



# Anatomy of the Female Genital Tract and Role of Clinical Gynecological Assessment



**43<sup>RD</sup> ICRO PG Teaching Program**

6<sup>th</sup> & 7<sup>th</sup> May 2023

On

**Gynecological Cancer**



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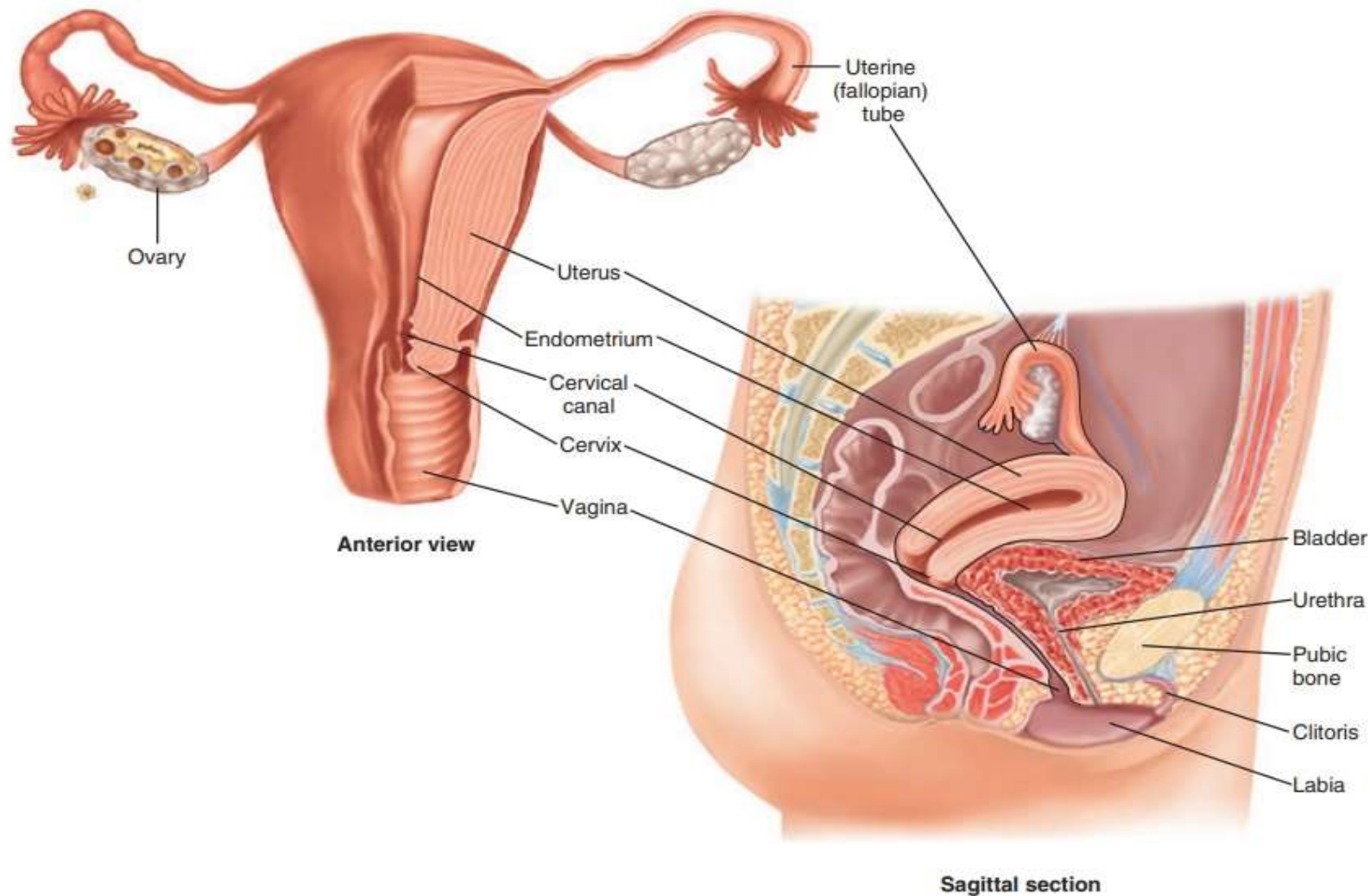


# What we shall discuss *today*

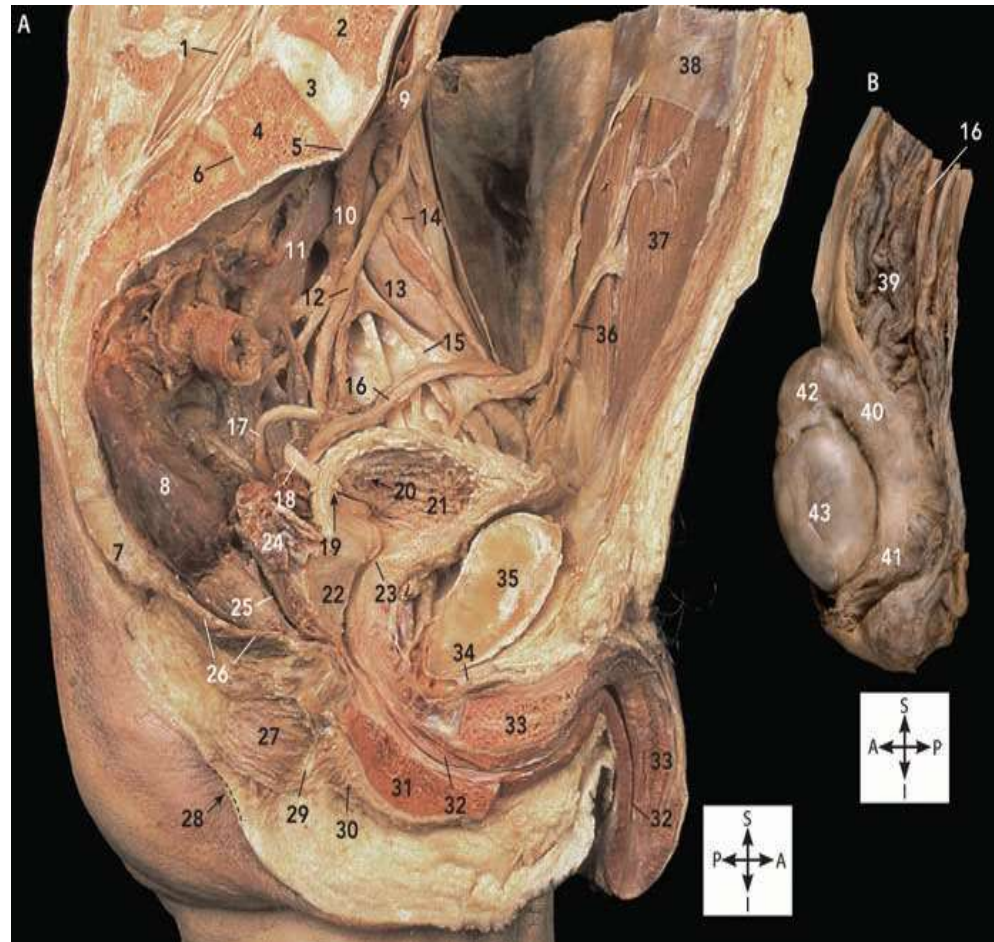
- Anatomy of the female genital tract
  - Clinical importance
  - Vascular and lymphatic supply
- Gynecological assessment
  - Importance
  - Practical tips and tricks!
- Documentation : Clinical diagrams

# The female genital tract

- Uterus
- Cervix
- Vagina
  
- Ovaries
- Fallopian tubes
  
- External genitalia

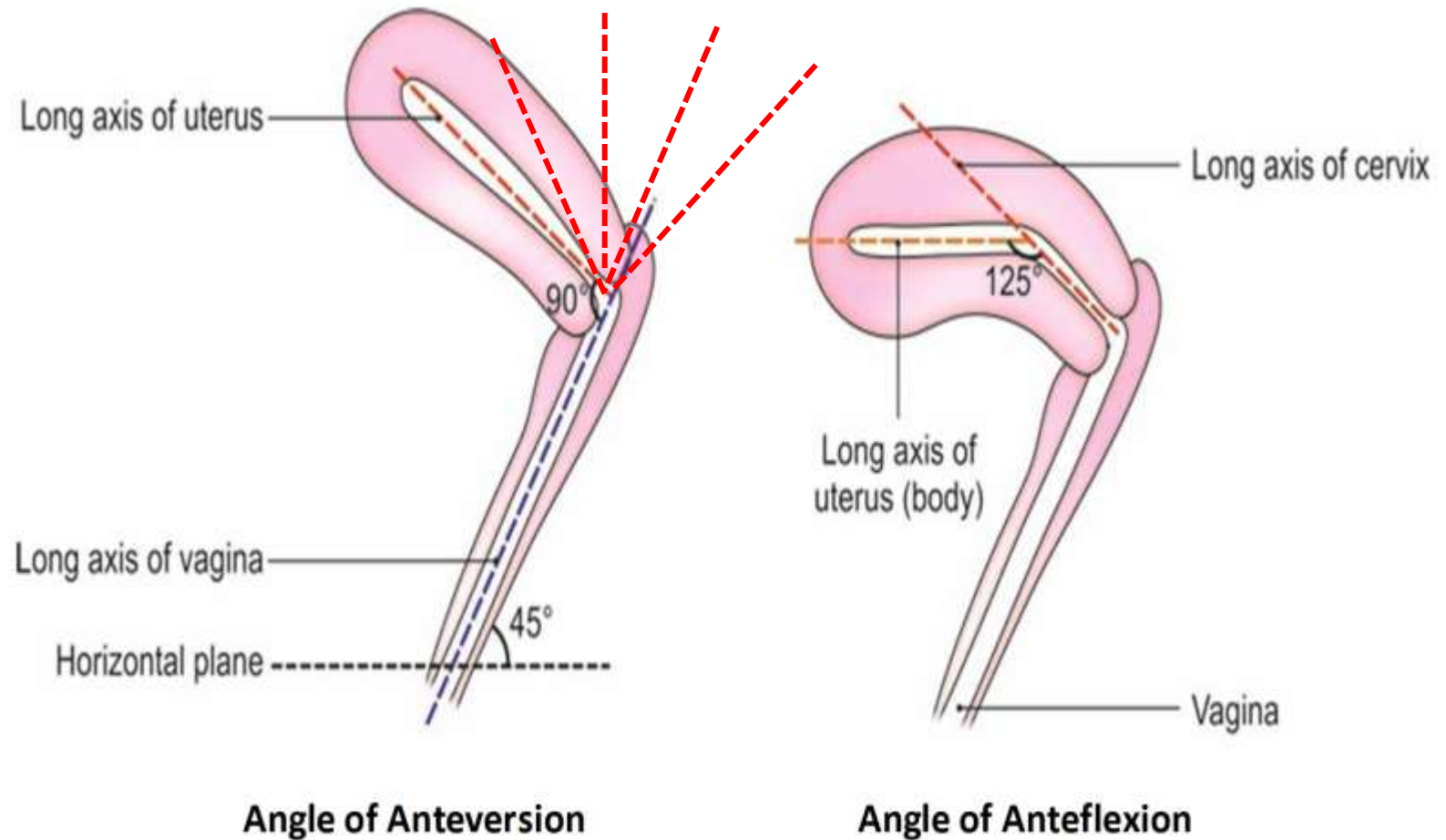


# Anatomy Uterus / Cervix



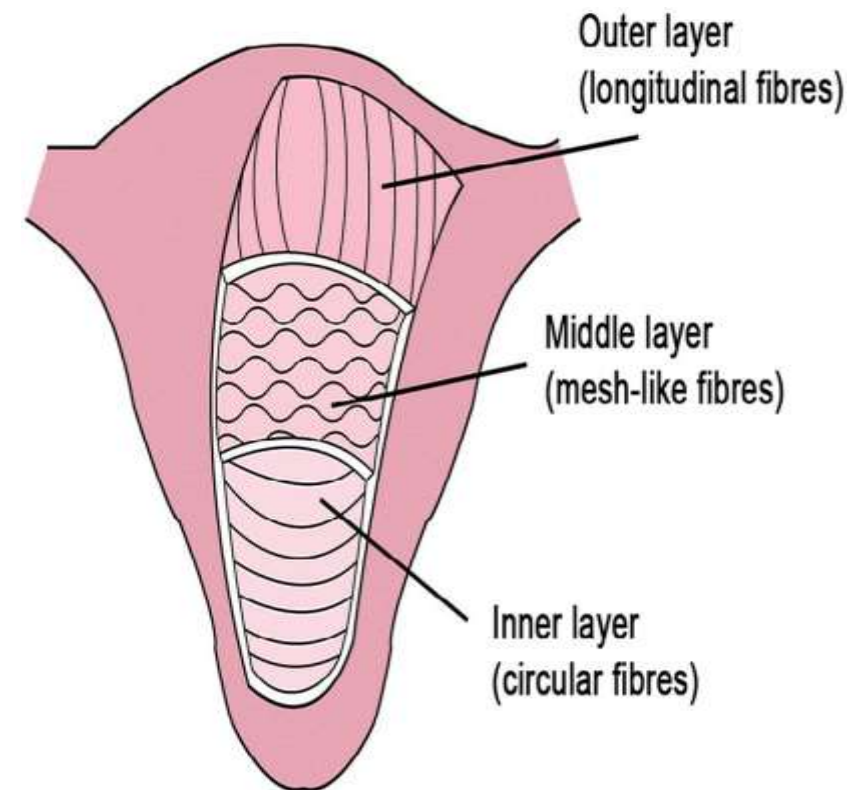
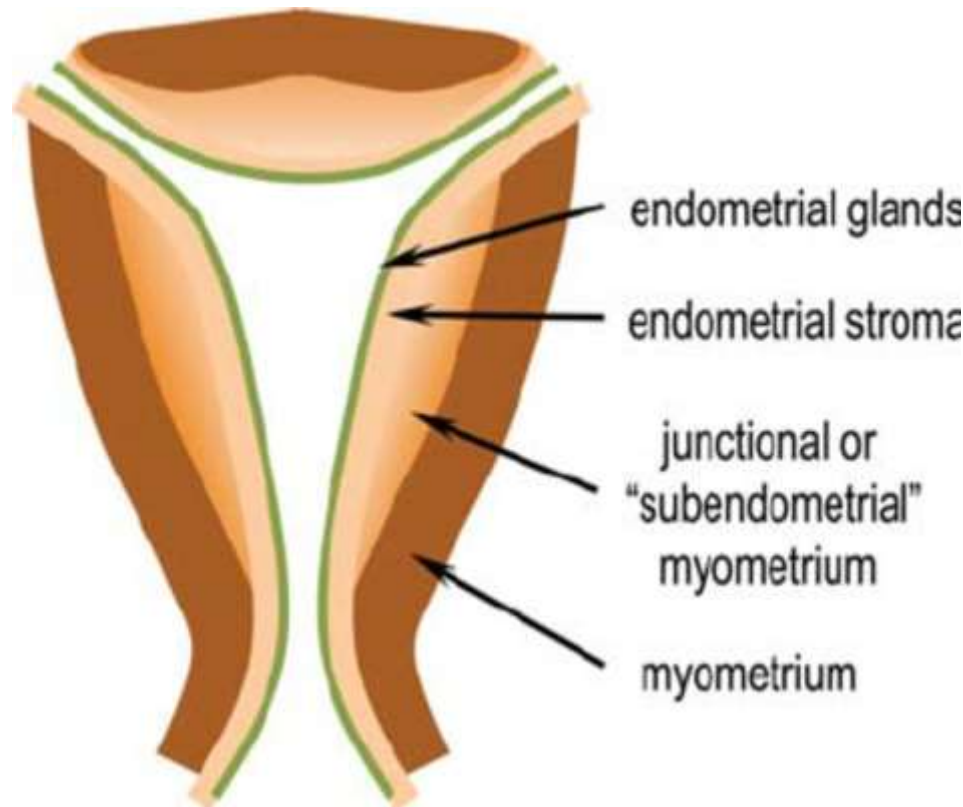
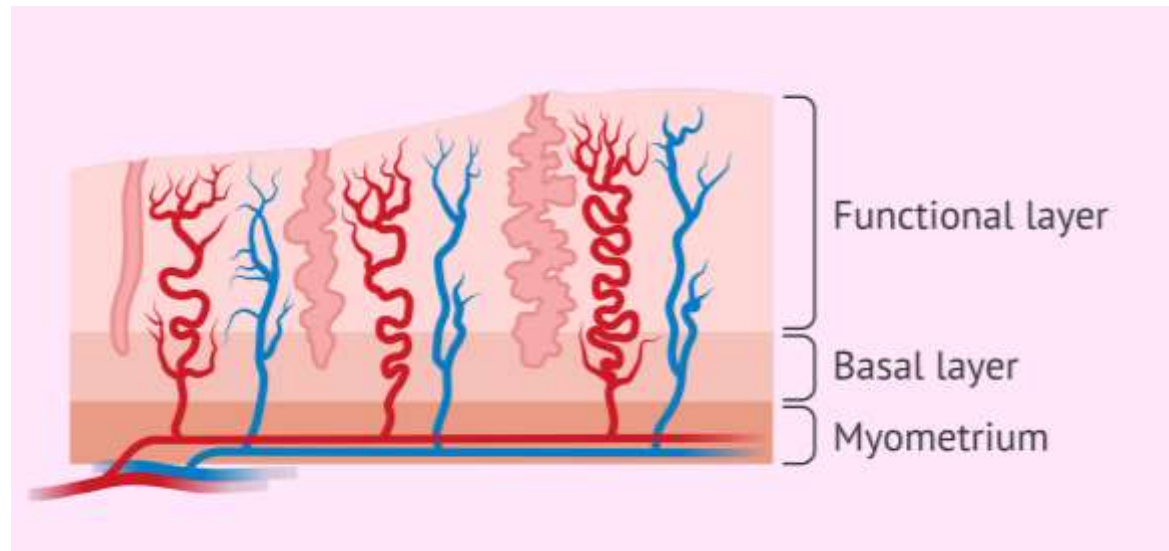
# The Uterus

