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HEAD & NECK.

(2 types of Skeletal muscles) 3 Motor w/ work.
(1. Smooth muscle)

Cranial nerve nuclei

* pharyngeal arches

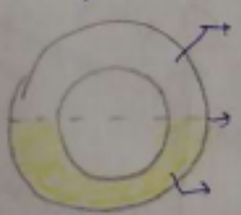
I → Mandibular nerve → M/s of mastication.
II → facial nerve → M/s of facial expression
III → glossopharyngeal. IX → M/s of palate, pharynx, Larynx.
IV → X vagus nerve.
V →
VI →

are supplied by (VAC) vago accessory complex.

Somatic Muscles :-

* Extra occular & Tongue muscles. (not derived from)

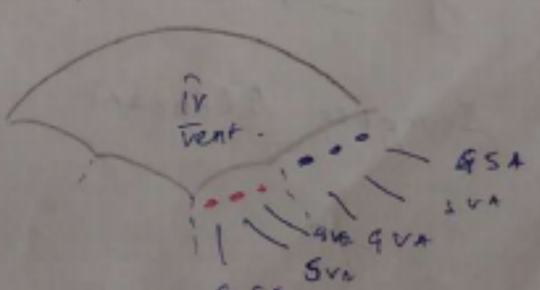
Neural tube.



Alar plate (Dorsal). → sensory nuclei
Sulcus limitans.
Basal plate. → Motor nuclei



GSA (Gen. Somatic Afferent) → Gen. sensation from Body wall
SVA (Sp. visceral A.) → Taste.
GVA (G. Visceral A.) → General sensation from viscera.
GVE (General Visceral Eff.) → smooth muscles & glands, → mucous gland.
SVE (Sp. Visceral Efferent) → Pharyngeal arch mus → motor pharynx
(Motor Efferent): GSE
Gen. Somatic Efferent. → Somatic skl. mus → tongue → Eom.



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2016

HEAD & NECK.

(2 types of Skeletal muscles) 3 Motor column.
(1. Smooth muscle)

Cranial nerve nuclei

* pharyngeal arches

I → Mandibular nerve → M/s of mastication.
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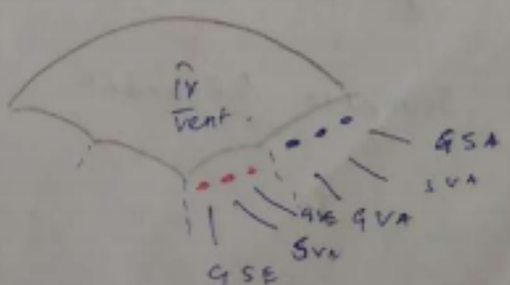
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Brainstem : GSE | SVE | GVE

Midbrain : III, IV → Edinger Westphal → Sphincter pupillare → ciliaris (using 3rd nerve)

Pons : V, VI, VII → Sup. Salivatory nr. (Sub mandibular, Sublingual) Caudal part → (lacrimatory) using VII; Inf. SSN (parotid) using IX

MO : XII, XI (Cranial + Spinal) → Dorsal nucleus of vagus using X

(Nucleus Ambigus)

injury to n.A.
* ipsilateral bulbar palsy
* loss of gag reflex.

3, 7, 9, 10
Para Sympathetic

GVA | SVA | SSA

Midbrain.
Pons
MO

→ Mesencephalic (Proprioception)
→ Principal Sensory (Touch, pressure)
→ Spinal (Pain & temp)
→ C2 level of Spinal cord.

Cranial Taste.
Nucleus of Tractus solitarius.

① Inter reflex / Homonymic reflex.
② Site of Pseudounipolar neurons.

Trigeminal
↓
Nucleus.

SSA → Special Somatic Afferent.

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(2) Olfactron → I × no nuclei

(3) Auditory → VIII → Vestibulo cochlear nucleus.

V — 3S 1M — SVE, GSA (2 columns).

III — GSE, GVE, GSA

IV — GSE, GSA.

VI — GSE, GSA.

VII — SVE (M/S face exp) GVE ~~parotid~~ SVA (chorda tympani taste from Ant 2/3rd of tongue) GSA (skin & auricle.)

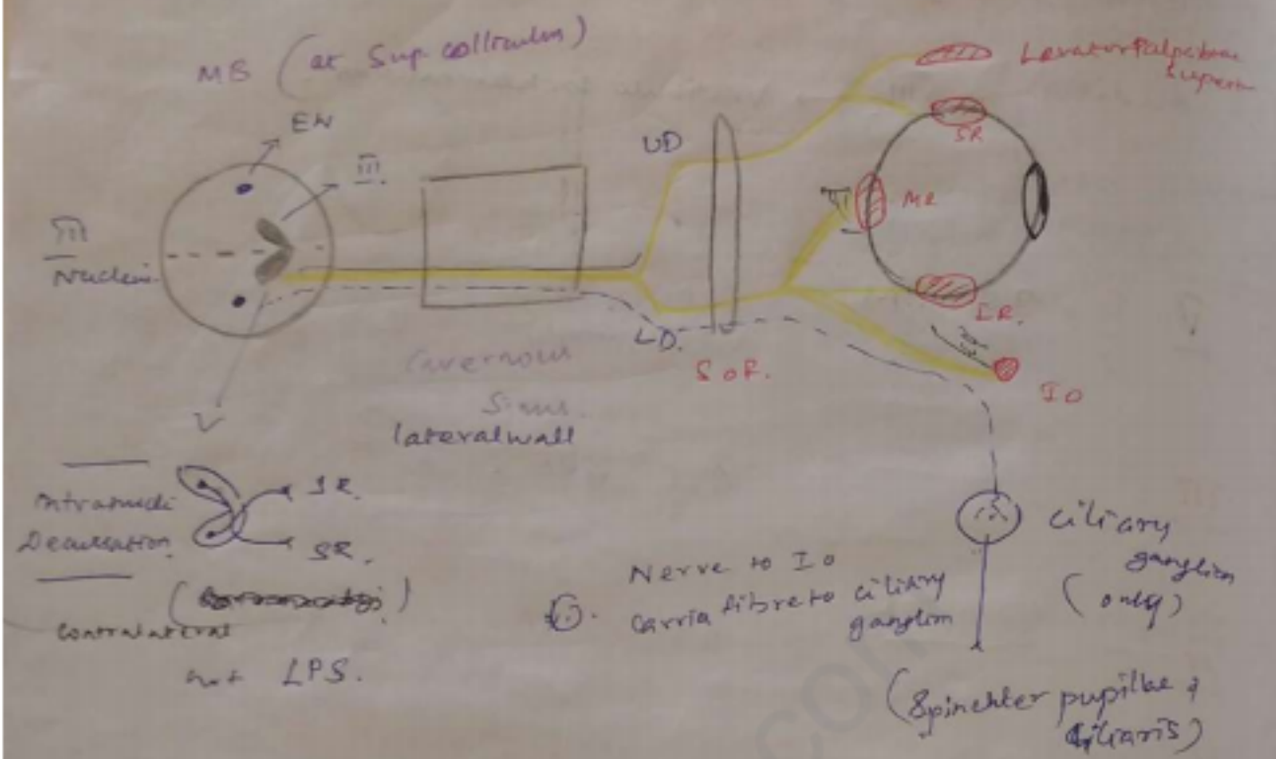
IX — SVE (stylopharyngeus) GVE inf. Salivary nu GVA/SVA ↓ general sensation post 1/3rd tongue ↓ taste sensation post 1/3rd tongue. Proprioception GSA

X (Vagus) — SVE GVE. GVA/SVA. GSA

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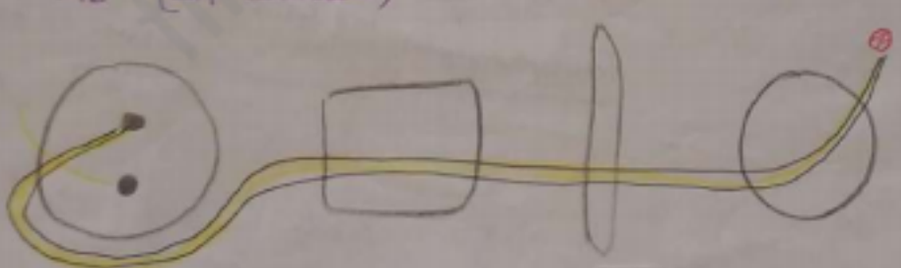
III Occulomotor nerve



- ★ III nerve content of interpeduncular fossa.
- ★ Nerve which is most commonly involved intracranial aneurysms. due to circle of willis.

IV Trochlear Nerve...

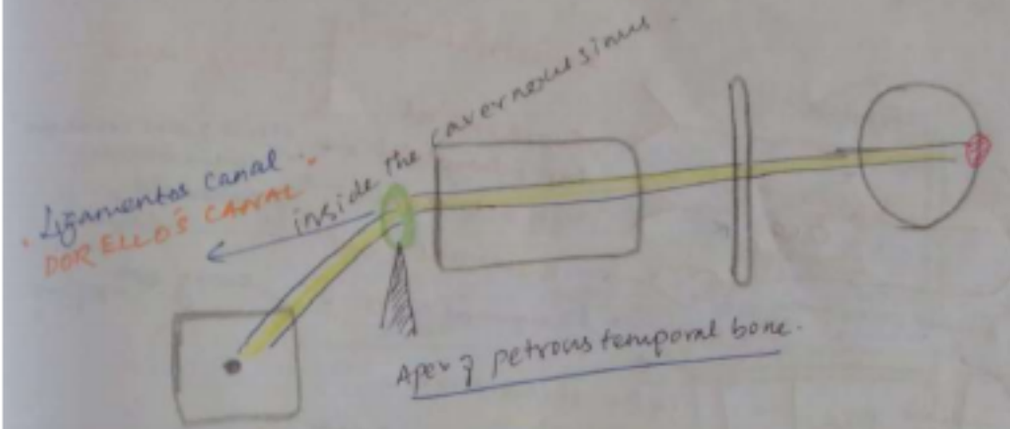
MB (Inf. colliculus)



- ★ Thinnest cranial Nerve (more slender) & smallest (thickness)
- ★ only Nerve from Dorsal aspect of Brainstem
- ★ Longest Intracranial course.
- ★ LMN Decussate within Brainstem

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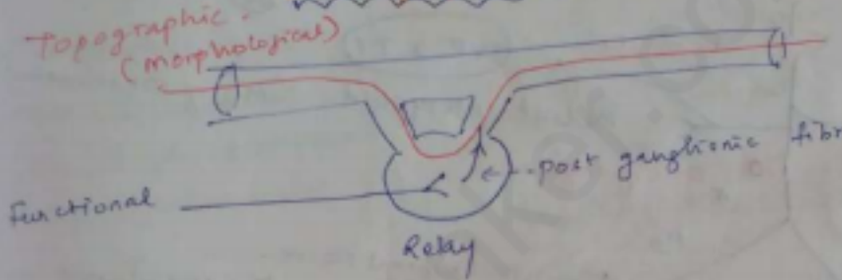
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Pons

* most commonly involved in ↑ ICP.
* Longest intradural coarse.

Parasympathetic Ganglion.

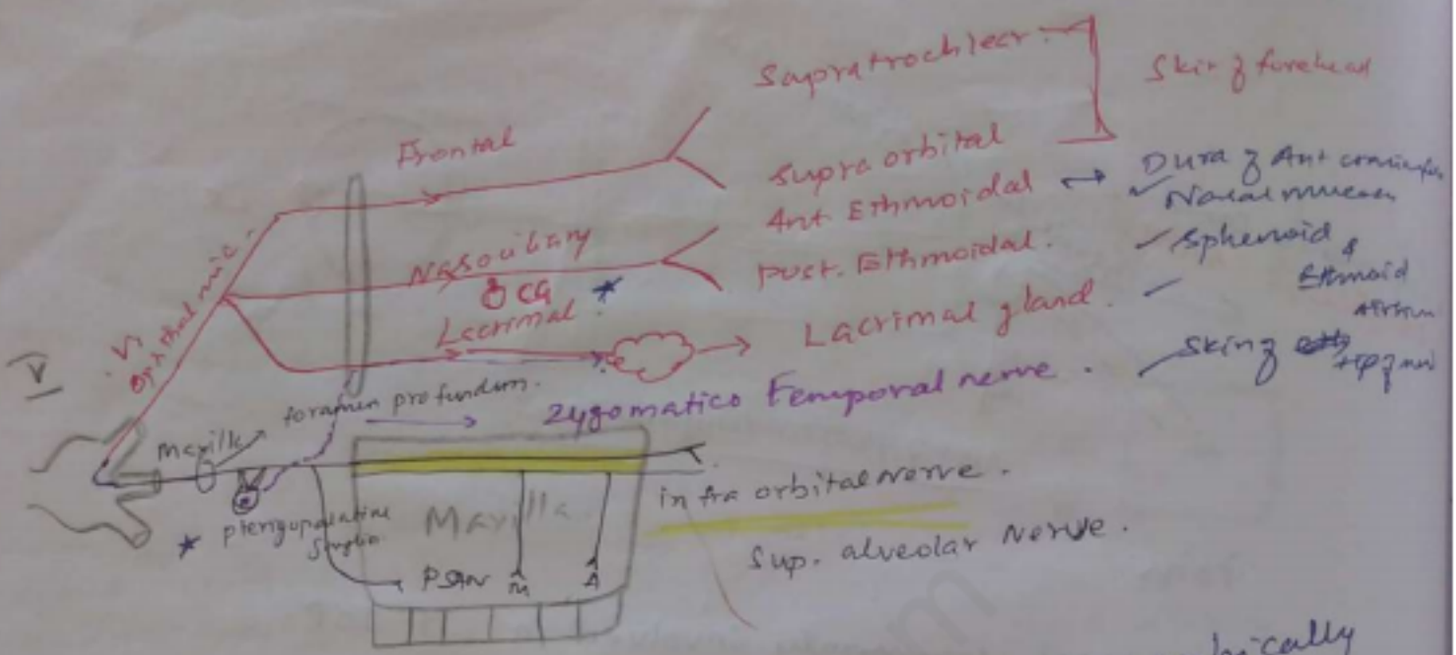


* Nerve which connects ganglion topographically will also carry post ganglionic parasympathetic fibres.
* All parasympathetic ganglions of H & N are topographically related to "Trigeminal Nerve fibres".
* So that the All post-gang. parasympathetic fibres are Branches of "Trigeminal Nerve"

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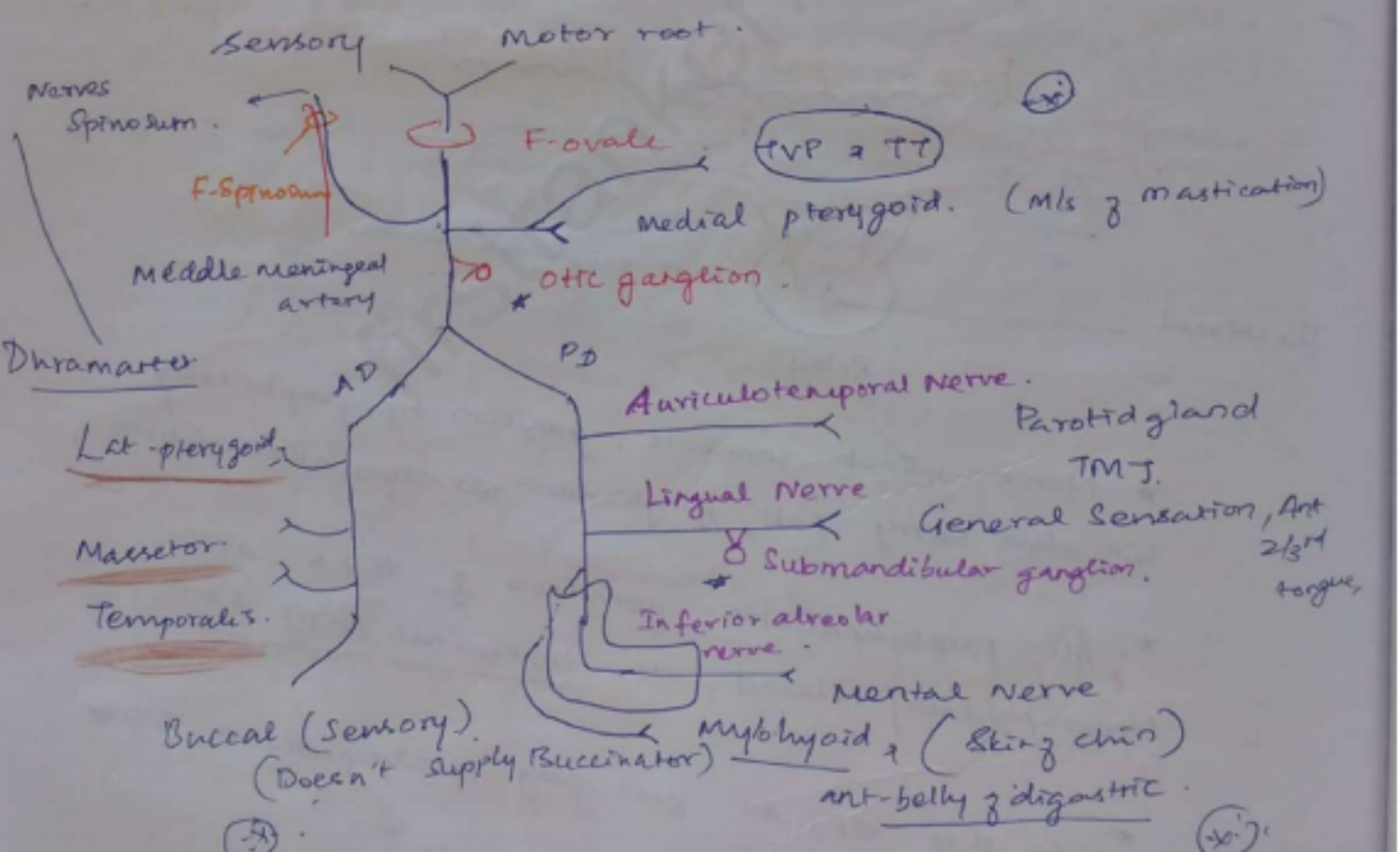
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V Trigeminal Nerve :-



★ topographically

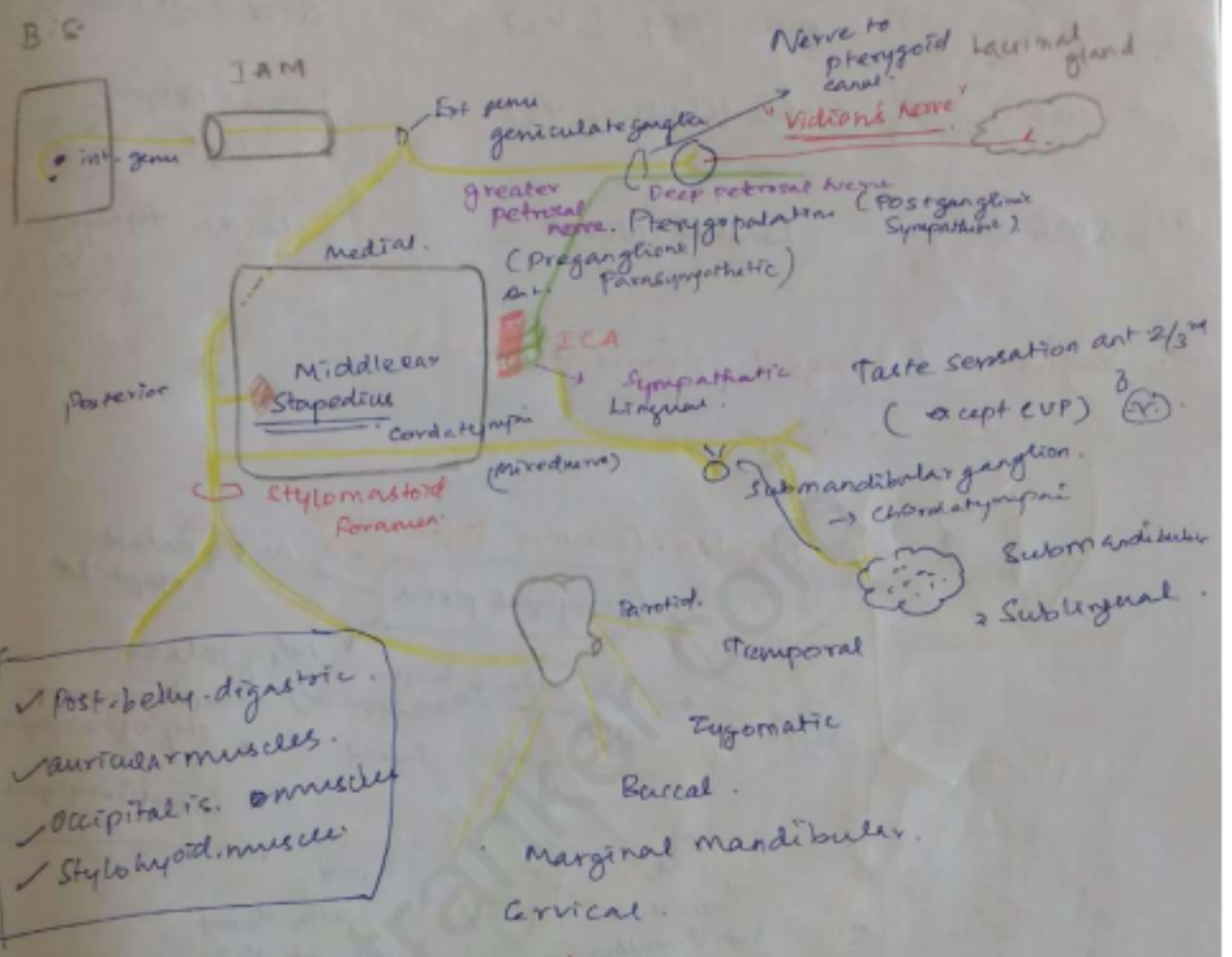
Mandibular Nerve :-



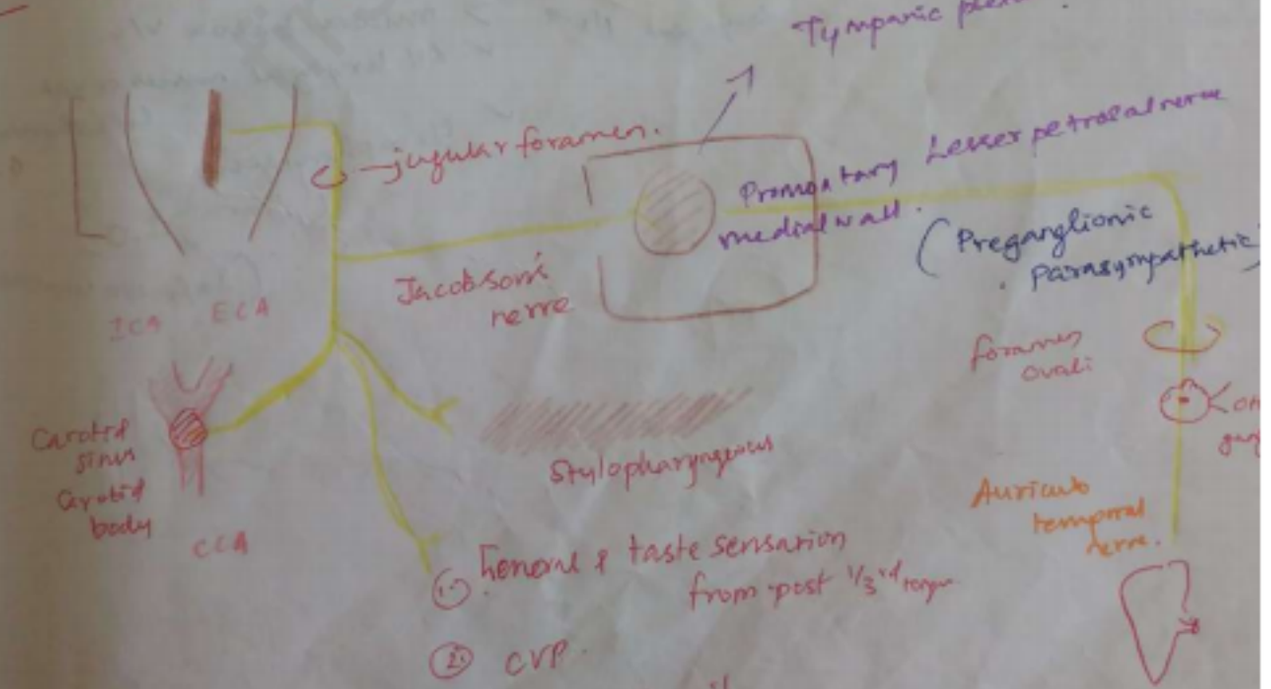
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VII facial Nerve: (long ... nerve)



IX Glossopharyngeal Nerve:-

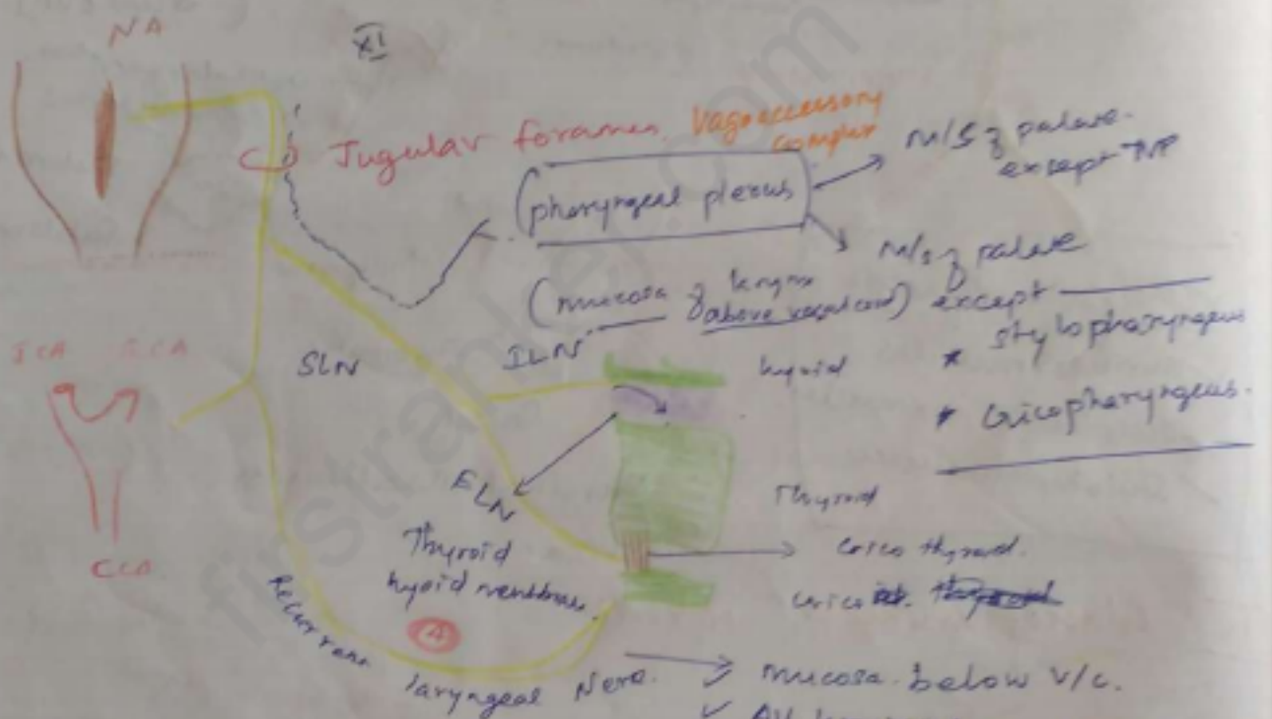


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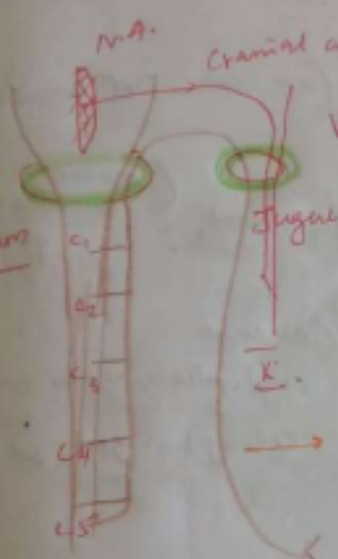
Ganglion	Topography	Fibers from Facial nerve
1. Ciliary	Nasociliary (V_1)	IIIrd nerve.
2. PPG.	maxillary (V_2)	GPN (VII branch)
3. Otic	Mandibular (V_3)	Lesser petrosal (IX)
4. SMG	Lingual Nerve	chorda tympani (VII)

