

REVIEW SKULL SESSION 2024

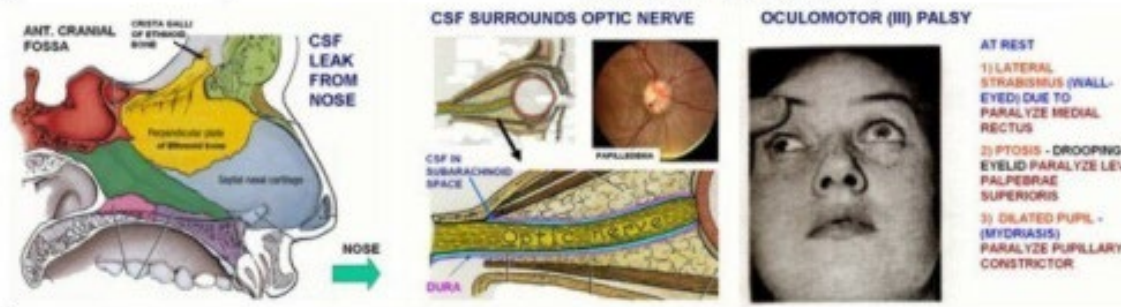
**Skull (sutures, foramina),
Reflexes Cranial Nerves,
Nasal Cavity**

CLINICAL ANATOMY CHARTS; SUMMARIES FOR EXAM AND BOARD REVIEW (TOTAL 8 PAGES INCLUDING REFLEX TESTING AND EMBRYOLOGY)

