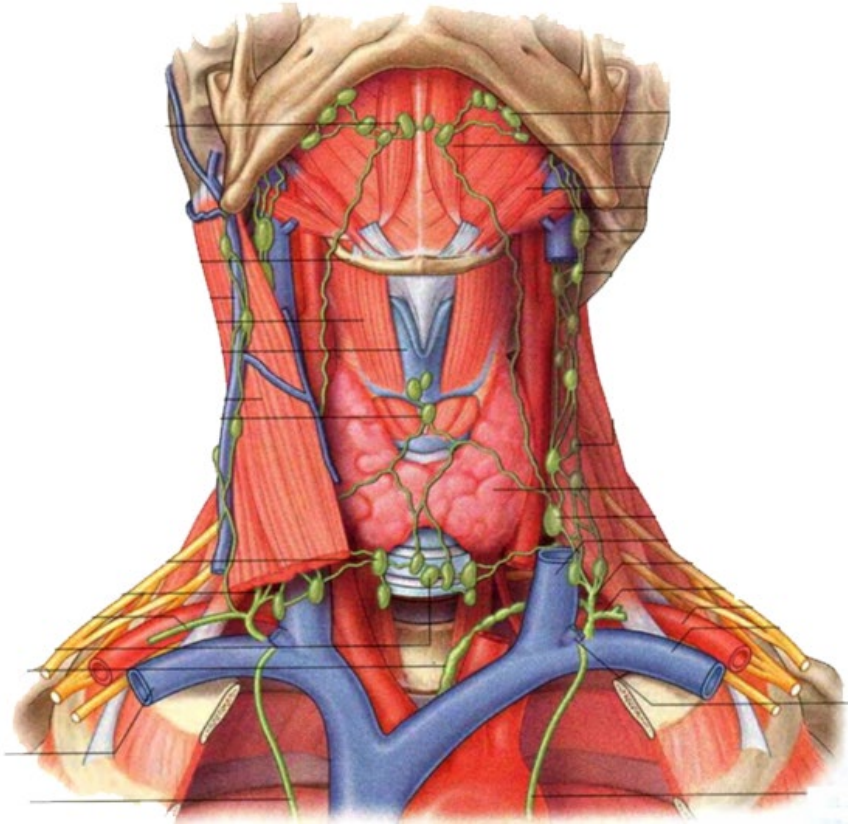
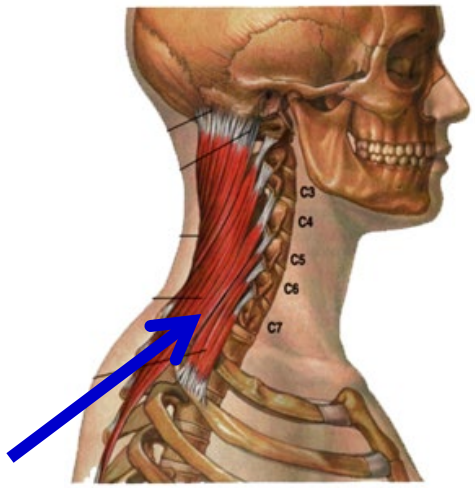
NECK 1 - OUTLINE



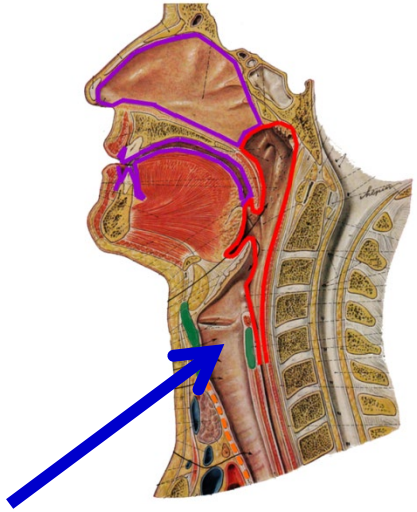
I. OVERVIEW - <u>NECK IS COMPARTMENTALIZED</u>
II. MUSCLES
III. NERVES
IV. ARTERIES
V. VEINS
VI. FASCIA
VII. LYMPHATICS

WORD OF THE DAY - <u>CONTRACTURE</u> - condition of sustained (permanent) SHORTENING of a structure (ex. muscle).

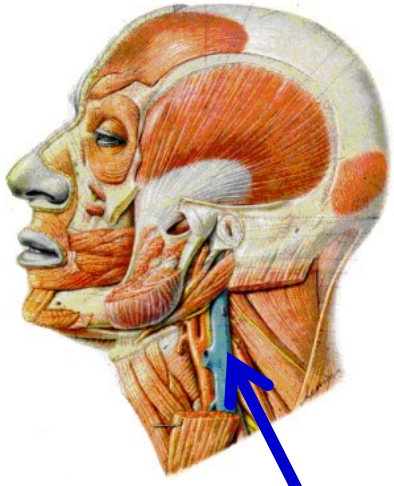
I. OVERVIEW OF NECK - neck is compartmentalized



Posterior - Vertebrae and Muscles



Anterior - Viscera (Pharynx, Larynx, etc.)



Lateral - Carotid Sheath

disease processes in or between compartments

1. Posterior Compartment - Vertebrae and muscles which support and move head and neck

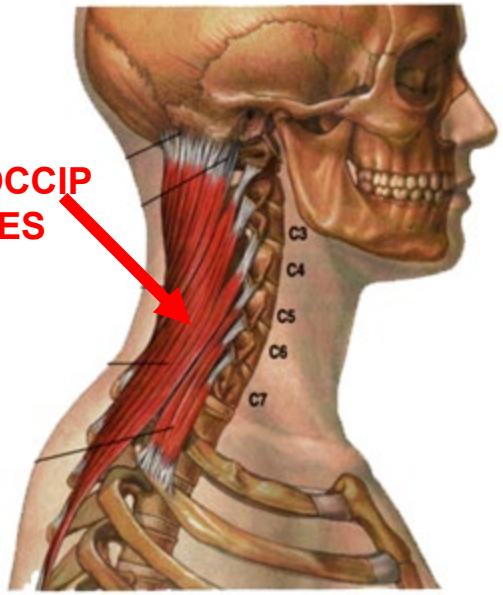
2. Anterior Compartment- Viscera and rostral continuation GI and Respiratory Systems

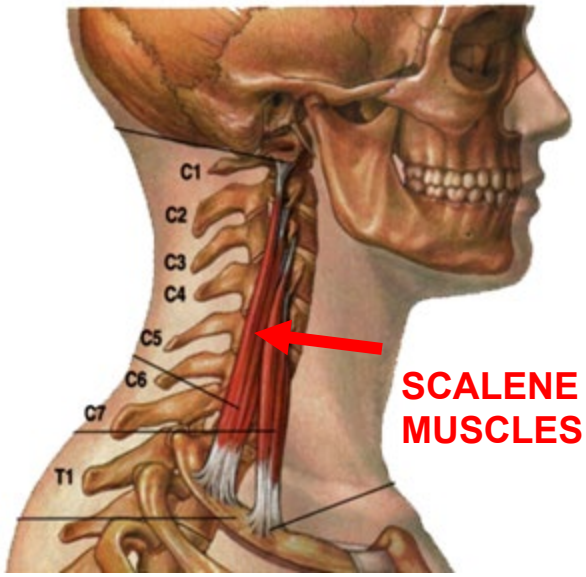
3. Lateral Compartment- Blood vessels and nerve

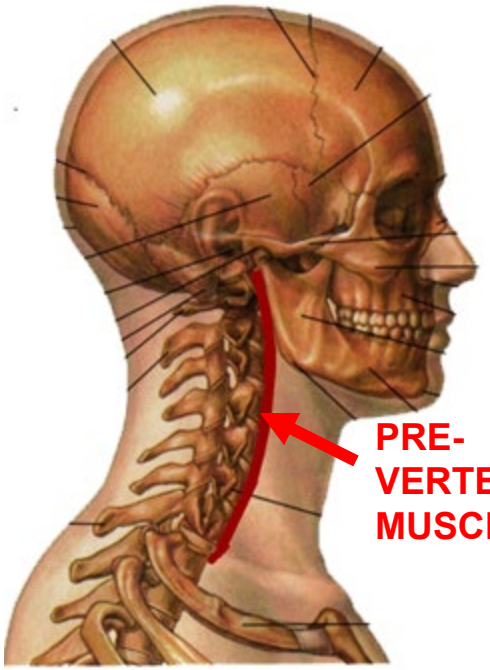
1. POSTERIOR COMPARTMENT

- muscles that move head and neck

NECK IS MOBILE







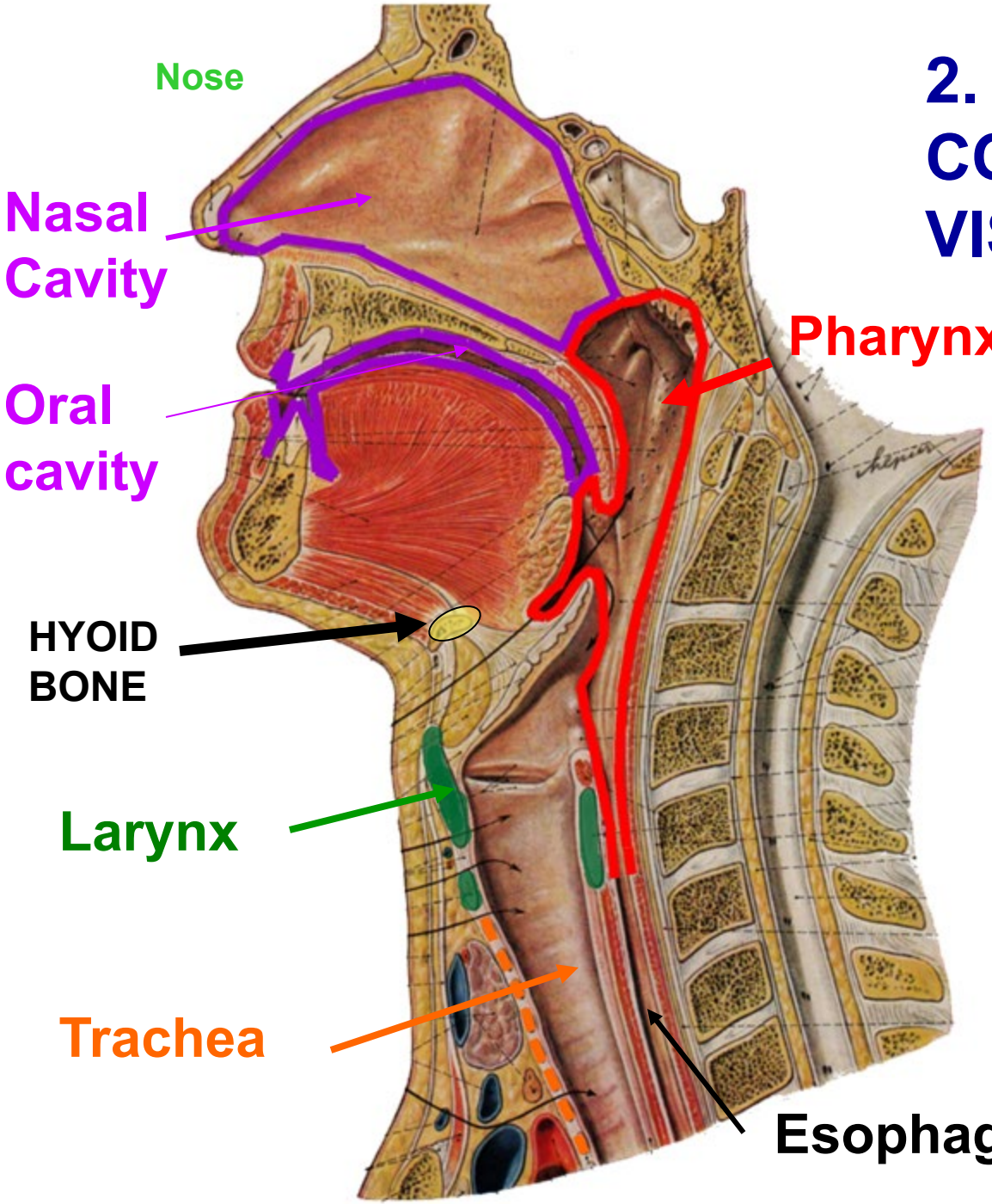
Posterior side - Deep Muscles (extensors like back) and Suboccipital Muscles

Lateral side - Scalene muscles - flex neck laterally

(IMPORTANT LANDMARKS FOR NERVES, ETC.)

Anterior side - Prevertebral Muscles - directly anterior to vertebrae - flex head and neck (anterior movement)

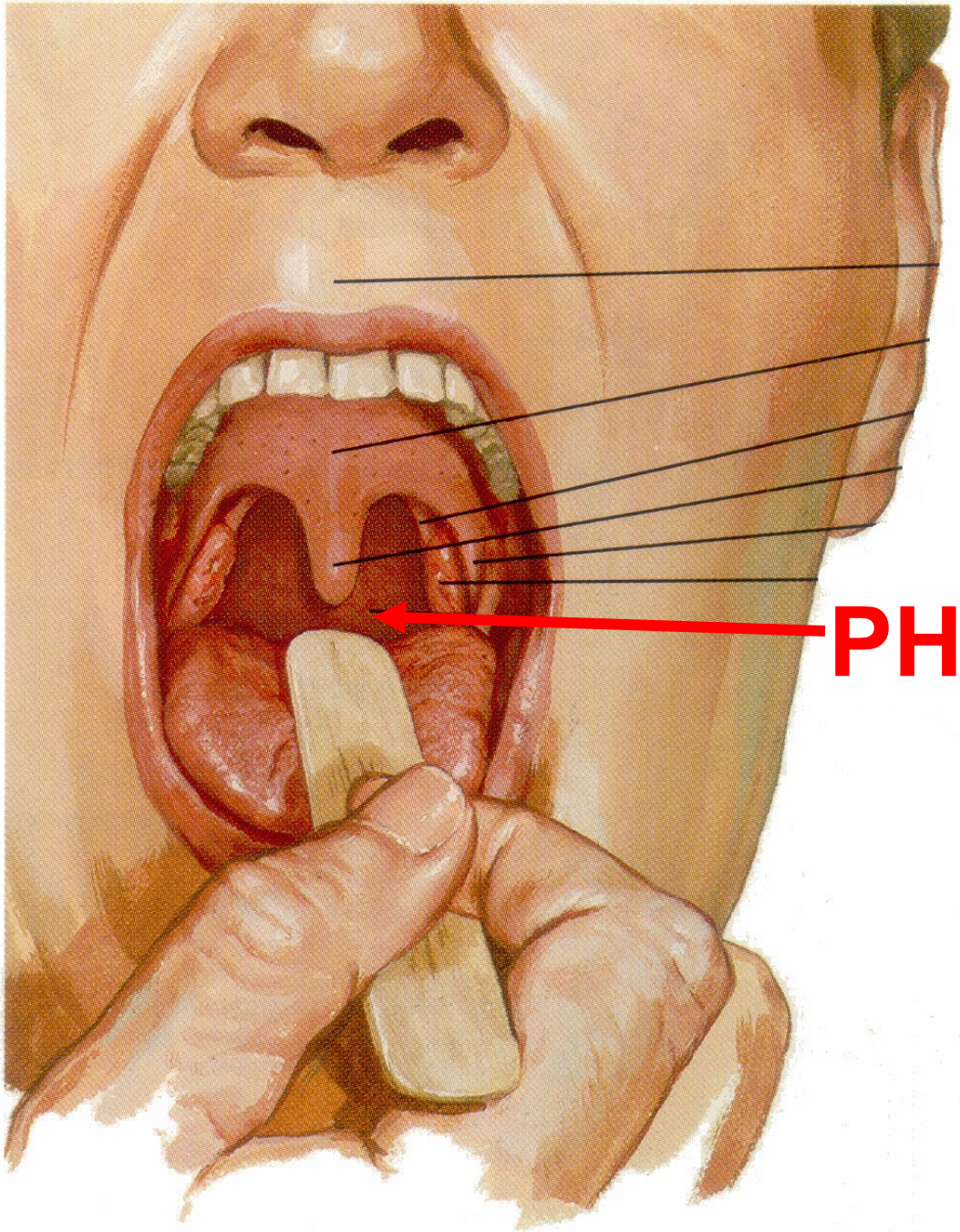
2. ANTERIOR COMPARTMENT - VISCERA



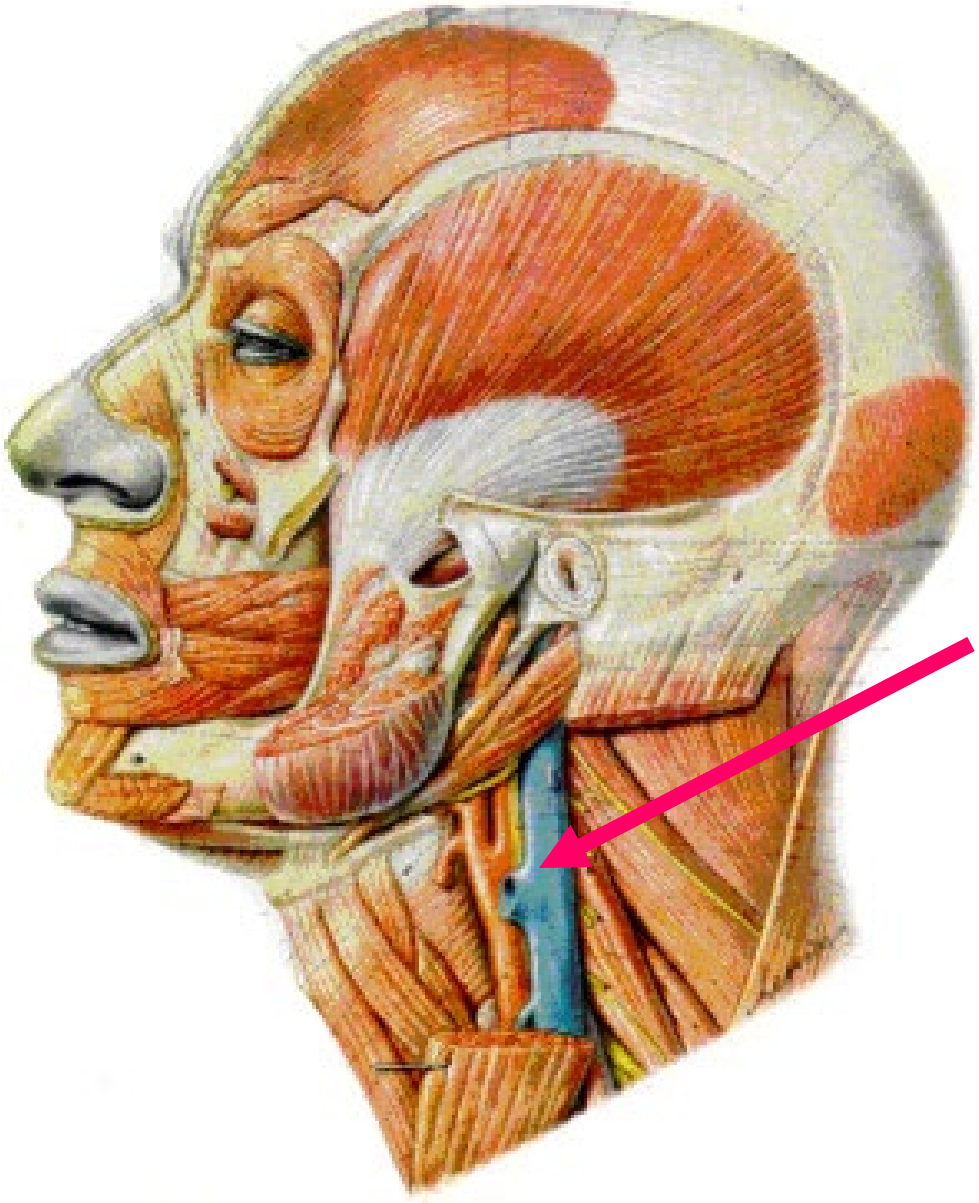
1) Larynx & Esophagus open into pharynx

2) Pharynx - a tube of muscles and fascia that opens to nasal and oral cavities

SAY AAHH!



3. LATERAL COMPARTMENT - CAROTID SHEATH



CLINICAL **

Lateral Compartment- lateral and posterior to pharynx

Contained in Carotid Sheath

1) Common and Internal Carotid arteries; 2) Internal jugular vein, 3) Vagus nerve

Note: Sympathetic chain is posterior to (NOT IN) Carotid Sheath

II. MUSCLES OF NECK **

KNOW MUSCLE, ACTION, INNERVATION;
NOT REQUIRED: ORIGIN, INSERTION

Muscles not attached to Hyoid bone

MUSCLE		INSERTION	ACTION	NERVE
Sternocleidomastoid	Two heads 1) Sternum - Manubrium 2) Clavicle - medial 1/3	Both heads to Temporal bone - Mastoid process	Acting on both sides - flex neck; Acting singly - rotate head so face is directed to opposite side	Accessory nerve (XI)
Scalenus anterior and Scalenus medius	Vertebra- transverse processes of upper cervical	Rib 1	Flex neck and elevate rib 1	branches of ventral rami of cervical spinal nerves

Infrahyoid muscles

MUSCLE	ORIGIN	INSERTION	ACTION	NERVE
Omohyoid (Muscle has two bellies connected by an intermediate tendon)	Inferior belly from Scapula - medial to suprascapular notch (Intermediate tendon - linked to clavicle and rib 1 Superior belly - continues to insertion	Hyoid Bone	Depresses hyoid bone	Ansa cervicalis
Sternohyoid	Sternum - manubrium Clavicle	Hyoid bone	Depresses hyoid bone	Ansa cervicalis
Sternothyroid	Sternum - manubrium	Thyroid cartilage	Depresses thyroid cartilage, indirectly depresses hyoid bone, larynx	Ansa cervicalis
Thyrohyoid	Thyroid cartilage	Hyoid bone	Depresses hyoid bone, elevates larynx	C1 via branch hitch-hiking with Hypoglossal nerve (XII)

A. MUSCLES OF NECK - NOT ATTACHED TO HYOID - move head and neck

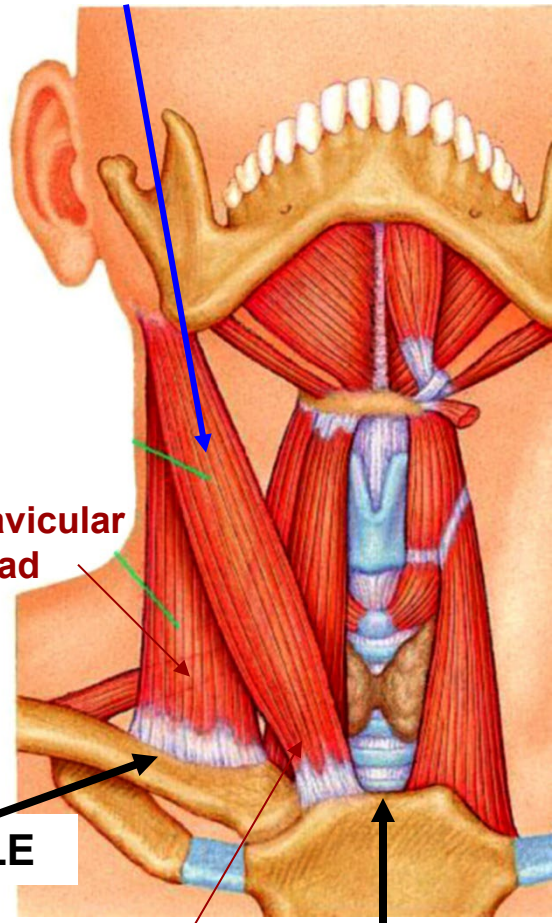
1. STERNO-CLEIDOMASTOID

ACTIONS - bilateral - flex head; unilateral rotate head, face directed to opposite side

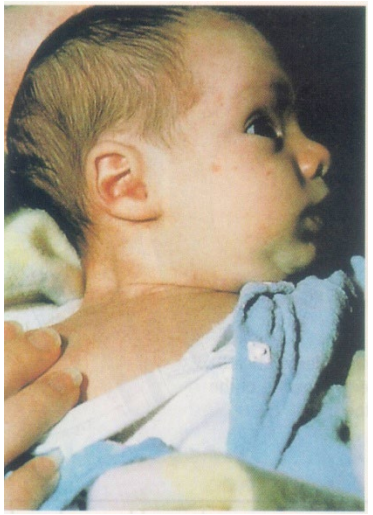
(MASTOID MOVES TOWARD STERNUM)

Inn - CN XI Accessory.

