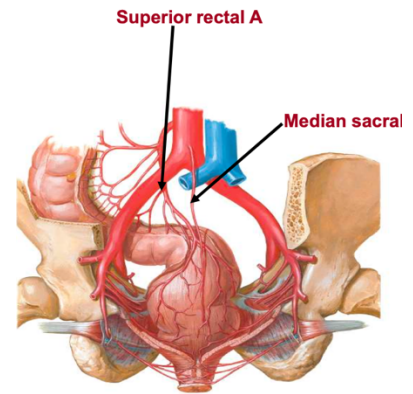


Anatomy of the pelvis II

4- Arteries Of The Pelvis

- This item includes;
 - Internal iliac artery
 - Other arteries:
 - Superior rectal artery (continuation of the inferior mesenteric)
 - Median sacral artery (from Aorta)
 - The two ovarian arteries (from Aorta)



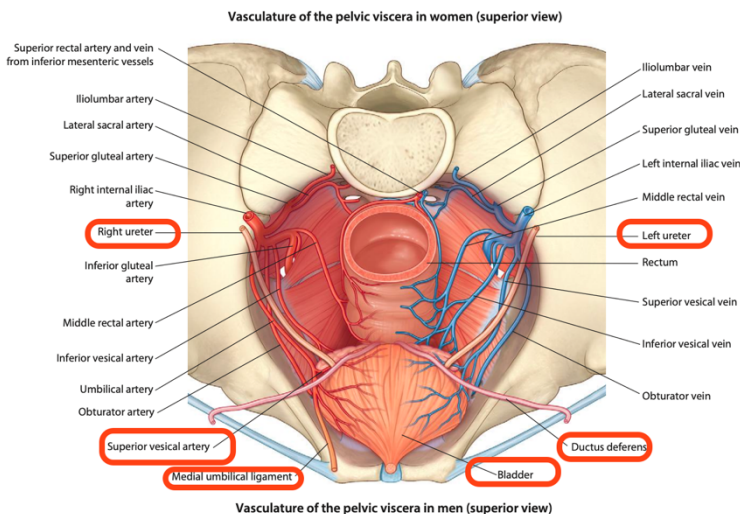
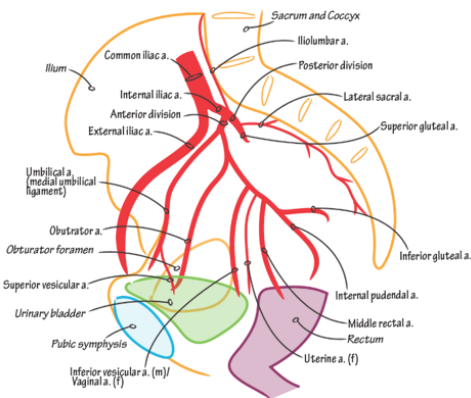
1. Internal Iliac Artery :

- a. **Beginning** : Opposite the lumbosacral disc
- b. **Termination** : Upper margin of greater sciatic foramen by dividing into anterior and posterior divisions
- c. **Branches of Internal Iliac Artery:**

i. Anterior Visceral branches:

1. Superior Vesical Artery (Obliterated Umbilical Artery)

- a. Was the umbilical artery in the fetus
- b. The **proximal part** is **patent (open)**
- c. Gives branches to:
 - i. Bladder
 - ii. Ureter
 - iii. Vas deference
- d. The **distal part is fibrosed** and forms medial umbilical ligament which forms the medial umbilical fold of peritoneum



2. Inferior Vesical Artery (or vaginal in females)

a. Supplies

- i. Base of urinary bladder
- ii. Seminal vesicle
- iii. Prostate

b. Gives artery of vas

- i. Runs in the spermatic cord
- ii. Anastomoses with testicular artery

c. In **females**: the vaginal artery supplies

- i. Base of the bladder
- ii. Gives vaginal branches which anastomoses with vaginal branches from uterine artery

