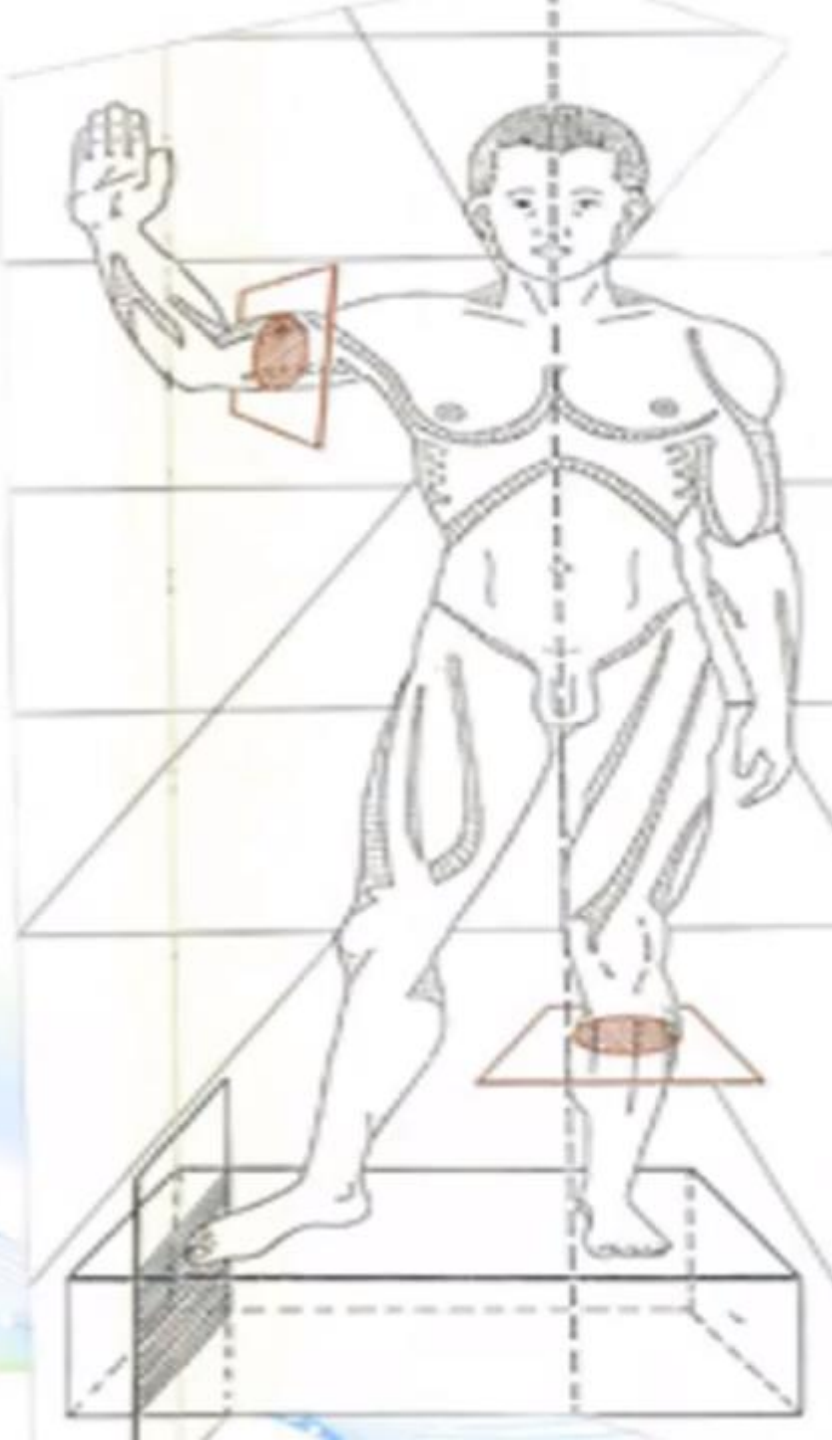
THE CAROTID SYSTEM



PR.M.D.ELAMRANI

Dr.Chaima KASSI

PLAN

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II – COMMON CAROTID ARTERIES

III – EXTERNAL CAROTID ARTERIES

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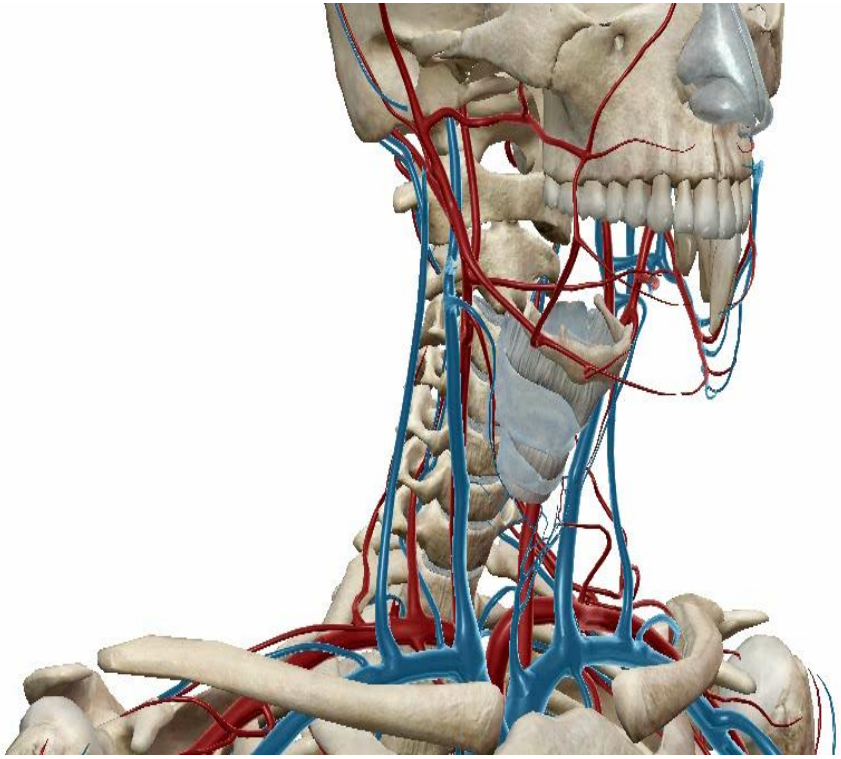
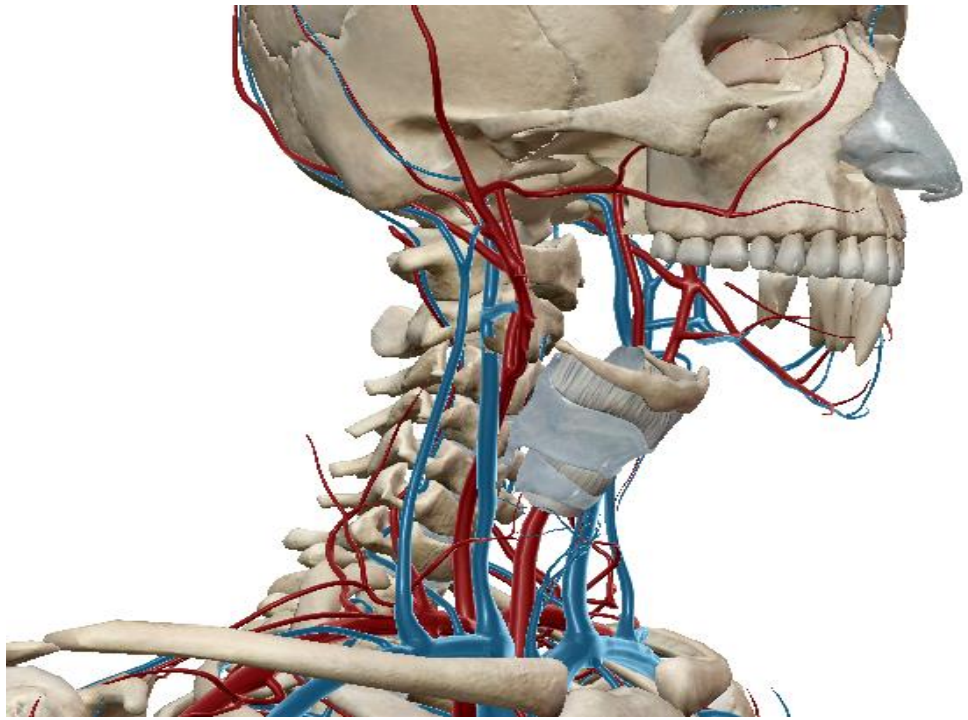
VII – CONCLUSION



I - INTRODUCTION:

The carotid system plays a crucial role, providing arterial blood supply to most of the face, neck, and brain.



