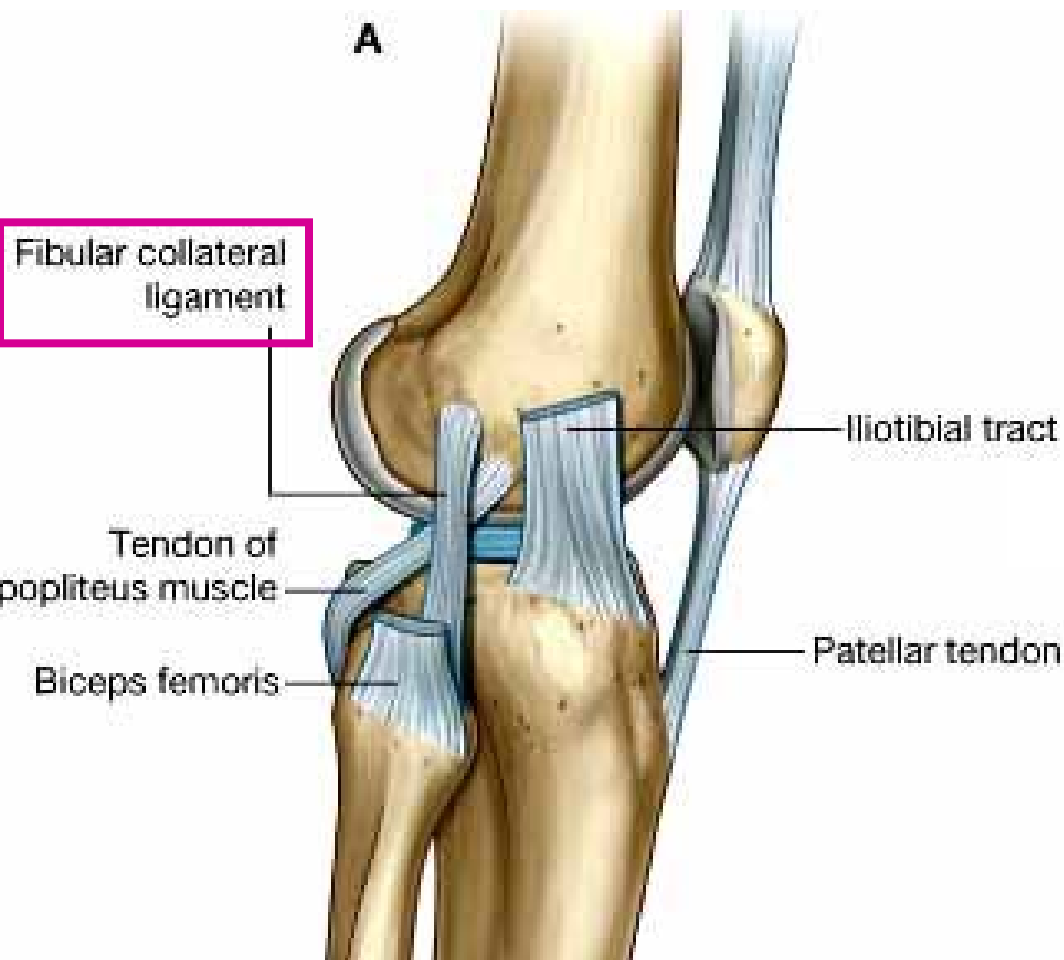


Knee: cruciate ligaments

- interconnect femur and tibia
- ant. cruciate: ant. intercondylar area of tibia to lateral wall of intercondylar fossa of femur
- post. intercondylar area of tibia to medial wall of intercondylar fossa of femur
- limitations of extreme anterior and posterior displacements of tibia on fixed femur

