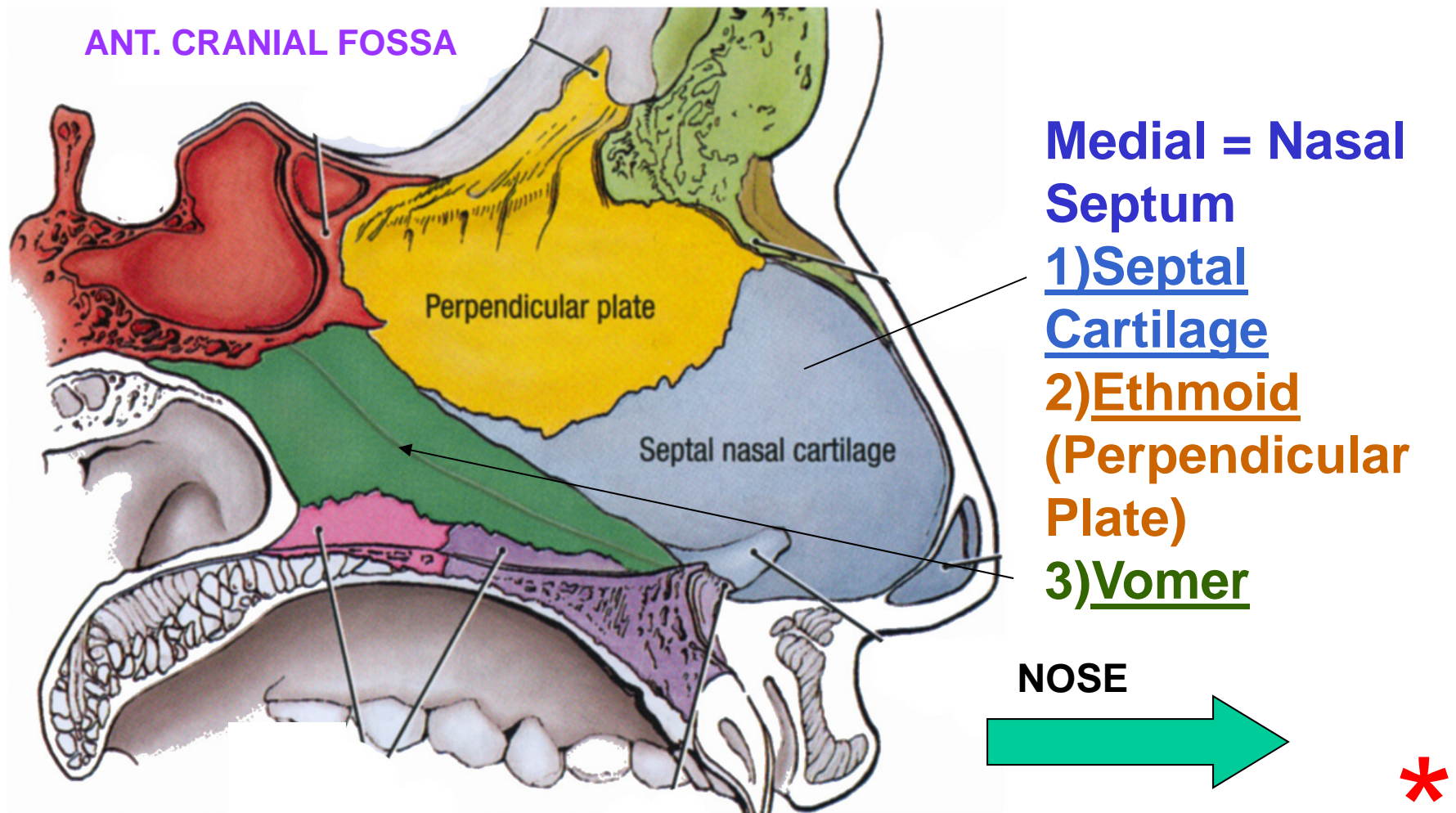


REVIEW CLINICAL ANATOMY HEAD AND NECK SPRING 2019

- 1. NASAL CAVITY, PALATE**
- 2. PAROTID**
- 3. ORAL CAVITY**
- 4. INDEPEDENT LEARNING**

1. NASAL CAVITY - FRACTURE OF NOSE



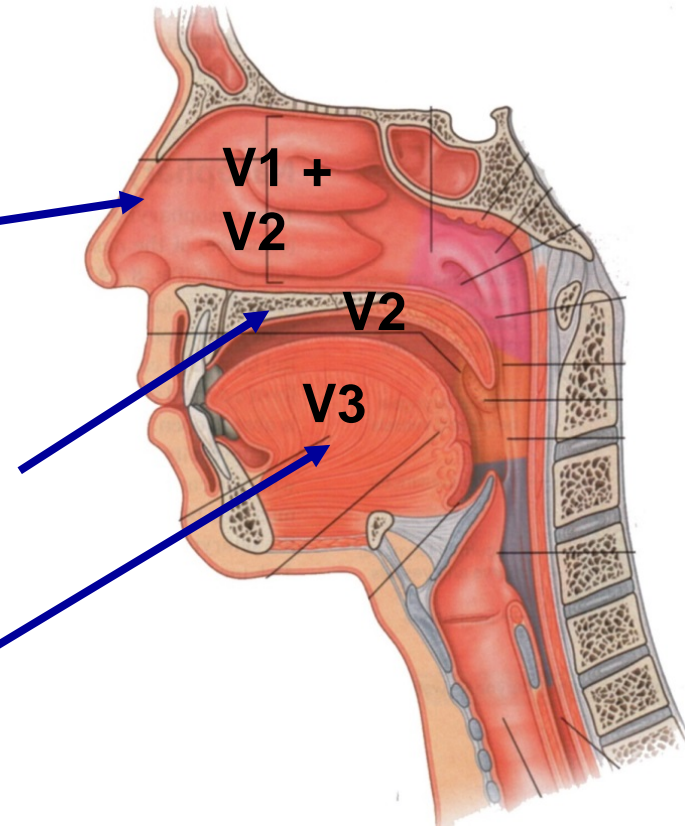
ETHMOID – Fracture of nose can break cribriform plate, floor of Ant. Cranial fossa - **leak CSF from nose**; Meningitis

SENSORY INNERVATION OF NASAL CAVITY, PALATE, FLOOR OF MOUTH

**NASAL CAVITY -
V1 AND V2**

PALATE - ALL V2

**FLOOR OF
MOUTH - ALL V3**



**NOTE: MUCOUS GLANDS OF NOSE AND
PALATE - VII (Parasympathetics)***

NASAL CAVITY: EPISTAXIS AND ARTERIAL ANASTOMOSES

1. Arteries

a. Sphenopalatine Artery

- from Maxillary A.

b. Ant. and Post Ethmoidal A.
- from Ophthalmic A.

c. **Branches of Facial A.**

2. Veins

a. Ethmoidal vein
drain to Ophthalmic v.

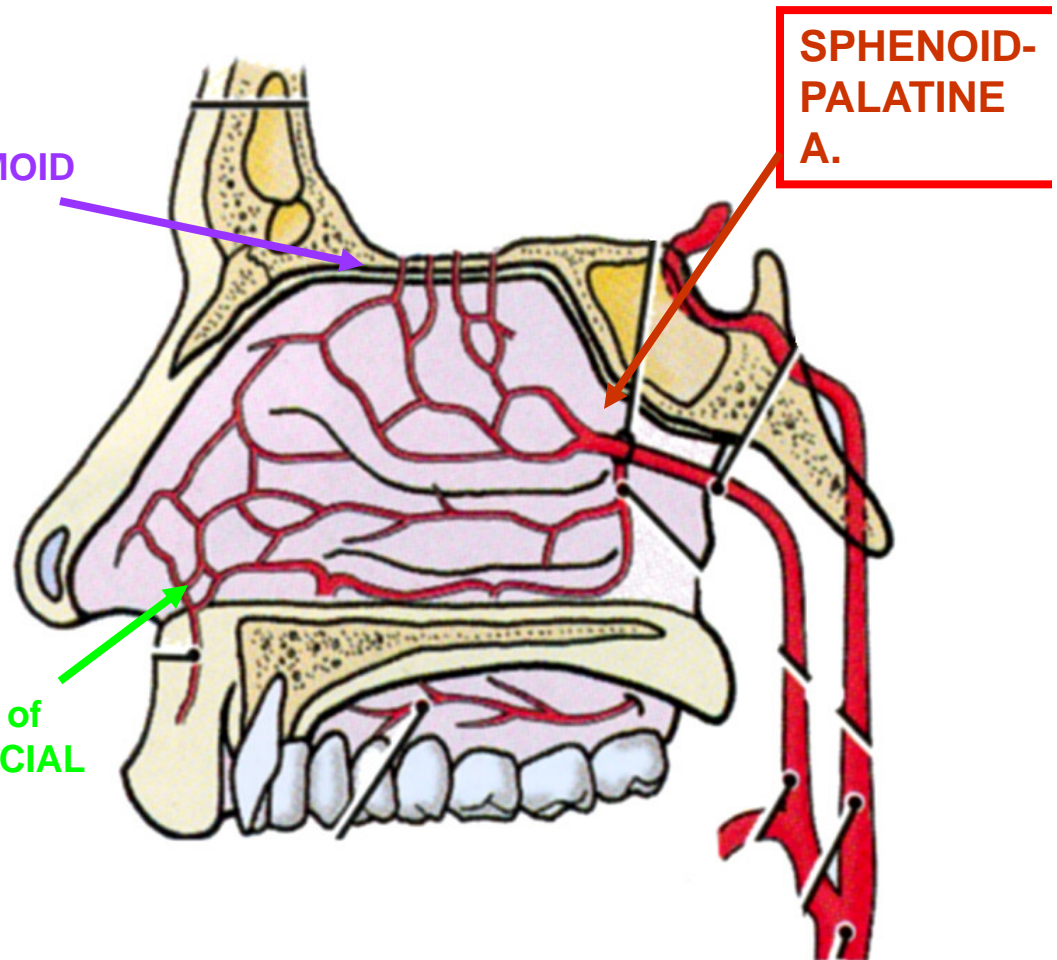
b. Other branches
Pterygoid Venous Plexus

c. Facial Vein

ANT.
ETHMOID
A.

SPHENOID-
PALATINE
A.

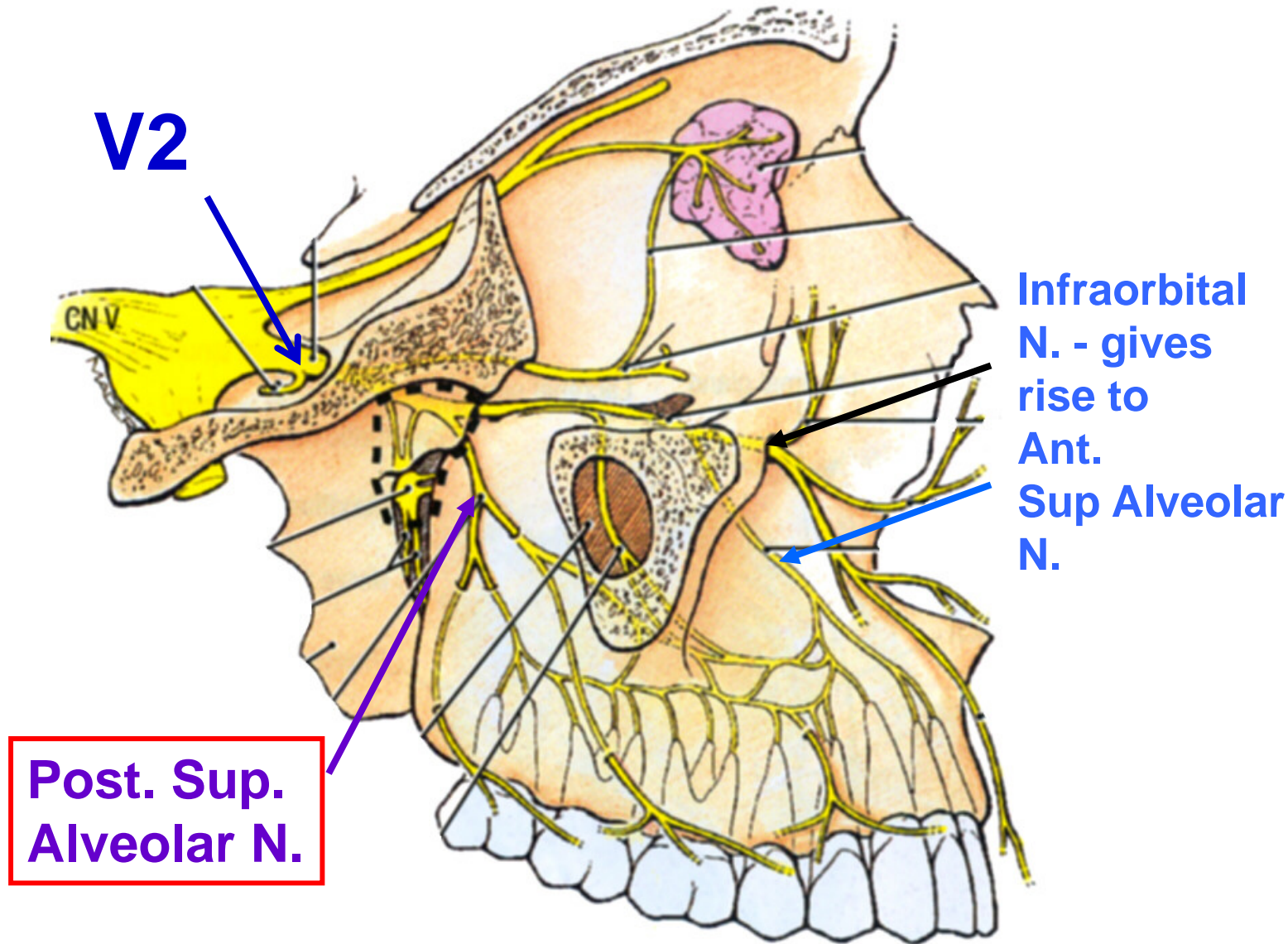
br. of
FACIAL
A.