- Fundus
- Body / Corpus
- Cervix
  - Endocervix
  - Ectocervix
- Isthmus

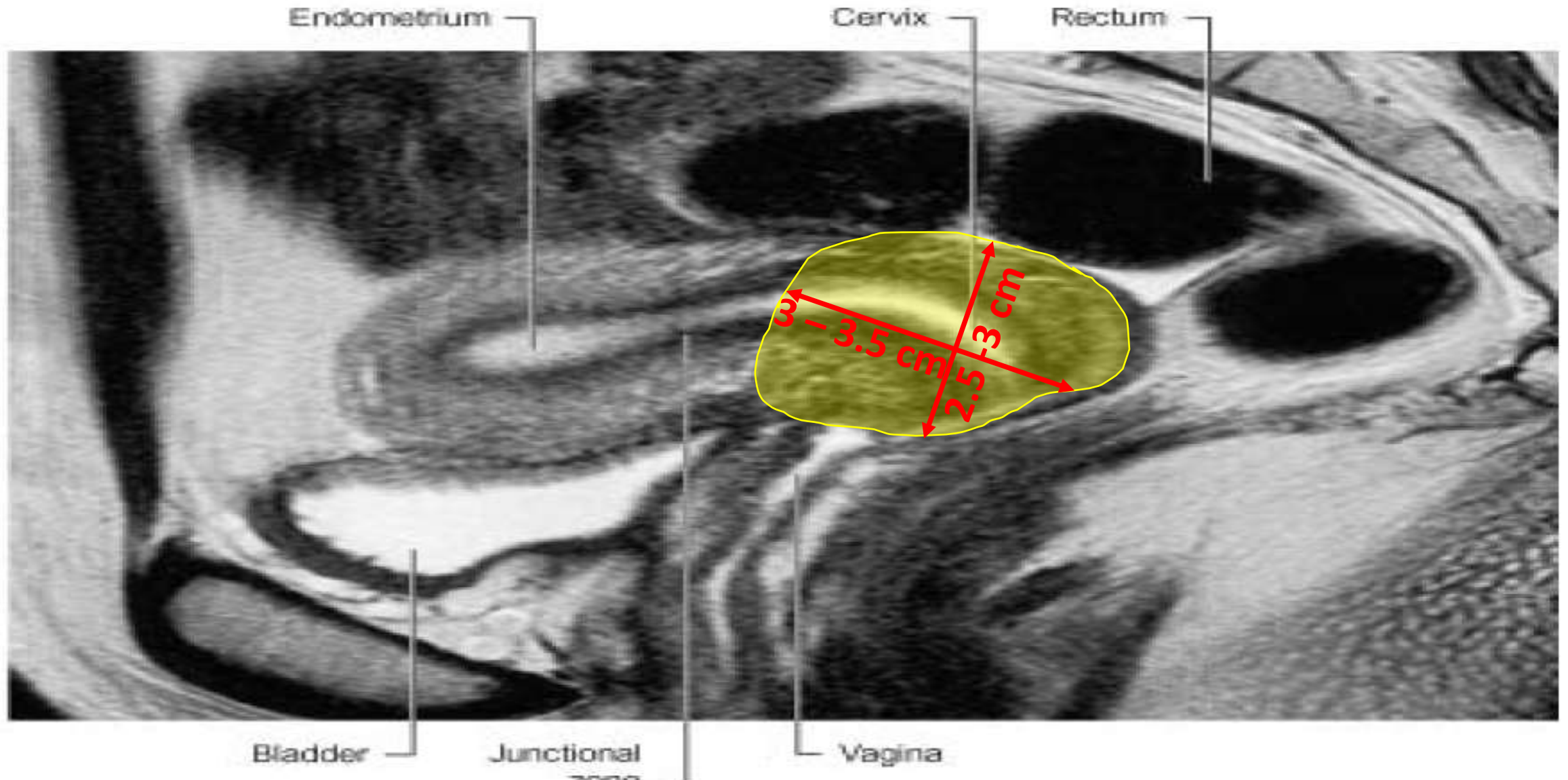


# The Uterine layers

- Endometrium
  - Inner
  - Outer
- Myometrium
- Perimetrium (Serosa)



# The Uterus on imaging



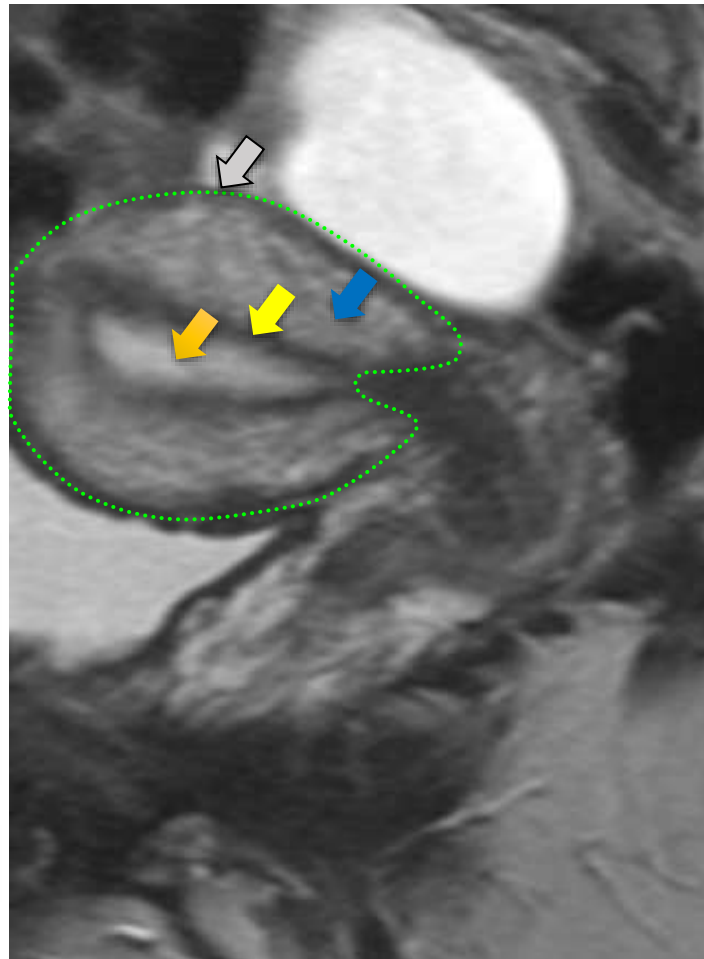
# The Cervix on Imaging

Endometrium:  
Hyperintense

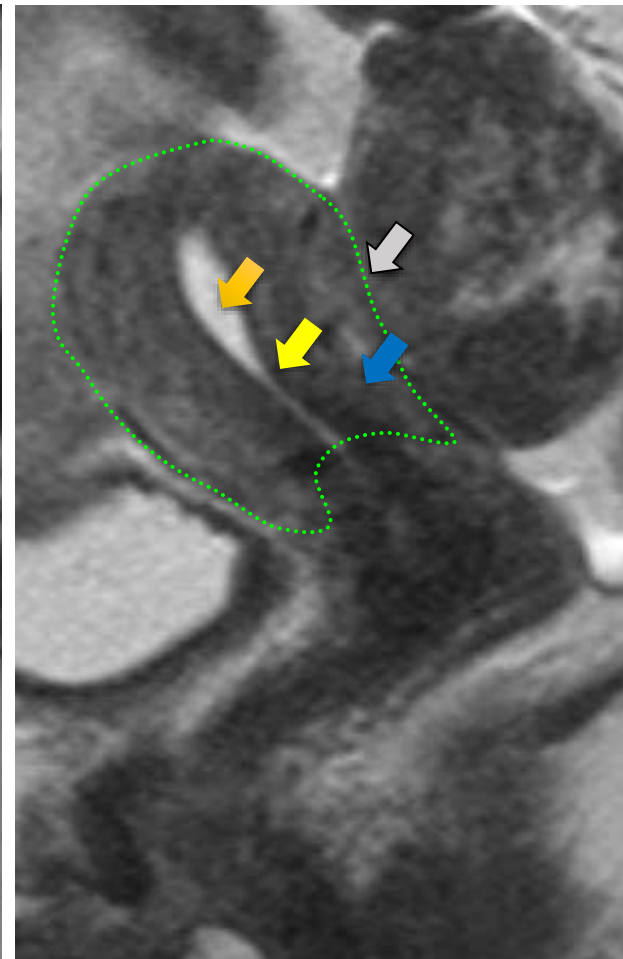
Inner  
myometrium=  
Junctional zone:  
Low intensity

