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INTERNATIONAL SURGICAL  
ANATOMY TEACHING  
SERIES

A detailed anatomical illustration of a human torso, showing the ribcage, spine, and various muscles. The illustration is rendered in a dark green color, matching the background. The text 'ISATS HANDOUT 2024/25' is overlaid on the illustration in a light yellow-green color.

# ISATS HANDOUT 2024/25

Pelvis Anatomy

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High Yield | Surgical Relevance | CPD Accredited

# PELVIS ANATOMY

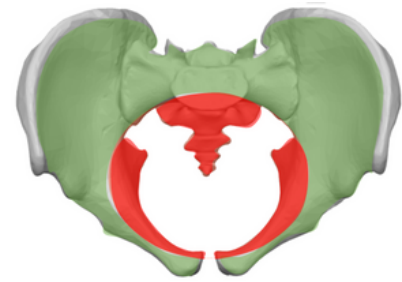
**Objectives:** Understand the bony anatomy of the pelvis, the muscles of the pelvic floor and the gross anatomy & neurovascular supply of the uterus, ovaries, fallopian tubes, cervix and vagina. Apply anatomical knowledge in context of common procedures within obstetrics and gynaecology.

## Greater Pelvis

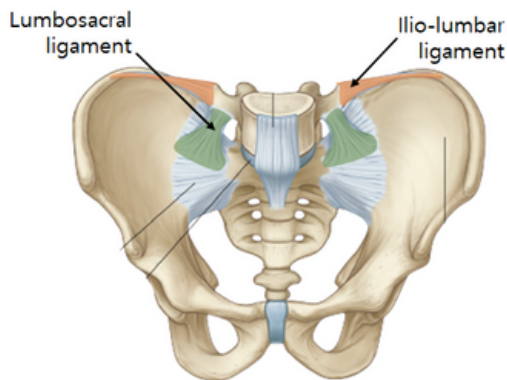
- Superior (above pelvic brim)
- Part of abdominal cavity

## Lesser Pelvis

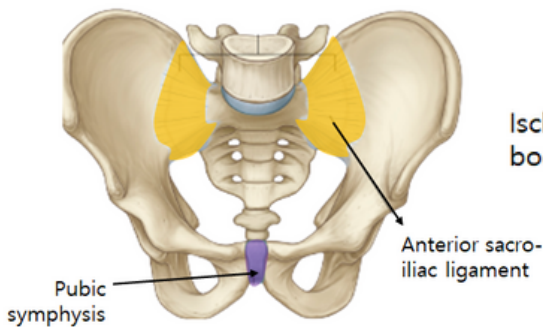
- Inferior (below pelvic brim)
- Encloses pelvic cavity and contains structures of urinary, GI, and reproductive system



