

# Pelvis

## Chapter 8

# New Terminology

Combining Form	Meaning	Example	Meaning of New Term
Andr/o	Male	Androgynous	Pertaining to male and female
Balan/o	Glans penis	Balanitis	Inflammation of the glans penis
Crypt/o	Hidden	Cryptorchidism	Condition of hidden testis
Epididym/o	Epididymis	Epididymitis	Inflammation of the epididymis
Orcho/o	Testis	Orchiopathy	Disease of a testis
Orchi/o		Orchiectomy	Surgical removal of a testis

# New Terminology

Combining Form	Meaning	Example	Meaning of New Term
Orchid/o	Testis	Orchidopexy	Surgical fixation of a testis
Testicul/o		Testicular	Pertaining to the testes
Phall/I	Penis	Phalloid	Resembling a penis
Prostat/o	Prostate	Prostatectomy	Surgical removal of part all of the prostate gland
Semin/o	Sperm	Seminuria	Semen in the urine

# New Terminology

Combining Form	Meaning	Example	Meaning of New Term
Sperm/o	Sperm	Aspermia	Failure to form semen or to ejaculate
Spermat/o	Sperm	Spermatogenesis	Production of sperm
Vas/o	Vessel	Vasotomy	Incision of the vas deferens

# New Terminology

Combining Form	Meaning	Example	Meaning of New Term
Amni/o	Amnion, amniotic fluid	Amniocentesis	Surgical puncture of the amnion
Cervic/o	Cervix	Cervical	Pertaining to the cervix
Colp/o	Vagina	Colposcopy	Visual examination of the vagina
Vagin/o		Vaginopexy	Surgical fixation of the vagina
Embry/o	Embryo	Embryonic	Pertaining to an embryo
Episi/o	Vulva	Episiotomy	Cutting into or incision of the vulva

# New Terminology

Combining Form	Meaning	Example	Meaning of New Term
Vulv/o	Vulva	Vulvodynia	Pain of the vulva
Fet/o	Fetus	Fetotoxic	Poisonous to a fetus
Galact/o	Milk	Galactorrhea	Flow/discharge of milk
Lact/o		Lactotherapy	Milk therapy
Gonad/o	Gonads	Gonadectomy	Surgical removal of a gonad
Gynec/o	Woman, female	Gynecology	Study of female disorders
Hyster/o	Uterus	Hysterotomy	Cutting into or incision of the uterus

# New Terminology

Combining Form	Meaning	Example	Meaning of New Term
Metr/o	Uterus	Metrocarcinoma	Cancerous tumor of the uterus
Uter/o		Uterocervical	Pertaining to the uterus and cervix
Lapar/o	Abdomen, abdominal wall	Laparoscopy	Visual examination of the abdomen
Mamm/o	Breast	Mammoplasty	Surgical
Mast/o		Mastectomy	
Men/o	Menses	Dysmenorrhea	Bad, painful, or difficult menstrual flow
Nat/o	Birth	Natal	Pertaining to birth

# New Terminology

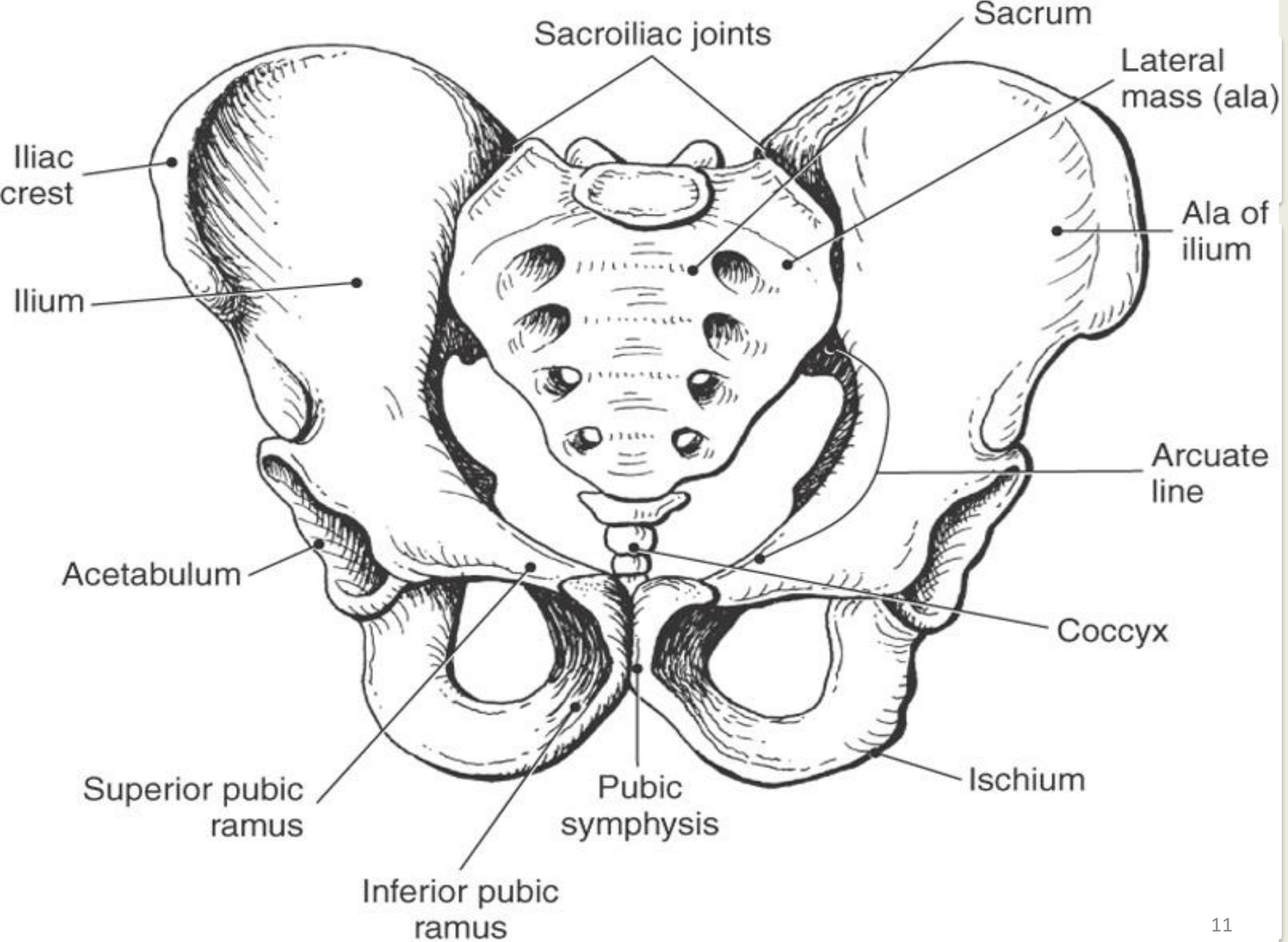
Combining Form	Meaning	Example	Meaning of New Term
Oophor/o	Ovary	Oopherectomy	Surgical removal of an ovary
Ovari/o	Ovary	Ovariocele	Tumor or hernia of the ovary
Ov/o	Ovum	Ovogenesis	Creation of an ovum
Perine/o	Perineum	Perineoplasty	Surgical repair of the perineum
Placent/o	Placenta	Placental	Pertaining to the placenta
Salping/o	Tube (fallopian or eustachian)	Salpingitis	Inflammation of a fallopian tube

# New Terminology

Combining Form	Meaning	Example	Meaning of New Term
Son/o	Sound	Sonorous	Full and loud in sound
Vagin/a	Vagina	Vaginapexy	Surgical fixation of the vagina

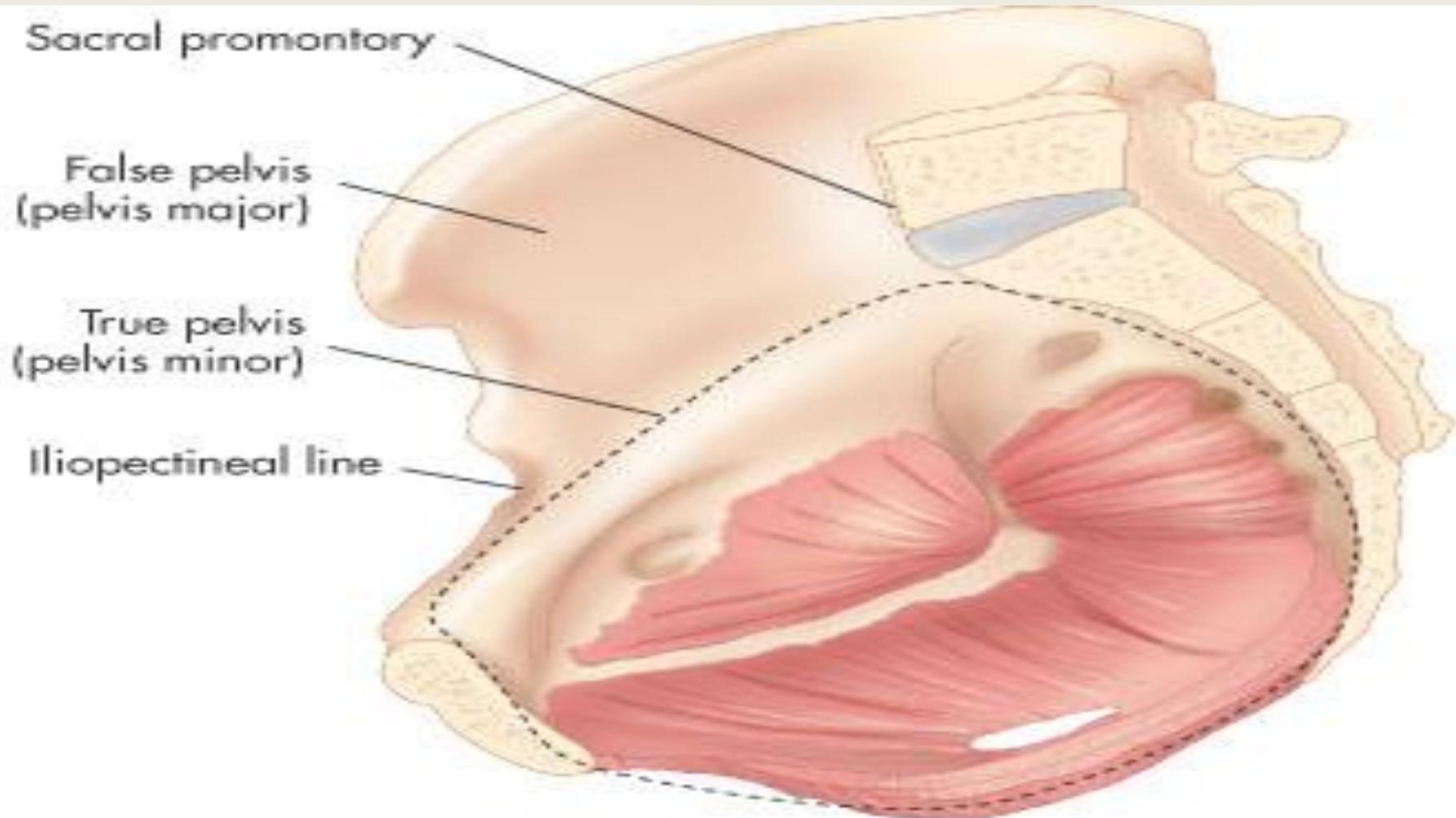
# Bony Pelvis

- **Consists of four bones:**
  - **Sacrum**
  - **Coccyx**
    - **Both form the posterior wall**
  - **Two os coxae or innominate bones (RT & LT)**
    - **Make up the anterior and lateral margins of the bony pelvis**
    - **Made up of three bones**
      - **Ilium, pubis, & ishium**



# Pelvis

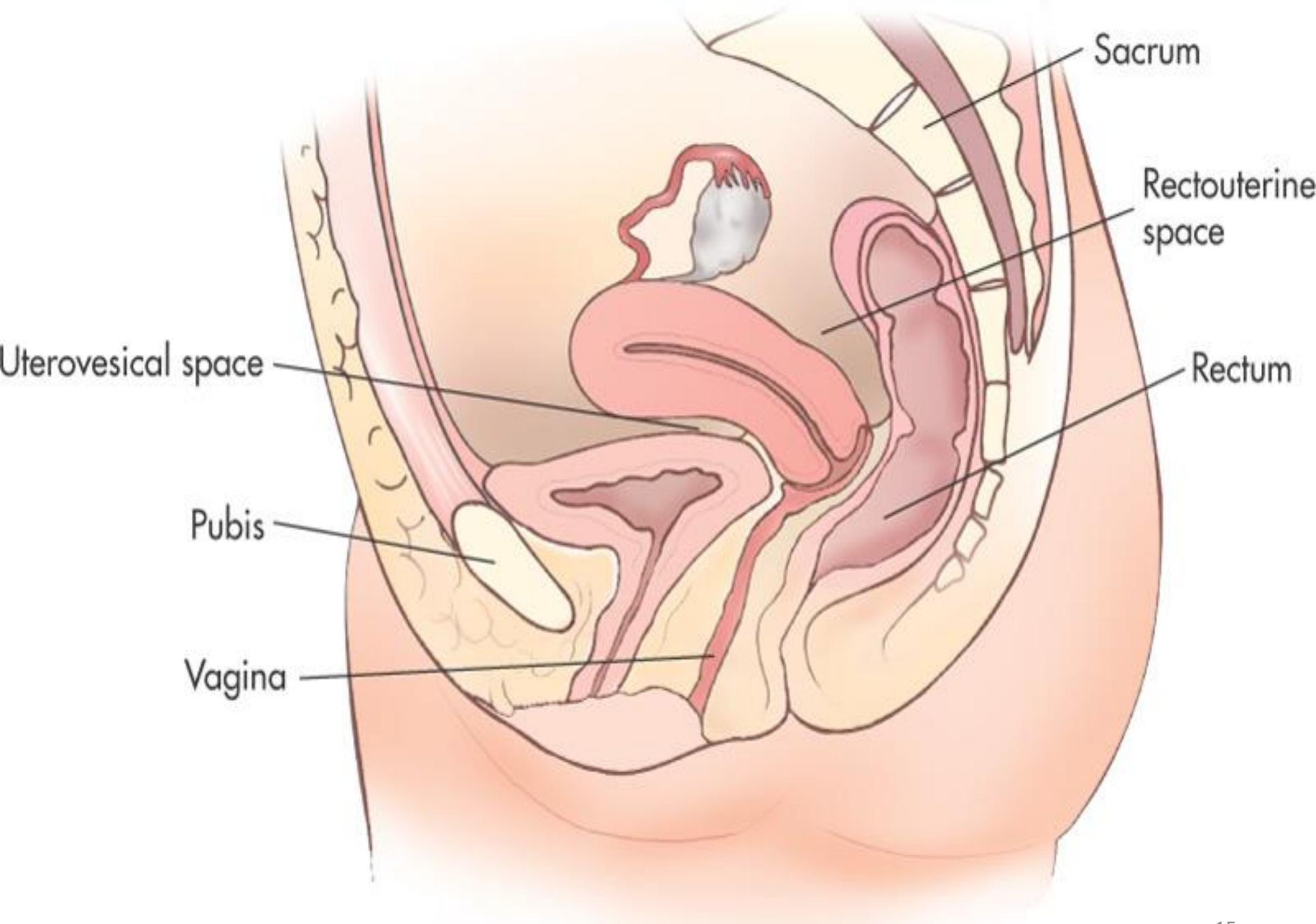
- **Divided into:**
  - **False Pelvis (greater pelvis)**
  - **True Pelvis (lesser pelvis)**
- **By Pelvic Brim**
  - **Iliopectineal line**
    - **Boundary line that extends from upper anterior sacrum to upper pubic symphysis**
    - **Region above is the false pelvis**
    - **Region below is the true pelvis**



**Figure 35-2** Sagittal plane through the lateral pelvis. The true pelvis is the most inferior portion of the body cavity. It is separated from the false pelvis by the pelvic brim, which corresponds with the iliopectineal line and the sacral promontory.

# True Pelvis

- **Considered “the pelvic cavity”**
- **Divided into**
  - **Main pelvic cavity**
  - **Perineum**
    - **And its contents cover and partially fill the inferior bony pelvis**



# Muscles

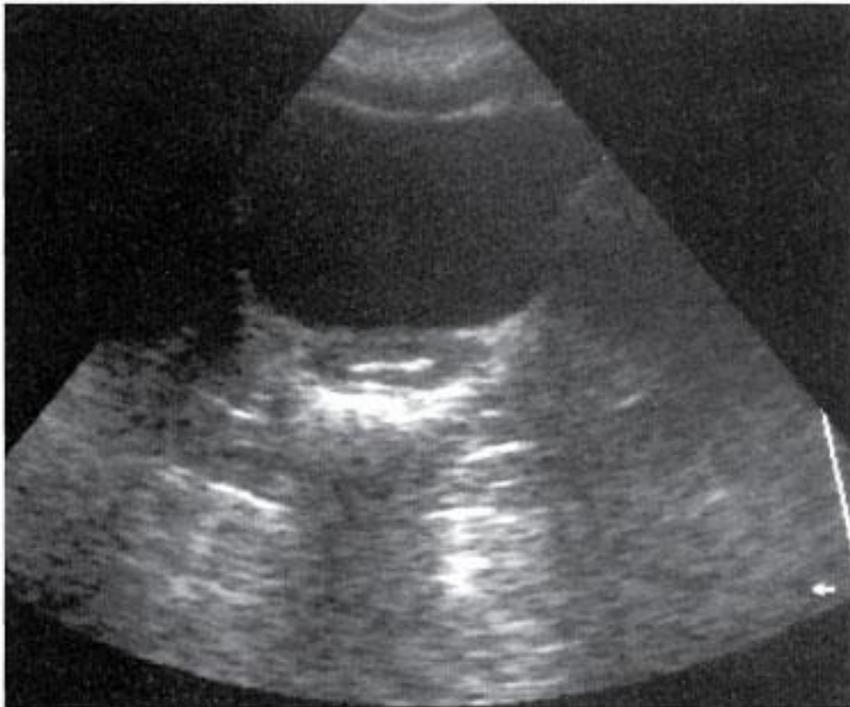
- **Rectus Abdominis: symphysis pubis to xiphoid process**
- **Psoas major: lumbar spine to anterior side wall**
- **Iliacus: forms pelvic side wall**
- **Piriformis: sacrum to posterior pelvis**
- **Obturator internus: forms pelvic floor (diaphragm)**
- **Coccygeus: forms pelvic floor (diaphragm)**

# Muscles

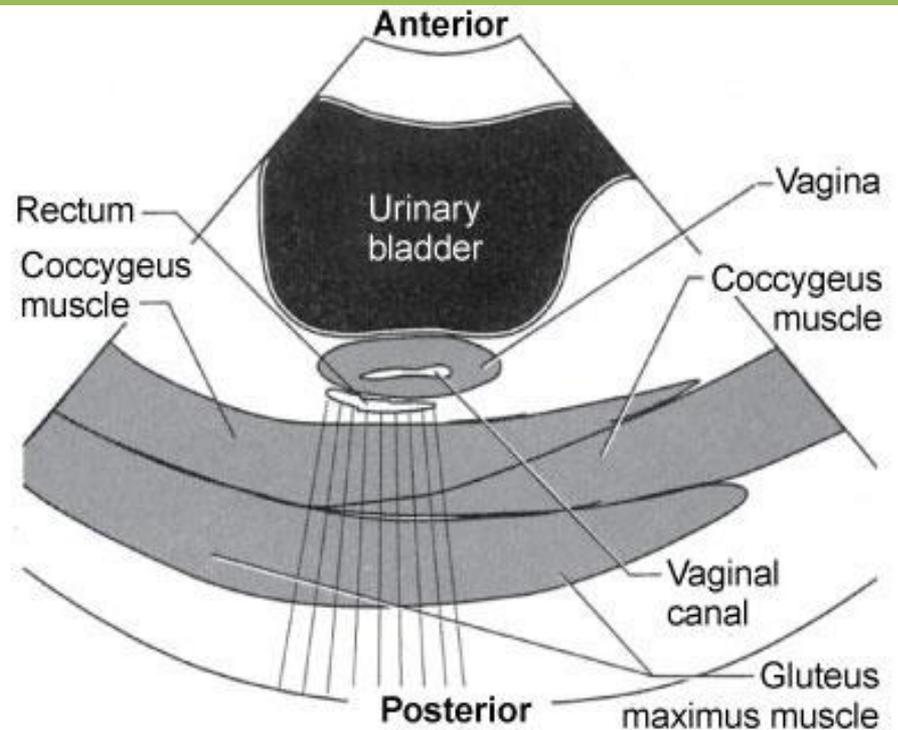
- **Several primary muscle groups in the pelvis that the sonographer must be able to identify**
- **These muscles serve as landmarks that may be used to help differentiate the reproductive organs**
  - **Prevents misidentifying the muscles as a mass**
- **The pelvic muscles vary in shape, but typically appear hypoechoic with characteristic hyperechoic striations when viewed in their long axis**

