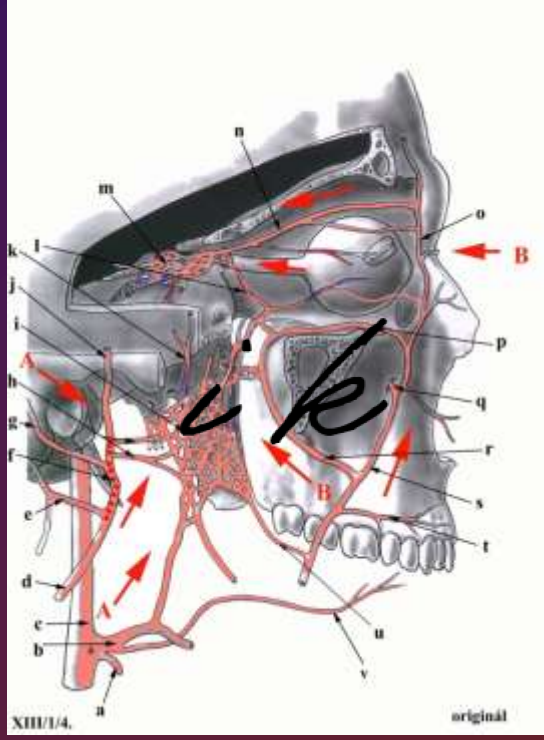
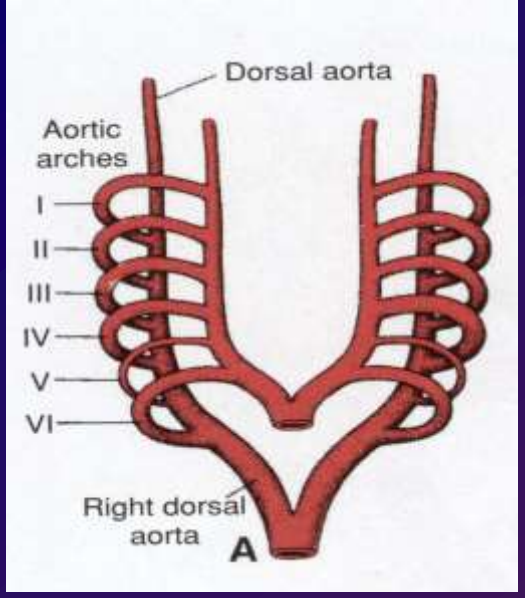
Arteria carotis externa, arteria subclavia, vena jugularis interna and its tributaries, thyroid gland, parathyroid glands



By

Ivo Klepáček

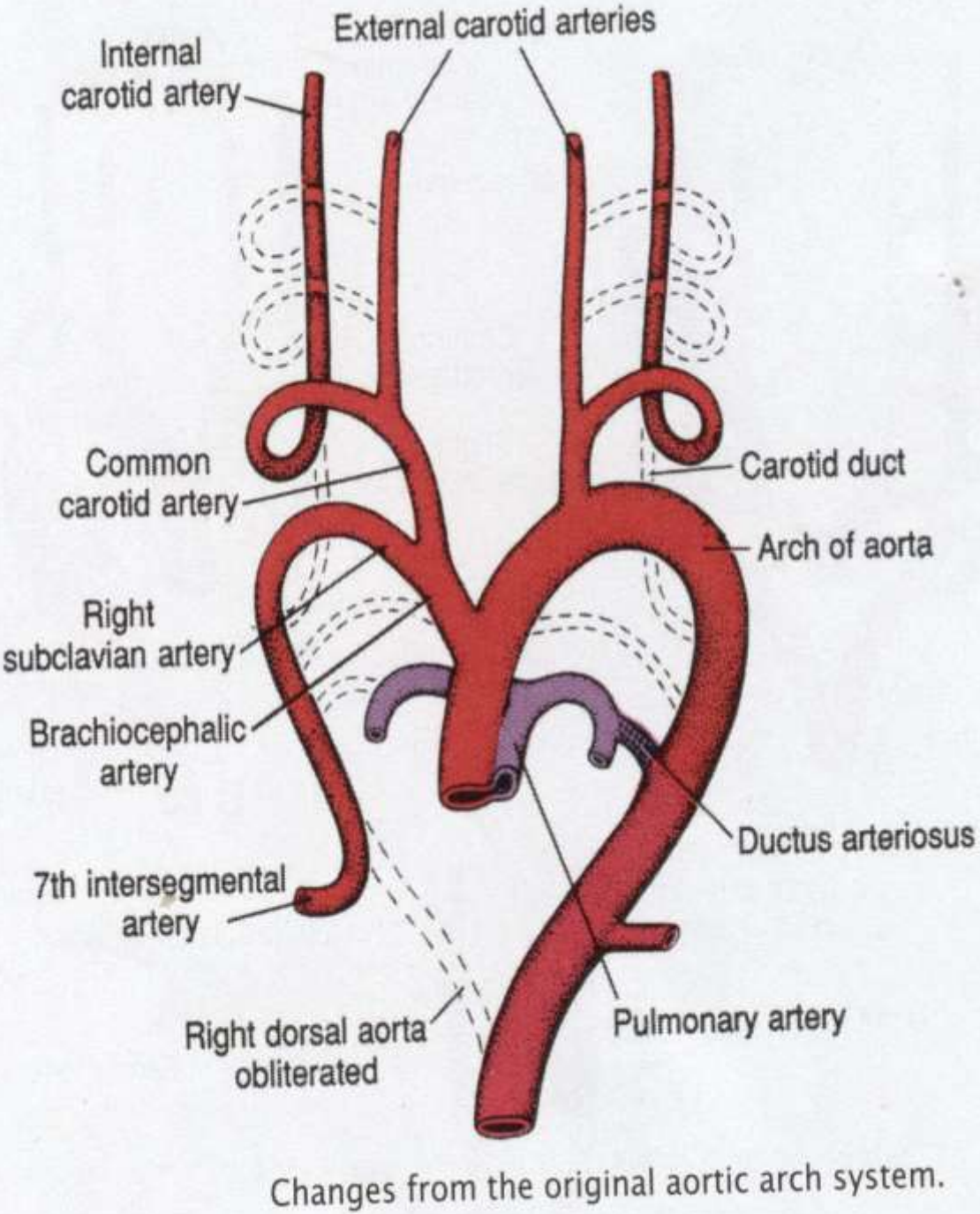


1st – maxillary artery

2nd – hyoid, stapedial aa.

3rd – common carotid a. and first part of the internal carotid a., external carotid a.

4th – part of the subclavian aa. some of intersegmental arteries



Changes from the original aortic arch system.

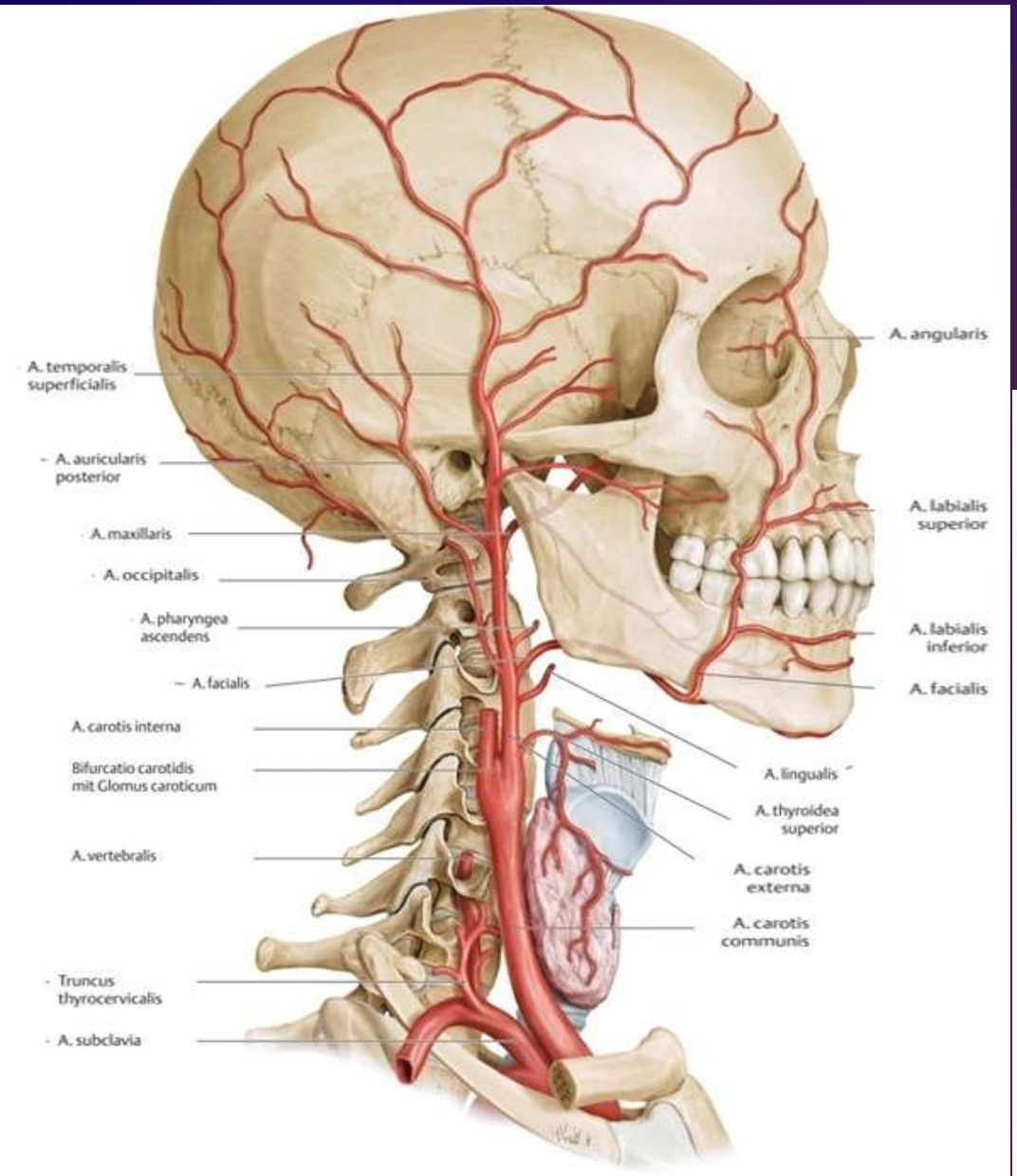
Main arteries

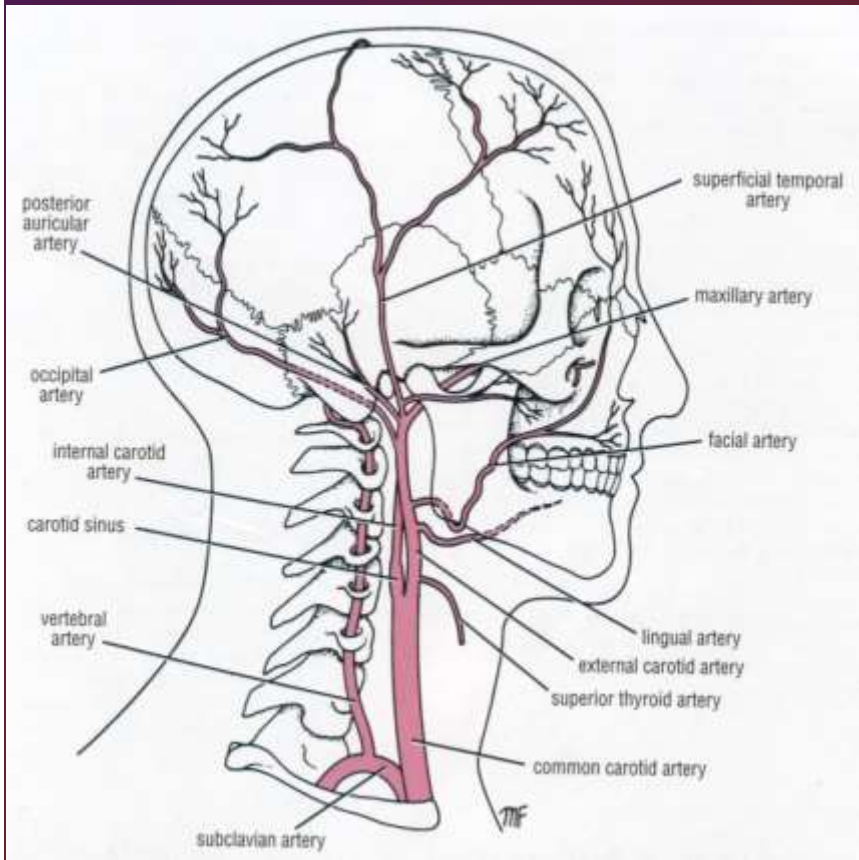
Common carotid artery (left)

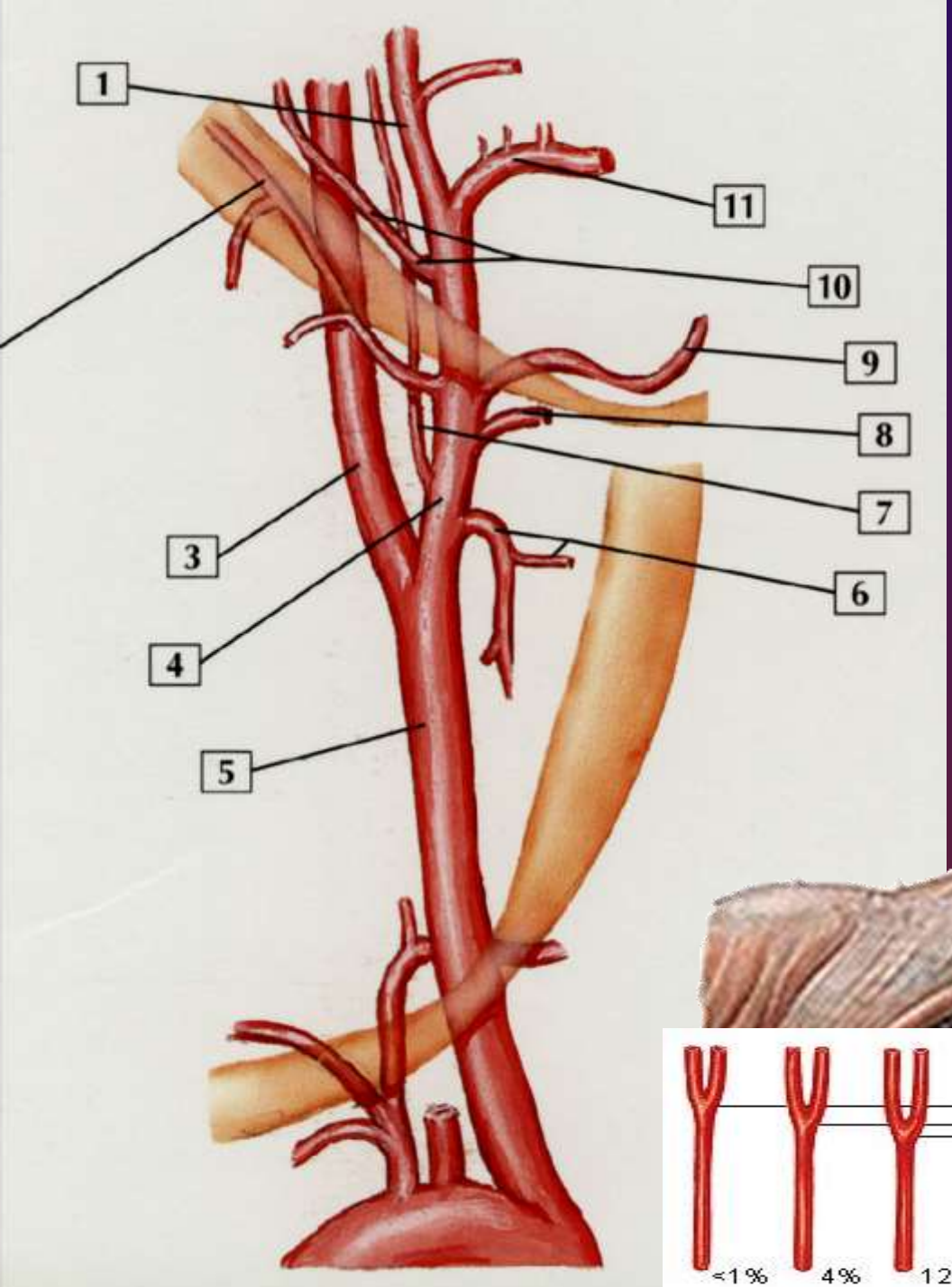
Brachiocephalic trunk (right)

Internal carotid artery

External carotid artery

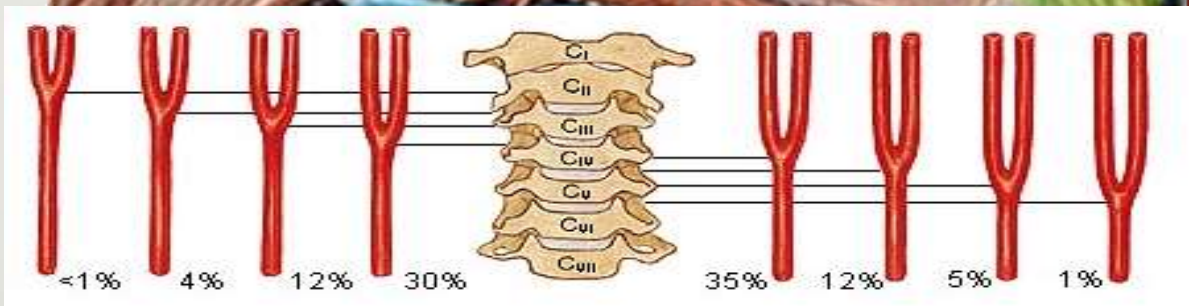




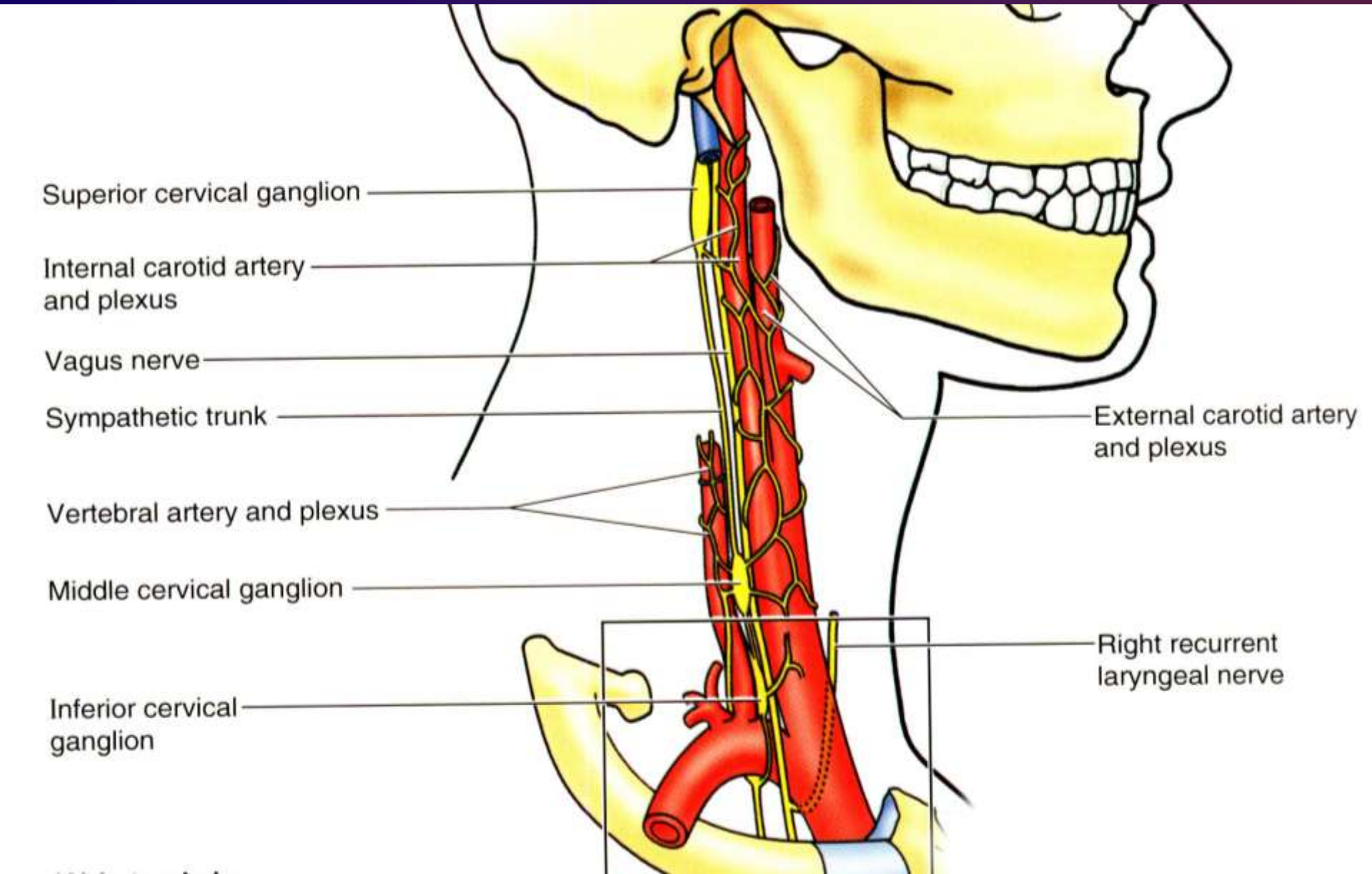


Fascia pretrachealis a ACC

Pretracheal fascia and ACC



Sympathetic nerve trunks



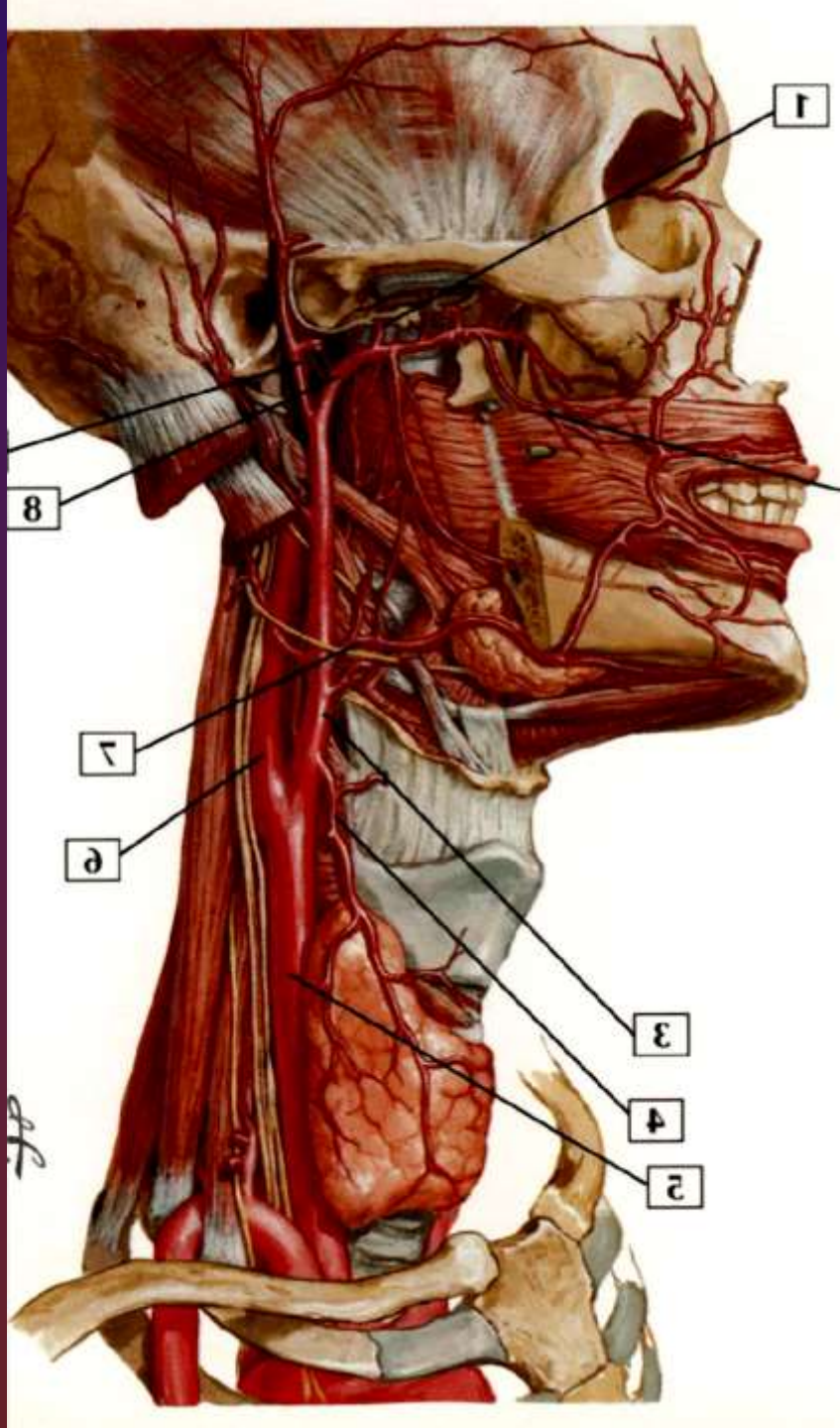
Common carotid artery

Anterolaterally – skin, fascia, sternocleidomastoid muscle, sternohyoid, sternothyroid, superior belly of the omohyoid

Posteriorly – transverse process of the C4 vertebrae, prevertebral muscles, sympathetic trunk

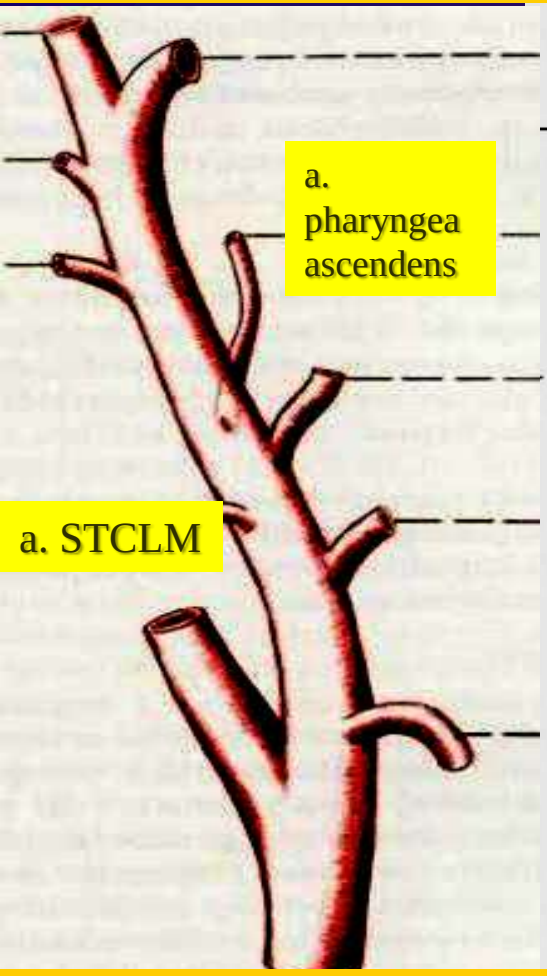
Medially – wall of the pharynx and larynx, trachea, esophagus, the lobe of the thyroid gland

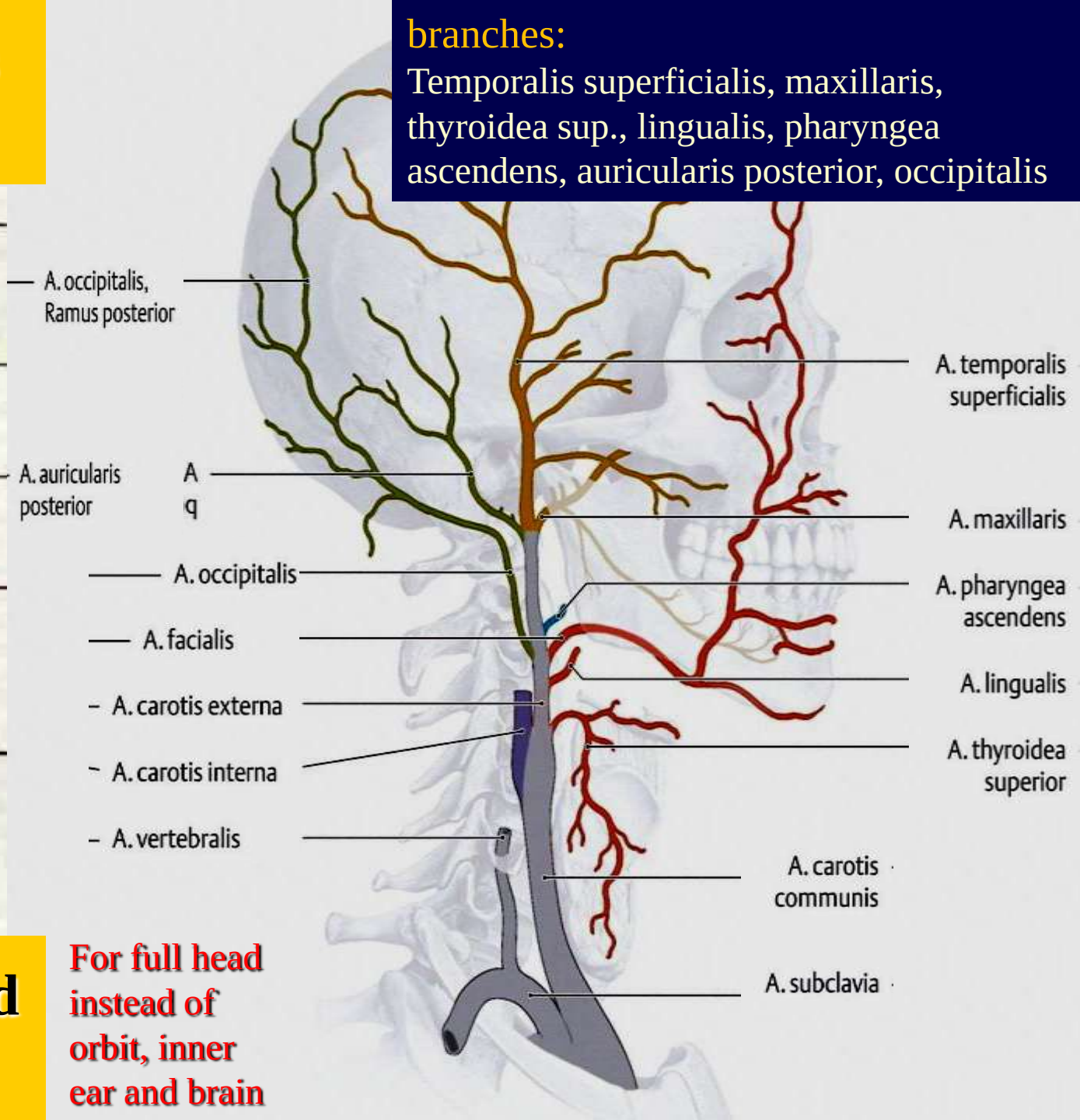
Laterally – the internal jugular vein, vagus nerve (posterolaterally)



Arteria carotis externa ACE

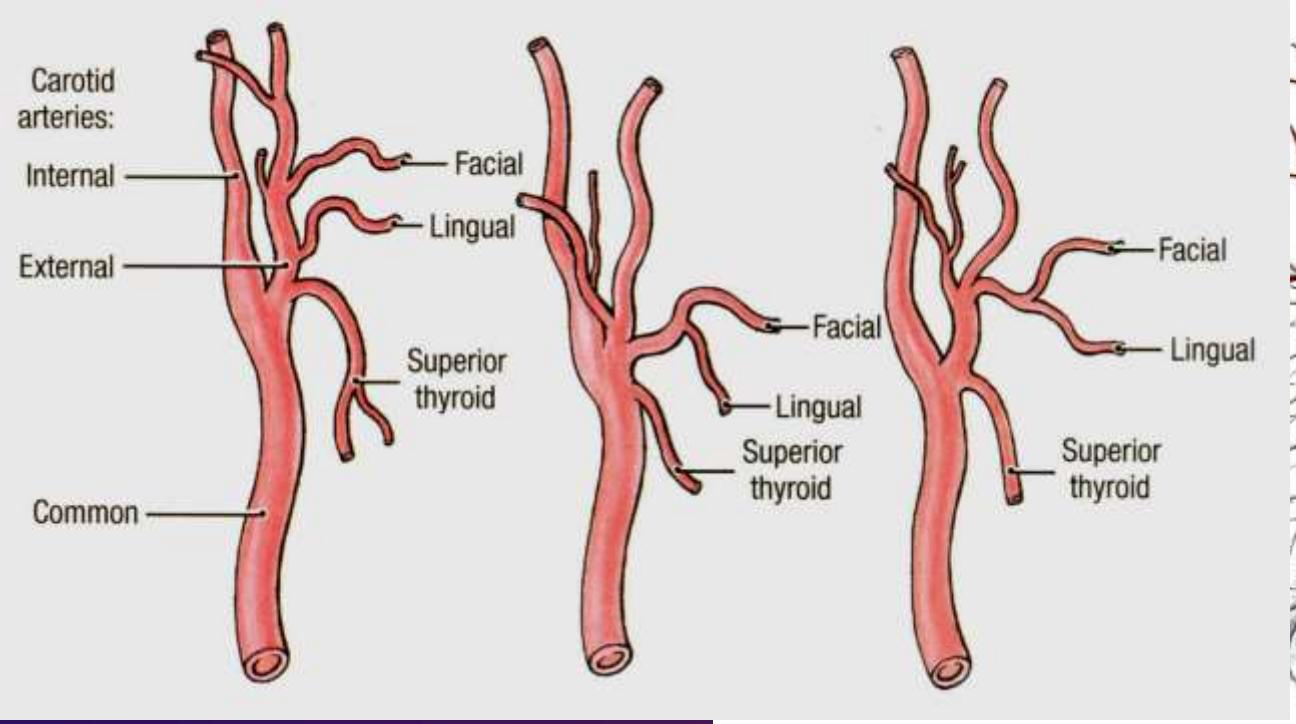
branches:
Temporalis superficialis, maxillaris, thyroidea sup., lingualis, pharyngea ascendens, auricularis posterior, occipitalis

