

REVIEW OF HEAD AND NECK

CRANIAL NERVES AND EVERYTHING ELSE PART 2

HEAD AND NECK

LAB CLOSED - SUNDAY JAN 22 AT NOON

**REVIEW - ENDS TOMORROW
- NO REVIEW SESSIONS ON SATURDAY**

**1. WRITTEN EXAM - 39 questions, 3 points per question,
total 117 points (= 10.68% of grade)**

**CLINICAL VIGNETTES
VERY DIRECT QUESTIONS**

HEAD AND NECK

LAB CLOSED - SUNDAY JAN 22 AT NOON

2. PRACTICAL EXAM - 36 questions, 2 points per question, total 72 points (= 6.57% of grade)

- PROSECTION PICTURES - NOT JUST ID BUT INFORMATION FROM LECTURE: INNERVATION, TYPE OF NEURON, BRANCHIAL ARCH, MUSCLE ACTION, ORIGINS, INSERTIONS IN TABLES

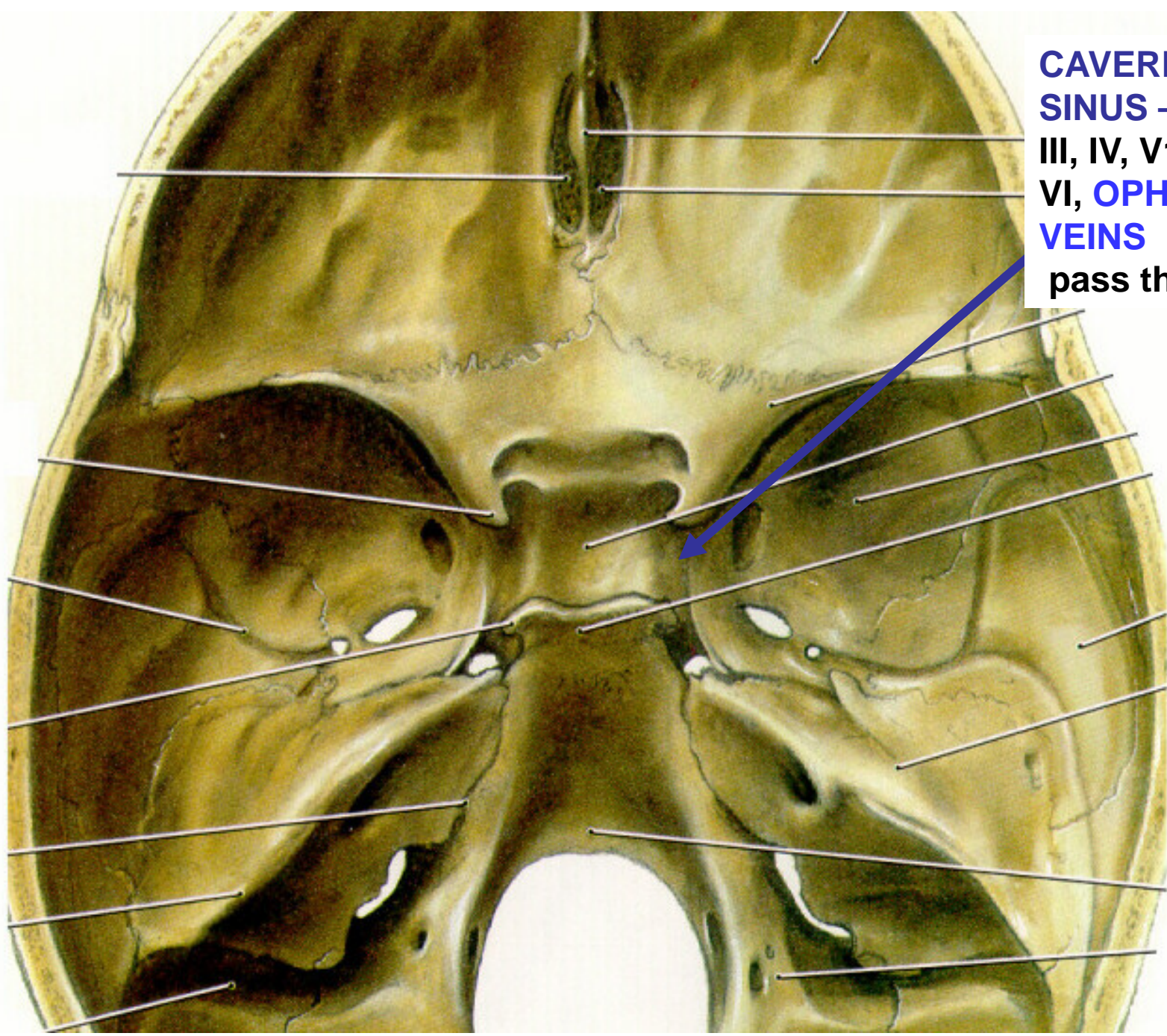
- MORE PROSECTIONS NOT PREVIOUSLY SEEN

- DISSECTION OF BRAINSTEM

- SKULLS - ALL INFORMATION ON FORAMINA OF SKULL

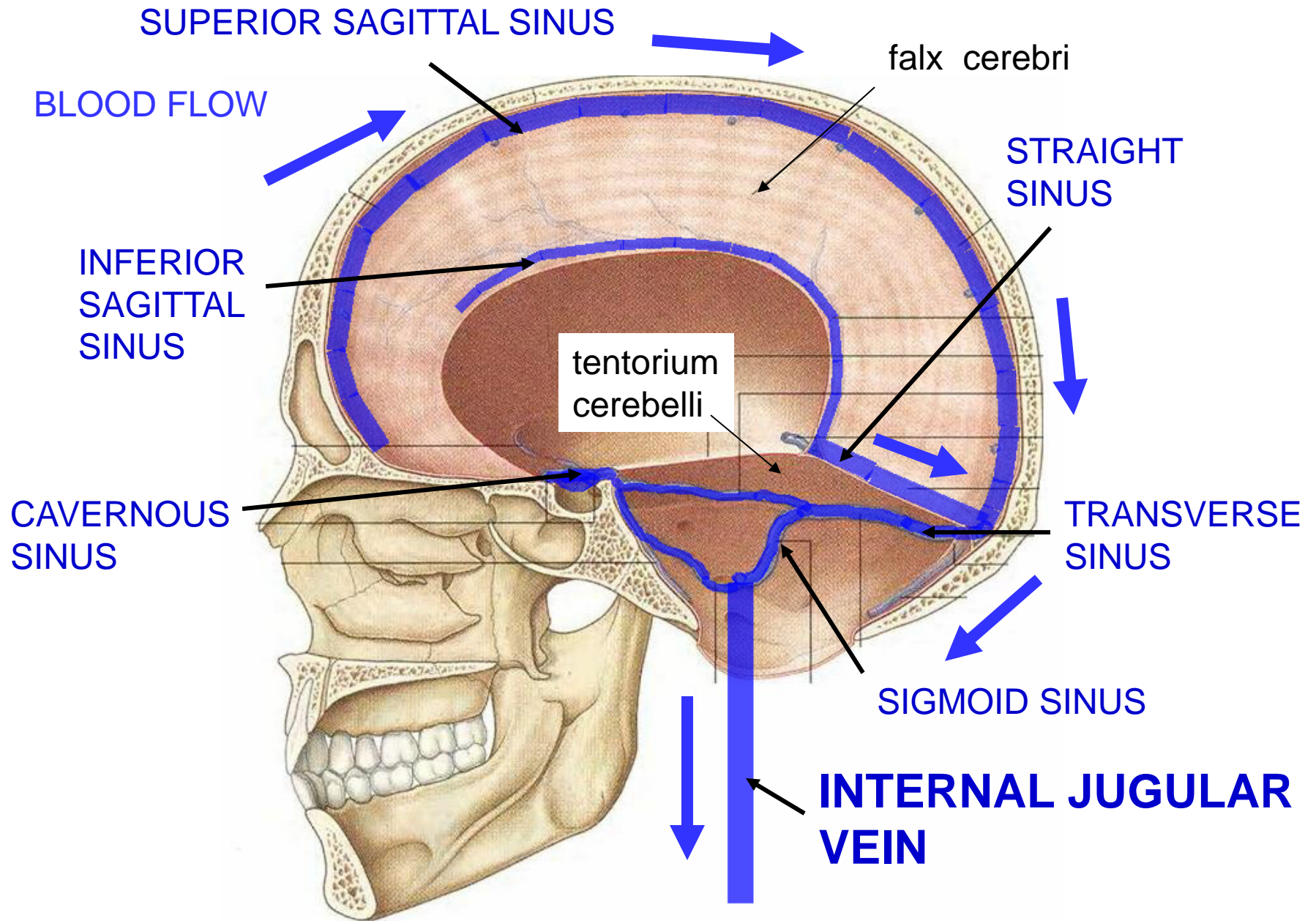
HANDOUT

- RADIOGRAPHS: SEE POWERPOINT ON CD (CT SERIES)



**CAVERNOUS
SINUS –
III, IV, V1, V2,
VI, OPTHALMIC
VEINS
pass through**

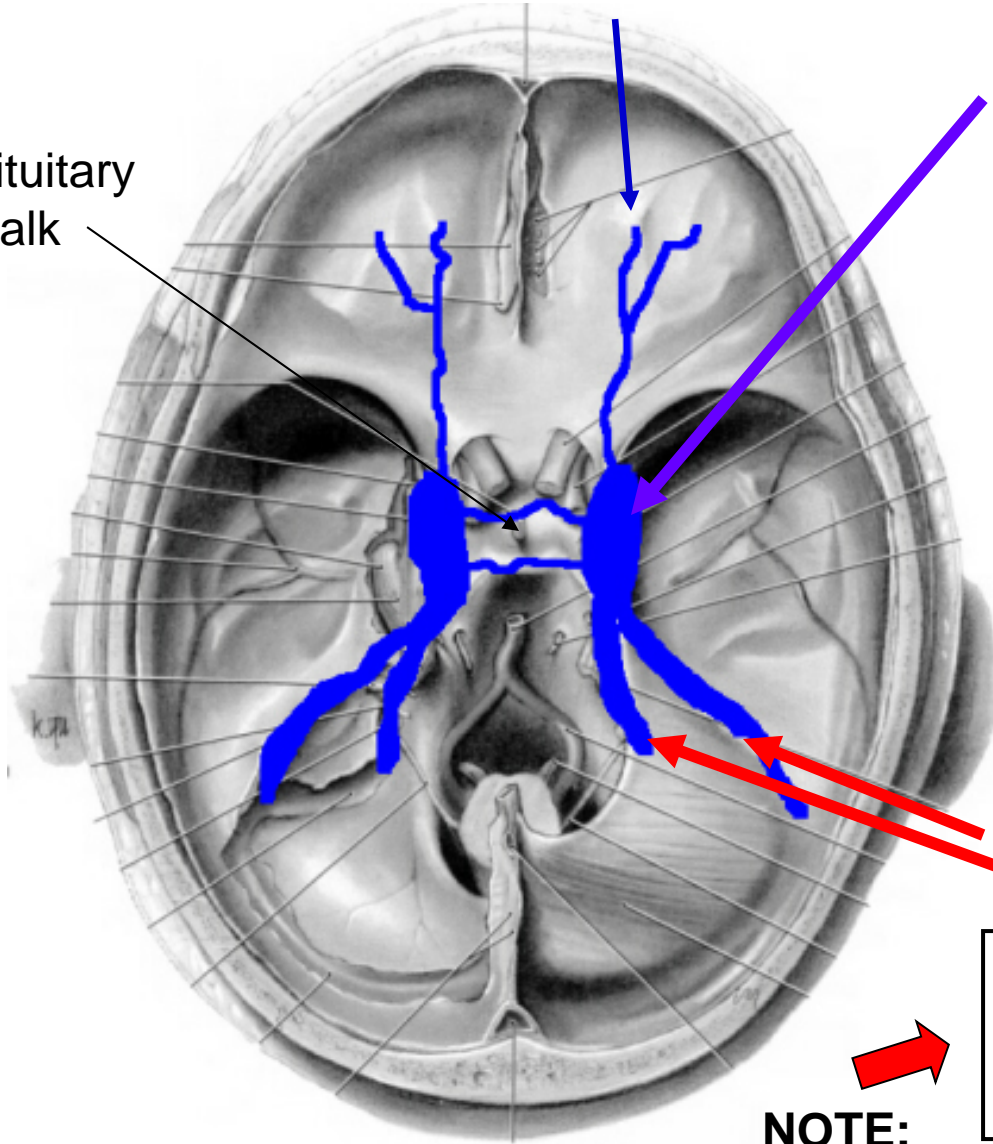
BLOOD FLOW IN VENOUS SINUSES OF BRAIN



CAVERNOUS SINUS

OPHTHALMIC VEINS

Pituitary
stalk



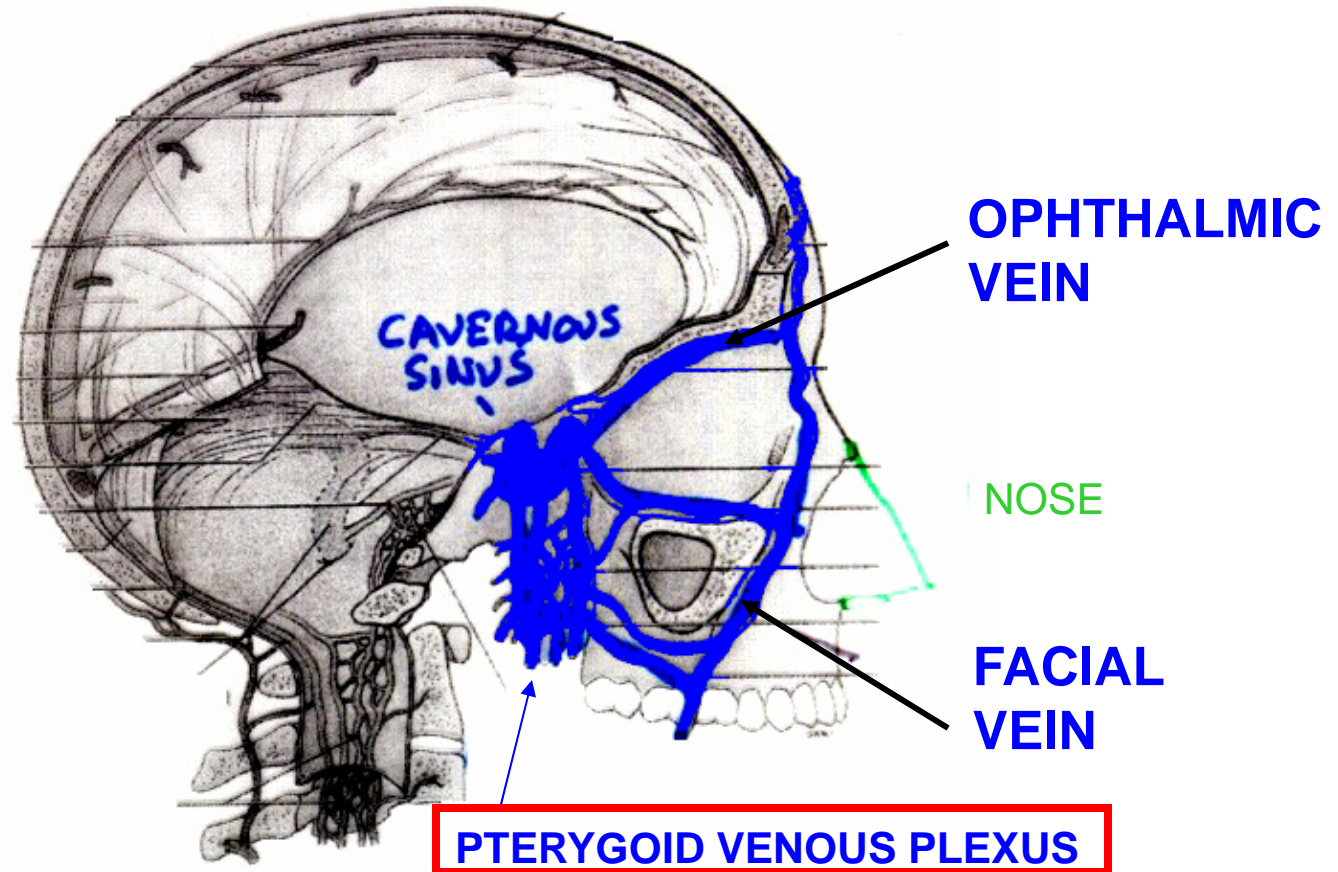
Cavernous sinuses - in middle cranial fossa; on side of the body of the sphenoid bone; receive blood from Sup. and Inf. Ophthalmic veins; drain to Sup. and Inf. Petrosal sinuses

Sup. and Inf. Petrosal sinuses - on petrous part of temporal bone
Sup. drains to Transverse sinus (or Sigmoid Sinus) ****
Inf. drains to Internal Jugular V.