MOST IMPORTANT LANDMARK IN NECK



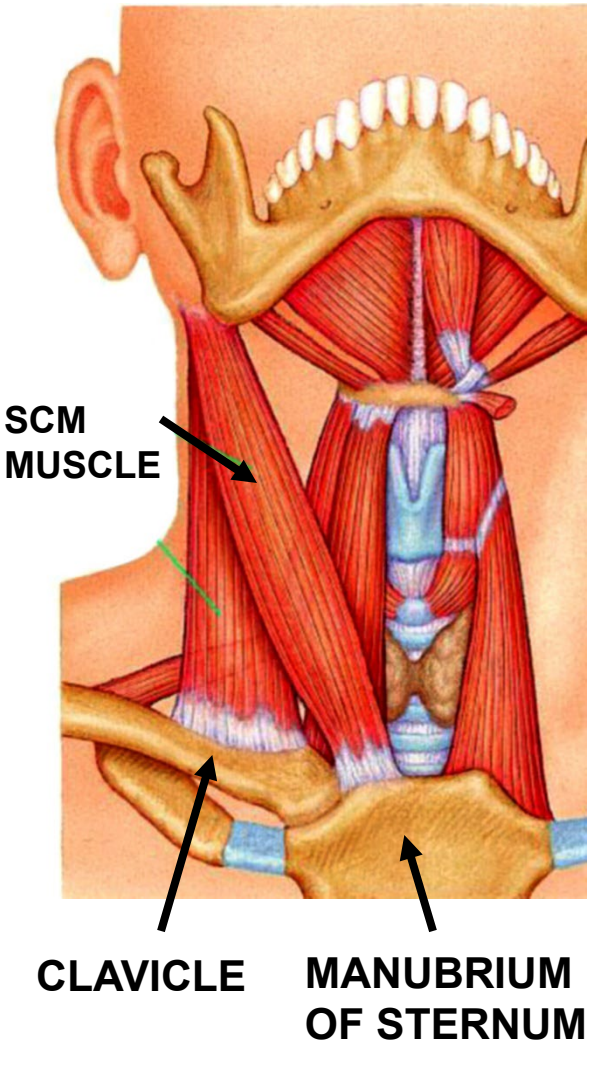
ACTION - PULL MASTOID TOWARD STERNUM

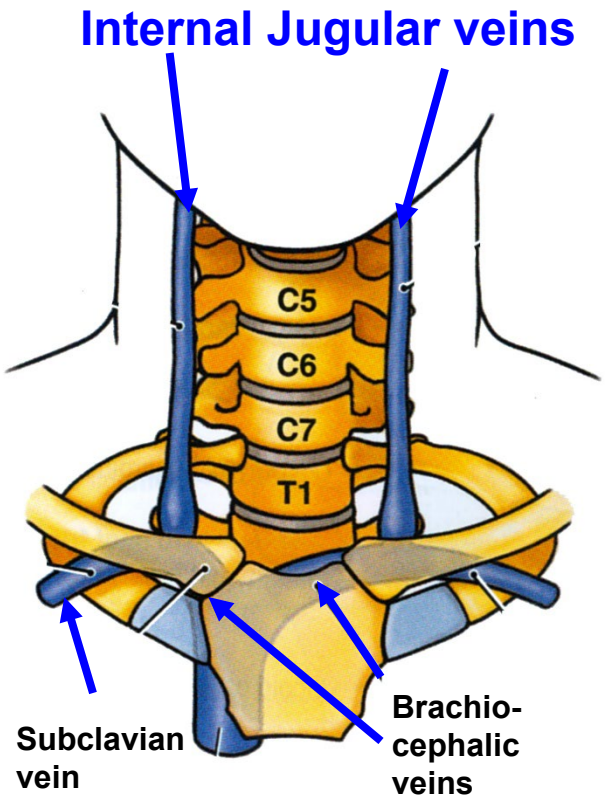


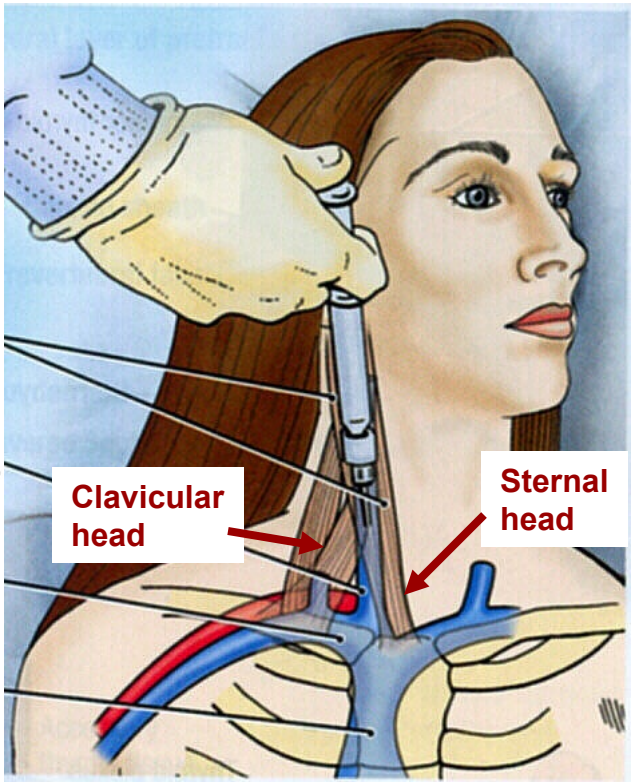
* **TORTICOLLIS – Contracture of Sternocleido-mastoid (congenital or acquired); face to opposite side**

TORTICOLLIS = twisted neck

STERNOCLEIDOMASTOID: IMPORTANT LANDMARK IN PROCEDURES: VENOUS CATHETERIZATION





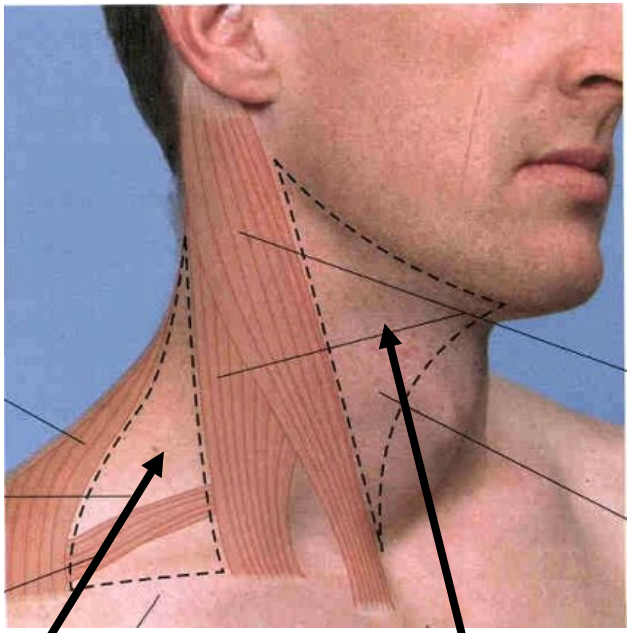


Internal Jugular vein can be accessed and catheterized between Sternal and Clavicular heads of Sternocleidomastoid

feel sternal head on yourself

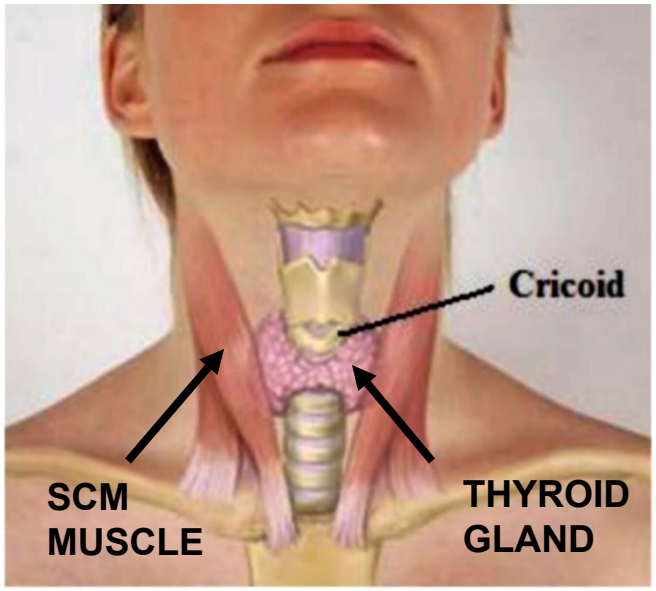
STERNOCLEIDOMASTOID: IMPORTANT LANDMARK IN EXAMINATION OF NECK

Sternocleidomastoid (SCM) defines areas in Neck



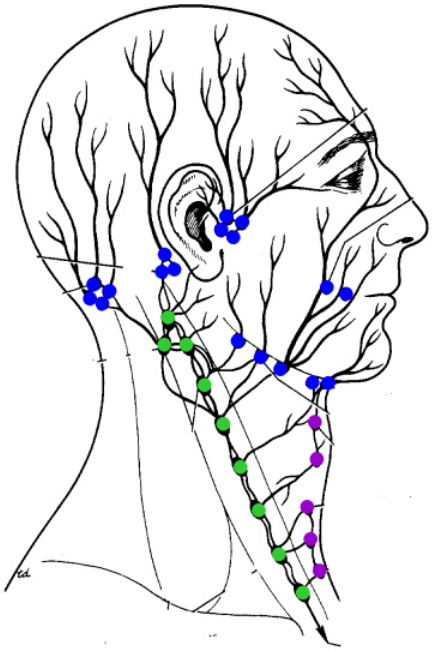
POSTERIOR TRIANGLE (Post. to Sterno-cleidomastoid)

ANTERIOR TRIANGLE (Ant. to Sterno-cleidomastoid



Thyroid gland: palpated in Anterior Triangle below Cricoid cartilage, medial to Sternocleidomastoid

Stand behind patient; have patient swallow



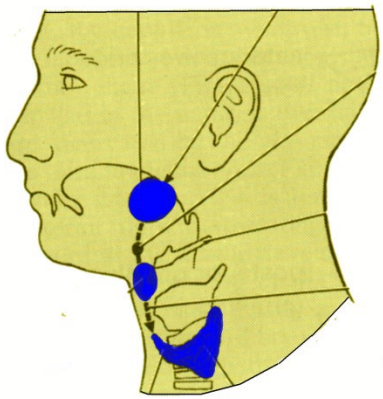
Deep Cervical Chain of Lymph nodes are located deep to Sternocleido-mastoid

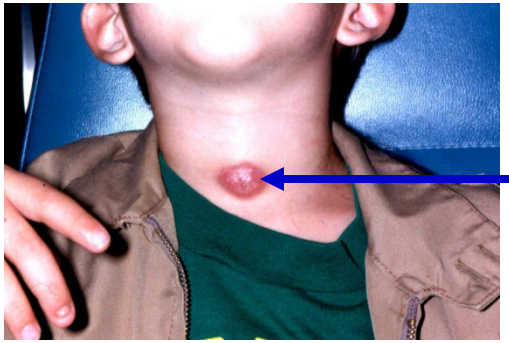
ICS: ENT EXAM Spring 2020

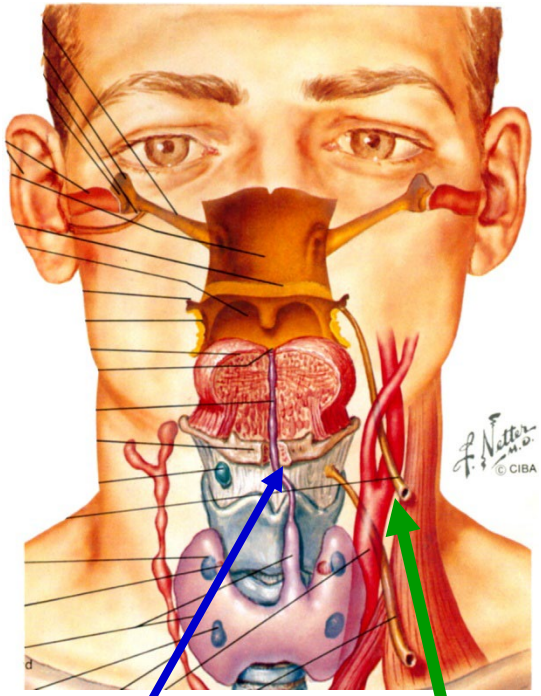
USE STERNOCLEIDO MASTOID TO DIAGNOSE NECK MASSES: BRANCHIAL CLEFT CYSTS, FISTULI LATERAL NECK MASSES

LATERAL NECK MASS - Branchial Cyst or (Fistula = Channel) - located Anterior to Sternocleidomastoid Muscle

Differentiate from Thyroglossal Duct Cysts - Midline masses

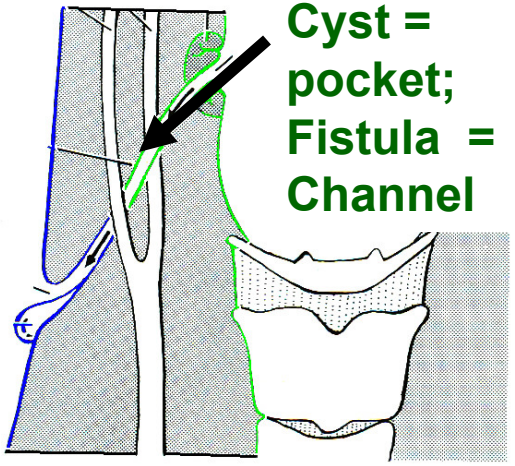






Thyroglossal Duct Cysts - Midline mass

Branchial Cysts, Fistula - Lateral neck mass



Cyst = pocket; Fistula = Channel

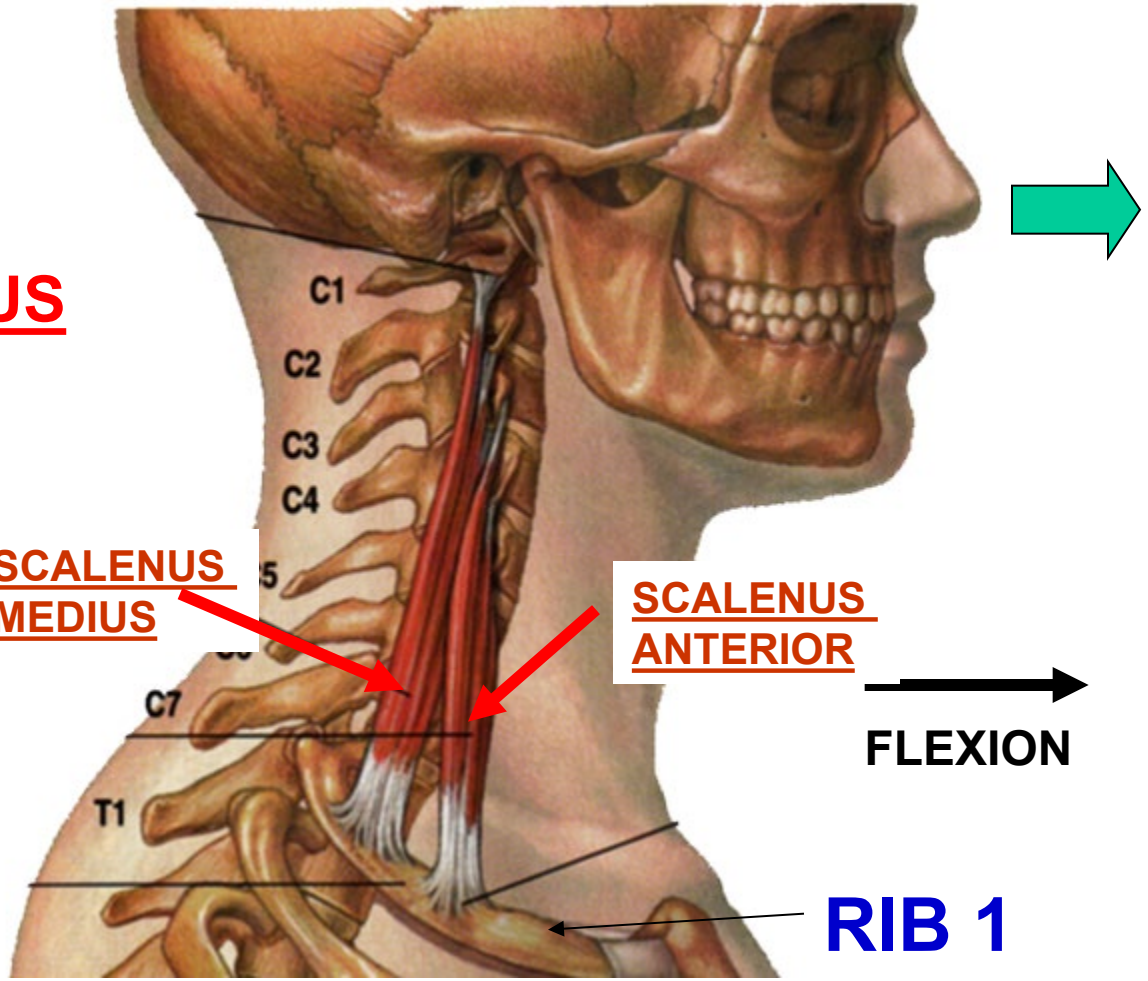
Branchial Cyst - Anterior to Sterno-cleido-mastoid

MUSCLES OF NECK - NOT ATTACHED TO HYOID

2. SCALENUS ANTERIOR AND SCALENUS MEDIUS

A - flex neck, elevate rib 1

Inn - ventral rami of cervical spinal nerves



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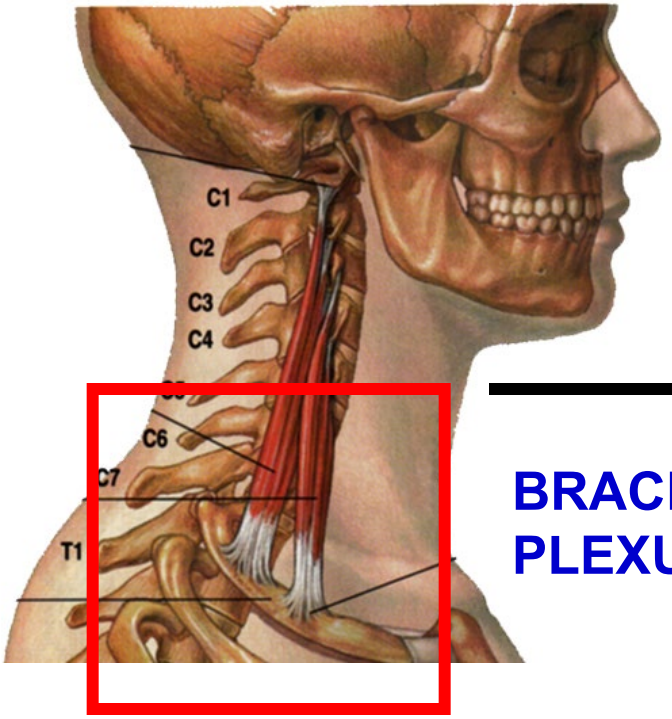
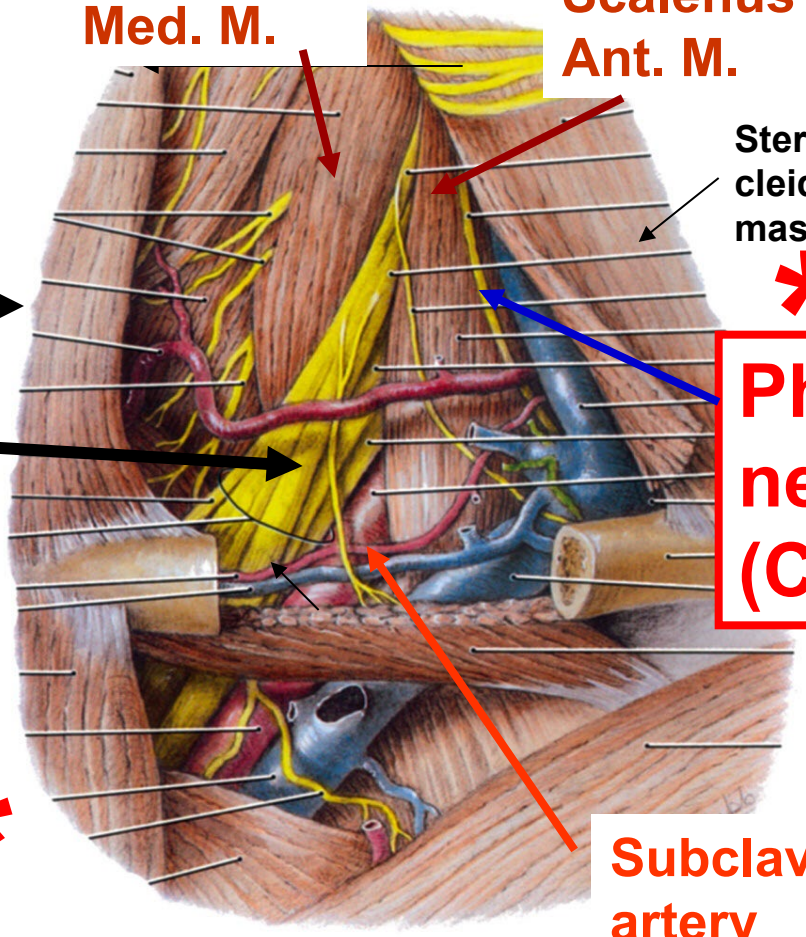
SCALENUS ANTERIOR - SECOND MOST IMPORTANT LANDMARK IN NECK: BRACHIAL PLEXUS, PHRENIC NERVE; LATERAL (POSTERIOR) TO STERNOCLEIDOMASTOID

SCALENUS ANTERIOR AND SCALENUS MEDIUS ARE IMPORTANT LANDMARKS

- **Brachial Plexus**, Subclavian Artery pass between Scalenus Ant. and Med.;
- **Phrenic nerve** (to Diaphragm) **courses on Scalenus Anterior**



BRACHIAL PLEXUS



Phrenic nerve courses on surface of Scalenus anteior muscle (wound to neck can damage Phrenic N.)

