FEMALE REPRODUCTIVE SYSTEM

Dr. Priti Acharya

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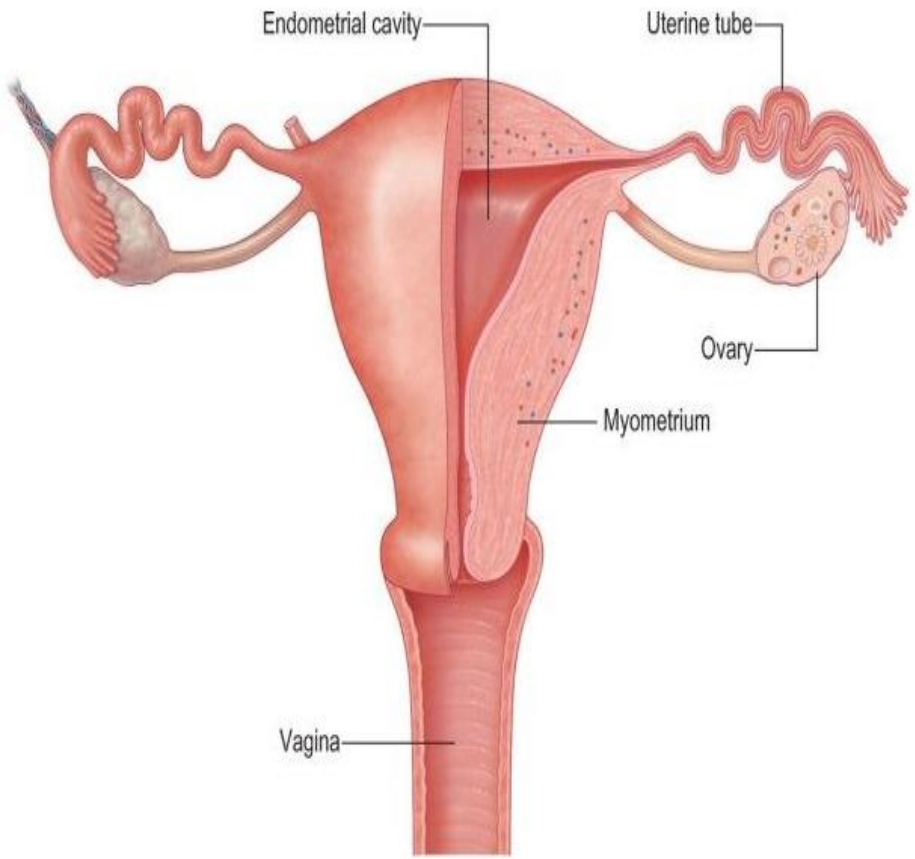


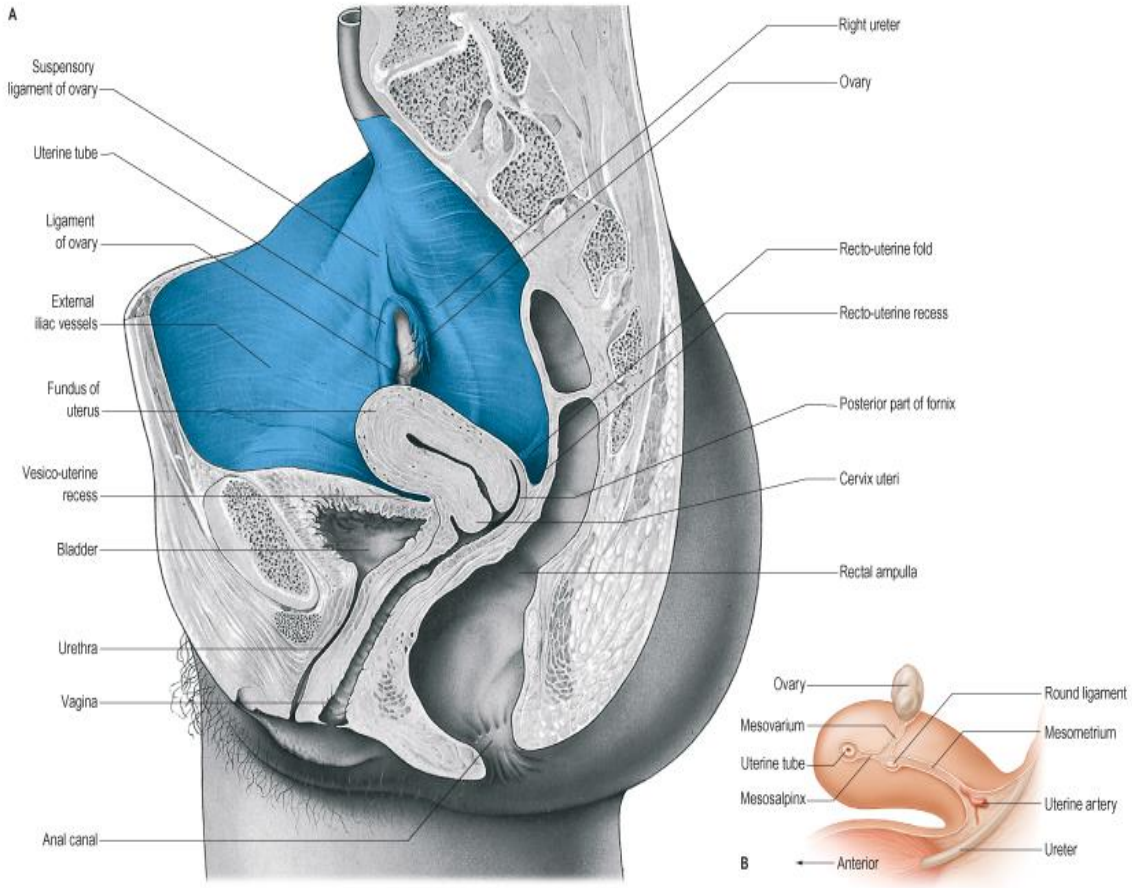
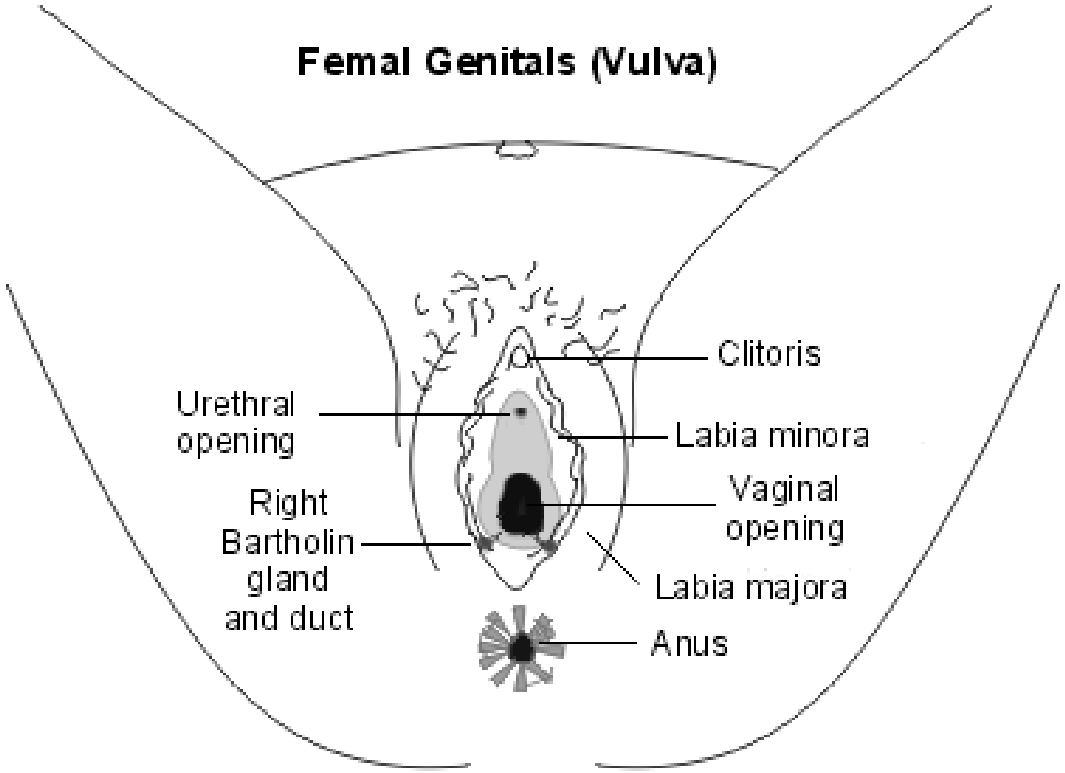


Figure 102.1 **A,** Median sagittal section through a human female pelvis. Peritoneum: blue. **B,** Sagittal section showing the peritoneal attachments of the ovary.

External organ

- Mon pubis
- Labia majora
- Labia minora
- Clitoris
- Vestibule of vagina
- Bulb of vestibule
- Greater vestibular gland

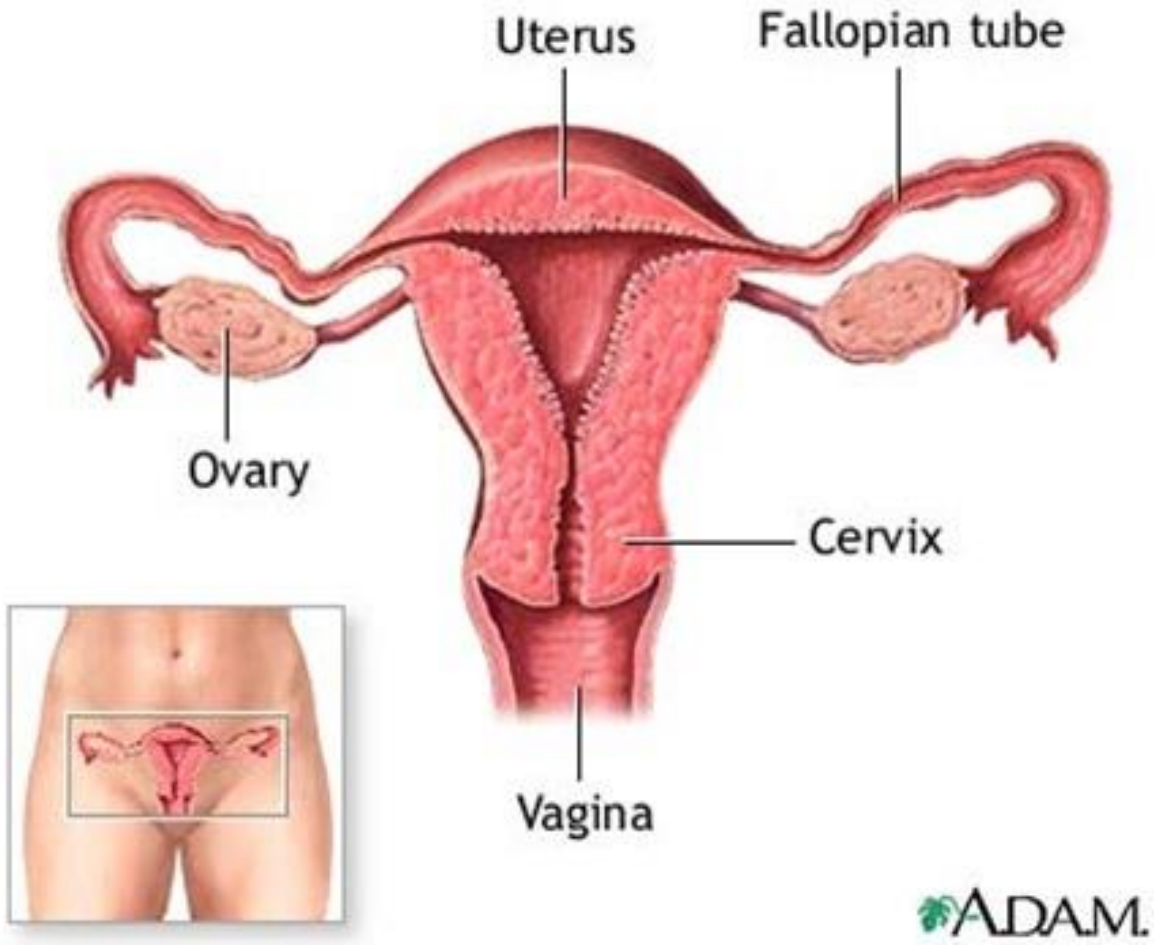
External Organs



Internal organ

- Ovaries
- Utreus
- Fallopian tubes
- Vagina

Internal Female Reproductive Organs

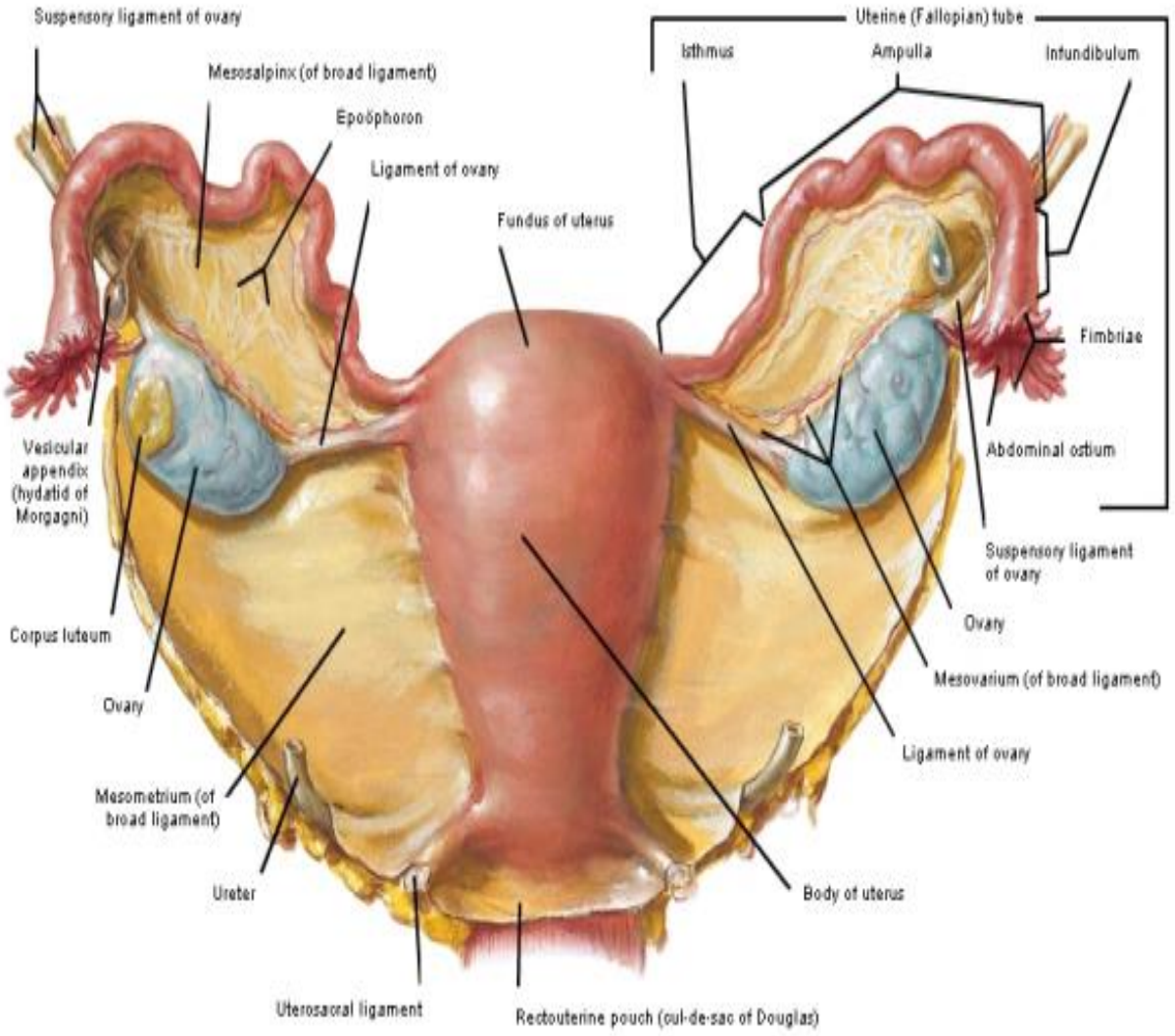


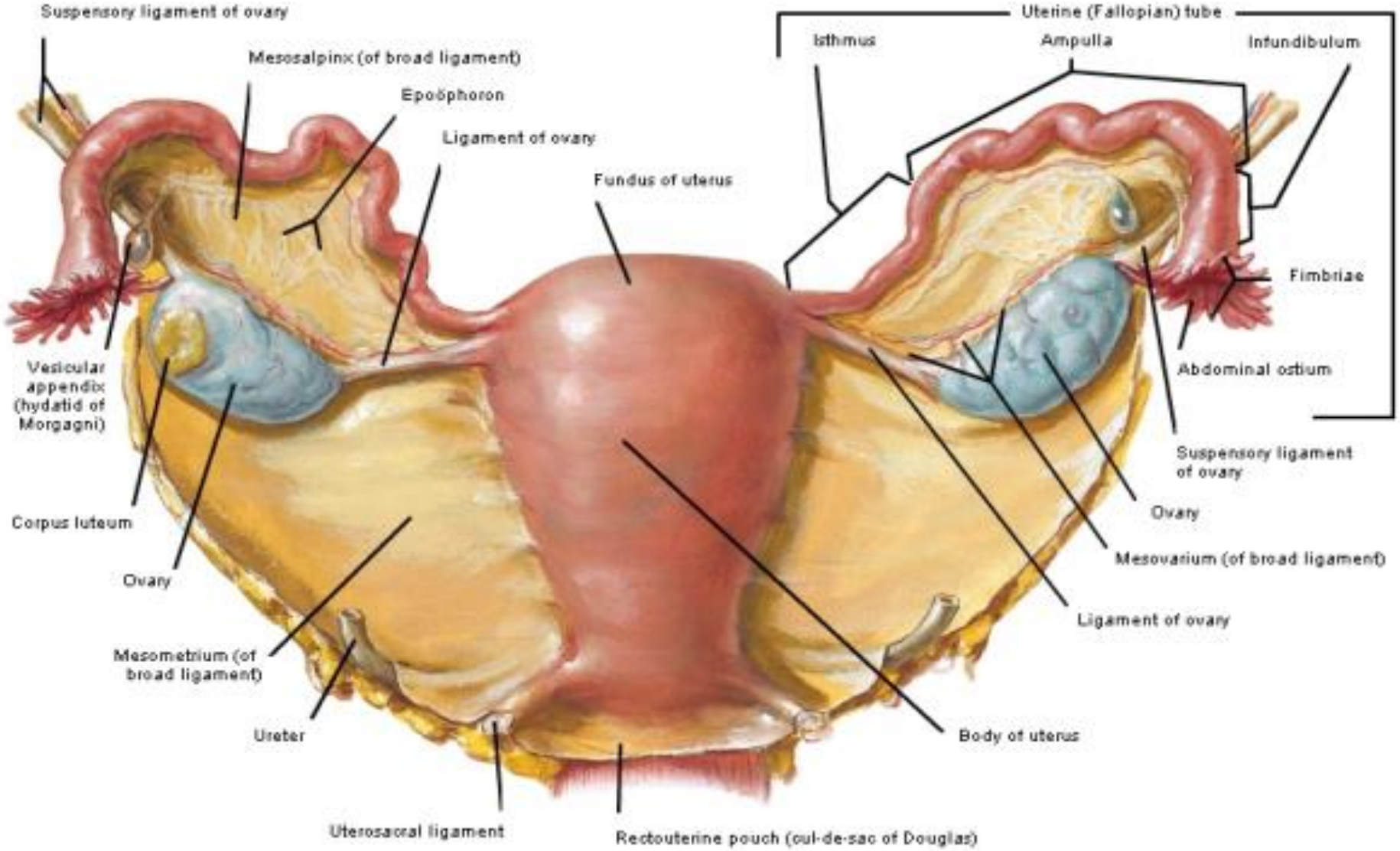
OVARIES

- The ovaries are female gonads
- The ovaries are almond-shaped
- 3cm-long
- 1.5 cm-wide
- 1 cm- thick