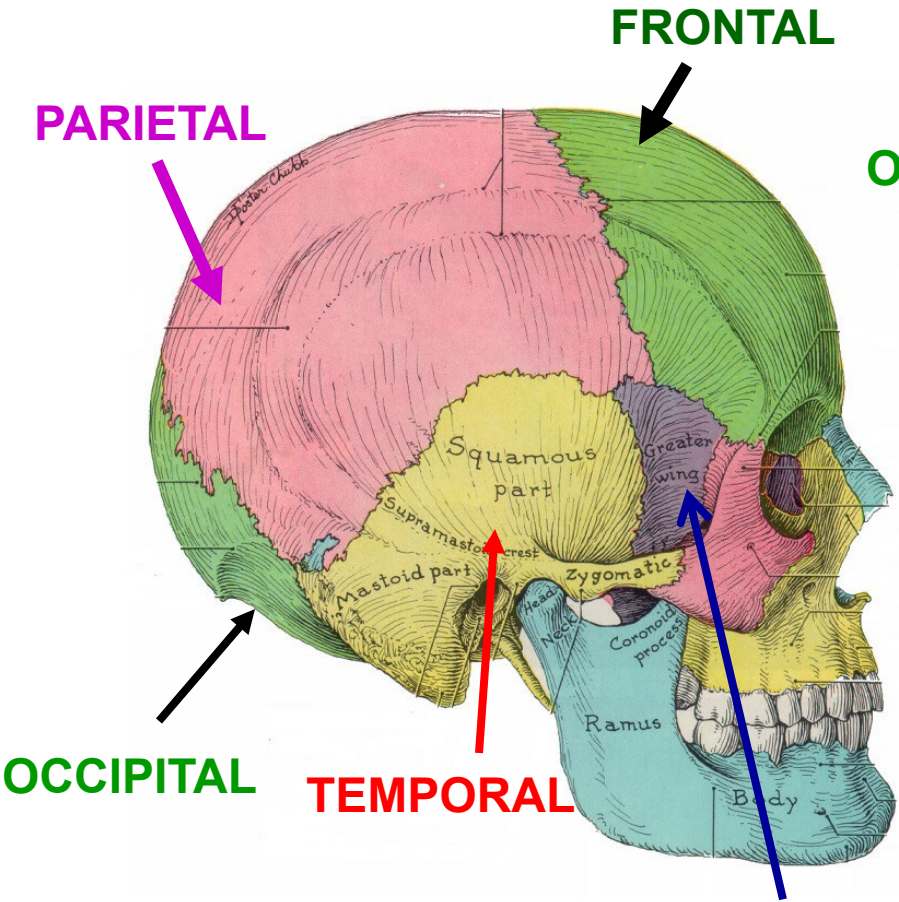
CLINICAL ANATOMY OF HEAD AND NECK 2023

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Clinical	Anatomy	Cause	Sign/Symptom
Anterior Cranial Fossa - Cranial nerve I, Nasal Cavity			
Fracture of cribriform plate of ethmoid bone	Nasal septum continuous with crista galli of ethmoid bone; Olfactory nerve passes through cribriform plate of ethmoid bone	Blow to nose; fracture produces continuity between subarachnoid space and nasal cavity	Leakage of CSF from nose ('runny nose'); Decreased sense of smell (hyposmia)
Middle Cranial Fossa - Cranial nerves II-VI Orbit, Eye Movements, Face			
Rapid loss of vision in one eye	Central artery of retina (branch of Ophthalmic artery from Int. Carotid) is an normally an end artery with no functional anastomoses (exception: Chorioretinal anastomoses)	Occlusion of Central Artery of Retina	Sudden onset blindness in one eye (one eye only, sign: artery occlusion visible through ophthalmoscope)
Slow loss of vision in one eye	Dura mater and subarachnoid continue over optic nerve; Optic nerve function affected by CSF pressure	Communicating hydrocephalus (many causes)	Decreased visual function both eyes; sign: papilledema in ophthalmoscope view; also other signs of increased intracranial pressure (headache, etc.)
Abducens nerve palsy	Abducens nerve innervates only Lateral Rectus muscle (action: abduction of eye)	Damage Abducens nerve VI (causes ex. increased intracranial pressure. CAVERNOSUS)	Diplopia and Medial strabismus