X Vagus (Longest cranial nerve)



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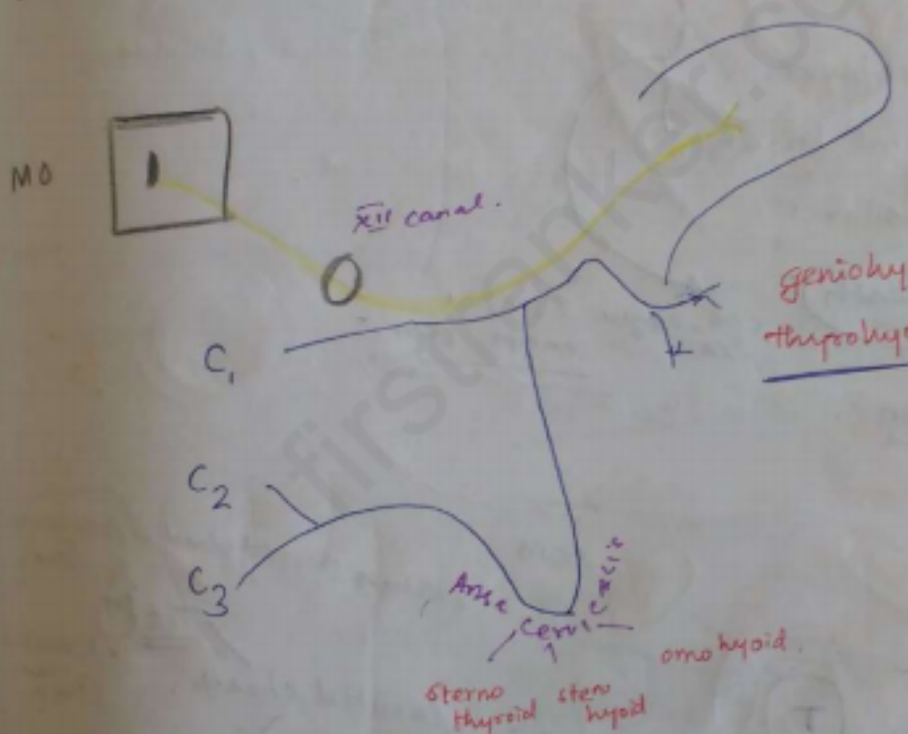
Spinal accessory

sternocleidomastoid.

Trapezius.

XII Hypoglossal Nerve :-

All m/s of tongue except. Palatoglossus



Geniohyoid
thyrohyoid.

only strap muscle which is not supplied by Ansacervicalis

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* All tongue muscles are supplied by XII (except palatoglossus ← X)
* All m/s of palate " " VAC (except TVP ← V_3)
* All m/s of larynx " " recurrent laryngeal nerve (except cricothyroid ↑ ELN)
* All m/s of pharynx " " VAC (except stylopharyngeus ← IX, cricopharyngeal nerve ← RLN)

DEEP CERVICAL FASCIA.

↓

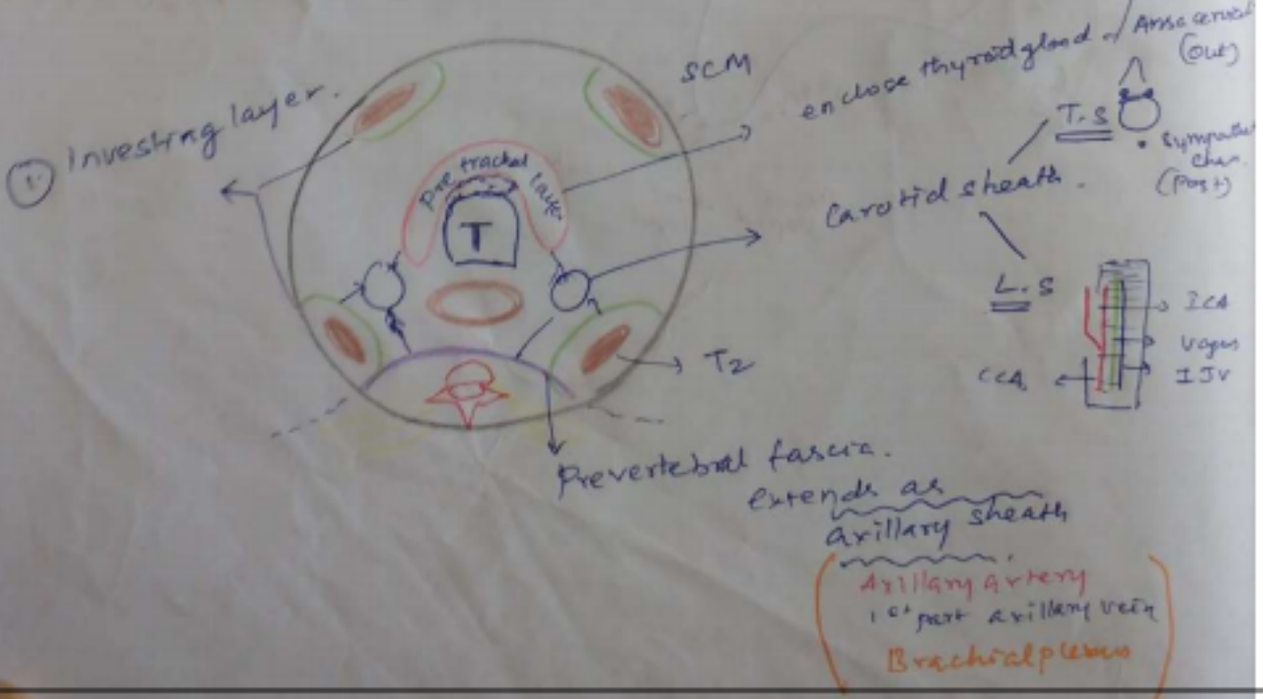
Modification.

↓

1. Investing layer.
2. Pretracheal layer.
3. Prevertebral layer.
4. Paryngobasilar.
5. Carotid sheath. → CCA, vagus, IJV, ICA. except ECA.

5

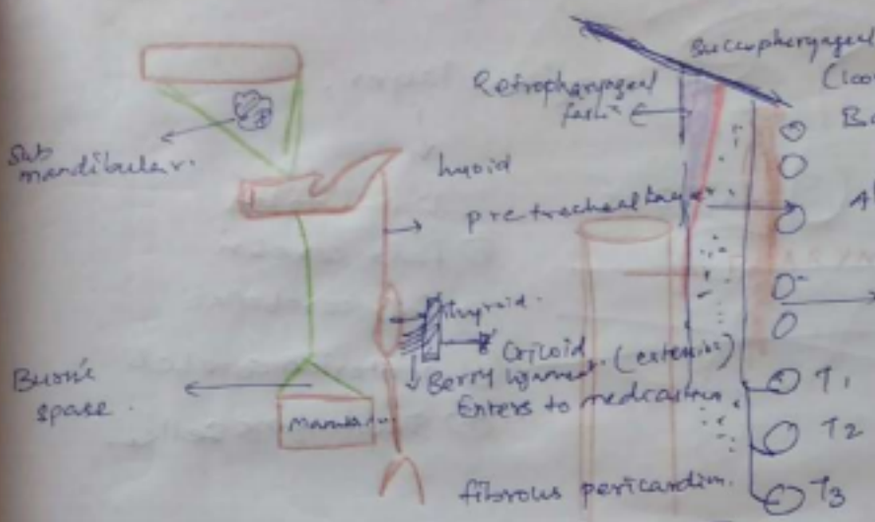
Transverse Section :-



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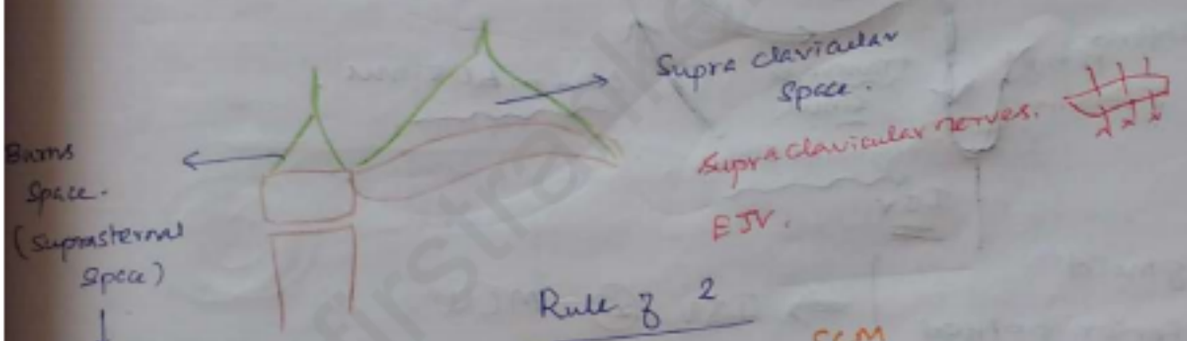
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Longitudinal section :-



Danger Space ⇐ Infection.
Can descend downward to Post-mediastinum.
Can Cause Dyspnea, Dysphagia.

① Investing layer :-



Interclavicular ligament
Sternal head of SCM.
Jugulo Venous Arch.

Rule of 2

* 2 muscles < SCM, Trapezius.
* 2 gland. < Submandibular, Parotid.
* 2 spaces < Burns space, Supra clavicular.
* 2 ligaments < Sphenomandibular lig, Stylomandibular lig.

false ligament - TMJ.

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Endosteal layer.

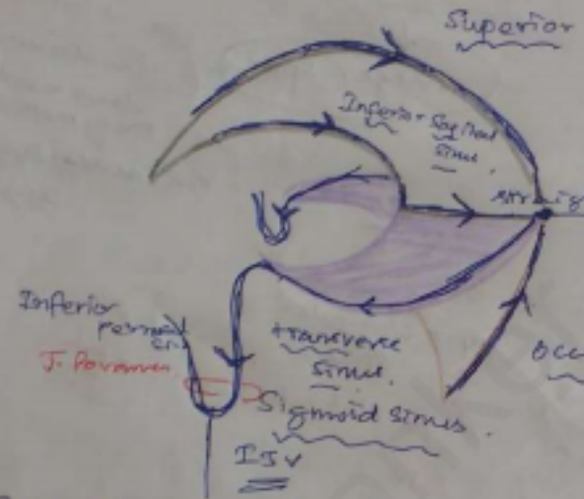
Dura

Meningeal layer.

Dura.

Dural folds

① falx cerebri
② falx cerebelli
③ Tentorium cerebeli
④ Diaphragma Sellae.



Sigmoid
Inferior petrosal → IJV ⑧ MCQ
"formatory tributaries"

Inferior Sagittal
?
Straight sinus → only in meningeal layer of Dura.

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CAVERNOUS SINUS

(emissary vein)

Incoming :-

- SOV
- IOV

ORBIT

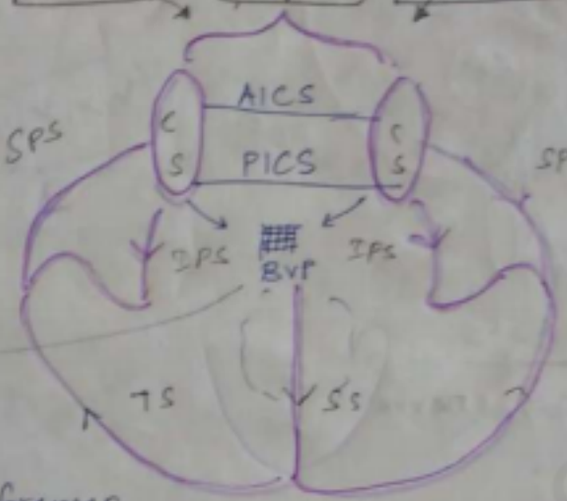
- Sup. Middle cerebral vein
- Inf. cerebral vein

BRAIN

- Sphenoparietal sinus.
- middle meningeal sinus

(Ant. tributary of middle meningeal vein).

MENINGES





Basilar venous Plexus

Beyond foramen magnum

Vertebral Venous plexus

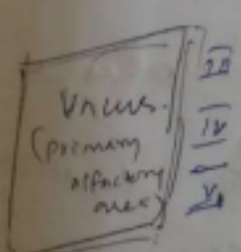
(BETSONS PLEXUS)

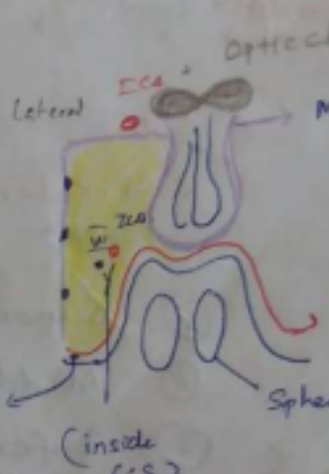
Outgoing

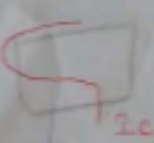
- ✓ SOV - (emissary).
- ✓ SPS
- ✓ IPS.

Relations :-

Coronal section :-

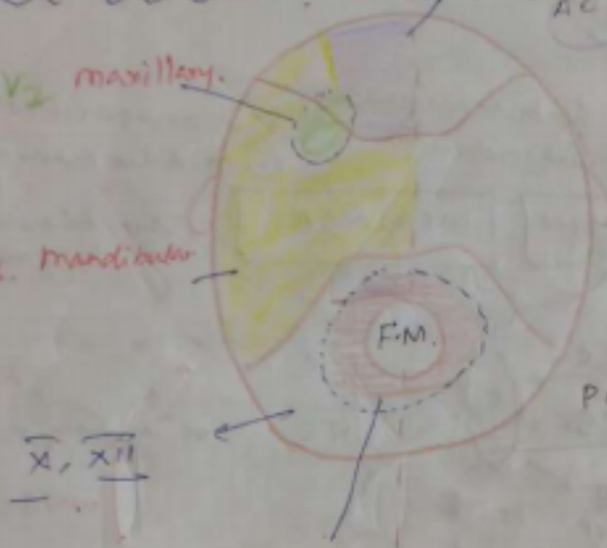






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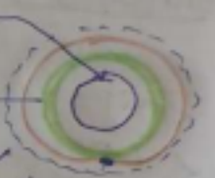
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Pharyngeal wall :-

Inside → outside.

1. Mucous membrane.
2. pharyngo basilar fascia.
3. Muscle coat.
4. Buccopharyngeal fascia.



Muscles of pharynx

3 longitudinal (Inner)

1. Stylopharyngeus.
2. palatopharyngeus.
3. Salpingopharyngeus. (medial end of auditory tube.)

Pharyngeal aponeurosis / Pharyngeal cartilage

→ Deglutition.

3 Circular muscles (outer)

1. Superior Constrictor
2. Middle.
3. Inferior
   - Thyropharynx
   - Cricop

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I → Killians dehiscence. (Weakest part)

C

RLN, ILA, Thy. Px → VAC
Crico Px → RLN
} Neuronal incoordination

Bolus producing diverticulum in postero lateral wall.

ZENKERS DIVERTICULUM



Tracheo oesophageal group.

— Hyaline
— elastic

LARYNX.

unpaired cartilages (3).

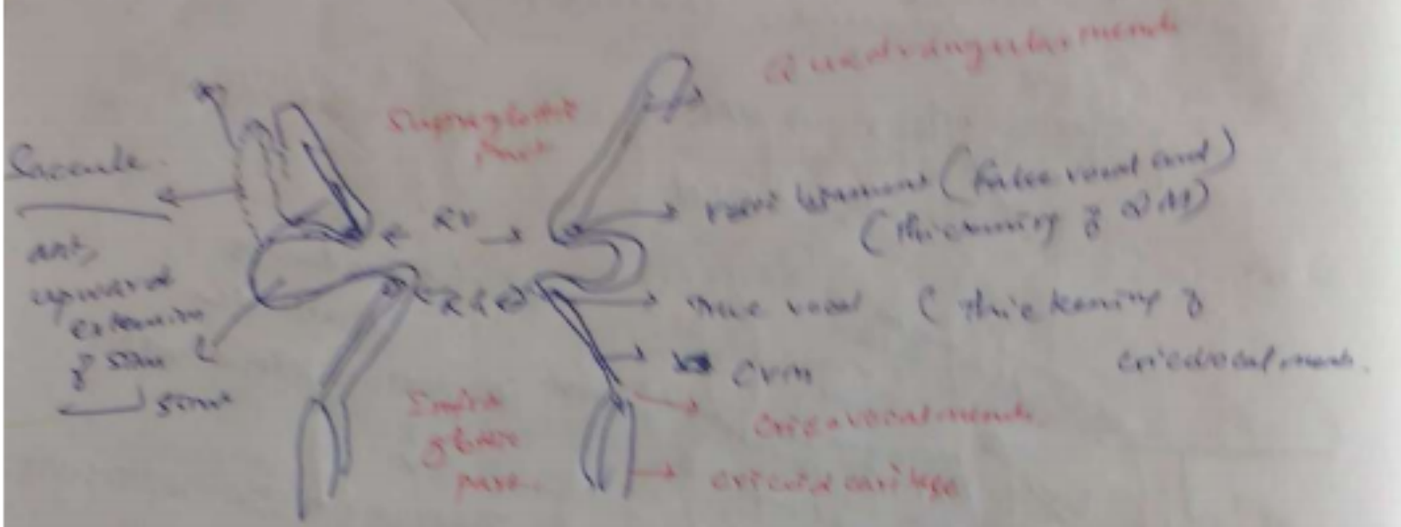
1. Thyroid cartilages → HC
2. Cricoid. → HC (Bevel cricoid).
3. Epiglottis. (EC)
(fibroelastic cartilage)

Paired cartilages (4)

1. Arytenoid — Apex (EC), Base (HC)
2. Corniculate (EC)
3. Cuneiform (EC)
4. Triticeal (EC)

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* Lining epithelium of Larynx Respiratory epithelium except Vocal cords & upper part of anterior surface of epiglottis.

Cricoid & Mucus glands

Vocal cord receives mucus from (Arytenoid & Larynx, Corniculate & Larynx)

Stratified Squamous epithelium.

Muscles of Larynx :-

Controlling inlet of larynx

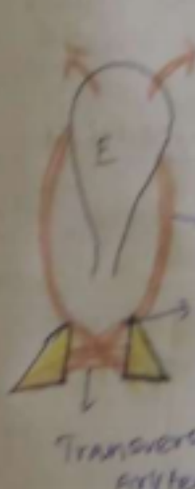
Controlling RG.

Controlling tension in vocal cords.

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Controlling
Inlet of Larynx.



→ Thyroepiglotticus (opening of inlet of larynx).

cont. of oblique arytenoid)
→ Aryepiglotticus : closing of inlet of Larynx.

→ oblique arytenoids.

Transverse arytenoids

Controlling
Rima glottidis

T.S.

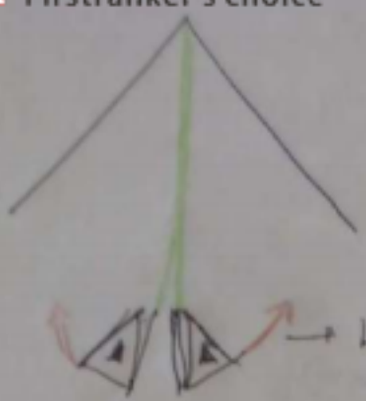




Post. Cricoarytenoid (Life Saving) only Abductor.
(Fatty)

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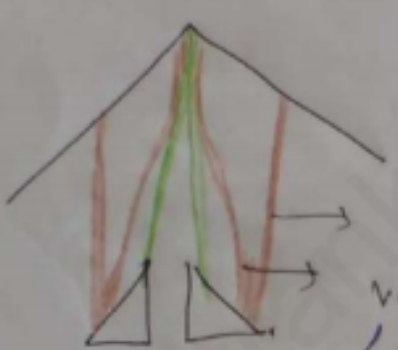
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→ Lateral cricoarytenoid (Adduction) interarytenoid RG.
(muscle of whispering)

complete closure of RG ⇒ Interarytenoids

Controlling tension.



Relaxing the vocal cord.

→ Thyroarytenoid m/s. (modulator of larynx).
→ vocalis medial fibre of
(Thyroarytenoid)

Tension Ant 1/3rd
Relax post 2/3rd

Pure tensor of vocal cord Cricothyroid.

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Pre epiglottic Space (Boyer's space).



DAY-2

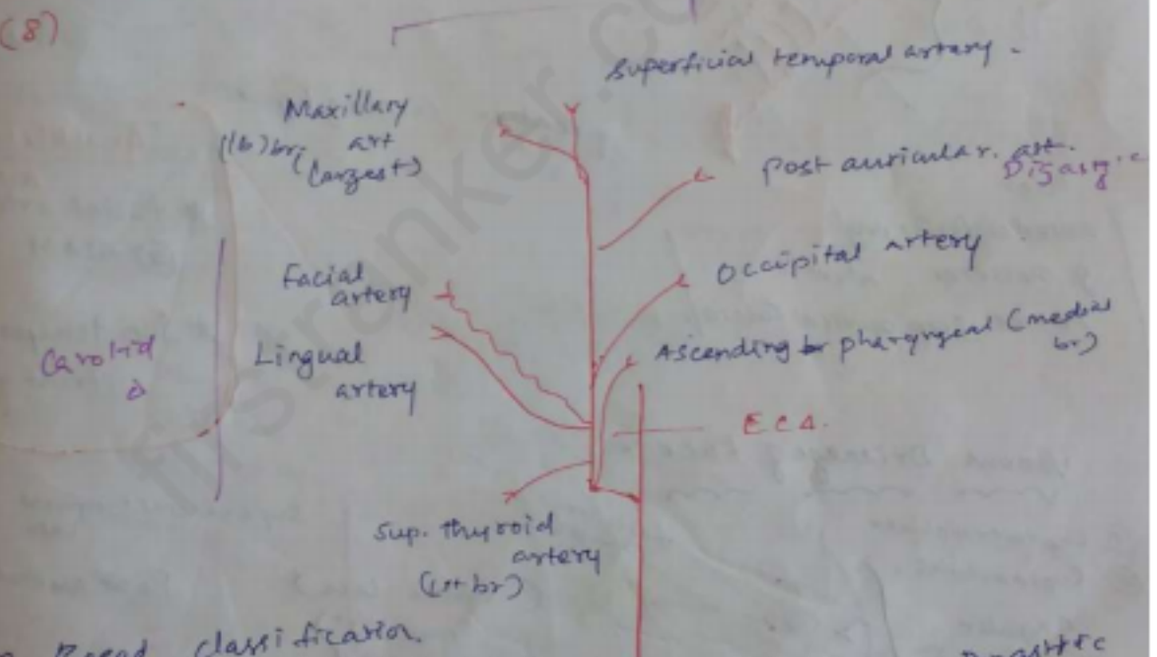
9 AM DEC 2

Blood vessels in Neck

ECA (8)

(5) (Carotid Δ)

Face :



Location Based classification.

Sup thy. art.
Asc. ph. art.
Lingual
facial
occipital.

Carotid Δ

Post-auricular art.
Sup. rt. temporal
Maxillary

face

Digastric Δ

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Direction based classification:-

- Medial
  - Asc. pharyn
  - * Sup. thyr
  - * Lingual
  - * Facial
- Ant
- Post
  - * Occipital
  - * Post auricular
- terminal
  - * STA
  - * Maxillary

Arterial supply of face

ECA = ICA

Dorsal nasal art. — Ophthalmic

ICA CB STAG FB

- * Submental
- * Tonsilar
- * Assc. palatine
- * Glandular

a - Inf labial
b - Sup. labial
c - lat. nasal art.
d - Angular art. ↓ Dorsal nasal art.

Facial branch, cervical branch

greater cornu of hyoid

Point
Anteroinferior angle of masseter where it pierces Deep cervical fascia.

Anaesthetic Artery
* facial artery @ AIAM
* Sup temporal infront of Tragus

Venous Drainage of face:-

① Supratrochlear. ② Supraorbital. Angular. Facial Vein.

Sokes — DFV — CS — CFV — IJV

Superficial temporal vein — Post auricular — (valve less) — maxillary — pterygoid venous plexus (Infra Temporal Area) — Deep temporal tributaries — Lateral pterygoid plexus — Retromandibular vein — AD — PD — CFV — ETV — Subclavian vein

formatory tributary: Post. Div RMV → Post auricular → EJV

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pterygo



I Deep to neck & mandible.

II Hw lat. pterygoid.

III pterygomaxillary fissure.

I part :- 5 br
(A - ADMI)

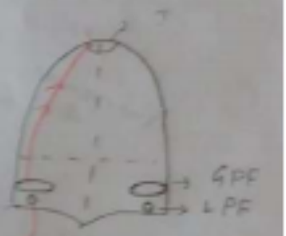
A - Acc. meningeal artery — Dura
A - Ant. tympanic artery] middle ear.
D - Deep auricular artery]
M - Middle meningeal artery. — Dura.
I - Inferior alveolar artery. — Mandible

II Part : 5 br.

2 - Deep temporal artery → temporalis muscle.
↙ Artery to masseter.
↙ Artery to M. pterygoid.
↙ Artery to L. pterygoid.

