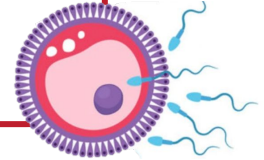


Female pelvis

Reproductive block-Anatomy-Lecture

[Editing file](#)
[Summary file](#)



Color index:

- Girls' slides
- Boys' slides
- Main content
- Extra
- Important
- Drs' notes



Objectives

At the end of the lecture, students should be able to:

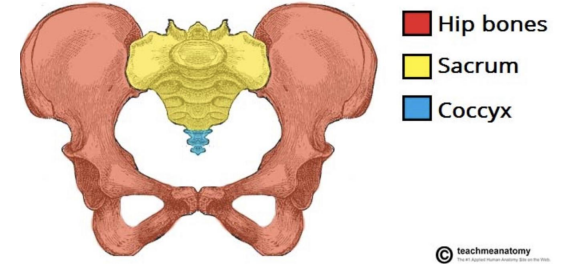
- Describe the anatomy of the pelvic wall, bones, joints & muscles.
- Describe the boundaries and subdivisions of the pelvis.
- Differentiate the different types of the female pelvis.
- Describe the pelvic walls & floor.
- Describe the components & function of the pelvic diaphragm.
- List the arterial & nerve supply.
- List the lymph & venous drainage of the pelvis.

Useful Links:

- [Kenhub](#) (1) - [Kenhub](#) (2) - [Kenhub](#) (3) - [Kenhub](#) (4)
- [Teach me anatomy](#) (1) - [Teach me anatomy](#) (2) - [Teach me anatomy](#) (3) - [Teach me anatomy](#) (4)
- [Amboss](#)

Introduction

- The bony pelvis is composed of **4** bones, connected by **4** joints and lined by **4** muscles. The bony pelvis with its joints and muscles form a strong **basin-shaped** **زي الوعاء أو الحاوية** structure (with multiple foramina). **The foramina helps in structures pass through it.**
- The pelvis contains and protects the:
 - 1) Lower parts of the alimentary tract.
 - 2) Urinary tract.
 - 3) Internal organs of reproduction.



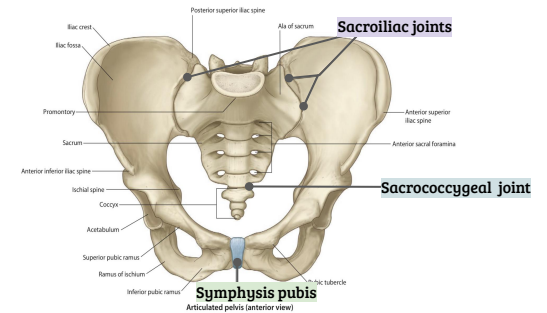
Four Bones

1. ★ Two hip bones, which form the **anterior & lateral walls**.
2. ★ Sacrum and ★ coccyx, which form the **posterior wall**.

Four Joints

Joint connect 2 or more bones together

1. **Anteriorly:** **Symphysis pubis** (2ry **Cartilaginous joint** **غضروفي غير متحرك و قليل المرونة**). **it's the joint where the left and right side of the hip bone meet inferiorly.**
2. **Posteriorly:** **Sacroccygeal joint** (2ry **Cartilaginous joint** **غضروفي غير متحرك و قليل المرونة**).
3. **Posterolaterally:** **Two Sacroiliac joints** (**Synovial joints** **مرونة و مجال حركة أكبر**, **plain variety**).



Pelvis

The pelvis is divided into two parts by the pelvic brim (inlet).

-pelvic brim is the edge of the pelvic inlet

ABOVE

BELOW

False or greater pelvis
(Part of the abdominal cavity)

- It supports the lower abdominal contents, it's bounded by:
 - **Anteriorly** → Lower part of the anterior abdominal wall.
 - **Posteriorly** → Lumbar vertebrae.
 - **Laterally** → Iliac fossae and the iliacus muscle.