Outer  
myometrium:  
Intermediate  
intensity

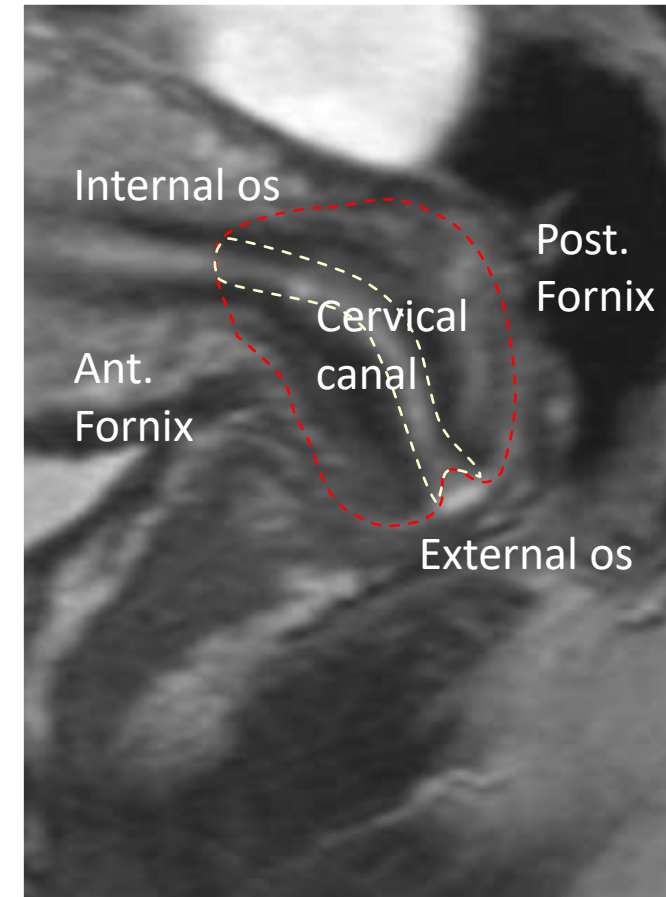
Peritoneal layer



Younger woman



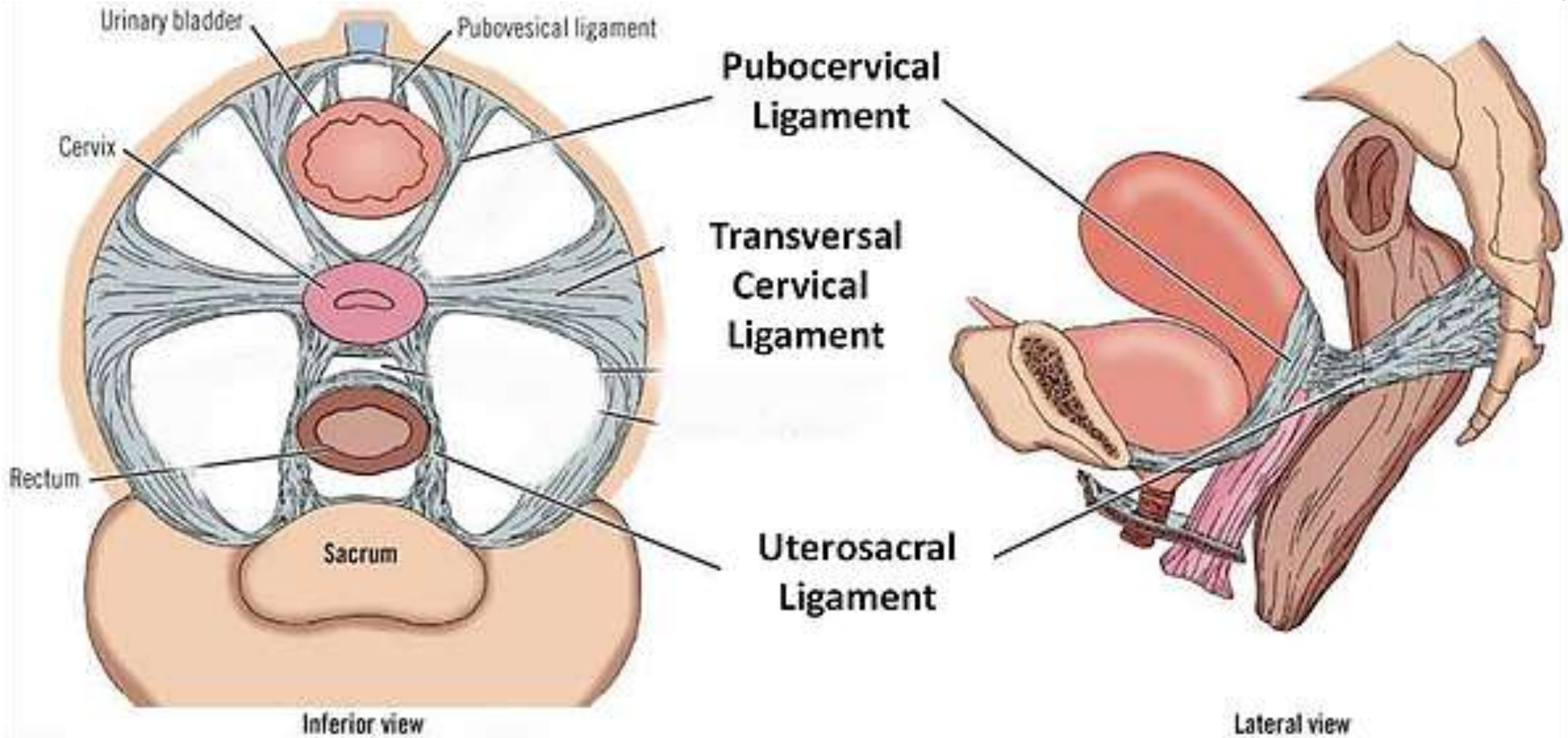
Older woman



*Courtesy of P. Petric*



# The supports of the Uterus

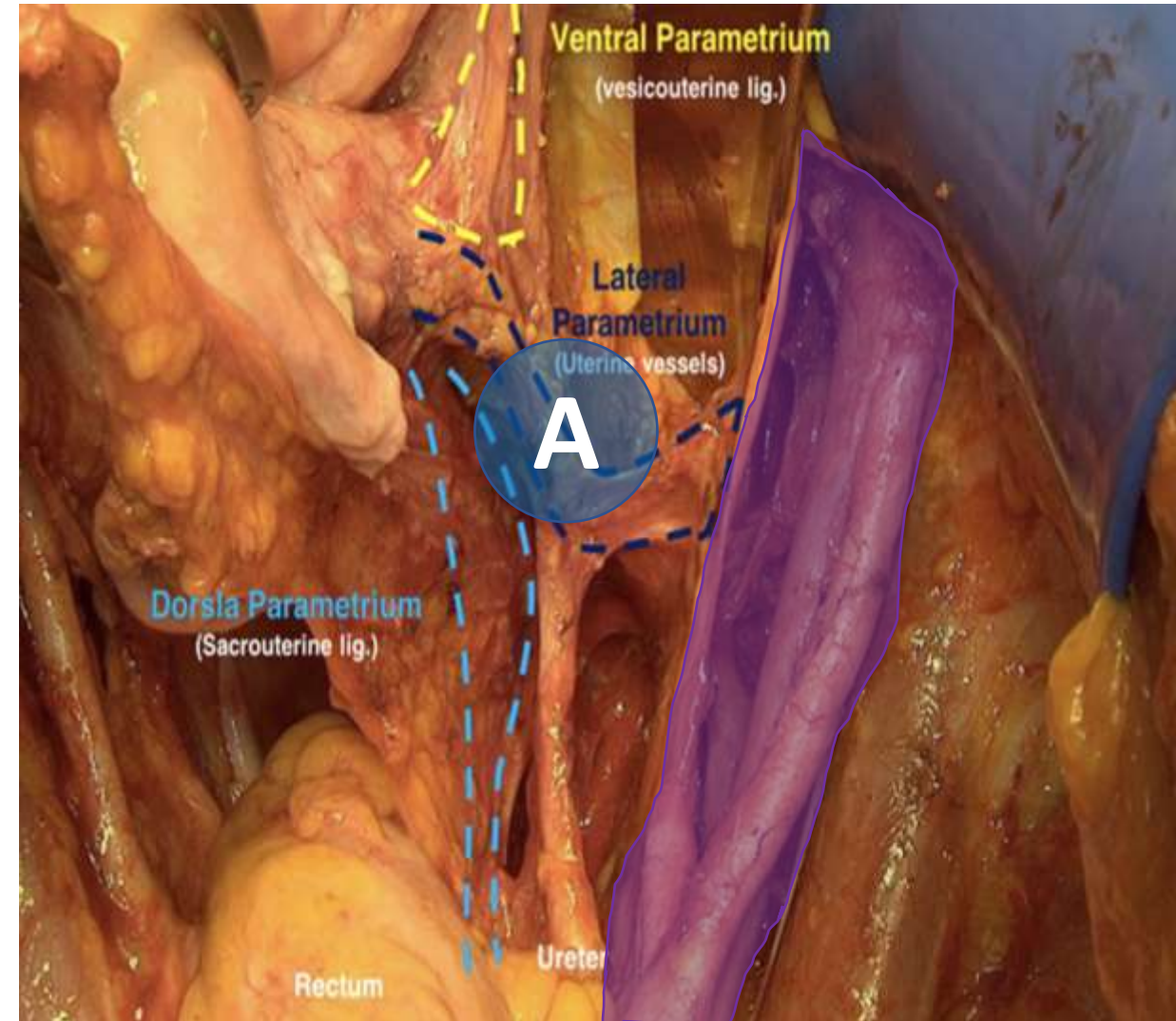
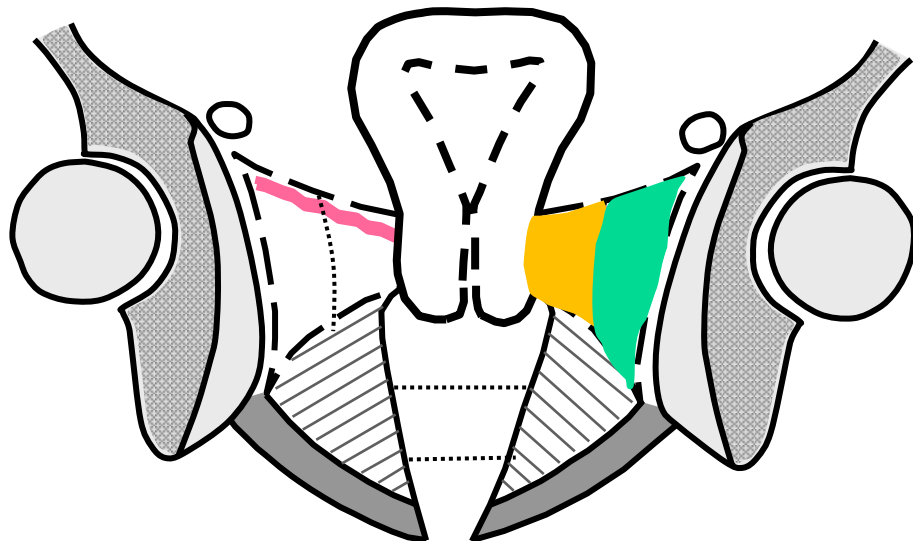


# The parametrium

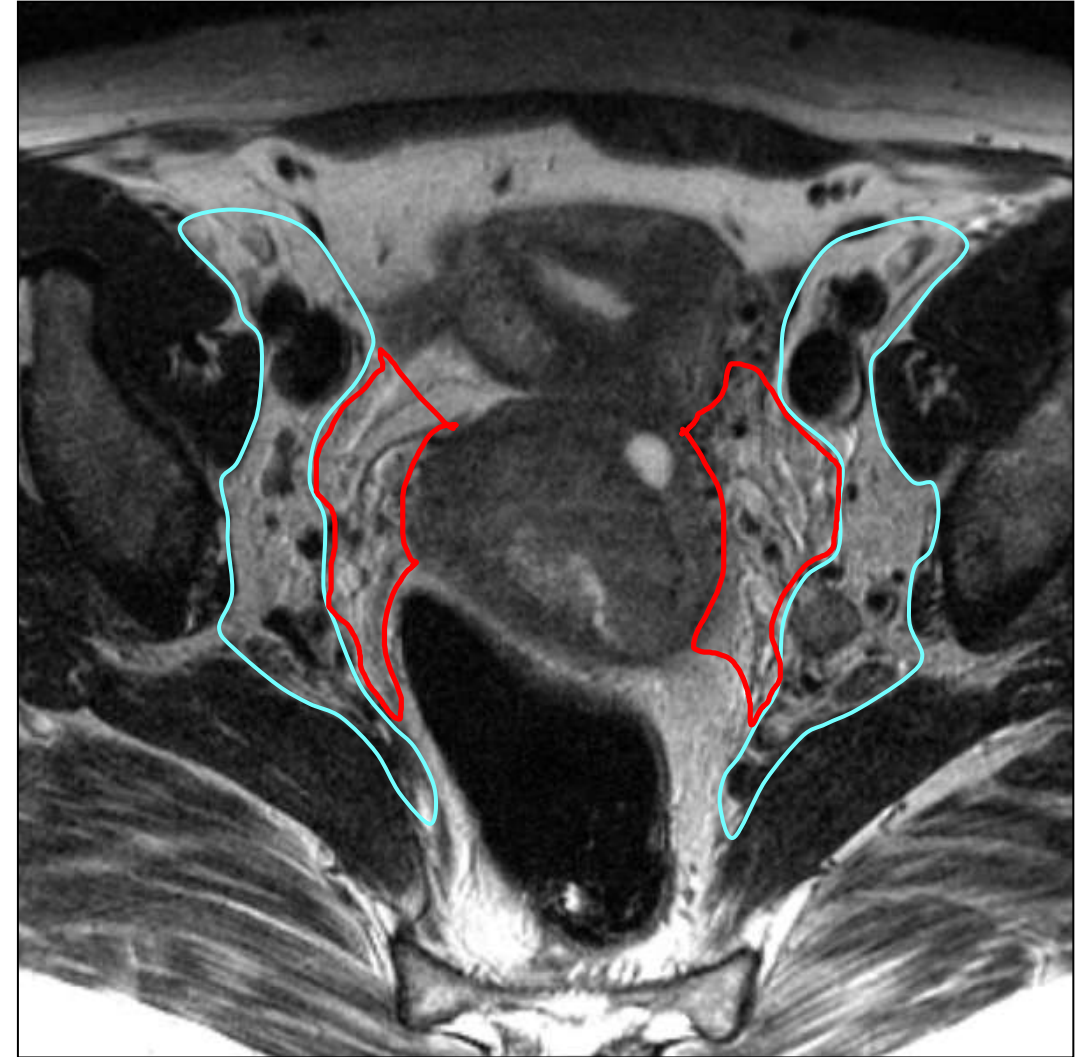
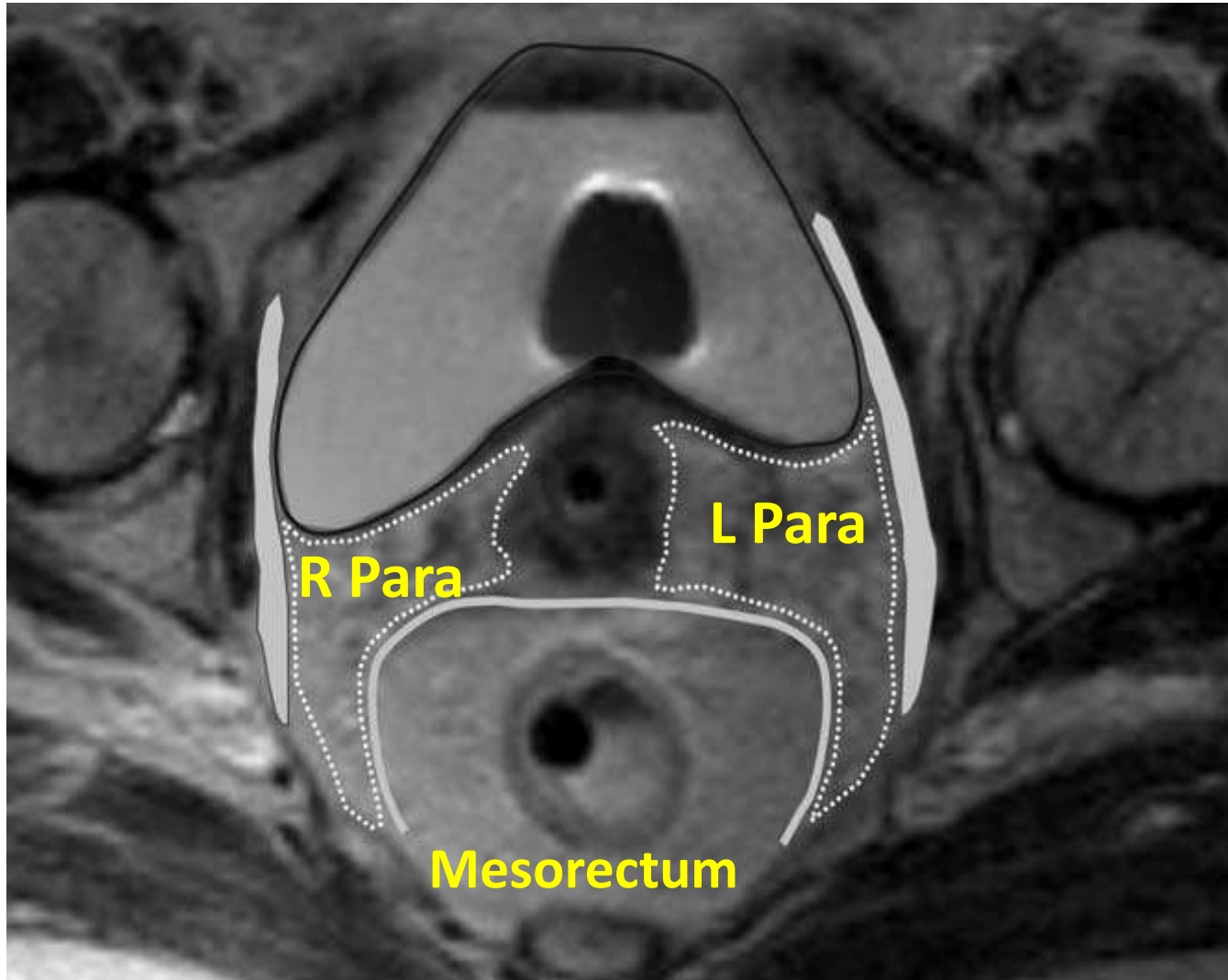
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Anteriorly	Posterior wall of bladder or posterior border of external iliac vessel
Posteriorly	Uterosacral ligaments and mesorectal fascia
<u>Laterally</u>	<u>Medial edge of internal obturator muscle/ ischial ramus bilaterally</u>
Superiorly	Top of fallopian tube/ broad ligament. Depending on degree of uterus flexion, this may also form the anterior boundary of parametrial tissue.
Inferiorly	Urogenital diaphragm

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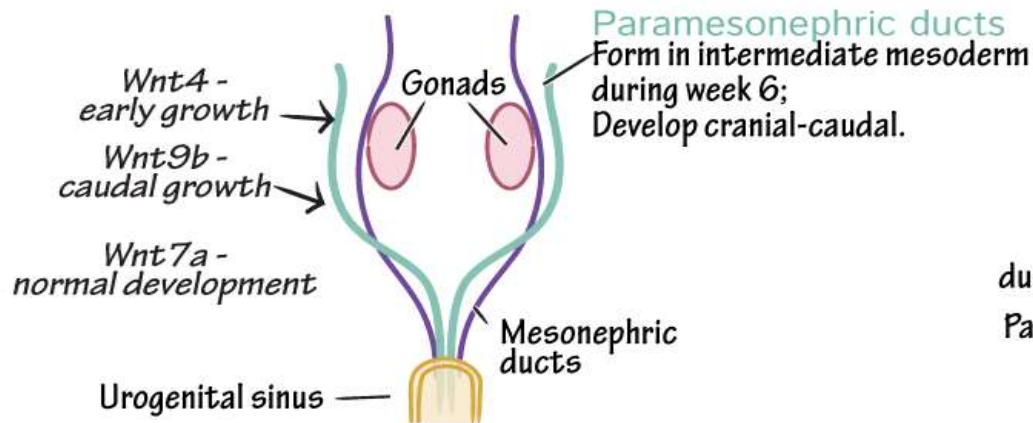


# The parametrium on MRI

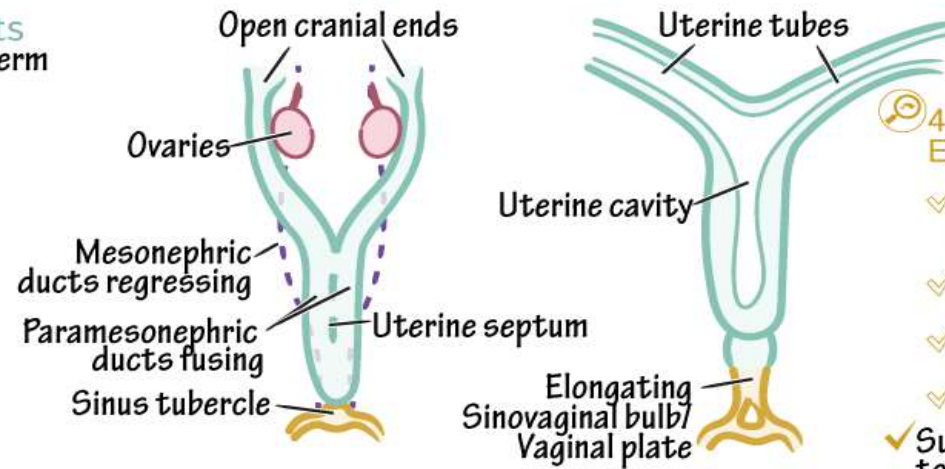


# Embryology

## ~Week 7 — Undifferentiated gonad



## ~Week 10 — Paramesonephric ducts fuse



### 4 Models of Vaginal Epithelium Origins:

- ✓ Upper 2/3 = Paramesonephric; Lower 1/3 = Urogenital sinus
- ✓ Only Paramesonephric ducts
- ✓ Paramesonephric & Mesonephric
- ✓ Only Urogenital sinus
- ✓ Surrounding mesenchyme gives rise to musculature and peritoneal coverings of vagina and uterus.

