

The Perineum

The cavity of the pelvis is divided by the pelvic diaphragm into the main pelvic cavity above and the perineum below. When seen below with the thighs abducted, the perineum is diamond shaped and is bounded anteriorly by the symphysis pubis, posteriorly by the tip of the coccyx, and laterally by the ischial tuberosities.

Pelvic Diaphragm

The pelvic diaphragm is formed by the important levatores ani muscles and the small coccygeus muscles and their covering fascia. It is incomplete anteriorly to allow the passage of the urethra in males and the urethra and vagina in females.

Anal Canal

The anal canal is about 4 cm long and passes downward and backward from the rectal ampulla to the anus.

Posteriorly, the anal canal is related to the anococcygeal body, which is a mass of fibrous tissue lying between the anal canal and the coccyx.

Laterally, it is related to the fat-filled ischiorectal fossa.

Anteriorly, in the male it is related to the perineal body, the urogenital diaphragm, the membranous part of the urethra, and the bulb of the penis. In the female it is related perineal body, the urogenital diaphragm, and the lower part of the vagina.

Structure

The **mucous membrane of the upper half of the anal canal** is derived from the hindgut endoderm. It has the following structure:

1. It is lined by columnar epithelium.
2. It is thrown into vertical folds called anal columns, which are joined together at the lower ends by small semilunar folds called anal valves (remains of proctodeal membrane).
3. The nerve supply is the same as that for the rectal mucosa and is derived from autonomic hypogastric plexuses. It is sensitive only to stretch.
4. The arterial supply is from the superior rectal artery, a branch of the inferior mesenteric artery. The venous drainage is mainly by the superior rectal vein, a tributary of the inferior mesenteric vein and the portal vein.
5. The lymphatic drainage is mainly upward along the superior rectal artery to the pararectal nodes and then eventually to the inferior mesenteric nodes.

The **mucous membrane of the lower half of the anal canal** is derived from the ectoderm of the proctodeum. It has the following structure:

1. It is lined by stratified squamous epithelium, which gradually merges at the anus with the perianal epidermis.
2. There are no anal columns.
3. The nerve supply is from the somatic inferior rectal nerve, it is thus sensitive to pain, temperature, touch, and pressure.

4. The arterial blood supply is the inferior rectal artery, a branch of the internal pudendal artery. The venous drainage is by the inferior rectal vein, a tributary of the internal pudendal vein, which drains into the internal iliac vein.
5. The lymph drainage is downward to the medial group of the superficial inguinal nodes.

The **pectinate line** indicates the level where the upper half of the anal canal joins the lower half.

Muscular Coat

As in the upper part of the intestinal tract, it is divided into an outer longitudinal and an inner circular layer of smooth muscle.

Anal sphincter

The anal canal has an involuntary internal sphincter and a voluntary external sphincter.

The **internal sphincter** is formed from a thickening of the smooth muscle of the circular coat at the upper end of the anal canal. The internal sphincter is enclosed by a sheath of striped muscle that forms the voluntary external sphincter.

The external sphincter can be divided into three parts:

1. A **subcutaneous** part, which encircle the lower end of the anal canal and has no bony attachment.
2. A **superficial** part, which is attached to the coccyx behind and the perineal body in front.
3. A **deep** part, which encircles the upper end of the anal canal and has no body attachments.

Pudendal Nerve

The pudendal nerve is a branch of the sacral plexus and leaves the main pelvic cavity through the greater sciatic foramen. After a brief course in the gluteal region of the lower limb, it enters the perineum through the lesser sciatic foramen. It supplies the external sphincter and muscles and skin of the perineum. It gives off the following branches.

1. **Inferior rectal nerve.** This runs medially across the ischiorectal fossa and supplies the external anal sphincter, the mucous membrane of the lower half of the anal canal, and the perianal skin.
2. **Dorsal nerve of the penis (or clitoris).** This is distributed to the penis (or clitoris).
3. **Perineal nerve.** This supplies the muscles in the urogenital triangle and skin on the posterior surface of the scrotum (or labia majora).

Internal Pudendal Artery

The internal pudendal artery is a branch of the internal iliac artery and passes from the pelvis through the greater sciatic foramen and enters the perineum through the lesser sciatic foramen. It gives off the following branches:

1. **Inferior rectal artery.** This supplies the lower half of the anal canal.

2. **Branches to the penis** (the artery to the bulb of the penis, arteries to the crura of the penis, and the dorsal artery of the penis) in the male and to the **labia and clitoris in the female**.

Male Urogenital Triangle

The urogenital triangle is bounded in front by the pubic arch and laterally by the ischial tuberosities. In the male the urogenital triangle contains the penis and the scrotum.

