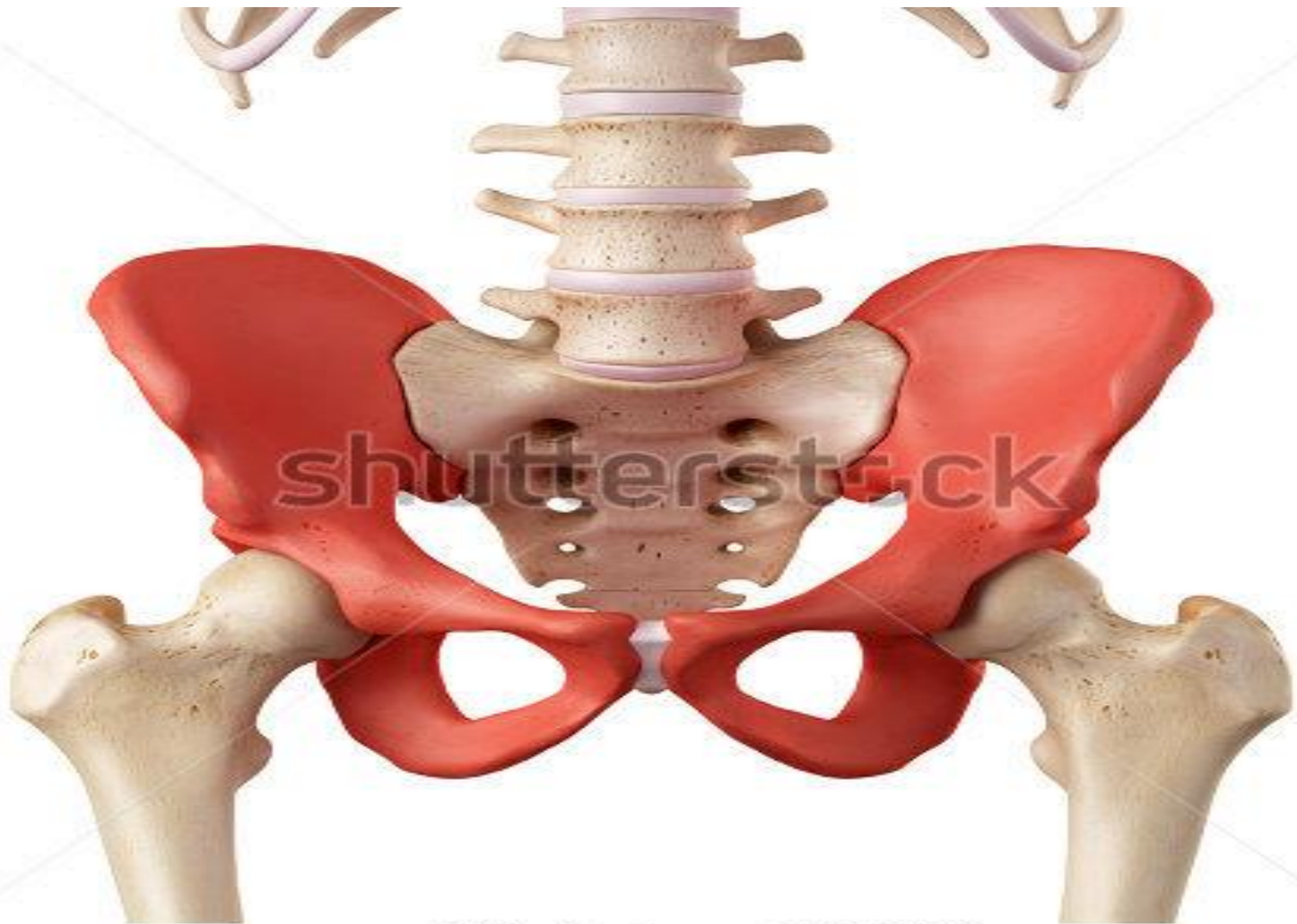
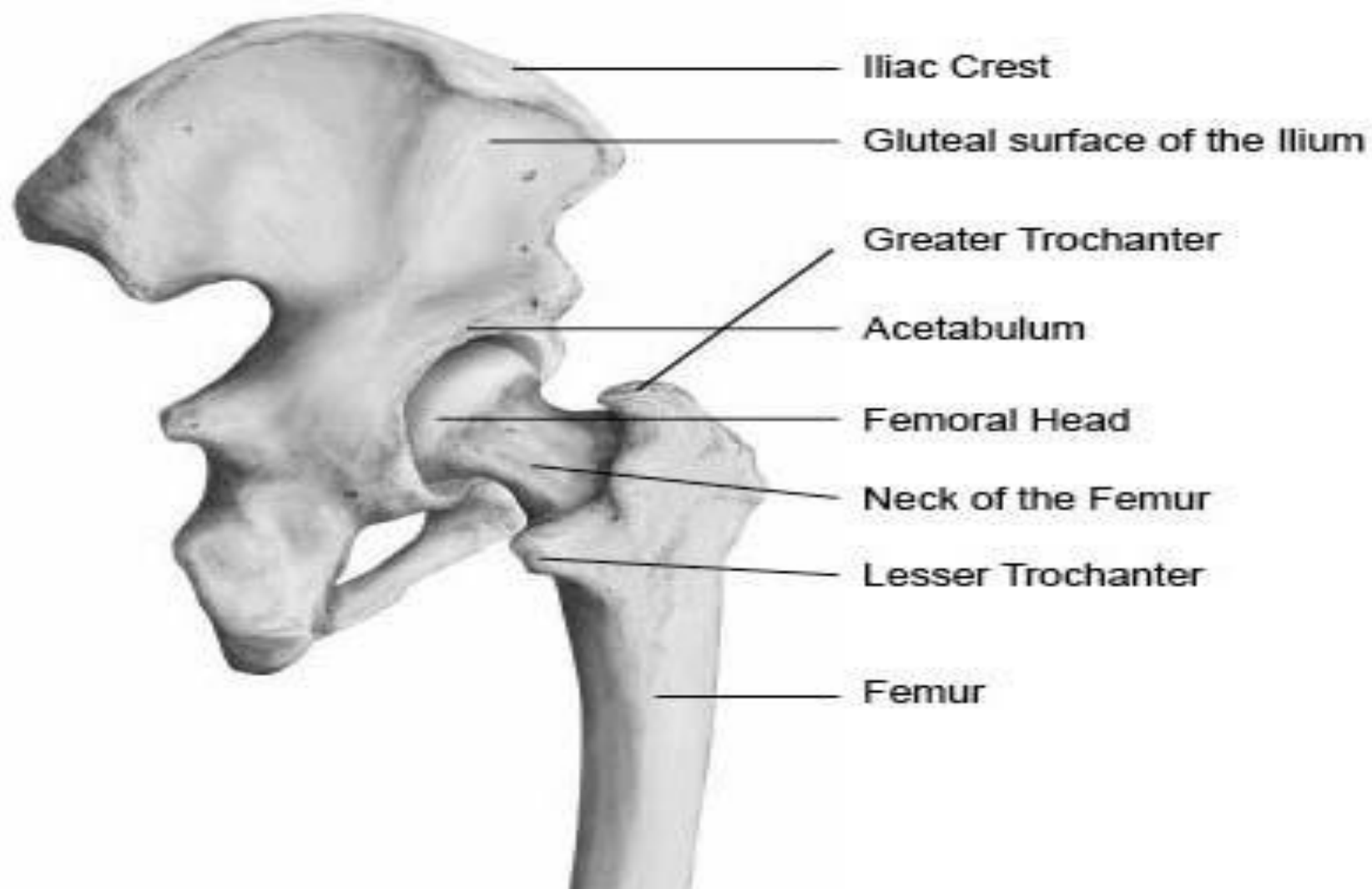


