

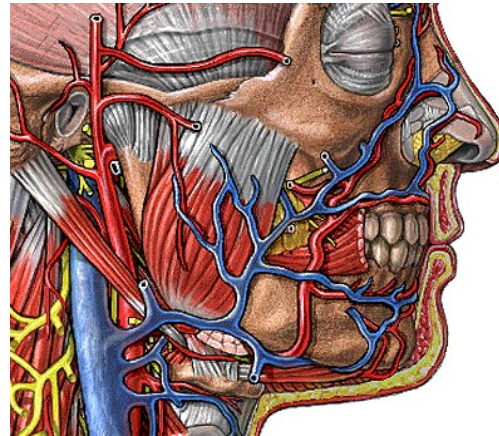
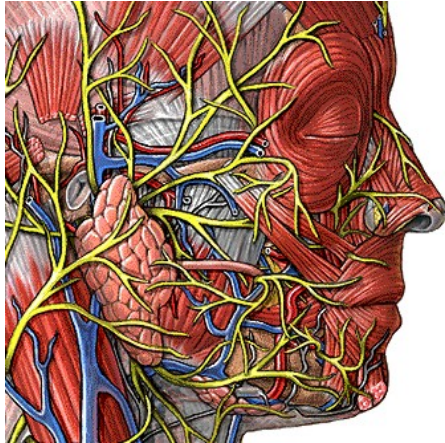
HEAD AND NECK PART 2
DISCUSSION SESSION: GROSS ANATOMY

ONN BLOCK

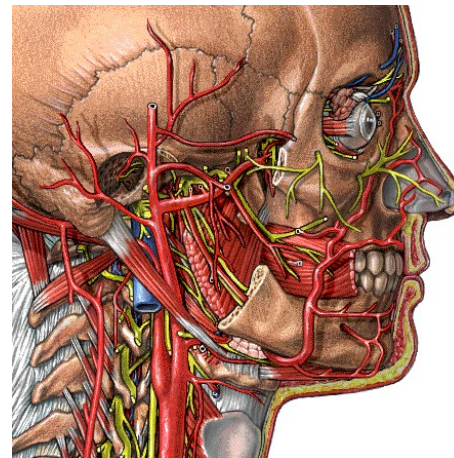
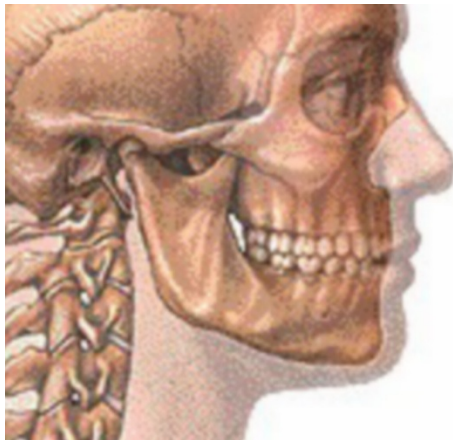
March 2021

- 1) Parotid, Maxillary Artery, Muscles of Mastication**
- 2) Oral cavity**
- 3) Pharynx - Swallowing**

PAROTID AND INFRATEMPORAL REGIONS



**SUPERFICIAL – PAROTID
GLAND, MUMPS
TMJ – MUSCLES OF
MASTICATION (V3),
EFFECTS DAMAGE CN V**

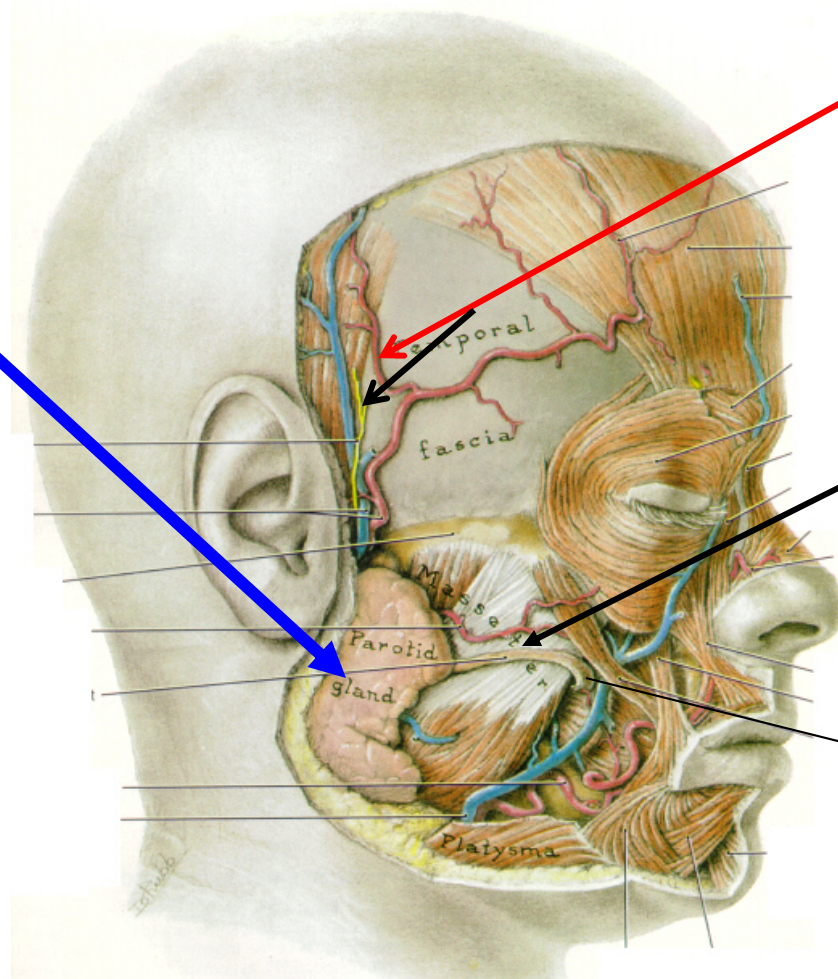


**INFRATEMPORAL REGION –
(below zygomatic arch ,
medial to Mandible) -
MAXILLARY ARTERY –
meningeal branches
PTERYGOID VENOUS
PLEXUS- spread of infection**

COMPLEX, CLINICALLY IMPORTANT AREA - source of blood supply to nasal cavity, calvarium, oral cavity, middle ear; location of muscles of mastication

PAROTID REGION

**PAROTID GLAND –
LARGEST
SALIVARY GLAND
CAPSULE VERY
TOUGH**



**SUPERFICIAL
TEMPORAL ARTERY
AND AURICULO-
TEMPORAL NERVE**

**PAROTID
DUCT**

**90 DEGREE
TURN**

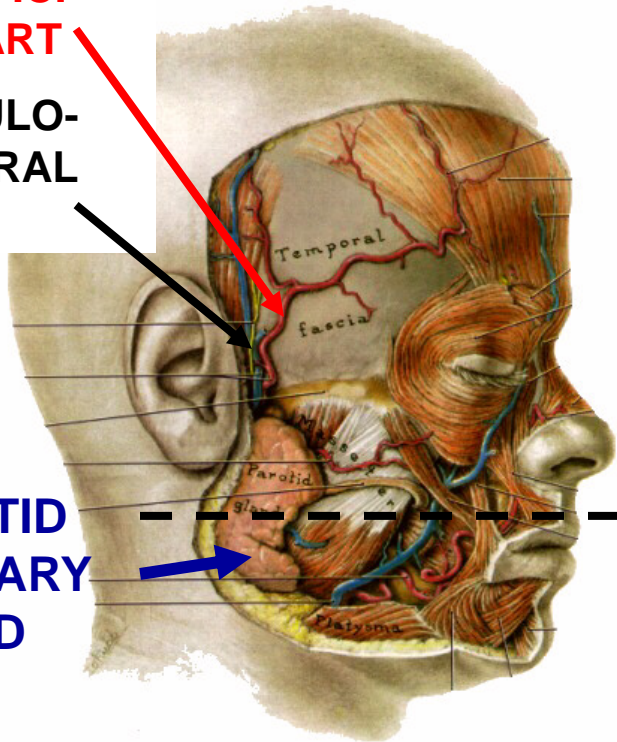
**PAROTID DUCT- ENTERS MOUTH, PIERCES BUCCINATOR
OPPOSITE 2ND MANDIBULAR MOLAR TOOTH; MAKES 90 DEGREE
TURN - ACTS AS PASSIVE VALVE, LETS YOU BLOW UP BALLOONS**

STRUCTURES PASS THROUGH PAROTID GLAND

**SUPERFIC.
TEMP. ART**

**AURICULO-
TEMPORAL
NERVE.**

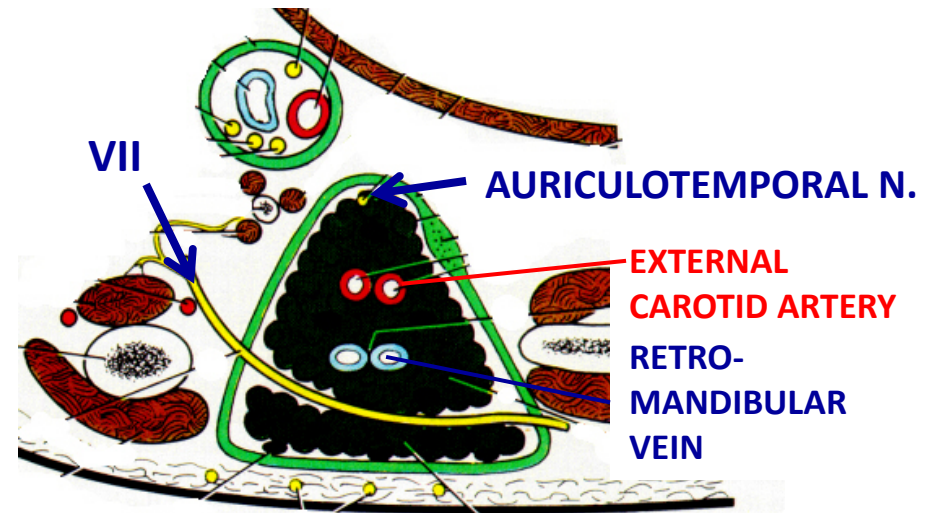
**PAROTID
SALIVARY
GLAND**



SUPERFICIAL TEMPORAL ARTERY
– branch of External Carotid Artery

AURICULO-TEMPORAL NERVE (V3)
– to skin of scalp, external auditory meatus

**HORIZONTAL SECTION THROUGH PAROTID
GLAND**



WITHIN PAROTID-

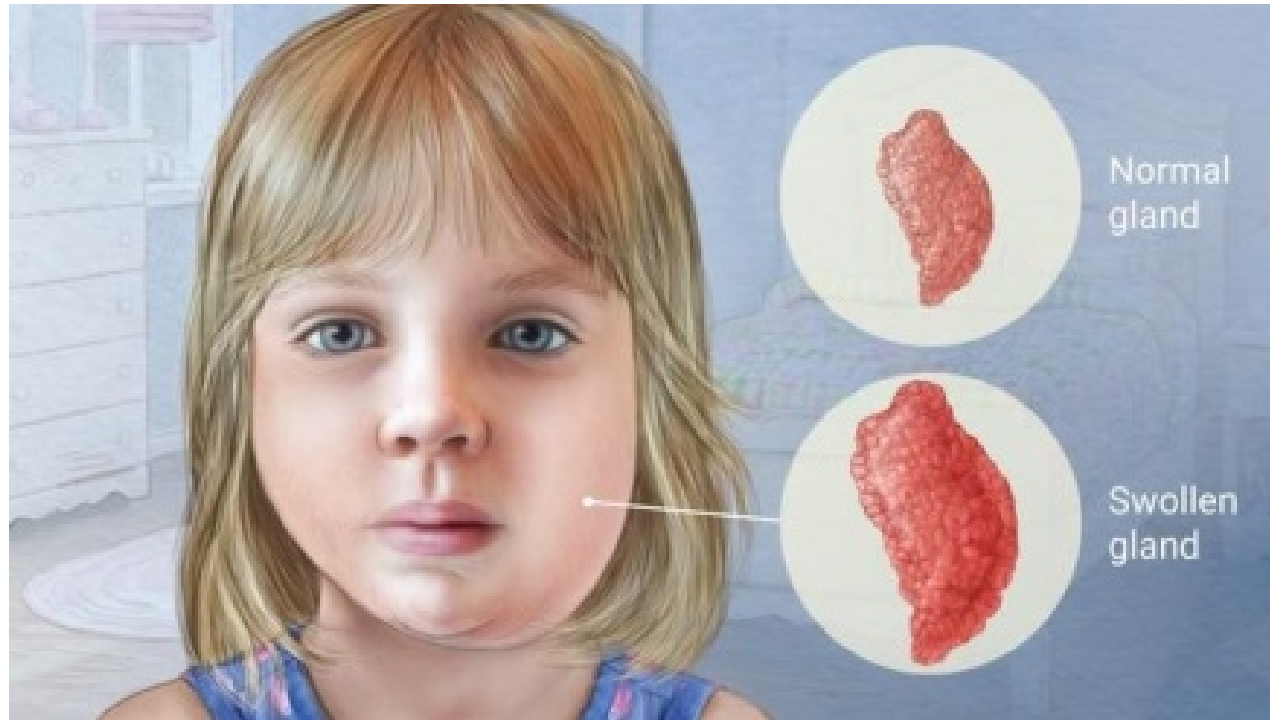
**1) CN VII – FACIAL PARALYSIS IN
PAROTID TUMORS**

2) RETROMANDIBULAR VEIN,

3) EXT CAROTID A.,

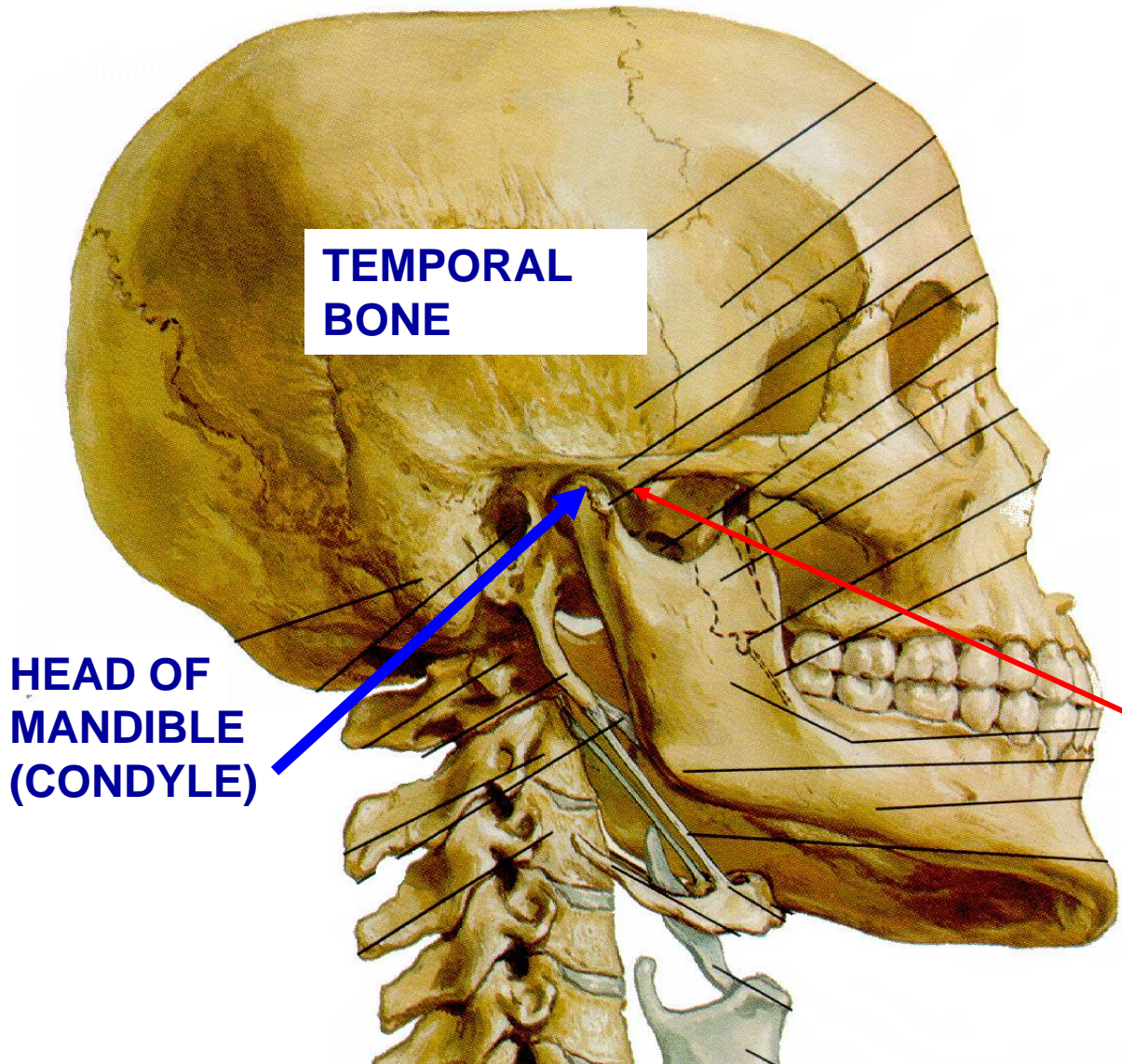
4) AURICULOTEMPORAL N.