# Gluteus Maximus Muscle

- Largest, most superficial
- Makes up the bulk of the buttocks

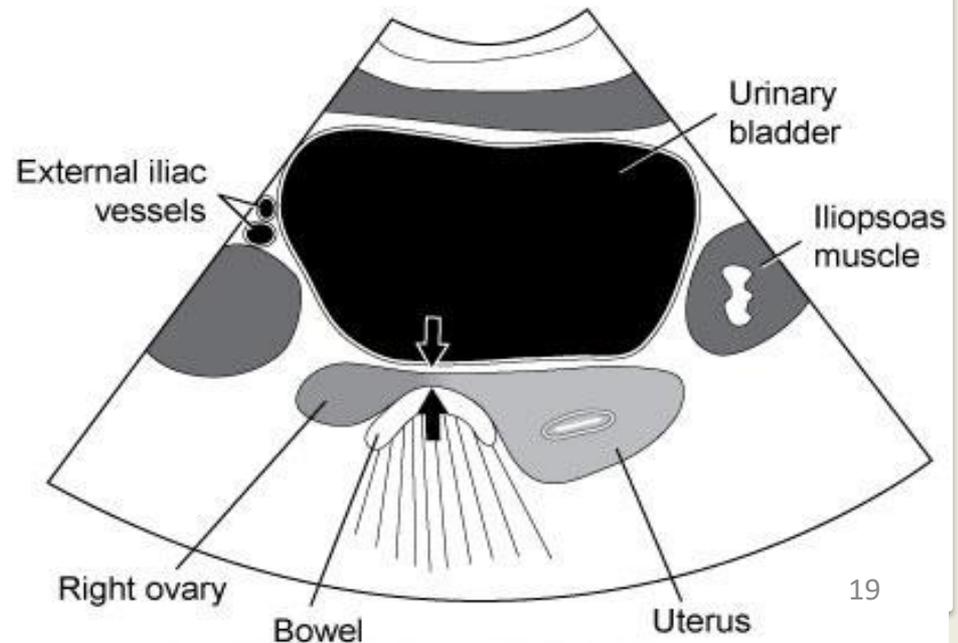
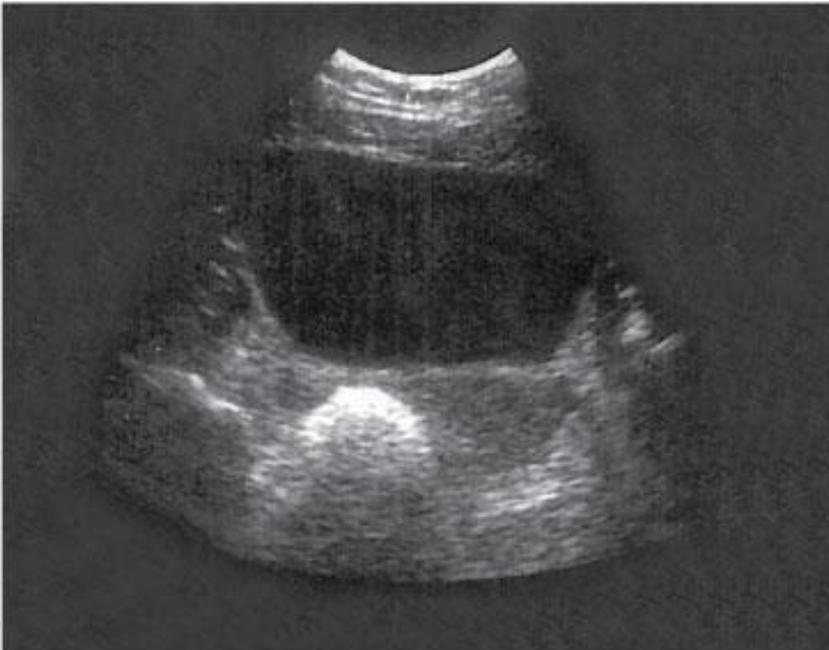


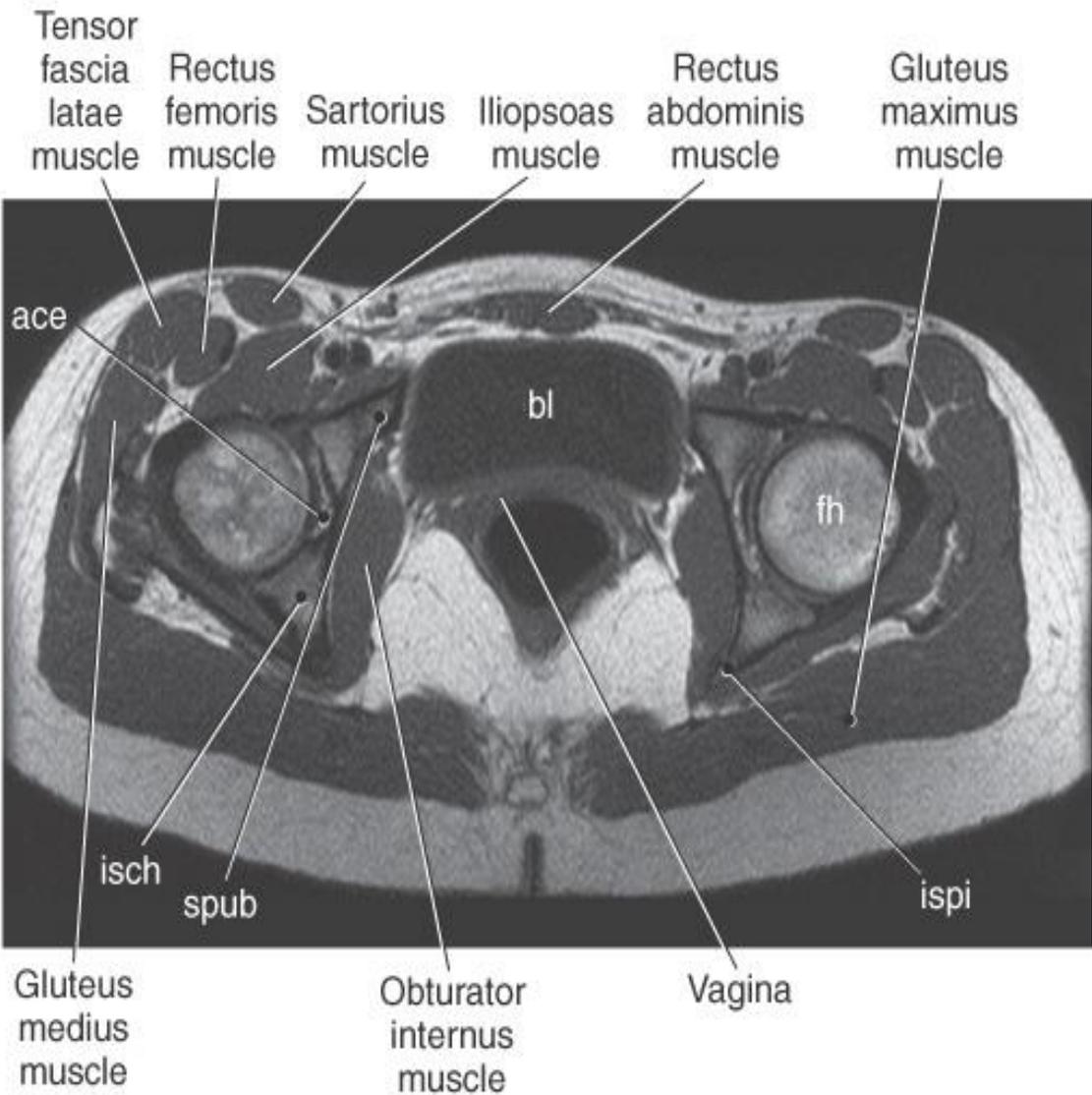
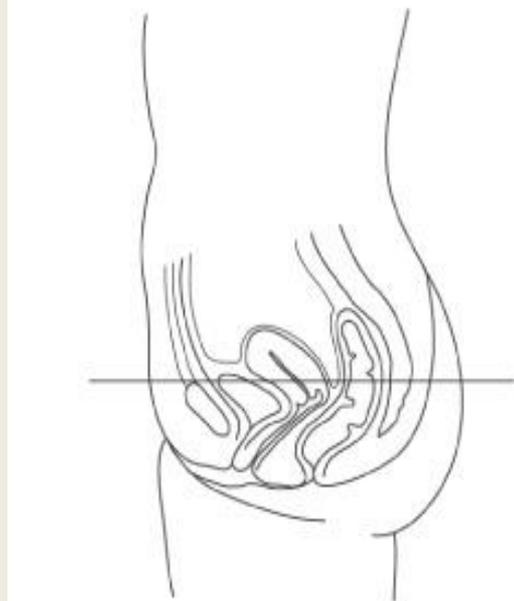
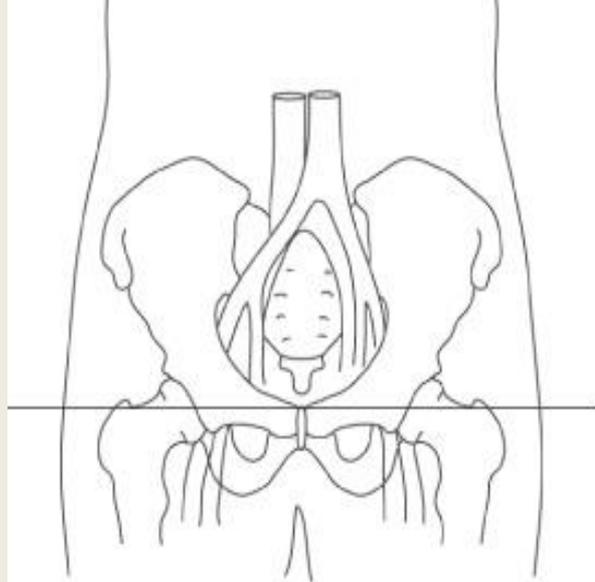
Unn. Fig. 12-27. TRV VAG



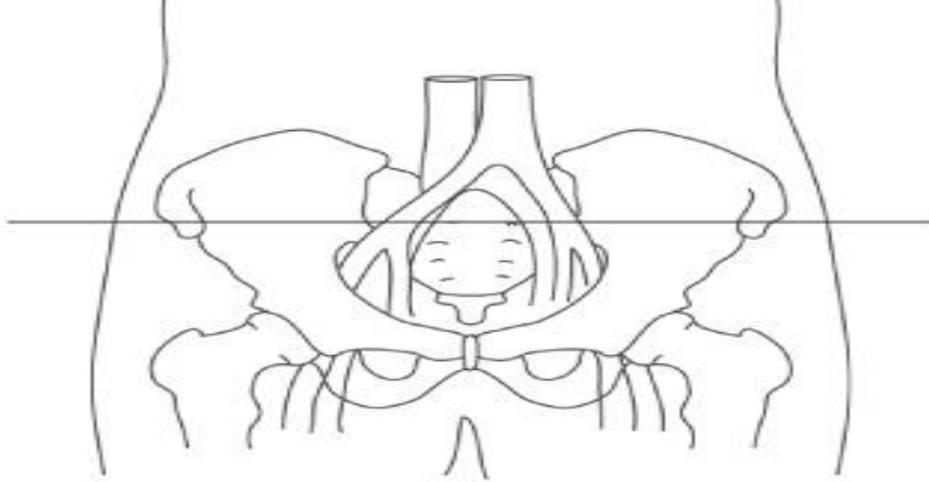
# Iliopsoas Muscle

- Psoas major muscles join with the iliacus muscles to form the iliopsoas
- Pass outside the pelvic bones and does not enter the true pelvis

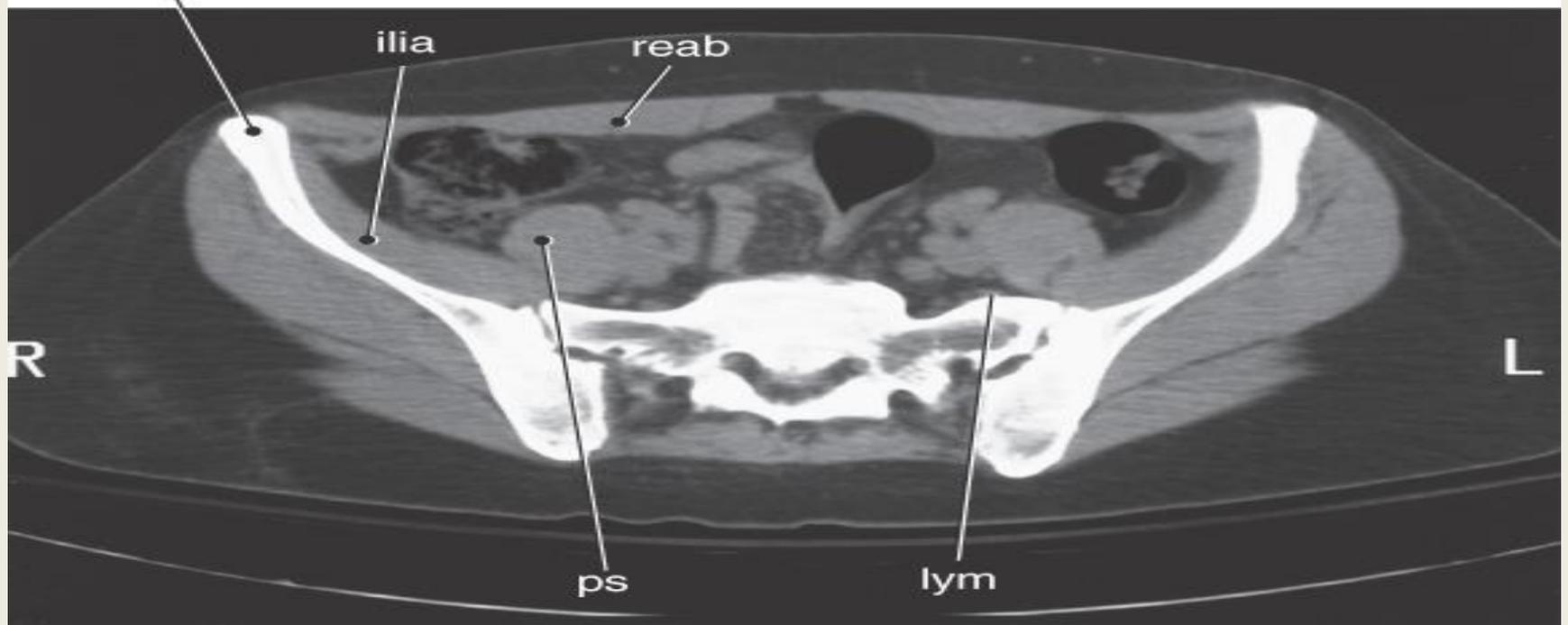




**KEY:** ace, Acetabulum; bl, bladder; fh, femoral head; ipsi, ischial spine; spub, superior pubic ramus; isch, ischium.



Iliac crest

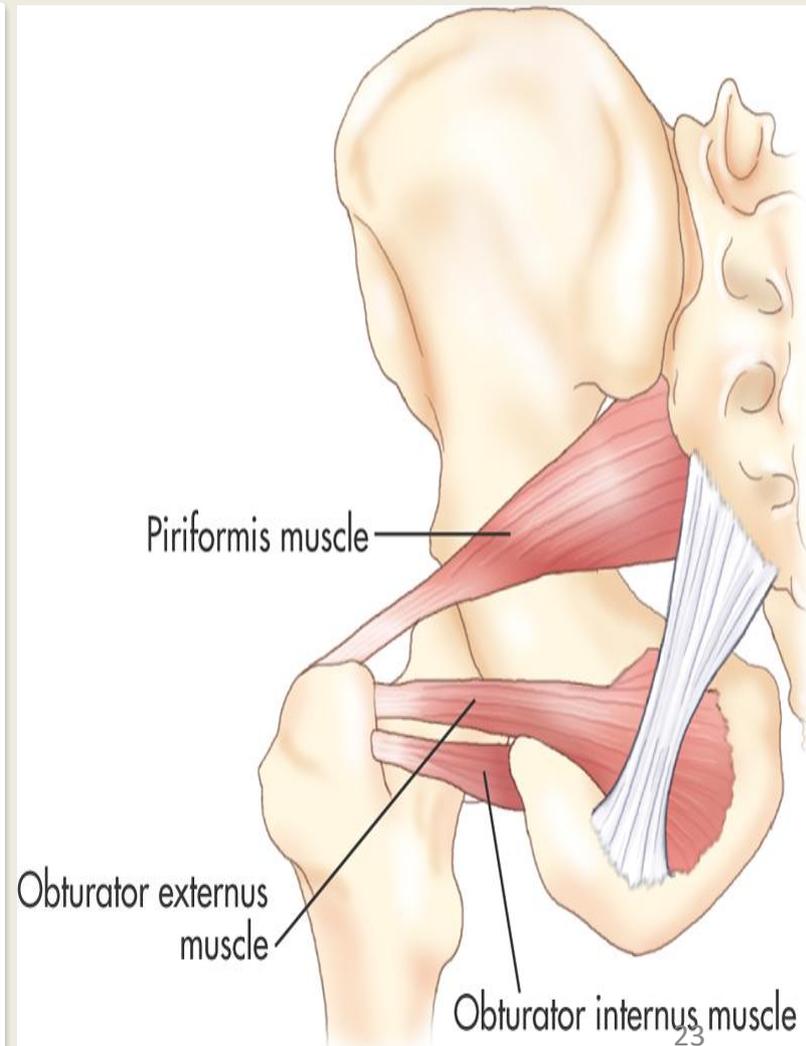


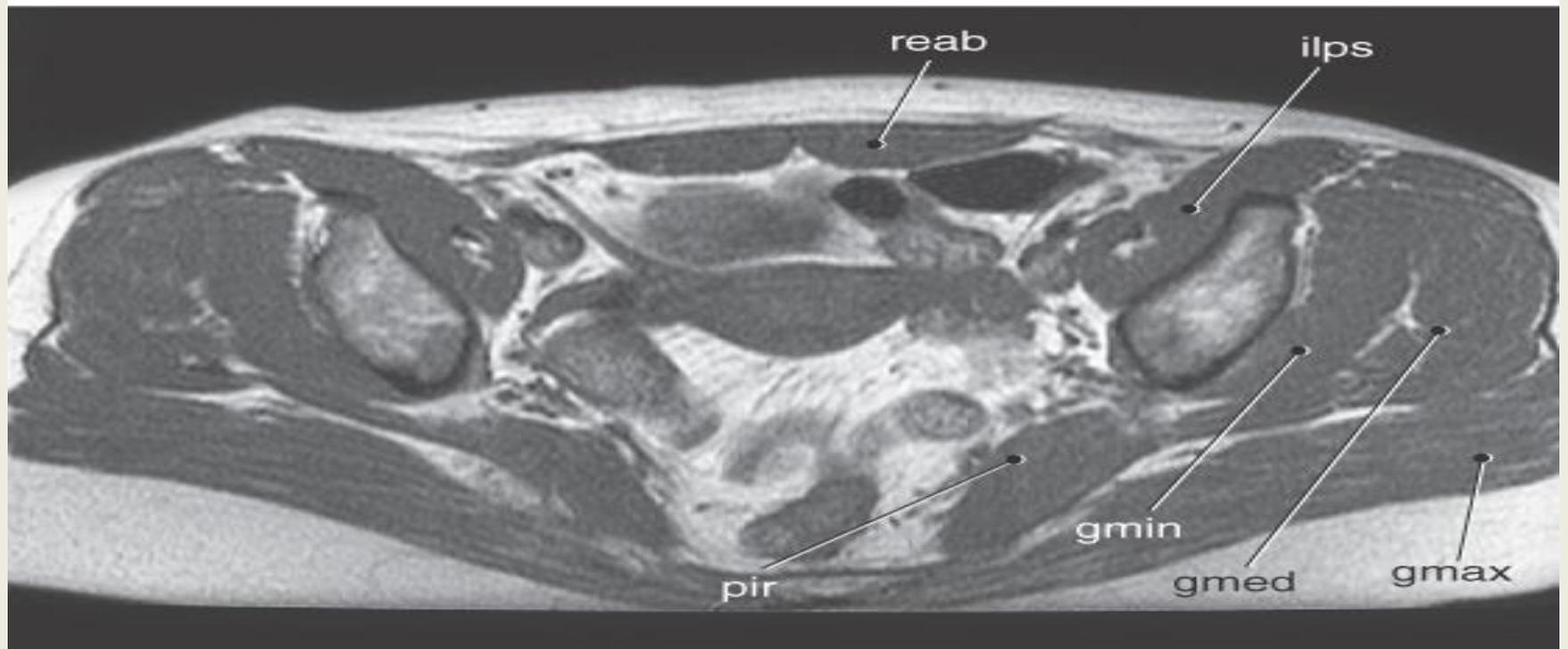
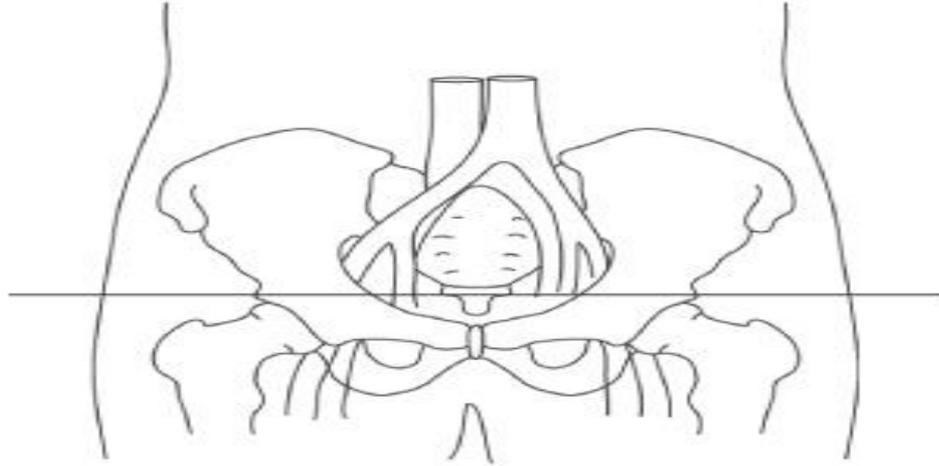
**KEY:** ps, psoas muscle; lym, lymph nodes; ilia, iliacus; reab, rectus abdominis.