## Pelvic Joints

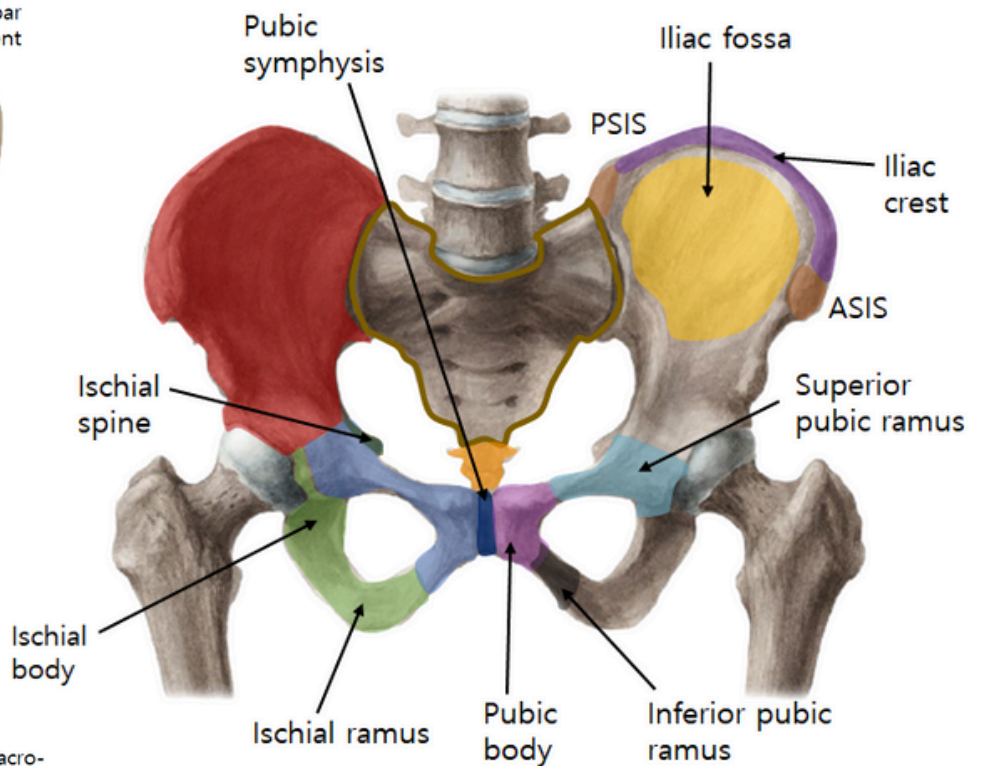


- Lumbosacral joint – sacrum with
  - Lumbosacral ligaments
  - Ilio-lumbar ligaments



- Sacro-iliac joints – sacrum with pelvic bones
  - Anterior & posterior sacro-iliac ligament
  - Interosseous sacro-iliac ligament
- Pubic symphysis – anteriorly in midline

## Bony Anatomy of the Pelvis



### Male

- Pelvic inlet: heart-shaped
- Angle formed by pubic arch: 50–60 degrees
- Ischial spine – project medially into pelvic cavity

### Female

- Pelvic inlet: circular
- Angle formed by pubic arch: 80–85 degrees
- Ischial spine – less prominent projection



# PELVIS ANATOMY

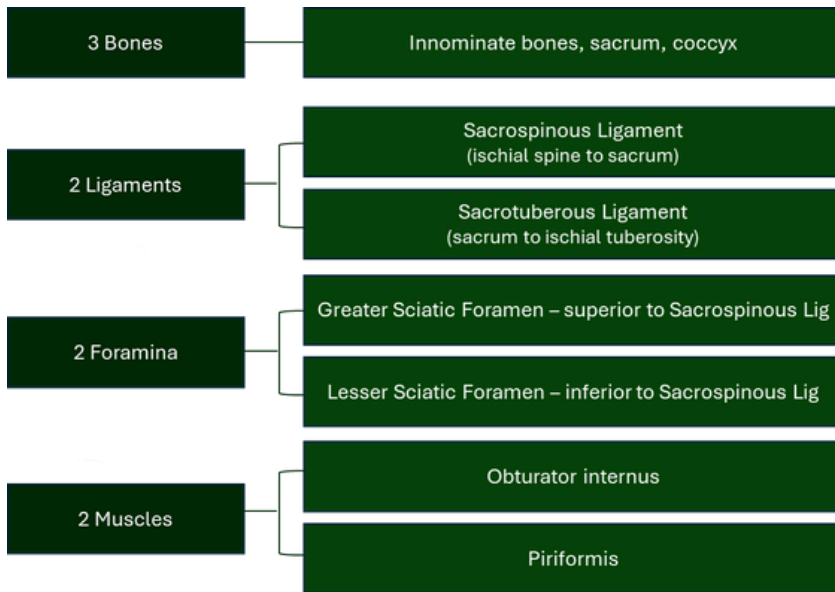
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## Lesser (False Pelvis)

### Pelvic Inlet

- Posteriorly - vertebral body of S1 (**sacral promontory**) + alae (**wings**) of sacrum
- Laterally - rim of ilium and superior pubic ramus (**linea terminalis**)
- Anteriorly - **pubic symphysis**

