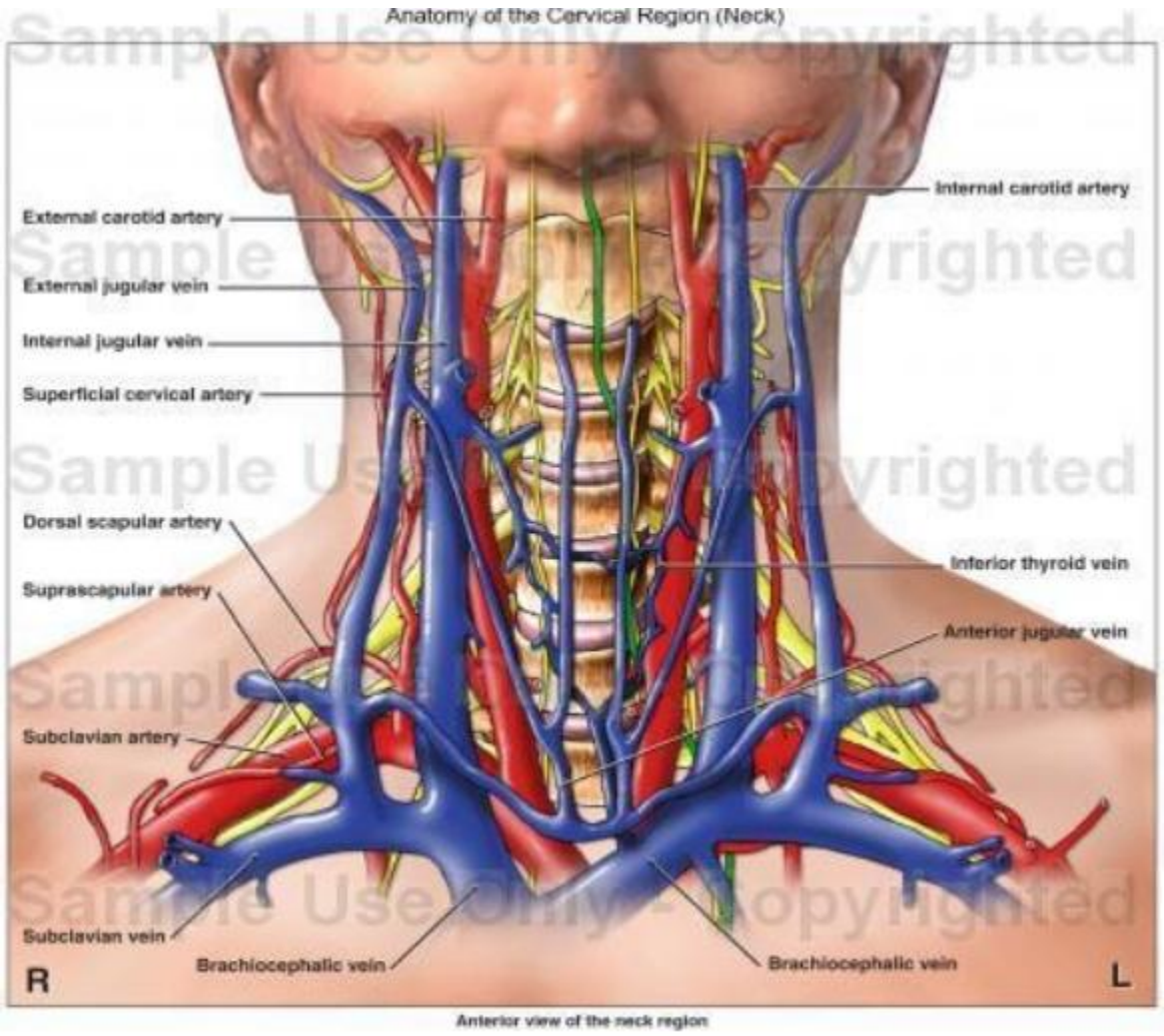
Main vessels of the neck

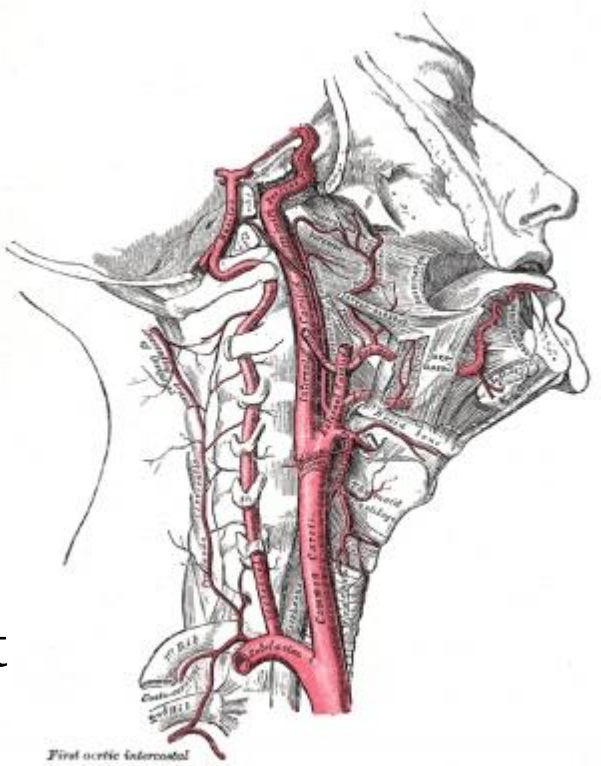
L 1-2-3



PROF. ABBAS TAHER

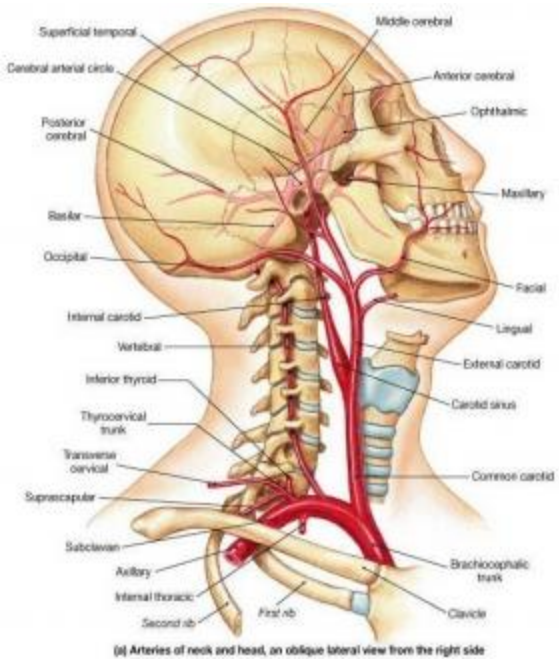
Common Carotid Artery

The left and right **common carotid arteries** are arteries that supply the head and neck with oxygenated blood; they divide in the neck to form the external and internal carotid arteries



Structure

The common carotid arteries are present on the left and right sides of the body. These arteries originate from different arteries but follow symmetrical courses. The right common carotid originates in the neck from the brachiocephalic trunk; the left from the aortic arch in the thorax. These split into the external and internal carotid arteries at the upper border of the thyroid cartilage, at around the level of the fourth cervical vertebra.

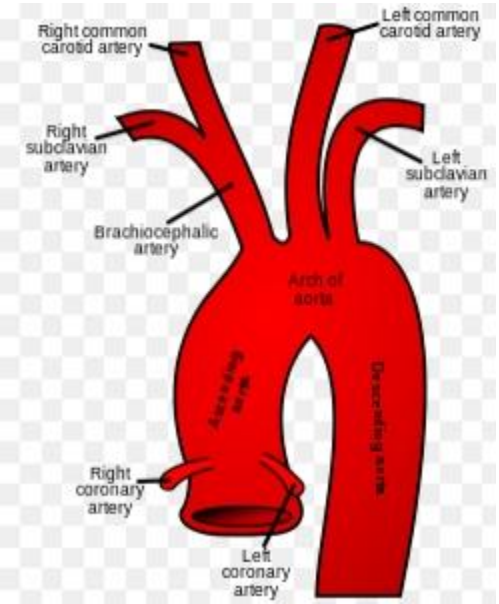


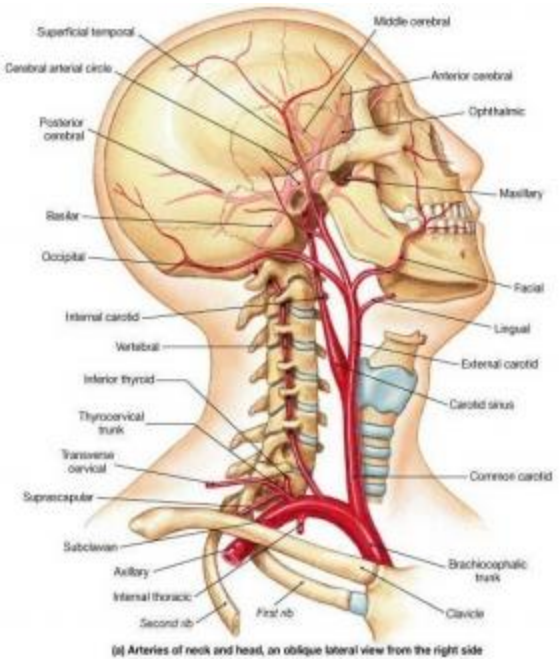
(a) Arteries of neck and head, an oblique lateral view from the right side

Common Carotid Artery

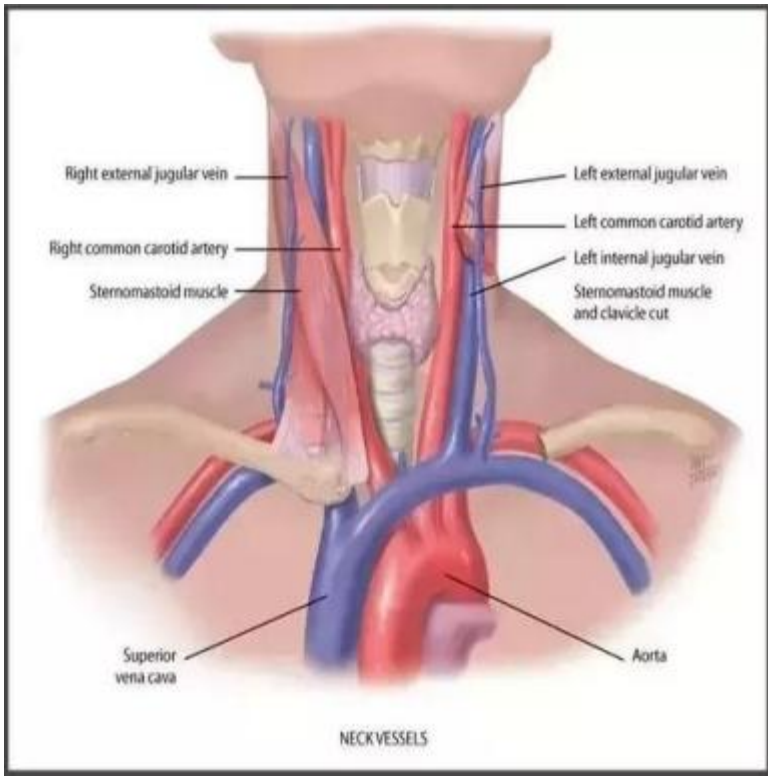
The **right common** carotid artery arises from a **bifurcation** of the**brachiocephalic trunk** (the right subclavian artery is the other branch). This bifurcation occurs roughly at the level of the right sternoclavicular joint

The left common carotid artery branches directly from the **arch of aorta**. The left and right common carotid arteries ascend up the…… neck, **lateral** to the trachea and the oesophagus. They do not give off any branches in the neck. At the level of the superior margin of the **thyroid cartilage (C4),** the carotid arteries split into the **external** and **internal** carotid arteries. This bifurcation occurs in an anatomical area known as the carotid triangle

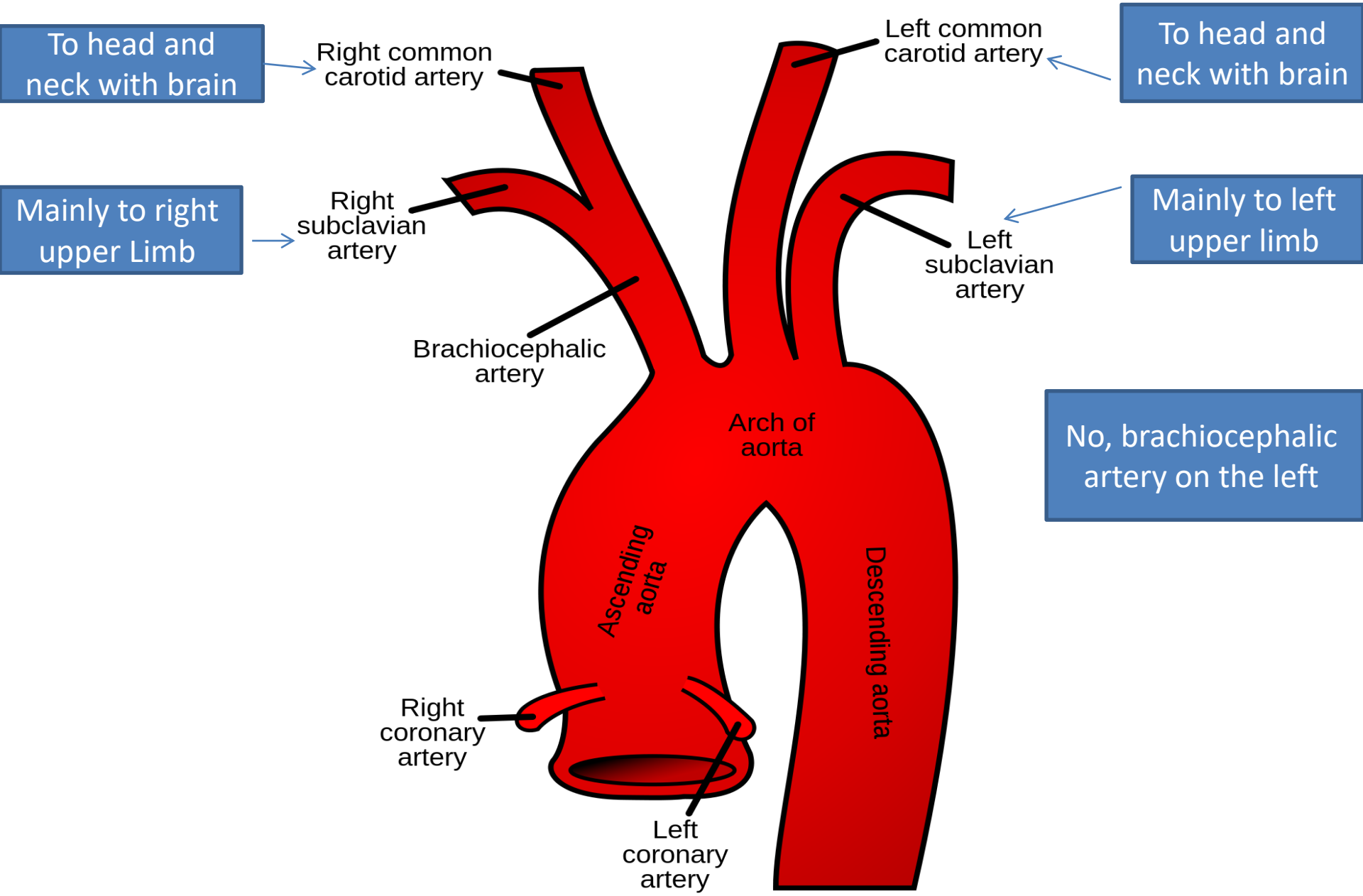




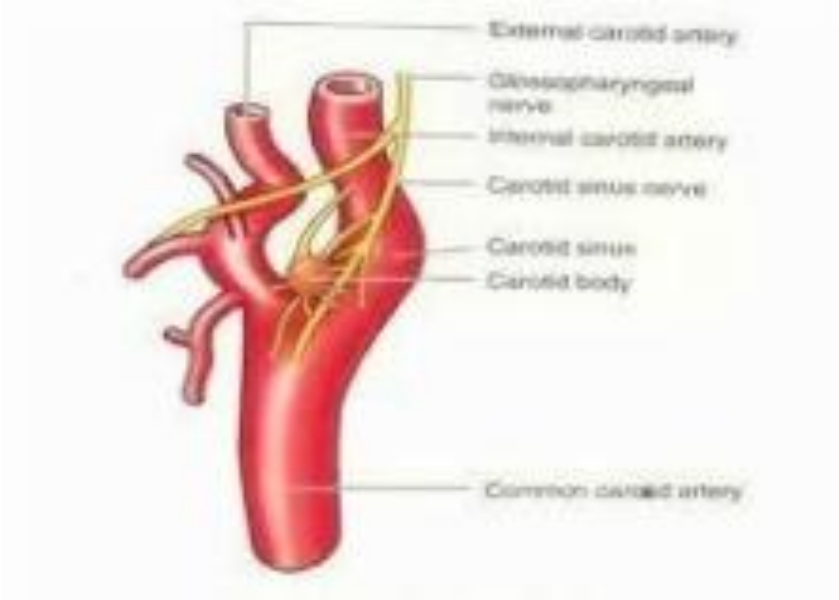
(a) Arteries of neck and head, an oblique lateral view from the right side



AORTA it arises from left ventricle to whole body



Carotid Body and Carotid Sinus



Carotid Body

The carotid body is a chemoreceptor located in the adventitia of the bifurcation of the common carotid artery

Chemoreceptor function:

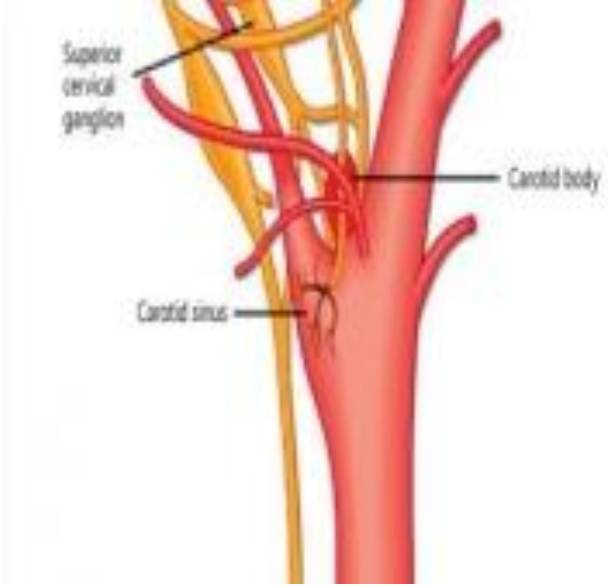
- Carotid body monitors the blood's pH, pCO_2, and pO_2 and thereby modulates cardiovascular and respiratory function primarily through sympathetic tone
- When the carotid body senses acidemia, hypercapnea, or hypoxia, autonomic firing leads to increased blood pressure, heart rate, and respiratory rate
- The function of the carotid body is complemented by other chemoreceptors, most notably the aortic body located in the aortic arch

Anatomy:

- Located in the bifurcation of the common carotid artery
- Average size of carotid body is 3-5 mm in diameter and average weight is 12 mg
- Blood supply: from external carotid through Mayer's ligament (provides attachment to carotids)
- Innervation: Hering's nerve (aka carotid sinus nerve), a branch of the glossopharyngeal (CN IX), originating 1.5 cm distal to jugular foramen

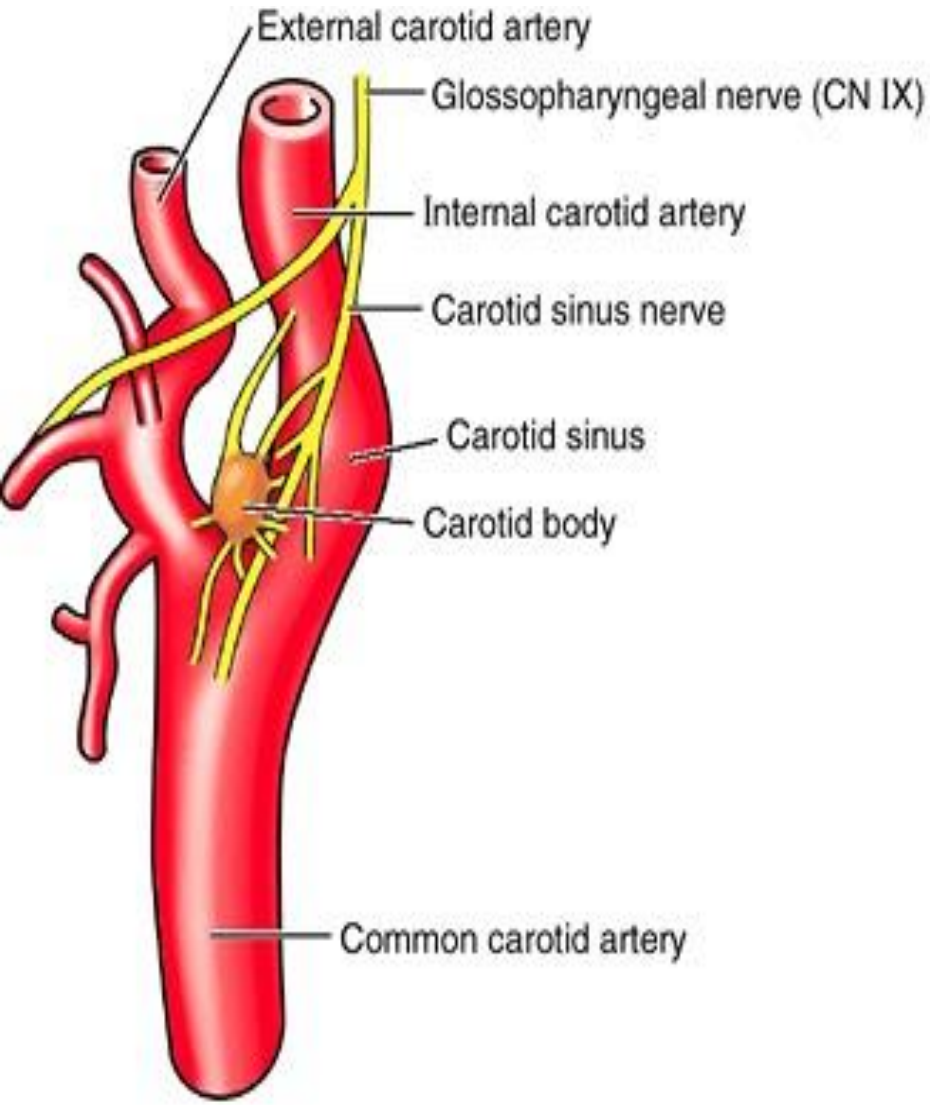
Composed of two receptor cell types:

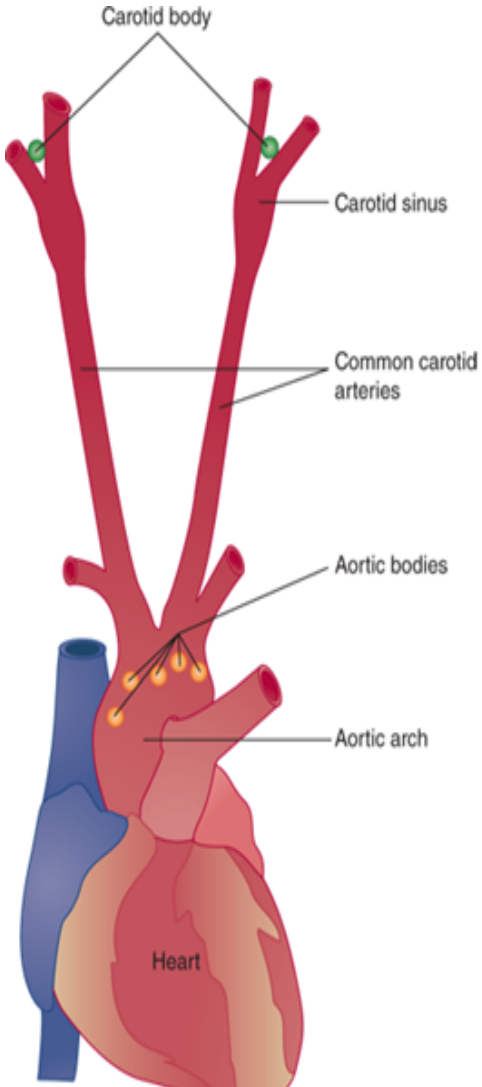
- Chief cells (Type I): derived from neural crest, release ACh, ATP, dopamine in response to activation
- Sustentacular cells (Type II): supporting cells



- Carotid Sinus
  - The carotid sinus is a baroreceptor that senses changes in systemic blood pressure and is located in the adventitia of the carotid bulb of the internal carotid artery
  - Due to its location the carotid sinus is an intimately related but distinct organ from the carotid body
  - Innervation: same as carotid body (Hering's nerve, aka carotid sinus nerve, a branch of CN IX)
  - The function of the carotid sinus can be affected by carotid body tumor resection (see below)
  - Carotid sinus syndrome (syncopal episodes due to inadvertant triggering of the carotid sinus) is a pathology of the carotid sinus, in addition, carotid massage triggers the carotid sinus pathway **(increased pressure on carotid sinus due to massage → sends signal to decrease systemic BP)**

Chemoreceptor and Baroreceptor Carotid and Aortic body-Carotid and Aortic sinuses





Common Carotid Relations

The common carotid artery is a large elastic artery, which provides the main blood supply to the head and neck region. There is one common carotid artery on either side of the body and these arteries differ in their origin. The left common carotid artery arises from the aortic arch within the superior mediastinum, whilst the right common carotid artery arises from the brachiocephalic artery posterior to the right sternoclavicular joint.

The common carotid artery ascends lateral to the trachea and oesophagus within a deep cervical fascia, the carotid sheath, with the internal jugular vein and the vagus nerve. The anatomical relation :

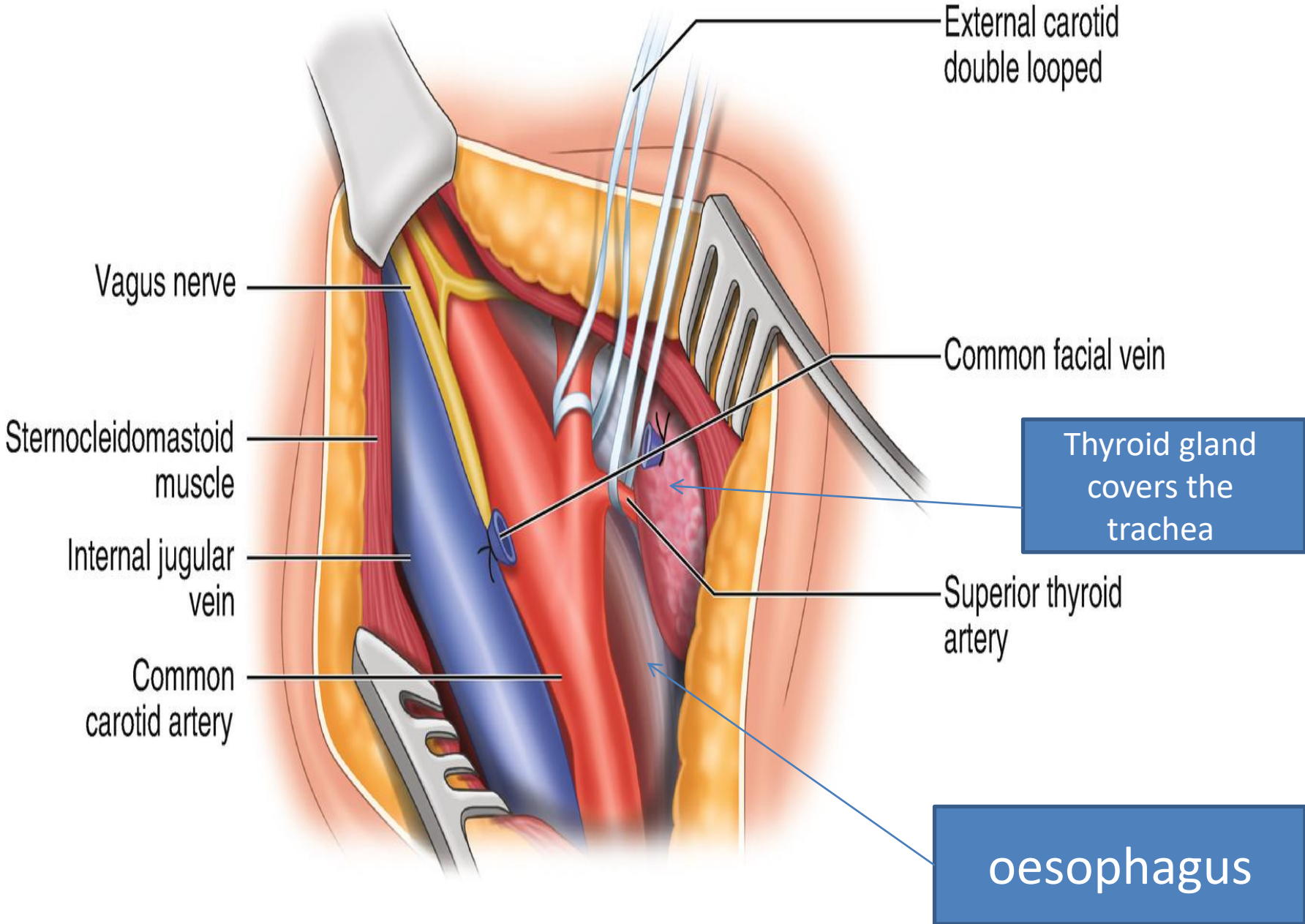
Anterolaterally: The skin, fascia, sternocleidomastoid, sternohyoid, sternothyroid, and superiore belly of omohyoid

Posteriorly: The transverse processes of lower four cervical vertebrae, the prevertebral muscles, sympathetic trunk, vertebral vessels in the lower part of the neck

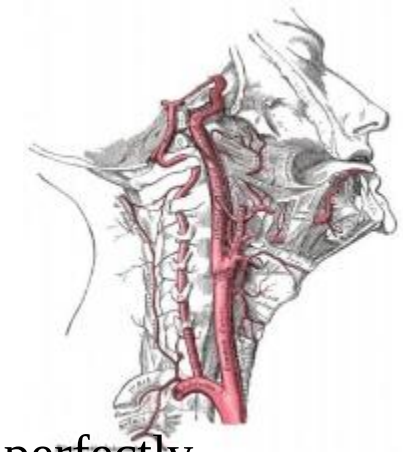
Medially: The larynx, pharynx, and below these, the trachea and esophagus and the lobe of thyroid gland

Laterally: The internal jugular vein, and posterolaterally, the vagus nerve

Relation of neck vessels



Collateral circulation

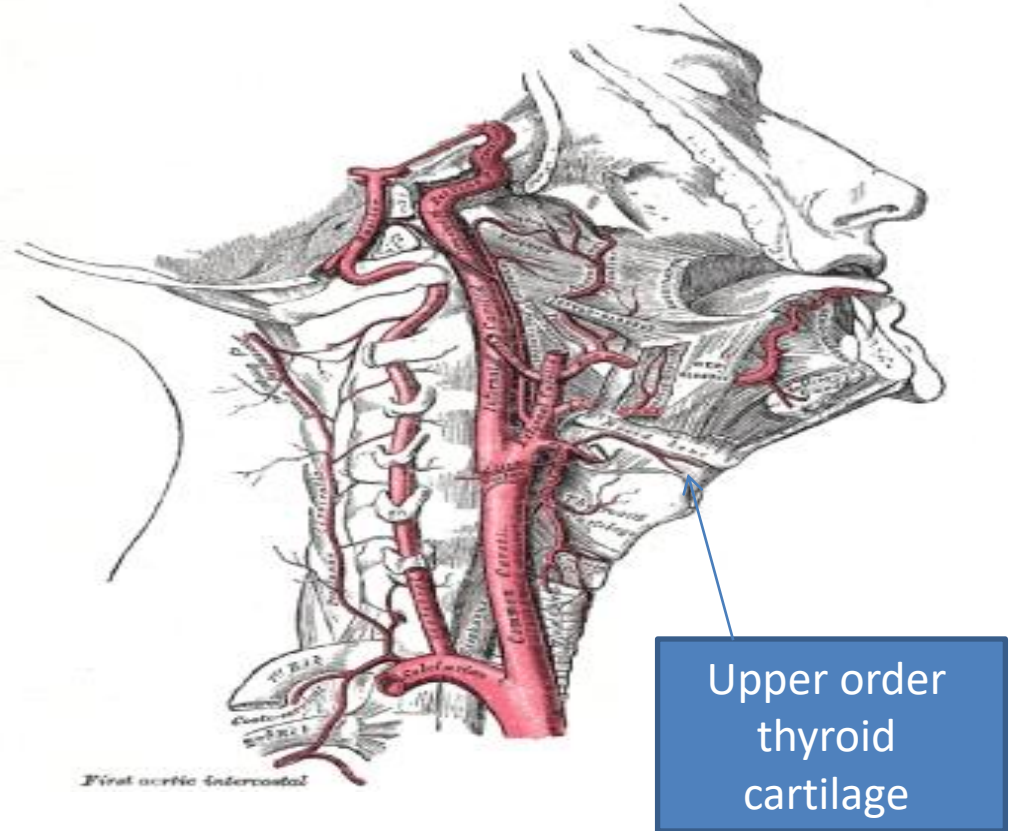


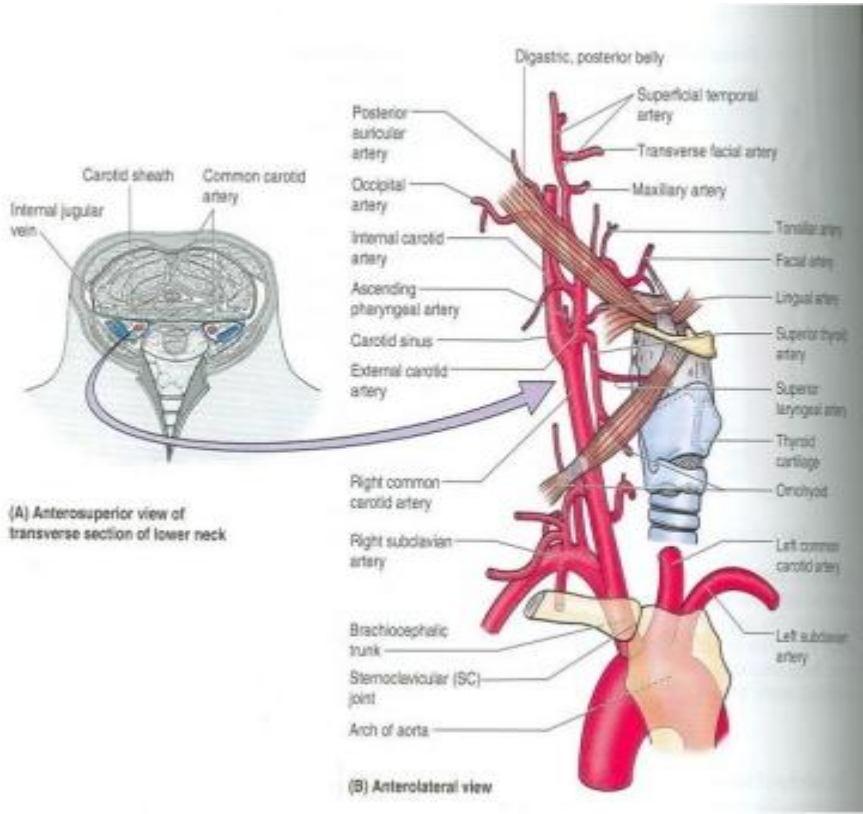
After ligature of the common carotid, the collateral circulation can be perfectly established, by the free communication which exists between the carotid arteries of opposite sides, both without and within……..
the cranium, and by enlargement of the branches of the subclavian artery on the side corresponding to that on which the vessel has been tied.
The chief communications outside the skull take place between the superior and inferior thyroid arteries, and the deep cervical artery and the descending branch of the occipital artery; the vertebral artery takes the place of the internal carotid artery within the cranium.

