

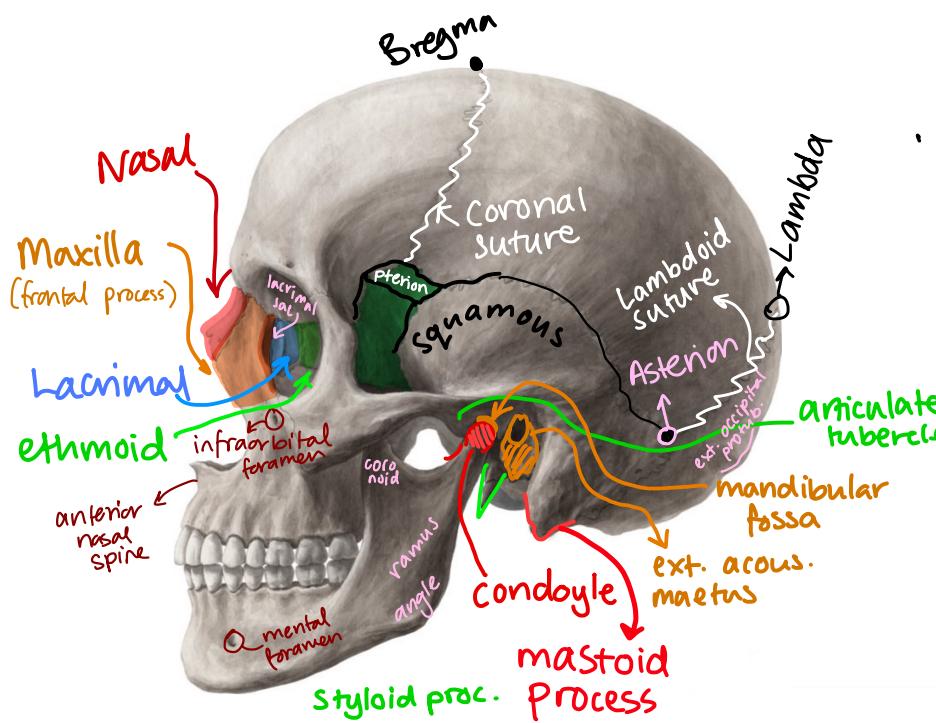
•

# Cranial & Cervical Anatomy

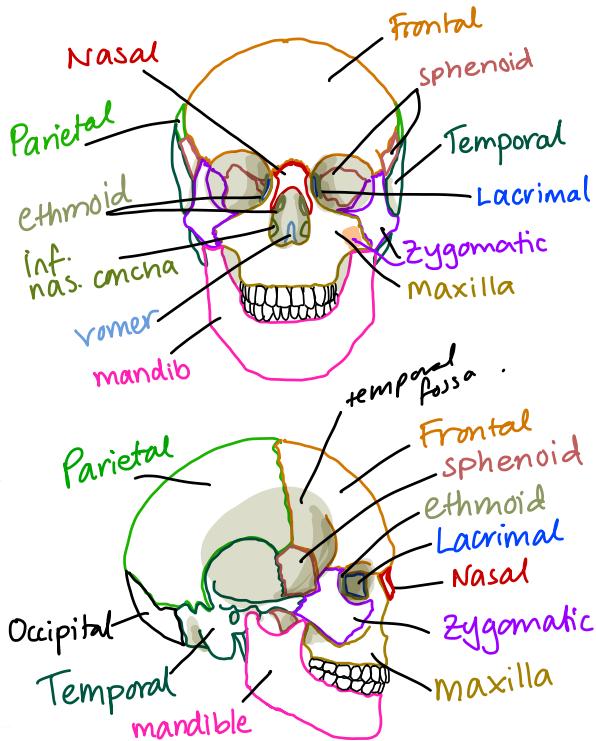
Sumen

BY SUMEN

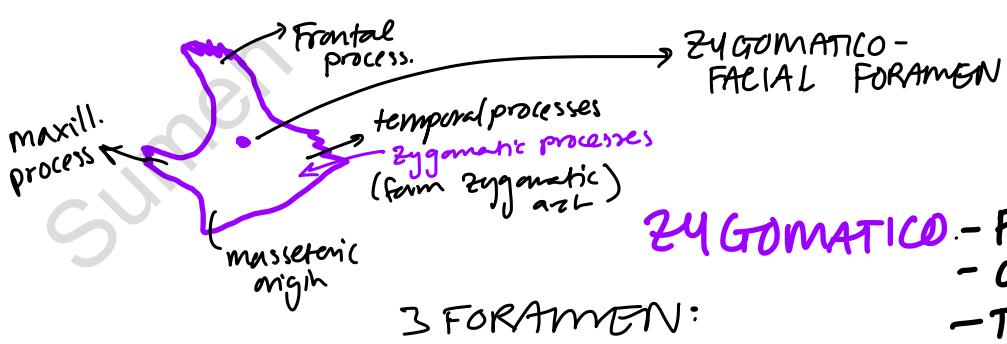
# LATERAL SKULL



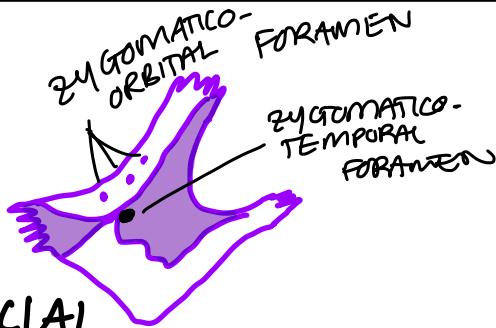
# BONES



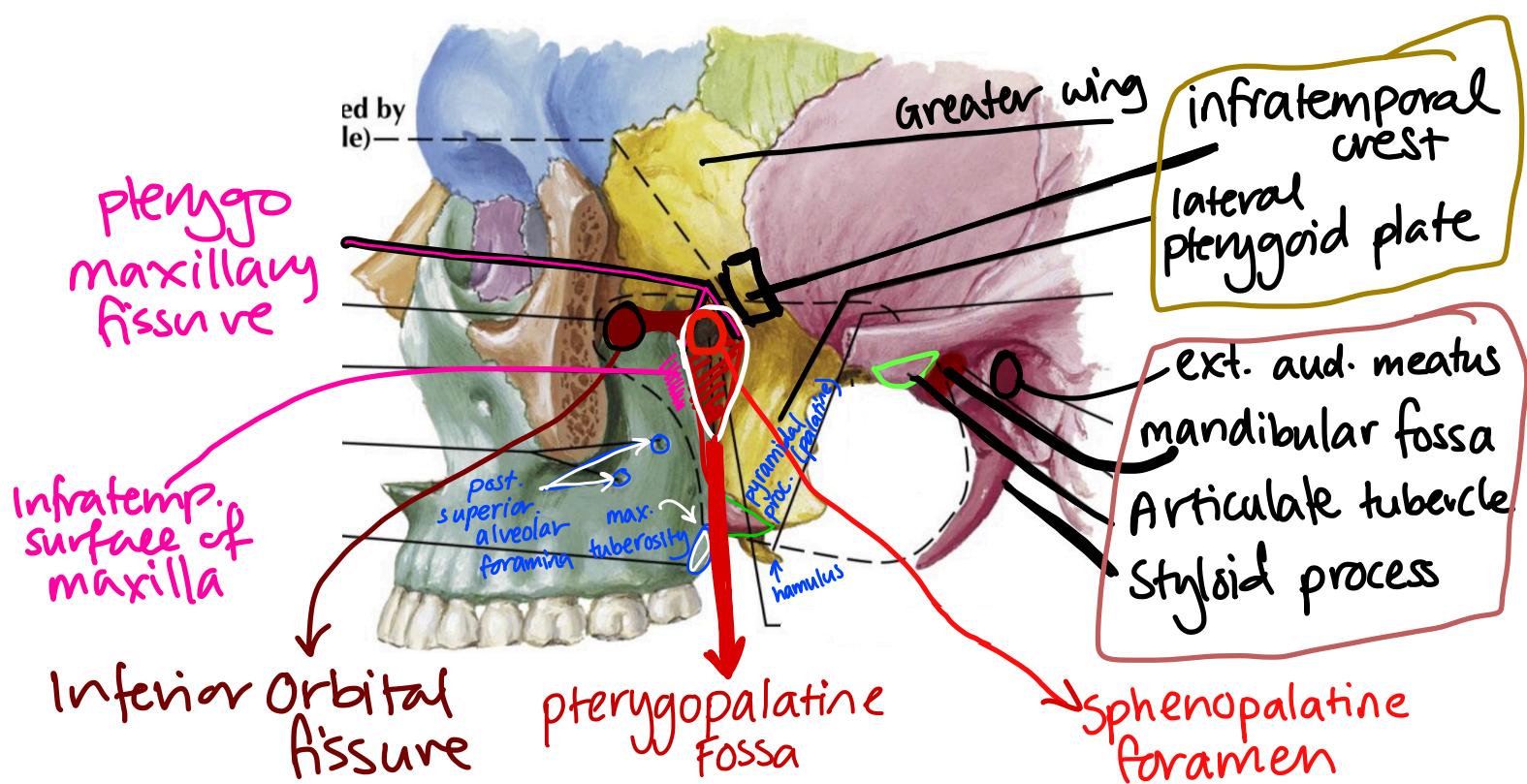
## ZYGOMATIC BONE:



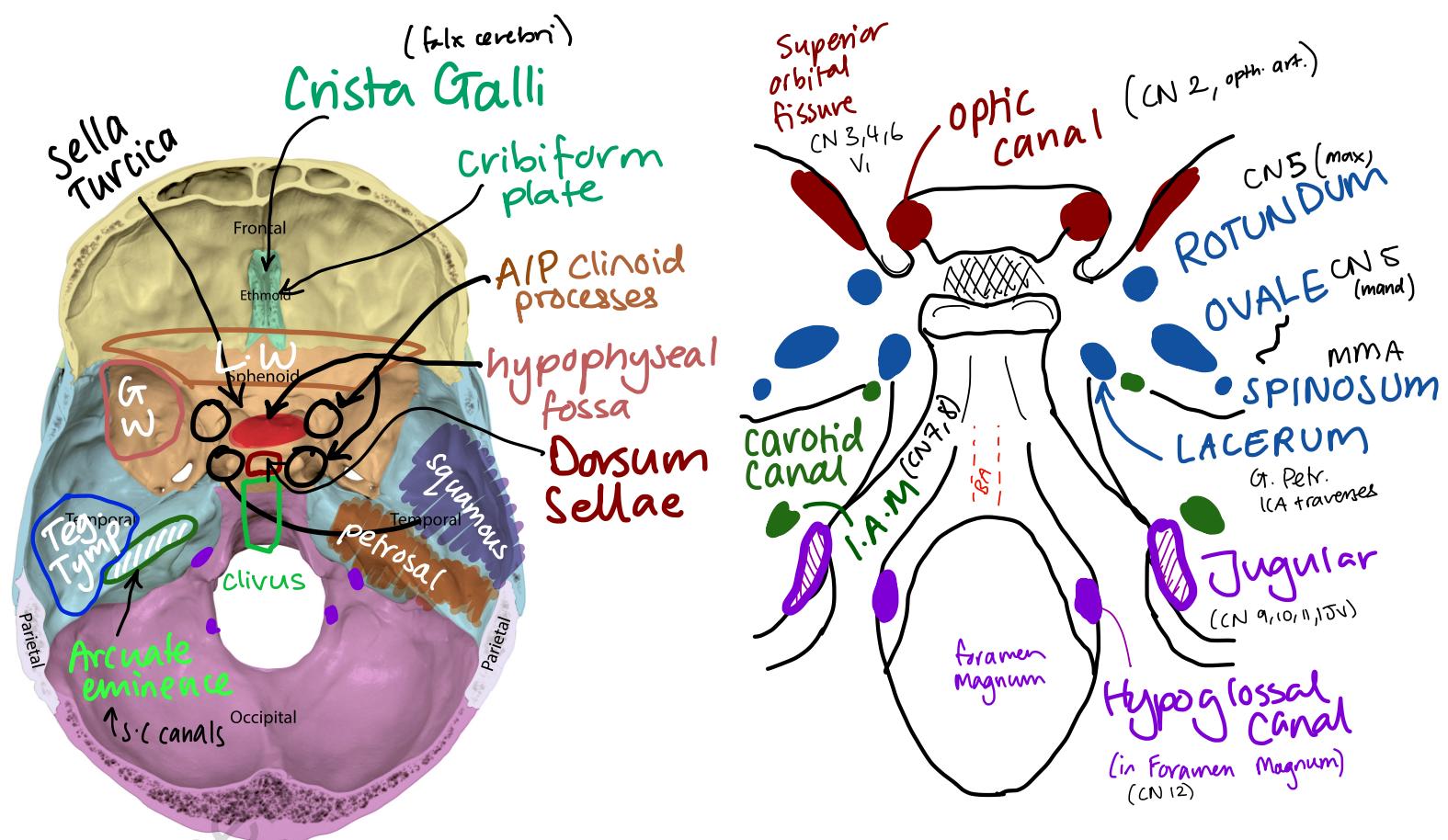
ZYGOMATICO -  
- FACIAL  
- ORBITAL  
- TEMPORAL



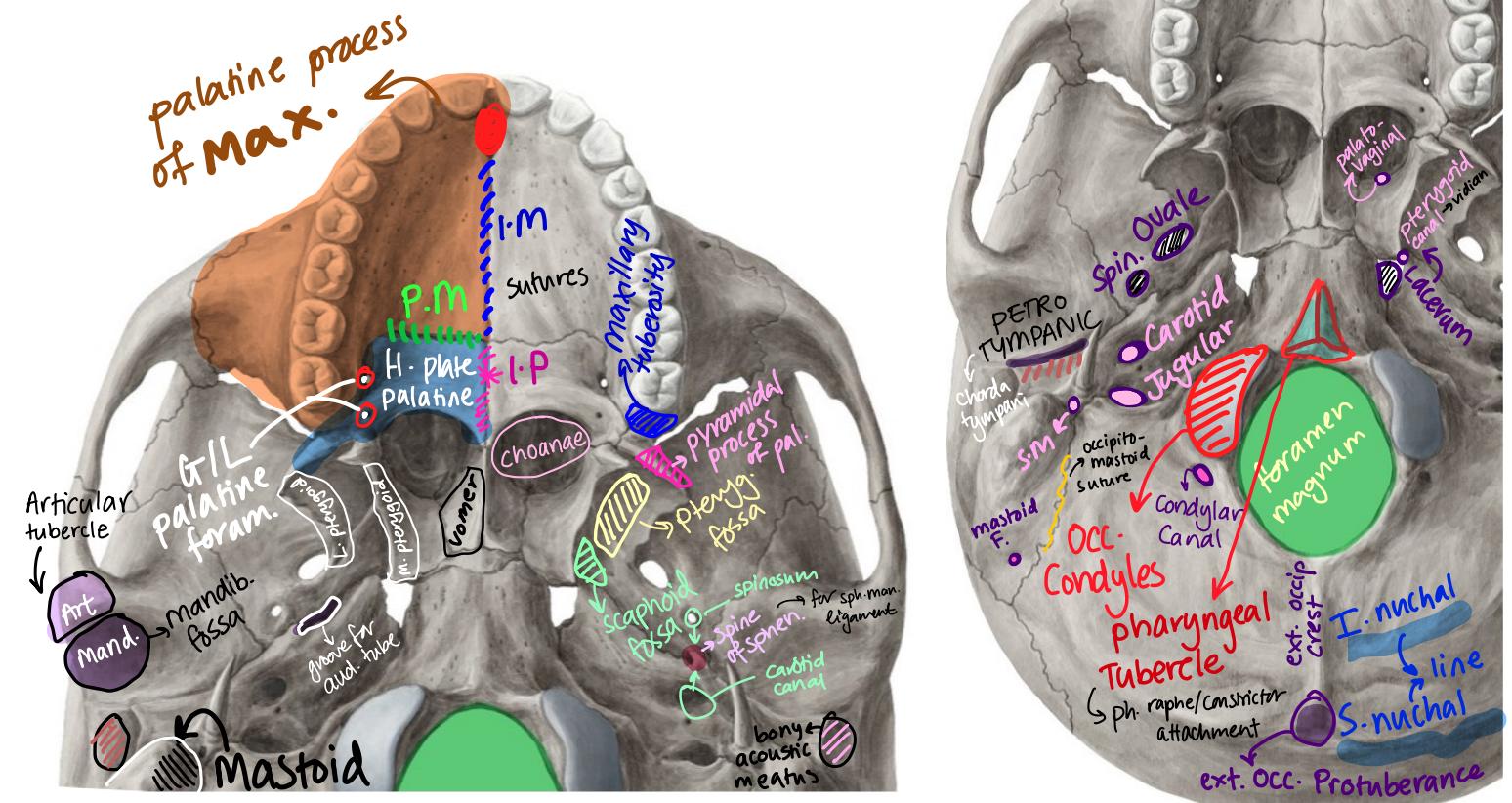
## LATERAL INFRATEMPORAL FOSSA:



# INTERNAL SKULL

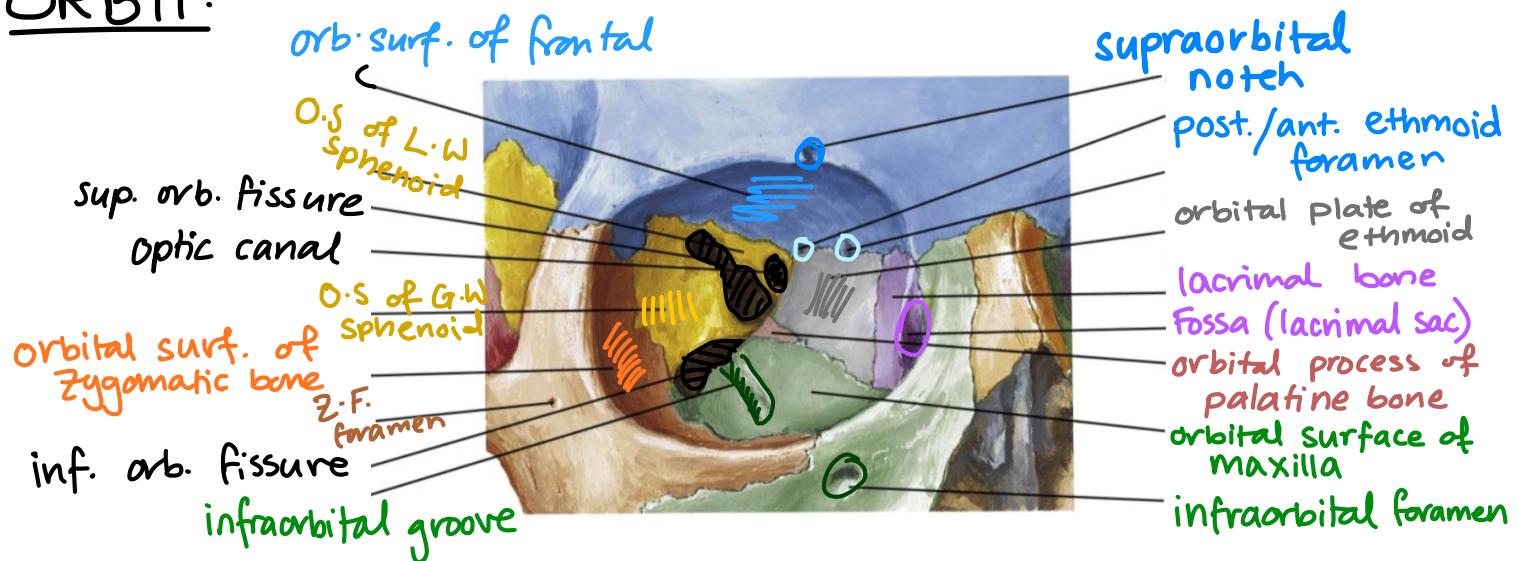


# **INFERIOR SKULL**

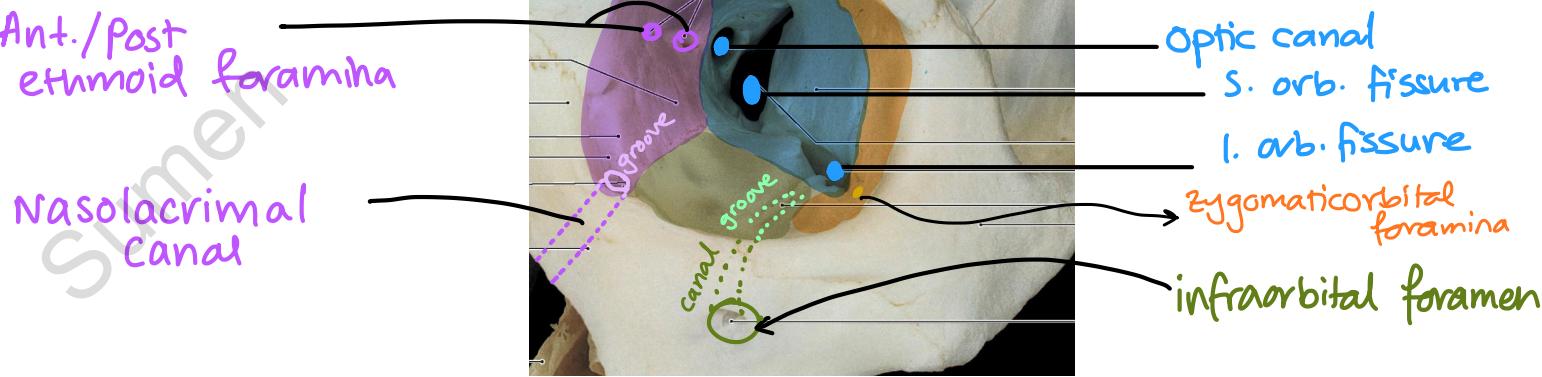


# FRONTAL SKULL

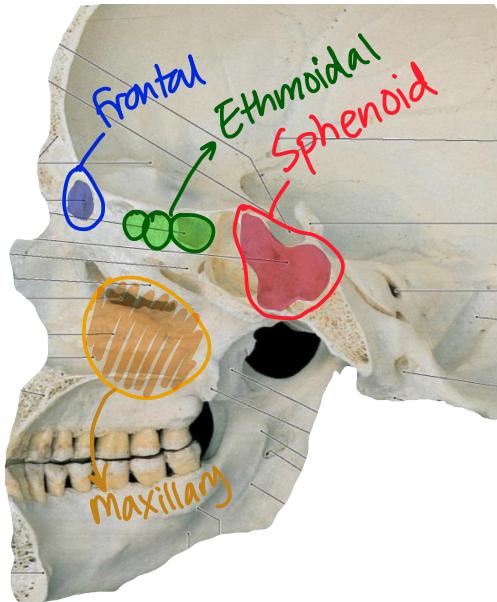
## ORBIT:



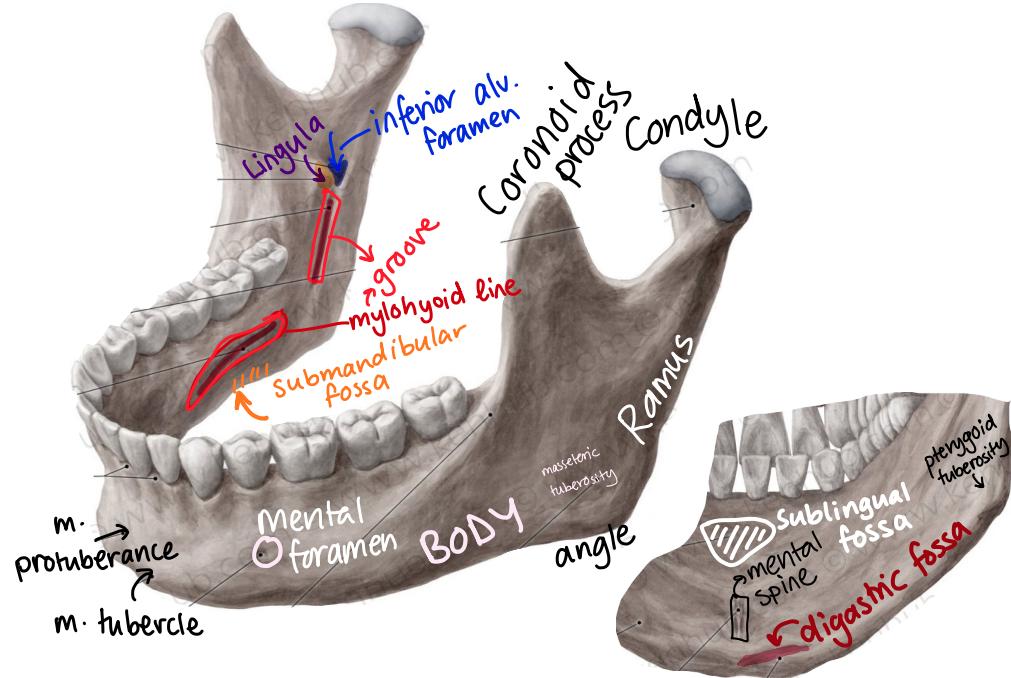
## ORBIT OPENINGS



## SINUSES



## MANDIBLE



# BLOOD VESSELS

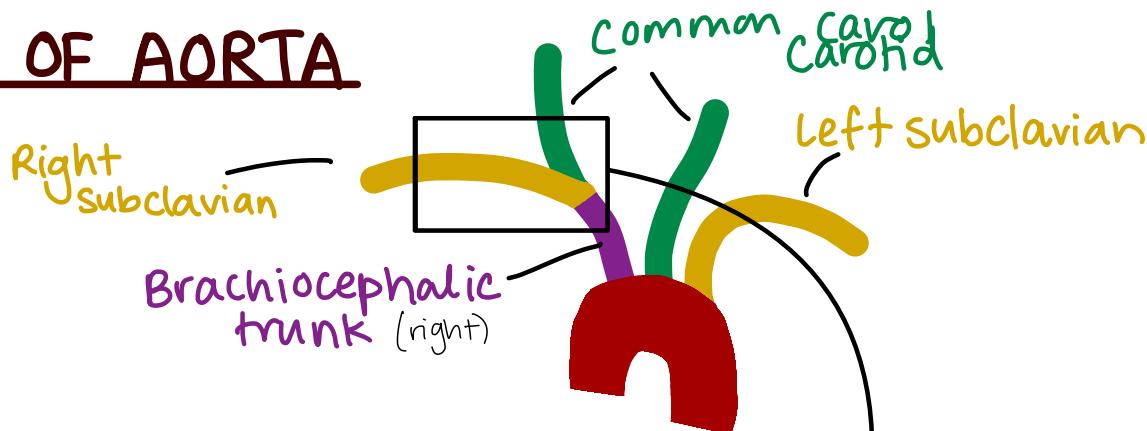
**ARTERIES:** Oxyg. blood from 

**VEINS:** deoxyg. blood  
low pressure

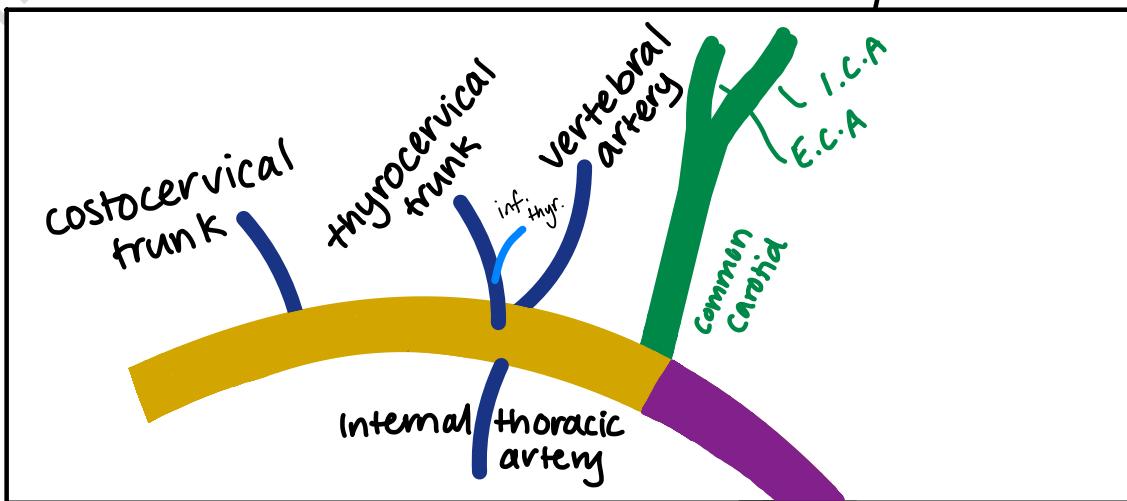
- Thicker walls / smaller Ø  
(Smooth muscle / elastin)
- Systemic & Pulmonary circulation

- Thin walled / 80% of blood
- Venous return via:  
- gravity, muscle, valves, etc.

