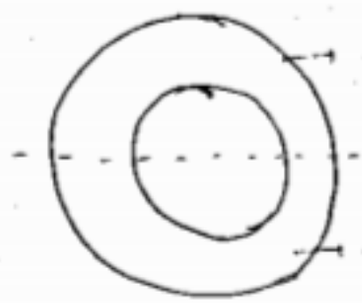
(a) Somatic muscles: → Extraocular & Tongue muscles

(b) All muscles in the Head & neck are supplied by pharyngeal arches except Extraocular & Tongue muscles - which are derived from somatic muscles

Neural Tube:

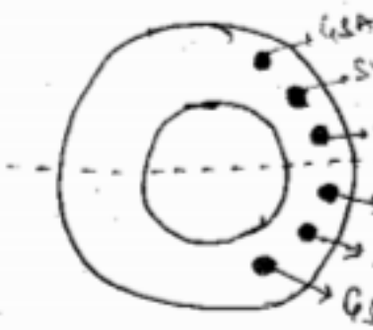


→ Alar plate - Sensory plate → All sensory cranial nuclei develop

Sulcus limitans

Basal plate → Motor plate → Motor cranial nerve nuclei develop

Types of columns:



GSA → General somatic Afferent → All general sensation from Body wall

SVA → Special visceral sensation → TASTE sensation

GVA → General visceral afferent → General sensation from viscera [pain, touch, temp]

GVE → General visceral Efferent → Smooth muscles & glands

SVE → Special visceral Efferent → pharyngeal arch muscles

GSE → General somatic Efferent → Somatic muscles → Extraocular, Tongue

Skeletal muscles

– SVE, GSA.

4 columns for **facial** ① SVE – facial muscles

② GVE – SSN →

③ SVA – Taste sensation from ant 2/3rd of Tongue

④ GSA – Branch supplying skin of Auricle

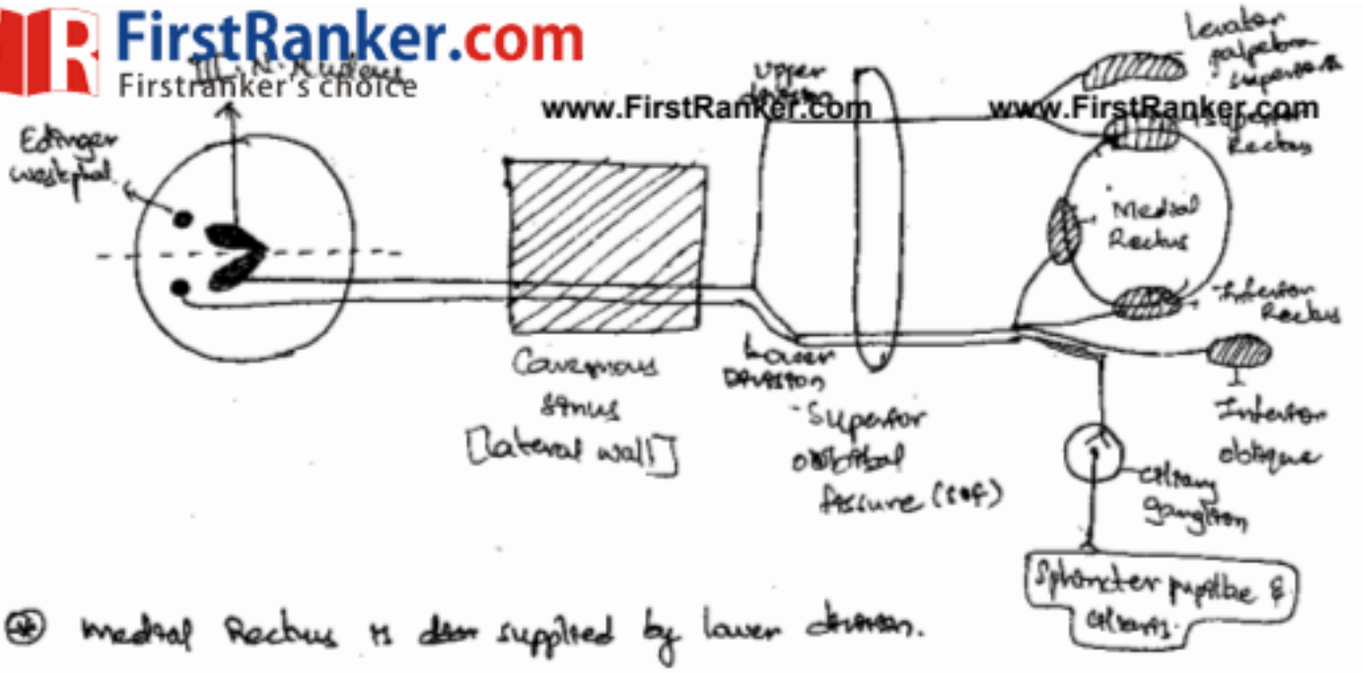
5 Columns of **glossopharyngeal** ① SVE – Stylopharyngeus

② GVE – ISN → parotid

③ GVA – General sensation from post 1/3rd of Tongue

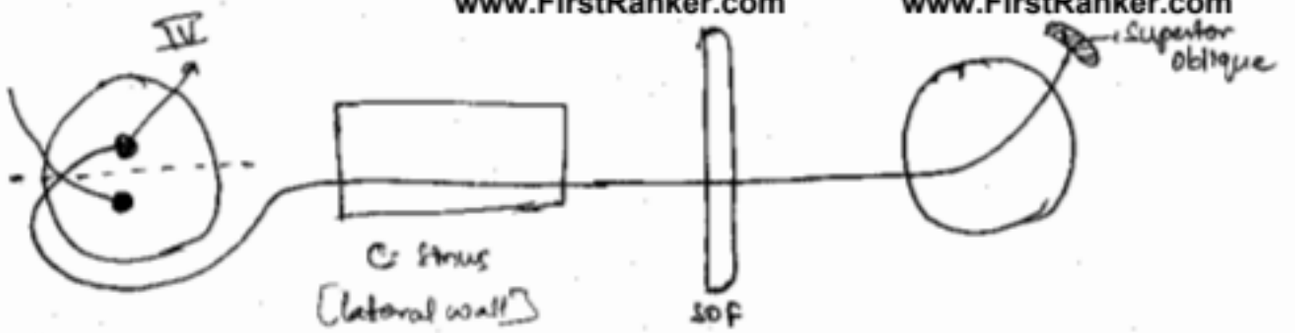
④ SVA – Taste sensation from post 1/3rd of Tongue

⑤ GSA – proprioception from stylopharyngeus



* Medial Rectus is also supplied by lower division.

Nerve to Inferior oblique carries the fibres to ciliary ganglion



① Lower motor neurons decussates inside Brainstem

② N. having Longest intracranial course

③ Only nerve to emerge from dorsal aspect of the Brainstem.

④ That is the thinnest / most slender cranial · N.

⑤ Smallest cranial · N.

Smallest → Refers to thickness

Shortest → " " length.

parasympathetic ganglion:

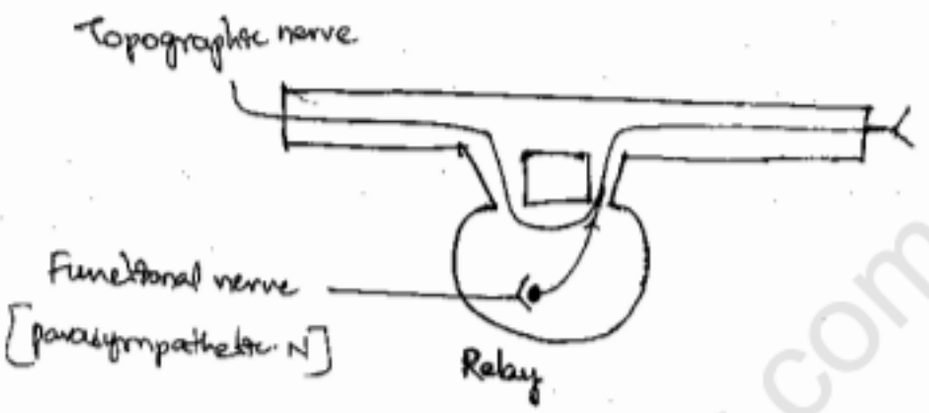
Head & Neck:→ 4 parasympathetic ganglions

① Ciliary ganglion

② otic "

③ pterygopalatine " / Sphenopalatine

④ Submandibular "



① The Nerve which connects ganglion Topographically will also carry postganglionic parasympathetic fibres.

② All parasympathetic ganglions of Head & Neck are Topographically related to

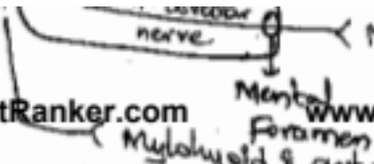
Branch of maxillary N

MLAN } " " Infraorbital N.

ALAN }

⇒ Anterior Ethmoidal N. → Supplies Dura of Ant. cranial fossa
Posterior " " N.

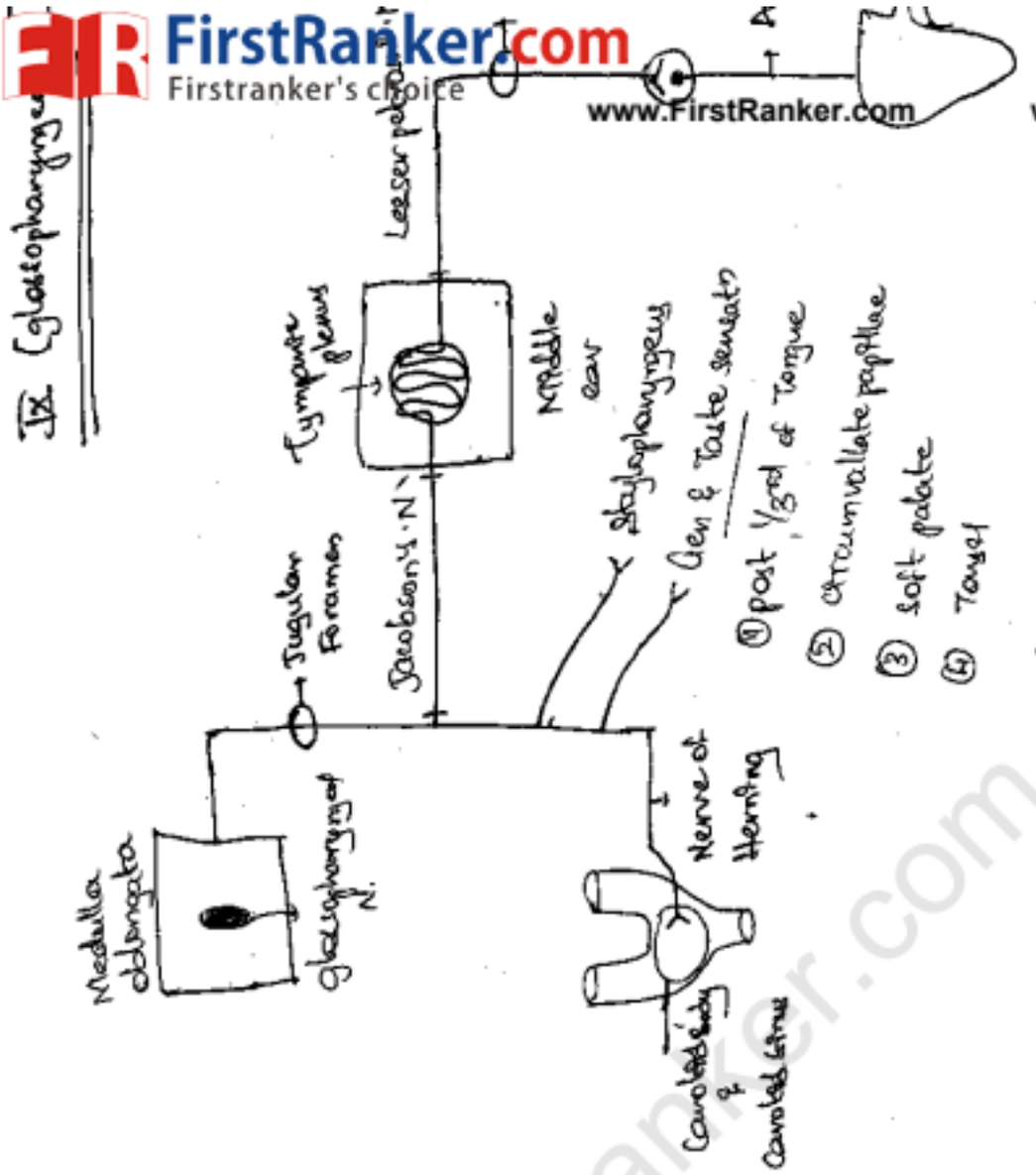
↓
Nasal mucosa
↓
Ethmoidal & Sphenoidal air sinus
↓
External nasal nerve
↓
Supply skin of tip of Nose



Note: Buccal n supplies mucosa of cheek and pierces buccinator but doesn't supply buccinator - Exception to HILTON'S LAW

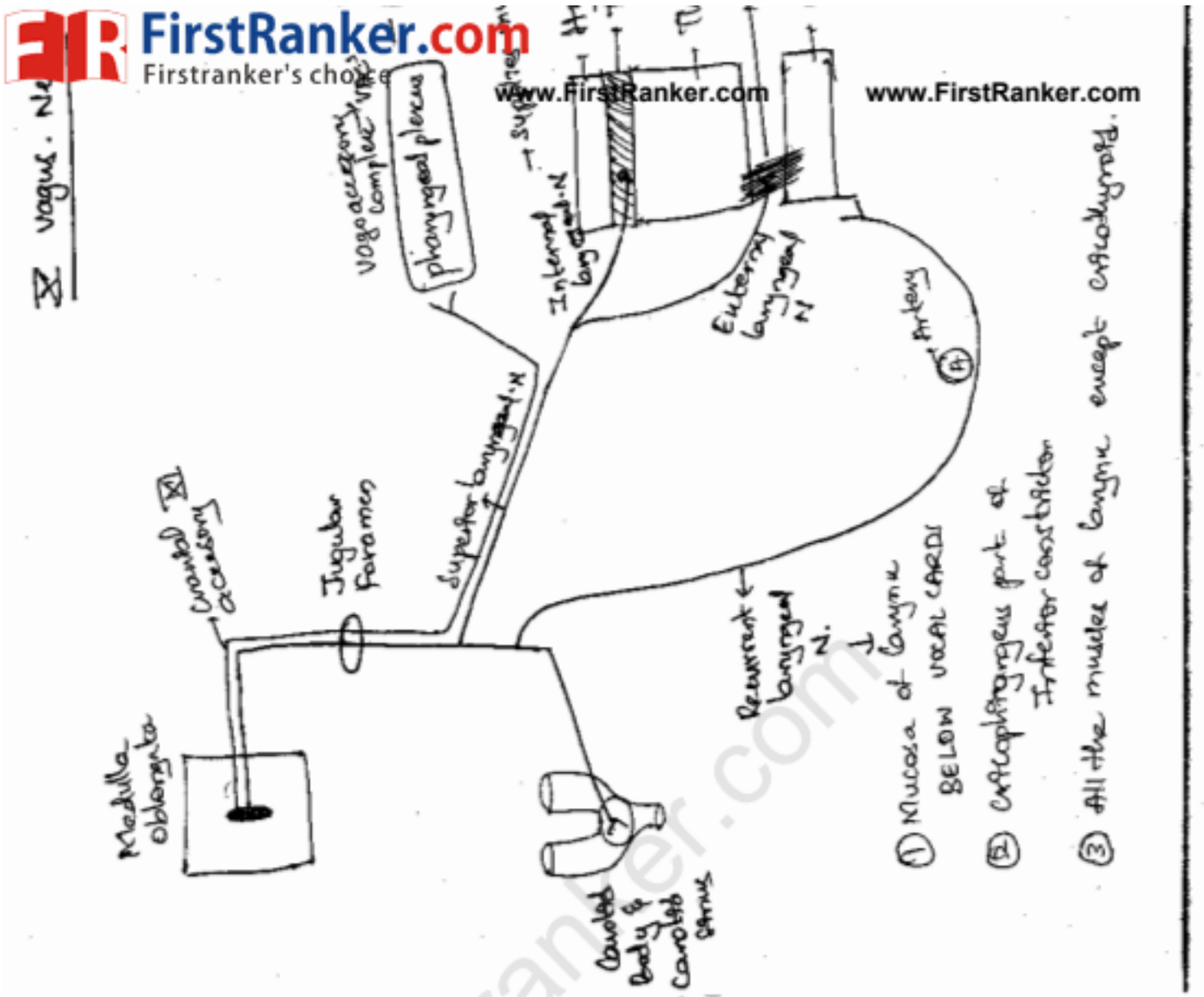
- greater petrosal Nerve ⇒ preganglionic parasympathetic N
  [It does not come from the geniculate ganglion. It just accompanies overlying N]
- Deep petrosal Nerve - postganglionic sympathetic N

THE Facial Nerve:

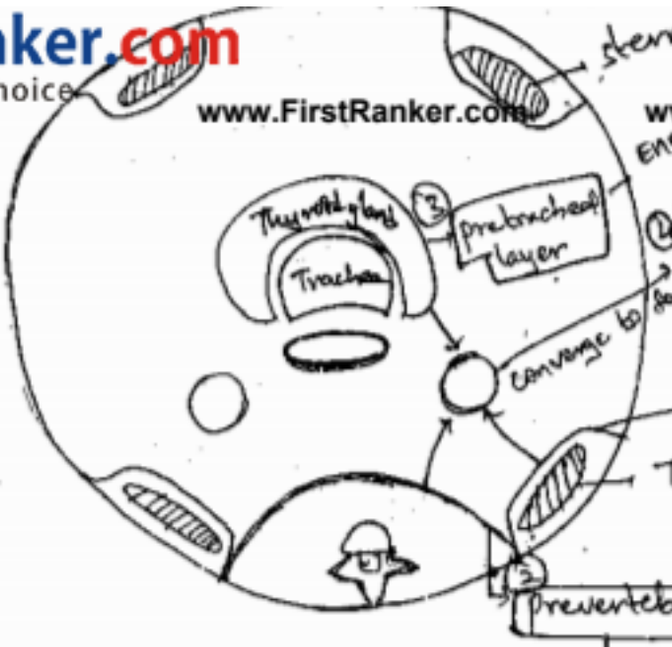


parasympathetic

Topographic Nerve		ganglion
Nasociliary (V_1)	-	① ciliary ganglion
Maxillary (V_2)	-	② pterygopalatine ganglion
Mandibular (V_3)	-	③ otic ganglion
Lingual n/v [$V_{3\text{br}}$]	-	④ Sub mandibular ganglion



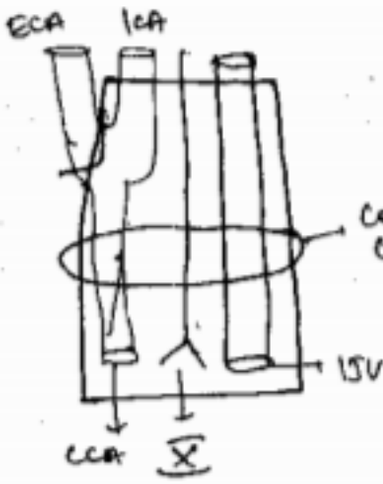
XI | Cranial accessory



Extends as axillary sheath

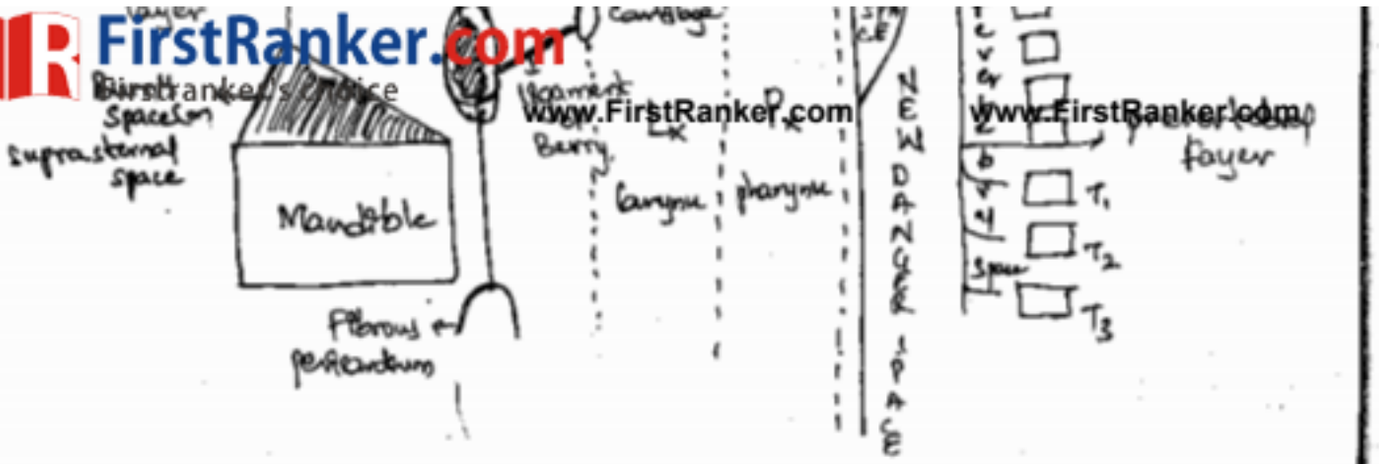
↓

Enclosing Axillary artery & Brachial plexus



Contents of carotid sheath

1. common carotid · A
2. Internal " "
3. Internal Jugular · Vein
4. X n/v.



④ The space b/w Buccopharyngeal Fascia & Alar Fascia is "Dangerous space of face" → older
But this is actually Retropharyngeal space.

The NEW dangerous space of face is

Retropharyngeal abscess

↓

drain down to post mediastinum

↓

Cause Dysphagia & dyspnoea

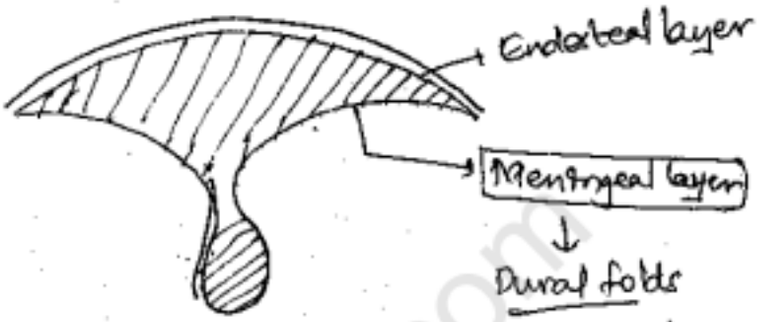
By Compressing Trachea larynx & pharynx

③ 2 spaces — Burns space
Supraclavicular space

④ 2 ligaments — Sphenomandibular ligament
Stylomandibular ligament.