### Pelvic Walls

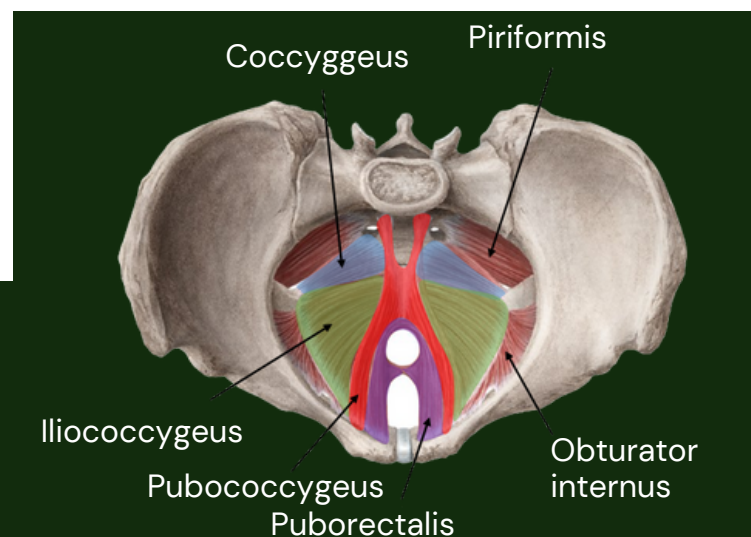
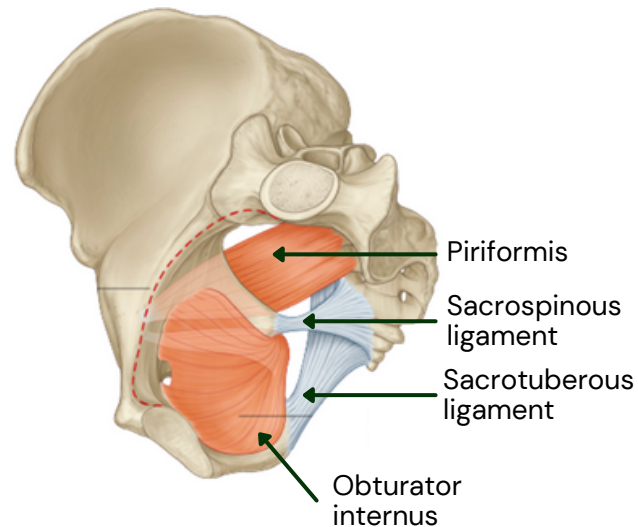
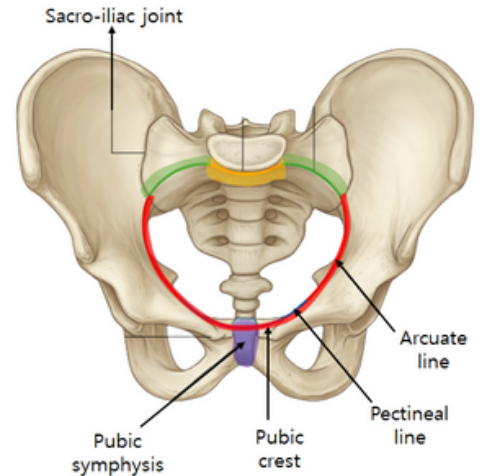


### Pelvic Floor

- Pelvic floor: divides pelvic cavity + perineum
- Consists of: pelvic diaphragm + perineal membrane + deep perineal pouch
- Vagina and urethra penetrate pelvic floor to pass into perineum

### Pelvic Floor Muscles

- Form pelvic floor, support pelvic viscera, reinforce sphincters
- 2 Muscles
  - Coccygeus
  - Levator ani muscles