# Muscles of the True Pelvis

# Piriformis muscles

- Flat, triangular muscles that arise from the anterior sacrum and pass through the greater sciatic foramen on the posterior aspect of the innominate bone to insert into the superior aspect of the greater trochanter of the femur

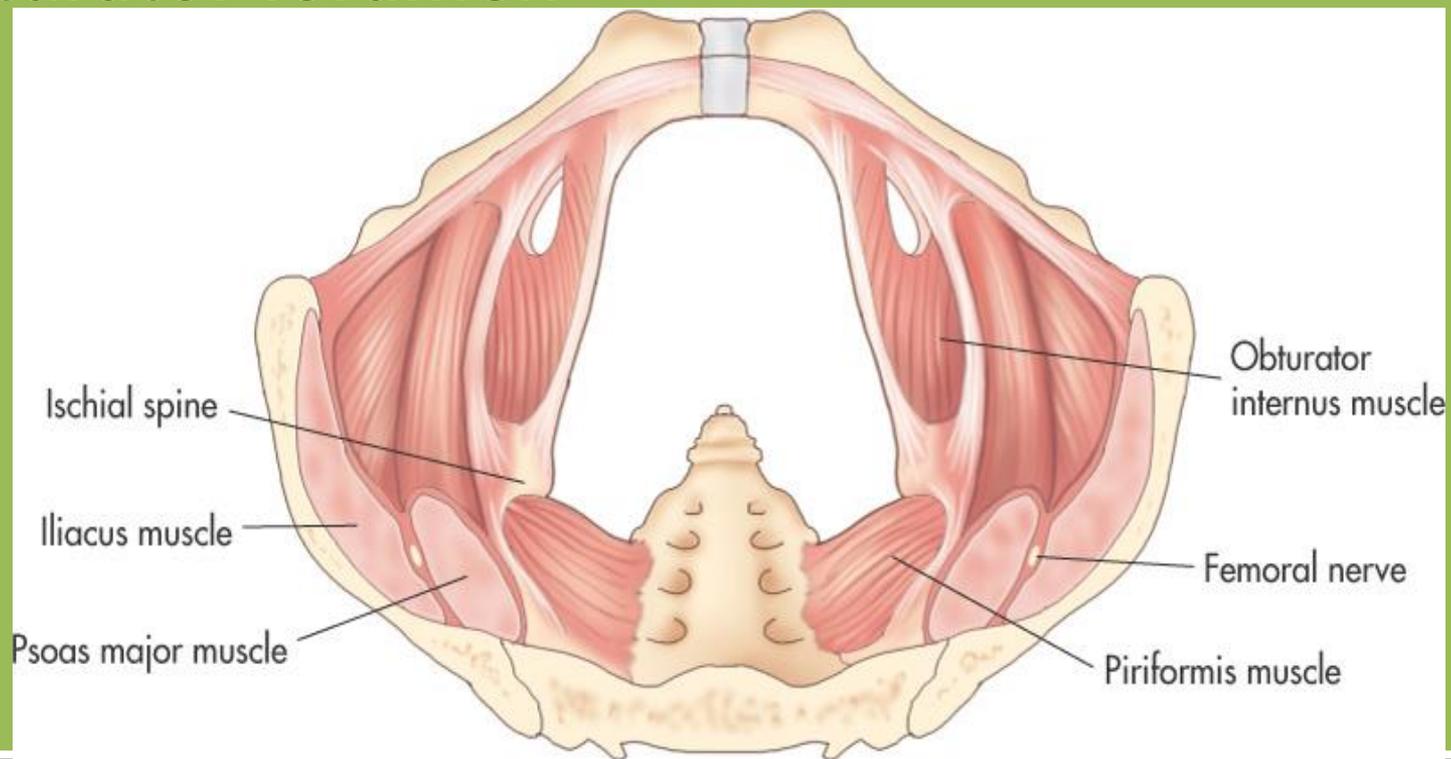


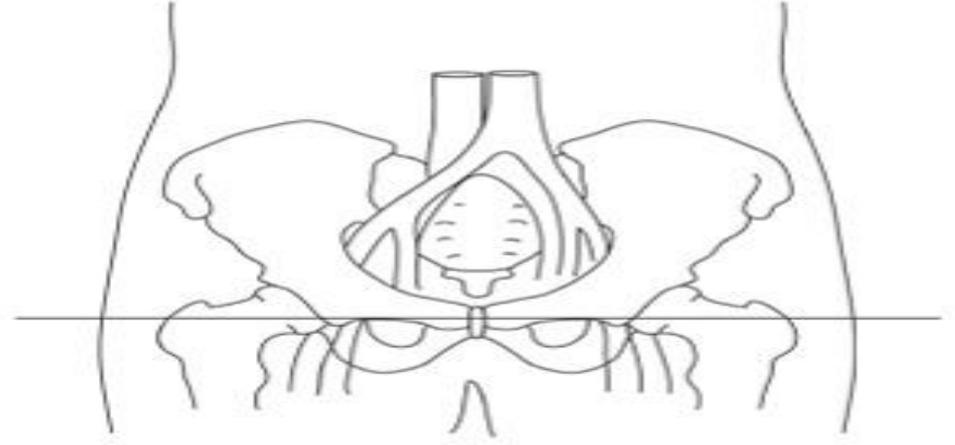


**KEY:** reab, Rectus abdominis; ilps, iliopsoas; gmax, gluteus maximus; gmed, gluteus medius; gmin, gluteus minimus; pir, piriformis.

# Obturator internus muscles

- Triangular sheets of muscle that arise from the anterolateral pelvic wall and surround the obturator foramen