# Hip bone

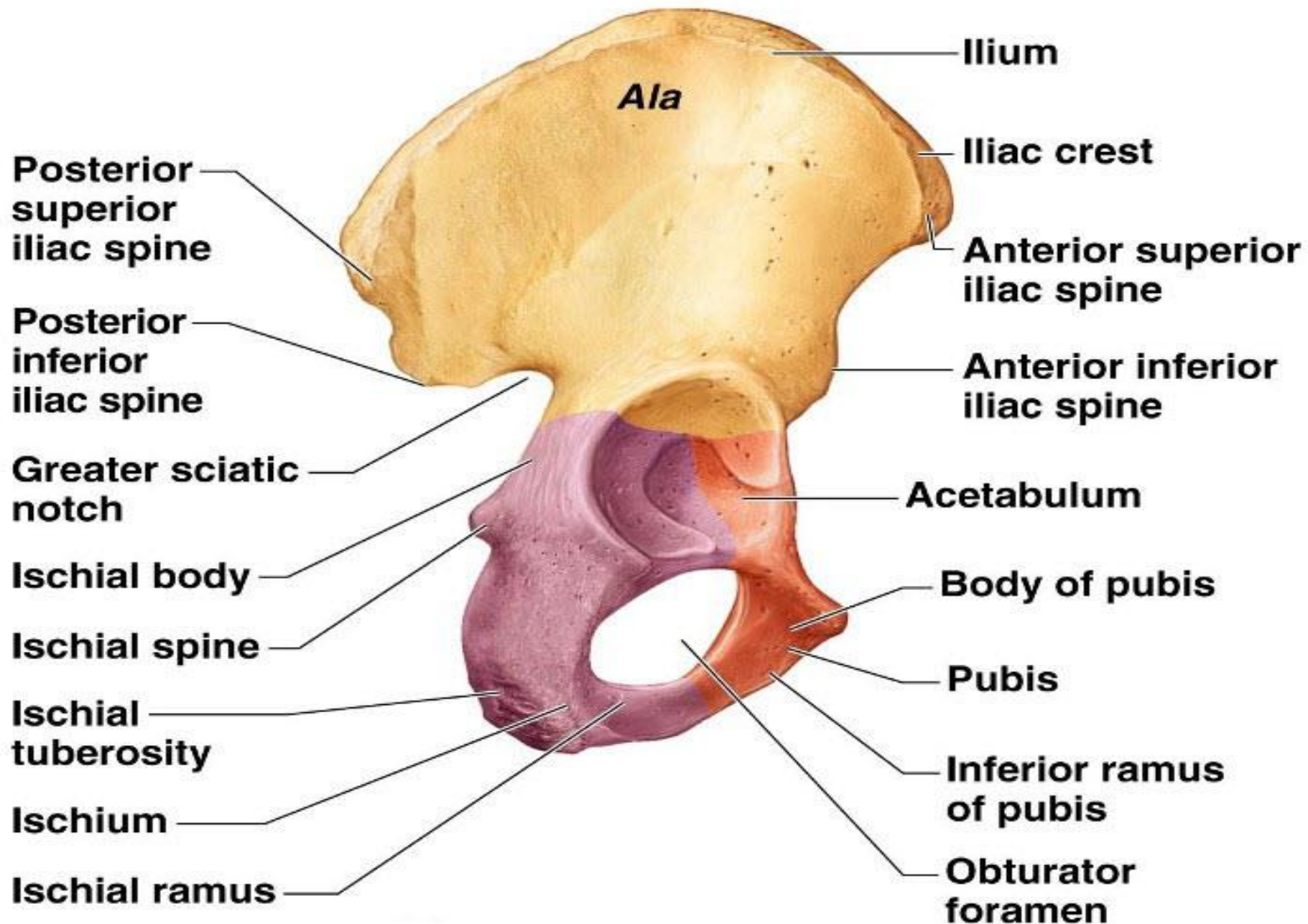


## Posterior (Back) of Hip



# Hip bone

- This is a large irregular bone
- It is made up of 3 parts
- These are the **ilium superiorly**, the **pubis anteroinferiorly** and the **ischium posteroinferiorly**.
- The 3 parts are joined to each other at a cup shaped hollow, called the **acetabulum**.
- The pubis and ischium are separated by a large oval opening called the **obturator foramen**.



- The acetabulum articulates with the head of the femur to form the hip joint. The pubic parts of the 2 hip bones meet anteriorly to form the **pubic symphysis**.
- The 2 hip bones form the **pelvic or hip girdle**.
- The **bony pelvis** is formed by the 2 hip bones along with the sacrum and coccyx.

### **Side determination-**

1. The acetabulum is directed laterally.
2. The flat, expended ilium forms the upper part of the bone, that lies above the acetabulum.

**3.The obturator foramen lies below the acetabulum.**

**4. It is bounded anteriorly by the thin pubis and posteriorly by the thick and strong ischium.**

# ilium

- ❖ The ilium or flank forms the upper expended plate like part of the hip bone.
- ❖ Its lower part forms the **upper 2/5<sup>th</sup> of the acetabulum.**
- ❖ The ilium has the following-
  1. An upper end which is called the **iliac crest.**
  2. A lower end which is smaller and is fused with the pubis and the ischium at the acetabulum.

- 3. 3 borders- anterior, posterior, medial.**
- 4. 3 surfaces- gluteal surface, iliac surface or iliac fossa and a sacropelvic surface.**

### **Iliac crest-**

- **The iliac crest is a broad convex ridge forming the upper end of the ilium. It can be felt in the living at the lower limit of the flank.**
- **The highest point of the iliac crest is situated a little behind the midpoint of the crest.**



- It lies at the level of the interval between the spines of **vertebrae L3 and L4**.
- **Ends**- the anterior end of the iliac crest is called the **anterior superior iliac spine**. This is a prominent landmark that is easily felt in the living.
- The posterior end of the crest is called the **posterior superior iliac spine**. Its position on the surface of the body is marked by a dimple 4 cm lateral of the 2<sup>nd</sup> sacral spine.