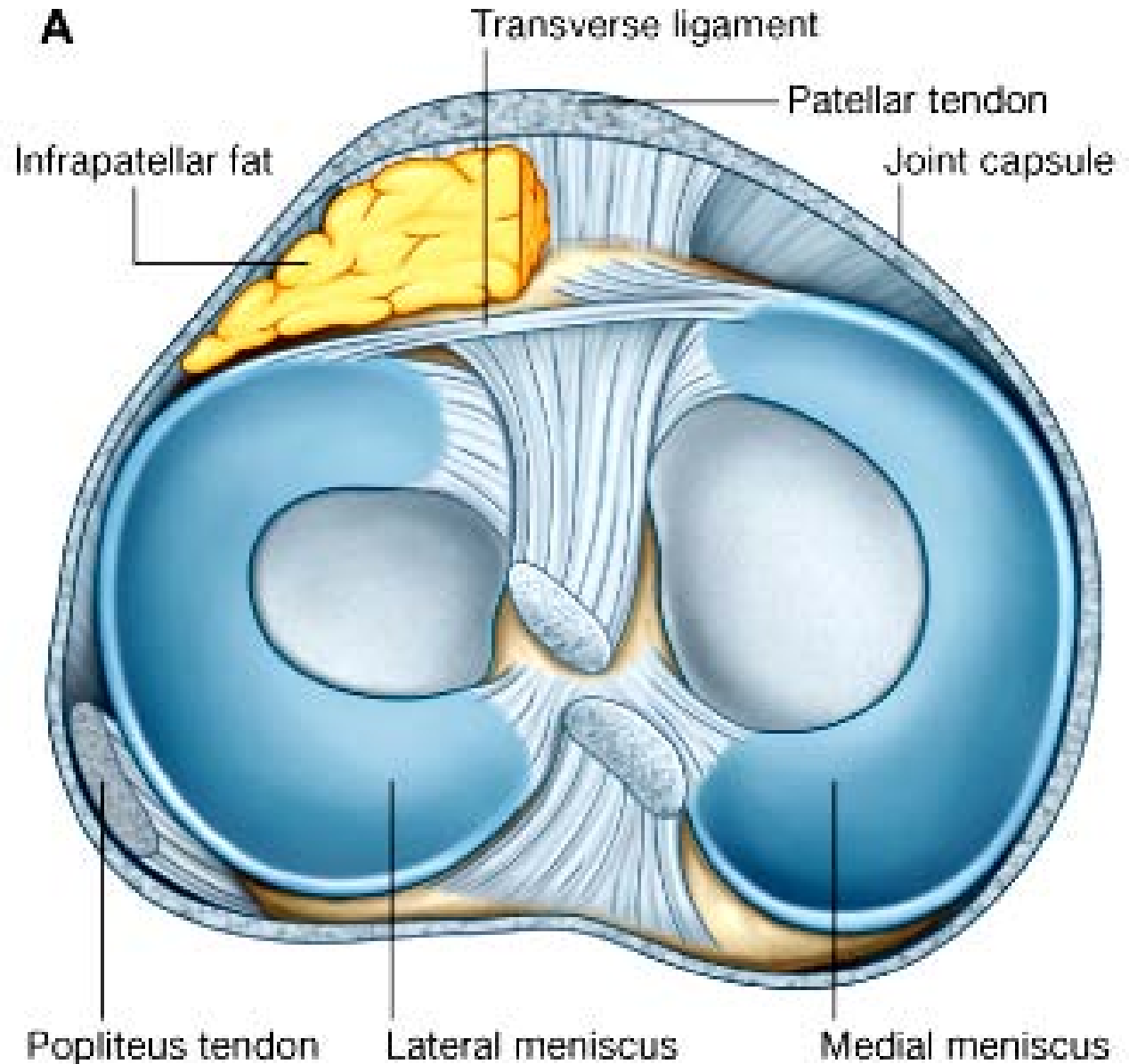


Knee: collateral ligaments



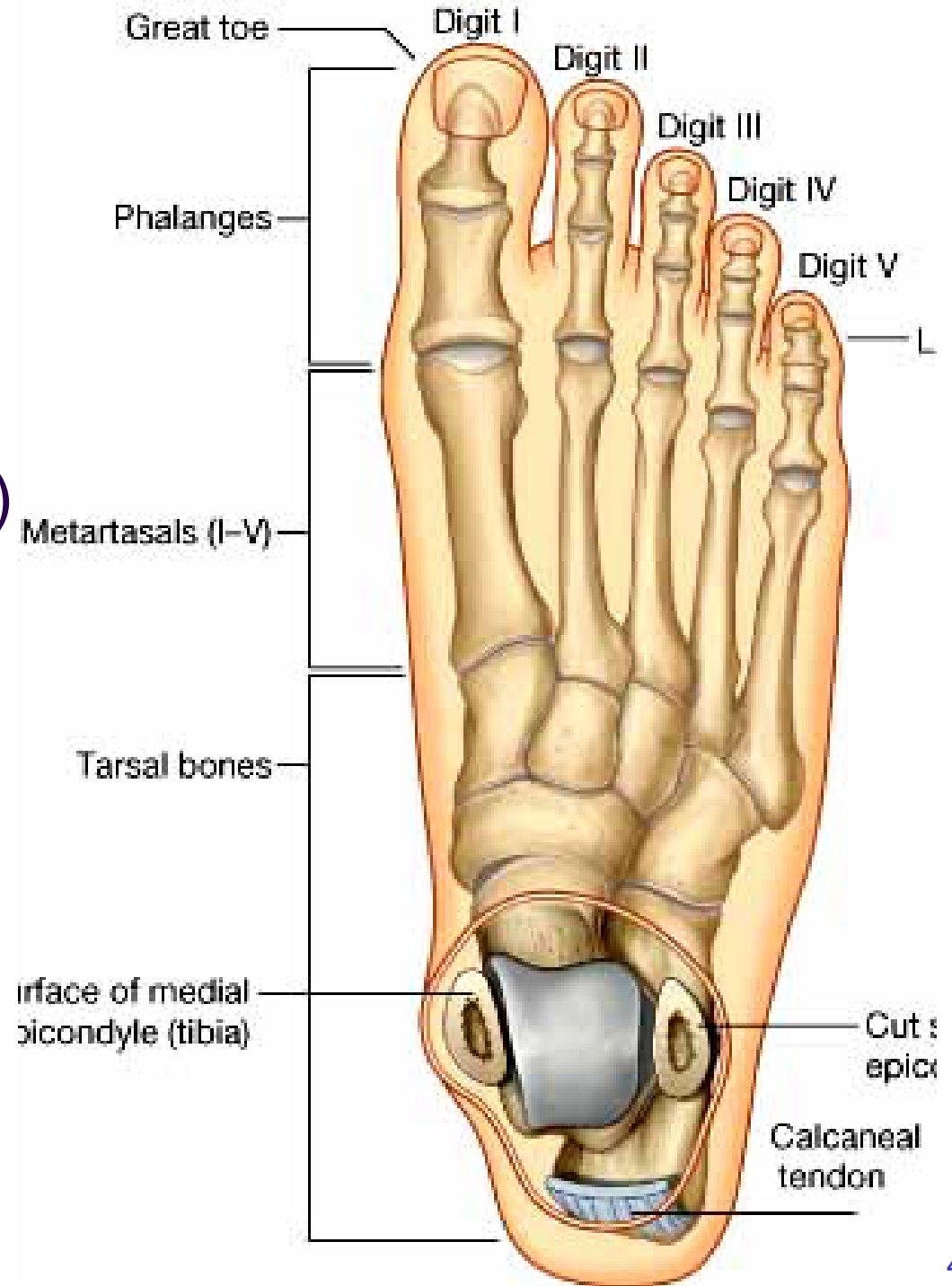
Meniscus

- **Medial meniscus:** fibrocartilage; wide-C shaped; periphery attaches to joint capsule
- **Lateral meniscus:** more circular in shape



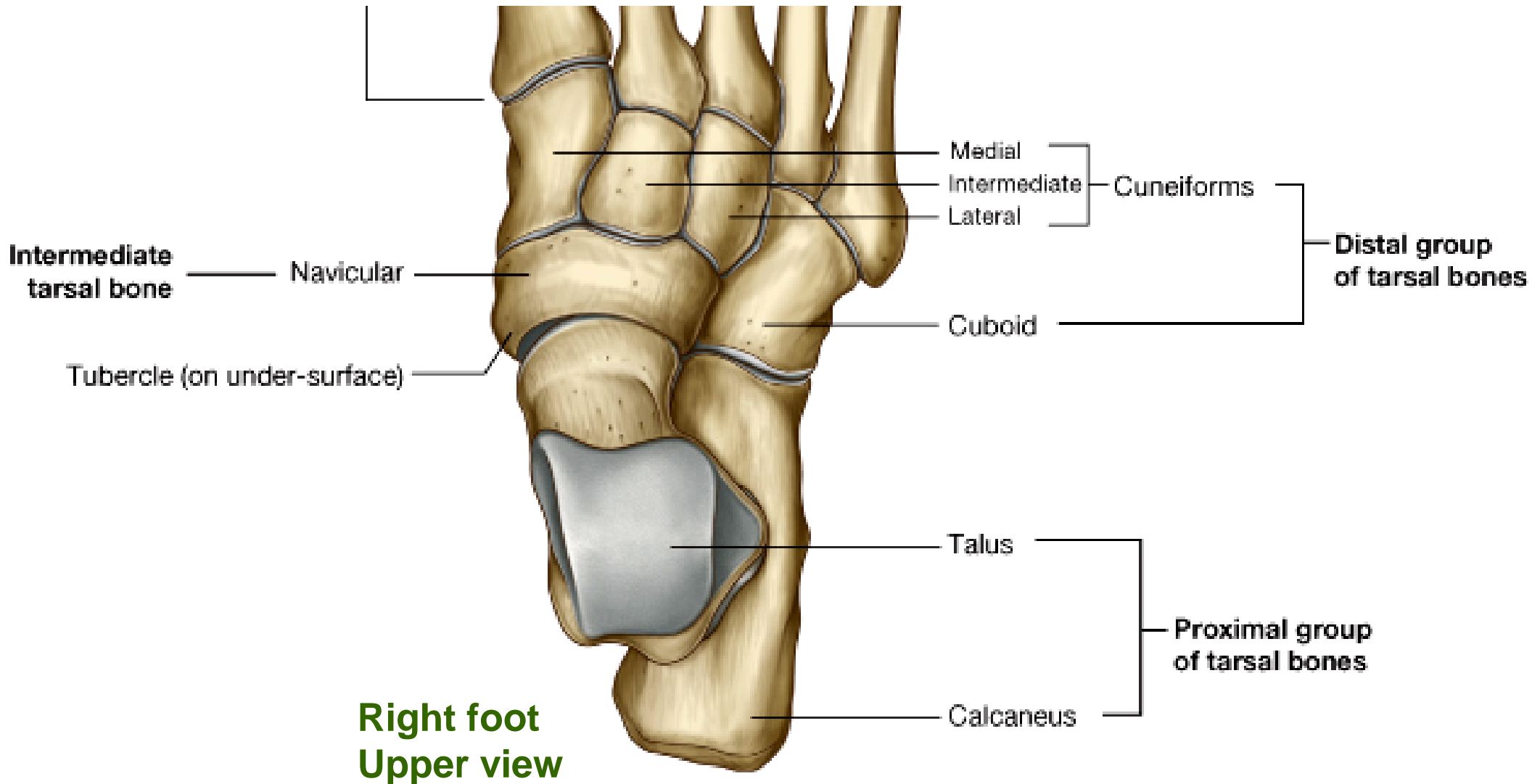
Bones of the foot

- Tarsal bones
- Metatarsal bones
- Phalanges (pl. of phalax)