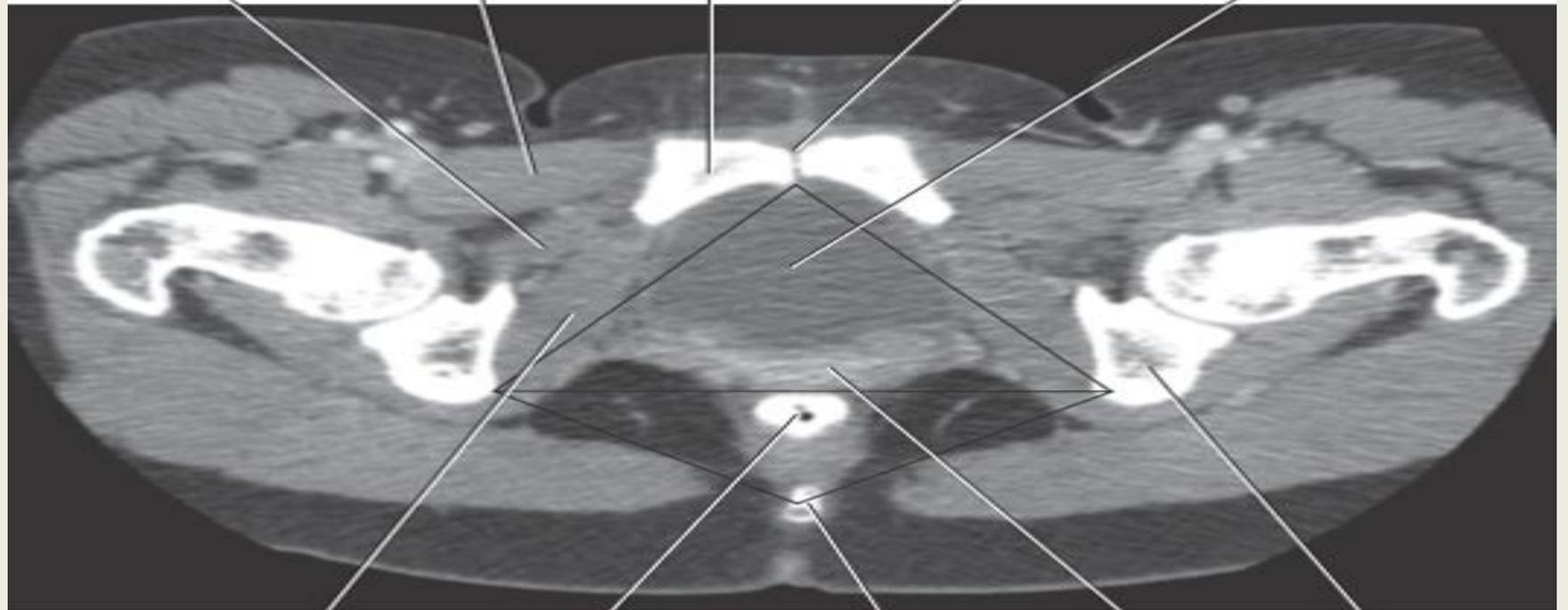
Obturator  
externus  
muscle

Pectineus  
muscle

Pubic  
bone

Pubic  
symphysis

Bladder



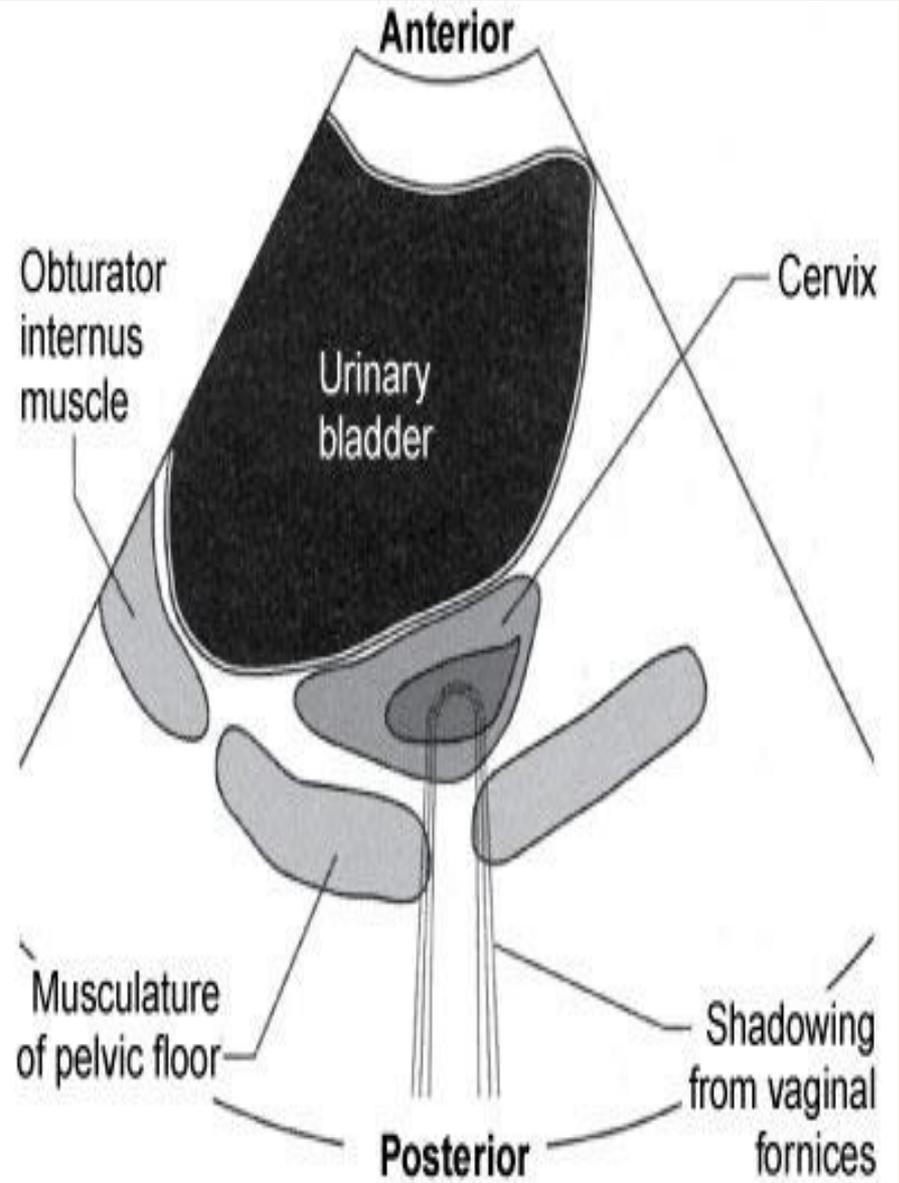
Obturator  
internus  
muscle

Rectum

Coccyx

Vagina

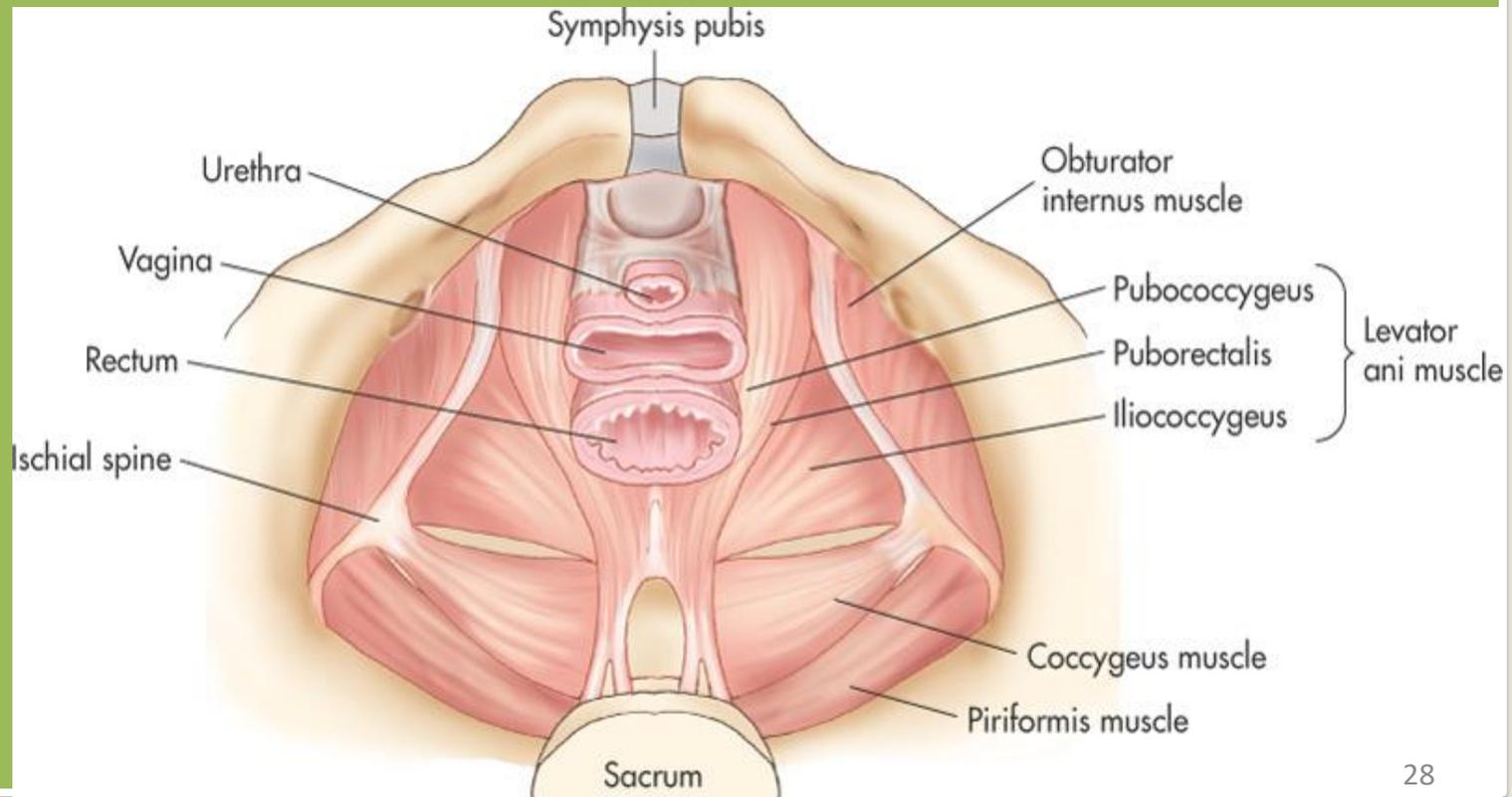
Ischium

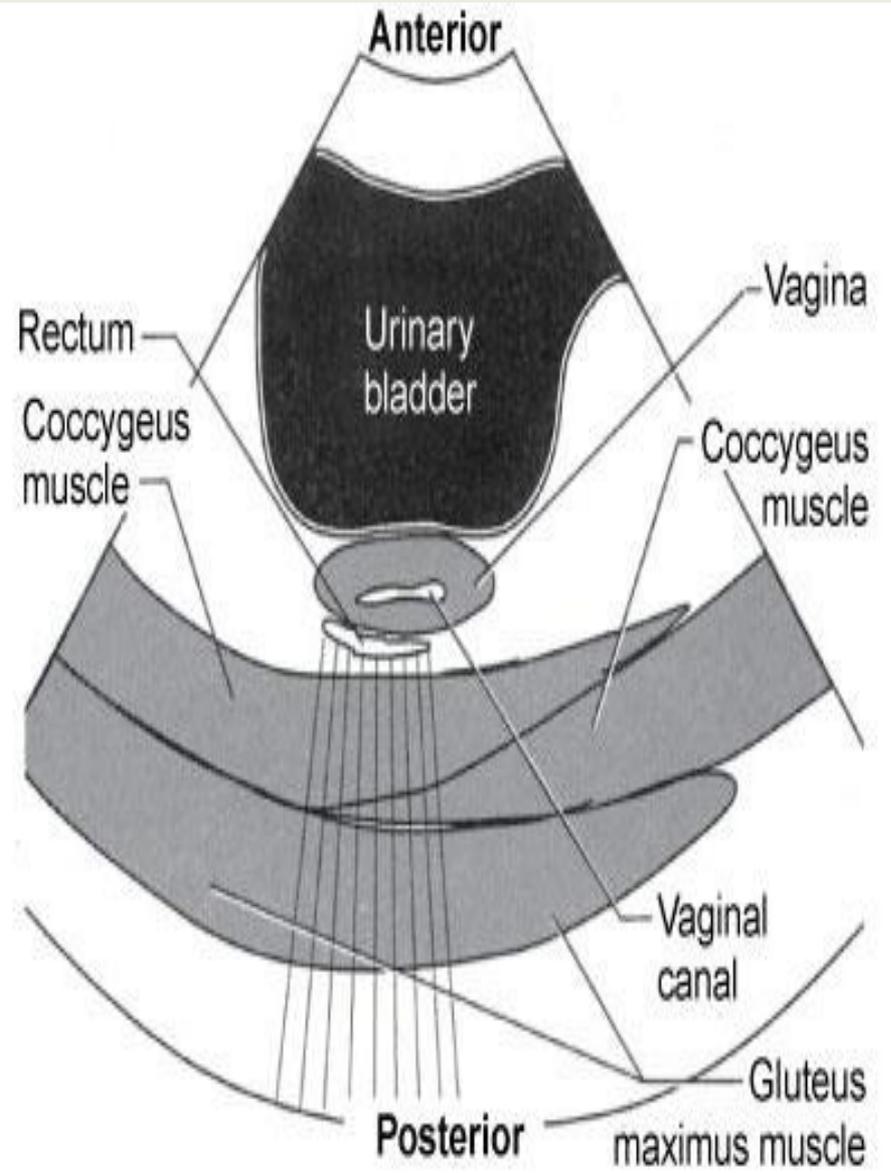


Unn. Fig. 12-28. TRV CERX

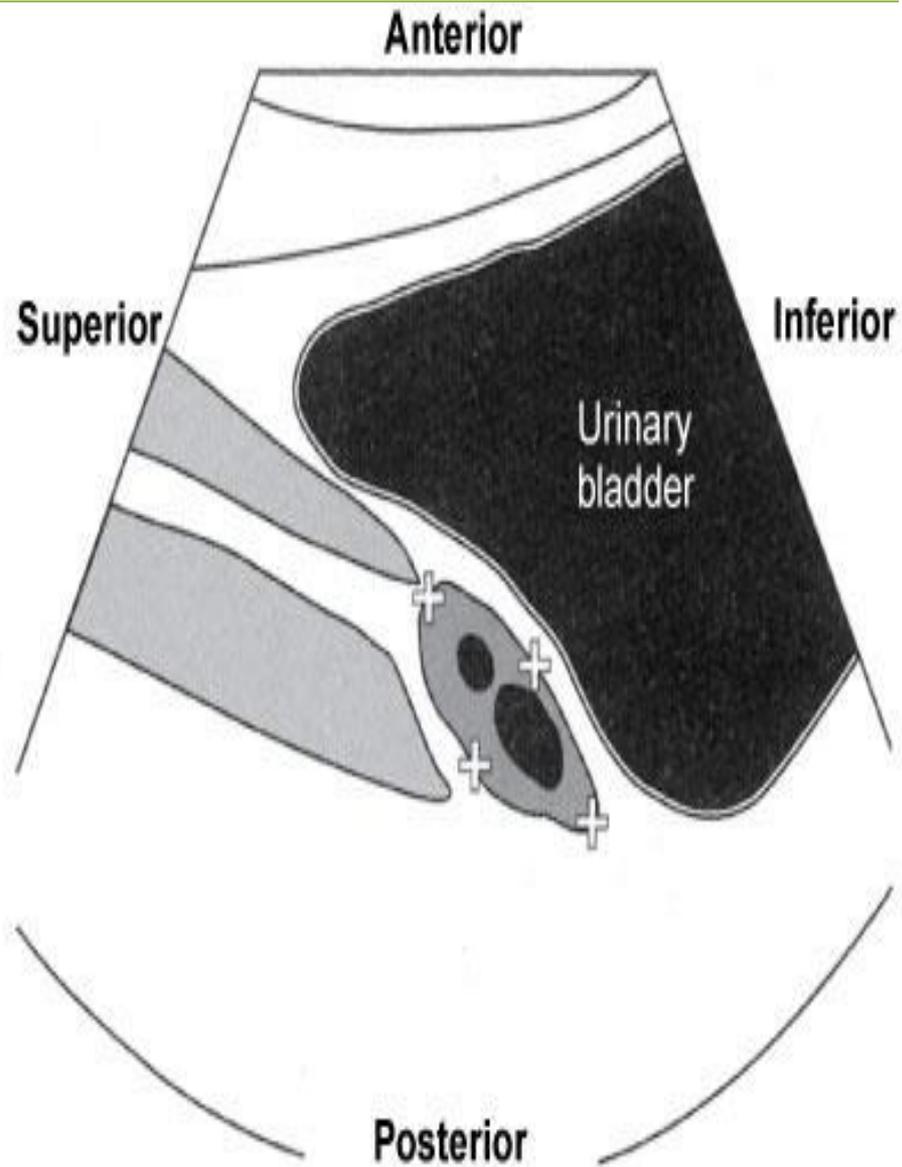
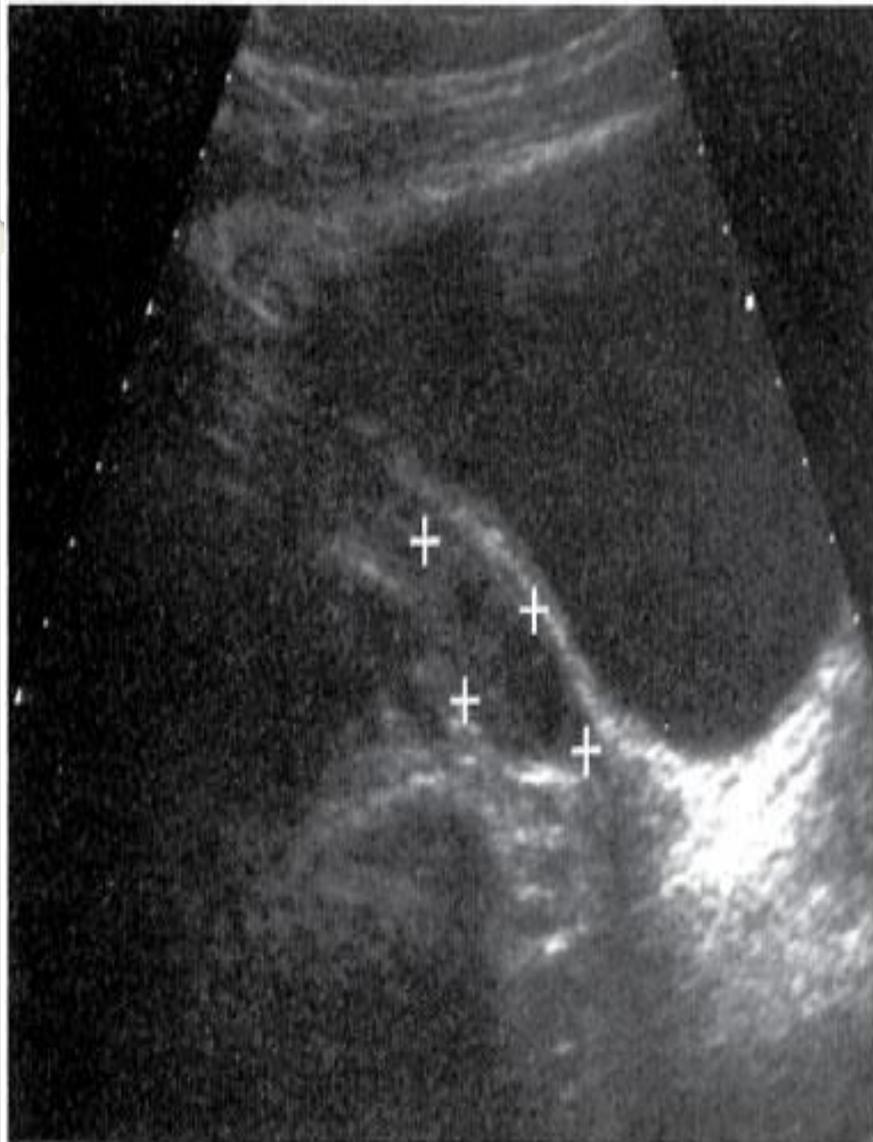
# Muscles of the Pelvic Diaphragm

- Formed by the levator ani and coccygeus muscles and makes up the floor of the true pelvis





Unn. Fig. 12-27. TRV VAG



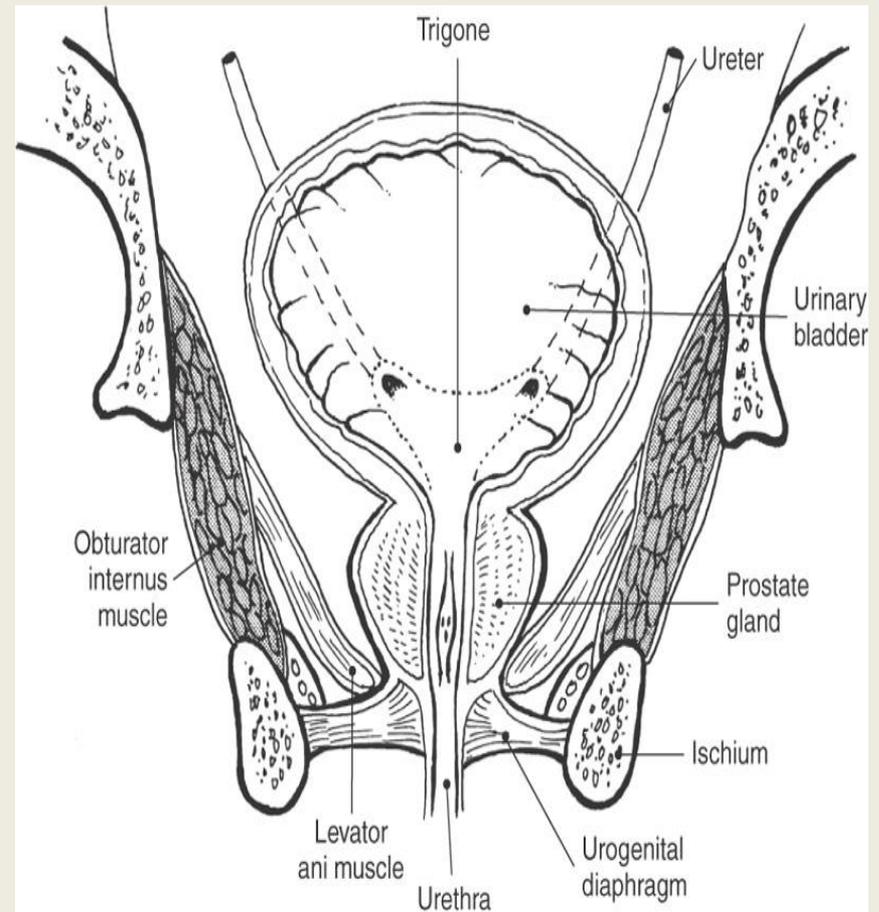
Unn. Fig. 12-36. LT OV SAG LONG AXIS

# Urinary Bladder

- **Pyramid-shaped muscular organ**
- **Rests on pelvic floor**
- **Immediately posterior to symphysis pubis**
- **Approx. 250 ml of urine triggers urge to urinate**
- **Storage capacity – 750 ml**

# Urinary Bladder

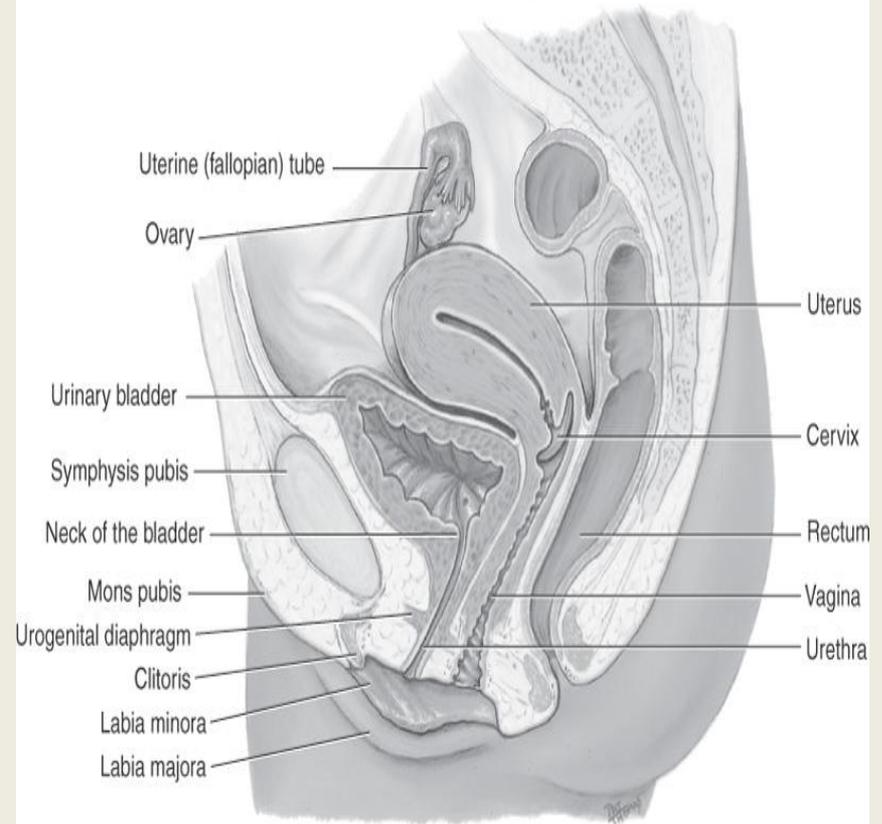
- When full, the lining is smooth and stretched
- When empty, the lining is a series of folds
- Three openings in floor, forms a triangle
  - This area is called the trigone
  - Two - posterior and lateral for the ureters
  - One - anterior for the urethra



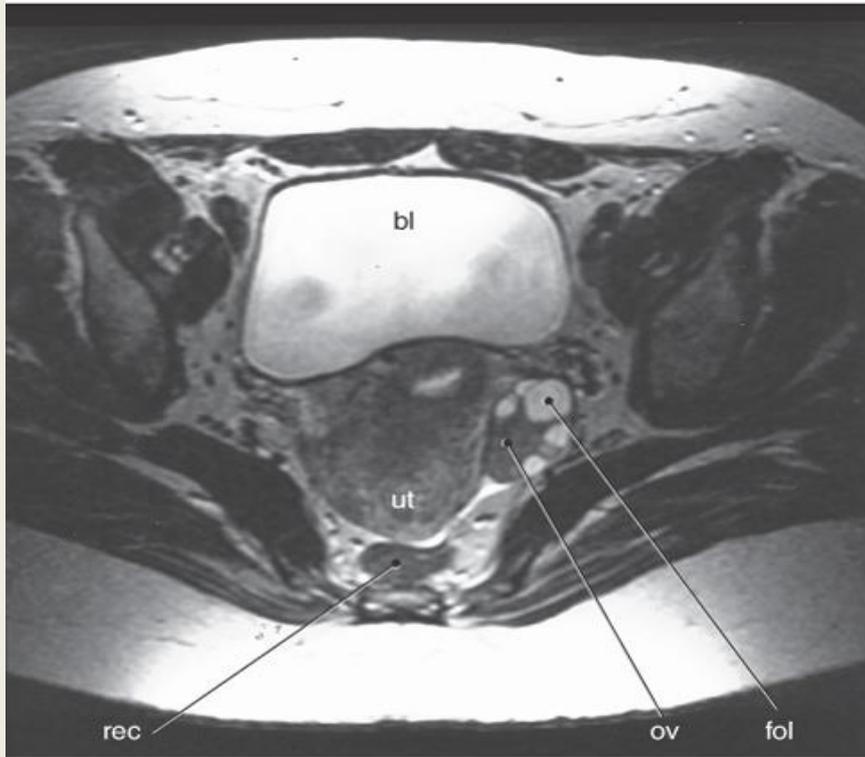
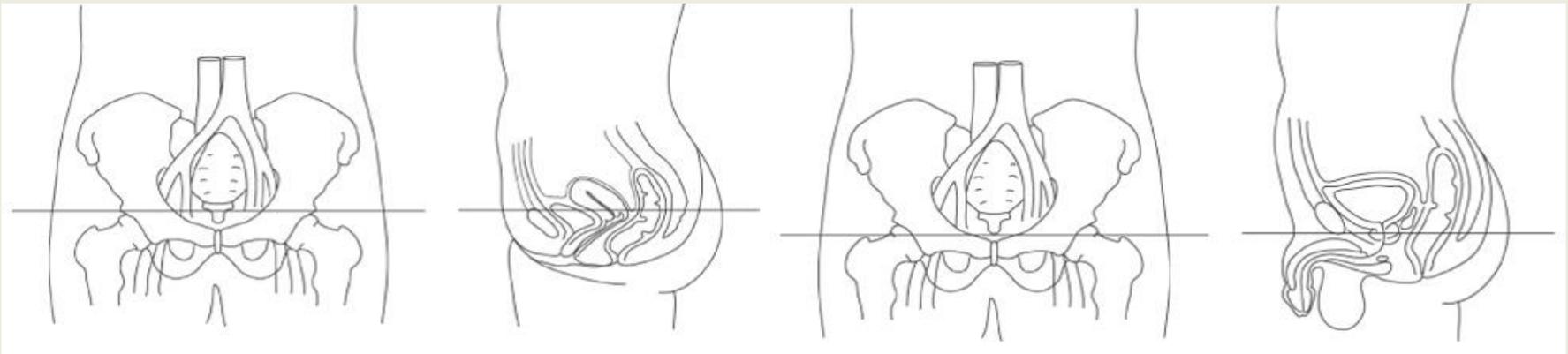
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# Urinary Bladder

- **Neck**
  - Continuous with urethra
  - Contains muscular internal urethral sphincter
- **Apex**
  - Posterior to pubic bones
- **Base**
  - Anterior to vagina

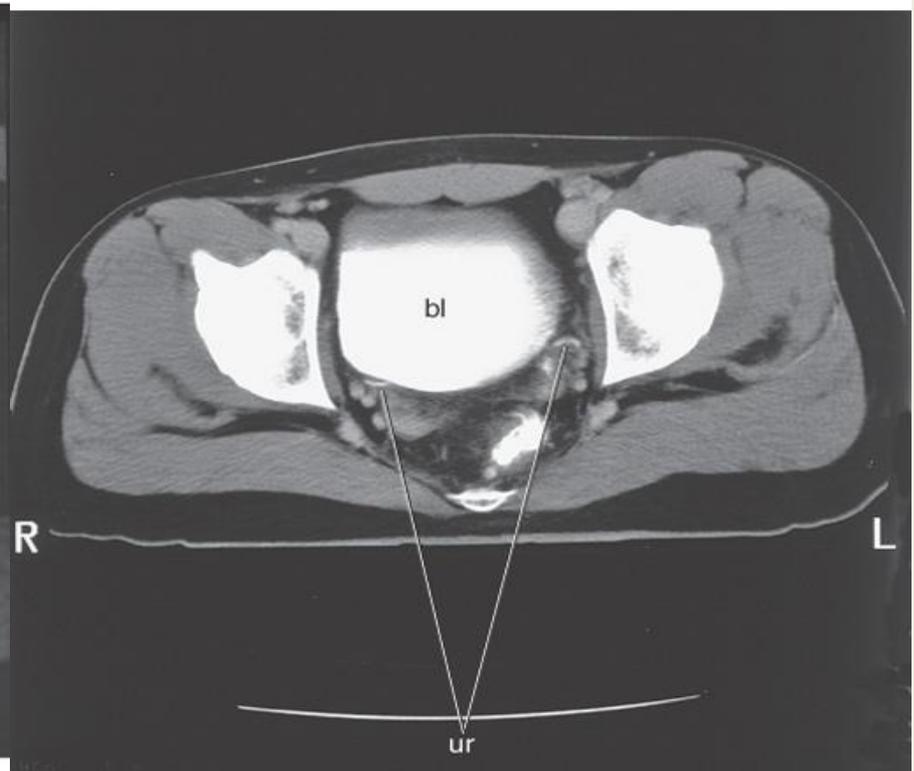


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**KEY:** ut, Uterus; rec, rectum; ov, ovaries; fol, follicular cyst; bl, bladder.

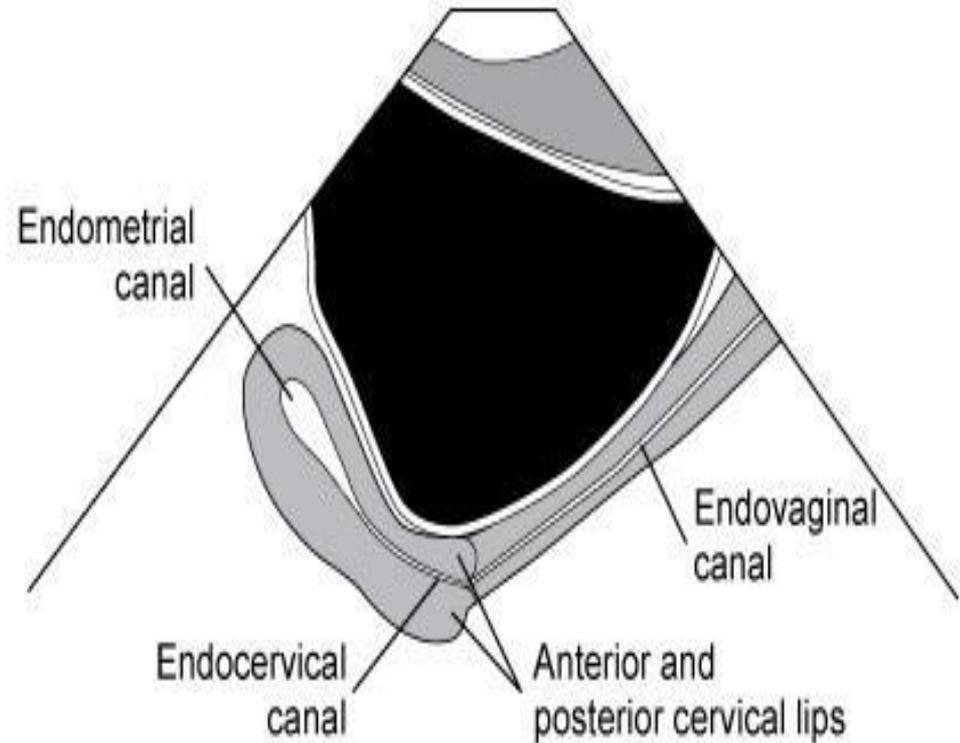
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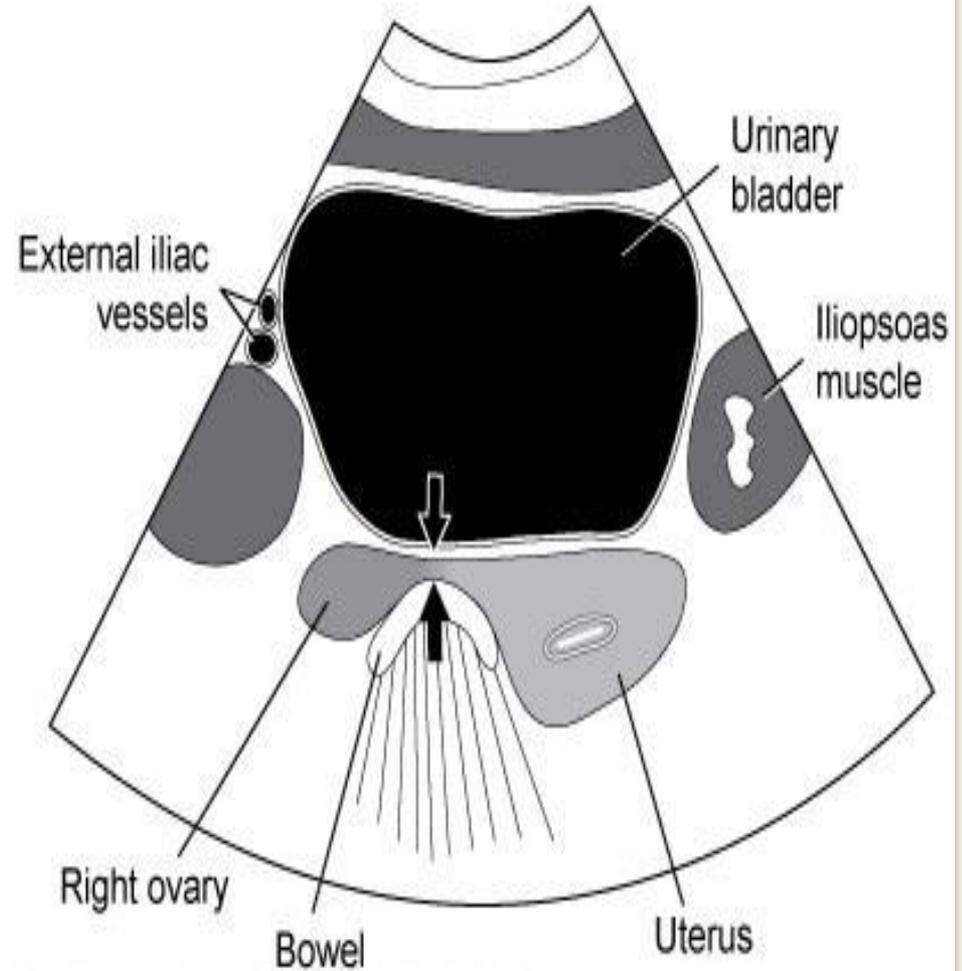
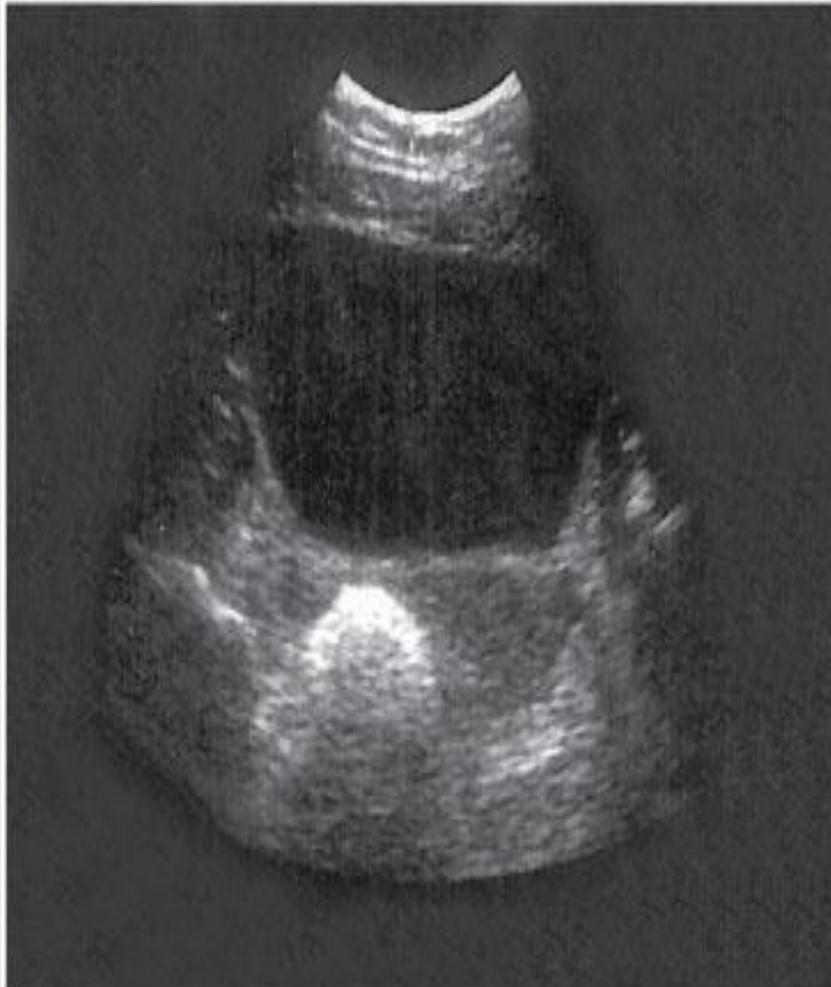
**KEY:** bl, Bladder; ur, ureter.