Clinical significance:
The common carotid artery is often used in measuring the pulse, especially in patients who are in shock and who lack a detectable pulse in the more peripheral arteries of the body. The pulse is taken by palpating the artery just deep to the anterior border of the sternocleidomastoid muscle at the level of the superior border of the thyroid cartilage.
Presence of a carotid pulse has been estimated to indicate a systolic blood pressure of more than 40 mmHg, as given by the 50% percentile.
Carotid stenosis may occur in patients with atherosclerosis.

External Carotid Artery

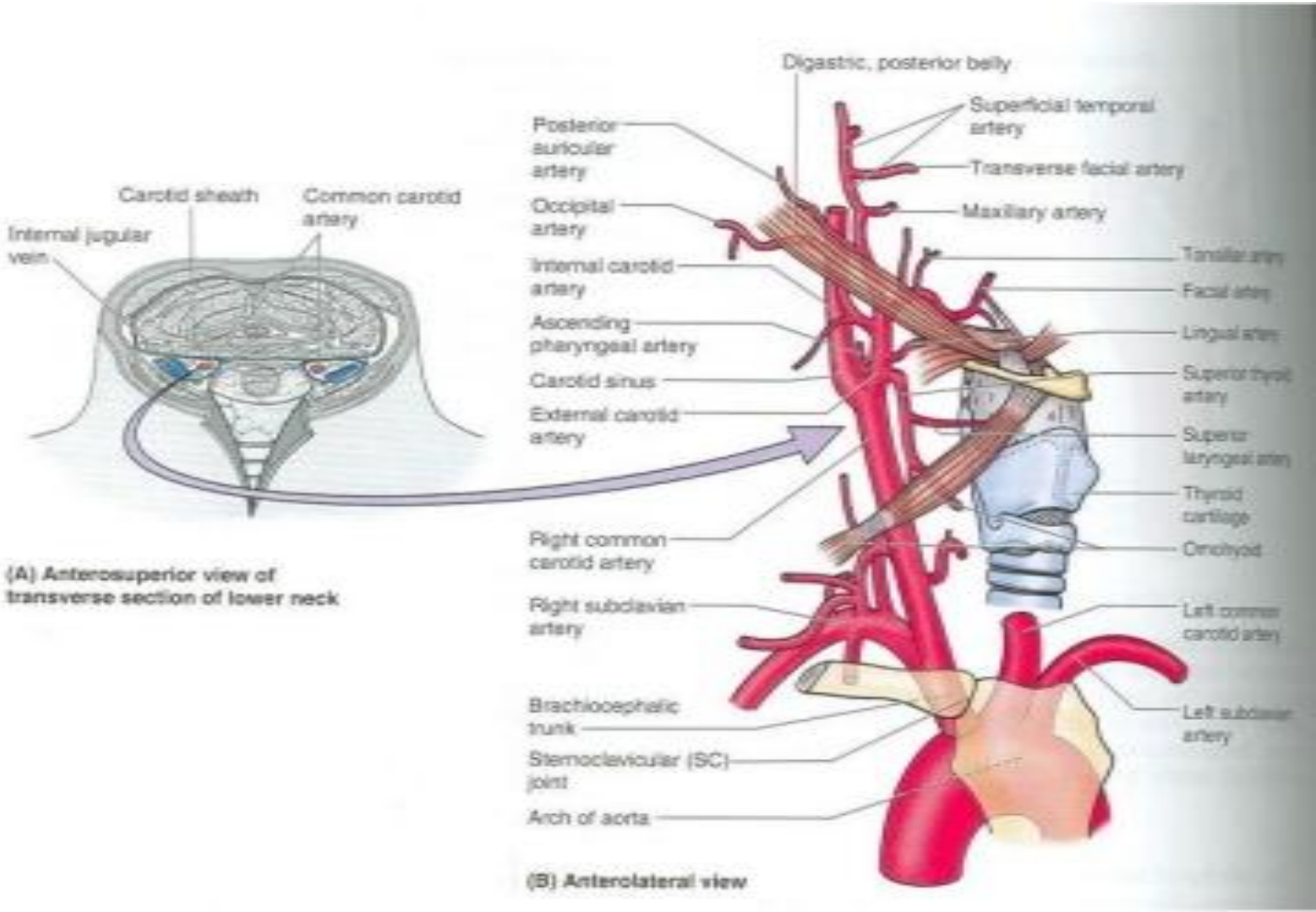
-It is one of the terminal branches of the common carotid artery
-It supplies the structures in the neck, face, scalp, tongue and maxilla
-Begins at the level of the upper border of the thyroid cartilage
-Terminates in the substance of the parotid gland by dividing into superficial temporal and maxillary arteries.
-At its origin, where its pulsation can be felt, the artery lies within the carotid triangle
-At first, it lies medial to the internal carotid artery
-It is crossed by the posterior belly of the digastric and the stylohyoid muscles .





External Carotid Artery

-



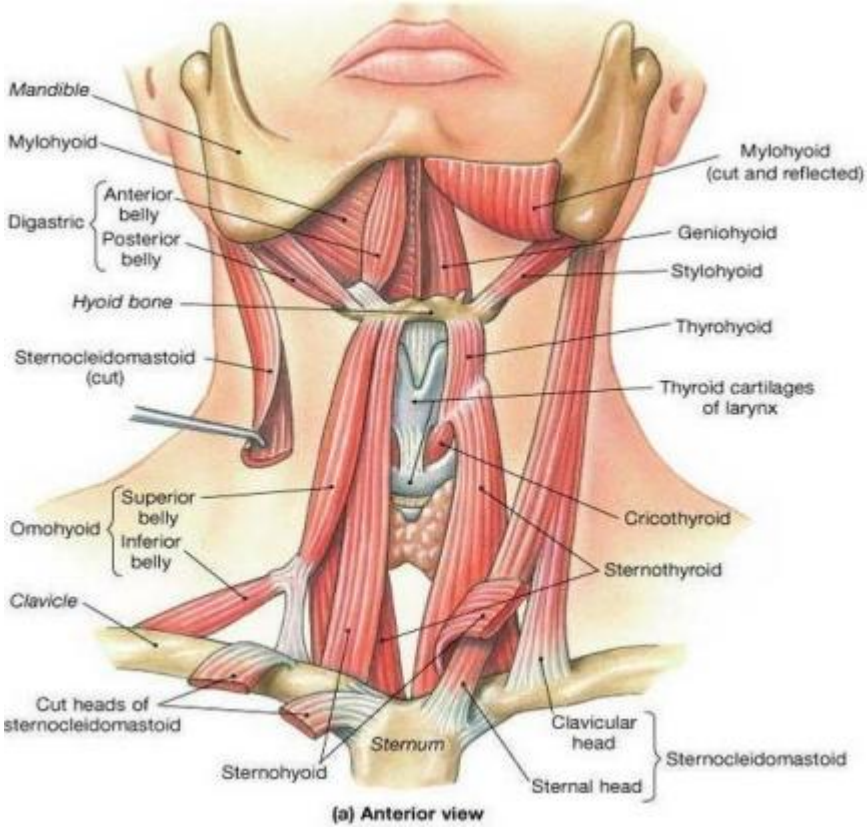
Relations

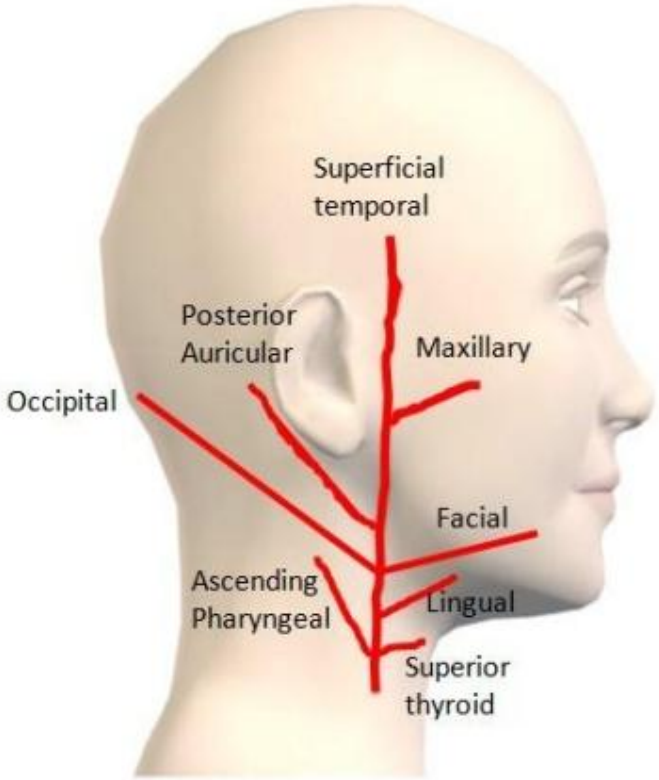
Anterolaterally: overlapped by sternocleidomastoid muscle, fascia and skin, it is crossed by the hypoglossal nerve the posterior belly of the digastric muscle and the stylohyoid, crossed by the facial nerve within the parotid gland

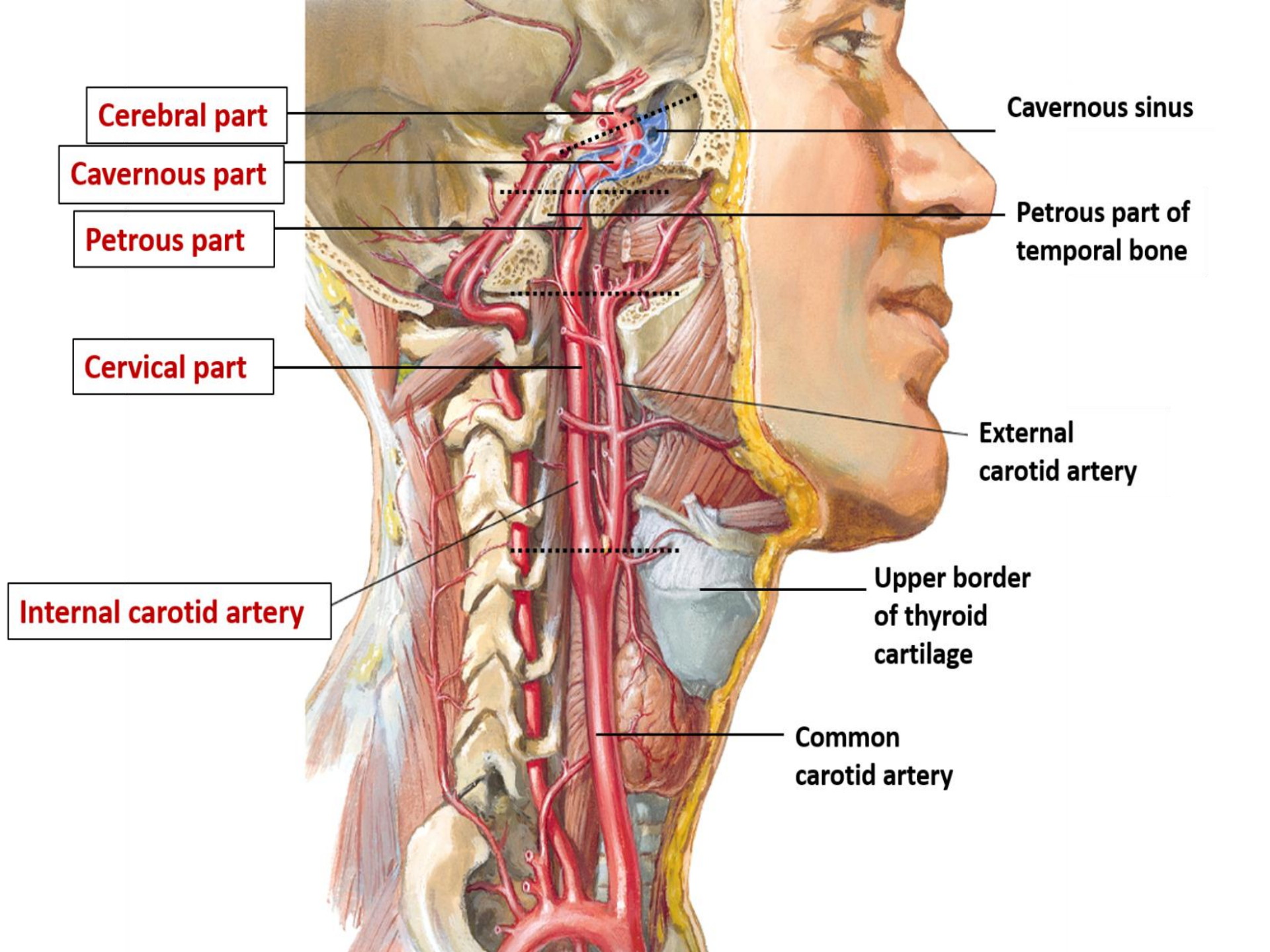
The internal jugular vein first lie anterior to the artery then posterior to it

Medially: the wall of the pharynx, internal carotid artery

The stylopharyngeus muscle, the glossopharyngeal nerve, and pharyngeal branch of the vagus pass between the external and internal carotid arteries






Cerebral part
Cavernous part
Petrous part
Cervical part
Internal carotid artery
Cavernous sinus
Petrous part of temporal bone
External carotid artery
Upper border of thyroid cartilage
Common carotid artery

BRANCHES OF THE EXT CAROTID ARTERY:

Superior thyroid artery

Ascending pharyngeal artery

Lingual artery

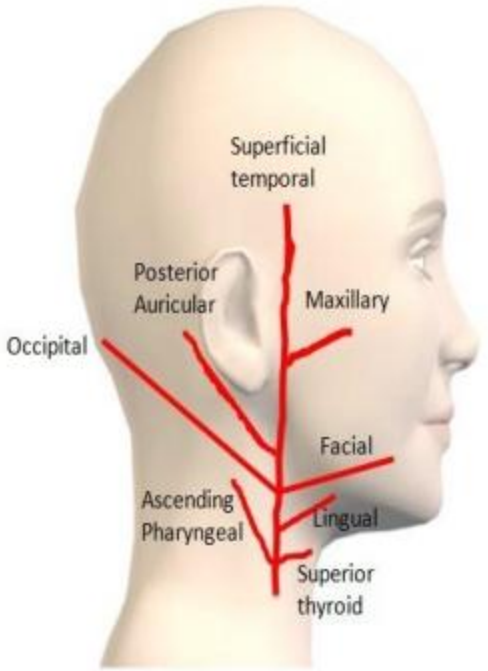
Facial artery

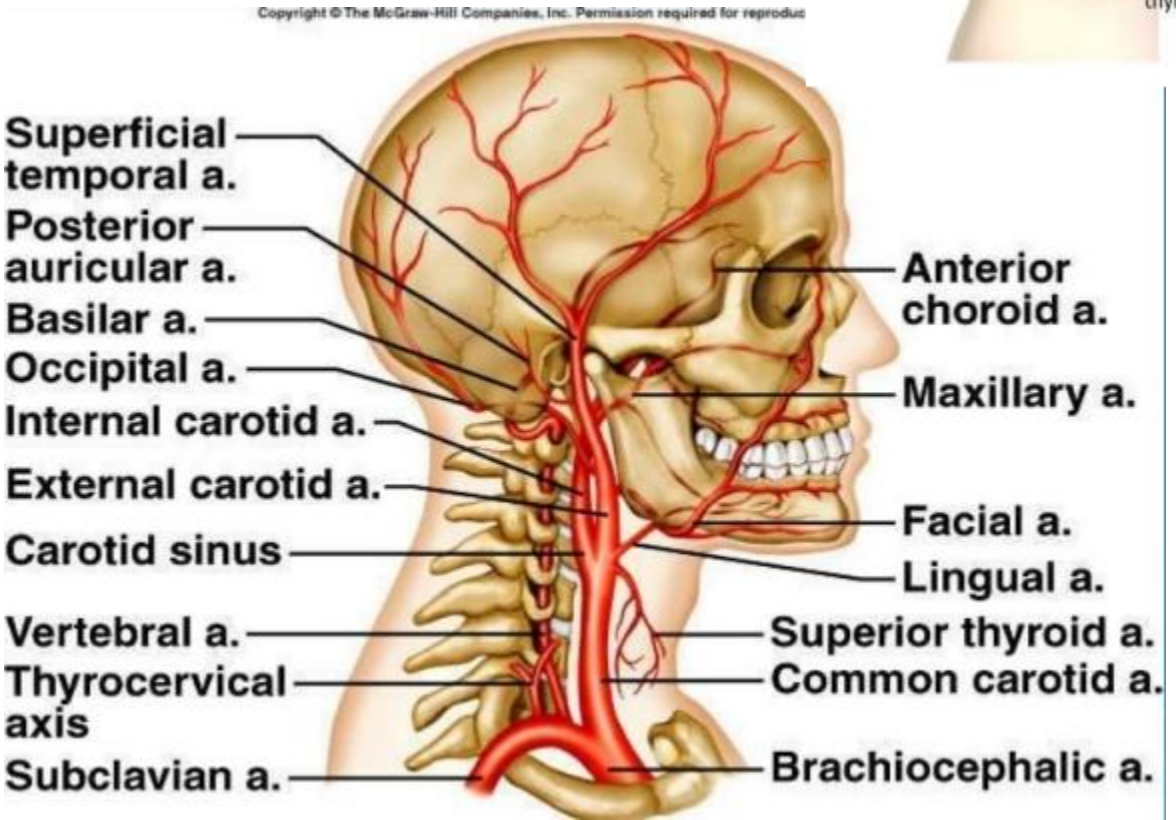
Occipital artery

Posterior auricular artery

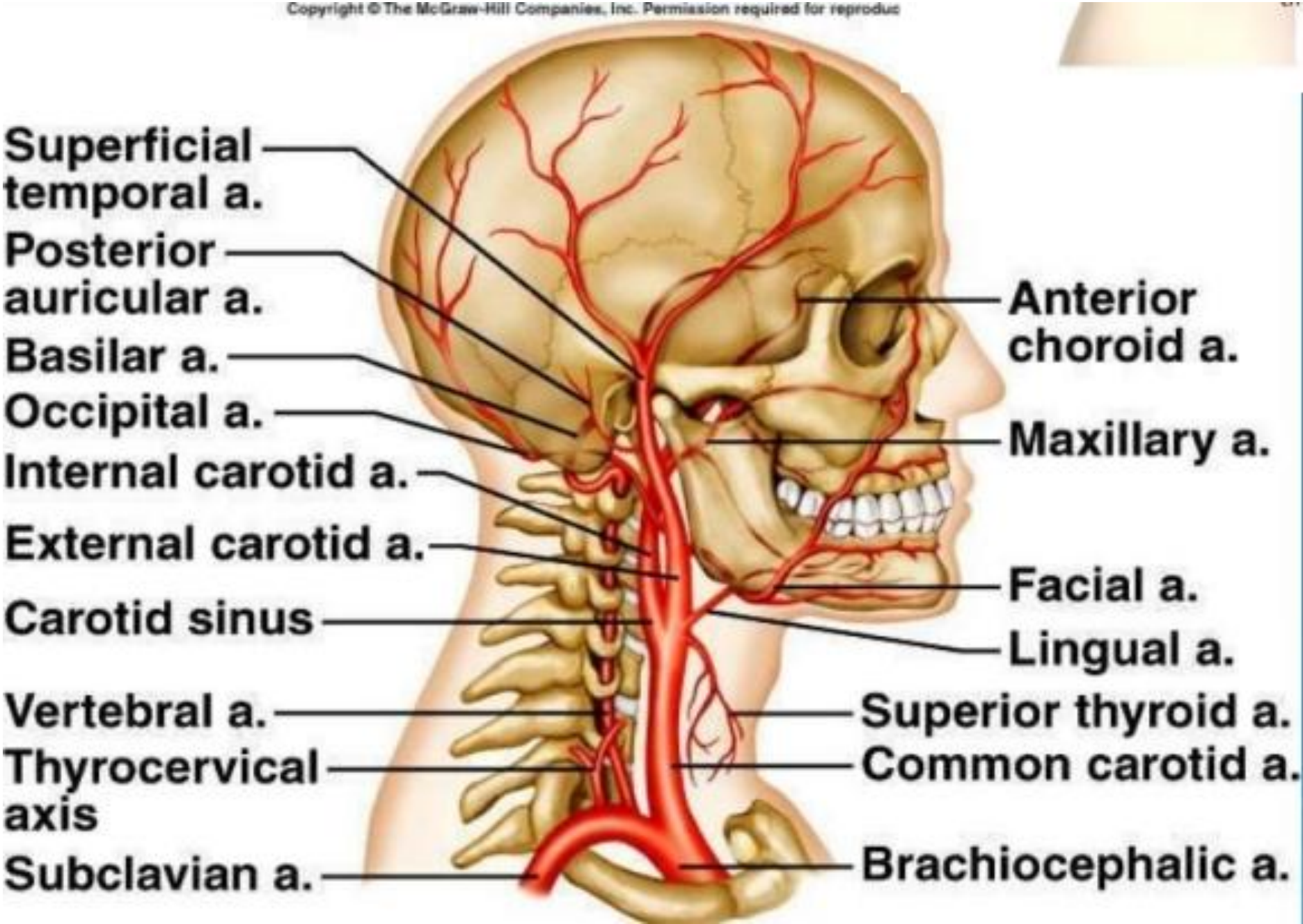
Maxillary

Superficial temporal artery





BRANCHES OF THE EXT CAROTID ARTERY:



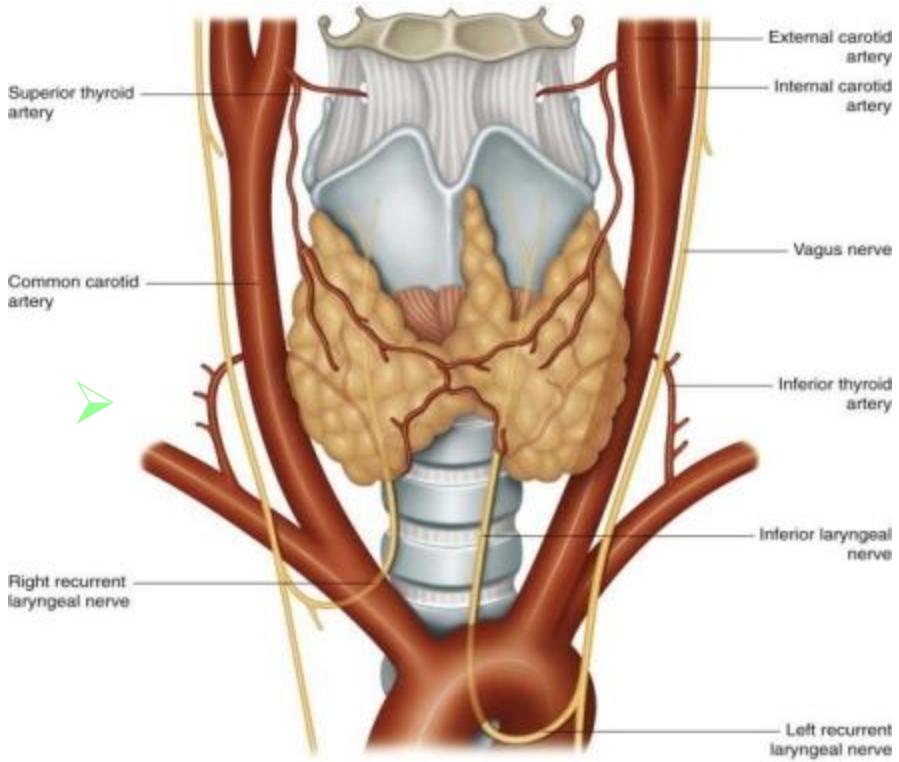
Superior Thyroid Artery

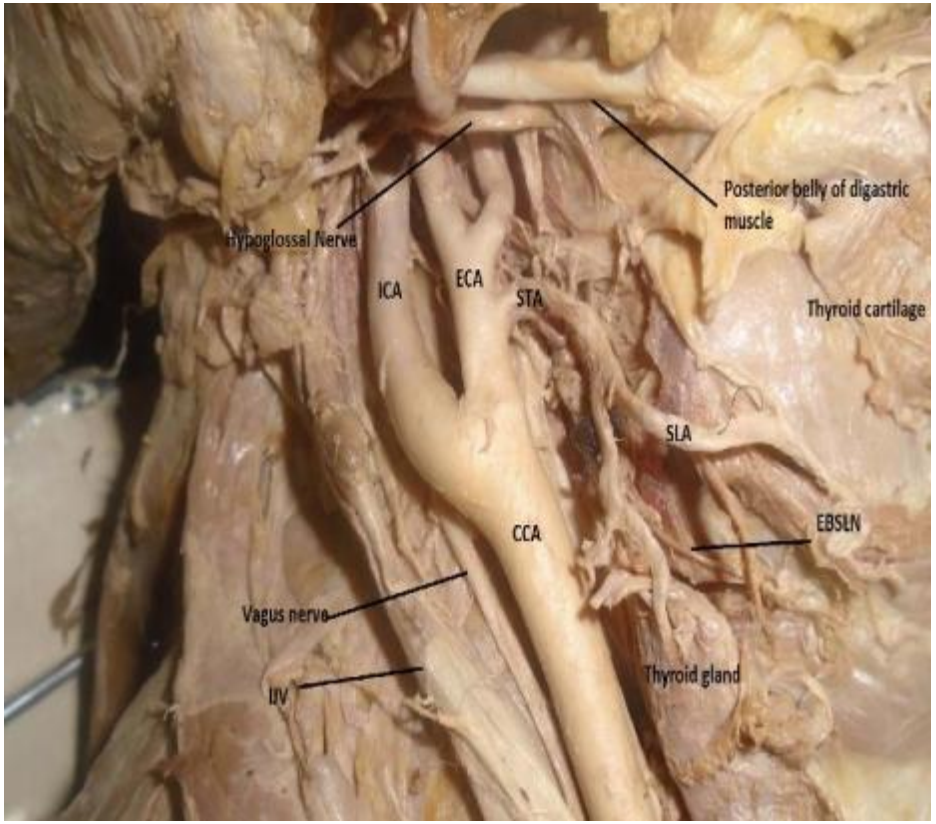
Arises from the external carotid artery near its origin

Passes almost vertically downward

Reach the upper pole of thyroid gland

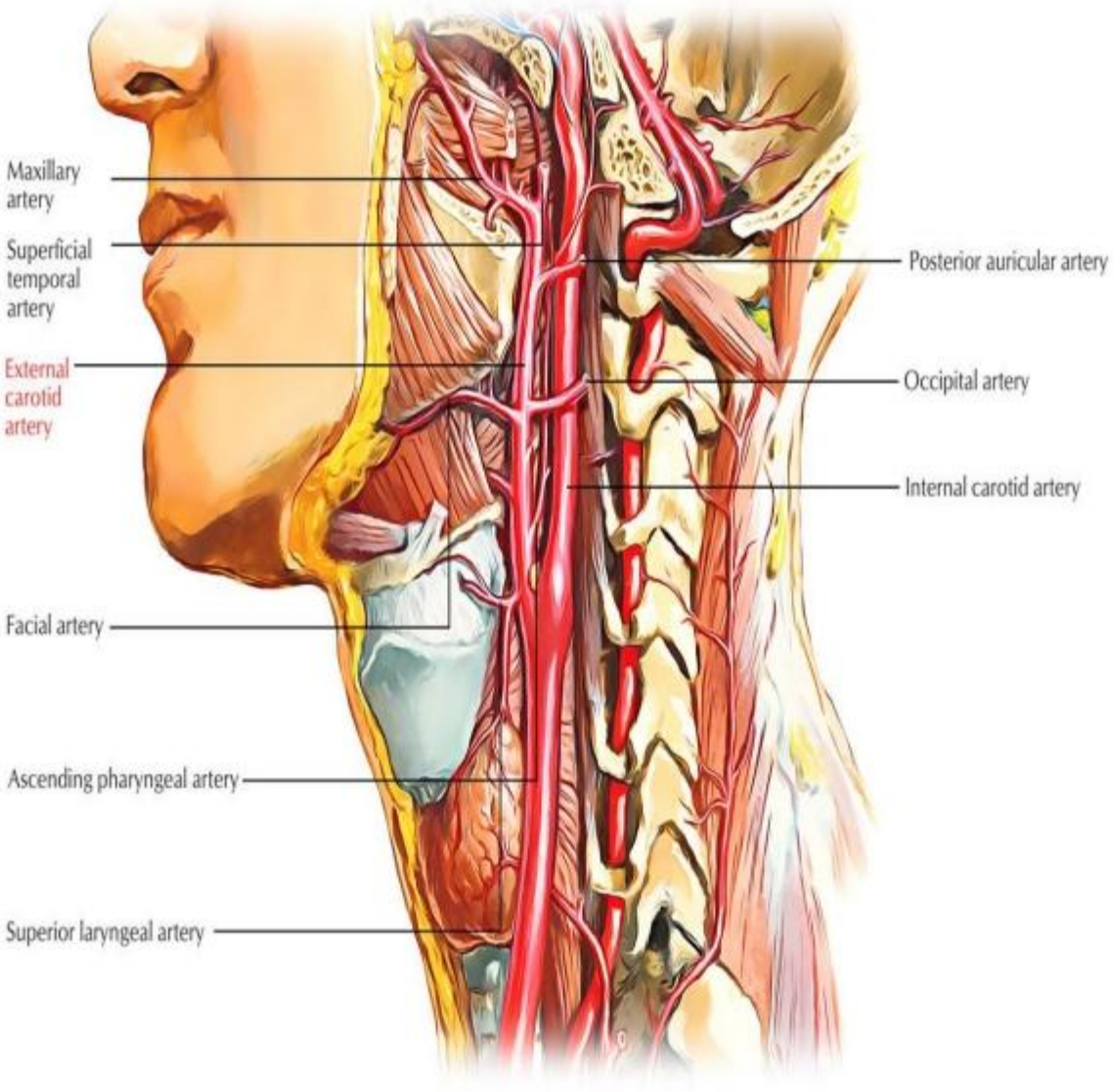
It gives off a branch to the sternocleidomastoid

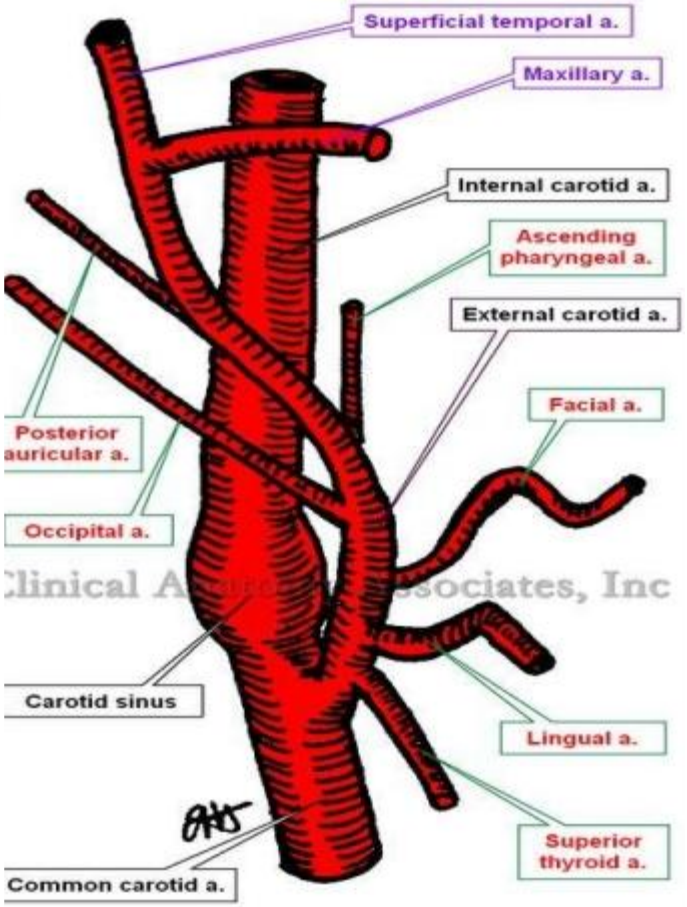




Ascending Pharyngeal Artery

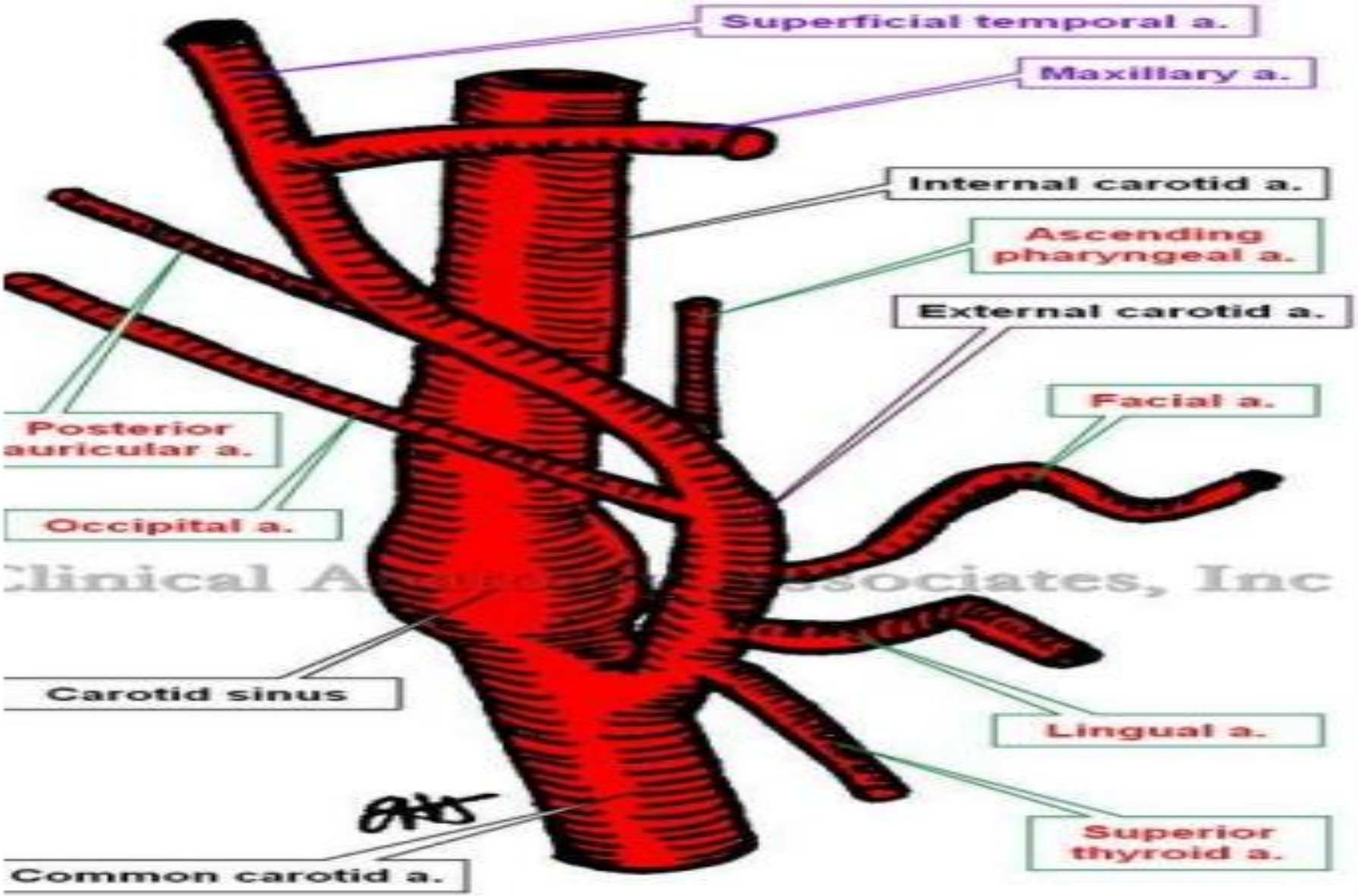
It’s a long slender vessel that ascends on the wall of the pharynx, which it supplies