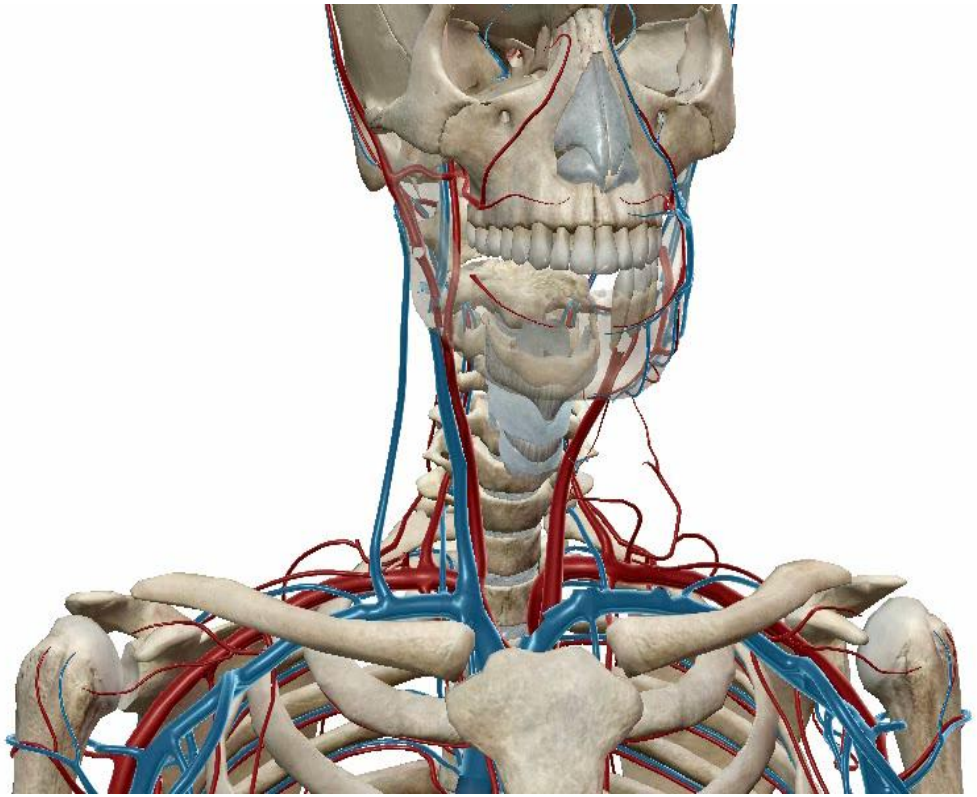
Lateral view of the carotid region

II – COMMON CAROTID ARTERY:

There are two, right and left.

Origin

- The left one arises from the convexity of the aortic arch.
- The right one arises as a terminal branch of the brachiocephalic trunk.



Trajectory

They project along a line from the sternoclavicular joint to the neck of the mandible.

Termination

Both end by dividing into the external and internal carotid arteries at the level of the upper border of the thyroid cartilage.

Anatomical relations

➢ In the thorax:

In the thorax, only the left common carotid runs through this region.

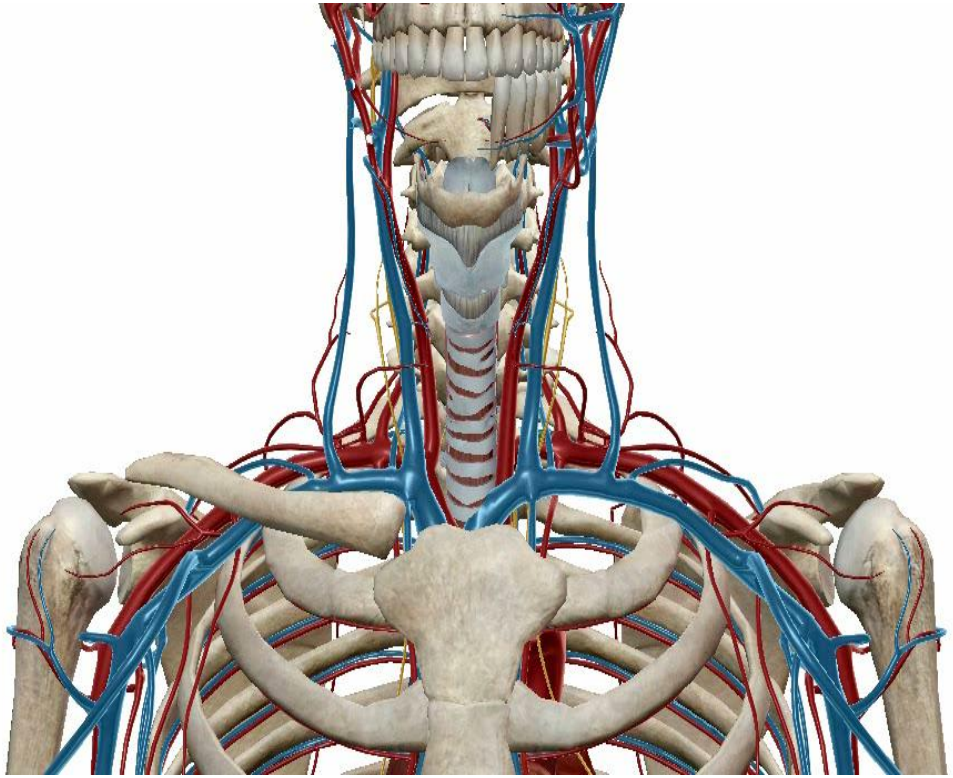
- **Anteriorly:**

The left brachiocephalic vein.

- **Posteriorly:**
  - The esophagus,
  - The left subclavian artery,
  - The thoracic duct.

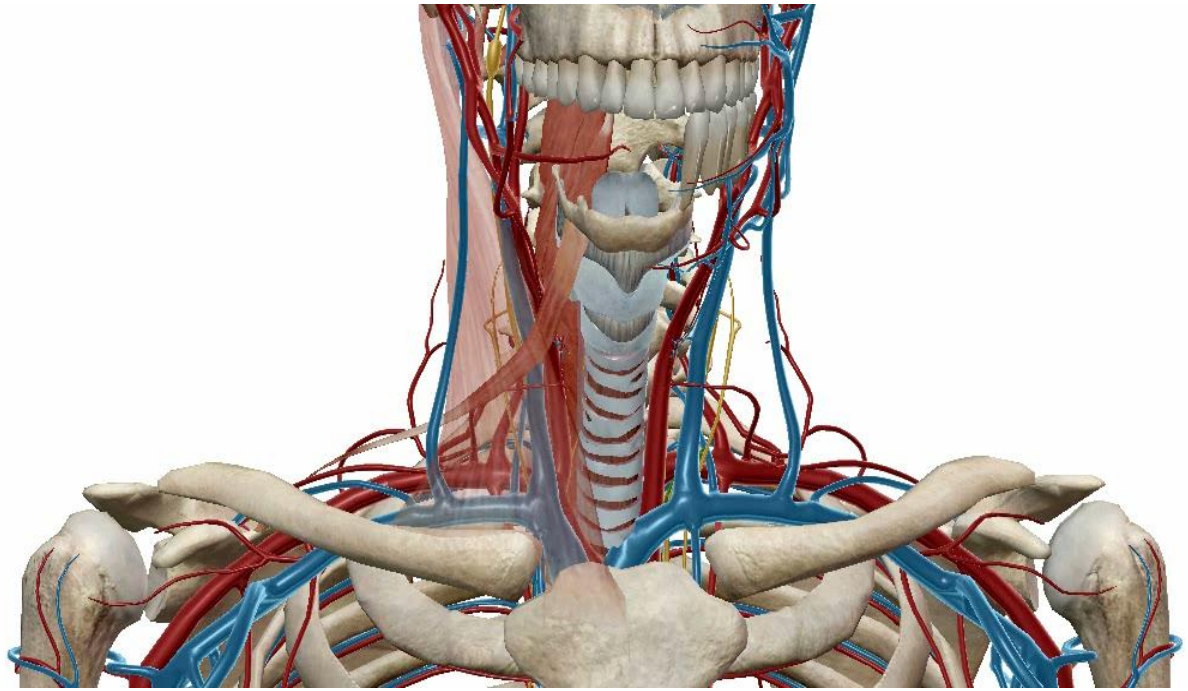
- **To the right:**
  - The right brachiocephalic trunk,
  - The trachea.

- **To the left:**
  - The left vagus nerve,
  - The left phrenic nerve.



➢ In the neck:

The right and left common carotid arteries are related to:



- **Anteriorly:**
  - The sternocleidomastoid muscle,
  - The superior belly of the omohyoid muscle.

- **Posteriorly:**
  - Prevertebral muscles,
  - The sympathetic trunk.

- **To the left:**

The arch of the thoracic duct.

- **Medially:**
  - The trachea,
  - The esophagus,
  - The larynx,
  - The thyroid gland.

- **Laterally:**
  - The vagus nerve,
  - The internal jugular vein,
  - The phrenic nerve.

III – EXTERNAL CAROTID ARTERIES:

They supply the anterior regions of the neck, the skin of the face, and the head.

Origin

They arise from the common carotid artery, at the level of the upper border of the thyroid cartilage.

