

DISCUSSION SESSION 6: GROSS ANATOMY

ONN BLOCK

Monday Feb 19, 2024

Parotid, Ear, Pharynx, Larynx,

PAROTID SALIVARY GLAND

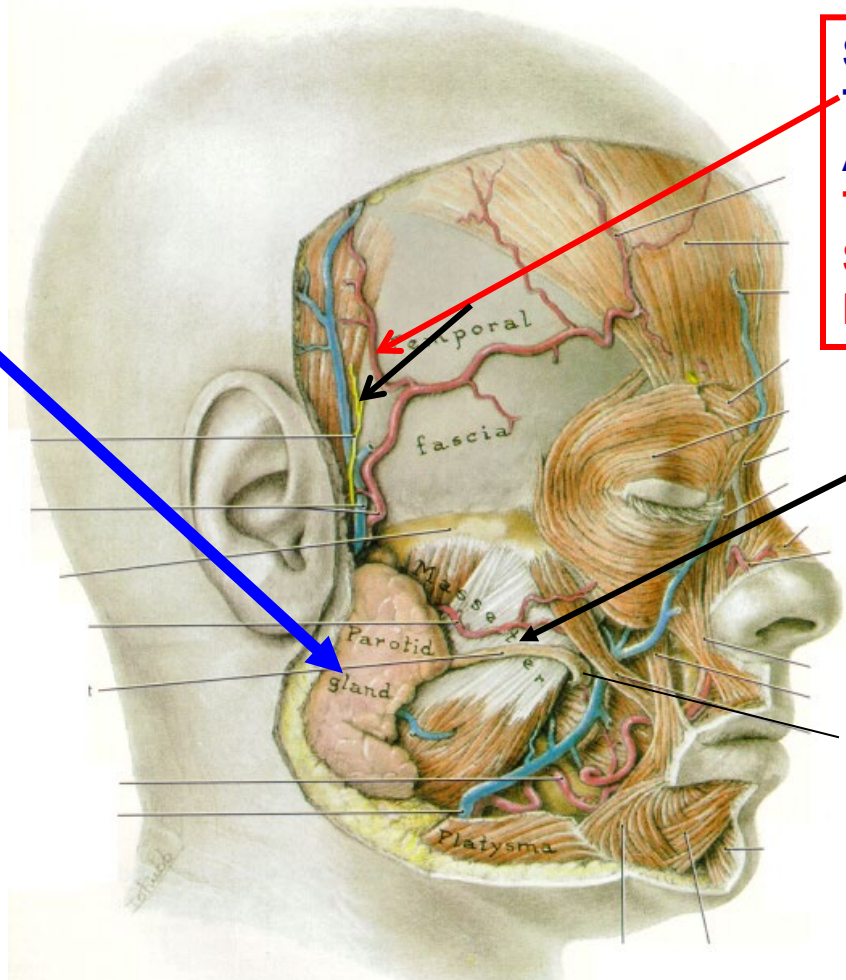
PAROTID

PAROTID SALIVARY GLAND

SUPERFICIAL TEMPORAL ARTERY AND AURICULO-TEMPORAL NERVE - SENSORY TO OUTER EAR

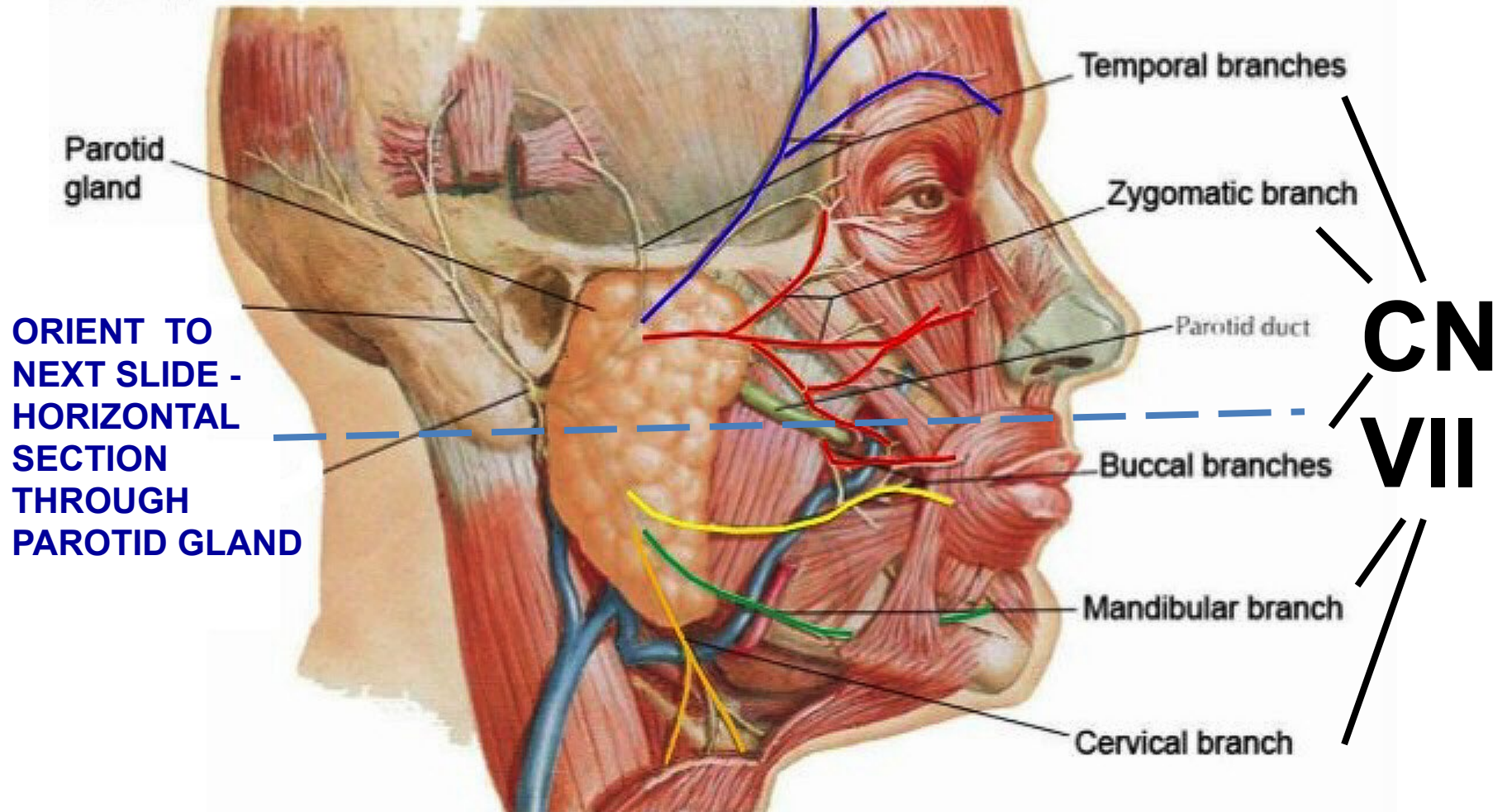
PAROTID DUCT

90 DEGREE TURN



STRUCTURES PASS THROUGH PAROTID - VII;
AURICULOTEMPORAL NERVE (BRANCH OF V3) -
INNERVATES OUTER EAR

FACIAL NERVE (CN VII) BRANCHES ARISE AND PASS THROUGH PAROTID SALIVARY GLAND



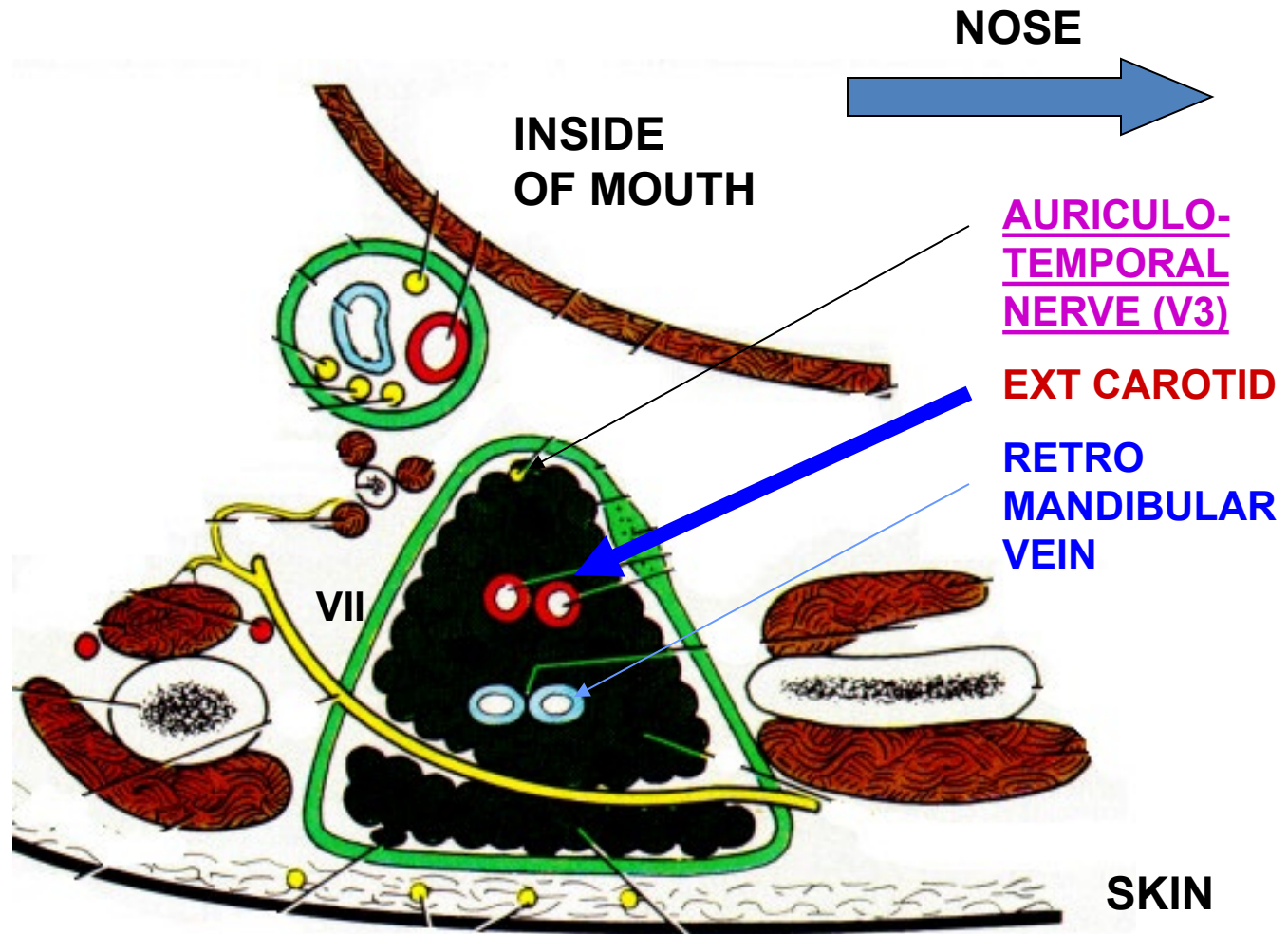
PAROTID TUMORS CAN AFFECT FACIAL NERVE - symptoms are FACIAL PARALYSIS ONLY - no loss taste, no hyperacusia, etc.

PAROTID REGION - DEEP STRUCTURES

WITHIN PAROTID-

- 1) VII
- 2) RETROMANDIBULAR VEIN,
- 3) EXT CAROTID A.,
- 4) AURICULO-TEMPORAL N.

INNERV. OF PAROTID - VISCERAL MOTOR (PARASYMP) OF IX (GLOSSOPHARYNG. N)

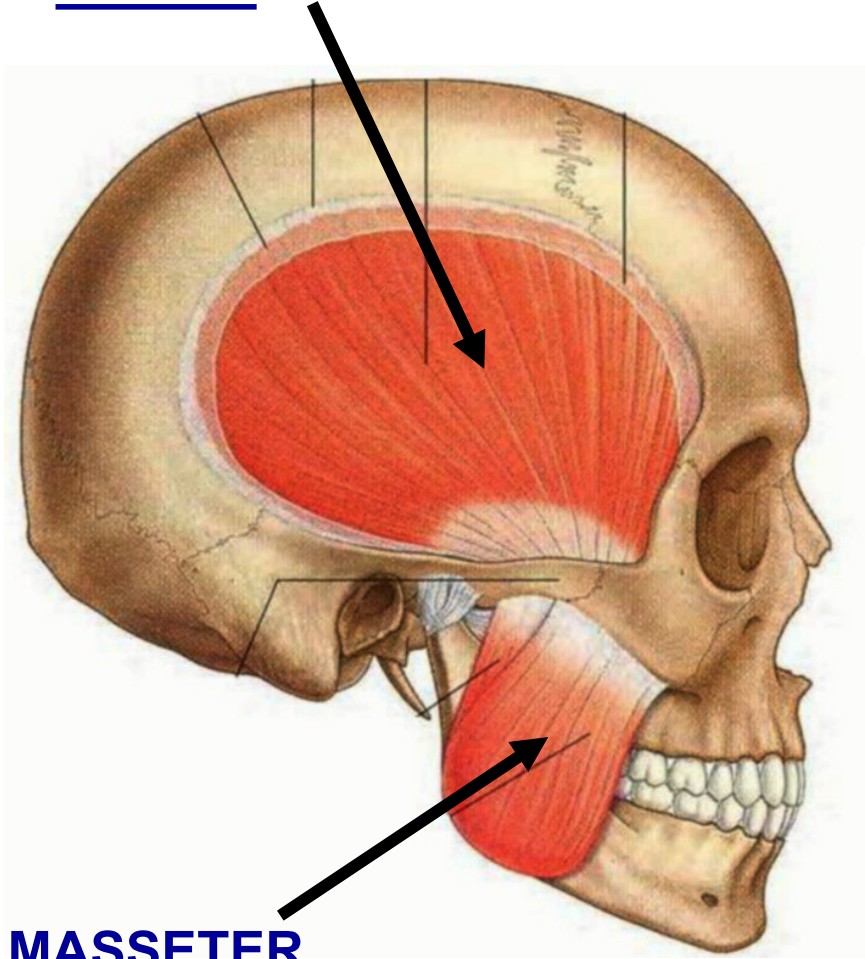


NOTE: MUMPS: VIRAL INFECTION OF PAROTID; SWELLING PAINFUL DUE TO TIGHTNESS CAPSULE; REFERRED PAIN TO EAR - COMPRESSION OF AURICULO-TEMPORAL NERVE (ALSO PAROTID TUMOR)

MUSCLES OF MASTICATION

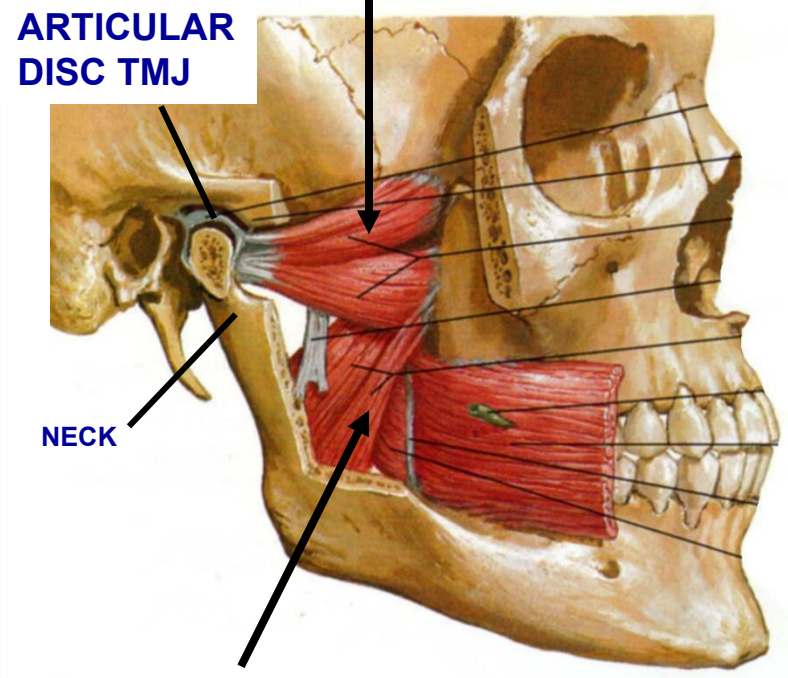
TEMPORALIS -
- Action - Elevate,
Retrude

