1- PELVIC GIRDLE

BY

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to 2nd class biotechnology

Pelvic girdle, also called bony pelvis, in human anatomy, basin-shaped complex of bones that connects the trunk and the legs, supports and balances the trunk, and contains and supports the intestines, the urinary bladder, and the internal sex organs. The pelvic girdle consists of paired hip bones, connected in front at the pubic symphysis and behind by the sacrum; each is made up of three bones—the blade-shaped ilium, above and to either side, which accounts for the width of the hips; the ischium, behind and below, on which the weight falls in sitting; and the pubis, in front.

All three unite in early adulthood at a triangular suture in the acetabulum, the cup-shaped socket that forms the hip joint with the head of the femur (thighbone). The ring made by the pelvic girdle functions as the birth canal in females. The pelvis provides attachment for muscles that balance and support the trunk and move the legs, the hips, and the trunk. In the human infant the pelvis is narrow and non supportive. As the child begins walking, the pelvis broadens and tilts, the sacrum descends deeper into its articulation with the ilia, and the lumbar curve of the lower back develops

Bony Pelvis

Hip Bone

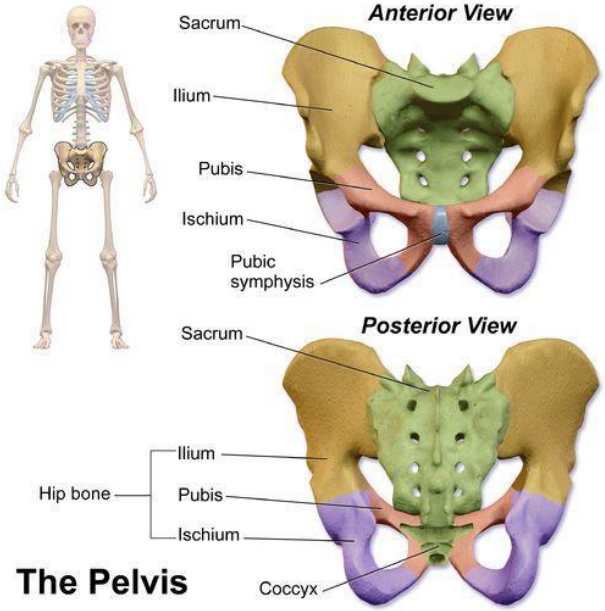
In children:3 separate bones joined by cartilage at acetabulum.

At puberty : fuse together to form one large , irregular bone (hipbone). On its outer surface is deep depression , acetabulum. Behind acetabulum is a large notch, greater sciatic notch, which is separated from lesser sciatic notch by spine of ischium. Sciatic notches are converted into greater and lesser sciatic foramina by presence of sacrotuberous and sacrospinous ligaments.

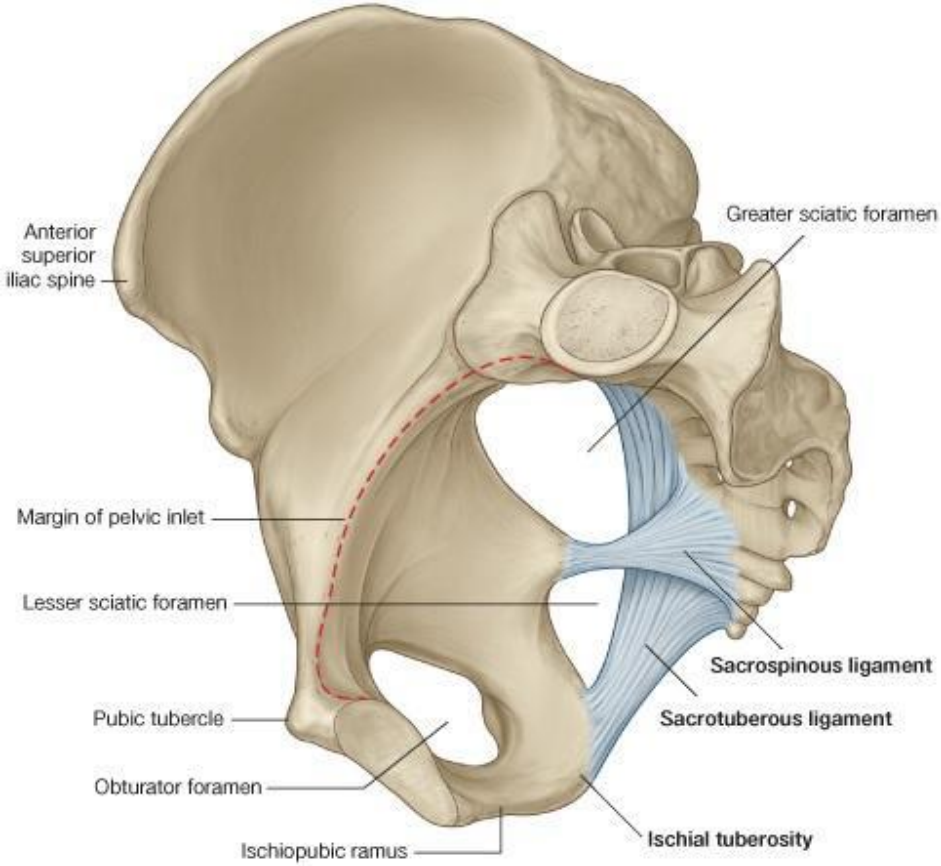
The ilium is upper flattened part of hip bone (iliac crest). Iliac crest runs between anterior and posterior superior iliac spines & below between anterior and posterior inferior iliac spines. Medial surface of ilium is divided into two parts by arcuate line: Above iliac fossa; below a flattened surface continuous with medial surfaces of pubis and ischium. It has large auricular surface for articulation with sacrum.