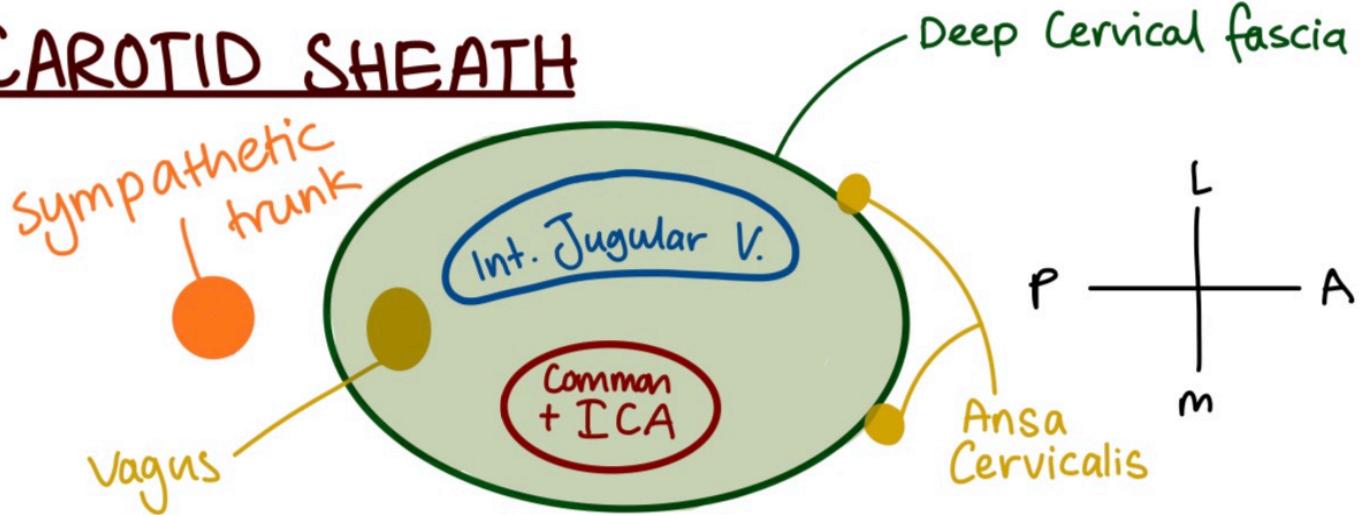
## ARCH OF AORTA



## SUBCLAVIAN BRANCHES



## CAROTID SHEATH



# EXTERNAL CAROTID

## Superficial Temporal TERMINAL

↳ Scalp, ear, orbicularis oculi, temporalis, parotid

## POSTERIOR

### Posterior Auricular

↳ parotid, auricle, occiput

### Occipital

↳ SCM, occiput  
groove → medial to mastoid notch

### Ascending Pharyngeal

↳ extracranial: pharynx, TMJ, tympanic cavity  
↳ intracranial: meninges

## BRANCHES OF E.C.A

### MAXILLARY

5/6 branches beyond Lat. Pteryg.

→ nerves

Infraorbital

P.S.A.

Sph. Palatine

G. palatine

L.

pharyngeal

palato vaginal

Buccal

Lingual

4/5 branches near/in Lat. Pter.

→ soft tissue

5 branches before Lateral Pterygoid

→ bone

Access. Mening.

ovale

Middle

meningeal

Spinosum

Ant. Tympanic

petrotympanic f.

Deep

Auricular

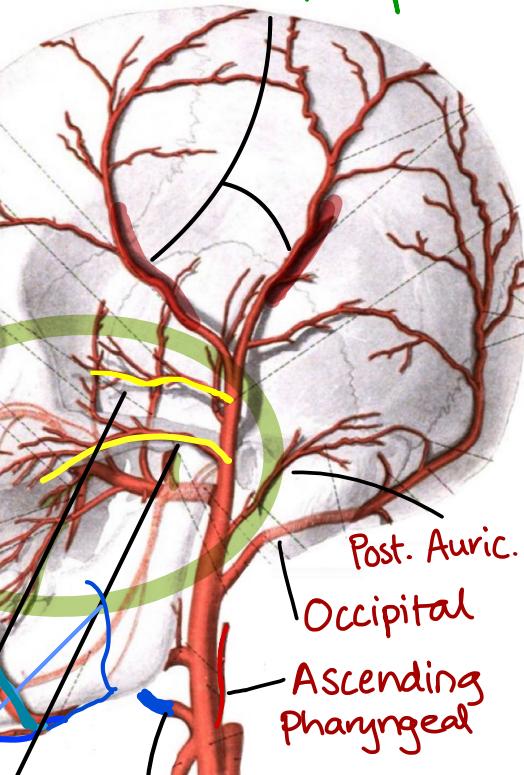
STA

ECA

Mylohyoid

Inferior Alveolar

### Superficial Temporal



### FACIAL

Sup. Labial  
Angular

Inf. Labial

Submental

Tonsilar

Zygomatico-orbital

Transverse Facial

Superior Thyroid  
Lingual

maxillary teeth, MoM,  
Skin of face (eyes → mouth)

ANTERIOR

Facial

submandibular  
glands, soft palate,  
tonsils, superficial face

Lingual

→ Tongue

Superior Thyroid

→ thyroid

(dual with inferior)

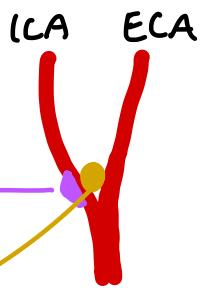
# INTERNAL CAROTID

## BIFURCATION OF COMMON CAROTID

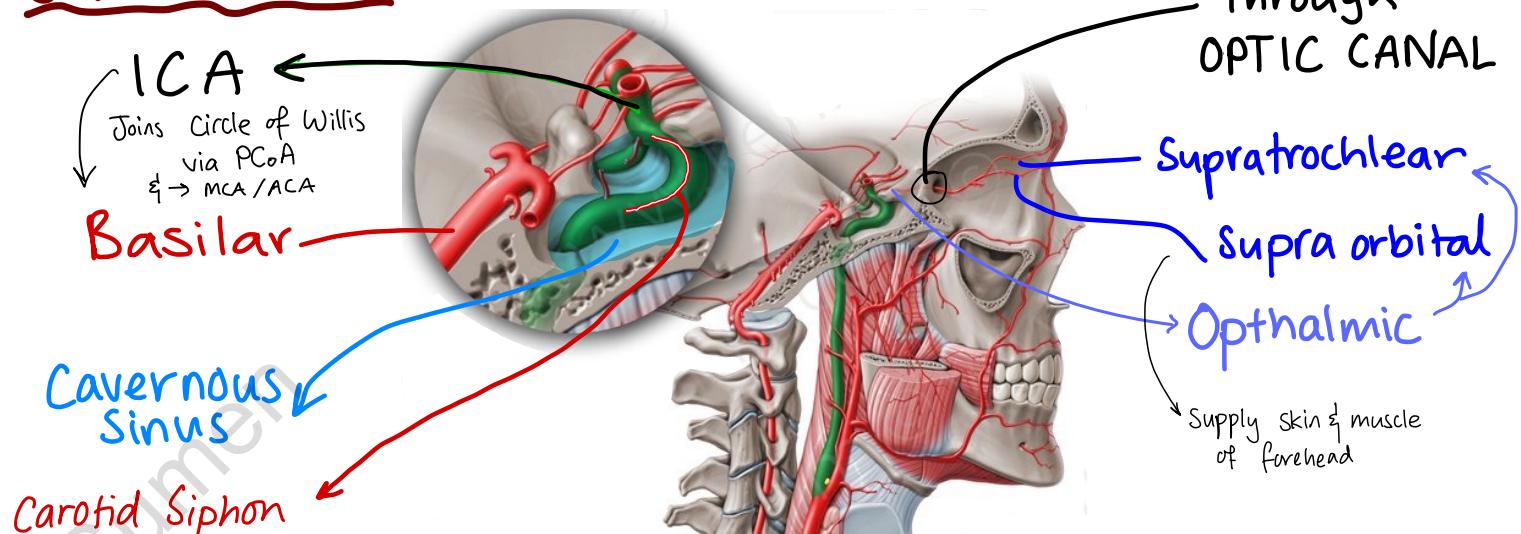
CAROTID SINUS: dilation  
↳ has baroreceptors

CAROTID BODY: chemoreceptors  
↳ O<sub>2</sub> levels

ICA: medial / posterior to ECA

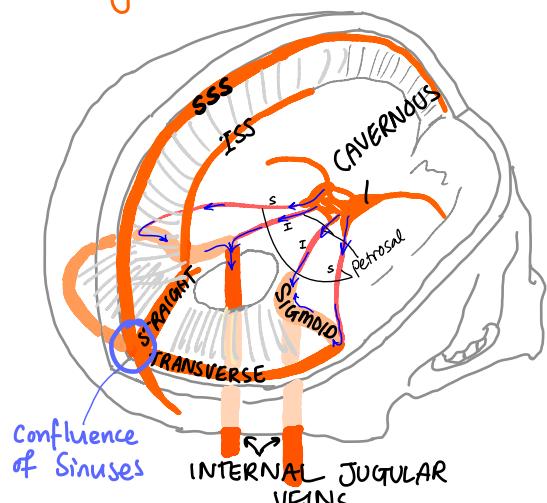


## BRANCHES

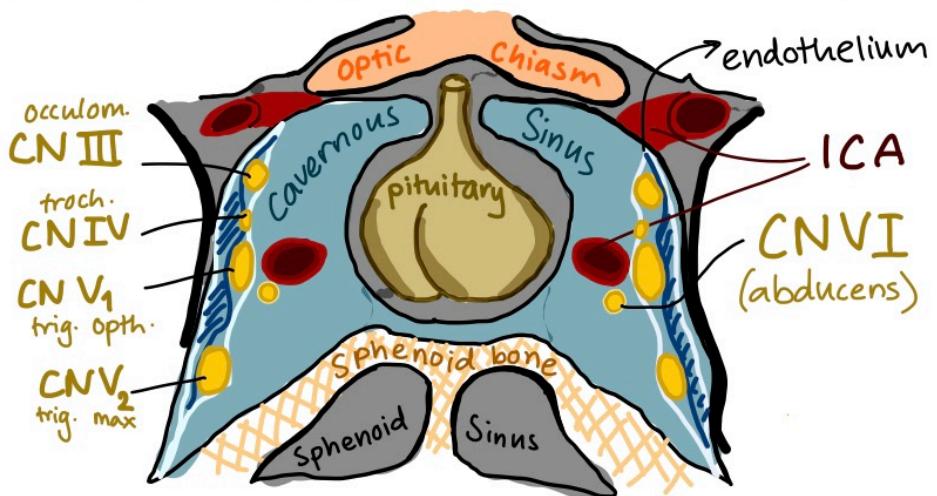


## VENOUS SINUSES

- \* Collect blood from brain & Cranial bones
- \* No valves or muscle
- \* Drain into Internal Jugular Vein

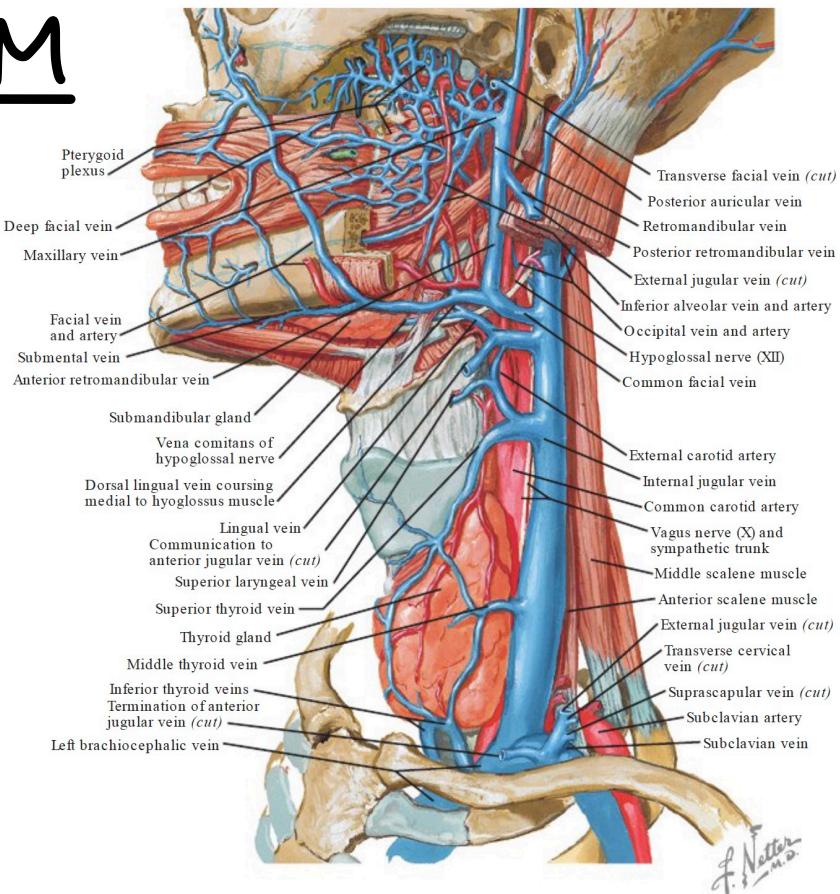
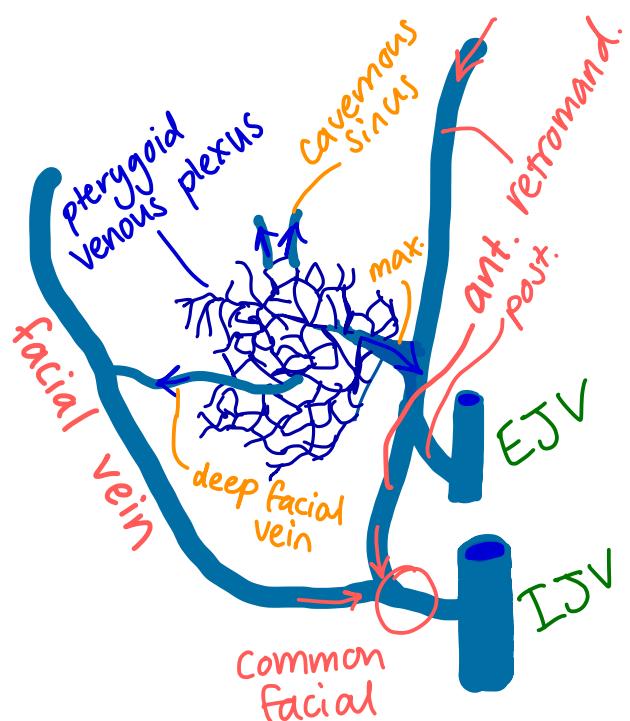


## CAVERNOUS SINUS

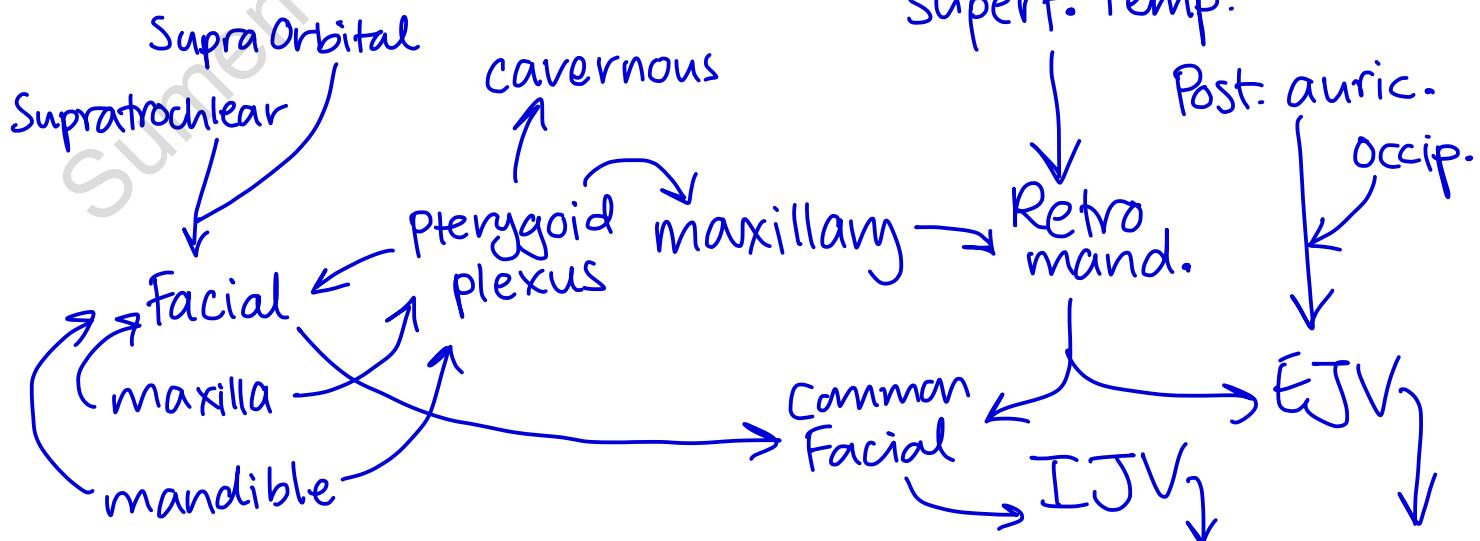


- \* Connected to dural sinuses, ophth. veins, pterygoid venous plexus

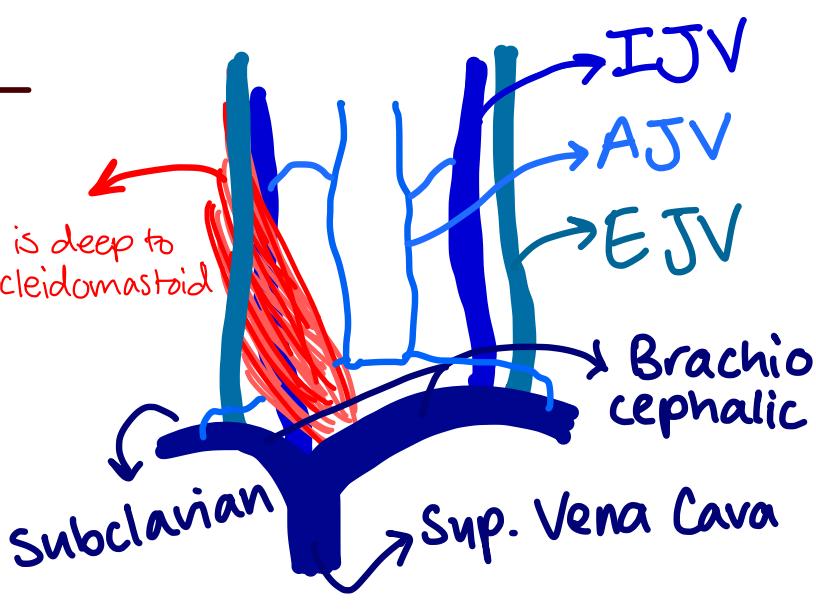
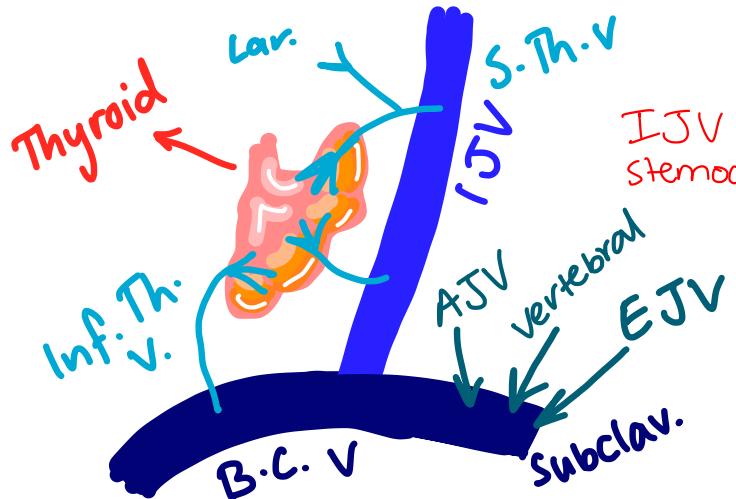
# VENOUS SYSTEM



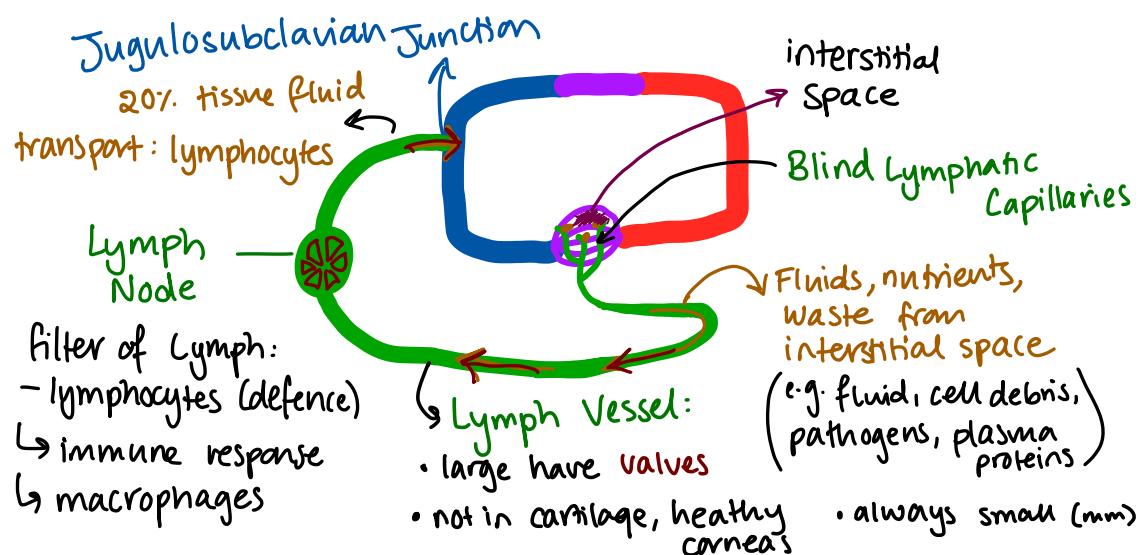
## DRAINAGE PATTERNS



## VEINS OF THE NECK

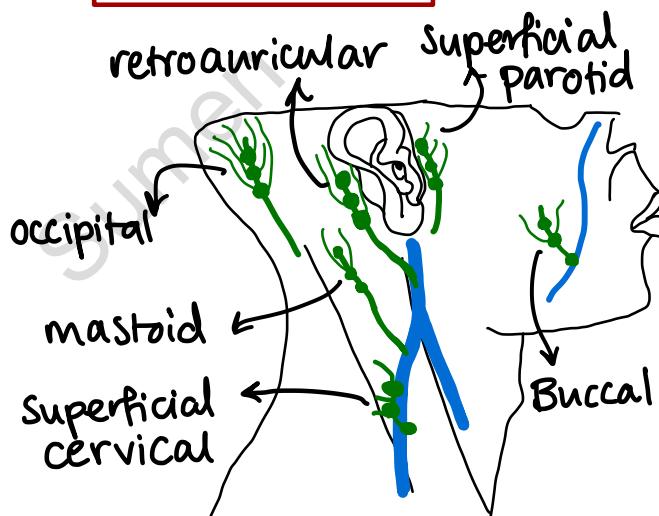


# LYMPHATIC SYSTEM

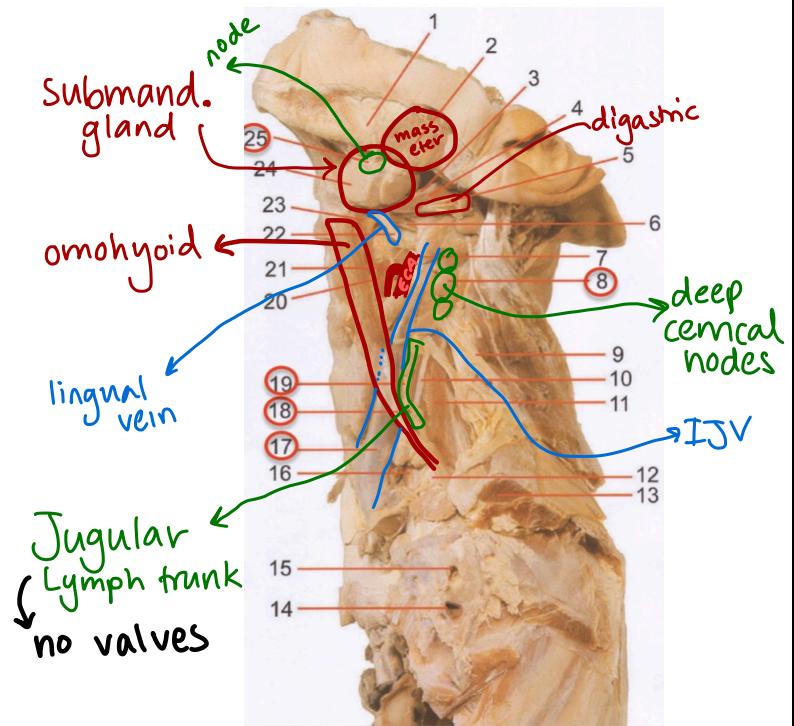
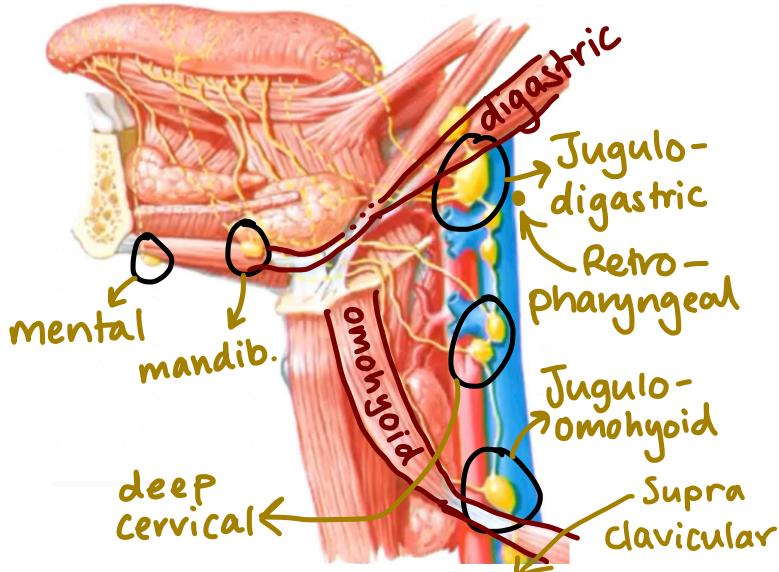


## LYMPH NODES

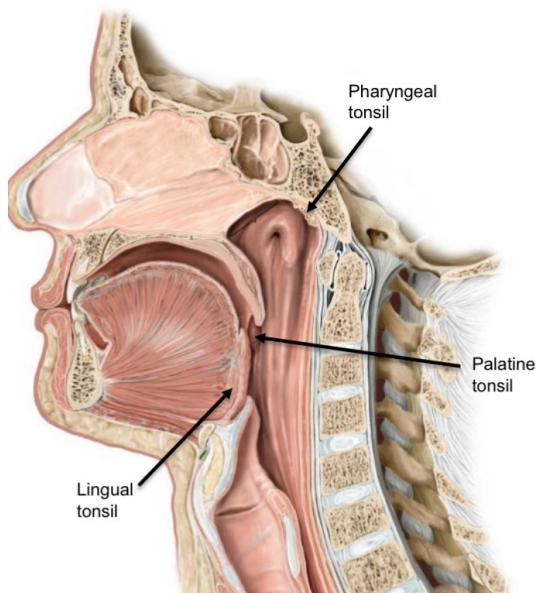
### SUPERFICIAL



### DEEP



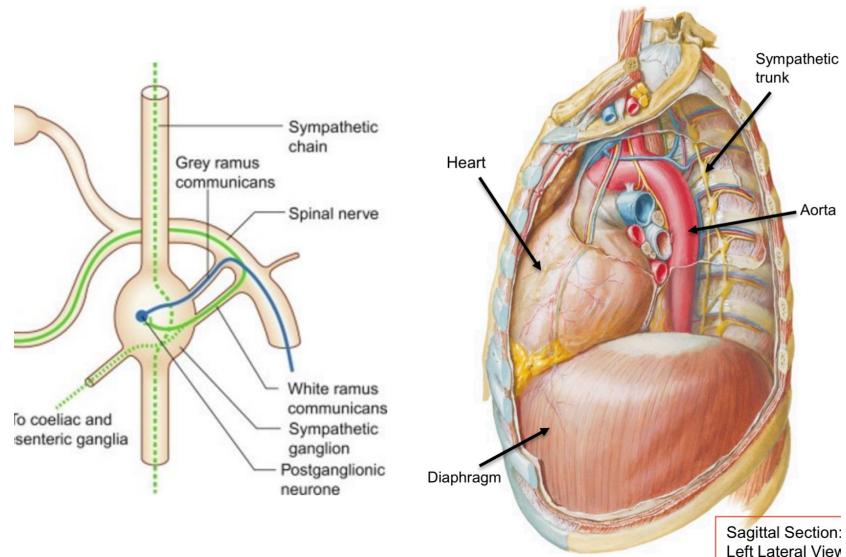
## TONSILS



# AUTONOMIC N.S.

## SYMPATHETIC

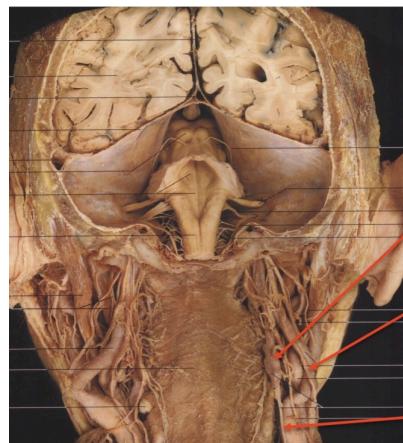
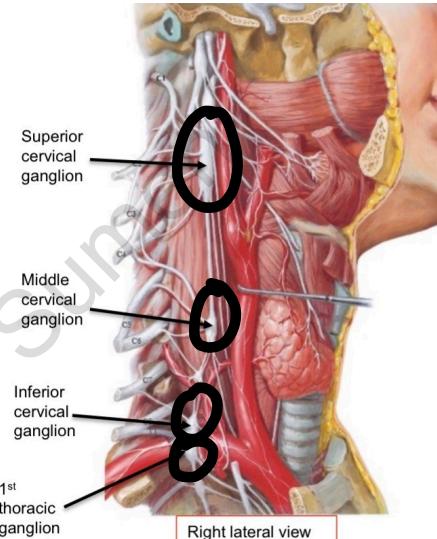
- Ganglia in trunk
- T<sub>1</sub> → L<sub>2</sub> outflow (runs fully)