III part :- 6 br (PIG PAS)

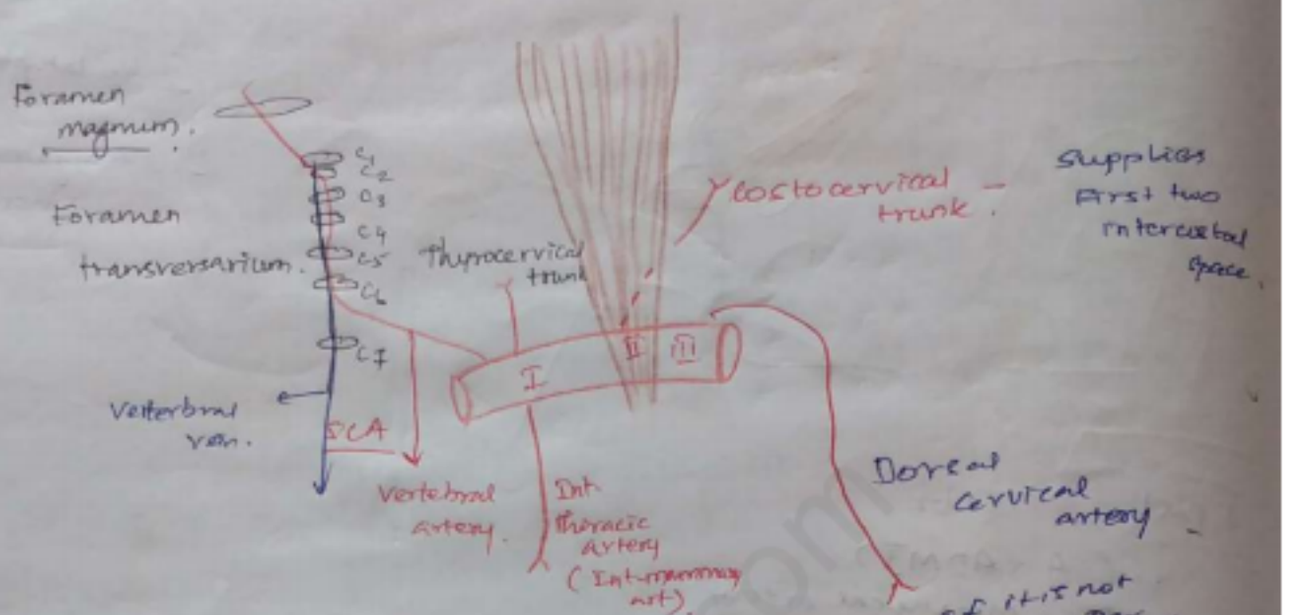
P Post. Sup. alveolar art.
I Infra orbital art.
G Greater palatine art.
P pharyngeal art.
A Art to pterygoid canal.
S Sphenopalatine artery (Largest br of maxillary art).



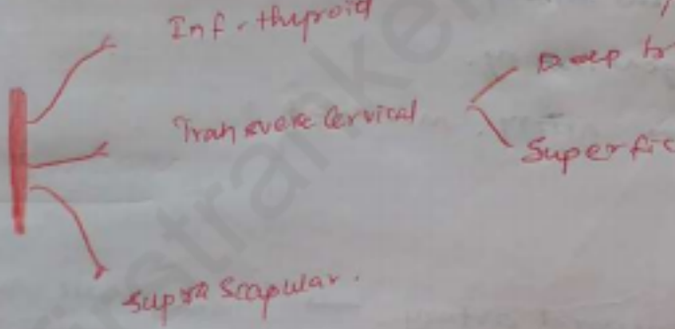
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Subclavian artery :-



Thyrocervical trunk.



Triangles of Neck :-



SCM | Spinal Accessory
T2

Ant. Belly mand
mylohy

Post.

Sternohyoid. Ansa Cervicalis

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Post Δ

Greater auricular nerve → auriculo temporal nerve most commonly fuses with great auricular nerve in Frey's syndrome.
It supplies skin of lobule of ear, angle of mandible

Lesser occipital nerve.

EJV

Transverse (Ant) cutaneous nerve of neck.

Supra clavicular nerve.

ROOF

FLOOR

- Semispinalis capitis.
- Splenius capitis
- Levator scapulae. (Δ)
- Scalenus posterior.
- Scalenus medius.

Covered by (Prevertebral fascia)

SCM | C_2 C_4 (proprioceptive)
T_2
↓
hybrid
(dual nerve supply)

Occipital artery

C_2
C_4
→ Spinal Accessory (b/w Prevertebral & Investing layer)

Trunks of Brachial plexus.

Subclavian vessels.

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CAROTID SHEATH

ROOF

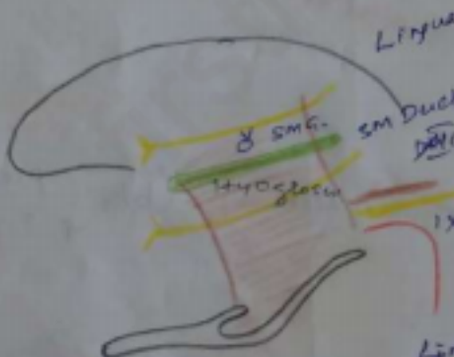
1. platysma.
2. cervical br. of Facial nerve.
3. Transverse cutaneous nerve of Neck.

Contents



- ★ CCA
- ★ ICA
- ★ ECA
  - ✓ Sup. thyroid
  - ✓ Lingual
  - ✓ Ascending pharyngeal
  - ✓ occipital
  - ✓ Facial.
- ★ IJV
- ★ X, XI, XII
- ★ Ansa cervicalis.

Relations of Hyoglossus :-



Superficial.

- ✓ Lingual nerve
- ✓ SMG.
- ✓ XII nerve
- ✓ SM Duct.

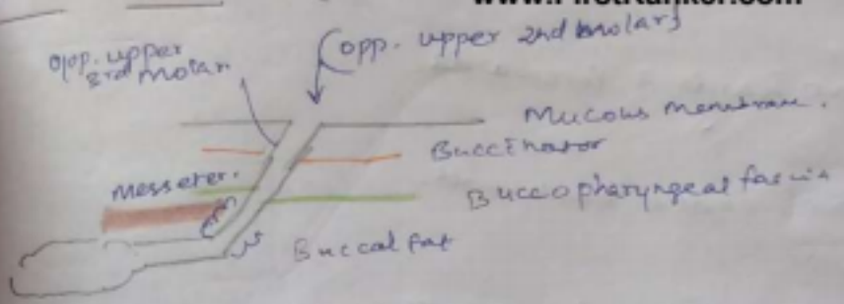
Deep.

- ✓ Lingual artery
- ✓ IX nerve.
- ✓ Stylopharyngeus muscle

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PAROTID (Stensen's duct)

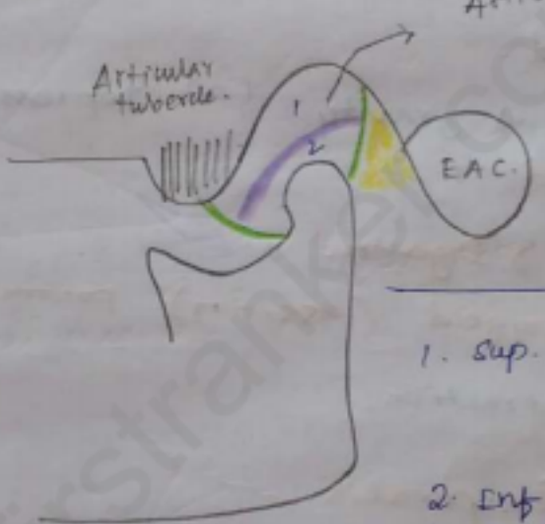


T.S

BBBM.

Temperomandibular Junction.

Type:- Condylor (Bicondylor joint).



1. Sup. Joint Cavity → Sliding / Gliding movement

2. Inf. Joint Cavity → Rotatory movements.

Supports of TMJ

TRUE

1. Capsule → Loose & lax → Up part.
   Tense & thick → L. part.
2. Lateral Ligament →



FALSE

1. Stylomandibular ligament.
2. Sphenomandibular ligament.



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Muscles & movements of mandible.

Temporalis	Downwards & forewards.
Messeter.	Downwards & backward.
M. pterygoid	Downwards & backwards.
L. pterygoid.	Backwards

Closing of mouth (or) elevation of mandible.

- ☆ Temporalis
- ☆ Messeter
- ☆ M. pterygoid.

Opening of mouth => gravity (or) Depression of mandible.

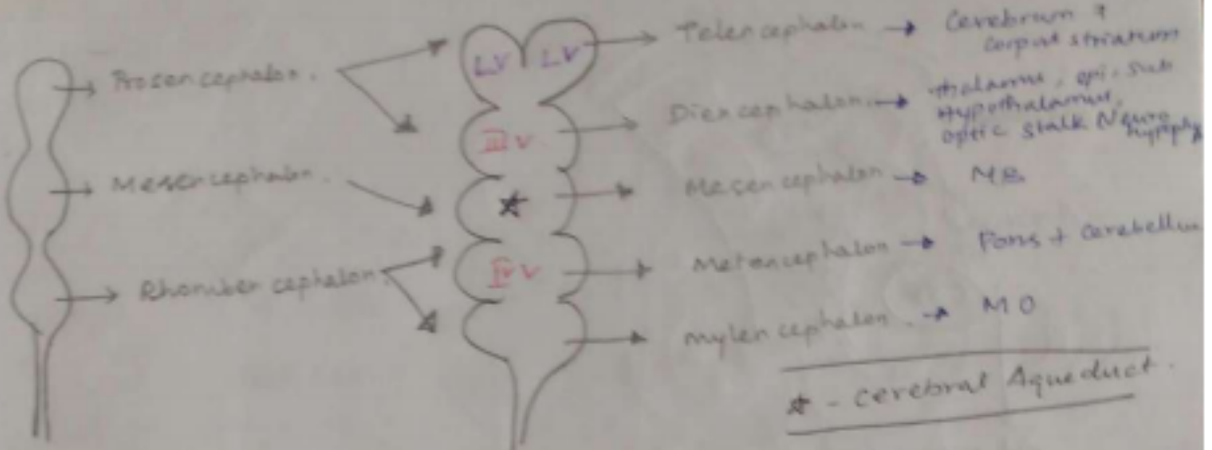
- ☆ Mylohyoid
- ☆ Ant. belly. of Digastric
- ☆ Lateral pterygoid (Assisting) protraction)

Protraction.	Retraction.
L. pterygoid.	Temporalis.
Assisted by M.P> Messeter.	(forewards)
(Backwards)	

Side ware movement alternate M. pterygoid & L. pterygoid.

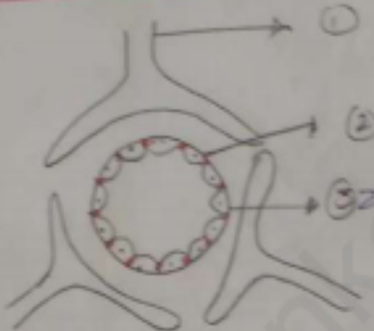
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Neural tube
(Neuro Ectoderm)

Blood Brain Barrier :-



1. Astrocyte
2. B/w meninges & capillary endothelium
3. Zonae occludens / tight junct.
(True BBB)

* Areas devoid of Blood Brain Barrier (Circum Ventricular organs)

1. Area of Postremum. (IV vent)
2. Median Eminence.
3. Pineal gland. (III vent)
4. Neurohypophysis.
5. OVLT :- Organum Vasculosum Lamina Terminalis.

Areas devoid of pain fibres.

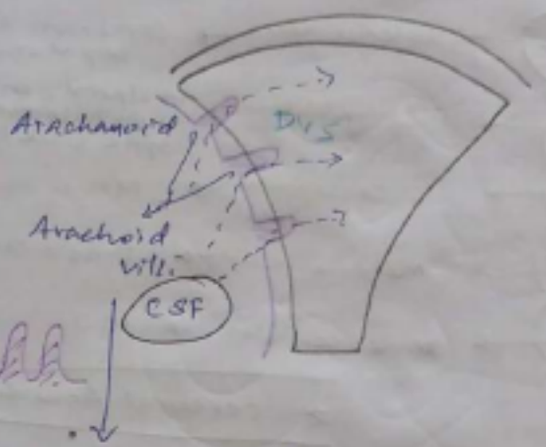
Brain parenchyma.
Ependyma.
Duramater
↓
Neither forming DVS nor covering BV

Pia mater
Arachanoid mater
Choroid plexus.

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Arachanoid matter



old & caseated

↓

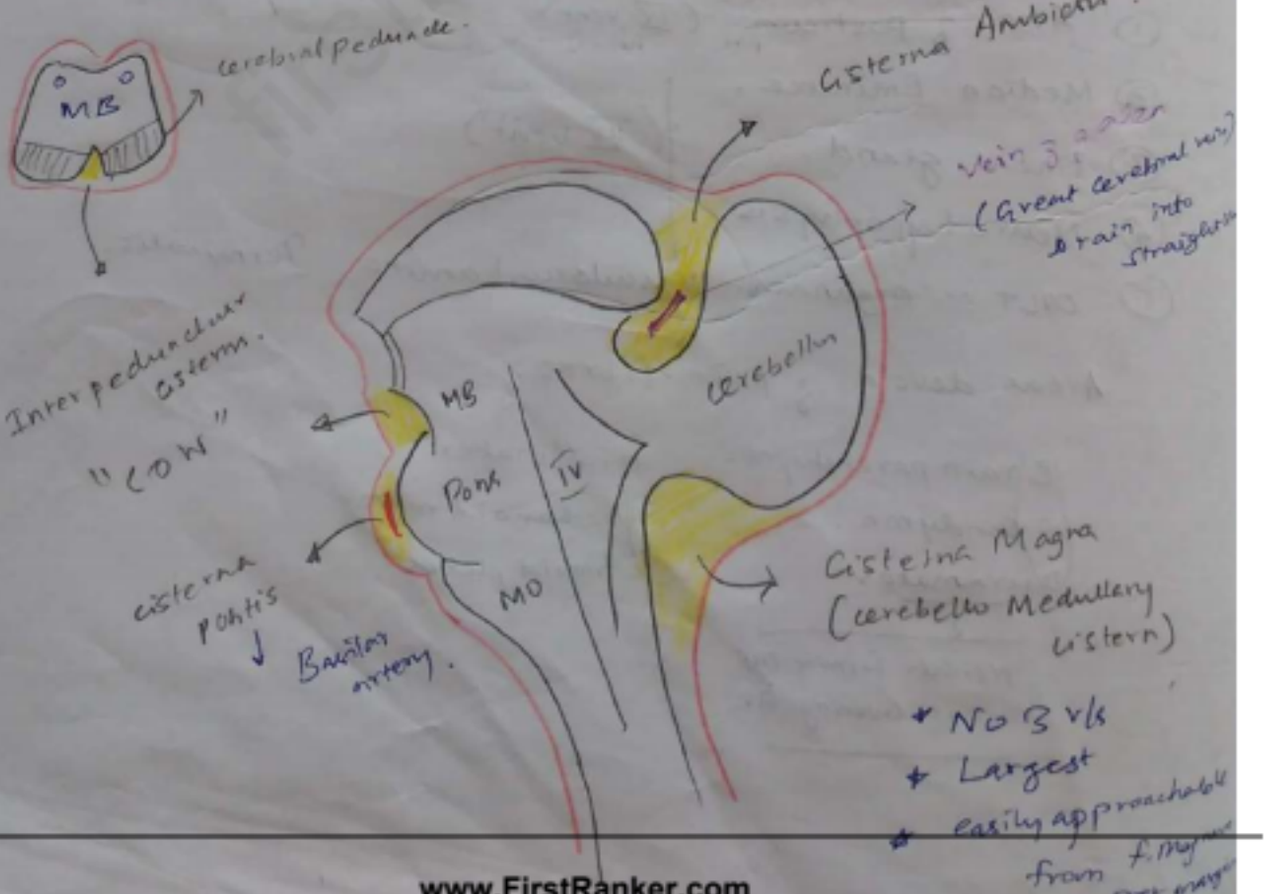
Arachanoid Granulations

⊕ along superior sagittal sinus.

Meningoma ∴ Arachanoid origin along SSS.

Subarachanoid cisterns :-

★ Large Subarachanoidal Space :-



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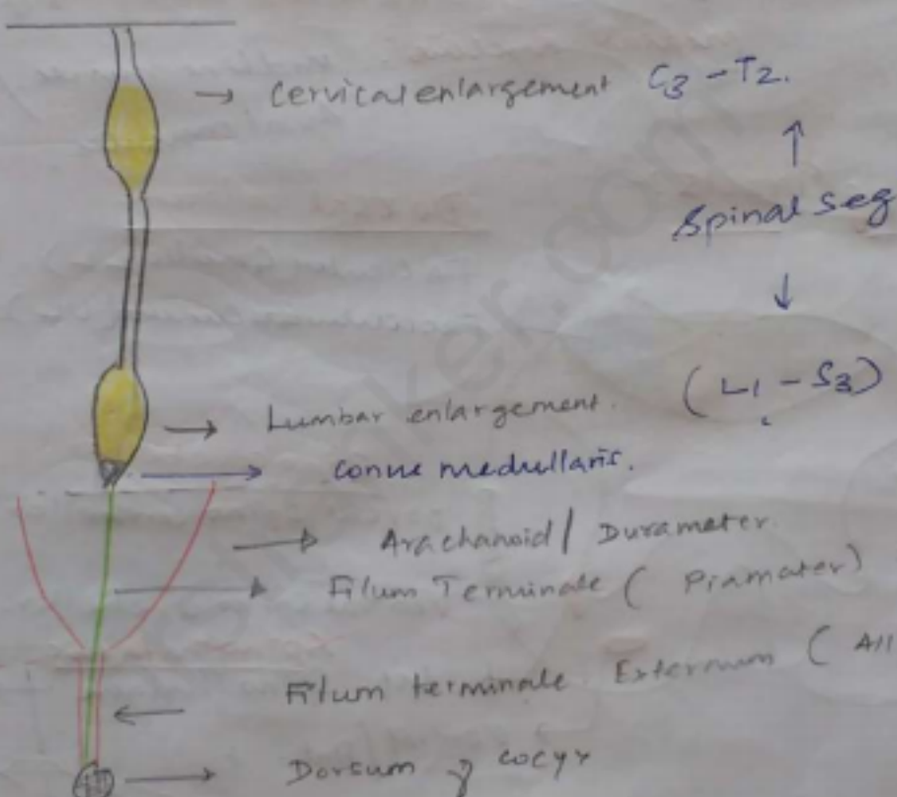
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Sylvian cistern.

SPINAL CORD

Extends : Adults :- C_1 to Lower border of L_1

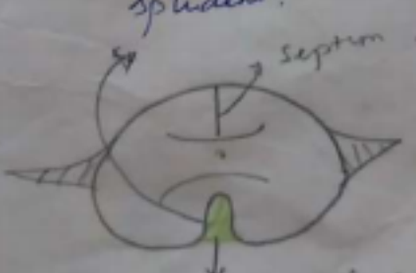
Neonates :- C_1 to Upper border of L_3



Spinal piamater

Filum Terminale

Linea splendens.



Neurosurgical Landmark for Anteroposterior hemisection

Ligamentum Denticulatum



21 pairs

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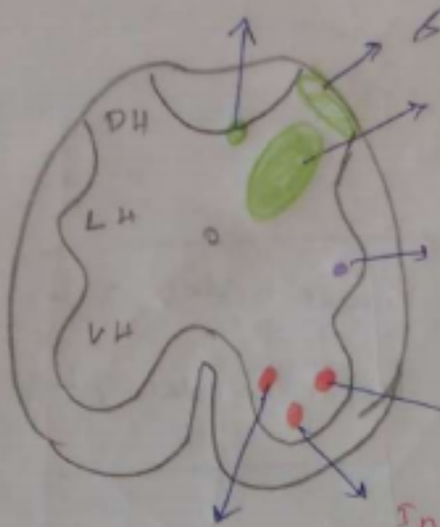
Grey mater. 8 S-C

Spino cerebellar

Nucleus Dorsalis. (clarke's column)

Substantia gelatinosa. (R-S) for Relay station ⇒ Spino thalamic

Nucleus proprius. ⇒ Dorsal column (Post. column)



Intermedio Lateral Nucleus → Sympathetic thoracolumbar ($T_1 - L_2$)

→ Parasymp ($S_2 - S_4$)

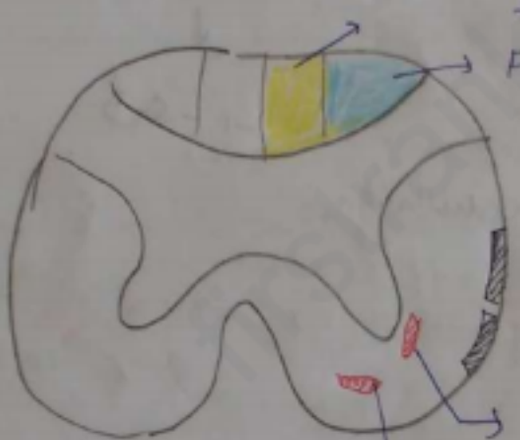
Lateral nucleus. → Limb muscles.

Intermediate nucleus. → Phrenic ($C_3 - C_5$)

→ Sp. Accessory ($C_1 - C_5$)

Medial nucleus. - Midline muscles / Axial muscles.

Ascending Tracts :-



Dorsal columns.

Faliculus Gracilis (LL)

Faliculus Cuneatus (UL)

→ Proprioception, Conscious, Vibration, Fine touch, Pressure Stereognosis.

Spino cerebellar

Dorsal spino cerebellar.

Ventral spino cerebellar.

→ Unconscious proprioception

Spinothalamic

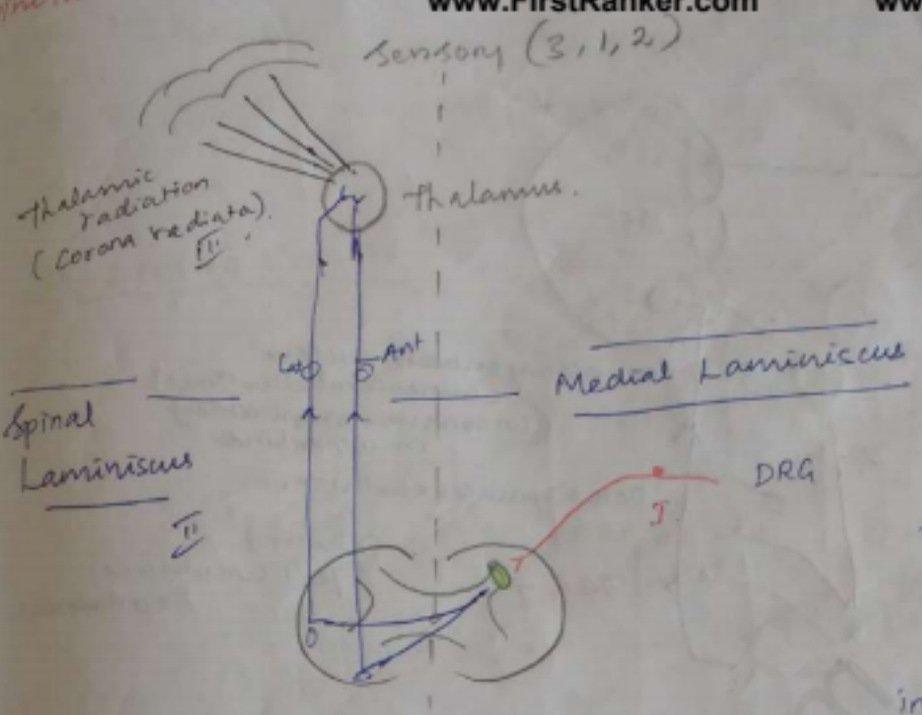
Lat. Spinothalamic → Pain & temp.

Ventral / Ant. → Crude touch, (-X) pressure major.