Cranial Duramater & Dural venous sinuses:

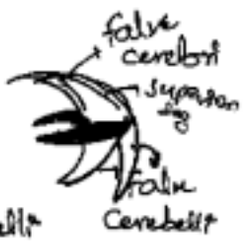
Cranial Duramater:

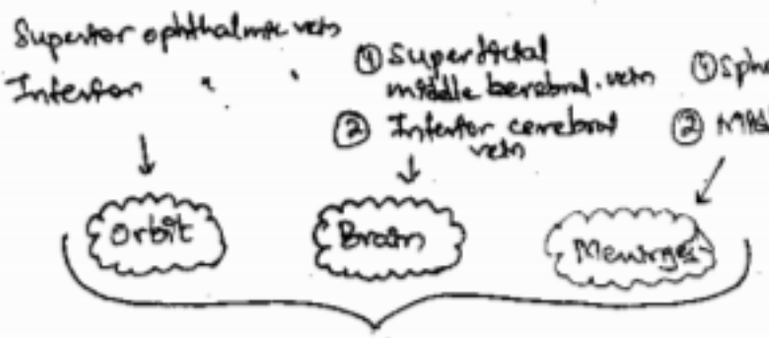


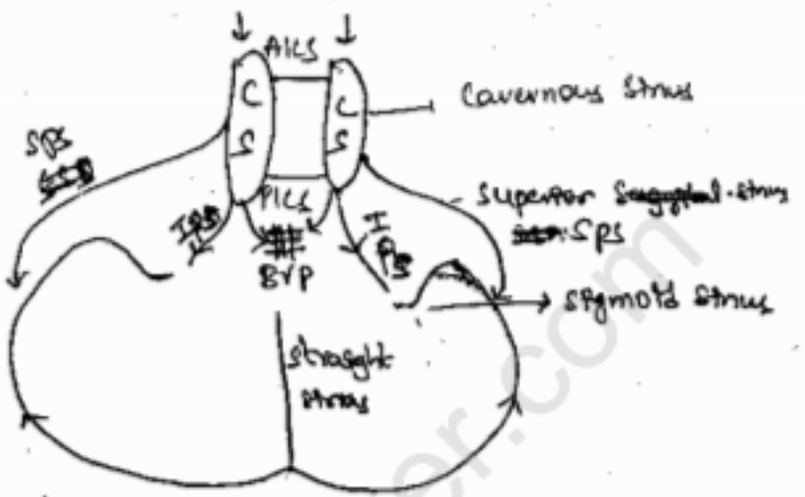
↓

Dural folds

① Falx cerebri
② Falx cerebelli
③ Tentorium cerebelli
④ Diaphragma sellae



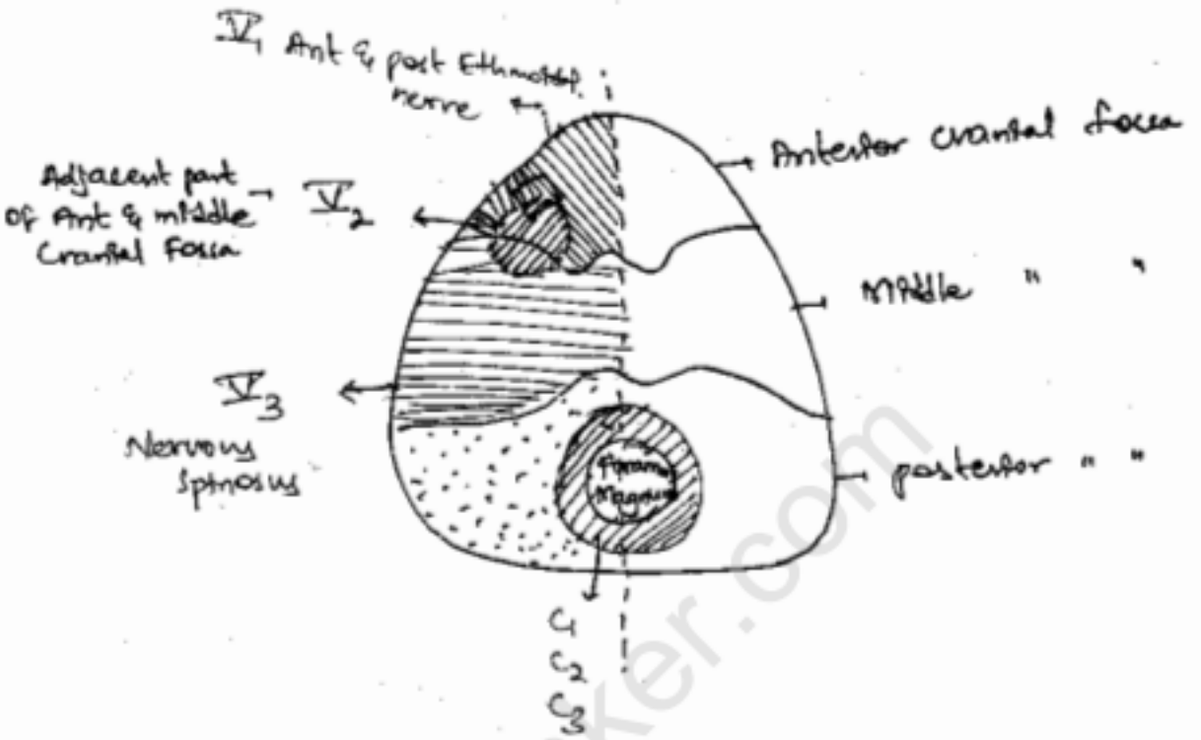




Outgoing channels: ① Superior petrosal sinus
② Inferior " "
③ Superior ophthalmic vein → Emissary vein [No valve]

Nerve Inside the C3

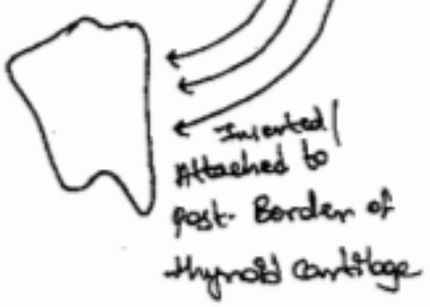
Dural innervation:



Outer circular m/s

① Superior constrictor
② Middle "
③ Inferior " < Thyropharyngeus
Cricco "

① Stylopharyngeus
② palatopharyngeus
③ Salpingopharyngeus



Inserted/ Attached to post. Border of thyroid cartilage

No supply

⇒ Thyropharyngeus - VAC
Cricopharyngeus - RLN
} Neuronal incoordination
↓
Bolus will produce diverticulum on posterolateral wall
⇓
[ZENKER'S DIVERTICULUM]

Larynx:

paired cartilage

① Arytenoid
- Apex → Elastic cartilage
- Base → Hyaline "
  - ↓ Ossify → Bone

② Corniculate

③ Cuneiform

④ Triticeal [Triticate]

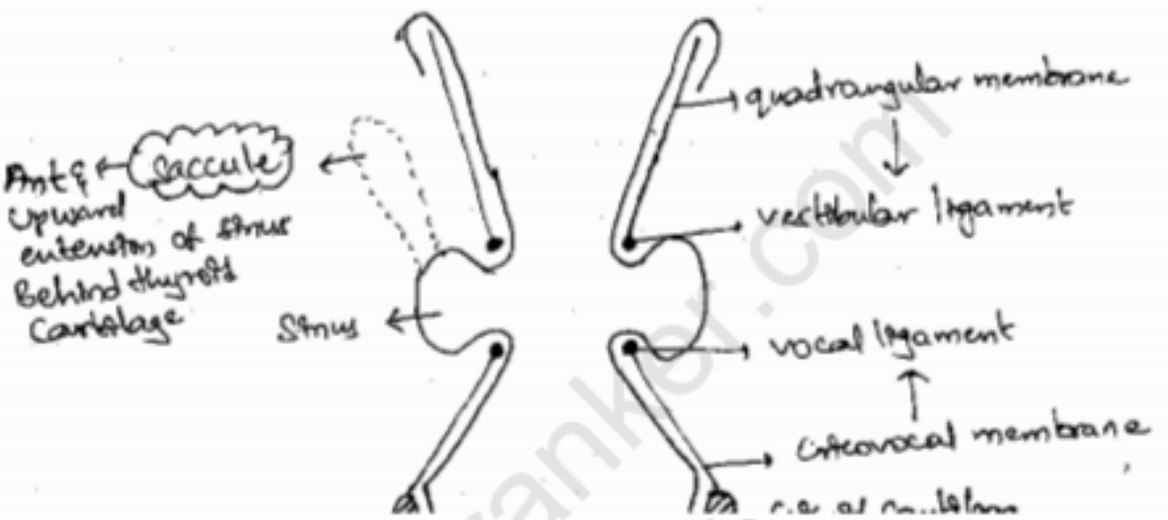
□ → Elastic cartilage
□ → Hyaline "

unpaired cartilage:

① Thyroid

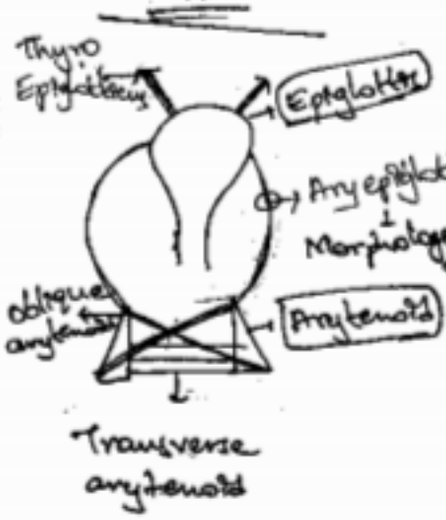
② Cricoid

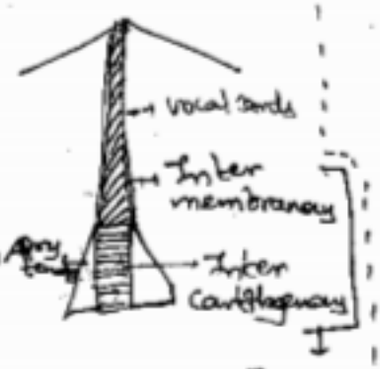
③ Epiglottis → Fibro Elastic

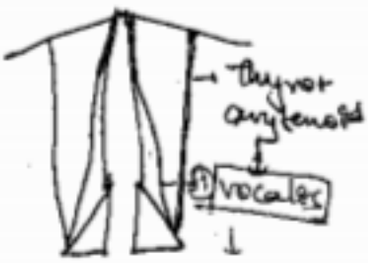


Muscles controlling Rima glottidis

Muscles controlling Tension in vocal cords.







Tension in Ant 1/3rd of vocal cords

Relaxation in post 1/3rd of vocal cords

⇓

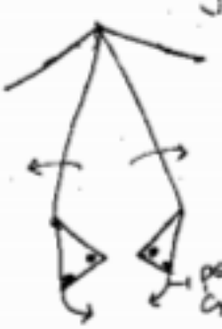
Modulation of larynx

(2) Thyroarytenoid
↓
Muscle only for Relaxation of vocal cord.

Tension: cricothyroid.

(1) Aryepiglottics → Muscle for "closing" of Inlet of larynx

(2) Thyro epiglottics - "opening" of Inlet of larynx



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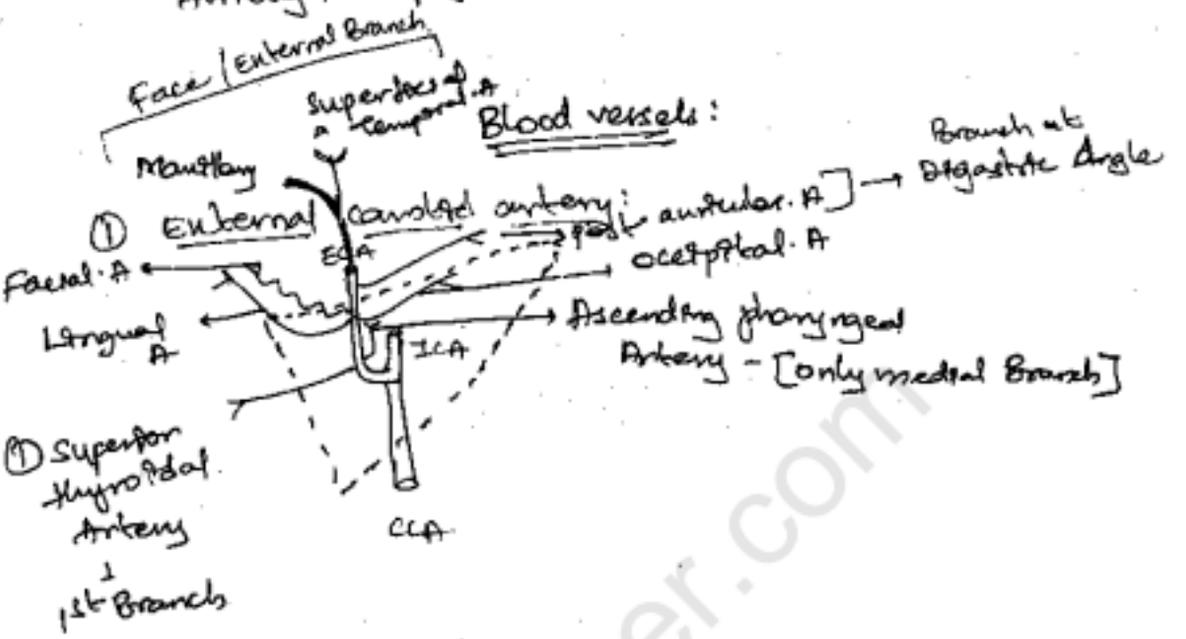
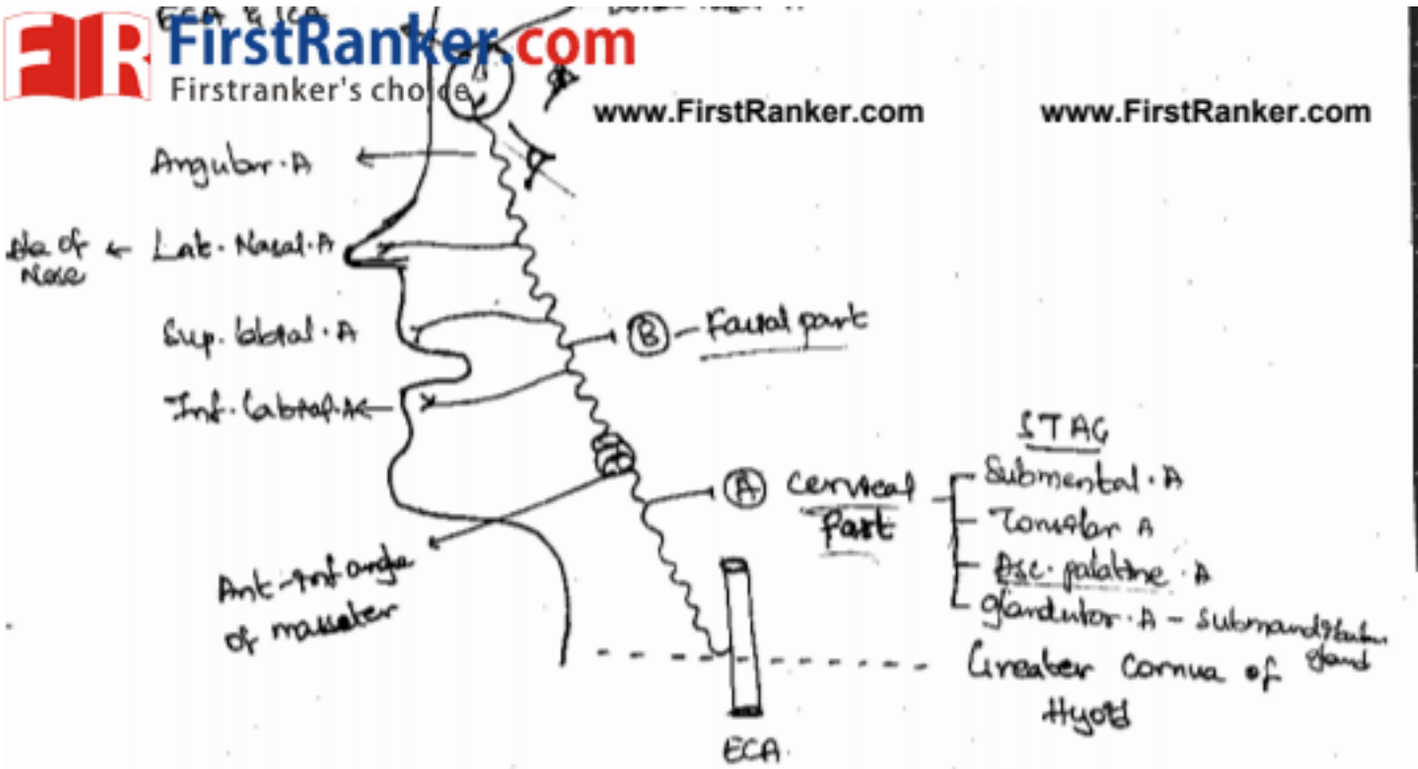
Pre-Epiglottic space

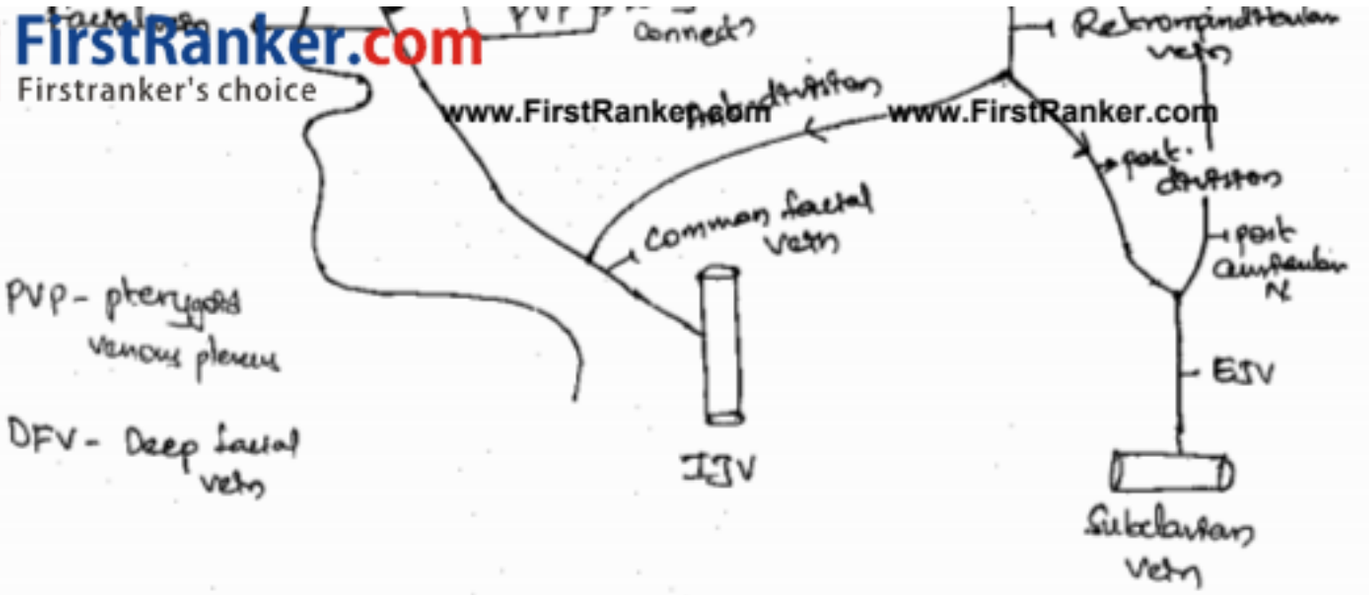
Thyroid cartilage

Thyro epiglottic lig. → Floor

* Supraglottic Carcinoma can infiltrate pre-Epiglottic space through Epiglottic perforations







Maxillary Artery:

Largest Branch of [facial Artery] ECA.

~~II part - 3 Branches~~ only Muscular Branches

III part - 6 Branches: [PIG-PAS]

P - post sup. alveolar art

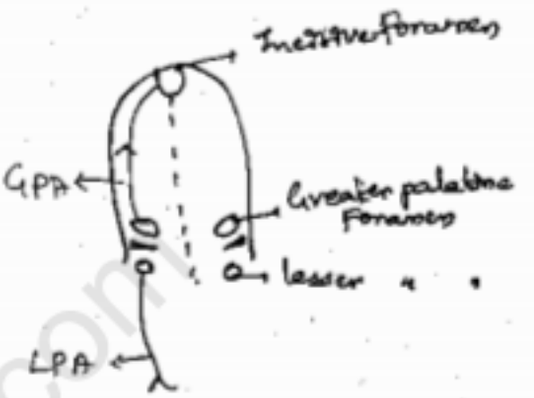
I - Infraorbital A

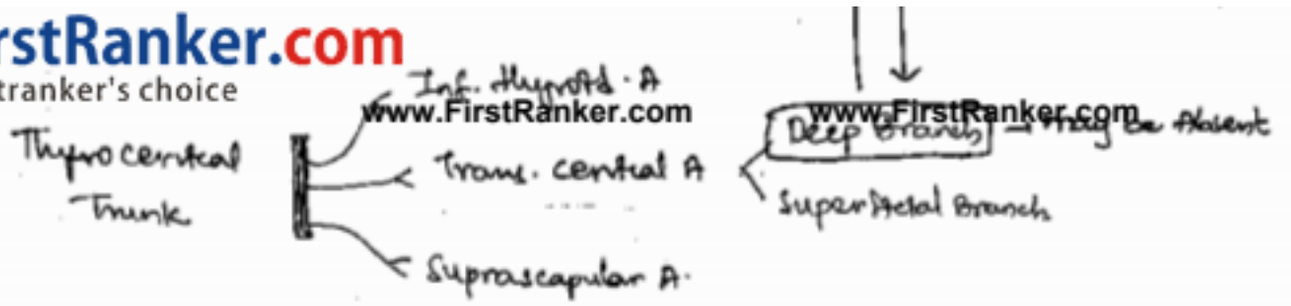
G - Greater palatine A → Hardpalat ← GPA

p - pharyngeal A

A → Artery to pterygoid canal

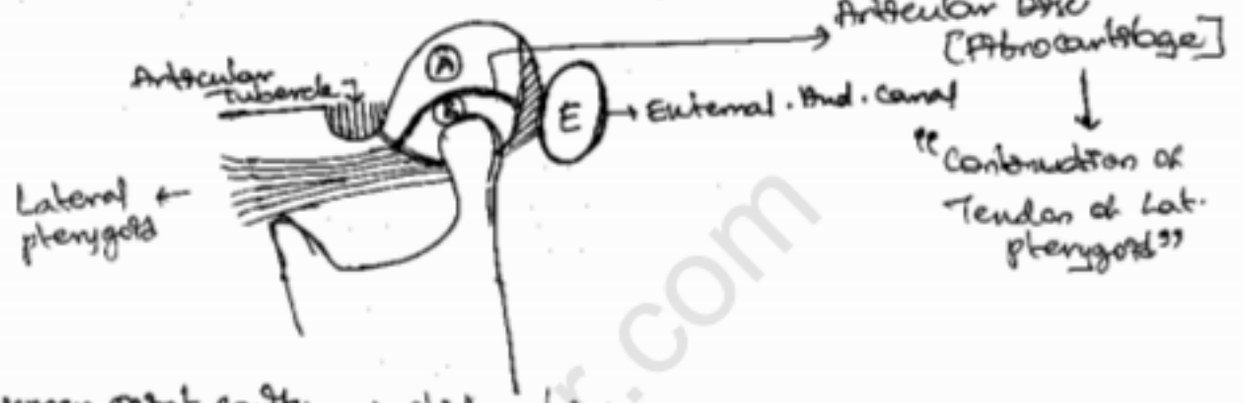
S - Sphenopalatine A
↓
major artery to supply Nasal cavity
Largest artery of Maxillary A





Tempora Mandibular Joint:

Type : Condylar Joint



(A) Upper joint cavity → sliding / gliding

(B) Lower " " → Rotatory movements

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⑤ Masseter → Downwards & Backwards

③ Medial pterygoid → " " "

④ Lateral " → Backwards

④ Retraction

② Closing of Mouth or Elevation of Mandible

Protracted

① Protraction

Assistance

① Opening of mouth or Depression of Mandible

Note: ③ "Sideways movement" is done by alternate medial & lateral pterygoids

For the ® deviate

® medial pterygoid

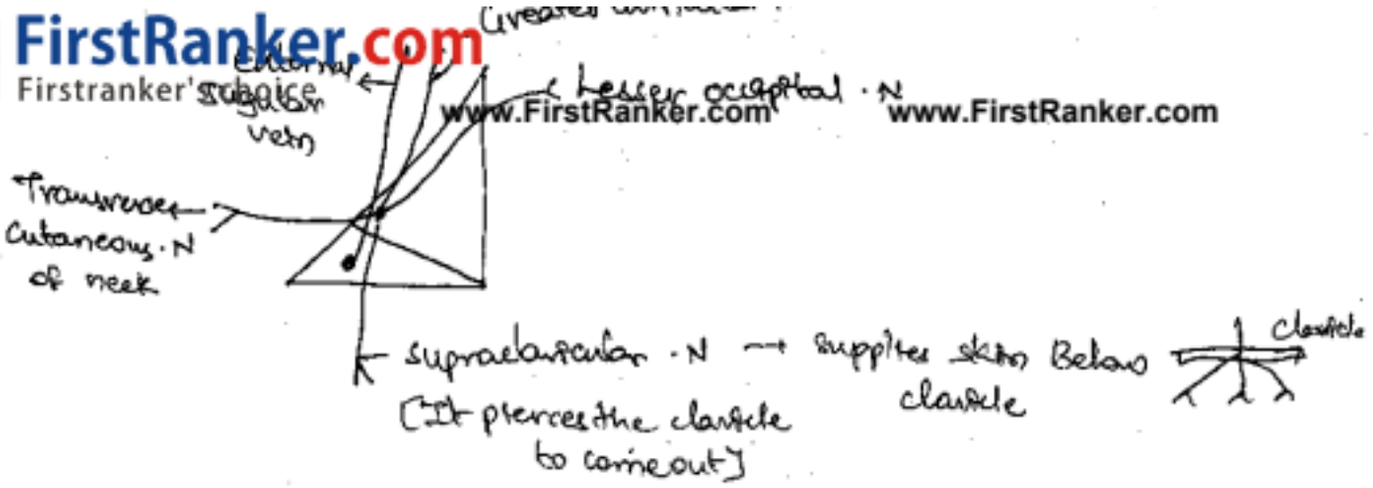
Ⓛ Lateral " "

Nerve supply of TMJ:

1. Auriculo Temporal N.
2. Masseteric N

Blood supply

1. Maxillary A
2. Superficial Temporal A



Great auricular (N): [Non-Trigeminal N/v supplying skin of face]

① Most commonly fused with auriculo Temporal · N ≠ In FRAY syndrome

② Runs ↑ external jugular vein

③ Supplies skin of lobule of ear

④ Supplies skin at the angle of mandible

Trunks of Brachial plexus

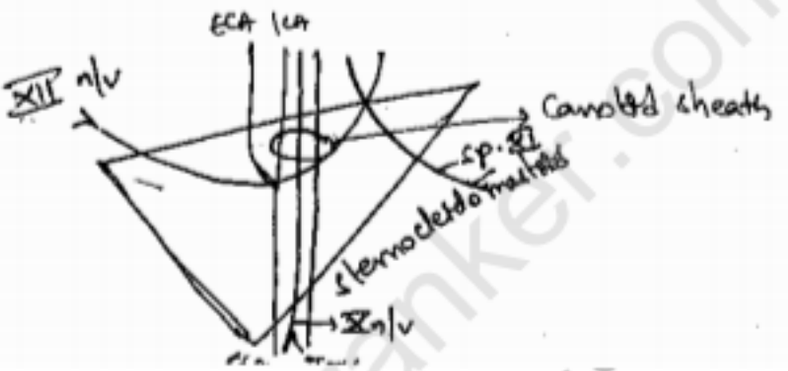
⑧ Spinal accessory N is present b/w prevertebral and investing fascia layer of fascia - (scm)

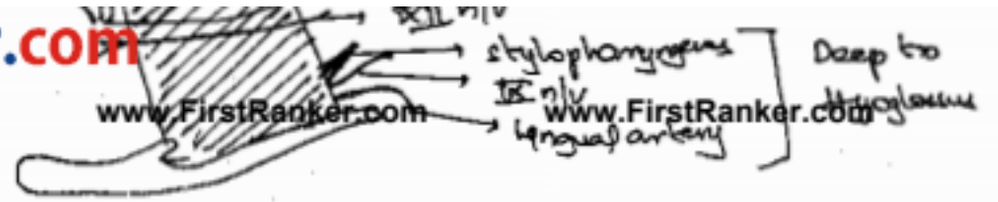
⑨ sternocleidomastoid & Trapezius supplied by Spinal accessory N & C_3-C_4 - Hybrid Muscle.

