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Edition 8.5

Gynaecology

Instructions

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APPLIED ANATOMY : INTRODUCTION & UTERINE ARTERY

----- Active space -----

Sex Differentiation & Lymphovascular Supply

00:01:18

Sex Differentiation :

Females		males	
Karyotype	46(XX) / 44 + XX	46(XY) / 44 + XY	
Bar body	1	0	
(No. of X chromosome - 1)			
Internal genitalia		• Fallopian tube • uterus • Cervix • Vagina	
		• Seminal vesicle • Epididymus • Ejaculatory duct • Vas deferens	
		mnemonic : SEED	

external genitalia : Homologous organs : Organs with same embryological origin in males & females)

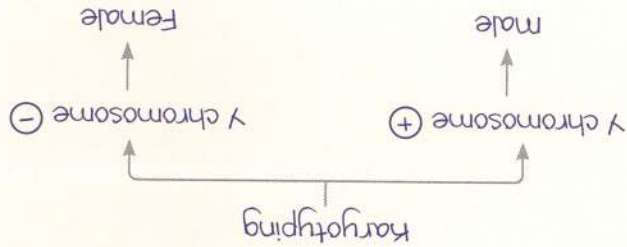
Females		males	
Labia majora	Scrotum	Penile urethra	
Labia minora			
Clitoris	Penis		
Bartholin glands/ greater vestibular gland	Bulbourethral / Cowpers gland		
Paraurethral / Skene gland	Prostate		

Sex determination :

• m/c method : **Assessment of external genitalia.**

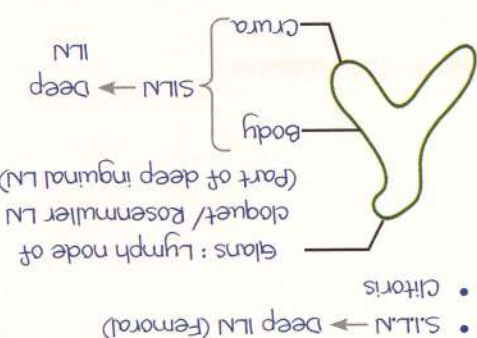
Drawback : Not applicable in ambiguous genitalia.

• Best method :



Lymphovascular Supply:

----- Active space -----

	Blood Supply	Nerve Supply	Lymphatic Drainage
Ovary	- Arterial drainage: Ovarian artery (branch of abdominal aorta at L₄) - Venous drainage: Left ovarian vein → Renal vein. - Right ovarian vein → IVC.	- T₁₀, T₁₁ via Ovarian plexus ↑ Also supplies Fallopian tube (lateral). - Broad ligament.	Para-aortic lymph nodes
Fallopian tube	- medial a/3rd: uterine artery. - lateral 1/3rd: ovarian artery.	- T₁₀, T₁₁, L₁ - Applied aspect: Pain in unrup-tured ectopic (b/t stretching of fallopian tube)	- major: Para-aortic lymph node (LN) - intra-uterine + round ligament node (SILN) - superficial inguinal lymph node (SILN)
uterus	80% → uterine artery (branch of anterior division of internal iliac artery) 20% → Anastomotic branch of ovarian artery	T₁₀ - L₁ via Frankenhäuser ganglion (uterovaginal plexus)	- Cornua - Round ligament - Fundus: Para-aortic LN - Body: external + internal iliac LN
Cervix	Descending cervical artery: A branch of uterine artery	S _a - S ₄	- Frankenhäuser ganglion - Hypogastric LN (internal iliac) - Obturator LN. - Paracervical LN - external iliac LN
Vagina	vaginal artery: Branch of internal iliac artery.	- Upper vagina: S_a - S₄. - Lower vagina: Pudendal N.	- Upper a/3rd: HOPE - Lower 1/3rd: SILN
Vulva	- Internal pudendal artery - mons pubis: external pudendal artery.	- Pudendal nerve + Anterior superior part of: Ilioinguinal nerve - Genito-femoral nerve - Posterior-inferior part of: Posterior cutaneous nerve of thigh - Pudendal nerve	 - Clitoris - S.I.L.N. → Deep ILN (Femoral) - ilios: Lymph node of cloquet/Rosenmuller LN (Part of deep inguinal LN) - SILN - Deep ILN

