Appendicular Skeleton

Introduction to Anatomy and Embryology

Lab 4

Hip bone & Femur

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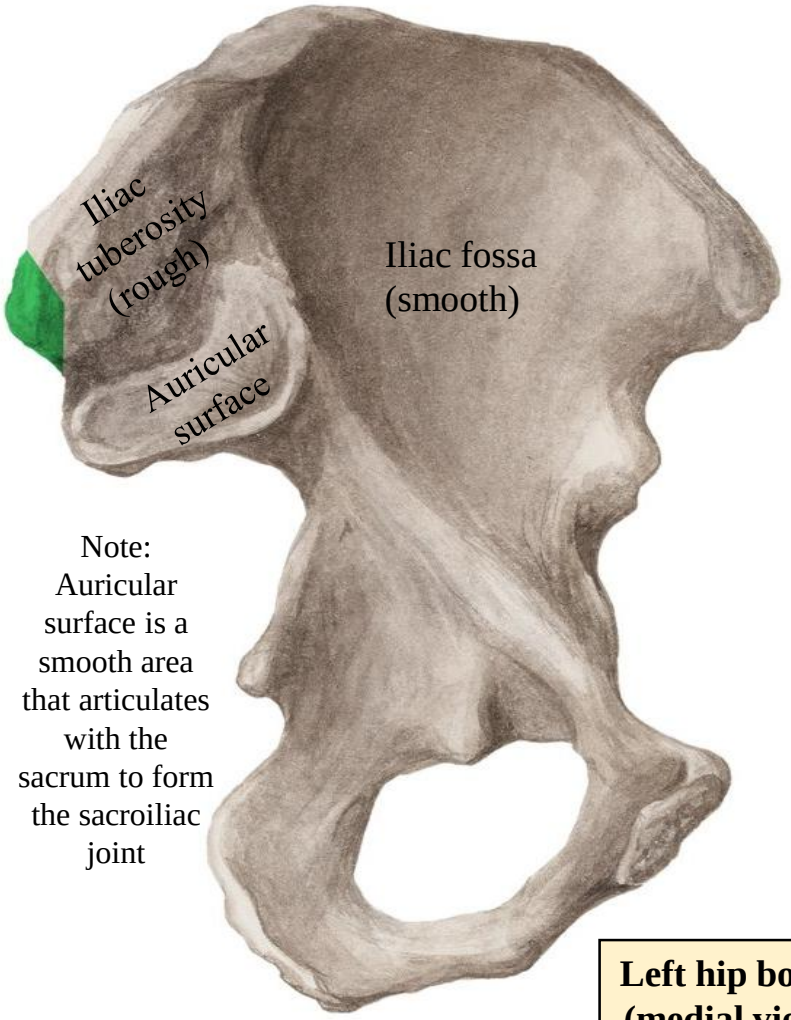
Hip bone

Inner or pelvic surface



Note: Auricular surface is a smooth area that articulates with the sacrum to form the sacroiliac joint

Left hip bone (medial view)

Hip bone is formed of 3 bones: Ilium, Pubis, Ischium

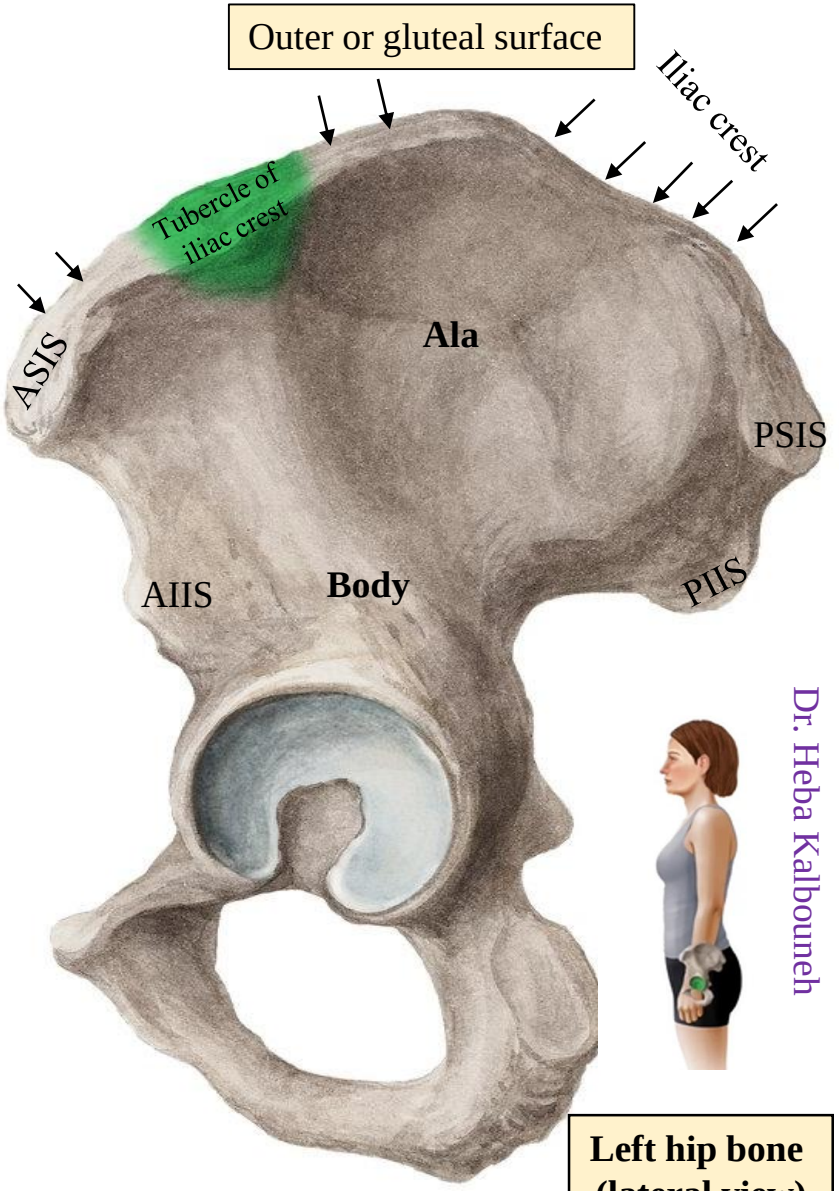
Ilium: is the upper part of hip bone.