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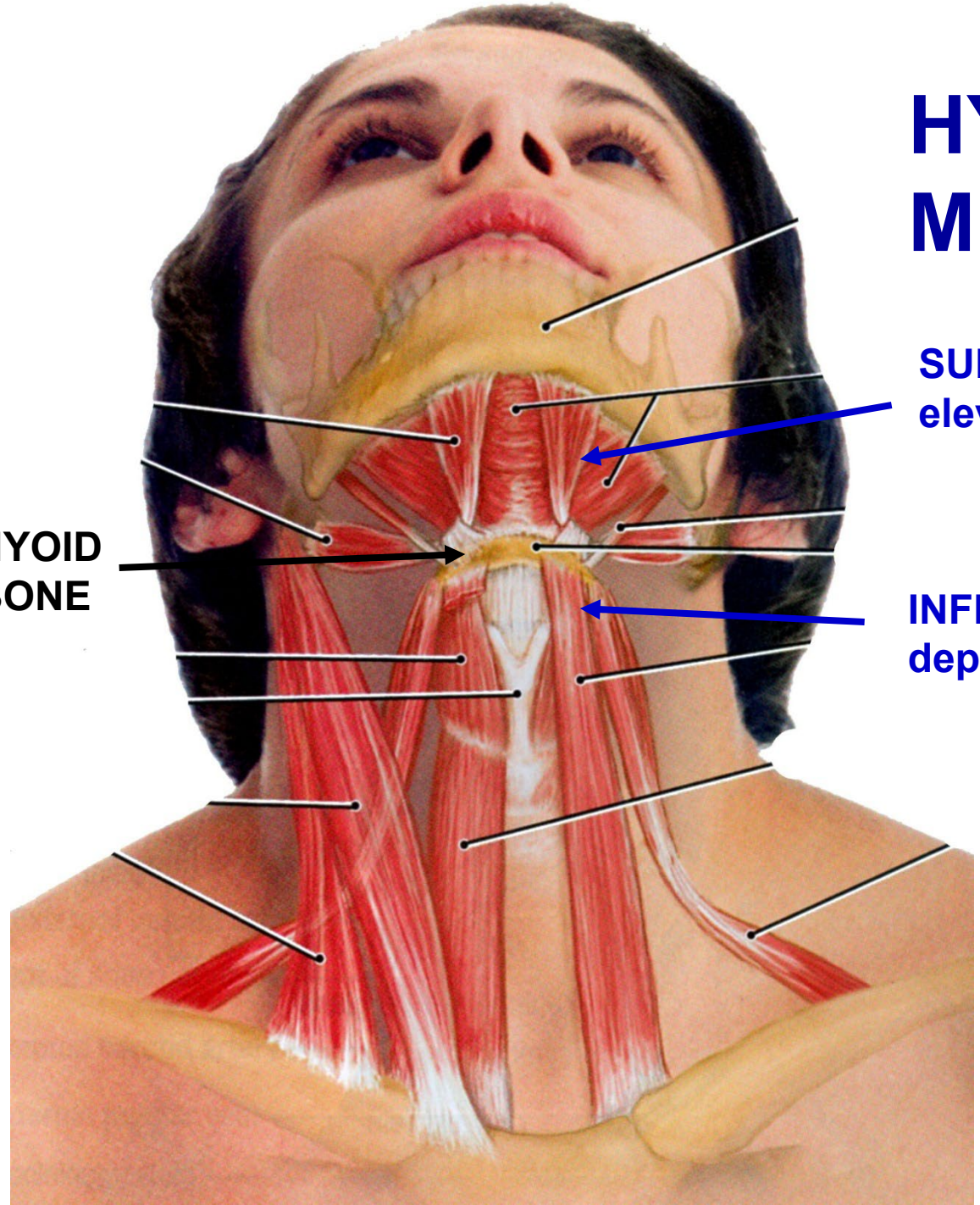
HYOID MUSCLES

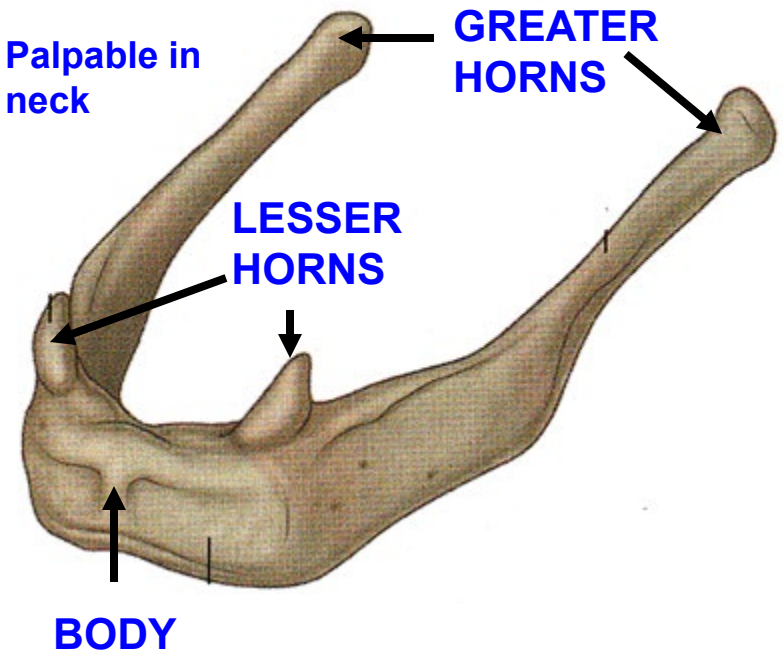


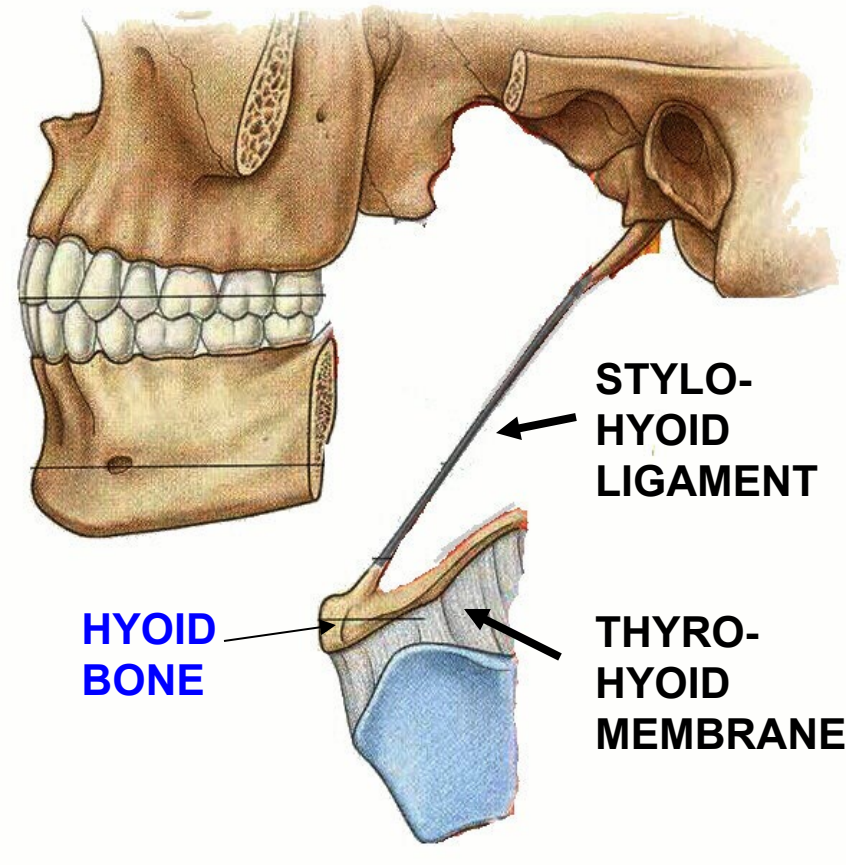
SUPRAHYOID MUSCLES - elevate hyoid

INFRAHYOID MUSCLES - depress hyoid

A. HYOID BONE - 'free floating', no bony attachment; held by muscles, ligaments

Parts: Body, Greater and Lesser Horns; Hyoid means "U" shaped





– All Infrahyoid & Suprahyoid attach to Body of Hyoid (except Sternothyroid inserts to thyroid cartilage)

Stylohyoid ligament - to Styloid process of temporal bone
Thyrohyoid membrane - to Thyroid cartilage

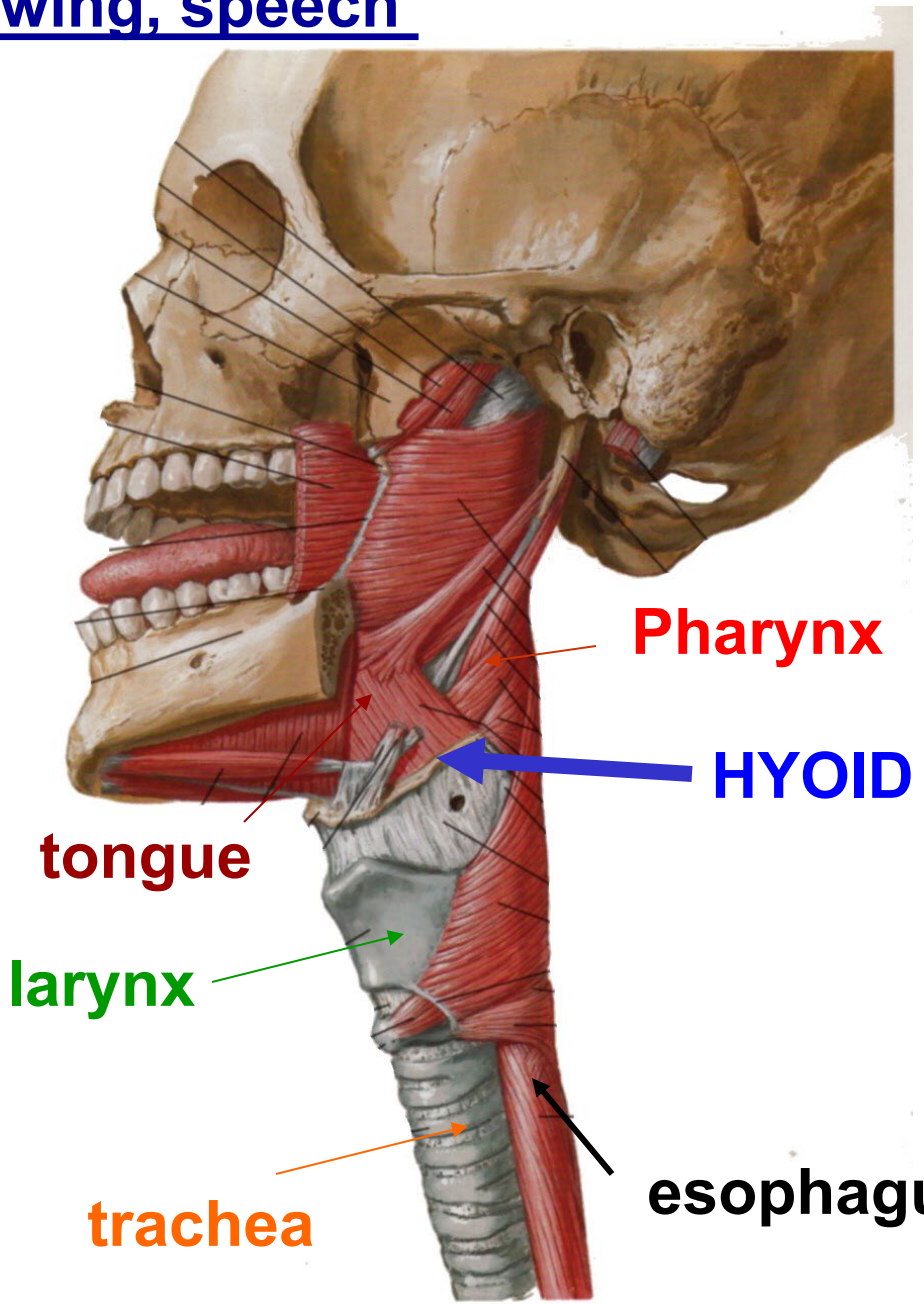
STRUCTURES DERIVED FROM BRANCHIAL ARCHES

ARCH/NERVE	SKELETAL	LIGAMENTS	MUSCLES
First (V)	1) Malleus 2) Incus	1) Ant. ligament of malleus 2) Spheno-mandibular ligament	1) Muscles of Mastication 2) Tensor tympani 3) Tensor palati 4) Mylohyoid 5) Ant. belly of Digastric
Second (VII)	1) Stapes 2) Styloid process 3) Hyoid bone - lesser horn, upper half of body	Stylohyoid ligament	1) Muscles of Facial Expression 2) Stapedius 3) Stylohyoid 4) Post. belly of Digastric
Third (IX)	Hyoid bone - greater horn, lower half of body	----------	Stylopharyngeus
Fourth (X)	Cartilages of Larynx	----------	1) All muscles of Larynx 2) All muscles of Pharynx (except Stylopharyngeus) 3) All muscles of Soft Palate (except Tensor palati)
Sixth (XI)	----------	----------	1) Sternocleidomastoid 2) Trapezius

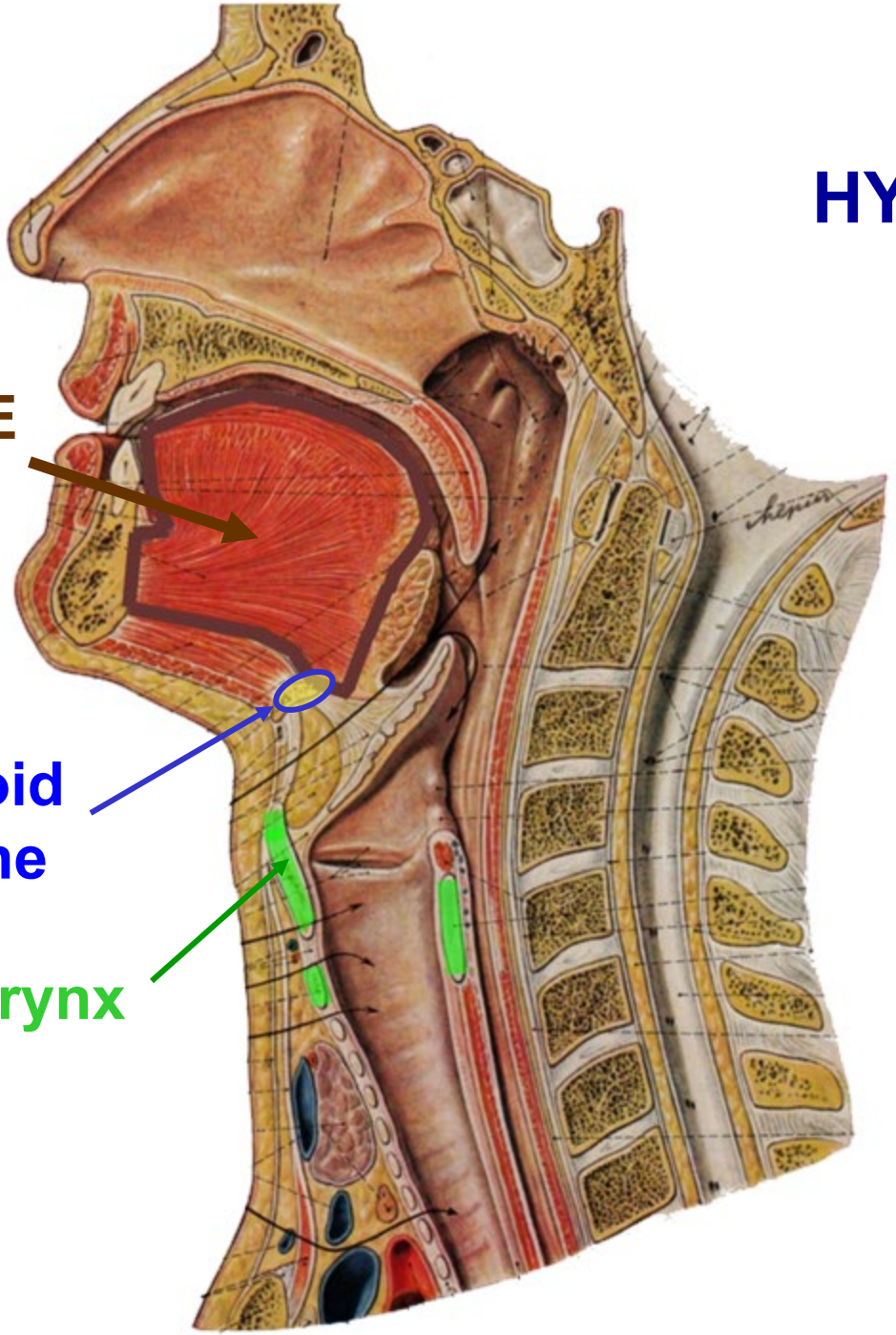
HYOID BONE DEVELOPS AS ADAPTATION TO LIFE ON LAND - SPEECH, SWALLOWING

ANTERIOR COMPARTMENT - moveable, changes shape in swallowing, speech

Hyoid Bone – attached to larynx, pharynx and tongue; free floating; attached by ligaments and moved by muscles



HYOID BONE



- muscles that move hyoid bone move larynx and tongue, for Swallowing, Talking

- contraction of muscles can stabilize position of hyoid bone (ex. in movements of tongue)

INFRAHYOID MUSCLES - all depress hyoid - many named for origin/insertion

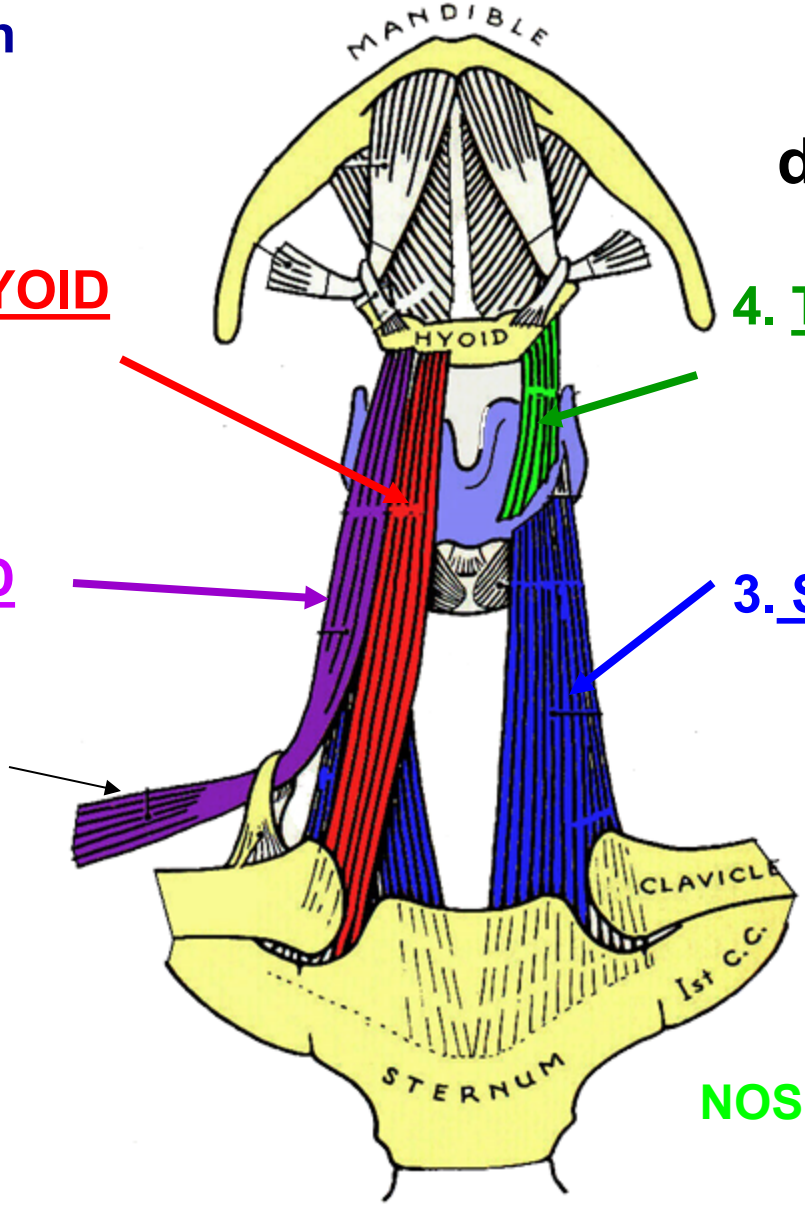
deeper

2. STERNOHYOID

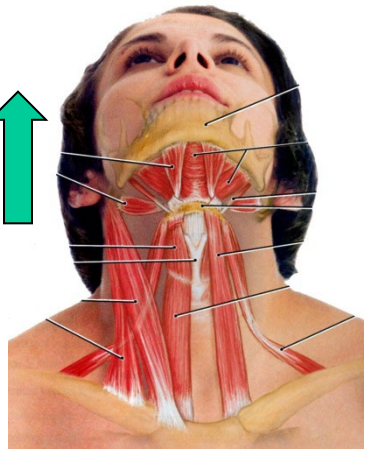
4. THYROHYOID

1. OMOHYOID

3. STERNOTHYROID



NOSE



ORIENT - HEAD TILTED BACK

SUPRAHYOID MUSCLES - all elevate hyoid

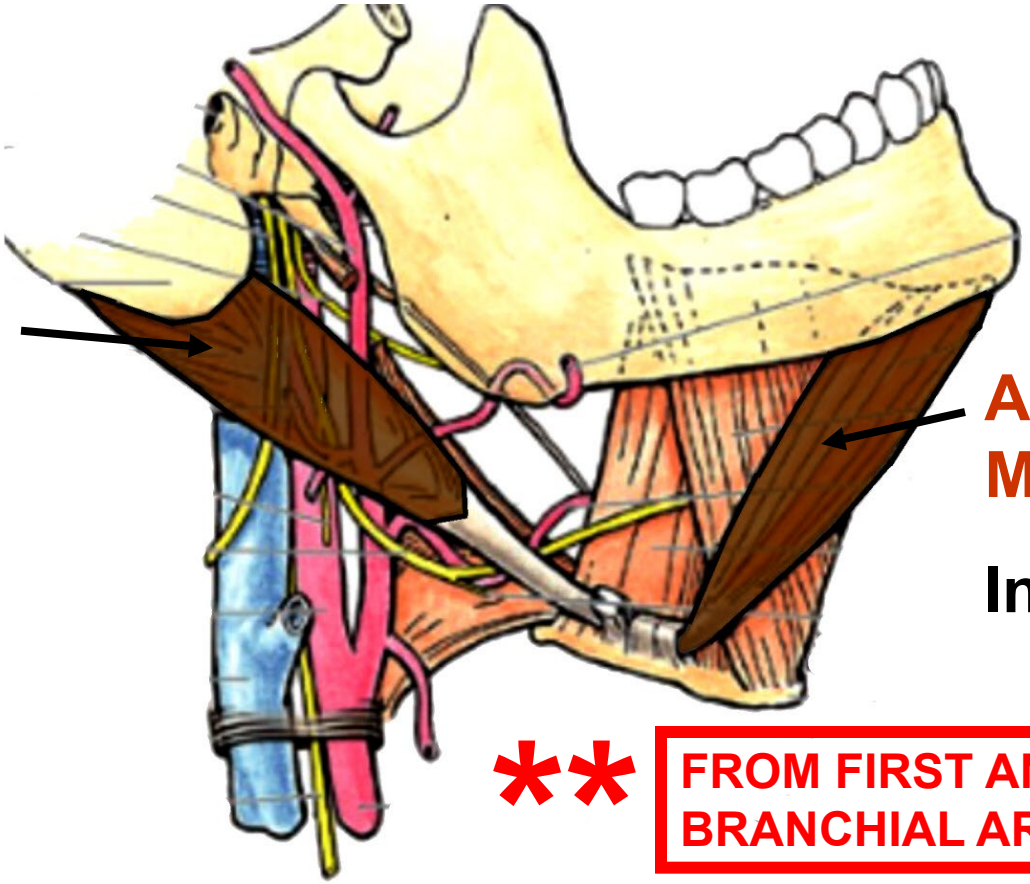
Suprahyoid muscles

MUSCLE	ORIGIN	INSERTION	ACTION	NERVE
Digastric (has two bellies)	Posterior belly from **Temporal bone** - mastoid notch (medial to mastoid process) Anterior belly from **Mandible** - inner side	**Hyoid Bone** - via intermediate tendon	Elevates hyoid bone, Depresses mandible	Posterior belly - Facial nerve (VII) Anterior belly - Trigeminal nerve (V3)
Stylohyoid	**Temporal bone** - styloid process	**Hyoid bone**	Elevates hyoid bone	Facial nerve (VII)
Mylohyoid	**Mandible** - mylohyoid line	**Hyoid bone**	Elevates hyoid bone, Raises floor of mouth during swallowing	Trigeminal nerve (V3)
Geniohyoid	**Mandible** - inner side	**Hyoid bone**	Elevates hyoid bone, draws hyoid forward	C1 via branch hitch-hiking with Hypoglossal nerve (XII)

