

# Structures of the head and neck

Adriana Nudga  
2019

# Contents

- The general triangles of the neck
- Posterior triangle and its subdivisions
- Anterior triangle and its subdivisions

Posterior belly of the digastric m.

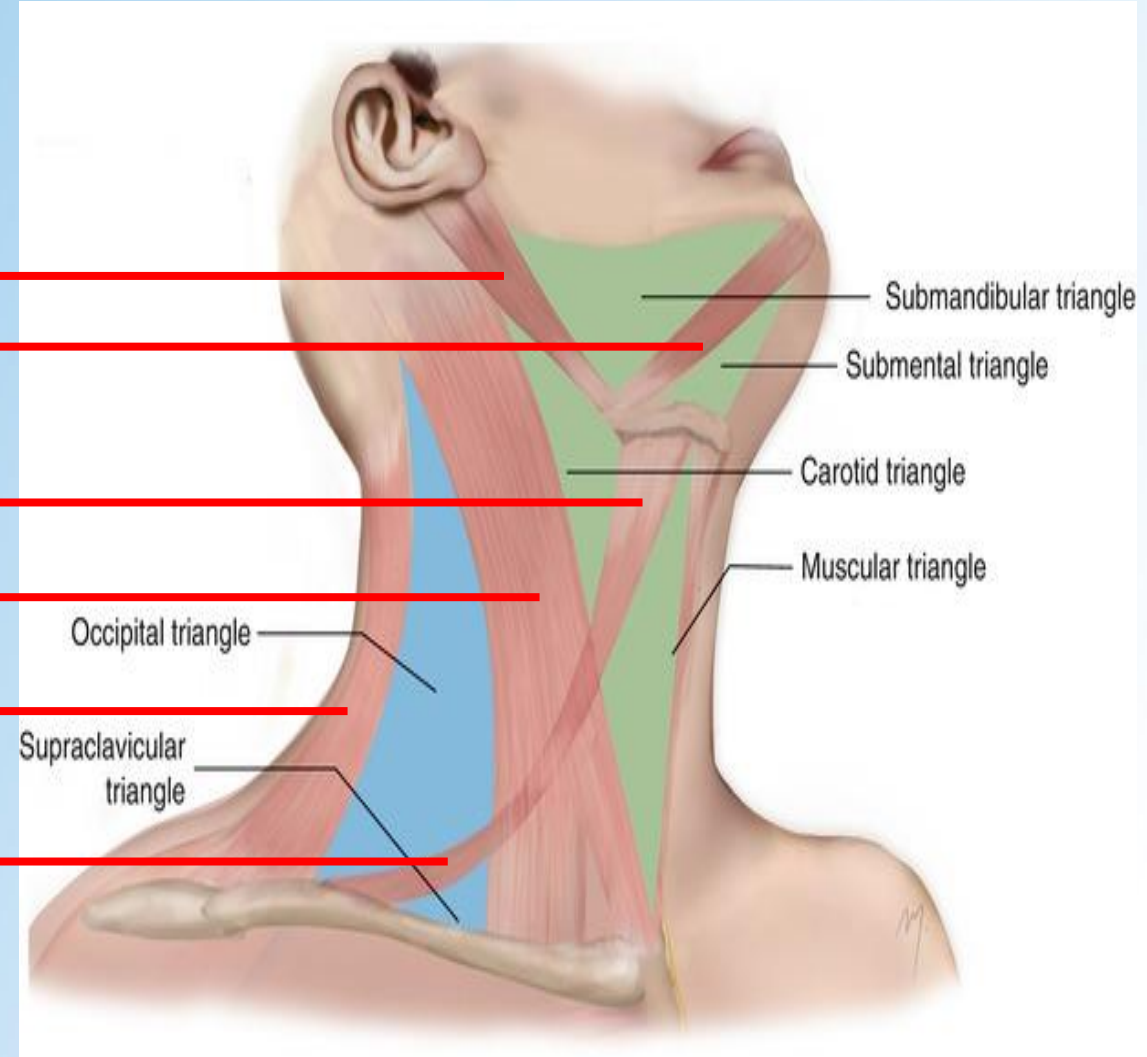
Anterior belly of the digastric m.

Superior belly of the omohyoid

Sternocleidomastoid

Trapezius

Inferior belly of the omohyoid



# Posterior triangle

## Boarders:

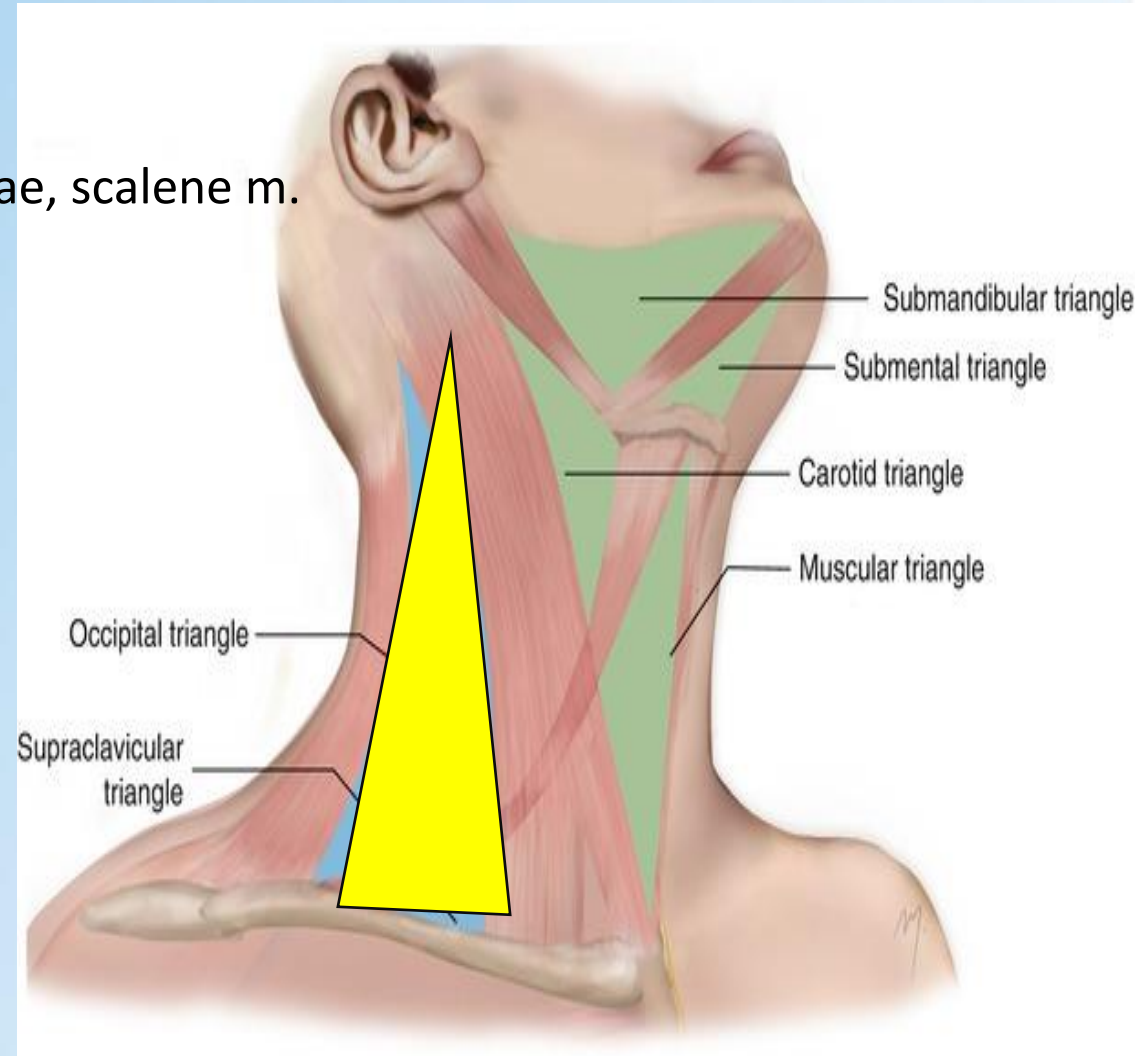
ant: sternocleidomastoid    Inf: clavicle        roof: platysma  
post: trapezius            floor: splenius capitis, levator scapulae, scalene m.

## Contains:

Accessory n  
Cutaneous branch of cervical plexus  
Ext. jugular v.  
Transverse cervical and suprascapular vessels  
Subclavian v + a  
Inf. Belly of omohyoid m.  
Roots and trunks of brachial plexus

Further divides into occipital and supraclavicular triangles via the inf. belly of omohyoid m.

the **subclavian triangle** contains the distal portion of the **subclavian artery**.



# Anterior triangle

boarders:

sup: inferior border of mandible      medial: midline of neck  
lateral: sternocleidomastoid

Contains:

**Muscles:** thyrohyoid, sternothyroid, sternohyoid muscles

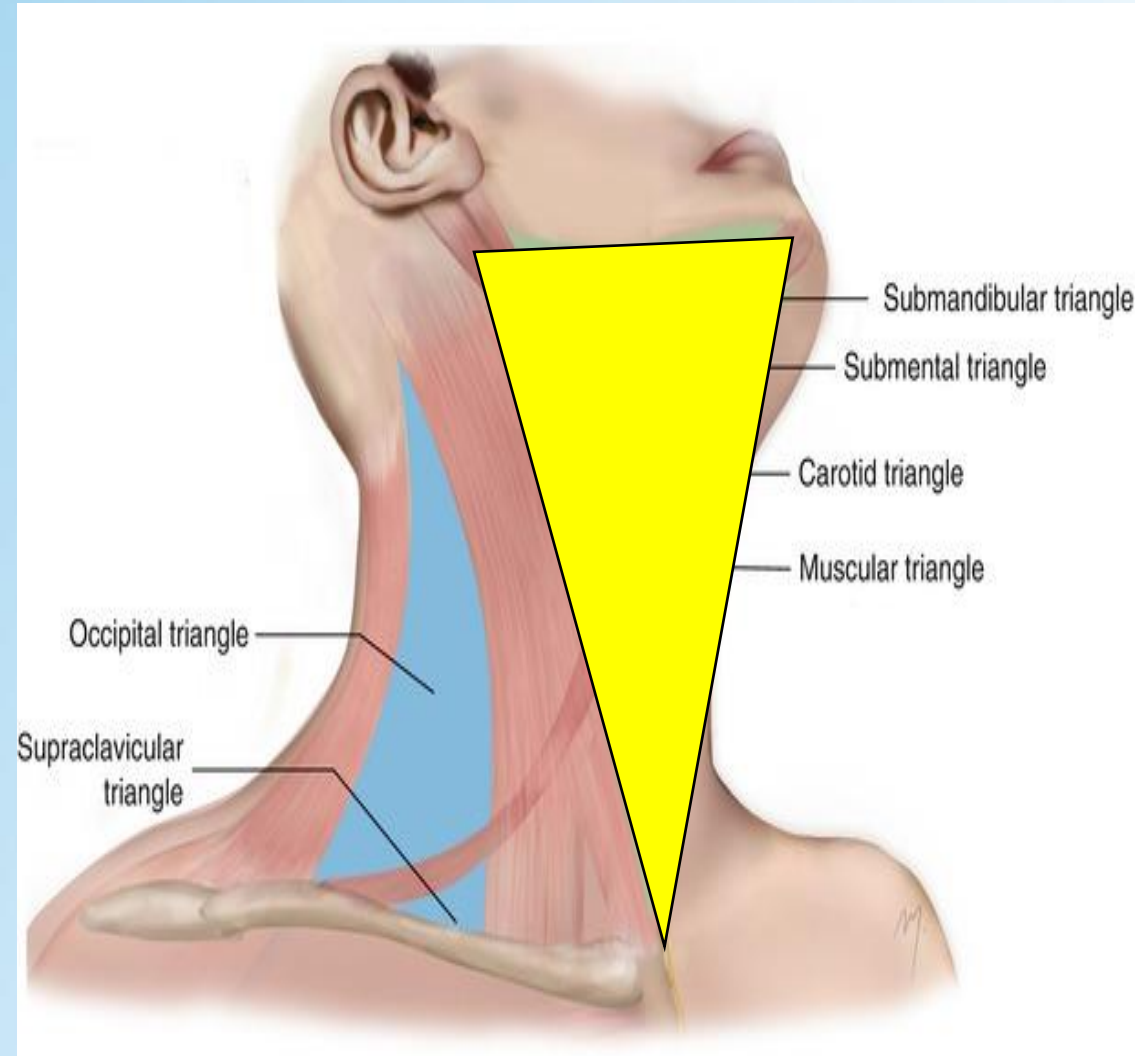
**Viscera:** thyroid gland, parathyroid glands, larynx, trachea, esophagus, submandibular gland, caudal part of the parotid gland

**Arteries:** superior and inferior thyroid, common carotid, external carotid, internal carotid artery (and sinus), facial, submental, lingual arteries

**Veins:** anterior jugular veins, internal jugular, common facial, lingual, superior thyroid, middle thyroid veins, facial vein, submental vein, lingual veins

**Nerves:** vagus nerve (CN X), hypoglossal nerve (CN XII), part of sympathetic trunk, mylohyoid nerve

Further subdivided into Submandibular triangle, Submental triangle, Carotid triangle and Muscular (omotracheal) triangle



# Submandibular triangle (digastric)

## Boarders:

Superior - inferior border of mandible

Lateral - anterior belly of digastric muscle

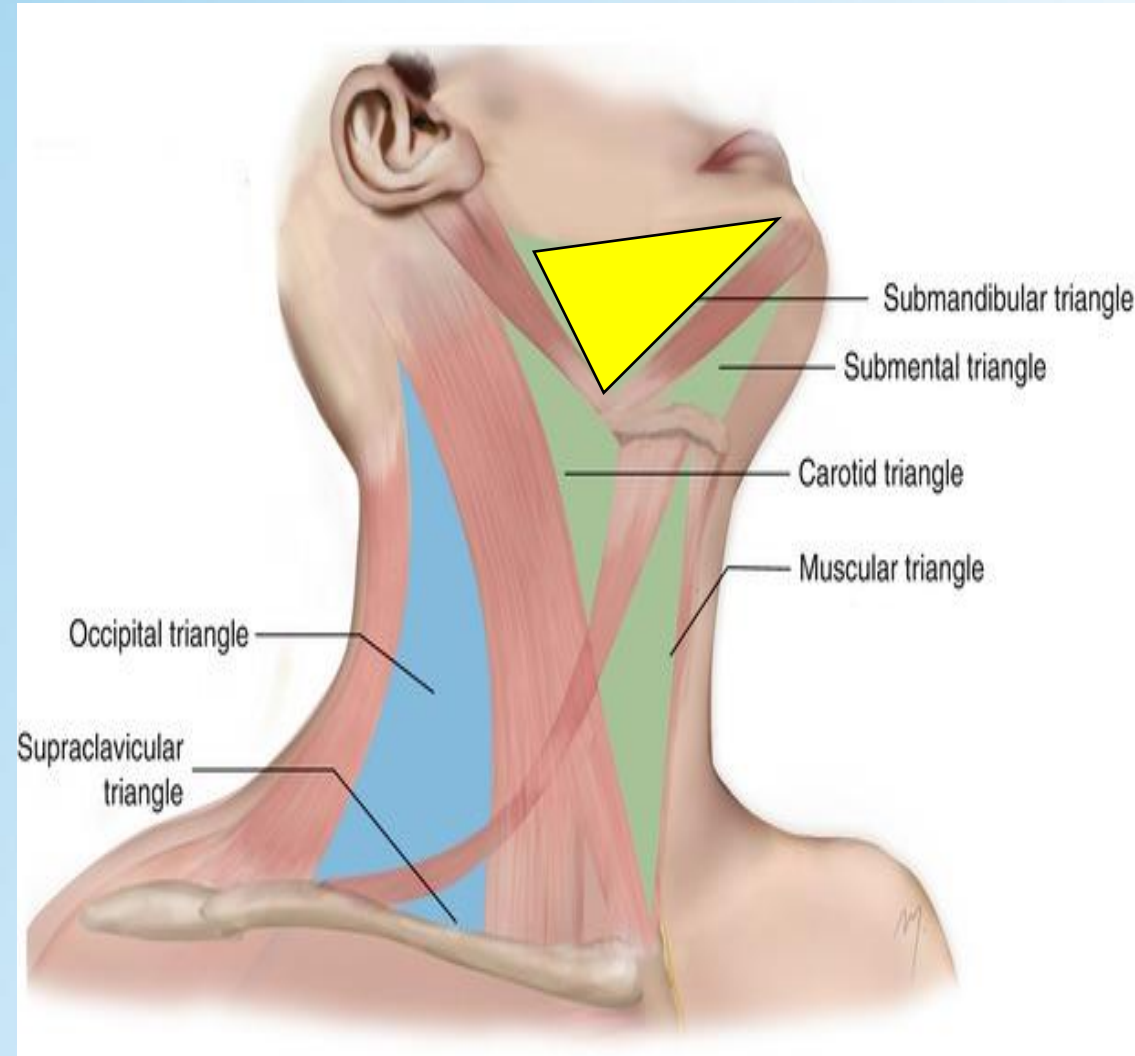
Medial - posterior belly of digastric muscle

## Contains:

**Viscera:** submandibular gland and lymph nodes (anteriorly), caudal part of the parotid gland (posteriorly)

**Vessels:** facial artery and vein, submental artery and vein, lingual arteries and veins

**Nerves:** mylohyoid, hypoglossal (CN XII)



# Submental triangle

## Boarders:

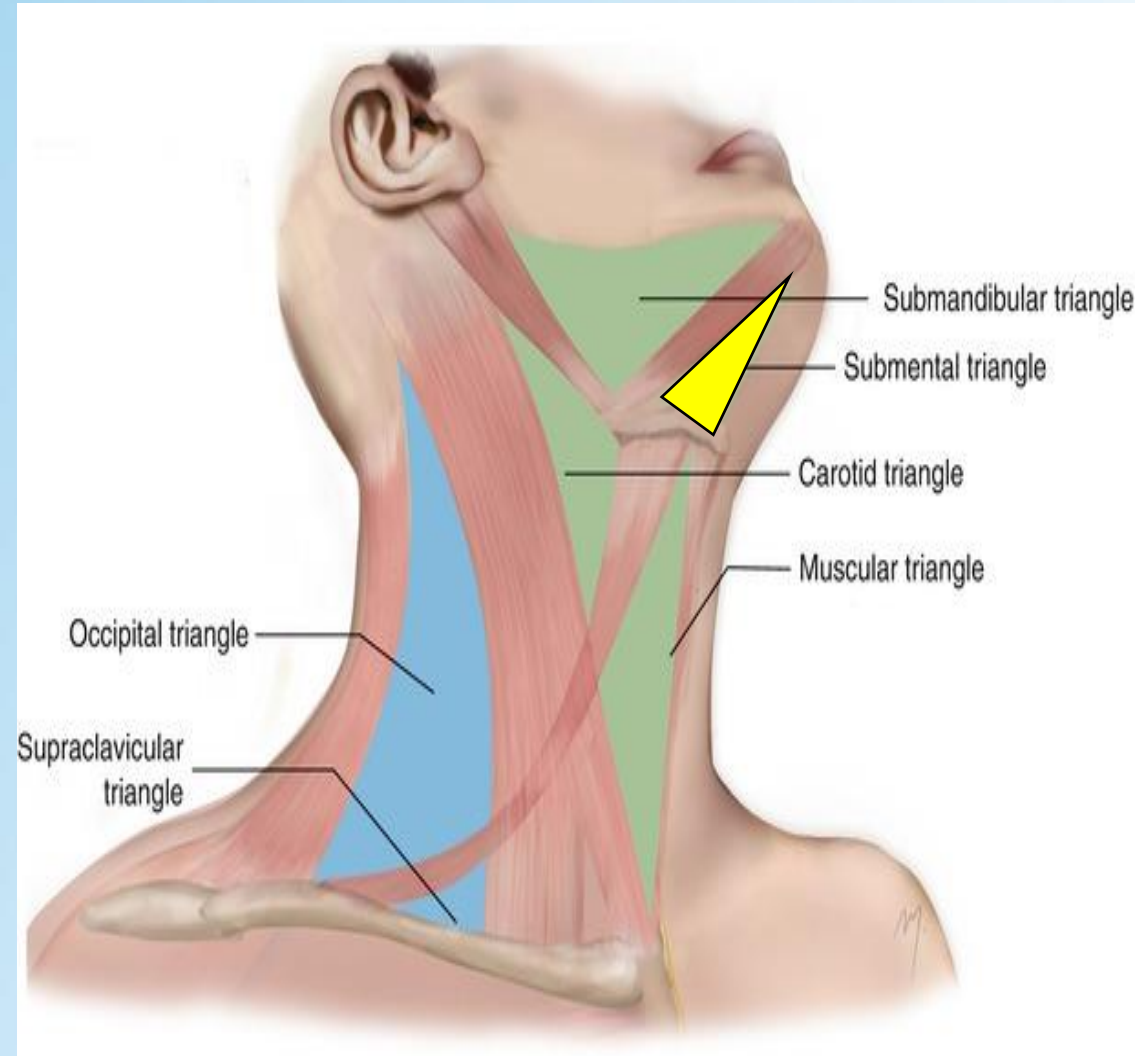
Inferior - hyoid bone (C3)