NOTE:

SPREAD OF INFECTION FROM FACE TO BRAIN

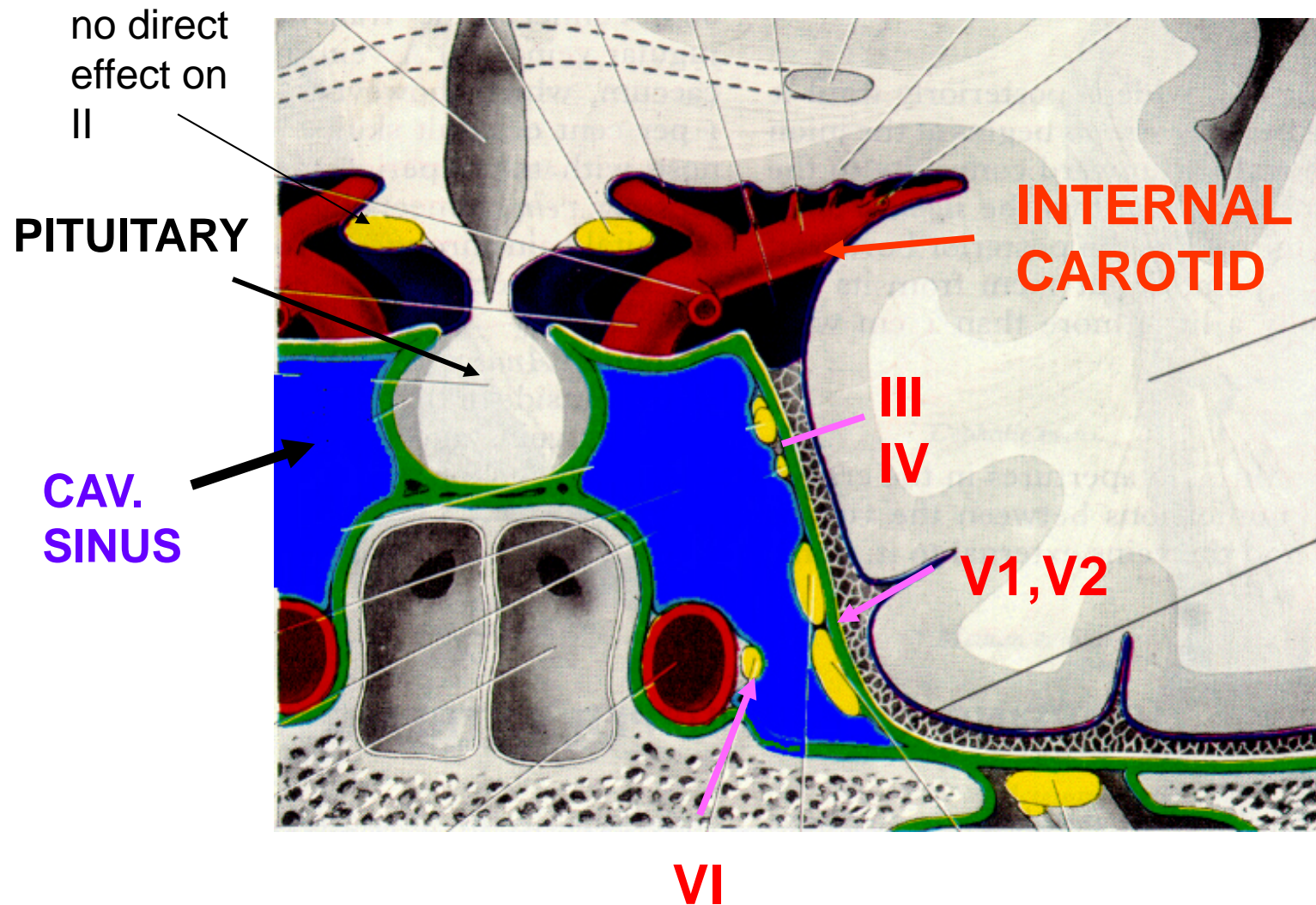
Anastomoses
of Facial and
Ophthalmic Vv.
- Ophthalmic
veins drain to
cavernous
sinus (venous
sinus inside
skull)



Question: Prolonged infection on face (lateral to nose) produces 'Blurred vision' (Diplopia)

- Why? **Prolonged infections spread via veins (pressure low, no valves) through orbit via Ophthalmic Veins to Cavernous Sinus**
- Infections lateral to nose particularly dangerous; also infections from teeth can spread through pterygoid venous plexus

STRUCTURES PASSING THROUGH WALL OF CAVERNOUS SINUS - Int. Carotid A., Cranial N.'s III, IV, V1, V2, VI;
SYMPTOM of Infection in Sinus – ‘BLURRED’ VISION; not affect CN II



CAVERNOUS SINUS SYNDROME



**SPREAD OF INFECTION TO
CAVERNOUS SINUS**

CAUSES

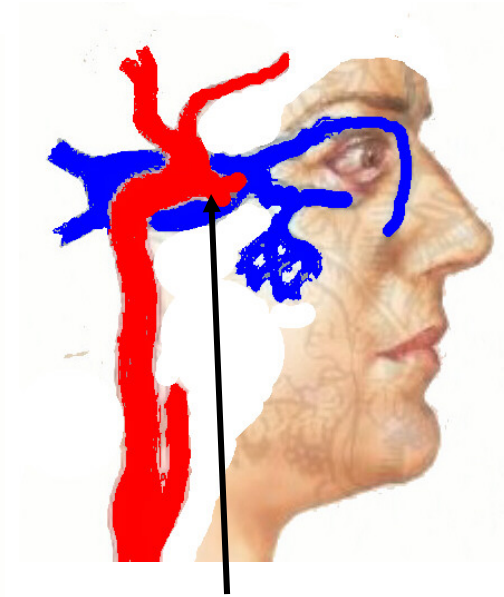
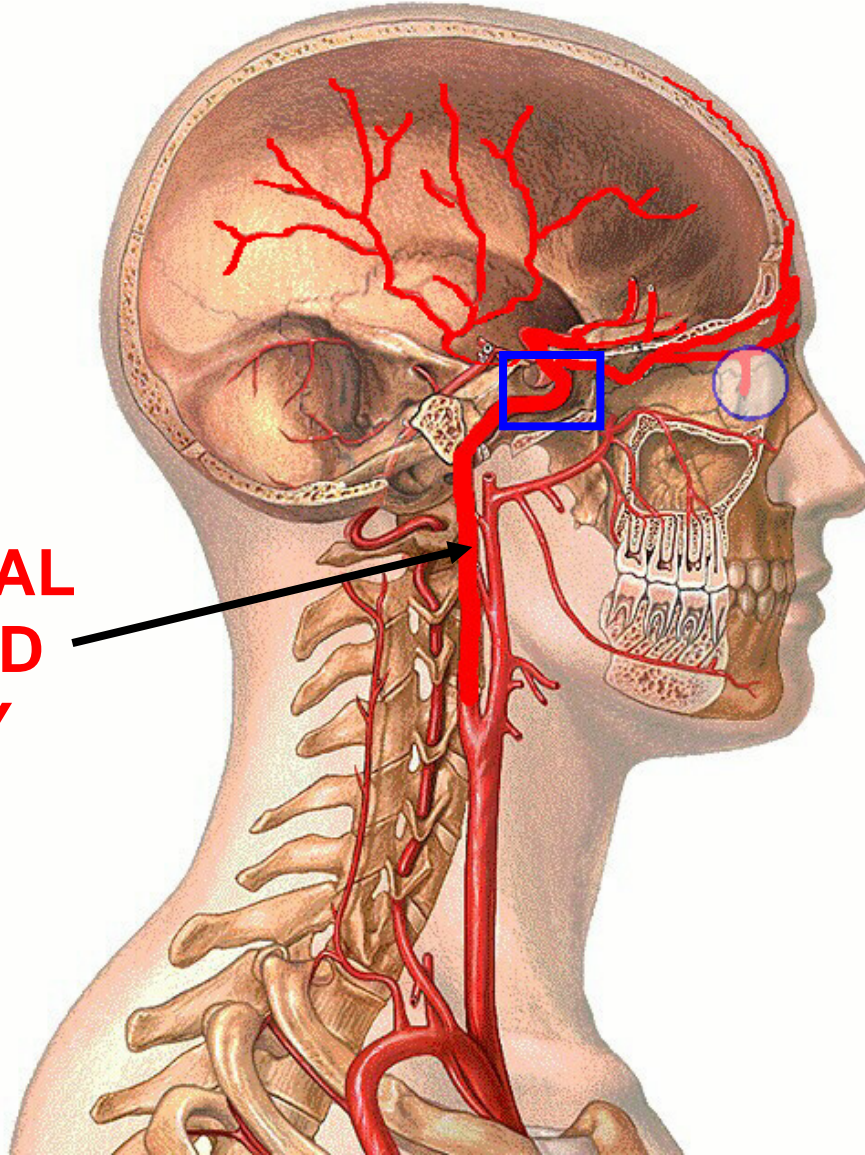
1) an aneurysm of the internal carotid artery in the cavernous sinus, 2) infection or venous thrombus (blood clot) in cavernous sinus, or by 3) pituitary tumor encroaching into sinus.

NERVES EFFECTED

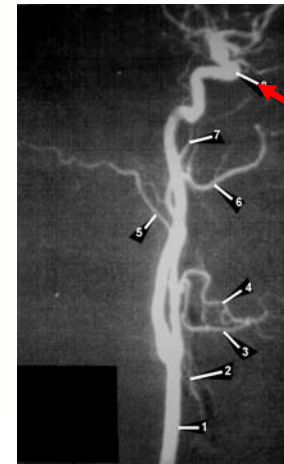
III, IV, V1, V2, and VI and Sympathetic fibers to orbit (travel on Internal Carotid)

INTERNAL CAROTID ARTERY PASSES IN WALL OF CAVERNOUS SINUS

**INTERNAL
CAROTID
ARTERY**



**CAROTID-CAVERNOUS
FISTULA - artery ruptures into
venous sinus**



**CAROTID
SIPHON**

CAVERNOUS SINUS SYNDROME SYMPTOMS



SPREAD OF INFECTION TO
CAVERNOUS SINUS

1) III

- Ocular palsy (impaired eye movement)
- Damage III - Dilated pupil (paralyze constrictor)
- No pupillary light reflex (paralyze **pupillary** constrictor)
- No accommodation (paralyze ciliary muscle)
- Ptosis (drooping eyelid, paralyze levator palpebrae superioris)

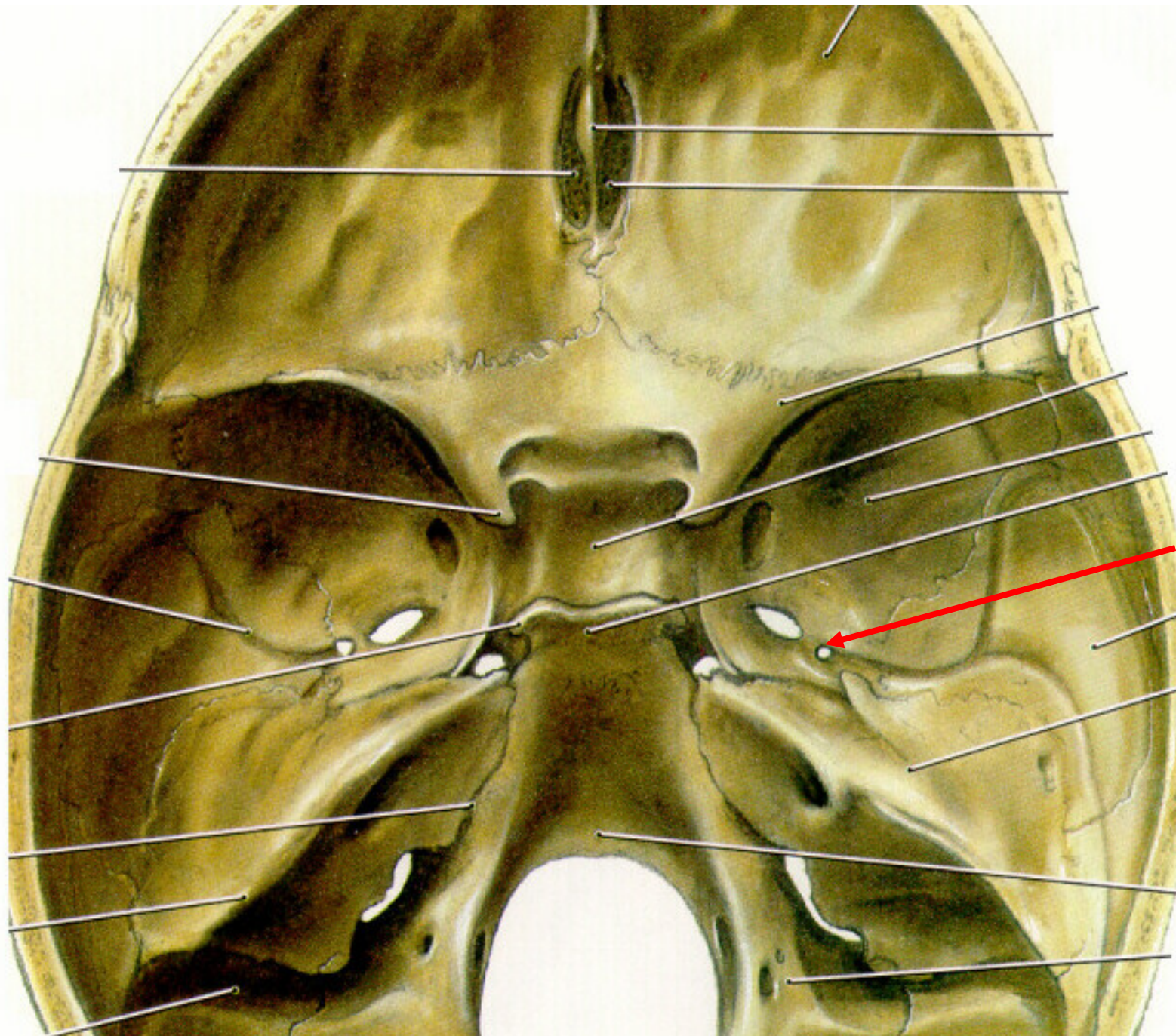
2) V1, V2

Facial pain (pressure on nerves)

3) Sympathetics on Internal Carotid

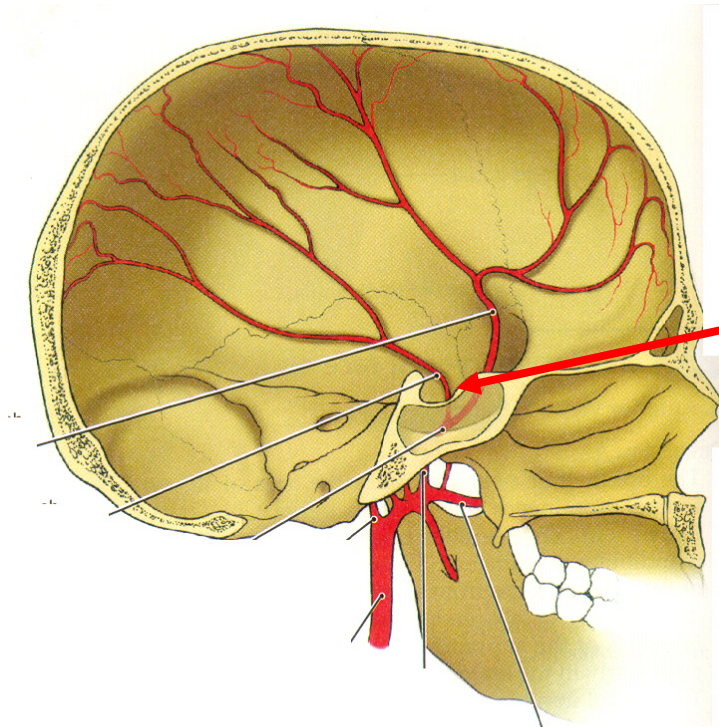
Ptosis (drooping eyelid)