MUMPS – VIRAL INFECTION OF PAROTID SALIVARY GLAND



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

TEMPORO-MANDIBULAR JOINT (TMJ)

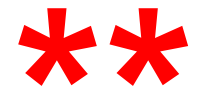


TEMPORAL BONE

HEAD OF MANDIBLE (CONDYLE)

SYNOVIAL JOINT BETWEEN HEAD OF MANDIBLE (CONDYLE) AND MANDIBULAR FOSSA OF TEMPORAL BONE (DISC INTERIOR TO JOINT CAPSULE)

*NOTE: ARTICULAR TUBERCLE (EMINENCE) ANTERIOR TO JOINT



MOVEMENTS OF MANDIBLE – HEAD OF MANDIBLE MOVES ANTERIORLY OUT OF MANDIBULAR FOSSA

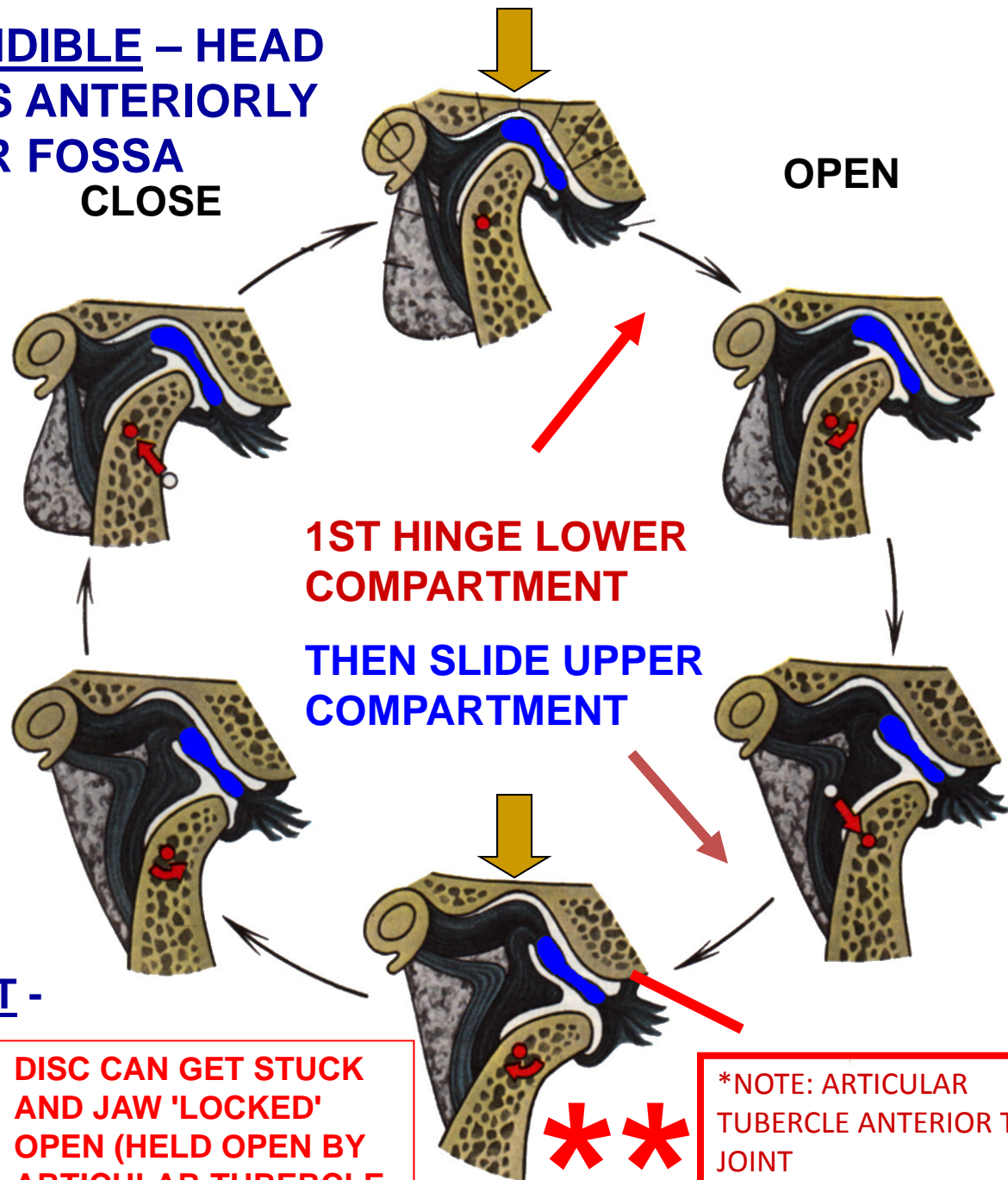
CLOSE

OPEN

1. DEPRESSION/ELEVATION -
OPEN/CLOSE MOUTH -
FIRST HINGE IN LOWER
COMPARTMENT THEN SLIDE IN
UPPER
COMPARTMENT

2. PROTRUDE/RETRUDE

3. LATERAL MOVEMENT -
BOTH SLIDE UPPER
COMPARTMENT

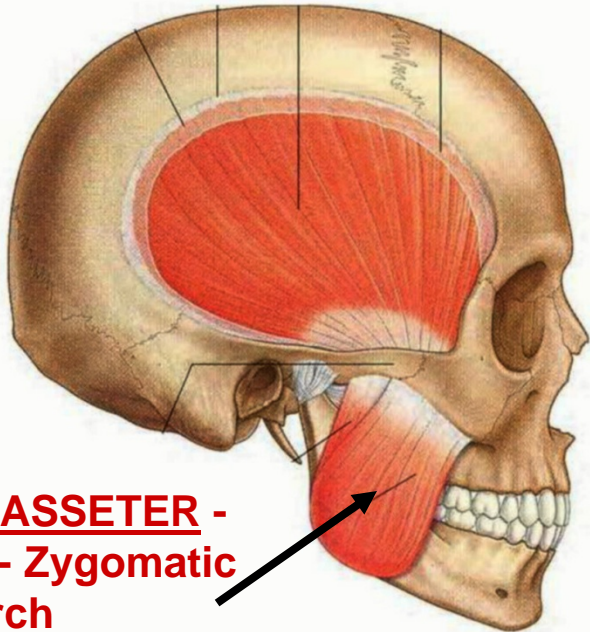


DISC CAN GET STUCK
AND JAW 'LOCKED'
OPEN (HELD OPEN BY
ARTICULAR TUBERCLE)

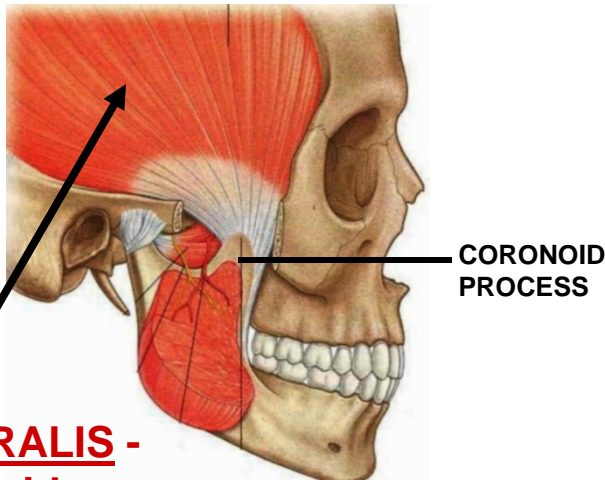
*NOTE: ARTICULAR
TUBERCLE ANTERIOR TO
JOINT

MUSCLES OF MASTICATION

- ALL INN BRANCHIOMOTOR V3
- MOST MUSCLES ELEVATE = CLOSE; ONE MUSCLE DEPRESS = OPEN MOUTH



MASSETER -
O- Zygomatic arch
I Ramus, A -
Elevate

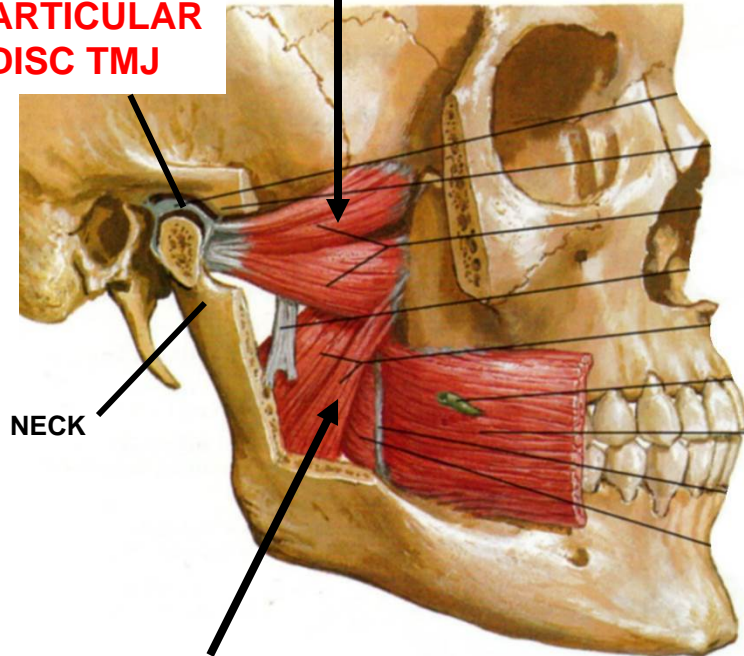


TEMPORALIS -
I, Coronoid process,
medial to zygomatic arch
A - Elevate, Retrude

MUSCLES INSIDE RAMUS OF MANDIBLE

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

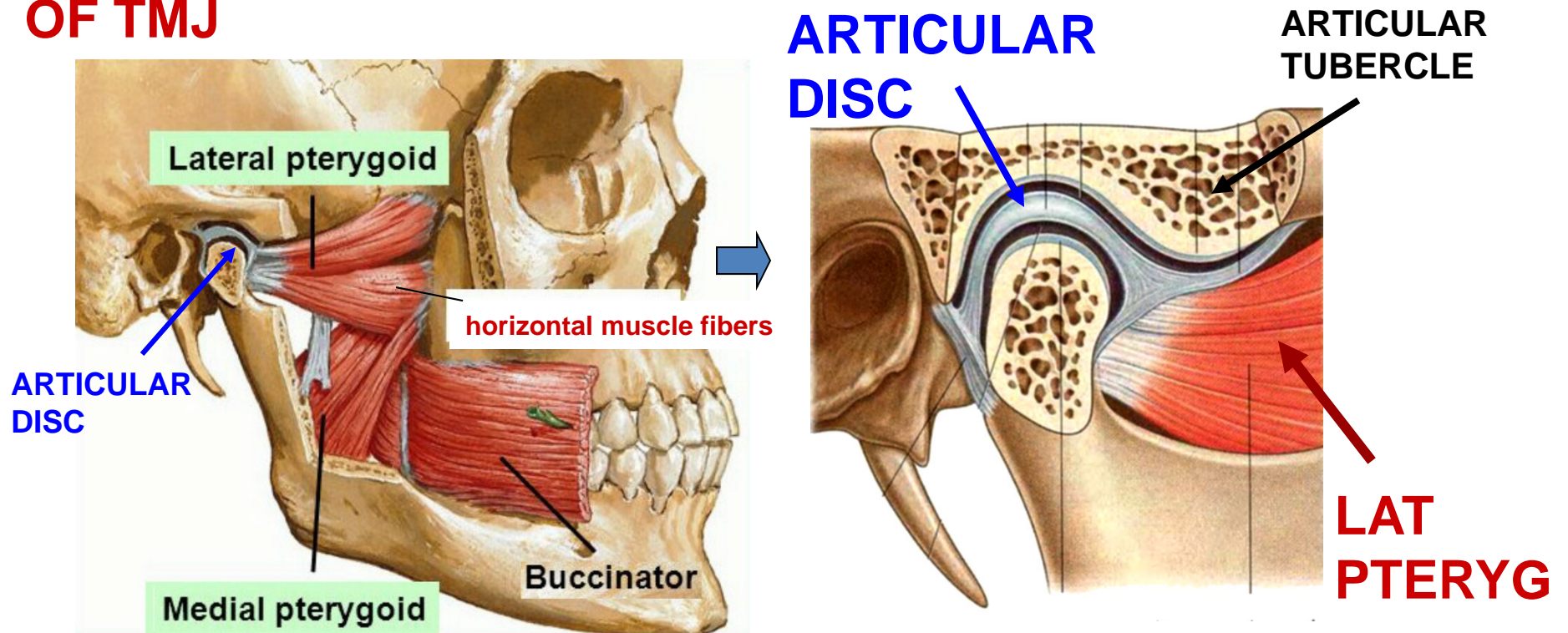
ARTICULAR DISC TMJ



MED. PTERYGOID - I -
Ramus, A - Elevate

MUSCLES OF MASTICATION

LATERAL PTERYGOID - ATTACHES TO ARTICULAR DISC OF TMJ



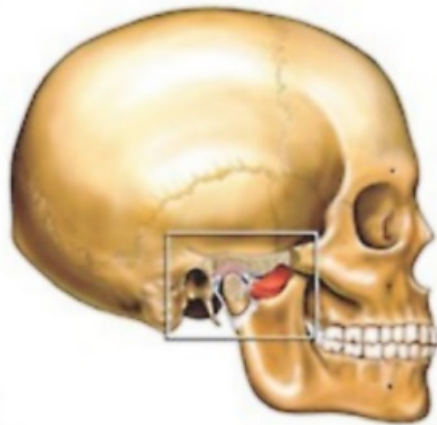
PULLS DISC ANTERIORLY WHEN OPEN MOUTH



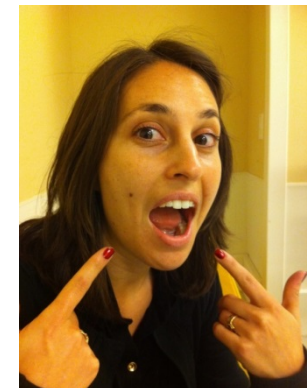
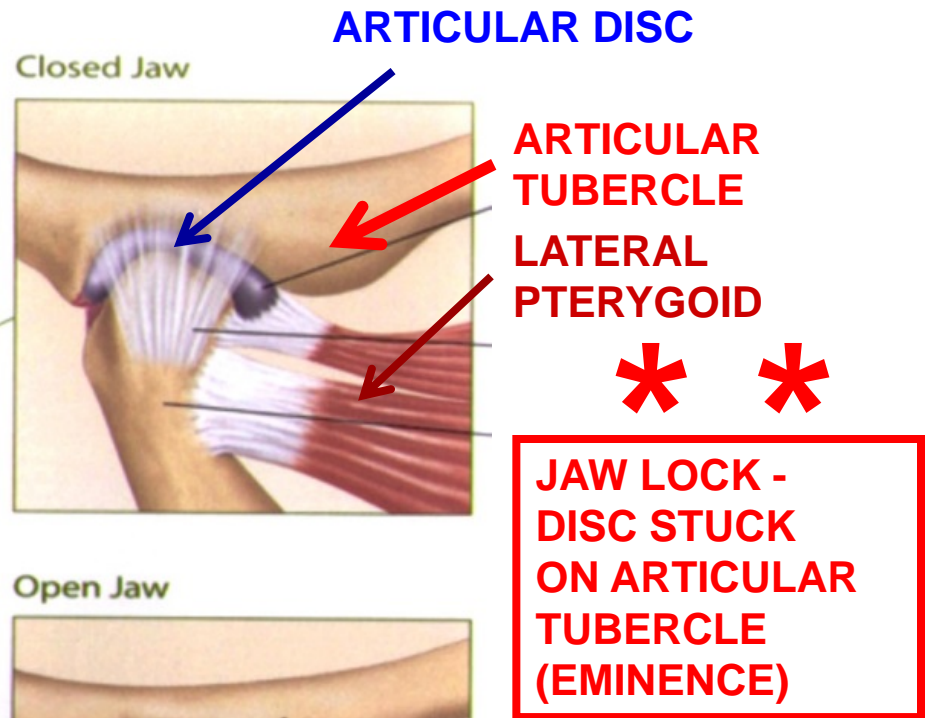
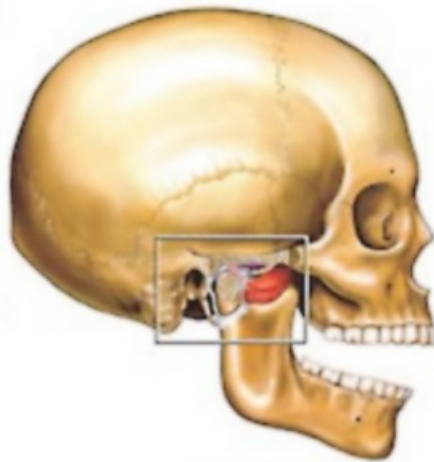
TMJ JAW LOCK - mandible stuck in partial depression