Lateral - anterior belly of digastric muscle

Medial - midline of neck

## Contains:

Anterior jugular vein, submental lymph nodes



# Carotid triangle

## Boarders:

Anterior - superior belly of omohyoid muscle

Superior - stylohyoid and posterior belly of digastric muscles

Posterior - sternocleidomastoid

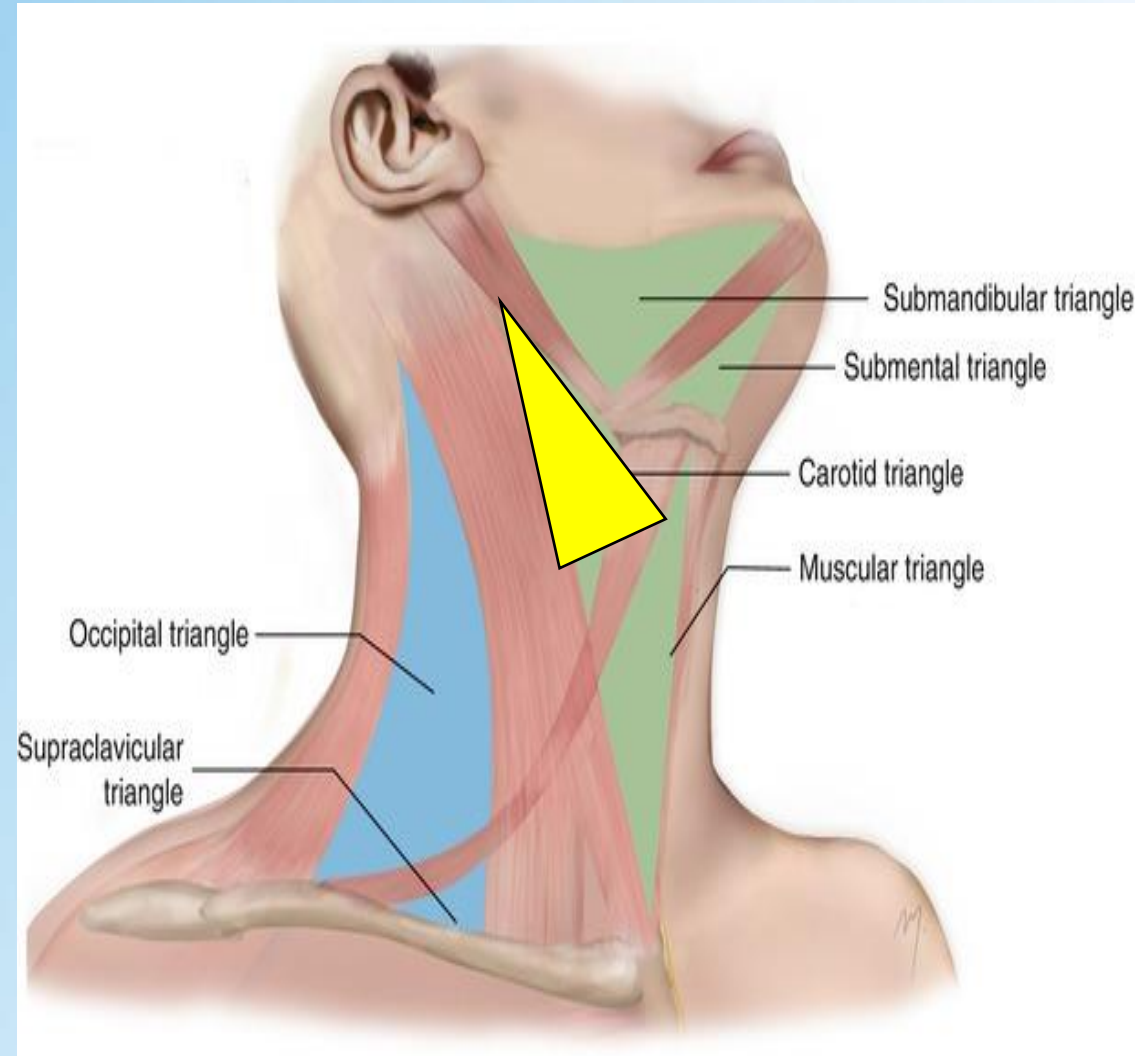
## Contains:

**Arteries:** common carotid (split at C4), external carotid (and branches except maxillary, superficial temporal and posterior auricular), internal carotid artery (and sinus)

**Veins:** internal jugular, common facial, lingual, superior thyroid, middle thyroid veins

**Nerves:** vagus nerve (CN X), hypoglossal nerve (CN XII), part of sympathetic trunk

*Sympathetic trunk has the superior ganglion which lies at the level of C2 & C3, the middle at the level of C6, and the inferior ganglion at the neck of the first rib behind the vertebral artery*





# Muscular triangle

Borders:

Superior - hyoid bone (C3)    Medial - midline of neck

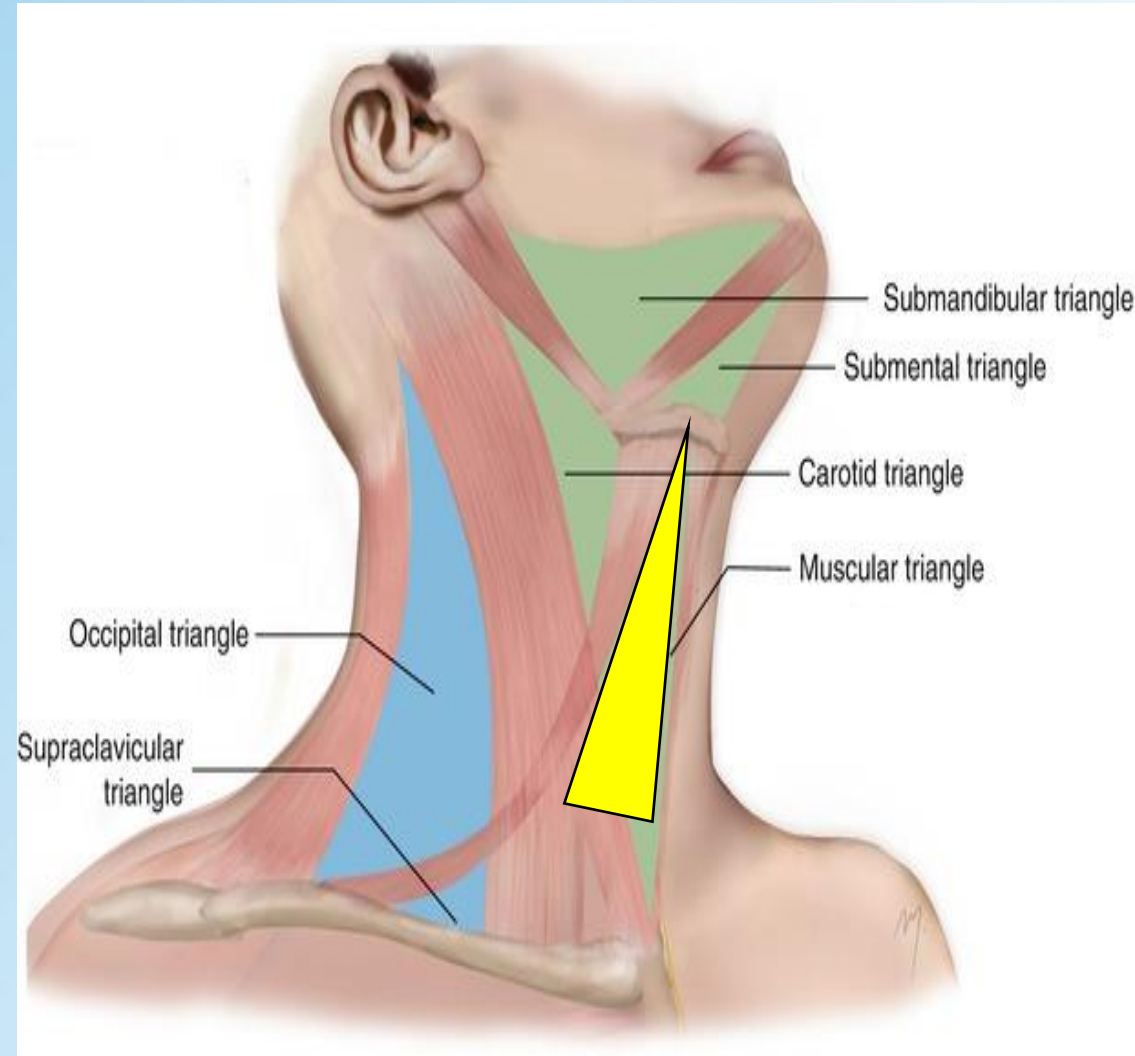
Lateral - superior belly of omohyoid and sternocleidomastoid

Contains:

**Muscles:** thyrohyoid, sternothyroid, sternohyoid

**Vessels:** superior and inferior thyroid arteries, anterior jugular veins

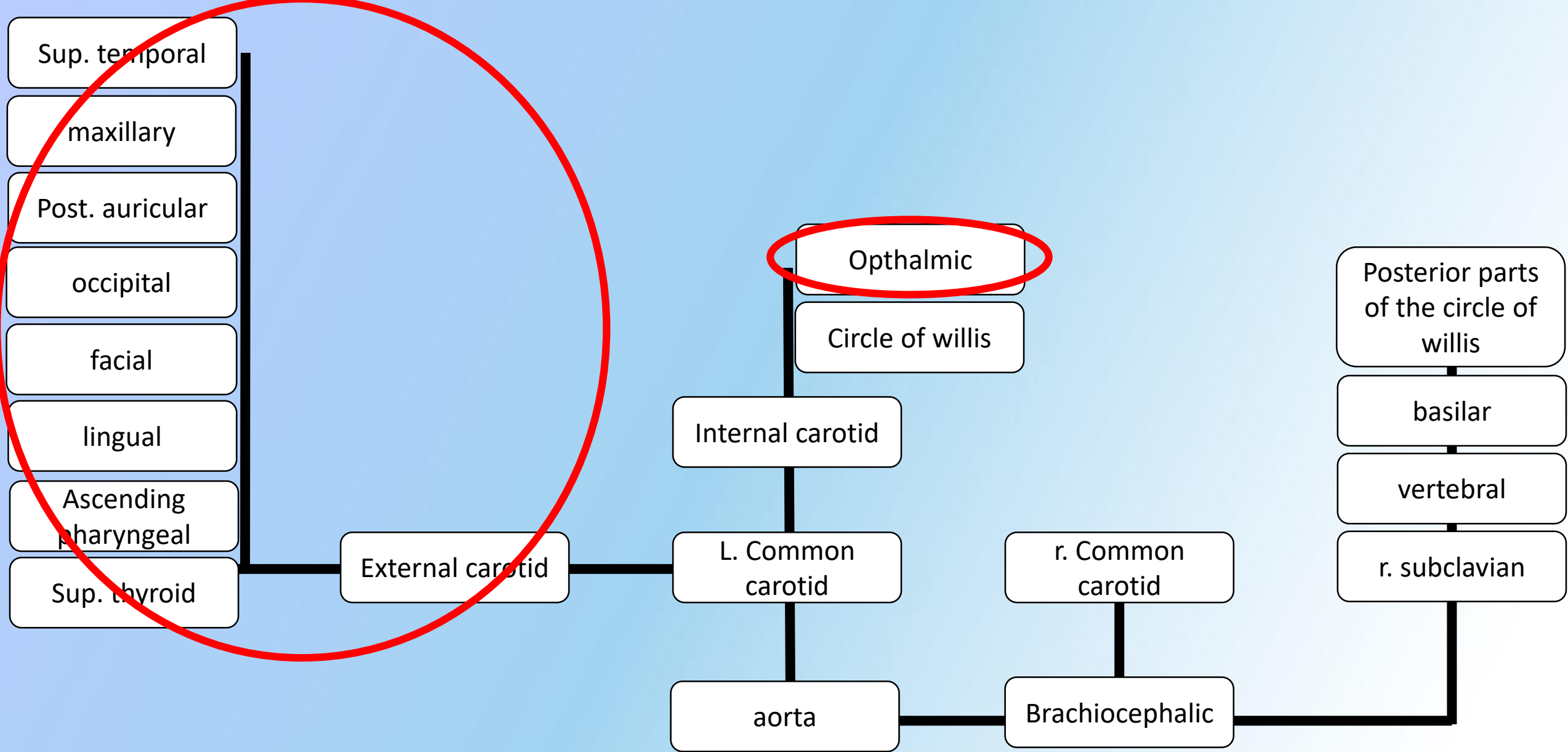
**Viscera:** thyroid gland (C5 and T1), parathyroid glands, larynx, trachea, esophagus