SUPRAHYOID MUSCLES - all elevate hyoid

1. DIGASTRIC - two bellies / two cranial nerves - insert to hyoid via intermediate tendon

NOSE



Post Belly- Temp. Bone

Inn - CN VII

Ant. Belly - Mandible

Inn. - CN V

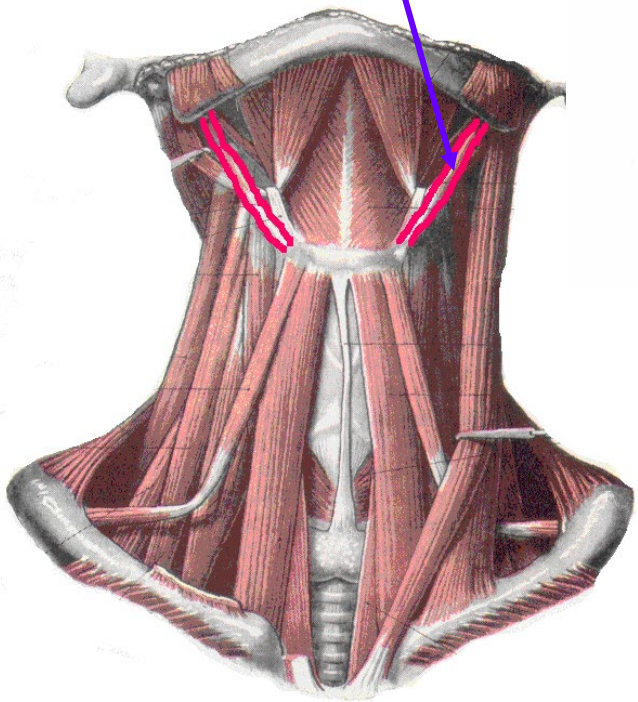
** FROM FIRST AND SECOND BRANCHIAL ARCH

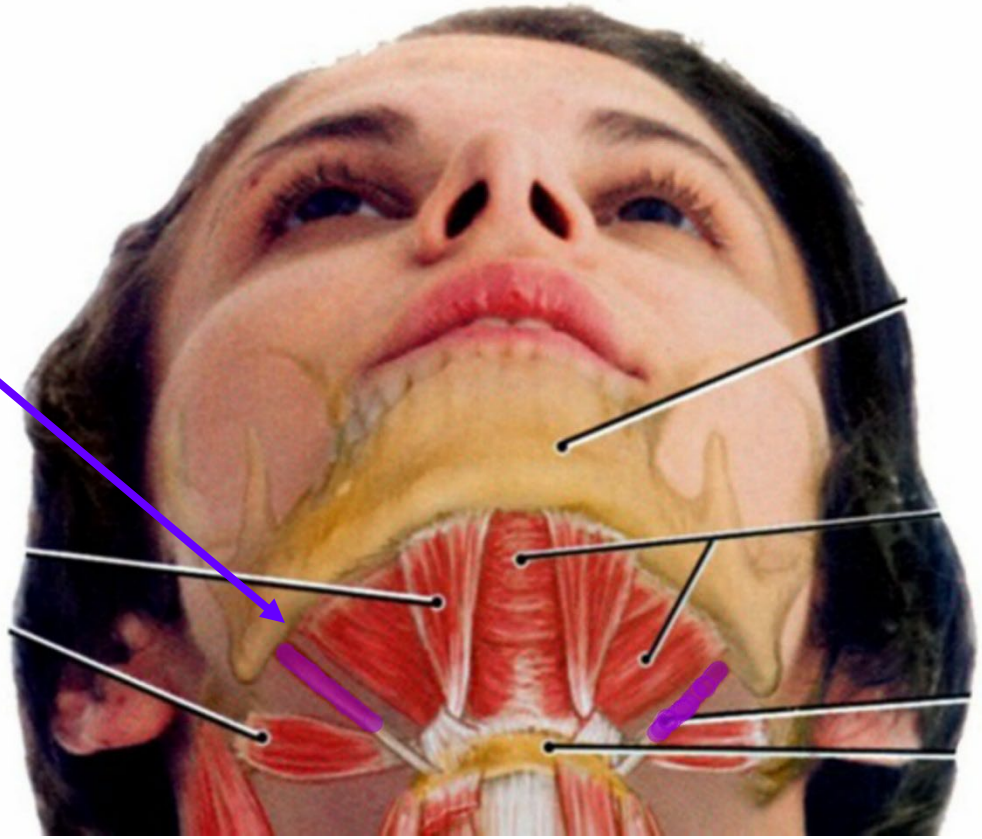
Act - Depress mandible - MAJOR EFFECT is OPEN MOUTH

SUPRAHYOID MUSCLES - all elevate hyoid

2. STYLOHYOID

Inn - CN VII

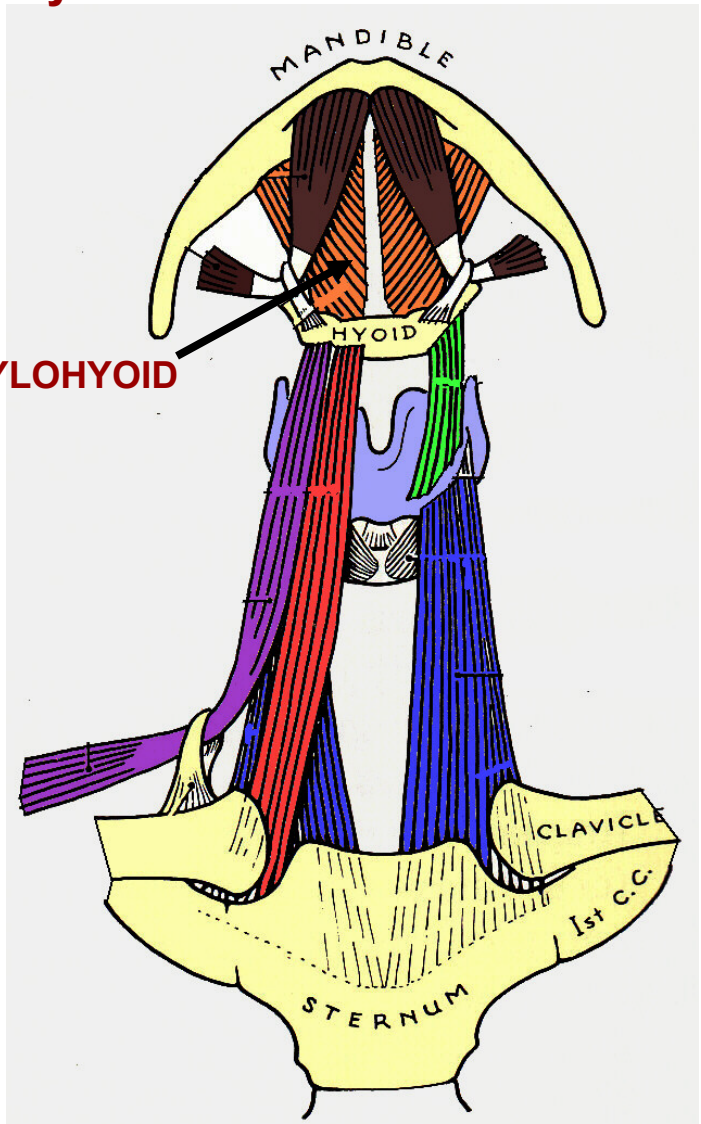




SUPRAHYOID MUSCLES - all elevate hyoid

3. MYLOHYOID - forms muscular floor of mouth

mylo = Gk. molar tooth

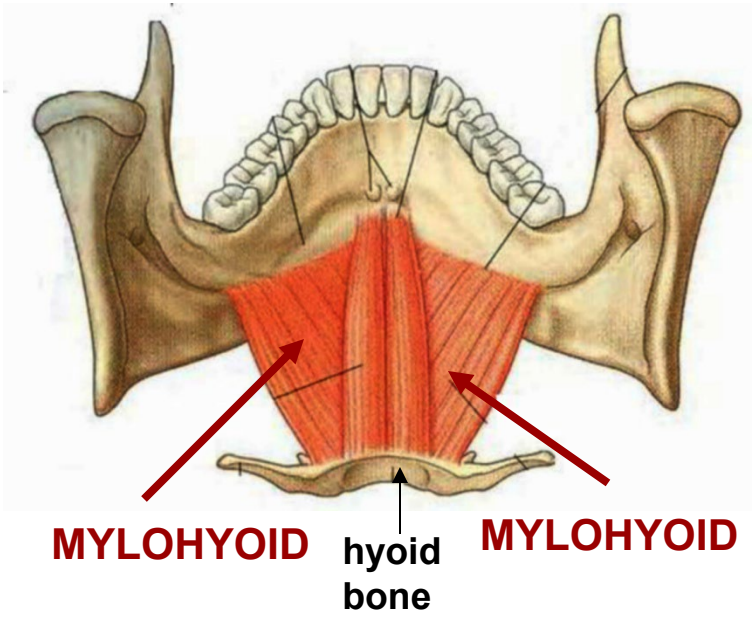


mandible

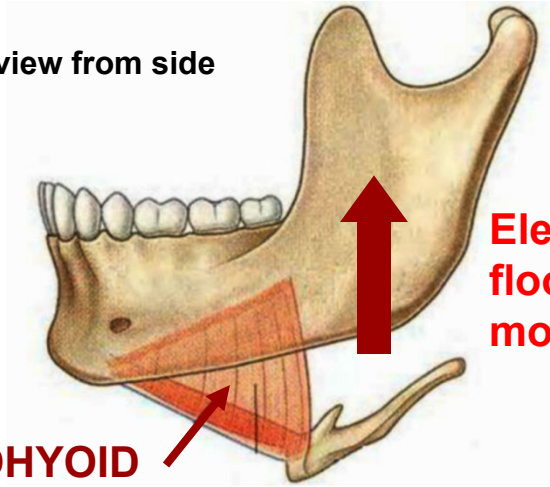
Action - Elevates floor of mouth in swallowing

Inn - CN V - from V3

view from inside mouth

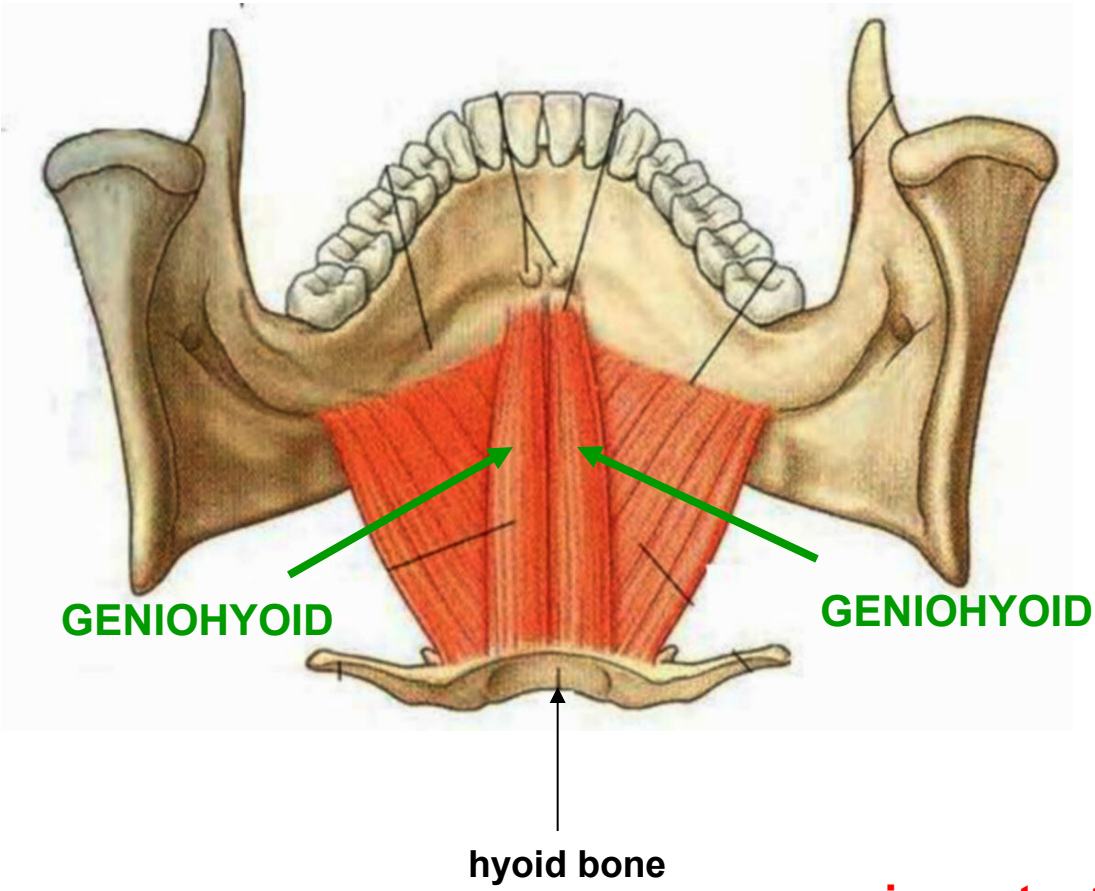


view from side



SUPRAHYOID MUSCLES - all elevate hyoid

view from inside mouth



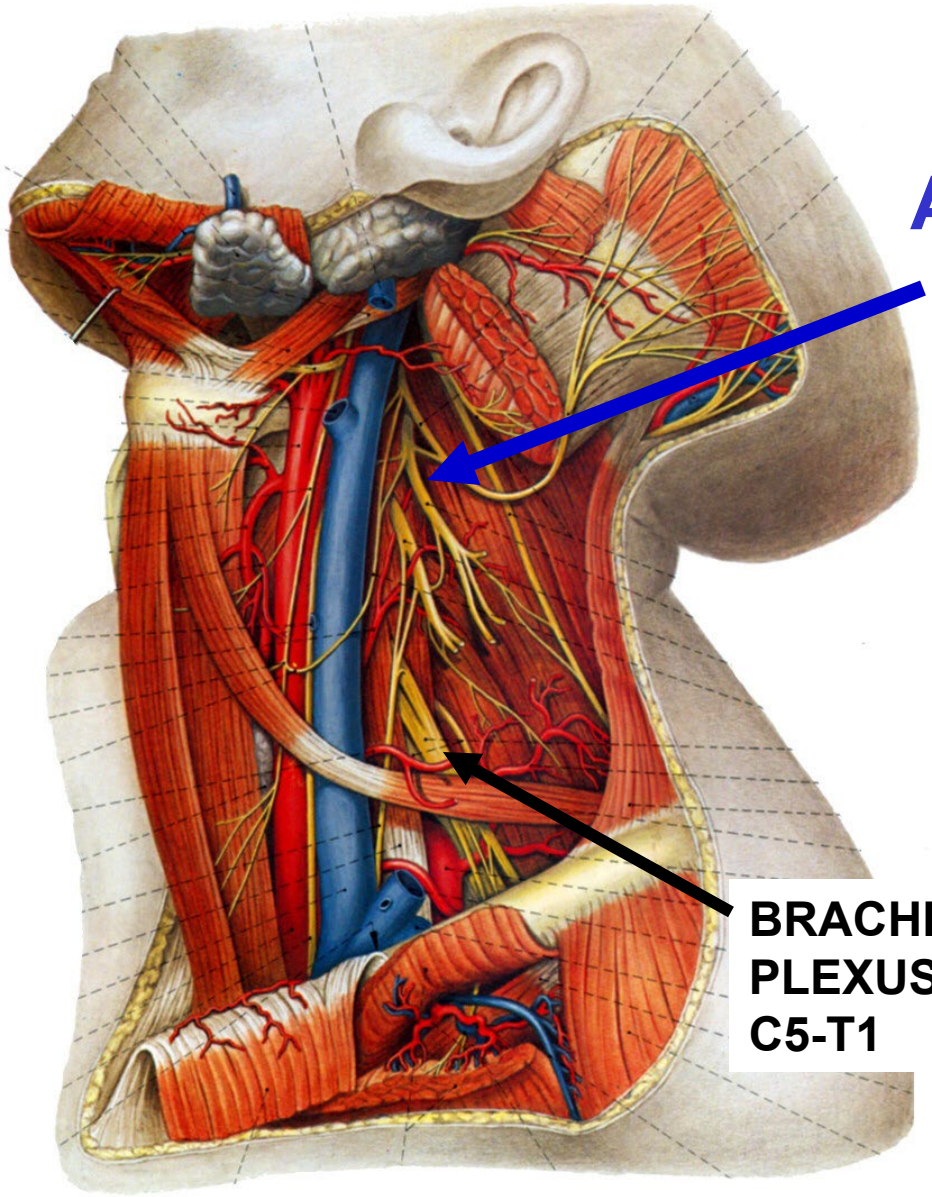
4. GENIOHYOID -

A - Elevates hyoid and draws forward

Inn - C1 branch hitch-hiking with Hypoglossal nerve (CN XII)

important in swallowing

III. NERVES OF NECK

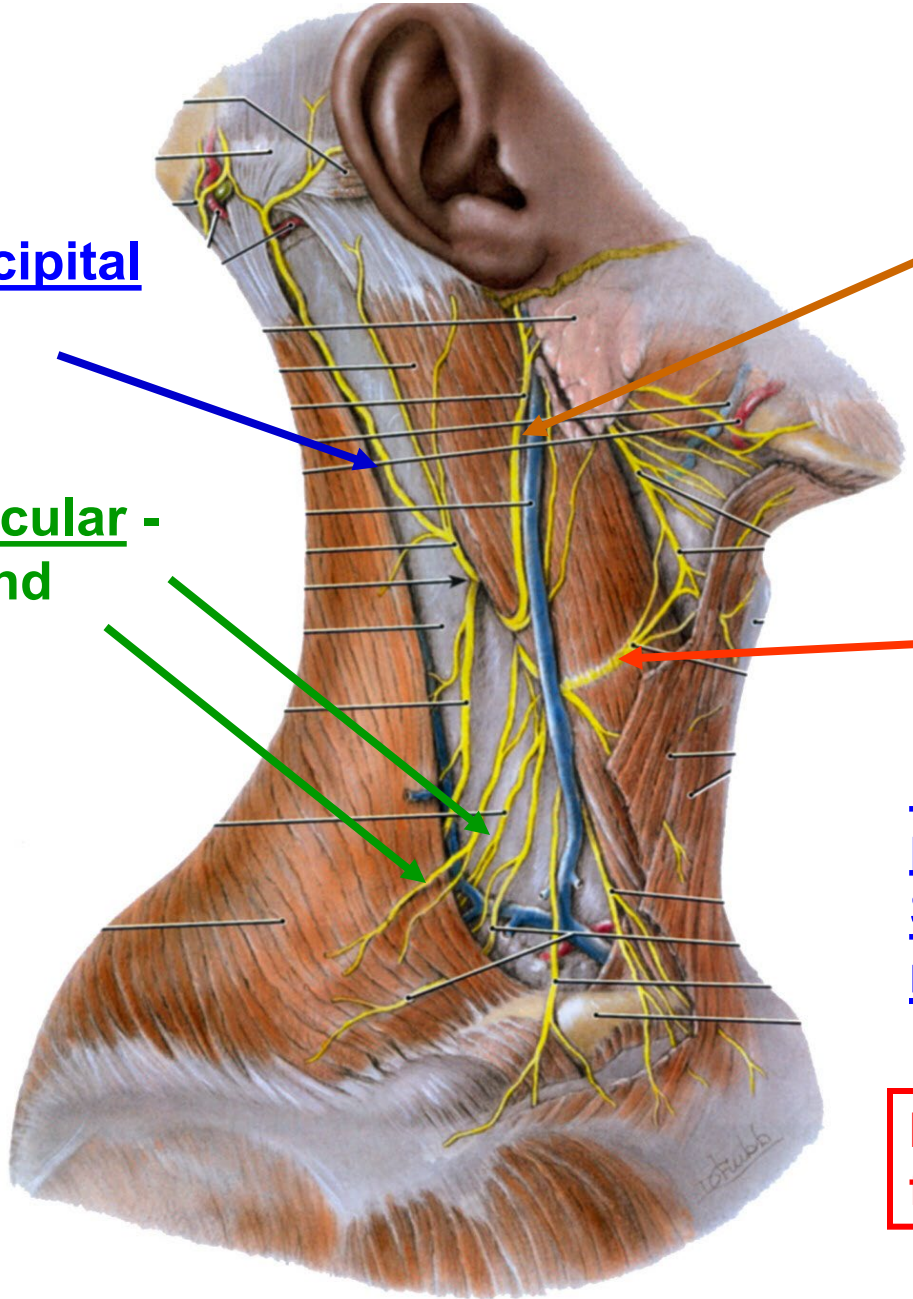


A. CERVICAL PLEXUS

from C2-C4 ventral primary rami

not know detailed branching pattern: cervical plexus is deep and protected

A. CERVICAL PLEXUS - cutaneous nerves



NOSE

1) Lesser Occipital behind ear

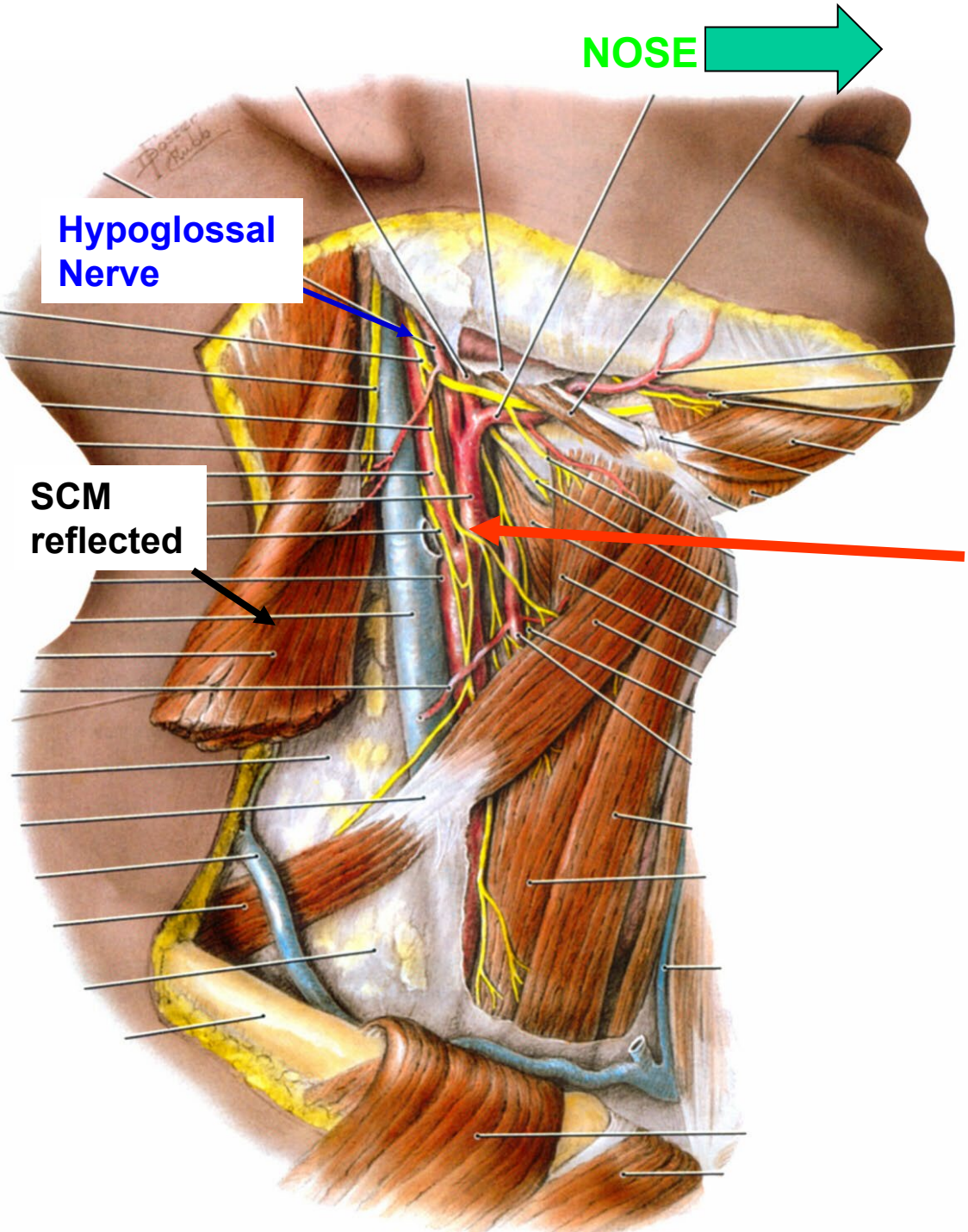
2) Great Auricular - skin over parotid, inf. to ear

3) Transverse Cervical - ant. neck

4) Supraclavicular - lower neck and shoulder

Nerves emerge from post border of Sternocleidomastoid m.