True or lesser pelvis
(Has 3 parts)

01 **Cavity**

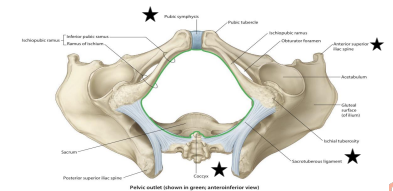
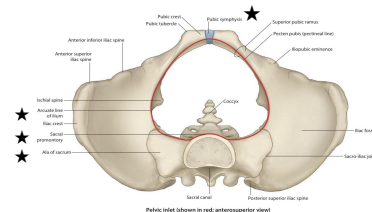
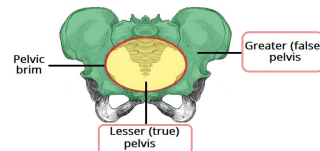
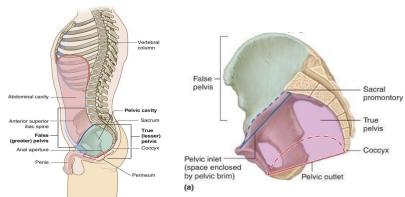
- The cavity is a short, curved canal, with a shallow anterior wall and a deeper posterior wall. **The cavity is deeper posteriorly.**
- It lies between the inlet and the outlet.

02 **Inlet** ★
(Oval/circular shape):

- **Anteriorly** → Symphysis pubis (**upper border**).
- **Posteriorly** → Promontory & ala of sacrum.
- **Laterally** → Iliopectineal (arcuate) lines.

03 **Outlet** ★
(Diamond shape):

- **Anteriorly** → Symphysis pubis (**lower border**).
- **Posteriorly** → Coccyx.
- **Anterolaterally** → Ischiopubic ramus.
- **Posterolaterally** → Sacrotuberous ligament.



-The content of the pelvic outlet can be seen from the inferior view or when you flip the pelvic bone

Main difference between ♂ & ♀ pelvis

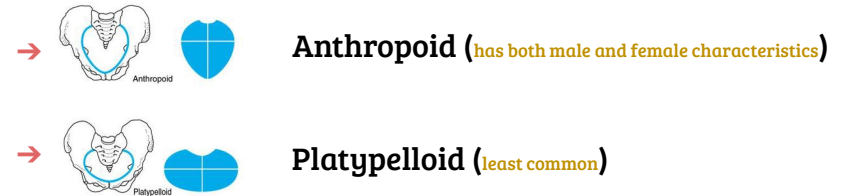
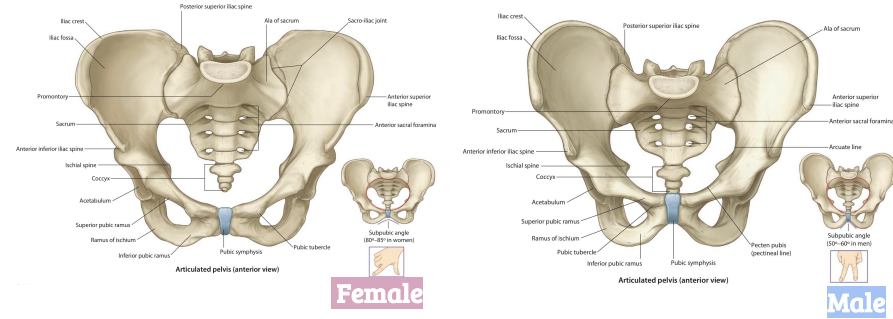
In Males:

- The **Sacrum** is usually longer, narrowest and curved.
- The **promontory** and the **ischial spines** are more projecting (inverted).
- The **Angle of the pubic arch** is acute
- **Heart shaped inlet**

In Females:

- The **Sacrum** is usually wider and shorter.
- The **Angle** of the pubic arch is wider (80° - 85°).
- **clinical importance:** It is important in the growth and delivery of the baby.
- The **promontory** and the **ischial spines** are less projecting (everted).
- **Circular / oval shaped inlet.**

Types of Female Bony Pelvis:



- Information of the shape and dimensions of the female pelvis is of great importance for obstetrics, Why? because it is the bony canal through which the child passes during birth. **Gynaecoid pelvis:** considered the most suitable female pelvic shape for childbirth. In general, female pelvis is wider than the male pelvis but females have different shapes all supporting the idea of growth and delivery of the baby

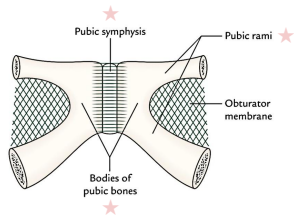


Pelvic Walls

The pelvis has 4 walls. The walls are formed by bones and ligaments that are lined with muscles covered with fascia and parietal peritoneum.

