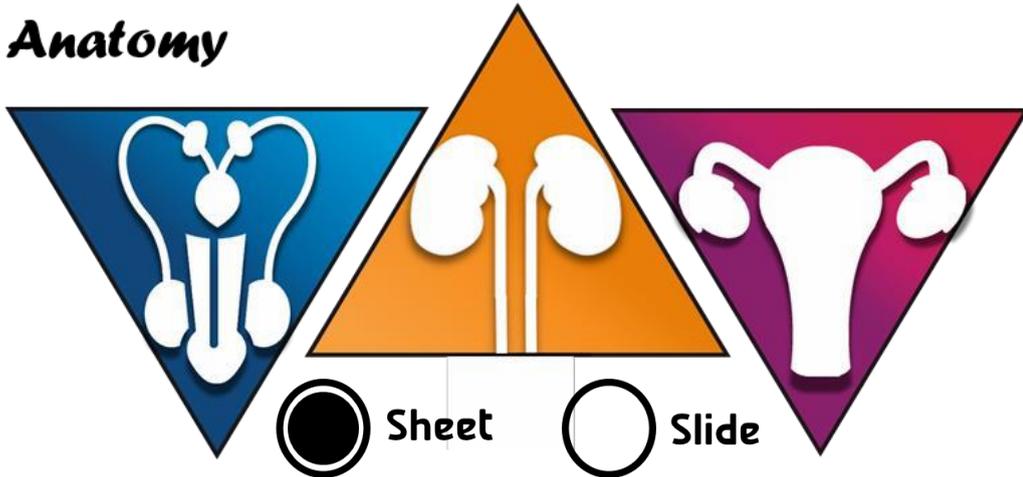




Urogenital system

Anatomy



Number:

- 8

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Female genital system

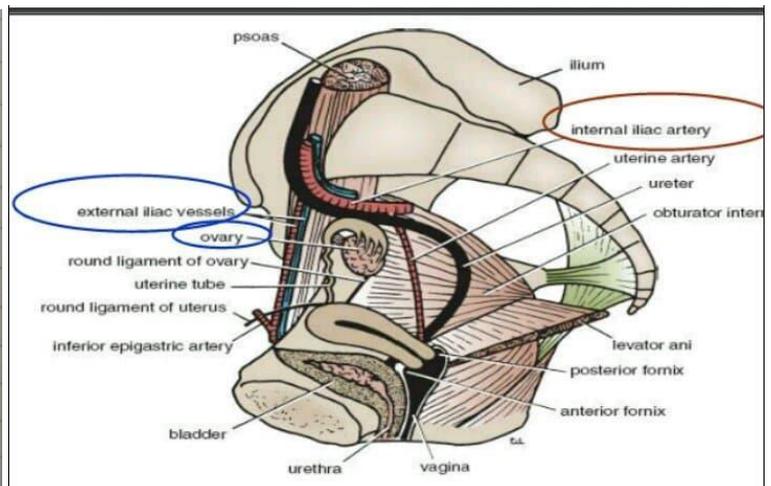
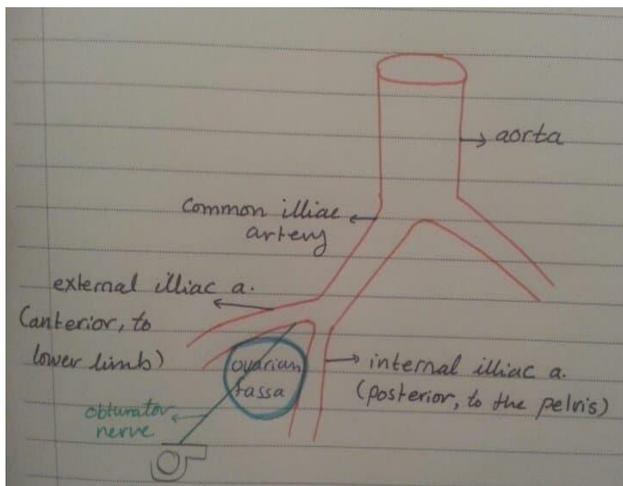
This sheet covers the basic anatomy of the ovaries, the uterine tube and the uterus. Please **go over the slides** once you are done.

