

# NECK



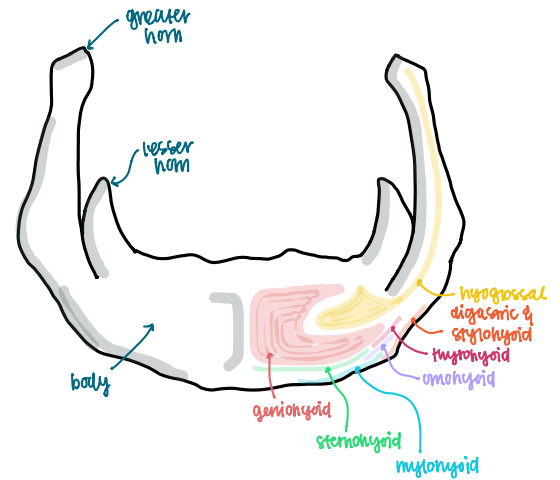
## NECK REGIONS

- ↳ Borders: sternal notch, clavicle, 1st rib, & IV disc C7-T1 → base of skull & lower border of mandible
- ↳ Regions: posterior paraspinal region, posterior cervical triangle, anterior neck region

## SUPERFICIAL ANTERIOR NECK

### Hyoid Bone

- ↳ important for swallowing
- ↳ U-shaped
- ↳ body: thick anterior portion
- ↳ greater horns: the sides curve posteriorly
- ↳ lesser horns: arise from the upper lateral margins of the body
- ↳ is suspended in the anterior neck
- ↳ just superior to the thyroid cartilage of the larynx
- ↳ connected to the thyroid cartilage by the thyrohyoid membrane & median & lateral thyrohyoid ligaments
- ↳ muscles attach to the body & horns

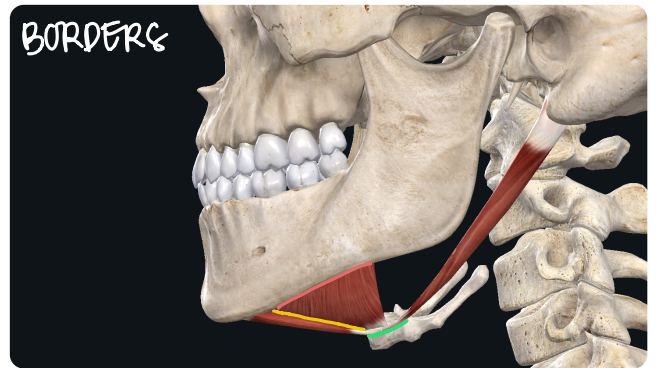


### Suprahyoid Region

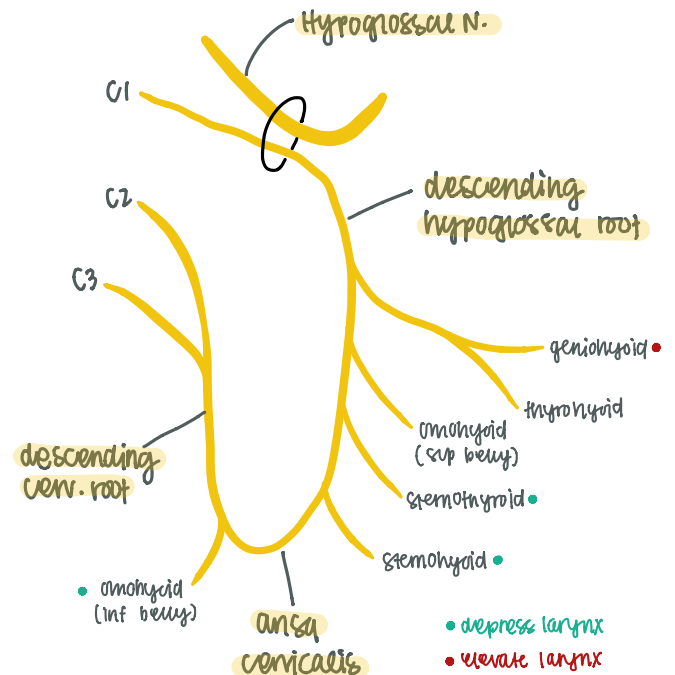
- ↳ triangular region posterior & inferior to chin
- ↳ base: hyoid bone
- ↳ sides: anterior bellies of digastric
- ↳ inferior: skin & cervical fascia
- ↳ superior: mylohyoid mm
  - separates it from oral cavity
  - deep to mylohyoid is sublingual salivary gland & geniohyoid muscle

### ↳ muscles:

- **anterior belly of digastric**
  - ↳ innervation: mylohyoid N from inferior alveolar N off mandibular division of trigeminae
  - ↳ action:
    - elevate & stabilize hyoid
    - depress & retract mandible
- **mylohyoid**
  - ↳ innervation: mylohyoid N from inferior alveolar N off mandibular division of trigeminae
  - ↳ action: elevate hyoid, floor of mouth & tongue
- **geniohyoid**
  - ↳ innervation: C1 through descending hypoglossal
  - ↳ action:
    - elevate & protrude hyoid
    - elevate larynx
    - depress mandible



### BORDER &



## Infrahyoid Region

- ↳ superior: hyoid bone
- ↳ inferior: sternum
- ↳ sides: superior belly of omohyoid (superior) & SCM (inferior)

### ↳ contains:

- **thyroid**: superficial to thyroid cartilage
- **parathyroid glands**: embedded in thyroid (4)

### ↳ muscles: 3 pairs interconnect hyoid, thyroid cartilage, & sternum

- all innervated by ansa cervicalis, except SCM
  - ↳ loop formed by descending hypoglossal N & descending cervical N

#### • sternohyoid

- ↳ innervation: ansa cervicalis
- ↳ action: depresses hyoid

#### • sternothyroid

- ↳ innervation: ansa cervicalis
- ↳ action: depresses thyroid cartilage & hyoid

#### • thyrohyoid

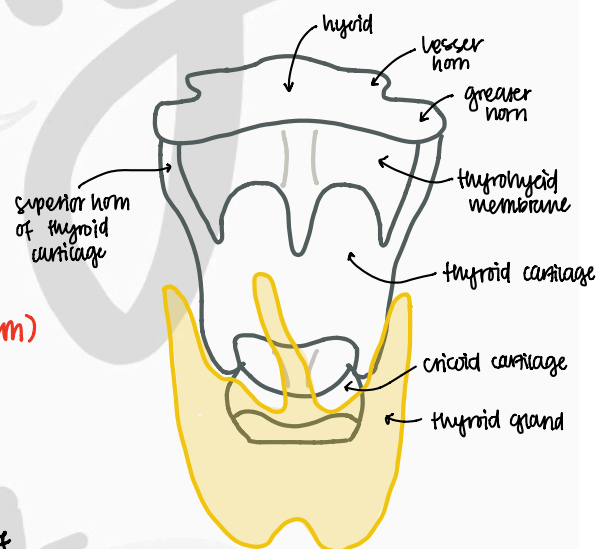
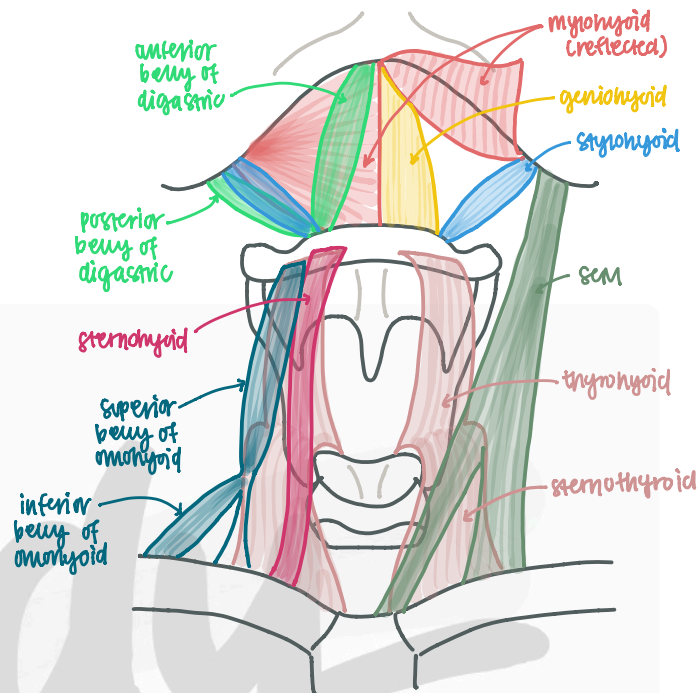
- ↳ innervation: ansa cervicalis
- ↳ action:
  - depresses hyoid
  - elevates thyroid cartilage

#### • omohyoid

- ↳ has superior & inferior bellies (SCM on top splits them)
- ↳ innervation: ansa cervicalis
- ↳ action: depresses & stabilizes hyoid

#### • sternocleidomastoid

- ↳ innervation: spinal accessory N (C2,3)
- ↳ action: ipsi side bending w/ contra rotation, (B) extension of head, (B) C-spine flexion, (B) elevates sternum



\* Torticollis/wryneck: kids disorder where neck is tilted to one side bc short SCM (from spasm/damage at birth)

## Submandibular Region

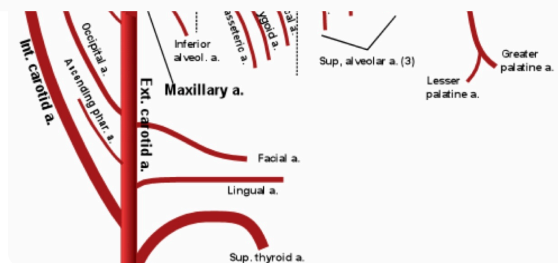
- ↳ superior: inferior body of mandible
- ↳ anterior: anterior digastric
- ↳ posterior: posterior digastric & stylohyoid
- ↳ medial: mylohyoid, hypoglossus, middle pharyngeal constrictor