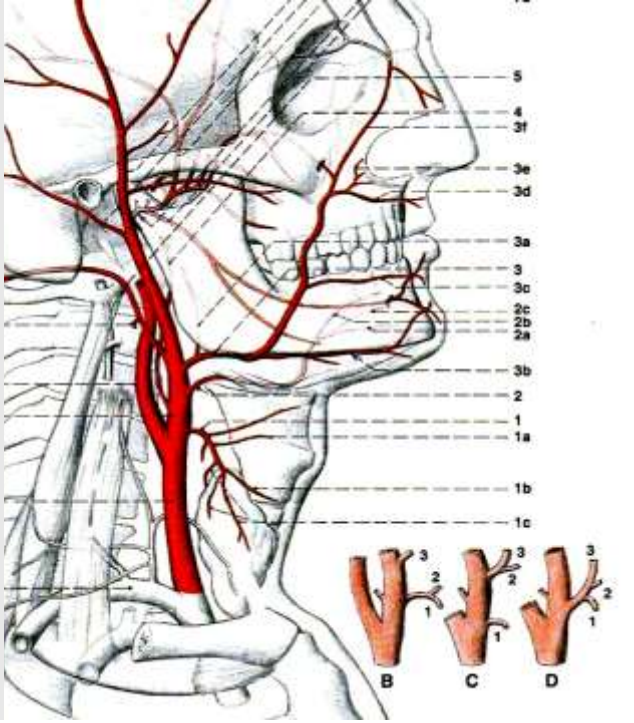




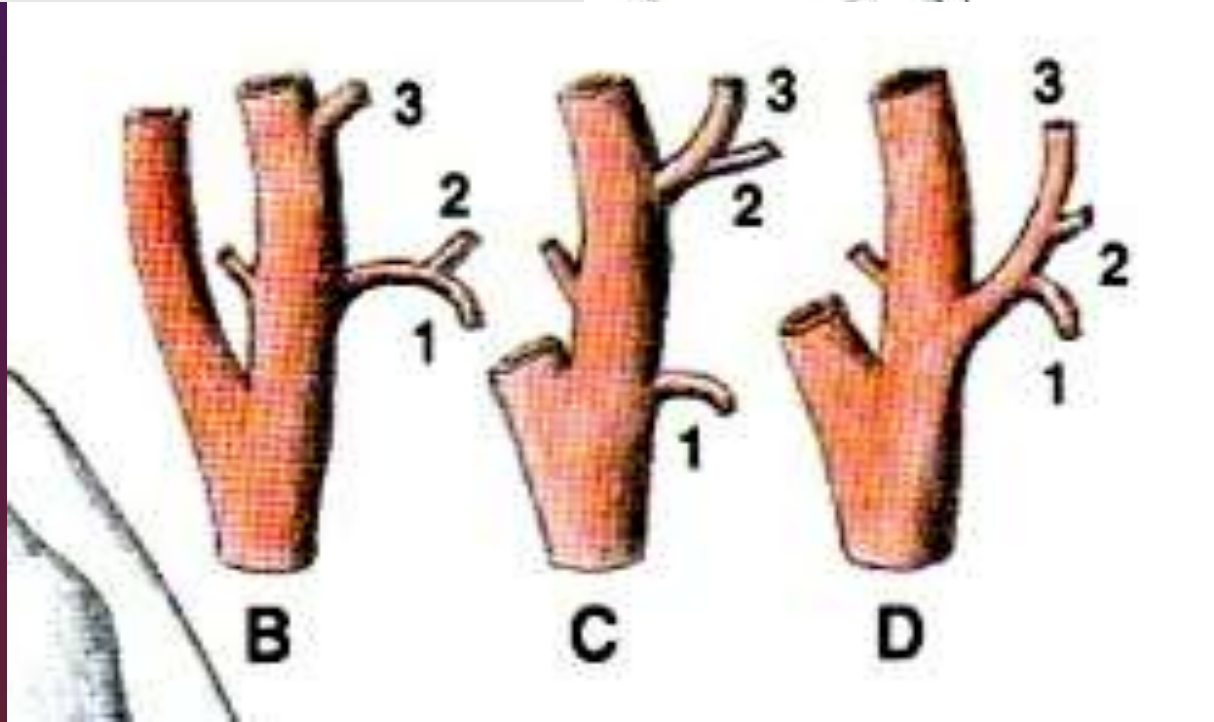
External carotid artery ECA

For full head instead of orbit, inner ear and brain

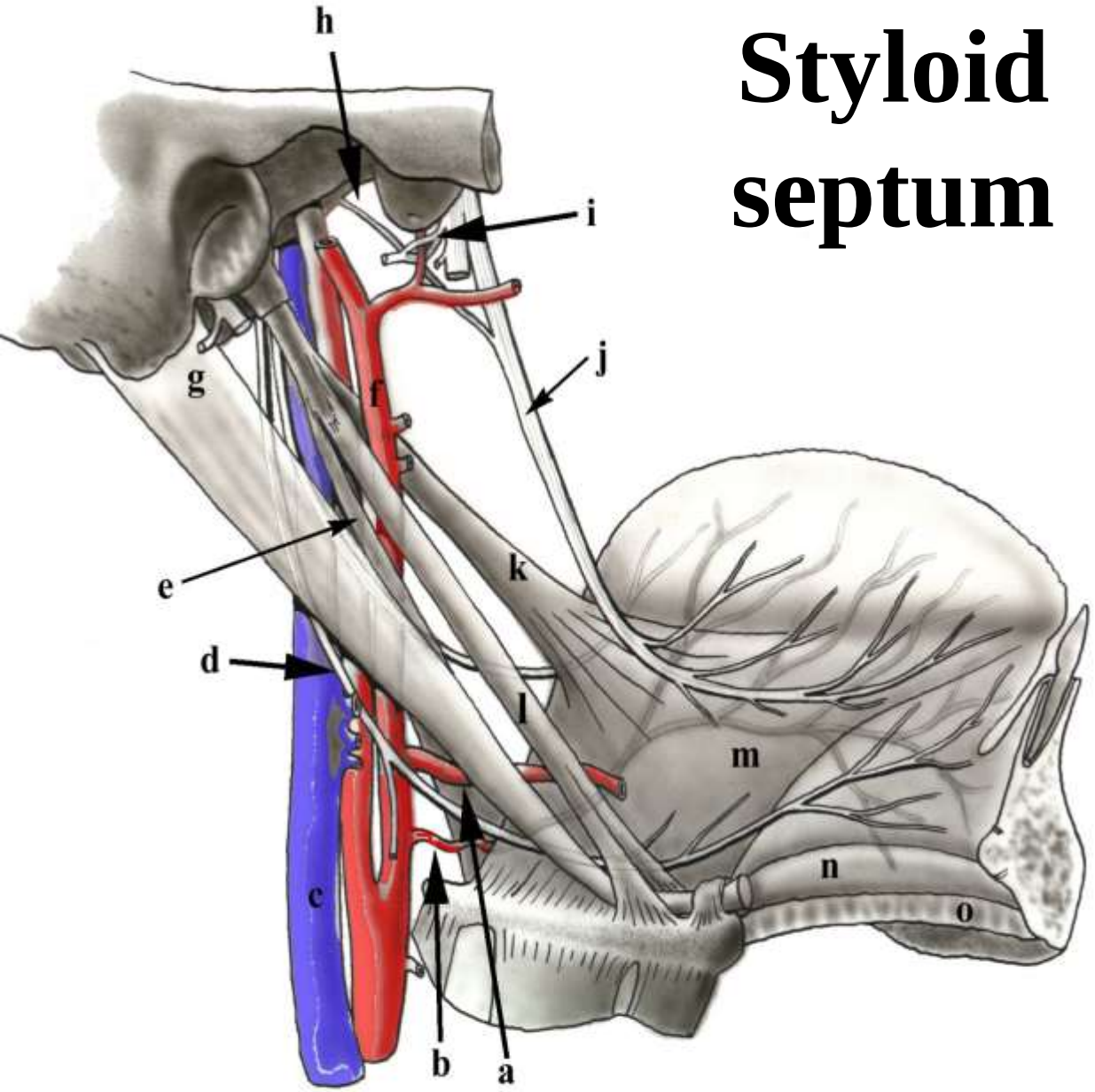




Variety
Varieties



Styloid septum



Internal jugular vein

lies

dorsally and lateraly from internal carotid artery behind m. m. stylohyoideus and styloglossus

External carotid artery

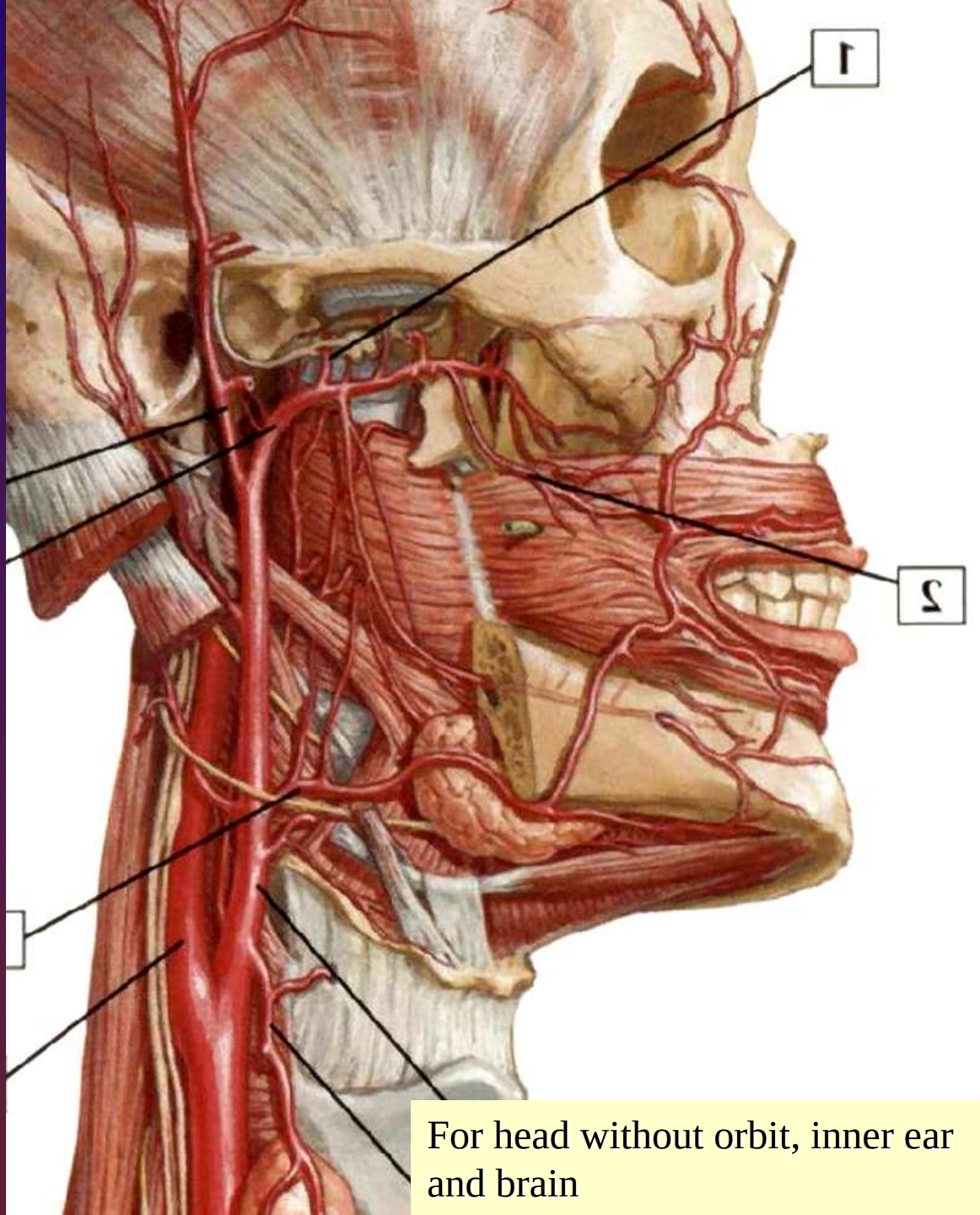
lies

ventrally and laterally from internal jugular vein between m.stylohyoideus and styloglossus

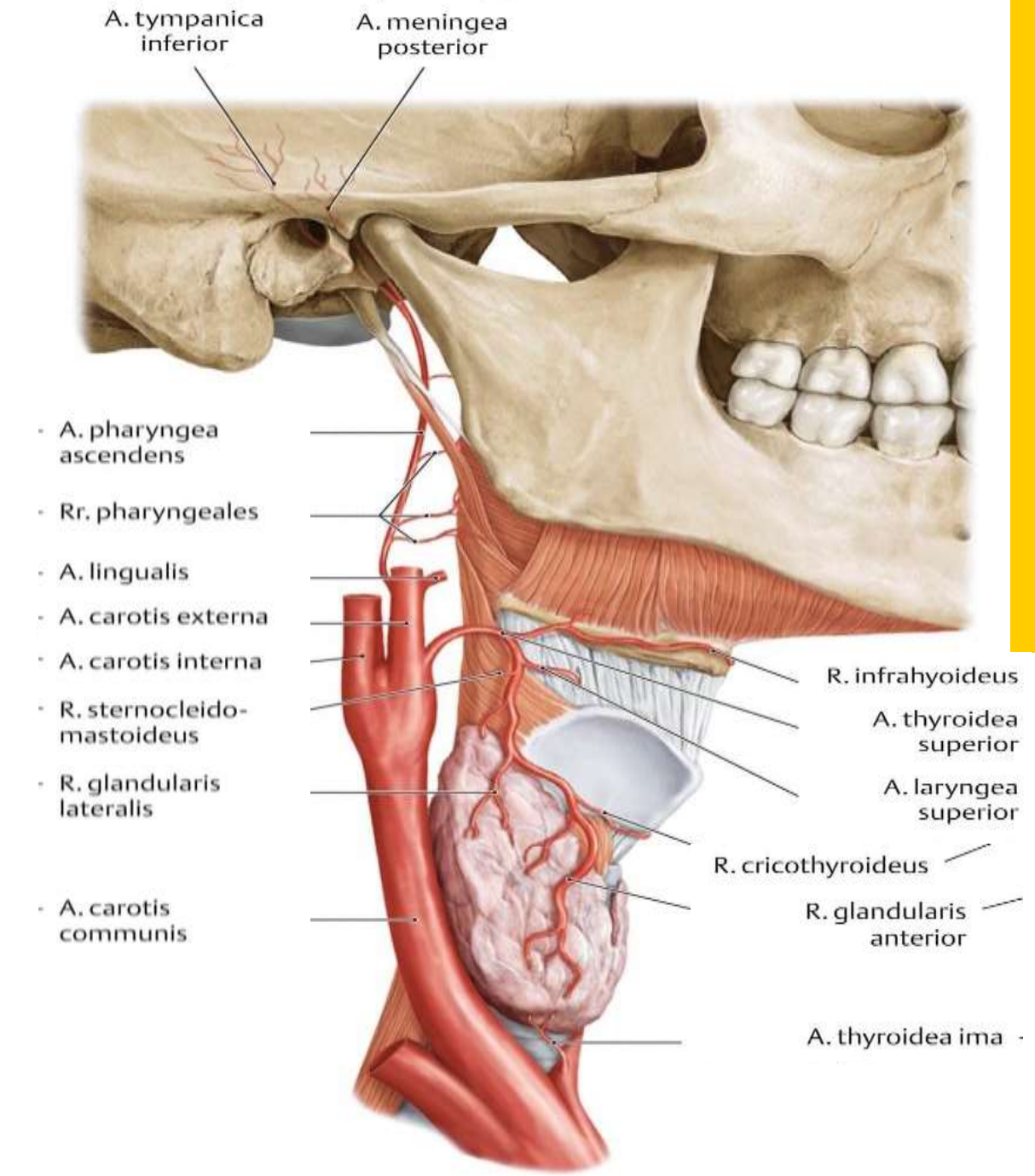
External carotid artery ECA

Anterolaterally – sternocleidomastoid muscle, XII. nerve, within parotid gland is crossed by VII. nerve, fascia, skin

Medially – wall of the pharynx, internal carotid artery, stylopharyngeus, pharyngeal branch of the vagus



For head without orbit, inner ear and brain

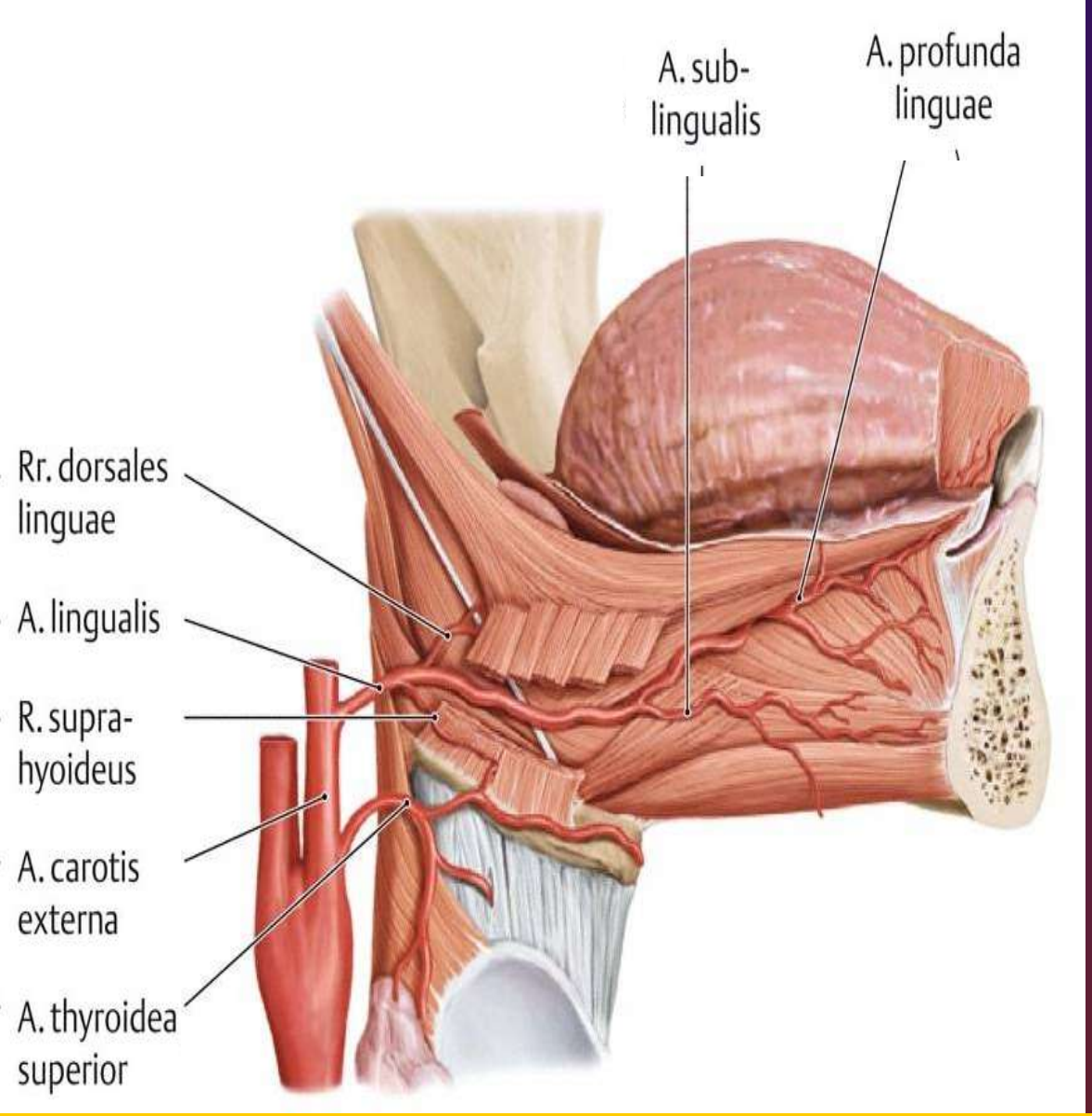


Superior thyroid a.,

Arteria thyroidea superior

For thyroid gland,;
Ventral branch anastomoses with the same contralateral opposite artery ;
Dorsal branch anastomoses with inferior thyroid a.,

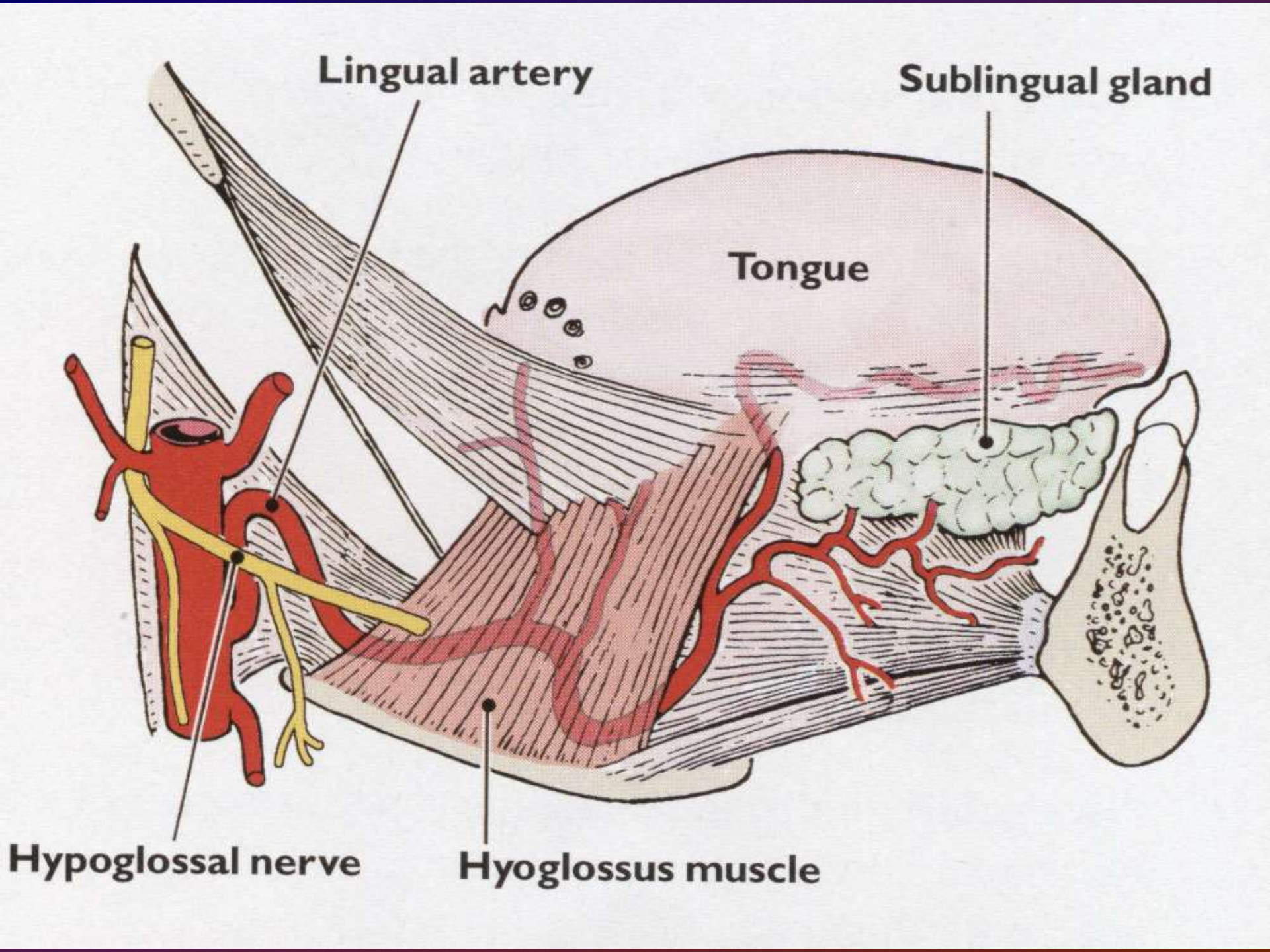
- glandular branches
- superior laryngeal a.,
- muscular branches

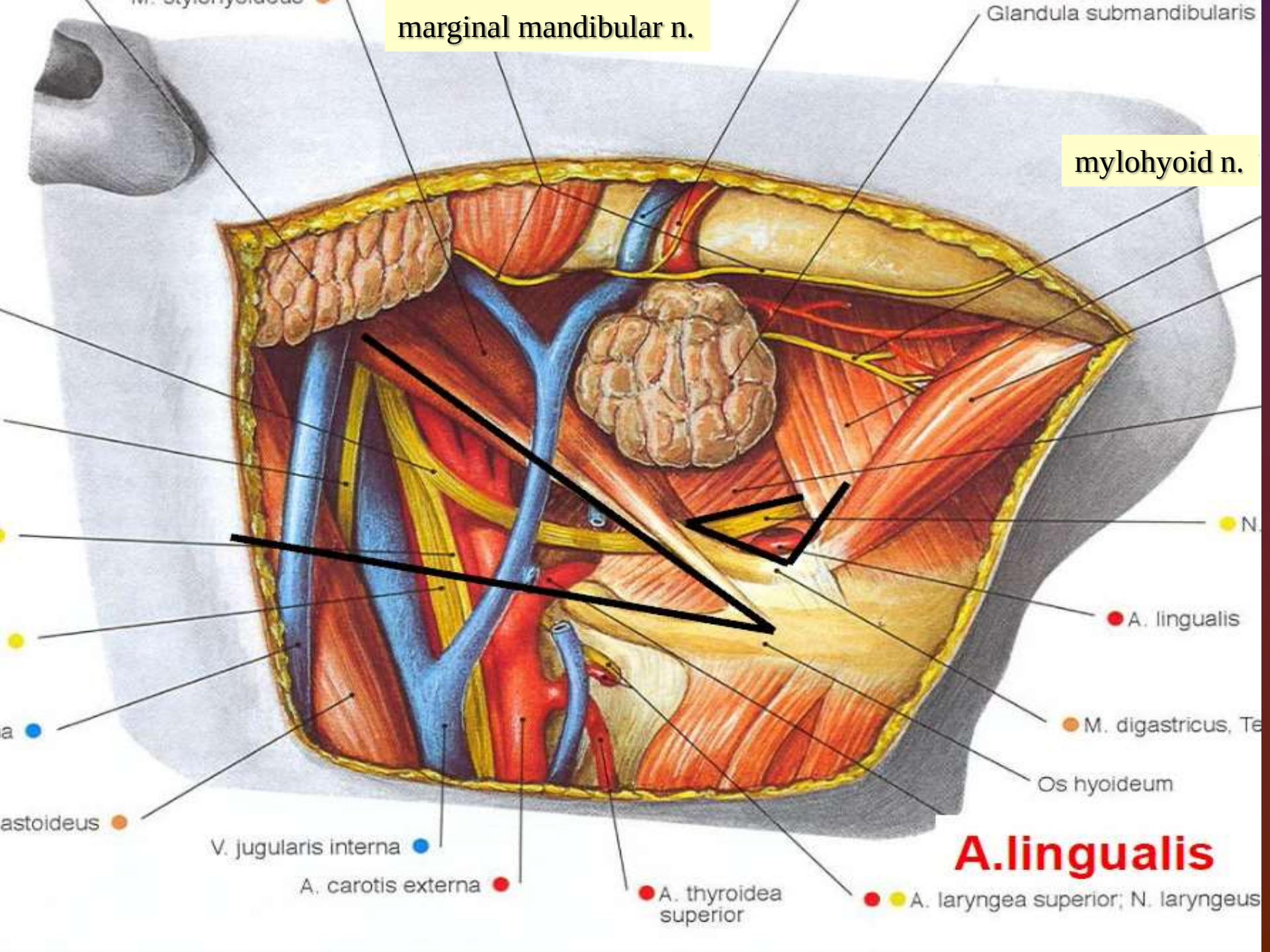


For tongue;

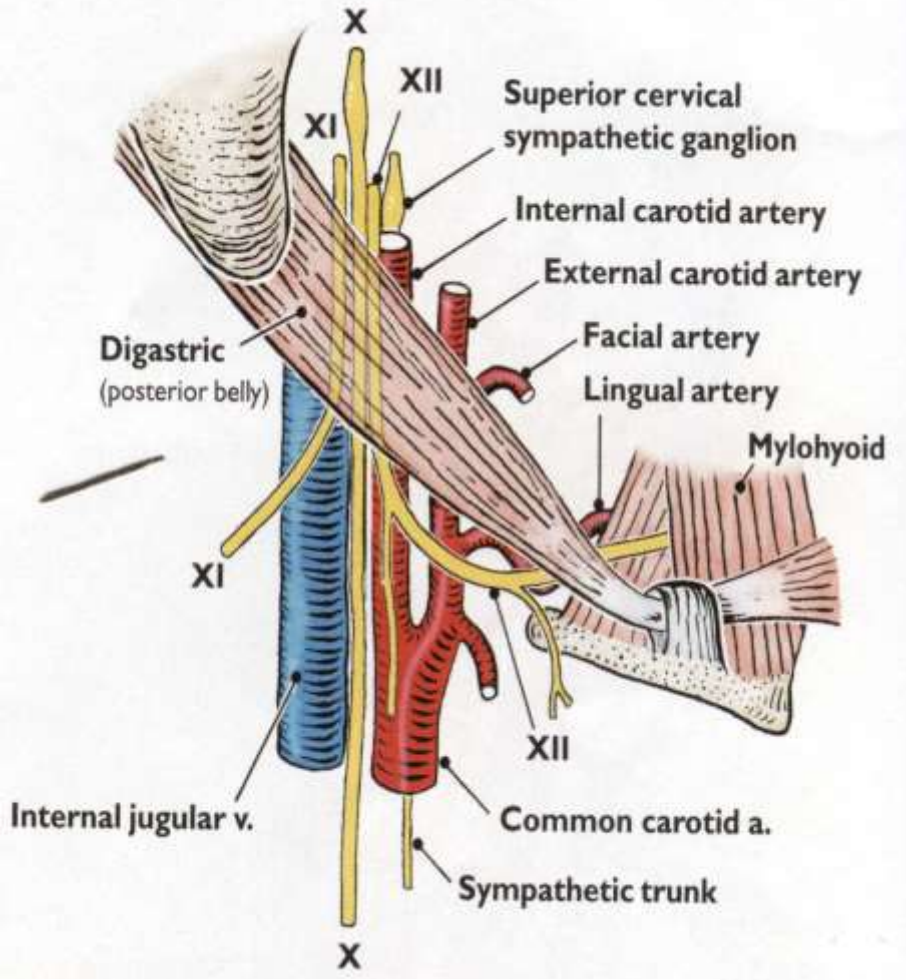
- Suprahyoid branch
- Sublingual a. (for sublingual gland)
- Dorsal lingual branches (from tongue root to epiglottis)
- a. profunda linguae (deep lingual a. – for intraglossal muscles; it proceeds to frenulum linguae)

Arteria lingualis - inside paralingual canal (canalis paralingualis)

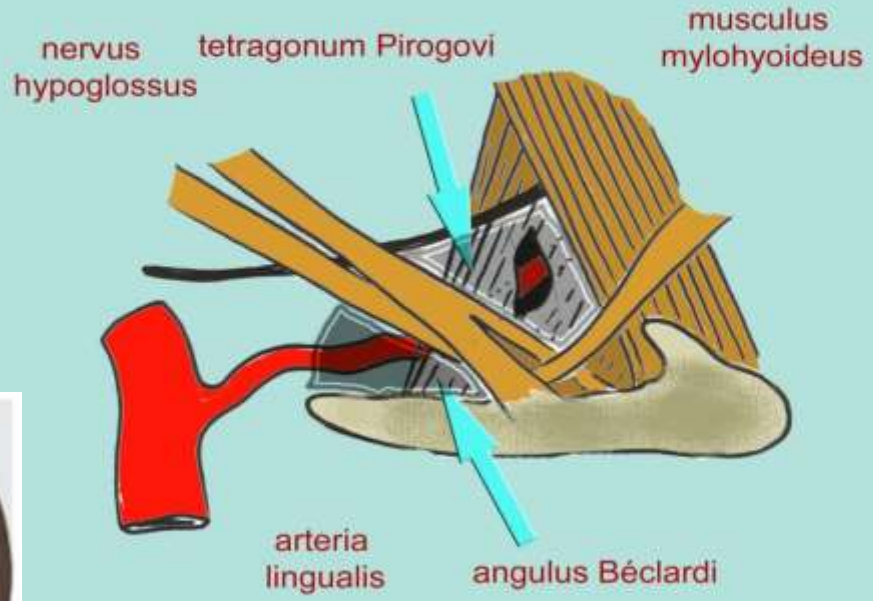

Lingual artery
Sublingual gland
Tongue
Hypoglossal nerve
Hyoglossus muscle

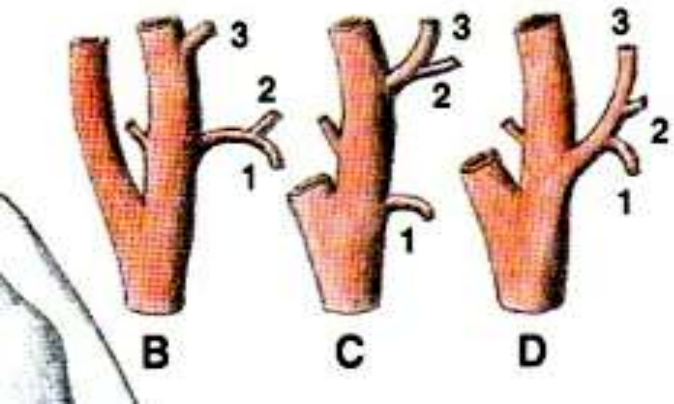

marginal mandibular n.
Glandula submandibularis
mylohyoid n.
N.
A. lingualis
M. digastricus, Te
Os hyoideum
astoideus
V. jugularis interna
A. carotis externa
A. thyroidea superior
A. laryngea superior; N. laryngeus
A.lingualis

Trigonum Pirogovi
(Pirogoff ´triangle)
Angulus Béclardi
(Béclard´ angle)



Pierre Augustin Béclard,
French anatomist (*1785- †1825)

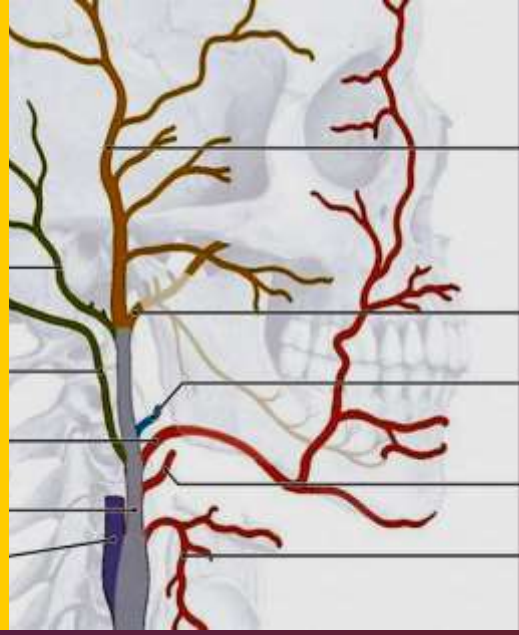




N. Pirogov

Nikolaj Ivanovič, Pirogov,
Russian surgeon (*1810 - †1881)

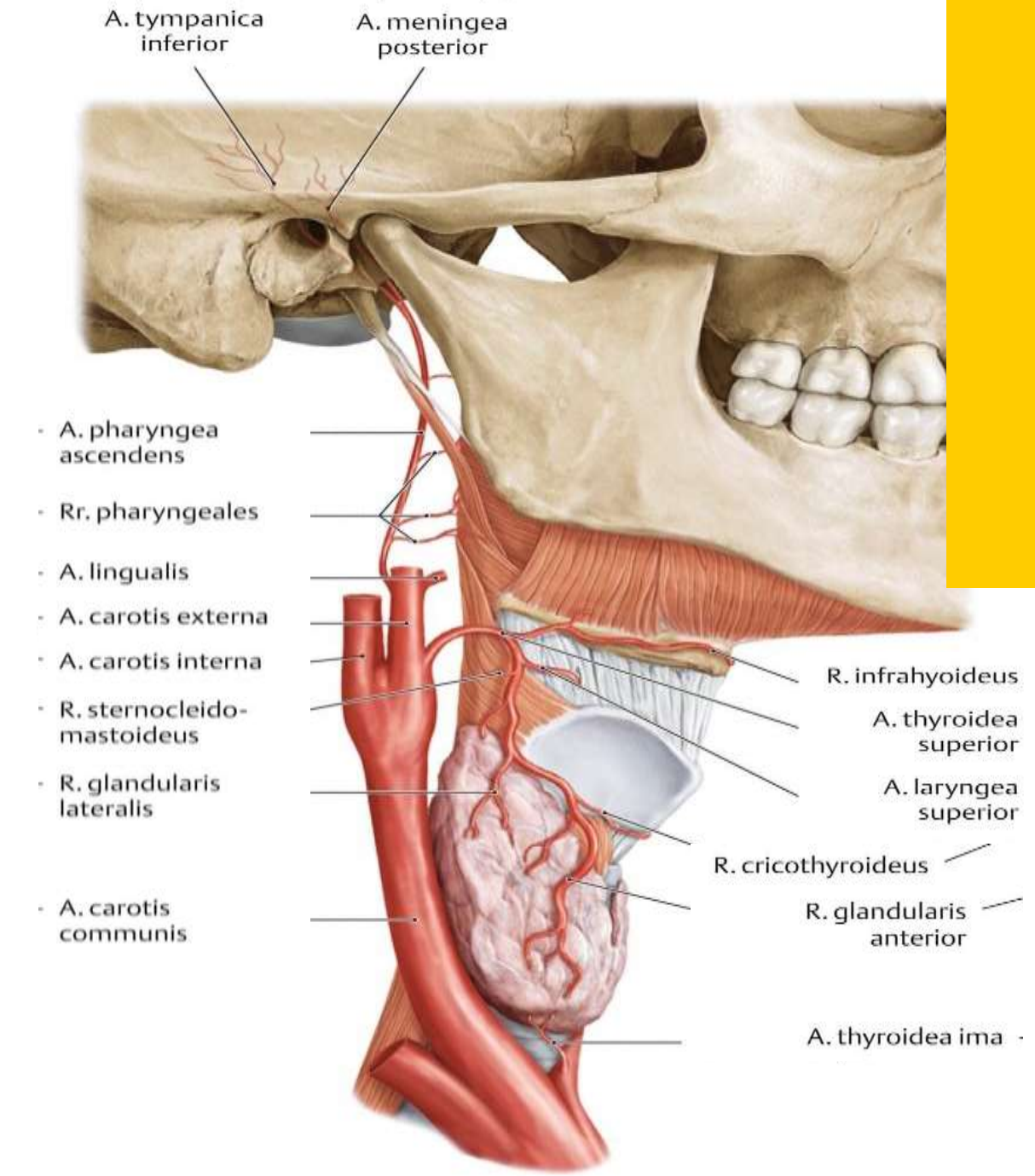
Facial artery Arteria facialis



For neck and face;

- Ascending palatine a. (for soft palate and palatine tonsil)
- Glandular branches (for submandibular gland)
- Submental a. (for mylohyoid a., anterior belly of digastric m.)