A) Ovaries:

First: the location of the ovaries

To understand the location of the ovaries, you need to remember that the common iliac artery gives rise to the external and the internal iliac arteries, the external is anterior to the internal iliac artery. Also remember that the obturator nerve passes laterally on the pelvic wall to reach the obturator foramen.

Now, the ovary lies in a depression called the ovarian fossa in the lateral wall of the pelvis. It is bounded anteriorly by the external iliac artery, posteriorly by the internal iliac artery and laterally by the obturator nerve and vessels. The ovary lies posterior to the uterus.



Second: the structure of the ovaries

The ovary is oval shaped and has: 2 poles; upper and lower.

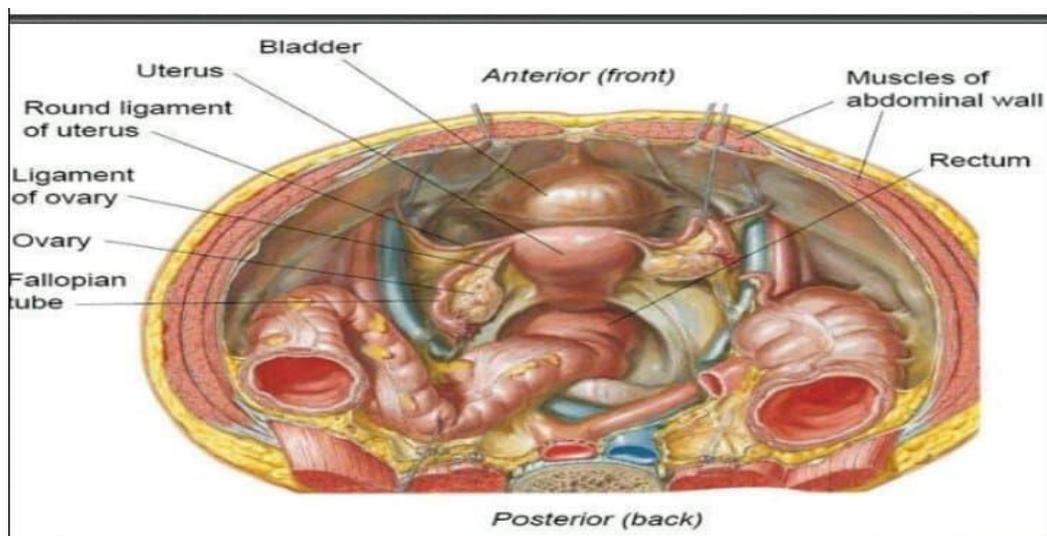
2 borders; anterior and posterior.

And 2 surfaces; lateral and medial.

□ The poles:

- The upper pole: is related to the ovarian fimbria, part of the uterine tube, and is attached to side wall of the pelvis by the ovarian suspensory ligament where the nerves and vessels to the ovary pass.

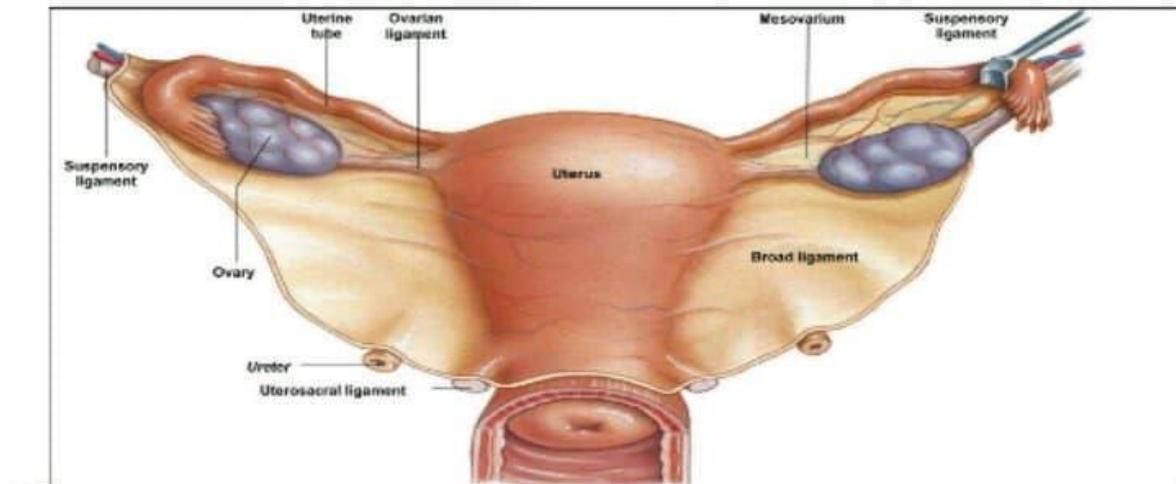
- The lower pole: Is related to the round ligament of the ovary, this ligament is between the ovary itself and the uterotubal junction, a junction between the uterus and the uterine tube.
- Borders of the Ovary:
 - Anterior border: related to the posterior layer of the broad ligament of uterus, where the mesovarian ligament is found, this area is also called the hilum of the ovary. (further explanation is in the third section of this discussion)
 - Posterior (free) border: related to the uterine tube.
- Surfaces of the Ovary:
 - Lateral surface: Is related to the lateral pelvic wall, and the obturator nerve and vessels.
 - Medial surface: Is related to the uterine tube. Notice how the uterine tube curves in the lateral wall of the pelvis making it related to the upper pole, posterior border and the medial surface of the ovaries.



