MEDICAL EDUCATION RESOURCE

Perineum

Introduction

- The **perineum** is the **diamond-shaped area** forming the **inferior part of the pelvis** located below the **pelvic diaphragm**.
- It corresponds to the region between the **thighs**, and lies **inferior to the pelvic outlet**.
- It contains the **anal canal and external genitalia**.
- It is important in **urination, defecation, sexual activity**, and **childbirth**.

Surface extent:

- Extends from the **pubic symphysis (anteriorly)** to the **tip of the coccyx (posteriorly)**.
- Laterally bounded by the **ischial tuberosities** and **sacro-tuberous ligaments**.

Clinical significance:

- Perineal tears may occur during childbirth.
- Surgical interventions like **episiotomy**, **perineal body repair**, and **urethral catheterization** require anatomical understanding.

Superficial Boundaries of the Perineum

The perineum's **surface boundaries** form a **diamond-shaped area** with the following limits:

- **Anterior boundary:** Pubic symphysis.

- **Posterior boundary:** Tip of coccyx.
- **Lateral boundaries:** Ischial tuberosities.
- **Anterolateral boundaries:** Conjoint rami of ischium and pubis.
- **Posterolateral boundaries:** Sacrotuberous ligaments covered by gluteus maximus.

Shape division:

- The diamond-shaped perineum can be divided by an **imaginary line between the two ischial tuberosities** into:
    - **Anterior urogenital triangle** (contains external genital organs and urogenital structures).
    - **Posterior anal triangle** (contains anal canal and ischioanal fossae).

Deep Boundaries of the Perineum

The perineum forms the **floor of the pelvic cavity** and has deeper limits corresponding to bony and muscular structures.

Boundaries (deep plane):

- **Anteriorly:** Inferior border of pubic symphysis and arcuate ligament of pubis.
- **Posteriorly:** Tip of coccyx and sacrum.
- **Laterally:** Ischial tuberosities and obturator internus fascia.
- **Superiorly (roof):** Pelvic diaphragm (mainly the **levator ani** muscle and coccygeus).

- **Inferiorly (floor):** Skin, superficial fascia, and perineal membrane (urogenital diaphragm).

Clinical significance:

- Deep perineal fascia and muscles are involved in **continence and sexual reflexes**.
- In females, it supports pelvic viscera and prevents prolapse.

Divisions of the Perineum

The perineum is divided into **two triangles** by a **line joining the ischial tuberosities**:

1. Anal Triangle (posterior part):

- Contains:
  - Anal canal.
  - External anal sphincter.
  - Ischioanal fossae (fat-filled spaces on each side).
- Boundaries:
  - Posteriorly ? Tip of coccyx.
  - Laterally ? Sacrotuberous ligaments and gluteus maximus.
  - Anteriorly ? Line joining the ischial tuberosities.
- Clinical importance: Common site of **abscess**, **fistula**, and **pilonidal sinus** formation.

2. Urogenital Triangle (anterior part):

- Contains:
    - External genital organs (penis/scrotum in males; vulva in females).
    - Urethra and associated muscles (deep and superficial perineal pouch).
- Boundaries:
    - Anteriorly ? Pubic symphysis and pubic arch.
    - Laterally ? Ischiopubic rami.
    - Posteriorly ? Line joining the ischial tuberosities.
- Clinical importance: Involved in **urethral rupture**, **episiotomy**, and **Bartholin's gland abscess**.

Anal Region

- The **anal region** forms the **posterior triangle** of the perineum.
- It contains the **anal canal** in the midline and the **ischioanal fossae** on either side.
- The overlying skin is thick, pigmented, and contains sweat and sebaceous glands.
- **Surface features:**
    - Median groove corresponds to anal canal.
    - Anal orifice lies centrally.
    - Two buttocks form its lateral boundaries.

- **Functions:** Defecation, maintenance of continence (through sphincters and perineal muscles).

Perineal Body

- A **fibromuscular node** located in the **midline between the anal canal and urogenital structures**.
- Also called **central tendon of perineum**.
- **Position:**
    - In males: Between bulb of penis and anal canal.
    - In females: Between vagina and anal canal (felt through posterior vaginal wall).
- **Muscles attached:**
    - External anal sphincter.
    - Bulbospongiosus.
    - Superficial and deep transverse perineal muscles.
    - Fibers of levator ani (especially pubococcygeus).
- **Function:**
    - Acts as a central point of support for pelvic floor.
    - Maintains integrity of perineum during defecation and childbirth.
- **Clinical importance:**

- May tear during childbirth ? leads to pelvic floor weakness and uterovaginal prolapse.
- Often reinforced surgically by **episiotomy**.

External Anal Sphincter

- A **voluntary, striated muscle** encircling the **anal canal**; lies outside the internal anal sphincter.
- **Parts:**
  1. **Subcutaneous part:** Surrounds the lower end of anal canal; no bony attachment.
  2. **Superficial part:** Attached anteriorly to the perineal body and posteriorly to coccyx via anococcygeal raphe.
  3. **Deep part:** Blends superiorly with **puborectalis** (part of levator ani).
- **Nerve supply:**
  - Inferior rectal branch of **pudendal nerve (S2–S4)**.
  - Perineal branch of **S4** and **inferior rectal plexus**.
- **Actions:**
  - Maintains **voluntary control over defecation**.
  - Helps close the anal orifice in conjunction with internal sphincter.
- **Clinical note:** Damage during childbirth or surgery can lead to **fecal incontinence**.

Ischioanal Fossa

- A **wedge-shaped fat-filled space** located on each side of the anal canal.
- Lies between the **skin of anal region** and the **pelvic diaphragm**.
- **Shape and limits:**
  - **Apex:** Upward, where levator ani and obturator internus meet.
  - **Base:** Downward, forming the skin of perineum.
- **Boundaries:**
  - **Medial wall:** Levator ani and external anal sphincter.
  - **Lateral wall:** Obturator internus covered by obturator fascia (contains pudendal canal).
  - **Posterior wall:** Sacrotuberous ligament and gluteus maximus.
  - **Anterior wall:** Posterior border of urogenital diaphragm (perineal membrane).

Functions:

- Permits expansion of anal canal during defecation.
- Acts as cushion for protection of pelvic diaphragm.

Spaces and Canals of the Fossa

1. **Pudendal Canal (Alcock's Canal):**

- A fascial canal within the obturator fascia on the **lateral wall** of ischioanal fossa.
- **Contents:** Pudendal nerve and internal pudendal vessels.
- Extends from lesser sciatic foramen to anterior perineal region.

2. **Anterior Recess:**
   - A forward extension of ischioanal fossa into **urogenital triangle**.
   - Lies between pelvic diaphragm above and urogenital diaphragm below.
   - Communicates with opposite side in front of the anal canal.
3. **Posterior Recess:**
   - Extends backward between gluteus maximus and sacrotuberous ligament.