3. Middle Rectal Artery

a. Supplies

- i. Musculosa of rectum
- ii. Seminal vesicles
- iii. Prostate in males
- iv. Vagina in females

b. Anastomoses with other rectal arteries

4. Uterine Artery (no corresponding branch in the male)

a. Runs medially on the upper surface of pelvic diaphragm

b. Ends by anastomosing with the ovarian artery

c. Supplies

- i. pelvic part of the ureter
- ii. vagina (azygos arteries)
- iii. cervix and of uterus
- iv. medial parts of the uterine tube

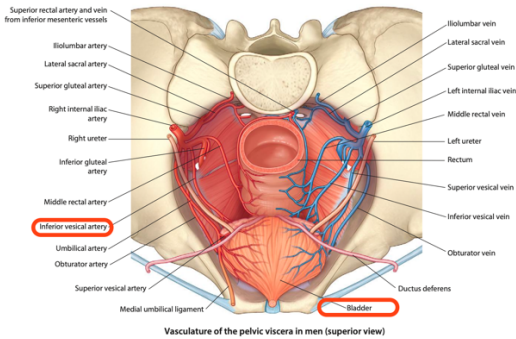
ii. **Anterior Parietal branches**

1. Obturator Artery

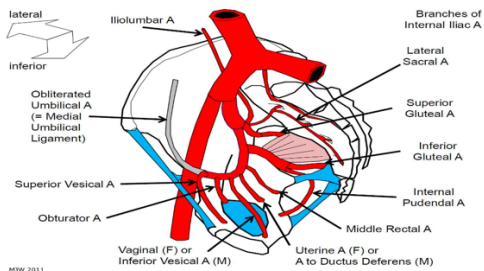
a. In the pelvis

b. Gives a pubic branch with anastomoses with the pubic branch of inferior epigastric artery on the posterior surface of the body of the pubis

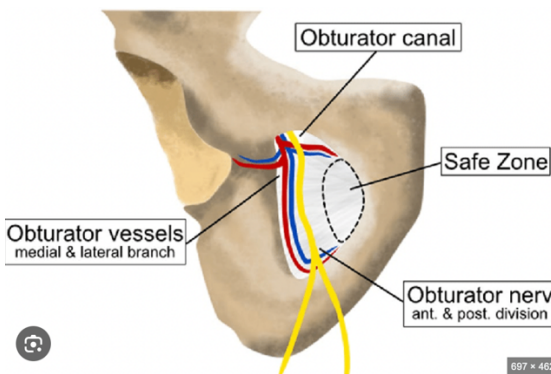
c. Enters the thigh through the obturator foramen



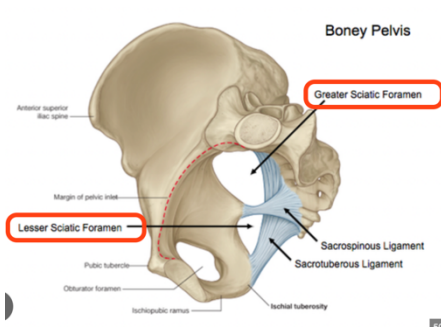
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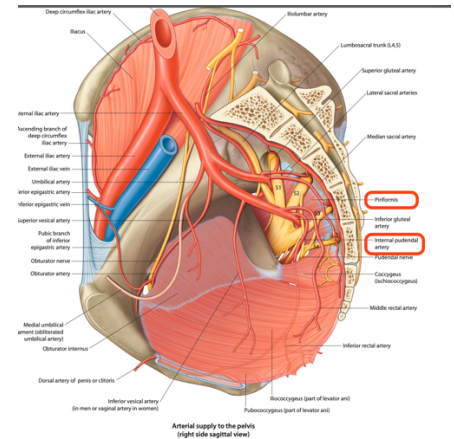


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2. Internal Pudendal Artery

- a. Leaves the pelvis through the greater sciatic foramen and enters the gluteal region below the piriformis muscle
- b. It then enters the perineum by passing through the lesser sciatic foramen and passes forward in the pudendal canal with the pudendal nerve