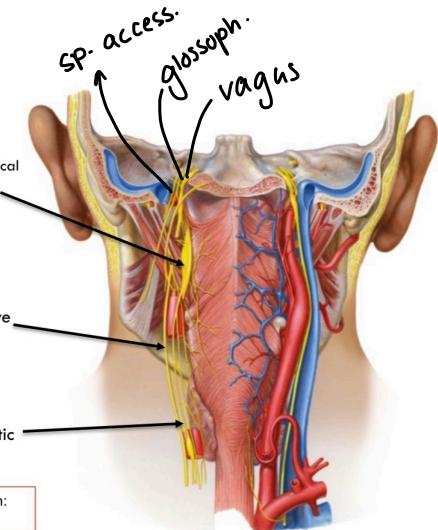
## PARASYMPATHETIC

- CN III, VI, IX, X
- Long Pre-ganglionic

## CERVICAL GANGLIA



## SYMPATHETIC



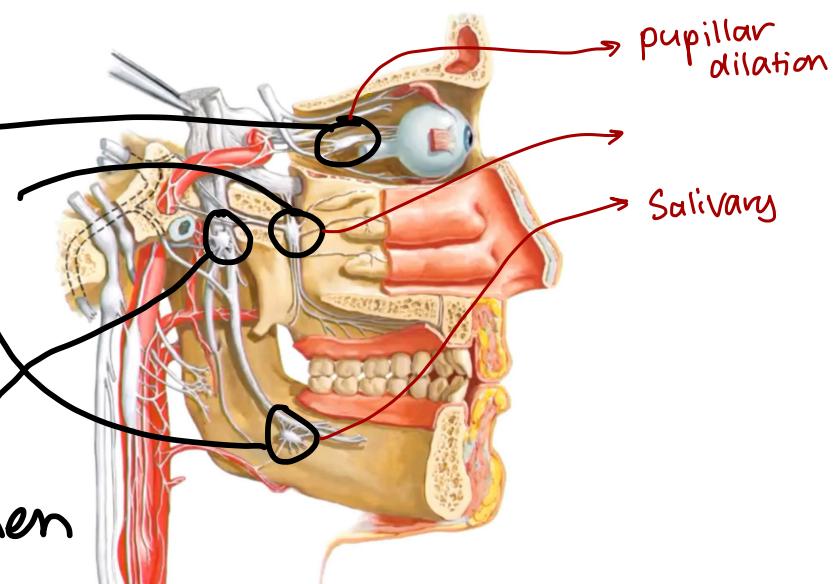
\* Post ganglionic fibres → plexus → blood vessels → ORGAN  
 → hitchhike → Cranial Nerves →

## PARASYMPATHETIC

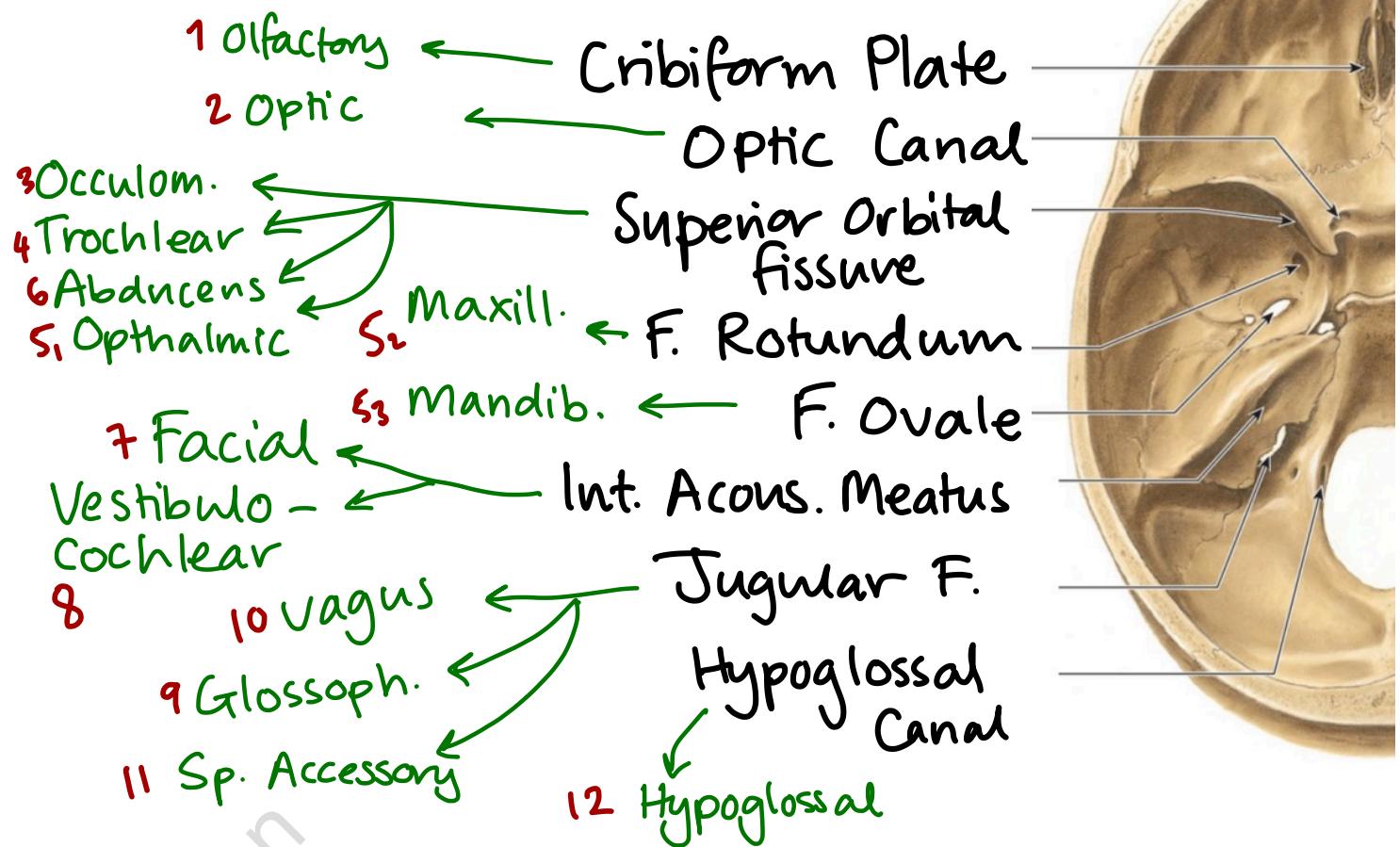
Occulomotor → Ciliary  
 Facial → Pterygopalatine  
 Submandibular

Glossopharyngeal → Otic

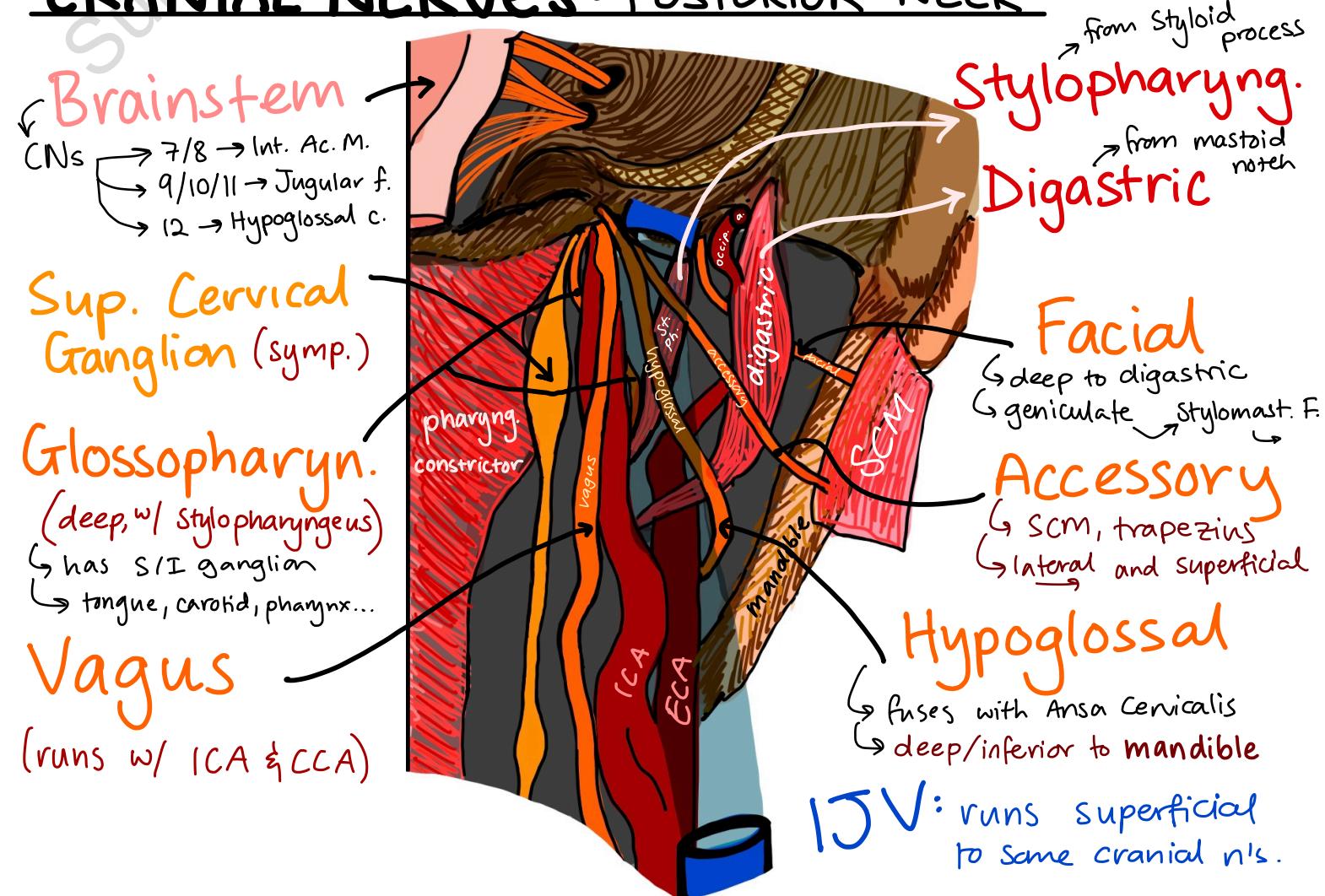
Vagus → Thorax/Abdomen



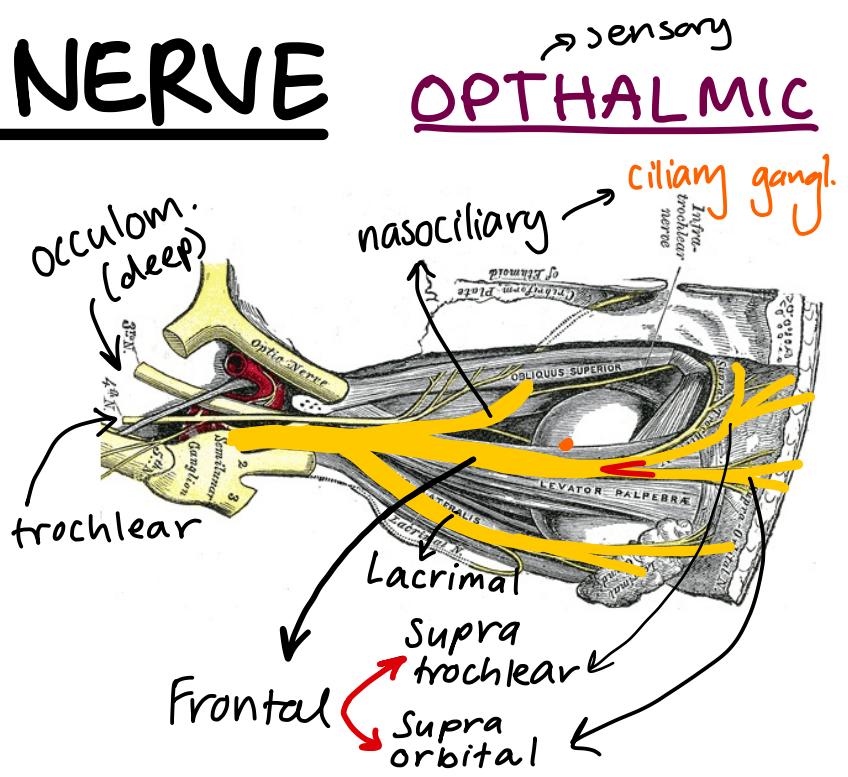
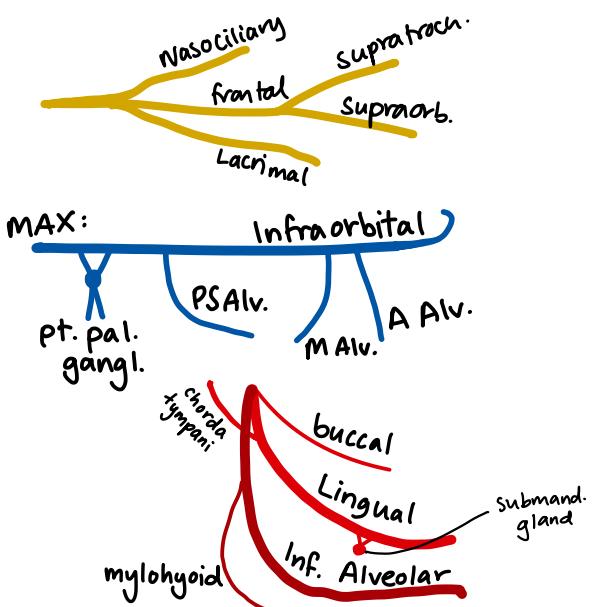
# CRANIAL NERVES



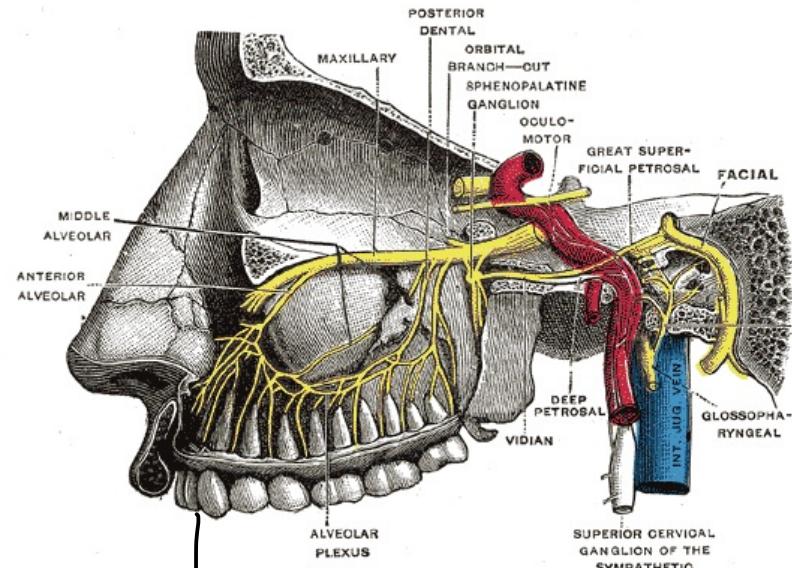
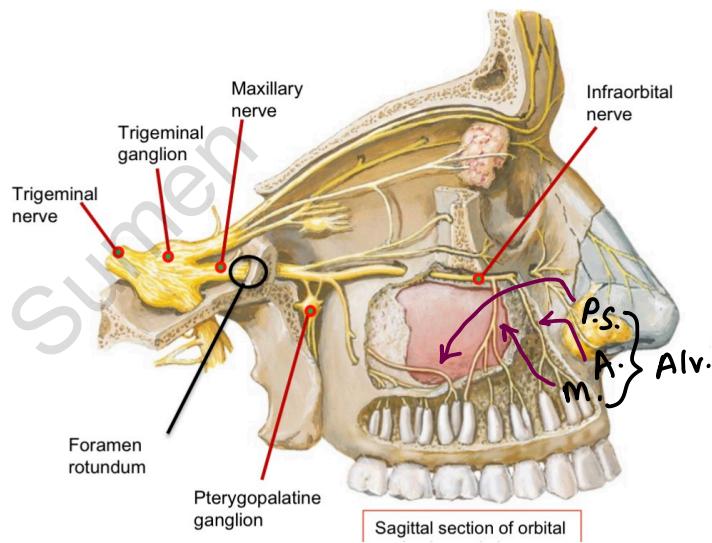
## CRANIAL NERVES: POSTERIOR NECK



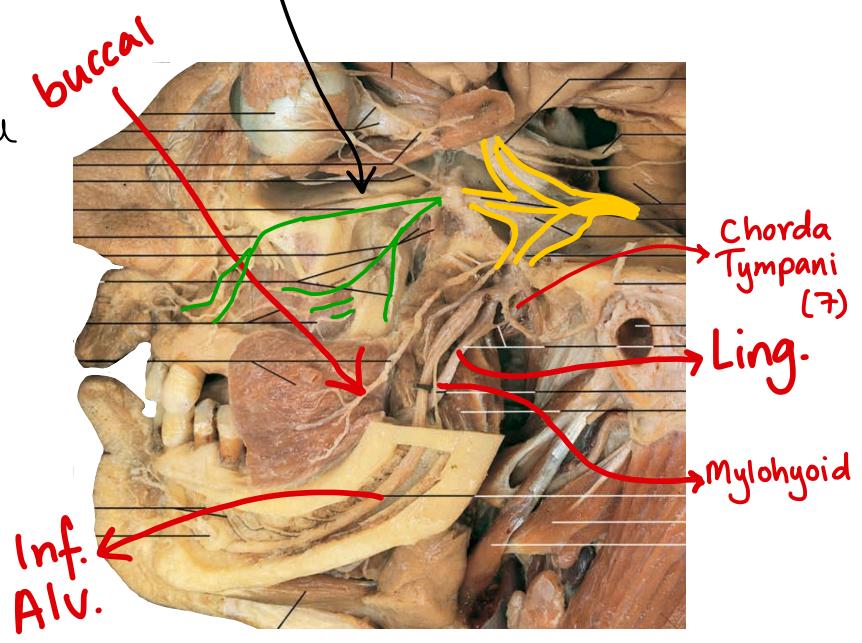
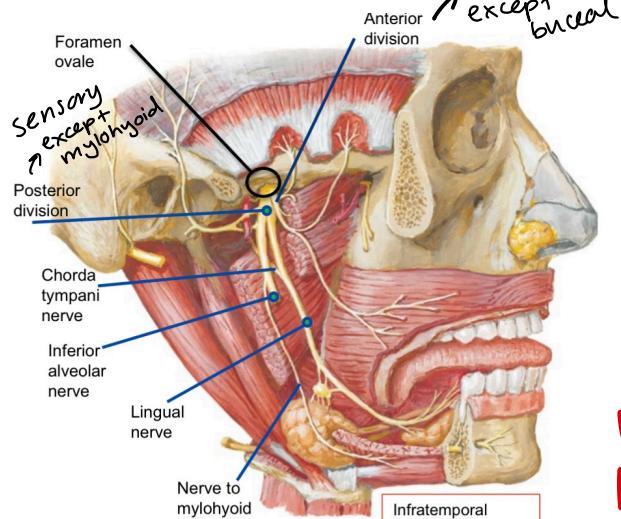
# TRIGEMINAL NERVE



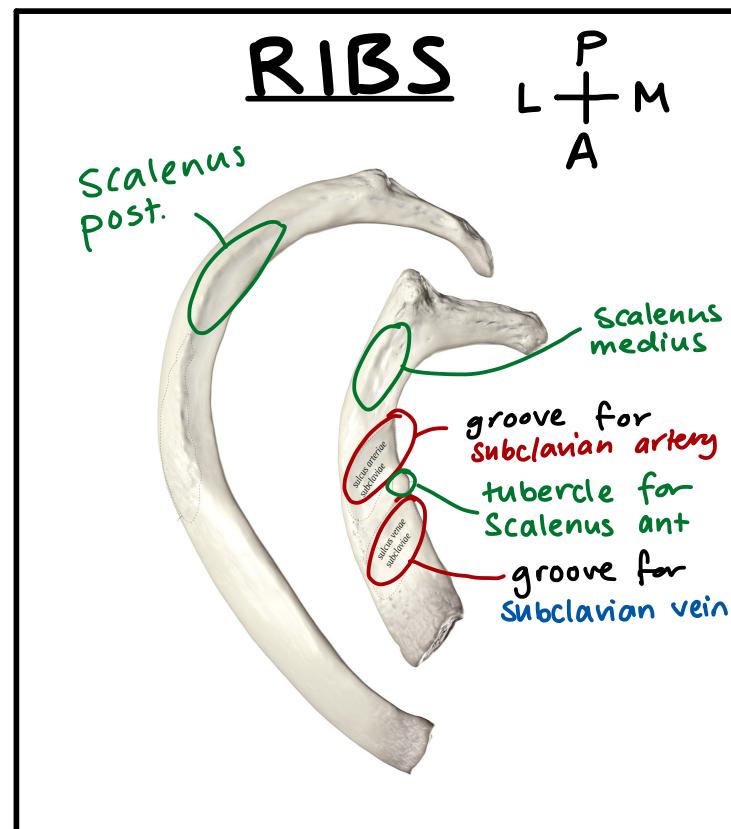
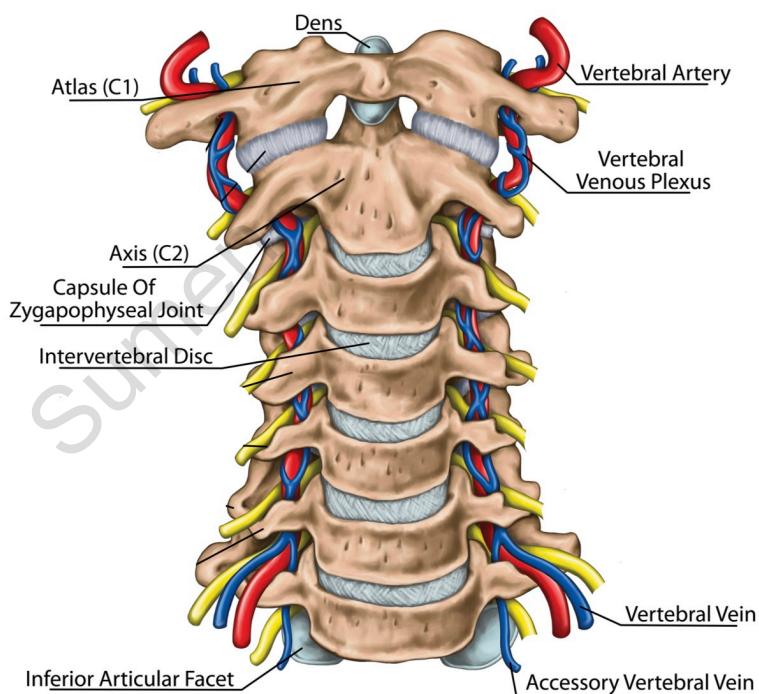
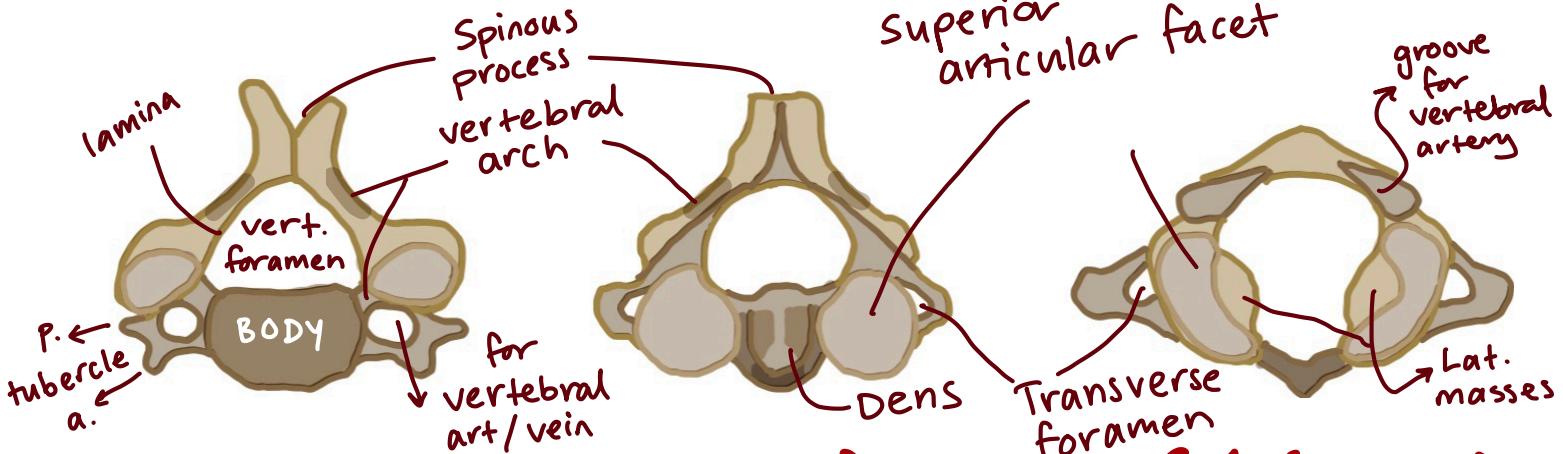
## MAXILLARY → sensory



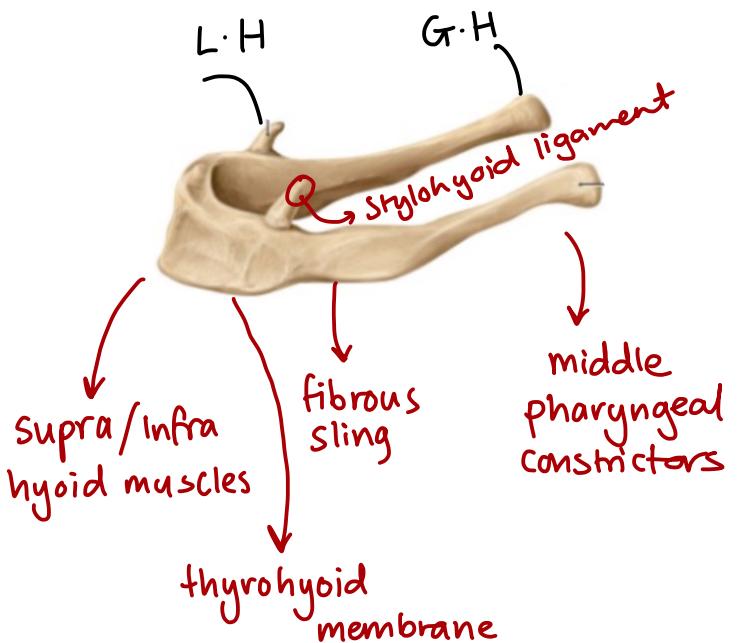
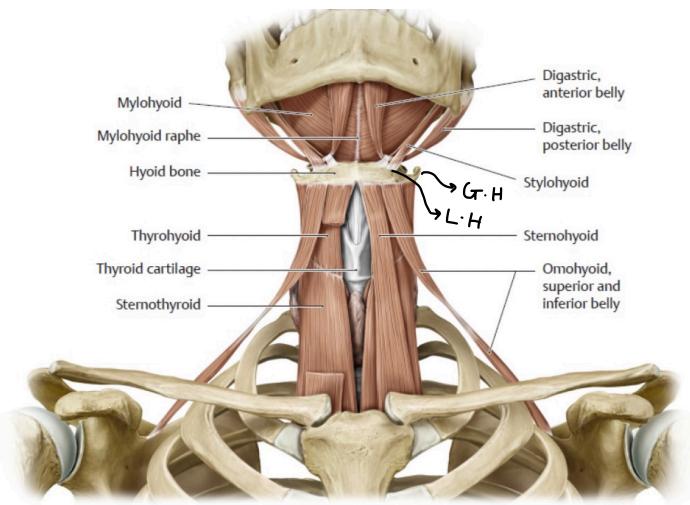
## MANDIBULAR



# NECK: BONES



## HYOID



# SUPERFICIAL NECK MUSCLES

## PLATYSMA: ← cervical facial (CN 7)

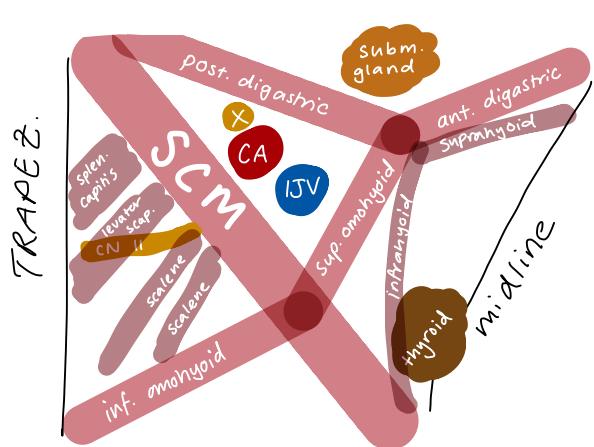
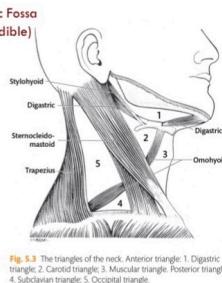
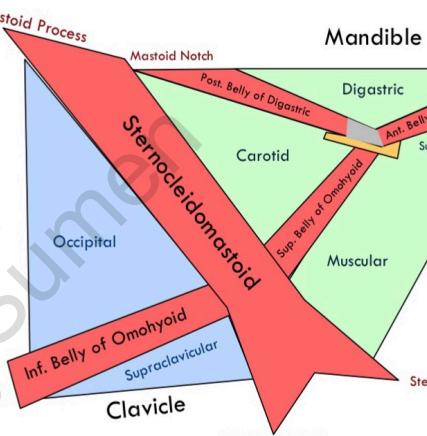
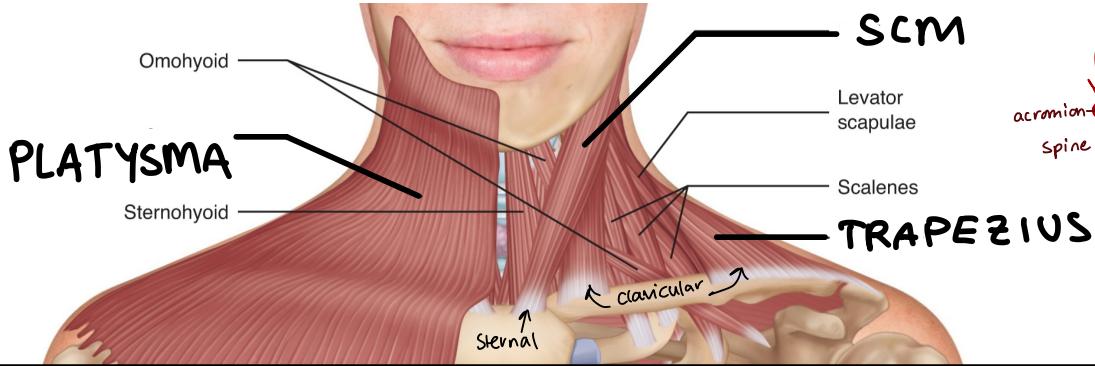
- Broad, flat, subcutaneous
- ↳ covers ant. neck & SCM
- wrinkles neck, depresses lip / mand.