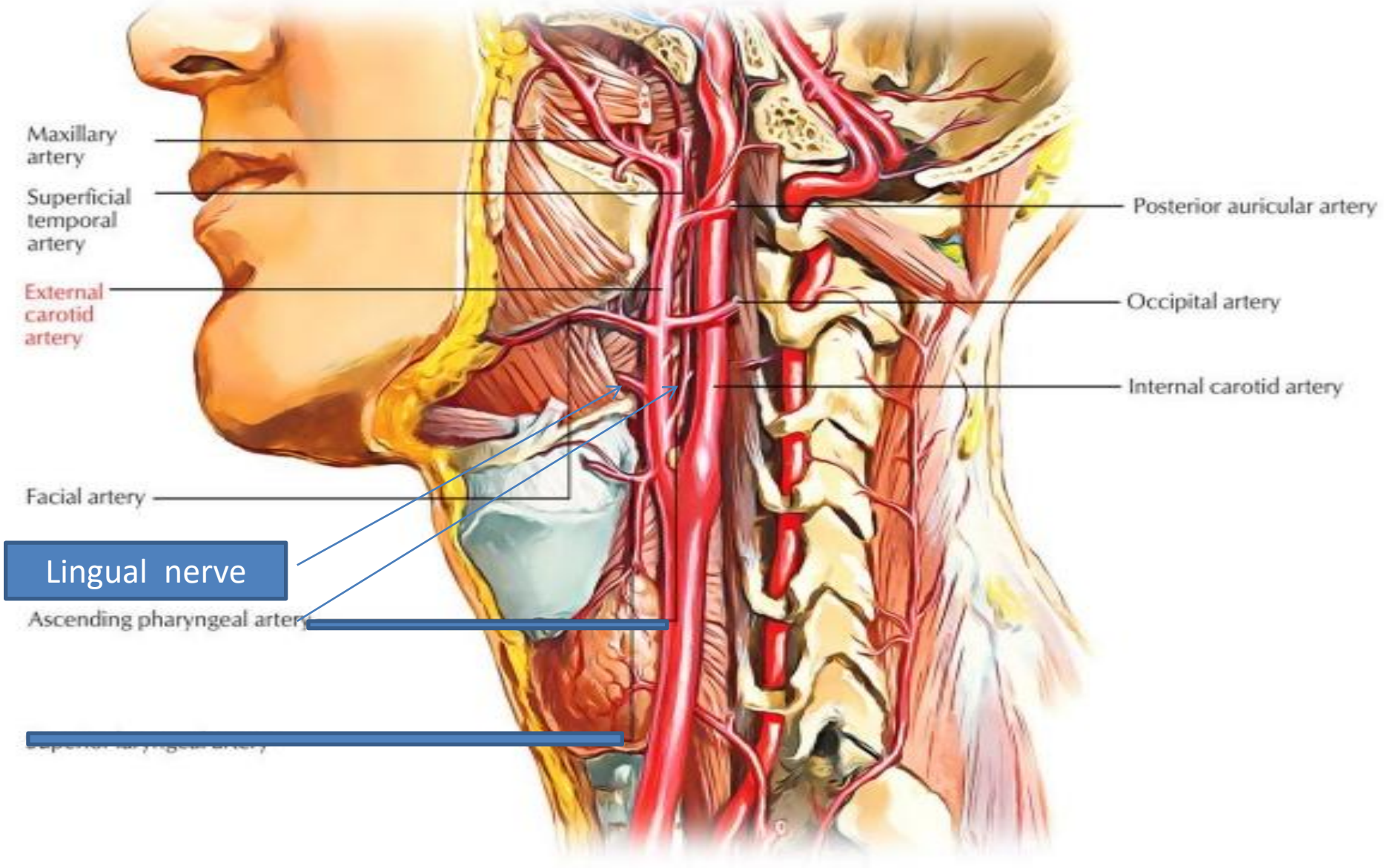
Ascending Pharyngeal Artery

It's a long slender vessel that ascends on the wall of the pharynx, which it supplies



Ascending Pharyngeal Artery

It's a long slender vessel that ascends on the wall of the pharynx, which it supplies



Lingual Artery

It arises from the external carotid artery, opposite the tip of the greater cornu of hyoid bone

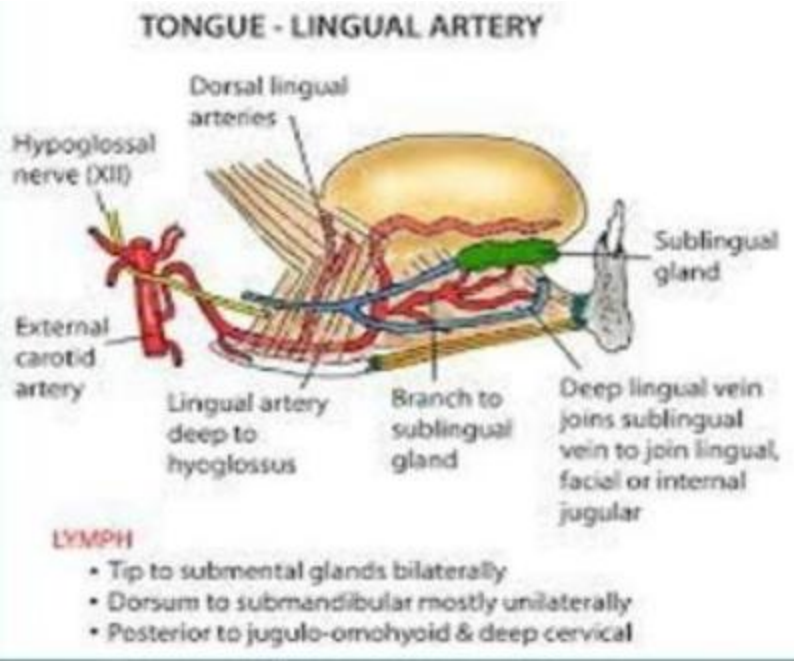
It loops upward to enter the submandibular region

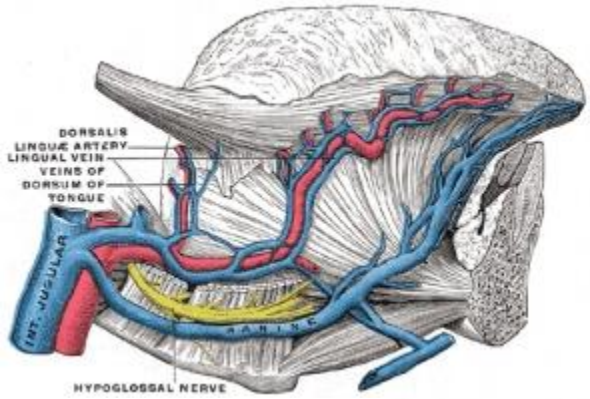
The loop of the artery is crossed superficially by the hypoglossal nerve

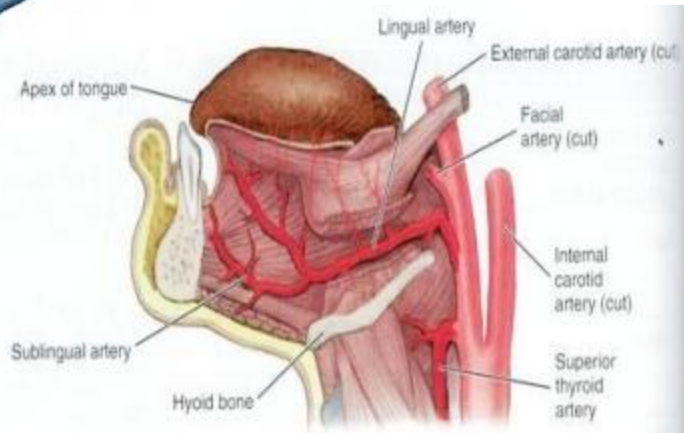
and passing beneath the digastric muscle and stylohyoid muscle it runs horizontally forward, beneath the hyoglossus, and finally, ascending almost perpendicularly to the tongue, turns forward on its lower surface as far as the tip, under the name of the deep lingual artery (profunda linguae).

It also supplies palatine tonsil.

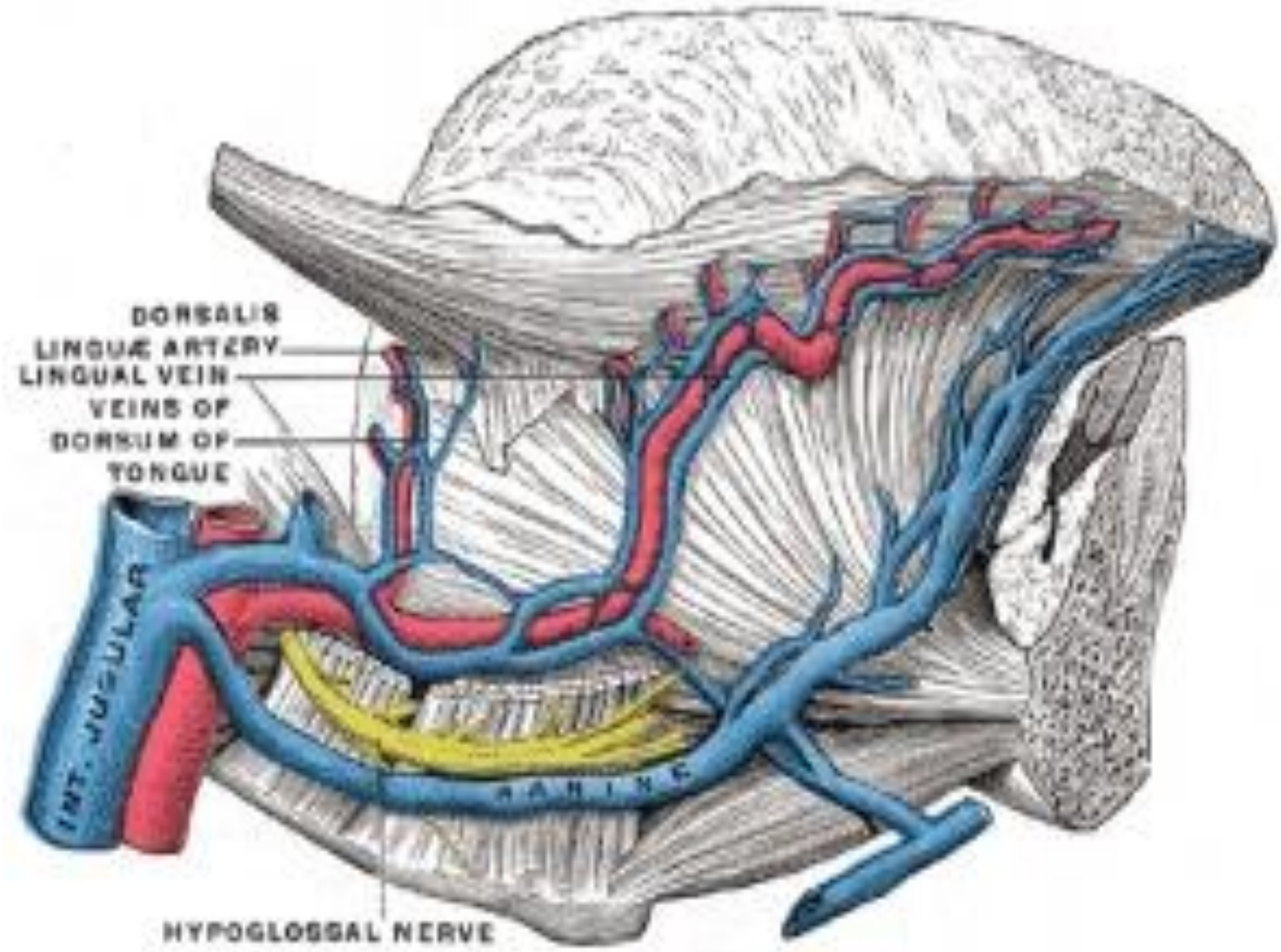
It supplies the tongue



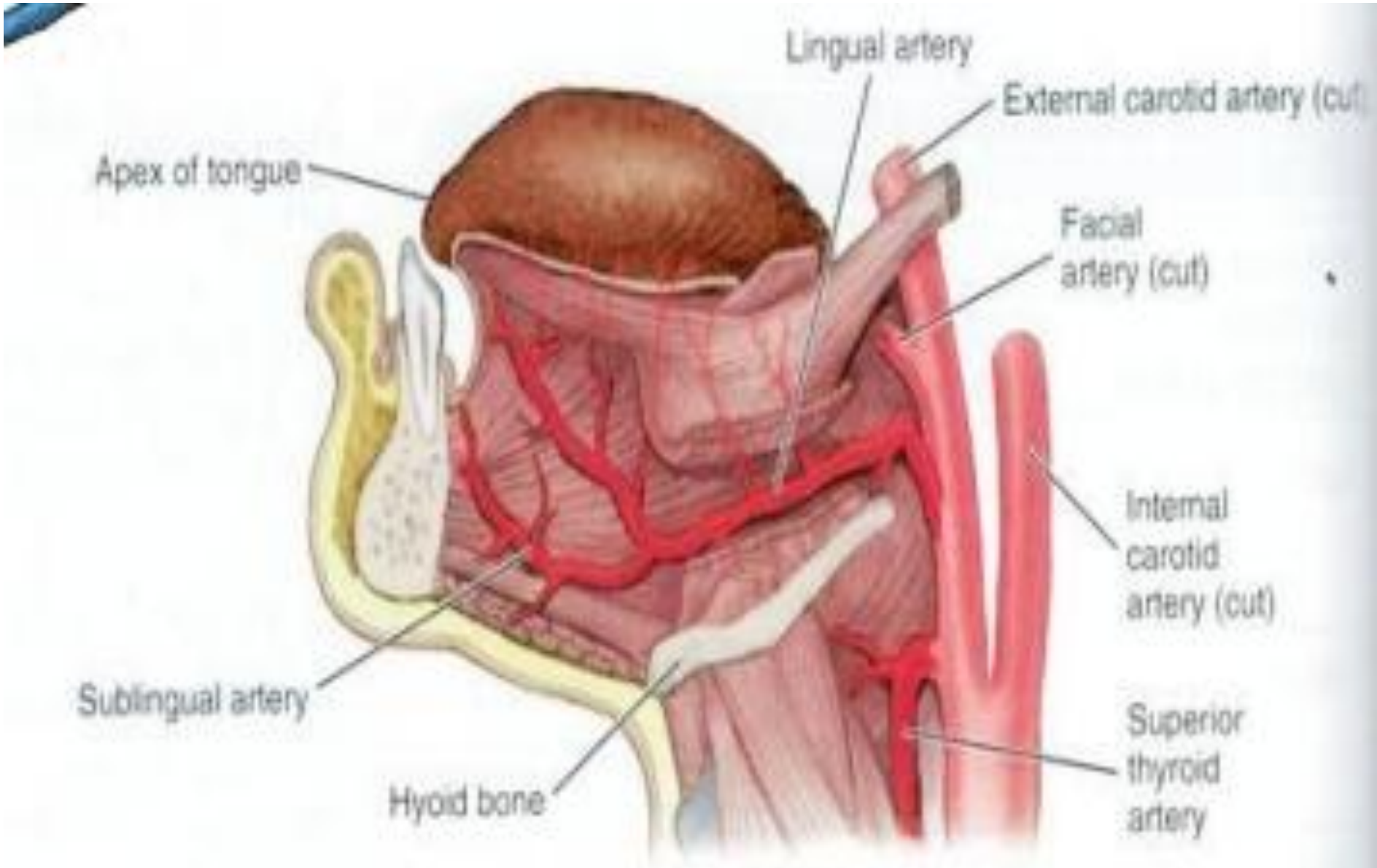




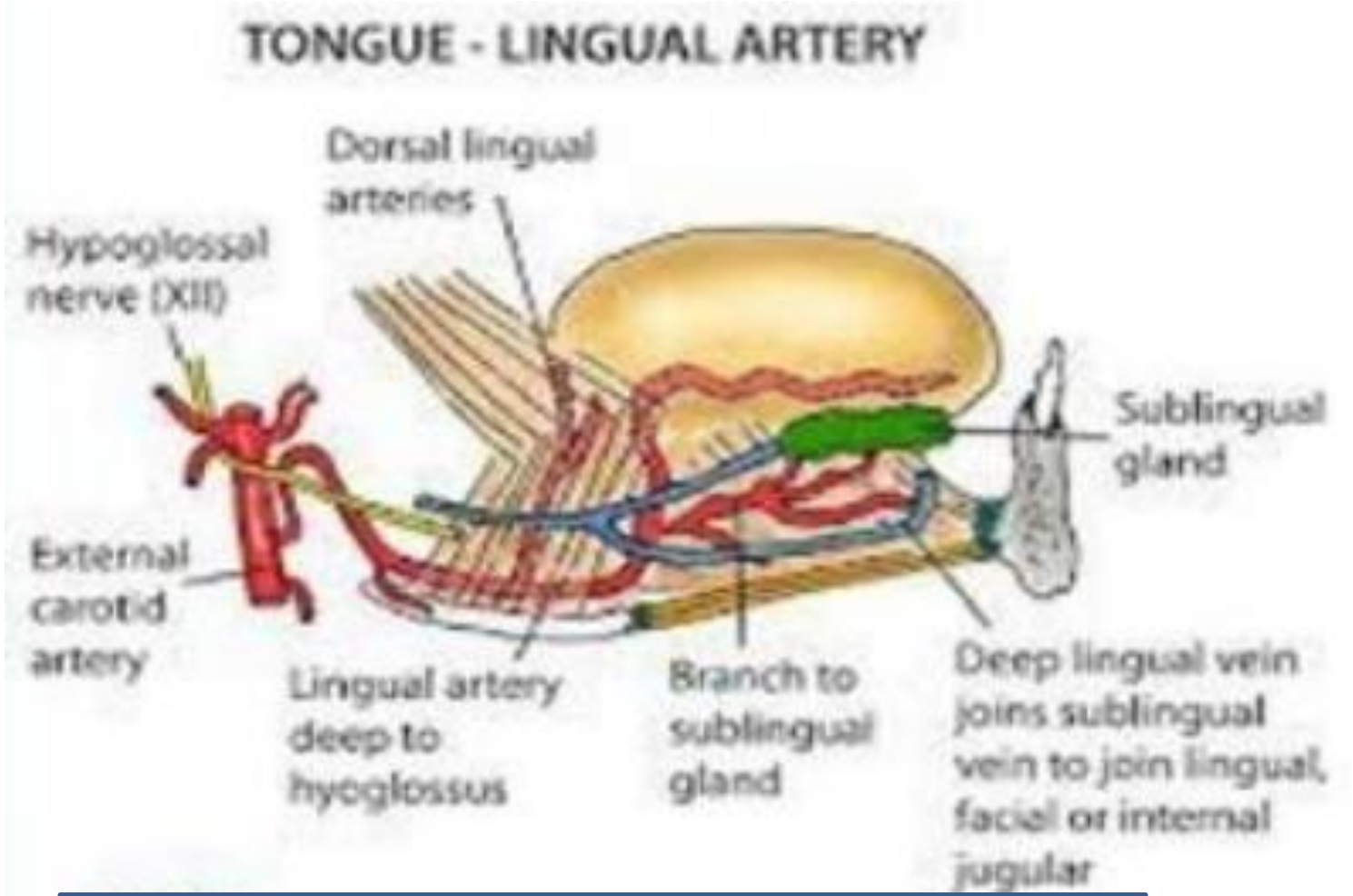
Lingual Artery



Lingual Artery



Lingual Artery



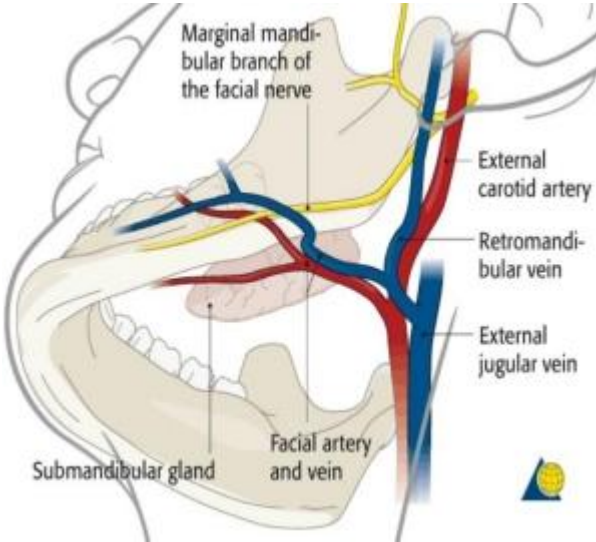
Facial Artery

It arises from the external carotid artery, just above the level of the tip of the greater cornu of hyoid bone.It arches upward deep to reach the posterior part of the submandibular salivary gland .

The facial artery arises in the carotid triangle from the external carotid artery a little above the lingual artery and, sheltered by the ramus of the mandible, passes obliquely up beneath the digastric and stylohyoidmuscles, over which it arches to enter a groove on the posterior surface of the submandibular gland.

It then curves upward over the body of the mandible at the antero-inferior angle of the masseter; passes forward and upward across the cheek to the angle of the mouth, then ascends along the side of the nose, and ends at the medial commissure of the eye, under the name of the angular artery.

The facial artery is remarkably tortuous. This is to accommodate itself to neck movements such as those of the pharynx in deglutition; and facial movements such as those of the mandible, ~~lips~~, and cheeks



supplies the face

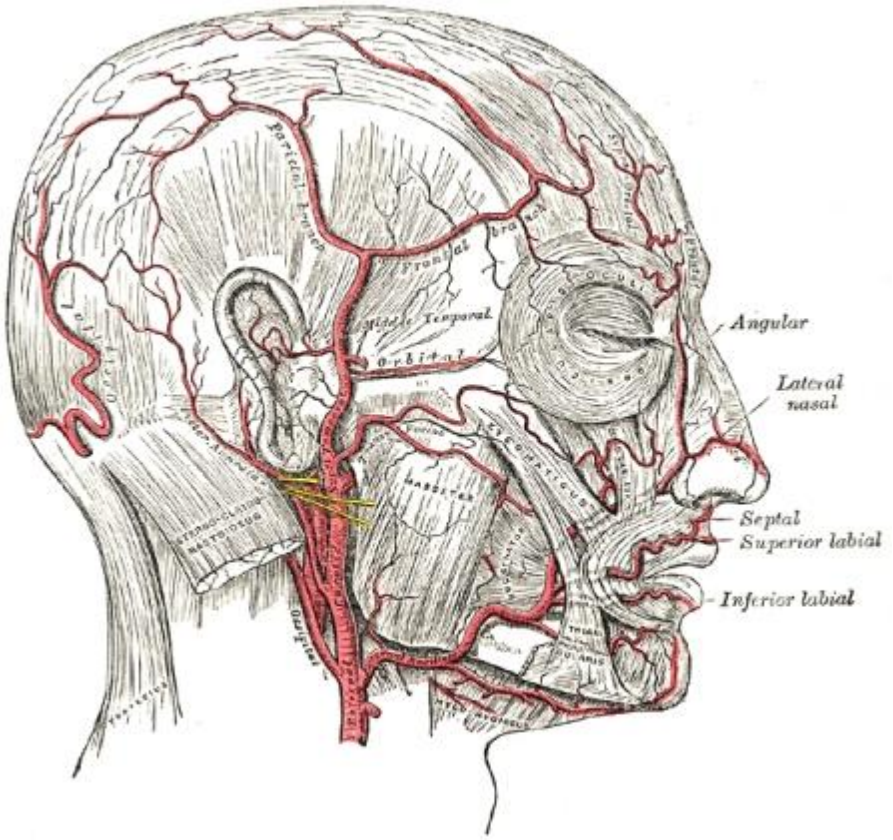
The branches of the facial artery are:

cervical

- Ascending palatine artery
- Tonsillar branch
- Submental artery
- Glandular branches

facial

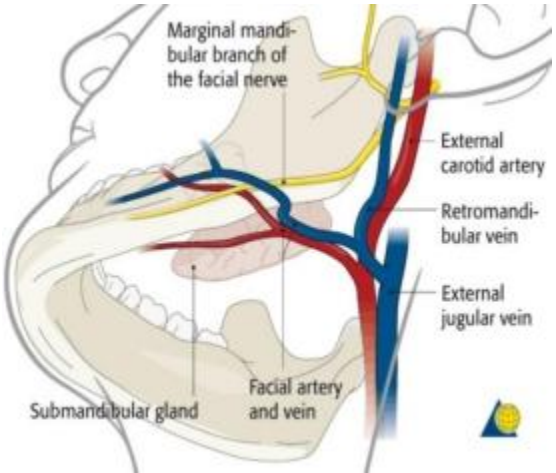
- Inferior labial artery
- Superior labial artery
- Lateral nasal branch to ~~nasalis muscle~~
- ~~Angular artery~~ - the terminal branch

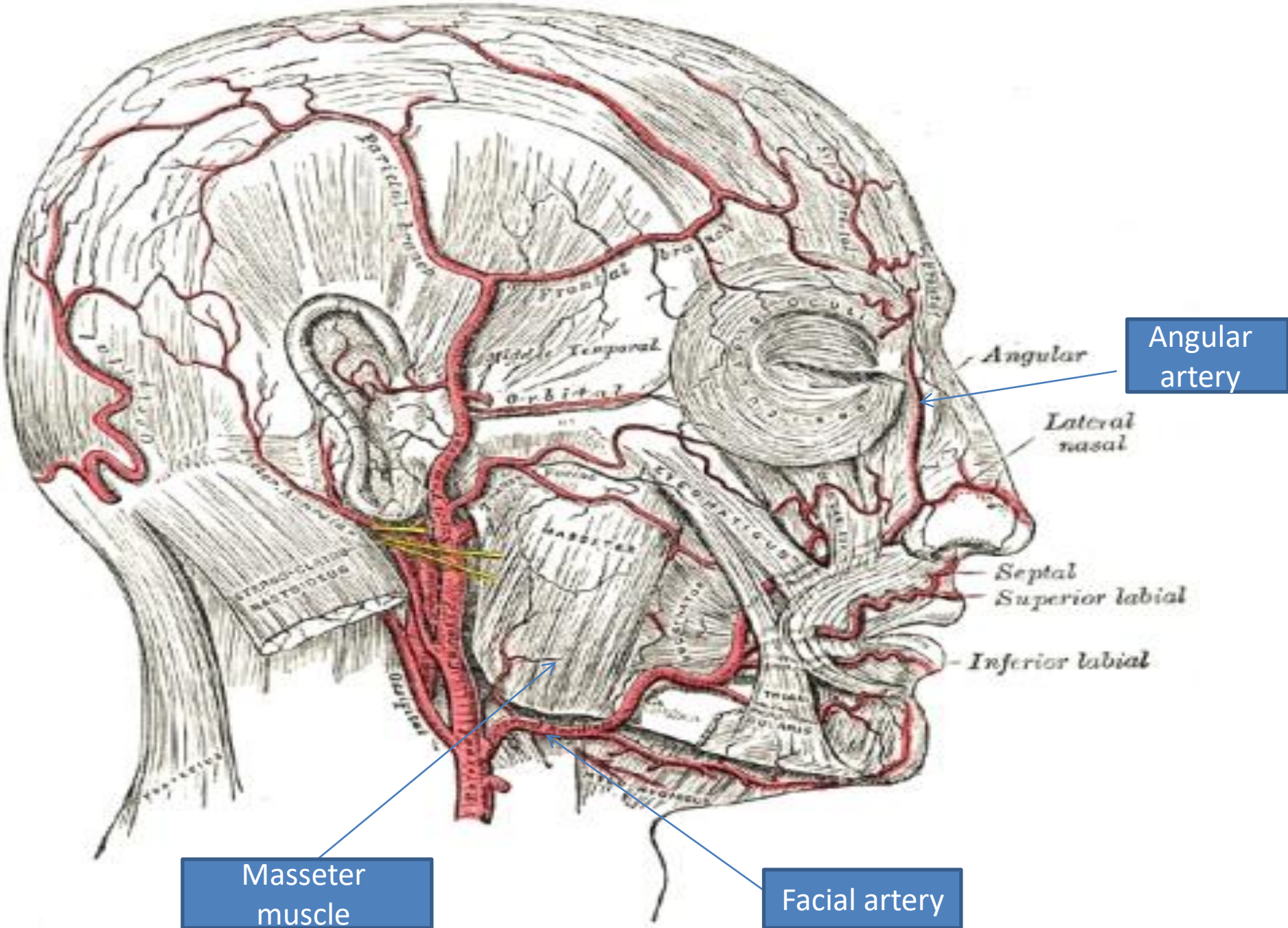


Muscles

Muscles supplied by the facial artery include:

- buccinator
- levator anguli oris
- levator labii superioris
- levator labii superioris alaeque nasi
- levator veli palatini
- ~~masseter~~
- mentalis
- mylohyoid
- nasalis
- palatoglossus
- palatopharyngeus
- ~~platysma~~
- procerus
- ~~risorius~~
- styloglossus
- transverse portion of the nasalis




Angular artery
Masseter muscle
Facial artery
Angular
Lateral nasal
Septal
Superior labial
Inferior labial
Frontal
Middle Temporal
Orbital

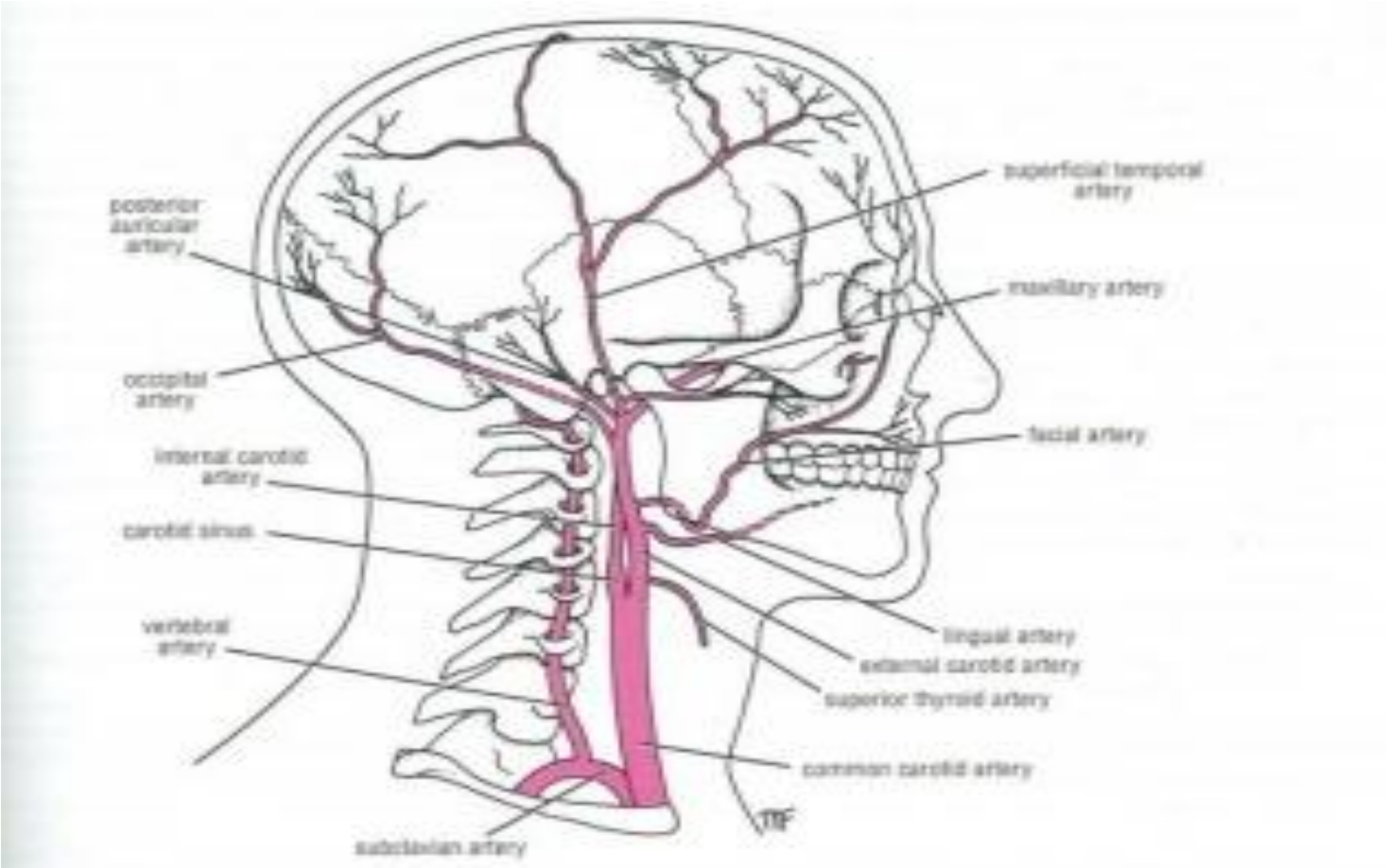
Occipital Artery

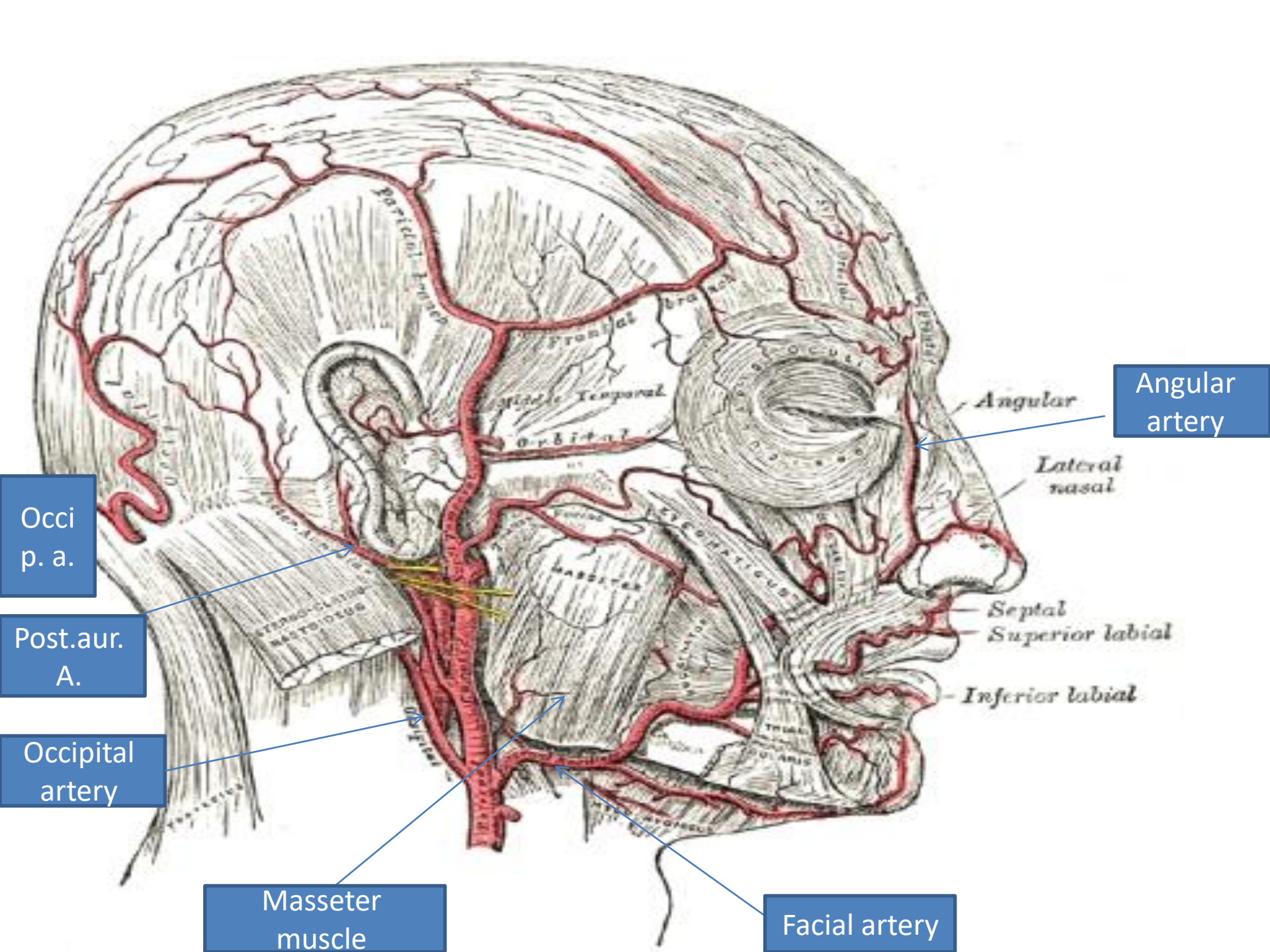
It arises from the external carotid artery, opposite the facial artery