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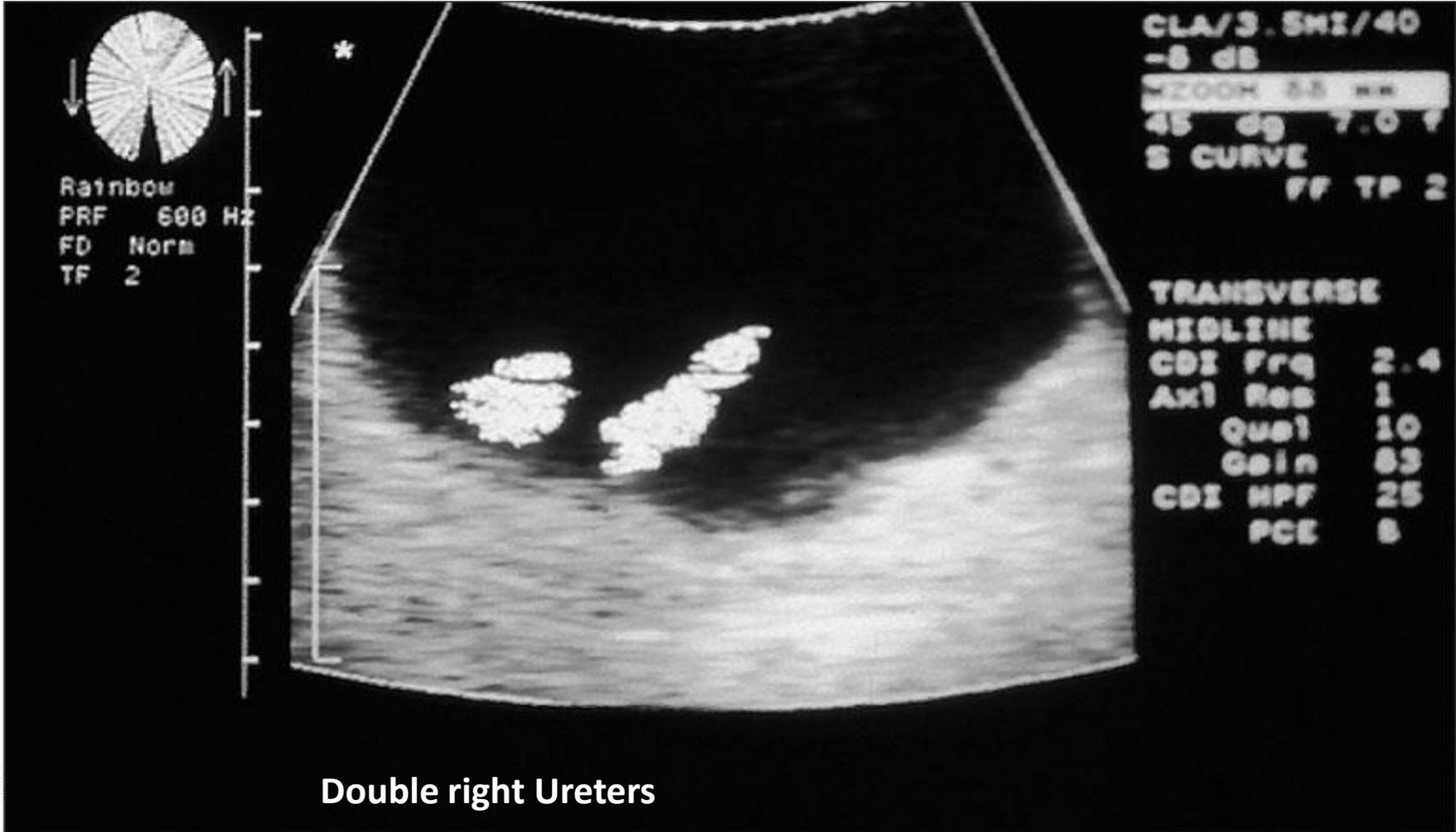
# Urinary Bladder (Longitudinal)



# Urinary Bladder (Transverse)



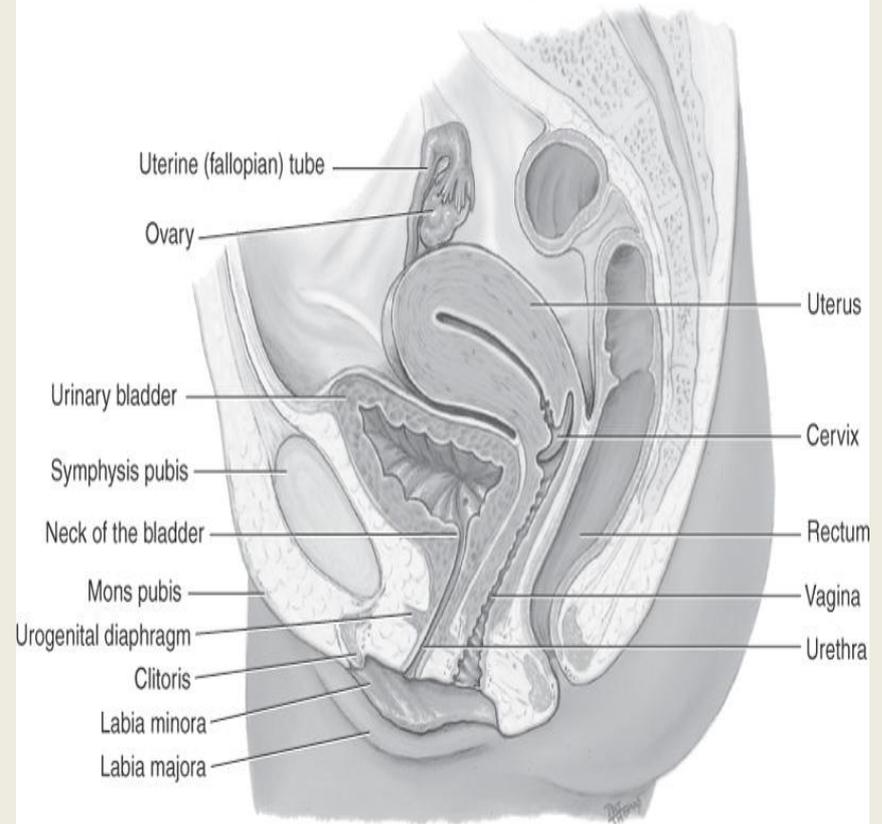
# “Ureteral Jets”



(Courtesy Shpetim Telegrafi, New York University.)

# Uterus

- Pear-shaped
- Largest organ in the normal female pelvis when the bladder is empty
  - Cervix
  - Body
  - Fundus



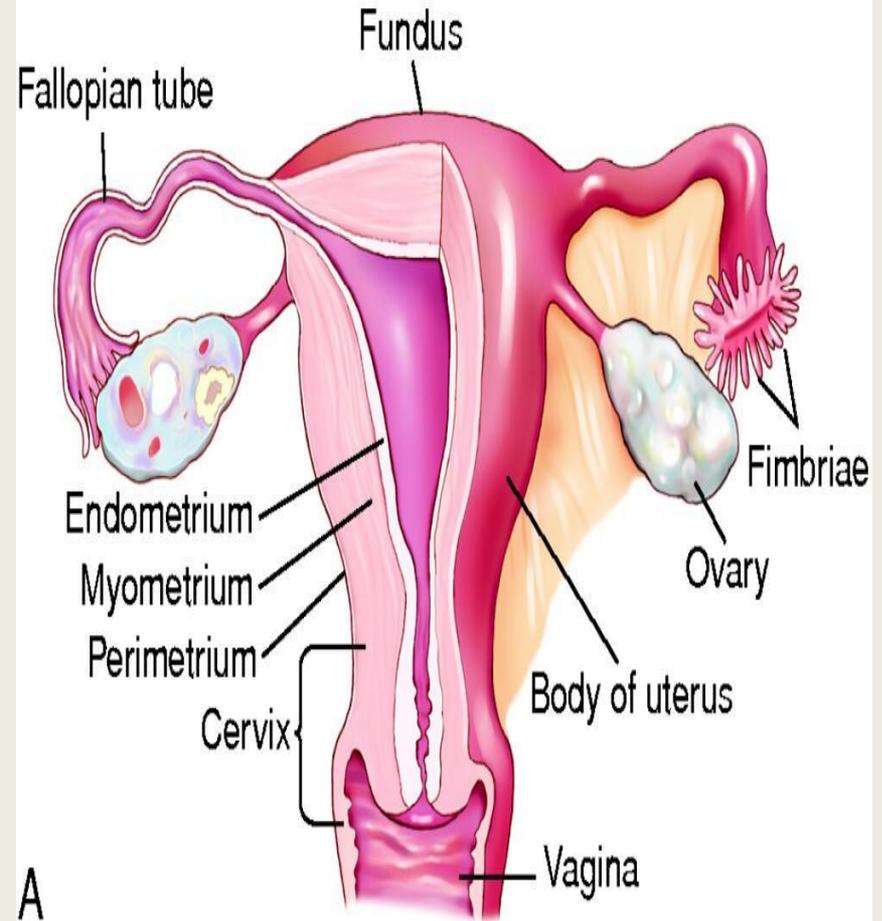
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# Uterus

- **Size varies with age and parity**
- **Measures approximately:**
  - 6 to 8 cm in length
  - 3 to 5 cm in AP and Transverse
- **Fundus is the widest and most superior portion of the uterus**
  - **Lateral borders of the fundus are the cornua**
    - **Where fallopian tubes enter the uterine cavity**

# Uterine Layers

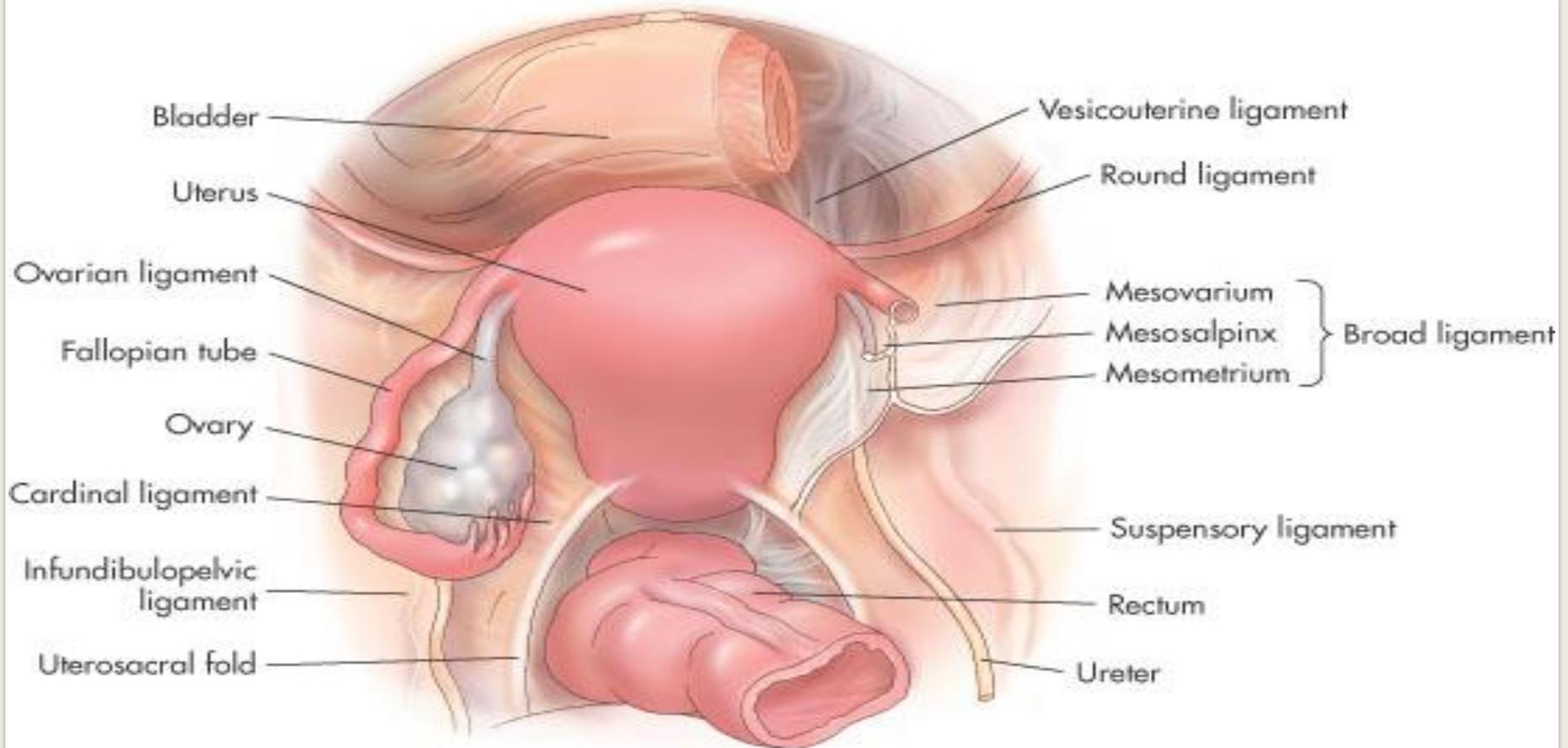
- **Endometrium**
  - Mucous membrane
- **Myometrium**
  - Muscular
- **Perimetrium**
  - Serous membrane



# Uterine Ligaments

- **Uterus is supported in its midline position by:**
  - **Paired broad ligaments**
    - Double-fold of peritoneum that drape over the fallopian tubes, uterus, and ovaries
    - Contains the uterine blood vessels and nerves
  - **Round ligaments**
    - Fibrous cords that occur in front of and below the fallopian tubes between the layers of broad ligament
  - **Uterosacral ligaments**
    - Originate at the lateral uterine isthmus and extend downward along the sides of the rectum to the third and fourth bones of the sacrum
  - **Cardinal ligaments**
    - Continuation of the broad ligaments that extend across the pelvic floor laterally

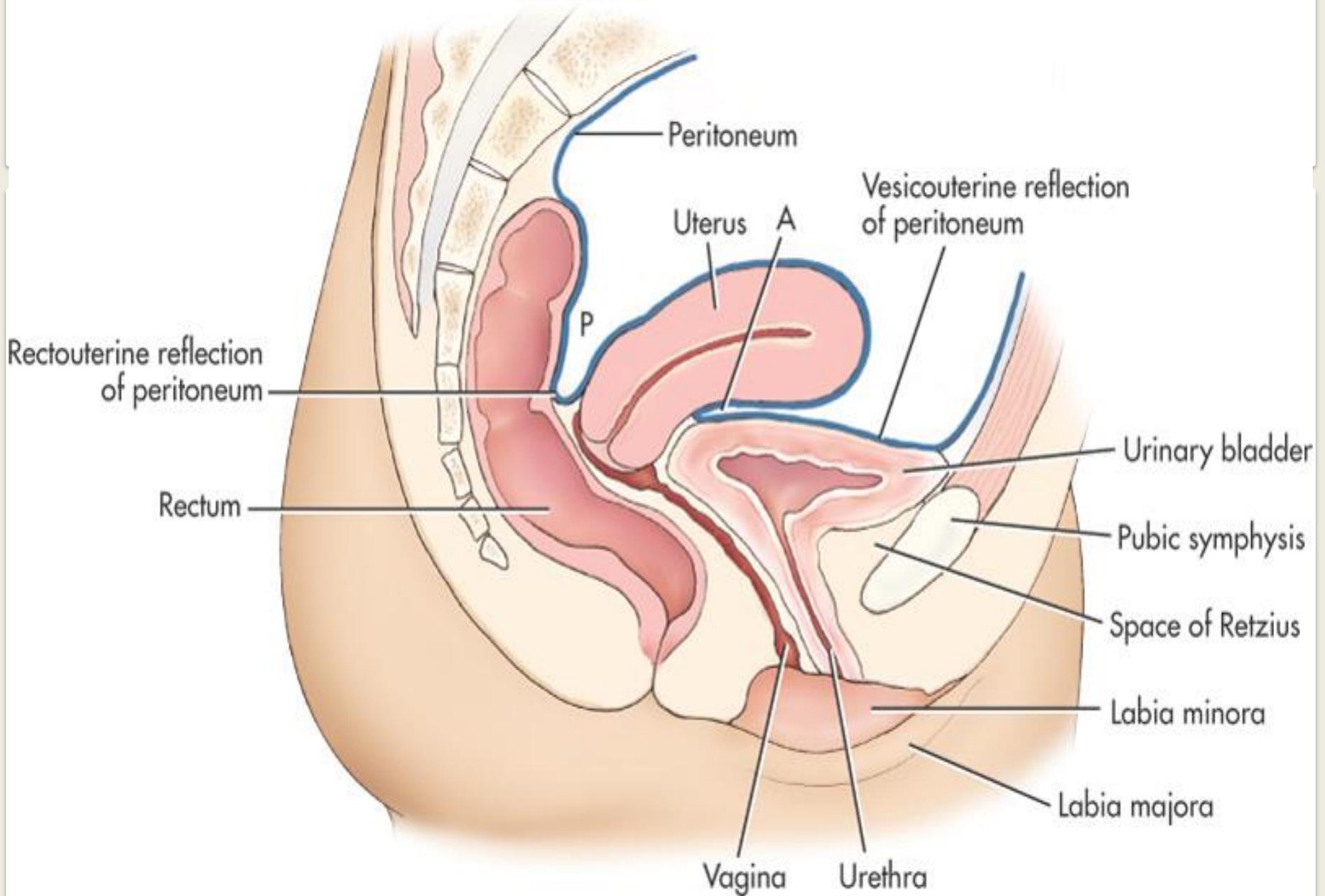
# Uterine Ligaments



**Figure 35-12** View of the pelvic cavity from above, looking inferiorly, showing the attachment of the round ligament and broad ligament to the uterus.