- **Morphological division-** morphologically, the iliac crest is divided into a **long vertical segment** and a **short dorsal segment**.
- The **vertical segment** forms more than the anterior  $2/3^{\text{rd}}$  of the crest. It has an outer lip, an inner lip and an intermediate area.
  - The tubercle of the iliac crest is an elevation that lies on the outer lip about 5 cm behind the anterior superior iliac spine.
  - The **dorsal segment** forms less than the posterior  $1/3^{\text{rd}}$  of the crest. It has a lateral and a medial slope separated by a ridge.

### ➤ **Anterior border of ilium-**

- This border starts at the anterior superior iliac spine and runs downwards to the acetabulum.
- The upper part of the border present a notch, while its lower part shows an elevated area called the anterior inferior iliac spine.

### ➤ **Posterior border of ilium-**

- This border extends from the posterior superior iliac spine to the upper end of the posterior border of the ischium.

- A few centimetres below the posterior superior iliac spine it presents another prominence called the **posterior inferior iliac spine**. Still lower down the posterior border is marked by a large deep notch called the **greater sciatic notch**.

➤ **Medial border-**

- It extends on the inner or pelvic surface of the ilium from the iliac crest to the iliopubic eminence.

- It separates the iliac fossa from the sacropelvic surface.

### ➤ Gluteal surface-

- This is the outer surface of the ilium. It is divided into 4 areas by **3 gluteal lines**.
- **The posterior gluteal line**, the shortest, begins 5 cm in front of the posterior superior spine and ends just in front of the posterior inferior spine.

POSTERIOR

ANTERIOR

Gluteal lines

Anterior

Inferior

Posterior

Posterior  
superior  
iliac spine

Posterior  
inferior  
iliac spine

Greater sciatic notch

Body of ischium

Ischial spine

Lesser sciatic notch

Ischial tuberosity

Ramus of ischium

ILIUM

ISCHIUM

Iliac crest

Ala

Anterior superior  
iliac spine

Anterior inferior  
iliac spine

Body of ilium

Acetabulum

Acetabular notch

Superior ramus  
of pubis

Pubic tubercle

PUBIS

Obturator  
foramen

Inferior ramus  
of pubis

(b) Detailed lateral view

- **The anterior gluteal line**, the longest, begins about 2.5 cm behind the anterior superior spine, runs backwards and then downwards to end at the middle of the upper border of the greater sciatic notch.
- **The inferior gluteal line**, the most ill-defined, begins a little above and behind the anterior inferior spine, runs backwards and downwards to end near the apex of the greater sciatic notch.