Miosis (constricted pupil)



**FORAMEN
SPINOSUM -
MIDDLE
MENINGEAL
ARTERY,
NERVUS
SPINOSUS**

INTRACRANIAL HEMATOMAS

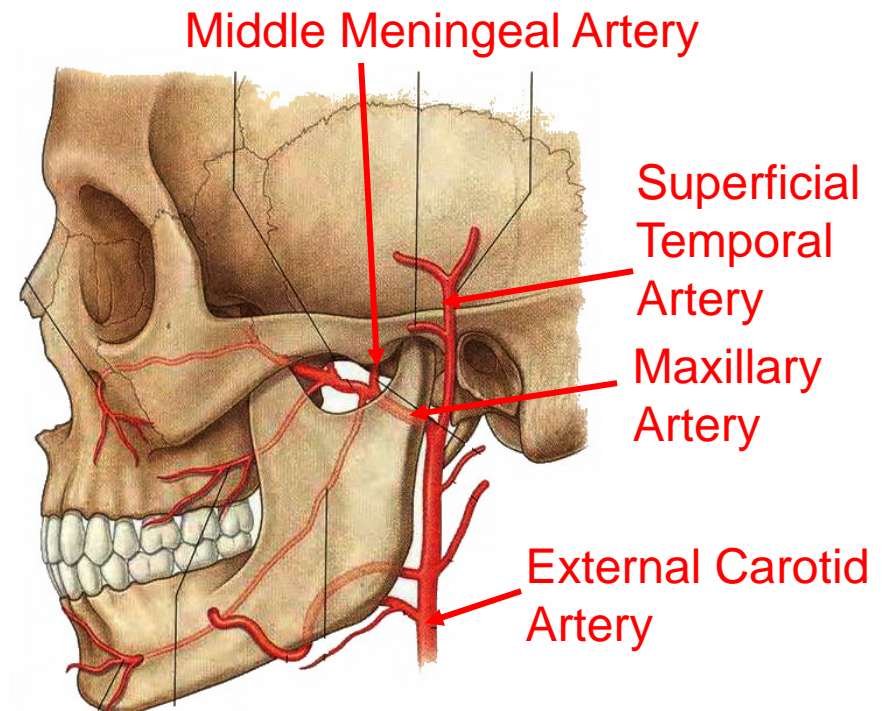


- provides blood supply to calvarium
- outside Dura

**NOTE: PLEASE REVIEW
MAXILLARY ARTERY**

EPIDURAL HEMATOMA

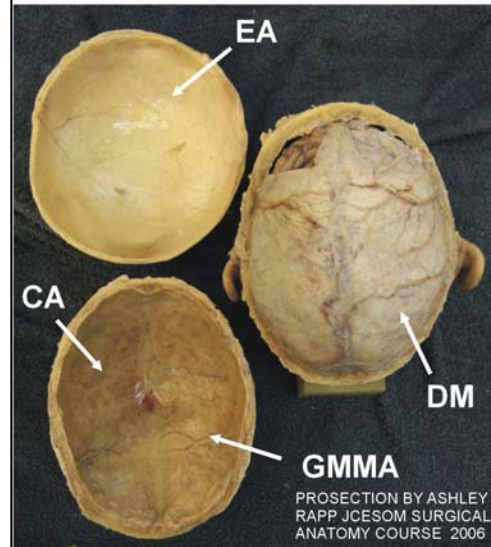
– Middle meningeal artery - branch of Maxillary artery from External Carotid Artery



SCALP, CALVARIUM AND DURA MATER

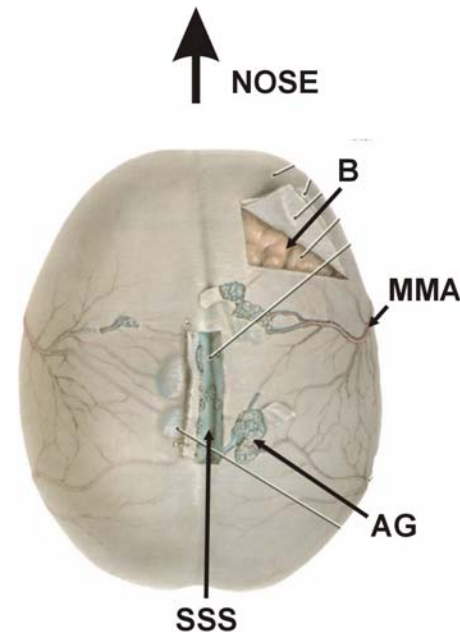
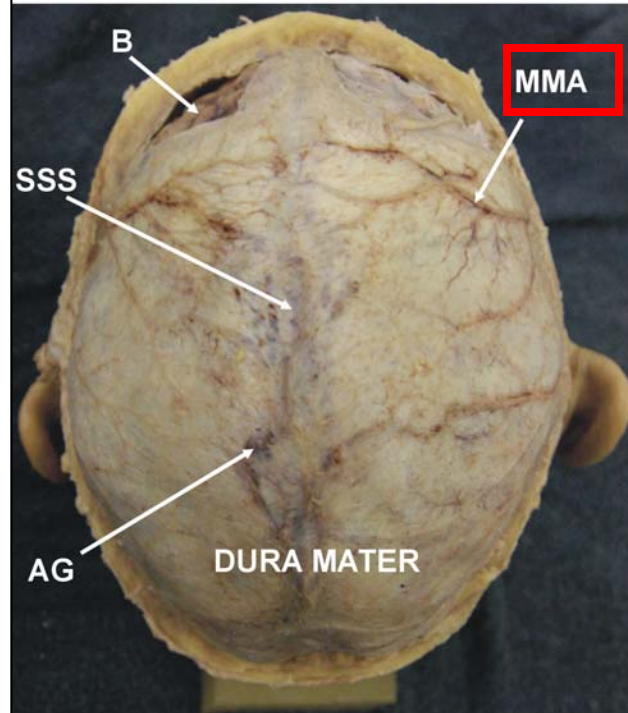
282

INNER SIDE OF CALVARIUM AND SCALP



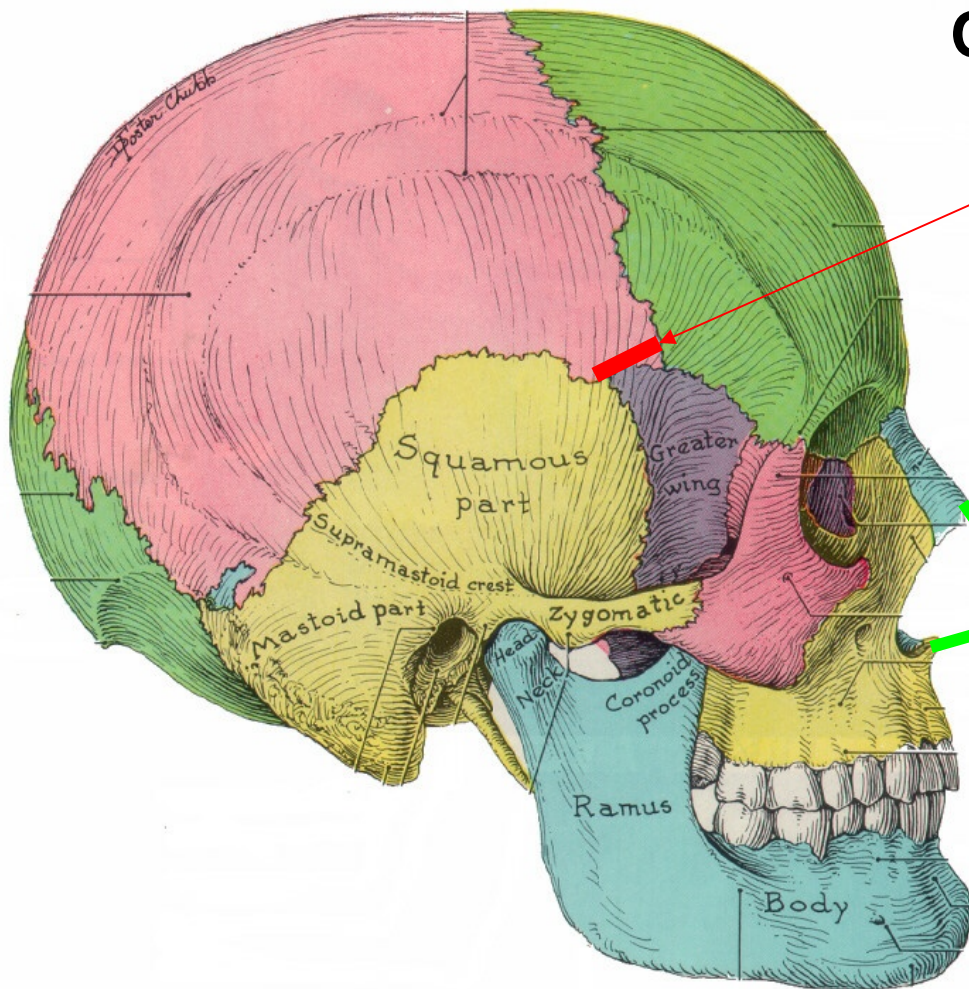
EA - EPICRANIAL APONEUROSIS
(ON INNER SIDE OF SCALP)
CA - CALVARIUM WITH DURA MATER
REMOVED
GMMA - GROOVE FOR MIDDLE
MENINGEAL ARTERY
DM - DURA MATER
B - BRAIN
SSS - SUPERIOR SAGITAL SINUS
AG - ARACHNOID GRANULATION
MMA - MIDDLE MENINGEAL ARTERY

DURA MATER AT HIGH MAG



CORONAL SUTURE

**CALVARIUM THIN
ON LATERAL SIDE
OF SKULL**



PTERION

**- JUNCTION OF
TEMPORAL
SPHENOID PARIETAL
& FRONTAL BONES -
(LATERAL FONTANELLE)**

NOSE

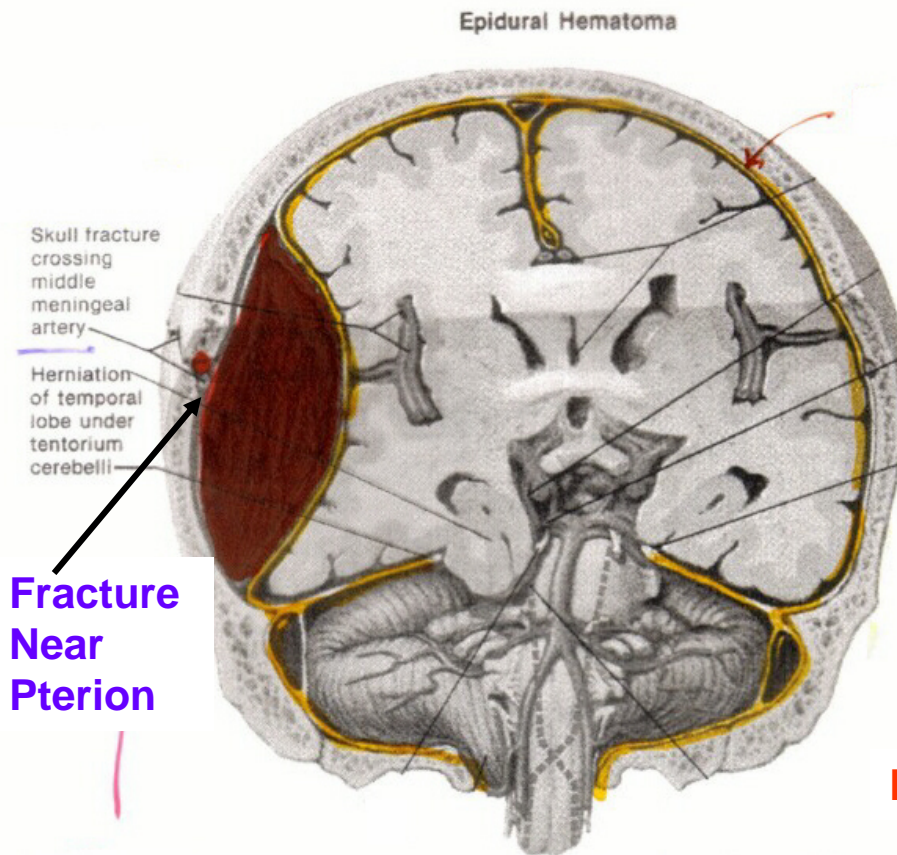
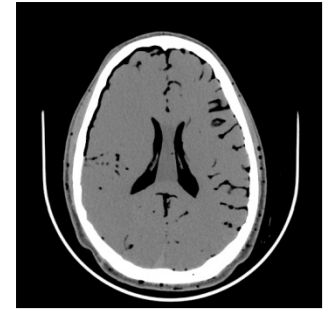
PIC THANKS TO DR. ALBERICO



BLOWS TO HEAD LATERAL SIDE

EPIDURAL HEMATOMA

NORMAL
CT →



CT -
BONE
WHITE;
NOTE
ASYMMETRY
LATERAL
VENTRICLES

EPIDURAL HEMATOMA

Clinical question - Car accident; patient lucid at first; coma/death within hours.

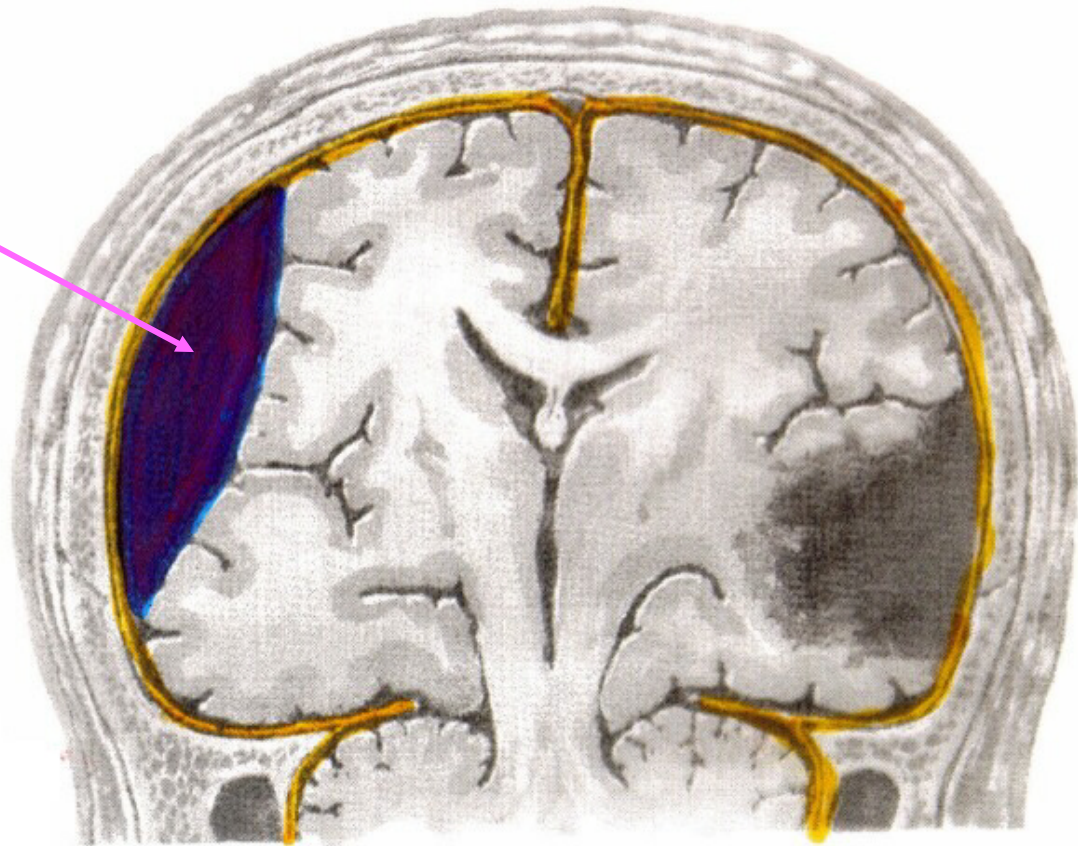
Why? Bleeding is arterial, profuse and rapid; tentorial herniation causes death.