### ↳ contains:

- submandibular salivary gland
- hypoglossal N: mms of tongue
- mylohyoid N: mylohyoid mm & ant digastric
- lingual N: general sensation to tongue
- lingual A: from external carotid A to tongue
- lingual V
- facial A: from external carotid to face
- facial V

### ↳ submandibular triangle:

- mylohyoid:



- ↳ **innervation**: mylohyoid N from mandibular div of trigeminal
- ↳ **action**: elevate hyoid, floor of mouth & tongue
- **anterior belly of digastric**:
  - ↳ **innervation**: mylohyoid N from mandibular div of trigeminal
  - ↳ **action**: retract mandible
- **posterior belly of digastric**:
  - ↳ **innervation**: posterior auricular branch of facial
  - ↳ **action**:
    - depress, retract mandible
    - retract, elevate, stabilize hyoid
- **stylohyoid**:
  - ↳ **innervation**: cervical branch of facial
  - ↳ **action**: retracts & elevates hyoid
- **hyoglossus**:
  - ↳ **innervation**: hypoglossal N (XII)
  - ↳ **action**: depress & retract tongue
- **middle pharyngeal constrictor**:
  - ↳ **innervation**: vagus N
  - ↳ **action**: constricts middle pharynx for swallowing

## SUBMANDIBULAR

### MAPS to H & M

- M** ylohyoid
- A** nterior Digastric
- P** osterior Digastric
- S** tylohyoid
- H** yoglossus
- M** iddle pharyngeal constr.

## Carotid Triangle

- ↳ superior: posterior digastric
- ↳ inferior: superior belly omohyoid
- ↳ posterior: SCM
- ↳ contains:

- **internal jugular V**
    - ↳ lies deep to SCM
    - ↳ joins the subclavian V to form brachiocephalic V
    - ↳ blood from venous sinuses, facial V, lingual V, superior, middle, & inferior thyroid V drain into this vein
  - **retromandibular V**
    - \* common carotid A, internal jugular V, & vagus nerve run together in neck & covered by carotid sheath
  - **ansa cervicalis**
  - **common carotid A**
    - ↳ from brachiocephalic on (R)
    - ↳ arch of aorta on (L)
    - ↳ internal carotid A → brain
    - ↳ external carotid A → neck & face
- at the split, is the carotid body & carotid sinus
- **superior thyroid A** → thyroid gland & larynx
  - **ascending pharyngeal A** → pharynx, cervical paraspinals
  - **lingual A** → tongue
  - **facial A** → face
  - **occipital A** → posterior scalp
  - **posterior auricular A** → ear & parotid gland
  - **maxillary A** → face, mm of mastication, meninges, oral cavity
  - **superficial temporal A** → side of head & face

## CAROTID

### ARCHIVE

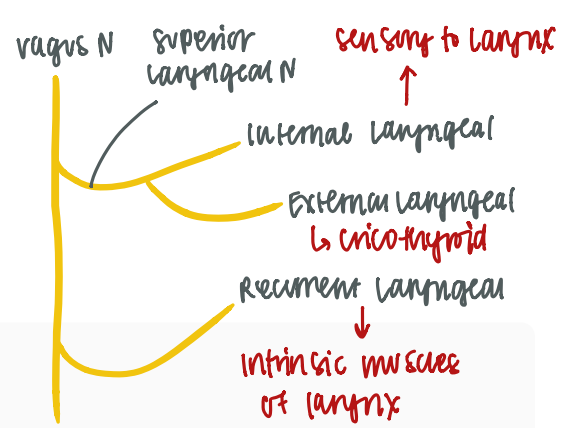
- A** nsa cervicalis
- R** etromandibular V
- C** ommon carotid A
- I** nternal jugular V
- V** agus

## EXT. CAROTID

### Some Angry Ladies Fight off PMS

- S** uperior thyroid A
- A** scending pharyngeal A
- L** ingual A
- F** acial A
- O** ccipital A
- P** osterior auricular A
- M** axillary A
- C** urrential Temporal A

- **vagus N (X)**
- ↳ preganglionic parasympathetic visceral motor to muscles of larynx through recurrent laryngeal N & external laryngeal N
- ↳ general visceral sensory from the larynx by the internal laryngeal N



**Laryngeal Region**

↳ **larynx:**

• **thyroid cartilage:**

- ↳ largest of laryngeal cartilages
- ↳ C-shaped w/ an opening facing posteriorly
- ↳ has a superior & inferior horn on each side
  - superior horn is connected to greater horn of thyroid by a **lateral thyrohyoid ligament**
  - inferior horn is attached to the cricoid cartilage by a **lateral cricothyroid ligament**

• **cricoid cartilage:**

- ↳ circular ring of cartilage
- ↳ narrow anteriorly but wide posteriorly
- ↳ attaches to body of thyroid cartilage by **median cricothyroid ligament**
- ↳ attaches to inferior horn of the thyroid & arytenoid cartilages by the **lateral cricothyroid ligament**

• **arytenoid cartilage:**

- ↳ paired, triangular cartilages
- ↳ superior to posterior border of the cricoid cartilage
  - attaches to cricoid by **posterior cricoarytenoid ligament**
- ↳ **vocal process:** attachment of vocal ligament & vocalis m
- ↳ **muscular process:** attachment for posterior & lateral cricoarytenoid muscles

↳ **larynx attachments:**

- hyoid bone: superior by thyrohyoid membrane
- trachea: inferior by cricotracheal lig

↳ **muscles:**

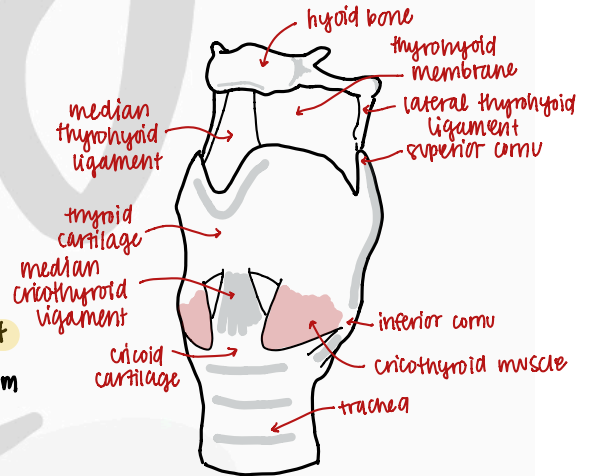
• **extrinsic:** move entire laryngeal complex

- ↳ omohyoid } depress larynx
- ↳ sternohyoid }
- ↳ sternothyroid }
- ↳ stylohyoid }
- ↳ ant & post digastric } elevate larynx
- ↳ mylohyoid }
- ↳ geniohyoid }

• **intrinsic:** change tension in vocal folds

- ↳ posterior cricoarytenoid
  - ↳ lateral cricoarytenoid
  - ↳ transverse & oblique arytenoids
  - ↳ thyroarytenoid
  - ↳ vocalis
  - ↳ cricothyroid
- Innervated by:  
recurrent laryngeal of vagus (X)

Prepara for this vicious Motion  
Preganglionic  
Parasympathetic  
Visceral  
Motor



\* **swallowing:**

- ↳ voluntary oral phase by tongue
- ↳ involuntary pharyngeal phase down larynx
- ↳ involuntary esophageal phase down esophagus

\* **phonation happens in larynx by vocal cords**

\* **damage of vagus N → dysfunction of swallowing & phonation mechanisms**

• innervation: external laryngeal N branch of superior laryngeal N of vagus (X)

↳ sensation of larynx:

- internal laryngeal N branch of superior laryngeal N of vagus (X)

## DEEP ANTERIOR NECK

### CONTENTS

- ↳ internal jugular V
- ↳ brachiocephalic A
- ↳ carotid A
- ↳ subclavian A
  - vertebral A → brain *she very intimately touches the tip of C1*
  - internal thoracic A → ribcage & infrahyoid muscles
  - costocervical trunk
    - ↳ deep cervical A → deep neck muscles
    - ↳ superficial intercostal A → upper intercostal spaces
  - thyrocervical trunk → inf. thyroid A, suprascap A, transverse cervical A, & ascending cervical A
- ↳ vagus N
- ↳ hypoglossal N
- ↳ lingual N
- ↳ cervical portion of sympathetic trunk → deep to carotid sheath
- ↳ deep anterior cervical mms
  - longus capitis & coli