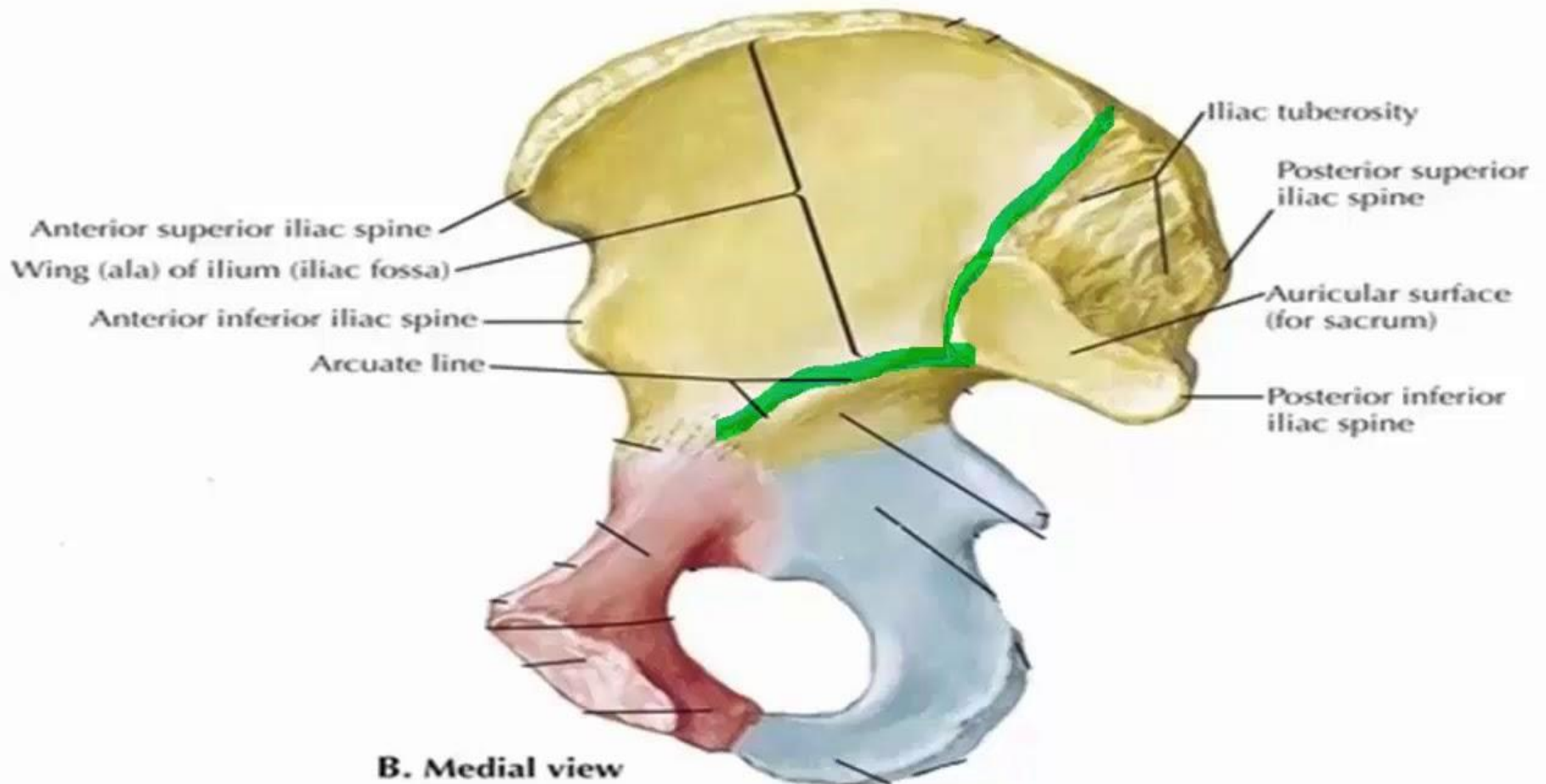
## ➤ Iliac fossa-

- This is the large concave area on the inner surface of the ilium, situated in front of its medial border. It forms the lateral wall of the false pelvis.

## ➤ Sacropelvic surface-

- This is the uneven area on the inner surface of the ilium, situated behind its medial border.