SUBDURAL HEMATOMA

- Bleed into potential space between Dura & Arachnoid
- from tear 'Bridging' vein or sinus
- bleeding often slow
- chronic subdural hematomas can remain undetected

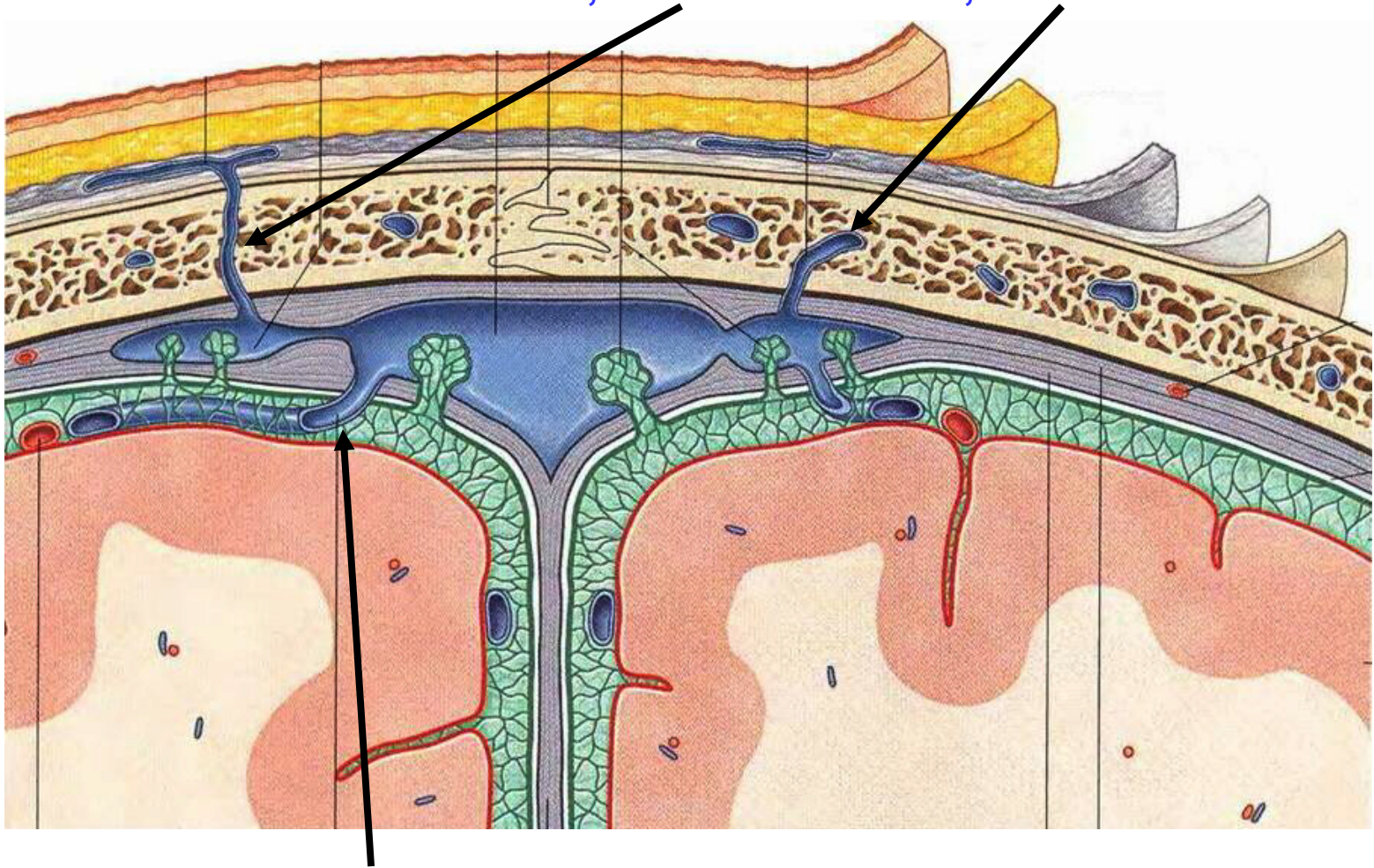
Clinical questions -
causes can be diverse

- trauma; car accident; headaches days later
- non-traumatic - in elderly

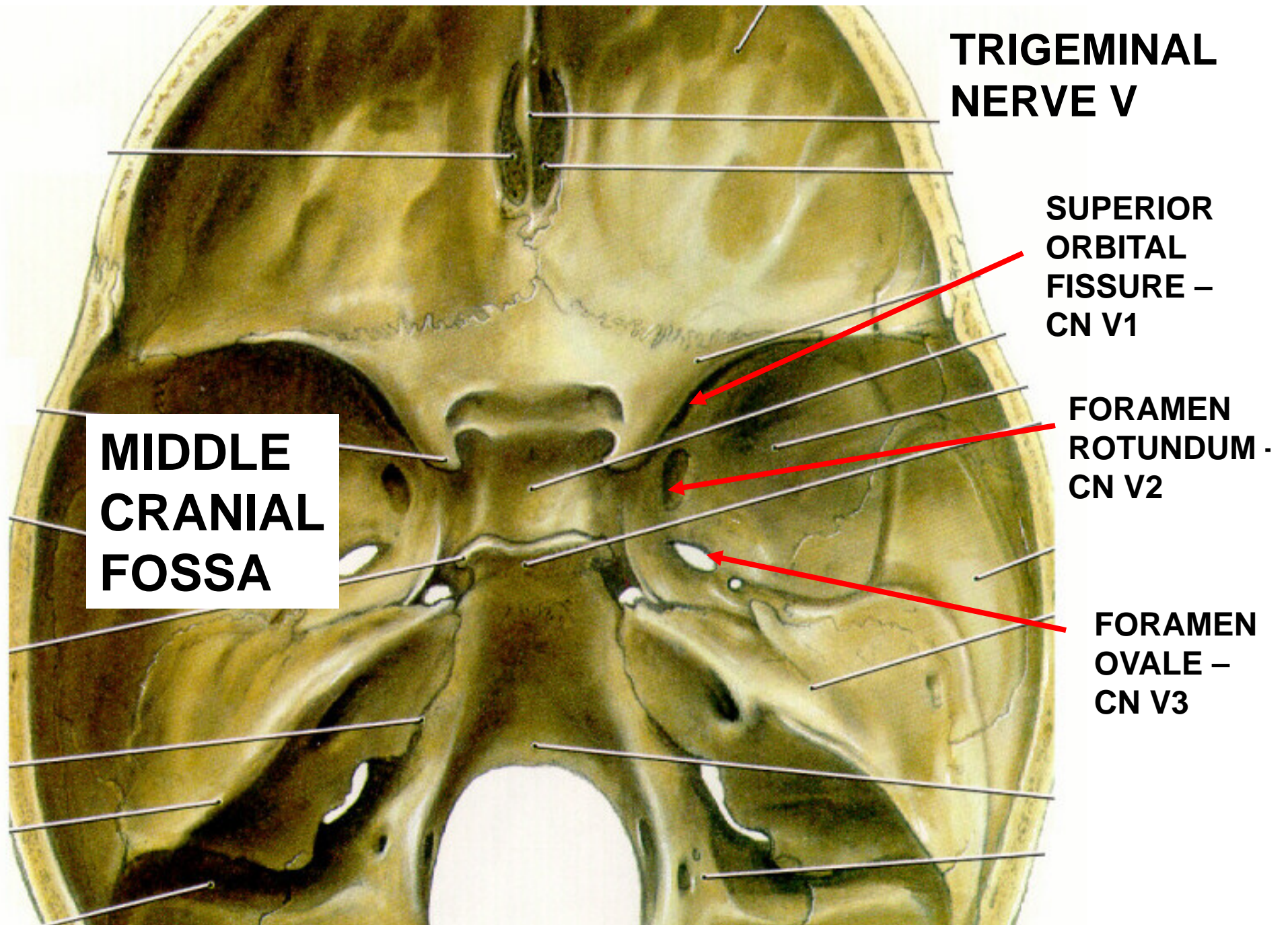


EMISSARY VEINS VS BRIDGING VEINS

EMISSARY VEIN - SCALP TO DIPLOE, SCALP TO SINUS, DIPLOE TO SINUS

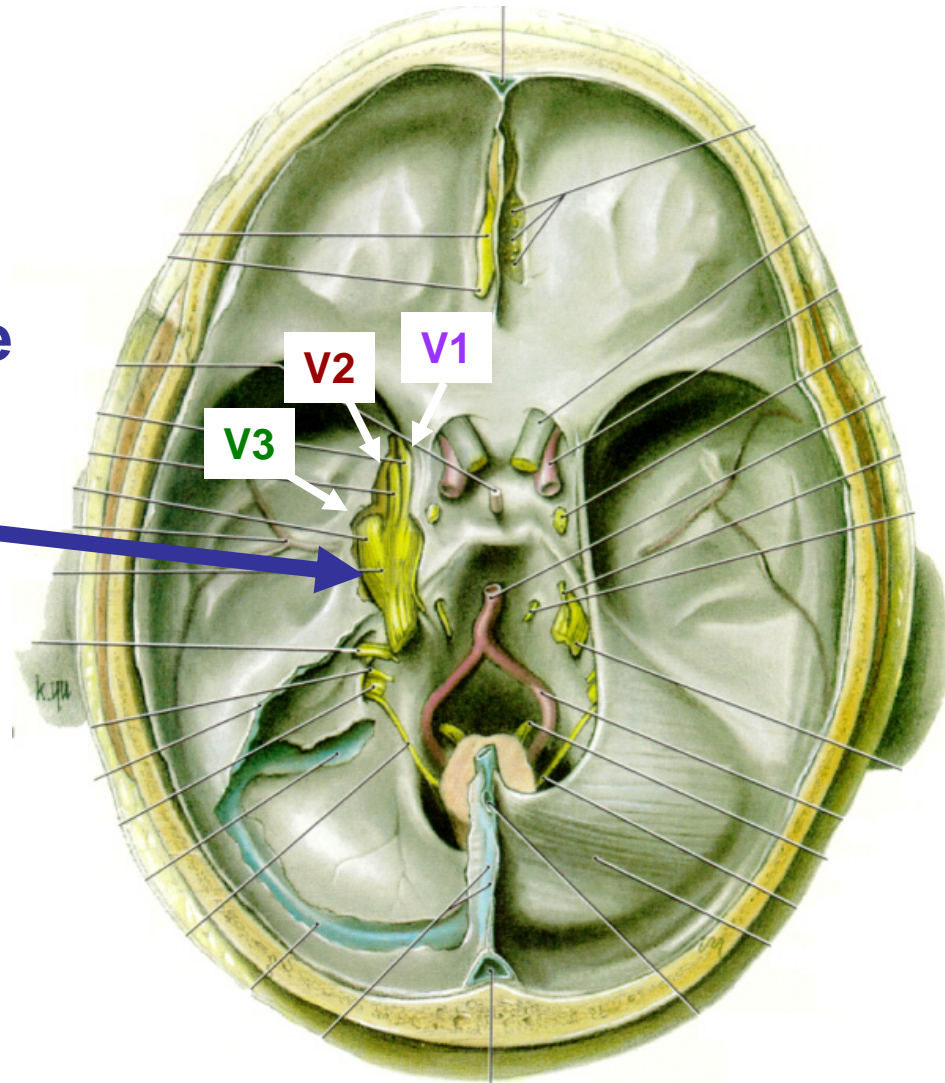


BRIDGING VEIN - CEREBRAL VEIN (BRAIN) TO SINUS



SENSORY GANGLIA ARE ATTACHED TO CRANIAL NERVES

- cell bodies of sensory neurons in Trigeminal Nerve are in Trigeminal (Semilunar) Ganglion



Cell bodies of sensory neurons in VII (Facial Nerve) in Geniculate Ganglion

V. TRIGEMINAL NERVE – SENSORY INNERVATION TO SKIN OF HEAD – 3 DIVISIONS

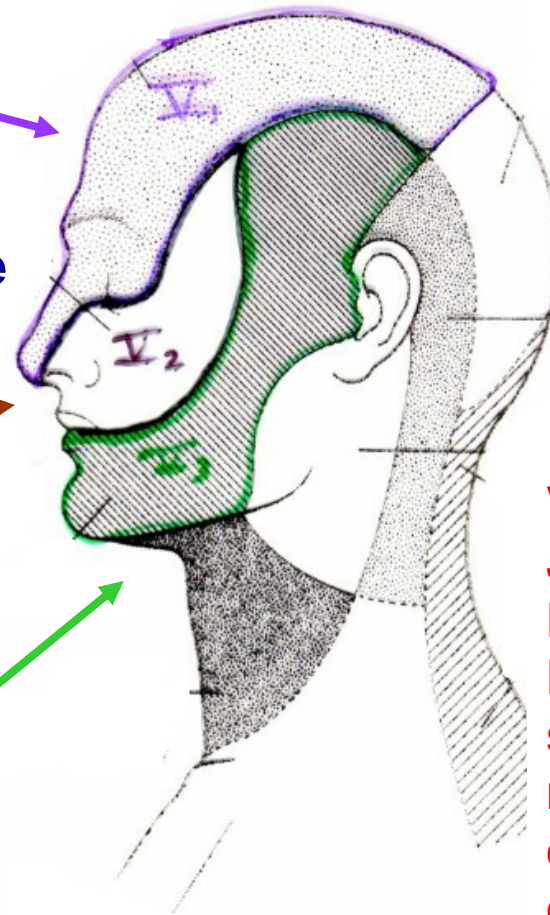
**V1 - GSA
OPHTHALMIC
DIVISION**

**V2 - GSA
MAXILLARY
DIVISION**

**V3 - GSA,
SVE
MANDIBULAR
DIVISION**

Boundary-
Lateral edge
of eye

Boundary
Lateral
edge
of mouth

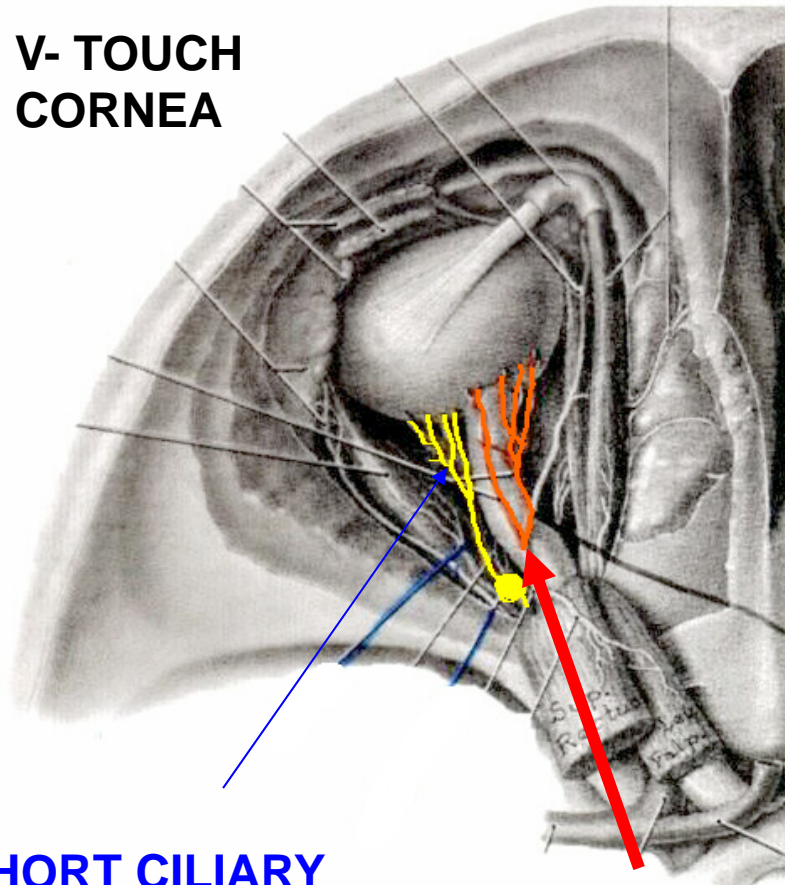


**V1 - also
CORNEAL
REFLEX -
touch cornea V1
(Long Ciliary N.).
close eye VII
(Orbicularis Oculi
M).**

**V3 -
JAW JERK
REFLEX (STRETCH
REFLEX) - ALL V
stretch muscles
mastication (tap
down on mandible)
contract muscles of
mastication (mouth
closes)**