It has 2 parts:
Body and ala (wing)

It has 3 borders:

- ✓ **Superior border:** called iliac crest (palpable). The iliac tubercle is located approximately 5 cm posterior to the ASIS on the iliac crest.
- ✓ **Anterior border** which presents the anterior superior iliac spine (ASIS) & anterior inferior iliac spine (AIIS).
- ✓ **Posterior border** which presents the posterior superior iliac spine (PSIS) & posterior inferior iliac spine (PIIS).

Outer or gluteal surface



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Left hip bone (lateral view)

It has 2 surfaces :

- ✓ **Outer or gluteal surface** which has 3 gluteal lines (posterior, middle & inferior).
- ✓ **Inner or pelvic surface** which shows iliac fossa, iliac tuberosity and auricular surface (which articulates with sacrum).

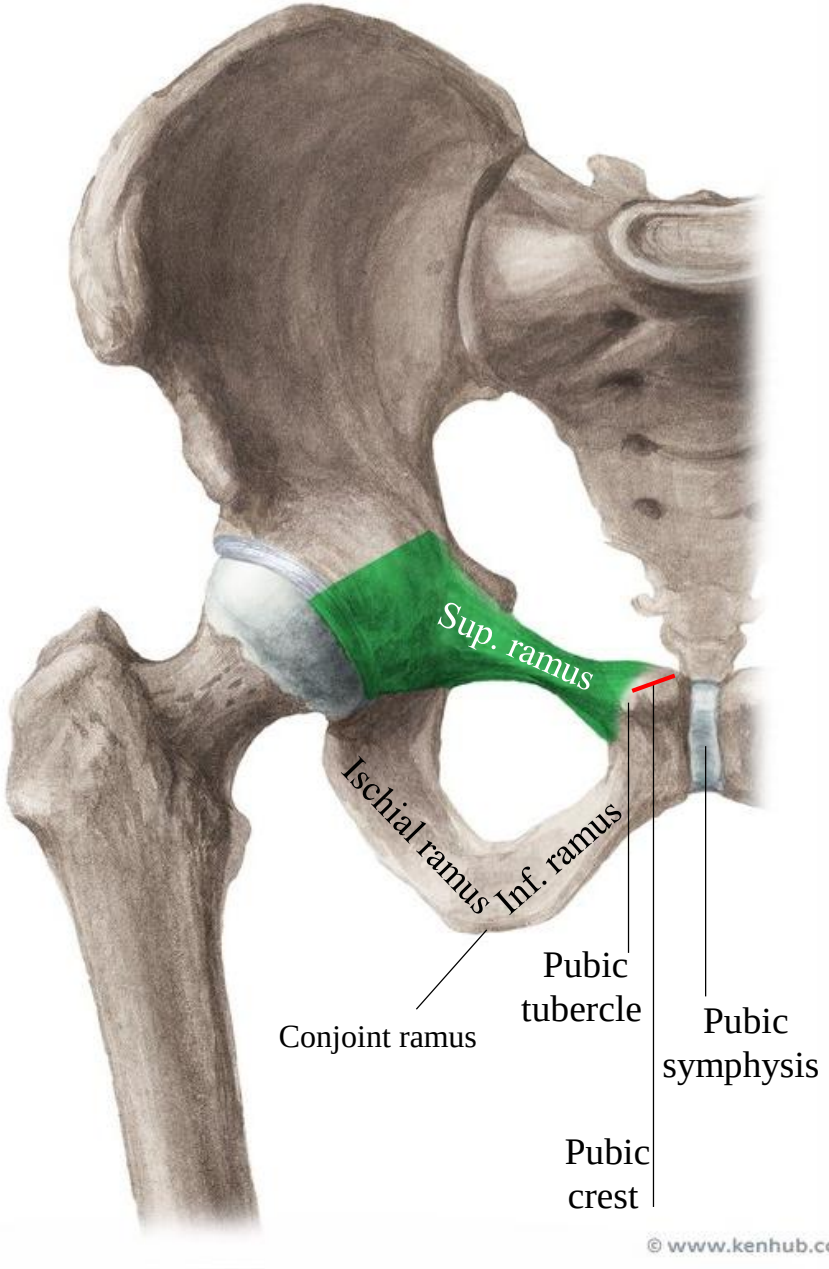
Pubis: is the anterior-inferior part of hip bone.

It has 3 parts:
Body, superior ramus and inferior ramus.

Pubic crest is the upper border of the body of pubis.
Pubic crest ends laterally by the **pubic tubercle.**