- It is subdivided into 3 parts: the iliac tuberosity, the auricular surface and the pelvic surface.





### Borders:

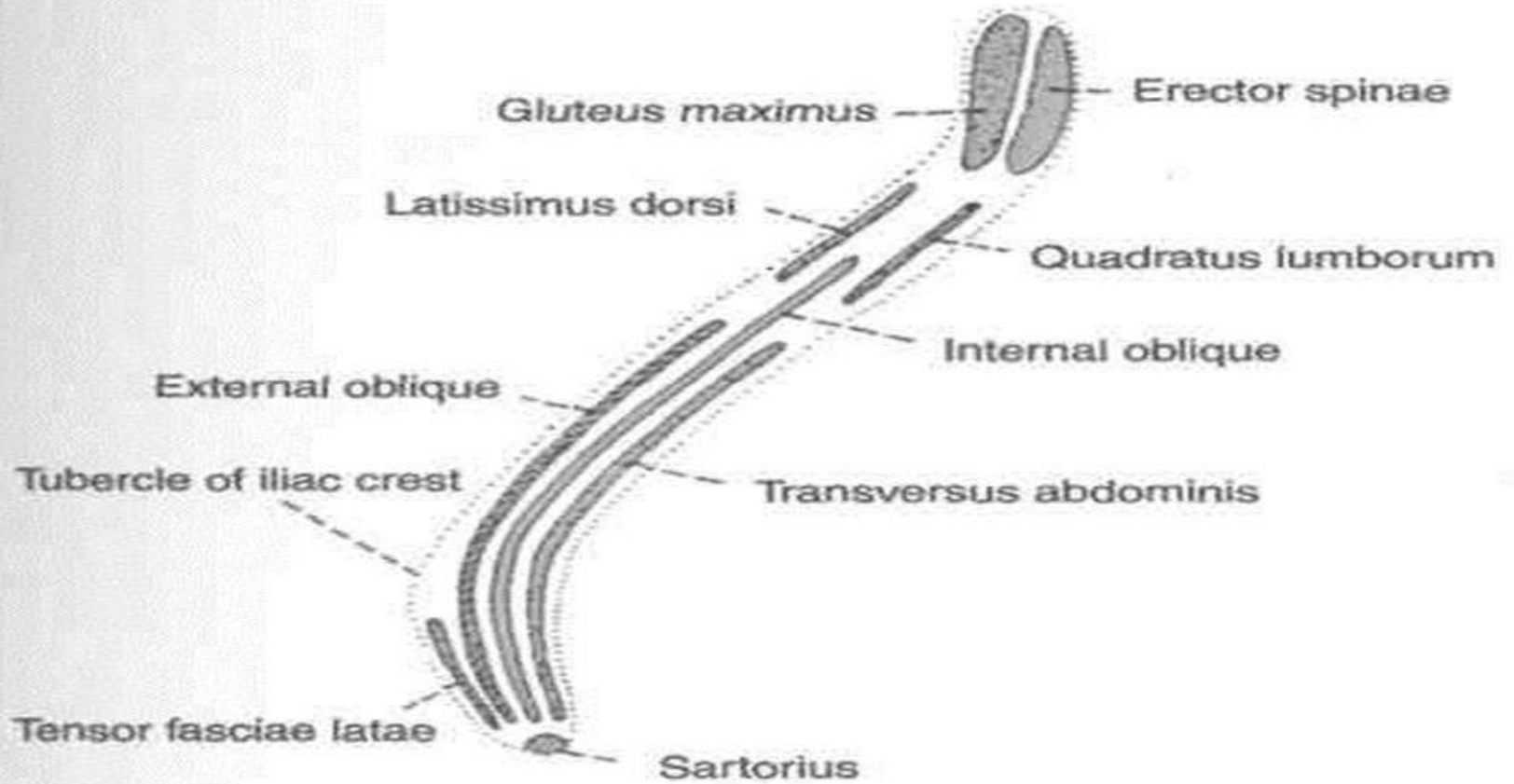
**3] Med.bor.** – lies internally & it separates Iliac fossa from Sacro-iliac sur. In upper part.