CORNEAL REFLEX - V to VII

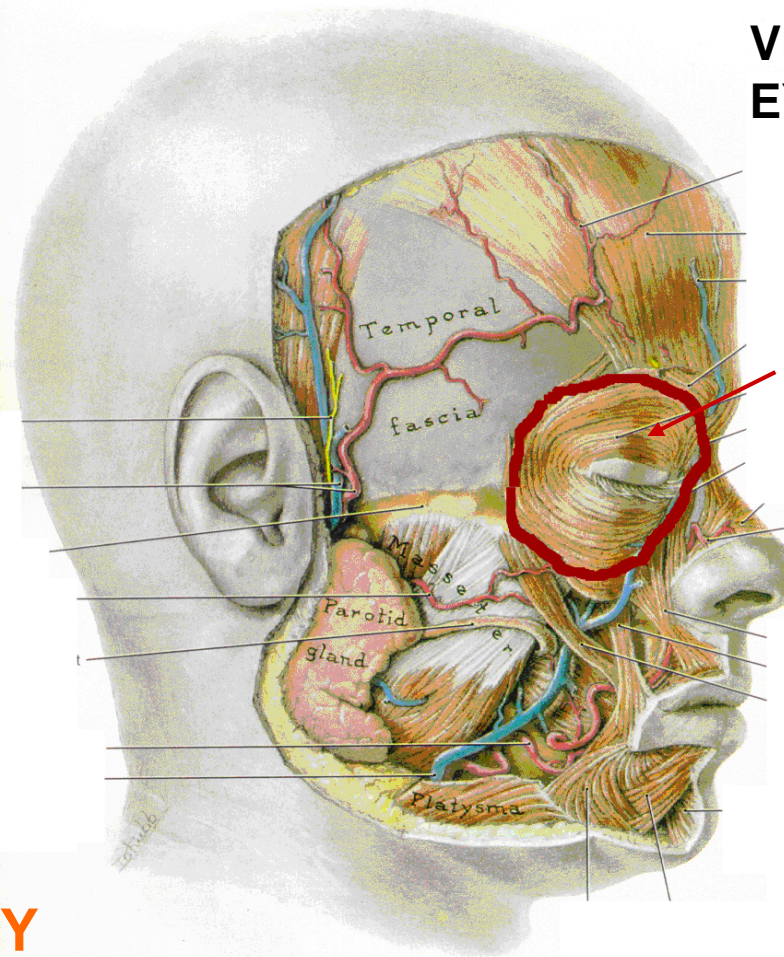
V- TOUCH
CORNEA



SHORT CILIARY
NERVES (III),
CILIARY GANGLION
PARASYMPATHETIC

LONG CILIARY
NERVES (V1) -
SENSORY TO
CORNEA

VII - CLOSE
EYELID

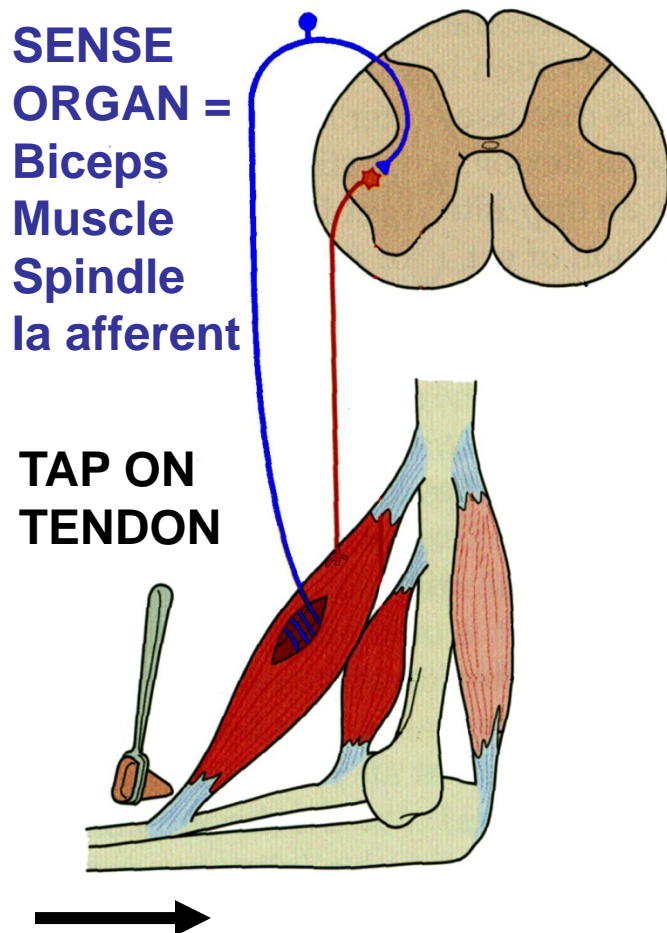


ORBICU-
LARIS
OCULI
M.

- Palpebral part - Close eyelids
- Orbital part - Buries eyelids, Ex. sandstorm

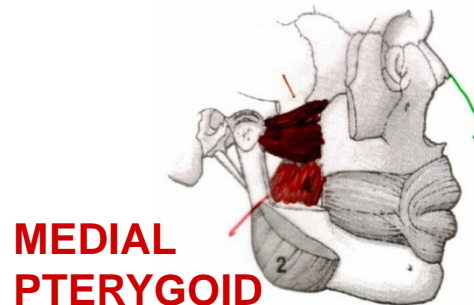
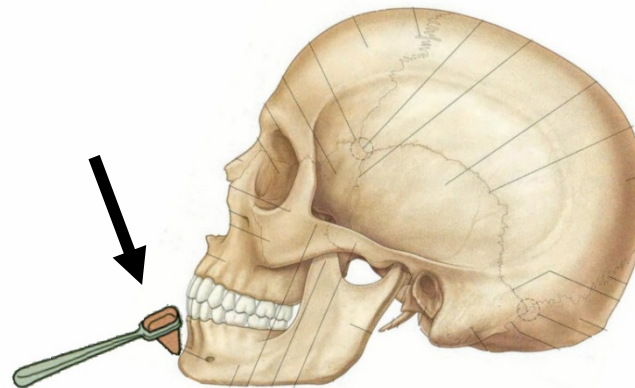
JAW JERK REFLEX = STRETCH REFLEX OF MUSCLES OF MASTICATION - sensory and motor in V3

STRETCH REFLEX IN BICEPS

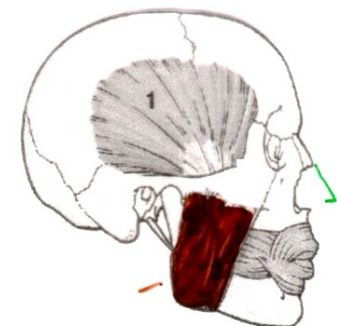


STRETCH REFLEX IN MUSCLES OF MASTICATION

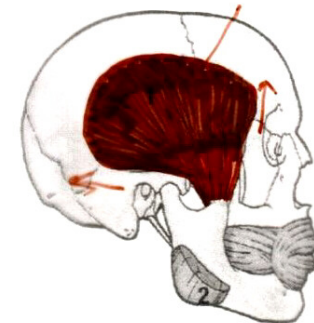
TAP DOWN ON CHIN



STRETCH MUSCLES THAT CLOSE MOUTH (ELEVATE MANDIBLE)



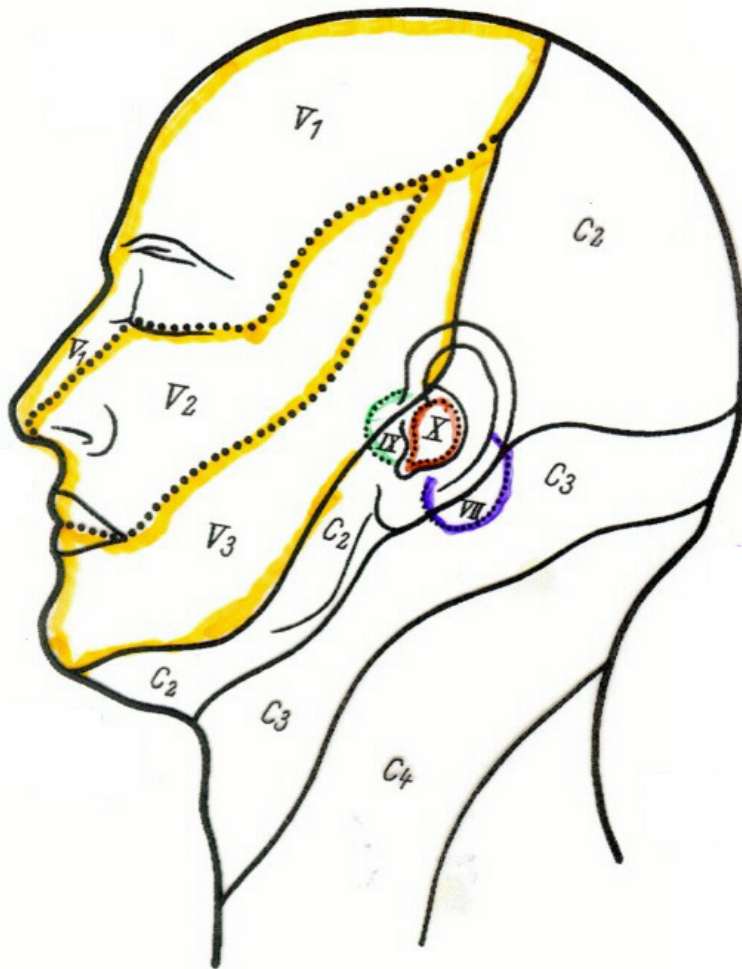
MASSETER



TEMPORALIS

TRIGEMINAL SENSORY DISTRIBUTION

sensory to skin, ORAL cavity, NASAL cavity, joints



ALMOST ALL
TRIGEMINAL V
EXCEPTION:
SKIN OF OUTER EAR
ALSO

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

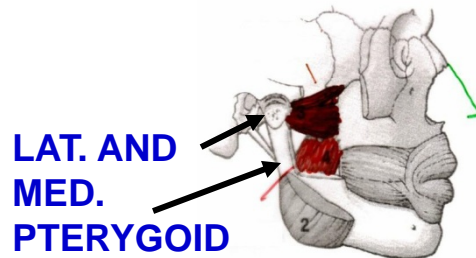
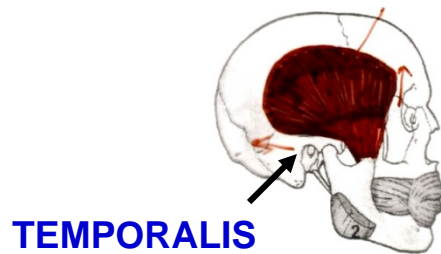
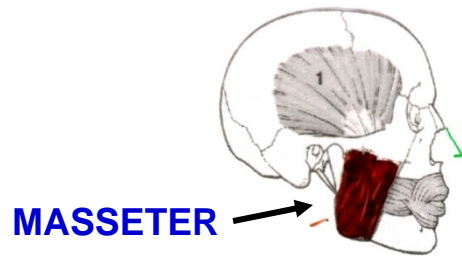
CLINICAL QUESTION: BELL'S PALSY (VII) - PARALYSIS OF FACIAL MUSCLES; IN RECOVERY, PATIENTS COMPLAIN OF EAR ACHES

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

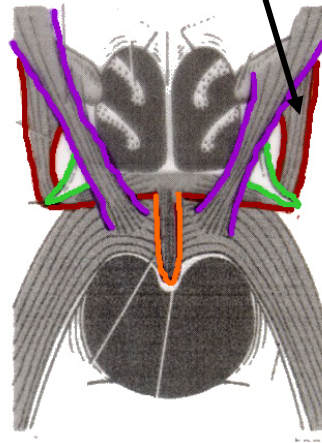
V MOTOR - DIVERSE

MUSCLES OF MASTICATION

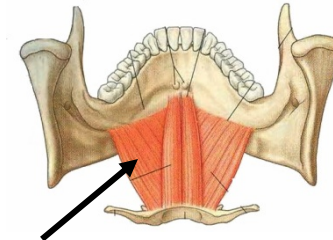
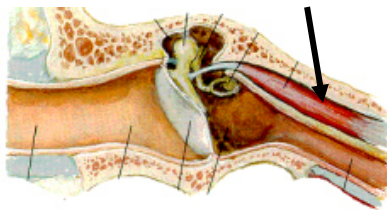


**ACTIONS - MOST CLOSE MOUTH -
MASSETER, TEMPORALIS, MED. PTERYGOID
OPEN MOUTH - LAT. PTERYGOID;
PROTRUDE - LAT. PTERYGOID; RETRUDE - TEMPORALIS**

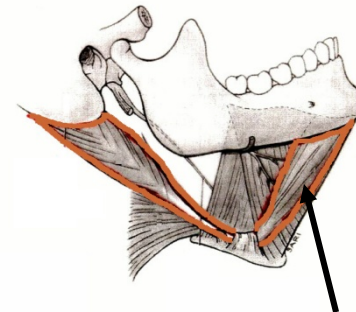
**TENSOR PALATI -
tenses palate in
swallowing**



**TENSOR TYMPANI
- dampen sound**



**MYLOHYOID -
raise floor of mouth
in swallowing**



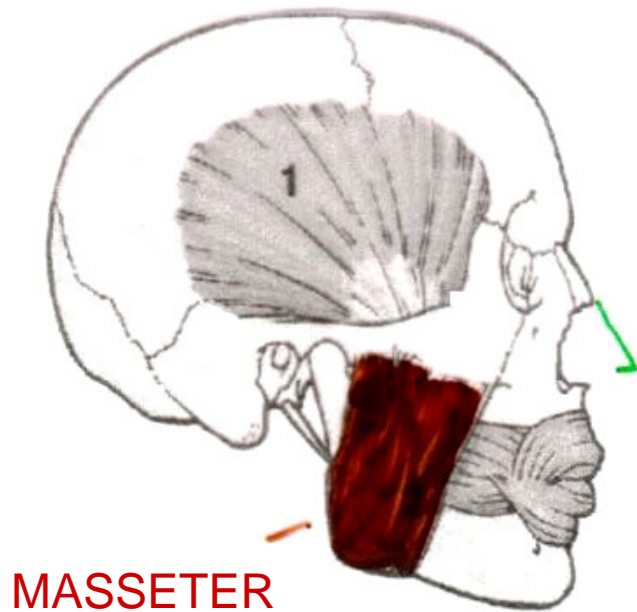
**ANT. BELLY OF
DIGASTRIC -
opens mouth**