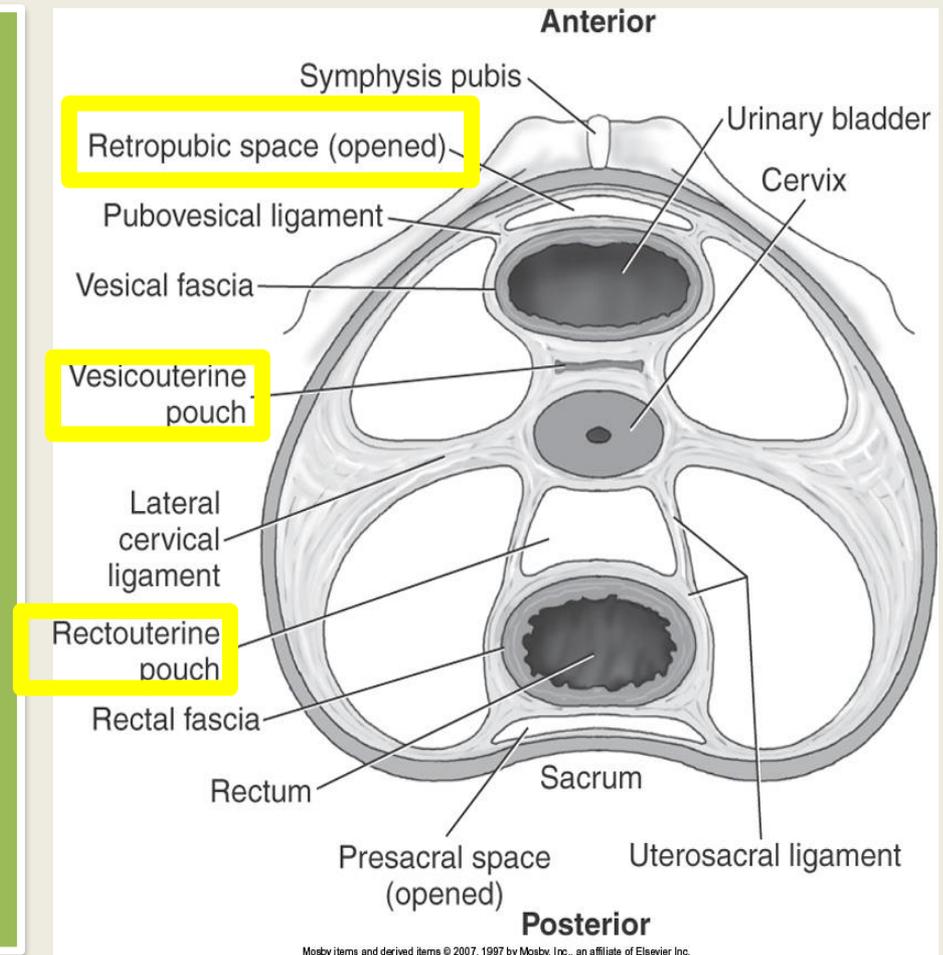
# Pelvic Spaces

- **Broad ligament divides pelvis into 2 pouches:**
  - **Anterior**
    - 1. Vesicouterine pouch (Anterior Cul de Sac)**
      - **Between uterus and posterior wall of bladder**
  - **Posterior**
    - 2. Retrouterine pouch (Posterior Cul de Sac)**
      - **“pouch of Douglas”**
      - **Between uterus and rectum**



# Pelvic Spaces (Continued)

- **3. Retropubic space**  
**(Space of Retzius)**  
– **Between pubic bones and bladder**



# Ovaries

- Paired, Almond-shaped
- Held in place by:
  - Ovarian ligament
    - Cord-like
    - Inferior aspect of ovary to lateral surface of uterus
  - Suspensory ligament
    - Superior aspect of ovary to lateral sides of pelvic wall
      - Contains ovarian vessels

# Ovaries

- **Responsible for:**
  - **Production of ova**
  - **Production/secretion of:**
    - **Estrogen**
      - **Maintain female characteristics and reproductive organs**
    - **Progesterone**
      - **Responsible for uterine changes in preparation of pregnancy**
        - » **Thickening of lining**
        - » **Decreasing contractions by uterine muscles**

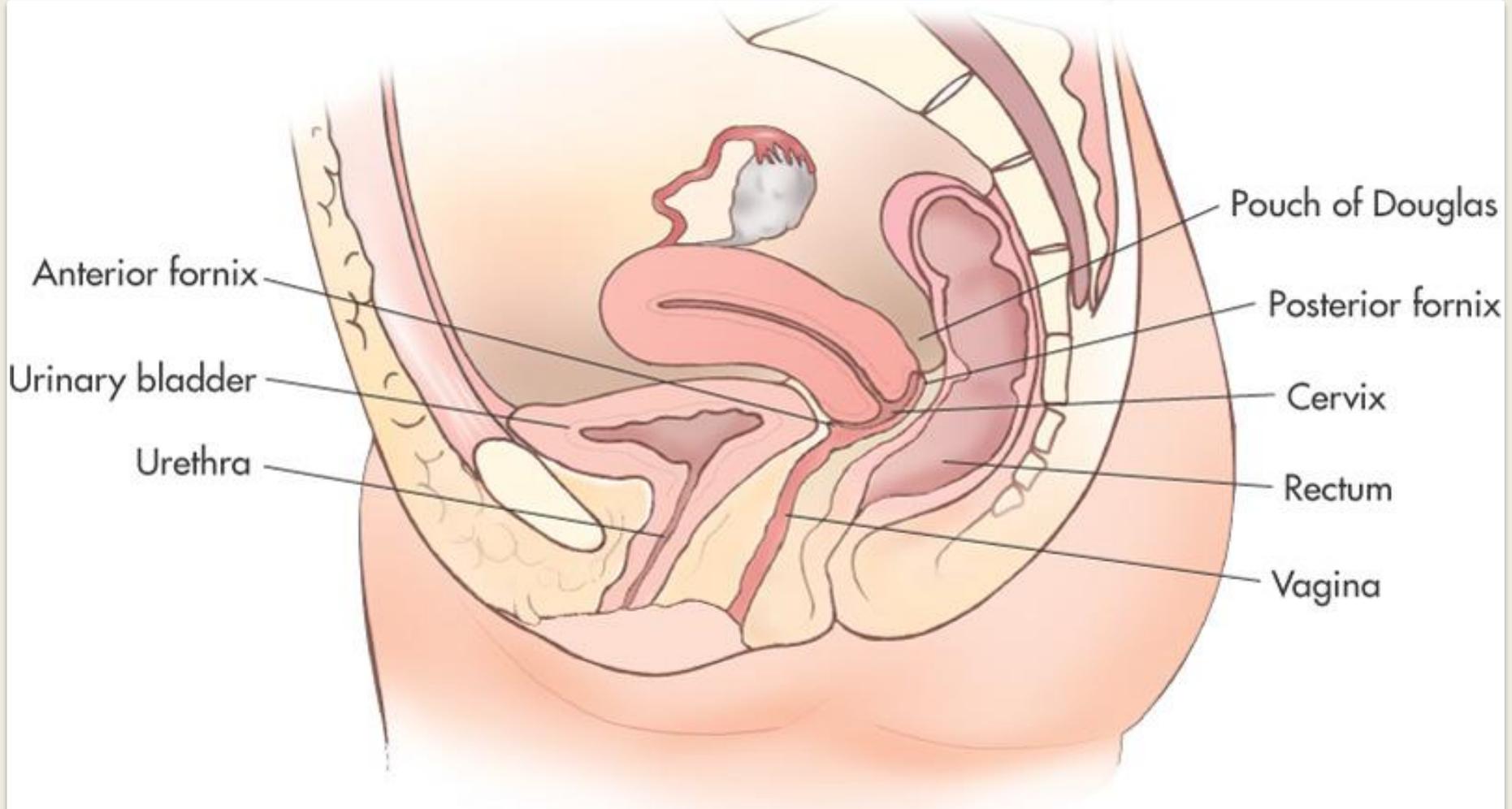
# Fallopian Tubes “Oviducts”

- Coiled, muscular tubes that open into the peritoneal cavity at lateral end (infundibulum)
- Supported by the broad ligament
- Lies above round ligament, tuboovarian vessels
- Length can vary
  - 10 to 12 cm in length, 1 to 4 mm in diameter
- Infundibulum
  - Funnel-shaped
  - “Fimbriae” – finger-like projections

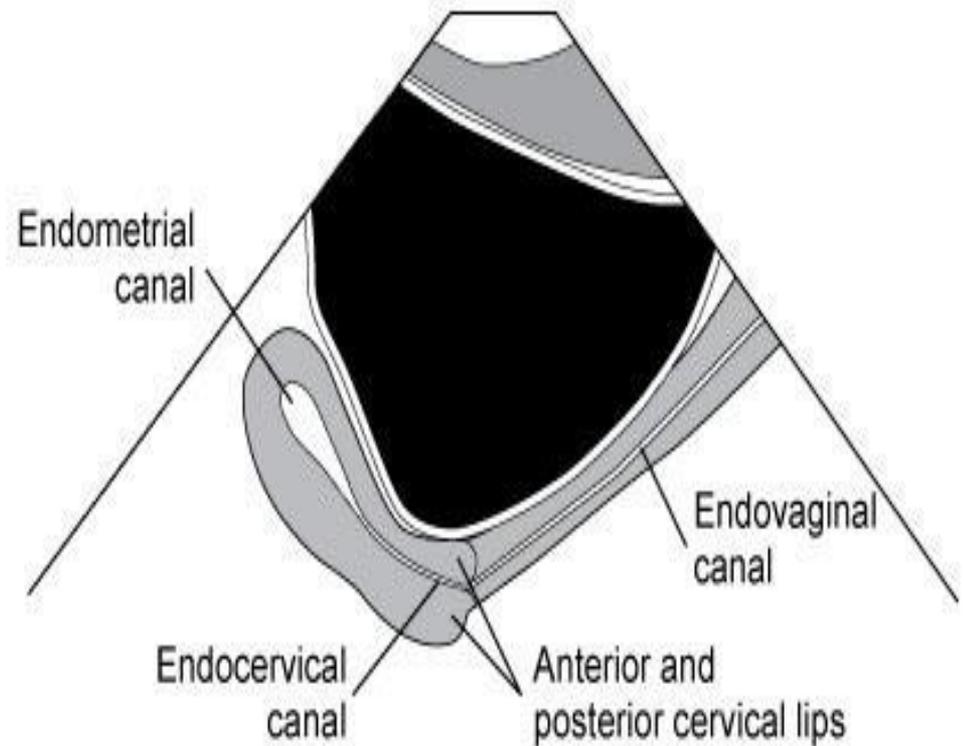
# Vagina

- Collapsed muscular tube that extends from the external genitalia to the cervix of the uterus
- Lies posterior to the urinary bladder and urethra, and anterior to the rectum
- 8-10 cm in length
- Vaginal Vault or fornix
  - Upper vaginal area surrounding the cervical os
  - Divided into anterior and posterior fornices

# Vagina

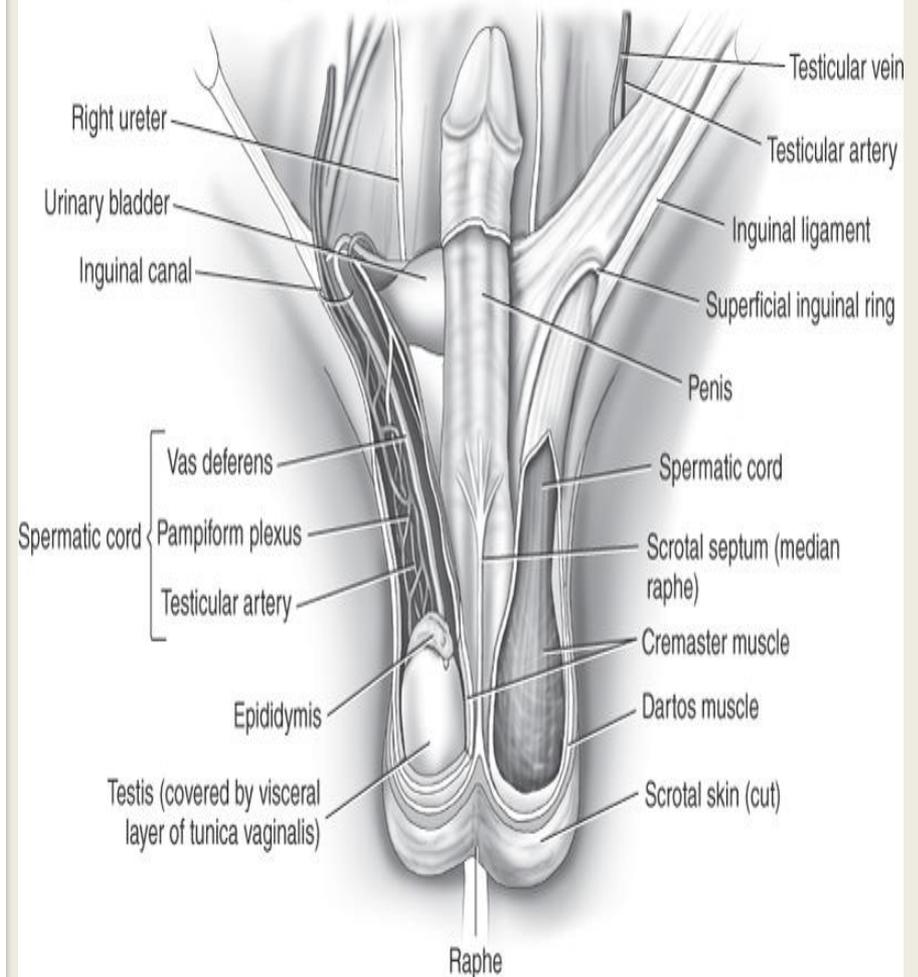


# Vagina



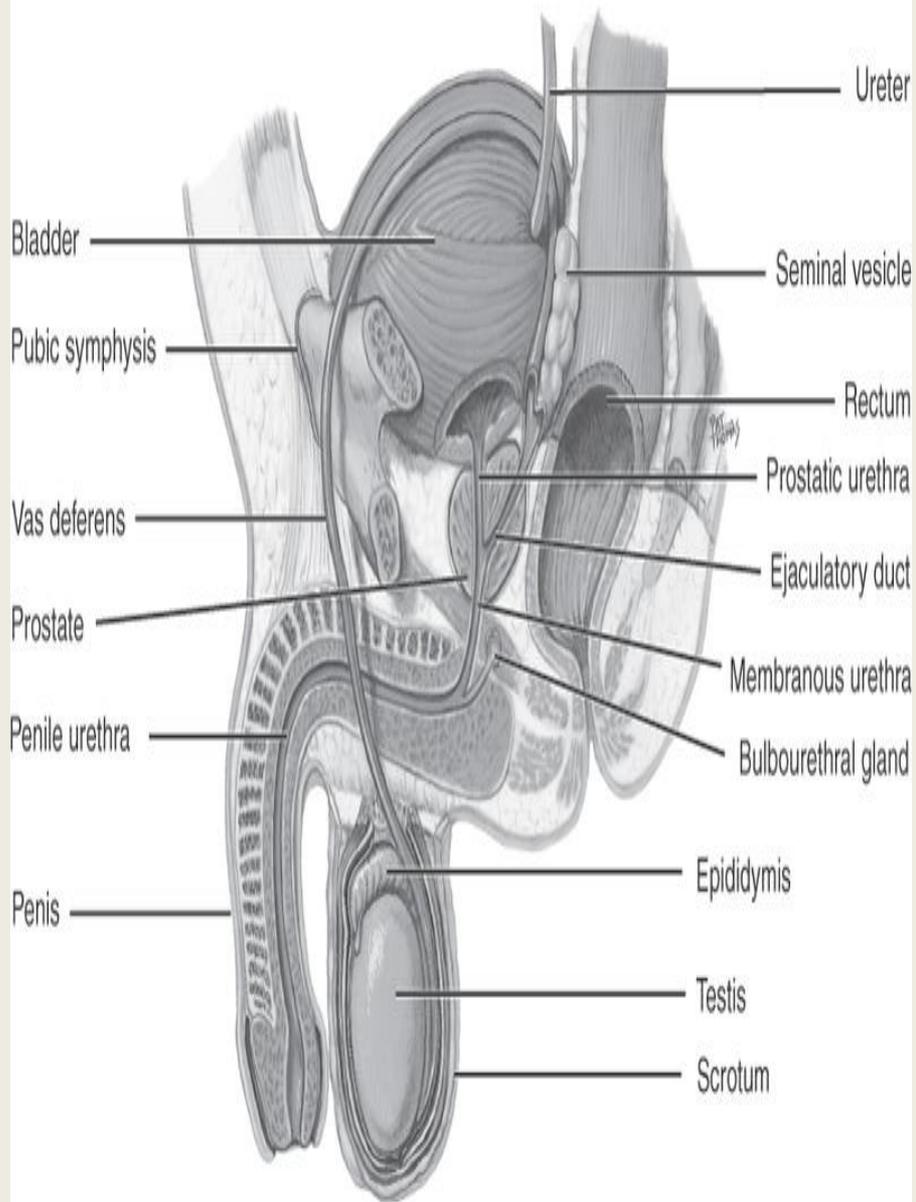
# Scrotum

- **Sac that contains:**
  - Testis, epididymis, segment of spermatic cord
- **Dartos tunica**
  - Connective tissue layer
  - Internally forms a septum that divides the scrotum into right and left compartments
  - “Median Raphe”

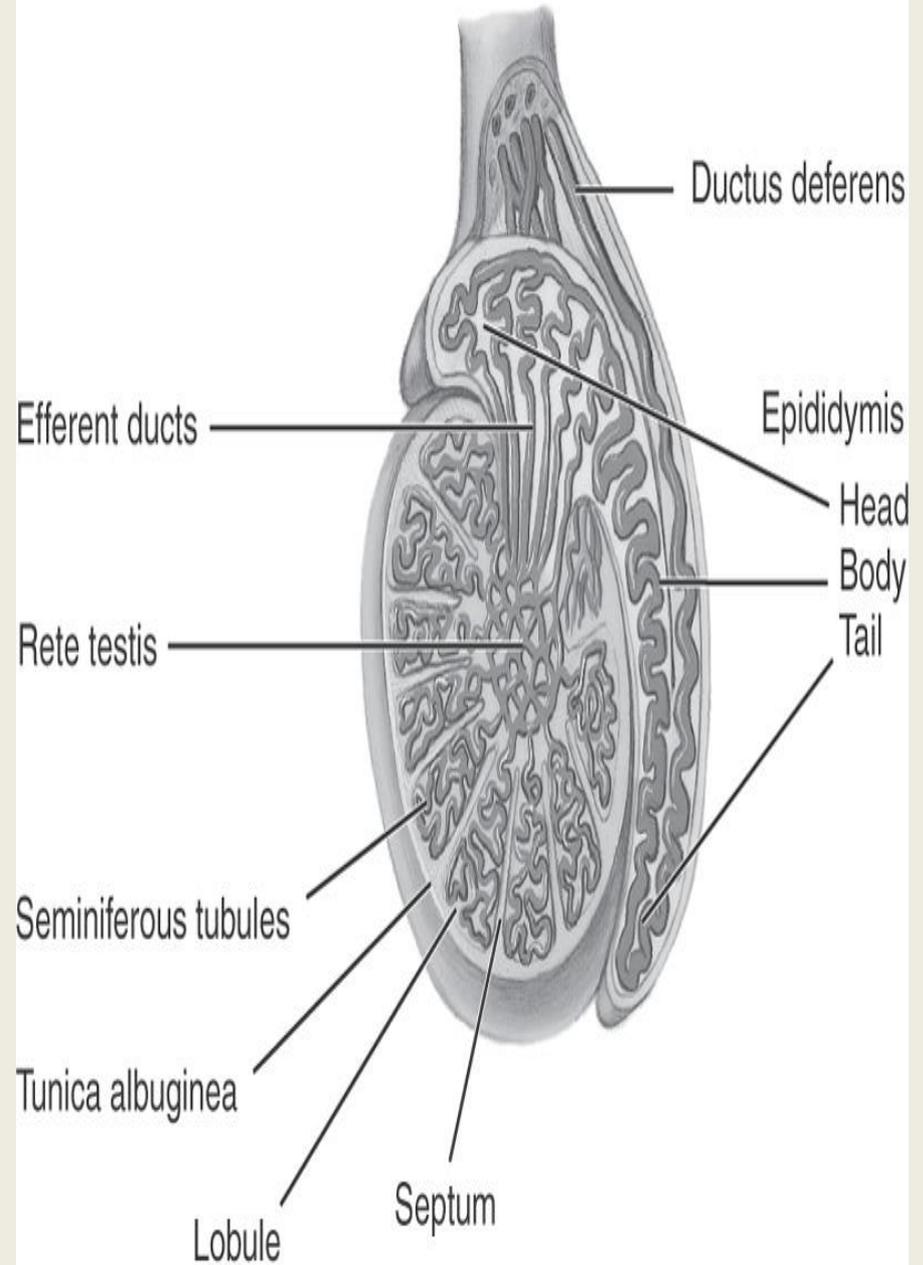


# Testes

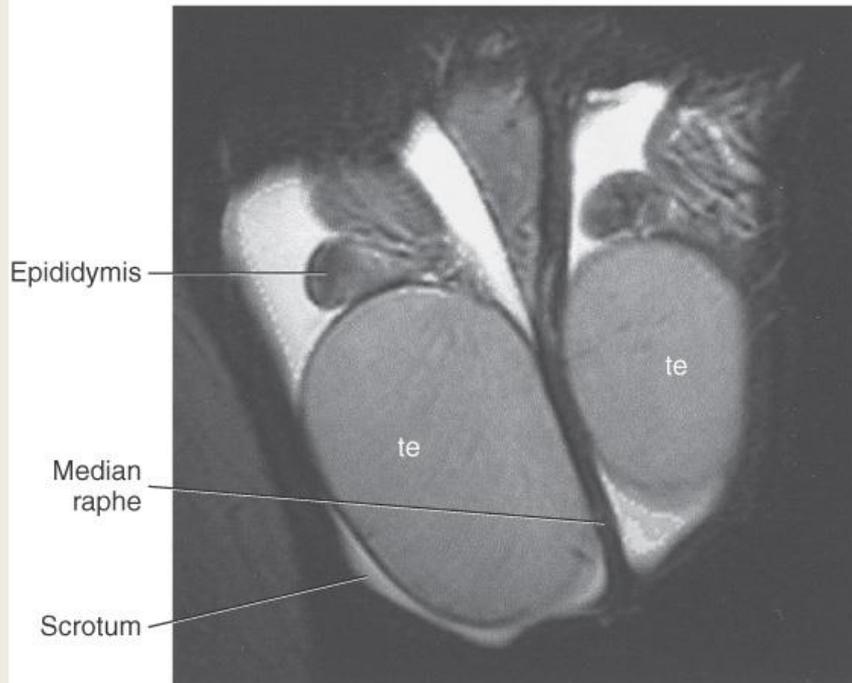
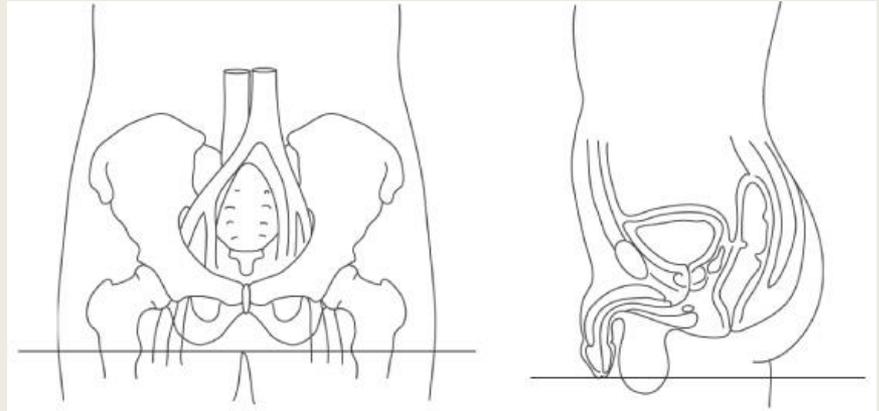
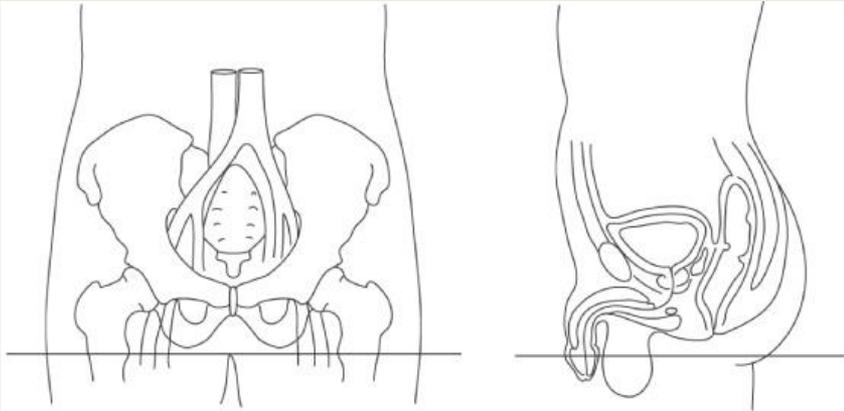
- **Symmetric, oval-shaped glands in the scrotum**
- **Outer fibrous covering**
  - **Tunica Albuginea**
    - This also projects into the teste to create wedge-shaped lobules
- **Each testis is divided into more than 250 to 400 conical lobules containing the seminiferous tubules**
- **These tubules converge at the apex of each lobule and anastomose to form the rete testis in the mediastinum**
- **Rete testis drains into the head of the epididymis**