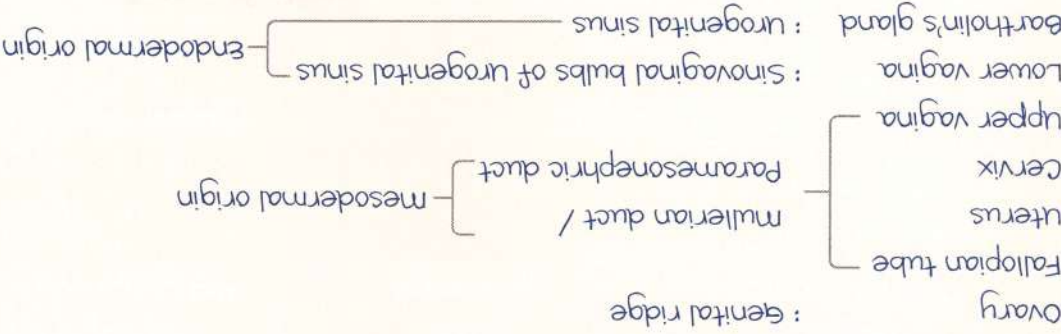
Note:

Vulva is AHA pudendum and is the external genitalia of females.

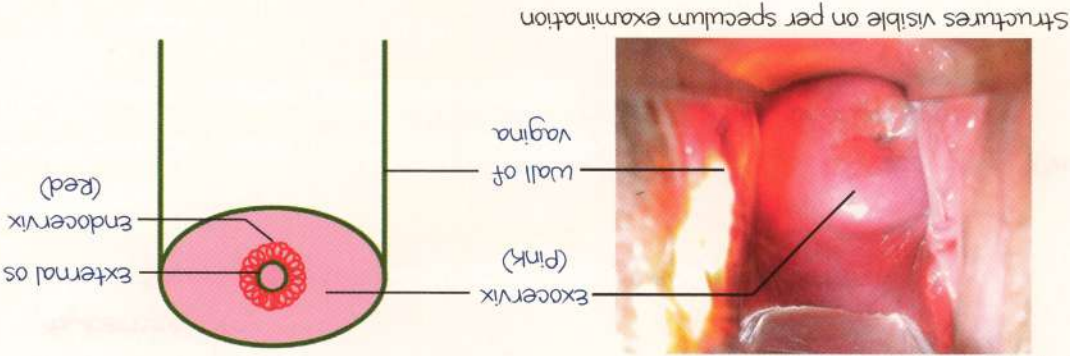
Lining Epithelium of Female Genitalia :

Organ	Lining epithelium	m/c cancer
Ovary	Surface epithelium : Single layer of cuboidal epithelium	epithelial cell tumor
Fallopian tube	Ciliated columnar epithelium	Adenocarcinoma
uterus	Ciliated columnar epithelium (onset of menstruation : Cilia lost)	Endometrial ca : Adenocarcinoma
Cervix	Endocervix	Adenocarcinoma
	Exocervix	Squamous cell carcinoma (m/c)
Vagina	Non-keratinized stratified	Squamous cell carcinoma
Hymen	Non-keratinized stratified squamous epithelium	Squamous cell carcinoma
Bartholin's gland	- Gland : Columnar epithelium. - Duct : Transitional epithelium. - Opening : Squamous epithelium.	- Adenocarcinoma (m/c) - Transitional cell ca - Squamous cell carcinoma

Embryological Derivatives



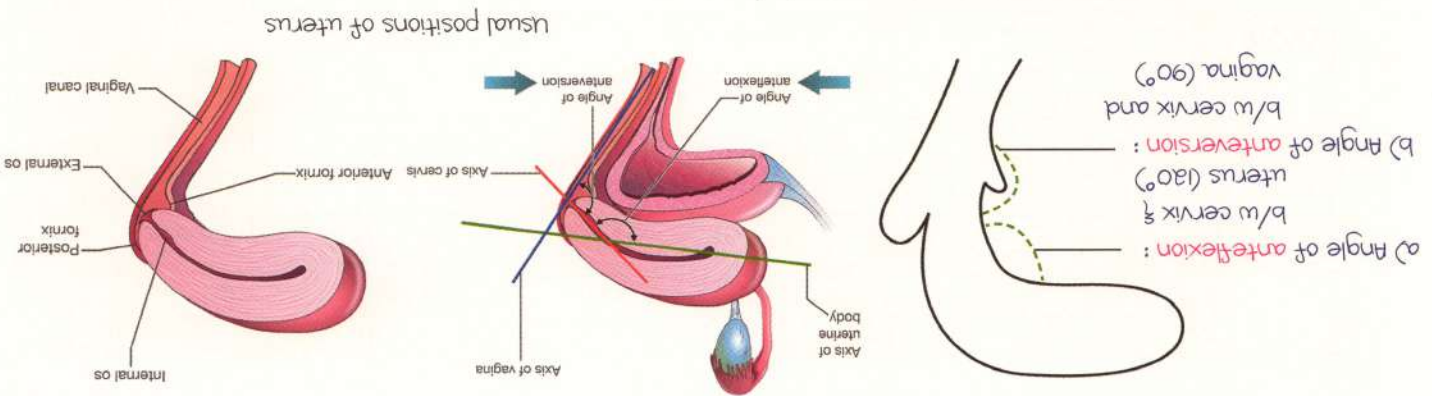
Per Speculum Examination :