Third: broad ligament of the uterus

This is a fold of peritoneum that covers the uterus entirely, it is laterally related to the pelvic wall, inferiorly related to pelvic diaphragm, medially related to the uterus, its upper border is related to the uterine tube and at the last part of it the suspensory ligament is found. The broad ligament also has an anterior layer and a posterior layer. The posterior

layer is related to the anterior border of the ovary, the anterior layer is where the round ligament of the uterus passes, note that this ligament also joins the uterotubal junction. (remember in class when a volunteer wore a coat/ cloth thing, that cloth represented the broad ligament)



Forth: the ovaries develop in the abdomen, so:

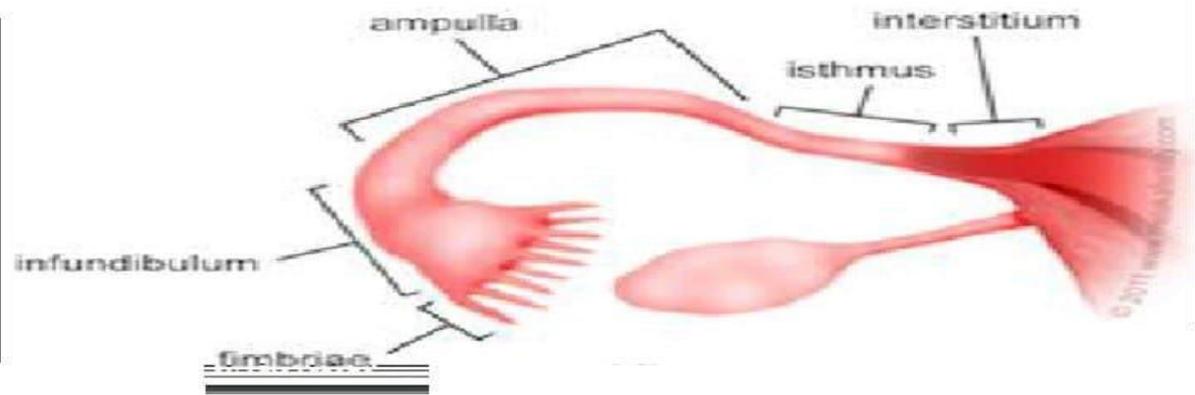
- Blood supply: abdominal aorta---gonadal artery---ovarian artery which passes through the suspensory ligament to the ovary.
- Venous drainage: pampiniform plexus ---ovarian vein
The right ovarian vein → I.V.C., while the left → left renal vein
- Lymphatic Drainage: to lateral aortic lymph nodes
- Nerve supply: coeliac and aortic nerve plexuses.