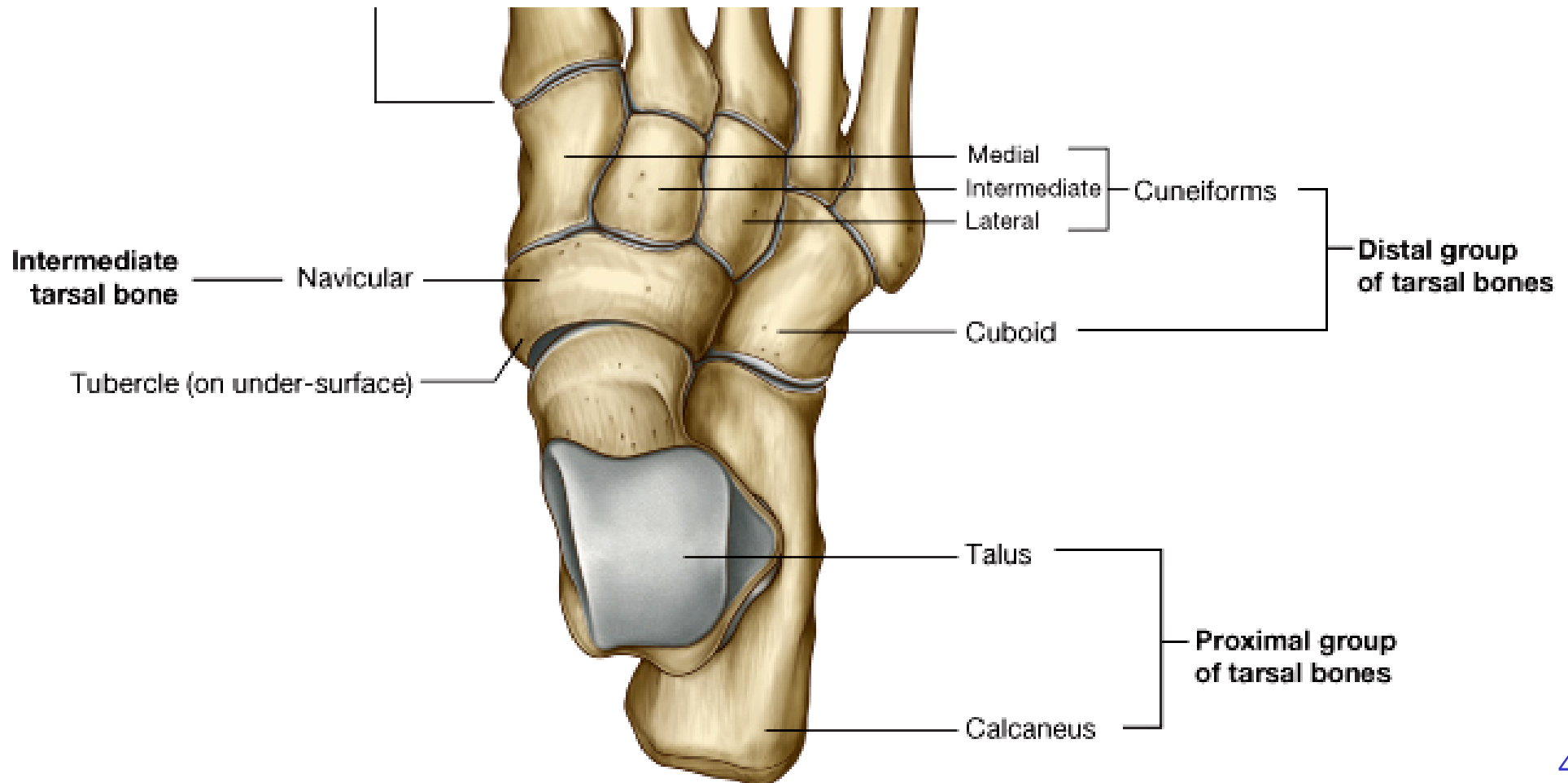
Tarsal bones: proximal row

- Proximal row: Talus, Calcaneus (Calcaneum), Navicular



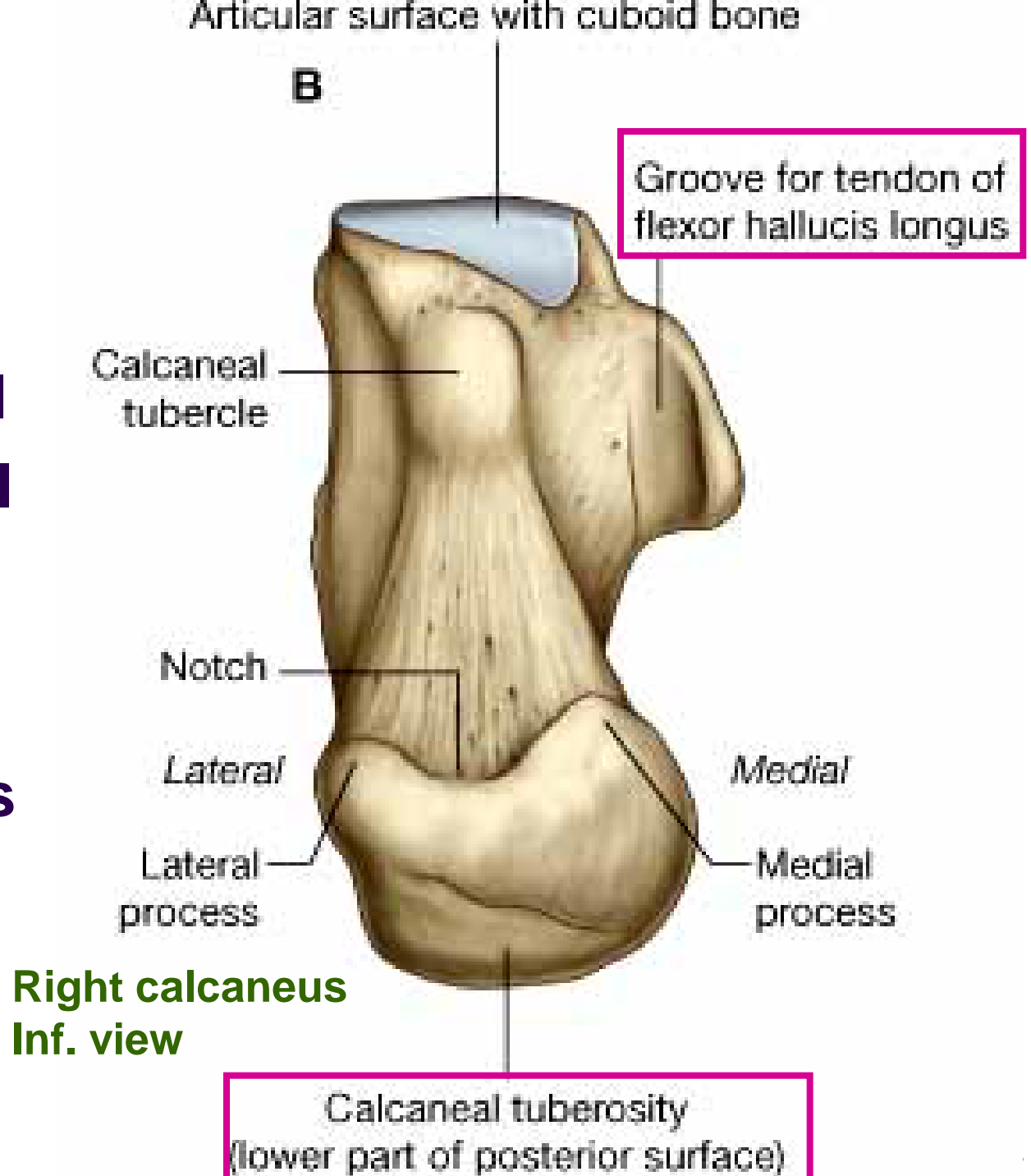
Talus

- transfers body weight
- postero-inferiorly to calcaneum which relays it to ground