- Superior and inferior labial aa. (they form circle around rima oris)
- alaris nasi m.
- angularis m.



Superior pharyngeal a.,

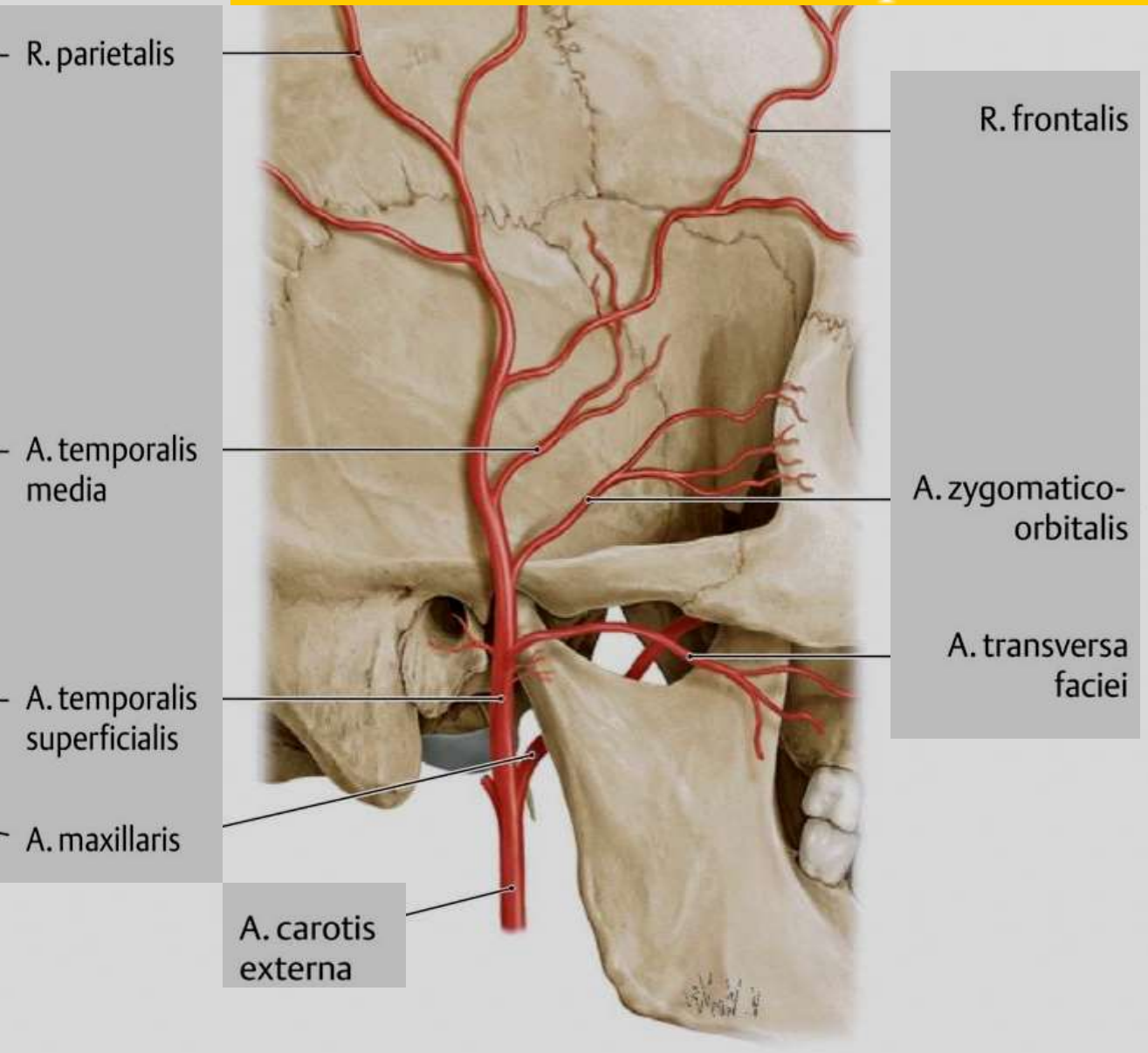
Arteria pharyngea ascendens

The very thin artery, supplies pharynx

pharyngeal branches (for truncus sympathicus, vagus, n. hypoglossus and pharynx)

- Meningeal branches (for dura mater)
- inferior tympanic artery (for tympanic cavity)

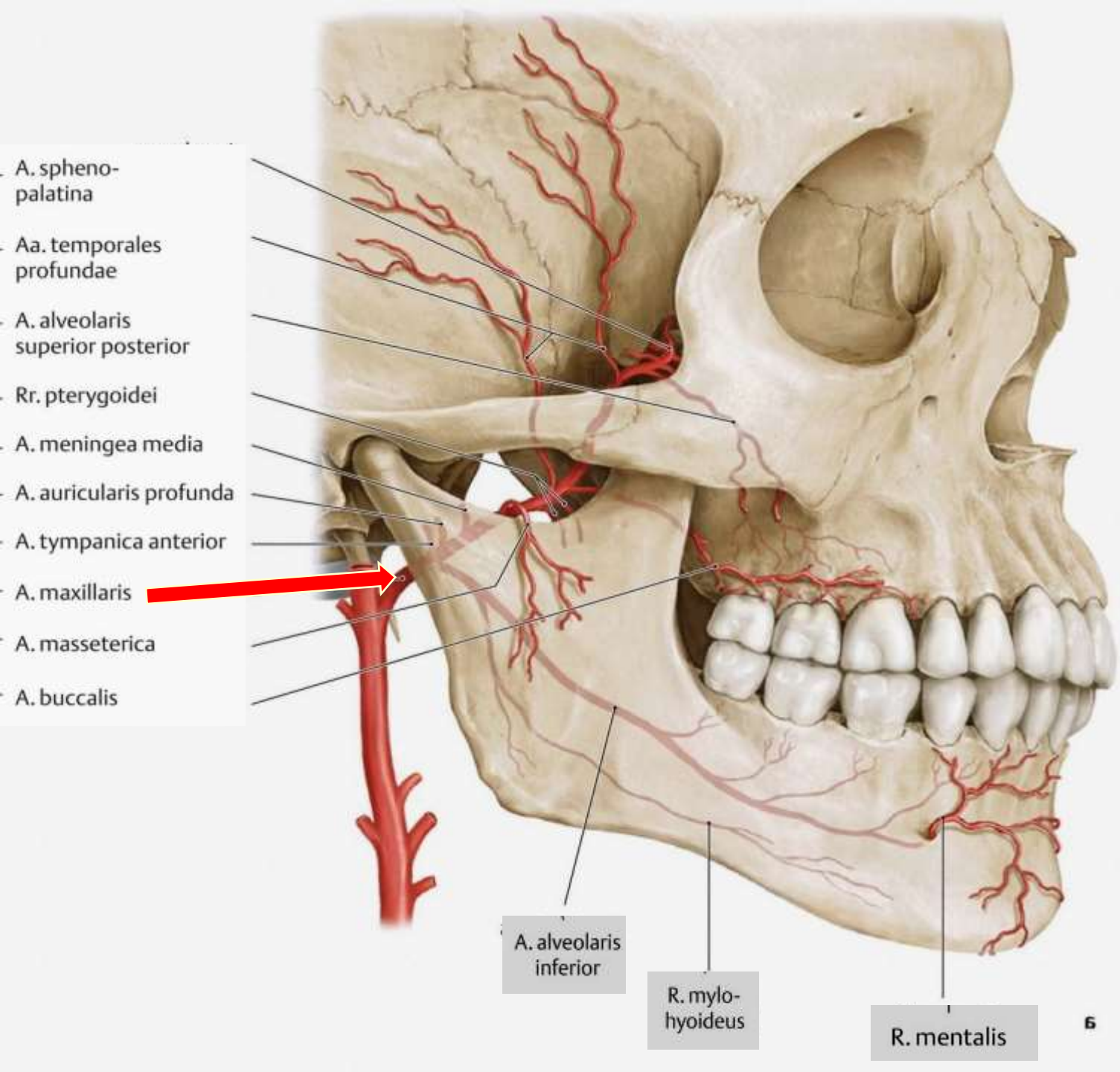
Superficial temporal artery
Arteria temporalis superficialis

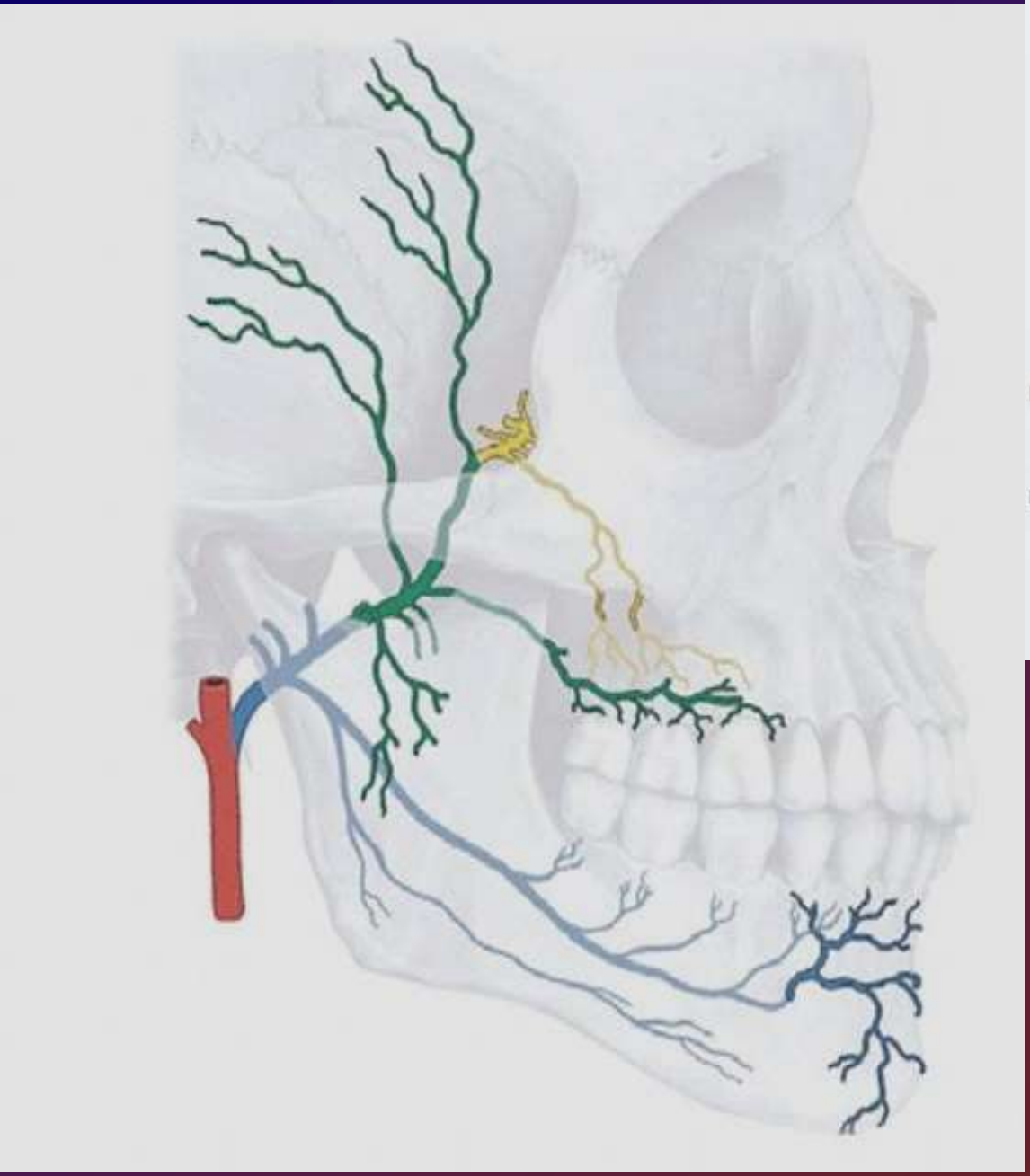


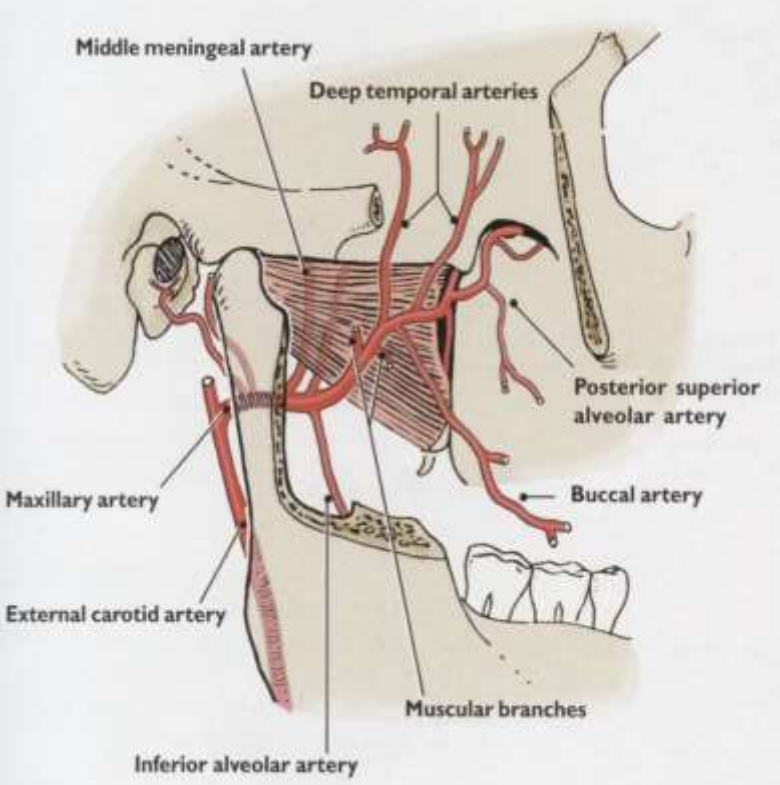
For gl. parotis, TMJ, m. orbicularis oculi, m. temporalis;

- glandular branches transversa faciei (for mimic muscles)
- rr. auriculares anteriores (capsule of TMJ)
- a. zygomaticoorbitalis
- a. temporalis media
- frontal branches
- parietal branches

Arteria maxillaris – owerwiev







Maxillary artery

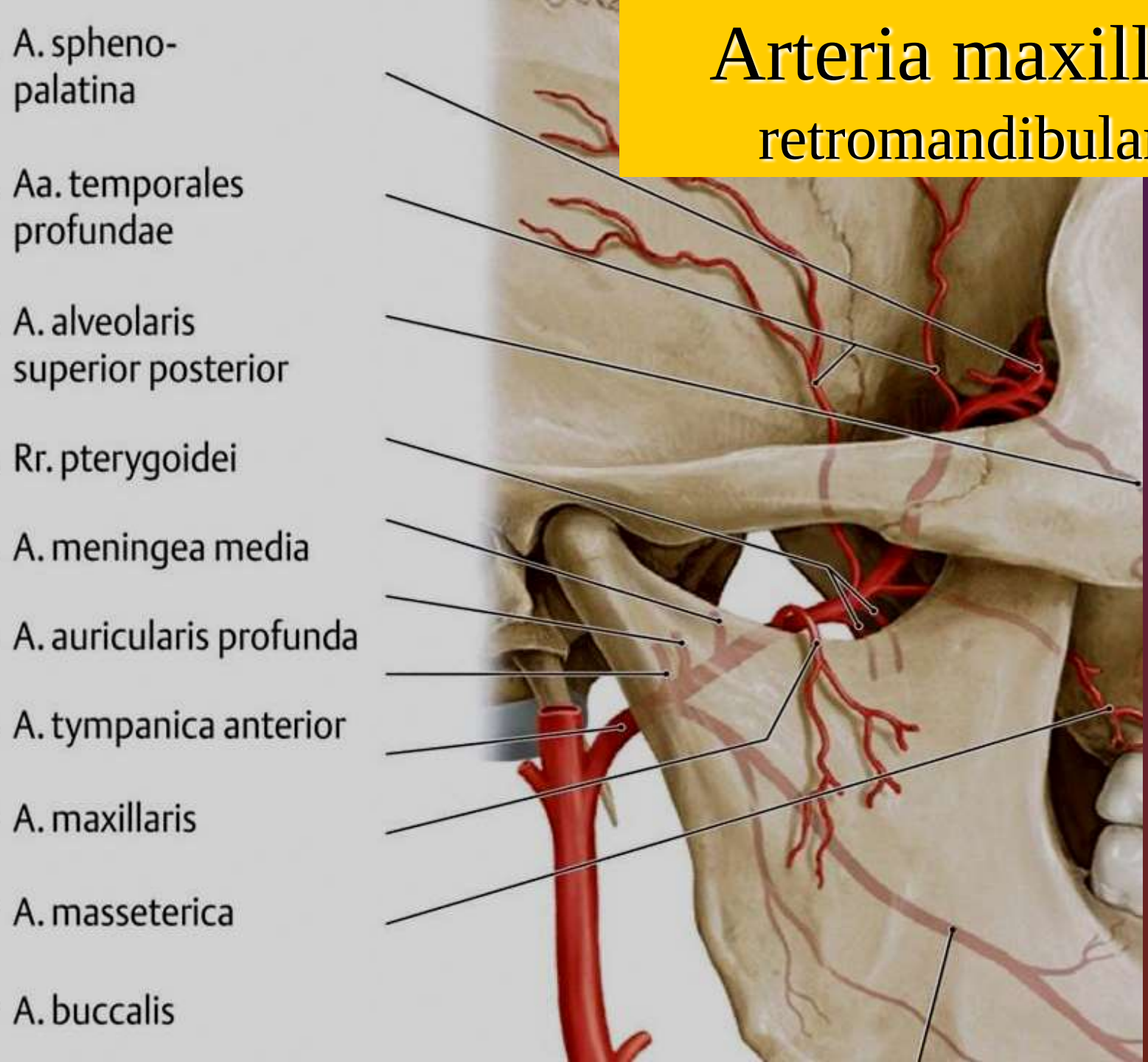
Three segments (parts):

Retromandibular

Pterygoid

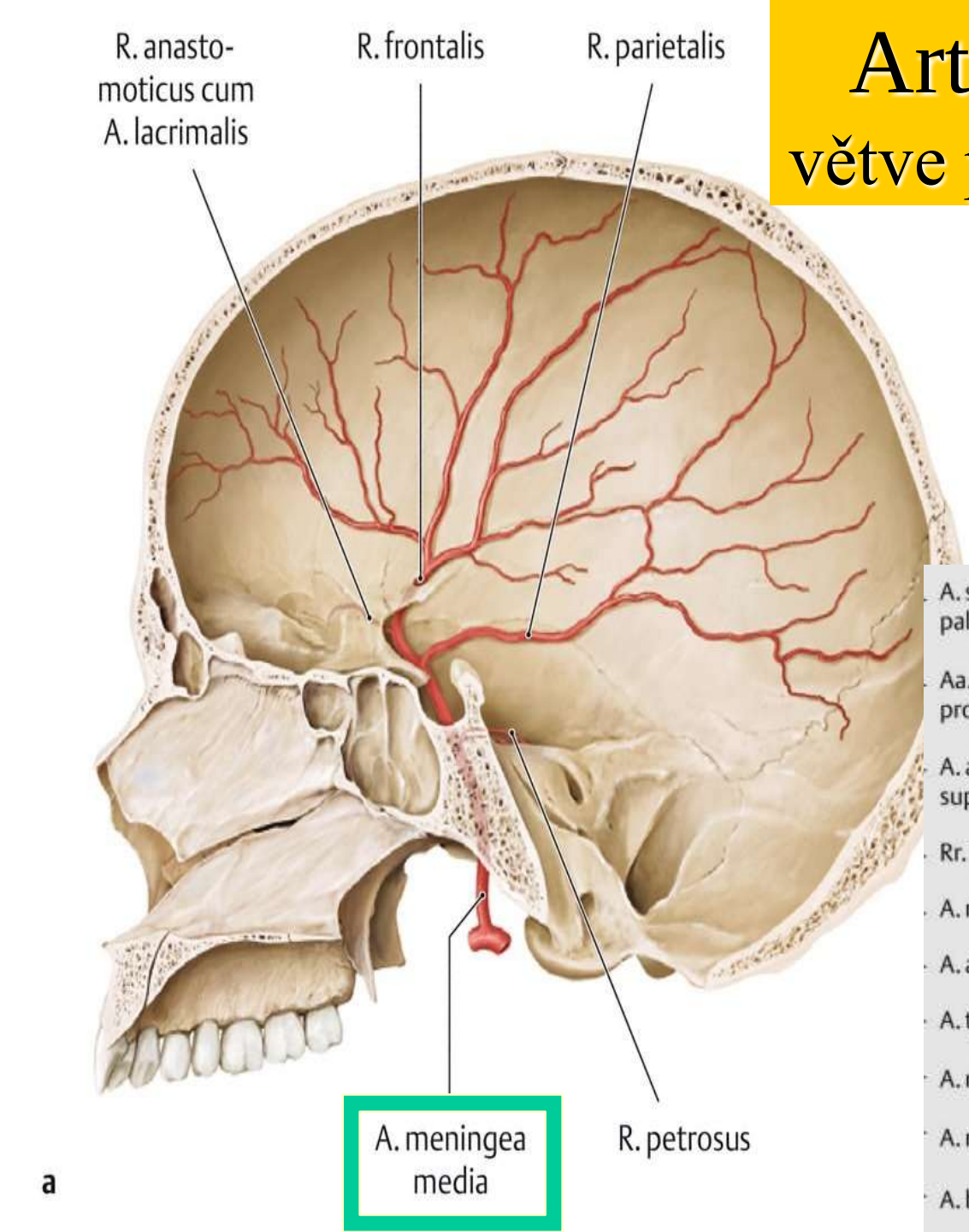
Pterygopalatine

Arteria maxillaris – retromandibular part

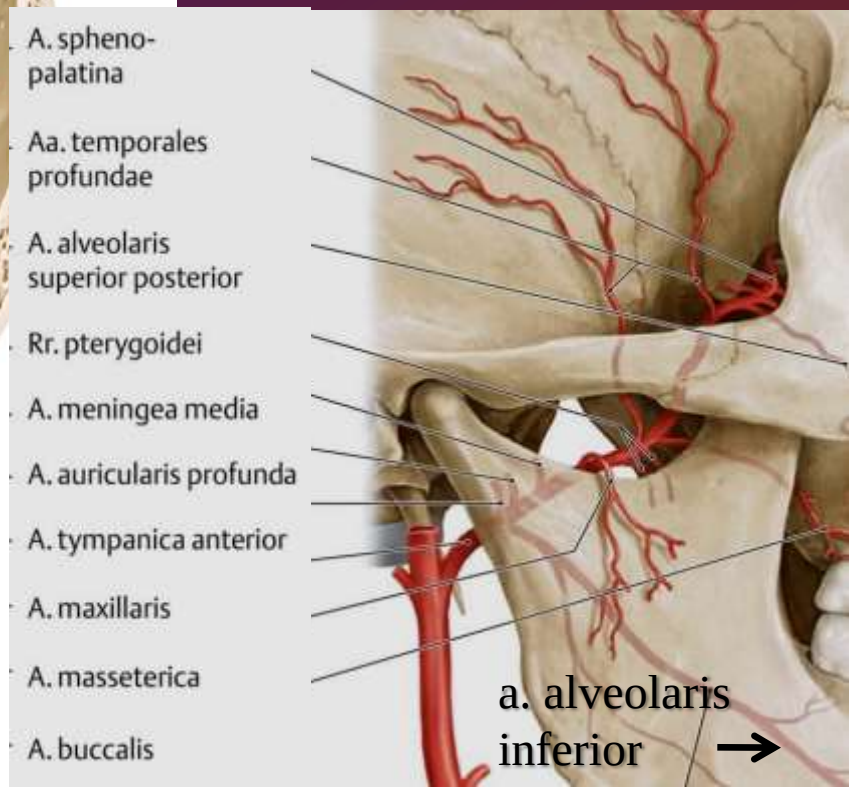


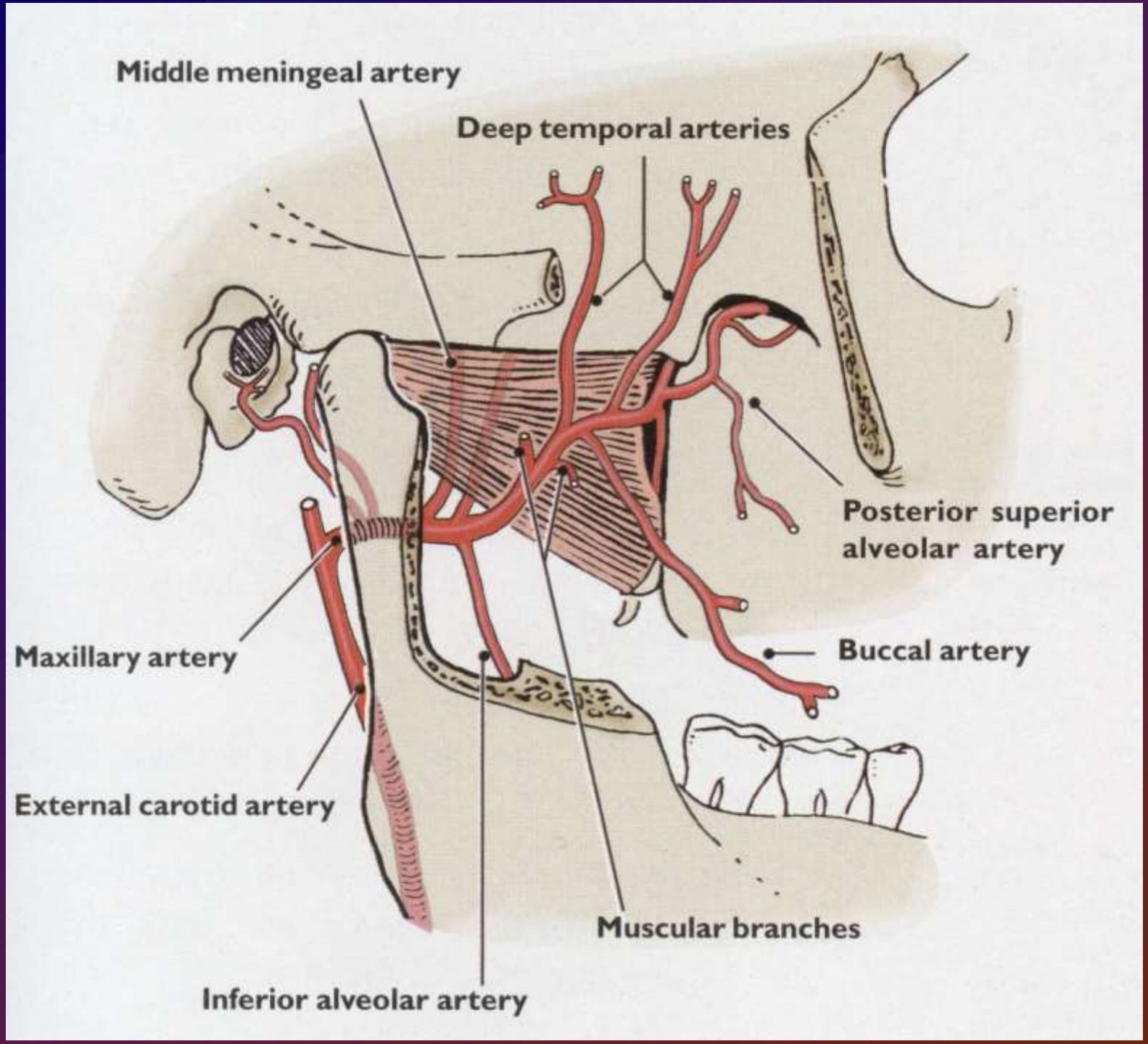
- a. auricularis profunda
- a. tympanica anterior
- a. meningea media
- a. alveolaris inferior

Arteria maxillaris – větve pars retromandibularis



- a. auricularis profunda
- a. tympanica anterior
- **a. meningea media**
- **a. alveolaris inferior**

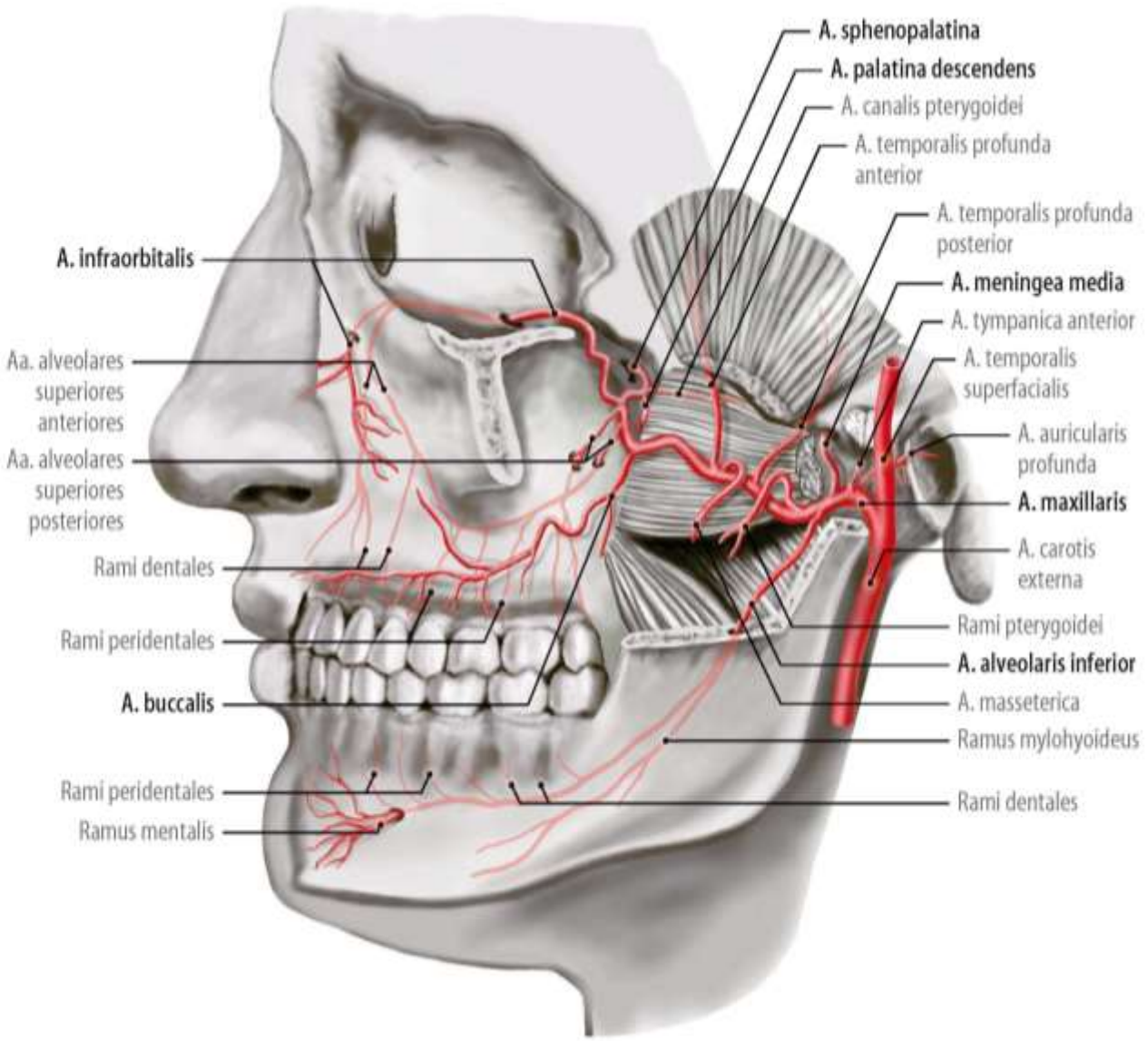


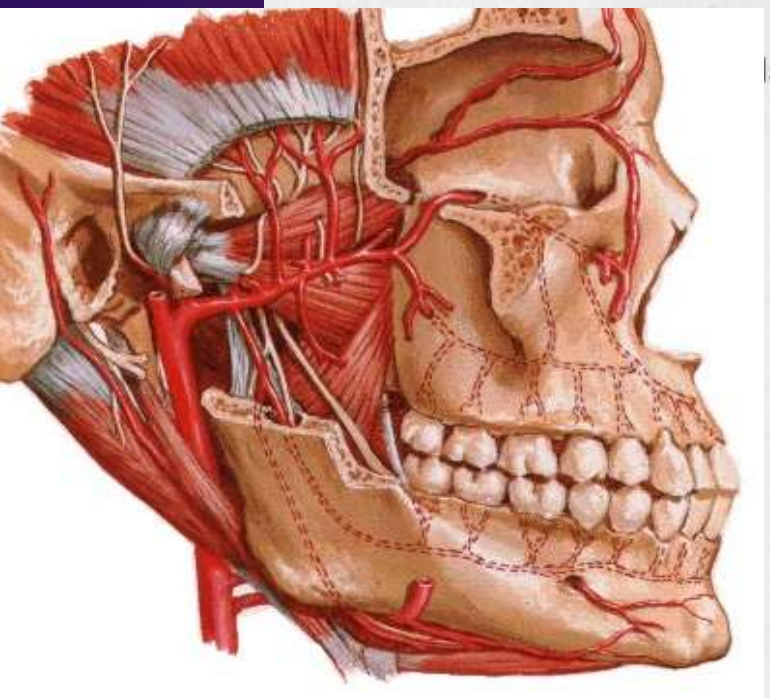

Middle meningeal artery
Deep temporal arteries
Posterior superior alveolar artery
Maxillary artery
Buccal artery
External carotid artery
Muscular branches
Inferior alveolar artery