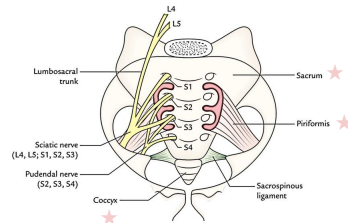
Anterior pelvic wall very narrow

- It is the **shallowest wall and has no muscles**, it's formed by:
 - The posterior surfaces of the bodies of the pubic bones.
 - The 2 pubic rami.
 - The symphysis pubis.



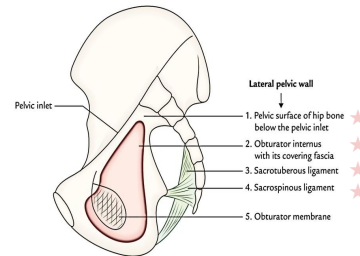
Posterior pelvic wall deep & wide

- It is **large & deeper than the anterior wall**, formed by:
 - Sacrum.
 - Coccyx.
 - Piriformis muscles & their covering of partial pelvic fascia.**



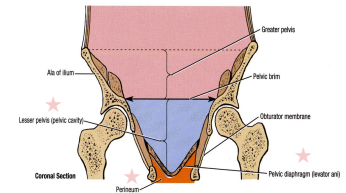
Lateral pelvic wall

- It is formed by:
 - Part of the hip bone below the pelvic inlet.
 - Obturator internus and its covering & obturator fascia.
 - Sacrospinous ligament.
 - Sacrospinous ligament.



Inferior pelvic wall (pelvic floor)

- Basin-like** structure which supports the pelvic viscera and is formed by the **pelvic diaphragm**. It stretches across the **lower part of the true pelvis** and divides it into:
 - Main (true) pelvic cavity **above**, which contains the pelvic viscera.
 - Perineum **below** which carries the external genital organs.



Pelvic Muscles (4 Muscles)

01

Piriformis
(part of posterior pelvic wall)

02

Obturator Internus
(part of lateral pelvic wall)

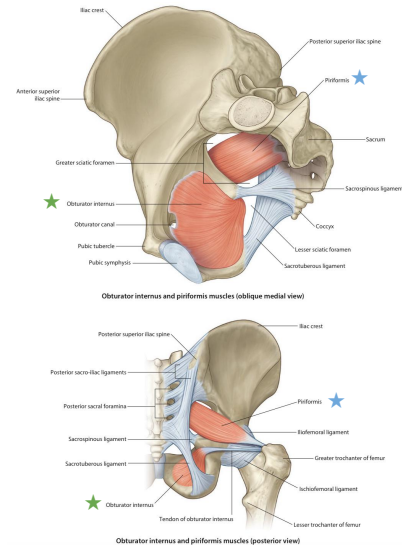
03

Levator Ani
(wide thin sheet-like muscle that has a linear origin)

04

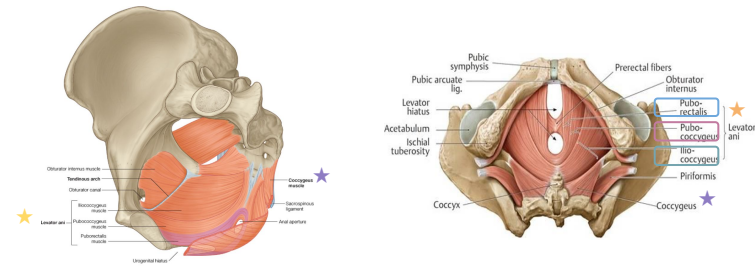
Coccygeus
(small triangular muscle)

Muscle	Piriformis ★	Obturator Internus ★
Origin	<ul style="list-style-type: none"> Pelvic surface of the middle 3 sacral vertebrae. 	<ul style="list-style-type: none"> Inner surface of the obturator membrane and the hip bone.
Insertion	<ul style="list-style-type: none"> It leaves the pelvis through the <u>greater sciatic</u> foramen, to be inserted into the Greater trochanter of the femur. 	<ul style="list-style-type: none"> It leaves the pelvis through the <u>lesser sciatic</u> foramen, to be inserted into the Greater trochanter of the femur.
Nerve supply	<ul style="list-style-type: none"> Sacral plexus. 	<ul style="list-style-type: none"> Nerve to obturator internus (from sacral plexus).
Action	<ul style="list-style-type: none"> Lateral rotator of the femur at the hip joint. 	