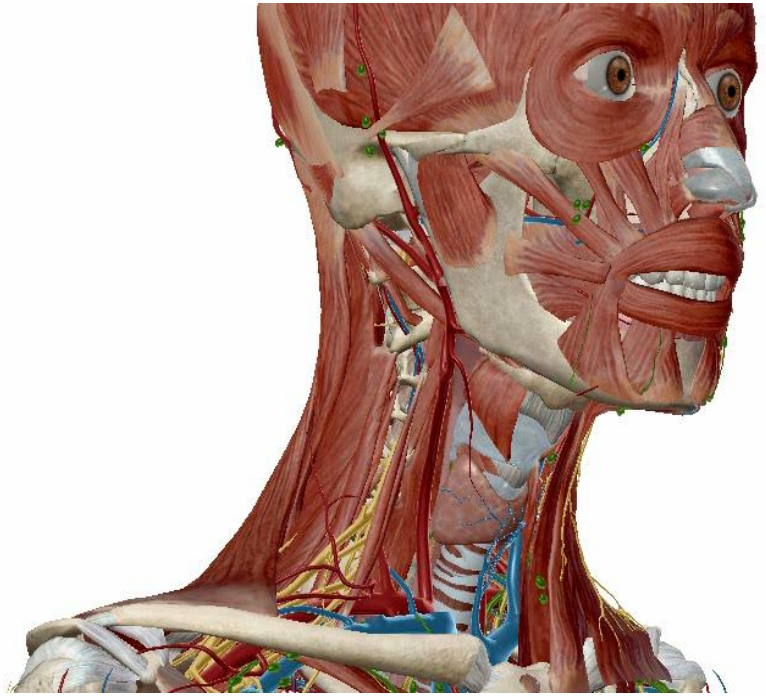
Trajectory

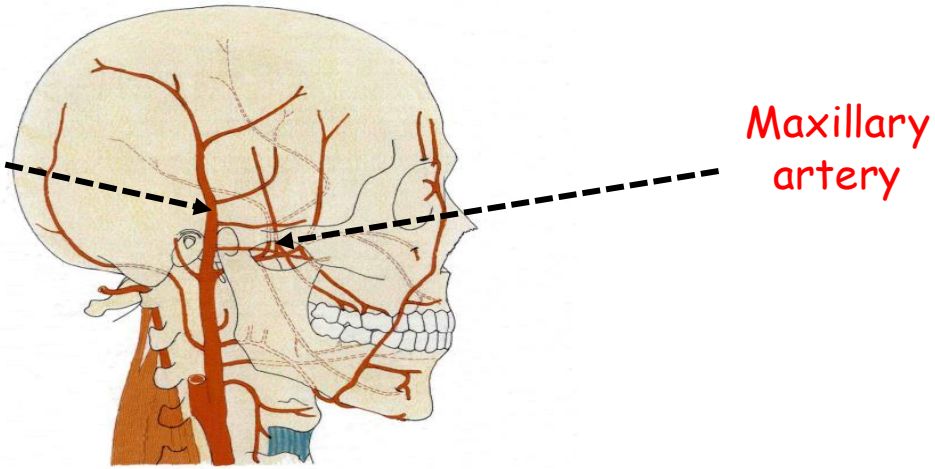
- They are anteromedial to the internal carotid artery.
- Then, they ascend vertically for about 2 cm, before inclining laterally and posteriorly to become lateral to the internal carotid artery.

Termination

They end below the neck of the mandible, giving rise to:

- the superficial temporal artery,
- and the maxillary artery.





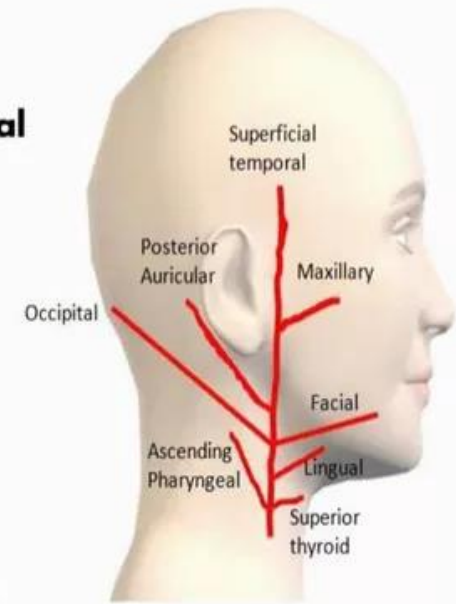
Collateral branches of the external carotid artery

- The superior thyroid artery,
- The lingual artery,
- The facial artery,
- The occipital artery,
- The posterior auricular artery,
- The ascending pharyngeal artery.

External Carotid Artery Branches

Mnemonic : She Always Like Friends Over Papa, Mama & Sister

* **S** Superior Thyroid
* **A** Ascending Pharyngeal
* **L** Lingual
* **F** Facial
* **O** Occipital
* **P** Posterior Auricular
* **M** Maxillary
* **S** Superficial temporal



1. SUPERIOR THYROID ARTERY:

Origin

It arises near the origin of the common carotid artery.

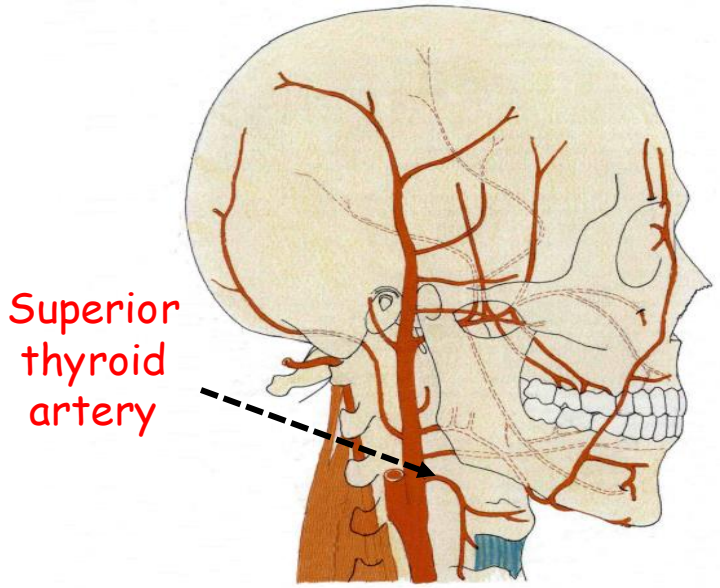
Trajectory

The superior thyroid artery lies against the inferior constrictor muscle of the pharynx.

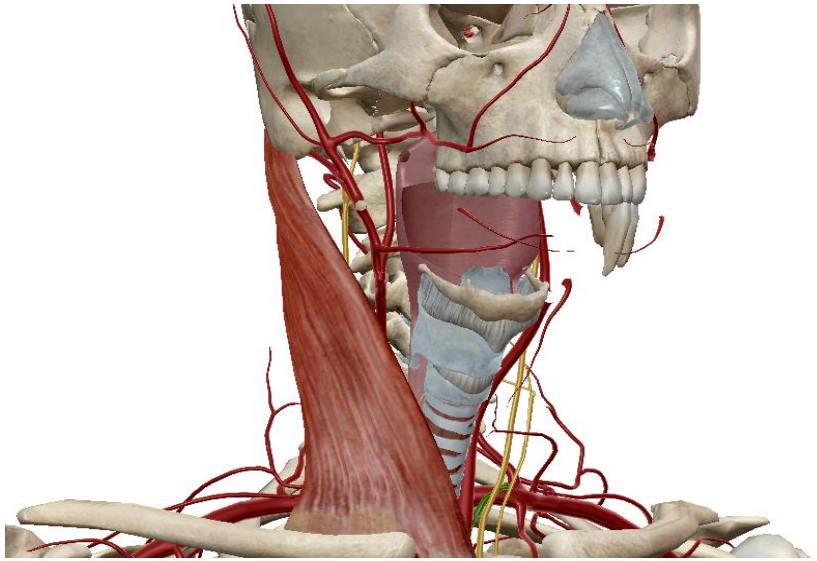
Termination

It ends in three branches:

- the infrahyoid branch,
- the sternocleidomastoid branch,
- the superior laryngeal artery.



Lateral view of the carotid region



2. LINGUAL ARTERY:

Origin

It arises above the superior thyroid artery.

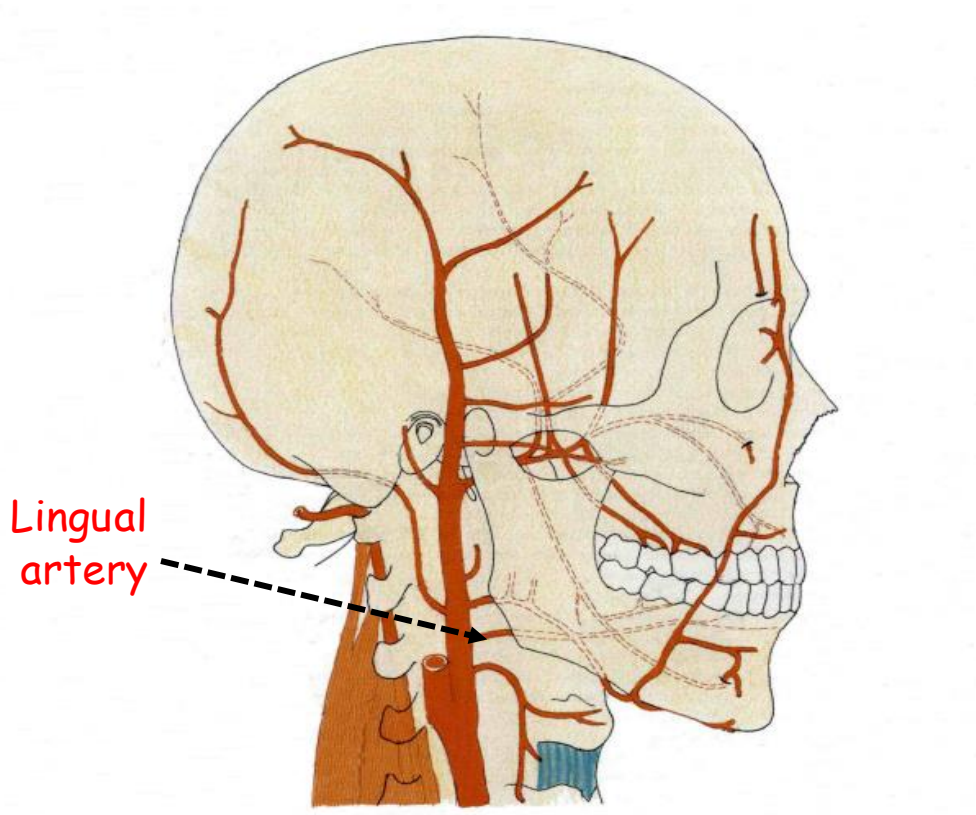
Trajectory

The lingual artery follows the lateral muscular wall of the pharynx.