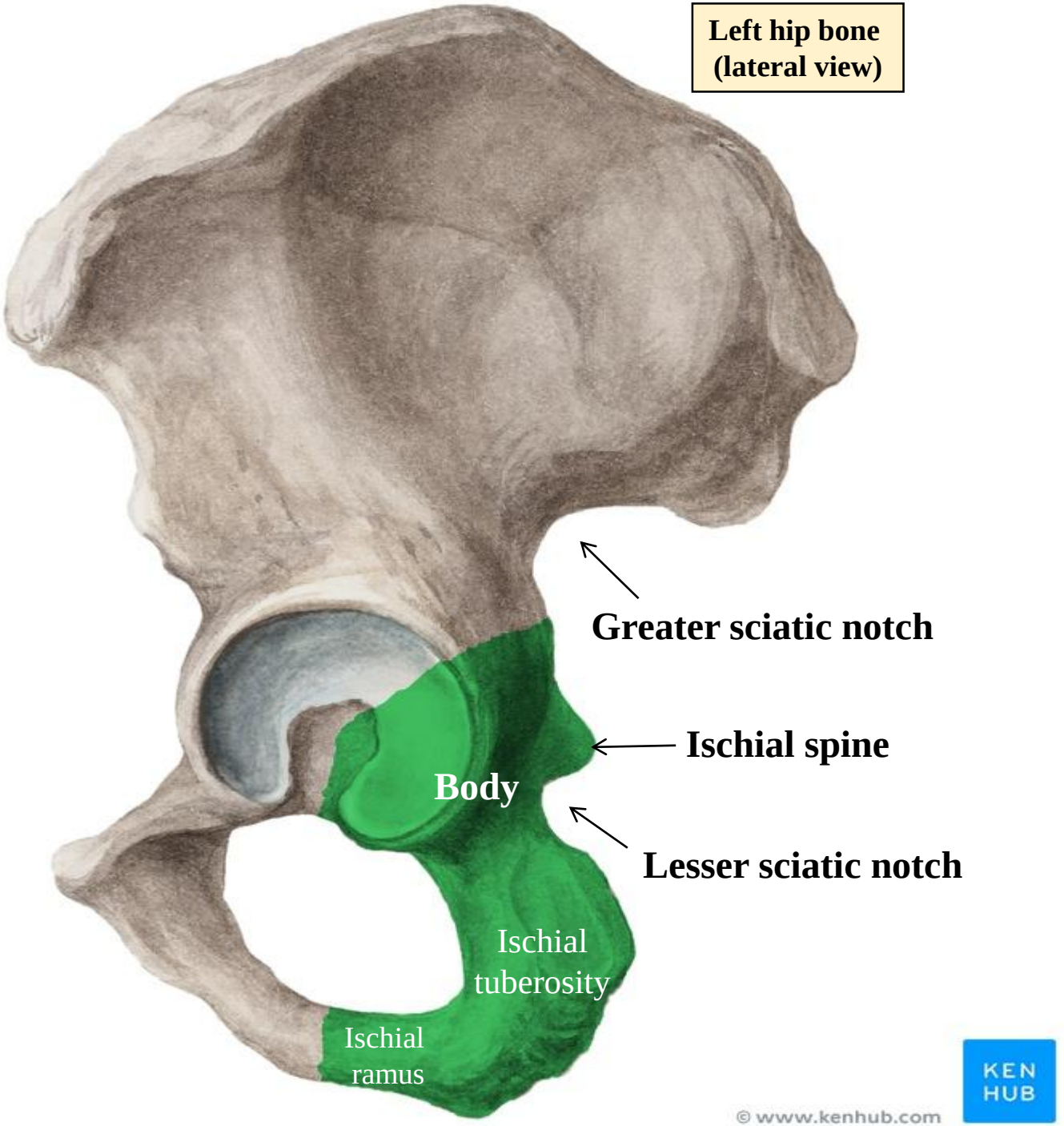
The medial surface of the body articulates with the opposite pubis to form the **pubic symphysis.**

The inferior ramus of the pubic bone joins the ischial ramus to form the **conjoint ramus (ischiopubic ramus)**.



Outer or gluteal surface

Left hip bone (lateral view)



Ischium: is the posterior-inferior part of hip bone.

It has 4 parts:

Body

Ischial tuberosity: (sitting bone) it is related to bursa to reduce friction during sitting.

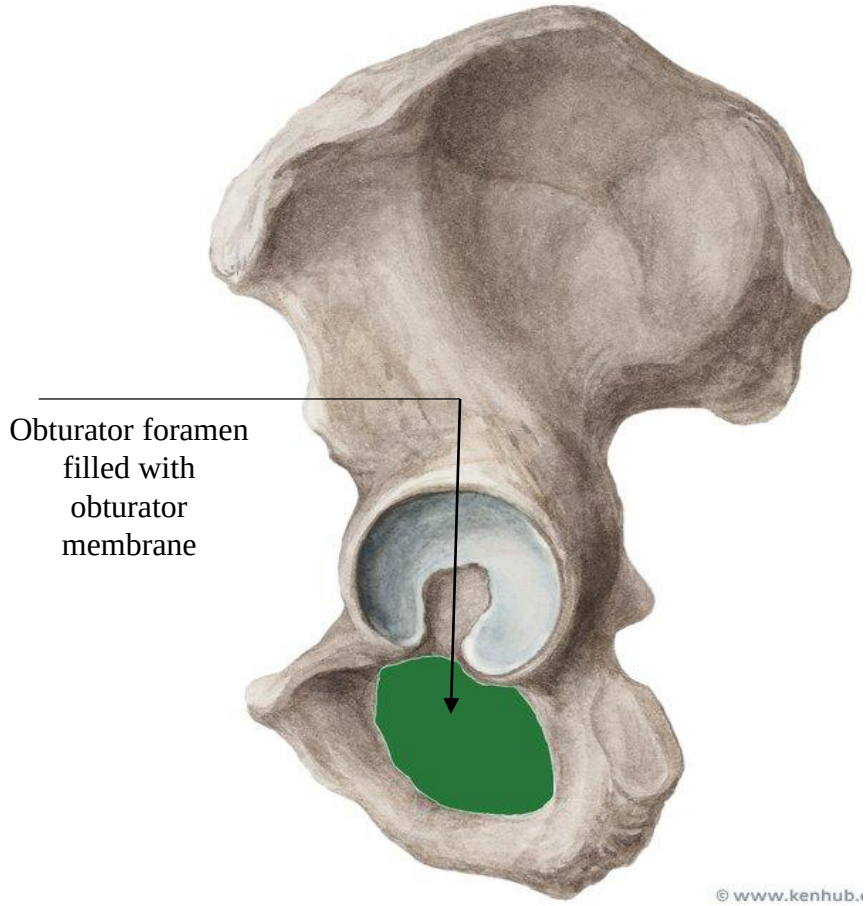
Ischial spine: which separates the greater sciatic notch from the lesser sciatic notch.

Ischial ramus: which joins the inferior pubic ramus to form ischiopubic (conjoint) ramus.

Obturator foramen

- ✓ A large opening below the acetabulum.
- ✓ In living subjects, it is filled with obturator membrane except superiorly

Obturator canal for the passage of obturator vessels and nerve.