- ALL INN BRANCHIOMOTOR (First Arch) - V3
- ELEVATE = CLOSE; DEPRESS = OPEN MOUTH



MASSETER
- Action -
Elevate

LATERAL PTERYGOID - Action -
Depress, Protrude Pull Disc
Forward

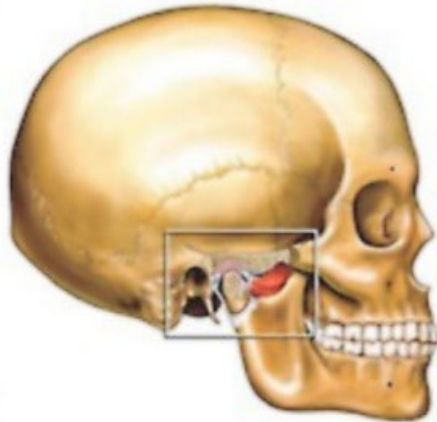


MED. PTERYGOID -
Action - Elevate

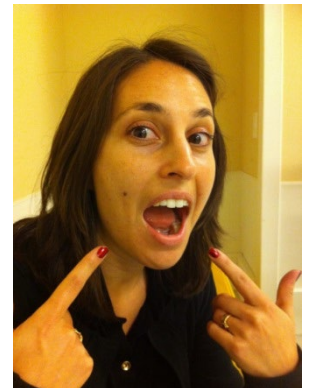
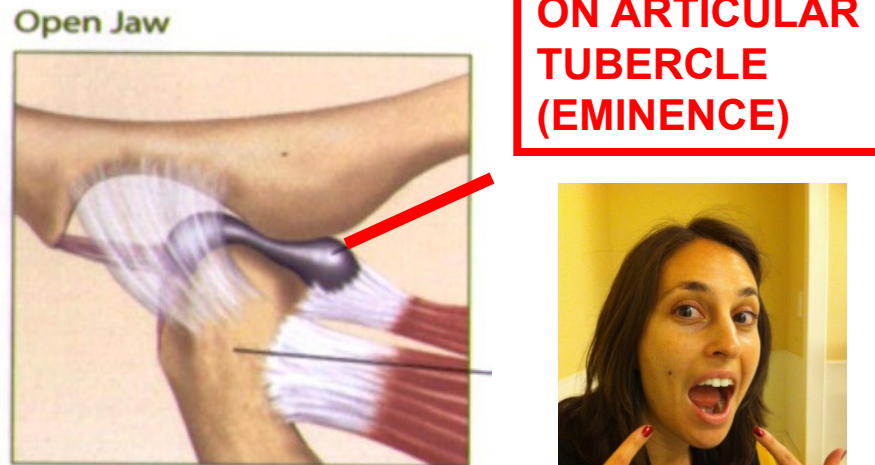
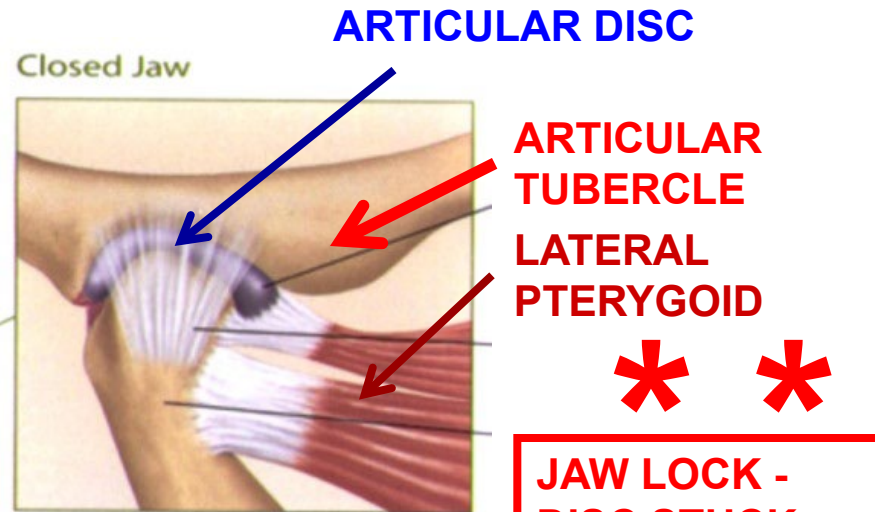
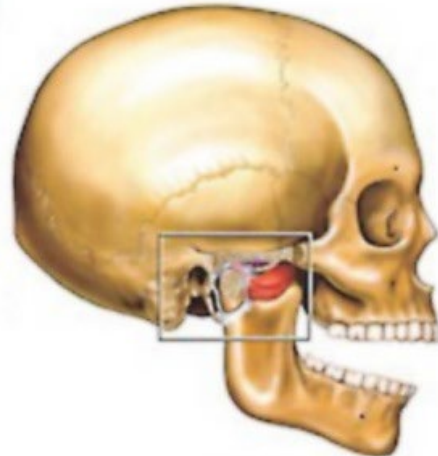
TMJ JAW LOCK - mandible stuck in partial depression

**OPEN MOUTH =
depress mandible**

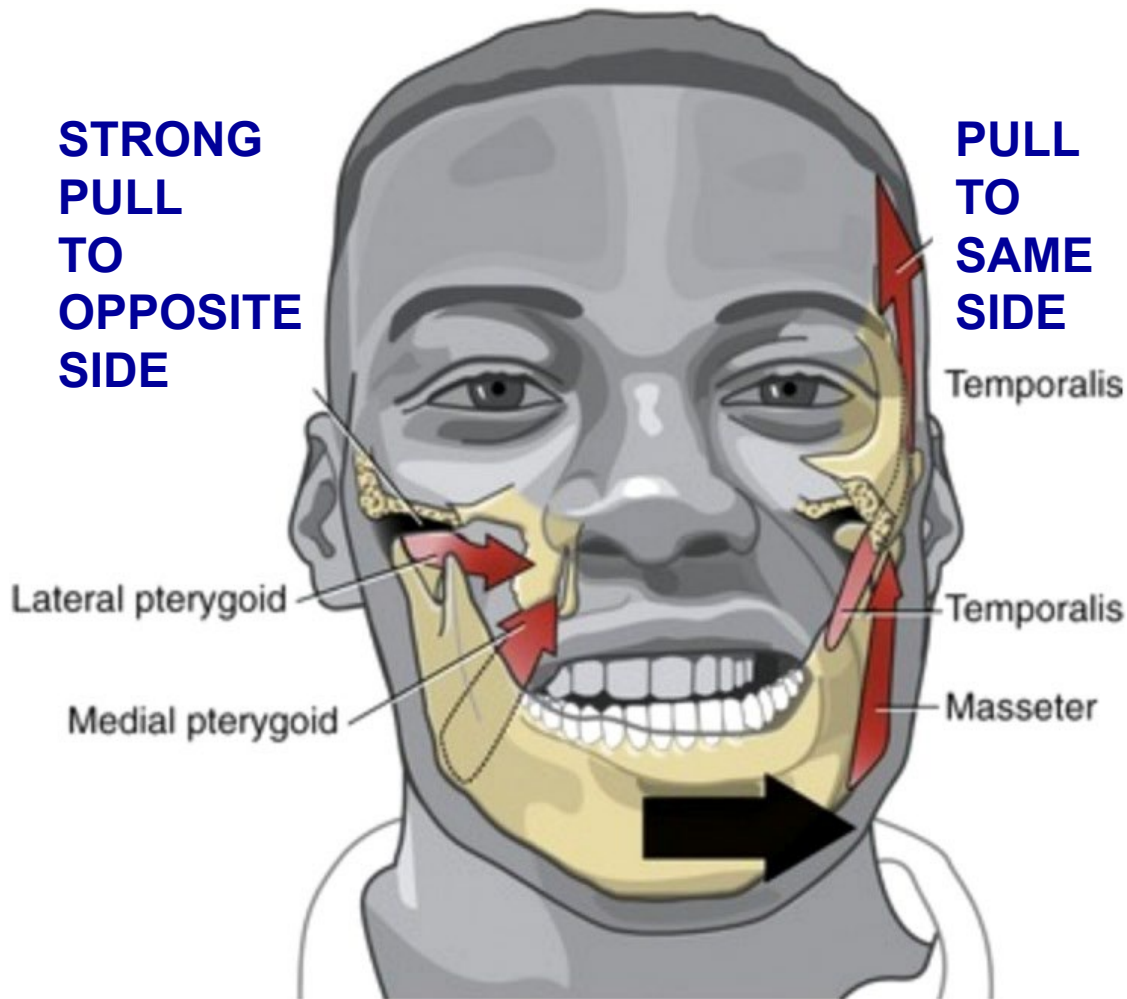
**FIRST
HINGE
LOWER
COMPART
MENT**



**THEN
SLIDE
UPPER
COMPART
MENT**



LATERAL MOVEMENTS OF JAW - occur in chewing



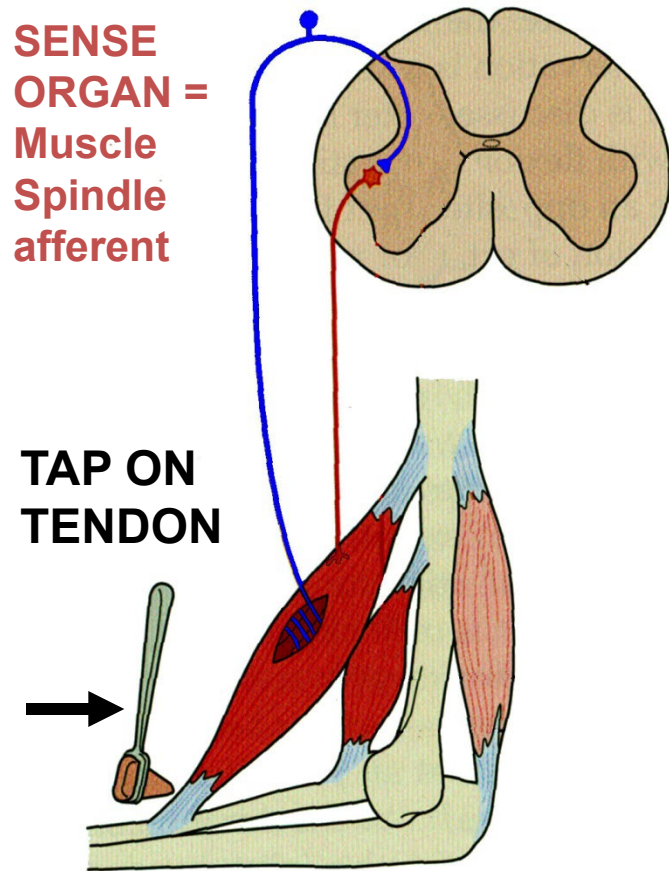
Lateral movements

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

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

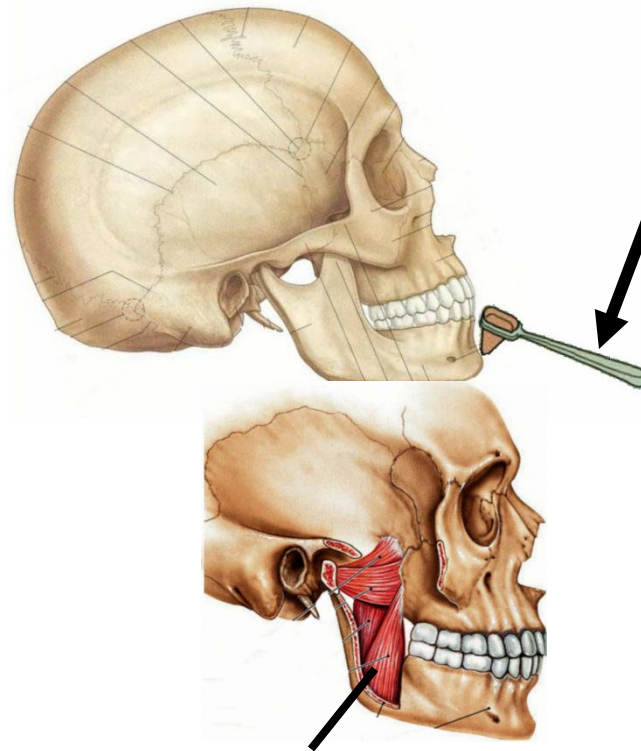
JAW JERK REFLEX = STRETCH REFLEX OF MUSCLES OF MASTICATION - sensory and motor in V3

STRETCH REFLEX IN BICEPS



STRETCH REFLEX IN MUSCLES OF MASTICATION - TEST CN V

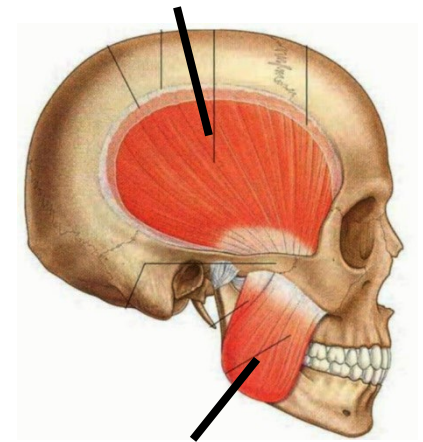
TAP DOWN ON CHIN



MEDIAL PTERYGOID

STRETCH MUSCLES THAT CLOSE MOUTH (ELEVATE MANDIBLE)

