

Important topics Anatomy – by DR. S.D

1. UPPER LIMB IMPORTANTS –

- BRACHIAL PLEXUS
- AXILLA
- AXILLARY ARTERY
- CUBITAL FOSSA
- MAMMARY GLAND
- MAMMARY GLAND LYMPHATICS
- RADIAL NERVE
- ULNAR NERVE
- MEDIAN NERVE
- ROTATOR CUFF MUSCLES
- FLEXOR RETINACULUM
- MID PALMAR SPACE
- SNUFF BOX
- LUMBRICALS
- THENAR
- SHOULDER JOINT
- ELBOW JOINT
- SUPINATION & PRONATION
- CARPEL & META CARPLES
- IMPORTANT CLINICAL ANATOMY (REFER BDC)

2. LOWER LIMBS IMPORTANTS –

- FEMORAL TRIANGLE
- FEMORAL SHEAT & CANAL
- FEMORAL ARTERY
- FEMORAL NERVE
- ADDUCTOR CANAL
- POPLITEAL FOSSA
- OBTURATOR NERVE
- SCIATIC NERVE
- ARCHES OF FOOT
- LOWER LIMB VENOUS DRAINAGE
- HAMSTRING
- FLEXOR RETINACULUM
- HIP JOINT
- LOCKING & UNLOCKING OF KNEE
- KNEE JOINT
- IMPORTANT CLINICAL ANATOMY (REFER BDC)

3. THORAX IMPORTANTS –

- PLEURA
- RECESSES OF PLEURA
- PULMONARY LIGAMENTS
- FISSURE & LOBES OF LUNGS
- ROOT OF LUNG
- BRONCHO PULMONARY SEGMENTS
- MEDIASTINUM
- PERICARDIUM
- RIGHT ATRIUM
- HEART BLOOD SUPPLY
- VEINS OF HEART
- AZYGOS VEINS
- ARCH OF AORTA
- THORACIC DUCT
- INTERCOSTAL NERVE
- INTERCOSTAL SPACE
- INLET OF THORAX
- OUTLET OF THORAX
- IMP CLINICAL ANATOMY (REFER BDC)

ANATOMY OF CECUM

M56BOOKSTORE – WRITTEN BY – DR.SAHITHI (PHYSIOTHERAPIST)

INTRODUCTION

- The cecum is blind end /cul-de-sac of the large intestine below the level of ileal opening.
- It projects into the right iliac fossa.
- Cecum lies above the lateral part of inguinal ligament.

DIMENSION

- 6cm wide
- 8cm long
- Often mobile
- Enveloped by peritoneum

EXTERNAL FEATURES

1. TENIAE COLI
 - There are three ribbon like bands of the longitudinal muscle coat.
2. SACCULATION
 - These are a series of pouches /dilations in the wall of cecum and colon.
 - The sacculations are responsible for the characteristic puckered appearance of the large intestine
3. APPENDICES EPIPLOICAE
 - These are small bags of visceral peritoneum filled with fat attached to the teniae of large intestine.

TYPES OF CECUM

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On the basis of growth of the cecum four types of caecum may be found in adults:

- **CONICAL TYPE /FETAL TYPE:** 2% caecum is conical shape.
- **INFANTILE:** The caecum is quadrate in shape.
- **NORMAL TYPE:** 80-90% the right sacculus is larger than the left.
- **EXAGGERATED TYPE:** 4-5% the right sacculus is hugely enlarged and the left sacculus is absent/atrophied.

PERITONEAL RELATIONS

- The about 90% individual the cecum is almost completely surrounded by the peritoneum.
- The vermiform appendix frequently lies in the retrocaecal recess.

VISCERAL REALTIONS

1. ANTERIOR:
 - Coils of intestine
 - Anterior abdominal wall
2. POSTERIOR:
 - MUSCLES: Right psoas iliacus.
 - VESSELS: Testicular or ovarian.
 - NERVE: Genitofemoral femoral and lateral cutaneous nerve of thigh.
 - Appendix in the retrocaecal recess.

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POSTERIOR REALTIONS

1. Genito femoral.
2. Femoral nerve.
3. Lateral cutaneous nerve of thigh.

ILEO CECAL JUNCTION

The junction of cecum with the ascending colon demarcated by the entrance of the ileum.

POSSIBLE FUNCTION OF THE ILEO CECAL JUNCTION:

- Preventing reflux from the cecum to the ileum.
- Regulating the passage of contents from the ileum to the cecum.

APPENDICULAR ORIFICE

- The appendix is attached to the postero medial wall of the cecum.
- Appendix orifice lies 2 cms inferior to the ileo cecal orifice.
- The orifice is guarded by insignificant semicircular fold of mucous membrane called “**Valve of Gerlach**” attached to the lower margin of the opening.

BLOOD SUPPLY

Branches of ilio colic artery from the superior mesenteric artery.

- The anterior cecal artery.
- The posterior cecal artery.

VENOUS DRAINAGE

- Ileo colic vein to superior mesenteric vein to portal vein.

LYMPHATIC DRAINAGE

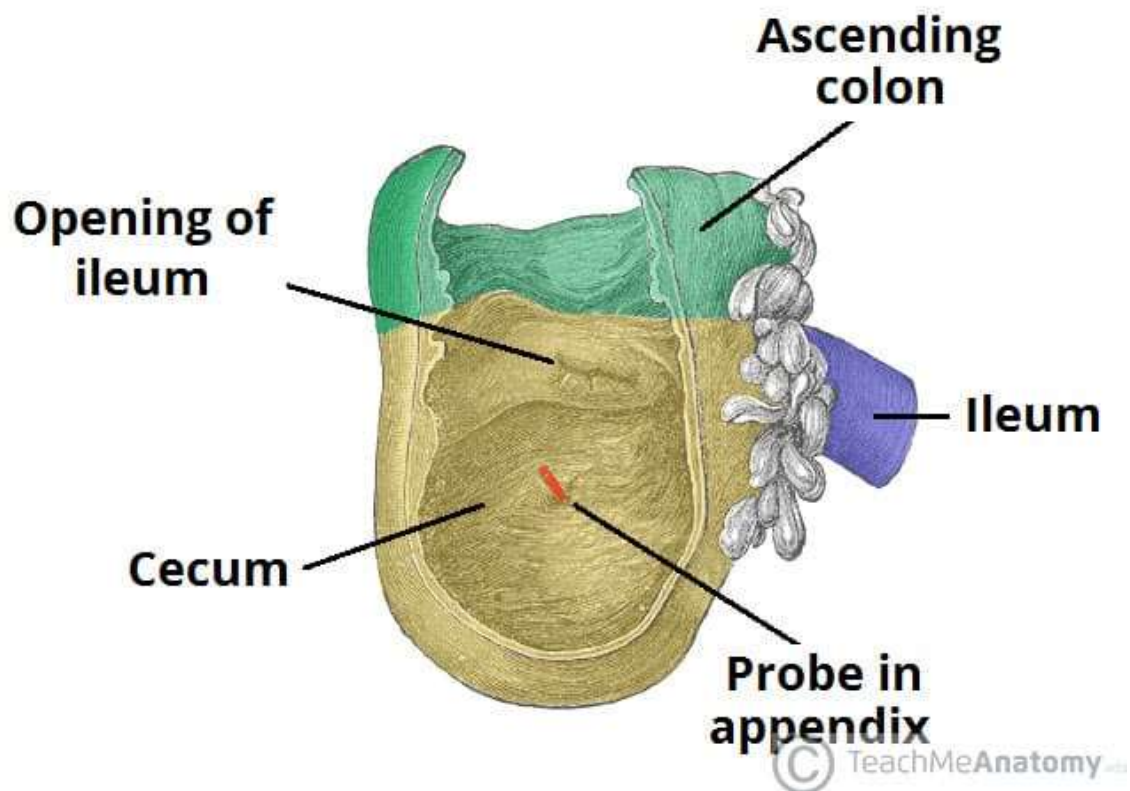
- The lymph vessels from the caecum drain into the ileo colic lymph nodes which in turn drain into the superior mesenteric group of pre- aortic lymph nodes.

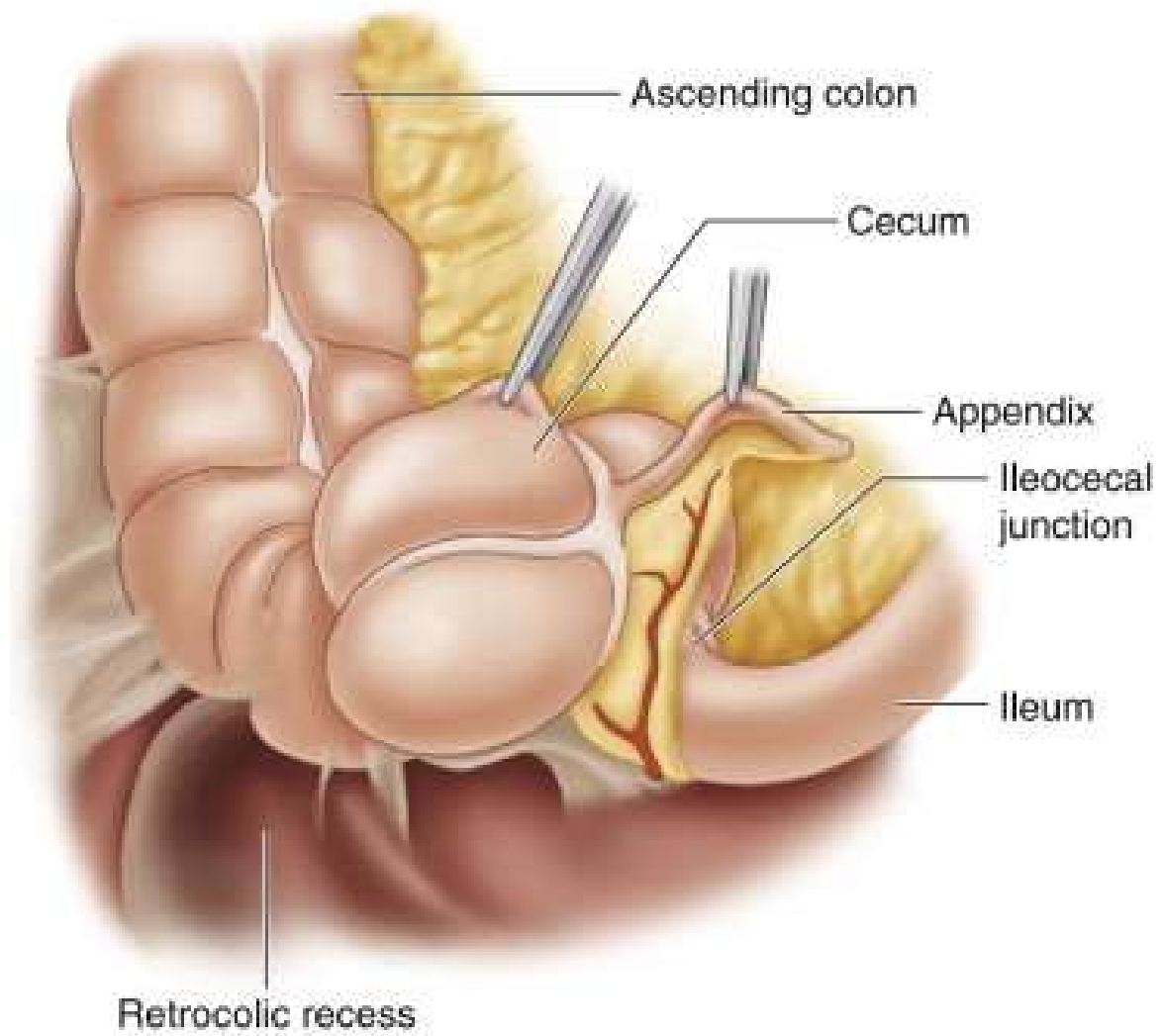
NERVE SUPPLY:

- Sympathetic nerve supply: T11&L1 spinal segments through superior mesenteric plexus.
- Parasympathetic nerve supply: Vagus nerve.

CLINICAL ANATOMY:

- Abnormal position.
- Inflammation.
- Intestinal tuberculosis.





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ANATOMY OF INGUINAL CANAL -

WRITTEN BY – ISHA SINGH (BPT)

Oblique intermuscular passage in the lower part of anterior abdominal wall

SITUATED: just above the medial half of inguinal ligament

- directed downward, forward, medial

EXTENDED: From deep inguinal ring to superficial inguinal ligament

DEEP INGUINAL RING:

- ❖ oval opening in fascia transversalis
- ❖ situated 1.2 cm above the midinguinal point
- ❖ immediately lateral to stem of inferior epigastric artery

SUPERFICIAL INGUINAL RING:

- ❖ triangular opening - in external oblique aponeurosis
- ❖ it is like an obtuse angle triangle
- ❖ BASE - from by public crest
- ❖ To margin of triangular ...lateral and medial reflected as crura
- ❖ Beyond the apex of triangle: 2 crura United by innercrural fibres

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BOUNDARIES:

#ANTERIOR WALL: whole extend

- ❖ skin by superficial fascia
- ❖ external oblique aponeurosis
- ❖ lateral 1/3rd - internal oblique muscle

#POSTERIOR WALL: whole extend

- ❖ fascia transversalis
- ❖ extra peritoneal tissue
- ❖ parietal peritoneum

➤ **MEDIAL 2/3RD:**

- conjoint tendon
- medial end by the reflected part of inguinal ligament

➤ **ROOF:**

- Arched fiber
- Internal oblique
- Transversalis abdominis muscle

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➤ **FLOOR:**

- Grooved upper surface of inguinal ligament
- Medial end by lacunar ligament

STRUCTURE PASSING THROUGH THE CANAL

1. spermatic cord in males

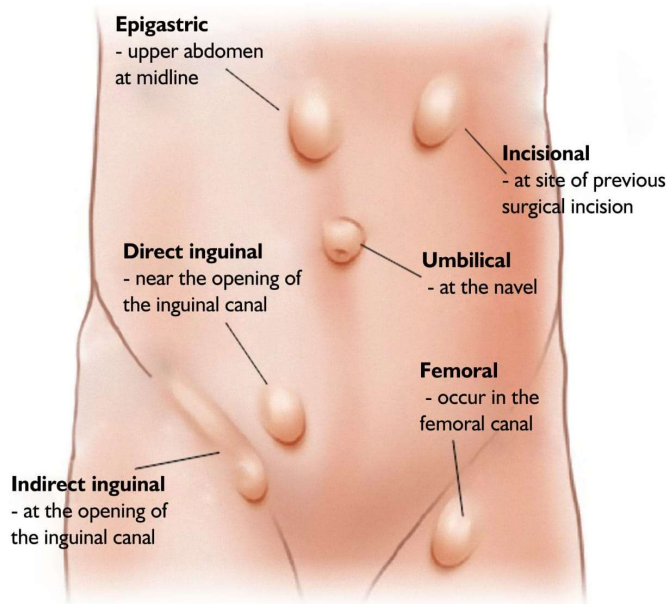
Round ligament of the uterus in female

2. Ilioinguinal nerve enters the canal through the interval between the external and internal oblique muscle and passes out through the superficial inguinal ring

INGUINAL HERNIA

➤ **Types of hernia**

- Epigastric hernia
- Incisional hernia
- Umbilical hernia
- Femoral hernia
- Inguinal hernia

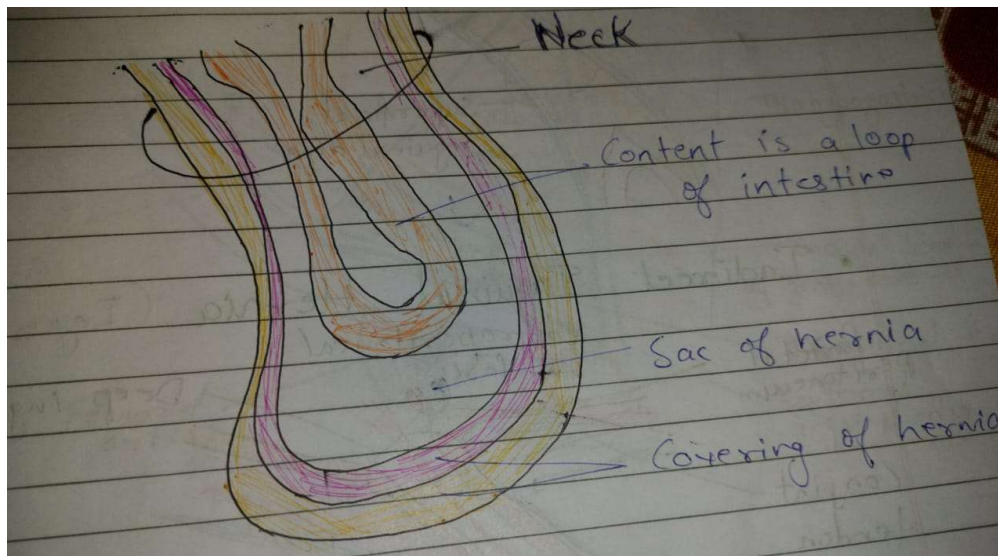


PARTS OF HERNIA

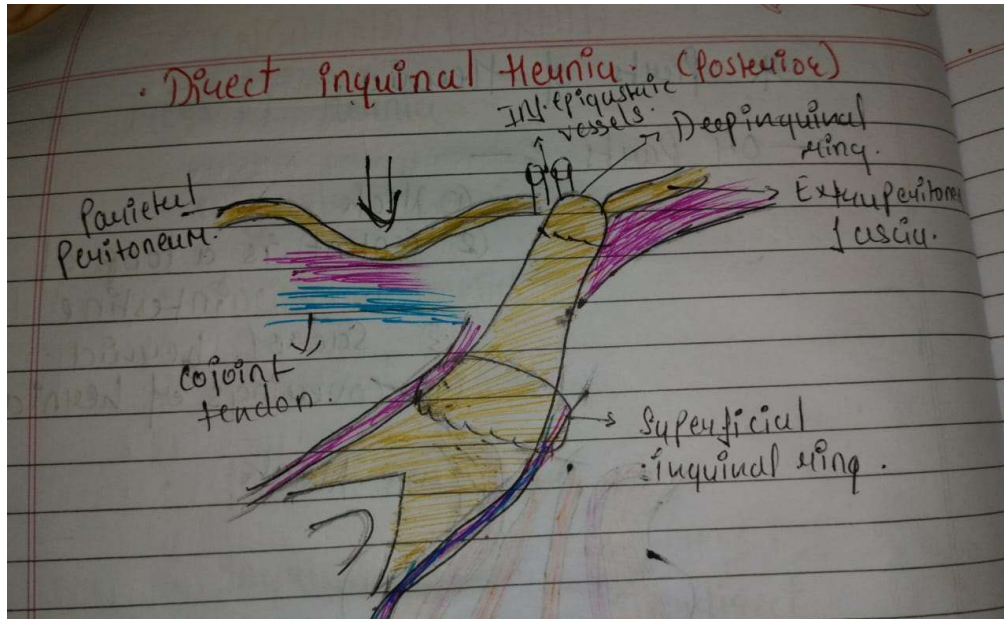
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➤ 4 Parts

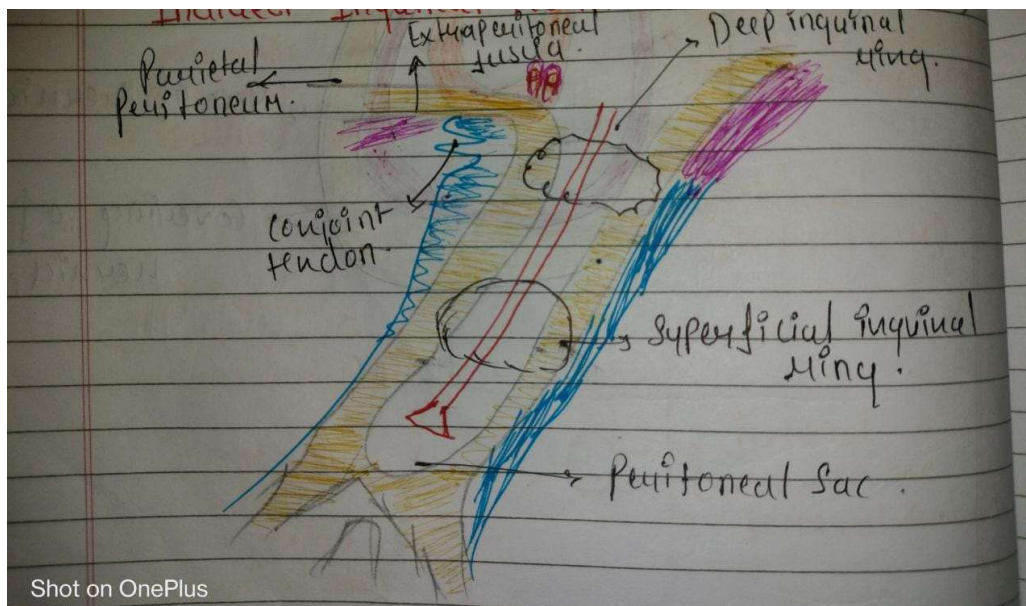
- Neck
- content is a loop of intestine
- Sac of hernia
- coverings of hernia



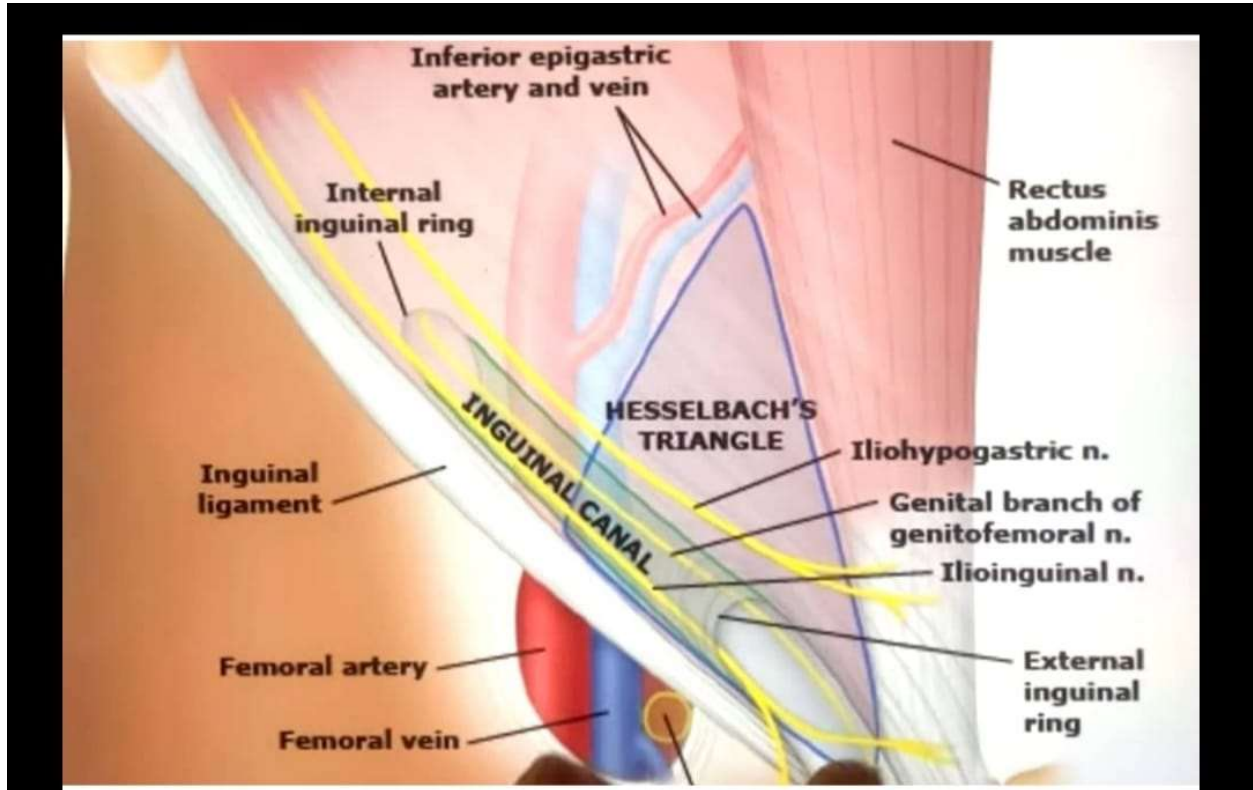
DIRECT INGUINAL HERNIA (posterior)



INDIRECT INGUINAL HERNIA



HASSELBACH'S TRIANGLE



HERNIA

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- EXTERNAL HERNIA
 - Inguinal - 80%
 - Incisional - 10%
 - Femoral - 5%
 - Umbilical - 4%
 - Epigastric - < 1%
 - Others - < 1%

Inguinal and femoral hernia or know as groin hernia

➤ SINGNS AND SYMPTOMS

- Outside lump
- Heavy discomfort around gut
- Pain/ache on exertion
- Constipation

➤ RISK FACTORY

- History of hernia
- Older age
- Male sex
- Causation
- Chronic cough
- Chronic constipation
- Abdominal wall
- Smoking

- Hernia is protrusion of any abdomina content through any of its wall. this is called External hernia
- Intestine protrudes into the no entry zone within abdominal cavity itself this condition is called Internal hernia

TYPES OF HERNIA

- ❖ Internal hernia
- ❖ External hernia

INGUINAL HERNIA: protusion of loop of intestine through intestinal wall is called inguinal hernia

INDIRECT INGUINAL HERNIA: when the protusion occur through the deep inguinal ring , inguinal canal , superficial inguinal ring into scrotum it is called Indirect hernia

➤ **COVERINGS -**

- Extraperitoneal tissue
- Internal spermatic fascia
- Cremasteric fascia
- External spermatic fascia
- Skin

#DIRECT HERNIA -

- When the protusion occur through weak posterior wall of inguinal canal or traingle of Hesselbach this is called direct hernia

#HESSEIBACH -

- Bounded by inf epigastric artery, lateral border of rectus abdominis and inguinal ligament
- This area is divided into medial and lateral part by passage of obliterated umbilical artery

➤ **COVERING**

#COVERINGS OF LATERAL DIRECT INGUINAL HERNIA

- Extraperitoneal tissue
- Fascia transversalis
- Cremasteric fascia
- External spermatic fascia
- Skin

#COVERINGS OF MEDIAL DIRECT INGUINAL HERNIA

- Extraperitoneal tissue
- Fascia transversalis
- Conjoint tendon
- External spermatic fascia
- Skin

Anatomy of Vermiform Appendix

M56BOOKSTORE – Written by – Dr. Sakshi (physiotherapist)

- **POSITION:** Appendix 2cm from Iliocaecal valve

position is medially and length is about 2-20cm

- **ORIGIN:**

-Arises from Posteromedial wall of cecum

-Above the 2cm ilo caecal junction

- **DIMENSIONS:**

Length – 2 to 20cm (Average 9cm)

-It is larger in children than adults

-Varies according to the age

Width – 5mm

-It's a tube like structure

-Diameter of lumes varies with age

- **Parts of Appendix**

- Base
- Body
- Tip

Body –

-Body is tube like structure

-Situated between Base and Tip

-Body is narrow

Tip-

-Least vascular distal blind end



- **Position Of Appendix**

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- Lies in right iliac fossa
- Base of appendix is fixed

1.Paracolic Position (11'o Clock):

- Here tip ascends right side of ascending colon
- seen in about 2% cases

2.Retro caecal position (12'o Clock):

- Commonest type
- Seen in > 60% cases
- Passes through behind the caecum and Ascending colon

3.Splenic Position (2'o Clock):

- Passes from the pre ileal position and medially passes through ileum
- Pre ileal variety is most dangerous (inflammation from appendix spreads to general peritoneal cavity)
- Pre ileal seen in 1% cases
- Post ileal seen in 0.4% cases

4.Promonteric Position:

- Rare in occurrence
- Appendix tip is directed horizontally towards Sacral promontary

5.Pelvic position:

- Second commonest position

-seen in >30% cases

-Appendix tip passes downwards and medially and crosses pelvic brim to enter the pelvic

6. Mid Inguinal (6'o clock) (Subcecal Position):

-Appendix tip passes vertically downwards below the cecum and pointed towards the inguinal ligament

-Seen in 2% cases

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- **PERITONEAL RELATIONS**

-Vermiform appendix is intraperitoneal structure

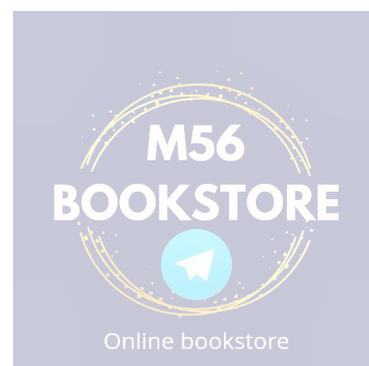
-Suspended by small triangular peritoneal fold

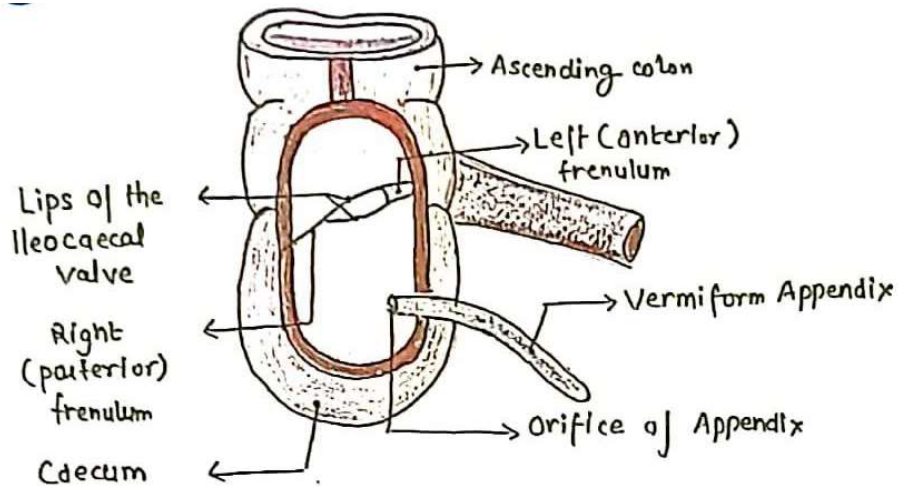
-Derived from posterior / left layer of mesentery of ileum

-Appendicular artery runs through the mesoappendix portions

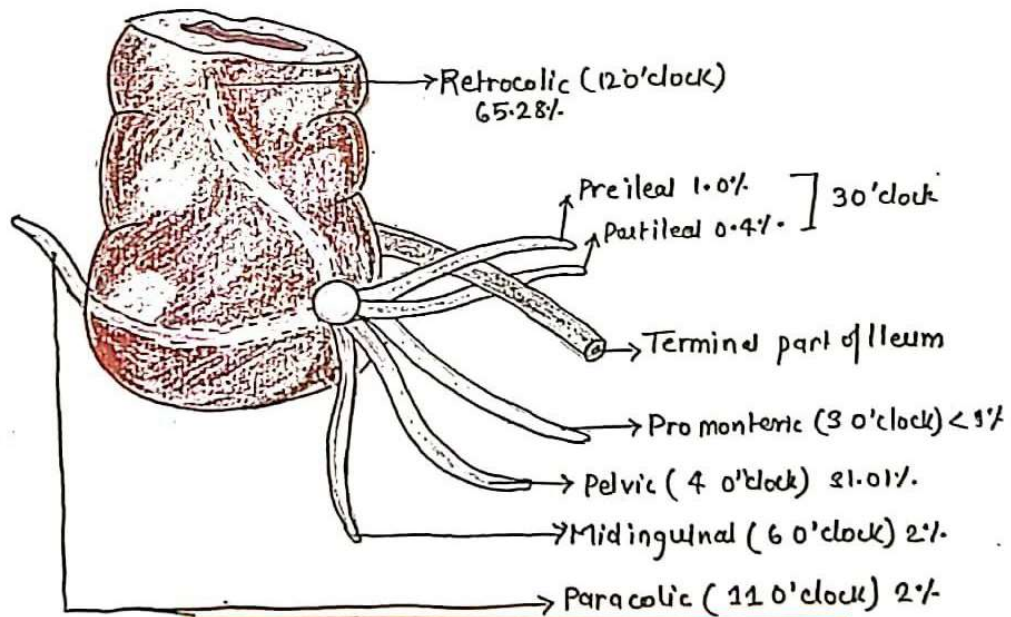
- **Appendicular Orifice**

-Sometimes guarded by indistinct semilunar fold of mucous membrane known as **Valve Of Gerlach**





INTERIOR OF CAECUM



POSITION OF VERMIFORM APPENDIX

Axilla -

dr s.d notes

Also called cervico axillary canal

It is a pyramidal space

Present b/w upper thoracic wall & arm

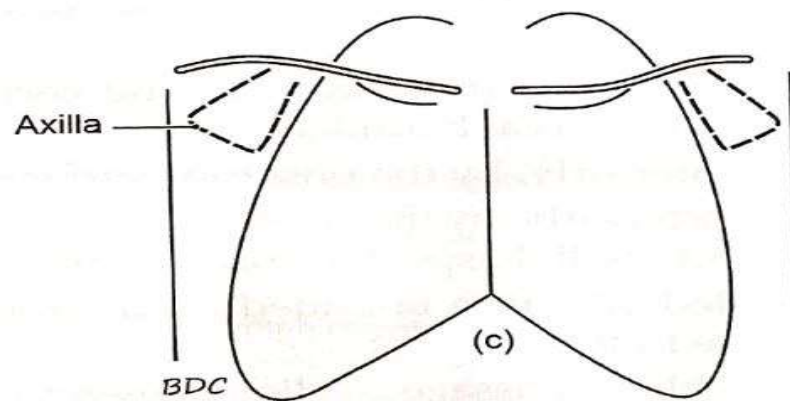
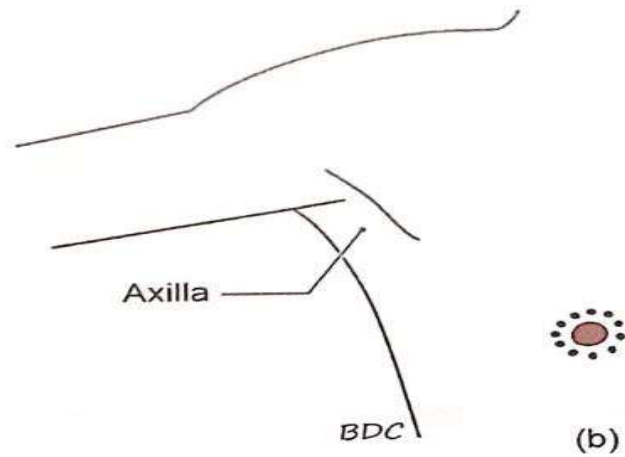
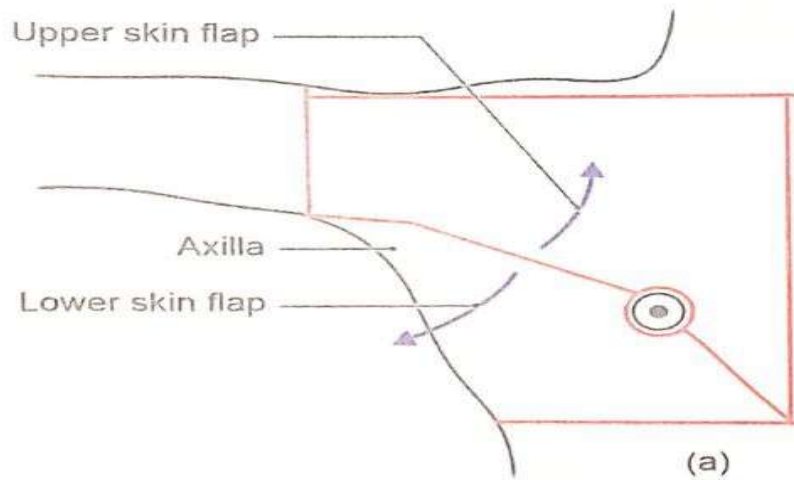
Boundaries –

1. Apex
2. Base
3. Anterior wall
4. Posterior wall
5. Medial wall
6. Lateral wall

Apex is blunt – directed upwards and medially into root of neck (cervico-axillary canal)

Base – directed downwards

Diagram –



Figs 4.1a–c: (a) Dissection of axilla, (b) axilla in living body, and (c) relations to the skeleton

Boundaries description –

1.Apex – blunt

- Directed upwards
- Cervico- axillary canal

Bounded by –

anteriorly – clavicle

Posteriorly – scapula & coracoid process

Medially – 1st rib (outer border)

2.Base – directed downwards

At this chest and narrow at the arm

Formed by – skin

Superficial fascia

Axillary fascia

It is convex upwards , forming concavity of armpit.

Anterior wall – formed by

- pectoralis major
- clavi pectoral fascia
- pectoralis minor

posterior wall – formed by

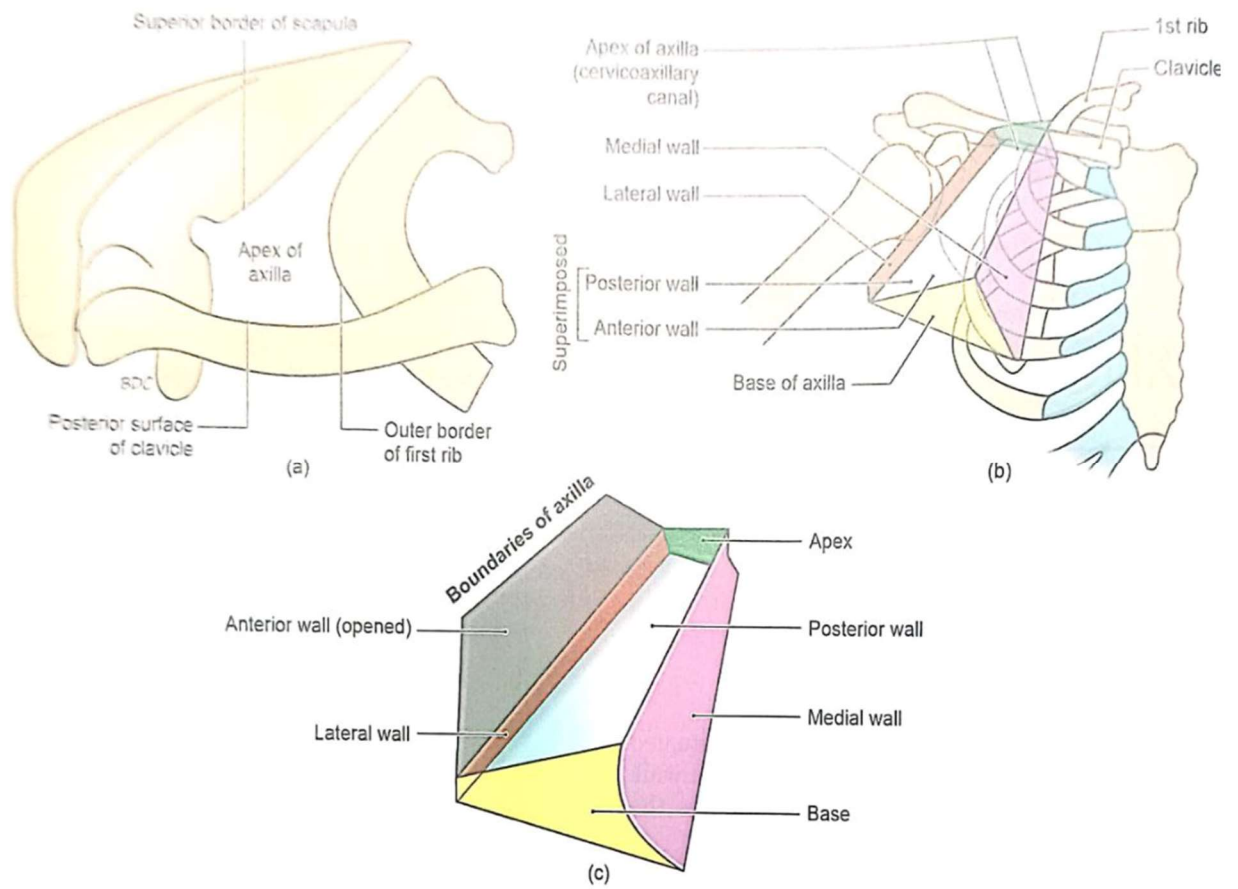
- sub scapularis
- teres minor
- lattismus dorsi

medial wall - formed by

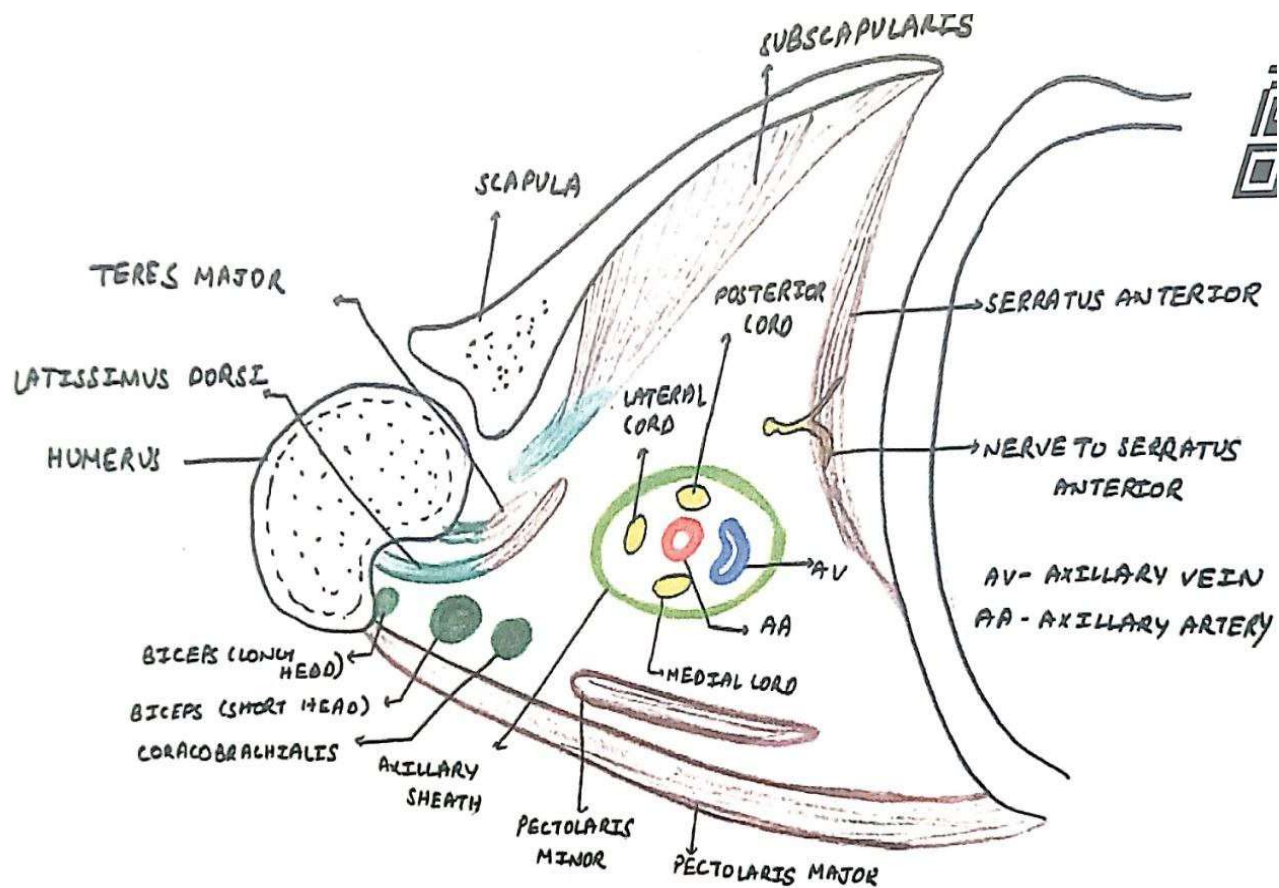
- Upper part of shaft of humerus
- Coracobrachialis
- Short head of biceps brachii

Contents –

- Axillary artery & its branches
- Axillary vein
- Axillary lymph node
- Long thoracic nerve
- Intercoastal nerve
- Axillary tail of breast Brachial plexus



Figs 4.2a to c: (a) Boundaries of the apex of the axilla, (b) walls of the axilla, and (c) opened up axilla



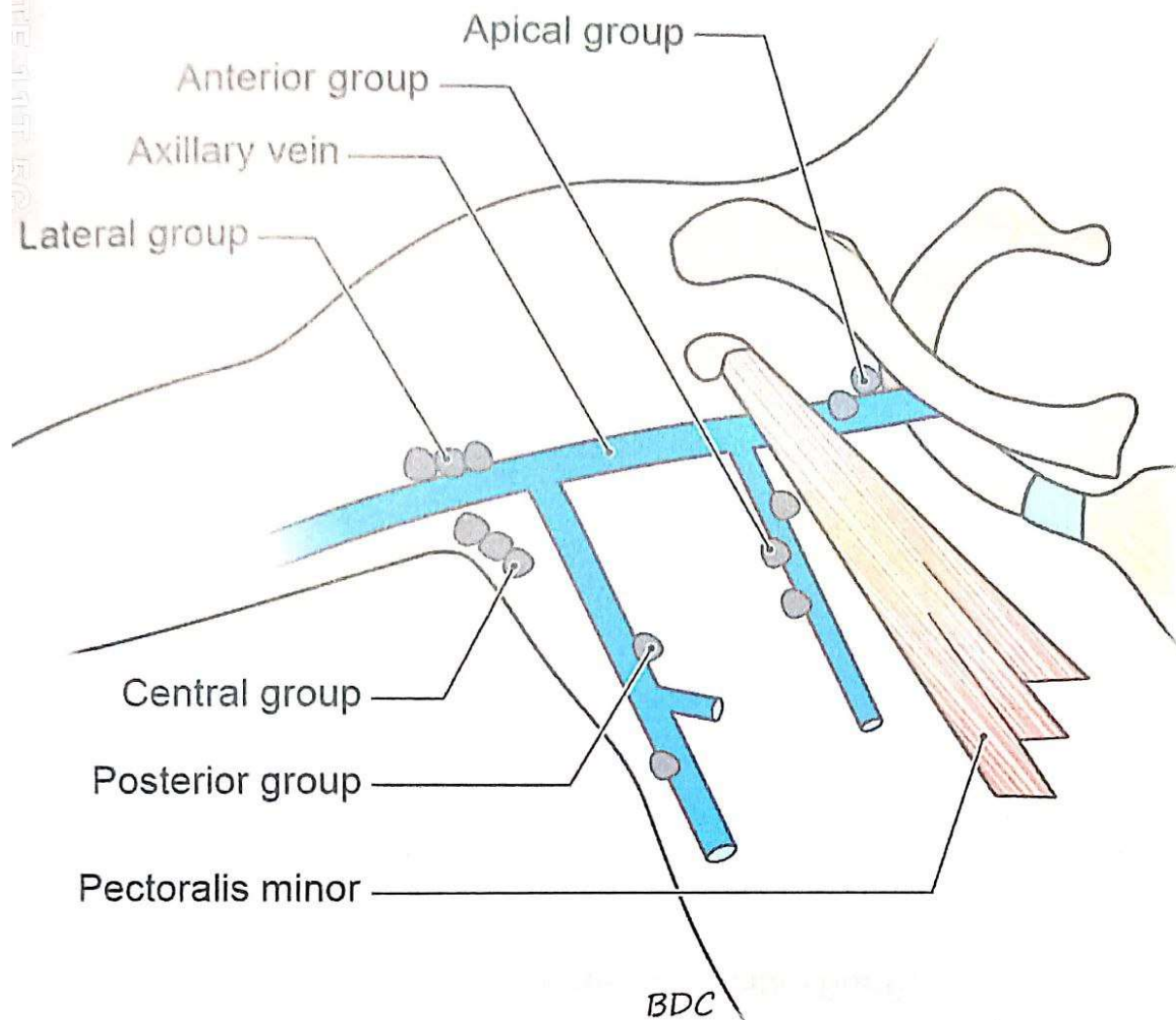


Fig. 4.11: The axillary lymph nodes

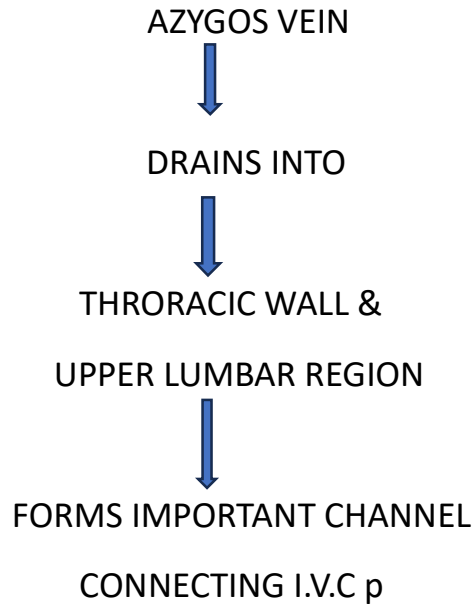
Reference – anatomy bdc 9th edition page no – 53

AZYGOS VEIN

S.D NOTES (MBBS)

THE AZYGOS VEIN MEANS – UNPAIR

FLOWCHART -



- Veins occupies upper part of posterior wall of abdomen & mediastinum
- Main contents –
 - 1. Formation
 - 2. Course
 - 3. Relations
 - 4. Tributaries

- Formations –
- Union of lumbar azygos vein
- Right subcoastal region
- Ascending lumbar vein

Course –

- Enters thorax & passing through aortic opening of diaphragm
- Ascends up 4th thoracic vertebrae
- & finally pierces into pericardium through svc (superior vena cava)

Relations -

- Anterior
 - Posterior
 - Right
 - Left
-
- Anterior – oesophagus
 - Posterior – right post. Intercoastal arteries
 - Right – right lung pleura -
 splanchic nerve
 - Left – left lung
 - Aorta
 - Thoracic duct
 - Trachea
 - Vagus

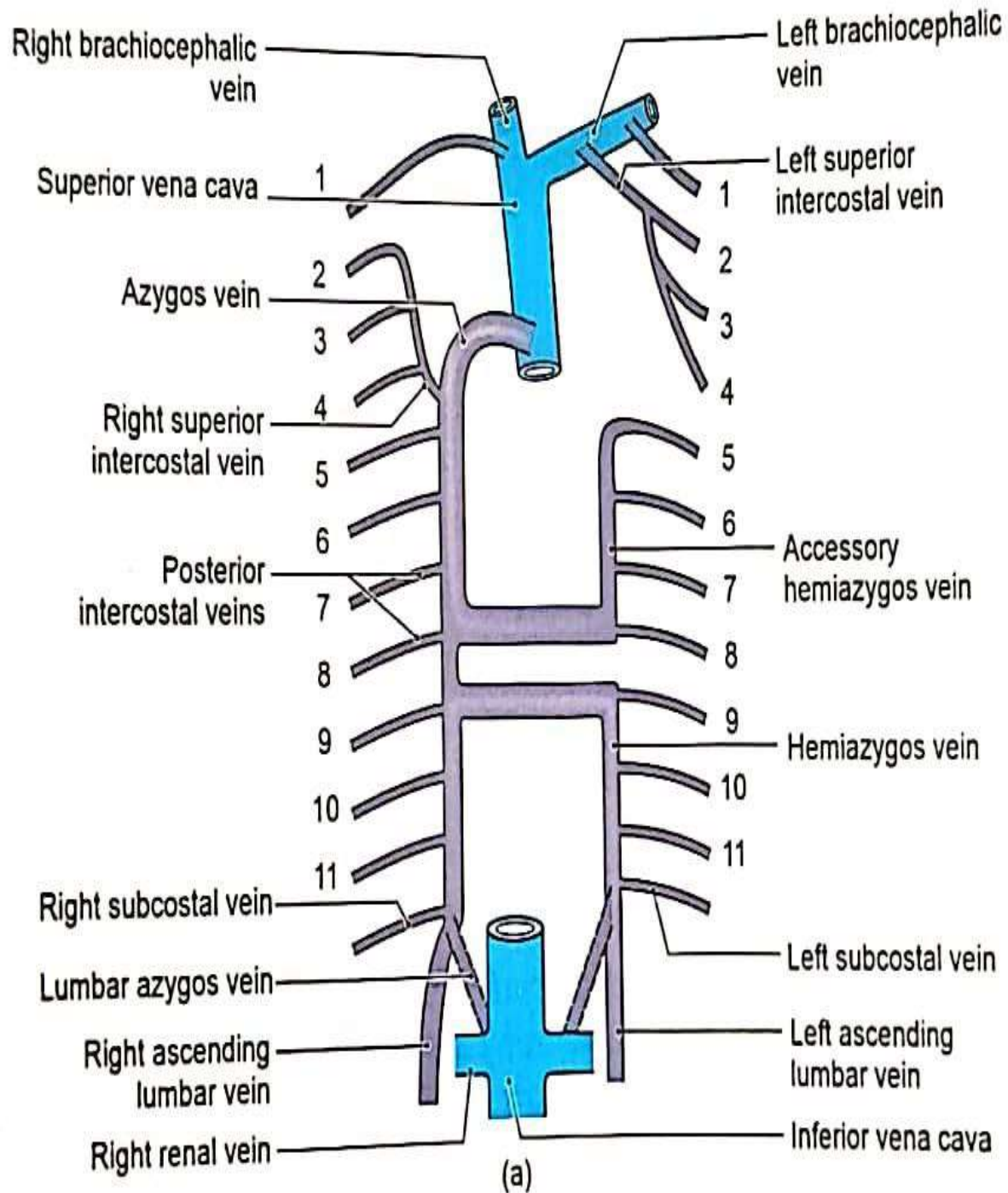
Tributaries –

- Right superior intercostal vein
- 5th to 11th intercostal vein
- Hemiazygos vein (accessory)
- Right bronchial vein
- Oesophageal , mediastinal , pericardial veins

- HEMI AZYGOS VEIN

Formed formly from azygos vein only –

- Also called – inferior hemiazygos vein
- Mirror image of lower part of azygos vein
- Formation –
 - Left lumbar
 - Left ascending lumbar region
 - Left subcoastal vein
- Tributaries –
 - 9th to 11th (post. Intercoastal vein)
 - Oesophageal vein

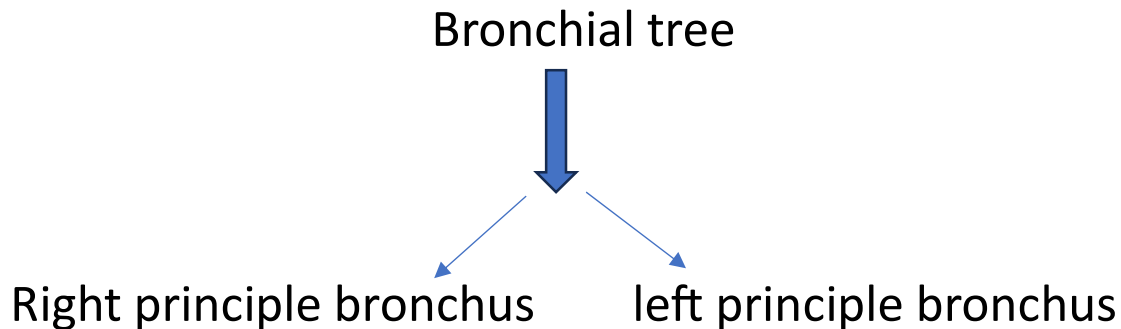


Azygos diagram – Reference- B.D CHAURASIA – VOL 01 – PAGE NO – 254 9TH EDITION

BRONCHIL TREE

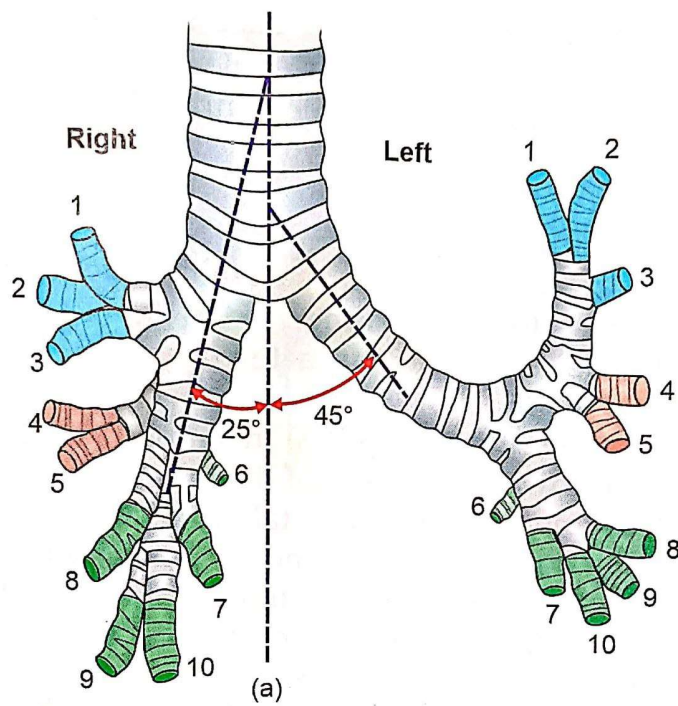
S.D NOTES

Location – at the level of lower border of 4th thoracic vertebrae.



1. Right principle bronchus –
 - 2.5 cm long
 - Shorter
 - Wider
 - More lined with trachea
 - Infections are more common.
 - Making 25 degree with tracheal bifurcation
2. Left principle bronchus –
 - 05 cm long
 - Longer
 - Narrower
 - More oblique
 - Making 45 degree with tracheal bifurcation

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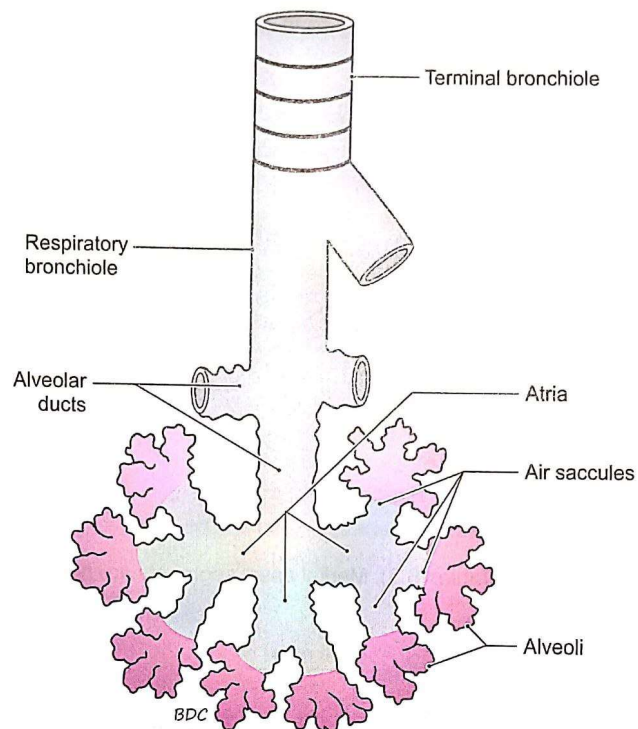


Fig. 16.7: Parts of a pulmonary unit

Each principle bronchus



Enters the lungs through hilum



Divides into secondary lobar bronchii

There are 03 lobar bronchii on right side

02nd on the left side

Each lobar bronchus divides into tertiary bronchii

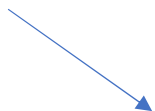
Tertiary also called segmental bronchii



1. Right side segments 2. Left side segments

10 segments

09 segments



Splits into respiratory bronchioles

Respiratory bronchiole of lung known as pulmonary unit.