**OPEN MOUTH =
depress mandible**

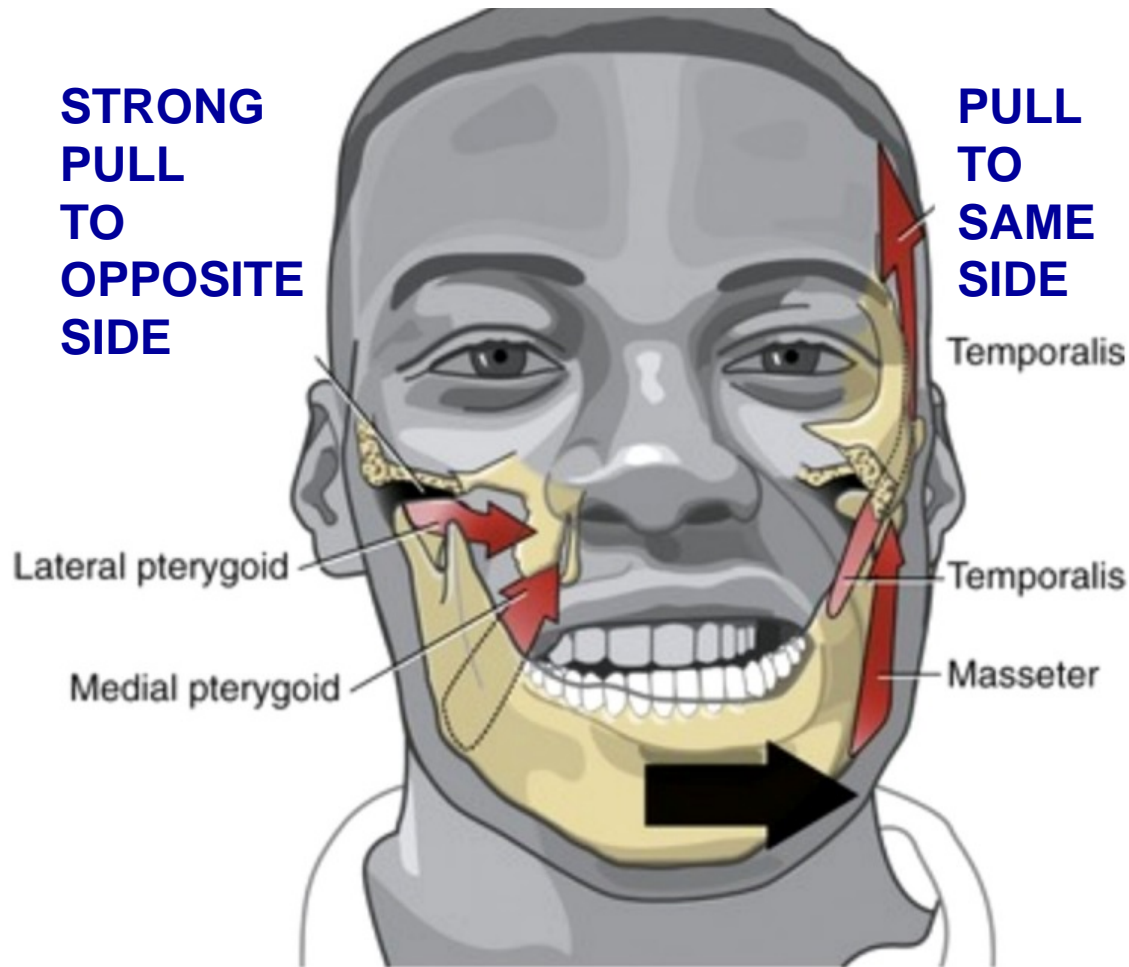
**FIRST
HINGE
LOWER
COMPART-
MENT**



**THEN SLIDE
UPPER
COMPART-
MENT, DISC
MOVES OUT
OF FOSSA**



LATERAL MOVEMENTS IN CHEWING – CN V DAMAGE - JAW DEVIATES TOWARD SIDE OF LESION



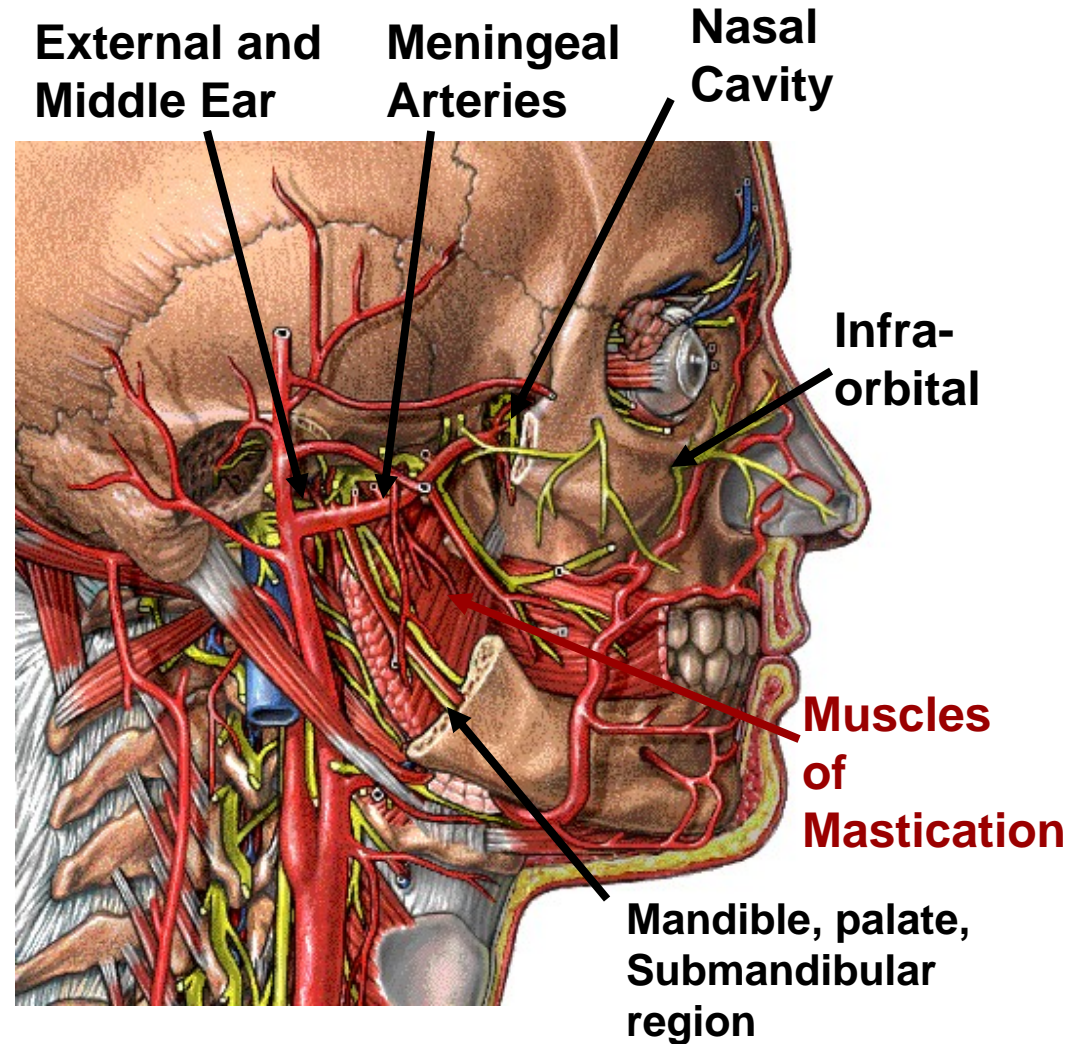
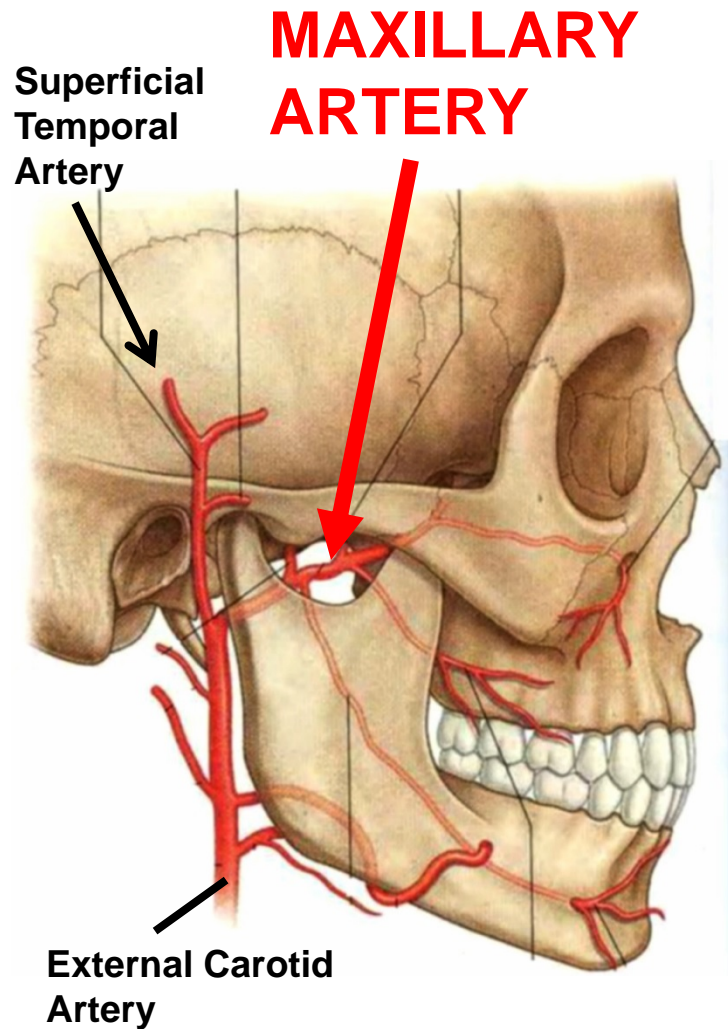
Lateral movements – occur in chewing

- 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)

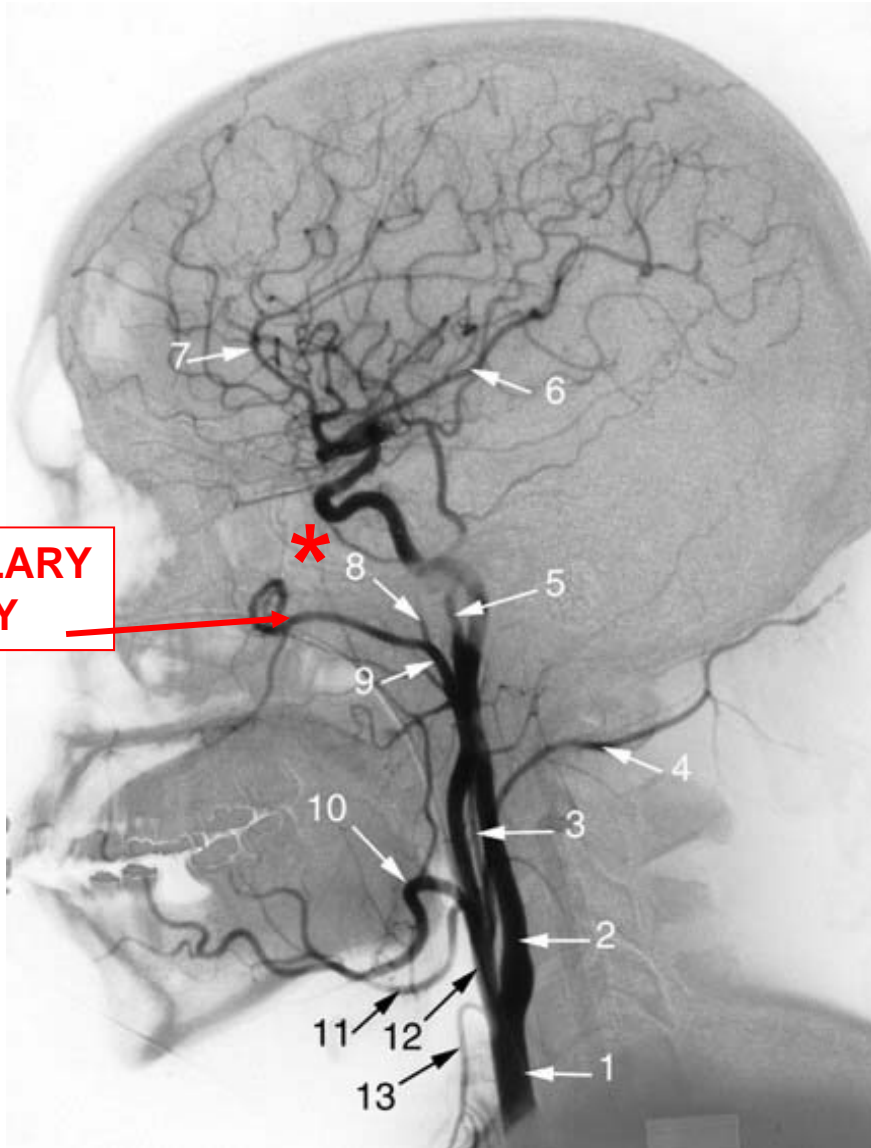
PAROTID; INFRATEMPORAL FOSSA, MAXILLARY ARTERY



CANNOT EFFECTIVELY LIGATE MAXILLARY ARTERY - bleeding (ex. nosebleed = epistaxis) treated by cauterization of branches

MAXILLARY ARTERY

TABLE OF BRANCHES



First part - posterior and medial to neck of mandible		
1. Deep Auricular Artery	External Auditory Meatus	Outer Ear, Tympanic Membrane
<u>2. Anterior Tympanic Artery*</u>	<u>Petrotympanic Fissure</u>	<u>Middle Ear</u>
<u>3. Middle Meningeal Artery*</u>	<u>Foramen Spinosum</u>	<u>Calvarium, Middle Cranial Fossa</u>
<u>(4. Accessory Meningeal A.)*</u>	<u>Foramen Ovale</u>	<u>Calvarium, Middle Cranial Fossa</u>
<u>5. Inferior Alveolar Artery*</u>	<u>Mandibular Foramen</u>	<u>Mandibular teeth; branch - Mental A. to chin</u>
Second part - superficial to or within Lateral Pterygoid muscle		
1. Deep Temporal Artery	-----	Temporalis muscle
2. Pterygoid Arteries	-----	Med. and Lat. Pterygoid m.
3. Masseteric Artery	-----	Masseter
4. Buccal Artery	-----	over Buccinator to Cheek
Third part - within Pterygopalatine fossa		
<u>1. Post. Superior Alveolar Artery*</u>	<u>Post. Sup. Alveolar Foramen</u>	<u>Posterior Maxillary Teeth</u>
<u>2. Descending Palatine Artery*</u>	<u>Greater and Lesser Palatine Foramina</u>	<u>Hard and Soft Palate</u>
3. Artery of Pterygoid Canal	Pterygoid Canal	Upper pharynx, Auditory tube
<u>4. Sphenopalatine Artery*</u>	<u>Sphenopalatine Foramen</u>	<u>Nasal Cavity, Palate</u>
<u>5. Infraorbital Artery*</u>	<u>Infraorbital Foramen</u>	<u>Skin below orbit; branches: Anterior Maxillary Teeth</u>