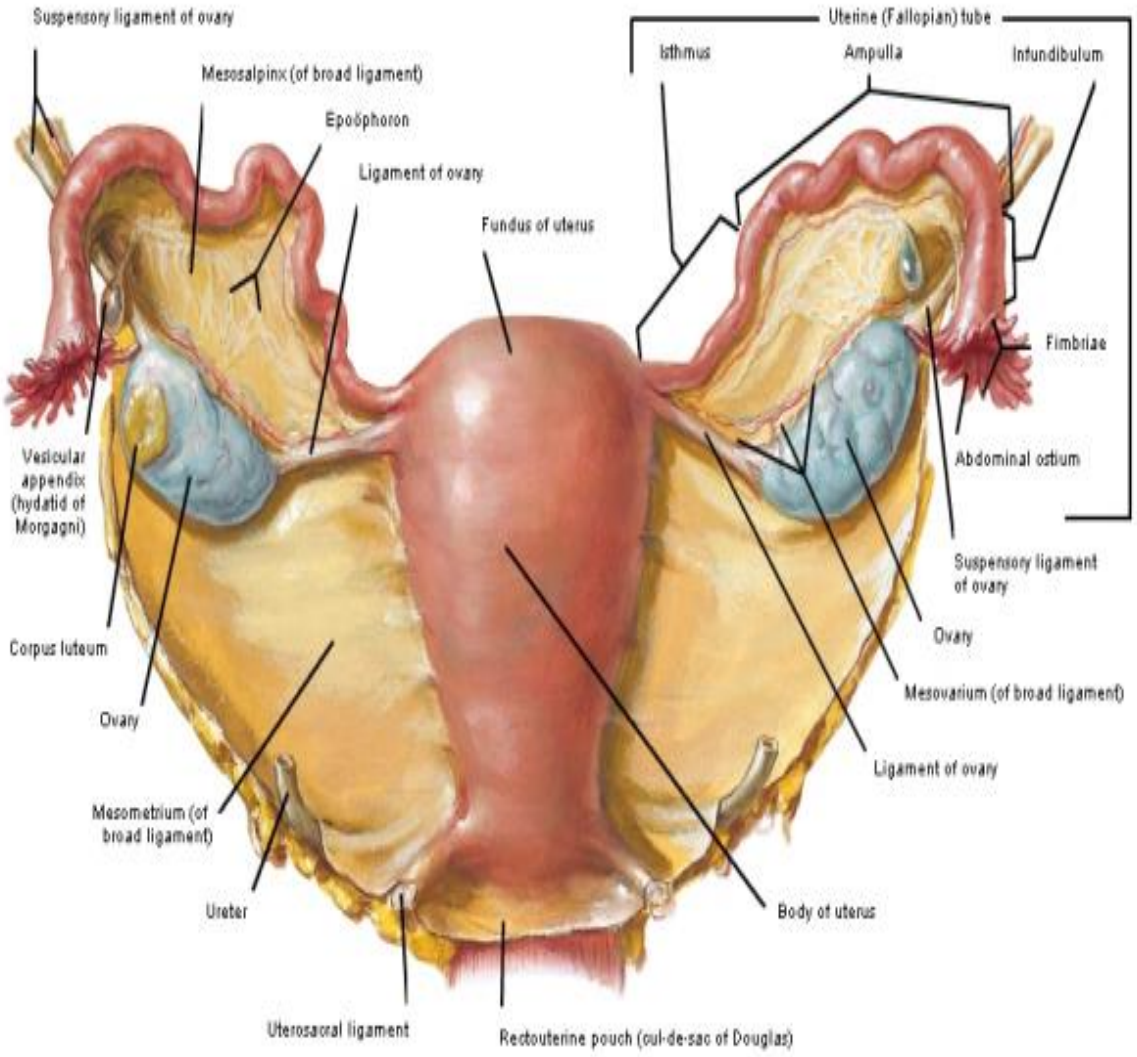
Young- Pink color and smooth surface

Old- Greyish color and irregular surface




Suspensory ligament of ovary
Mesosalpinx (of broad ligament)
Epoöphoron
Ligament of ovary
Fundus of uterus
Uterine (Fallopian) tube
Isthmus
Ampulla
Infundibulum
Fimbriae
Abdominal ostium
Vesicular appendix (hydatid of Morgagni)
Corpus luteum
Ovary
Mesometrium (of broad ligament)
Ureter
Uterosacral ligament
Rectouterine pouch (cul-de-sac of Douglas)
Body of uterus
Ligament of ovary
Mesovarium (of broad ligament)
Ovary
Suspensory ligament of ovary

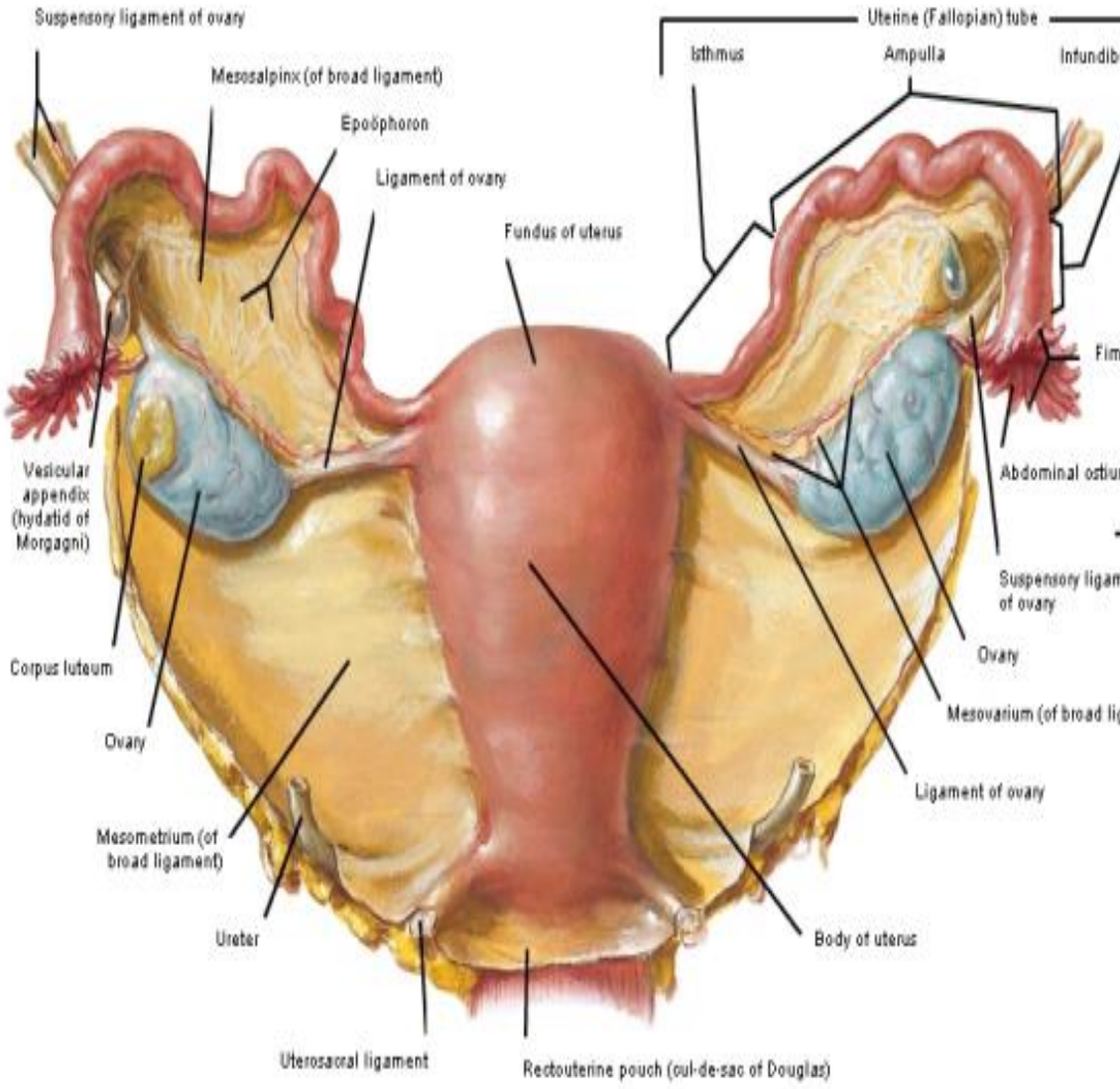
- **LOCATION-**
- Lie on each side of the uterus close to th lateral pelvic wall
- Suspended in the pelvic cavity by a doub fold of peritoneum, the mesovarium
- mesovarium is the portion of the broad ligament of the uterus that suspends the ovaries
- Acts as a hilum of the ovary
- Conveys blood vessels and nerves to the ovary



• PARTS OF OVARY

Parts:

- i. Lateral and medial surfaces.
- ii. Upper and lower poles.
- iii. Anterior and posterior borders.



- In nulliparous women-The long axis of ovary becomes vertical and its surfaces is smooth
- In multiparous women-The long axis of ovary becomes horizontal and its surfaces become irregular

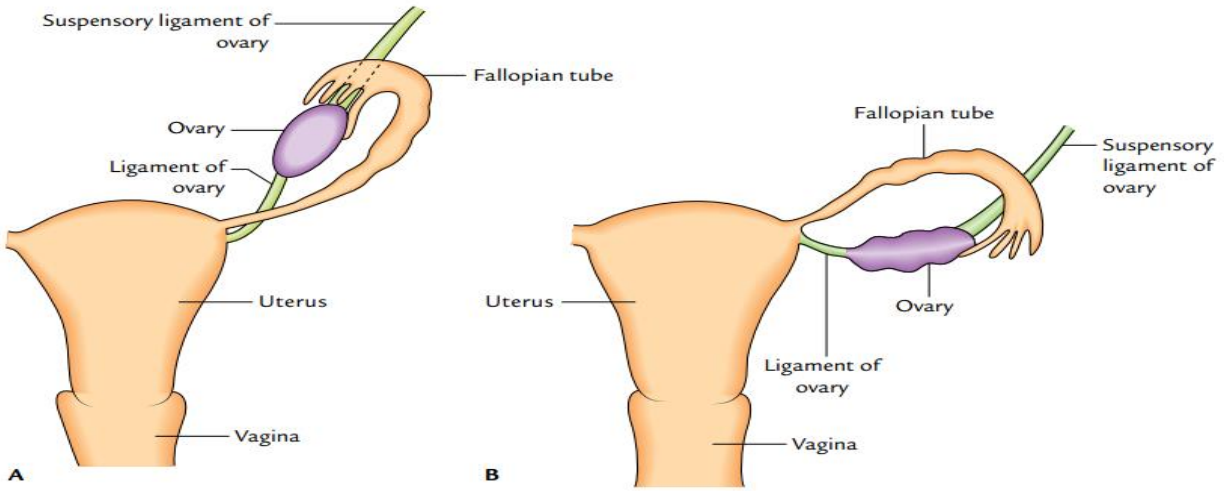


Fig. 18.4 Position of ovary: A, in a nulliparous woman it is vertical and its surfaces are smooth; B, in a multiparous woman it is horizontal and its surfaces are irregular.

•Arterial Supply

- Ovarian artery arises from just below the renal artery.
- It crosses the pelvic brim to enter the suspensory ligament and to reach the ovary via the mesovarium
- Ovarian branch of uterine artery

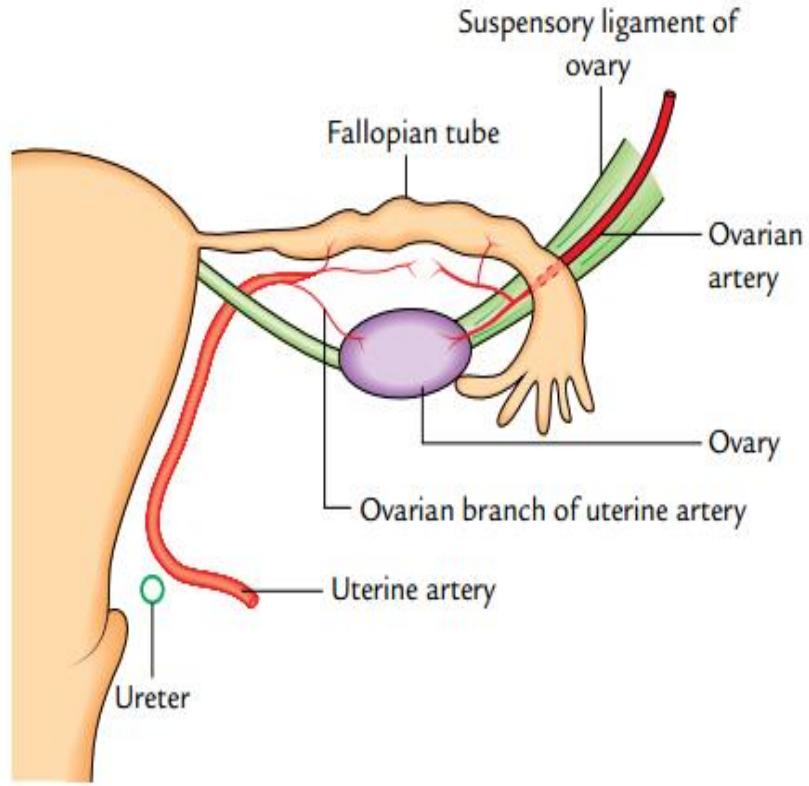


Fig. 18.6 Arterial supply of the ovary.

VENOUS DRAINAGE

- The veins of the ovary emerge from the hilum
- Form the pampiniform plexus around the ovarian artery
- From which a single ovarian vein is formed near the pelvic inlet.
- The right ovarian vein drains into the inferior vena cava
- The left ovarian vein drains into the left renal vein

Lymphatic Drainage

- Drain into the pre-aortic and para-aortic lymph nodes

•Nerve supply

- The ovarian innervation is derived from autonomic plexuses.
- Sympathetic fibres & Parasympathetic fibres

- **Clinical aspect**
- **Ovarian torsion:** The torsion of an ovary may occur due to an abnormally long mesovarium and suspensory ligament of the ovary.

- **Prolapse of ovaries:** The ovaries are often prolapsed / displaced into the pouch of Douglas where they can be palpated on per vaginal (PV) examination.

FALLOPIAN TUBE

- Pair of ducts which transmit ova from the ovaries to the uterine cavity
- Each tube is about 10 cm long
- Lies in the upper free margin of the broad ligaments of the uterus.