It passes upward and reaches the back of the scalp

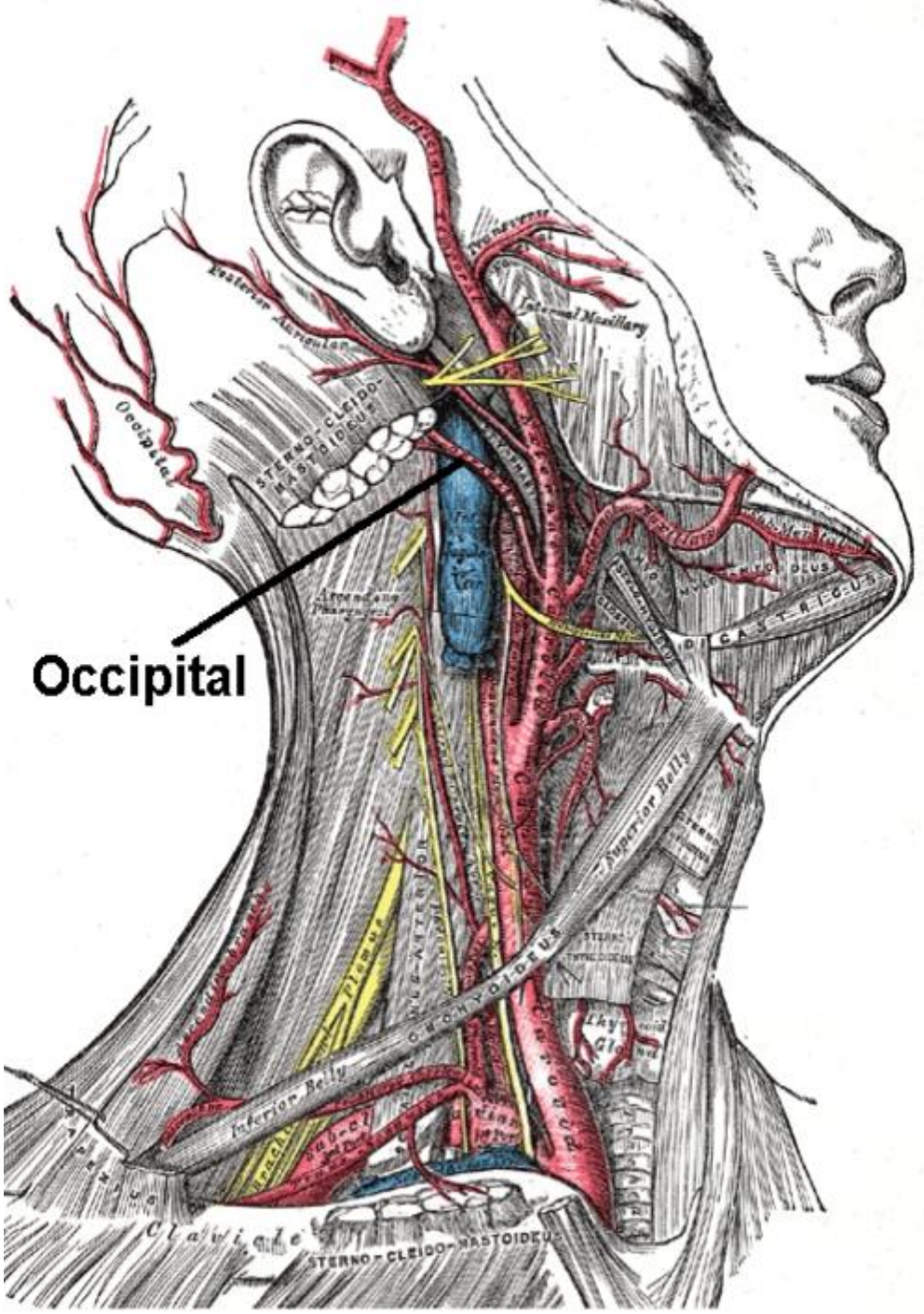
Its terminal part accompanies branches of the greater occipital nerve to supply the back of scalp

which reach as high as the vertex of the skull and anastomose with the posterior auricular and superficial temporal arteries.




Angular artery
Occi p. a.
Post.aur. A.
Occipital artery
Masseter muscle
Facial artery
Angular
Lateral nasal
Septal
Superior labial
Inferior labial
Frontal
Middle Temporal
Orbital

Occipital Artery



BRANCHES:

1-Muscular branches: supply the digastric, stylohyoid, splenius, and longus capitismuscles.

Sternocleidomastoid branch:

.

Auricular branch:

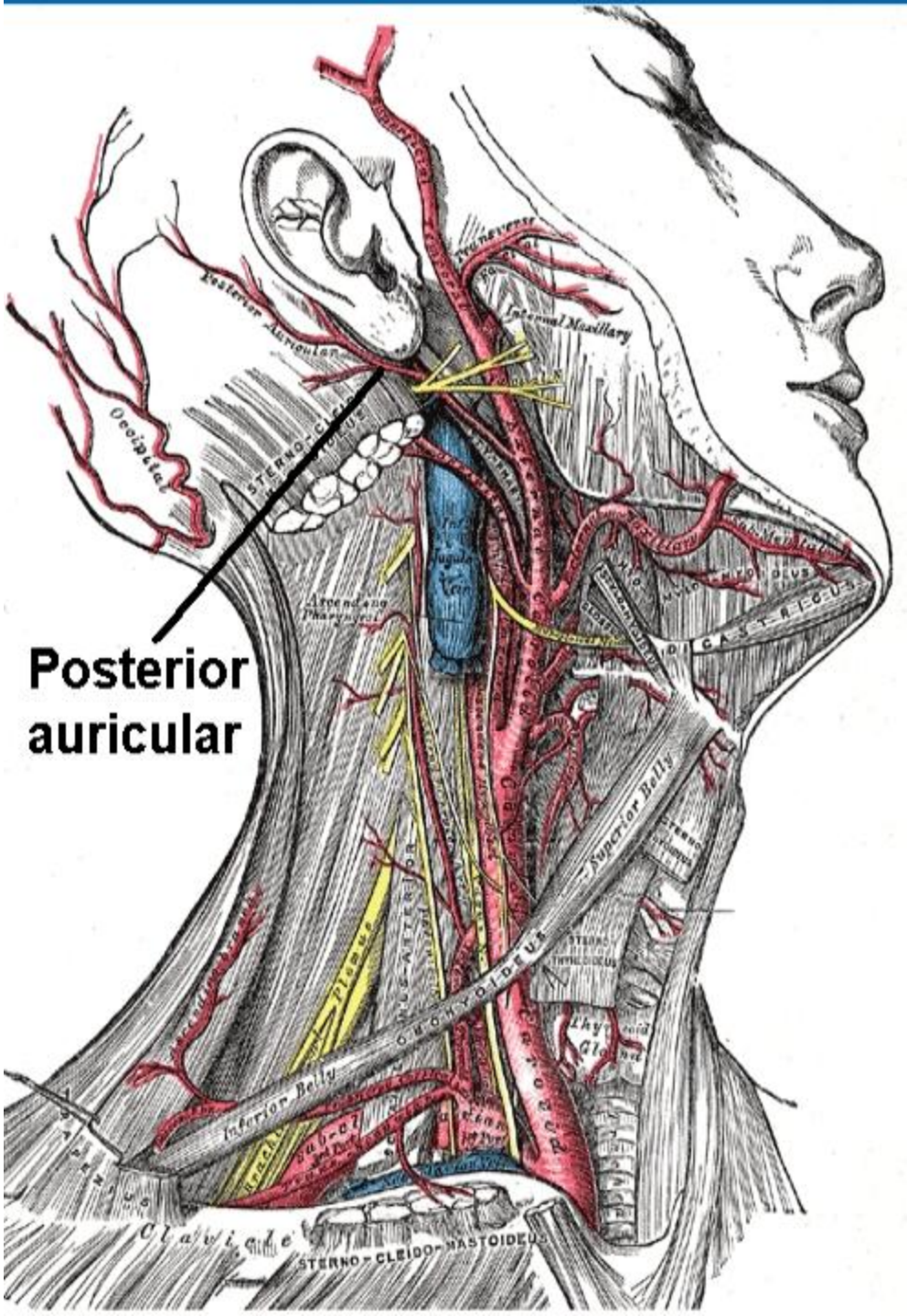
Meningeal branch: supplies the dura mater in the posterior cranial fossa

Descending branches:

[1]

Posterior auricular artery

The **posterior auricular artery** is a
, between the cartilage of the ear and the mastoid process of the temporal bone along the lateral side of the head.
The posterior auricular artery gives off small branches to
the auricle, and supplies blood to the scalp posterior to the auricle.



Superficial Temporal Artery

The **superficial temporal artery** is a major artery of the head. It arises from the external carotid artery when it splits into the superficial temporal artery and maxillary artery. Its pulse can be felt above the zygomatic arch, above and in front of the tragus of the ear.

Structure

Based on its direction, the superficial temporal artery appears to be a continuation of the external carotid.

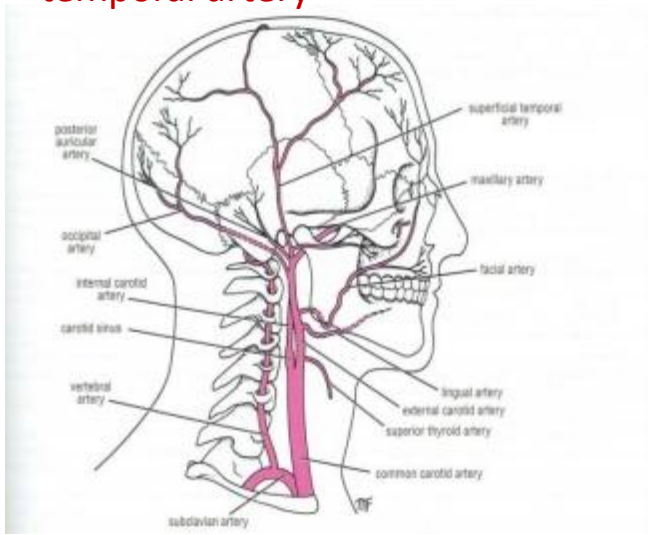
It begins within the parotid gland, behind the neck of the mandible, and passes superficially over the posterior root of the zygomatic process of the temporal bone; about 5 cm above this process it divides into two branches,

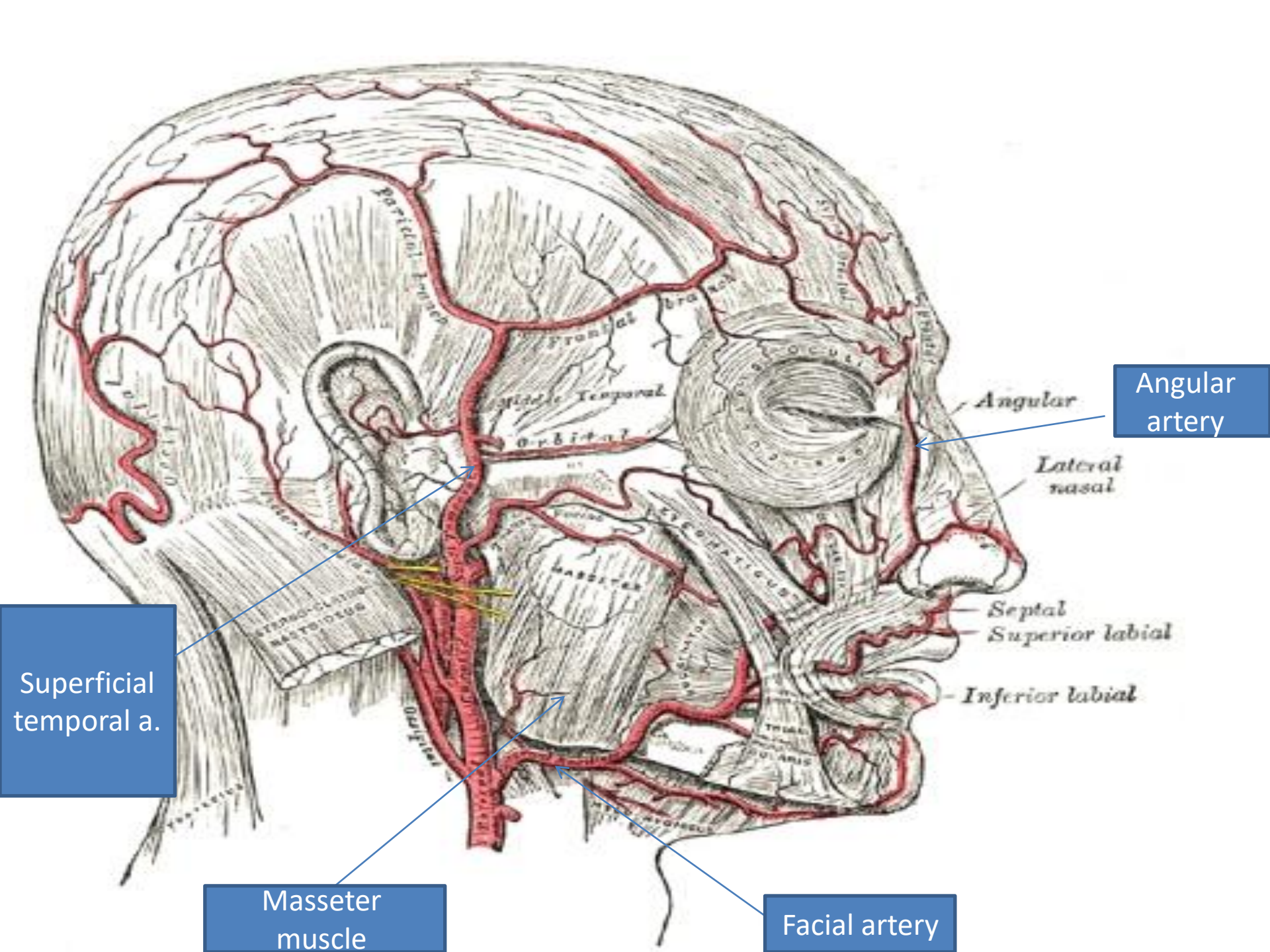
a. frontal

b. Parietal

which supply the skin over the frontal and temporal regions

Frontal branch of the superficial temporal artery



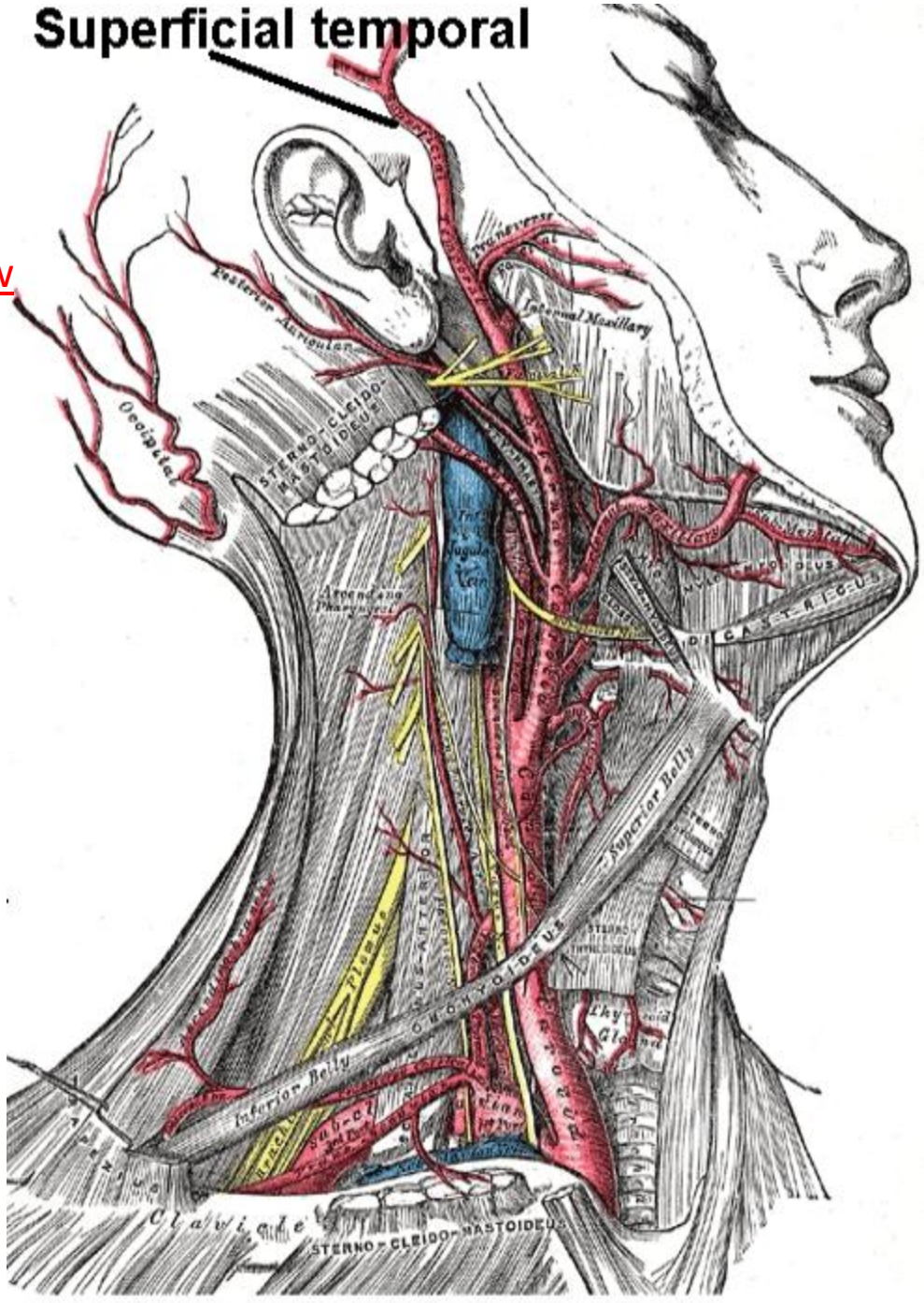

Angular artery
Superficial temporal a.
Masseter muscle
Facial artery
Angular
Lateral nasal
Septal
Superior labial
Inferior labial
Frontal
Middle Temporal
Orbital

Superficial Temporal Artery

Branches

The **parietal branch of superficial temporal artery** (**posterior temporal)** lyiging superficial to the temporal fascia, and joins with its fellow of the opposite side, and with the posterior auricular and occipital arteries.

The **frontal branch of superficial temporal artery** (**anterior temporal**) runs tortuously upward and forward to the forehead, anastomosing with the supraorbital and frontal arteries.

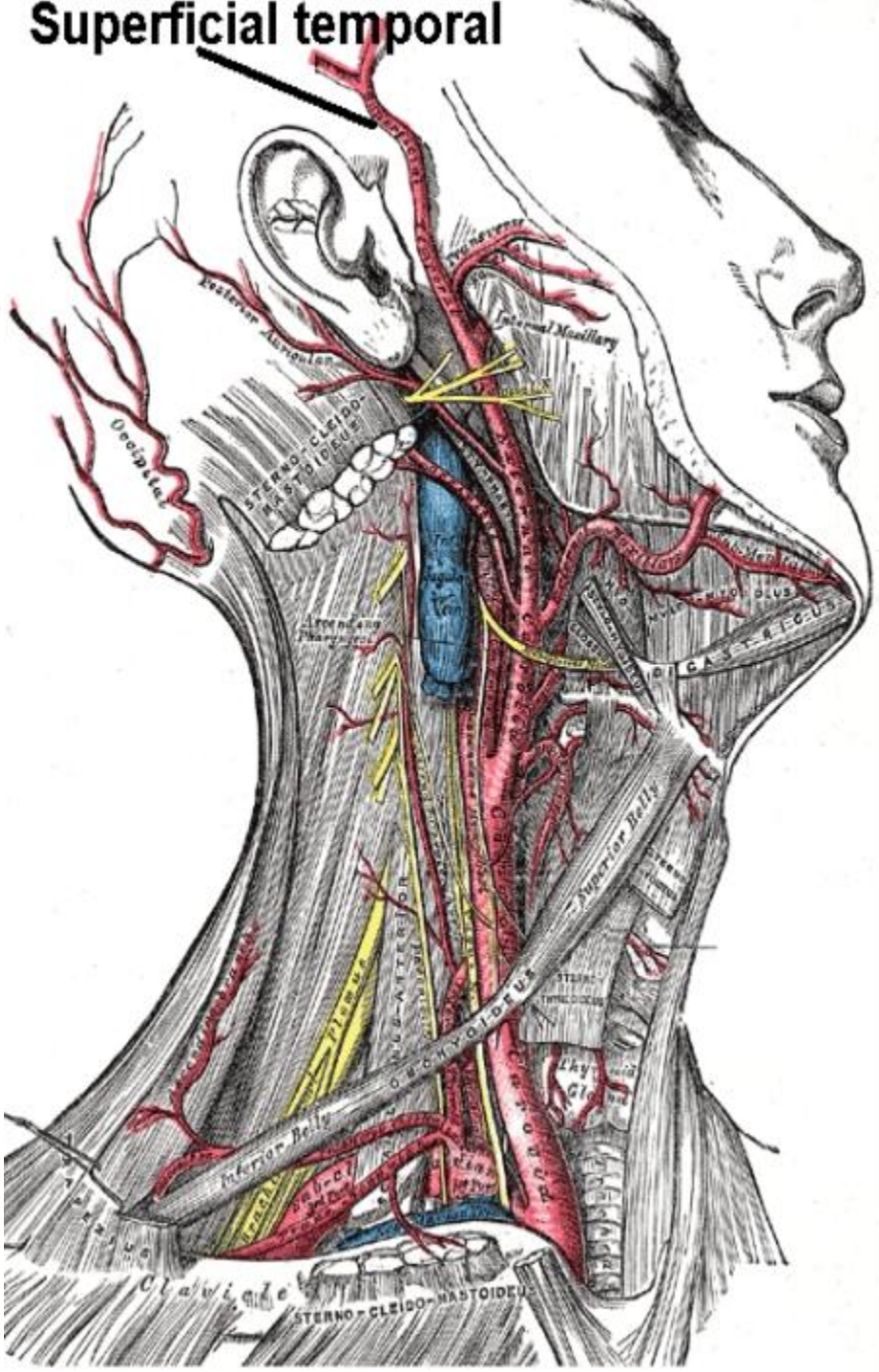


Relations

is accompanied by the auriculotemporal nerve, which lies immediately behind it.
The superficial temporal artery joins (anastomoses) with (among others) the supraorbital artery of the internal carotid artery.

Clinical significance:

The superficial temporal artery is often affected in giant-cell arteritis and biopsied if the diagnosis is suspected.
Migraine attacks can occur when the temporal artery enlarges



Maxillary Artery

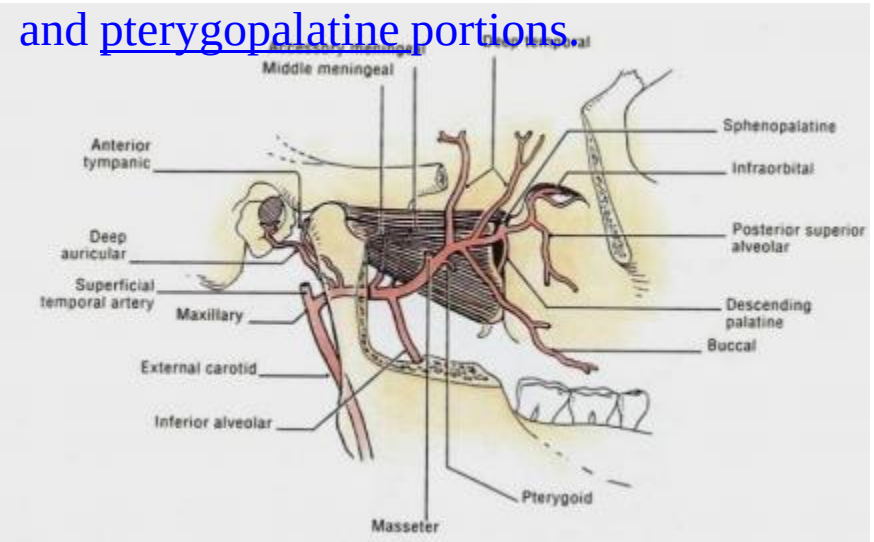
It is the larger terminal branch of the external carotid artery in the parotid gland

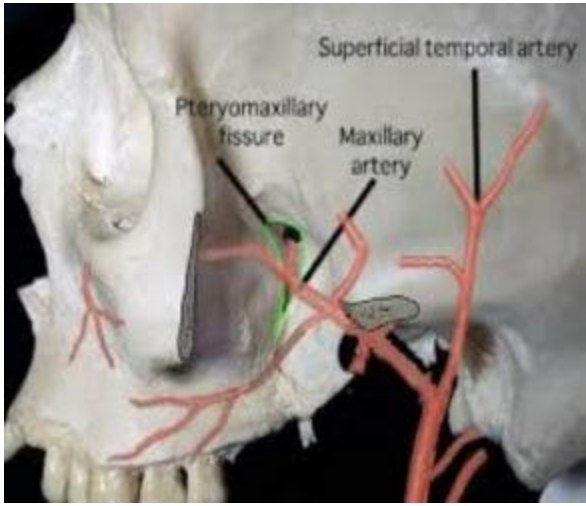
The **maxillary artery** supplies deep structures of the face. It branches from the external carotid artery just deep to the neck of the mandible.It gives branches with mandibular and maxillary nerve branches.

Structure

The maxillary artery, the larger of the two terminal branches of the external carotid artery, arises behind the neck of the mandible, and is at first imbedded in the substance of the parotid gland; it passes forward between the ramus of the mandible and the sphenomandibular ligament, and then runs, either superficial or deep to the lateral pterygoid muscle, to the pterygopalatine fossa. It runs upward and forward, leaves the infratemporal fossa by entering the pterygopalatine fossa.

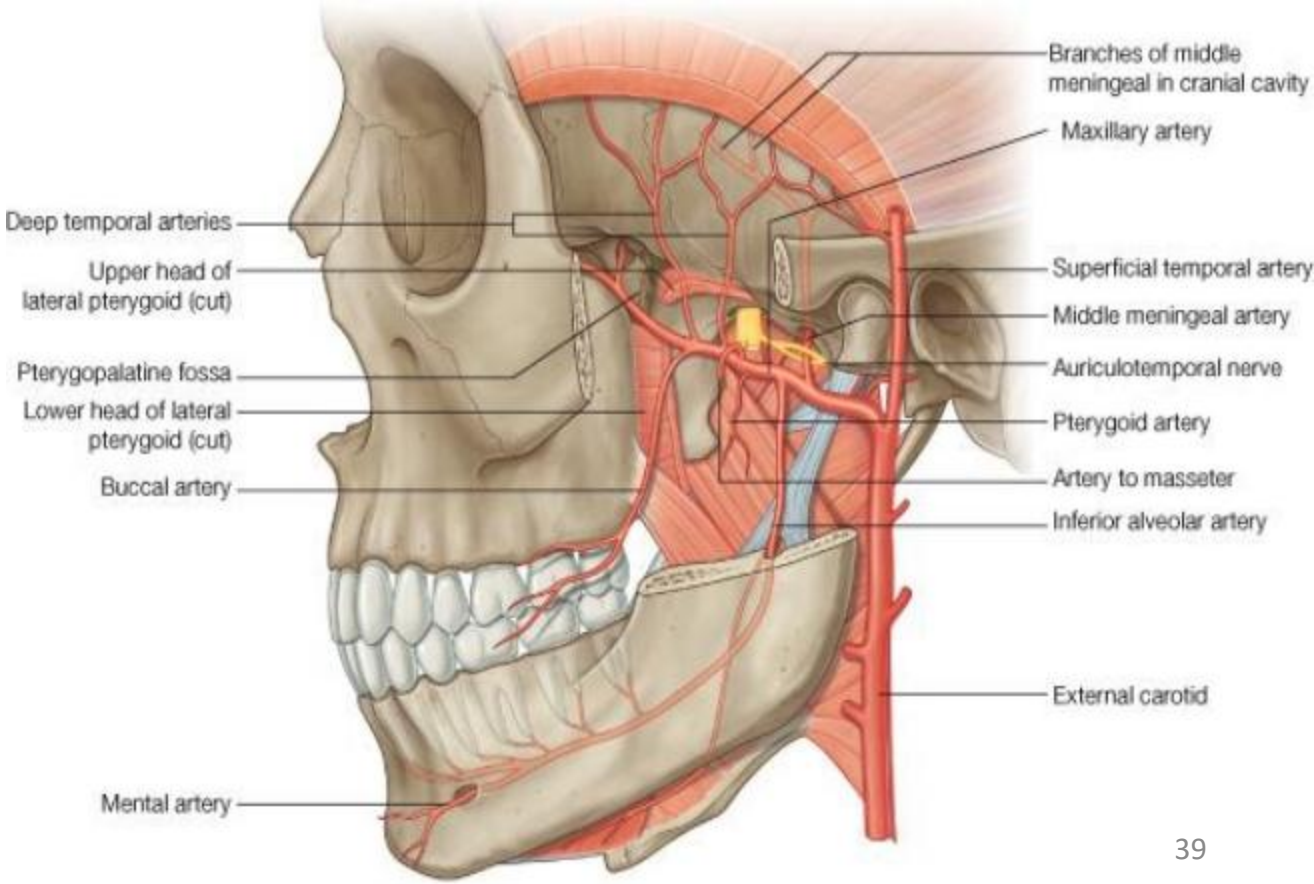
It supplies the deep structures of the face, and may be divided into mandibular, pterygoid, and pterygopalatine portions.