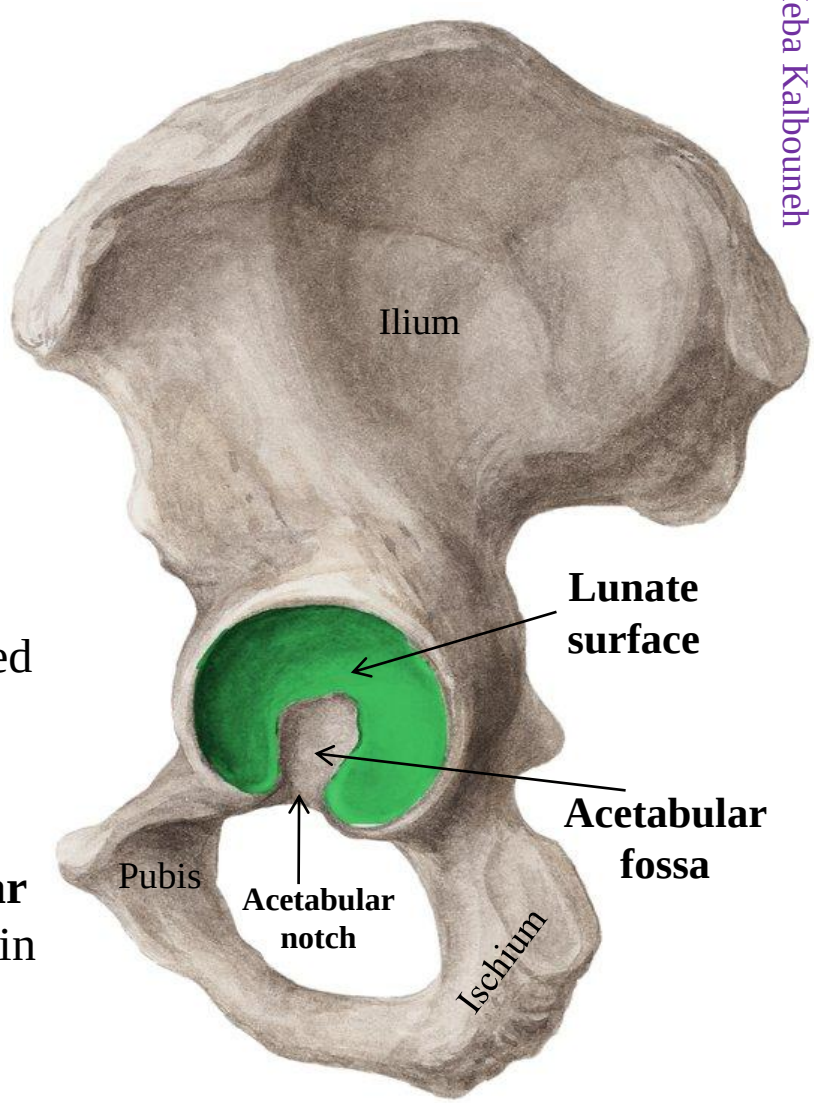


Acetabulum

- ✓ It is a hollow depression located on the lateral aspect of the hip bone.
- ✓ It is directed laterally, downwards and forwards.
- ✓ A fibrocartilaginous lip called **acetabular labrum**, is attached to the margin of the acetabulum to increase its depth.

- ✓ The acetabulum articulates with head of femur to form hip joint.
- ✓ It is notched inferiorly by the **acetabular notch** which is bridged by the **transverse acetabular ligament** (part of the acetabular labrum).

- ✓ Its cavity presents a horse-shoe shaped articular surface called **Lunate surface.**
- ✓ The lunate surface surrounds a non articular depression called **acetabular fossa** which is occupied by fat tissue in living subjects.



Anatomical position of the hip bone

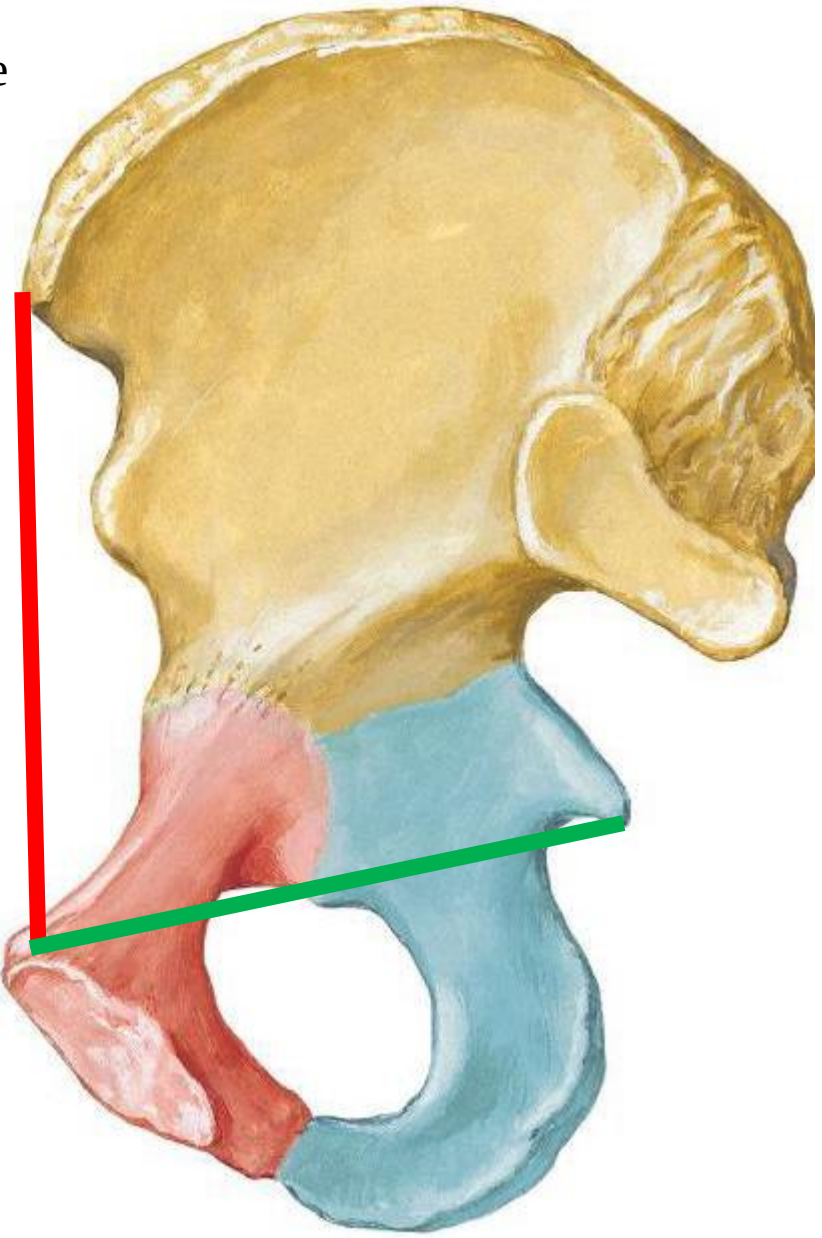
It is very important to understand the anatomical position of the hip bone.