Important for anesthesia for suturing neck



B. ANSA CERVICALIS

- fibers from C1 join Hypoglossal Nerve (XII)

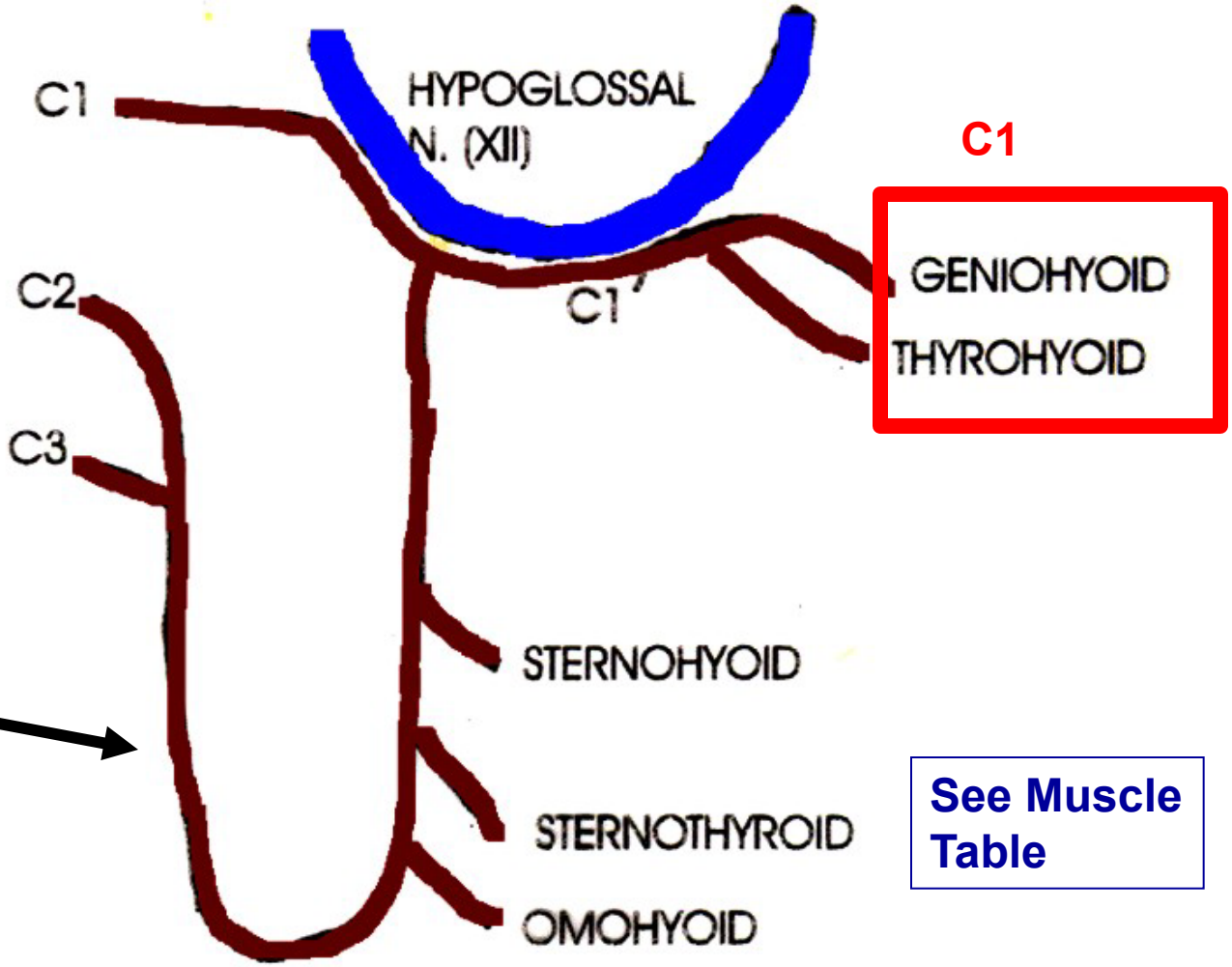
- some leave and join fibers of C2 and C3 to form ANSA (loop) Cervicalis

- other fibers continue with XII to innervate Thyrohyoid and Geniohyoid

(Looks like XII innervates neck muscles; actually C1-C3 do)

ANSA CERVICALIS

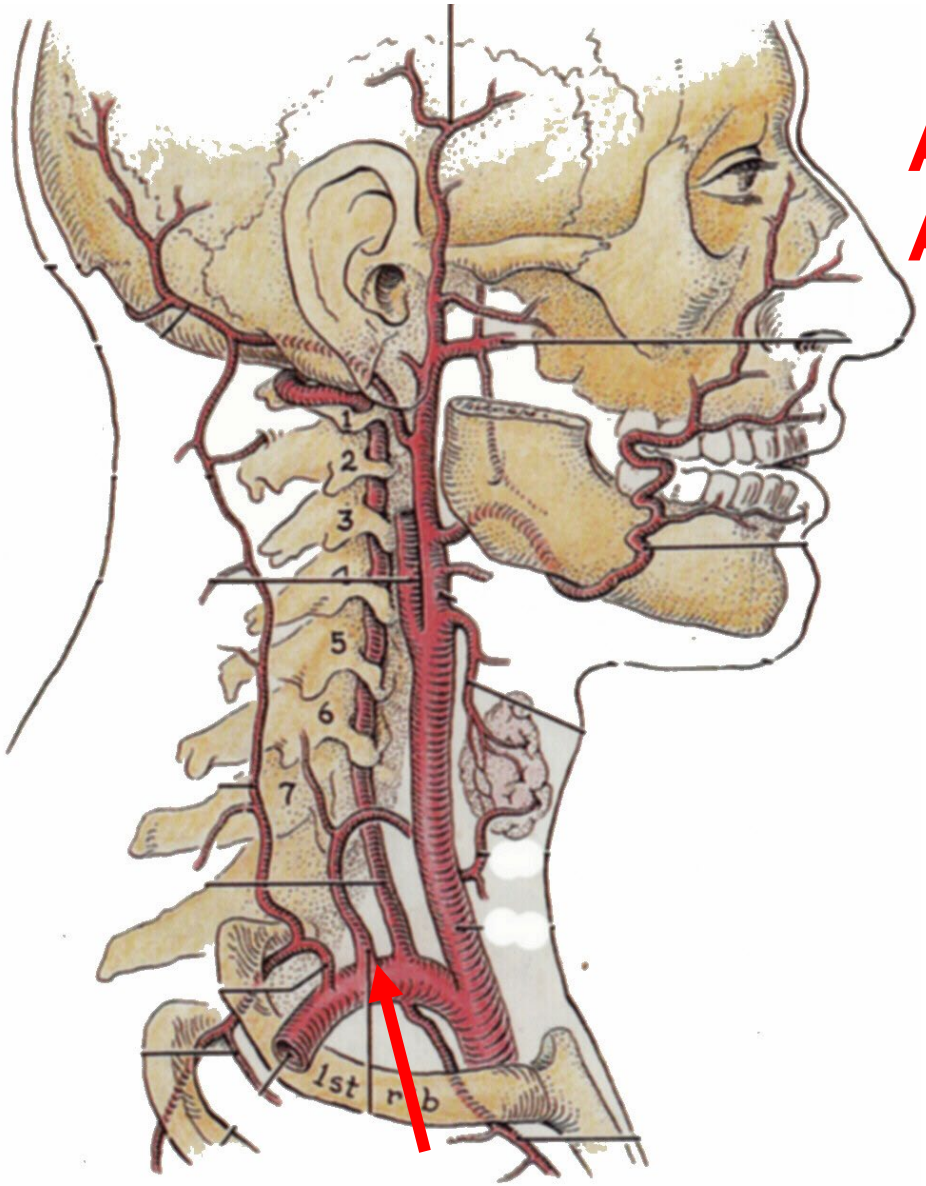
CN XII Receives hitchhiking fibers



LOOP = ANSA CERVICALIS

See Muscle Table

IV. ARTERIES OF HEAD AND NECK



SUBCLAVIAN A.

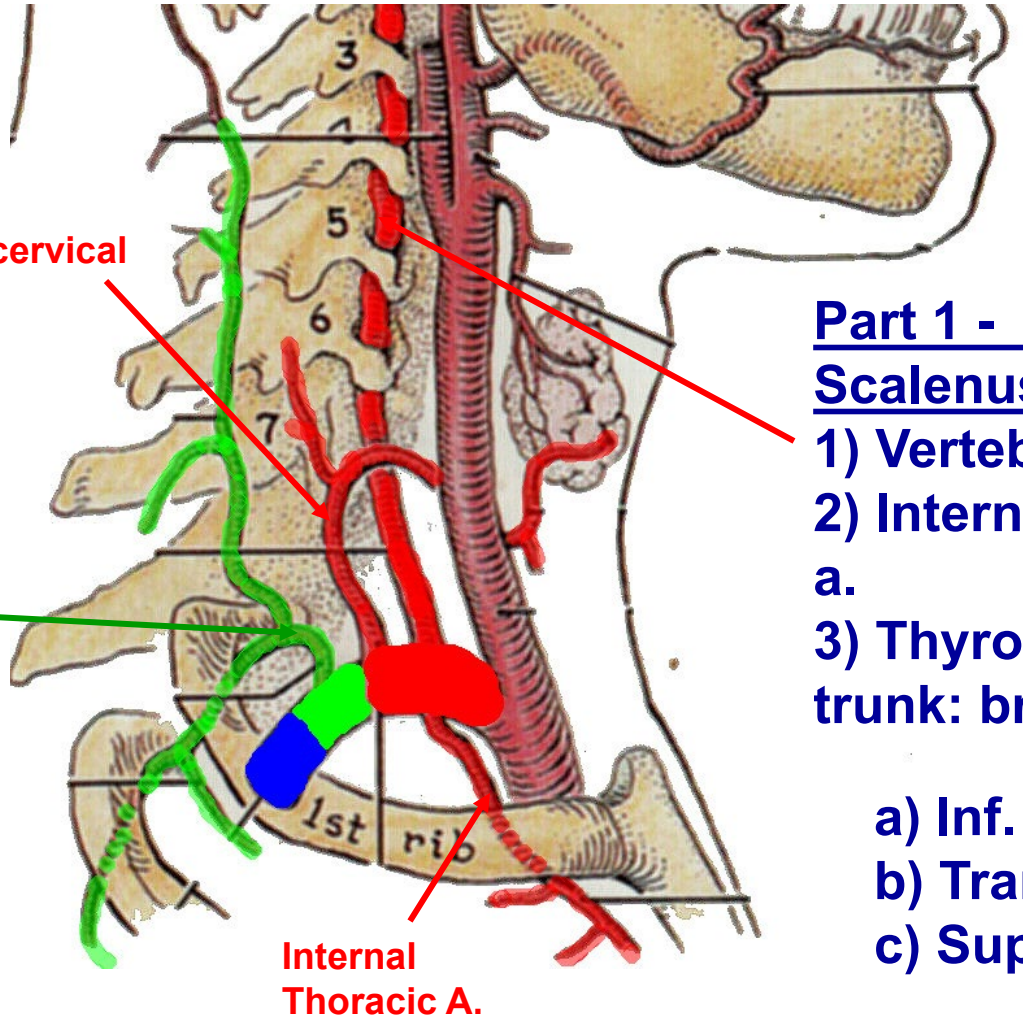
A. SUBCLAVIAN ARTERY

At root of neck- passes to arm - becomes Axillary a. (rib 1)

- Scalenus Anterior muscle divides Subclavian into 3 parts

SUBCLAVIAN ARTERY - divided into 3 parts by Scalenus Anterior muscle

NOSE



Part 2- Posterior to Scalenus Anterior

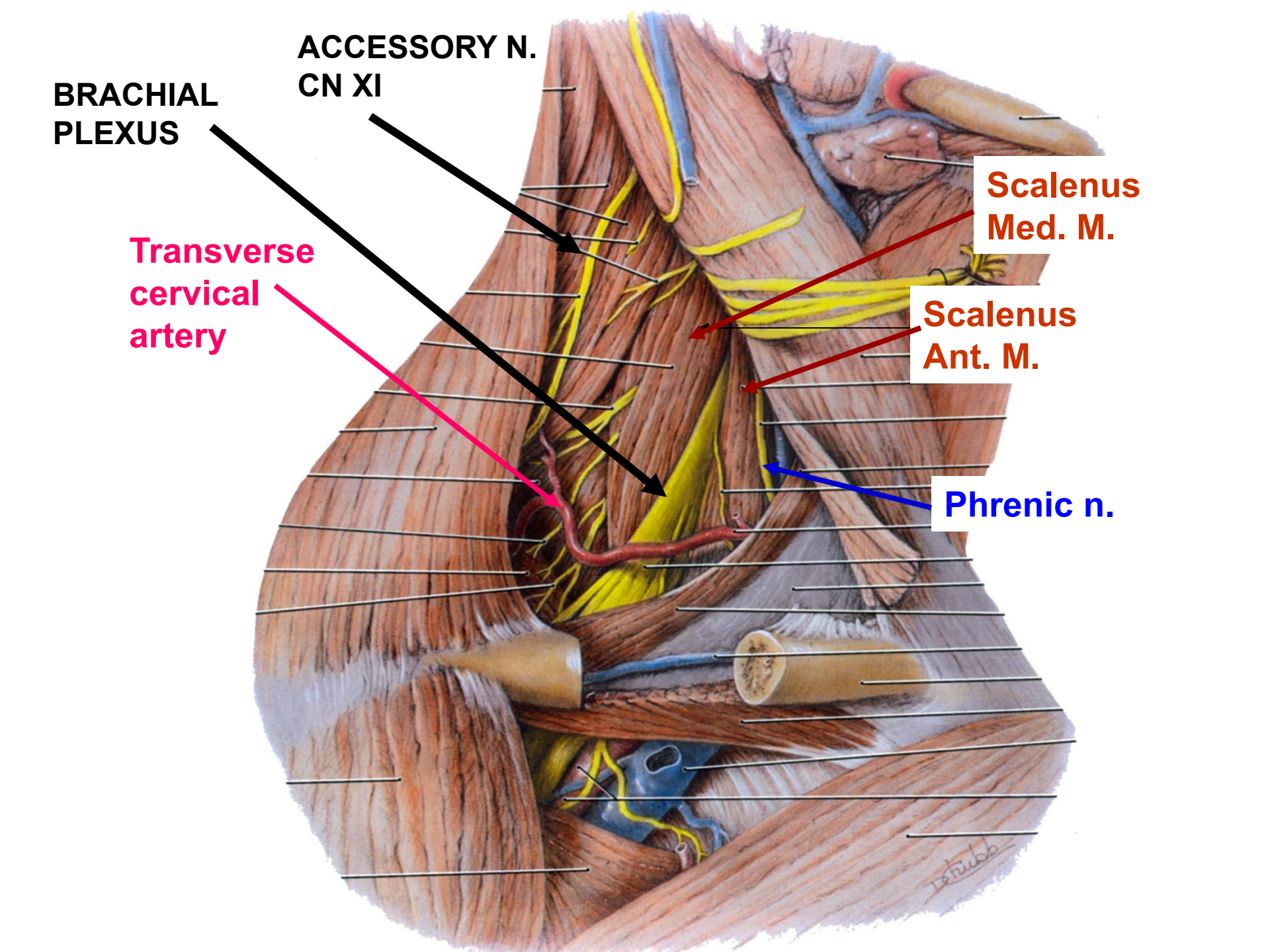
1) Costocervical trunk - branches
a) Superior intercostal a. first two int spaces;
b) Deep cervical a. - deep neck

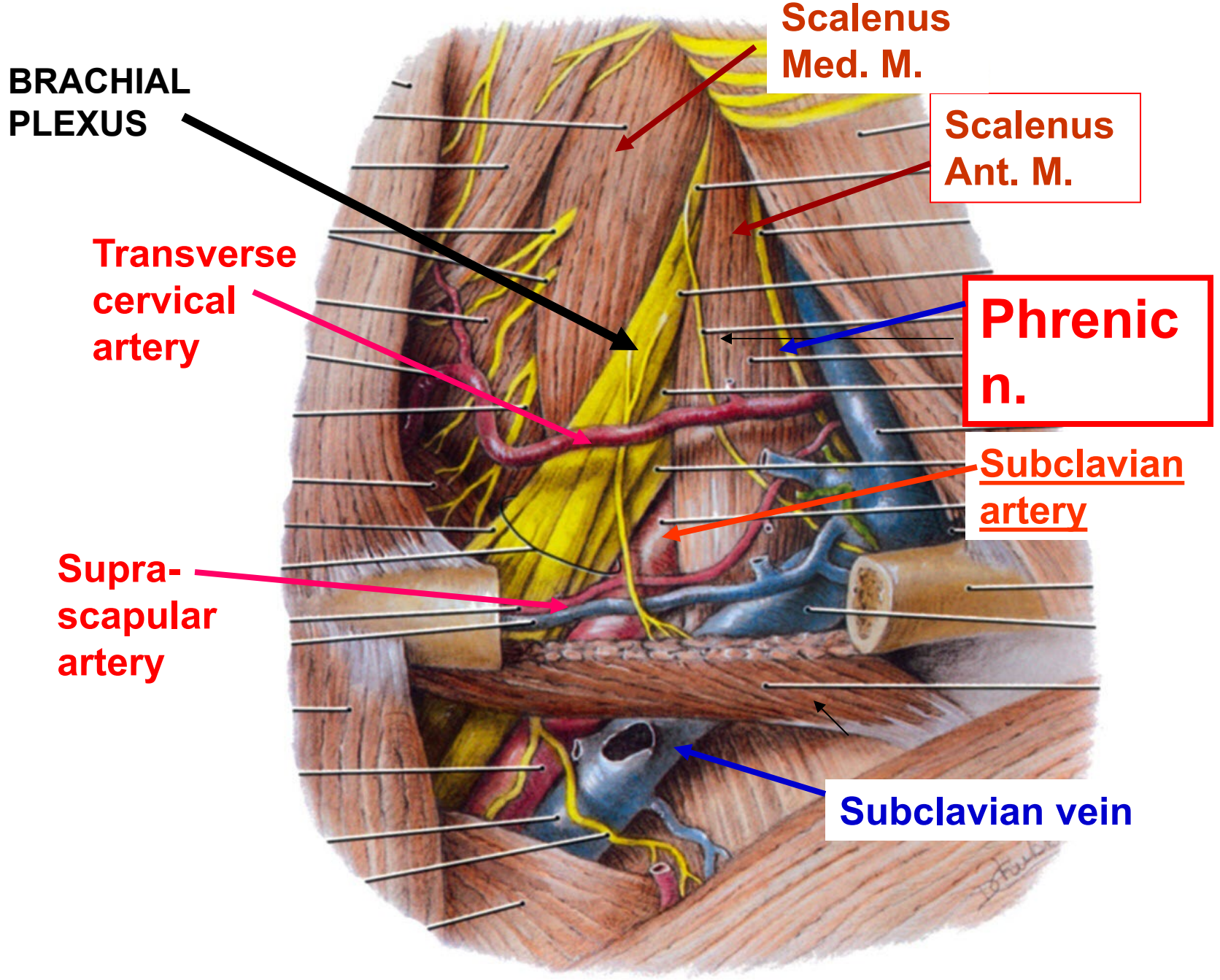
Part 1 - Medial to Scalenus Anterior

1) Vertebral a.
2) Internal thoracic a.
3) Thyrocervical trunk: branches -

a) Inf. thyroid
b) Trans. cervical
c) Suprascapular

Part 3 - Lateral to Scalenus Anterior - No Branches


ACCESSORY N.
CN XI
BRACHIAL
PLEXUS
Scalenus
Med. M.
Transverse
cervical
artery
Scalenus
Ant. M.
Phrenic n.


BRACHIAL PLEXUS
Scalenus Med. M.
Scalenus Ant. M.
Transverse cervical artery
Phrenic n.
Subclavian artery
Supra-scapular artery
Subclavian vein

B. EXTERNAL CAROTID ARTERY

Terminal branches

Superficial Temporal A..

Maxillary A..