Contents of Ischioanal Fossa

- **Fat and loose areolar tissue** (main bulk).
- **Inferior rectal vessels and nerves** (branches of pudendal neurovascular bundle).
- **Perineal branches of S4 nerve.**
- **Pudendal canal (on lateral wall):** encloses pudendal nerve and internal pudendal artery and vein.
- **Fibrous bands:** Connect fat to skin, providing support to anal canal.

Dissection

- **Position:** Cadaver in lithotomy position with perineum exposed.
- Make a **midline incision from coccyx to perineal body**, and a **transverse cut between ischial tuberosities**.
- Reflect skin and superficial fascia to expose **fat-filled ischioanal fossae**.
- Identify **inferior rectal vessels and nerves** crossing medially toward the anal canal.
- On lateral wall, trace **pudendal canal** and its contents (internal pudendal artery, vein, and pudendal nerve).
- Note the **apex** formed by meeting of levator ani and obturator internus muscles.

Clinical Anatomy

- **Ischioanal abscess:**
  - Common due to infection in fat of the fossa.
  - Presents with painful swelling beside the anal canal; may rupture into anal canal or skin.
  - Requires surgical drainage.
- **Pudendal nerve block:**
  - Given through vaginal wall (in females) or transperineally (in males).
  - Provides anesthesia for childbirth and perineal procedures.
- **Anal fissure and fistula:**

- Infection of anal glands can spread into the ischioanal fossa forming a fistulous tract.

- **Perineal tear:**
  - In obstetrics, tearing of perineal body may extend into anal sphincter ? fecal incontinence.
  - Prevented by mediolateral **episiotomy**.
- **Loss of anal tone:**
  - Indicates damage to pudendal nerve or external anal sphincter.

Male Perineum

- The **male perineum** includes the **anal region** and the **urogenital region**, together forming the lower outlet of the pelvis.
- It contains the **anal canal**, **urethra**, and **external genital organs (penis, scrotum, and associated glands and muscles)**.
- **Boundaries:**
  - **Anterior:** Pubic symphysis.
  - **Posterior:** Tip of coccyx.
  - **Lateral:** Ischial tuberosities and sacrotuberous ligaments.
- Divided into:

- **Posterior anal triangle:** Contains anal canal and ischioanal fossae.
- **Anterior urogenital triangle:** Contains external genitalia and urethral structures.

Functional importance:

- Serves as a passage for urinary and reproductive tracts.
- Provides muscular support during erection, ejaculation, and urination.

Male External Genital Organs

The main **external genital organs** in the male perineum include:

1. Penis

- Consists of **root**, **body**, and **glans penis**.
- Root attached to perineal membrane by **crura and bulb**.
- Formed of **three erectile tissues:**
  - **Two corpora cavernosa** (dorsal).
  - **One corpus spongiosum** (ventral, containing urethra).
- Covered by **Buck's fascia** and **skin**; terminally expanded as **glans penis**.
- **Blood supply:** Deep and dorsal arteries of penis (branches of internal pudendal artery).
- **Nerve supply:** Pudendal nerve (S2–S4), dorsal nerve of penis (sensory).

2. Scrotum

- A pendulous pouch containing **testes**, **epididymides**, and **lower parts of spermatic cords**.
- Layers (from superficial to deep):
    - Skin ? Dartos muscle ? External spermatic fascia ? Cremasteric fascia ? Internal spermatic fascia ? Tunica vaginalis.
- **Function:** Maintains temperature ~2–3°C below body temp for spermatogenesis.
- **Nerve supply:**
    - Anterior scrotal nerves (ilioinguinal).
    - Posterior scrotal nerves (pudendal).
- **Blood supply:** External and internal pudendal arteries.

Male Urogenital Region

- The **urogenital region** forms the **anterior triangle** of the perineum.
- Contains the **urethra (membranous part)**, **external genitalia**, and **perineal muscles**.

Layers of urogenital region (from below upward):

1. **Skin and superficial fascia (Colles' fascia).**
2. **Superficial perineal pouch:**
    - Between Colles' fascia and perineal membrane.
    - Contains:

        - Root of penis (bulb + crura).
        - Bulbospongiosus and ischiocavernosus muscles.
        - Superficial transverse perineal muscles.
        - Branches of internal pudendal vessels and pudendal nerve.

3. **Perineal membrane (urogenital diaphragm):**
    - A fibrous sheet closing the urogenital triangle.
    - Pierced by urethra and vessels.
4. **Deep perineal pouch:**
    - Between perineal membrane below and pelvic diaphragm above.
    - Contains:
        - Membranous urethra.
        - Sphincter urethrae.
        - Deep transverse perineal muscles.
        - Bulbourethral glands.
        - Dorsal nerve and artery of penis.

Dissection

- Make a **midline incision** from the base of scrotum to the anus.

- Reflect skin and superficial fascia to expose:
    - **Superficial perineal pouch** ? Identify bulb of penis, crura, and associated muscles (ischiocavernosus, bulbospongiosus, superficial transverse perineal).
    - Cut through perineal membrane to open **deep perineal pouch** ? Observe sphincter urethrae, deep transverse perineal muscles, and membranous urethra.
    - Identify **internal pudendal artery and pudendal nerve** on lateral side, entering from pudendal canal.

Clinical Anatomy

1. Rupture of Urethra

- Common in trauma to perineum (“straddle injury”).
- **Site:** Usually in bulbous urethra (below perineal membrane).
- **Result:** Extravasation of urine into superficial perineal pouch and scrotum (may extend into lower abdominal wall).

2. Perineal Tear

- May occur from violent straining or surgery.
- Can damage perineal body, leading to loss of support to pelvic floor and incontinence.

3. Pudendal Nerve Block

- Administered at ischial spine or through vaginal wall for perineal anesthesia (during surgery or childbirth).

4. Abscess in Deep Perineal Pouch

- Infection may spread from urethra or bulbourethral glands.
- May present as deep perineal swelling and dysuria.

5. Erectile Dysfunction (Neurovascular cause)

- Damage to pudendal nerve or internal pudendal vessels affects penile erection.

6. Perineal Hernia

- Rare protrusion of pelvic viscera through weakened pelvic floor (usually after multiple childbirths).

Superficial Perineal Space (Pouch)

- Also known as the **superficial perineal pouch**, it lies **below the perineal membrane** and **above Colles' fascia** (superficial perineal fascia).
- **Location:** Within the **urogenital triangle** of the perineum.

Boundaries:

- **Superiorly:** Perineal membrane (urogenital diaphragm).
- **Inferiorly:** Colles' fascia (deep membranous layer of superficial fascia).
- **Laterally:** Ischiopubic rami.
- **Posteriorly:** Closed by fusion of Colles' fascia and perineal membrane.
- **Anteriorly:** Communicates with **scrotum, penis, and anterior abdominal wall** (via potential space beneath superficial fascia).

Contents (in males):

- Root of penis (bulb and crura).
- Bulbospongiosus and ischiocavernosus muscles.
- Superficial transverse perineal muscles.
- Perineal branches of internal pudendal vessels and pudendal nerve.