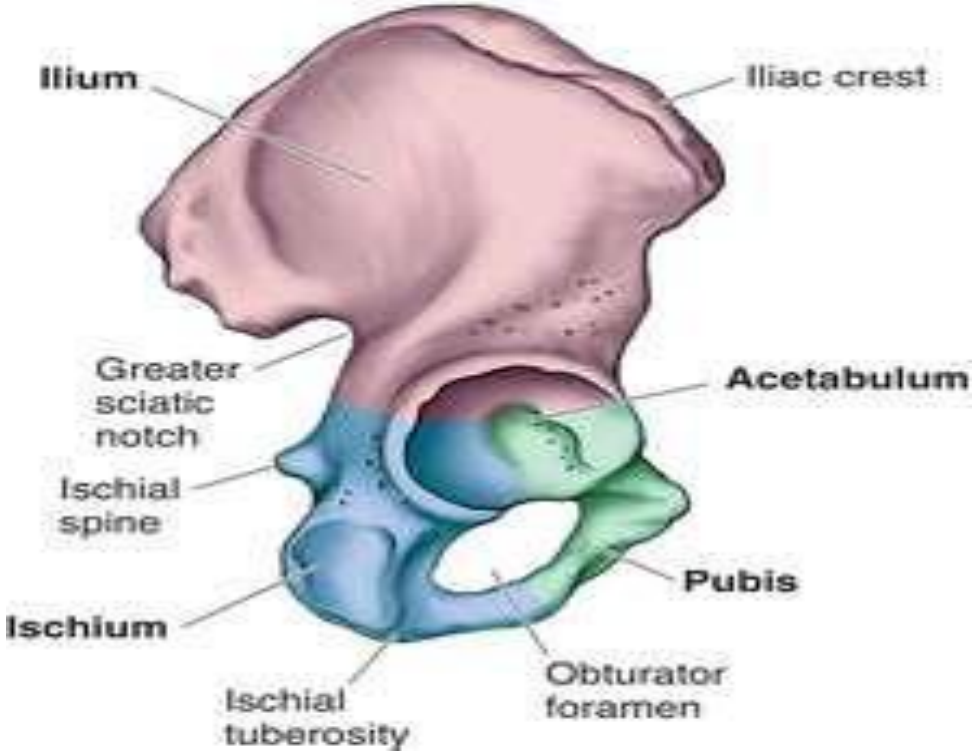
The ischium is inferior and posterior part of hip bone and possesses an ischial spine and an ischial tuberosity.

The pubis is anterior part of hip bone and has a **body, superior and inferior pubic rami**. Body of pubis bears pubic crest and pubic tubercle and articulates with opposite pubis at symphysis. Hip bone has large opening, **obturator foramen**, which is filled in by obturator membrane.


Anterior View
Sacrum
Ilium
Pubis
Ischium
Pubic symphysis
Posterior View
Sacrum
Ilium
Hip bone
Pubis
Ischium
Coccyx

The Pelvis


Anterior superior iliac spine
Greater sciatic foramen
Margin of pelvic inlet
Lesser sciatic foramen
Sacrospinous ligament
Pubic tubercle
Sacrotuberous ligament
Obturator foramen
Ischial tuberosity
Ischiopubic ramus

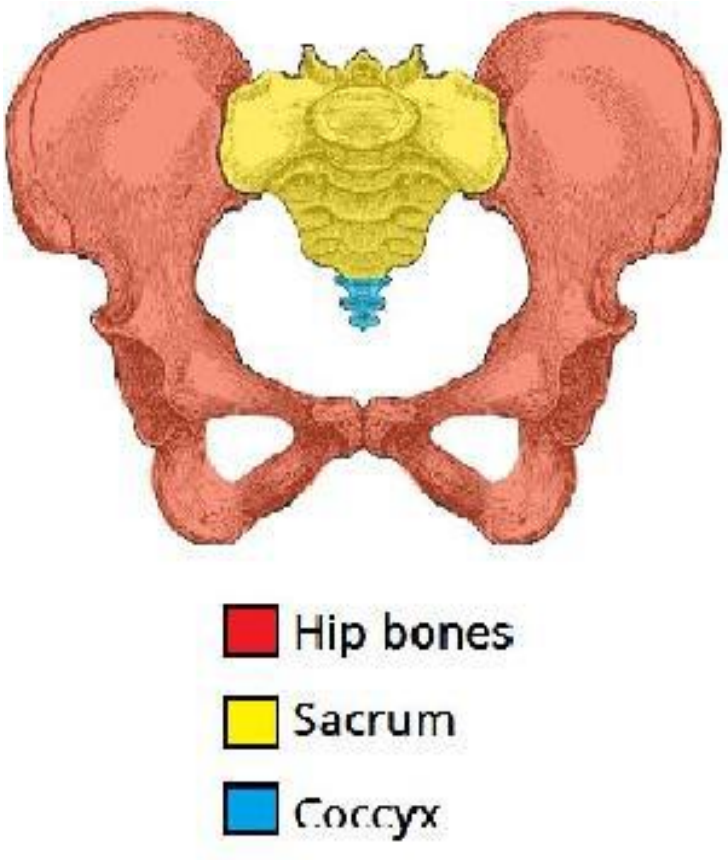

Ilium
Iliac crest
Greater sciatic notch
Acetabulum
Ischial spine
Pubis
Ischium
Ischial tuberosity
Obturator foramen

The Pelvis:

It is the region of trunk that lies below abdomen and it is continuous with abdominal cavity. Also it is the part of the abdominal cavity that lies between the iliac fossae is known as the greater (or "false")pelvis.

Bony Pelvis:

Bony pelvis is a strong structure composed of 4 bones: 2hipbones, sacrum& coccyx. The 2 hipbones articulate with each other anteriorly at symphysis pubis and posteriorly with sacrum at sacroiliac joints



The Pelvis

The pelvis is divided into two parts by pelvic brim, which is formed by sacral promontory behind, iliopectineal lines laterally, and symphysis pubis anteriorly. Above the brim is false pelvis (part of abdominal cavity). Below the brim is true pelvis.