Anterior branches

4. FACIAL A - BELOW THEN ON SURFACE OF MANDIBLE

3. LINGUAL A- TONGUE

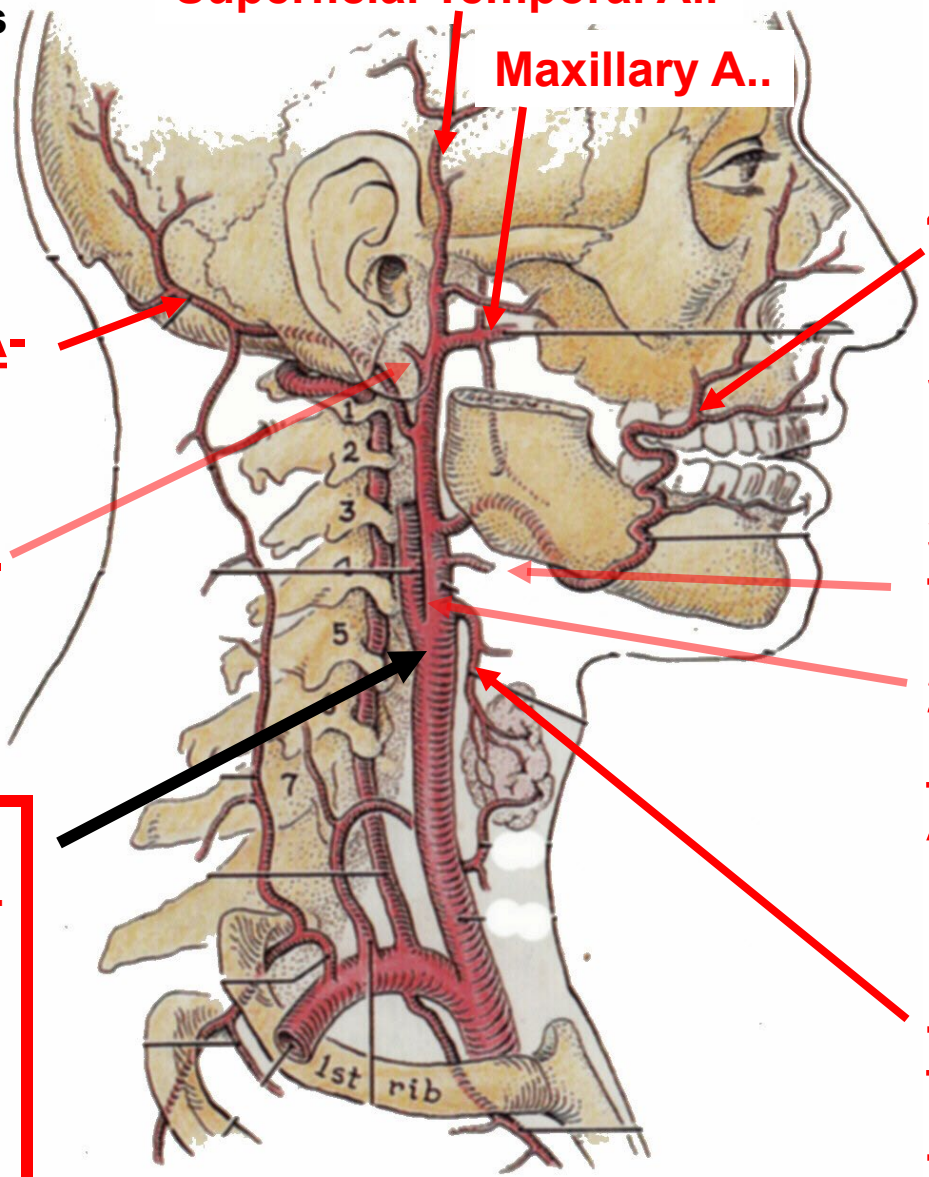
2. ASCENDING PHARYNGEAL A- ASCENDS TO PHARYNX

1. SUPERIOR THYROID A- DESCENDS TO THYROID

Posterior branches

5. OCCIPITAL A- POST SCALP

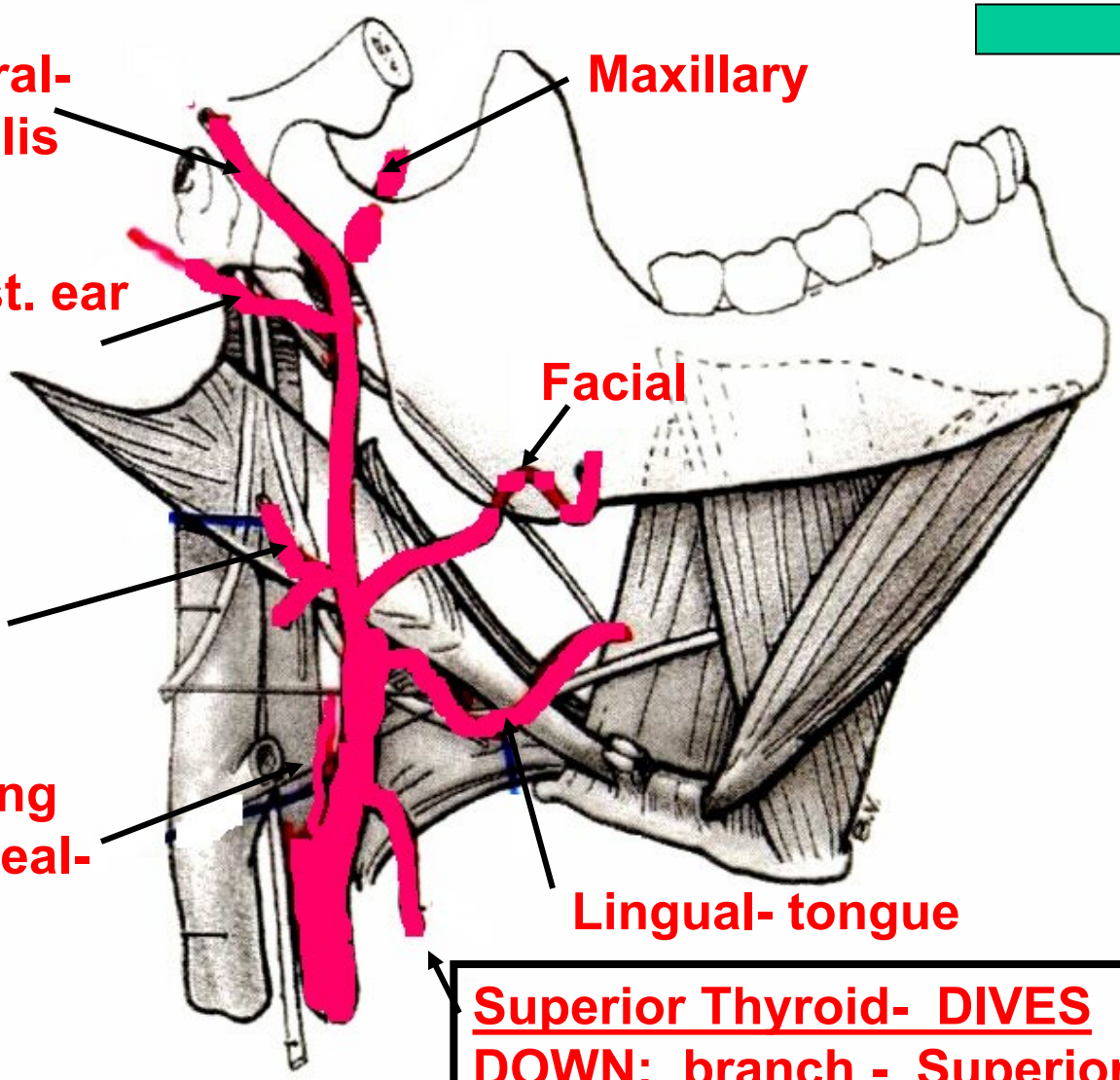
6. POST. AURICULAR A- POST TO EAR



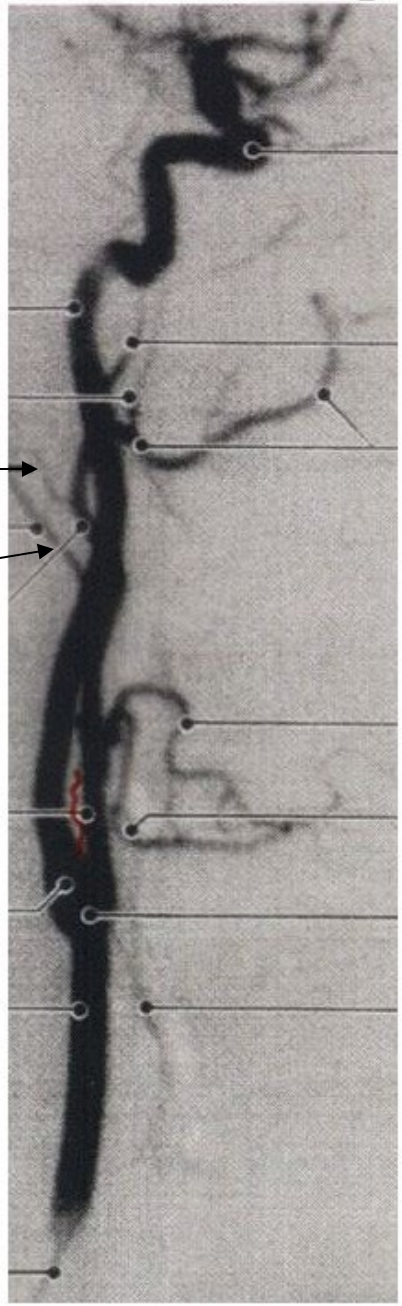
**

CAROTID BIFURCATION - AT UPPER BORDER OF THYROID CARTILAGE - LEVEL C4

EXTERNAL CAROTID ARTERY



carotid arteriogram



Post side

Ant side

POST. AURICULAR

OCCIPITAL

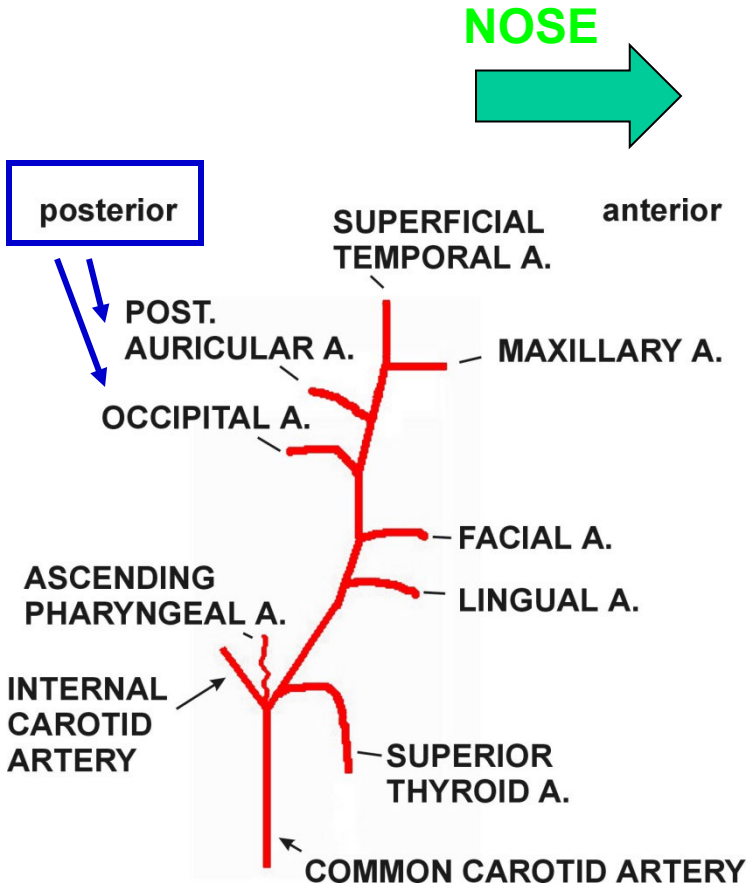
SUP. TEMPORAL

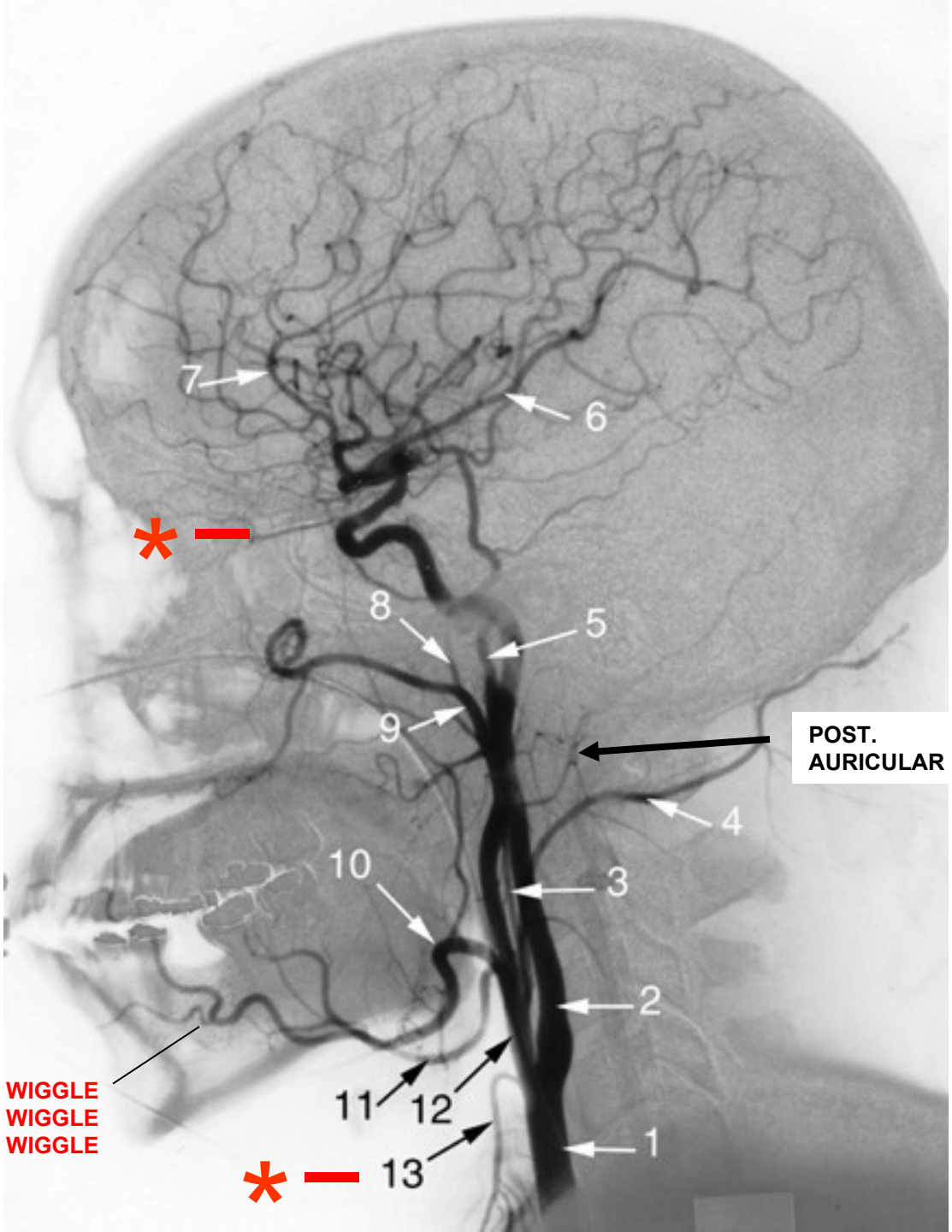
MAXILLARY

FACIAL

LINGUAL

SUP. THYROID





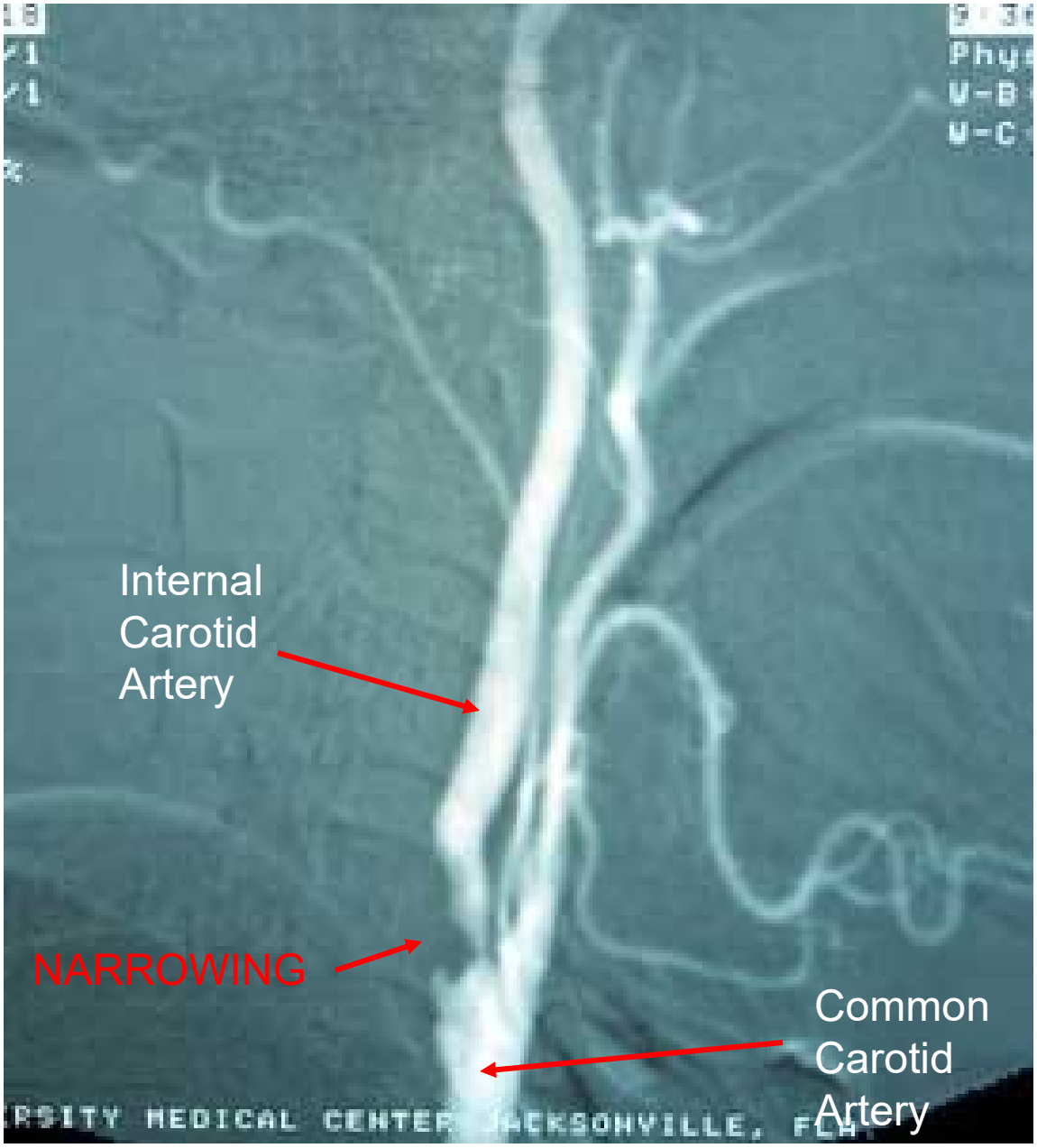
NOSE

KNOW THIS SLIDE

1. COMMON CAROTID
2. INTERNAL CAROTID
3. ASCENDING PHARYNGEAL
4. OCCIPITAL
5. SUPERFICIAL TEMPORAL
6. MIDDLE CEREBRAL
7. ANTERIOR CEREBRAL
8. MIDDLE MENINGEAL
9. MAXILLARY
10. FACIAL
11. LINGUAL
12. EXTERNAL CAROTID

13. SUPERIOR THYROID

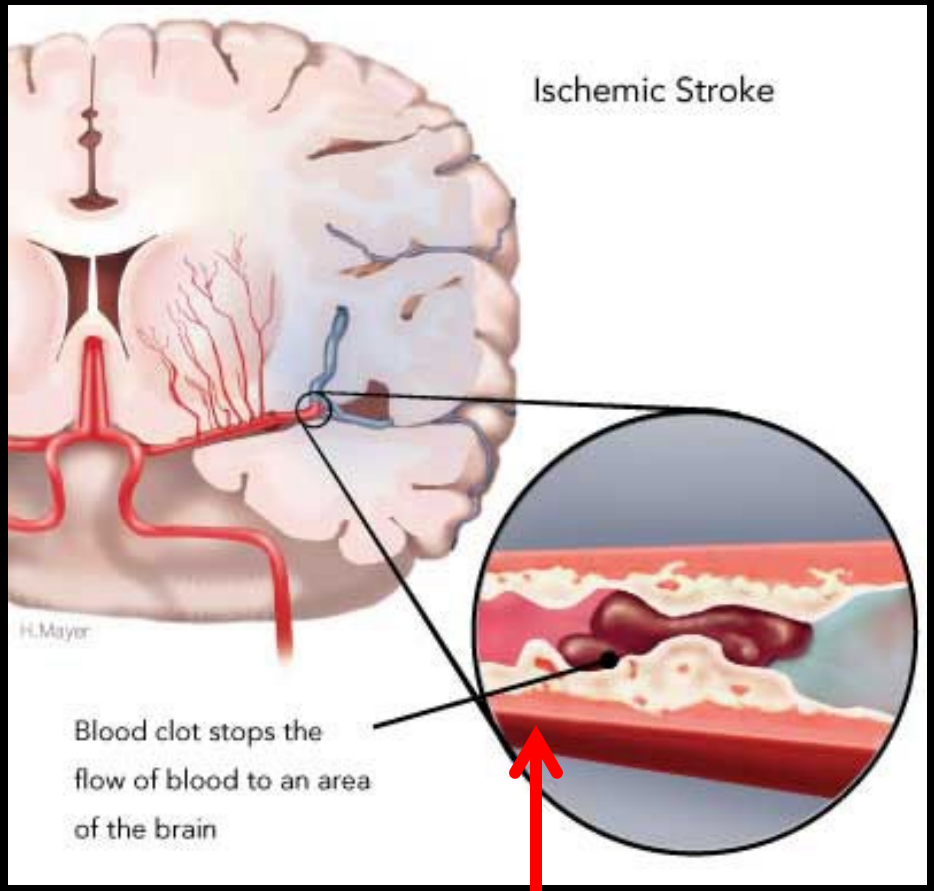
*- OPHTHALMIC ARTERY ARISING FROM CAROTID SIPHON **

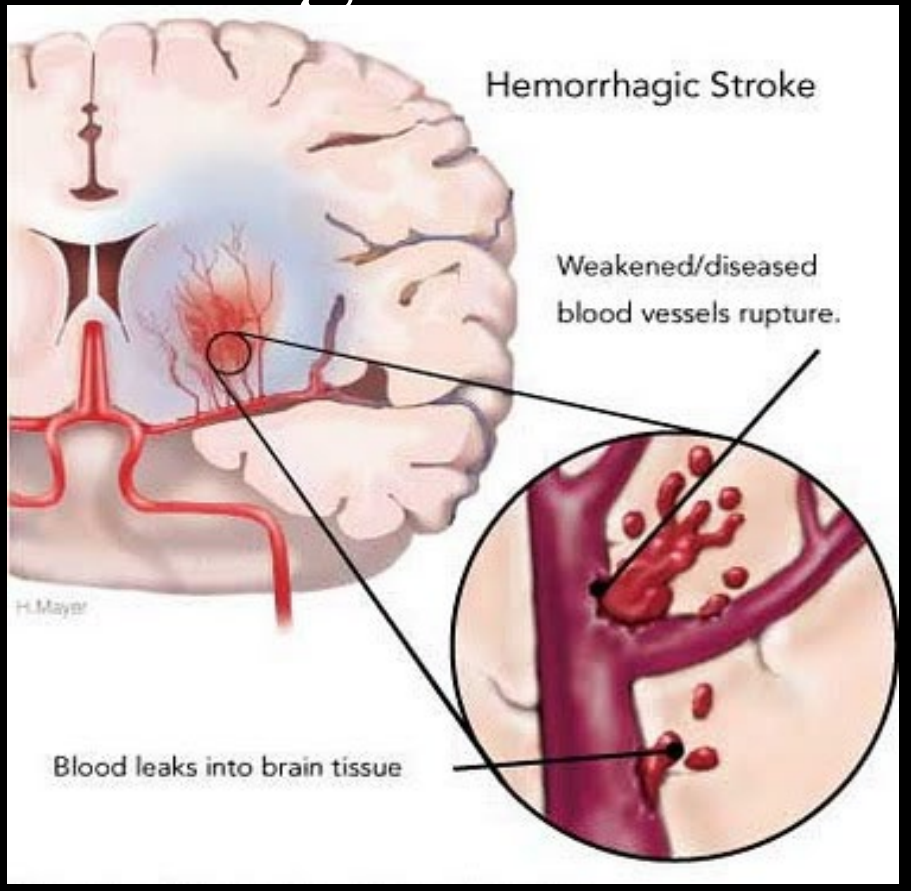


The patient presented is a healthy 72 year old man who was found to have a preocclusive stenosis on work up.