Contents (in females):

- Clitoris and bulbs of vestibule.
- Greater vestibular (Bartholin’s) glands.
- Bulbospongiosus, ischiocavernosus, and superficial transverse perineal muscles.
- Perineal branches of pudendal vessels and nerves.

Function:

- Supports external genital structures.
- Contains erectile tissues essential for sexual function.

Deep Perineal Space (Pouch)

- Lies **above the perineal membrane** and **below the pelvic diaphragm** (levator ani).
- Part of the **urogenital diaphragm**.

Boundaries:

- **Superiorly:** Fascia of pelvic diaphragm (levator ani).
- **Inferiorly:** Perineal membrane.
- **Laterally:** Obturator fascia over ischiopubic rami.
- **Anteriorly and posteriorly:** Closed by fascial fusion.

Contents (in males):

- Membranous urethra.
- External urethral sphincter.
- Deep transverse perineal muscles.
- Bulbourethral (Cowper's) glands.
- Dorsal nerve and artery of penis.

Contents (in females):

- Part of urethra and vagina.
- External urethral sphincter complex.
- Deep transverse perineal muscles.
- Dorsal nerve and artery of clitoris.

Function:

- Provides support to pelvic viscera.

- Contains sphincteric mechanism for urinary continence.

Boundaries of the Perineal Spaces (Summary Table)

- **Superficial pouch:** Between Colles' fascia (below) and perineal membrane (above).
- **Deep pouch:** Between perineal membrane (below) and pelvic diaphragm (above).
- Both limited laterally by **ischiopubic rami** and posteriorly by fascial fusion.

Deep Transversus Perinei (Deep Transverse Perineal Muscle)

- A **paired, flat muscle** of the **deep perineal pouch**.
- **Origin:** Inner surface of ischiopubic ramus.
- **Insertion:** Median fibrous raphe and perineal body.
- **Nerve supply:** Perineal branch of pudendal nerve (S2–S4).
- **Action:**
    - Fixes the perineal body.
    - Supports pelvic viscera (especially in males).
    - Aids in voluntary control of urination.
- **Clinical note:** Weakness contributes to perineal descent and urinary incontinence.

Distal Urethral Sphincter Mechanism

- Located mainly in the **deep perineal space**; essential for **continence**.
- **Components:**
    1. **External urethral sphincter (striated muscle):**
        - Surrounds membranous urethra in both sexes.
        - In females, also encircles the distal urethra and vagina (urethrovaginal sphincter).
    2. **Compressor urethrae muscle:**
        - Encircles urethra anteriorly and compresses it against vaginal wall (in females).
    3. **Smooth muscle of urethra and internal sphincter** (in males, at bladder neck).

Function:

- Provides voluntary control over urination.
- Works in coordination with bladder detrusor muscle.

Nerve supply:

- Pudendal nerve (S2–S4) for voluntary control.
- Pelvic splanchnic nerves for parasympathetic control.

Clinical relevance:

- Injury during pelvic surgery or childbirth may cause **stress urinary incontinence** (especially in females).

Perineal Membrane

- A **fibrous sheet** stretching between the **ischiopubic rami**, forming the **floor of the deep perineal pouch** and **roof of the superficial pouch**.
- Previously known as **urogenital diaphragm** (term now replaced).

Extent:

- **Anteriorly:** Attaches to arcuate ligament of pubis.
- **Posteriorly:** Fuses with perineal body and fascia of superficial transverse perineal muscle.
- **Laterally:** Attached to ischiopubic rami.

Structures piercing perineal membrane (male):

- Urethra (membranous part).
- Ducts of bulbourethral glands.
- Arteries to bulb and dorsal artery of penis.
- Dorsal nerve of penis.

Structures piercing perineal membrane (female):

- Urethra and vagina.
- Dorsal artery and nerve of clitoris.

Functions:

- Provides firm support to pelvic organs.
- Gives attachment to muscles of urogenital diaphragm.
- Maintains integrity of pelvic outlet during straining or sexual activity.

Clinical Anatomy

1. Rupture of Urethra

- Common in males due to **perineal trauma (straddle injury)**.
- **Below perineal membrane:** Urine extravasates into **superficial perineal pouch**, scrotum, and anterior abdominal wall.
- **Above perineal membrane:** Urine accumulates in **deep perineal pouch** and pelvic cavity.

2. Perineal Body Tear

- Occurs in **childbirth** due to overstretching of pelvic floor.
- Leads to **pelvic organ prolapse** or **rectocele**.

3. Episiotomy

- A surgical incision through the **posterior vaginal wall and perineal body** to prevent uncontrolled perineal tearing during delivery.

4. Pudendal Nerve Block

- Administered where the pudendal nerve crosses the **ischial spine** or near the **sacrospinous ligament**.

- Provides anesthesia to perineum for childbirth and perineal surgery.

5. Weakness of Urogenital Diaphragm

- May result from multiple deliveries or aging.
- Causes urinary stress incontinence and prolapse of pelvic viscera.

6. Bartholin's Gland Abscess (in females)

- Infection of greater vestibular gland (in superficial pouch).
- Presents as a painful swelling at the posterior part of the labia majora.

7. Perineal Hematoma

- Results from rupture of perineal vessels; swelling in scrotum or vulva due to extravasated blood.

Female Perineum

- The **female perineum** is broader and more flexible than the male perineum due to the presence of the **vagina** and **wider pelvic outlet**.
- It is divided into:
    - **Anterior urogenital triangle** ? Contains external genitalia and urethral/vaginal openings.
    - **Posterior anal triangle** ? Contains anal canal and ischioanal fossae.

Boundaries:

- **Anterior:** Pubic symphysis.
- **Posterior:** Tip of coccyx.
- **Lateral:** Ischial tuberosities and sacrotuberous ligaments.

Functional importance:

- Plays a key role in urination, defecation, sexual function, and childbirth.
- Muscles and fascia here form the **pelvic floor**, supporting pelvic viscera.

Female External Genital Organs (Pudendum/Vulva)

The **vulva** or **pudendum** refers to all external genital structures in the female.

Components:

1. **Mons Pubis:**
    - Fat pad in front of pubic symphysis, covered by hair-bearing skin after puberty.
    - Cushions the pubic bone during sexual activity.
2. **Labia Majora:**
    - Two prominent folds of skin extending backward from mons pubis.
    - Contain fat, smooth muscle, and sebaceous glands.
    - Homologous to **scrotum** in males.
3. **Labia Minora:**

- Two thin folds of skin medial to labia majora; devoid of fat and hair.
- Enclose the **vestibule of vagina**.
- Anteriorly unite to form:
  - **Prepuce of clitoris** (above).
  - **Frenulum of clitoris** (below).

4. **Clitoris:**
   - Erectile organ homologous to **penis** in males.
   - Composed of **two corpora cavernosa** and **glans clitoridis**.
   - Root formed by **crura** attached to ischiopubic rami.
   - Supplied by **deep and dorsal arteries of clitoris** and **dorsal nerve of clitoris** (branch of pudendal nerve).
5. **Vestibule of Vagina:**
   - The cleft between the labia minora, into which open:
     - **Urethra (anteriorly)**.
     - **Vagina (posteriorly)**.
     - **Ducts of greater vestibular glands (Bartholin's glands)** on either side.
6. **Bulbs of Vestibule:**
   - Pair of elongated erectile bodies on either side of vaginal orifice.