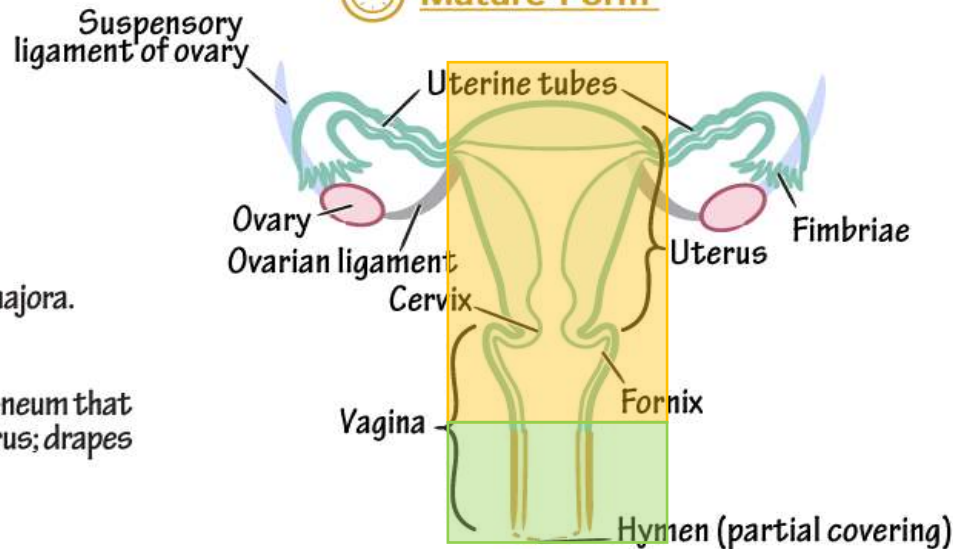
### + Ovarian descent

- ✓ Migrate caudally & laterally, Stabilized by ligaments.

### + Uterine ligaments

- ✓ Round ligament — Extends from uterus to labia majora.
- ✓ Broad ligament — Double-layered sheet of peritoneum that extends laterally from the uterus; drapes over uterine tubes.

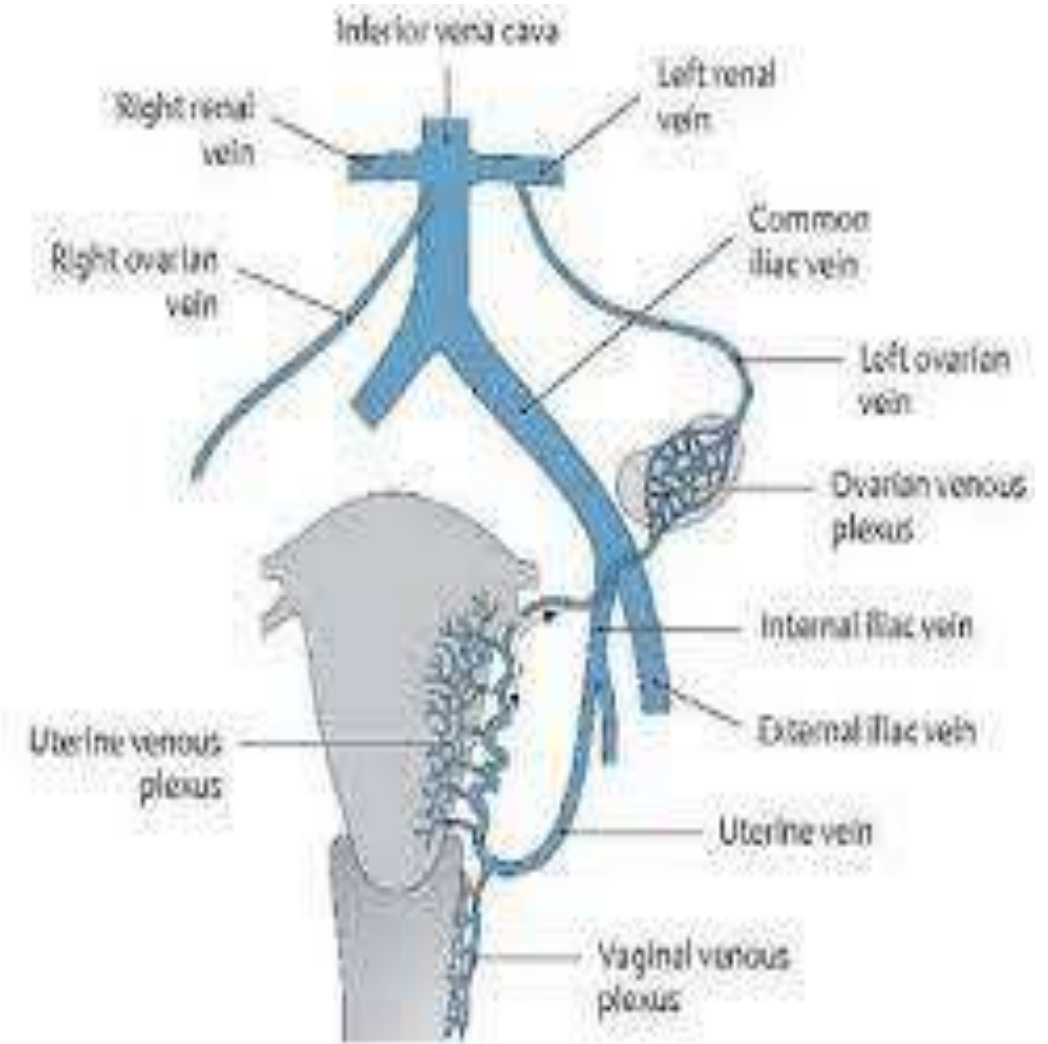
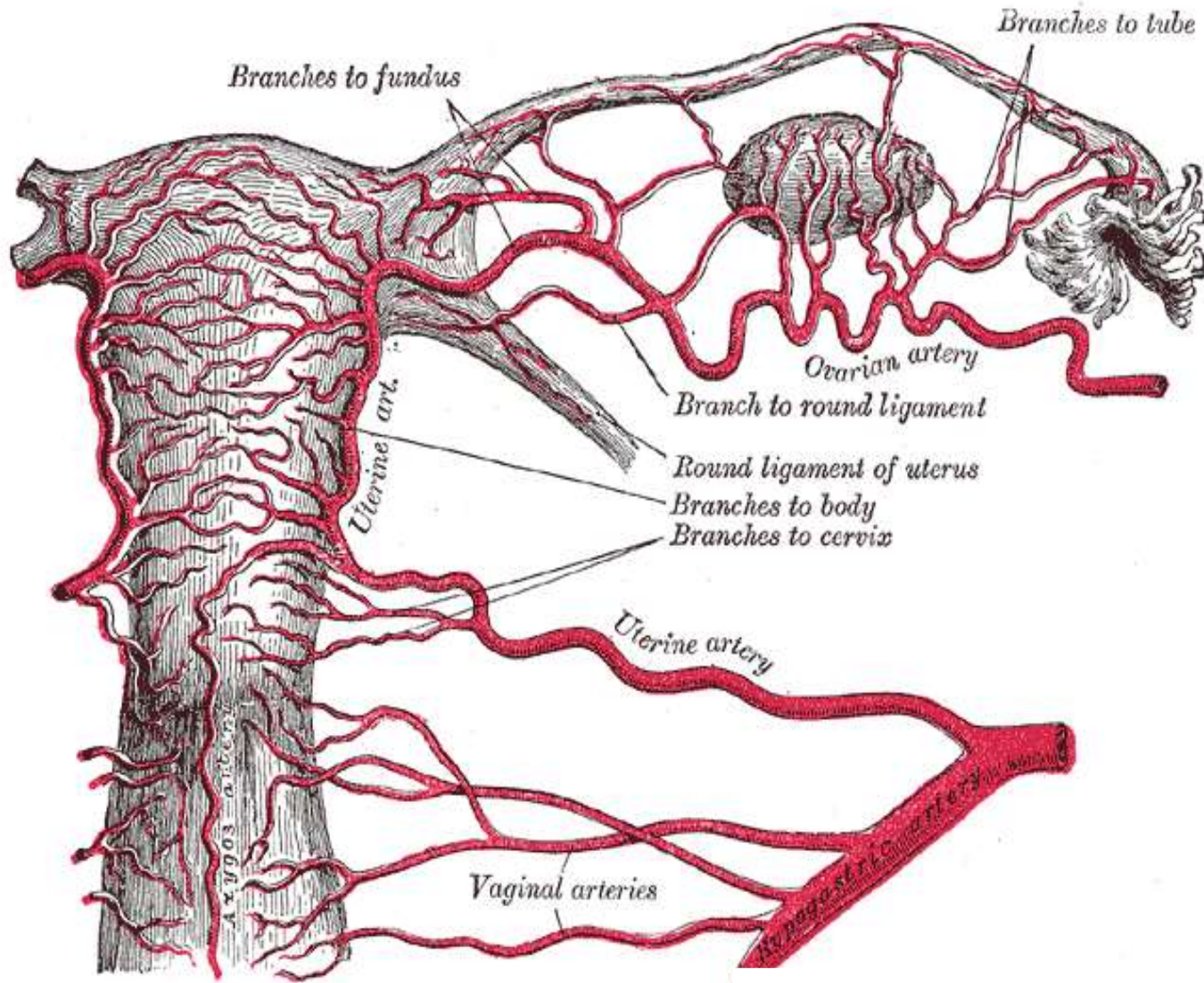
## Mature Form



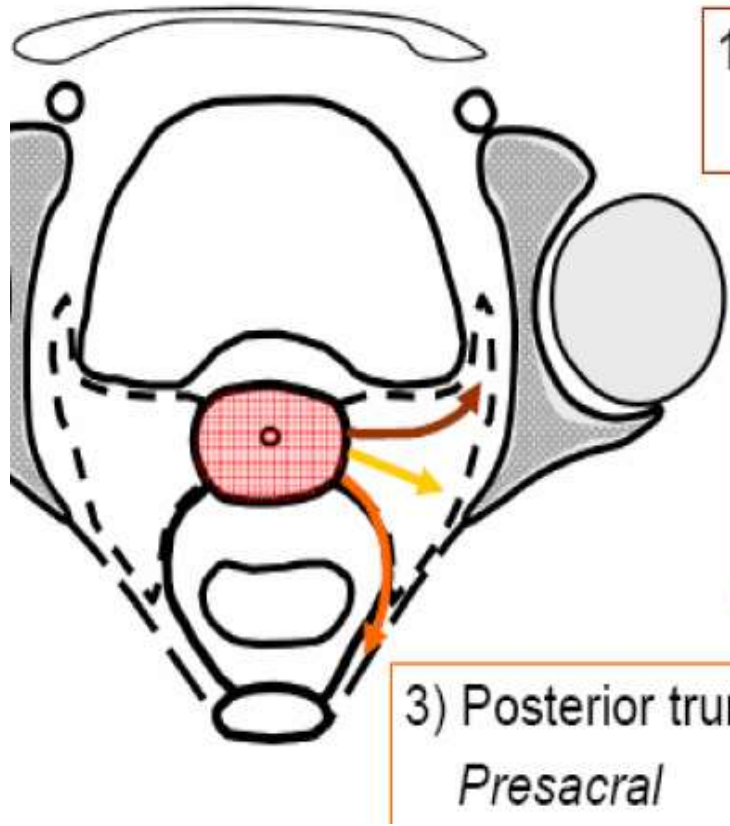
### Embryological Origins

Paramesonephric ducts	Uterine tubes Uterus Vagina
Urogenital sinus	Vagina (lower*) Urinary bladder Urethra
Cranial genital ligament	Suspensory ligament of ovary
Caudal genital ligament	Ovarian ligament Round ligament of uterus
Mesonephros	Eoophoron Paraooophoron Gartner's duct