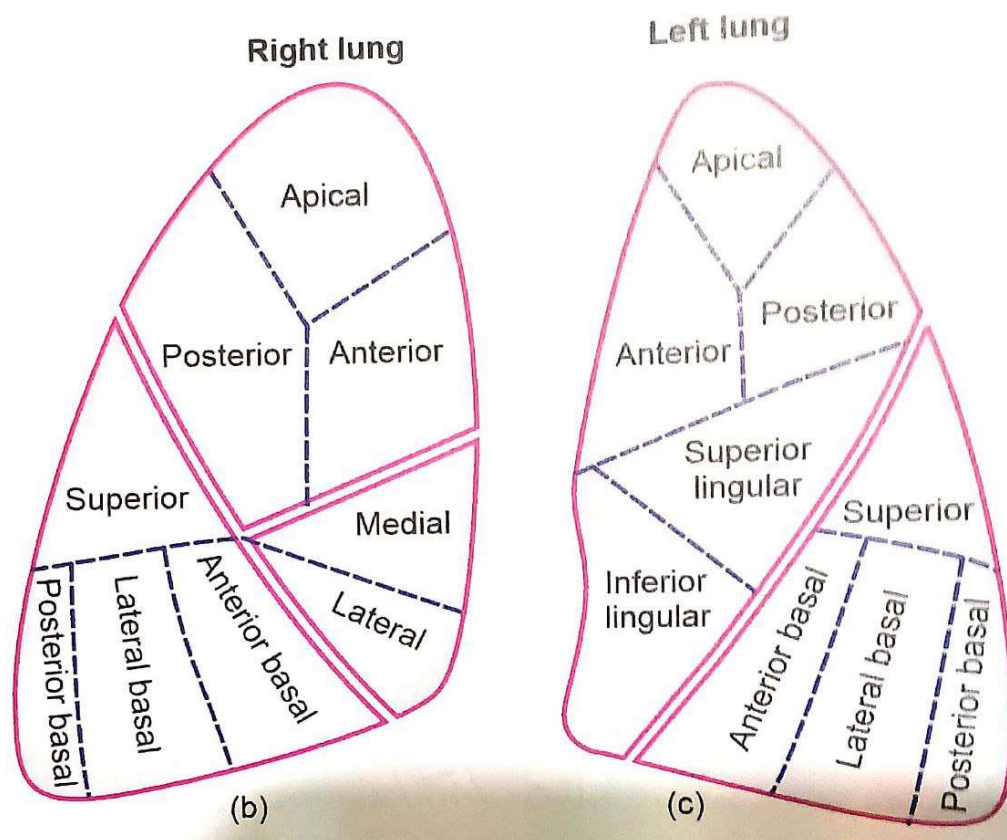
Microscopic passage –

1. Alveolar ducts
2. Atria
3. Air sacules
4. Pulmonary alveoli (small cavity)

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Bronchopulmonary segments table –

Table 16.3: The bronchopulmonary segments		
<i>Right lung</i>		
<i>Lobes</i>		<i>Segments</i>
A. Upper		1. Apical 2. Posterior 3. Anterior
B. Middle		4. Lateral 5. Medial
C. Lower		6. Superior 7. Medial basal 8. Anterior basal 9. Lateral basal 10. Posterior basal
<i>Left lung</i>		
A. Upper		1. Apical 2. Posterior 3. Anterior
	• Upper division	
	• Lower division	4. Superior lingular 5. Inferior lingular
B. Lower		6. Superior 7. Medial basal 8. Anterior basal 9. Lateral basal 10. Posterior basal



CAVERNOUS SINUS

Cavernous sinus- paired dural venous sinus

Located- Within the cranial cavity

Divided by septae into two small caves

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Anatomical Location:

- Located within the middle cranial fossa
- Either side of sella tursica of sphenoid bone
- Enclosed by the endosteal and meningeal layers of dura mater

Borders:

- Anterior Border- Superior orbital fissure
- Posterior Border- Petrous part of temporal bone
- Medial border- Body of sphenoid bone
- Lateral Border- Meningeal layer of duramater

Roof:

- Formed by meningeal layers of the duramater
- attaches to clinoid process of sphenoid bone

Floor:

- Formed by endosteal layer of duramater
- Greater wing of sphenoid bone

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Contents:

Structures passing through the C.S-

- enters into orbit
- Travels through sinus
- Travels through lateral wall of sinus

Structures passing through the sinus-

- Internal Carotid artery
- Abducens nerve

Structures passing through lateral wall-

(MOTTO OK)

- i) Oculomotor Nerve O
- ii) Trochlear Nerve T
- iii) Ophthalmic Nerve O
- iv) Maxillary Nerve. M
- v) Trigeminal Ganglion T

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Incoming channels-

- Superior Ophthalmic Vein
- Inferior Ophthalmic Vein
- Central Vein of Retina

Communications-

- Transverse sinus- drain through superior petrosal nerve
- Internal jugular vein- Inferior petrosal nerve
- Pterygoid Plexus- Emissary vein
- Facial vein- Sup. Ophthalmic Vein
- Rt. and Left Cavernous sinus- Ant Post. Intercavernous sinus

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Applied Anatomy-

- Cavernous sinus thrombosis
- Clot formation within sinus

Paired Venous sinuses-

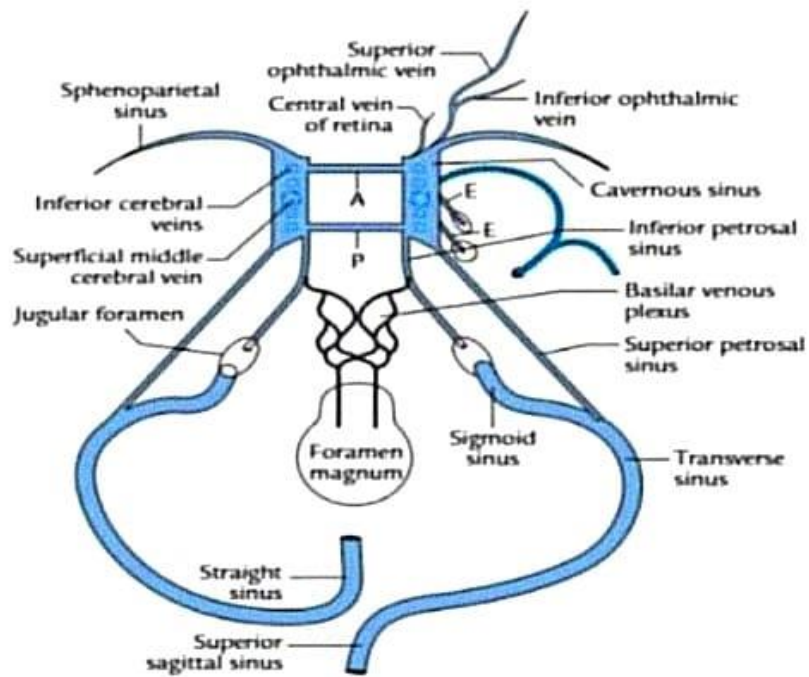
- Cavernous sinus
- Superior petrosal Sinus
- Inferior Petrosal sinus
- Transverse sinus
- Sphenoparietal sinus
- Petrosquamous sinus
- Middle Meningeal sinus

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Unpaired venous sinuses-

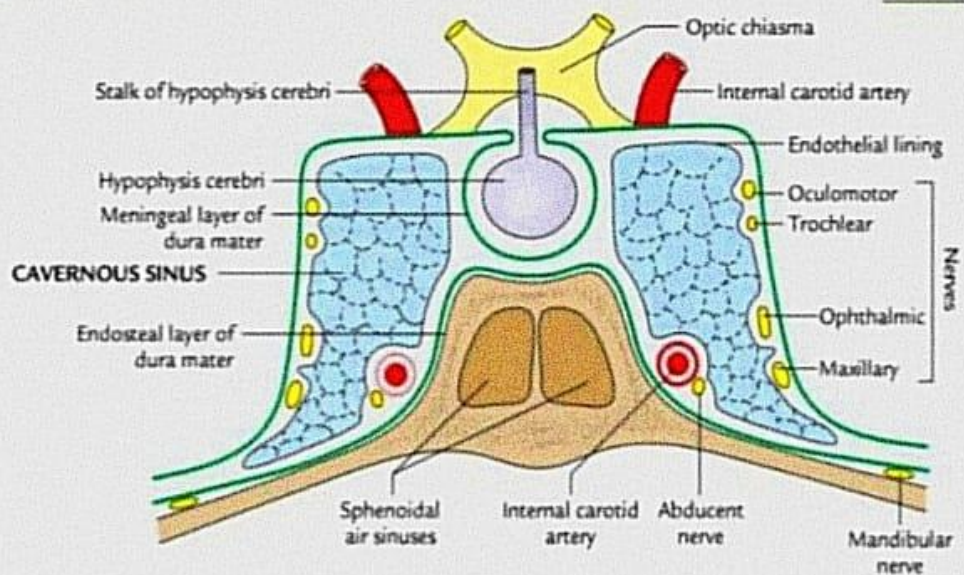
- Superior sagittal sinus
- Inferior sagittal sinus
- Straight sinus
- Occipital sinus
- Ant. Inter Cavernous sinus
- Post. Inter cavernous sinus

a. Tributaries

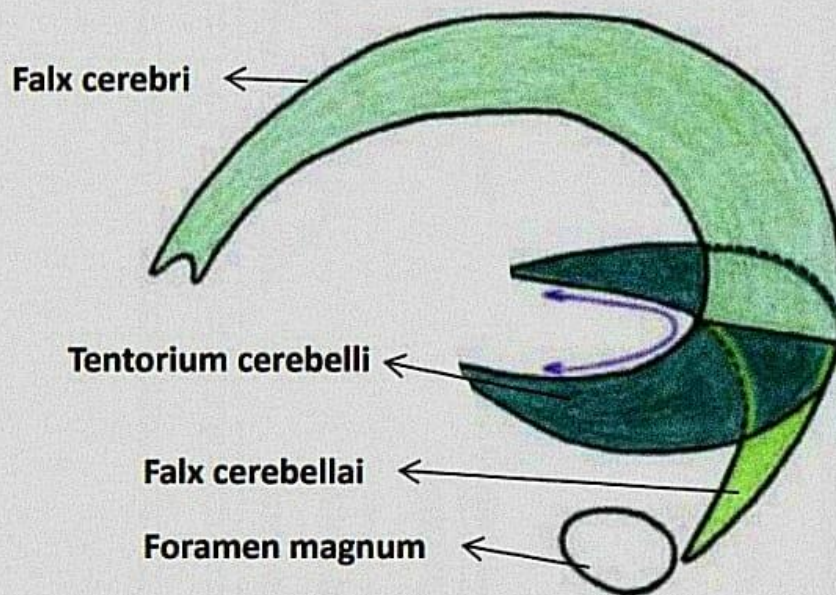


Basilar plexus of veins

b. Relations

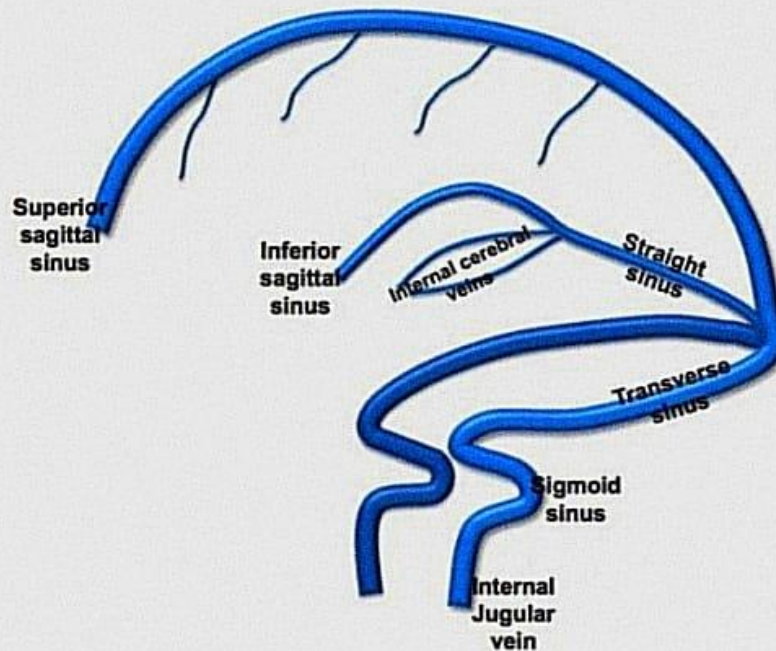


A. DURAL FOLDS



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B. DURAL SINUSES



CRANIAL NERVES

SD NOTES

1. Olfactory nerve – sensory type

Location - Fore brain

Distribution - Nerve of smell

2. Optic nerve - sensory type

Location - forebrain

Distribution - Nerve of vision

SDNOTES

3. Oculomotor - Motor type

Location - Midbrain

Distribution - eye muscles
except- superior oblique & lateral rectus.

4. Trochlear - Motor

Location - Midbrain

Distribution - superior oblique

5. Trigeminal - Both sensory/motor

Location - pons & medulla

Distribution - 3 branches,
ophthalmic, Maxillary and mandibular

CRANIAL NERVES

SD NOTES

6. Abducent – Motor type

Location - pons vrolli

Distribution - to lateral rectus

7. Facial - both – motor/sensory

Location - pons vrolli

Distribution - motor- lingual gland

Sensory- Ant. 2/3rd of tongue &
Soft palate

SDNOTES

8. Auditory - sensory

Location - pons vrolli

Distribution - nerve of hearing

9. Glosso pharyngeal – both s/m

Location - medulla oblongata

Distribution - motor – pharyngeal muscle

Parotid gland

Sensory – post. 1/3rd of
Tongue , tonsils , pharynx
Carotis sinus & body

CRANIAL NERVES

SD NOTES

10. Vagus - both
Location - medulla oblongata
Dist . – thorax & abdominal viscera.
11. Accessory nerve – Motor
Location - Motor
Distribution - sterno mastoid, trapezius
Constrictor muscles
12. Hypoglossal - Motor
Location - medulla oblongata
Distribution - muscles of neck & tongue

Trick –

one of our trained teacher asked for a
good vehicle and horse .

SD NOTES

KIDNEY (EXCRETORY SYSTEM/URINARY SYSTEM)

M56BOOKSTORE ANATOMY NOTES

- Reddish brown s
- Bean shaped excretory structure
- Situated between T12 and L3 vertebra

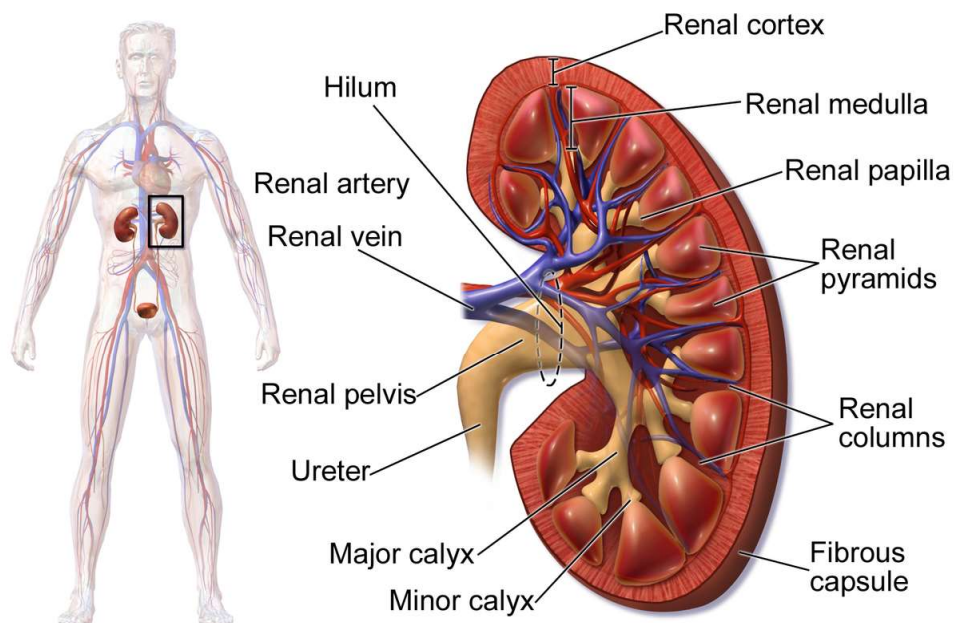
Each kidney of an adult measures

- 10-12 cm length
- 5-7 cm width
- 2-3 cm thickness
- 120- 170 gm weight

Outer layer of the kidney is a tough capsule

The kidney is divided into two zones

1. Outer cortex
2. Inner medulla



Kidney Anatomy

EXTERNAL FEATURES

- Shape
- 2 Pole - Upper & lower pole
- 2 border – Medial border & Lateral border
- 2 surface
- 2 Hilum (anterior – posterior)

INTERNAL FEATURES

- Outer Cortex
- Inner Medulla
- Renal Sinus

External Features

- Shape
- Poles

The pole is further divided into 2 parts

1. Upper
2. Lower

The upper pole is covered by supra renal gland whereas the lower pole is pointed.

- 2 borders are divided in Medial and Lateral

MEDIAL BORDER CONCAVE

- Middle part is more concave which is also known as hilum.

Hilum is further divided into 3 subparts

1. Renal Vein
2. Renal Artery
3. Renal Pelvis

- LATERAL BORDER CONVEX .

The lateral border is divided into 2 surfaces

1. anterior
2. posterior

Anterior surface – irregular

Posterior – flute – Abdominal Wall

Internal Features

1. Outer Cortex

- Medulla consists about conical masses called pyramid
- Outer portion of kidney
- Between renal capsule and renal medulla

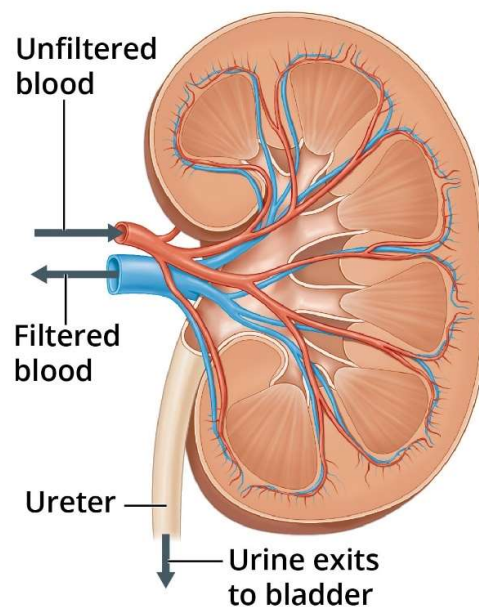
2. Inner Medulla

- Medulla is divided into few conical masses called medullary_pyramids.

3. Renal Sinus

- Renal Artery
 - Renal vein
 - Renal pelvis
- Renal Pelvis has 2 major calyx- 7 – 13 Minor calyx

Kidney



ANTERIER RELATION

RIGHT KINDEY	LEFT KIDNEY
1. parts of supra renal gland	1. parts of supra renal gland
2. 2 nd part of duodenum	2. spleen
3. hepatic flexure	3. stomach
4. small intestine	4. pancreas
5. right lobe of liver	5. splenic flexure

POSTERIER RELATION

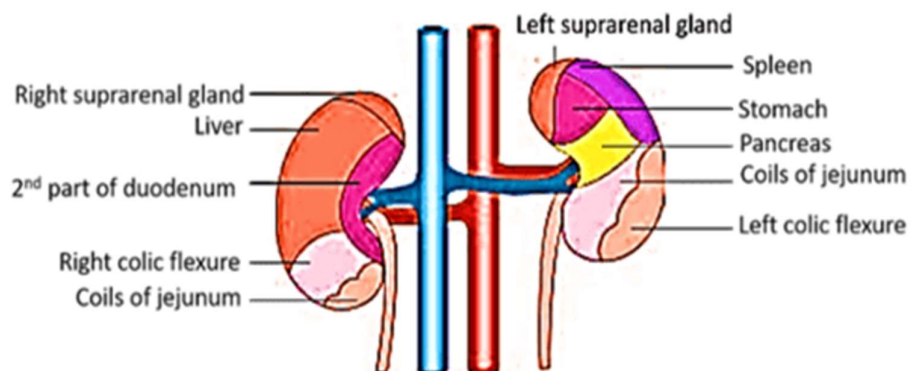
RIGHT KIDNEY	LEFT KIDNEY
1. Diaphragm	1. Psoas major muscle
2. Accurate ligament	2. Quadratus lumborum
3. Tranverse abdominis muscle	3. Subcostal vessels

Right kidney

- Right suprarenal gland
- Right lobe of liver
- 2nd part of duodenum
- Right colic flexure
- Coils of jejunum

Left kidney

- Left suprarenal gland
- Stomach
- Spleen
- Pancreas
- Left colic flexure
- Coils of jejunum



Kidney consists of:

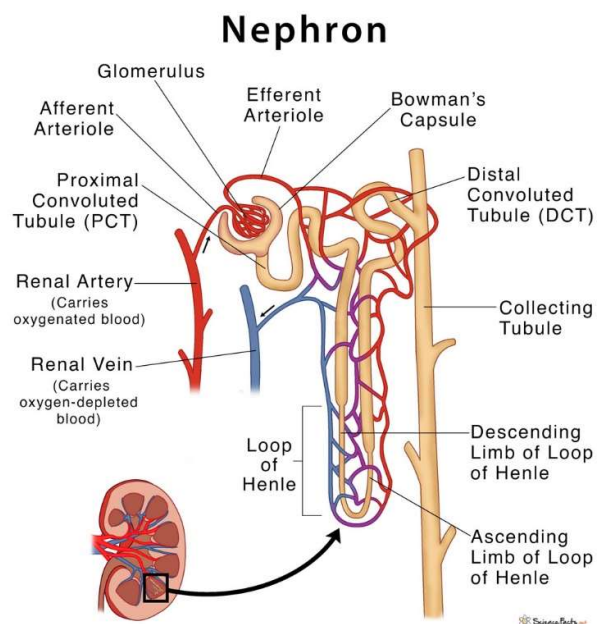
- Medullary Pyramids
- Columns of Bernini
- Hilum
- Renal pelvis
- Nephron

SECRETORY PART

- Nephron
- Bowman's Capsule
- Collecting Duct

NEPHRON

BOWMAN CAPSULE	RENAL TUBULE
1. Afferent arteriol	1. PCT [PROXIMAL CONVOLUTED TUBULE]
2. Efferent arteriol	2. DCT [DISTAL CONVOLUTED TUBULE]
	3. HENLE'S LOOP
	4. COLLECTING DUCT



BLOOD SUPPLY

- Right and left renal artery
- Abdominal aorta

NERVE SUPPLY

- Renal plexuses

VEIN Renal vein

URETER -

Ureters are pair of narrow thick walled muscular tubes which carry the urine from the kidneys to the urinary bladder.

Each ureter is 25 cm long and 3mm in diameter.

The ureter is divided into 3 parts:

1. Pelvis
2. Abdominal
3. Pelvic

PELVIS	ABDOMINAL	PELVIC
1. Funnel shaped dilation at the upper.	Pass downwards and beneath the peritoneum.	Downwards towards peritoneum along greater sciatic notch
2. found by union of calyx	Enters in pelvic cavity by common iliac artery.	Oblique part – forward and medial through supra lateral angle of bladder
3. pass downwards and through hilum		Intra vesicle part – undergoes oblique and downwards through the bladder.
4. capacity – 5-7 ml		

Ureter starts with the renal sinus.

Descends along medial margin then downwards

POSTERIOR RELATION - psoas major and femoral nerve

TIPS OF TRANSVERSE PROCESS

ANTERIOR RELATION

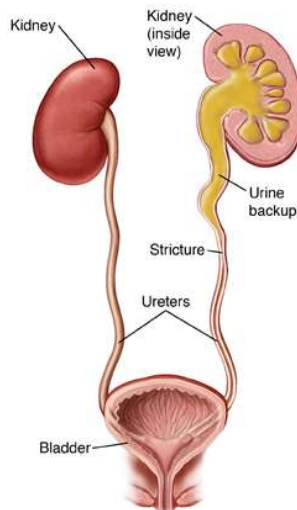
RIGHT SIDE	LEFT SIDE
1. Parietal peritoneum	Apex
2. 2 nd and 3 rd of duodenum	Parietal peritoneum
3. Right colic and ilocolic vessel	2 nd and 3 rd of duodenum
	Left colic and ilocolic vessel
	Terminal part of ileum
	Sigmoid colon

BLOOD SUPPLY

- Renal Artery
- Branch of Aorta
- Branch of Vesicle

N.S.

- Sympathetic – T10 – L1
- Para sympathetic – S2 – S4



So, this is about ureter which comes under the urinary system or excretory system.

* Ureters Constrictions (foldings)

1. Also called as compression

→ Total 5 constrictions are there -

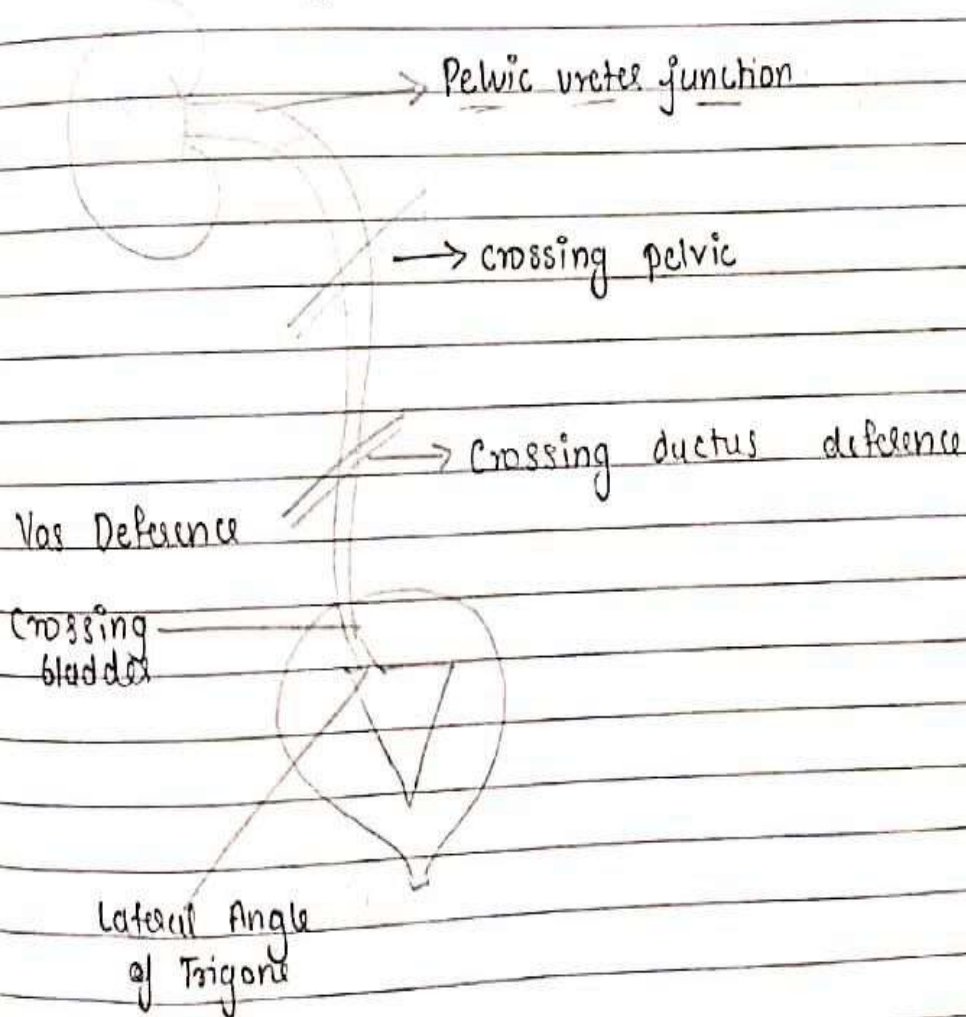
1] Pelvic Ureteric junction

2] Crossing Pelvic Brim.

3] Crossing Ductus Deferens

4] crossing Bladder

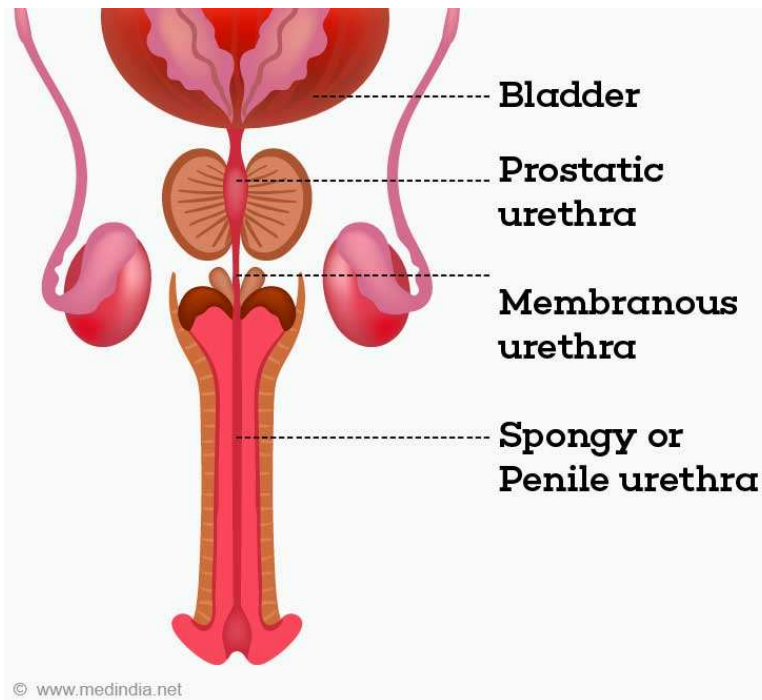
5] lateral Angle of Trigone.



URETHRA

MALE URETHRA:

- The male urethra connects the urinary bladder to the penis.
- It is the membranous canal, conveys urine.
- Its length is 18 -20 cm.
- Extends from internal urethral orifices to external urethral orifice
- Internal Urethral Orifice – Neck of the bladder
- External Urethral Orifice – Tip of the penis
- The prostatic part passes through prostate about 3cm long.
- Membranous part – Sphincter urethra



- Penile part passes through bulk.
- Corpus Spongiosum of penis – 15 cm long
- The internal sphincter is involuntary in

INTERNAL SPHINCTER

- Supplied by sympathetic nerve.
- Sympathetic nerve controls the neck of the bladder and prostatic urethra.

EXTERNAL SPHINCTER

- Urethra is voluntary in nature.
- Supplied by pudendal nerve.
- Controls the membranous sphincter.

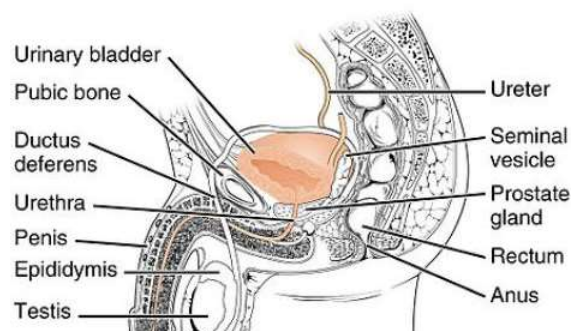
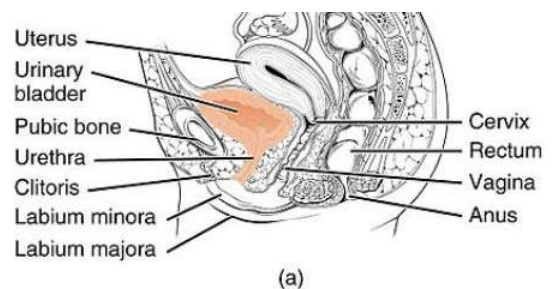
S

BLOOD SUPPLY

- Branches of vesicle.
- Pudendal artery.

FEMALE URETHRA -

- Female urethra is embedded within the vaginal wall.
- Its opening is situated between the labia major and labia minor.
- The female urethra is much shorter than the male urethra.
- Female urethra is 4cm long [1.5 inches].
- Begins at the neck of the bladder
- Opens to the outside of urethra sphincter.
- The mucous of the urethra much folded and contain mucous gland.
- Group of mucous gland are known as paraurethral gland.
- These are homologous with male urethra.



URINARY BLADDER

- It is one of the 7 important parts of the human body.
- It is situated within the pelvis.
- It extends up to abdominal cavity when it is full.
- It is
- It is hollow muscular organ which acts as urine reservoir.
- Capacity – 120- 32000 [cubic centimeter]

EXTERNAL FEATURES – The empty bladder is trigon [tetrahedral] in shape.

APEX	BASE	NECK
------	------	------

- 1) **APEX – It is directed downwards**
 - i) Connect to the umbilicus through umbilical ligament.
 - ii) Represents the obliterated embryonic urachus.
- 2) **BASE – It is directed backwards**
 - i) Related to the cervix and vagina in female.
 - ii) Male base is separated from the rectum by the recto vesicle pouch.
- 3) **NECK – The neck is divided into 3 surfaces and 4 borders.**

Surface has a superior which is further into 2 parts right and left

Border has a lateral which is divided into 2 parts of anterior and posterior each.

The lowest and the most fixed part on the prostate in male.

INTERNAL FEATURES

- Interior part of the mucosa shows irregular fold.
- Small triangular area at the base of the bladder.
- Mucous attachment of muscular cortex.
- Apex of trigon is downward and forward.

LIGAMENT: The ligament is divided into 2 parts

RIGHT LIGAMENT	LEFT LIGAMENT
----------------	---------------

TRUE LIGAMENT

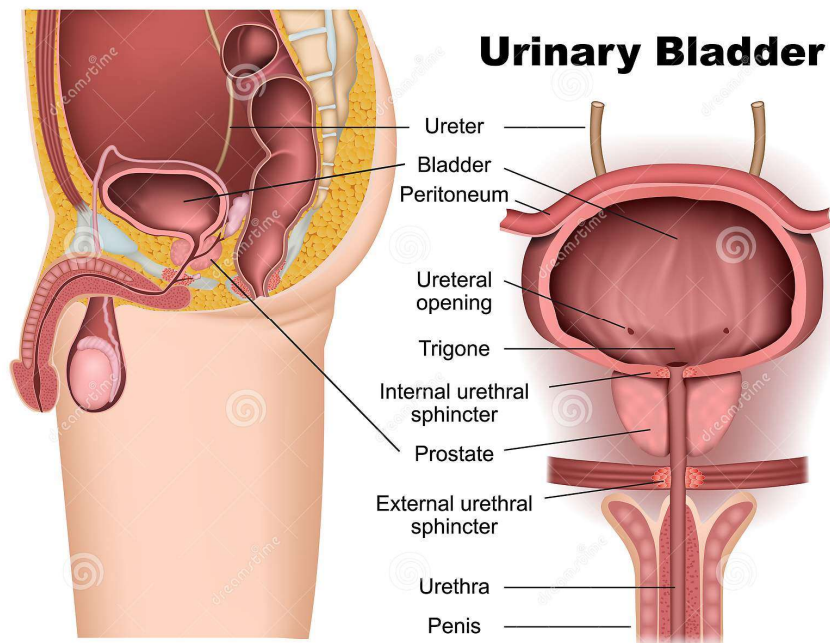
- Lateral and medial prostatic ligament.
- Median umbilical ligament.
- Posterior ligament.

FALSE LIGAMENT

- Medial umbilical fold.
- Medial umbilical fold.
- Lateral false ligament.
- Posterior false ligament.

BLOOD SUPPLY

- Superior, inferior vesicle arteries.
- Vaginal artery.
- Gluteal artery.
- Uterine artery.

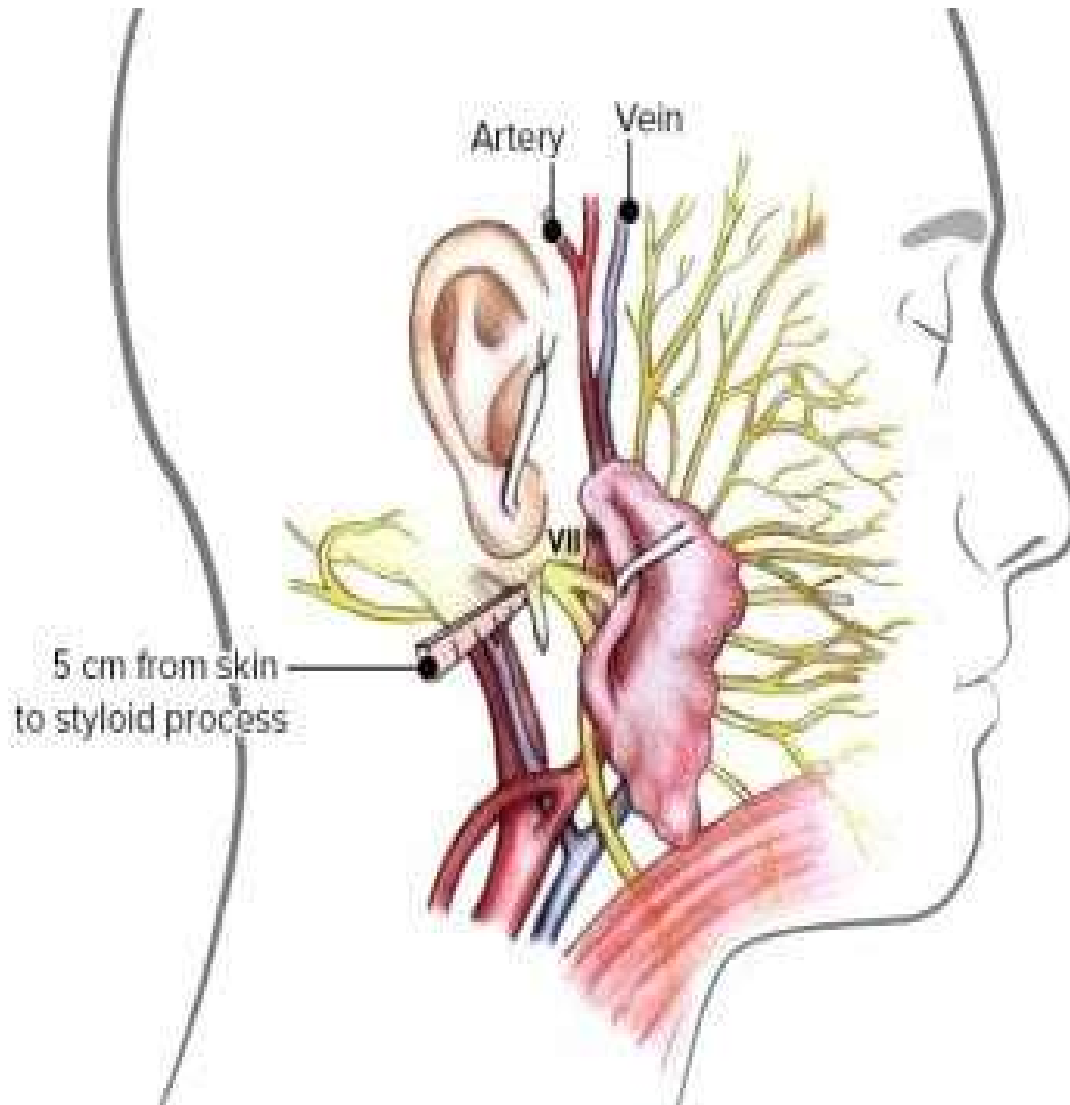


APPLIED ANATOMY –

- Nephritis
- Renal stones
- Pyelonephritis
- Tuberculosis Of kidney
- Renal tumor
- Renal oedema
- Hypertension
- Renal failure
- Polycystic kidney
- (Chronic renal failure) – dialysis needs to be done
- Renal colic – due to pain in ureteric stone
- Prostate gland enlargement
- Cystoscopy
- Urinary tract infection
- Urinary incontinence

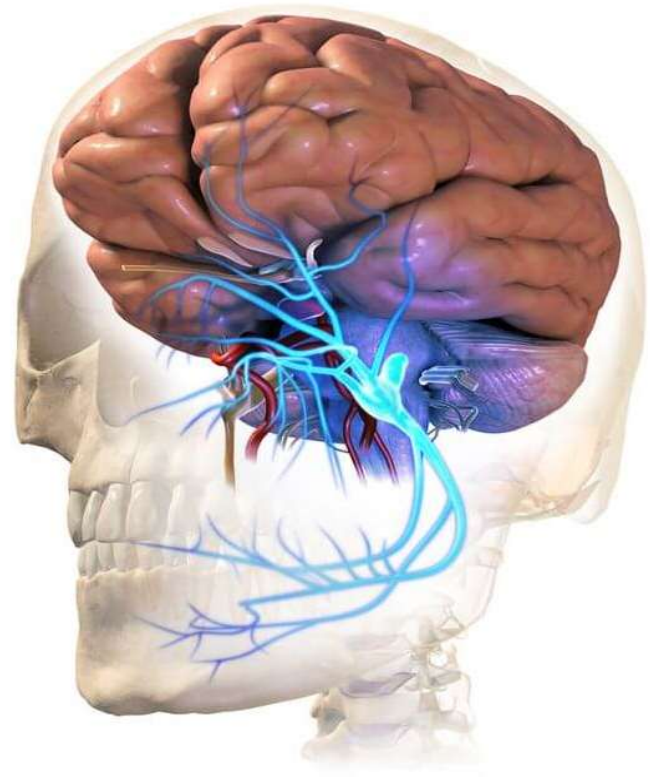
FACIAL NERVE & BELLS Palsy

**PRESENTED BY – SHAMA
(119-123) SARANSH D
SARAN RAJ
SHALINI
SANDHIYA**



FACIAL NERVE CONTENTS -

- Introduction
- Formation
- Fibers
- Functions
- Nuclei
- Origin & course
- Branches & distribution



Competency based presentation -

A 40-year-old male comes to the OPD with the history of **inability to close the right eye** and **dribbling of saliva on the right side of mouth** since early morning. He gives history of exposure to cold wind while travelling on the bus. On examination, there is **loss of wrinkling on the right side of forehead** and **angle of the mouth is deviated** to the left side.

INTRODUCTION-

Facial nerve is a vital nerve for facial expression.

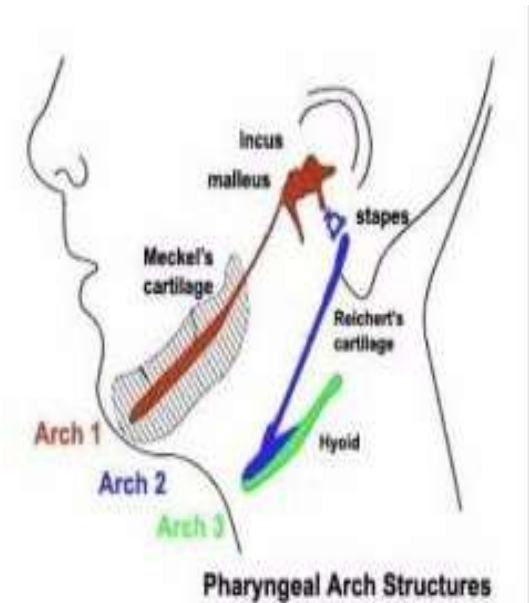
Facial nerve – seventh cranial nerve

Facial nerve – nerve of 2nd branchial arch/pharyngeal arch –

2nd branchial arch forms –

- Stapes
- Styloid process
- Stylohyoid ligament
- Smaller cornu of hyoid bone
- Superior half of hyoid bone

Also forms – facial nerve & stapedia artery



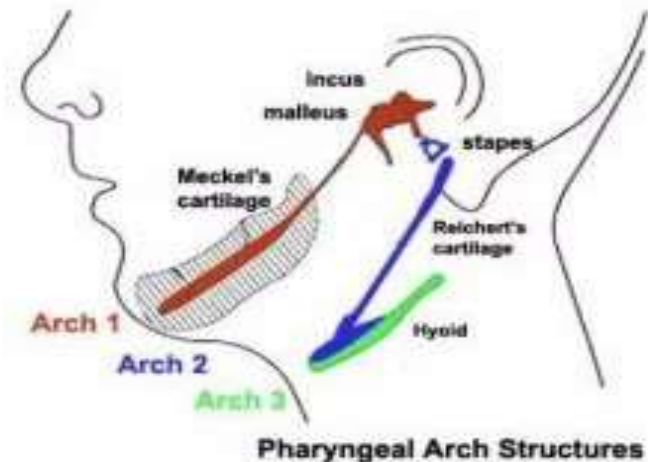
Formation -

Second Pharyngeal Arch (Hyoid Arch)

Cartilage: Reichert's cartilage.

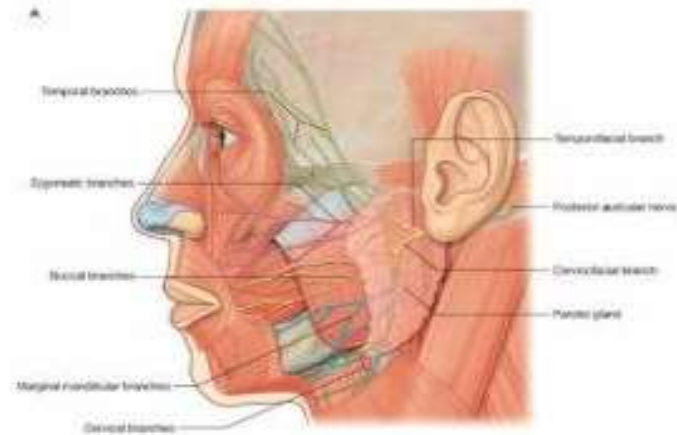
It forms:

- **Stapes**
- **Styloid Process**
- **Stylohyoid Ligament**
- **Smaller Cornu of Hyoid**
- **Superior half of body of Hyoid**



Muscles of Second Pharyngeal Arch

- Muscles of facial expression
- Occipito frontalis
- Platysma
- Stylohyoid
- Post belly of digastric
- Stapedius
- Auricular muscles



Second Pharyngeal Arch

Nerve :Facial nerve

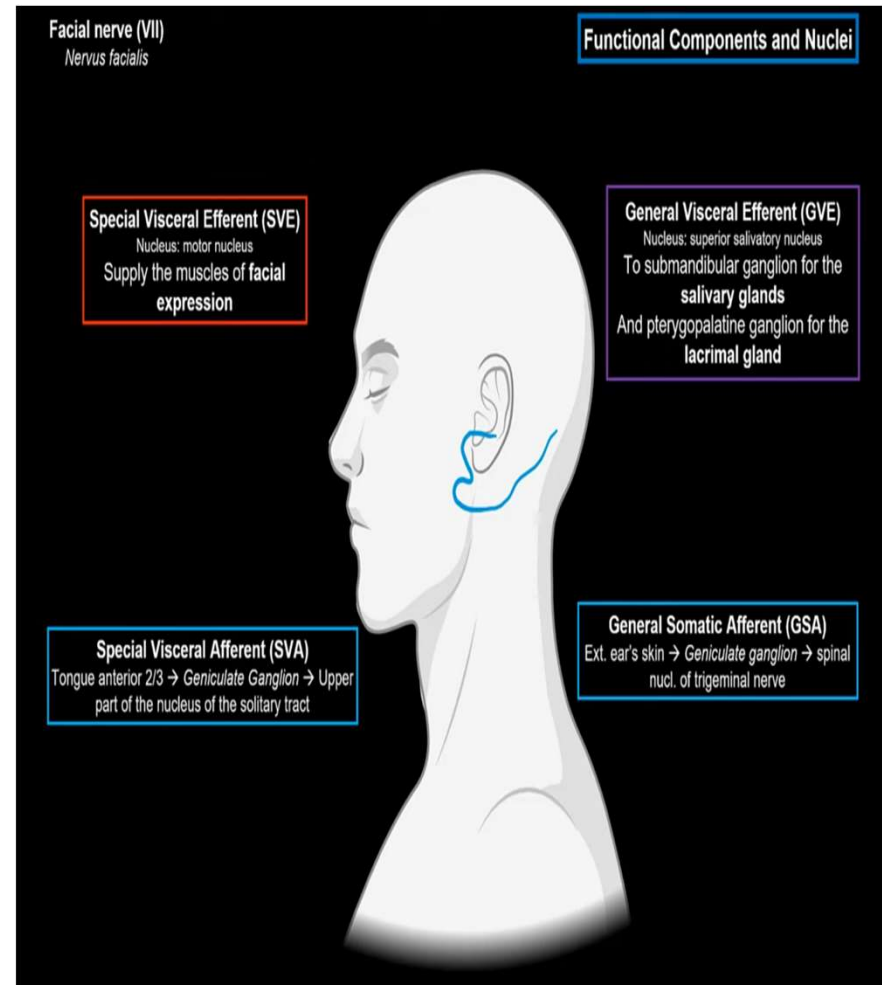
Artery: Stapedial artery (only during fetal life)

Fibers -

- Sensory fibers (afferent)
- Special sensory fibers
- Visceral/autonomic motor (efferent)
- Somatic motor fibers

What are fibers ?

A nerve fiber is a threadlike extension of a nerve cell (the neuron) and consists of an axon and myelin sheath.



- **Sensory fibers –**

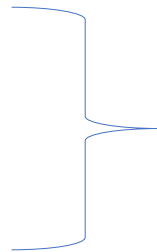
Transmitting signals to brain -----from external acoustic meatus as well as skin over mastoid & lateral pinna.

- **Special sensory fibers –**

Receiving & transmitting taste information from anterior 2/3rd of tongue.

- **Visceral/autonomic motor fibers – innervating -----**

- Lacrimal gland
- Submandibular gland
- Sublingual gland



then innervating mucous memb.of nasal cavity & hard – soft palate.



Allowing production of tears & saliva.

Somatic motor –

innervating muscles of facial expression-----Like –

- Muscle in scalp
- Stapedius muscle of ear
- Posterior belly of digastric muscle
- Stylohyoid muscle

Nuclei -

- Nerve fibers connected to 4 x nuclei – situated in lower pons
- Motor nucleus
- Superior salivatory nucleus
- Lacratory nuclei
- Nucleus of tractus solitarius

NTS cranial nerves ? Imp – 2mark Q

COURSE — Brainstem -----middle ear -----parotid gland

- Attached to brainstem by ---- 02 roots of motor & sensory
- 02 roots of facial nerve ----- attached to lateral part of pons.



- 02 roots run laterally & forward with 08th cranial N. (VBC) to reach



Internal acoustic meatus

- In meatus – 2 x roots – sensory & motor fuse
- 1st part – laterally above vestibule
- 2nd part – medial wall above promontory
- 3rd part - vertically downward behind promontory.



- Facial nerve leave skull by passing through stylomastoid foramen.

Extra cranial course -

- Facial nerve crosses -----lateral sidebase of styloid process.



- Enters – posteromedial surface of parotid gland.



- Runs forward through the gland -----crossing retromandibular vein &ECA.



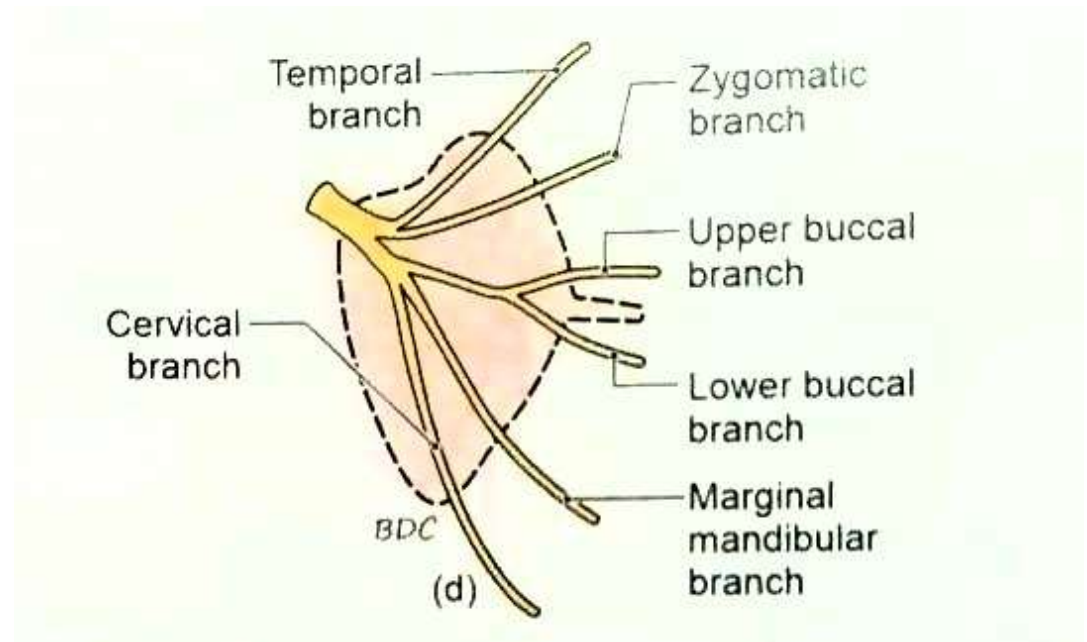
- Behind the neck of mandible -----divided into 5 x terminal branches emerge



- Anterior border of parotid gland.

Divided into 5 x terminal branches -

- 1. Temporal branch**
- 2. Zygomatic branch**
- 3. Buccal branch**
- 4. Mandibular branch**
- 5. Cervical branch**



Branches & distributions -

With in facial canal –

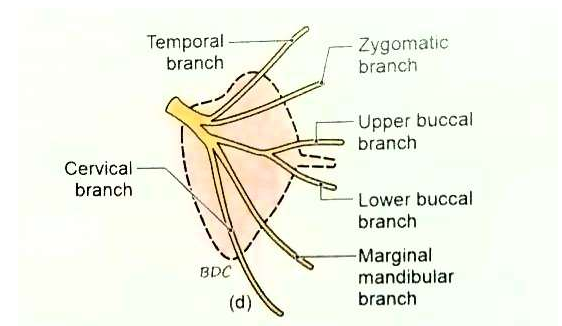
- greater petrosal nerve
- stapedius nerve
- Chordatympani

Exit from stylomastoid foramen –

- Posterior auricular
- Post. Belly of digastric
- Stylohyoid

Terminal branches – with in parotid gland –

- Temporal branch
- Zygomatic branch
- Buccal branch
- Mandibular branch
- Cervical branch

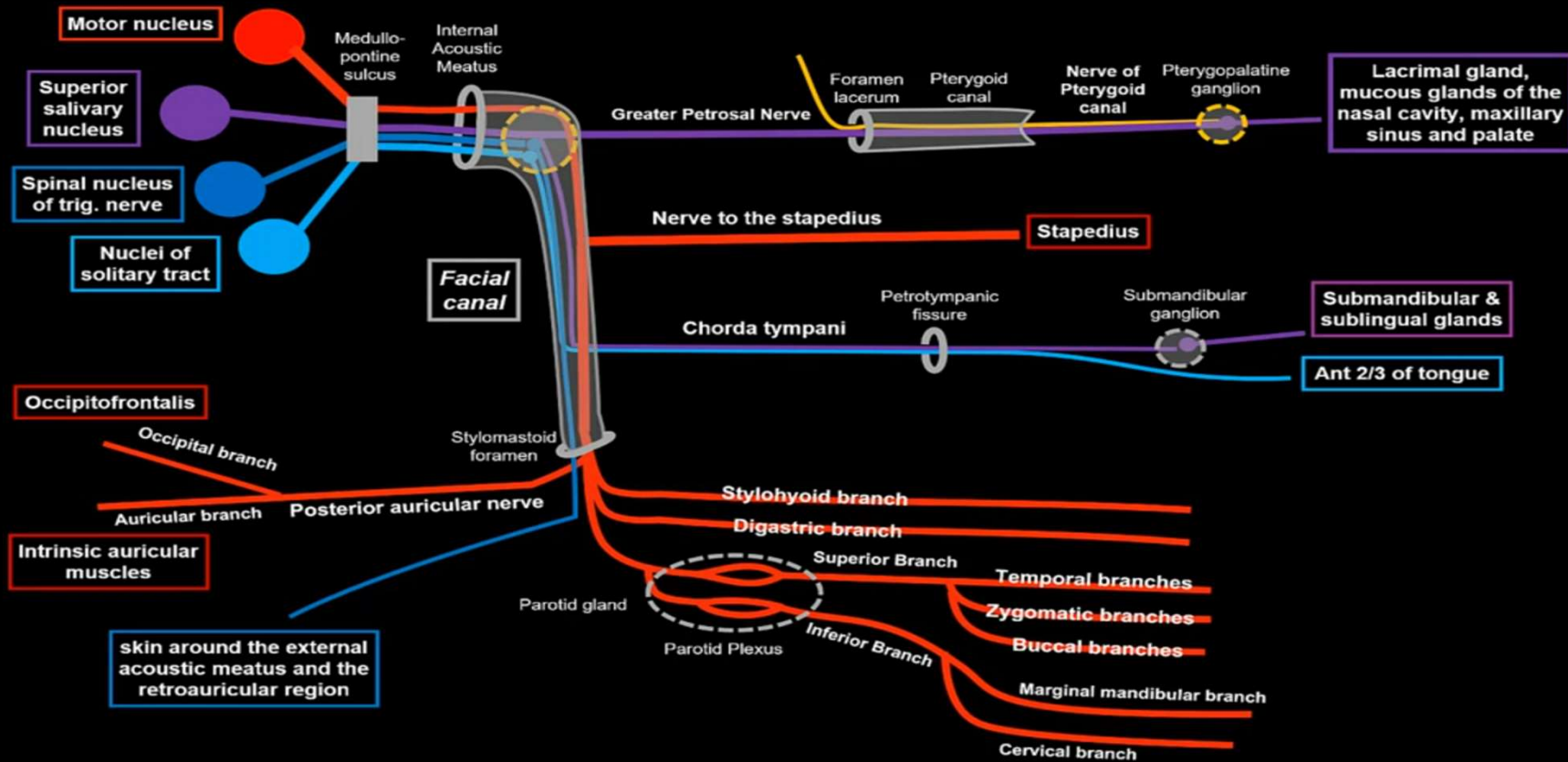


Facial nerve (VII)

Nervus facialis

Scheme/Overview

Responsible for providing motor innervation to facial muscles, as well as taste (ant 2/3 of tongue) and producing saliva and tears



- **Bell's palsy –**
- Sudden paralysis of nerve at stylomastoid foramen----result in asymmetry of corner of mouth
- Inability to close to eye
- Wrinkling of skin of forehead on the same side.

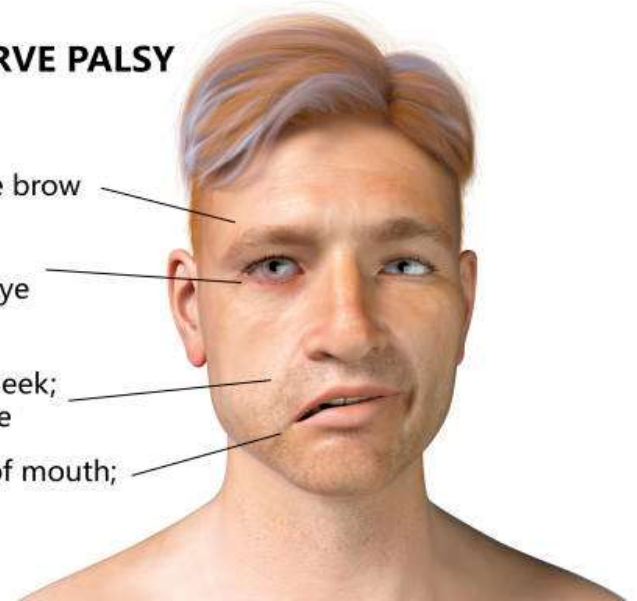
FACIAL NERVE PALSYP

Inability to wrinkle brow

Drooping eyelid;
inability to close eye

Inability to puff cheek;
asymmetrical smile

Drooping corner of mouth;
dry mouth

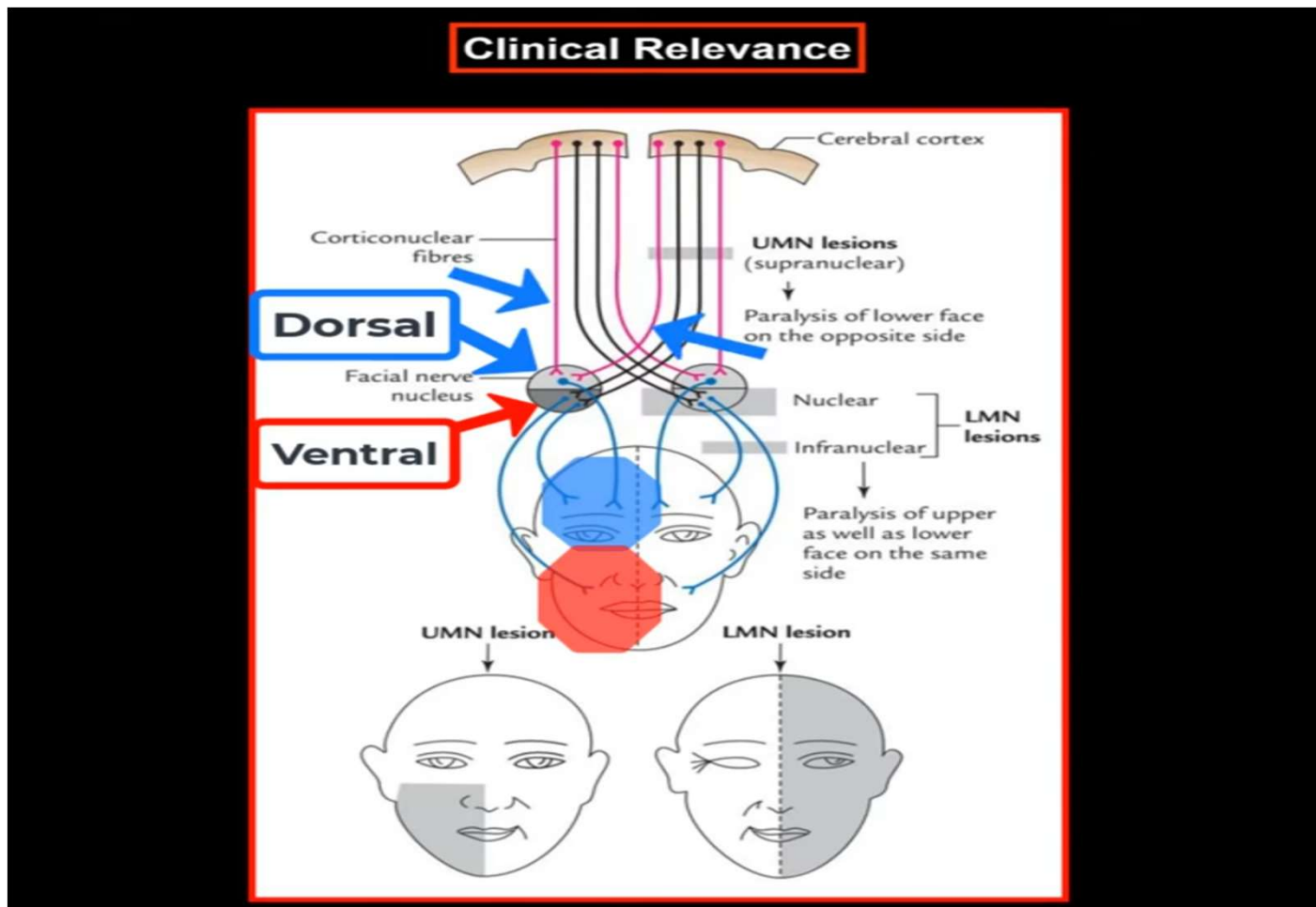


How to remember – bell's palsy -

Trick –

- B – blink reflex abnormal
- E – Earache
- L – lacrimation
- L - loss of taste
- S – sudden onset
- P – paralysis of facial nerve

- Lesions – bell's palsy –



- A 40-year-old male comes to the OPD with the history of inability to close the right eye and dribbling of saliva on the right side of mouth since early morning. He gives history of exposure to cold wind while travelling on the bus. On examination, there is loss of wrinkling on the right side of forehead and angle of the mouth is deviated to the left side.
- 1. Identify the condition.
- 2. Which cranial nerve is affected?
- 3. Is this an upper motor neuron or lower motor neuron type of lesion?
- 4. Which part of the nerve is involved in the lesion?
- 5. Mention the nucleus, course, branches and distribution of involved nerve.

• Answers –

1. The condition is Bell's palsy.
2. The cranial nerve affected is the facial nerve (CN VII) .
3. Bell's palsy is typically a lower motor neuron type of lesion.
4. The lesion is likely affecting the facial nerve as it exits the skull.
5. The facial nerve originates from the facial nucleus in the pons
courses through the internal auditory canal
branches out to innervate the muscles of facial expression –
including the forehead, eyelids, nose, and mouth.