- Homologous to the **bulb of penis** in males.
- Covered by **bulbospongiosus muscle**.

7. **Greater Vestibular (Bartholin's) Glands:**
   - Pea-sized mucus-secreting glands located in superficial perineal pouch.
   - Ducts open into the vestibule near vaginal orifice.
   - Function: Lubricate vulva during sexual arousal.

Female Urogenital Region

- Corresponds to the **anterior triangle of the perineum**.
- Contains the **urethral and vaginal openings**, **clitoris**, and **perineal muscles**.

Layers of the Female Urogenital Region:

1. **Skin and superficial fascia (Colles' fascia).**
2. **Superficial perineal pouch** (between Colles' fascia and perineal membrane):
   - **Contents:**
     - Clitoris and its crura.
     - Bulbs of vestibule.
     - Greater vestibular glands.

        - Superficial perineal muscles (ischiocavernosus, bulbospongiosus, superficial transverse perineal).
        - Perineal branches of pudendal nerve and internal pudendal vessels.

3. **Perineal membrane (urogenital diaphragm):**
    - Fibrous sheet forming the base of the urogenital triangle.
    - Pierced by **urethra** and **vagina**, and by **dorsal vessels and nerves of clitoris**.
4. **Deep perineal pouch** (between perineal membrane below and pelvic diaphragm above):
    - **Contents:**
        - Part of urethra and vagina.
        - External urethral sphincter (voluntary).
        - Compressor urethrae and urethrovaginal sphincter muscles.
        - Deep transverse perineal muscles.
        - Dorsal nerve and artery of clitoris.

Functions:

- Provides support to the lower urinary and genital tracts.
- Participates in sexual function and urinary continence.

Clinical Anatomy

1. Perineal Tear in Childbirth:

- Occurs during vaginal delivery due to overstretching of the perineal body.
- **Consequences:** Pelvic floor weakness, cystocele, rectocele, or uterovaginal prolapse.
- **Prevention:** Controlled delivery or **episiotomy** (mediolateral incision of perineum).

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2. Episiotomy:

- Surgical incision of posterior vaginal wall and perineal body to enlarge the vaginal orifice during childbirth.
- **Types:**
  - **Mediolateral (commonest)** ? avoids anal sphincter injury.
  - **Median** ? may extend into anal canal (less preferred).
- **Purpose:** Prevent irregular tears and facilitate delivery.

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3. Bartholin's Cyst or Abscess:

- Obstruction or infection of **greater vestibular gland** duct.
- Presents as a painful swelling on one side of the posterior vestibule.
- **Treatment:** Drainage and antibiotics.

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4. Stress Urinary Incontinence:

- Caused by weakness of **pelvic floor muscles** and **urethral sphincter** (after childbirth or aging).

- Leads to leakage of urine during coughing or sneezing.
- Managed with pelvic floor exercises or surgical sling procedures.

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5. Female Circumcision (Clitoridectomy):

- Illegal procedure involving removal of the clitoris or labia minora; causes scarring, infection, and sexual dysfunction.

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6. Pudendal Nerve Block:

- Given at the **ischial spine** through vaginal wall for perineal anesthesia during childbirth or surgical repair.
- Anesthetizes vulva, lower vagina, and perineum.

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7. Pelvic Organ Prolapse:

- Results from damage to **levator ani**, **perineal body**, and **urogenital diaphragm**.
- May cause descent of uterus, bladder, or rectum into vaginal canal.

Superficial Perineal Space (Pouch)

- The **superficial perineal space** (also called **superficial perineal pouch**) is a **potential space** within the **urogenital triangle**.
- Lies **below the perineal membrane** and **above Colles' fascia**.
- Present in both sexes but with slightly different contents.

Boundaries:

- **Superiorly:** Perineal membrane (urogenital diaphragm).
- **Inferiorly:** Colles' fascia (deep layer of superficial fascia).
- **Laterally:** Ischiopubic rami.
- **Posteriorly:** Fusion of Colles' fascia and perineal membrane.
- **Anteriorly:** Communicates with scrotum, penis, and lower abdominal wall (via potential fascial plane).

Contents (in males):

- Root of penis (bulb and crura).
- Bulbospongiosus and ischiocavernosus muscles.
- Superficial transverse perineal muscles.
- Perineal branches of pudendal nerve and internal pudendal vessels.

Contents (in females):

- Clitoris and its crura.
- Bulbs of vestibule.
- Greater vestibular (Bartholin's) glands.
- Bulbospongiosus, ischiocavernosus, and superficial transverse perineal muscles.
- Perineal branches of pudendal nerve and vessels.

Clinical significance:

- Site for **extravasation of urine or blood** following rupture of urethra (in males).
- **Bartholin's gland abscess** may develop in females within this space.

Deep Perineal Space (Pouch)

- Located **between the perineal membrane (below)** and **pelvic diaphragm (above)**.
- Contains important muscles and urethral structures that maintain **continence and pelvic support**.

Boundaries:

- **Superiorly:** Fascia of levator ani (pelvic diaphragm).
- **Inferiorly:** Perineal membrane.
- **Laterally:** Obturator fascia covering ischiopubic rami.
- **Anteriorly and posteriorly:** Closed by fascial fusion at pubic symphysis and perineal body.

Contents

In males:

- Membranous part of urethra.
- External urethral sphincter (striated muscle).
- Deep transverse perineal muscles.

- Bulbourethral (Cowper’s) glands.
- Dorsal nerve and artery of penis.

In females:

- Part of urethra and vagina.
- External urethral sphincter complex.
- Compressor urethrae and urethrovaginal sphincter.
- Deep transverse perineal muscles.
- Dorsal nerve and artery of clitoris.

Function:

- Supports pelvic viscera and controls urinary continence.

Urethral Sphincter Mechanism

- Present in both sexes, mainly within the **deep perineal space**.
- Provides **voluntary control of micturition** and supports the **pelvic floor**.

Components (in males):

1. **External urethral sphincter:**
    - Circular muscle surrounding membranous urethra.
    - Voluntary control of urination.

2. **Internal urethral sphincter:**
    - Smooth muscle at neck of bladder (not in females).
    - Involuntary; prevents retrograde ejaculation.

Components (in females):

1. **External urethral sphincter:**
    - Surrounds middle portion of urethra.
2. **Compressor urethrae:**
    - Wraps anteriorly around urethra; compresses it against vagina.
3. **Urethrovaginal sphincter:**
    - Encircles both urethra and vagina together.

Function:

- Maintains urinary continence by compressing urethra.
- Coordinates with detrusor muscle during micturition.

Actions

- **Superficial muscles (bulbospongiosus, ischiocavernosus, superficial transverse perineal):**
    - Stabilize perineal body.