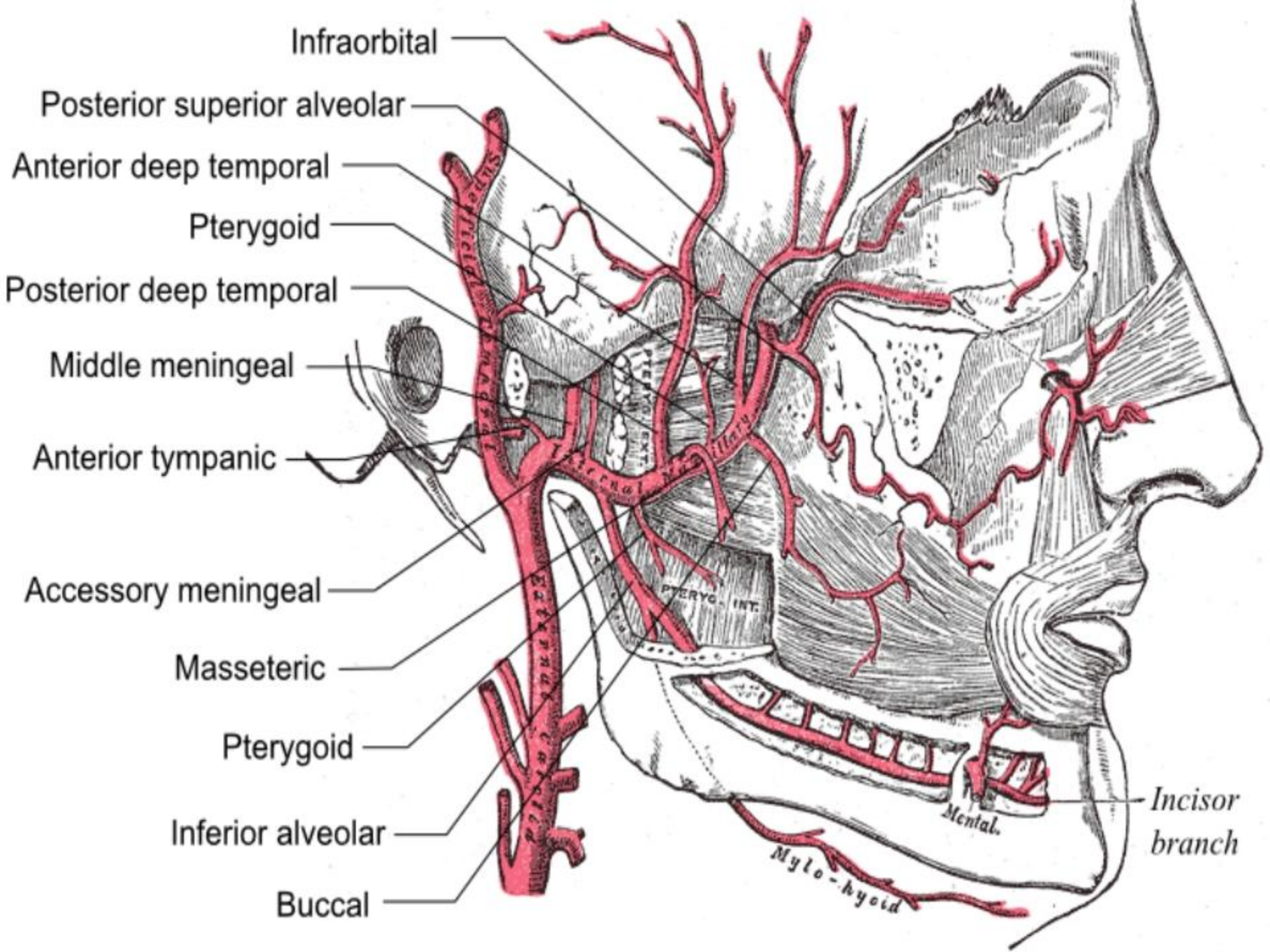


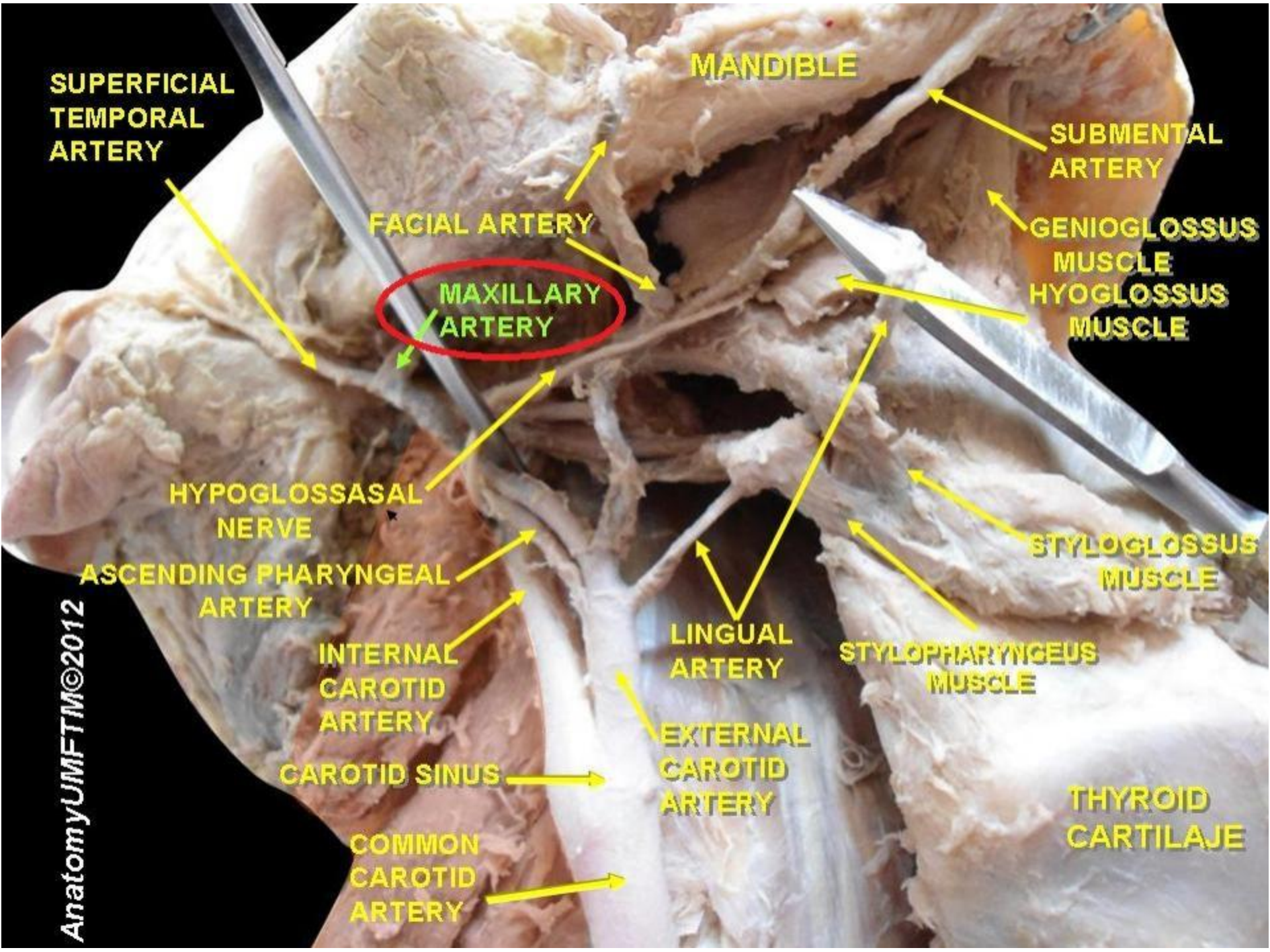


MAXILLARY ARTERY

- Major branch of the external carotid artery in the neck
- Originates adjacent to the neck of mandible
- Originates within the substance of the parotid gland
- Passes forward through the infratemporal fossa
- Enters the pterygopalatine fossa through the pterygomaxillary fissure (the third part)




Infraorbital
Posterior superior alveolar
Anterior deep temporal
Pterygoid
Posterior deep temporal
Middle meningeal
Anterior tympanic
Accessory meningeal
Masseteric
Pterygoid
Inferior alveolar
Buccal
Incisor branch
Mental.
Mylo-hyoid
PTERYG. INT.


SUPERFICIAL TEMPORAL ARTERY
MANDIBLE
SUBMENTAL ARTERY
FACIAL ARTERY
GENIOGLOSSUS MUSCLE
MAXILLARY ARTERY
HYOGLOSSUS MUSCLE
HYPOGLOSSASAL NERVE
STYLOGLOSSUS MUSCLE
ASCENDING PHARYNGEAL ARTERY
LINGUAL ARTERY
INTERNAL CAROTID ARTERY
STYLOPHARYNGEUS MUSCLE
EXTERNAL CAROTID ARTERY
CAROTID SINUS
THYROID CARTILAJE
COMMON CAROTID ARTERY
AnatomyUMFTM©2012

Branches of Maxillary Artery

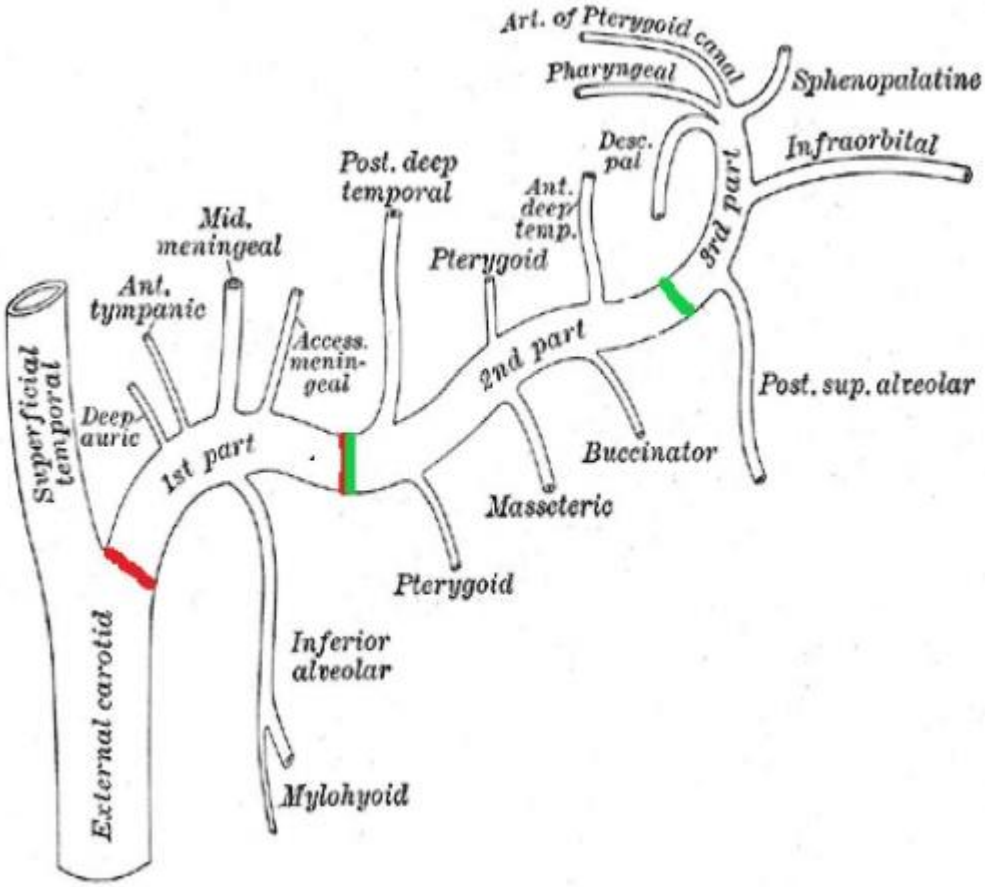
The maxillart artery divided into three portiones (mandibular, pterygoid, and pterygopalatine portions.

First portion

The **first or mandibular portion (or bony portion)** passes horizontally forward, between the neck of the mandible and the sphenomandibular ligament, where it lies parallel to and a little below the auriculotemporal nerve; it crosses the inferior alveolar nerve, and runs along the lower border of the lateral pterygoid muscle.

First part branches include:

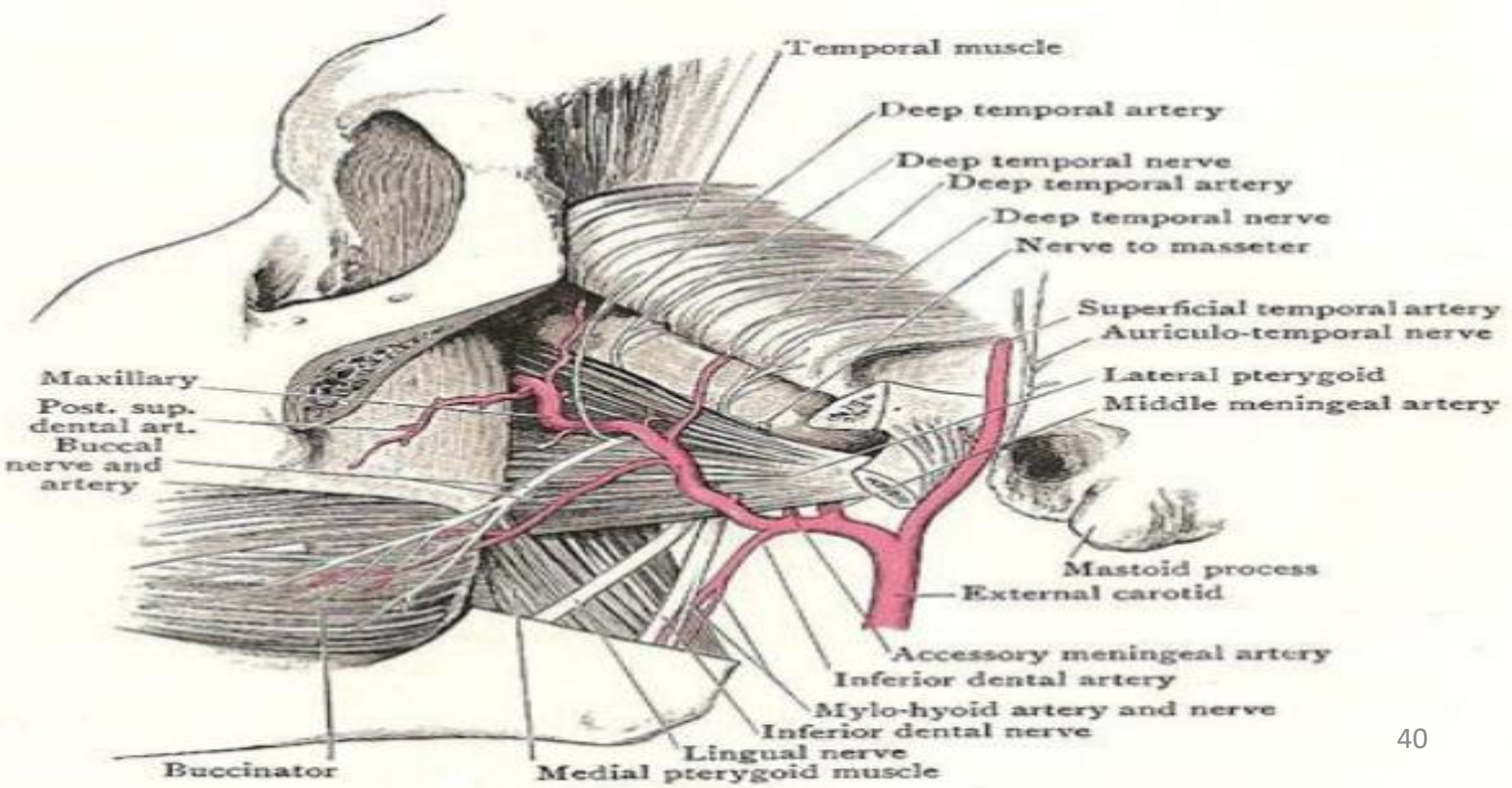
Deep auricular artery
Anterior tympanic artery
Middle meningeal artery
Inferior alveolar artery which gives off its mylohyoid branch just prior to entering the mandibular foramen
Accessory meningeal artery



FIRST PART OF MAXILLARTY ARTERY

- The first part of the maxillary artery is the part between the neck of mandible (Lat.) and the sphenomandibular ligament (Med.)

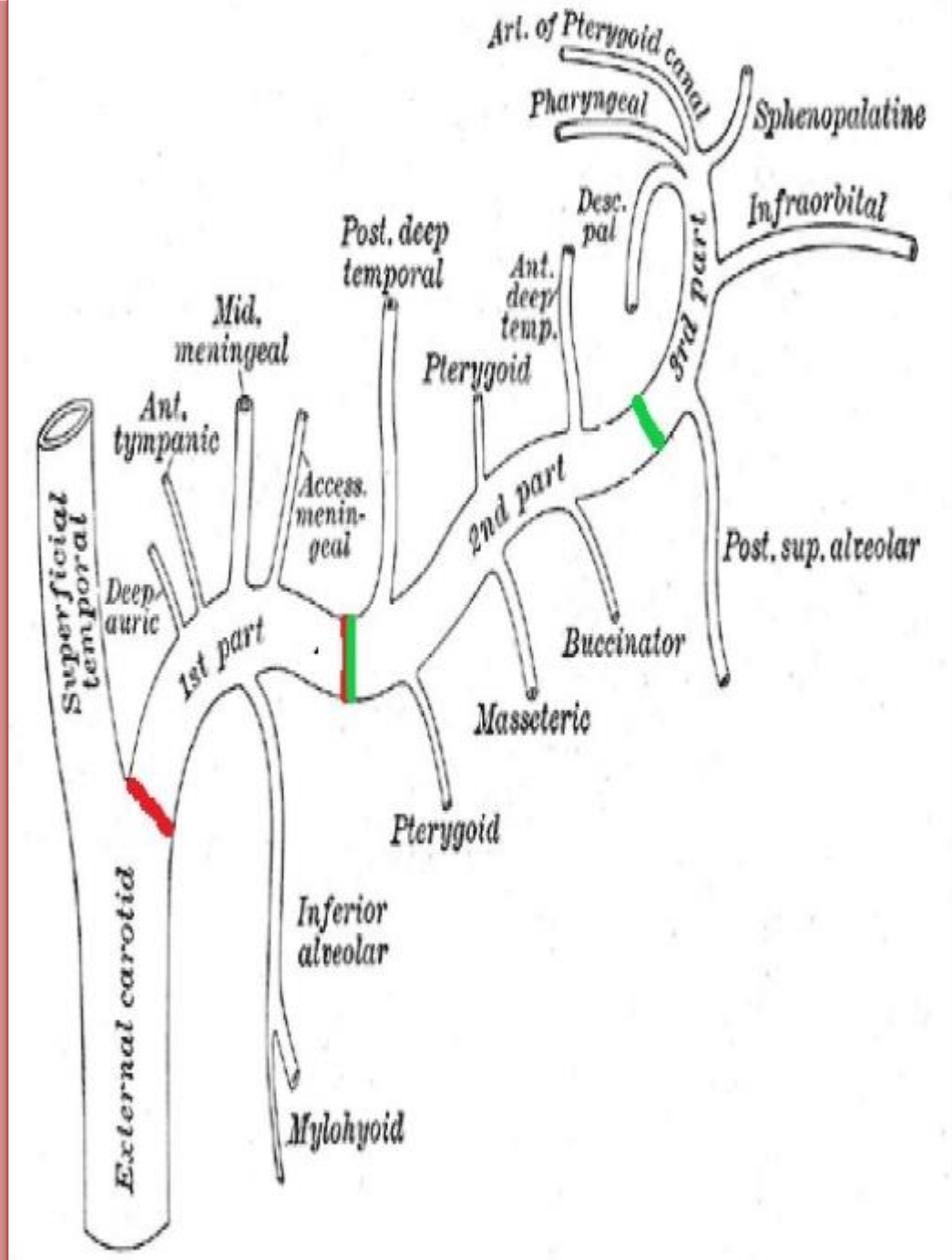
- Gives origin to two major branches (the middle meningeal and inferior alveolar arteries) •



Second portion

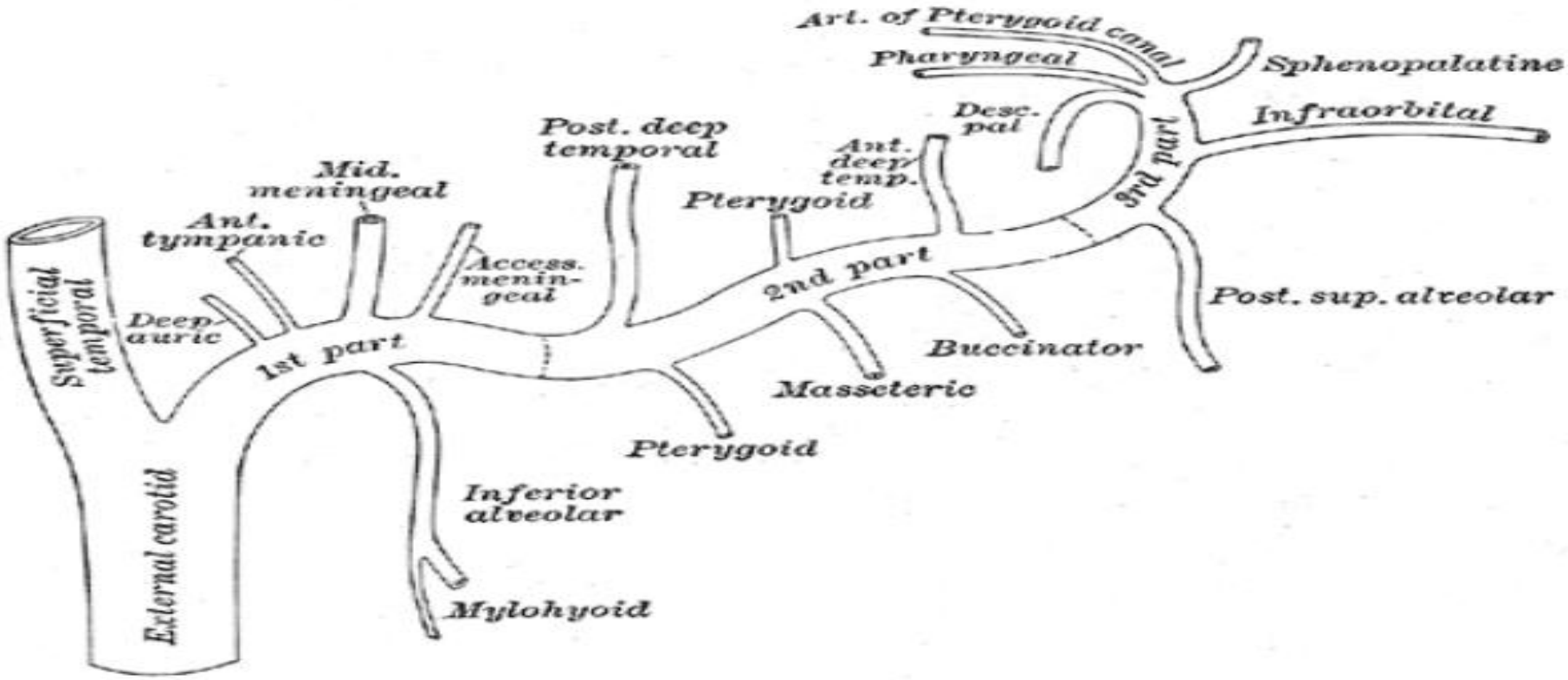
The **second or pterygoid portion (or muscular portion)** runs obliquely forward and upward under cover of the ramus of the mandible deep surface of the lateral pterygoid muscle; it then passes between the two heads of origin of this muscle and enters the spheopalatine fossa. Branches include:

Masseteric artery
Pterygoid branches
Anter & posterior deep temporal arteries
Buccal artery for buccinator
Same mandibular nerve branches



SECOND PART

- The second part of the maxillary artery the part related to the lateral pterygoid muscle •
- Course with branches of the mandibular nerve



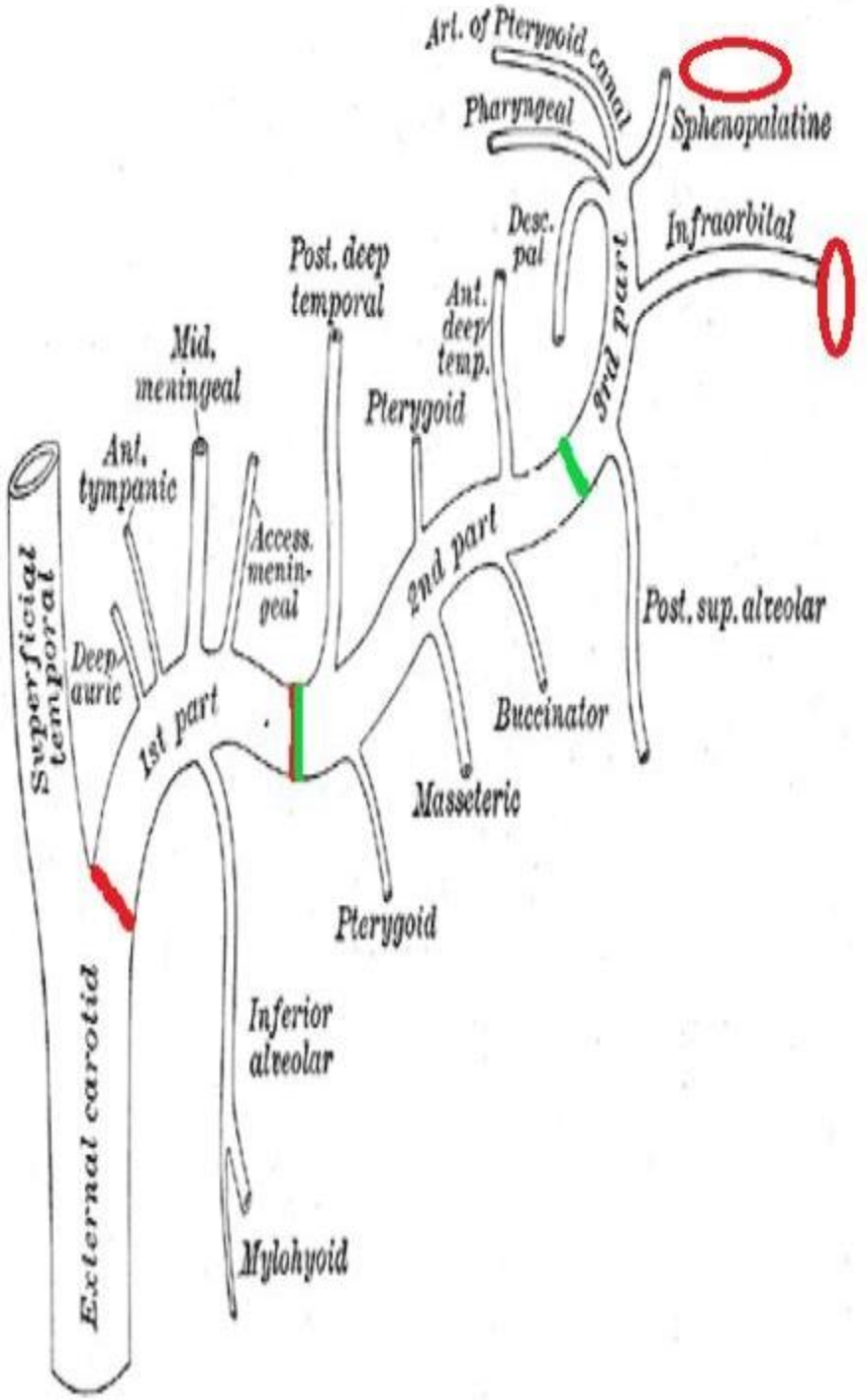
Branches of the maxillary artery
Gray's Anatomy 1918

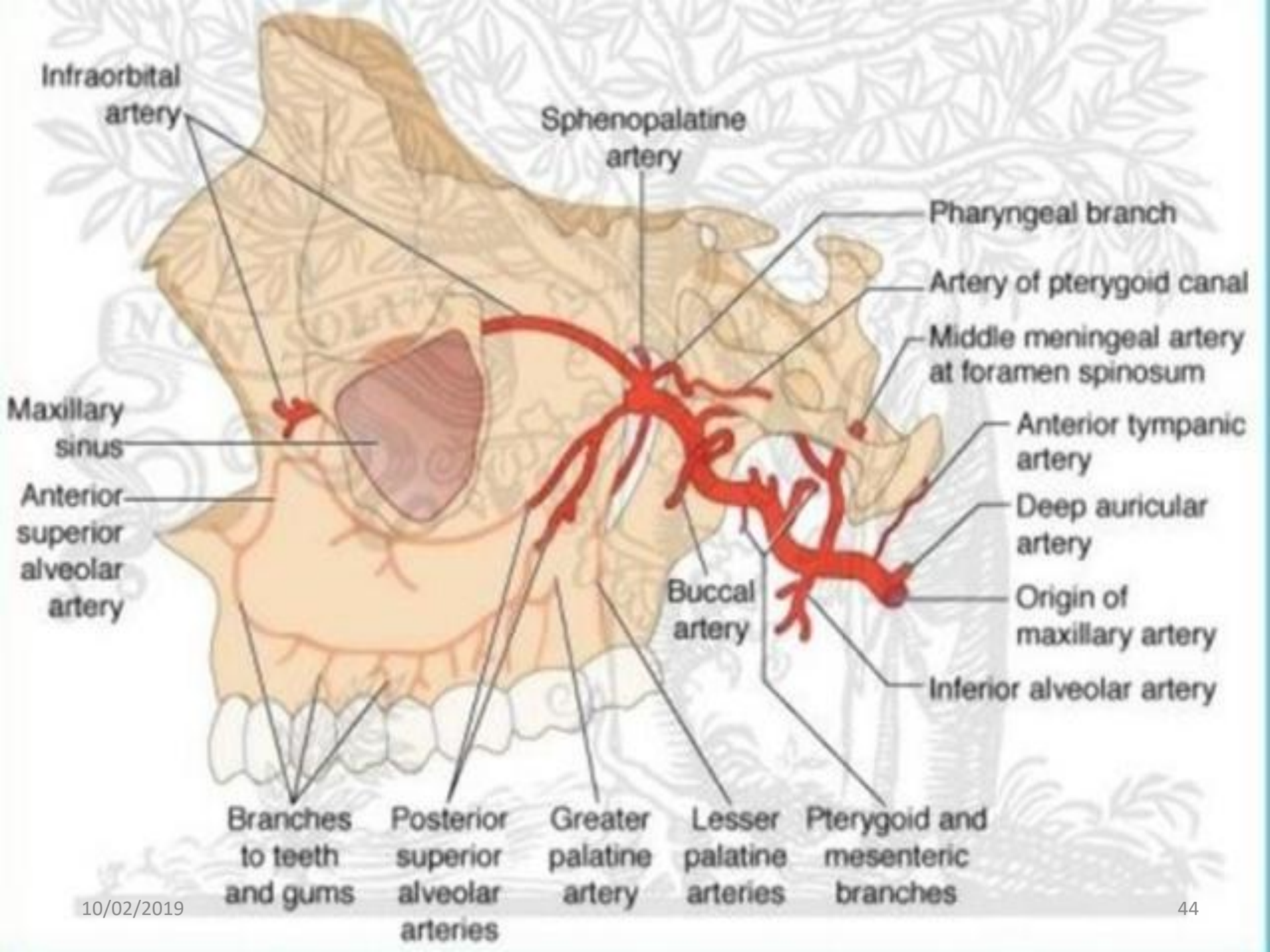
Third portion

The **third or pterygomaxillary portion** lies in the pterygopalatine fossa in relation with the pterygopalatine ganglion. This is considered the terminal branch of the maxillary artery.

Branches include:

Sphenopalatine artery (Nasopalatine artery is the terminal branch of the Maxillary artery)
Descending palatine artery (Greater palatine artery and lesser palatine artery) Infraorbital artery
Posterior superior alveolar artery
Artery of pterygoid canal
Pharyngeal branch, directed to palatovaginal canal
Middle superior alveolar artery (a branch of the infraorbital artery)
Anterior superior alveolar arteries (a branch of the infraorbital artery)




Infraorbital artery
Sphenopalatine artery
Pharyngeal branch
Artery of pterygoid canal
Middle meningeal artery at foramen spinosum
Maxillary sinus
Anterior tympanic artery
Anterior superior alveolar artery
Deep auricular artery
Buccal artery
Origin of maxillary artery
Inferior alveolar artery
Branches to teeth and gums
Posterior superior alveolar arteries
Greater palatine artery
Lesser palatine arteries
Pterygoid and mesenteric branches

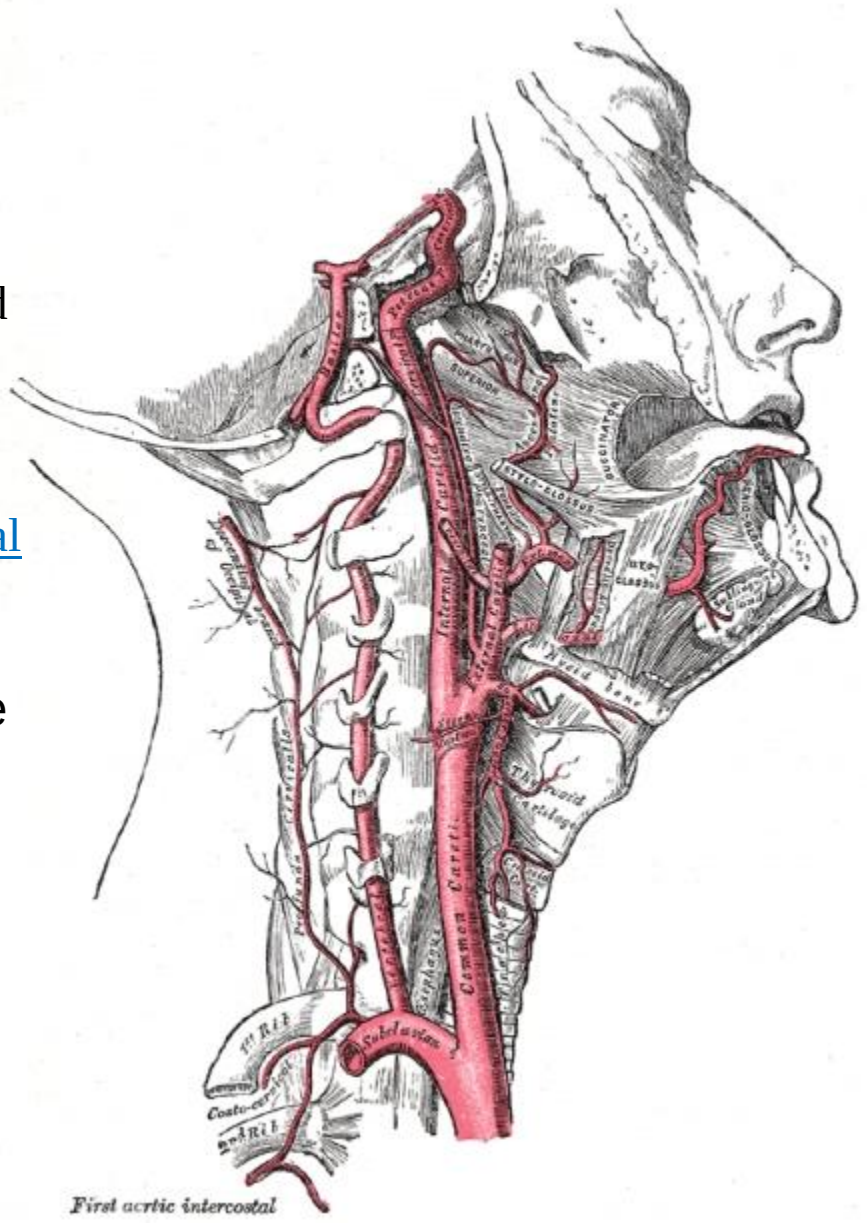
Internal Carotid Artery(ICA)

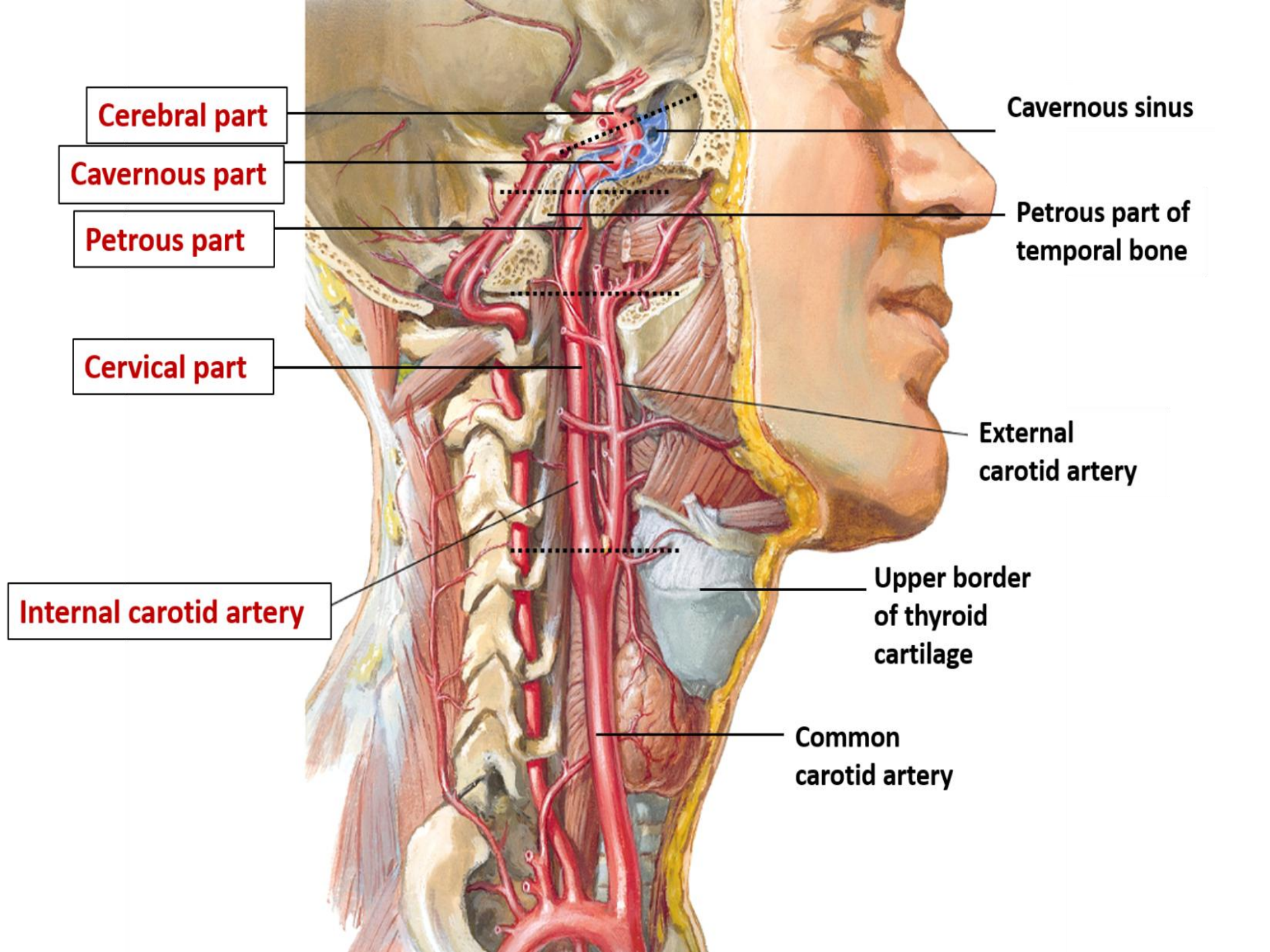
The **internal carotid artery** is a major paired artery, one on each side of the head and neck, in human anatomy. They arise from the common carotid arteries where these bifurcate into the internal and external carotid arteries at cervical vertebral level 3 or 4; the internal carotid artery supplies the brain, while the external carotid nourishes other portions of the head, such as face, scalp, skull, and meninges.