B) Uterine tube:

First: description

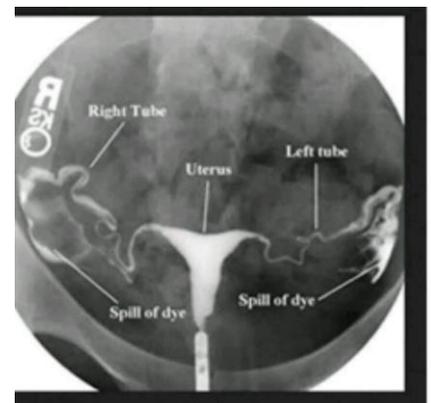
Also known as the fallopian tube, it is medially related to the uterus and opens laterally into the peritoneal cavity. it has four parts, from lateral to medial:

1. Infundibulum: It is the lateral part of the tube which is closely related to the ovary by the fimbriae which trap the oocyte into the uterine tube.
2. Ampulla: It is the widest and it is the site of fertilization.
3. Isthmus: It is narrow, short
4. Uterine (intramural) part: passes through the wall of the uterus. It is the narrowest part of the whole tube.



Second: clinical applications

- Although rare, but infection in the vagina can ascend to the uterus and reach the peritoneum via the uterine tube. Here we need to highlight the fact that the uterine tube is not attached to the ovary, instead there is an opening at the end of uterine tube called the ostium, and through this space the infection can spread. So, think of the tube as a cap that covers the ovary.
- Bilateral blockage of the uterine tube due to fibrosis or scarring causes infertility.
- A permanent contraceptive method is to tie or ligate the uterine tubes.
- Hysterosalpingography is a therapeutic and a diagnostic method, where a dye is injected in the vagina, a radiograph is then taken. This enables the physician to spot any blockages in the tube, and the injection might also clear up any minor blockages if present, thus therapeutic.



Hysterosalpingography

- A case:

A female patient, 30 years old, married came to the ER with severe abdominal pain. Her first day of last menstrual period was 10/2/2019 . Last week, pregnancy test was positive.

She was pale, blood pressure 90/50, and pulse 120 /M. Ultrasonography revealed intra-abdominal haemorrhage.

The late menstruation indicates a potential pregnancy, pain and haemorrhage can be due to an ectopic pregnancy in the uterine tube for example, which will eventually rupture. In general, ectopic pregnancies can be discovered due to the haemorrhage or by Ultrasound scans that show an abnormal pregnancy.



Third: the uterine tube is located between the ovary and uterus, so:

- Blood Supply: Medial 2/3 by uterine vessels. Lateral 1/3 by ovarian vessels
- Nerve Supply: Medial 2/3 by uterine nerve plexus. Lateral 1/3 by ovarian nerve plexus
- Lymphatic Drainage: Lateral aortic lymph nodes.

C) Uterus:

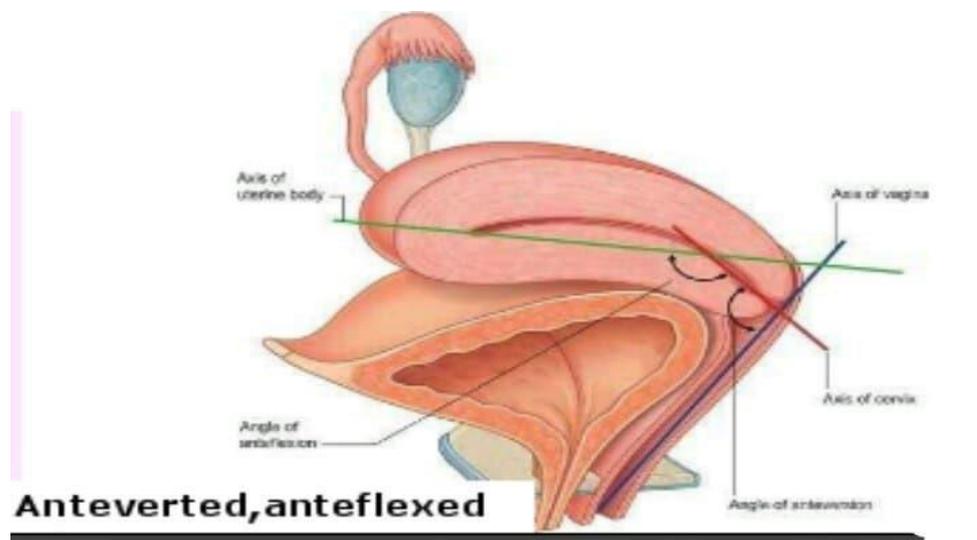
First: Normal Position of the Uterus

Normally, the uterus is anteverted, anteflexed:

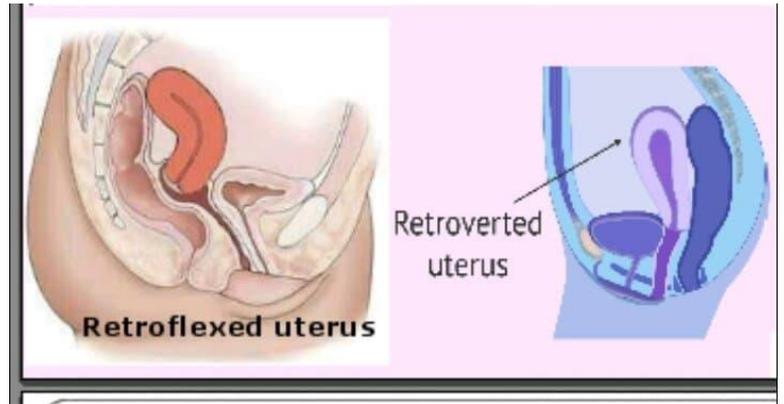
The "ante" part means anterior, now follow the [axis of the uterus](#) and notice how it intersects with the [axis of the vagina](#), the angle formed is the angle of anteversion = 90°. This time follow the [axis of the uterus](#) and its intersection with the [axis of the cervix](#), this is the angle of anteflexion = 170°.

Uterus + yagina --- anteverted

Uterus + cervix --- anteflexed.



An abnormally positioned uterus would be retroverted retroflexed, retro means posterior, this abnormal position would make pregnancies less likely to happen, and miscarriages more frequent.