* - 8- MIDDLE MENINGEAL ARTERY

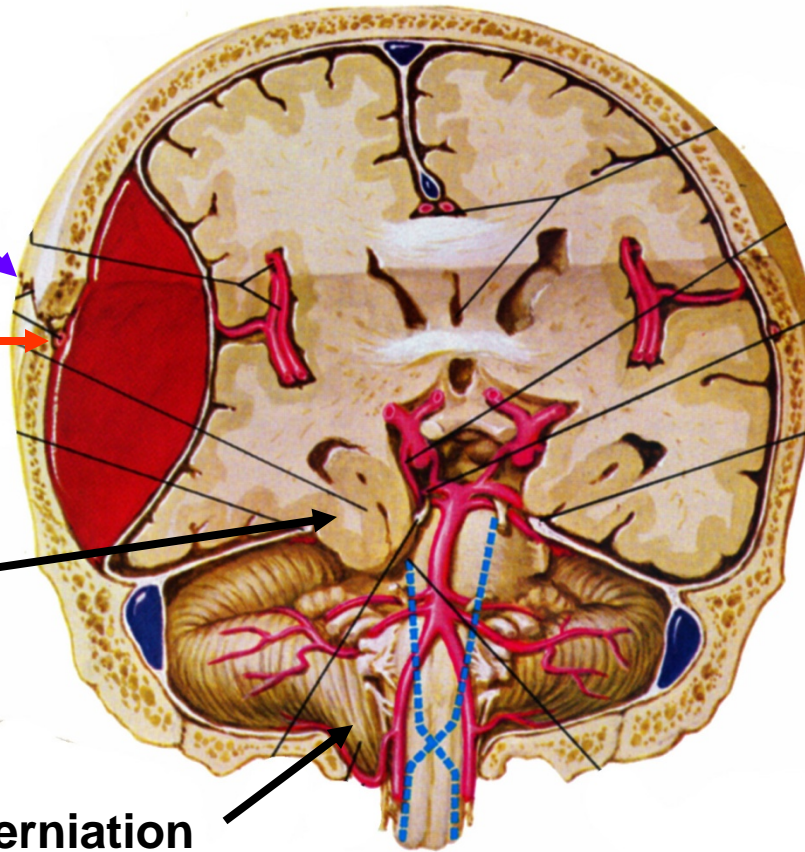
DAMAGE MIDDLE MENINGEAL, [ACCESSORY MENINGEAL ARTERIES] - EPIDURAL HEMATOMA

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 can displace brain
- 6) Herniation -
 - i. Uncal herniation - push Temporal lobe (uncus) through tentorial notch
 - ii. Tonsillar herniation - push Cerebellum (tonsil) through foramen magnum

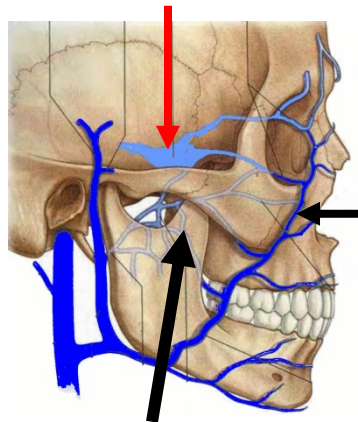
Clinical - bleeding is arterial – can be profuse and rapid; - ex, car accident – patient lucid at first - can be fatal within hours if herniation occurs

PTERYGOID VENOUS PLEXUS

NOSE →

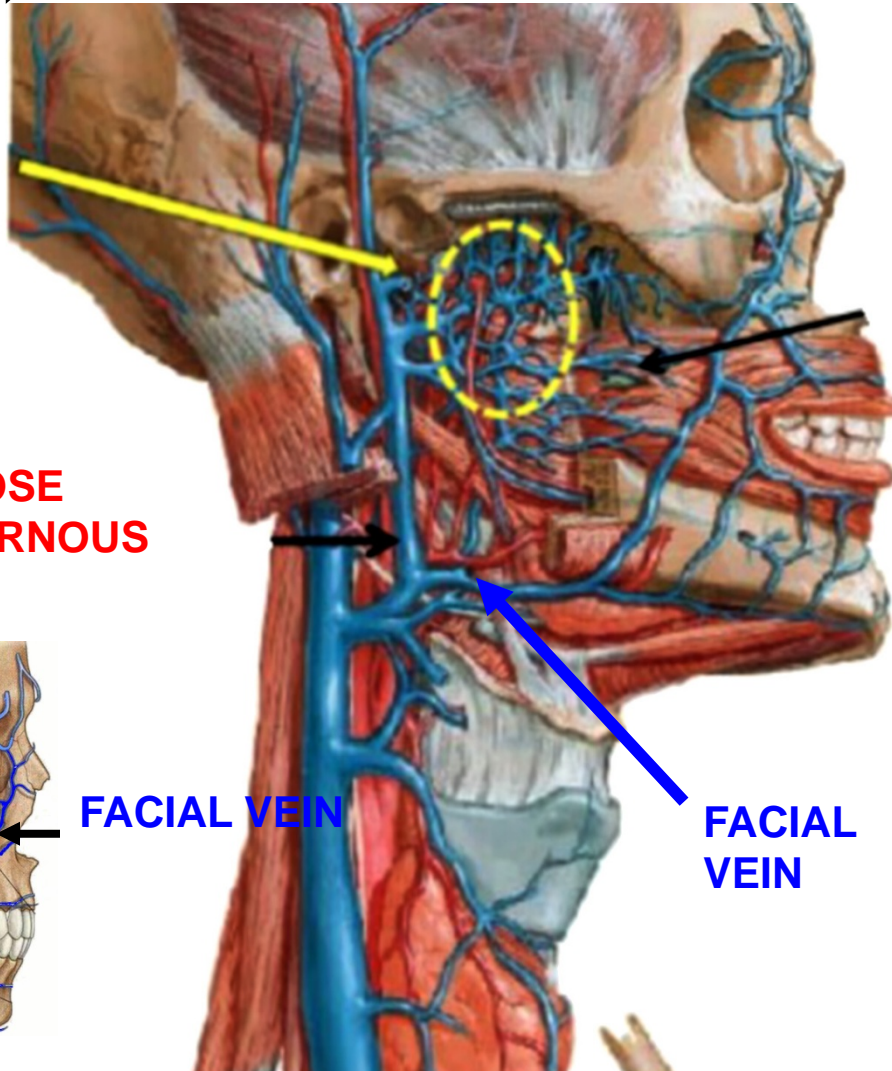
PTERYGOID
VENOUS
PLEXUS

ANASTOMOSE
WITH CAVERNOUS
SINUS



FACIAL VEIN

PTERYGOID
VENOUS
PLEXUS



FACIAL
VEIN

1) Branches of Maxillary artery have accompanying veins.

2) Drain to Pterygoid Venous Plexus (Superficial to

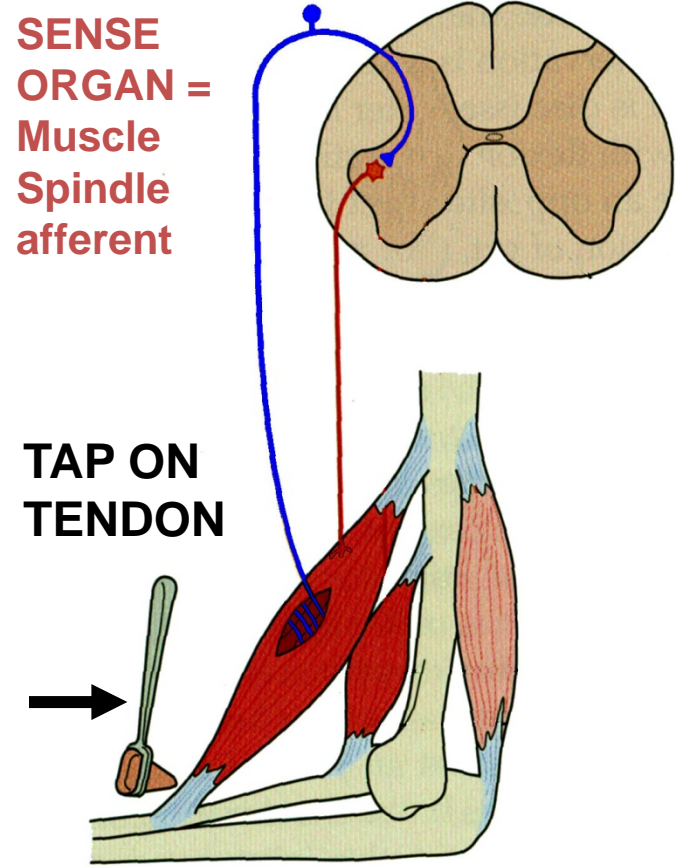
3) ANASTOMOSE WITH CAVERNOUS SINUS AND FACIAL VEIN



Clinical Note: Pterygoid venous plexus has anastomoses with veins that drain to Cavernous Sinus; Infections can spread from teeth, nasal cavity, palate, etc. to brain (similar to anastomoses of Facial Vein).

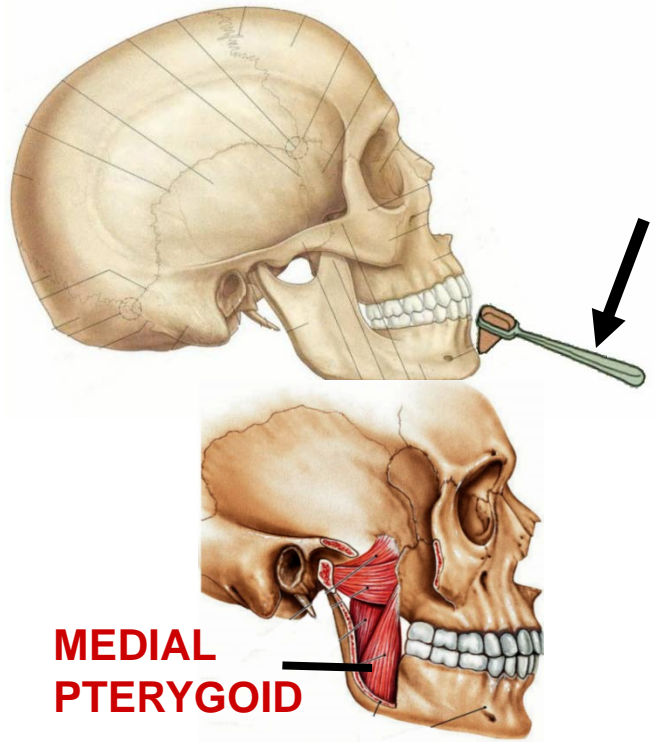
JAW JERK REFLEX = STRETCH REFLEX OF MUSCLES OF MASTICATION - sensory and motor in V3

STRETCH REFLEX IN BICEPS

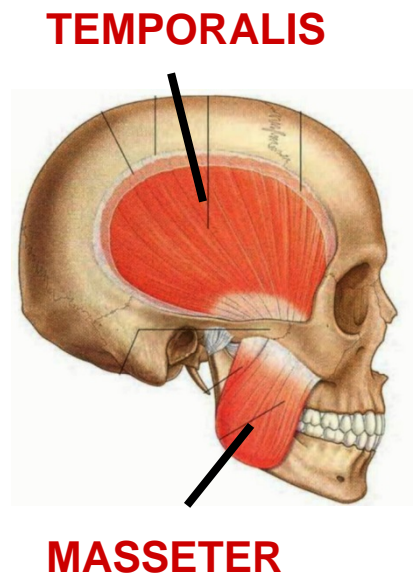


STRETCH REFLEX IN MUSCLES OF MASTICATION

TAP DOWN ON CHIN



STRETCH MUSCLES THAT CLOSE MOUTH (ELEVATE MANDIBLE)



Hyperreflexia in Jaw Jerk – UMN lesion

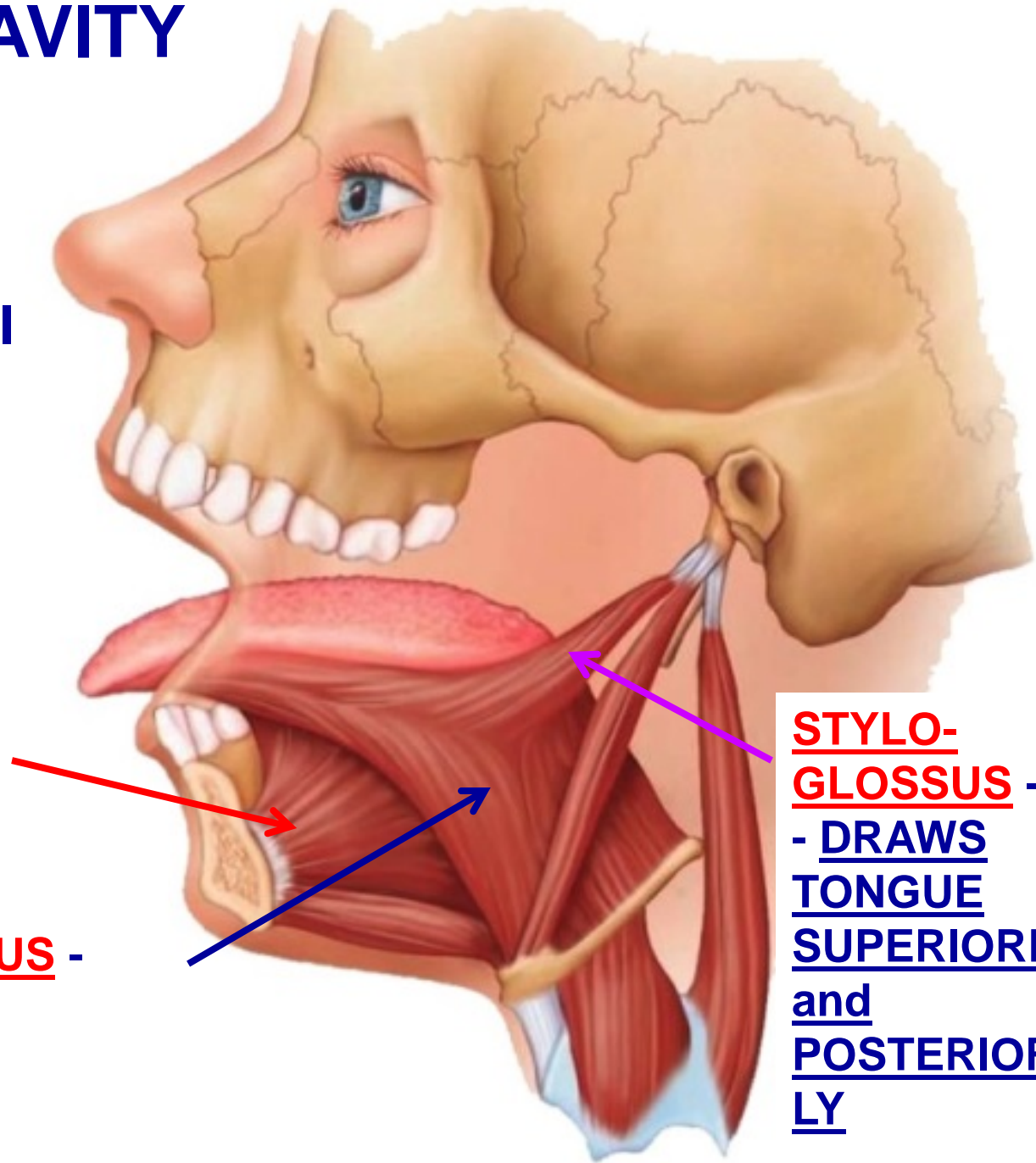
ORAL CAVITY

MUSCLES OF TONGUE - all innervated by XII

GENIOGLOSSUS
- PROTRUDES
(STICKS OUT)
TONGUE

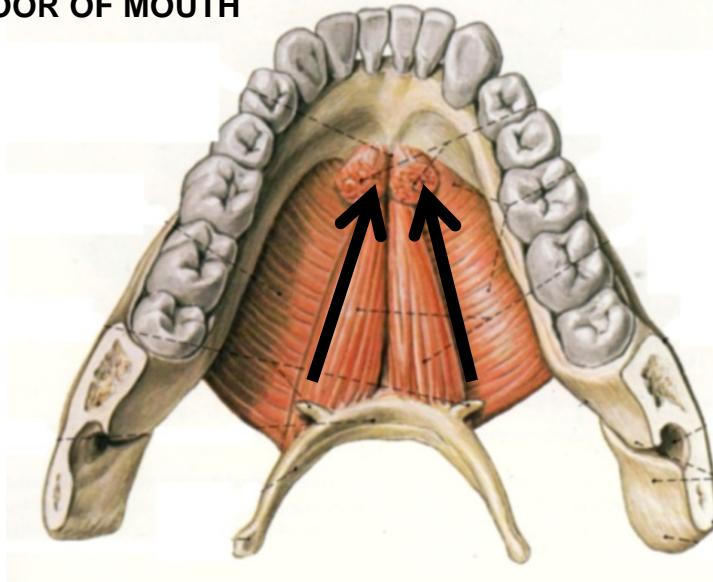
HYOGLOSSUS -
- DEPRESS
TONGUE

STYLO-GLOSSUS -
- DRAWS
TONGUE
SUPERIORLY
and
POSTERIORLY



VIEW OF FLOOR OF MOUTH

**GENIO-
GLOSSUS
DIRECTION
OF
ACTION**



**CLINICAL SIGN OF
DAMAGE TO
HYPOGLOSSAL
NERVE (XII)**

**GENIO-
GLOSSUS
INTACT**



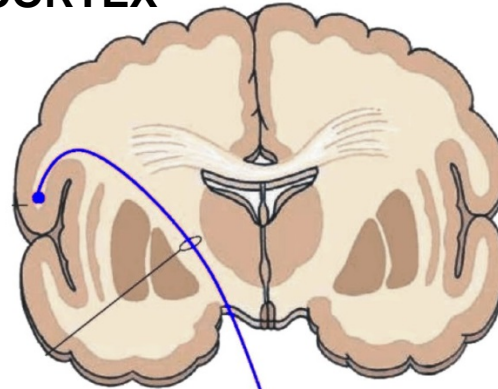
**DAMAGE
HYPOGLOSSAL
NERVE ON ONE
SIDE**