VI. MUSCLES OF MASTICATION- ALL INN V3

1. MASSETER

ORIGIN - ZYGOMATIC

ARCH INSERT - RAMUS OF
MANDIBLE (LATERAL SIDE)
ACT - ELEVATE

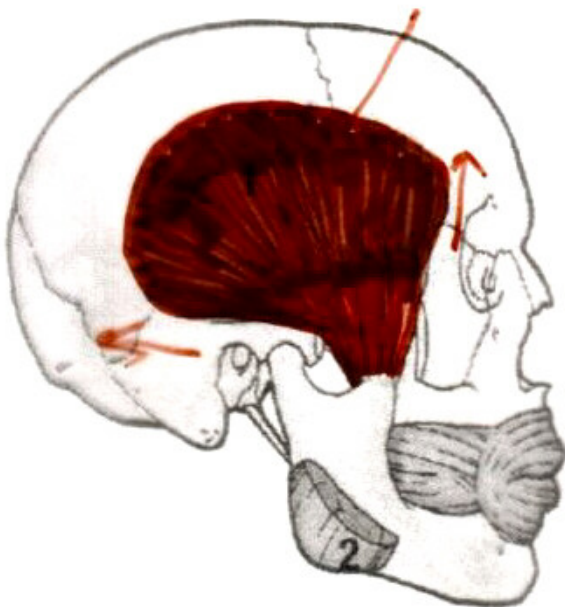


TEMPORALIS

2. TEMPORALIS

ORIGIN - TEMPORAL BONE

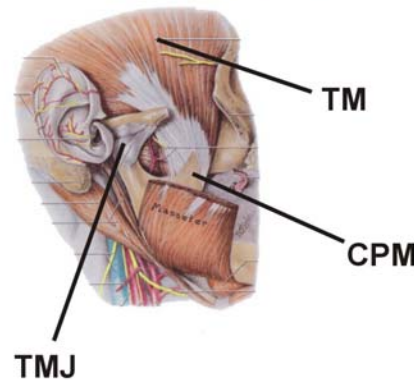
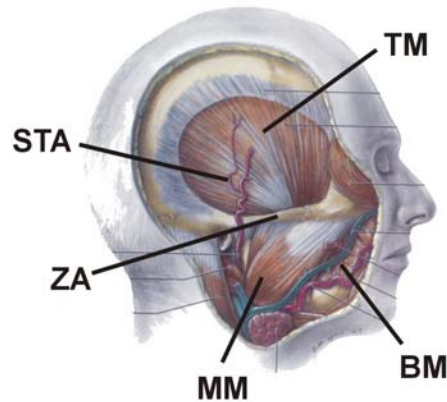
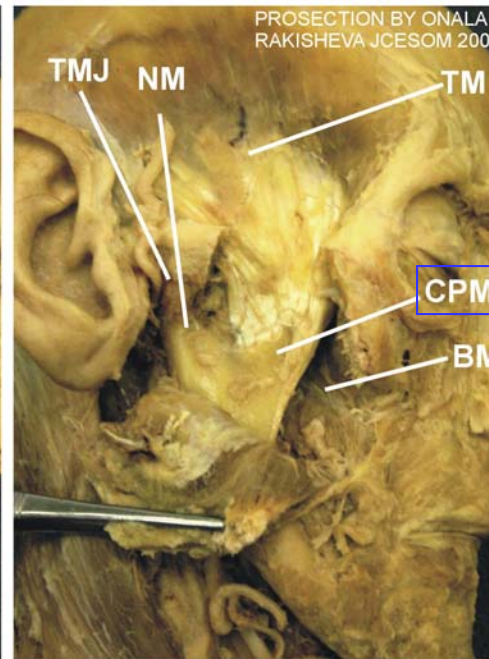
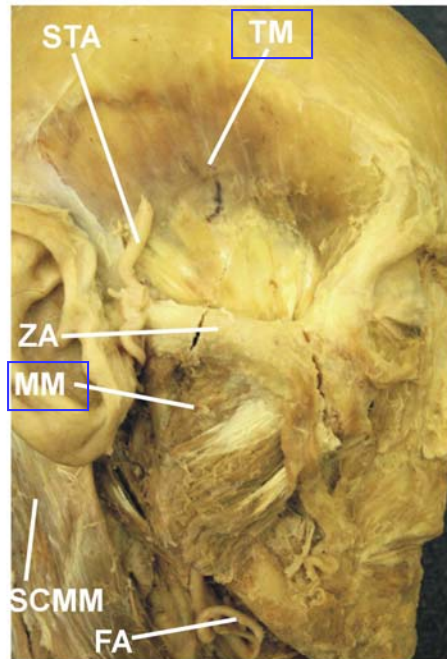
INSERT -CORONOID
PROCESS OF MANDIBLE
ACT - ELEVATE, RETRUDE
(POST FIBERS) MANDIBLE



MUSCLES OF MASTICATION

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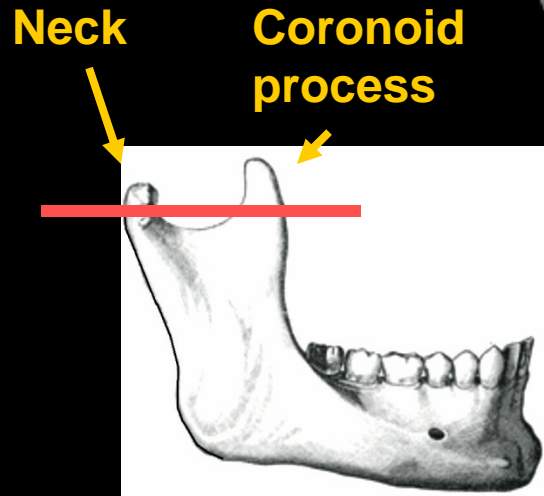
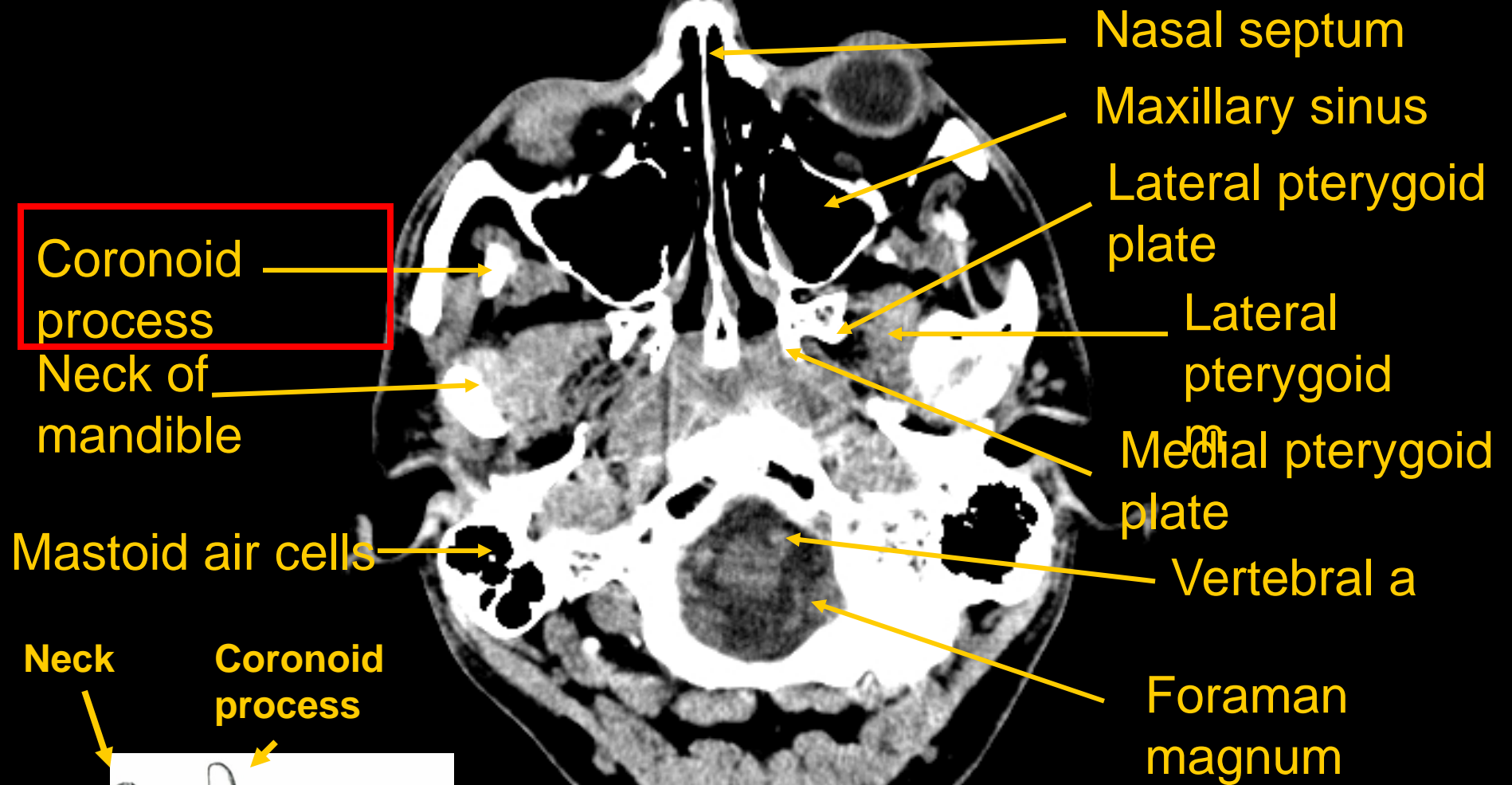
CAREFULLY REFLECT ZYGOMATIC ARCH AND MASSETER MUSCLE

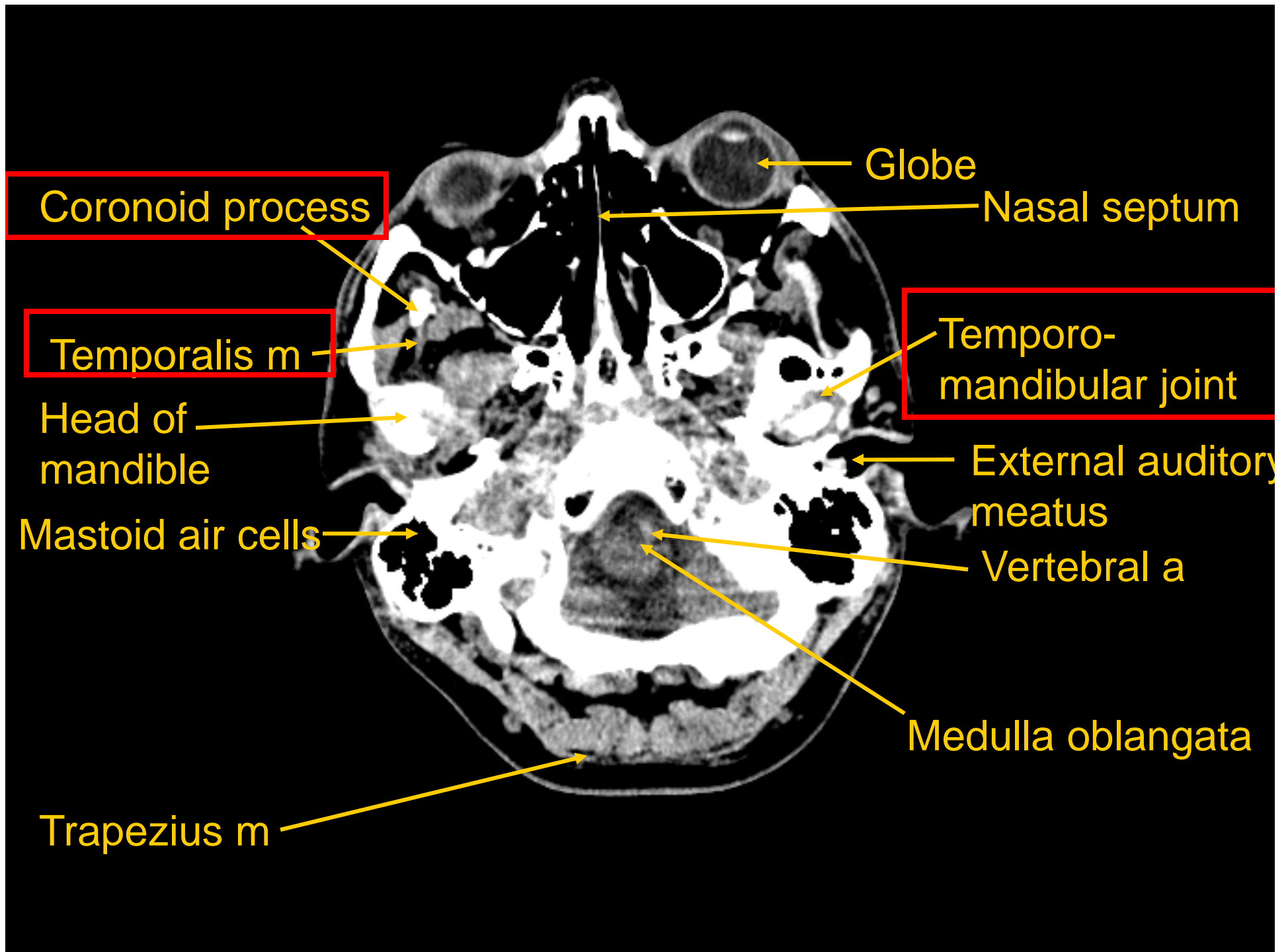


BM - BUCCINATOR MUSCLE
FA - FACIAL ARTERY (CUT)
NM - NECK OF MANDIBLE
ZA - ZYGOMATIC ARCH
MM - MASSETER MUSCLE
TM - TEMPORALIS MUSCLE

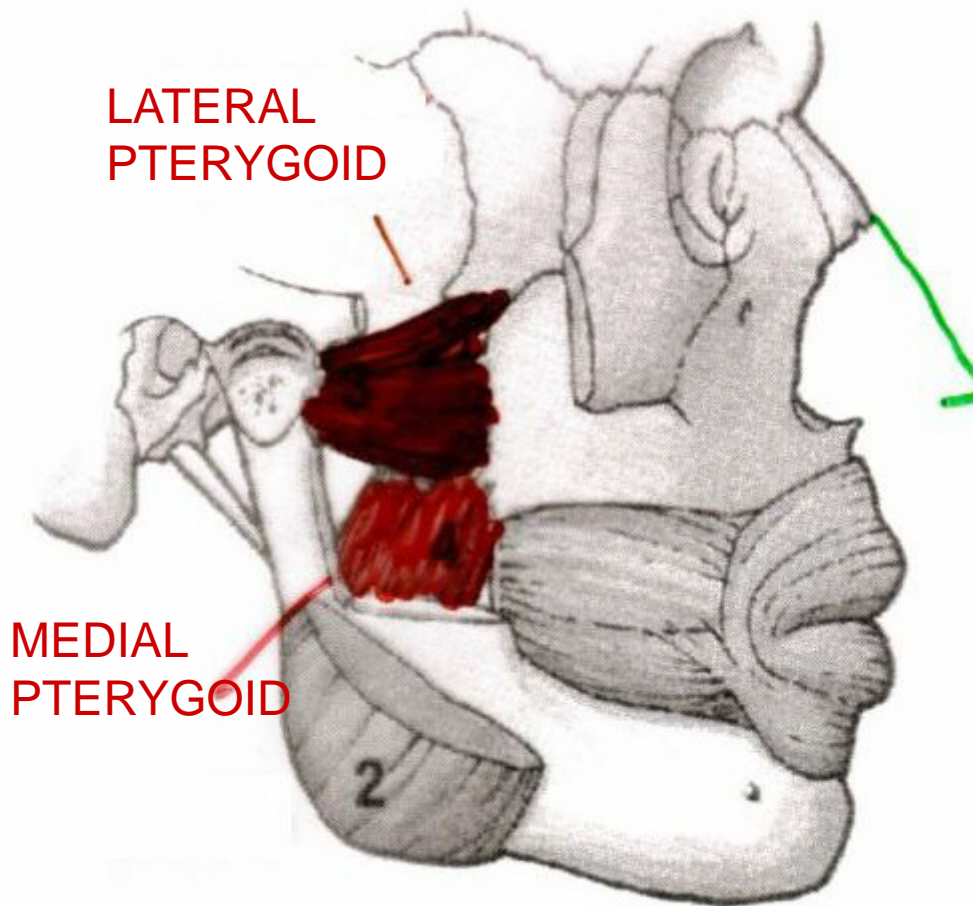
STA - SUPERFICIAL TEMPORAL ARTERY
SCMM - STERNOCLEIDOMASTOID MUSCLE
CPM - CORONOID PROCESS OF MANDIBLE
TMJ - TEMPOROMANDIBULAR JOINT