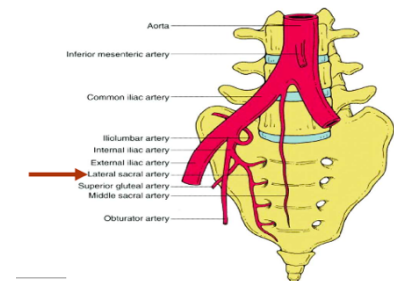
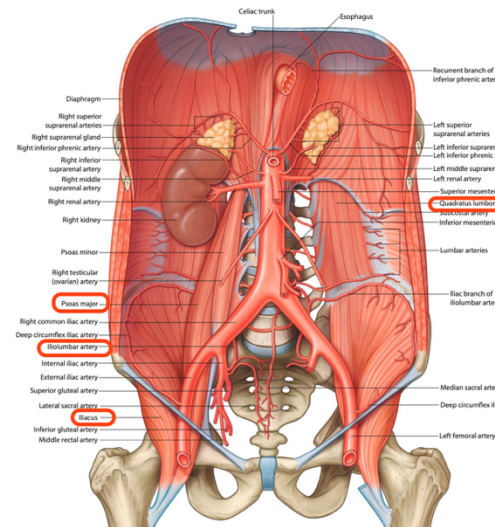
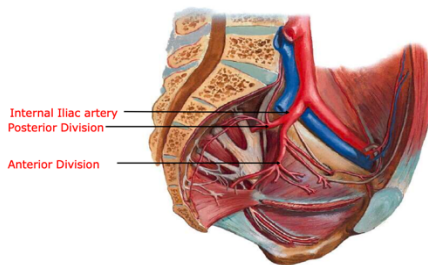


3. Inferior Gluteal Artery

iii. Posterior Division Parietal branches

1. Iliolumbar Artery - Muscular

- a. Divides into iliac + lumbar branches
- b. Supplies:
 - i. Psoas major
 - ii. Iliacus
 - iii. Quadratus lumborum



2. Two Lateral Sacral Arteries (superior, inferior)

- a. These are the arteries of sacral canal
- b. Enter the ventral sacral foramina to supply contents of sacral canal and then come through the dorsal sacral foramina to supply the overlying muscles

3. Superior Gluteal Artery

iv. Other Arteries in the pelvis

1. Superior Rectal Artery

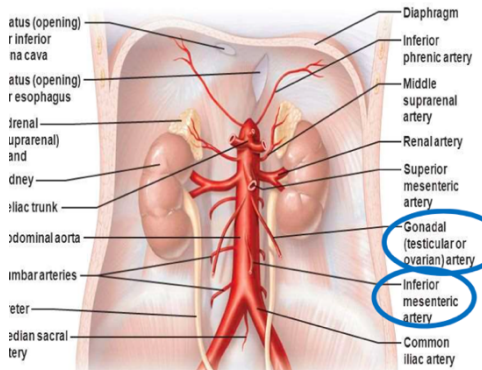
- a. Direct continuation of the inferior mesenteric artery as it crosses the left common iliac artery
- b. Supplies
 - i. Mucous membrane of the rectum
 - ii. Upper half of the anal canal

2. Ovarian Artery

- a. Arises from the abdominal part of the aorta at the level L2

3. Median Sacral Artery

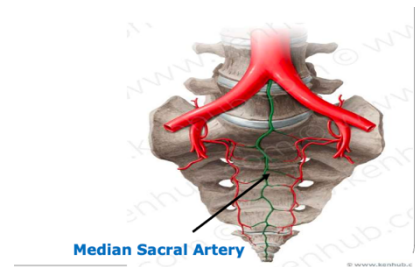
- a. Arises at the bifurcation of the aorta
- b. Descends over the anterior surface of the sacrum and coccyx



Major branches of the abdominal aorta.