**GENIO-
GLOSSUS
PARALYZED**

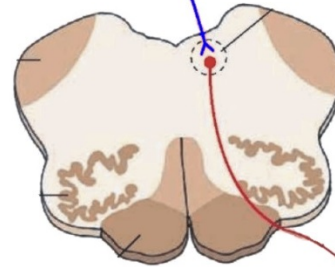
**LOWER MOTOR NEURON LESION - PROTRUDED TONGUE **
DEVIATES TOWARD SIDE OF LESION - due to unopposed action
of the **Genioglossus** muscle.**

**UPPER MOTOR
NEURON TO
GENIOGLOSSUS -
ONLY
CONTRALATERAL**

CORTEX



**BRAINSTEM -
MEDULLA**



**UPPER MOTOR NEURON –
LESIONS OF CRANIAL NERVES**

- ALL BILATERAL EXCEPT:

1) ONLY CONTRALATERAL:
**- VII - LOWER FACE (BELOW
ORBICULARIS OCULI)**

- XII - GENIOGLOSSUS

- XI - TRAPEZIUS

2) ONLY IPSILATERAL:

- XI - STERNOCLEIDOMASTOID

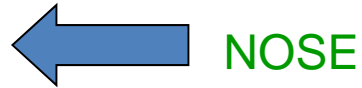
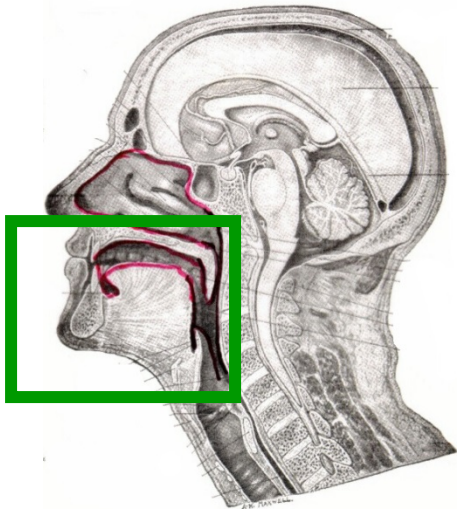
**HYPOGLOSSAL
LOWER MOTOR
TO GENIOGLOSSUS
MUSCLE (IPSILATERAL)**

**DAMAGE
UPPER MOTOR -
TONGUE
DEVIATES
AWAY FROM SIDE
OF CORTICAL
LESION ****



**DAMAGE
LOWER MOTOR -
TONGUE
DEVIATES **
TOWARD SIDE OF
LOWER MOTOR
NEURON LESION**

SUBMANDIBULAR REGION

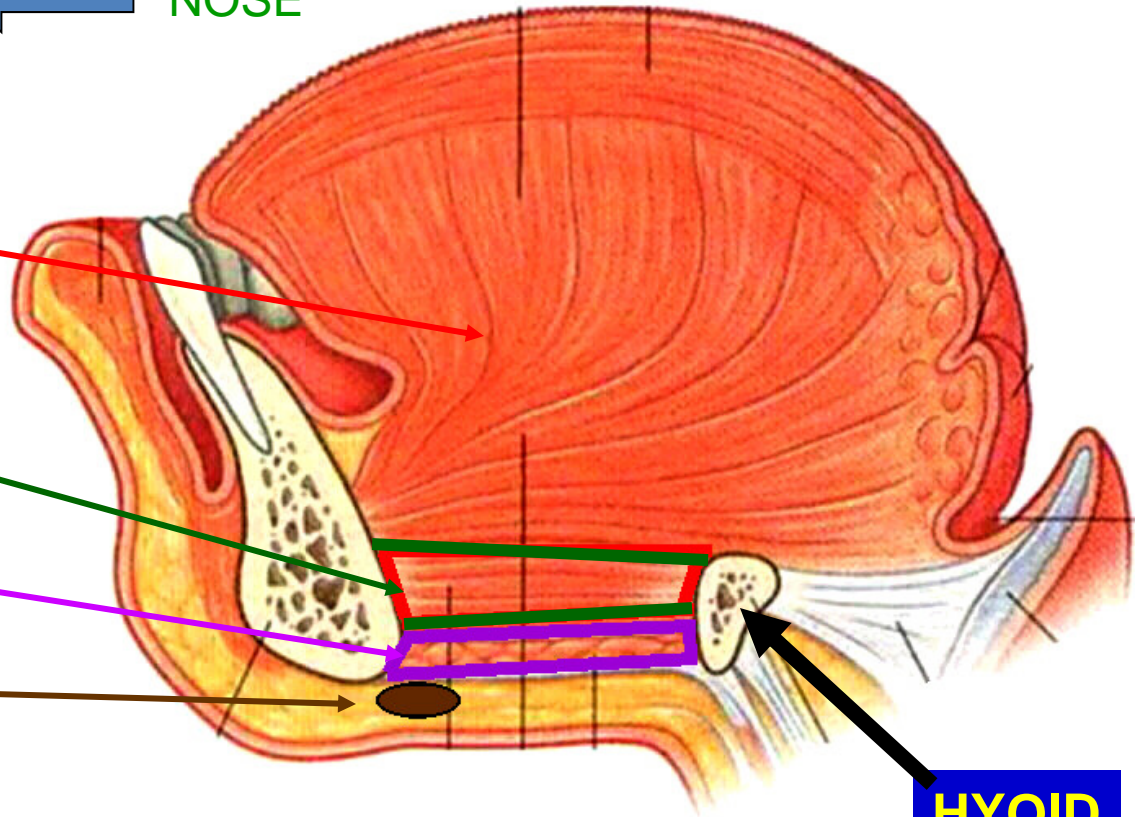


GENIOGLOSSUS
- mandible-tongue

GENIOHYOID
- mandible-hyoid

MYLOHYOID
- cut on end

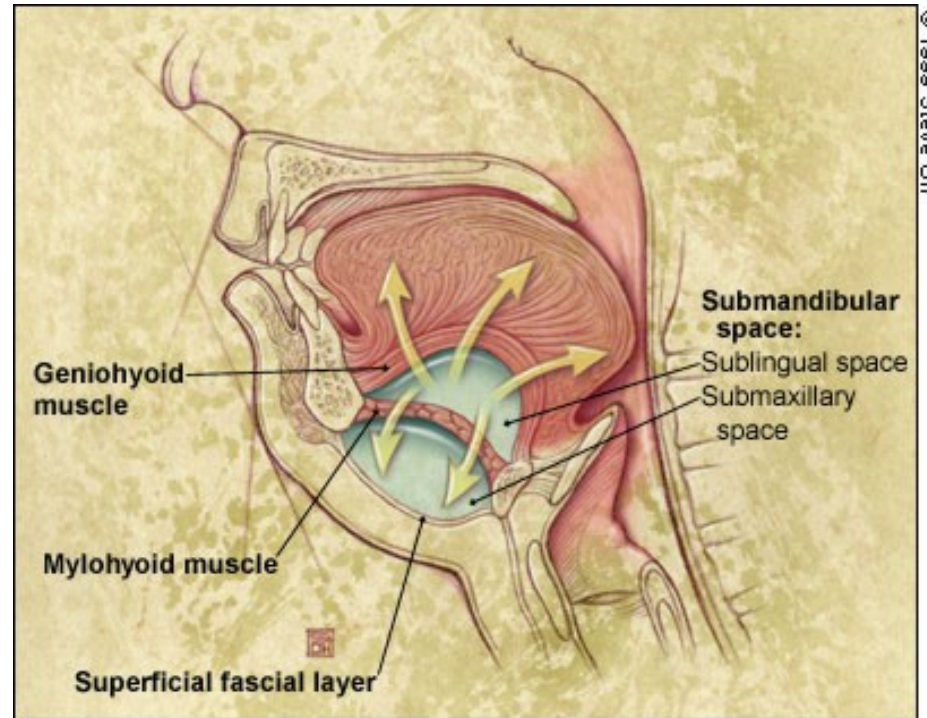
DIGASTRIC



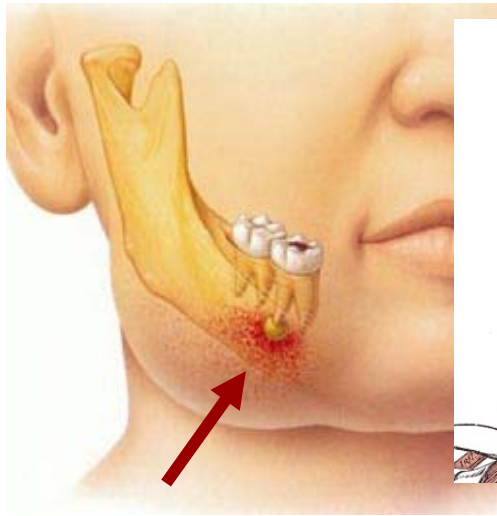
**HYOID
BONE**

MUSCLES VIEWED ON BISECTED HEAD

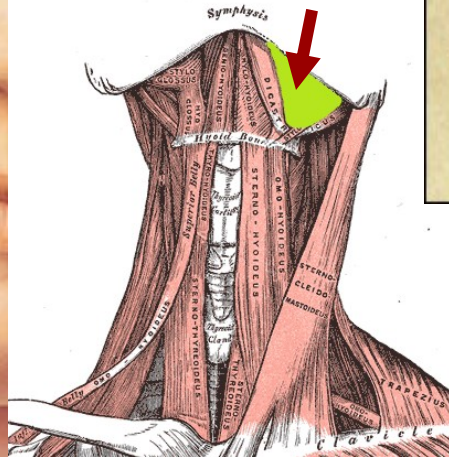
**LUDWIG'S ANGINA - infection of floor of mouth
(Submandibular space), often due to spread from
abscessed mandibular tooth ***



© 1999 Steve Oh



tooth abscess

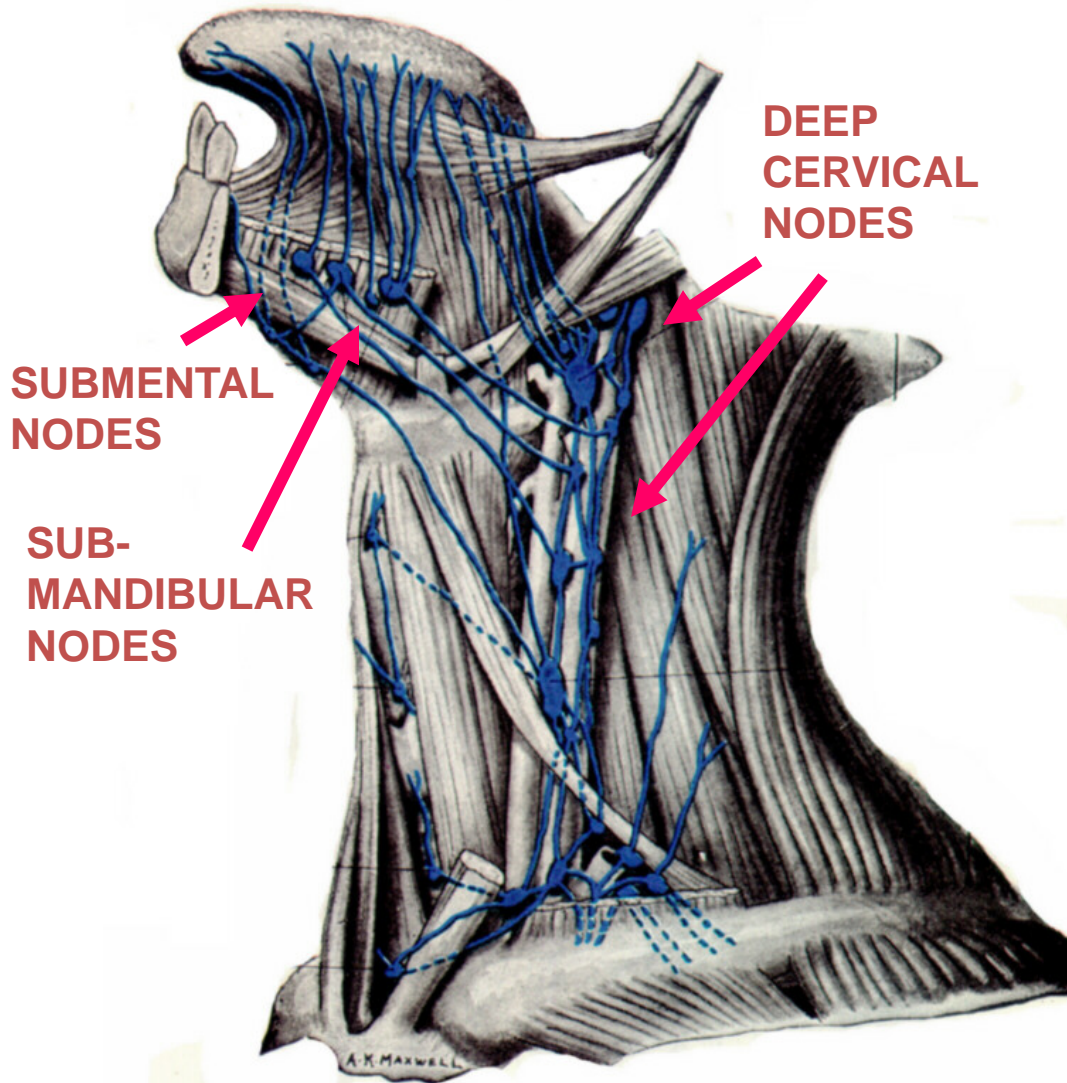


**Submandibular Space -
in Anterior Triangle of neck**

**Infection may obstruct
airway, push up tongue**

**Angina = condition with
intense pain: from L.
strangling**

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 (ex. Cancer) MAY SPREAD TO OPPOSITE SIDE



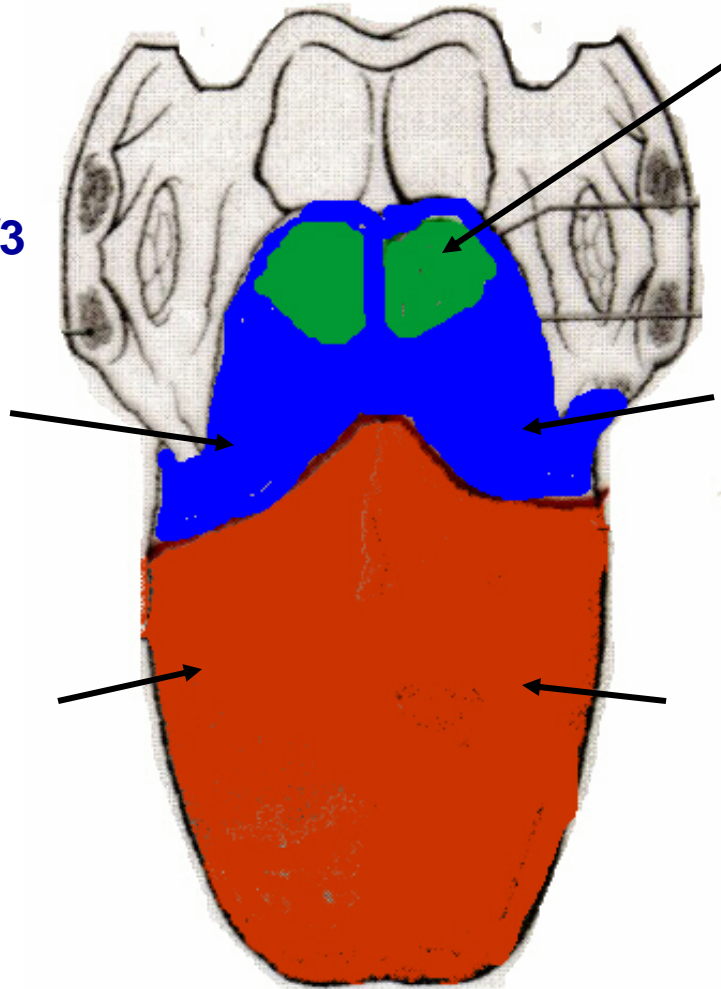
E. SENSORY INNERVATION OF TONGUE

NOTE:



PHARYNGEAL PART- POST 1/3
and ANT. TO EPIGLOTTIS-
VISCERAL SENSORY,
TOUCH, PAIN;
TASTE

ORAL PART -
ANT 2/3 -
SOMATIC SENSORY
TOUCH, PAIN;
TASTE



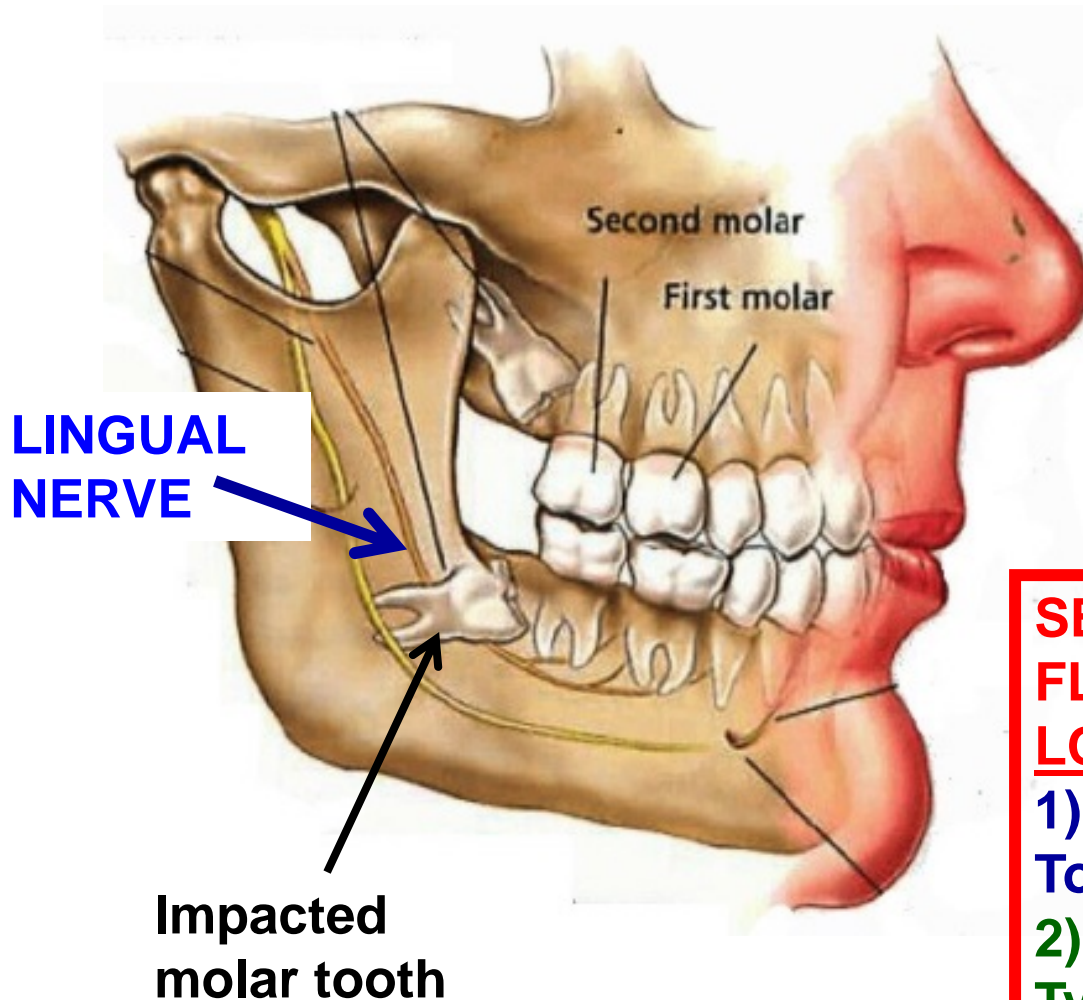
ANT. TO EPIGLOTTIS -
1) X- VAGUS- VISCERAL
SENSORY TOUCH AND
TASTE

POST. 1/3 OF TONGUE
1) IX - GLOSSOPHARYNGEAL
- 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 (SOMATIC MOTOR)
NOTE; PALATOGLOSSUS IS MUSCLE OF PALATE INNERVATED BY X (VAGUS)

CLINICAL: LINGUAL NERVE (V3) CAN BE DAMAGED IN THE FLOOR OF THE MOUTH

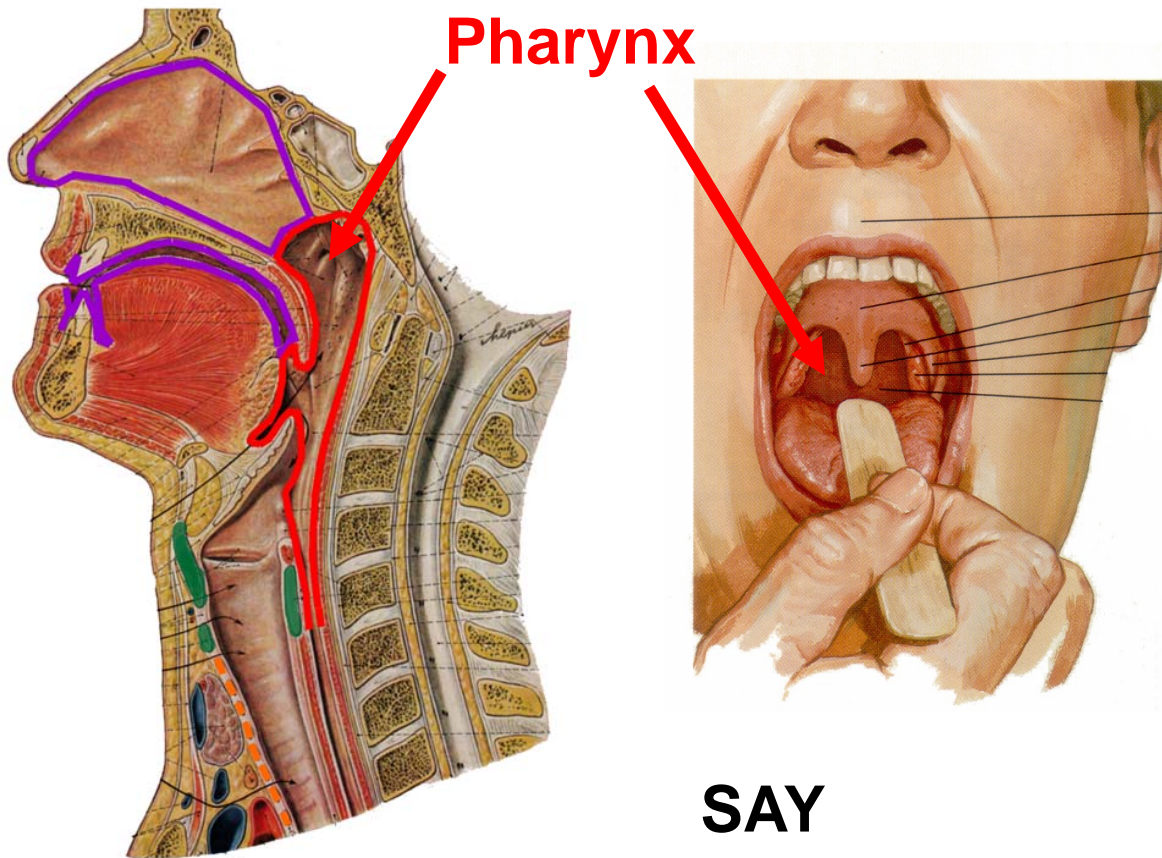


- Lingual nerve courses below mucosa in floor of mouth
- Can readily be damaged during dental extraction of impacted molar tooth
- Also damaged in children: ex. fall with glass pop bottle in mouth

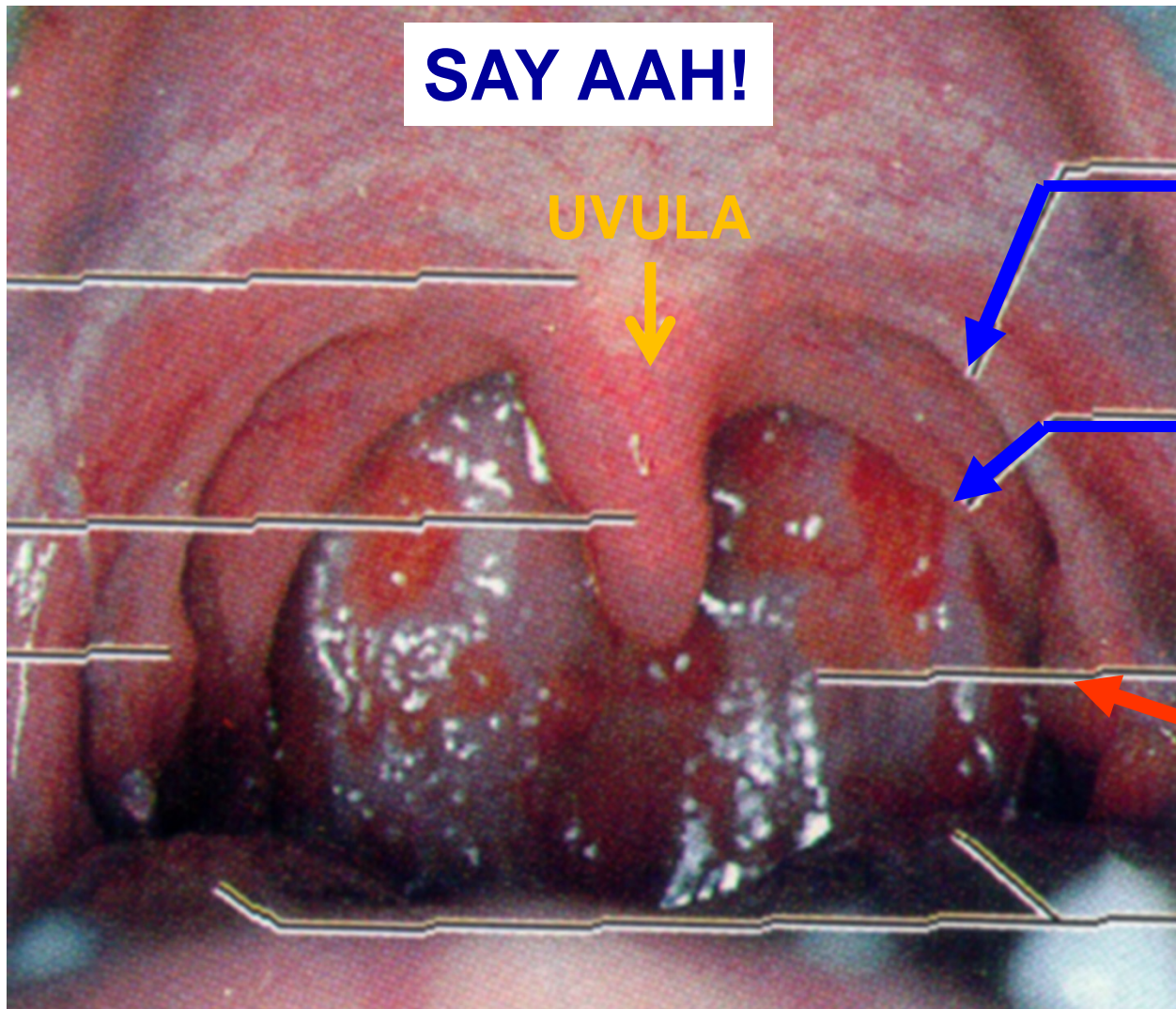
SEVERING LINGUAL NERVE IN FLOOR OF MOUTH - LOSE TOUCH AND TASTE:

- 1) V - General sensation to Ant. Tongue AND
- 2) Hitchhiking VII – (Chorda Tympani Taste fibers to Anterior Tongue

PHARYNX



**SAY
AAHH!**



SAY AAH!