Male Urethra

The male urethra is about 20 cm long and extends from the neck of the bladder to the external meatus on the glans of the penis. It is divided into three parts: (1) prostatic, (2) membranous, and (3) penile.

The **prostatic urethra** is about 3 cm long and passes through the prostate from the base to the apex. It is the widest and most dilatable portion of the urethra.

The **membranous urethra** is about 1.25 cm long and lies within the urogenital diaphragm surrounded by the sphincter urethrae muscle. It is at least dilatable portion of the urethra.

The **penile urethra** is about 15.75 cm long and is enclosed in the bulb and the corpus spongiosum of the penis. The external meatus is the narrowest part of the entire urethra. The part of the urethra that lies within the glans penis is dilated to form the **fossa terminalis** (navicular fossa). The bulbourethral glands open into the penile urethra below the urogenital diaphragm.

Sphincter Urethrae Muscle

The sphincter urethrae muscle surrounds the urethra in the deep perineal pouch. It arises from the pubic arch on the two sides and passes medially to encircle the urethra.

Bulbourethral Glands

The bulbourethral glands are two small glands that lie beneath the sphincter urethrae muscle. Their ducts pierce the perineal membrane (inferior fascial layer of the urogenital diaphragm) and enter the penile portion of the urethra. The secretion is poured into the urethra as a result of erotic stimulation.

Female Urogenital Triangle

In the female the triangle contains the external genitalia and the orifice of the urethra and the vagina.

Vulva

The term vulva is the collective name for the female external genitalia and includes the mons pubis, labia majora and minora, the clitoris, the vestibule of the vagina, the vestibular bulb, and the greater vestibular gland.

The blood supply is large and is from branches of the external and internal pudendal arteries on each side.

The anterior parts of the vulva are supplied by the ilioinguinal nerves and the genital branch of the genitofemoral nerves. The posterior parts of the vulva are supplied by the branches of the perineal nerves and the posterior cutaneous nerves of the thigh.

Clitoris

The clitoris, which correspond to the penis in the male, is situated at the apex of the vestibule anteriorly. It has a structure similar to the penis. The glans of the clitoris is partly hidden by the prepuce.

The **root of the clitoris** is made up of three masses of erectile tissue called the bulb of the vestibule and the right and left crura of the clitoris.

The **bulb of the vestibule** corresponds to the bulb of the penis, but because of the presence of the vagina, it is divided into two halves. It is attached to the undersurface of the urogenital diaphragm and is covered by the **bulbospongiosus muscles**.

The **crura of the clitoris** corresponds to the crura of the penis and become the corpora cavernosa anteriorly. Each remains separate and is covered by an **ischiocavernosus muscle**.

The **body of the clitoris** consists of two corpora cavernosa covered by their ischiocavernosus muscles. The corpus spongiosum of the male is represented by a small amount of erectile tissue leading from the vestibular bulbs to the glans.

The **glans of the clitoris** is a small mass of erectile tissue that caps the body of the clitoris. It is provided with numerous sensory endings. The glans is partly hidden by the prepuce.

The blood supply, lymph drainage, and nerve supply are similar to those of the penis.

Mons Pubis

This is the rounded, hair-bearing elevation of skin found anterior to the pubis. The pubic hair in the female has an abrupt superior margin, whereas in the male it extends upward to the umbilicus.

Labia Majora

These are prominent, hair-bearing folds of skin extending posteriorly from the mons pubis to unite posteriorly in the midline.

Labia Minora

These are two smaller, hairless folds of soft skin that lie between the labia majora. their posterior ends are united to form a sharp fold, the **fourchette**. Anteriorly they split to enclose the clitoris, forming **prepuce** and a posterior **frenulum**.

Vestibule

This is a smooth triangular area bounded laterally by the labia minora, with the clitoris at its apex and the fourchette at its base.

The vestibular orifice is protected in virgins by a thin mucosal fold called the hymen, which is perforated at its center.

Greater Vestibular Glands

The greater vestibular glands are a pair of small mucous secreting glands that lie under cover of the posterior parts of the bulb of the vestibule and the labia majora. Each drains its secretion into the vestibule by a small duct, which opens into the groove between the hymen and the posterior part of the labium minus. These glands secrete a lubricating mucous during sexual intercourse.

Female Urethra

The female urethra is about 3.8 cm long. It extends from the neck of the bladder to the **external meatus**, where it opens into the vestibule about 2.5 cm below the clitoris. It traverses the sphincter urethrae and lies immediately in front of the vagina. At the sides of the external urethral meatus are the small openings of the ducts of the paraurethral glands (corresponds to the prostate in the male).