- Assist in erection of penis/clitoris.
- Expel last drops of urine or semen (in males).

- **Deep muscles (external urethral sphincter, deep transverse perineal):**
  - Support pelvic organs.
  - Maintain urinary continence.
  - Control flow of urine voluntarily.

Nerve Supply

- **Somatic supply:** Pudendal nerve (S2–S4).
  - Perineal branch ? supplies superficial and deep perineal muscles.
  - Dorsal nerve ? sensory to penis or clitoris.
- **Autonomic supply:**
  - **Sympathetic fibers:** From hypogastric plexus ? cause vasoconstriction and ejaculation (in males).
  - **Parasympathetic fibers:** From pelvic splanchnic nerves (S2–S4) ? cause vasodilatation and erection.

Applied aspect:

- **Pudendal nerve block** at the ischial spine provides anesthesia for the entire perineum.

- **Injury to pudendal nerve** (during pelvic surgery or childbirth) leads to loss of perineal sensation and sphincter control.

Compressor Urethrae (422)

- A **flat, transverse muscle** found **only in females**.
- Part of the **urethral sphincter complex**, lying in the **deep perineal pouch**.

Origin:

- From the **ischiopubic rami** on both sides.

Course and Insertion:

- Fibers pass medially in front of the **urethra**, forming a muscular sling that compresses it against the **vaginal wall**.

Nerve Supply:

- **Perineal branch of pudendal nerve (S2–S4).**

Action:

- Compresses the urethra to help maintain **urinary continence**.
- Contracts during voluntary inhibition of micturition and coughing or sneezing (prevents stress incontinence).

Clinical note:

- Weakness or injury during childbirth can result in **stress urinary incontinence** due to loss of sphincteric support.

Sphincter Urethrovaginalis

- Also **present only in females**.
- Lies **posterior and inferior** to the **compressor urethrae** within the **deep perineal space**.

Origin:

- From the **perineal body and fascia of deep perineal pouch**.

Course and Insertion:

- Encircles both the **urethra and vagina** as a muscular loop.
- Fibers blend anteriorly with the **external urethral sphincter**.

Nerve Supply:

- **Perineal branch of pudendal nerve (S2–S4).**

Action:

- Constricts the **urethra and vaginal orifice** simultaneously.
- Helps maintain **urinary continence** and tightens the vaginal opening during sexual activity.

Clinical note:

- Damage during episiotomy or childbirth leads to **weak pelvic floor** and contributes to **urinary or vaginal prolapse**.

Actions

1. Superficial Perineal Muscles:

- **Ischiocavernosus:** Compresses crus of penis/clitoris ? maintains erection.
- **Bulbospongiosus:**
  - In males ? Expels last drops of urine or semen; aids erection by compressing bulb.
  - In females ? Constricts vaginal orifice; assists in erection of clitoris.
- **Superficial Transverse Perineal:** Fixes perineal body; provides support to pelvic floor.

2. Deep Perineal Muscles:

- **External urethral sphincter:** Voluntary control of micturition.
- **Compressor urethrae & sphincter urethrovaginalis:** Provide support and continence in females.
- **Deep transverse perineal:** Reinforces perineal body; supports pelvic viscera.

3. Levator Ani (indirect contribution):

- Assists perineal muscles in maintaining pelvic organ support and increasing intra-abdominal pressure during straining.

Pudendal Canal (Alcock's Canal)

- A **fibrous canal** within the **obturator fascia** on the **lateral wall of the ischioanal fossa**.
- Extends from the **lesser sciatic foramen** to the **posterior border of perineal membrane**.

Boundaries:

- **Medially:** Obturator internus muscle.
- **Laterally:** Obturator fascia (splits to form the canal).
- **Superiorly & Inferiorly:** Formed by the fascial folds enclosing the canal.

Contents:

- **Pudendal nerve (S2–S4).**
- **Internal pudendal artery and vein.**
- Their branches traverse the canal and emerge into the perineum.

Branches inside the canal:

1. **Inferior rectal nerve and vessels** ? to anal sphincter and skin around anus.
2. **Perineal nerve and vessels** ? to perineal muscles and scrotal/labial skin.
3. **Dorsal nerve and artery of penis/clitoris** ? to erectile tissues and glans.

Functions:

- Transmits the main **neurovascular supply to the perineum**.

- Essential for sensory innervation of external genitalia and motor supply to perineal muscles.

Clinical importance:

- **Pudendal nerve block:**
  - Given at the **ischial spine** (through vaginal or perineal route).
  - Produces anesthesia of the perineum, vulva, and lower vagina during childbirth or perineal surgery.
- **Injury to pudendal nerve:** Causes **loss of anal and urethral sphincter control**, and **sexual dysfunction** due to loss of sensation in genitalia.

Perineal Membrane (422)

- The **perineal membrane** is a **triangular fibrous sheet** stretched across the **urogenital triangle** of the perineum.
- It forms the **floor of the deep perineal pouch** and **roof of the superficial perineal pouch**.
- Previously termed the **urogenital diaphragm** (a term now replaced).

Attachments:

- **Anteriorly:** Inferior border of the pubic symphysis and arcuate ligament of pubis.
- **Posteriorly:** Fuses with perineal body and fascia of superficial transverse perineal muscles.

- **Laterally:** Attached to ischiopubic rami.

Structures piercing it (in males):

- Urethra (membranous part).
- Artery to bulb of penis.
- Dorsal artery and nerve of penis.
- Ducts of bulbourethral glands.

Structures piercing it (in females):

- Urethra.
- Vagina.
- Dorsal artery and nerve of clitoris.

Functions:

- Provides attachment to perineal muscles.
- Supports pelvic viscera.
- Maintains integrity of the urogenital triangle.
- Helps in control of urinary continence through external urethral sphincter.

Applied anatomy:

- Damage or tear may occur in obstetric procedures or perineal trauma.

- Urethral rupture above or below the membrane determines the direction of urine extravasation.

Pudendal Nerve (423)

- The **pudendal nerve** is the **chief nerve of the perineum**, carrying both **motor and sensory fibers**.
- Root value: **S2, S3, S4** (ventral rami).

Course:

1. Leaves pelvis through the **greater sciatic foramen**, below piriformis.
2. Winds around **ischial spine** and **sacrospinous ligament**.
3. Enters perineum through **lesser sciatic foramen**.
4. Travels forward in the **pudendal canal (Alcock's canal)** on the lateral wall of ischioanal fossa.

Branches:

1. **Inferior rectal nerve:**
    - Supplies external anal sphincter and perianal skin.
2. **Perineal nerve:**
    - Divides into superficial (cutaneous) and deep (muscular) branches.
    - Supplies perineal muscles and scrotal/labial skin.

3. **Dorsal nerve of penis/clitoris:**
    - Terminal branch supplying skin, glans, and erectile tissue.

Functions:

- **Motor:** All muscles of perineum, external urethral and anal sphincters.
- **Sensory:** Skin of perineum, scrotum, penis, or labia and clitoris.
- **Autonomic (minor):** Contributes sympathetic fibers to erectile tissues.

