

# **THE PELVIS: PART I—THE PELVIC WALLS**

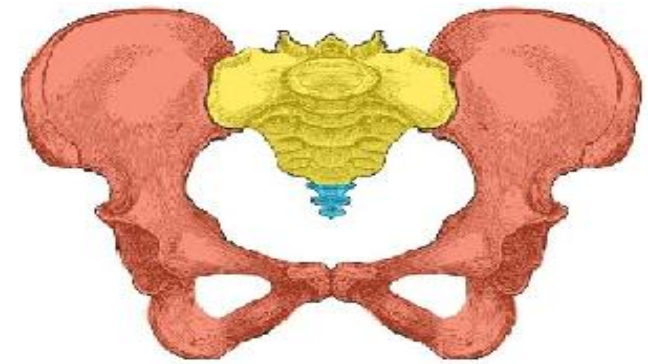
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# The Pelvis

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: 2 hip bones, sacrum & coccyx. The 2 hip bones articulate with each other anteriorly at symphysis pubis and posteriorly with sacrum at sacroiliac joints.



-  Hip bones
-  Sacrum
-  Coccyx

# 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)

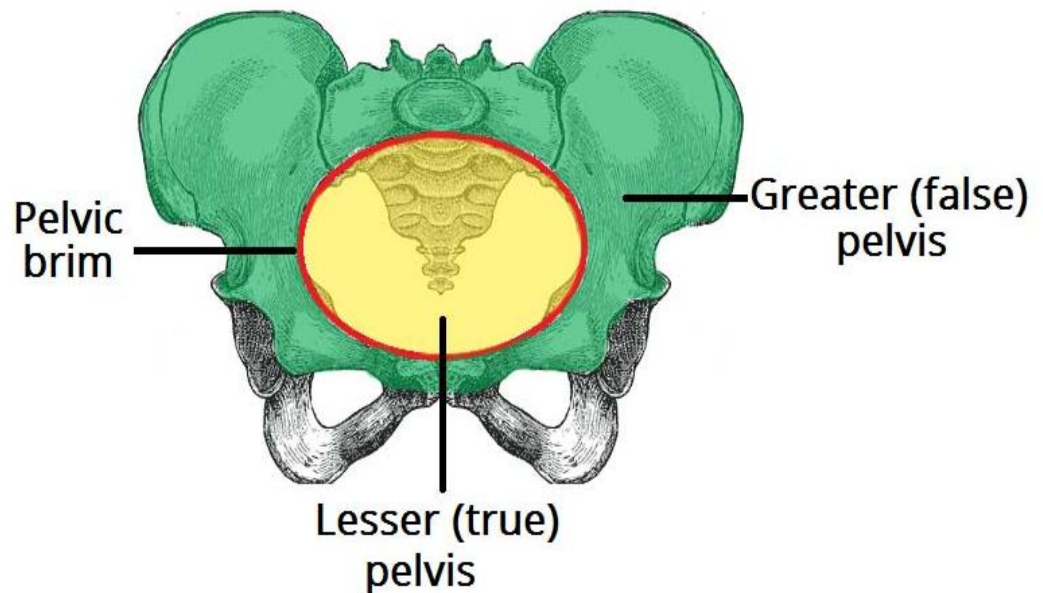
It is bounded behind by lumbar vertebrae, laterally by iliac fossae and iliacus muscles, and in front by lower part of anterior abdominal wall. It supports abdominal contents and gravid uterus in pregnancy (>3<sup>rd</sup> month).

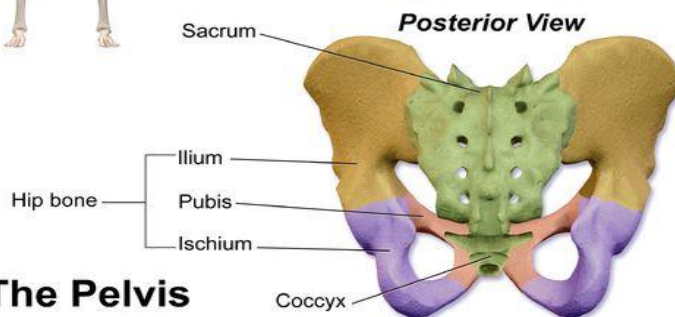
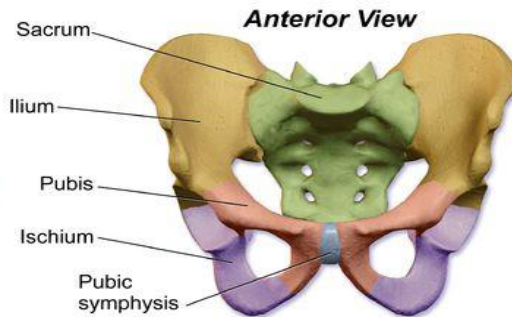
## B. True Pelvis (Lesser Pelvis)

It is of clinical significance for obstetrics?.