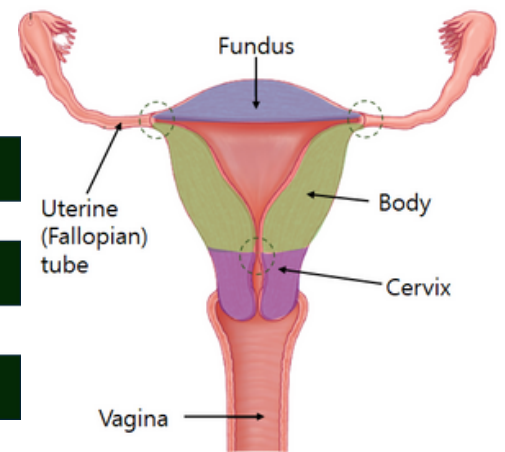
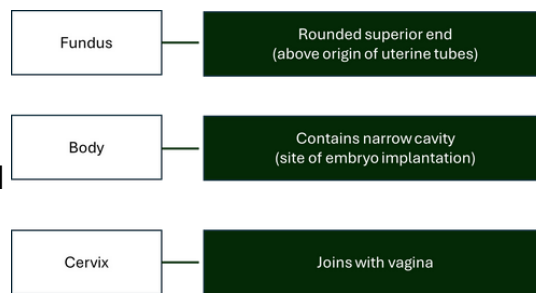
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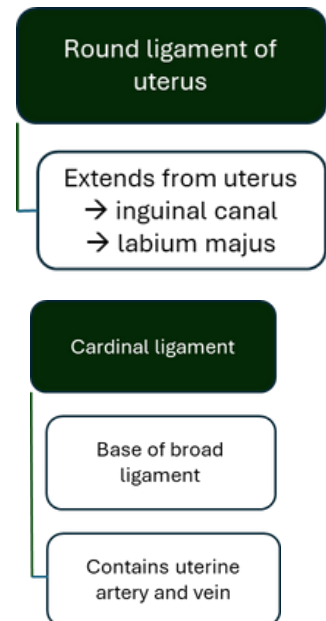
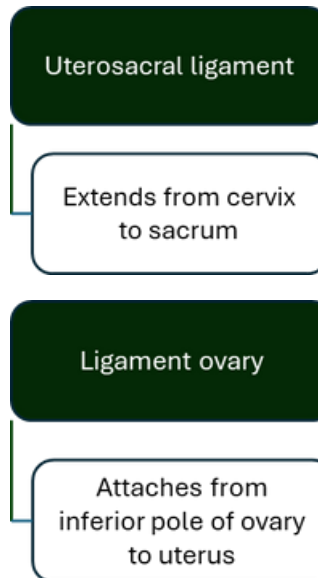
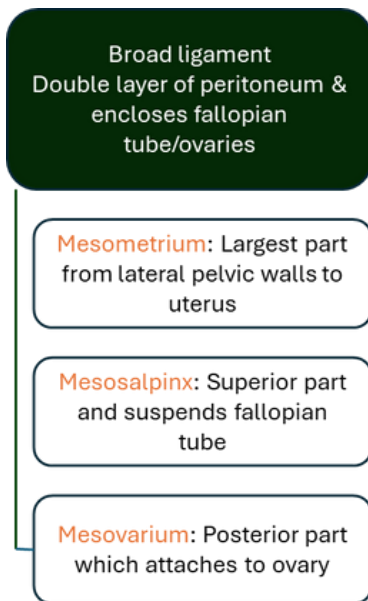
## Female Reproductive System

### Uterus

- Thick-walled muscular organ located between bladder and rectum
- Usually:
  - **Anteverted** (rotated anteriorly)
  - **Anteflexed** (flexed anteriorly)

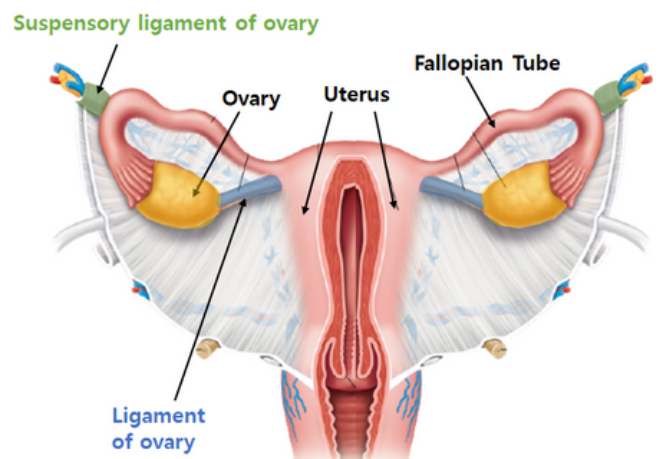


### Ligaments



### Ovaries

- Function: site of egg production (oogenesis)
- **Structure**
  - 2 almond-shaped
  - Suspended by **mesovarium**
- **Ligaments**
  - **Ligament of ovary:** ovary to fundus of uterus
  - **Suspensory ligament of ovary:** contains ovarian vessels, nerves & lymphatics ("suspend the end")