## SCM: ← sp. access (CN 11) (m) cervical vent. (c2-4) rami (s)

- manubrium / medial 1/3 of sternum / clavicle → mastoid
- tilts, rotates, flexes head / raises sternum
- deep to EJV, drained by IJV

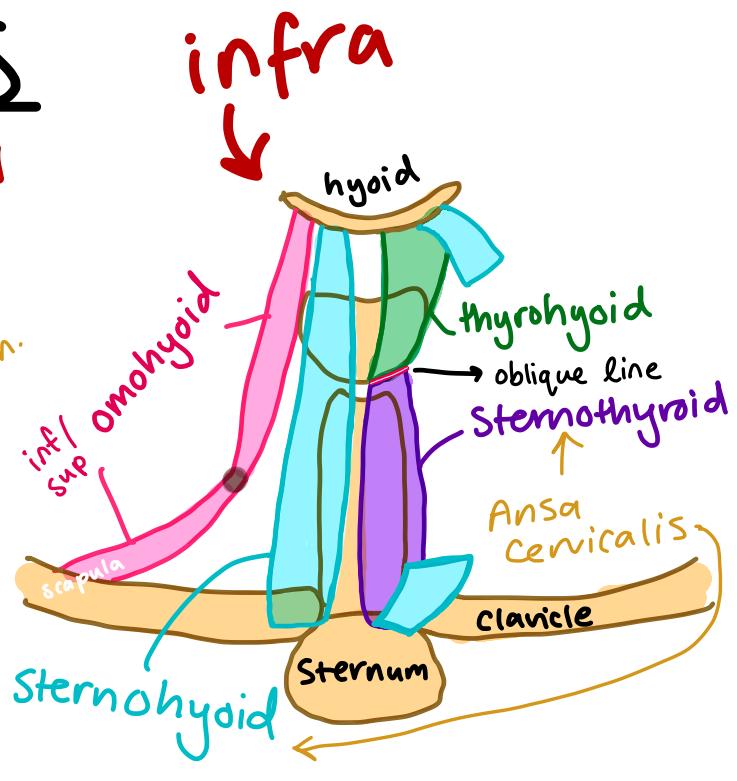
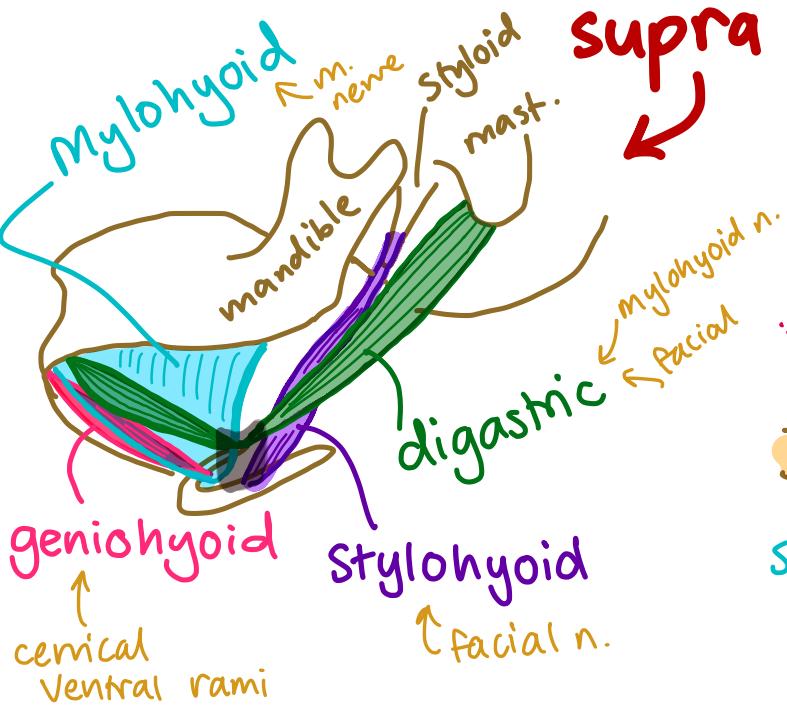
## TRAPEZIUS:

- ext. occip. prot.
- sup nuchal line
- moves shoulders & scapula, extends head

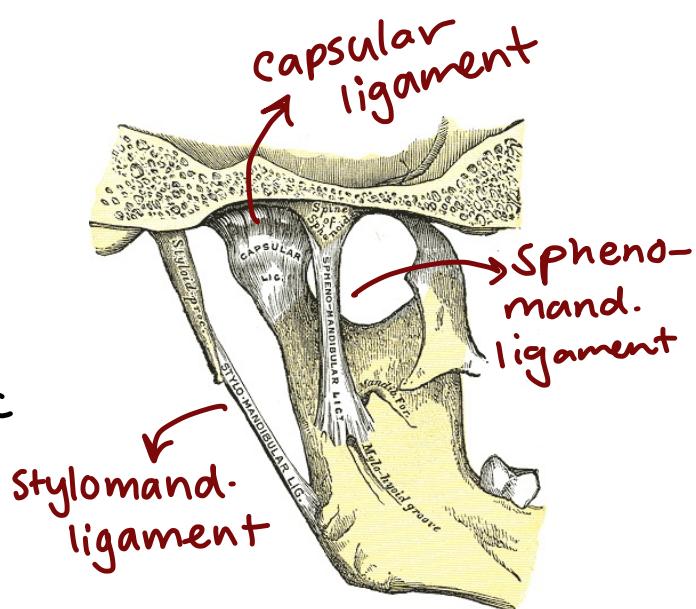
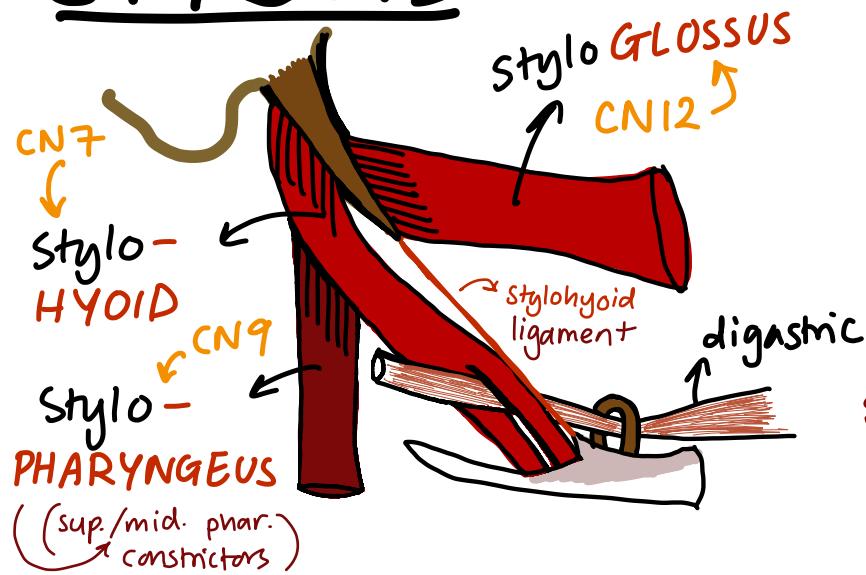


# TRIANGLES

# HYOID MUSCLES



# STYLOID



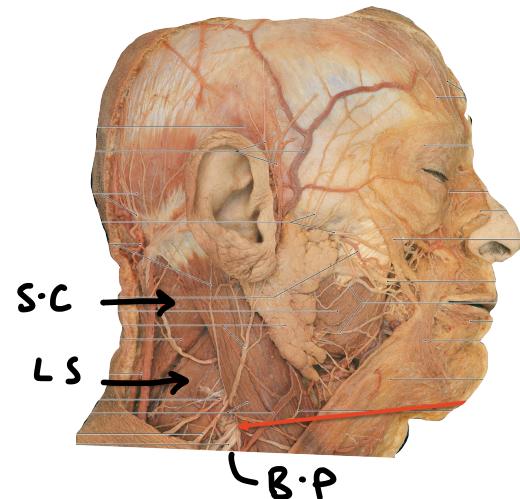
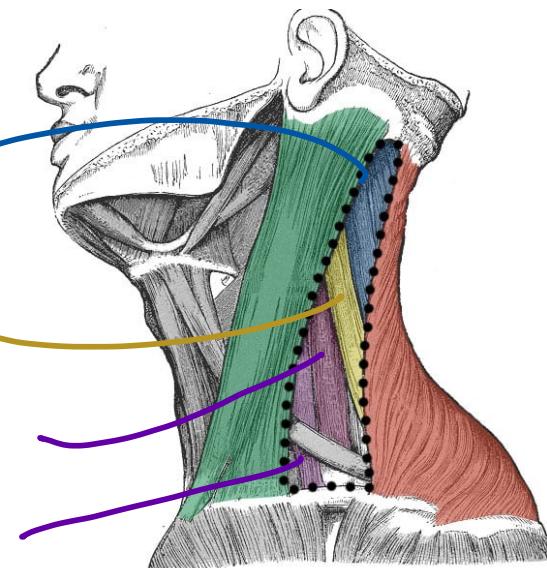
# POSTERIOR TRIANGLE

## MUSCLES:

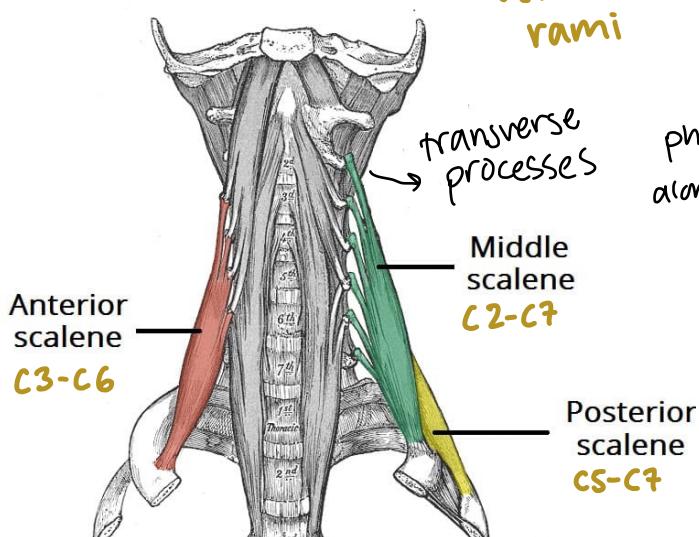
**SPLENIUS CAPITIS**

**LEVATOR SCAPULAE**

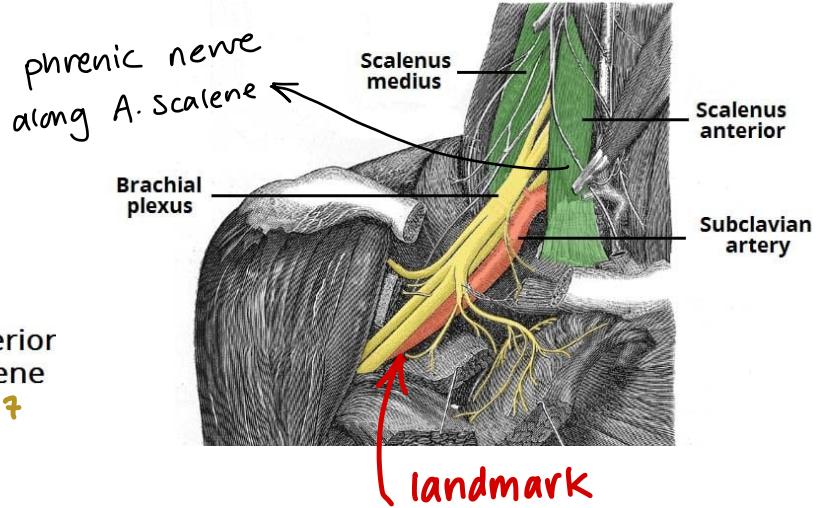
**SCALENE**



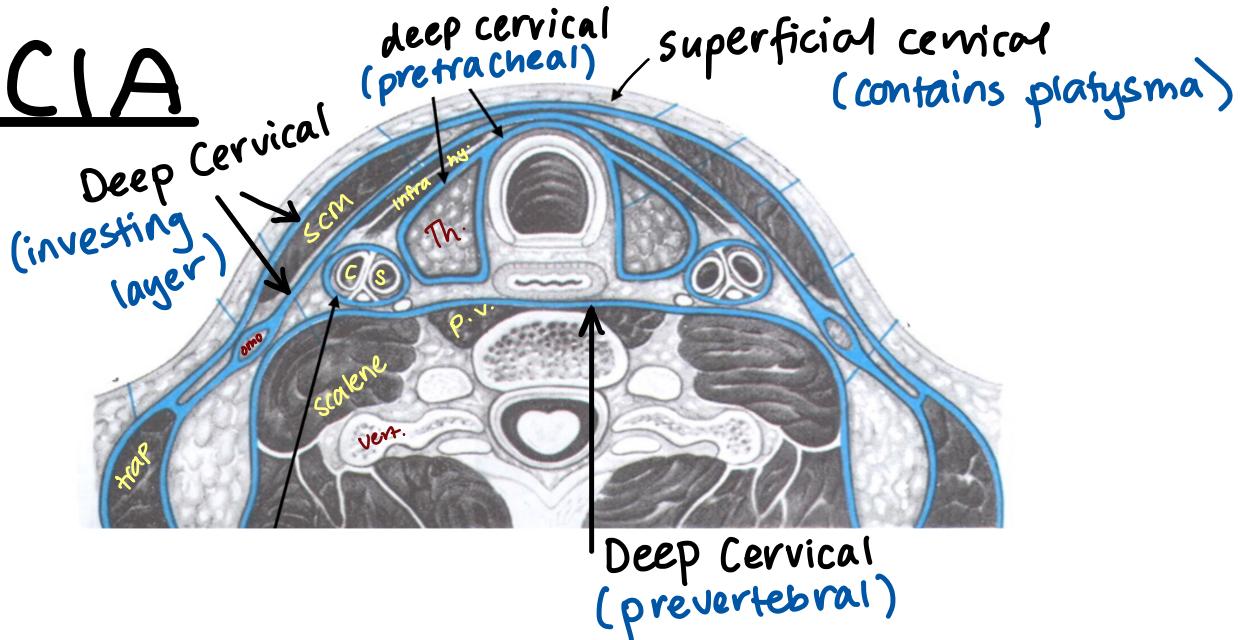
## SCALENES:



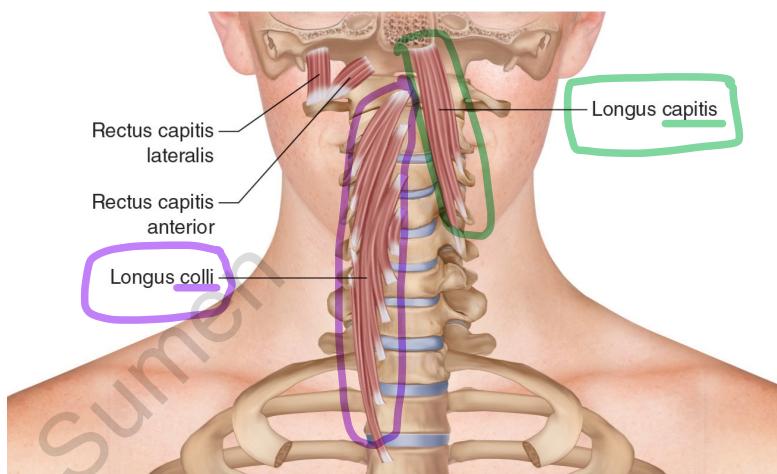
\* post. scalene often deep, underneath fascia



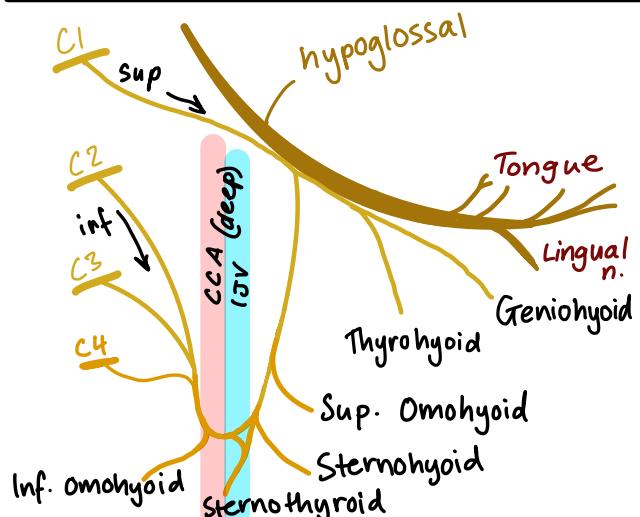
# FASCIA



## PREVERTEBRAL MUSCLES

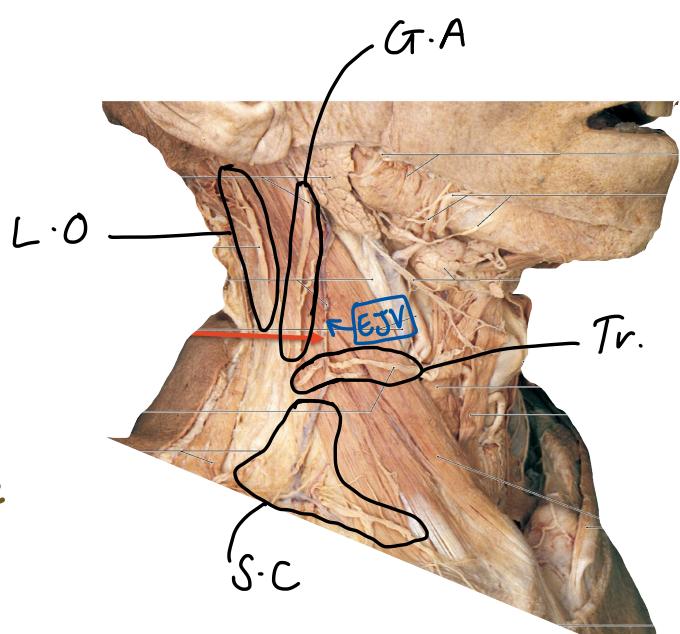
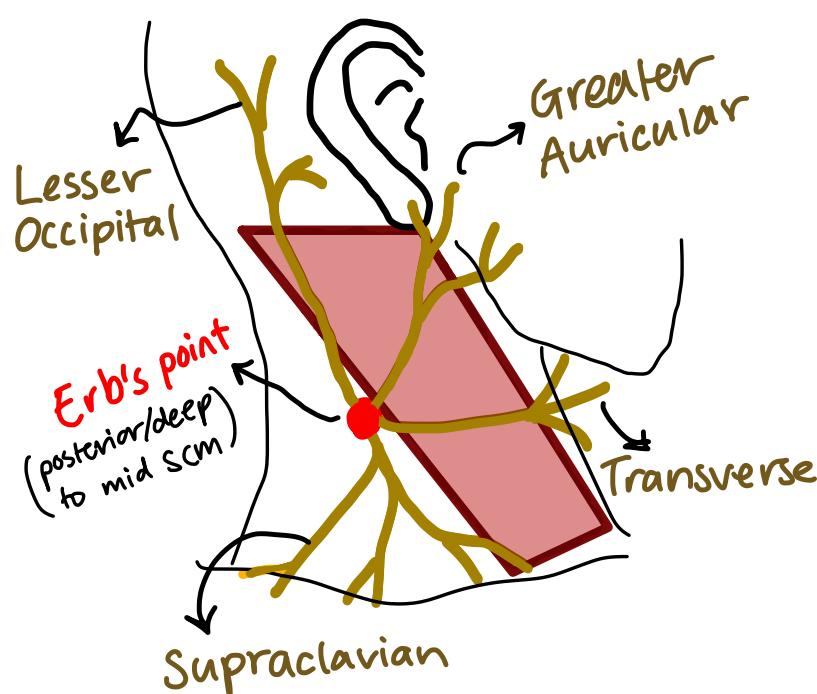


## ANSA CERVICALIS / CN 12



## CUTANEOUS CERVICAL VENTRAL RAMI

\* Greater Occipital part of Dorsal Rami



# FACIAL MUSCLES

origin: bone  
inserts: skin

## UPPER HALF:

Occipitofrontalis  
(frontal)

Temporalis

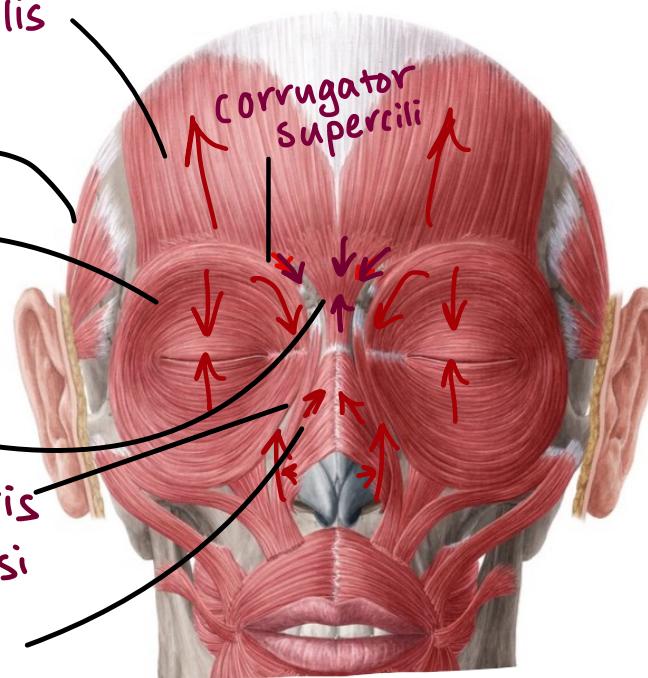
Orbicularis Oculi

NOSE:

Procerus

L.L. superioris  
alaeque nasi

Nasalis



O·F: epicranial aponeurosis

C·S: supraorbital ridge

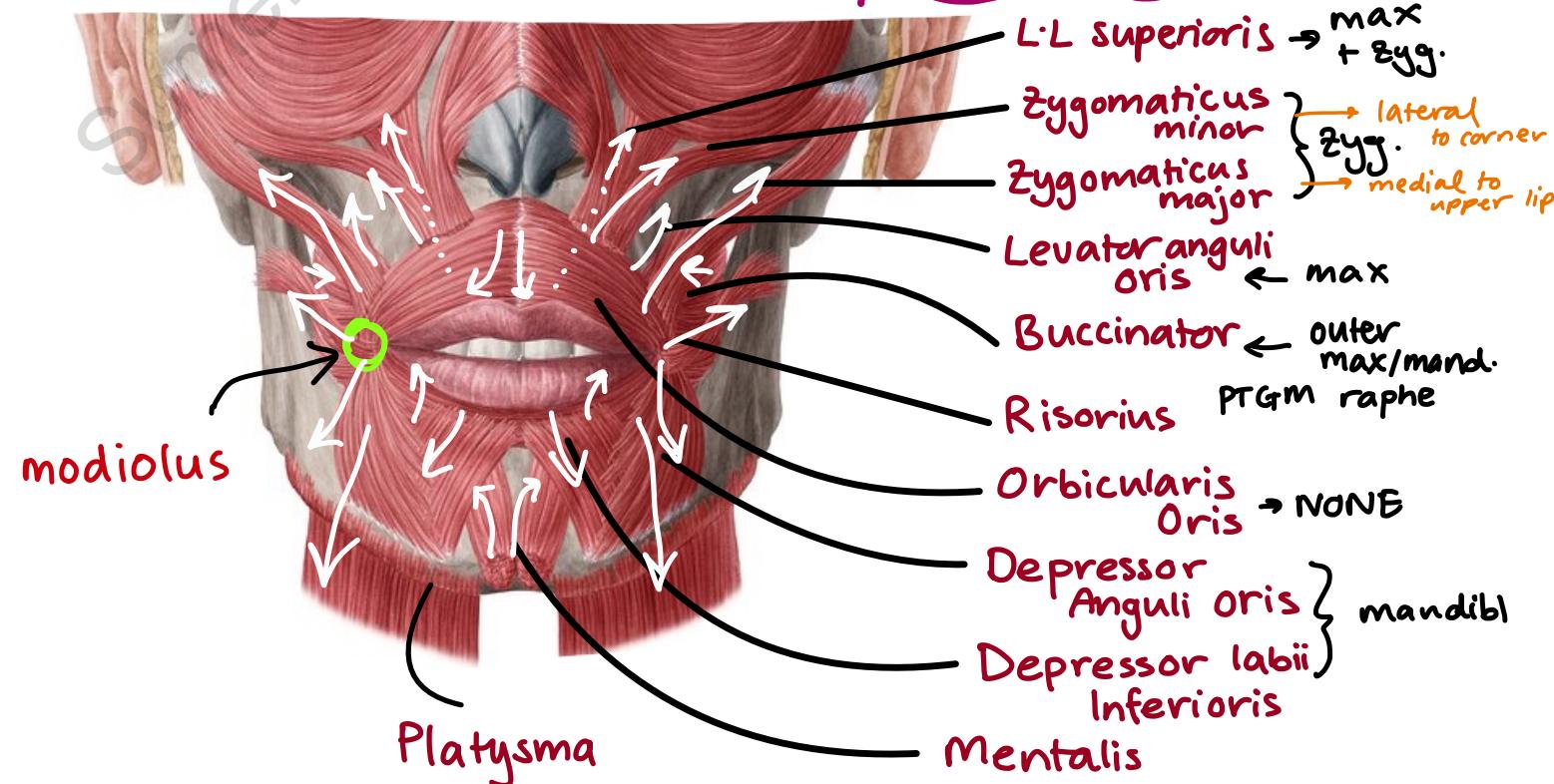
O·O: max, lacrimal, frontal

Pr.: nasal bone/cart.