TEMPORALIS

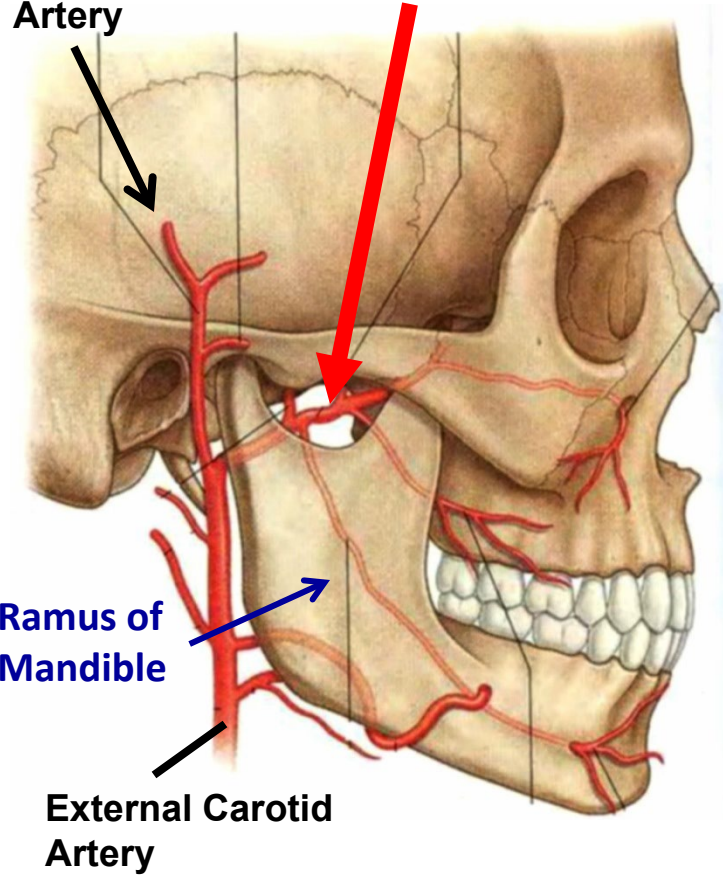


MASSETER

MAXILLARY ARTERY

MAXILLARY ARTERY

Superficial Temporal Artery

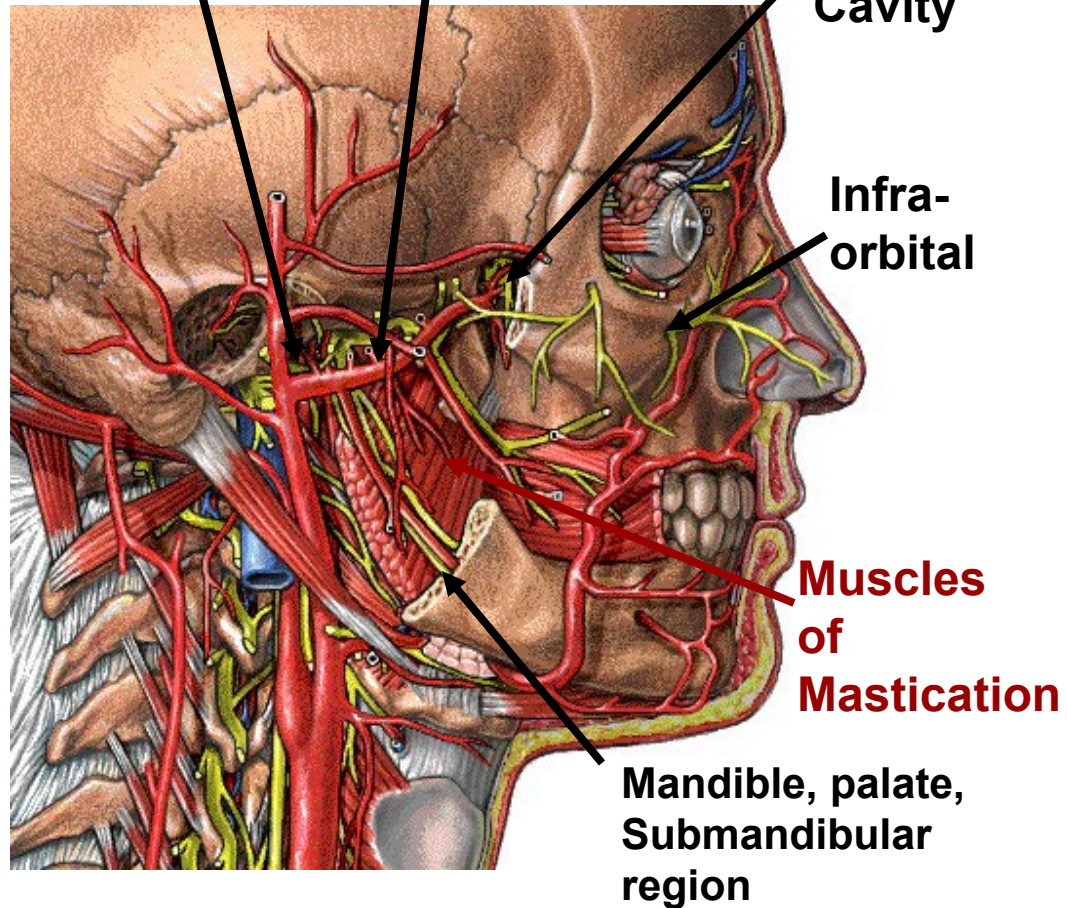


NOT ASK BRANCHES OR FORAMINA EXCEPT MIDDLE MENINGEAL A

Middle Meningeal Artery

External and Middle Ear

Nasal Cavity



View - after removed Ramus of Mandible

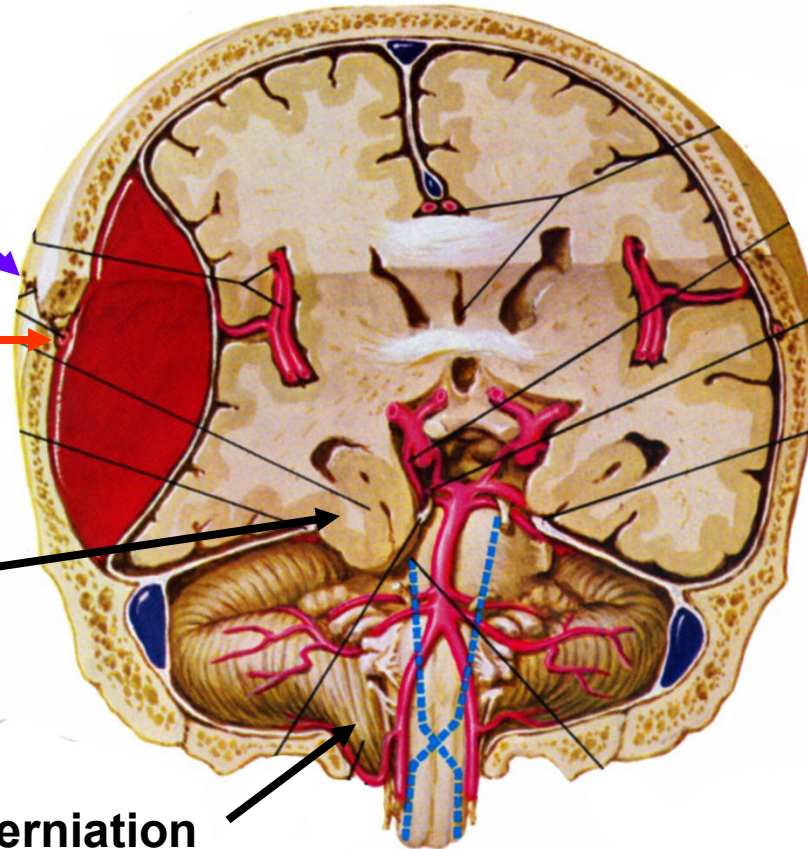
DAMAGE MIDDLE MENINGEAL, [ACCESSORY MENINGEAL] ARTERIES - EPIDURAL HEMATOMA

Skull Fracture Near Pterion

Tear Middle Meningeal Artery

Uncal herniation

Tonsillar herniation



1) Skull fracture near Pterion

2) Tear Middle Meningeal Artery

3) Blood 'peels' dura from bone

4) Lens shaped (biconvex) mass on CT

5) mass (LENS SHAPED) can displace brain

6) Herniation -

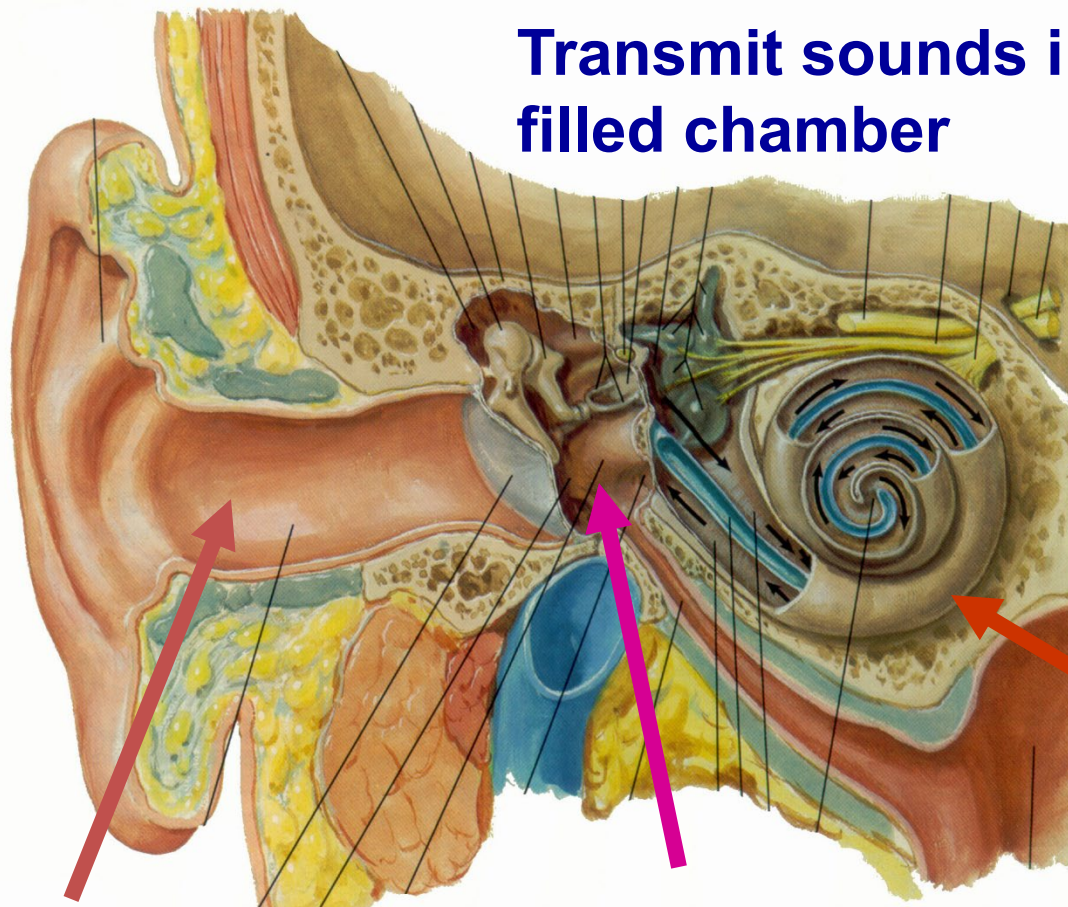
i. **Uncal herniation**- push Temporal lobe (uncus) through **tentorial notch**

ii. **Tonsillar herniation** - push Cerebellum (tonsil) through foramen magnum

Clinical - bleeding is arterial – can be profuse and rapid; - ex, car accident – patient lucid at first - can be fatal within hours if herniation occurs

EAR

Transmit sounds in air to fluid filled chamber



REGIONS

A. Outer Ear
directs sound
(pressure waves in
air) to tympanic
membrane

**B. Middle Ear - air-filled
chamber**
- bones link tympanic
membrane to cochlea;
amplify force/area
- muscles can dampen
loud sounds

**C. Inner Ear-
fluid-filled
chamber
inside BONE**
Cochlea-
hearing;
Vestibular
apparatus-
gravity,
balance

CONDUCT SOUND -
(CONDUCTIVE HEARING LOSS)

DETECT SOUND
(= SENSORI-NEURAL LOSS)

TERMINOLOGY

OUTER EAR

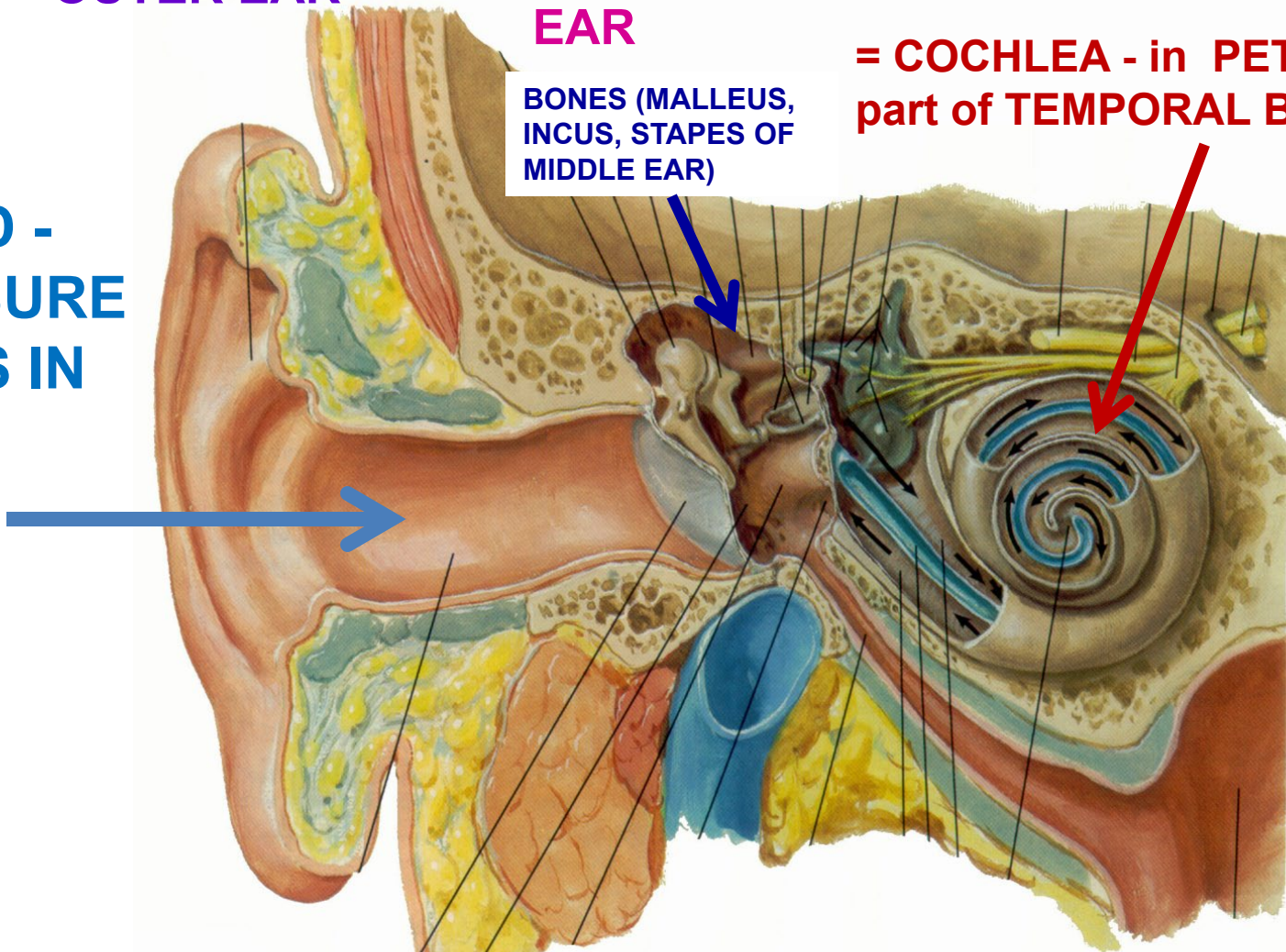
MIDDLE EAR

INNER EAR

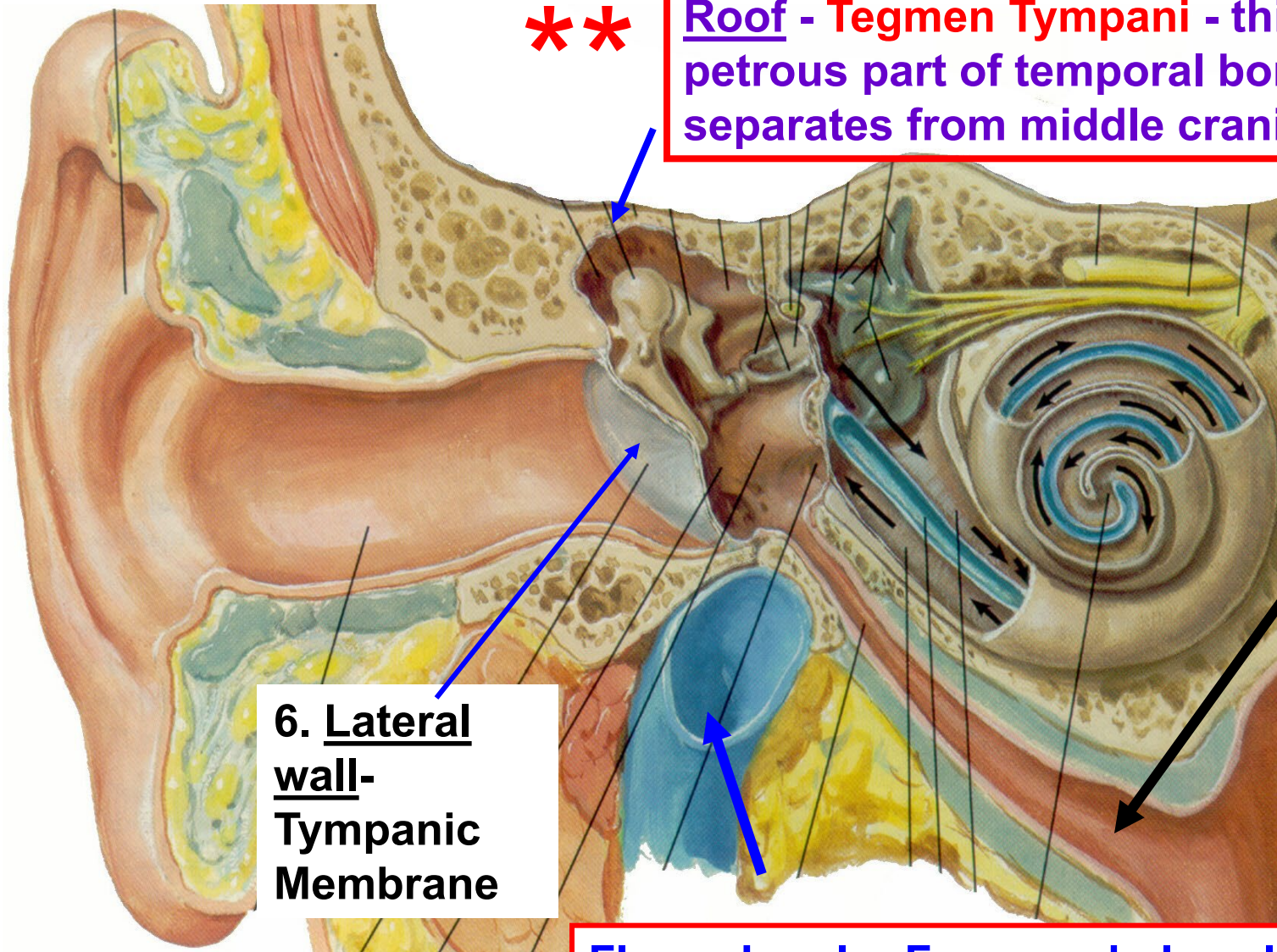
= COCHLEA - in PETROUS part of TEMPORAL BONE

BONES (MALLEUS, INCUS, STAPES OF MIDDLE EAR)

SOUND - PRESSURE WAVES IN AIR



MIDDLE EAR - BOUNDARIES - SPREAD OF INFECTION



Roof - Tegmen Tympani - thin plate of petrous part of temporal bone; separates from middle cranial fossa

6. Lateral wall-
Tympanic Membrane

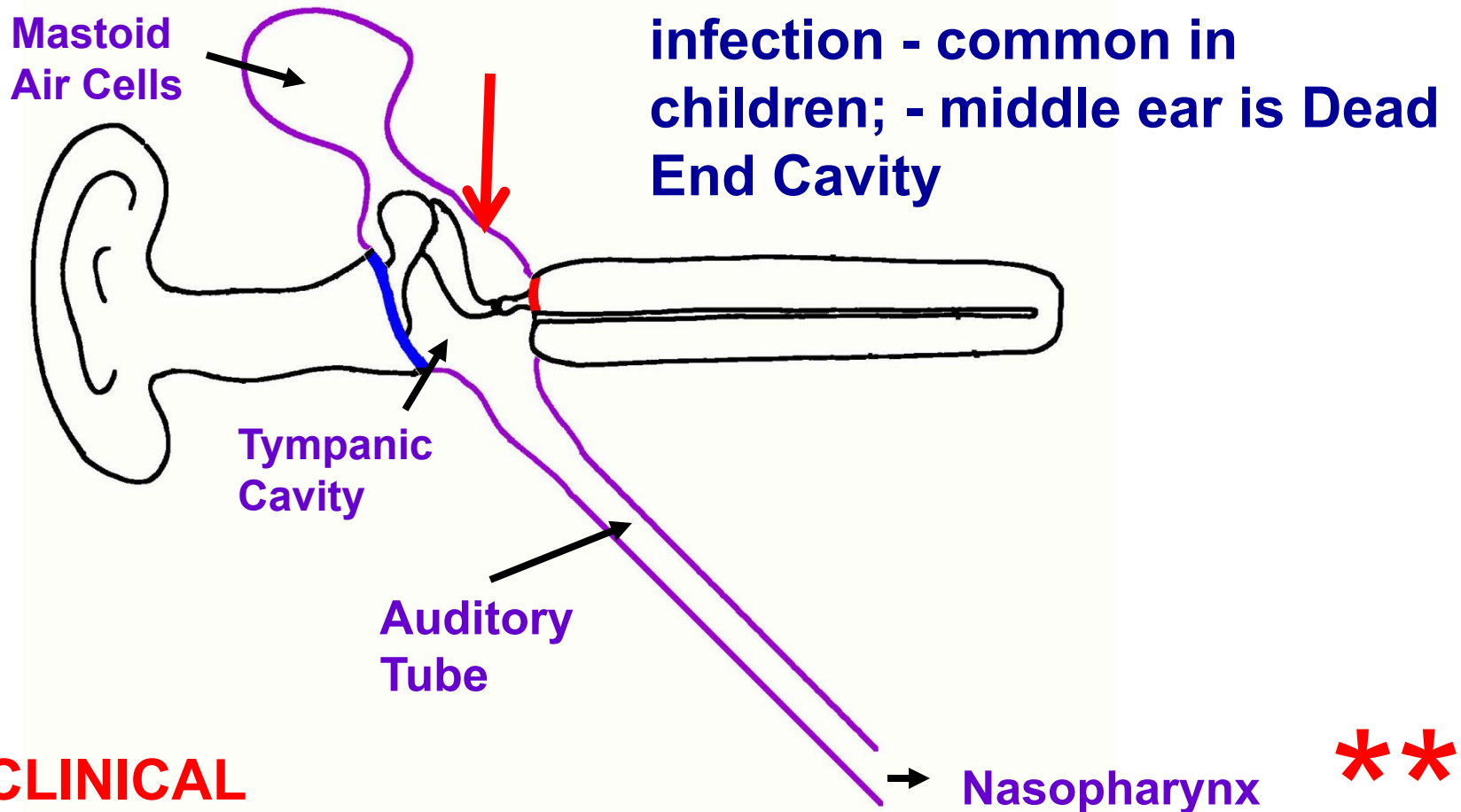
3. Ant. wall -
Opening of Auditory Tube (ant. 2/3 cartilage; post. 1/3 bone)

Tegmen = L. roof

Floor- Jugular Foramen below- Internal Jugular vein can rupture to middle ear

OTITIS MEDIA

Otitis Media – middle ear infection - common in children; - middle ear is Dead End Cavity