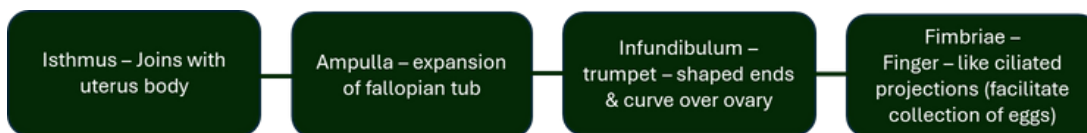


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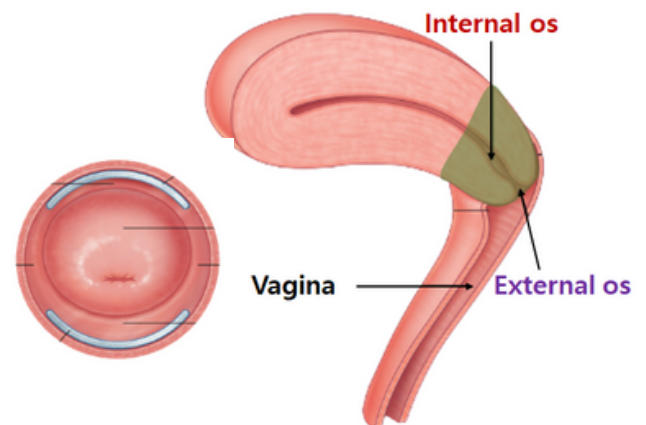
## Fallopian Tube

- Muscular tubes extending from superior end of body of uterus to ovary
- Enclosed in upper margin of broad ligament (**mesosalpinx**)
- Course – pass superiorly and laterally to ovaries



## Cervix

- Short, broad cylinder at inferior part of uterus
- **Function:** passage of sperm & maintain sterility of female reproductive tract
- Cervix is connected to the vagina distally
- **Connections:**
  - Internal os – central cervix opens **above** into uterine cavity
  - External os – central cervix opens **below** into vaginal cavity



## Arterial Supply

- Internal iliac artery – supply pelvic viscera
  - Arises from common iliac at IV disc of L5/S1
  - Located medial to external iliac vein

- Bladder → **Superior vesical a.**
- Uterus/Cervix → **Uterine a.**
- Vagina → **Vaginal a.**
- Perineum → **Internal pudendal a.**
- Ovaries → **Ovarian a.**