Pelvis Diaphragm

- It is formed by the ★ levator ani and the ☆ coccygeus muscles and their covering fasciae.
- It is incomplete anteriorly to allow passage of:
 - Urethra in males.
 - Urethra and vagina in females.



Muscle	Levator Ani ★
Origin	<ol style="list-style-type: none"> Back of the body of the pubis. Tendinous arch of the obturator fascia. Spine of the ischium.
Fibers	<ul style="list-style-type: none"> Its fibers are divided into 3 parts: <ul style="list-style-type: none"> → ★ Pubococcygeus, ☆ Puborectalis & ★ Iliococcygeus. • This is the floor of insertion that is why it is a wide muscle
Nerve supply	<ol style="list-style-type: none"> Perineal branch of the 4th sacral nerve (S4) → upper surface. Perineal branch of the pudendal nerve → lower surface.
Action (Important) ★	<ol style="list-style-type: none"> The muscles of the two sides form an efficient muscular sling that supports and maintains the pelvic viscera in position. If the muscle gets fatigue (age, repeated pregnancy) → pelvic organs prolapse (descent to perineum). They resist the rise in intra pelvic pressure during the straining and expulsive efforts of the abdominal muscles (as in coughing). It prevents the increase in pelvic pressure. They have a very important role in <u>maintaining fecal continence</u> (puborectalis) by acting as a sphincter at the anorectal junction. They serve as a vaginal sphincter in the female. تزيد من كفاءة الصمام

Muscle	Coccygeus ☆
Origin	<ul style="list-style-type: none"> Ischial spine.
Insertion	<ul style="list-style-type: none"> Lower end of sacrum & coccyx. <p>Coccygeus muscle has the <u>same attachment</u> as the sacrospinous ligament.</p>
Nerve supply	<ul style="list-style-type: none"> Branches of the 4th and 5th sacral nerves.
Action	<ul style="list-style-type: none"> Assist the levator ani in supporting the pelvic viscera.

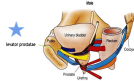
Levatores Ani Muscles (Fibers)

1. Pubococcygeus (Anterior part)

- **Origin:** originates from the posterior surface of the body of the pubis.
- **Insertion:** inserted into the perineal body & coccyx.
- **Action:** stabilizes the perineal body & forms a sling around the prostate or the vagina. *توفر الدعامة*



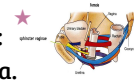
★ Levator prostate: ★



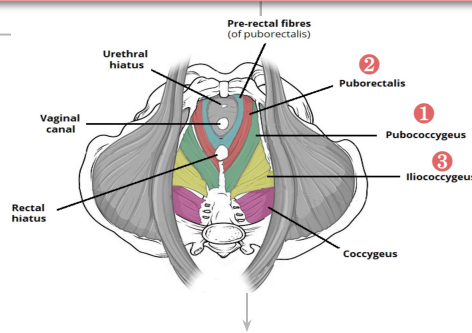
- 1) Supports prostate.
- 2) Stabilizes perineal body.



★ Sphincter vaginae: ★

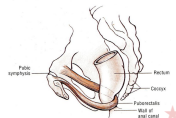


- 1) constricts the vagina.
- 2) Stabilizes perineal body.