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Figure 19.2

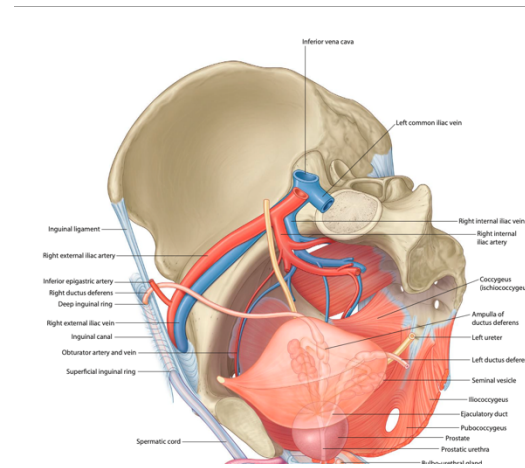


Branches of Internal Iliac Artery

Anterior Visceral branches	Anterior Parietal branches	Posterior division parietal branches
Superior vesical A.	Obturator A.	Iliolumbar A.
Inferior vesical A. <i>(OR vaginal in female)</i>	Internal pudendal A	Two lateral sacral arteries
Middle rectal A.	Inferior gluteal A.	Superior gluteal A.
Uterine A. <i>(has NO corresponding branch in the male)</i>		

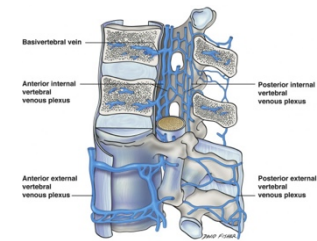
5-Venous drainage of the pelvis

- This is include
 - Internal iliac vein
 - Superior rectal
 - Median sacral
 - Ovarian veins



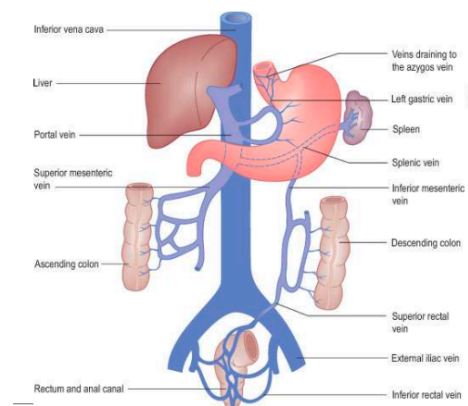
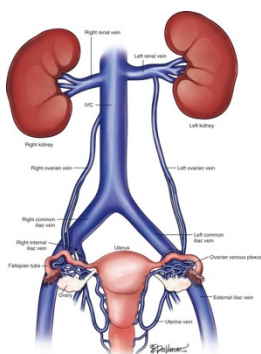
Internal Iliac Vein:

- It begins opposite the upper part of greater sciatic foramen
- It ends at pelvic brim by joining the external iliac vein to form the common iliac vein
- It receives veins similar to the branches of internal iliac artery except the **iliolumbar vein** which ends in the common iliac vein.
- The internal iliac veins drain blood from the **pelvic viscera** by means of visceral veins and drain blood from the **internal vertebral venous** plexuses by means of the valveless lateral sacral veins.
- Increase in the pelvic pressure (e.g. coughing & straining) may cause reflux of blood backwards up to the internal vertebral venous plexuses.
- In this way, primary tumors in pelvic viscera give rise to secondaries in the lumbar vertebrae



Other Veins in The Pelvis:

- 1. Superior rectal vein :
 - arises from the internal rectal venous plexus of rectum and ascends to become inferior mesenteric vein which joins splenic vein.
- 2. Median sacral vein :
 - begins in front of sacrum and ascends to join **left common iliac v.**
- 3. Ovarian veins:
 - The right joins I.V.C. and the left joins left renal vein



6- Nerves in The Pelvis

Somatic

1. Sacral plexus

- Sacral plexus is formed by union of lumbosacral trunk (part of L₄ and whole L₅) and S₁, S₂, S₃ and part of S₄ ventral rami
- The plexus lies between piriformis and parietal pelvic fascia.

Vessels Related To The Sacral Plexus:

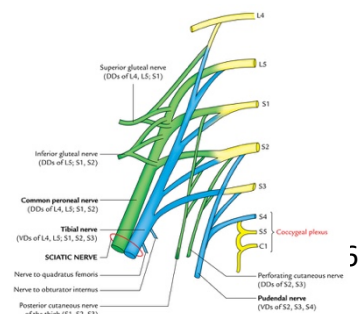
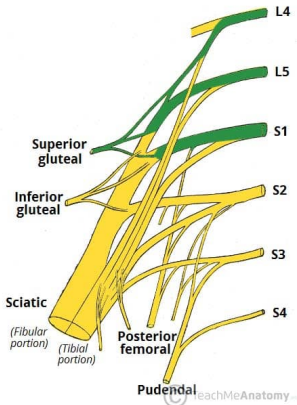
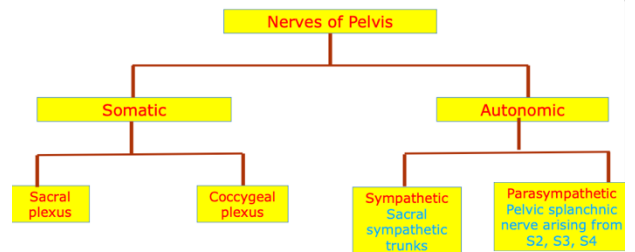
- Internal pudendal vessels descends in front of the plexus.
- The superior gluteal A. passes backwards between the lumbosacral trunk and S₁ ventral ramus.
- The inferior gluteal A. passes backwards between S₁, S₂ ventral rami

Branches Of The Sacral Plexus (pelvic branches)

- To levator ani and coccygeus .**
 - Perineal branch of the fourth sacral nerve**
 - Supplies external anal sphincter and perianal skin
 - Pelvic splanchnic nerves (S₂, S₃, S₄):**
 - It join inferior hypogastric plexus.
 - Pudendal N, (S₂, S₃, S₄):**
 - it is the somatic nerve of the perineum.
 - Perforating cutaneous nerve:**
 - Supplies skin of lower medial part of the buttock
- Pressure from the Fetal Head During the later stages of pregnancy, leads to compression of sacral plexus , the mother often complains of discomfort or aching pain extending down one of the lower limbs.

2. The Coccygeal Plexus

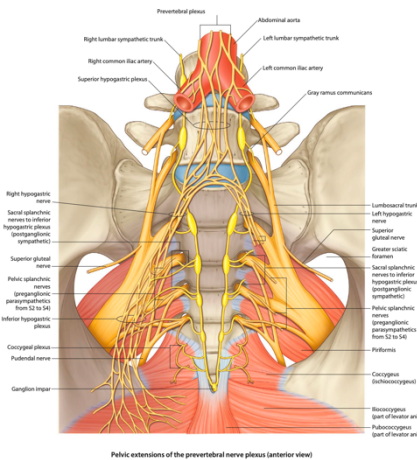
- It is formed by union of the inferior part of S₄ and whole S₅ and coccygeal ventral rami.
- **It gives**
 - **Anococcygeal nerves :**
 - supplies skin from coccyx to the anus.



Autonomic

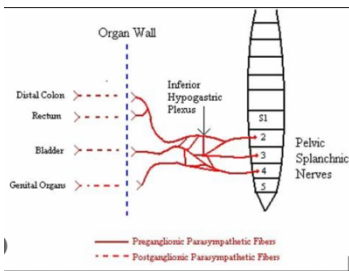
Sacral sympathetic trunk

- Is continuous above with the abdominal part at Common iliac vessels
- It runs down behind the rectum and on the front of the sacrum
- Has 4 or 5 ganglion
- The two trunks unite in front of the coccyx to form **ganglion impar**
- Branches

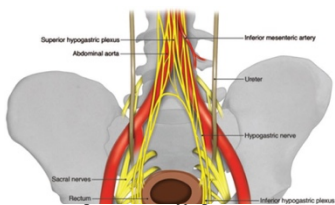


- **Grey rami communicantes :**
 - Join the sacral, coccygeal nerves for distribution to the blood vessels, sweat glands and erector pilae muscles.
- **Visceral branches :**
 - Join inferior hypogastric plexus

Pelvic Splanchnic Nerves

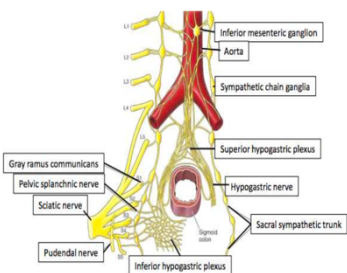


- It forms the parasympathetic part of the autonomic nervous system in the pelvis.
- The preganglionic fibers arise from the 2nd, 3rd and 4th sacral nerves
- It synapses in ganglia in the **inferior hypogastric plexus** or in the **walls of the viscera**.
- Some of the parasympathetic fibers supplies large intestine from the left colic flexure to the upper half of the anal canal via inferior mesenteric plexus`