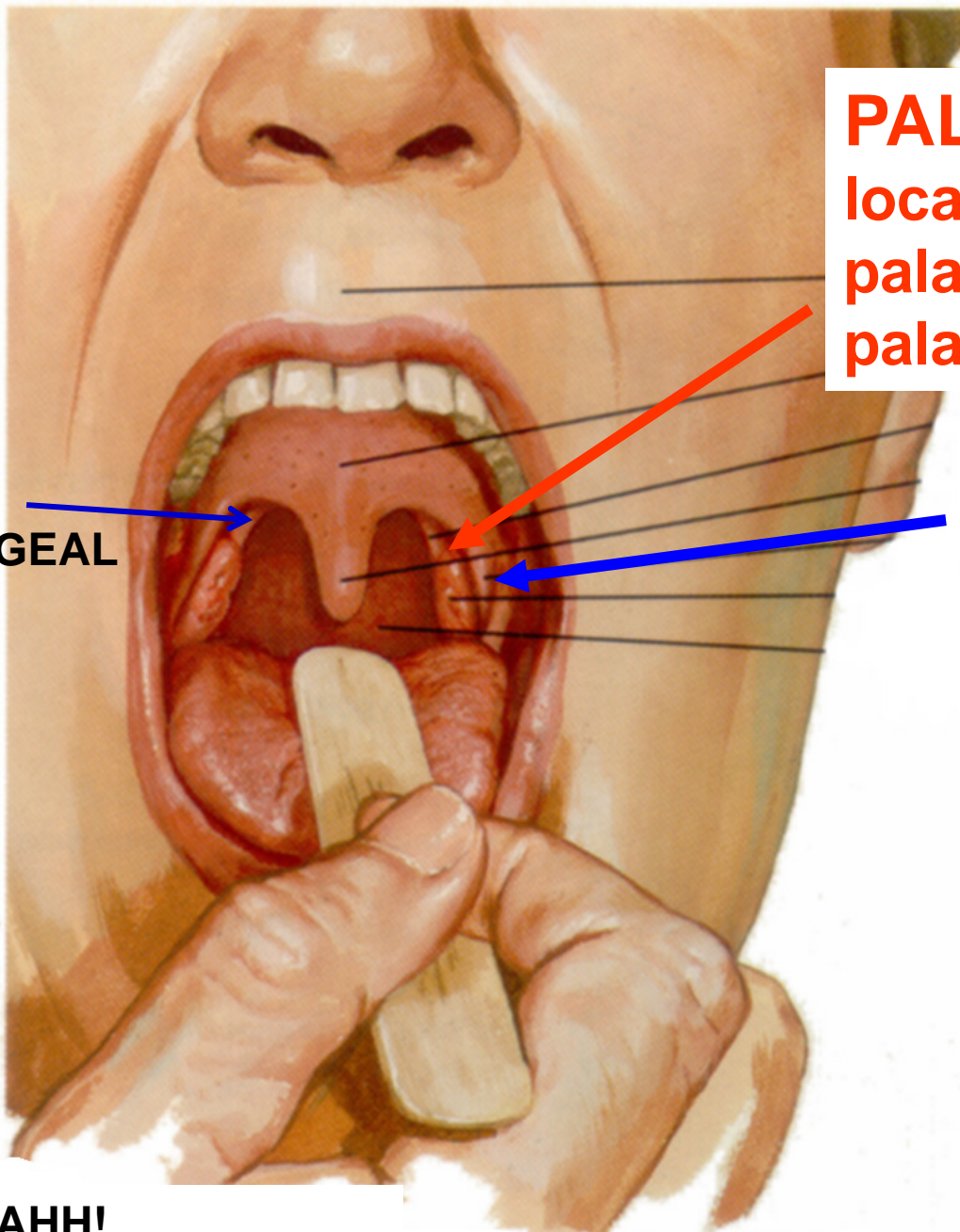
Note: Epistaxis (nosebleed) can be extensive due to Anastomoses – Spurting if arterial



MAXILLARY SINUS INFECTION: SYMPTOM - TOOTHACHE



V2 - Ant. and Post. Sup. Alveolar N. supply Max Sinus and Teeth; (Infected sinus can feel like tooth ache) *



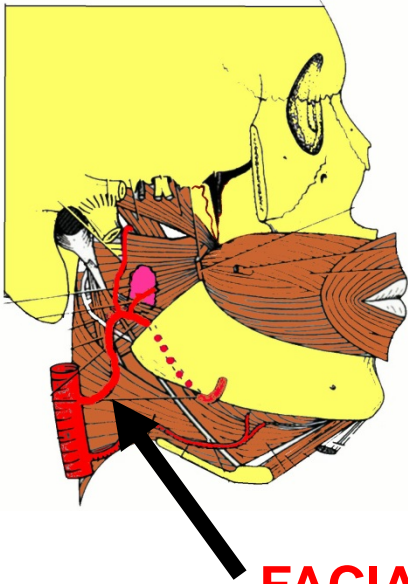
PALATINE TONSIL -
located between
palatoglossal and
palatopharyngeal arches

**PALATO-
PHARYNGEAL
ARCH**

**PALATOGLOSSAL
ARCH = SITE OF
OROPHARYNGEAL
MEMBRANE'
= BOUNDARY
BETWEEN ORAL
CAVITY (SOMATIC
SENSORY) AND
PHARYNX (VISCERAL
SENSORY)
- OVERLIES
PALATOGLOSSUS
MUSCLE**

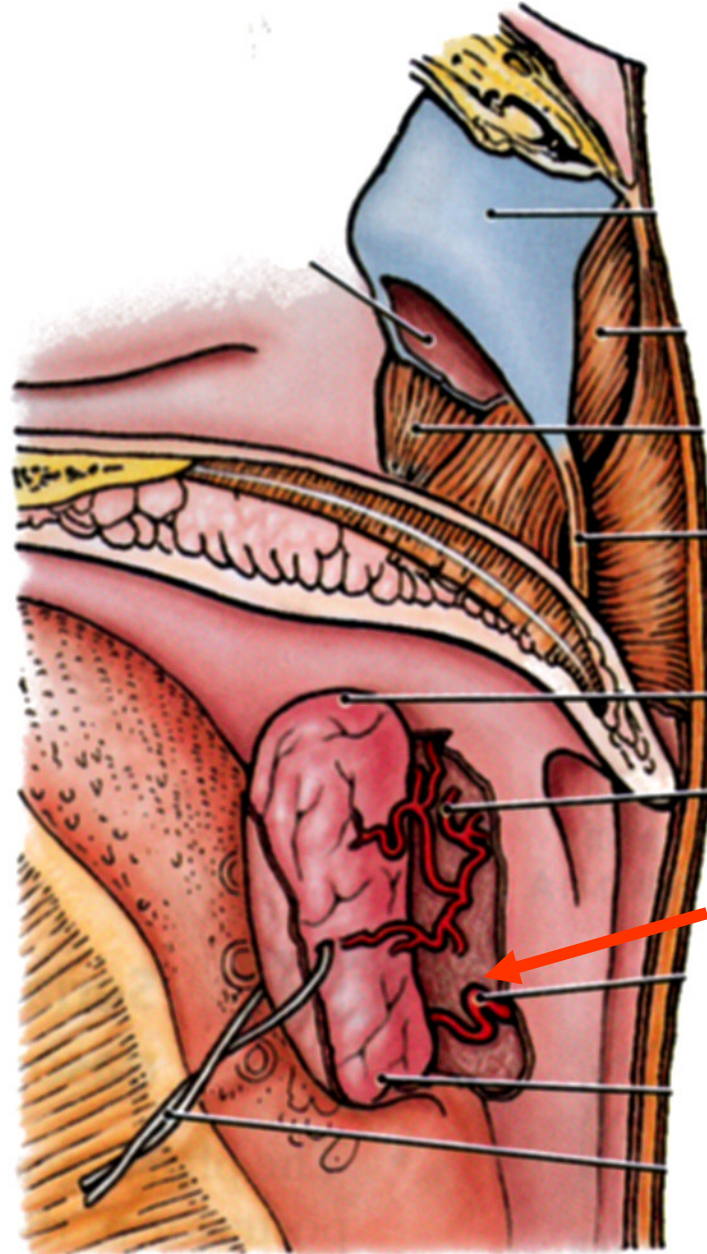
SAY AAHH!

TONSILLECTOMY: COMPLICATIONS



**FACIAL
ARTERY**

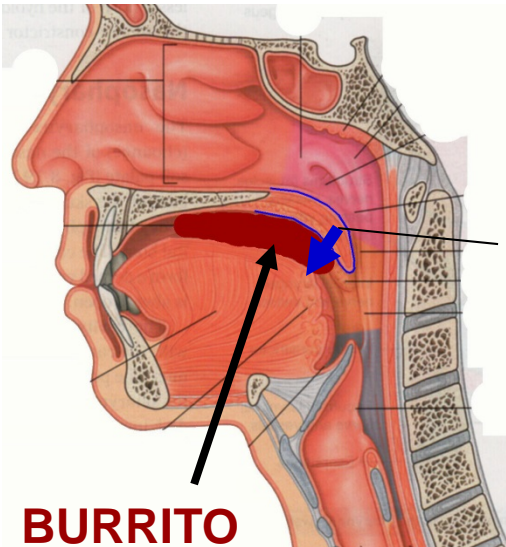
NOTE: TONSILLECTOMY -
1) Post-operative bleeding
of **Tonsillar branch of
Facial artery** is
complication of
removal of palatine
tonsils;
2) also damage CN
I(Glossopharyngeal)



**TONSILLAR
BRANCH -
PALATINE
TONSIL**

MECHANISM OF SWALLOWING: DEGLUTITION

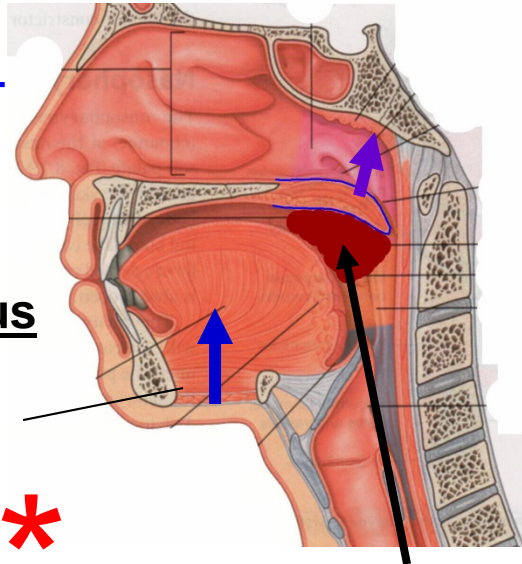
FORM BOLUS



BURRITO

Voluntary:
 1) Form Bolus – chew, form wad with tongue; palate down by Palatoglossus
 2) Push Bolus back – contract Mylohyoid, Styloglossus *

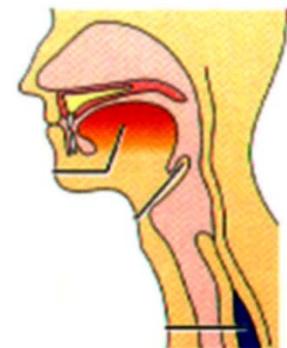
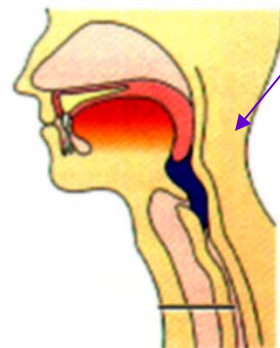
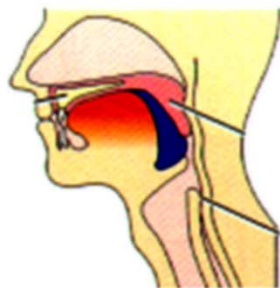
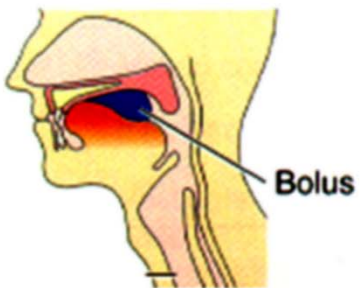
BOLUS BACK STARTS INVOLUNTARY CONTRACTIONS



BURRITO

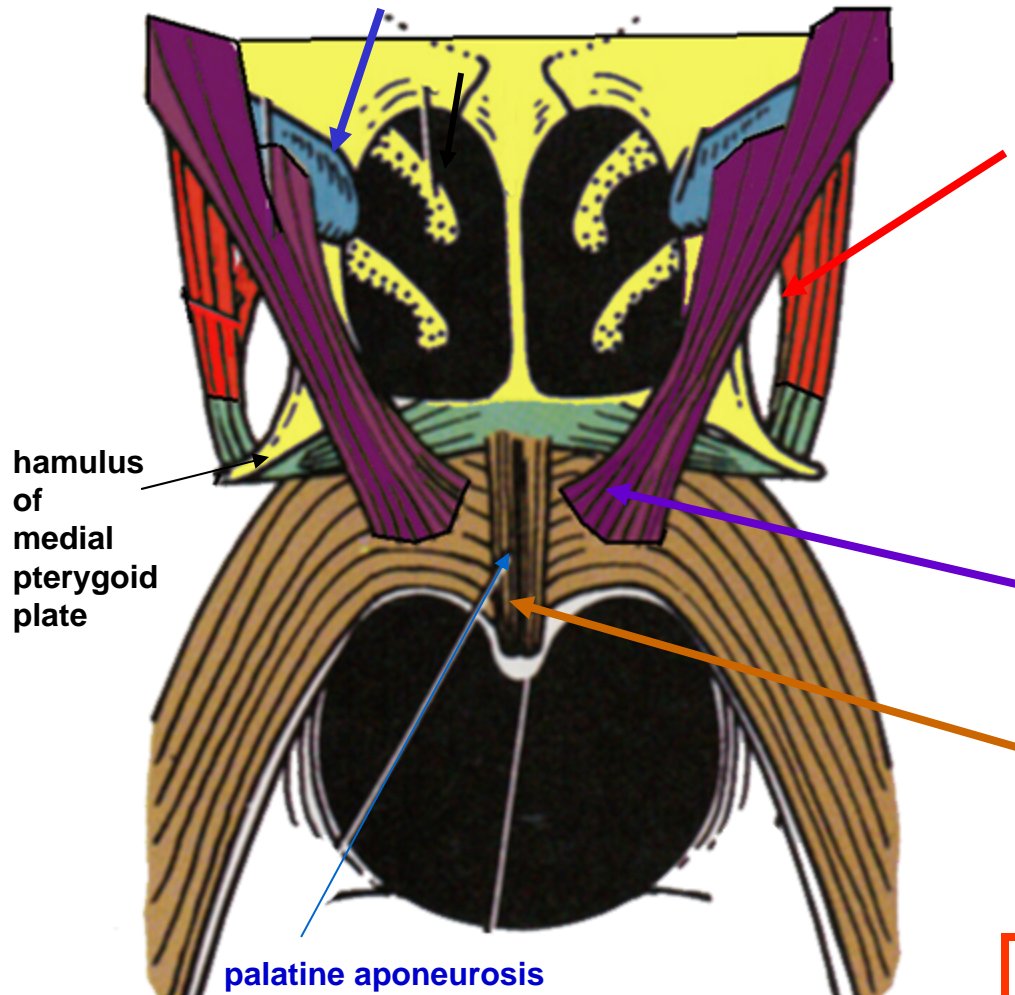
Involuntary:
 3) Elevate soft palate - contract Tensor, Levator, Stylopharyngeus
 4) Down tube – contract Pharyngeal Constrictors, Pull larynx forward with Hyoid muscles

