LEARNING OBJECTIVES

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

- The names and anatomical location of female external genitalia
- Function, arterial supply, venous drainage and nerve supply of female external genitalia
- Clinical importance of female external genitalia
- Course & relations of female urethra
- Arterial supply, venous drainage and nerve supply of female urethra
- Clinical importance of female urethra

THE FEMALE EXTERNAL GENITALIA

These include:
- Mons pubis
- Labia majora
- Labia minora
- Clitoris
- Bulbs of the vestibule
- Greater and lesser vestibular glands

Synonyms are vulva and pudendum

FUNCTIONS OF VULVA

The vulva serves:
- As sensory and erectile tissue for sexual arousal and intercourse
- To direct the flow of urine
- To prevent entry of foreign material into the urogenital tract

MONS PUBIS

- It is the rounded, fatty eminence
- anterior to the
  - pubic symphysis
  - pubic tubercles
  - superior pubic rami
- Formed by a mass of fatty subcutaneous tissue
- The amount of fat
– increases at puberty
– decreases after menopause

• After puberty, the mons pubis is covered with coarse pubic hairs.

**LABIA MAJORA**

• These are prominent folds of skin
• Filled with a finger-like digital process of loose subcutaneous tissue
• Containing smooth muscle and the termination of the round ligament of the uterus
• Enclose the pudendal cleft, within which are the labia minora and vestibule
• **Function:** indirectly provide protection for the urethral and vaginal orifices

**LABIA MAJORA**

• Externally the labia majora (in the adult) are covered
  – with pigmented skin (containing many sebaceous glands)
  – with crisp pubic hair
• Internally the labia are smooth, pink, and hairless
• Anteriorly, (labia are thicker) join to form the **anterior commissure**
• Posteriorly, (in nulliparous) merge to form a ridge, the **posterior commissure**

**LABIA MINORA**

• Are two fat-free, small, rounded folds of hairless skin
• Internally labium minus consists of thin moist skin, pink in color, contains many sebaceous glands and sensory nerve endings
• Situated between the labia majora
• Extending from the clitoris obliquely downward, lateralward, and backward for about 4 cm. on either side of the orifice of the vagina
• Are enclosed in the pudendal cleft and immediately surround the vestibule

**LABIA MINORA**

• Have a core of spongy connective tissue containing erectile tissue at their base and many small blood vessels
• Anteriorly, the labia minora form two laminae
  • The **medial laminae** of each side unite as the **frenulum of the clitoris**
  • The **lateral laminae** unite anterior to the glans of the clitoris, forming the **prepuce (foreskin) of the clitoris**
• In young women, especially virgins, the labia minora are connected posteriorly by a small transverse fold, the frenulum of the labia minora (fourchette)
**CLITORIS**

- An erectile organ located where the labia minora meet anteriorly
- **Consists of**
  - a root
  - a body, composed of
    - two crura
    - two corpora cavernosa
  - the **glans of the clitoris**, covered by a prepuce, is the most highly innervated part of the clitoris
- Highly sensitive and enlarges on tactile stimulation
- **FUNCTIONS:**
  - act as an organ of sexual arousal

**VESTIBULE**

- This is the space surrounded by the labia minora
- It contains
  - The external urethral orifice
  - The vaginal orifice
  - The hymen
  - The bulb of vestibule
  - The greater vestibular glands

**THE EXTERNAL URETHRAL ORIFICE**

- is located 2-3 cm posteroinferior to the glans of the clitoris and anterior to the vaginal orifice
- On each side of the external urethral orifice are the openings of the ducts of the **paraurethral glands**

**THE VAGINAL ORIFICE**

- is a median slit below and behind the opening of the urethra
- its size varies inversely with that of the **hymen**
HYMEN

- A thin annular fold of mucous membrane immediately within the vaginal orifice surrounding the lumen
- After its rupture, only remnants of the hymen, hymenal caruncles (tags), are visible
- The hymen has no established physiological function. It is considered primarily a developmental vestige
- Its condition (and that of the frenulum of the labia minora) often provides critical evidence in cases of child abuse and rape

TYPES OF HYMEN

BULBS OF THE VESTIBULE

- Paired masses of elongated erectile tissue
- Approximately 3 cm in length
- Homologous with the bulb of the penis
- Lie along the sides of the vaginal orifice, superior or deep to (not within) the labia minora, immediately inferior to the perineal membrane

BULBS OF THE VESTIBULE

- Anteriorly united to each other by a narrow median band the pars intermedia.
- Posteriorly are expanded and are in contact with the greater vestibular glands
- Inferiorly are in contact with the inferior fascia of the urogenital diaphragm
• Superiorly they are covered by the **Bulbocavernosus**

**THE GREATER VESTIBULAR GLANDS**

• Aka Bartholin glands
• Homologues of the bulbo-urethral glands in the male
• Consist of two small, roundish bodies of a reddish-yellow color
• Approximately 0.5 cm in diameter
• Located
  – on each side of the vestibule
  – posterolateral to the vaginal orifice
  – inferior to the perineal membrane
• Each gland opens by means of a duct, about 2 cm. long, immediately lateral to the hymen, in the groove between it and the labium minus
• **Function:** secrete mucus into the vestibule during sexual arousal