Superior Hypogastric Plexus

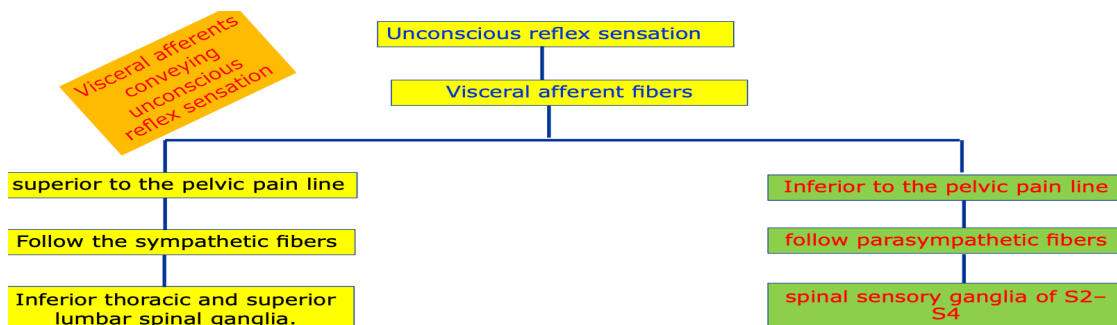
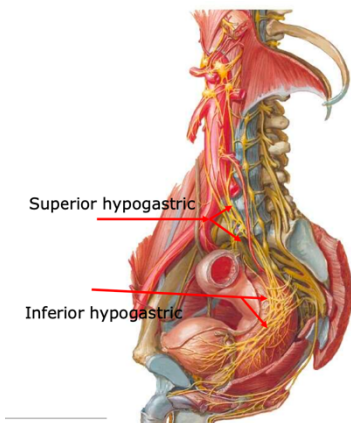
- **Location :**
 - It is situated in front of the promontory of the sacrum .
 - It is formed as a continuation of the aortic plexus and from branches of the 3rd and 4th lumbar sympathetic ganglia.



- It contains sympathetic and sacral parasympathetic nerve fibers and visceral afferent nerve fibers.
- It divides inferiorly to form the **right and left hypogastric nerves**

Inferior hypogastric plexus

- **Location :**
 - Lie medial to internal iliac vessels and lateral to rectum
- **Contributions:**
 - **1- Parasympathetic contribution**
 - Pelvic splanchnic nerves (S2, S3, S4).
 - **2- Sympathetic contribution**
 - Is derived mainly from
 - superior hypogastric plexus
 - sacral sympathetic chain
- **Distribution :**
 - The branches of the plexus reach the viscera along the branches of internal iliac artery as follows:-
 - **A.Branches (parasympathetic)**
 - ascend to join inferior mesenteric plexus to supply hindgut.
 - **B. Autonomic branches to pelvic viscera and perineal organs:**
 - 1. Rectum, anal canal and internal anal sphincter.
 - 2. Urinary bladder and internal urethral sphincter.
 - 3. Male genitalia:
 - Prostate, seminal vesicles, and ejaculatory ducts (for ejaculation).
 - Corpora cavernosa, corpus spongiosum (for erection).
 - **N.B- Ejaculation depends upon the sympathetic while erection depends upon the parasympathetic innervation.**
 - 4- Female genitalia
 - Uterus, medial part of uterine tube.
 - Vagina, erectile tissue of vestibular bulbs and clitoris



Superior to the pelvic pain line :

structures in contact with the peritoneum, except for the distal sigmoid colon and rectum

Inferior to the pelvic pain line

structures that do not contact the peritoneum plus the distal sigmoid colon and rectum