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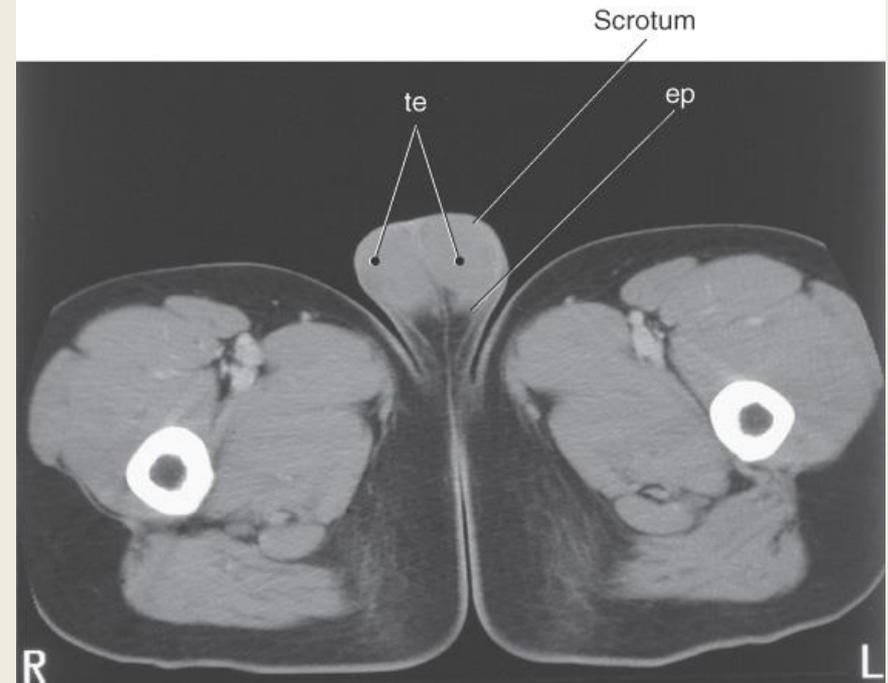


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**KEY: te, testes.**

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**KEY: te, testes; ep, epididymis.**

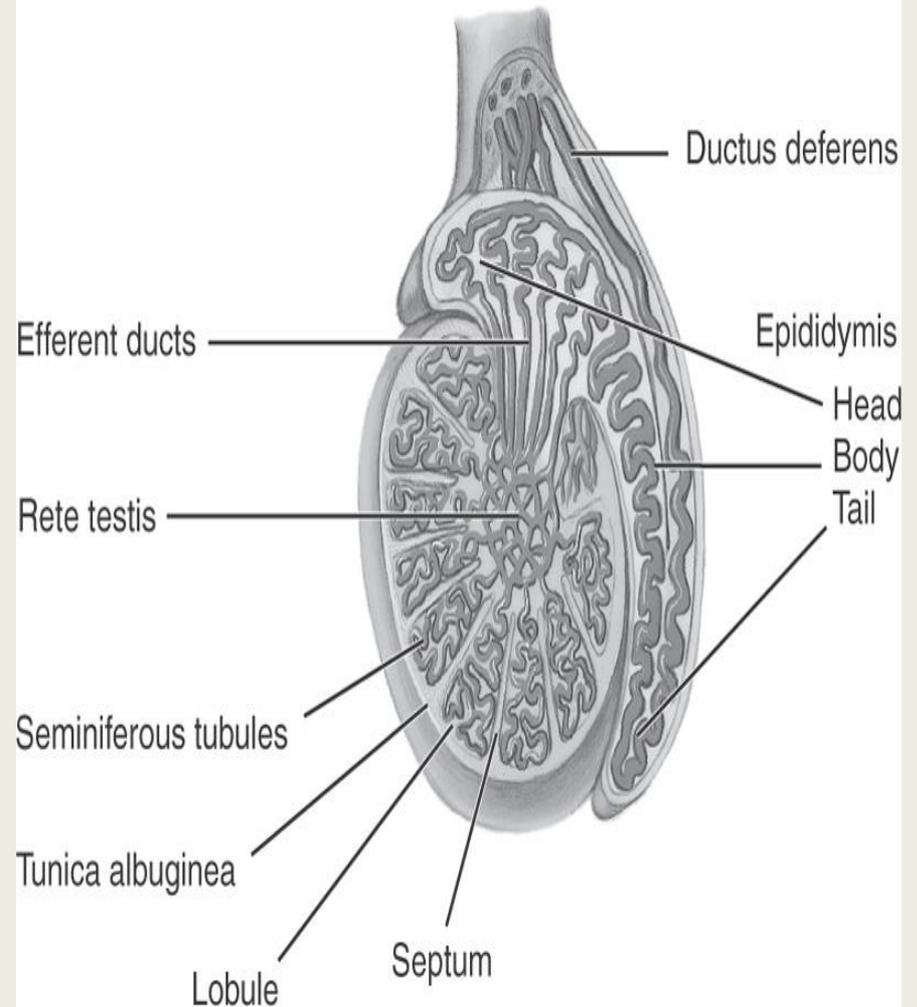
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# Testes

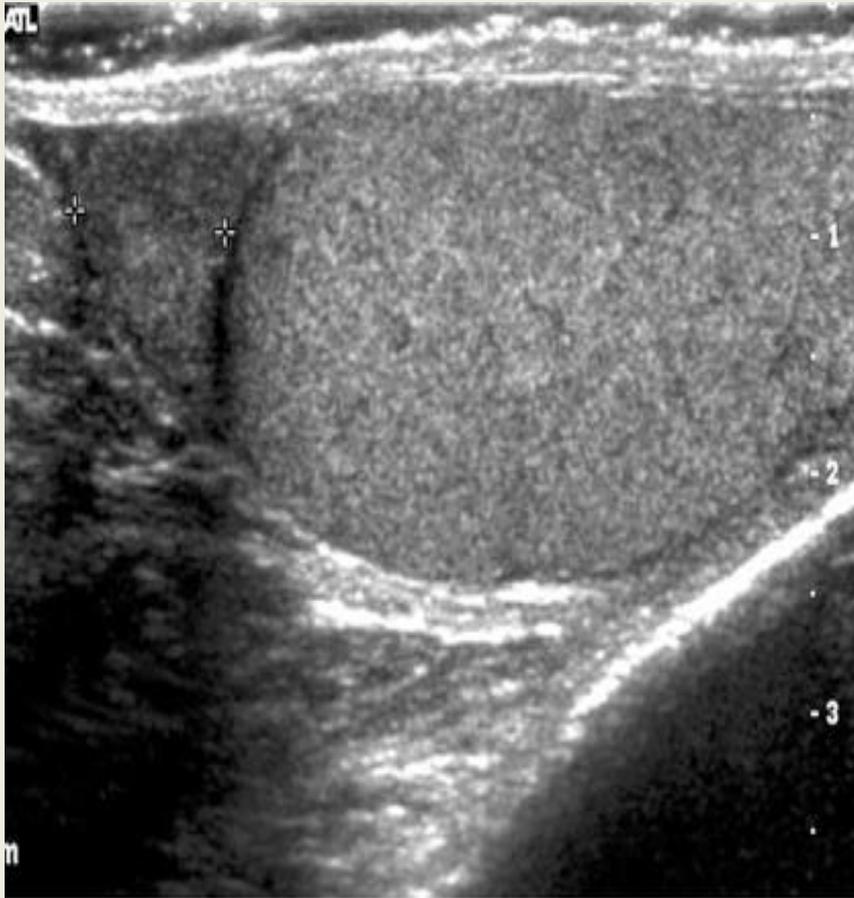


# Epididymis

- Coiled tubular structure
- Superoposterior surface of testis
- Divided into:
  - Head
    - On Upper pole
  - Body
    - Posterior surface of testis
  - Tail
    - Under lower pole



# Epididymis



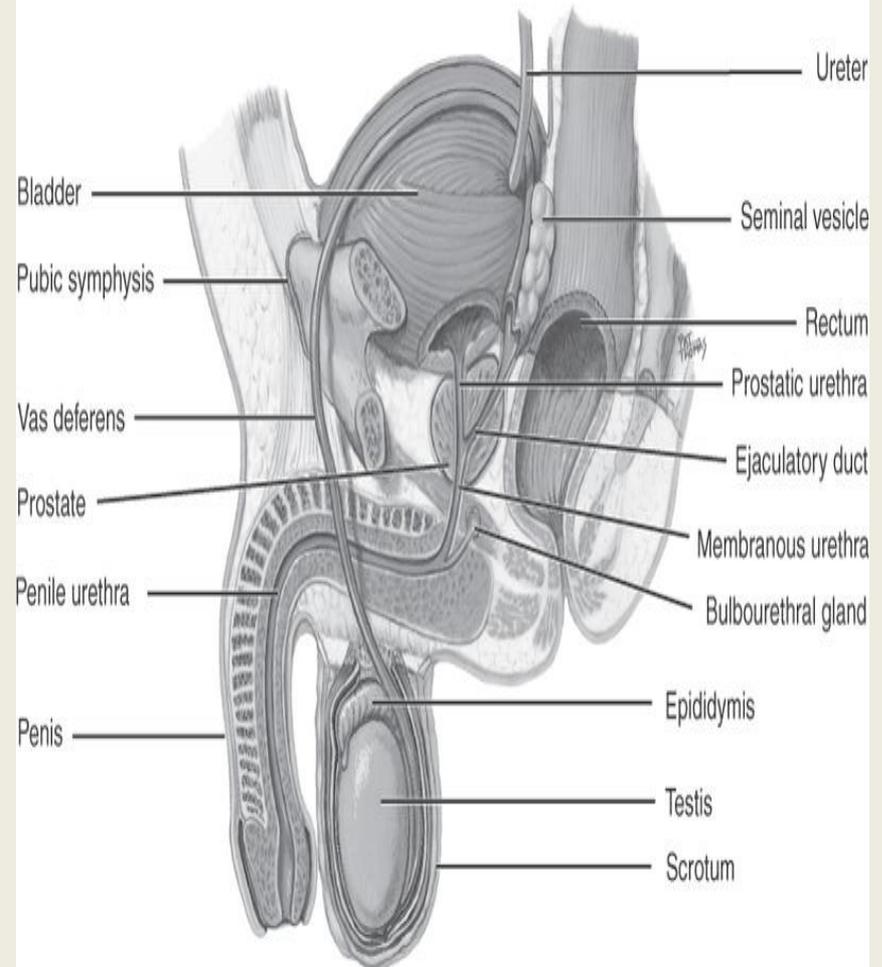
a.



b.

# Prostate

- Cone or chestnut shaped
- Located inferior to bladder
- Surrounds prostatic urethra
- Secretes alkaline fluid into the prostatic urethra by the prostatic ducts



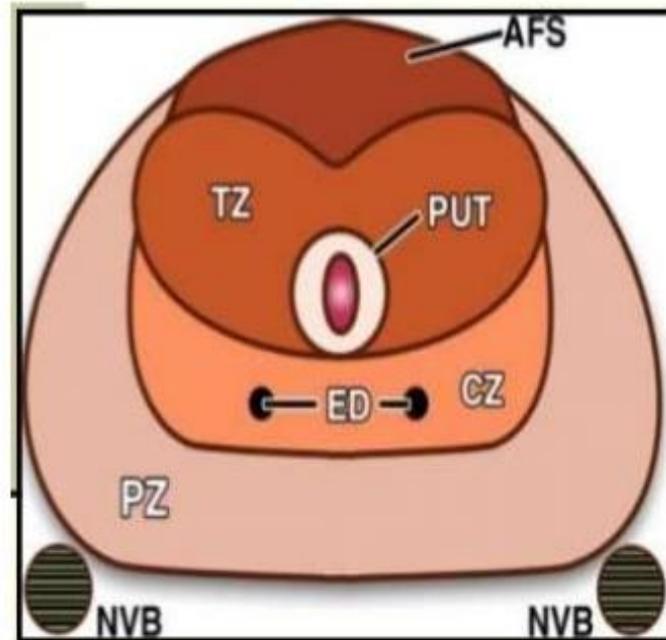
# Prostate

- **4 main regions or zones**
  - **Central**
  - **Peripheral**
  - **Transition**
  - **Periurethral**

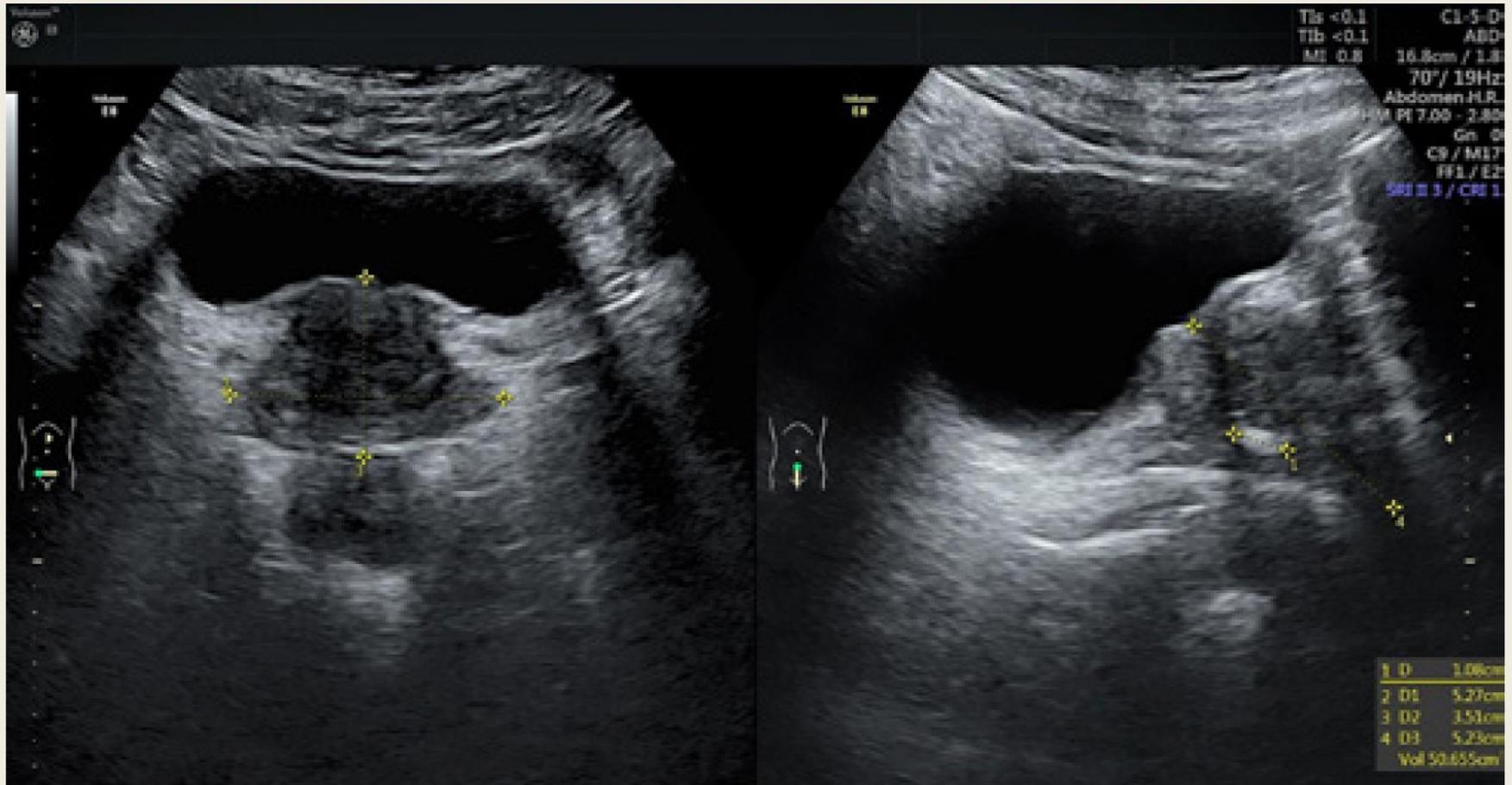
# Prostate

## Prostatic Zonal Anatomy

- There are four zones of the prostate :
  - ✓ the peripheral zone (PZ) ,
  - ✓ transition zone (TZ) ,
  - ✓ Central zone, and
  - ✓ anterior fibromuscular stroma zone.



# Prostate



# Prostate

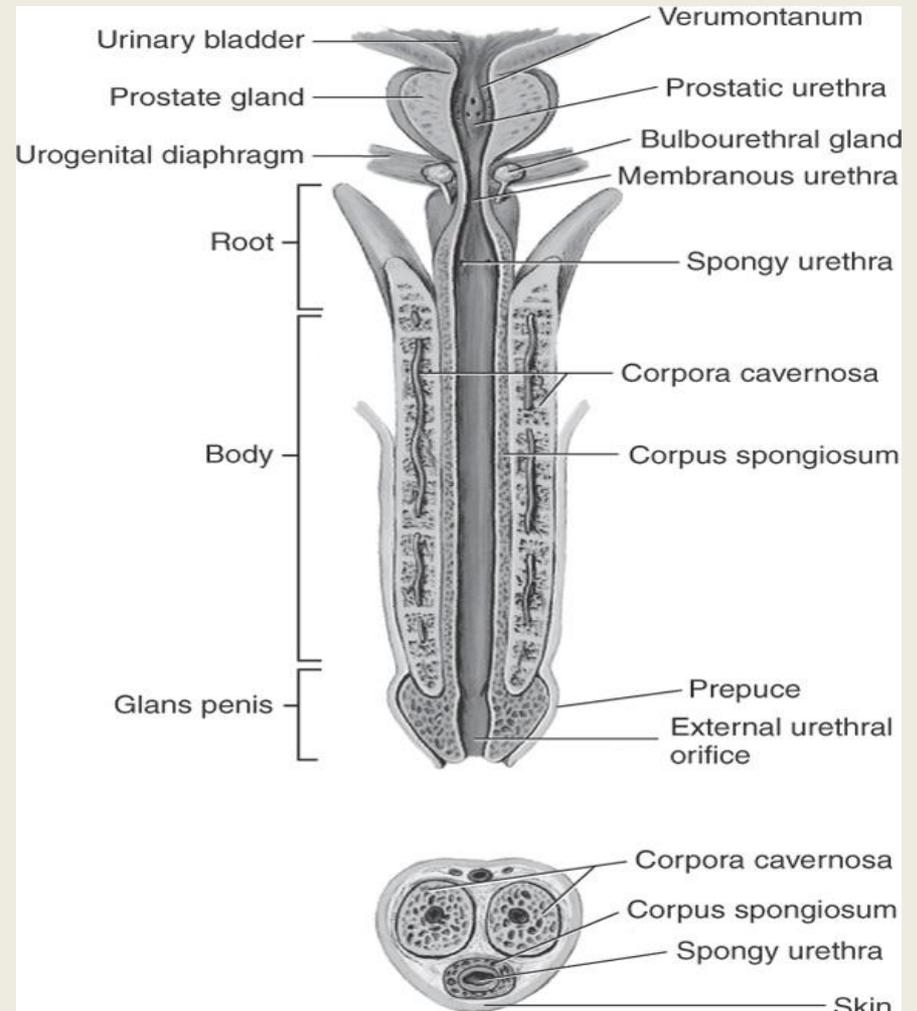


# Bulbourethral Glands (Cowper's glands)

- Two small glands
- Lie posterolateral to urethra in the urogenital diaphragm
- Secrete alkaline fluid into urethra
  - Acid environment is not optimal in sperm motility
  - Alkalinity aids in neutralization promoting maximum sperm motility