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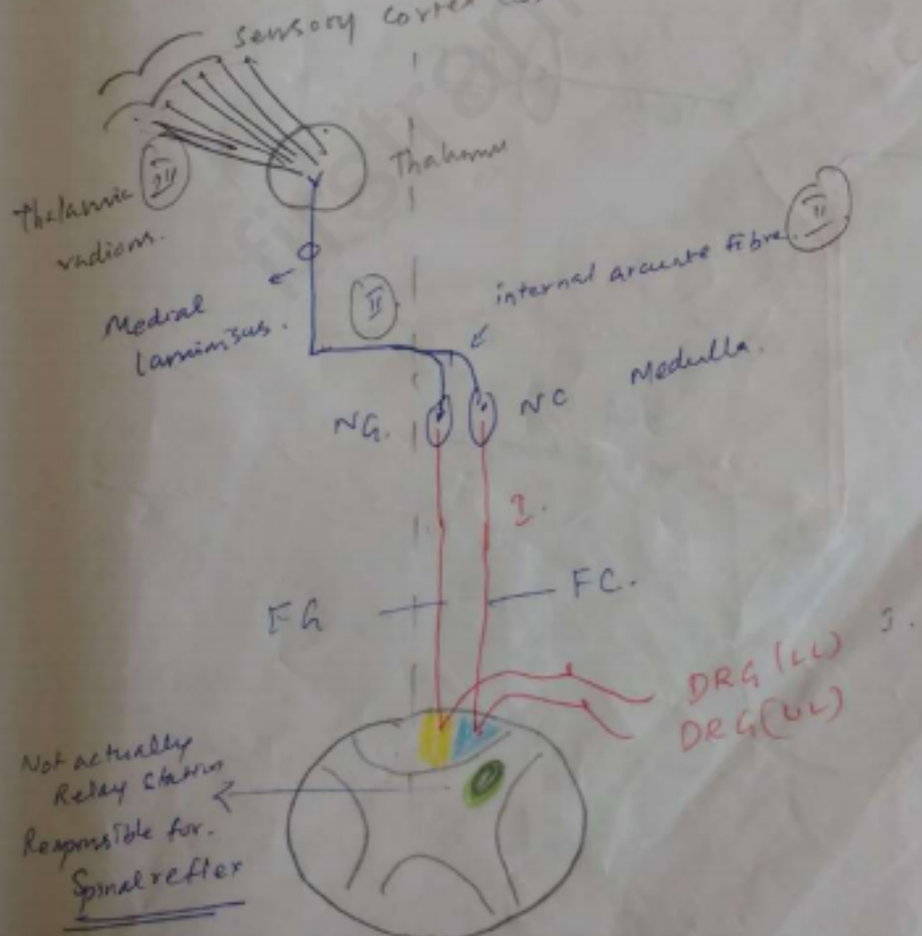
Spinothalamic tract :-



* Always 2nd order neuron decussates to opposite site.

track enters into Spinal cord
lemniscus
injury to any lemniscus.
effect is on contralater

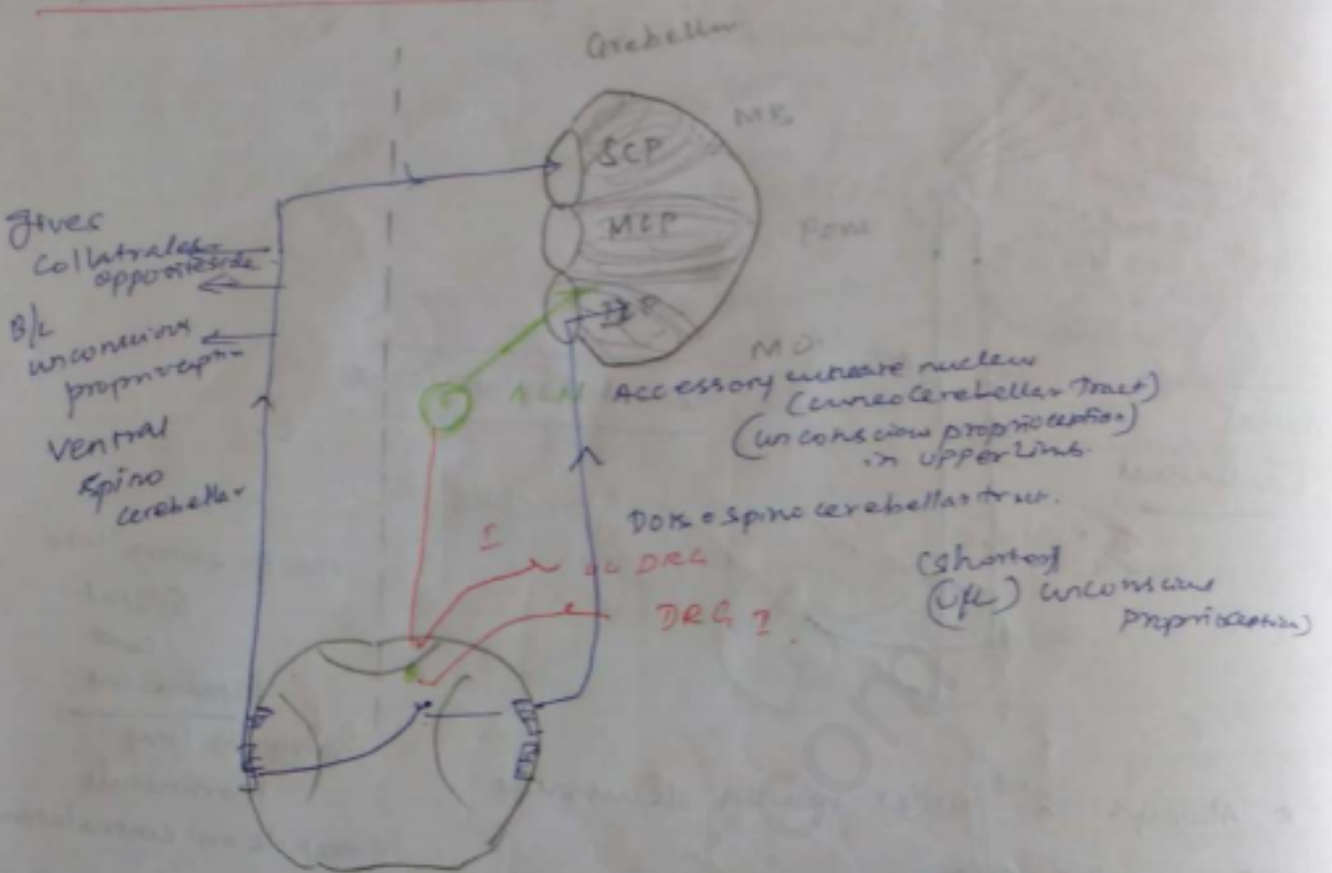
Dorsal Column Tract :-

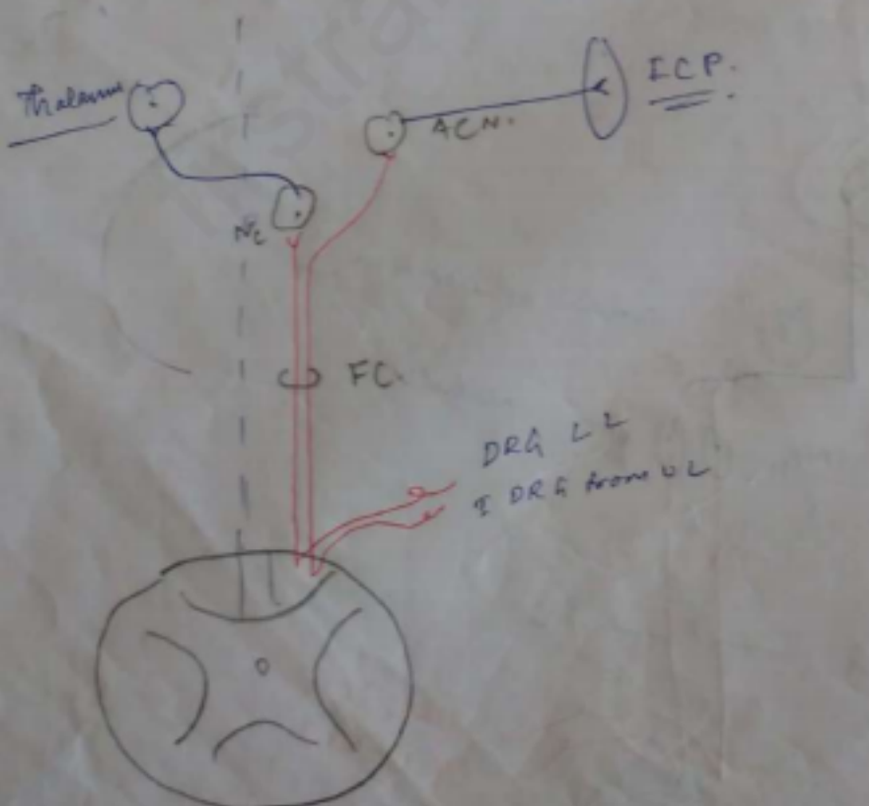


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Spino cerebellar tract





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* injury to Fasiculus Gracilis ipsilateral loss of
* injury to (F C) ipsilateral loss of both conc/unconc. proprio (UL)

Descending Tracts :-

Pyramidal Track

uncrossed (decussation) → Skilled Voluntary movements.

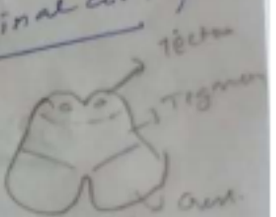


Lat (Crossed)
→ Rubro spinal track → facilitates flexion inhibits extensor.
→ L & M Reticulo Spinal tract → Tract via Which Hypothalamus controls lat. horn & Spinal cord.

Vestibulospinal tract (postural tract).

Tectospinal tract.

FE
IF.





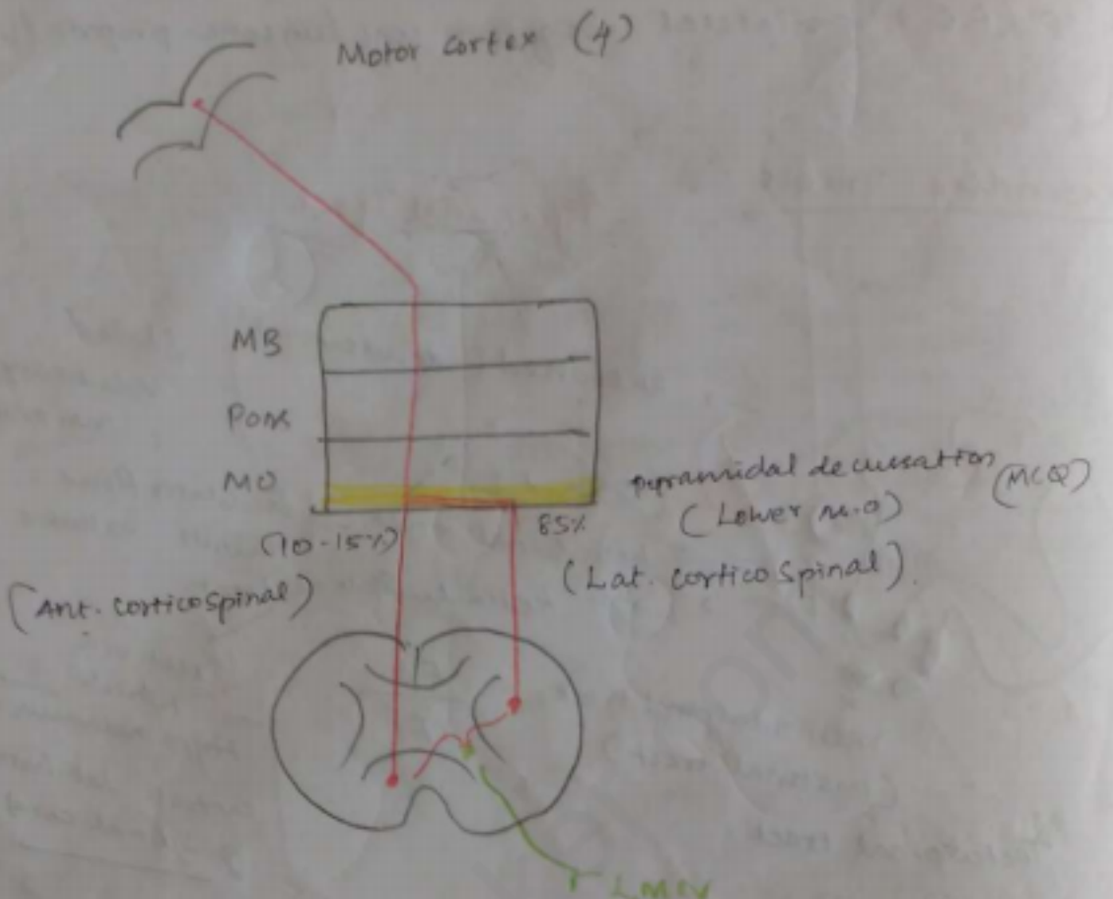
S.C. Reflex

* Coordinated movement of Head & Eyeball & UL Based on visual stimulus

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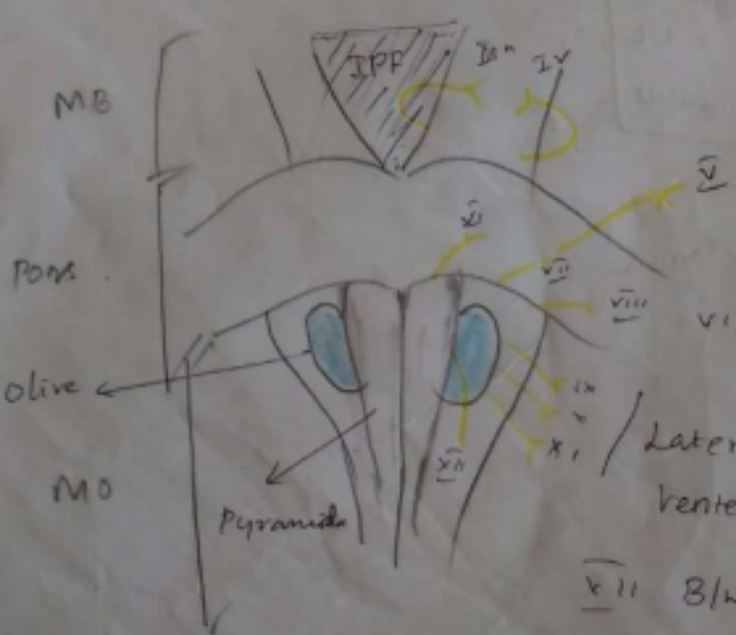
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Pyramidal tract



BRAIN STEM

Ventral aspect of Brainstem :-



VI, VII, VIII Coming from ponto medullary junction

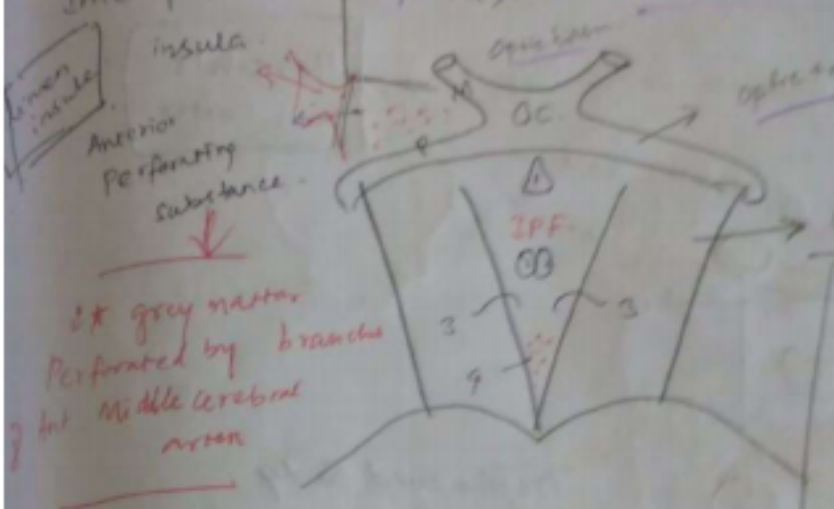
IX / Lateral to olive / Ventero lateral Rt. cun.

XII B/w pyramid & olive Ventero medial.

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Inter peduncular fossa :-



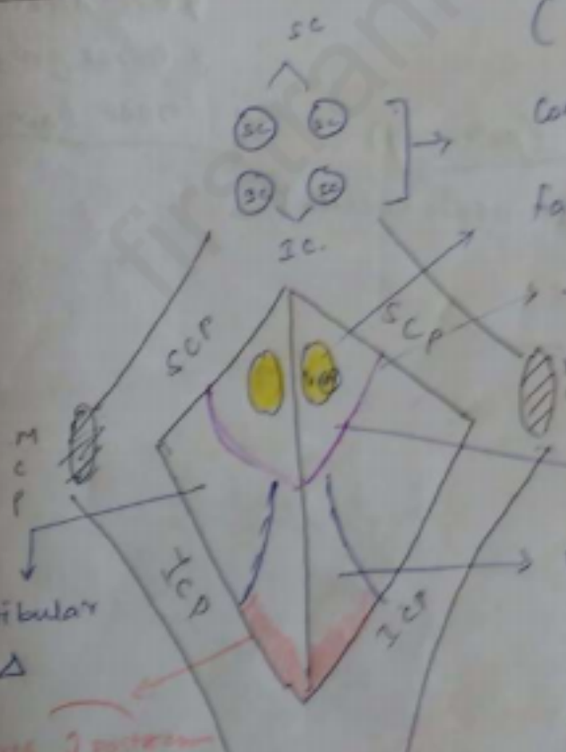
* grey matter Perforated by branches of Middle cerebral artery

1. Inferior cerebellar / Internal auditory
2. Maxillary artery
3. 3rd nerve
4. Posterior perforating substance

* grey matter perforated by branches of posterior Cerebral artery

Dorsal aspect of Brainstem :-

(Floor of IV th ventricle)



Corpora Quadrigemina.

Facial colliculus.

Sulcus Limitans.

VI, VIII, X, XII

MCQ

Nuclei present in floor of fourth ventricle

MCQ

NEURO BIOTAXIS.

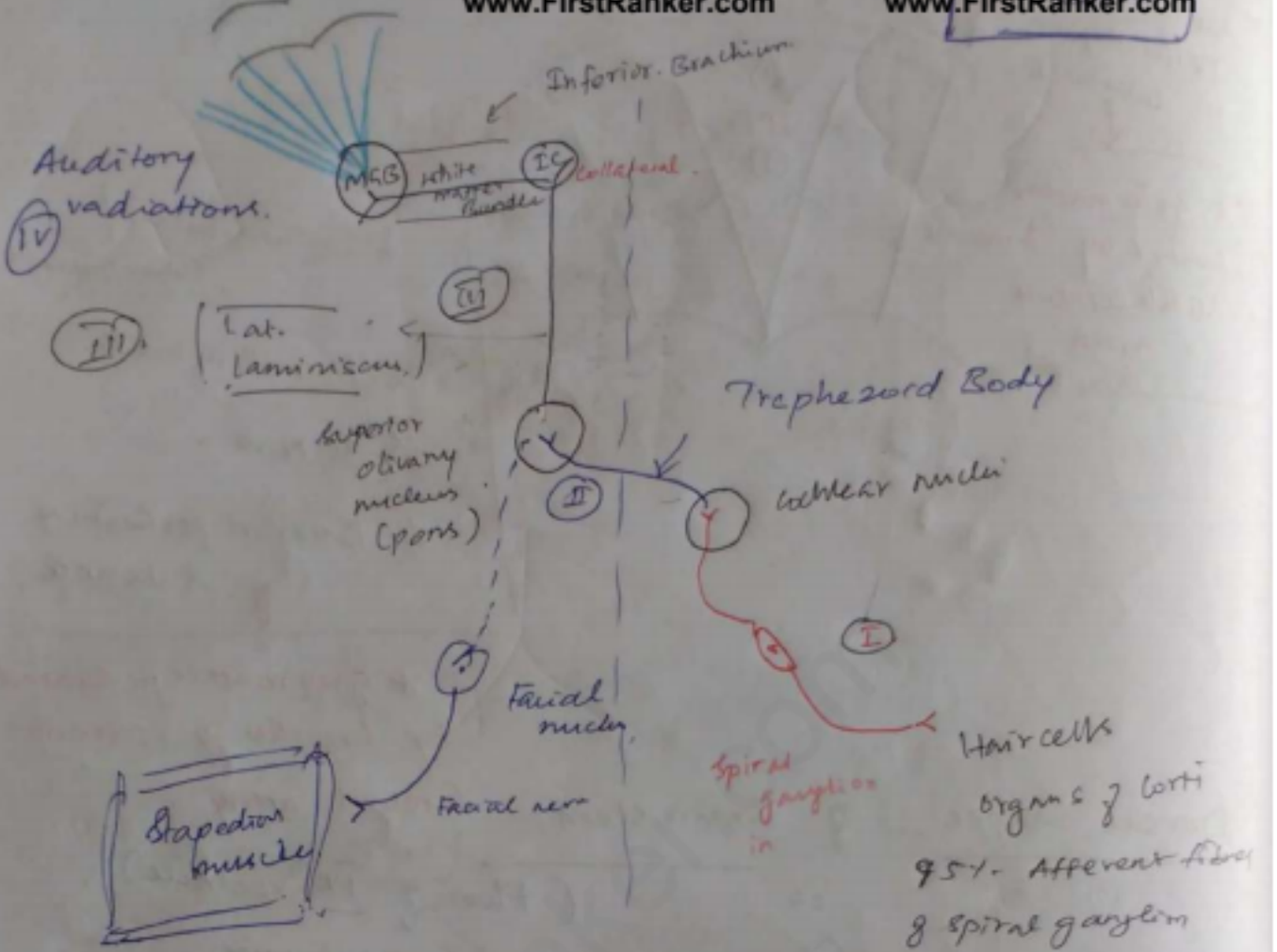
int. genu resultant of thickness migration of motor facial nucleus towards ventral determined nucleus for lower refer.

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Auditory Cortex (41, 42)

Herschl's



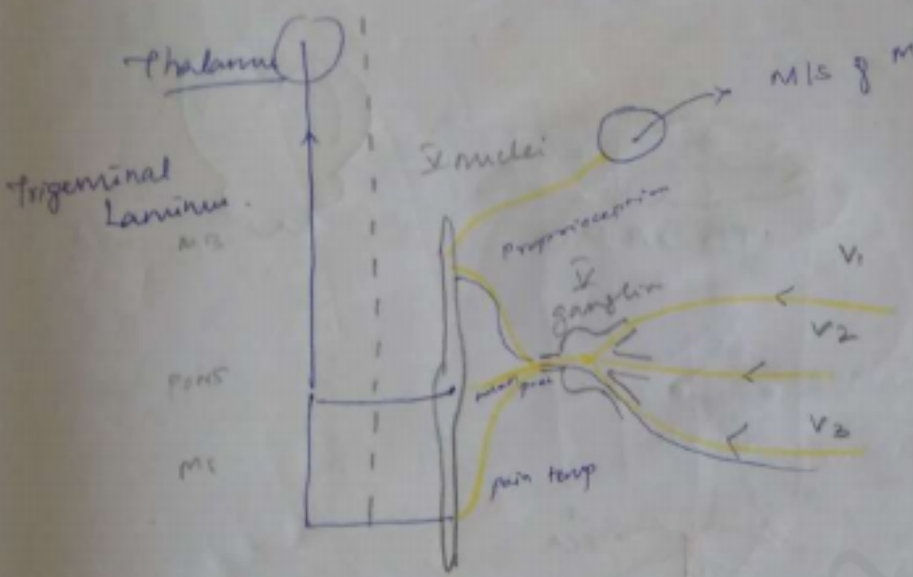
Stapedial Reflex arc (pathway)

- ✓ Spiral ganglion neurons (in cochlea)
- ✓ auditory nerve
- ✓ Cochlear nucleus
- ✓ Sup. Olivary nucleus
- ✓ Facial nerve nucleus
- ✓ Facial nerve
- ✓ Stapedius muscle.

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Trigeminothalamic pathway :-



Injury to.....

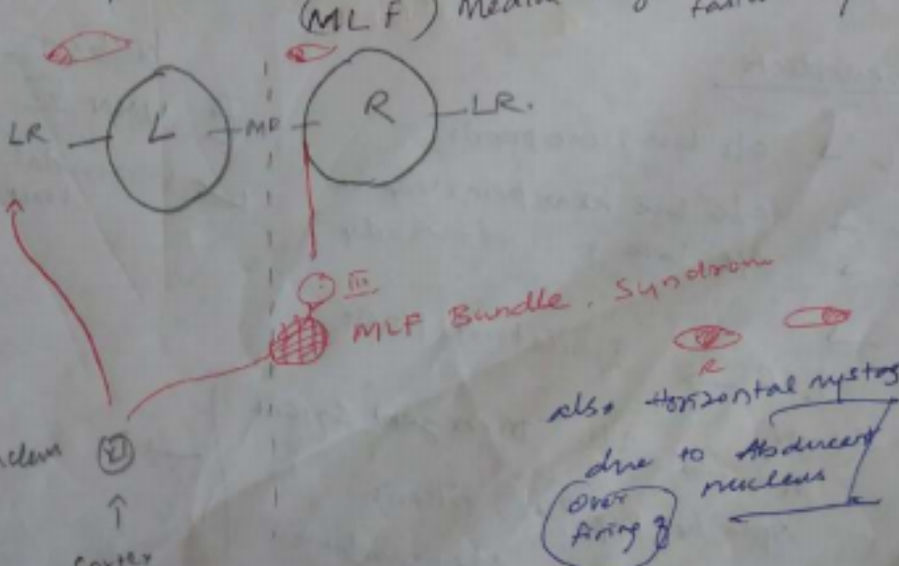
① Medial Lemniscus ⟶ Contralateral loss of Conscious proprioception

② Lateral L. ⟶ C/L hearing loss.

③ Spinal. ⟶ C/L loss of pain, temperature from the body

④ Trigeminal. ⟶ C/L loss of pain & temperature from face. Touch, pressure.

★ Internuclear Ophthalmoplegia. (MLF) Medial Longitudinal Fasciculus Syndrome.

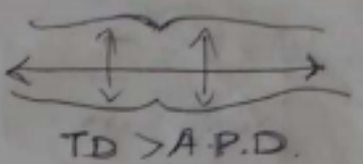


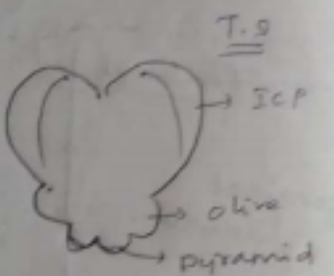
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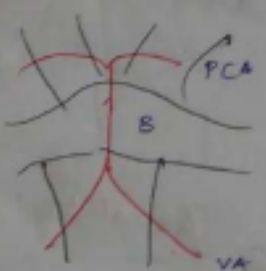
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M·B Pons M O









Midbrain Syndrome:-

- Benedict's syndrome.
- Weber's syndrome

★ UMN of VII



Benedicte

- ML → c/L loss of conc. proprio.
- TL → c/L loss pain & temp fine
- SL → c/L loss of Extremity
- III →
  - LPS → Ipsilateral ptosis
  - (LMN) MR → I/L Divergent Squint.
    - Sphincher pupillae, ciliaris
    - Light Accomodation

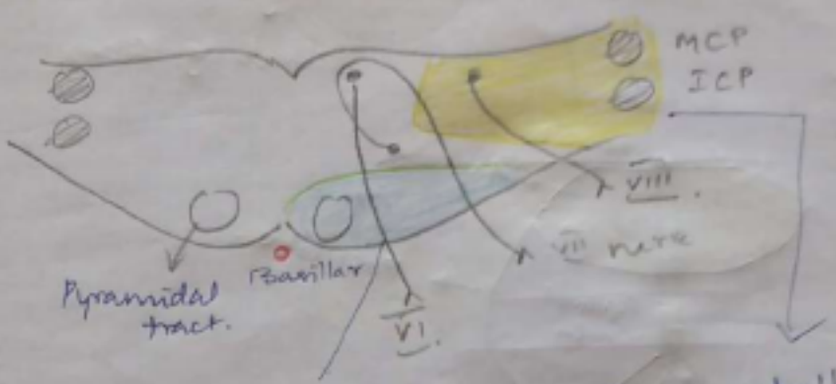
Webers

- UMN VII c/L lower half Face
- pyramidal tract c/L hemiplegia

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Pontine syndromes:



Millard Gubler Syndrome

Acoustic Neuroma

VI → I/L Convergent Squint
VII — I/L Facial paralysis
Pyramidal → C/L Hemiplegia.

Abducent Alternating Hemiplegia

Pontocerebellar Angle Syndrome.

Basillar Stroke

VII — I/L facial paralysis
VIII — I/L Hearing loss
MCP / ICP — I/L ataxia.

Medullary syndromes:



Medial Medullary Syndrome (Dejerine)

ML → C/L loss of Conc. proprio
Pyramid → C/L Hemiplegia.
XII → I/L tongue paralysis.

Deviates on Same side paralysis on protrusion of tongue.

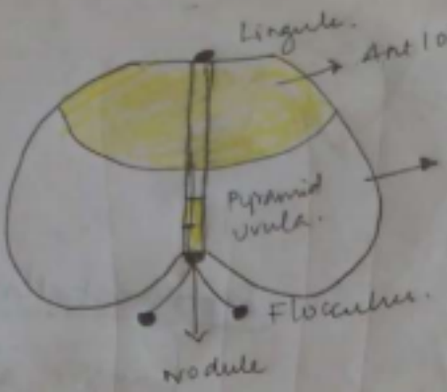
Lateral Medullary syndrome (Wallenberg Syndrome).