CAROTID TRIANGLE:

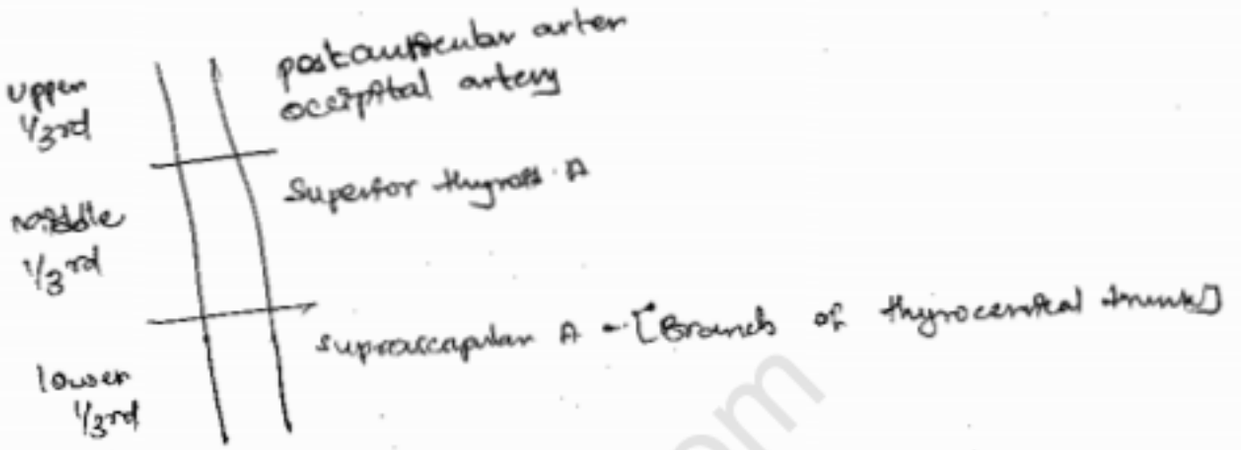
Roof: ① platysma
② cervical Branch of VII n/v
③ Transverse cutaneous n/v of neck

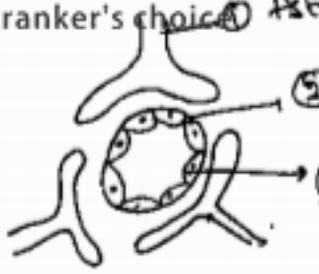
Contents:





Sternocleido mastoid:





① Astrocytes
② Basement membrane of capillary Endothelium
③ Tight junction [Zona occludens] → TRUE BBB
b/w cap. Endothelium

Areas devoid of BBB: - [Circumventricular organs]

① Area of postrema → periphery of IV ventricle
④ Pineal gland
② Neurohypophysis
⑭ Median eminence
⑤ OVLT : Organas vasculosum lamina Terminalis

circumference of III ventricle

Areas of Brain Devoid of pain fibres:

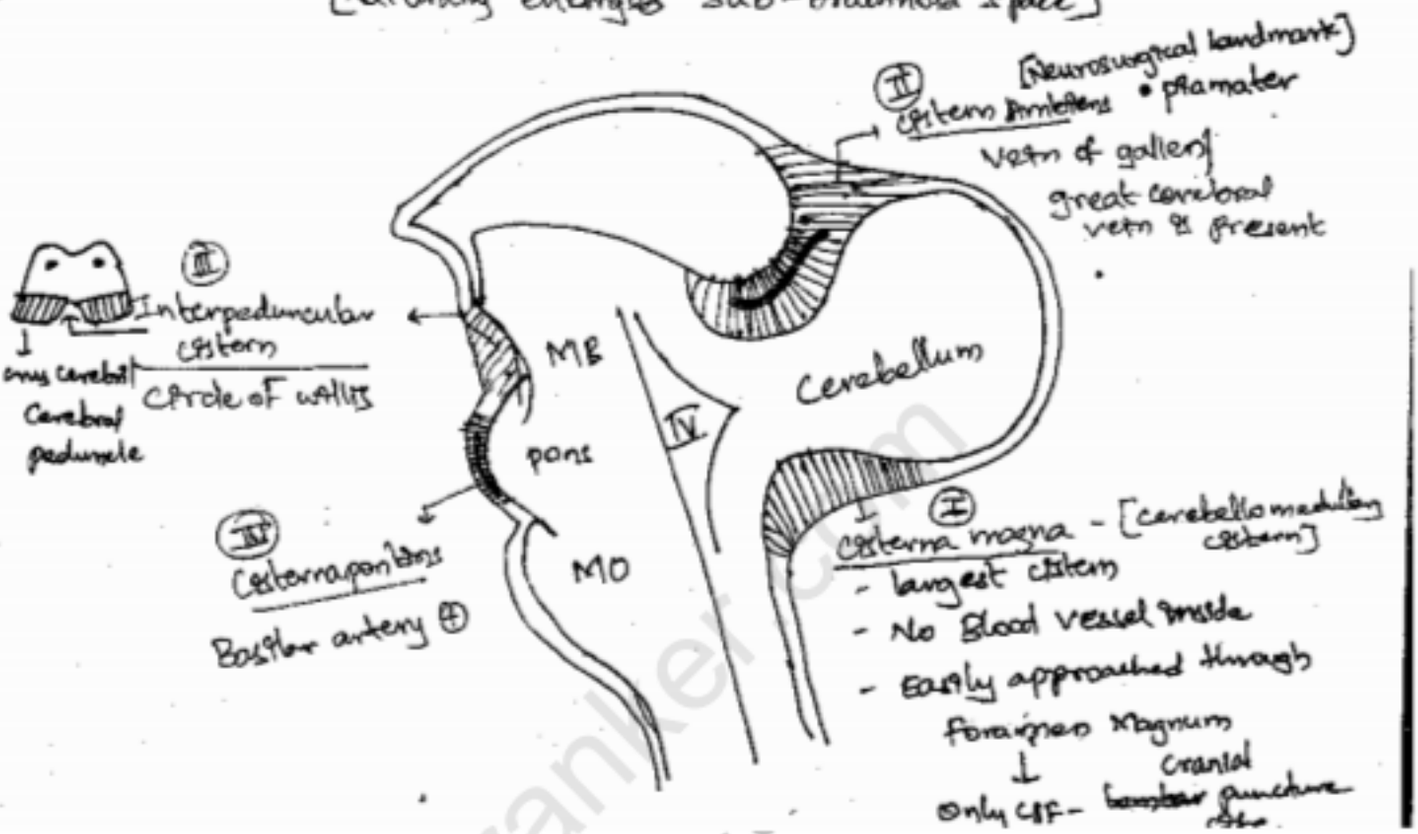
B - Brain parenchyma
E - Ependyma - lining of ventricles
D - Duramater - Duramater which is neither Covering any blood vessel

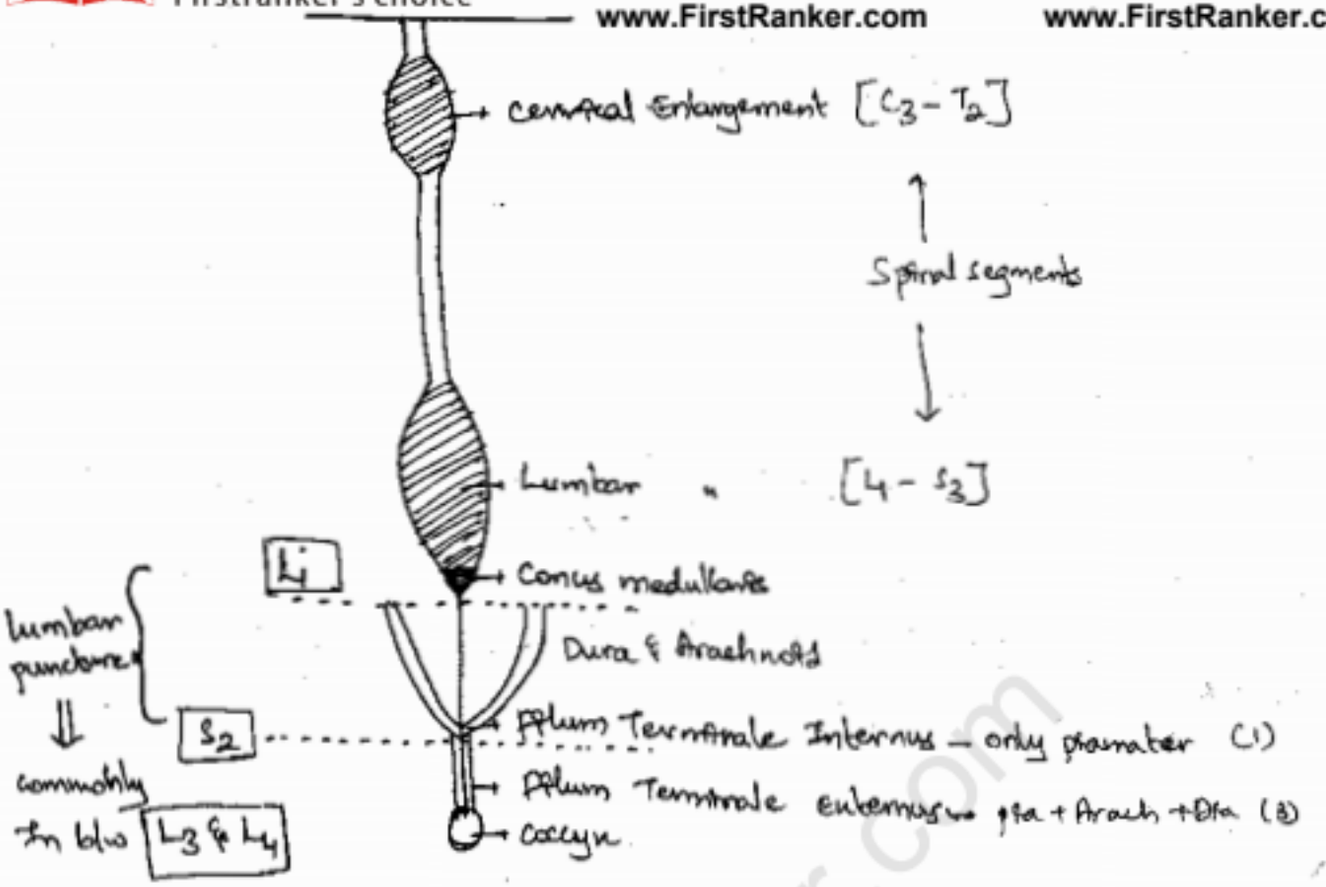
Superior sagittal sinus

Meningeal villi of Arachnoid mater are also seen along the Superior sagittal sinus

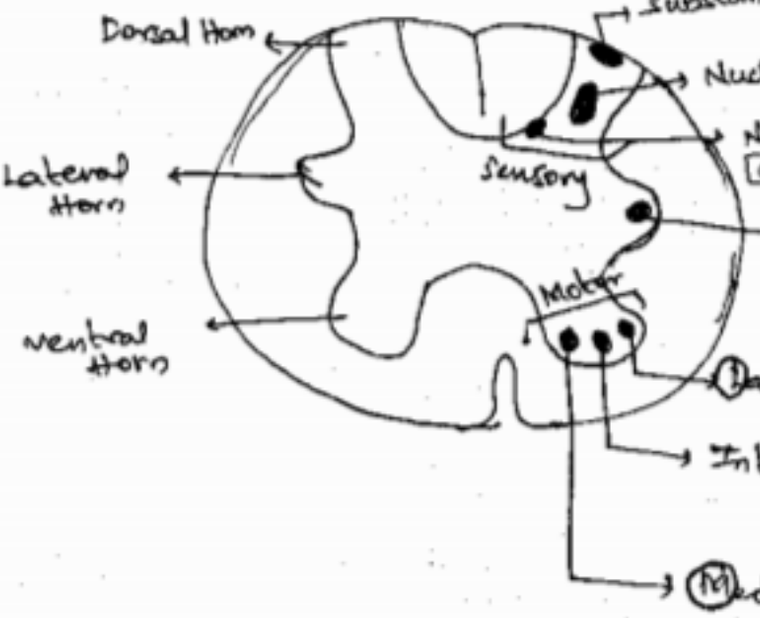
Subarachnoid cisterns:

[Naturally enlarged sub-Arachnoid space]



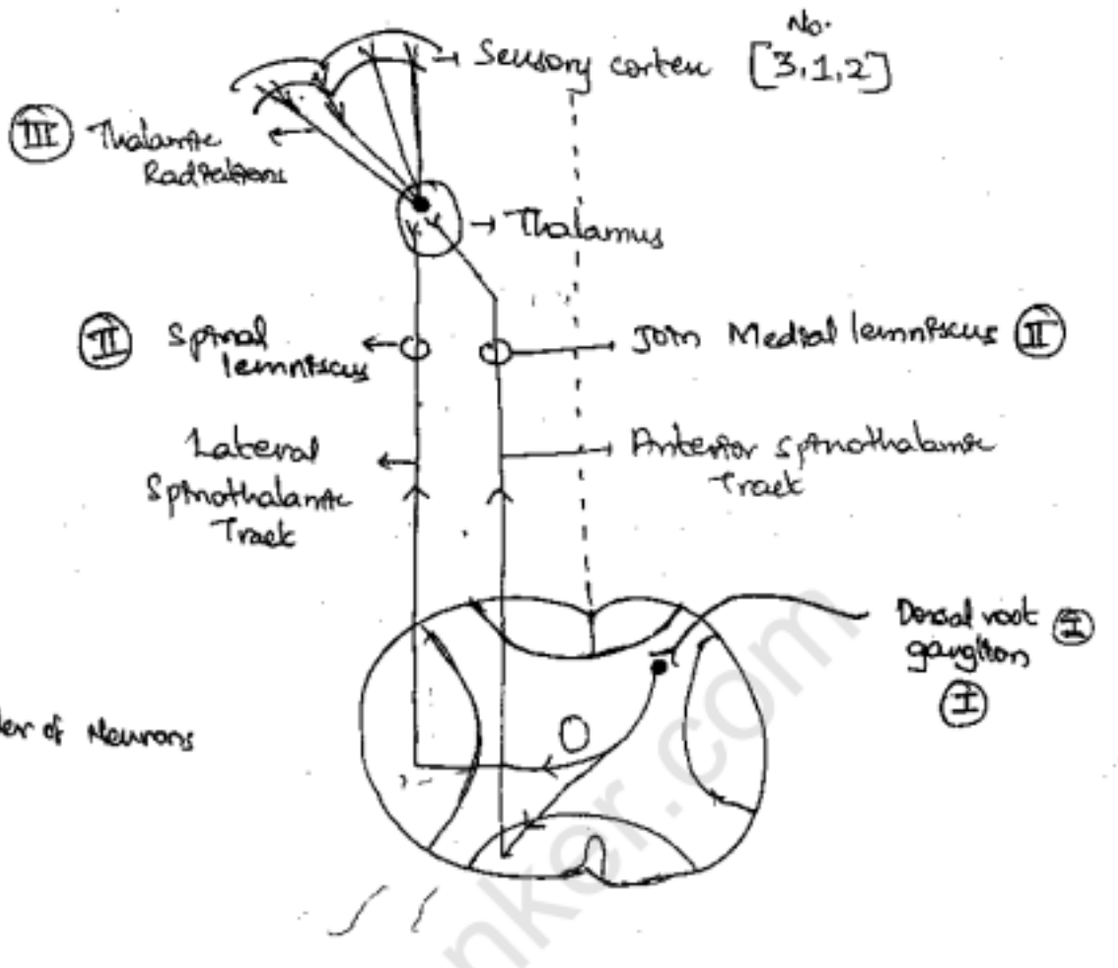


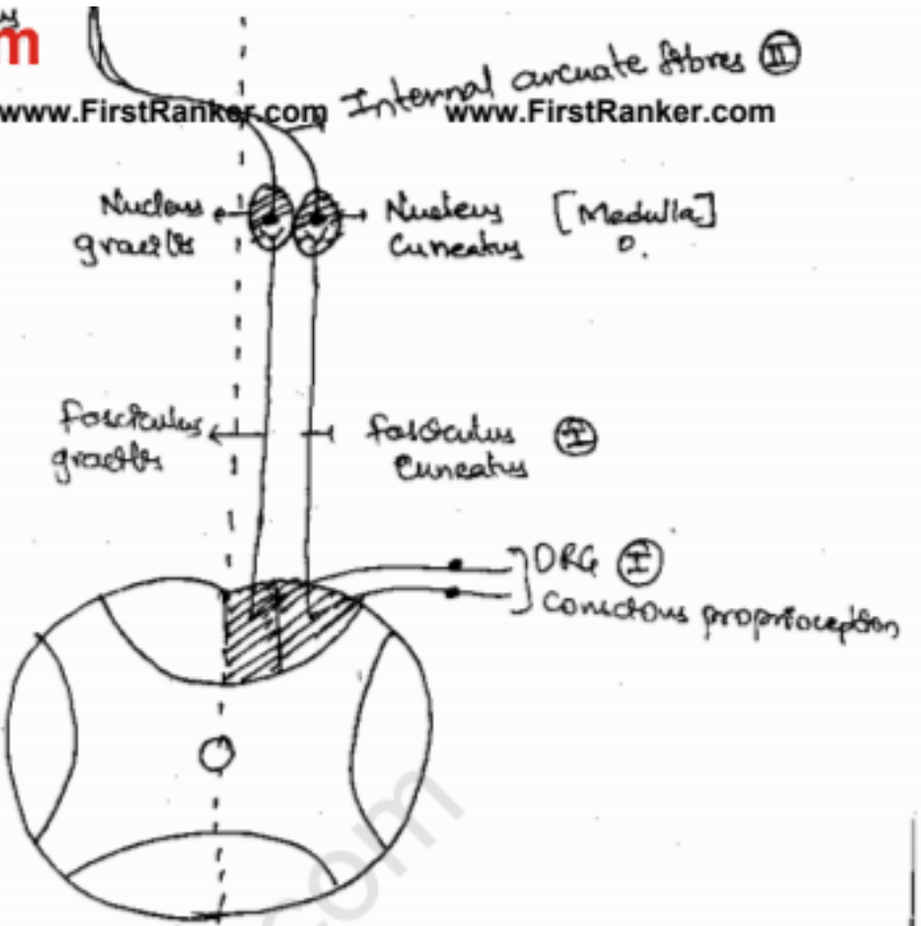
Arrangement of spinal cord:

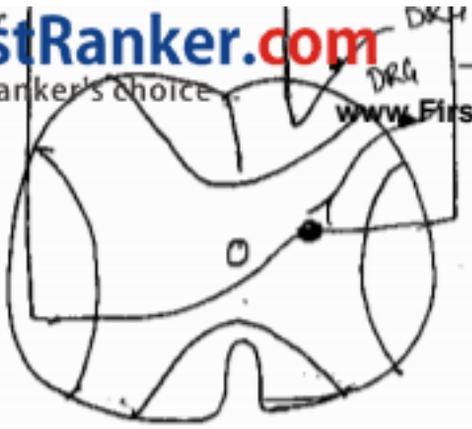


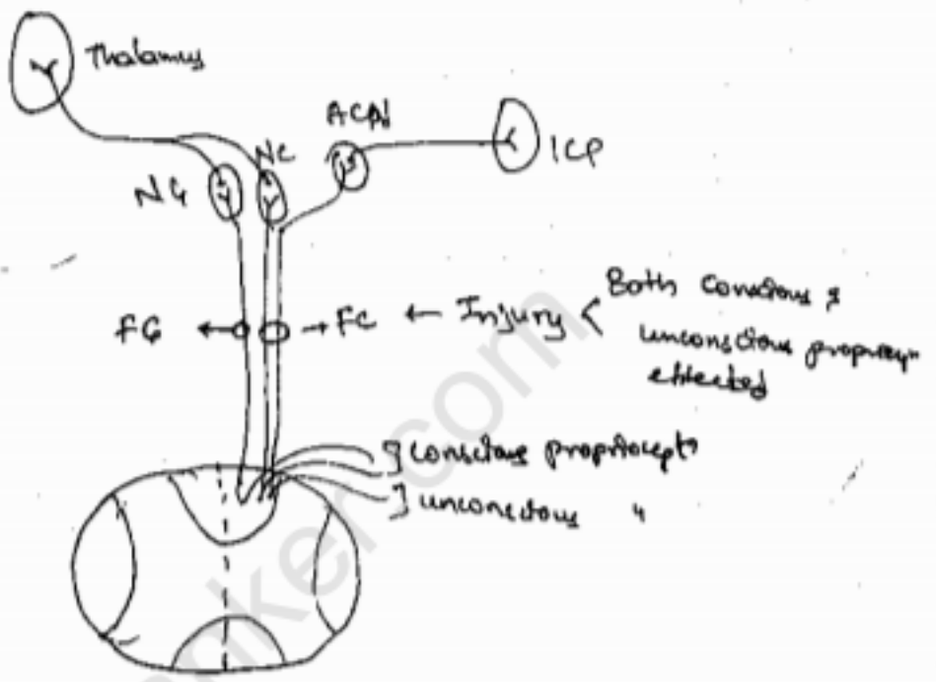
- Substantia gelatinosa : Rel for Spinothalamic Tract
- Nucleus proprius : Rel for Dorsal column Tract
- Nucleus Dorsalis : Rel for Spinocerebellar tracts [Clarke's column]
- Intermediolateral nucleus
  - Symp : [T_1–L_2]
  - parasymp [S_2, S_3, S_4] neurons
- (L) Lateral Nucleus – (L) Limb Muscles
- Intermediate
  - Phrenic Nucleus (C_3–C_5)
  - Sp. XI Nucleus (C_1–C_5)
- (M) Medial – Nucleus – (M) Midline Muscle [Axial Muscles]

Spinothalamic Tracts:



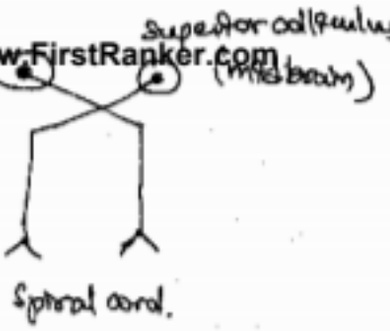






Tectospinal tract:

"Coordinated movement of Head & neck, eyeball & Upper limb Based on Visual stimulus"



MLF: Medial longitudinal Fasciculus:

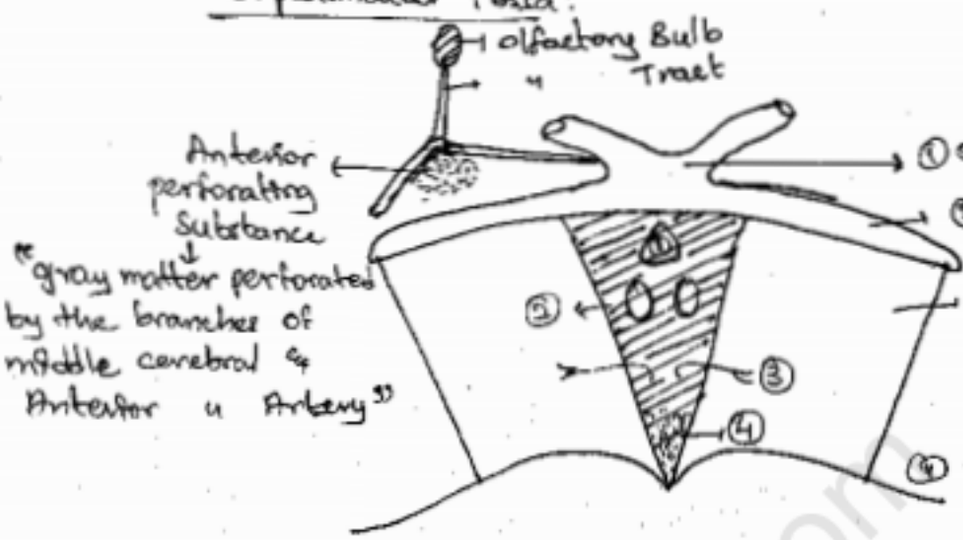
"Coordinated movement of Head & Neck & eyeball Based on Auditory stimulus" – upper limb is not involved

Pyramid

B/w pyramid & olive / Anterolateral sulcus

Median sulcus

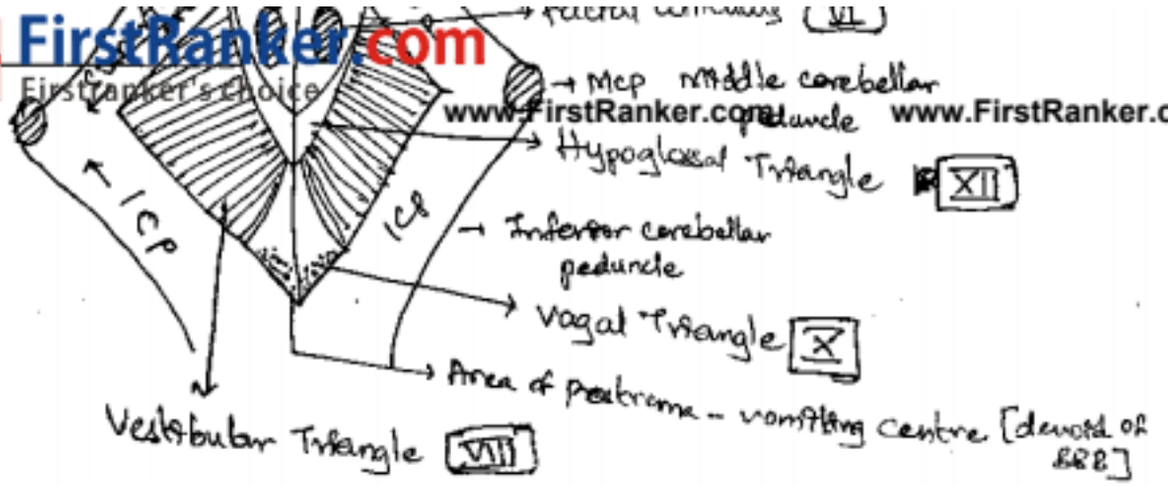
Interpeduncular Fossa:



- Boundaries
  - ① optic chiasma
  - ② optic tract
  - ③ crus cerebri

- contents
  - ① Infundibulum / Tuber cinereum
  - ② Mamillary Bodies
  - ③ III n/v
  - ④ post perforating substance

"post perforating substance is the gray matter perforated by the branches of posterior cerebral artery"



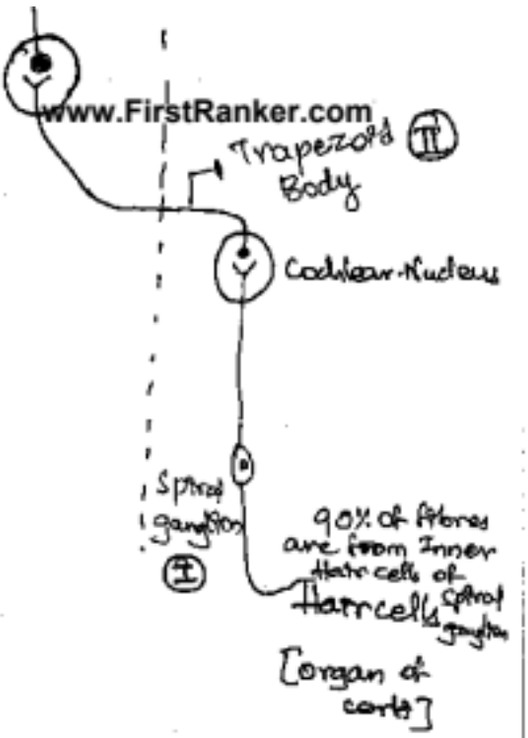
Nucleus in BS: VI, VIII, X, XII [6, 8, 10, 12]

Nerves in BS: VII, VIII, X, XII [7, 8, 10, 12]

"Internal genu is the resultant of Neurobiotaxis which is migration of motor facial Nucleus towards sensory Trigeminal nucleus for faster Reflexes"

Superior olivary complex → "Centre for stapedial Reflex"

Superior olivary Nucleus



Stapedius Reflex arc components:

1. Spiral ganglion neurons [In the cochlea]
2. The auditory n/v
3. The cochlear Nucleus
4. The superior olivary Nucleus
5. The facial n/v nucleus
6. The facial n/v
7. The stapedius muscle

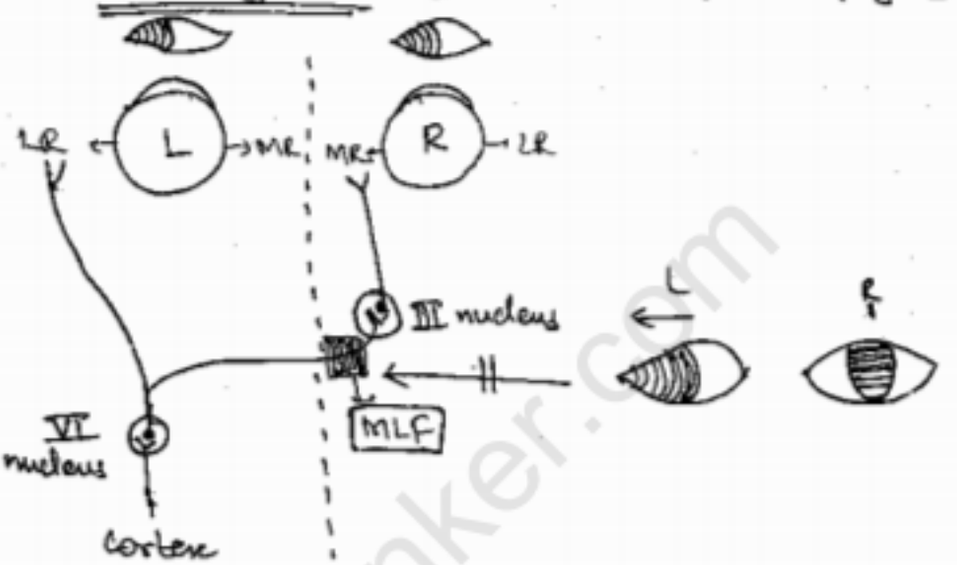
② Lateral " # → c/L Loss of Conscious Proprioception

③ Spinal " # → c/L Hearing Loss

④ Trigeminal " # → c/L " " " from 'Body'

" " " from 'face'

MLF syndrome [Internuclear ophthalmoplegia]



~~III n/v lesion~~ as Benedikt's Syndrome

Pyramidal Tract - c/L Hemiplegia

UMN lesion of VII n/v - c/L Lower 1/2 of Face paralysis

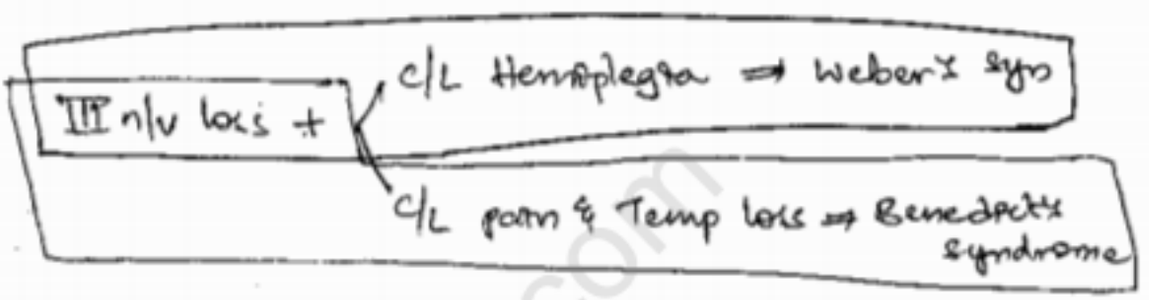
ML - c/L loss of Conscious prop

SL - c/L loss of pain & Temp (Body)

TL - c/L " " (Face)

III n/v →
LPS - I/L ptosis
MR - I/L divergent squint

Sphincter & ciliaris pupillae → Loss of accomodation & Light reflex



③ Pyramidal Tract - c/l Hemiplegia

② Mid brain I/l

ICP

Also called as "Abducent alternating Hemiplegia"

M/c cause Basilar stroke

M/c cause: Acoustic Neuroma

I/L Tongue paralysis only when asked to protrude tongue

pyramid - C/L Hemiplegia

Lateral medullary syndrome:

Inferior cerebral peduncle → I/L ataxia

Vestibular Nucleus → Nystagmus, vertigo, vomiting

Nucleus Ambiguous → I/L Bulbar paralysis

Sympathetic tract → Horner's Syndrome

Spinal lemniscus → C/L loss of pain & Temp (Body) Spastic

Spinal Nucleus of V n/s → I/L " " (Face)

Archae cerebellum
[oldest]
↓
Also known as
Vestibular cerebellum
↓
Lingula + flocculonodular lobe
↓
Axial stability & Muscle Tone

paleocerebellum

[Next to appear]
↓
Spinal Cerebellum
↓
Anterior lobe + Pyramis & uvula from post. lobe
↓
Appendicular stability

Neocerebellum

[Recent]
↓
Cerebro cerebellum
↓
Largest posterior lobe except pyramis & uvula
↓
Smooth execution of voluntary movements

Note:
"planning & programming → By Basal ganglia.
smooth execution → By cerebellum (Neocerebellum)"

"Deep cerebellar nuclei → Efferent from cerebellum"

"Cerebral cortex is the largest collection of inhibitory neurons."

Purkinje cells are the largest only efferent from the cortex

Deep cerebellar Nuclei:

① D - Dentate Nucleus → Largest nucleus | Nu. of Neocerebellum

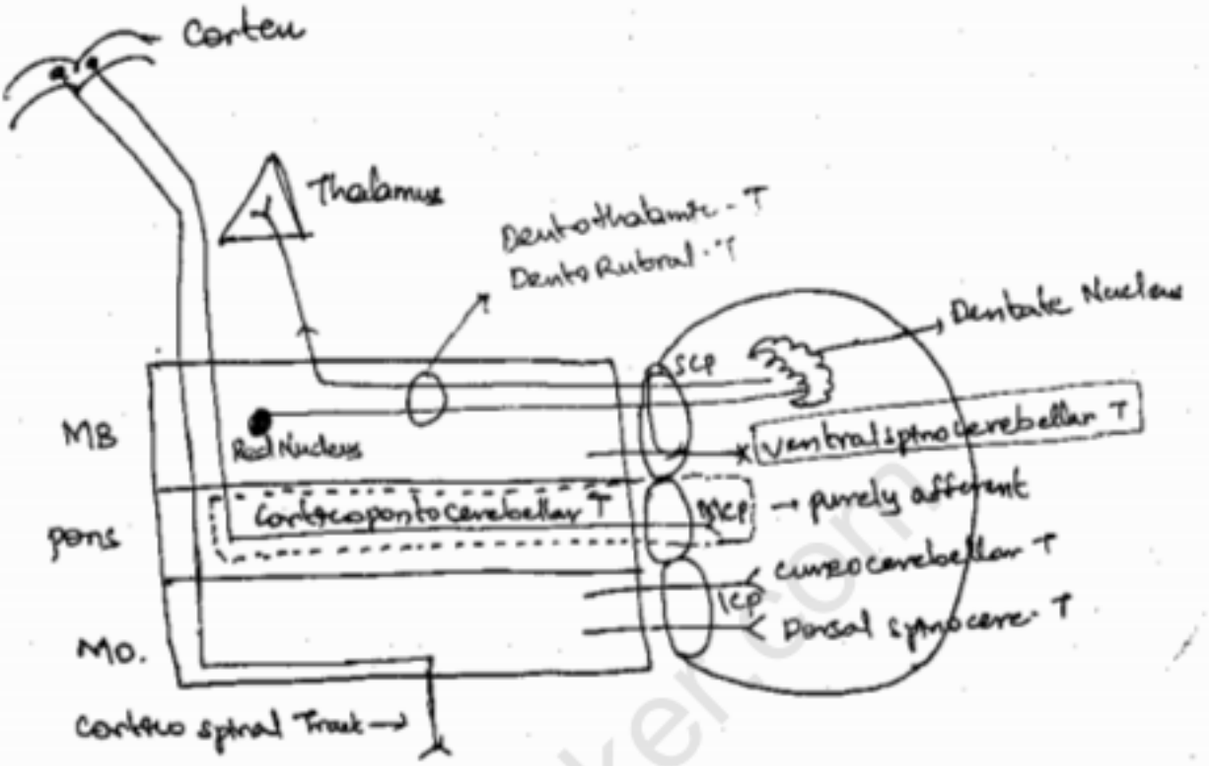
② E - Emboliform "
③ F - Fastigial "
④ G - Globose "
] - Nucleus of paleocerebellum

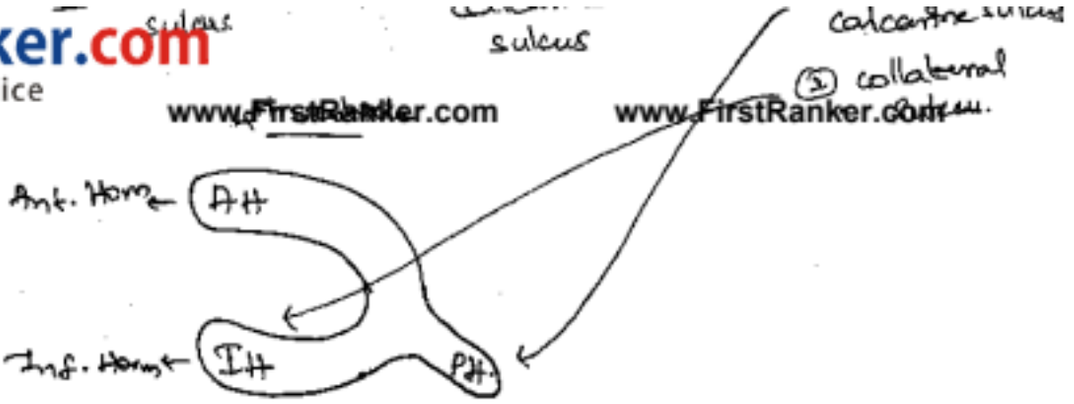
Fastigial is also Nu. of Archeocerebellum

D (E) F (G) H (I)

Emboliform + Globose = Interposed Nucleus

Comparator Functions:

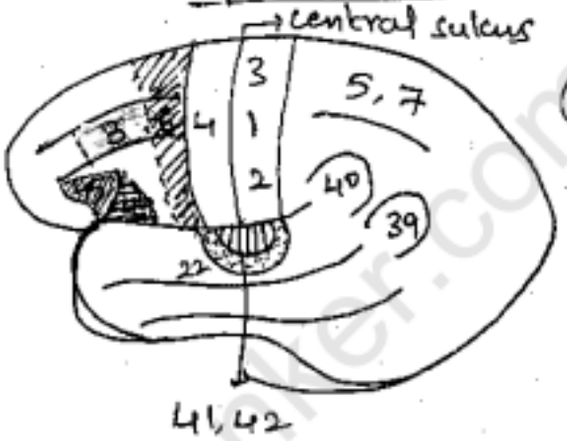




Rest of the sulcus are called as incomplete sulcus

[Apart from the above mentioned types & examples]

Supero-lateral surface:



Area:

(3,1,2) - post central gyrus
P sensory area

(5,7) - Sup. parietal lobule
Sensory association area.

(4) - Precentral gyrus
1° motor area.
Pyramidal tract Begins

(6) Association areas :- for previous Experience & past-memory.

(22) : STG " " - Auditory association area.

(39, 40) : Angular & Supramarginal gyrus - sensory speech area [Wernicke's Area]

↓

[22, 39, 40]

↓ #

Sensory Aphasia

(39,40) (44,45)
Sensory + Motor Aphasia

↓

Global Aphasia is due to ↓
M/c Middle cerebral artery stroke.

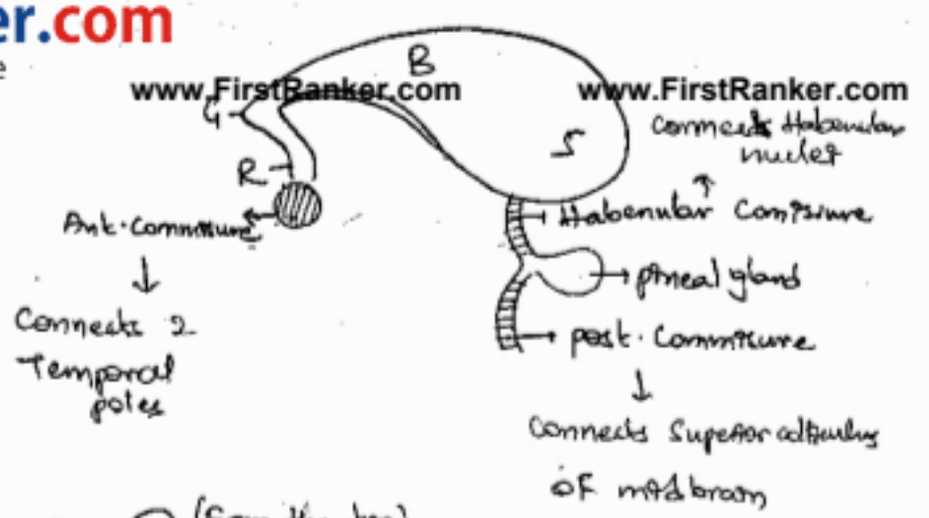
Association fibres
↓
Which connects different areas of same cerebral Hemisphere

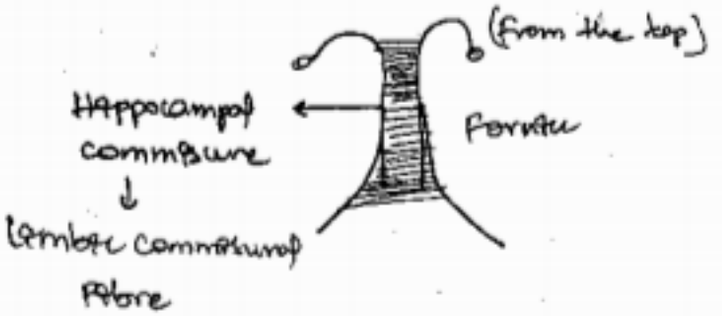
Commissural fibres
↓
Connects same areas of Both cerebral Hemispheres

Projection fibres
↓
Ascending & Descending tracts

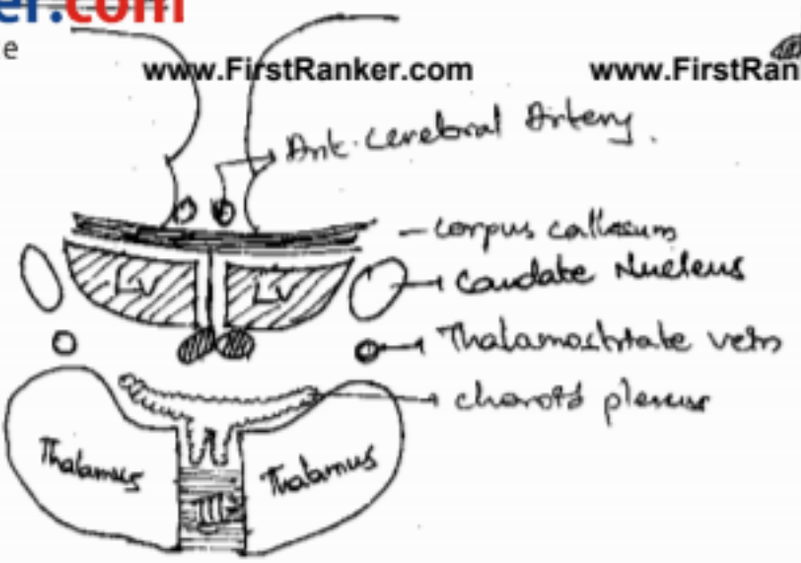
Association fibres
- Short A.F → Arcuate fasciculus
- Long A.F
  1. Superior Longitudinal fasciculus
  2. Fronto-occipital "
  3. Inferior Longitudinal "
  4. uncinate "
  5. cingulum "

⑤ Hippocampal ⁿ





Coronal Section:



Note:

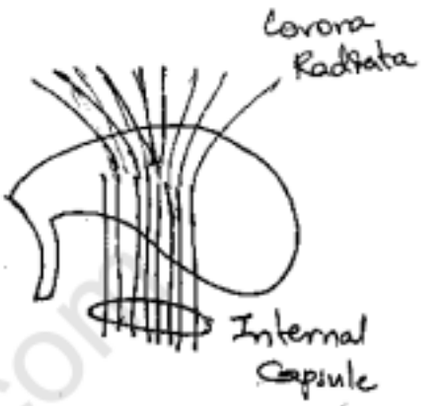
"There is no Lateral wall in Lateral ventricle
there is no III n/v in 3rd ventricle"

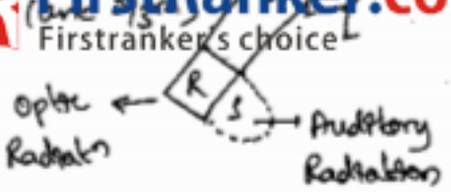
pia mater

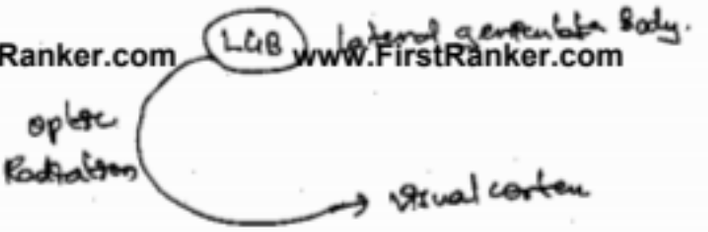
Floor: Optic chiasma
↓
Infundibulum
Mamillary Bodies
Posterior perforating substance

Projection Fibres:

"Upper border of the Corpus Callosum & the Junction of Internal capsule & Corona radiata"







Blood supply

Charcot's artery - Also known as lenticulostriate a
Artery of cerebral Haemo
Ant. choroidal Artery - Artery of Cerebral thrombosis

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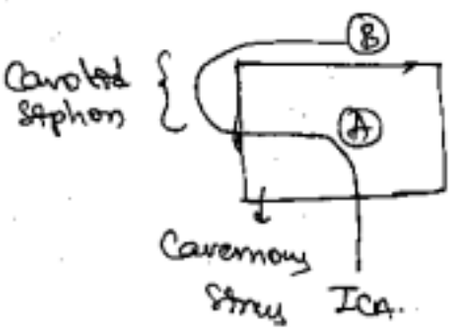
Internal carotid artery:



(A) Intracavernal part (Branches)
- (1) Superior Hypophyseal
- (2) Inferior "
- (3) Meningeal Branches of Cavernous sinus

(B) Supra / Extracavernal part
- (1) Ophthalmic part - 1st Branch
- (2) Middle cerebral A
- (3) ACA
- (4) post. communicating A
- (5) Ant. choroidal A

Direct Branches

pterion → MMA

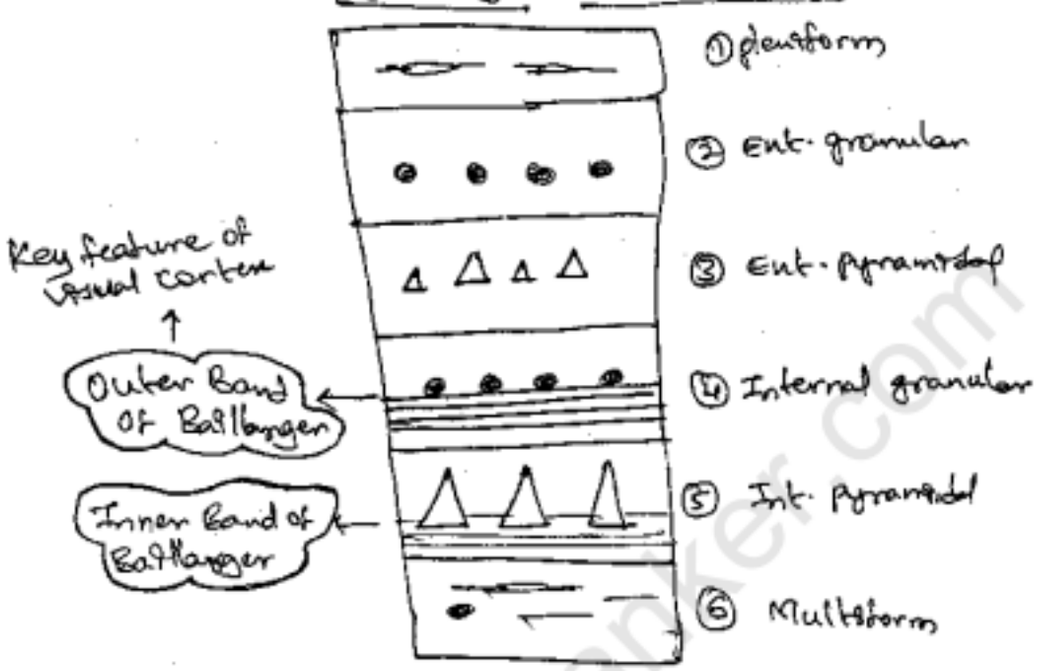
① Extradural Hg → MM Artery

② Subdural " → Bridging veins

③ Sub Arachnoid " Rupture of Berry aneurysm

④ Intracerebral ; charcot's artery

Histological layers of cerebral cortex:



[illegible] cells → gametogonium < oogenesis

Spermatogenesis:

Spermatogonium

↓ mitotic div

Stage for Independent assortment of chromosome

1° spermatocyte (2n)

↓ Meiosis (I) → Diploid becomes Haploid

2° spermatocyte (n)

↓ meiosis - II

Spermatids (n) ⊙

↓ Spermiogenesis

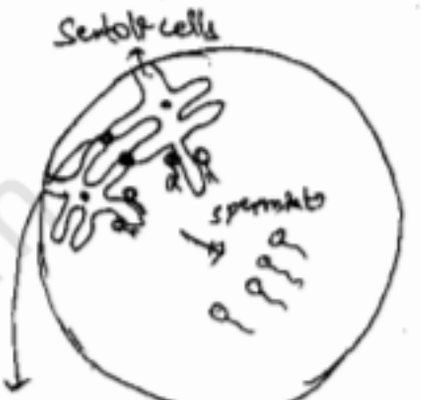
Spermatozoa (n) ♀

↓ Spermiation

Released in the lumen of Seminiferous Tubule

↓

[illegible] Maturation



Tight Junction → Blood Test Barrier - [illegible]

"Sertoli-Sertoli Barrier"

Meiosis ... arrested in "prophase-(I) : Diplophene"

↓

Puberty :- LH surge (~36 hrs prior to ovulation)

↓

Meiosis-(I) complete

2° oocyte (n) + 1st polar Body (n)

↓

Meiosis - II

↓

Arrested in Metaphase - II

↓

Meiosis II completes only if fertilization takes place

- Should be put ... for 3 days

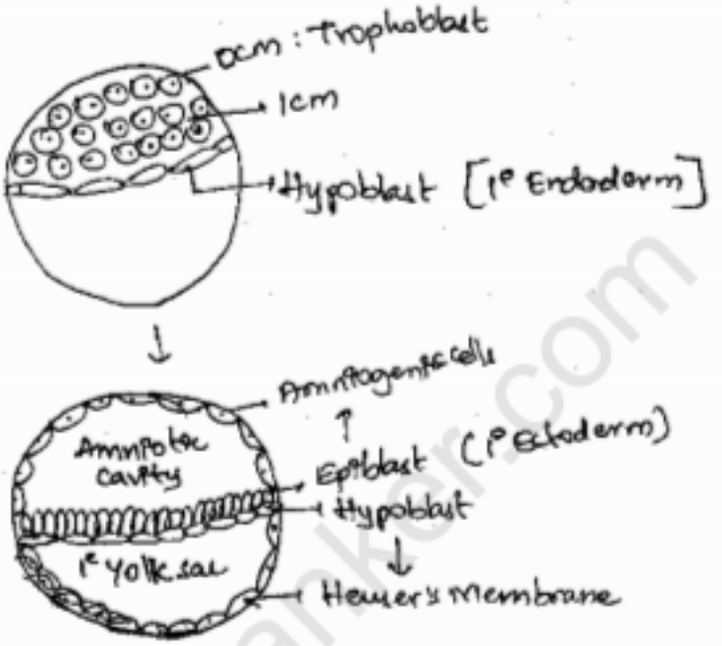
- ... Day 6
- ... Interstitial implantation

M/c site: Junction of posterior wall of Fundus & Body of uterus

- "Stage for embryonic stem cells."