**TEMPORALIS,
CORONOID
PROCESS,
MASSETER**





MUSCLES OF MASTICATION



3. MEDIAL PTERYGOID

ORIGIN - MEDIAL SIDE OF
LATERAL PTERYGOID PLATE

INSERT - MEDIAL SIDE OF
RAMUS

ACT - ELEVATE

4. LATERAL PTERYGOID

ORIGIN - LATERAL SIDE OF
LATERAL PTERYGOID PLATE &
GREATER WING OF SPHENOID

INSERT - NECK OF MANDIBLE
& ARTICULAR DISC OF TMJ

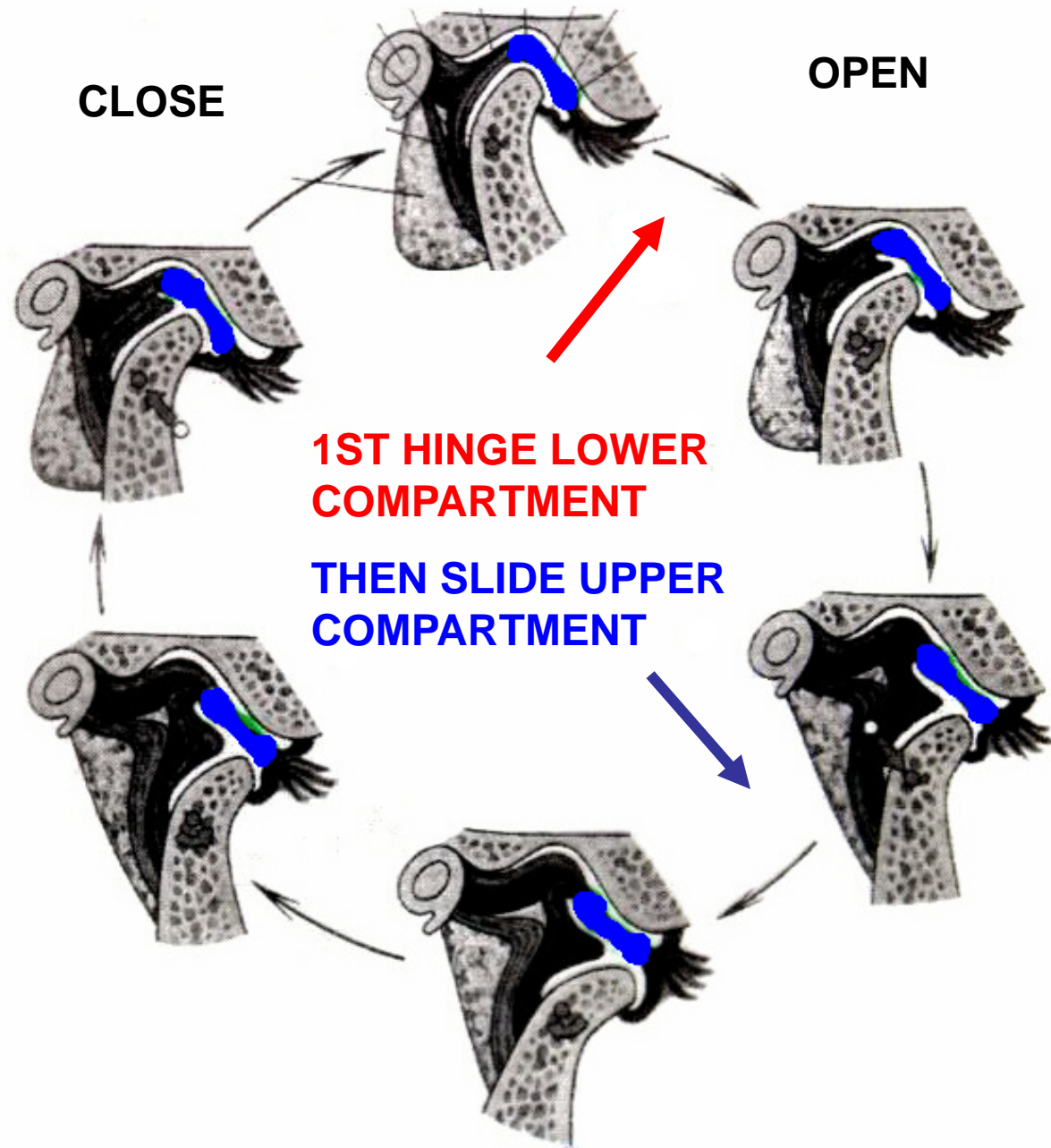
ACT - DEPRESS, PROTRUDE
MANDIBLE

D. MOVEMENTS OF MANDIBLE

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

2. PROTRUDE/
RETRUDE

3. LATERAL MOVE->
BOTH SLIDE UPPER
COMPARTMENT

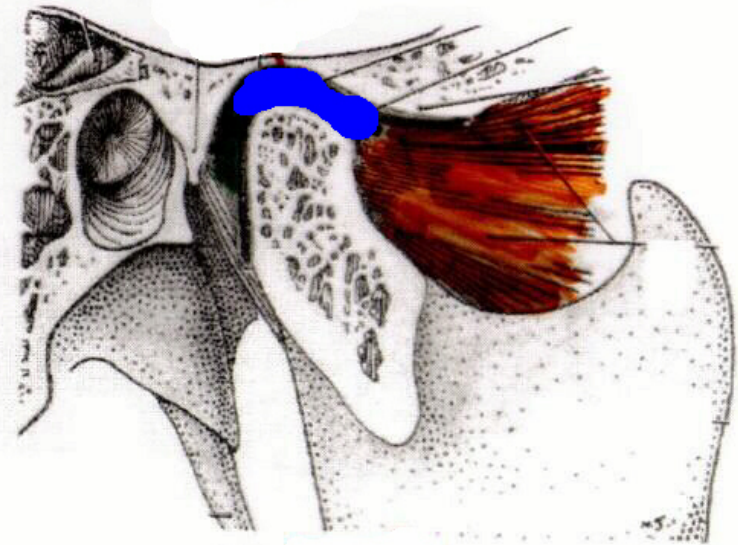
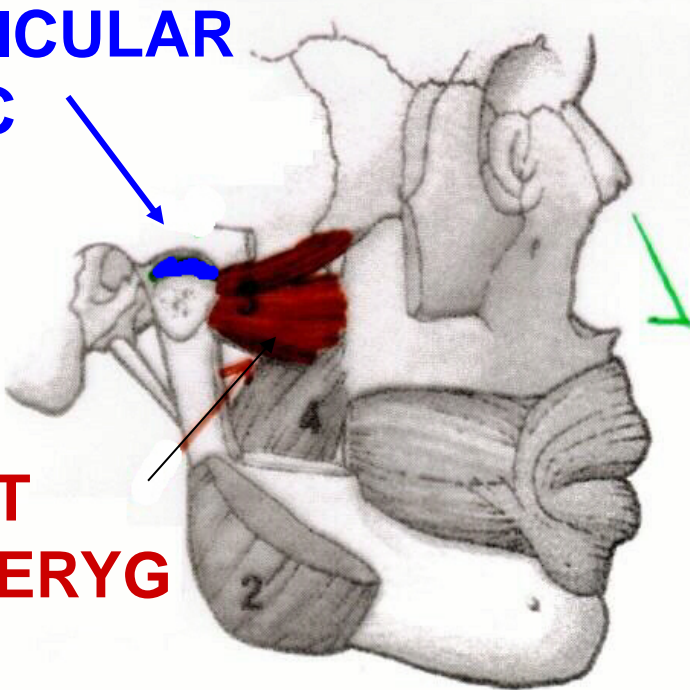


MUSCLES OF MASTICATION

LATERAL PTERYGOID- ATTACHES TO ARTICULAR DISC OF TMJ

**ARTICULAR
DISC**

**LAT
PTERYG**

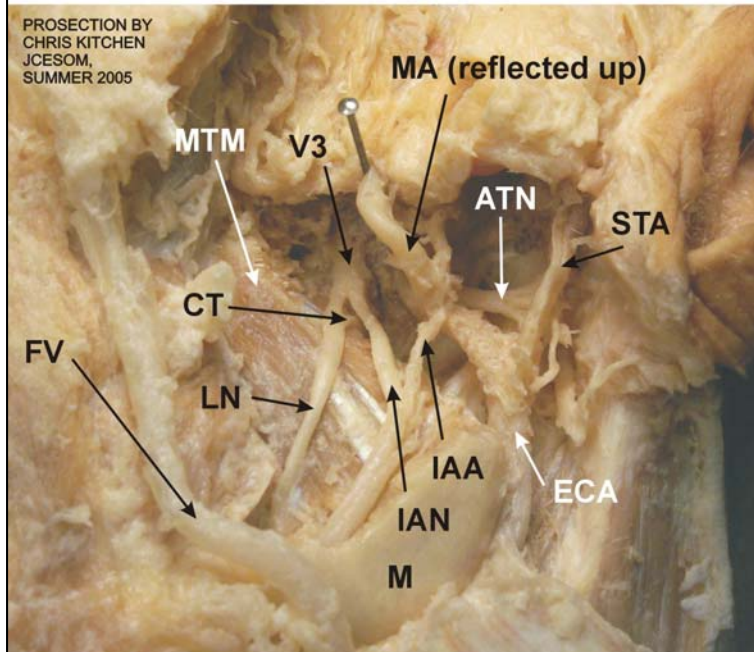


PULLS DISC ANTERIORLY WHEN OPEN MOUTH

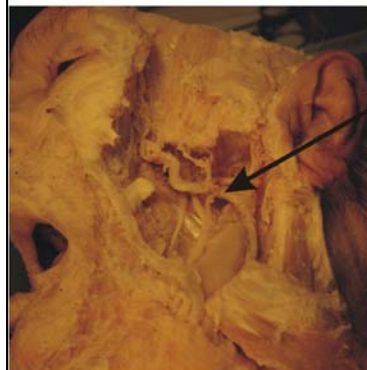
**CLINICAL CORRELATES - DEGENERATION OF ARTICULAR DISC
- JAW 'LOCKED' OPEN**

INFRATEMPORAL FOSSA: SUPERFICIAL DISSECTION WITH CHORDA TYMPANI

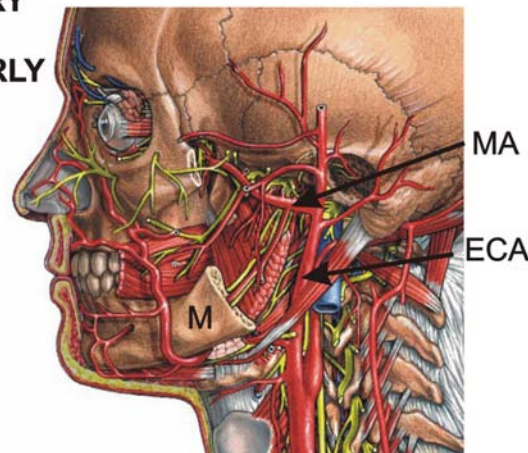
PROSECTED BY
CHRIS KITCHEN
JCESOM,
SUMMER 2005

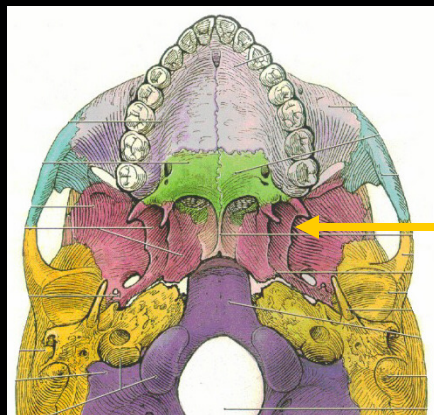
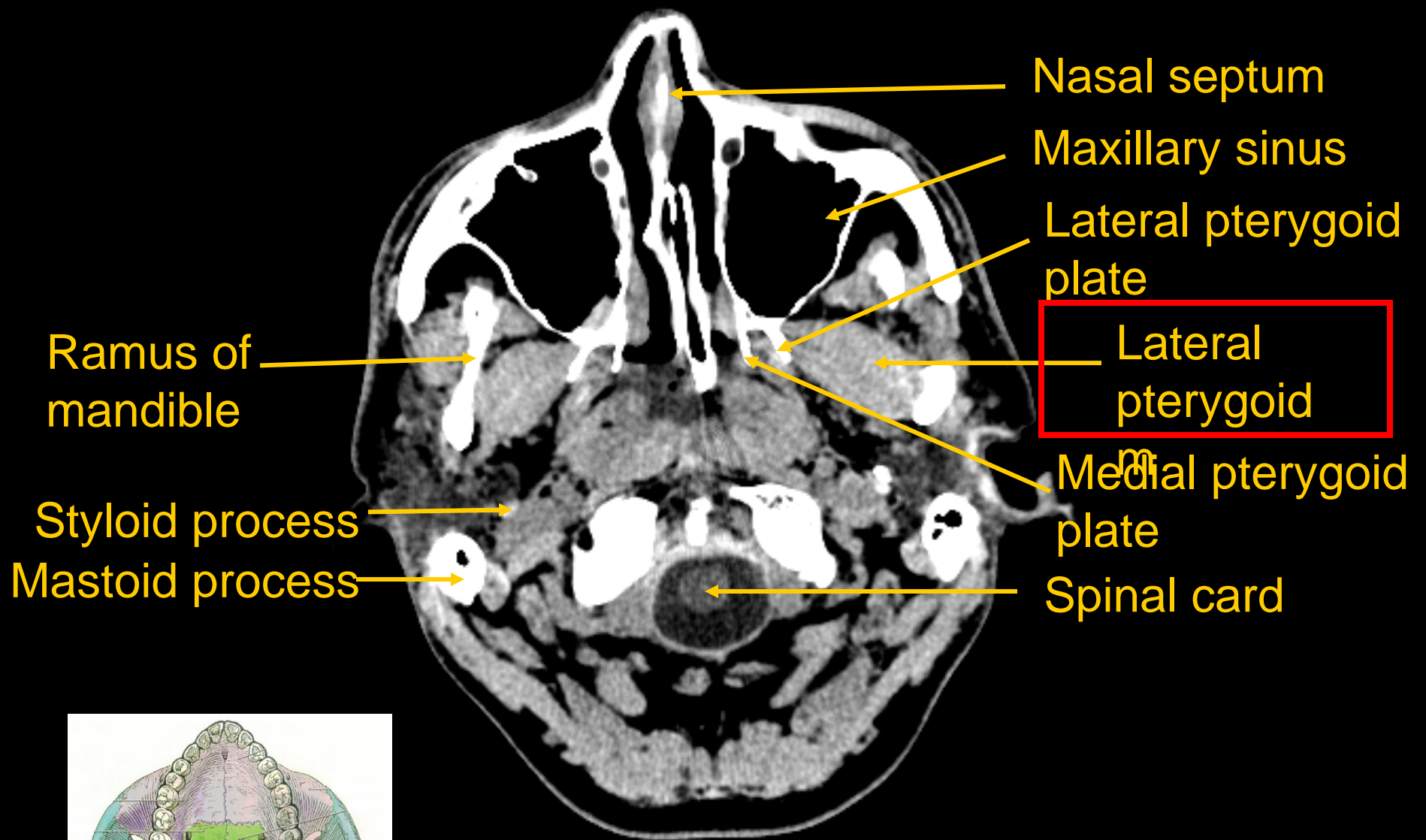


MA - Maxillary artery
V3 - Mandibular division of V
MTM - Medial Pterygoid Muscle
CT - Chorda Tympani Nerve
LN - Lingual Nerve
FV - Facial Vein
ATN - Auriculo-temporal Nerve
STA - Superficial Temporal Artery
ECA - External Carotid Artery
IAA - Inferior Alveolar Artery
IAN - Inferior Alveolar Nerve
M - Mandible



ORIENT:
GENTLY
REFLECT
MAXILLARY
ARTERY
SUPERIORLY
TO SEE
CHORDA
TYMPANI

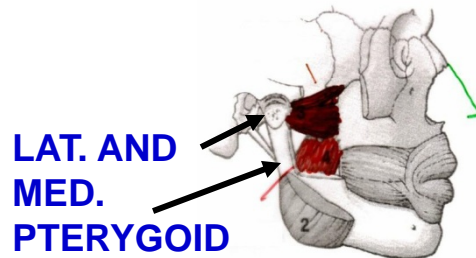
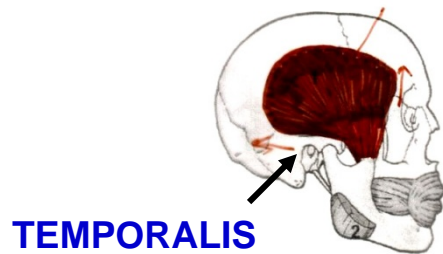
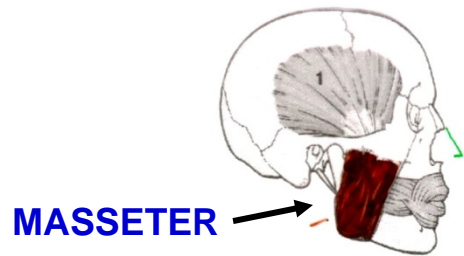