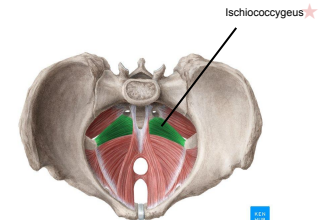
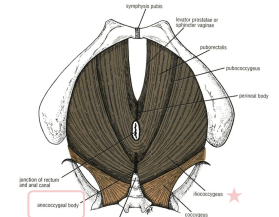
2. Puborectalis (Intermediate part)

- Forms a sling around the recto-anal Junction.
- **It has a very important role in maintaining fecal continence.**
تسهل عملية التبرز و في حال صار في مشكلة في العضلة يصير في عسر التبرز
- Relaxation of puborectalis muscle allow fecal passage from rectum to and canal



3. Iliococcygeus OR Ischiococcygeus (Posterior part)

- **Insertion:** Inserted into the anococcygeal body and the coccyx.
- **Origin of Ischiococcygeus:** arises from the ischial spine.

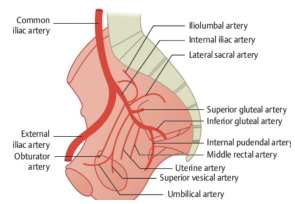


Arterial Supply of the Pelvis

01

Internal iliac artery (IIA): One of the 2 terminal branch of the Common iliac artery.

- **Course:** Arises in front of the sacroiliac joint → It descends downward & backwards over the pelvic inlet → It divides at the upper border of the greater sciatic foramen into: Anterior & Posterior divisions.
- 2 common iliac arteries are bifurcation of Aorta at level of L4.



Posterior Division	Parietal	<ol style="list-style-type: none"> 1. Iliolumbar artery 2. Lateral Sacral arteries (2 branches) 3. Superior Gluteal artery 	<p>Supplies: Posterior abdominal wall, Posterior pelvic wall & Gluteal region.</p>
		<ol style="list-style-type: none"> 1. Obturator artery 2. Inferior Gluteal artery 	
Anterior Division	Visceral	<ol style="list-style-type: none"> 1. Umbilical artery: gives the superior vesical artery. The distal part of this artery fibrosed and forms the medial umbilical ligament. Umbilical artery is only in fetus. After birth becomes: 1- fibrosis to form medial umbilical ligament 2- forms superior vesical artery which supplies upper part of urinary bladder in both male & female. 2. Inferior Vesical artery in male (or vaginal in female): In the male it supplies the Prostate and the Seminal Vesicles. It also gives the artery of the Vas Deferens. In male, it supplies lower part of urinary bladder. 3. Middle Rectal artery 4. Internal Pudendal artery: It is the main arterial supply to the perineum. 	
	Visceral (Female)	<ol style="list-style-type: none"> 1. Vaginal artery: Replaces the inferior vesical artery. Supplies: 1-vagina 2- Lower part of urinary bladder in female. 2. Uterine artery: Tortuous, crosses the Ureter superiorly and supplies the uterus & uterine tube. IMP: in hysterectomy, the surgeon ligates uterine artery. Complication (hydronephrosis) may happen if the surgeon ligates the ureter by mistake. 	<p>★ IMP: upper part of urinary bladder in male & female is supplied by: superior vesical A. Lower part of urinary bladder is supplied in female by: vaginal A & In male by: Inferior vesical A.</p>

02

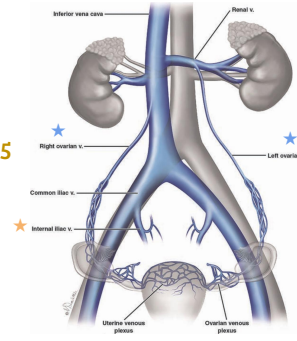
Ovarian artery (in female): Arises from the Abdominal aorta.



Supply of the Pelvis

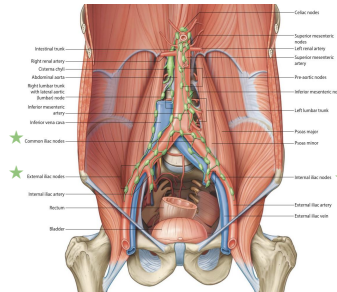
Venous drainage

- Internal iliac veins:** ★
 - It collect tributaries corresponding to the branches of the internal iliac artery.
 - joins the external iliac vein in **front of the sacroiliac joint** to form the common iliac vein (**the common iliac veins join at the level of L5 to give the inferior vena cava**).
- Ovarian vein:** ★
 - Right** vein drains into **IVC**.
 - Left** vein drains into **left renal** Vein.