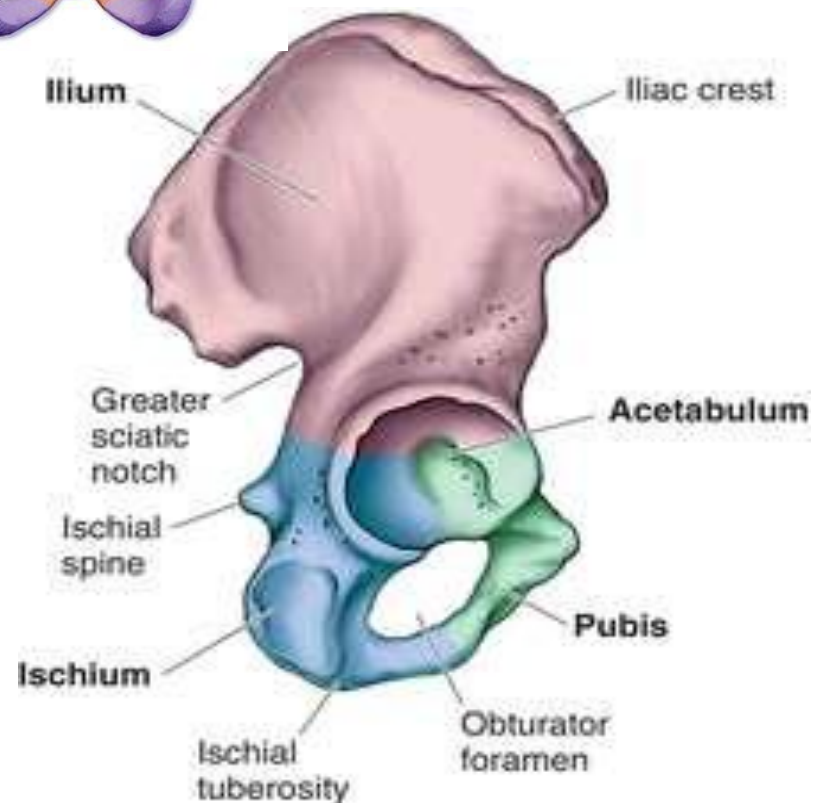
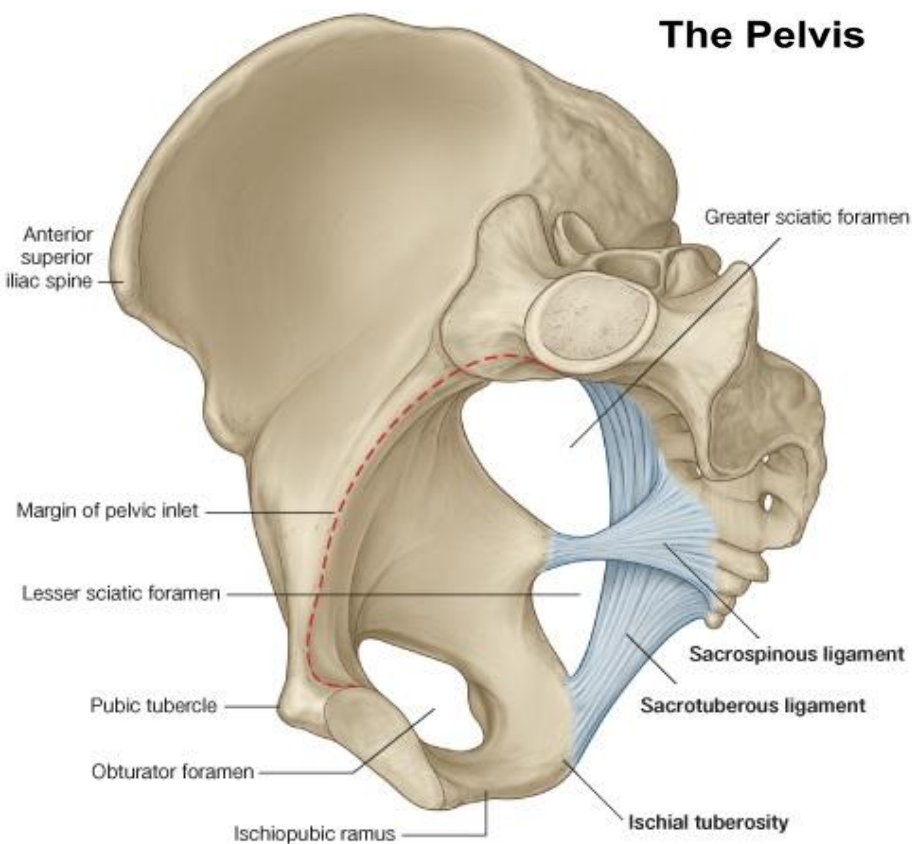
True pelvis has:

- **an inlet**
- **an outlet**
- **a cavity**





## The Pelvis



# Bony Pelvis

## Hip Bone

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

At puberty: fuse together to form one large, irregular bone (hip bone).

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.

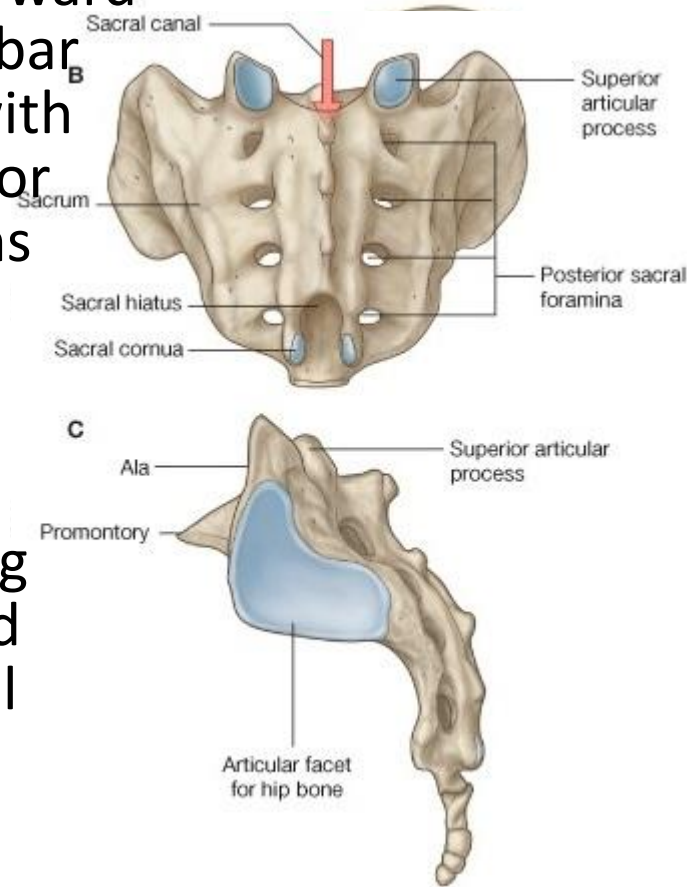
**The pubis** is anterior part of hip bone and has a **body, superior and inferior pubic rami**. Body of pubis bears pubic crest and pubic tubercle and articulates with opposite pubis at symphysis. Hip bone has large opening, **obturator foramen**, which is filled in by obturator membrane.

# 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 5<sup>th</sup> 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 5<sup>th</sup> sacral vertebra, and sometimes those of 4<sup>th</sup>, 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 2<sup>nd</sup> 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.