STAGES OF SWALLOWING RADIOPAQUE MATERIAL



TENSOR AND LEVATOR PALATI TAKE ORIGIN FROM AUDITORY TUBE

AUDITORY TUBE



1) Tensor Palati - O - Auditory tube; I - Palatine Aponeurosis (tendon under hamulus of medial pterygoid plate)

A - Tenses Soft Palate

2) Levator Palati - O - Temporal Bone, Auditory Tube; I - Palatine Aponeurosis; A - Elevates Soft Palate

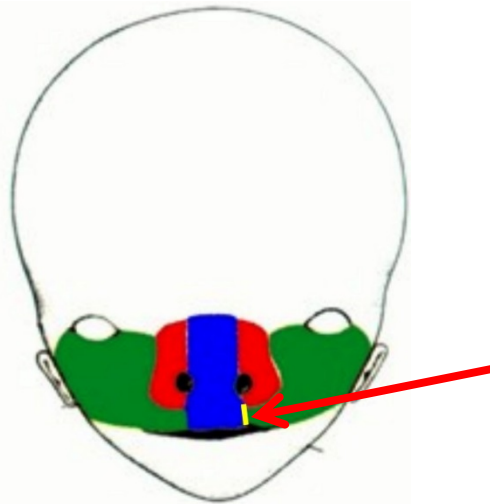
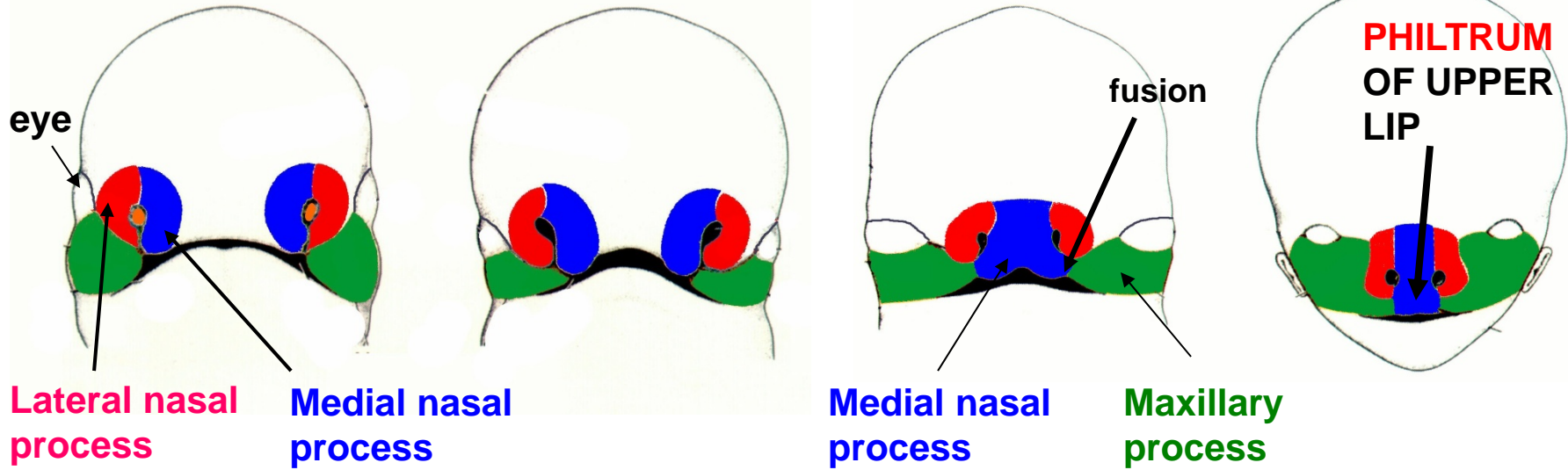
3) Musculus uvuli - O - Palatine aponeurosis, I - Uvula; A - Raises Uvula

VIEW: POST. SIDE OF
NASAL AND ORAL CAVITIES

**TENSOR AND LEVATOR PALATI
TRANSIENTLY OPEN AUDITORY TUBE
WHEN SWALLOW - EQUALIZE
PRESSURE IN MIDDLE EAR**

REVIEW CLEFT LIP

Medial nasal process and Maxillary Process – fuse to form upper lip

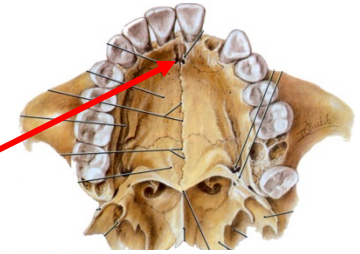


CLEFT LIP – *
failure of fusion
of Medial Nasal
Process and
Maxillary process

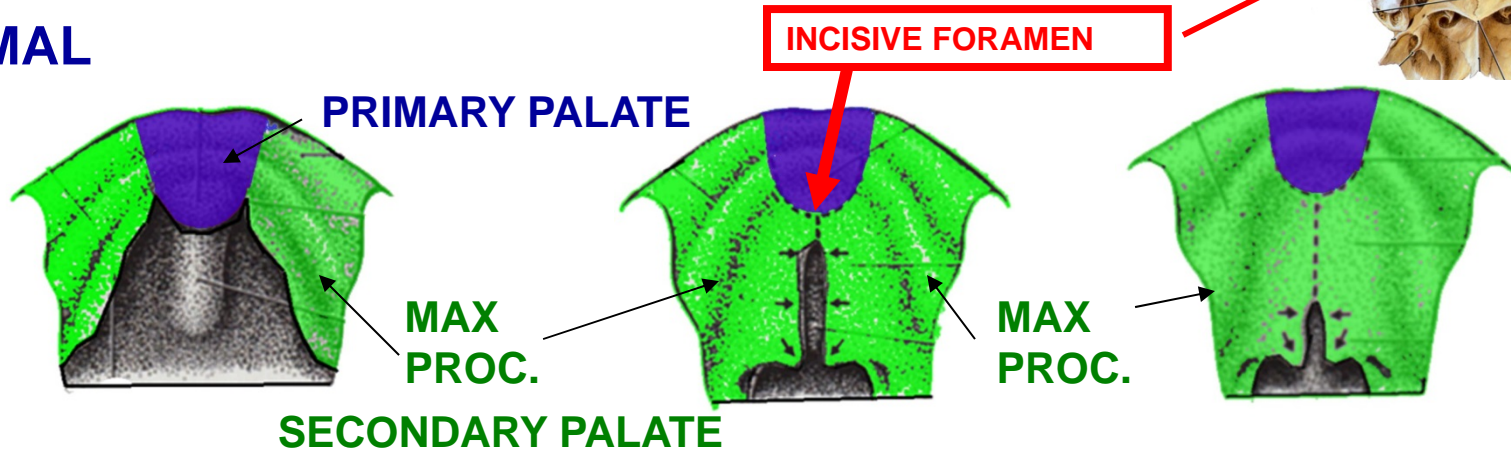


CLEFT LIP

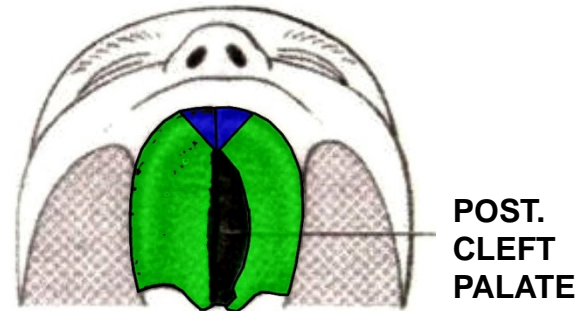
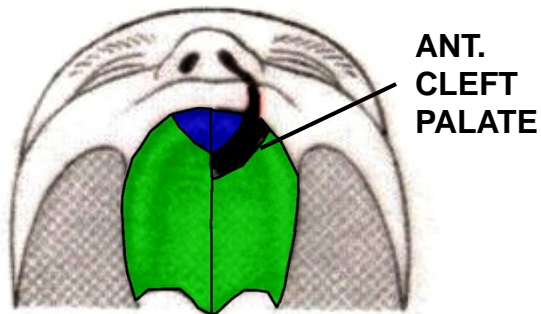
MALFORMATIONS: CLEFT PALATE



NORMAL



CLEFT PALATE

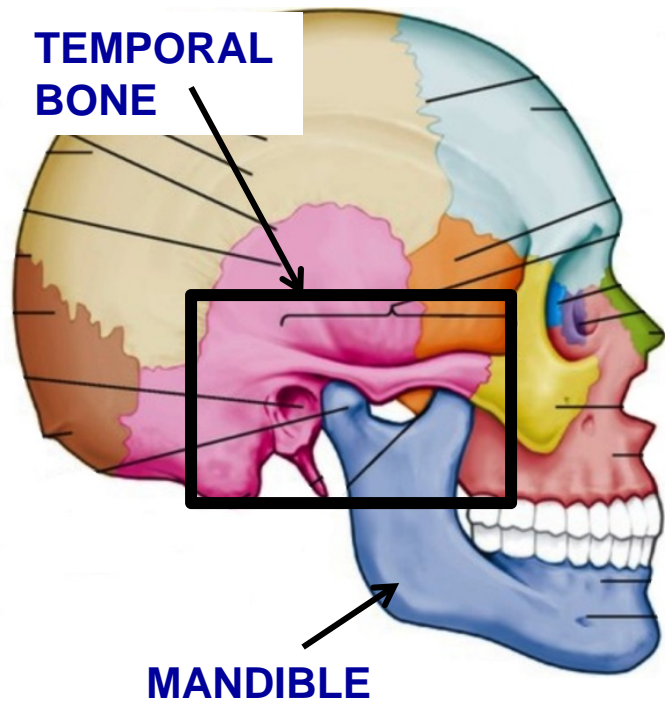


POSTERIOR CLEFT PALATE

ANTERIOR CLEFT PALATE --
 Not fuse Medial Nasal Process and Maxillary Process (SAME AS CLEFT LIP) *

POSTERIOR CLEFT PALATE -
 Not fuse Secondary palate (not fuse Maxillary Processes each side) *