Femoral sheath

Funnel shaped sleeve of fascia – encloses 4cm

Walls –

1. Anterior wall
2. Posterior wall
3. Inferior

Anterior wall – form – fascia transversalis

Posterior wall – form – fascia iliaca

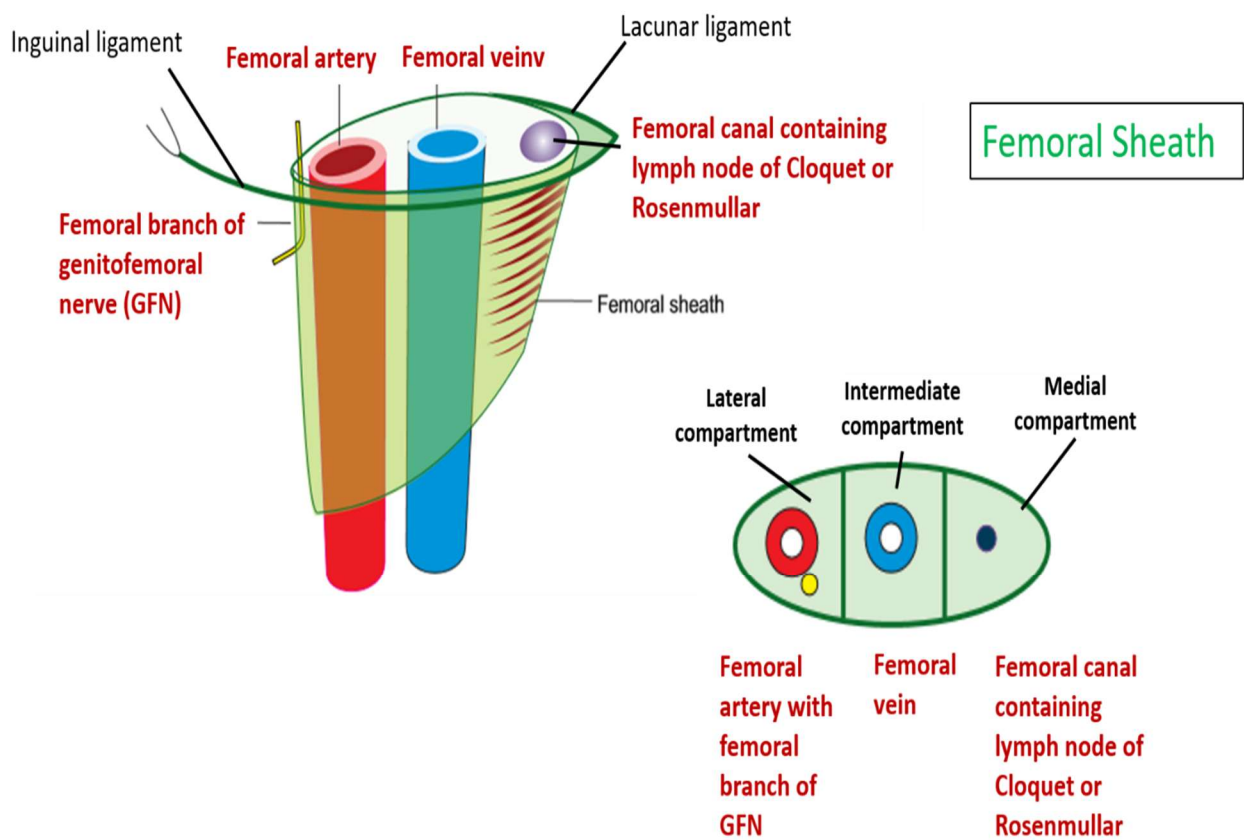
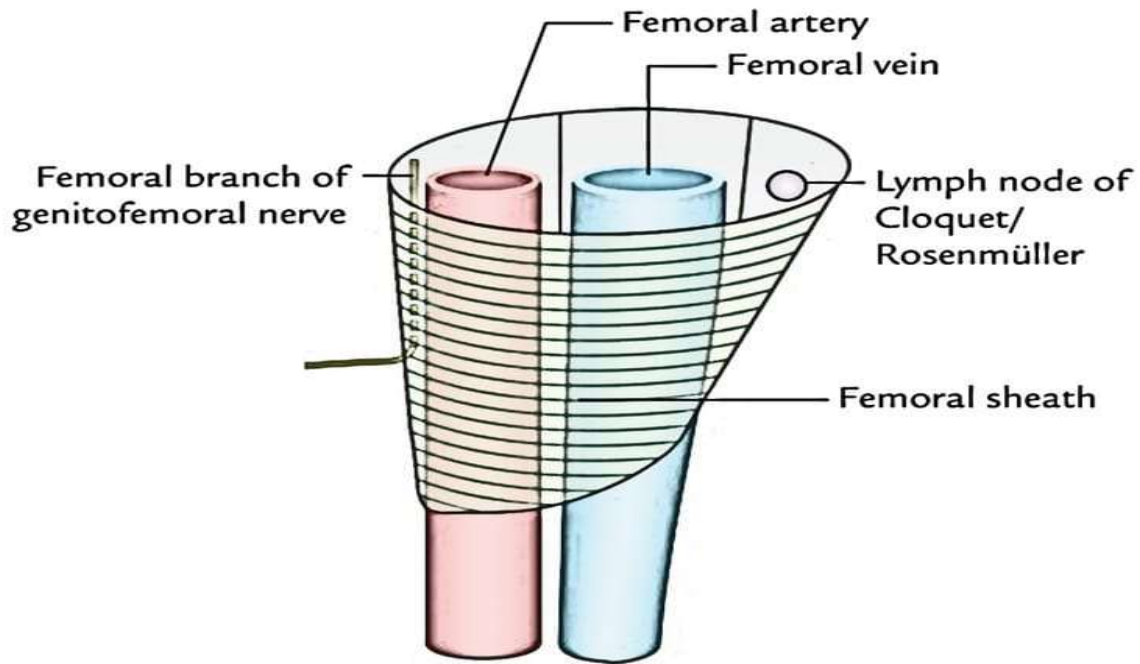
Inferior - sheath merge with connective tissues

Sheath divided into 03 compartment by septa –

1. Lateral compartment – femoral artery
2. Intermediate compartment – femoral vein
3. Medial compartment - also know as femoral canal

Contents of the femoral sheath:

1. Femoral artery
2. Femoral vein
3. Femoral branch of genitofemoral nerve
4. Femoral canal, which contains Cloquet's lymph node (the most superior deep inguinal lymph nodes).



Femoral canal

Medial compartment of femoral sheath

1. Conical in shape
2. Wide in above
3. Narrow below

Base of femoral canal also known as femoral ring

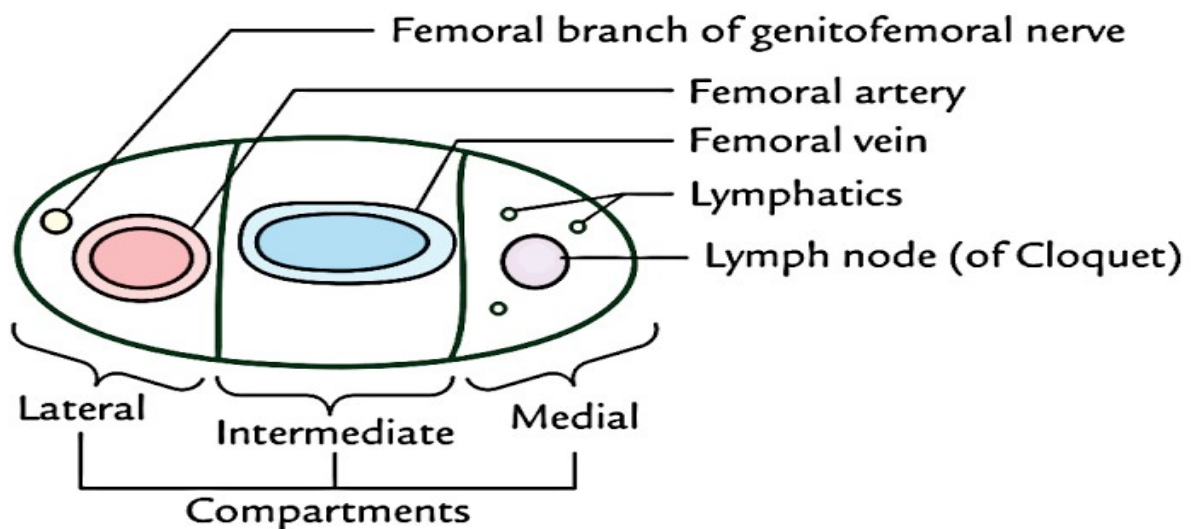
Clinical anatomy –

Femoral hernia – potential weakness in abdominal wall

Abdominal content may bulge out from femoral hernia

Femoral nerve – paralysis of quadriceps femoris

Sensory loss – medial side of leg



Femoral triangle

DR S.D NOTES

It is a triangle depression – in front of upper 1/3rd of thigh

Thigh below inguinal ligament

Boundaries –

1. Lateral – medial border of sartorius muscle
2. Medial – medial border of adductor muscle
3. Base - inguinal ligament
4. Apex - lateral & medial border cross
5. Roof - skin, superficial fascia, deep fascia
6. Floor - psoas major, iliacus – lateral
Adductor longus, pectineous - medial

Superficial fascia content –

1. Superficial inguinal ligament
2. Genitofemoral nerve
3. Ilio inguinal nerve
4. Great saphenous vein
5. Femoral artery

Contents –

- Femoral artery
- Femoral vein
- Femoral sheath
- Deep inguinal ligament
- Nerve

- Femoral artery – 06 branches –
 1. 03 superficial branches
 2. 03 deep branches

- Femoral vein - femoral vein



Great saphenous vein



Circumflex vein



Corresponding branch of femoral artery

- Femoral sheath - encloses upper 4cm of femoral vessel
- Deep inguinal ligament – lymph from – superficial inguinal ligament

Deep lymphatic of lower limb

Glans penis

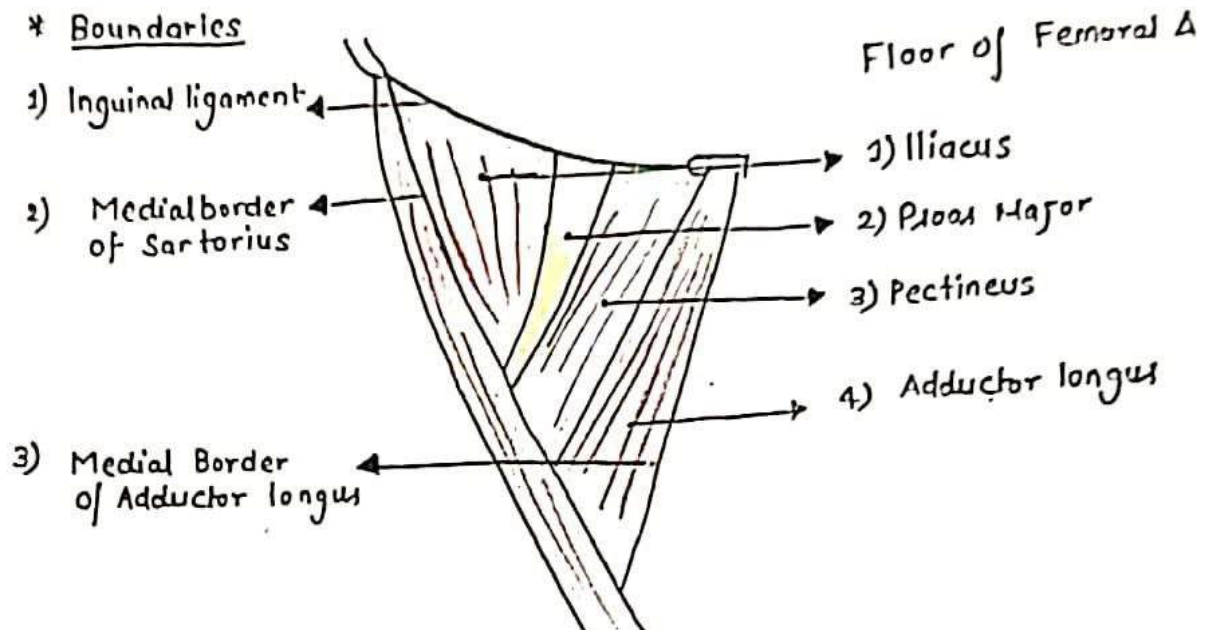
Clitoris

- Nerve – femoral nerve

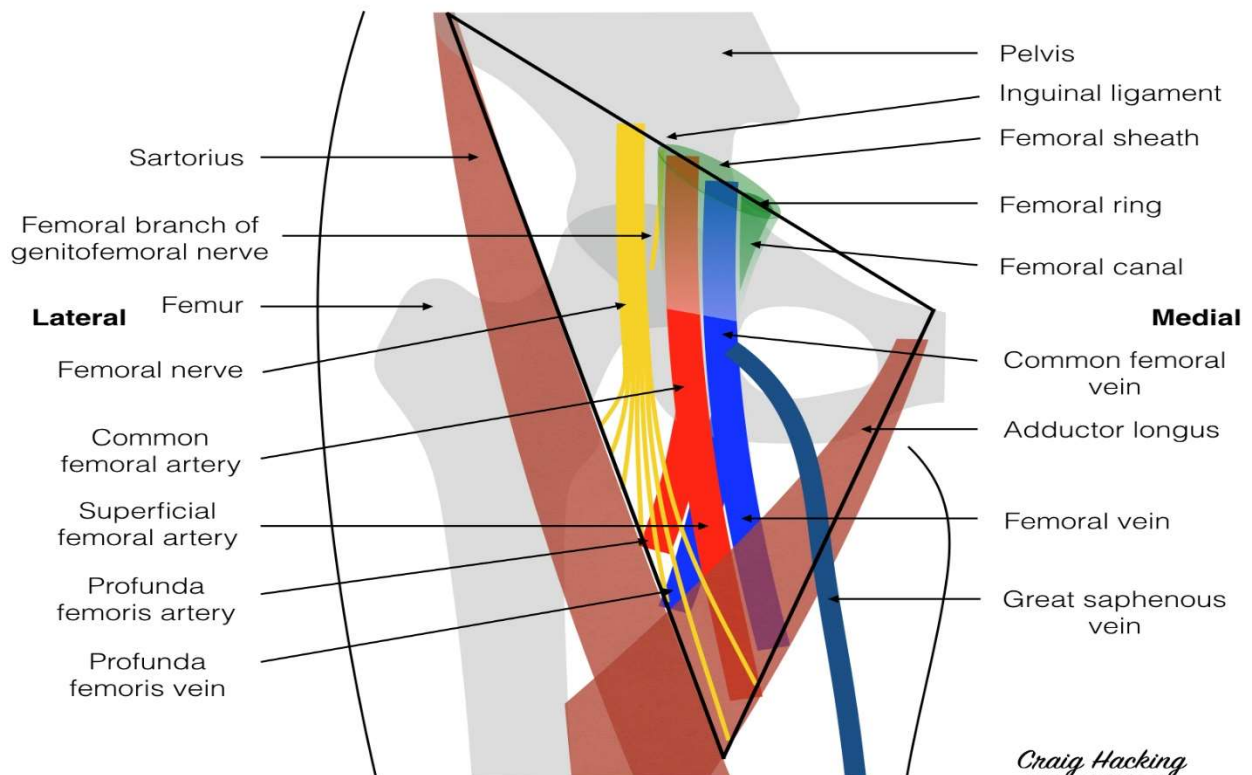
Pectinous nerve

Gentifemoral nerve

Lateral cutaneous nerve of thigh



FEMORAL TRIANGLE



FERTILIZATION

- process of fusion of male and female gametes (pronuclei) to form a zygote.
- it takes place within 24 hrs of ovulation.
- occurs at the Ampullary-Isthmic junction of fallopian tube.
- Fertilization has three process -
 - a) Syngamy → union of male and female gamete.
 - b) Plasmogamy → intermixing of cytoplasm.
 - c) Karyogamy → fusion of pronuclei of ovum and sperm.
 - d) Amphimixis → the intermingling of their chromosomes.
- The Results of fertilization are →
 - a) determination of genetic sex of the embryo.
 - b) restoration of diploid no. of chromosomes.
 - c) initiation of cleavage.

Approximation of gametes →

- During coitus, male ejaculates about 200-300 million sperm into the female's vagina.
- The journey of sperm from the vagina to the Ampulla of uterine tube is promoted by prostaglandins present in the semen.
- The prostaglandins cause powerful contractions of the uterine muscle, which is facilitated by oxytocin released by Neurohypophysis.

- ✓ uterine contractions create the negative pressure in the uterine cavity.
- ✓ Consequently the sperms are sucked in from vagina into the uterine cavity.
- ✓ The movement of sperms occurs primarily by their own propulsive action, and to some extent it is also assisted by fluid currents created by uterine cilia.
- ✓ After ovulation, the oocyte reaches the ampullary region of the fallopian tube due to ciliary movements.
- ✓ The sperms again become motile due to chemoattractants produced by cumulus cells surrounding the oocyte.
- ✓ Before fertilization, the sperm must gain the ability to disintegrate the various oocyte barriers.

There are -

- First barrier → cells of corona radiata.
- Second barrier → zona pellucida (formed by glycoprotein ZP1, ZP2, and ZP3)
- Third barrier → vitelline membrane of oocyte.

- This ability to penetrate these barriers by sperm is achieved by two processes -
 - Capacitation (occurs in female genital tract)
 - Acrosome reaction.

capacitation → process of conditioning of sperm in the female genital tract.

- ✓ During capacitation, the glycoproteins coat and seminal plasma proteins covering the plasma membrane of the sperm in the acrosomal region are removed.
- ✓ only capacitated sperm undergoes acrosome reaction and then can fertilize ovum.

Acrosome Reaction →

- ✓ occurs when capacitated sperm comes in contact with the zona pellucida.
- ✓ The Acrosomal reaction is induced by the zona proteins.
- ✓ The Acrosomal reaction leads to the release of the enzymes from acrosomal cap.
- ✓ These enzymes are - Hyaluronidase and Acrosin.
- ✓ Hyaluronidase enzyme penetrates cells of corona radiata.
- ✓ Acrosin (Zona Lysin); penetrates the zona pellucida.
- ✓ The Antigenic coating of the sperm initiates the immunological reaction between the oocyte's Fertilizin and the sperm's Antifertilizin.

Mechanism of Fertilization →

Movement of sperm towards 2° oocyte

penetration of corona radiata by Hyaluronidase

Adherence of sperm to ZP3 receptors on zona pellucida

Sperm bind to receptor on Z.P leads to initiation of Acrosomal reaction. - Acrosin released

Acrosin facilitates penetration of sperm through Z.P

Fusion of sperm and membrane of 2° oocyte
(Syngamy)

phagocytosis of sperm by 2° oocyte
(Fast block polyspermy)

Completion of Meiosis II of 2° oocyte

Structural changes in Z.P through cortical reaction

discharge of cortical granules in perivitelline space forms Fertilization membrane.
(Slow block polyspermy)

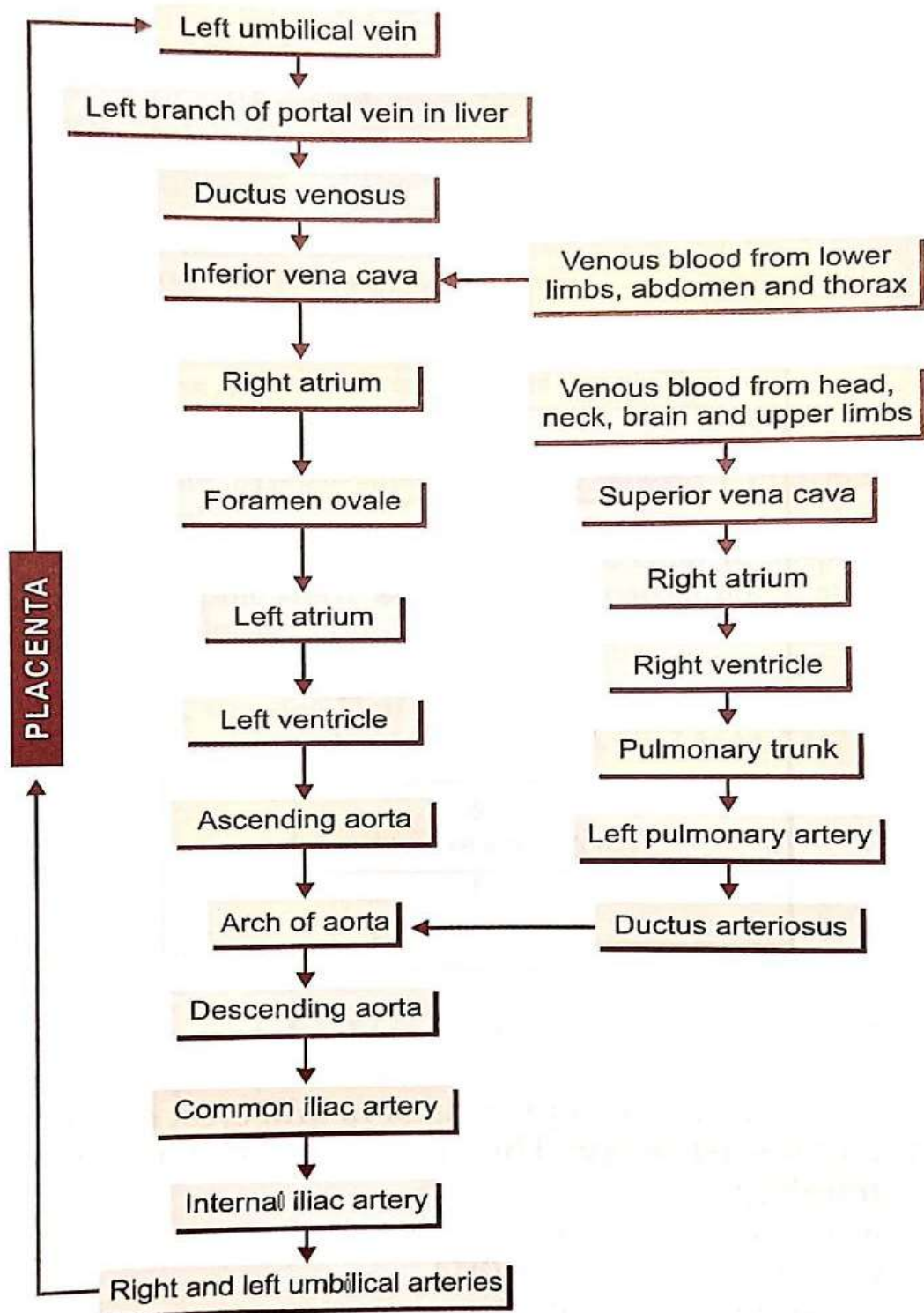
Sperm enters the ovum

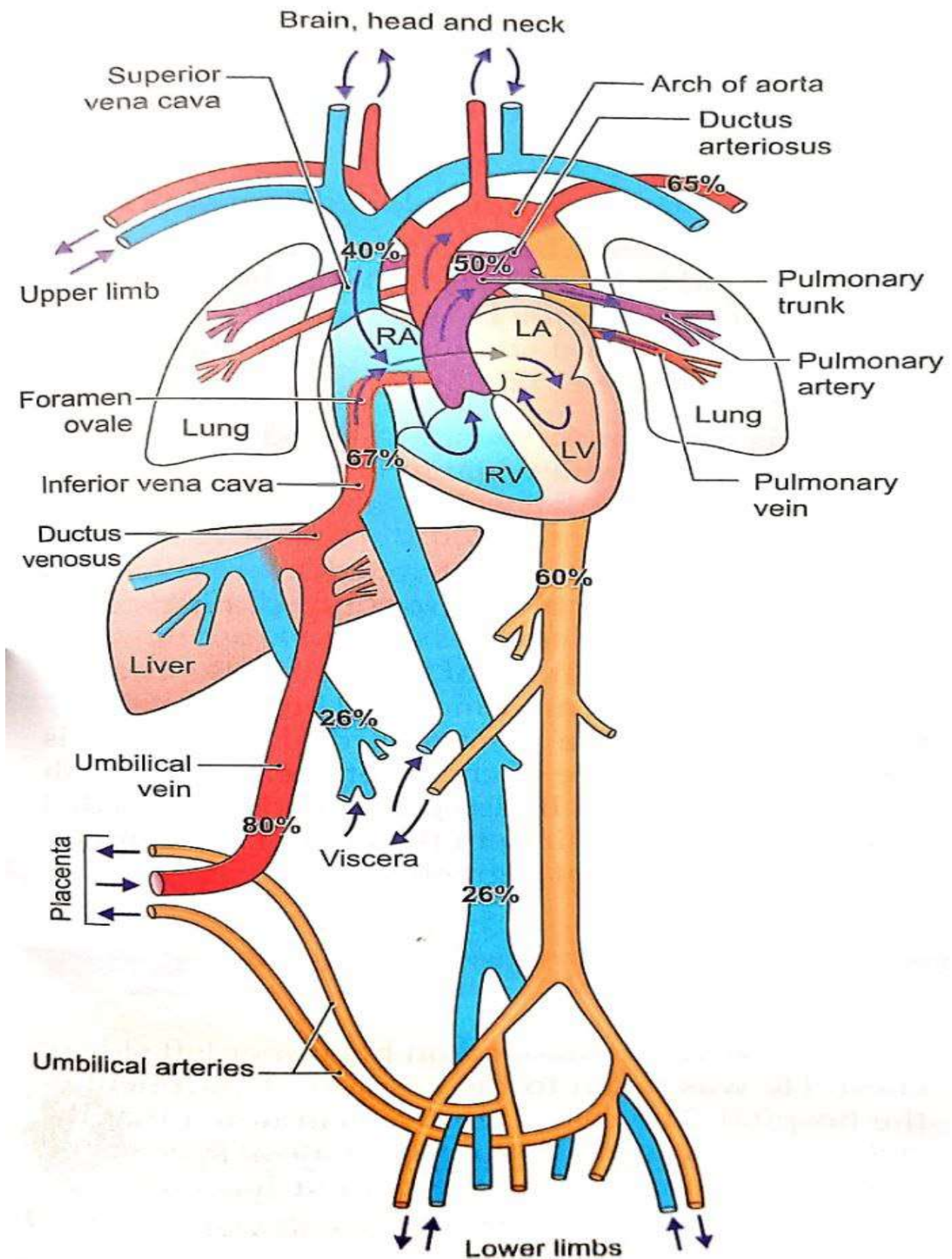
event is followed by plasmogamy, karyogamy and Amphimixis

Fertilization complete.

FOETAL CIRCULATION -

DR .SD NOTES





CHANGES AFTER BIRTH –

1. Lungs starts functioning
2. Umbilical vein -----ligamentum teres
3. Ductus venosum -----ligamentum venosum
4. Foramen ovale closes
5. Ductus arteriosus -----ligamentum arteriosum
6. Umbilical arteries -----umbilical ligaments
7. Placenta removed & delivered

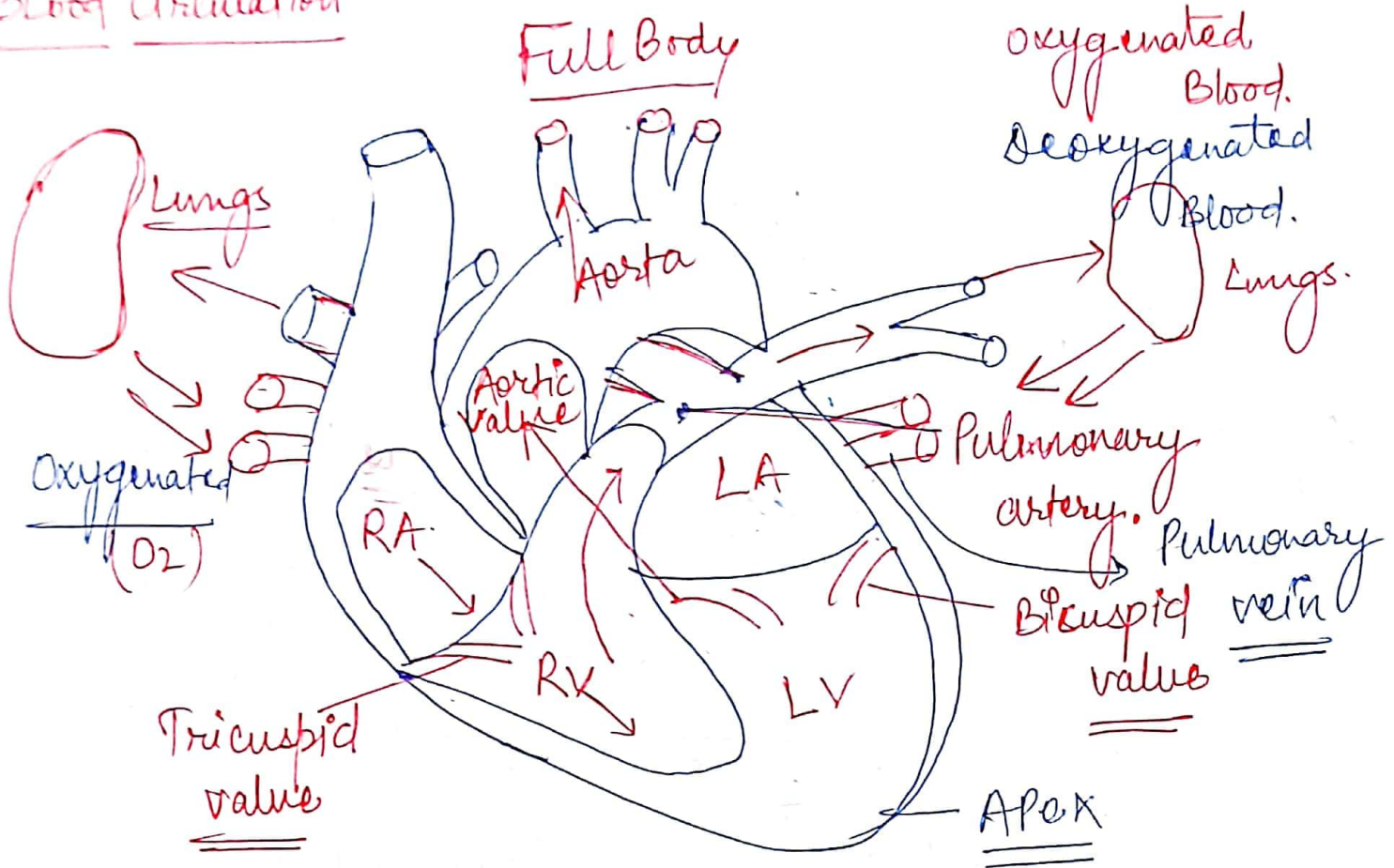
Developmental components –

1. Right atrium – atrial chamber proper
Right horn of sinus venosus
Interatrial septum
2. Left atrium - atrial chamber
Absorption of pulmonary veins
3. Right ventricle – bulbus cordis – rough part
Conus cordis - smooth part
4. Left ventricle – primitive ventricle – rough part
Conus cordis – smooth part
5. Interatrial septum – septum primum – fossa ovalis
Septum secundum – limbus fossa ovalis
6. Interventricular septum – Av cushion (atrioventricular)
7. Truncus arteriosus – forms ascending aorta & pulmonary trunk .

Trick – LAB & RAT – LEFT ATRIUM , RIGHT ATRIUM (BICUSPID & TRICUSPID)

• CIRCULATORY system • (Double circulation)

Blood circulation



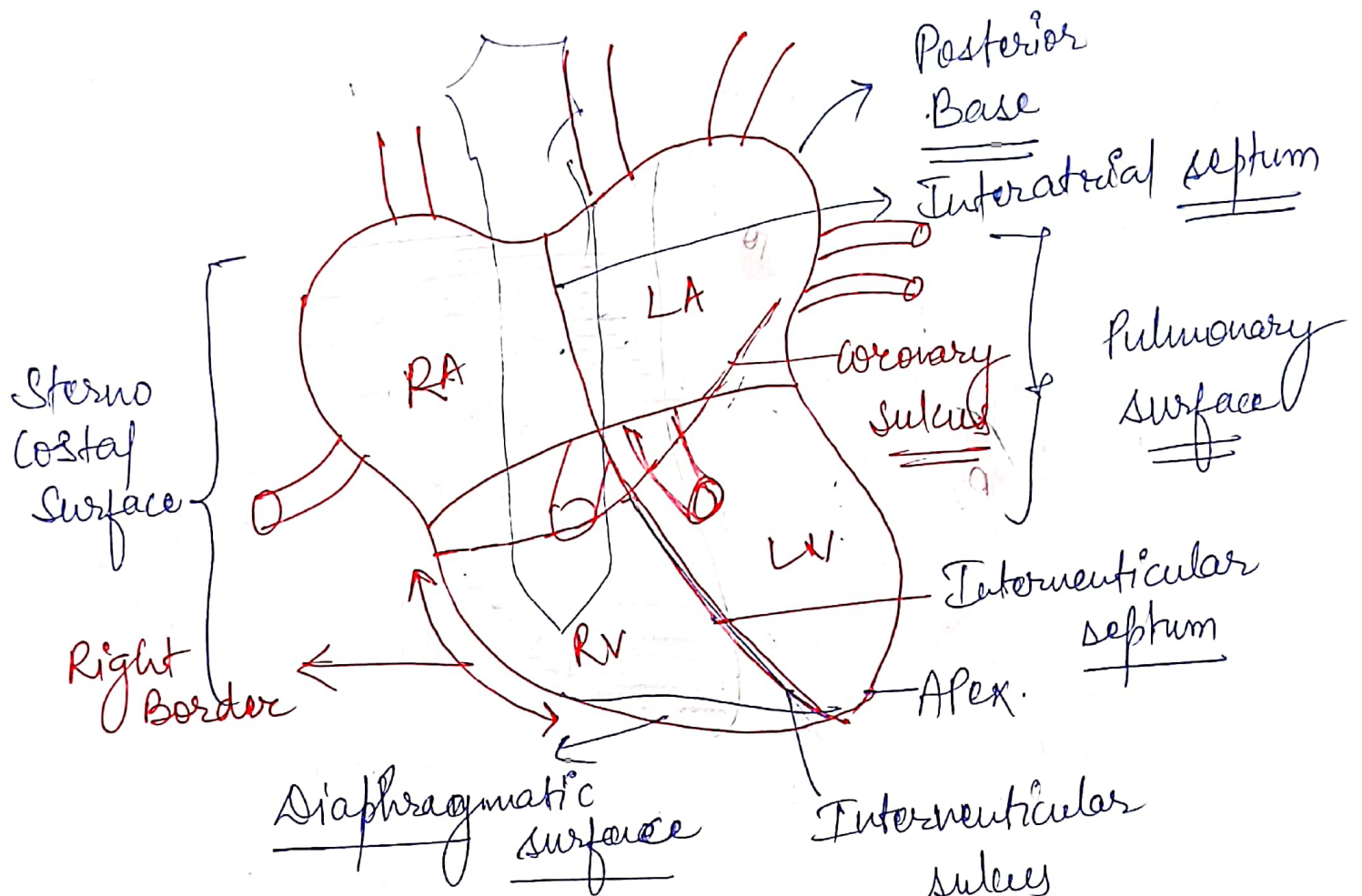
— Blood from Heart to Lung = Pulmonary circulation (Arteries No-oxygen)

(veins — contain oxygen)

— Systemic circulation → Arteries contain oxygen

— veins — No oxygen

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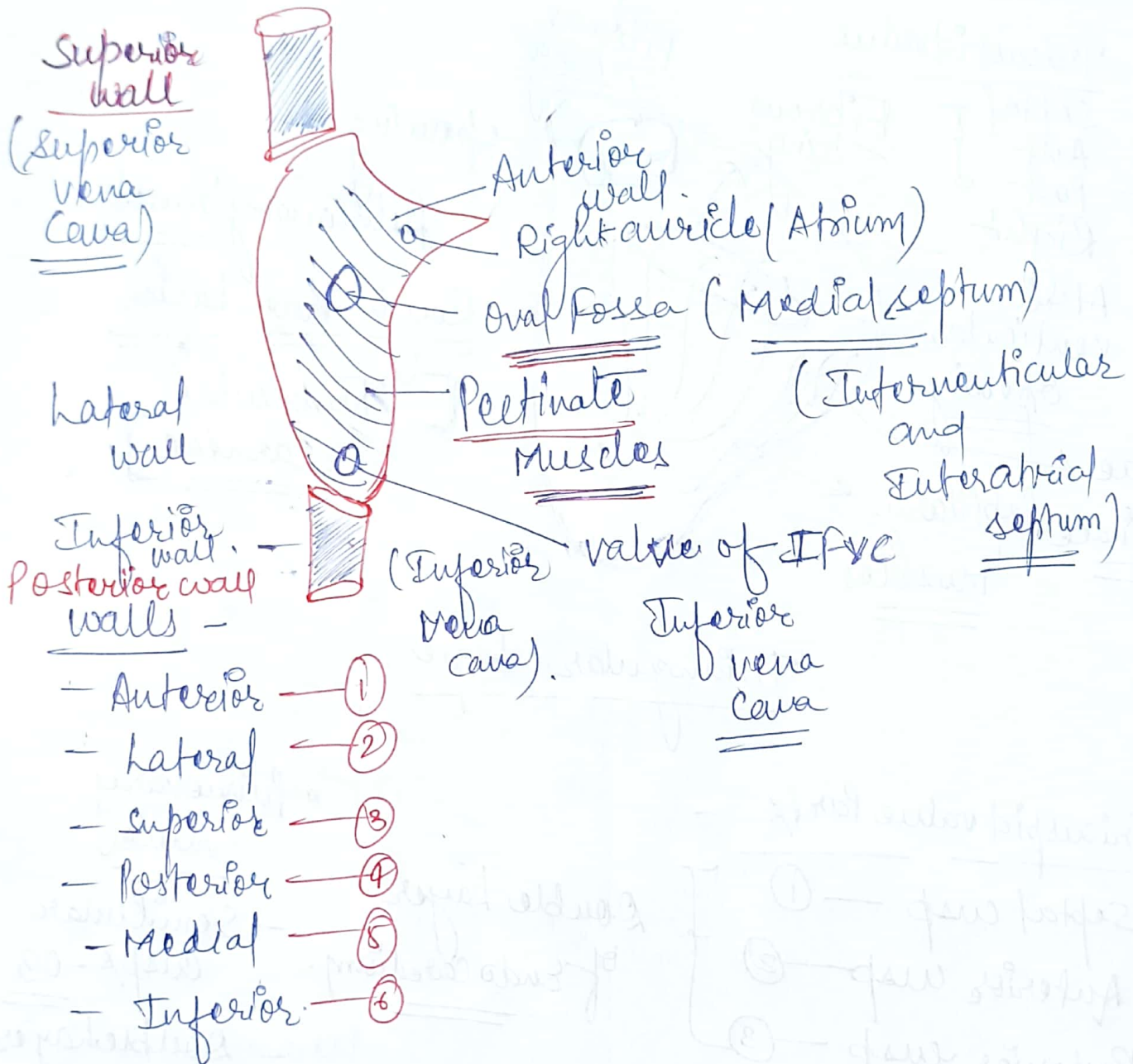


- Surface - Pulmonary surface — (1)
- Sterno Costal surface — (2)
- Diaphragmatic surface — (3)

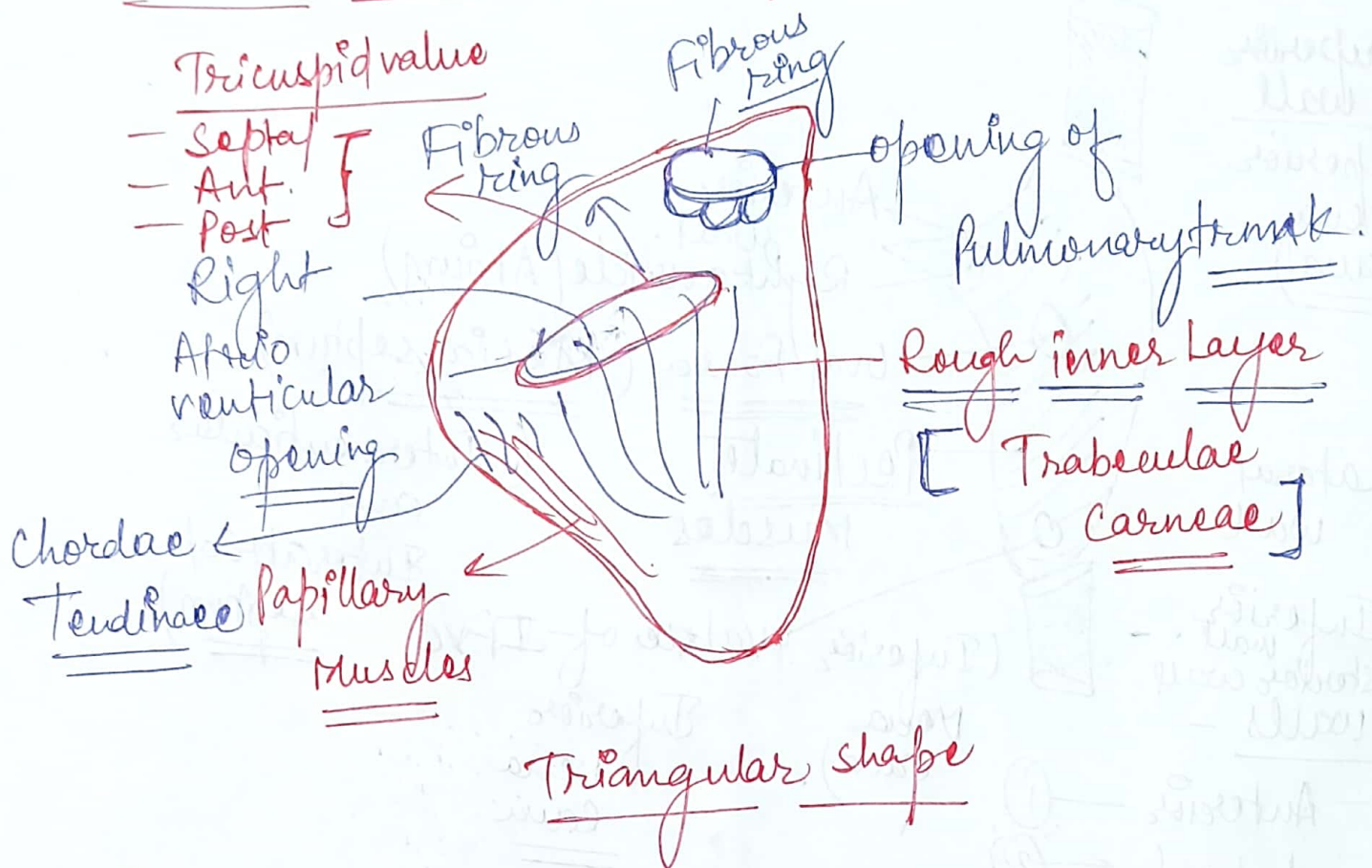
- Sulcus - coronary sulcus (Atria and ventricles separate)
- Anterior Interventricular sulcus.
- Posterior Interventricular sulcus.

- Septum
- (1) Interventricular septum
- (2) Interatrial septum

Internal structure of Right atrium



Internal structure of Right ventricle



• Tricuspid valve parts -

- Septal cusp — ①
- Anterior cusp — ②
- Posterior cusp — ③

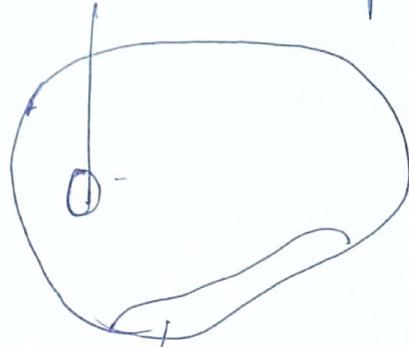
Double layer
of Endocardium.

• Pulmonary valve

- Semilunar cusps — 03
- Double layer of Endocardium

• Internal structure of left atrium

Left atrioventricular opening.



Medial wall

Inter atrial septum.

Bicuspid valve / mitral valve

• Left ventricle

3 Semilunar
cusps.
+
Aortic
sinus

Anterior
usp

Aortic opening

Fibrous ring

Posterior usp.

Bicuspid
value

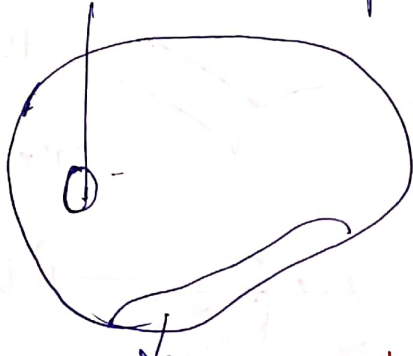
Left Atrioventricular
opening.

— Anterior usp. — ①

— Posterior usp — ②.

• Internal structure of left atrium

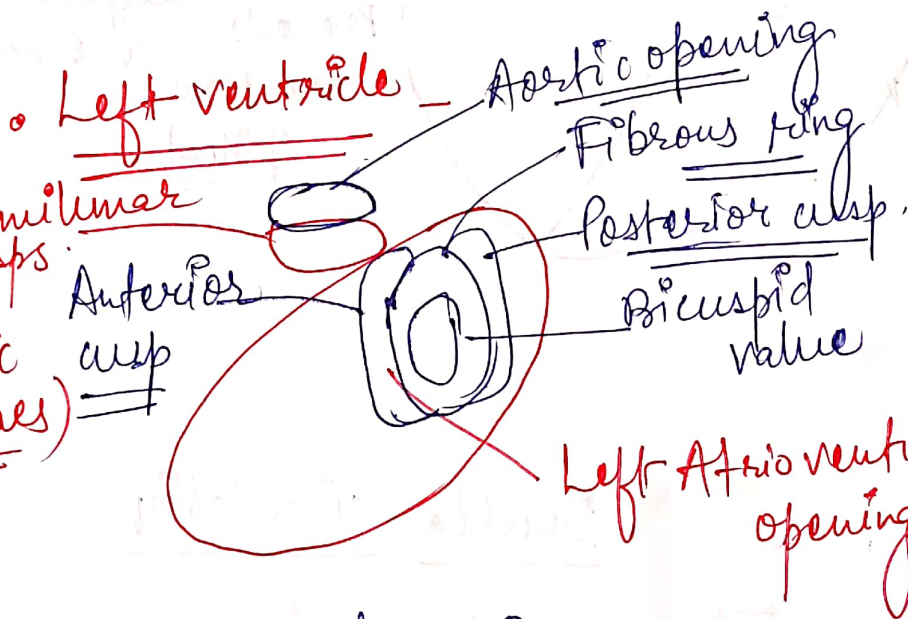
Left atrio ventricular opening.



Medial wall

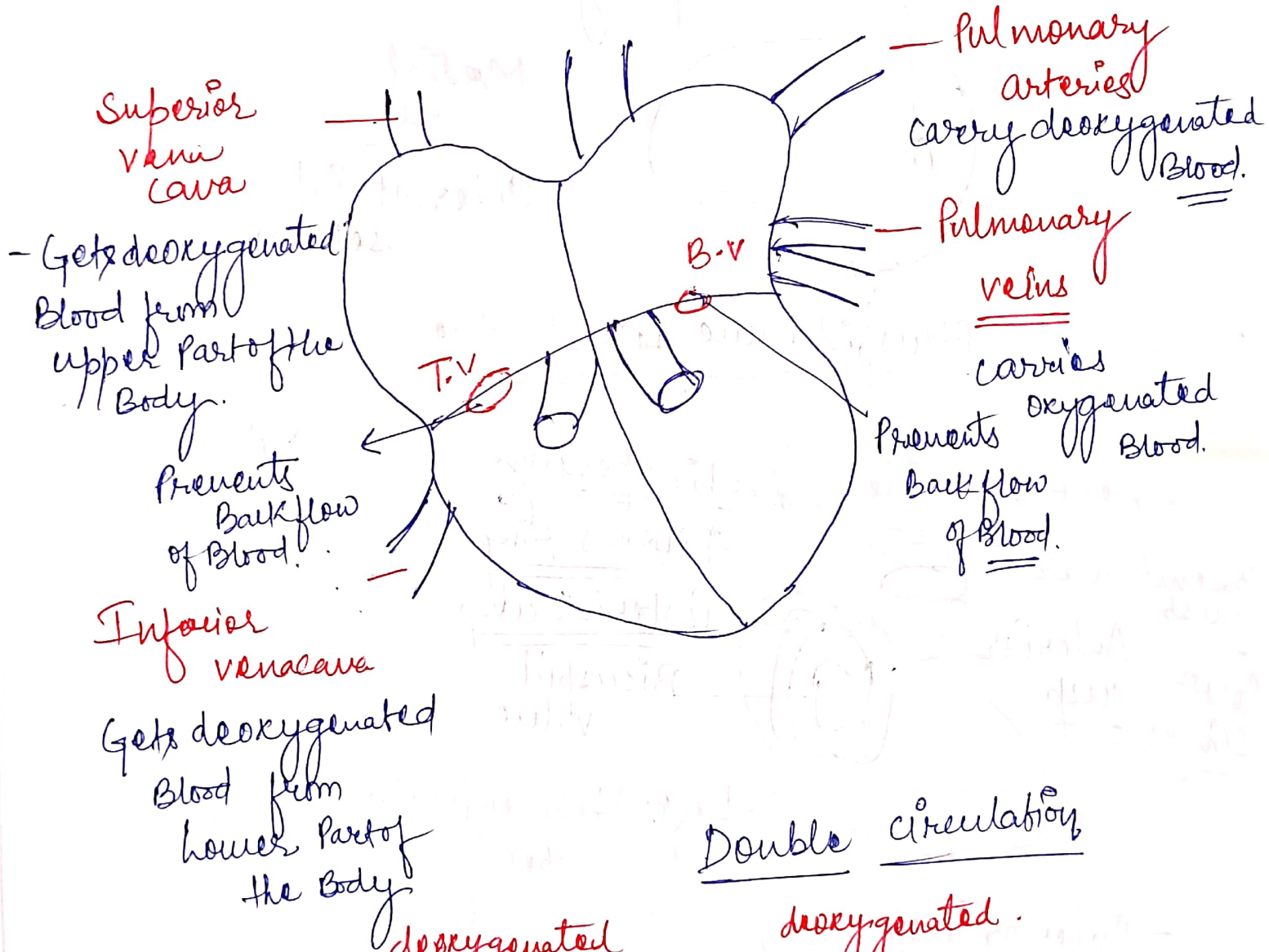
Inter atrial septum

Bicuspid value / Mitral value

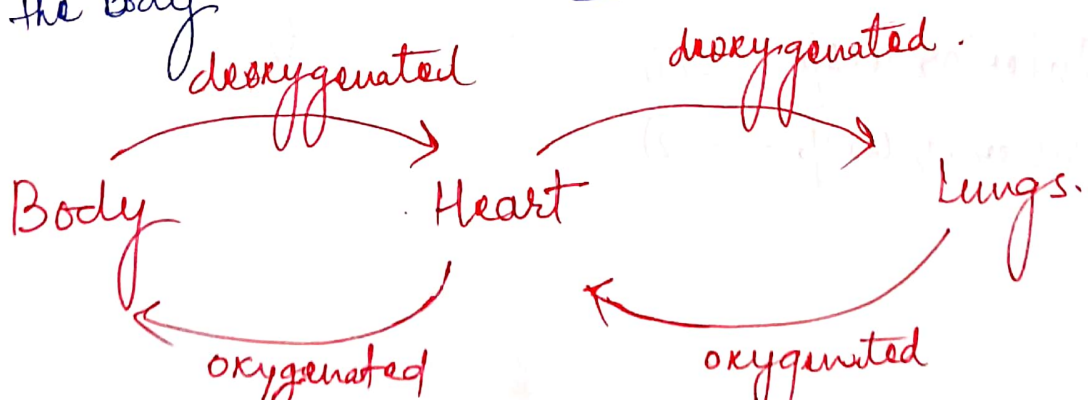


- Anterior cusp. — ①
- Posterior cusp — ②.

Veins — Deoxygenated — ①
 Arteries — oxygenated — ②



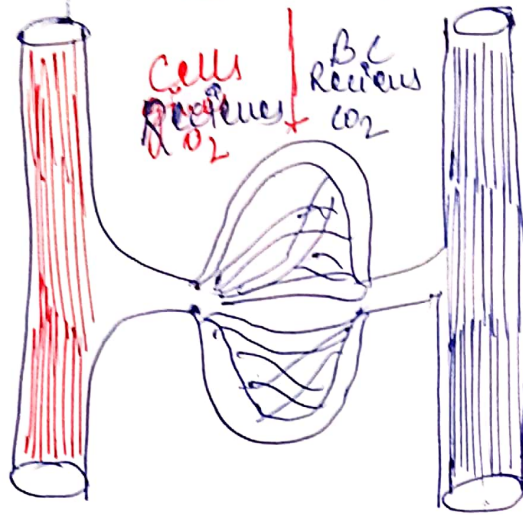
Double circulation



Blood Vessels

(carries Blood)

Blood capillaries

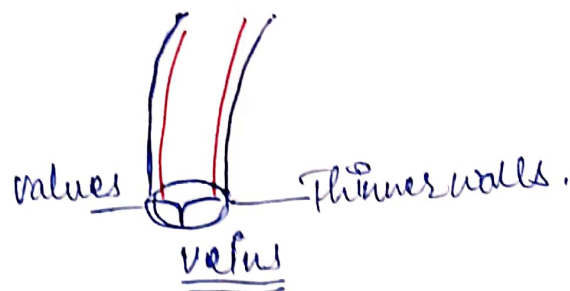
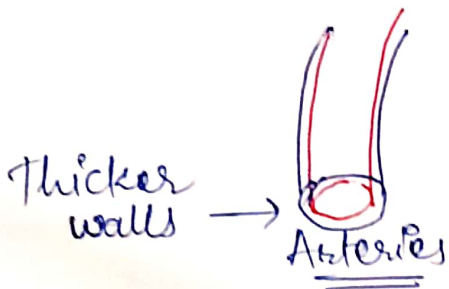
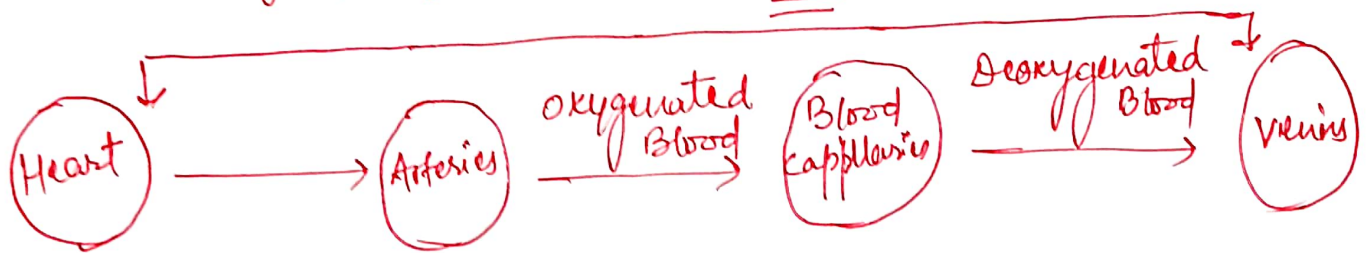


Arteries

oxygenated
Blood

veins

deoxygenated
Blood



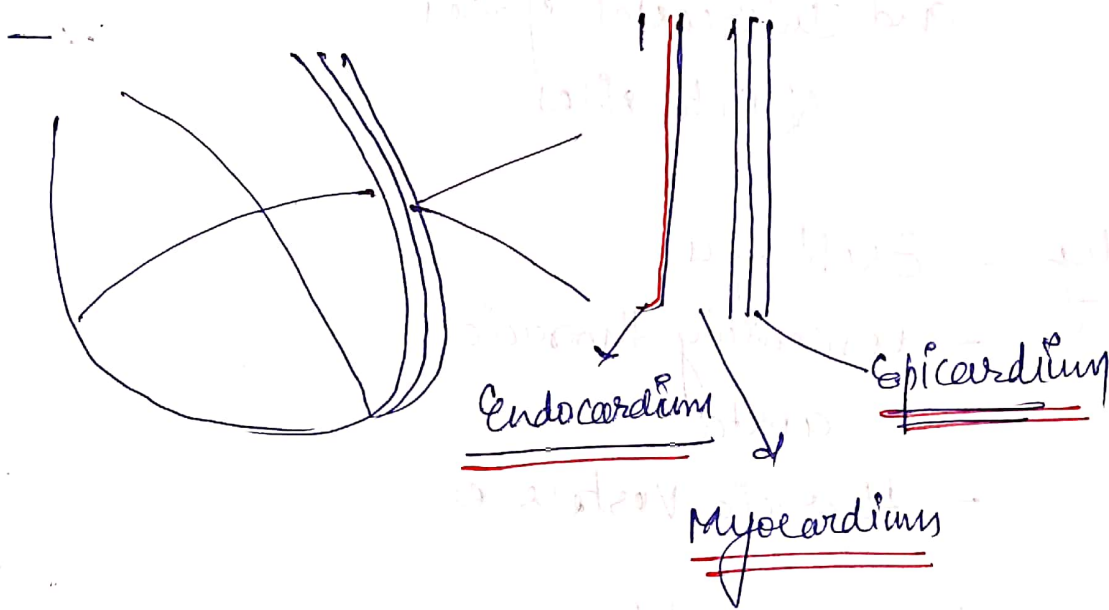
• Relations of Heart - (Synopsis)

- Anteriorly - Sternum
 - 2-8th costal cartilages and Intercostal spaces of Both sides.
- Posteriorly - Esophagus
 - descending thoracic aorta
 - Thoracic Vertebrae
- Laterally - Lungs and pleura
 - .
- Inferiorly - Central tendon of diaphragm
- Superiorly - Aorta
 - Pulmonary trunk
 - Superior vena cava

Part-02

◦ Layers of the Heart -

Serous
pericardium
Fibrous
Pericardium



①

Endocardium -

- Lined by endothelium
- Innermost layer of the Heart
- Forms double layer endocardium
- Mainly valves covered.

② Myocardium -

- Mainly muscle fibres.
- Forms fibrous rings (valves)

② - Myocardium { Atria — ①
Ventricles — ②

— ① Atria — 02 layers

— Superficial layer — circular muscle fibres

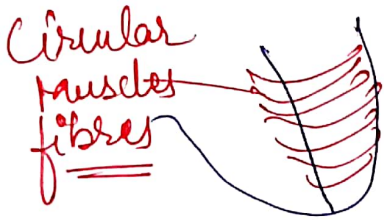
— Deep layer — longitudinal muscle fibres

— ② Ventricles — 03 layers

— Superficial layer — ① Longitudinal M. fibres

— Middle layer — ② circular M.F.

— Deep layer — ③ longitudinal M.F.