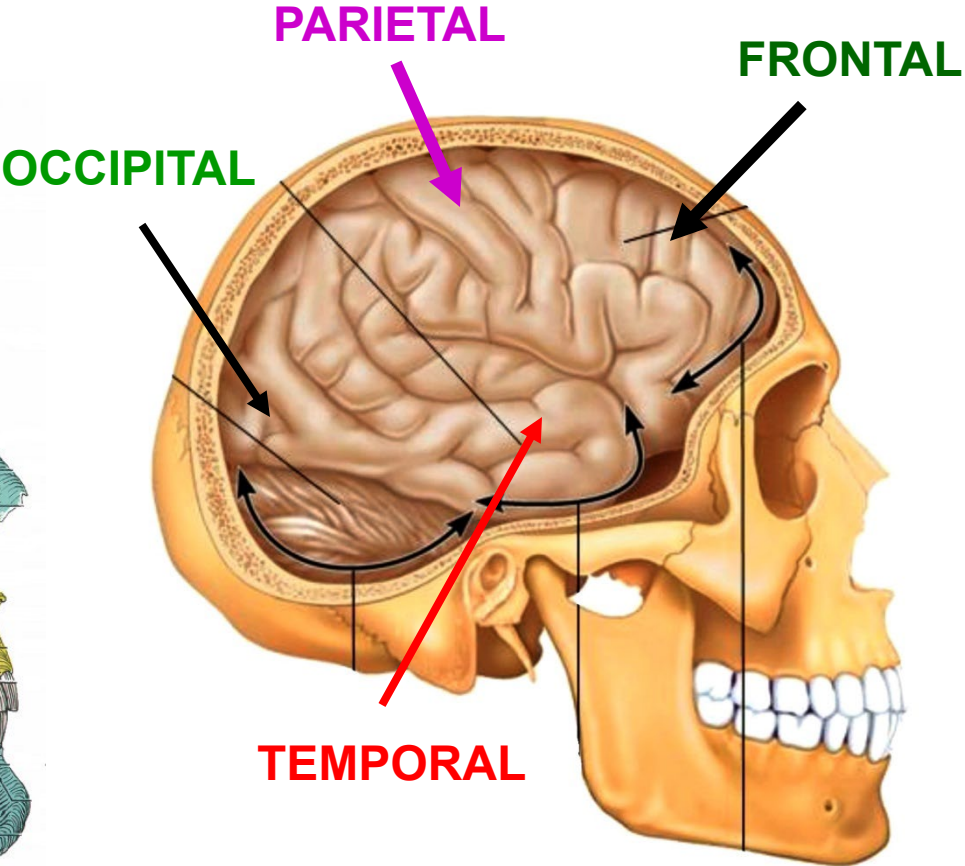


BONES OF SKULL

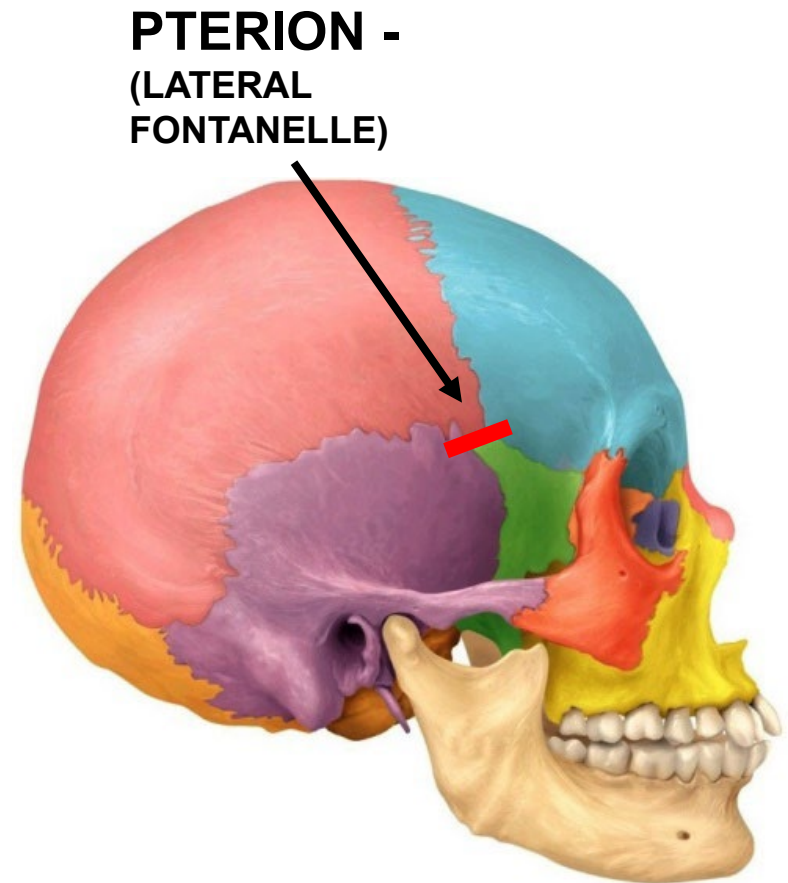
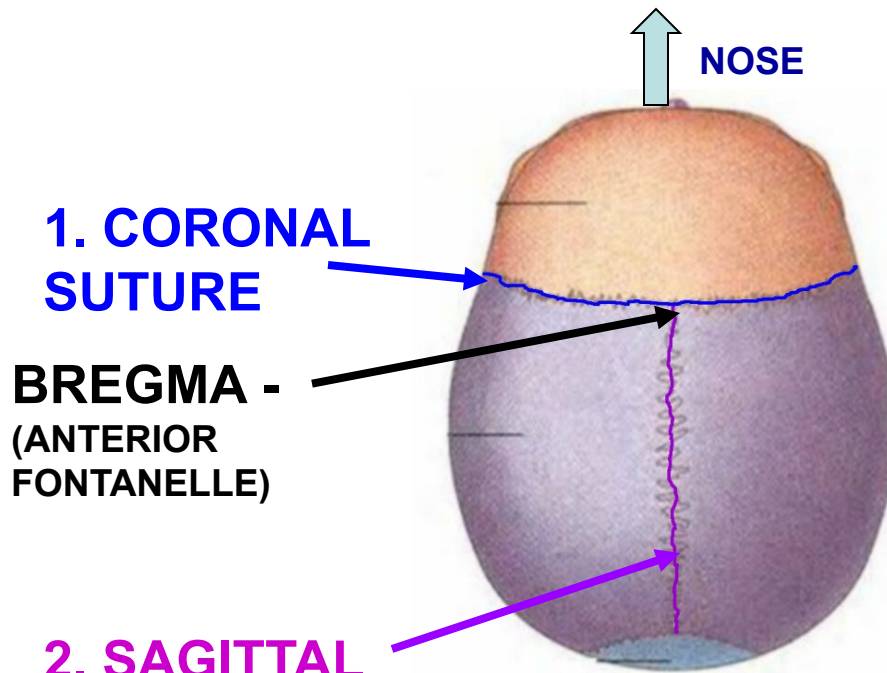