# Blood supply of the face

# Contents

- External carotid a. and its branches
- Facial a.
- Maxillary a.
- Veins
- Deadly triangle



Superficial temporal artery

Maxillary artery

Posterior auricular artery

Occipital artery

Facial artery

Lingual artery

Ascending pharyngeal  
artery

Superior thyroid artery

External carotid

*Some Anatomists Like Freaking Out Poor Medical Students*

**Superior thyroid artery**, arising from its anterior aspect

**Ascending pharyngeal artery** - arising from medial, or deep, aspect

**Lingual artery** - arising from its anterior aspect

**Facial artery** - arise from its anterior aspect

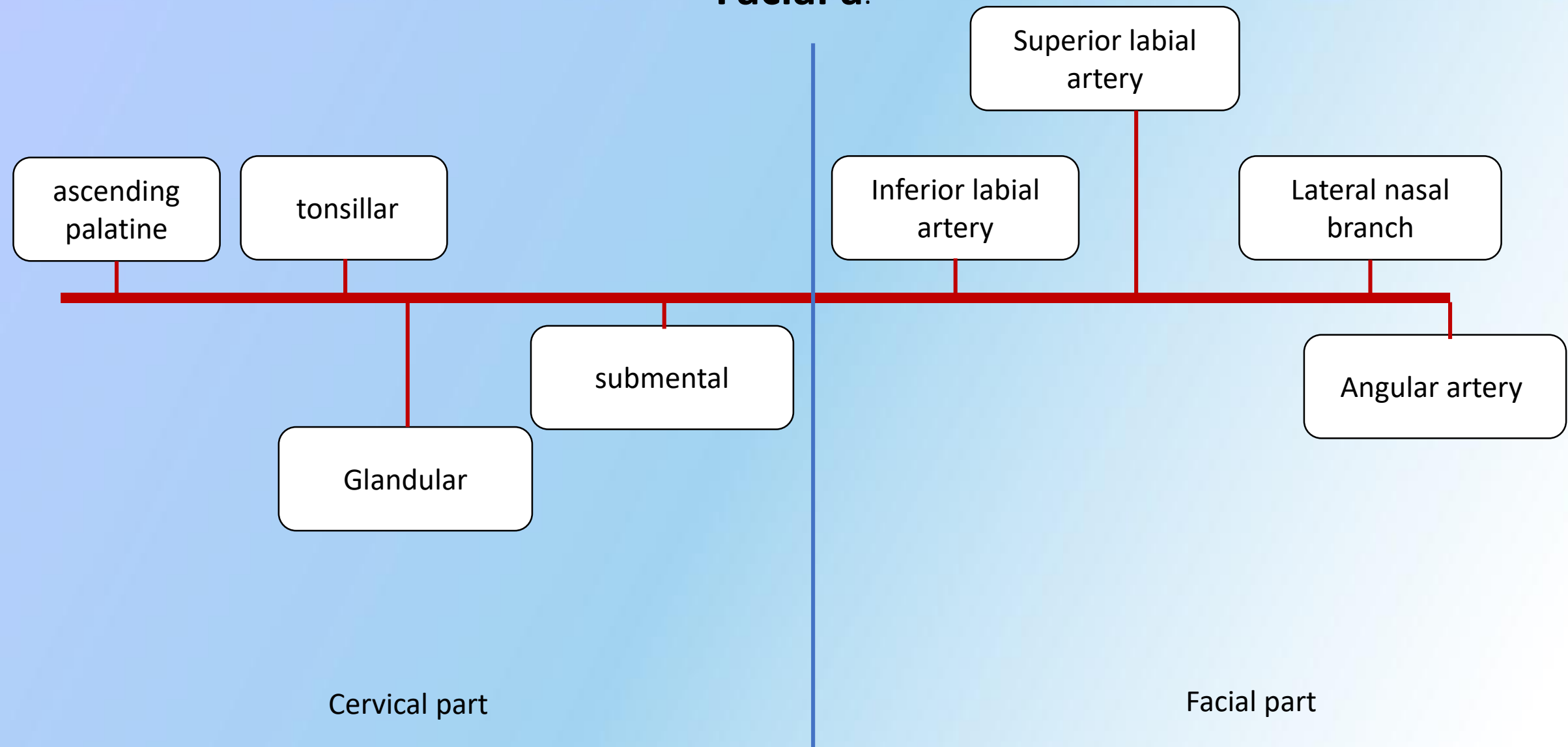
**Occipital artery** - arising from its posterior aspect

**Posterior auricular artery** - arising from posterior aspect

**Maxillary artery** – terminal branch

**Superficial temporal artery** –terminal branch

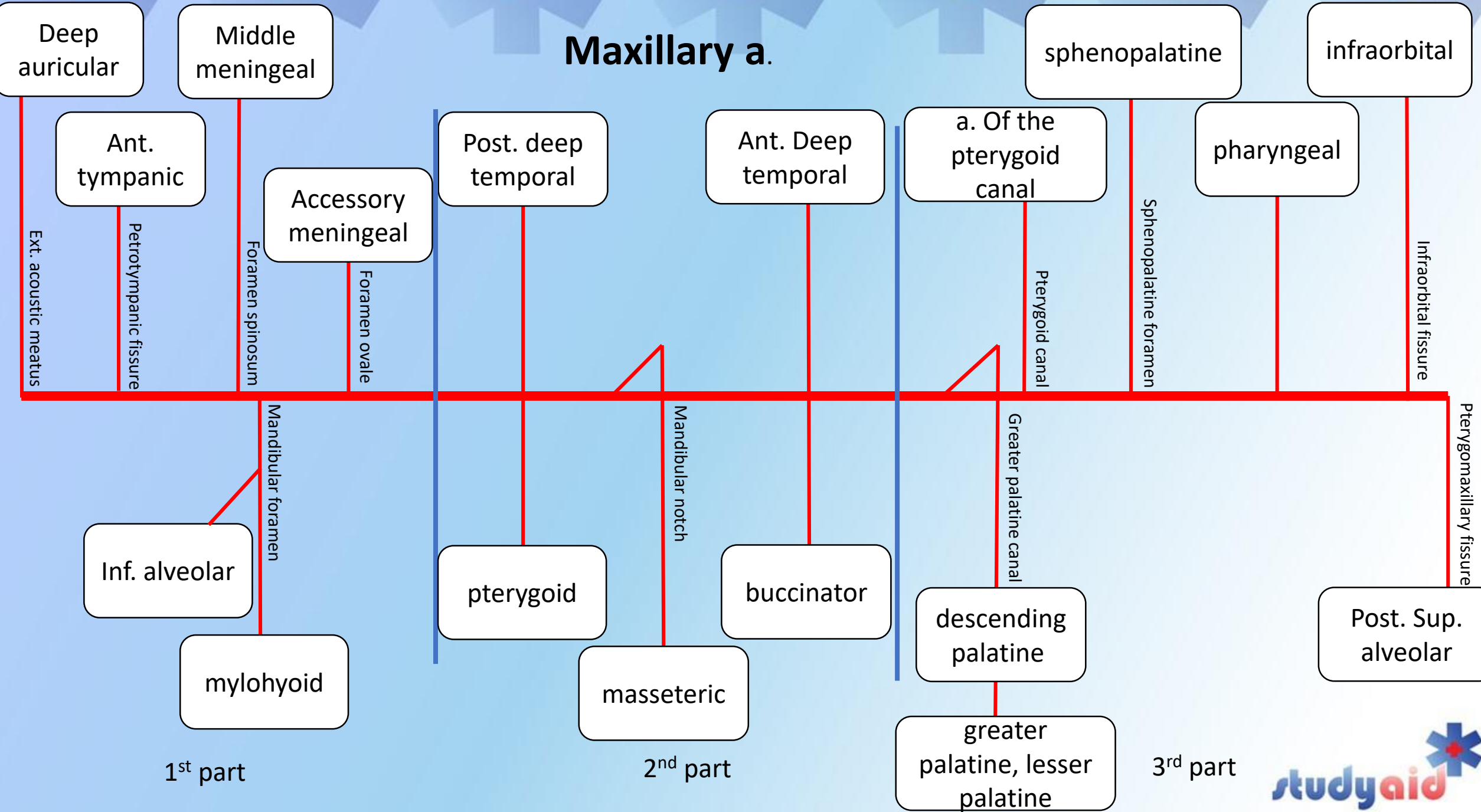
# Facial a.