Lymphatic drainage

- The lymph nodes and vessels are arranged along the main blood vessels.
- Thus, there are ★ **external iliac nodes**, ★ **internal iliac nodes**, and ★ **common iliac nodes**.
- Lymph from Common iliac nodes & the (Ovaries, uterine tubes & fundus of uterus) passes to **Lateral aortic (paraaortic)** nodes.



Nerve Supply

Somatic

- Sacral plexus:**
 - from ventral (anterior rami) of L4 & L5 (lumbosacral trunk) + S1, S2, S3 and most of S4.
 - It gives pudendal nerve to perineum.

Autonomic

- Sympathetic (Pelvic part of sympathetic trunk):**
 - It is the continuation of the abdominal part of sympathetic trunk. It descends in front of the ala of the sacrum.
 - The 2 sympathetic trunks unite inferiorly in front of the coccyx and form a single ganglion (Ganglion Impar).
 - Superior & Inferior Hypogastric plexuses.
- Parasympathetic (Pelvic splanchnic nerves):**
 - (From S2, 3 & 4): preganglionic fibers to pelvic viscera & hindgut.

Additional notes:

Arterial supply of the pelvis

- ❑ The abdominal aorta is divided into 2 branches : the right and left common iliac artery .
- ❑ Each common iliac artery divides into :
 - 1)Internal iliac artery : mainly supplies the pelvic region.
 - 2)External iliac artery : mainly supplies the lower region and gives some supply to the pelvic region .
- ❑ The gluteal region has both anterior and posterior division supply from the internal iliac artery.
- ❑ They could ask you which of the following arteries is not found in female and is found in male ?
The answer is the inferior vesical artery as the vaginal artery replaces it in females.

Additional notes from practical:

Doctor Sahar:

- ❑ One question about the origin of piriformis muscle came in an OSPE exam before.
- ❑ Obturator foramen is covered by obturator membrane and this membrane is one of the origins of the obturator internus (This came as a question before) a small portion of the foramina is not covered by the membrane as some nerves pass through it.
- ❑ The obturator internus muscle is covered by obturator fascia and this is one of the origins of levator ani muscle.

QUIZ

Q1: The Sacroiliac joints is:

- A. Anterolateral - Cartilaginous joint
- B. Posteromedial - Cartilaginous joint
- C. Posterolateral - Synovial joint
- D. Anteromedial - Synovial joint

Q2: The False (greater) pelvis is bounded posteriorly by:

- A. Lumbar vertebrae
- B. Sacral vertebrae
- C. Iliac fossa & iliacus muscle
- D. Promontory

Q3: Which of the following is false about the INLET of true pelvis?

- A. It's part of lesser pelvis
- B. It's bounded anteriorly by Symphysis pubis
- C. It's bounded posteriorly by Coccyx
- D. It's bounded laterally by Iliopectineal (arcuate) lines

Q4: Which of the following is female pubic arch angle?

- A. 45°
- B. 50° - 60°
- C. 70°
- D. 80° - 85°

Q5: Which of the following is formed by Sacrotuberous ligament?

- A. Anterior pelvic wall
- B. Posterior pelvic wall
- C. Lateral pelvic wall
- D. Inferior pelvic wall (floor)

Q6: The nerve supply of levator ani muscles:

- A. Branches of 4th and 5th sacral nerves
- B. Branche 4th sacral nerve
- C. Branch of the pudendal nerve
- D. Both B & C

Q7: The relaxation of which of the following muscle fibers leads to defecation?

- A. Pubococcygeus
- B. Puborectalis
- C. Iliococcygeus
- D. Coccygeus

Q8: The ovarian artery originated from:

- A. Uterine artery
- B. Vaginal artery
- C. Abdominal aorta
- D. Internal iliac artery



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by 438's team

Team leaders

- **Abdulrahman Shadid**
- **Ateen Almutairi**

Member

Nouf Al Humaidhi

Edited by 439's team

Team leaders

- **Mohammed Alshunaif**
-  **Sarah AlQuwayz**

Note Taker

Farah Alsayed

May barakah

Member

Mubarak Alanazi

Reviser

Leen Almadhyani