Angles of Uterus, Round Ligament & Uterine Artery

00:33:25

Angles of uterus :



Anteverted vs retroverted uterus :

Anteverted uterus	Retroverted uterus
Direction of uterine fundus	Direction of uterine fundus
Towards pubic symphysis : 80% Anteverted & ante-flexed uterus ⊕	Towards sacral promontory : 20% retroverted & retro-flexed uterus ⊕
PV examination	PV examination
Part easily felt	Part easily felt
Fundus	Cervix
Difficult to palpate :	Fundus
Part of cervix easily felt	Posterior lip

Significance :

a. Prevent prolapse.

b. mechanical support of uterus

Round Ligament :

Attachments : **cornua of uterus** & anterior 1/3rd of labia majora.

Function : Indirect support / a° support (keeps uterus in anteverted position).

Origin : **gubernaculum**

Blood supply : **Sampson's artery** (Branch of inferior epigastric artery).

uterine Artery :

Branch of anterior division of internal iliac artery

(Posterior division supplies lower limb muscles).

Structures supplied :

1. uterus

a. Fallopian tube (medial a/3rd)

3. Anterior division of internal iliac artery

a. Ovarian artery

↑
fals

1. uterine artery

↑
fals

Devascularization in PPH

Note :

Applied Anatomy : Introduction & Uterine Artery

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3. Round ligament (Sampson's artery)
4. Cervix (Descending cervical branches)
5. Ureter

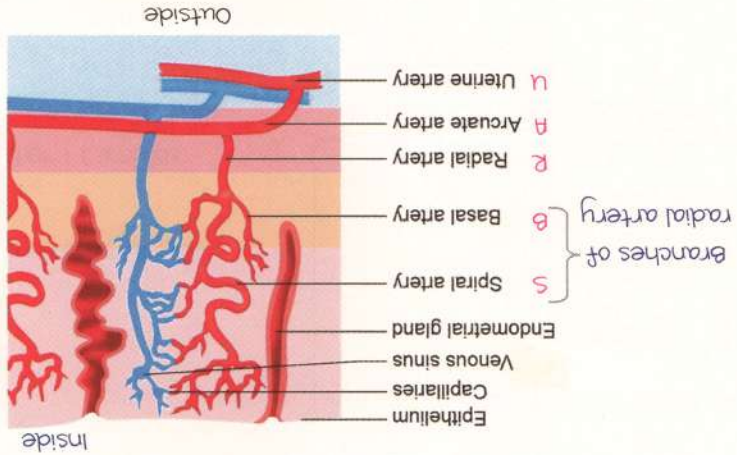
Vagina : Not supplied by uterine artery

Hence

uterine artery embolization : Vaginal blood supply intact

Branches of uterine artery (Outside → Inside) :

mnemonic : **U ARES**

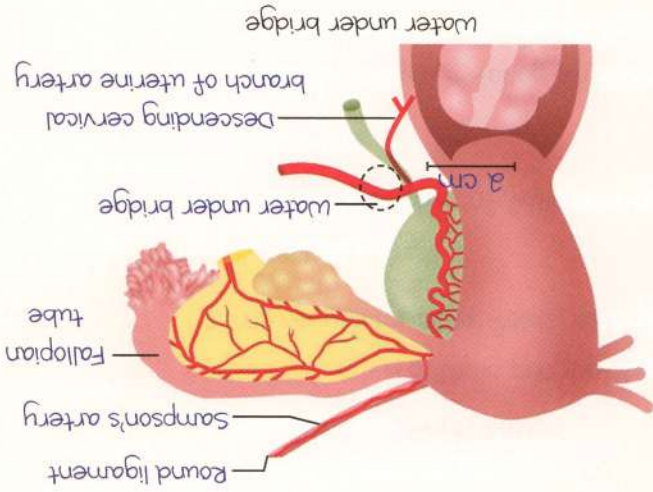


Note :
Spiral artery : responsible for menstrual blood.

water under bridge :

- uterine artery directly crosses over ureter.
- a cm lateral to internal os.
- m/c site of ureteric injury during hysterectomy.