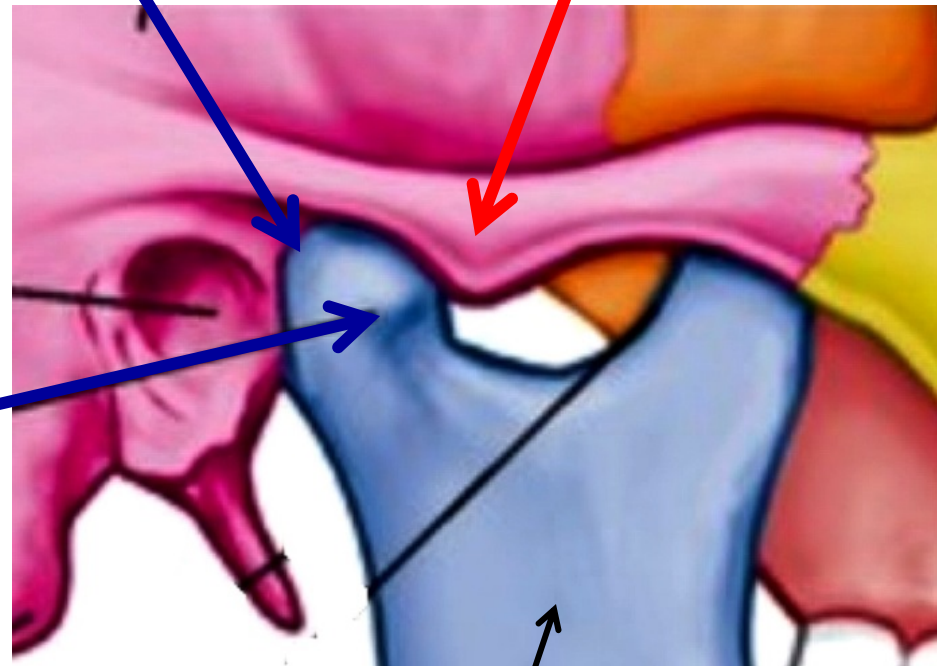
PAROTID: TEMPORO-MANDIBULAR JOINT



MANDIBULAR FOSSA OF TEMPORAL BONE

ARTICULAR TUBERCLE ON ZYGOMATIC ARCH

HEAD OF MANDIBLE



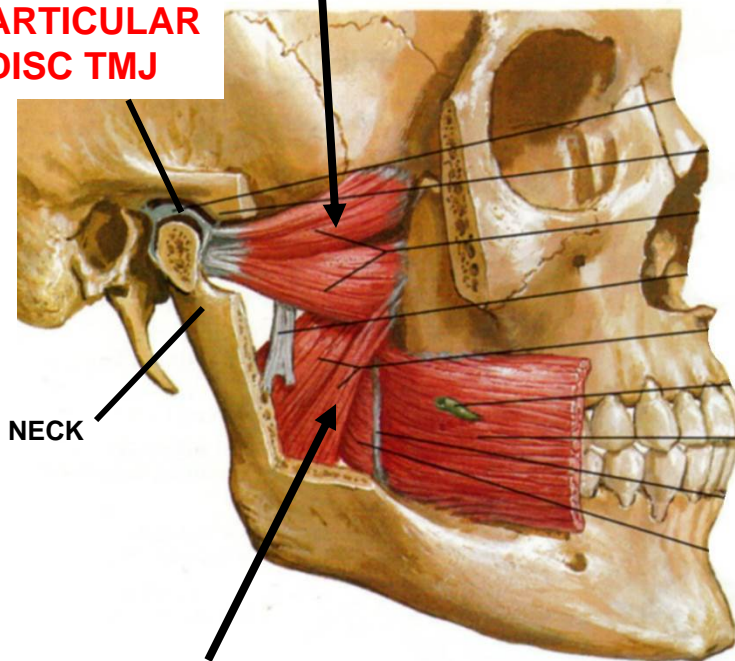
MUSCLES OF MASTICATION

- ALL INN BRANCHIOMOTOR V3
- **ELEVATE = CLOSE; DEPRESS = OPEN MOUTH**

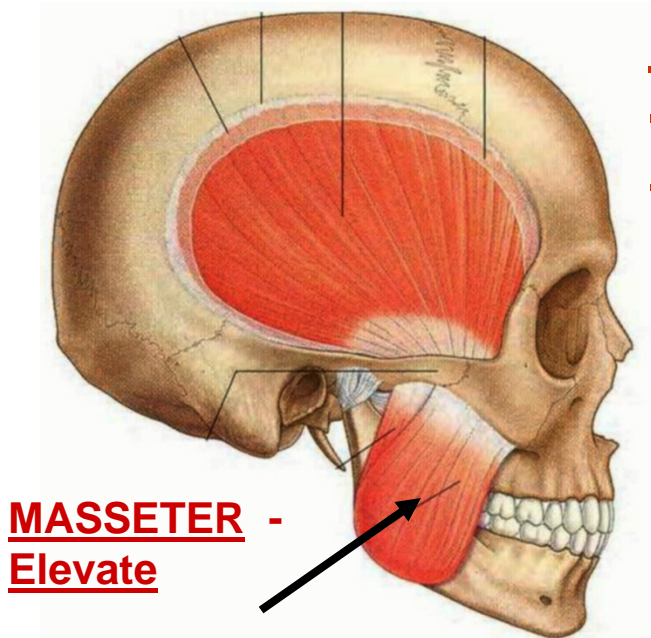
PTERYGOID MUSCLES - INSIDE MANDIBLE

LAT. PTERYGOID - I - Neck, Articular Disc
A - Depress, Protrude, Pull Disc Forward

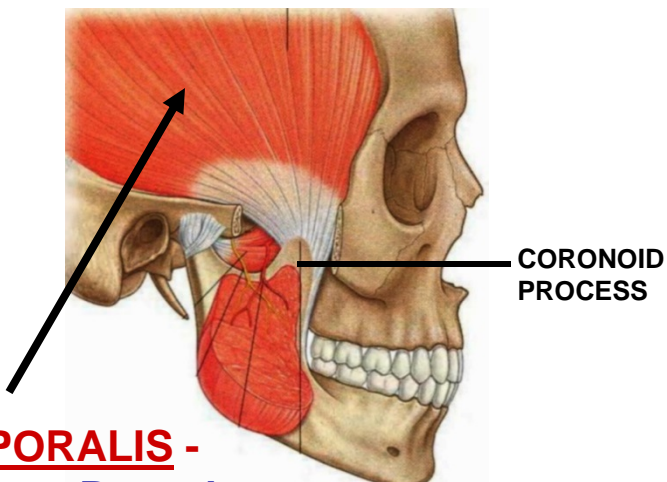
ARTICULAR DISC TMJ



MED. PTERYGOID - Elevate



MASSETER -
Elevate

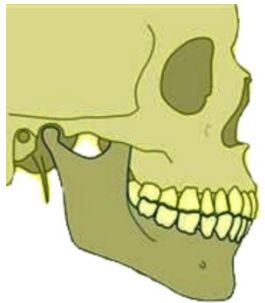


TEMPORALIS -
Elevate, Retrude

TMJ JAW LOCK - mandible stuck in partial depression

OPEN MOUTH =
depress mandible

CLOSED MOUTH



**START TO
OPEN
MOUTH**



**FULLY
OPEN
MOUTH**

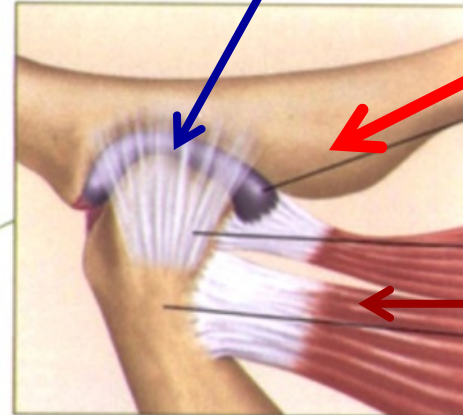


**FIRST
HINGE
LOWER
COMPART-
MENT**

**THEN
SLIDE
UPPER
COMPART-
MENT**

**ARTICULAR DISC MOVES
WITH HEAD OF MANDIBLE**

Closed Jaw

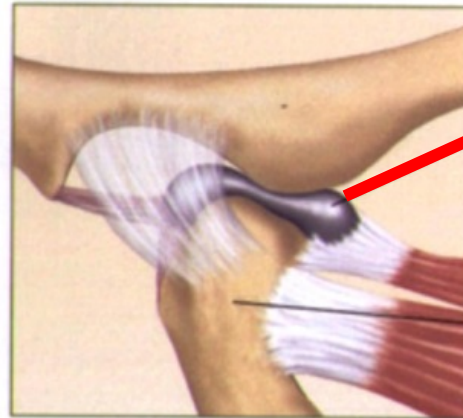


**ARTICULAR
TUBERCLE**

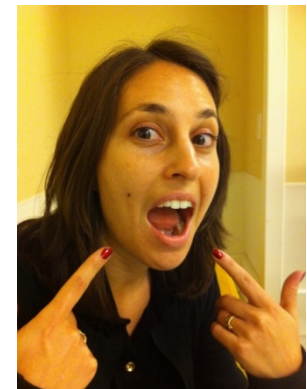
**LATERAL
PTERYGOID**



Open Jaw

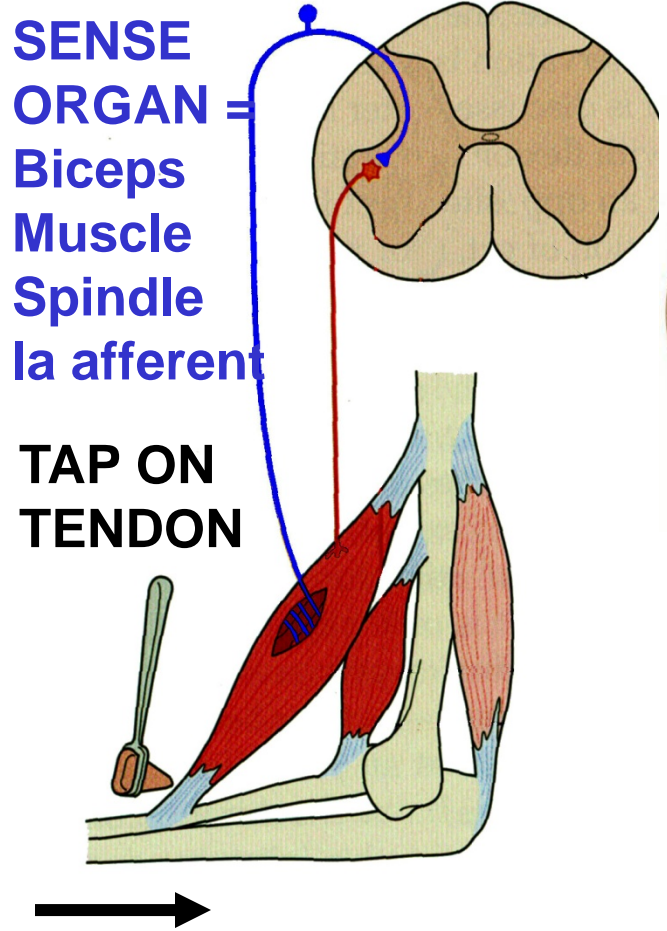


**JAW LOCK -
DISC STUCK
ON ARTICULAR
TUBERCLE**



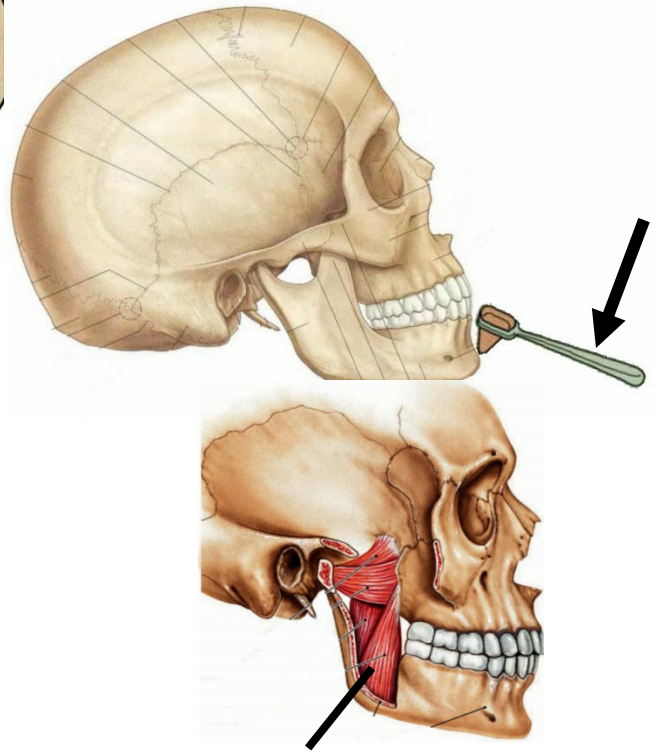
JAW JERK REFLEX = STRETCH REFLEX OF MUSCLES OF MASTICATION - sensory and motor in V3

STRETCH REFLEX IN BICEPS



STRETCH REFLEX IN MUSCLES OF MASTICATION

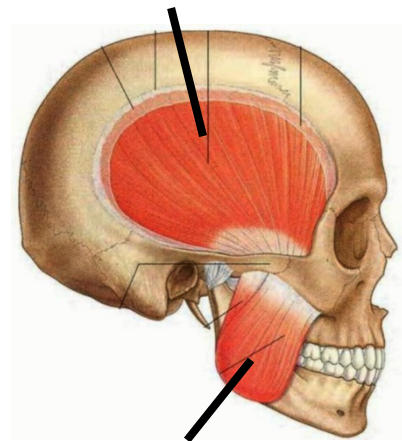
TAP DOWN ON CHIN



MEDIAL PTERYGOID

STRETCH
MUSCLES THAT
CLOSE MOUTH
(ELEVATE MANDIBLE)

TEMPORALIS

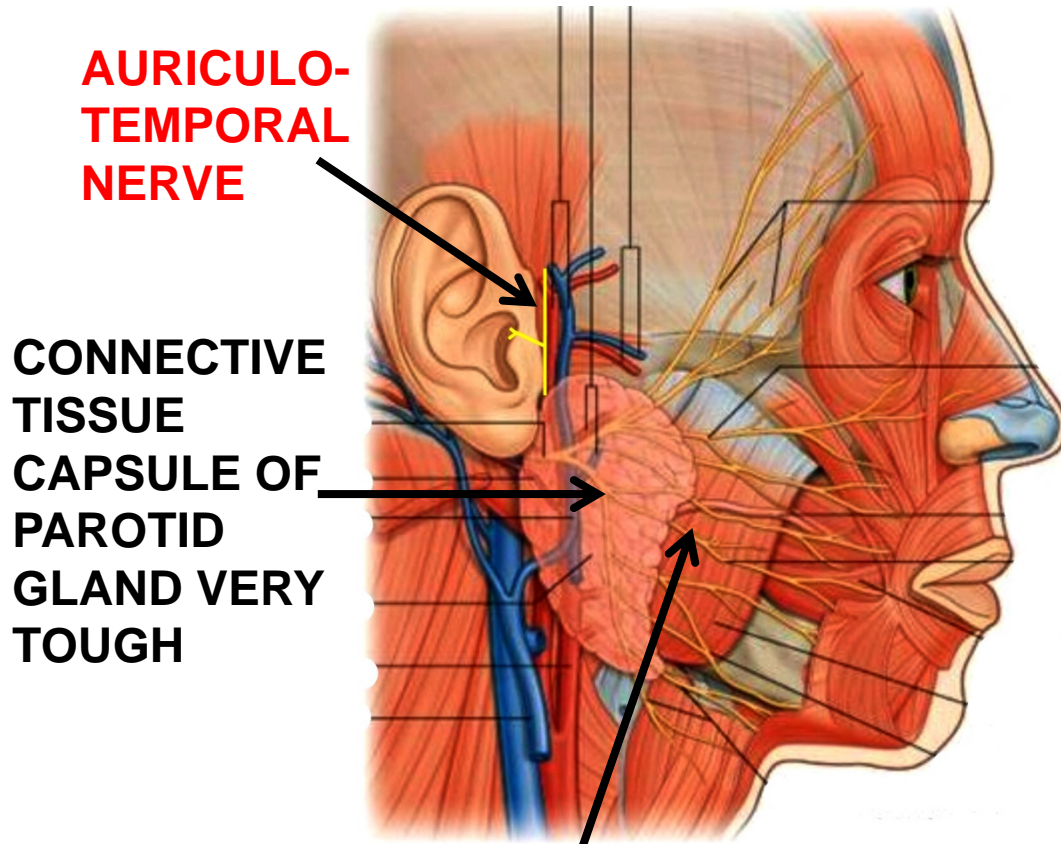


MASSETER

PAROTID GLAND 'COMPARTMENT SYNDROME'

STRUCTURES PASS WITHIN PAROTID-

- 1) VII,
- 2) RETROMANDIBULAR VEIN,
- 3) EXT CAROTID A.,
- 4) AURICULOTEMPORAL N. (V3)