In anatomical position:

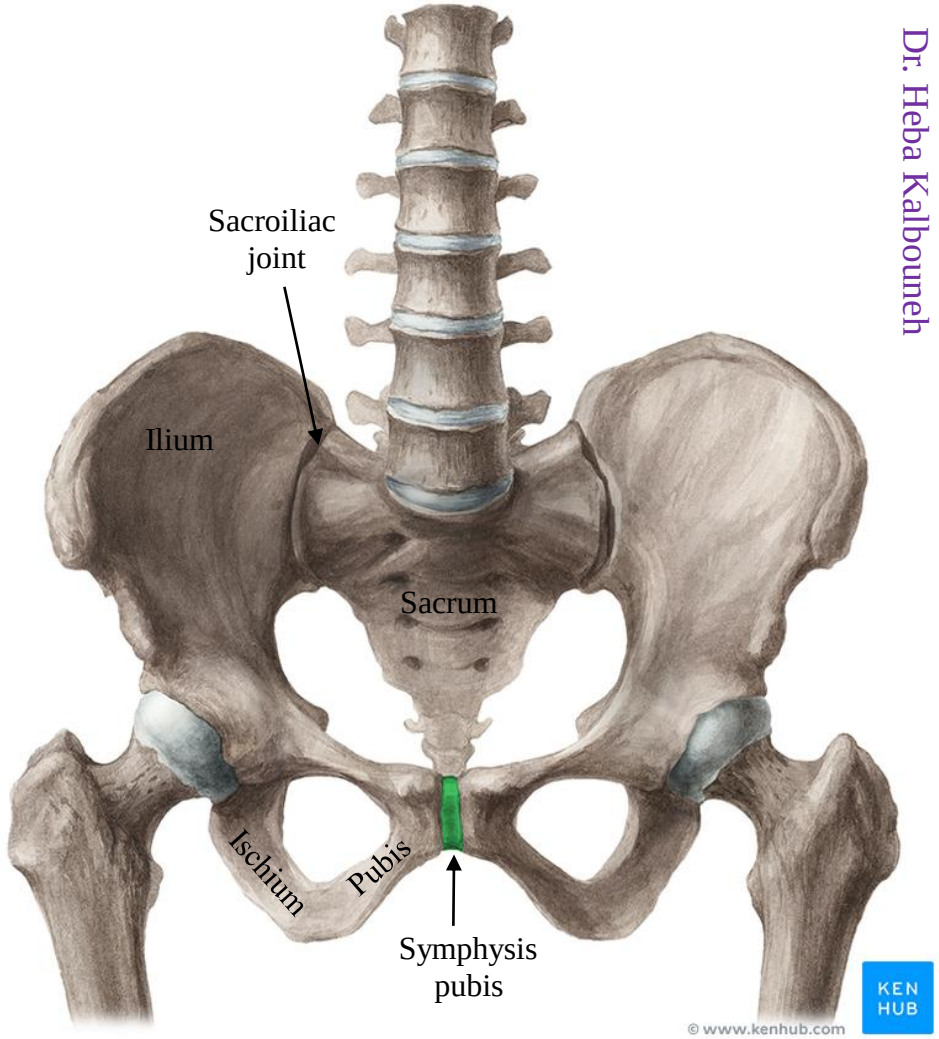
1-The anterior superior iliac spine and the pubic tubercle lie in the **same vertical plane.**

2-The ischial spine and the upper border of the symphysis pubis lie in the **same horizontal plane.**

It means that the pelvis is looking forward in the anatomical position



The 2 hip bones with the sacrum form the pelvis



Now look! where does the pelvis look? It is looking right at you! Never upwards

During your first practical session, make sure to have a look at the anatomical position of the pelvis

Femur

Femur (thigh bone)

It is the longest & strongest bone in the body. It has:

Upper end, consists of:

Head (shows fovea) and **neck**.

Greater trochanter (Its medial surface shows **trochanteric fossa**)

Lesser trochanter

Intertrochanteric line (anterior) & **intertrochanteric crest** (posterior) between greater and lesser trochanters.