Cervical part

Facial part

# Maxillary a.



Deep auricular	Dogs are
Anterior tympanic	Always Trying (to)
Middle meningeal	Mount my
Accessory meningeal	Aunt Margaret's
Inferior alveolar	Inner ankle

1<sup>st</sup> part

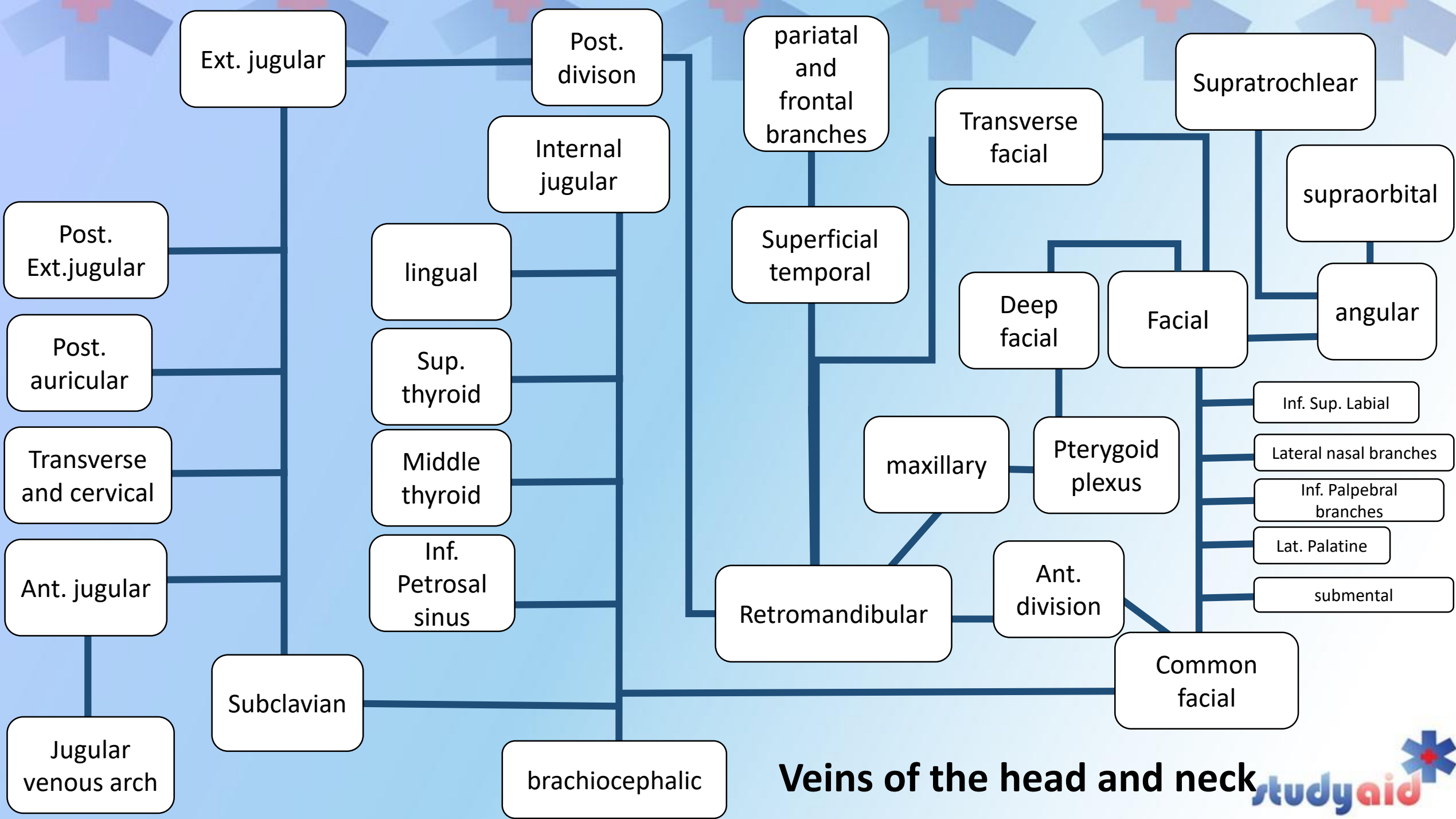
2<sup>nd</sup> part

Posterior Deep temporal	People Don't Tend(to)
Anterior Deep temporal	Always Display The
pterygoid	Proper
masseteric	mail
buccinator	boxes

Descending palatine	Dear pastor
pharyngeal	preach
Artery of Pterygoid canal	About Porn cause
Posterior Superior alveolar	Proper Sex always
infraorbital	is
sphenopalatine	sacred

3<sup>rd</sup> part





# Veins of the head and neck

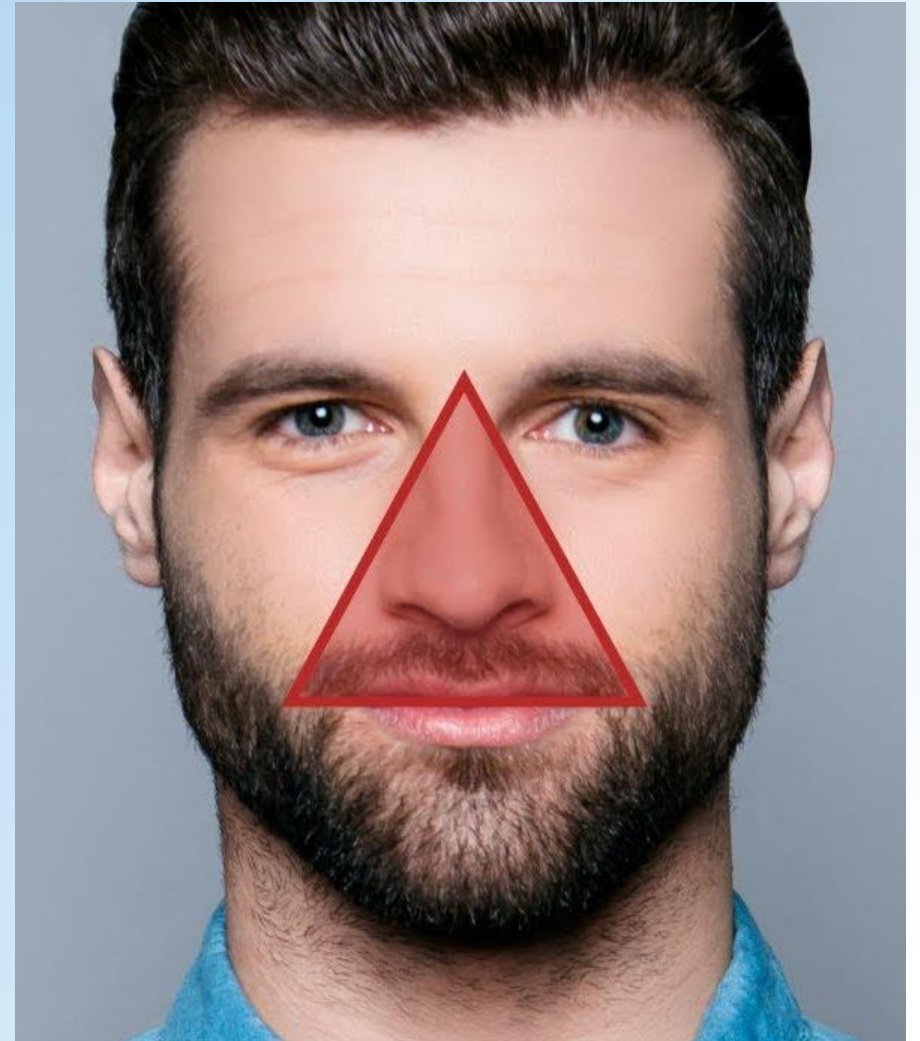
# The Deadly Triangle

The deadly triangle of the face consists of the area from the corners of the mouth to the bridge of the nose, including the nose and maxilla. Due to the blood supply to the human nose and surrounding area, it is possible for retrograde infection from the nasal area to spread to the brain, causing cavernous sinus thrombosis, meningitis or brain abscess.

This is because of the venous communication (via the ophthalmic veins) between the facial vein and the cavernous sinus.

The cavernous sinus lies within the cranial cavity, between layers of the meninges and is a major conduit of venous drainage from the brain.

*The cavernous sinus contains: cranial nerves (CN) can be found: CN III (oculomotor nerve), CN IV (trochlear nerve), CN VI (abducens nerve), CN V (trigeminal nerve), specifically V1 (ophthalmic nerve) and V2 (maxillary nerve) branches.*



# The orbit and its structures

# Contents

- Borders of the orbit
- The muscles of the eye
- Ring of zinn
- Nerves and vessels in the orbit

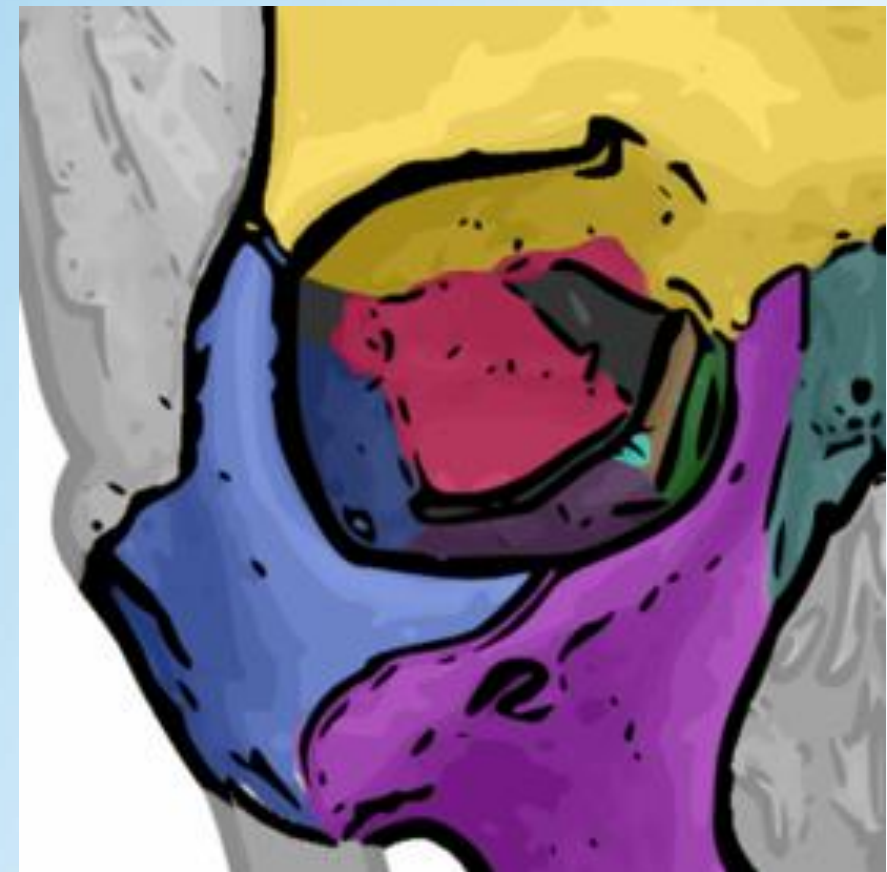
## Borders of the orbit

Superior margin: **frontal bone** and **sphenoid**

Inferior margin: **maxillary bone**, **palatine** and **zygomatic**

Medial margin: **ethmoid**, **lacrimal bone**, **sphenoid (body)** and **maxillary bone**