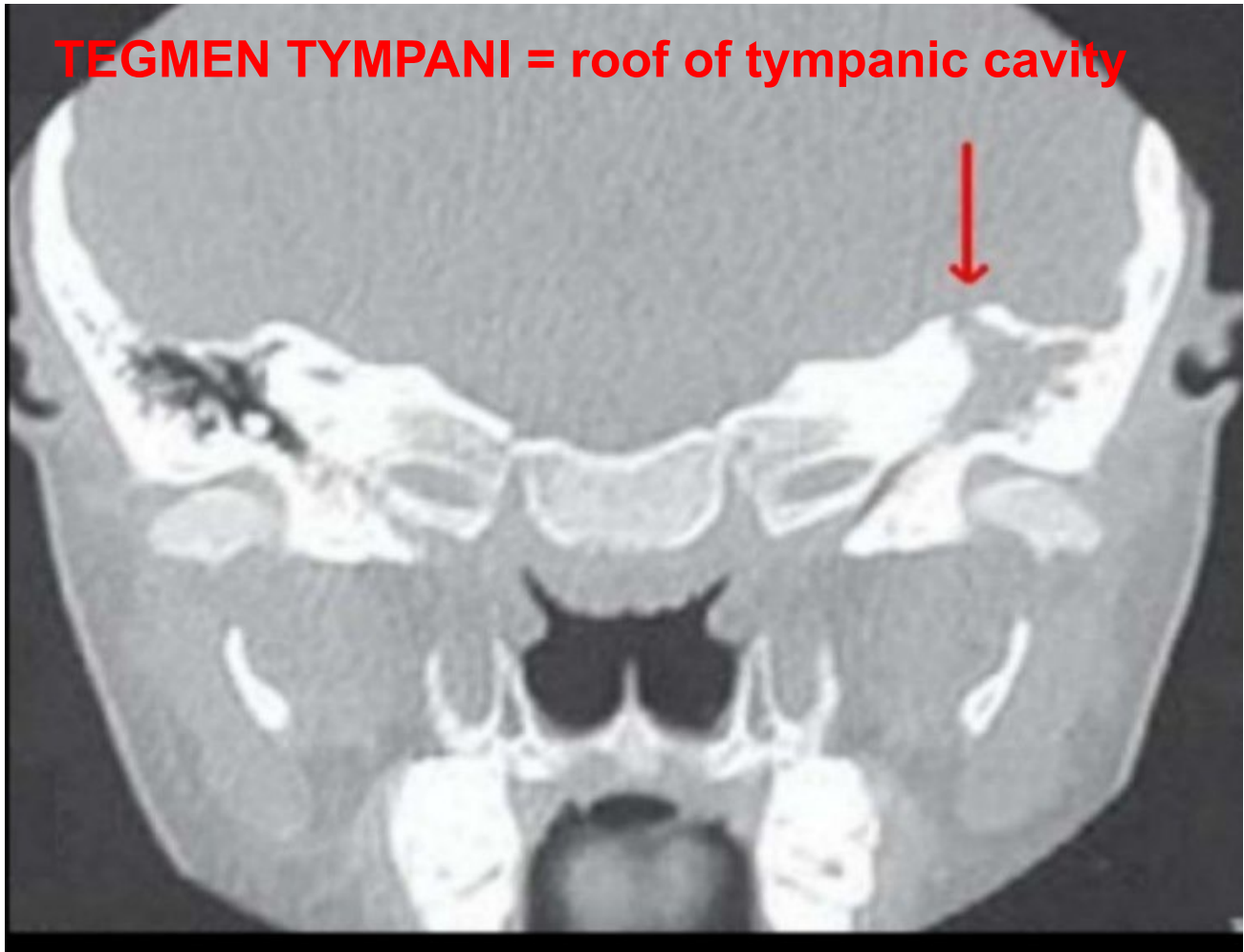
CLINICAL

Spread of infection from Respiratory System can damage Auditory Ossicles - Hearing Loss; Prolonged infection - Tegmen Tympani to Brain; treatment tympanostomy - tube through tympanic membrane

INFECTION IN OTITIS MEDIA CAN SPREAD TO MIDDLE CRANIAL FOSSA - TEGMEN TYMPANI

TEGMEN TYMPANI = roof of tympanic cavity

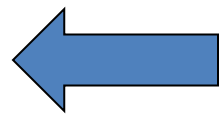
tegman L. =
covering



In prolonged Otitis media, infection can spread to Middle Cranial Fossa by eroding Tegmen Tympani (roof of tympanic cavity, middle ear)

MUSCLES OF MIDDLE EAR - dampen sound

View of
Lateral Wall
of tympanic
cavity



Nose

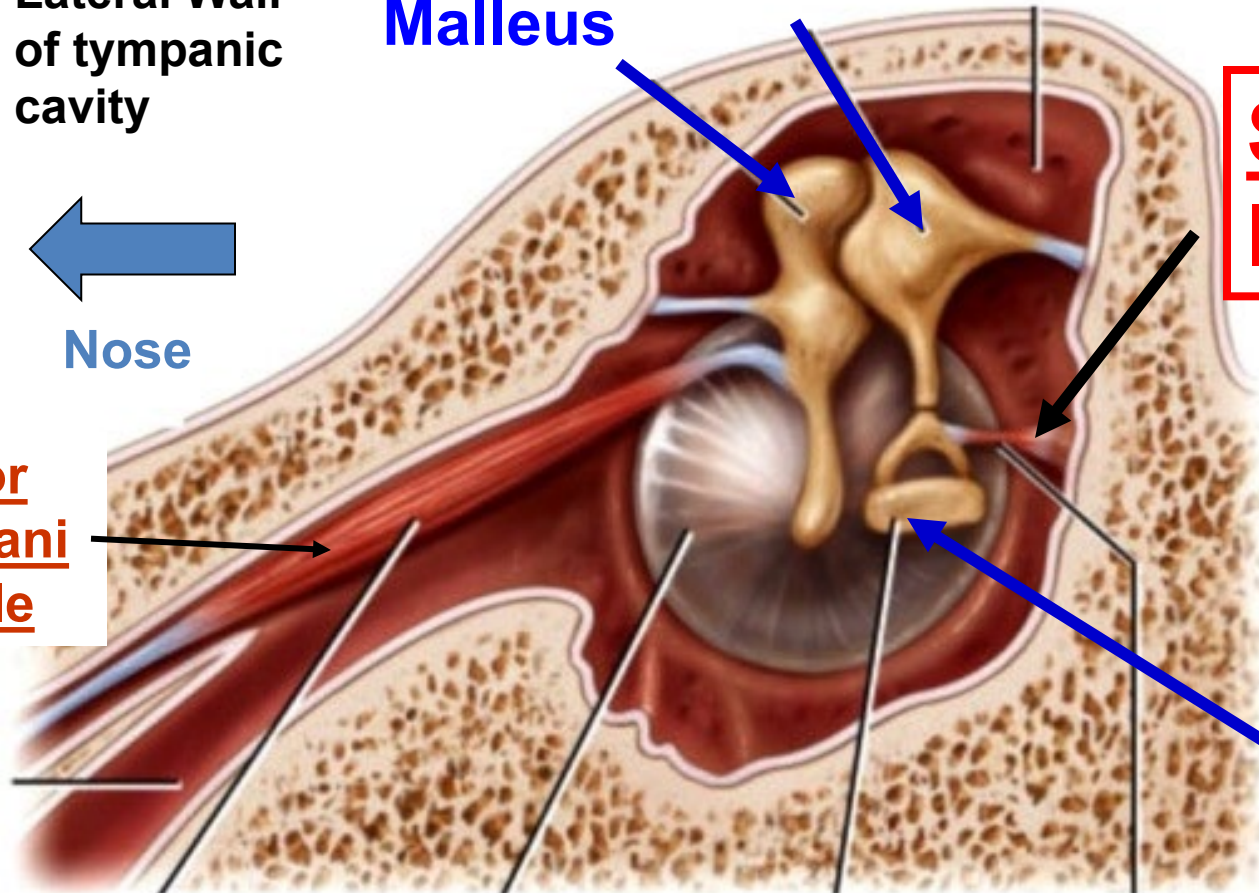
Tensor
Tympani
Muscle

Malleus

Incus

Stapedius
Inn - CN VII

Stapes

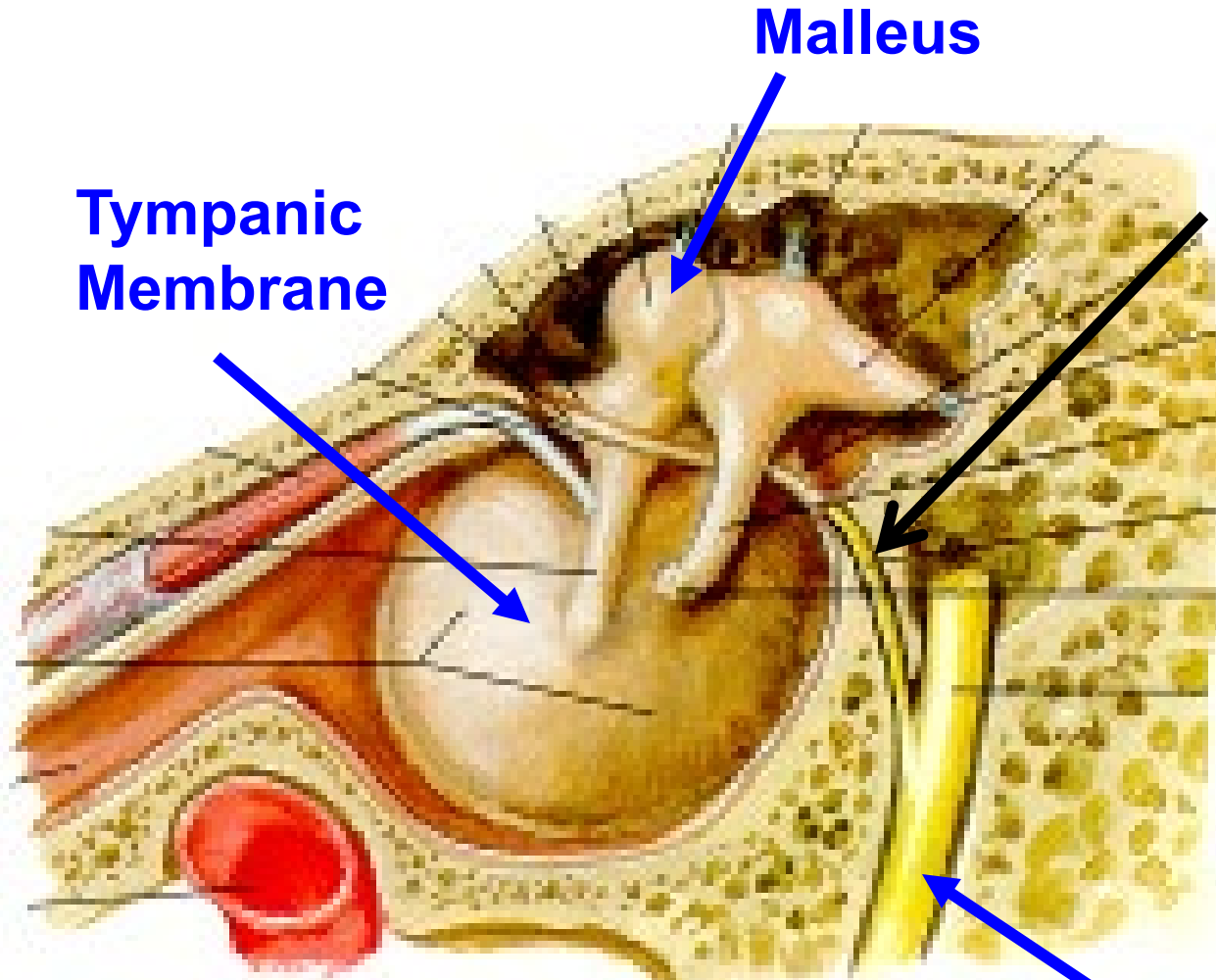


Damage to VII - Hyperacusia - Bell's Palsy -
sounds seem too loud

CHORDA TYMPANI - CN VII

CLINICAL

Taste to ant. 2/3 of tongue
Parasympathetic to Submandibular, Sublingual Salivary glands

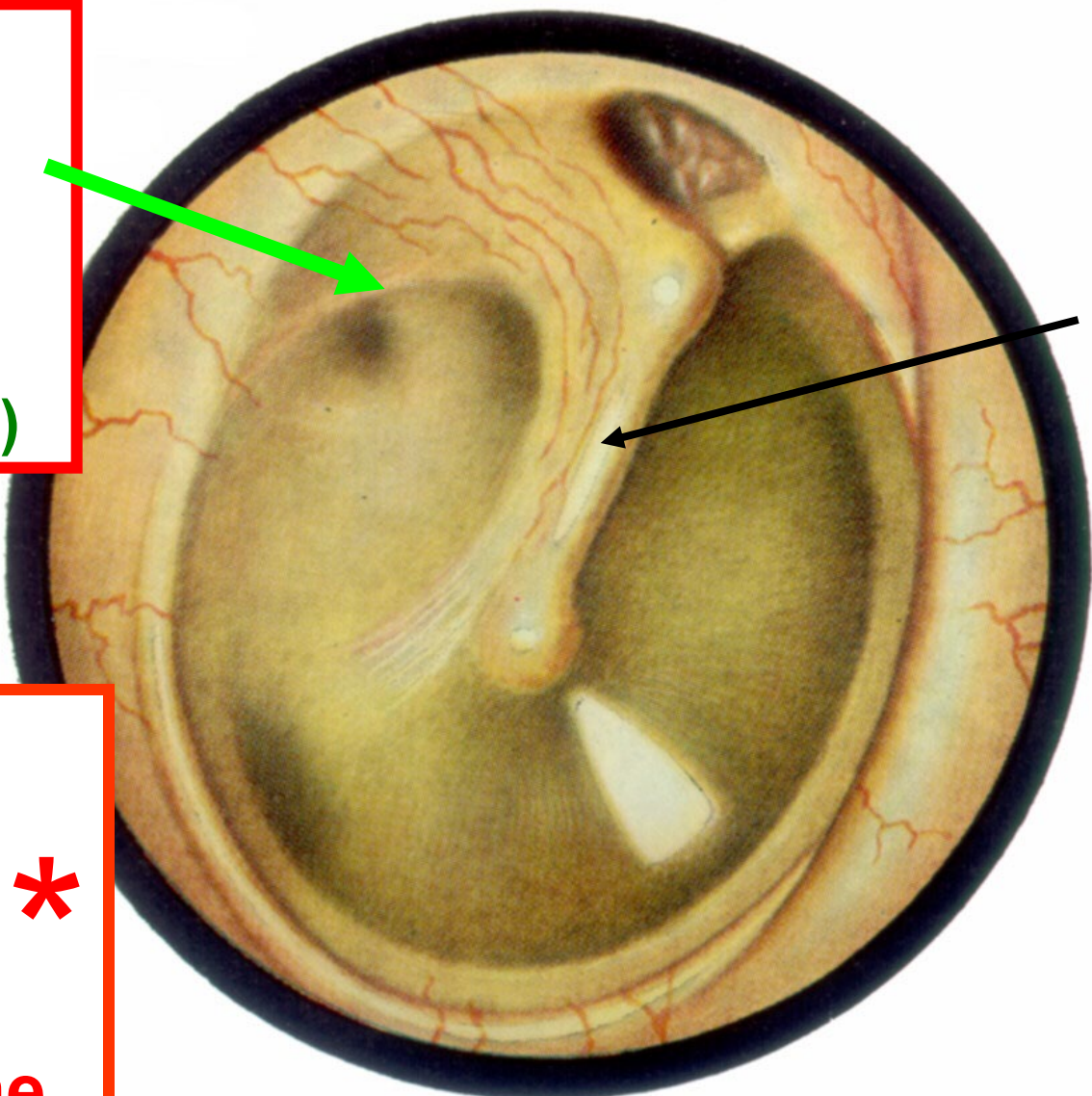


- Chorda Tympani has no function in middle ear
- Crosses through tympanic cavity
- Over handle of malleus