NOTE EXCEPTION:
SPHENOID BONE

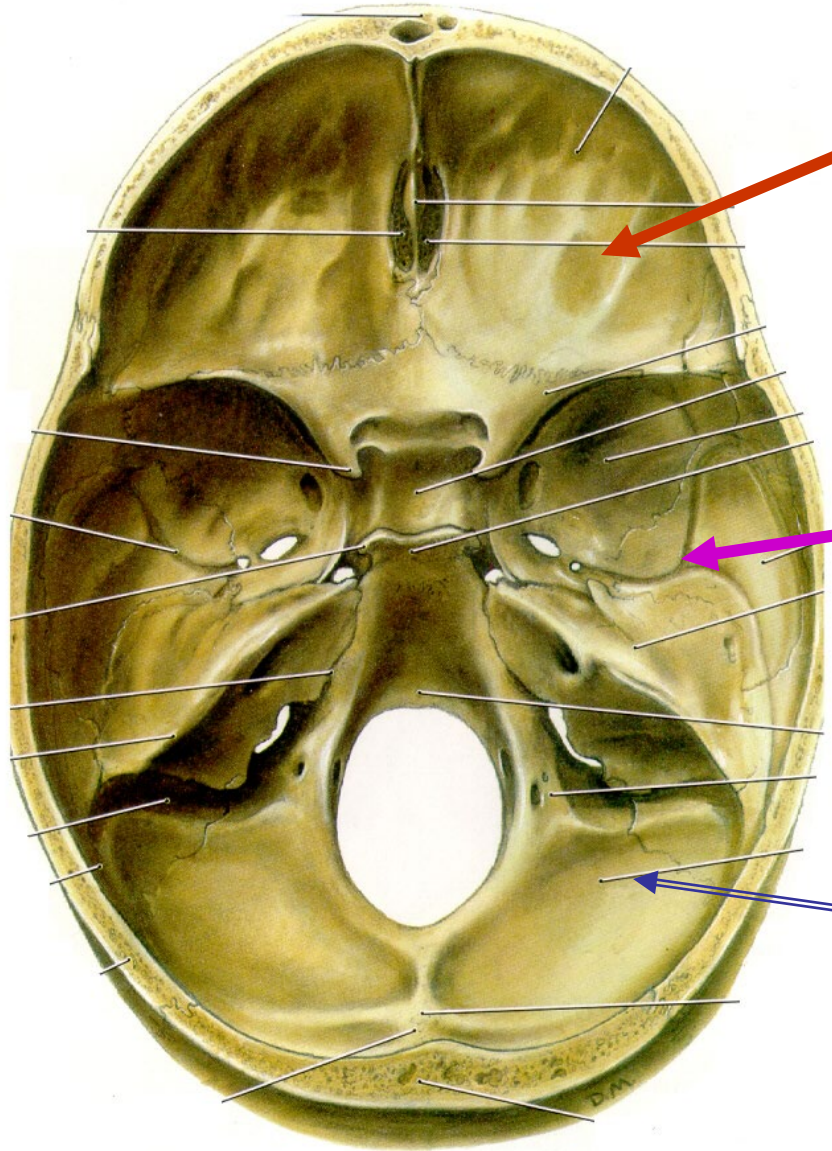
LOBES OF CEREBRAL CORTEX OF BRAIN ARE NAMED FOR BONES OF SKULL



SUTURES AND LANDMARKS (NEWBORN)