### MUSCLES

↳ longus capitis

- innervation: C1, C2, C3
- action: flexion of head

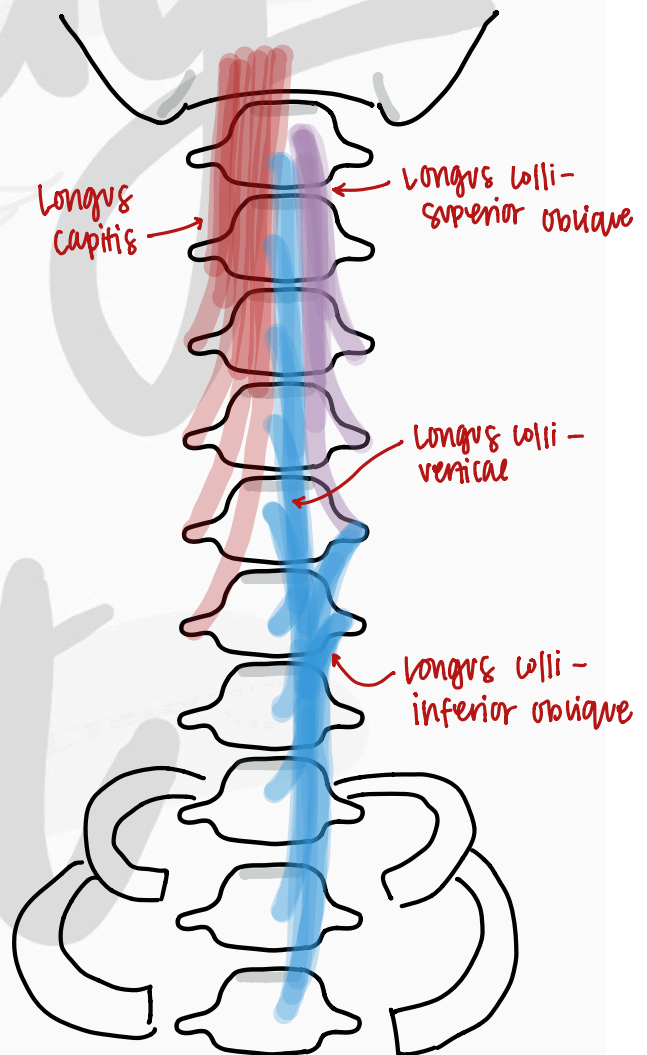
↳ longus coli

- superior oblique portion → transverse process
- inferior oblique → transverse process
- vertical → body
- innervation: C2 - C7 (C6)
- action: flexion of neck

↳ rectus capitis

- anterior
- lateralis
- innervation: C2, C3
- action:

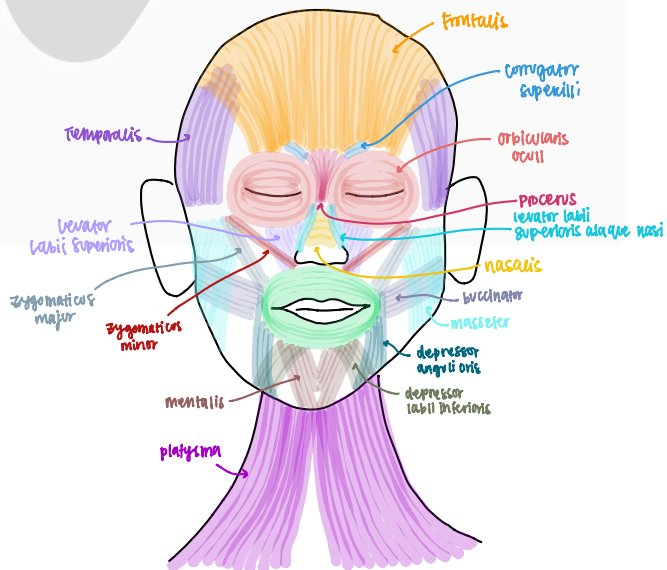
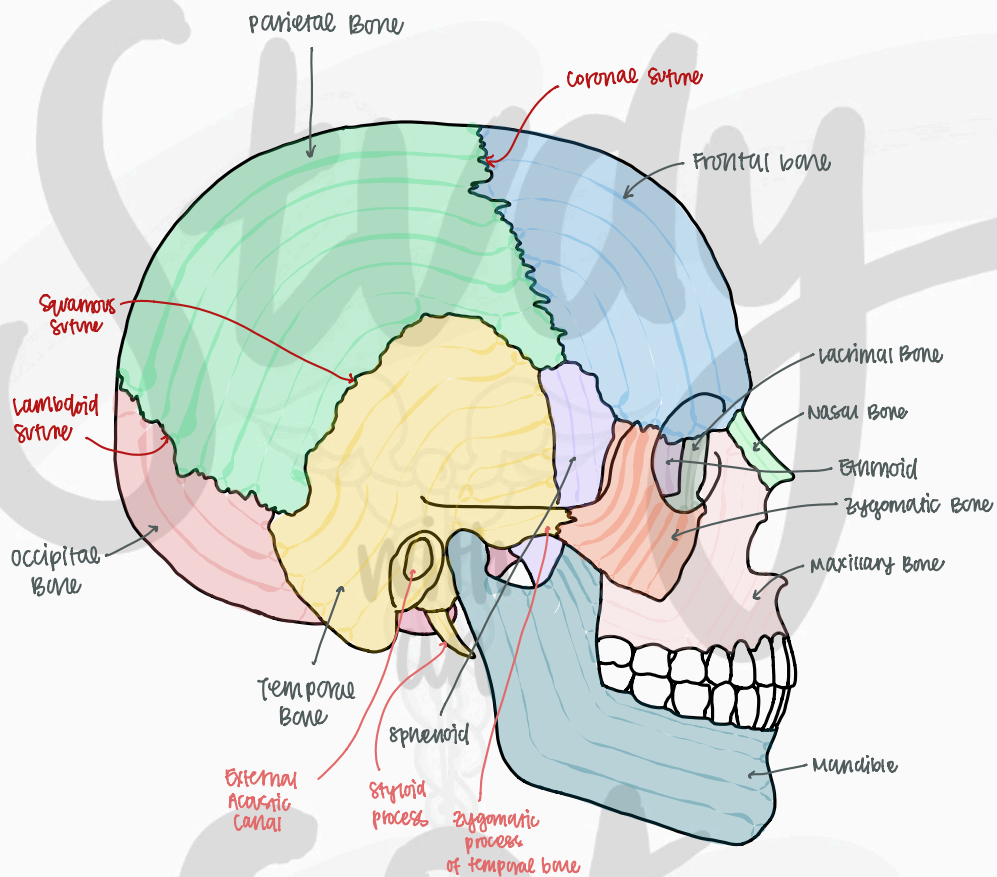
- ↳ flexion & lateral flexion of head
- ↳ stabilization of skull on C-spine



# HEAD

## CRANIAL BONES

Lateral view



# TRIGEMINAL NERVE

↳ general sensation to the face (except for muscles of mastication)

## Ophthalmic Division

↳ sensory: skin of forehead & nose

↳ frontal N.:

- supraorbital N. → mid & lat forehead
- supratrochlear N. → mid & lat forehead

↳ nasociliary N. → infratrochlear N. → root of nose

## Maxillary Division

↳ sensory: below eyes & above mouth

- face, upper teeth, & palate

↳ infraorbital N. → side of nose, lower eyelid, below eye, upper lip

↳ zygomatic:

- zygomaticofacial N. → zygomatic arch
- zygomaticotemporal N. → skin just lateral to eye

## Mandibular Division

↳ MOTOR & SENSORY

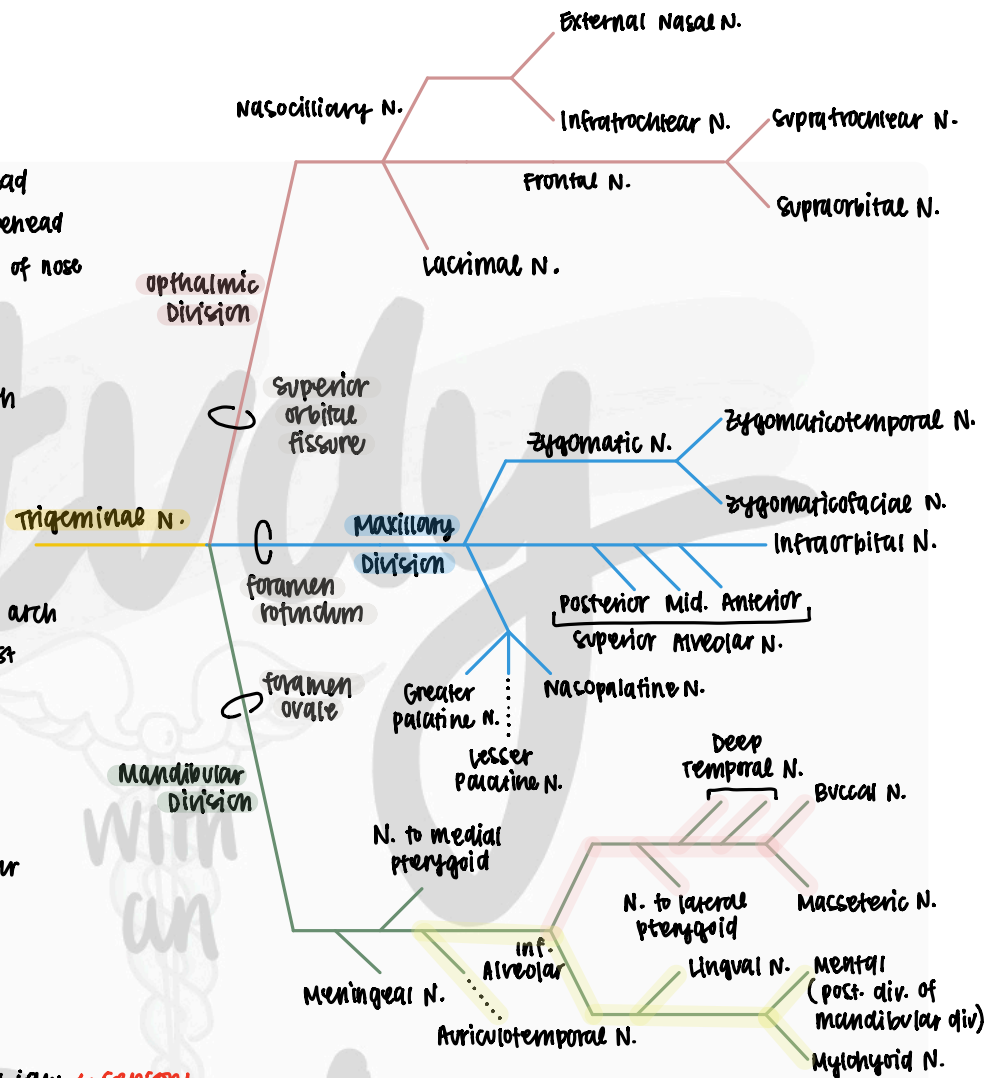
↳ sensory: lower jaw & anterior to ear

↳ anterior division:

- masseteric N. → masseter
- deep temporal N. → temporalis
- N. to lateral pterygoid
- buccal N. → skin of cheek & lateral jaw ← sensory

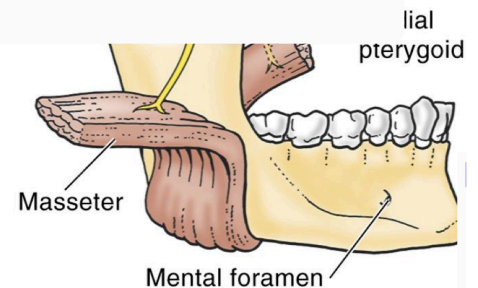
↳ posterior division:

- auriculotemporal N. → skin anterior to ear & parotid gland & lateral scalp
- lingual N. → sensation to ant. tongue
- inferior alveolar N. → sensation to mandible & teeth → mylohyoid N. ← motor
- ends as mental N. → skin of chin



Ant. Div.

oralis



# MUSCLES OF FACIAL EXPRESSION

↳ All muscles innervated by FACIAL N (CN 7)

• except levator palpebrae superioris occulomotor N (CN 3)

## Forehead

↳ **frontalis**: elevates eyebrows

• creates transverse forehead lines when contracted

## Eye

↳ **orbicularis oculi**: full closure

↳ **levator palpebrae superioris**: opens

↳ **corrugator**: depress eyebrows

## Nose

↳ **nasalis**: compress/dilate nostril

↳ **procerus**: medial brow down, wrinkles skin of nose

• contraction creates ridges on nasal bridge – "bunny lines"

## Cheek

↳ **buccinator**: cheek inward, blow & suck

• "blow a trumpet"

## Mouth

↳ **orbic oris**: protrude lips, close

↳ **zygomaticus maj/min**: elevate angle of mouth (up & out)

↳ **levator labii superioris**: elevate (raise & protrude) upper lip

↳ **levator anguli oris**: raises angle

↳ **risorius**: retract corners laterally

↳ **depressor anguli oris**: sides of lips angled down

↳ **depressor labii inferioris**: lower lip angled down & out

↳ **mentalis**: depress medial lower lip & raises skin of chin "pout"

## Neck

↳ **platysma**: depress lower lip, assist w/ mouth opening

## Clinical point

↳ **Bell's palsy**:

- unilateral paralysis of muscles of facial expression
- inflammation of facial N → often infection in parotid region
- recovery slow

↳ **facial paralysis**:

- trauma
- surgery
- severe infection
- symptoms: loss of taste to anterior tongue, decreased salivation from sublingual & submandibular glands
- **SENSATION TO FACE INTACT** → sensory is from trigeminal N



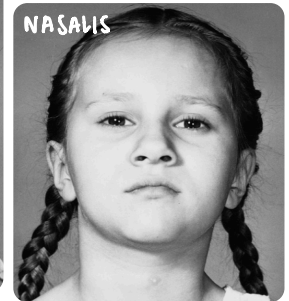
FRONTALIS



PRO CERUS



CORREGATOR



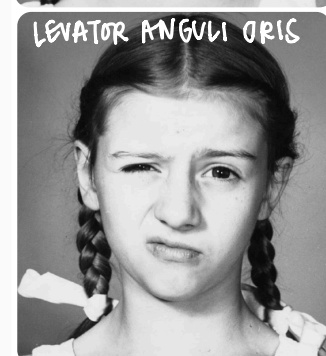
NASALIS



RISORIVS



BUCCINATOR



LEVATOR ANGULI ORIS



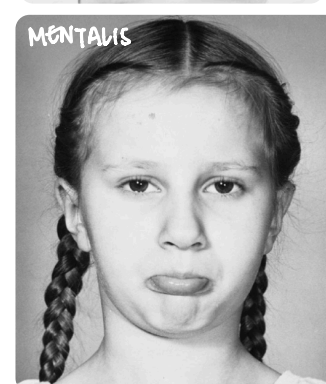
ORBICULARIS ORIS



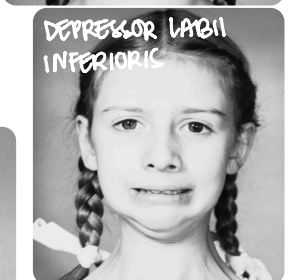
ZYGMATICUS MAJOR



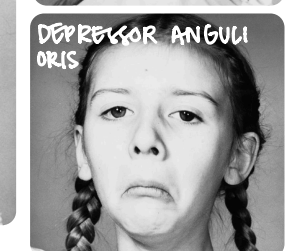
LEVATOR LABII SUPERIORIS



MENTALIS



DEPRESSOR LABII INFERIORIS



DEPRESSOR ANGULI ORIS



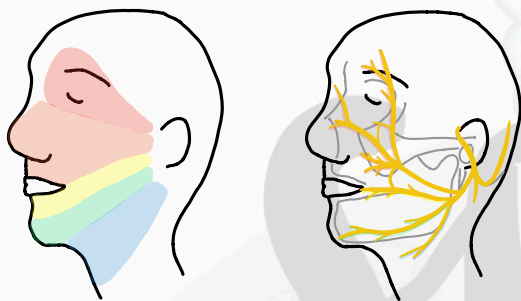
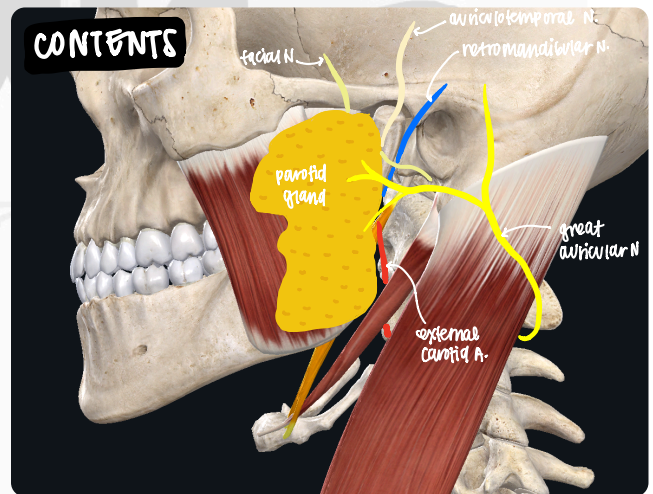
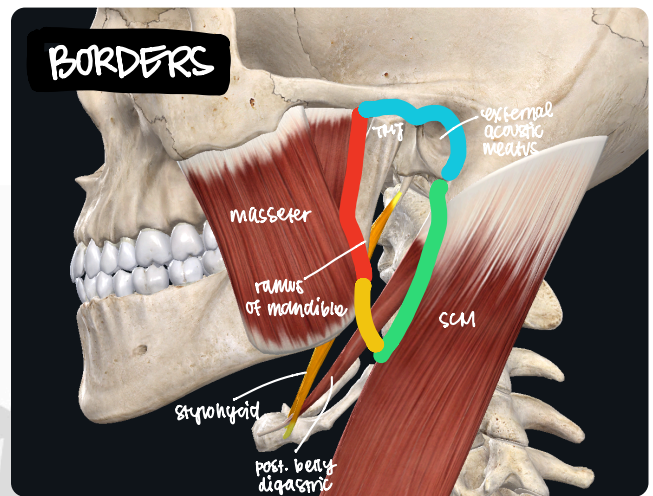
# PAROTID REGION

## Boundaries

- L anterior: ramus of mandible, masseter, medial pterygoid muscles
- L posterior: mastoid process of temporal bone, anterior border of SCM
- L superior: external auditory meatus & TMJ
- L inferior: posterior belly of digastric & stylohyoid

## Contents

- L parotid gland
- L auriculotemporal N (mandibular div. of V)
- L greater auricular N (C2,3)
- L external carotid A & 3 branches
- L retromandibular v.
- L facial N
  - passes through parotid gland
  - posterior auricular N to posterior belly digastric
  - 5 terminal branches (4 anterior)
  - L temporal: mm above & around eye
  - L zygomatic: below eye & upper cheek
  - L buccal: buccinator & mm in lower cheek, upper mouth
  - L mandibular: mm around & below mouth
  - L cervical: platysma, stylohyoid