— Longitudinal connection (Superficial layer) → superficial → Apex (downward) → Deep (Right ventricle)

③ epicardium - Visceral layer of
Serous Pericardium

- Pericardium -

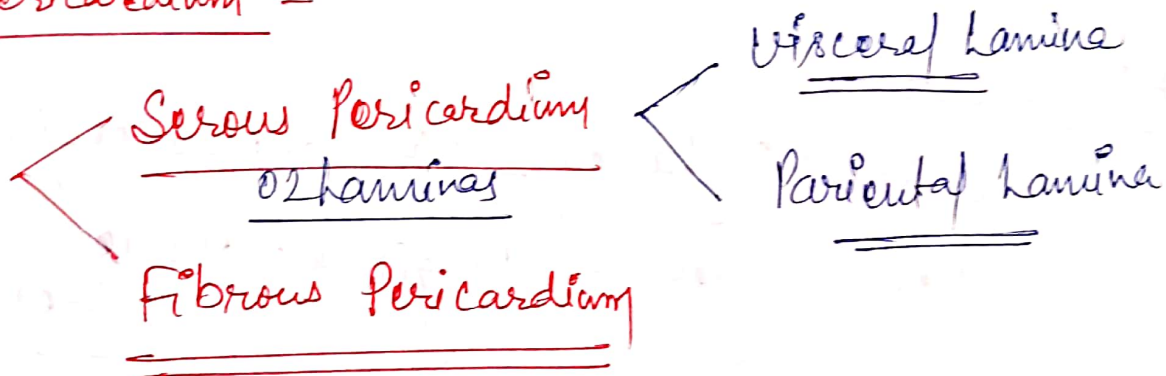
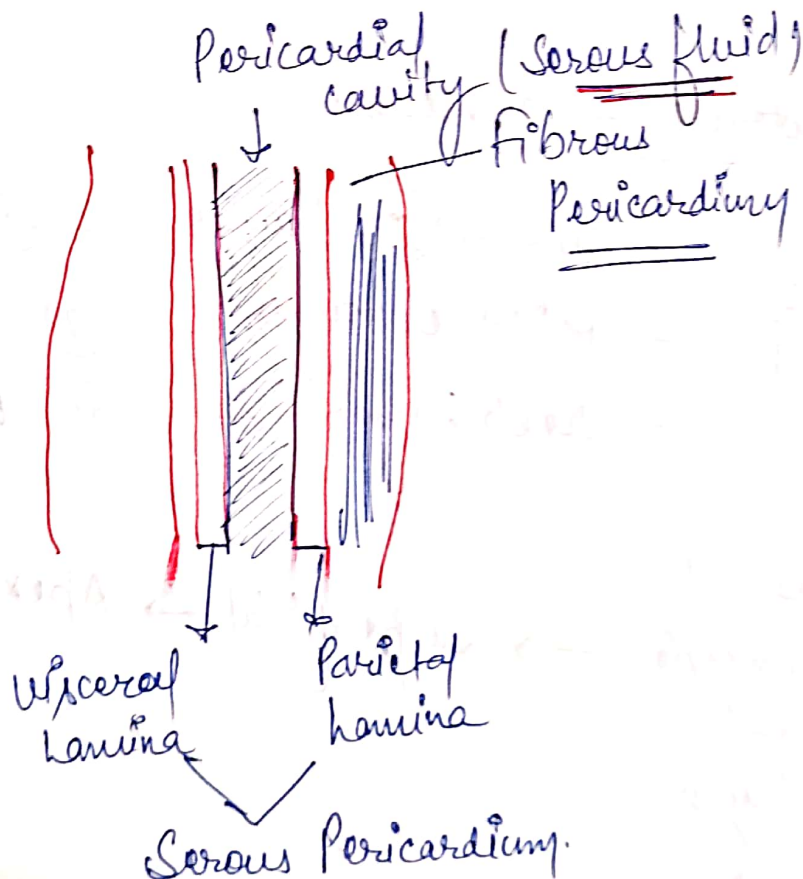
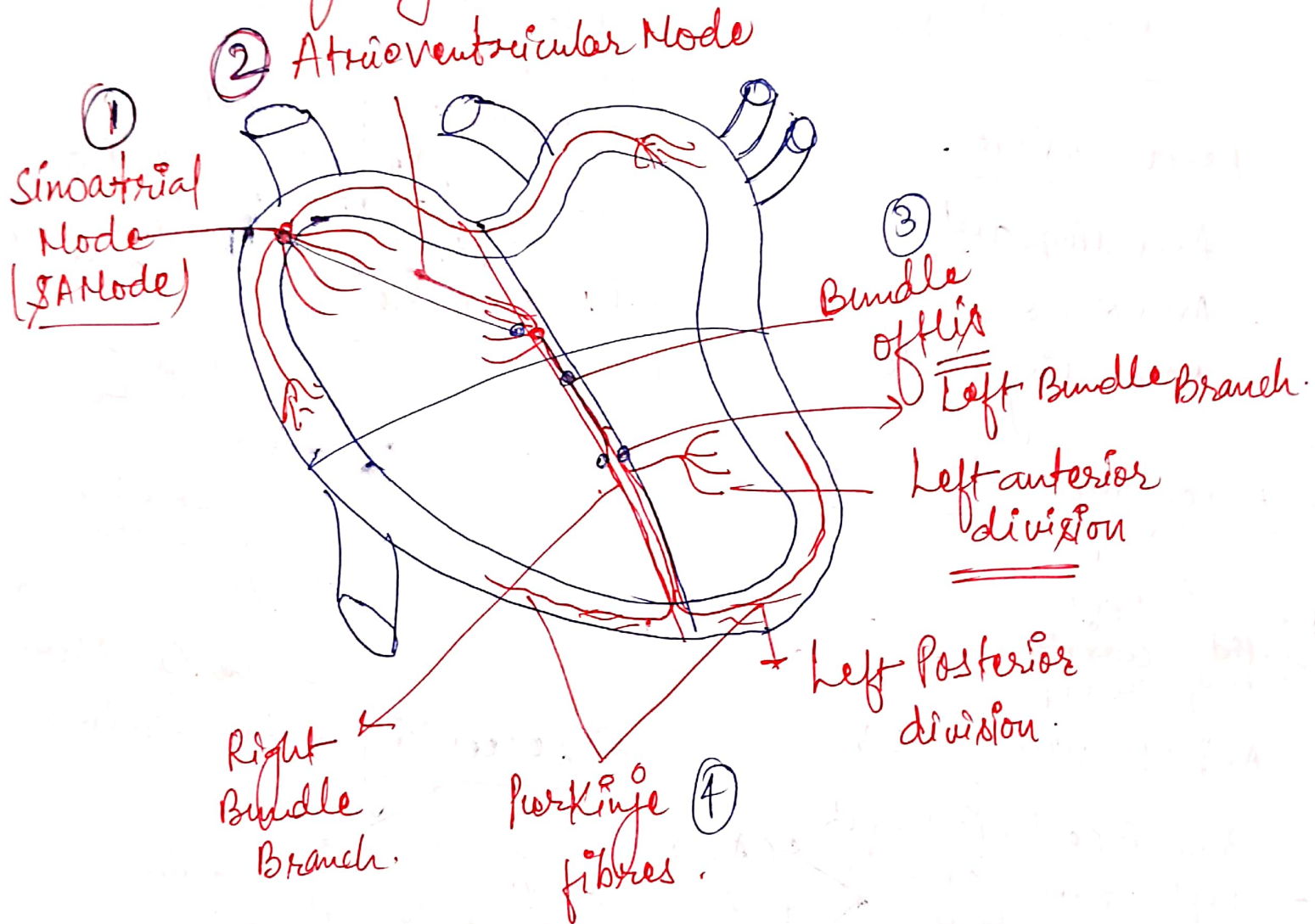


diagram -



• Conducting system -



- ① SANode ——— ①
- ② AV Node ——— ②
- ③ Bundle of His ——— ③
- ④ Purkinje fibres ——— ④

Branches of Aorta (Arises from Left Ventricle)

Flowchart

- Aorta - 03 Part -
- Ascending aorta
- Arch of aorta
- Descending aorta

① Ascending aorta - 02

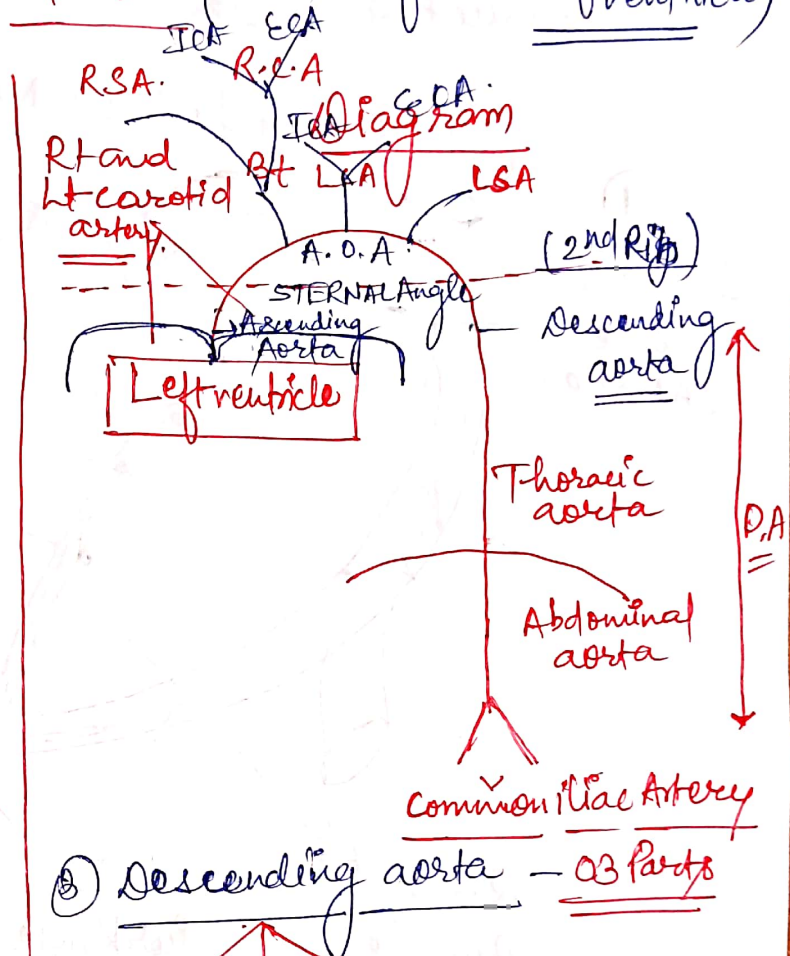
Rt carotid artery
Left carotid artery

② Arch of aorta - 03

- Brachiocephalic trunk
- Left common carotid artery - ①
- Left subclavian artery - ②

Bt
 Rt common carotid artery
 Rt. subclavian artery

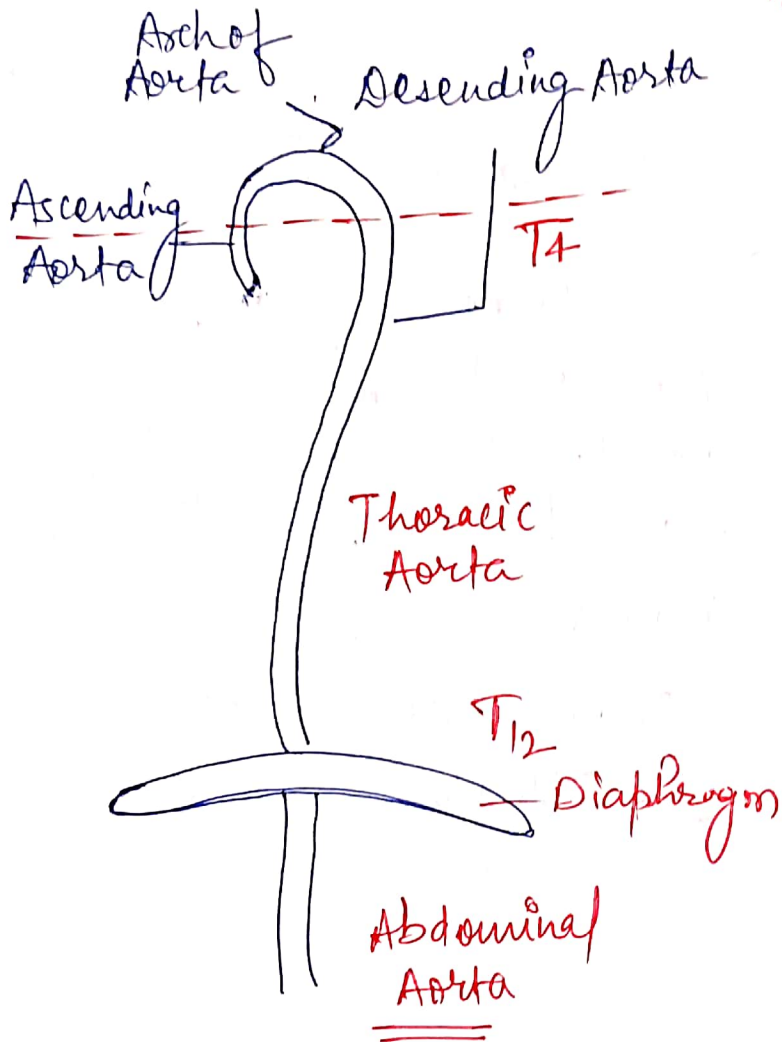
RCCA
 External carotid artery
 Internal carotid artery



③ Descending aorta - 03 Parts

Thoracic part
Abdominal part
Terminal part

Thoracic Aorta and its Branches



$T_4 - T_{12}$ = Thoracic Aorta

① It has 07 different types of Branches

Visceral Branches

④

① - Pericardial Branch

② - Bronchial Branch

③ - Esophageal Branch

④ - Mediastinal Branch.

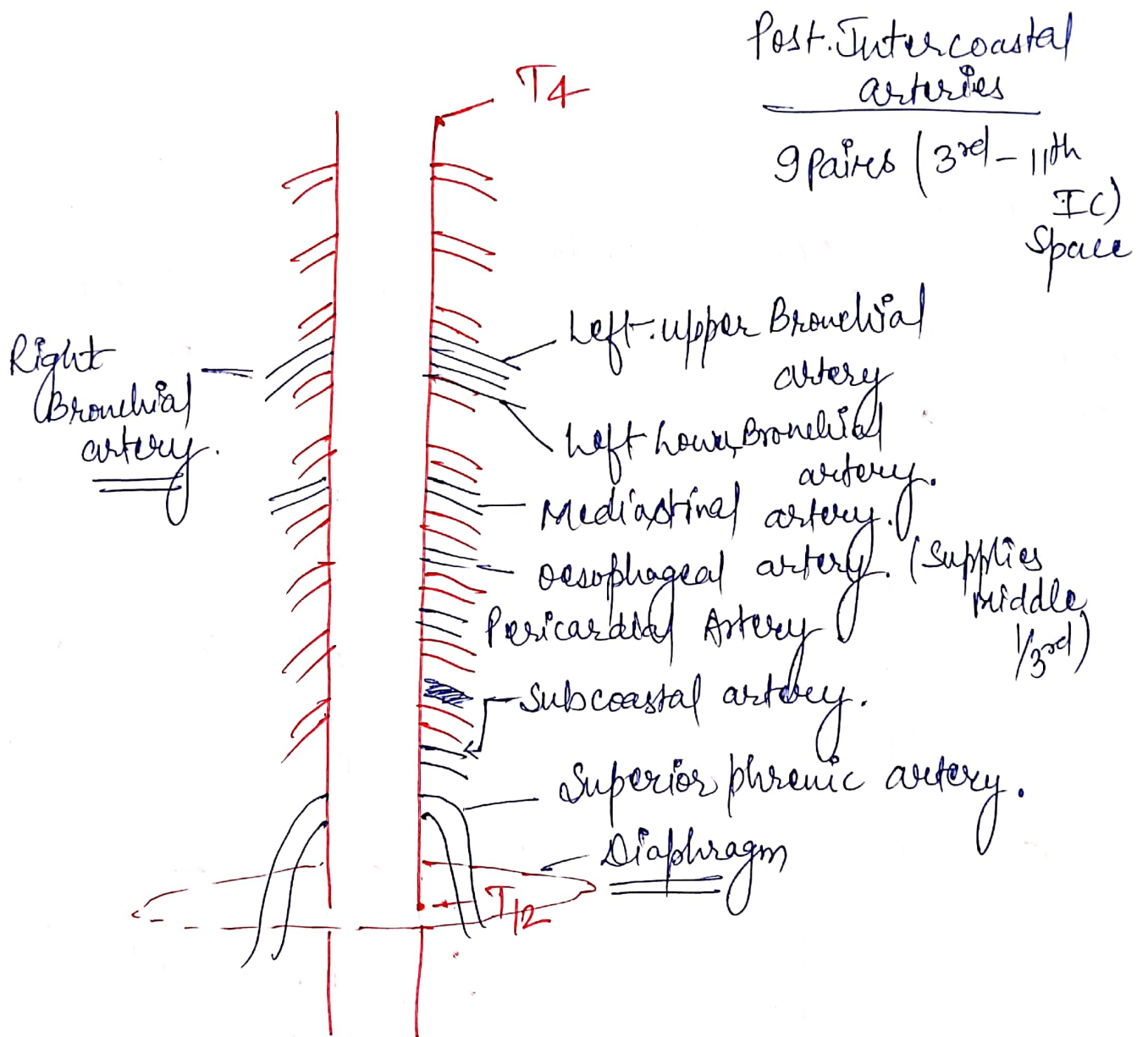
Parietal Branches.

③

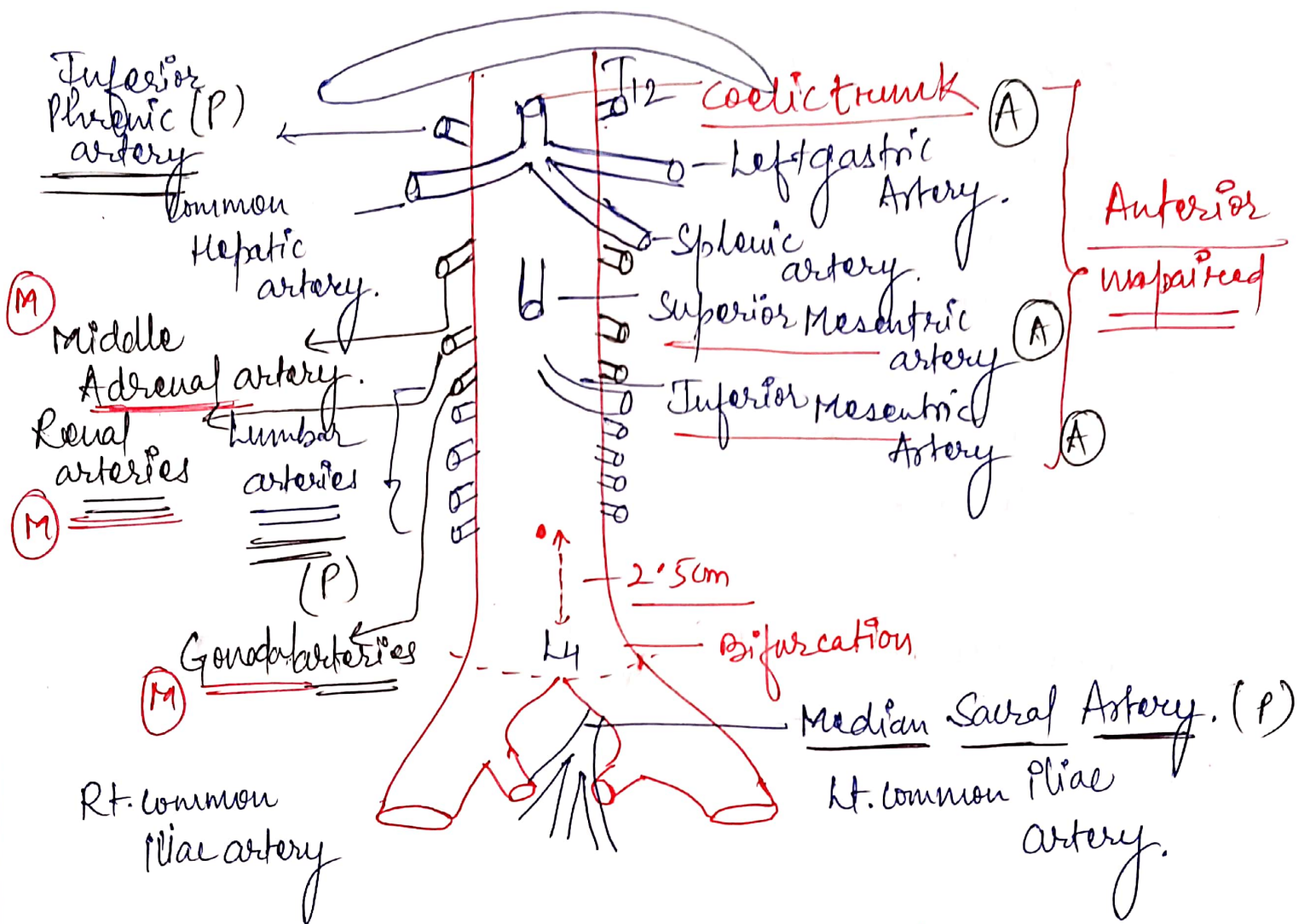
① Post-intercostal Branch.

② Subcostal Branches

③ Superior Phrenic Branch.



Abdominal Aorta



— Supplies — coeliac trunk supplies foregut

- Abdominal esophagus
- Stomach
- duodenum
- Liver
- Pancreas
- Gall Bladder
- spleen.

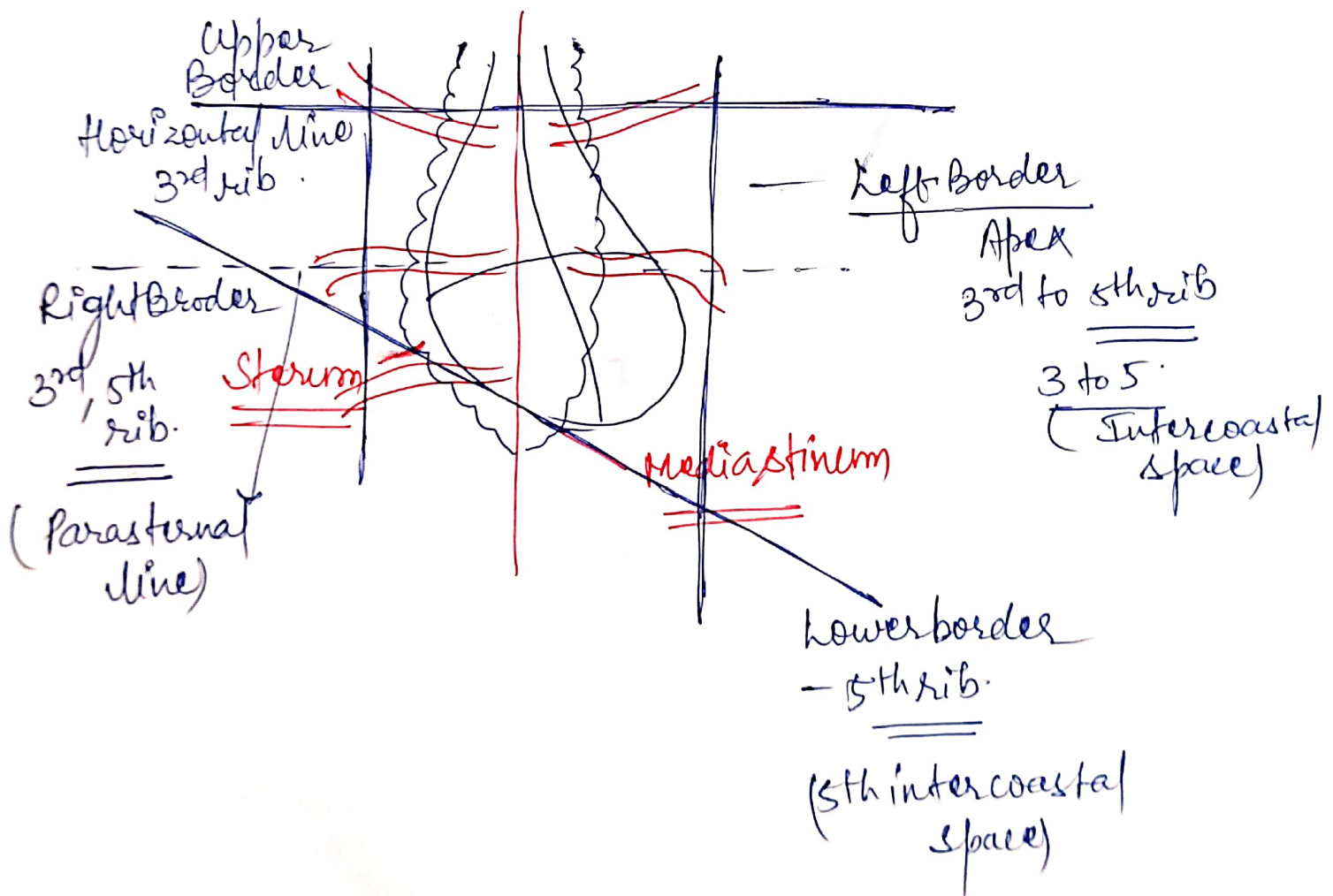
② Superior Mesenteric artery supplies —

- Midgut
- Descending duodenum
- Jejunum
- Ileum
- Caecum
- Appendix
- Ascending colon.
- R. transverse colon.

③ Inferior Mesenteric Artery supplies hindgut

Topography of Heart

- Holotopy - Location of organ in Regions of Body.
 - Skeletopy - Projection of organ on skeleton
 - Syntopy - Position of organ according to the other organs.
- (Relations of Heart)



Hip joint

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Type – ball & socket variety of synovial joint.

Articulating surface – head of femur with acetabulum cavity

Hip joint – high degree of stability & mobility .

Stability depends upon –

Depth of acetabulum

strength of ligament (SURROUNDING OF MUSCLES)

ligament –

1. Fibrous capsule
2. Iliofemoral ligament
3. Pubofemoral ligament
4. Ischiofemoral ligament
5. Head of femur ligament
6. Acetabular labrum

Ligaments description –

1. Fibrous capsule – attached to acetabulum labrum
Infront – intertrochanteric line
2. Iliofemoral ligament – strongest ligament
Triangular in shape
Apex is attached – iliac spine
Base – intertrochanteric line
3. Pubofemoral ligament – support joint
Triangular in shape
Superior – obturator crest
Inferior - iliofemoral ligament
4. Ischiofemoral ligament - cover joint posteriorly
Twisted fiber
5. Head of femur ligament – triangular in shape
Apex – fovea capitis
Base – acetabulum notch
6. Acetabulum labrum - fibrocartilaginous rim
attached to acetabulum margin

Relations –

Anterior – femoral artery , femora nerve , femoral vein , iliopsoas

Posterior – piriformis , sciatic nerve , quadratus femoris , gluteus maximus

superior - gluteus maximus , gluteus minimus , gluteus medius

inferior - obturator externus , hamstring muscles

Blood supply – obturator artery

circumflrx femoral artery

gluteal artery

Nerve supply – femoral nerve



Nerve to rectus femoris



Obturator nerve



Quadratus femoris



Gluteal nerve

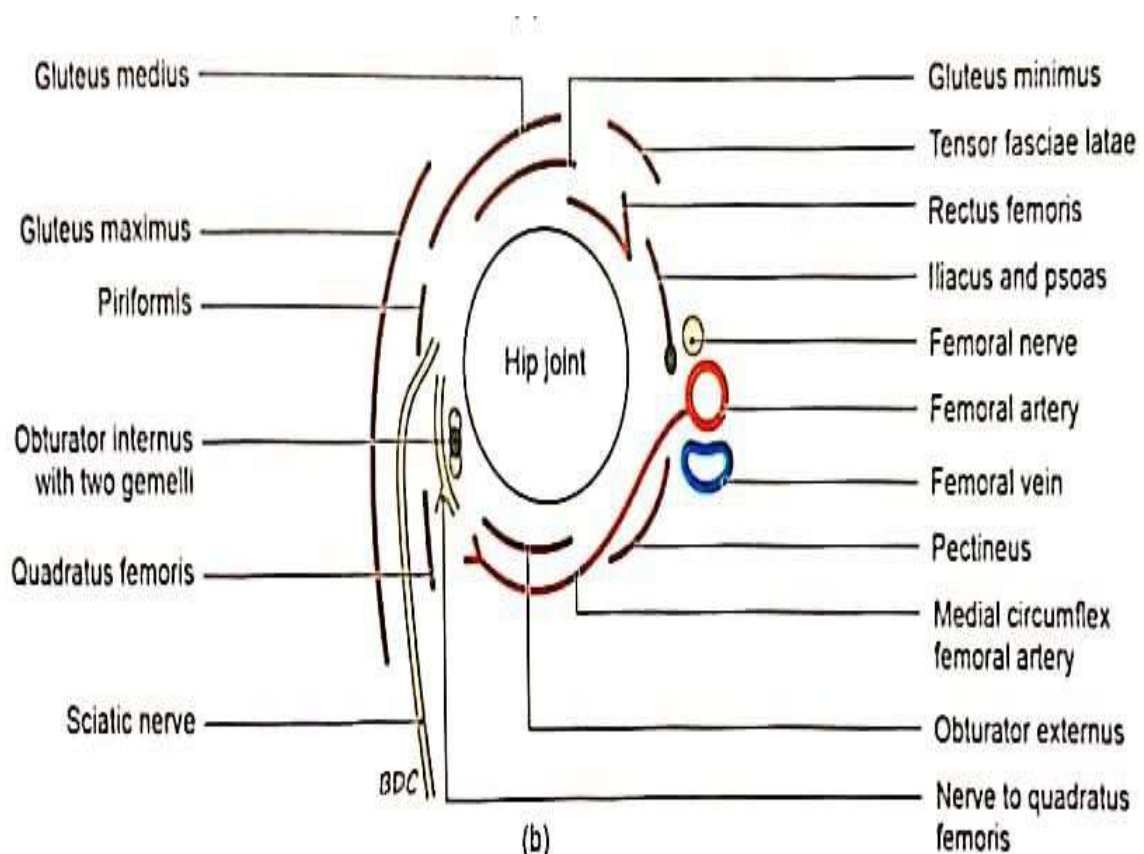
Movements – flexion & extension

Adduction & abduction

Medial & lateral rotation

Circumduction

Diagram – Relations of hip joint (VOL 2 BDC – PAGE NO 163 – 9TH EDITION)



Figs 12.5a and b: Relations of the hip joint

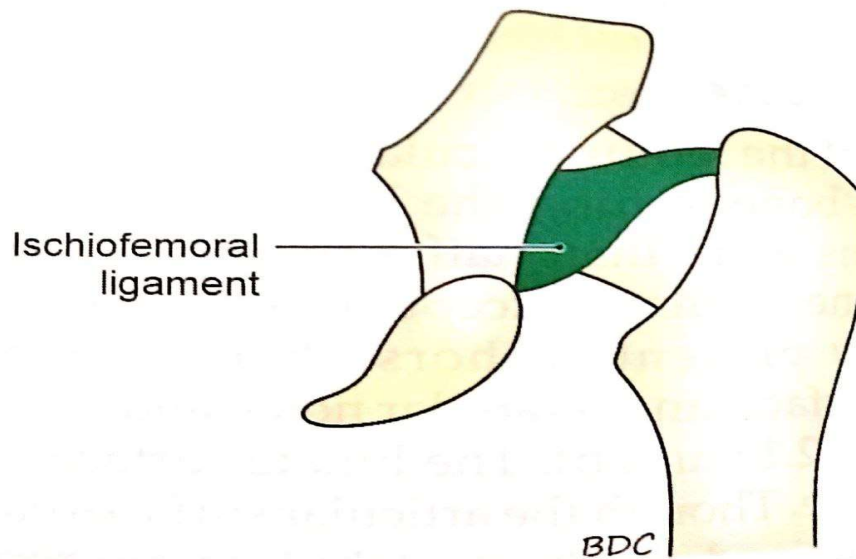


Fig. 12.4: The ischiofemoral ligament

Applied anatomy of hip joint –

1. Dysplasia of hip – abnormal development
2. Congenital dislocation – femur head slips upwards
3. Perthes disease – pseudo coxalgia
4. Coxa vara – neck shaft angle reduced
5. Dislocation of hip joint
6. Aspiration of hip joint

Age wise pattern –

Below 5 yrs – congenital dislocation

5 – 10 yrs - perthes disease

10-20 yrs – coxa vara

Above 40 – osteo arthritis

Kidney

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- pair of excretory organ
- situated on posterior abdominal wall
- retroperitoneal in the upper left & right abdominal quadrants.
- Functional unit of excretory system.

Kidney helps in –

- Acid- base balance
- Blood pressure
- Homeostatic parameters

Shape & colour –

- Bean – shaped
- Reddish brown in colour

Size –

- 11 cm – long
- 06 cm – broad
- 03 cm - thick
- Weight – 150 gm in males

135 gm in females.

Location –

- epigastric
 - hypochondriac region
 - lumbar region
 - umbilical region
-
- Extend up to – T12 to L3
 - Right kidney is slightly lower than left kidney.

External features – 222 trick

- 02 poles
- 02 surfaces
- 02 borders
- 01 hilum (entrance)

02 poles –

- Upper pole
- Lower pole
- Broad & close with suprarenal gland

02 surfaces –

- Anterior surface - irregular
- Posterior surface – flat

02 border –

- Lateral border – convex
- Medial border – concave – middle part – hilum present
- Hilum – entrance part – renal vein – renal artery – renal pelvis.

Relations of kidney –

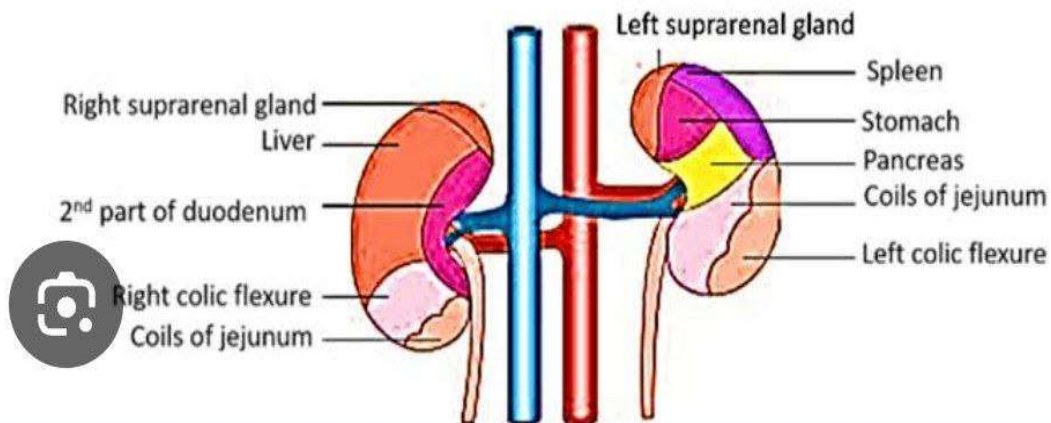
- Anterior relations of kidney -

Right kidney

- Right suprarenal gland
- Right lobe of liver
- 2nd part of duodenum
- Right colic flexure
- Coils of jejunum

Left kidney

- Left suprarenal gland
- Stomach
- Spleen
- Pancreas
- Left colic flexure
- Coils of jejunum



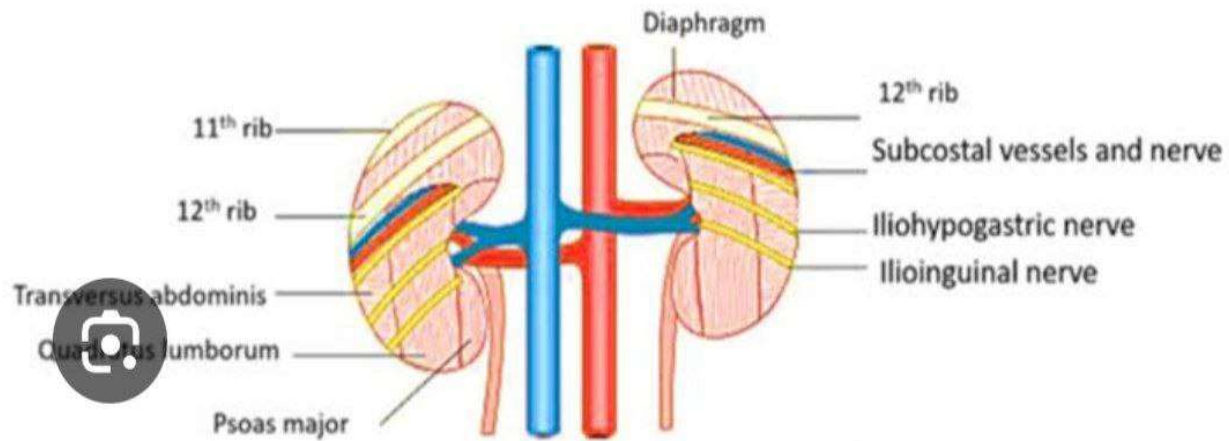
➤ Posterior relations of kidney –

Left kidney

- 11th and 12th ribs
- Diaphragm
- Psoas major muscle
- Quadratus lumborum muscle
- Transversus abdominis muscle
- Subcostal vessels and nerve
- Iliohypogastric nerve
- Ilioinguinal nerve

Right kidney

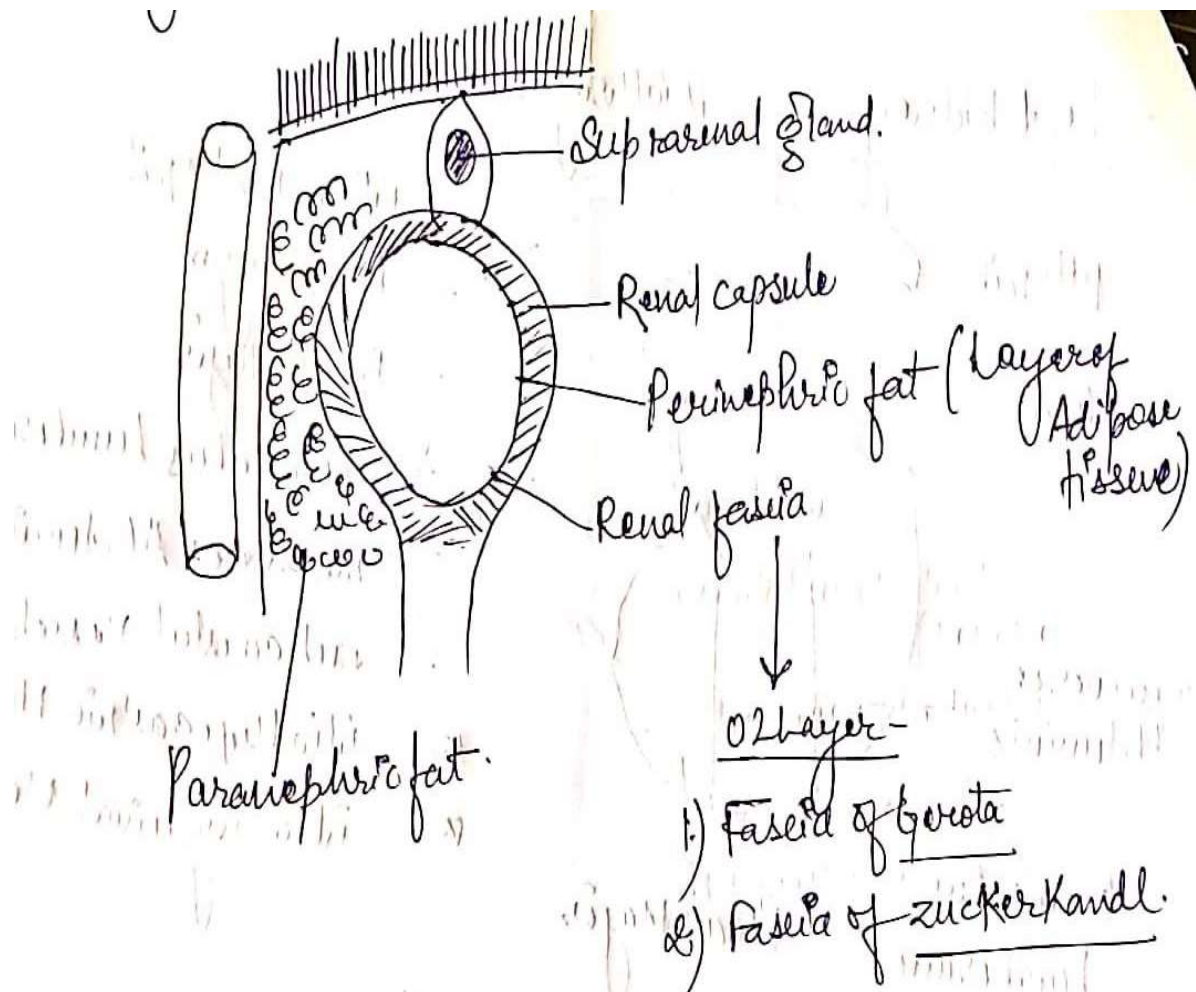
- 12th ribs
- Diaphragm
- Psoas major muscle
- Quadratus lumborum muscle
- Transversus abdominis muscle
- Subcostal vessels and nerve
- Iliohypogastric nerve
- Ilioinguinal nerve



Coverings –

- Renal capsule
- Perinephric fat - adipose tissue
- Renal fascia
- Paranephric fat

➤ Renal fascia – 02 parts – fascia of gerota & zuckerkandl



➤ Blood supply of kidney –

- Blood supply of kidney –

- Abdominal Aorta

↓
Renal artery

↓
5-segmental artery

↓
Lobar artery

↓
Interlobar artery

↓
Arcuate artery

↓
Interlobular artery

→ Afferent arteriole – Glomerulus

- Efferent arteriole

↓
Peritubular plexus

↓
Interlobular vein

↓
Arcuate vein

↓
Interlobar vein

↓
Lobar vein

↓
5 Segmental vein

↓
Renal vein

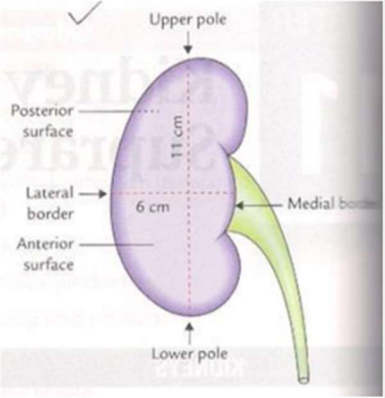
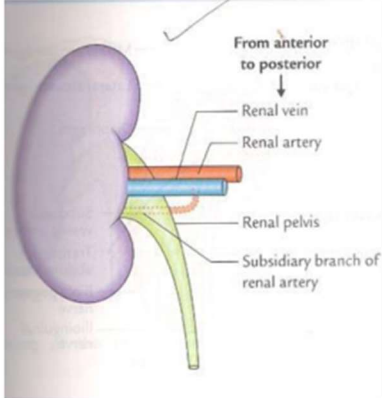
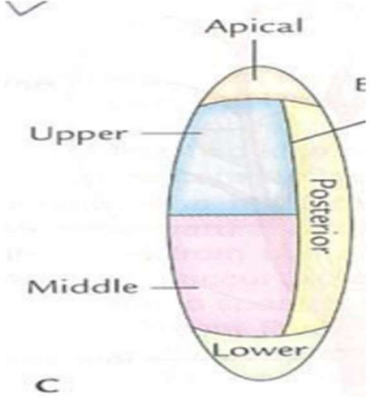
↓
Inferior Vena cava

05 segmental branches –

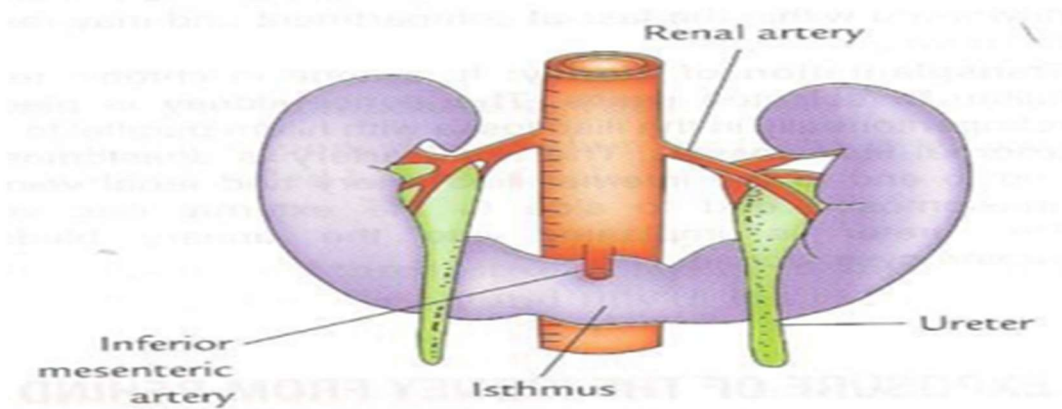
- Apical branch
- Upper branch
- Middle branch
- Lower branch

Applied anatomy –

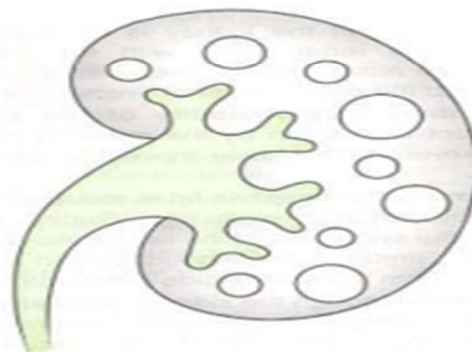
- Renal agenesis
- Renal calculus
- Acute renal failure
- Horseshoe shape kidney
- Polycystic kidney

A. PARTS	B. HILUM	C. SEGMENTS
 ✓ Upper pole Posterior surface 11 cm Lateral border 6 cm Anterior surface Medial border Lower pole	 ✓ From anterior to posterior Renal vein Renal artery Renal pelvis Subsidiary branch of renal artery	 ✓ Apical Upper Middle Lower Posterior E C

G. APPLIED



Horse shoe kidney



Polycystic kidney

KNEE JOINT -

DR. S.D NOTES

Type – condylar synovial joint

- 02 condylar joint b/w condyle of femur & tibia
- 01 saddle joint b/w femur & patella

Ligaments –

1. Fibrous capsule
2. Ligamentum patellae
3. Tibial collateral ligament
4. Fibular collateral
5. Oblique popliteal ligament
6. Arcuate popliteal ligament
7. Meniscus
8. Cruciate ligament
9. Transverse ligament

Ligament description –

Fibrous capsule – Thin & deficient anteriorly

- Replace by – quadriceps femoris

Ligamentum patellae

- Femoral attachment -

Ant – deficient

Post – intercondylar line

- Tibial attachment -

Ant - tibial tuberosity

Post – intercondylar ridge

Ligamentum patellae –

- central portion of common tendon.
- Above – posterior surface of patellae
- Below - tibial tuberosity

Tibial collateral ligament –

- Long band of great strength
- Attachment –
- superior – Medial epicondyle shaft of femur
- inferior - divided into ant. & post. part
- Ant. Part – tibial shaft (medial part)
- post part - tibia (medial condyle)

fibular collateral –

- superior – lateral epicondyle of femur
- inferior - Head of fibula

oblique popliteal ligament –

- tendon of semi membranous
- attachment –
intercondylar line & femur lateral condyle

arcuate popliteal ligament –

extend backward from fibula head to post. Border of intercondylar area of tibia .

Meniscus –

02 fibrous cartilaginous disc = lateral & medial meniscus

Cruciate ligament – very thick & strong fibrous band

- Divided into 02 -
- Ant cruciate ligament.
- Post. Cruciate ligament.

Ant cruciate – ant. Intracondylar area  lateral condyle of femur

Post cruciate – post. Intercondylar area  medial condyle of femur

Transverse ligament –

connects – ant. End of meniscus (lateral & medial)

Relations –

Anterior – Ant. Bursae

Ligamentum patellae.

Patellar plexus of nerves

Posterior –

1. Middle – popliteal vessels , tibial nerve

2. Posterolaterally – gastrocnemius

Plantaris

Common peroneal nerve

3. Posteromedially – gastrocnemius

Semi- tendinosus

Semi membranousus

Gracilis

Popliteus

Medially

- sartorius

Gracilis

Semi tendinosus

Saphenous nerve + vein

Semi membranousus

Laterally

- biceps femoris , popliteus origin

blood supply –

1. 05 genicular branch of popliteal artery.
2. Descending genicular branch
3. Lateral circumflex artery
4. 02 recurrent branch of ant. Tibial artery
5. Circumflex fibular branch of post. Tibial artery.

Nerve supply –

1. Femoral nerve
2. Sciatic nerve through genicular branch
3. Peroneal nerves
4. Obturator nerve -----post . division

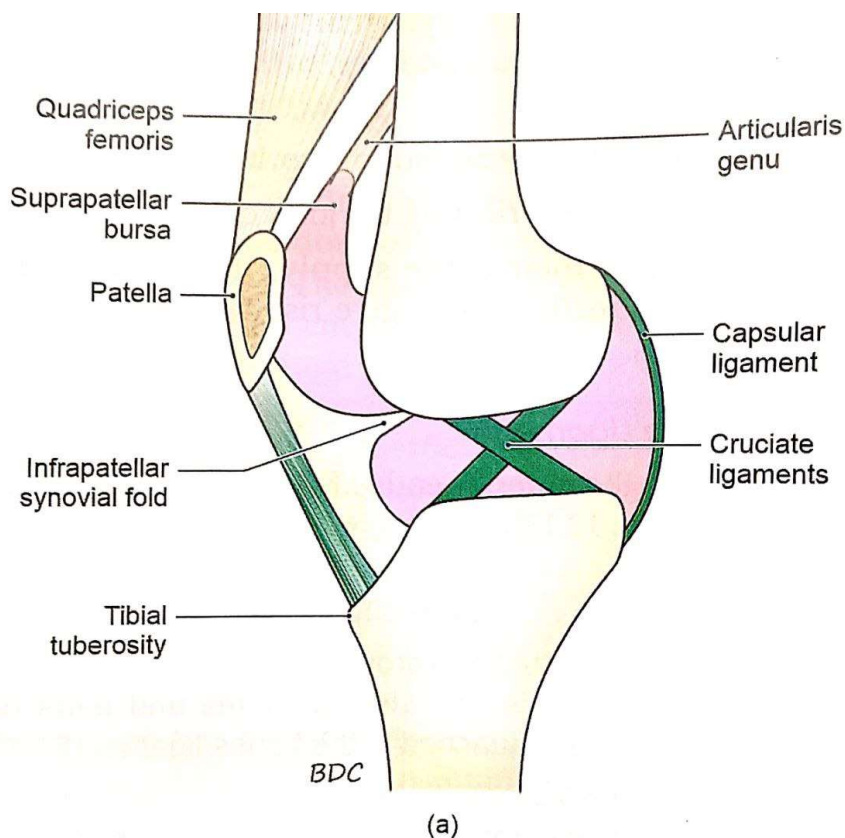
Movements –

1. Extension – quadriceps femoris
2. Flexion -
biceps femoris
semi tendinous
semi membranous
3. Medial rotation – semi- mem. & semi tendinous.
4. Lateral rotation - biceps femoris

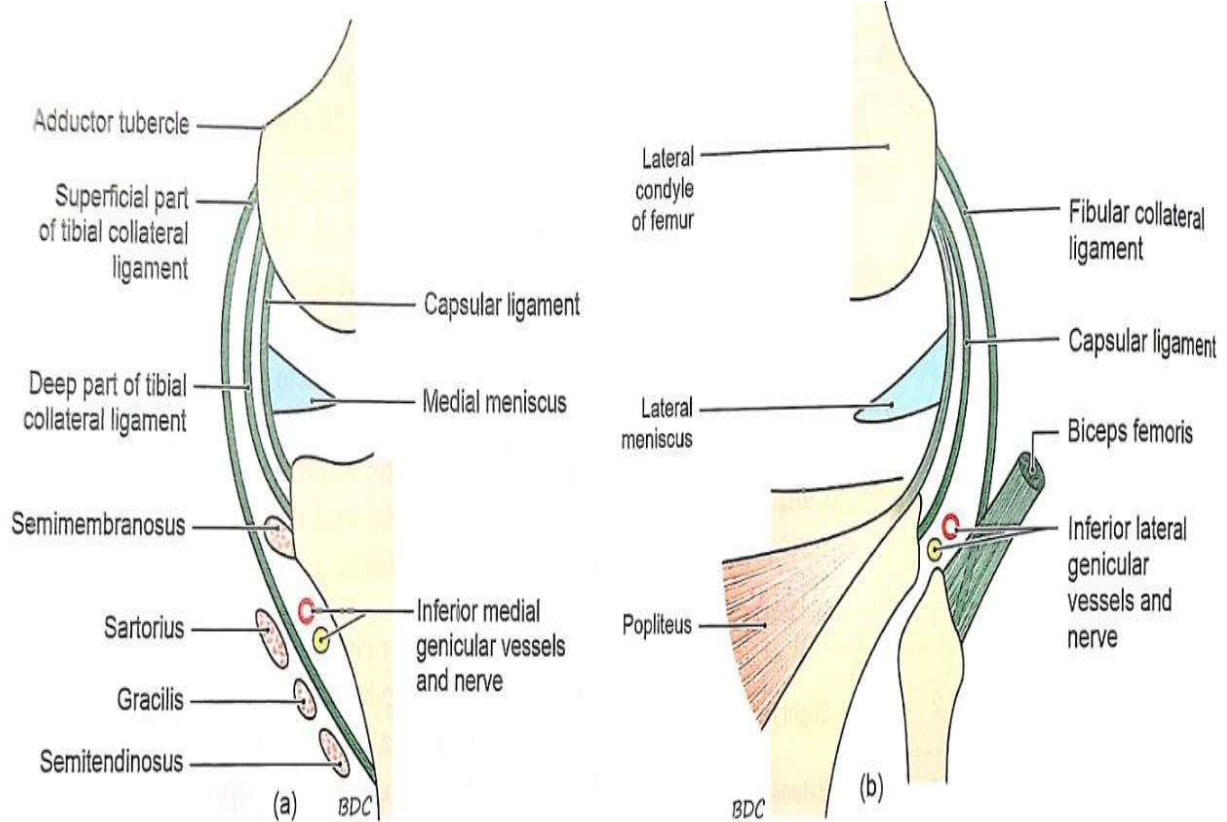
Locking – vastus medialis ----- unlocking – popliteus

Applied anatomy –

1. Osteo arthritis
2. Deformities of knee
3. Disease of knee
4. Injuries of menisci
5. Injuries to cruciate ligament
6. Injuries to collateral ligaments
7. semi membraneous bursitis
8. bakers cyst



Figs 12.12a to c: Sagittal section through the knee joint of right side : synovial membrane (note the cruciate ligaments)



Figs 12.11a and b: Collateral ligaments: (a) Tibial; (b) Fibular

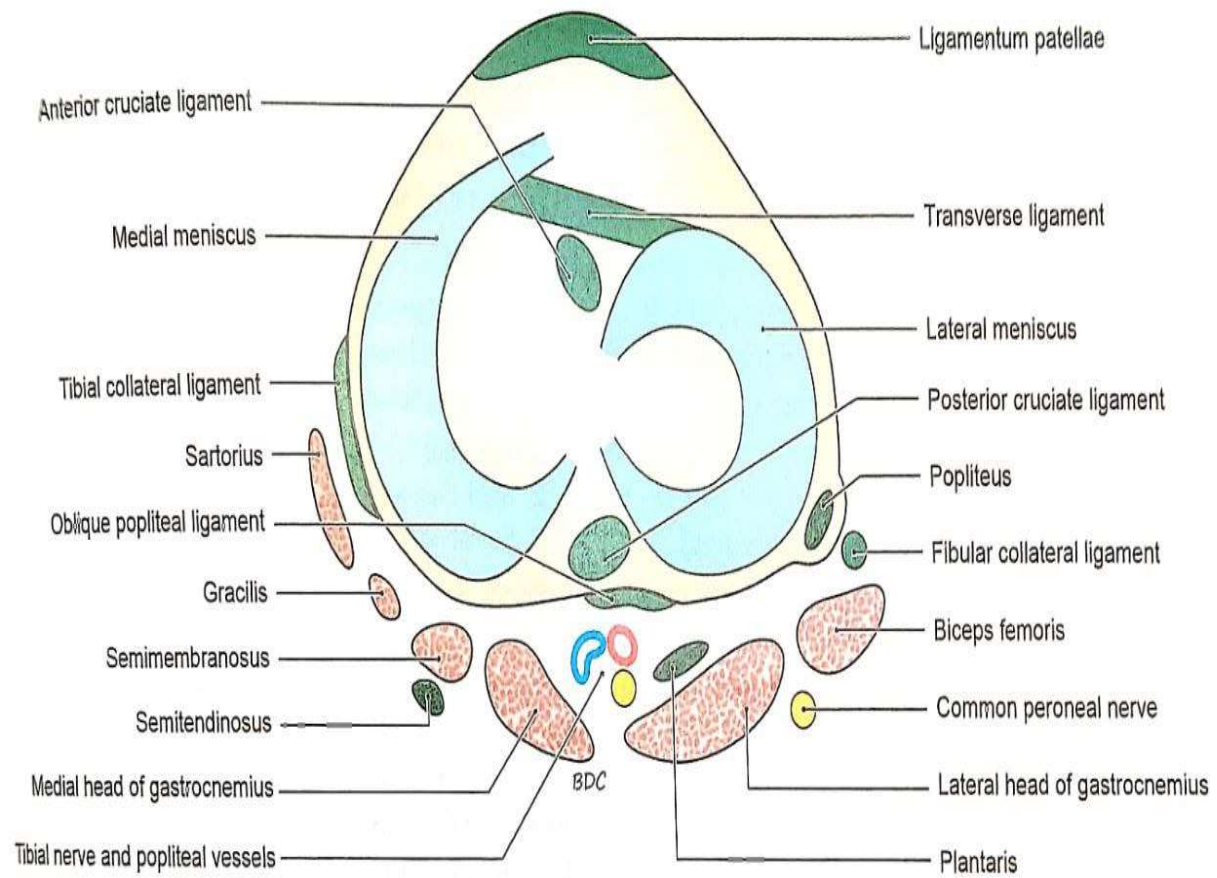
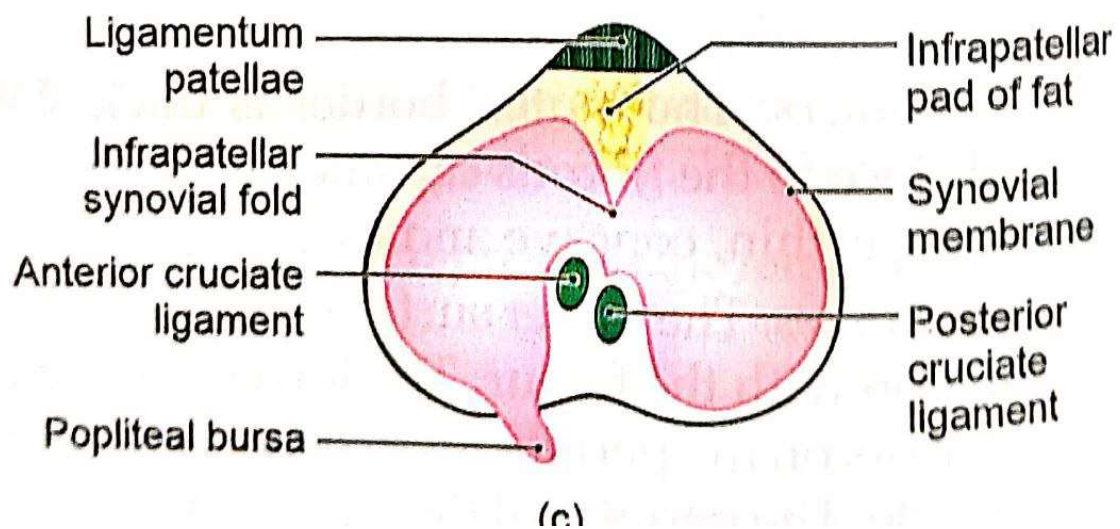
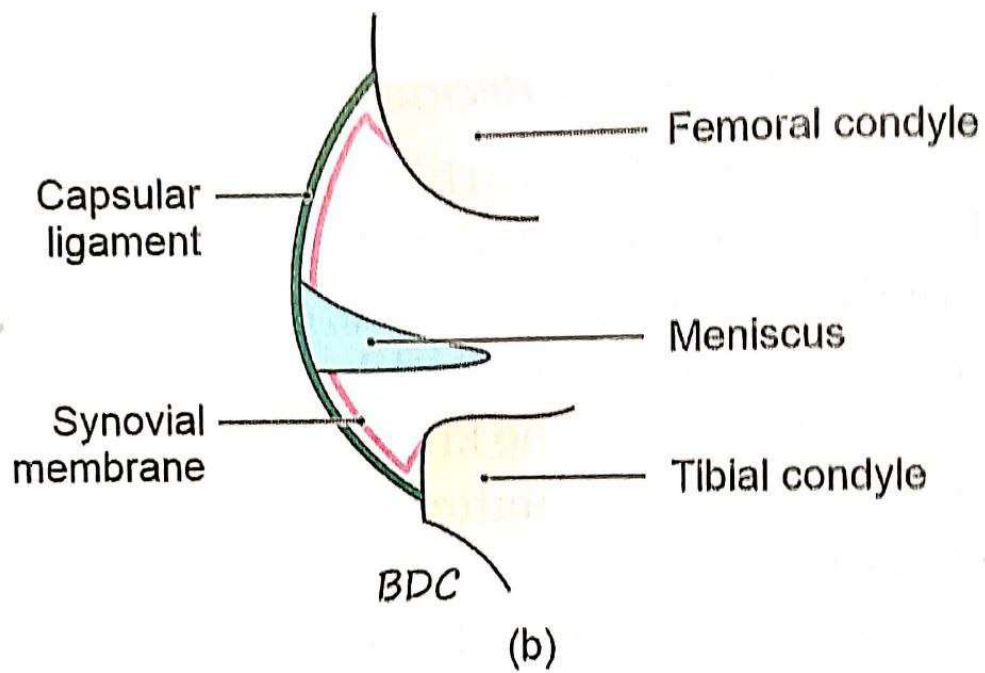


Fig. 12.13: Transverse section through the right knee joint showing the relations



Locking & unlocking of knee joint –

Mechanism that allow the knee to remain in the position of full extension without muscular effort .

Locking occur –

Medial rotation of femur -----at last stage of extension.

Diameter of lateral femoral condyle less than medial condyle

Lateral condyle articulation in extension.

Medial condyle remain unused

Locking produced by extensor muscle -----quadriceps femoris

Unlock – reverse of locking – by lateral rotation of femur

Unlock caused -----by popliteus muscle.

Larynx

Larynx is the organ for production of voice or phonation
Also called the sound box.

-It's air passage and act as sphincter at inlet of lower respiratory passages.

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Situation:

- Lie in - Ant. Midline of neck
- Extending -Root of tongue to trachea
- Extend from epiglottis above to the lower border of cricoid cartilage.