FACIAL NERVE

OTOSCOPE VIEW OF TYMPANIC MEMBRANE

**CHORDA
TYMPANI:
TASTE,
VISCERAL
MOTOR
(parasymp)**

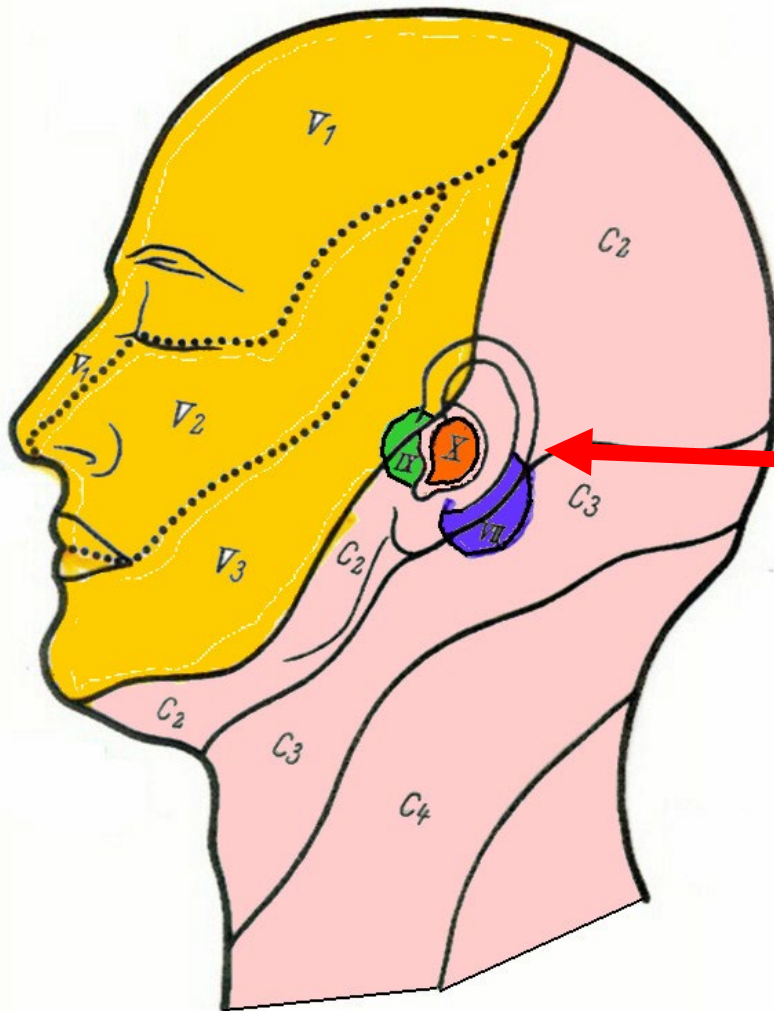


**MALLEUS –
manubrium
(handle)**

CLINICAL*

**Lose
taste if
pierce **
tympanic
membrane**

SOMATIC SENSORY TO OUTER EAR



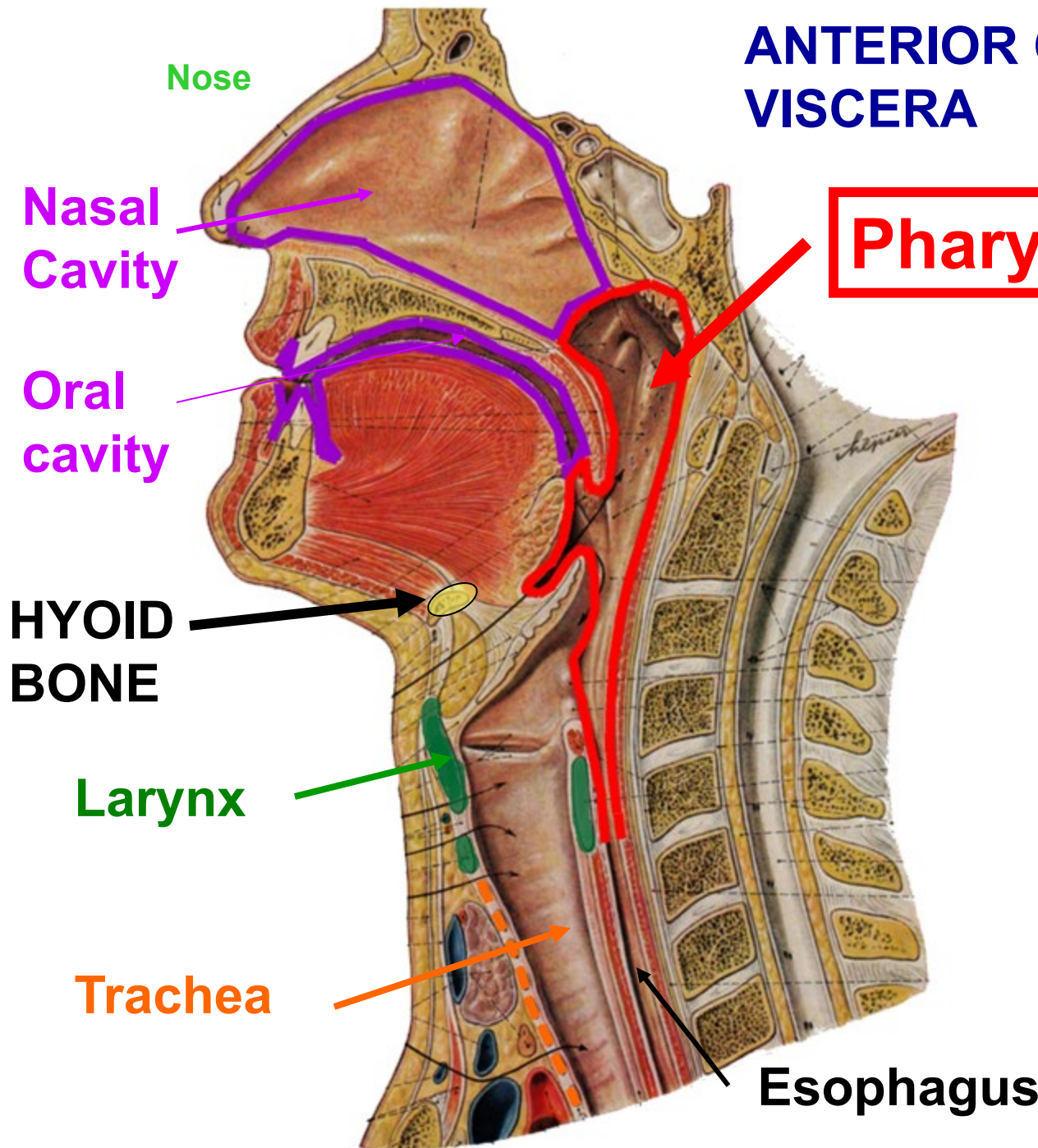
**ALMOST ALL
TRIGEMINAL V
EXCEPTION:
SKIN OF OUTER EAR –
FOUR CRANIAL NERVES**

- 1) V - TRIGEMINAL**
- 2) VII- FACIAL**
- 3) IX - GLOSSO-
PHARYNGEAL**
- 4) X - VAGUS**



**BELL'S PALSY (VII) - PARALYSIS OF FACIAL MUSCLES; IN
RECOVERY, PATIENTS COMPLAIN OF EARACHES**

ANTERIOR COMPARTMENT - VISCERA



1) Larynx and Esophagus open into pharynx

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

SAY AAH!



UVULA



PALATO-
GLOSSAL
ARCH

PALATO-
PHARYNGEAL
ARCH

PALATINE
TONSIL



CLINICAL - PALATOGLOSSAL ARCH = SITE OF THE OROPHARYNGEAL MEMBRANE = BOUNDARY BETWEEN ORAL CAVITY (PRECISE SOMATIC SENSORY) AND PHARYNX (IMPRECISE VISCERAL SENSORY)

**VIEW: SEPARATE
PHARYNX FROM
VERTEBRA,
POSTERIOR
COMPARTMENT**

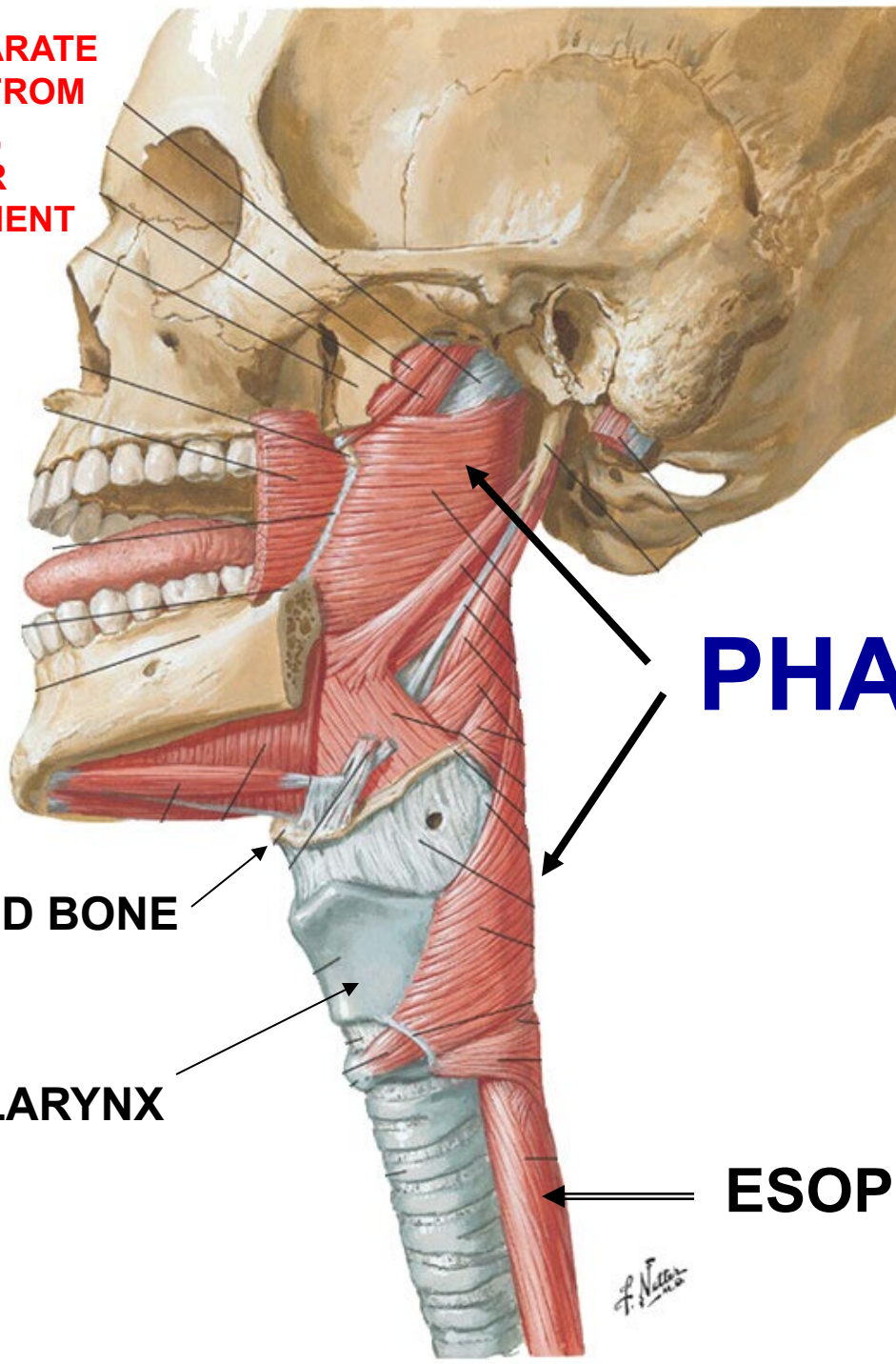
**PHARYNX - is
continuous
with esophagus,
opens to larynx
trachea**

HYOID BONE

LARYNX

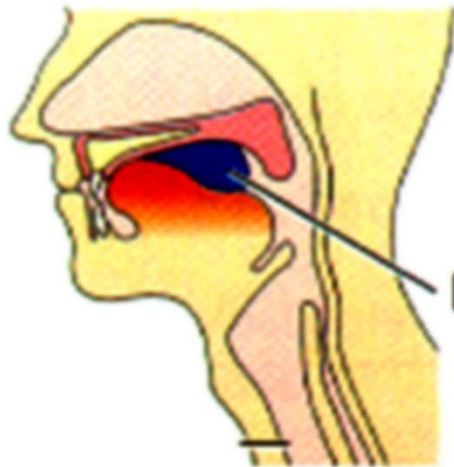
PHARYNX

ESOPHAGUS = TUBE



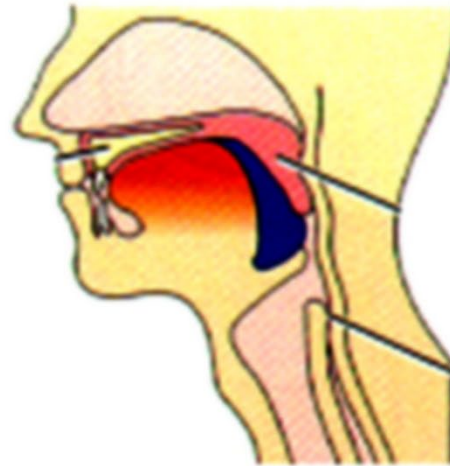
OVERVIEW OF SWALLOWING

PHARYNX ACTS TO PROPEL FOOD IN SWALLOWING

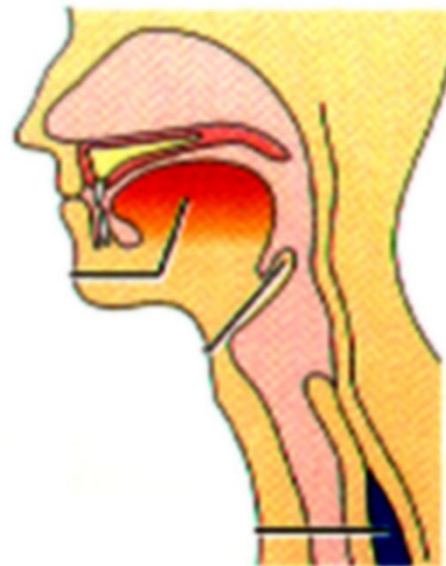
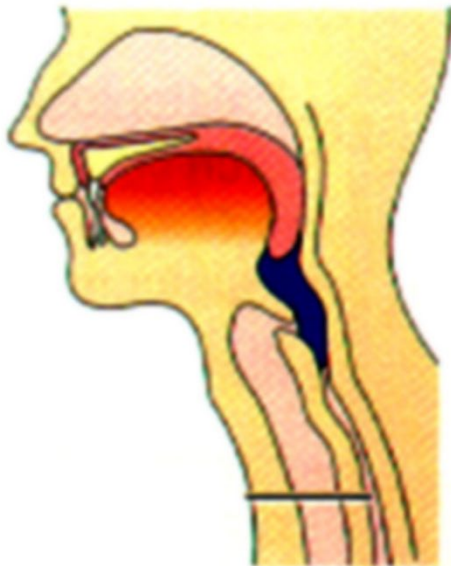


**Voluntary
phase**

Bolus = FOOD



**Involuntary
phase 1**



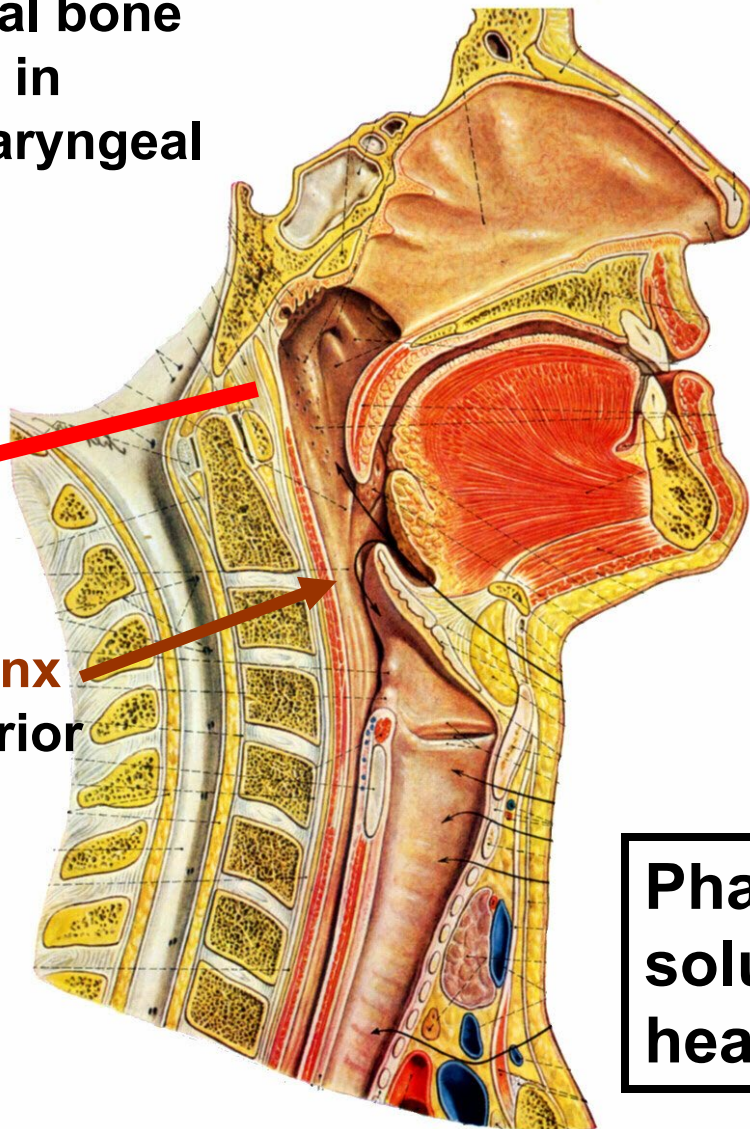
**Involuntary
phases 2,3 =
Muscles of
pharynx propel
food down to
esophagus**

PHARYNX

Disarticulate C1
– occipital bone
separate in
Retropharyngeal
Space

**CUT
HERE**

View **Pharynx**
from Posterior
Side

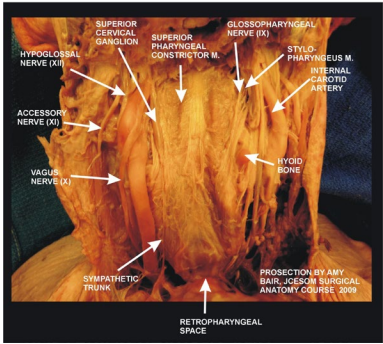


Pharynx is
Muscular Tube
opens to nasal,
oral cavities;
continuous
below with
esophagus;
Pharynx has
layers like GI
tract