**Note:** Ovarian (gonadal) artery from abdominal aorta to supply the ovaries and fallopian tubes

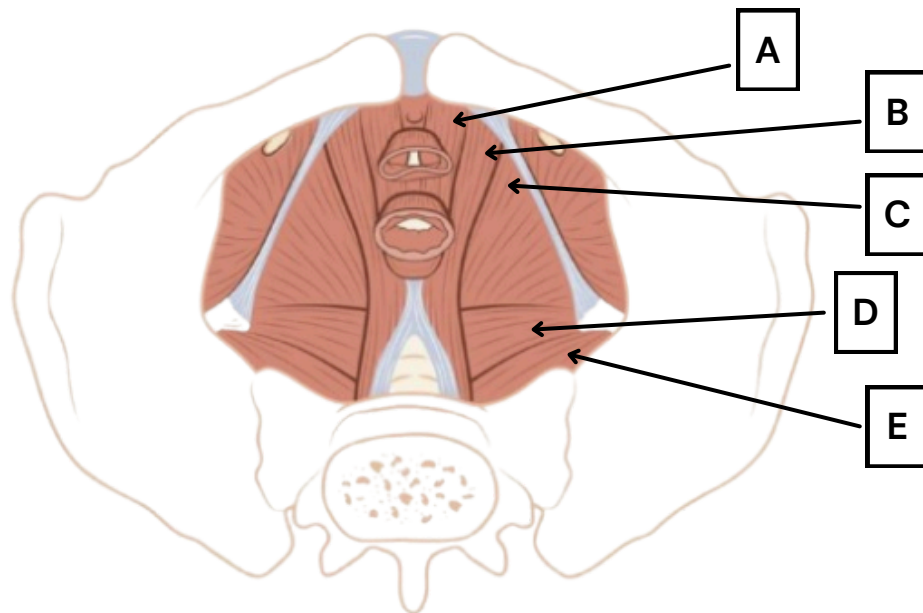
## Innervation

- Mixed autonomic innervation enter through inferior hypogastric plexus
- **Parasympathetic:**
  - Pelvic splanchnic nerves – S2–S4 – penetrate pelvic floor to innervate erectile tissue in females and males (vasodilation)
- **Sympathetic:**
  - Fibres supply blood vessels, accessory reproductive glands, cause contraction of internal anal and urethral sphincter
- **Pudendal nerve (SOMATIC INNERVATION)**
  - Leaves pelvic cavity via greater sciatic foramen to enter gluteal region
  - Then around ischial spine and enters lesser sciatic foramen to enter perineum
  - Sensory: supplies skin of perineum/ external genitalia.
  - Motor: skeletal muscle of perineum.

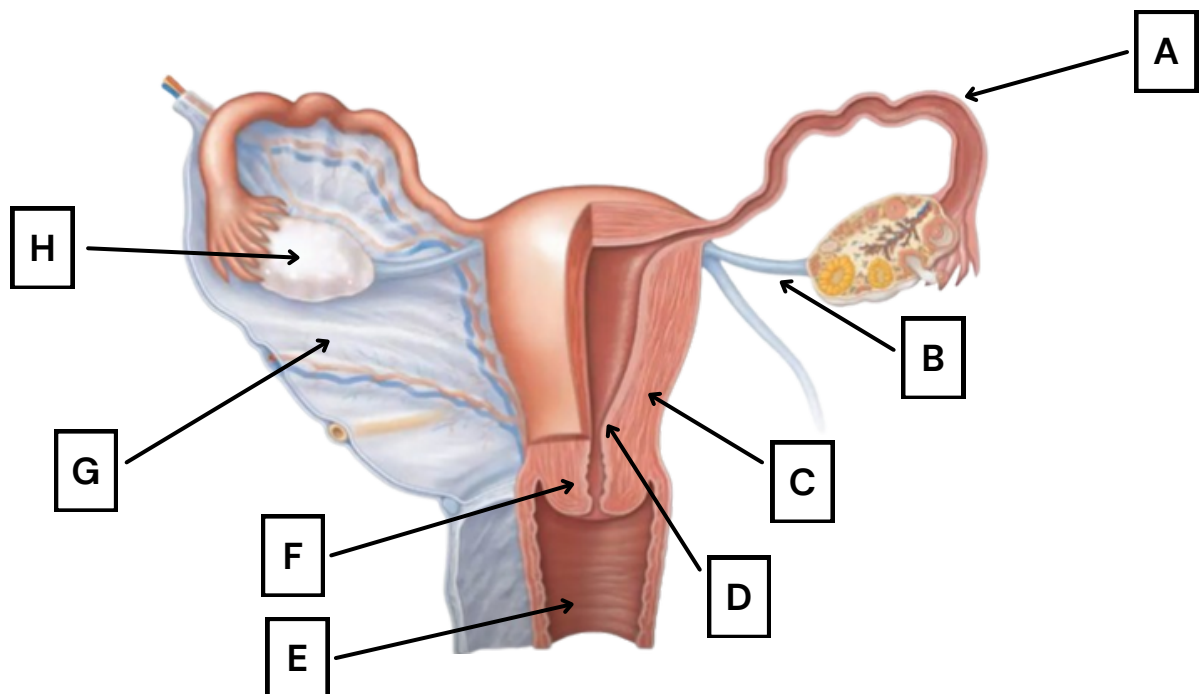
# PELVIC ANATOMY

## Test yourself

1) Label the structures of the pelvic floor:



2) Label the structures within the female reproductive organ:



# PELVIC ANATOMY

## Test yourself

### MCQ 1

A 48-year-old female presents to the day surgery unit for a bilateral salpingo-oophorectomy. Which of the following ligaments would the surgeon have to open to access the ovaries and the fallopian tubes?