2nd wk of Embryogenesis:

"II Week - wk of Bilaminar Germ Disk"



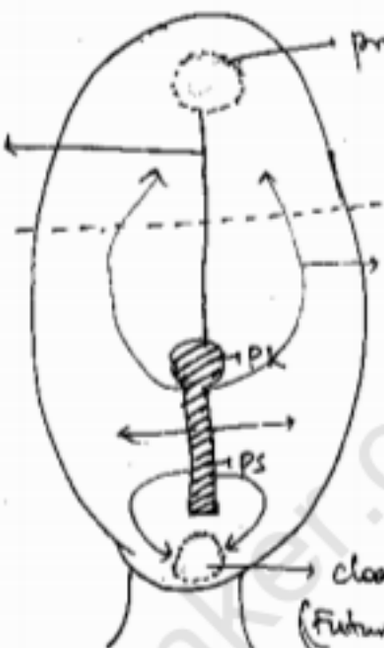
Prochordal plate

↓

1st structure developing the Cranio-caudal axis of the embryo

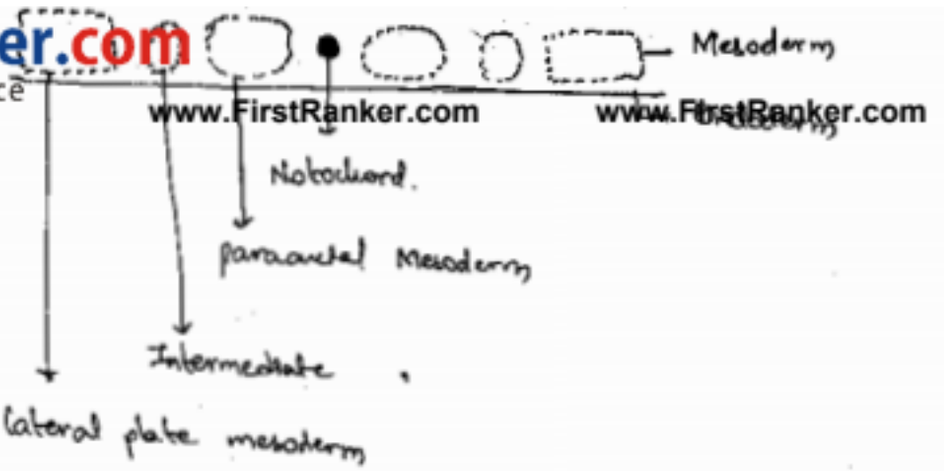
all the 3 germ layers:

① Endoderm - 1st appear
② Mesoderm
③ Ectoderm



- Derived from primitive knot
- Function: "Stimulates Surface Ectoderm & convert it into Neuroectoderm"

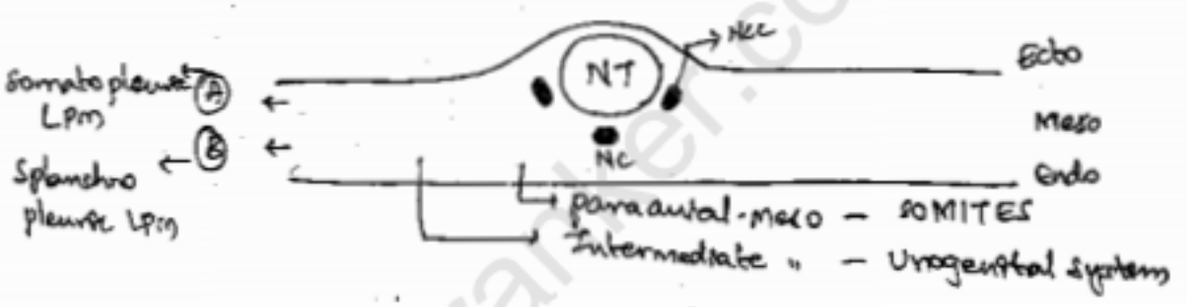
- proliferating mesoderm cannot reach in b/w Ecto & Endo of prochordal plate &



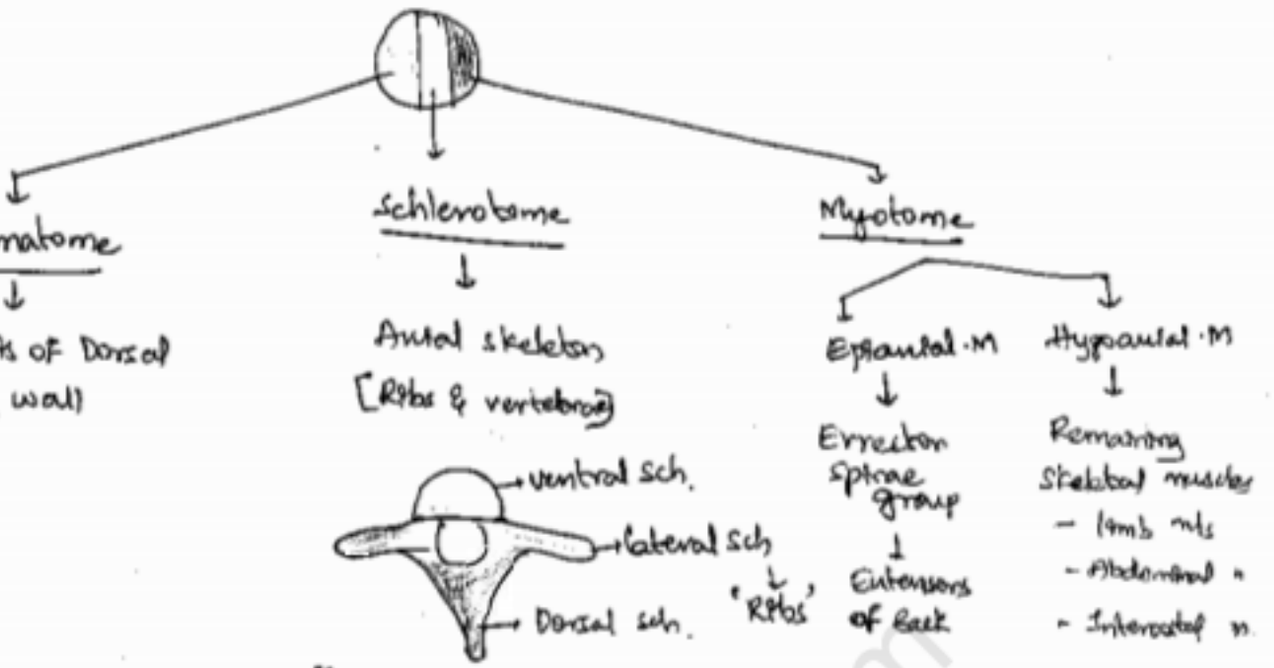
(*) "Fusion of neural tube begins at cervical region & runs Cranio-Caudally"

Cranial Neuropore - closes on 'Day 25'

Caudal " - " 'Day 28'



Somite



"Hemivertebrae is Due to defective development of ventral schlerotome"

"Spina Bifida - Defective Dev. of Dorsal schlerotome"

① Central Tendon of Diaphragm

② Fibrous pericardium

③ Liver parenchyma including Sinusoids & kupffer cells.

④ Ventral mesogastrium - In future gives rise to lesser omentum

"Most cranial structure in the Embryonic plate Before folding."

Exceptions:

⇒ Sphincter pupillae & Dilator pupillae - Smooth muscle . derived from "Neuro Ectoderm"

Cardiac mfs

Smooth muscle of Ascending aorta
Pulmonary Trunk
Coronary vessels

Derived from Neural crest cells

④ Neuroglial cells
⑤ Retina

Neural crest cells Derivatives:

Neural Derivatives: (PNS)

① All ganglions
② All enteric plexus
③ Schwann cells
④ Adrenal medulla
⑤ Parafollicular C cells
⑥ Melanoblasts (Cytes)

Mesenchymal Derivatives:

① Skull Bones except sphenoid & occipital
② Arachnoid & pia mater
③ odontoblasts (Dentine)
④ pharyngeal arch cartilages
⑤ Dermis of Head & Neck
⑥ Conotruncal septum.

(I) - Lining of tympanic membrane
middle ear cavity
mastoid antrum
Auditory tube

(II) - Lining epithelium of palatine tonsil. [Lymphoids of tonsil are derived from NCC]

(III) - Thymus & Inferior parathyroid gland

(IV) - Superior parathyroid gland.

Remnant of V pouch - Ultimobranchial Body. [last to develop from the pharyngeal arches]
UBB

"Neural crest cells migrate into ultimobranchial body & gives rise to parafollicular C cells"

UBB: 1) Arrests the descendant of thyroid gland.
2) It transfers the parafollicular cells to the (thyroid)

⇒ "Thyroid tissue in the mediastinum & devoid of parafollicular 'C' cells due to (defect) of 'UBB'"
Absence

All cartilage except

↓

Foot plate of the stapes & Annular ligament are Derived from otic capsule

Arches	Nerve	Muscles
I	V_3 & chorda Tympani	mls of mastication, Tensor veli palatini, Tympani, Mylohyoid, Ant. Belly of Digastric
II	VII n/v	Mls of facial expression, Stapedius, Post. Belly of Digastric, Stylohyoid, auricular mls, occipitalis
III	IX n/v	stylopharyngeus
IV	superior laryngeal n/v (X) (SLN)	cricothyroid, all mls of palate except TVP & all mls of pharynx except stylopharyngeus & cricopharyngeus
VI	Recurrent laryngeal n. (X) (RLN)	cricopharyngeus & all muscles of larynx except cricothyroid.

[illegible] maxillary & medial nasal process
↓
forms [illegible]

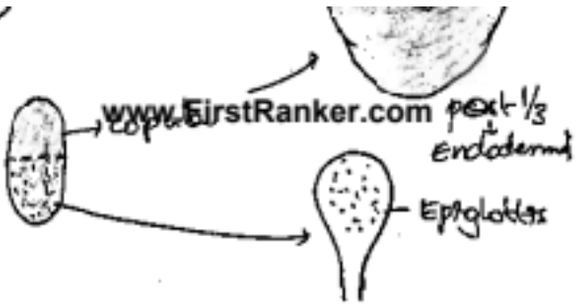
Unilateral cleft upper lip – Non-fusion of maxillary to median nasal process

Bilateral " " → Non-fusion of both maxillary process to median nasal process. "
[HARE LIP]

⇒ " Ala of the Nose " is derived from lateral nasal process."

⇒ " Oblique facial cleft → Non-fusion of maxillary to lateral nasal process"
↓
Exposed Nasolacrimal Duct

⇒ " Palate " is also derived from maxillary process & median nasal process → Incisive portion of the palate"



post 1/3 + endoderm

Structures of Adult size at birth:

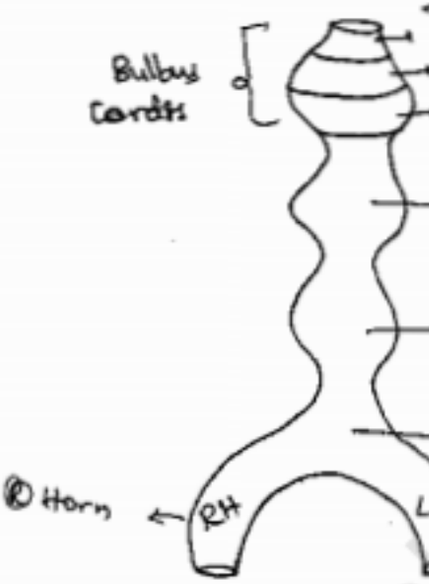
1. Tympanic membrane
2. Ear ossicles
3. Middle ear cavity
4. Cochlea.
5. semi-circular canals
6. Mastoid Antrum [not Mastoid process]

Endothelial Heart tubes

In the splanchnopleuric Lpm

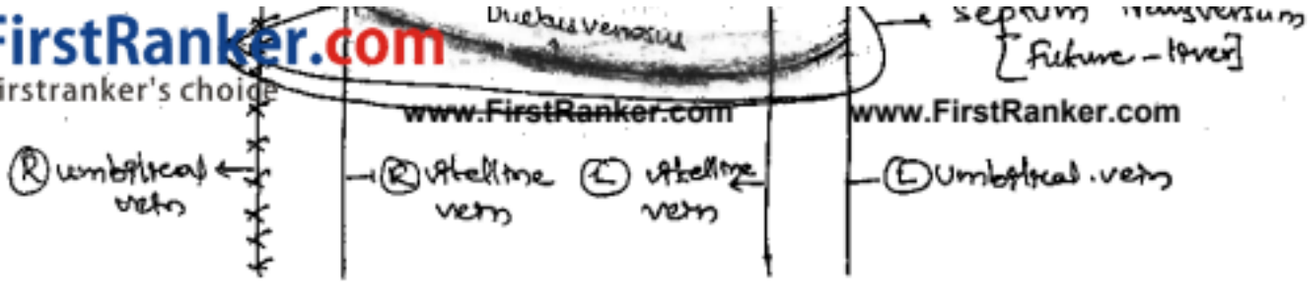
[Nothing but modified Cardiac muscle]

Derivatives



[Most of the major veins are pnt in (R) atrium]

(R) Smooth post wall of (L) Atrium - By absorption of pulmonary vein



(R) HCC → Rt Hepato cardiac channel. → Also gives Rise to terminal part of IVC

④+⑤ = ⓛ Branch of portal vein

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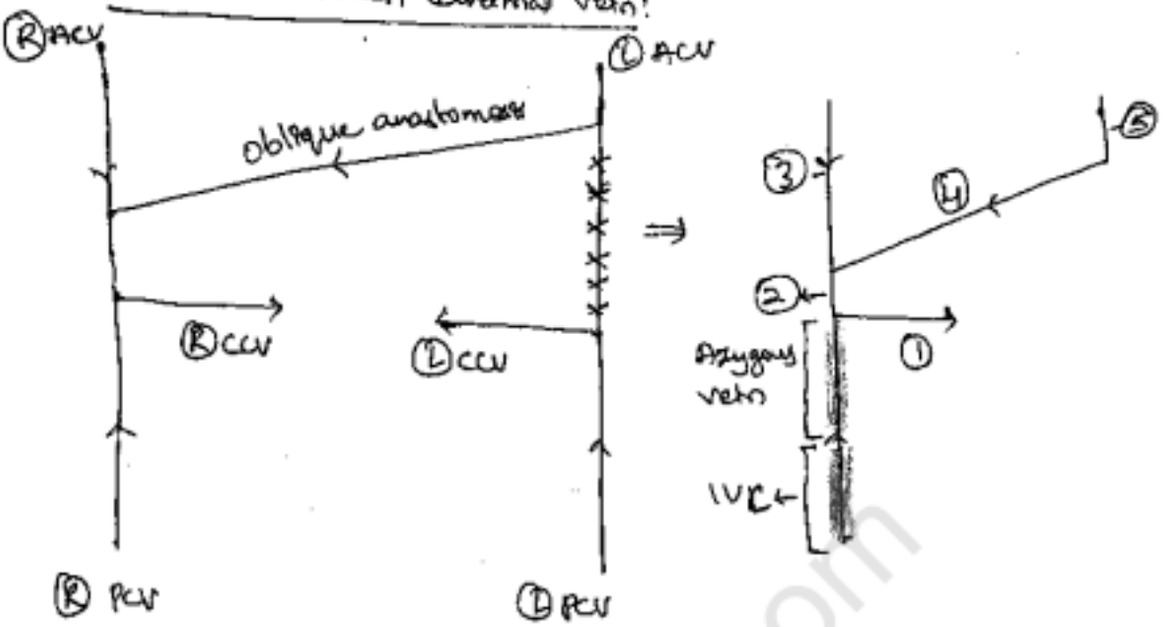
Fate of common cardinal vein:

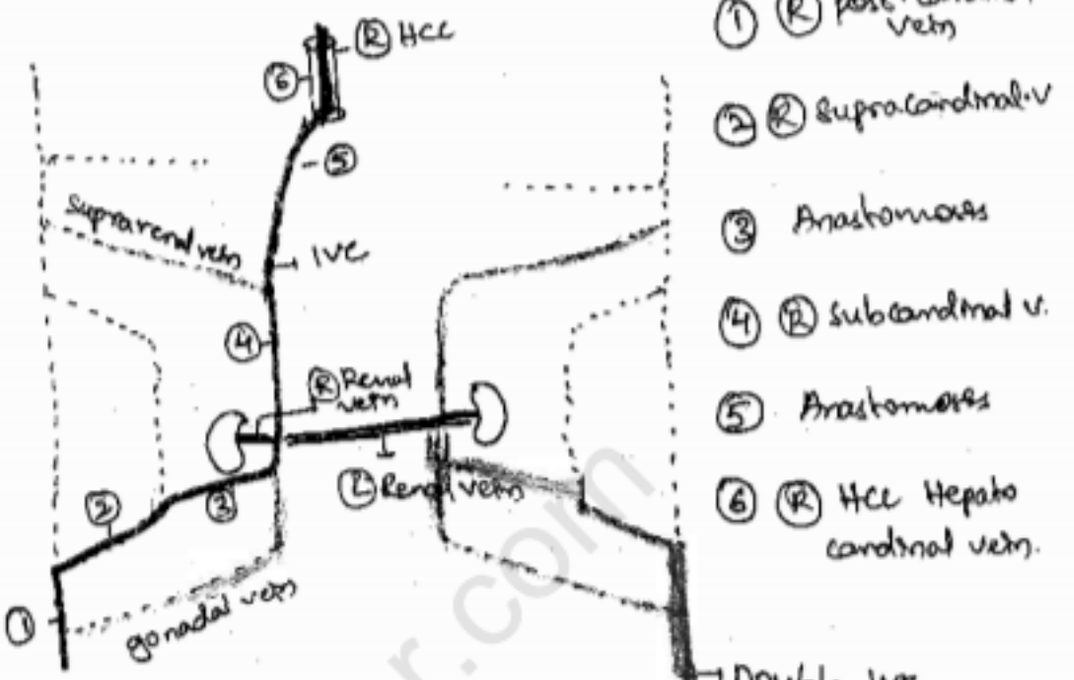


1+2 = Superior vena cava

③ = Ⓡ Brachiocephalic vein

④ & ⑤ = Ⓛ Brachiocephalic vein

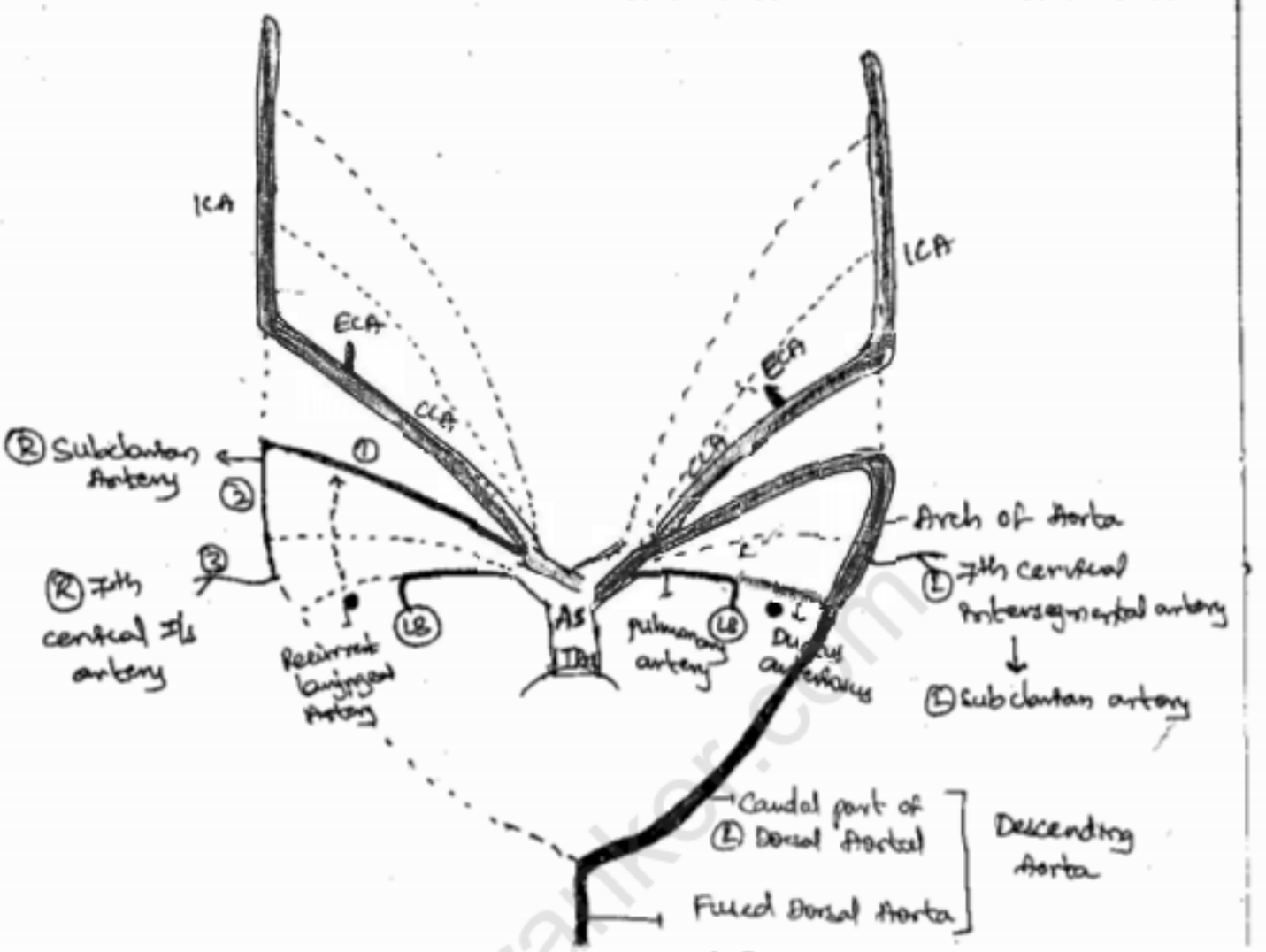
Intersubcardinal anastomosis



(R) Renal vein – (R) Mesonephric vein

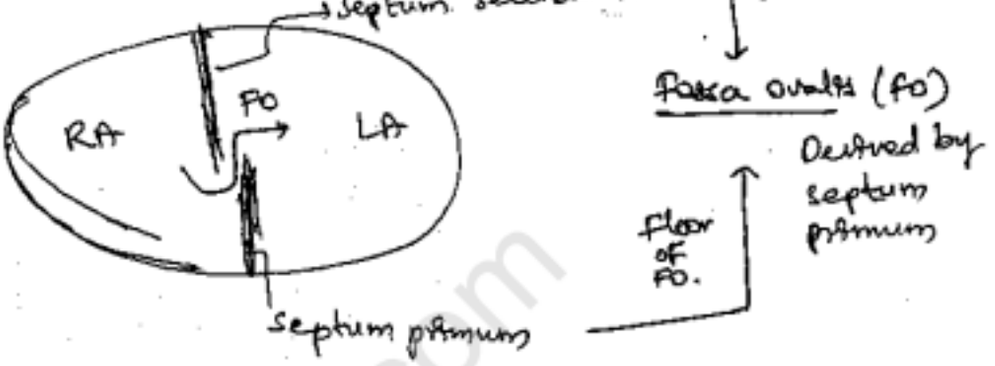
(L) " " – (L) " " + (L) subcardinal vein + Intersubcardinal Anastomosis