Talented Zebra's Bake Many Cookies Professionally

T emporal  
Z ygomat  
B uccal

M andibular  
C ervical  
P osterior auricular

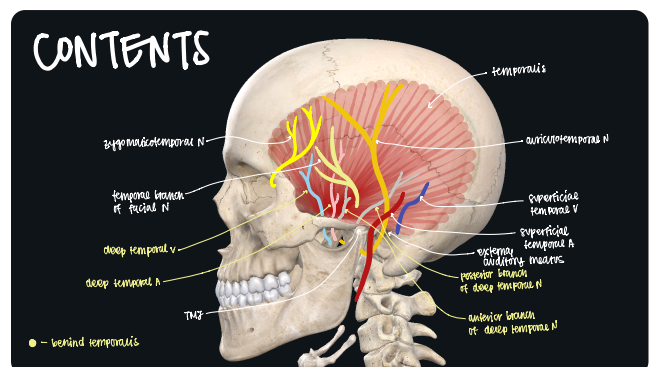
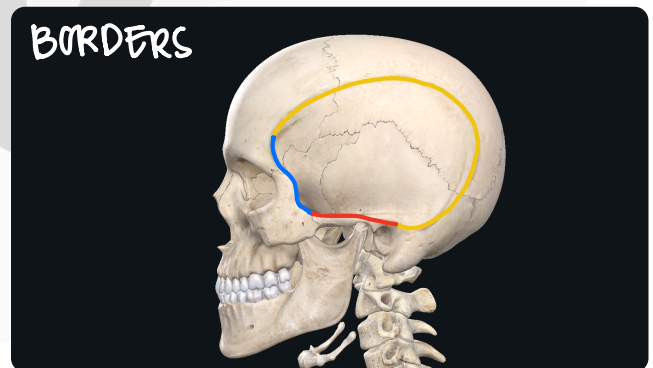
# TEMPORAL REGION

## Boundaries

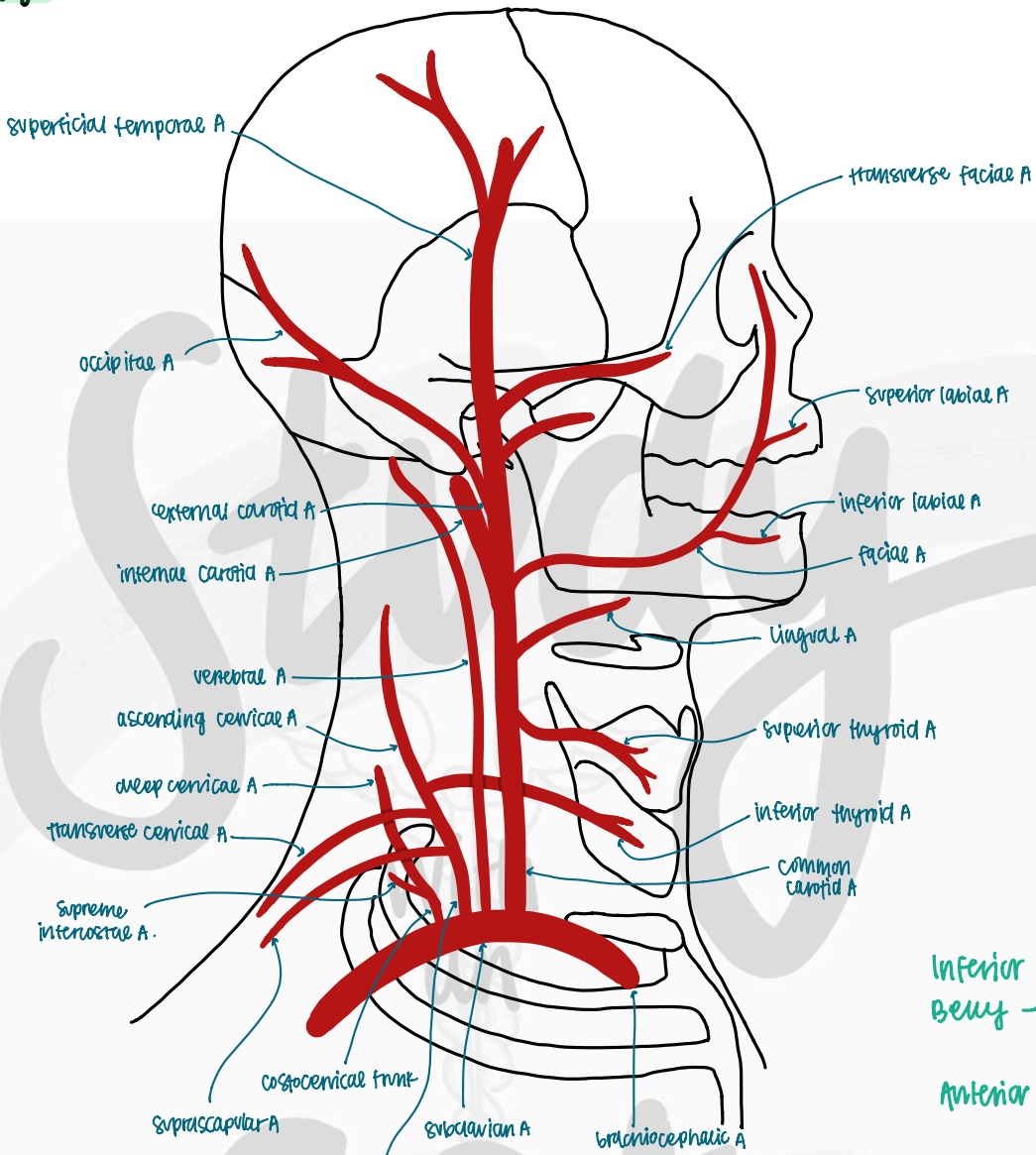
- L inferior: parotid region
- L anterior: frontal process of zygomatic bone
- L posterior: root of zygomatic process of temporal bone

## Contents

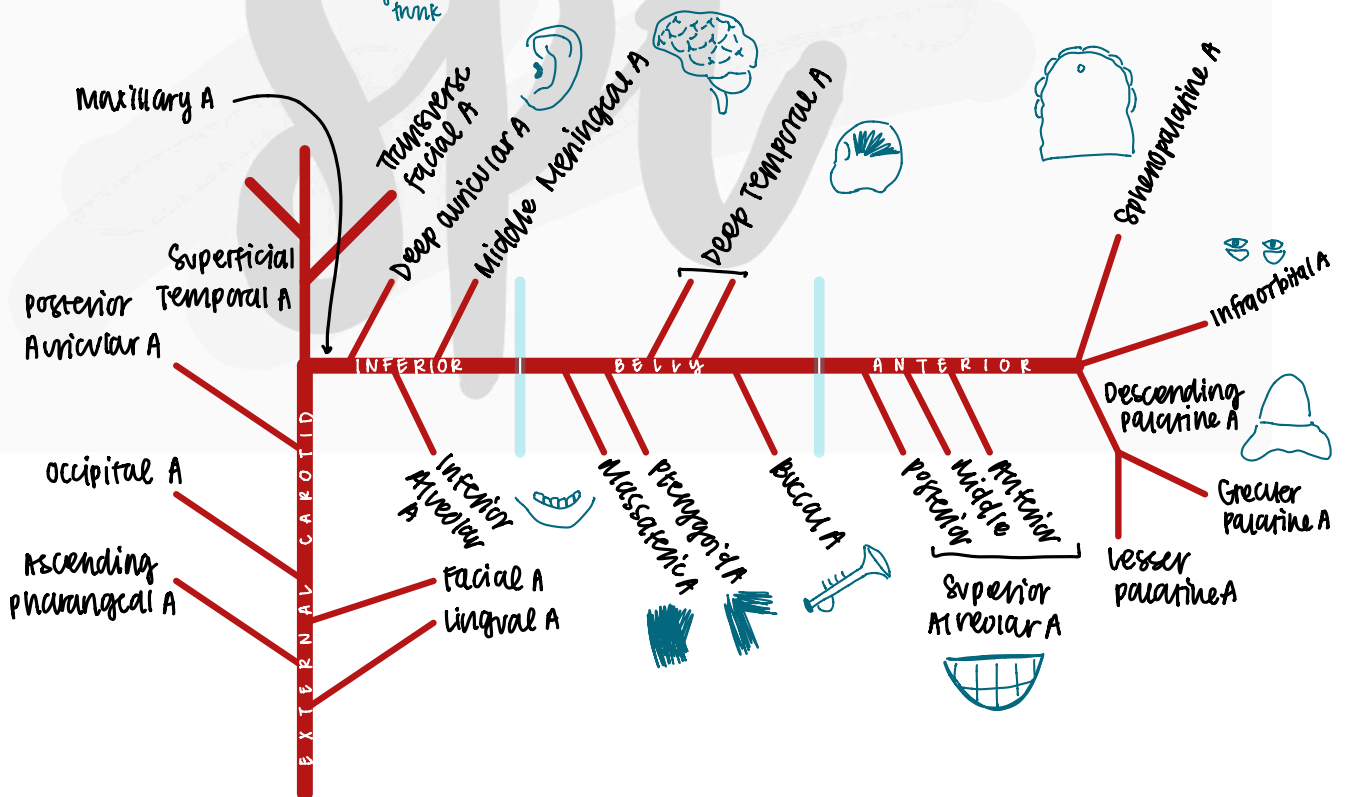
- L temporalis m.
- L nerves:
  - temporal branches of facial N
  - auriculotemporal N (mandibular div. of CN5)
  - deep temporal Ns (mandibular div. of CN5)
  - zygomaticotemporal N (maxillary div. of CN5)
- L superficial & deep temporal blood vessels
- L TMJ
- L external auditory meatus