Termination

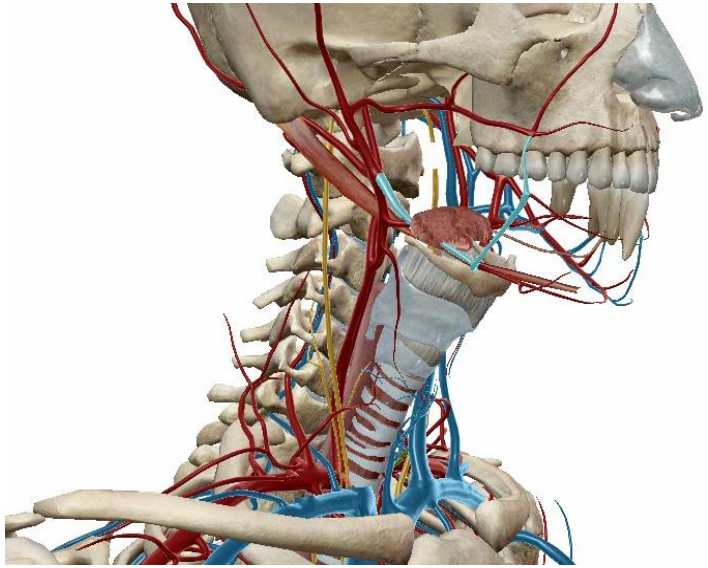
It ends in:

- The deep artery of the tongue,
- The sublingual artery.



Lateral view of the carotid region

3. FACIAL ARTERY



Origin

It arises above the lingual artery, at the level of the greater horn of the hyoid bone.

Trajectory

- It passes under the belly of the digastric muscle, then it loops around the submandibular gland.

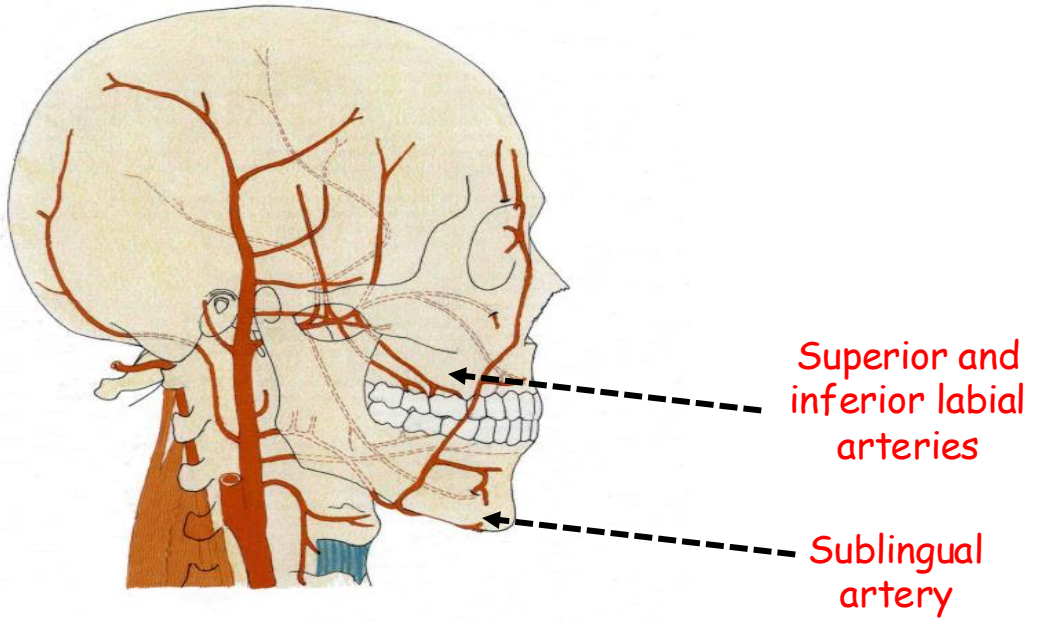
- It lies against the mandibular angle before becoming subcutaneous in the nasolabial groove.

Termination

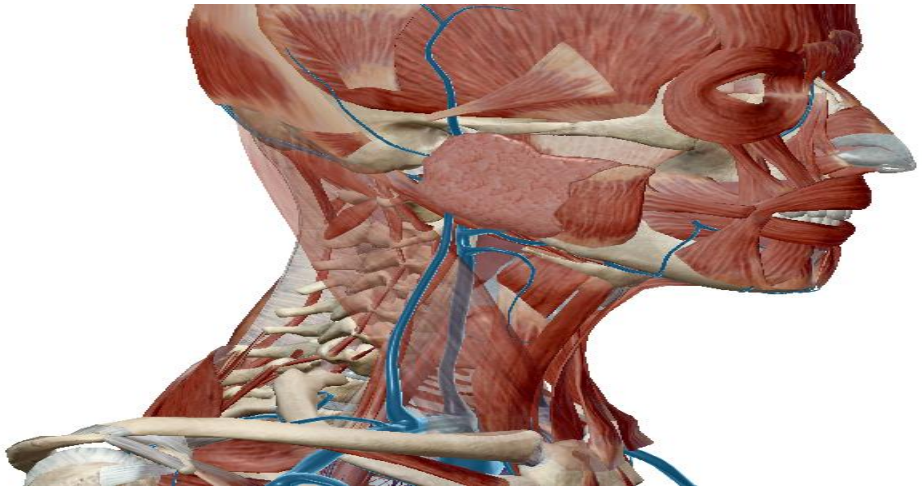
It ends at the internal angle of the eye, giving off the angular artery, which anastomoses with the dorsal nasal artery, a branch of the ophthalmic artery (internal carotid artery).

Collateral branches

- Superior and inferior labial arteries,
- Sublingual artery,
- Cutaneous arteries for the facial skin.

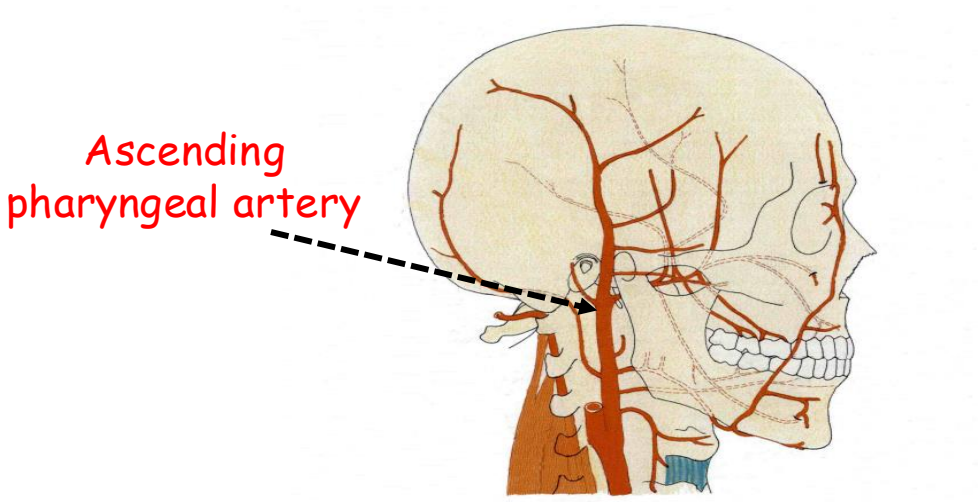


Lateral view of the carotid region



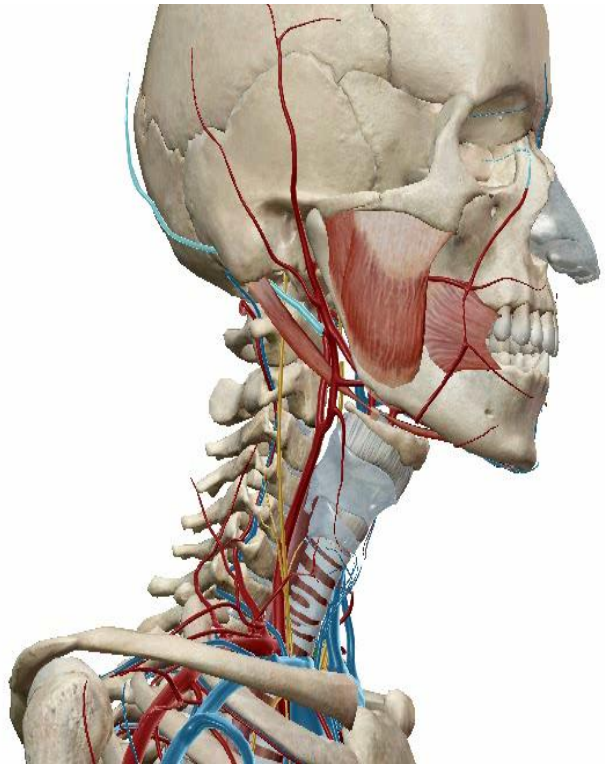
4. ASCENDING PHARYNGEAL ARTERY

It arises above the lingual artery and terminates in the lateral pharyngeal wall.