# Vascular supply



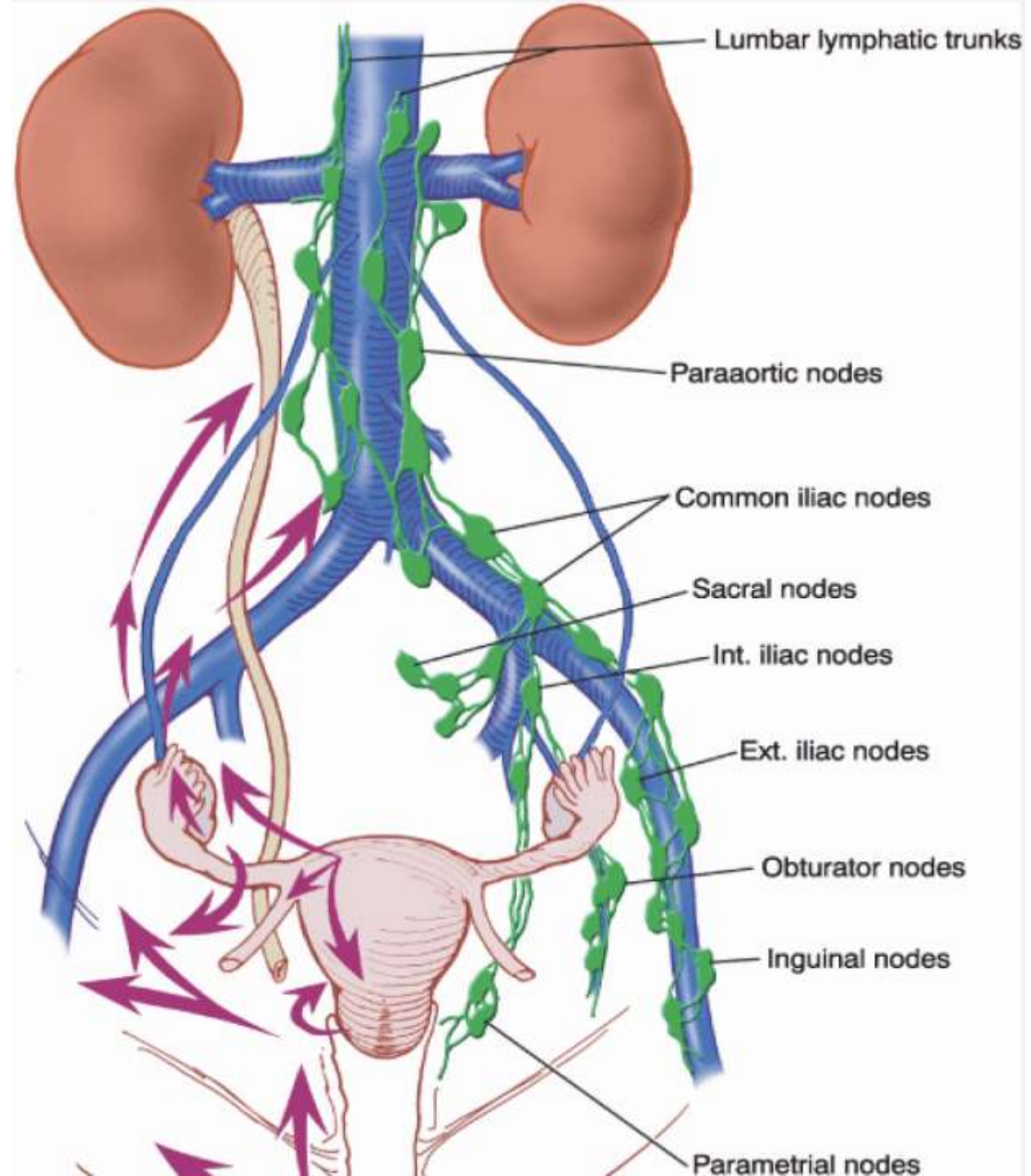
# Lymphatic drainage



1) Anterior trunk  
*Ext. iliac*

2) Lateral trunk  
*Parametrial*  
*Obturator*  
*Int. iliac*

3) Posterior trunk  
*Presacral*



Lumbar lymphatic trunks

Paraaortic nodes

Common iliac nodes

Sacral nodes

Int. iliac nodes

Ext. iliac nodes

Obturator nodes

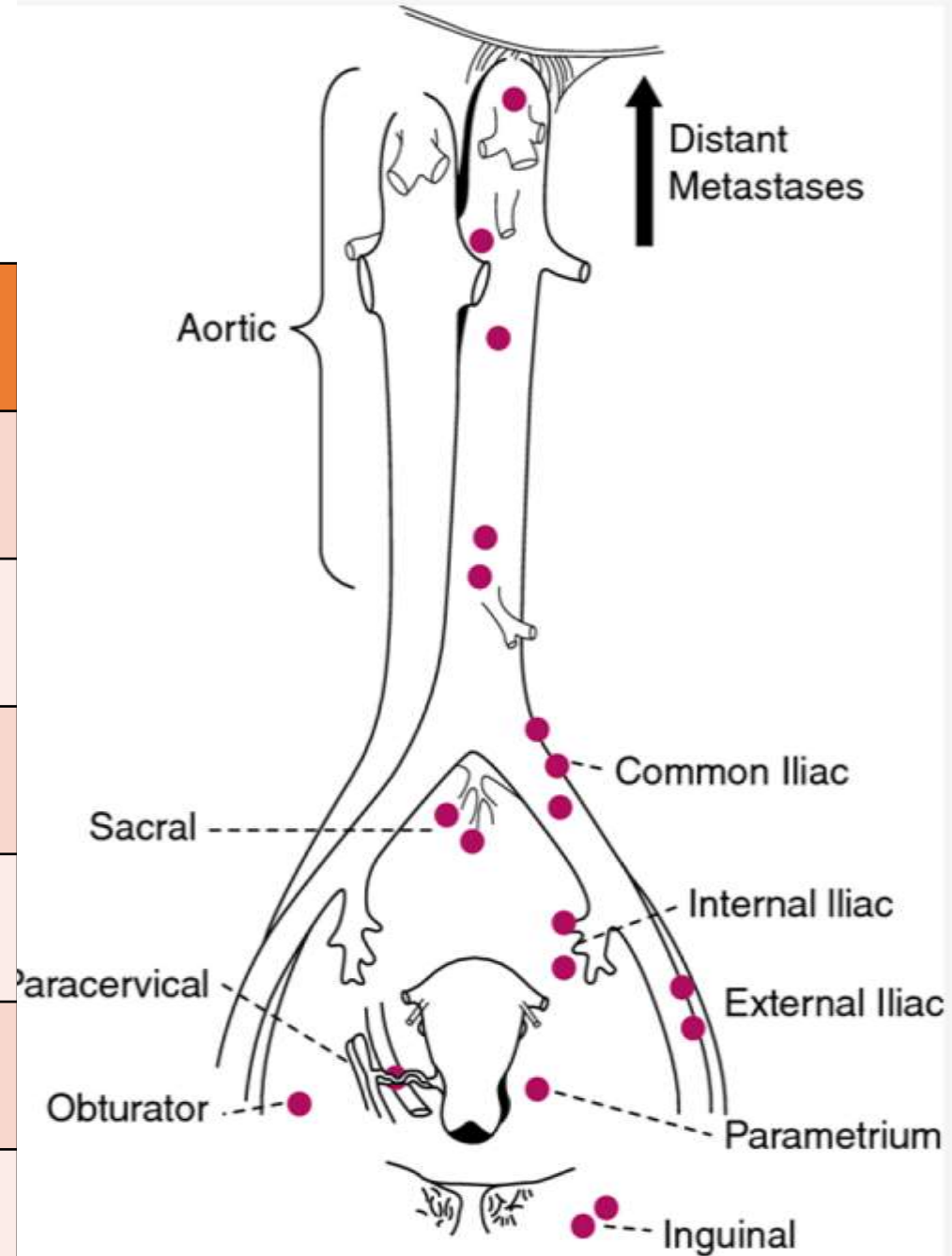
Inguinal nodes

Parametrial nodes

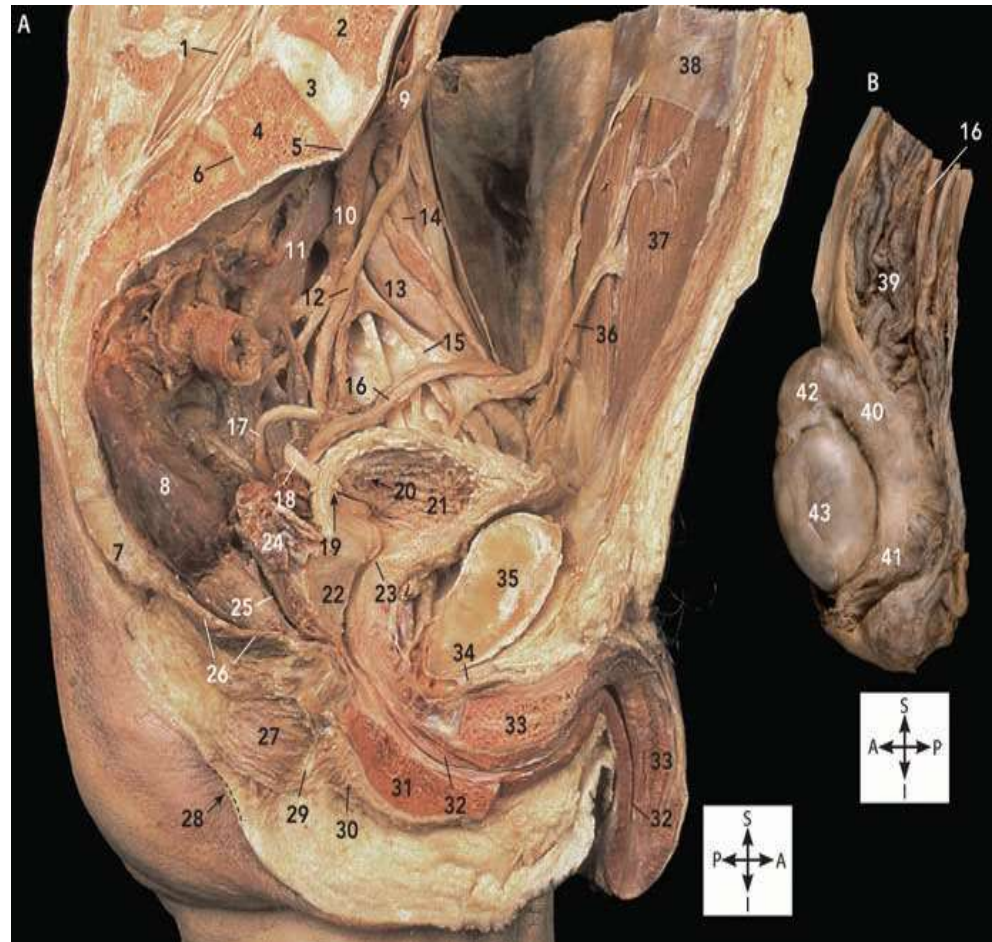
# Nodal involvement

## Nodal involvement Ca Cx – historical data

FIGO Stage	Pelvic LN	Para-aortic LN
IA1	0.5%	0%
IA2	5%	2%
IB	15.9%	2.2%
II	30%	15%
III and IV	50%	25%

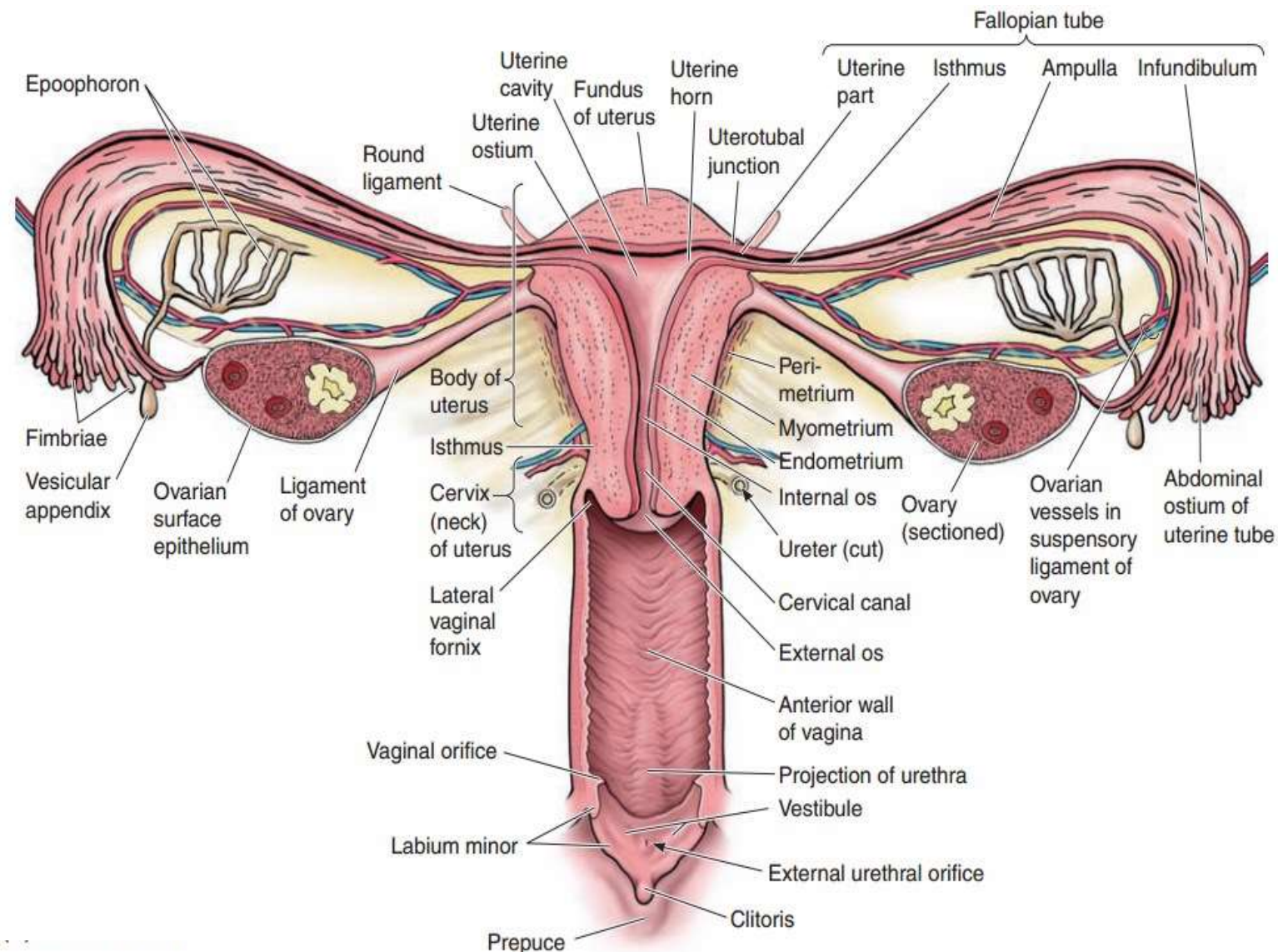


# Anatomy Others

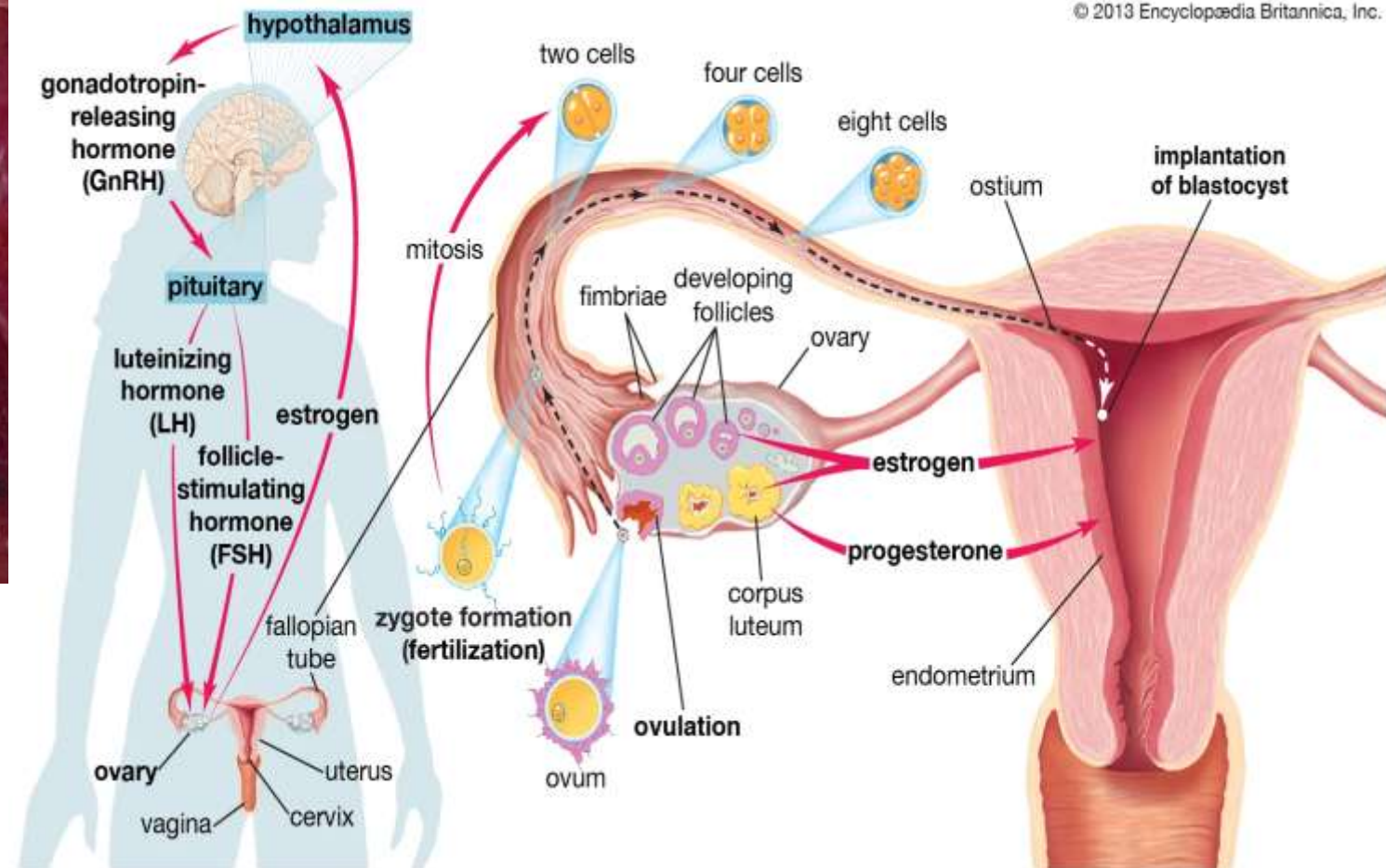
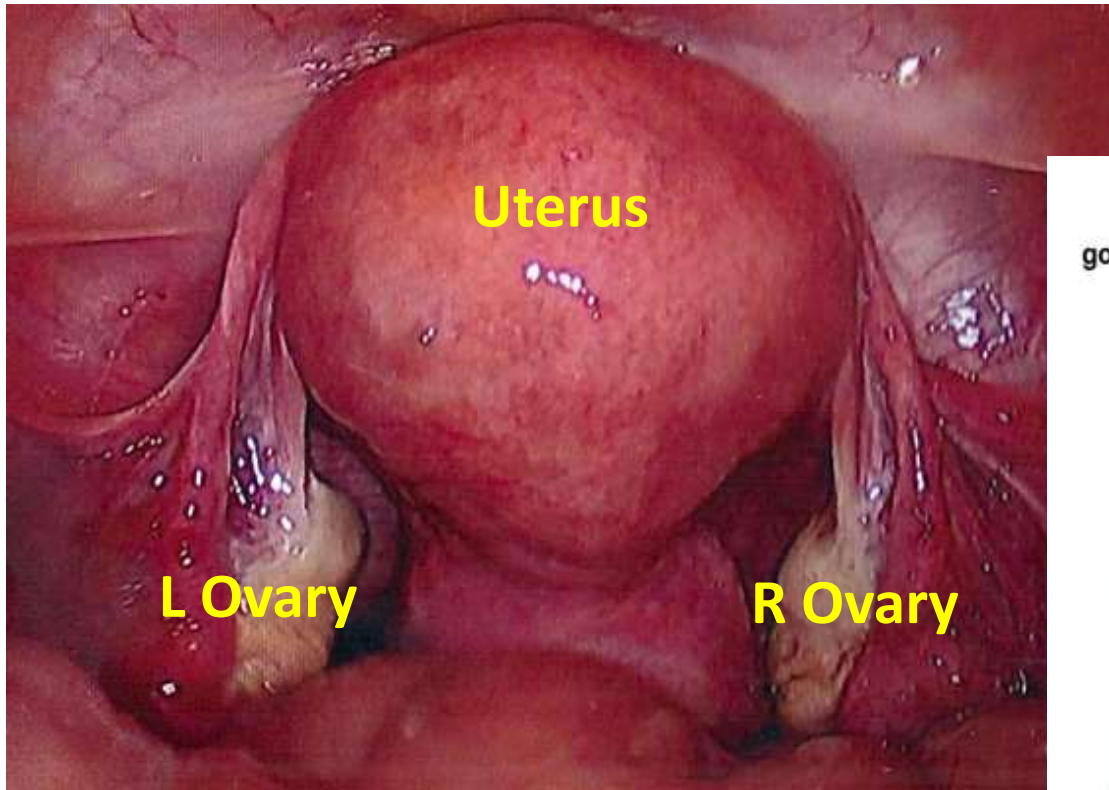