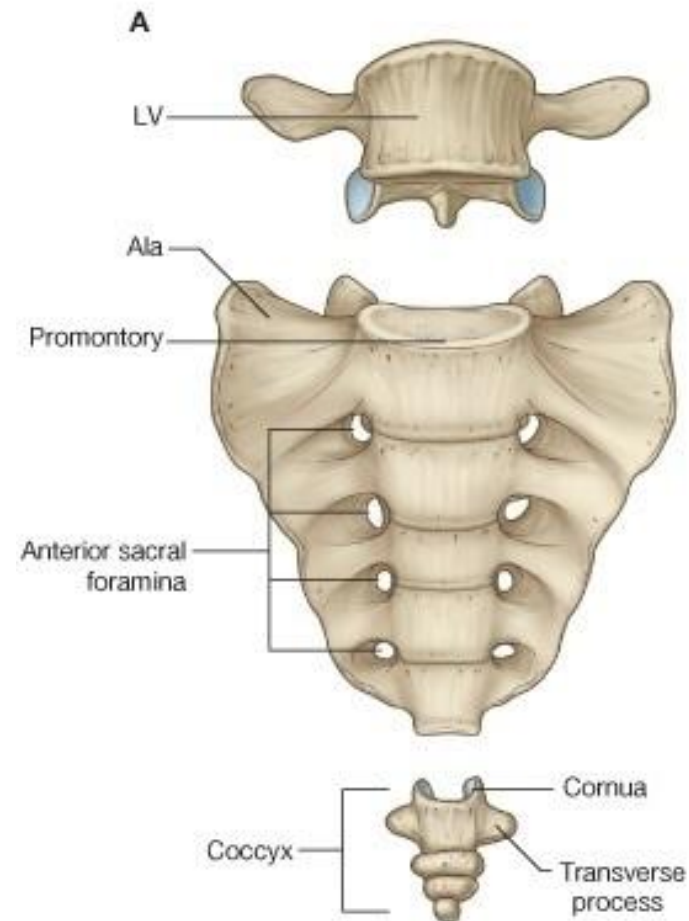




# Bony Pelvis

## 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. Cornua are remains of pedicles and superior articular processes and project upward to articulate with sacral cornua.