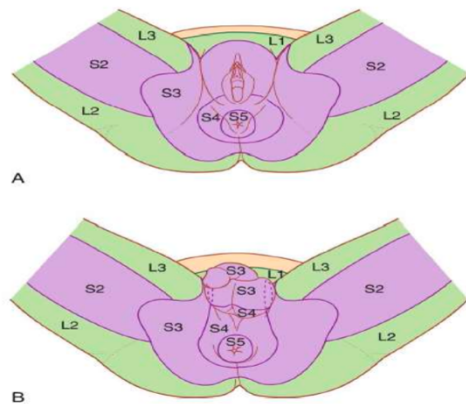
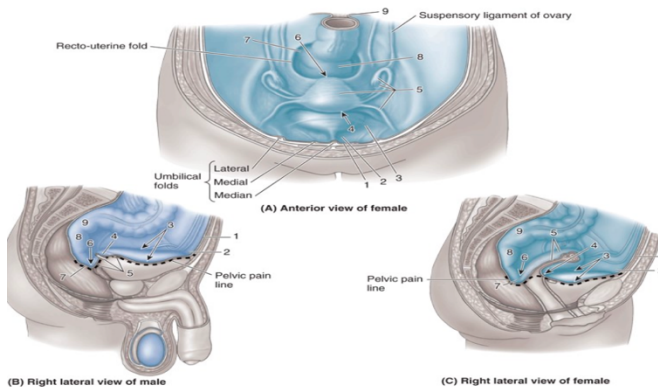
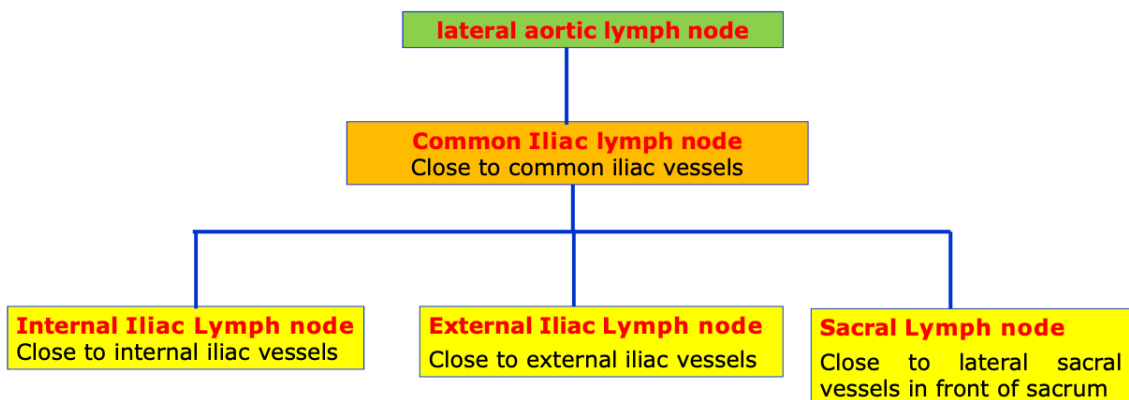
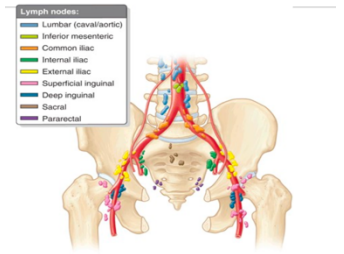


Fig. 5.14 Dermatomes of the perineum. A. In women. B. In men.