- A. Broad ligament
- B. Cardinal ligament
- C. Ovarian ligament
- D. Round ligament
- E. Uterosacral ligament

### MCQ 2

Mrs. Smith presents to the GP with a sensation of heaviness and 'dragging' consistent with prolapse. A ligament that runs between the cervix and lateral pelvic wall has been damaged. What is the name of the affected ligament?

- A. Broad Ligament
- B. Round Ligament
- C. Pubocervical ligament
- D. Cardinal/ transverse cervical ligament
- E. Uterosacral ligament

### MCQ 3

In what part of the fallopian tube does fertilisation most commonly occur?

- A. Fimbriae
- B. Isthmus
- C. Ampulla
- D. Infundibulum
- E. Endometrium

### MCQ 4

A 25-year-old woman comes in with vomiting and abdominal pain. On examination, she is tender on palpation at all lower quadrants of the abdomen. Her temperature is 38°C. On ultrasound, there is fluid in the rectouterine pouch. What anatomical structure would a needle be passed via to extract this fluid?

- A. Anterior fornix of the vagina
- B. Bladder
- C. Posterior fornix of the vagina
- D. Round ligament
- E. Urethra

### MCQ 5

Which muscle forms the posterior wall of the pelvic cavity?

- A. Obturator internus
- B. Piriformis
- C. Coccygeus
- D. Gluteus medius
- E. Levator ani

### MCQ 6

Which structure passes through the lesser sciatic foramen?

- A. Pudendal nerve
- B. Femoral artery
- C. Sciatic nerve
- D. Inferior gluteal artery
- E. Internal pudendal artery



# PELVIC ANATOMY

## Test yourself

### OSCE Station – Case Based Discussion

*Emily, a 36-year-old woman (G3P1), presents to the Emergency Department at 10 weeks gestation with sudden onset of heavy vaginal bleeding and cramping lower abdominal pain. She mentions that her previous two miscarriages were at weeks 10 and 12 of gestation. A transvaginal ultrasound is ordered to assess the viability of the pregnancy. Emily has unfortunately had an incomplete miscarriage.*



- Q1. What is the most common cause of spontaneous pregnancy loss in the first trimester?**
- Q2. What two factors in Emily's history put her at a higher risk of a miscarriage?**
- Q3. What does medical management of an incomplete miscarriage entail?**
- Q4. List four contraindications of expectant management.**
- Q5. Emily is rhesus-negative. If she receives surgical management, what type of prophylaxis should be offered? In what scenarios would it be inappropriate to administer this?**
- Q6. List two potential complications of an incomplete miscarriage.**

#### Answers:

**Labelling:** 1) A: Puborectalis, B: Pubococcygeus, C: Iliococcygeus, D: Coccygeus, E: Piriformis  
 2) A: Fallopian tube, B: Ovarian ligament, C: Myometrium, D: Endometrium, E: Vagina, F: Cervix, G: Broad ligament, H: Ovary  
**MCQs:** 1) A, 2) D, 3) C, 4) C, 5) B, 6) A  
**OSCEs:**  
 1) Foetal chromosomal abnormalities  
 2) Advanced maternal age (defined as older than 35 years old), history of miscarriages.  
 3) A single dose of 600 micrograms of misoprostol (via oral, vaginal or sublingual route). The woman is advised to do a pregnancy test after 3 weeks and return if it is positive.  
 4) Maternal choice, history of adverse and/or traumatic experiences with pregnancy (e.g., stillbirth, miscarriage, antepartum haemorrhage), increased risk of haemorrhage, evidence of infection.  
 5) She should be offered anti-D immunoglobulin prophylaxis. It should not be offered to women who have a threatened miscarriage, have had a complete miscarriage, have a pregnancy of an unknown location, or have received solely medical management for an ectopic pregnancy or miscarriage.  
 6) Infections/sepsis (may occur before or after the miscarriage), recurrent miscarriages