L.L.S.N: Frontal process of maxilla

N: Maxilla

## LOWER HALF:



## FAT PADS

- **BUCCAL:** z.mj, L.a.O, bucc
  - ↳ \*\* parotid duct / sensory buccal n. pass through.
  - ↳ b/w fascia & muscle

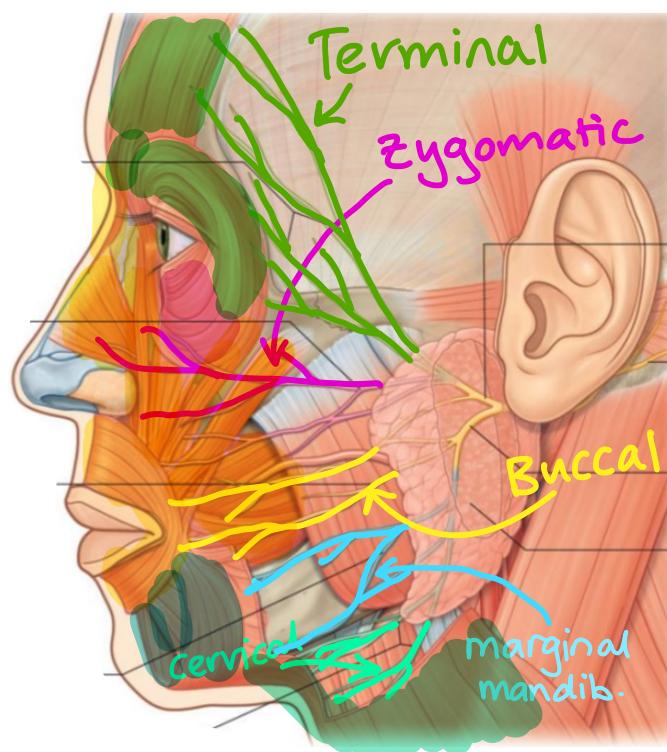
• **MALAR:**  $\nabla \rightarrow O.Oc.$

• **Infraorbital:** deep to O.Oc.

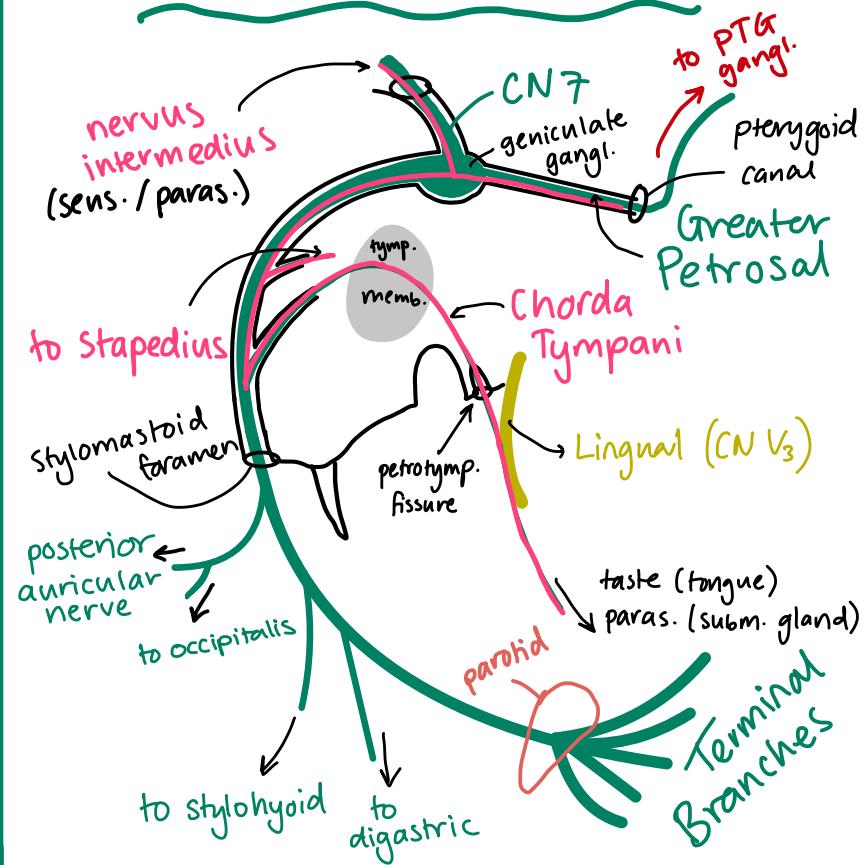
• **SUBMENTAL / SUBMANDIB.**: below mandible

# FACIAL MUSCLE INNERVATION

## TERMINAL BRANCHES



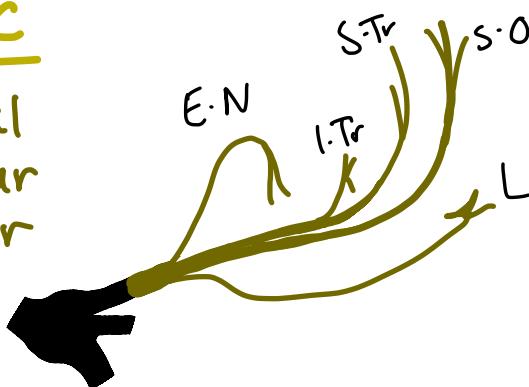
## COURSE OF CN 7



## CUTANEOUS TRIGEMINAL

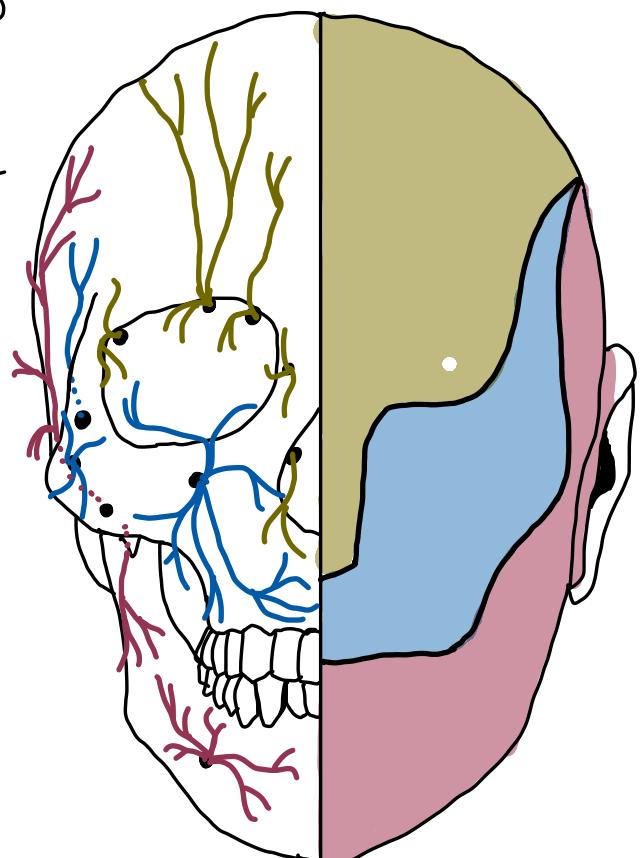
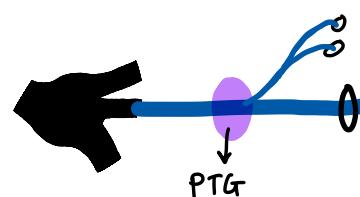
### OPTICOMOTORIC

- ↳ Supraorbital
- ↳ Supratrochlear
- ↳ Infratrochlear
- ↳ Lacrimal
- ↳ Ext. nasal



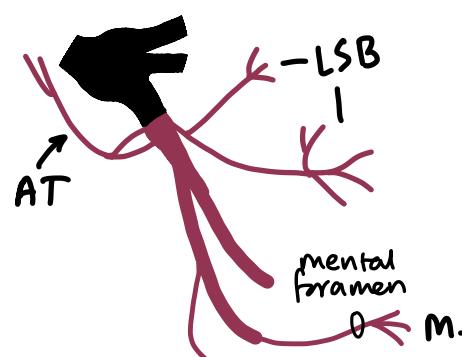
### MAXILLARY

- ↳ Zygomaticotemporal
- ↳ Zygomaticofacial
- ↳ Infraorbital



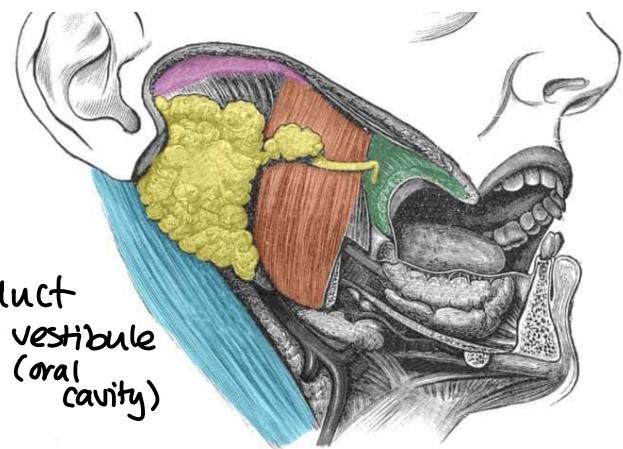
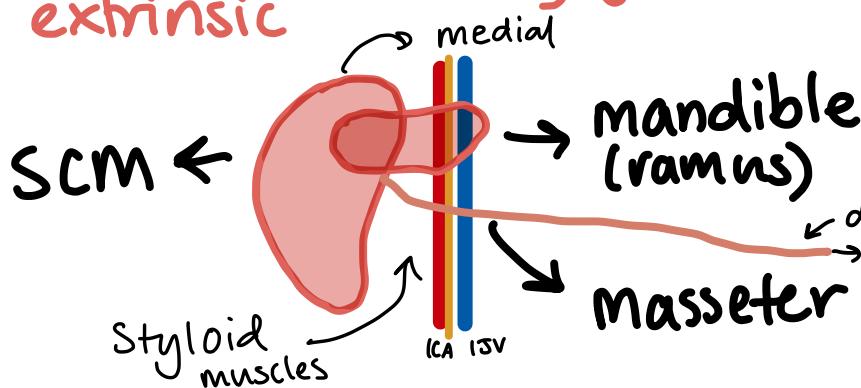
### MANDIBULAR

- ↳ Auriculotemporal
- ↳ Long Sensory Buccal
- ↳ Mental



# PAROTID GLAND

\* Lobulated salivary gland extrinsic



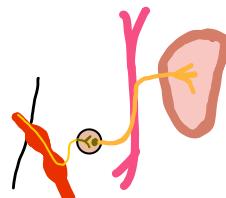
PAROTID CAPSULE: Deep Cervical Fascia (Investing layer)

Superficially: → zygomatic, mandible, tympanic plate

Deep (thick): Styloid process, medial angle of mandible, forms stylomandibular ligament (TMJ) ligament

## INNERVATION

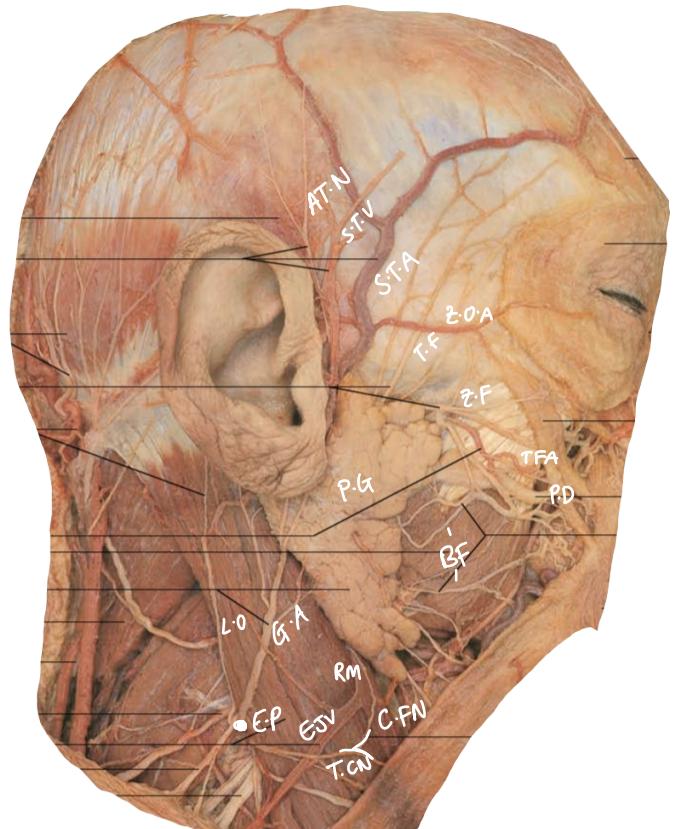
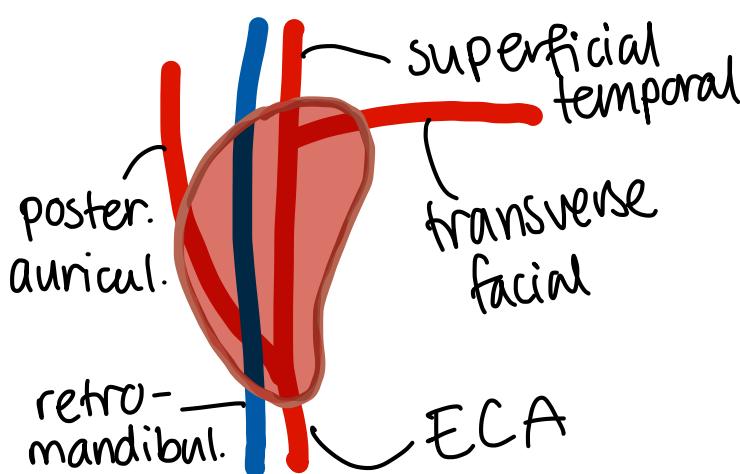
Sympathetic: Superior cervical  
Parasympathetic: glossopharyngeal produces ← (via auriculotemp.)



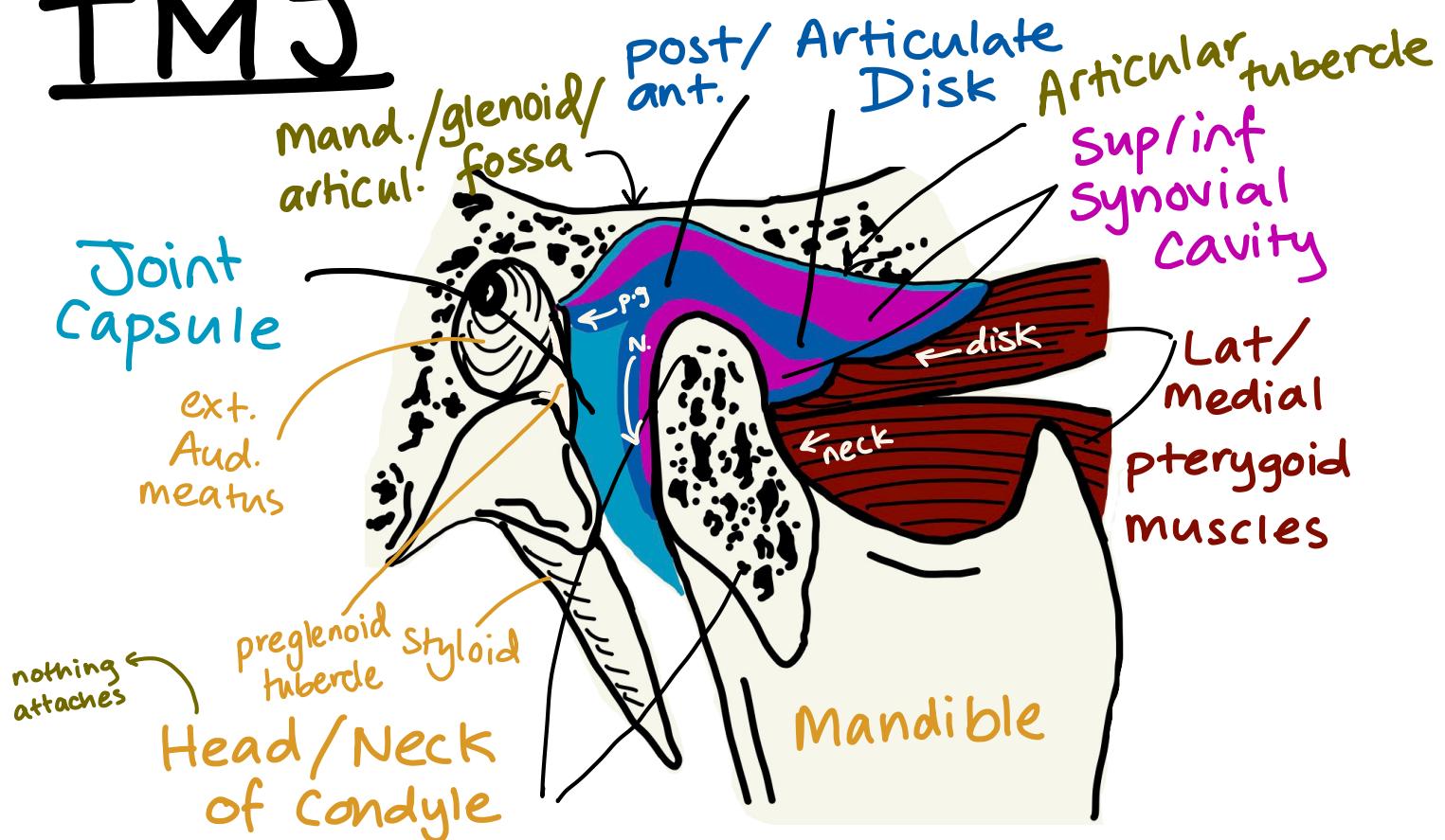
Sensory:

greater auricular (cervical plex) → capsule superior/inferior  
Auriculotemporal (V3) → deep/superior

## VASCULATURE



# TMJ



## Innervation (sens.)

Masseteric

Auriculotemporal

Deep Temporal

## Arterial Supply:

Superficial Temp. <sup>ECA</sup>

Ascending Pharyng. <sup>ECA</sup>

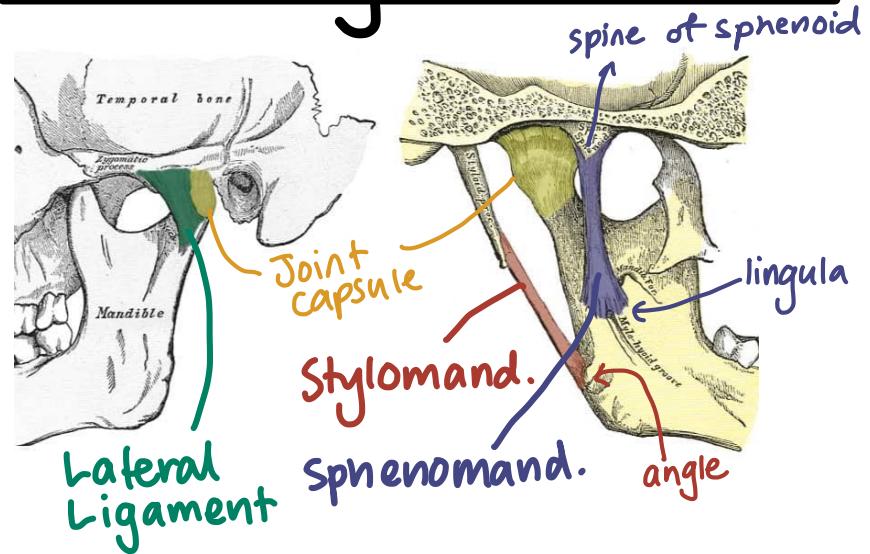
Deep Auricular <sup>MA</sup>

## Venous Drainage

Pterygoid Venous

Plexus <sup>M to coronoid/temp.</sup>  
<sup>L to pt./Bucc</sup>

## Stabilising Structures



## Movements

**Elevation ↑:** Temp., M. pter., masseter

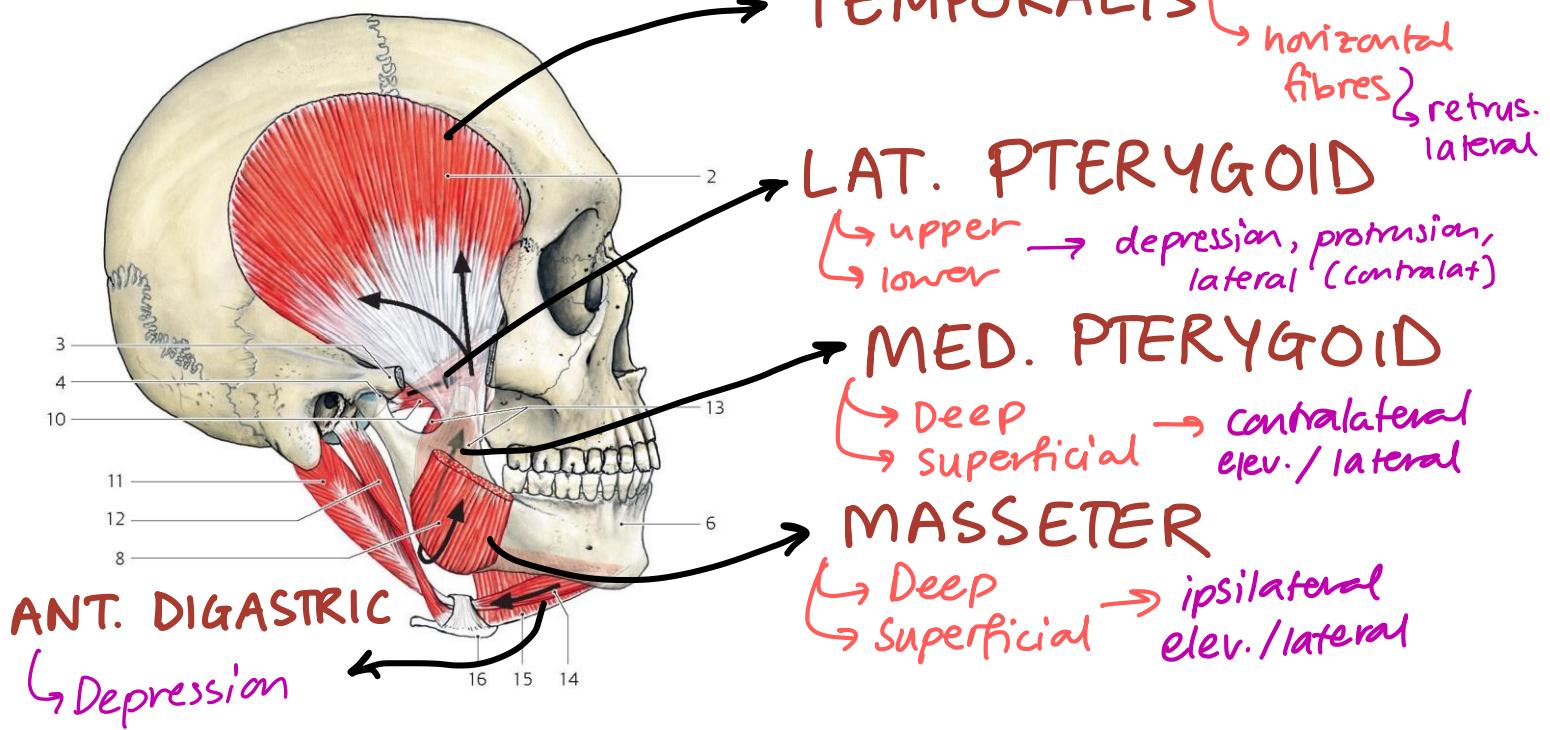
**Depression ↓:** lower L. pter., digastr.

**Retrusioin ←:** horizontal tempor.

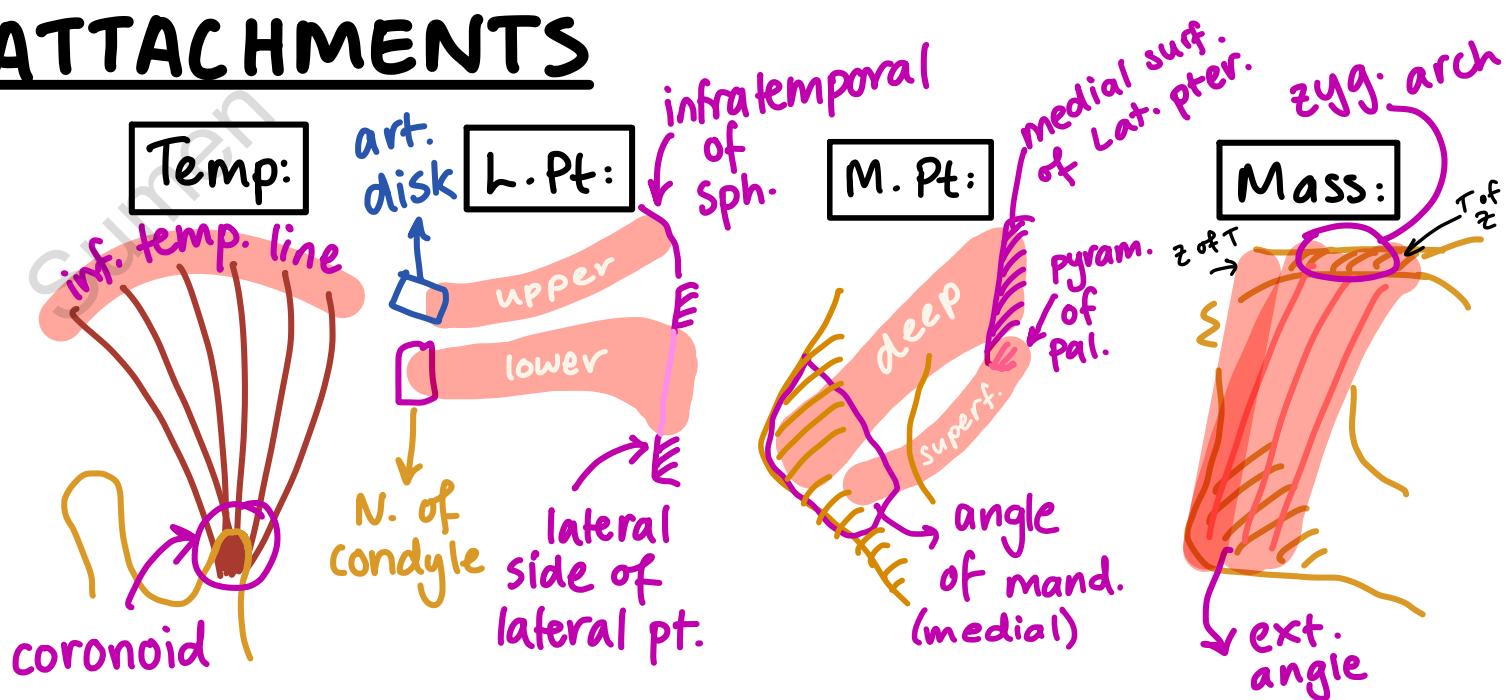
**Protrusion →:** lateral pterygoid

**Lateral ↓:** pterygoids, temporalis  
 masseter <sup>contralateral</sup>

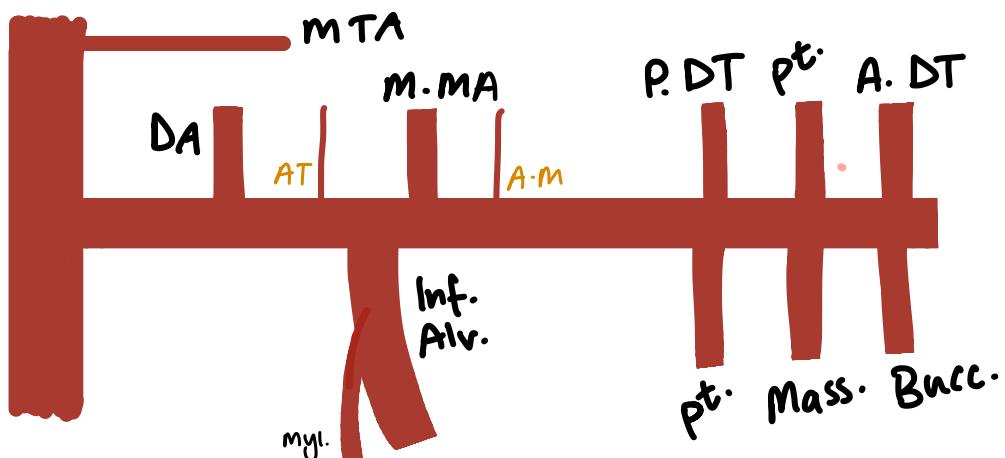
# MUSCLES OF MASTICATION



## ATTACHMENTS

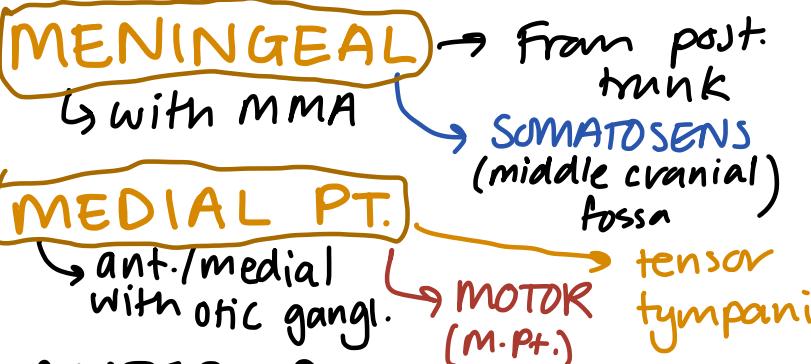


## ARTERIAL SUPPLY



# MANDIBULAR NERVE

## TRUNK - F. Ovale



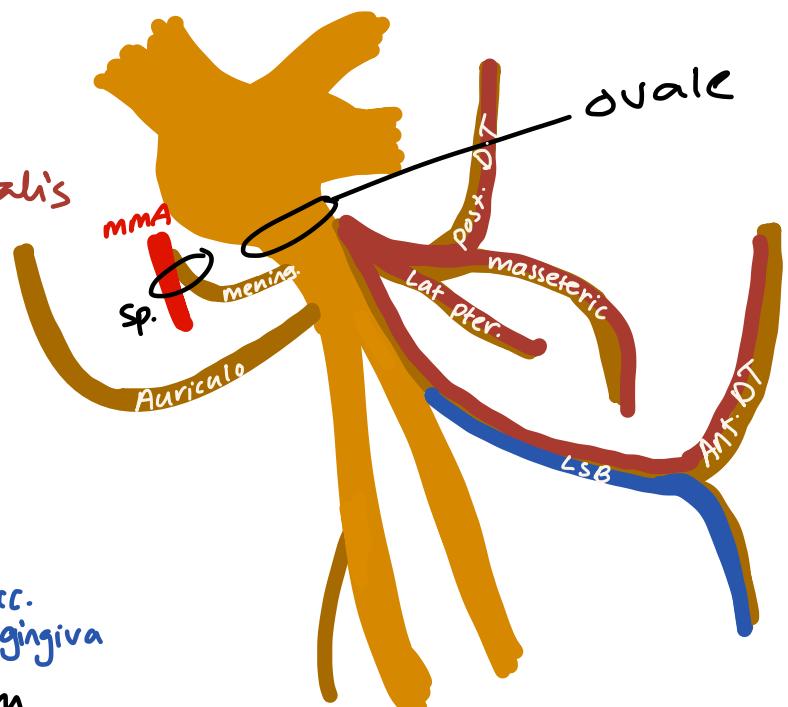
## ANTERIOR:

**DEEP TEMP.** SENS: TMJ  
A/P superior to temporalis with temporalis DTAs

**MASSETER**  
laterally over U. L. Pt., mand. notch

**LATERAL PT.**  
MOTOR: L. Pt.

**L.S. BUCCAL**  
between U/L L. Pt. → joined by buccal artery  
SENS: skin, bucc. mucosa/gingiva



## POSTERIOR:

**AURICULOTEMPORAL** → SENS: parotid ( $\uparrow$ )  
↳ close to trunk → split by MMA → medial to n. of condyle → PARA: hitchhike from otic  $\rightarrow$  parotid  
SENS: TMJ, temp. skin

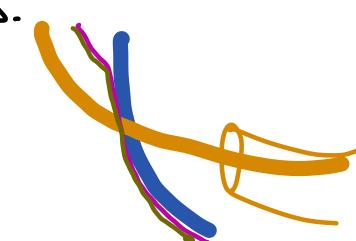
## INF. ALVEOLAR:

MOTOR: mylohyoid, Ant. digast.  
SENS: molars, canines, incisors, labial gingiva, mental  
Anterior division of the mandibular nerve branches into the inferior dental plexus (supplying molars), the incisive branch (supplying canines, incisors, and labial gingiva), and the mental branch (supplying the mental area).