UVULA

**PALATO-
GLOSSAL
ARCH**

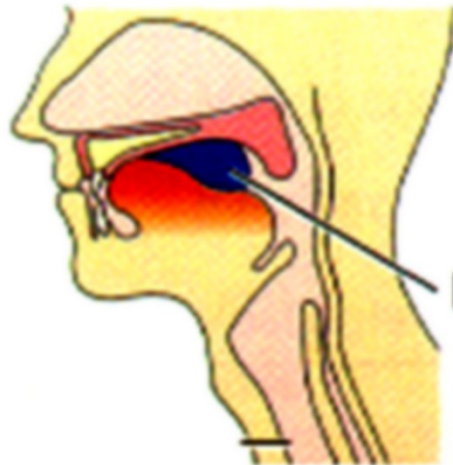
**PALATO-
PHARYNGEAL
ARCH**

**PALATINE
TONSIL**

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

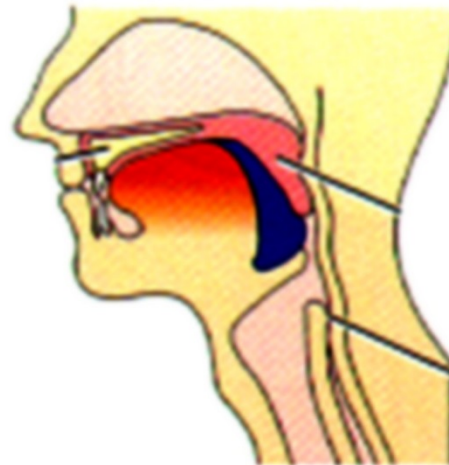
OVERVIEW OF SWALLOWING

PHARYNX ACTS TO PROPEL FOOD IN SWALLOWING

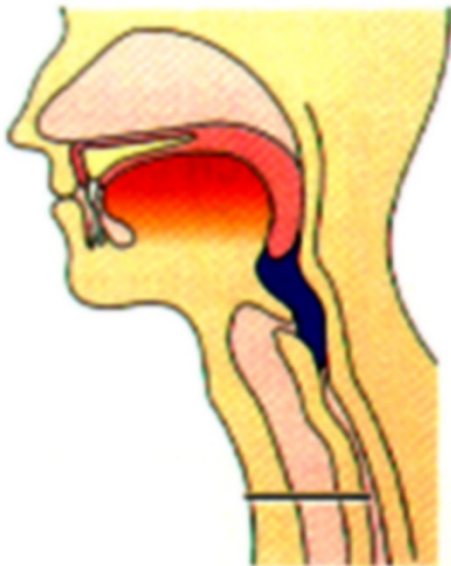


**Voluntary
phase**

Bolus = FOOD

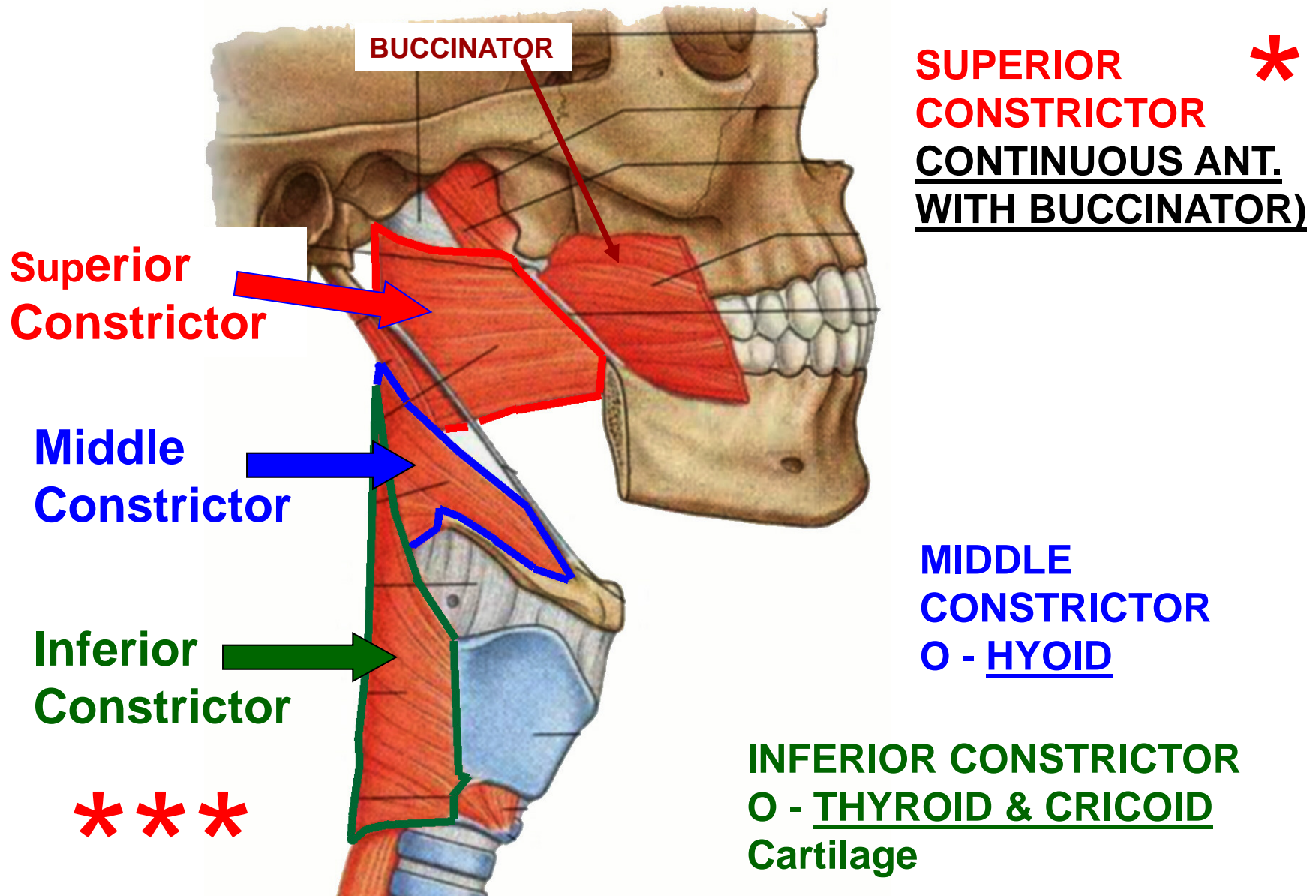


**Involuntary
phase 1**

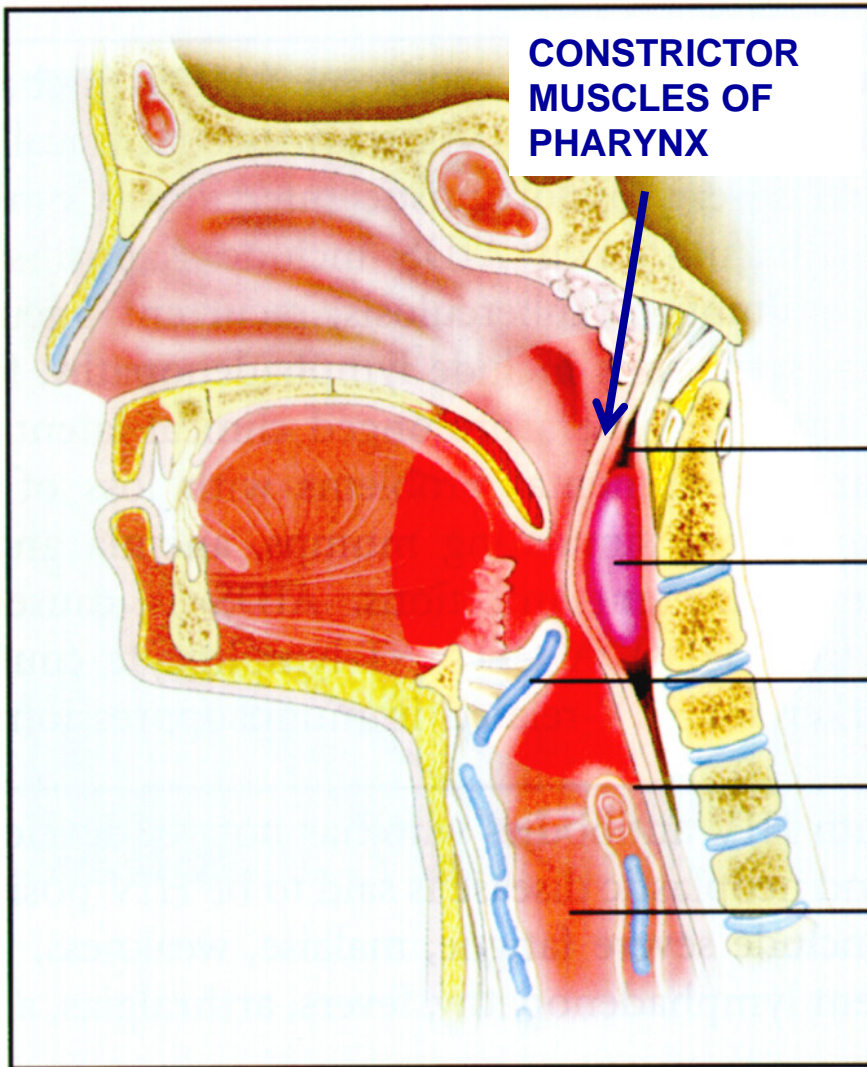


**Involuntary
phases 2,3 =
Constrictor
Muscles of
pharynx propel
food down to
esophagus**

PHARYNX CONSTRICTOR MUSCLES – ALL CN X



RETROPHARYNGEAL ABSCESS



Retropharyngeal space – potential space between pharynx (" pretracheal " fascial layer) and vertebrae ("prevertebral ") layer of fascia

Retropharyngeal space

Abscess

Epiglottis

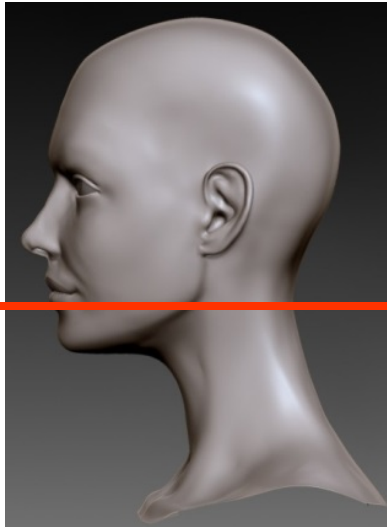
Esophagus

Trachea

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



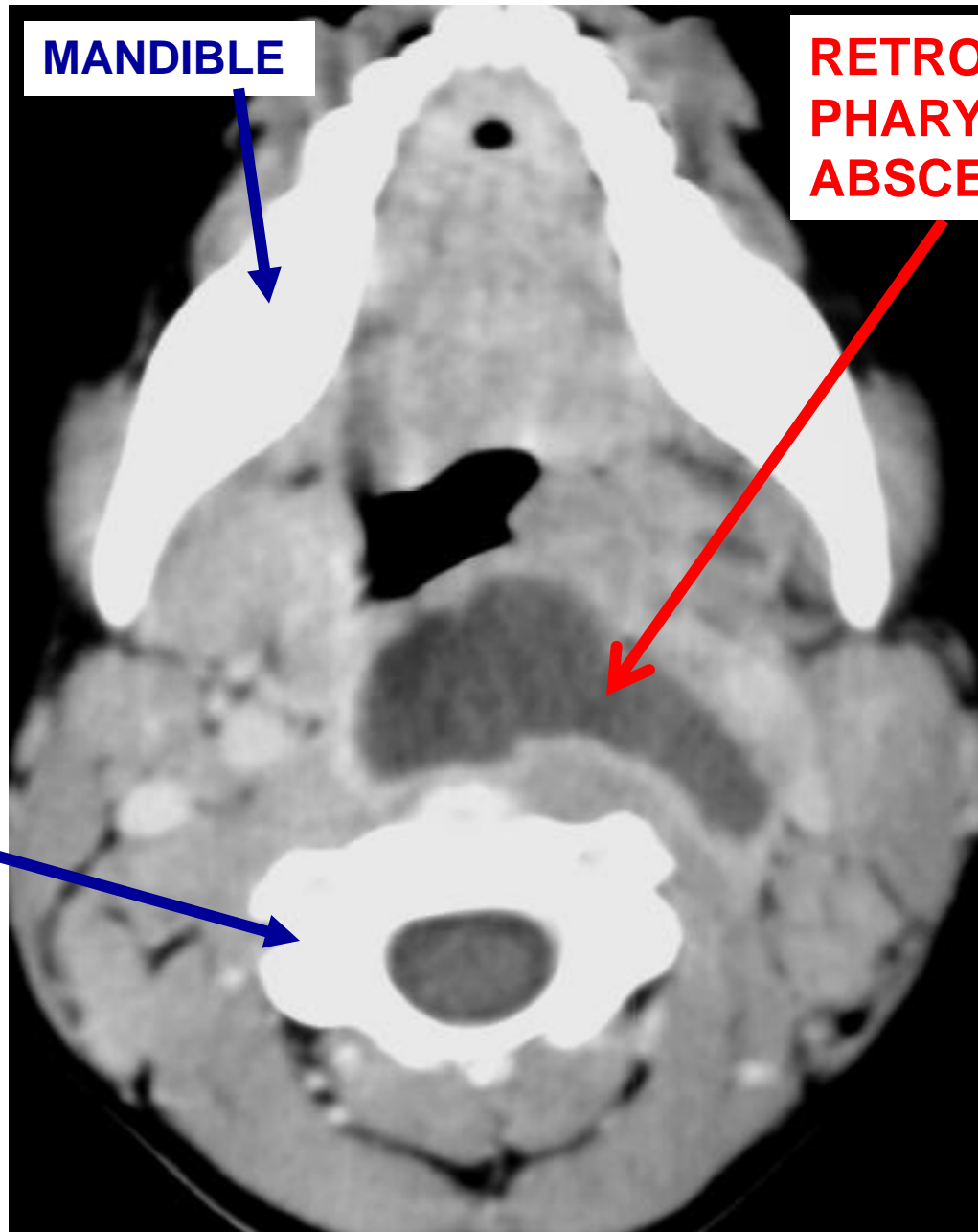
Note: George Washington may have died from this



MANDIBLE

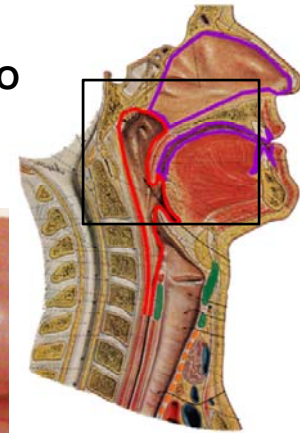
**RETRO-
PHARYNGEAL
ABSCESS**

**POST.
COMPARTMENT -
- Posterior
Compartment -
Vertebrae and
muscles which
support and move
head & neck**



STRUCTURES IN PHARYNX

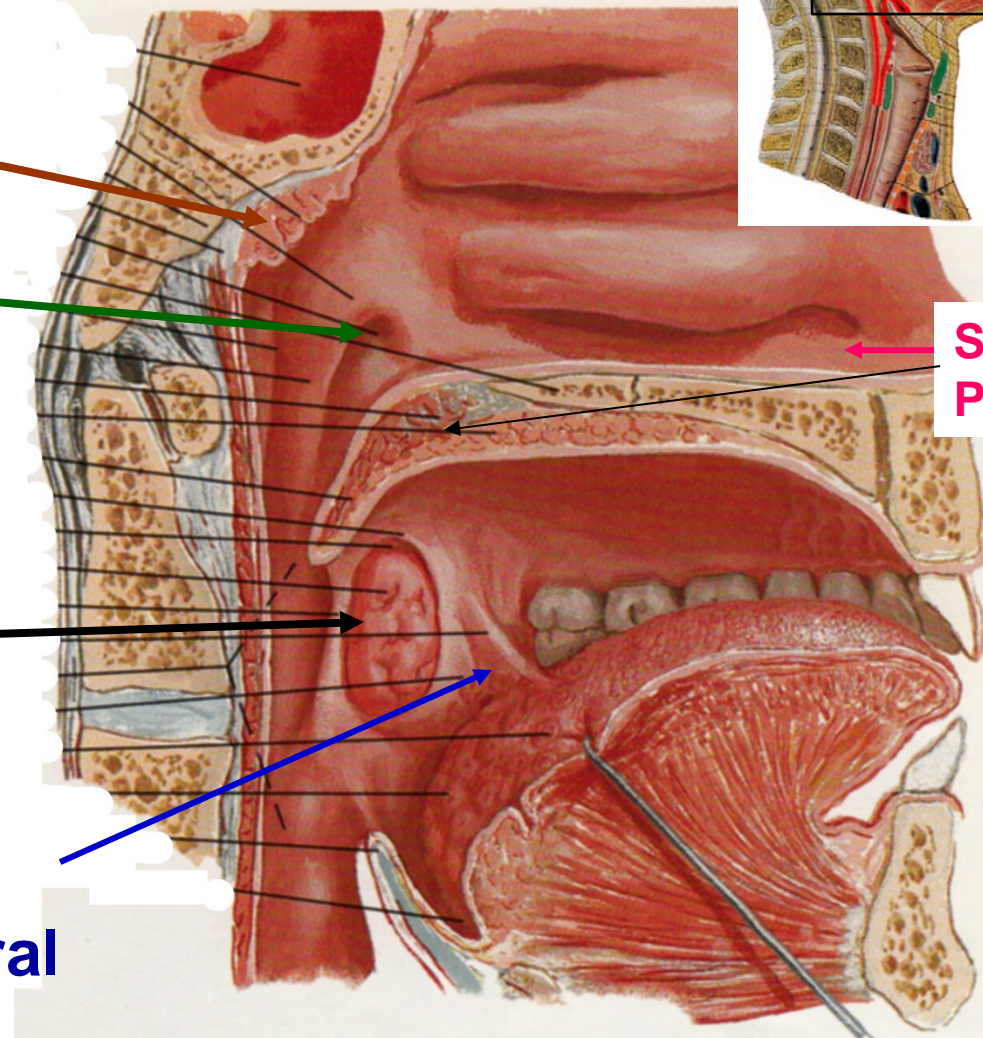
ORIENT TO
PALATE



in Nasopharynx
- Pharyngeal Tonsil
(Adenoids)