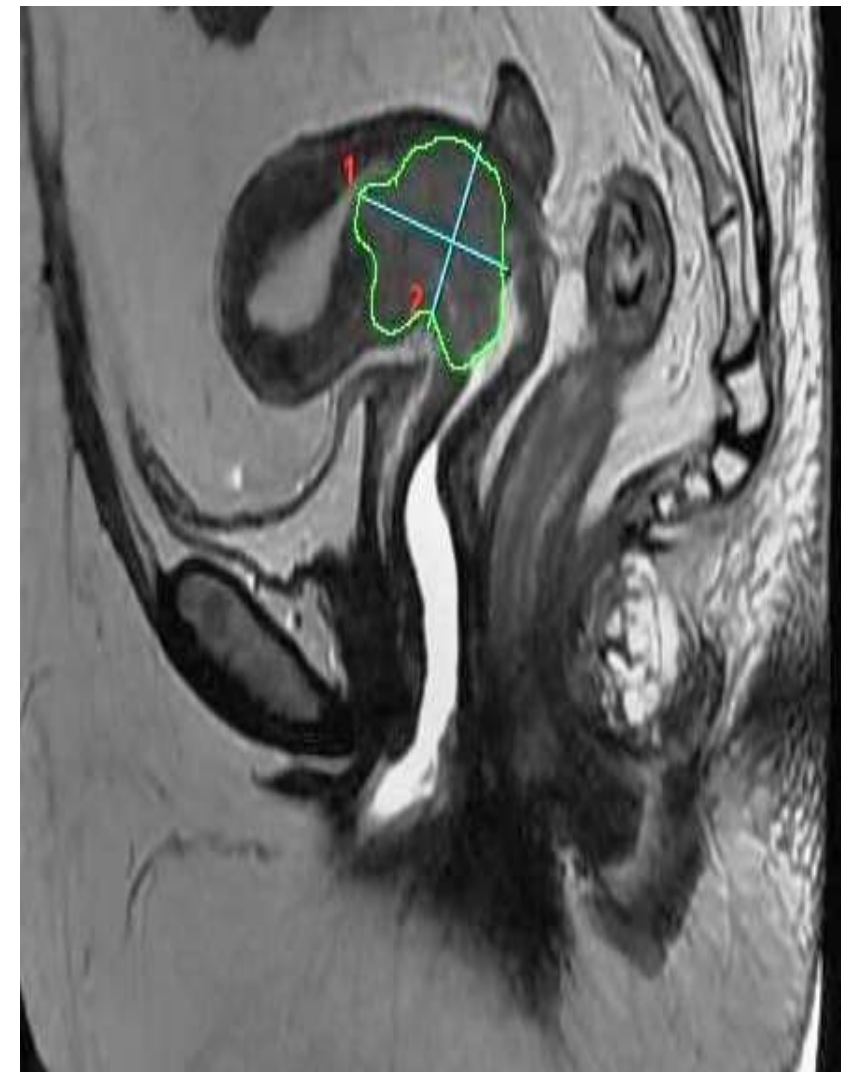
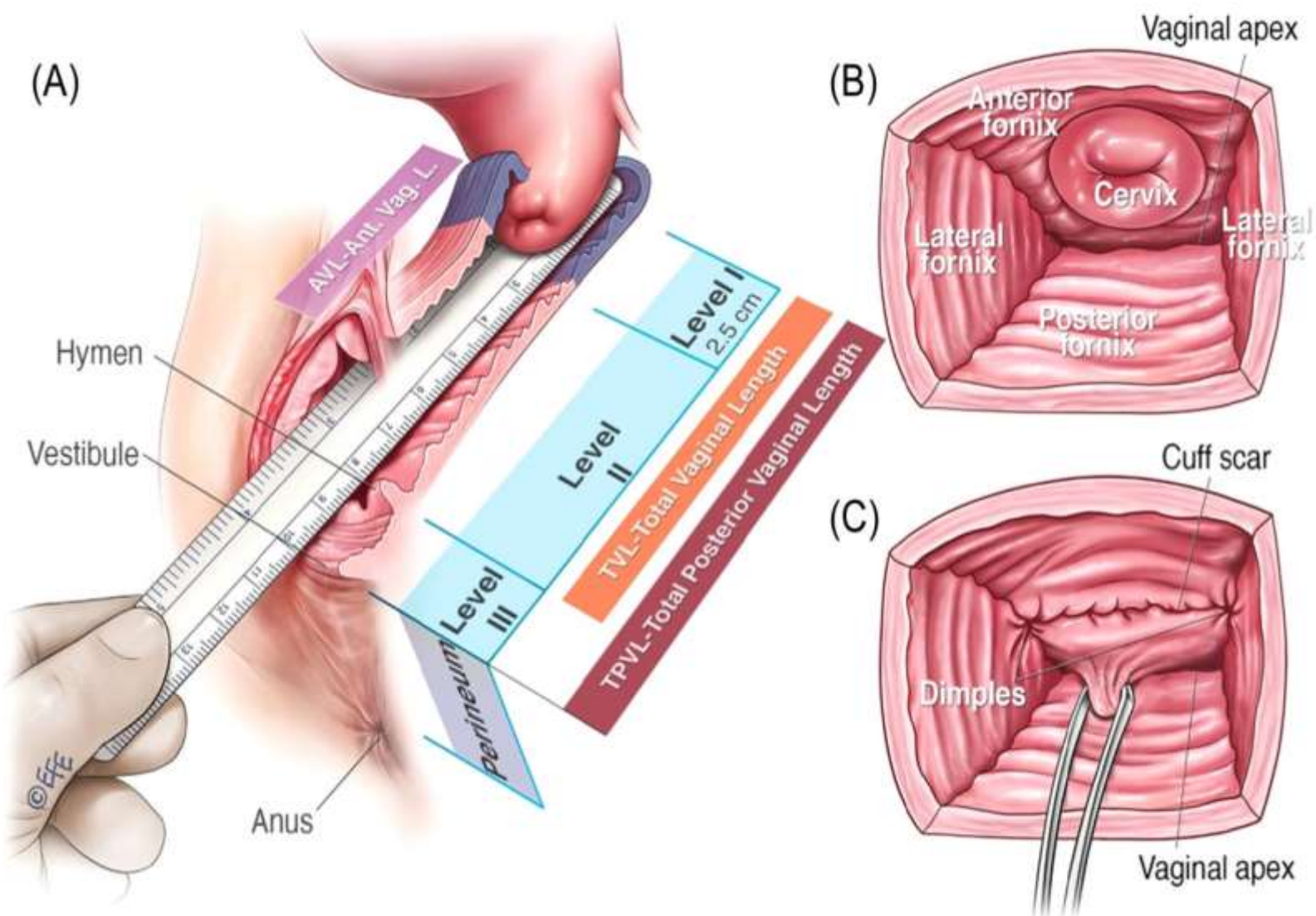
- Ovary
- Fallopian tubes
- Vagina
- External genitalia



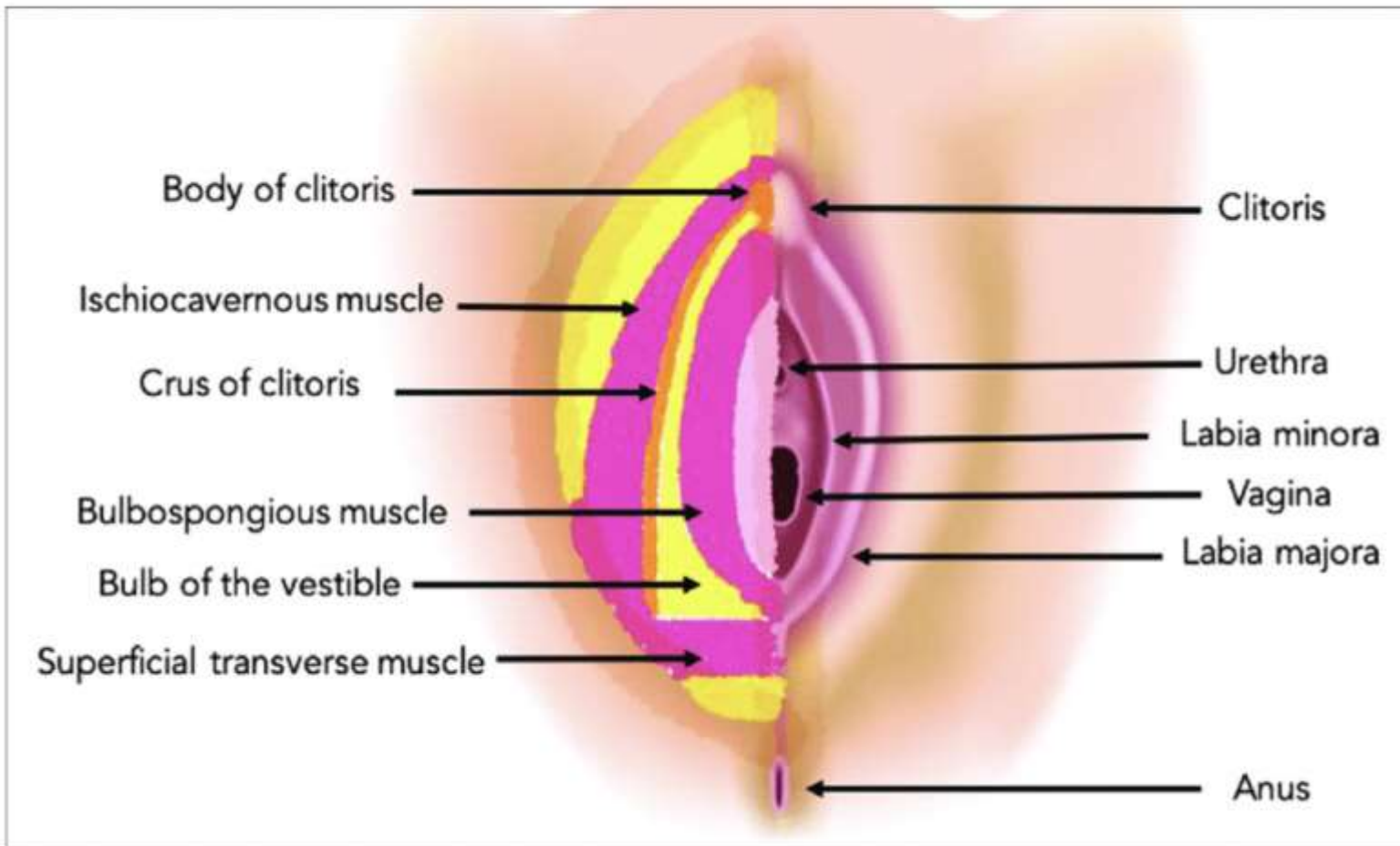
# The Ovary and Fallopian Tubes



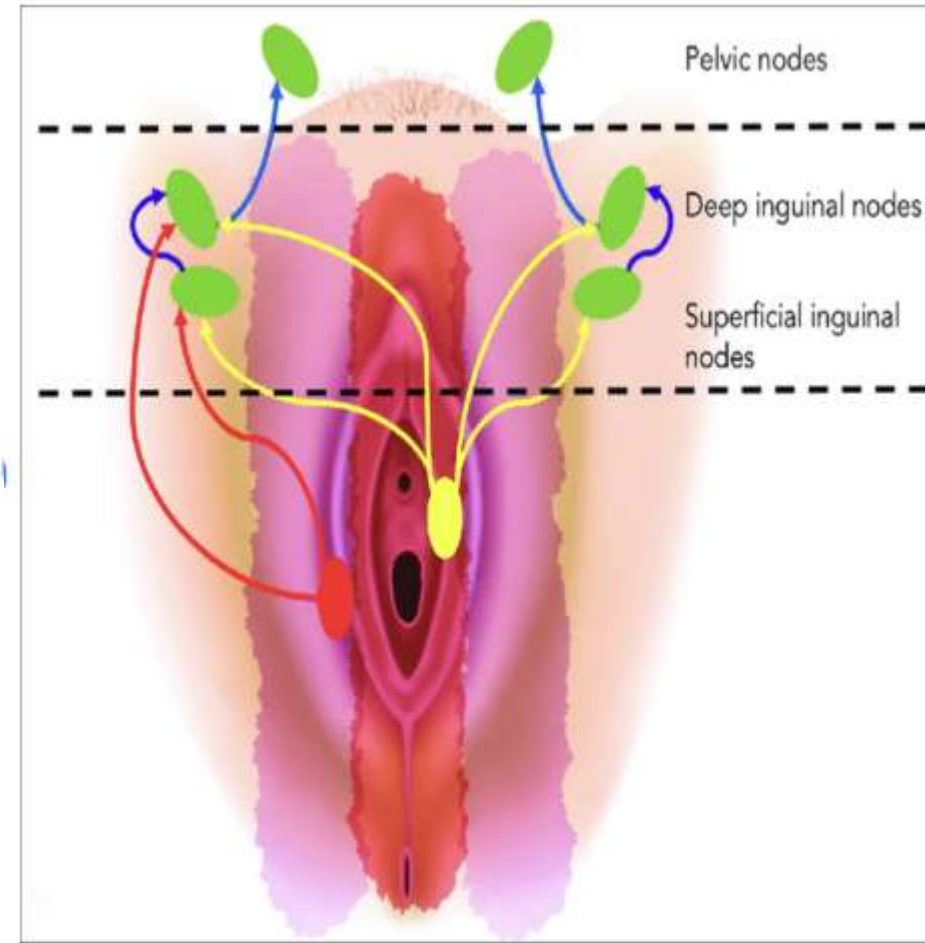
# Vagina



# External genitalia

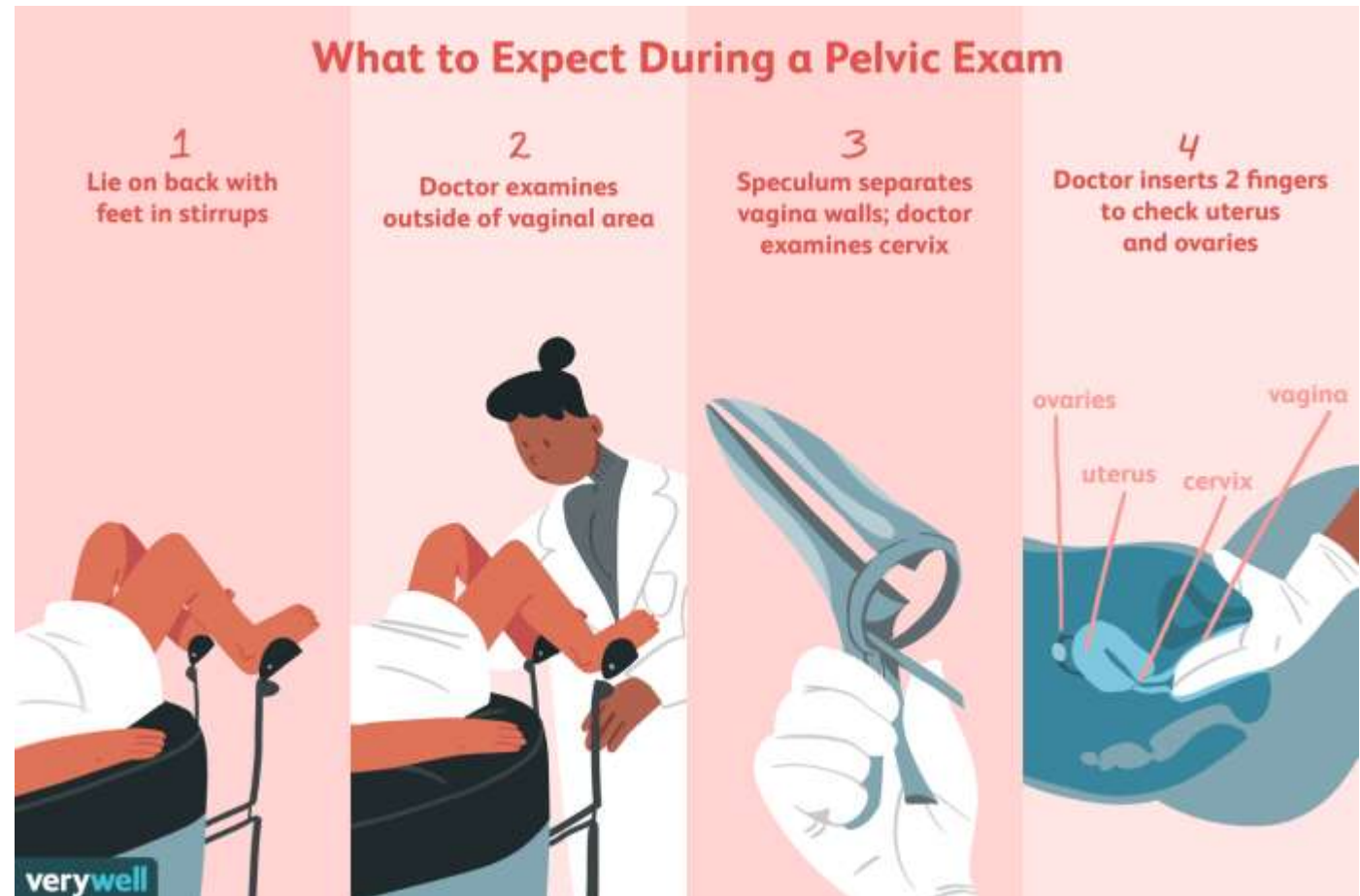


Schematic representation of the superficial and deep structures of the vulva.