A. maxillaris

- Pars retromandibularis
  - A. auricularis profunda
  - A. tympanica anterior
  - A. alveolaris inferior
    - Rami dentales
    - Rami peridentales
    - Ramus mentalis
    - Ramus mylohyoideus
  - A. meningea media (◘ Abb. 2.164)
  - [A. pterygomeningea]
- Pars intermuscularis
  - A. masseterica
  - A. temporalis profunda anterior
  - A. temporalis profunda posterior
  - Rami pterygoidei
  - A. buccalis
- Pars sphenopalatina
  - A. alveolaris superior posterior
    - Rami dentales
    - Rami peridentales
  - A. infraorbitalis
    - Aa. alveolares superiores anteriores
      - Rami dentales
      - Rami peridentales
  - A. canalis pterygoidei
  - A. palatina descendens
  - A. sphenopalatina (◘ Abb. 2.95)

[ ] nicht sichtbar





Nerves to temporalis

Sphenopalatine artery
entering pterygopalatine fossa

Nerve to masseter

Auriculotemporal nerve

Buccal nerve
(branch of V_3)

Chorda tympani

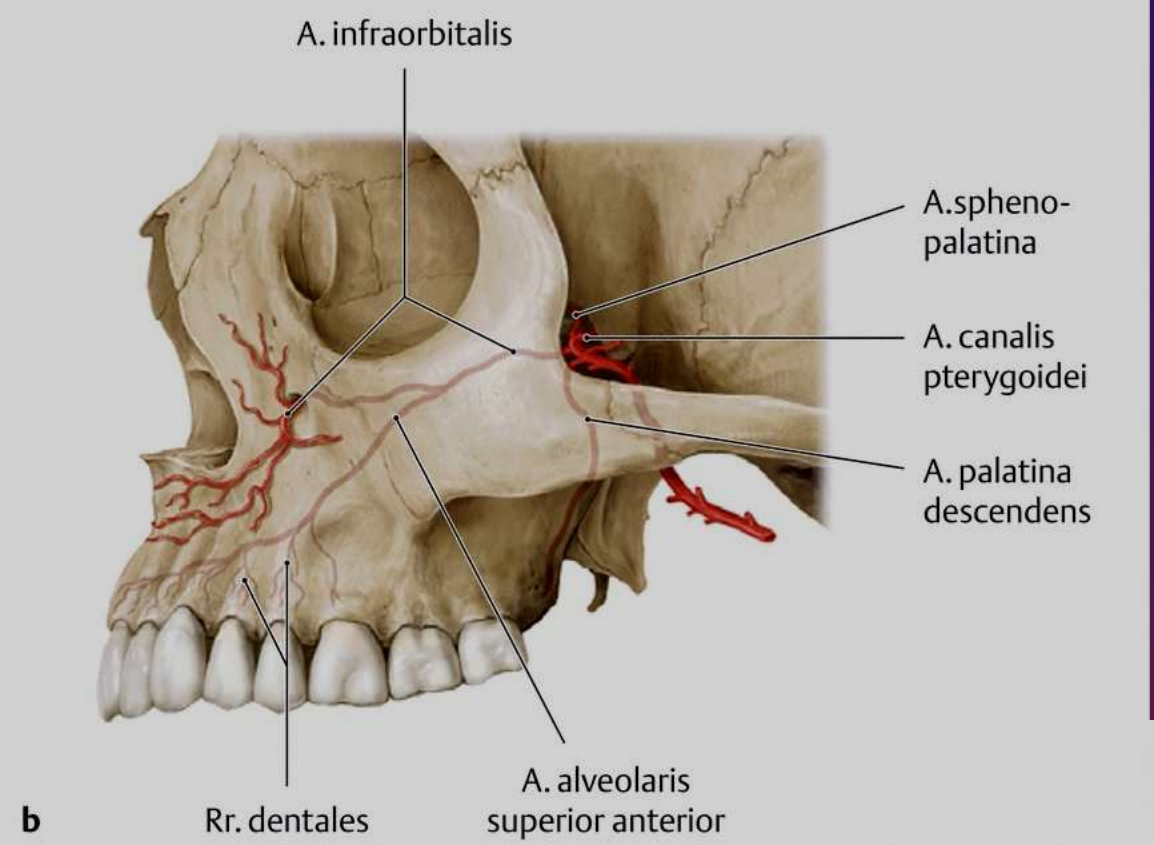
lary artery

Inferior alveolar nerve

Lingual nerve

Medial pterygoid muscle

Nerve to mylohyoid and digastric



- Superior posterior alveolar a.
- Infraorbital a.
- Palatine descendens a.:

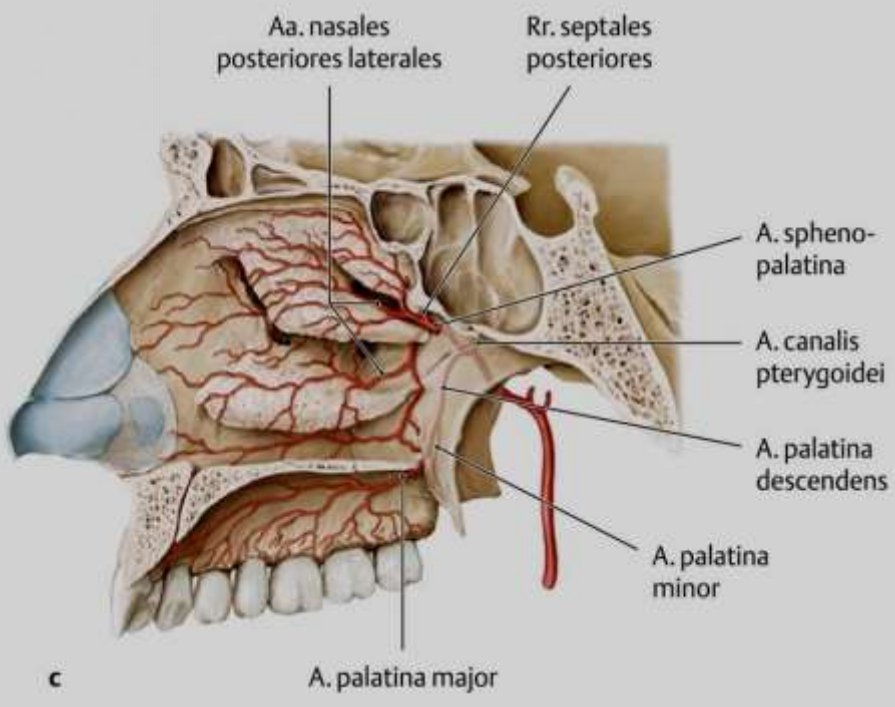
a. palatina major et minores

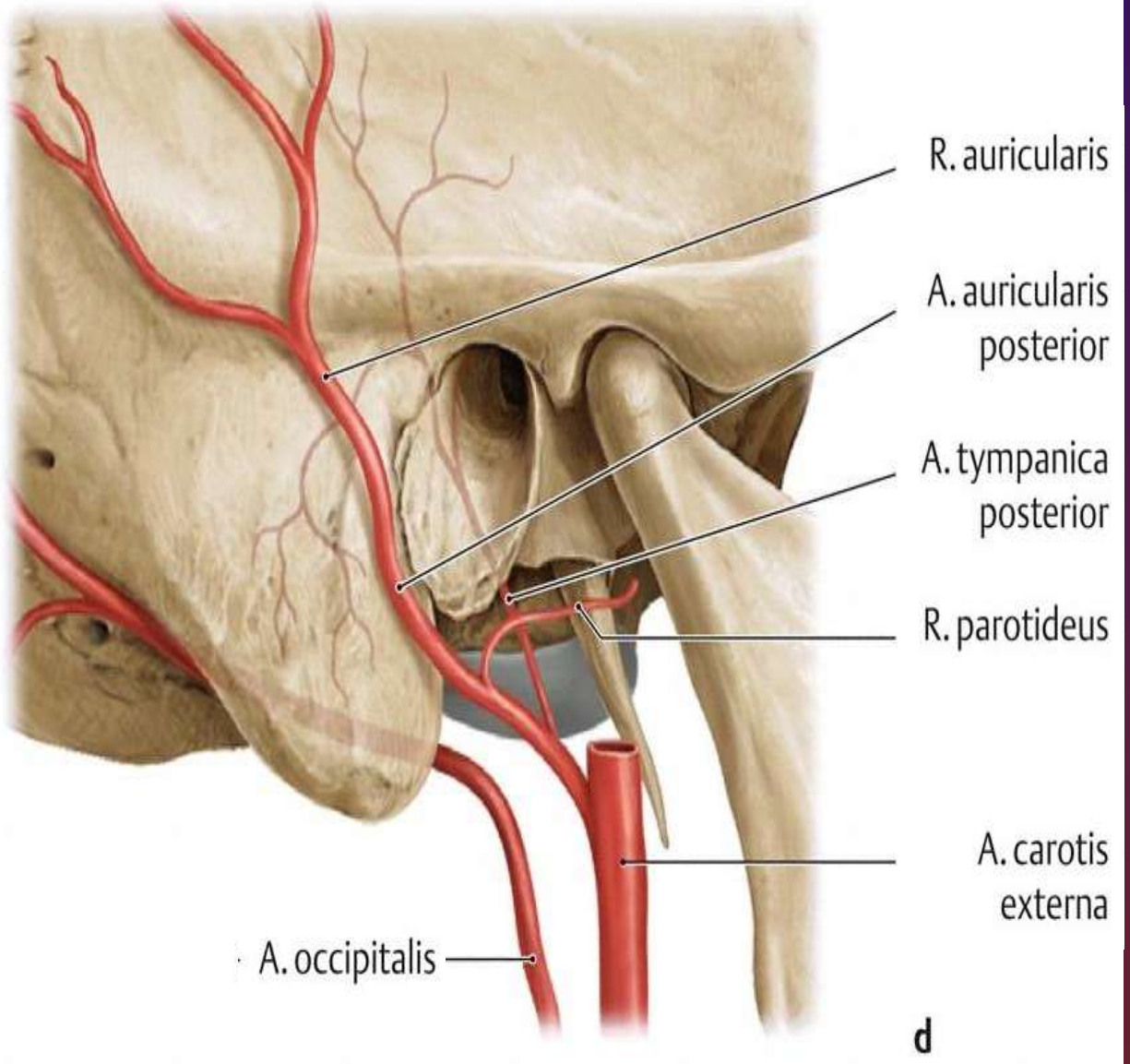
a. canalis pterygoidei

- a. sphenopalatina:

a. nasales posteriores laterales et nasales posteriores septales

Arteria maxillaris – branches from pterygopalatinous part





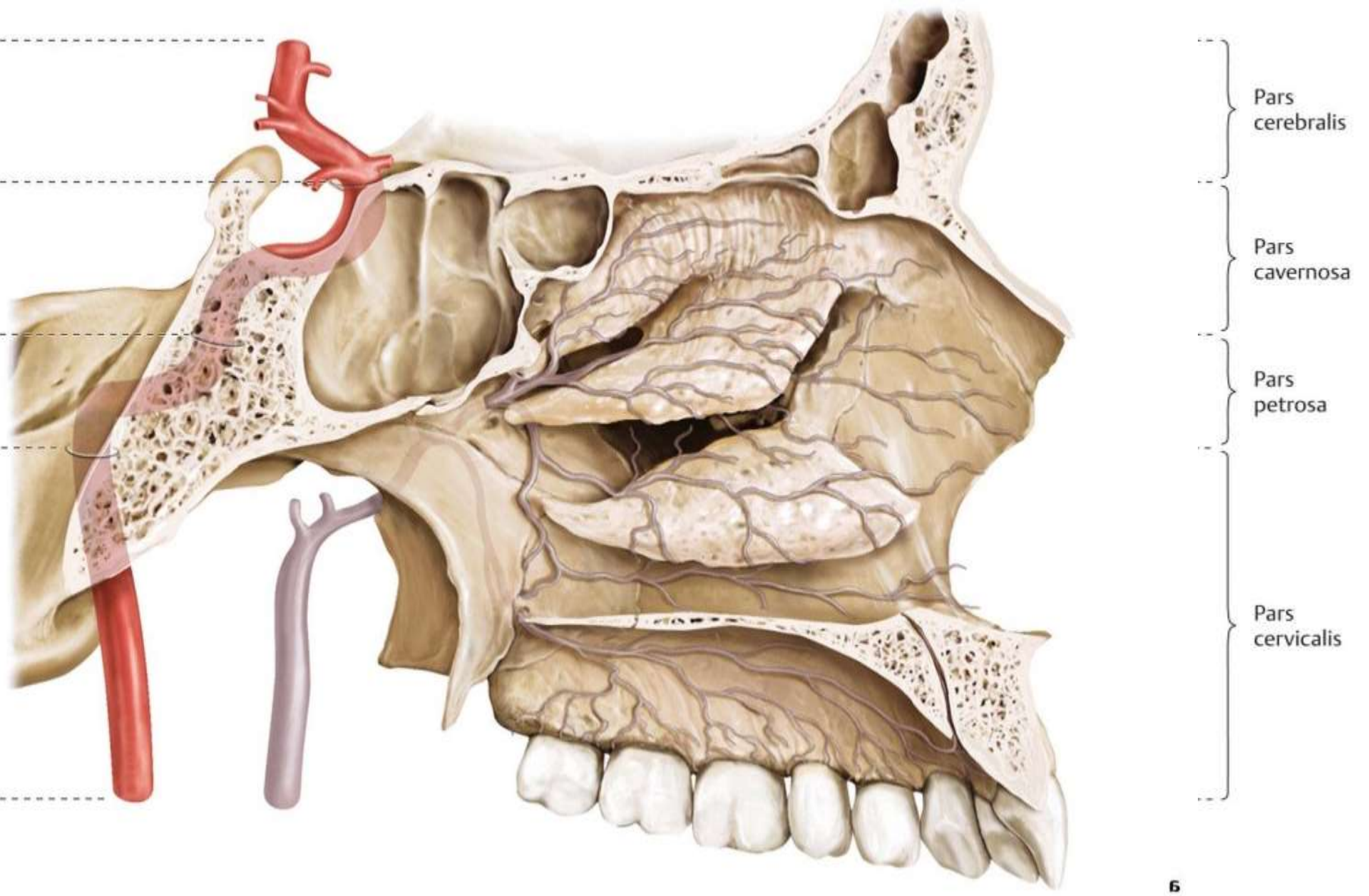
For soft meningeal membranes;

- Occipital branches
- Sternocleidomastoid brr. (sternocleidomastoid a. – crosses arcus nervi hypoglossi)
- Auricular br.
- Mastoid ale br. (for dura mater near mastoid canal)
- Meningeal brr. (for dura mater near for. jugulare)

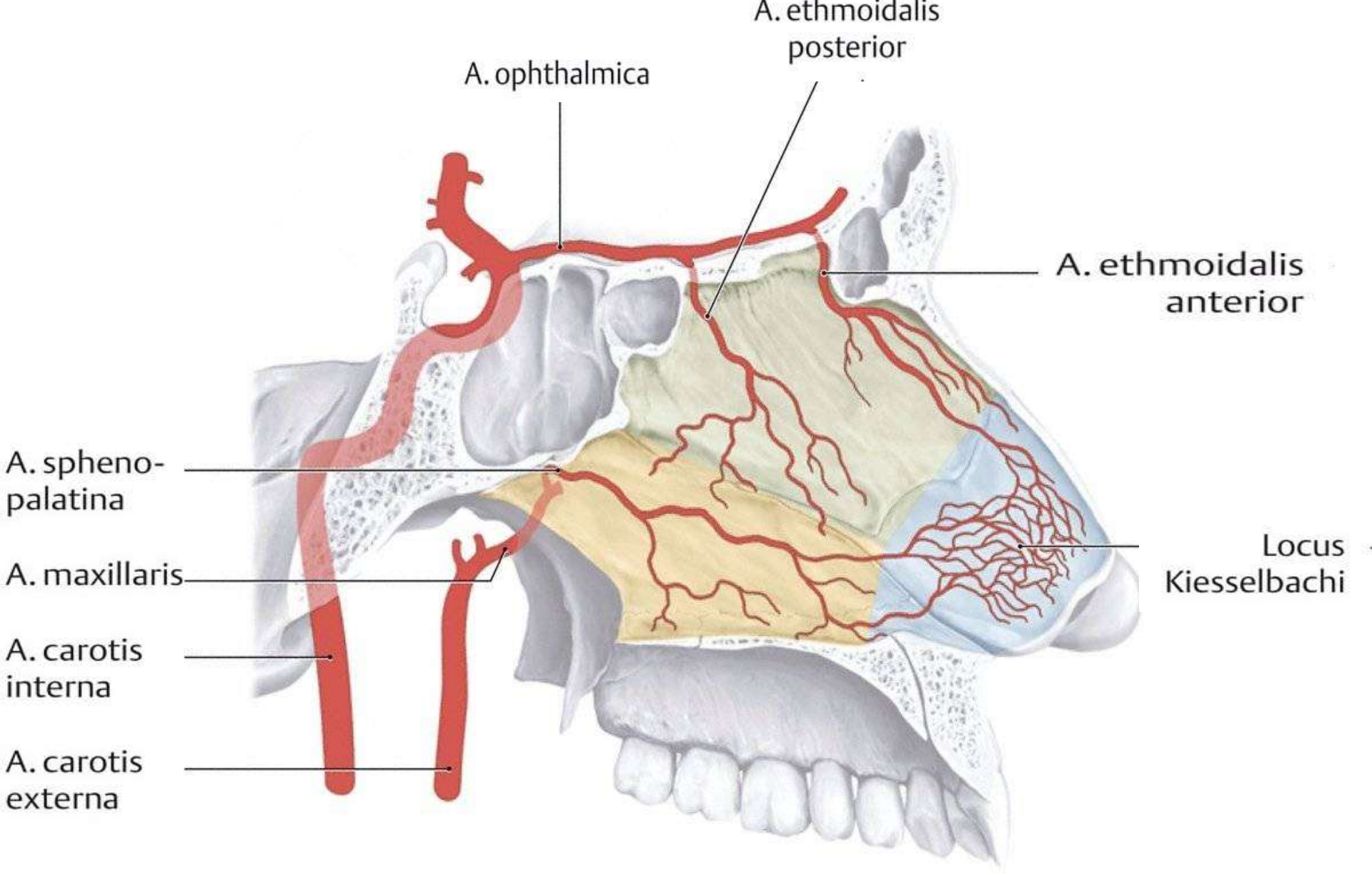
- Stylomastoid a. (for cavum tympani, canales semicirculares and cellulae mastoideae;
- Posterior tympanic a. supplies cavum tympani)

Occipital artery + posterior auricular a.
Arteriae occipitalis + auricularis posterior

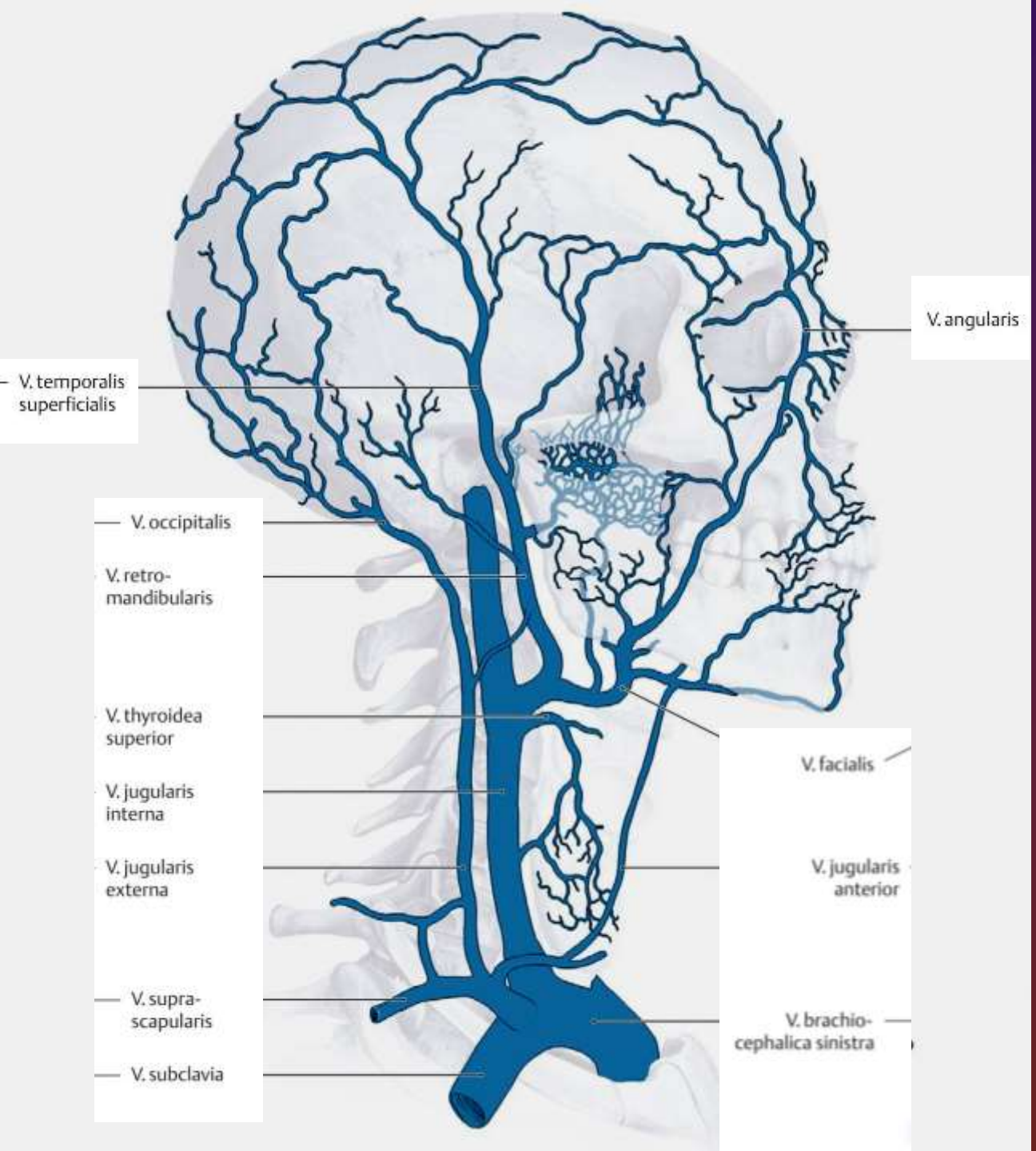
Aa. caroticotympanicae		A. carotis interna
A. stylomastoidea		A. auricularis posterior
A. tympanica inferior	←	A. pharyngea ascendens
A. auricularis profunda		A. maxillaris
A. tympanica posterior	←	A. stylomastoidea
A. tympanica superior	←	A. meningea media
A. tympanica anterior	←	A. maxillaris



Internal carotid artery Arteria carotis interna



ACI has anastomoses with maxillary artery in nasal septum



Superficial veins:

external jugular, anterior jugular and branches

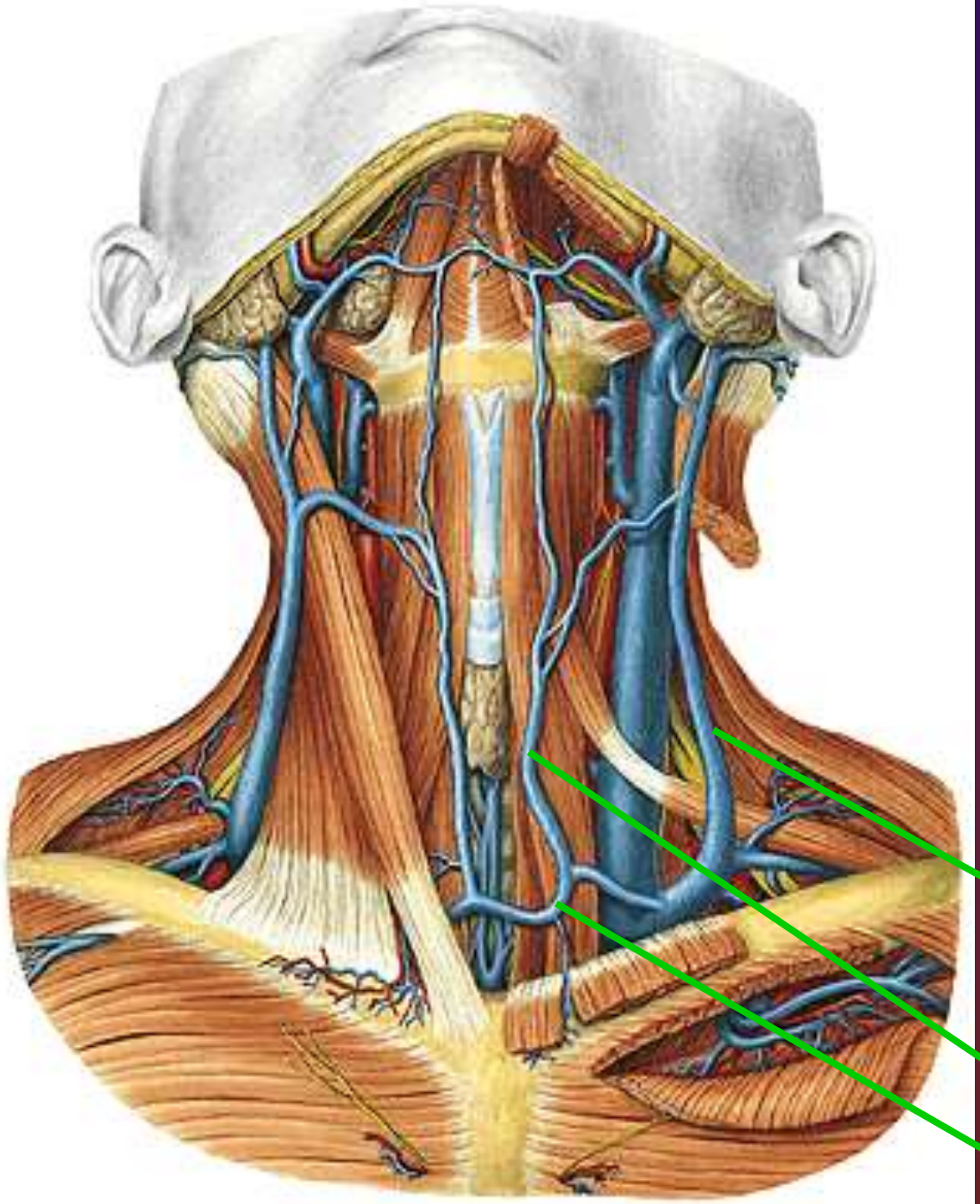
Deep veins

Venae profundae:

Pterygoid plexus

Plexus pterygoideus

Internal jugular



superficial veins

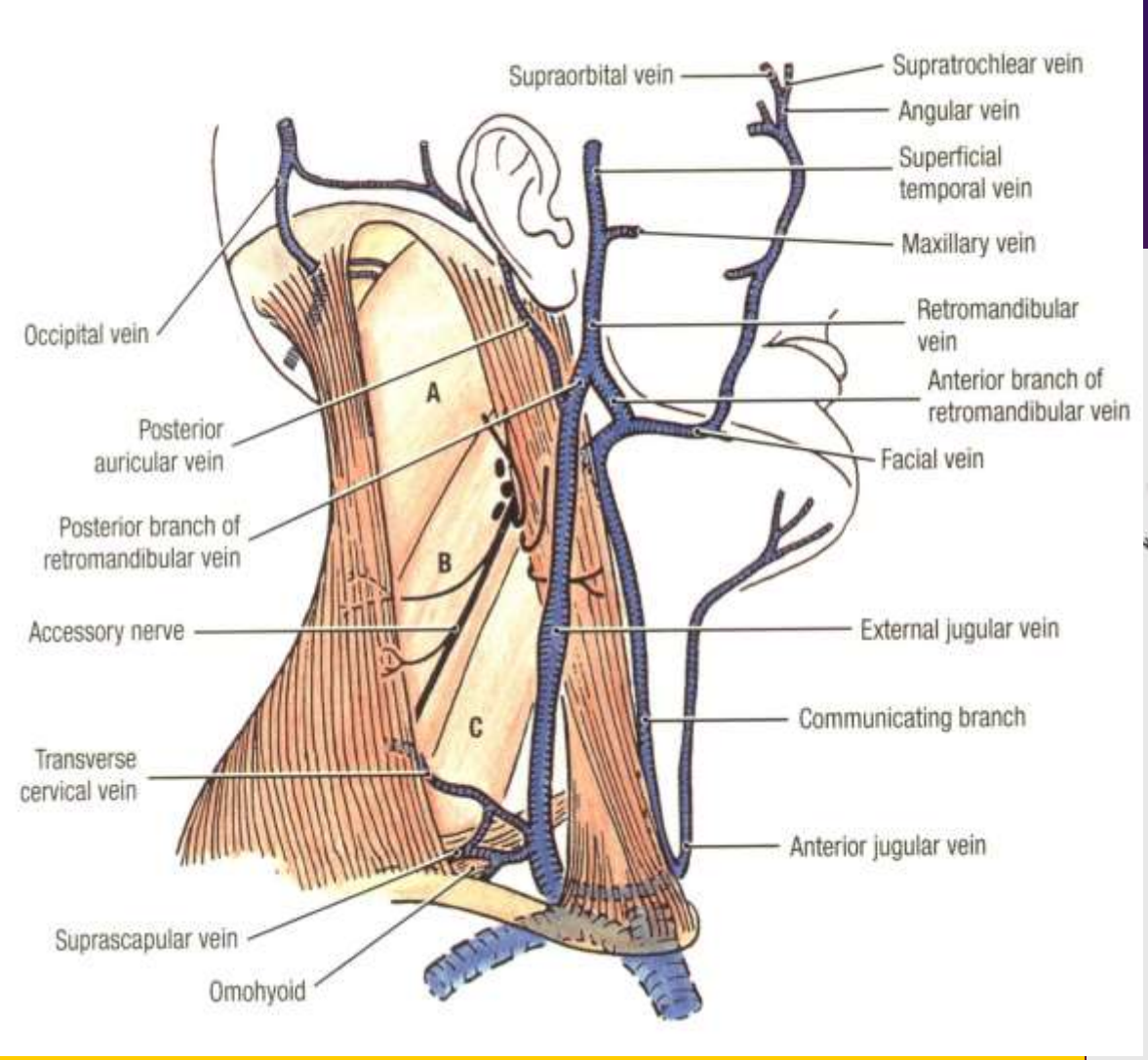
External jugular vein

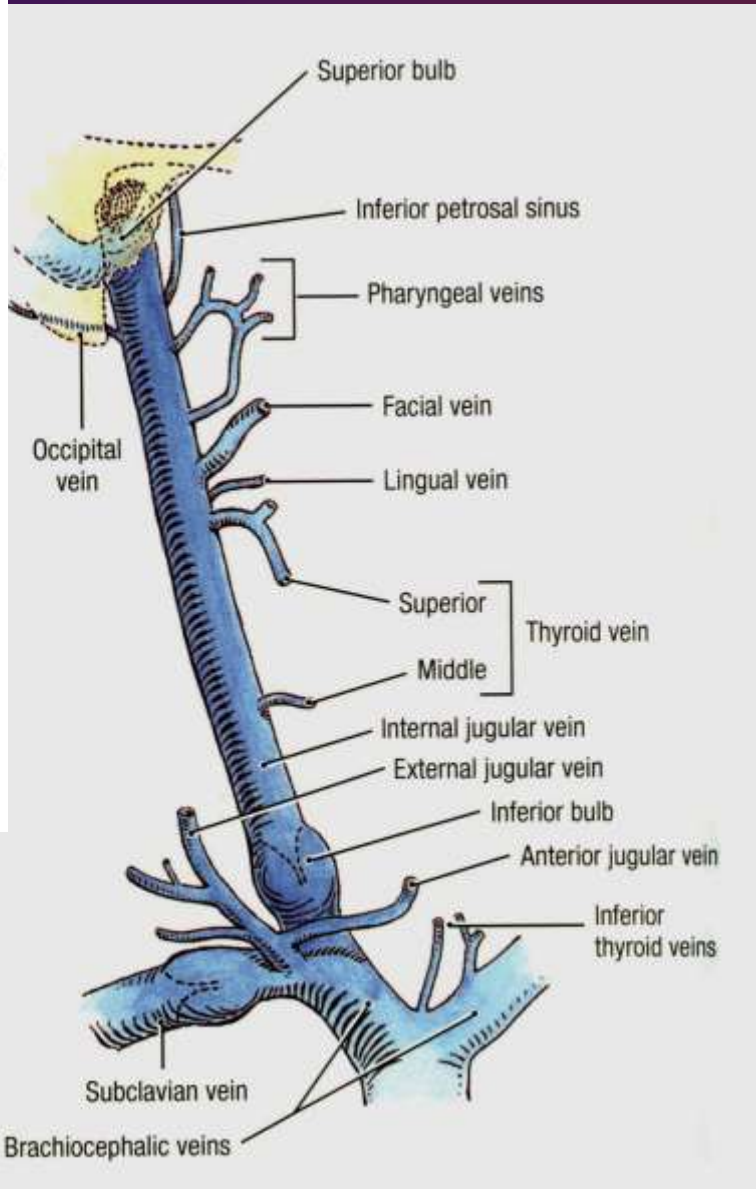
Anterior jugular vein

Venous jugular arch

deep veins

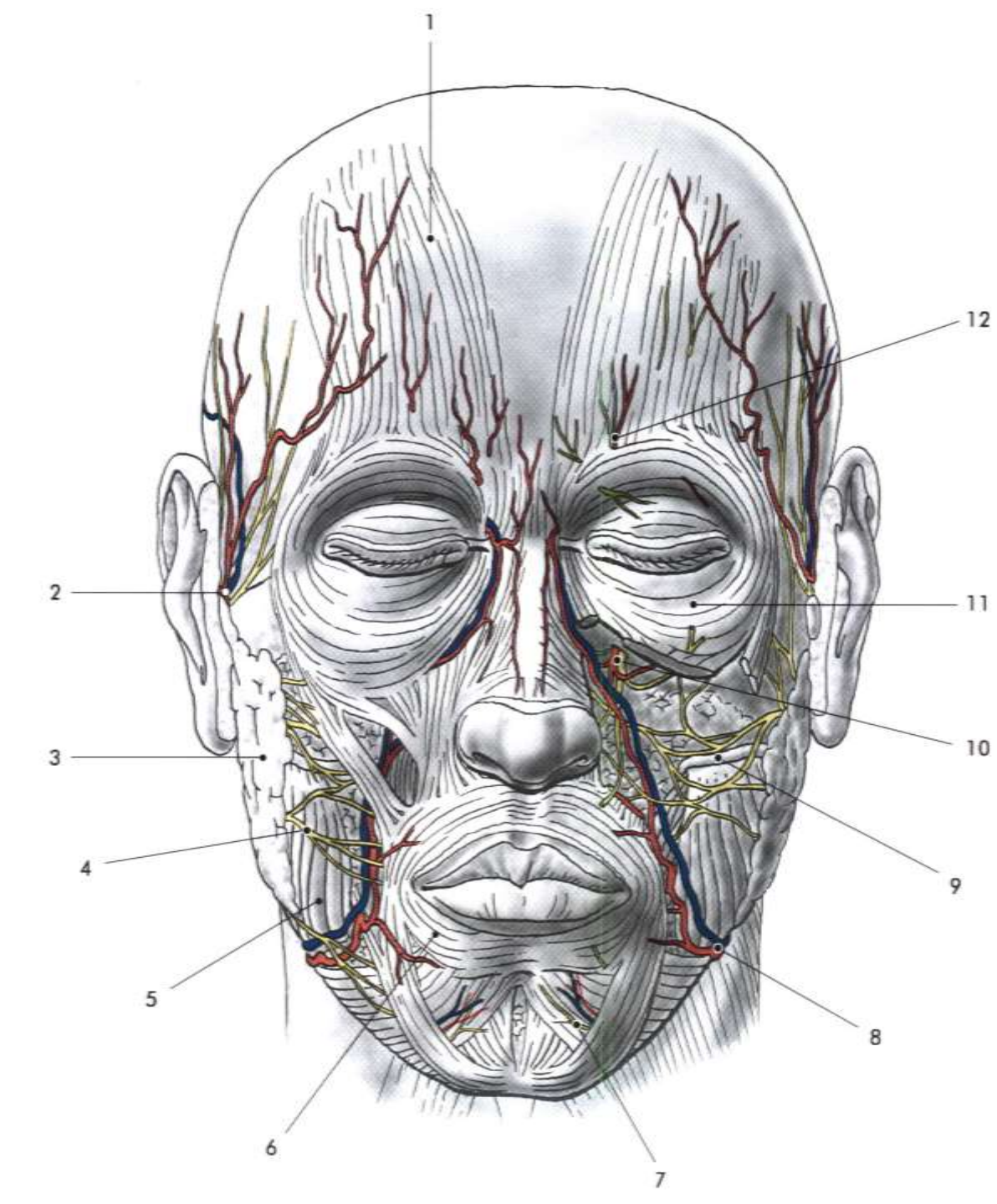
Internal jugular vein

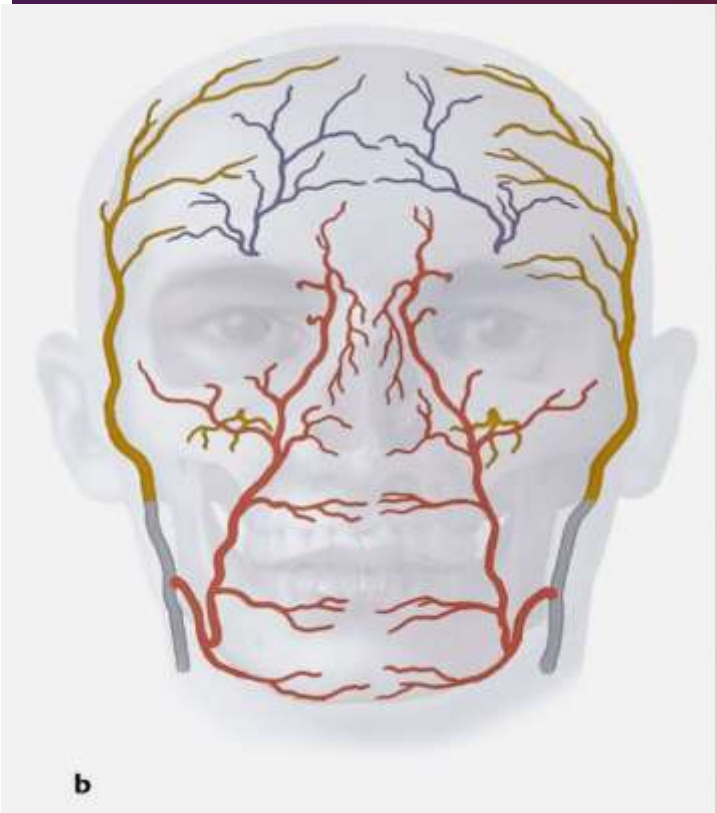




Internal jugularis vein; external jugular vein

Facial vein
Vena facialis



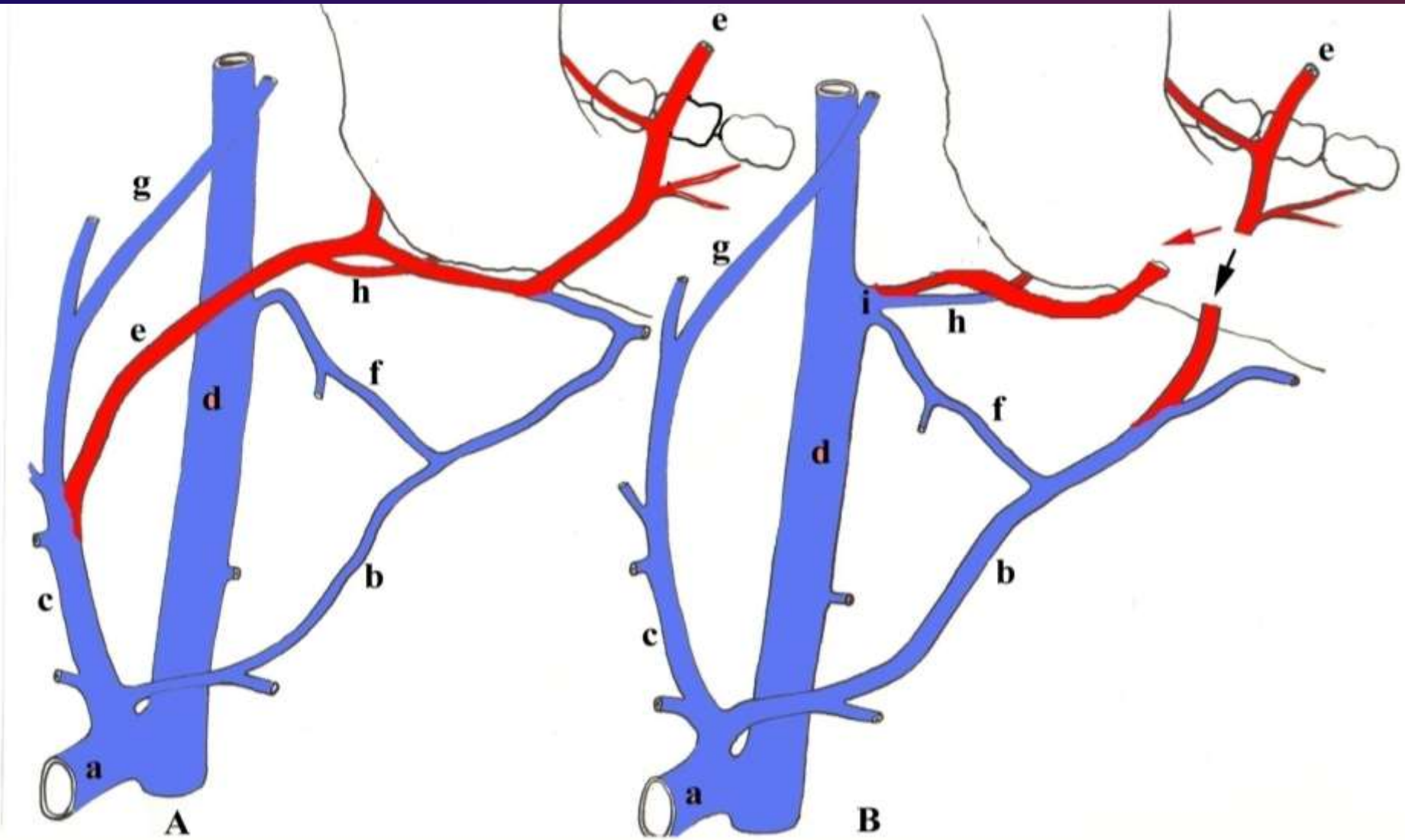


Vena facialis can be open to from:

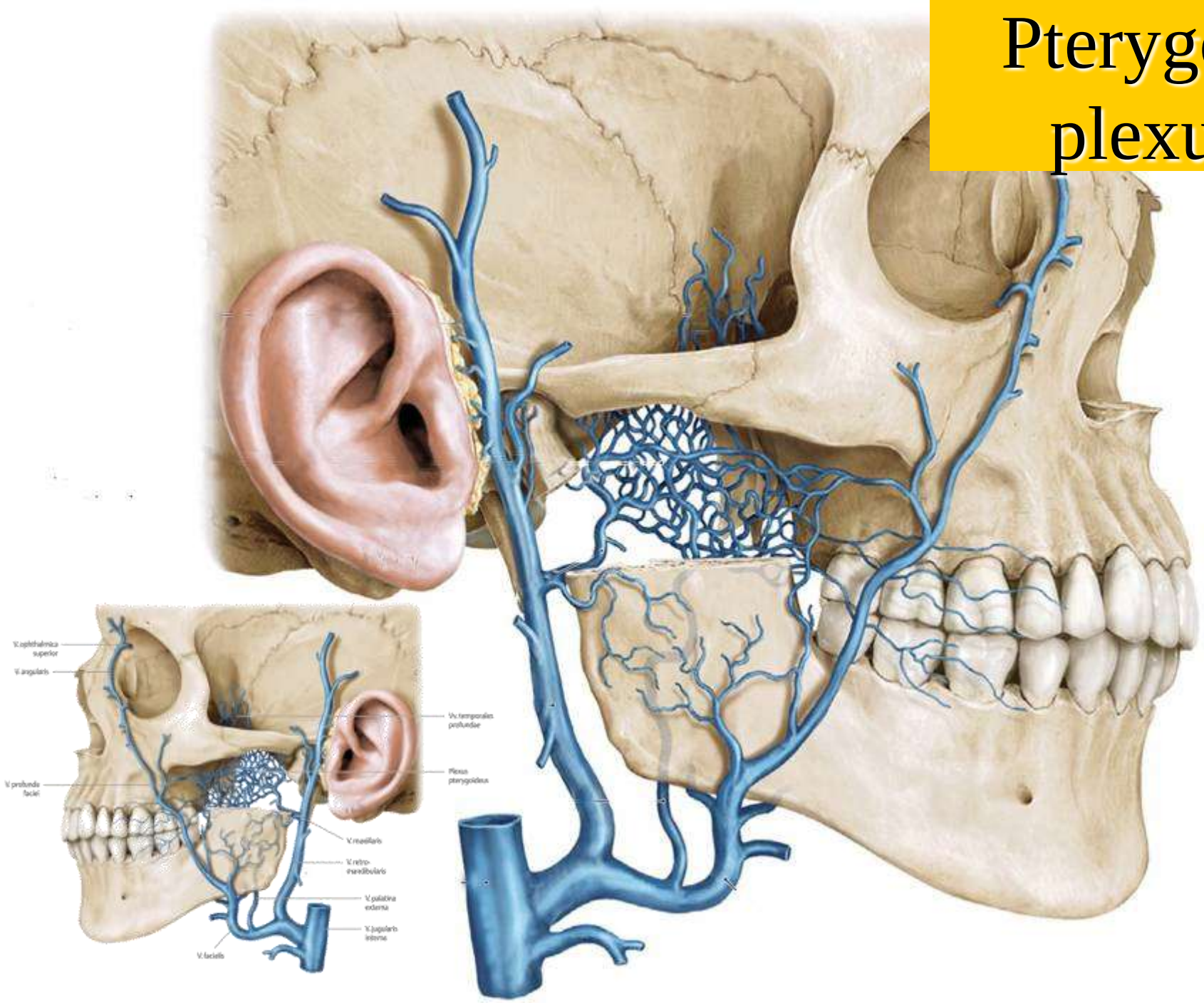
Vena jugularis externa

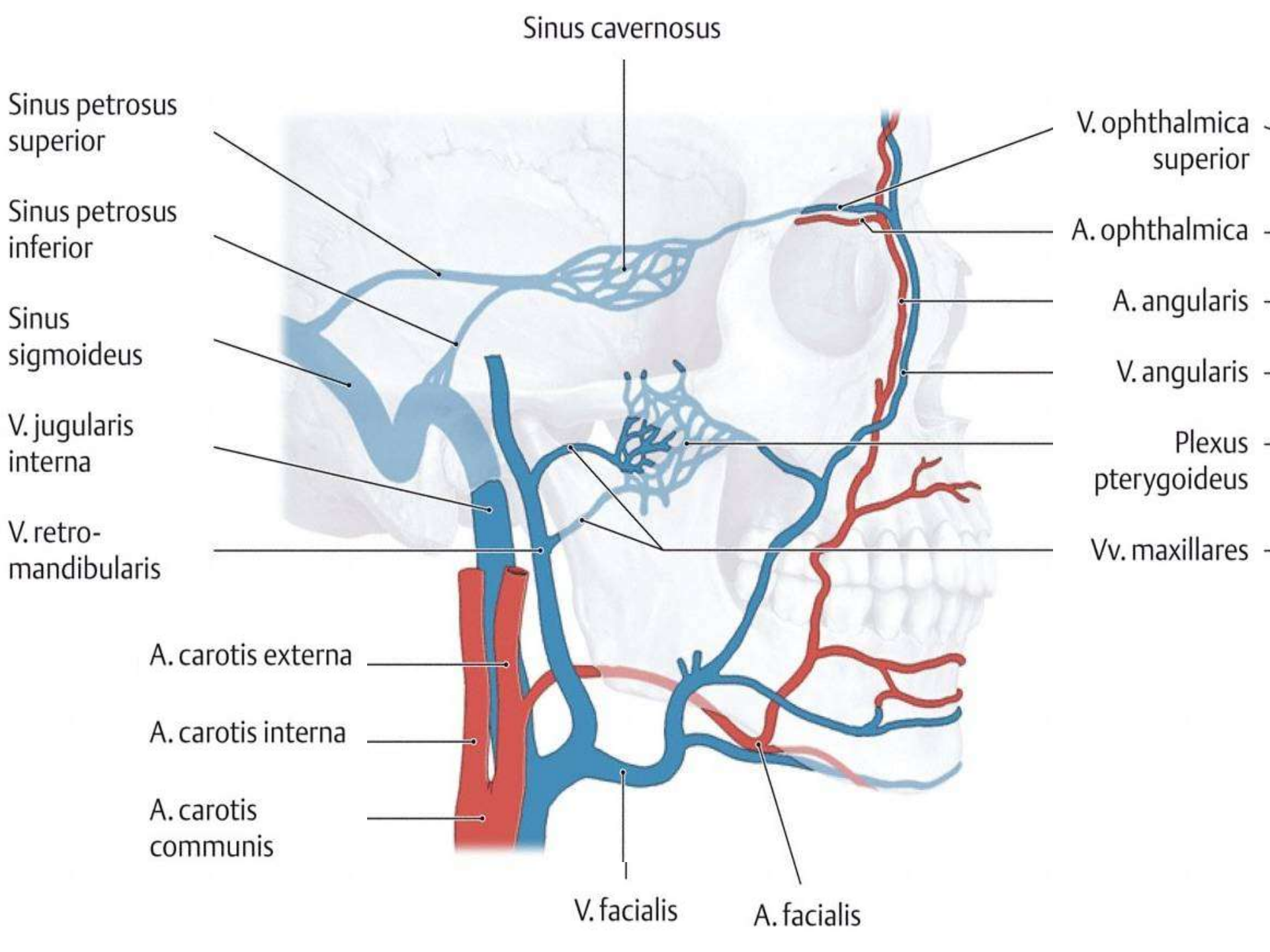
Vena jugularis interna

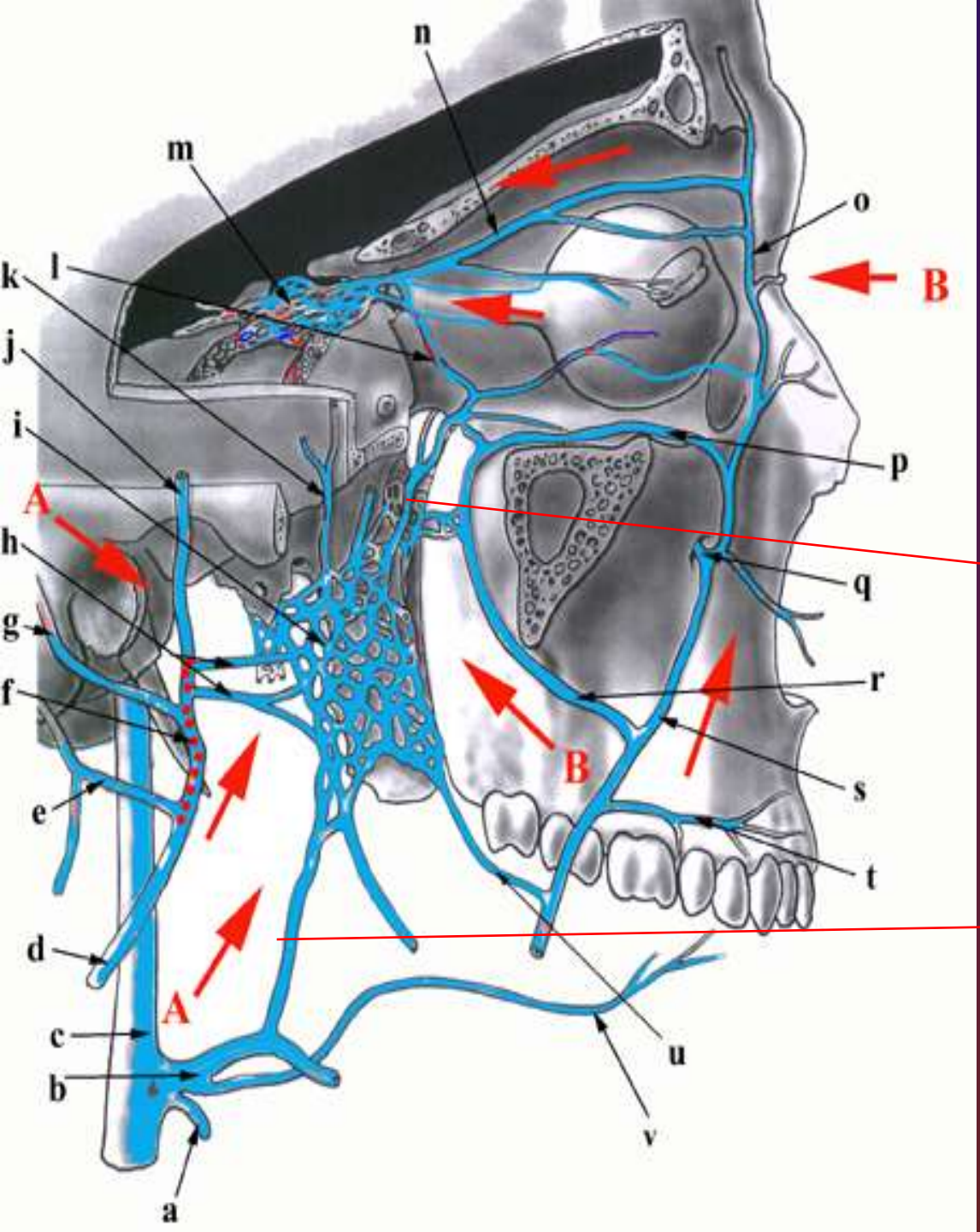
Vena jugularis anterior



Pterygoid plexus




Sinus cavernosus
Sinus petrosus superior
Sinus petrosus inferior
Sinus sigmoideus
V. jugularis interna
V. retro-mandibularis
V. ophthalmica superior
A. ophthalmica
A. angularis
V. angularis
Plexus pterygoideus
Vv. maxillares
A. carotis externa
A. carotis interna
A. carotis communis
V. facialis
A. facialis



Pterygoid venous plexus

and its tributaries:

n superior ophtalmic

p inferior ophtalmic

n infraorbital

vein to pterygoid plexus

(through foramen ovale – rete)

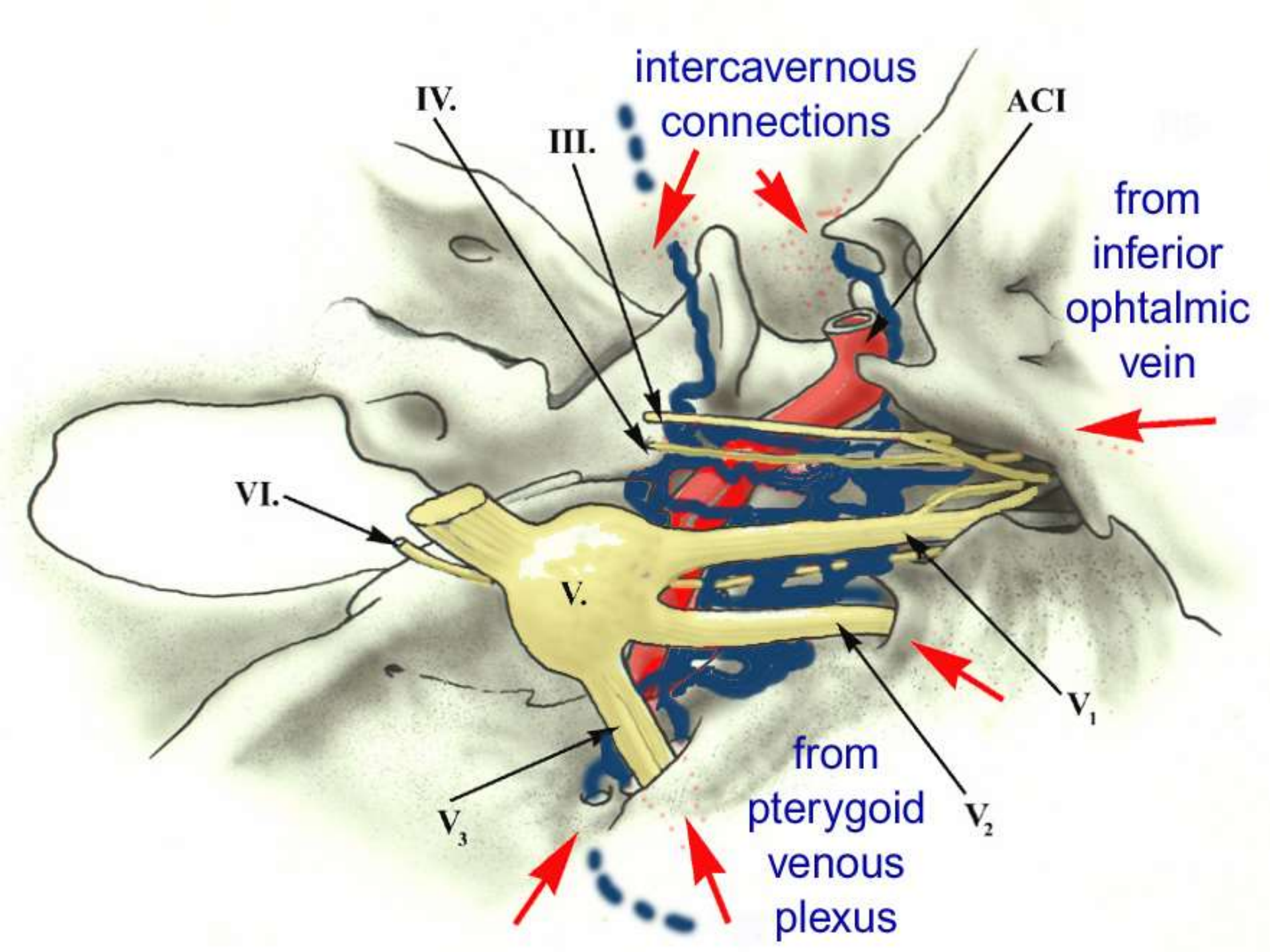
r deep facial

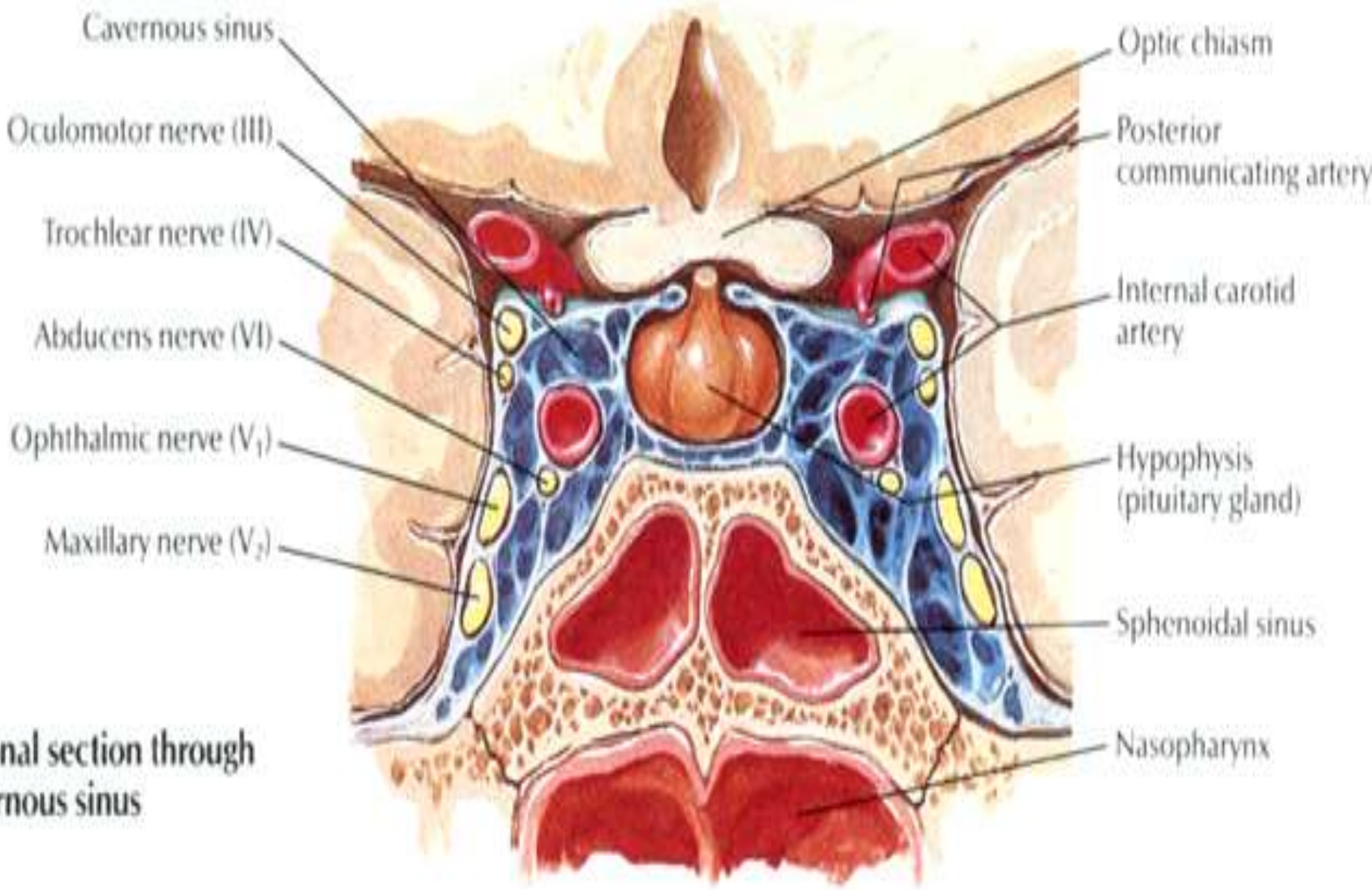
u buccal

inferior alveolar vein

... retromandibular vein

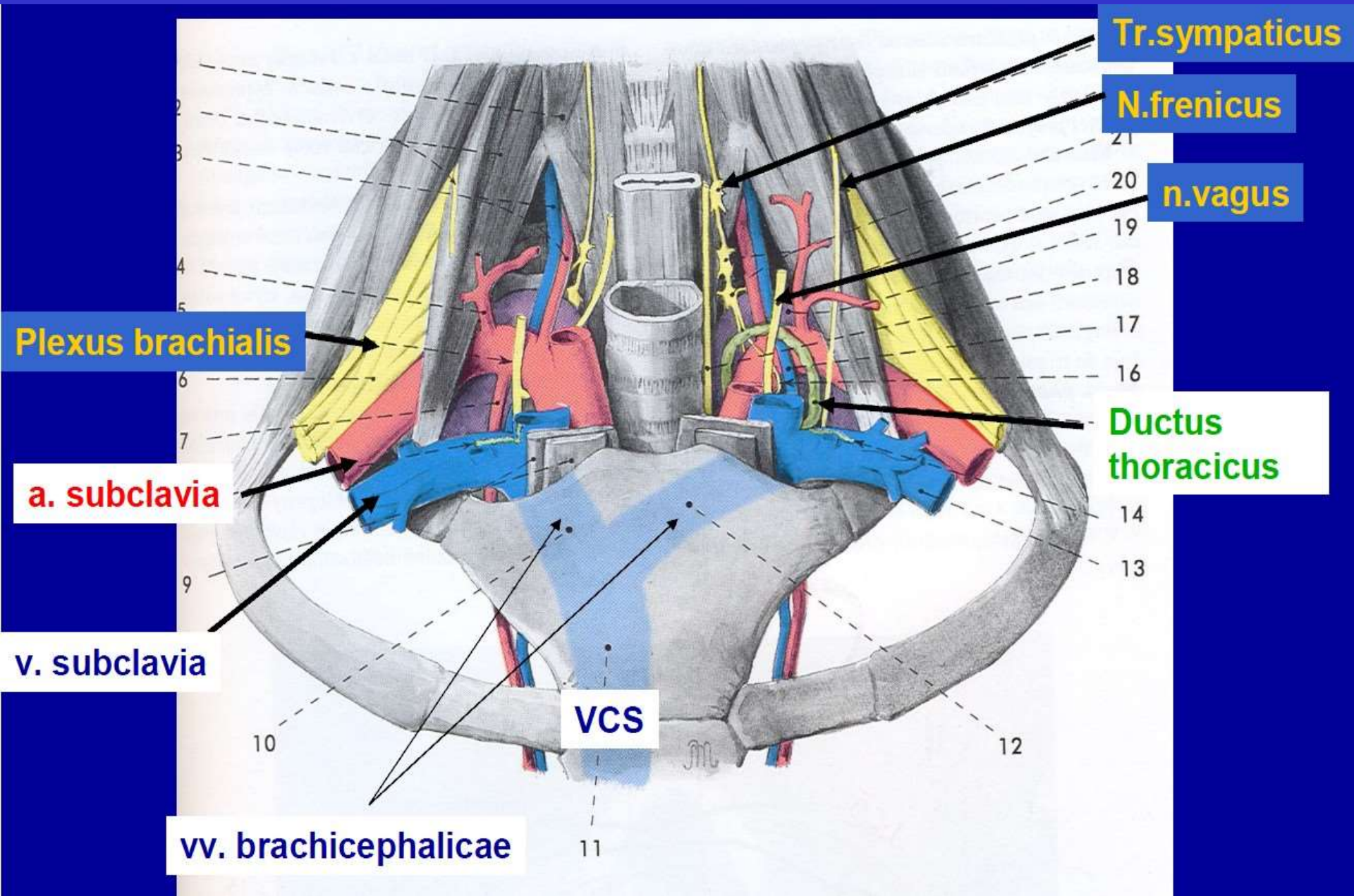
h maxillary veins


intercavernous
connections
IV.
III.
ACI
from
inferior
ophtalmic
vein
VI.
V.
V1
V2
V3
from
pterygoid
venous
plexus