Lateral margin: **zygomatic** and **sphenoid (greater wing)**



yellow = Frontal bone

green = Lacrimal bone

brown = Ethmoid bone

blue = Zygomatic bone

purple = Maxillary bone

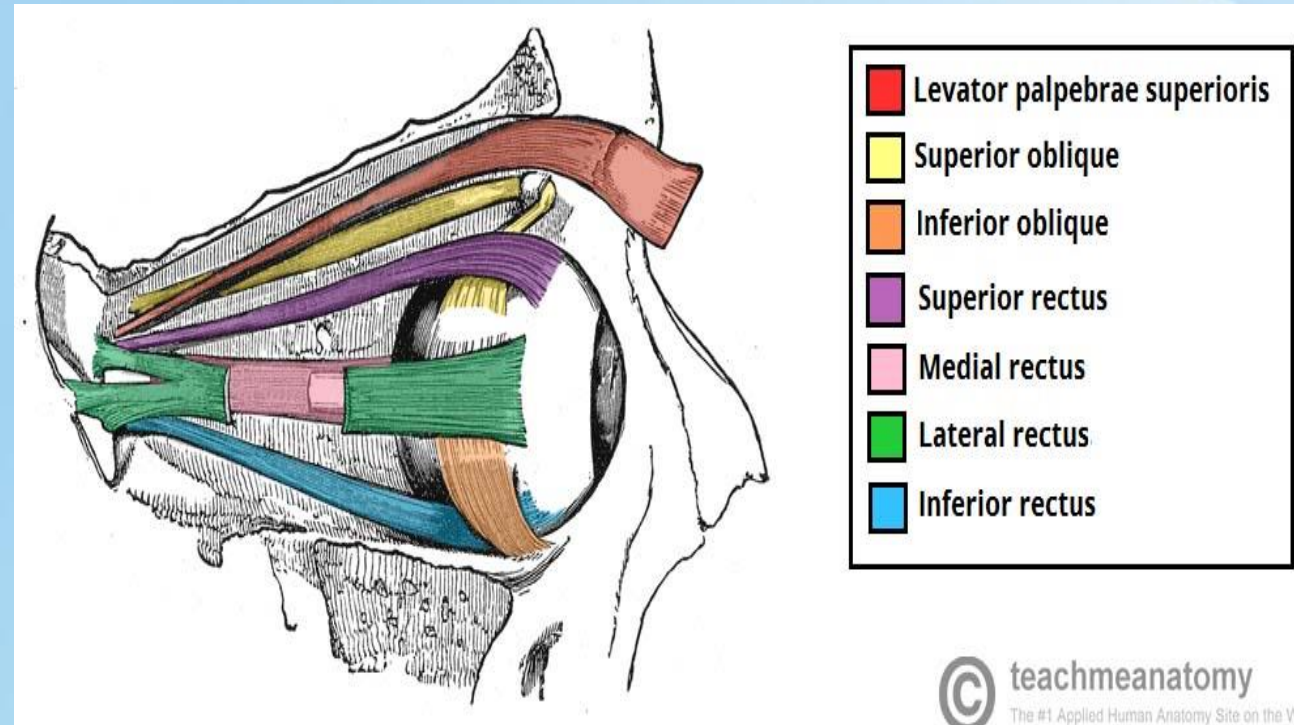
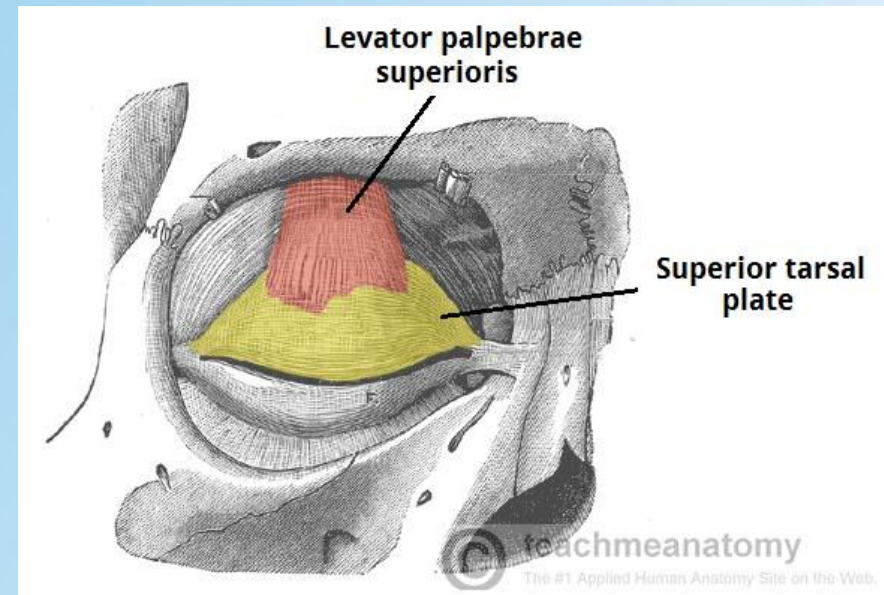
aqua = Palatine bone

red = Sphenoid bone

teal = Nasal bone (not part of the orbit)

# Muscles of the eye

- Levator Palpebrae Superioris
- Recti Muscles:
  - Superior Rectus
  - Inferior Rectus
  - Medial Rectus
  - Lateral Rectus
- Oblique Muscles:
  - Superior Oblique
  - Inferior Oblique



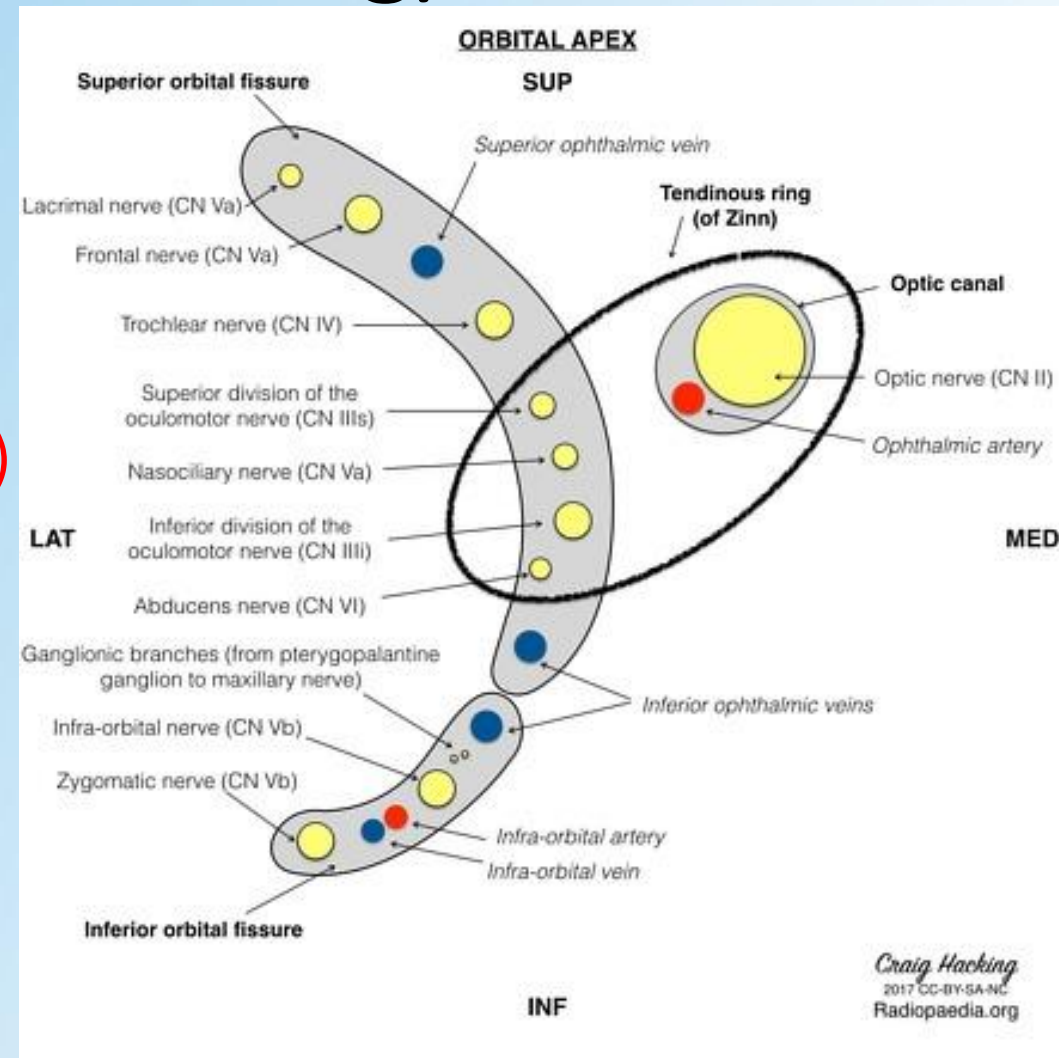
# Clinical Relevance: Horner's Syndrome

- produced by damage to the **sympathetic trunk** in the neck:
- **Partial ptosis** (drooping of the upper eyelid) – Due to denervation of the superior tarsal muscle.
- **Miosis** (pupillary constriction) – Due to denervation of the dilator pupillae muscle.
- **Anhydrosis** (absence of sweating) on the ipsilateral side of the face – Due to denervation of the sweat glands.
- *Can come from a tumour of the apex of the lung (Pancoast tumour), aortic aneurysm or thyroid carcinoma.*

# Ring of zinn (common tendinous ring)

- surrounding the optic nerve
- common origin of the four rectus muscles
- following structures pass through the tendinous ring:
  - Superior division of the oculomotor nerve (CNIII)
  - Nasociliary nerve (branch of **ophthalmic nerve CNV**)
  - Inferior division of the oculomotor nerve (CNIII)
  - Abducens nerve (CNVI)
  - Optic nerve (CNII)
  - Ophthalmic a.