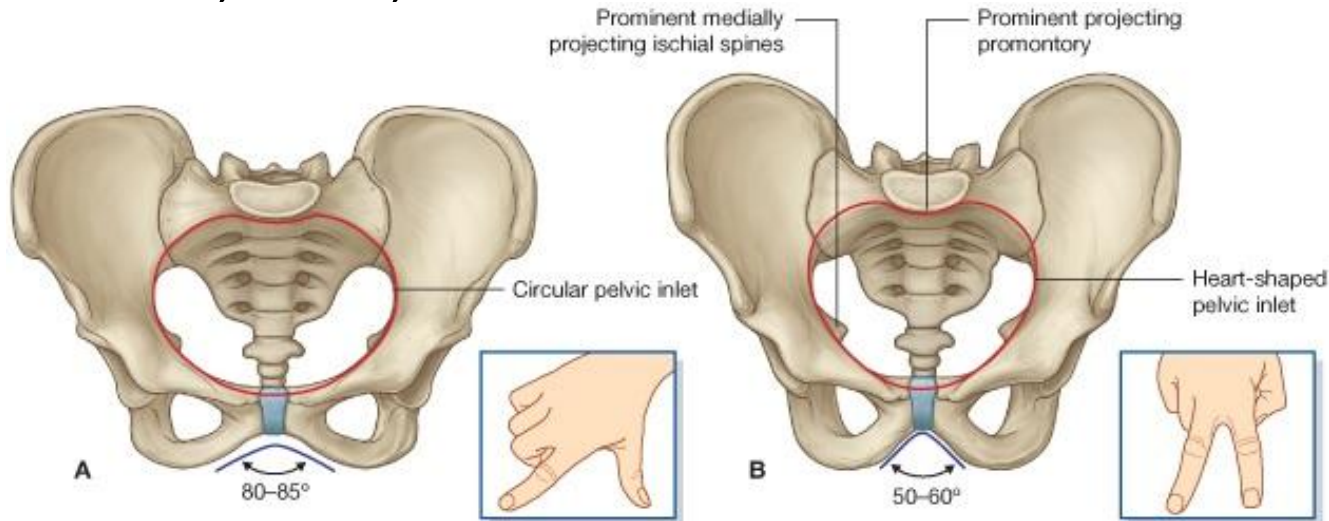


# Bony Pelvis

## 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 everted) 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.

## Sacrospinous Ligament

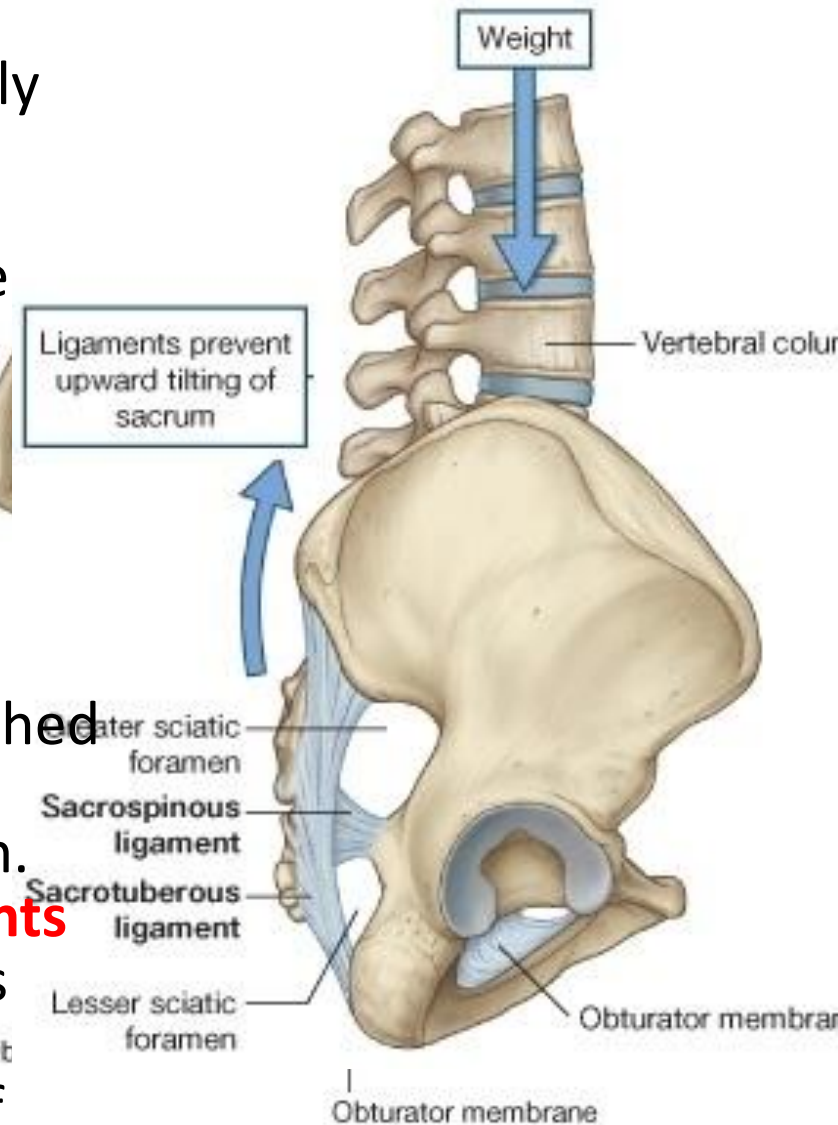
It is strong & extends from lateral part of sacrum & coccyx & posterior inferior iliac spine to ischial tuberosity.

## 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.

## Sacrospinous and sacrotuberous 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.

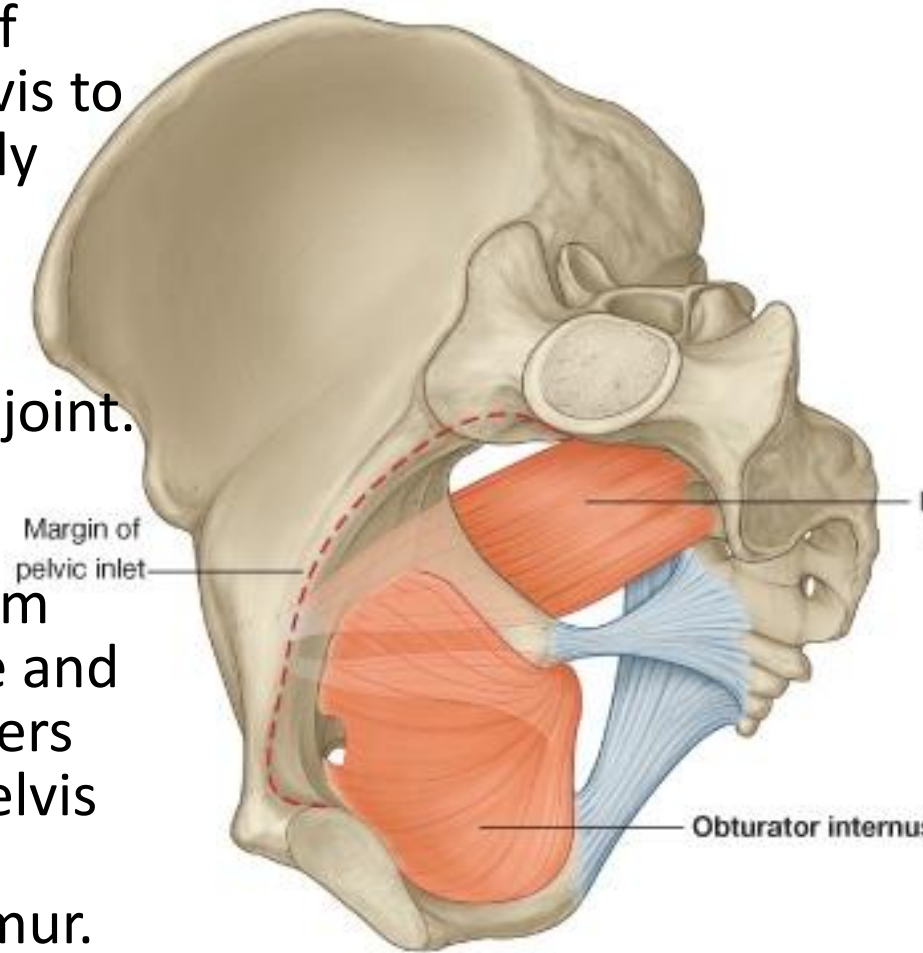
**Action:** lateral rotator of femur at hip joint.