## LINGUAL: lateral to M.Pt/hyglossus.

SENS: Ant 2/3 tongue  
SPECIAL: Taste (Ant 2/3)  
PARASYMP: motor for subm./e. salivary glands

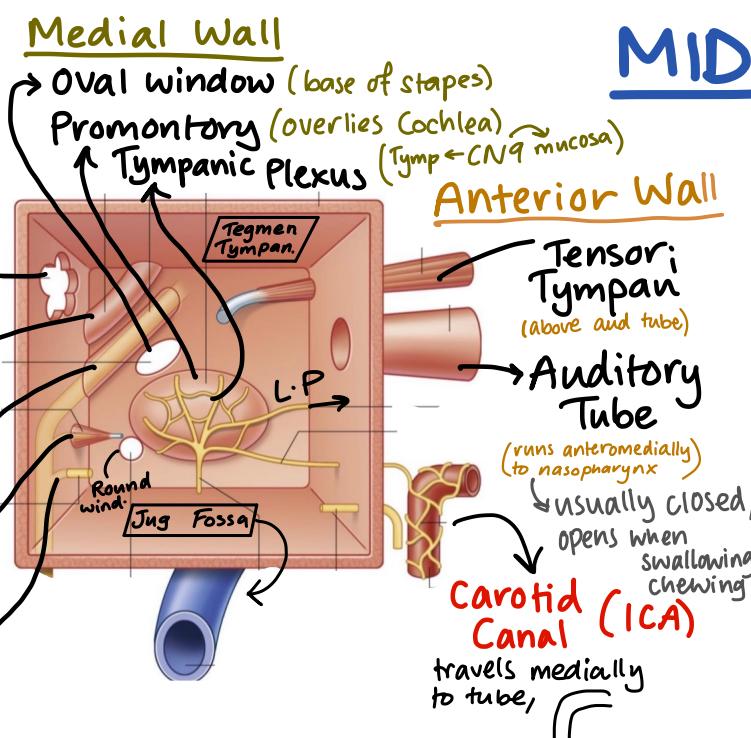
chorda tympani



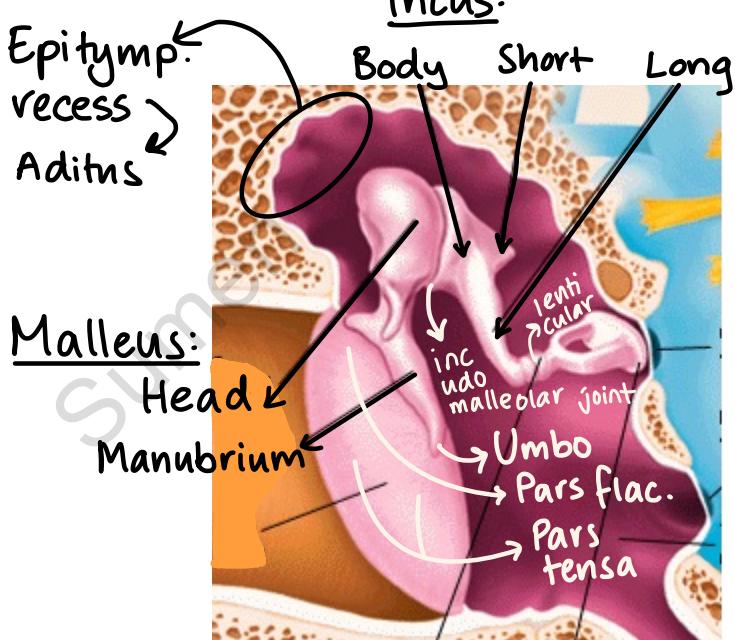
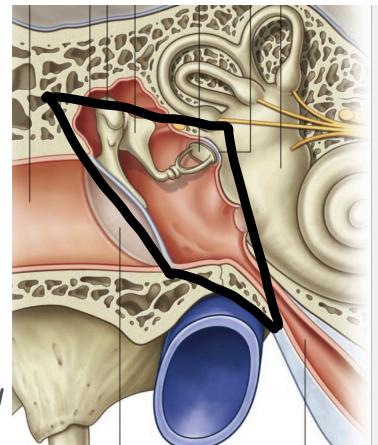
# EAR

## Posterior Wall

epitympanic recess  
↳ aditus ↗ antrum (lateral)  
lateral S-C canal (medial)  
Facial canal (lateral)  
Pyramidal eminence (stapedius)  
Chorda Tympani (under head of malleus)



## MIDDLE EAR

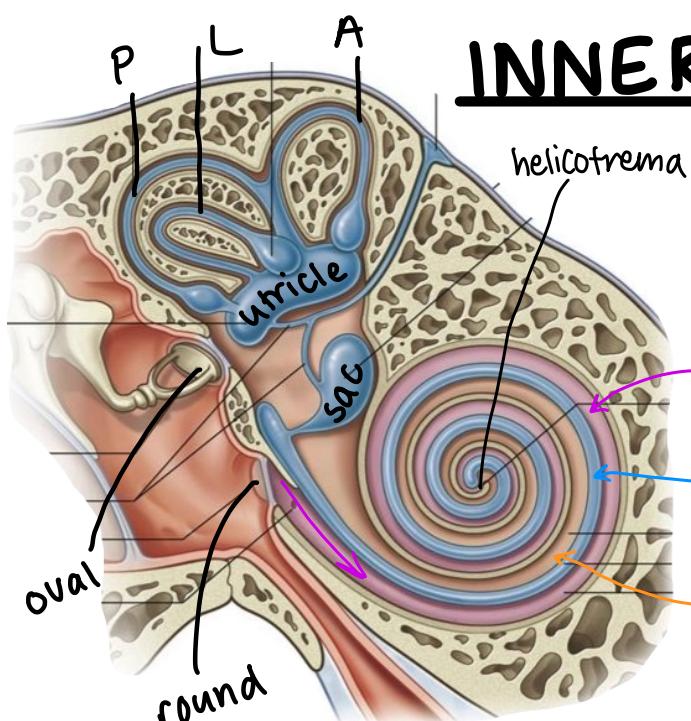


## MUSCLES:

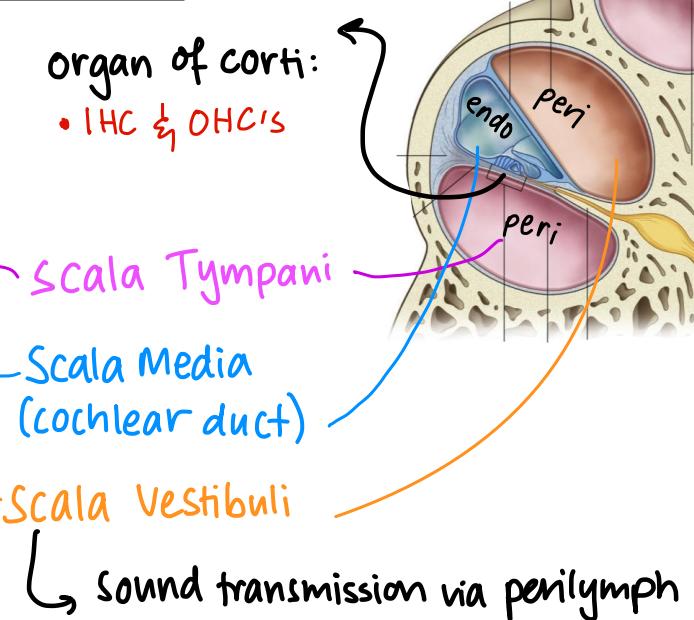
Tensor Tympani → pulls membrane in to ↓ sound CN V<sub>3</sub>  
Stapedius → attaches to neck of Stapes: CN VII

## NERVES:

Tensor Tympani → from M. pteryg. ← CN V<sub>3</sub>  
Chorda Tympani → from CN 7 (passes only)  
Nerve to Stapedius  
CN 9 → tympanic plexus



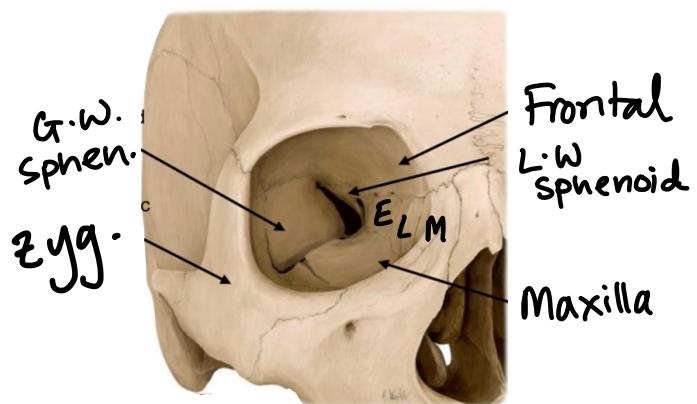
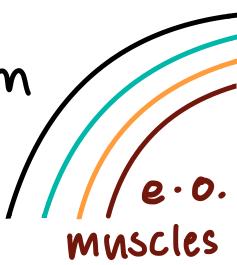
## INNER EAR



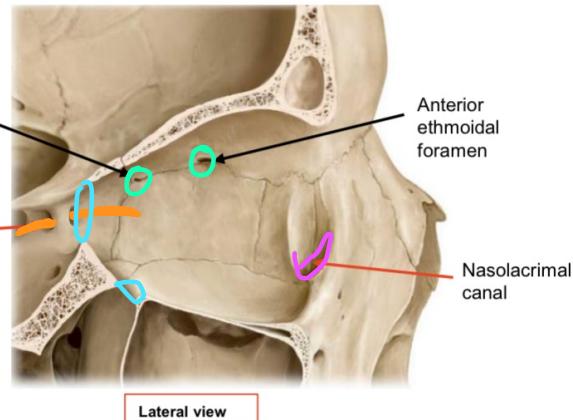
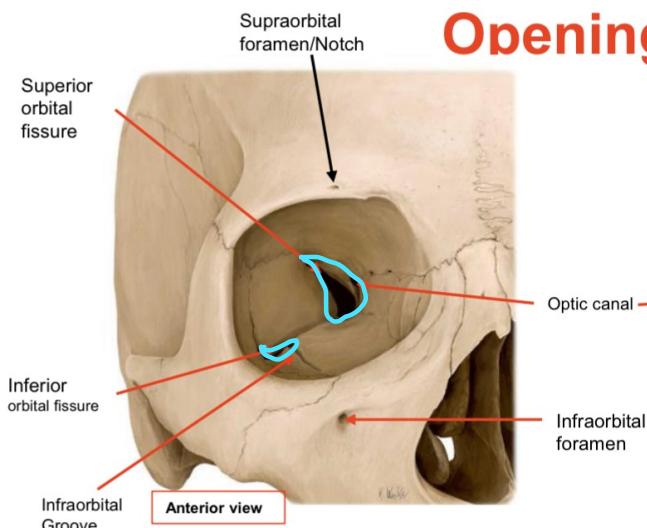
# BONY ORBIT

Orbital Periosteum

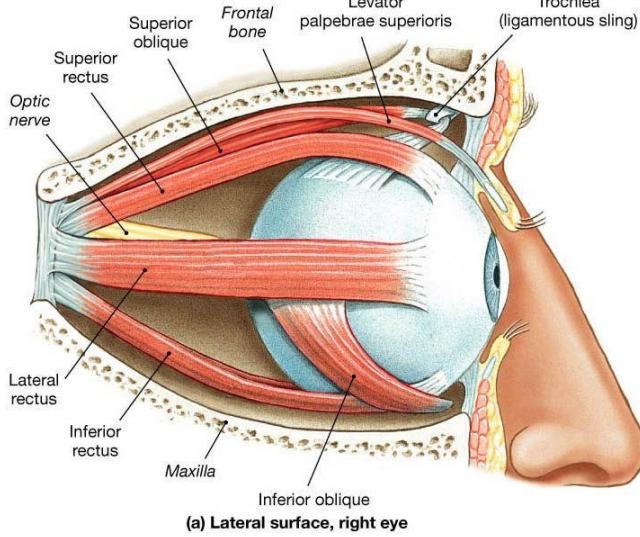
orbital fascia  
periorbital fat



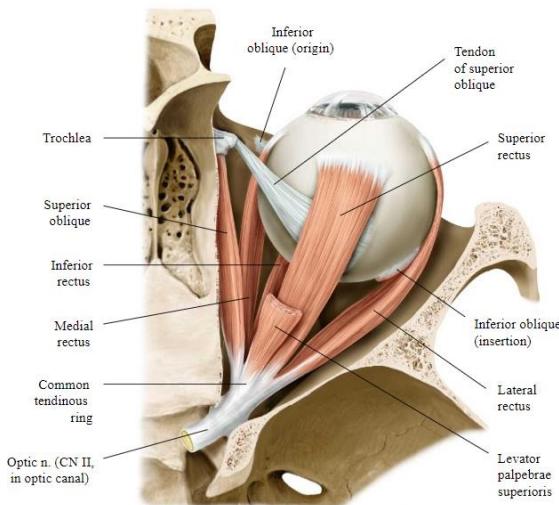
## Openings of Orbit



MUSCLES : 4 Recti 2 oblique L.P.S  
 ↳ CN3 except: ↳ Lat rectus CN6  
 ↳ Sup. oblique CN4



(a) Lateral surface, right eye



Frontal Nerve superior

LPS: from L.W sphenoid → above S.Rect. → upper eyelid (NOT eyeball)

Recti: from common tendinous ring (around CN2) → Sclera (6mm behind cornea)  
 Ant. to equator



Sup. Obl: from body of sphenoid, superomedial to optic canal → hooks around trochlea → tendon attaches pm between L.R & S.R

Inf. Obl: from orbital surf. of maxilla → under sclera post. to eq:  
 ↳ lateral to N.L groove → I.R → ↳ between I.R & L.R

# LACRIMAL GLANDS

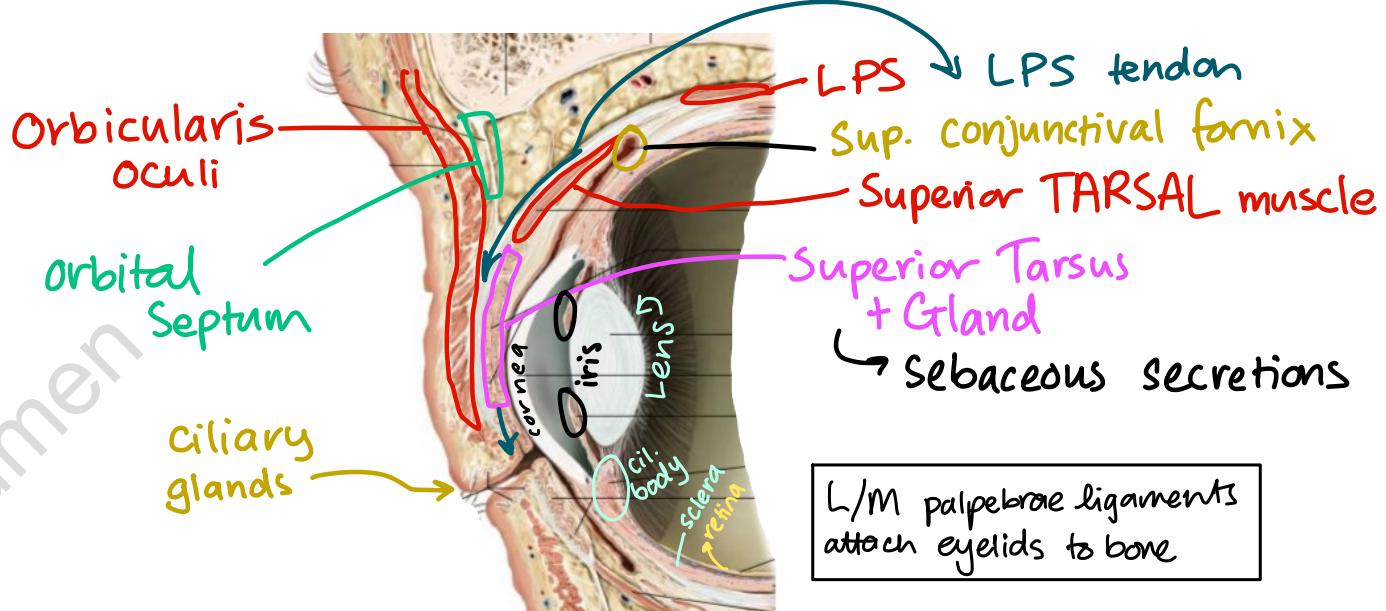
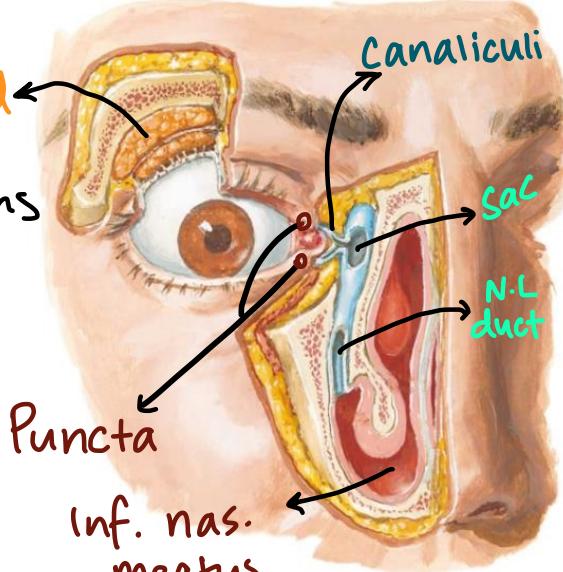
↳ located in S-L orbit + eyelid      Gland  
 \* tears (CN7 PNS) → Serous, mucous, sebaceous secretions

Tears → medial corner

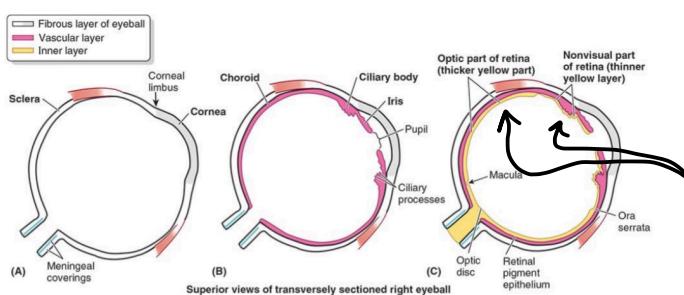
↳ lacrimal puncta

lacrimal canaliculi → sac → duct  
 I-N-Meatus

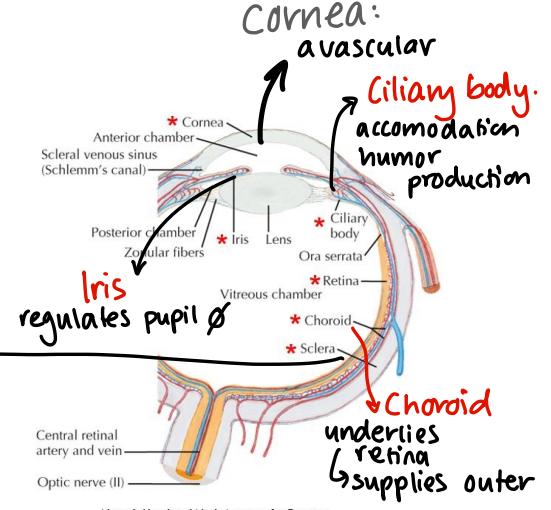
## EYELID



## EYEBALL-OVERVIEW



Retina  
sensory /  
nonsensory

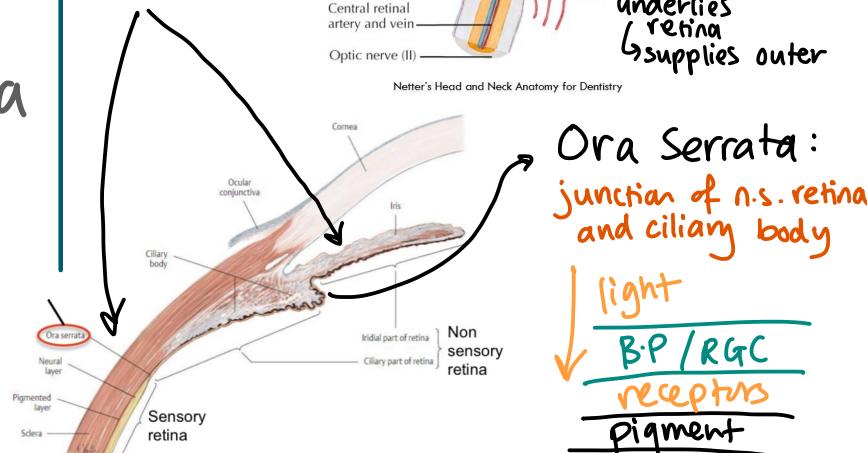


FIBROUS: Sclera, Cornea

VASCULAR: Choroid, Iris, (uvea) Ciliary Body

NEURAL: Retina

↳ Layers

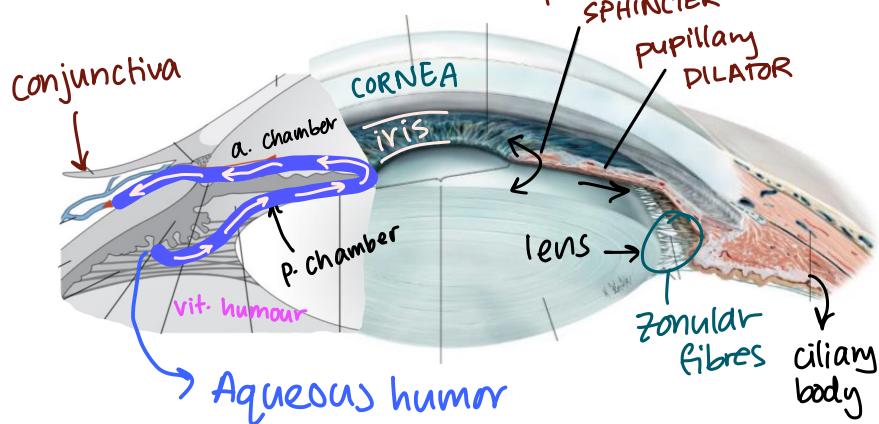


# EYEBALL

**IRIS:** controls amt. of light →

**Circular muscle:** PSNS from CN3 (pupillary sphincter) → around pupil

**Radial muscle:** SNS from S-G (pupillary dilator) → extend from pupil



**LENS:** tethered to ciliary body by zonular fibres

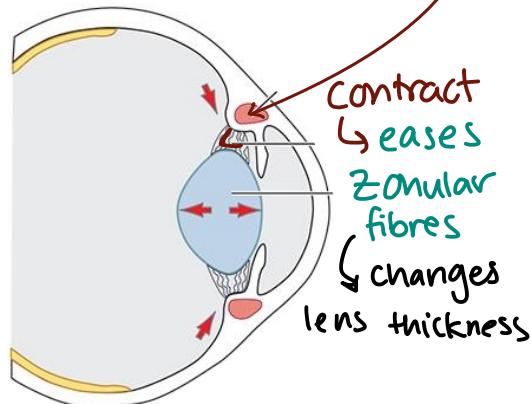
acellar capsule: Ant: cuboidal epithelial Post: elongated cells