* ICP → I/L Lateral Ataxia.
* Vestibular → Vertigo, vomiting, nystagmus
* N. Ambiguus → XI, X, IX I/L bulbar paralysis loss of gag reflex.
* Spinal Lemiscus → C/L loss of Pain, temperature Entire Body
* Spinal nucleus of V nlv → I/L loss of pain, temperature from face.

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CEREBELLUM



Classification.

Archicerebellum (Oldest)
↓
Lingular + Flocculonodular lobe
(aka Vestibular cerebellum)
↓
Axial stability

Paleocerebellum (next to appear)
↓
Ant. lobe + pyramid, uvula.
(aka Spinal cerebellum)
↓
Appendicular stability

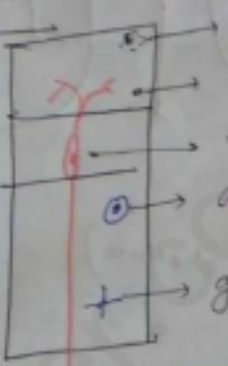
Neocerebellum (Recurrent)
↓
Post. lobe except Pyramid & uvula
(aka cerebro cerebellum)
↓
Smooth execution of voluntary movements.

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3 Layers of Cerebellar Cortex



1. Molecular Layer.
2. Purkinje Layer
3. Granular Layer.

* Purkinje Largest only efferent from Cortex.
* Efferent from Cerebellum Deep cerebellar nuclei

Deep Cerebellar Nuclei

D - Dentate nucleus → Largest nucleus / Neo / Neocerebellum
E - Emboliform nucleus
F - Fastigial nucleus. / Nucleus of Paleocerebellum
G - Globose nucleus

* Fastigial Nucleus → Nu of Archaecerebellum

D (E) F (G) I

E + G = Interpositus Nucleus.

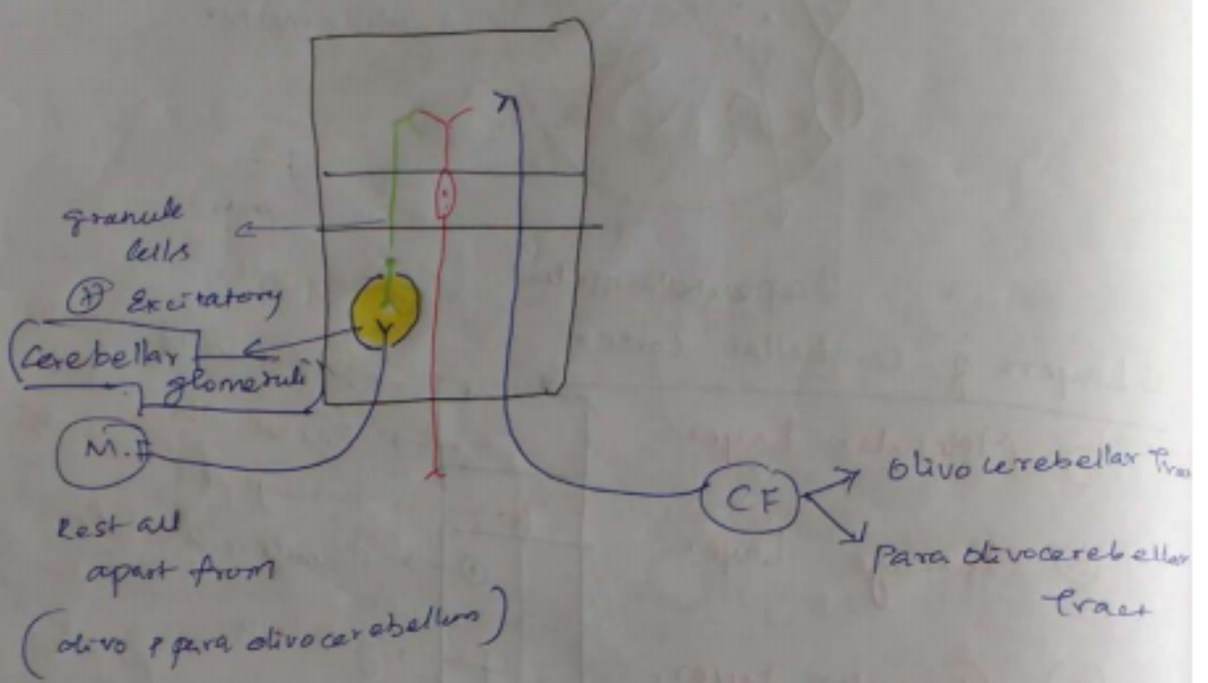
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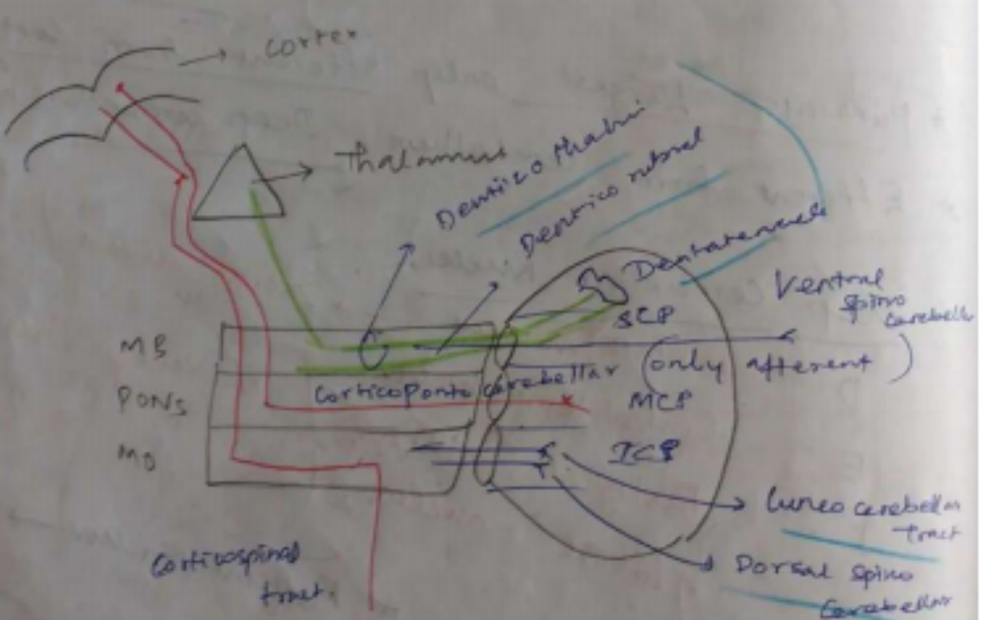
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Afferent fibres

Mossy fibres

climbing fibres.





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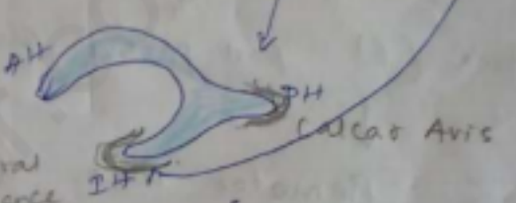
Types of Sulci

Limiting Sulcus
separates two diff areas at FLOOR
eg Central Sulcus.

Operculated Sulcus.
Just like limiting Sulcus but transition at LIP (or) margin.
(eg) Lunate Sulcus.

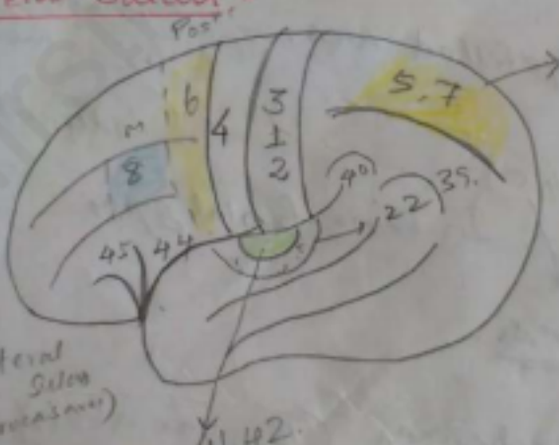
Axial Sulcus
Around which Cortex will develop.
(eg) posterior part of Calcarine Sulcus

Complete Sulcus.
ventricle
Deep enough to indent the wall of Ventricle.
(eg) Ant. part of Calcarine Sulcus → Collateral.



* Remaining All Sulcus are called as Incomplete Sulcus

Superior Lateral Sulcus:- Central Sulcus



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Area (3, 1, 2) :

Post central gyrus

↓

Primary sensory area.

Area 5, 7 : Superior parietal lobe

↓

Sensory association area.

Area (4) :

Pre central gyrus

↓

Primary motor area. (origin of pyramidal tract)

Area (6) Post part of Sup. Frontal Gyrus, MFG, IFG.

↓

Premotor area. (Origin of Extrapyramidal tract)

Area (8) : Middle frontal gyrus

↓

Frontal eyefilled area. (conjugate Scanning movement of eyeball)

(independent of visual Stimulus)

Area ~~44~~ (44, 45) : Inferio-frontal gyrus

↓ ↓

Pars operularis Pars Δs.

Motor Speech area (Broca's area)

↓ # # injury

Motoraphasia

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Area (41, 42) : Superior temporal gyrus (Herschl's Gyrus).

↓

Primary Auditory area.

Area (22) STG.

↓

Auditory association area.

Area (39, 40) : Angular & supramarginal gyrus

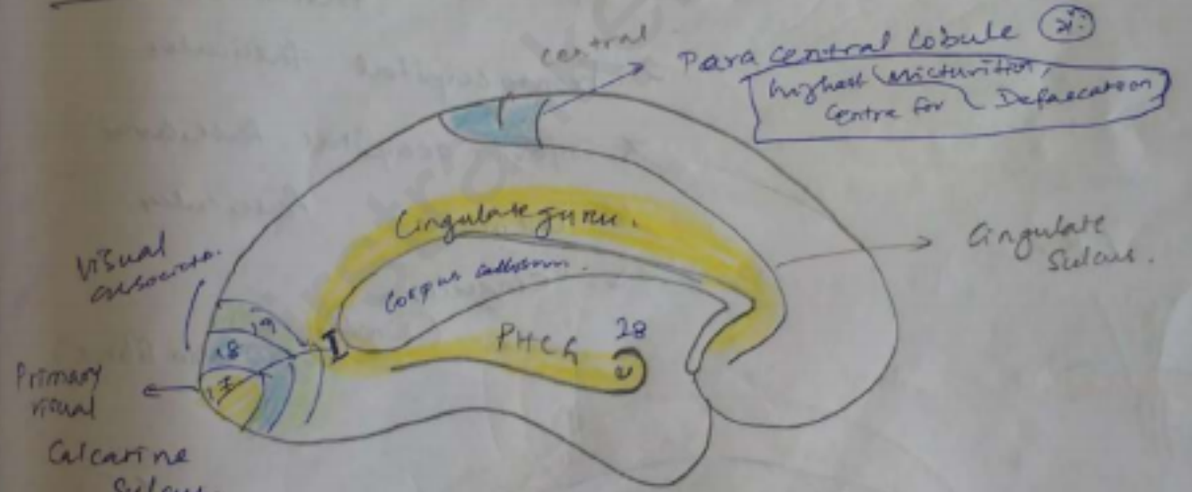
↓

Sensory speech area

(or)

Wernicke's area (22, 39, 40)

Medial Surface of Brain :-



I - Isthmus

PHCG : Parahippocampal Gyrus.

V : Uncus 2° primary olfactory area.

Limbic System :-

Components

- Cingulate gyrus
- PHCG
- I
- V

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White matter of cerebrum

Association fibres → Connects different areas of same Cerebral hemisphere

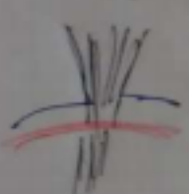
Commissural fibres → Connects Same area of both Cerebral hemisphere

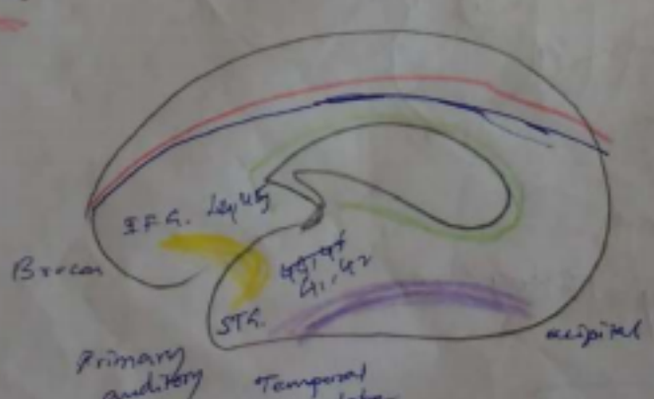
Projection fibres → All Ascending & Descending tracts. [One functional area to other functional area.]

Association fibres
- Short Association : are Arcuate fasiculus → neibouring area.
- Long Association
  1. Superior longitudinal fasiculus.
  2. Fronto occipital fasiculus
  3. Inferior occipital fasiculus
  4. Uncinate fasiculus
  5. cingulum.

(Limbic association fibres)

CR.





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matter of cerebr...

Association fibres → Connects different area of same Cerebral hemisphere

Commissural fibres → Connects same area of both Cerebral hemisphere

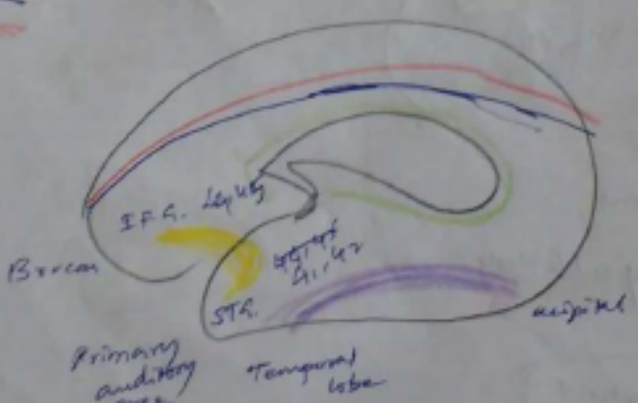
Projection fibres → All Ascending & Descending tracts. [One functional area to other functional area.]

Association fibres
- Short Association : e.g. Arcuate fasciculus → neibouring area.
- Long Association
  1. Superior longitudinal fasciculus.
  2. Fronto occipital fasciculus
  3. Inferior occipital fasciculus
  4. Uncinate fasciculus
  5. Cingulum.

(Limbic association fibres)

CR.



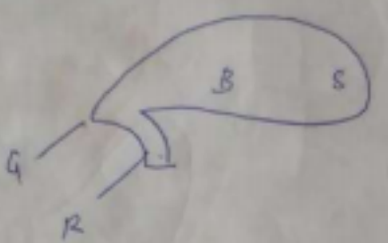


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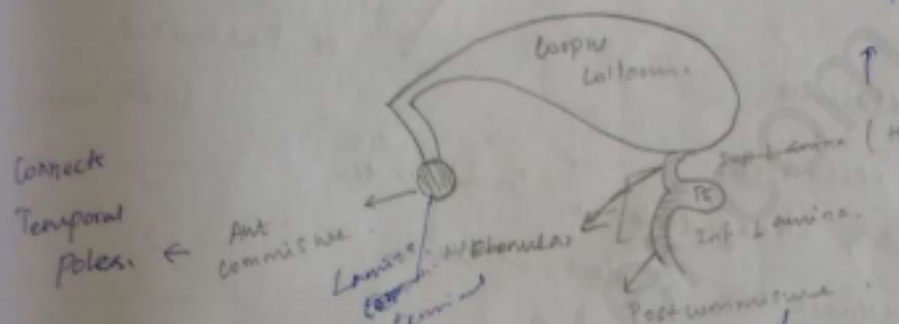
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Commissural fibres

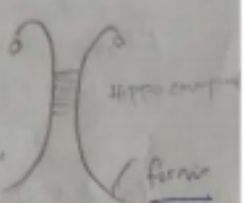
1. Corpus Callosum (Largest) → Genu, Rostrum, Trunk/Body, Splenium
2. Ant. Commissure.
3. Post. Commissure.
4. Habenular "
5. Hippocampal "



Connects Habenular nuclei



connects Sup. colliculus & Midbrain.

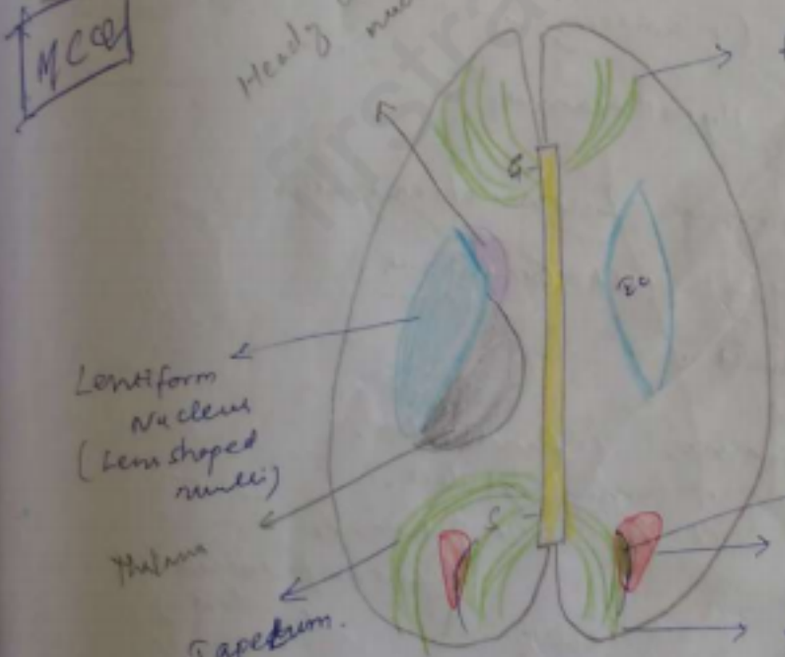


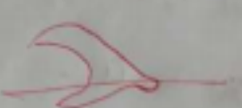
Limbic commissural fibres

T.S
MCQ

Head of caudate nucleus

forceps minor.





Lentiform Nucleus (Lens shaped nuclei)

Thalamus

Tapetum.

Bwb & post. horn.

Posterior horn & Lateral Ventricle

forceps major.

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Coronal section

MCQ



Boundaries of LV

Roof : Corpus callosum

M. wall : Septum pellucidum

Floor : Fornix, choroid plexus, Thalamus, thalamostriate vein, caudate nucleus

No Lateral wall

Lateral Ventricle

Boundaries of III rd ventricle :-

No III rd Nerve in 3rd ventricle

Roof : choroid plexus (pia mater)

Lat. wall : Thalamus, Hypothalamus

Ant. wall :- Ant. commissure, Lamina terminalis

post. wall :- pineal gland. post. commissure.

Cerebral Aqueduct.

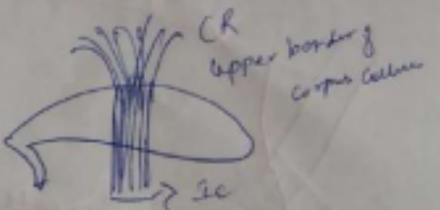
Floor :- optic chiasma, infundibulum, mammillary bodies, post. perforating substance (Interpeduncular fossa)

Continued

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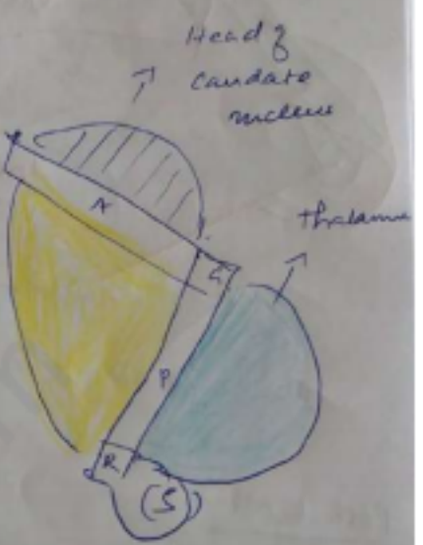
Projection fibres :-

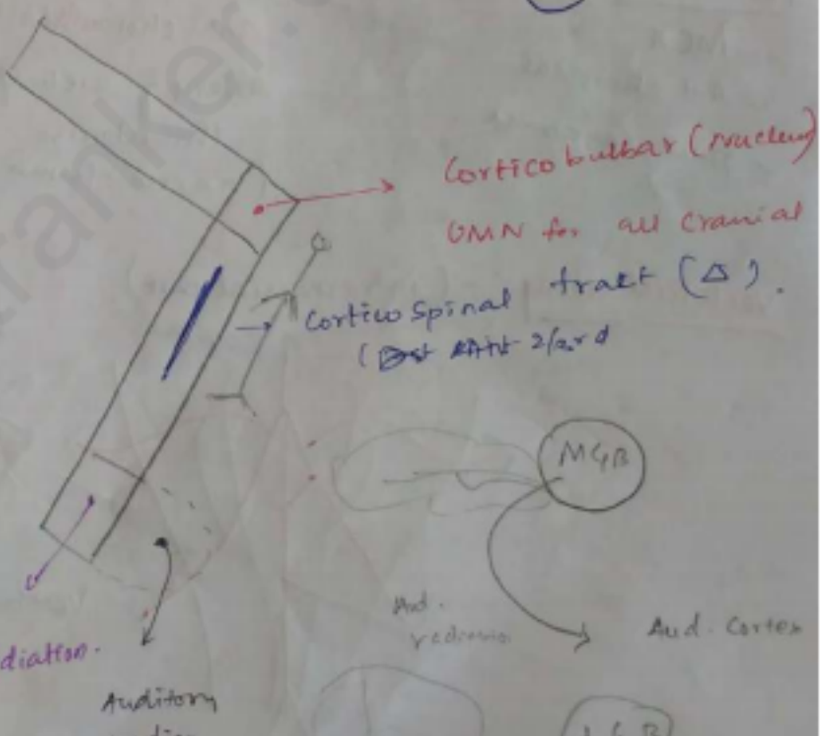
1. Internal capsule.
2. Corona radiata.



Internal capsule

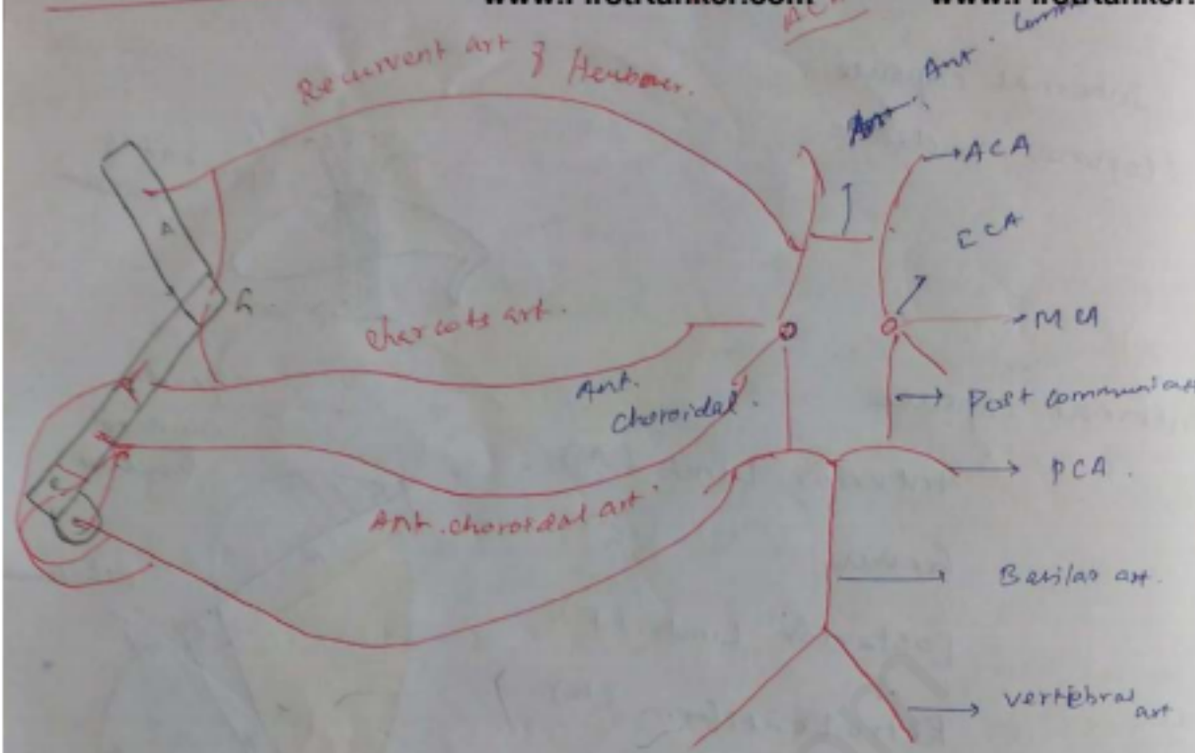
- Anterior Limb (A)
- Genu (G)
- Posterior Limb. (P)
- Retro Lentiform. (R)
- Sub Lentiform. (S)





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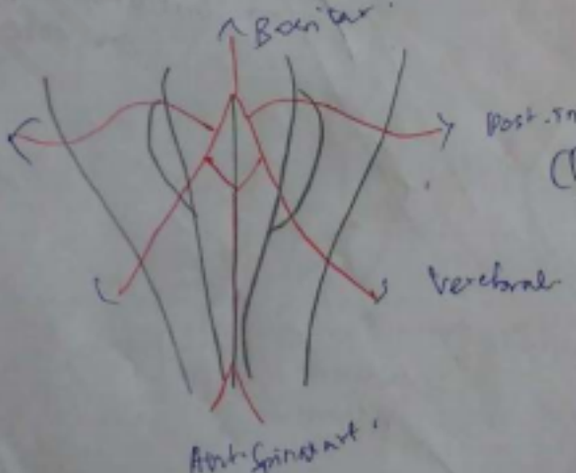
"Circle of willis"

Post. Limb
- MCA
- Ant. choroidal.
- post. cerebral.

Ant. choroidal art
Artery of cerebral thrombosis
(narrow lumen.

Charcots artery
(Lenticulate striate artery)
= artery of cerebral haemorrhage
(intracerebral)

Vertebral artery :- (intracranial part).