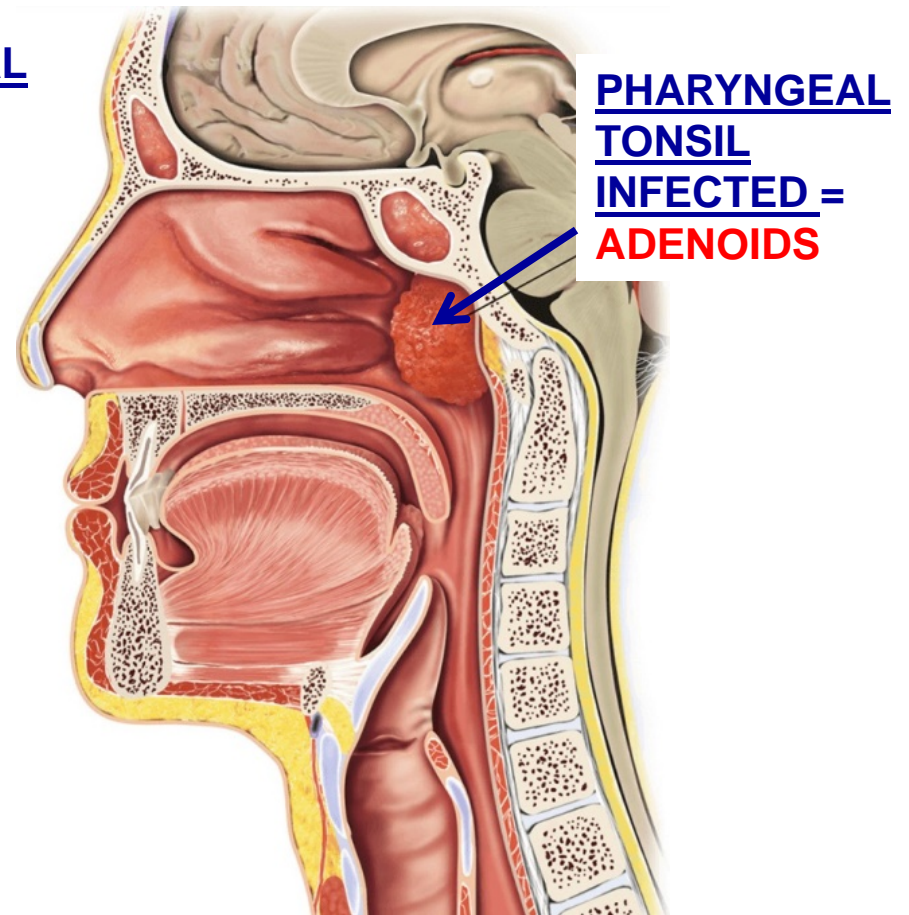
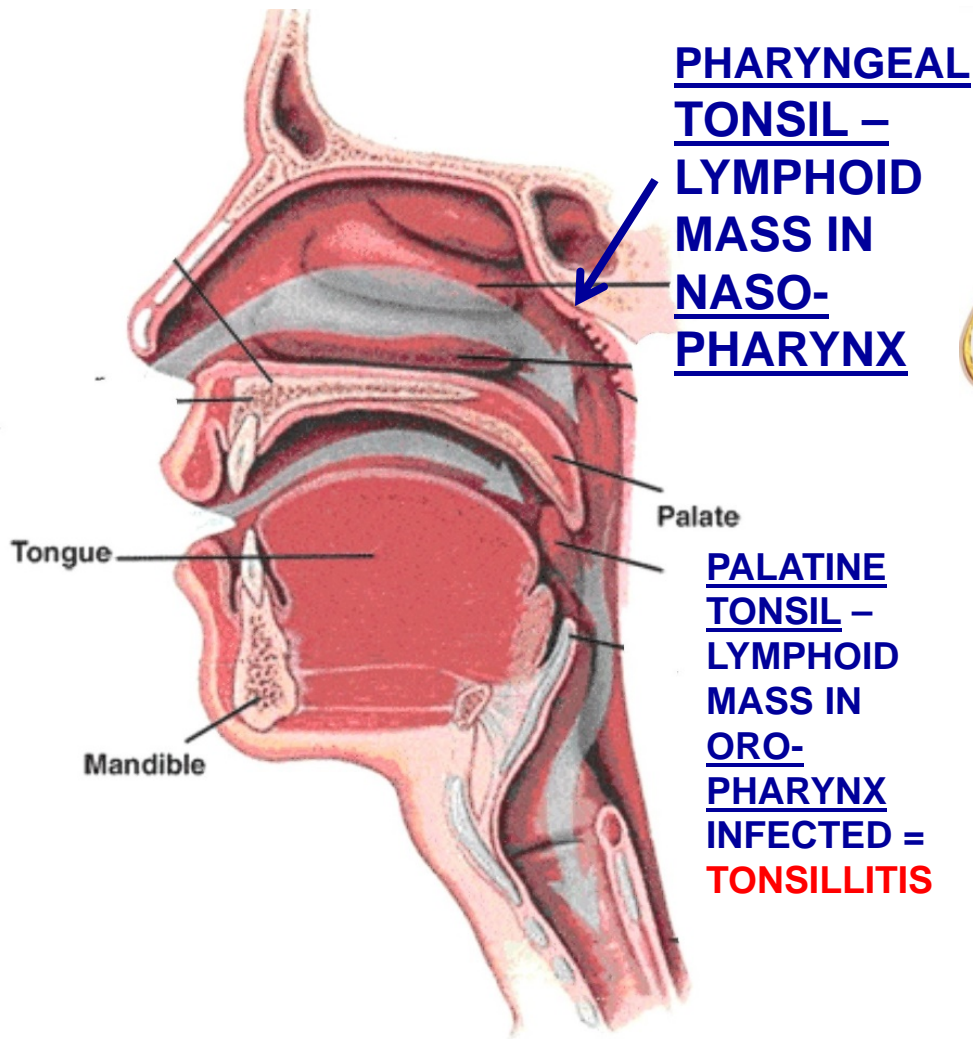
- opening of Auditory
Tube (Torus tubarius
- overlies opening)

in Oropharynx
- Palatine Tonsils
(Tonsillitis)
posterior to
Palatoglossal Arch
(boundary between Oral
Cavity
and Oropharynx)



-TORUS - donut shape

PHARYNGEAL TONSIL – INFECTION IS **ADENOIDS**



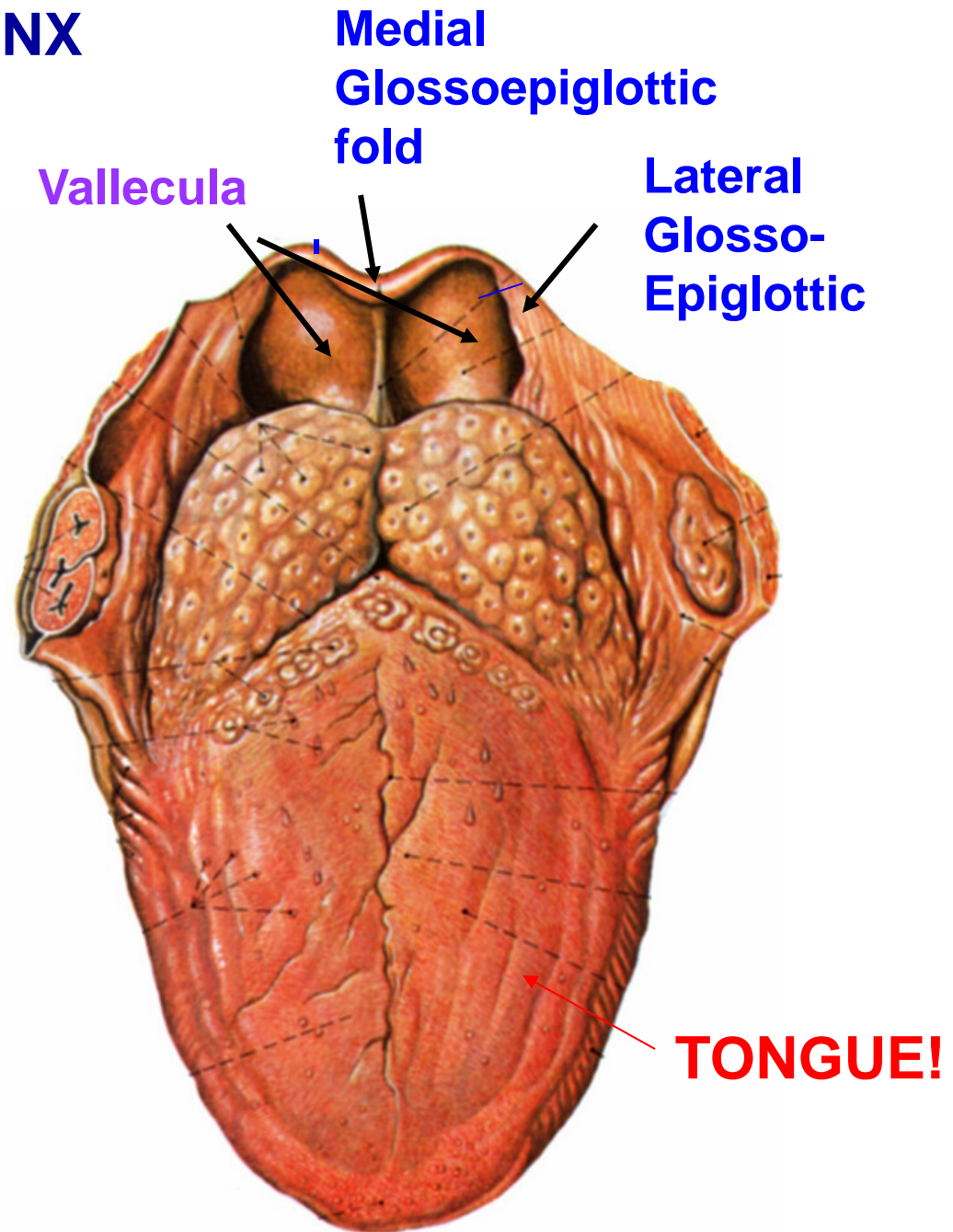
ADENOIDS CAN BLOCK PASSAGE OF AIR THROUGH NASAL CAVITY – SYMPTOM: NASAL VOICE

'POCKETS' IN PHARYNX

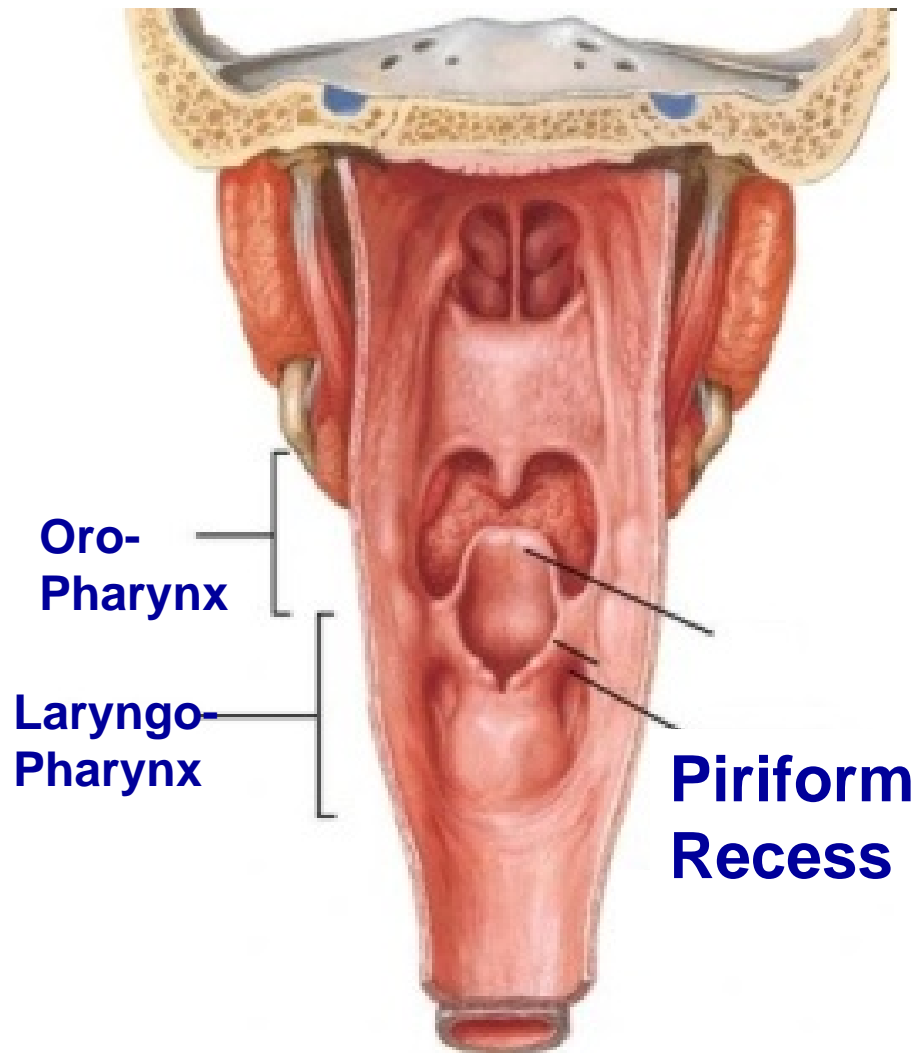
in Oropharynx

**- Valleculae =
depressions (2)
Between Med., Lat.
Glossoepiglottic
Folds; Food/objects
Lodge in
Valleculae**

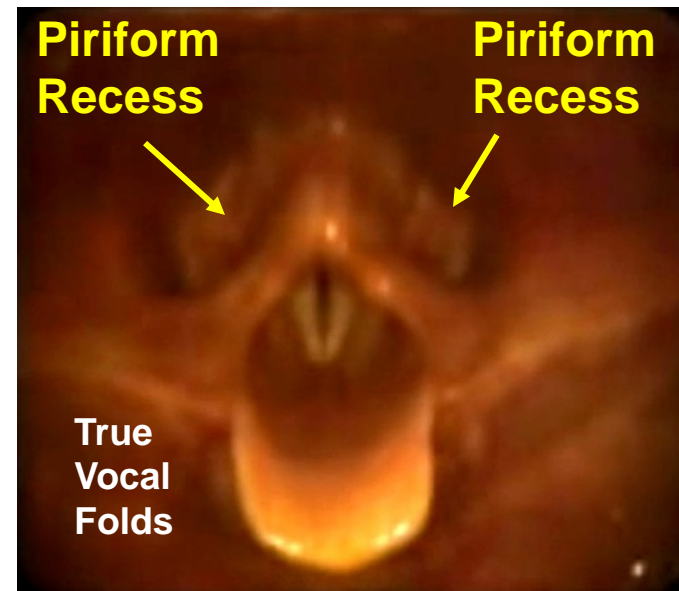
Clinical: **Valleculae =
Popcorn 1**



'POCKETS' IN PHARYNX



Piriform Recesses - in Laryngo-Pharynx- lateral to inlet of Larynx



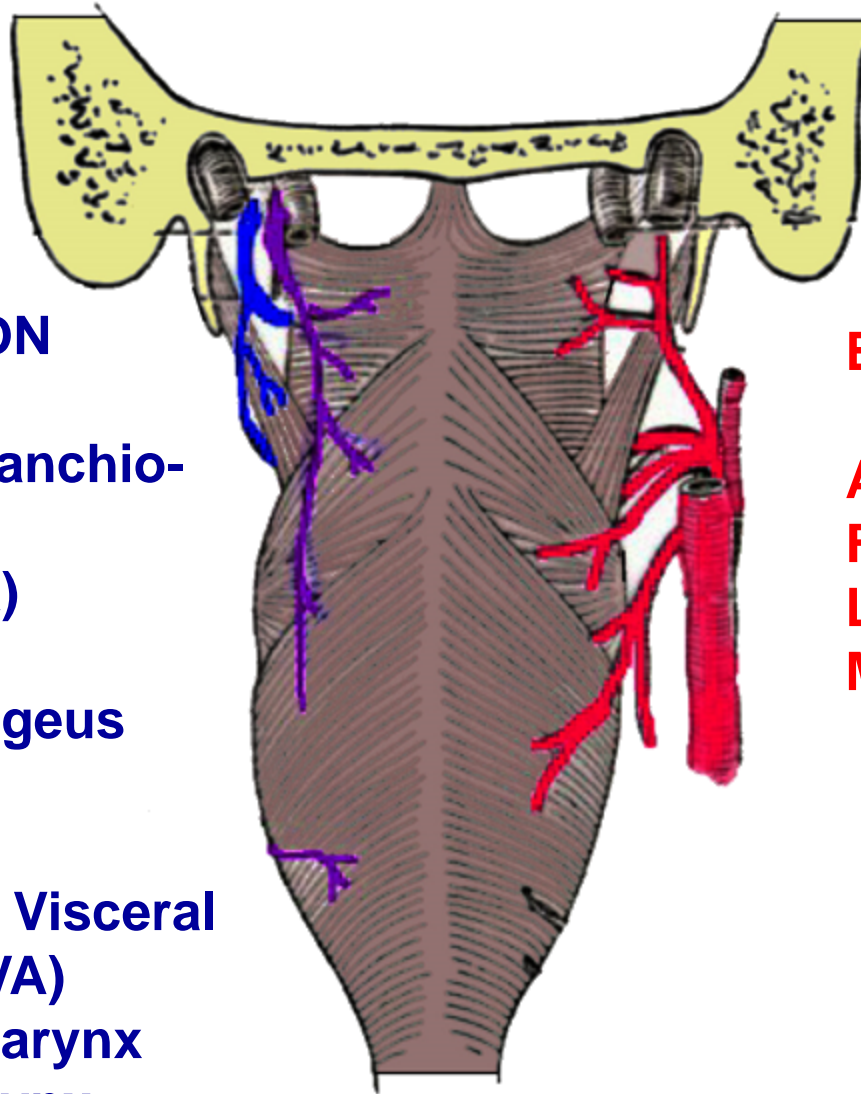
Clinical: Piriform Recess = Popcorn 2 – food lodge in Laryngo-Pharynx

POPCORN QUESTIONS - Food stuck when trying to swallow - **not localize** because innervation is **Visceral Sensory**

POPCORN 1) Posterior tongue - food caught in **Valleculae** between **Medial and Lateral Glossoepiglottic folds**

POPCORN 2) 'Throat'- food caught in **Piriform recesses**, lateral to opening of larynx

PHARYNX: INNERVATION, BLOOD SUPPLY



INNERVATION

1) Motor- Branchio-
motor (SVE)
All Vagus (X)
except
Stylopharyngeus
(IX)

2) Sensory - Visceral
Sensory (GVA)
VII - Nasopharynx
IX - Oropharynx
X - Laryngopharynx

Blood Supply Arteries

Ascending Pharyngeal
Facial
Lingual
Maxillary