- antero-inferiorly to calcaneum and navicular, through which to distal row of tarsus and metatarsus



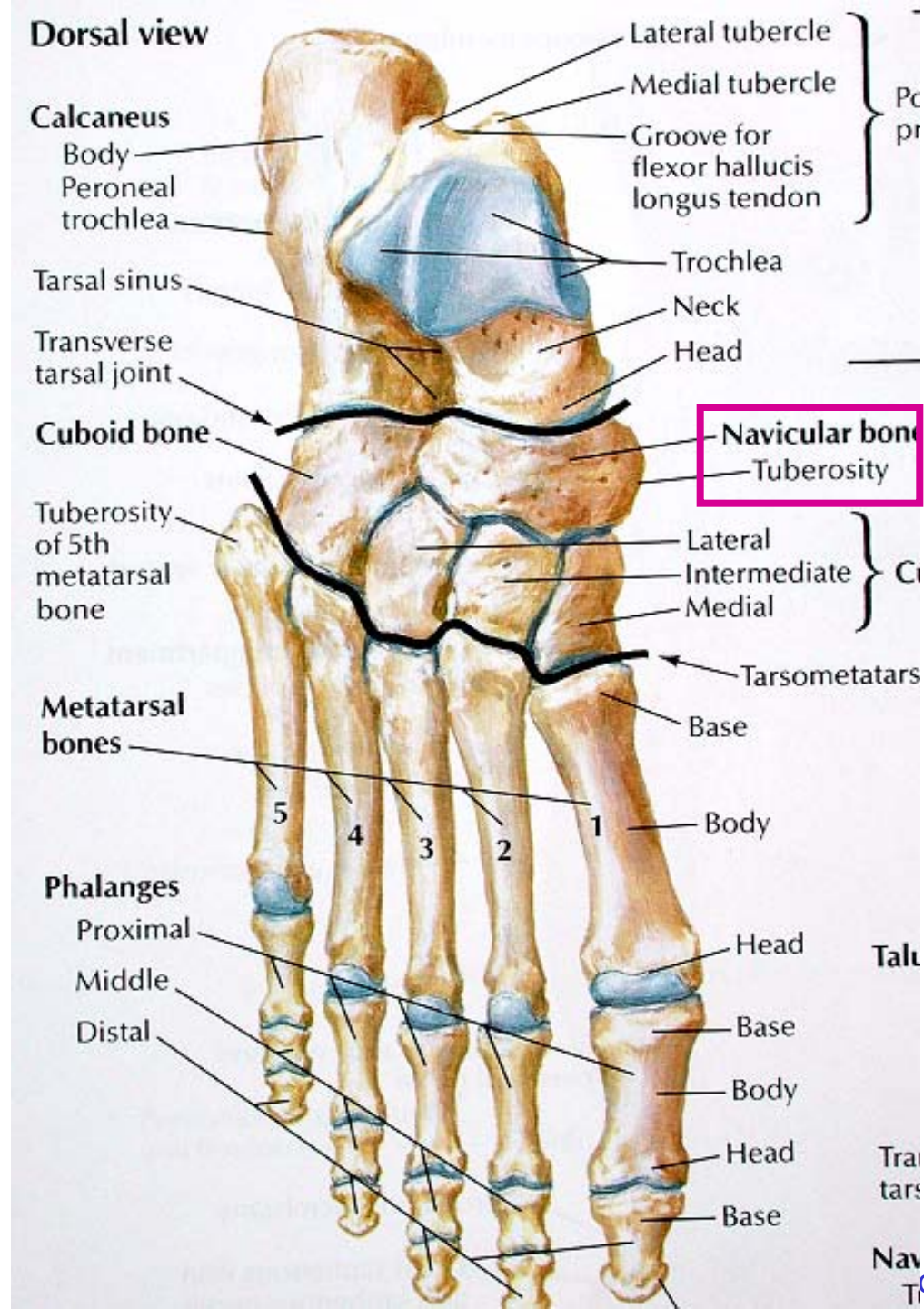
Calcaneus (Calcaneum)

- **calcaneal tuberosity**
- ant. surface for Cuboid
- **insertion of calcaneal tendon (Achilles tendon)**
- **groove for tendon of flexor hallucis longus on its undersurface**