Clamp applied as close to the uterus as possible



APPLIED ANATOMY : FALLOPIAN TUBES, OVARY & UTERUS

Fallopian Tube

00:00:15

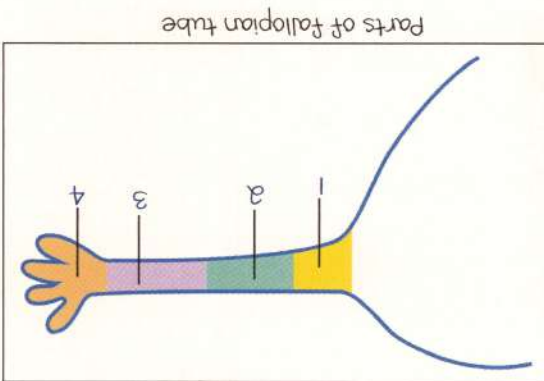
Length : 10cm.

Parts of Fallopian Tube :

medial to lateral.

1. Interstitium :

- Intramural part (inside uterus).
- **Narrowest** part.
- Anatomical sphincter : Circular muscle fibres (+).



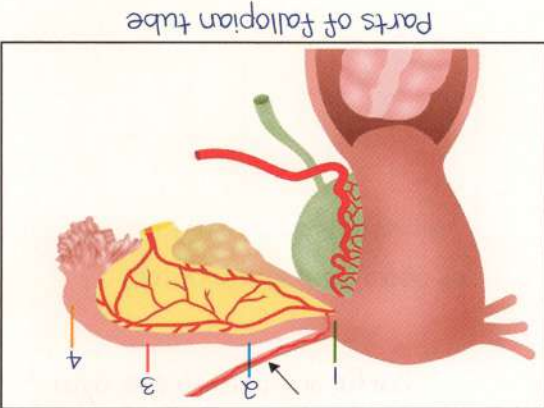
- a. Isthmus :
- 2nd narrowest part.
- Physiological sphincter :
- Product of conception moves from ampulla (widest) → Isthmus (narrow).
- Site for female sterilization (Tubal ligation).

3. Ampulla :

- widest & longest part.
- Site for **Fertilization**
- maximum mucosal folds, aka. plicae.

4. Infundibulum :

- AKA fimbrial part of fallopian tube.



Note :

1. Adnexa : Ovary + fallopian tube
- Peg cells : + in lining of fallopian tube.
- a. Genital TB :
- m/c affects fallopian tube (**Ampulla**).
- can lead to b/l cornual block.

3. Gonococcal infection Leads to Fimbrial block.4. IOC for tubal patency : **HSG** (Hysterosalpingography).

Ovary

Present posteriorly

General Features :

Size : 3 x 2 x 1 cm

Volume : 6-7 cc (≥ 10cc : PCOS).

Location : Ovarian fossa of Waldeyer (lateral pelvic wall).

Intrauterine life : Abdominal organ

Descends into the pelvis
↑
with the help of gubernaculum

Applied aspect :

uterus : Prevents further descent of ovary.

gubernaculum
↓
divided by uterus
Ovarian ligament

Round ligament.

Ligaments Related to Ovary :

1. Ovarian ligament : Attaches ovary to

cornua of uterus.

a. Infundibulopelvic ligament :

• AKA suspensory ligament of ovary.

• Connects ovary to lateral pelvic wall.

• Contains ovarian vessels & nerves.

• Preserved during hysterectomy

without oophorectomy.

3. mesovarium : Part of broad ligament near

the ovary.

Relations of Ovary :

Superior/anterior : external iliac artery.

Posterior : Ureter & internal iliac artery.