AURICULO-TEMPORAL NERVE

CONNECTIVE TISSUE CAPSULE OF PAROTID GLAND VERY TOUGH

BRANCHES OF FACIAL NERVE (CN VII)

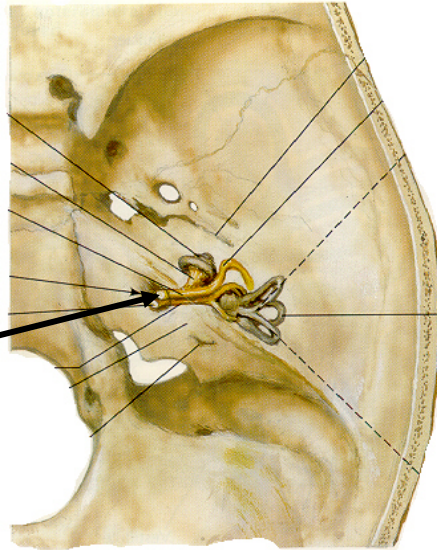
PAROTID TUMORS AND MUMPS CAN COMPRESS STRUCTURES PASSING THROUGH PAROTID:

SYMPTOMS:

- 1) **EAR (OUTER) ACHE** - DUE TO COMPRESS **AURICULOTEMPORAL NERVE (V3)** *
- 2) **FACIAL PARALYSIS** (possible) - COMPRESS VII

SYMPTOMS OF DAMAGE TO FACIAL NERVE DEPEND UPON LOCATION

**Int. aud.
meatus**



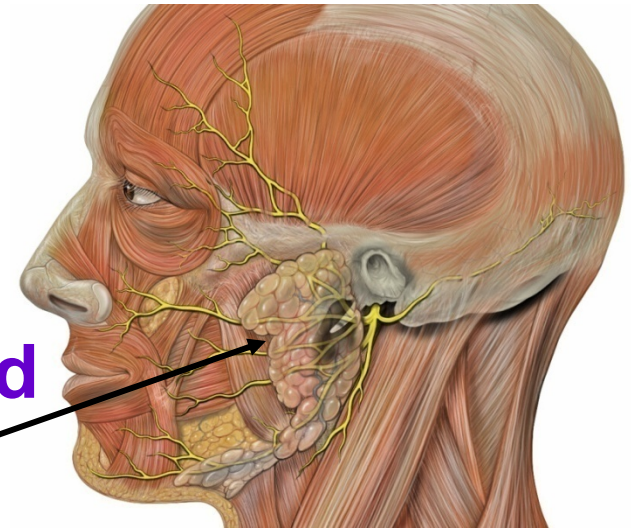
**VII - FACIAL AND
VIII - VESTIBULO-COCHLEAR**

**ACOUSTIC NEUROMA (NEURINOMA)-
tumor at INTERNAL AUDITORY **
MEATUS - BLOCK VII AND VIII**

VIII - auditory/vestibular deficits

**VII - all FACIAL NERVE SYMPTOMS
PRESENT - facial paralysis, loss
of taste, hyperacusia, decrease in
secretion of lacrimal and salivary glands**

**Stylo-
mastoid
foramen
or
in Parotid
Gland**

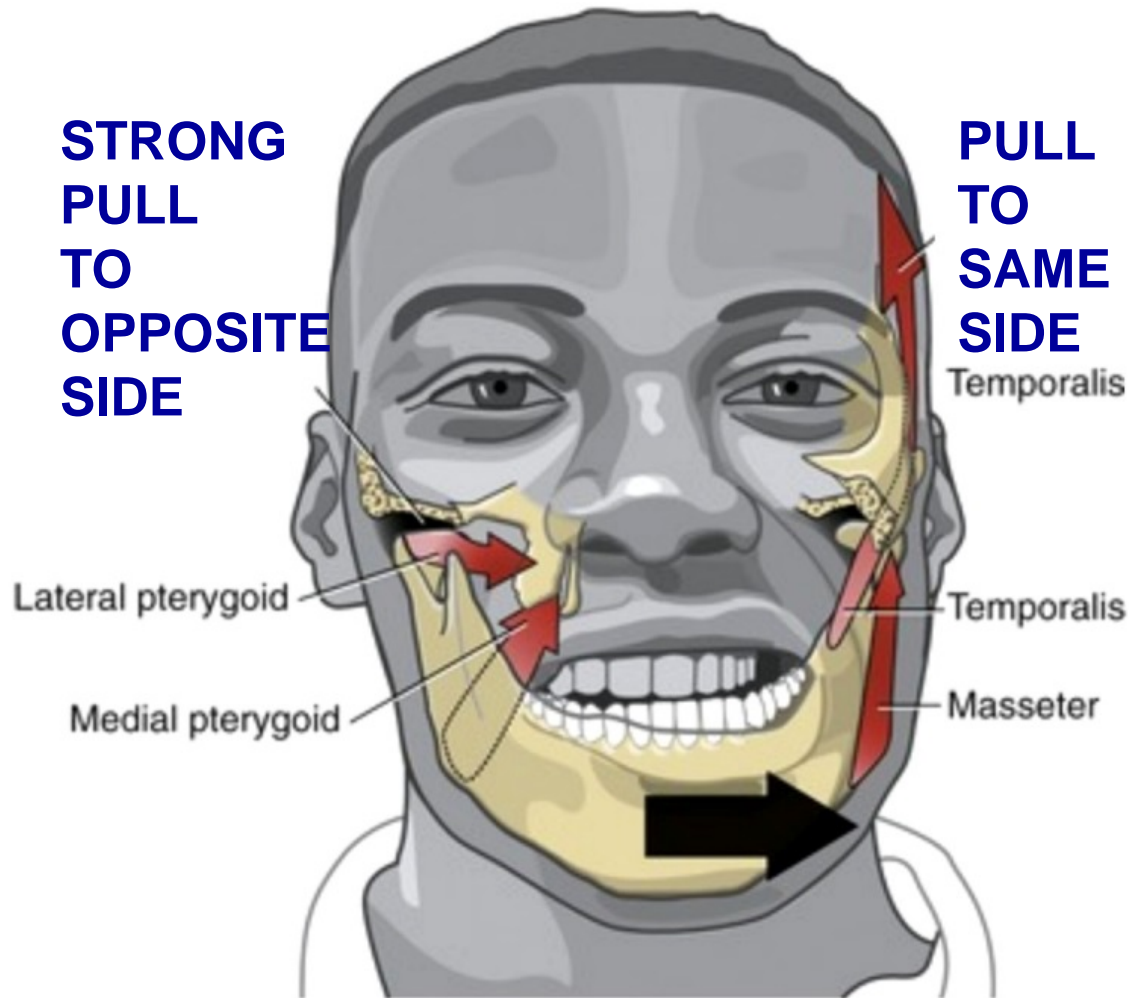


VII - ONLY

**VII - ONLY facial paralysis;
NO loss of taste, NO **
hyperacusia, NO decrease in
secretion of lacrimal and salivary
glands**

**NO auditory/vestibular deficits;
VIII NOT AFFECTED**

LATERAL MOVEMENTS OF JAW - occur in chewing



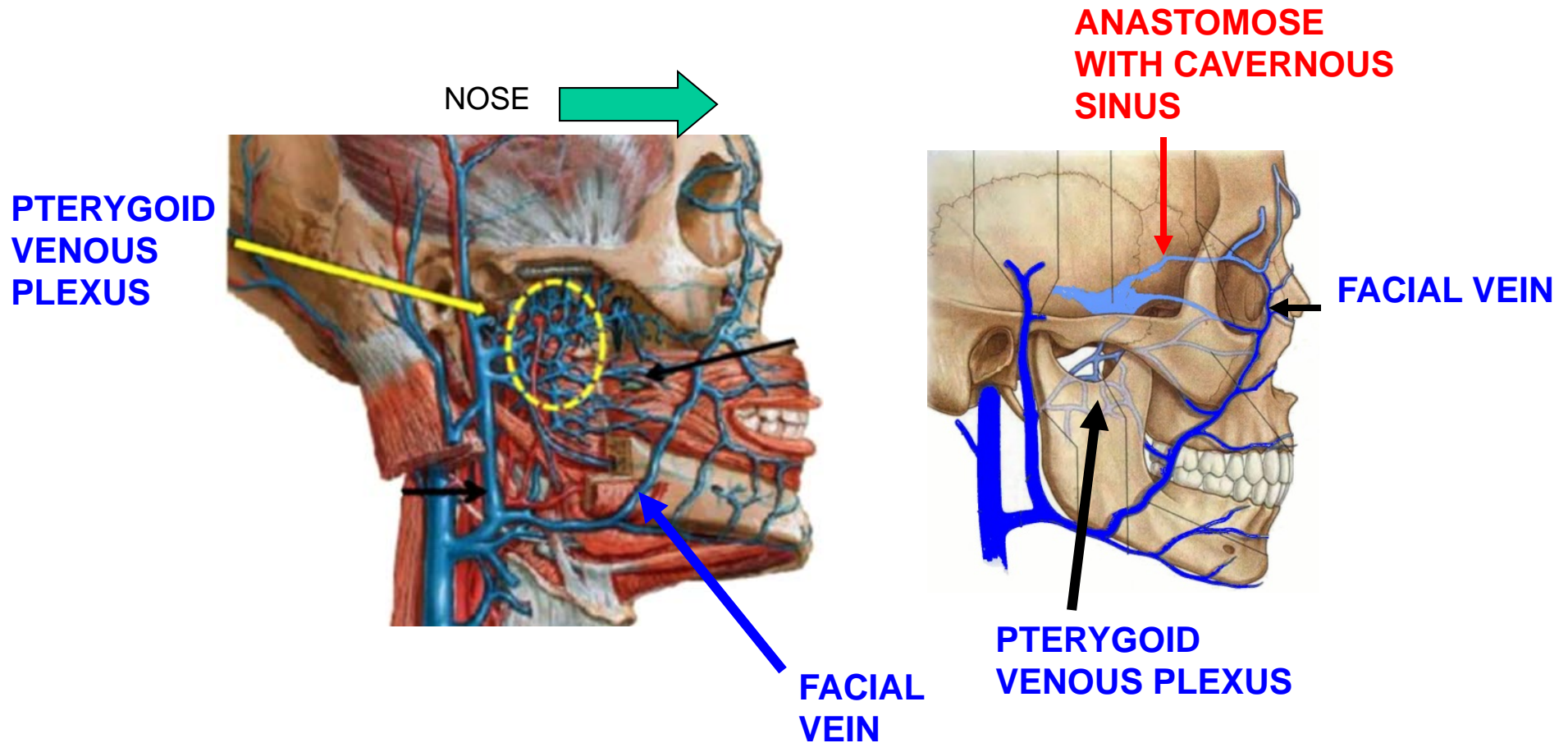
Lateral movements

- 1) Lateral and Medial Pterygoid (inside mandible) pull toward opposite side
- 2) Temporalis and Masseter (outside mandible) pull toward same side (but lower mechanical advantage)



TRIGEMINAL NERVE DAMAGE (LMN) - Jaw deviates TOWARD paralyzed side (patient opens mouth); unopposed action of Lateral Pterygoid muscle of intact side)

INFECTION IN PTERYGOID VENOUS PLEXUS



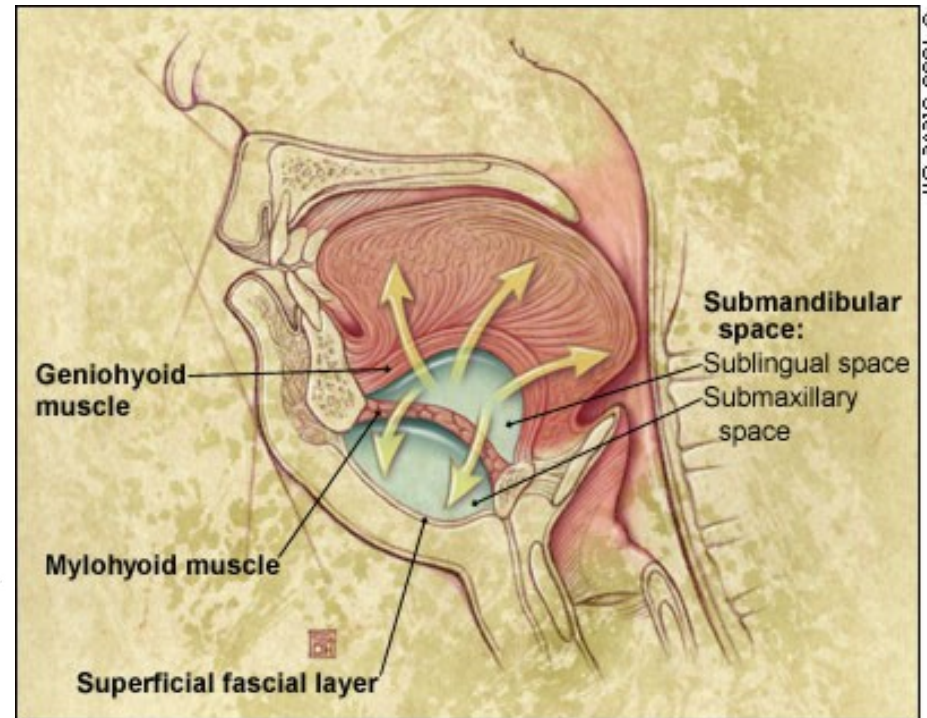
1) BRANCHES OF MAX. VEIN FIRST DRAIN TO PTERYGOID VENOUS PLEXUS - SUPERFICIAL TO LATERAL PTERYGOID MUSCLE