Lateral view of the carotid region

5. OCCIPITAL ARTERY



Origin

It arises from the posterior aspect of the external carotid artery, at the level of the facial artery.

Trajectory

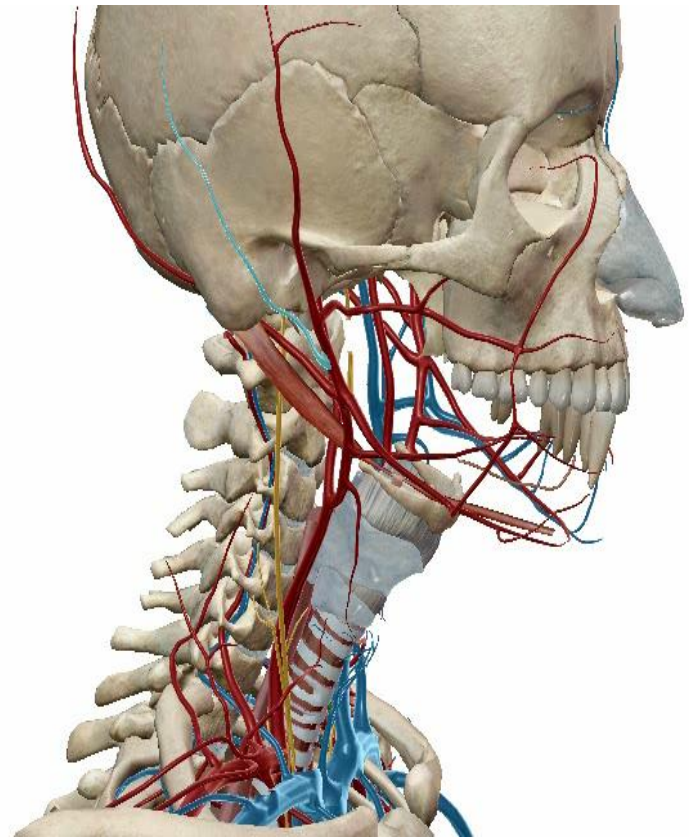
It follows the posterior belly of the digastric muscle towards the occipital bone.

Termination

It ends at the occipital scalp, dividing into two branches:

- The medial branch,
- The lateral branch.

6. POSTERIOR AURICULAR ARTERY



Origin

It arises above the posterior belly of the digastric muscle.

Trajectory

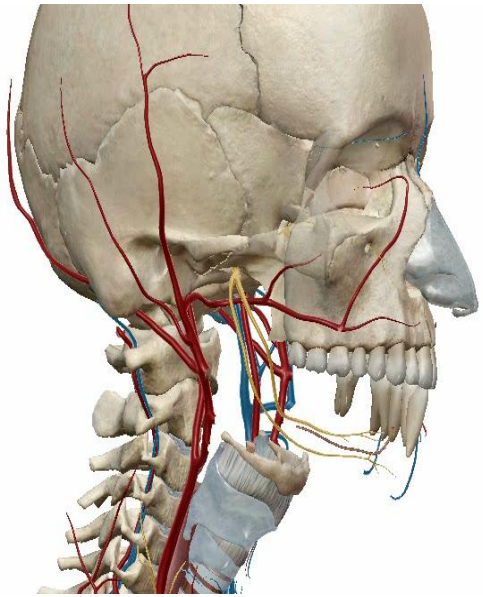
It follows a vertical course behind the auricle.

Termination

It divides into two branches:

- The auricular branch,
- The occipital branch.

Terminal branches of the external carotid artery



1. SUPERFICIAL TEMPORAL ARTERY

Origin

- It supplies the frontoparietal scalp.
- It arises from the external carotid artery and emerges from the parotid gland.

Trajectory

At its origin, it runs vertically, pre-auricular, near the temporomandibular joint (TMJ).

Terminal branches

- The frontal branch,
- The parietal branch.

2. MAXILLARY ARTERY

Origin

- It is a deep artery.
- Supplies the maxillomandibular and nasal bones.
- It arises behind the neck of the mandibular condyle.

Trajectory

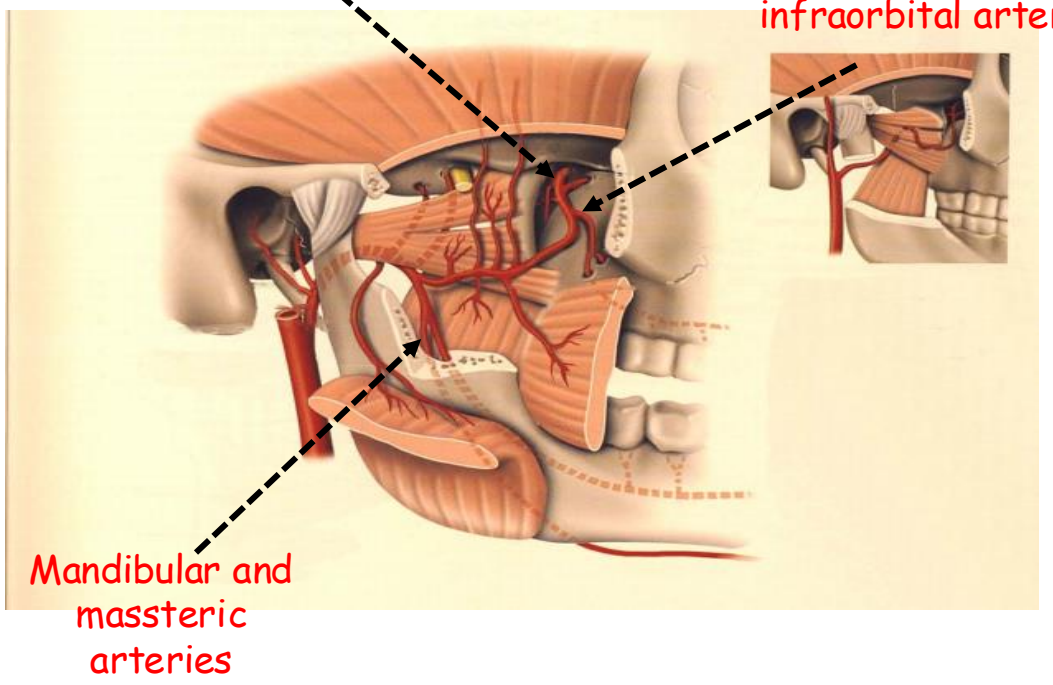
It passes through the infratemporal fossa, then the pterygopalatine fossa, and makes contact with the V nerve (trigeminal nerve).

Termination

It ends in a terminal branch: the sphenopalatine artery, which supplies the nasal cavity.

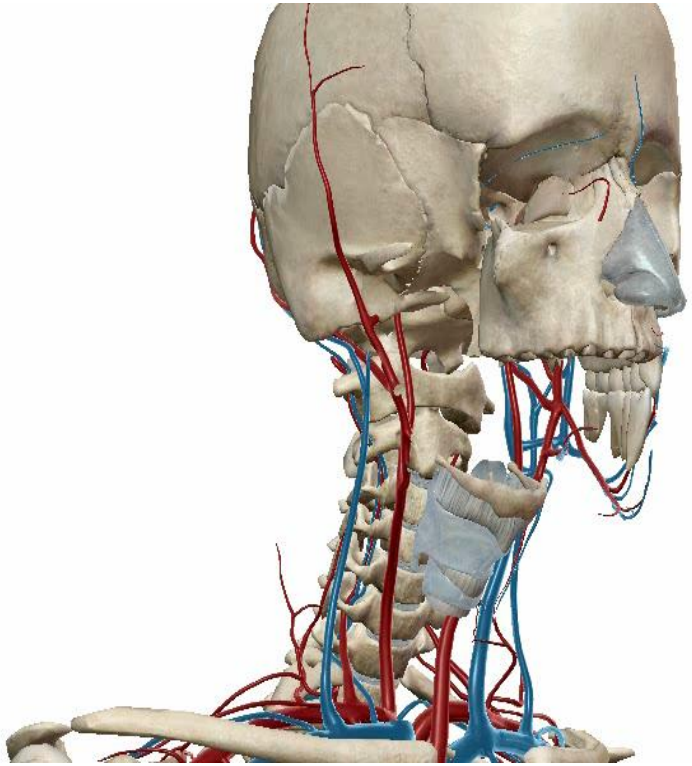
Collateral branches

- The posterior pterygopalatine branch,
- The ascending branches: superior maxillary and infraorbital arteries,
- The mandibular and masseteric arteries.



Lateral view showing the collateral branches of the maxillary artery

IV – INTERNAL CAROTID ARTERIES:



Origin

They arise from the common carotid artery at the level of the upper border of the thyroid cartilage.