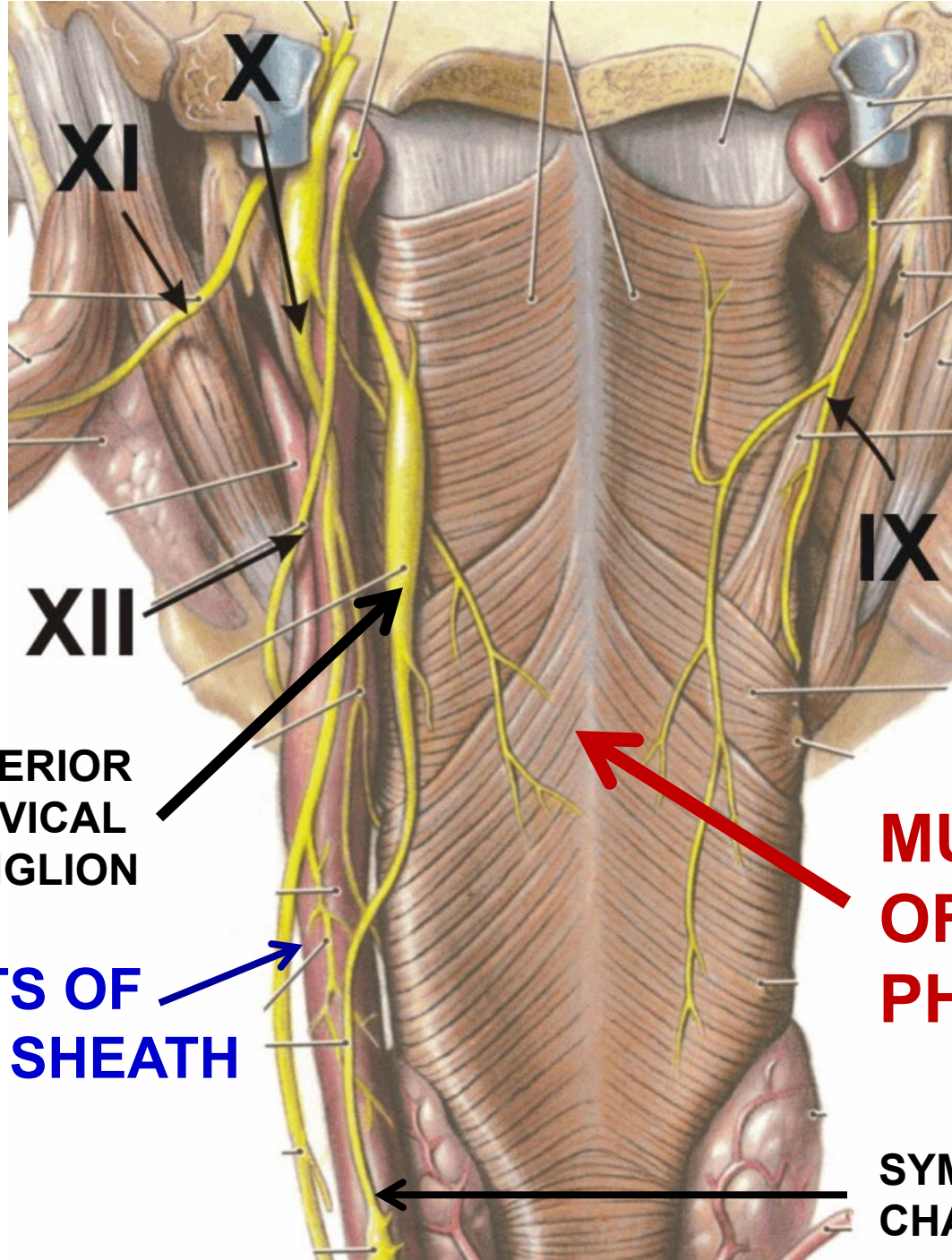
Pharynx is difficult to see;
solution: disarticulate
head

POSTERIOR PHARYNX AND RETROPHARYNGEAL SPACE

314



**NOT ASK
ON EXAM**



**SUPERIOR
CERVICAL
GANGLION**

**CONTENTS OF
CAROTID SHEATH**

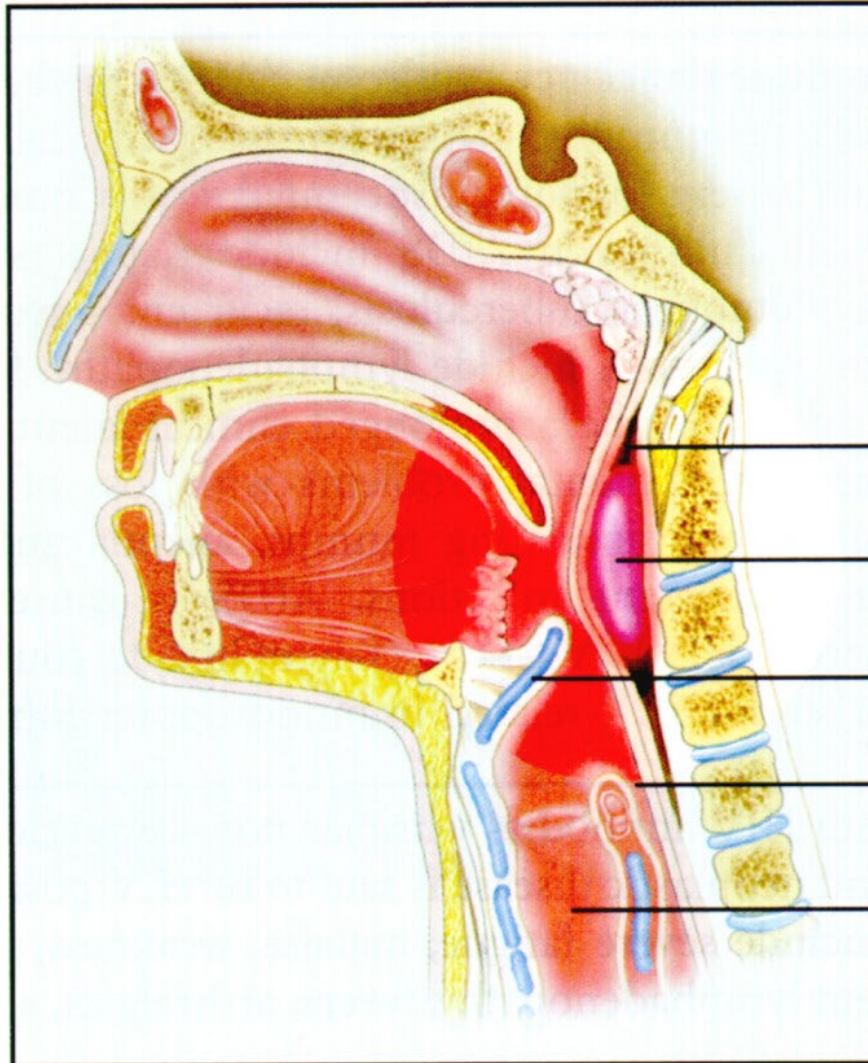
**MUSCLES
OF
PHARYNX**

**SYMPATHETIC
CHAIN**

CLINICAL: RETROPHARYNGEAL ABSCESS



Infection in retropharyngeal space can spread unimpeded to mediastinum (MIDDLE OF THORACIC CAVITY)



Retropharyngeal space

Abscess

Epiglottis

Esophagus

Trachea

Note: George Washington may have died from this

PHARYNX - LONGITUDINAL MUSCLES

1. Stylopharyngeus

O - Styloid process
of Temporal bone

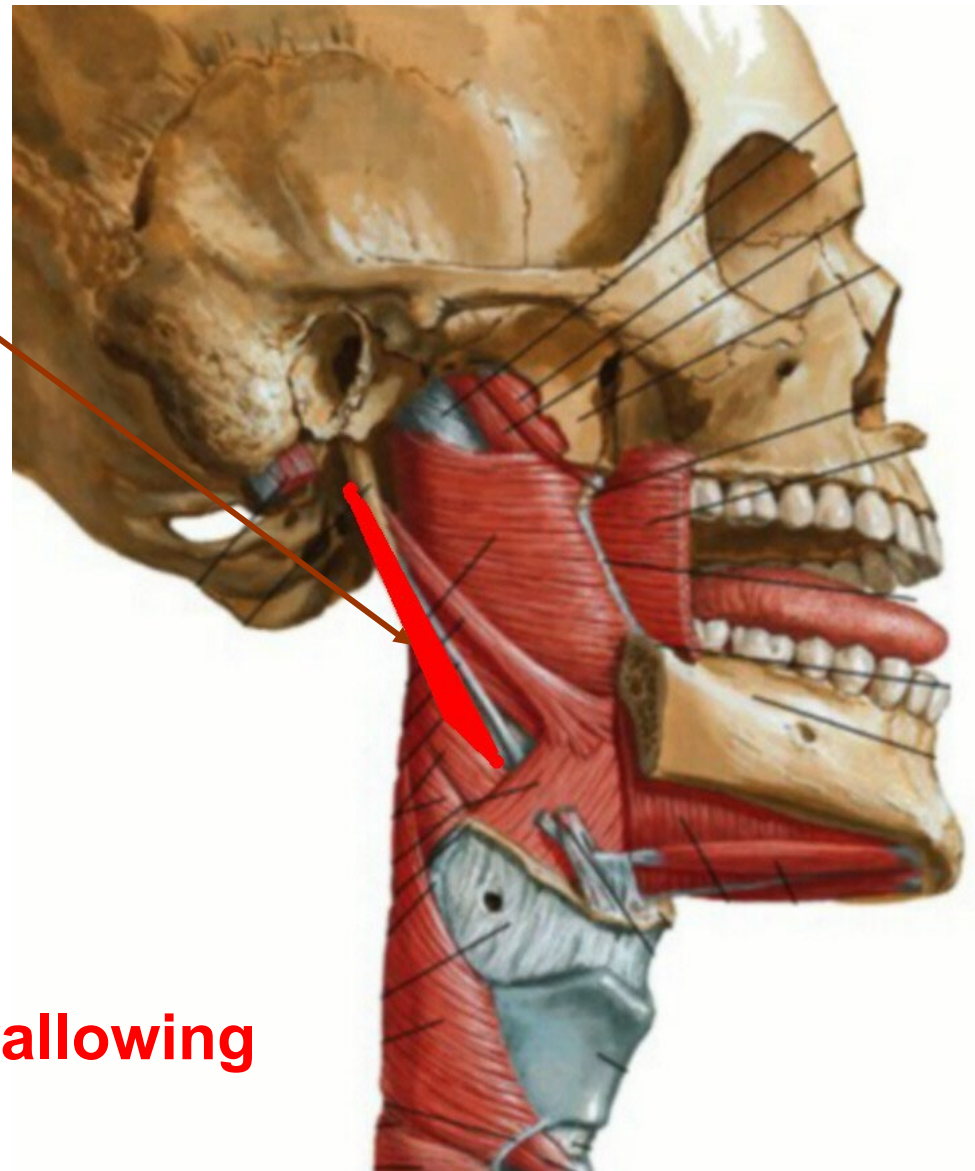
I - Thyroid Cartilage

A - Raise pharynx
and pull walls laterally
in **swallowing**

Inn - IX (BRANCHIO-
MOTOR)

Damage - Difficulty swallowing

SEE ON PROSECTION 314



GAG REFLEX - IX to X

AFFERENT ARM OF REFLEX

EFFERENT ARM OF REFLEX

**SENSORY
STIMULUS**

**MOTOR
RESPONSE**

**TOUCH
ORO-
PHARYNX**



**PATIENT GAGS -
CONTRACT
PHARYNGEAL
MUSCLES**



CRANIAL NERVES LECTURE

GAG REFLEX

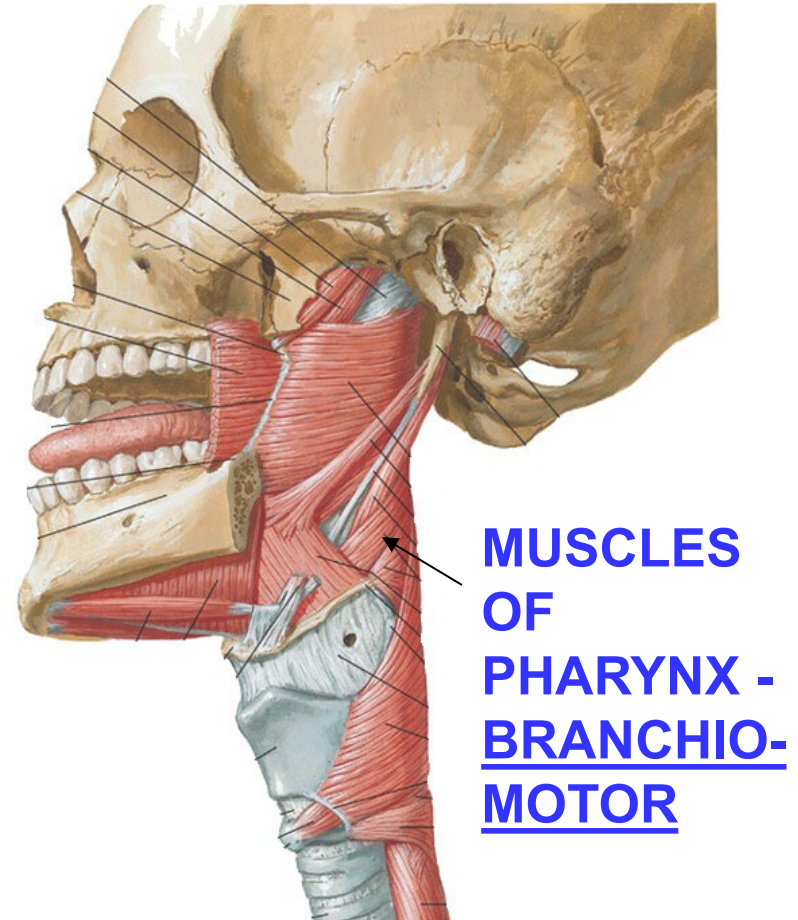
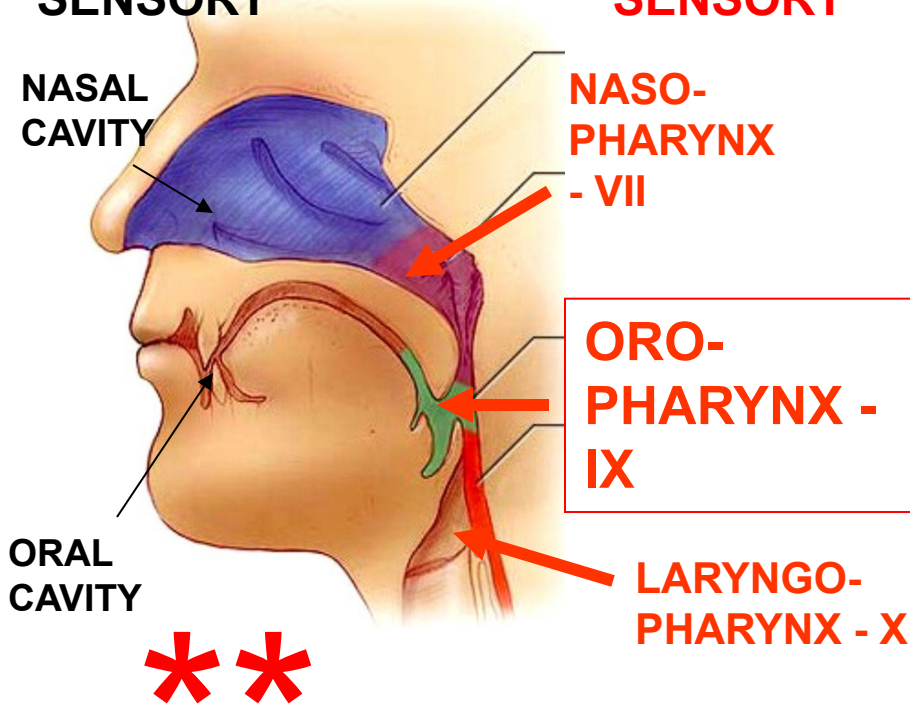
IX - SENSORY INNERVATION TO OROPHARYNX

X - INNERVATES ALL MUSCLES OF PHARYNX (except Stylopharyngeus)

All Pharynx is Visceral Sensory In 3 Cranial Nerves

SOMATIC SENSORY

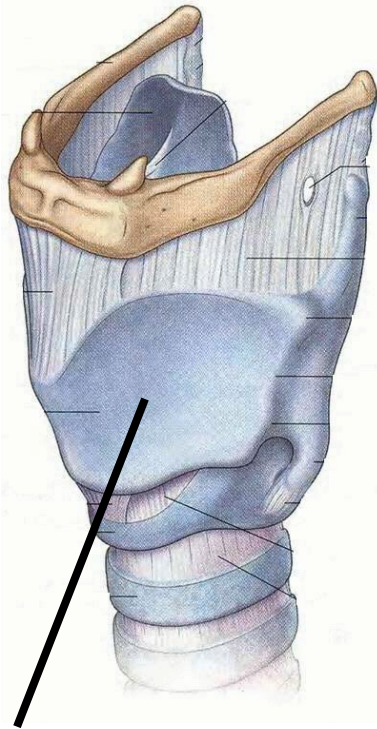
VISCERAL SENSORY



IX AND X - LEAVE MEDULLA, EXIT BY JUGULAR FORAMEN - CAN DIAGNOSE DAMAGE IN BRAINSTEM BY TESTING REFLEXES

LARYNX CONSISTS OF CARTILAGES (WITH JOINTS) MOVED BY SKELETAL MUSCLES

LARYNX



**THYROID
CARTILAGE**

**ARYTENOID
CARTILAGES**

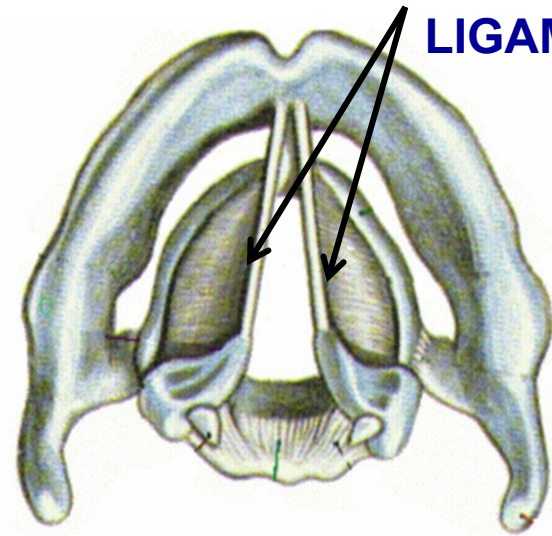


**CRICOID
CARTILAGE**

View with
Thyroid Cartilage
Removed

SOUND IS PRODUCED BY FORCING AIR THROUGH VIBRATING INTERNAL LIGAMENTS (VOCAL LIGAMENTS (extend from Thyroid to Arytenoid Cartilages))