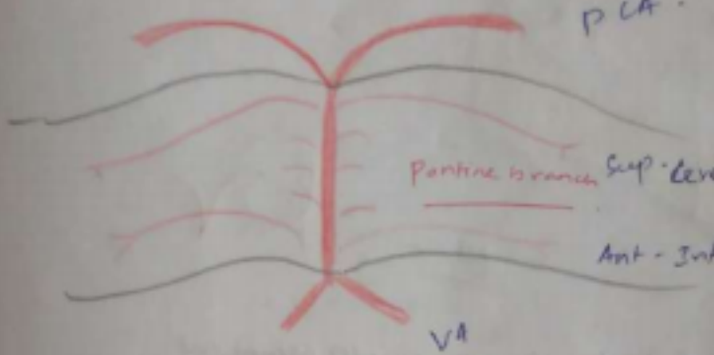


1. PICA
2. Ant. spinal art.
3. post. spinal art.
4. medullary br.
5. meningeal br.

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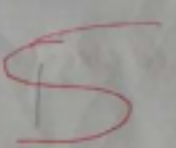
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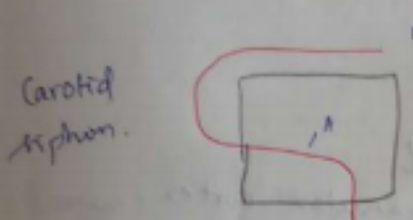
Basilar Artery :-



Labrynthine artery. (may arise from Basilar art.)

Internal Carotid artery :-





A. Intra cavernal part.

① Meningeal br. → Wall of C.S.

② Sup & Inf. Hypophyseal art.

B. Supra cavernal part

First br. ← ① Ophthalmic art.
② MCA.
③ ACA.
④ Ant-choroidal
⑤ Post-Communicating art.



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Haemorrhages.

- Extradural → Ant. division of Middle Meningeal art.
- Subdural → Bridging Vein.
- Subarachanoid → Rupture of Berry aneurysm.
- Intracerebral → charcots artery

Cerebral Cortex Histology

- Granular Cortex → Granul → S Cortex
- Agranular Cortex (motor) → pyramidal (motor) → M-Cortex.



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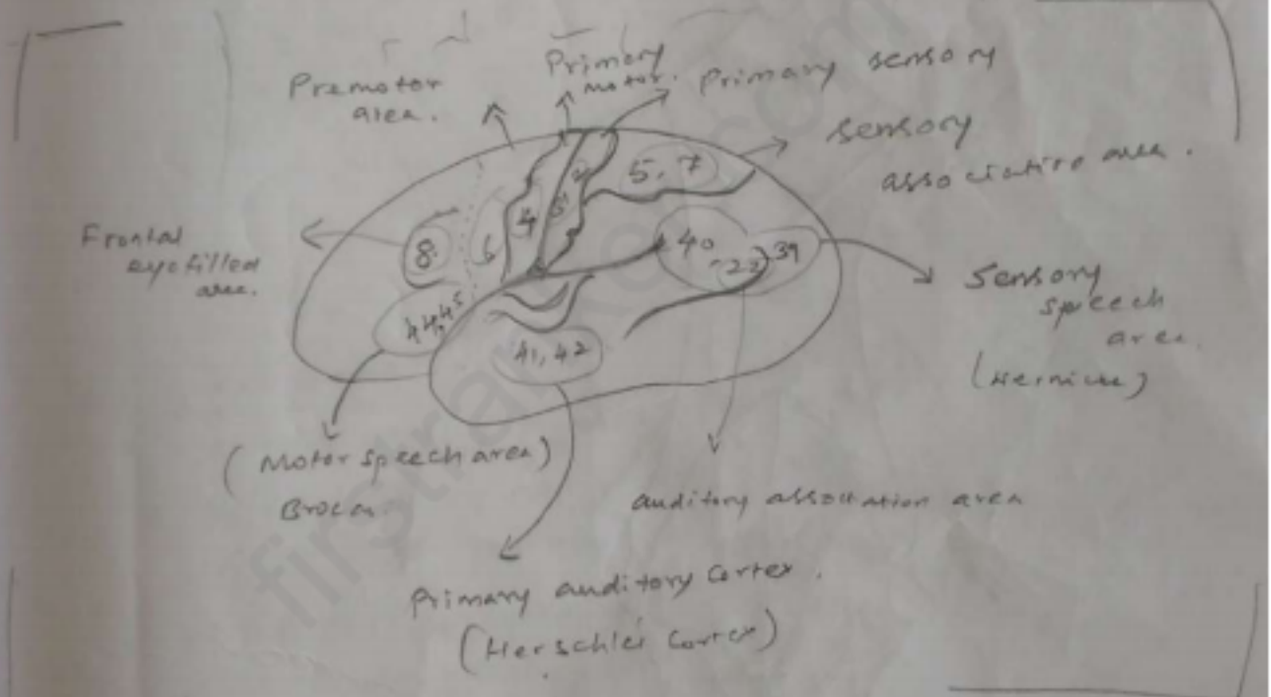
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MCQ

→ Horz running myelin Bevone

→ visual cortex so reffered as "Striate Cortex"





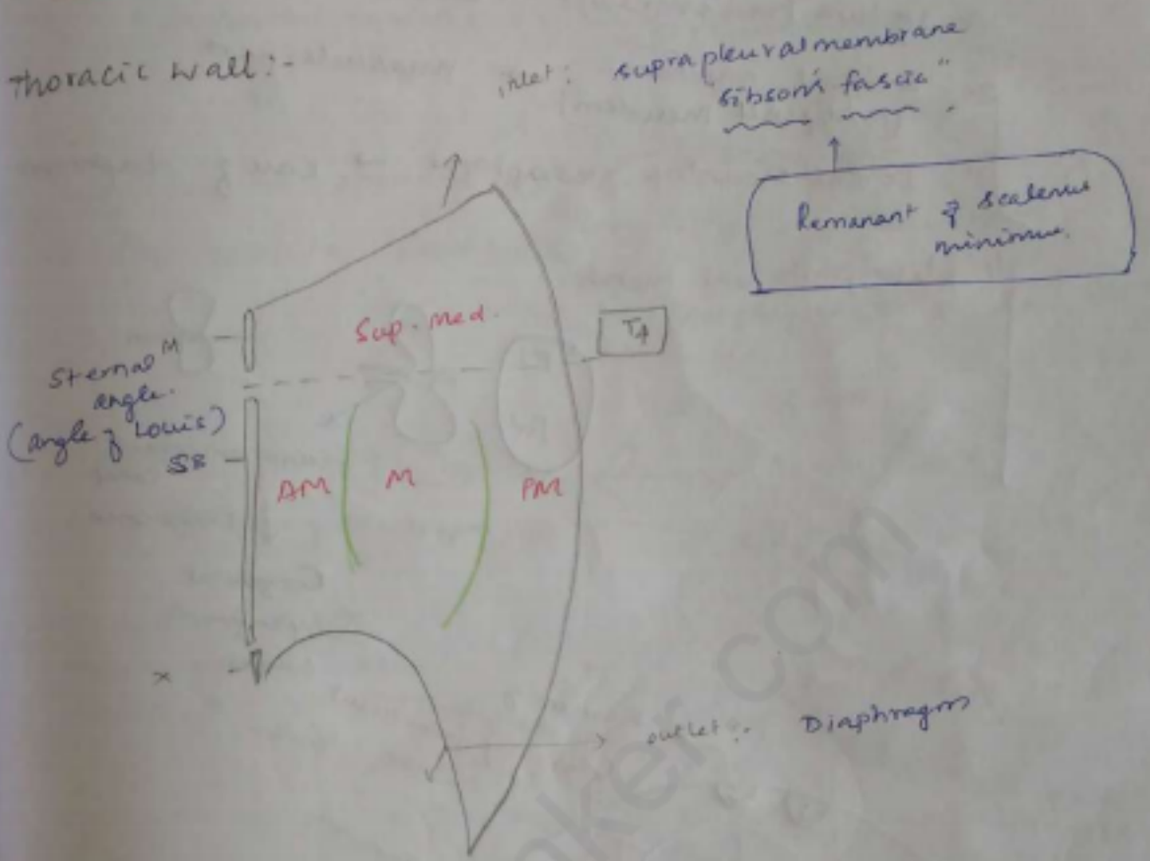


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THORAX :-

Thoracic wall :-



* Sternal angle :-

1. Bifurcation of trachea. (cadaveric)
2. Beginning & end of arch of aorta.
3. 2nd costal cartilage
4. Arch of azygous vein.
5. Thoracic duct shifts to (L) side.
6. Superficial Cardiac plexus.
7. Level for Apex of fibrous pericardium.
8. Level for Attachment of Sup. sterno pericardial Ligament.
9. Junction of superior & Inferior mediastinum.

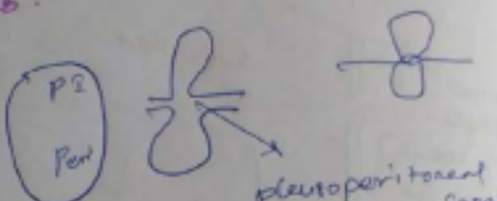
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Diaphragm :-

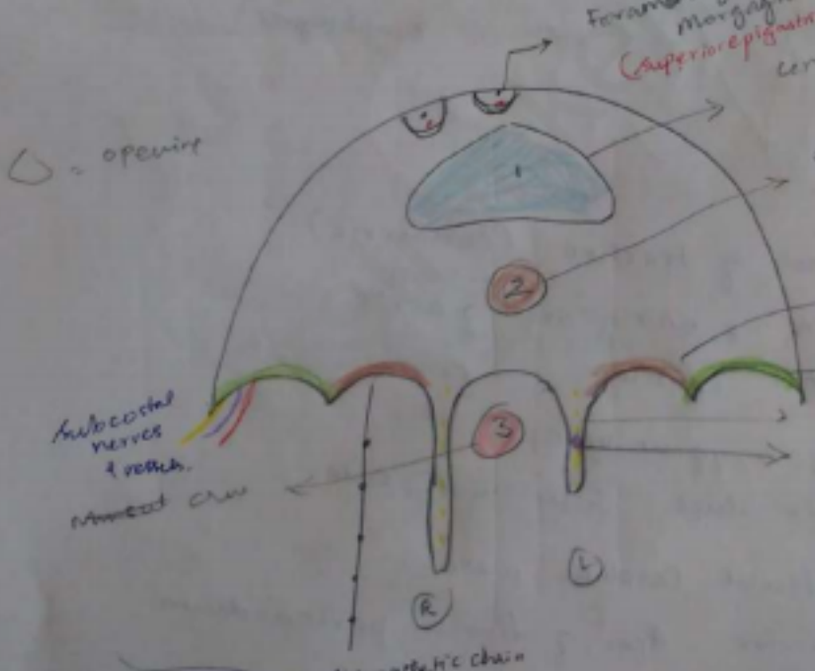
Development :-

1. Septum transversum → Central tendon.
2. Cervical myotome → muscular part (Body wall mesoderm)
3. Dorsal mesentry of oesophagus → Crus & diaphragm
4. pleuroperitoneal memb.



↓ Persistence

Congenital Diaphragmatic Hernia



↙ Preganglionic from Sympathetic chain without relaying in sympathetic chain

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1) Venacaval opening
[In central tendon]
→ IVC
→ Phrenic nerve
IVC

2) Oesophageal opening (T10)
(in muscular part)
→ Oesophagus.
→ Vagus nerve.
→ Oesophageal br of Left Gastric Artery.

3) Aortic opening (T12)
(B/w crus of Diaphragm)
→ Aorta.
→ Thoracic Duct.
→ Azygous vein.

Inter costal Spaces :-

Inter costal muscles :-

3 → Sub costalis.
3 → Intercostalis intimi
→ Sternocostalis
[Transverse Thoracic]

Innermost
Intermd
External

MCQ

1) Downwards, forwards medially
2) Downwards, backwards laterally

* Neurovascular bundle is present b/w internal innermost intercostal muscles.

V
A
N

except 1st inter Inter costal Space

N
A
V

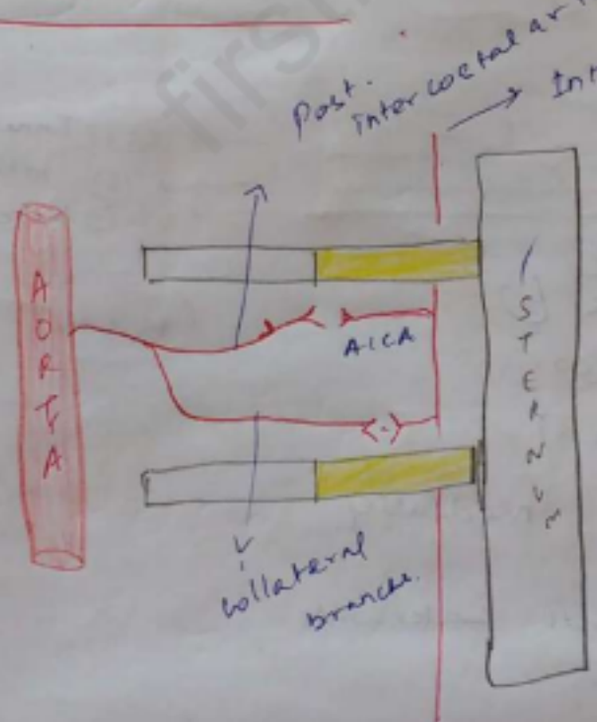
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Intercostal nerves :-

T_1 ← Brachial plexus.
T_2 — intercosto brachial nerves.
T_3, T_4, T_5, T_6 ⇒ Typical intercostal nerve supply Intercostal space. and nothing else
T_7, T_8, T_9, T_{10}, T_{11} → thoracoabdominal nerves.
T_{12} - subcostal nerve / skin in gluteal region.

Intercostal arteries :-



A1CA
= Anterior intercostal artery

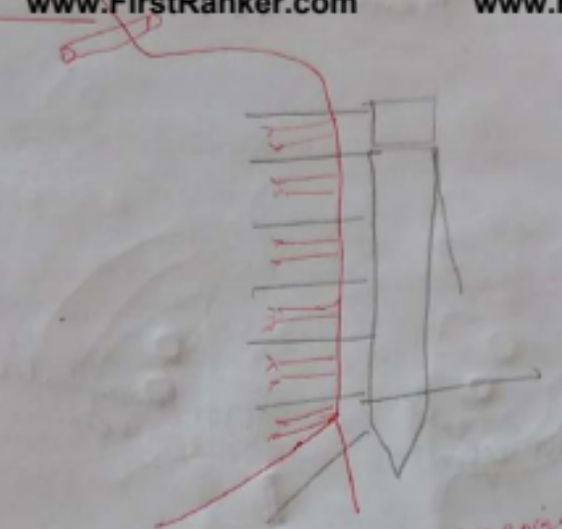
Branch of ITA from 1st Aortic

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Internal thoracic artery :-

from subclavian artery (1st part)



↓
gives AICA
(From 7th to 9th)

Branches of ITA :-

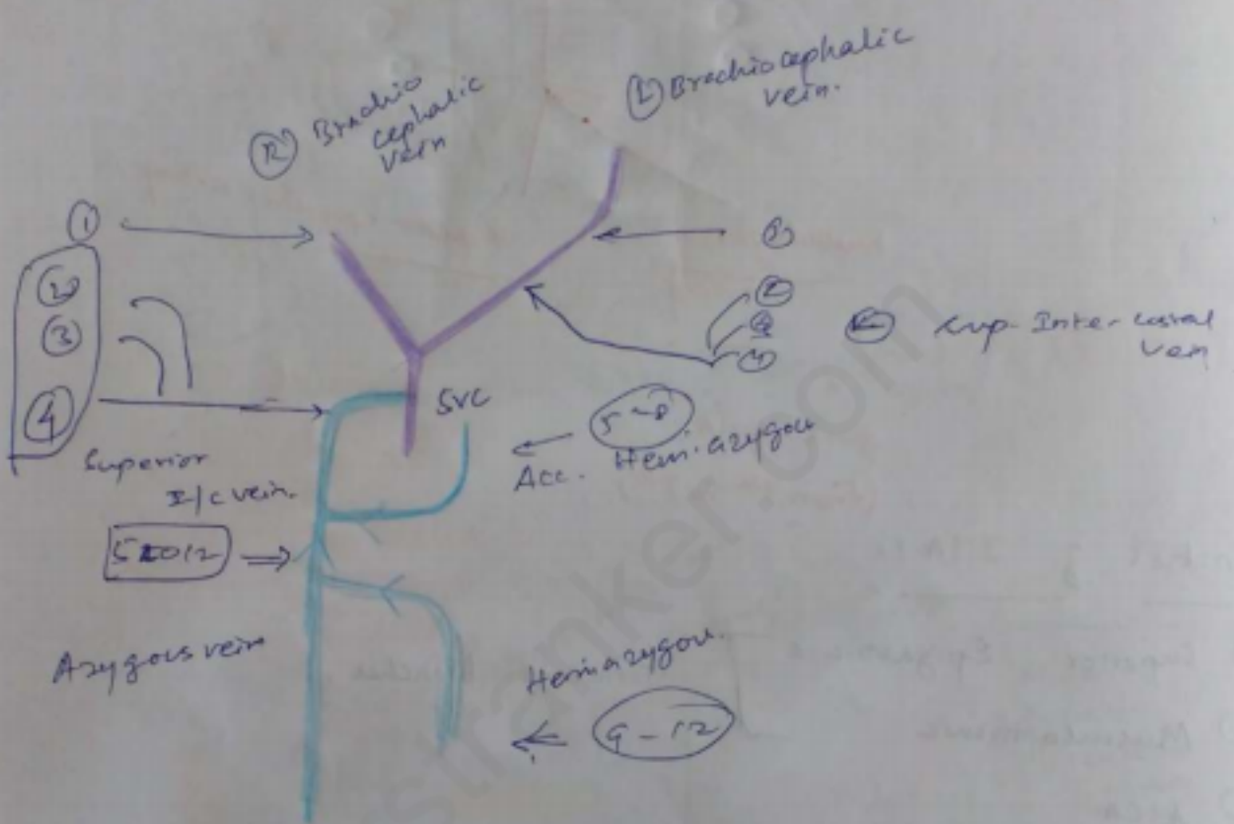
1. Superior Epigastric a.] Terminal branches.
2. Musculophrenic
3. AICA
4. mediastinal branch. → Remains of thymus.
5. Pericardiophrenic art → supplies → fibrous pericardium
   - Diaphragm

6. ~~Inferior~~ :- Perforating mamary br.
   [Supplying 2nd to 6th I/c space]

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Azygous & Hemiazygous veins.



* (R) sup. I/c vein tributary of Azygous vein.

* (L) sup. I/c vein tributary of

(C) Brachiocephalic vein.

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Formative tributaries :-

* Azygous vein
  - a) ® Subcostal vein
  - b) ® Lumbar azygous vein.
  - c) ® Lumbar Ascending vein.

* Hemi azygous vein.
  - a) (L) Sub costal
  - b) (L) Lumbar azygous
  - c) (L) Lumbar Ascending.

* ® Bronchial vein is the last tributry of azygous vein.

Pleura.

- Parietal pleura.
  1. Cervical pleura
  2. Costal pleura
  3. Diaphragmatic pleura
  4. Mediastinal pleura.
- Visceral pleura
  - Pulmonary Septae
  - Broncho Pulmonary Segments



Costo Diaphragmatic recess.

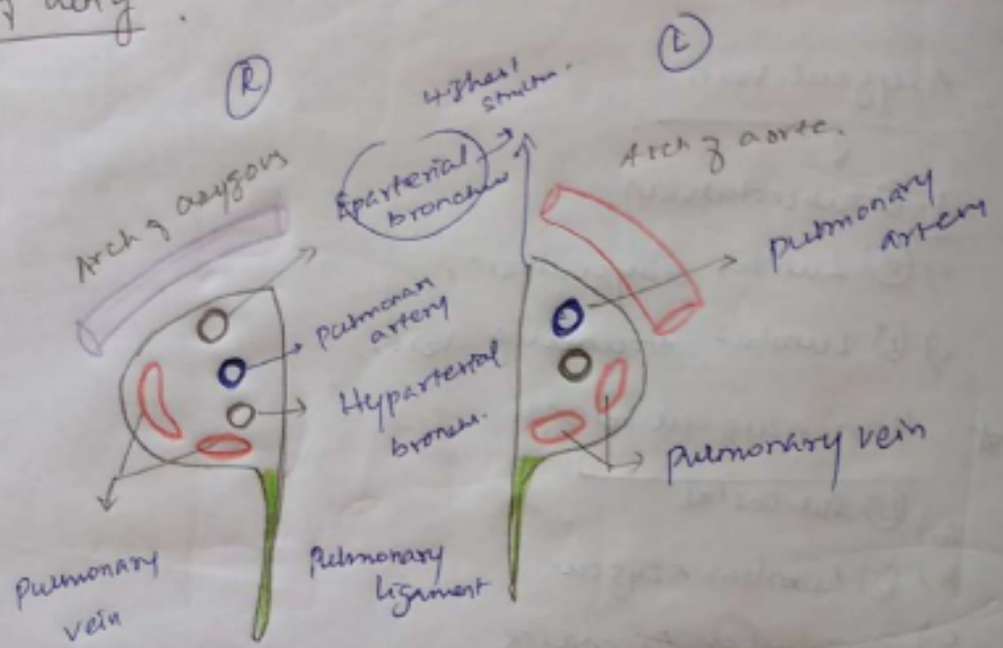
Diaphragmatic (most dependent site of pleural cavity).

pleural tap 9th ICS mid axillary line.

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Root of lung.



R L

Bronchial artery

Left lung → Two bronchial arteries (Branch of aorta).

Right lung → one br. artery (R) 3rd posterior intercostal arteries.

* Bronchial arteries supplies Tracheobronchial tree till Respiratory Bronchioles.

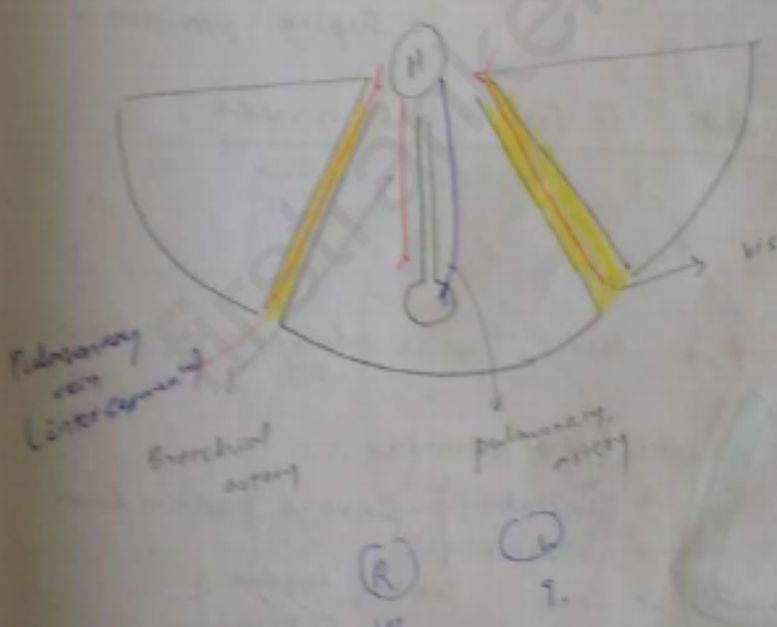
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Broncho pulmonary Segment

Features :-

1. Area of lung created by tertiary bronchus / Segmental bronchus / IIIrd generation bronchus.
2. Pyramidal in shape; Apex is towards lung (Hilum) (principle for postural Drainage)
3. Surgically resectable. (Bcoz they are divided by fissural pleura)
4. Broncho pulmary segments :- No vein. pulmonary veins are inter segmental not intra segmental.



R 10 L 9.

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(R) Lung (10) www.FirstRanker.com

Upper lobe
- A - Apical
- P - Posterior
- A - Anterior.

Middle lobe
- L - Lateral
- M - medial.

Lower lobe
- A - Apical Basal. (Superior)
- P - posterior Basal
- A - Anterior Basal
- L - Lateral Basal
- M - Medial Basal

(L) Lung (9) www.FirstRanker.com

Upper lobe
- A - Apical | may form Apicoposterior
- P - posterior |
- A - Anterior.
- S - Superior | Lingular BPS.
- I - Inferior. |

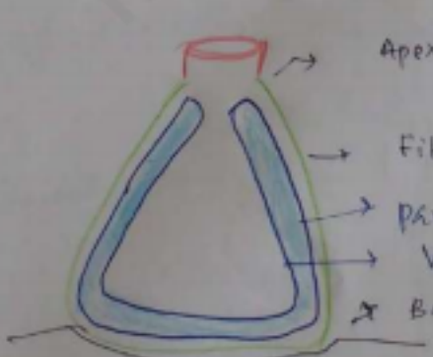
Lower lobe
- A - Apical | Basal
- P - posterior |
- A - Anterior |
- L - Lateral |
- M - Medial |

Commonly Absent.

★ (R) Posterior Basal => most dependent BPS in Erect posture.

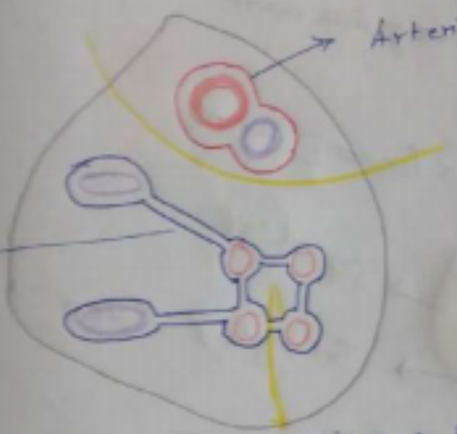
★ (L) Apical Basal => most dependent BPS in Supine position.

Pericardium & Pericardial sinuses



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Transverse Sinus
↓
Can be used to ligate great vessels. (Asc. Aorta & PT) during Cardiac Sx

Oblique Sinus.
↓
Additional Dead space behind L atrium for its Expansion in ↑VR.