Trajectory

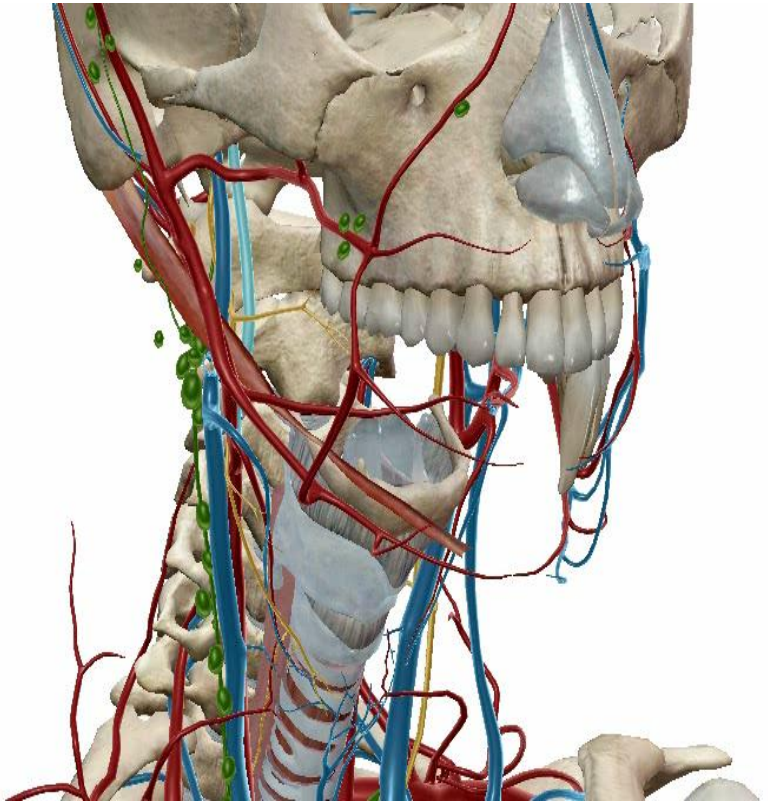
- They ascend vertically for about 2 cm, then incline medially towards the lateral masses of the atlas.
- At this level, they pass through the carotid canal and the cavernous sinus.

- The internal carotid artery has four segments:
  - The cervical part ;
  - The petrous part ;
  - The cavernous part ;
  - The cerebral part.

Anatomical relations

➢ Cervical part:

Within the carotid sheath, it is located :



- **Anteriorly and laterally:**

  - Below the digastric muscle, it is in relation to the sternocleidomastoid muscle.
  - At the level of the digastric muscle, it is in relation to:
    - ✓ the stylohyoid muscle,
    - ✓ the occipital artery.
  - Above the digastric muscle, it is in relation to the glossopharyngeal nerve.

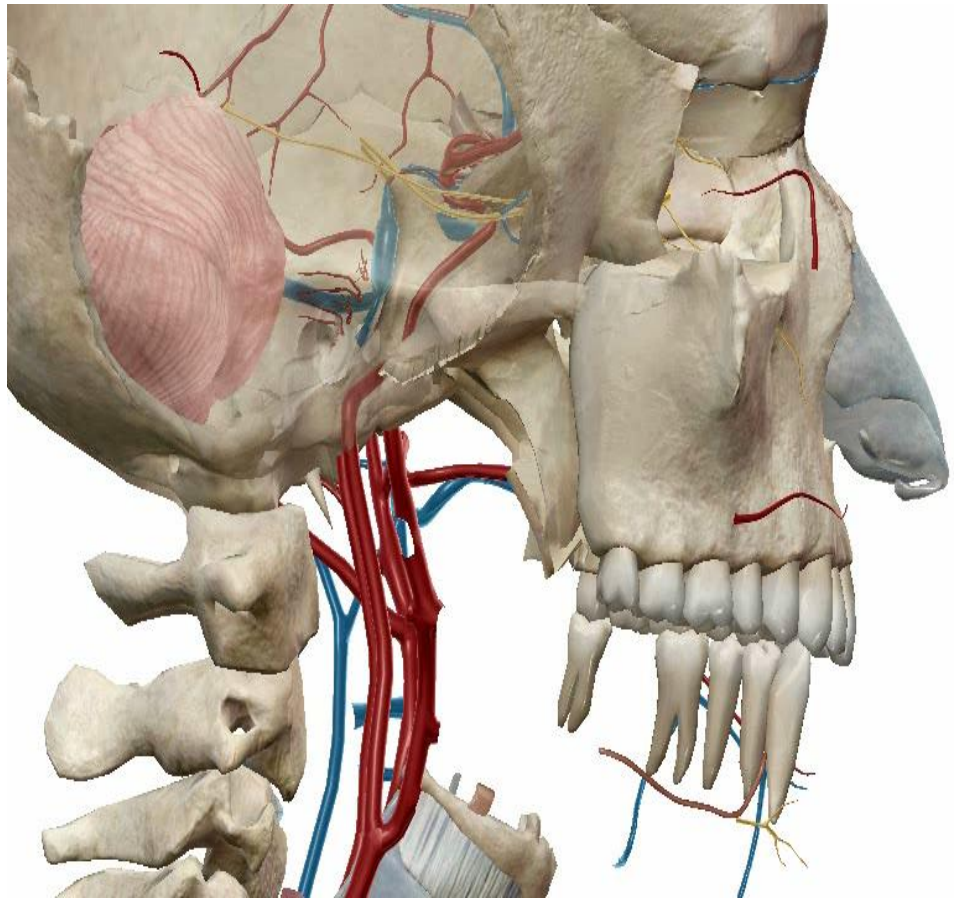
- **Posteriorly:**
  - The cervical sympathetic trunk,
  - The longus capitis muscle,
  - The internal jugular vein.

- **Medially:**

The pharyngeal wall.

➢ Petrous part:

- It passes through the carotid canal.
- Then emerges from the canal.
- It traverses the medial part of the carotid canal, passing between the lingula and the body of the sphenoid.



➢ Cavernous part:

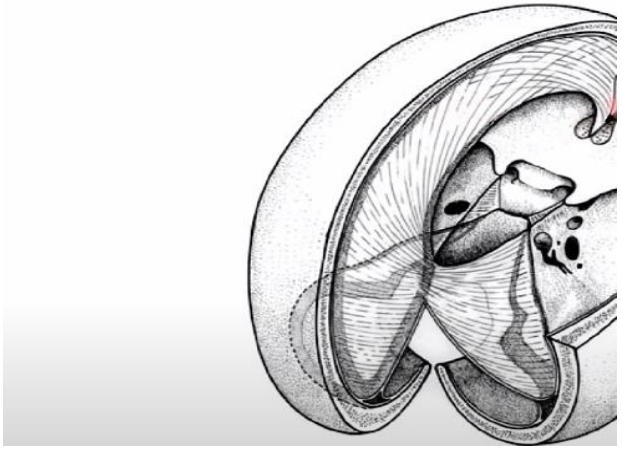
- The cavernous part is located within the cavernous sinus.
- It is related to:
  - The oculomotor nerve,
  - The trochlear nerve.

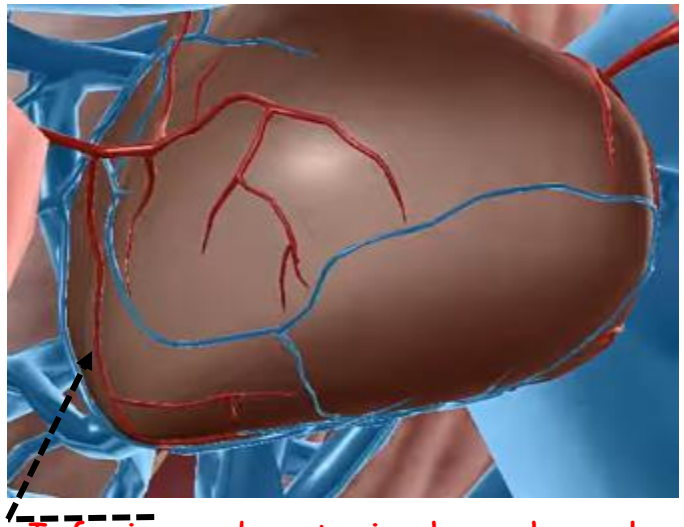
➢ Cerebral part:

- The cerebral part passes through the roof of the cavernous sinus.
- It is in relation:
  - Medially: to the optic nerve and optic chiasm.
  - Laterally: to the anterior clinoid process.

✓ Branches of the cavernous part:

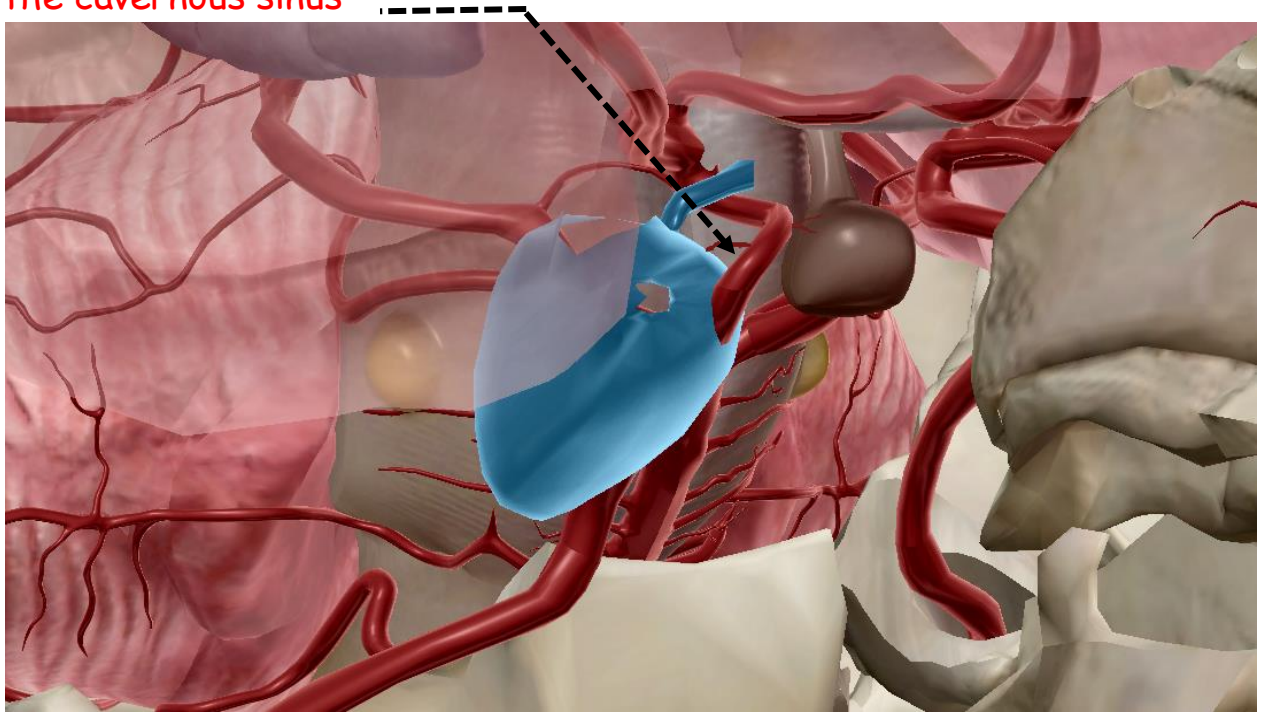
- Branches to the cerebellar tentorium,
- Branches to the cavernous sinus,
- The inferior and posterior hypophyseal arteries.





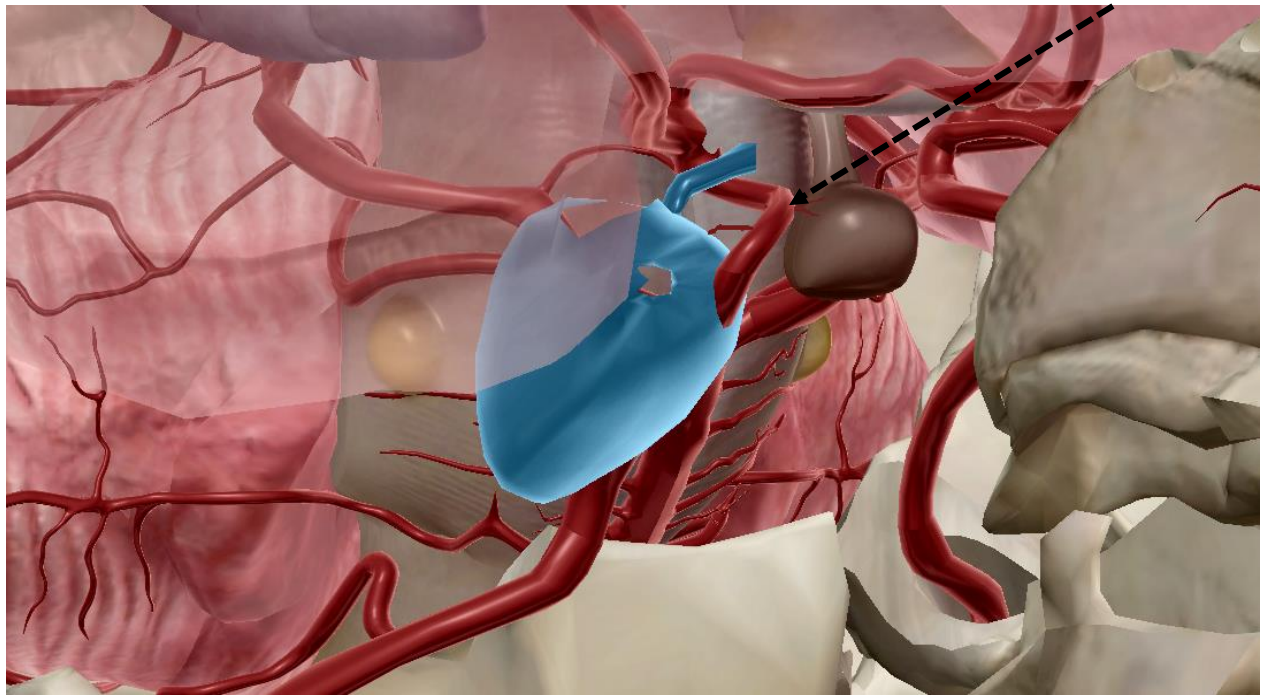
Inferior and posterior hypophyseal arteries.

Branch to the cavernous sinus



✓ **Branches of the cerebral part:**

1. **Superior hypophyseal artery**

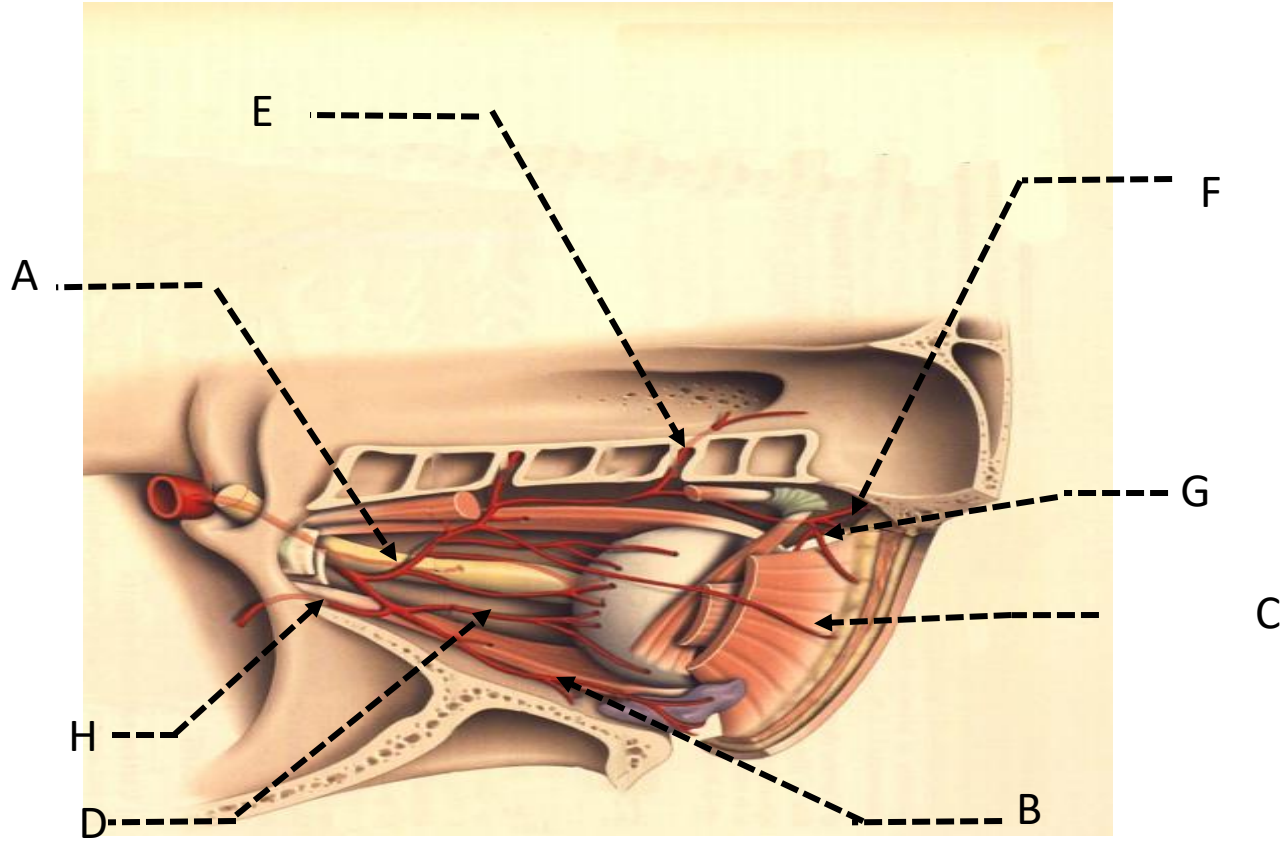


2. Ophtalmic artery

- It travels anteriorly to the optic canal, below the optic nerve.
- It terminates at the medial angle of the eye.