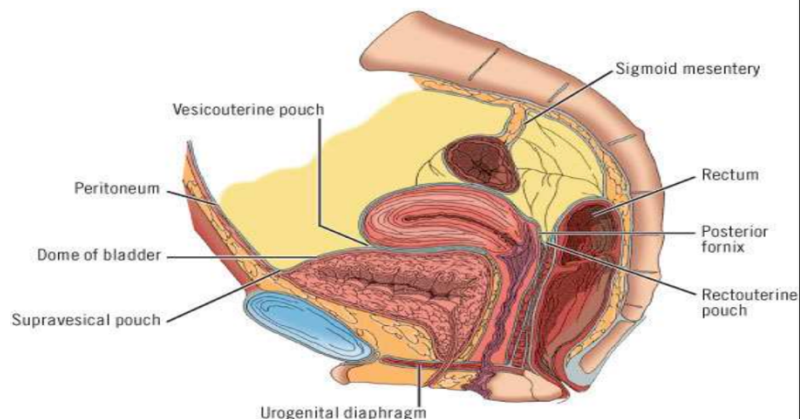
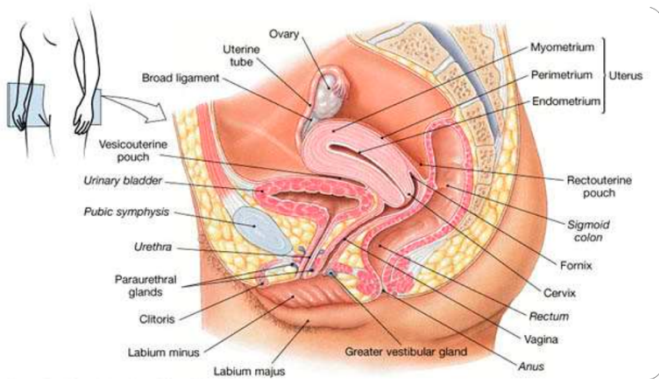
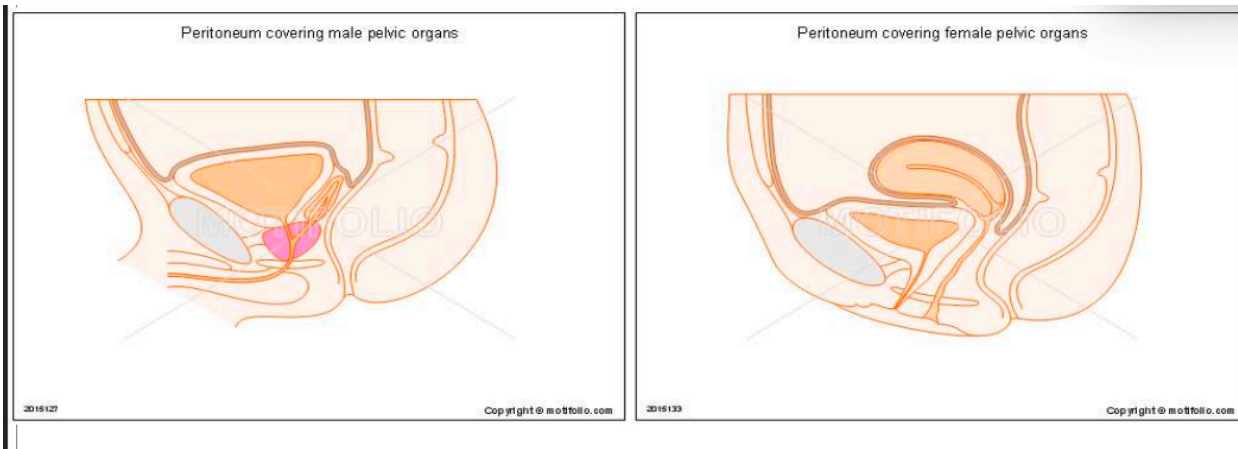
7-Lymph Drainage of the Pelvis

- The lymph drainage of pelvic viscera and deep perineum returns to 3 groups of lymph nodes :
 - 2 main groups :
 - internal iliac lymph nodes
 - external iliac lymph nodes
 - one subsidiary :
 - sacral lymph nodes.
- The final lymph nodes for these 3 groups is the common iliac lymph nodes.
- Some of pelvic viscera drain directly to the lateral aortic lymph nodes as ovaries, uterine tubes and fundus of the uterus



8- Peritoneum of The Pelvis

- The peritoneum forms the sigmoid mesocolon, and cover front and, sides of the upper 1/3 of rectum, front only of the middle 1/3 of the rectum.
- **2- In the male:**
 - the peritoneum cover upper part of the fundus and upper surface of urinary bladder and then is reflected on to the anterior abdominal wall.
 - The pouch, so formed, is called **rectovesical pouch**.
- **3-In the female:**
 - the peritoneum is reflected on to the upper part of posterior vaginal wall, forming **recto-vaginal pouch (pouch of Douglas)**
- 4- It covers upper surface of uterus, inferior surface of uterus down to level of internal os, then reflected on to upper surface of the urinary bladder, forming **uterovesical pouch**, then to anterior abdominal wall.
-



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