Pelvis and Perineum

Peritoneal, subperitoneal and perineal compartments

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The pelvis is the part of the body surrounded by the pelvic girdle (bony pelvis).

The pelvic cavity is the inferiormost part of the abdominopelvic cavity.

The pelvic cavity contains:
- the rectum,
- the urinary bladder and the terminal parts of the ureters
- the internal genitalia,
- blood vessels
- lymphatics
- nerves
Skeleton of the Pelvis

The **pelvis** (L. pelvis, basin) is formed by
- two hip bones (os coxae) joined posteriorly by
- the sacrum
- the coccyx

Joints and Ligaments:
- sacroiliac joints and pubic symphysis
- sacrotuberous and sacrospinous ligaments
- obturator membrane
Walls of Pelvic Cavity:

- **Muscles:**
  - obturator internus muscle
  - piriformis m.
  - coccygeus m.

- **Openings:**
  - foramen suprapiriforme
  - foramen infrapiriforme
  - obturator canal
  - lesser sciatic foramen
Pelvic Cavity

The pelvic cavity is funnel-shaped.

- It is continuous with the abdominal cavity at the **pelvic inlet** bounded by *linea terminalis*.

- Structures marking the boundaries of the **pelvic outlet** are the:
  - coccyx,
  - sacrotuberal lig.,
  - ischial tuberosity,
  - ischiopubic rami,
  - pubic symphysis
The pelvic cavity is subdivided into:

- **Peritoneal compartment**
- **Suberitoneal compartment**
- **Perineal compartment** (perineum)
The parietal peritoneum lining the abdominal cavity reflects onto the pelvic viscera, remaining separated from the pelvic floor.

The peritoneum forms “pockets”:

- **In the male:**
  - The **rectovesical pouch** and its lateral extensions, the pararectal fossae, are the inferiormost extents of the peritoneal cavity in males.

- **In the female:**
  - The uterus is located between the bladder and rectum, creating **uterovesical** and **rectouterine** pouches.
Peritoneal Cavity of Pelvis

6 - rectovesical pouch

4 - vesicouterine pouch

6 - rectouterine pouch
Peritoneal Cavity of Pelvis

Male

Female
The subperitoneal compartment occupies the space between the peritoneum and the muscular pelvic walls and floor.

- The **pelvic fascia** consists of parietal and visceral components:
  - The **parietal pelvic fascia** is a membranous layer that lines the inner aspect of the walls and floor of the pelvis. Specific parts of the parietal fascia are named for the muscle that is covered (e.g., obturator fascia).
The **visceral pelvic fascia** includes the membranous fascia that directly ensheathes the pelvic organs, forming the adventitial layer of each. The membranous parietal and visceral layers become continuous where the organs penetrate the pelvic floor.
Subperitoneal compartment

The abundant connective tissue remaining between the parietal and visceral membranous layers forms packing material for the pelvic viscera. There are potential spaces around the organs.

- **Visceral spaces:**
  - **parametrium** – around the uterus and continues laterally between the layers of the broad ligament. The ureter and uterine a. traverse the space.
  - **paracolpium**
  - **paraproctium**
Subperitoneal compartment

- **Parietal spaces:**
  - *Prevesical space* (retropubic, *cavitas Retzii*) — between the pubic bone and the visceral layer of the urinary bladder.
    - Pubovesical lig.
    - Puboprostatic lig.
    - Venous plexus
Subperitoneal compartment

- **Retrovesical space** - between the visceral layers of the urinary bladder and rectum.

- In the male:
  - rectovesical septum (Denonvillier)*

- In the female:
  - rectovaginal septum** – continuous with the perineal body inferiorly
  - vesicovaginal septum***
**Subperitoneal compartment**

- **Retrorectal** (or presacral) space* - between the visceral layer of the rectum and parietal layer over the sacrum.

  The contents are:
  - superior and middle rectal arteries
  - rectal venous plexus
  - sympathetic trunk
  - lymph nodes.
Subperitoneal compartment

- **Lateral space** (paired) – between the visceral and parietal layers of the pelvic fascia.

The contents are:
- internal iliac a. and v.,
- sacral plexus,
- inferior hypogastric plexus
- venous plexuses
- lymph nodes

Communications to:
- gluteal region
- thigh
- retroperitoneum
- pelvic spaces
Blood vessels in pelvis

- **Internal iliac a.** – arises from the common iliac a. at the level of the sacroiliac joint. It gives off parietal and visceral branches.

The common iliac a. divides into two trunks:

- **Posterior trunk** (only parietal branches):
  - Iliolumbal a.
  - Lateral sacral a.
  - Superior gluteal a.