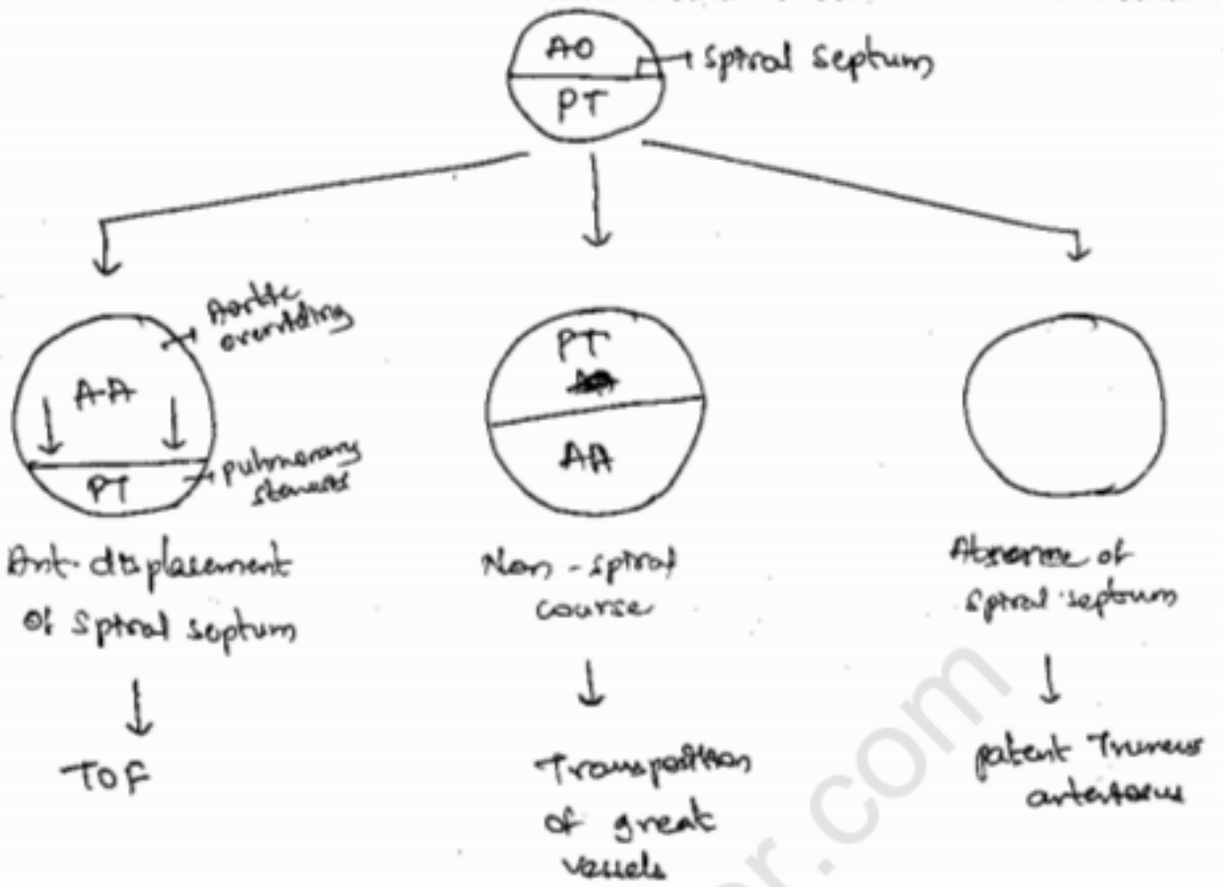
Arterial Development:



It cause dysphagia &
hiccup
By compressing oesophagus

Interatrial septum:





Ant. displacement of spiral septum

↓

TOF

Non-spiral course

↓

Transposition of great vessels

Absence of spiral septum

↓

patent Truncus arteriosus

Liver

Septum Transversum
(Mesoderm)

1. Liver parenchyma (CT)
2. Sinusoids
3. Kupffer cells
   ↓
   fat storing Ito cells

Hepatic Bud
(Endoderm)

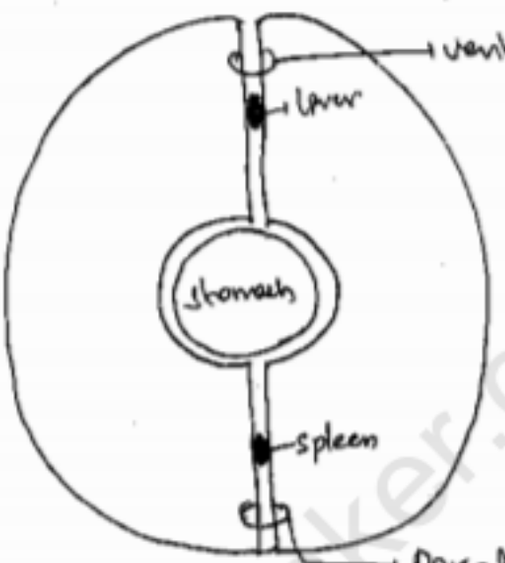
1. Hepatocytes
2. Billiary apparatus

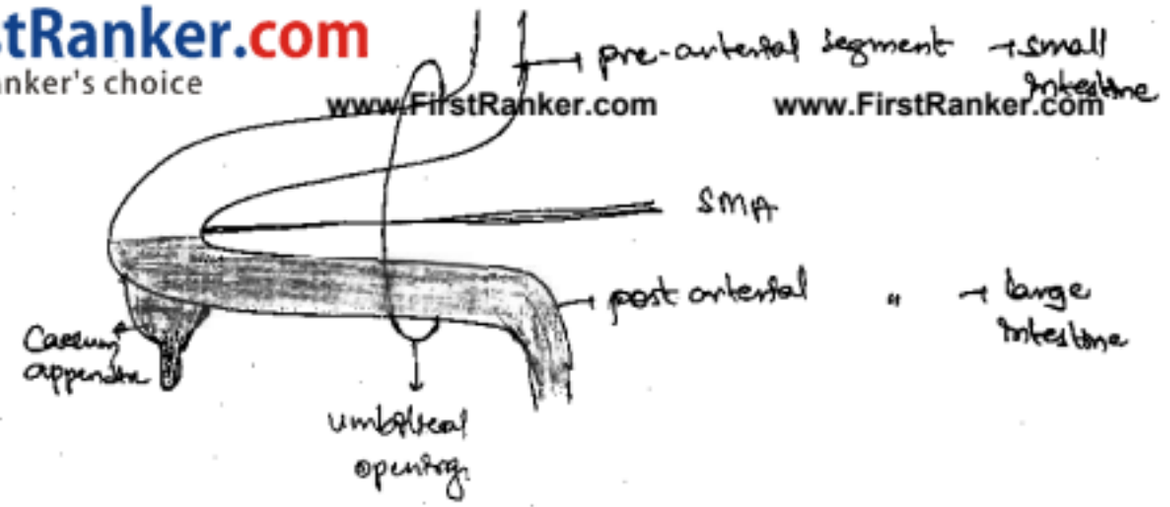
"DPB - upper head, Body, neck & tail of pancreas"

"VPB - lower head, & uncinate process"

Most/c Developmental anomaly of pancreas - pancreatic DIVIsum

Failure of Anastomosis b/w the Duct systems





(I) Rotation – 90° Anticlockwise

Site – umbilical opening

Result – pre arterial seg to (R) side
post arterial seg to (L) side

(II) Rotation – 90° Anticlockwise

Site – Umbilical opening & Abdominal cavity

Result – (1) pre-arterial segment overlapped by post-art. seg.
(2) Subpyloric / midline caecum.

NON ROTATION

1st Rotation as (N)

↓

2nd & 3rd Rotation – Abnormal

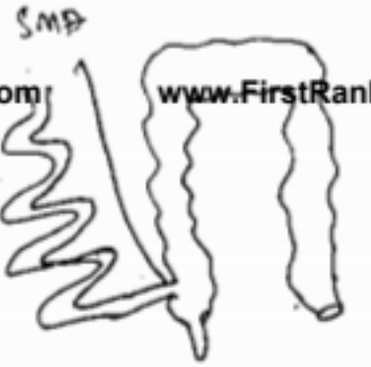
↓

Reduction of Hernia

↓

SI to (R) side

LI to (L) side



Case-II

1st Rotation – (N)

↓

180° of clockwise (direct) rotation

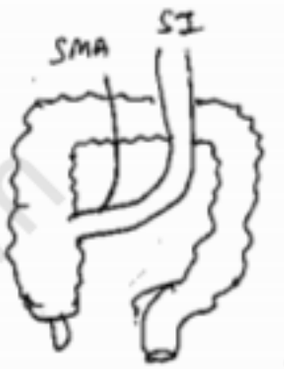
↓

REVERSE ROTATION

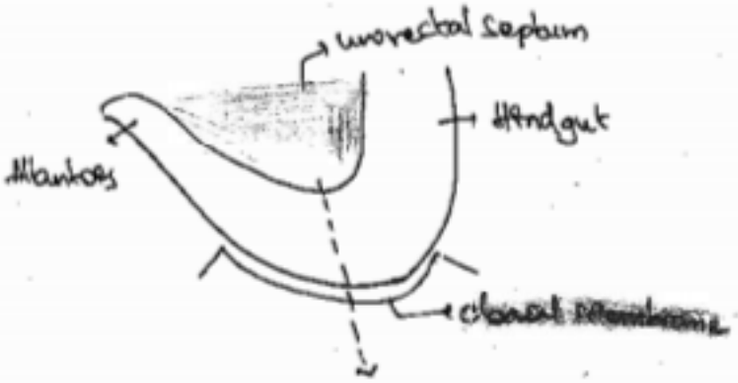
post-arterial segment returns to abdominal cavity before pre-arterial sg

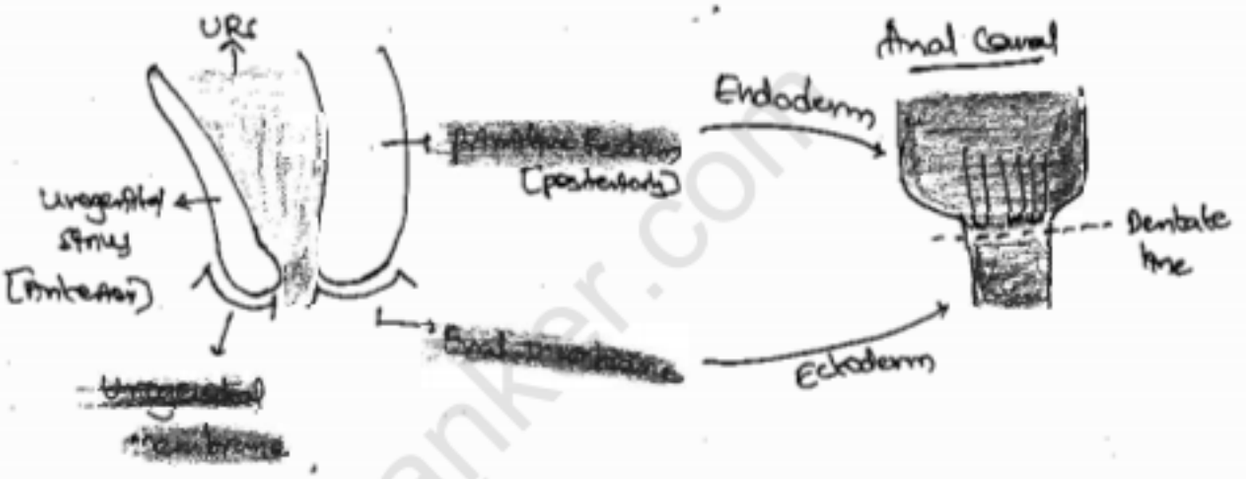
↓

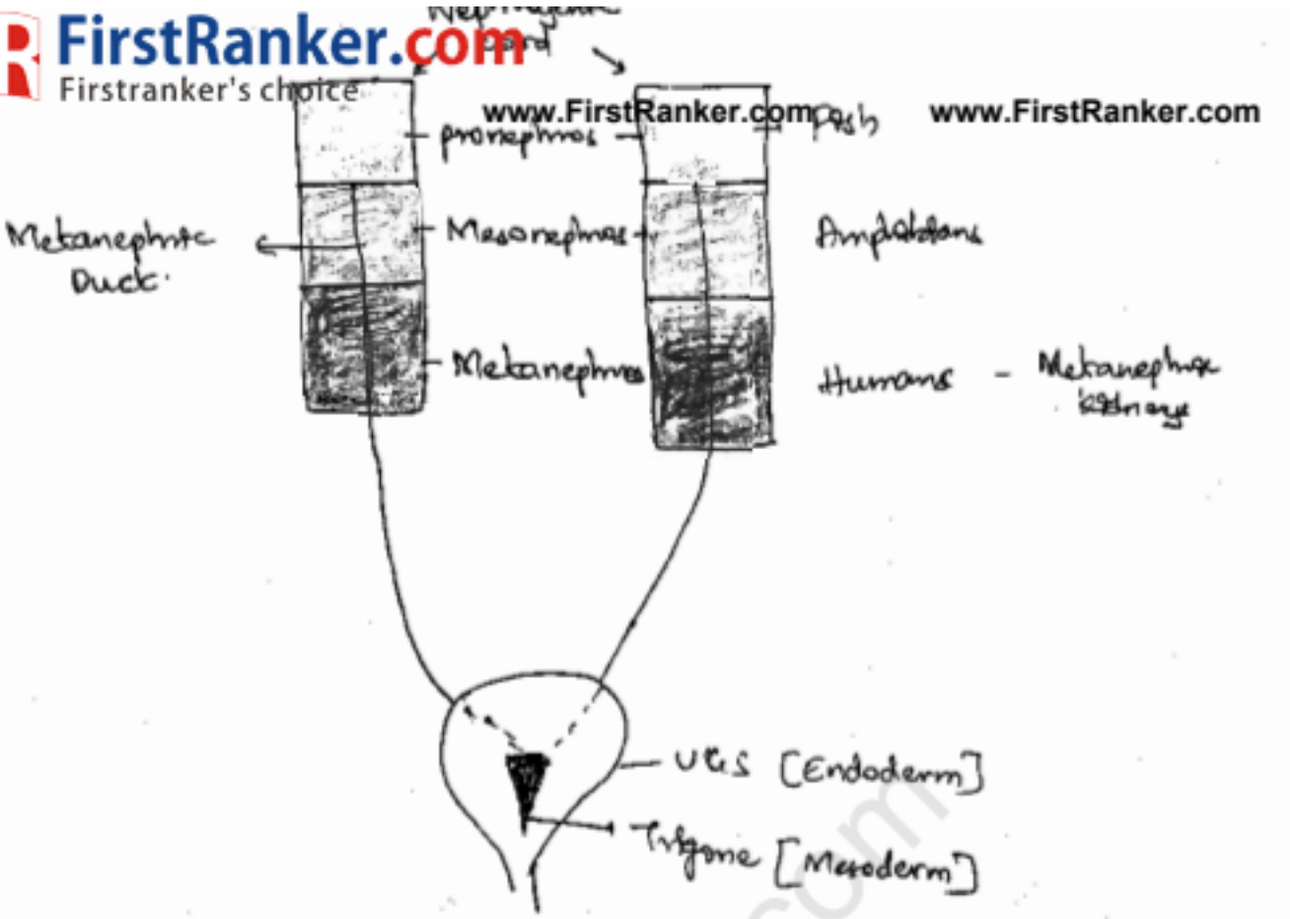
Transverse colon overlapped by Small Int & Asp. mesenteric artery

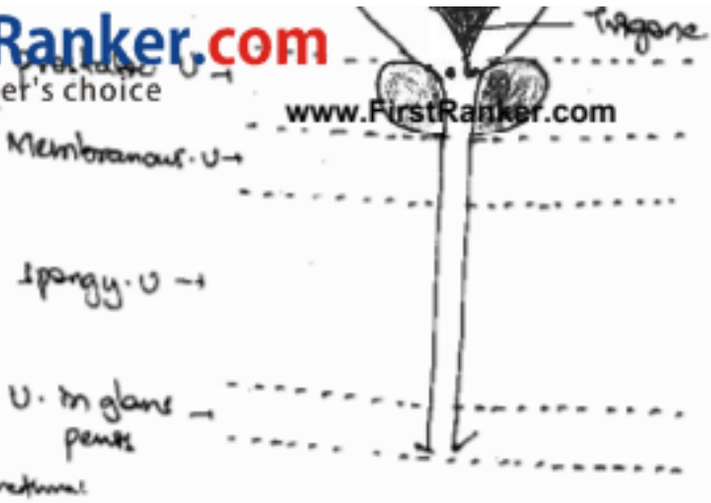


Hindgut & UGS:









Male urethra:

post wall of prostatic urethra till the opening of Ejaculatory - Mesoderm

Rest of the prostatic U + membranous & spongy urethra - Endoderm

Male Terminal urethra - Ectoderm

Female urethra:

post wall of female urethra - Mesoderm

Rest of the urethra - Endoderm

No Ectoderm in ♀ urethra.

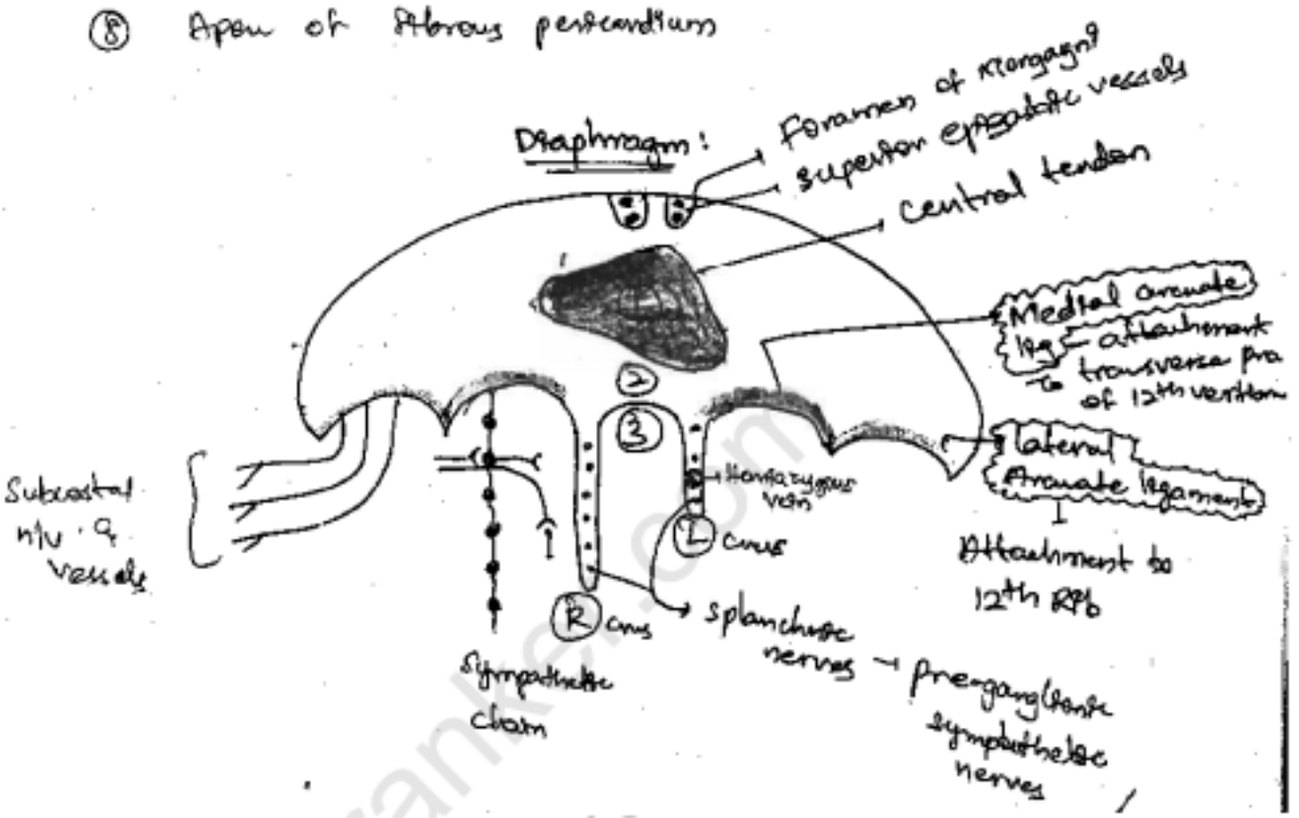
Vaginal wall - Meso + Endo

Entire vaginal epithelium is derived from - UGS - Endoderm only

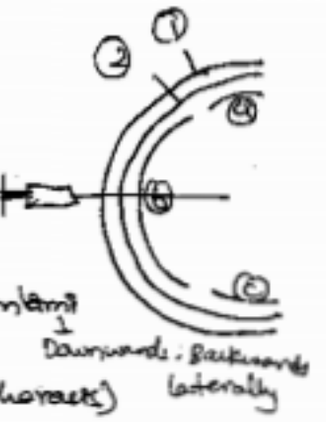
Gartner's Duct is present in b/w the layers of Broad ligament

" Cyst " in the upper wall of vagina

* ④ Attachment of 2nd costal cartilage
- ⑤ Arch of Azygous vein
- * ⑤ Deviation of thoracic duct to ⑥ side
- * ⑥ Superficial cardiac plexus
- ⑦ Junction of Superior & Inferior mediastinum
- ⑧ Apex of fibrous pericardium



Intercostal muscles



* Intercostal muscles
  1. External I/c m/s → Downward, Forwards medially
  2. Internal I/c m/s → Downwards, Backwards laterally
  3. Innermost I/c m/s ← a) Subcostales
     b) Intercostales intimi
     c) sternocostalis [transverse thoracis]

Muscles punctured in pleural tap [In mid axillary line]

External I/c
Internal I/c
Intercostalis intima

⇒ Neurovascular plane is present b/w Internal & Innermost I/c muscles

Arranged as V A N

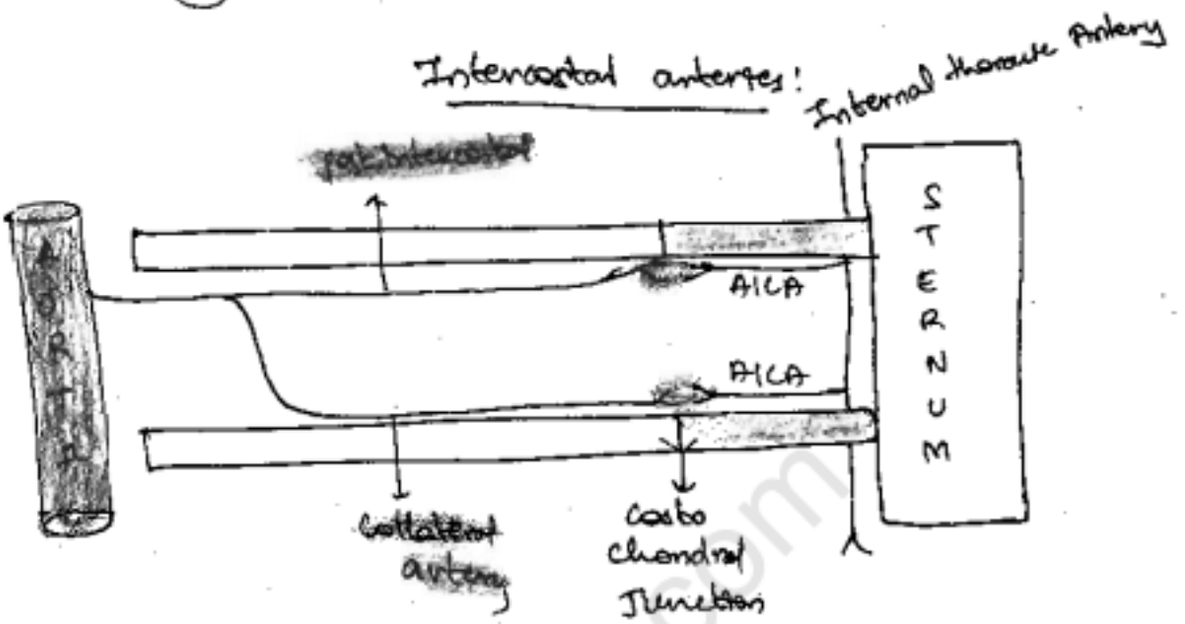
Except 1st space N A V

N. Nerve
A - Artery
V - Vein

T_{11}

T_{12} → subcostal n/v

Intercostal arteries:



[Rectus sheath]

(7th to 9th ICS)

Branches of ITA:

1. Superior Epigastric Artery] → Terminal Branches
2. Musculophrenic Artery]
3. AICA
4. Mediastinal Artery → Remains of thymus
5. pericardiophrenic N/v & runs with phrenic N/v & supplies pericardium & Diaphragm.
6. In ♀ → perforating mammary Branches [2nd – 4th ICS]
   ↓
   [Internal Mammary Artery]

Formative Tributaries of Azygous vein:

① ® Subcostal vein
② ® Lumbar Azygous vein
③ ® " Ascending "

Hemiazygous vein

⟷ (L) "
⟷ (L) "
⟷ (L) "

pleura

parietal pleura

① Cervical
② Costal
③ Diaphragmatic
④ Mediastinal

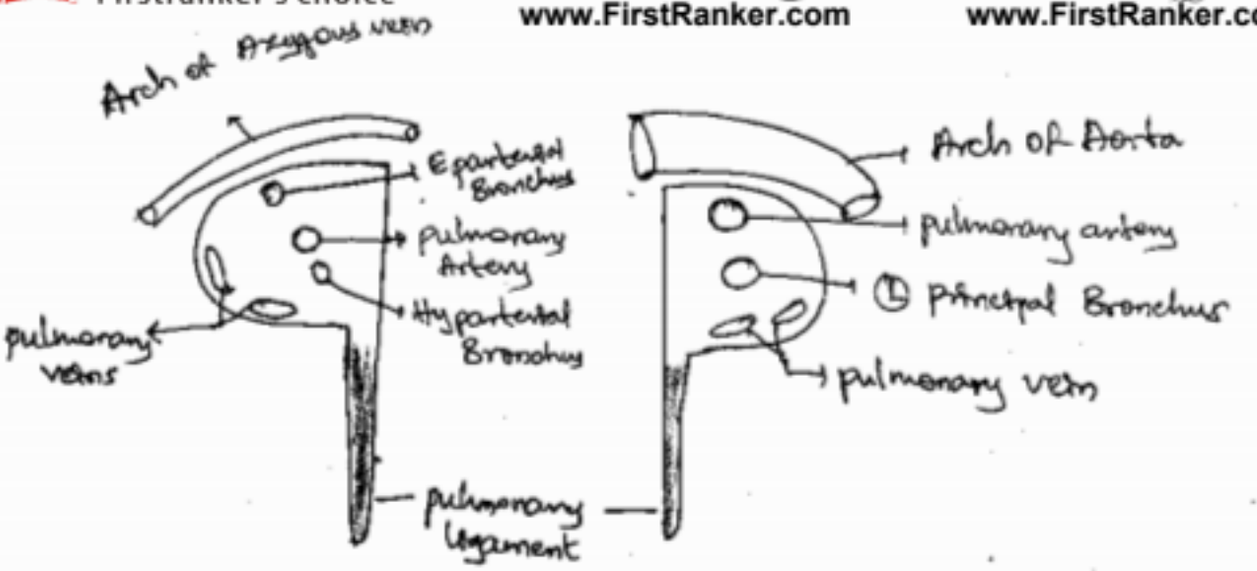
Visceral pleura

↓

pulmonary septae

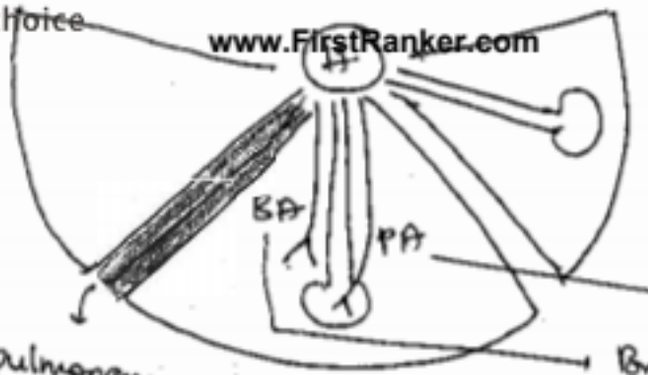
↓

Divides Bronchopulmonary segments



- Epartetal Branches is the Highest Structure in (R) root of lung.
- pulmonary artery is the highest structure in (L) Root of lung