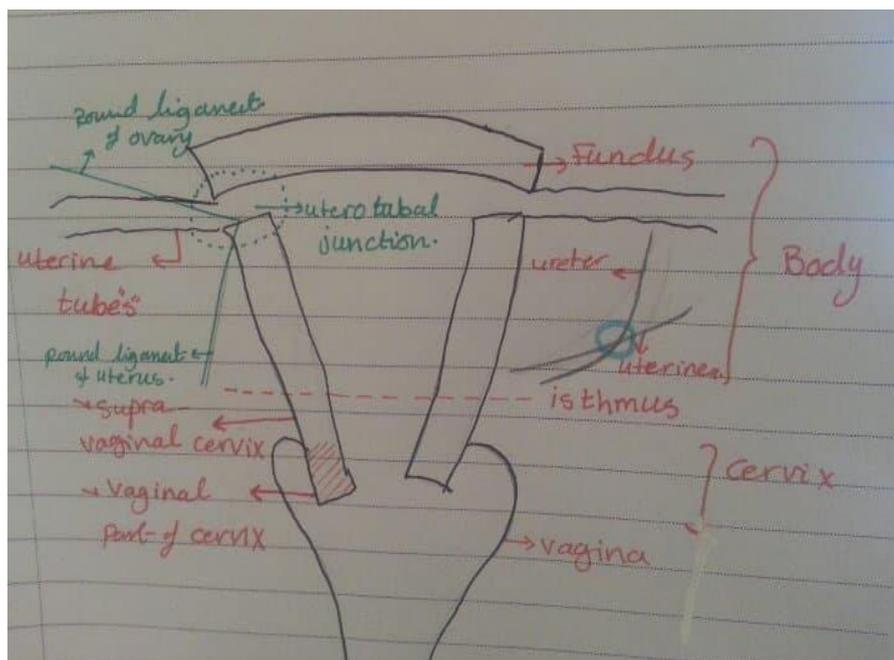


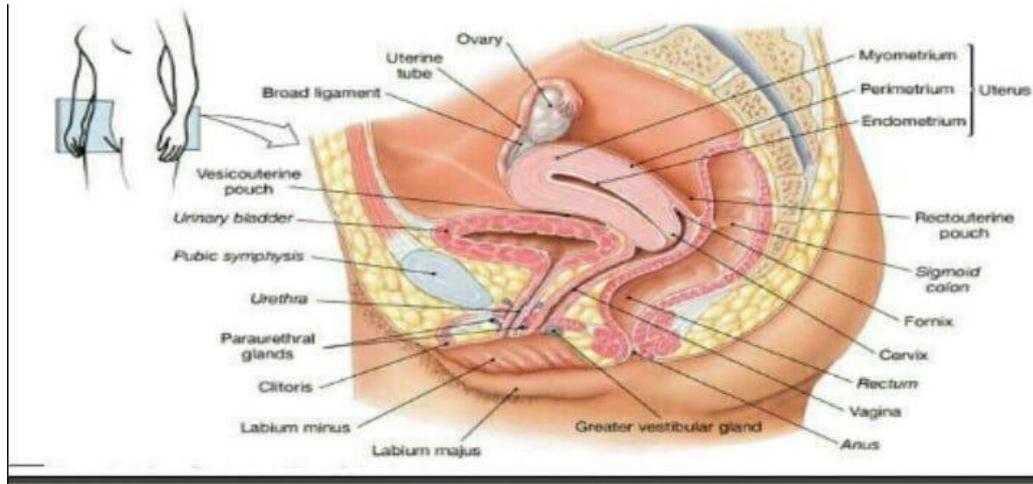
Second: Description of the Uterus

The uterus is divided by a transverse constriction called the isthmus, it separates the body and fundus above, and the cervix below. The cervix is further divided to the supravaginal cervix above the vagina, and the intravaginal cervix within the vagina.

Anterior to the uterus is the bladder and posterior to it is the sigmoid colon and the rectum.

The peritoneum covers the bladder and then descends to the anterior wall of the uterus forming a flexion called the uterovesical pouch, the peritoneum then covers the fundus superiorly and continues to pass posteriorly till it reaches the rectum forming another flexion called the Douglas pouch.





Third: relations of the uterus

When studying the relations of the uterus we divide it into two parts; the body and fundus, then the cervix.

1) body:

Anteriorly: bladder and uterovesical pouch.

Posteriorly: coils of small intestine sigmoid colon and Douglas pouch.

Superior to the fundus: sigmoid colon and small intestine.

Lateral: 2 ligaments:

- A ligament going anterior inferior: the round ligament of uterus.
- A ligament going posterior superior: round ligament of the ovary.

2) cervix:

a) supra vaginal cervix:

anteriorly: urinary bladder, parametrium

NOT the pouch.

Posteriorly: Douglas pouch and the rectum.

Lateral wall: the crossing of uterine artery and ureter. (further explanation on the following page.)

Peritoneal Covering of the Uterus :

- The posterior surface and fundus of body of uterus are covered by peritoneum
- The peritoneum descends to cover its anterior surface down to the level of *internal os*, where it is reflected on to the bladder.
- The supravaginal cervix is covered by peritoneum *only posteriorly*.
- The front and sides of The supravaginal cervix are **bare** of peritoneum and related to cellular connective tissue, the parametrium.

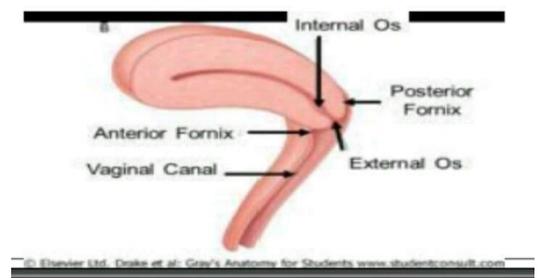
Anatomical significance of the internal os :

- It corresponds to the isthmus of the uterus.
- It is the site of junction between uterine cavity and cervical canal.
- It is the level of the angle of anteflexion.
- It is the level at which the peritoneum is reflected anteriorly on to the bladder

The ureter passes to reach the bladder, and the uterine artery passes to enter the uterus. These two cross laterally to the supra vaginal cervix, the ureter is under the uterine artery (water under bridge). This relation is important, because surgically you need to be cautious not to tie the ureter while ligating the uterine artery. (look at the previous drawing, we are talking about the area in the blue circle).