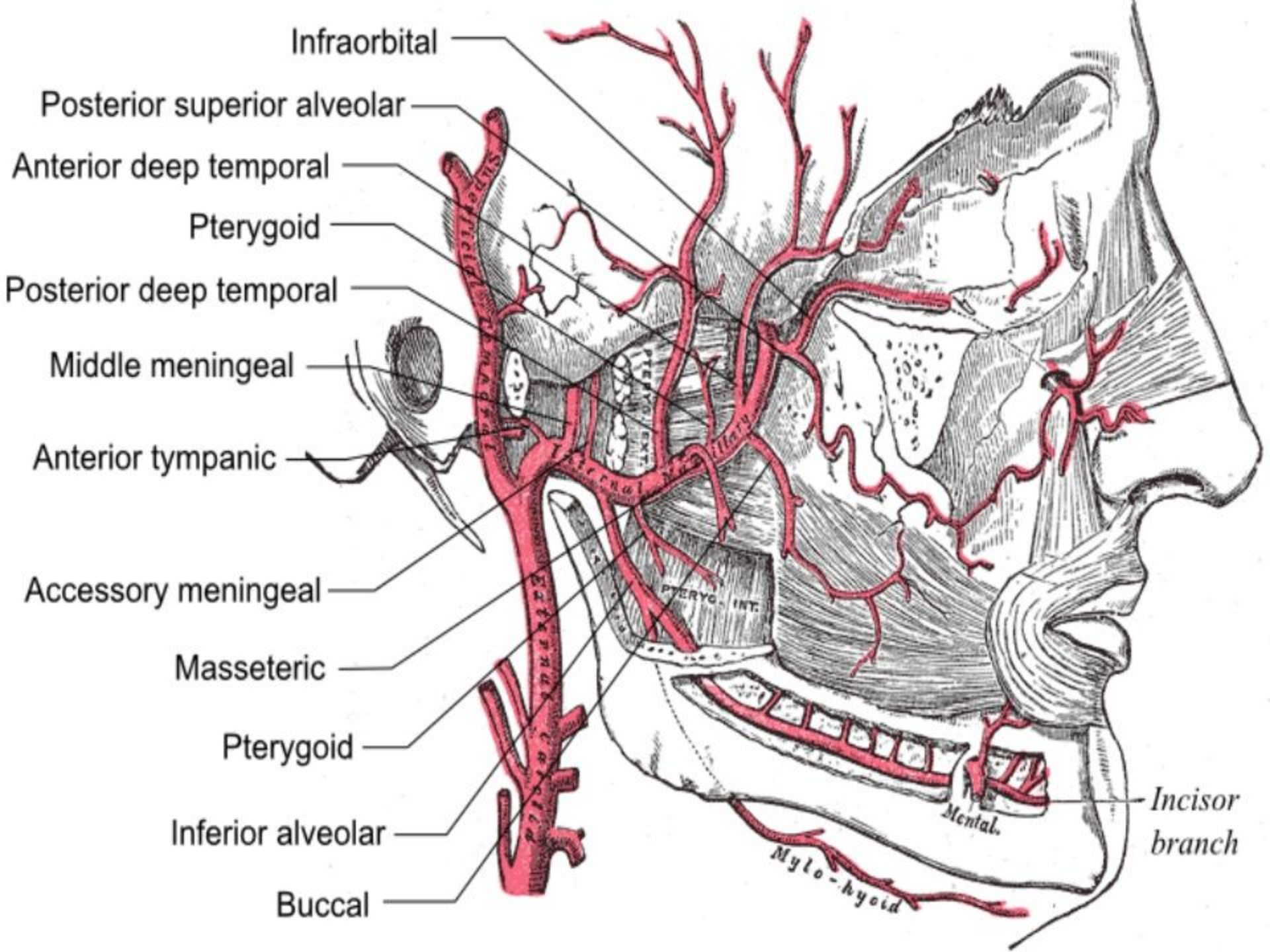
It enters the cranial cavity through the carotid canal in the petrous part of the temporal bone

It lies embedded in the carotid sheath with the internal jugular vein and vagus .

It gives off no branches in the neck




Cerebral part
Cavernous part
Petrous part
Cervical part
Internal carotid artery
Cavernous sinus
Petrous part of temporal bone
External carotid artery
Upper border of thyroid cartilage
Common carotid artery


Infraorbital
Posterior superior alveolar
Anterior deep temporal
Pterygoid
Posterior deep temporal
Middle meningeal
Anterior tympanic
Accessory meningeal
Masseteric
Pterygoid
Inferior alveolar
Buccal
Incisor branch
Mental.
Mylo-hyoid
PTERYG. INT.

The segments of the internal carotid artery are as follows:

Cervical segment, or C1, identical to the commonly used Cervical portion

Petrous segment, or C2

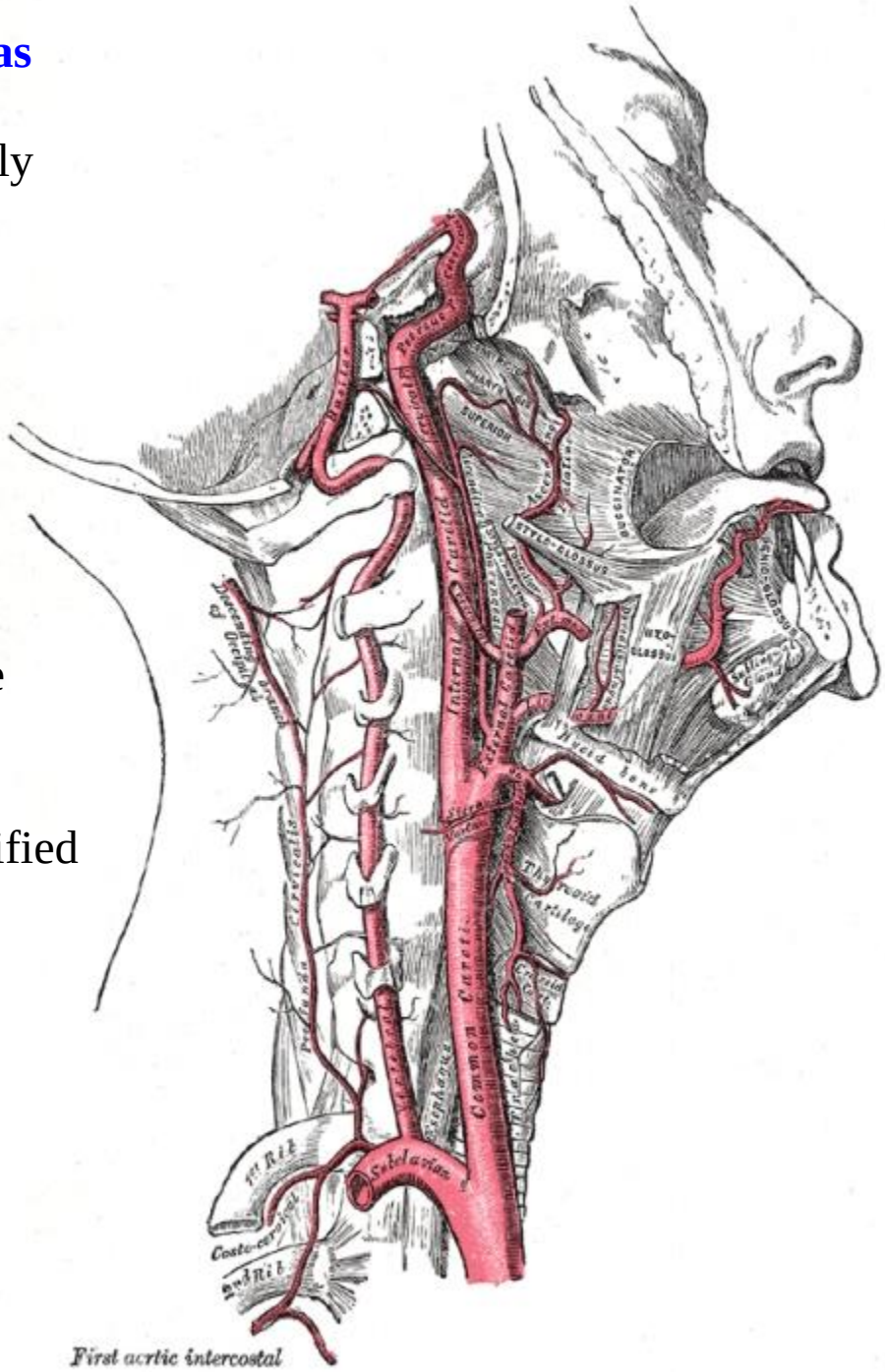
Lacerum segment, or C3
C2 and C3 compose the commonly termed Petrous portion

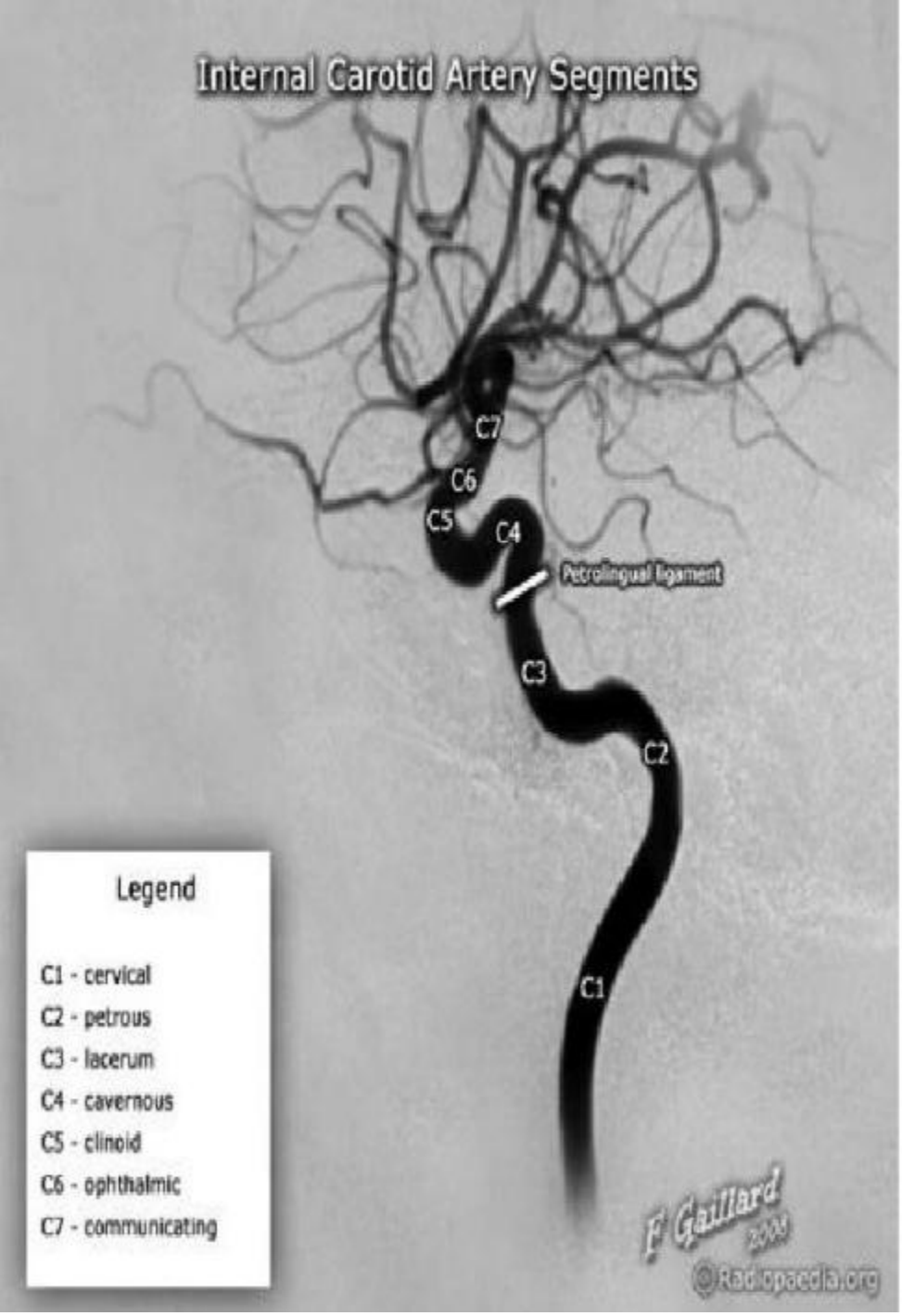
Cavernous segment, or C4, almost identical to the commonly used Cavernous portion

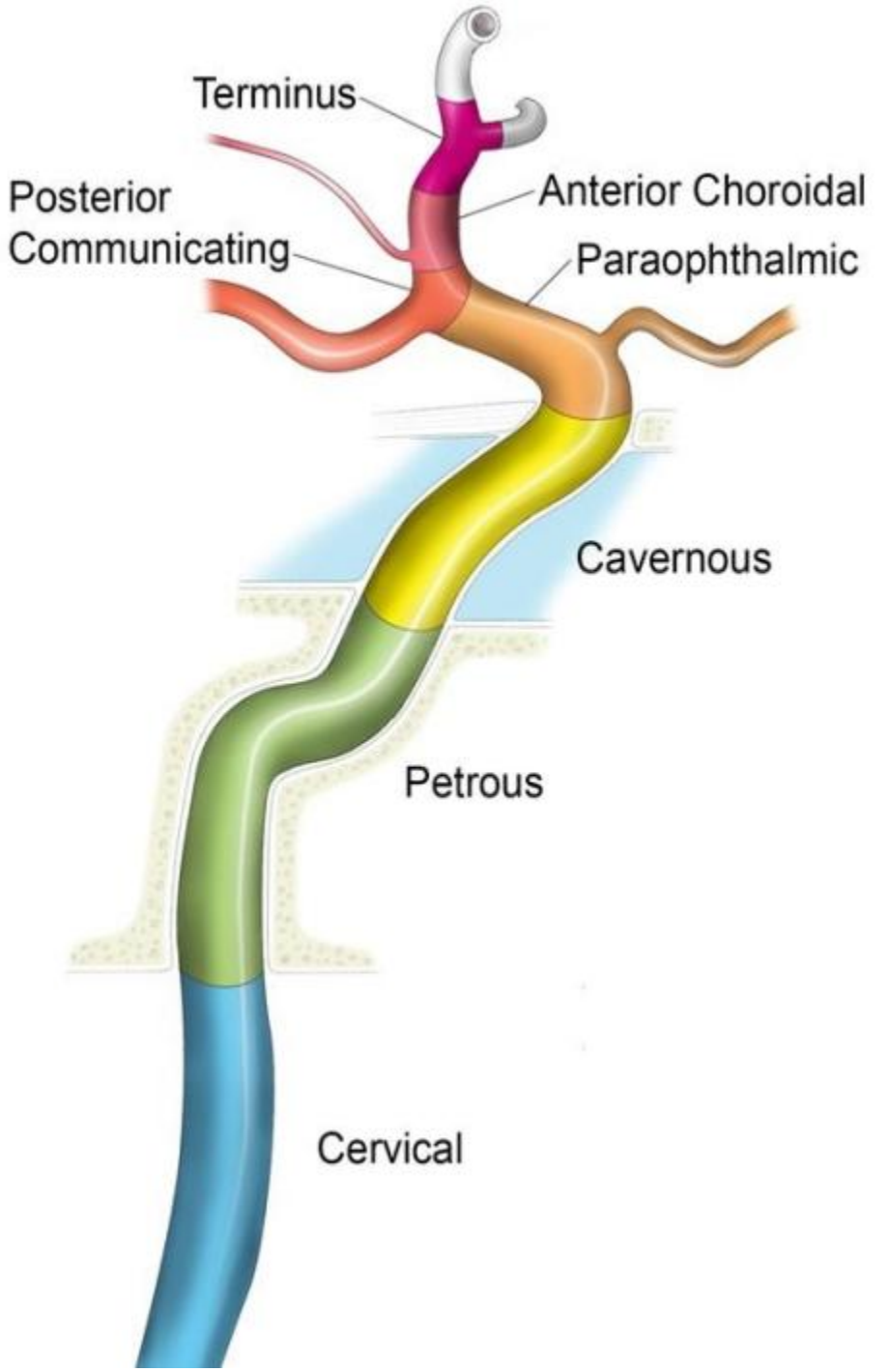
Clinoid segment, or C5. This segment is not identified in some earlier classifications and lies between the commonly used cavernous portion and cerebral or supraclinoid portion.

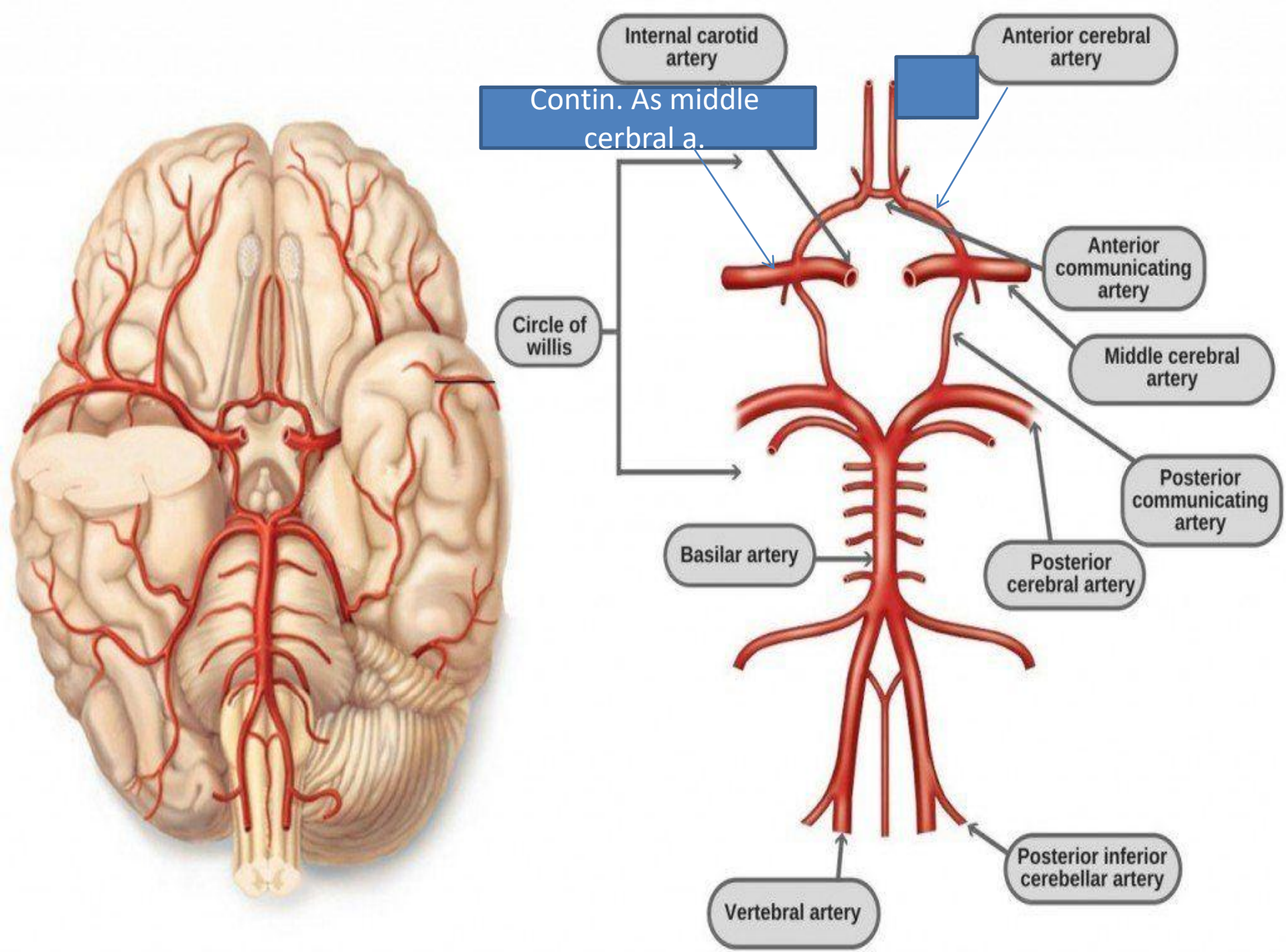
Ophthalmic, or supraclinoid segment, or C6

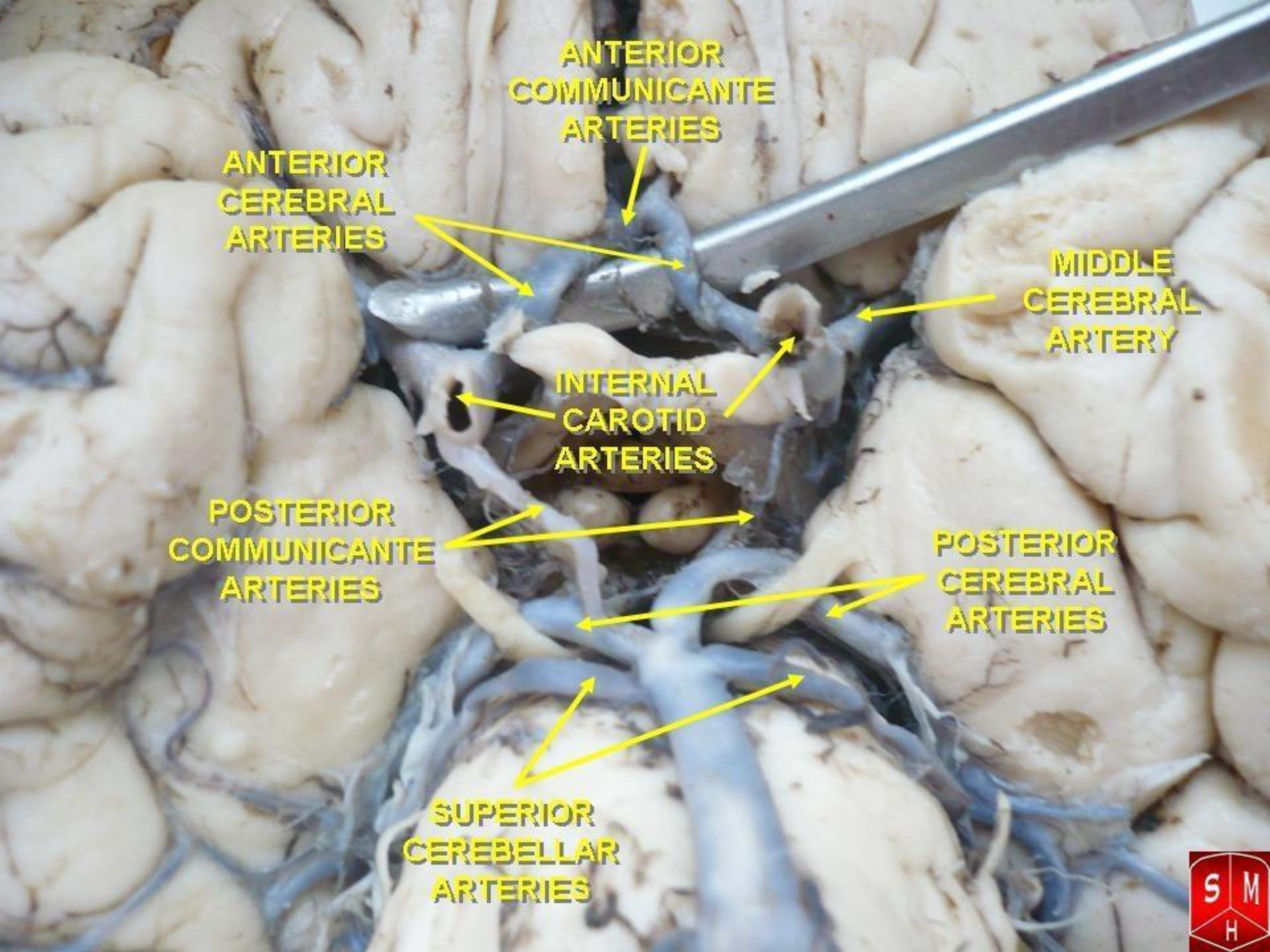
Communicating, or terminal segment, or C7
C6 and C7 together constitute the commonly used cerebral or supraclinoid portion

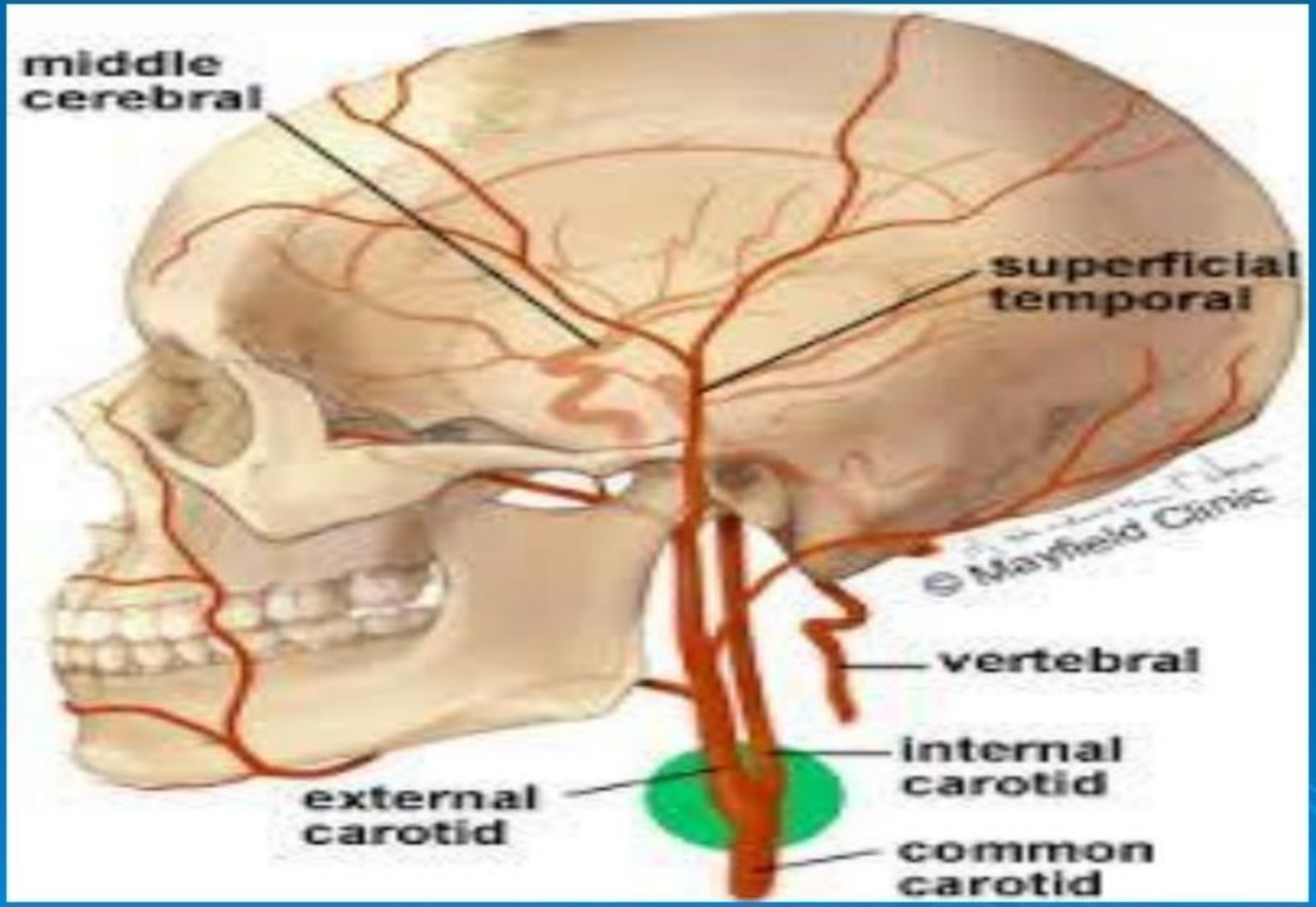



Internal Carotid Artery Segments
C7
C6
C5
C4
Petrolingual ligament
C3
C2
C1
Legend
C1 - cervical
C2 - petrous
C3 - lacerum
C4 - cavernous
C5 - clinoid
C6 - ophthalmic
C7 - communicating
F Gaillard
2008
Radiopaedia.org

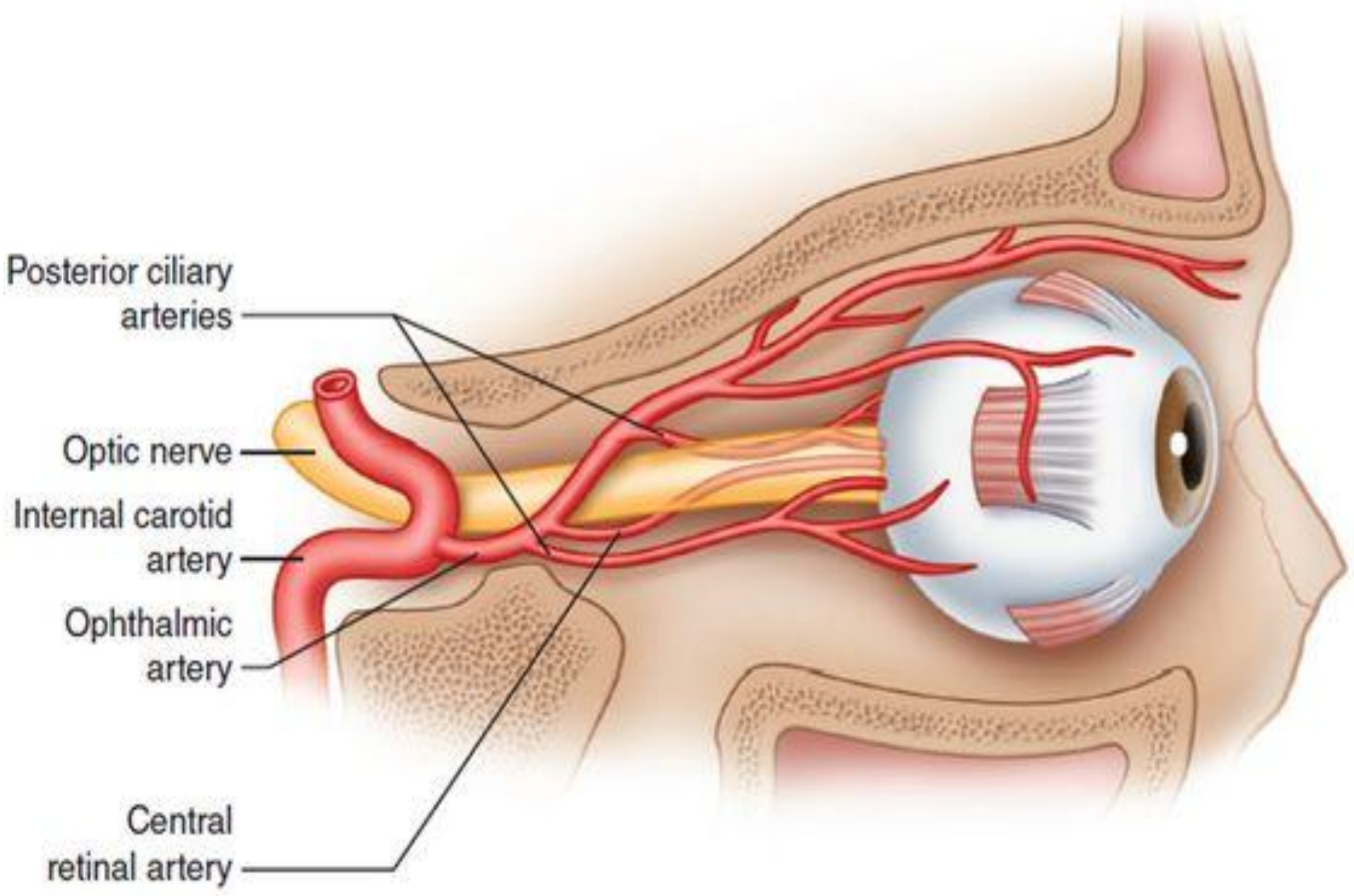

Terminus
Posterior
Communicating
Anterior Choroidal
Paraophthalmic
Cavernous
Petrous
Cervical


Internal carotid artery
Anterior cerebral artery
Contin. As middle cerbral a.
Anterior communicating artery
Circle of willis
Middle cerebral artery
Posterior communicating artery
Basilar artery
Posterior cerebral artery
Posterior inferior cerebellar artery
Vertebral artery


ANTERIOR COMMUNICANTE ARTERIES
ANTERIOR CEREBRAL ARTERIES
MIDDLE CEREBRAL ARTERY
INTERNAL CAROTID ARTERIES
POSTERIOR COMMUNICANTE ARTERIES
POSTERIOR CEREBRAL ARTERIES
SUPERIOR CEREBELLAR ARTERIES


middle cerebral
superficial temporal
© Mayfield Clinic
vertebral
internal carotid
external carotid
common carotid

Ophthalmic artery branch of internal carotid



Relations of the ICA

Anterolaterally: Below the digastric lie the skin, the fascia, anterior border of sternocleidomastoid and the hypoglossal nerve .

Above the digastric lie the stylohyoid and the stylopharyngeus muscles, the glossopharyngeal nerve, the pharyngeal branch of vagus nerve, the parotid gland and the external carotid artery.

Posteriorly : The sympathetic trunk, longus capitis muscle, and the transverse processes of the upper three cervical vertebrae

Medially: The pharyngeal wall and the superior laryngeal nerve

Laterally: The internal jugular vein and the vagus nerve

Branches of the ICA

The following are the branches of the internal carotid artery, listed by segment:

C1: Branches from the cervical portion - none.