Clinical relevance:

- **Pudendal nerve block:** Used for perineal anesthesia in obstetrics and minor surgery.
- **Injury:** Leads to loss of sensation and sphincter control (urinary and fecal incontinence).

Clinical Anatomy

1. Pudendal Nerve Block:

- Injection given near **ischial spine** via vaginal or perineal route.
- Provides anesthesia to perineum, vulva, and lower vagina (used in childbirth).

2. Urine Extravasation:

- Rupture of urethra below perineal membrane ? urine collects in **superficial perineal pouch**, scrotum, and anterior abdominal wall.
- Rupture above perineal membrane ? urine enters **deep perineal pouch** and pelvic cavity.

3. Ischioanal Abscess:

- Infection in fat of ischioanal fossa, may extend into opposite side.
- Presents as painful perineal swelling; requires drainage.

4. Perineal Tear in Females:

- Occurs during childbirth; may involve perineal body and anal sphincter.
- Leads to pelvic floor weakness and rectocele.
- Prevented by **mediolateral episiotomy**.

5. Pudendal Neuralgia:

- Compression or irritation of pudendal nerve (e.g., by prolonged cycling).
- Causes perineal pain, numbness, and sexual dysfunction.

6. Perineal Hernia:

- Rare; occurs through weakened pelvic floor between levator ani and perineal membrane.
- Seen in multiparous women and elderly.

Internal Pudendal Artery

- Main **arterial supply of perineum**; branch of **internal iliac artery** (anterior division).

Course:

1. Leaves pelvis through **greater sciatic foramen** (below piriformis).

2. Winds around **ischial spine** and **sacrospinous ligament**.
3. Enters perineum through **lesser sciatic foramen**.
4. Travels in **pudendal canal** along with pudendal nerve.

Branches:

- **Inferior rectal artery** ? anal canal and perianal skin.
- **Perineal artery** ? superficial perineal muscles and scrotal/labial skin.
- **Artery to bulb of penis/clitoris.**
- **Urethral artery.**
- **Deep artery of penis/clitoris** ? supplies corpora cavernosa.
- **Dorsal artery of penis/clitoris** ? supplies glans and skin.

Distribution:

- Perineal structures, external genitalia, anal canal, and erectile tissues.

Clinical relevance:

- May be ligated or embolized in pelvic trauma or severe postpartum hemorrhage.
- Damage leads to erectile dysfunction due to loss of blood flow to corpora cavernosa.

Internal Pudendal Vein

- Accompanies the **internal pudendal artery and nerve** through the pudendal canal.

- Begins at the **root of penis/clitoris** by union of deep veins of penis/clitoris.
- Drains into the **internal iliac vein**.

Tributaries:

- Veins corresponding to the branches of internal pudendal artery (inferior rectal, perineal, dorsal veins).
- Communicates with **prostatic venous plexus (in males)** and **vesicovaginal plexus (in females)**.

Clinical significance:

- Connection with pelvic venous plexuses ? route for **spread of infection or carcinoma** from perineum to pelvic organs.
- **Deep dorsal vein of penis** drains erectile tissues and communicates with **prostatic venous plexus**, explaining prostatic congestion during sexual arousal.

Histology of Body of Penis / Clitoris

Common structural plan: Both penis and clitoris are composed of **erectile tissues enclosed in connective tissue coverings**.

1. Components:

- **Corpora cavernosa (paired):**
  - Each has a thick fibrous capsule, the **tunica albuginea**.
  - Consists of **vascular spaces (cavernous sinusoids)** lined by **endothelium**, separated by smooth muscle and connective tissue trabeculae.

- Fill with blood during erection due to vasodilation.

- **Corpus spongiosum (penis only):**
  - Surrounds the urethra.
  - Less fibrous than corpora cavernosa to prevent closure of urethra during erection.
  - Enlarged distally to form the **glans penis**.

- **In clitoris:**
  - Only **two corpora cavernosa**, no corpus spongiosum.
  - Surrounded by thin tunica albuginea and covered by skin forming the **glans clitoridis**.

2. Blood supply:

- Rich network of **helicine arteries** that dilate during sexual arousal, filling cavernous spaces.

3. Venous drainage:

- Subtunical venules and deep dorsal vein ? drain blood post erection.

4. Nerve supply:

- Autonomic fibers (parasympathetic from pelvic splanchnic nerves) cause vasodilation and erection.

5. Histological significance:

- Erectile tissue has the ability to **engorge with blood**, enabling erection of penis or clitoris.

- Degenerative changes or fibrosis (e.g., Peyronie's disease) may affect tunica albuginea leading to painful erections or curvature.

Facts to Remember

- The **perineum** is diamond-shaped and divided into the **urogenital** and **anal triangles** by a line joining the two ischial tuberosities.

- The **urogenital triangle** contains the **external genital organs** and **urogenital diaphragm**, while the **anal triangle** contains the **anal canal** and **ischioanal fossae**.

- The **perineal body** (central tendon of perineum) is a key fibromuscular node where several muscles meet — its integrity is essential for pelvic floor support.

- The **perineal membrane** is a strong fibrous sheet stretched across the urogenital triangle; it forms the **floor of the deep perineal pouch** and the **roof of the superficial perineal pouch**.

- The **deep perineal pouch** contains the **external urethral sphincter**, **deep transverse perineal muscles**, and (in males) **bulbourethral glands**, or (in females) **vagina and urethral sphincter complex**.

- The **superficial perineal pouch** contains erectile tissues — **bulb of penis** and **crura of penis** in males; **bulbs of vestibule** and **crura of clitoris** in females — along with their covering muscles.

- The **pudendal canal (Alcock's canal)** runs within the obturator fascia on the lateral wall of the ischioanal fossa, transmitting the **pudendal nerve** and **internal pudendal vessels** .

- The **pudendal nerve (S2–S4)** supplies all perineal muscles, the skin of external genitalia, and both urethral and anal sphincters.
- The **internal pudendal artery**, a branch of the internal iliac artery, is the **main arterial supply** of the perineum and external genitalia.
- The **deep dorsal vein of the penis/clitoris** drains into the **prostatic or vesicovaginal plexus**, forming an important route for venous return.
- The **erectile tissues (corpora cavernosa and corpus spongiosum)** are composed of **vascular sinusoids** supported by connective tissue trabeculae and enclosed in **tunica albuginea**.
- **Parasympathetic fibers** from pelvic splanchnic nerves mediate **erection** by vasodilatation; **sympathetic fibers** from the hypogastric plexus mediate **ejaculation**.
- The **ischioanal fossa** allows expansion of the anal canal during defecation and may become the site of **abscess formation** due to infection.
- The **perineal muscles** assist in maintaining continence, supporting pelvic viscera, and contributing to sexual functions.
- Injury to the **perineal body** or **pudendal nerve** can result in **pelvic organ prolapse**, **urinary/fecal incontinence**, or **sexual dysfunction**.
- The **histological structure** of the penis and clitoris is similar, except the clitoris lacks the **corpus spongiosum**.
- During **childbirth**, mediolateral **episiotomy** is preferred to prevent uncontrolled perineal tears and protect the anal sphincter.
- The **deep perineal pouch** is the site of the **urethral sphincter mechanism**—a key structure for urinary continence, especially in females.