**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 rotator of femur at hip joint.

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



# Pelvic Diaphragm (Pelvic Floor)

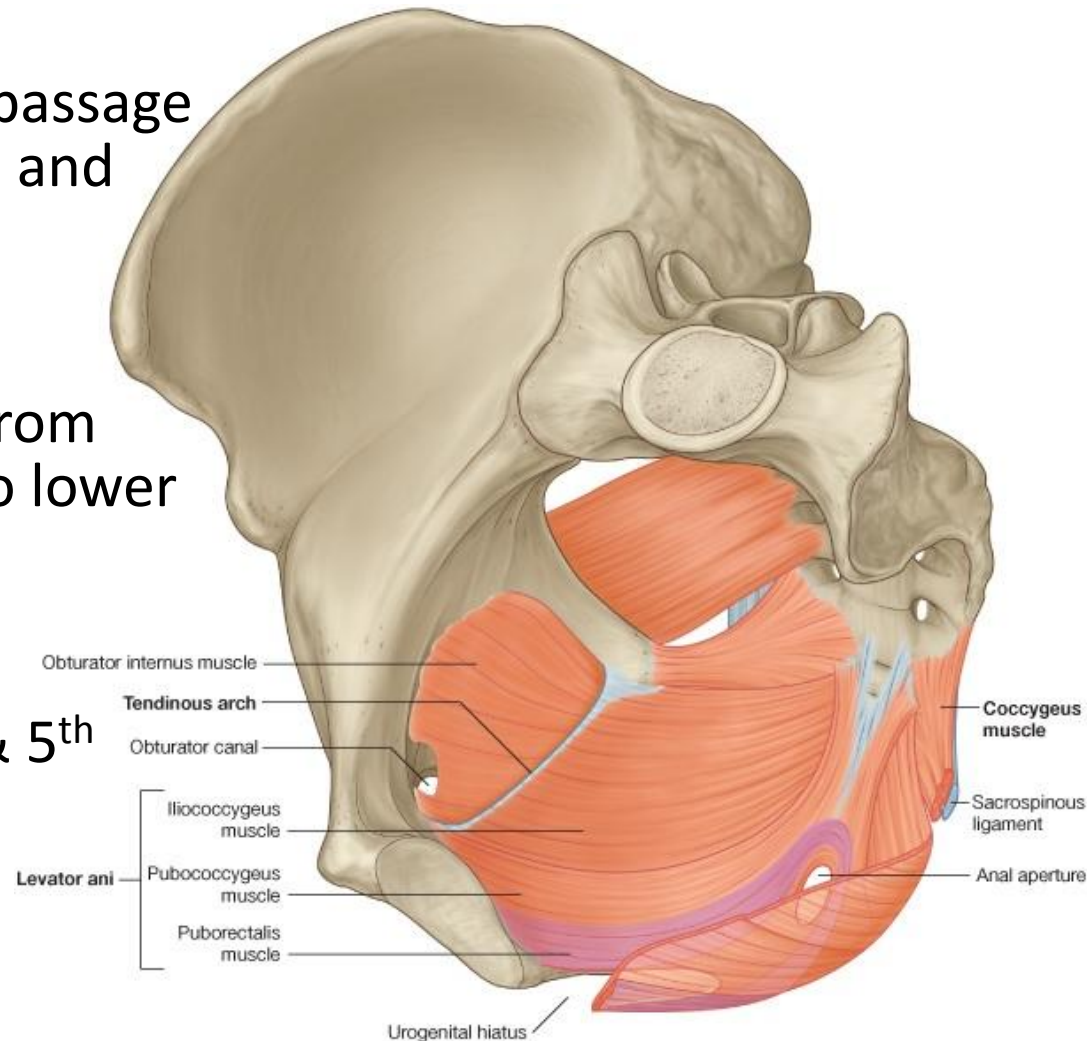
It is formed by important **levator ani muscles** and small **coccygeus muscles** and their covering fasciae. It is incomplete anteriorly to allow passage of urethra in males and urethra and vagina in females.