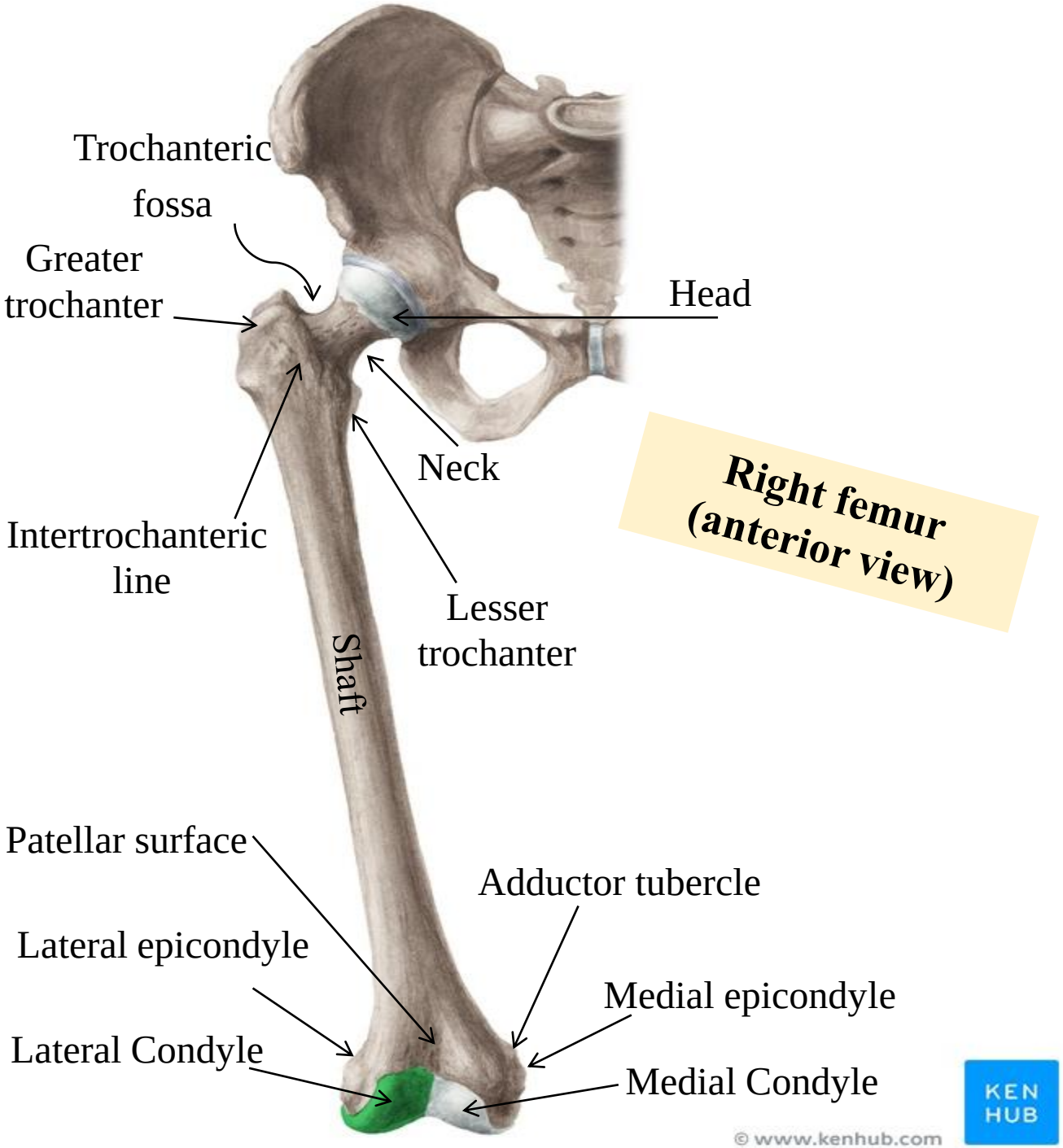
Lower end, consists of:

Medial and lateral condyles: The lateral condyle is more prominent.

The two condyles are fused anteriorly to form a **patellar surface** and separated posteriorly to form an **intercondylar fossa.**

Medial and lateral epicondyles

Adductor tubercle is a prominence present at the lower end of the medial supracondylar line.



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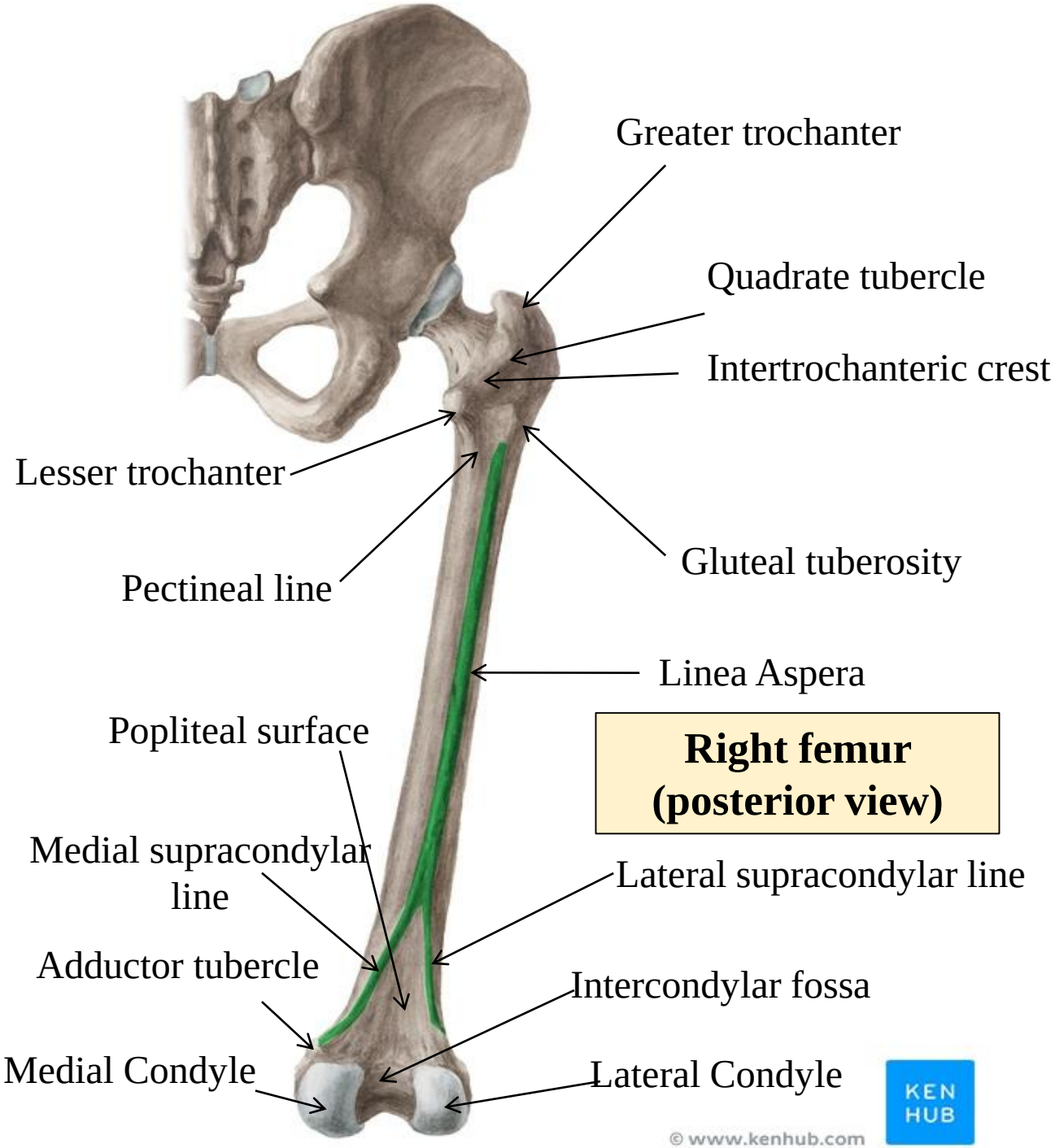