A. False Pelvis (Greater Pelvis)

It is bounded behind by lumbar vertebrae, laterally by iliac fossae and iliacus muscles, and in front by lower part of anterior abdominal wall. It supports abdominal contents and gravid uterus in pregnancy (>3rdmonth).

B. True Pelvis (Lesser Pelvis)

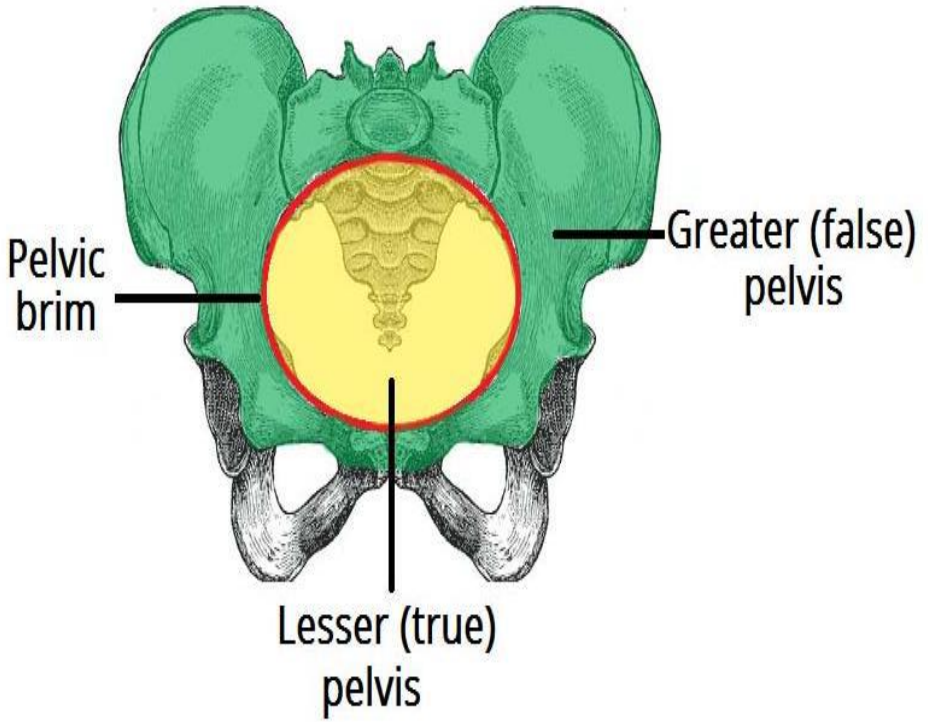
It is of clinical significance
for obstetrics?.

True pelvis has:

-**an inlet**

-**an outlet**

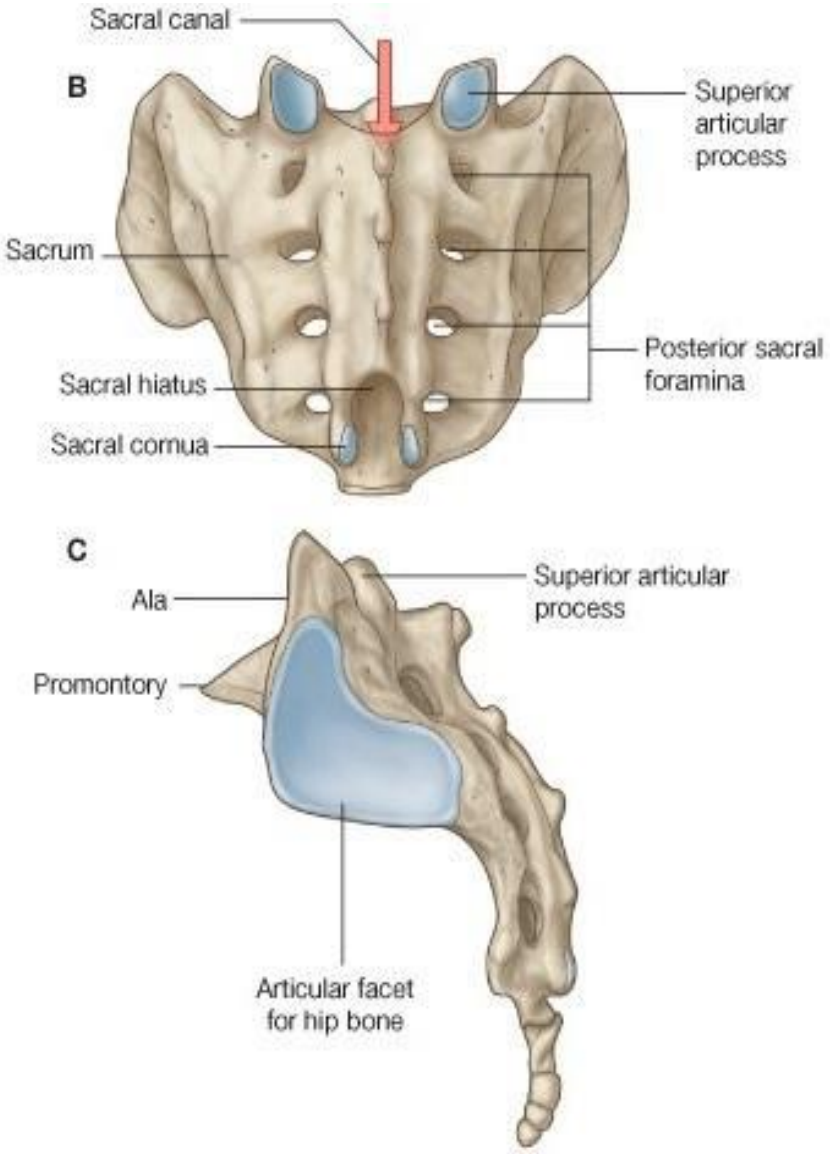
-**a cavity**



Bony Pelvis

Sacrum: It consists of 5 rudimentary vertebrae fused together to form a single wedge-shaped bone with a forward concavity. It articulates superiorly with 5th lumbar vertebra, inferiorly with **coccyx** and Laterally with two iliac bones to form sacroiliac joints. Anterior and upper margins of first sacral vertebra forms sacral promontory (important obstetric landmark used when measuring size of pelvis). Vertebral foramina together form **sacral canal**. Laminae of 5thsacral vertebra, and sometimes those of 4th, fail to meet in the midline, forming sacral hiatus. Sacral canal contains anterior and posterior roots of lumbar, sacral, and coccygeal spinal nerves; filum terminale. It also contains lower part of subarachnoid space down as far as lower border of 2nd sacral vertebra.

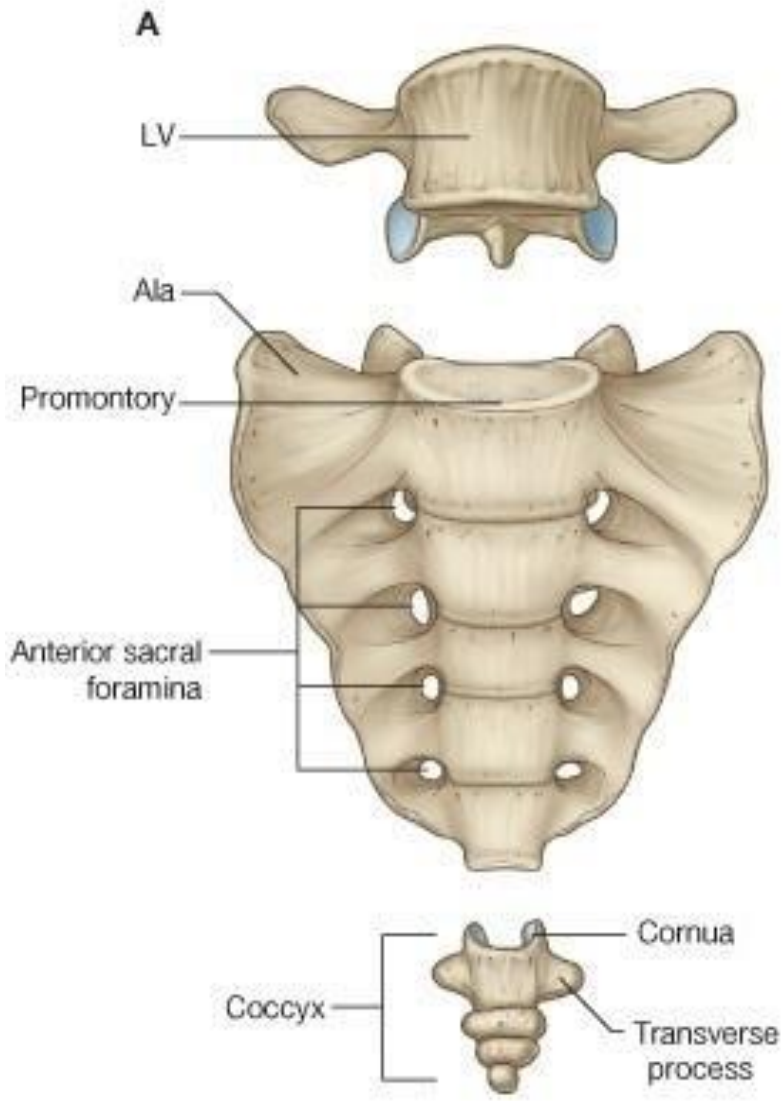
Anterior and posterior surfaces of sacrum possess on each side four foramina for passage of anterior and posterior rami of upper four sacral nerves.



Bony Pelvis

Coccyx:

It consists of **4** vertebrae fused together to form a small triangular bone, which articulates at its base with lower end of sacrum. Coccygeal vertebrae consist of bodies only, but first vertebra has a rudimentary transverse process and cornua. Cornuaare remains of pedicles and superior articular processes and project upward to articulate with sacral cornua.

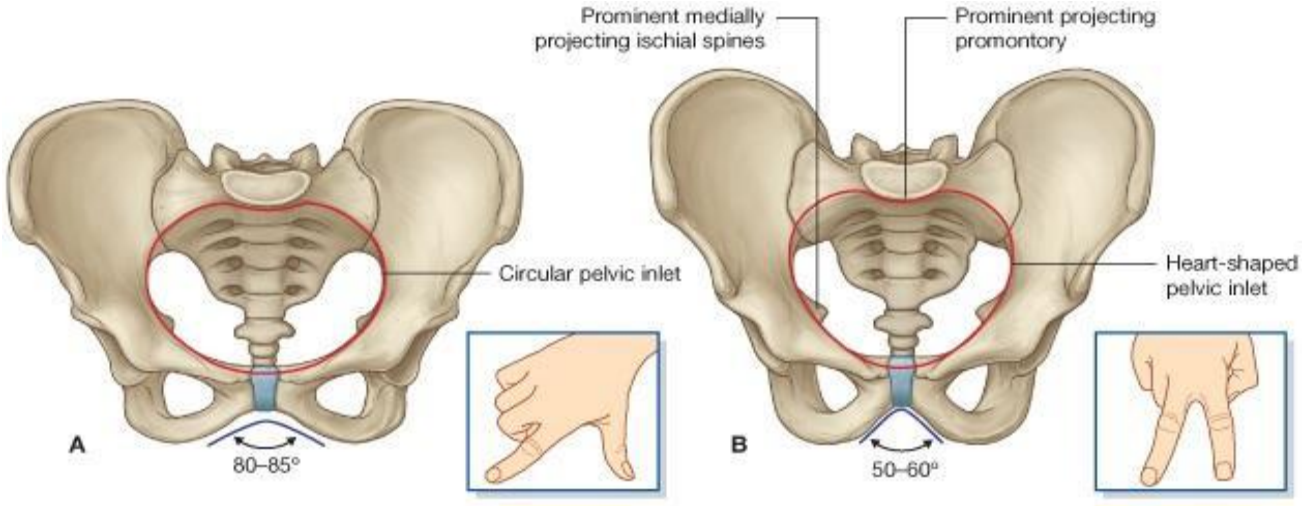


Bony Pelvis

Sex Differences of the Pelvis:

There are sex differences of bony pelvis caused by adaptation of female pelvis for childbearing and stronger muscles in male that make thicker bones and more prominent bony markings.