## Coccygeus Muscle:

small triangular muscle arises from ischial spine 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<sup>th</sup> & 5<sup>th</sup> sacral nerves



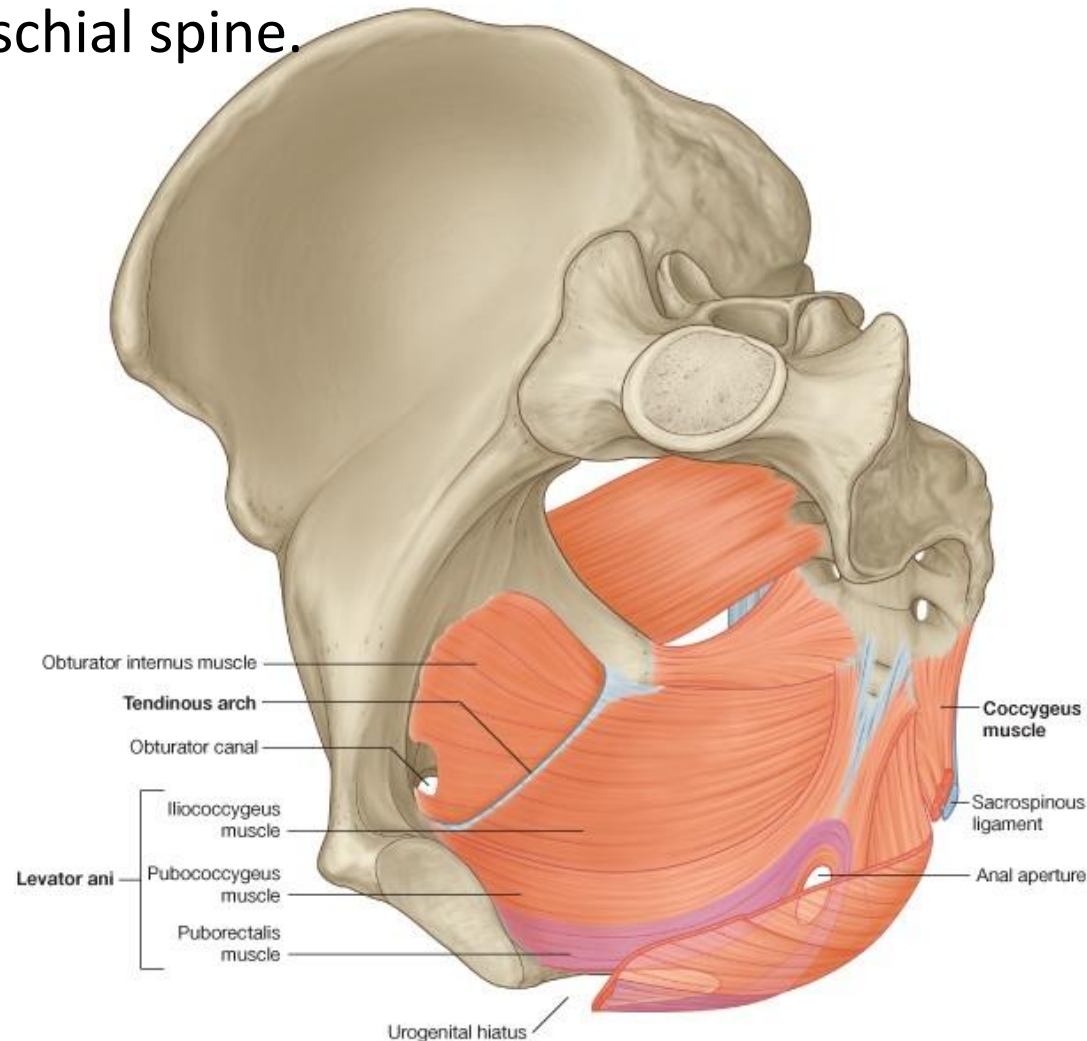
# Pelvic Diaphragm (Pelvic Floor)