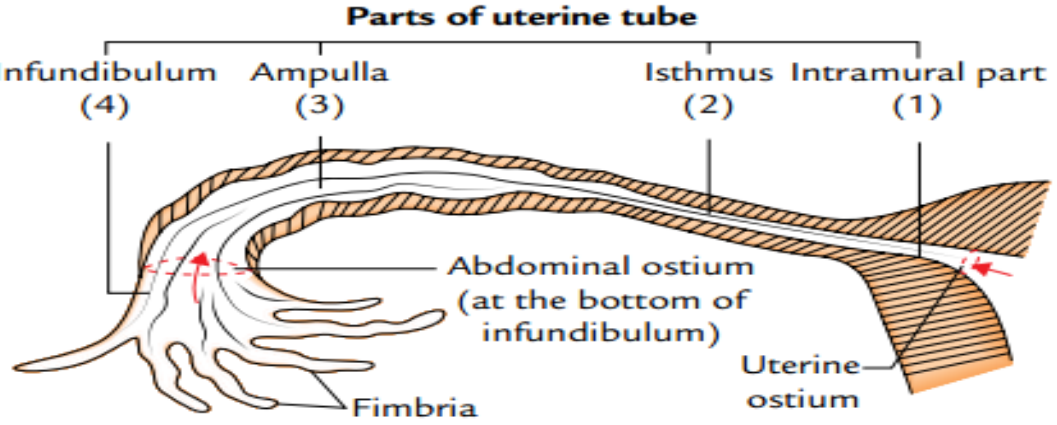
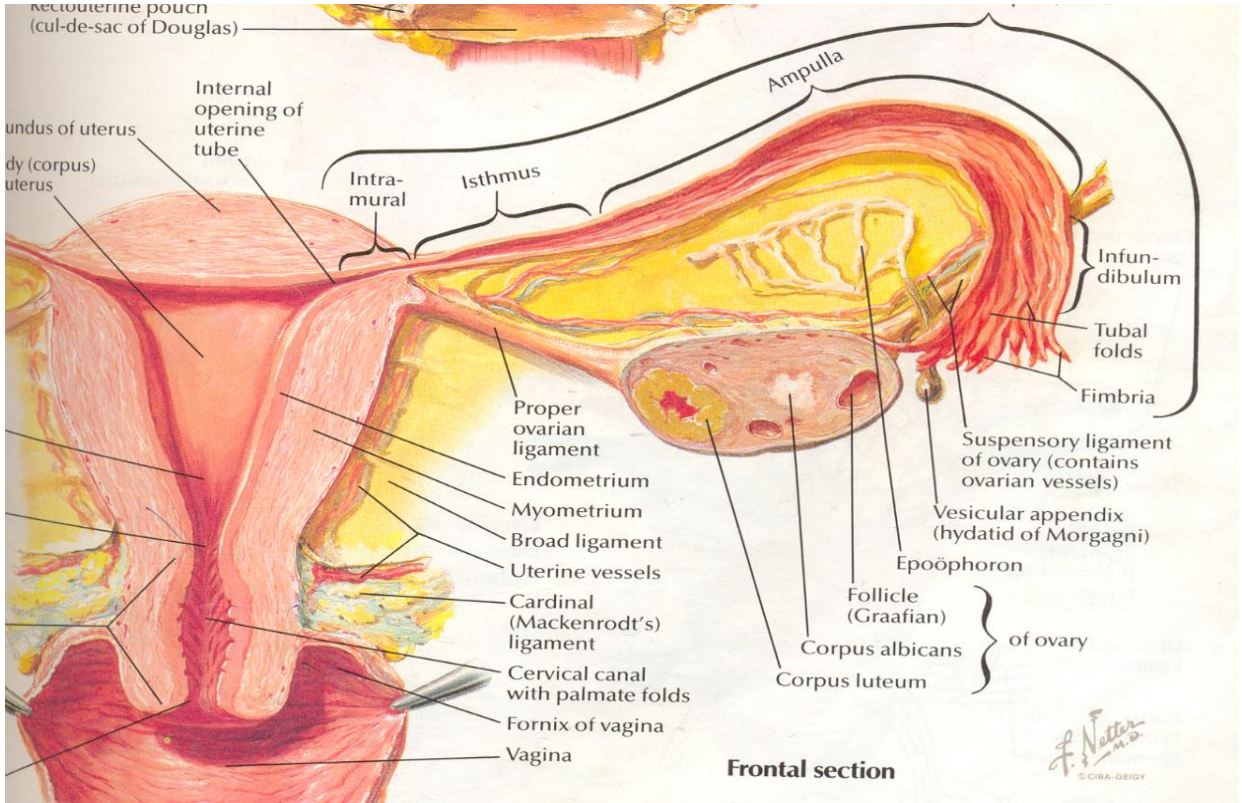


Fig. 18.8 Parts of the uterine tube.



EXTERNAL FEATURES

Each tube presents two ends and four parts

- **Ends**
- **Medial End**
- It opens into the lateral angle of the uterine cavity.

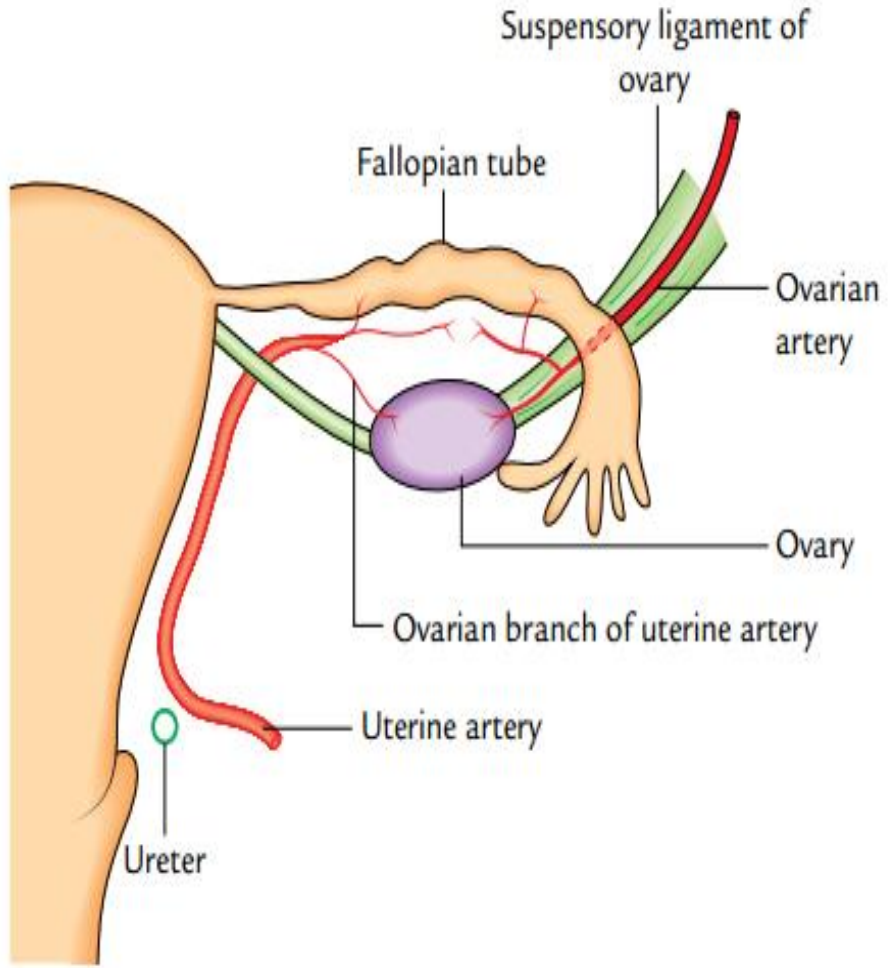


Fig. 18.6 Arterial supply of the ovary.

- **Lateral (fimbriated) End**

- It communicates with the peritoneal cavity close to the ovary by piercing the posterior layer of the broad ligament.
- Its margin possesses irregular small finger like processes called fimbriae known as fimbriated end

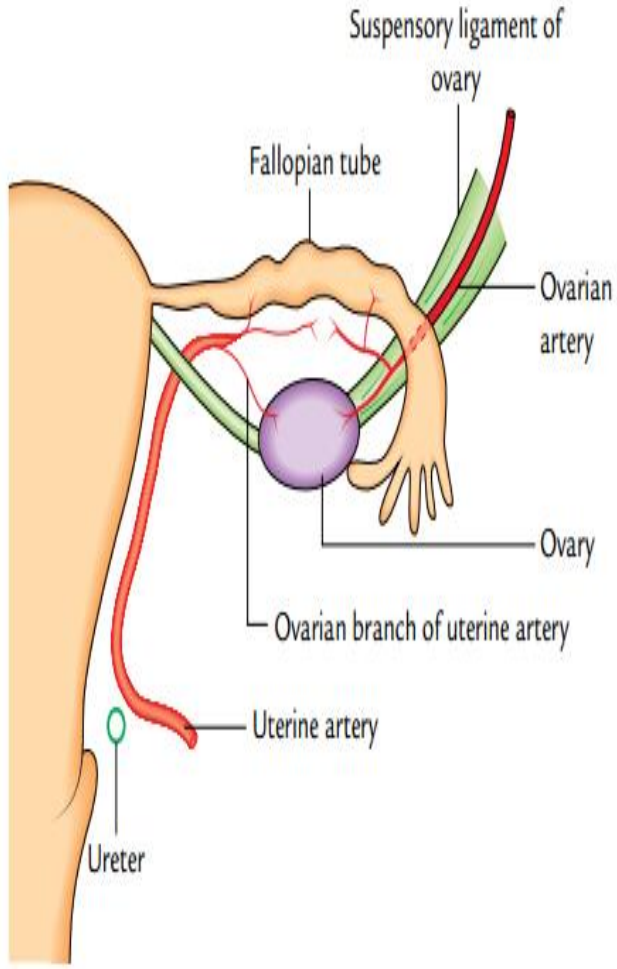


Fig. 18.6 Arterial supply of the ovary.

PARTS

- From lateral to medial end

- Infundibulum, ampulla, isthmus, and intramural.

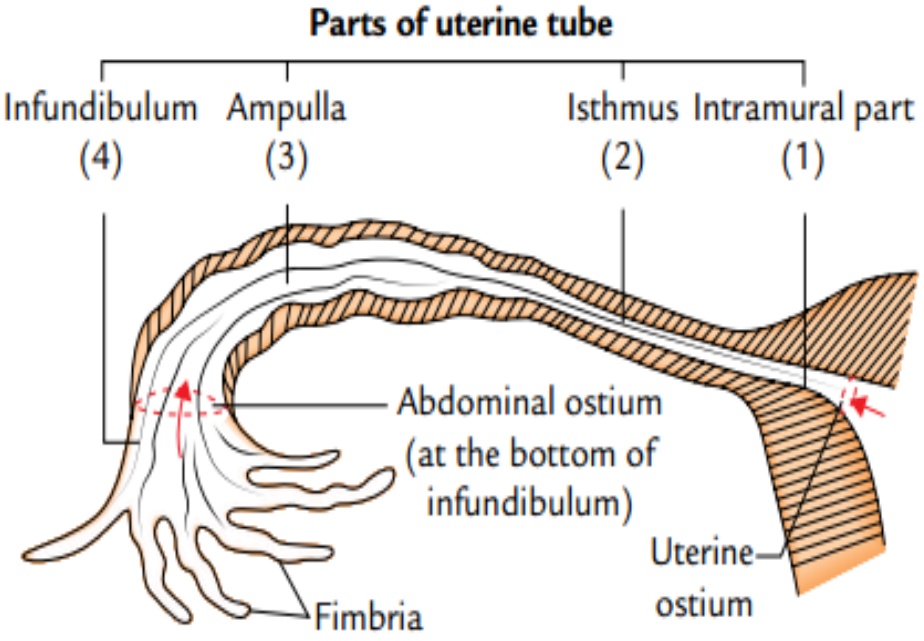


Fig. 18.8 Parts of the uterine tube.

- **Infundibulum (1 cm long)**
- It is the funnel-shaped lateral-most part which projects beyond the broad ligament of uterus.
- It overlies the ovary and presents an abdominal ostium.

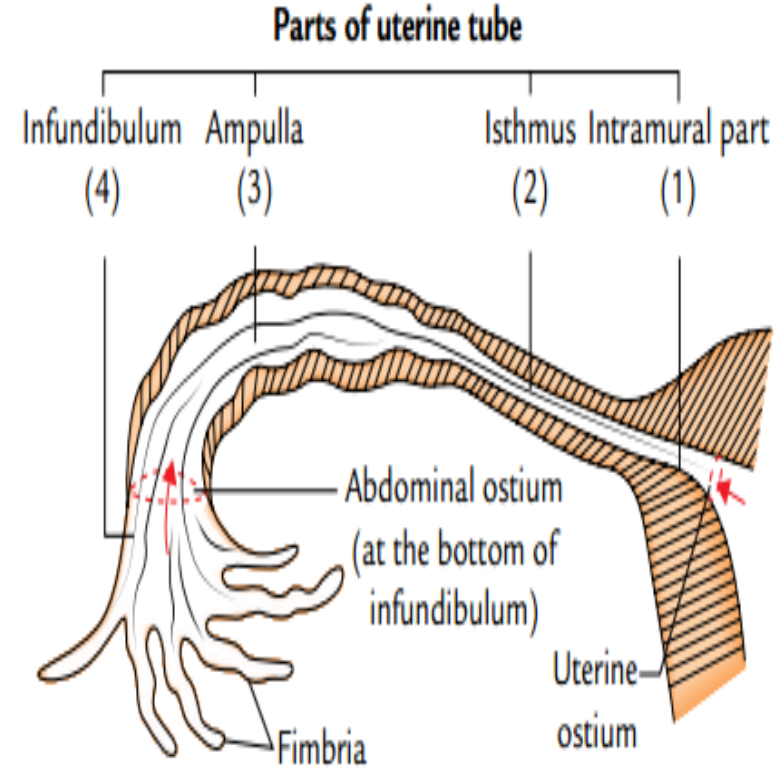


Fig. 18.8 Parts of the uterine tube.

- **Ampulla (5 cm long)**

- It is the widest and longest part of the tube
- It is the site of fertilization of ovum.

- **Isthmus (2.5–3 cm)**
- It is the narrowest part and lies just lateral to the uterus.
- It is round and cord-like due to thick muscular wall.

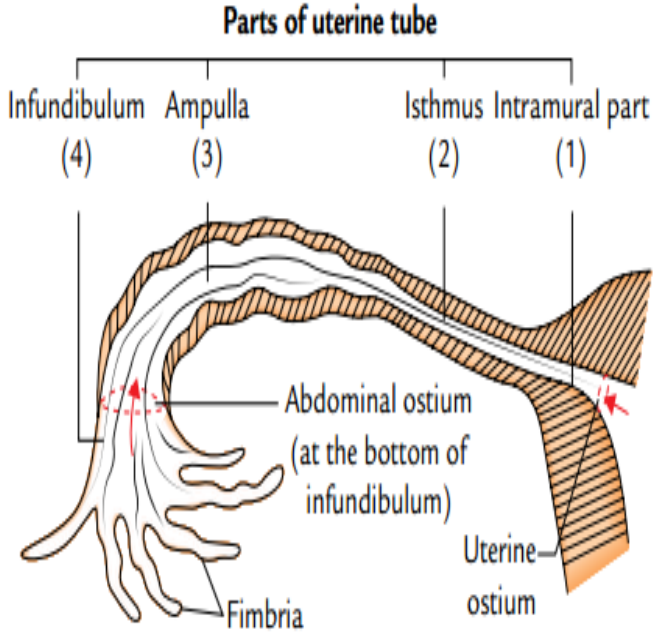
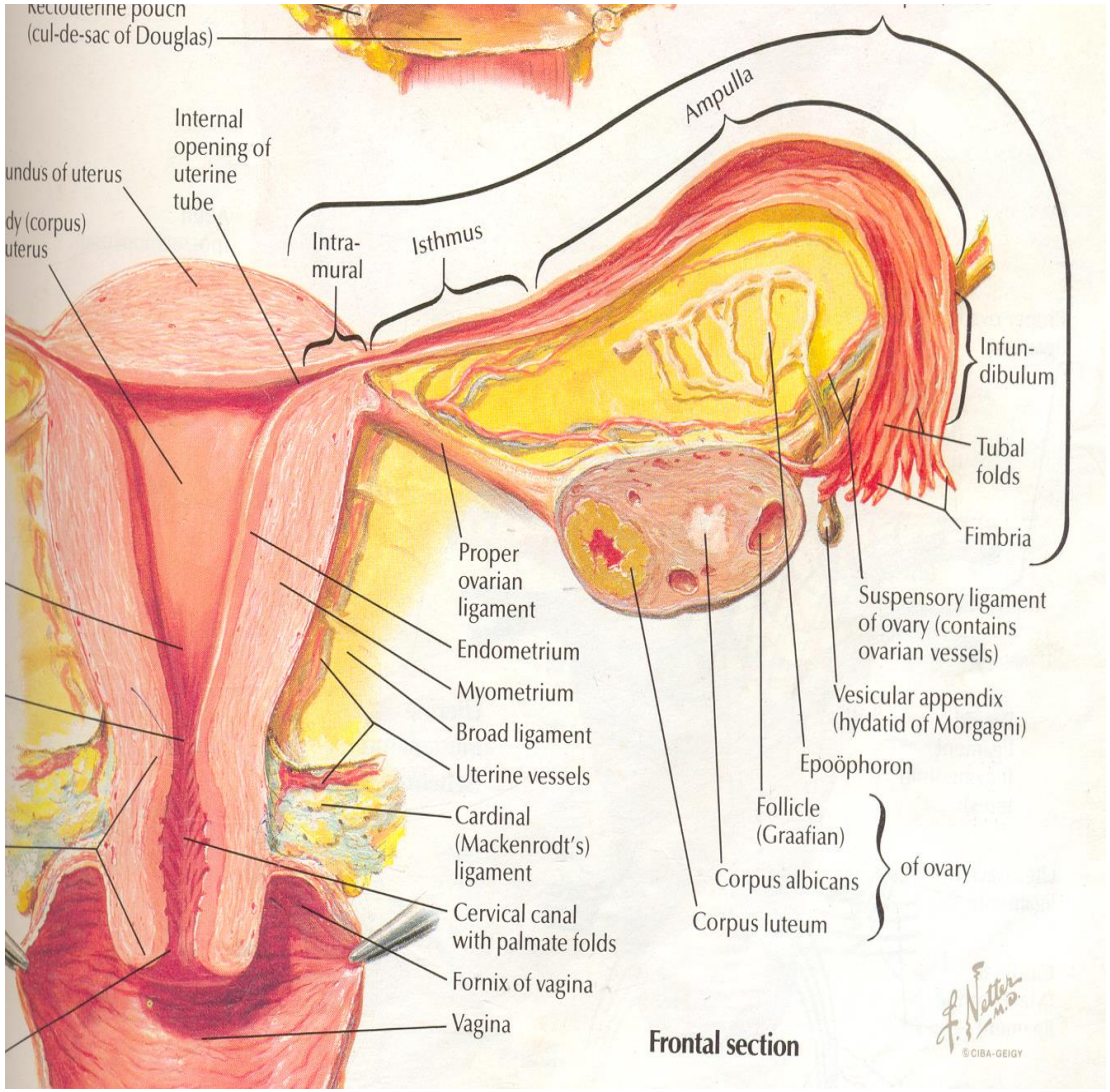


Fig. 18.8 Parts of the uterine tube.