1. Pelvic inlet is oval in female but heart shaped in male.
2. Subpubic angle (pubic arch) more rounded & wider in female > male.
3. False pelvis is shallow in females and deep in males.
4. Pelvic cavity is wider in female than in male, and distance between inlet and the outlet is much shorter.
5. Pelvic outlet is larger in female (ischial tuberosities are averted) than in male (they are turned in).
6. Sacrum is shorter, wider, and flatter in female than in male.



Pelvic Membranes & Ligaments

Obturator Membrane

It is a fibrous sheet that almost completely closes obturator foramen, leaving a small gap, obturator canal, for passage of obturator nerve and vessels as they leave the pelvis to enter the thigh.

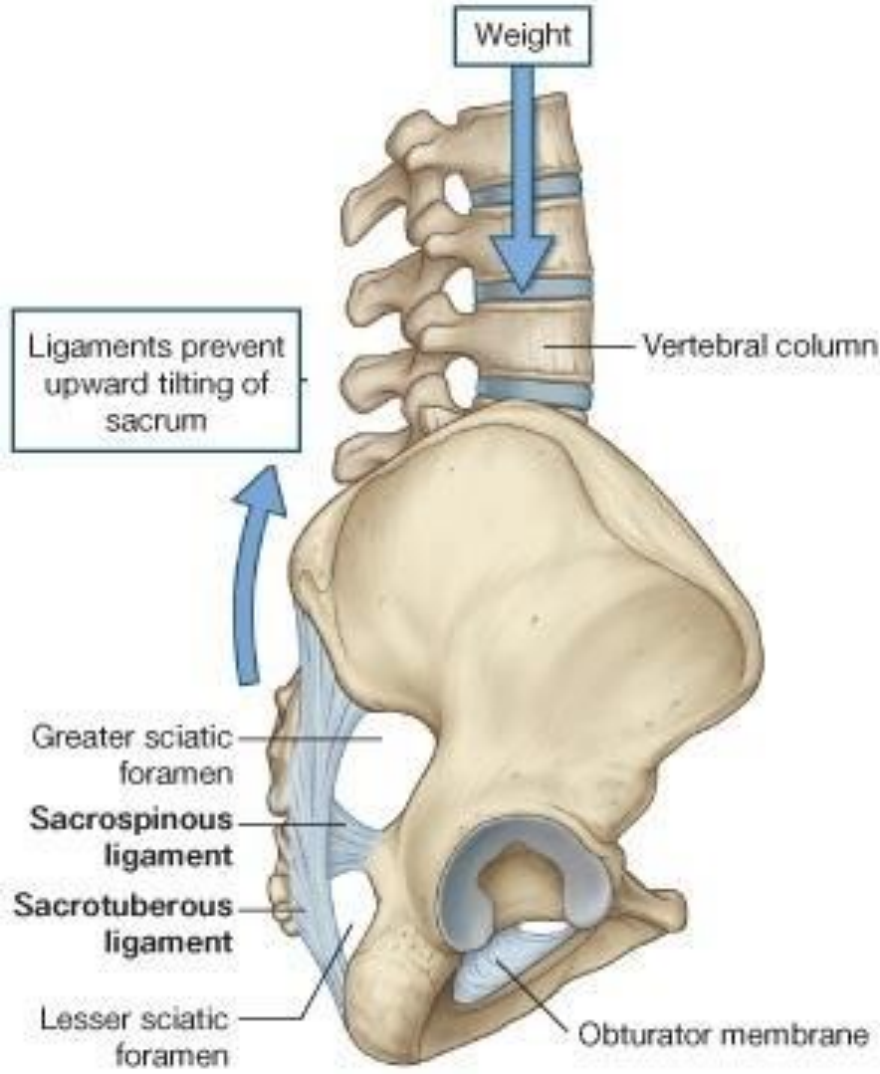
Sacrotuberous Ligament

It is strong & extends from lateral part of sacrum & coccyx & posterior inferior iliac spine to ischial tuberosity.

Sacrospinous Ligament

It is strong and triangle shaped. It is attached by its base to lateral part of sacrum and coccyx and by its apex to spine of ischium.

Sacrotuberous and sacrospinous ligaments convert greater and lesser sciatic notches into foramina, greater and lesser sciatic foramina. They also prevent lower end of sacrum and coccyx from being rotated upward at sacroiliac joint by weight of body.



Pelvic Muscles

Piriformis Muscle: arises from front of lateral mass of sacrum and leaves pelvis to enter gluteal region by passing laterally through **greater sciatic foramen**. It is inserted into upper border of greater trochanter of femur.