- **Anterior trunk**:
  - Inferior gluteal a.
  - Obturator a.
  - Superior vesical a.
  - Inferior vesical a.
  - Ductus deferens a.
  - Uterin a.
  - Middle rectal a.
  - Internal pudendal a.

- **Median sacral a.**
Blood vessels in pelvis

- **Veins** – accompanying the arteries. Pelvic venous plexuses are formed by the interjoining veins surrounding the pelvic viscera.
  - rectal venous plexus
  - vesical venous plexus
  - prostatic venous plexus
  - uterine venous plexus
  - vaginal venous plexus
Lymph nodes of pelvis

- The lymph nodes receiving lymph drainage from pelvic organs are variable in number, size, and location.
- The primary groups of nodes are located in or adjacent to the pelvis, named for the blood vessels with which they are associated.
Pelvic nerves

- The **sacral plexus** is located on the posterolateral wall of the lesser pelvis.
- Most of the nerves seen here are involved with the innervation of the lower limb rather than the pelvic structures.

**Nerves:**
- Superior gluteal nerve
- Inferior gluteal nerve
- Sciatic nerve
- Posterior cutaneous nerve of thigh
- Pudendal nerve
- Muscular branches for the internal obturator m., quadratus femoris and gemelli mm.

- Sacral portion of sympathetic trunk*
Pelvic nerves

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Pelvic autonomic nerves

- **superior hypogastric plexus** is a continuation of the aortic plexus that divides into left and right hypogastric nerves as it enters the pelvis. The hypogastric and pelvic splanchnic nerves merge to form the **inferior hypogastric plexuses** thus contain both sympathetic and parasympathetic fibers.
The perineum refers to a shallow compartment of the body bounded by the pelvic outlet and fascia covering the inferior aspect of the pelvic diaphragm.

The perineal region — is the narrow region between the proximal parts of the thighs.
Perineum, perineal compartment

- The pelvic outlet is a diamond-shaped area.
- A transverse line joining the anterior ends of the ischial tuberosities divides the diamond-shaped perineum into two triangles:
  - The **urogenital (UG) triangle** is anterior to this line*.
  - The **anal triangle** lies posterior to this line**.
The pelvic outlet is almost closed by the **pelvic diaphragm** (levator ani and coccygeus muscles), forming the floor of the pelvic cavity.

The urethra (and vagina in females) and rectum pass through the **urogenital hiatus** of the pelvic diaphragm.
The pelvic diaphragm is formed by the:

- **levator ani muscle** and
- **coccygeus muscle** plus
- the **fasciae** covering their superior and inferior surfaces

The pelvic diaphragm extends from the pubic symphysis to the coccyx. Laterally, the pelvic diaphragm is attached to the fascia covering the obturator internus muscle.
The urogenital hiatus is covered by the superficial and deep perineal pouches.

The muscles within the deep perineal pouch plus the perineal membrane* are known as the **urogenital diaphragm**:

- **Deep transverse perineal muscle** has a lateral attachment to the ischial tuberosity and the ischiopubic ramus.

- **External urethral sphincter** – a voluntary muscle that surrounds the urethra.
The contents of the superficial perineal pouch include three muscles:

- **bulbospongiosus** – covers the bulbus spongiosum (in the male) and superficial surface of the bulb of the vestibule (in the female).
- **Ischiocavernosus** – covers crus penis (in the male) and crura clitoridis (in the female).
- **superficial transverse perineal** – between the perineal body and ischial tuberosity.
The superficial perineal fascia has a superficial fatty layer and a deep membranous layer*.

The **superficial perineal pouch** is a potential space between the perineal fascia and the perineal membrane**.
The midpoint of the line joining the ischial tuberosities is the **central point of the perineum**.

This is the location of the **perineal body***, which is an irregular mass, variable in size and consistency, and containing collagenous and elastic fibers.

The **perineal body** lies deep to the skin, posterior to the vestibule or bulb of the penis and anterior to the anus and anal canal.

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* Indicates a specific anatomical structure or region in the perineum.
The ischioanal fossa is a wedge-shaped area on either side of the anus. The apex of the wedge is directed superiorly and the base is beneath the skin.

Each ischioanal fossa is bounded:

- Laterally by the obturator internus, covered with obturator fascia.
- Medially by the external anal sphincter, with a roof formed by the levator ani as it descends to blend with the sphincter;
- Posteriorly by the sacrotuberous ligament and gluteus maximus
Ischioanal Fossa

- The **pudendal canal** (Alcock canal) is an essentially horizontal passageway within the obturator fascia that covers the medial aspect of the obturator internus.

- The **internal pudendal artery and vein**, the **pudendal nerve**, and the nerve to the obturator internus enter this canal.

- They give rise to the inferior rectal artery and nerve, which pass medially to supply the external anal sphincter and the perianal skin.
Ischioanal Fossa