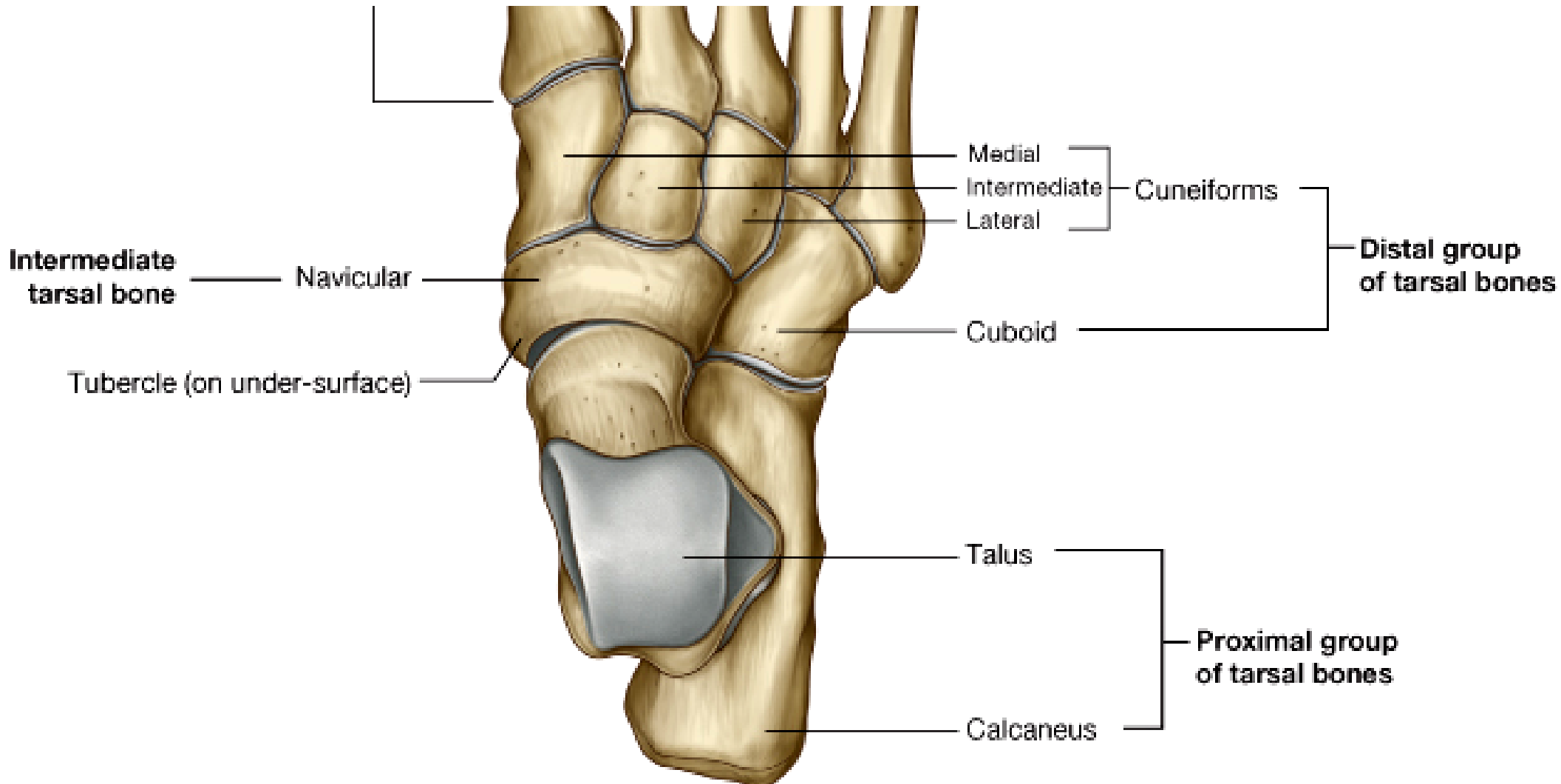
Navicular bone

- between head of talus and distal row of 3 cuneiform bones
- **tuberosity:** attachment of Tibialis posterior