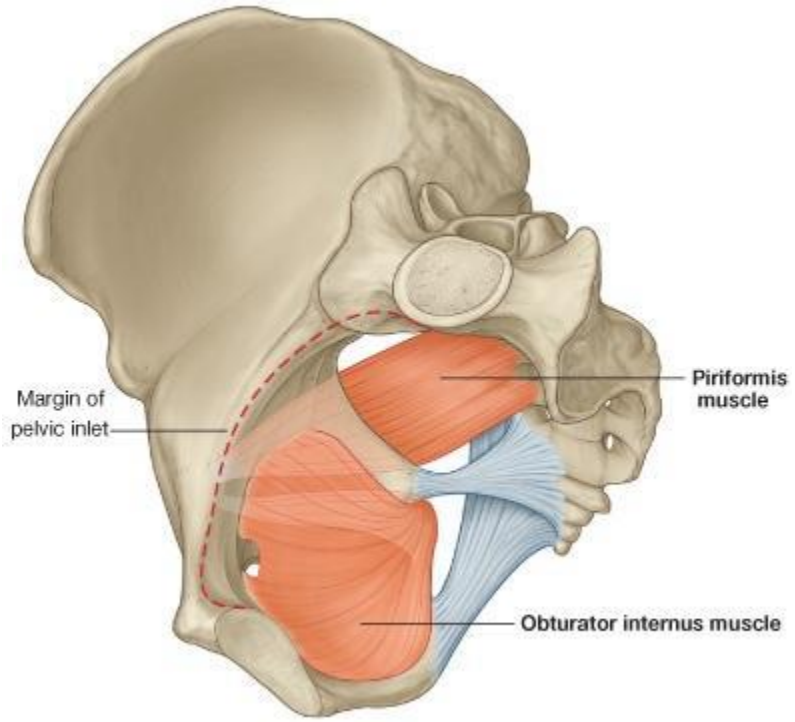
Action: lateral rotator of femur at hip joint.

Nerve supply: sacral plexus.

Obturator Internus Muscle: arises from pelvic surface of obturator membrane and adjoining part of hip bone. Muscle fibers converge to a tendon, which leaves pelvis through **lesser sciatic foramen** and is inserted into greater trochanter of femur.

Action: lateral rotater of femur at hip joint.

Nerve supply: nerve to obturator internus, a branch from sacral plexus.



Pelvic Diaphragm (Pelvic Floor)

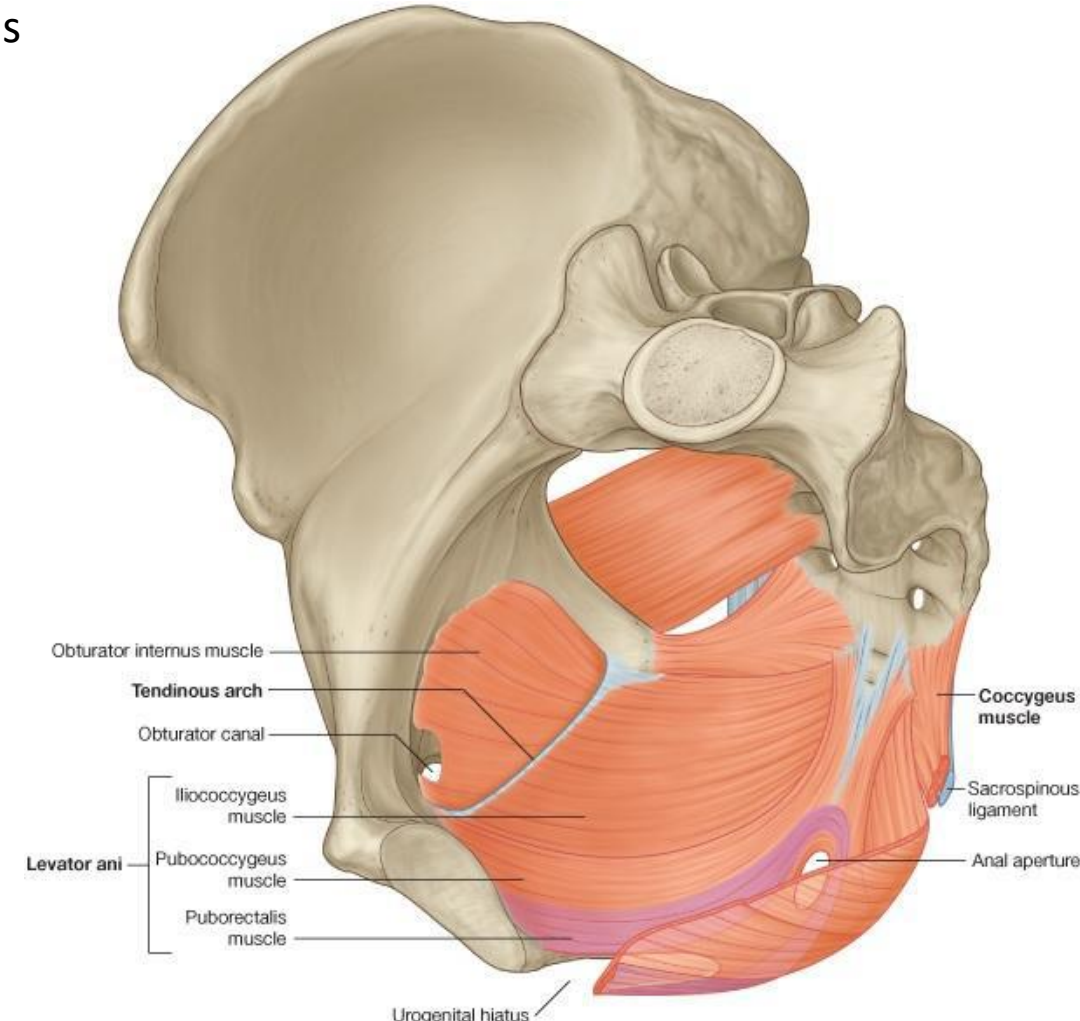
It is formed by important **levatores ani muscles** and small **coccygeus muscles** and their covering fasciae. It is incomplete anteriorly to allow passage of urethra in males and urethra and vagina in females.

Coccygeus Muscle:

small triangular muscle arises from ischial s and is inserted into lower end of sacrum and into coccyx.