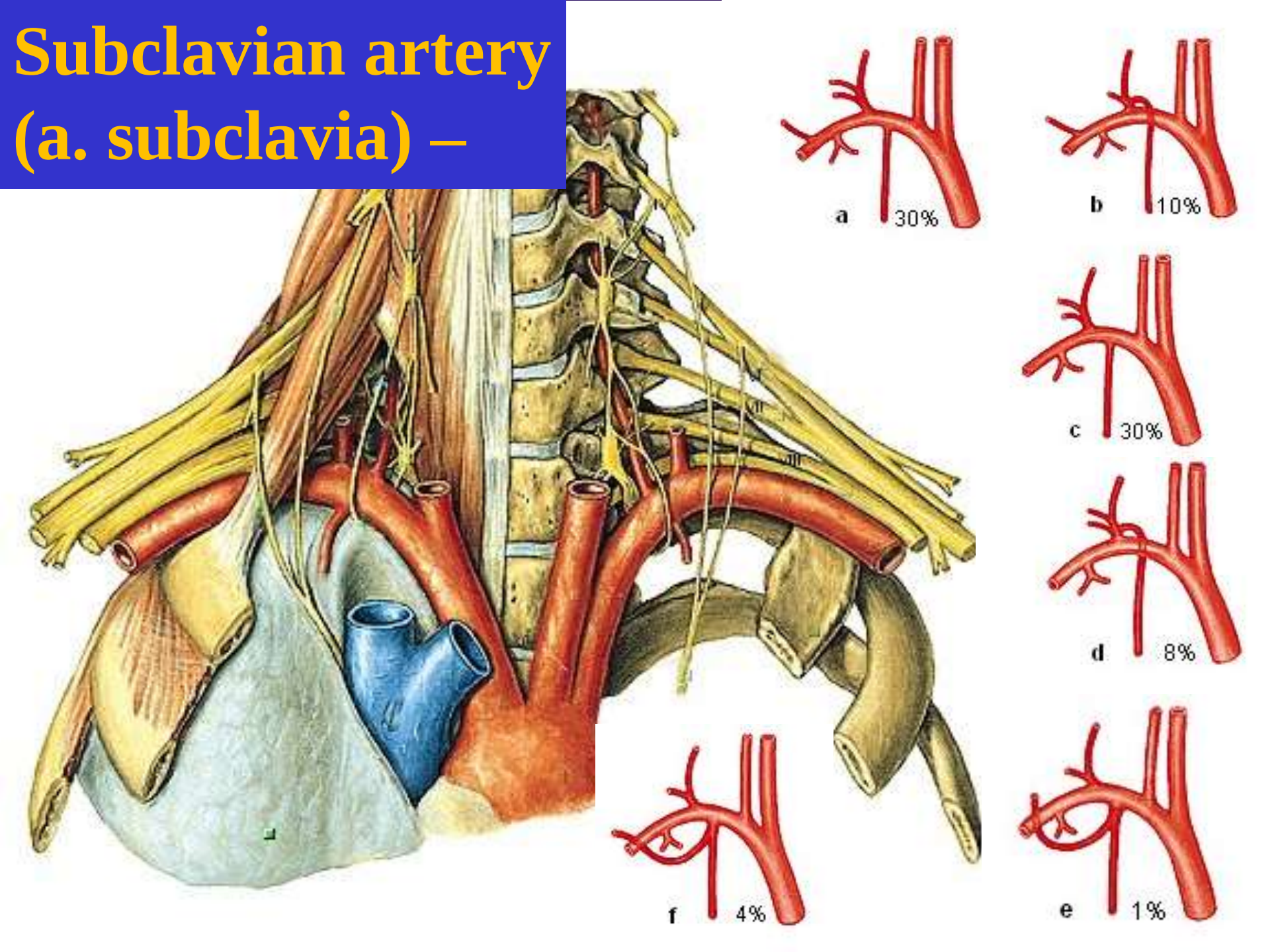


Coronal section through cavernous sinus

Superior thoracic aperture



Subclavian artery (a. subclavia) –



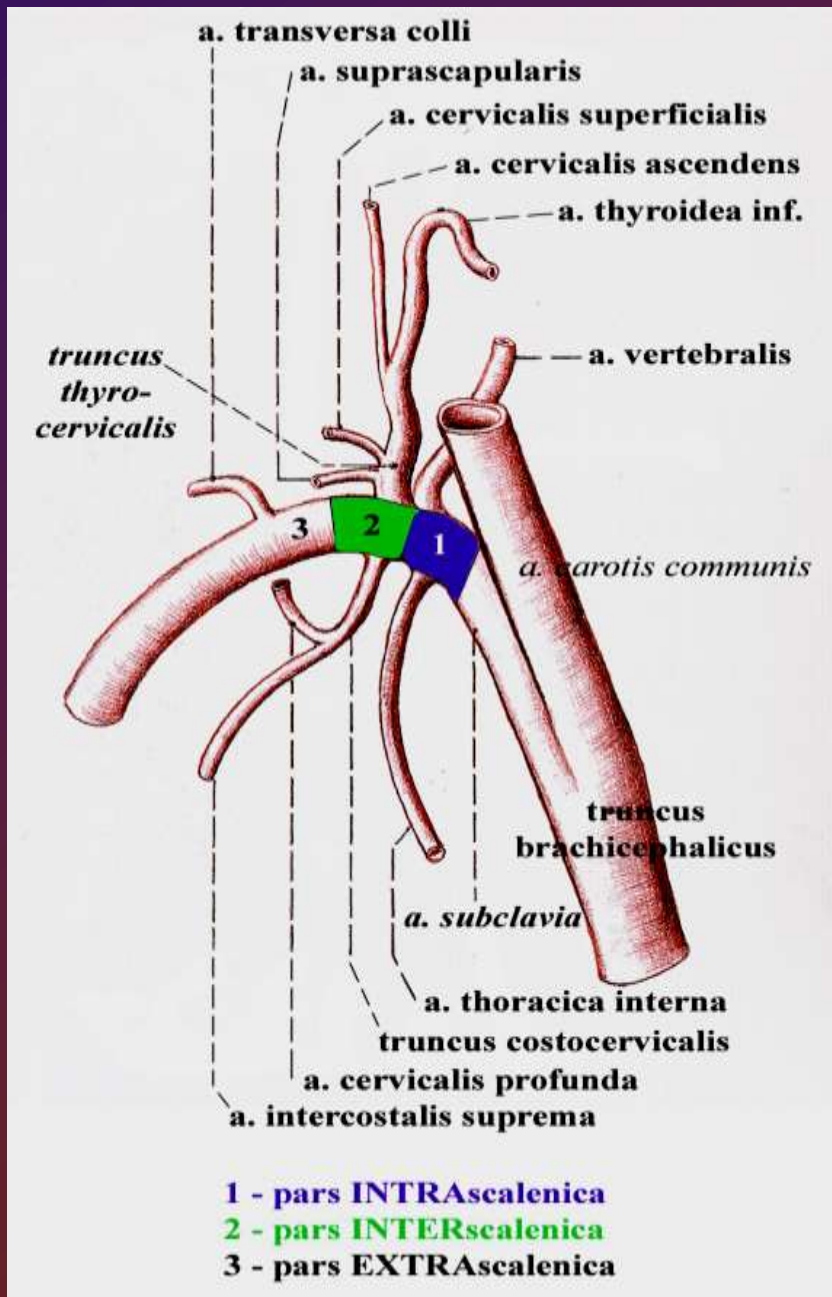
Subclavian artery (a. subclavia) – relations and branches

Parts and trunci

- sulcus arteria subclaviae pulmonis
- apertura thoracis superior
- sulcus arteriae subclaviae costae primae
- fissura scalenorum

branches exhibit variations

- *(thoracic outlet syndrom)*
- *steal phenomenon* (a. vertebralis)



Arteria subclavia

Arteria vertebralis
Truncus thyrocervicalis
Truncus costocervicalis
arteria thoracica interna

Vertebral artery

- **Prevertebral part**

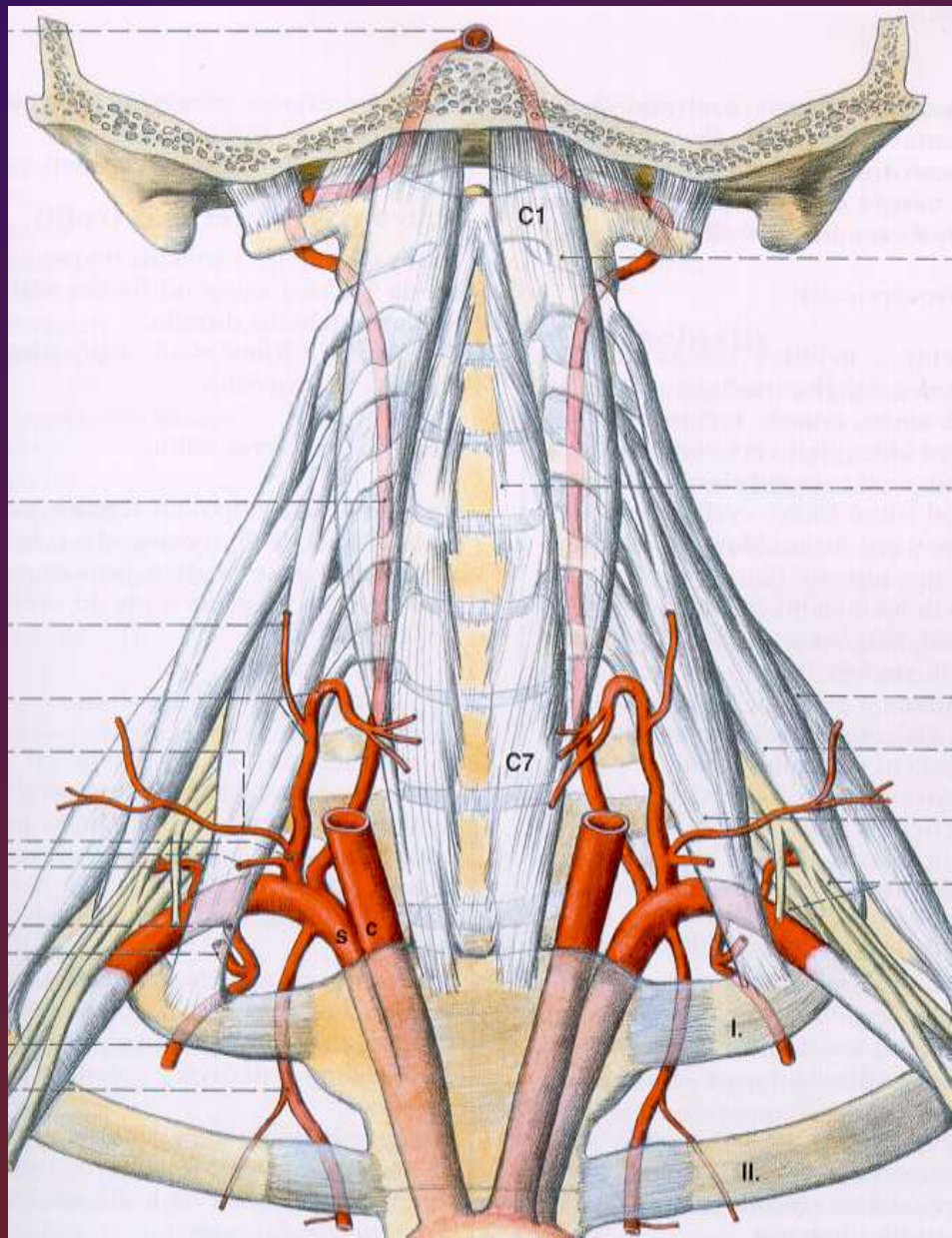
Cervical or transverse part

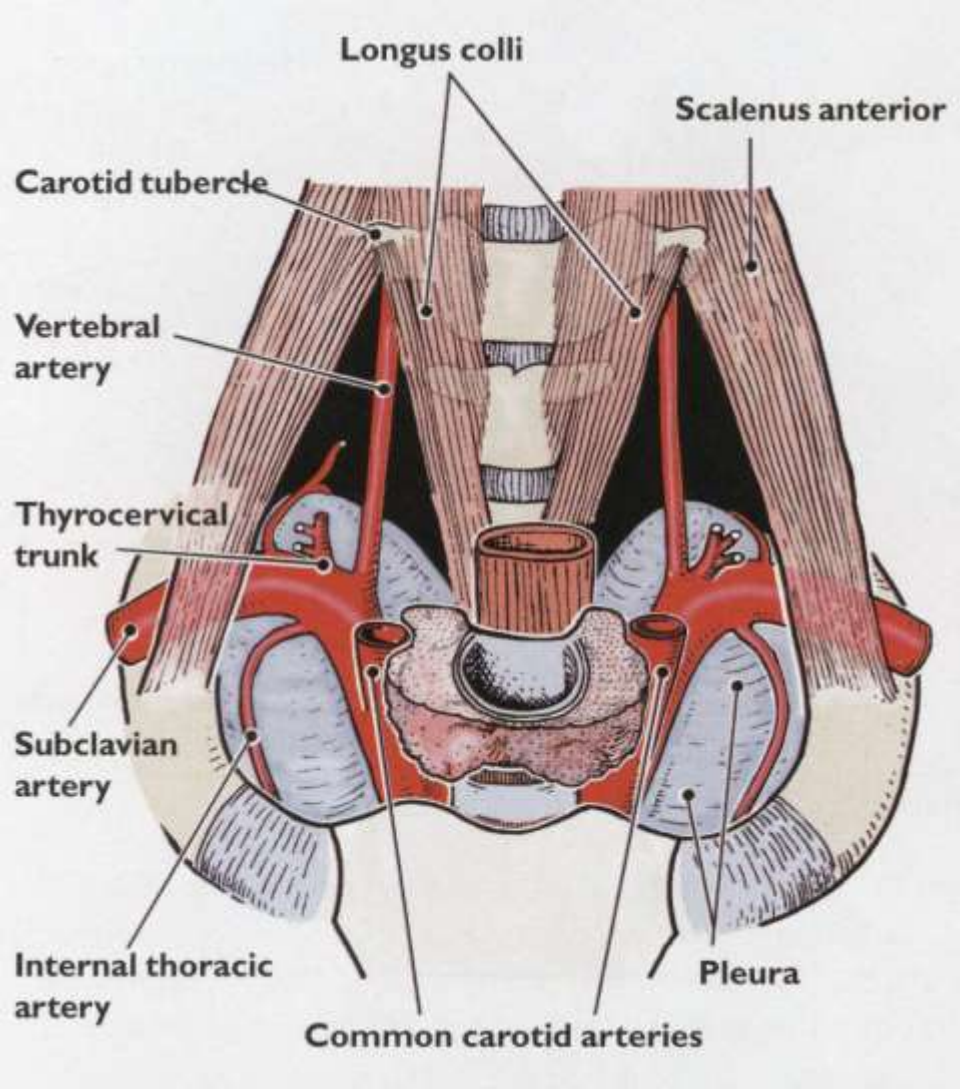
(C6-C1) → Spinal and muscular branches

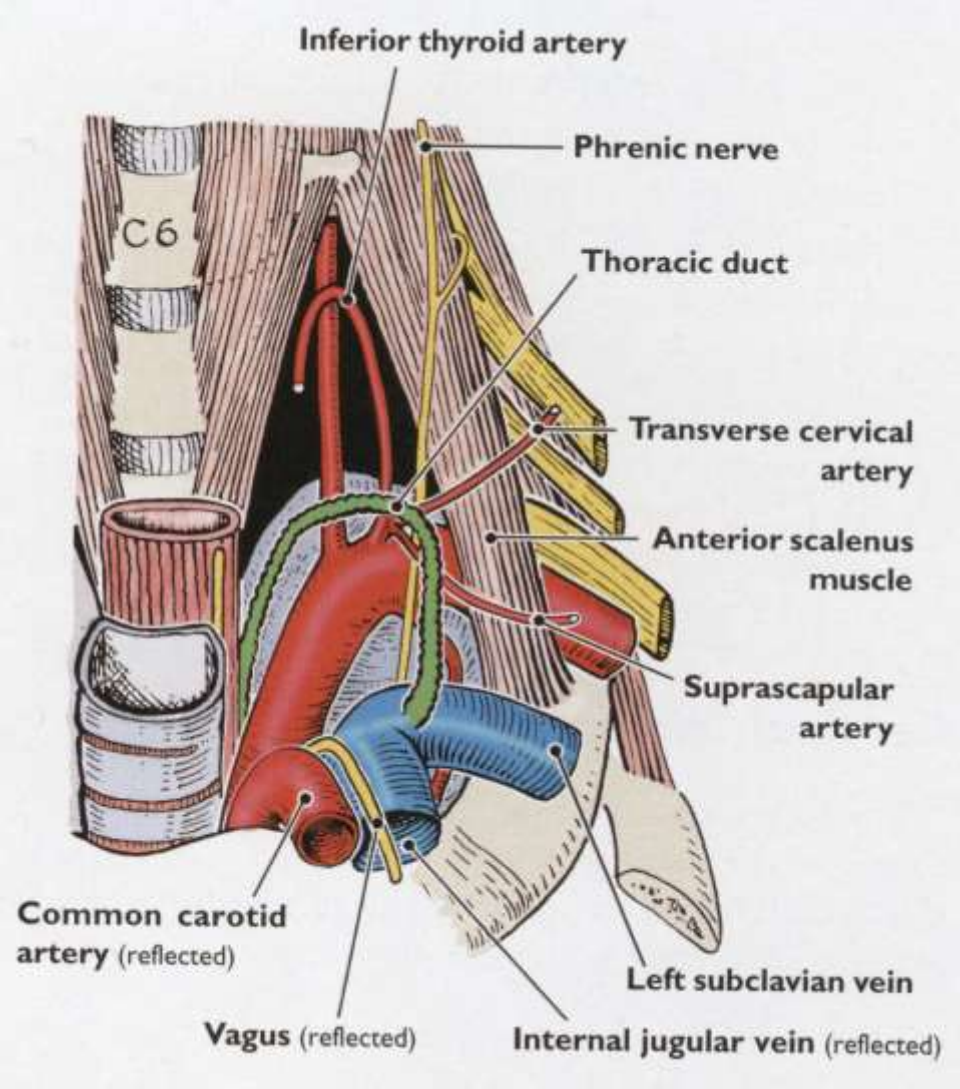
- **Atlantic part** – sulcus a.v., membrana

atlantooccipitalis post., foramen occipitale magnum

- **Intracranial part**
  - Meningeal brr. a. inferior posterior cerebellar brr. (→ a. spinalis post.)
  - Ant. spinalis branches

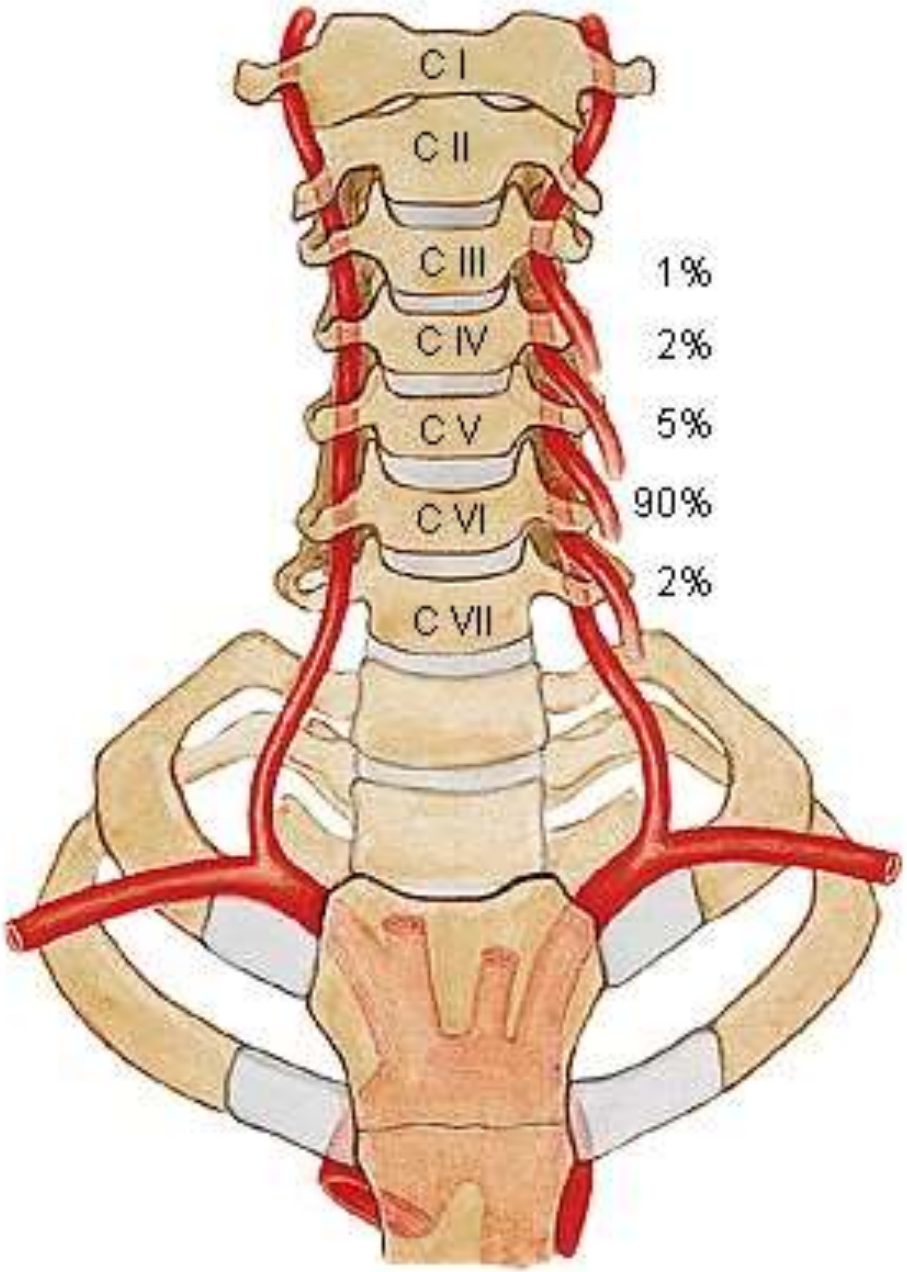


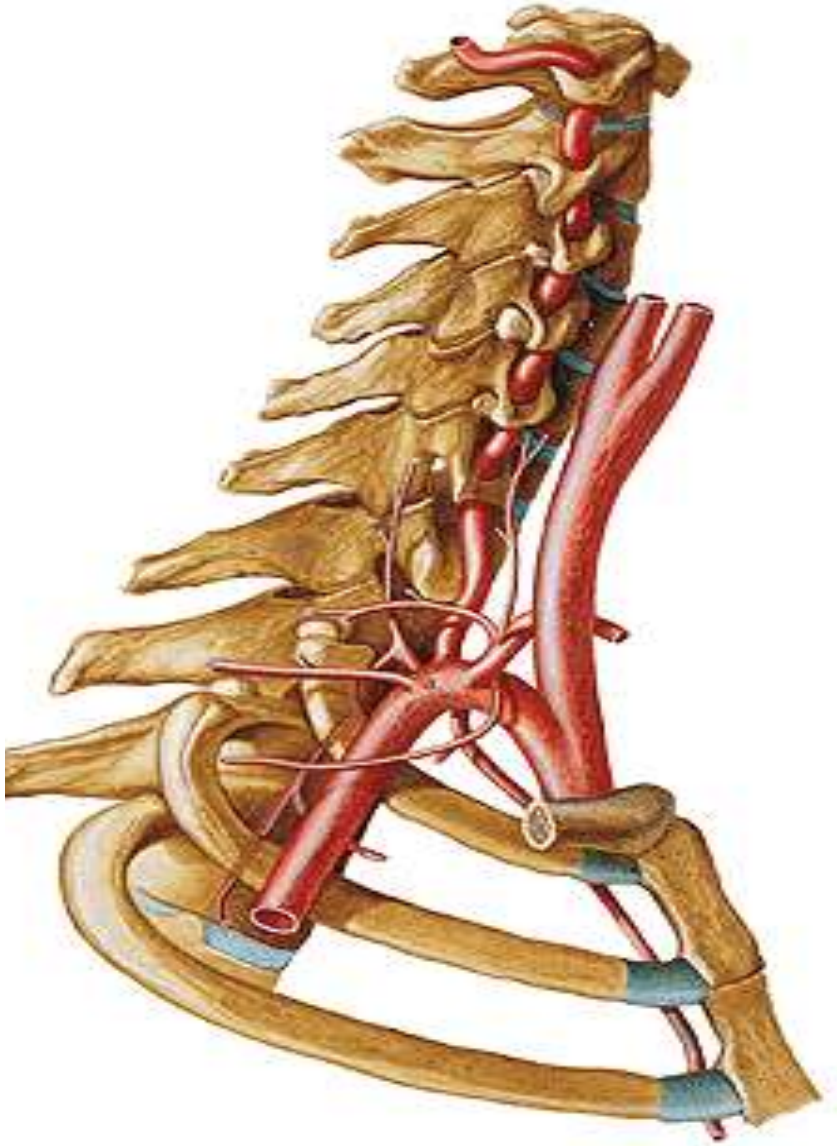


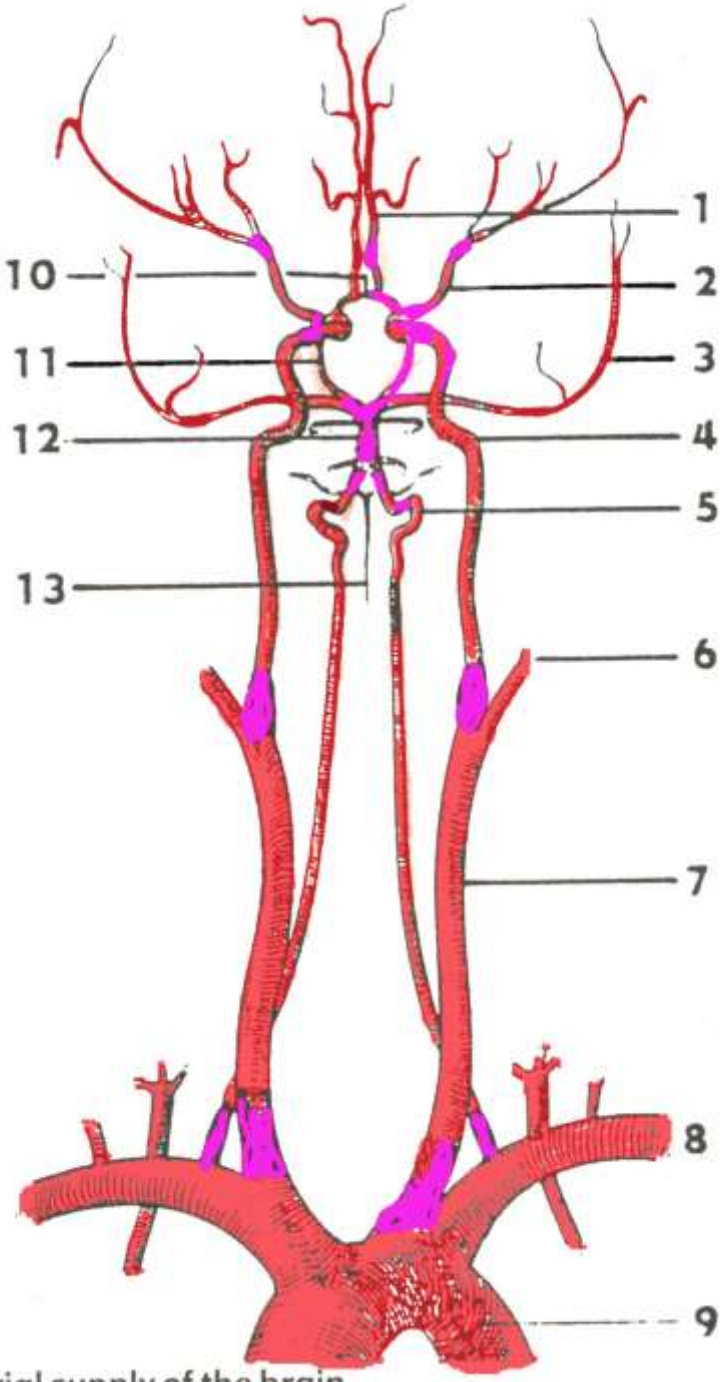


Trigonum scalenovertebrale
Scalenovertebral triangle

a. vertebralis







Arterial supply of the brain.

Blood source for brain:
Carotis interna 80%
Vertebralis 20%

1 – a. cerebri ant.,
2 – a. cerebri media,
3 – a. cerebri post.
4 – a. carotis int.,
5 – a. vertebralis,
6 – a. carotis externa,
7 – a. carotis communis,
8 – a. subclavia,
9 – arcus aortae,
10 – a. communicans anterior,
11 – a. communicans posterior,
12 – a. basilaris,
13 – a. spinalis anterior.

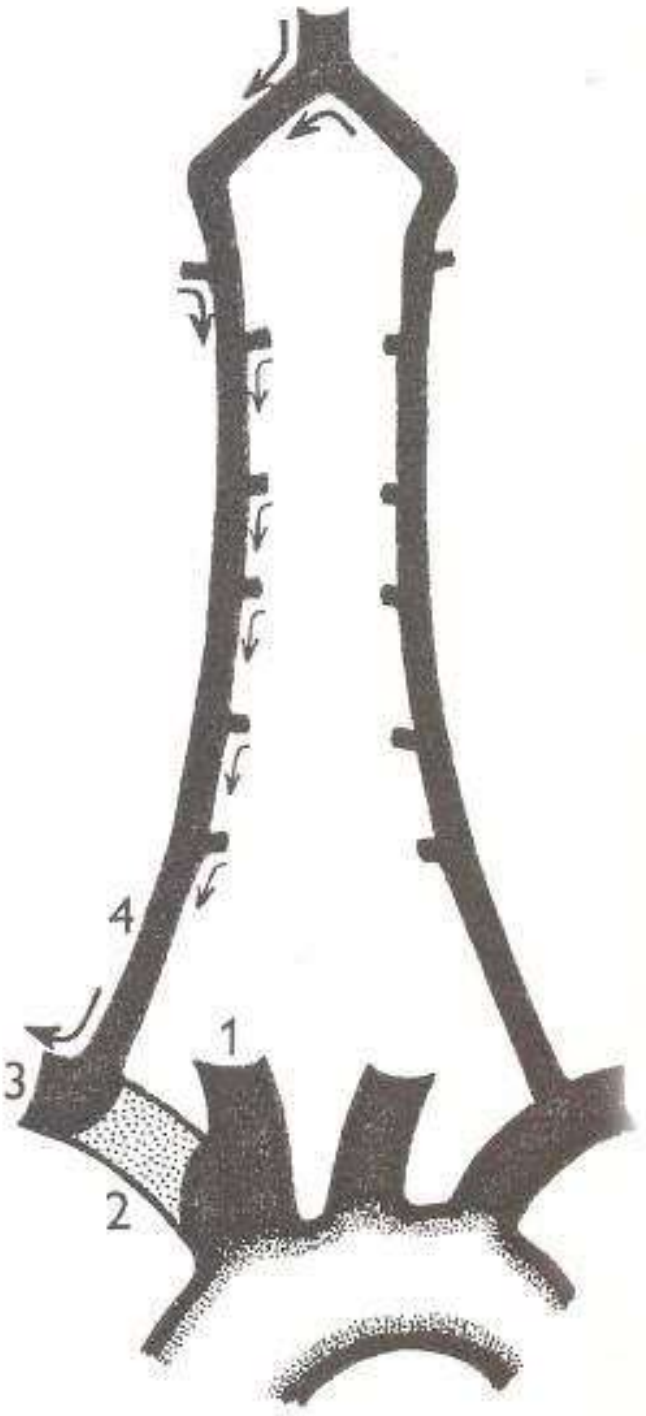
Syndrome „thievish“ subclavian a.

Ligature on a.subclavia:

• Subclavian a. “steals“ blood using vertebral artery for upper extremity

Diplopia, diziness, inconlopii, závratě, syncope, comatose

• Pulsation on irritated side, poor pulsation, low blood pressure



Shunts (collaterals) open during collapse of vertebral a.:

1-a.carotis communis

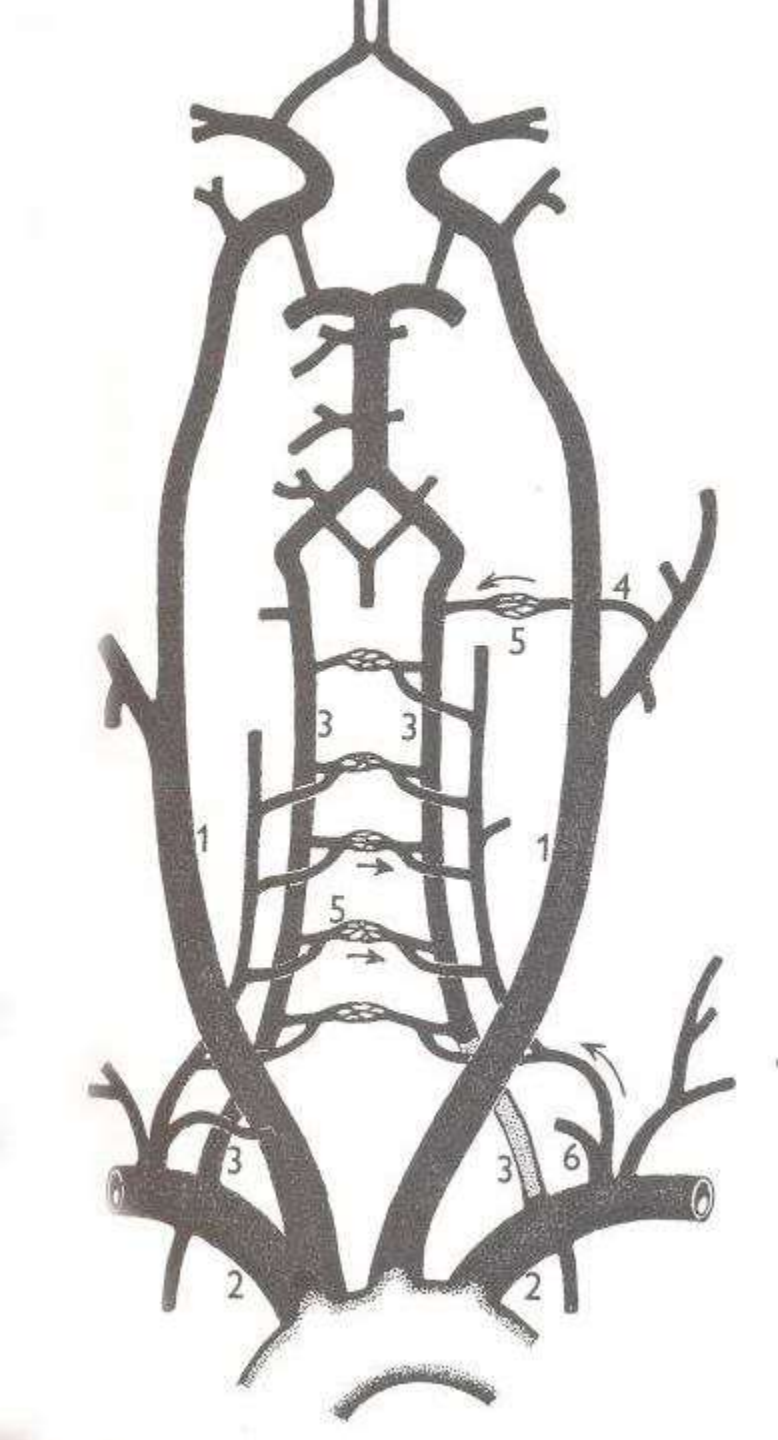
2-a.subclavia

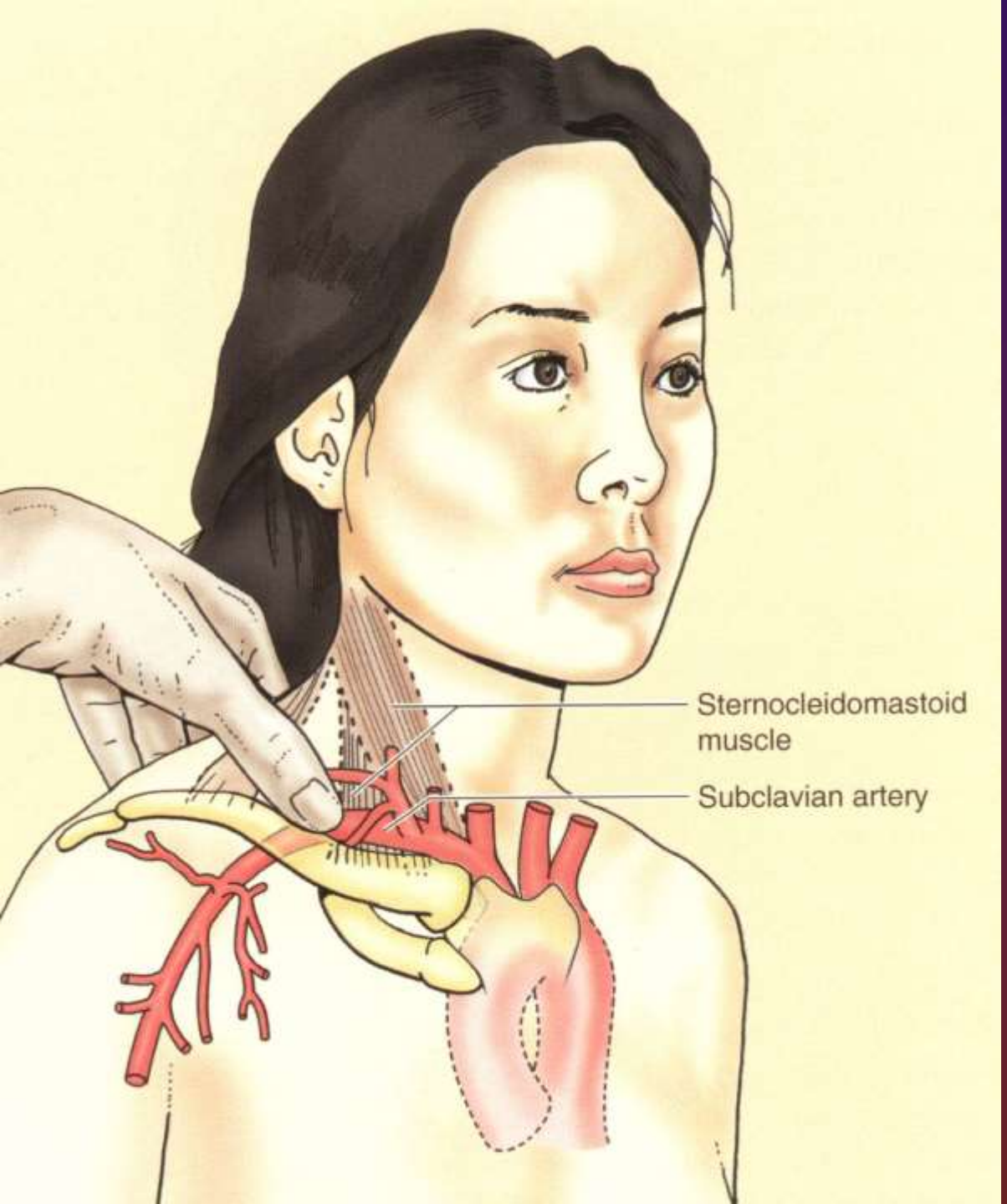
3-a.vertebralis

4-a.occipitalis

5-rami spinales et musculares

6-truncus thyrocervicalis





Anterior triangle importances

Subclavian opulse

Compression or ligation of the subclavian artery

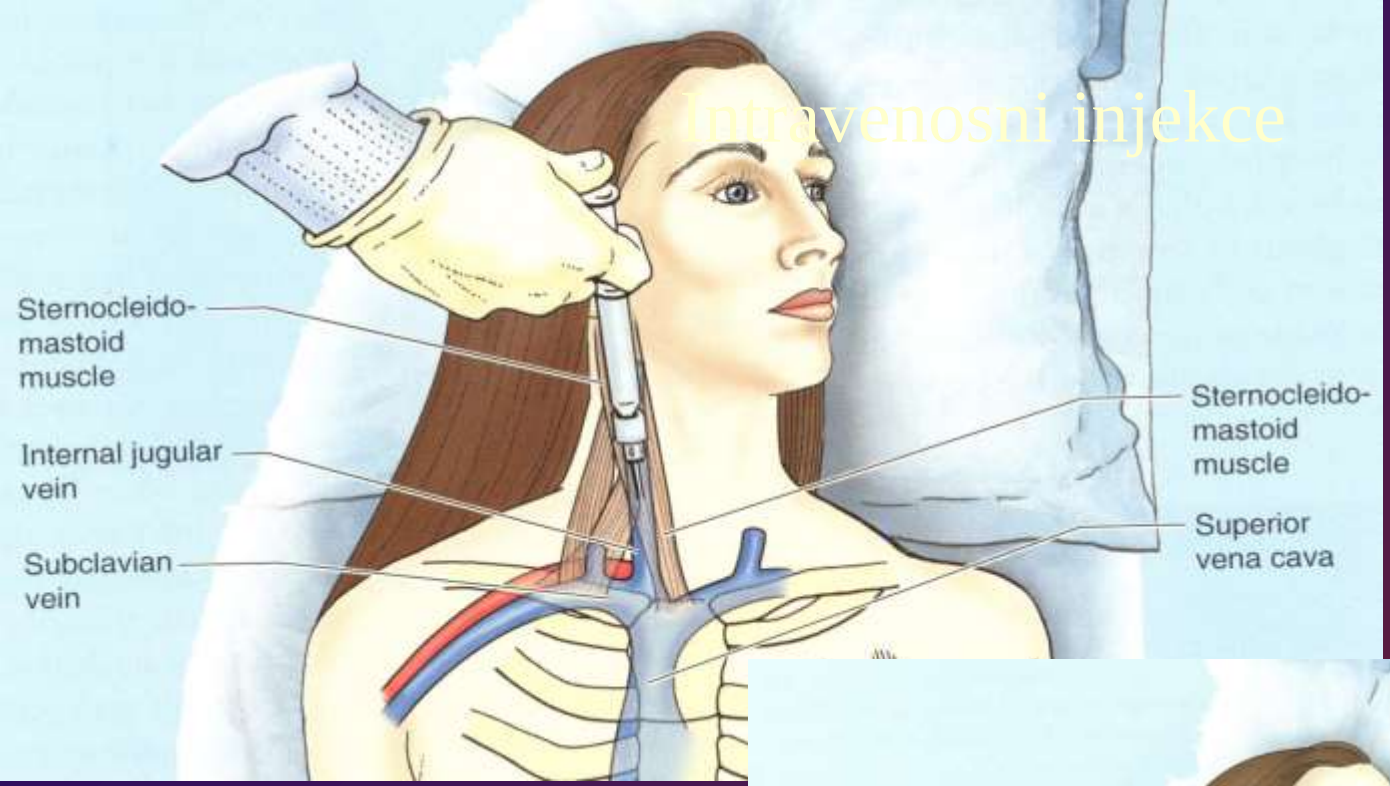
Ligation of the external carotid artery

Carotid endarterectomy

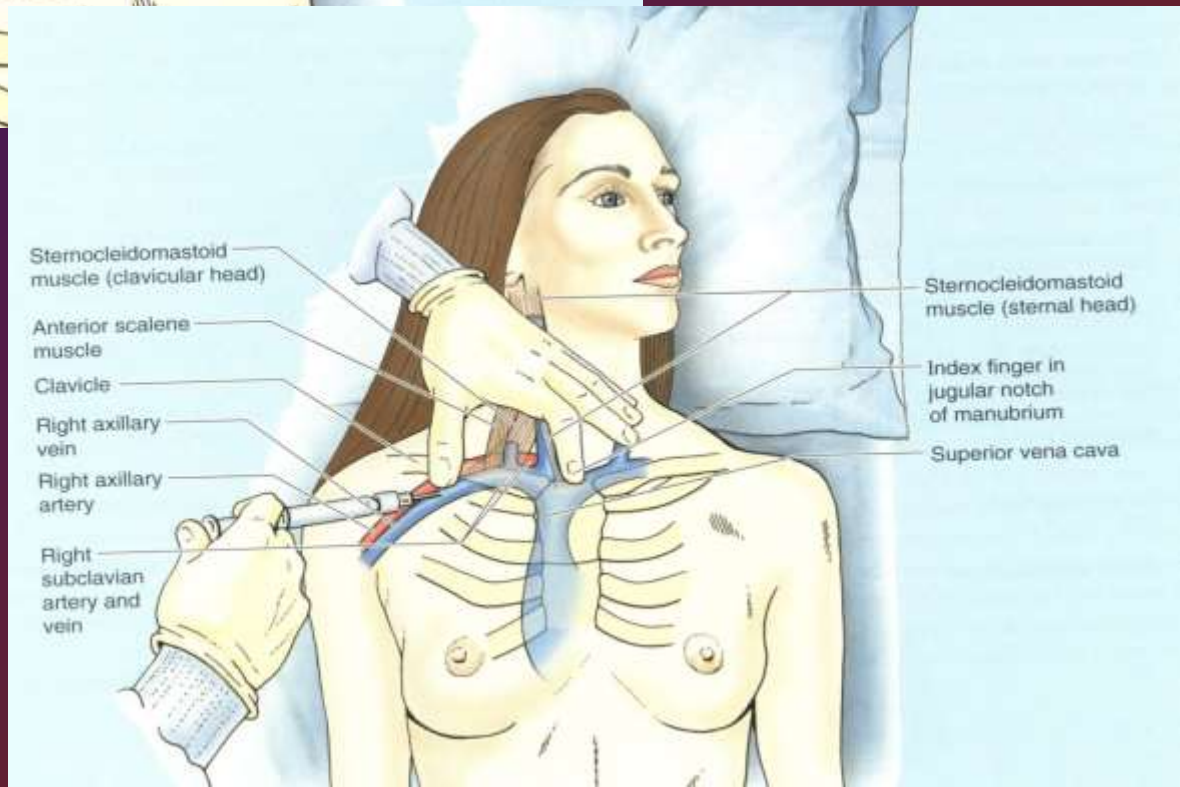
Carotid pulse

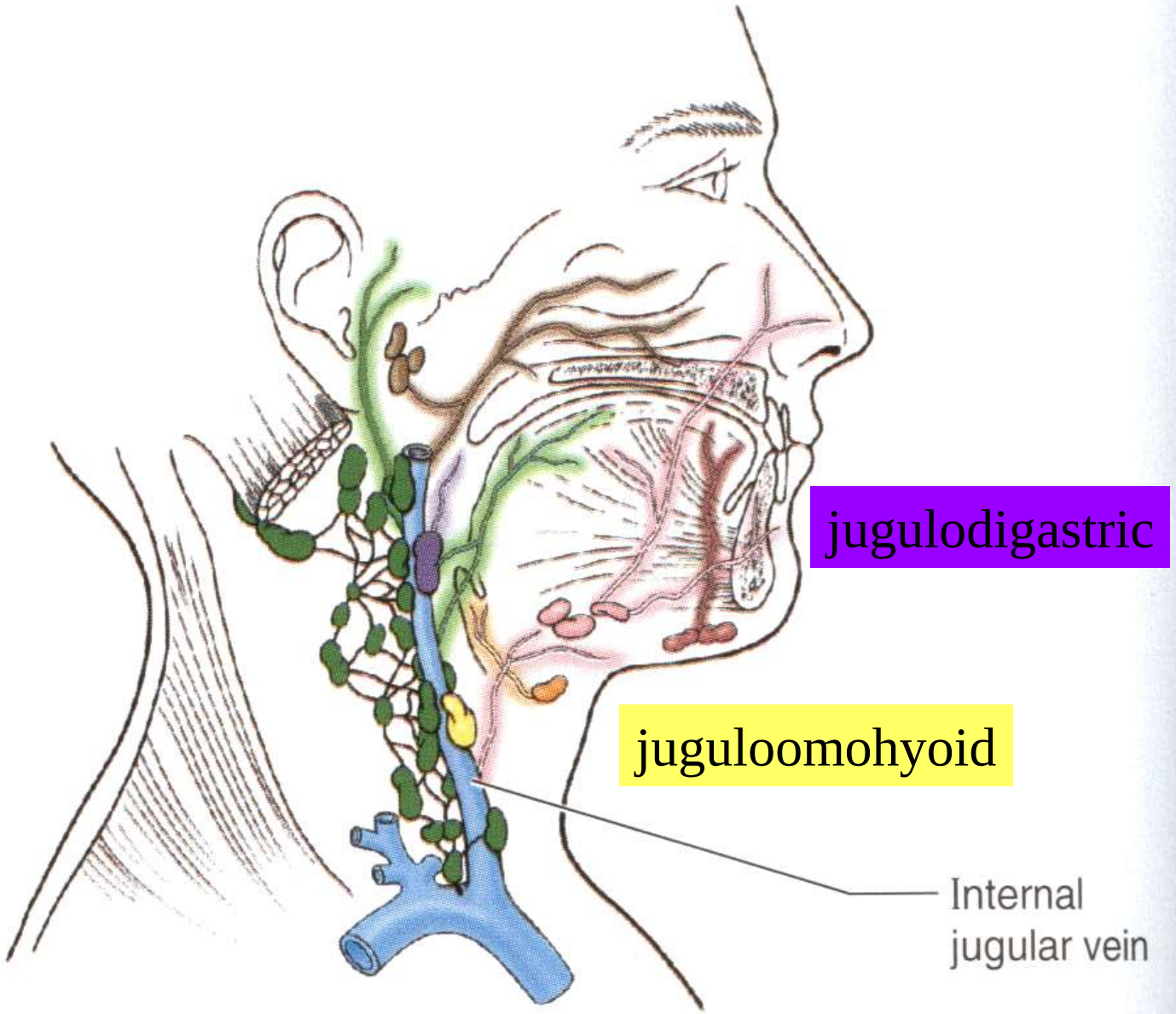
Carotid artery palpation

Intravenosni injekce



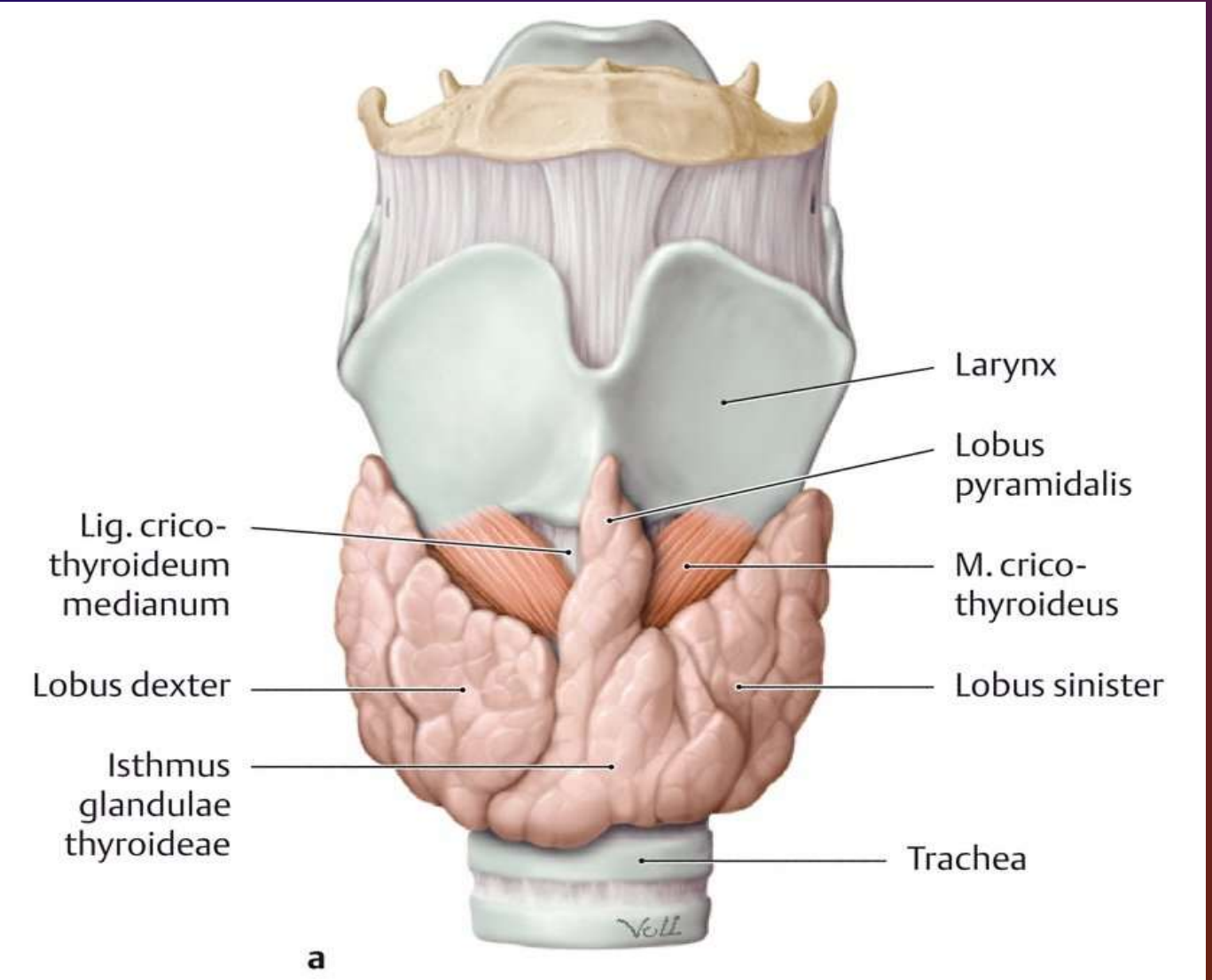
Intravenosni injekce
Intravenous injection



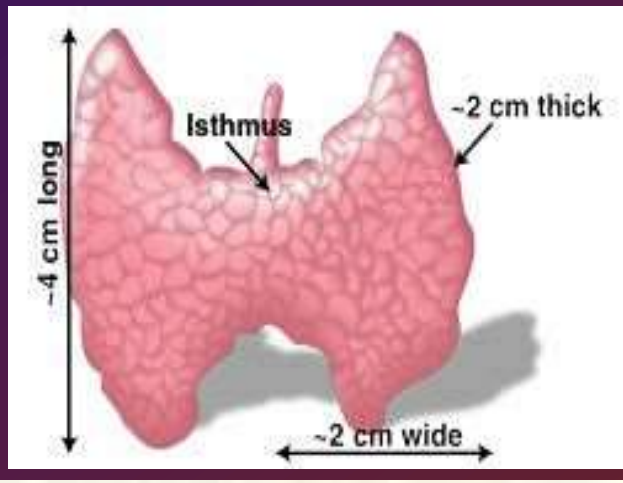


Lateral view

Glandula thyroidea
Thyroid gland

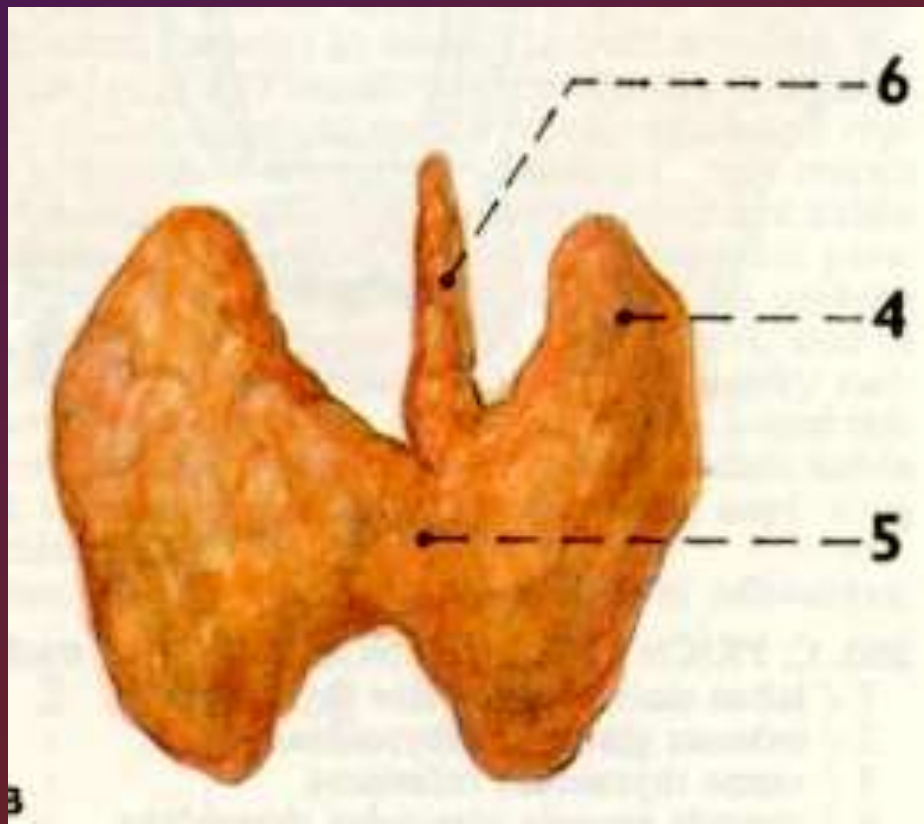


Thyroid gland – structure and role



Parts

Lobus dx., sin. (4)
isthmus (6)
lobus pyramidalis (6)



Metabolic role

- **thyroxin** T_4, **trijodtyronin** T_3
- calcitonin

Descent of the thyroid primordia during development can be followed by anomalies

Thyroglossal duct –

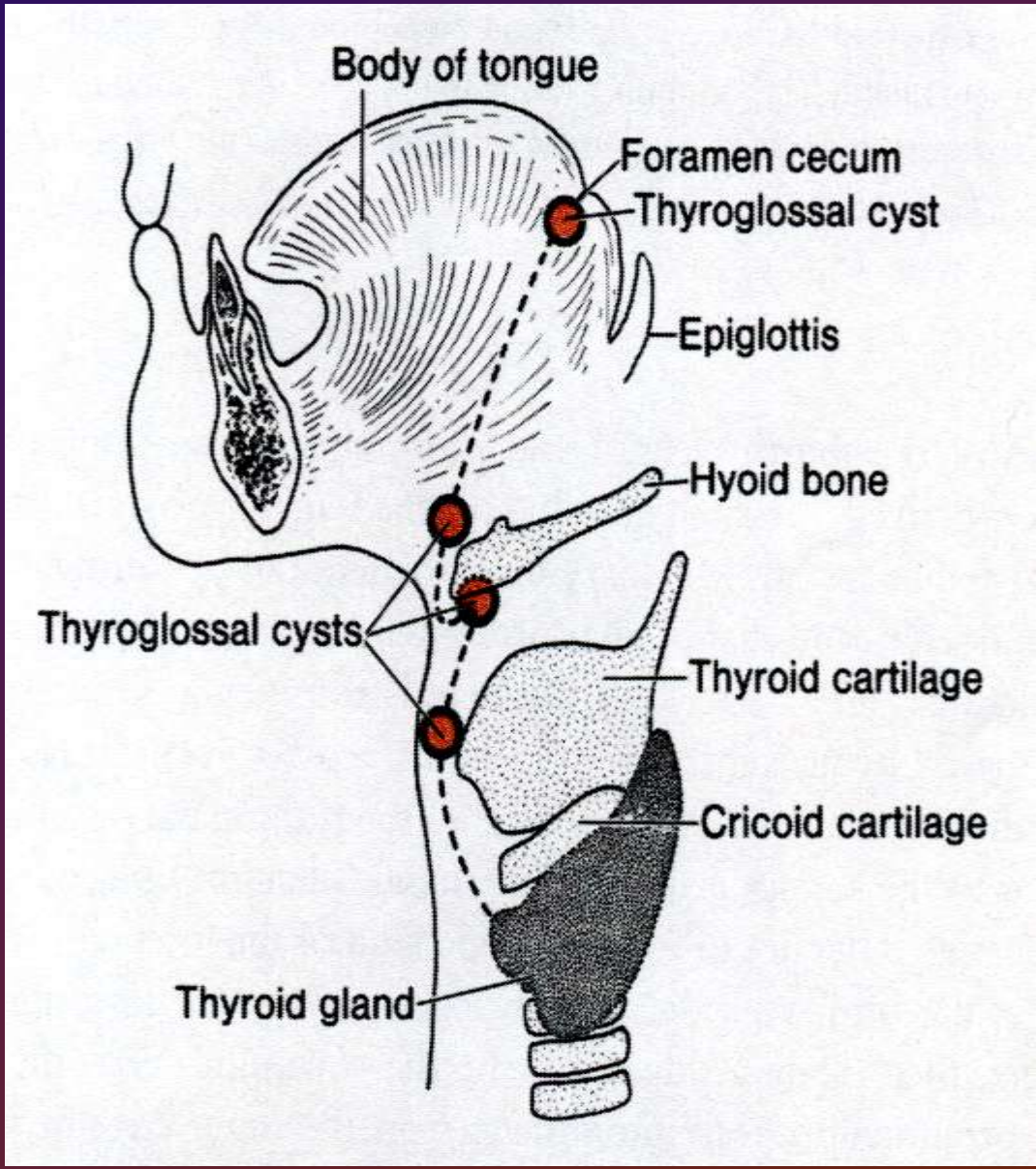
Persisting canal between tongue and gland

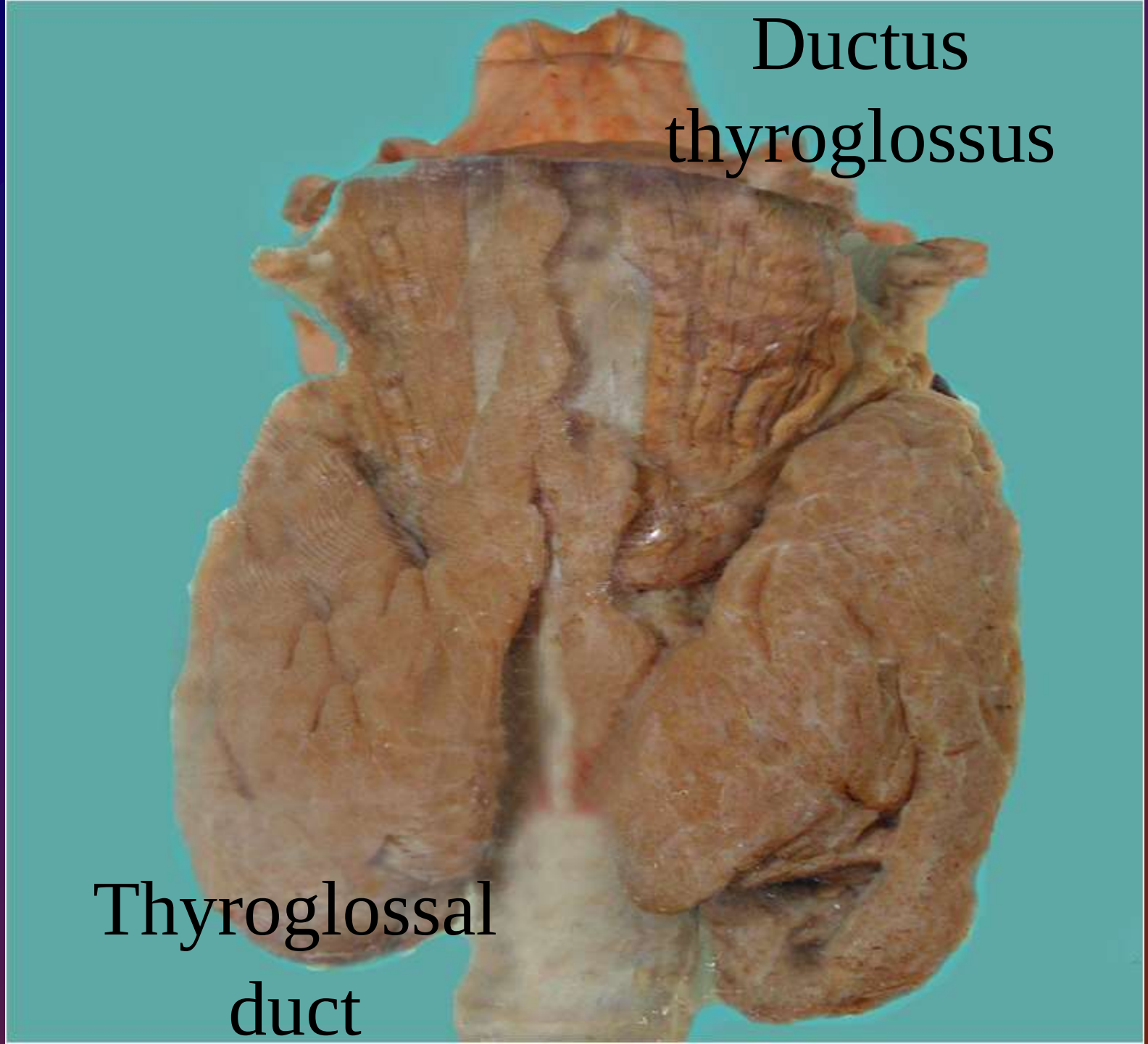
Thyroglossal cyst + thyroglossal fistula –

Lie in the midline of the neck at any point along the migratory pathway of the thyroid gland, can be connected with outside by a fistulous canal

Aberrant thyroid tissue –

Found in the base of the tongue



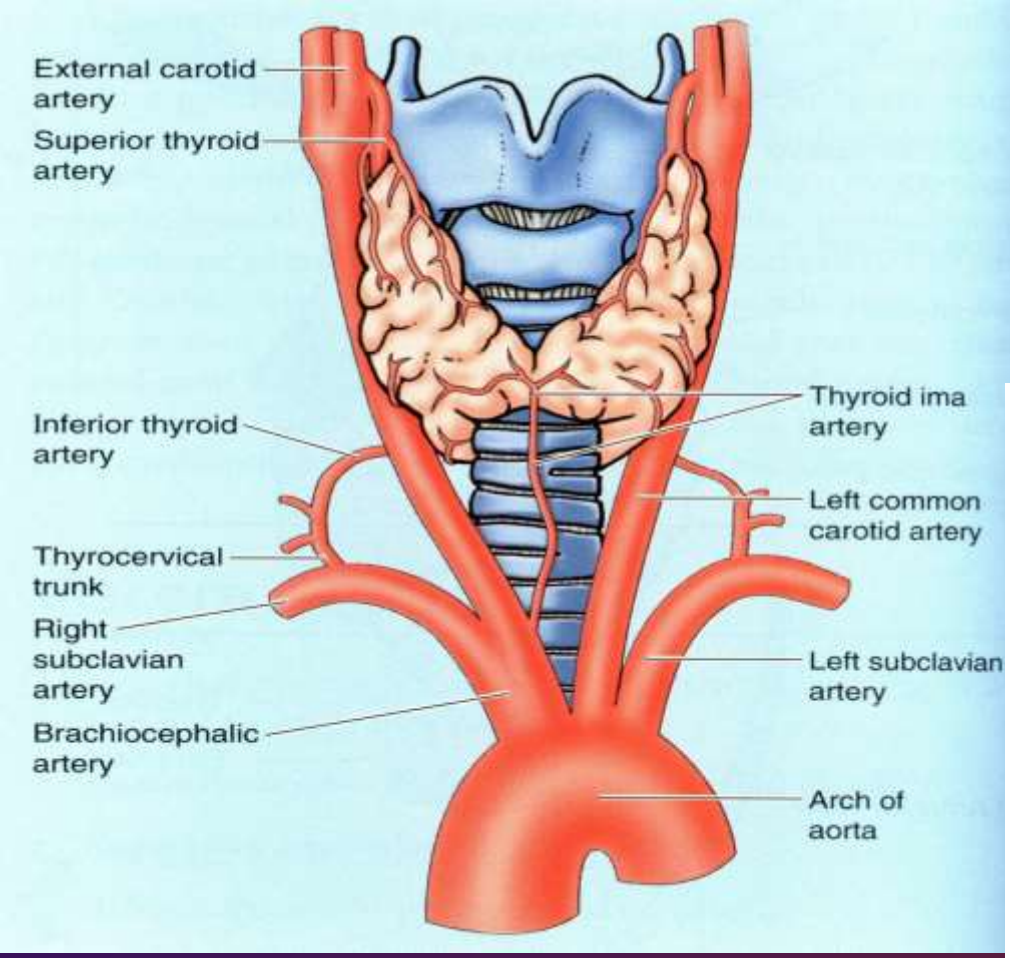

Ductus thyroglossus
Thyroglossal duct

Cysta thyreoglossea

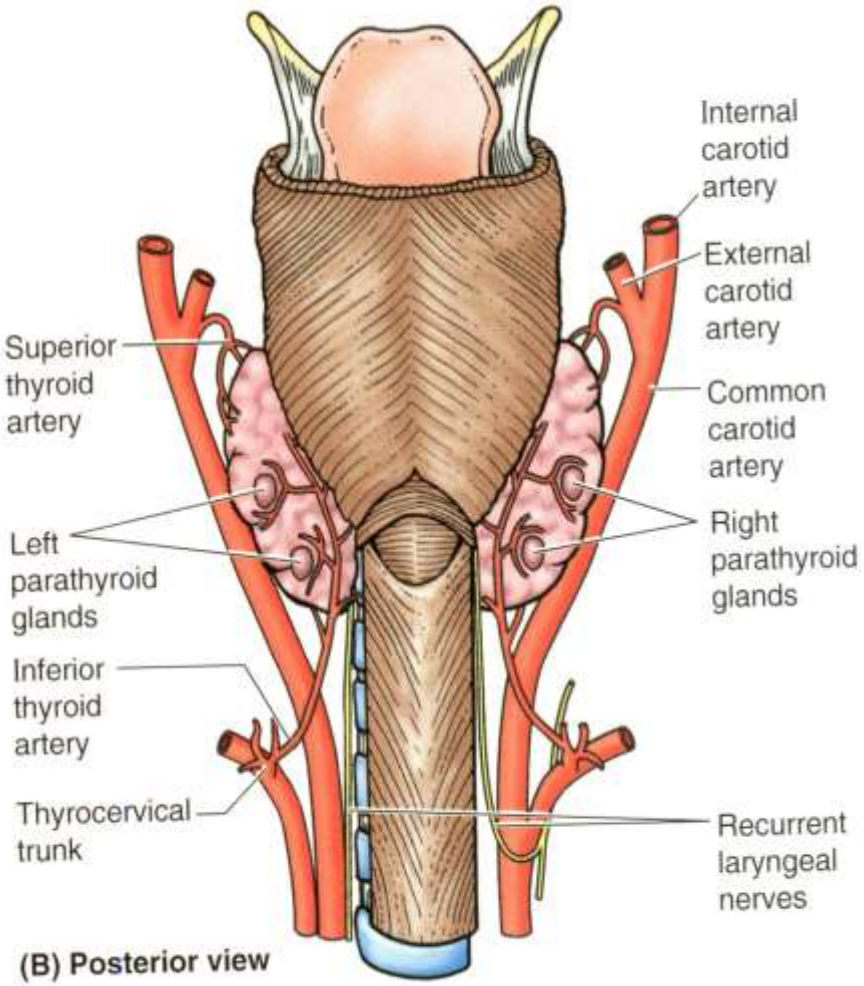
Thyroglossal cyst

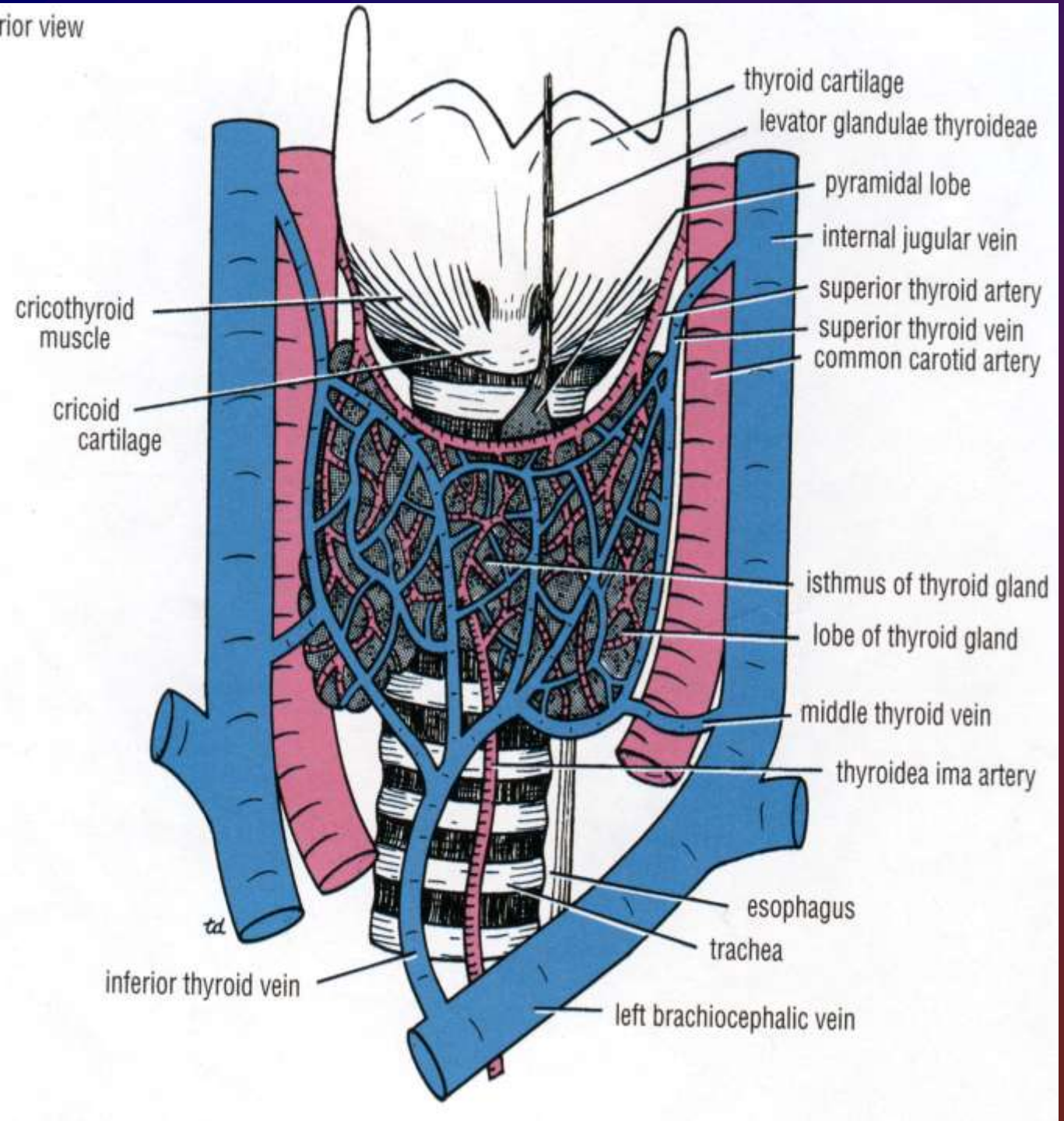
Thyroid gland

Arterial supply



A. thyroidea sup. (from a. carotis ext.)
A. thyroidea inf. (from truncus thyrocervicalis); is crossing
n. laryngeus recurrens
A. thyroidea ima (2% - from arcus aortae)