**Arcuate line:** is a smooth & rounded line is present in lower part.

- **The iliac tuberosity** is the upper, large, roughened area, lying just below the dorsal segment of the iliac crest.
- **The auricular surface** is articular but pitted. it lies anteroinferior to the Iliac tuberosity.
- Along the upper border of the greater sciatic notch, this surface is marked by the **preauricular sulcus**. This sulcus is deeper in females than in male.

# Muscles attachments

## ATTACHMENTS ON ILIAC CREST



**Fig. 2.3:** Scheme to show the attachments on the right iliac crest (as seen from above).

- The anterior superior iliac spine-
  1. Lateral end of the inguinal ligament
  2. (o) **Sartorius muscle**; the origin extends onto the upper half of the notch below the spine.
- Outer lip of the iliac crest-
  1. **Fascia lata** in its whole extent.
  2. (O) **tensor fascia latae** in front of tubercle
  3. (I) **external oblique muscle** in its anterior 2/3rd

4. (O) **latissimus dorsi** just behind the highest point of the crest.

- Inner lip of the iliac crest-

1. (O) **transversus abdominis** in its anterior 2/3<sup>rd</sup>

2. fascia transversalis and to the fascia iliaca in its anterior 2/3<sup>rd</sup>, deep to the attachments of the transversus abdominis.

3. (O) **quadratus lumborum** in its posterior 1/3<sup>rd</sup>.

4. Thoracolumbar fascia around the attachment of the quadratus lumborum

- Intermediate area of the iliac crest-
    1. (O) **internal oblique muscle** in its anterior 2/3<sup>rd</sup>.
  - Dorsal segment of the iliac crest-
    1. The lateral slope-(O) **gluteus maximus**
    2. The medial slope-(O) **erector spinae**
  - The upper half of the anterior inferior iliac spine-
    - 1.(O) **straight head of the rectus femoris.**
- Lower part of this spine- iliofemoral ligament

- **The posterior border of the ilium-**

- 1.(O) few fibres of the **piriformis** from the upper margin of the greater sciatic notch.