- **Intramural (Interstitial) Part (1 cm long)**

- Segment of uterine tube that passes the uterine wall at the junction of fundus and body.



RELATION

- Below- Anastomosis of ovarian and uterine vessels
- Below and infront- round ligament of uterus
- Below and behind- ligament of ovary

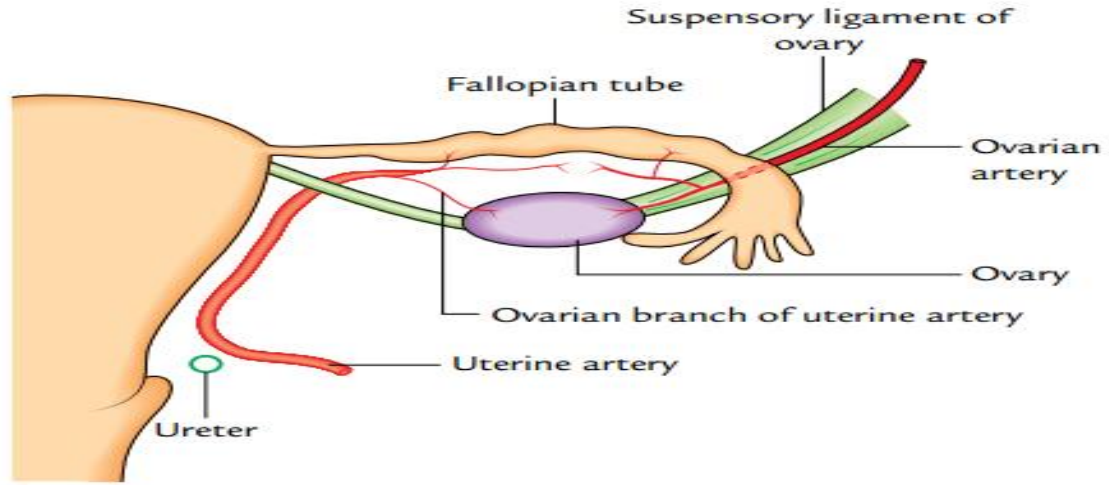


Fig. 18.6 Arterial supply of the ovary.

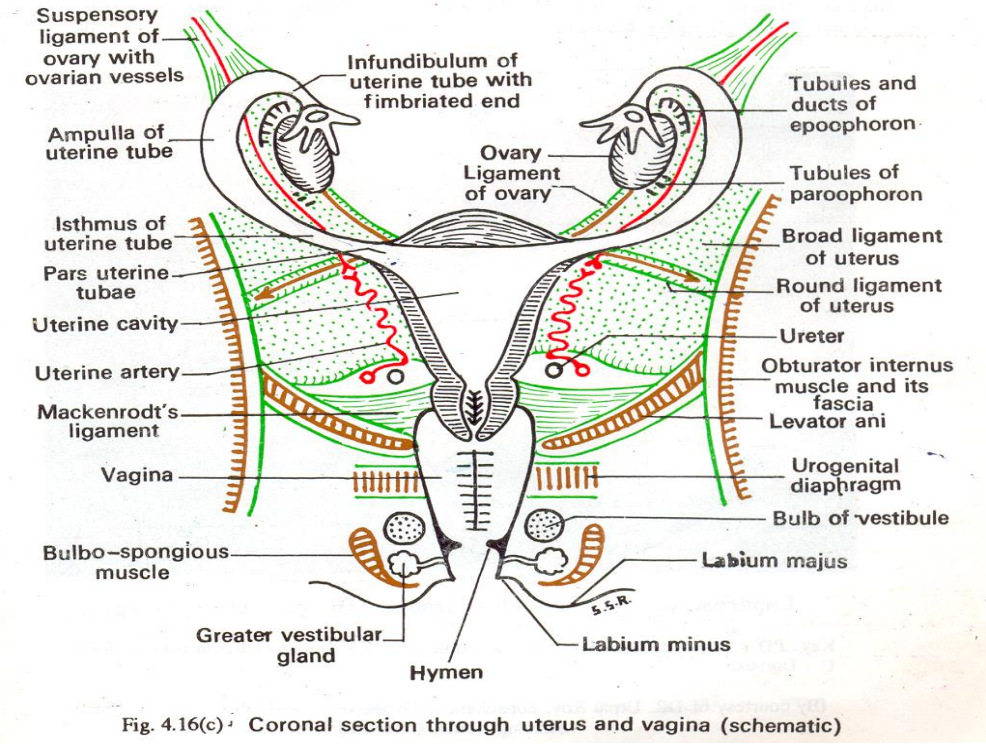
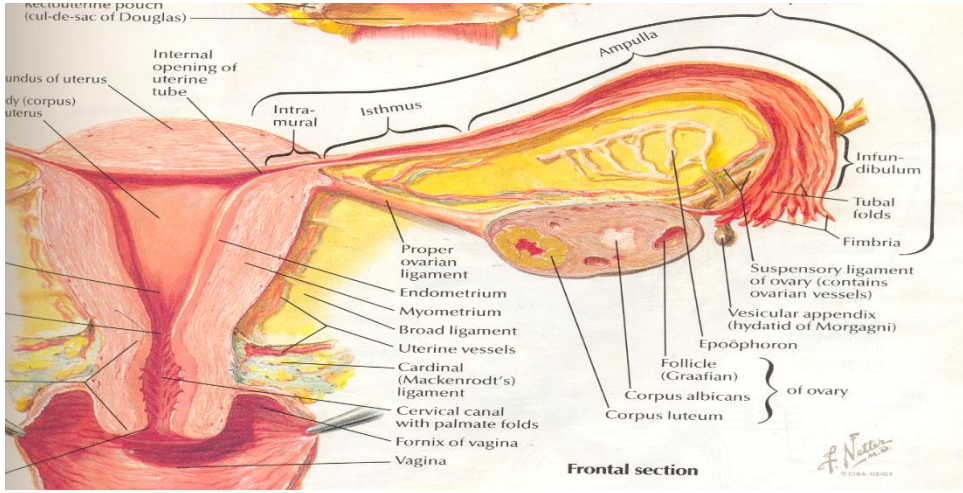


Fig. 4.16(c) Coronal section through uterus and vagina (schematic)



- **ARTERIAL SUPPLY**

- The medial two-third of the tube is supplied by the uterine artery
- Lateral one-third by the ovarian artery.

- **VENOUS DRAINAGE**
- The veins correspond to arteries

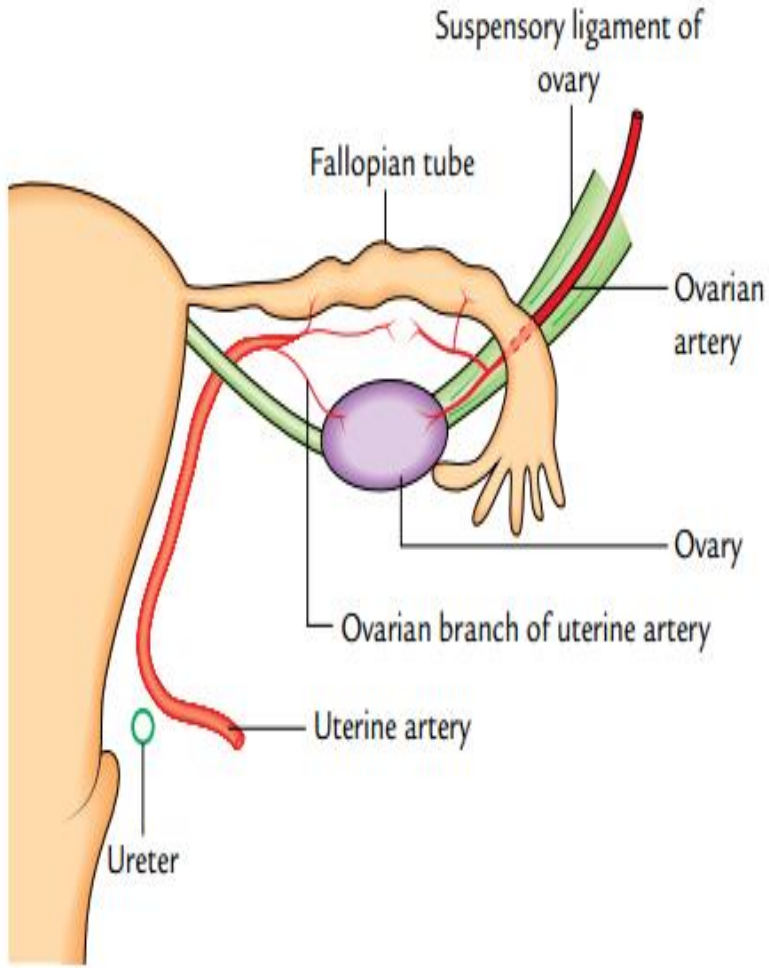


Fig. 18.6 Arterial supply of the ovary.

- **LYMPHATIC DRAINAGE**
  drain into internal iliac lymph nodes, pre-aortic and para-aortic lymph nodes

- **NERVE SUPPLY**
- The tubes are supplied by both sympathetic and parasympathetic fibres.

Clinical aspect

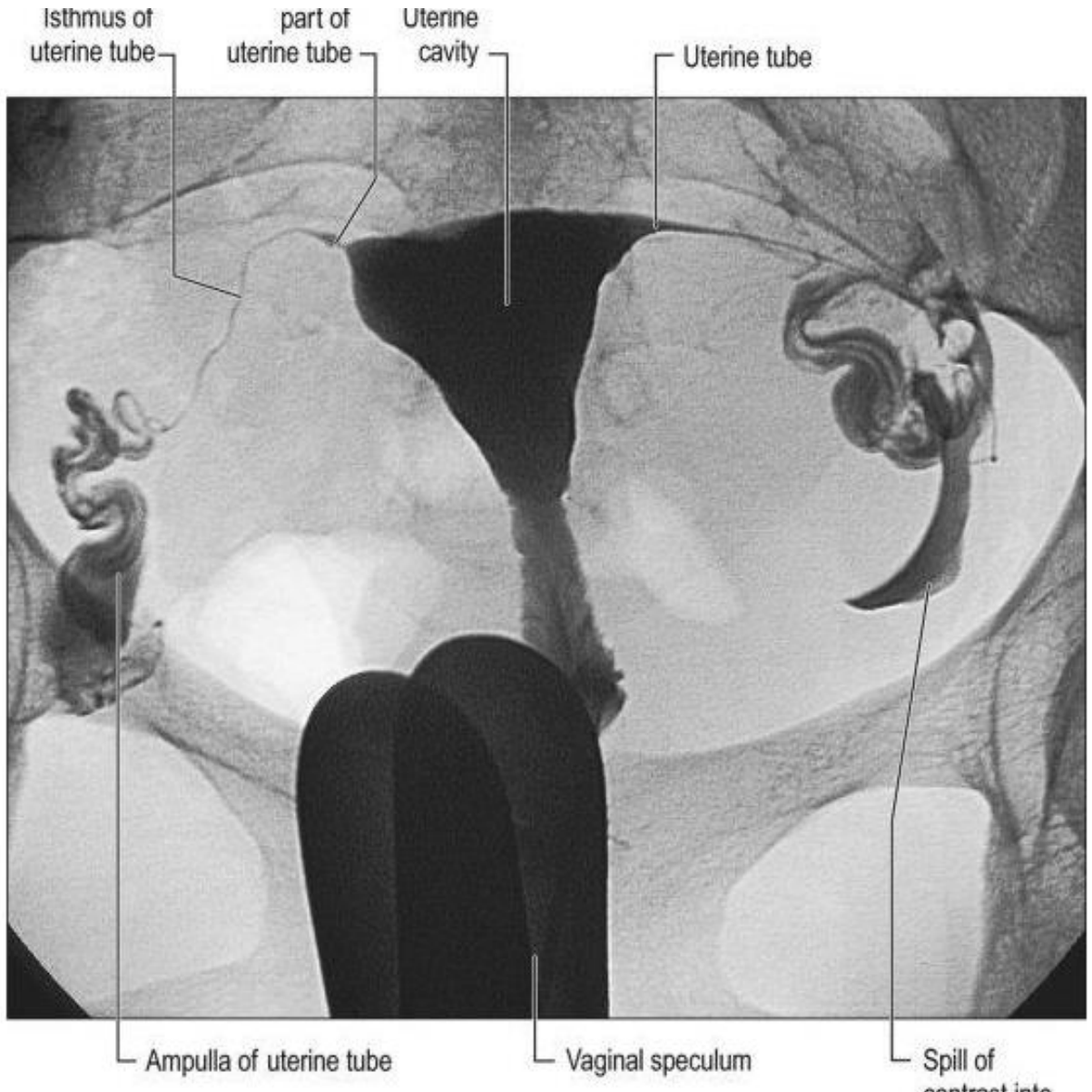
- **Salpingitis:** The inflammation of the uterine tube (or salpinx) is called salpingitis

  -Commonest cause of tubal block leading to secondary sterility in female

- **Hysterosalpingography:**
- It is a radiological technique in which a radiopaque substance (e.g., Lipiodol) is injected into the uterus by a suitable canula

- It outlines the uterine cavity and uterine tubes, and if tubes are patent, the contrast medium spills into the peritoneal cavity.

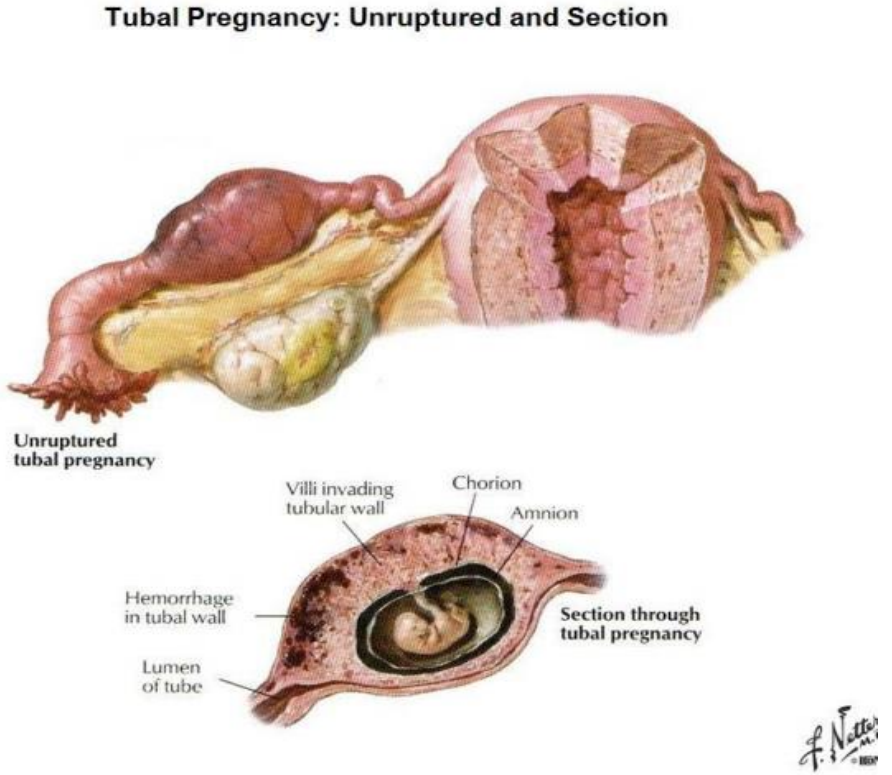
HYSTEROSALPHINGOGRAPH



- **Ectopic pregnancy:** It is commonest in the uterine tube (tubal gestation) and is usually associated with intraperitoneal hemorrhage
- Causes of acute abdominal emergency in women of childbearing age