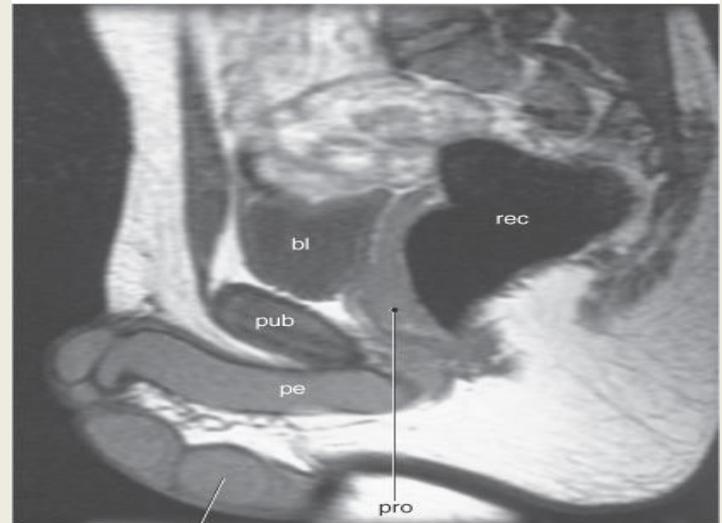
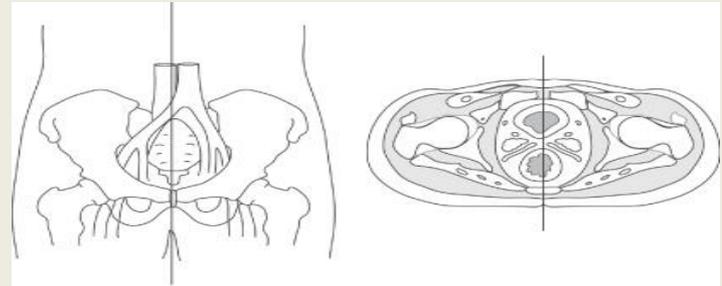
# Penis

- **Divided into:**
  - **Root**
    - Attached to pubic arch
  - **Body**
    - Remains free
- **Glans penis**
  - Distal end, surrounds the external urethral meatus



# Penis

- Corpora cavernosa x2
- Corpus spongiosum x1
  - Contains the urethra
- Tunica albuginea
  - Fibrous tissue bounds and separates 3 corpora
- Buck's fascia
  - Thick covering of skin enveloping the penis

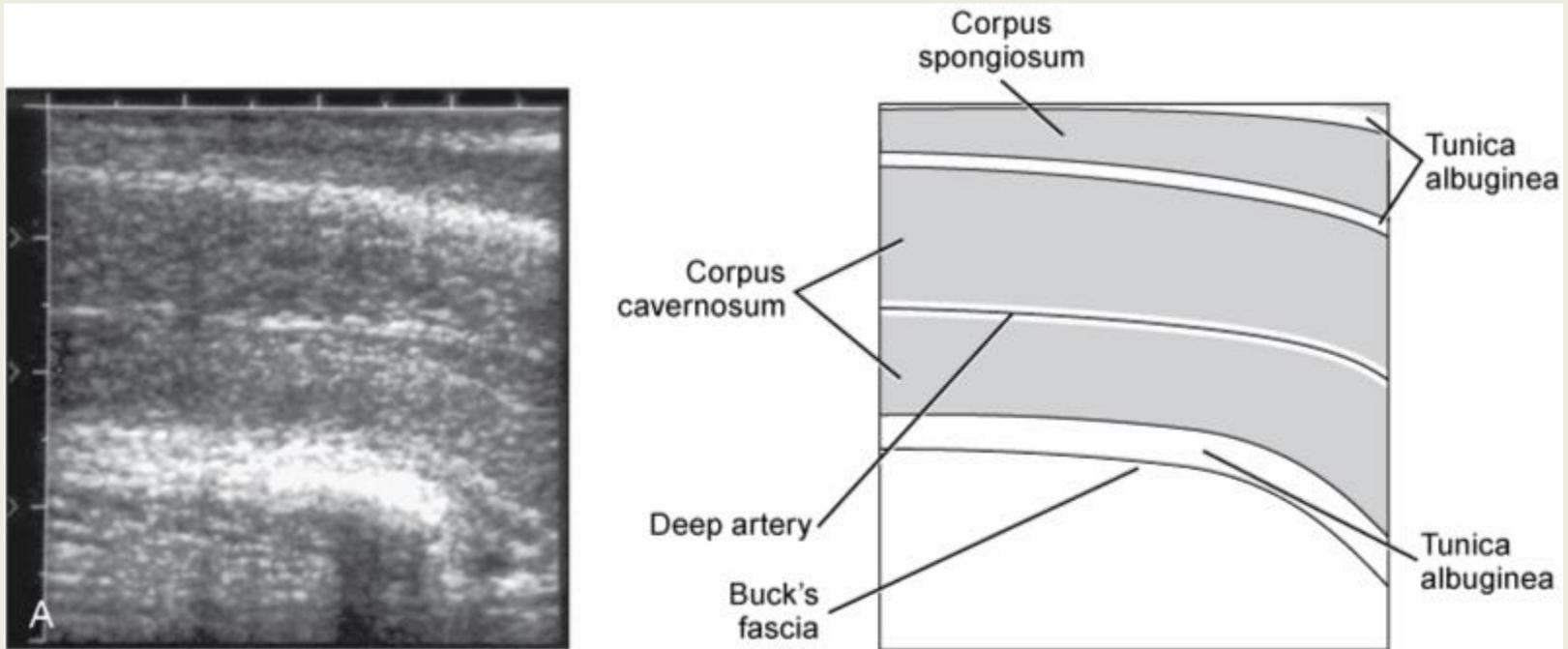


Testes

**KEY:** **bl**, Bladder; **rec**, rectum; **pub**, pubic symphysis; **pe**, penis; **pro**, prostate gland.

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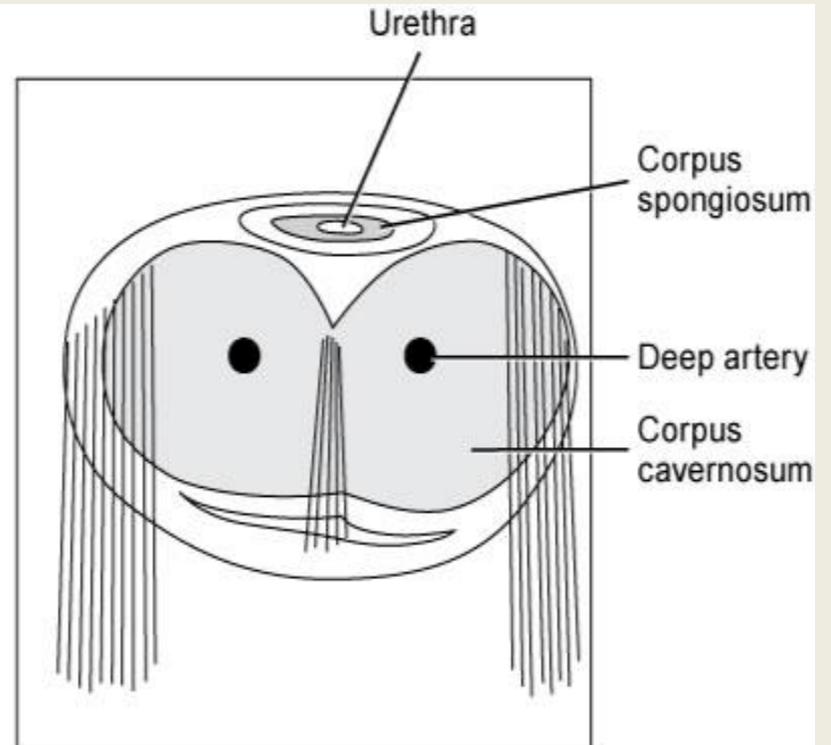
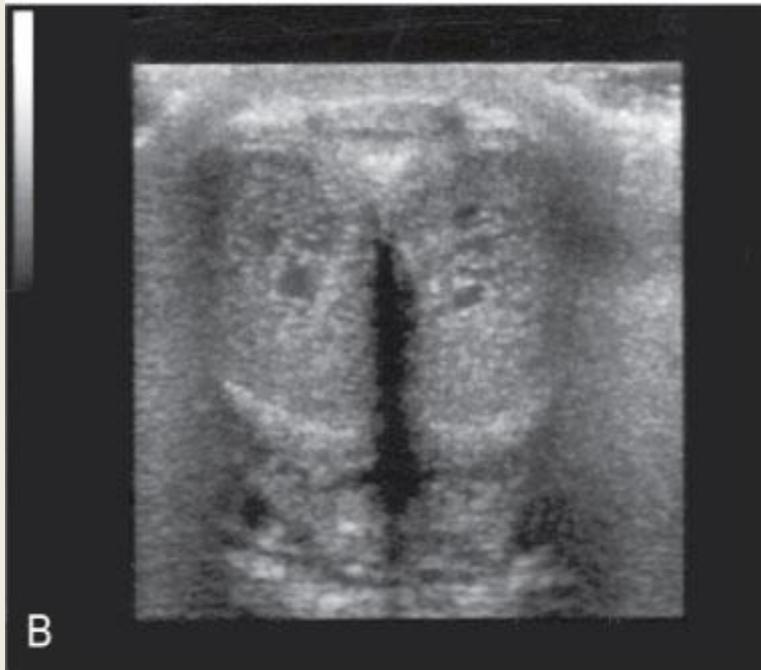
# Penis



Unn Fig. 14-81A. Representative longitudinal **(A)** and short axis **(B)** image sections of the penis.

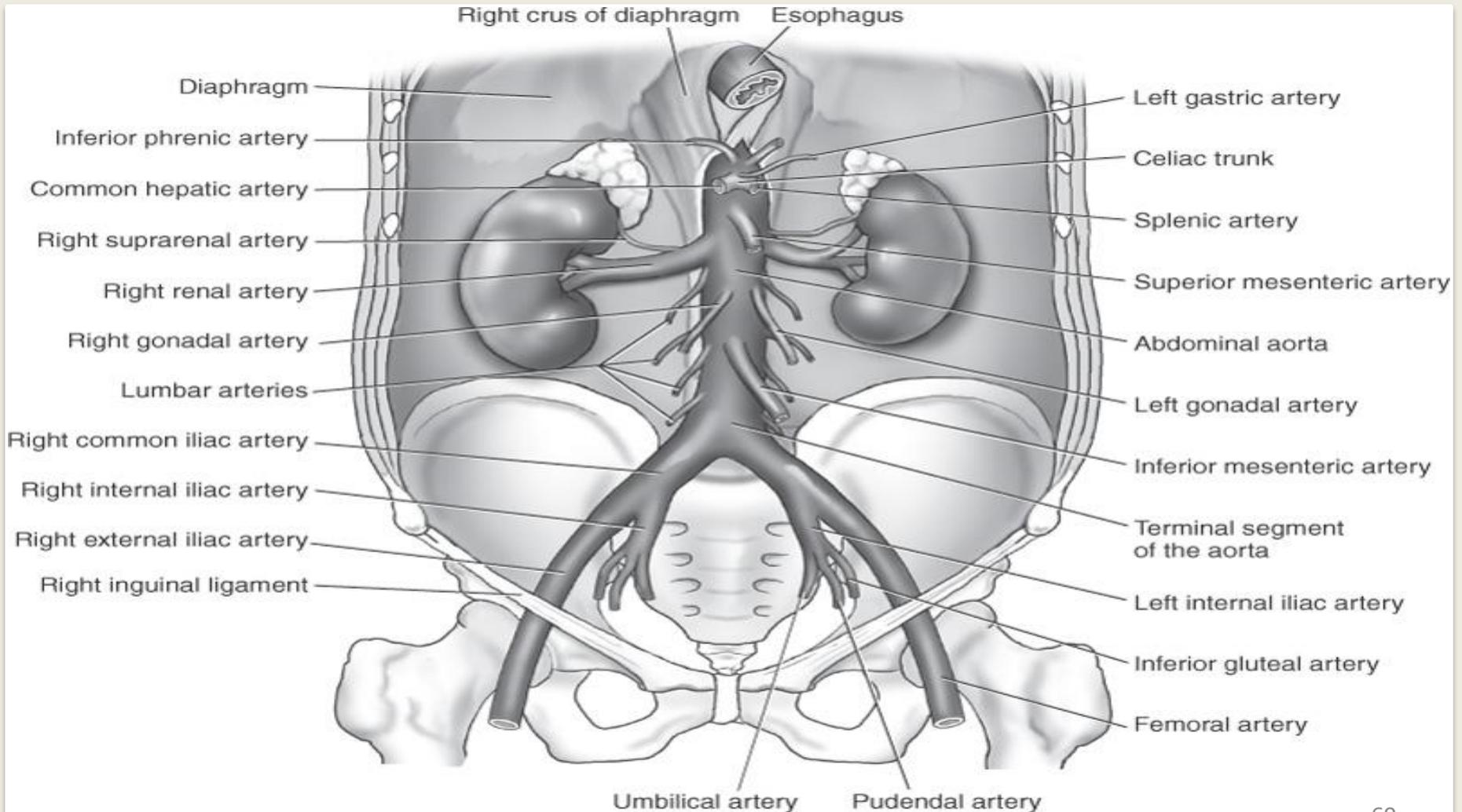
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# Penis



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# Arteries



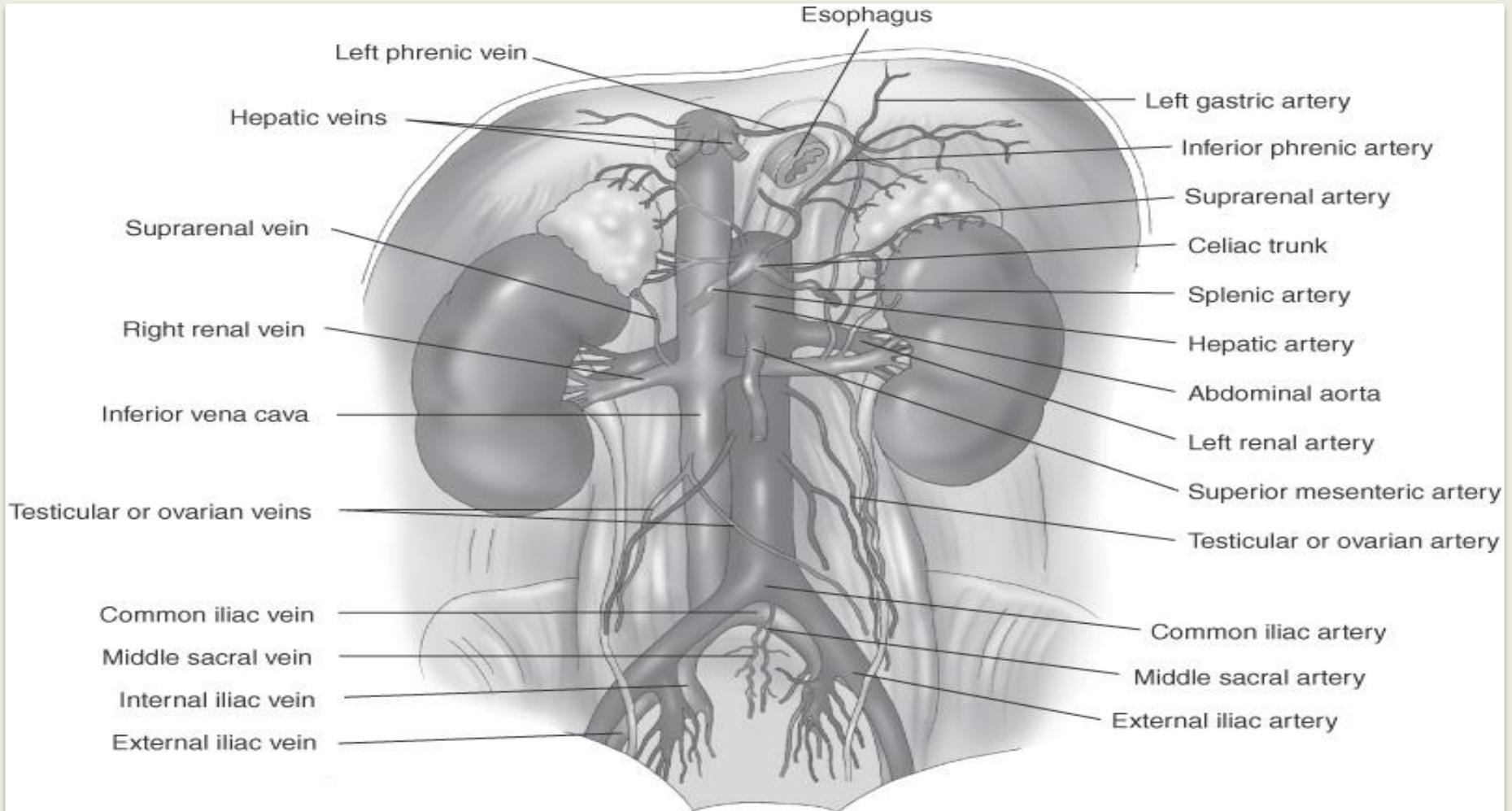
# Internal Iliac Arteries

- **Extend posteromedially into pelvis just medial to external iliac vein**
- **Branch into**
  - **Anterior trunk**
    - **Uterine, vaginal**
  - **Posterior trunk**
    - **Iliolumbar, lateral sacral**

# External Iliac Arteries

- **Does not enter the true pelvis**
- **Courses along the pelvic brim**
- **Exits iliac fossa**
- **Becomes the femoral artery**

# Veins



# Iliac Veins

## Internal Iliac Veins

- Mainly drains the pelvis
- Venous plexuses are formed by the veins in the pelvis and unite to drain into internal iliac vein

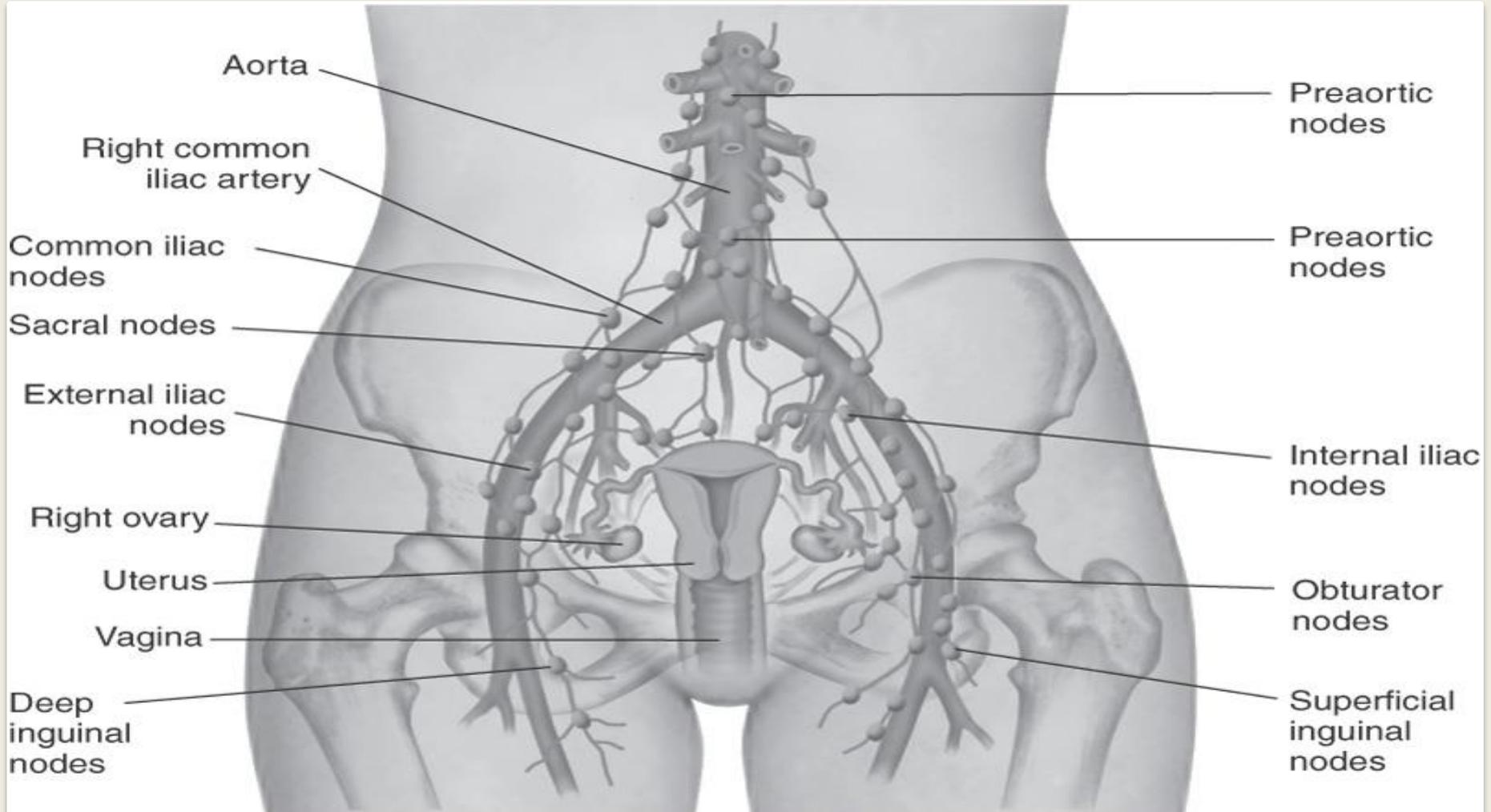
## External Iliac Veins

- Mainly drains the legs

# Lymph Nodes

- **Common iliac lymph nodes**
  - **Form two groups**
    - **Lateral common iliac group**
    - **Median common iliac group**
- **External iliac lymph nodes**
  - **Lie on external iliac vessels**
- **Internal iliac lymph nodes**
  - **Surround the internal iliac vessels and branches**

# Lymph Nodes



# Pelvis