C2: Branches from the petrous portion

- Caroticotympanic arteries
- Artery of pterygoid canal (vidian artery)

C3: Branches from the lacerum portion - none

C4: Branches from the cavernous portion

- Branches of the **meningohypophyseal trunk**:
  - **Tentorial basal branch**
  - **Tentorial marginal branch**
  - **Meningeal branch** - helps supply blood to the meninges of the anterior cranial fossa
  - **Clivus branches** - tiny branches that supply the clivus
  - **Inferior hypophyseal artery**
- Capsular branches - **supplies wall of cavernous sinus**
- **Branches of the inferolateral trunk**:
  - **Branches to trigeminal ganglion** - provide blood to trigeminal ganglion
  - ***Artery of the foramen rotundum***
  - **Branches to nerves**

C5: Branches from the clinoid portion - none

C6: Branches from the ophthalmic portion

- Superior hypophyseal artery

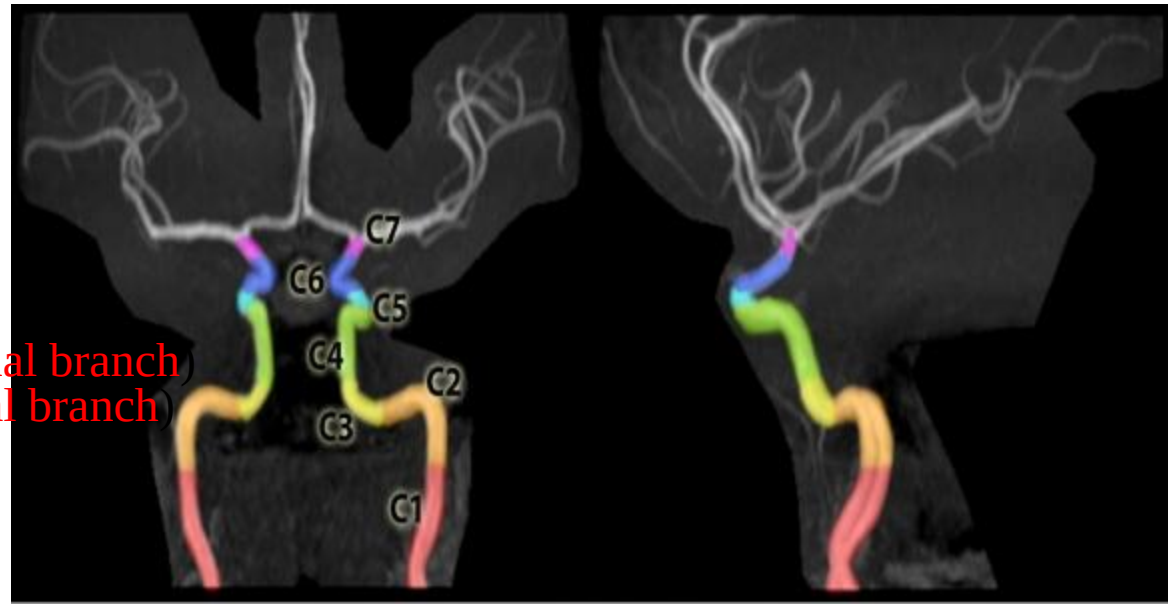
C7: Branches from the communicating portion

- Posterior communicating artery
- Anterior choroidal artery

Ophthalmic artery

Anterior cerebral artery (a terminal branch)

Middle cerebral artery (a terminal branch)

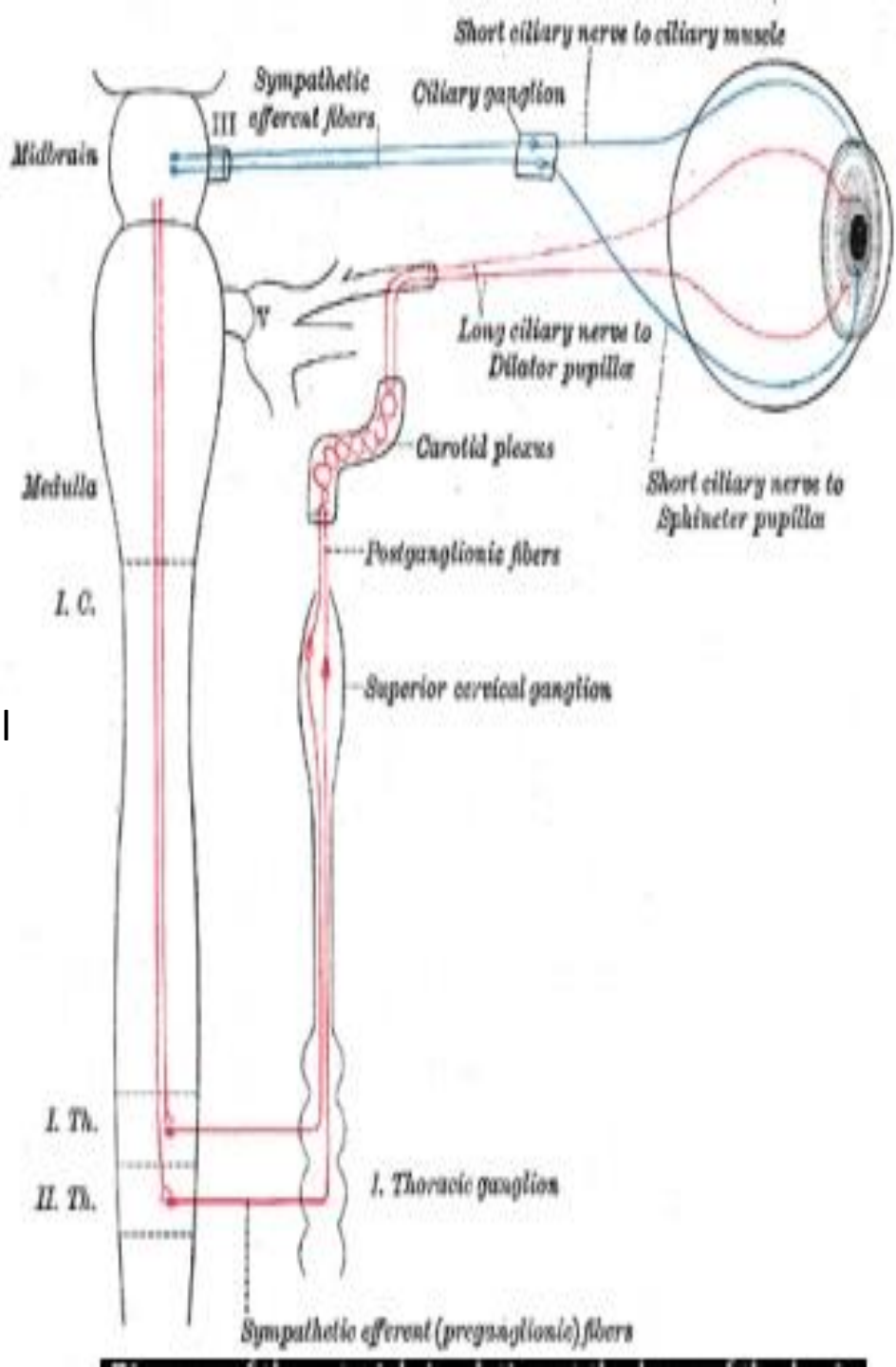


Internal carotid plexus

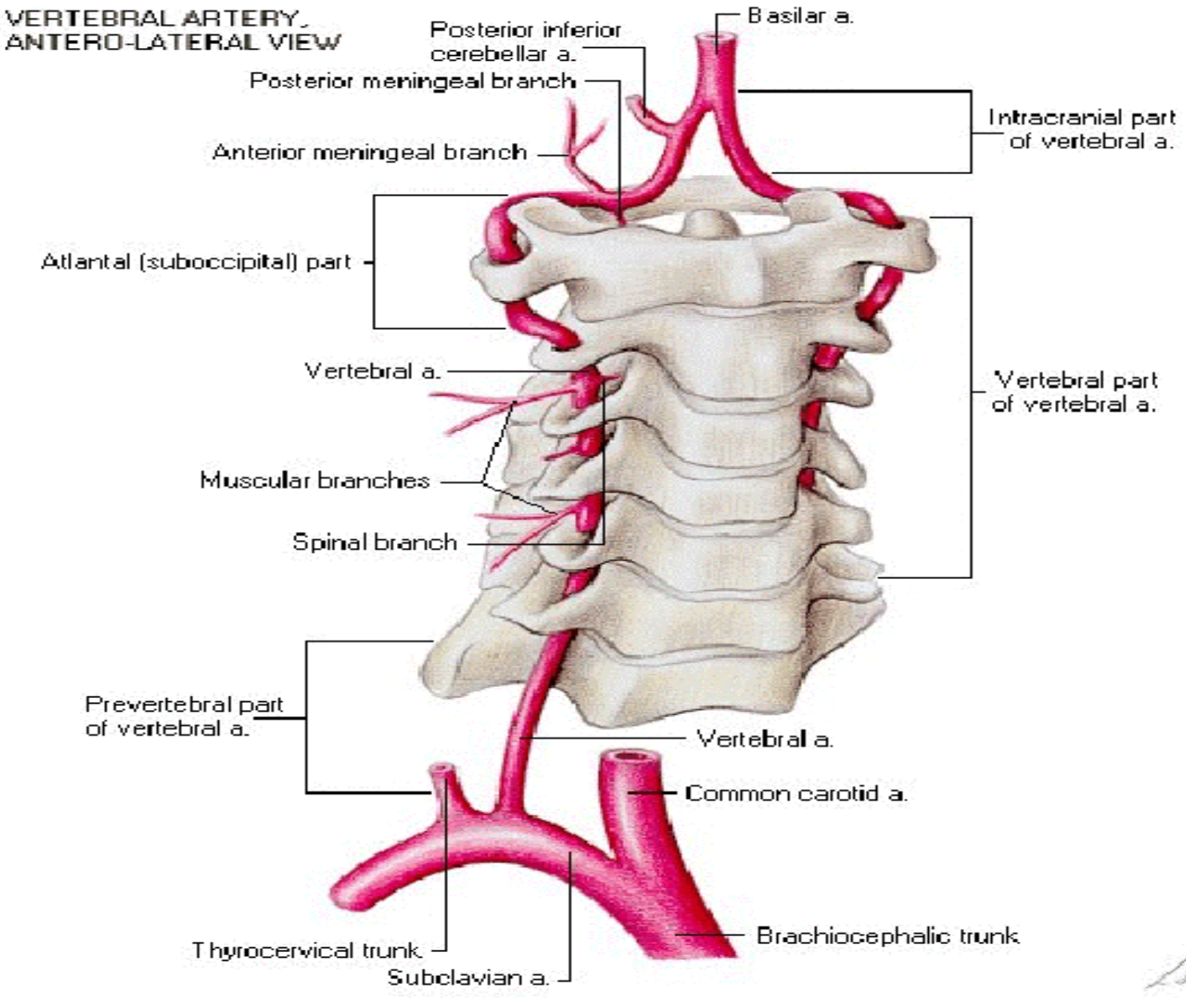
The **internal carotid plexus plexus**) is situated on the lateral side of the internal carotid artery, and in the plexus there occasionally exists a small gangliform swelling, the *carotid ganglion*, on the under surface of the artery.

Postganglionic sympathetic fibres ascend from the superior cervical ganglion, along the walls of the internal carotid artery, to enter the internal carotid plexus. These fibres then distribute to deep structures, which include the Superior Tarsal Muscle and pupillary dilator muscles. Some of the fibres from the internal carotid plexus converge to form the deep petrosal ~~nerve~~.

The internal carotid plexus communicates with the trigeminal ganglion, the abducent nerve, and the pterygopalatine ganglion (also named sphenopalatine); it distributes filaments to the wall of the internal carotid artery, and also communicates ~~with the tympanic~~ branch of the glossopharyngeal nerve



VERTEBRAL ARTERY

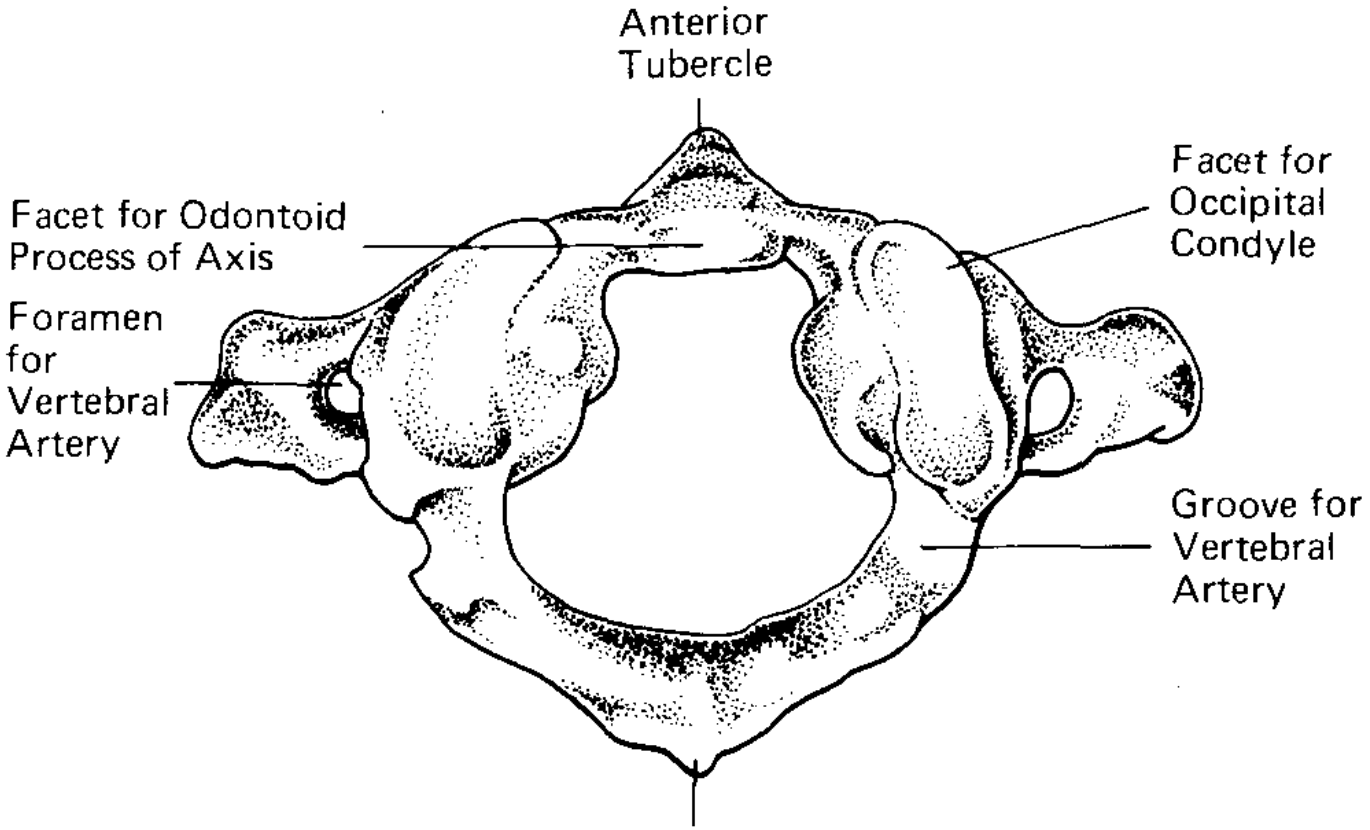


Vertebral a.

Vertebral artery one of major arterial supply to the brain.It arises from the suclavian artery and passes through the foramen of the transverse processes of cervical vertebrae from 6^{th} vertebra in to post.cranial fossa and meets its fellow forming the BASILAR ARTERY on the PONS,then divides in to two branches the POSTERIOR CEREBRAL ARTERY forming part of CIRCLE OF WILLIS and anastmoses with the middle cerebral artery by posterior communicating artery.Basilar artery gives branches to the cerebellum .

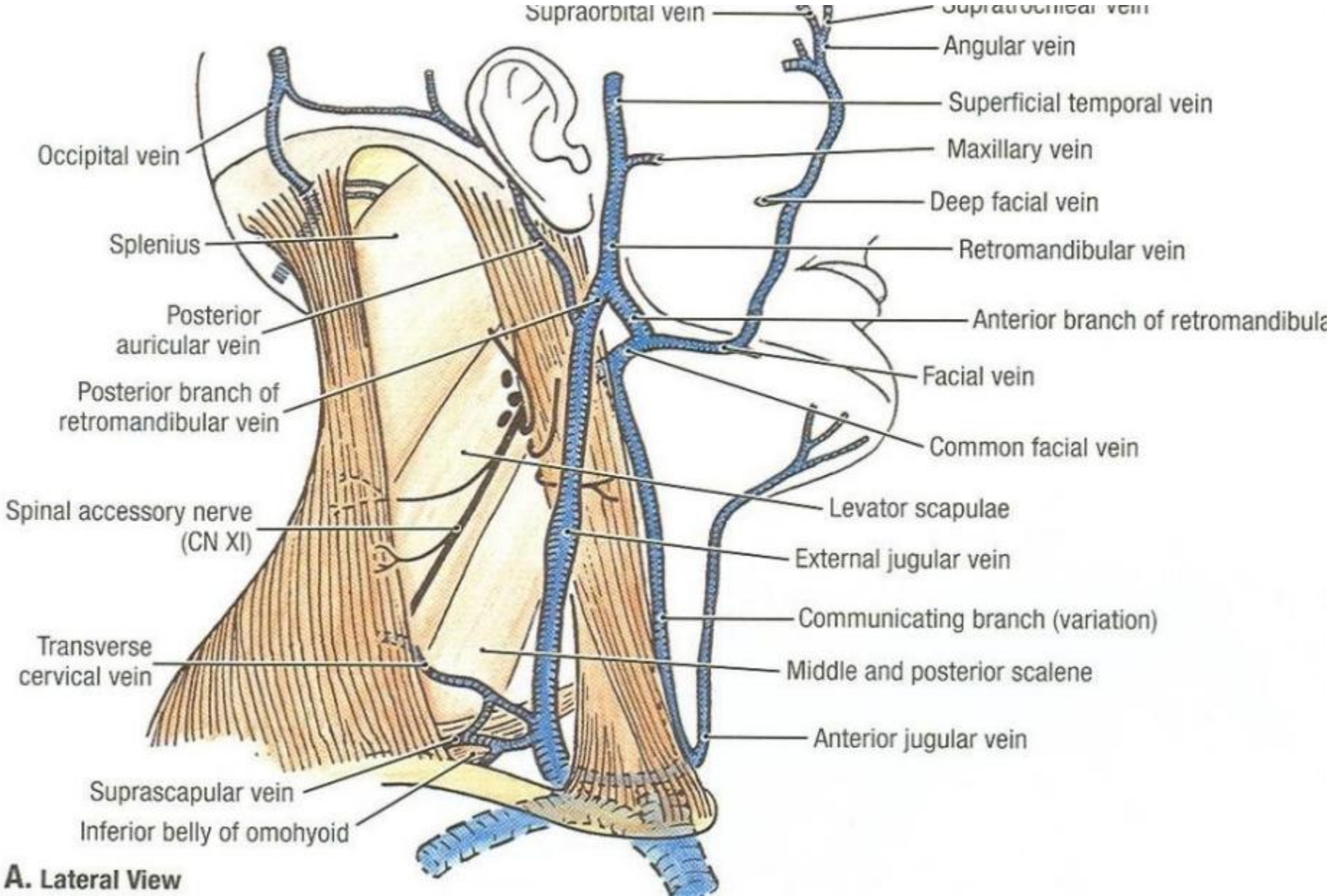
Circle of Willis good communication between right and left and internal carotid with subclavian A.

Cervical vertebra with foramen with in the transverse process



The atlas viewed from above.

Veins of the Neck



Veins

Veins (*vena*) are blood vessels that carry blood towards the heart. Most veins carry deoxygenated blood from the tissues back to the heart.

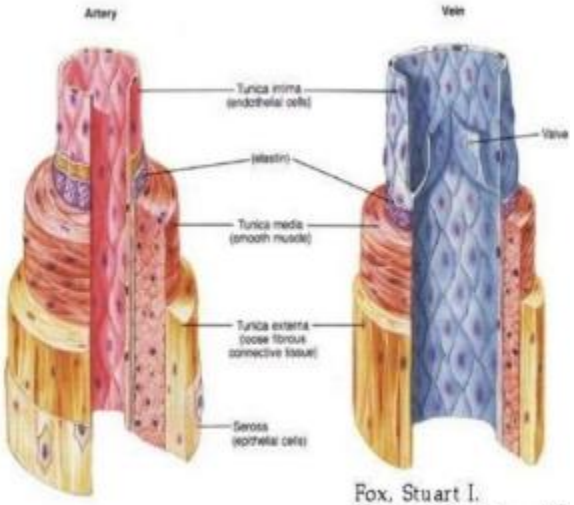
Exceptions are the pulmonary and umbilical veins . Veins ,usually travel with arteries

Role of veins

Return of deoxygenated blood to heart

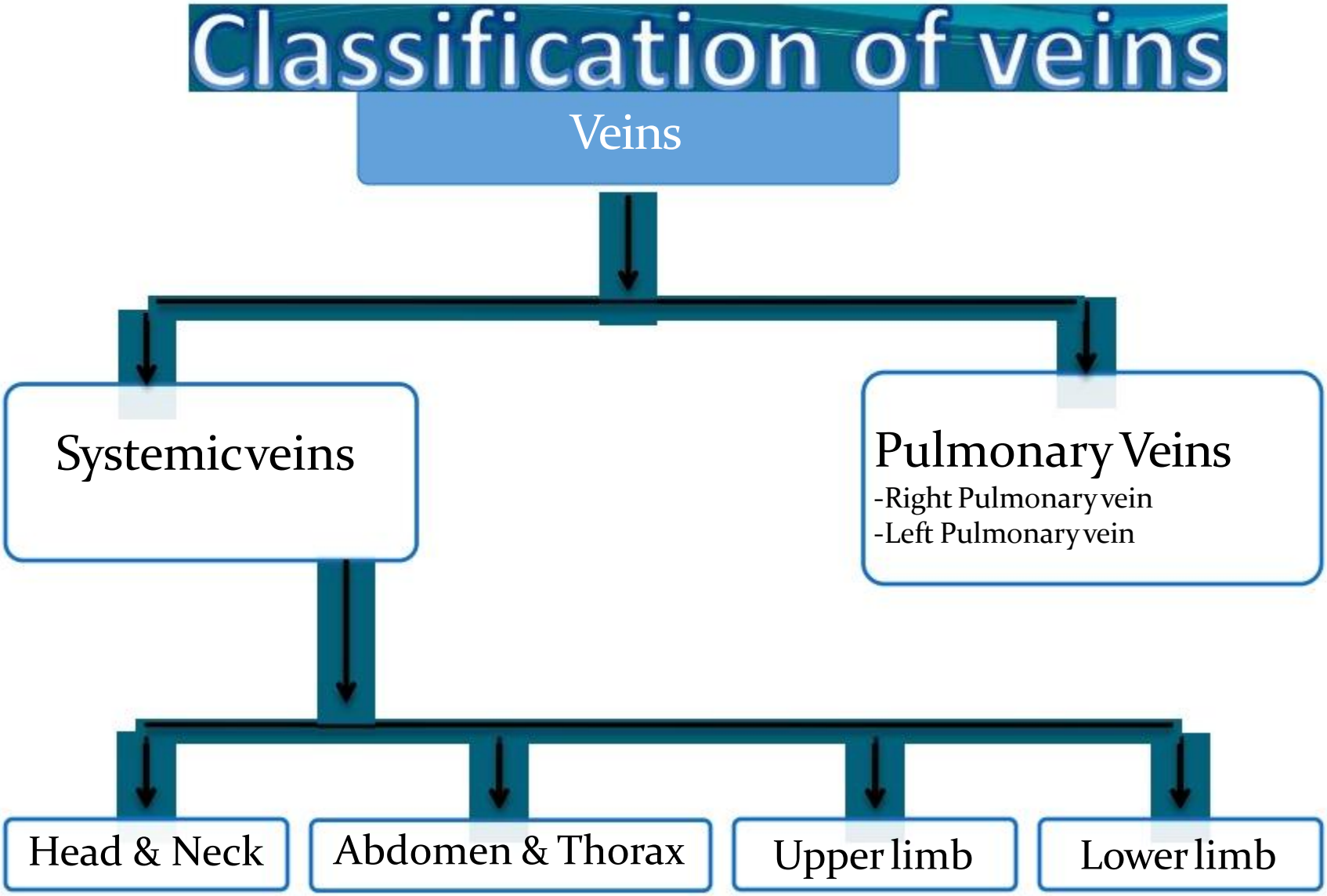
Cushion associated arteries from jaw movements(peri arterial plexus)

Protect against extensive intracranial pressure



Fox, Stuart I.
Human Physiology 4th
Brown Publishers

Classification of veins



Veins of the Head and neck

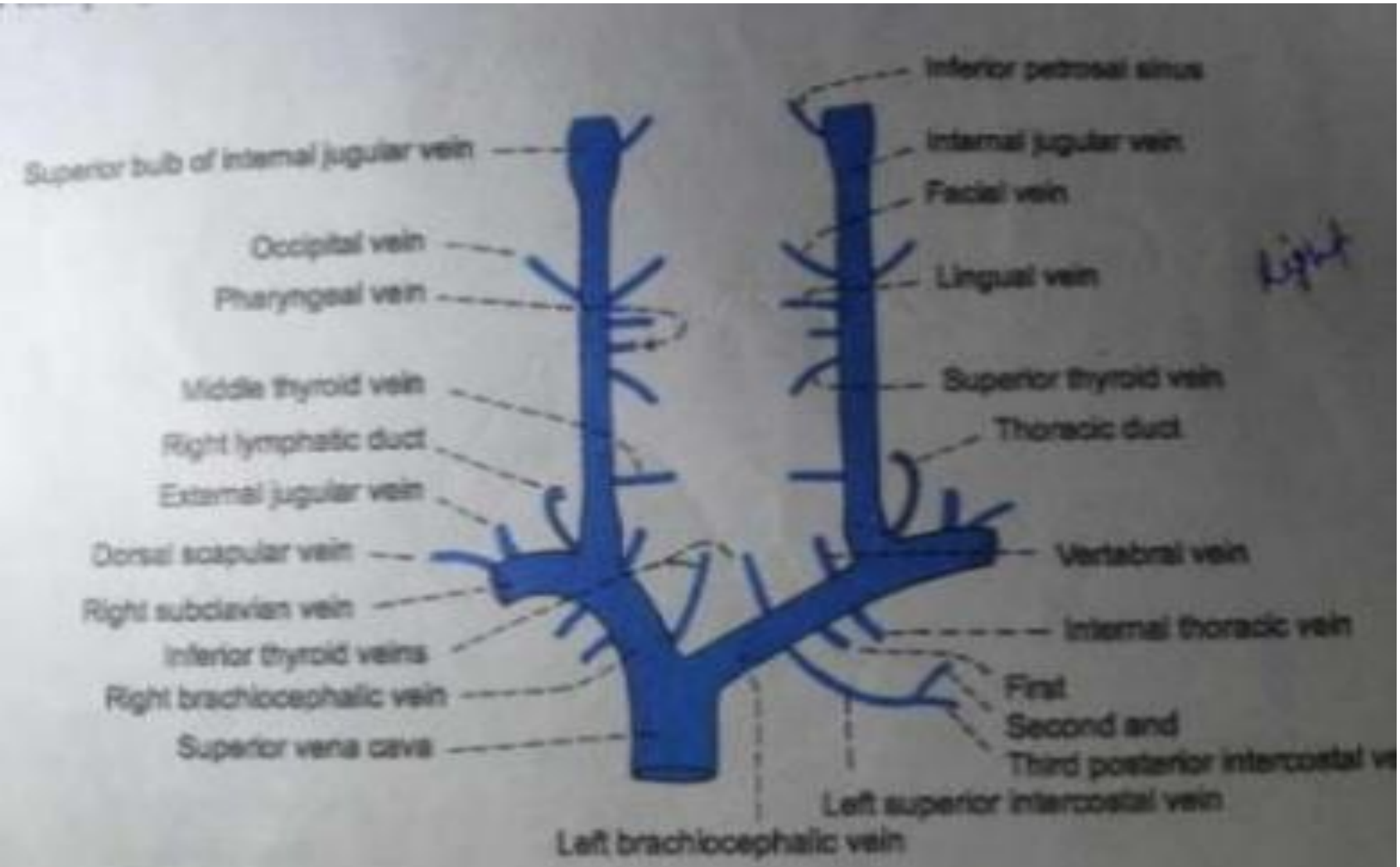


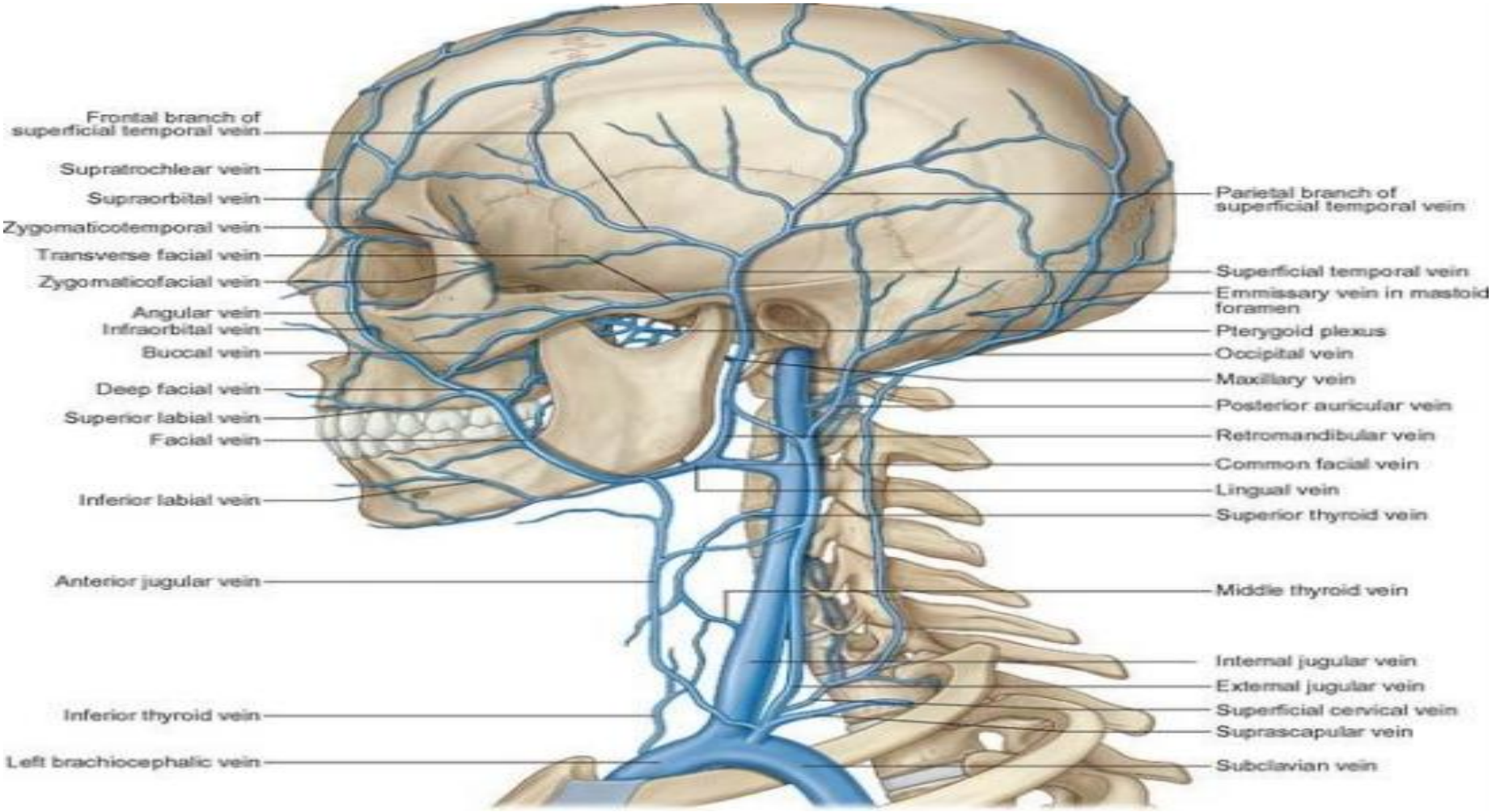
Fig. 12.18: The veins of the neck.

Veins of the Head and neck

Venous drainage from the face is entirely superficial

All the venous drainage from the head and neck terminate in the *internal jugular vein* which join the *subclavian vein* to form the brachiocephalic vein behind the medial end of the clavicle

Two brachiocephalic veins unite to form superior vena cava

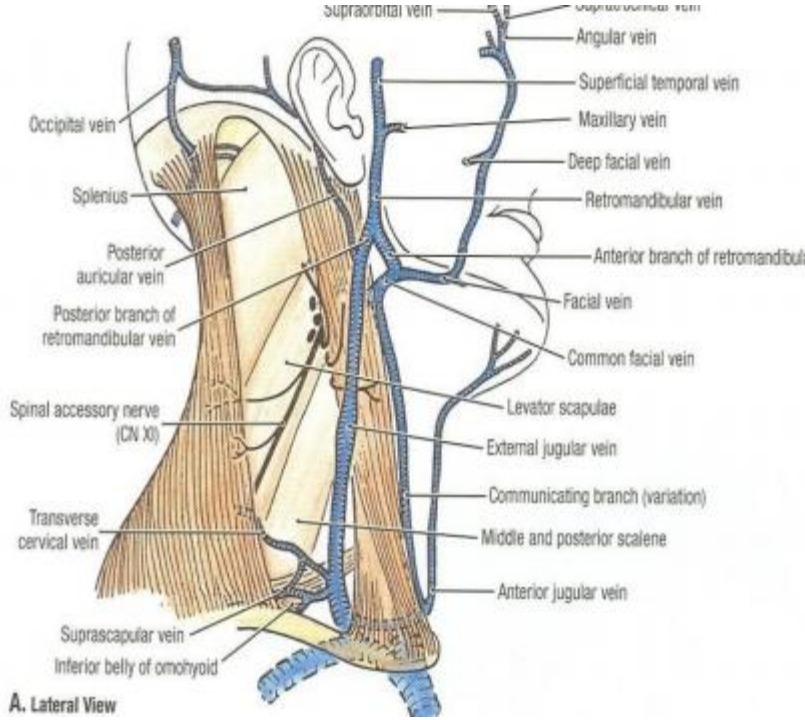


External Jugular Vein

The external jugular vein derives from the union of the posterior auricular vein and the posterior division of the retromandibular vein, which occurs in the substance of the parotid gland at the level of the angle of the mandible. It also receives blood from the transverse cervical vein, the suprascapular vein, the superficial cervical vein, and the anterior jugular vein in some instances. The retromandibular vein anterior division joins with the facial vein to form the common facial vein.
The anterior jugular vein is a related vein which is formed from submandibular veins and can drain into the external jugular vein or the subclavian vein.
The external jugular vein most commonly drains into the subclavian vein near the middle third of the clavicle. Like most veins, the external jugular vein has a valve at the terminal end before entering the subclavian vein. The function of this valve is to inhibit the regurgitation of blood from the subclavian vein into the external jugular vein.
The function of the external jugular vein is to drain blood from the superficial structures of the cranium and the deep portions of the face
The external jugular vein is formed behind the angle of the jaw by the union of the posterior auricular vein with the posterior division of the retromandibular vein It descends across the sternocleidomastoid muscle and beneath the platysma muscleIt drains into the subclavian vein behind the middle of the clavicle

Anterior Jugular Vein

The anterior jugular vein descends in the front of the neck close to the midline Just above the sternum,
it is joined to the opposite vein by the jugular arch
It joins the external jugular vein deep to the sternocleidomastoid muscle



Internal Jugular Vein

The **internal jugular vein** is a paired venous structure that collects blood from the brain, regions of the face, and neck, and delivers it to the right atrium.