- **Tubectomy-**

This is the ideal method of family planning in female



UTERUS

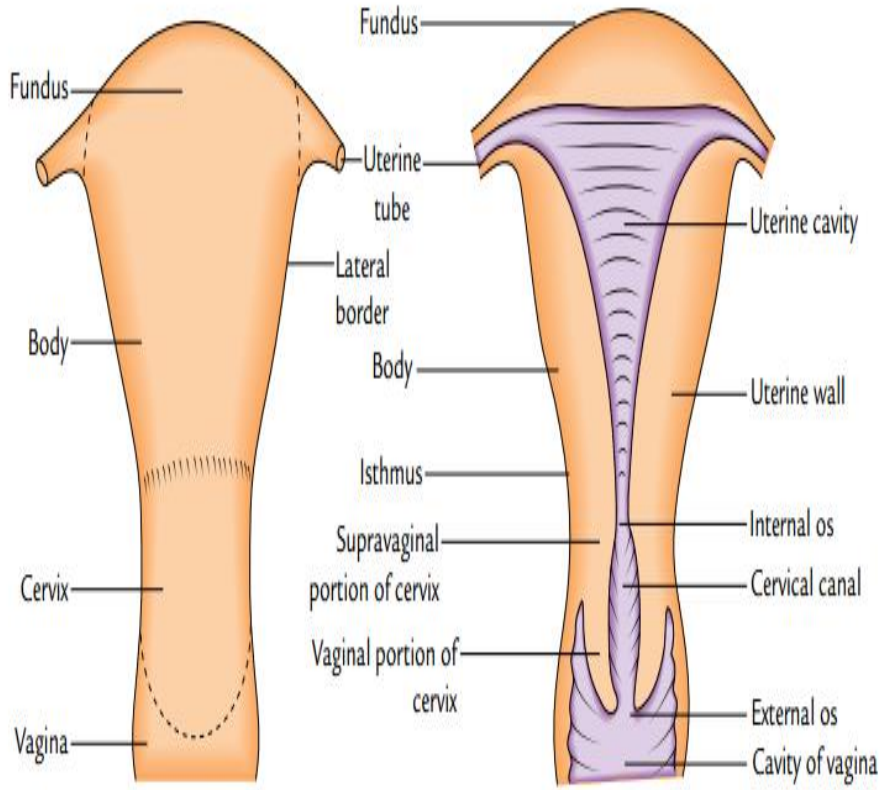
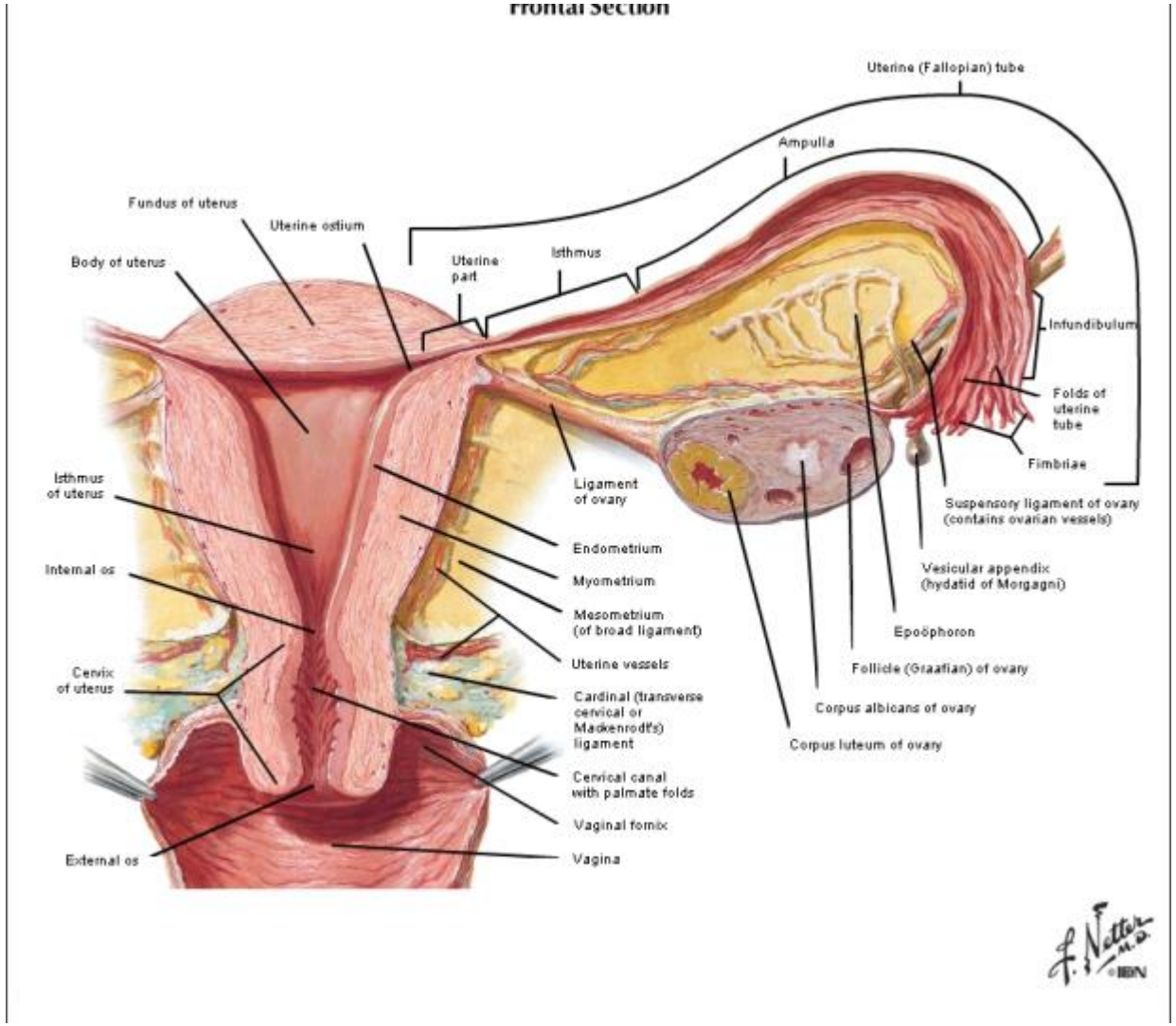
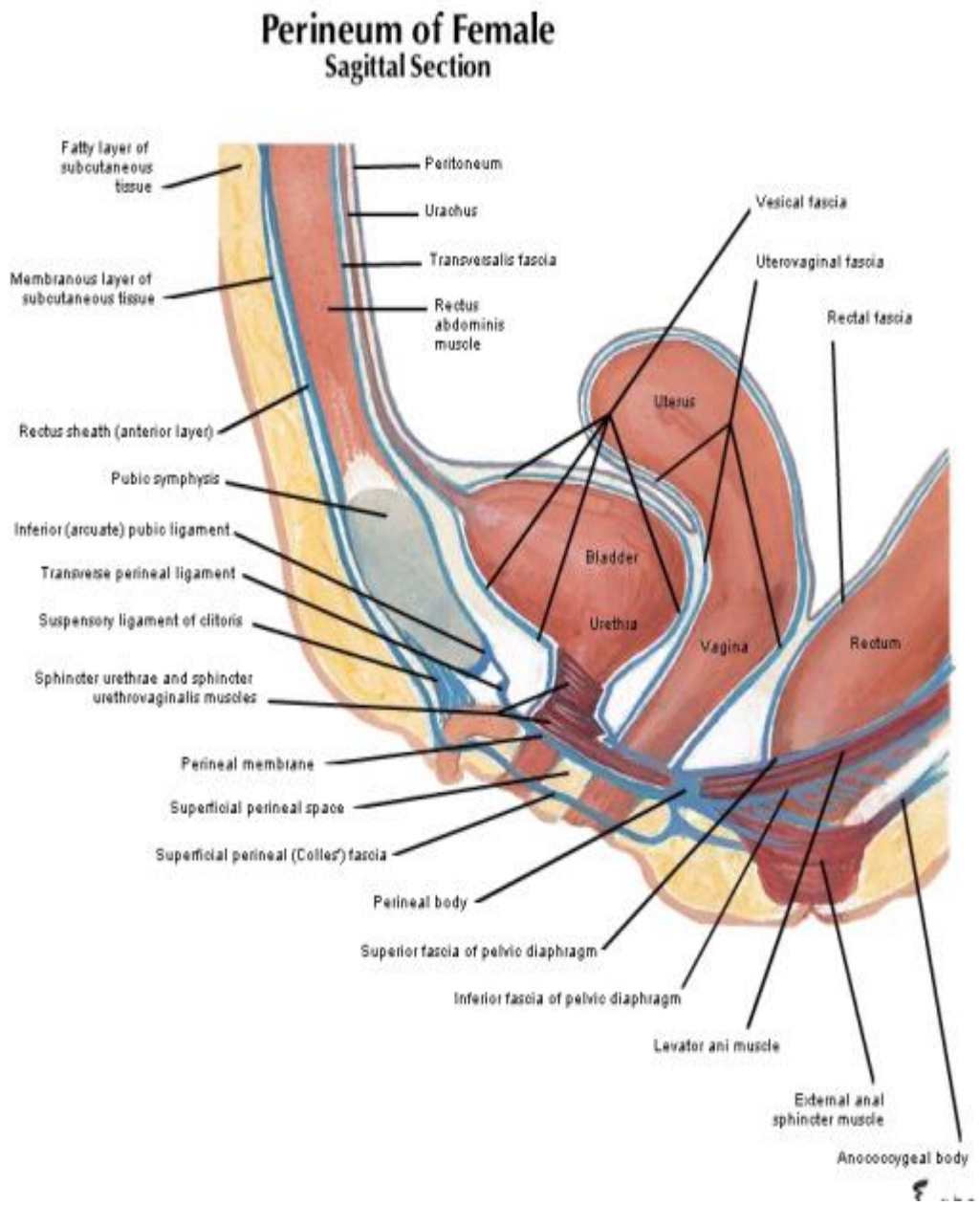


Fig. 18.9 Subdivisions of the uterus.

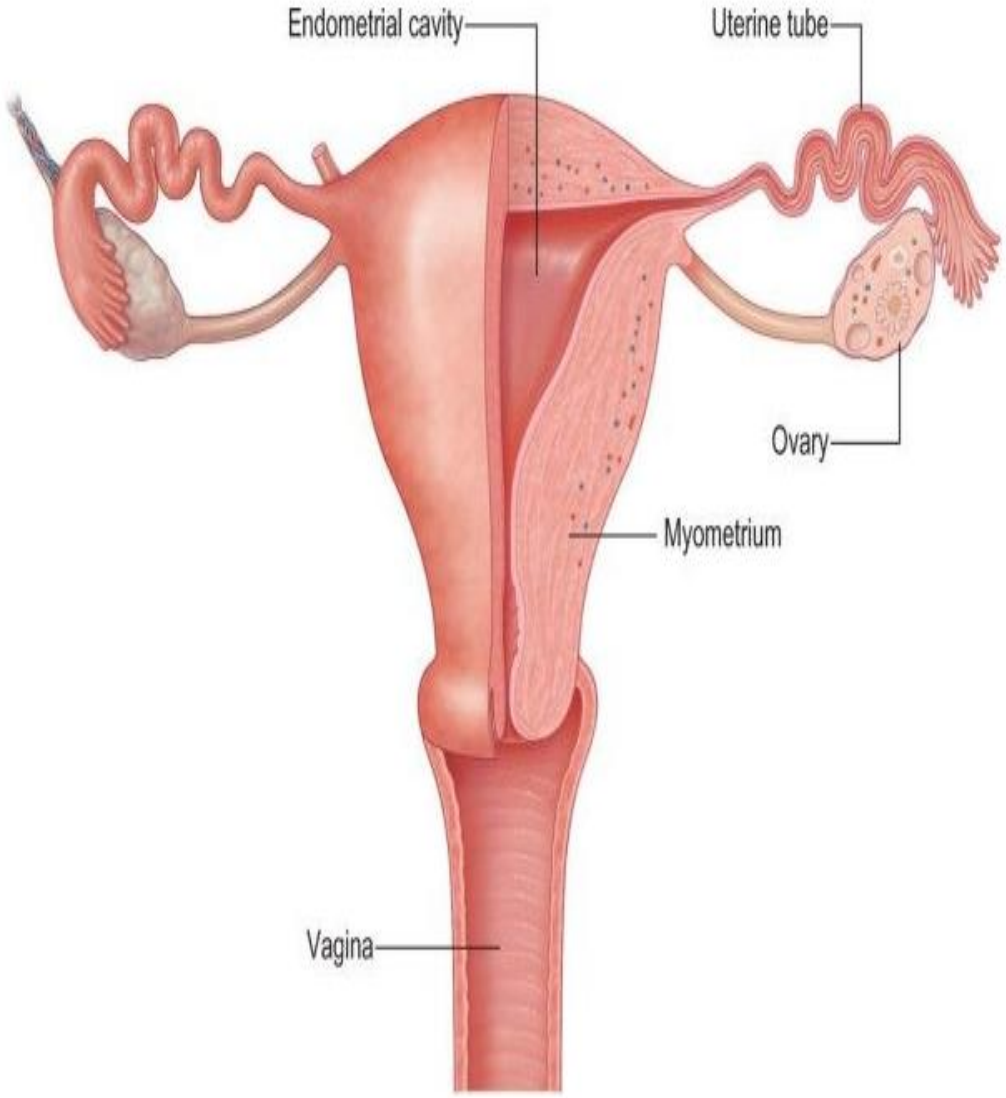


- It is a hollow thick-walled, muscular organ with a narrow lumen.



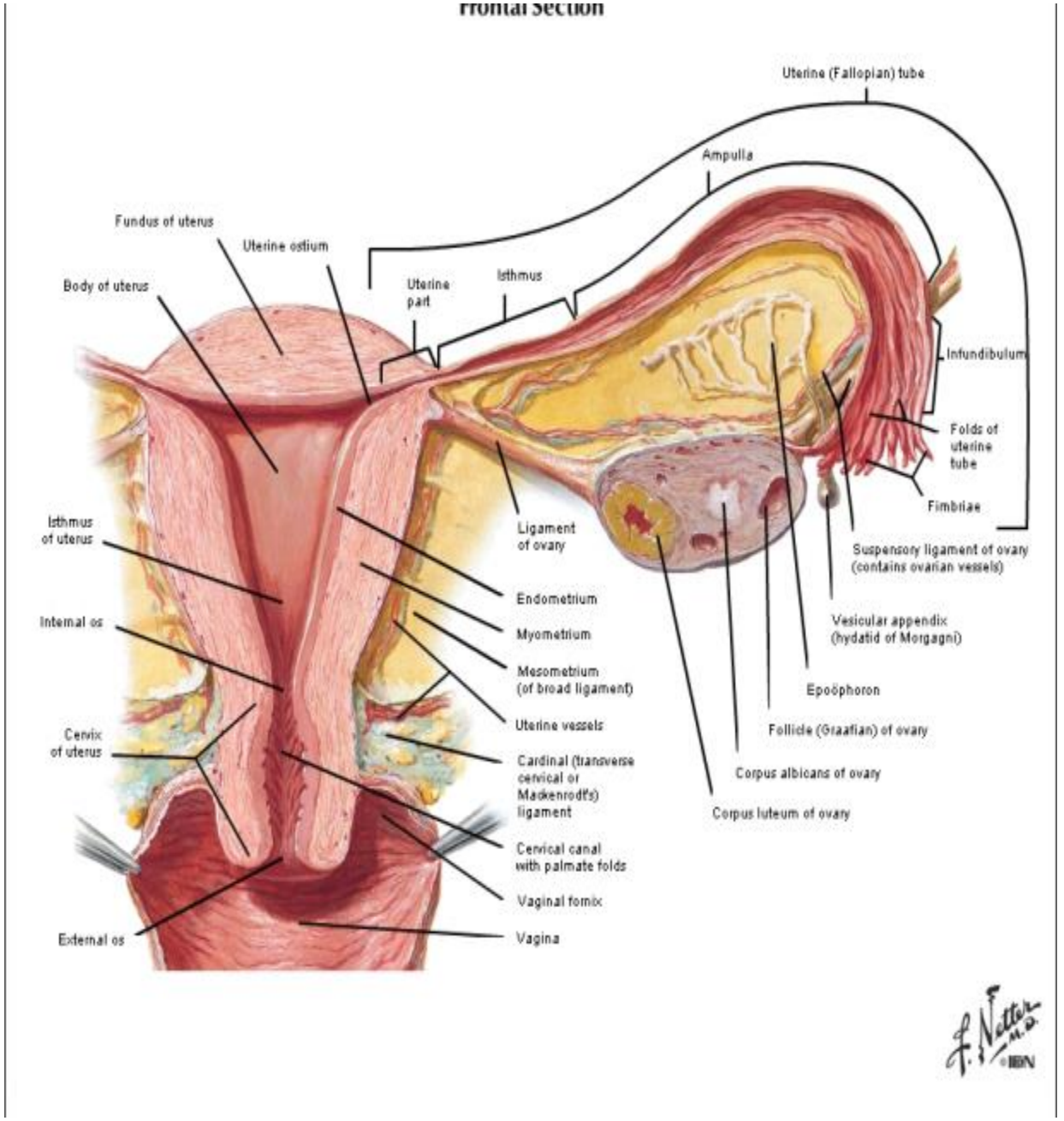
- **Shape and Size**

- It is pear-shaped, being flattened anteroposteriorly.
- Measurements
  Length: (7.5 cm).
  Breadth (at fundus): (5 cm).
  Thickness: (2.5 cm).
  Weight: 30–40 g.
- The fundus and body together are 5 cm long
- The cervix is 2.5 cm long.