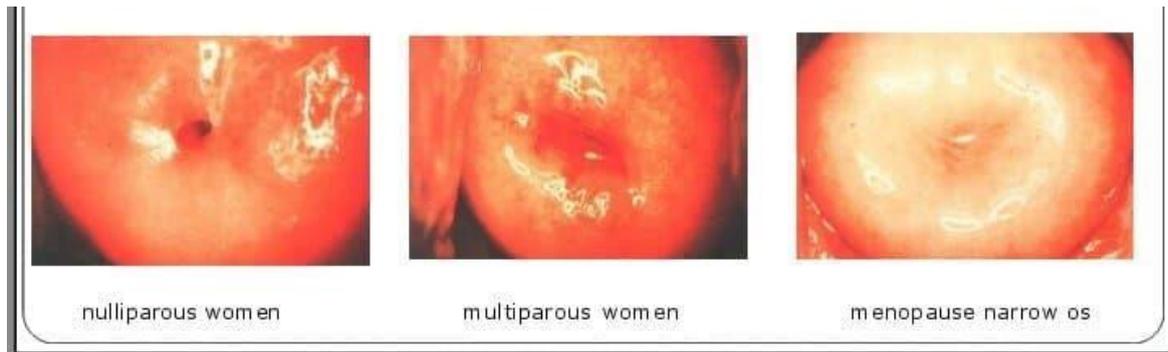
b) vaginal cervix:

around this part of the cervix there a space called the fornix is formed; 1 anterior, 1 posterior which is the deepest and covered with peritoneum, and 2 lateral fornices.



The uterine cavity opens into the cervix at the internal os, and the cervix opens into the vagina through the external os.

Clinically the external os can be viewed, in nulliparous women it is rounded, in multiparous women it is transverse.



Fourth:

Arterial Blood Supply: by uterine artery

- It runs medially on the upper surface of the pelvic diaphragm to reach the root of broad ligament close to the lateral vaginal fornix. It enters the broad ligament and runs a tortuous course along the lateral margin of the uterus.
 - blood supply: From the uterine artery a branch of the internal iliac artery.

Remember that the uterine artery crosses with the ureter in the lateral wall of the supravaginal cervix. The uterine artery also anastomoses with the ovarian and the vaginal arteries this anastomosis is called azygous anastomoses.

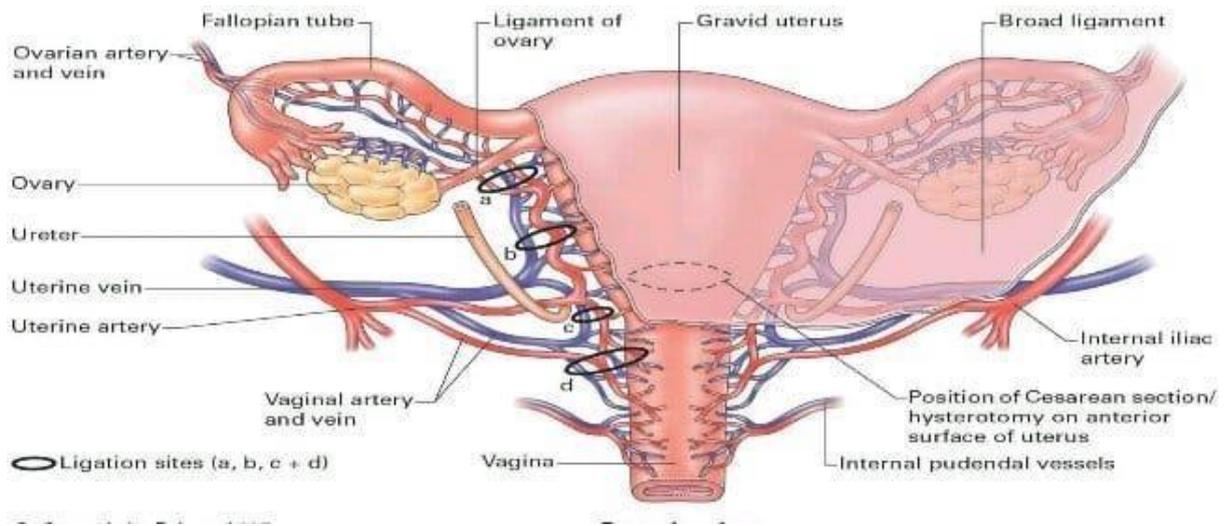
- Venous drainage: via uterine vein --- internal iliac vein
- Lymphatics:

Fundus: lateral aortic lymph node

Uterotubal junction along the round ligament of the uterus: Superficial inguinal lymph nodes.

Body, lymphatics pass through the broad ligament: External iliac lymph nodes

Cervix: to all of them, External, internal and sacral lymph nodes (remember this by knowing that the cervix cancer is very dangerous and spreads all over)



Best of luck!