The **internal jugular vein** is a run-off of the sigmoid sinus. It arises in the posterior cranial fossa and exits the cranium through the **jugular** foramen, located at the base of the skull. As the **internal jugular vein** runs down the lateral neck, it drains the branches of the facial, retromandibular, and the lingual **veins**.
The course of
the **internal jugular vein** is directed caudally in the carotid sheath and is accompanied by the vagus nerve posteriorly and the common carotid artery anteromedially. It lies just lateral and anterior to the **internal** and common carotid arteries.

At the junction of the neck and thorax, the **internal jugular vein** combines with the subclavian **vein** to form the brachiocephalic or innominate **vein**. The

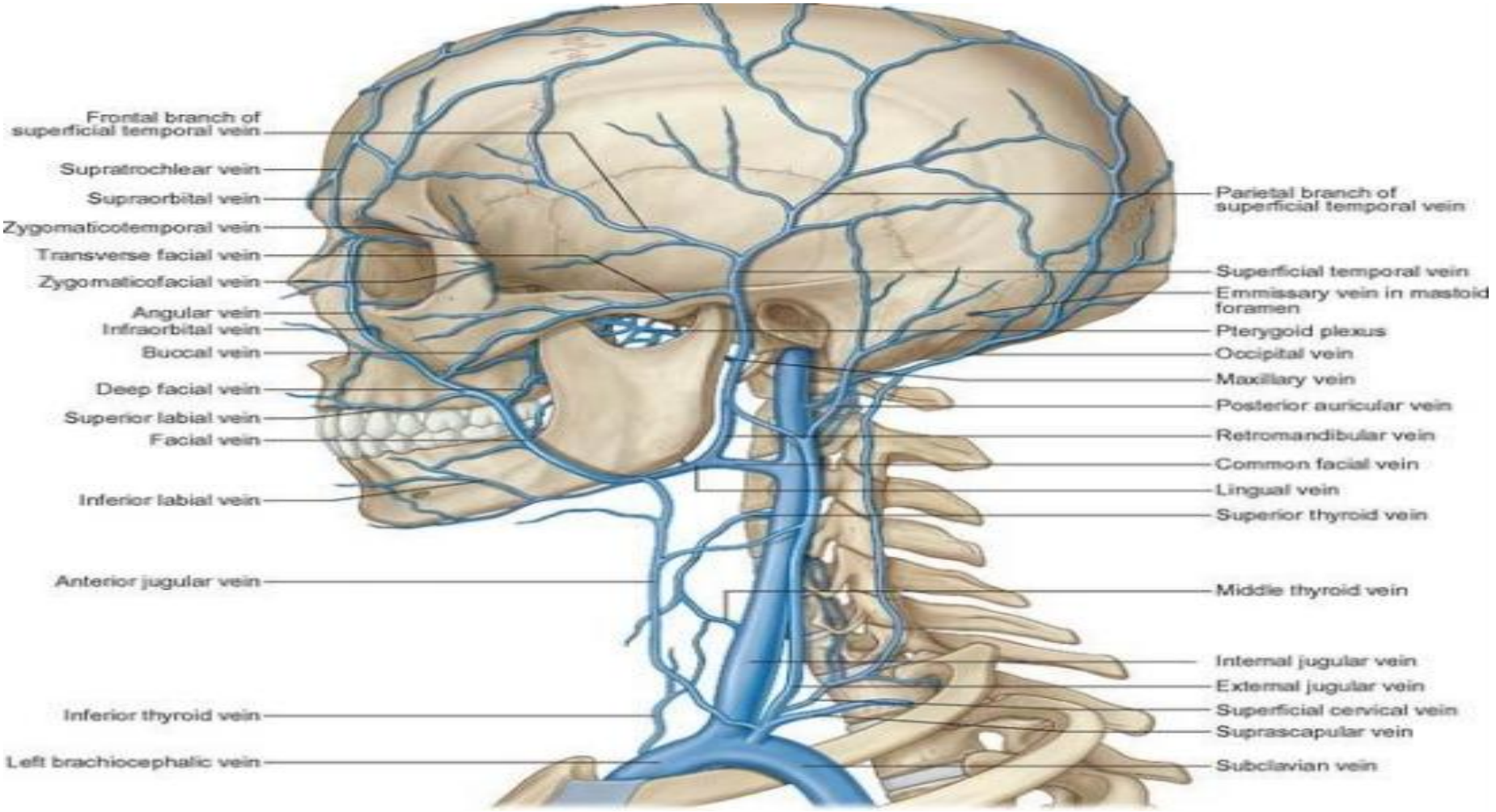
Both **veins** contain valves that are located a few centimeters before the vessels drain into the subclavian **vein**

Veins of the Head and neck

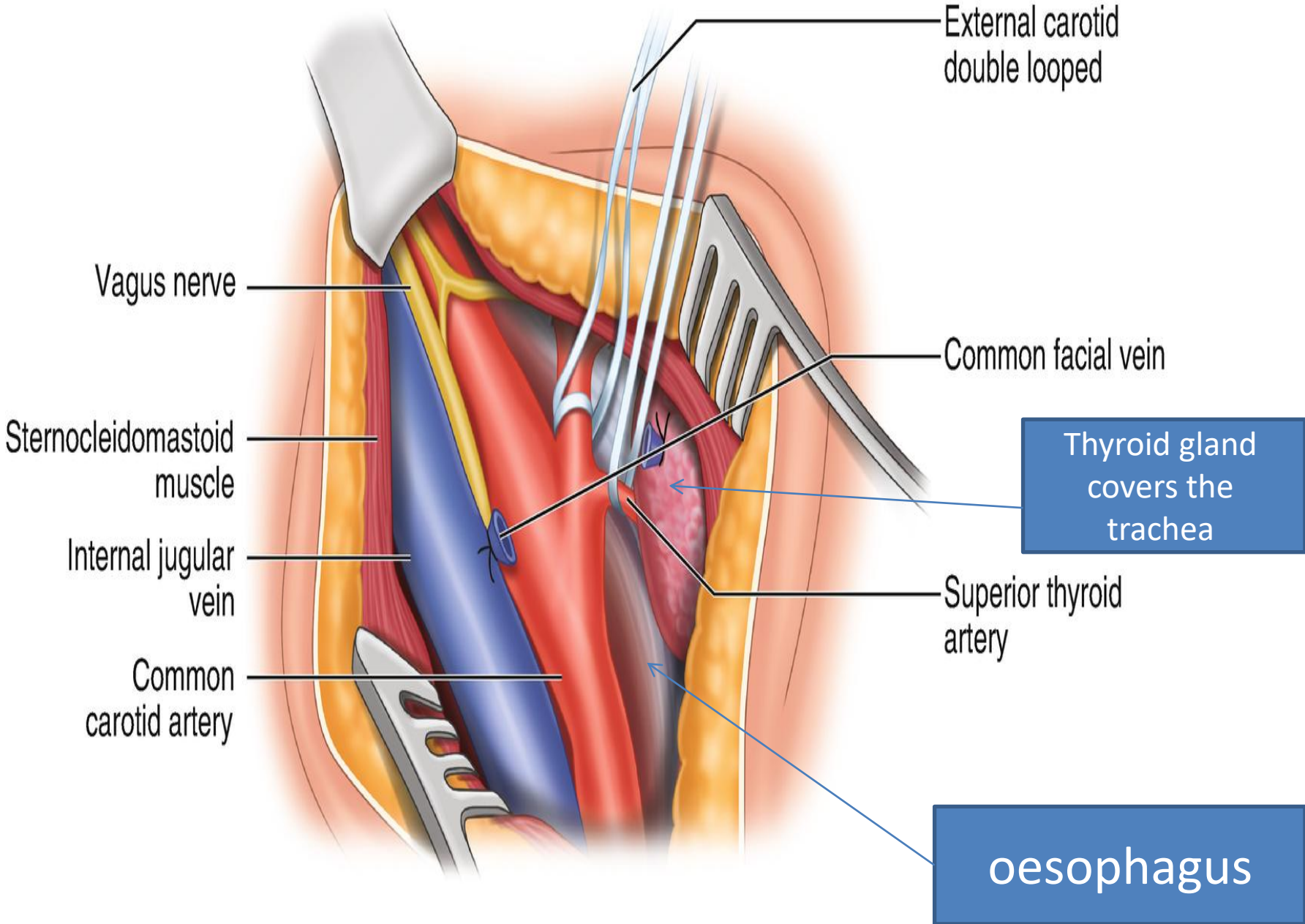
Venous drainage from the face is entirely superficial

All the venous drainage from the head and neck terminate in the *internal jugular vein* which join the *subclavian vein* to form the brachiocephalic vein behind the medial end of the clavicle

Two brachiocephalic veins unite to form superior vena cava

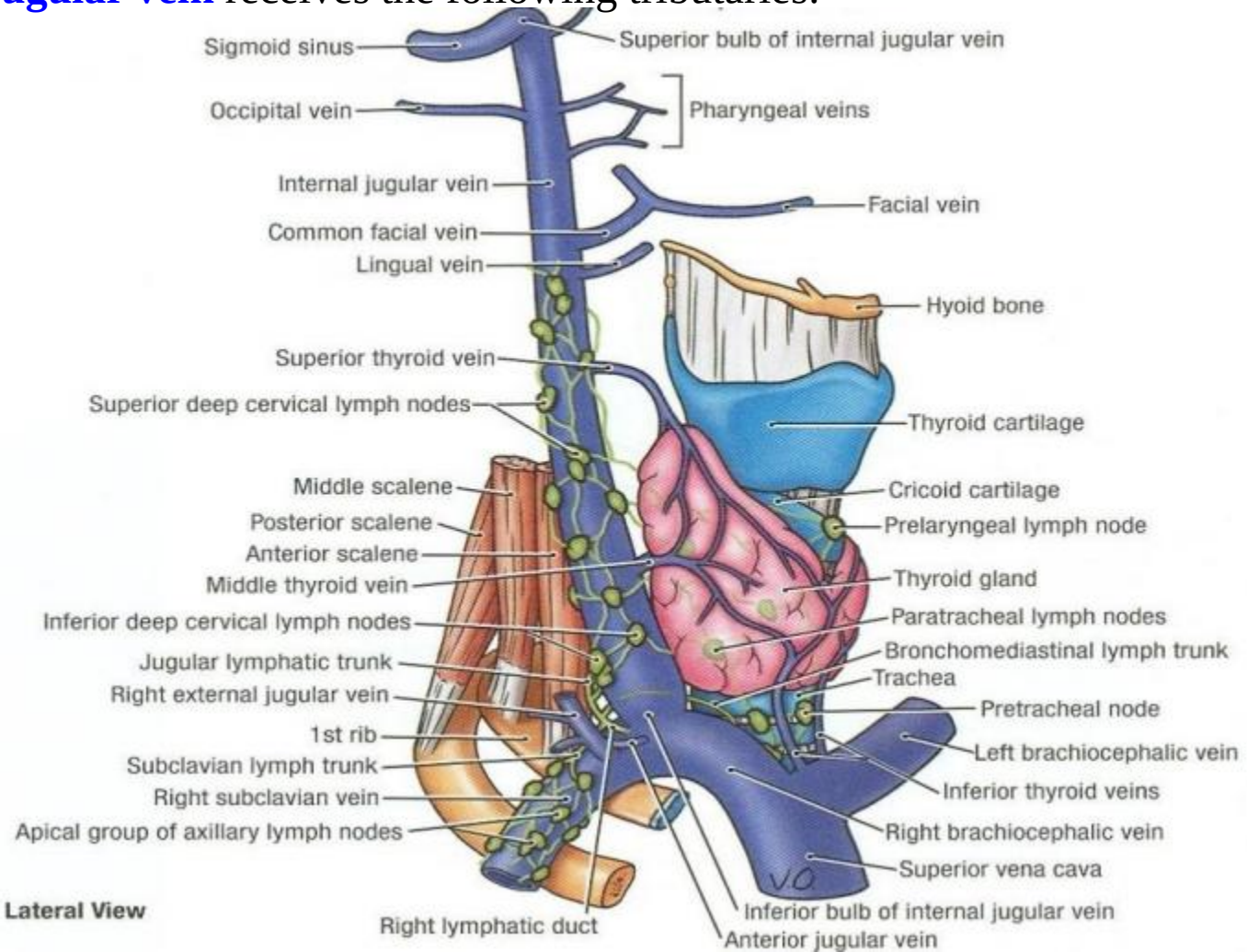


Relation of neck vessels



The **internal jugular vein** is a blood vessel that arises from the junction of two intracranial venous sinuses - the inferior petrosal sinus and the sigmoid sinus.
The **internal jugular vein** arises at the cranial base in the jugular foramen. Further, the **internal jugular vein** passes inferiorly within the carotid sheath situated anterolateral to the carotid artery. At the level of the sternoclavicular joint the **internal jugular vein** units with the subclavian vein to form the brachiocephalic vein.

On its course, the **internal jugular vein** receives the following tributaries:
inferior petrosal sinus,
pharyngeal vein,
common facial vein,
lingual vein,
superior thyroid vein,
middle thyroid vein,
occipital vein.



LYMPATIC SYSTEM IN THE NECK

Interstial Fluids move throughout the body via several paths lymphatic vessels

The cardiovascular system circulates blood, nutrients, and gases throughout the body. The lymphatic system carries white blood cells and other immune cells through a network of vessels and tissues, including lymph nodes.

The lymphatic system also serves as a connection between tissues and the bloodstream, performing several functions such as removing dead blood cells and drain tissue fluid, plasma proteins and other cellular debris back into the blood stream, and is also involved in immune defence. Once this collection of substances enters the lymphatic vessels, it is known as **lymph.** Lymph is subsequently filtered by lymph nodes and directed into the venous system.

Lymphatic Vessels

The lymphatic vessels of the head and neck can be divided into two major groups; superficial vessels and deep vessels.

Superficial Vessels

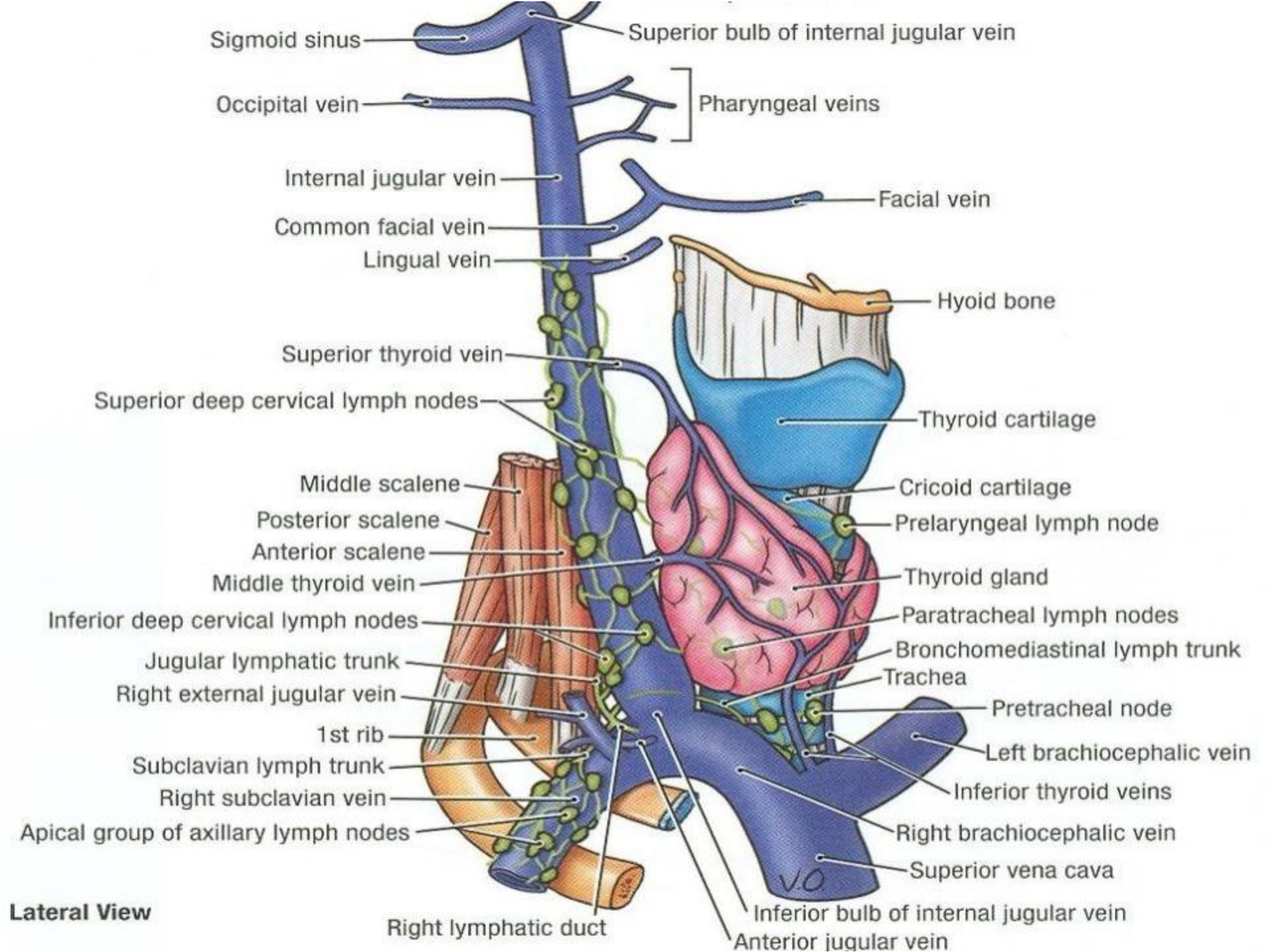
The superficial vessels drain lymph from the scalp, face and neck into the **superficial ring** of lymph nodes at the junction of the neck and head.

Deep Vessels

The deep lymphatic vessels of the head and neck arise from the **deep cervical lymph nodes**. They converge to form the left and right jugular lymphatic trunks:

Left jugular lymphatic trunk – combines with the thoracic duct at the root of the neck. This empties into the venous system via the left subclavian vein.

Right jugular lymphatic trunk – forms the right lymphatic duct at the root of the neck. This empties into the venous system via the right subclavian vein



Lateral View

LYMPHATIC SYSTEM IN THE NECK

As blood flows through the capillaries of the body, two opposing forces are exerted. Blood pressure tends to force fluid through the walls of the capillaries into the tissue spaces, whereas the osmotic pressure of the blood tends to draw fluid into the vessels

Lymph node, any of the small, bean-shaped masses of lymphoid tissue enclosed by a capsule of connective tissuethat occur in association with the lymphatic vessels. As part of the lymphatic system, lymph nodes serve as filters for the blood, providing specialized tissues where foreign antigens can be trapped and exposed to cells of the immune system for destruction. They are typically found concentrated near junctions of the major lymphatic vessels, most prominently in the neck, groin, and armpits

Lymph Nodes

The lymph nodes of the head and neck can be divided into two groups; a superficial ring of lymph nodes, and a vertical group of deep lymph nodes.

Superficial Lymph Nodes

The superficial lymph nodes of the head and neck receive lymph from the scalp, face and neck. They are arranged in a **ring shape** ; extending from underneath the chin, to the posterior aspect of the head. They ultimately drain into the deep lymph nodes

The superficial **lymph** nodes of the **head and neck** receive **lymph** from the scalp, face and **neck**. They are arranged in a ring shape; extending from underneath the chin, to the posterior aspect of the **head**. They ultimately drain into the deep **lymph**nodes.

Occipital: There are usually between 1-3 occipital **lymph** nodes**Lymph node**, any of the small, bean-shaped masses of lymphoid tissue enclosed by a capsule of connective tissuethat occur in association with the lymphatic vessels. As part of the lymphatic system,

Lymph nodes serve as filters for the blood, providing specialized tissues where foreign antigens can be trapped and exposed to cells of the immune system for destruction. They are typically found concentrated near junctions of the major lymphatic vessels, most prominently in the neck, groin, and armpit.

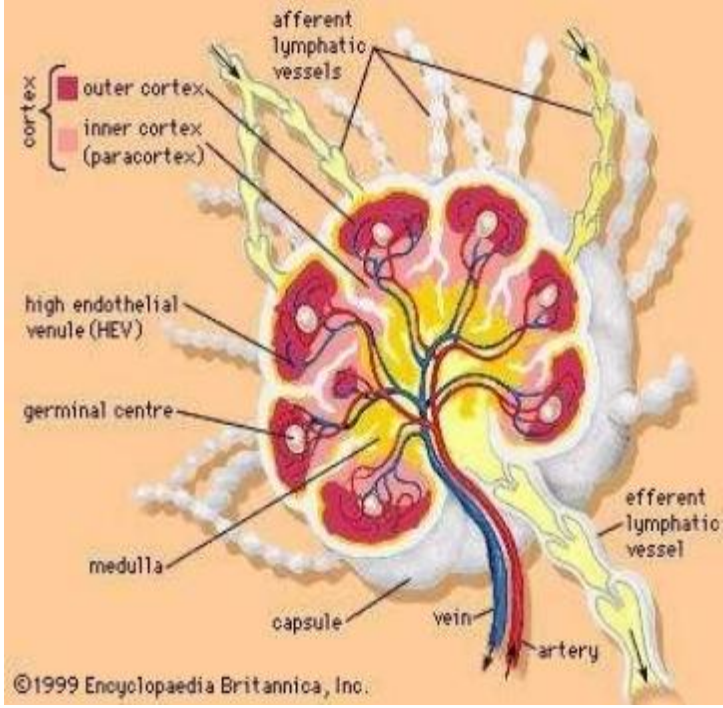
Each lymph node is divided into two general regions, the capsule and the cortex. The capsule is an outer layer of connective tissue. Underlying the capsule is the cortex, a region containing mostly inactivated B and T lymphocytesplus numerous accessory cells such as dendritic cells and macrophages. The cortex is further divided into two functional areas: the outer cortex and inner cortex, or paracortex. These regions surround an inner medulla, which consists primarily of activated antibody-secreting plasma cell.

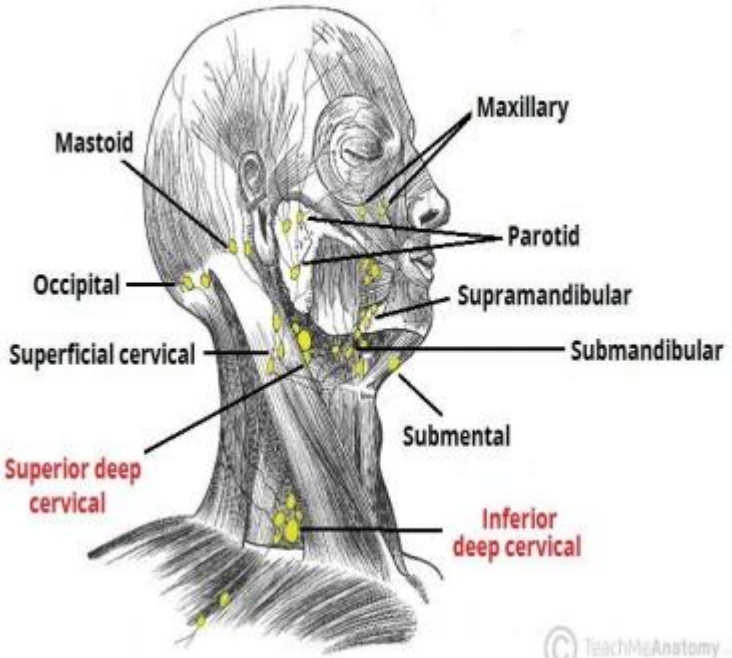
Superficial Lymph Nodes

The superficial lymph nodes of the head and neck receive lymph from the scalp, face and neck. They are arranged in a ring shape; extending from underneath the chin, to the posterior aspect of the head. They ultimately drain into the deep lymph nodes.

Occipital: There are usually between 1-3 occipital lymph nodes. They are located in the back of the head at the lateral border of the trapezius muscle and collect lymph from the occipital area of the scalp.

Mastoid: There are usually 2 mastoid lymph nodes, which are also called the post-auricular lymph nodes. They are located posterior to the EAR .They collect lymph from the posterior neck, upper ear and the back of the external auditory meatus (the ear canal). **Pre-auricular:** There are usually between 1-3 pre-auricular lymph nodes. They are located anterior to the auricle of the ear, and collect lymph from the superficial areas of the face and temporal region



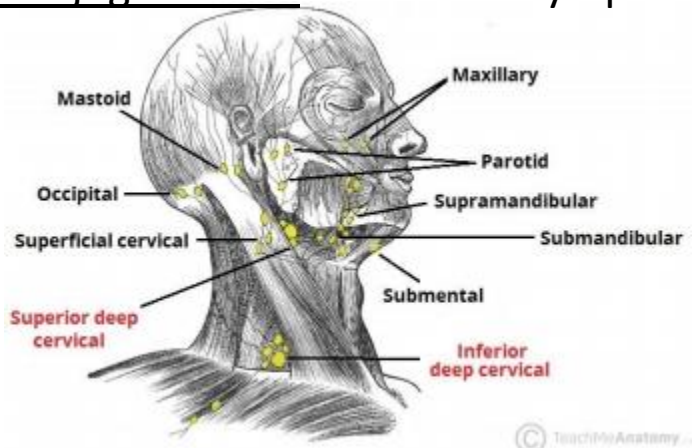


Parotid: The parotid lymph nodes are a small group of nodes located superficially to the parotid gland. They collect lymph from the nose, the nasal cavity, the external acoustic meatus, the tympanic cavity and the lateral borders of the orbit. There are also parotid lymph nodes deep to the parotid gland that drain the nasal cavities and the nasopharynx**. Submental**: These lymph nodes are located superficially to the mylohoid muscle. They collect lymph from the central lower lip, the floor of the mouth and the apex of the tongue.

Submandibular: There are usually between 3-6 submandibular nodes. They are located below the mandible in the submandibular triangle and collect lymph from the cheeks, the lateral aspects of the nose, upper lip, lateral parts of the lower lip, gums and the anterior tongue. They also receive lymph from the submental and facial lymph nodes.

Facial: This group comprises the maxillary/infraorbital, buccinator and supramandibular lymph nodes. They collect lymph from the mucous membranes of the nose and cheek, eyelids and conjunctiva.

Superficial Cervical: The superficial cervical lymph nodes can be divided into the superficial anterior cervical nodes and the posterior lateral superficial cervical lymph nodes. The anterior nodes lie close to the anterior jugular vein and collect lymph from the superficial surfaces of the anterior neck. The posterior lateral nodes lie close to the external jugular vein and collect lymph from superficial surfaces of the neck



Deep Lymph Nodes

The deep (cervical) lymph nodes receive all of the lymph from the head and neck – either directly or indirectly via the superficial lymph nodes. They are organised into a vertical chain, located within close proximity to the **internal jugular vein** within the carotid sheath. The efferent vessels from the deep cervical lymph nodes converge to form the **jugular lymphatic trunks**.

The nodes can be divided into **superior** and **inferior** deep cervical lymph nodes. They are numerous in number, but include the prelaryngeal, pretracheal, paratracheal, retropharyngeal, infrahyoid, jugulodigastric (tonsilar), jugulo-omohyoid and supraclavicular nodes

Waldeyer's Ring

Waldeyer's tonsillar ring refers to the collection of lymphatic tissue surrounding the superior pharynx. This lymphatic tissue responds to pathogens that may be ingested or inhaled. The tonsils that make up the ring are as follows:

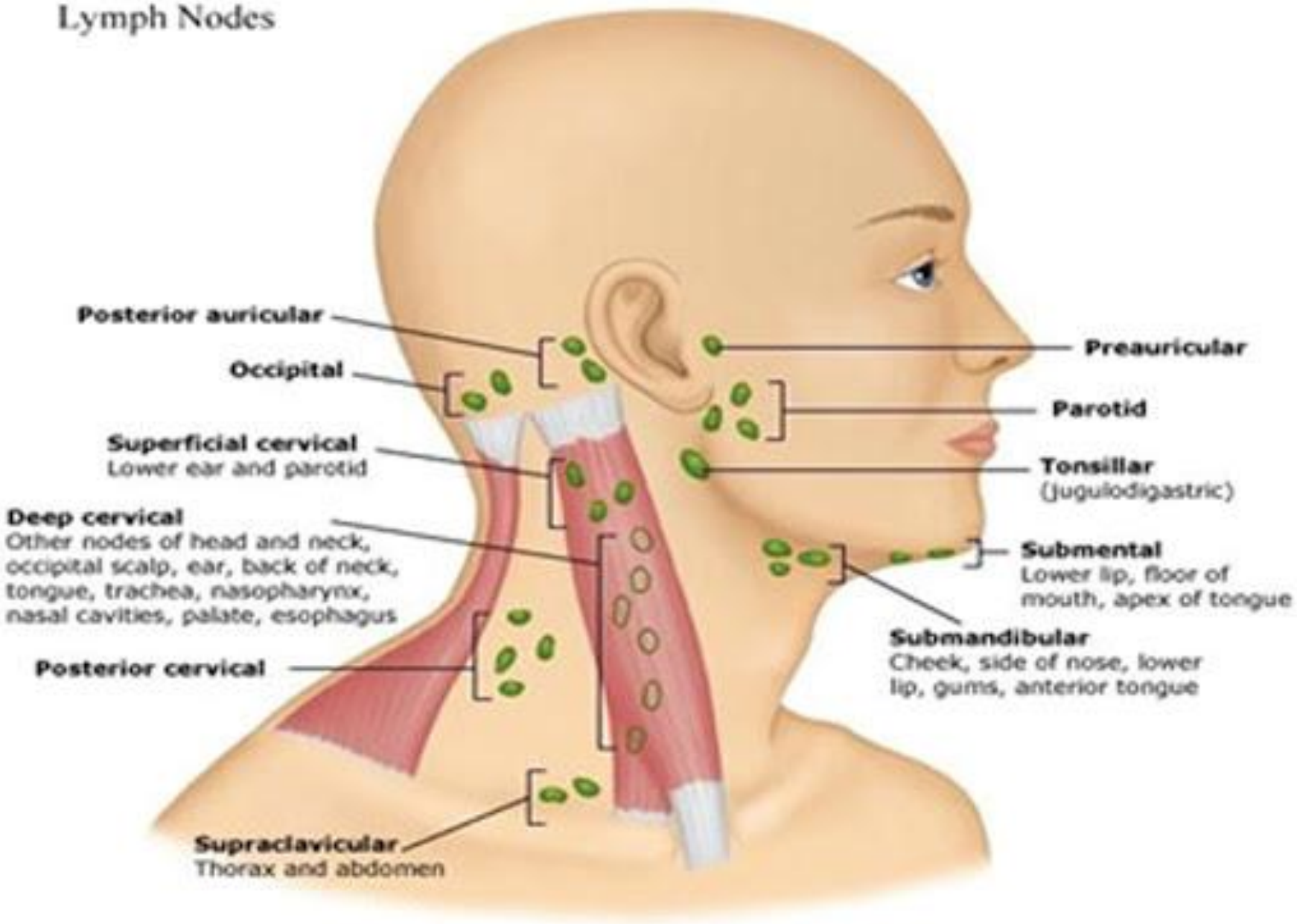
Lingual tonsil – located on the posterior base of the tongue to form the antero-inferior part of the ring.

Palatine tonsils – located on each side between the palatoglossal and palatopharyngeal arches. These are the common 'tonsils' that can be seen within the oral cavity. They form the lateral part of the ring.

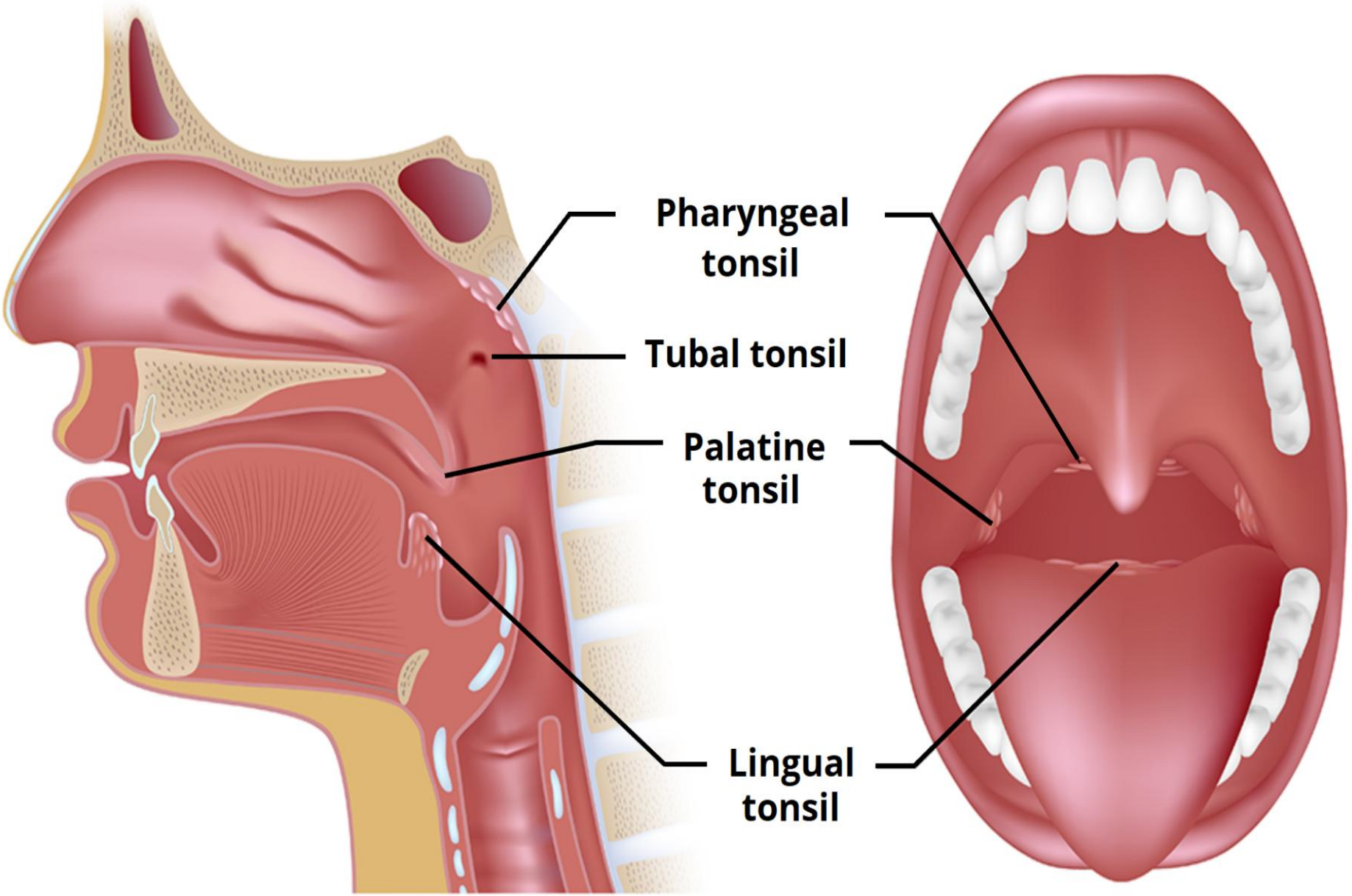
Tubal tonsils – these are located where each Eustachian tube opens into the nasopharynx and form the lateral part of the ring.

Pharyngeal tonsil – also called the nasopharyngeal/adenoid tonsil, located in the roof of the nasopharynx, behind the uvulva and forms the postero-superior part of the ring.

Superficial group of cervical lymph nodes



Waldeyer,s ring part of deep cervical lymph node



Thank you