Schematic representation of lymphatic drainage of carcinoma of the vulva.

# Gynecological assessment



# Why do we need to assess?



- Diagnose
- Stage the disease
- Determine the response
- Brachytherapy pre planning
- Follow up



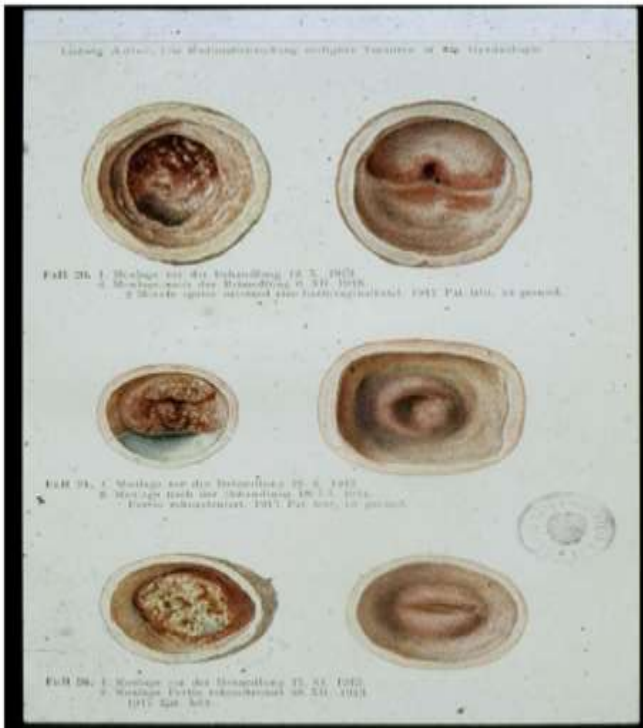
# Modalities available

	Clinical	USG	CT	MRI
Availability	[Green gradient bar]			
Cost	[Yellow to Red gradient bar]			
Standard	Gold	Silver+	Silver	Gold

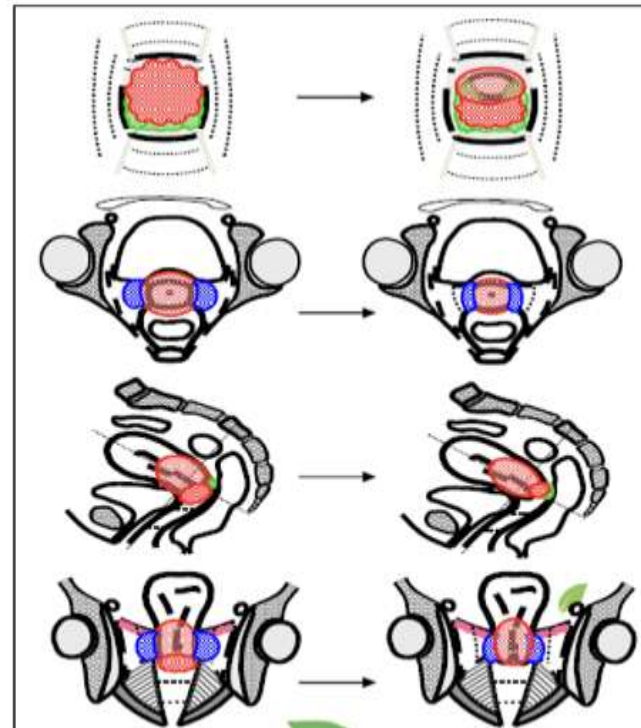
## Imaging device: Eye & Finger

- Technology widely available
- Low cost
- Largest amount of experience accumulated
- Superior to US, CT, MRI, PET CT for portio, vagina, vulva, skin...

Adler: Strahlentherapie, 1918



EMBRACE study protocol, 2011



REGN. NO. : RT/	/	UNIT
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**GYNAECOLOGICAL EXAMINATION**

Menopausal Status : Pre / Peri / Post menopausal / Pregnant. LMP :

Menarche at 13 yrs of age. Menopause at 48 yrs ago (at 45 yrs ago). Cycles - Regular Y / N

P<sub>3</sub> : L1-3 : LCB 25 yrs ago; Contraceptive used - None / OCP / Barrier / IUD / Permanent

Any other relevant points :

P/A: Vagina - deep & patent  
Mild cystocele

P/S + P/V + P/R: Uterus:

Cervix: Growth 3x4x5 cm involving Cervix  
5% AP L/M bleeds to touch

Vagina: Lateral fornix & part of post fornix involved (upper 1/3rd). Lat & Ant fornices free

Parametria: Both involved medial 1/2. Lat. pelvic wall free

Rectal mucosa: Free

Vulva and ext. genitalia: NAD.

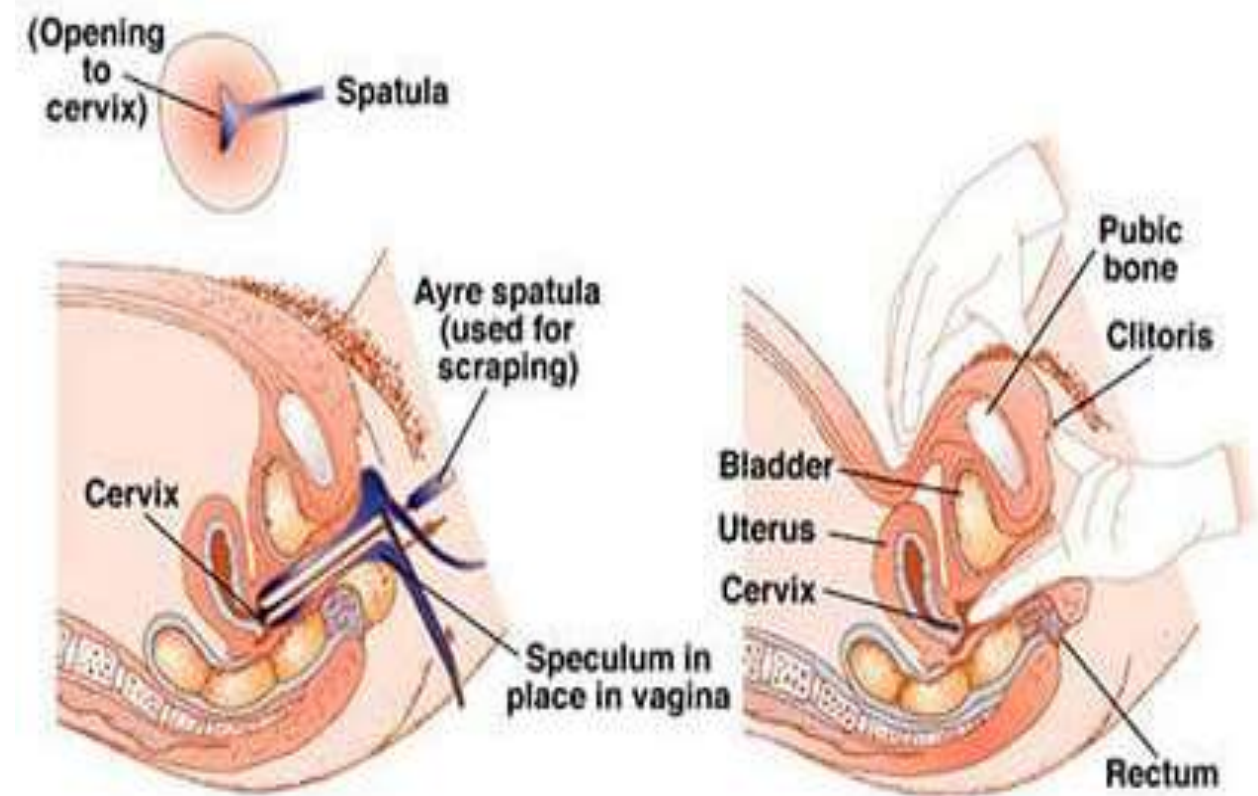
Ovaries:

PoD: NAD

Nodes: Supraclavicular nodes not palpable.

# Prerequisites for clinical assessment

- Take Informed consent.
- Allay apprehension. Ensure privacy.
- Prepare appropriate environment.
- Analgesia, anesthesia, position.
- Bladder and bowel prep.
- Be prepared to tackle bleeding.
- Pap smear : for at least 24 hours prior to exam :
  - No vaginal douches, tampons, medications.
  - No sexual intercourse.





# Steps of clinical assessment



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- Ulcers, tracts
- Infection
- Bleeding
- Inguinal nodes (visible)

Examn of the external genitalia

- Cervix
- Ext os
- Vagina
- Oozing
- Pap test
- Biopsy

Per speculum examination

- Growth cervix, corpus, para
- Height (CC/SI)
- Rectal mucosa

Per vaginal examination

Per rectal examination

- Tenderness
- Lump
- Inguinal nodes (palpable)

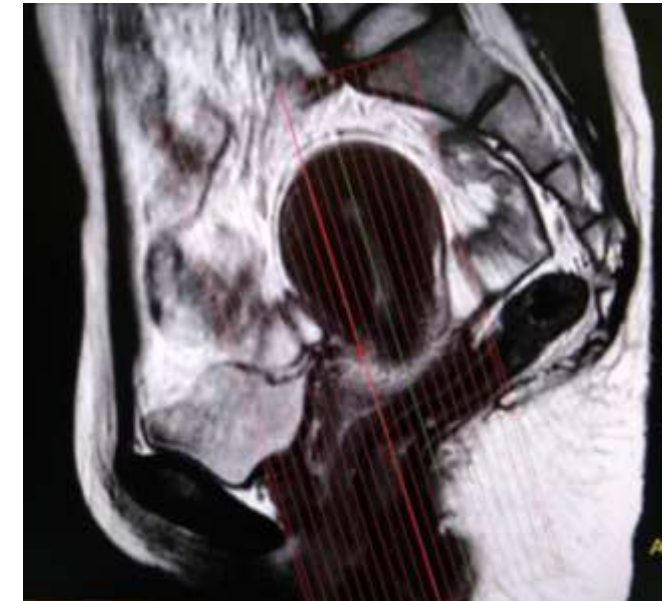
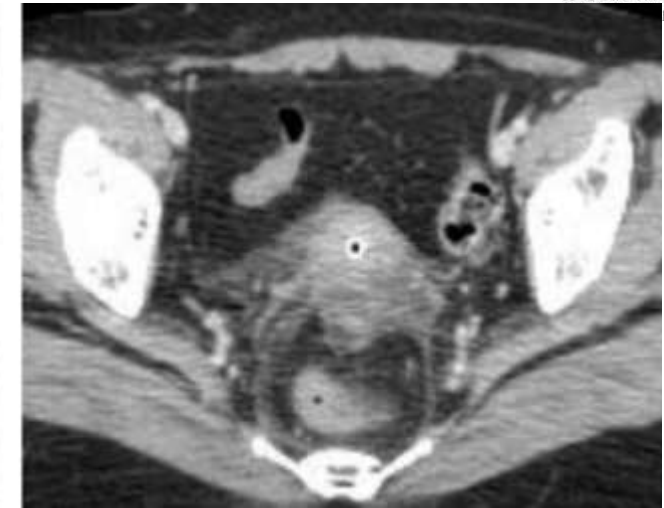
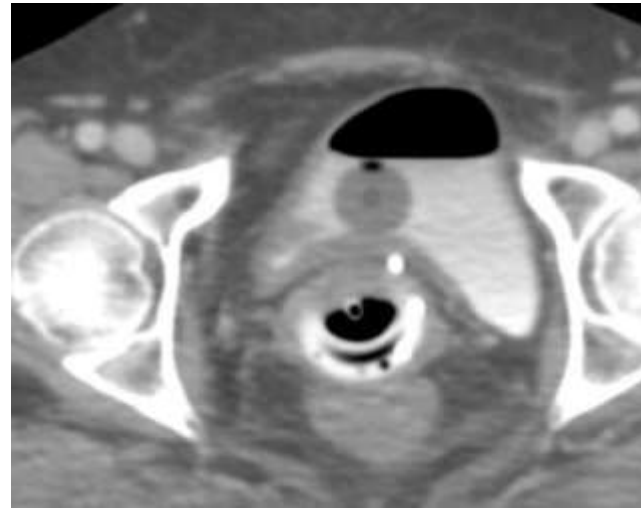
Per abdominal examination

- Growth cervix, vagina
- Width (ML)
- Thickness (AP)
- Bimanual

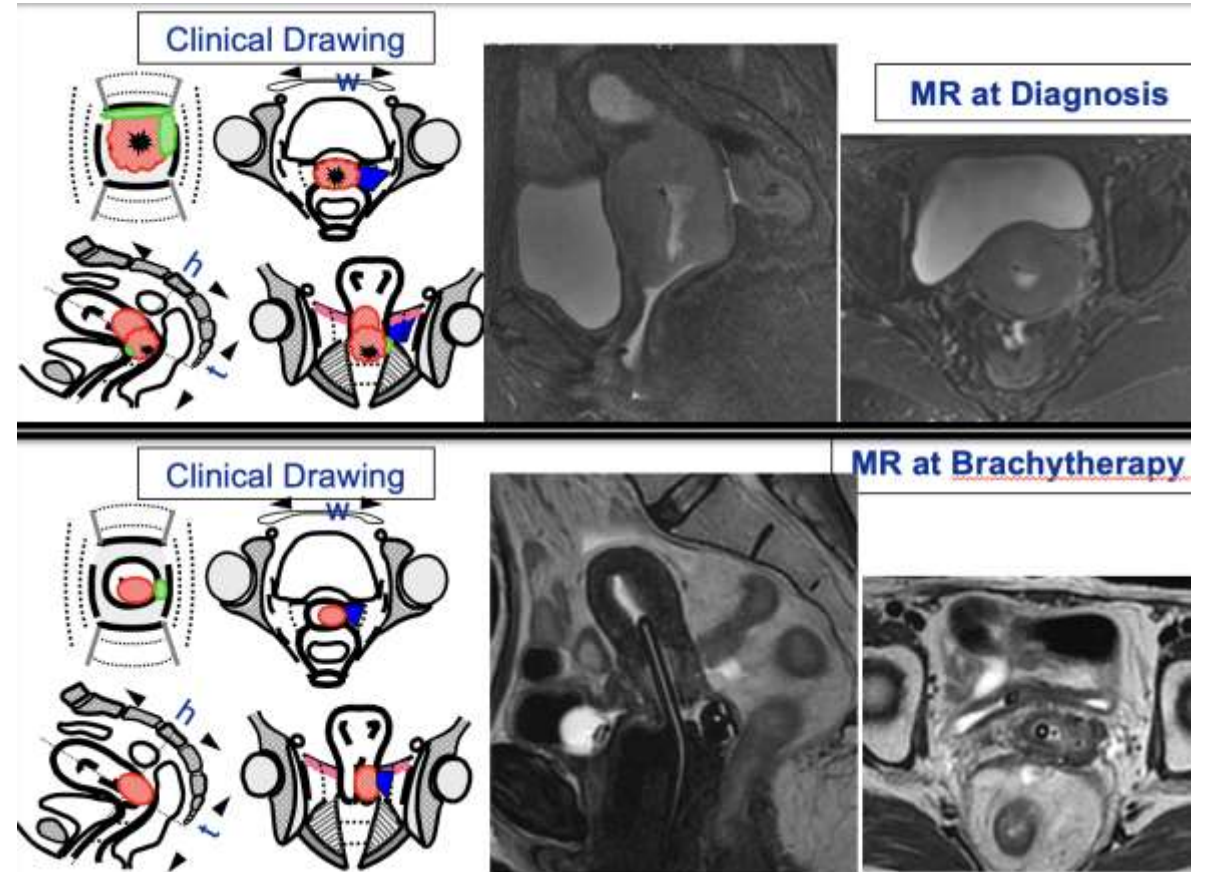
# Important points for radiological assessment



- Blood tests – KFT, Electrolytes.
- Bowel prep.
- CT scan
  - IV contrast – arterial phase.
  - Dilute bladder contrast.
  - $\leq 3\text{mm}$  slice cuts.
- MRI
  - T2w FSE para.
  - $\leq 3\text{mm}$  slice cuts. Zero gap.
- PETCT – nodal, distant mets.