**THE LESSER VESTIBULAR GLANDS**

• Are small glands
• On each side of the vestibule
• Open into vestibule between the urethral and the vaginal orifices
• **Function:** secrete mucus into the vestibule, which moistens the labia and vestibule

**ARTERIAL SUPPLY OF THE VULVA**

• The external and internal pudendal arteries
• The internal pudendal artery supplies
  – most of the skin
  – external genitalia
  – perineal muscles
• **The labial arteries** are branches of the internal pudendal artery, as are the **dorsal** and **deep arteries** of the **clitoris**
VENOUS DRAINAGE OF THE VULVA

- **The labial veins** are tributaries of the **internal pudendal veins** and accompanying veins (L. venae comitantes) of the internal pudendal artery.
- Venous engorgement during the excitement phase of the sexual response causes an increase in the size and consistency of the clitoris and the bulbs of the vestibule.

LYMPHATIC DRAINAGE OF THE VULVA

- The vulva
  - superficial inguinal lymph nodes
- The glans of the clitoris and anterior labia minora
  - may drain to the deep inguinal nodes
  - or directly to the internal iliac nodes.

INNERVATION OF THE VULVA

- The anterior aspect of the vulva (mons pubis, anterior labia) is supplied by
  - the lumbar plexus:
    - the anterior labial nerves, ilioinguinal nerve
    - genitofemoral nerve, genital branch
- The posterior aspect of the vulva is supplied by
  - the sacral plexus:
    - laterally
      - posterior cutaneous nerve of thigh, perineal branch
    - centrally
      - the pudendal nerve

INNERVATION OF THE VULVA

- The posterior labial nerves (terminal superficial branches of the perineal nerve) supply the labia.
- The deep and muscular branches of the perineal nerve supply the orifice of the vagina and superficial perineal muscles.
- The dorsal nerve of the clitoris supplies deep perineal muscles and sensation to the clitoris.
- The bulb of the vestibule and erectile bodies of the clitoris receive
parasympathetic fibers via cavernous nerves from the uterovaginal nerve plexus

- Parasympathetic stimulation produces increased vaginal secretion, erection of the clitoris, and engorgement of erectile tissue in the bulbs of the vestibule

**CLINICAL ANATOMY**

- Female Circumcision
- Vulvar Trauma
- Administration of Pudendal and Ilioinguinal Nerve Blocks
- Kegel exercises
- Vaginismus

**FEMALE URETHRA**

- is a narrow membranous canal
- shorter in females
  - Extend:
    - From the neck of the bladder at the lower angle of the trigone
    - to the external urethral meatus with in the vestibule of vagina.
  - Size: is about 4 cm
  - It is placed behind the symphysis pubis, imbedded in the anterior wall of the vagina
  - Course: it runs obliquely downward and forward; slightly curved with the concavity directed forward It perforates the fascia of the urogenital diaphragm, and open in external urethral orifice in front of the vaginal opening, about 2.5 cm. behind the glans clitoris
    - Its diameter when undilated is about 6 mm
    - The lining membrane is thrown into longitudinal folds, one of which, placed along the floor of the canal, is termed the **urethral crest**
  - Many small urethral glands open into the urethra
FEMALE URETHRA

- **Blood supply**
  - **Upper part** by
    - inferior vesical
    - uterine arteries.
  - **Lower part** by
    - perineal branch of internal pudendal Ar.

- **Venous drainage:**
  - vesical plexus
  - internal pudendal vein

- **Lymphatic drainage:**
  - internal iliac nodes (Mainly)
  - external iliac group

- **Nerve supply:**
  - From inferior hypogastric plexus and perineal nerve
  - Parasympathetic fibres from 2nd to 4th sacral segment run in the pelvic splanchnic nerves and synapse in the vesical plexus. Postganglionic fibres are distributed to smooth muscles of urethral wall.
  - Somatic fibres to striated muscles derived from the same sacral segments, run in the pelvic splanchnic nerves but do not synapse in the vesical plexus.
  - Sensory fibres run in 2nd to 4th sacral segments of the spinal cord.

**APPLIED ANATOMY**

- Urethra being shorter in females easy to be catheterized
- In late pregnancy it has to pass twice the normal distance
- During labor length increase due to stretching up to 10cm
- Urethra may compressed between the pubic symphysis and fetal head during labor
- Due to shorter length and opening to exterior get infected readily
• Its mucosa is responsive to female hormone, undergo atrophic changes in postmenopausal women

APPLIED ANATOMY

• Infection of the urethra is urethritis said to be more common in females than males. Urethritis is a common cause of dysuria (pain when urinating).
• Passage of kidney stones through the urethra can be painful, which can lead to urethral strictures.
• Urethral cancer is cancer originating from the urethra. Cancer in this location is rare, and the most common type is papillary transitional cell carcinoma