In adult male: C3- C6 vertebrae

In adult female: C1-C4

#Length:

Male- 44mm

Female- 36mm

Cartilage of Larynx:

- i) Unpaired cartilages
- ii) Paired cartilages

Unpaired Cartilages:

T- Thyroid (shield like)

C- Cricoid (ring like)

E- Epiglottis (leaf like)

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Paired Cartilages:

A- Arytenoid (Cup shaped)

C- Corniculate (Horn shaped)

C- Cuneiform (Wedge shape)

Membranes of Larynx

i) Extrinsic ii) Intrinsic

1. Thyrohyoid membrane :

- Extrinsic membrane
- connects thyroid cartilage to hyoid bone
- medial and lateral parts thickened

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2. Fibroelastic membrane:

- intrinsic membrane
- outside mucous membrane of larynx
- divides into two parts
- above sinus: quadrate membrane
- below sinus :conus elasticus

#Constitution of larynx (Internal features)

- Cartilages
- Laryngeal joints
 - Cricothyroid
 - Cricoarytenoid

1. *Cricothyroid*: -synovial joint

- permits two movements
- the rotatory movement (transverse axis)
- gliding movements (all directions)

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2. *Cricoarytenoid*: -synovial joint

- lamina of cricoid cartilage
- permits movements
 - i) Rotatory vertical axis ii) Gliding (all directions)

Ligaments of larynx

Extrinsic ligaments are :

1. Lateral thyrohyoid ligament
2. Median thyrohyoid ligament,
3. Hyoepiglottic ligament,
4. Cricotracheal ligament

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1. *LTL* - originate from thyrohyoid membrane
2. *MTL*- single ligament,
-originates from thyrohyoid membrane
3. *HGL*- epiglottic cartilage to hyoid bone
4. *Cricotracheal ligament, CTL* -Major intrinsic ligament
 - Aryepiglottic fold
 - Vestibular fold
 - Vocal fold

Muscles movement

i) Elevation-Thyrohyoid, Mylohyoid,

ii) Depression- Sternothyroid, Sternohyoid

iii)Opening inlet- Thyroepiglottic

iv)Closing inlet- Aryepiglottic

v)Abductor - Cricorarytenoid(Post.)

vi)Adductor - Cricorarytenoid(Lateral)

vii)Modulation - Oblique arytenoid, Cricothyroid

viii)Relaxation - Thyroarytenoid, Vocalis

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Blood supply: Superior laryngeal artery/ vein

Inferior laryngeal artery /vein

#Nerve supply:

(Motor) -Recurrent laryngeal nerve

-External laryngeal nerve

(Sensory) - Internal laryngeal nerve

- Recurrent laryngeal nerve

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#Clinical Anatomy: -Laryngeal cancer

-Laryngitis

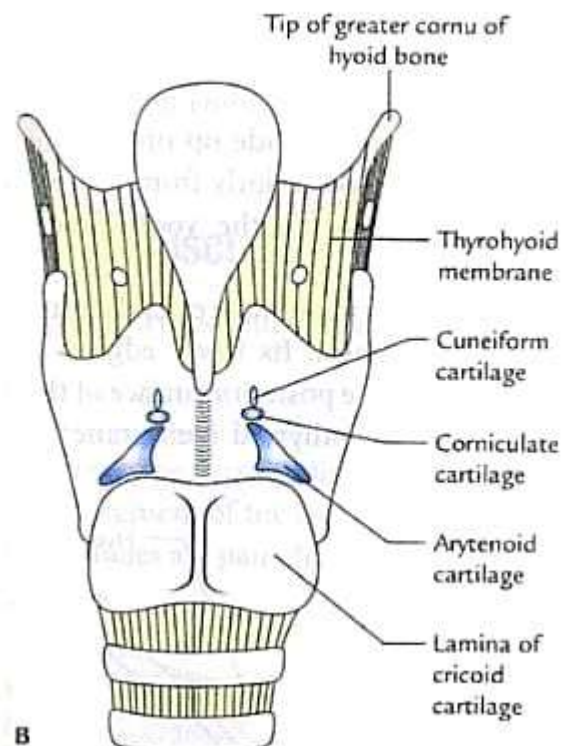
-Spasmodic dysphonia (Vocal cord
Spasm)

#Cartilages of Lateral wall of nose

- Sup. Nasal Cartilage
- Inf. Nasal Cartilage
- 3 to 4 small ala cartilages

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A. CARTILAGE



B. INTERNAL FEATURES

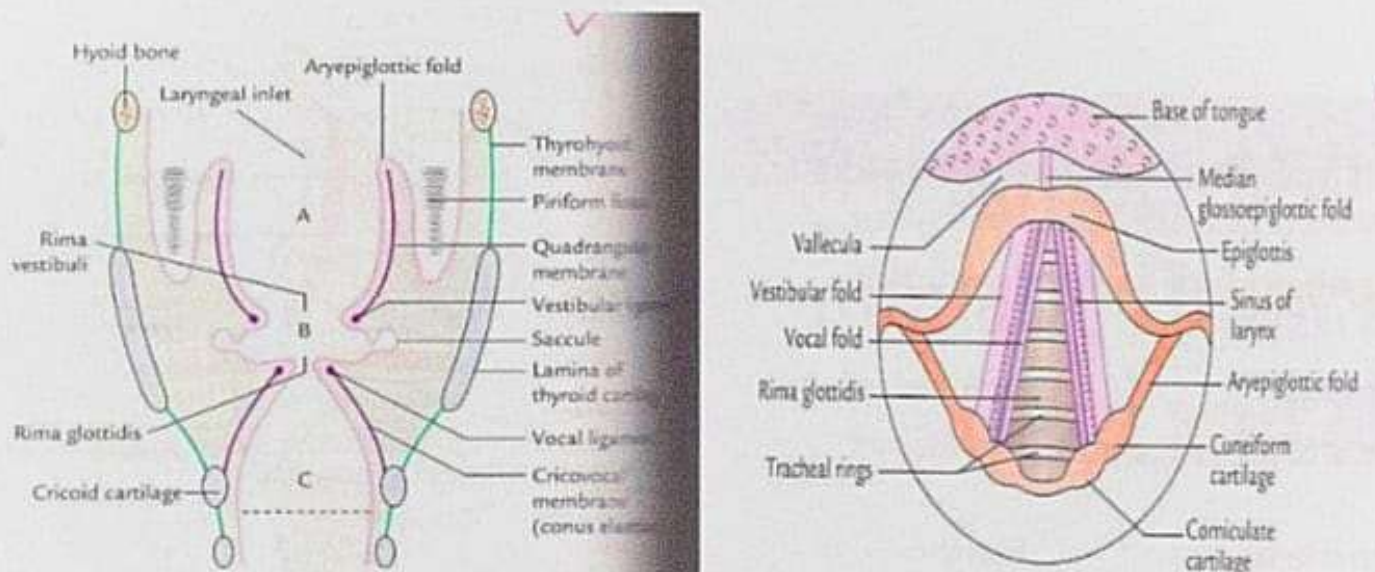
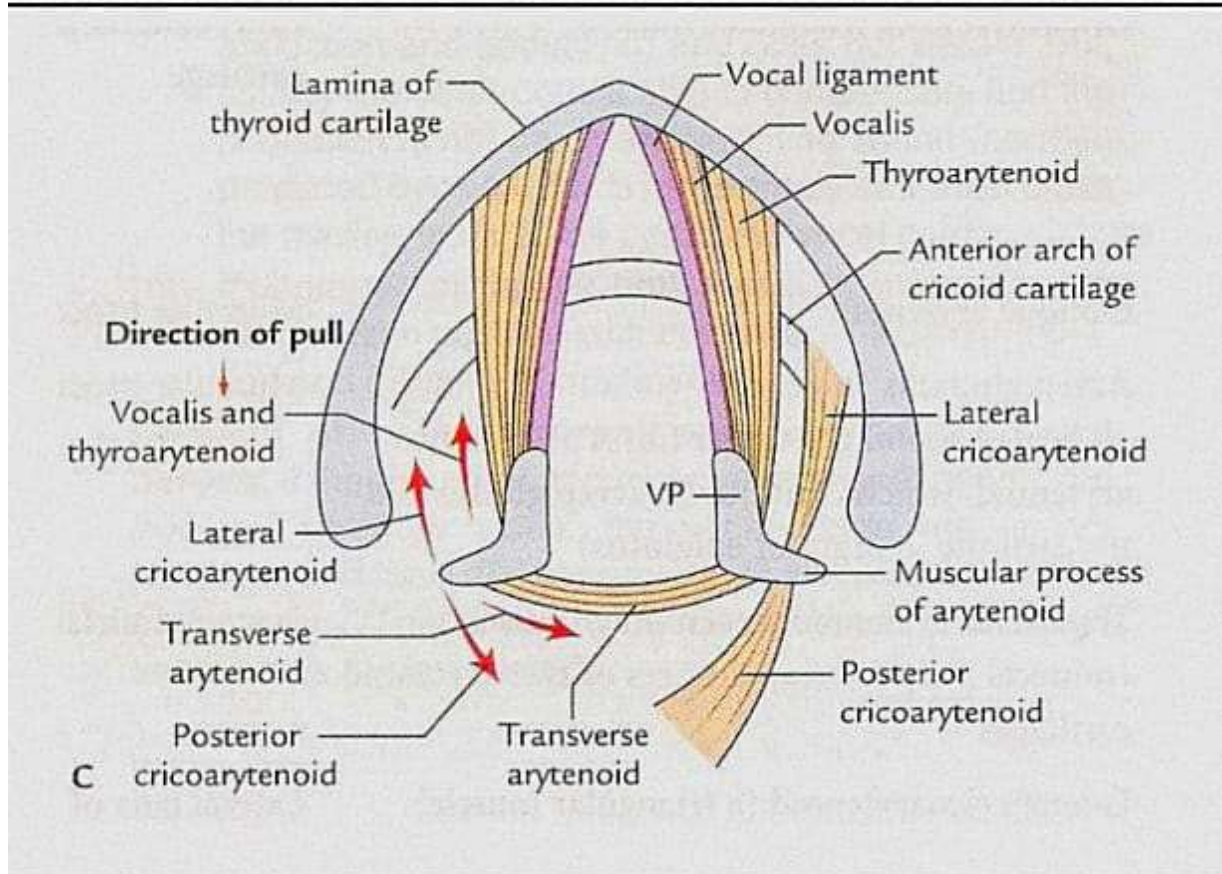


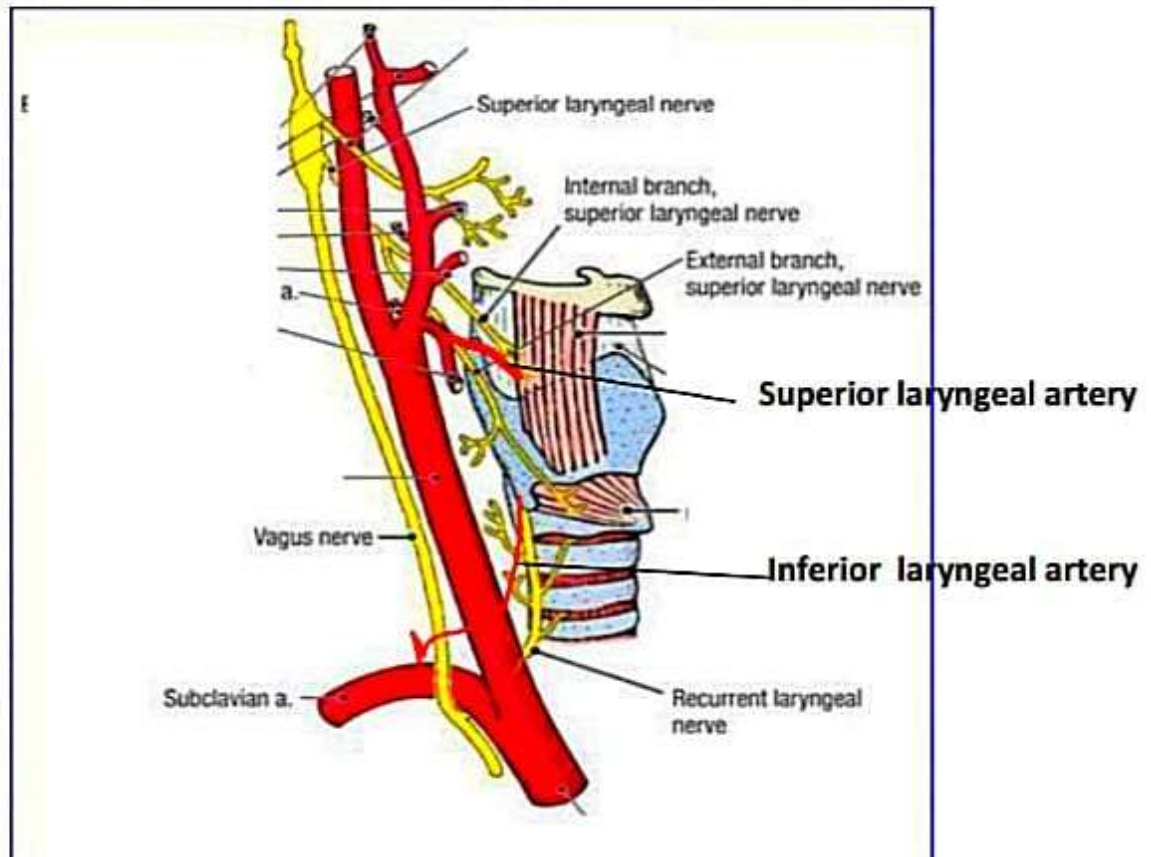
Fig. 15.10 Coronal section of the laryngeal cavity showing its subdivisions. A=vestibule, B=ventricle of the larynx, C=infraglottic compartment.

C. MUSCLES



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D. BLOOD AND NERVE SUPPLY



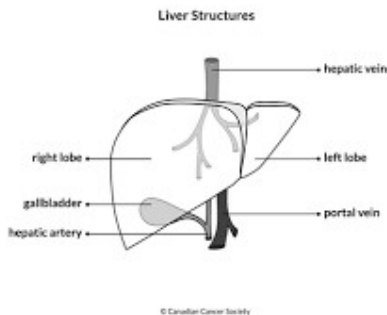
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Ref. BDC HUMAN ANATOMY 9th Edition, VOLUME 3,
Page 282

LIVER

sd Anatomy notes

- It is one of the metabolic organs.
- It is the largest gland of the human body.
- Located in the diaphragm and has also occupied the right hypochondrium.
- Extend up to the left hypochondrium.
- Almost covered by the peritoneum.
- Mostly covered by the ribs and coastal cartilage.



FEATURES

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- WEIGHT – 1-1.5 KG
- MALES - 1600 GM
- FEMALES – 1300 GM

SHAPE – Wedge

Surface

1. Anterior
2. Posterior
3. Superior
4. Inferior
5. Right

LOBES

1. Right
2. Left
3. Caudate
4. Quadrate

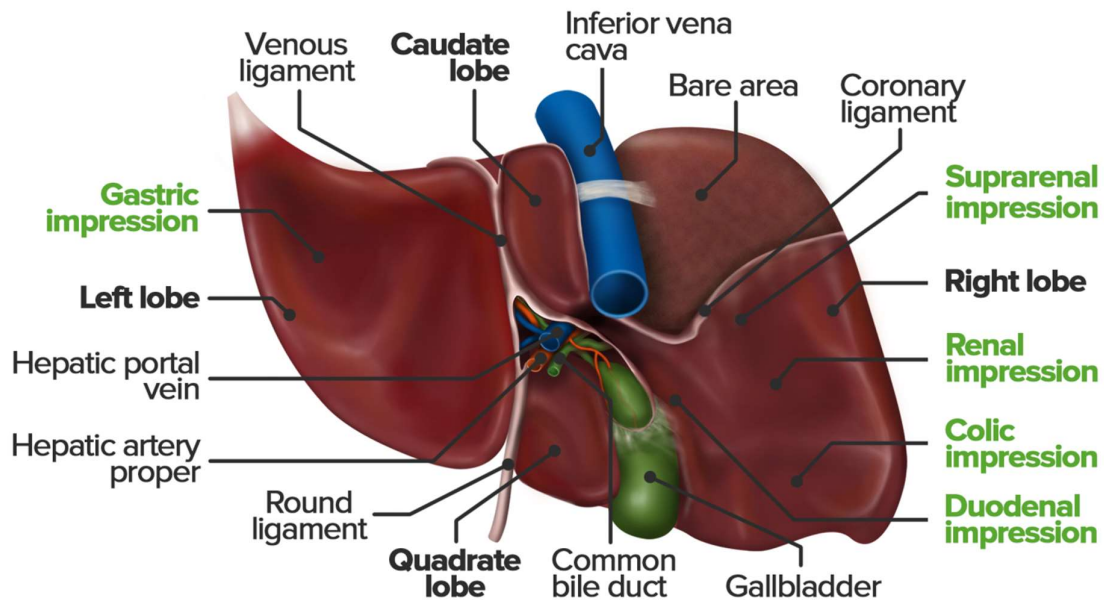
LIGAMENTUN VENOSUM

- Present in between the groove of IVC and tissues.
- Caudate lobe lies on the posterior surface.
- Quadrate lobe lies in the inferior surface.

PERITONEAL RELATIONS

- 1 bare area.
- Groove of IVC.
- Gall bladder Forssa.
- Coronary ligament.

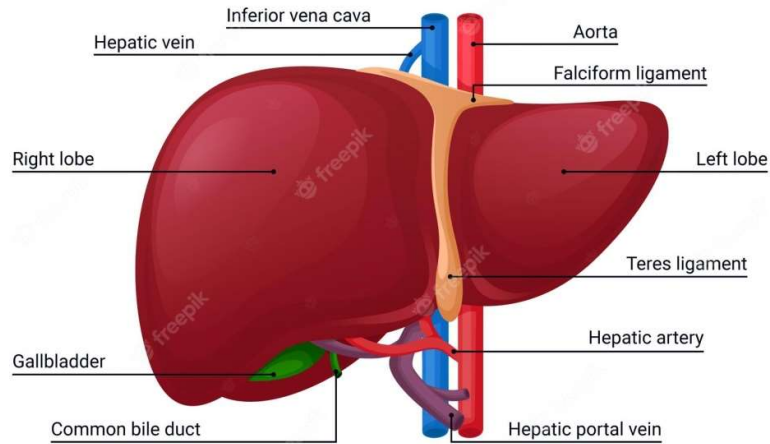
SD ANATOMY NOTES



Visceral relation –

- Anterior surface – related to xiphoid process
- Diaphragm on each side – separate pleura & lungs
- Posterior surface – is triangular – bare area – right suprarenal groove for IVC
- Inferior surface – gastric impression
- Right surface – quadrilateral & convex
- Superior surface – quadrilateral & concavity in middle

Anatomy of human liver



LIGAMENTS OF THE LIVER

- There are 5 types of ligaments.
- 1. Falciform ligament.
- 2. Left ligament.
- 3. Right ligament.
- 4. Coronary ligament.
- 5. Lesser omentum.

SD ANATOMY NOTES

1. FALCIFORM LIGAMENT

- Connecting Anterosuperior to anterior abdominal wall.

2. LEFT LIGAMENT

- Superior surface to diaphragm.

3. RIGHT LIGAMENT

- Posterior surface to diaphragm.

4. CORONARY LIGAMENT.

- Bare area of liver.

5. LESSER OMENTUM

- Lips of portal hepatic.

FUNTIONS

- **Manufacture of bile salts.**
- **Emulsification of fats.**
- **Absorption of fats.**
- **Anti-coagulant heparin.**
- **Forms prothrobin, fibrin and aluminum.**
- **Contains enzymes.**
- **Absorbed nutrients.**
- **Stores glycogen, copper, iron.**
- **Stores vitamins A, D, E, and K.**
- **Activation of vitamin D.**
- **Released Bile Rubin, bilverdin.**

BLOOD SUPPLY

- **Liver received 20% blood supply.**
- **Hepatic artery.**
- **80% portal vein.**

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NERVE

- **Hepatic plexus.**
- **Sympathetic – derived from coelic plexus**
- **Para Sympathetic – derived from hepatic branch**

Hepatic segments –

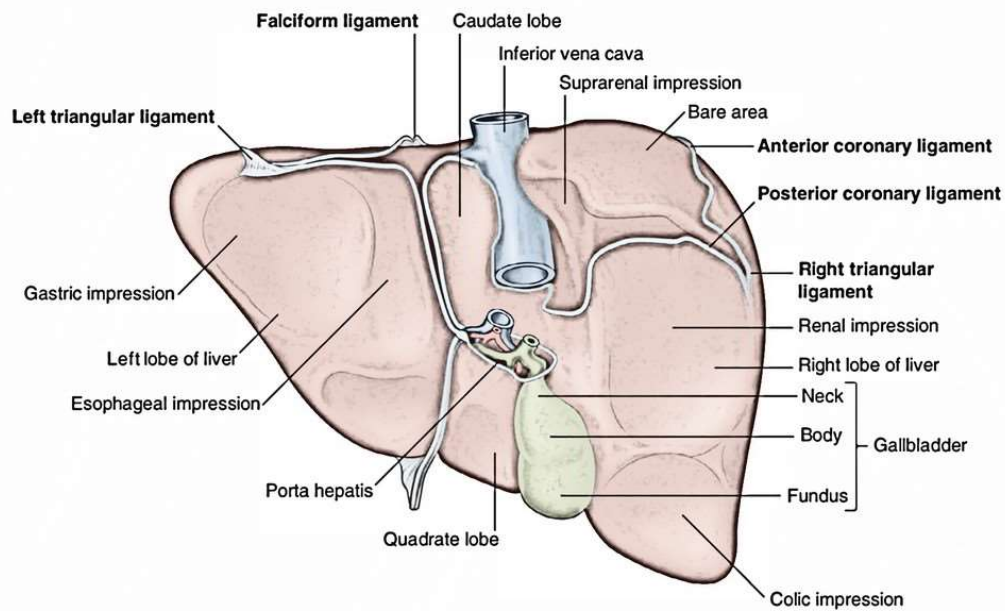
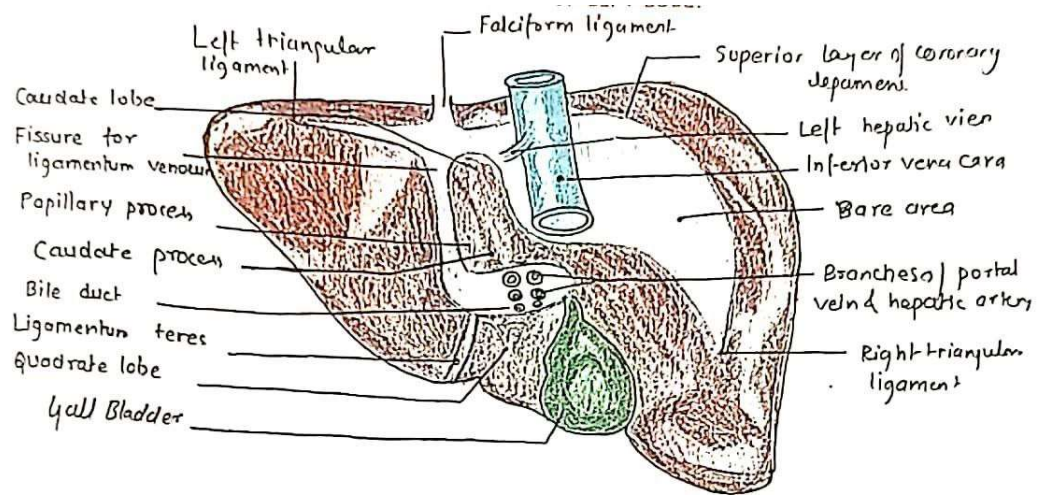
SD ANATOMY NOTES

Right lobe – divided into – anterior & posterior part

Left lobe - medial & lateral parts

Each parts divided into upper & lower part

Fissure for ligamentum teres & ligamentum venosum – make junction b/w medial & lateral segment of left lobe.



Inferior surface relations of liver

NEURAL TUBE FORMATION

- **Formation of the Neural Plate:**

- The process begins around the third week of embryonic development.
- The notochord induces the overlying ectoderm to thicken and form the neural plate.
- The neural plate is a flat, thickened region of ectoderm located along the dorsal midline of the embryo.

- **Shaping of the Neural Plate:**

- The edges of the neural plate elevate to form neural folds.
- The central region of the neural plate remains depressed, forming the neural groove.

- **Elevation of the Neural Folds:**

- The neural folds continue to elevate and move toward the midline.
- This movement creates a deeper neural groove.

- **Fusion of the Neural Folds:**

- The neural folds begin to fuse at the midline, starting in the cervical region (future neck area) and proceeding both cranially (toward the head) and caudally (toward the tail).
- The fusion of the neural folds converts the neural groove into a closed neural tube.

- **Closure of the Neural Tube:**

- The neural tube closes progressively from the center of the embryo outward, leaving two openings at the ends called the anterior (rostral) and posterior (caudal) neuropores.
- The anterior neuropore closes around day 25, and the posterior neuropore closes around day 27.

- **Differentiation of Neural Tube:**

- After closure, the neural tube differentiates into various regions that will form the brain and spinal cord.
- The cranial end of the neural tube expands and differentiates into the primary brain vesicles: the prosencephalon (forebrain), mesencephalon (midbrain), and rhombencephalon (hindbrain).
- The caudal portion of the neural tube forms the spinal cord.

- **Formation of Neural Crest Cells:**

- Cells at the edges of the neural folds, known as neural crest cells, separate from the neural tube and migrate to various parts of the embryo.
- Neural crest cells give rise to a variety of structures, including peripheral neurons, glial cells, melanocytes, and facial cartilage.

NEURAL TUBE FORMATION

- **Development of Surrounding Structures:**

- The mesoderm surrounding the neural tube forms the vertebrae and muscles of the back.
- The surface ectoderm, which lies above the neural tube, becomes the skin.

- **Establishment of the Central Nervous System:**

- The closed neural tube eventually forms the central nervous system, with the brain developing from the cranial portion and the spinal cord developing from the caudal portion.

NOTOCHORD FORMATION

- **Primitive Streak Formation:** During the third week of embryonic development, the primitive streak forms on the surface of the epiblast, a layer of cells in the bilaminar embryonic disc.
- **Primitive Node Formation:** At the cranial end of the primitive streak, the primitive node (or Hensen's node) develops, which is essential for the formation of the notochord.
- **Invagination of Epiblast Cells:** Cells from the epiblast migrate toward the primitive streak, invaginate, and move inward. Some of these cells displace the hypoblast and create the endoderm.
- **Mesoderm Formation:** Other invaginated cells move between the epiblast and the newly formed endoderm to form the intraembryonic mesoderm.
- **Notochordal Process Formation:** Cells that migrate cranially from the primitive node form a tube-like structure called the notochordal process, which extends cranially between the ectoderm and the endoderm.
- **Notochordal Plate Formation:** The floor of the notochordal process fuses with the underlying endoderm, and the cells intercalate with the endoderm to form the notochordal plate.
- **Notochord Formation:** The notochordal plate detaches from the endoderm and rolls up into a rod-like structure called the notochord. This process involves the folding of the notochordal plate into a tube, which becomes the definitive notochord.
- **Final Positioning:** The notochord lies in the midline between the ectoderm and the endoderm and extends from the primitive node to the prechordal plate, which is located cranially.
- **Signaling Role:** The notochord plays a crucial signaling role, inducing the formation of the neural tube and influencing the development of surrounding tissues, including the vertebral column.
- **Degeneration:** In humans, much of the notochord degenerates and is replaced by the vertebral column, although remnants of the notochord persist as the nucleus pulposus within the intervertebral discs.

OESOPHAGUS

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- It is a narrow muscular tube.
- Lies behind the trachea.
- About 23 – 25 cm long.
- Begins at the end of the larynx/pharynx.
- Passes through the mediastinum.
- It starts from at the level of 6th cervical vertebrae
- At the level of T10.

STRUCTURE

There are 4 layers of esophagus:

MUSOCA	SUBMUSOCA	MUSCULARIS	CONNECTIVE
--------	-----------	------------	------------

MUSOCA

- Non keratinized stratified
- Lamina propria.

SUBMUCOSA

- Contains secretory glands.
- Blood vessels.

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MUSCULARIS

- Upper 3rd is striated.
- Middle 3rd is striated.
- Lower 3rd is smooth,

CONNECTIVE

- OUTER – loose connective tissue
- Contains capillaries
- Does not produce digestive enzymes
- Secretes muscular
- Transport food to the stomach
- Called upper esophageal sphincters
- Involuntary muscular movement called peristalsis

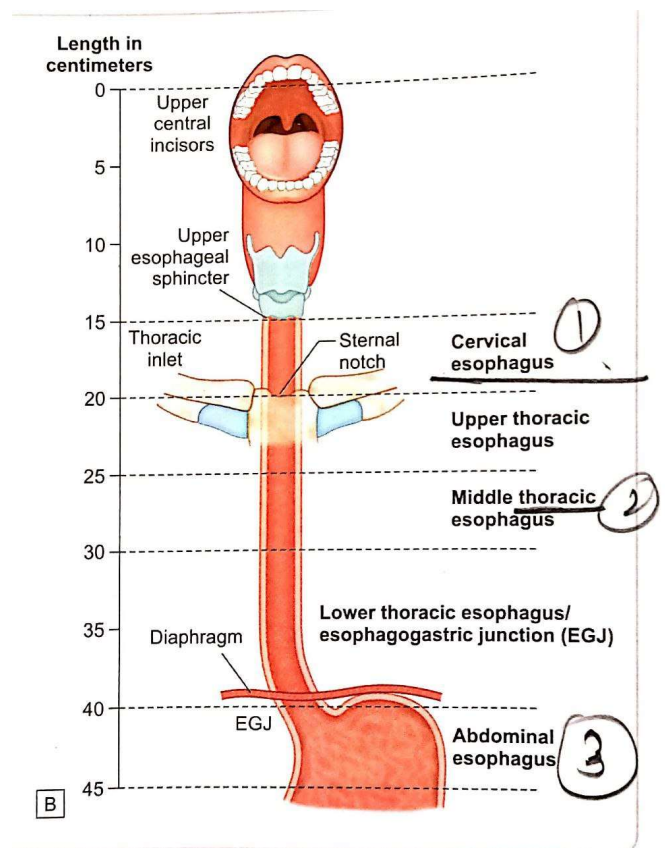
Parts of esophagus –

1.cervical esophagus

2.thoracic esophagus

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3.abdominal esophagus



CONSTRICTION

- At its starting
- Cross of the aortic arch
- At the diaphragm

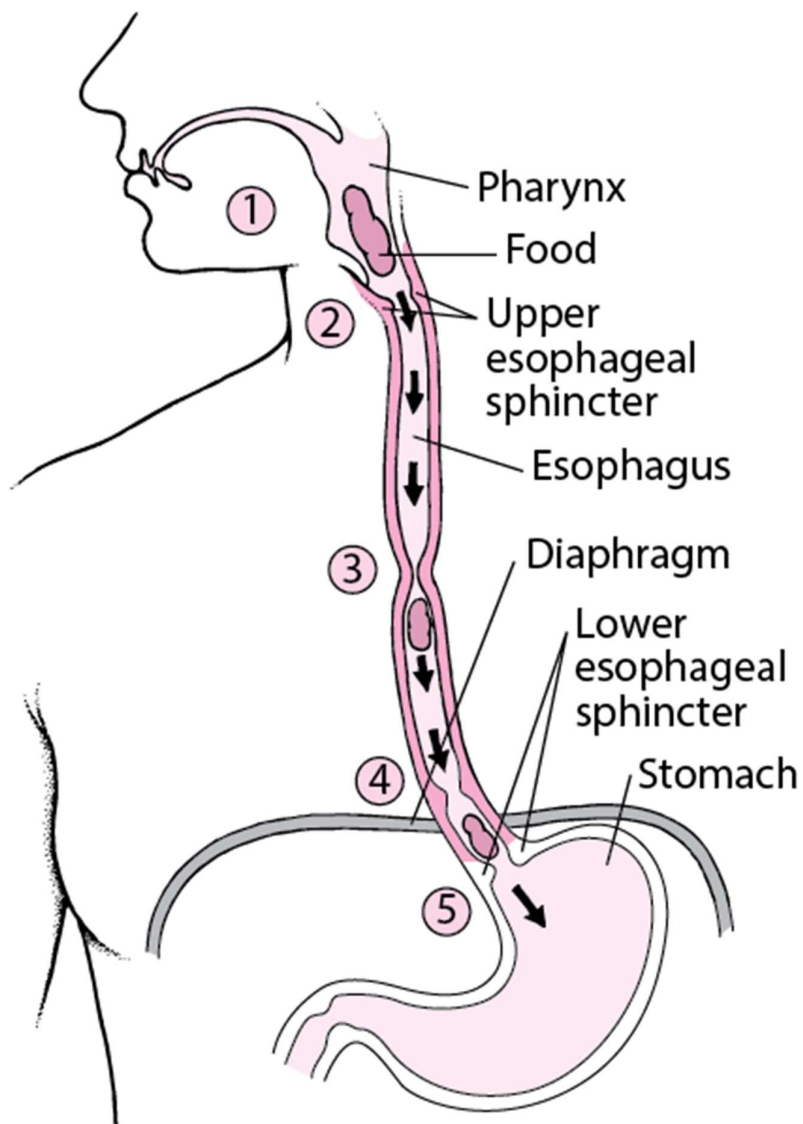
- Cross by the left branches

BLOOD SUPPLY

- Branches of aortic
- Branches of gastric artery
- Branches of thyroid artery

N.S.

PARASYMPASTHETIC	SYMPATHETIC
1. Laryngeal	1. Cervical ganglia
2. Esophageal	2. Thoracic ganglia



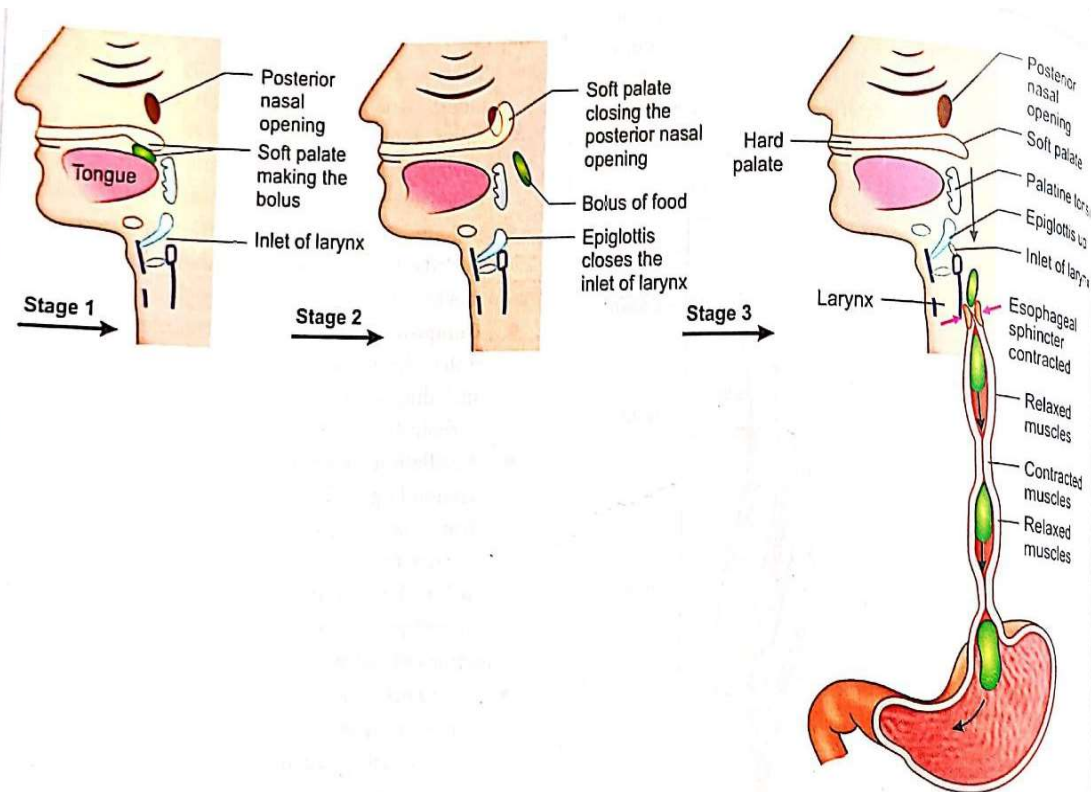


Fig. 6.10: Mechanism of deglutition (swallowing).

Stage 1. Bolus of food made by the soft palate.

Stage 2. Bolus lies in oropharynx; posterior nasal opening and inlet of larynx closed.

Stage 3. Bolus has nowhere to go, it passes into laryngopharynx and esophagus.

PANCREAS

- It is partly exocrine and partly endocrine gland.
- Secretes hormones like:
 - Exocrine secrets – pancreatic juice
 - Endocrine secrets – hormone like – insuline
- It is a soft organ.
- 15 – 20 cm long.
- 2 – 3 cm broad.
- 1 – 2 cm thick.
- 90 gm. weight.
- Lies transversely posterior abdominal wall.
- Entire organ lies posterior to stomach
- Level of L1 – L2 Vertebrate.

Sd anatomy notes

- Pancreas link with duodenum through duct.
- Pancreatic duct lies in posterior surface.
- Begins at the tail.
- Runs towards the neck and bends at the neck.
- Head of the pancreas direct related to bile duct.
- Ducts enter into the second part of the duodenum.
- Joins the hepatopancreatic ampulla.
- Ampulla opens in the second part of duodenum.

PANCREAS IS DIVIDED INTO 4 PARTS

HEAD	NECK	BODY	TAIL
-------------	-------------	-------------	-------------

1. HEAD

- It is expanded portion.
- Lies in the cavity of duodenum.
- External features –
- 03 borders – superior , inferior , right lateral
- 02 surfaces – anterior & posterior
- One process – uncinata process

Relations – border – superior – overlapped by 1st part of duodenum

Inferior - 3rd Part of duodenum

Right border – 3rd part of duodenum

Surface- anterior – 1st part of duodenum

Posterior – inferior vena cava

Renal vein

Right crus of diaphragm

Uncinate process - superior mesenteric vessel

2. NECK

- Slightly constricted part.

3. BODY

- Extends from the neck tail.
- It has 3 borders
- There is projection like called tuber omental.

4. TAIL

- Narrow terminal part.
- Lies at lienorenal ligament.

- It has two types of cells

CULTURES OF EPITHELIAL CELL	ISLETS OF LANGERHANS
-----------------------------	----------------------

- Consist of cells – alpha 1 & alpha 2 , f cells , beta cells , delta cells
- Secrets

Pancreatic gastrin	Serotonin	Glucagon
--------------------	-----------	----------

- Produce insulin.
- The exocrine part is serous gland cells acne.
- Secrets digestive enzymes called pancreatic juice.

Sd anatomy notes

FUNCTIONS – DIGESTIVE ENZYMES CONTAINS

- Trypsine
- Lipase
- Amylase
- Peptides
- Glucagon

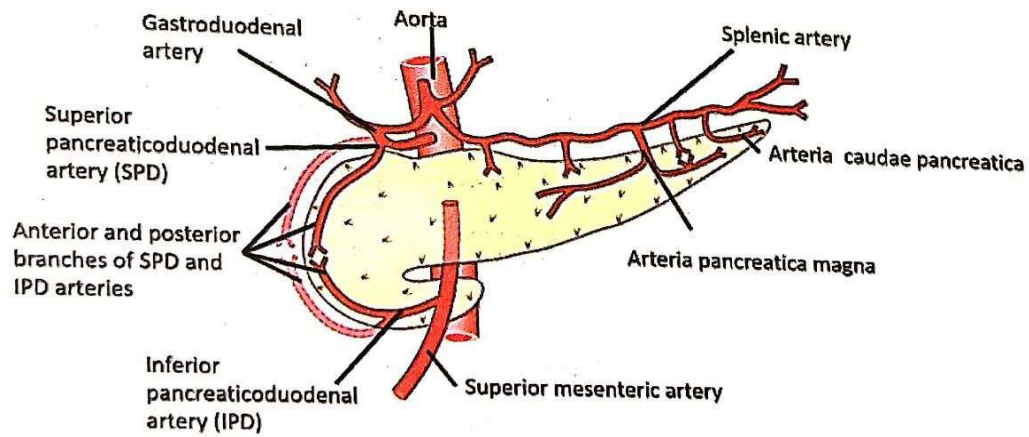
Ducts of pancreas – 02 ducts –

1. Main pancreatic duct
2. Accessory pancreatic duct

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1. Main pancreatic duct – 3mm in diameter
2. Lie near posterior surface of pancrease
3. Begins at tail , run towards right & bend at neck downwards
4. 02 ducts enters the wall of 2nd part of duodenum
5. Join and form hepato pancreatic **ampulla of vater**.

Arterial supply diagram -



Arterial supply –

Mainly by – pancreatic branches of splenic artery

Superior pancreatico duodenal artery

Inferior pancreatico duodenal artery

Venous supply –

Splenic vein

Superior mesenteric vein

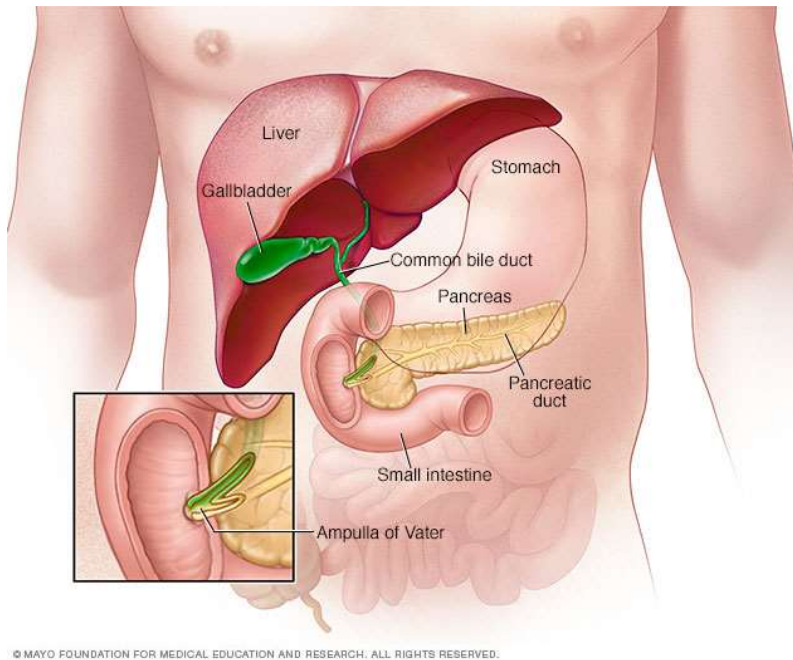
Portal vein

NERVE SUPPLY

- Para sympathetic – Vagus nerve
- Sympathetic – Splenic nerve

Important terminologies –

1. **Ampulla of vater**
2. **Sphincter of oddi**

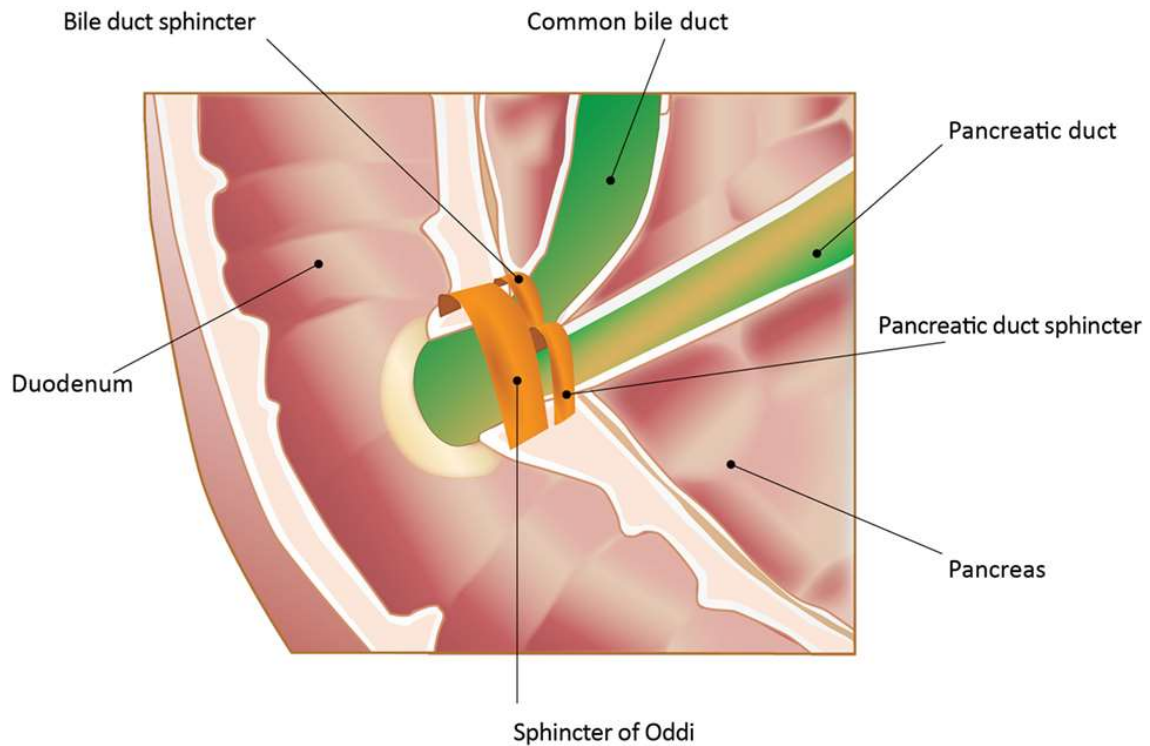


The ampulla of Vater is located where your bile duct and pancreatic duct join and empty into your small intestine.

Ampullary cancer forms near many other parts of the digestive system, such as the liver, pancreas and small intestine. When ampullary cancer grows, it may affect these other organs.

SPHINCTER OF ODDI -

The sphincter of Oddi is a muscular valve responsible for controlling the flow of bile and pancreatic secretions through the ampulla of Vater into the second part of the duodenum.



PAROTID GLAND

- INTRODUCTION: -Largest Salivary Gland
-Weight 25g
- SITUATION: - Below external Acoustic Meatus
- B/w Ramus of Mandible and Sternocleido Mastoid
-Anteriorly: overlap – Masseter Muscle
- CAPSULE: -Investing layer of deep cervical fascia
- Form capsule for gland.
- Supplied By Auricular Nerve
-Deep Lamina -Thin
-Attached-tympani Plate
-Portion of deep Lamina B/W Styloid process and mandible is thicker

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External features

- 3 side Pyramid
- Apex-downward

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- 4 Surfaces : -Superior
-Superficial
-Anteromedial
-Posteromedial.
- 3 Borders: -Anterior
-Posterior
-Medial

Relations

- Apex
 - Post. Belly diagastric.
 - Cervical Branch of facial Nerve
 - Retro mandibular vein

Surfaces:

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i)Superior surface.

- Superficial Temporal vessel
- Auriculotemporal Nerve
- External Acoustic Meatus
- Posterior surface of TMT

ii)Superficial surface:

- Skin
- Superficial fascia
- Parotid fascia
- Deep parotid Lymph Node

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iii)Antero medial surface:

- Ramus of Mandible-Masseter
- Medial Pterygoid.
- Lateral surface of TMT

iv) Postero medial surface:

-Mastoid Process

-Styloid Process.

- **Borders:**

i) Anterior Border - Terminal Branch of facial
Nerve

-Parotid duct

-Transverse facial vessel

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ii) *Posterior border* separate: Superficial surface
to posteromedial
surface

iii) *Medial border* separate: Antero Medial to
posteromedial surface

Structure within parotid gland

#Arteries:

(i) ECA-->Enter Posteromedial Surface

(ii)Maxillary Artery leave-->

Anteromedial surface

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#Veins:

Retro mandibular vein --> Formed in gland with By STV + MV

-Lower part Anterior

-Posterior Division -->Emerge/Apex

Nerve Supply:

Branch - Temporal Branch

-Zygomatic Branch

Upper and Lower -Buccal Branch

-Marginal Mandibular Nerve

-Cervical Branch

Clinical Anatomy:

- Parotid Abscess
- Mixed Parotid Tumour
- Parotid calculi
- Viral parotitis

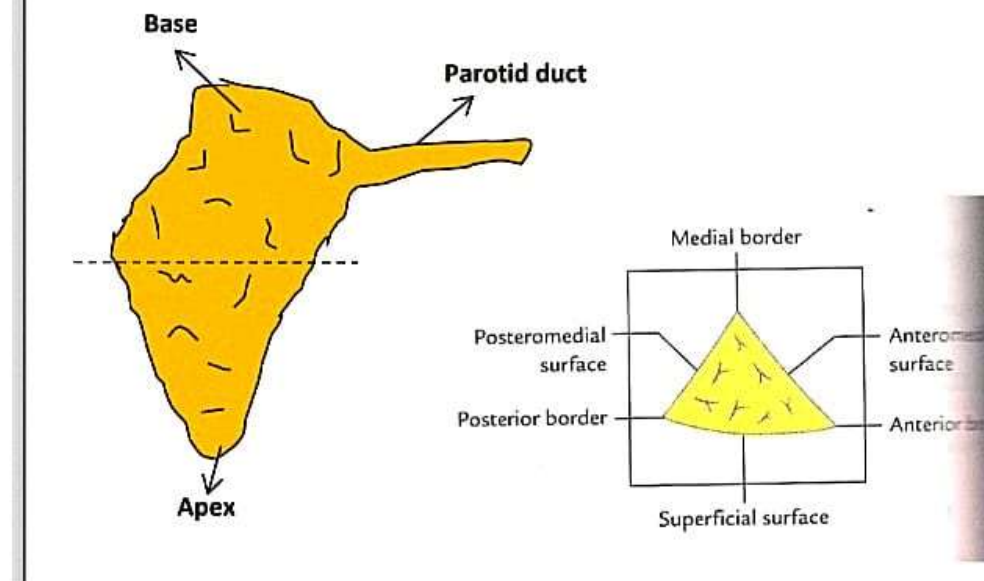
Parotid duct

- Upper 2nd Molar teeth
- Emerges, Middle of Anterior Border
- Pierce in - Buccinator Muscle
- Duct open- Vestibule of Mouth.

Secreto Motor

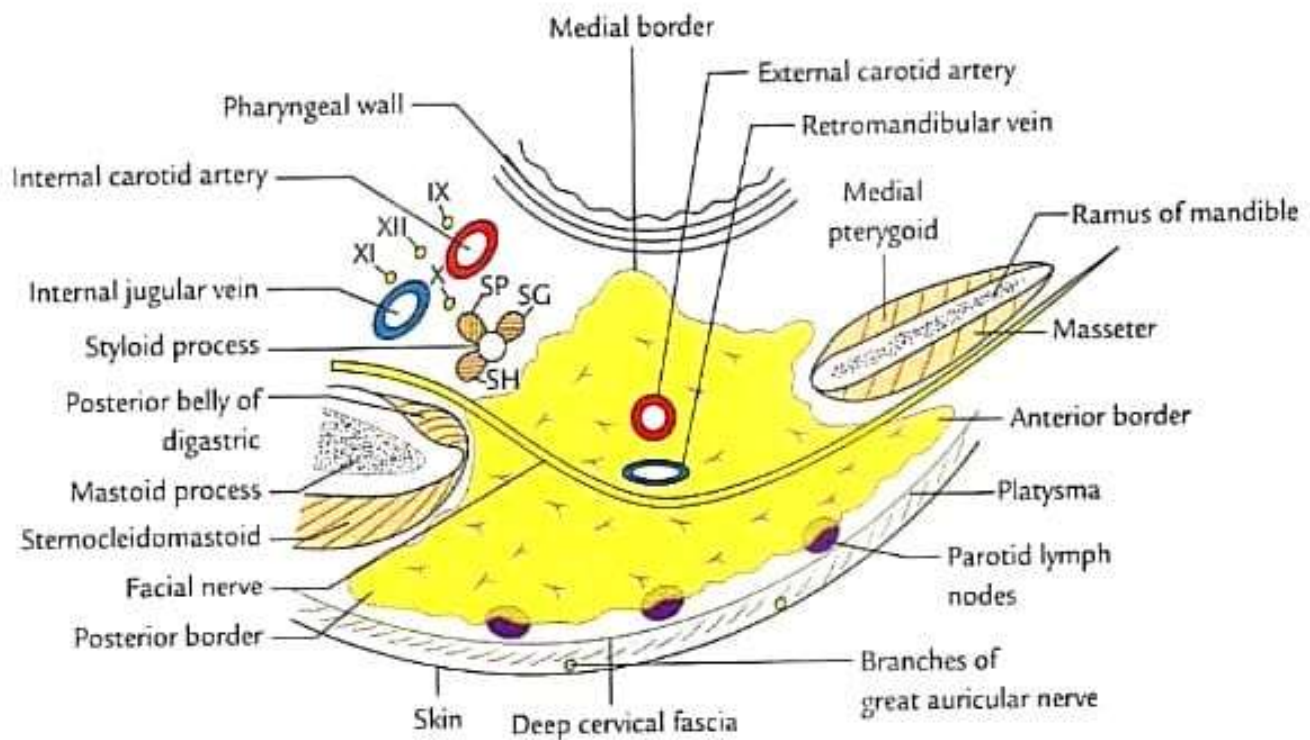
- Inferior Salivatory Nucleus
- Glossopharyngeal Nerve
- Tympanic Nerve
- Lesser Petrosal Nerve
- Otic ganglion
- Post ganglion fibre through Auriculotemporal Nerve

A. PARTS

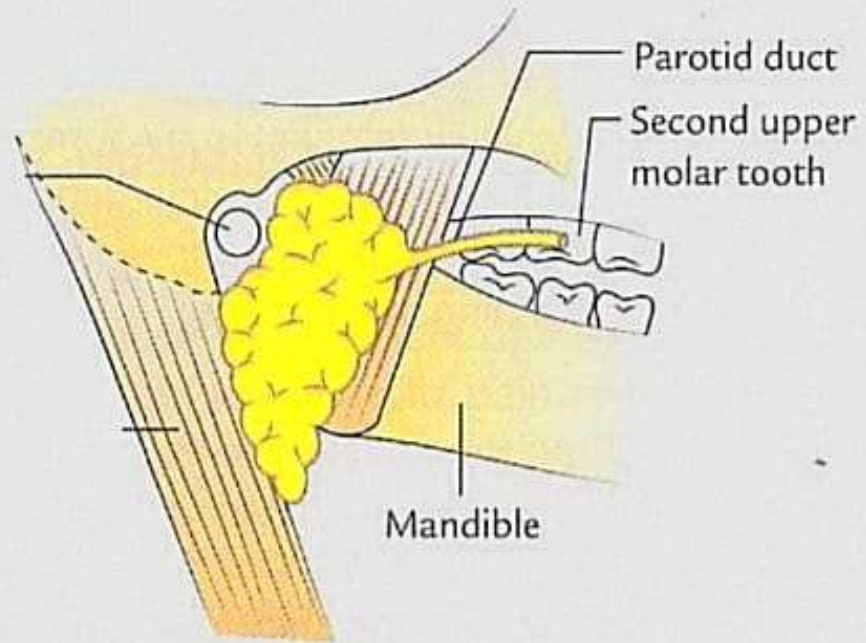


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B. RELATIONS

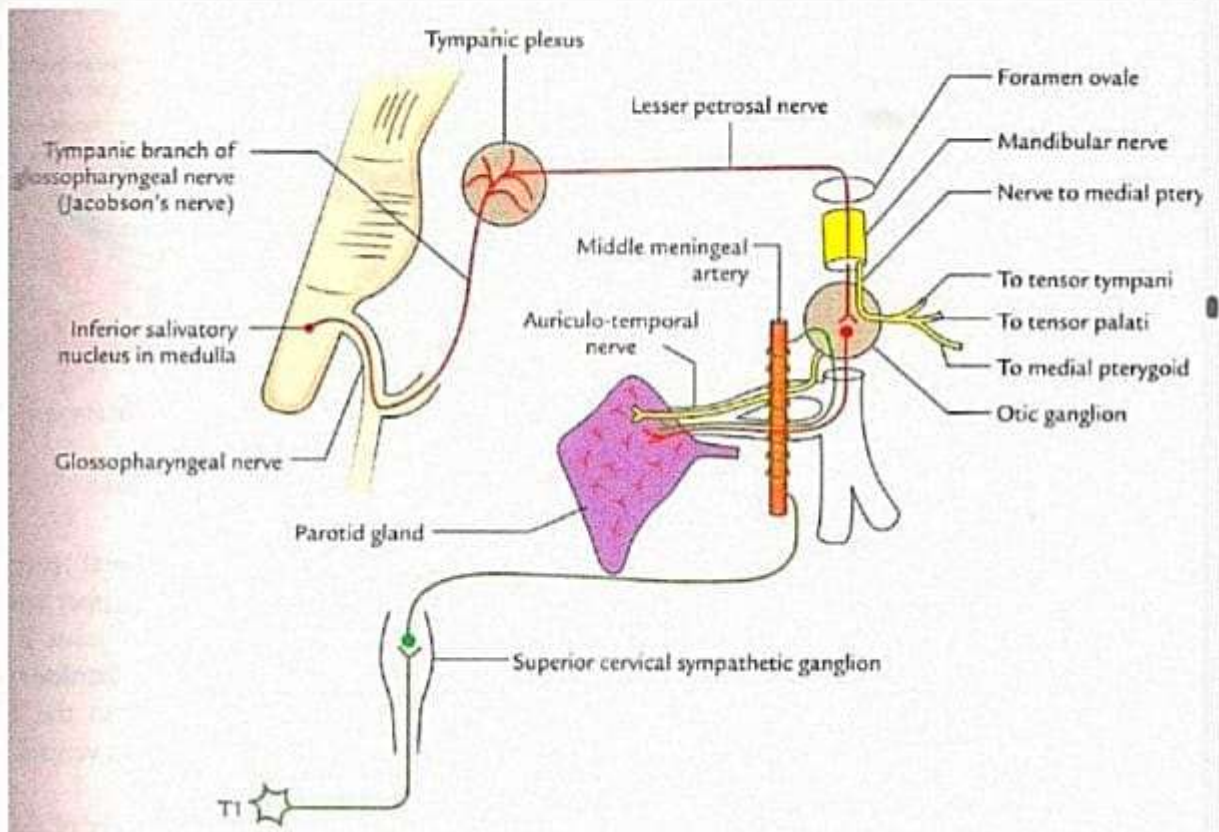


C. PAROTID DUCT



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D. NERVE SUPPLY



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Ref. BDC HUMAN ANATOMY 9TH EDITION VOLUME 3
PAGE 114

REPRODUCTIVE SYSTEM

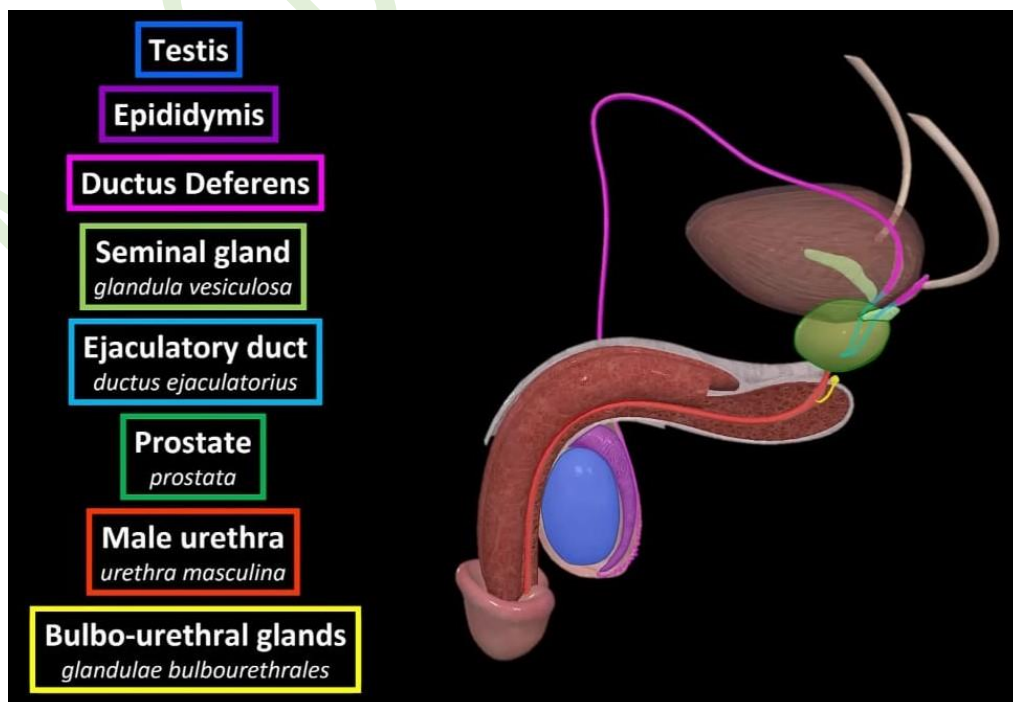
- M56BOOKSTORE
- WRITTEN BY : DR. SWEZA MANSURI
- PHYSIOTHERAPIST

- **CONTENTS:**

MALE REPRODUCTIVE SYSTEM (MRS)	FEMALE REPRODUCTIVE SYSTEM (FRS)
- Testis - Penis	- Ovaries - Vagina – i. internal ii. external

- **MALE REPRODUCTIVE SYSTEM**

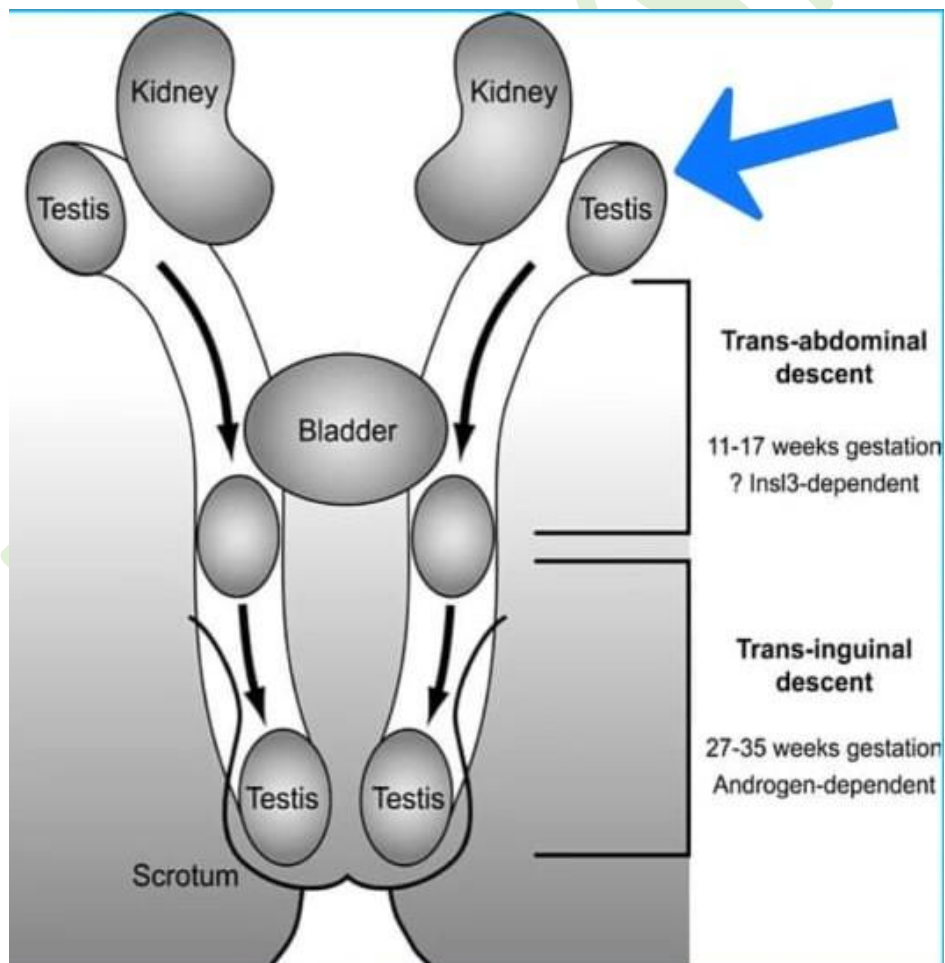
INTERNAL GENITAL ORGANS	EXTERNAL GENITAL ORGANS
- Testis - Epididymis - Ductus deferens - Ejaculatory duct - Prostate - Male urethra - Bulbo urethral gland	- Penis - Scrotum



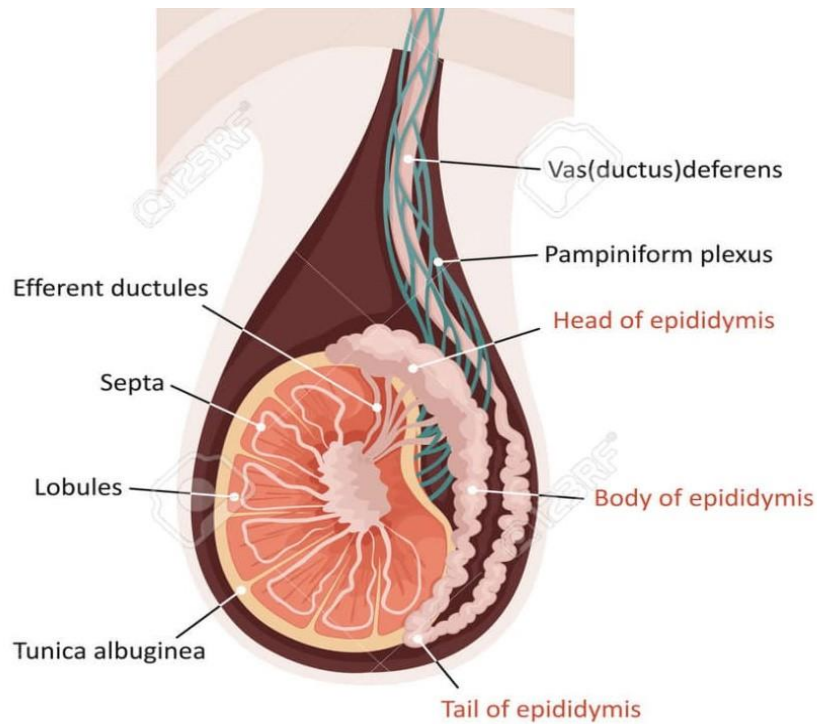
❖ TESTIS :

- 01 pair
 - Primary function → release out
 - 1. **LEYDIG CELLS** – produce **TESTOSTERONE**
 - also called **interstitial cells** (present in seminiferous tubule and made up of connective tissue)
 - 2. **SERTOLI CELLS** – formation of **SPERMATOGENESIS**
-
- **LOCATION:** outside the body
 - **TEMPERATURE:** 2-3 C
 - **STRUCTURE** : pouch like called as scrotum

❖ DESCENT OF TESTIS :

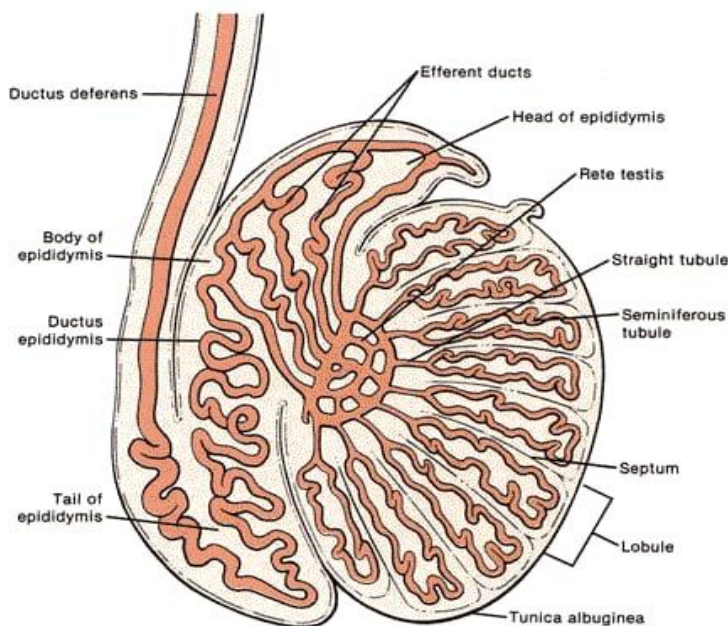


❖ EXTERNAL STRUCTURE OF TESTIS



POLES	BORDERS	SURFACES
- Upper - Lower	- Anterior - Posterior	- Lateral - Medial

❖ INTERNAL STRUCTURE OF TESTIS :