# BLOOD SUPPLY



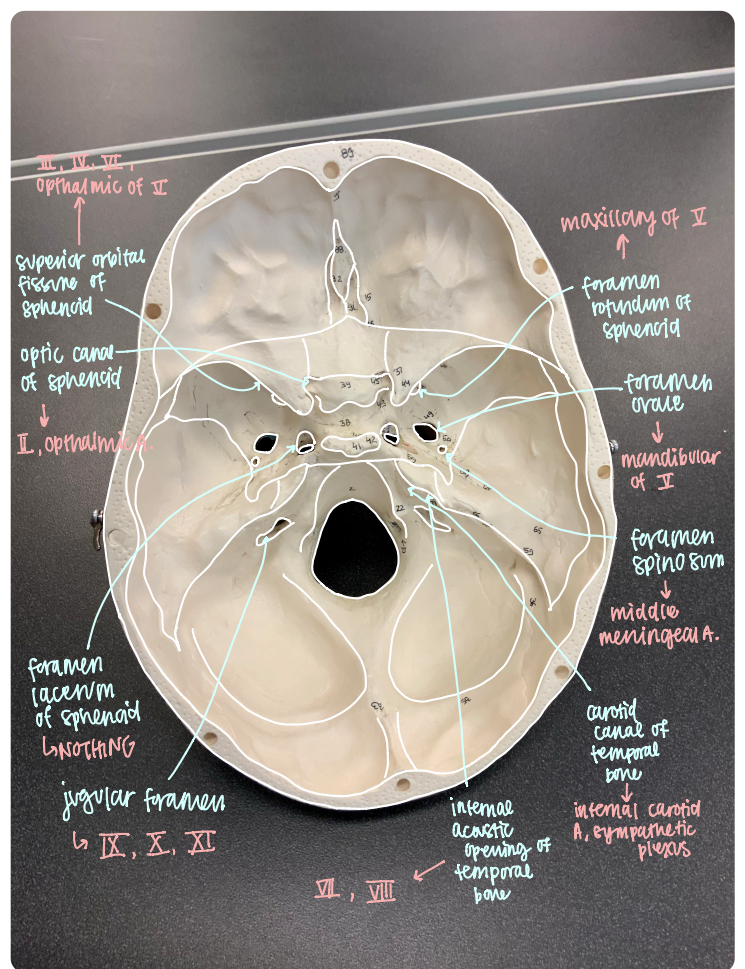
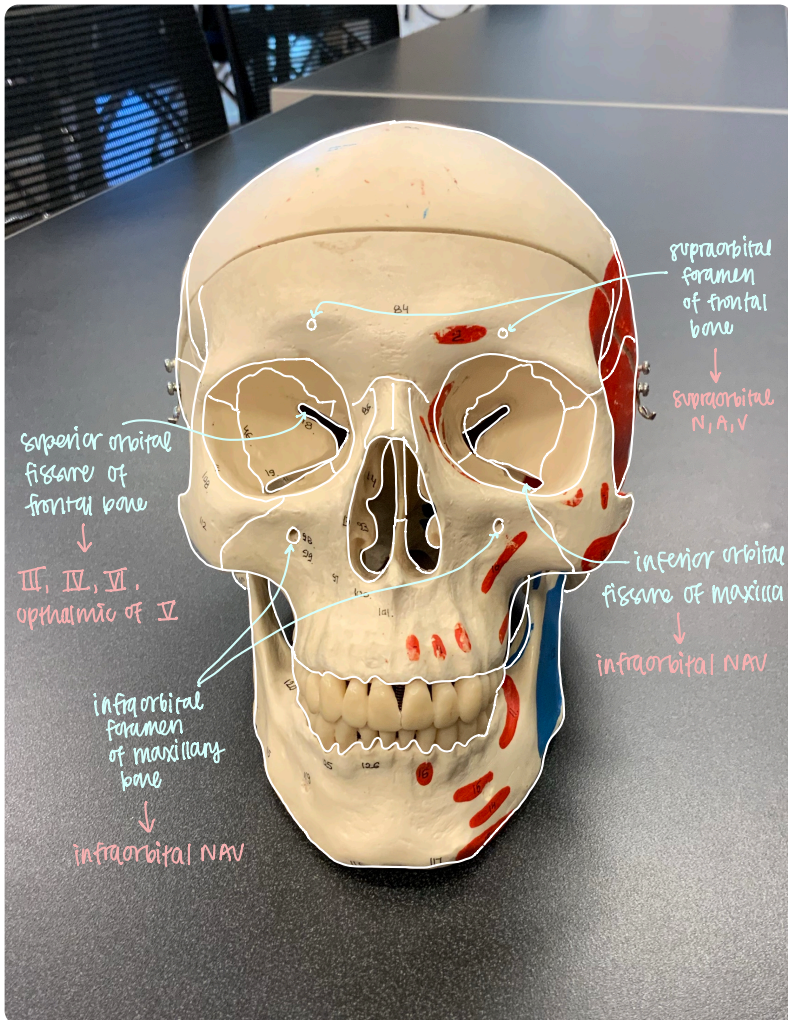
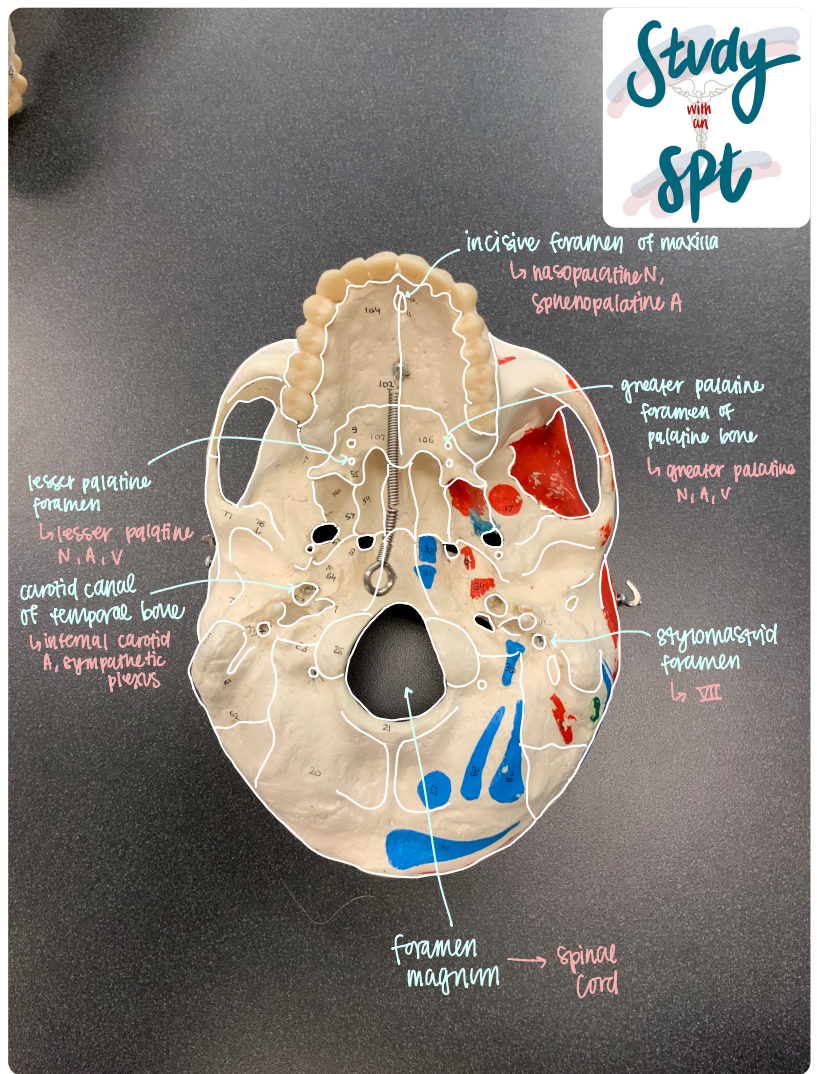
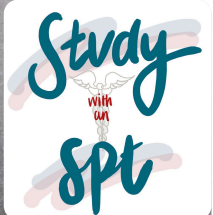
Inferior - DIM  
 Belly - Petty Boys Don't Take Money  
 Anterior - SATD



# FORAMEN

TABLE 22.1 FORAMINA OF THE SKULL

Foramen	Location	Contents
Supraorbital	Frontal bone	Supraorbital N., A., V.
Superior orbital fissure	Sphenoid bone	III, IV, VI, Ophthalmic of V
Optic	Sphenoid bone	II, Ophthalmic A.
Rotundum	Sphenoid bone	Maxillary of V
Ovale	Sphenoid bone	Mandibular of V
Spinosum	Sphenoid bone	Middle meningeal A.
Lacerium	Sphenoid bone	Nothing
Inferior orbital fissure	Maxilla	Infraorbital N., A., V.
Infraorbital	Maxilla	Infraorbital N., A., V.
Incisive	Maxilla	Nasopalatine N., Sphenopalatine A.
Greater palatine	Palatine bone	Greater palatine N., A., V.
Lesser palatine	Palatine bone	Lesser palatine N., A., V.
Stylomastoid	Temporal bone	VII
Carotid	Temporal bone	Internal carotid A., Sympathetic plexus
Jugular	Between Temporal & Occipital bones	IX, X, XI
Internal Auditory	Temporal bone	VI, VIII
Magnum	Occipital bone	Spinal cord



## TEMPEROMANDIBULAR JOINT

↳ mandibular fossa of temporal bone & mandibular condyle

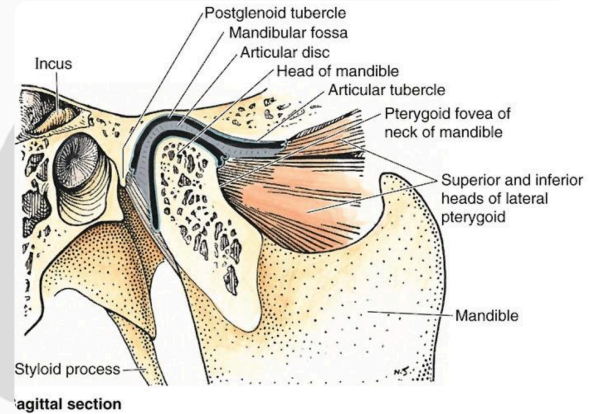
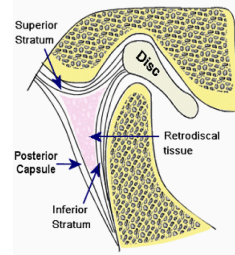
↳ intraarticular disc

- anterior portion attaches to lateral pterygoid
- attaches posterior to superior & inferior lamina of posterior ligament
  - ↳ superior ligament: collagen & elastic fibers
  - allows disc to move forward during mouth opening

↳ lateral to TMJ: temporal branch of facial N

↳ posterior to TMJ: parotid, external auditory meatus, trunk of facial N, auriculotemporal N, superior temporal vessels

↳ medial to TMJ: chorda tympani N off facial N & middle meningeal A.