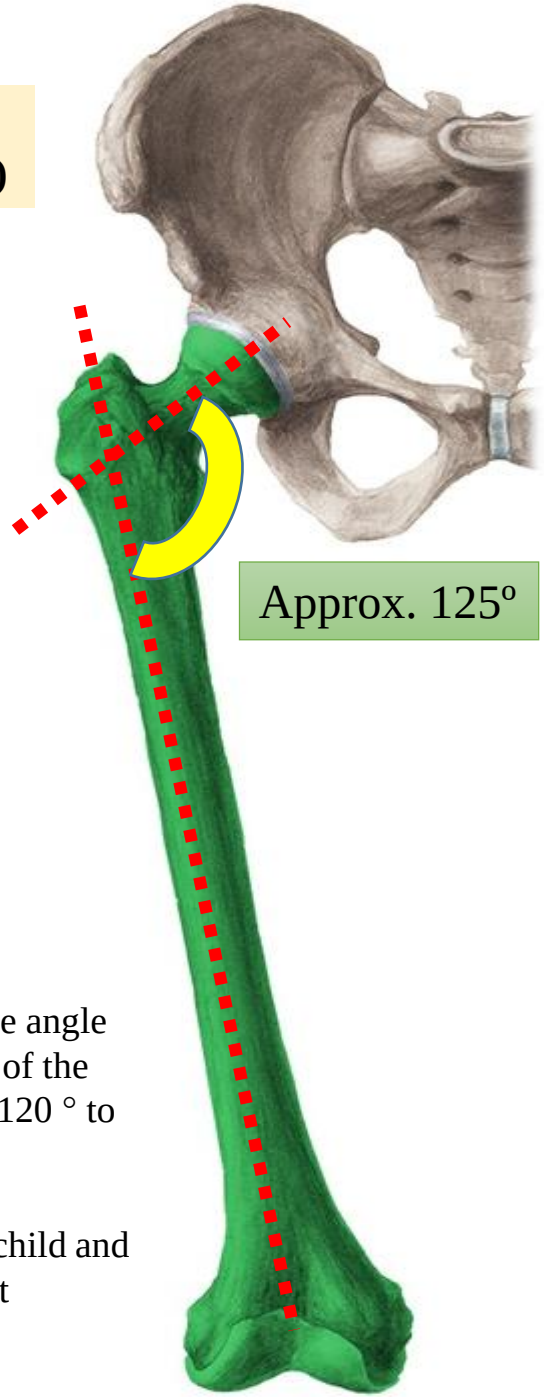
Shaft: It presents

Anterior surface convex smooth anteriorly.

Posterior surface shows:

- **Intertrochanteric crest**
- **Quadrate tubercle** is a small tubercle found on intertrochanteric crest.
- **Gluteal tuberosity** (lateral)
- **Pectineal line** (medial)
- **Linea aspera** (has a medial & lateral lips)
- **Medial & lateral supracondylar ridges**
- **Popliteal surface** of femur.

Right femur (Anterior view)



Approx. 125º

Descends at a 7 degree angle medially

Angle of inclination: It is the angle between the neck and shaft of the femur, typically ranges from 120 ° to 135 ° degrees

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

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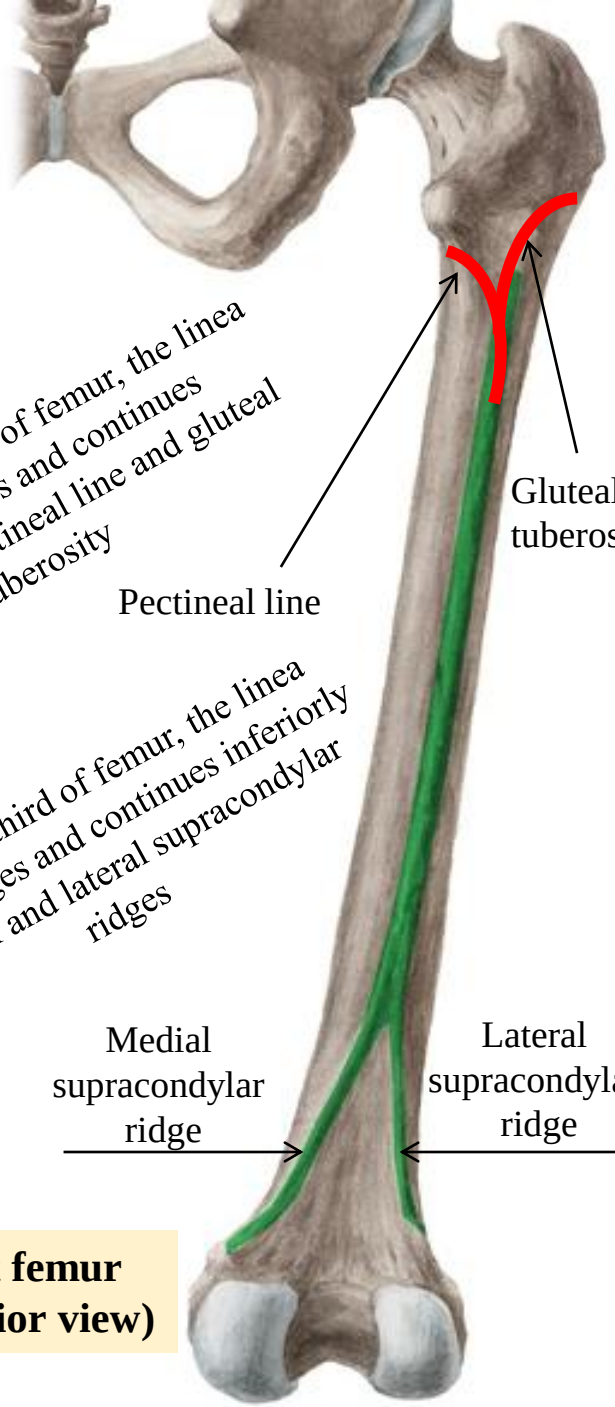