STENOSIS - ABNORMAL NARROWING OF VESSEL

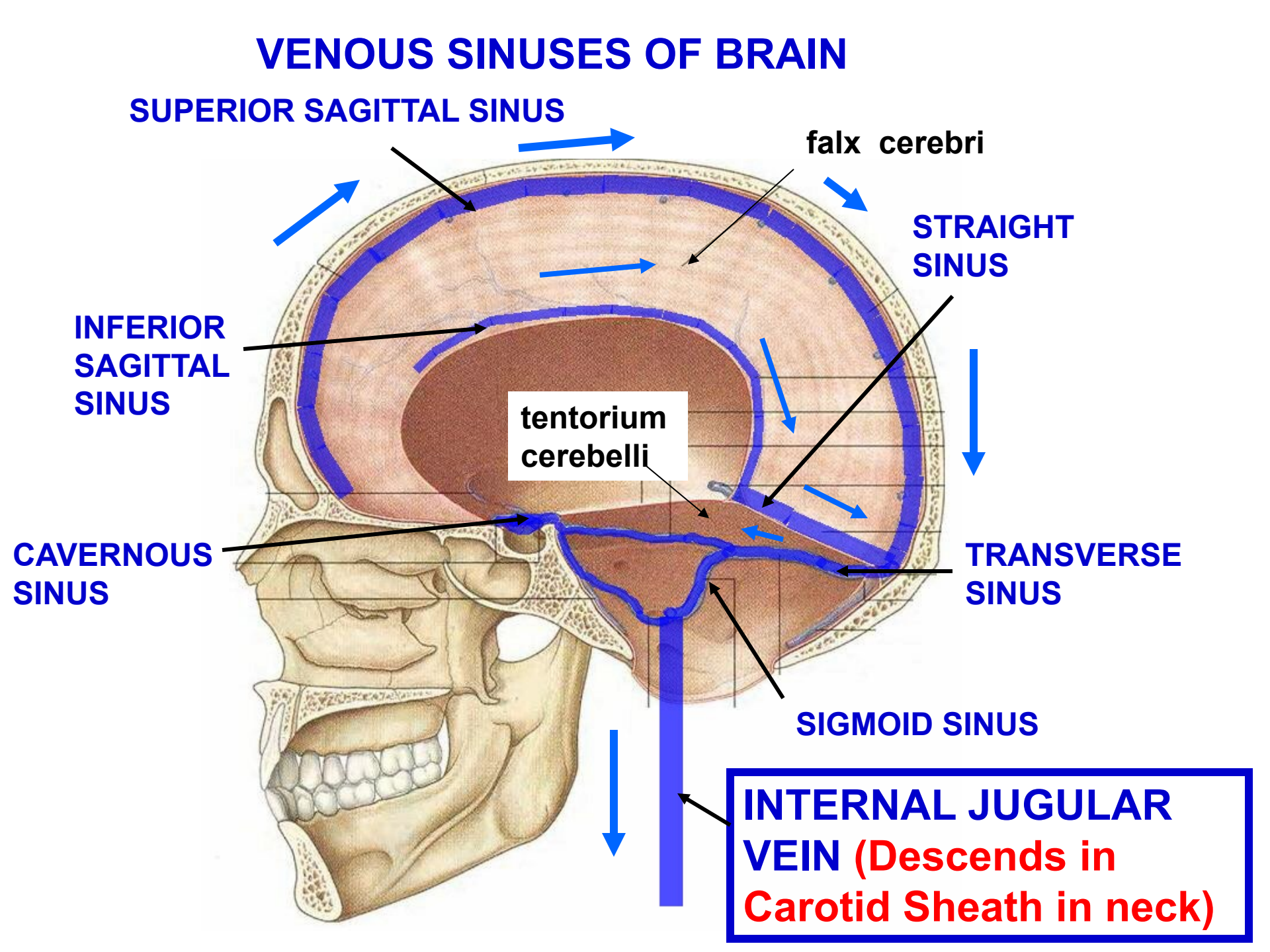
Ischemic vs. Hemorrhagic Stroke

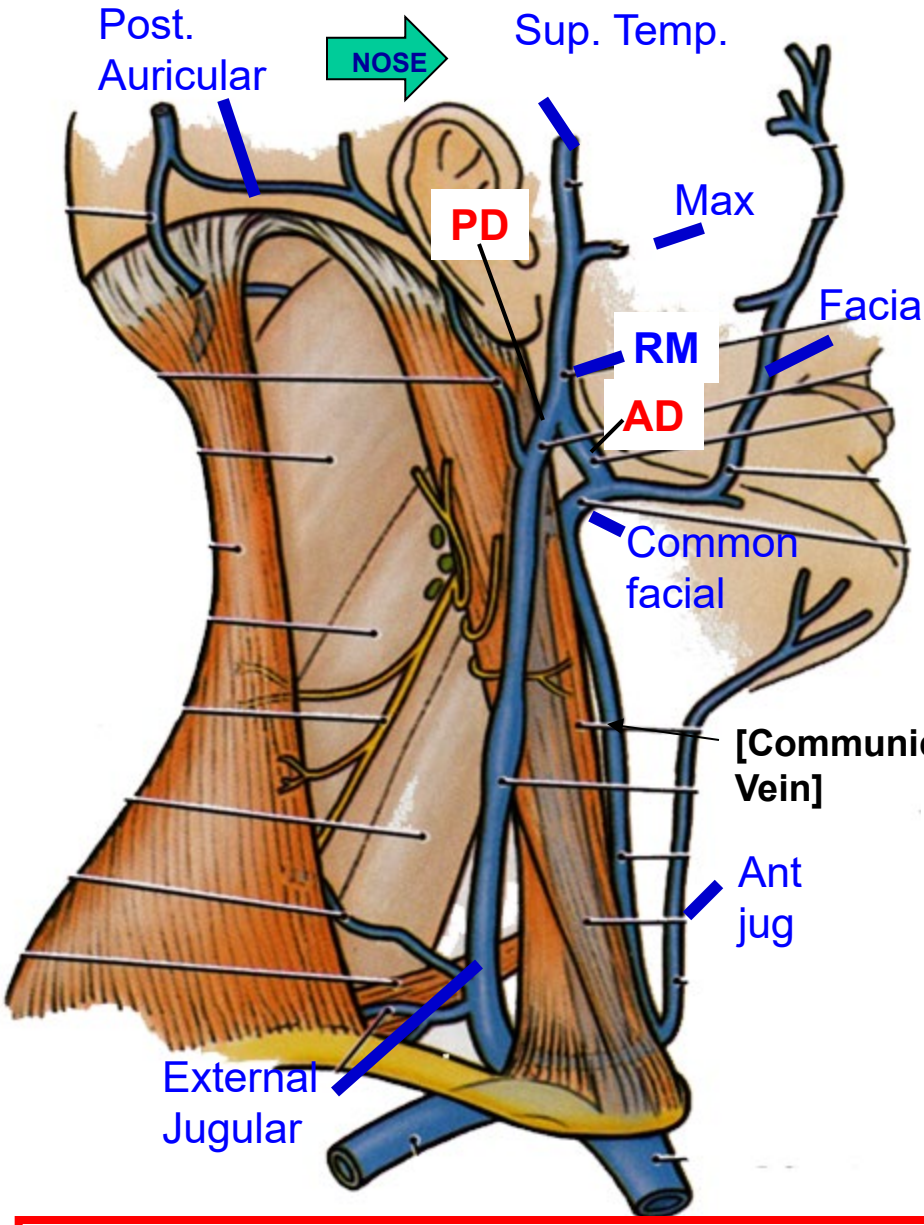




Danger of Occlusion is Ischemic stroke – Insufficient blood supply to brain or giving rise to embolus (clot that Is carried in arterial system, to brain)

VENOUS SINUSES OF BRAIN





V. VEINS OF NECK - drain areas of External Carotid Artery

1. Superficial Temporal and Maxillary veins form Retromandibular V. (RM)

2. Retromand. V. Divides Ant. (AD) and Post. (PD) divisions

3. Ant. Division joins Facial V. to form Common Facial V. drains to Int. Jugular V.

4. Post. Division joins Post. Auricular V. to form External Jugular V (on surface of Sternocleidomastoid muscle) drains to Subclavian V.

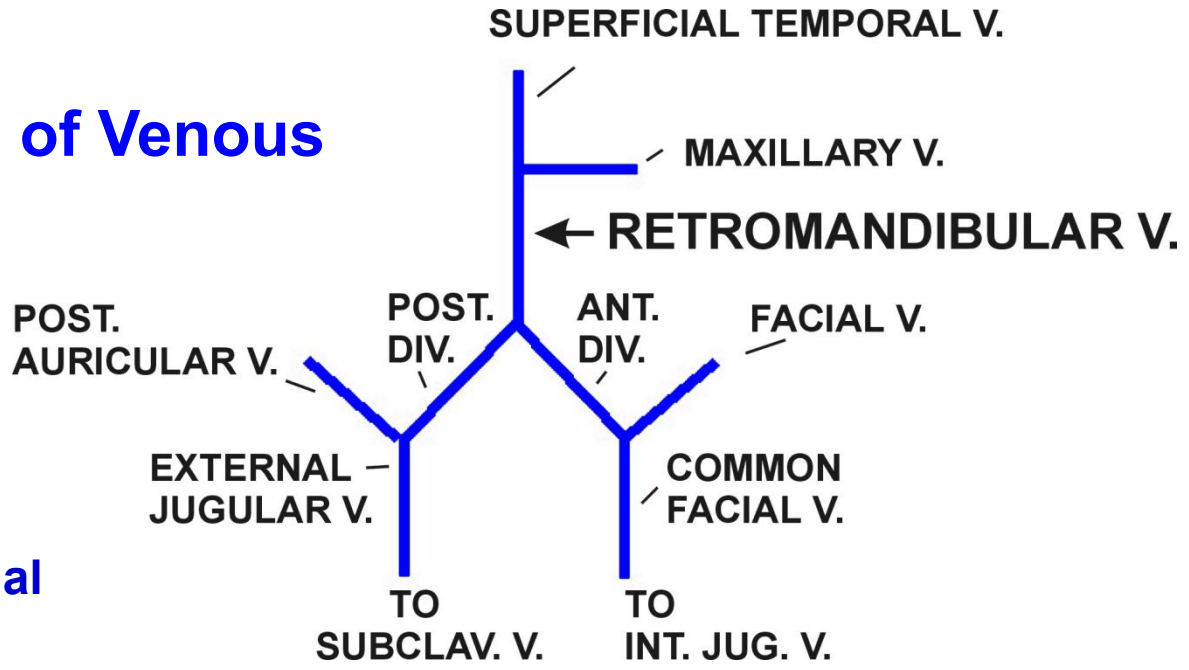
5. Ant. Jugular from veins below mandible drains Ext. Jugular (above clavicle)

EXTERNAL JUGULAR V. - ON SURFACE OF STERNOCLEIDOMASTOID; NOT IN CAROTID SHEATH
INTERNAL JUGULAR V. - DEEP TO STERNOCLEIDOMASTOID; IN CAROTID SHEATH **

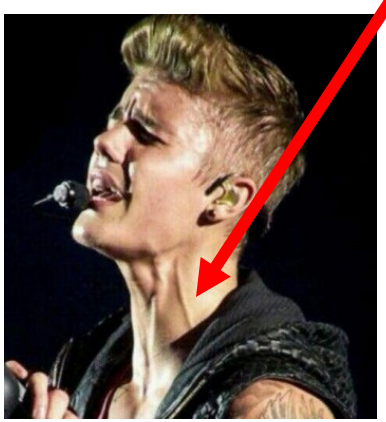
VEINS OF NECK

Typical Pattern of Venous Drainage

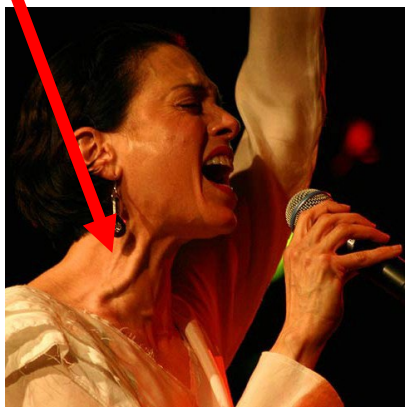
Variations Common



Large External Jugular V.



Justin Bieber - teen 'idol'



Helen Schneider - singer

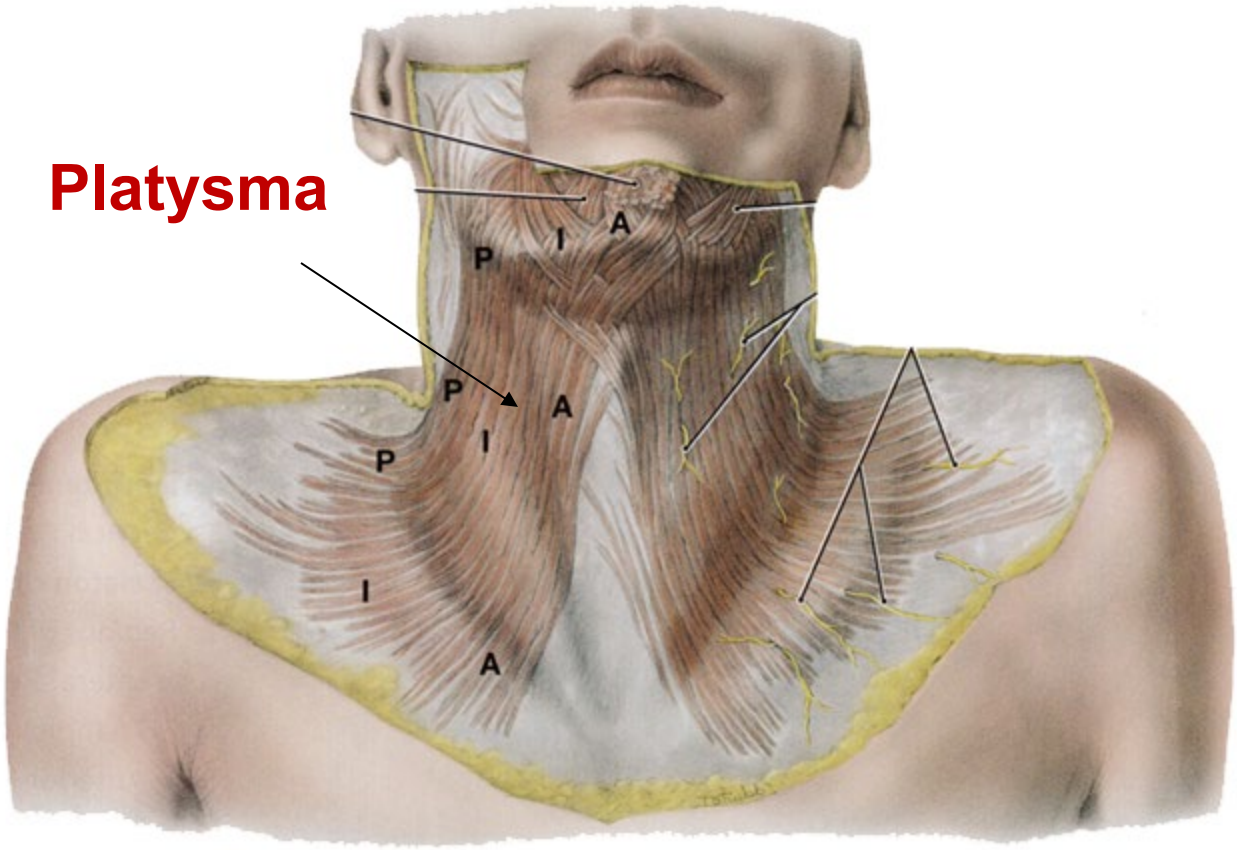
Bono - singer

Large Anterior Jugular V.

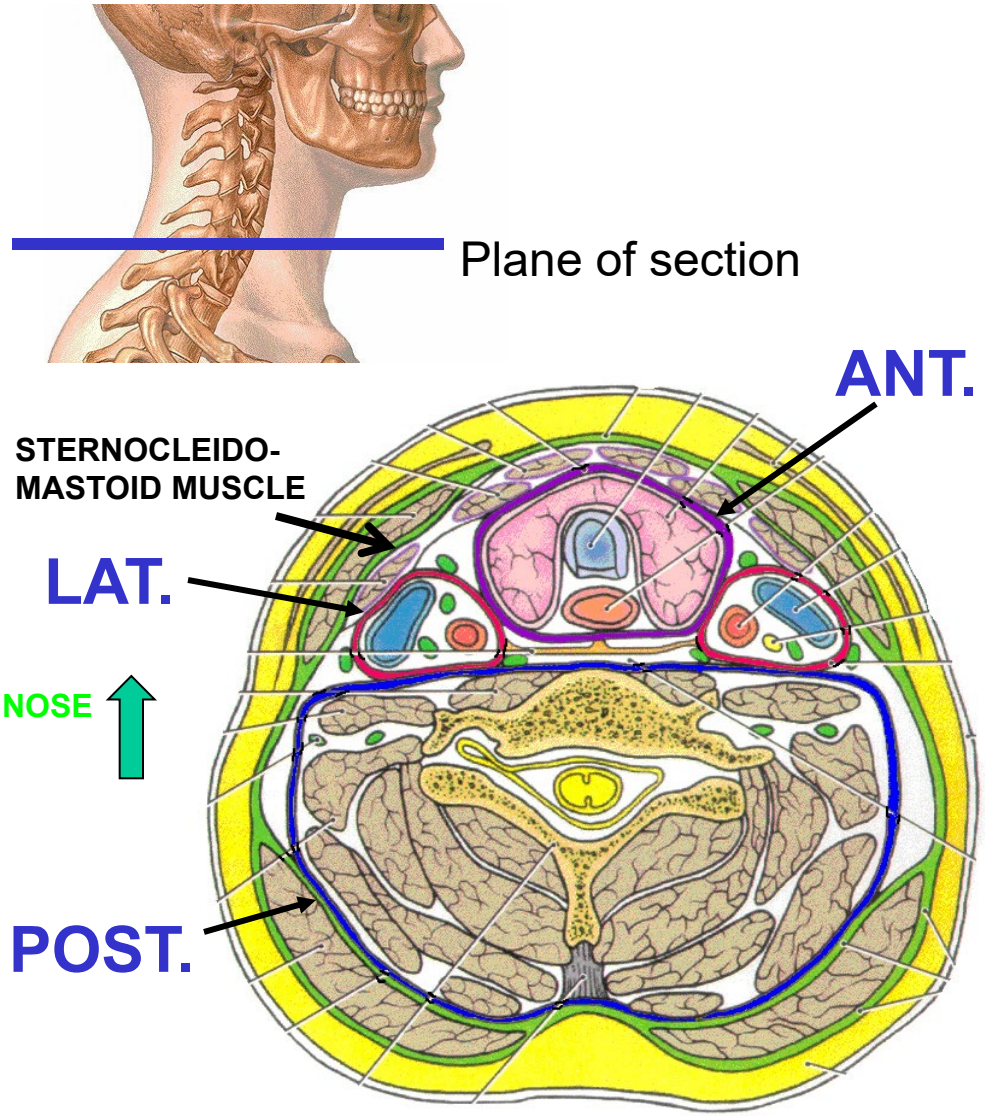
VI. FASCIA OF NECK

A. Superficial fascia:

- connective tissue below dermis
- completely surrounds neck - thin and hard to demonstrate
- contains Platysma (muscle of Facial Expression CN VII) and Superficial veins



I. OVERVIEW OF NECK - neck is compartmentalized



HORIZONTAL SECTION THROUGH NECK

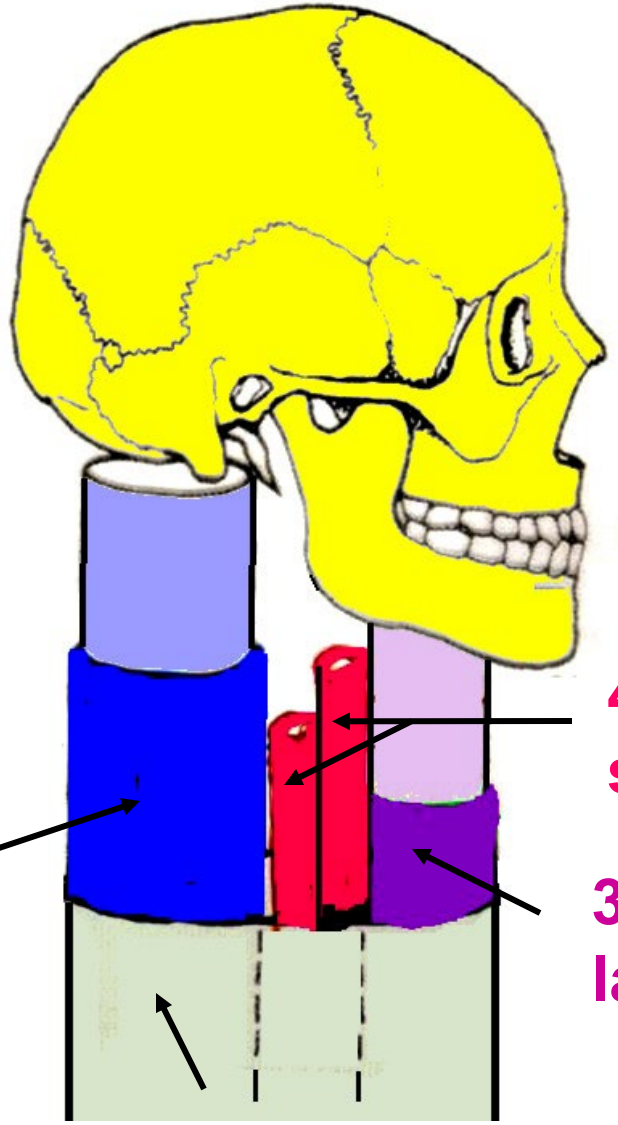
1. Posterior Compartment - Vertebrae and muscles which support and move head and neck