Lateral : Obturator nerve & infundibulopelvic

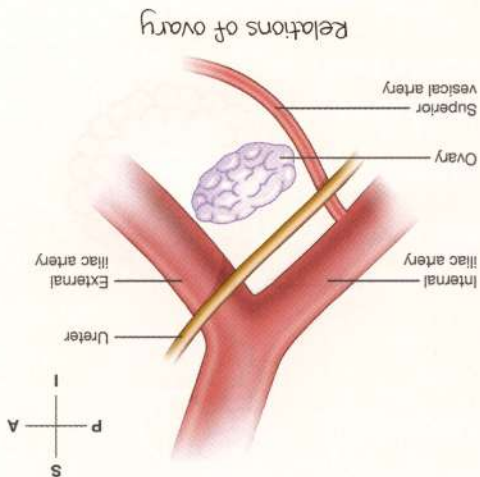
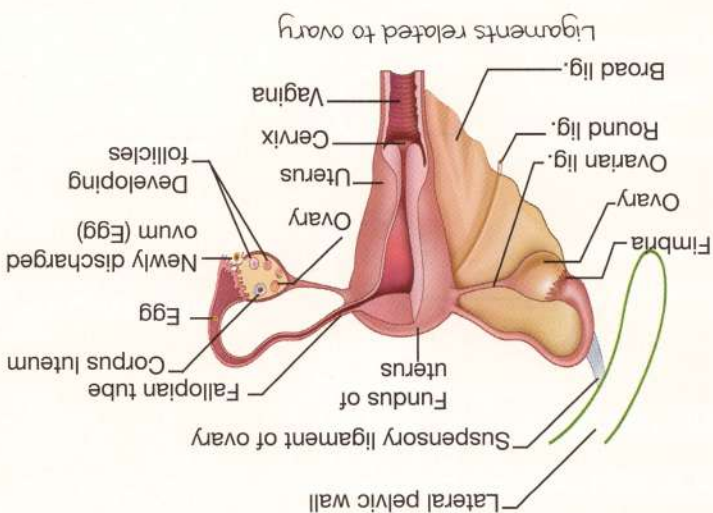
ligament.

Applied aspect :

Large ovarian mass

↑
d/t pressure on obturator nerve

Pain along medial side of thigh



s. Site for tubal ligation
← Laparoscopic : Isthmus
← Hysteroscopic (using Essure) : Interstitium.

Applied Anatomy : Fallopian Tubes, Ovary & Uterus

medial : Ovarian ligament.

----- Active space -----

Histological Features :

Surface epithelium : Single layer of cuboidal epithelium
Tunica albuginea : Below surface epithelium

Ovarian cortex : Contains follicles in

Note :

Parts of broad ligament :

- mesosalpinx : close to fallopian tube.
- mesovarium : close to ovaries.
- mesometrium : close to uterus.

medulla :

contains

Blood vessels

Hilar cells

Homologous to interstitial cells of testes.

Hilar cell tumor of ovary : Rare.

- secretes androgens.

- masculinizing tumour of ovary.

Folliculogenesis

00:18:45

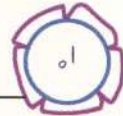
Follicle : 1° oocyte surrounded by follicular cells of ovary.

Follicular cells



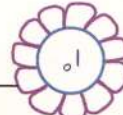
Primordial follicle :

Single layer of flattened cells



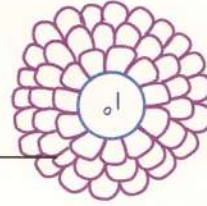
Primary follicle :

Single layer of cuboidal cells



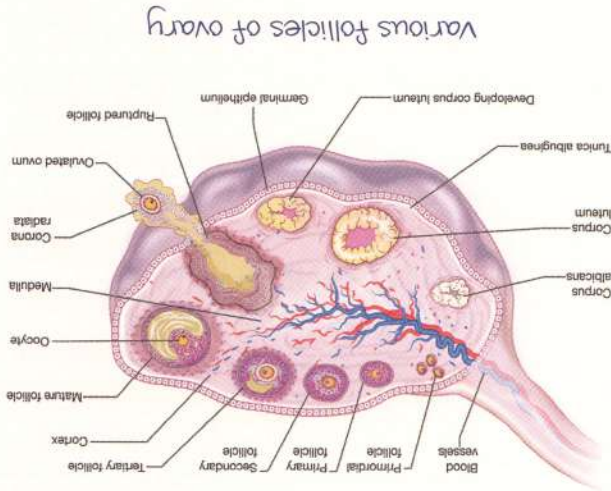
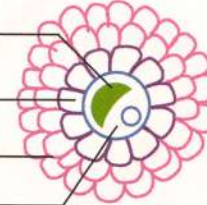
Secondary follicle :

multiple layer of granulosa cells



Antral follicle/
tertiary follicle :

1° oocyte
Theca cells
granulosa cells
Fluid filled
antral cavity



various follicles of ovary