## MUSCLES OF MASTICATION

↳ close mouth: mandibular division of Trigeminal N

↳ **temporals:**

- elevate & retract mandible
- lat deviation to SAME SIDE

↳ **masseter:**

- elevate, protrude

↳ **medial pterygoid:**

- elevate, protrude

very little lat deviation  
to opposite side

↳ **lateral pterygoid:**

- depression, protrusion
- lat deviation to OPPOSITE SIDE
- guide retraction of articular disc during jaw closing

↳ muscles of suprahyoid region: ant. digastric, mylohyoid, geniohyoid

## JAW MOVEMENTS

**Mouth opening**

↳ mandibular condyles rotate anteriorly

- mouth open 11-25 mm

↳ condyles & disc translate anteriorly over tubercle

- mouth opens to 40-60 mm
- disc moves anteriorly, controlled by elastic superior lamina & limited by non-elastic inferior lamina

↳ functional: PIP index of middle between incisors

↳ normal: PIP index, middle, & ring between incisors

**Mouth closing**

↳ mandibular condyles, articular disc moves posteriorly over articular tubercle into mandibular fossa

- disc movement by recoil of superior lamina
  - ↳ controlled by eccentric contraction of superior head of lateral pterygoid

↳ disc in mandibular fossa & does not move as mandibular condyle rotates posteriorly to fully close mouth

## Protrusion

- ↳ medial & lateral pterygoid
- ↳ masseter
- ↳ bilateral anterior translation of mandibular condyles & disk
- ↳ normal: 6-9 mm

## Retrusion

- ↳ temporalis
- ↳ digastric
- ↳ posterior translation of condyles & disc
- ↳ normal: 3mm

## Lateral Jaw Movement

- ↳ closed mouth
  - anterior translation of one condyle & horizontal rotation of other condyle
    - ↳ one rotates, one protrudes
- ↳ open mouth
  - retrusion of condyle on side to which jaw is moving & anterior translation (protrusion) of opposite side condyle
- ↳ ex) ⓐ lateral jaw movement
  - temporalis & digastrics (retruders) move ⓐ condyle posteriorly
  - masseter, medial & lateral pterygoid (protruders) move ⓑ condyle anteriorly

## Clinical Point

### ↳ TMJ Dysfunction:

- trauma
- poor posture
  - ↳ forward head compresses joint
- malalignment of teeth
- **DFD:**
  - ↳ wear & tear
  - ↳ inflammation
  - ↳ disc can stick out
  - ↳ clicking / popping
- **stress:**
  - ↳ increased tension in jaw muscles
  - ↳ clenching & grinding of teeth
  - ↳ cervical mm pain & stiffness
- most common in women (2:1)
- **signs:**
  - ↳ tenderness & spasms of jaw muscles
  - ↳ decreased ROM
  - ↳ referred pain to ear, face, & neck
  - ↳ locking of jaw
  - ↳ clicking or popping at the TMJ with opening & closing

# INFRATEMPORAL FOSSA

## Borders

- ↳ anteriorly → posterior surface of maxilla & inferior orbital fissure
- ↳ posteriorly → condylar process of mandible & styloid process
- ↳ superiorly → by the greater wing of sphenoid
- ↳ inferiorly → by inferior attachment of med pterygoid m
- ↳ medially → by the lateral pterygoid plate of sphenoid
- ↳ laterally → by the ramus of mandible
- ↳ no floor!

## Contents

- ↳ lateral & medial pterygoid
- ↳ temporalis mm inferior attachment
- ↳ mandibular division of trigeminal
- ↳ Chorda tympani of VII
- ↳ maxillary A branches

## Maxillary Artery

↳ 3 parts by lateral pterygoid m

• inferior to lateral pterygoid:

- ↳ deep auricular A → ear
- ↳ middle meningeal A → meninges of cortex
- ↳ inferior alveolar A → mandibular teeth & chin

• crosses belly of lateral pterygoid: → only goes to muscles

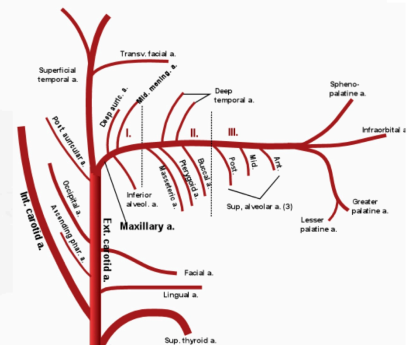
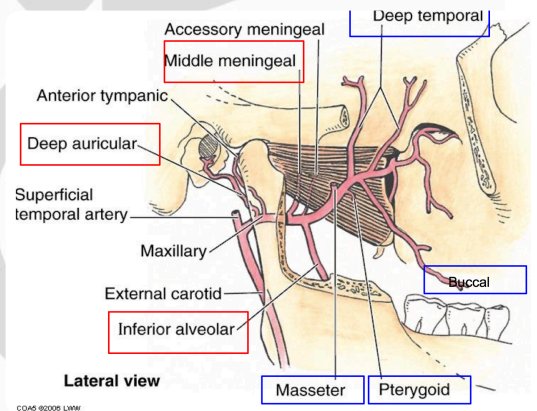
- ↳ masseteric A → masseter
- ↳ 2 deep temporal A → temporalis
- ↳ pterygoid A → med & lat pterygoid
- ↳ buccal A → buccinator

• anterior to lateral pterygoid: → goes to teeth & palate

- ↳ post, middle, & ant superior alveolar A → teeth
- ↳ descending palatine A (greater & lesser) → palate → nms with corresponding N
- ↳ sphenopalatine A → anterior hard palate → nms w/ nasopalatine N
- ↳ infraorbital A → area of face below eye

pg. 51

← comes from ext. carotid A



# ORAL CAVITY

## Contents

↳ palate:

• hard palate → anterior

- ↳ palatine plate of maxillary bone & palatine bone
- ↳ innervation:

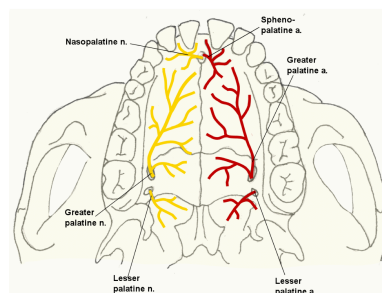
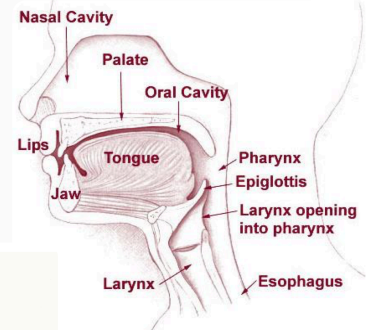
- anterior: nasopalatine N (maxillary div V)
- posterior: greater palatine N (maxillary div V)

↳ blood supply: sphenopalatine A & greater palatine A (from maxillary A)

• soft palate → posterior

- ↳ glandular tissue & 5 pairs of muscles
- ↳ innervation: lesser palatine N
- ↳ blood supply: lesser palatine A

↳ upper & lower teeth



↳ tongue:

• innervation: superior surface

↳ anterior 2/3:

- lingual N for general sensation
- chorda tympani (VII) for taste

↳ posterior 1/3:

- glossopharyngeal N (IX) for general sensation & taste except,
- root of tongue by vagus N (X)
- blood supply: lingual A off external carotid

• muscles:

↳ intrinsic: form transverse, longitudinal & vertical muscle bundles

• innervation: hypoglossal N (XII)

↳ extrinsic:

• geniohyoglossus

↳ innervation: hypoglossal N

↳ action: protrudes

• hyoglossus

↳ innervation: hypoglossal N

↳ action: depresses

• palatoglossus

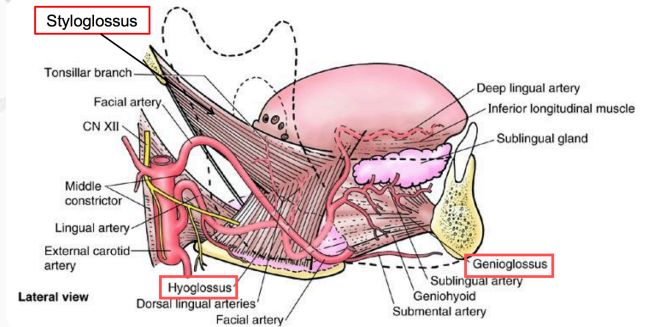
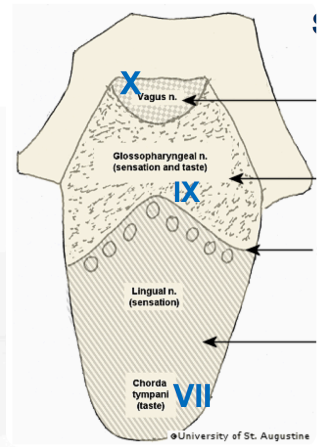
↳ innervation: vagus