- Its collateral branches include:
  - The central retinal artery, **(A)**
  - The lacrimal artery, **(B)**
  - The supraorbital artery, **(C)**
  - The long posterior ciliary arteries, **(D)**
  - The anterior ethmoidal artery. **(E)**

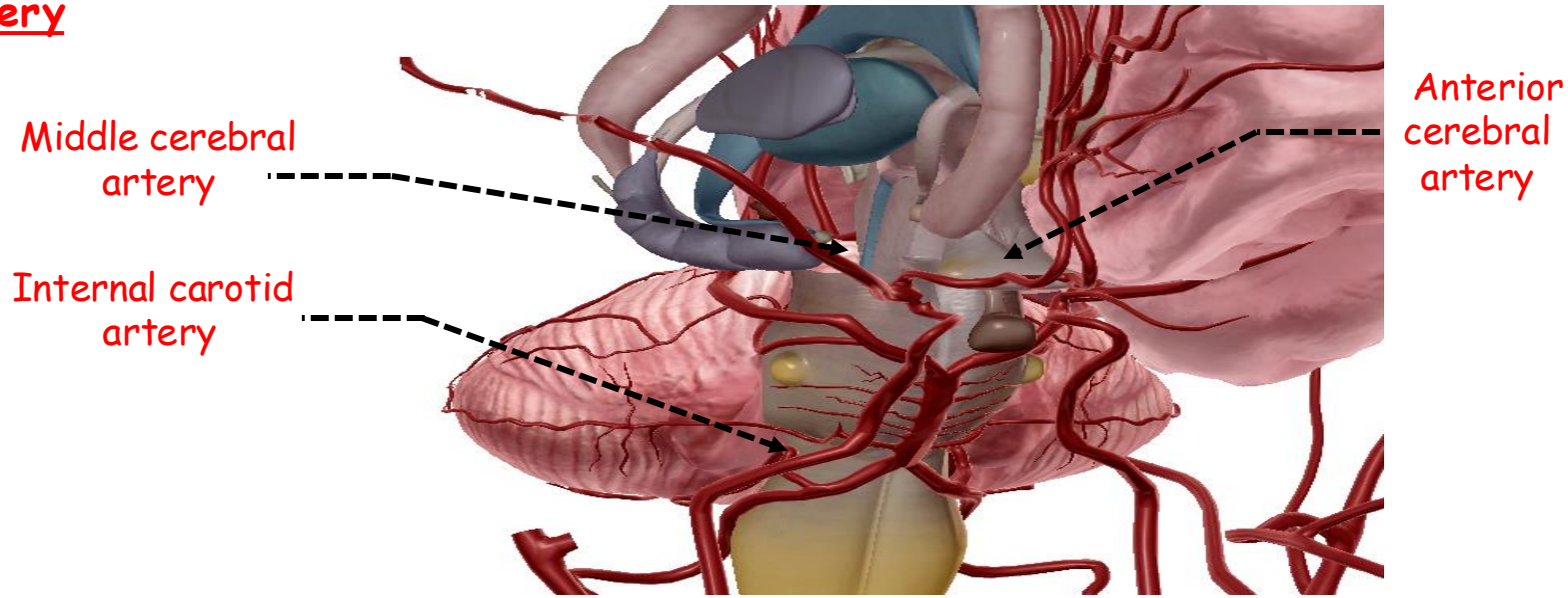
- Its terminal branches are:
  - The supratrochlear artery, **(F)**
  - The dorsal nasal artery. **(G)**



Lateral view showing the collateral branches of the ophtalmic artery

Terminal branches of the internal carotid artery

- Anterior cerebral artery,
- Middle cerebral artery.

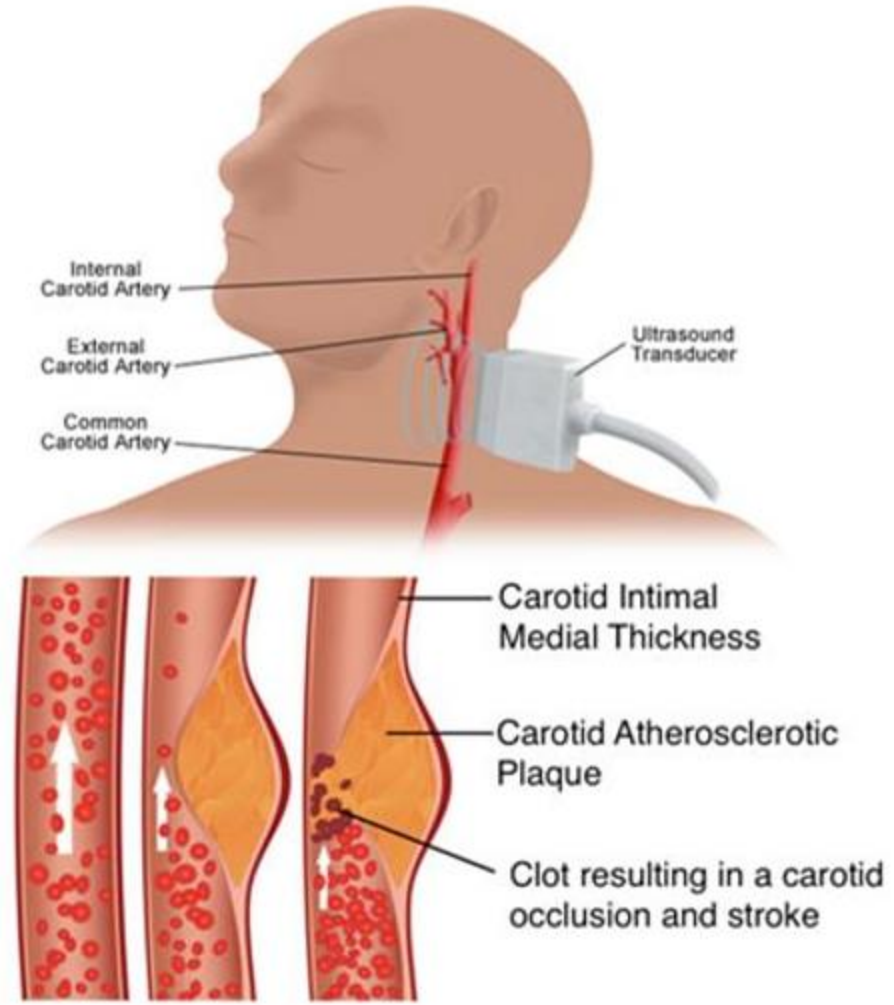


Frontal view showing the terminal branches of the internal carotid artery

V – CLINICAL APPLICATIONS

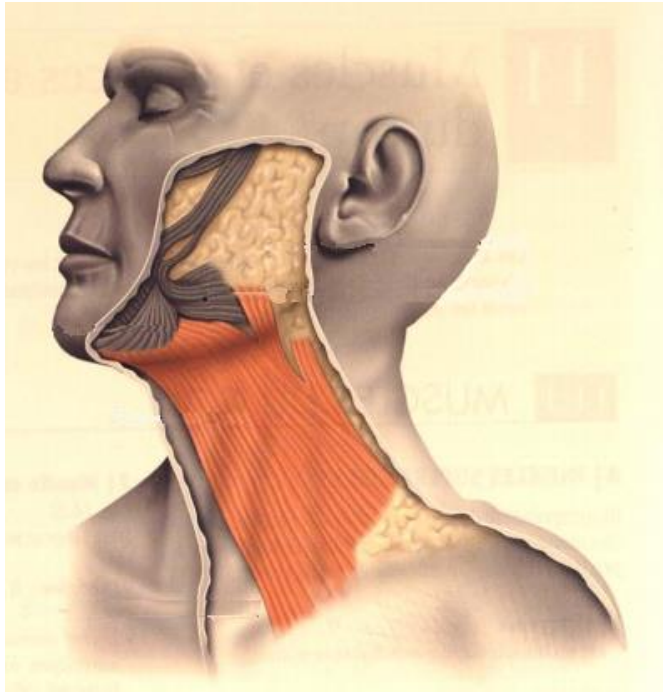
Carotid thrombosis

- Carotid thrombosis is a serious condition that can lead to strokes and other severe neurological consequences.
- The main factors influencing its development include atherosclerosis, hypertension, smoking, diabetes, and a sedentary lifestyle.
- Diagnosis is made through imaging studies, and treatment can involve medications, endarterectomy, or angioplasty with stenting.
- Surgical approaches, such as oblique or longitudinal incisions, are used in cases that require direct access to the carotid artery.



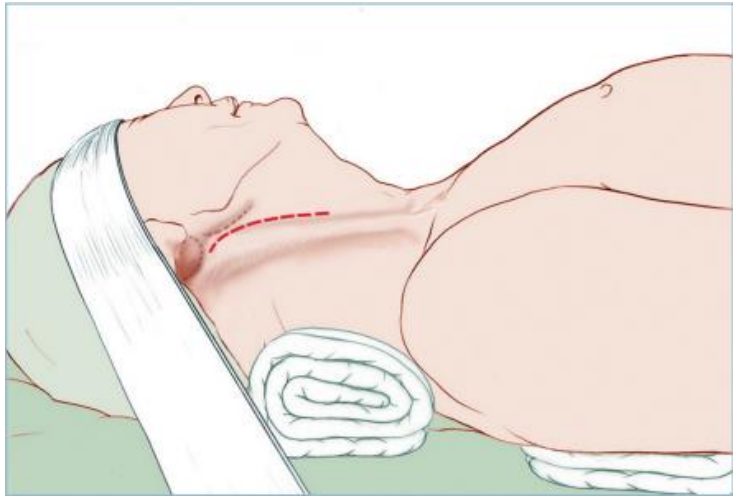
VI – SURGICAL ACCESS ROUTES

Oblique incision (pre-SCM):
Provides access to the common carotid artery, its bifurcation, and the internal jugular vein offers a clear view for carotid artery procedures like endarterectomy.



According to KAMINA

Longitudinal incision (between SCM heads):
Allows access to the carotid bifurcation and deeper structures and is ideal for more extensive procedures or when revascularization is needed.



VII – CONCLUSION:

- The carotid system plays a crucial role in supplying blood to the head and neck.
- It consists of the common carotid arteries, which bifurcate into the internal and external carotid arteries, each with distinct paths and vascular territories.
- Understanding their anatomy is essential for both clinical practice and surgical procedures involving the cervical region.