- **Gluteal surface-**

1. The area behind the posterior gluteal line –

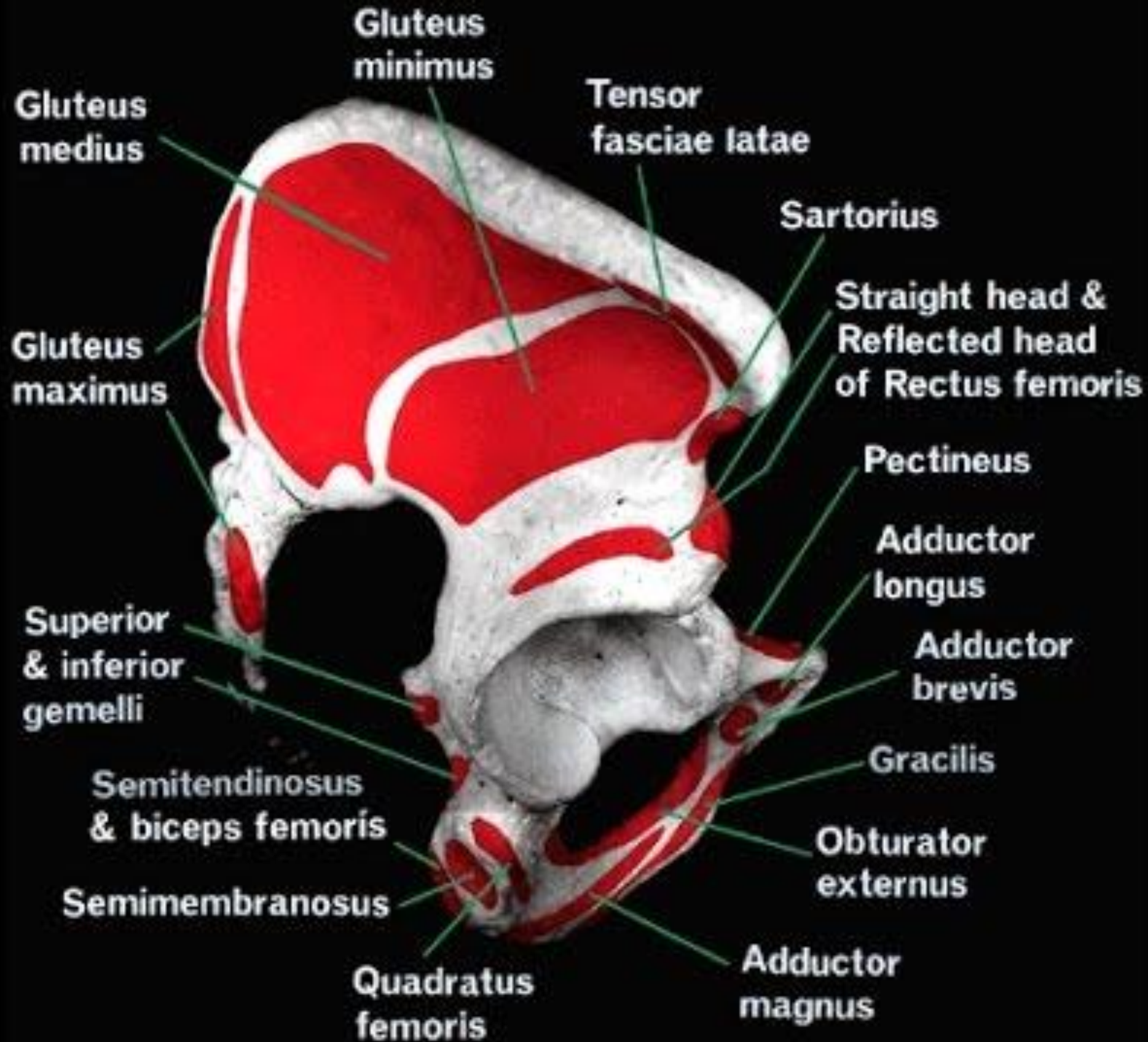
- (O) **Gluteus maximus**

2. Area b/w the anterior and posterior gluteal lines-(O)**gluteal medius**

3. Area b/w the anterior and inferior gluteal lines-(O)**gluteus minimus**

4. **Below the inferior gluteal line-(O) reflected head of the rectus femoris**







- Iliac fossa-(O) iliacus from its upper 2/3<sup>rd</sup>

# PUBIS

- **The pubis forms the anteroinferior part of the hip bone near the midline.**
- **It forms the anterior  $1/5^{\text{th}}$  of the acetabulum and it forms the anterior boundary of the obturator foramen.**
- **It consists of a body , a superior ramus and an inferior ramus.**

- **Body- anteriorly**
- **Superior ramus- superolaterally**
- **Inferior ramus- inferolateralally**

**Body of pubis-**

**This is flattened from before backwards, and has:**

- 1. A superior border called the pubic crest**
- 2. A pubic tubercle at the lateral end of the pubic crest.**

**3. - 3 surfaces, anterior, posterior and medial.**

- **Anterior surface- it is directed downwards, forwards and slightly laterally.**
- **Posterior or pelvic surface- it is directed upwards and backwards.**
- **It forms the anterior wall of the true pelvis and is related to urinary bladder.**
- **Medial or symphyseal surface- it articulates with the opposite pubis to form the pubic symphysis.**

- **Superior ramus-it extends from the body of the pubis to the acetabulum, above the obturator foramen.**

**-it has 3 borders and 3 surfaces**

**Superior border is called the pectineal line or pecten pubis. It is a sharp crest extending from just behind the pubic tubercle to the posterior part of the iliopubic eminence.**

**Anterior border- c/d obturator crest.extending from the pubic tubercle to the acetabular notch.**

- **Inferior border-** forms the upper margin of the obturator foramen.
- **Pectineal surface-** between the anterior and superior border. Extending from the pubic tubercle to the iliopubic eminence.
- **Pelvic surface-** between the superior and inferior borders.
- **Obturator surface-** between anterior and inferior borders.