**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:**





# Pelvic Fascia

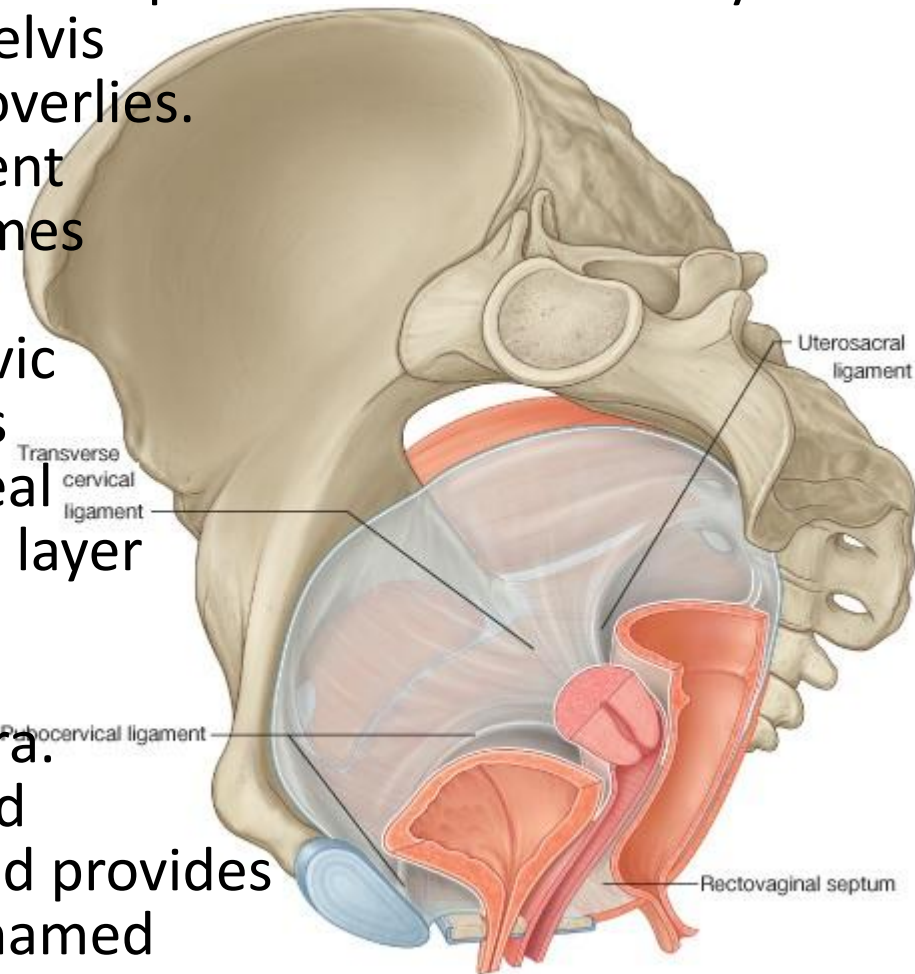
It is formed of connective tissue and is continuous above with fascia lining abdominal walls. Below, fascia is continuous with fascia of perineum. Pelvic fascia can be divided into parietal and visceral layers.

**Parietal Pelvic Fascia:** lines walls of pelvis and is named according to muscle it overlies.

Where the pelvic diaphragm is deficient anteriorly, parietal pelvic fascia becomes continuous through the opening with fascia covering inferior surface of pelvic diaphragm. In the perineum, it covers sphincter urethrae muscle and perineal membrane and forms superior fascial layer of urogenital diaphragm.

## **Visceral Layer of Pelvic Fascia**

It covers and supports all pelvic viscera. In certain locations fascia thickens and extends from viscus to pelvic walls and provides support. These fascial ligaments are named according to their attachments, for example, **pubovesical** and **sacro cervical** ligaments.



**Thanks**