↳ action: elevates posterior tongue

• styloglossus

↳ innervation: hypoglossal N

↳ action: retracts



## PHARYNX

Nasal cavity to Esophagus

↳ nasal pharynx

↳ oral pharynx

↳ laryngeal pharynx:

- behind larynx & continues w/ esophagus

Muscles posterior & lateral

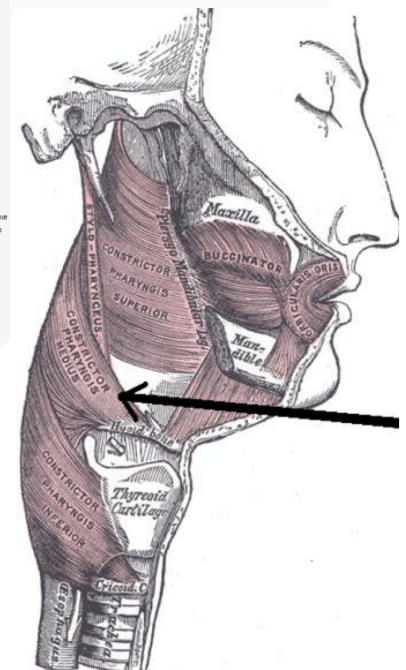
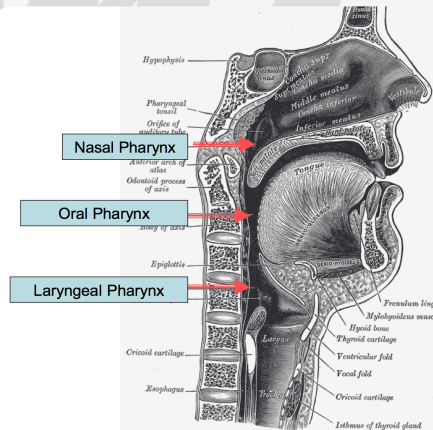
↳ superior constrictor: level of oral cavity

↳ middle constrictor: level of hyoid

↳ inferior constrictor: level of thyroid cartilage

↳ innervation: vagus N

↳ action: constrict pharynx for swallowing



# Eye

## Bony orbit

↳ frontal, zygomatic, maxillary, ethmoid, sphenoid, lacrimal, & palatine bones

### ↳ optic foramen:

- optic N
- retinal vessels

### ↳ superior orbital fissure:

- oculomotor III, trochlear IV, Ophthalmic of V, abducens VI
- frontal, lacrimal, nasolacrimal N

### ↳ inferior orbital fissure:

- infraorbital N & A

## eyeball

### ↳ anterior region:

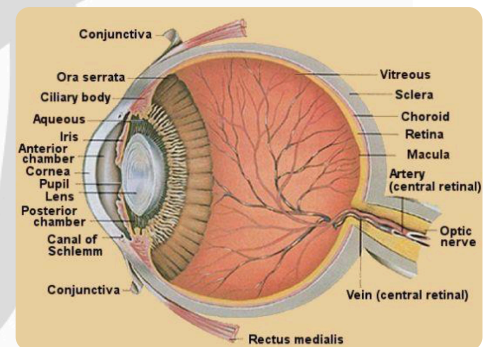
- **cornea**: where light first comes to eye, helps to focus incoming light
- **iris**: colored part of eye, dilates/contracts w/ light conditions
- **pupil**:
- **lens**: changes shape to control focus (near/distant objects)
- **ciliary body**:
- **aqueous humor**: clear, watery fluid, maintains constant pressure
- **vitreous**: clear, jelly-like substance, keeps shape of eye

### ↳ posterior region:

- **retina**: thin, light-sensitive tissue lining, must be flat & smooth
  - ↳ **retinal vessels**: nourish inner layers of retina
  - ↳ **macula**: center of retina, has many photoreceptors (light → signals)
    - **fovea**: center of macula, site of our sharpest vision
- **choroid**: behind retina, layer of blood vessels that supply O<sub>2</sub> & nutrients to outer layers of retina
- **optic nerve**: bundle of nerve fibers, which carries visual info from the eye to the brain

### ↳ sclera: white part all the way around the eye

- outside choroid extends anteriorly to cornea
- attachment of NMs of eye
- has tough fibrous tissue that protects inner workings of the eye



## Muscles

### ↳ medial rectus:

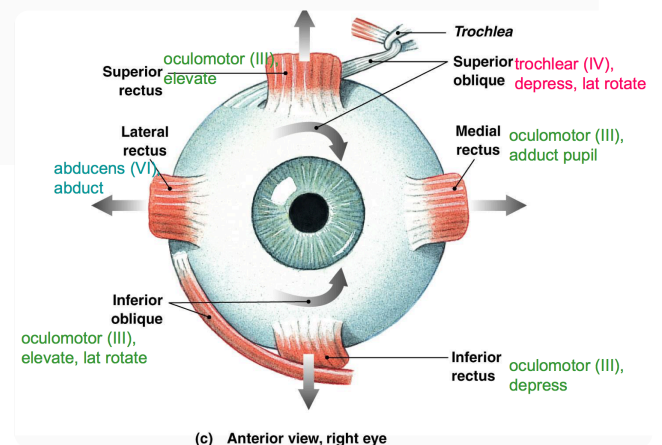
- **innervation**: oculomotor III
  - ↳ foramen: superior orbital fissure
- **action**: adduct pupil (towards midline)

### ↳ lateral rectus:

- **innervation**: abducens VI
  - ↳ foramen: superior orbital fissure
- **action**: abduct (move laterally)

### ↳ superior rectus:

- **innervation**: oculomotor III
  - ↳ foramen: superior orbital fissure





• **action:** elevate

↳ **inferior rectus:**

- **innervation:** oculomotor III
- ↳ **foramen:** superior orbital fissure
- **action:** depress

↳ **inferior oblique:**

- **innervation:** oculomotor III
- ↳ **foramen:** superior orbital fissure
- **action:** elevate & lat rotate

↳ **superior oblique:**

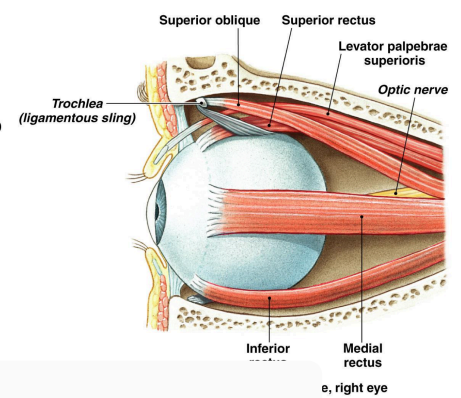
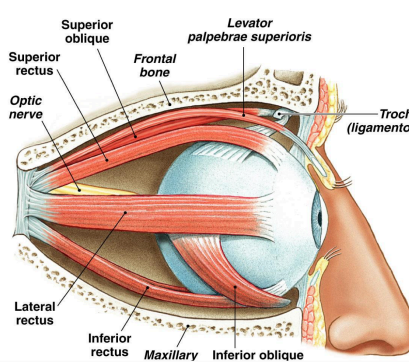
- **innervation:** trochlear IV
- ↳ **foramen:** superior orbital fissure
- **action:** depress & lat rotate
- can test trochlear N w/ this muscle
- ↳ on its own, it depresses & abducts
- ↳ but the muscles of the eye are synergistic
- ↳ trochlear N is tested by asking pt to look "down in"
- superior oblique has the greatest contribution
- need this for reading the newspaper, walking down the stairs
- ↳ diplopia can be a symptom

↳ **levator palpebrae superioris:**

- **innervation:** oculomotor N III
- **action:** opens eyelids

↳ **orbicularis oculi:**

- **innervation:** facial VII
- **action:** closes eye



ORBICULARIS OCULI



LEVATOR PALPABRAE SUPERIORIS



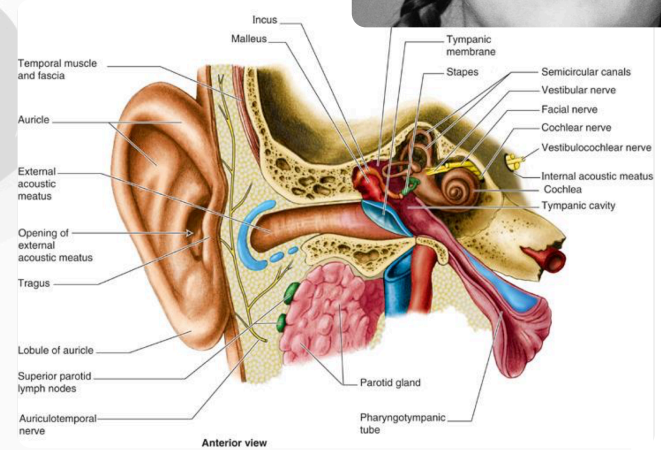
**EAR**

**External Ear**

- ↳ auricles, external auditory meatus

**Middle Ear**

- ↳ tympanic membrane
- ↳ auditory ossicles: malleus, incus, stapes
- ↳ eustachian (auditory) tube
- ↳ tensor tympani mm (mandibular div IX)
- ↳ stapedius mm (facial N)
- ↳ facial N, chorda tympani



**Inner Ear**

- ↳ **cochlea:** sensory organ for hearing
- ↳ **vestibule:** equilibrium
- ↳ **semicircular canals:** equilibrium (3)
- ↳ **innervation:** vestibulocochlear N VIII