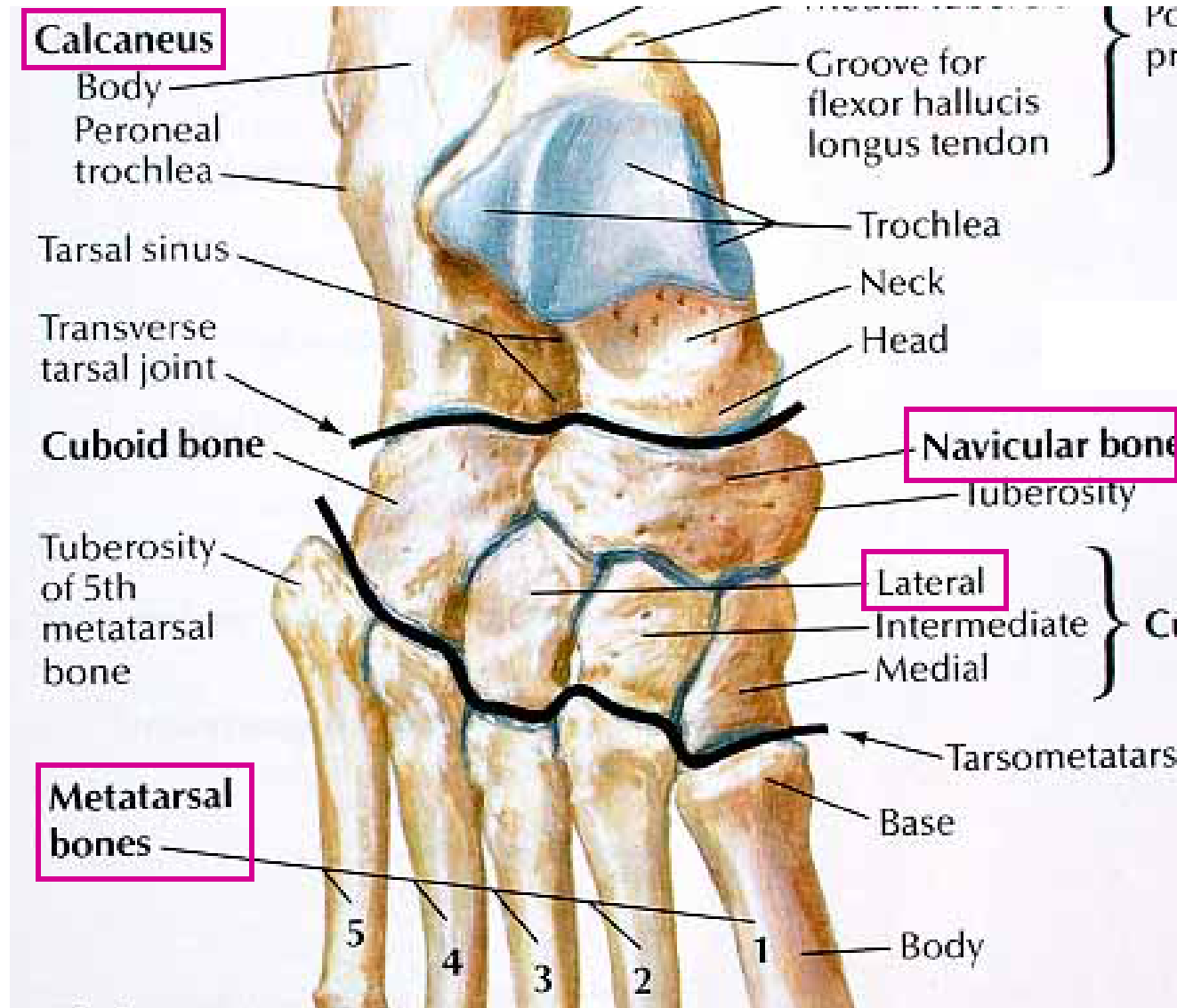
Tarsal bones: distal row-1

- Distal row: Cuboid + 3 Cuneiform bones



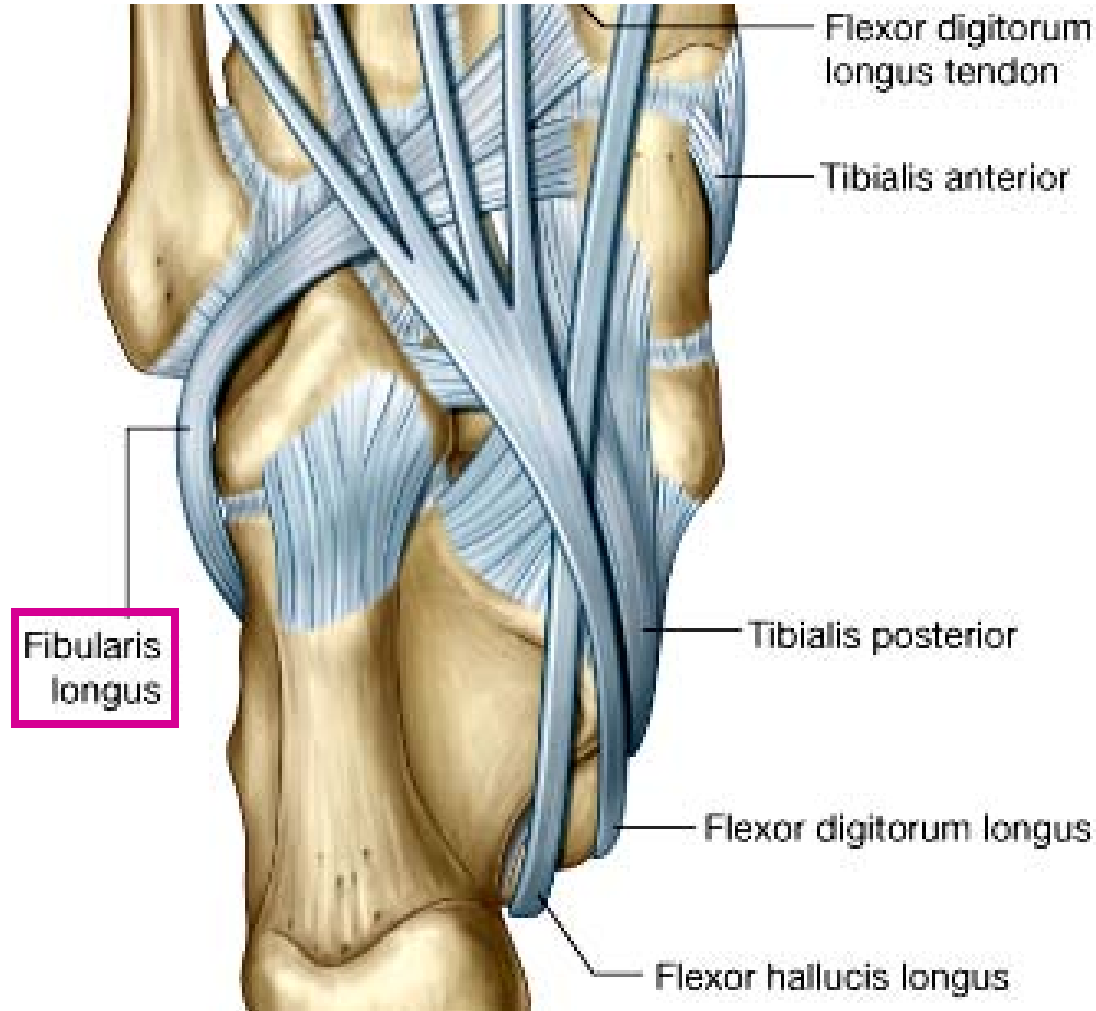
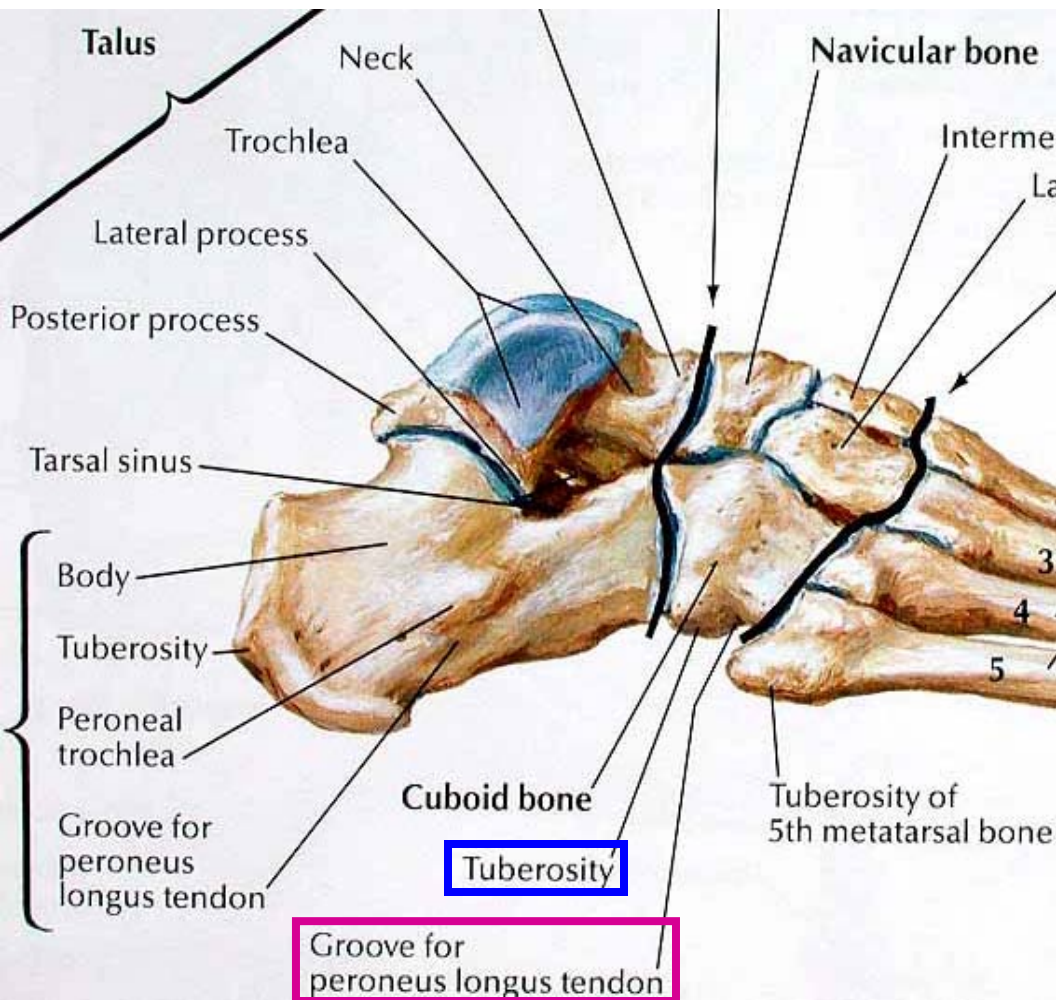
Cuboid

- ant. surface: for 4th, 5th metatarsals
- proximal: articulate with calcaneum
- medial: with navicular & lateral cuneiform