- **SUBDIVISIONS/PARTS OF THE UTERUS**

- (a) The large upper pear-shaped part-the body
- (b) a small lower cylindrical part-the cervix
- The body forms upper 2/3rd of uterus and cervix forms the lower 1/3rd of the uterus



FUNDUS

- The fundus is the rounded upper part above the level of the entrance of uterine tubes

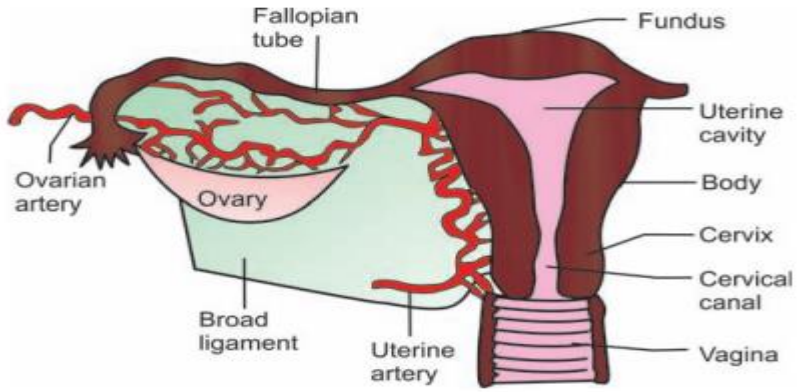


Fig. 88.25: Uterus, uterine tube and ovary seen from posterior aspect

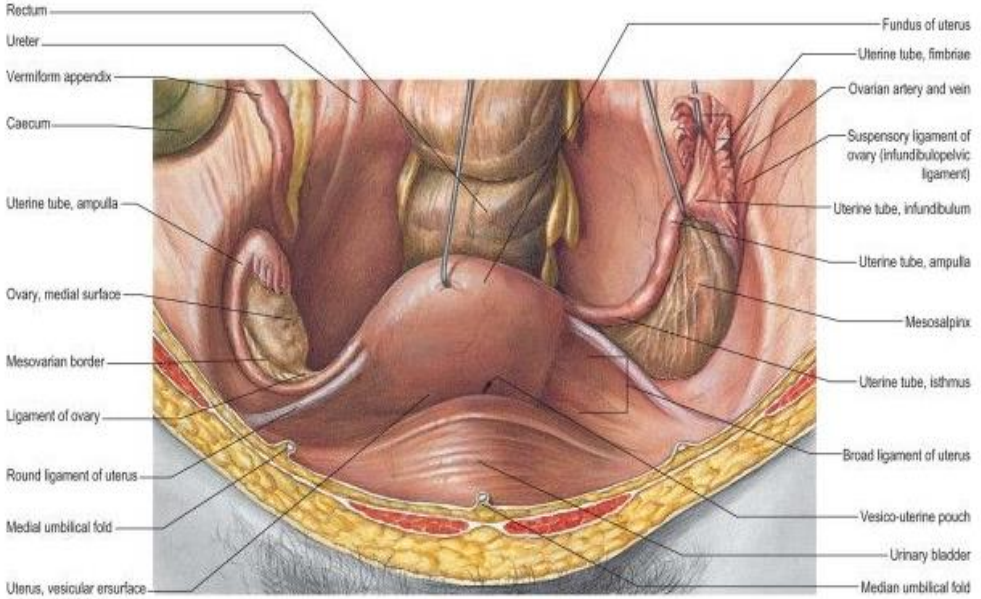
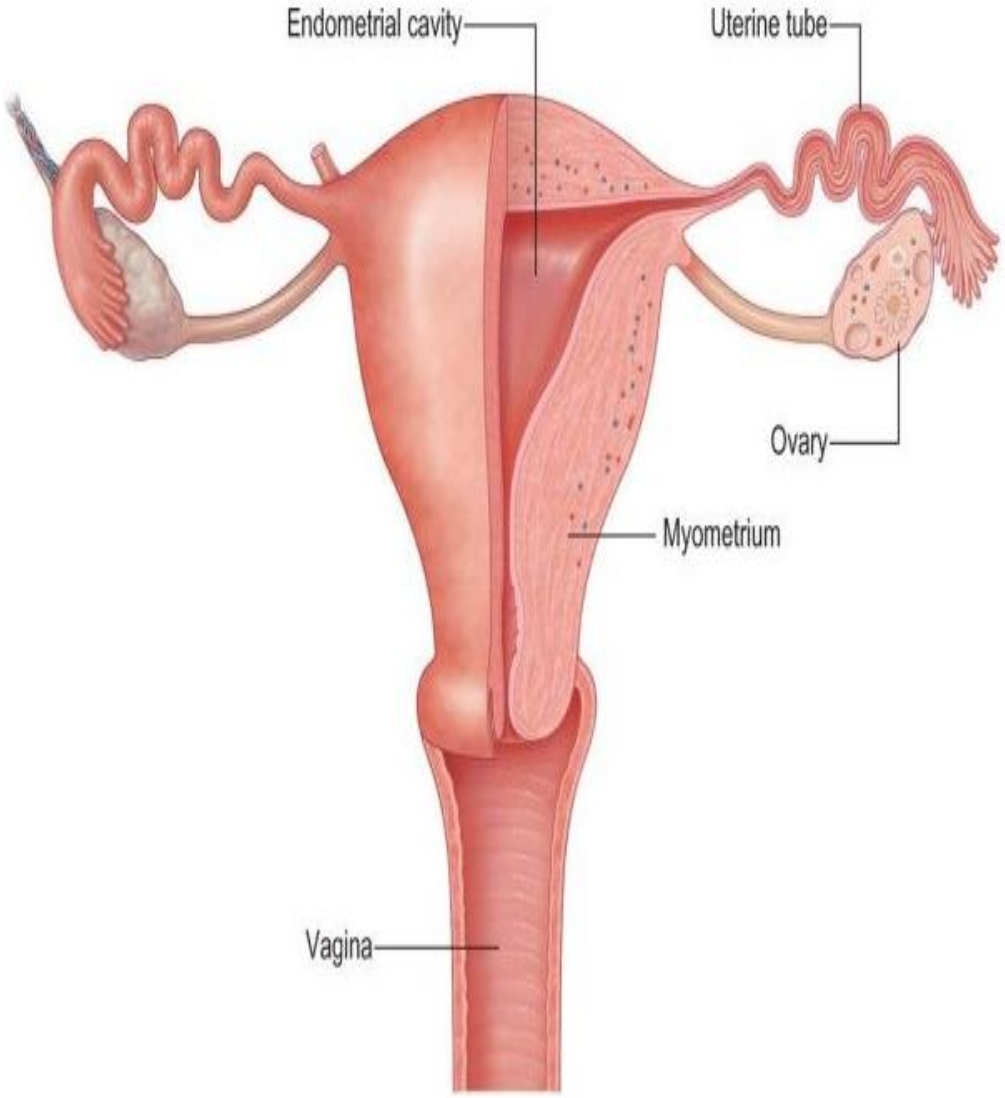


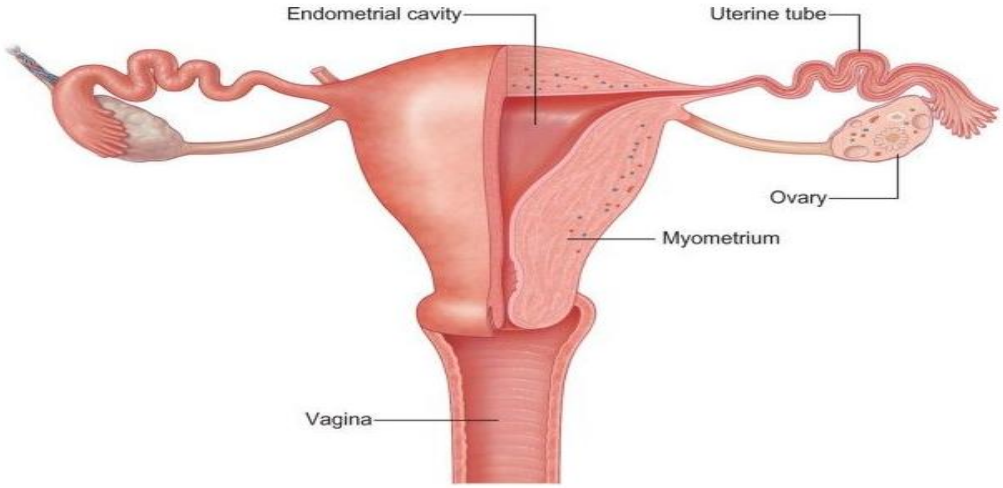
Fig. 77.18 Ovaries and broad ligament, superior view with the uterus lifted away from the bladder.

- The body of uterus is between the fundus and the isthmus.
- The isthmus is the constricted part between the body and the cervix.
- The cervix is cylindrical in shape.
- It extends from the isthmus and ends at external os
-

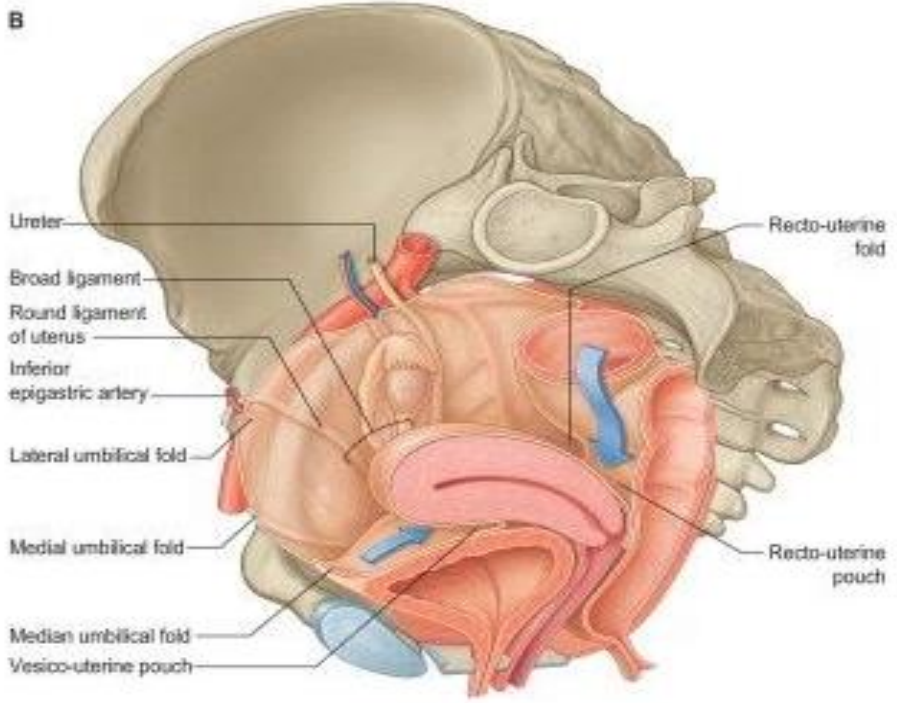


BODY

- Flattened anteroposteriorly, wider in upper part
- The body presents:
- Anterior & posterior surface
- Two lateral borders
- Uterine cavity

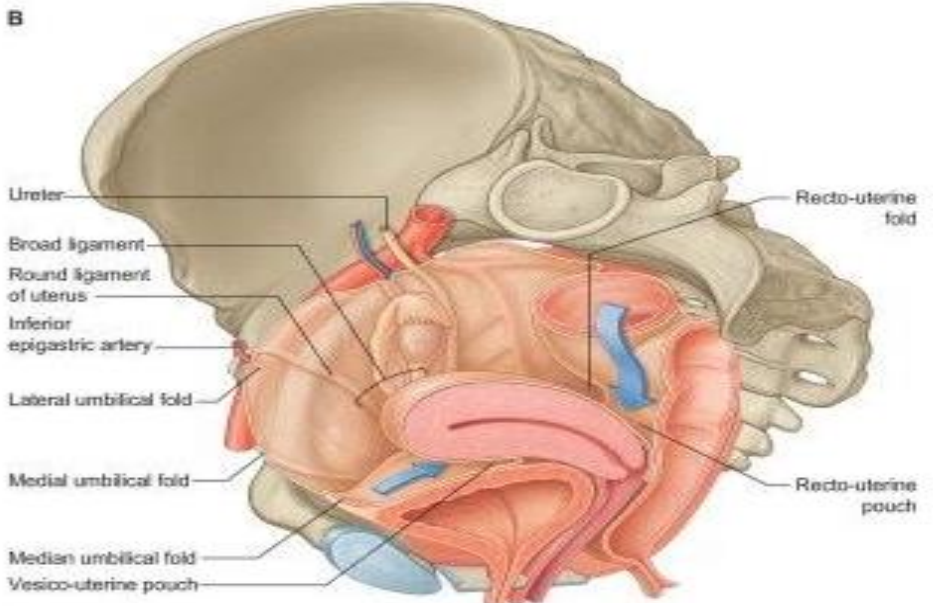


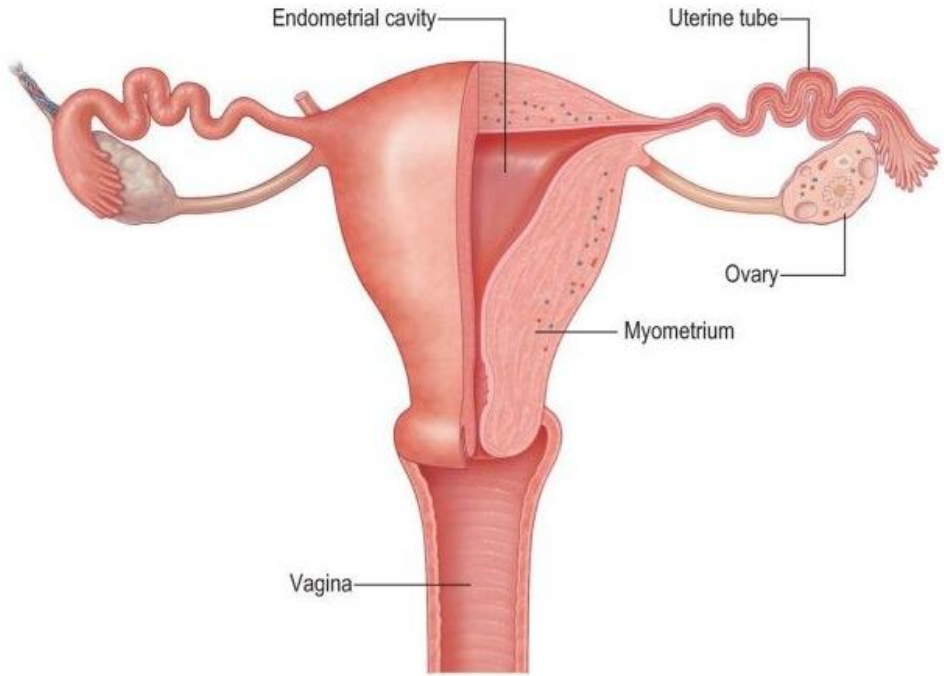
- Anterior surface:
- Flat, directed downward & forward
- Related anteriorly – urinary bladder



- Posterior surface:
- Convex, directed upward and backward
- Relation-
- Sigmoid colon & small intestine

- **Lateral border-**
- Rounded, - attachment of broad ligament of uterus





- **Uterine cavity**

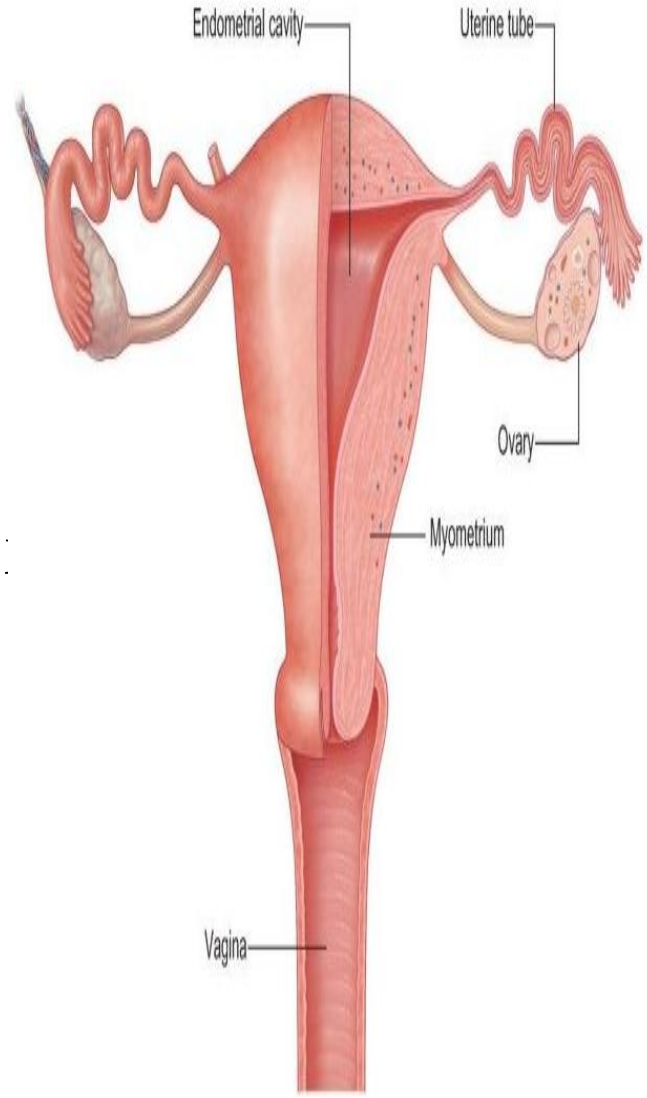
- The cavity of uterus is small in comparison to its size due to its thick muscular wall.