CRANIAL CAVITY- DIVIDED INTO DEPRESSIONS (FOSSAE)

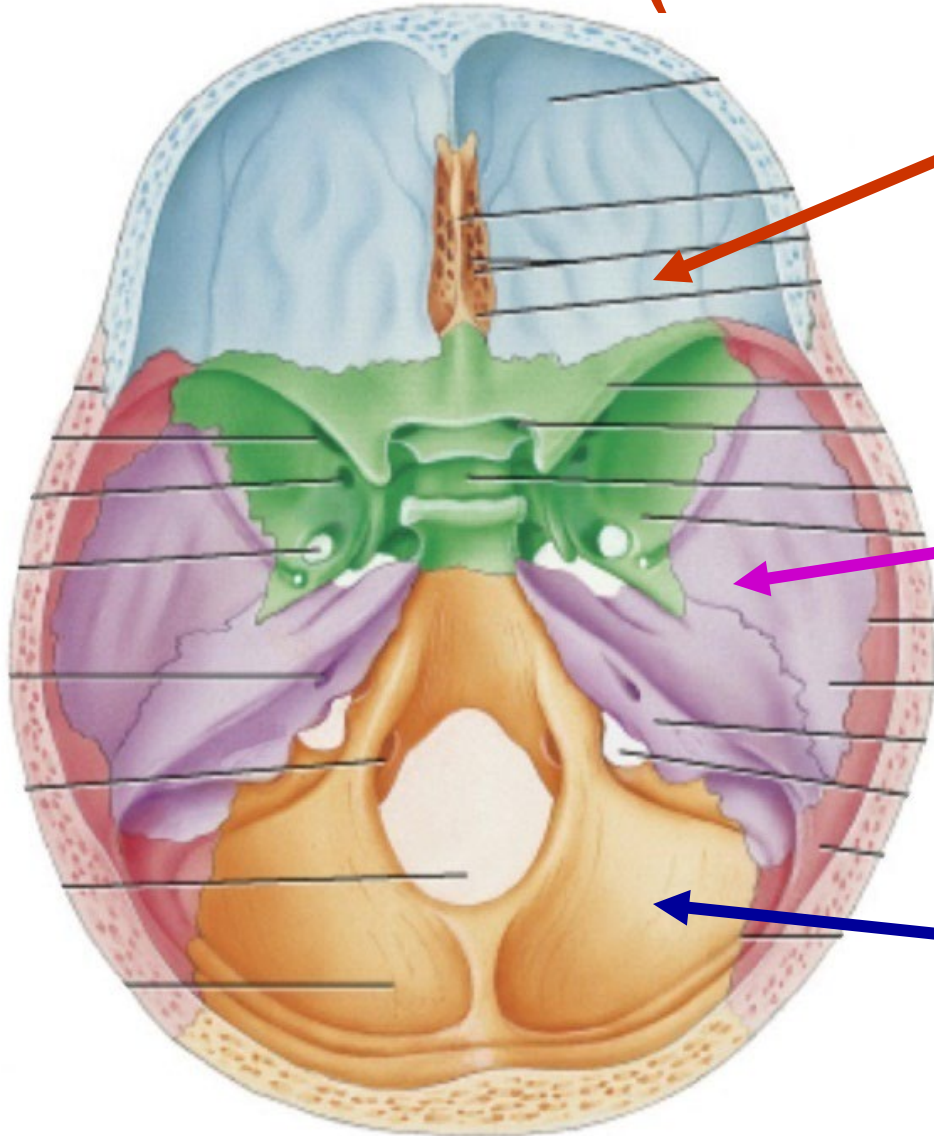


ANTERIOR CRANIAL FOSSA (ROOF OF NASAL CAVITY, ORBIT)

MIDDLE CRANIAL FOSSA (ORBIT, NASAL CAVITY, FACE)

POSTERIOR CRANIAL FOSSA (FACE, ORAL CAVITY, NECK)