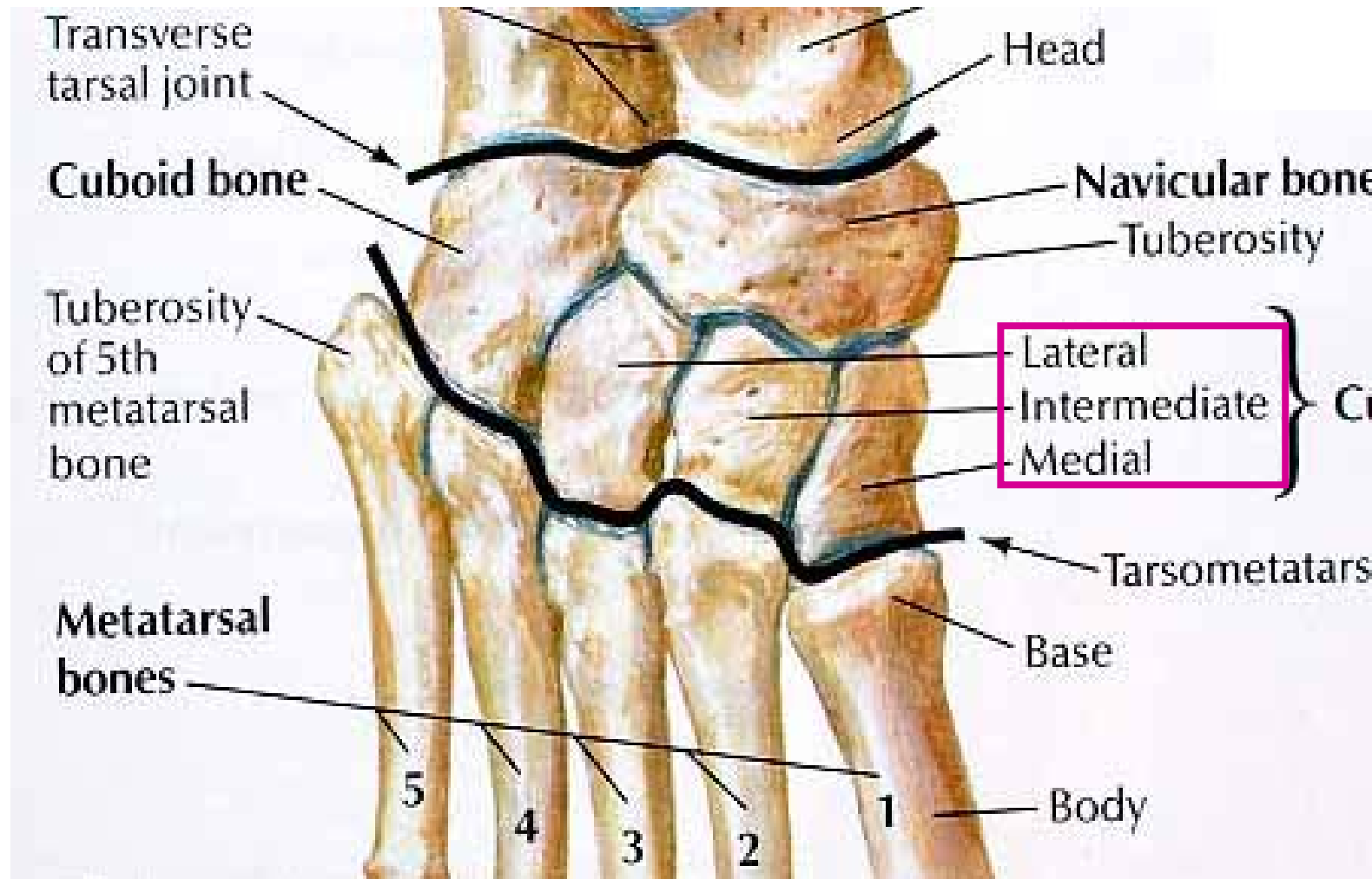
Cuboid-2

- Lateral surface: tuberosity
- groove for fibularis (peroneus) longus tendon on underside



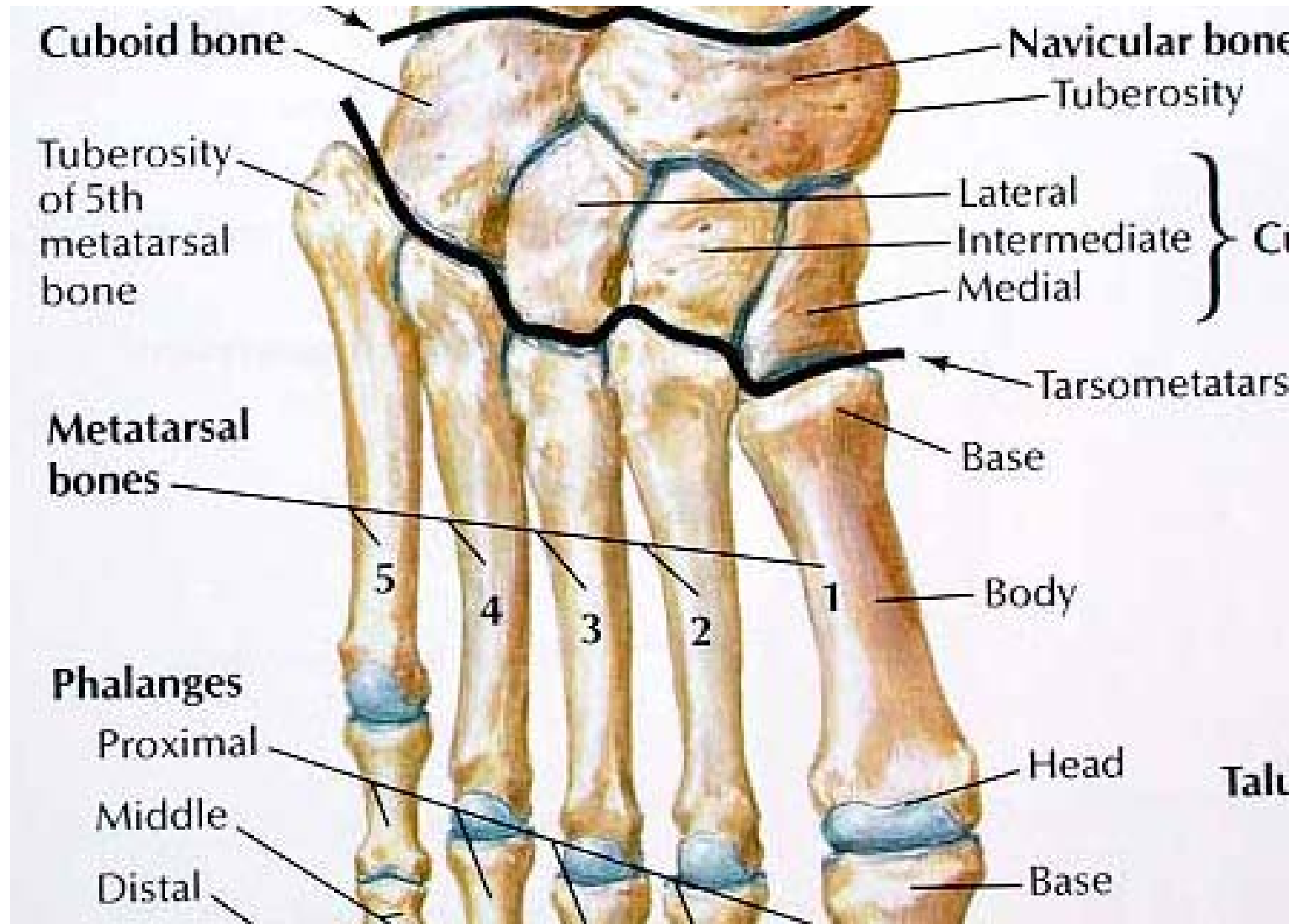
Cuneiforms (Latin: wedge)

- cuneiforms:
 - med.
 - Intermediate
 - lat.
- medial: largest
- proximal: navicular bone
- distal: metatarsus 1-3