CN 2,3,5,6





# Lazy French Tarts Sit Nakedly In Anticipation

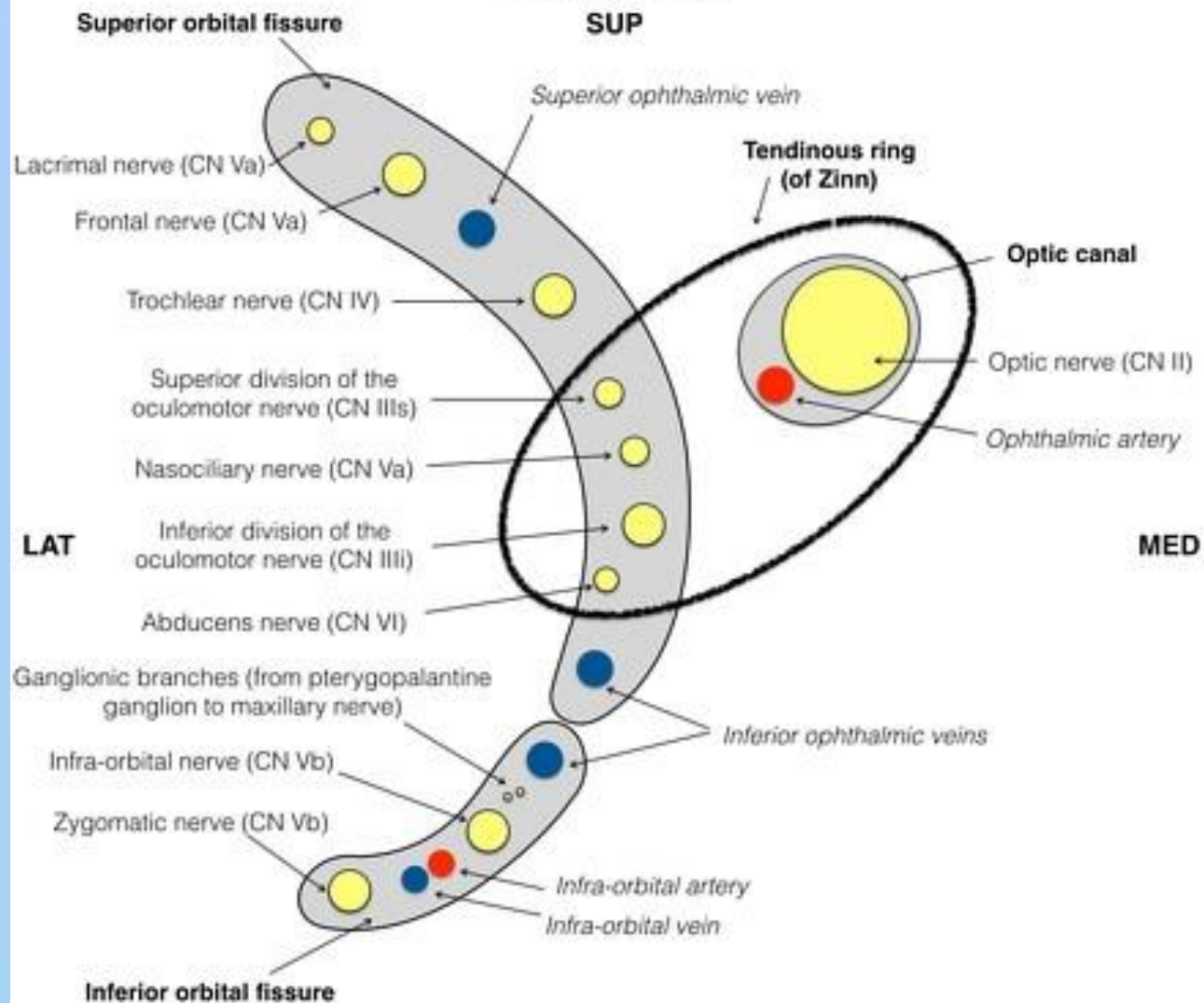
- L:** lacrimal nerve (branch of CN V1)
- F:** frontal nerve (branch of CN V1)
- T:** trochlear nerve (CN IV)
- S:** superior division of the oculomotor nerve (CN III)
- N:** nasociliary nerve (branch of CN V1)
- I:** inferior division of the oculomotor nerve (CN III)
- A:** abducens nerve (CN VI)



Don't forget the 2 veins: superior ophthalmic vein (tributary to cavernous sinus) and inferior ophthalmic vein (tributary to both cavernous sinus and pterygoid venous plexus)

# ORBITAL APEX

SUP



LAT

MED

INF

Craig Hacking  
2017 CC-BY-SA-NC  
Radiopaedia.org

# All the muscles of the head and neck ;)

You can go through this on your own time

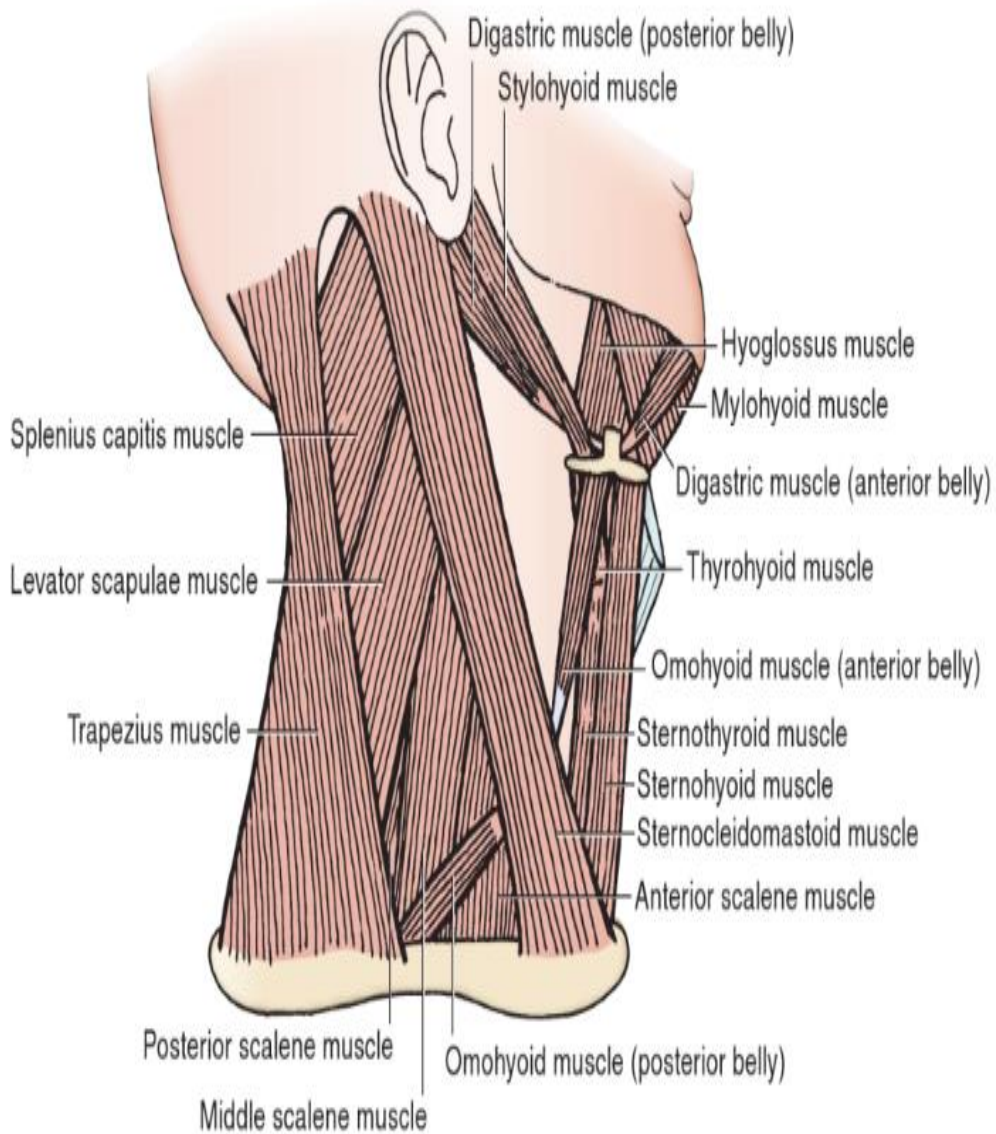
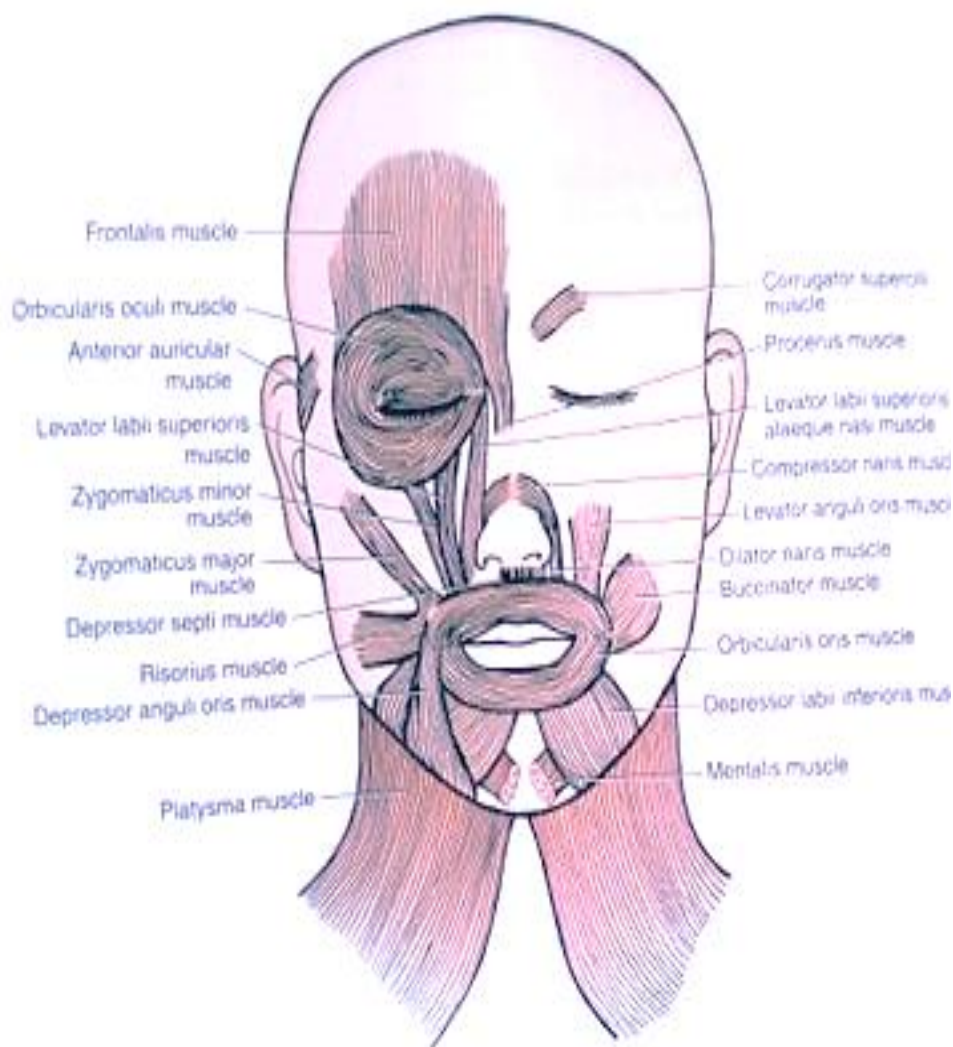
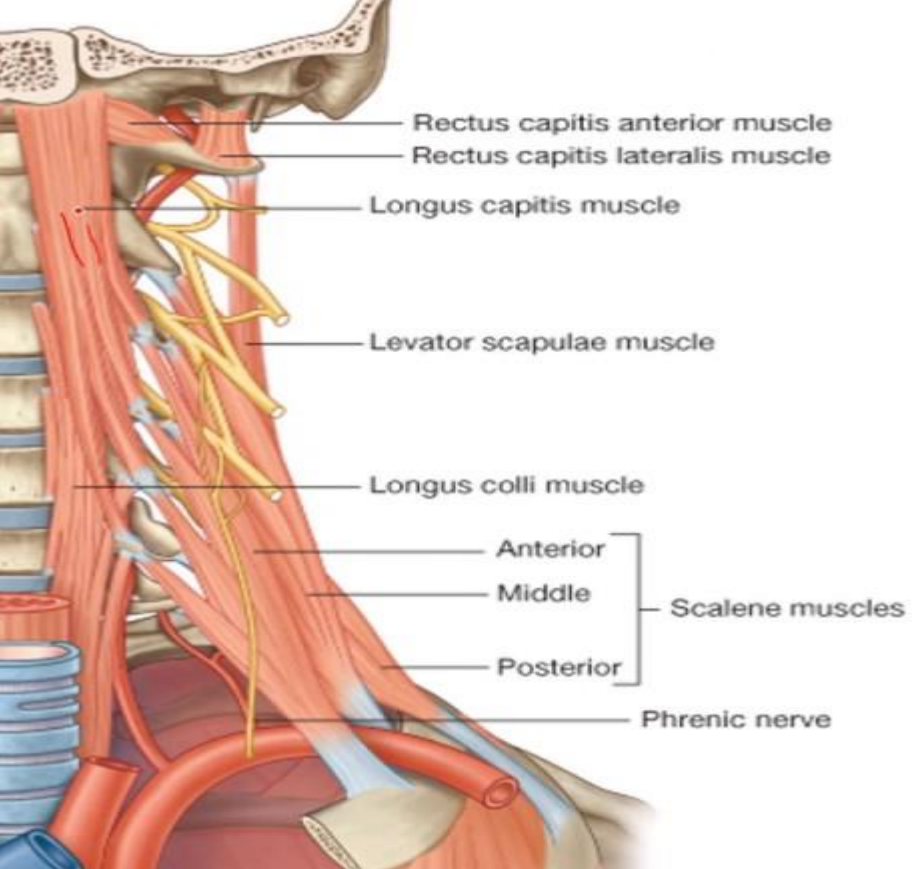