- The **superficial perineal fascia (Colles' fascia)** is continuous with **Scarpa's fascia** of the abdominal wall and **dartos fascia** of the scrotum.

- **Urine extravasation** following urethral rupture depends on whether the injury lies **above or below the perineal membrane**.

- The **perineum** plays a vital role in **defecation, micturition, copulation, childbirth, and pelvic organ support** — making its anatomy clinically and surgically significant.

Clinicoanatomical Problem

Case 1:
A 28-year-old man sustains a "straddle injury" while falling across a bicycle crossbar. He presents with painful perineal swelling and an inability to void urine.

Question:
Where does urine collect following rupture of the urethra, and what anatomical structure determines its spread?

Explanation:

- The **bulbar urethra** (below the perineal membrane) is the usual site of rupture in such injuries.

- Urine extravasates into the **superficial perineal pouch**, then passes into:

    - **Scrotum**,

    - **Penis**, and

    - **Anterior abdominal wall** (deep to Scarpa's fascia).

- The **perineal membrane** prevents urine from passing posteriorly into the deep perineal pouch or anal triangle.

Clinical significance:
Recognition of the site of urethral rupture is essential for catheterization and surgical repair.

Case 2:
A 32-year-old woman complains of involuntary leakage of urine while coughing and laughing, especially after childbirth.

Question:
Which structures are likely weakened or injured?

Explanation:

- The **perineal body**, **pelvic floor muscles (levator ani)**, and **external urethral sphincter complex** are weakened or overstretched during childbirth.
- This leads to **stress urinary incontinence**, as intra-abdominal pressure cannot be opposed effectively by urethral closure mechanisms.

Management insight:
Pelvic floor exercises, physiotherapy, or surgical sling procedures can help restore continence.

Case 3:
A 45-year-old male develops fever, pain, and swelling beside the anus. On examination, fluctuant swelling is found in the ischioanal region.

Question:
What is the diagnosis, and how may the infection spread?

Explanation:

- Diagnosis: **Ischioanal abscess** due to infection of fat within the ischioanal fossa.
- The **ischioanal fossae** of both sides communicate across the midline posterior to the anal canal; therefore, infection can **spread to the opposite side**.

Treatment:
Requires **surgical drainage** to prevent fistula formation or sepsis.

Case 4:
During an obstetric delivery, a **pudendal nerve block** is administered through the vaginal wall near the ischial spine.

Question:
Which regions are anesthetized by this procedure?

Explanation:

- The block affects the **pudendal nerve (S2–S4)** within Alcock's canal.
- Areas anesthetized:
    - Perineum,
    - Vulva and lower vagina,
    - Anal canal below the pectinate line.

Applied correlation:
Knowledge of the course of the pudendal nerve and its branches is vital to avoid incomplete anesthesia or vascular injury.

Case 5:
A 60-year-old multiparous woman presents with a bulge in the vaginal canal and difficulty controlling stools.

Question:
Which anatomical structures are likely damaged?

Explanation:

- The **perineal body**, **levator ani**, and **external anal sphincter** are weakened due to repeated childbirths.
- This results in **uterovaginal or rectal prolapse** and **fecal incontinence**.

Prevention:

Pelvic floor strengthening and timely **episiotomy** during delivery help preserve perineal support.

Multiple Choice Questions

1. The perineum is divided into two triangles by a line joining:

A. Pubic symphysis and coccyx

B. Ischial spines

C. Ischial tuberosities

D. Sacrotuberous ligaments

? Answer: C. Ischial tuberosities

---

2. The perineal body is also known as:

A. Central tendon of perineum

B. Urogenital diaphragm

C. Pelvic diaphragm

D. Colles' fascia

? Answer: A. Central tendon of perineum

---

3. The main contents of the anal triangle are:

A. Urethra and external genitalia

B. Anal canal and ischioanal fossae

C. Bladder and rectum

D. Pudendal canal and urethral sphincter

? Answer: B. Anal canal and ischioanal fossae

---

4. The perineal membrane forms the:

A. Floor of the superficial perineal pouch

B. Roof of the deep perineal pouch

C. Roof of the superficial perineal pouch and floor of the deep perineal pouch

D. Part of levator ani

? Answer: C. Roof of the superficial perineal pouch and floor of the deep perineal pouch

---

5. The chief nerve of the perineum is:

A. Pelvic splanchnic nerve

B. Ilioinguinal nerve

C. Pudendal nerve

D. Inferior hypogastric plexus

? Answer: C. Pudendal nerve

---

6. The root value of the pudendal nerve is:

A. L4–L5

B. S1–S2

C. S2–S4

D. S3–S5

? Answer: C. S2–S4

---

7. The artery supplying the perineum and external genital organs is a branch of:

A. External iliac artery

B. Internal pudendal artery

C. Inferior epigastric artery

D. Obturator artery

? Answer: B. Internal pudendal artery

---

8. The perineal body provides attachment to all of the following muscles **except:**

A. Bulbospongiosus

B. External anal sphincter

C. Deep transverse perineal

D. Ischiocavernosus

? Answer: D. Ischiocavernosus

---

9. The muscle responsible for voluntary control of urination is:

A. Puborectalis

B. External urethral sphincter

C. Compressor urethrae

D. Deep transverse perineal

? Answer: B. External urethral sphincter

---

10. The pudendal canal (Alcock's canal) is located in:

A. Fascia of obturator internus

B. Fascia of levator ani

C. Fascia of gluteus maximus

D. Pelvic fascia

? Answer: A. Fascia of obturator internus

---

11. The superficial perineal pouch in the male contains all of the following **except:**

A. Bulb of penis

B. Crura of penis

C. Bulbourethral glands

D. Superficial transverse perineal muscles

? Answer: C. Bulbourethral glands

---

12. The greater vestibular (Bartholin's) glands are present in the:

A. Deep perineal pouch

B. Superficial perineal pouch

C. Pudendal canal

D. Vestibule of vagina only

? Answer: B. Superficial perineal pouch

---

13. The perineal membrane is pierced in the female by:

A. Urethra only

B. Urethra and vagina

C. Urethra and rectum

D. Urethra, vagina, and rectum

? Answer: B. Urethra and vagina

---

14. The chief vein draining the erectile tissues of the penis is:

A. Superficial dorsal vein

B. Deep dorsal vein

C. Internal pudendal vein

D. Inferior rectal vein

? Answer: B. Deep dorsal vein

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15. The clitoris differs from the penis in that it:

A. Has no corpus spongiosum

B. Is supplied by the pudendal nerve

C. Possesses two corpora cavernosa

D. Has a prepuce

? Answer: A. Has no corpus spongiosum

---

16. The superficial perineal fascia (Colles' fascia) is continuous with:

A. Camper's fascia

B. Scarpa's fascia

C. Both A and B

D. Fascia lata

? Answer: C. Both A and B

---

17. The ischioanal fossa contains:

A. External urethral sphincter

B. Internal anal sphincter

C. Fat and inferior rectal vessels and nerves

D. Bulbourethral glands

? Answer: C. Fat and inferior rectal vessels and nerves

---

18. Parasympathetic fibers causing erection arise from:

A. Sacral spinal nerves S2–S4

B. Hypogastric plexus

C. Sympathetic chain

D. Lumbar spinal nerves L1–L2

? Answer: A. Sacral spinal nerves S2–S4

---

19. The deep perineal pouch in males contains all except:

A. Membranous urethra

B. Bulbourethral glands

C. Deep transverse perineal muscles

D. Bulb of penis

? Answer: D. Bulb of penis

---

20. The perineal body is especially important in:

A. Defecation

B. Erection

C. Childbirth

D. Urination

? Answer: C. Childbirth

---

21. The fascia forming the pudendal canal is derived from:

A. Fascia of levator ani

B. Obturator fascia

C. Fascia lata

D. Gluteal fascia

? Answer: B. Obturator fascia

---

22. The external anal sphincter is supplied by:

A. Inferior rectal nerve

B. Perineal branch of S4

C. Both A and B

D. Dorsal nerve of penis

? Answer: C. Both A and B

---

23. The perineal membrane supports:

A. Anal canal

B. Pelvic diaphragm

C. Urogenital diaphragm

D. Urethra and genital structures

? Answer: D. Urethra and genital structures

---

24. The internal pudendal artery passes through:

A. Greater and lesser sciatic foramina

B. Obturator canal

C. Femoral canal

D. Urogenital hiatus

? Answer: A. Greater and lesser sciatic foramina

---

25. The erectile tissue surrounding the urethra in males is called:
A. Corpus cavernosum
B. Corpus spongiosum
C. Crus penis
D. Bulb of penis
? Answer: B. Corpus spongiosum

Viva Voce

Q1. What is the perineum?
A. The perineum is the region below the pelvic diaphragm, forming the outlet of the pelvis. It contains the anal canal, urethra, and external genital organs.

Q2. How is the perineum divided?
A. By a line joining the ischial tuberosities into two triangles:

- **Urogenital triangle (anterior)** – contains external genitalia and urethral structures.
- **Anal triangle (posterior)** – contains the anal canal and ischioanal fossae.

Q3. What is the perineal body?
A. A fibromuscular node in the midline between the anal canal and vagina (in females) or bulb of penis (in males); it acts as the central point of the perineum.

Q4. Name the muscles attached to the perineal body.
A. External anal sphincter, bulbospongiosus, superficial and deep transverse perineal muscles, and fibers of levator ani.

Q5. What is the function of the perineal body?
A. It supports the pelvic floor and maintains the integrity of the perineum during defecation, sexual activity, and childbirth.

Q6. What is the perineal membrane?
A. A triangular fibrous sheet stretching across the urogenital triangle, forming the floor of the deep perineal pouch and the roof of the superficial perineal pouch.

Q7. Which structures pierce the perineal membrane in males?
A. Membranous urethra, ducts of bulbourethral glands, dorsal artery and nerve of penis, and artery to bulb.

Q8. Which structures pierce the perineal membrane in females?
A. Urethra, vagina, and dorsal artery and nerve of clitoris.

Q9. What is the difference between the deep and superficial perineal pouches?
A.

- **Deep perineal pouch:** Between pelvic diaphragm and perineal membrane; contains urethral sphincter and deep transverse perineal muscles.
- **Superficial perineal pouch:** Between Colles' fascia and perineal membrane; contains erectile tissues and superficial perineal muscles.

Q10. What is Alcock's canal?
A. Also called the **pudendal canal**, it is a passage within the obturator fascia on the lateral wall of the ischioanal fossa that transmits the pudendal nerve and internal pudendal vessels.

Q11. What is the root value of the pudendal nerve?
A. S2, S3, and S4 (ventral rami).

Q12. Name the branches of the pudendal nerve.
A. Inferior rectal nerve, perineal nerve, and dorsal nerve of penis or clitoris.

Q13. What is the main artery of the perineum?
A. Internal pudendal artery (branch of internal iliac artery).

Q14. What are the branches of the internal pudendal artery?
A. Inferior rectal artery, perineal artery, artery to bulb, urethral artery, deep artery, and dorsal artery of penis or clitoris.

Q15. What are the boundaries of the ischioanal fossa?
A.

- **Medial wall:** Levator ani and external anal sphincter.
- **Lateral wall:** Obturator internus with fascia.
- **Base:** Skin of perineum.
- **Apex:** Where levator ani and obturator internus meet.

Q16. What is the function of the ischioanal fossa?
A. Allows expansion of the anal canal during defecation and cushions pelvic diaphragm.

Q17. What is the nerve supply of the external anal sphincter?
A. Inferior rectal branch of the pudendal nerve and perineal branch of S4.

Q18. What are the components of the female urethral sphincter complex?
A. External urethral sphincter, compressor urethrae, and sphincter urethrovaginalis.

Q19. Which gland corresponds to the male bulbourethral gland in females?
A. Greater vestibular (Bartholin's) gland.

Q20. What is the function of the bulbospongiosus muscle?
A.

- In males: Expels last drops of urine and semen; assists erection.
- In females: Constricts vaginal orifice; assists erection of clitoris.

Q21. What is the histological structure of erectile tissue?

A. Composed of cavernous spaces lined by endothelium, separated by trabeculae of smooth muscle and connective tissue, enclosed by tunica albuginea.

Q22. What is the function of the corpora cavernosa and corpus spongiosum?

A. They engorge with blood during erection; corpus spongiosum keeps urethra open during ejaculation.

Q23. What is the parasympathetic root value responsible for erection?

A. S2, S3, and S4 (pelvic splanchnic nerves).

Q24. Which muscle is chiefly responsible for voluntary control of urination?

A. External urethral sphincter.

Q25. What is the applied importance of the perineal body in obstetrics?

A. It prevents tearing during childbirth; mediolateral episiotomy is done to avoid its uncontrolled rupture.

Q26. What is the difference between male and female perineum?

A. The female perineum is broader, contains the vagina, and is more flexible to accommodate childbirth.

Q27. What is the clinical significance of the deep dorsal vein of the penis?

A. It drains into the prostatic venous plexus; congestion can contribute to prostatic disorders.

Q28. What is the blood supply of the anal canal below the pectinate line?

A. Inferior rectal artery (branch of internal pudendal artery).

Q29. What happens if the pudendal nerve is injured?

A. Loss of perineal sensation, fecal and urinary incontinence, and erectile dysfunction.

Q30. Why is the perineum clinically important?

A. It is involved in defecation, urination, childbirth, sexual function, and pelvic floor support — all critical for normal daily physiological activities.

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