# Documentation : Clinical diagrams



# Documentation : Clinical diagrams



- Actually a ***clinico-radiological diagram***.
- Mental correlation of clinical findings and 3D imaging.
- ***Transformation of 3D findings to 2D drawings.***
- Uniform, unambiguous, consistent.
- Learning curve – 10 to 15 patients.

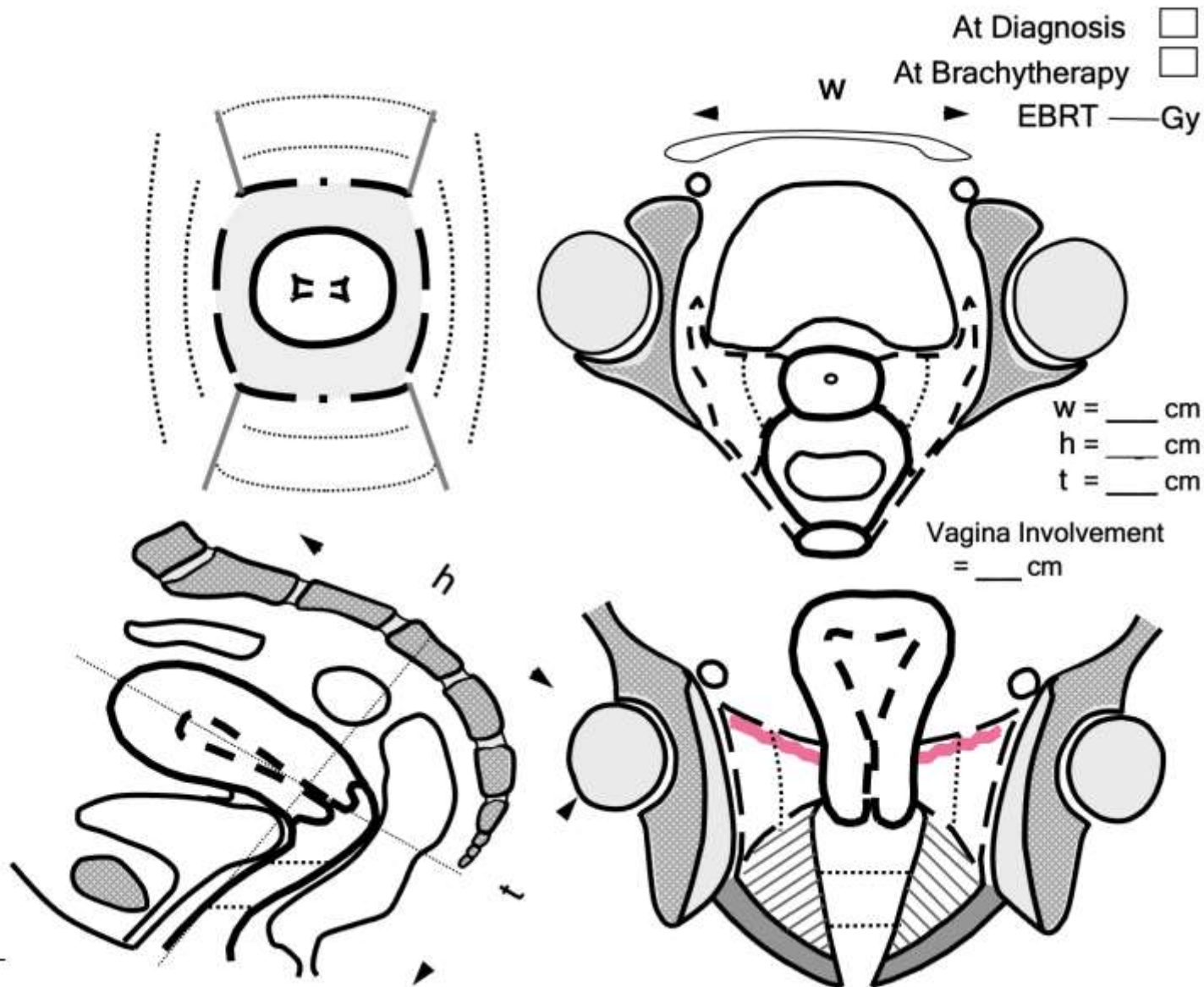


***Challenge yourself.....repeatedly.....!***

# Clinical diagrams : Cervix cancer (GYN GEC ESTRO)

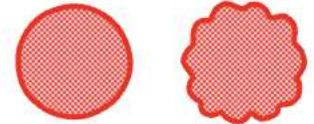


Patient : ABC



Infiltrative   Exophytic

Cervix



Vagina



Parametria



Rectum or Bladder



dd/mm/yy

Signature

# Clinical diagrams : Cervix cancer : IBS



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Patient Initials : \_\_\_\_\_ ID : \_\_\_\_\_

	Infiltrative	Exophytic
Cervix	●	●
Vagina	●	●
Parametria	●	●
Rectum or Bladder	●	●

Initial evaluation  
 At brachy (fraction no. \_\_)

h = \_\_\_\_\_ cm    t = \_\_\_\_\_ cm    NMD (R) = \_\_\_\_\_

**Vaginal Disease**

Ant : \_\_\_\_\_ cm  
 Post : \_\_\_\_\_ cm  
 Rt Lat: \_\_\_\_\_ cm  
 Lt Lat: \_\_\_\_\_ cm

Educational article

Original paper

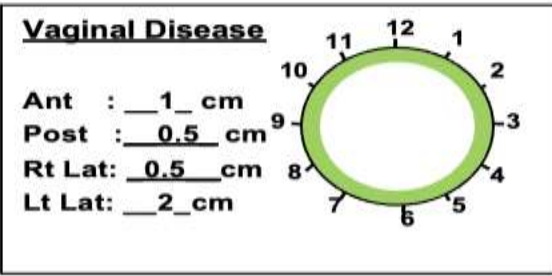
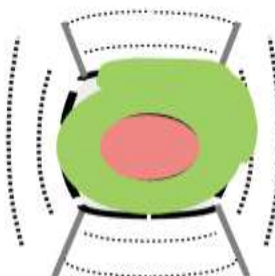
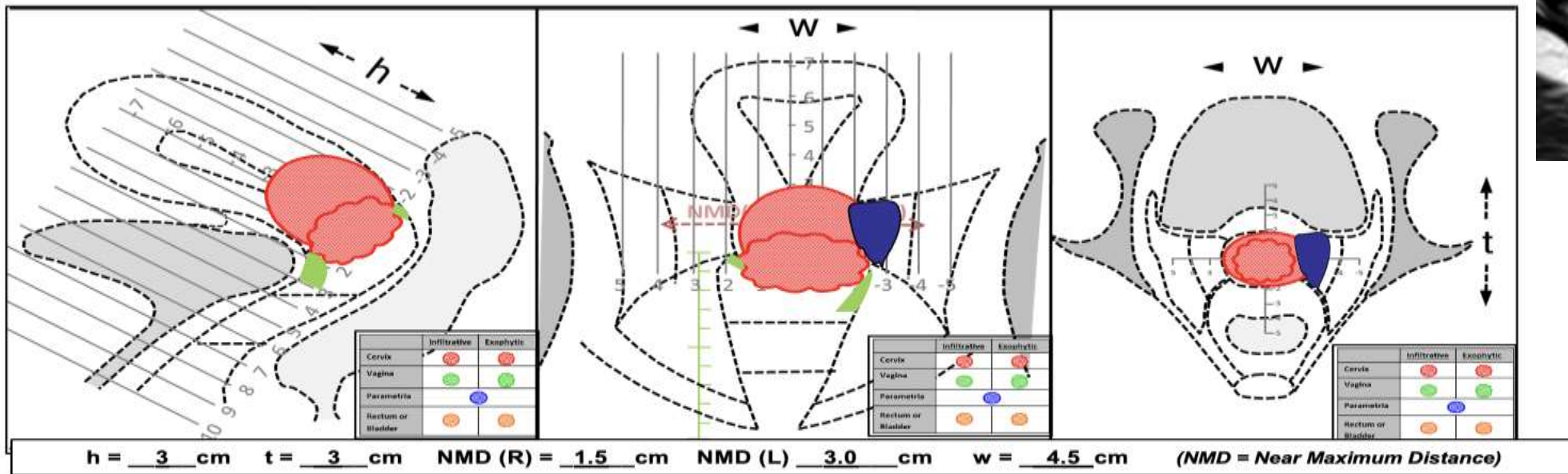
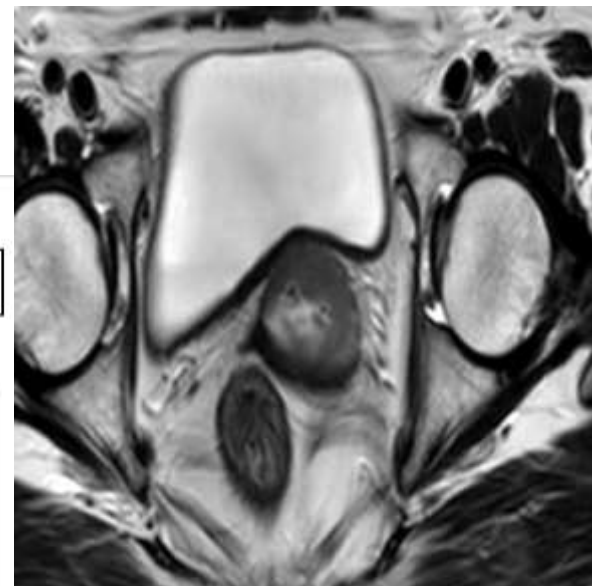
## Indian Brachytherapy Society Guidelines for radiotherapeutic management of cervical cancer with special emphasis on high-dose-rate brachytherapy

# Clinical diagrams : Example

**Patient Initials : CV**

**ID : VI/02864**

Initial evaluation  
 At brachy (fraction no. \_\_)



**FIGO (2018) II B**

T 2b   N 0   M 0

**Remarks:**  
 Predominantly endophytic

**Signature & Date:** RM,  
 04/04/2022

# Clinical diagrams : Post op / Vault / Vagina



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vagina



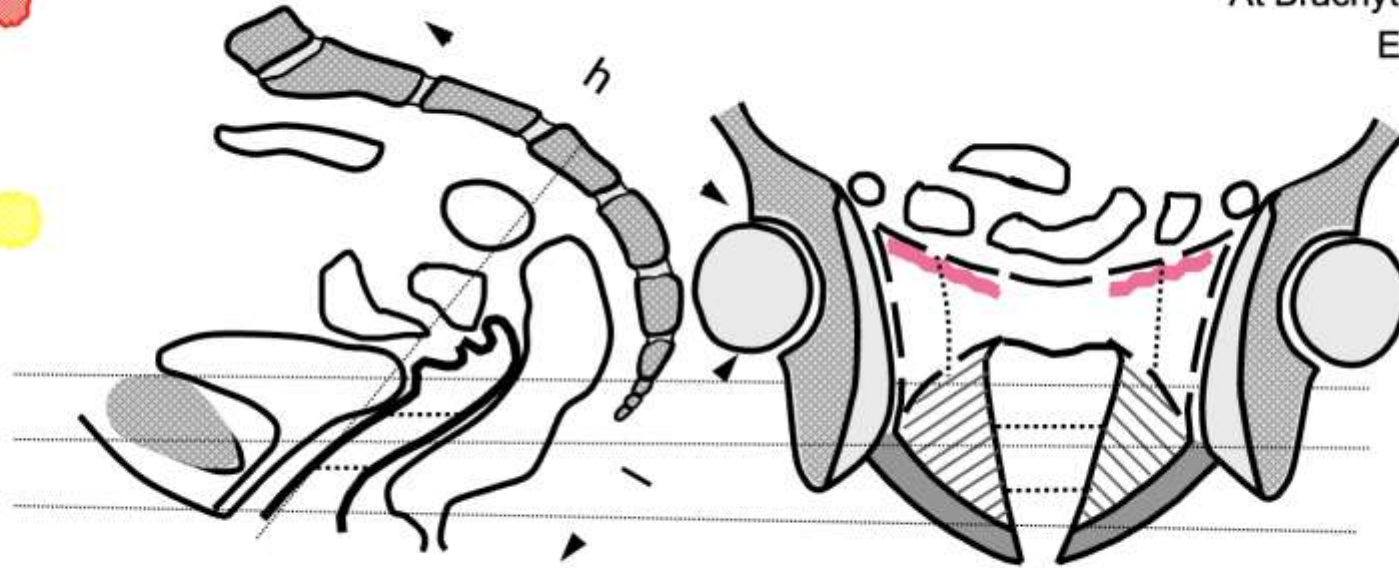
Paracolpos



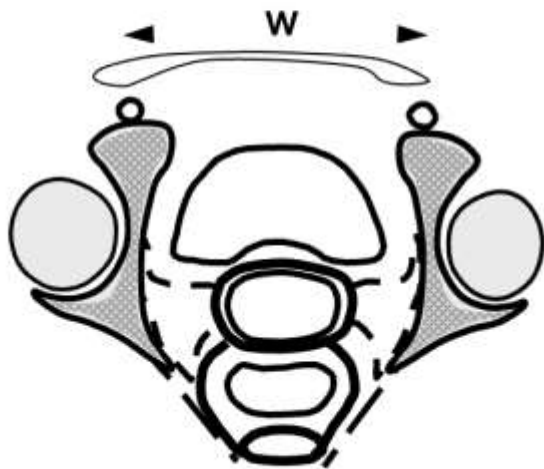
Rectum/ anal canal or  
Bladder/ urethra



At Diagnosis   
At Brachytherapy   
EBRT — Gy



W = \_\_\_ cm  
I = \_\_\_ cm  
C = \_\_\_ cm



Upper 1/3 vagina



Middle 1/3 vagina



Lower 1/3 vagina



# Take home messages

- Working knowledge of anatomy required.
  - Parts of uterus
  - Uterine artery
  - Lymphatic drainage of uterus
  - Watershed line in vagina
- Gynecological assessment important
  - Accessible
  - Preparation
  - Clinical examination
  - 3D imaging
- Documentation by diagrams
  - Uniform, unambiguous, consistent