It is divided into two parts:

- cavity of the body

The implantation commonly occurs in the upper part of posterior wall

- cavity of the cervix



Cavity of the Cervix (Cervical Canal)

- It is a spindle-shaped canal
- It communicates antero superiorly with the cavity of body of uterus through *internal os*

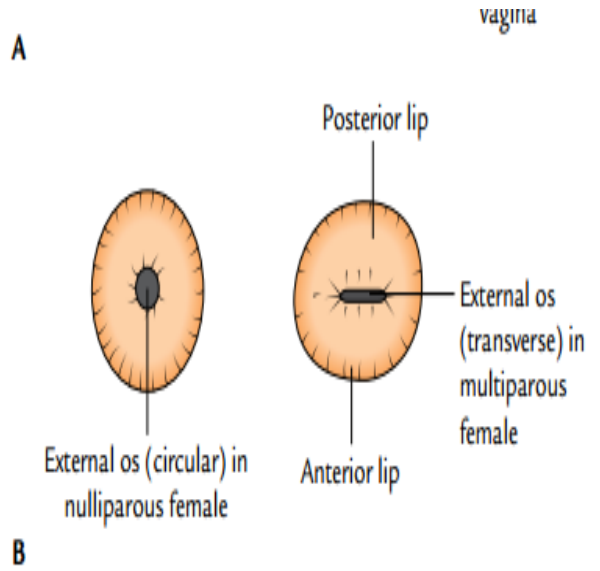
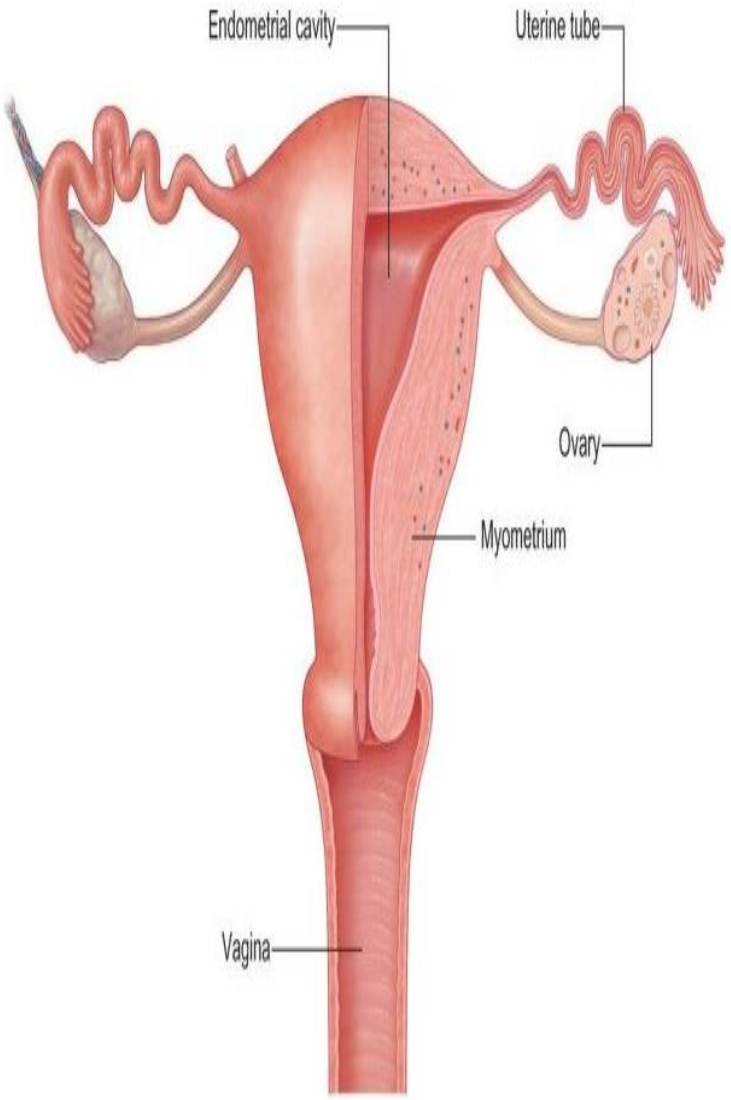


Fig. 18.13 A, Different parts of the uterus; B, shapes of external os in nulliparous and multiparous females.

CERVIX

- It is the lower cylindrical part.
- Part below the level internal os
- More fixed
- It is separated infront from body by constriction known as isthmus



- The ratio of length of uterus and of cervix varies with age.
- From birth till the age of puberty the ratio is 1:2
- While after puberty it becomes 2:1

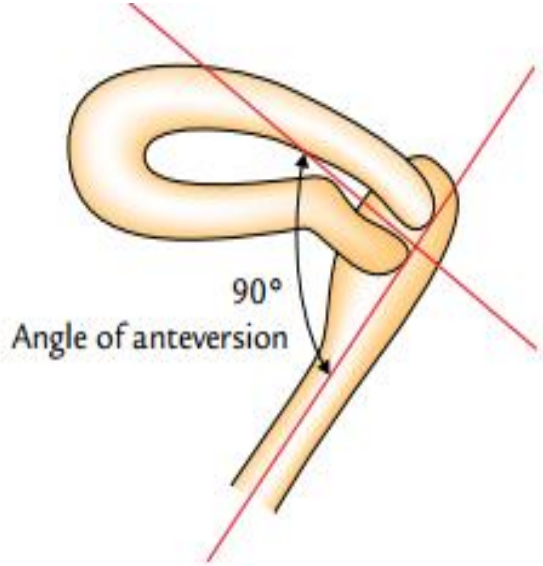
- **Angulation of uterus**

- Anteversion:(Forward tilting of uterus relative to the vagina)

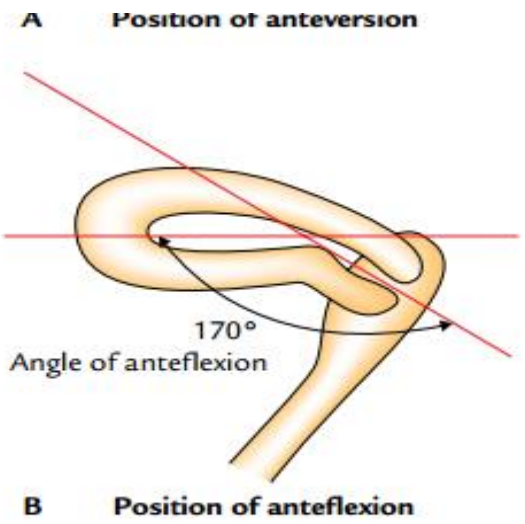
The long axis of the cervix is normally bent forward on the long axis of vagina forming an angle of about 90°

- Anteflexion: (Slightly flexion of uterus at the level of internal os)

The long axis of the body of uterus is bent forward at the level of isthmus (internal os) on the long axis of cervix forming an angle of 170◦

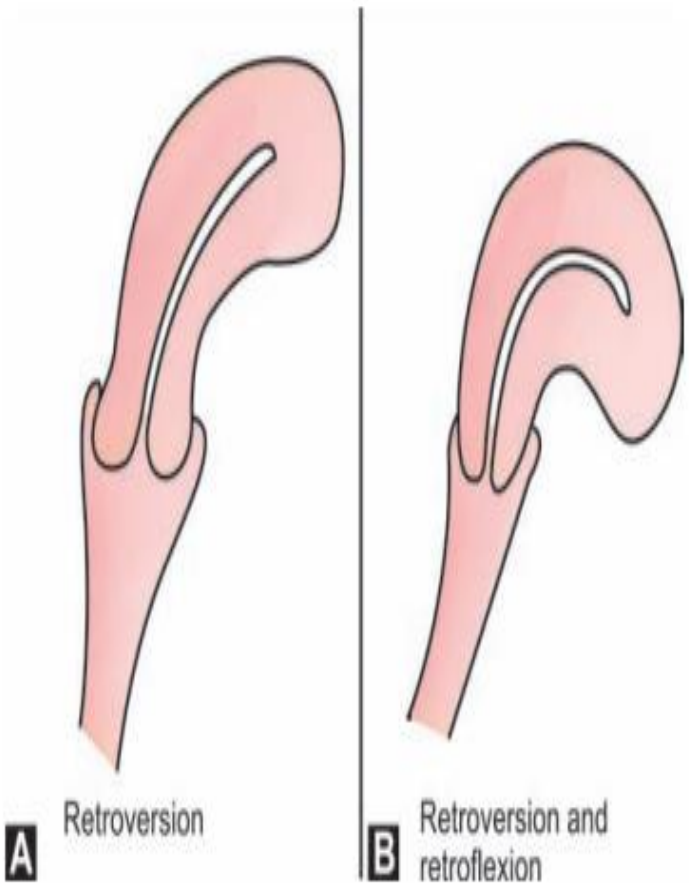


A Position of anteversion



- Sometimes the axis of uterine body passes upwards or backwards as a result of which there is no angulation between the uterus and cervix.

- In such cases the uterus bends back on the cervix causing narrowing of the cervical canal. This is known as **retroflexion**, Which may cause painful menstruation and reduce the chances of conception

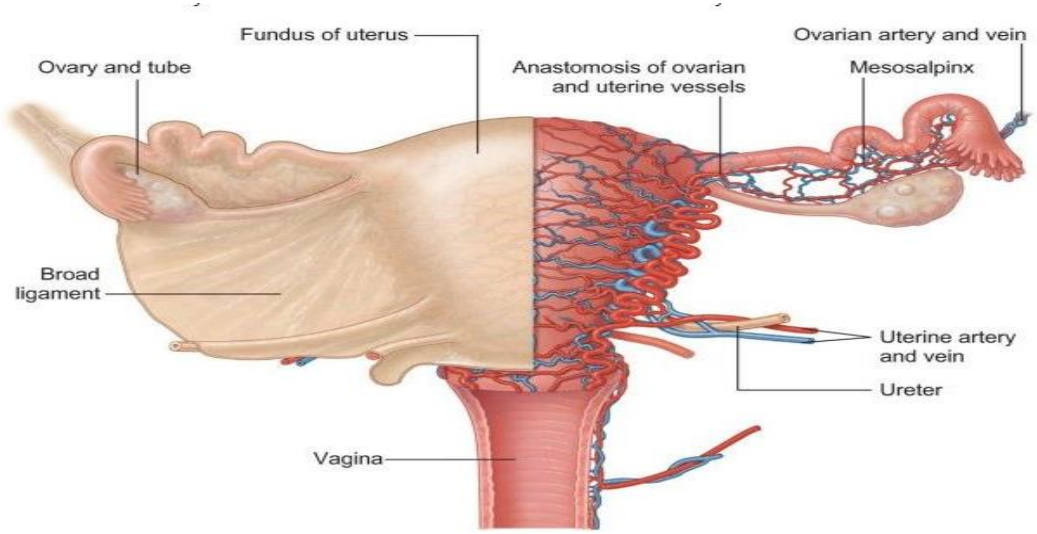


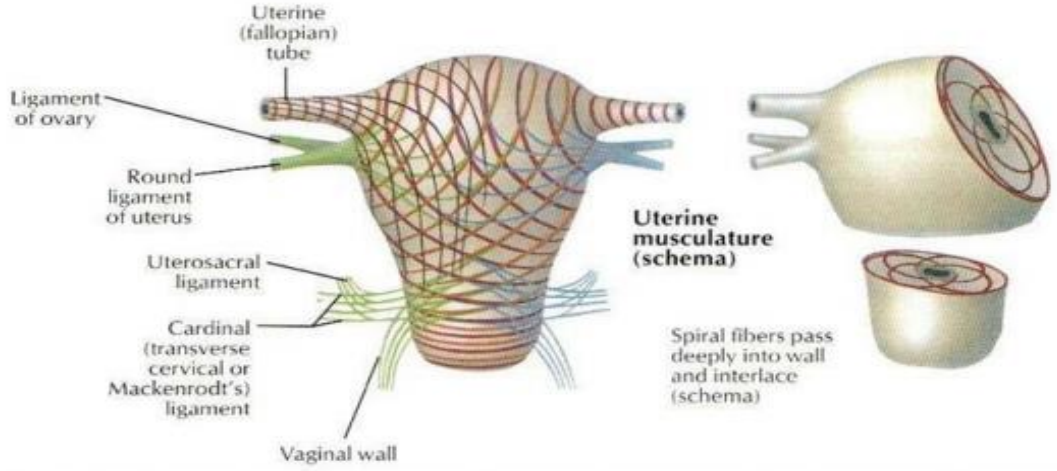
Figs 88.27A and B: Abnormal positions of uterus

Ligaments of uterus

- True ligaments (FIBROMUSCULAR BAND)
- Round ligament
- Mackenrodts ligament
- Uterosacral ligament
- Pubocervical ligaments

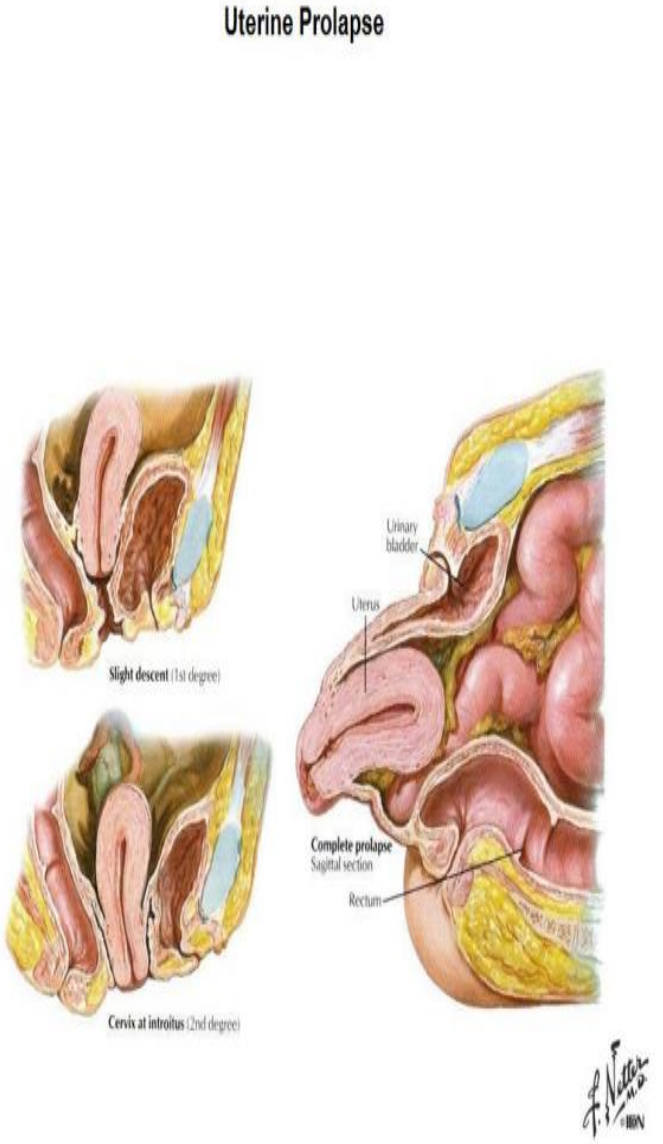
- The parietal peritoneum is reflected over the upper genital tract & produce these-
- False ligaments:
- Uterovesical (ant false ligaments)
- Rectovaginal folds (posterior false lig)
- Broad ligament
- A pair of recto-uterine fold





Applied aspect

- **Cervical carcinoma:** It is the most common cancer in females (11%). The second commonest cancer in females is breast cancer (about 8%)



Blood SUPPLY

- Supplied mainly by two uterine arteries and partly by two ovarian arteries
- The veins of the uterus correspond to arteries.

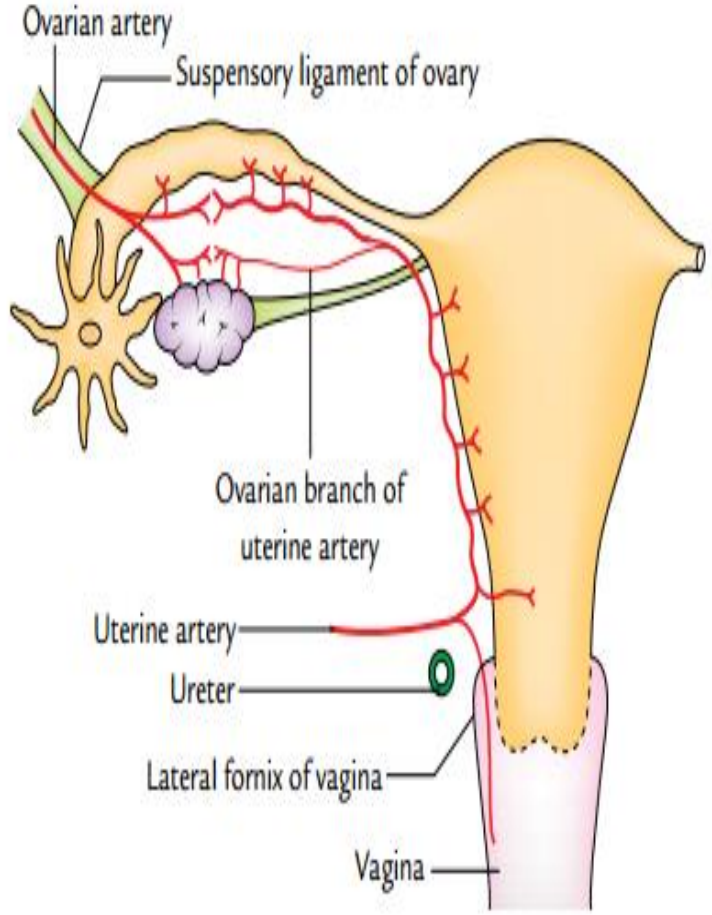


Fig. 18.15 Arterial supply of the uterus.