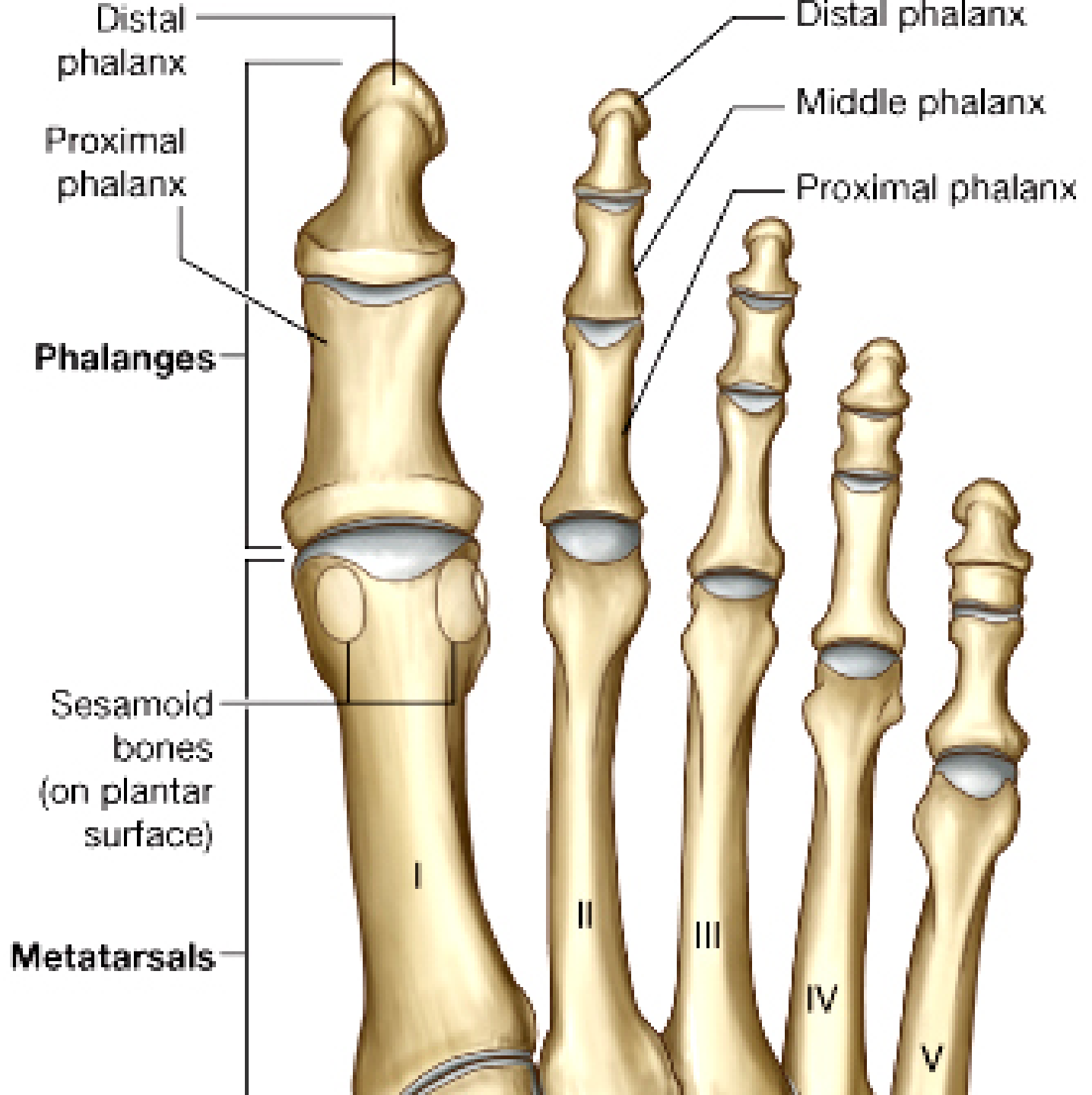
Metatarsus

- all metatarsals in the same plane (different from hand)?
- Base
- Body
- Head (distal end)



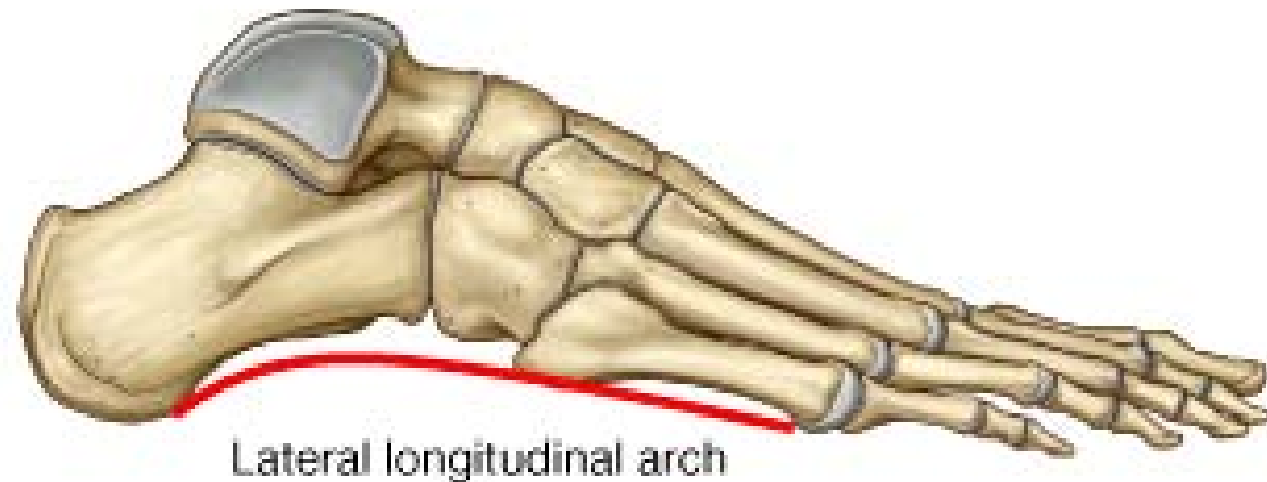
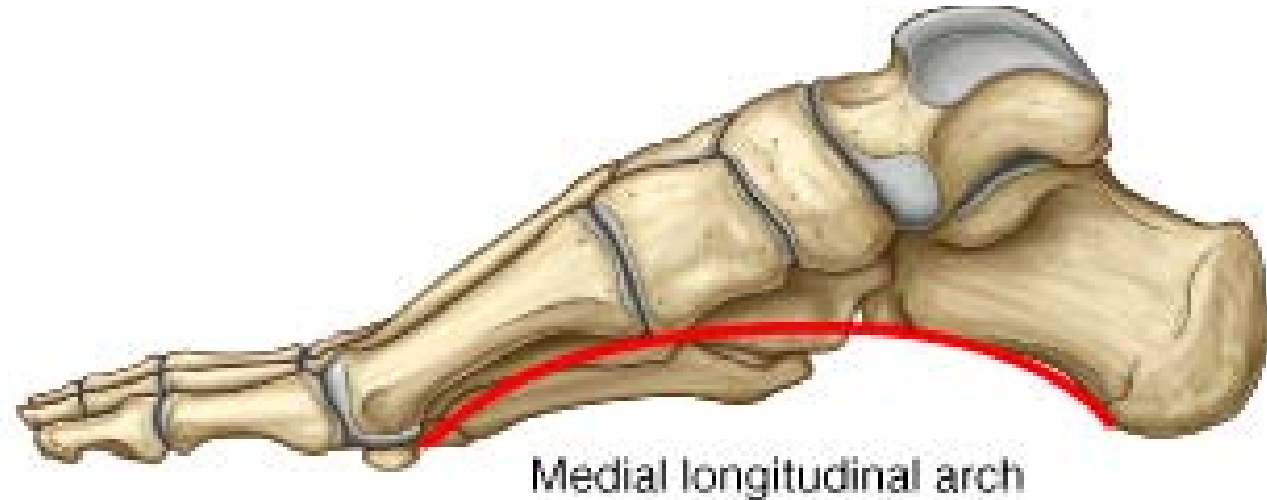
Phalanges

- Big toe: proximal and distal phalanx
- 2nd-5th toe: proximal, middle, distal phalanx



The arches of the foot: longitudinal arch

- medial view:
 - ant.: head of metatarsals on the ground
 - post.: calcaneal tuberosity (tuber calcanei) on the ground
- lateral view: lower longitudinal arch; apex at the ant. part of calcaneum



The arches of the foot: transverse arch

- obvious at the distal row of tarsal bones,
- cuboid (laterally) close to ground; medially, medial cuneiform off the ground
- movement (of foot at ankle): dorsiflexion/plantar flexion; inversion/eversion



Transverse arch