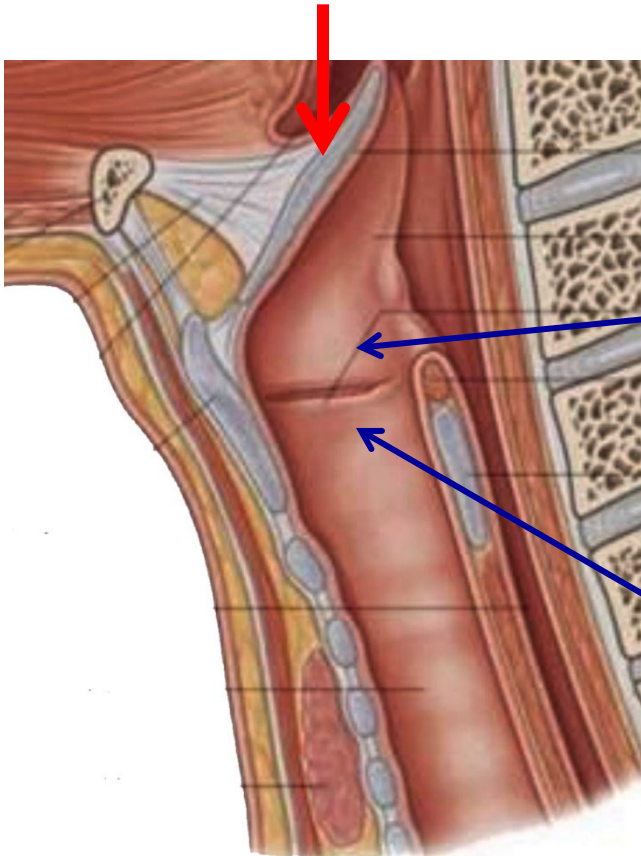
**VOCAL
LIGAMENTS**



Vocal ligaments act like lips of a trumpet player

INTERNAL VIEW OF LARYNX

ORIENT TO EPIGLOTTIS

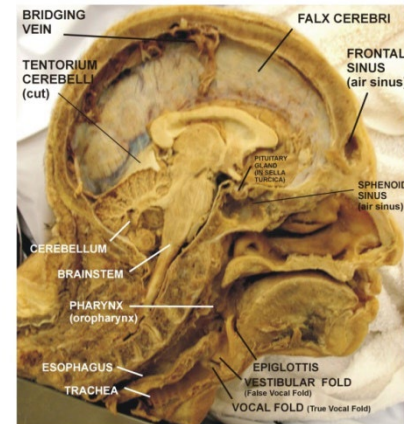


VESTIBULAR (FALSE VOCAL) FOLDS - overlie vestibular ligaments

VOCAL (TRUE VOCAL) FOLDS - overlie vocal ligaments

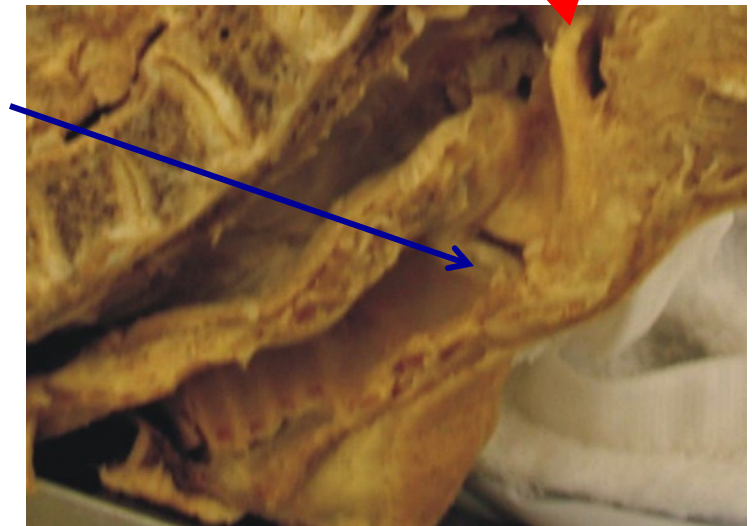
BISECTED HEAD WITH INTACT FALX CEREBRI

75



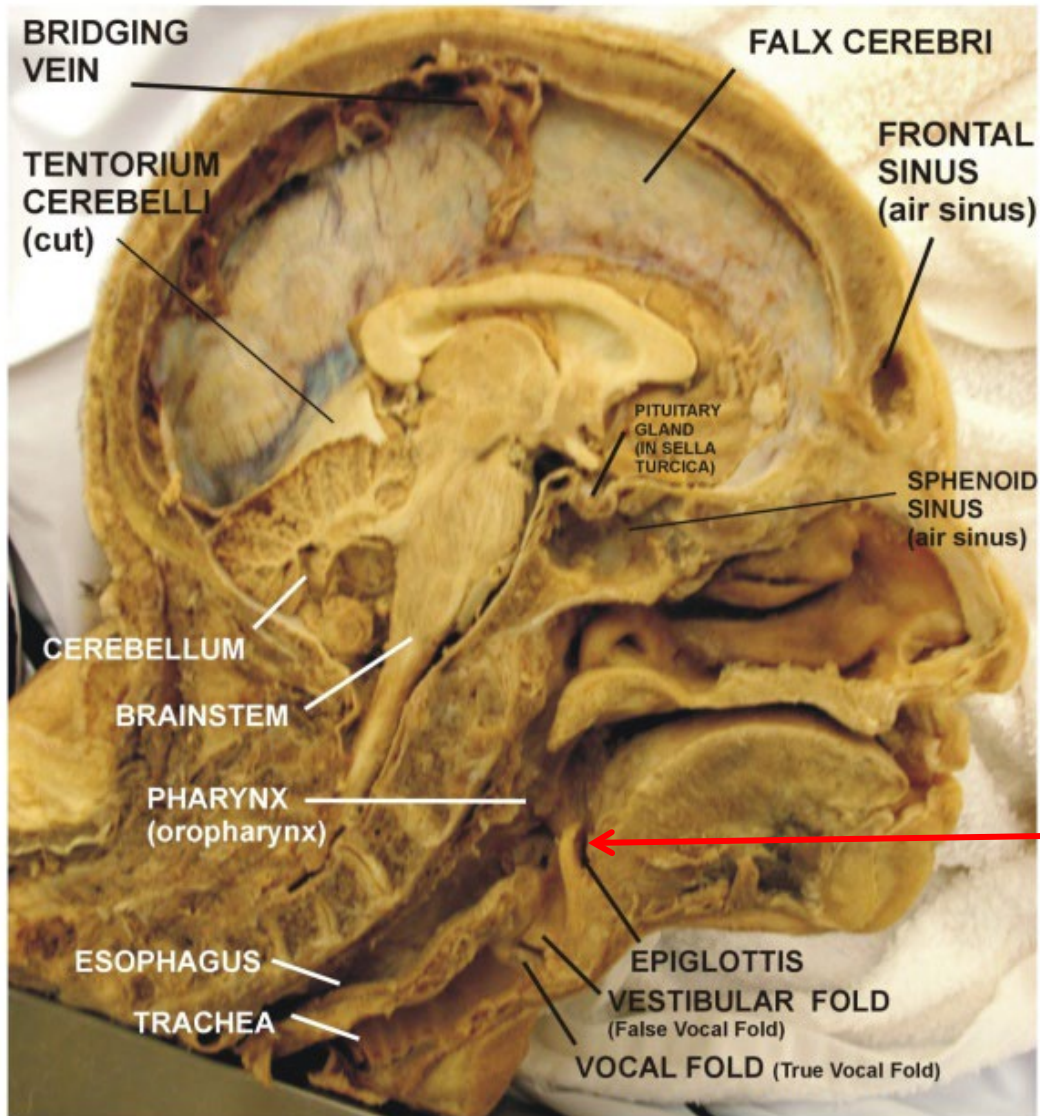
Note: Bridging Vein - cut when brain removed but still attached and entering Sup. Sagittal Sinus

EPIGLOTTIS



BISECTED HEAD WITH INTACT FALX CEREBRI

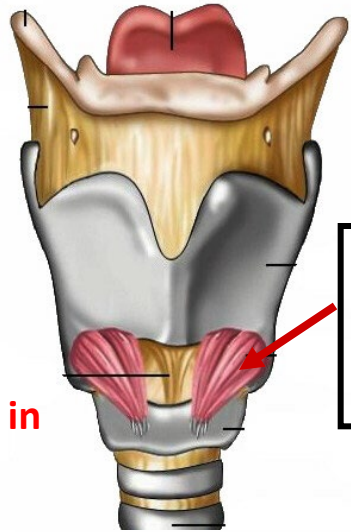
75



**ORIENT TO
EPIGLOTTIS**

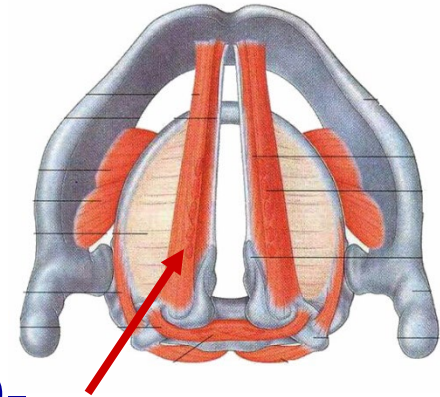
Note: Bridging Vein - cut when brain removed but still attached and entering Sup. Sagittal Sinus

MUSCLES OF LARYNX: RAISE/LOWER PITCH



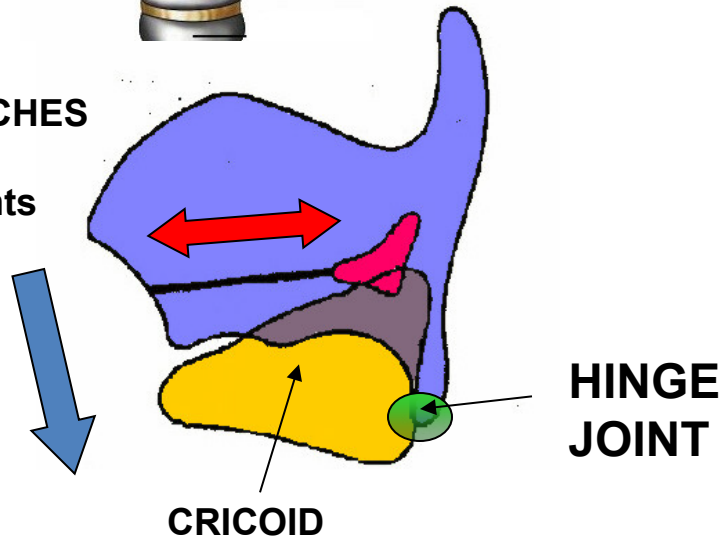
ADAM'S
APPLE -
longer
vocal folds in
males

**CRICO-
THYROID**



**THYRO-
ARYTENOID**

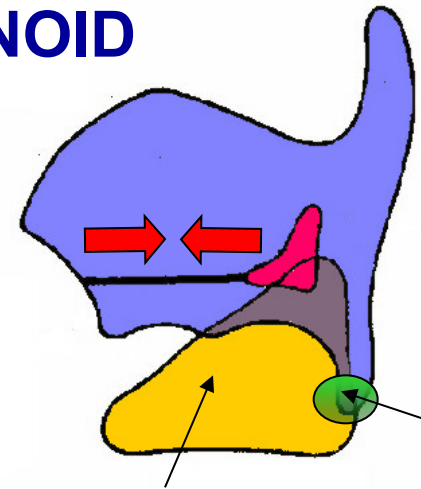
Tilting -
STRETCHES
vocal
ligaments



CRICOID

HINGE
JOINT

STRETCH vocal ligament
INCREASE PITCH -
CRICOTHYROID



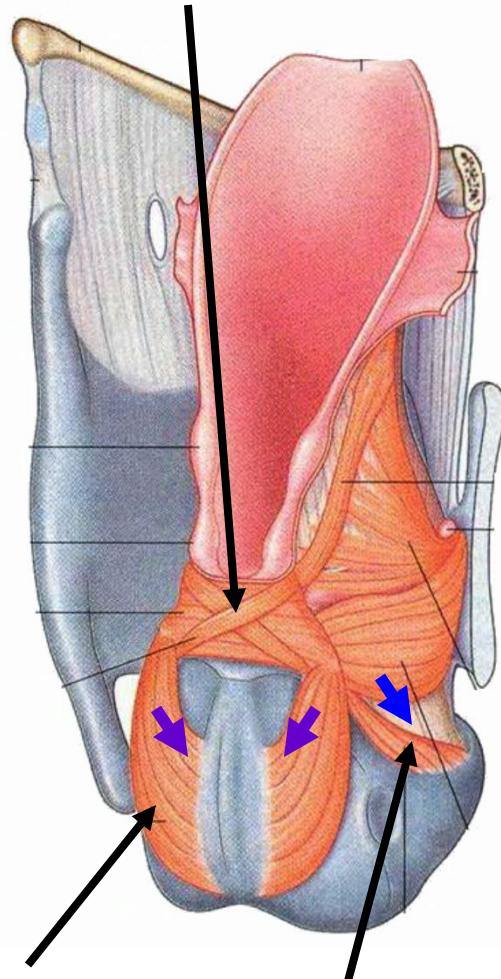
CRICOID

HINGE
JOINT

RELAX vocal ligament
DECREASE PITCH -
THYROARYTENOID

OPEN AND CLOSE LARYNX – (OPENING CALLED RIMA GLOTTIDIS)

ARYTENOIDEUS

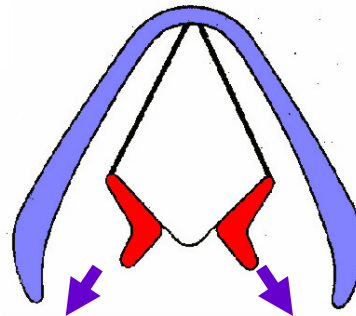


POSTERIOR
CRICO-
ARYTENOID

LATERAL
CRICO-
ARYTENOID

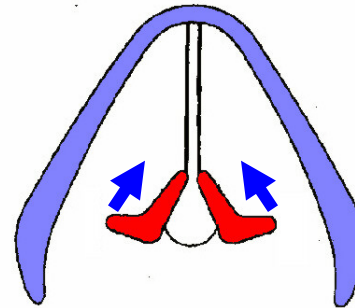
OPEN

POST.
CRICO-
ARYTENOID



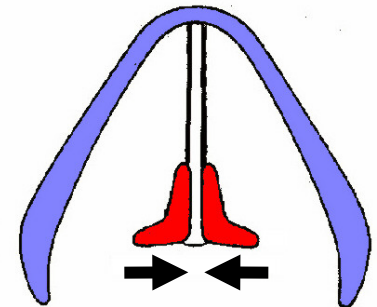
CLOSE

LATERAL
CRICO-
ARYTENOID



CLOSE

ARYTENOIDEUS



Open - deep breathing

Close - speech; also raise abdominal pressure (childbirth, defecation, micturition = empty urinary bladder)