- The 2 (L) Bronchial arteries are the direct Branches of "Descending aorta"
- (1) (R) Bronchial artery is the branch of "(R) 3rd post intercostal Artery"



Intersegmental

BPS

(R) Lung – (10)

Upper lobe (3)
- A – Apical
- P – posterior
- A – Anterior

Middle (2)
- L – Lateral
- M – Medial

Lower (5)
- A – Apical Basal (Gravity-dependent in supine lines)
- P – posterior " / Superior Basal ("Gravity dependent BPS in erect posture")
- A – Anterior "
- L – Lateral "
- M – Medial "

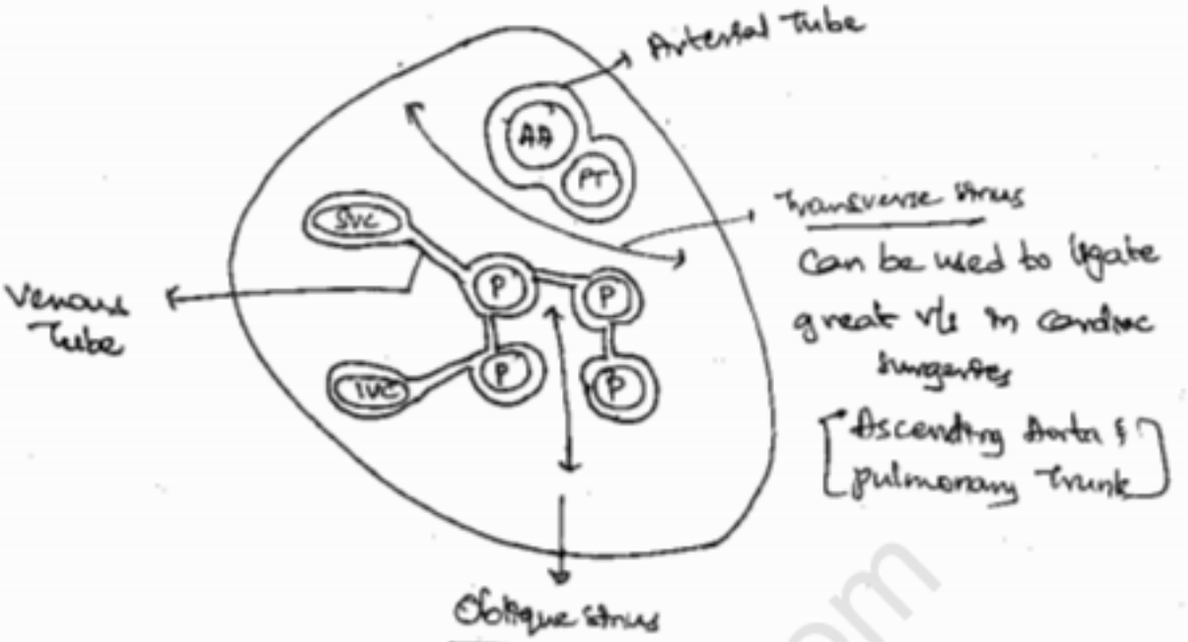
(L) Lung – (9)

(UL)
- A – Apical
- P – posterior
- A – Anterior
- S – superior
- I – Inferior

Lingular BPS.

(LL)
- A – Apical Basal
- P – post "
- A – Ant "
- L – Lat "
- M – Medial " (Usually Absent)

pericardium



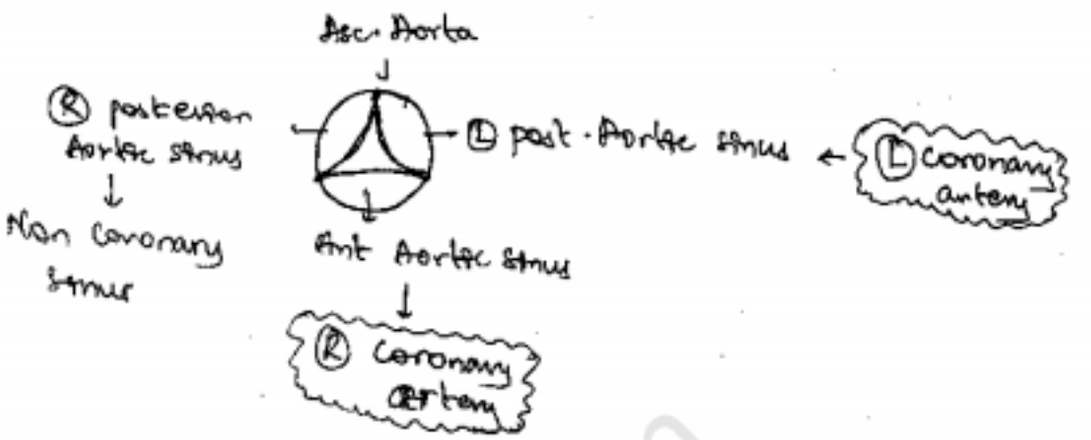
Additional Dead space behind (L) Atrium for its expansion on ↑ Venous Return

Septomarginal trabecula

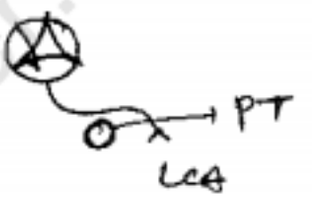
 passage to Bundle Branch

Also called as Moderator Band.

Coronary circulation:



LCA arising from Anterior Aortic sinus can lead to sudden cardiac death.



PIVA - Branch of RCA - 65% of population

(II) (L) Cardiac dominance:

PIVA - Branch of Circumflex artery

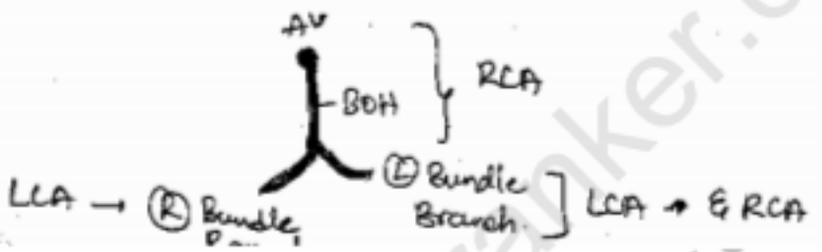
25% of population

(III) Co-Dominance:

posterior Interventricular groove is shared by both RCA and LCA

10% of population

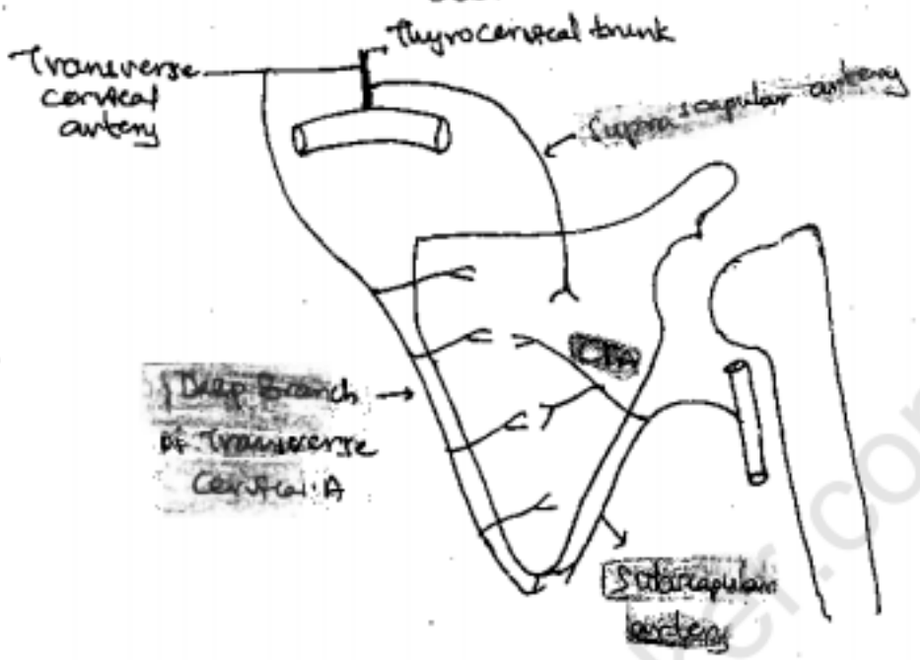
SA ● - RCA

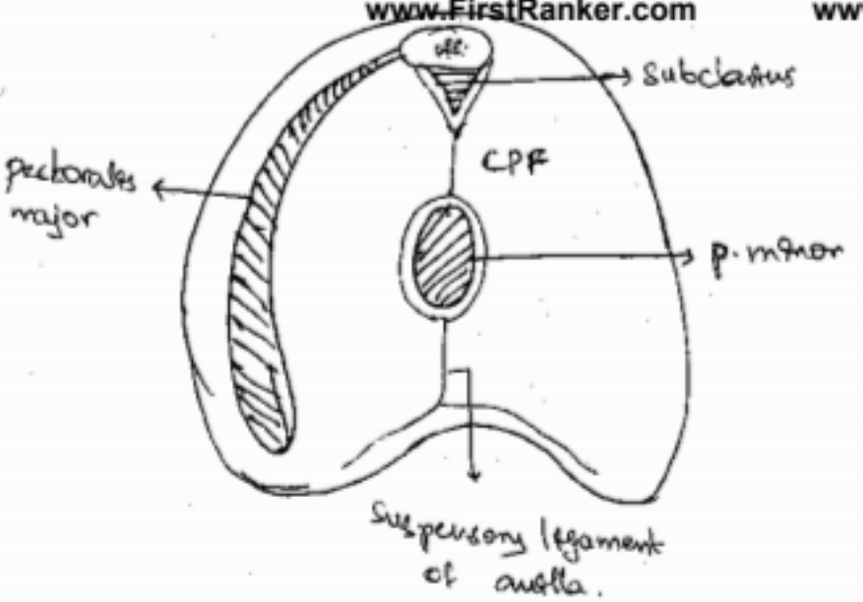


D - Deltoid

Anastomosis Around scapula:

- "Anastomosis b/w 1st part of subclavian to III part of axillary"





Muscles entering

1. Subclavius
2. Pectoralis minor

Structures piercing

1. Cephalic vein
2. Thoracoacromial Artery
3. Lateral pectoral n/v
4. Lymphatics

Roots.

① Dorsal scapular n/v – Rhomboid major & minor

② Long thoracic n/v – Serratus Ant – [Bower's Muscle]
[Bell]

③ Suprascapular n/v – supraspinatous & infraspinatous
[Abduction at shoulder 0–15°]

④ Nerve to subclavius – one of the accessory muscle of inspiration

Cords:

Lateral cord → LML
Posterior cord → LUNAR
Medial " → M4U

L – Lat. root of median n/v
M – Musculocutaneous – "BBC" → cont. meas
n/v Lat. cutaneous n/v of forearm
L – Lateral pectoral n/v → pectoralis major
CPF

B – Biceps
B – Brachialis
C – Coracobrachialis

Hybrid Muscles:

Neck
1. Sternocleidomastoid
2. Trapezius

UL
3. Subscapularis
4. pectoralis major
5. Brachialis
6. Flexor digitorum profundus
7. Flexor pollicis Brevis [May be]

LL
8. pectineus
9. Adductor magnus

Erb's palsy:

Root value involved
C5 & C6

Axillary n/v & musculocutaneous n/v

C5, C6 → Deltoid → # → Adducted Shoulder

C5, C6, C7-spared → Biceps & Brachialis → # → Extended Elbow, Pronated Forearm

Policeman's Tip hand
Porter's Tip hand
Waiter's " "

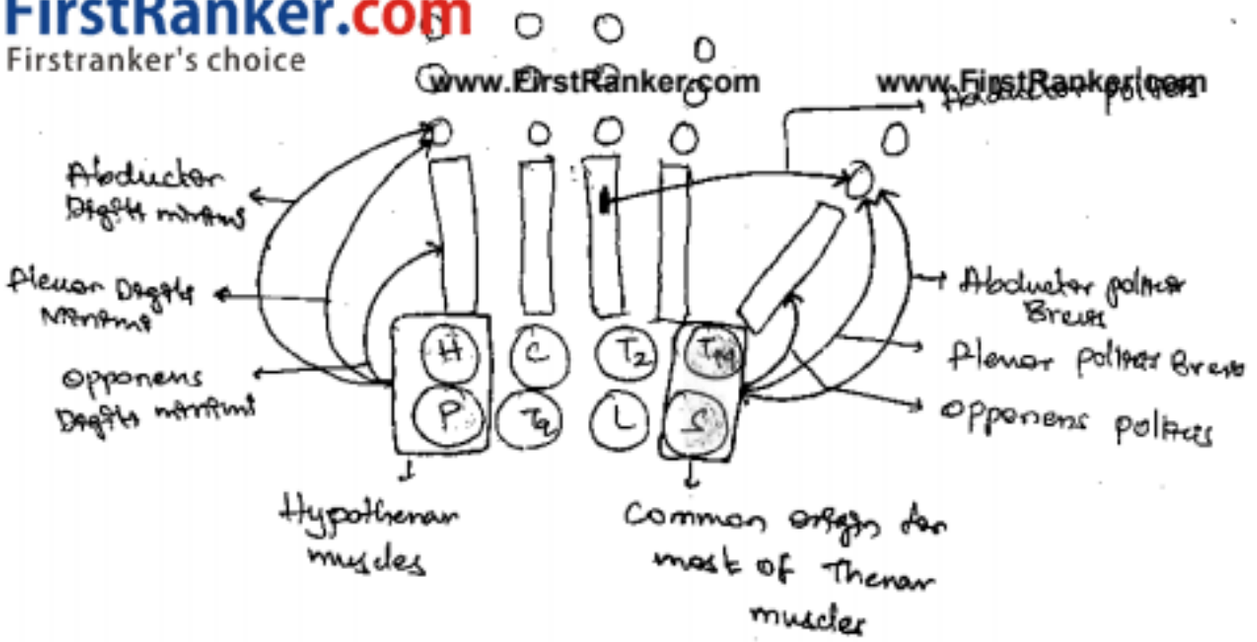
HAND:

Muscles in Hand: (20 muscles)

① Thenar muscles (4) - Flexor pollicis brevis
Abductor "
Opponens pollicis } Median n/v

Adductor "] Ulnar n/v

* function of Thumb completely lost in median n/v injury at carpel tunnel as opposition
* " " " ulnar n/v injury
Anywhere - Abduction
* " " " Radial n/v injury
- Extension



* Opponens pollicis is involved in case of Bennett's fracture [# of Base of 1st metacarpal]

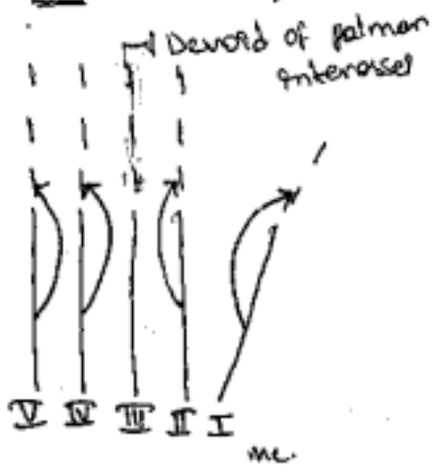
* All the thenar & Hypothenar muscles can reach maximum upto ~~dorsal~~ proximal ~~edge~~ phalanx.

Interossei

Palmar Interossei (4) – Unipinnate
Dorsal " (4) – Bipinnate

Palmar Interossei

P A D – Adduction

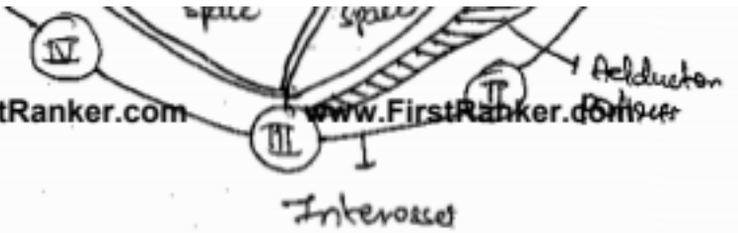


Middle finger is devoid of palmar interossei

Dorsal Interossei

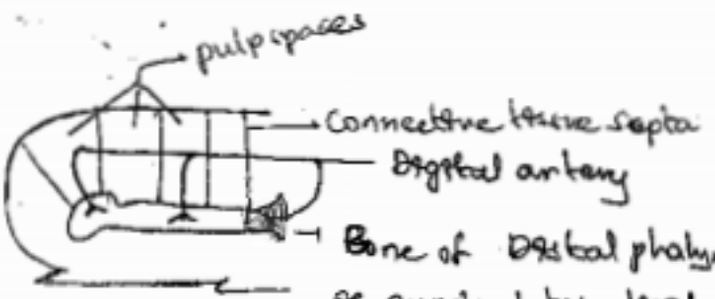
D – AB – Abduction

Thumb & Little fingers are Devoid of Dorsal interossei



Fascial space b/w FDP & pronator quadratus

pulp space of finger:



So prolonged pulp space infection leads to ↓ Avascular necrosis of 4/5th of distal phalynx

Radial n/v:

[$C_{5,6,7,8}$ & T_1]

Case A: Crutch palsy:

Triceps involved — Flexed elbow

All wrist extensors " — Flexed wrist [Wrist Drop]

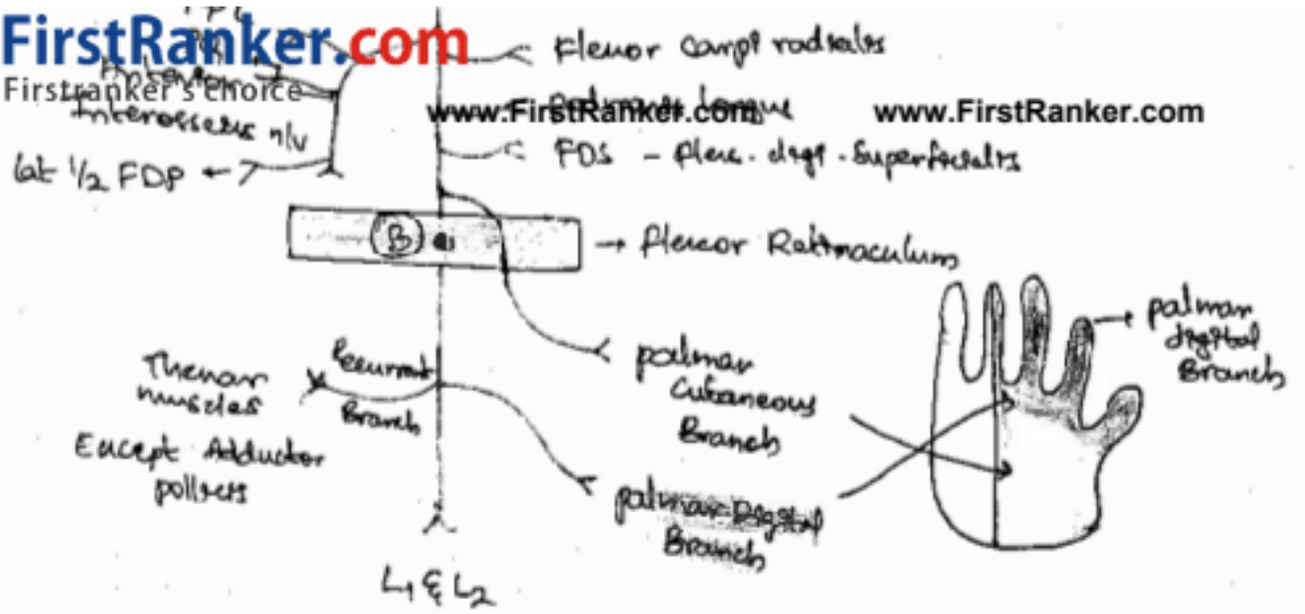
Finger extensors " — Finger drop

Case B Saturday night palsy:

- Triceps is partly involved → weakness in elbow extension
- Wrist extensors " → wrist drop
- Finger " " → Finger drop

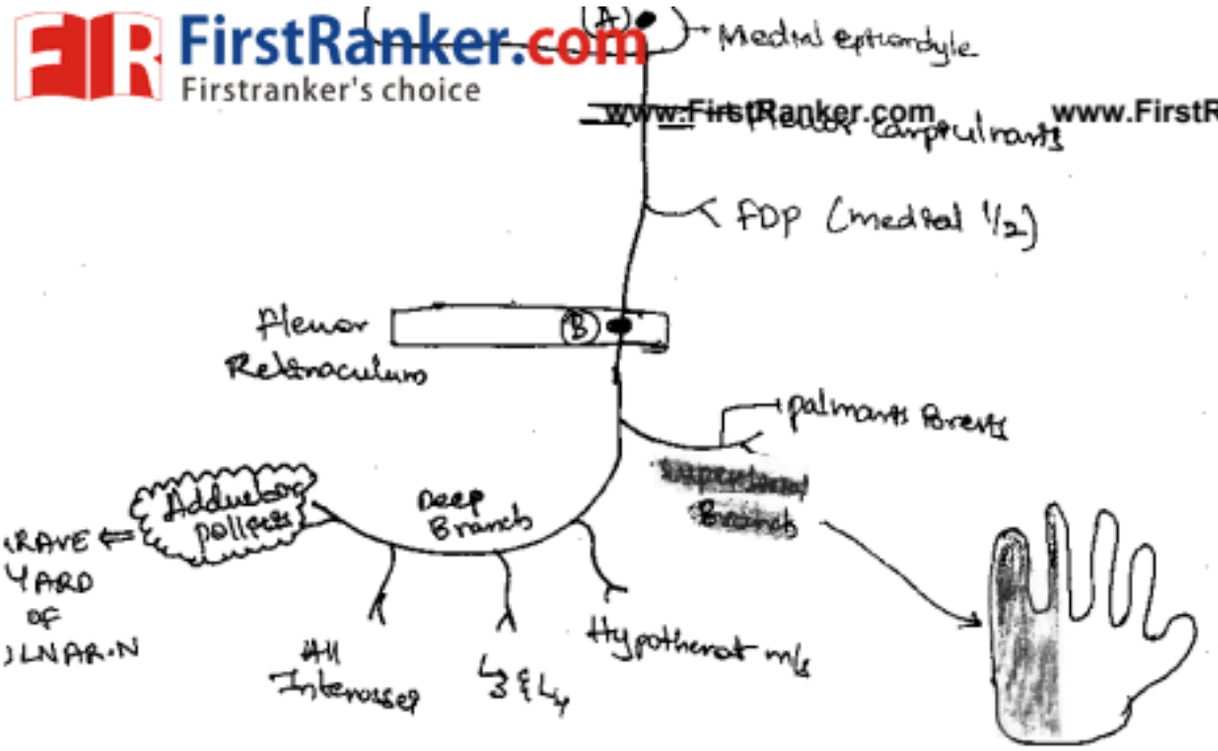
Case C Lateral epicondylar fracture:

- Extensor carpi radialis is spared — No wrist drop
- Extensor digitorum is involved — Finger drop



Case-A: Higher median n/v Injury [supracondylar #]
[Pronator Teres syndrome]

- FDS & lateral ½ FDP is involved.
  ↓
  {pointing index finger} +ve
- Opponens pollicis involved → {Ape thumb deformity}



(#) Compression of ulnar n/v blw the 2 heads of flexor carpi ulnaris is known as "Cubital tunnel syndrome"

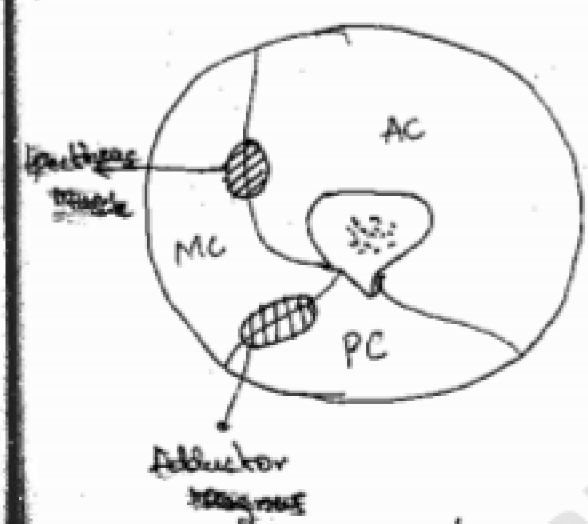
② [illegible]ular " → Acts as Fulcrum in " " wt