HEART

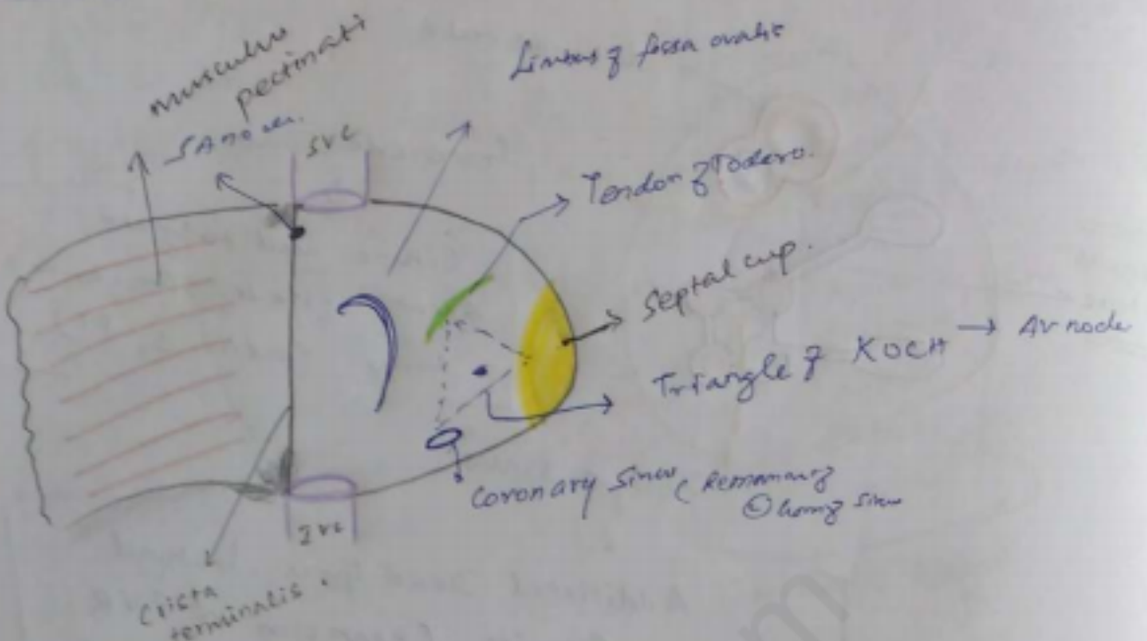


L auricle
L Border
LV + L auricle
R Border RA
Apex :- 5th intercostal space. Just lateral to mid clavicular line
Inf. Border RA+RV
Base
½ RA + ½ LA

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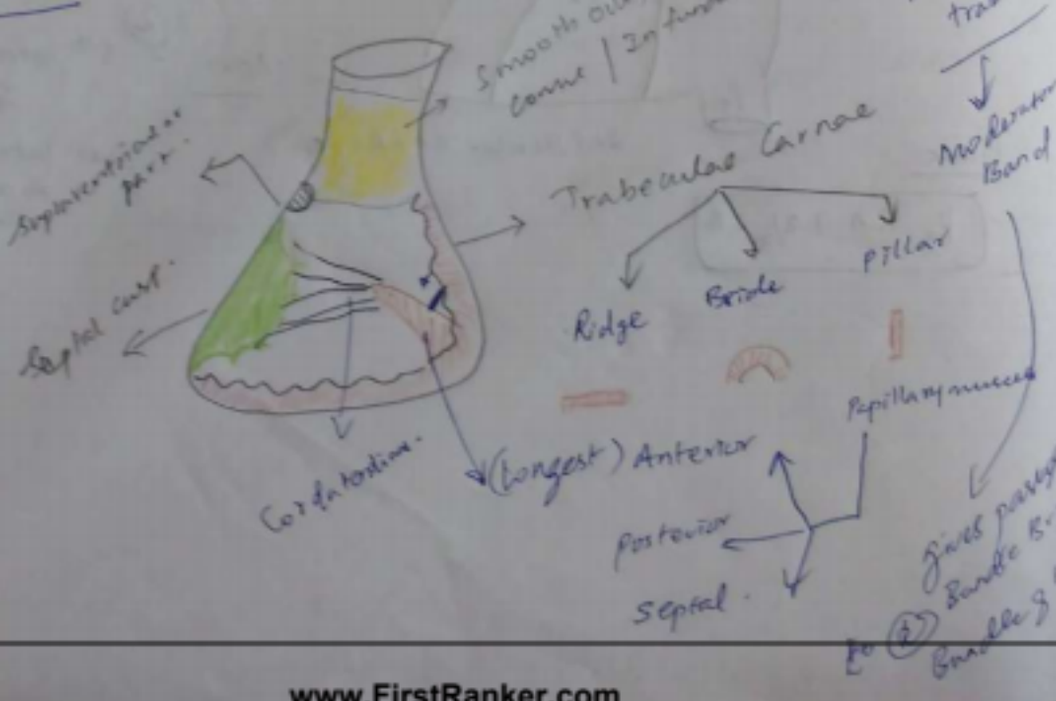
Right atrium :-



* Musculus Pectinati
  - it reduced the turbulence b/w Blood of SVC & IVC
  - it guides the blood towards AV valve.

* SVC - Devoid of valve.

(R) ventricle :-

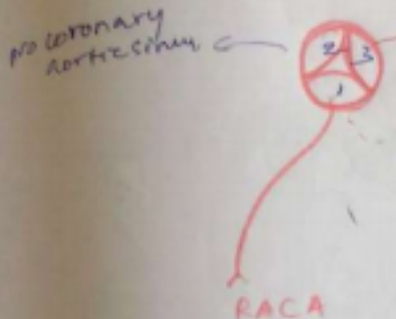


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CORONARY CIRCULATION :-

1. Ant. Aortic sinus
2. (R) Post. Aortic sinus.
3. (L) Post. Aortic sinus



One of the causes Sudden Cardiac Death.



SA node
AV

(Posterior Interventricular Artery)

Anteri
(L) Anterior descendy

AV node
Septal branch of PIVA

* Right Cardiac Dominance :-
PIVA br of RCA 65% population.

* Left Cardiac Dominance :-
PIVA br. circumflex 25% population.

RCA infundibulum



Conus branch of RCA & LCA

LCA

Annulus of Vieussens

* Co Dominance :-
* Post. interventricular groove shared by both RCA & LCA.
* 10% population.

Pregnant
MCQ

- Optic nerve
- Sciatic
- Sa node

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Blood Supply to Conducting System :-

SA node, AV node - BOH.

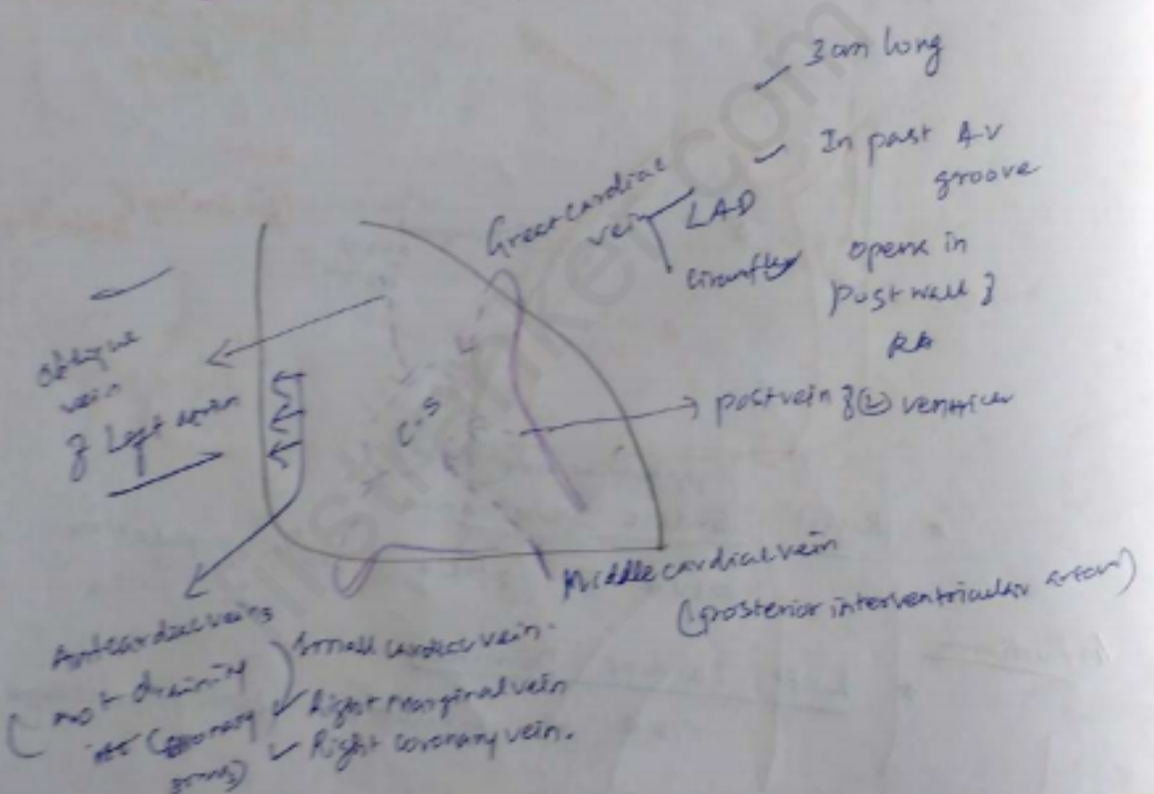
↑

RCA.

R Bundle Br ⟶ LCA

L Bundle Br ⟶ LCA.

Coronary Sinus :-



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Lower Limb

Fascia Lata

Intermuscular septum

Gluteus maximus

Anterior Compartment :-

Nerve → Femoral nerve → $L_2 L_3 L_4$

Sartorius

Quadriceps

Saphenous nerve

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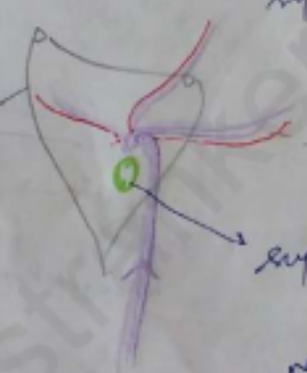
Femoral Triangle :-



Floor

Med - Lat
1. Adductor longus
2. pectineus
3. tendon psoas major.
4. Iliacus.

Roof



Superficial epigastric Vessels -
Superficial circumflex Iliac Vessels
Superficial ext pudental vessels.
Superficial Inguinal lymphnode.
Fascia lata.
Superficial fascia.
Skin

Contents :-



Lateral cutaneous nerve of thigh
femoral nerve.
femoral sheath
Ant wall (Fascia transversalis)
post wall.
E Fascia Iliaca
M
Lymphatics & Cloquet's deep inguinal glands
femoral artery
Lacunar ligament
extension of modification of inguinal ligament
Femoral branch of genito femoral nerve.
femoral canal
Femoral vein



Formed by Fascia iliaca
3-4 cm long.

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→ most superior Deep Inguinal lymph node.
→ most inferior ext. Illac lymph node.

→ most sup Deep inguinal lymphnode
most Inf. External Illac Lymphnode.

Cremastric reflex :-

Afferent | 1. Ilioinguinal nerve
2. Femoral branch of genitofemoral nerve.

Efferent 1. Genital branch of genitofemoral nerve.

Adductor canal | Sub sartorial canal | Hunter's canal :-





Contents :-

- ✓ femoral vessels.
- ✓ Nerve to vastus medialis.
- ✓ Saphenous nerve.
- ✓ Deep lymph vessels.
- ✓ Descending genicular artery.
- ✓ Two divisions of Obturator Nerve.

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Medial compartment (Adductor)

muscles GOA²

G - Gracilis

O — obturator Externus.

A - Adductor Longus.

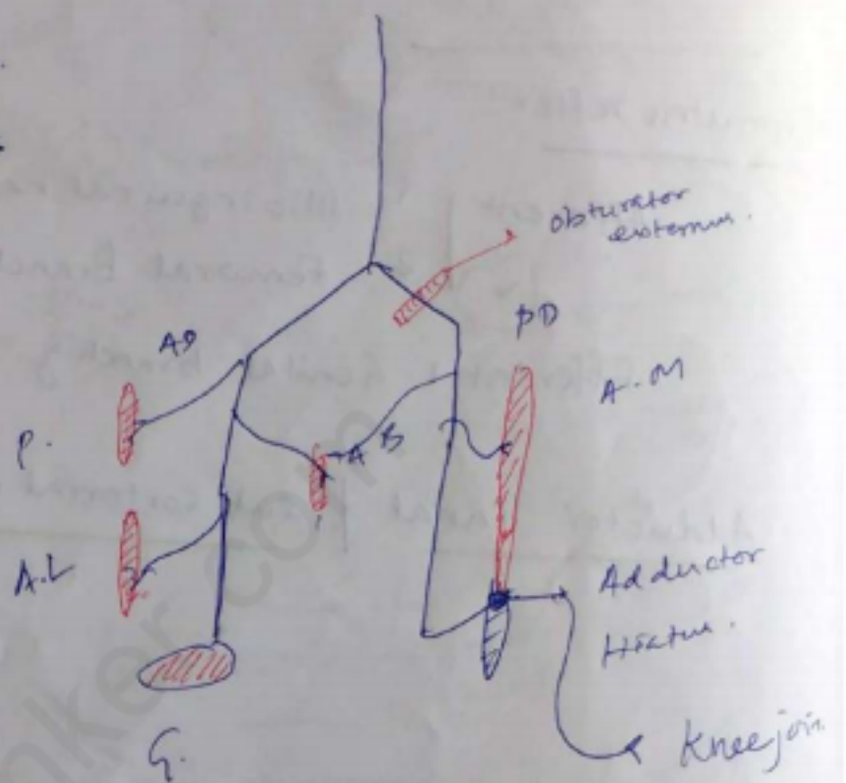
A - Adductor Brevis

A - Add. Magnus.

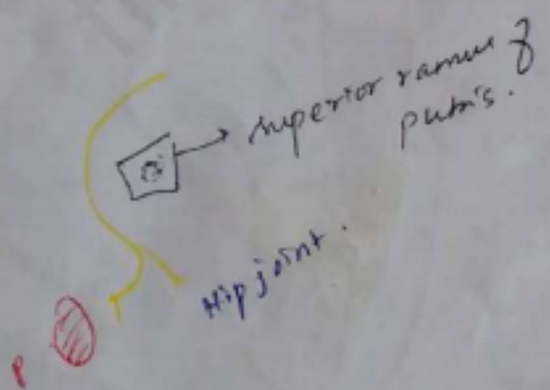
Nerve

Ventral div.

obturator nerve ($L_2 L_3 L_4$)



Accessory obturator nerve

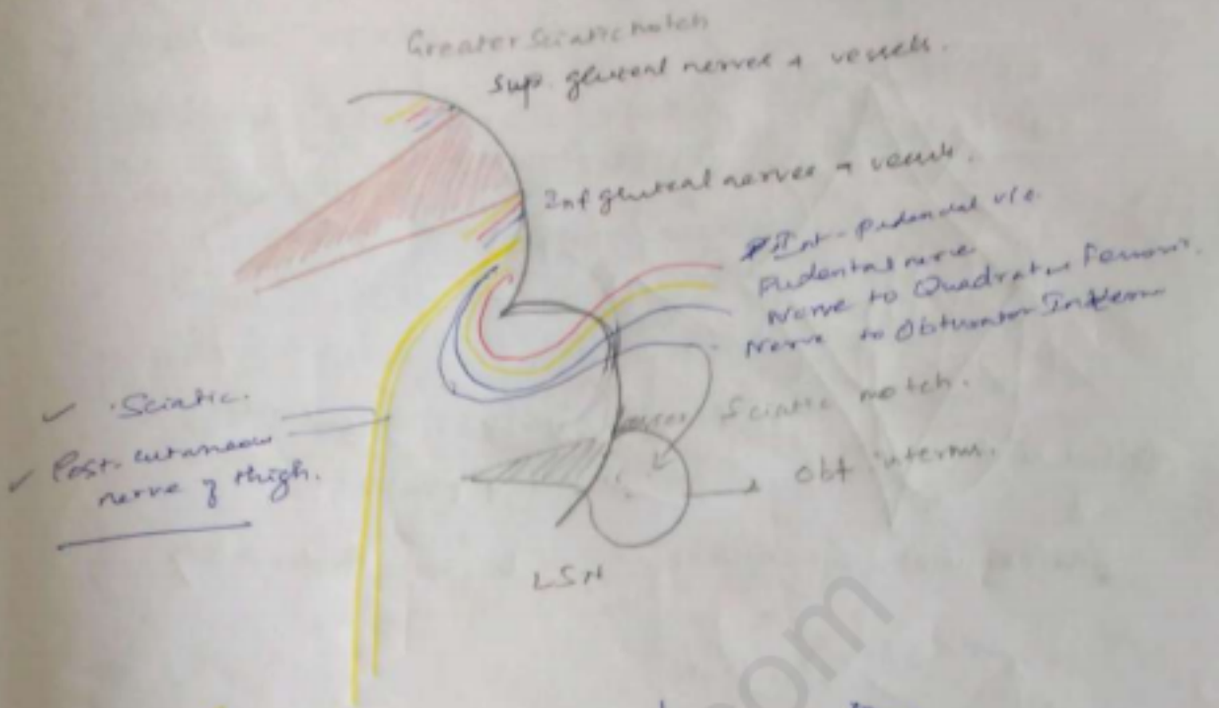


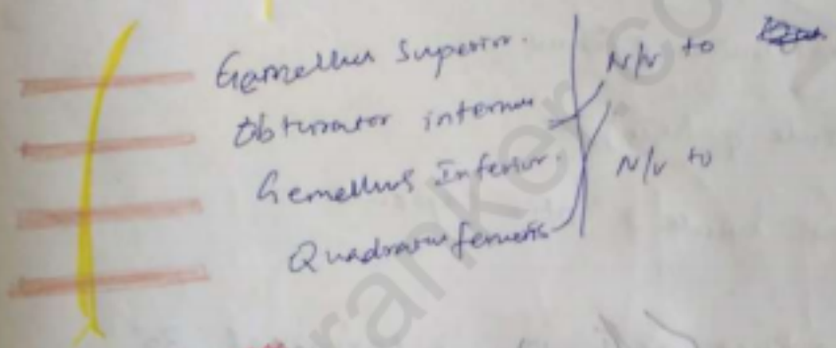
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Gluteal region

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Sciatic nerve

Hamstrings

Muscles

1.) Semitendinosus.

2.) Semimembranosus.

3.) Biceps femoris → Long head, short head.

4.) Adductor magnus.

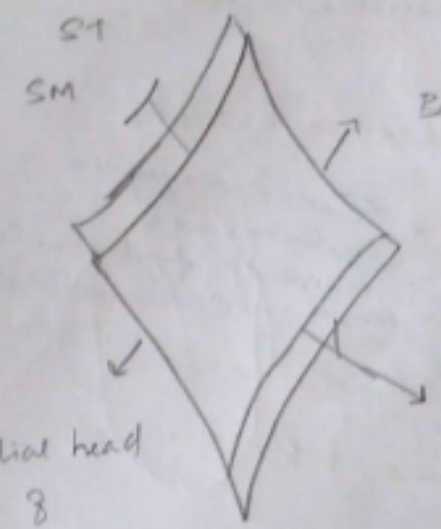


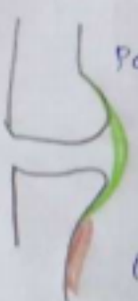
Modified Hamstrings.

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Popliteal fossa





Popliteal sulcus of femur.

Capsule of Knee Joint.

Popliteus muscle & Otic capsule.

Locking of Knee → During terminal 30° extension at knee.
medial rotation of femur on Tibia. (Vise versa)

muscle :- Vastus medialis.

Unlocking of Knee → Lateral rotation of femur on Tibia.
To initiate flexion at knee.

muscle - popliteus.

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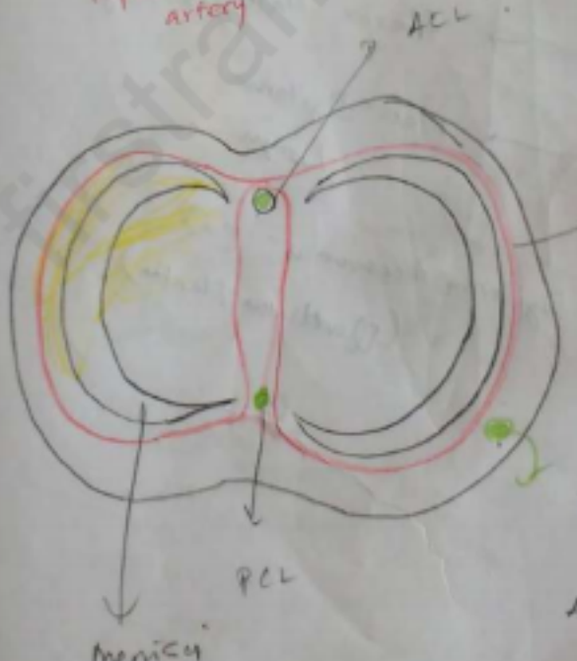
Contents (Deep to superficial)

→ Popliteal artery 2 branches.
→ Popliteal vein 2 tributries.
→ Sciatic nerve — Tibial nerve.
— Common peroneal nerve

Posterior femoral cutaneous nerve.
Genicular branch of posterior division of obturator nerve.

MCQ Popliteal artery Deep seated Structure not present against Bony prominence ?





Tendon of popliteus.

ACL & PCL

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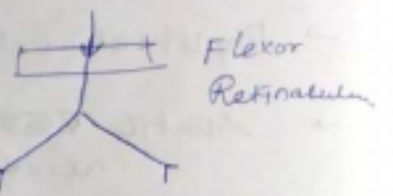
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Sole of foot

(4 Layers)

Tibial nerve



Dominant nerve.

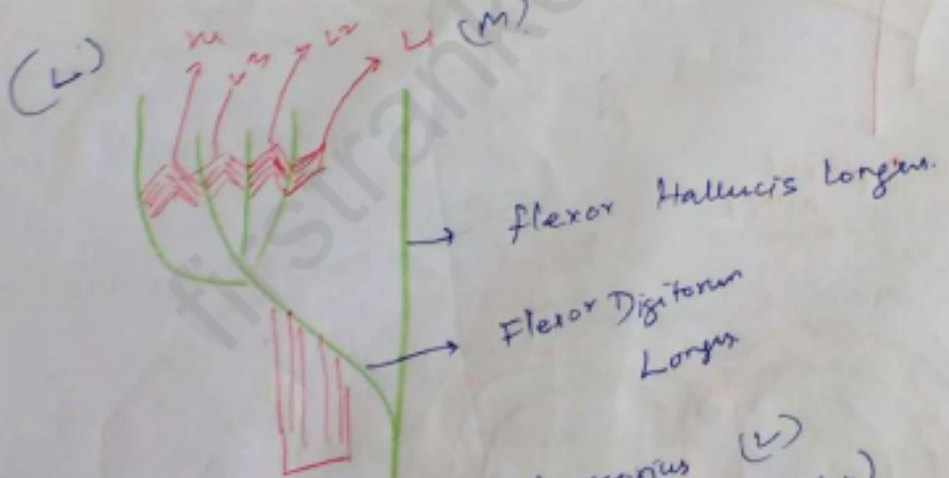
(I)



Adductors & interossei

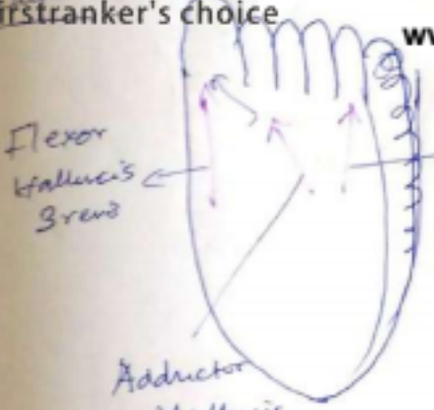
Dominant

(II) Layer — 2 tendons.
2 muscles.



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IV Layer :- Layer of interossei
- 3 plantar (unipinnate) (L)
- 4 Dorsal (Bipinnate)

Arches of foot :-



Bones of Medial Longitudinal arch.

Bones of Lateral Longitudinal arch.

Features	MLA	LLA
Summit (key stone)	Talus	Calcaneus
Joint	Talo calcaneo navicular joint (Ball & Socket)	
Ligament	Spring Ligament, Plantar Calcaneo	Short & long plantar ligament
Tie bean	Plantar aponeurosis	Peroneus longus, peroneus brevis / Evertors
Stirrup	Tibialis Ant (Inverters), Tibialis post	

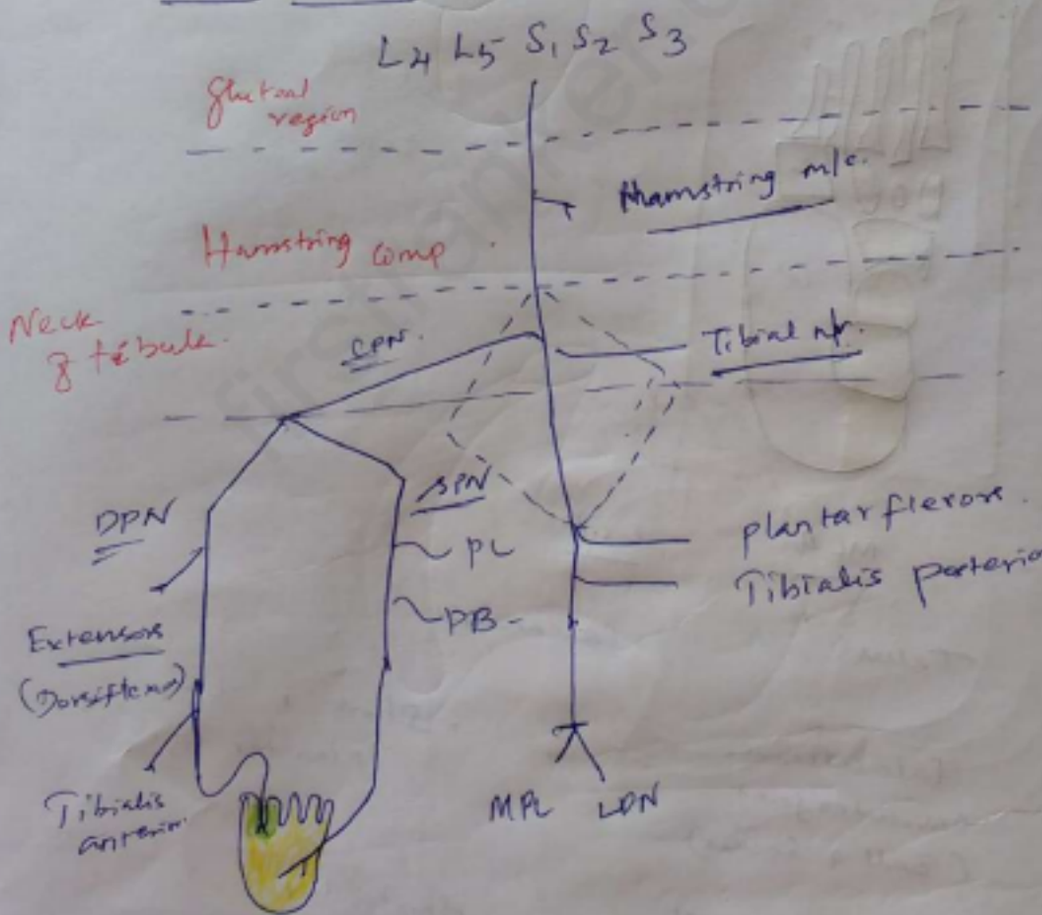
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Bigelow => illeofemoral ligament
(Strongest ligament)

Sciatic Nerve :-

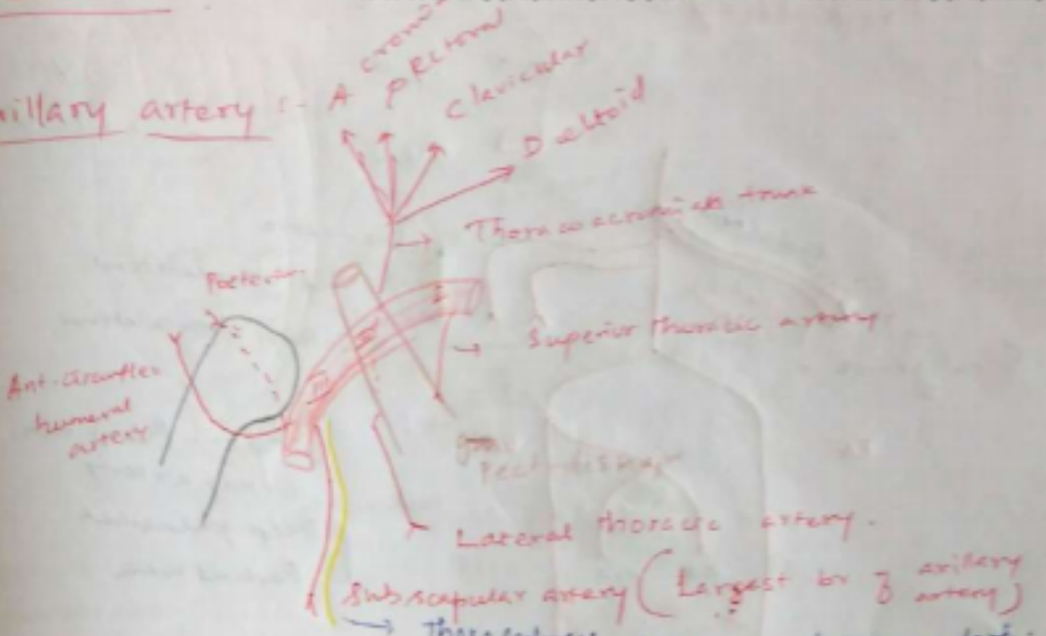


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Upper Limb

Axillary artery :- A crow pectoral clavicular D altoid



Anastomosis around Scapula :-

* Anastomose b/w 1st part of Subclavian & 3rd part of axillary artery.