3) ANASTOMOSE WITH CAVERNOUS SINUS AND FACIAL VEIN

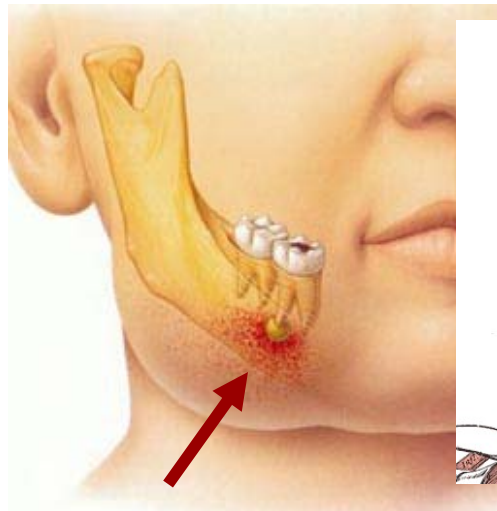
CLINICAL NOTE: INFECTION SPREAD FROM TEETH, FACE TO BRAIN



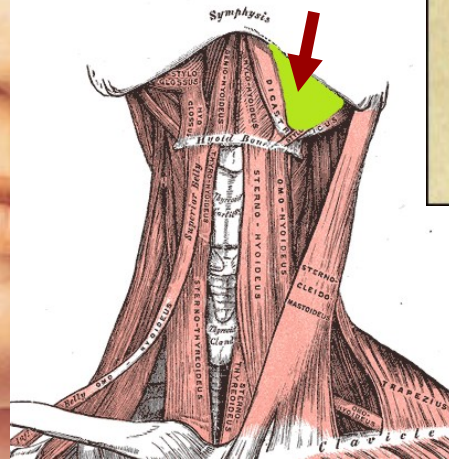
LUDWIG'S ANGINA - infection of floor of mouth (Submandibular space), often due to spread from abscessed mandibular tooth



© 1999 Steve Oh



tooth abscess



Submandibular Space - in Anterior Triangle of neck

Infection may obstruct airway, push up tongue *

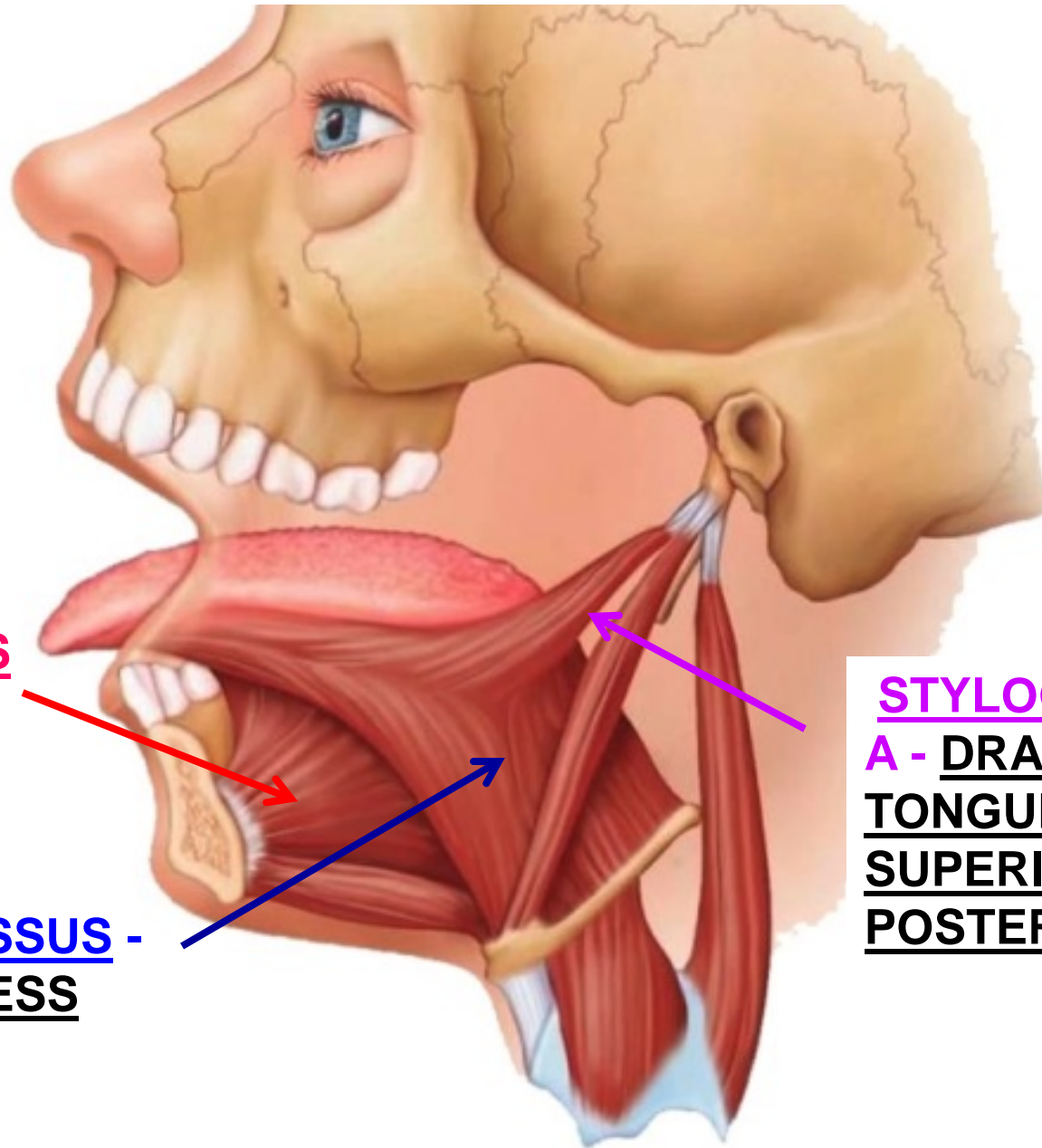
Angina = condition with intense pain: from L. strangling

MUSCLES OF TONGUE - all innervated by XII

GENIOGLOSSUS
A - PROTRUDE

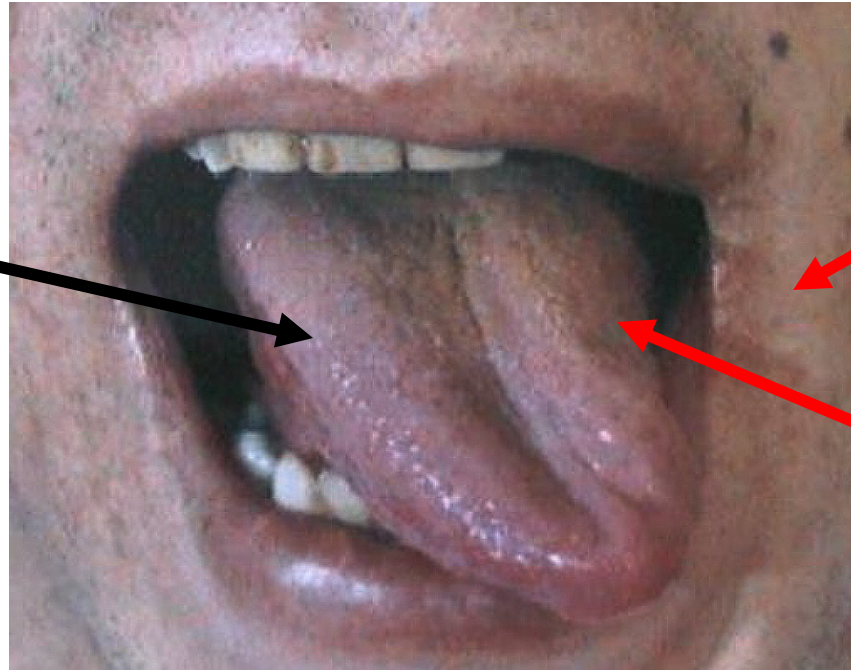
HYOGLOSSUS -
A - DEPRESS

STYLOGLOSSUS
A - DRAWS
TONGUE
SUPERIORLY and
POSTERIORLY



DAMAGE HYPOGLOSSAL NERVE

GENIO-
GLOSSUS
INTACT



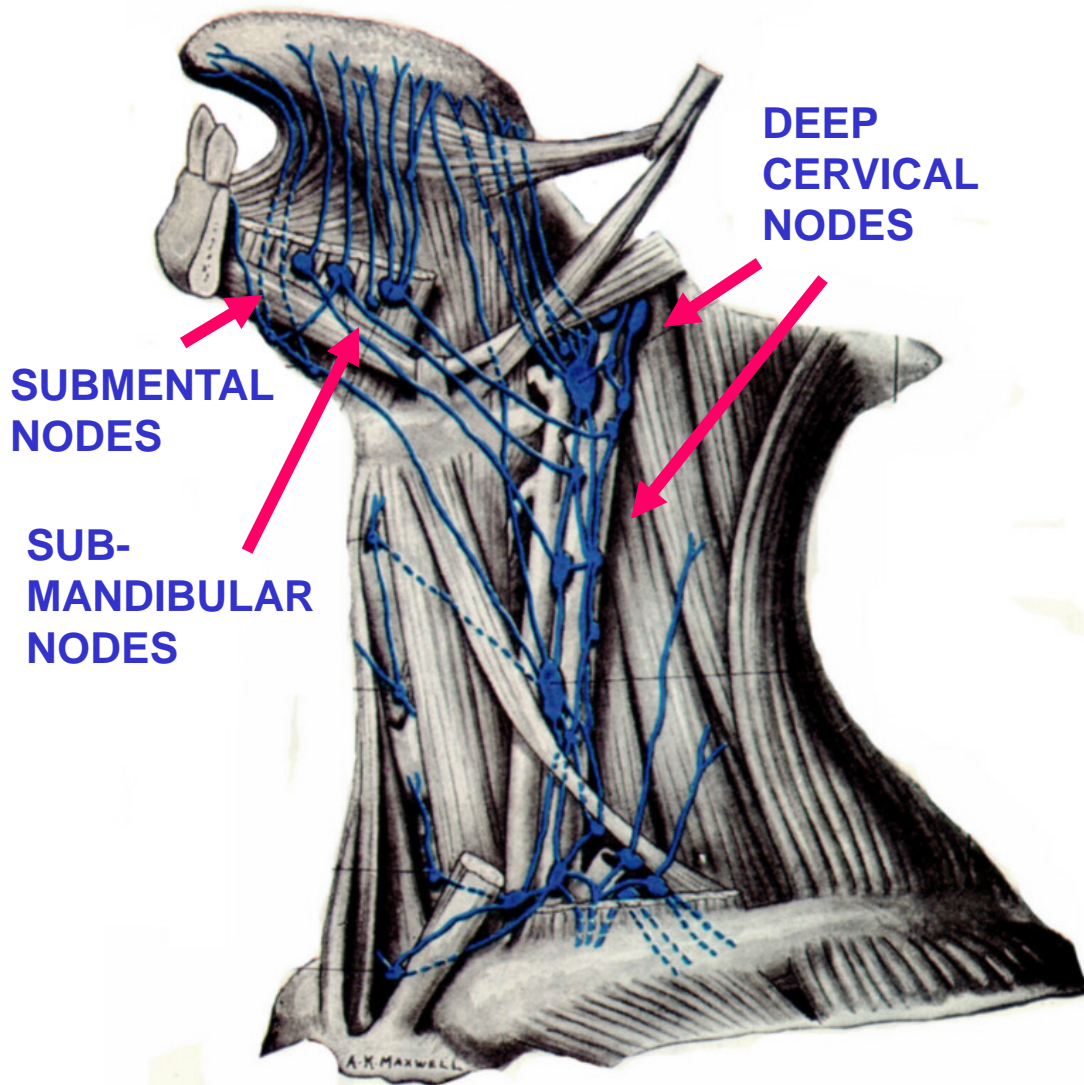
DAMAGE
HYPOGLOSSAL
NERVE ON ONE
SIDE **LMN**

**GENIO-
GLOSSUS
PARALYZED**

**LMN - LOWER MOTOR NEURON LESION -
PROTRUDED TONGUE DEVIATES TOWARD
SIDE OF LESION - due to unopposed action
of the **Genioglossus** muscle.
UPPER MOTOR NEURON LESION -**

**UMN - PROTRUDED TONGUE DEVIATES
AWAY FROM SIDE OF LESION TO CORTEX,
ETC. (CONTROL ONLY CONTRALATERAL)**

CANCER OF TONGUE - LYMPHATICS OF TONGUE CROSS MIDLINE



1. TIP OF TONGUE to SUBMENTAL NODES
2. REST OF ANTERIOR 2/3 OF TONGUE to SUBMANDIBULAR NODES AND DEEP CERVICAL LYMPH NODES
3. POSTERIOR 1/3 OF TONGUE TO DEEP CERVICAL LYMPH NODES