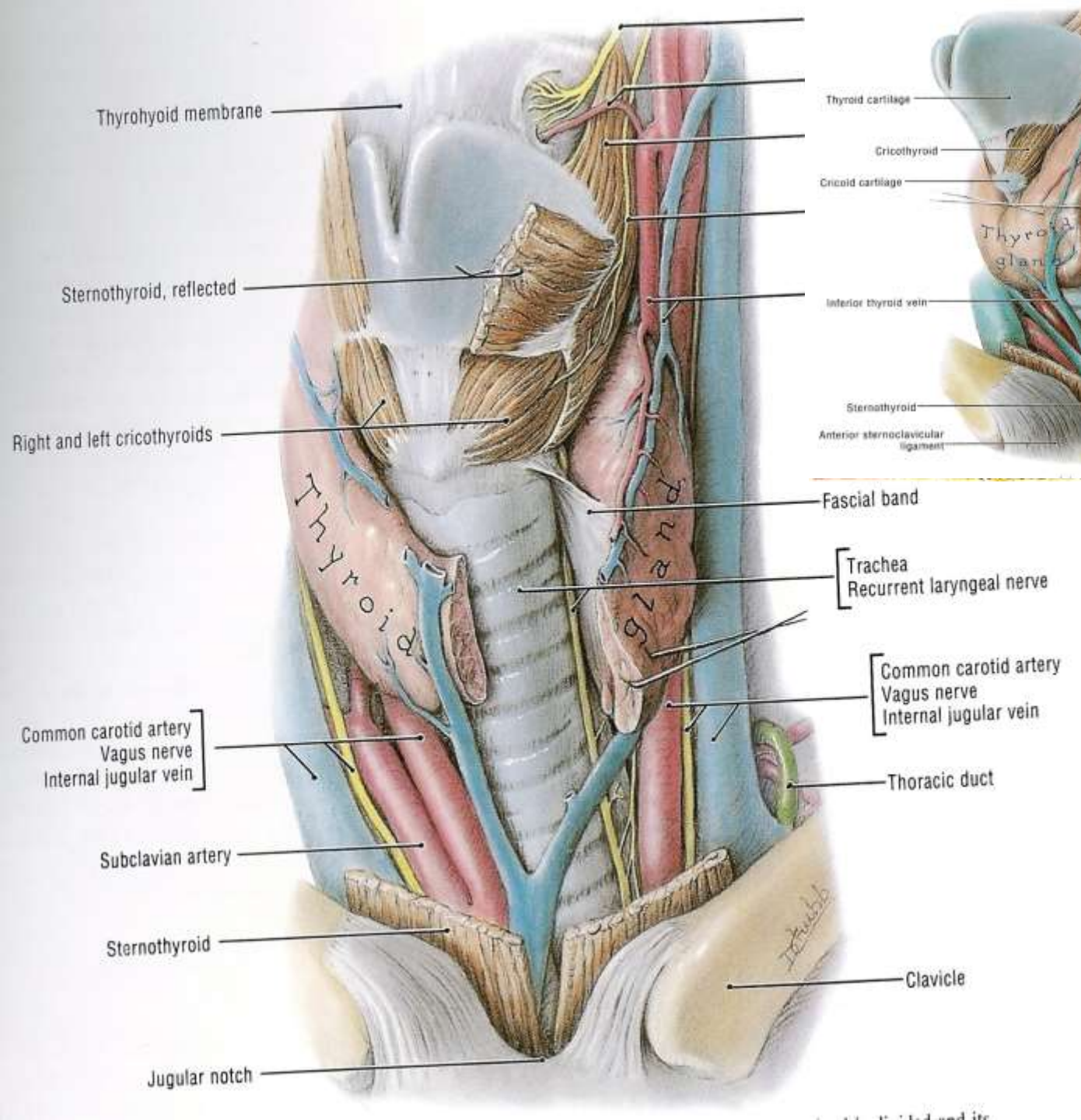


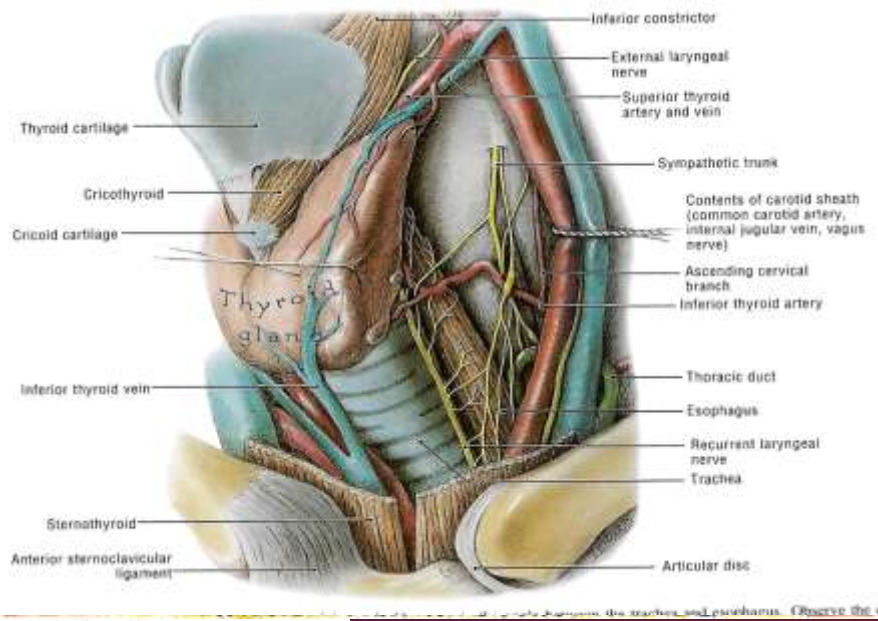


Thyroid gland

Venous supply

Vv. thyroideae sup., mediae et inf.
Plexus thyroideus impar (to v. brachiocephalica sin.)
Lymph bilaterally



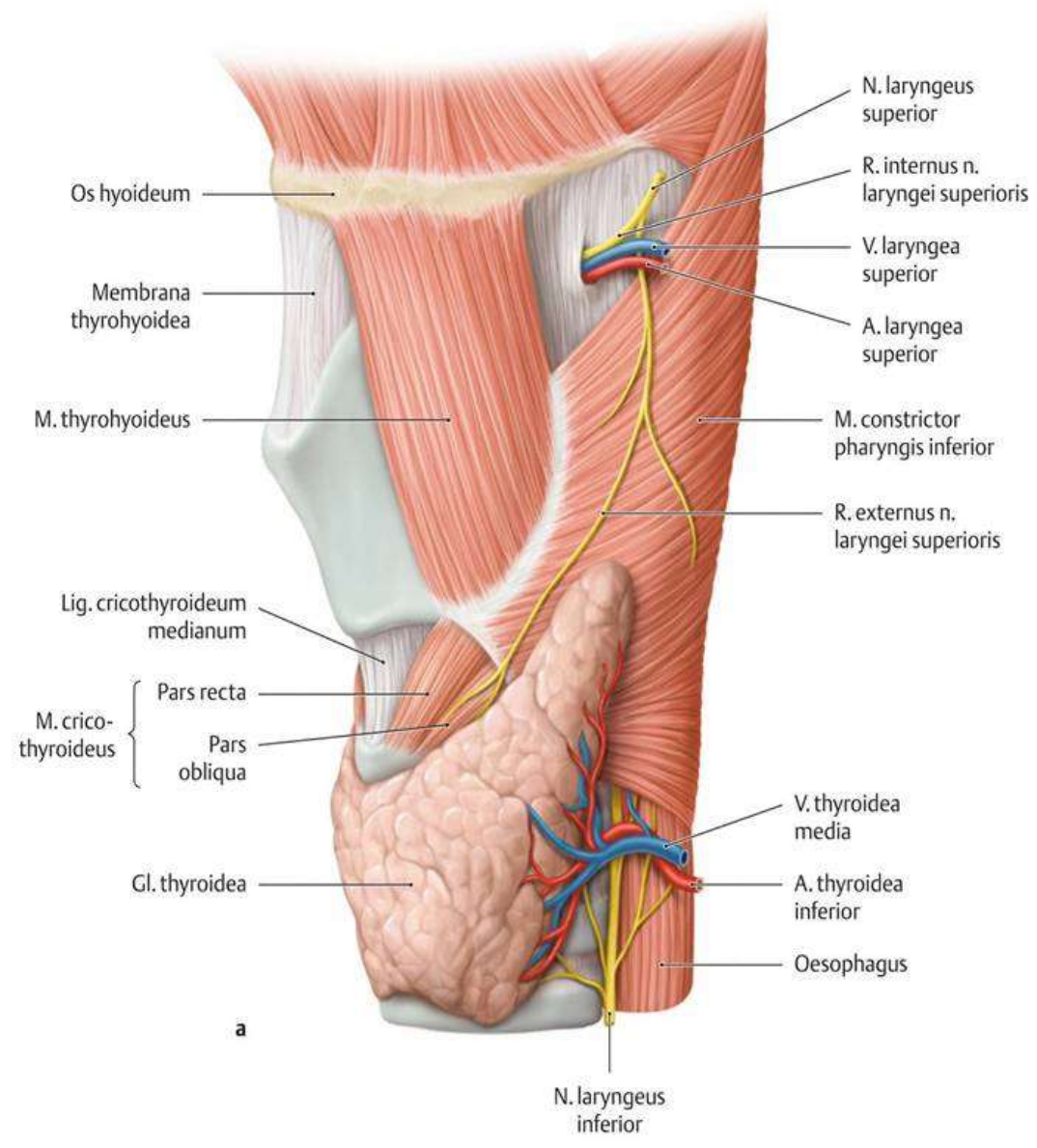


Vazivové upevnění štítné žlázy

Fascial fixation of the thyroid gland

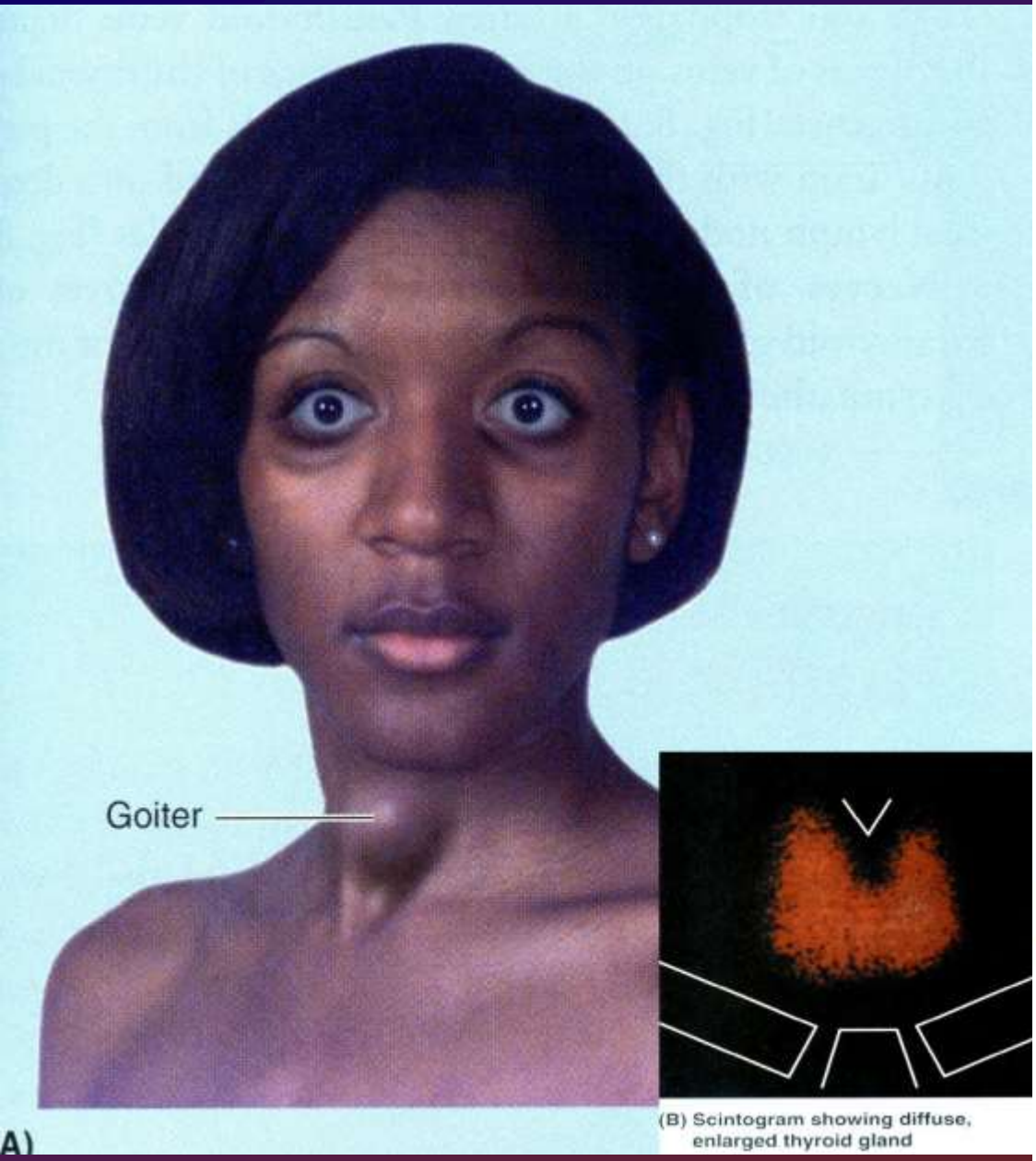
Thyroid gland

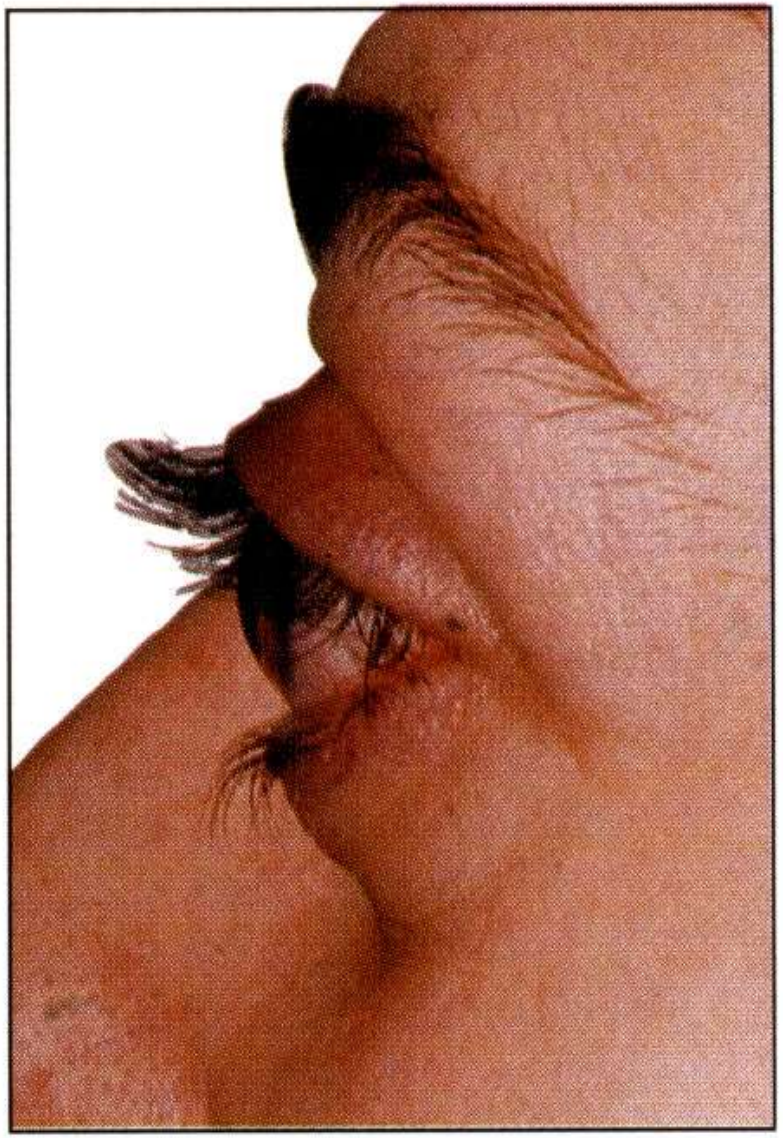
Parathyroid body



a. thyroidea inferior

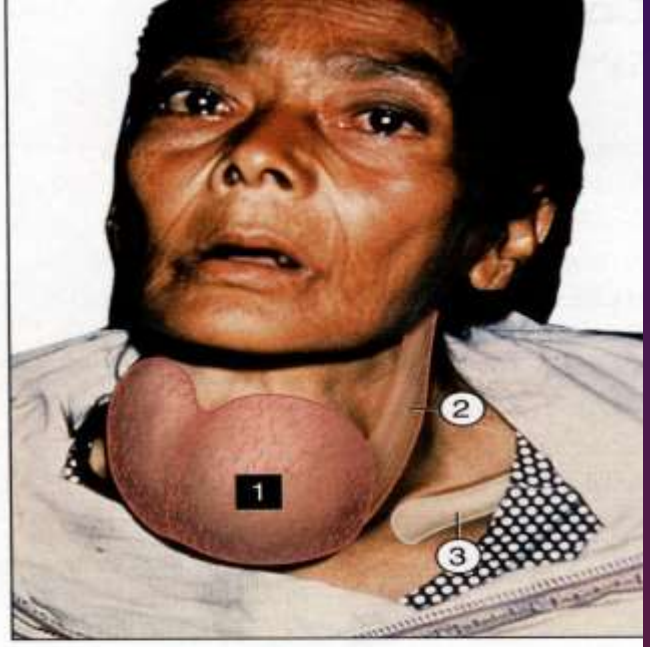
n. laryngeus inferior





Appearance of the eyes in hyperthyroidism – proptosis, lid retraction, chemosis

ig. 2.17 Multinodular goitre with dominant odule



Key
1 Goitre with dominant nodule
2 Sternocleidomastoid muscle
3 Clavicle

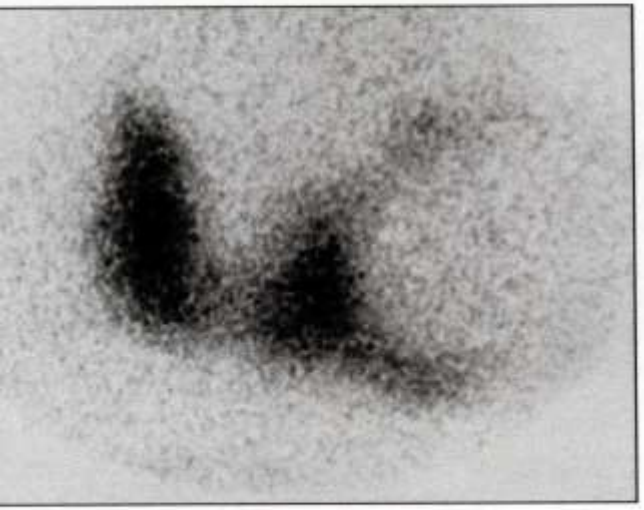
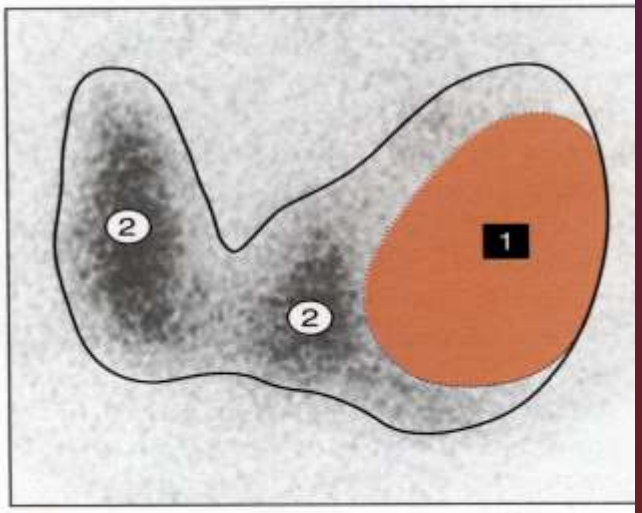
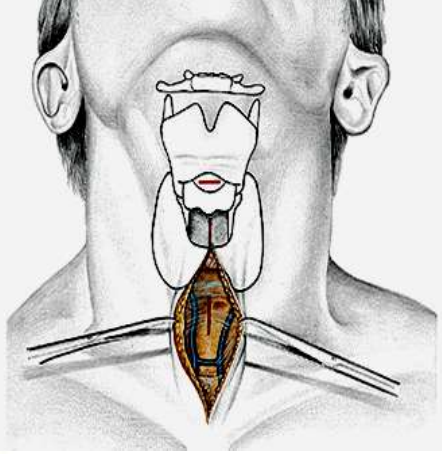


Fig. 2.18 Radionuclide scan of thyroid

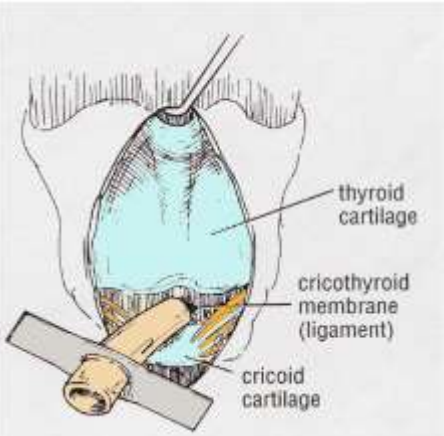


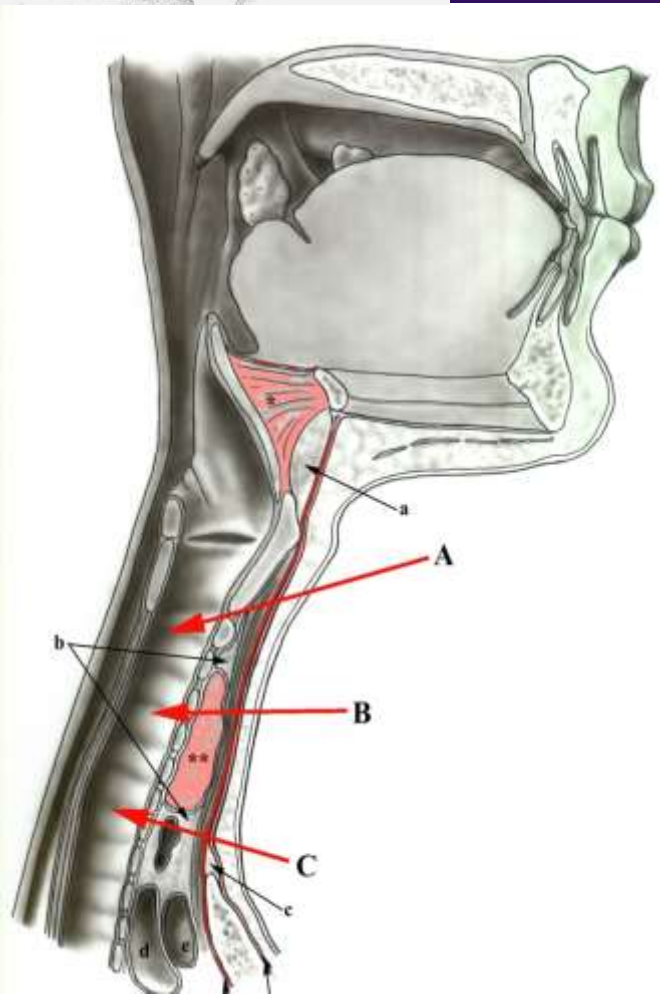
Key
1 'Cold nodule'
2 Normal thyroid

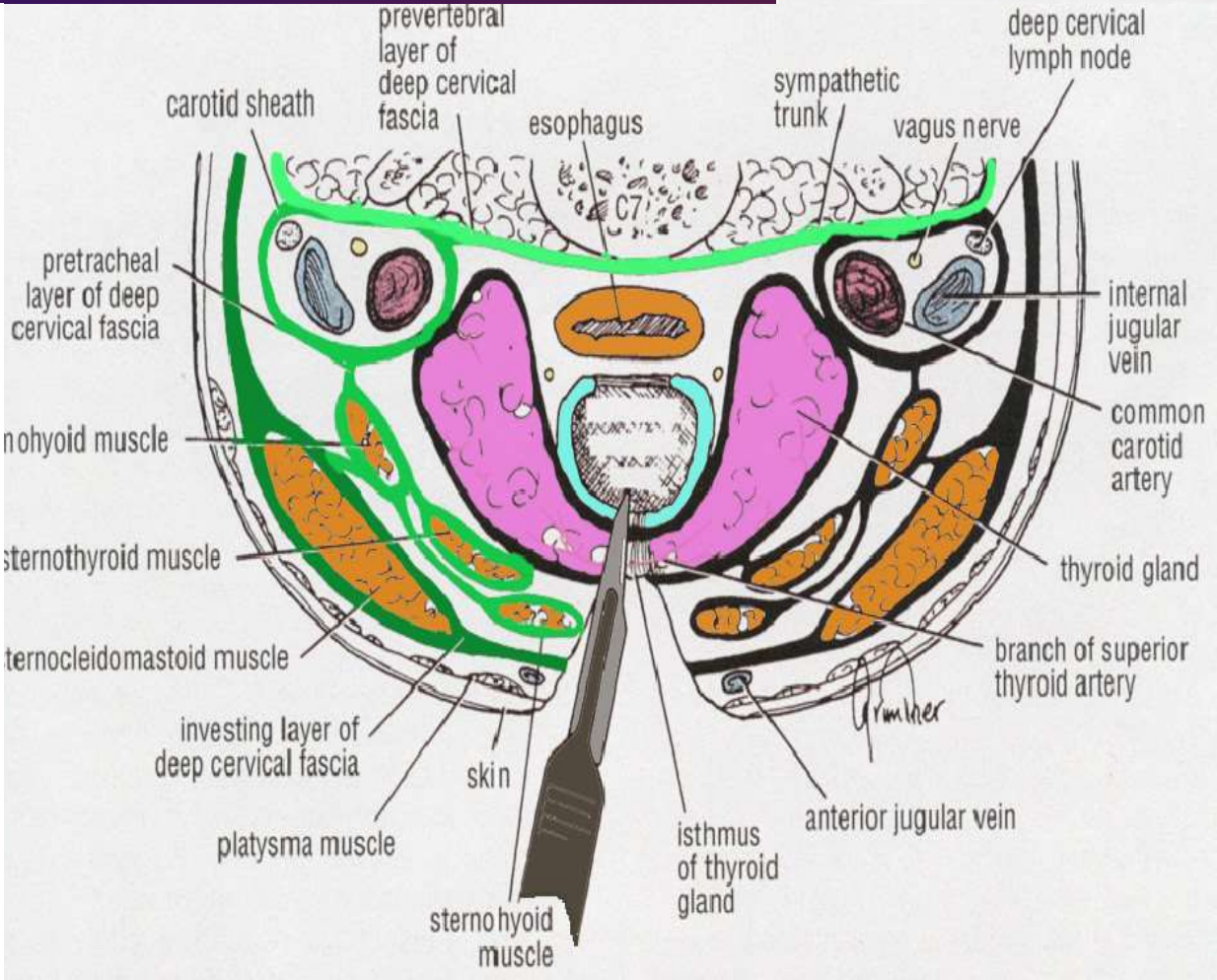
hypothyroidism

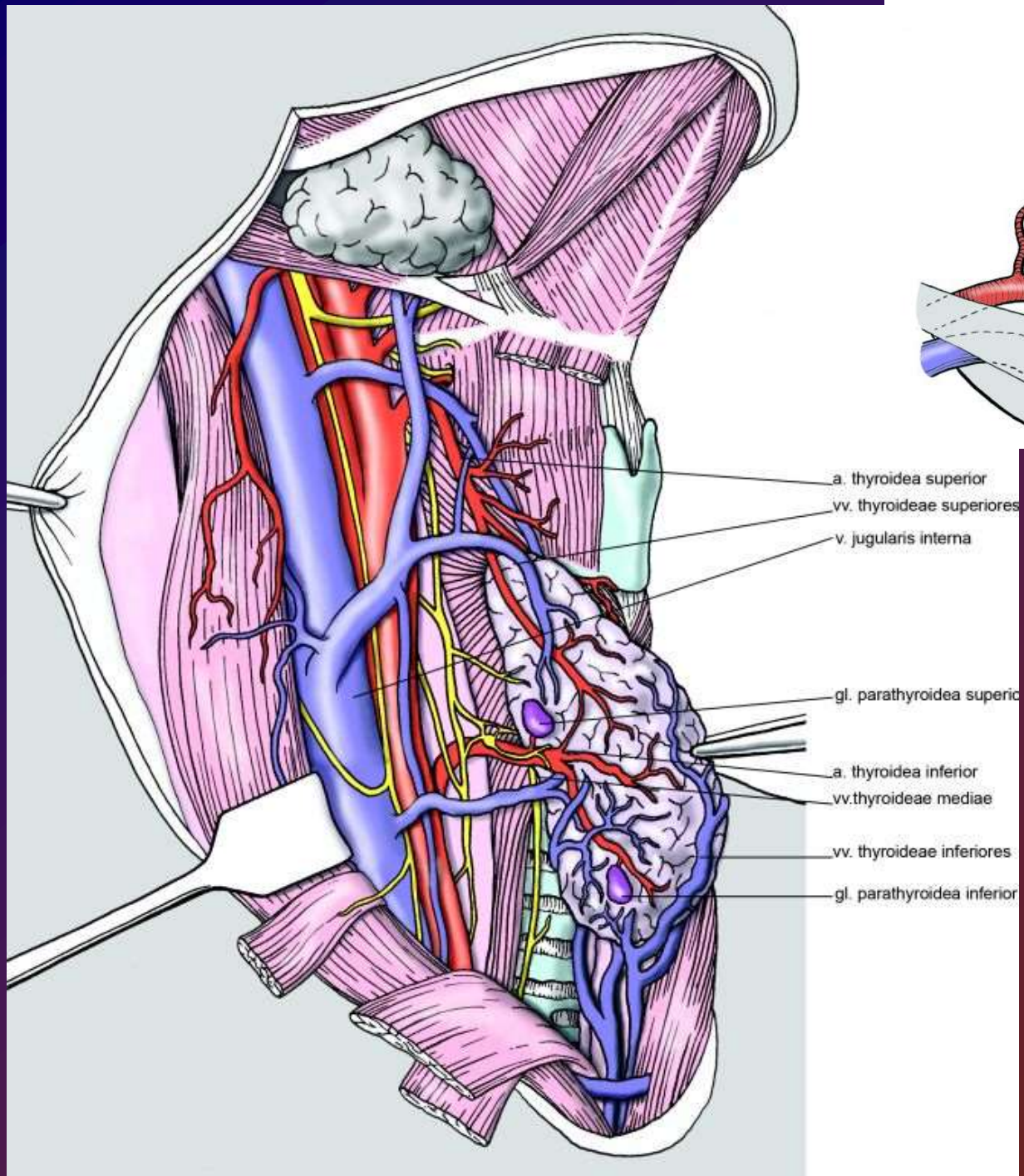


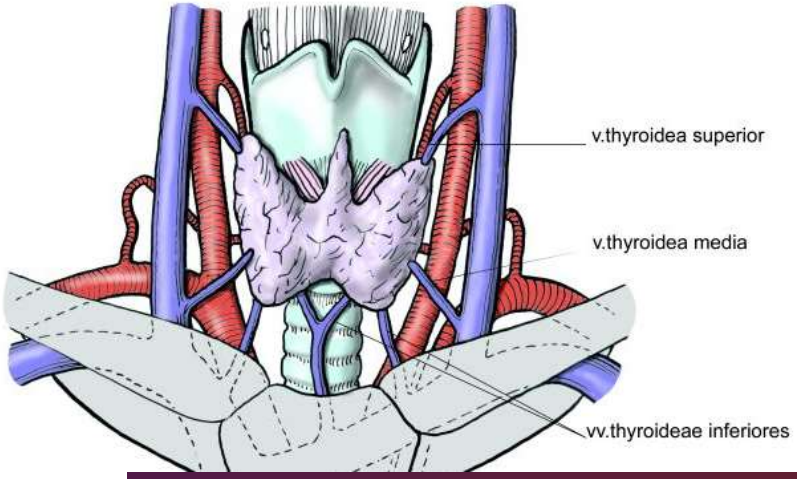
Tracheotomy
Tracheostomy








a. thyroidea superior
vv. thyroideae superiores
v. jugularis interna
gl. parathyroidea superic
a. thyroidea inferior
vv.thyroideae mediae
vv. thyroideae inferiores
gl. parathyroidea inferior


v.thyroidea superior
v.thyroidea media
vv.thyroideae inferiores

ZDROJE SOURCES

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- The Ascending Pharyngeal Artery: Branches, Anastomoses, and Clinical Significance
- Lotfi Hacein-Beya,b, David L. Danielsa, John L. Ulmera, Leighton P. Marka, Michelle M. Smitha, James M. Strottmanna, Douglas Browna,b,c, Glenn A. Meyerb and Phillip A. Wackymc *American Journal of Neuroradiology 23:1246-1256, August 2002*

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