- **LAYERS:**

1. Tunica albuginea : Dense membrane of connective tissue
2. Tunica vascularis

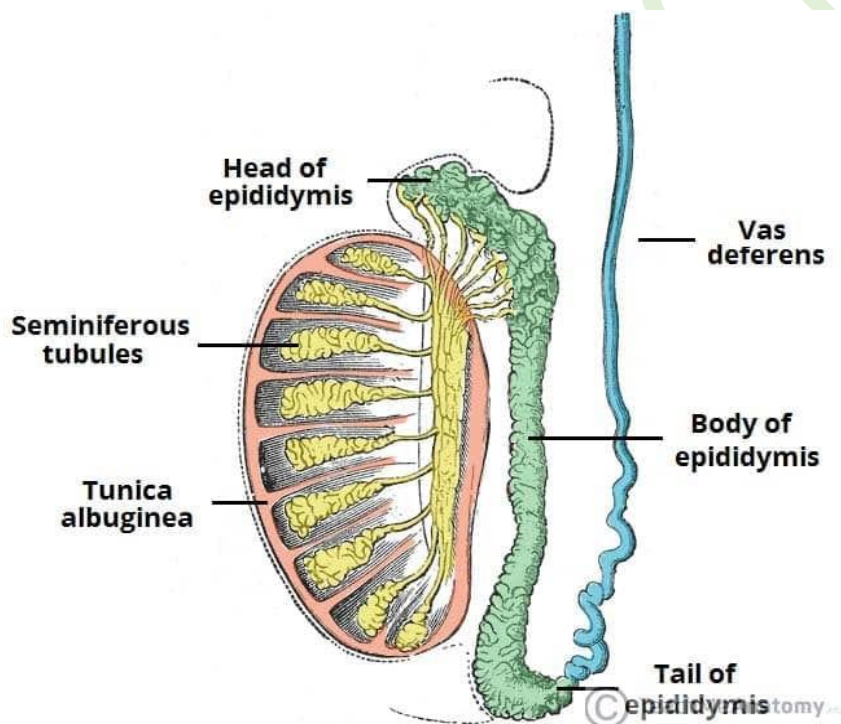
- **SEPTA OF TESTIS :**

- they are connective tissue called as lobule of testis
- each lobule has single tubules called as convoluted seminiferous tubule
- it has sertoli cells
- once the tubule leave the lobule then it is called as **straight tubule**

- **EFFERENT DUCTUS**

- continue with head of epididymis

❖ **EPIDIDYMIS :**



- **PARTS:**

- **HEAD** : broad , consist efferent ductus
- **BODY**
- **TAIL**

- No function but serves as a **reservoir of spermatozoa**
- sperm cells mature and gain the capacity to move and fertilize the ovum
- sperm cells provide nutrition to epididymis

#CLINICAL ANATOMY

- orchitis : infection occurs in gonads and epididymis head is swelled
- -Hydrocele: dehydration

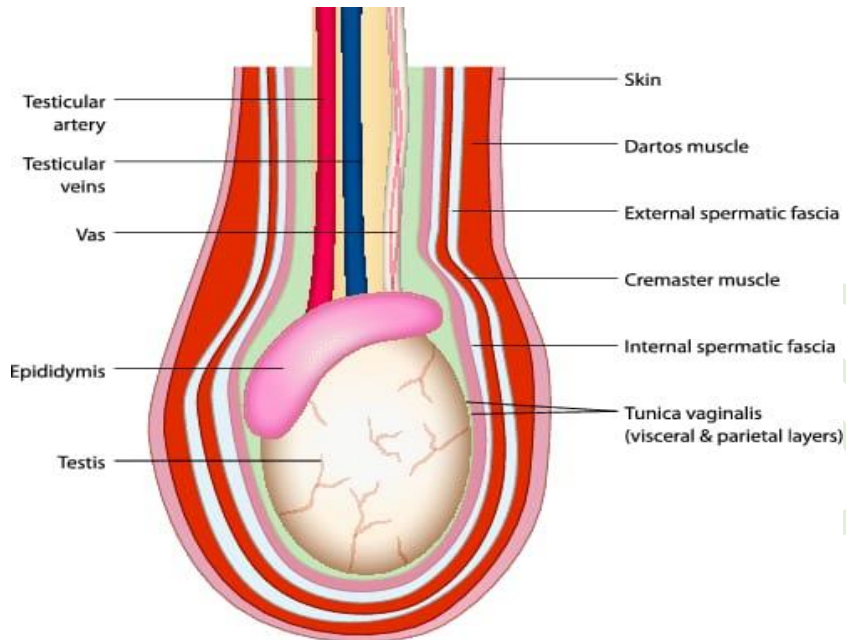
#SYMPTOMS:

- fever
- minute headache
- cannot sit for longer
- time period (10-20 days)

INVESTIGATION:

- ultrasonography (USD)

- **COVERINGS AND FIXATION OF TESTIS AND EPIDIDYMIS**



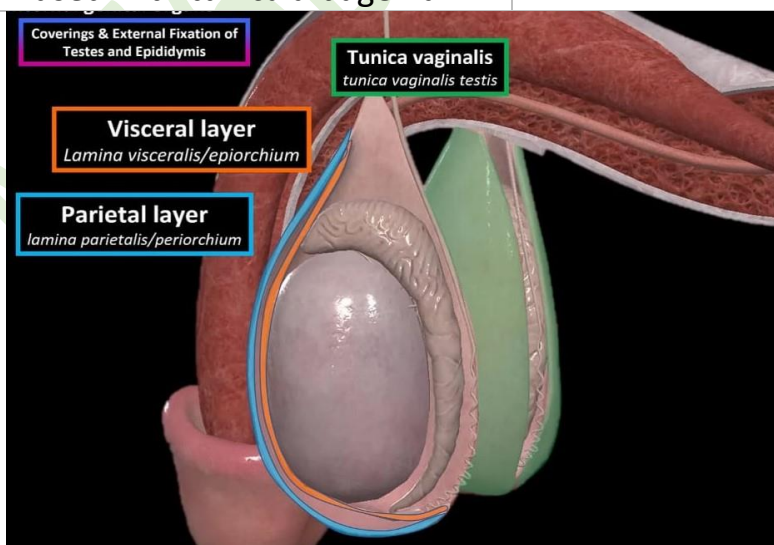
#TUNICA VAGINALIS :

VISCERAL LAYER

- Attached to lateral and anterior surface of testis and fused with tunica albugenia

PARIETAL LAYER

- Attached with tunica albugenia



#CREMASTER MUSCLE

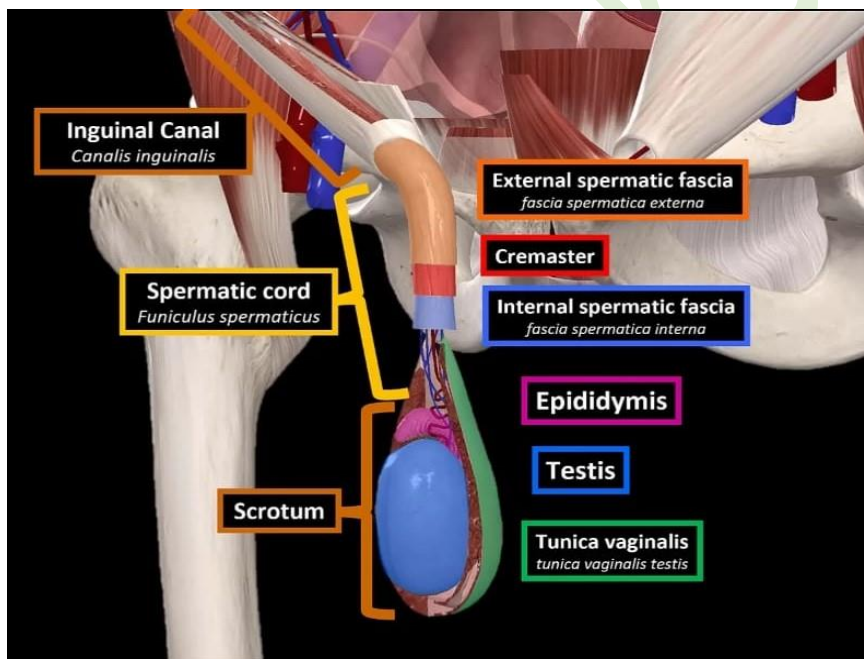
- Present between internal and external spermatic fascia

#SPERMATIC CORD

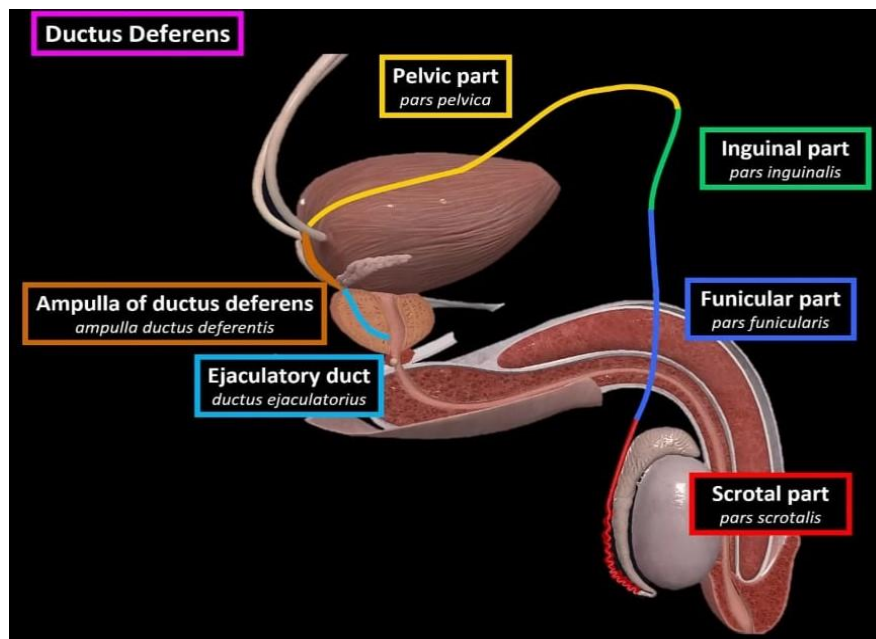
- formed with the help of :
- EXTERNAL SPERMATIC FASCIA
- CREMASTER MUSCLE
- INTERNAL SPERMATIC FASCIA

#BLOOD SUPPLY

- Testicular artery
- lymph vessels
- pampiniform plexus
- testicular plexus



❖ DUCTUS DEFERENS



#04 PARTS:

- Scrotal part
- Funicular part
- Inguinal part
- Pelvic part

#JUNCTION : ampulla of ductus deferens

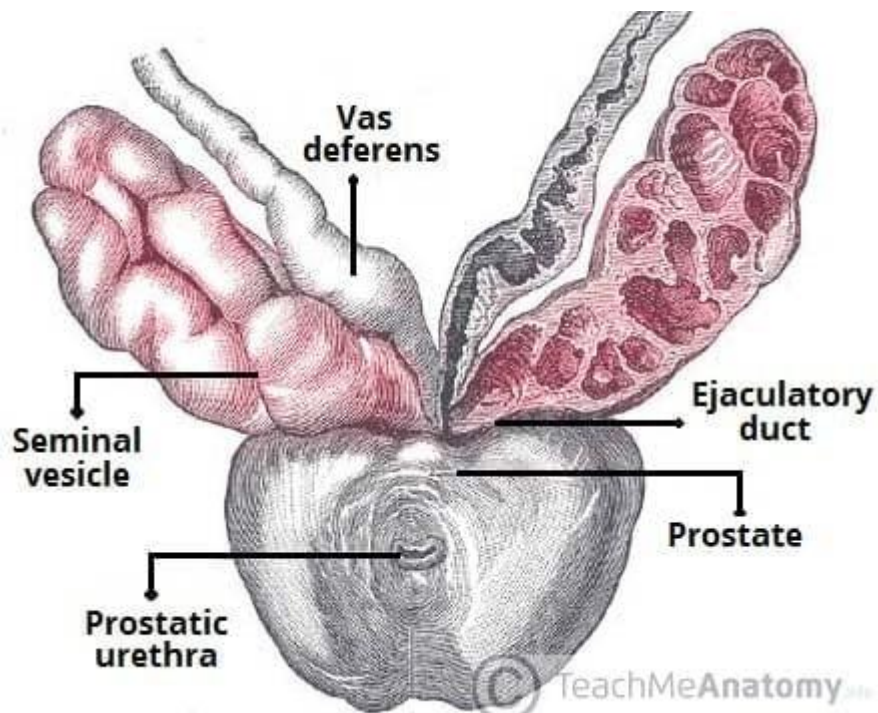
- ductus deferens fused with seminal glands
- forms ejaculatory duct
- enters into the prostate region called as prostatic urethra

❖ SEMINAL GLAND

- **LOCATED** : behind the urinary bladder above the prostate gland

#Seminal gland

- produces 50 - 80% of ejaculate fluid
- it has excretory duct which attaches to ductus deferens



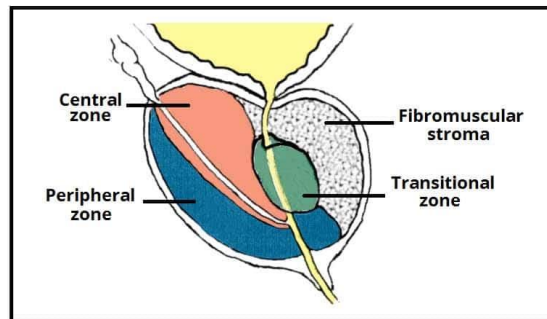
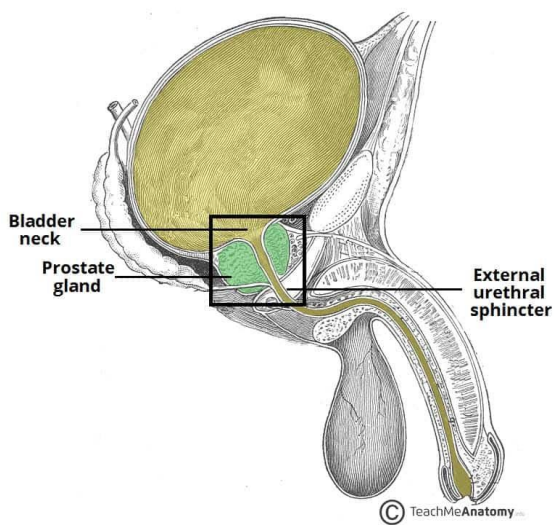
❖ PROSTATE GLAND :

- largest male genital gland
- produces 30% of ejaculate fluid

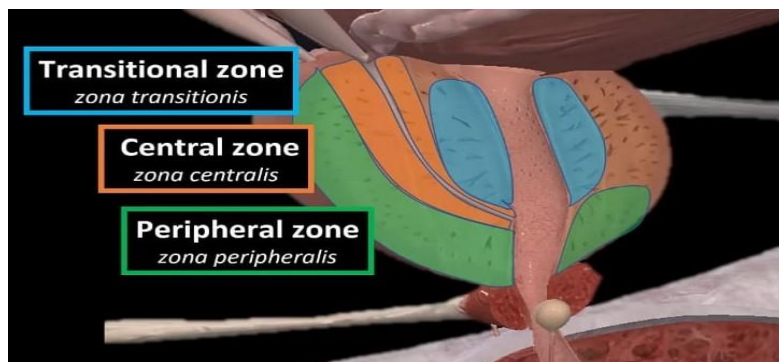
#CLINICAL ANATOMY:

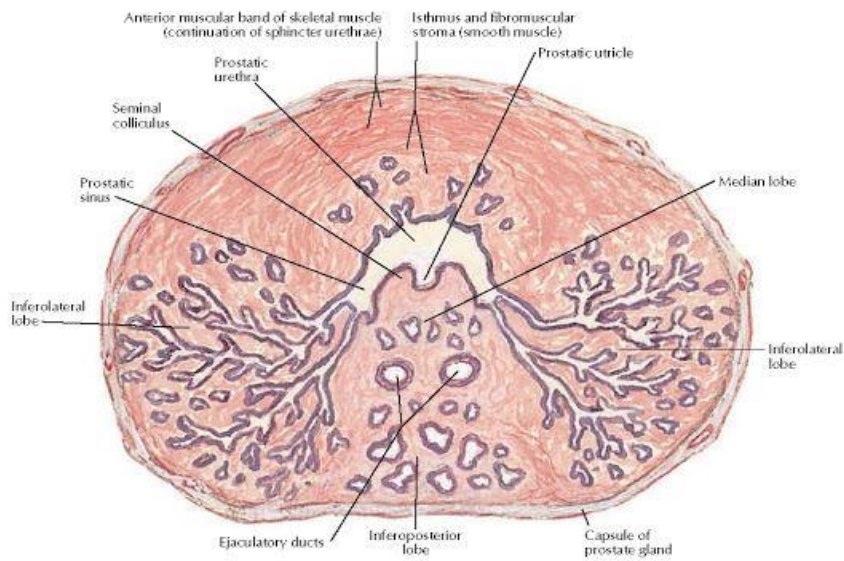
- Prostatitis
- (Enlargement of prostate gland)
- normal range 30-40 (beyond 40 then swelling will occur)

SURFACES	PARTS	ZONES
- anterior - posterior	- base (upwards) - apex (downside)	- central zone - transitional zone - peripheral zone

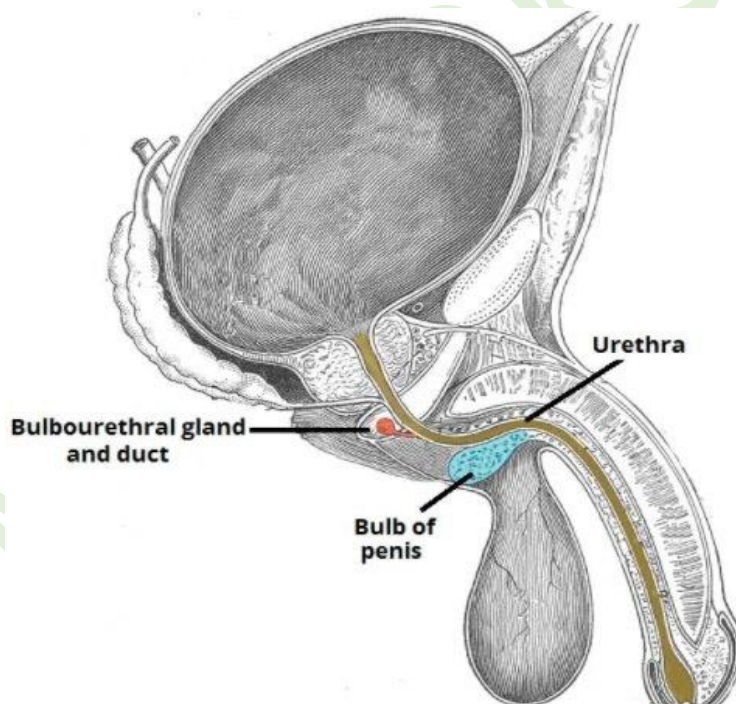


• CROSS SECTION OF PROSTATE GLAND



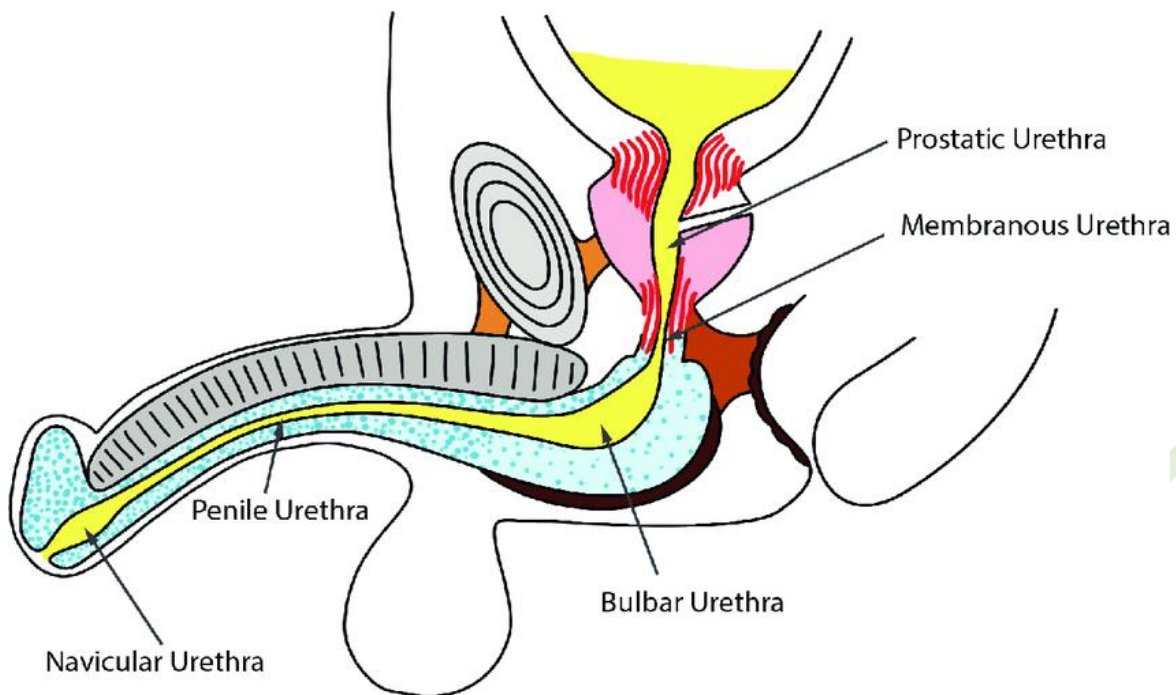


❖ BULBO URETHRAL GLAND



- paired of accessory genital gland
- attached to male urethral duct

❖ MALE URETHRA



03 Portions

- prostatic urethra
- membranous urethra
- spongy urethra

❖ PENIS:

#EXTERNAL STRUCTURE

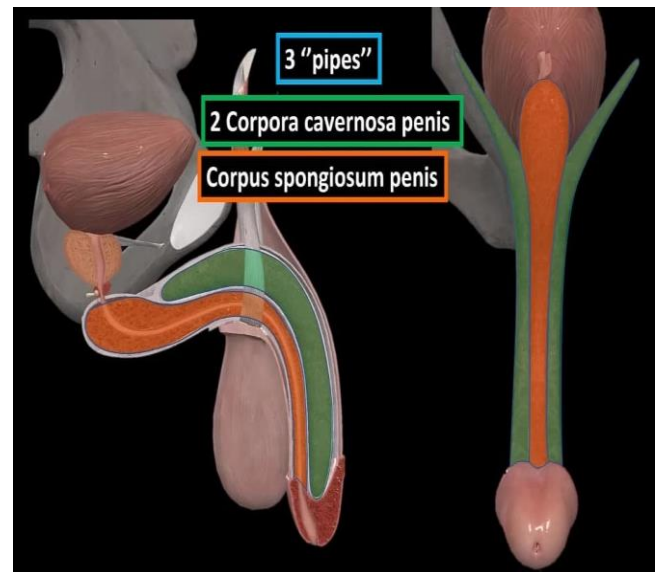
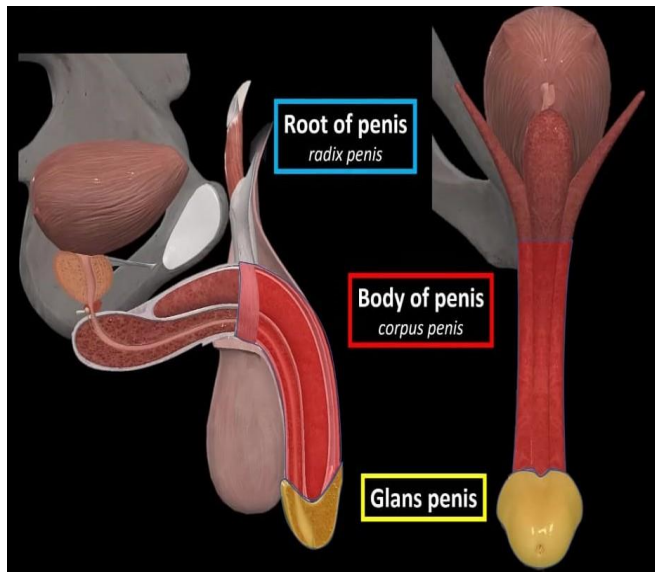
- consist 03 pipes/ erectile bodies

i. Corpora cavernosa (02)

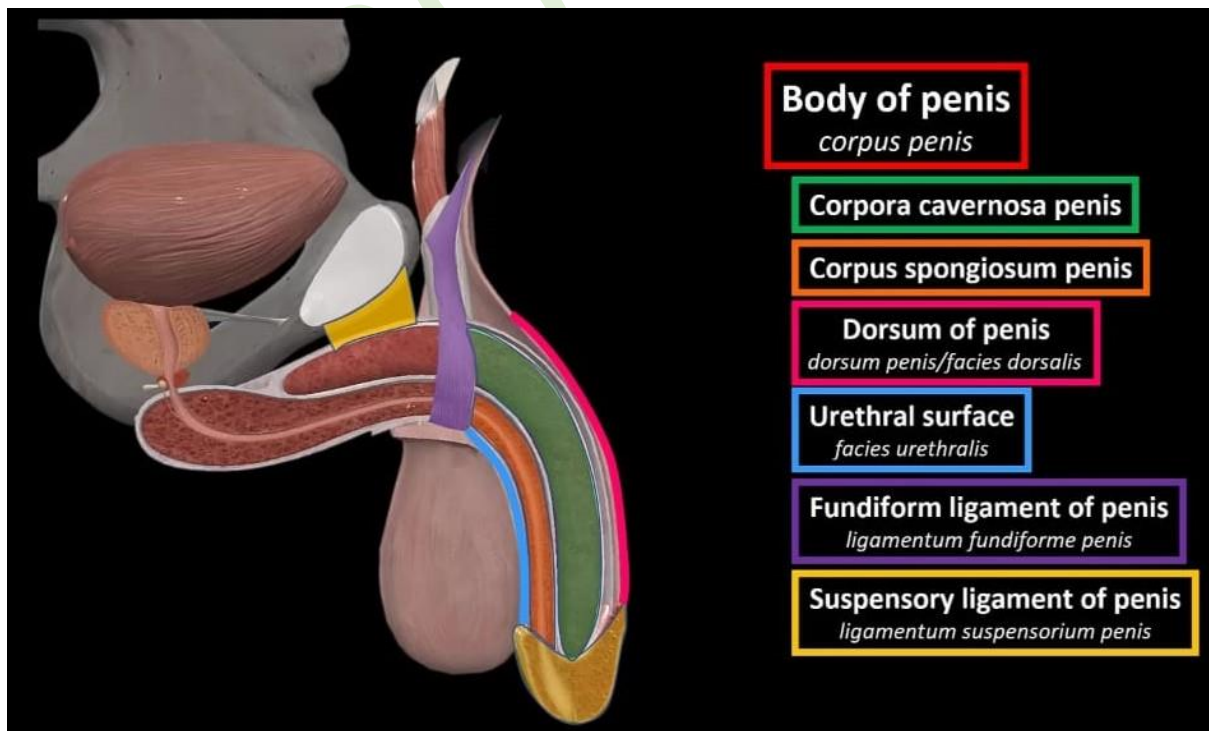
ii. Corpus spongiosum (01)

(Help in ejaculation)

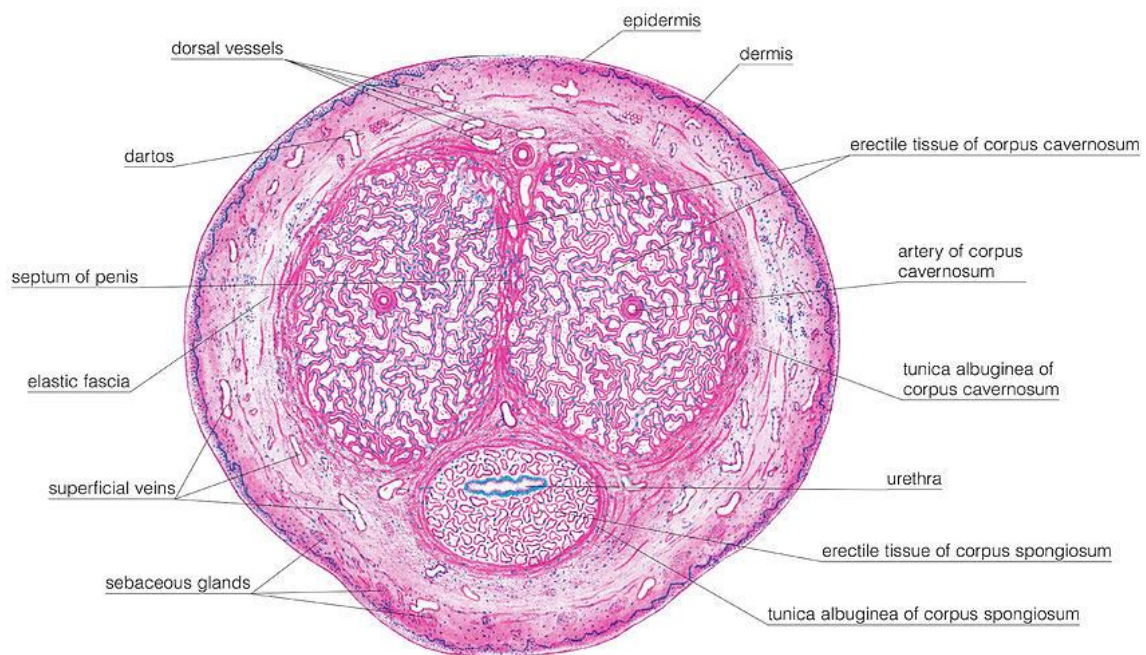
- unpaired erectile bodies



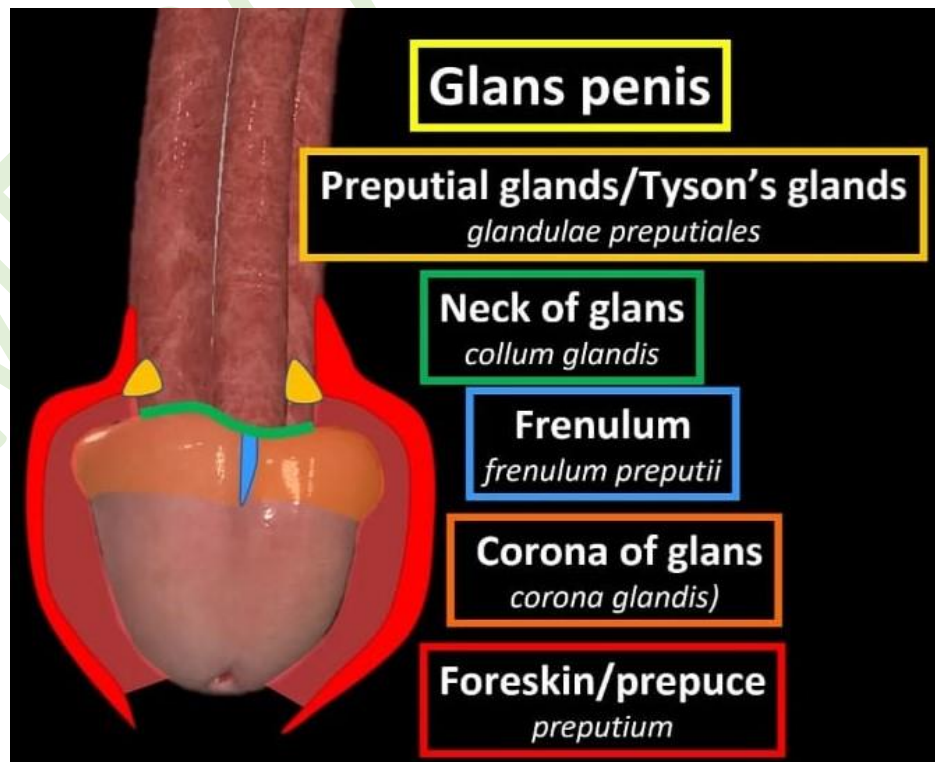
ROOT	BODY	GLANS PENIS
Consist : - Bulb of penis - Crura of penis	Composed of: - Corpora cavernosa - Corpus spongiosum	- Corona glandis



- **CROSS SECTION OF PENIS :**



- **GLANS OF PENIS**

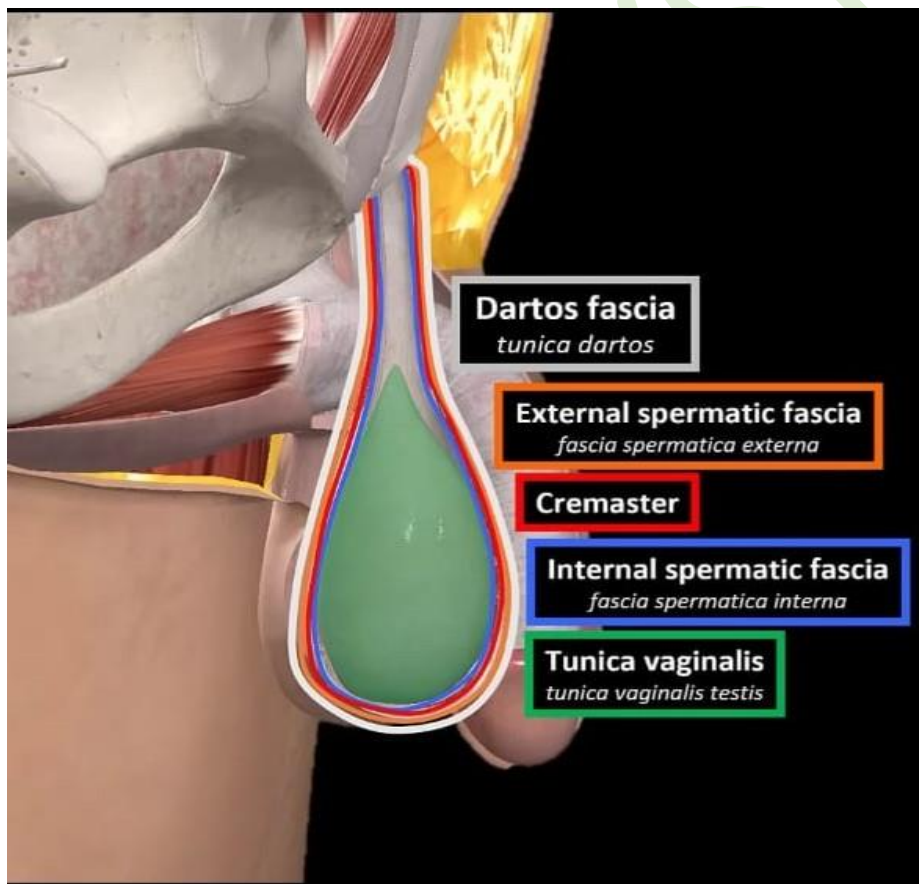


❖ SCROTUM

- pouch like structure
- sac located outside the body
- Contains : testis and epididymis

#LAYERS :

- tunica vaginalis
- tunica albugenia
- tunica vascularis
- spermatic fascia
- dartos fascia





FEMALE REPRODUCTIVE SYSTEM

INTERNAL GENITAL ORGANS	EXTERNAL GENITAL ORGANS
- Ovary - Uterine tube - Uterus - Vagina	- Vestibule - Labia majora - Labia minora - Bulb of vestibule - Clitoris

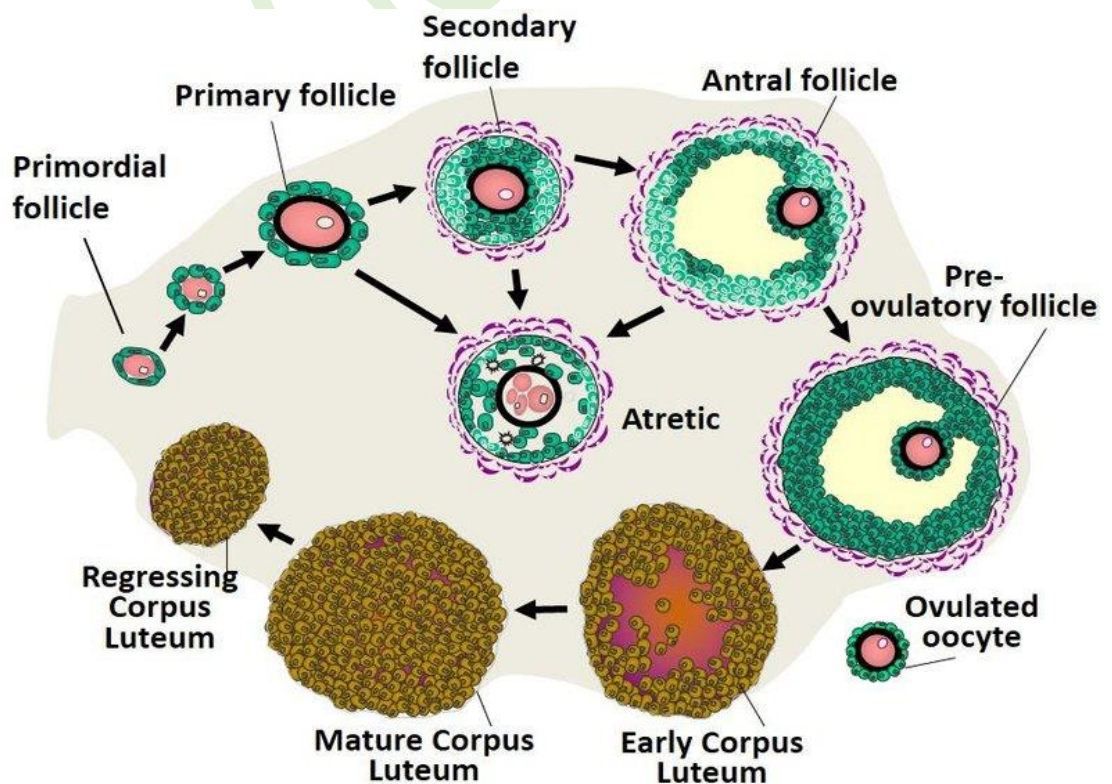


OVARY

#INNER STRUCTURE

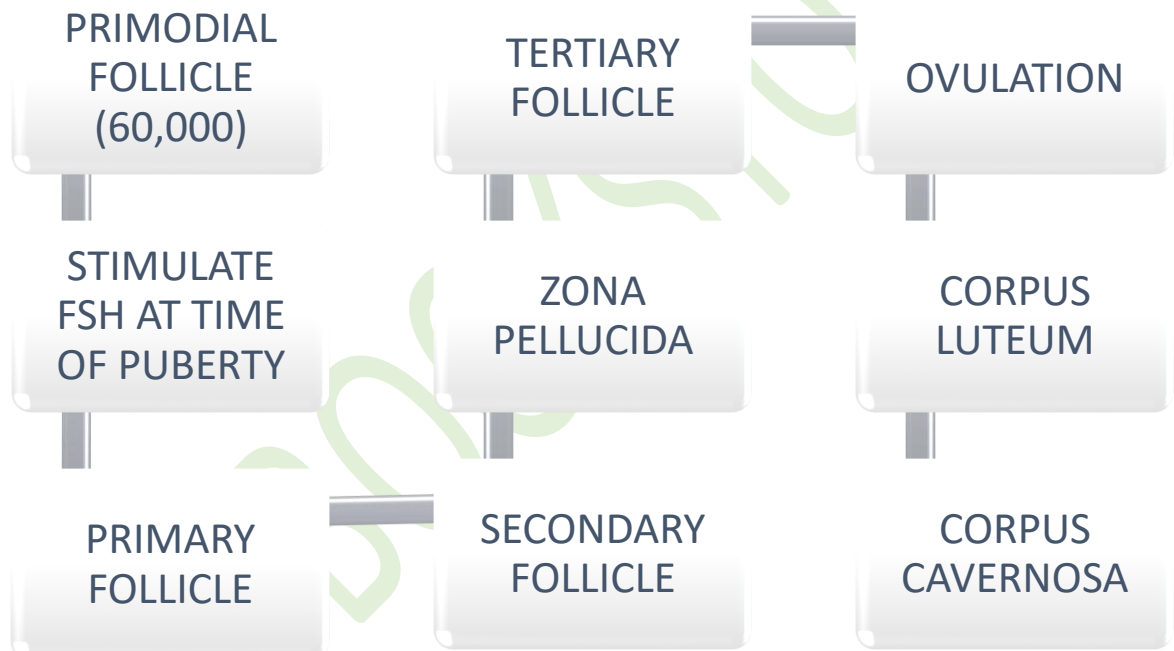
- contains oocytes with follicle
- Produces:
 - estrogen
 - progesterone

#GROWTH AND MATURATION OF OVARY :

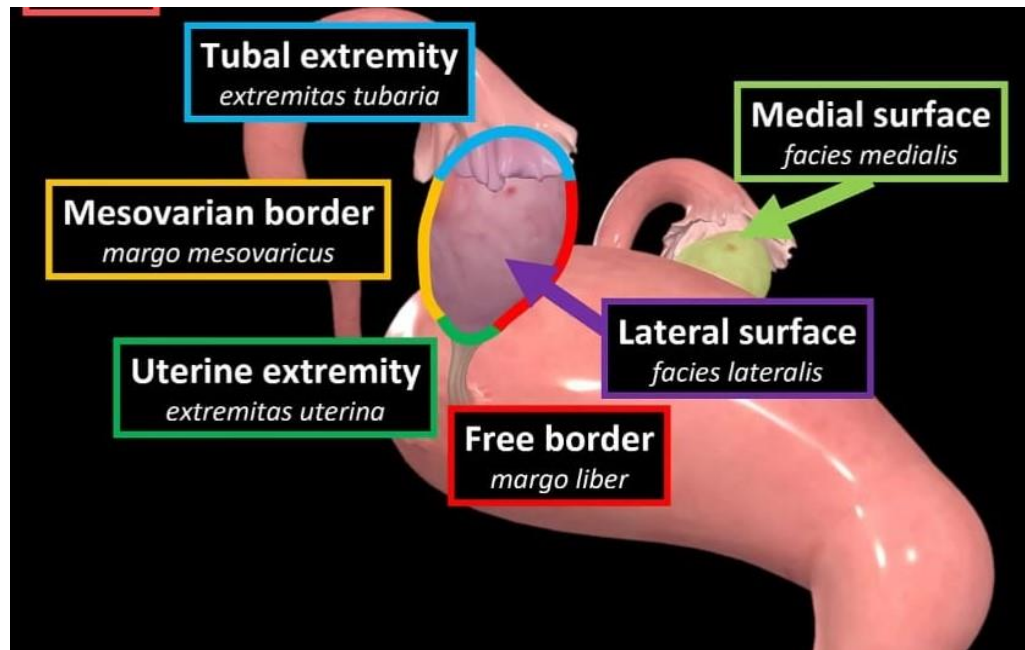


#OVARY:

OVARIAN CORTEX	OVARIAN MEDULLA
- Outer region	- Inner region Contains : - Arteries - Blood vessels - Capillaries

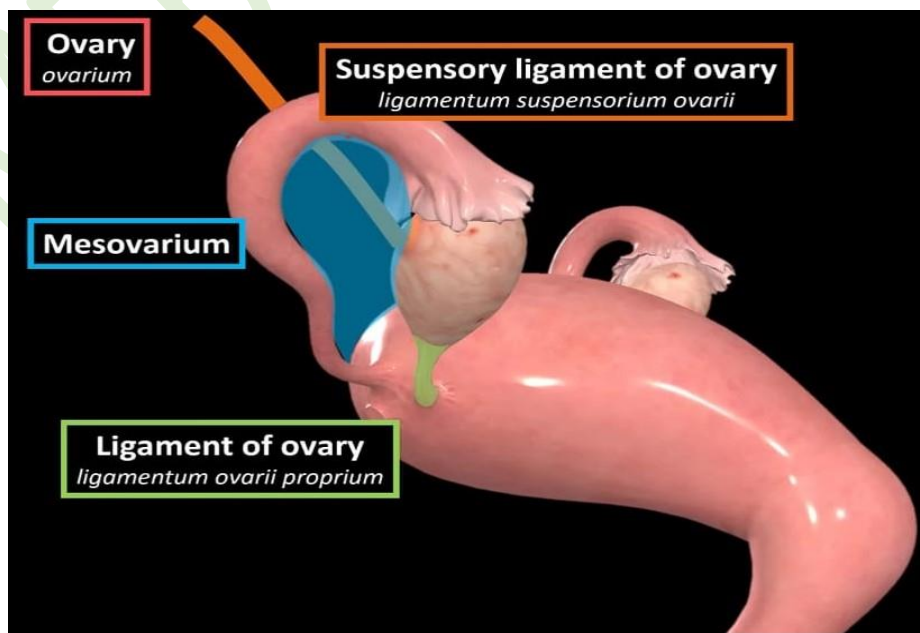


❖ EXTERNAL STRUCTURE OF OVARY



BORDERS	SURFACES
- Mesovarian border - Free border	- Lateral - Medial

• FIXATION OF OVARIES :



#LIGAMENTS:

1. Ovarian ligament
2. Suspensory ligament of ovary attached from tubal extremity to lateral wall of pelvis

#PERITONEAL FOLD :

VISCERAL PERITONEUM	PARIETAL PERITONEUM
- Lines the wall of organs	- Lines the internal surface of abdominal and pelvic wall

#LIGAMENTS OF UTERUS

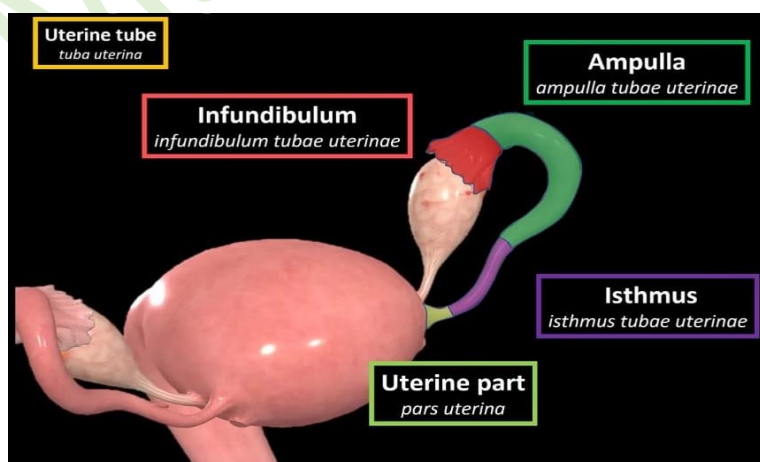
BROAD LIGAMENT OF UTERUS

- (double peritoneal fold)
- It consist 03 ligament

MESOVARIUM	Fixes the ovary
MESOSALPINX	Fixes the ovarian tube
MESOMETRIUM	From the uterus

❖ UTERINE TUBE / FALLOPIAN TUBE

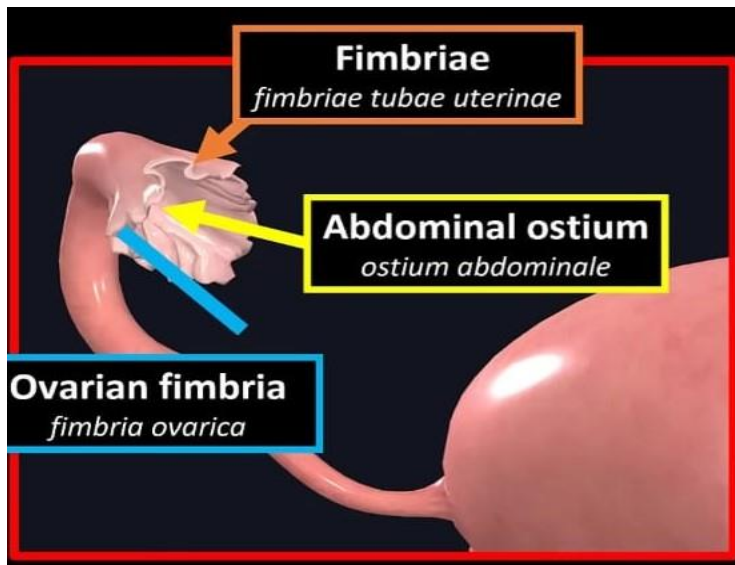
- paired tubes
- fixed with the uterus to ovaries
- fertilization happens in uterine tube



#PARTS OF UTERINE TUBE:

1. Infundibulum : dilated portion
2. Ampulla : wider
3. Isthmus : narrow
4. Uterine part : attached to uterus

INFUNDIBULUM



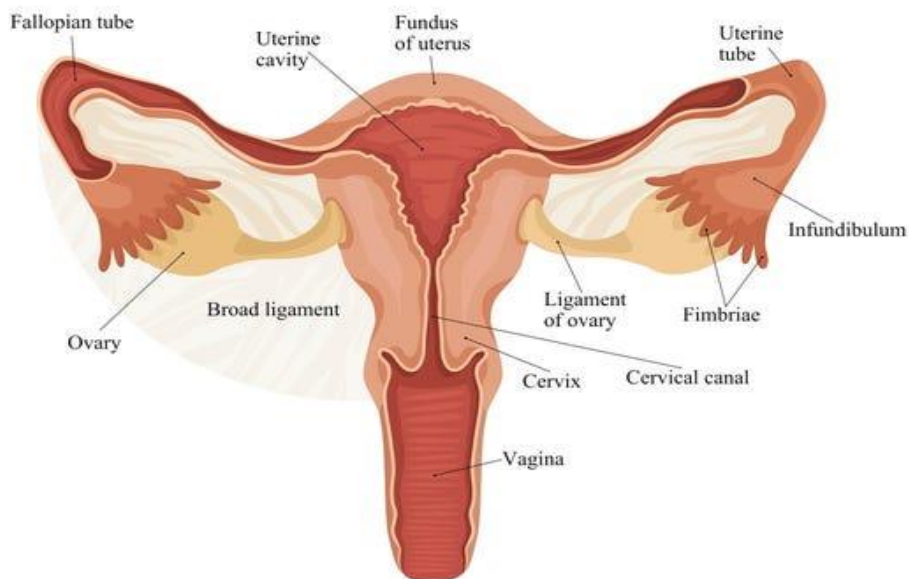
❖ UTERUS :

- undergo cyclic transformation
- synchronized with the ovarian cycle
- this ensures that uterus is ready for implantation

#PARTS OF UTERUS

- fundus
- body
- cervix

FEMALE REPRODUCTIVE SYSTEM



#CERVIX

- supravaginal part
- vaginal part

#UTERINE CAVITY OPENING

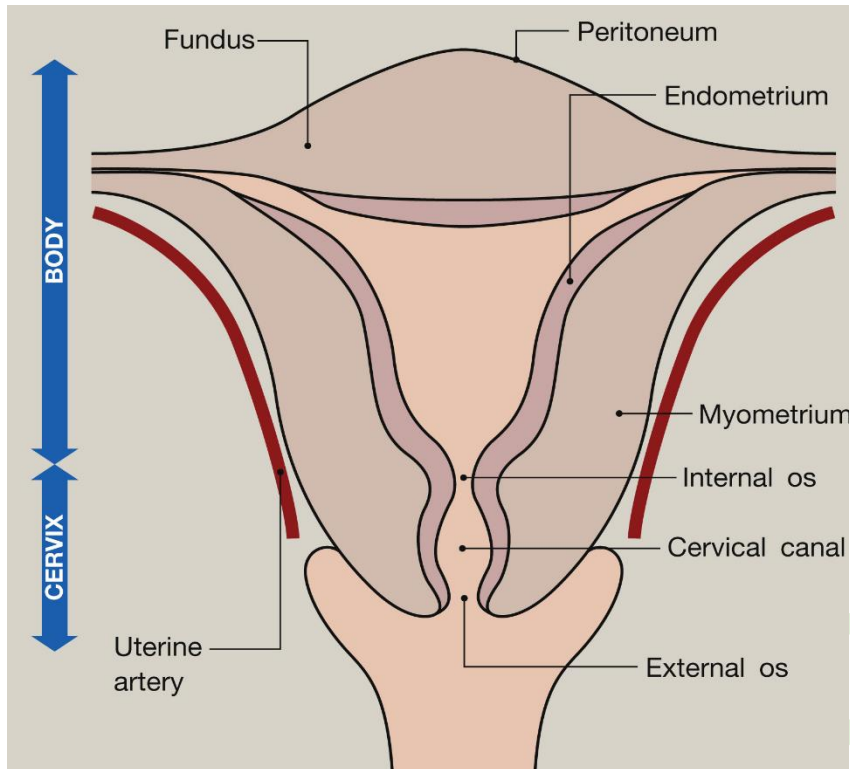
- uterine opening of oviduct(02)
- cervical canal(01)

#CERVIX (posterior view)

- anterior lip
- posterior lip

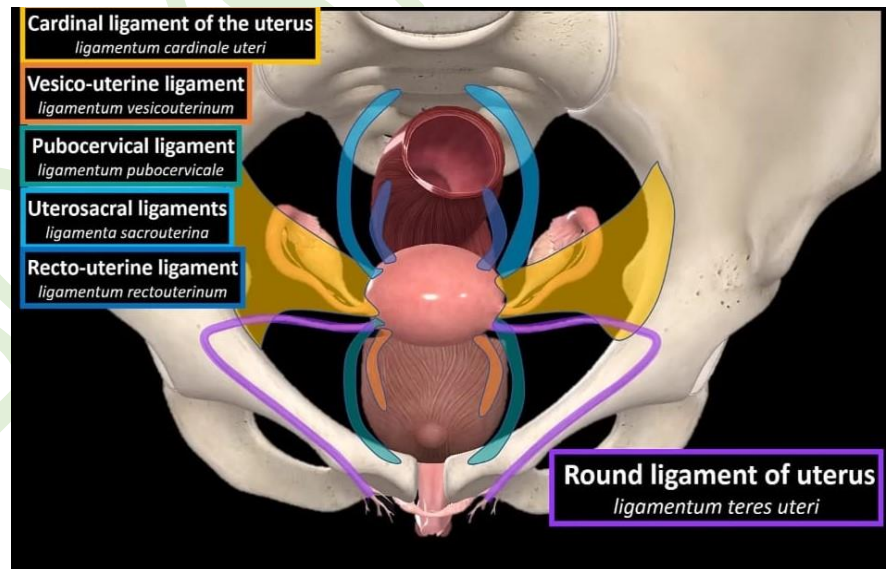
• UTERUS CONSIST 03 LAYERS

- **Endometrium (inner):**
 - i.stratum functionalis
 - ii.stratum basalis
- **Myometrium (middle):**
 - i.longitudinal (02)
 - ii.middle (01)
- **Perimetrium (outer)**



#PARAMETRIAL LIGAMENTS

- Cardinal ligament
- vesicouterine ligament
- pubocervical ligament
- uterosacral ligament
- rectouterine ligament



#SUPPORTING APPARATUS OF UTERUS

- perineal muscle
- levator ani muscle

❖ VAGINA

- it is hollow muscular tube like structure

#supports:

- Rectus
- Urinary bladder
- Uterus

#ORIFICE: vaginal orifice

#WALLS OF VAGINAL CANAL:

- anterior wall
- posterior wall

#VAGINAL FORNIX

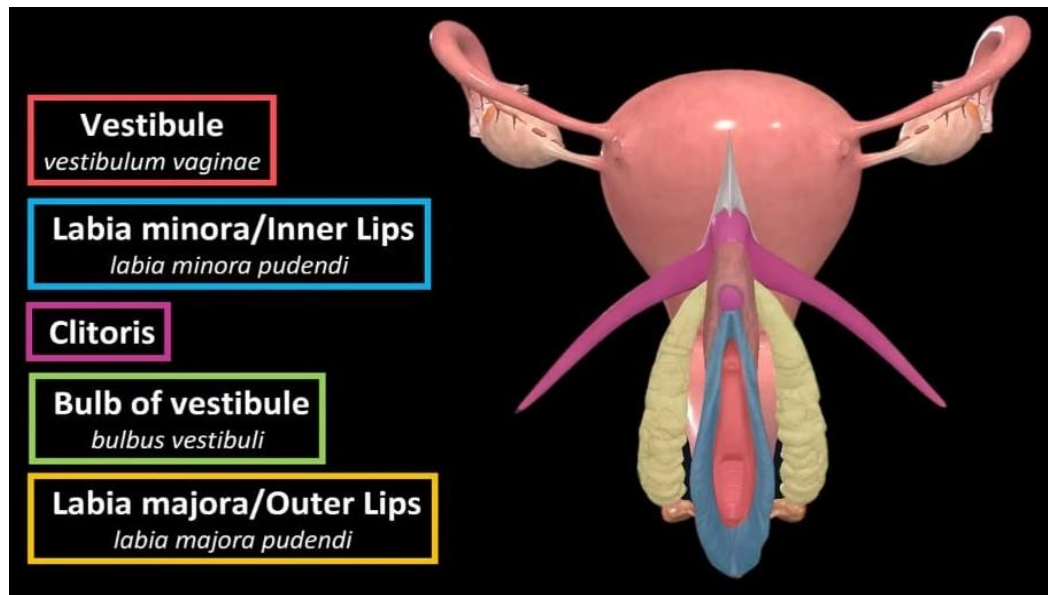
- anterior part
- posterior part

#URETHROVAGINAL SEPTUM

- retrovaginal septum

(separating urethra and vaginal canal)

❖ EXTERNAL GENITAL ORGANS



❖ VESTIBULE

#ORIFICE :

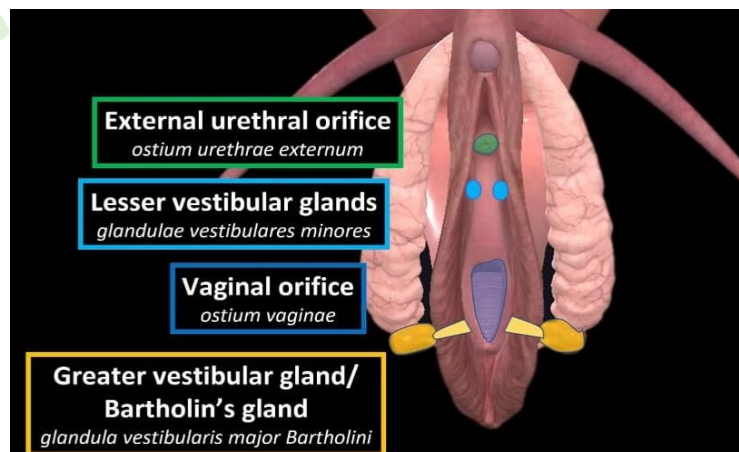
- external urethral orifice
- vaginal orifice

#LESSER VESTIBULAR GLAND:

- responsible for lubrication

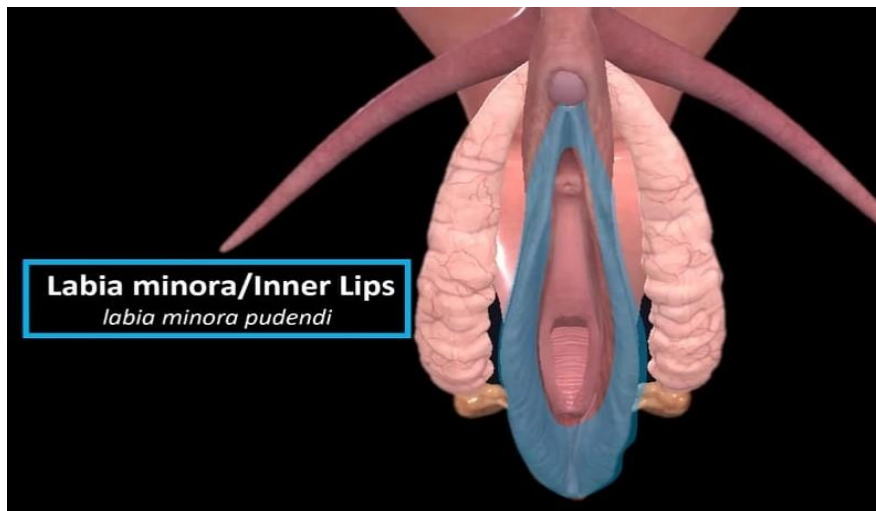
#GREATER VESTIBULAR GLAND:

- paired mucus gland
- opens in posterior part of vestibule
- secretes fluid for lubrication



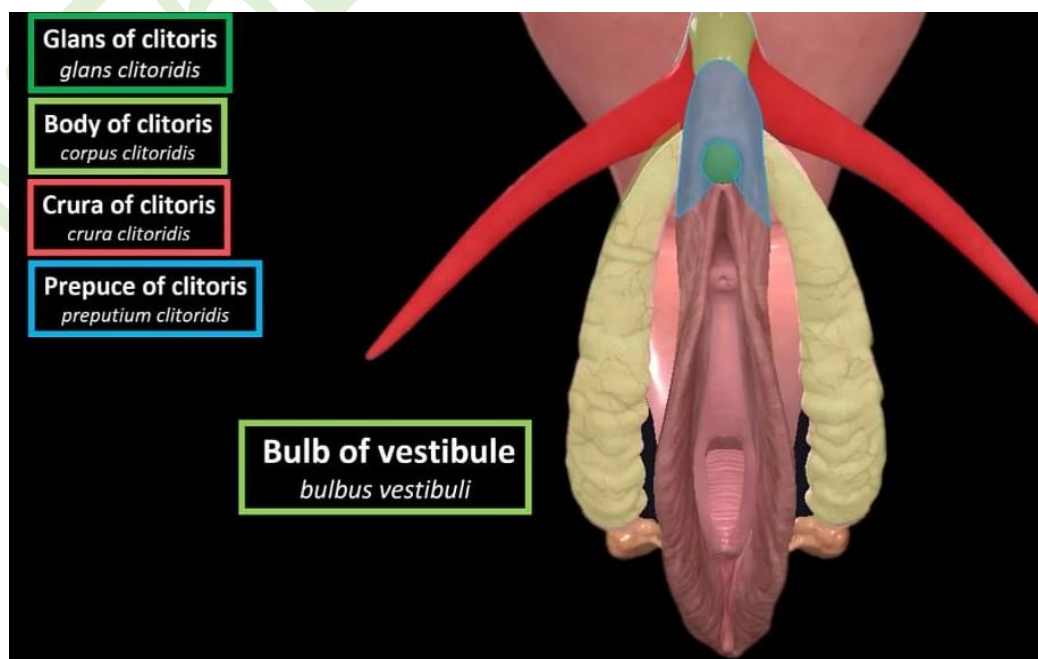
❖ LABIA MINORA (inner lips)

- 02 cutaneous folds
- inner surface lined by mucus



❖ CLITORIS

- One of the most sensitive zone in FRS
- made up of corpora cavernosa
- consist glans clitoris

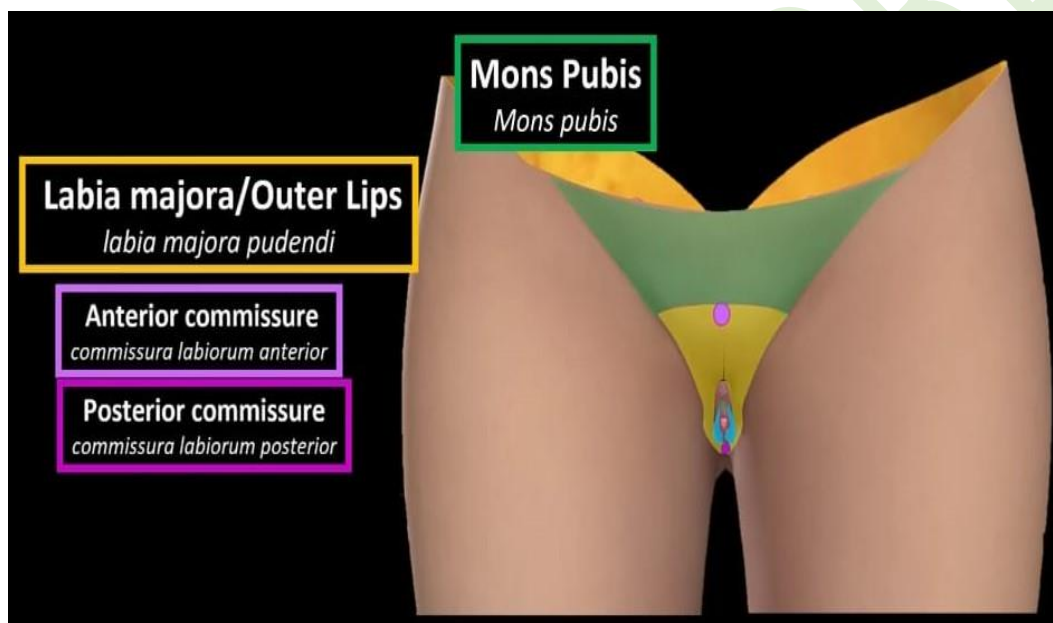


❖ BULB OF VESTIBULE

- LOCATED : inside of clitoris
- type of erectile tissue which is closest to clitoris
- formed by : plexus

❖ LABIA MAJORA

- upper part : anterior commissure
- lower part : posterior commissure



❖ MONS PUBIS :

- Covered by hair at the time of puberty
- triangular in shape

RIGHT ATRIUM

Right atrium is the right upper chamber of heart.