Pterygoid plates

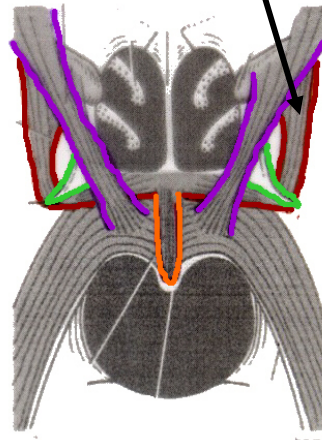
V MOTOR - DIVERSE

MUSCLES OF MASTICATION

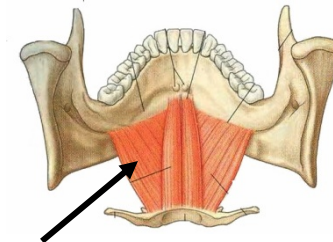
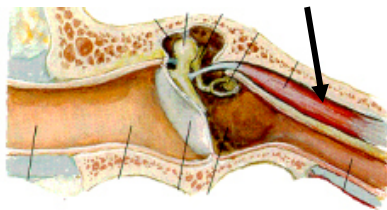


**ACTIONS - MOST CLOSE MOUTH -
MASSETER, TEMPORALIS, MED. PTERYGOID
OPEN MOUTH - LAT. PTERYGOID;
PROTRUDE - LAT. PTERYGOID; RETRUDE - TEMPORALIS**

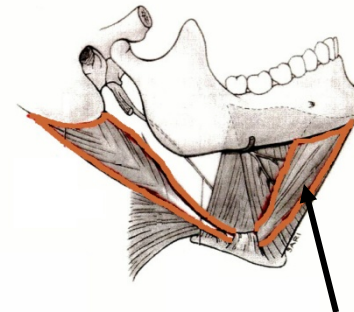
**TENSOR PALATI -
tenses palate in
swallowing**



**TENSOR TYMPANI
- dampen sound**

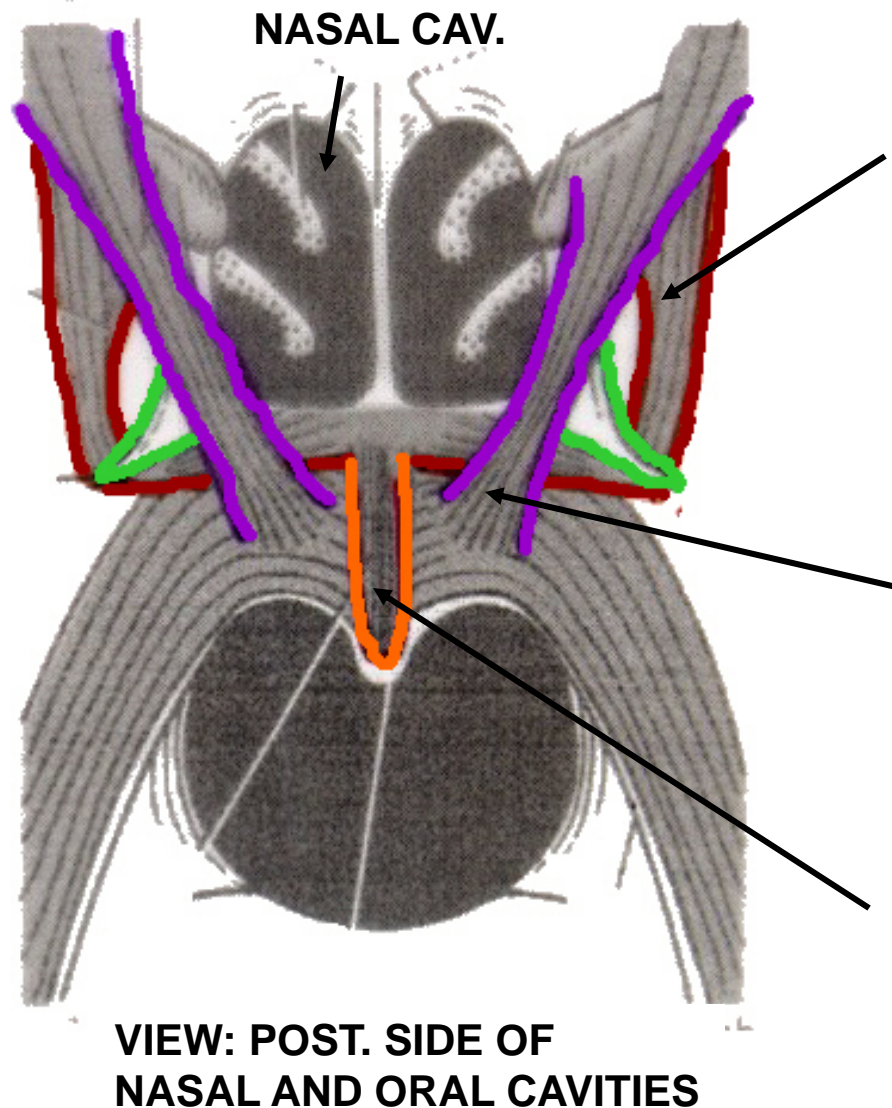


**MYLOHYOID -
raise floor of mouth
in swallowing**



**ANT. BELLY OF
DIGASTRIC -
opens mouth**

a. MUSCLES OF SOFT PALATE



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

MUSCLES OF SOFT PALATE

4) Palatoglossus

O - Palatine aponeurosis, I - Side of tongue; A - Draws palate down, raises tongue

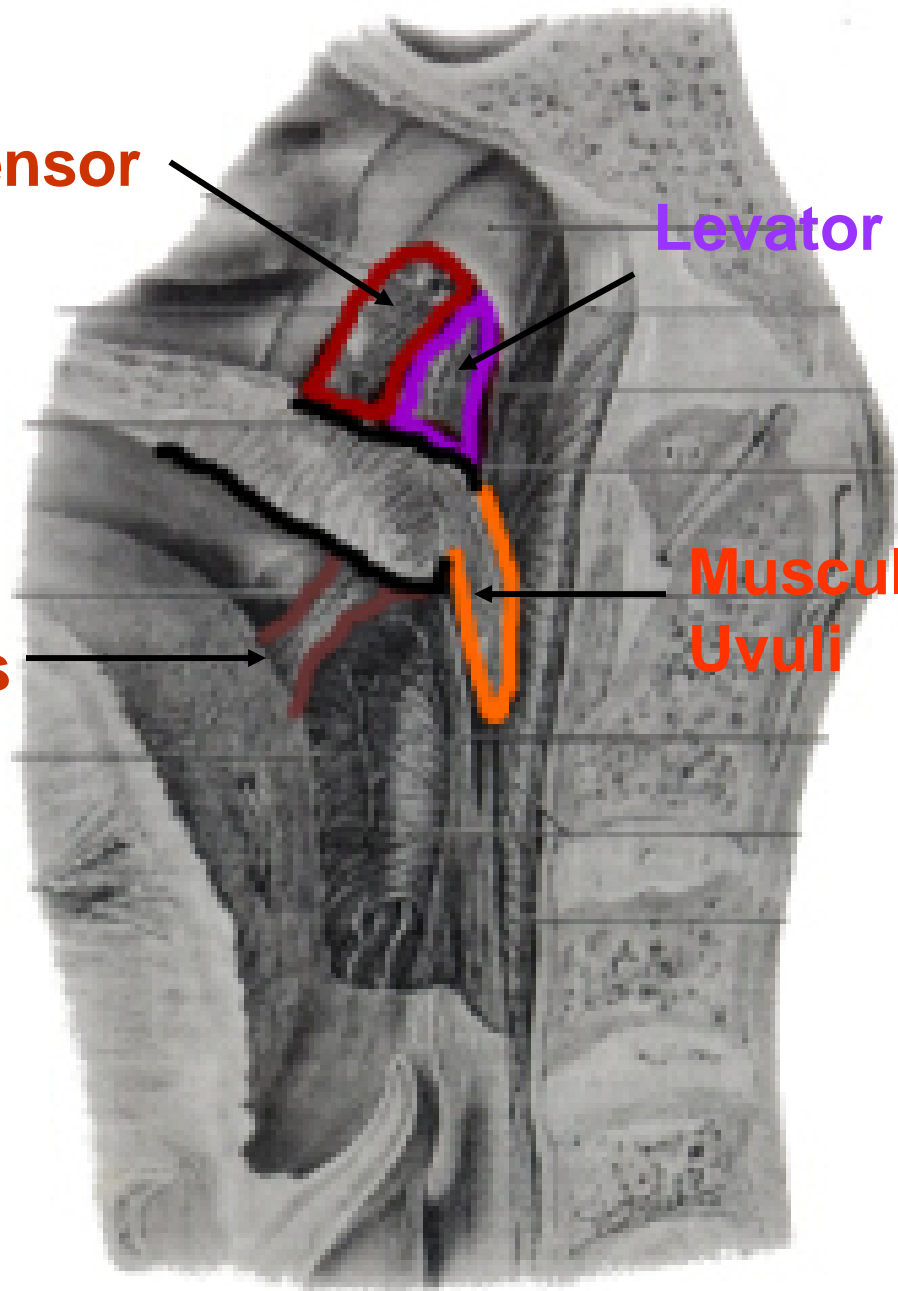
Innervation - All
X except Tensor (V3)

Palatoglossus

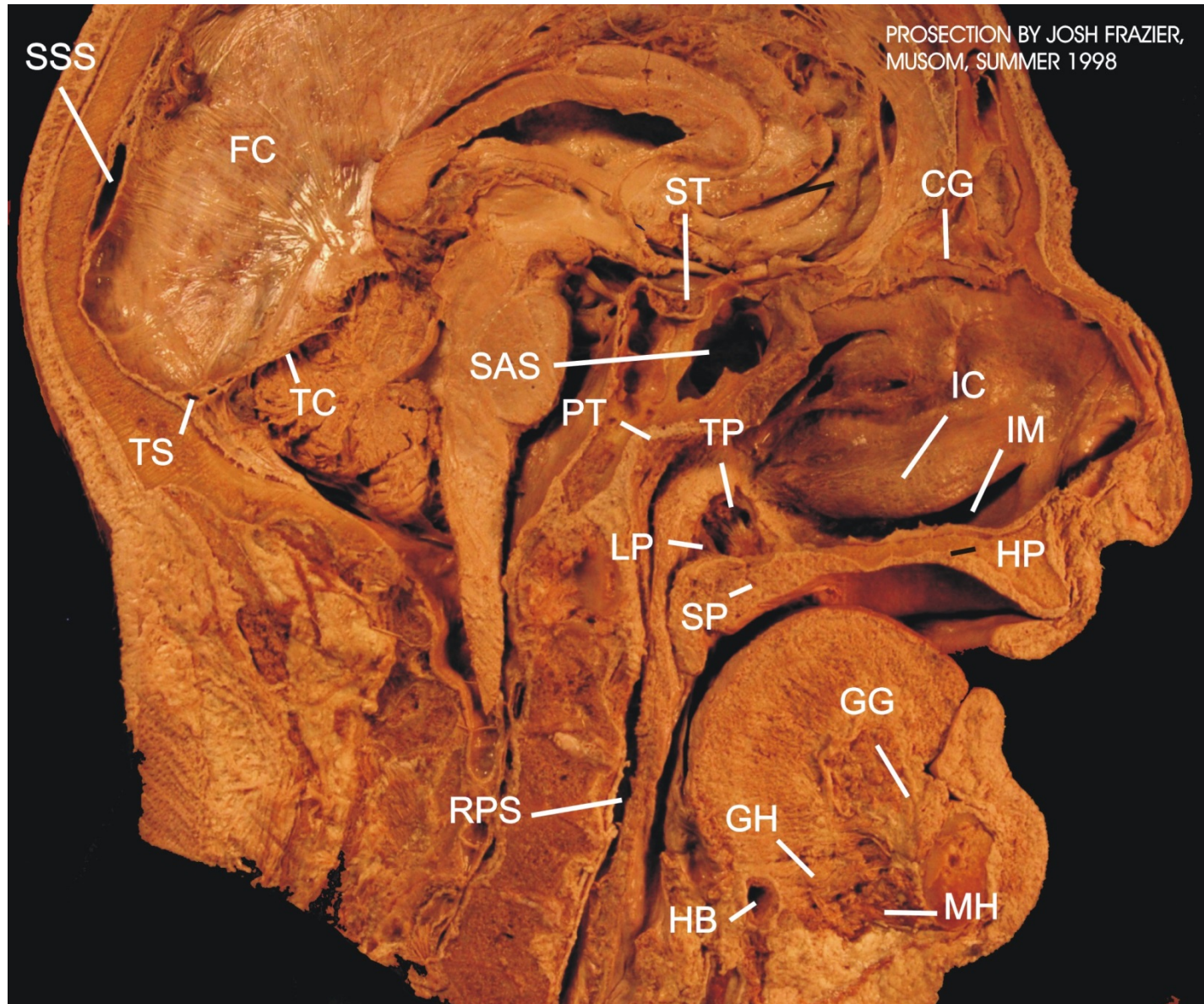
Tensor

Levator

Musculus Uvuli



PROSECTION OF TENSOR AND LEVATOR OF PALATE

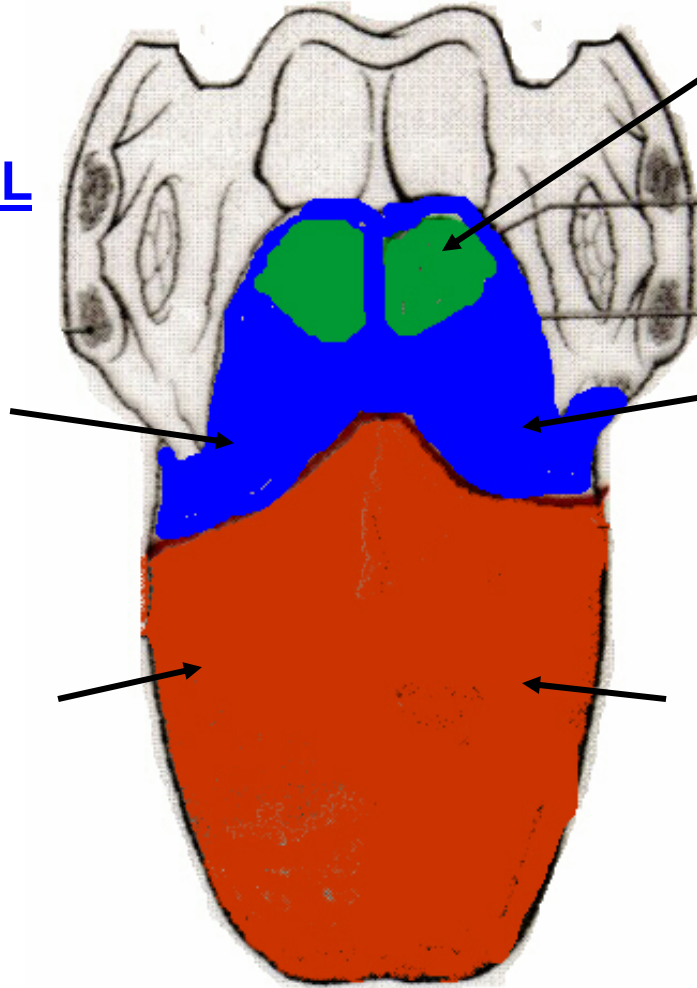


SENSORY INNERVATION OF TONGUE

NOTE: ↓

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

ORAL PART -
ANT 2/3



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

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

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

MOTOR - ALL MUSCLES INNERVATED BY XII HYPOGLOSSAL (GSE) –
PALATOGLOSSUS IS MUSCLE OF PALATE INNERVATED BY X (VAGUS)

GOOD LUCK!