Action: assist levatores ani in supporting pelvic viscera

Nerve supply: A branch of 4^{th} & 5^{th} sacral nerves



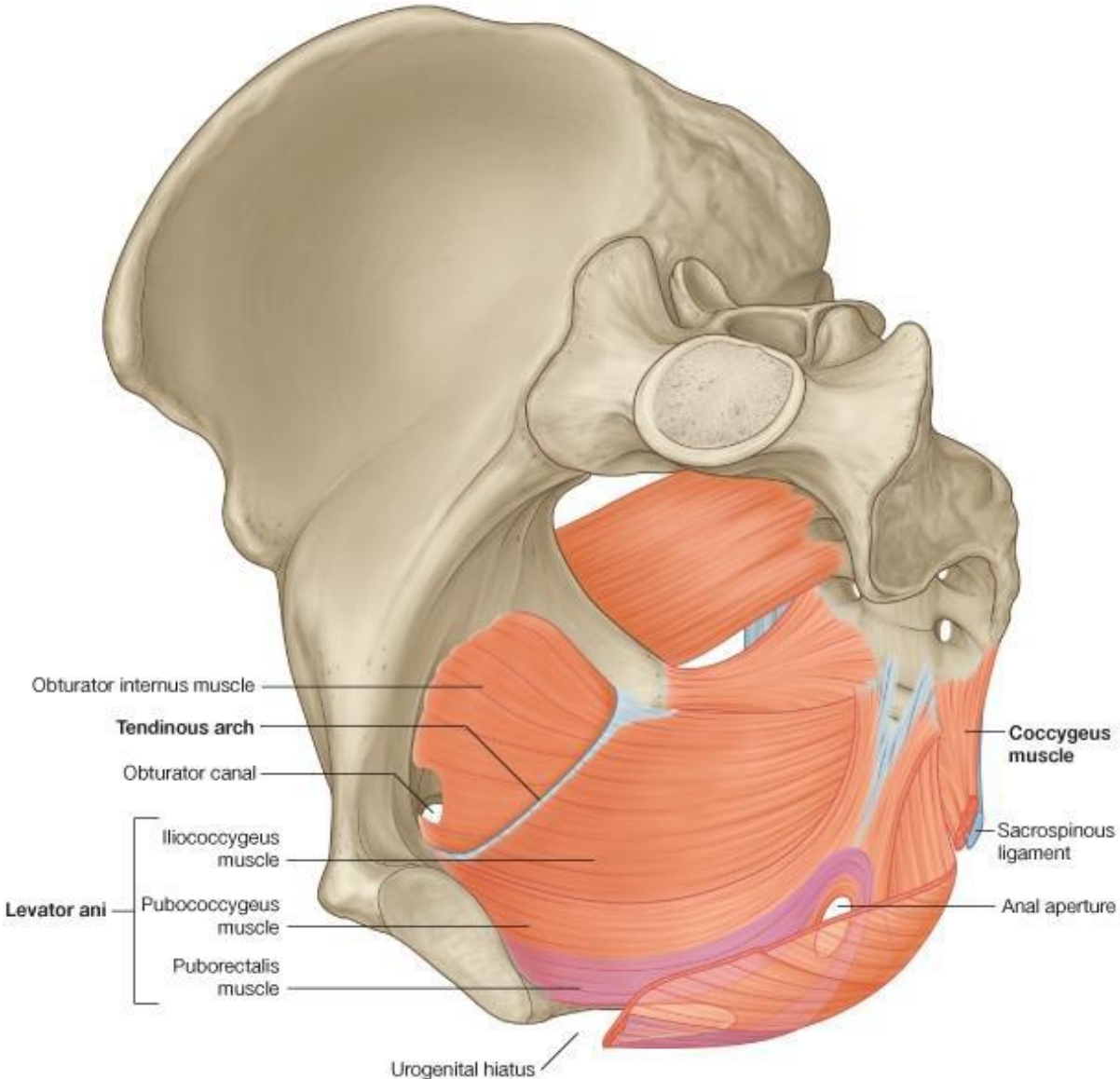
Pelvic Diaphragm (Pelvic Floor)