SUPPORTS OF THE UTERUS

primary supports and accessory or secondary supports

- **Primary Supports**
  1. Muscular
  (a) Pelvic diaphragm --- levator ani-
  (b) Perineal body –fibromuscular node
  (c) Urogenital diaphragm – musculofascial partition
  -sphincter urethrae
  -transversus perinei profundus
  -sup n inf fascia
  -urethra and vagina pierce this diaphragm
- Muscular support- the levator ani muscle of pelvic diaphragm

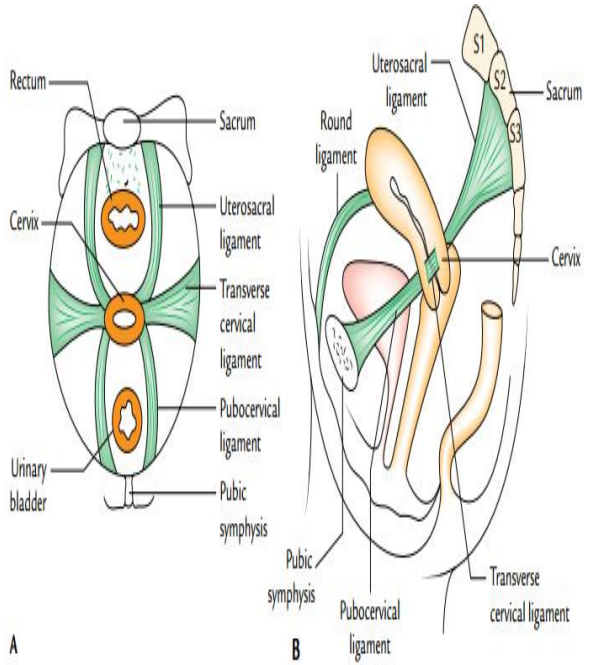
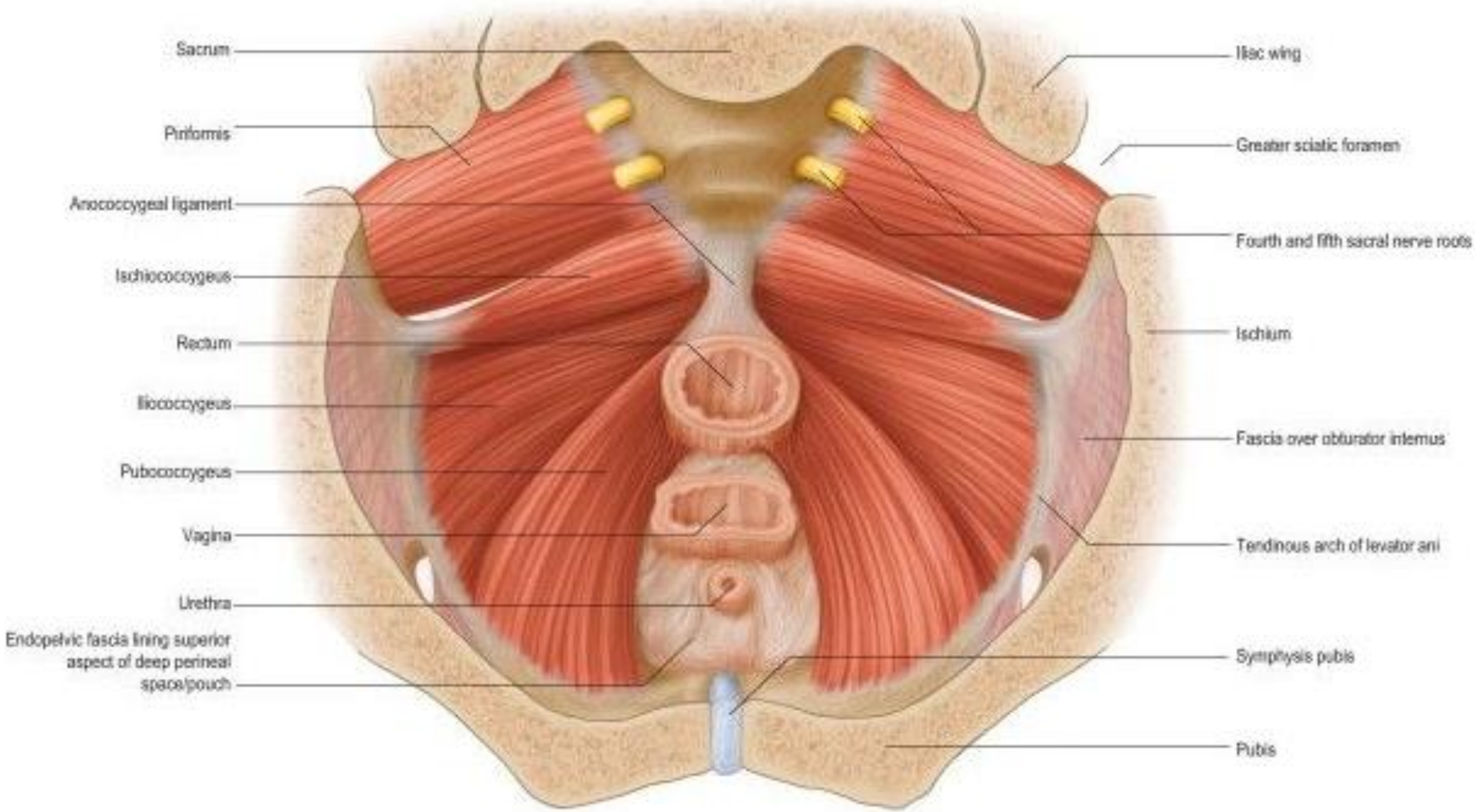
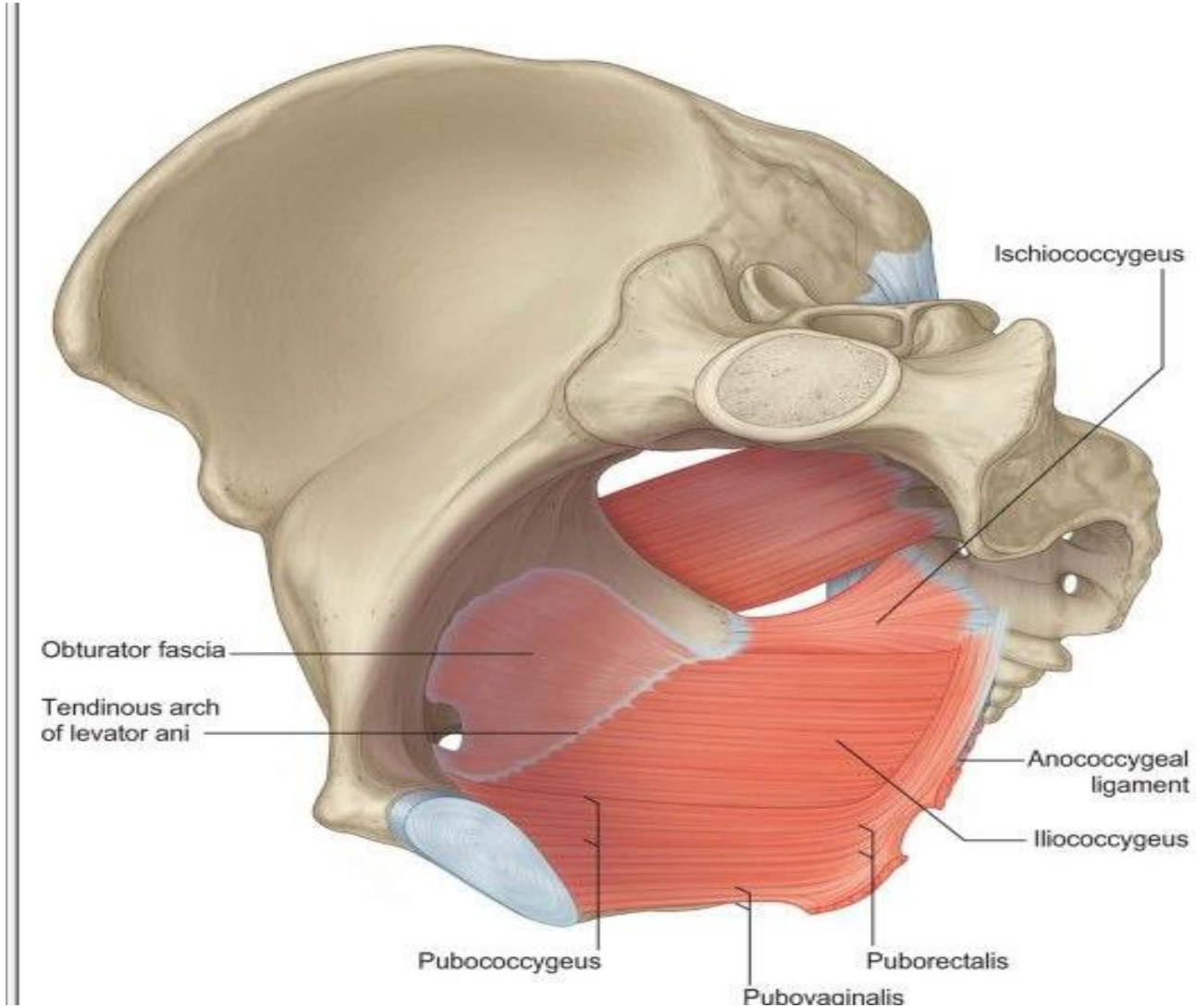
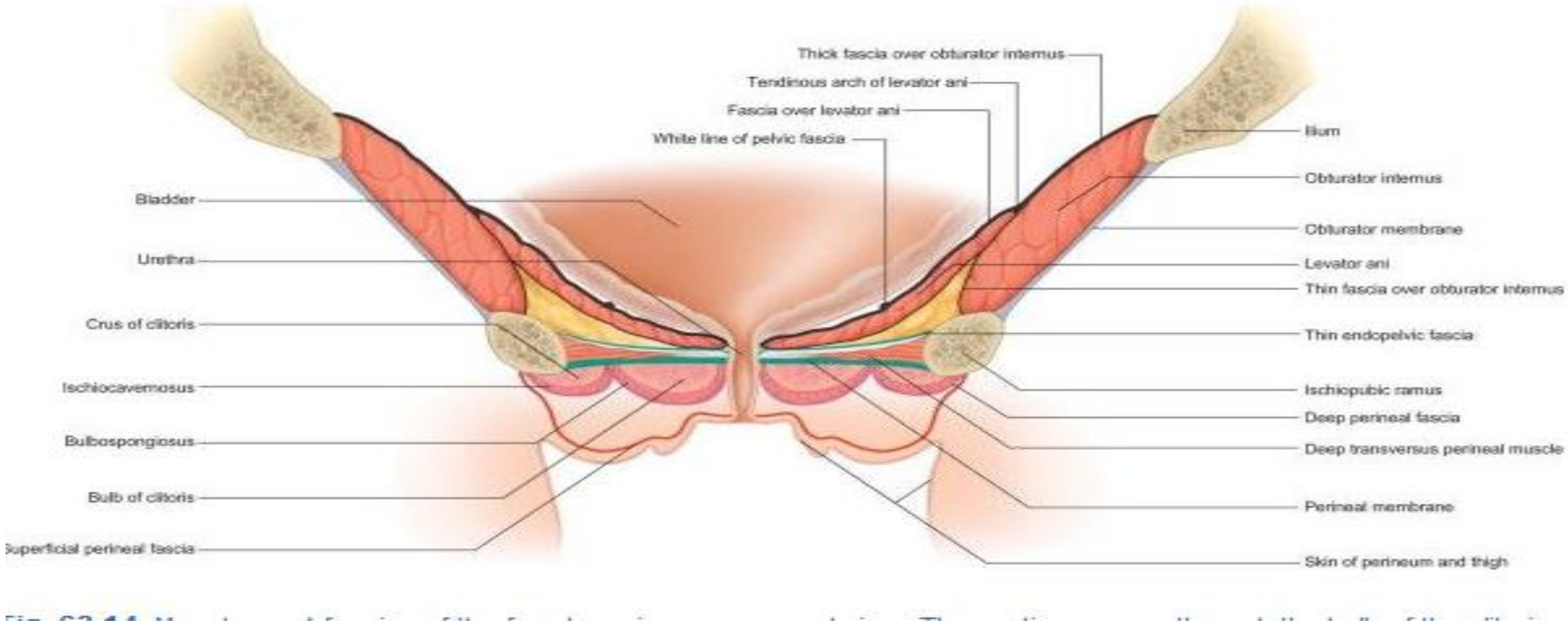


Fig. 18.18 Ligamentous (fibromuscular) supports of the uterus: A, as seen from above; B, lateral view. Note all these ligaments except the round ligaments are formed by the condensation of visceral layer of pelvic fascia.


Sacrum
Piriformis
Anococcygeal ligament
Ischiococcygeus
Rectum
Iliococcygeus
Pubococcygeus
Vagina
Urethra
Endopelvic fascia lining superior aspect of deep perineal space/pouch
Iliac wing
Greater sciatic foramen
Fourth and fifth sacral nerve roots
Ischium
Fascia over obturator internus
Tendinous arch of levator ani
Symphysis pubis
Pubis



Pelvic diaphragm


Thick fascia over obturator internus
Tendinous arch of levator ani
Fascia over levator ani
White line of pelvic fascia
Ilium
Obturator internus
Obturator membrane
Levator ani
Thin fascia over obturator internus
Thin endopelvic fascia
Ischiopubic ramus
Deep perineal fascia
Deep transversus perineal muscle
Perineal membrane
Skin of perineum and thigh
Bladder
Urethra
Crus of clitoris
Ischiocavernosus
Bulbospongiosus
Bulb of clitoris
Superficial perineal fascia

- **Visceral**
  (a) Urinary bladder- support body of uterus
  (b) Vagina -slanting post wall of vagina
  (c) Uterine axis

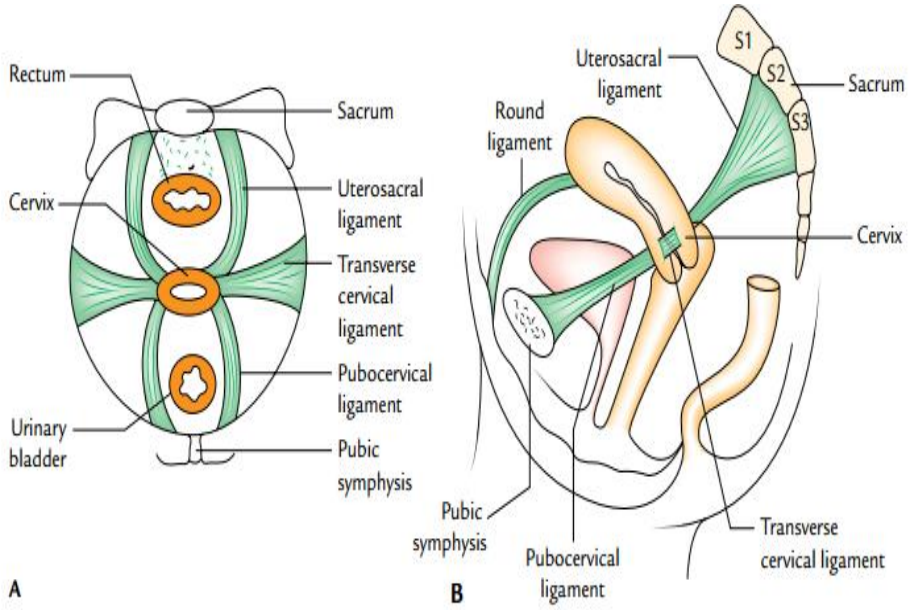


Fig. 18.18 Ligamentous (fibromuscular) supports of the uterus: A, as seen from above; B, lateral view. Note all these ligaments except the round ligaments are formed by the condensation of visceral layer of pelvic fascia.

- 3. Fibromuscular /condensation of pelvic fascia
  (a) Transverse cervical ligaments (of Mackenrodt).

- (b) Pubocervical ligaments.

- (c) Uterosacral ligaments.

- (d) Round ligaments of the uterus

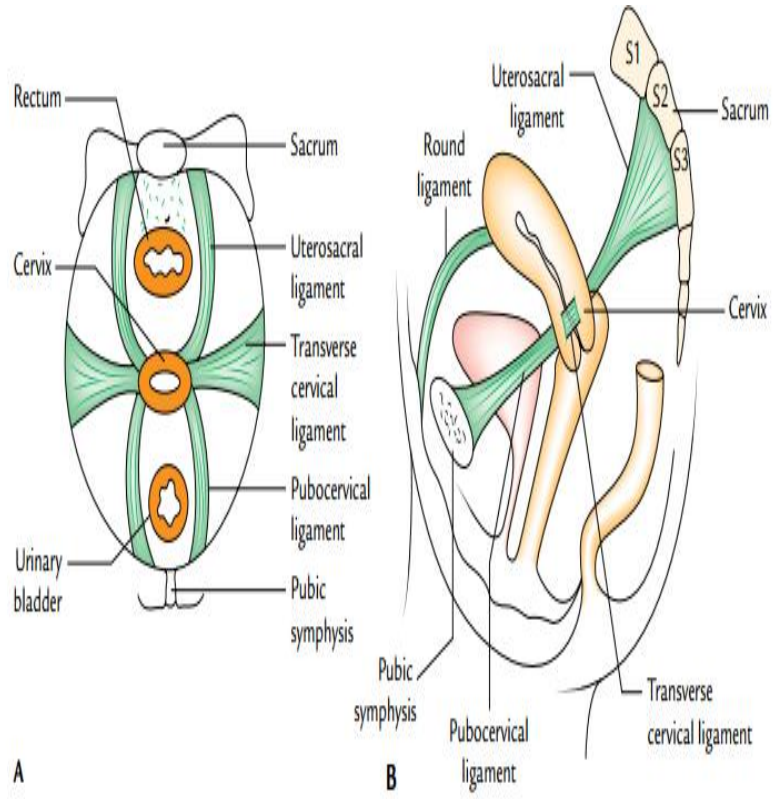


Fig. 18.18 Ligamentous (fibromuscular) supports of the uterus: A, as seen from above; B, lateral view. Note all these ligaments except the round ligaments are formed by the condensation of visceral layer of pelvic fascia.

- **Comprises of fibro areolar and fibromuscular tissue.**

Secondary Supports

1. Broad ligaments
2. Uterovesical fold of peritoneum.
3. Rectovaginal fold of peritoneum.

VAGINA

- The vagina is a fibro muscular tube connecting the cervical canal to the exterior at the vestibule

- **Per Vaginum Examination**

The form and size of the body of the uterus are examined by bimanual palpation with two fingers of one hand in the vagina and on the other hand anterior abdominal wall above the pubic symphysis

- The urinary bladder and urethra are felt through the anterior wall of vagina.

- The rectal ampulla is palpated through its posterior wall. The loops of intestine and sigmoid colon are felt in the pouch of Douglas

- The ureter and pulsations of uterine artery can be felt through lateral fornices.

THANK YOU