2. Anterior Compartment- Viscera and rostral continuation GI & Respiratory Systems

3. Lateral Compartment- Blood vessels and nerve - Carotid sheath

FASCIA OF NECK

B. Deep Cervical fascia - one layer (Investing layer) surrounds neck, other layers form tubes (names poorly chosen)



TUBES INSIDE AN OUTER TUBE

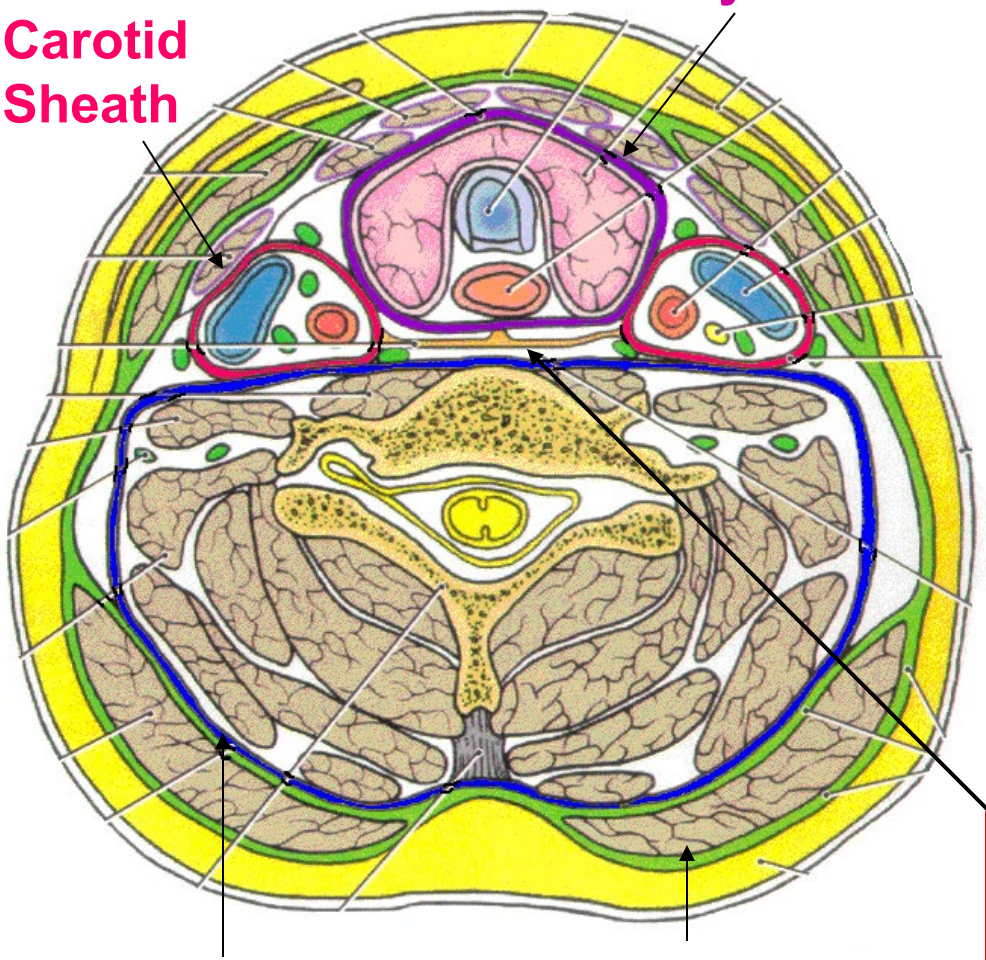
2. Prevertebral Layer

4. Carotid sheath

3. Pre-tracheal layer

1. Investing layer

FASCIA OF NECK



1. Investing layer of deep cervical fascia- surrounds neck, splits around sternocleidomastoid, trapezius, supra and infrahyoid m.

2. Prevertebral Layer- surrounds vert. column, muscles of neck, (prevertebral, lat. vertebral, suboccipital m.)

3. Pretracheal Layer- surrounds trachea, esophagus and thyroid continues to thorax. **

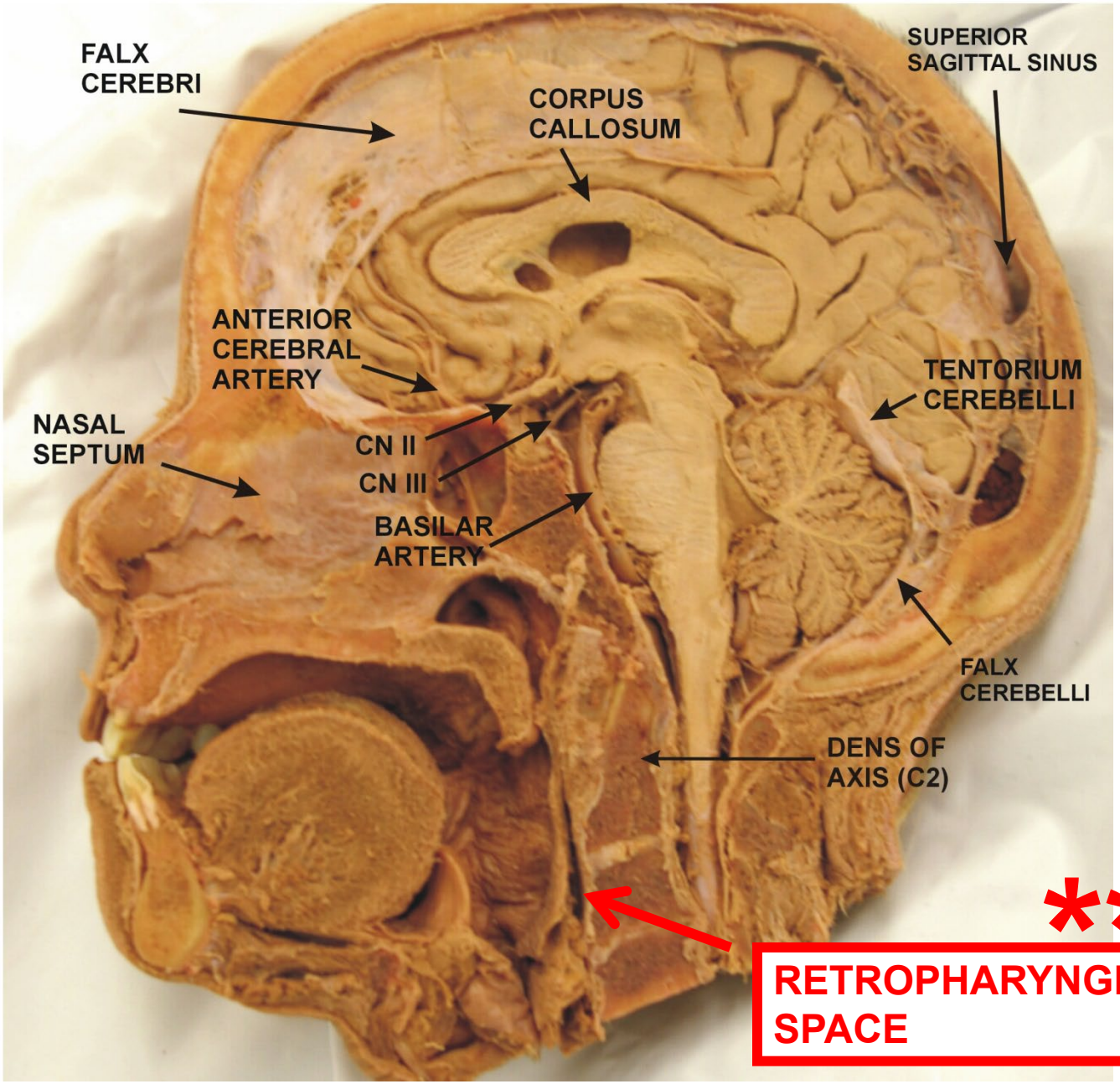
CLINICAL

4. Carotid Sheath- surrounds Common & Int carotid, Int jugular and X Vagus (not: Symp. Chain)

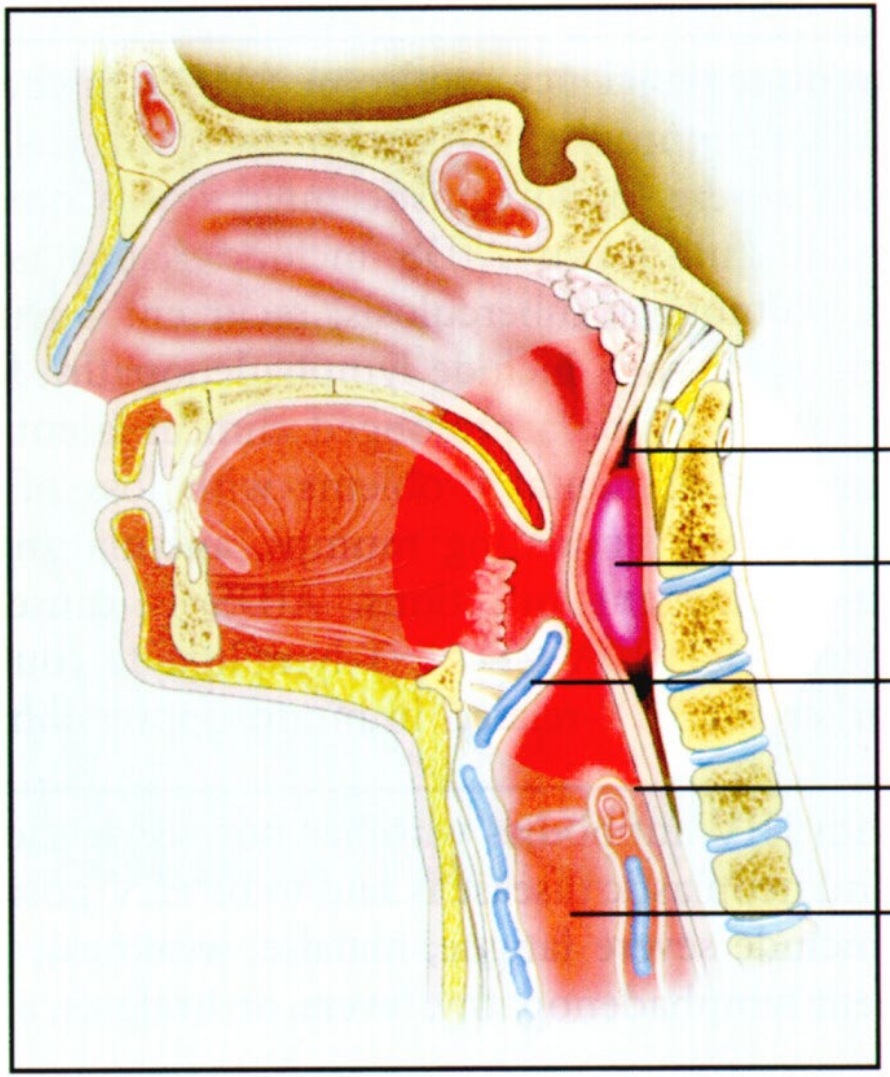
Retropharyngeal Space- between Pretracheal and Prevertebral layers - infection from head (tonsillitis) can spread to mediastinum **

MEDIAL VIEW OF BISECTED HEAD

1069



RETROPHARYNGEAL ABSCESS



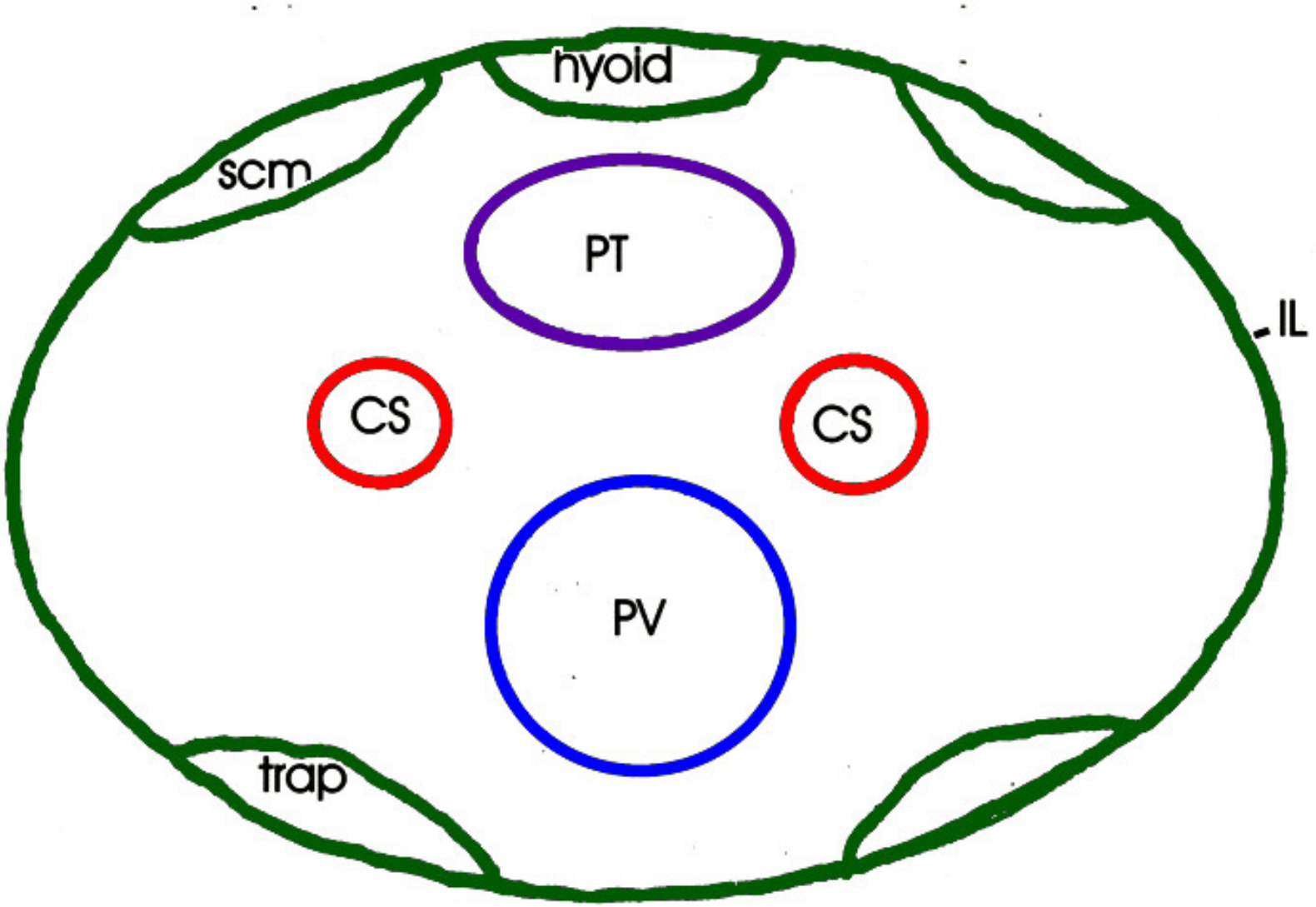
Infection in retropharyngeal space can spread unimpeded to thorax (mediastinum)

**

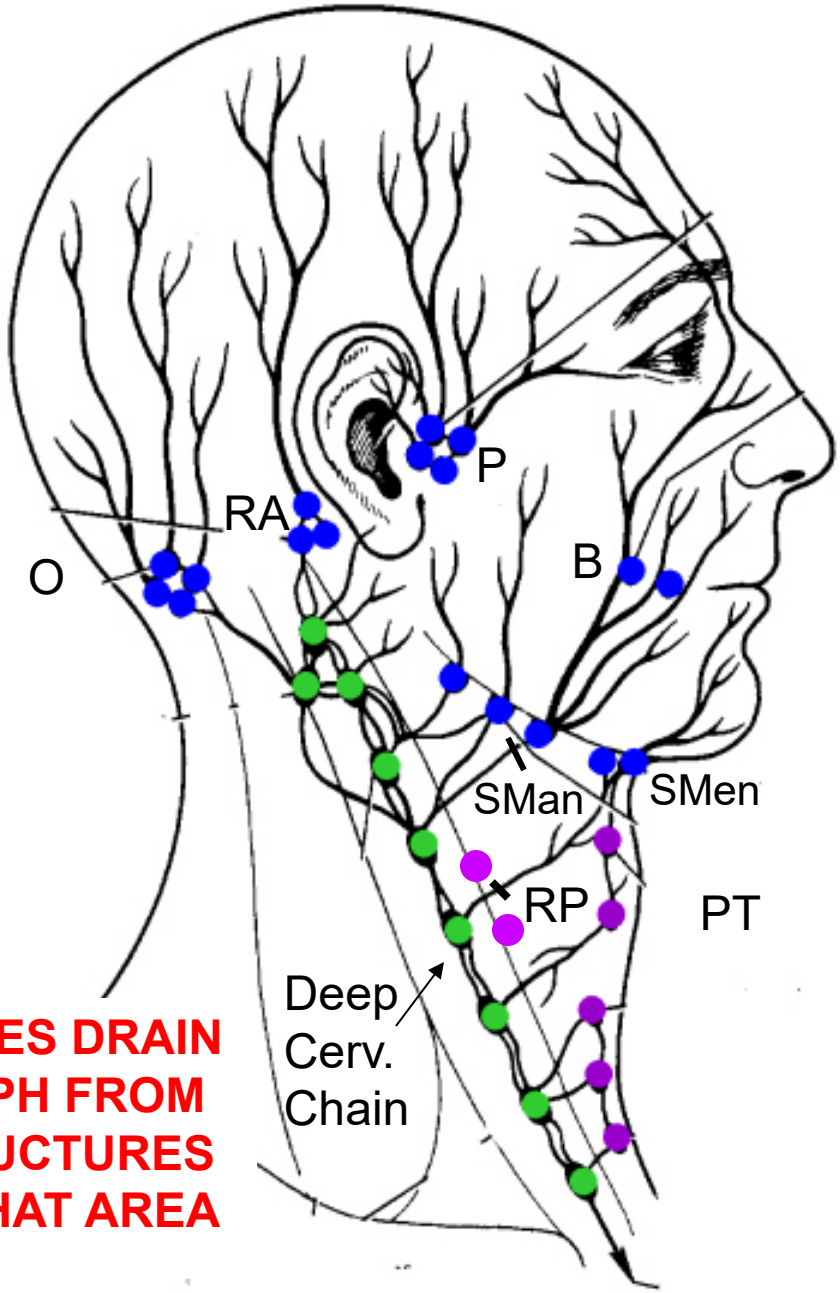
Retropharyngeal Abscess - can be difficult to diagnose (no external swelling; life-threatening as abscess can block airway; George Washington may have died of this.

CLINICALLY IMPORTANT

FASCIA OF NECK



VII. LYMPHATICS OF HEAD AND NECK



NODES DRAIN LYMPH FROM STRUCTURES IN THAT AREA

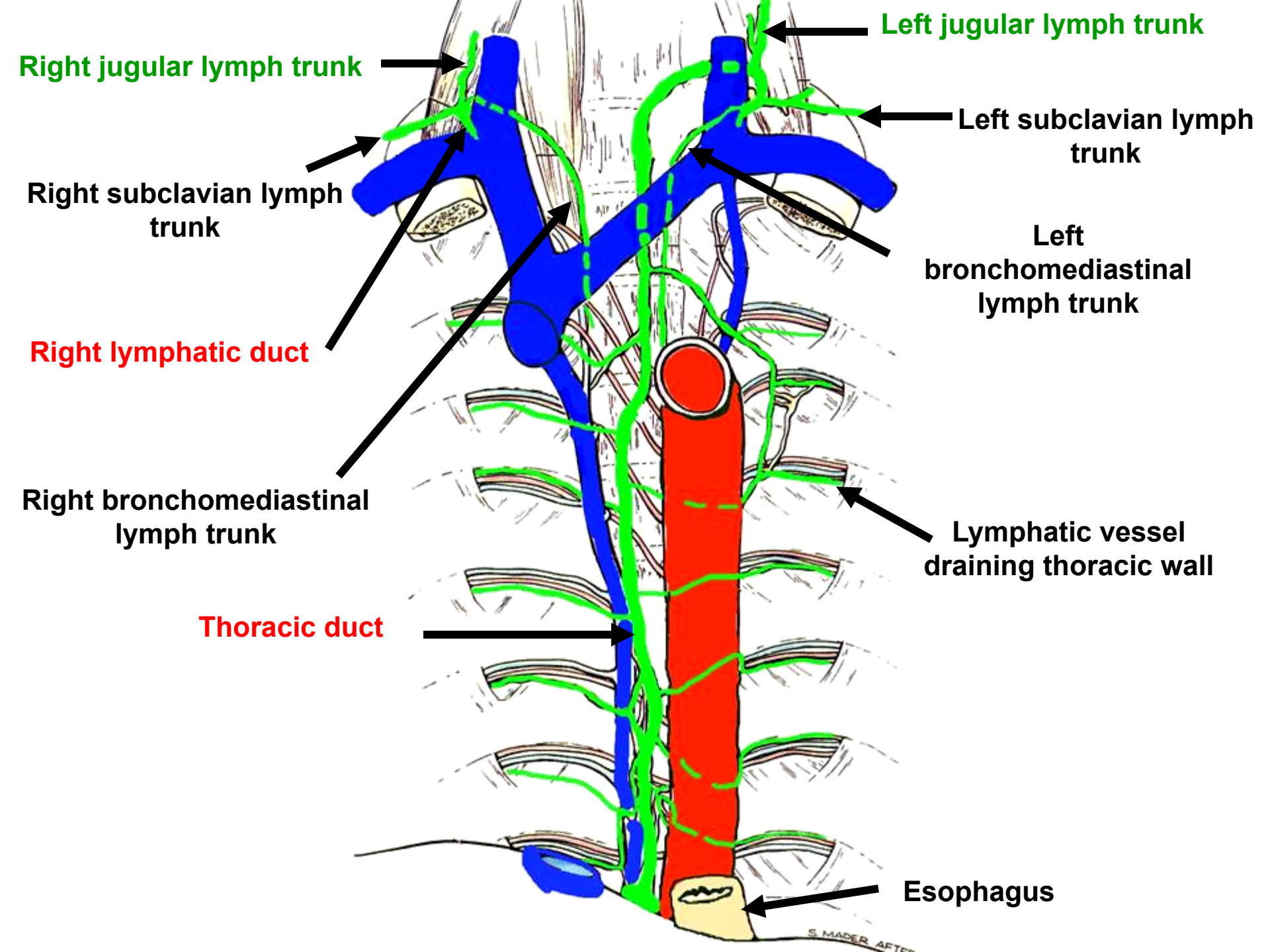
three groups (two arranged as rings; drain to chain); many named for regions drained

A. Superficial Ring; Submental, Submandibular, Buccal, Parotid, Retro-auricular and Occipital nodes

B. Deep Ring: Pretracheal, Retropharyngeal nodes

C. Deep cervical chain- along Internal Jugular vein; receive lymph from all above nodes

D. Jugular lymph trunk - to Right lymphatic duct or Thoracic duct


Left jugular lymph trunk
Right jugular lymph trunk
Left subclavian lymph trunk
Right subclavian lymph trunk
Left bronchomediastinal lymph trunk
Right lymphatic duct
Right bronchomediastinal lymph trunk
Lymphatic vessel draining thoracic wall
Thoracic duct
Esophagus