FIGURE 8-2. Muscles of the cervical triangle.

Muscle	Origin	Insertion	Nerve	Action
<b>Cervical muscles</b>				
Platysma	Superficial fascia over upper part of deltoid and pectoralis major	Mandible; skin and muscles over mandible and angle of mouth	Facial nerve	Depresses lower jaw and lip and angle of mouth; wrinkles skin of neck
Sternocleidomastoid	Manubrium sterni and medial one-third of clavicle	Mastoid process and lateral half of superior nuchal line	Spinal accessory nerve; C2–C8 (sensory)	Singly turns face toward opposite side; together flex head, raise thorax
<b>Suprahyoid muscles</b>				
Digastric	Anterior belly from digastric fossa of mandible; posterior belly from mastoid notch	Intermediate tendon attached to body of hyoid	Posterior belly by facial nerve; anterior belly by mylohyoid nerve of trigeminal nerve	Elevates hyoid and floor of mouth; depresses mandible
Mylohyoid	Mylohyoid line of mandible	Median raphe and body of hyoid bone	Mylohyoid nerve of trigeminal nerve	Elevates hyoid and floor of mouth; depresses mandible
Stylohyoid	Styloid process	Body of hyoid	Facial nerve	Elevates hyoid
Geniohyoid	Genial tubercle of mandible	Body of hyoid	C1 via hypoglossal nerve	Elevates hyoid and floor of mouth
<b>Infrahyoid muscles</b>				
Sternohyoid	Manubrium sterni and medial end of clavicle	Body of hyoid	Ansa cervicalis	Depresses hyoid and larynx
Sternothyroid	Manubrium sterni; first costal cartilage	Oblique line of thyroid cartilage	Ansa cervicalis	Depresses hyoid and larynx
Thyrohyoid	Oblique line of thyroid cartilage	Body and greater horn of hyoid	C1 via hypoglossal nerve	Depresses hyoid and elevates larynx
Omohyoid	Inferior belly from medial lip of suprascapular notch and suprascapular ligament; superior belly from intermediate tendon	Inferior belly to intermediate tendon; superior belly to body of hyoid	Ansa cervicalis	Depresses and retracts hyoid and larynx



Muscle	Origin	Insertion	Nerve	Action
Occipitofrontalis	Superior nuchal line; upper orbital margin	Epicranial aponeurosis	Facial	Elevates eyebrows; wrinkles forehead (surprise)
Corrugator supercilii	Medial supraorbital margin	Skin of medial eyebrow	Facial	Draws eyebrows downward medially (anger, frowning)
Orbicularis oculi	Medial orbital margin; medial palpebral ligament; lacrimal bone	Skin and rim of orbit; tarsal plate; lateral palpebral raphe	Facial	Closes eyelids: orbital part tightly (wink); palpebral part gently
Procerus	Nasal bone and cartilage	Skin between eyebrows	Facial	Wrinkles skin over bones (sadness)
Nasalis	Maxilla lateral to incisive fossa	Bridge on nose (transverse part); Ala (alar part)	Facial	Compresses nostrils (transverse part); dilates nostrils (alar part)
Depressor septi	Incisive fossa of maxilla	Ala and nasal septum	Facial	Constricts nares
Orbicularis oris	Maxilla above incisor teeth	Skin of lip	Facial	Closes lips or purse
Levator anguli oris	Canine fossa of maxilla	Angle of mouth	Facial	Elevates angle of mouth medially (disgust)
Levator labii superioris	Maxilla above infraorbital foramen	Skin of upper lip	Facial	Elevates upper lip; dilates nares (disgust)
Levator labii superioris alaeque nasi	Frontal process of maxilla	Skin of upper lip	Facial	Elevates ala of nose and upper lip
Zygomaticus major	Zygomatic arch	Angle of mouth	Facial	Draws angle of mouth backward and upward (smile)
Zygomaticus minor	Zygomatic arch	Angle of mouth	Facial	Elevates upper lip
Depressor labii inferioris	Mandible below mental foramen	Orbicularis oris and skin of lower lip	Facial	Depresses lower lip
Depressor anguli oris	Oblique line of mandible	Angle of mouth	Facial	Depresses angle of mouth (frowning)
Risorius	Fascia over masseter	Angle of mouth	Facial	Retracts angle of mouth (grimace)
Buccinator	Mandible; pterygomandibular raphe; alveolar processes	Angle of mouth	Facial	Compresses cheek to keep it taut
Mentalis	Incisive fossa of mandible	Skin of chin	Facial	Elevates and protrudes lower lip (doubt)
Auricularis anterior, superior, and posterior	Temporal fascia; epicranial aponeurosis; mastoid process	Anterior, superior, and posterior sides of auricle	Facial	Retract and elevate ear

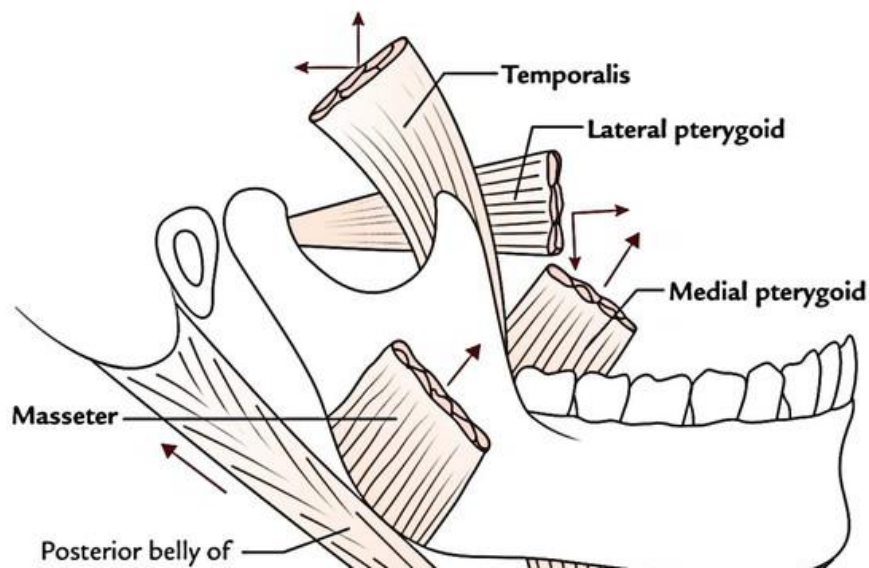


**table 8-2** Prevertebral or Deep Neck Muscles

Muscle	Origin	Insertion	Nerve	Action
<b>Lateral vertebral</b>				
Anterior scalene	Transverse processes of CV3–CV6	Scalene tubercle on first rib	Lower cervical (C5–C8)	Elevates first rib; bends neck
Middle scalene	Transverse processes of CV2–CV7	Upper surface of first rib	Lower cervical (C5–C8)	Elevates first rib; bends neck
Posterior scalene	Transverse processes of CV4–CV6	Outer surface of second rib	Lower cervical (C6–C8)	Elevates second rib; bends neck
<b>Anterior vertebral</b>				
Longus capitis	Transverse process of CV3–CV6	Basilar part of occipital bone	C1–C4	Flexes and rotates head
Longus colli (L. cervicis)	Transverse processes and bodies of CV3–TV3	Anterior tubercle of atlas; bodies of CV2–CV4; transverse process of CV5–CV6	C2–C6	Flexes and rotates neck
Rectus capitis anterior	Lateral mass of atlas	Basilar part of occipital bone	C1–C2	Flexes and rotates head
Rectus capitis lateralis	Transverse process of atlas	Jugular process of occipital bone	C1–C2	Flexes head laterally

**table 8-4** Muscles of Mastication\*

Muscle	Origin	Insertion	Nerve	Action on Mandible
Temporalis	Temporal fossa	Coronoid process and ramus of mandible	Trigeminal	Elevates; retracts
Masseter	Lower border and medial surface of zygomatic arch	Lateral surface of coronoid process, ramus and angle of mandible	Trigeminal	Elevates (superficial part); retracts (deep part)
Lateral pterygoid	Superior head from infratemporal surface of sphenoid; inferior head from lateral surface of lateral pterygoid plate of sphenoid	Neck of mandible; articular disk and capsule of temporomandibular joint	Trigeminal	Depresses (superior head); protracts (inferior head)
Medial pterygoid	Tuber of maxilla (superficial head); medial surface of lateral pterygoid plate; pyramidal process of palatine bone (deep head)	Medial surface of angle and ramus of mandible	Trigeminal	Elevates; protracts



\*The jaws are opened by the lateral pterygoid muscle and are closed by the temporalis, masseter, and medial pterygoid muscles.