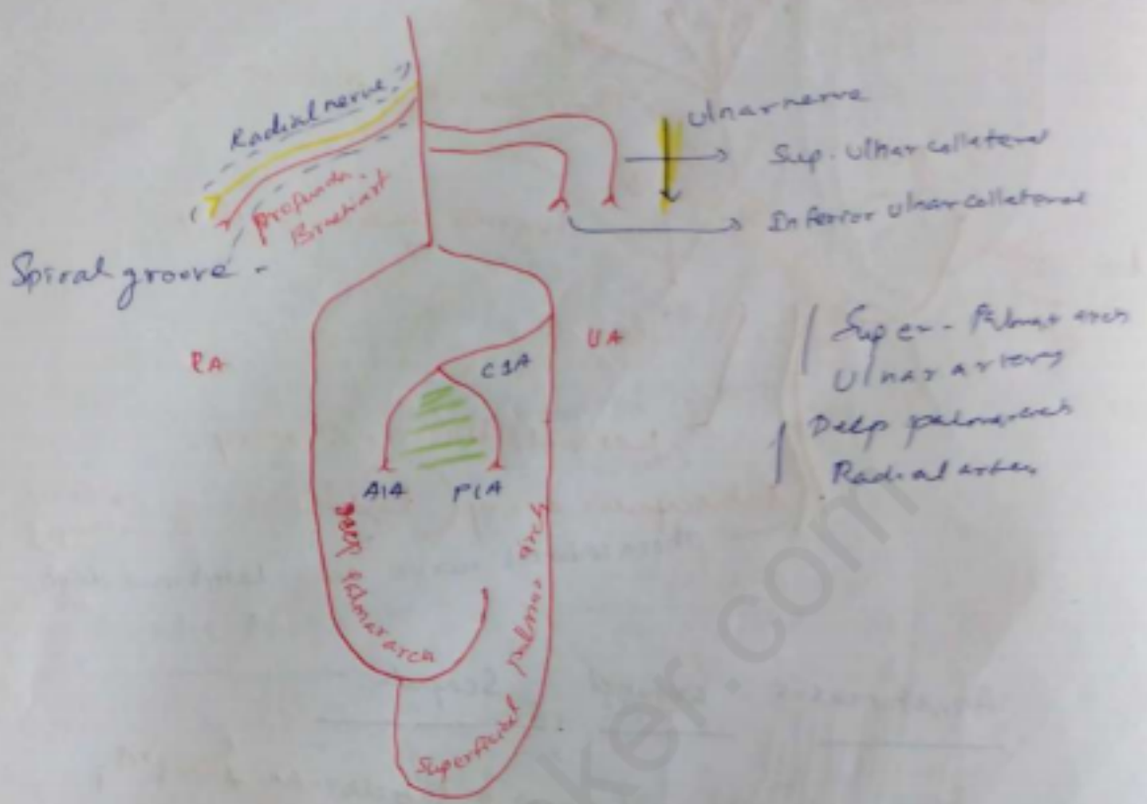
CSA

* Circumflex
* Scapular artery

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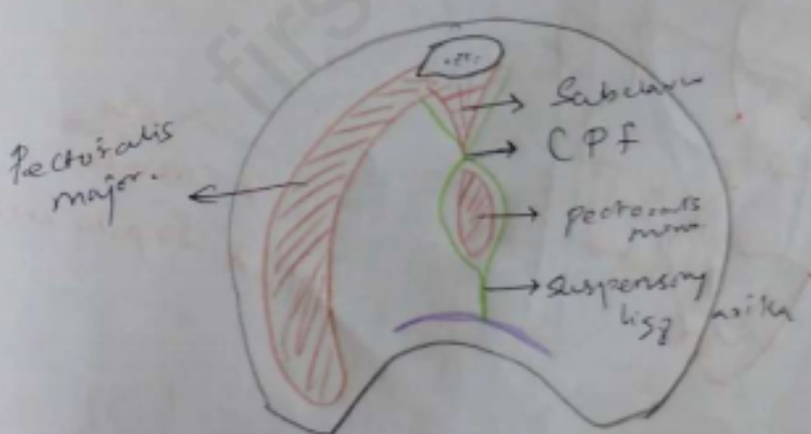
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Brachial artery :-



Super - Ulnar artery
Deep palmar arch
Radial artery

Clavipectoral Fascia :-



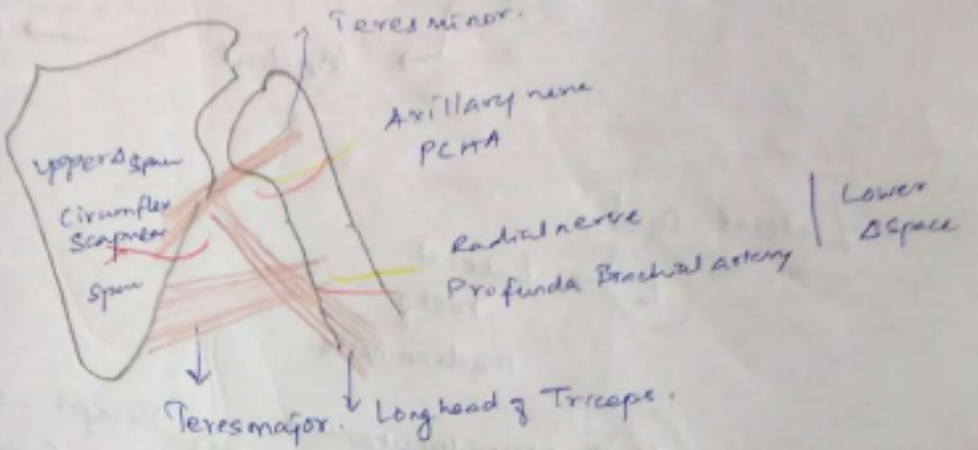
Muscles Enclosed

1. Subclavius
2. Pectoralis minor

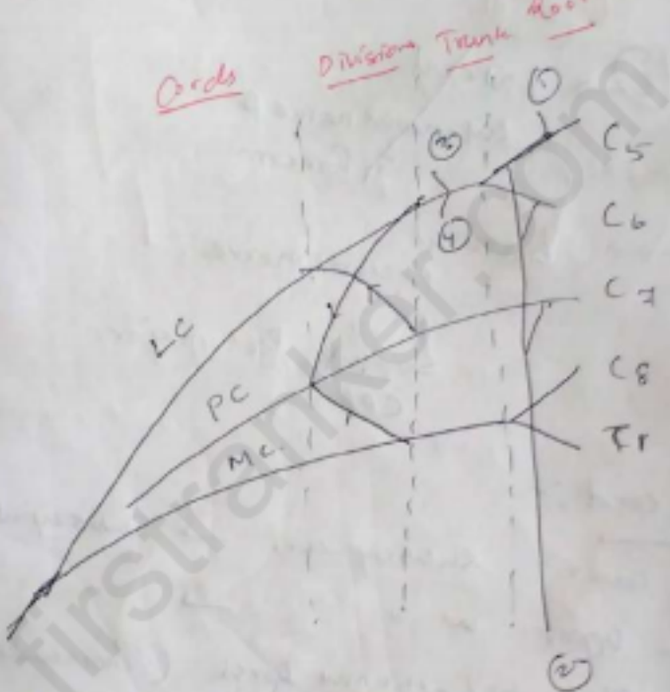
Structure piercing

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Brachial plexus



Branches from the Root.

1. Dorsal scapular nerve → Rhomboidus major, minor.
2. Long thoracic nerve → Serratus anterior.

Branches from the Trunk

3. Supra Scapular Nerve → Supraspinatus, Infra Spinatus
4. Nerve to Subclavius

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Branches from Cords → Lateral cords → LML
→ Post " → LUMAR
→ Medial " → MAU

Lateral cord

(L) → Lateral root of median nerve

(M) → Musculocutaneous nerve ⇒ Biceps, Brachialis, CoracoBrachialis

(L) → Lateral cutaneous nerve of forearm

Lateral pectoral nerve.

→ Pect. major.

CPF

Posterior cord :-

L - Lower Subscapular. → Subscapularis, Teres major
U - Upper. " → "
N - Nerve to Latissimus Dorsi (Thoracodorsal)
A - Axillary nerve → Deltoid & Teres minor
R - Radial nerve.

Medial cord :-

M - Medial root of median nerve.
M - Medial pectoral nerve → pectoralis minor & major
M - Medial cutaneous nerve of arm
" forearm.
M -
U - Ulnar nerve.

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Root Value involved (C_5 & C_6) MCQ

↓

Axillary nerve & Musculocutaneous nerve.

(C_5, C_6) (C_5 C_6 & C_7)

Coracobrachialis.

↓ ↓

Deltoid Biceps & Brachialis.

↓ ↓

Adducted shoulder Extended Elbow & pronated forearm

✓ police man tip hand.
✓ Porter "
✓ waiters "

Klumpe's palsy:-

Root value involved C_8, T_1.

↓

major root value of intrinsic muscles of hand.

↓

Hyper Extension @ Metacarpophalangeal joint
Flexion @ IP joints.

↓

Claw hand

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Horner syndrome :-

- ptosis → muller muscle (Smooth muscle component of LPS)
- ✓ miosis → Dilator pupillae. ↓ muller
- ✓ Enophthalmos → Apparent : Reduction in size of palpebral fissure
  True :- orbitalis muscle involvement.
- ✓ Hetero chromia iridis.

Failure of Deposition of melanin.
If the injury is before the age of 2

Hand

- ✱ 20 m/s
- ✱ Thenar m/s (4)
  - Abductor pollicis brevis
  - Flexor pollicis brevis
  - Opponens pollicis.
  - Adductor pollicis.

  (Abductor pollicis brevis, Flexor pollicis brevis, Opponens pollicis → Median nerve; Adductor pollicis → Ulnar nerve)

✱ Function of thumb completely lost in median nerve injury @ carpal tunnel injury

✱ Function of thumb completely lost in Ulnar nerve # Adduction.

✱ Radial nerve ∅ Extension.

✱ movement of thumb can be used to Test all long nerves of upper limb.

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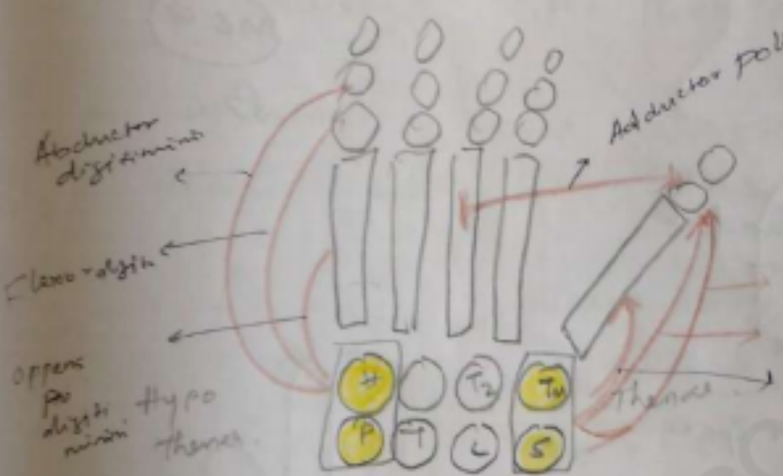
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(4)

→ Abductor digiti minimi
opponens digiti minimi
palmaris brevis.

Dominant Nerve/Hand.

↓ s/c no bony attach



(* Bennett # → muscle involved → opponens pollicis.)

Lumbricals :-



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Interossei → Palmar (3) Unipinnate (UN)
→ Dorsal (4) Bipinnate (UN)

P - AD → is absent on Middle finger.

D - AB. → is absent on Thumb & Little finger.

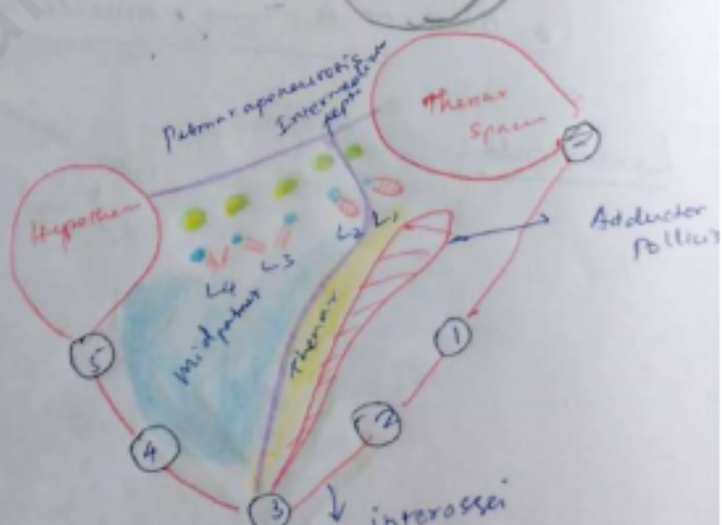
MCQ

Spaces in Hand :-

1) Thenar Space
2) Mid palmar Space.
3) pulp Space.
4) Forearm Space & parona.



Tendons
- FDS
- FDP



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Thenar Space communicates ē facial sheath ƒ 1st Lumbricals.

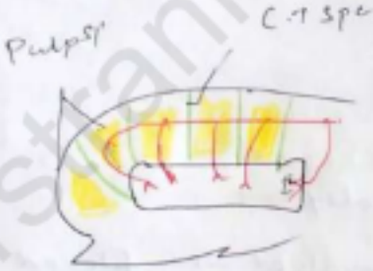
* Mid palmar Space communicates ē facial sheath ƒ 2, 3, 4th Lumbricals.

* Infections ƒ Thenar Space can be drained by incising 1st web space.

* Infections ƒ mid palmar Space can be drained by 3rd, 4th web Space

[Flexor digitorum profundus.
(← Space → Forearm ƒ parona
Pronator Quadratus]

Pulp Space :-



Base ƒ distal phalynx is supplied outside pulp space

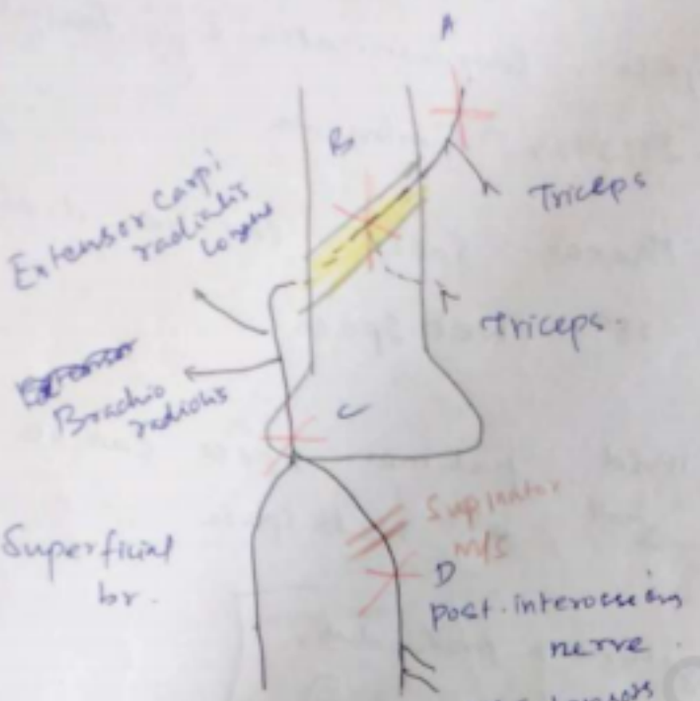
prolonged ps inf ⟹ AVN Distal 4/5th ƒ Distal Phx.

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Radial Nerve (C5-T1)

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Skin of lat 5½ & Dorsum of hand
Except nail bed



A:- Gotosh Crutch palsy

Triceps involved → flexed Elbow
Wrist Extensor " → wrist drop
Finger " " → finger drop.

B: Saturday night palsy :-

* Triceps is partly involved → weakness in Elbow extension
* Wrist Extensors involved → wristdrop.
* Finger " " → fingerdrop.

Sensory loss on dorsum of hand

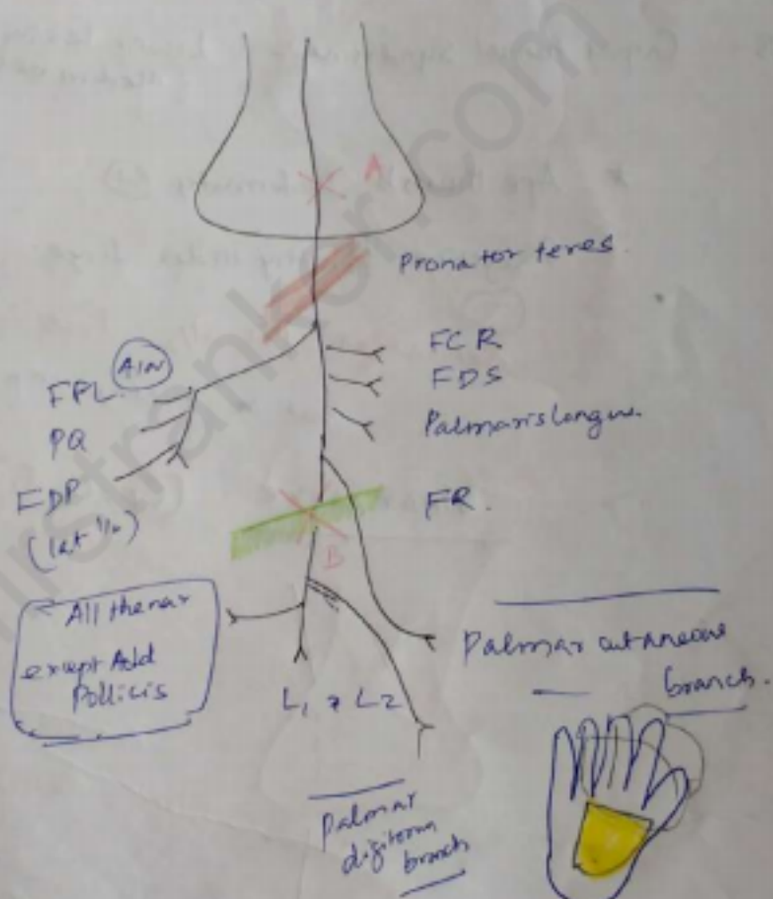
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Lat. epicondylar ~~fr~~.
. ECRL is Saved → No wrist drop.
Extensor Digitorum is involved → Finger Drop.
Sensory loss on Dorsum of hand.

D:- Radial ~~nerve~~ head # / Inj to PIN
No wrist Drop.
Finger Drop (+)
Sensory on Dorsum of hand INTACT.

Median nerve ($C_5 - T_1$)



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A :- Higher Median nerve
- Supra condylar #
- pronator teres syndrome

* Opponens pollicis involved → Ape thumb deformity

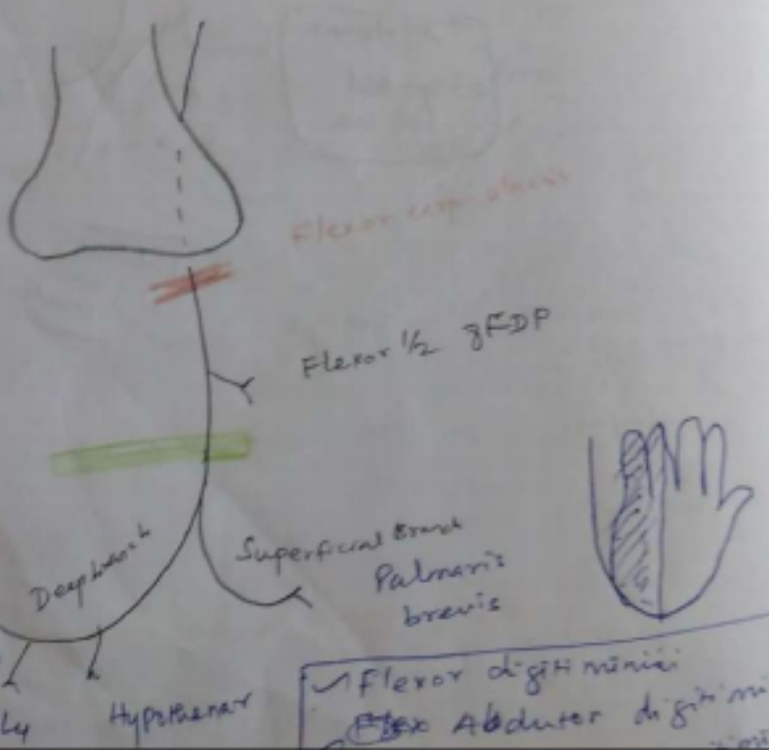
* FDS & Lat ½ FDP → pointing index finger

Sensory loss lat 3½ of palm & fingers

B :- Carpal tunnel Syndrome :- (Lower lesion of Median nerve

* Ape thumb Deformity (+)
- Pointing index finger
(−)
Sensation lat 3½ loss but intact on palm

Ulnar nerve (C7, C8, T1)



Flexor digiti minimi
Abductor digiti minimi
Opponens digiti minimi

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* Proximal Ulnar nerve injury => loss severe

  ↓ muscle producing flexion @ Distal interphalangeal joint also involved.

Ulnar Paradox

* Recovery phase also shows paradox.

Hybrid muscles :-

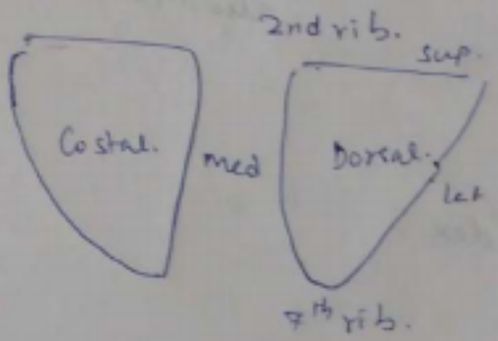
* SCM, T_2.
* Pectineus, Adductor magnus.
* Pectoralis Major.
* Subscapularis.
* Brachialis.
* Flexor digitorum profundus
* Flexor pollicis brevis.

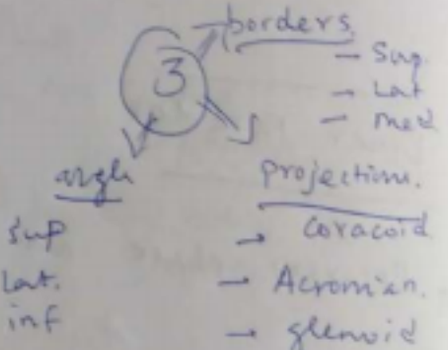
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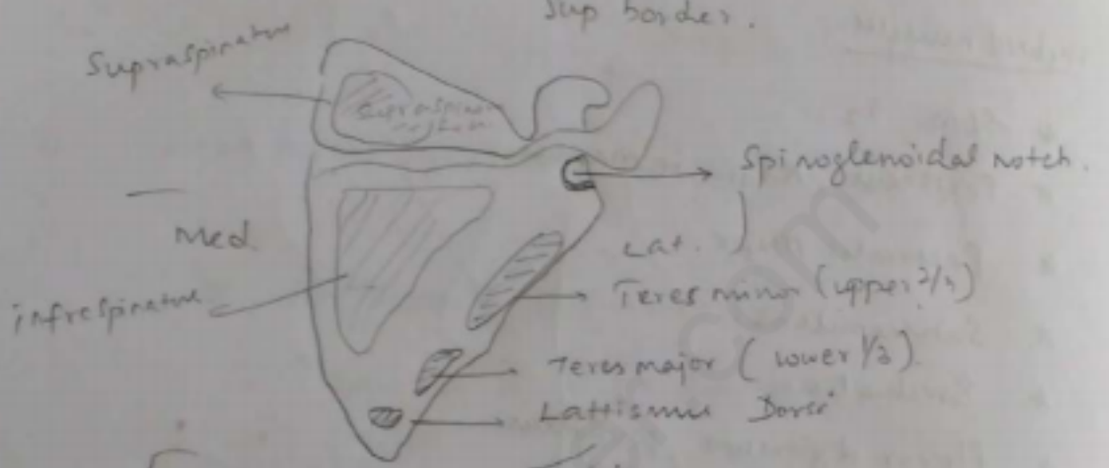
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flat bone





Sup border.



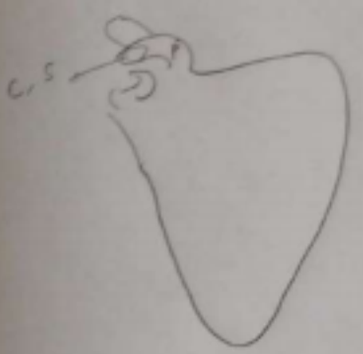




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Metaphysis :-



Pectoralis minor
Coracobrachialis
Short head of Biceps Brachii

Ossified from
- 1 primary centre → Body → 8th wk of IUL
- 7 Secondary centre ↓
  - 2 - Acromion
  - 2 - Coracoid
  - 1 - medial border of scapula
  - 1 - inferior angle
  - 1 - lower of glenoid cavity

1st yr Postnatal :-
appear in puberty
fuse 20 yr

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