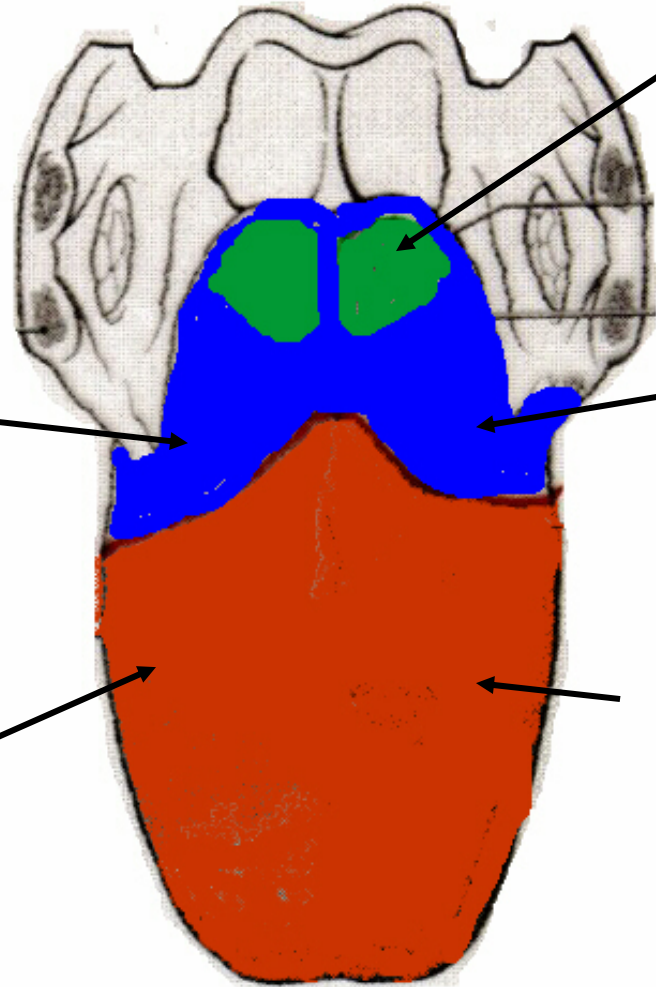
NOTE: LYMPH VESSELS OF TONGUE CROSS MIDLINE;
LESION MAY SPREAD TO OPPOSITE SIDE

SENSORY INNERVATION OF TONGUE: TOUCH AND TASTE

NOTE: ↓

PHARYNGEAL PART- POST 1/3
and ANT. TO EPIGLOTTIS-
VISCERAL SENSORY,

ORAL PART -
ANT 2/3 -
SOMATIC SENSORY



ANT. TO EPIGLOTTIS -
1) X- VAGUS
VISCERAL SENSORY
TOUCH AND
TASTE

POST. 1/3 OF TONGUE
1) IX - GLOSSO-
PHARYNGEAL VISCERAL
SENSORY TOUCH
AND TASTE

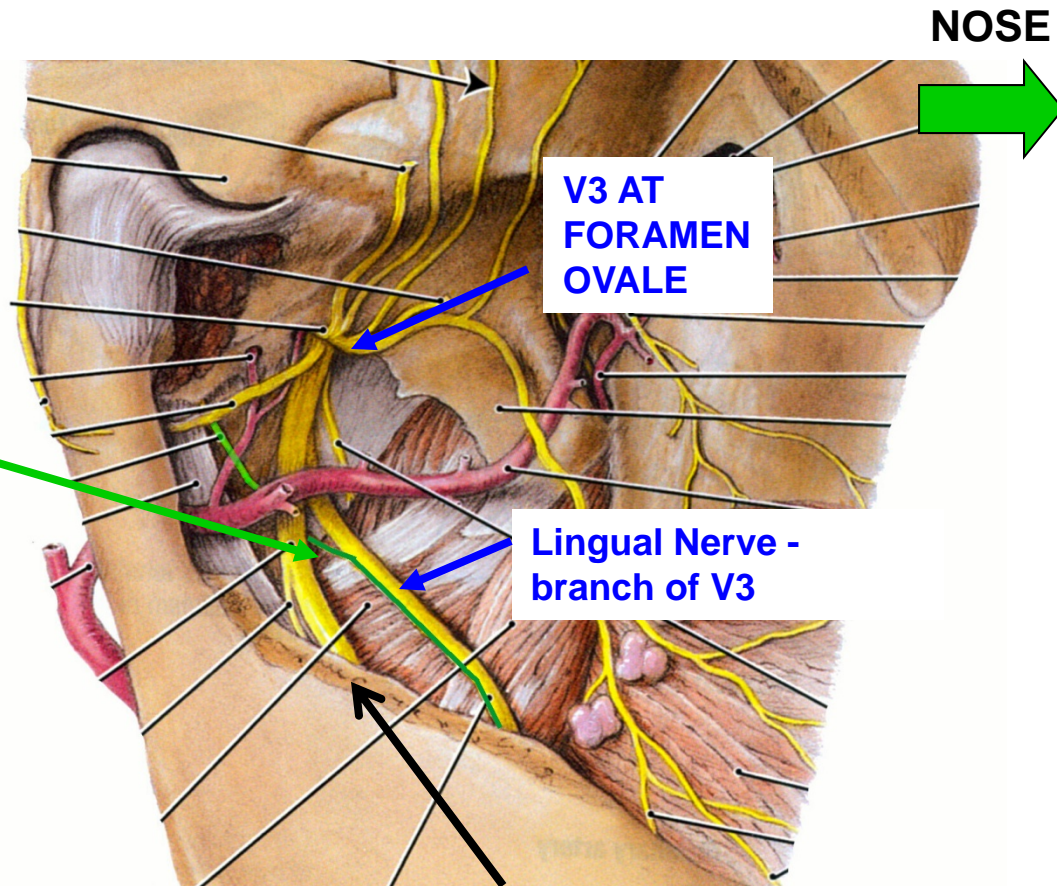
ANT. 2/3 OF TONGUE
1) V3 - LINGUAL N.
SOMATIC SENSORY
TOUCH
2) VII - CHORDA TYMPANI
- TASTE

NOTE: ALL MUSCLES INNERVATED BY XII HYPOGLOSSAL; PALATOGLOSSUS IS
MUSCLE OF PALATE INNERVATED BY X (VAGUS)

VII - CHORDA TYMPANI - PARASYMPATHETIC TO SUBMANDIBULAR AND SUBLINGUAL GLANDS, TASTE FIBERS TO ANT 2/3 OF TONGUE

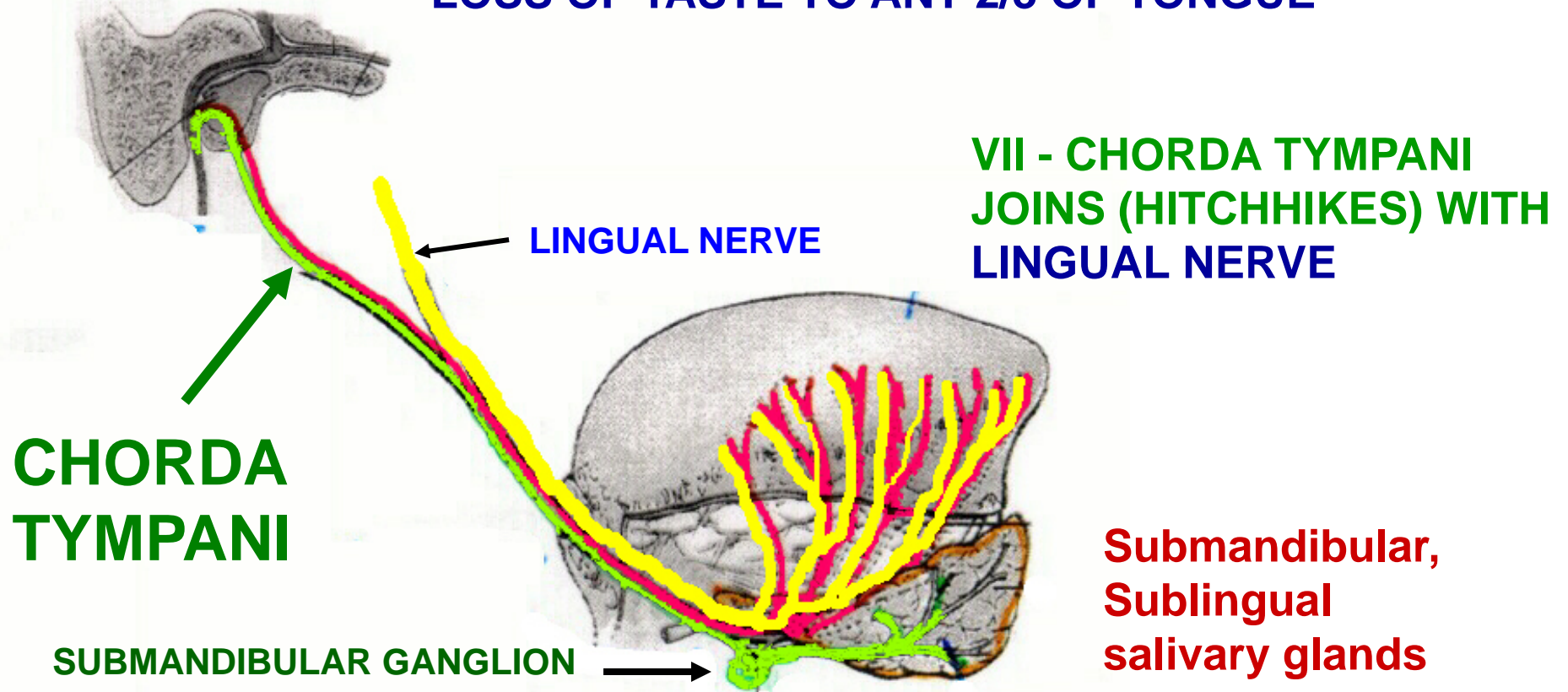


CHORDA TYMPANI leaves Petrotympanic Fissure; joins and hitchhikes with Lingual Nerve (V3)



DAMAGE CHORDA TYMPANI - damage tympanic membrane or al Petrotympanic fissure:
1) Lose taste to Anterior 2/3 of Tongue
2) Parasymp. to Submandibular and Sublingual Salivary glands (via Submandibular ganglion)

LOSS OF TASTE TO ANT 2/3 OF TONGUE



- Parasympathetics - synapse in Submandibular ganglion; postganglionics to Submandibular, Sublingual salivary glands

- Taste fibers - continue to taste buds on Ant. 2/3 of tongue

DAMAGE LINGUAL NERVE IN FLOOR OF MOUTH
- lose TASTE and TOUCH to Ant 2/3 tongue

ALBERT
ADAMKIEWICZ,
MD, 1850-1921

MUSTACHE

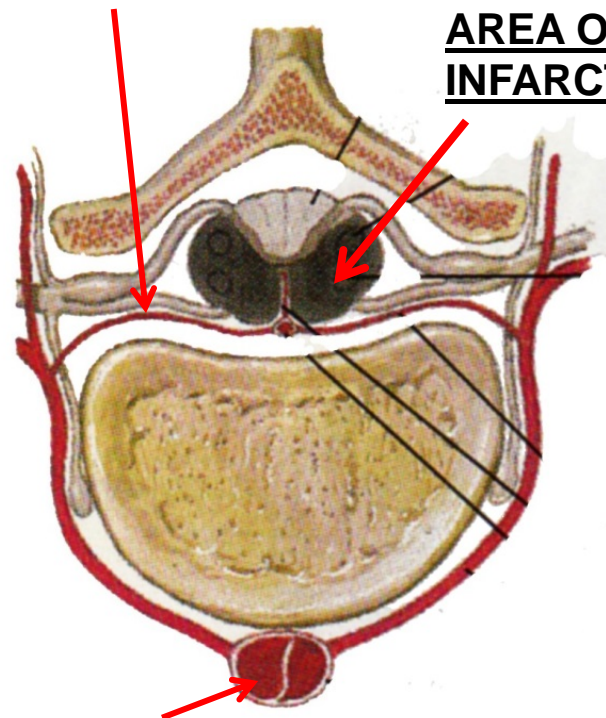
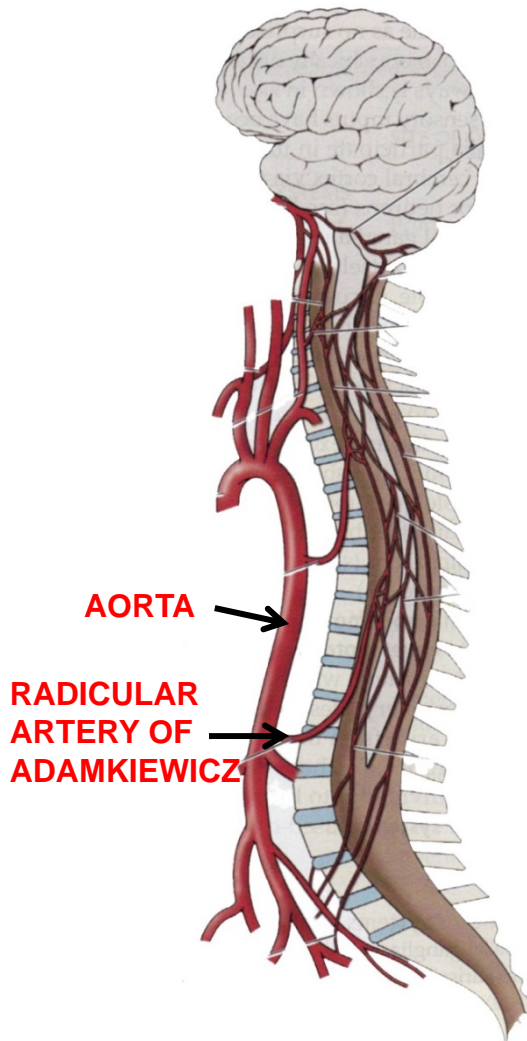


BLOCK OF ARTERY OF ADAMKIEWICZ CAN PRODUCE ANTERIOR SPINAL ARTERY SYNDROME



BLOCK RADICULAR ARTERY OF ADAMKIEWICZ

AREA OF
INFARCT



**AORTIC ANEURYSM
BLOCKS POSTERIOR
INTERCOSTAL ARTERY**

Obstruction of Radicular
Artery (of Adamkiewicz) -
Can occur during clamping
for heart surgery or by a
dissecting Aortic aneurysm;

causes

- **infarction** (tissue death in
spinal cord) similar to an

Anterior Spinal Artery
syndrome - symptoms

include:

1) **paraplegia** (Corticospinal
tracts, bilateral voluntary
paralysis of legs and lower
body)

2) **bilateral loss of pain and
temperature** sense
(Spinothalamic tract),

3) **loss of sphincter control**

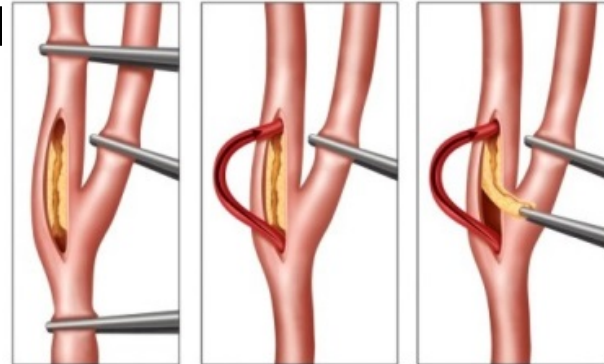
4) **sparing of vibration and
position sense** (Dorsal
Columns, sensory)

CAROTID ARTERY DISEASE - ACCUMULATION OF PLAQUE AT CAROTID BIFURCATION

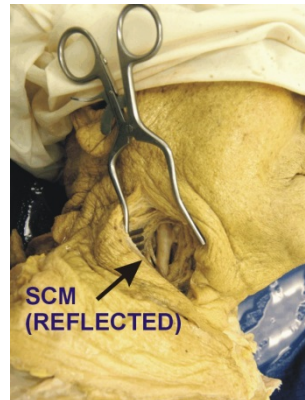
Obstruction in Internal Carotid Artery



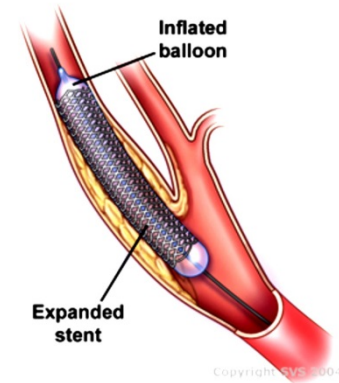
Carotid Endarterectomy
- surgical removal of