**Ciliary Body:**

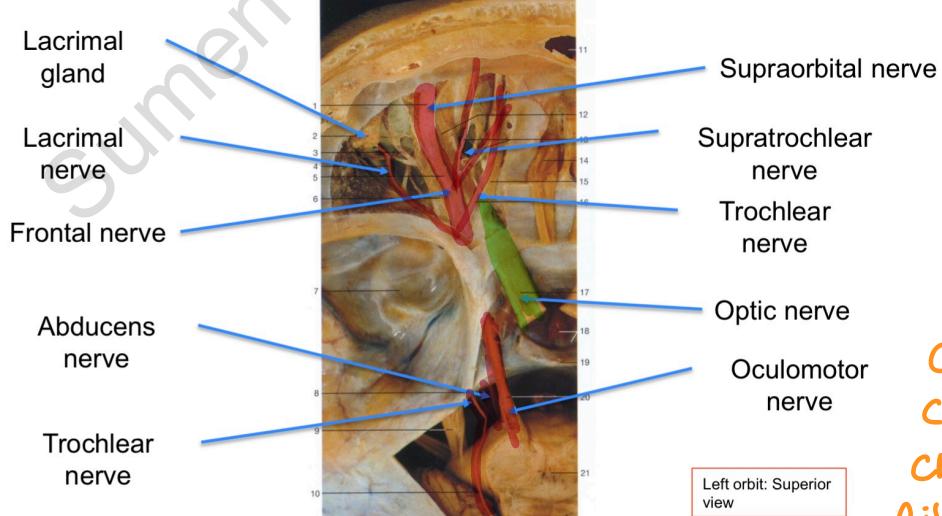
**Ciliary Muscle:** for accommodation

**Ciliary Processes:**

produces aqueous humor



## NERVES



**OPTIC:** visual sensory → RGC's  
eff. motor for adapt/reflex

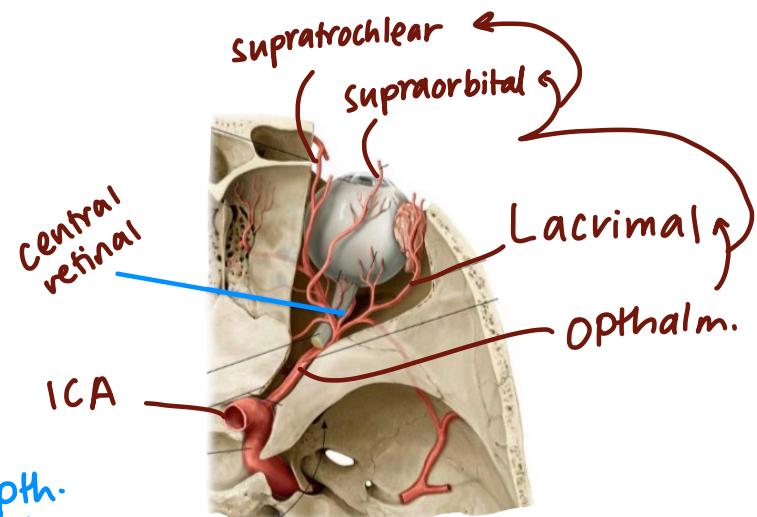
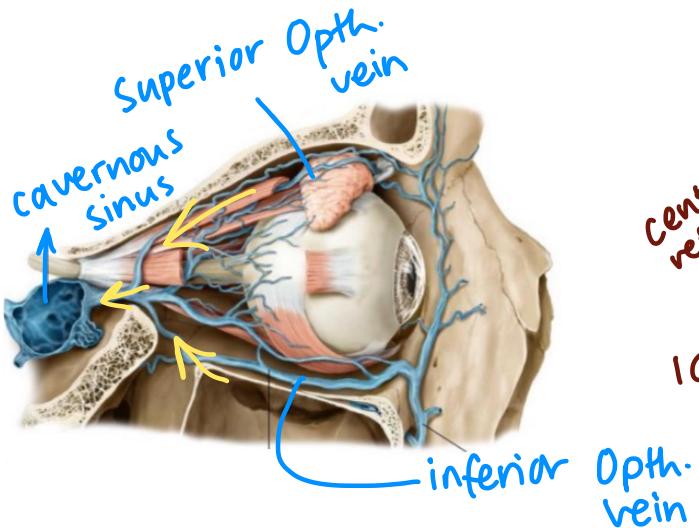
**CN 3:** All recti except S.O, L.R

**CN 4:** Sup. Oblique via trochlea

**CN 6:** Lat. Rectus - abducts

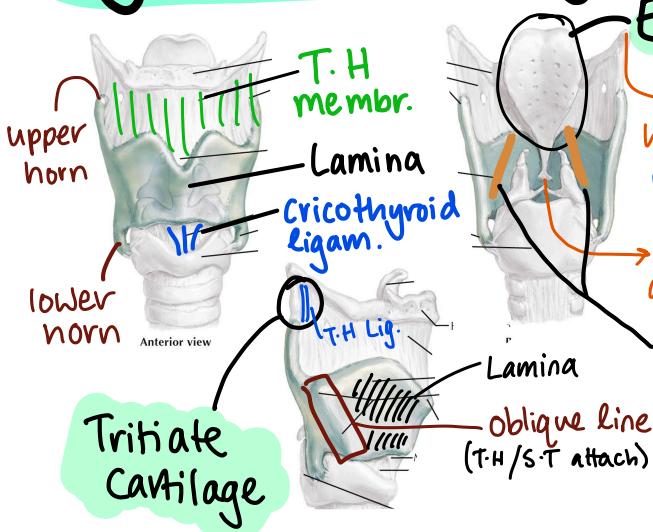
**Cil. Gangl:** PNS of CN3 - Ant to tend. ring  
nasociliary hijacks

## BLOOD SUPPLY



# LARYNX

## Thyroid Cartilage



## Epiglottis

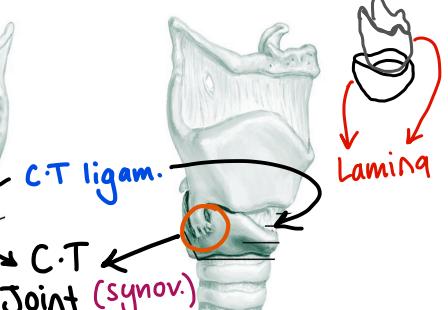
attached to hyoid A-S by H-E ligam.  
deep thyroid cart. attach: T-E ligam.

Cuneiform Cart.

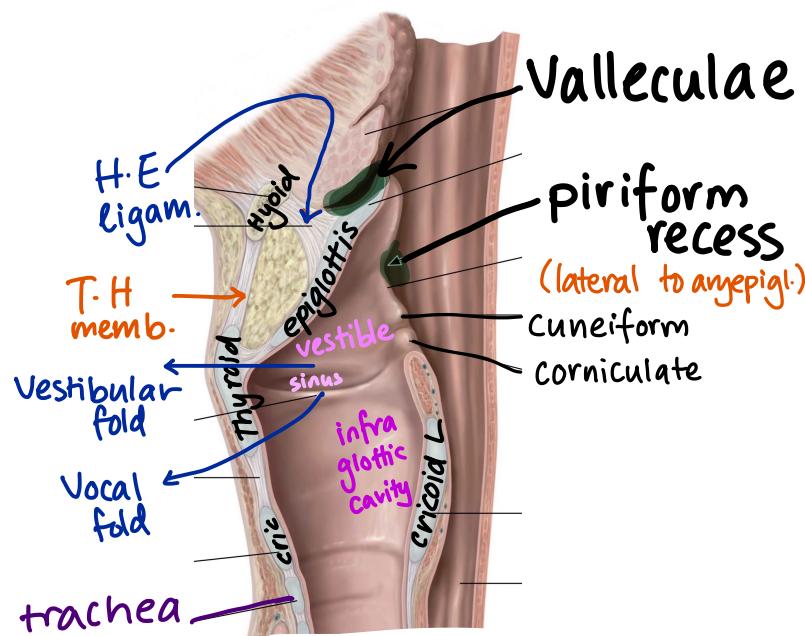
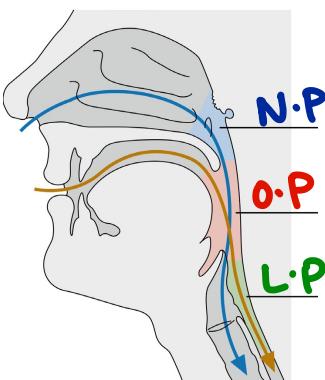
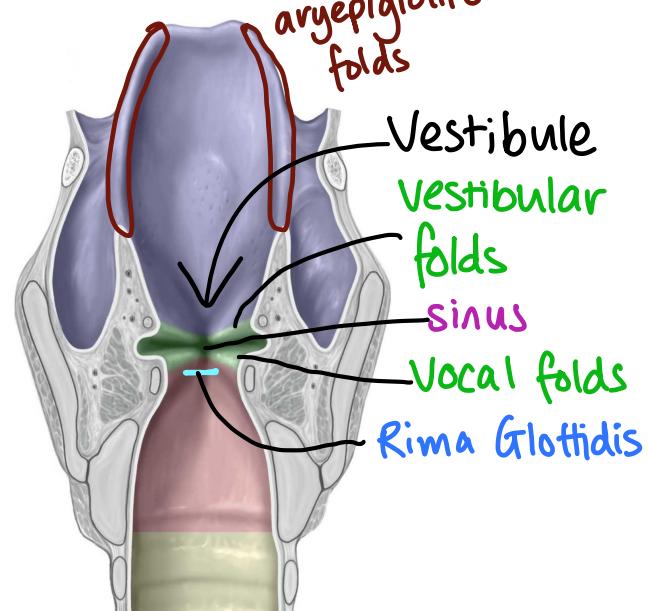
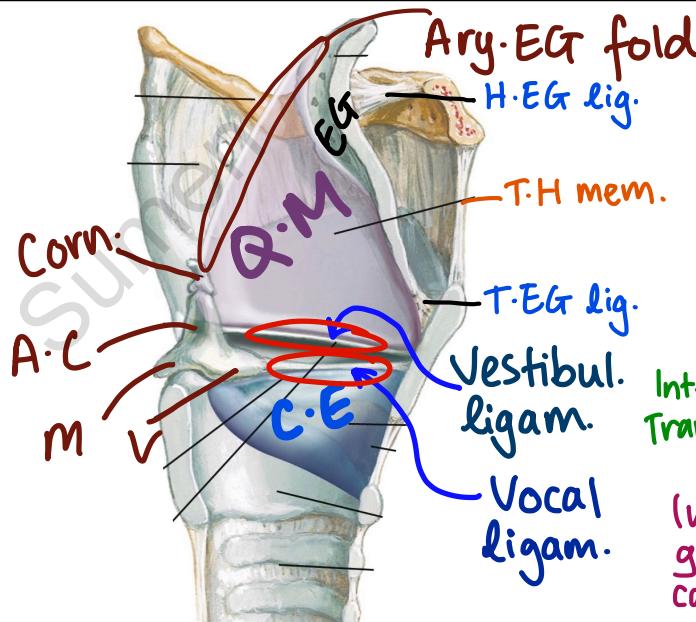
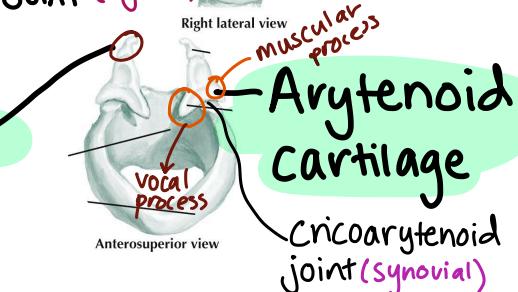
## Corniculate Cartilage



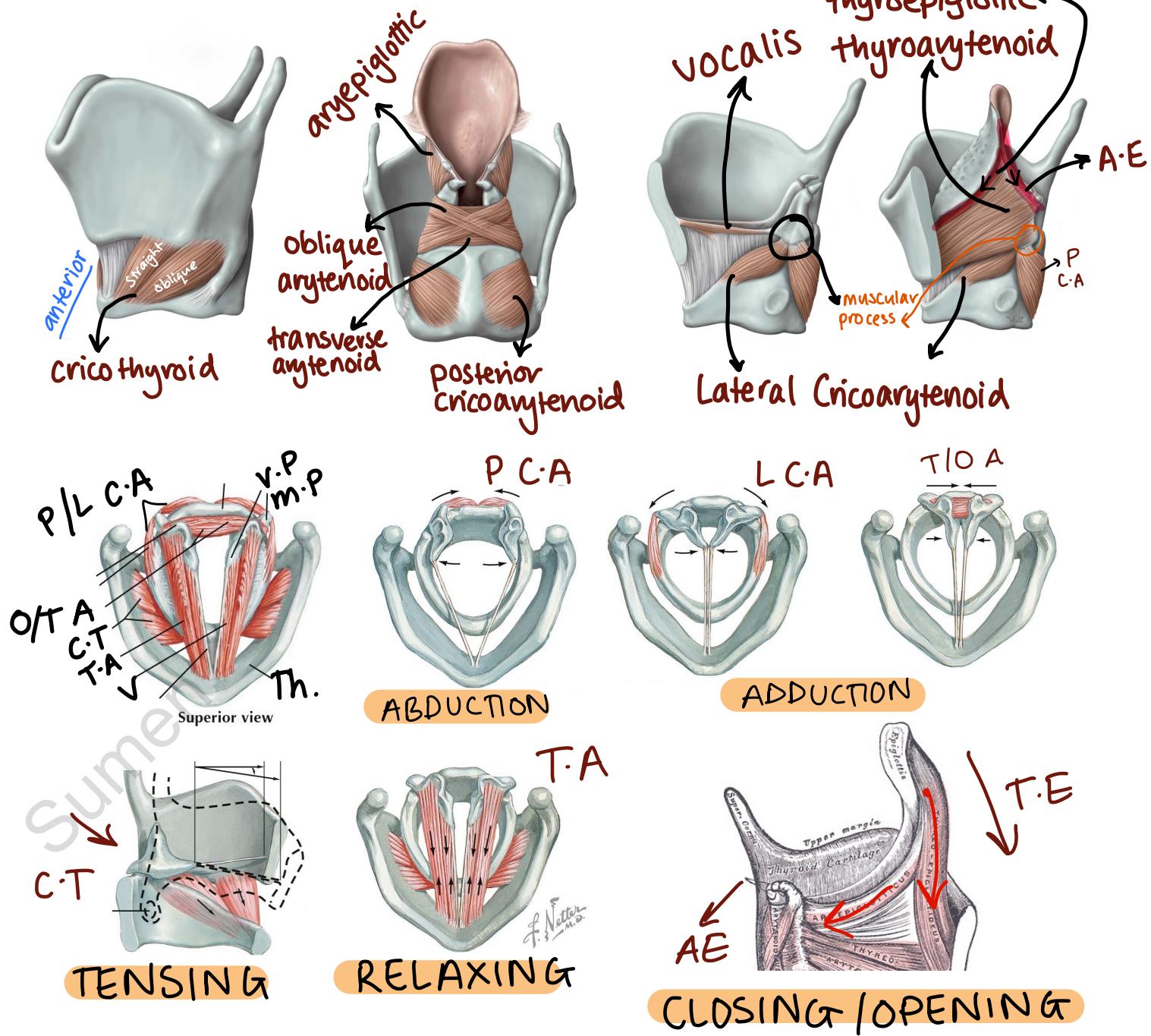
## Cricoid Cartilage



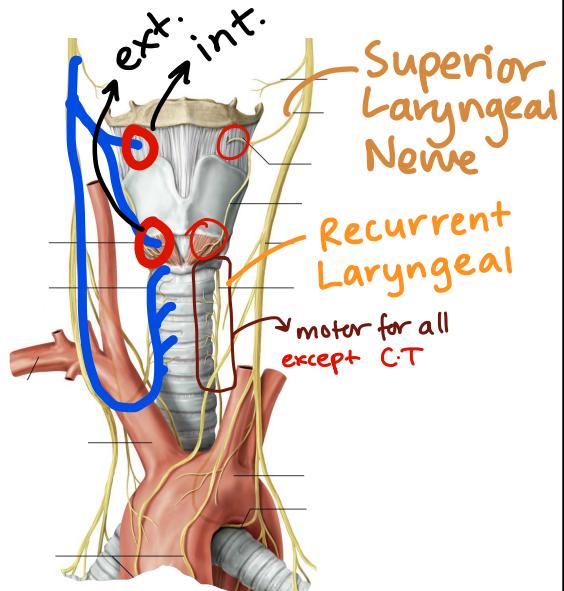
## Corniculate Cartilage



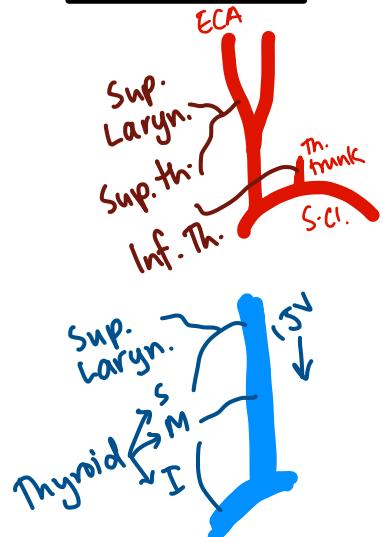
# LARYNGEAL MUSCLES



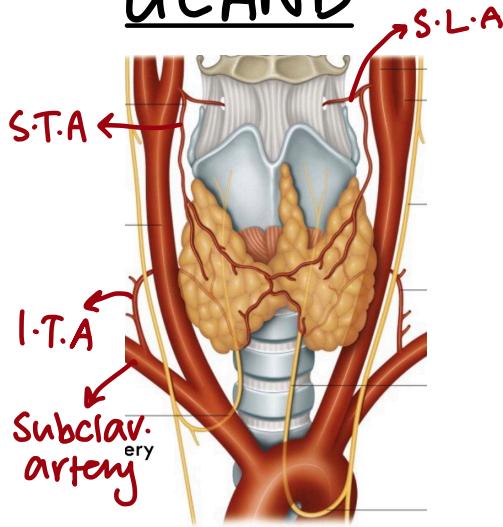
## VAGUS



## BLOOD VESSELS

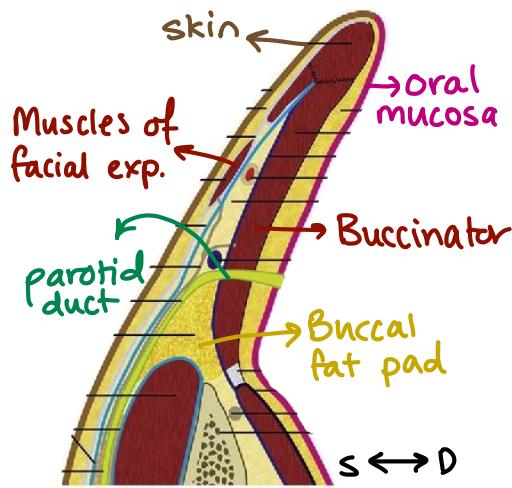
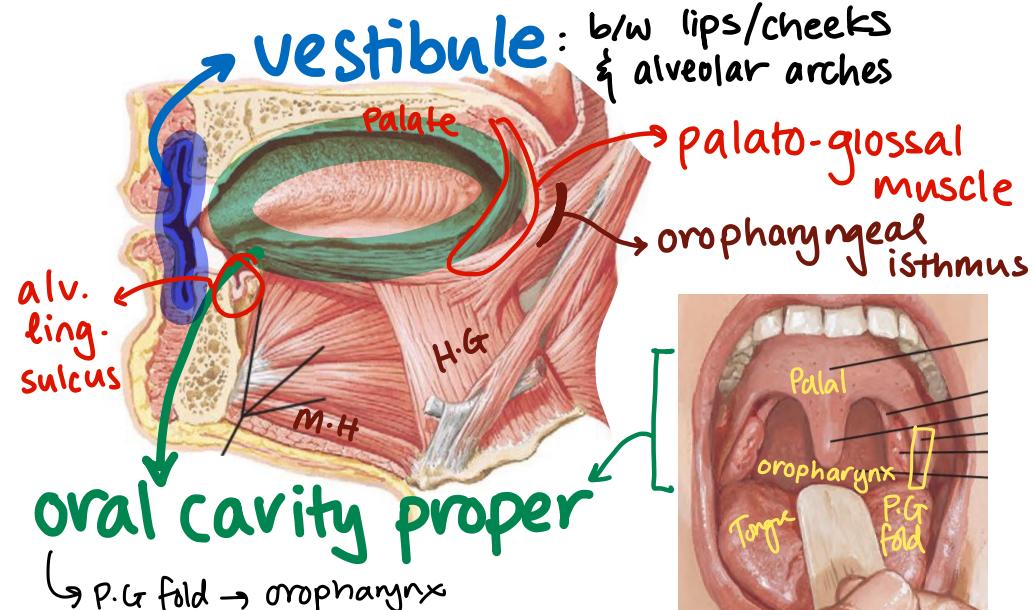


## THYROID GLAND

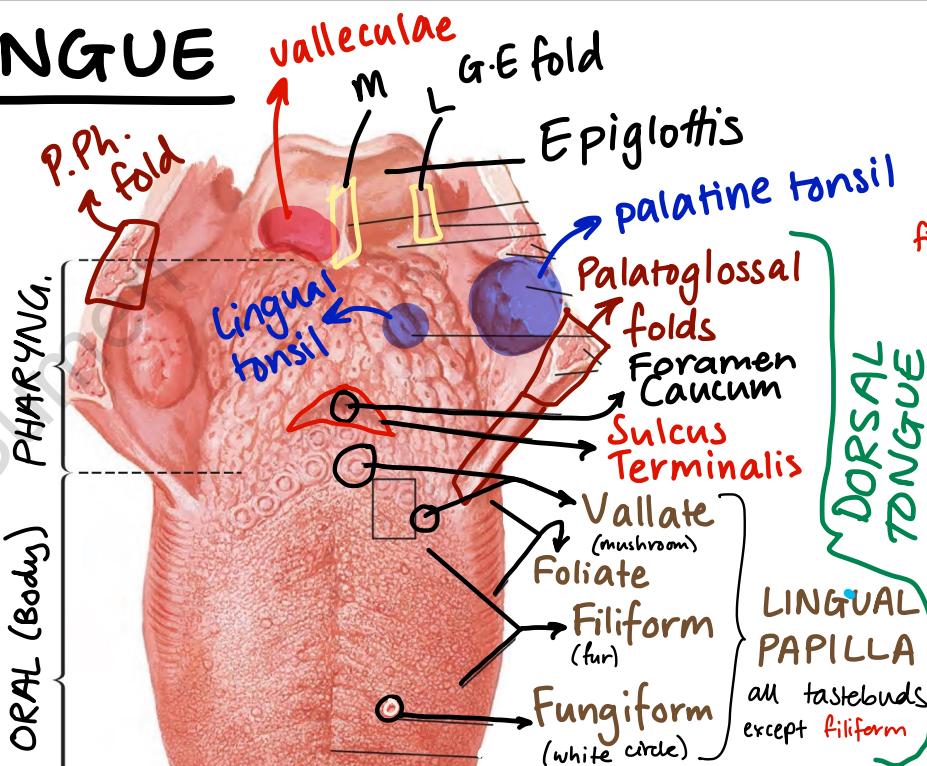


# ORAL CAVITY

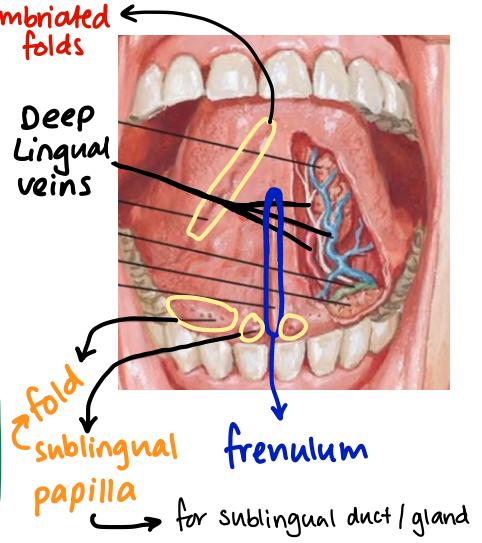
## CHEEK LAYERS



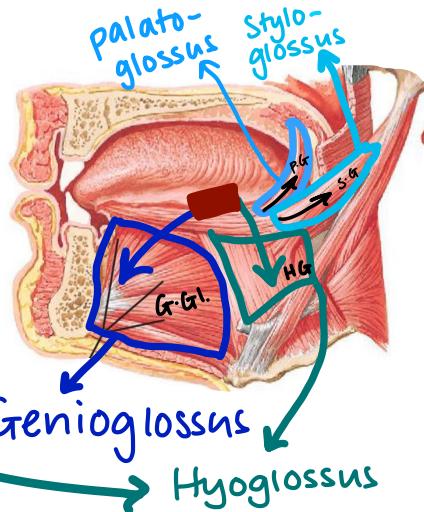
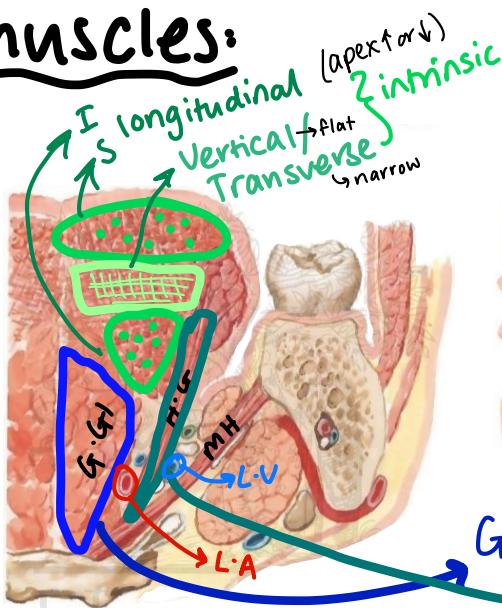
## TONGUE



## VENTRAL TONGUE



## MUSCLES:



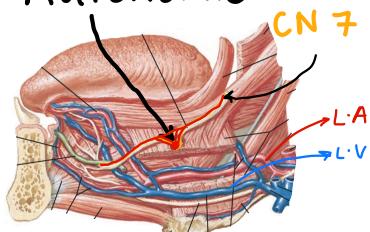
## NERVES

G. Sensory: P: 10, 9  
A: Lingual

Taste: P: 10, 9  
A: 7 (Ch. Ty.)

Motor: Hypoglossal (except P.G.)

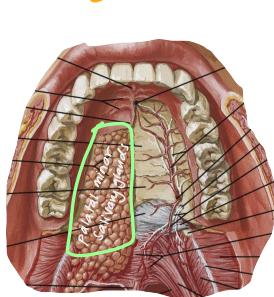
Autonomic: ECA hitchhikers  
CN 7 (Ch. Ty.)