In the proximal third of femur, the linea aspera diverges and continues superiorly as pectineal line and gluteal tuberosity

Pectineal line

Gluteal tuberosity

In the distal third of femur, the linea aspera diverges and continues inferiorly as medial and lateral supracondylar ridges

Medial supracondylar ridge

Lateral supracondylar ridge

Right femur (Posterior view)

Articulations of hip bones

Articulation of hip bones

1. The hip bones articulate with the sacrum at the **sacroiliac joints posteriorly.**
2. The hip bones articulate with one another at the **symphysis pubis anteriorly.**
3. The hip bone articulates with femur at the **hip joint laterally.**

The **sacroiliac joint** is the joint between sacrum and the ilium bones of the pelvis.
Type: plane synovial joint.

The main function of the joint is to bear the weight of the axial skeleton and transfer it to the hip bones. The weight can then be distributed to the two femurs in the standing position, or the ischial bones in the seated position.

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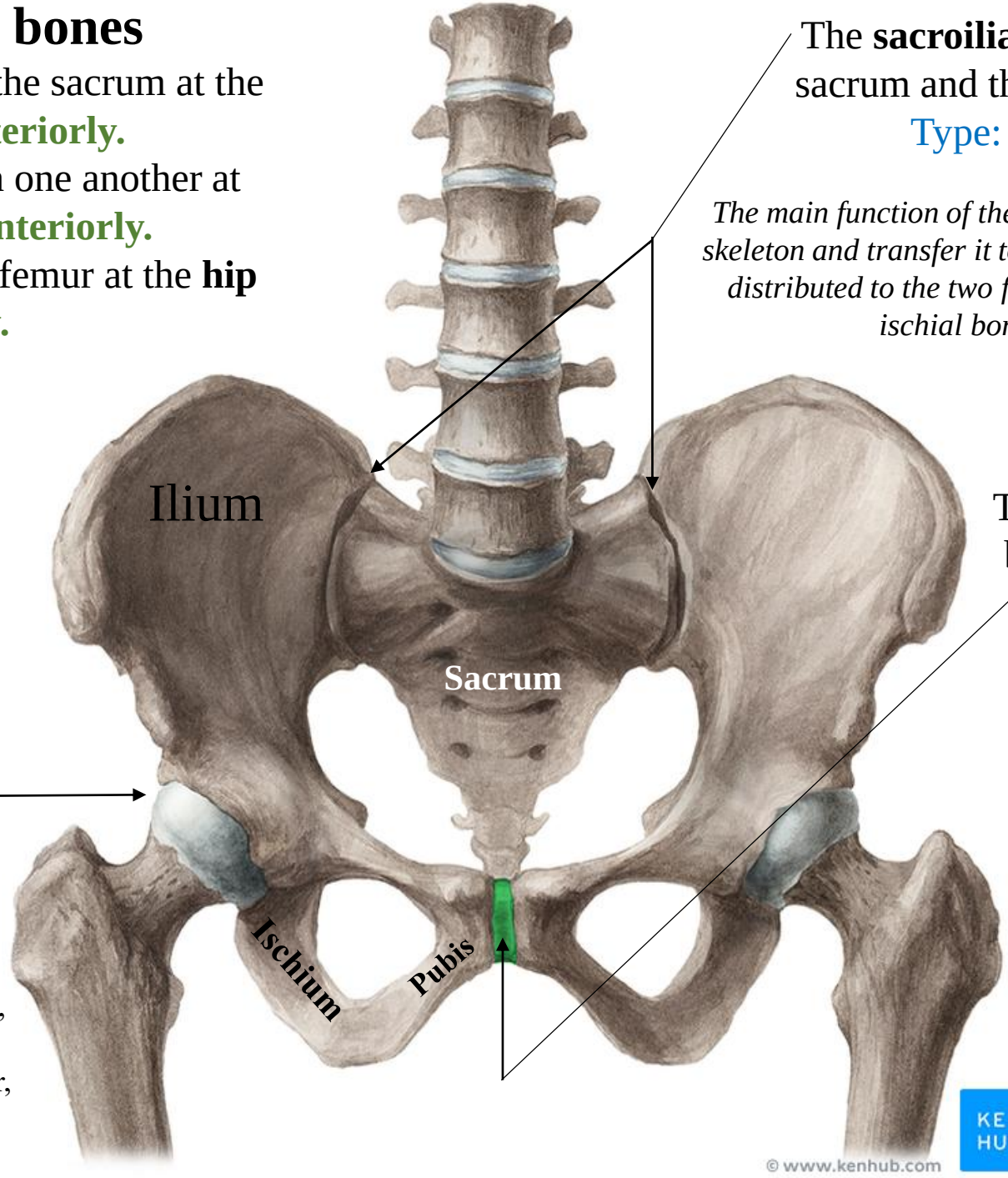
The **hip joint** is the joint between the head of femur and lunate surface of acetabulum (Acetabulofemoral joint).
Type: Ball and socket synovial joint.
Movements: flexion, extension, abduction, adduction, medial & lateral rotation & circumduction.

Ligaments:
Extracapsular: Iliofemoral, pubofemoral, ischiofemoral ligaments
Intracapsular: Ligament of head of femur, transverse ligament of acetabulum.



The **symphysis pubis** is the joint between the left and right pubic bones.
Type: Secondary cartilaginous joint.

The movements in the pubic symphysis are very limited but very important for cushioning the stress related to physical activity particularly while walking and running. During pregnancy, circulating hormones (e.g. relaxin) cause structural changes in the pubic symphysis in order to increase its width and mobility to prepare the pelvis for childbirth.