Procedure on Cadaver



Carotid Stent

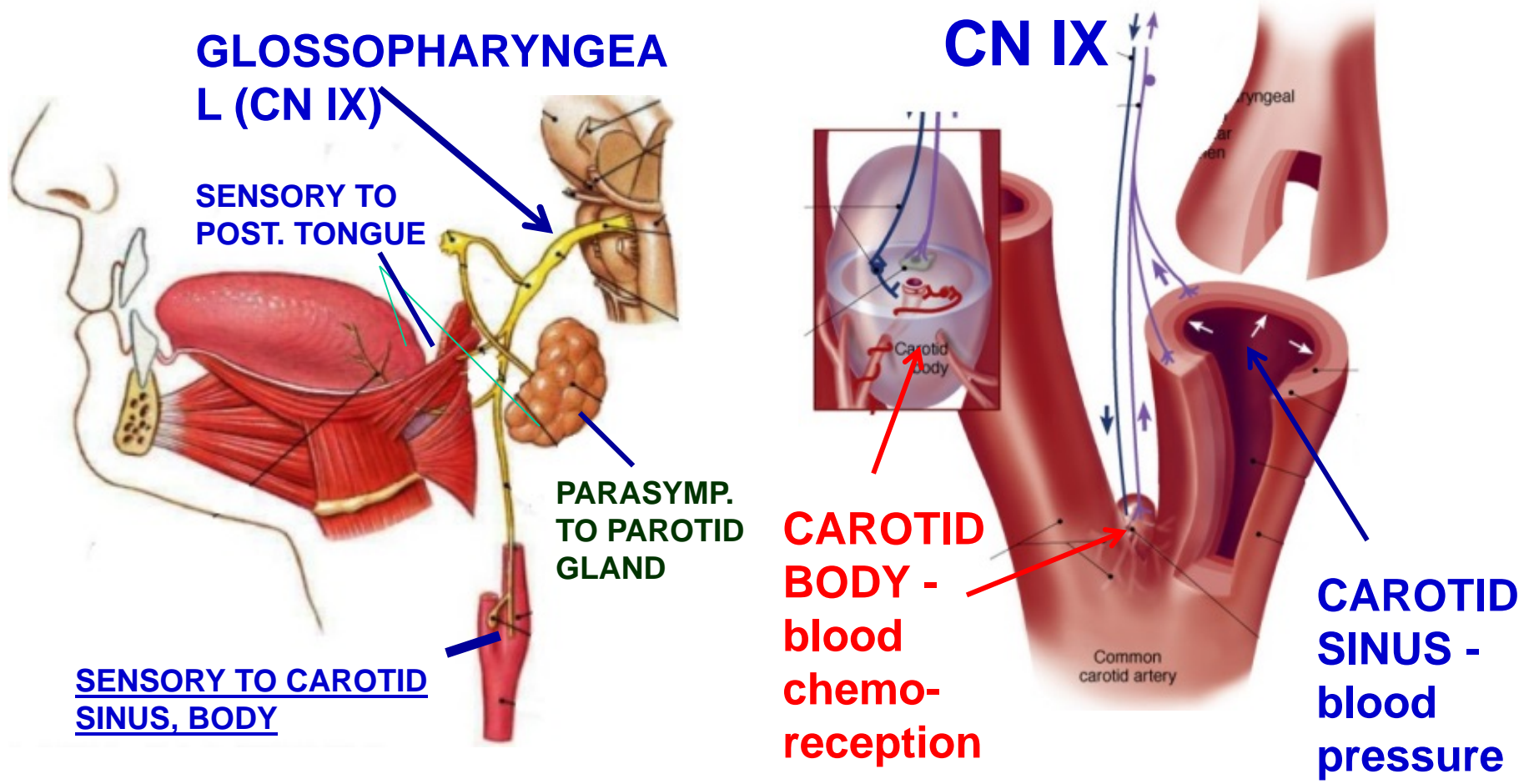


Plaque Removed from Cadaver



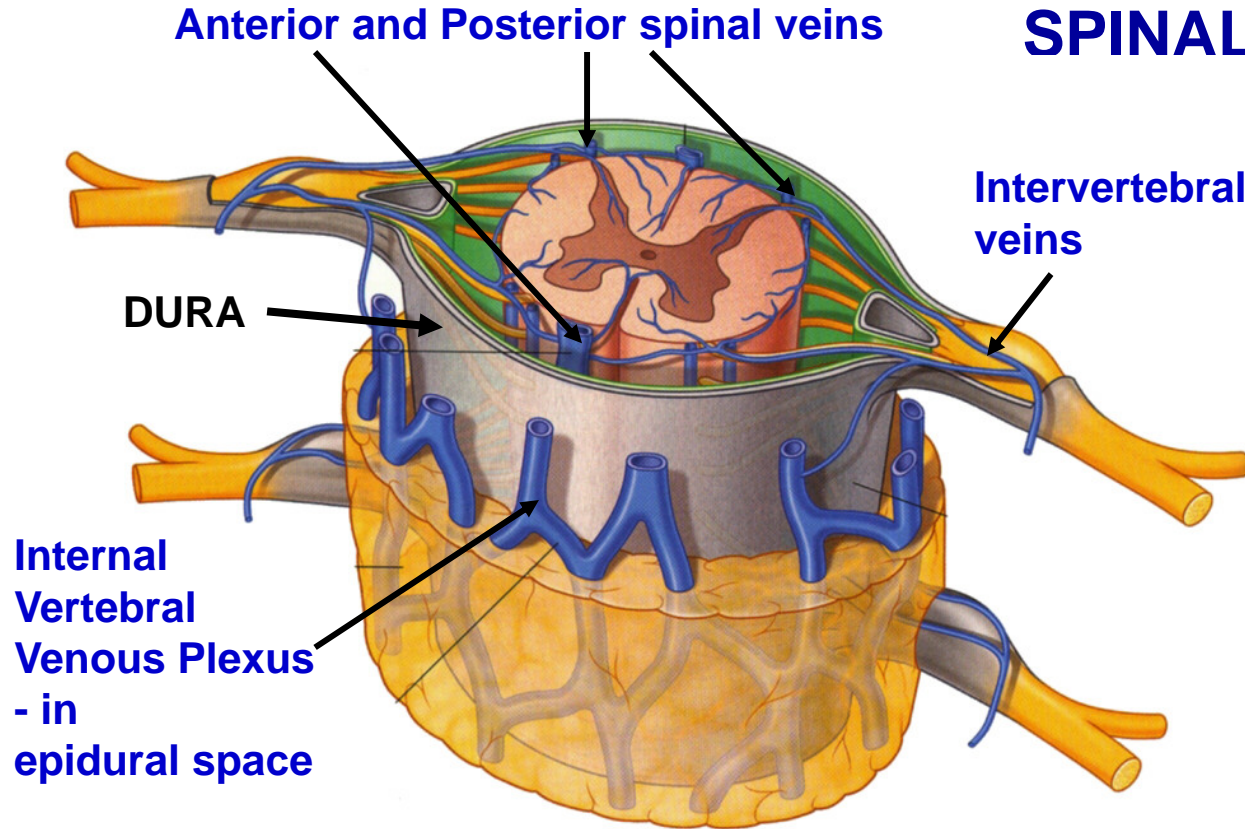
- Plaque at Bifurcation can give rise to Emboli in Internal Carotid Artery and cause cerebrovascular occlusion - STROKE *

GLOSSOPHARYNGEAL NERVE IX - INNERVATES CAROTID SINUS AND BODY (VISCERAL SENSORY)



- Visceral sensory endings monitor blood pressure, chemoreception
- Damage to IX - Cardiac-pulmonary dysfunction ***

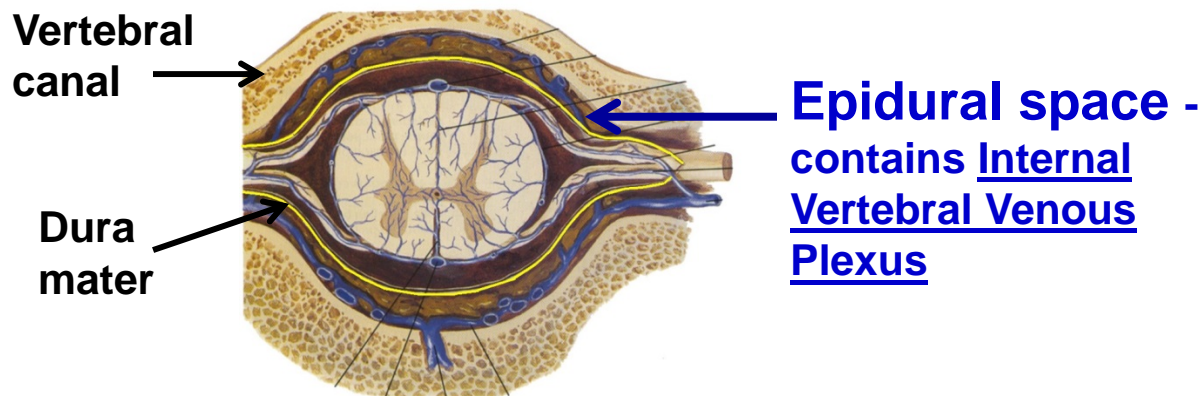
VENOUS DRAINAGE OF SPINAL CORD



1. Venous plexus in Pia mater - drains spinal cord and **Anterior and Posterior spinal veins**.

2. **Internal Vertebral Venous Plexus** - lies in **EPIDURAL SPACE** inside vertebral canal; drains venous plexus of Pia mater and veins of vertebrae; drains to External venous plexus by Intervertebral veins.

3. **Intervertebral veins** - correspond to Radicular arteries - pass through intervertebral foramina; drains to others veins in body.

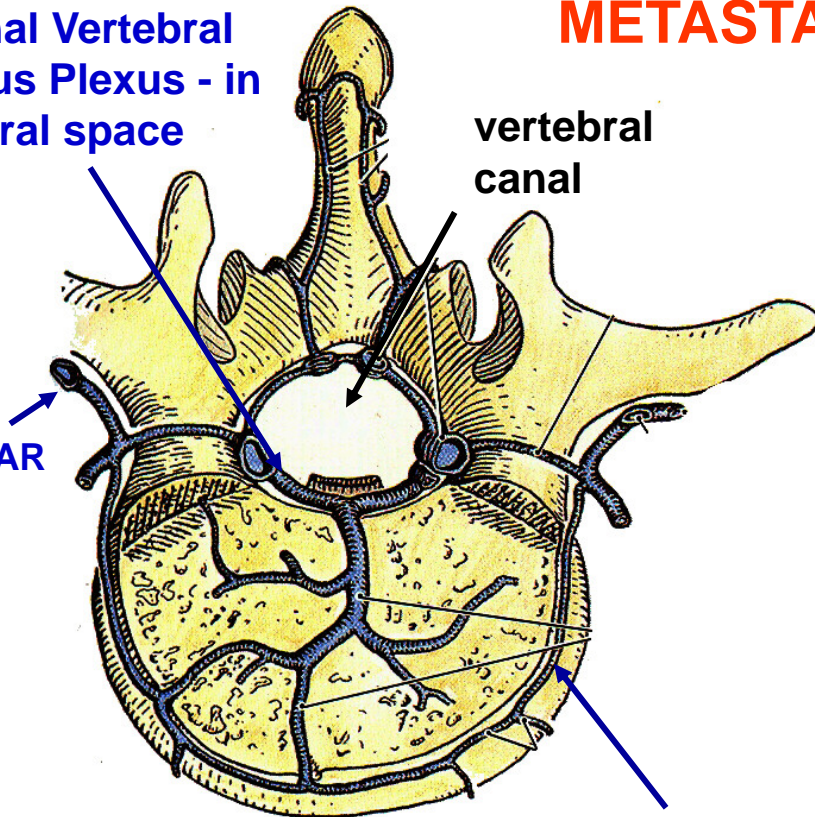


METASTASIS TO VERTEBRAL COLUMN

Internal Vertebral Venous Plexus - in epidural space

vertebral canal

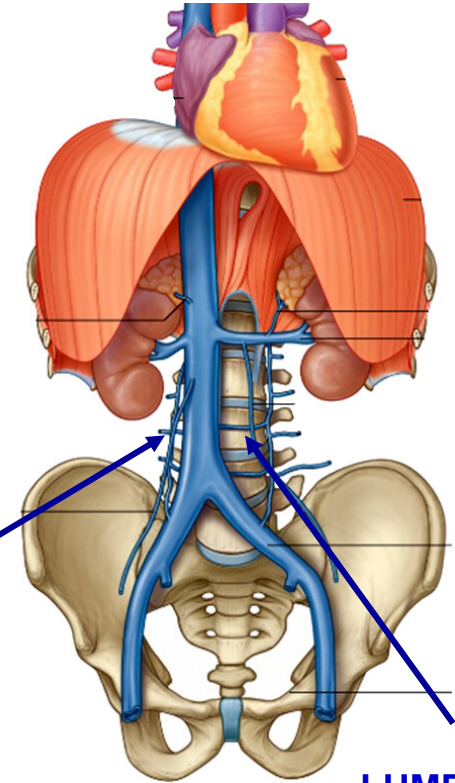
LUMBAR VEINS



External Vertebral Venous Plexus

4. External Vertebral Venous Plexus - outside of vertebrae; connects to other veins body.

TESTICULAR VEINS

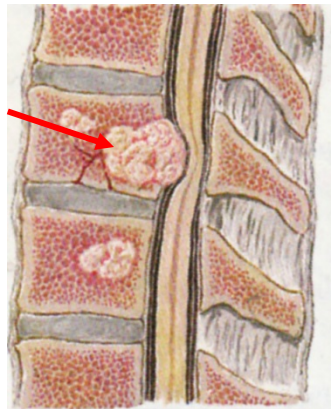


LUMBAR VEINS

SPREAD OF CANCER



METASTASIS



Note: Metastasis to Vertebral Column - Veins of Spinal Cord have NO VALVES; disease processes can spread to spinal cord and vertebra by Intervertebral veins (ex. carcinoma of prostate (in pelvis) can metastasize to vertebral column and spinal cord).