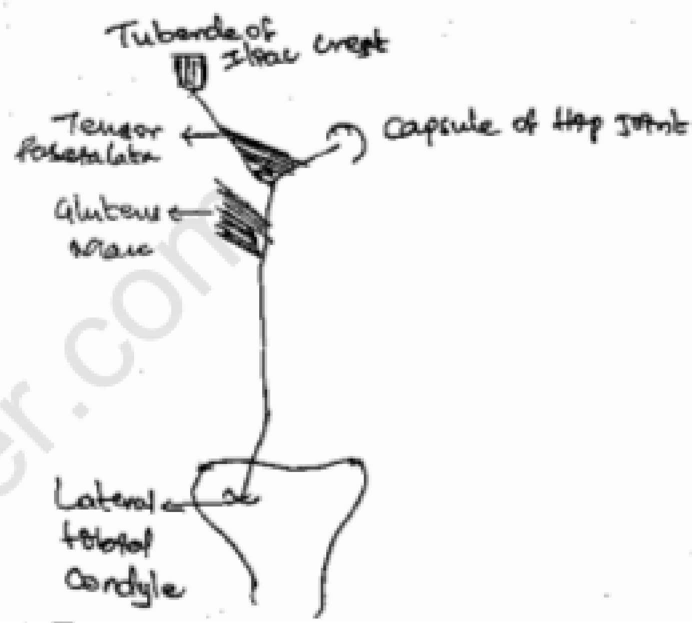
③ Inte[illegible]

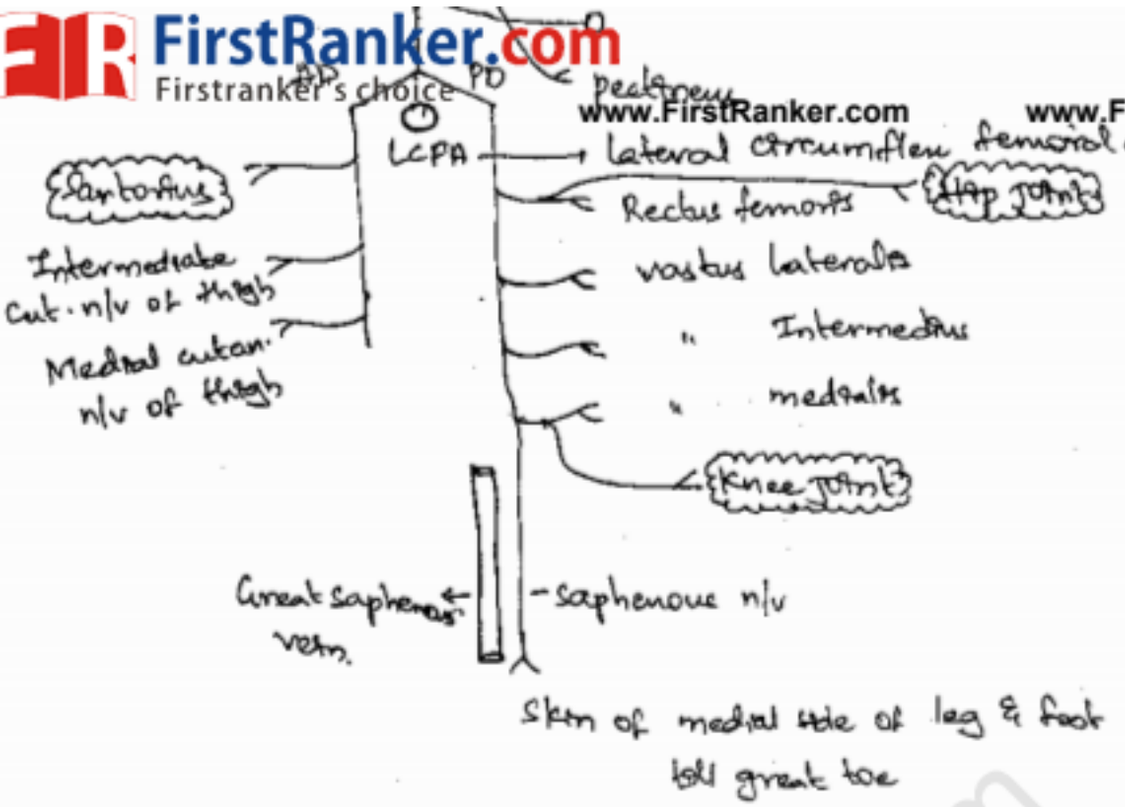
LOWER LIMB:

Fascia Lata:

Intermuscular septum | Iliotibial Tract





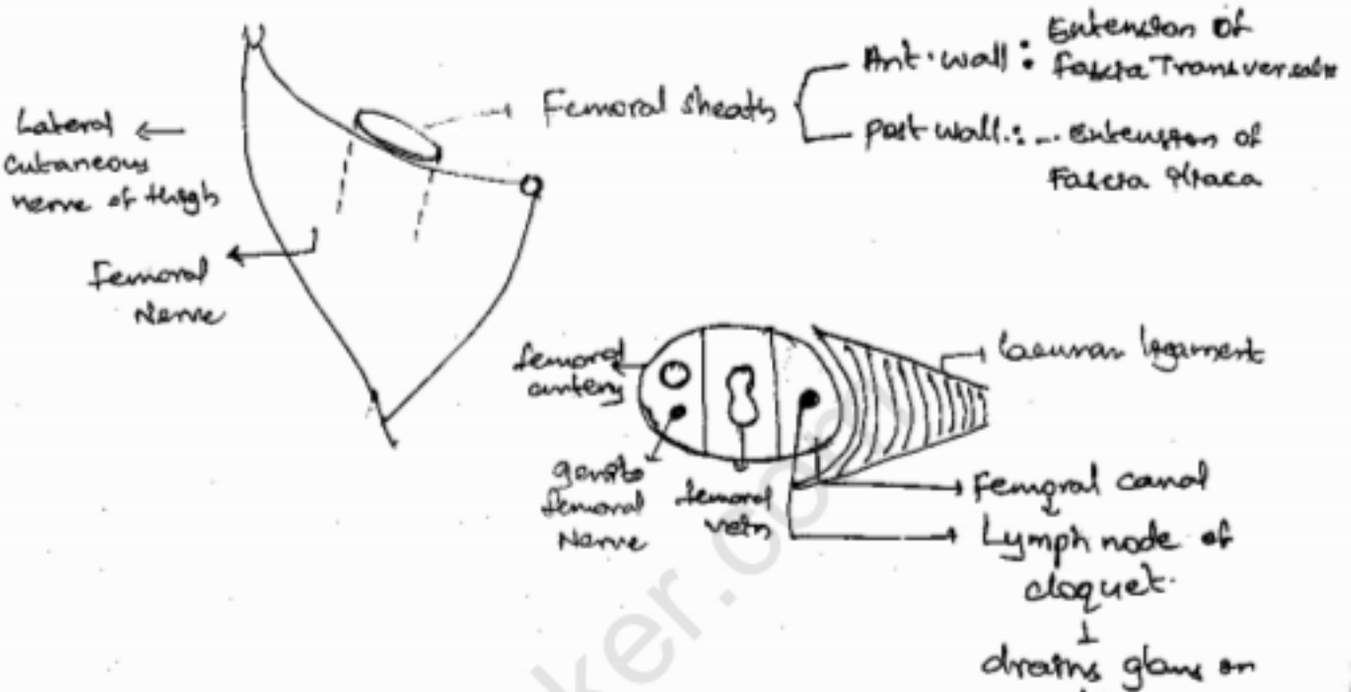


Pudendal vle

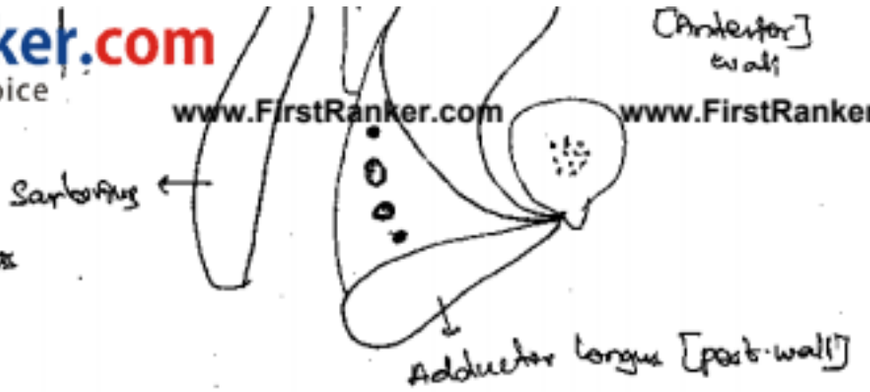
Superficial inguinal lymphnodes

Great saphenous vein

Contents:-



⑧ Lymphnode of cloquet is the most superior deep inguinal LN or the most inferior External iliac lymphnode.



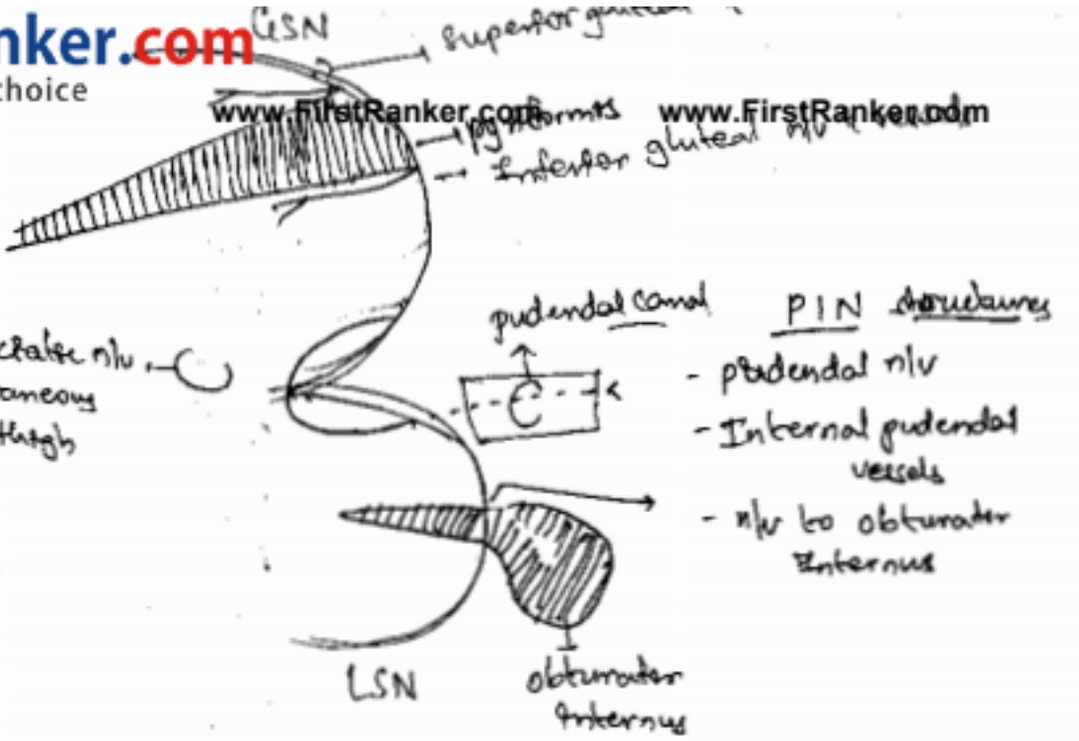
n/v to vastus medialis

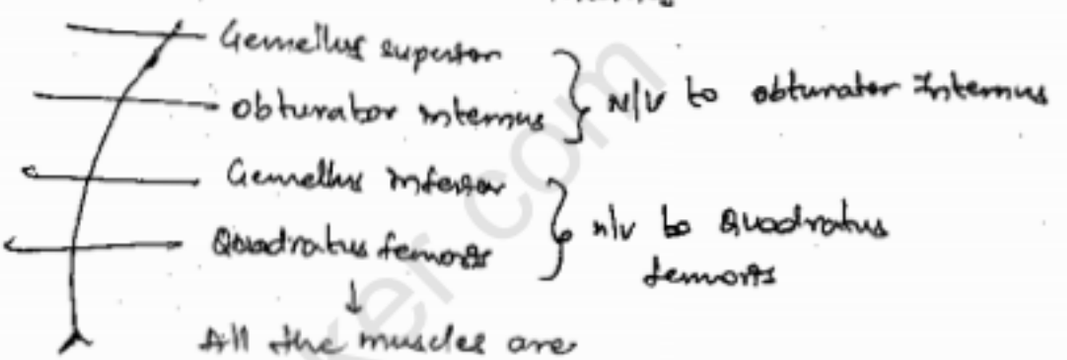
In lower 1/3rd of thigh - Nerve to vastus medialis as not seen in the adductor canal.

Medial Compartment of thigh [Adductor comp]

MLs GOA3

G - Gracilis
O - Obturator externus
A - Adductor longus
A - " brevis
A - Adductor magnus





All the muscles are Anterior to sciatic n/v

① Superior gluteal n/v → Gluteus medius, minimus & TFL

② Inferior

Medial Head of gastrocnemius

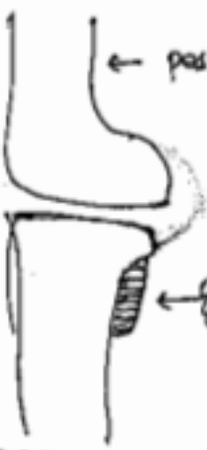
Lateral head of gastrocnemius

{Planta-Ag}

- longest tendon in the Body

popliteal fossa ⟶ Calcaneum

Floor:

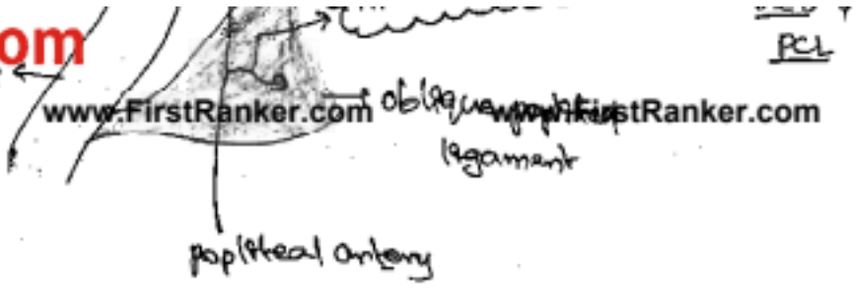


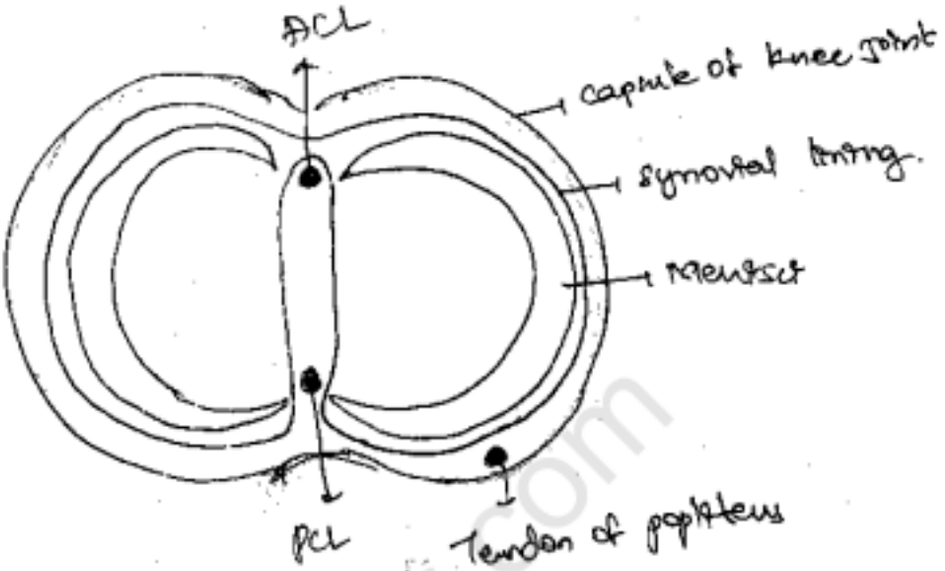
← post surface of femur.

← Capsule of knee joint

← {Popliteus} → Unlocking m/s

{Locking of knee} - Medial Rotation of femur on tibia during terminal 30° of extension → m/s for locking — vastus medialis





ACL, PCL & popliteal Tendon
- Intracapsular
- Extrasynovial

Meniscus
Intracapsular
Intrasynovial

— LPN
— MPN

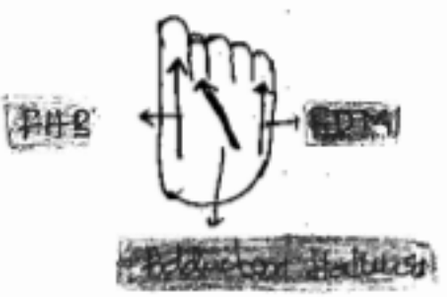
FHL - Flexor Hallucis longus

FDL - Flexor Digitorum longus

[illegible]

[Quadratus plantae]

III layer:



[illegible]

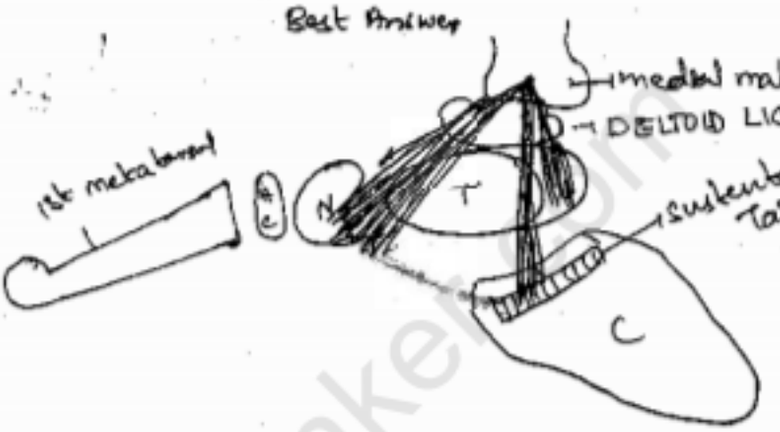
[illegible]

IV layer

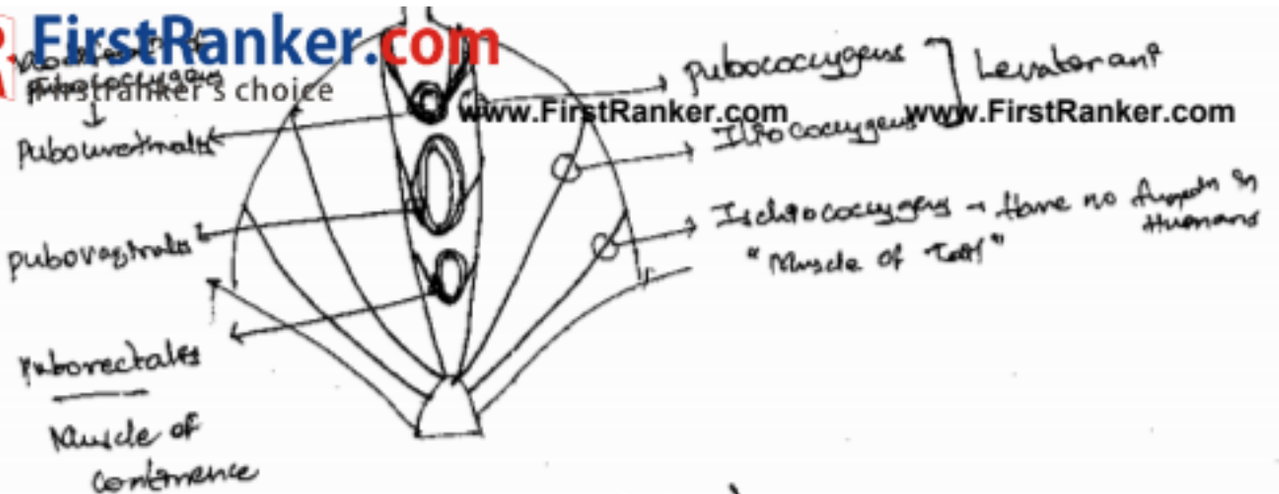
Interossei — plantar - 3 (3) Unipennate
Dorsal I (4) Bipennate

All the interossei are supplied by "[illegible]"

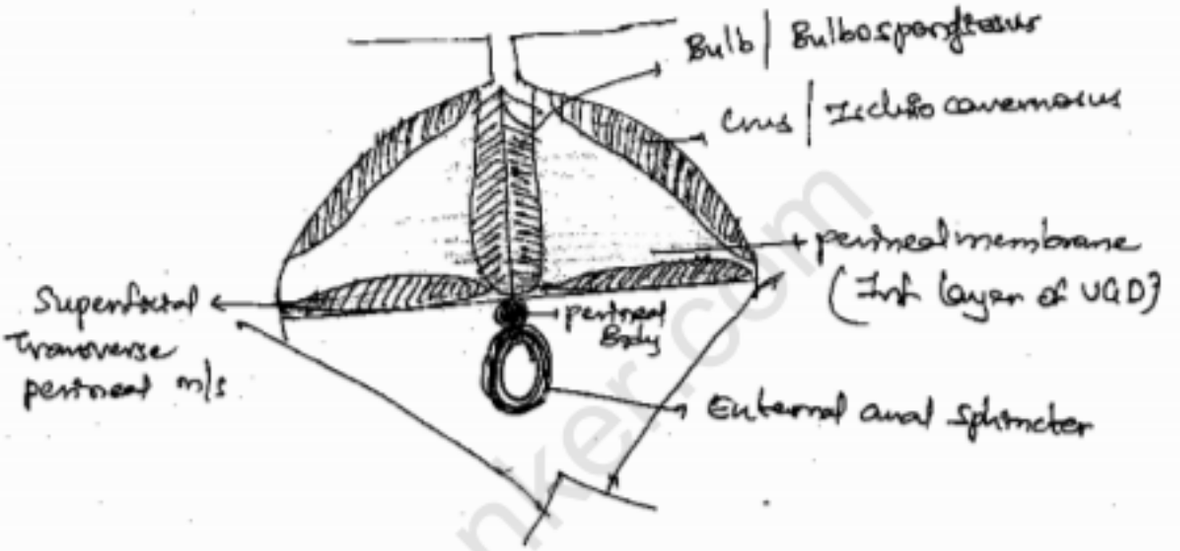
Joints	TCN joint (Talocalcaneonavicular) [Ball & socket]	Calcaneocuboid joint (Saddle joint)
Ligaments	Spring ligament [plantar CN ligament]	Short & long plantar ligament
Toe Bears	plantar Aponeurosis	-do-
Slings	Inverters of foot Tibialis Anterior " posterior Best Answer	Everters of foot peroneus longus - Best Answer " Brevis



"Strongest ligament of Body - Ligament of BIGLOW / Iliofemoral ligament"



Urogenital Diaphragm:



Boundaries of Deep peroneal pouch:

Roof: Superficial layer of UGD

Floor: perineal membrane

Ant wall: Transverse perineal ligament

post wall: Fusion of superior & inferior layer of UGD

Lateral wall: Ischiopubic ramus

Injury to membranous urethra will lead to accumulation of urine in Deep perineal pouch only.

Upper part of thigh till "Holden's line"

Represents junction of coxa's Fascia & Fascia lata.

- A transverse line drawn from the pubic tubercle

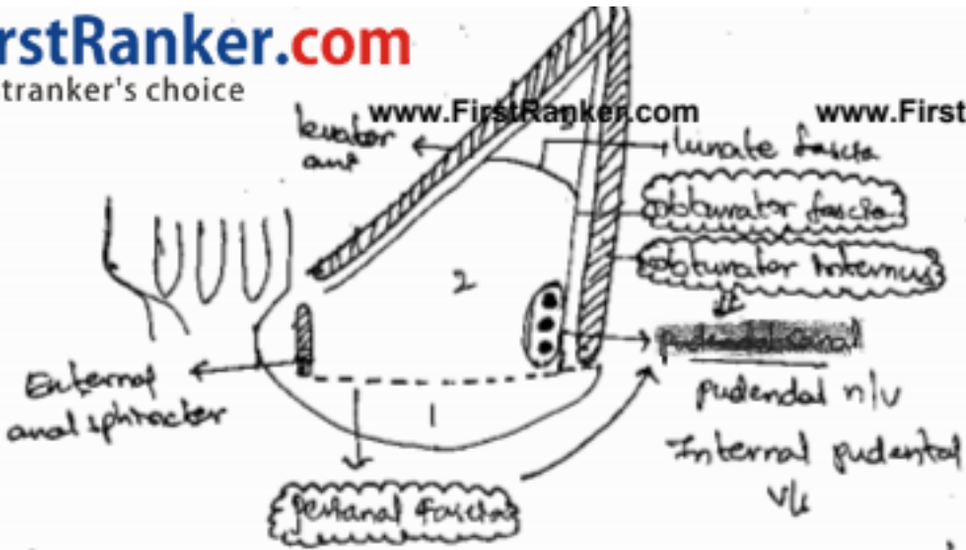
"Internal urethral sphincter is absent in female"

Contents of DPP:

1. Membranous urethra
2. External urethral sphincter
3. Bulbourethral gland (B)
4. Deep transverse perineal muscle
5. Structures piercing perineal membrane

Contents of SPP:

1. Bulb & Bulbospongiosus
2. Crus & Ischiocavernosus
3. Superficial Transverse perineal m/s
4. Bartholin's gland / Greater vestibular gland
5. Structures piercing perineal membrane



(1) perianal space → fat is tightly loculated ∴ infections are extremely painful.

(2) IRF proper

(3) Supralegmental space } fat is loosely " ∴ infections are lesser painful

Contents: (1) fat
(2) pudendal canal & its contents
(3) Inferior rectal n/v & v/s

↓
Can be injured during drainage of Ischiorectal Abscess

Joint

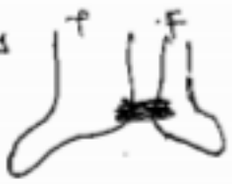
① Sacrococcygeal Jt

Ex: Lambdoid - Strong suture
Coronal s.

② Gomphosis →

Ex: Teeth & gum Jt

③ Syndesmosis



④ Schondylosis

⑤ Saddle - Jt

Sternoclavicular Jt
Carpometacarpal Jt
patellofemoral
Calcaneocuboid

⑥ Ellipsoid - wrist
Atlanto occipital
MCP Jt

⑦ Ball & socket - shoulder
Hip
Talocalcaneonavicular
Transdiaphragmatic Jt