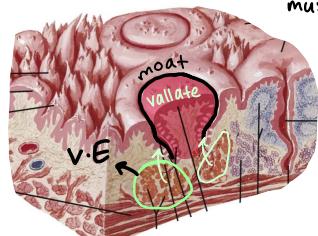
# SALIVARY GLANDS

## Intrinsic:

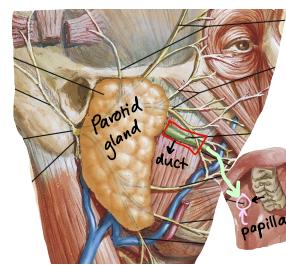
- Buccal, Palatal, Lingual → mucous secreting
- Von Ebner's glands → serous secreting
  - moats around vallate/foliate
- \* Ch.Ty. + G.Petr. (PSNS)



Von Ebner's: scattered b/w oral tongue muscles



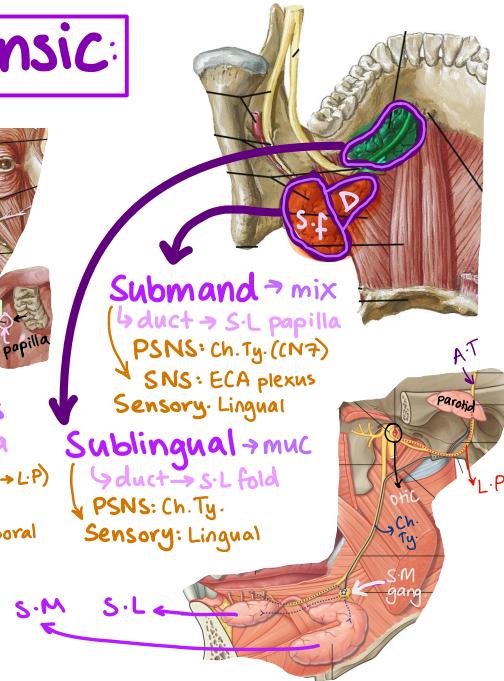
## Extrinsic:



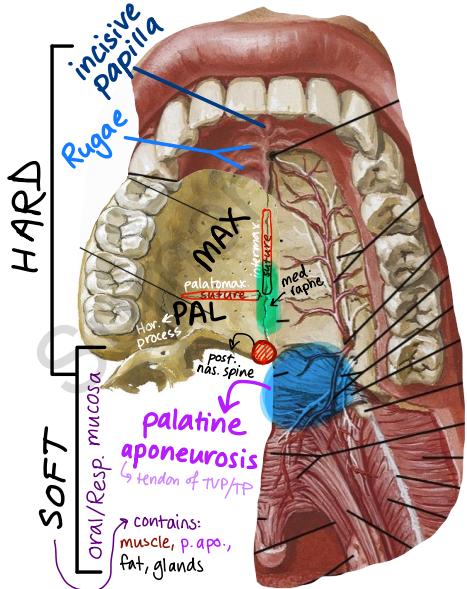
**Parotid** → serous  
↳ duct → papilla  
PSNS: CN9 → AT (otic → L.P)  
SNS: ECA plexus  
Sensory: Auriculotemporal

**Submandibular** → mix  
↳ duct → S-L papilla  
PSNS: Ch.Ty. (CN7)  
SNS: ECA plexus  
Sensory: Lingual

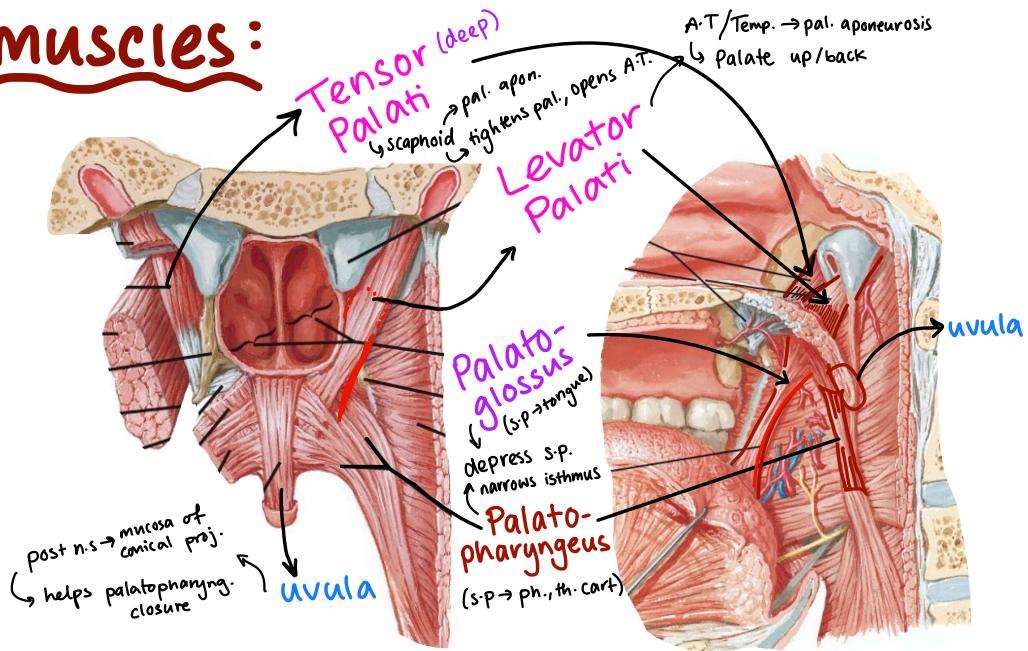
**Sublingual** → muc  
↳ duct → S-L fold  
PSNS: Ch.Ty.  
Sensory: Lingual



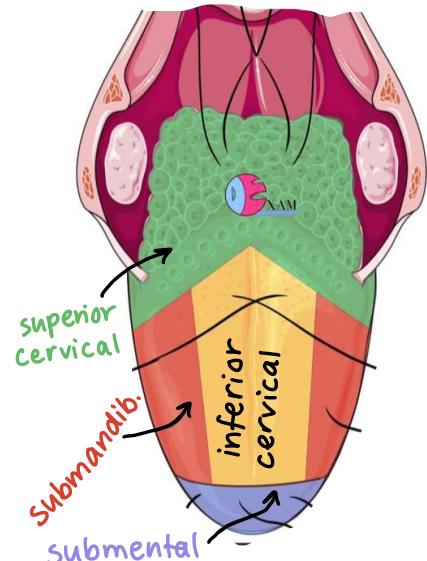
# PALATE



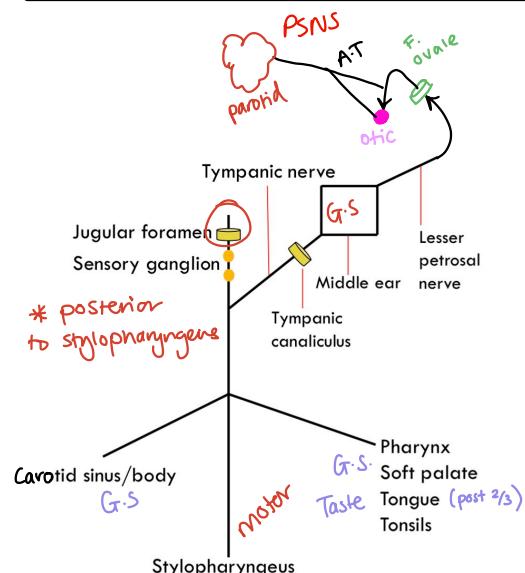
## MUSCLES:



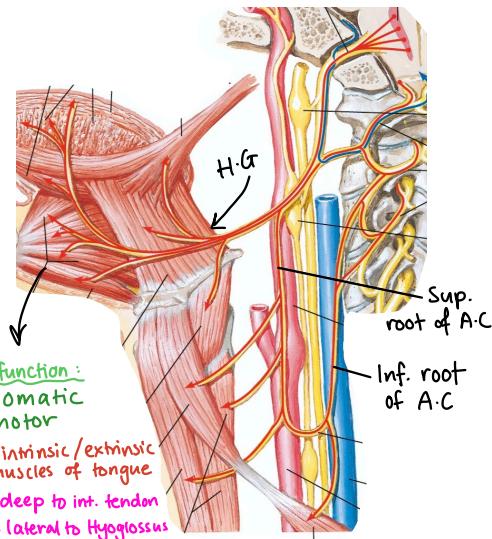
## LYMPH DRAINAGE



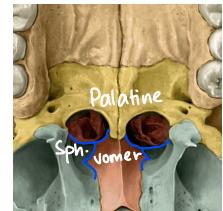
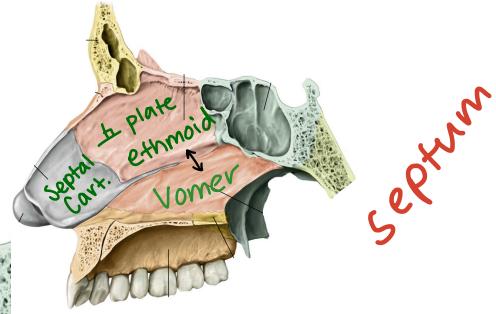
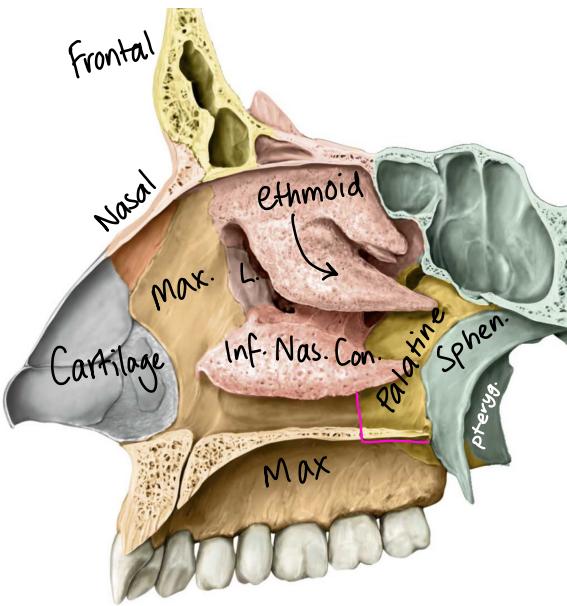
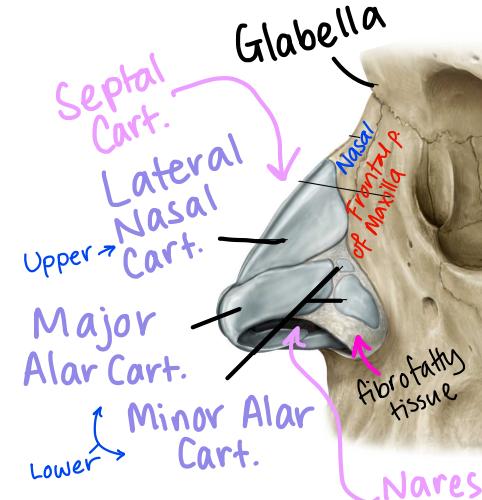
## CN 9: GLOSSOPHARYNG.



## CN 12: HYPOGLOSSAL

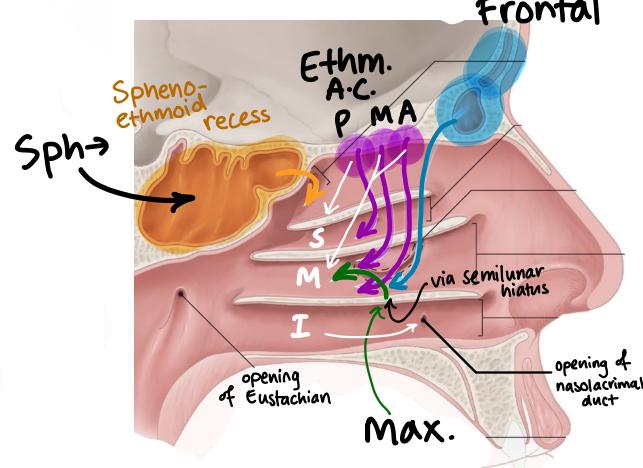
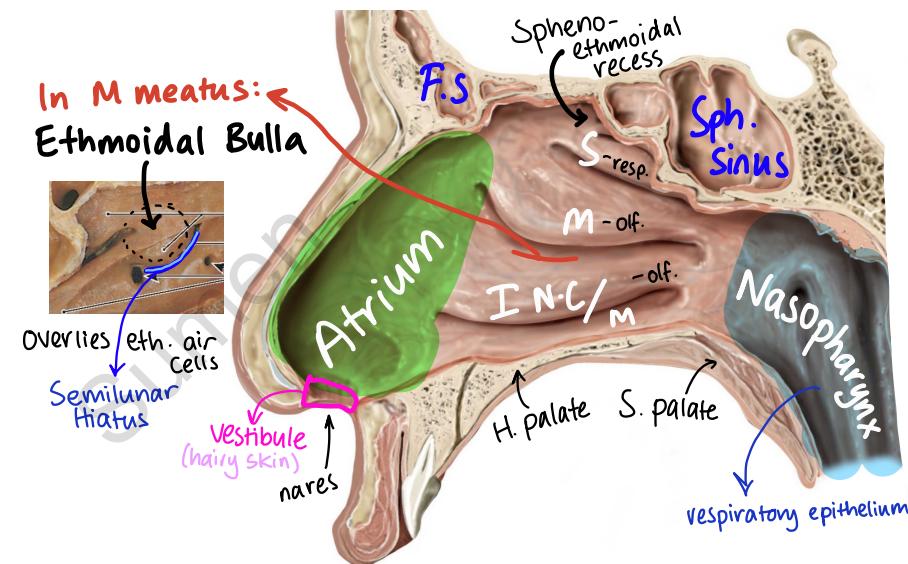


# NOSE

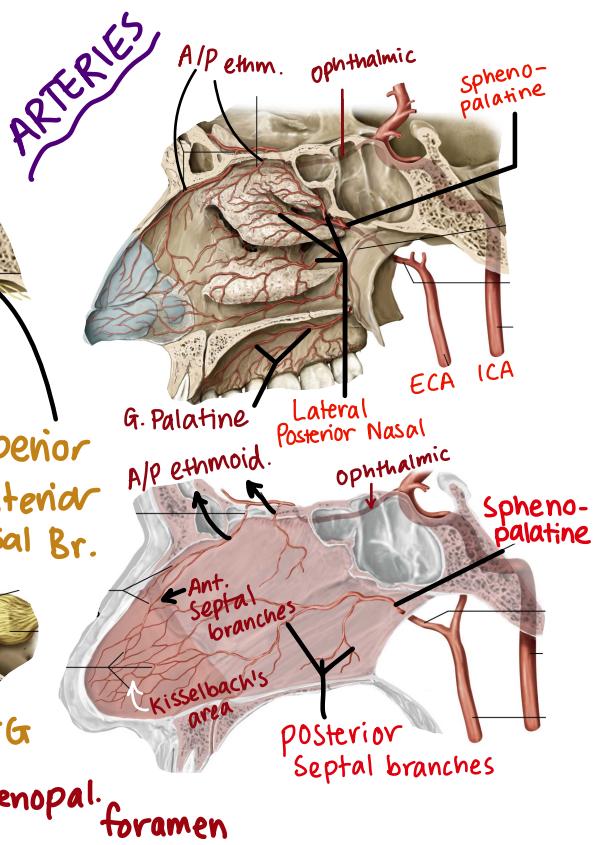
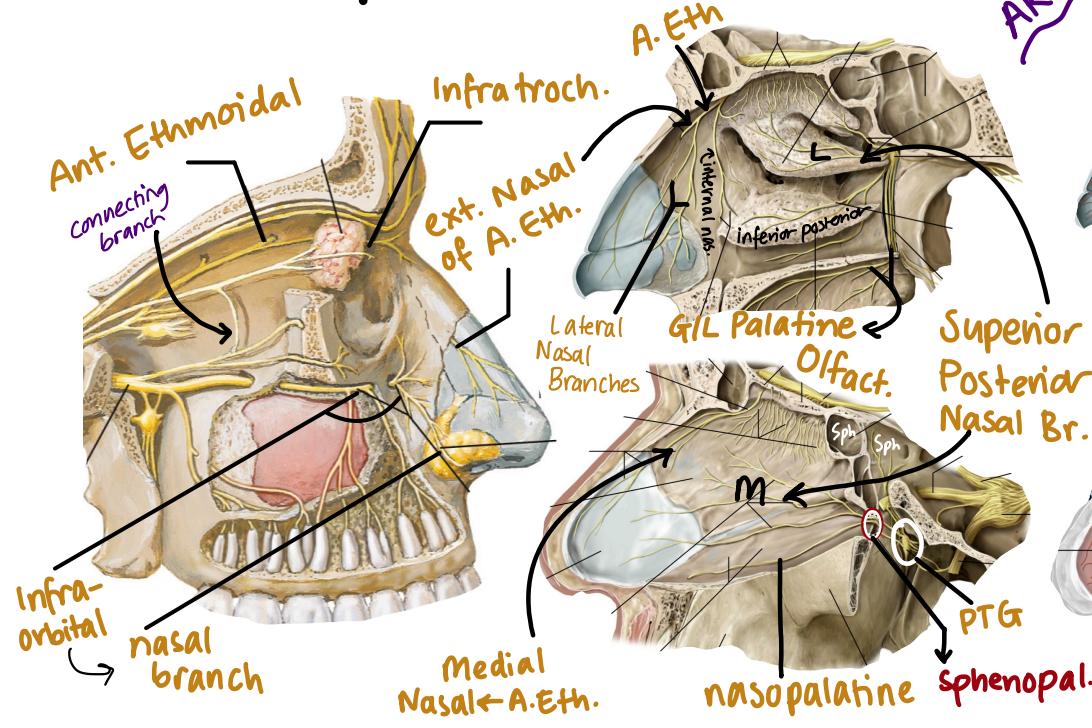


piriform ap.

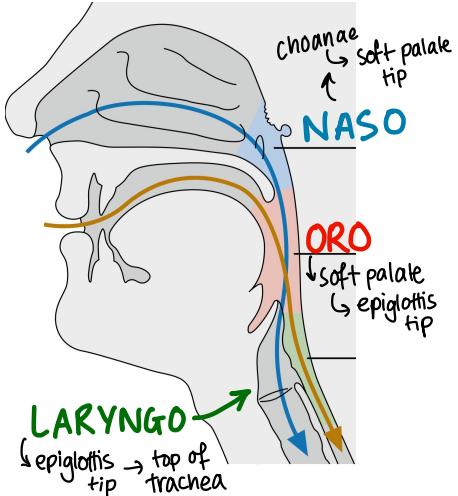
## NASAL CAVITY



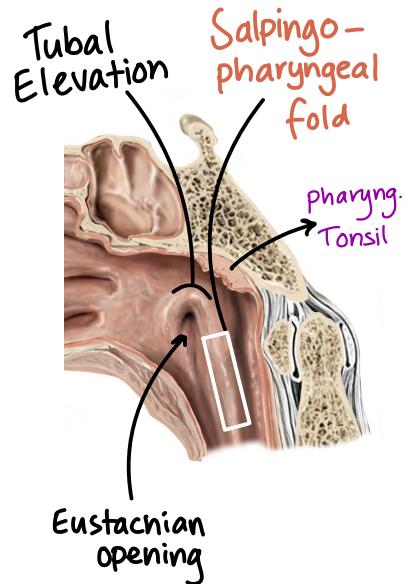
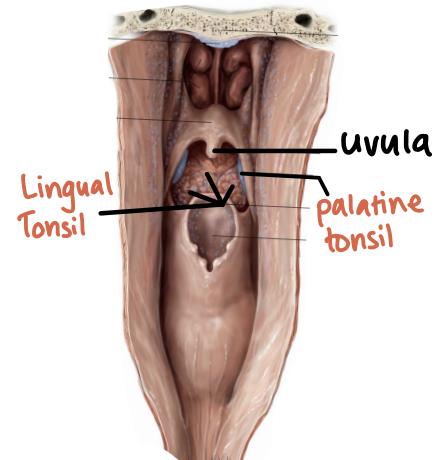
## NERVES & BLOOD VESSELS



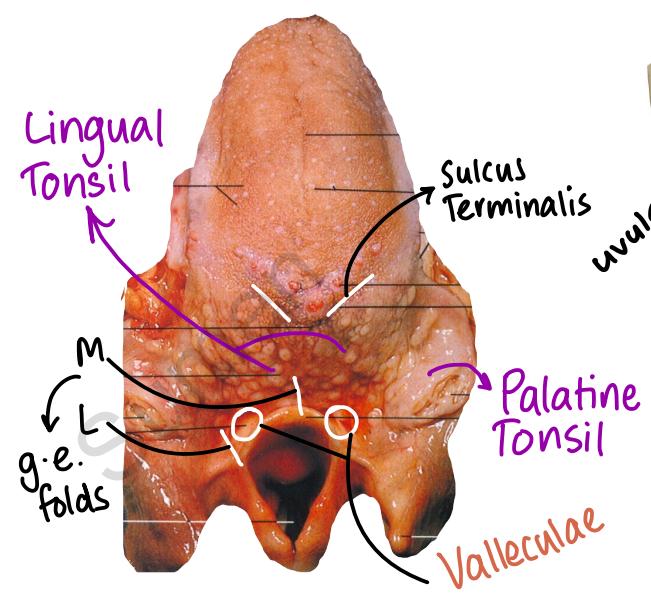
# PHARYNX



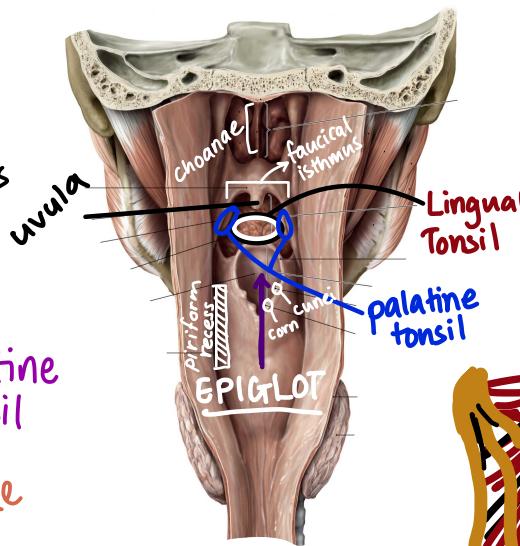
# NASO



# ORO



# LARYNGO



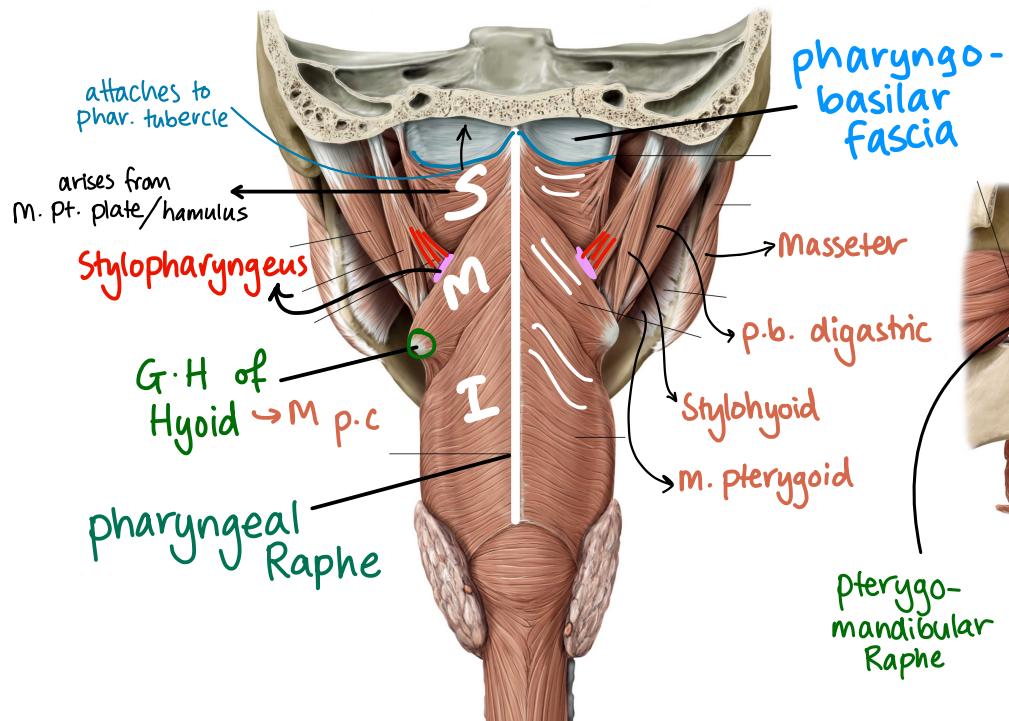
# INNERVATION

## Pharyngeal Plexus

- glossophar.
- vagus
- S.C.G fibres
- recurrent/external laryngeal branch (Vagus → Inf con)
- ph. branch - PTG (→ post. nasopharynx)

# MUSCLES

## Constrictors



## Elevators

### Palatopharyng.

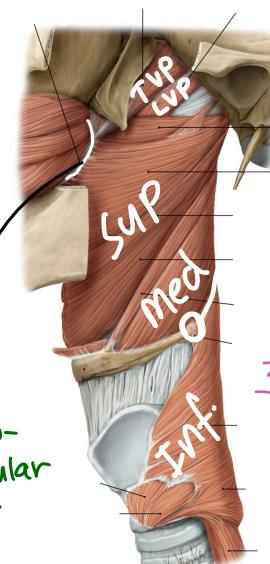
post. hard palate  
↳ thyroid cartilage

### Salpingopharyng.

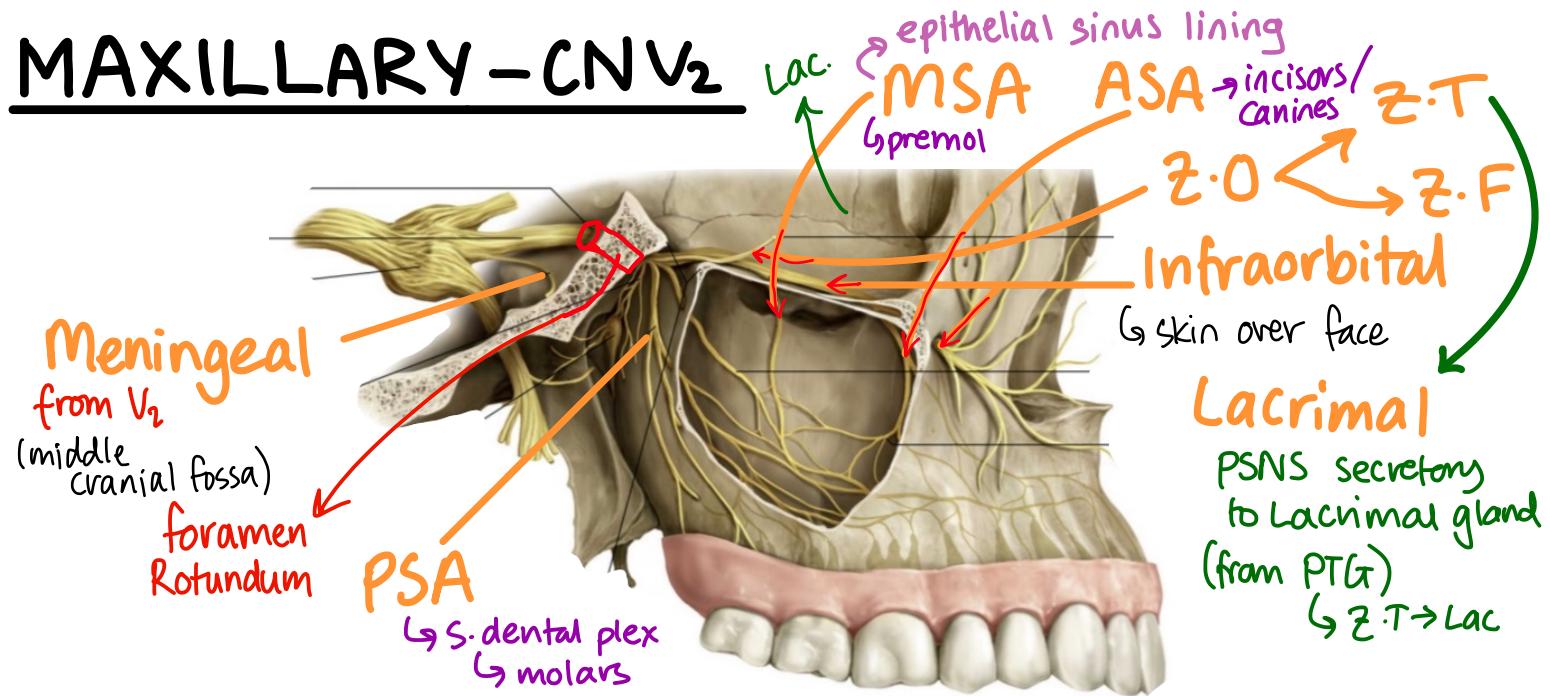
Cartilagenous and. tube  
↳ palatopharyngens

### Stylopharyng.

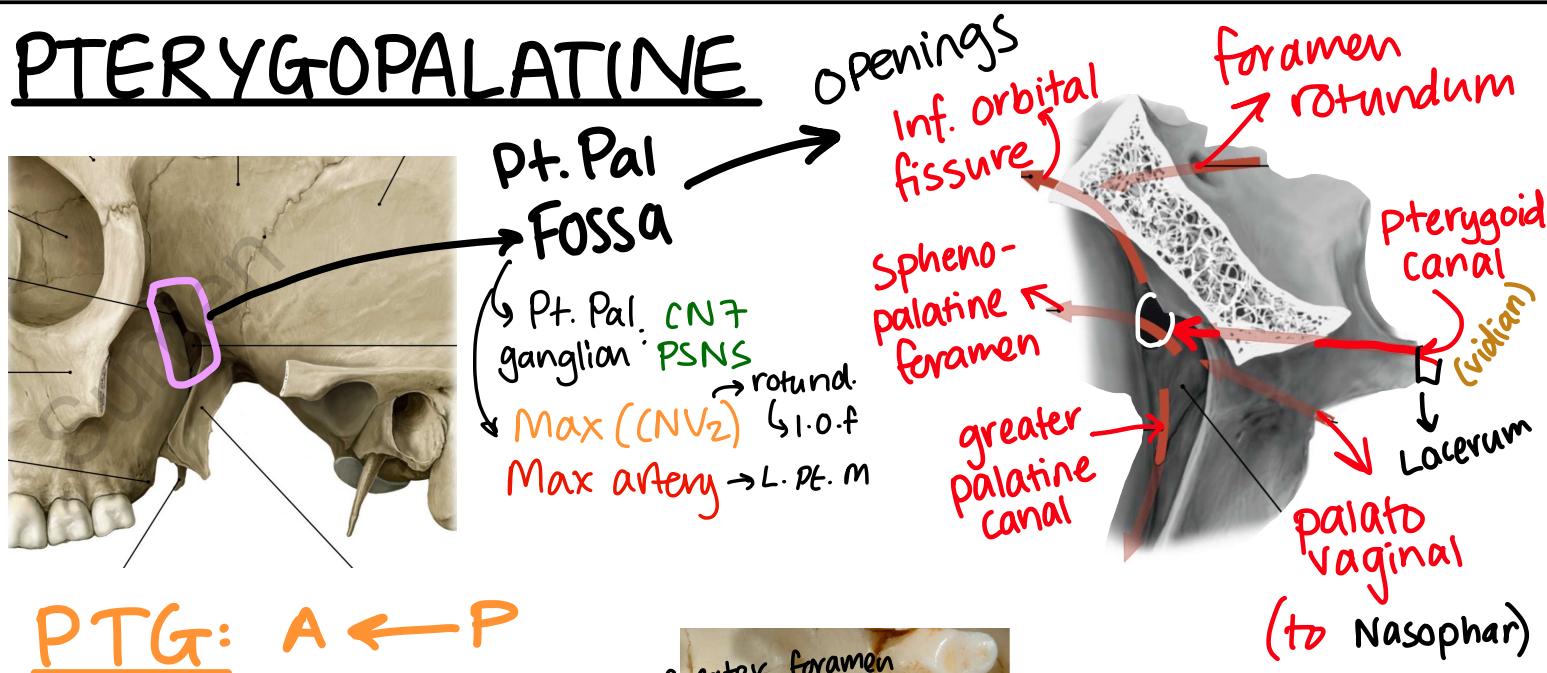
Styloid process  
↳ S/I phar. constr.



# MAXILLARY - CN V<sub>2</sub>



## PTERYGOPALATINE



PTG: A ← P