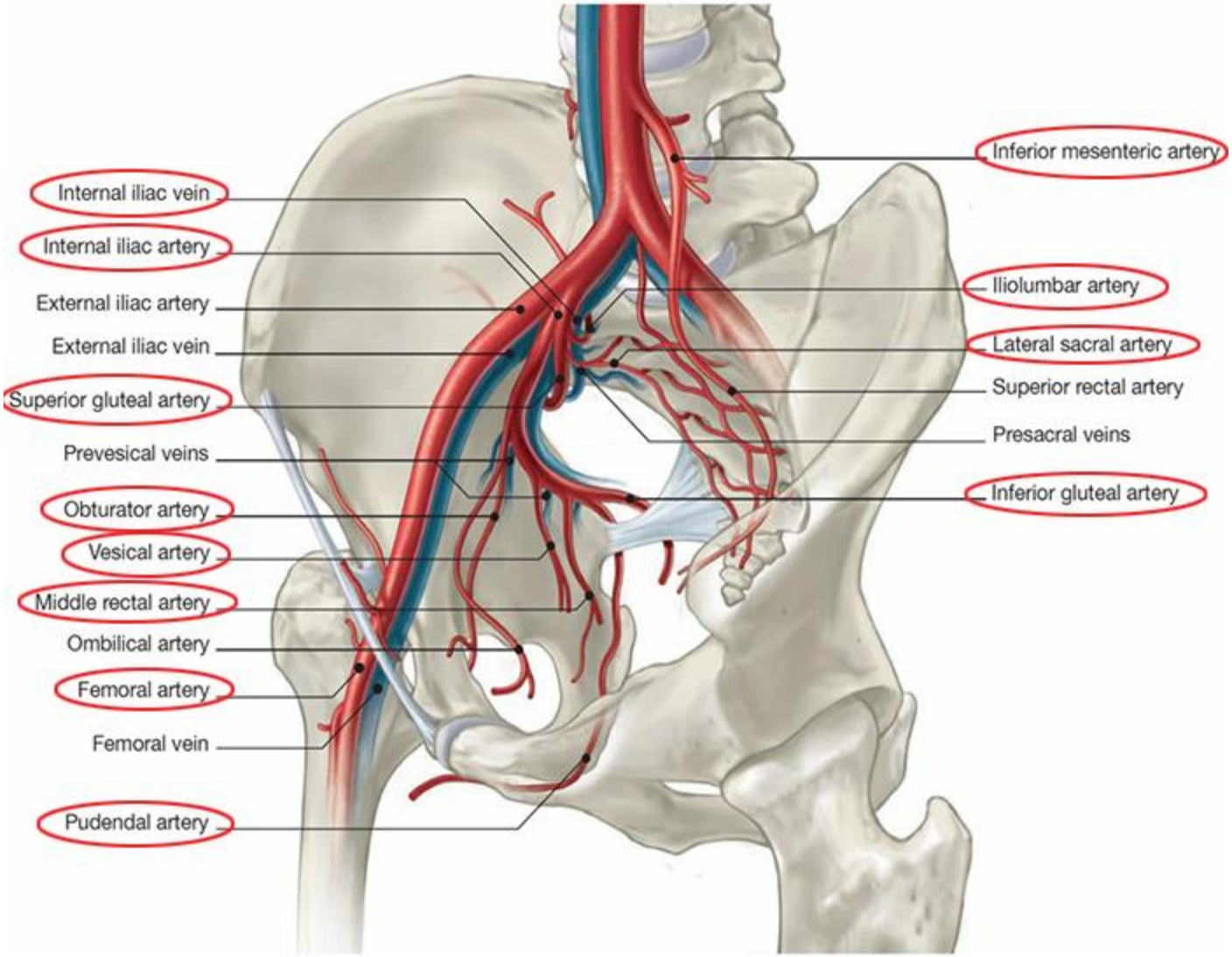
Levator Ani Muscle: wide thin muscular sheet that has a linear origin from back of body of pubis, a tendinous arch formed by a thickening of obturator internus fascia, and ischial spine.

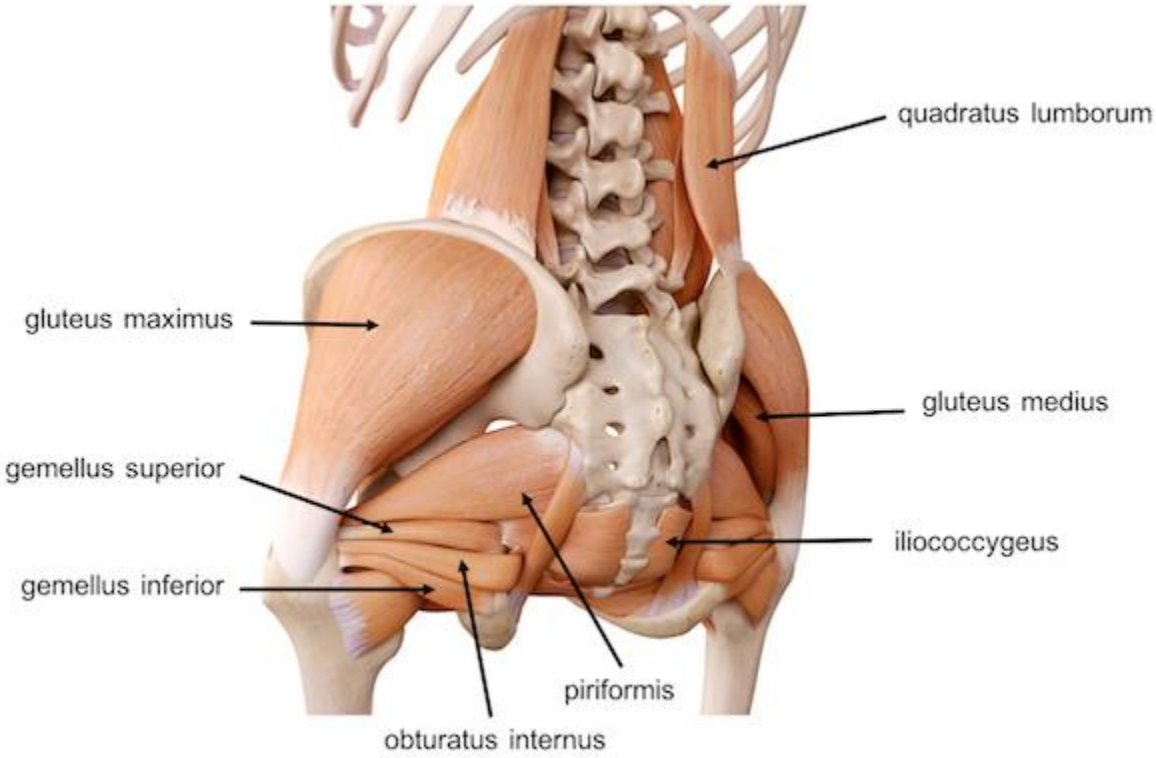
Anterior fibers:

Intermediate fibers:

Posterior fibers:




Inferior mesenteric artery
Internal iliac vein
Internal iliac artery
Iliolumbar artery
External iliac artery
External iliac vein
Lateral sacral artery
Superior rectal artery
Superior gluteal artery
Presacral veins
Prevesical veins
Inferior gluteal artery
Obturator artery
Vesical artery
Middle rectal artery
Ombilical artery
Femoral artery
Femoral vein
Pudendal artery


quadratus lumborum
gluteus maximus
gluteus medius
gemellus superior
iliococcygeus
gemellus inferior
piriformis
obturatus internus


THANKS