It receives venous blood from the whole body

Pump into right ventricle through tricuspid valve

External features –

Upper right chamber elongated vertically .

Along right border of atrium  shallow ventricular groove which passes from -----superior vena cava to inferior vena cava is called sulcus terminalis.

It produced by internal muscular ridge called crista terminalis.

s.d

Inlet of right atrium –

- 1.Superior vena cava
- 2.Inferior vena cava
- 3.Coronary sinus
- 4.Anterior cardiac veins

Internal features of heart -

s.d

Divided into 03 -----

1. Posterior Smooth part –

Derived from right horn sinus venosus

- Superior vena cava
- Inferior vena cava – eustachian valve
- Coronary sinus - thebesian valve
- Venae cordis minimae

2. Rough anterior part –

Derived from primitive atrial chamber

It present a series of muscular ridge called muscoli pectini.

3. Inter arterial septum –

Derived from primitive atrial chamber

Annulus ovalis & fossa ovalis the prominent margin fossa ovalis .

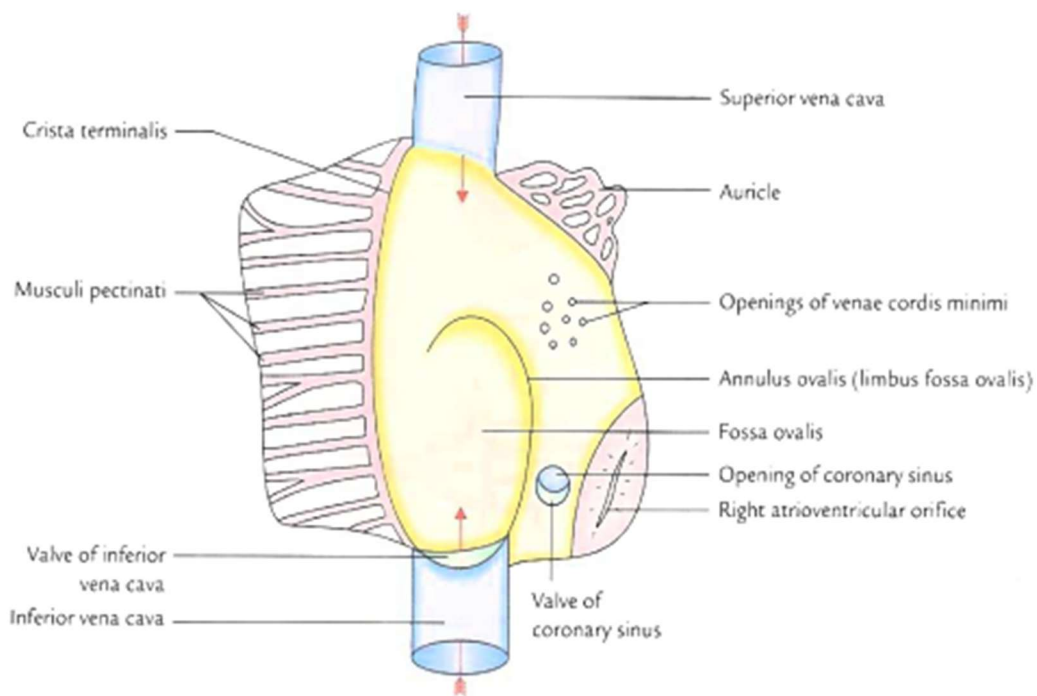
Arterial supply of heart

Heart is supply by 02 coronary arteries

Arising from ascending aorta

1. Right coronary artery

2. Left coronary artery



Right coronary artery

Position – smaller than left coronary artery.

Arise from anterior sinus

Course -

pass forward b/w root of pulmonary trunk & right auricle



runs downwards – right anterior coronary sulcus



winds around the inf. Border to reach –
diaphragmatic surface of heart.



Terminate by anastomosis with left coronary artery.

Branches –

1. Arterial branch – ant. Post. & lateral
2. Right conus artery called – annulus of Vieussens
3. Ventricular branch – ant. Post group
4. Right marginal artery
5. Post interventricular branch

Area of distribution –

Right atrium

Great part of right ventricle

Small part of left ventricle

Conducting system of heart except left branch of AV bundle.

LEFT CORONARY ARTERY –

Arises from – left aortic sinus

Course –

Run forward to left end emerge b/w pulmonary trunk



Run downward in a groove – continuation with circumflex artery



Binds left border of heart & continue with left coronary sulcus



& make anastomosis with right coronary artery .

BRANCHES & DISTRIBUTION –

1. Anterior interventricular branch – largest
2. Circumflex branch is terminate part of LCA
3. Ant. Post ventricular branch
4. Arterial branch

AREA OF DISTRIBUTION –

1. Left atrium
2. Greater part of left ventricle
3. Ant.part of inter ventricular septum
4. Left branch of av bundle

VEINS OF HEART

Great cardiac vein
Middle cardiac vein
Right marginal vein
Posterior vein of left ventricle
Anterior cardiac vein
Venae cordi minimae

Coronary sinus – largest vein of heart
Situating into left posterior coronary sulcus -----in right atrium.

TRIBUTARIES –

Great cardiac vein – with ant. Ventricular artery & left coronary artery

Middle cardiac vein – with – posterior interventricular artery

Small cardiac vein – with RCA

Right marginal vein – with – marginal branch of RCA

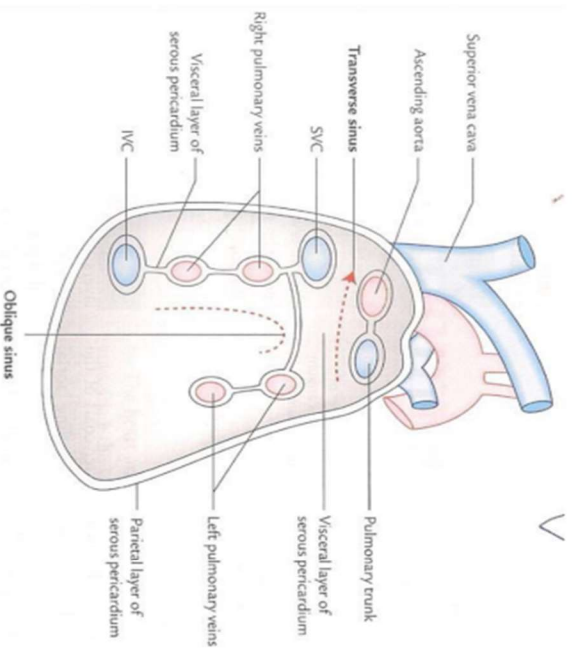
Post vein of left ventricle – towards to diaphragmatic surface

Oblique vein – running of post surface of left atrium

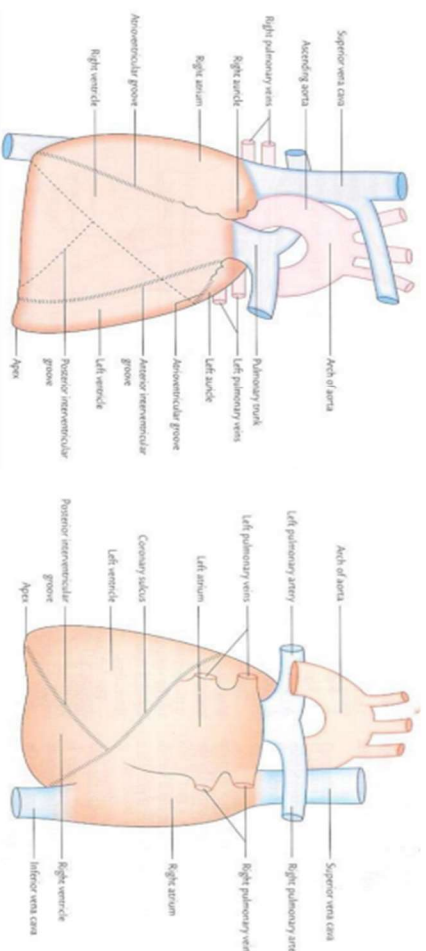
Anterior cardiac vein – open directly into right Atrium.

HEART AND PERICARDIUM

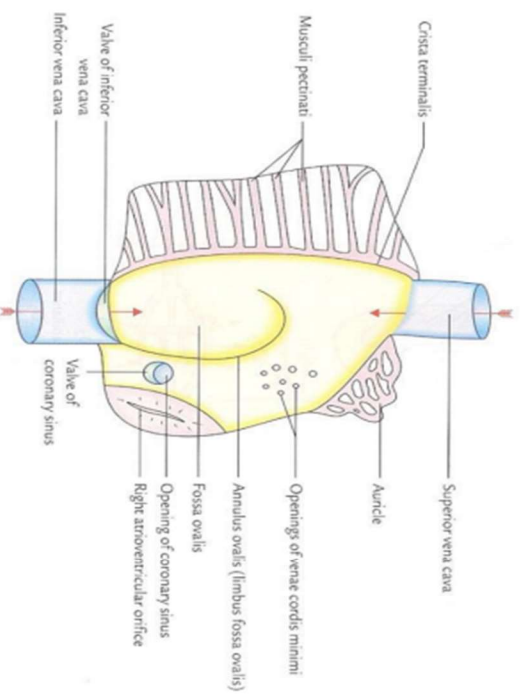
A. PERICARDIAL SINUSES



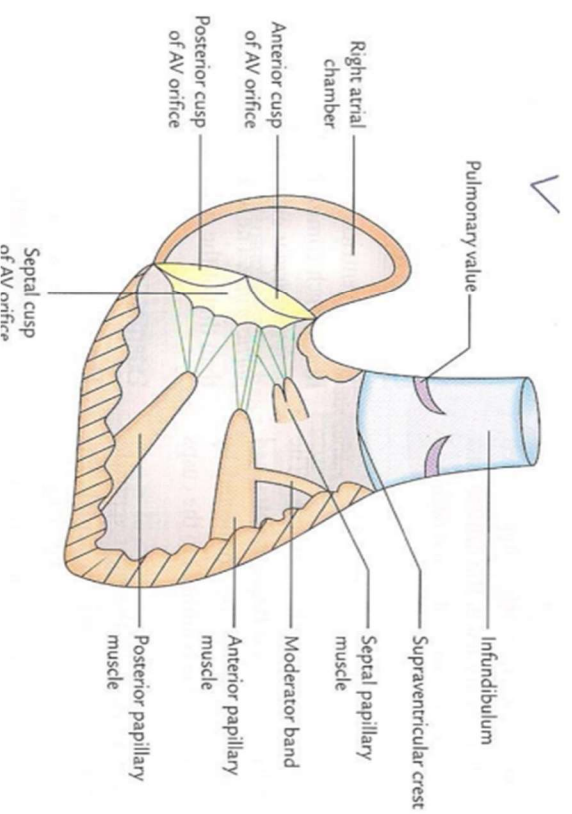
B. EXTERNAL FEATURES OF HEART



C. RIGHT ATRIUM

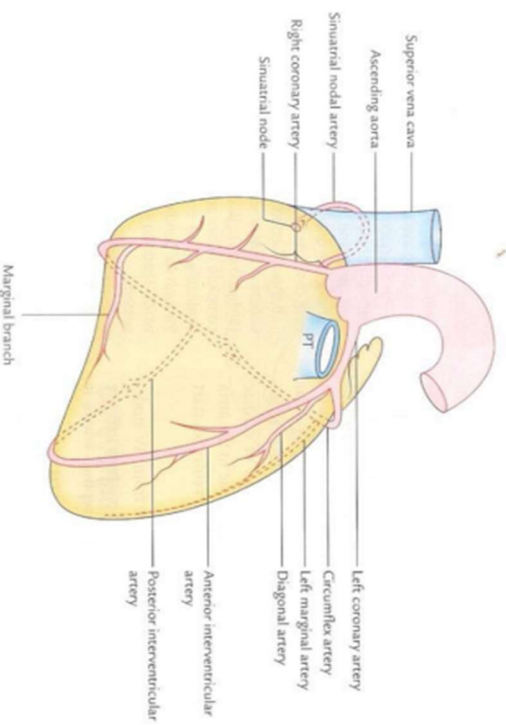


D. RIGHT VENTRICLE



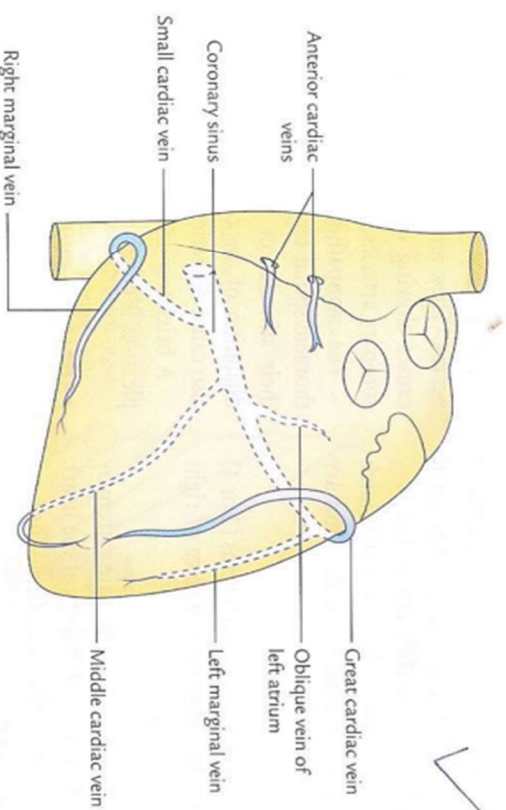
BLOOD SUPPLY OF HEART

A. ARTERIAL SUPPLY

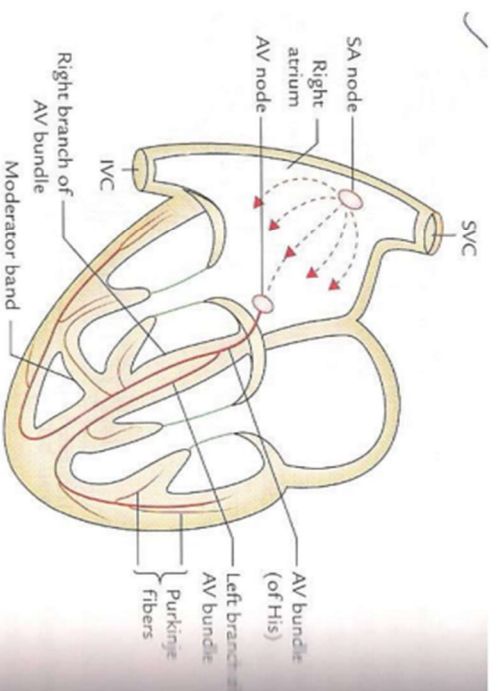


a. Origin and course of Right and left coronary artery

B. VENOUS DRAINAGE (CORONARY SINUS)



C. CONDUCTING SYSTEM OF HEART



Right coronary artery

Left coronary artery

b. Distribution of Right and left coronary artery

SPLEEN

SD ANATOMY NOTES

- It is a small, vascular organ.
- Dark purple in color.
- One of the major lymphatic organs.
- Acts as a filtration of the blood.
- Plays an important role in immune system.

SHAPE – wedge shaped.

- **SIZE** - 1 Inch thick.
- 1 Inch breadth.
- 5 Inch length.

WEIGHT 7 Ounce [1 ounce = 28.395]

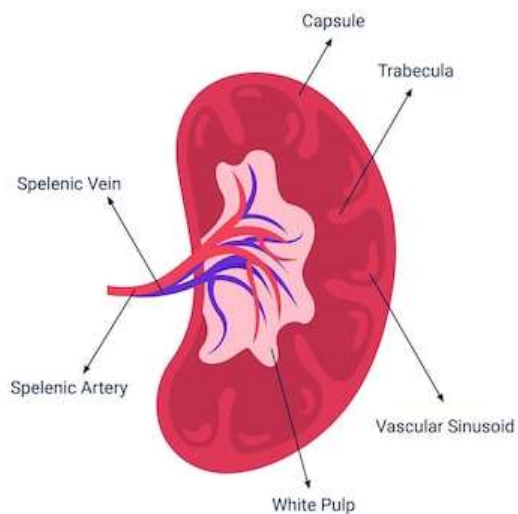
LOCATION - Left hypochondriac region

- Partly epigastrium

Up to 9 – 11TH ribs.

Spleen is non-palpable.

Anatomy of Spleen



EXTERNAL FEATURES

1. 2 ENDS	2. 3 BORDERS	3. 2 SURFACES
------------------	---------------------	----------------------

4. HILUM

- The ends are divided into two parts
- Anterior
- Posterior

SD ANATOMY NOTES

The borders are divided into three parts

- Superior
- Inferior
- Intermediate

The surface is further divided into two parts

- Diaphragmatic
- Visceral

ANTERIOR END

- Directed downwards.
- Laterally forward.

POSTERIOR END

- Directed upwards.
- Medially backward.

SUPERIOR BORDERS

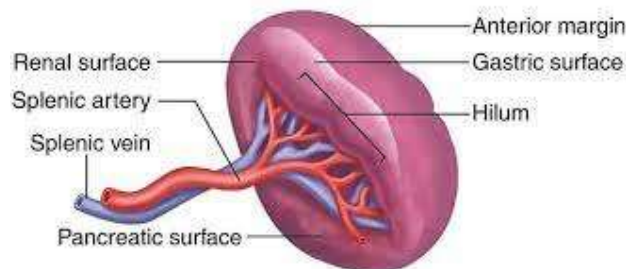
- Near the anterior end.
- Intermediate border are round.

SURFACES

- Convex and smooth in nature.
- Related to the diaphragm.
- Visceral surface is concave and irregular.

LIGAMENTS

- **Gastro splenic ligament.**
- **Lien renal ligament.**
- **Phrenic colic ligament.**
- **Phrenico splenic ligament.**



PERITONEAL RELATION

- **Gastro splenic ligament [hilum to spleen]**
- **Lien renal ligament [hilum to spleen]**
- **Phrenic colic ligament [supports anterior ends]**

VISCERAL REALTIONS

- **Related to fundus of stomach**
- **Anterior surface of left kidney**
- **Splenic flexure of colon**
- **Tail of pancreas**

Gastric impression

Renal impression

Pancreatic impression

Hilum

Colic impression

Diaphragmatic surface – related to diaphragm

- Which seprated the spleen from pleura & lungs

FUNCTIONS

- **Phagocytosis.**

- Hemiparesis.
- Immune response.
- Storage of red blood cells.

Blood Supply -

Splenic artery.

Nerve Supply -

Coeliac plexus – sympathetic fibers

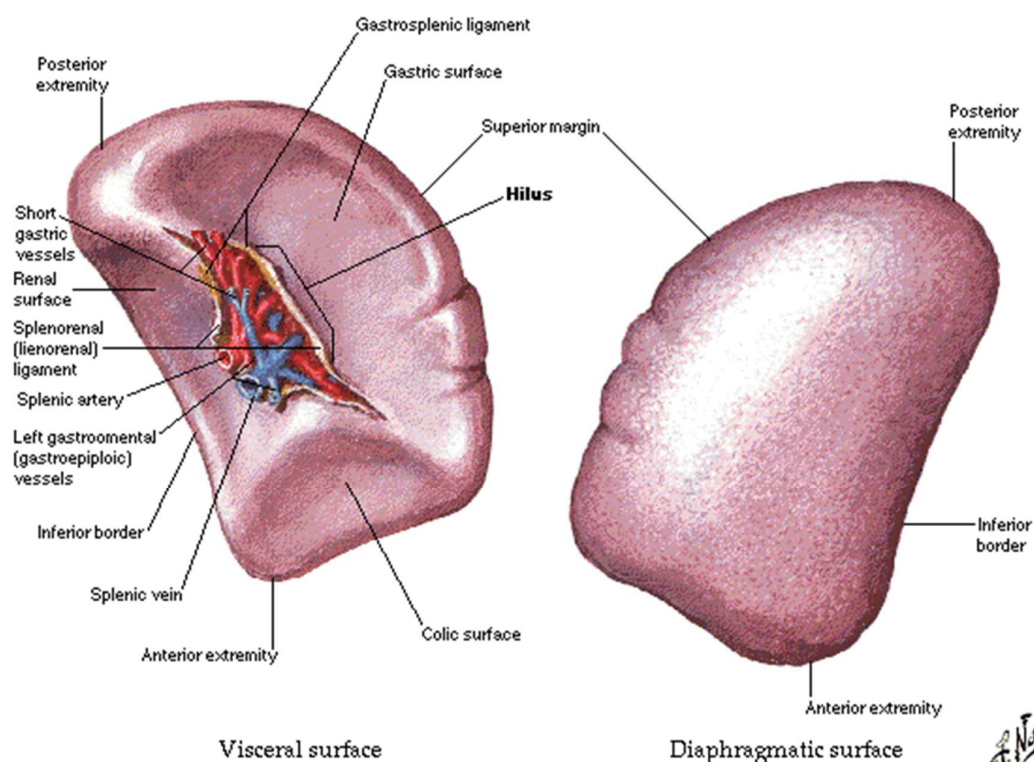
Venous supply – Drained by splenic vein

Tributaries are –

- 1. Short gastric**
- 2. Left gastroepiploic vein**
- 3. Pancreatic vein**
- 4. Inferior mesenteric vein**

Spleen

Visceral and Diaphragmatic Surfaces



SUBCLAVIAN ARTERY

M56BOOKSTORE

Principal artery which continues as axillary artery

Supplies – part of neck & brain

Origin –

Right side – branch of brachio cephalic artery

Left side - it is branch of arch of aorta

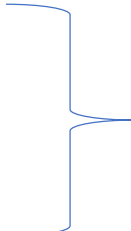
Course –

Each artery arches laterally from the sternoclavicular joint.

To outer border of 1st rib & continues with axillary artery

Scalenus anterior muscles crosses the artery

Divides into 03 parts

1 st – medial		to scalenus anterior
2 nd – posterior		
3 rd – lateral		

Relations –

SD NOTES

1st part –

Anterior – common carotid artery

- Vagus
- Internal jugular veins
- Sterno thyroid
- Sterno hyoid muscles
- Sternocleidomastoid

Posterior –

- supra pleural membrane
- cervical pleura
- apex of lung

2nd part –

Anterior – scalenus anterior

- Sternocleidomastoid

Posterior – cervical pleura

- Apex of lung

Superior – upper & middle trunks of branchial plexus

3rd part –

Anterior – middle 1/3rd of clavicle

- Posterior border of sterno cleido mastoid

Posterior –

- Scalenus medius
- Brachial plexus
- Cervical pleura
- Apex of lung

Superior –

SD NOTES

- Upper & middle trunks of brachial plexus

Branches –

- Vertebral artery
- Internal thoracic artery
- Thyro cervical trunk
- Costo cervical trunk

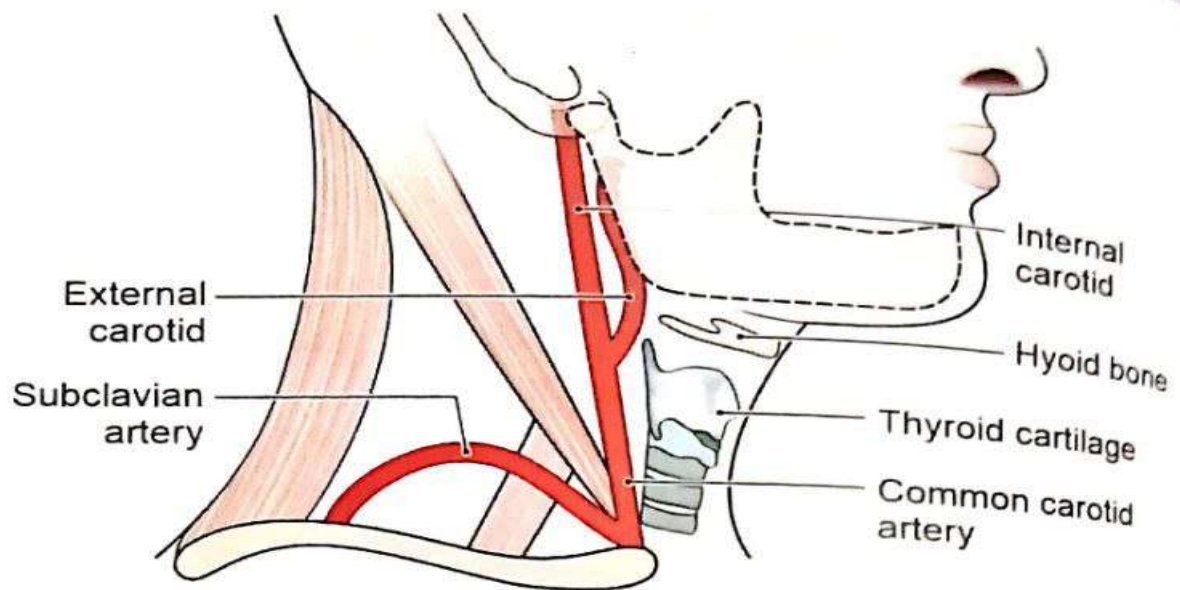


Fig. 8.16: Origin and course of the subclavian arteries

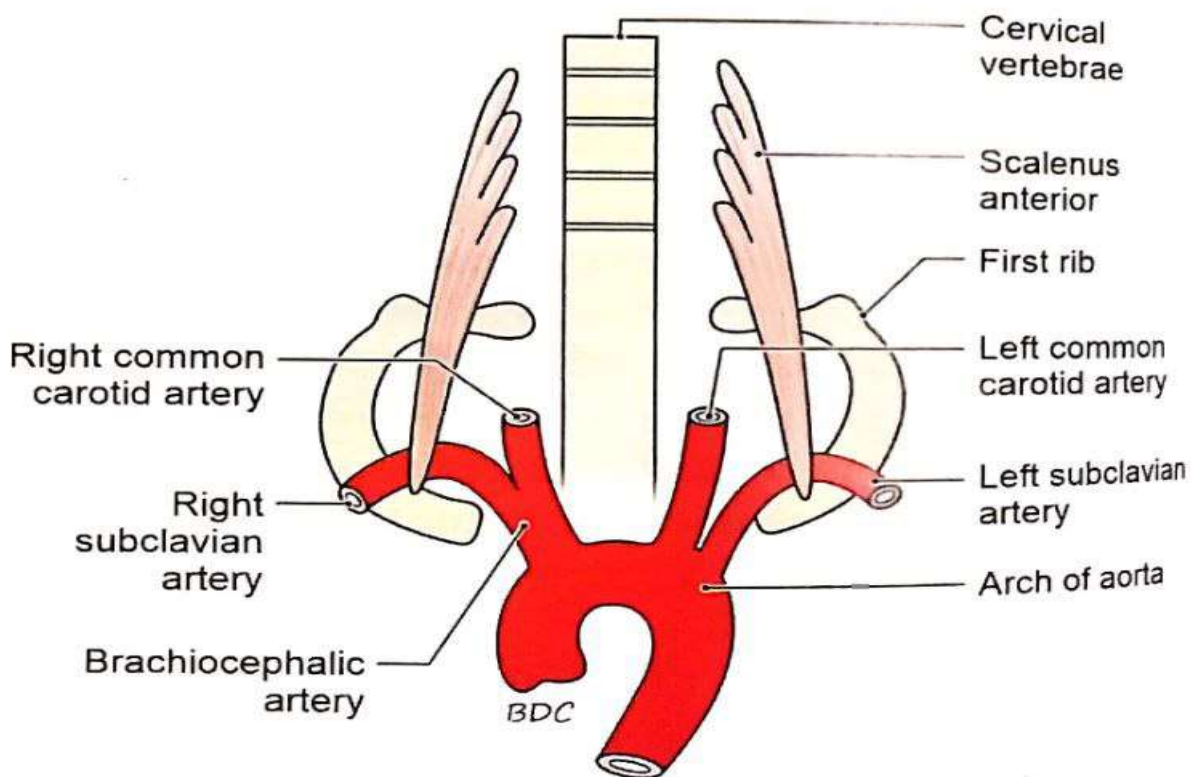


Fig. 8.17: Course of subclavian and carotid arteries

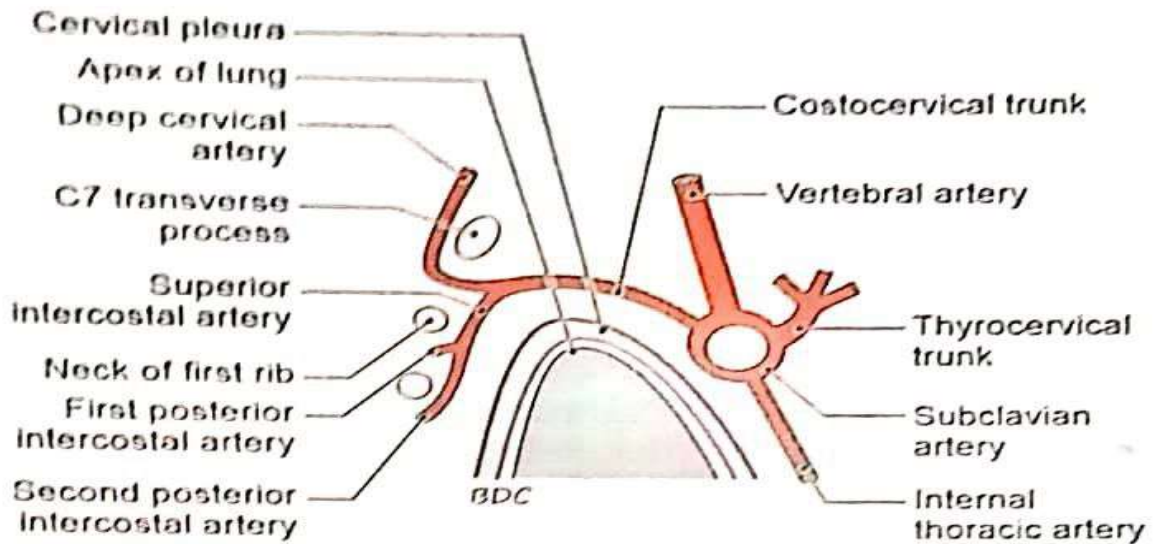


Fig. 8.19: Branches of the subclavian artery. Note that the branches actually arise at different levels, but are shown at same level schematically

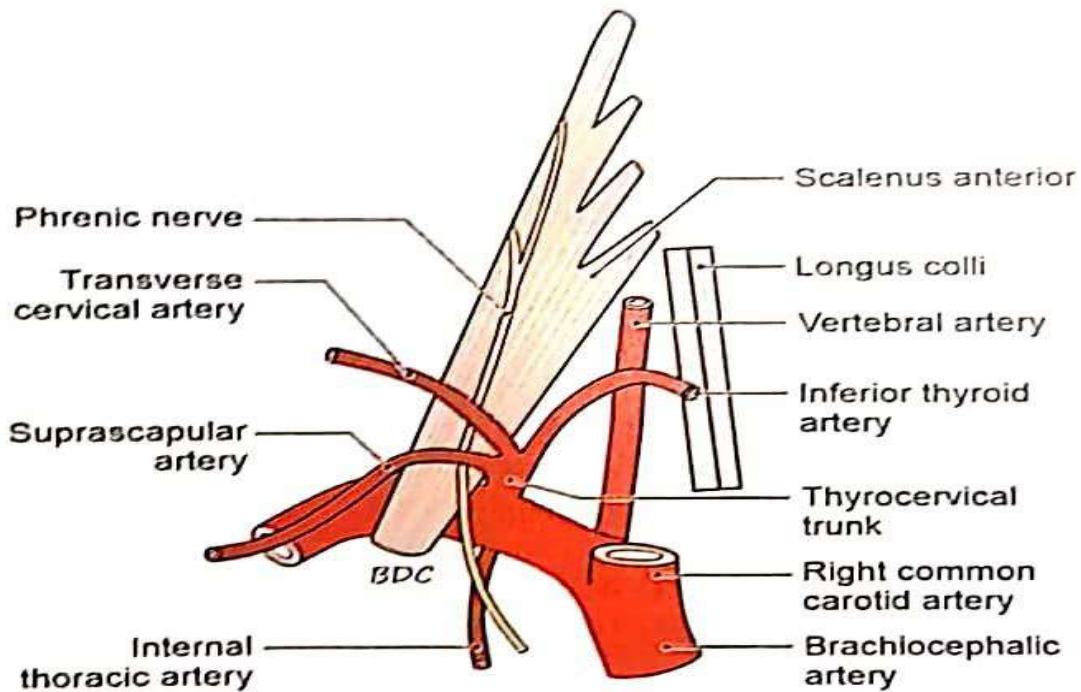


Fig. 8.20: Branches of the subclavian artery

Thyroid gland

SD NOTES [M56BOOKSTORE](#)

Thyroid gland – largest endocrine gland

- Lower part - in front
- Side of neck

Functions

- basal metabolic rate
- Calcium metabolism
- Natural iodine synthesis

Lobes –

- 1. Right lobe
 - 2. Left lobe
- } joined together by isthmus

Situation

- C5 – C7 & T1 vertebrae
- 5th tracheal ring
- Extend upto 2nd & 4th tracheal ring

Capsule

- true capsule
- False capsule

True capsule –

peripheral condensation of connective tissue of gland .

false capsule –

derived from – pretracheal layer of deep cervical fascia

suspensory ligament of berry

PARTS -

s.d notes

- Apex

- Base

SURFACES – 03

Lateral

Medial

Posteriolateral

Borders – 02

Anterior

Posterior

Isthmus – 02 surfaces -----anterior

Posterior

02 border ----- superior

Inferior

Relations –

Apex – sternothyroid muscle

Superior thyroid artery

External laryngeal artery

Base – inferior thyroid artery

Recurrent laryngeal nerve

Surface –

Lateral – sternothyroid

Strerno hyoid

Superior belly of omohyoid

Sternocleido mastoid

Medial – tracheal tube

Oesophagus

Inferior constrictor

Crico thyroid

Recurrent laryngeal nerve

Postero lateral – carotid sheath

Border – superior thyroid artery

Inferior thyroid artery

Parathyroid gland

Thoracic duct

Arterial supply –

Superior thyroid artery

Inferior thyroid artery

Accessory thyroid artery

Venous drainage –

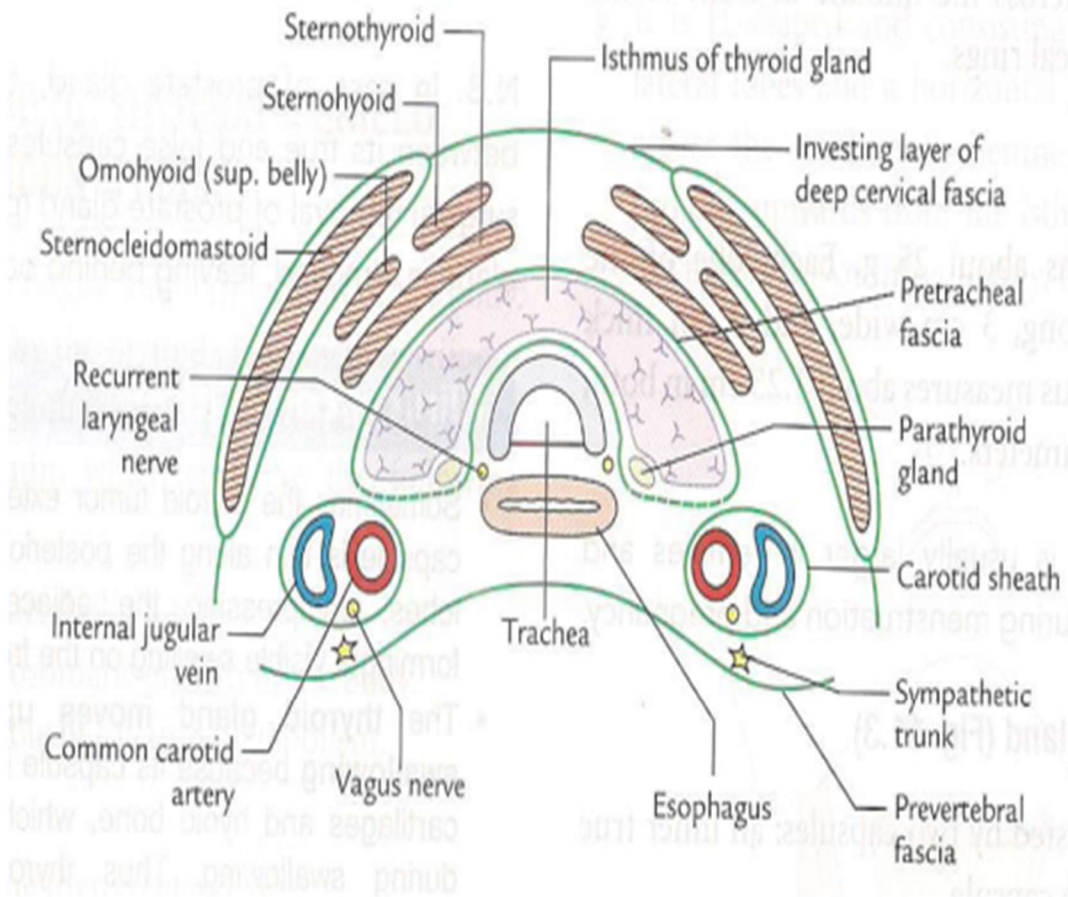
Superior thyroid vein

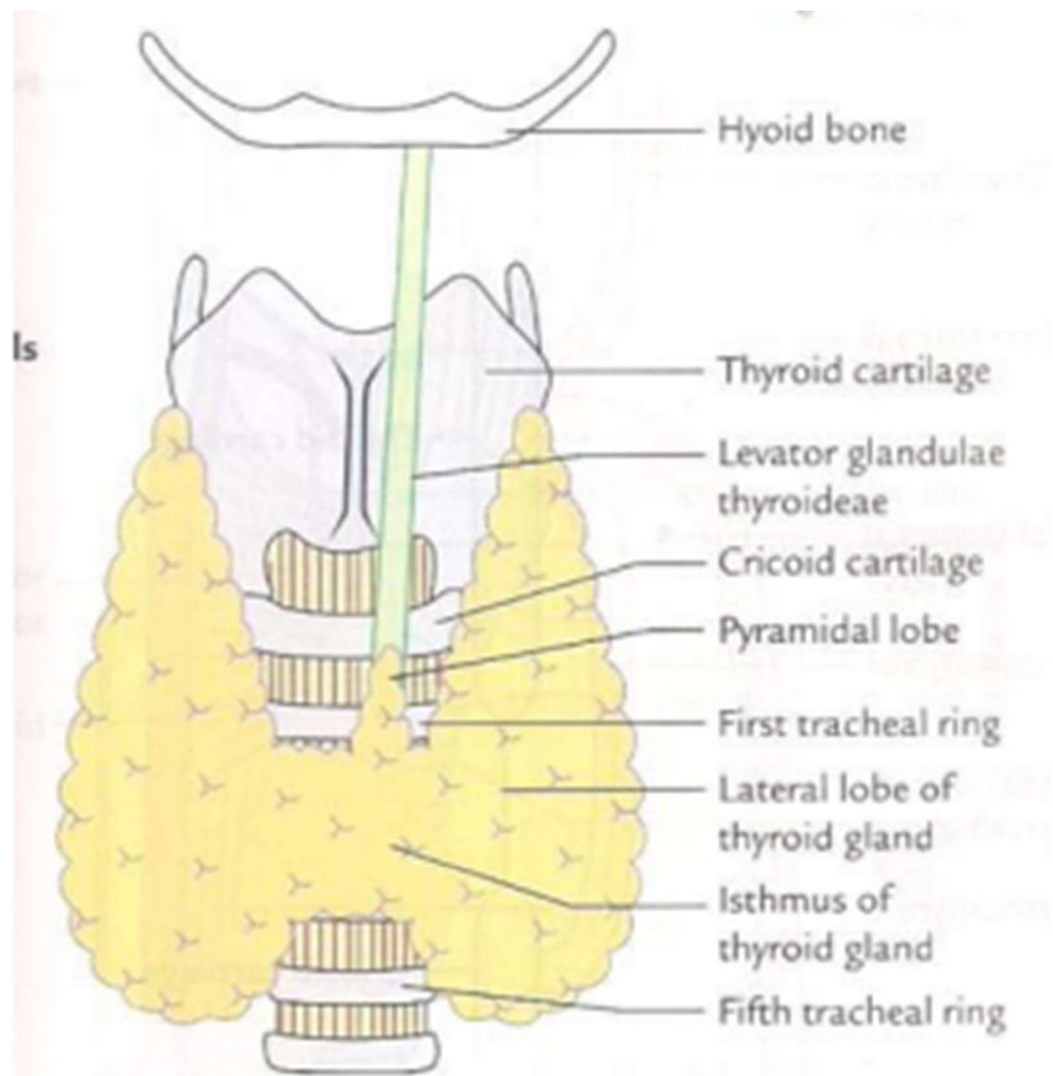
Middle thyroid vein

Inferior thyroid vein

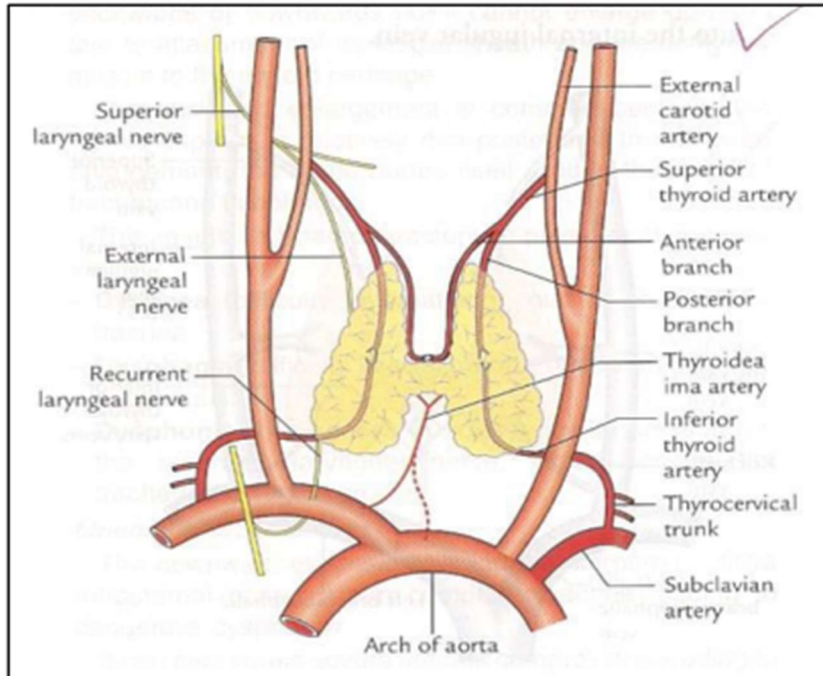
Lymphatic – deep cervical lymph nodes .

B. RELATIONS

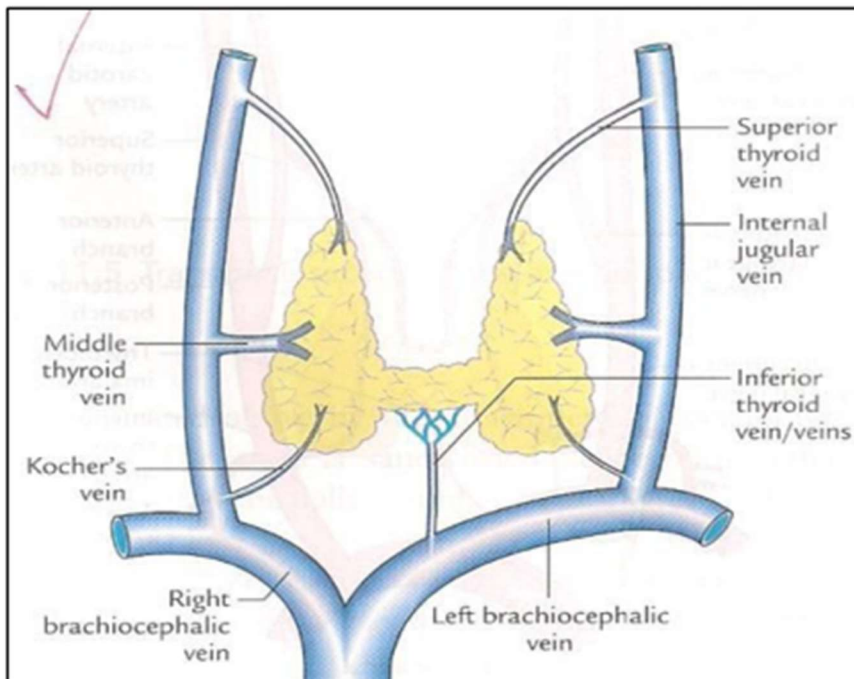




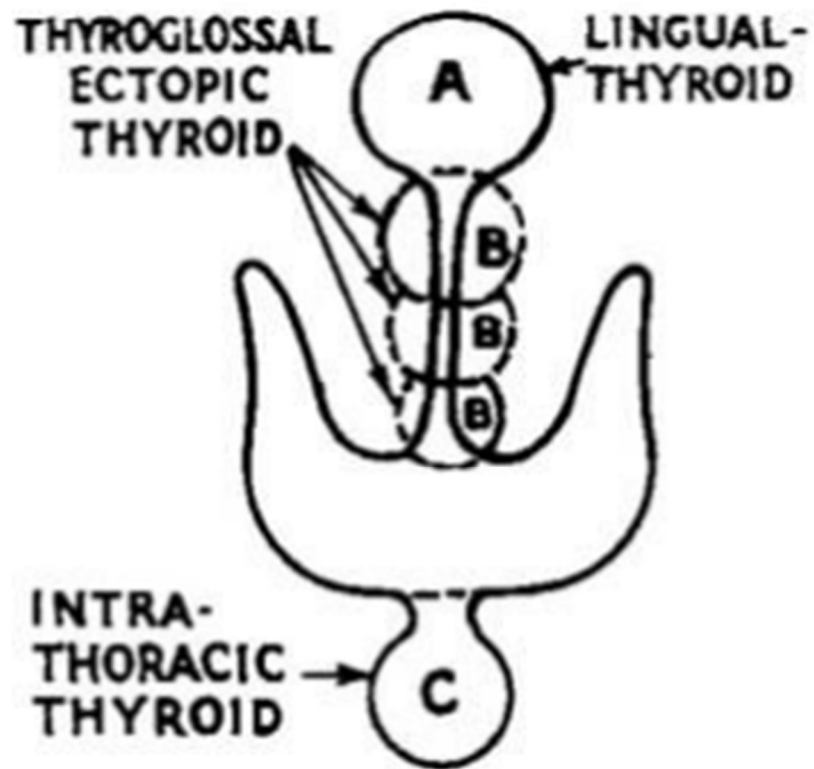
a.Arterial supply



b.Venous drainage



D. APPLIED



Reference ----- Anatomy – bdc – 9th edition – 160- 3rd volume .

TONGUE ANATOMY

M56BOOKSTORE-----DR.SD

MUSCULAR ORAGN

SITUTATED ---Floor of mouth

Functions ----

1. Taste
2. Speech
3. Chewing
4. Deglution

Structure -----

1. Root
2. Tip
3. Body

Tip of the tongue -----

- Anterior free end
- Behind upper incisor teeth

Root of the tongue -----

- Attached to styloid process and soft palate above
- To mandible and hyoid bone

Body of the tongue -----

- 02 borders
- 02 surfaces

-

- 02 borders -----
- Right lateral borders
- Left lateral borders
- 02 surfaces -----
- Dorsal surfaces / dorsum of tongue
- Ventral surfaces
- 1. Dorsal surfaces of tongue -----
- 1. Oral part
- 2. Pharyngeal part

Convex antero posteriorly

Divided into 02 ----- -

1. Anterior $2/3^{\text{rd}}$ or oral part
2. Posterior $1/3^{\text{rd}}$ or pharyngeal part

Anterior $2/3^{\text{rd}}$ & post $1/3^{\text{rd}}$ -----

Joined by sulcus terminalis (v – shaped)

Papillae are present on anterior $2/3^{\text{rd}}$ portion of tongue -----

Papillae are projections of mucous membrane

Roughness present on anterior $2/3^{\text{rd}}$ part

Papillae types ----

1. Circumvallate papillae -----lateral wall
 - It is of v shape
 - 1-2 mm in diameter
 - 8-12 in number
2. Fungiform papillae ----
 - Smaller and more in number
 - Large in size than filiform papillae
3. Filiform papillae ---
 - Present in the middle part of the dorsum tongue
 - Smallest in size
4. Foliate papillae -----
 - 3-4 small vertical folds on the margin of sulcus terminalis

Posterior 1/3rd part ----

- Lies behind the palatoglossal arches and sulcus terminalis
- Part (lymphoid follicles are present)
- 
- Collectively called lingual tonsils
- Mucous glands are present
- Either side of median fold ----depression called vallecula

Muscles of tongue -----

1. Intrinsic muscle
 2. Extrinsic muscle
- Intrinsic muscles ----
 1. Superior longitudinal linguae -----concave shortness
 2. Inferior longitudinal linguae -----convex shorten
 3. Transverse linguae -----narrow & elongated
 4. Verticalis linguae ----- broad and flattened

Extrinsic muscles ----

1. Genioglossus -----protrudes
2. Hyoglossus ----- depresses
3. Styloglossus -----retracts
4. Palatoglossus----- elevates

Arterial supply ----

- lingual artery
- branched of carotid artery

venous drainage ----

- deep lingual vein

Nerve supply -----

All muscle ----hypoglossal nerve ----12th cranial)

Motor nerve -----except ----palatoglossus ----pharyngeal plexus

Sensory ----- Anterior 2/3rd ---lingual nerve , posterior1/3rd ---glossopharyngeal nerve – 9th CN

CLINICAL ANATOMY -----

HYPOGLOSSAL nerve injury -----paralysis of tongue muscles

Glossitis -----generalized ulceration

Stomatitis ----- inflammation of tongue

Carcinoma of tongue

Pale colour in anemia

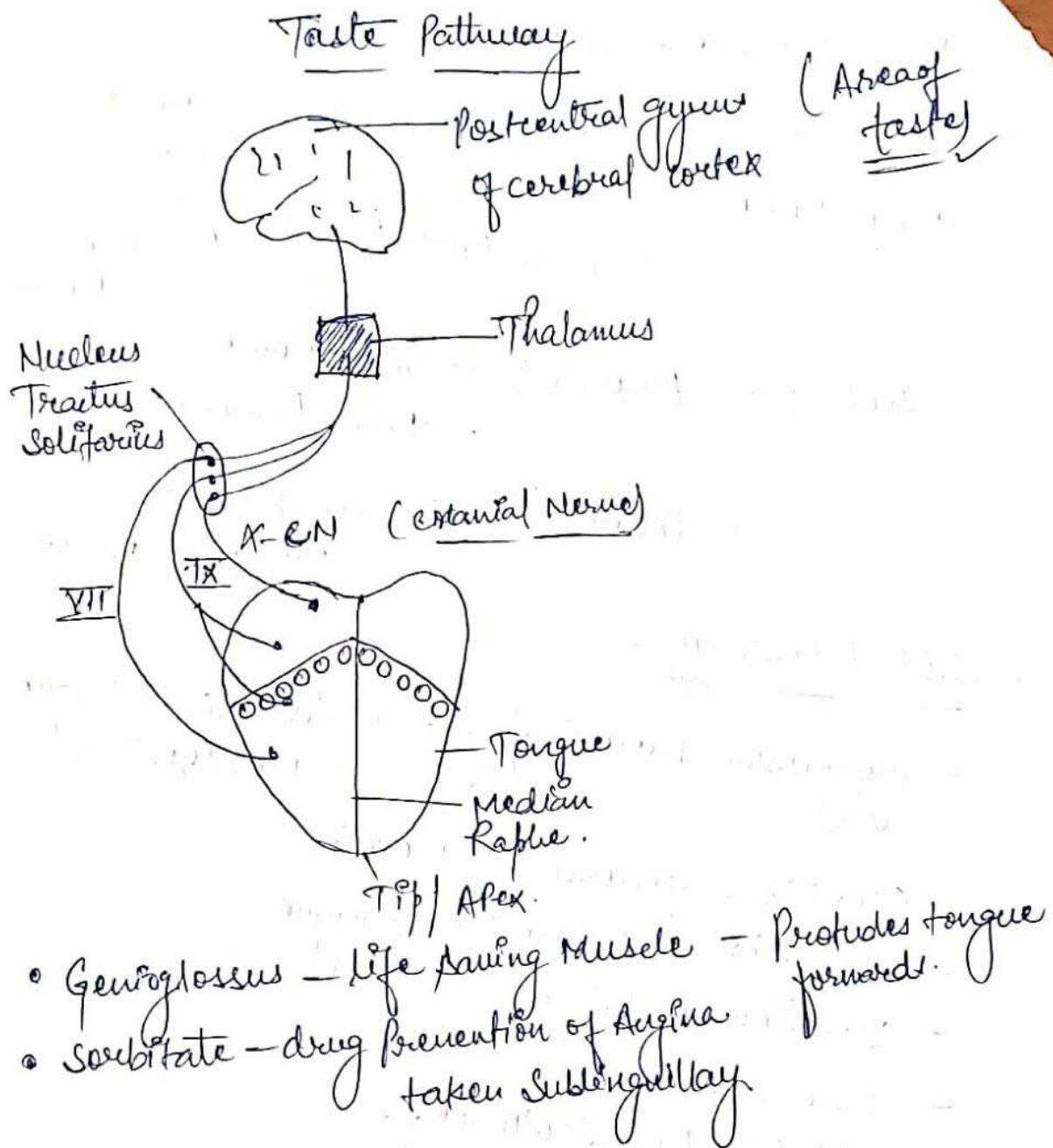
Violet colour in riboflavin deficiency

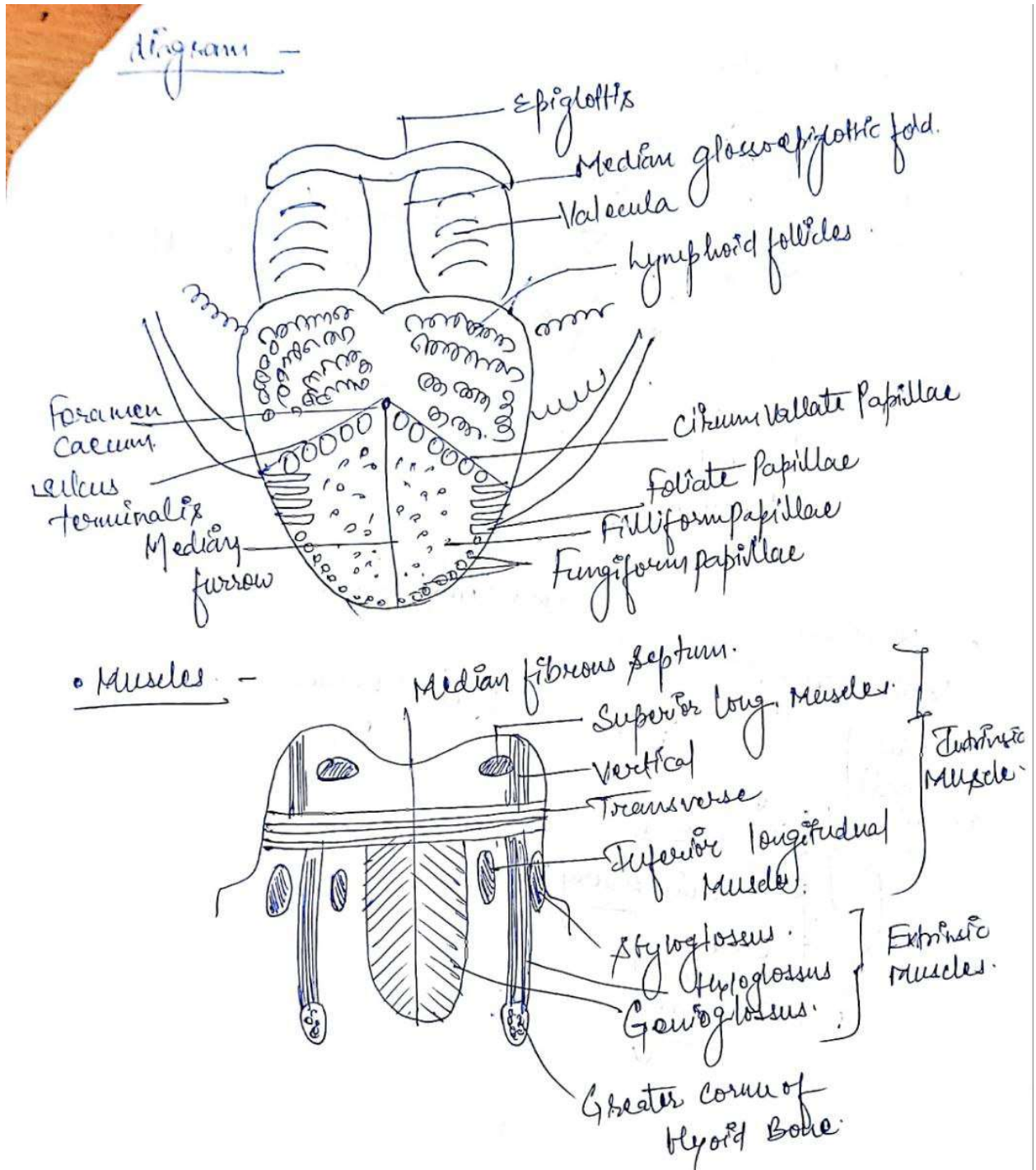
Dry in dehydration

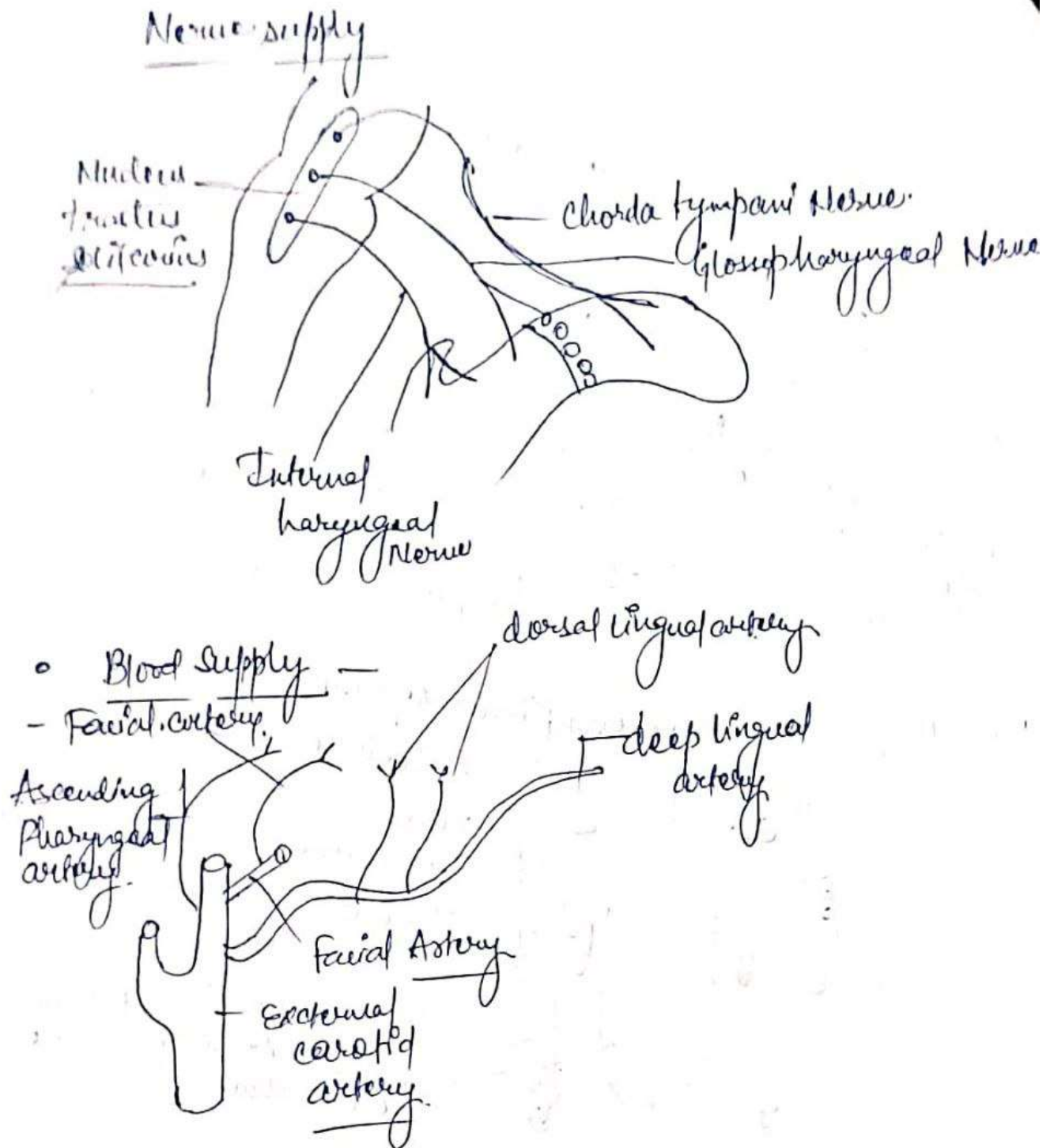
Blue in cyanosis

Tongue bite -----

TASTE PATHWAY







BREAKDOWN OF TONGUE DEVELOPMENT -----

- **Embryonic origin:**

- The tongue begins forming around the 4th week of embryonic development.
- It develops from multiple pharyngeal arches (first, second, and third).