## **Inferior ramus-**

- **It extends from the body of the pubis to the ramus of the ischium, medial to the obturator foramen.**
- **It unites with the ramus of the ischium to form the conjoined ischiopubic rami.**

# Attachments and relations of the pubis

- **Pubic tubercle-** medial end of the inguinal ligament.
- **The medial part of the pubic crest-**it is crossed by the medial head of the rectus abdominis.
- **The lateral part of the pubic crest-** (o)lateral head of the rectus abdominis, pyramidalis.



- Anterior surface of the body of the pubis-
  1. medially- anterior pubic ligament
  2. Between crest and symphysis- (o)adductor longus
  3. Margin of symphysis, inferior ramus- (O)gracilis
  4. Lateral to the origin of the gracilis- (O)adductor brevis
  5. Margin of obturator foramen- (O) obturator externus

- Posterior surface of the body of the pubis-
  1. Middle part- (O)levator ani
  2. Laterally- (O)obturator internus
- Pectineal line-
  1. Medial end- conjoint tendon
  2. Medial end, in front of the attachment of the conjoint tendon-lacunar ligament
  3. Lateral to the attachment of the lacunar ligament-pectineal ligament of cooper

4. (O)pectineus muscle

5. (I)psoas minor

- Upper part of the pectineal surface-  
(O)pectineus
- Obturator groove- it transmits the obturator vessels and nerve.

# Ischium

- It forms the posteroinferior part of the hip bone and the adjoining 2/5<sup>th</sup> of the acetabulum.
- It forms the posterior boundary of the obturator foramen.
- It has a body and a ramus

# Body of the ischium

➤ **This is a thick and massive mass of bone that lies below and behind the acetabulum.**

**It has:**

**2 ends- upper and lower**

**3 borders- anterior, posterior and lateral**

**3 surfaces- femoral, dorsal and pelvic**

## **2 ends**

- **Upper end- forms the posteroinferior 2/5<sup>th</sup> of the acetabulum.**
- **Lower end- forms the ischial tuberosity.**

## **3 Borders**

- **1. Anterior border- forms the posterior margin of the obturator foramen**
- **2. Posterior border- it is continuous above with the posterior border of the ilium.**

- **Below, it ends at the upper end of the ischial tuberosity.**
- **It also forms part of the lower border of the greater sciatic notch.**
- **Below the notch the posterior margin shows a projection called the ischial spine.**
- **Below the spine the posterior border shows a concavity called the lesser sciatic notch.**
- **3. Lateral border- forms the lateral margin of the ischial tuberosity.**

# 3 surfaces

- **femoral surface-** lies between the anterior and lateral borders.
- **Dorsal surface-** it is continuous above with the gluteal surface of ilium.
- **Pelvic surface-** it is smooth and forms part of the lateral wall of the true pelvis.
- **Ischial tuberosity-** it is divided by a transverse ridge into an upper and a lower area.



- 

Upper area

oblique ridge



superolateral area



inferomedial area

lower area

longitudinal ridge



outer area



inner area

# CONJOINT ISCHIO PUBIC RAMI

- **The inferior ramus of the pubis unites with the ramus of the ischium on the medial side of the obturator foramen.**
- **It has 2 borders**
- **Upper border- forms part of margin of the obturator foramen.**
- **Lower border- forms the pubic arch along with the corresponding border of the bone of the bone of the opposite side.**
- **2 surface – inner and outer**

# Acetabulum

- It Is a deep cup-shaped hemispherical on the lateral aspect of the hip bone.
- It is directed laterally, downwards and forwards.
- The margin of the acetabulum is deficient inferiorly, this deficiency is called the **acetabular notch**.

- **The nonarticular roughened floor is called the **acetabular fossa**.**
- **A horseshoe-shaped articular surface or lunate surface is seen on the anterior, superior and posterior parts of the acetabulum. It is lined with hyaline cartilage and articulates with the head of the femur to form the hip joint.**

# Obturator foramen

- **This is a large gap in the hip bone, situated anteroinferior to acetabulum, between the pubis and the ischium.**
- **It is large and oval in males and small and triangular in females**
- **It is closed by the obturator membrane which is attached to its margins, except at the obturator groove where the obturator vessels and nerve pass out of the pelvis.**

- ❑ Lesser sciatic notch – upper and lower part  
origin superior and inferior gemelli
- ❑ Obturator foramen margin – origin obturator  
externus
- ❑ Lateral border of ischium its upper part -  
origin quadratus femoris
- ❑ Superiolateral – origin semimembrannous
- ❑ Inferiomedial – origin semitendiosus and long  
head of the biceps femoris

- ❑ Lower outer – origin adductor magnus
- ❑ Pelvic surface of ischium – origin obturator internus
- ❑ Obturator foramen upper margin – obturator membrane
- ❑ Pubic ramus – origin adductor brevis, gracilis
- ❑ Ischial ramus – origin adductor magnus