NERVES OF LARYNX -

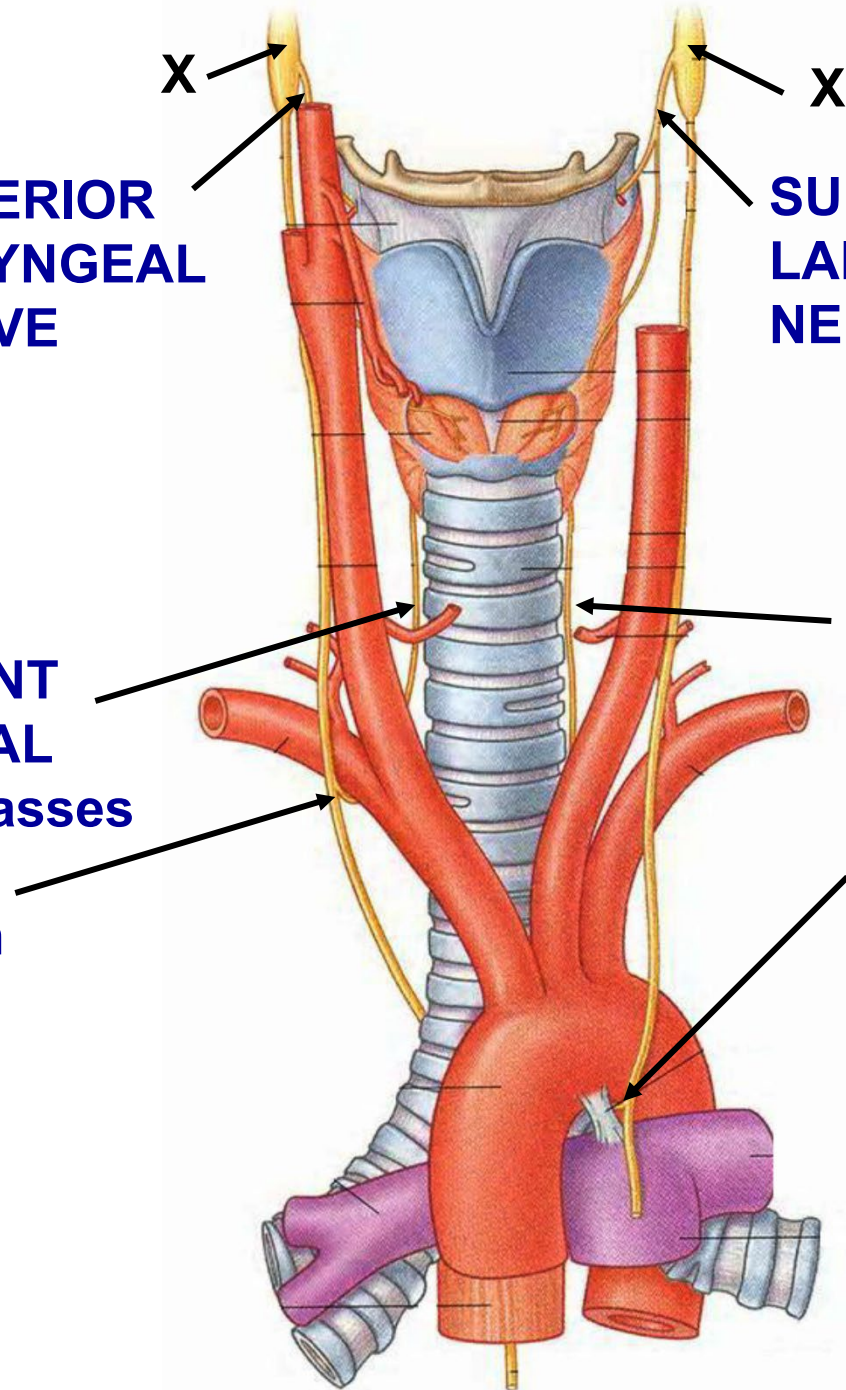
All are Branches of Vagus CN X

SUPERIOR LARYNGEAL NERVE

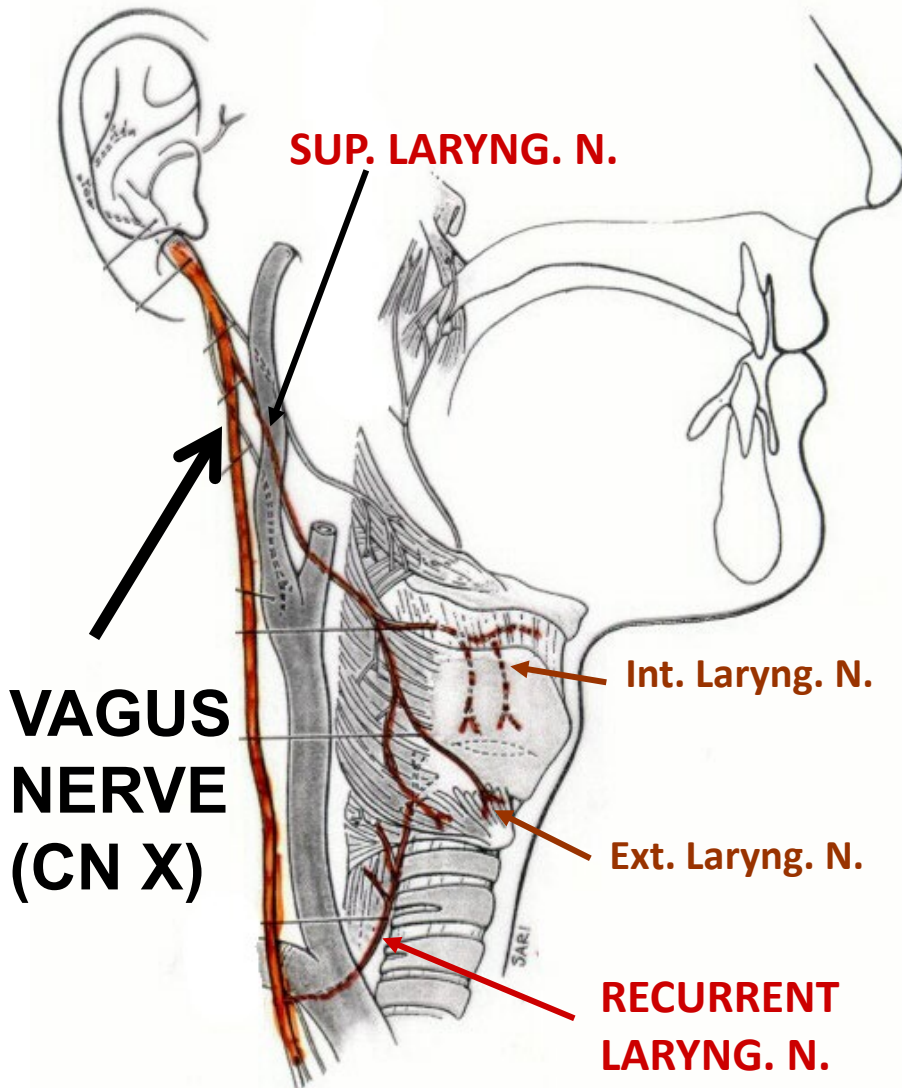
SUPERIOR LARYNGEAL NERVE

RIGHT RECURRENT LARYNGEAL NERVE - passes under Subclavian Artery

LEFT RECURRENT LARYNGEAL NERVE - passes under Arch of Aorta



DAMAGE TO RECURRENT LARYNGEAL NERVE



**ALL NERVES ARE
BRANCHES OF VAGUS
(CN X)**

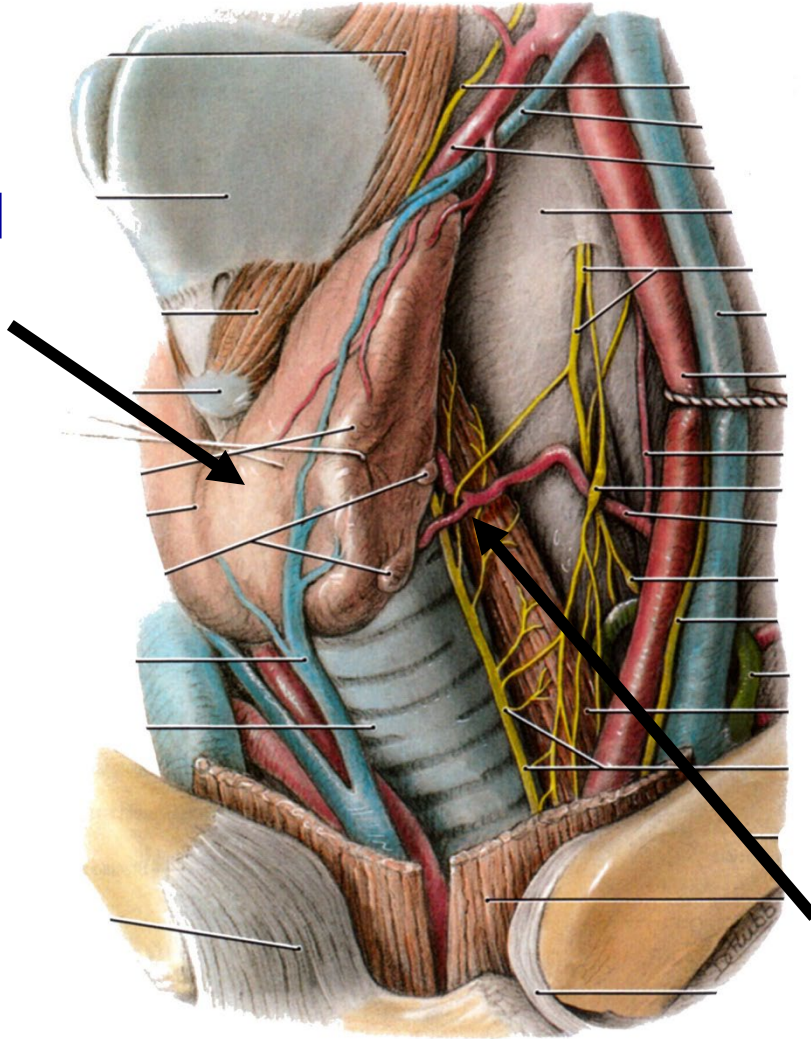
- A. Superior Laryngeal N.
motor to Cricothyroid**
- B. Recurrent Laryngeal N.
motor to All other
Muscles of Larynx ****

**DAMAGE TO RECURRENT
LARYNGEAL NERVE - can
occur in Thyroid Surgery;
paralyze all muscles one side
except Cricothyroid;
permanent hoarse voice**

DAMAGE RECURRENT LARYNGEAL NERVE IN THYROID AND OTHER NECK SURGERY

**

Thyroid Gland



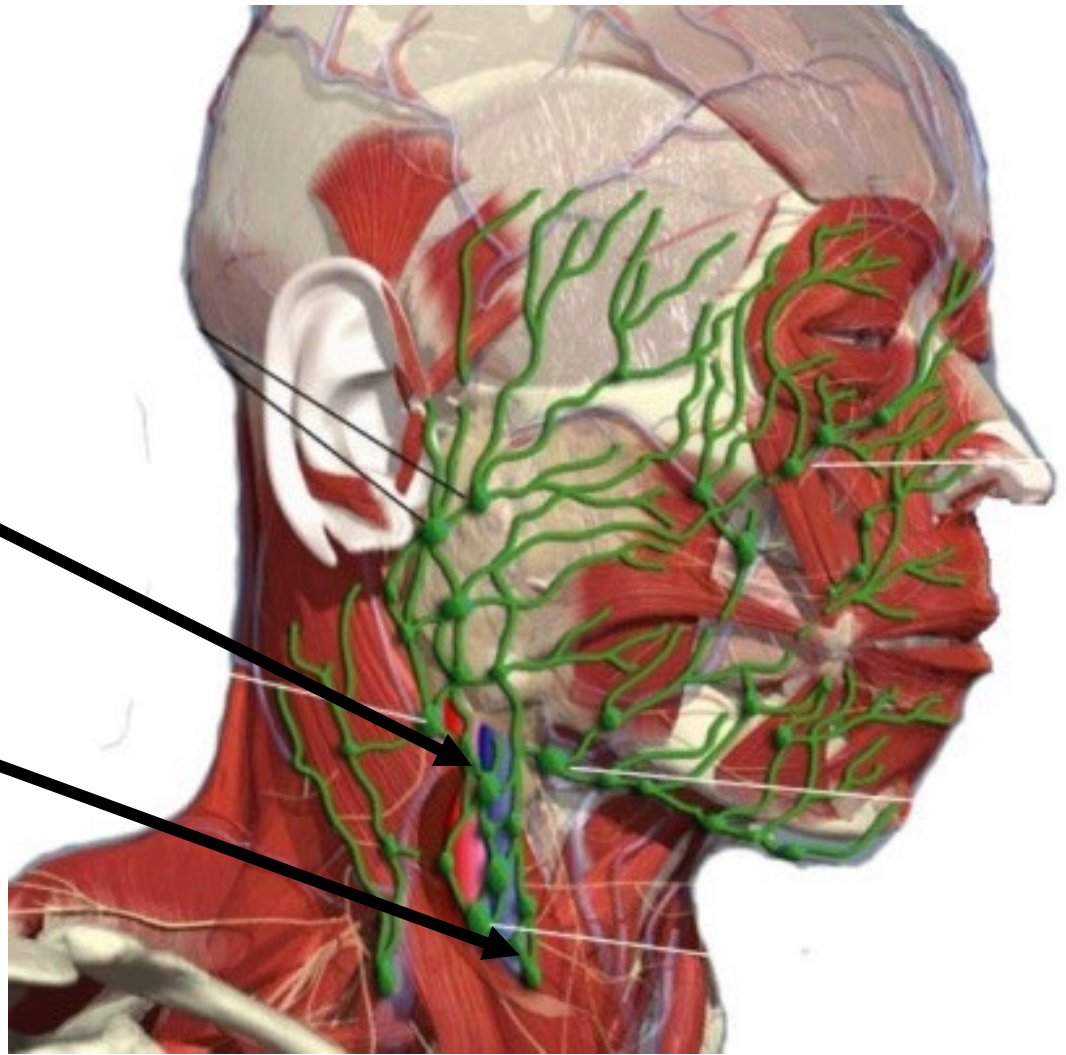
DAMAGE TO RECURRENT LARYNGEAL NERVE - can occur in Thyroid Surgery; paralyze all muscles one side except Cricothyroid; permanent hoarse voice

Recurrent Laryngeal Nerve

LARYNX - LYMPHATICS

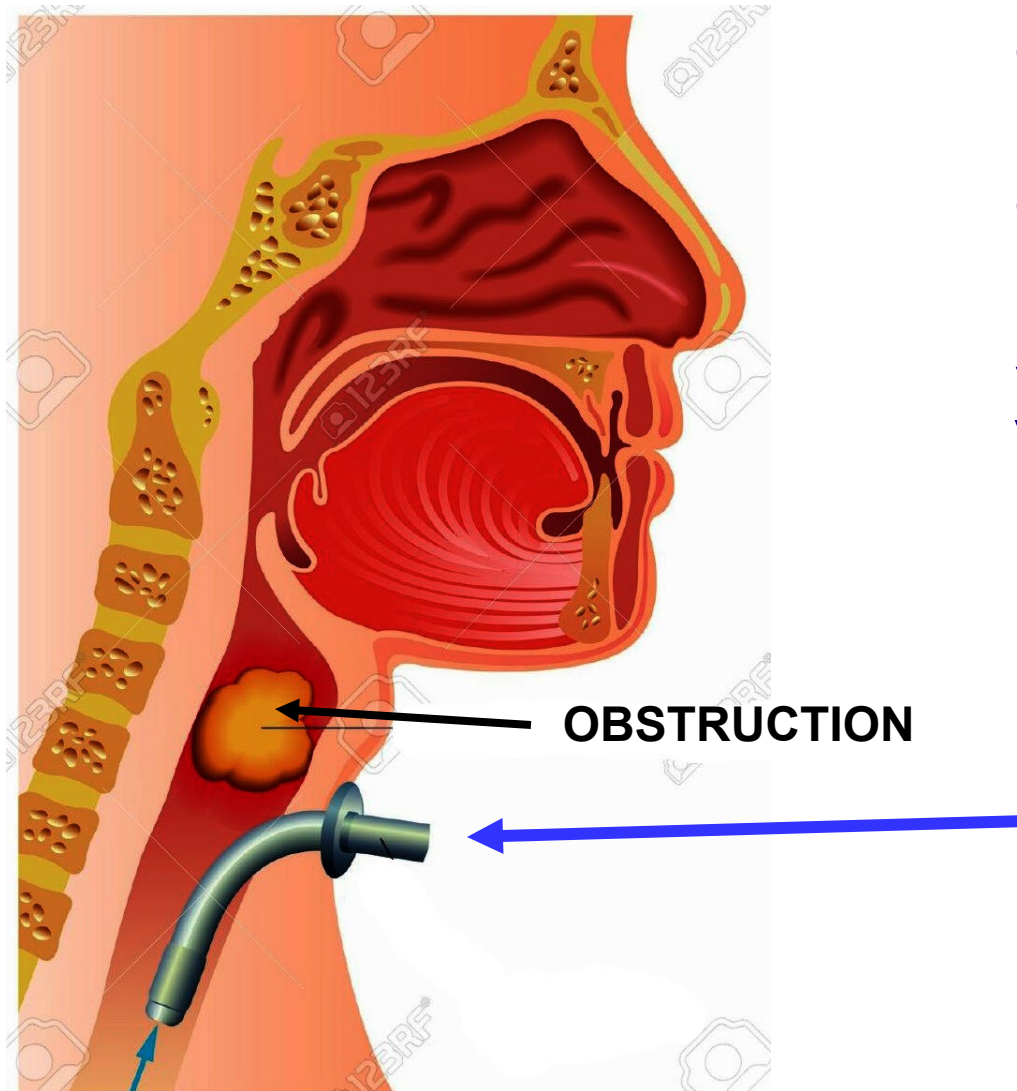
Superior Deep
Cervical Nodes -
drain Larynx above
true vocal folds

Inferior Deep
Cervical Nodes -
drain Larynx below
true vocal folds



CLINICAL Note: Mucosa is tightly attached to vocal folds; in Anaphylactic Shock (acute allergic reaction) swelling of Vestibular folds can constrict airway and lead to Suffocation

OBSTRUCTION OF LARYNX: TRACHEOTOMY

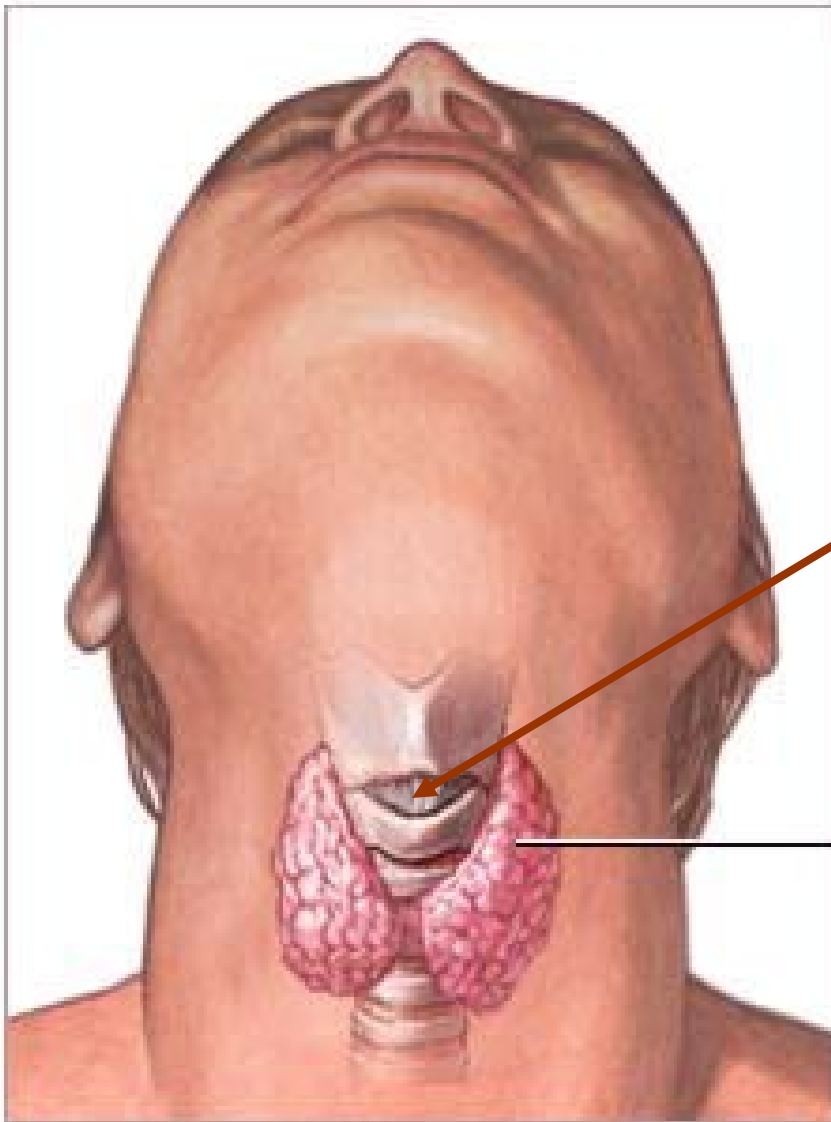


open airway to
lungs below
obstructed
larynx OR
swollen
vestibular folds

Tracheotomy
- cut between
1st and 2nd or
2nd and 3rd
Tracheal
cartilages

OBSTRUCTION OF LARYNX: CRICOTHYROTOMY

CLINICALLY IMPORTANT:
IN ANAPHYLACTIC SHOCK,
INSERT TUBE TO
CRICOTHYROID
MEMBRANE (LESS BLEEDING
THAN TRACHEOTOMY)



**Cricothyroid
Membrane**