- **Formation of the anterior 2/3 (body):**

- The anterior two-thirds of the tongue originates from the **first pharyngeal arch**.
- It starts as **two lateral lingual swellings** and a **tuberculum impar**. The lateral swellings grow and fuse, covering the tuberculum impar to form the anterior portion.
- The epithelium of this region is innervated by the **lingual nerve** (branch of the mandibular nerve, CN V3).

- **Formation of the posterior 1/3 (root):**

- The posterior one-third of the tongue forms from the **third pharyngeal arch**, with contributions from the second and third arches.
- This portion develops from the **hypobranchial eminence**.
- The mucosa of the posterior part is innervated by the **glossopharyngeal nerve** (CN IX).

- **Development of the muscles:**

- The muscles of the tongue originate from **occipital myotomes**, specifically from somites (segments of mesoderm).
- These muscles are innervated by the **hypoglossal nerve** (CN XII), which is responsible for tongue movement.

- **Development of taste buds:**

- The taste buds develop from **interactions between epithelial and mesenchymal tissues**.
- The anterior two-thirds (innervated by the **chorda tympani**, a branch of the facial nerve CN VII) provides taste sensation.
- The posterior one-third (innervated by the **glossopharyngeal nerve** CN IX) is also responsible for taste.

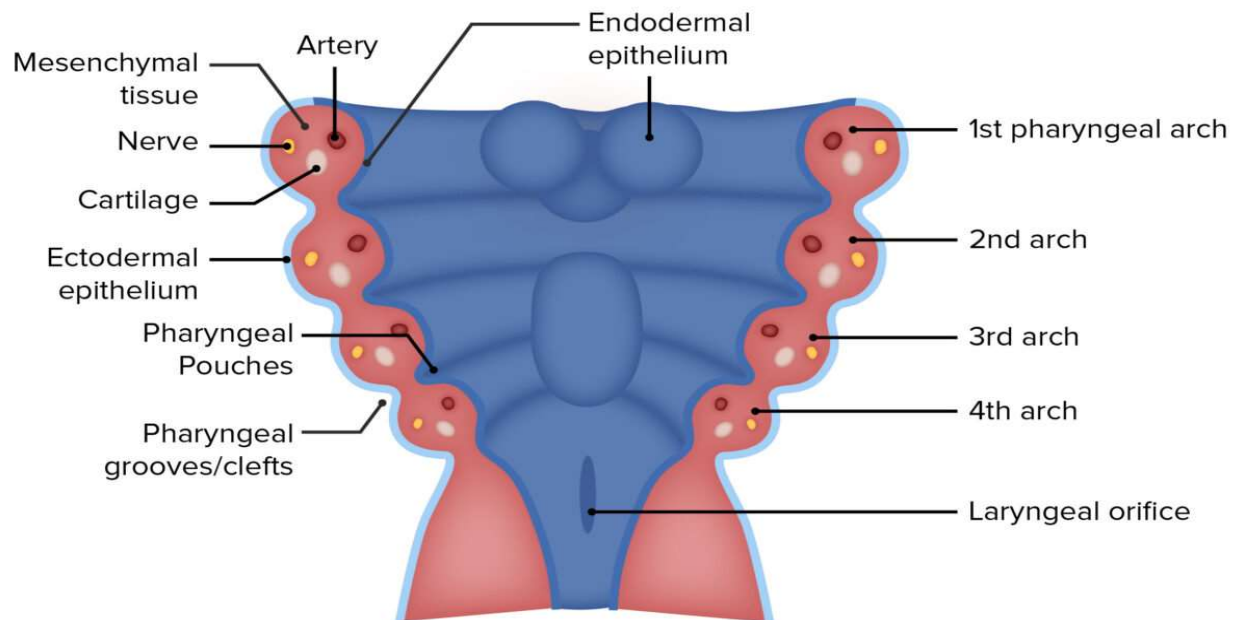
- **Fusion and appearance of the median sulcus:**

- The fusion of the lateral lingual swellings creates a midline structure called the **median sulcus**.

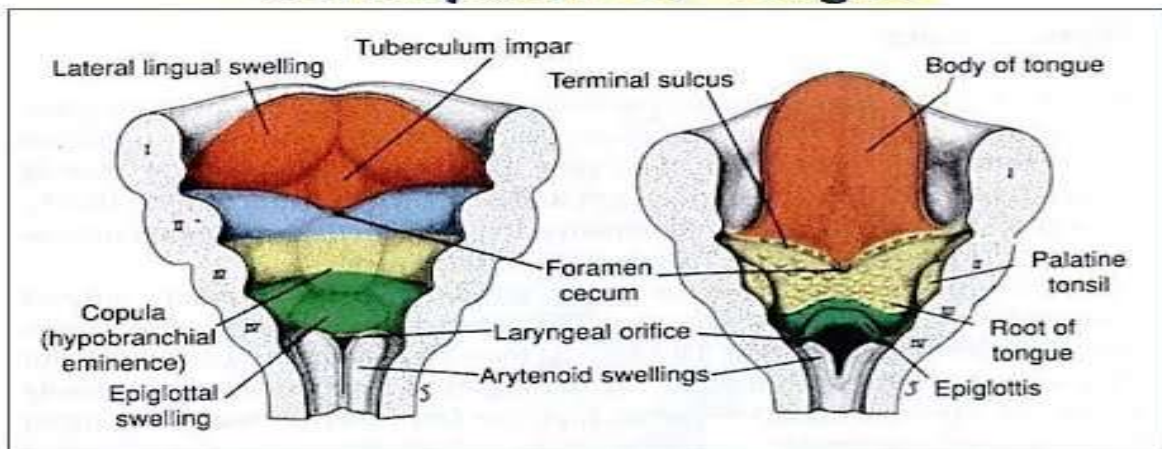
- **Developmental milestones:**

- By around **week 8** of embryonic development, the tongue is largely formed.

- Functional development and maturation of taste sensation continue into the fetal stage.
- **Innervation summary:**
 - **Motor:** Hypoglossal nerve (CN XII) for movement.
 - **General sensory:** Lingual nerve (CN V3) for anterior 2/3, glossopharyngeal nerve (CN IX) for posterior 1/3.
 - **Taste sensory:** Chorda tympani (CN VII) for anterior 2/3, glossopharyngeal nerve (CN IX) for posterior 1/3.



Development of Tongue



Prof. Mohamed A. Aitifi

Urinary bladder

M56bookstore

- Intrapelvic organ
- Storehouse of urine
- Tetrahedral shape – empty condition
- Ovoid shape – filled condition

External features –

- Apex
- Base
- Neck
- Surfaces
- Borders

- Apex – directed downwards in bladder
- Base – directed backwards in empty bladder
- Neck – most fixed part – urethral sphincter started

Surfaces – 03 surfaces –

- Superior surface
- Right surface
- Left inferolateral surface

Borders – 04 borders

- 02 lateral
- 01 anterior
- 01 posterior

Capacities –

- Average capacity – 120-320 ml
- Mean capacity - 220 ml
- Sense of filling - 100 – 150 ml
- Micturition - 250 ml
- Painful sensation - >450 ml

Male urethra parts –

- Pre postatic
 - Prostatic part
 - Membraneous part
- important parts
- Spongy part of urethra
 - Penile part
 - External urethral orifice

Diagram – image based –

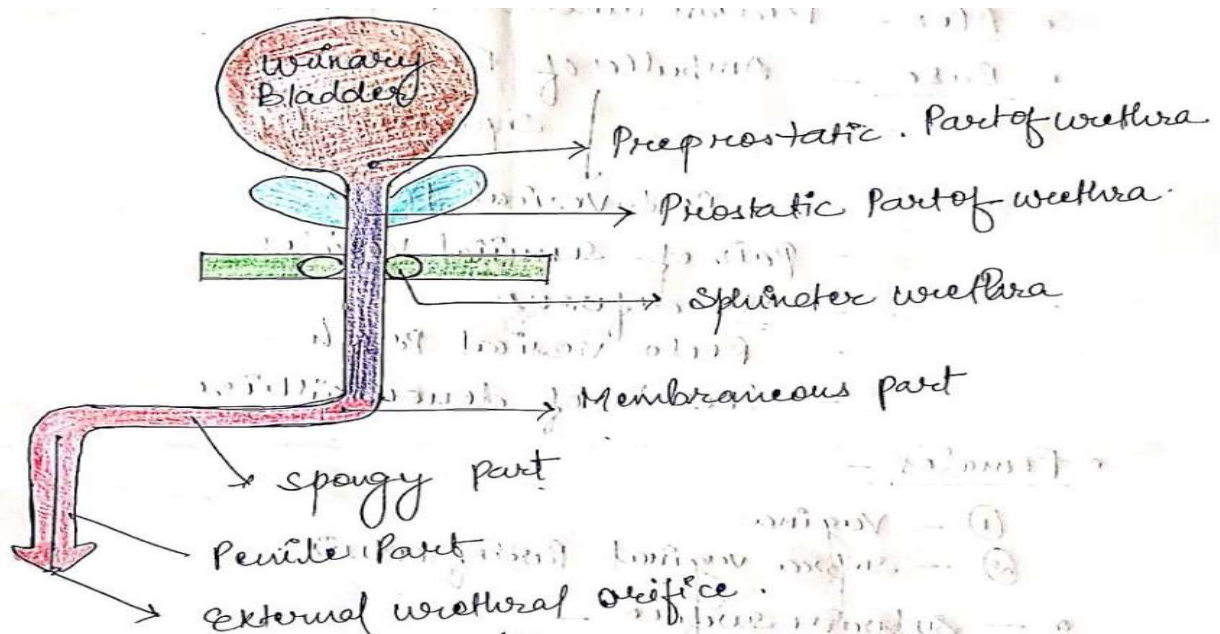
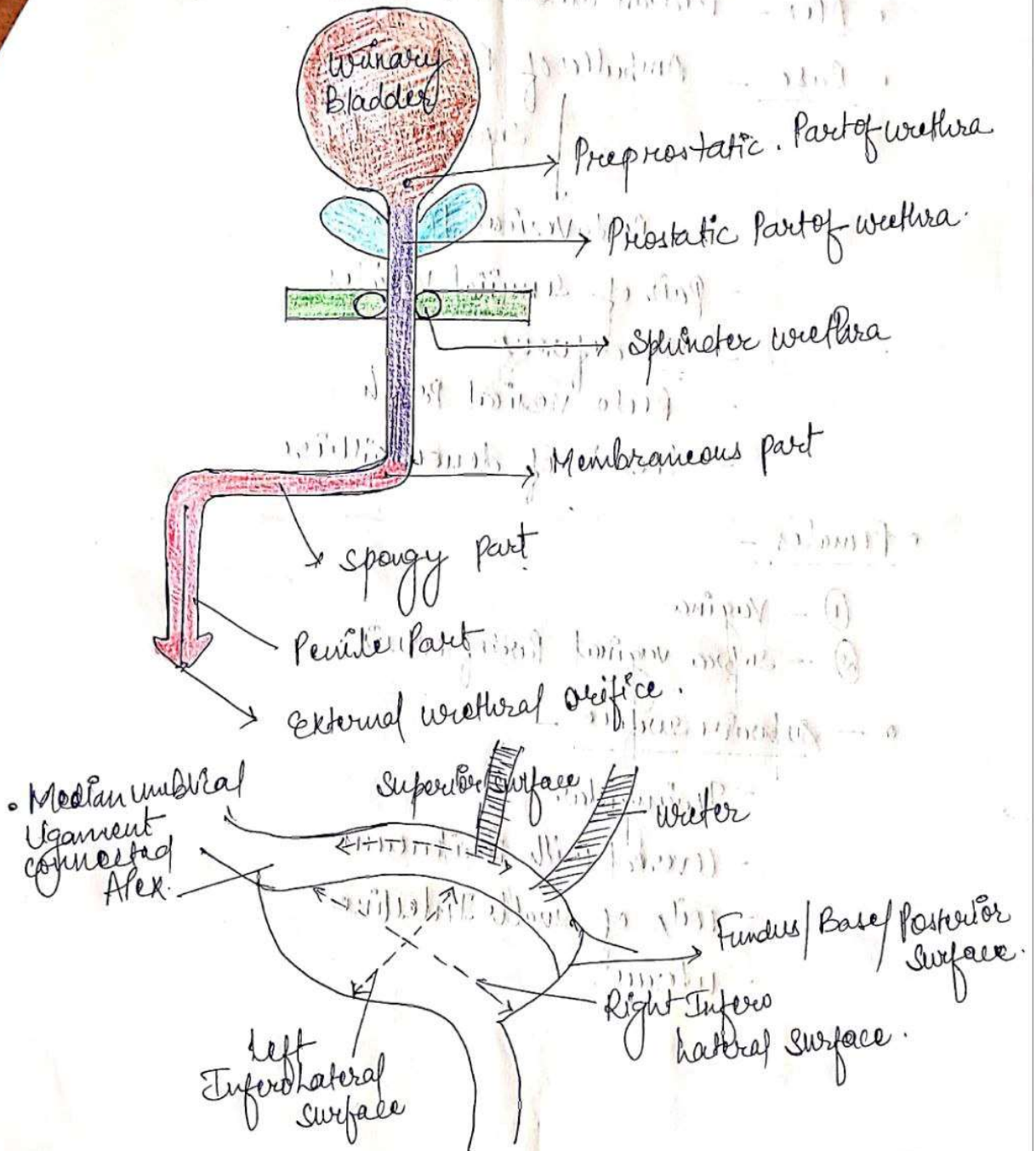


Image Based Information:



Realtions –

Relations – Males -

- Apex – median umbilical ligament
- Base – Ampulla of rectum



- Separated by
- Rectovesical pouch

- Pair of seminal vesicles
- Vas deferens
- Recto vesical pouch
- Fascia of Denon Villiers

Females –

- Vagina
- Supra vaginal part of cervix

Superior surface – relation

- Triangular
- Covered with peritoneum
- Uterus

Inferiolateral surface – Relations

- Directed downwards & laterally
- Pelvic surface
- Fascia covering levator ani & obturator internus muscles
- Space of retzius

Space of retzius – 2 marks –

- Space b/w infero lateral urinary bladder & fascia covering levator ani .

Neck Relations –

- Lowest part of urinary bladder
- Urethra begins – male prostatic part includes
- Surrounded – base of prostate

Females –

- contact with urogenital diaphragm

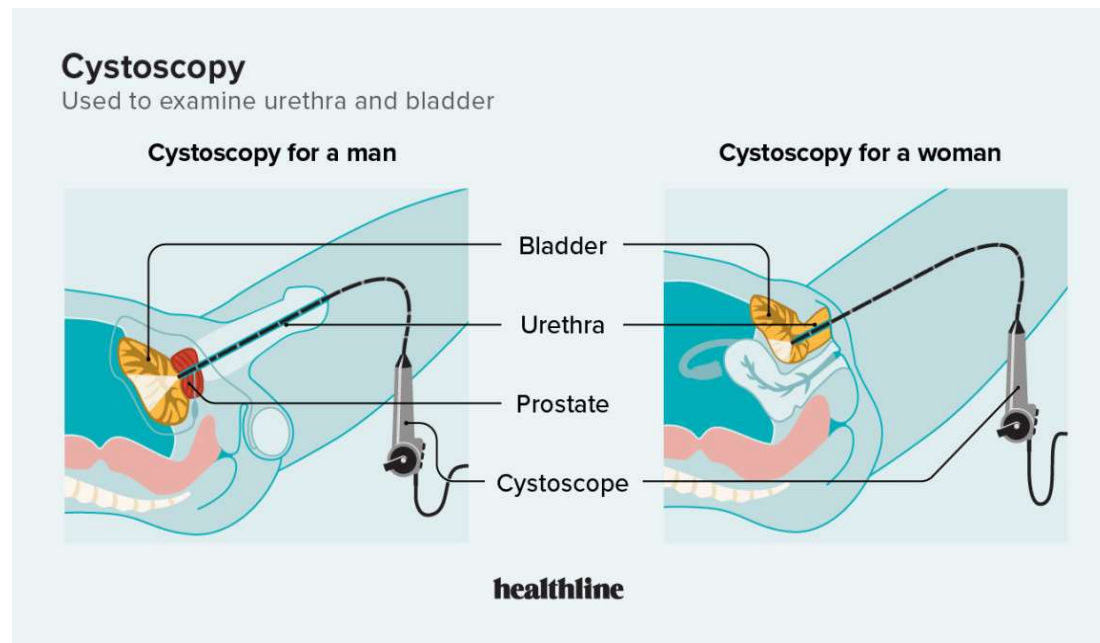
Distended bladder / empty –

- Shape – ovoid
- Surfaces –
- anterior inferior – No peritoneum
- Posterior superior – with peritoneum
- 02 lateral surfaces

Parts –

- summit , base , neck

Examination of bladder wall – tube of cystoscope – (imp)



Ligaments –

- True ligaments
- False ligaments

True ligaments –

- Median umbilical ligament
- Medial puboprostatic ligament
- Lateral puboprostatic ligament
- Lateral ligament pair
- Posterior ligament pair

False ligament –

- Median umbilical fold
- Medial umbilical fold
- Lateral false ligament
- Posterior false ligament

Structure –

- Outside to inside –
- Serous
- Muscularis -----detrusor muscle
- Submucosa
- Mucosa

Trigonum vesicae –

- Ureteric ridge of mercier

Uvula vesicae –

- Produced by median lobe of prostate

Arterial supply –

- Superior vesicle artery
- Inferior vesicle artery
- Obturator artery
- Branch of inf gluteal artery
- Female – uterine artery

Venous drainage –

- Venis form -----space of retzius -----communicates with prostatic plexus -----finally -----internal iliac veins .

Lymph nodes –

- External iliac nodes
- Internal iliac nodes

Nerve supply –

- Parasympathetic – splanchnic nerve -----s2 s3 s4
- Sympathic – plexus hypogastric fibers ----T11 – L2
- Somatic - pudendal nerve

Applied anatomy –

- Hypertrophy of bladder
- Urinary bladder incontinence
- Trabeculated bladder
- Dribbling of urine through autonomus bladder
- Bladder rupter – any injury of lower abdominal wall

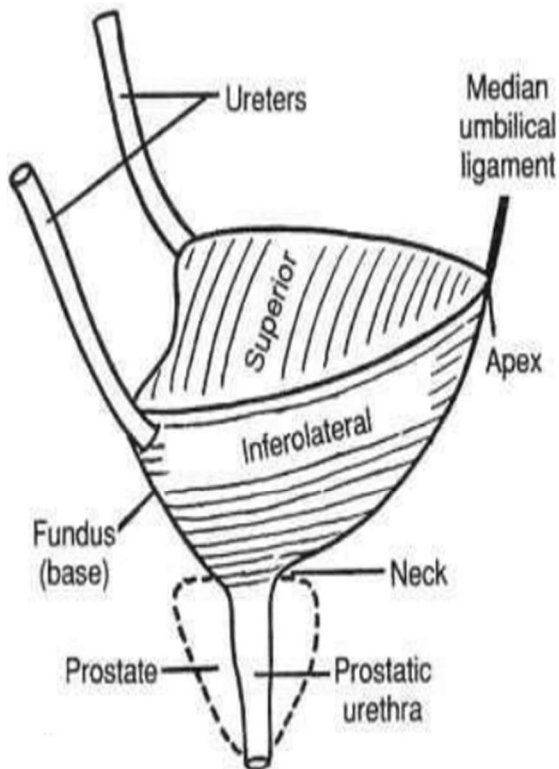
Suprapubic cystotomy (spc)

- Pt. cannot empty the bladder due to urethral trauma or bony fracture.
- Bladder – stones --- concentrated urine.

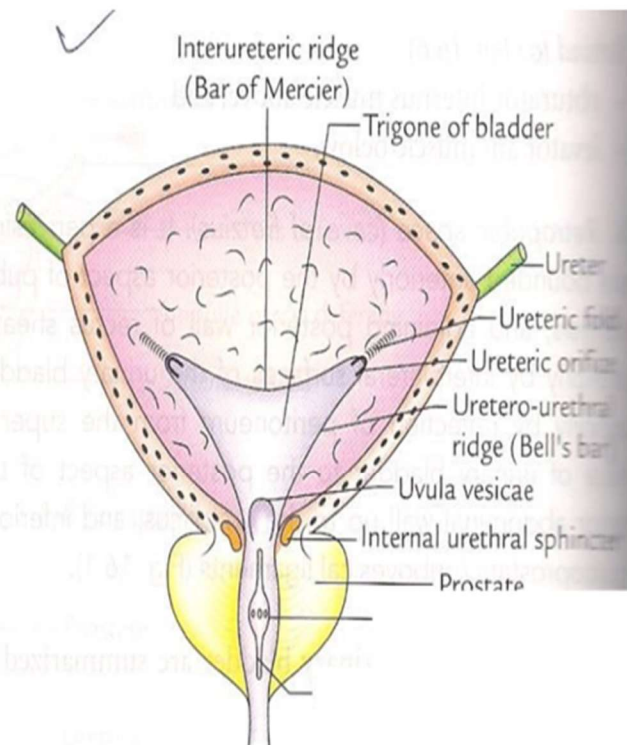
Diagrams –

A. PARTS

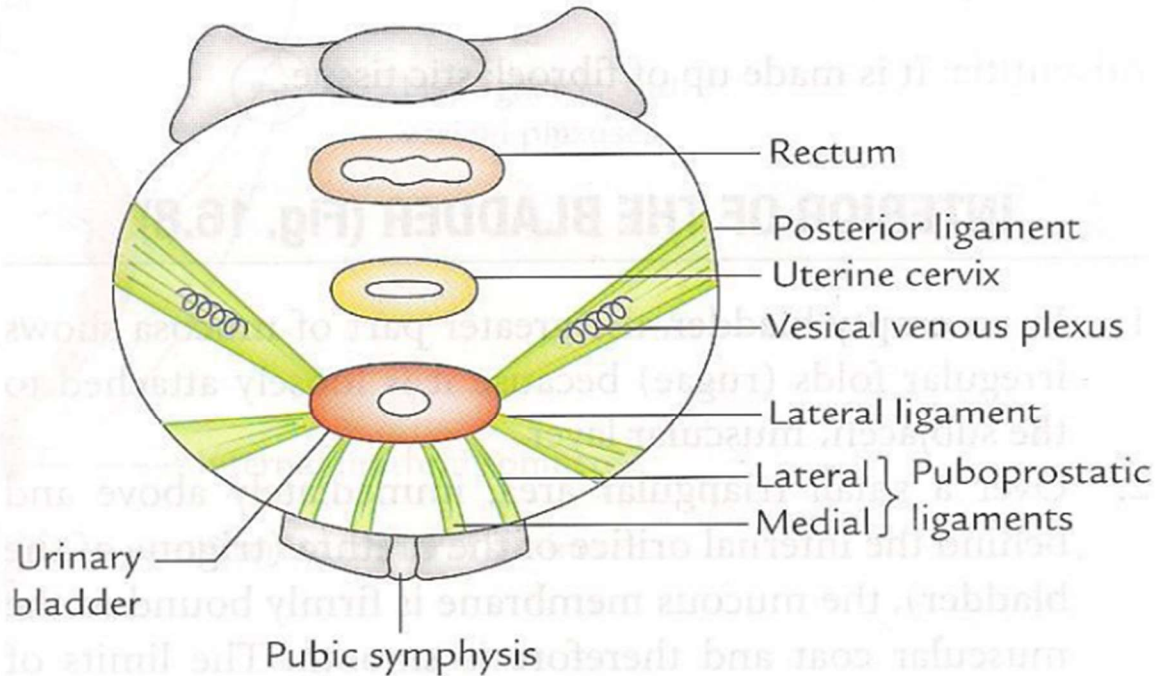
a.External features



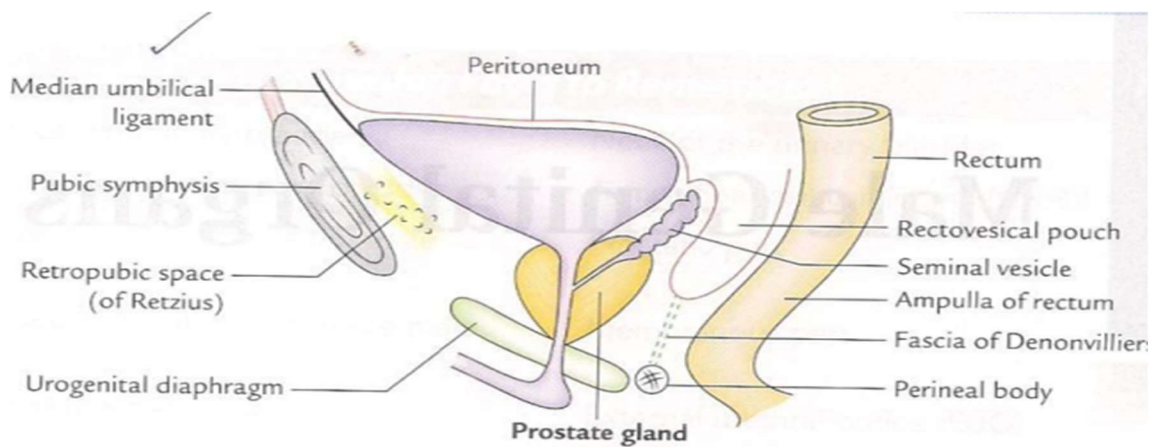
b.Internal features & Trigone



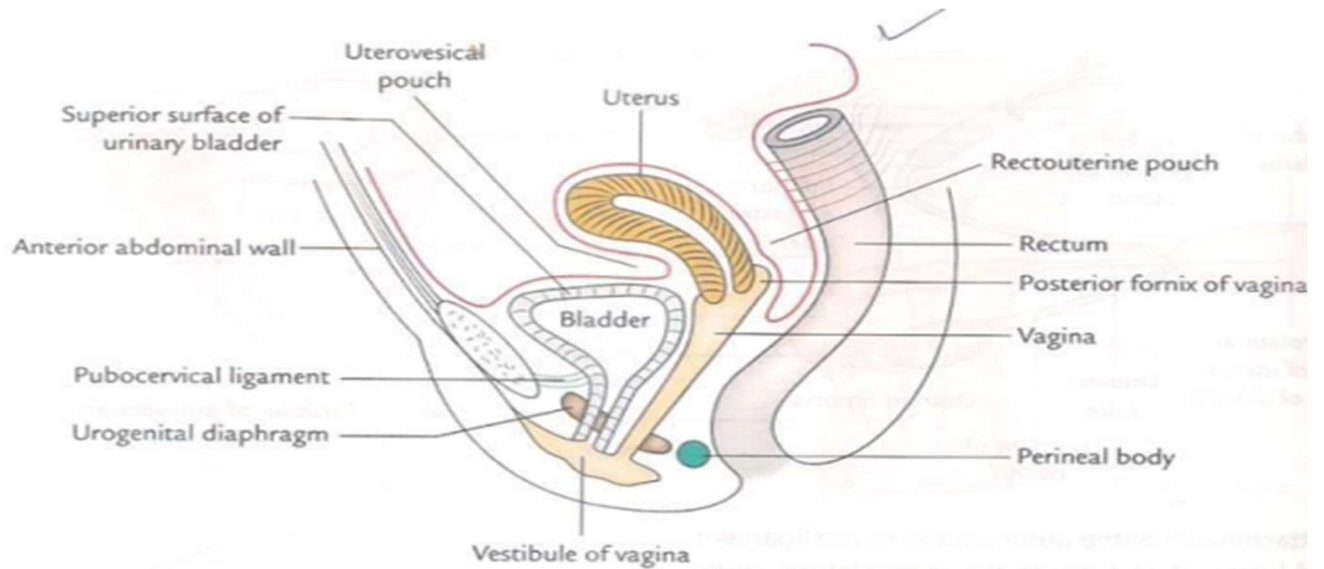
B. LIGAMENTS



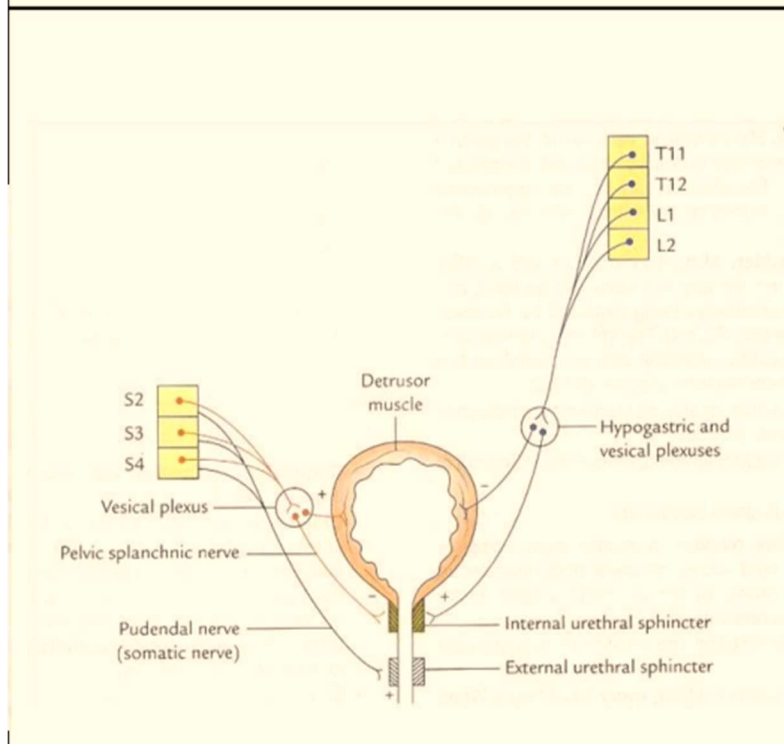
C. RELATIONS IN MALE



D. RELATIONS IN FEMALE



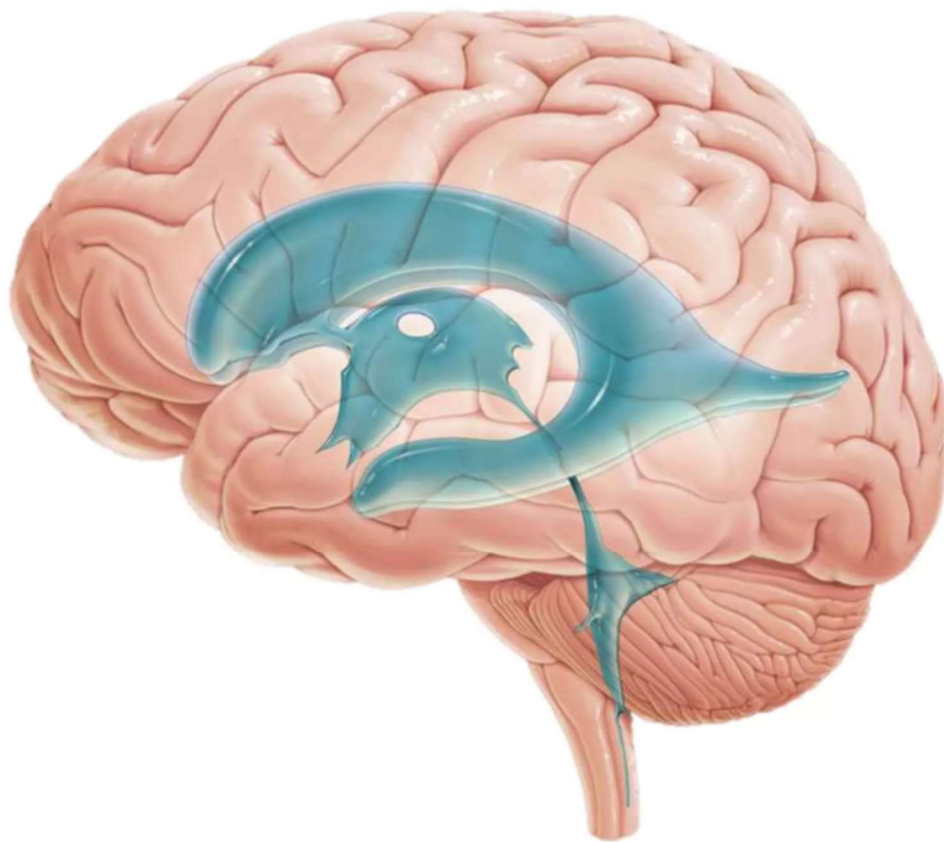
E. NERVE SUPPLY



VENTRICLES OF THE BRAIN – M56BOOKSTORE

VENTRICLES OF THE BRAIN –

**COMMUNICATING CAVITY WITHIN THE CNS THAT ARE
LINED BY EPENDYMAL CELLS , WHICH PRODUCES ,
CONTAINS AND CIRCULATES CSF .**



CAVITIES –

VENTRICULAT SYSTEM COMPRISES –

TWO LATERAL VENTRICALS

3RD VENTRICAL

4TH VENTRICAL

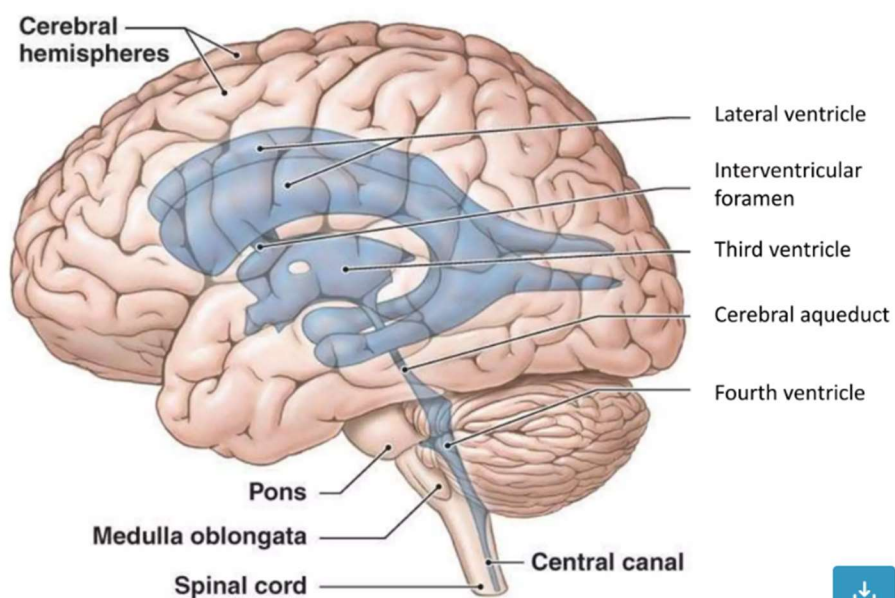
TERMINAL VENTRICAL

THESE CHANNELS ARE –

INTERVENTRICULAR FORAMEN OR FORAMEN OF MONRO

CEREBRAL AQUEDUCT

CENTRAL CANAL



VENTRICLES –

LATERAL VENTRICAL –

BODY – LIES IN THE PARIENTAL LOBE

ROOF – CORPUS CALLOSUM

FLOOR – BODY OF CAUDATE NUCLEUS

UPPER SURFACE OF THALAMUS

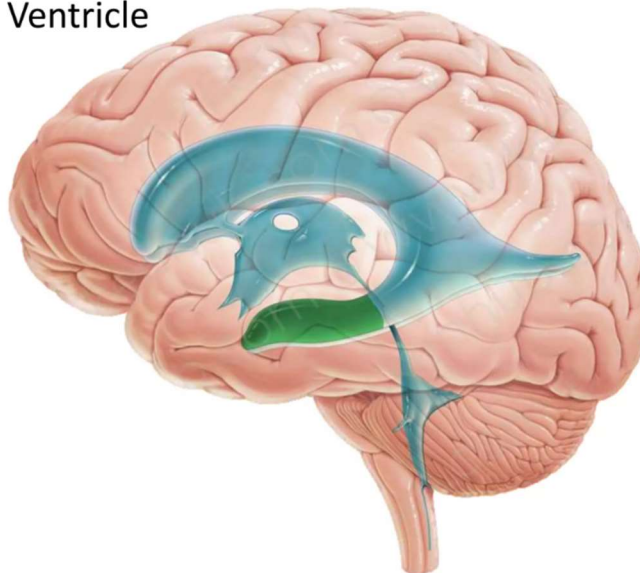
CHOROID PLEXUS

BODY OF FORNIX

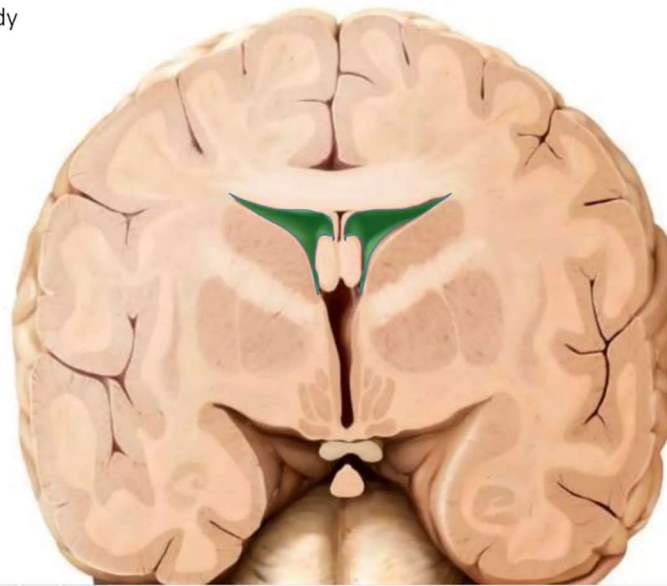
MEDIAL WALL – SEPTUM PELLUCIDUM

LATERAL WALL – NARROW AREA AT ROOF AND FLOOR

Lateral Ventricle



Body



ANTERIOR HORN –

LOCATION – FORNTAL LOBE

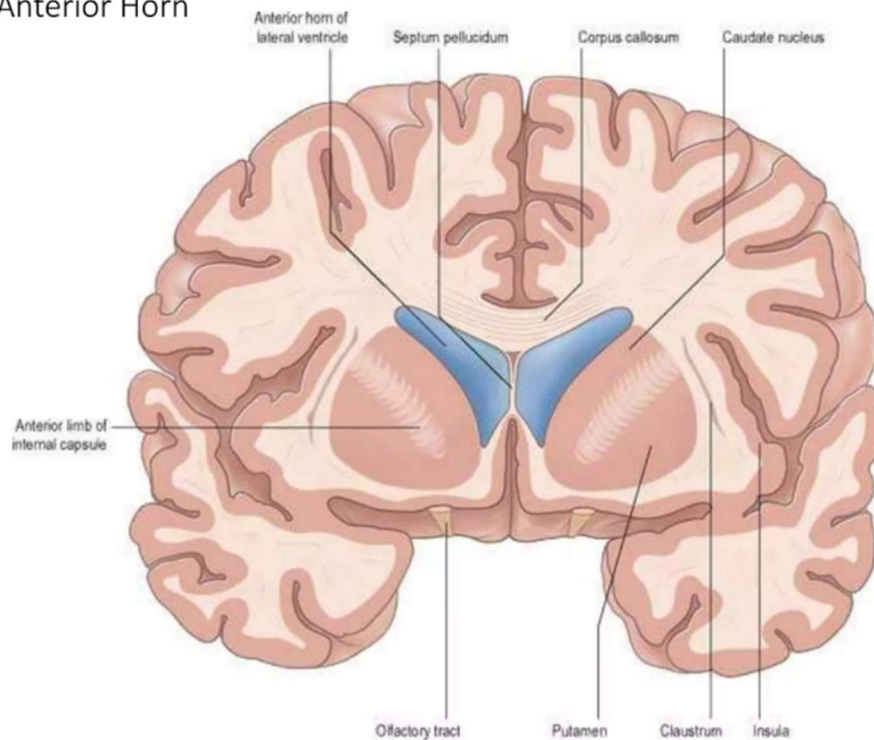
ROOF - CORPUS CALLOSUM

FLOOR - CORPUS CALLOSUM ,
CAUDATE NUCLEUS

ANTERIOR – CORPUS CALLOSUM

MEDIALY - SEPTUM PELLUCIDUM

Anterior Horn



POSTERIOR HORN –

LOCATION OCCIPITAL LOBE

ROOF & LATERAL WALL – TAPETUM OF CORPUS CALLOSUM

MEDIALY – 2 ELEVATIONS – BULB OF POSTERIOR HORN , CALCAR AVIS

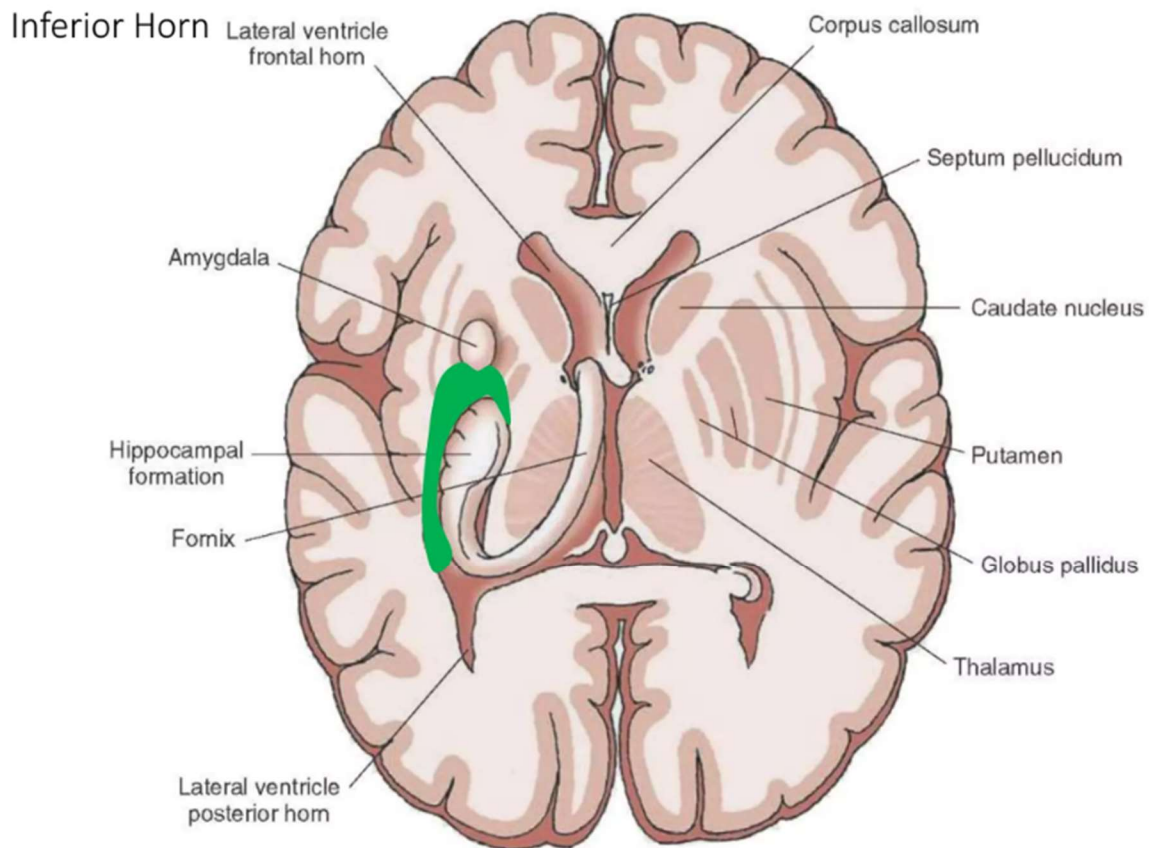
PRODUCE BY CALCARINE SULCUS.

INFRIOR HORN –

LOCATION – TEMPORAL LOBE

ROOF – TAPETUM , TAIL OF CAUDATE NUCLEUS,
AMYGDALOID NUCLEUS , STRIA TERINALIS

FLOOR – HIPPOCAMPUS , FIMBRIA , HIPPOCAMPUS
AND COLLATERAL EMINENCE .



3RD VENTRICLE –

LOCATION – B/W TWO THALAMUS

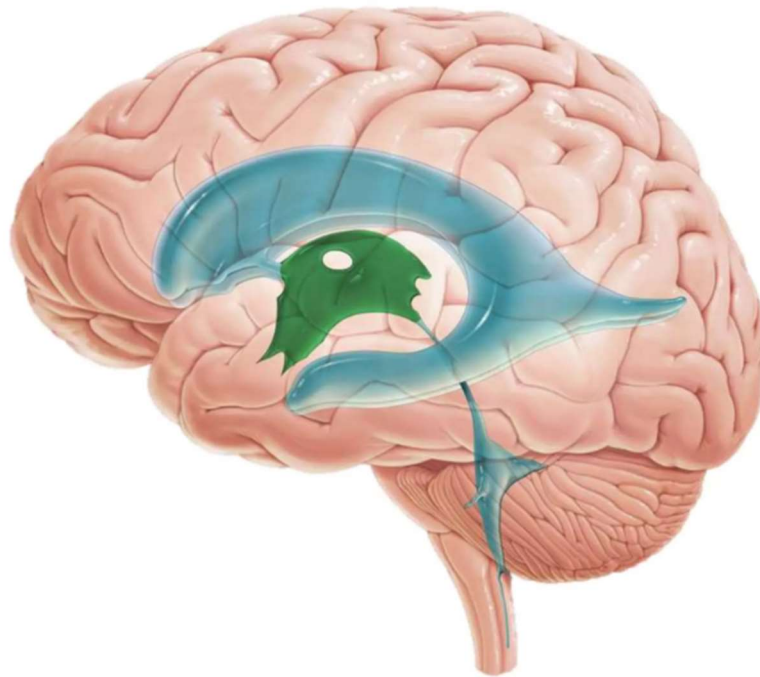
ROOF – FORNIX , TELLA CHOROIDA

FLOOR – HYPOTHALAMUS

LATERALLY – THALAMUS & HYPOTHALAMUS

ANTERIORLY – LAMINA TERMINALIS

POSTERIORLY – OPENING INTO THE CEREBRAL
AQUEDUCT ,PINEAL RECESS.



4TH VENTRICLE –

LOCATION – ANTERIOR – CEREBELLUM

POSTERIOR – PONS

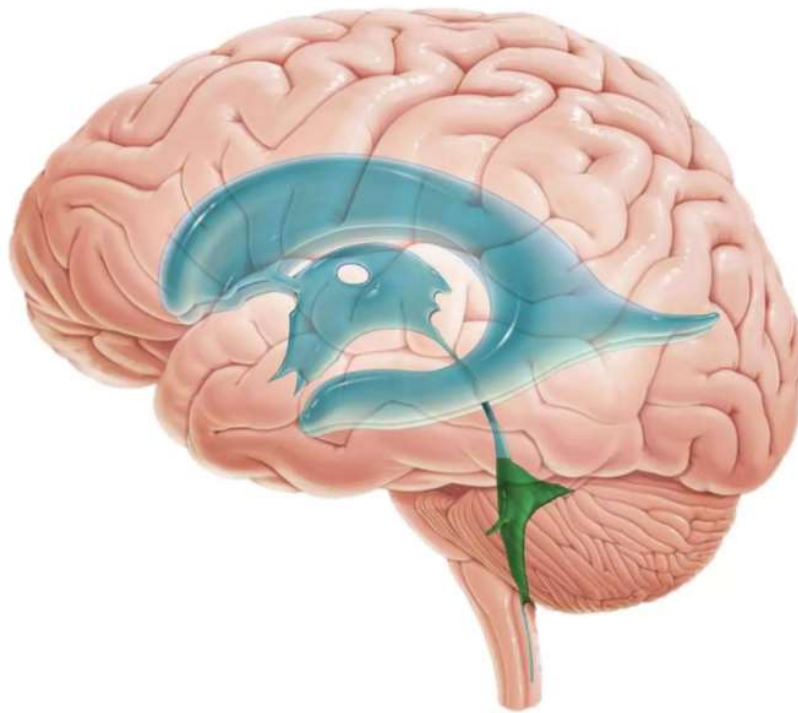
SUPERIOR $\frac{1}{2}$ OF MEDULLA OBLANGATA

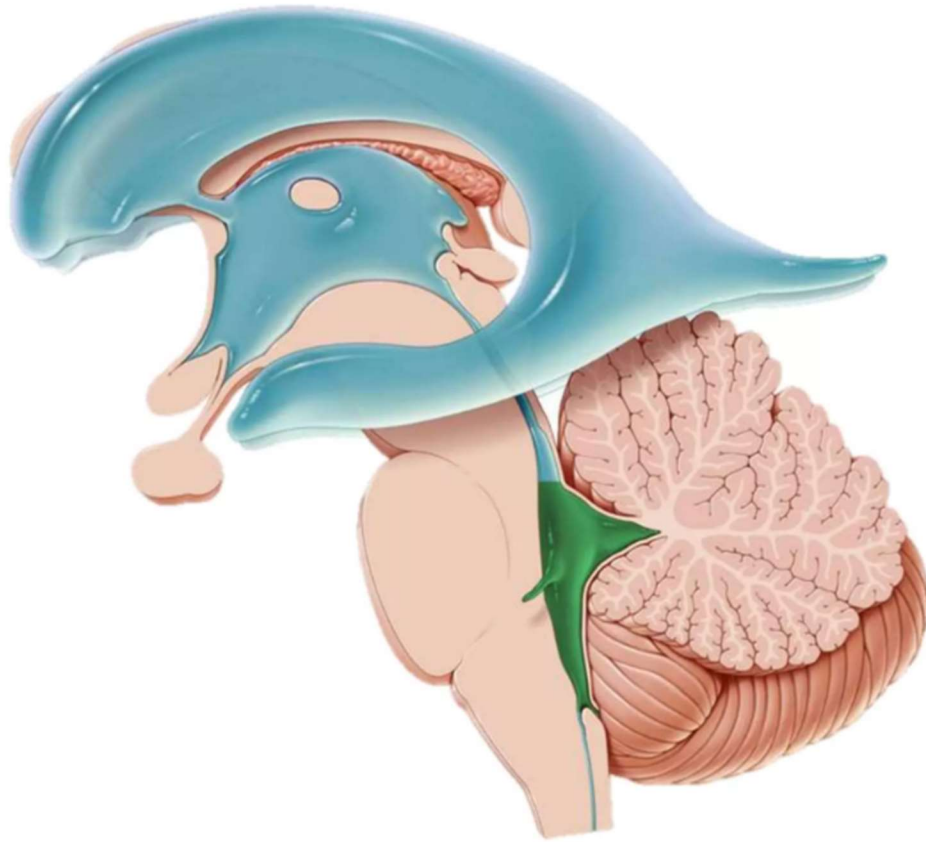
FLOOR – POST. SURFACE OF PONS

CRANIAL $\frac{1}{2}$ OF MEDULLA OBLONGATA

LATERALLY – INF. CEREBELLAR PEDUNCLE & SUP
PEDUNCLE

ROOF – TENT SHAPED ROOF INTO CEREBELLUM





FUNCTIONS OF VENTRICLES –

CSF – WATER LIKE FLUID RESIDES WITHIN THE VENTRICULAR SYSTEM.

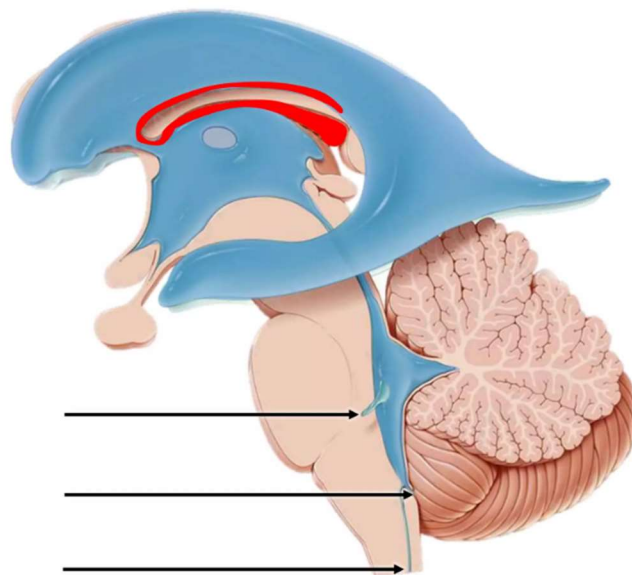
Appearance and composition

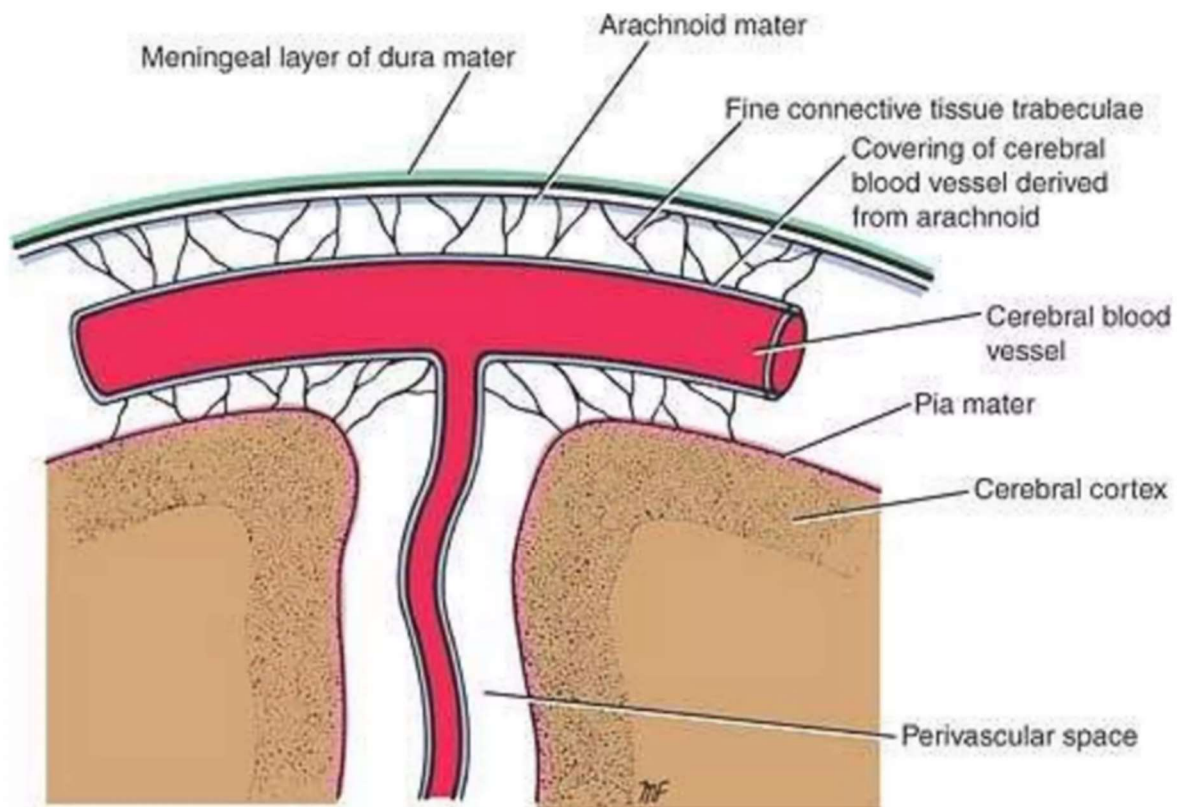
Appearance	Clear and colorless
Volume	150 mL
Rate of production	0.5 mL/minute
Pressure (spinal tap with patient in lateral recumbent position)	60-150 mm of water
Composition	
Protein	15-45 mg/100 mL
Glucose	50-85 mg/100 mL
Chloride	720-750 mg/100 mL
Number of cells	0-3 lymphocytes/cumm

CSF FORMATION –

CHOROID PLEXUS – IT IS A VASCULAR FRINGE COMPOSED OF PIAMATER COVERED WITH THE EPENDYMAL LINING OF VENTRICULAR CAVITY

CIRCULATION OF CSF –





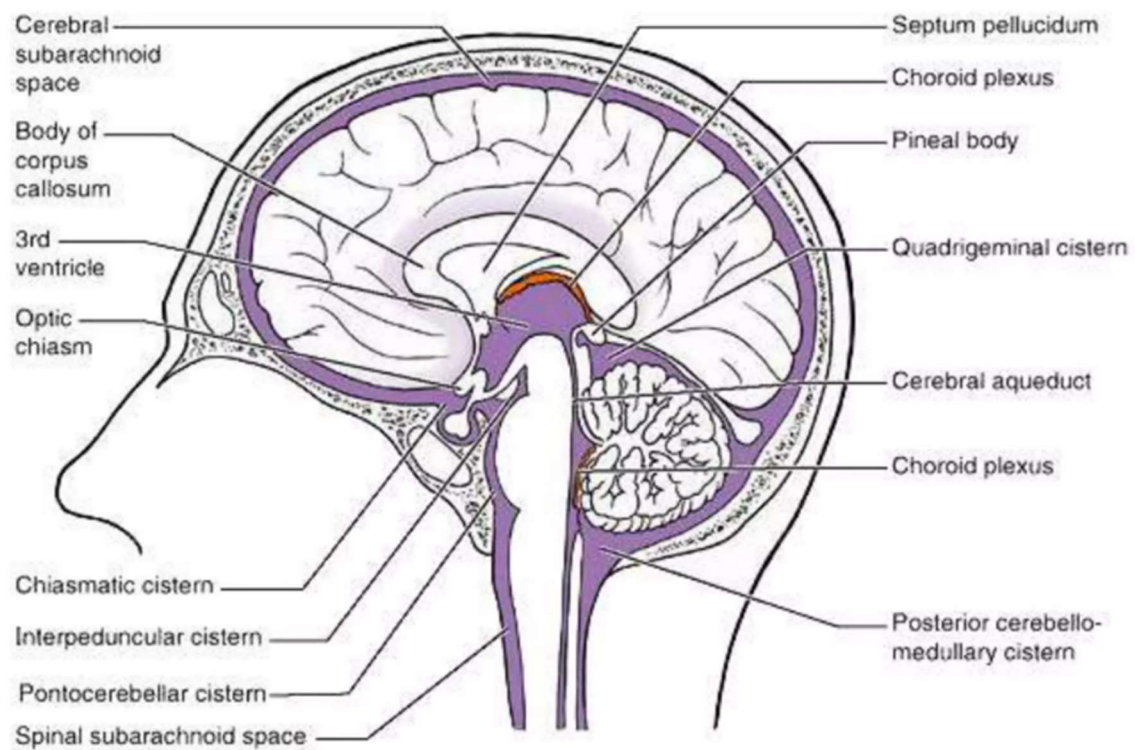
FACTORS OF CSF FLOW –

PULSATION OF CEREBRAL & SPINAL ARTERIES

MOVEMENT OF VERTEBRAL COLUMN

RESPIRATION AND COUGHING

CHANGING OF POSITION .

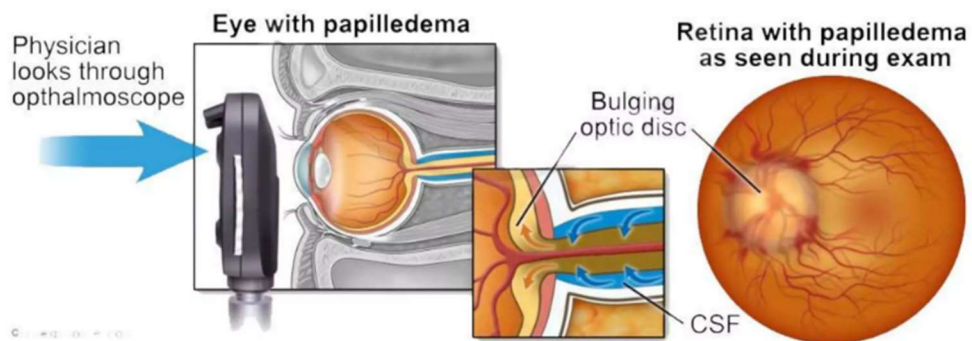


Function of the CSF

- Cushions and protects the central nervous system from trauma
- Provides mechanical buoyancy and support for the brain
- Serves as a reservoir and assists in the regulation of the contents of the skull
- Nourishes the central nervous system
- Removes metabolites from the central nervous system
- Serves as a pathway for pineal secretions to reach the pituitary gland

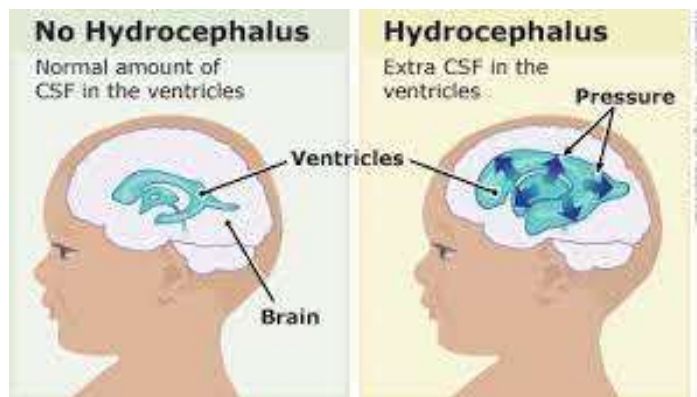
APPLIED ANATOMY –

Papilledema is a term that is exclusively used when a disc swelling is secondary to increased intracranial pressure (ICP).



Hydrocephalus -

It is the **buildup of fluid in the cavities (ventricles) deep within the brain**. The excess fluid increases the size of the ventricles and puts pressure on the brain.



Causes can be:

1. Blockage of the circulation of cerebrospinal fluid
2. Diminished absorption of cerebrospinal fluid
3. Excessive formation of cerebrospinal fluid

Diseases involving CFS

- Meningitis
- Blockage of the subarachnoid space in the vertebral canal
- Tumors of the fourth ventricle