CRANIAL CAVITY- DIVIDED INTO DEPRESSIONS (FOSSAE)

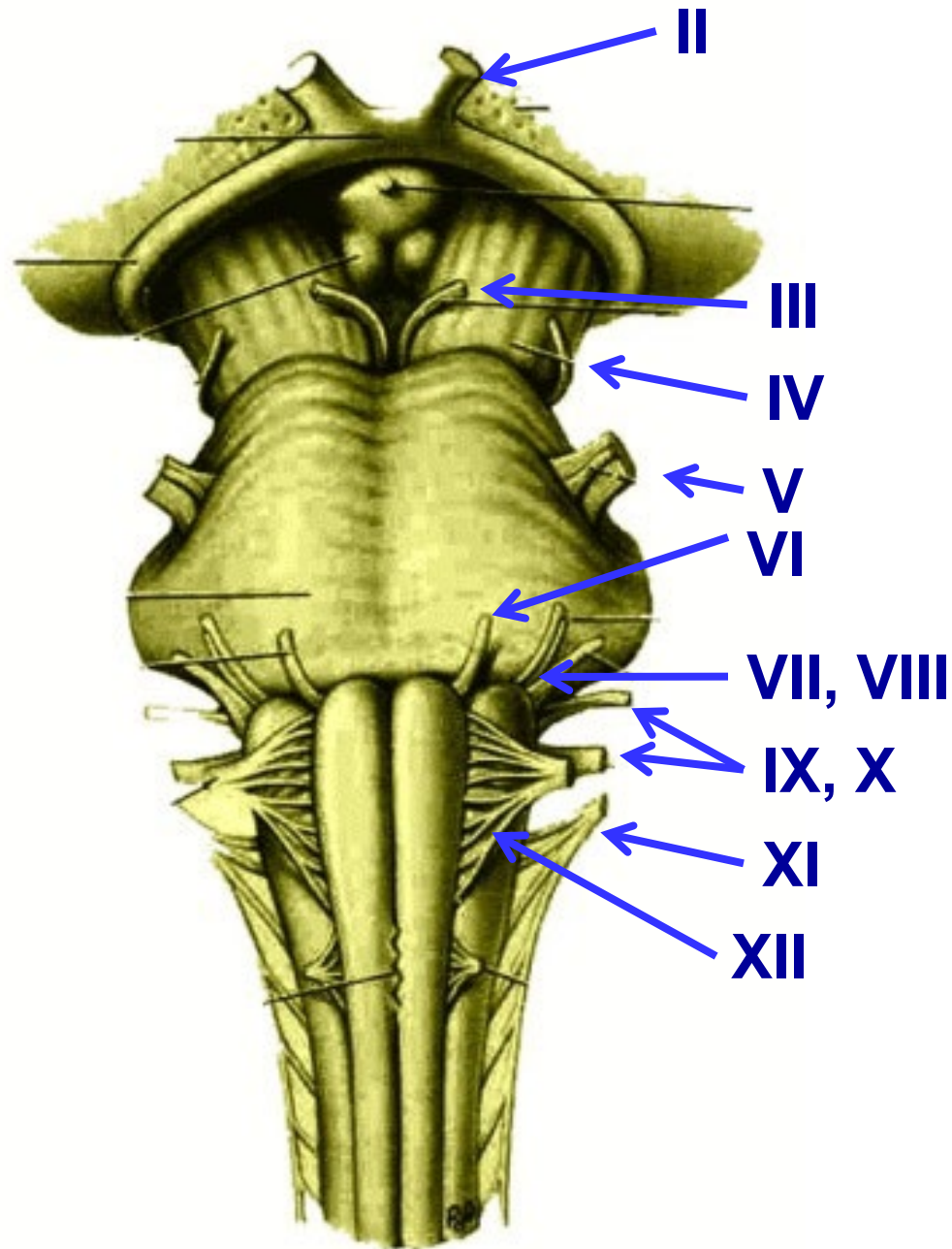


ANTERIOR CRANIAL FOSSA (ROOF OF NASAL CAVITY, ORBIT)

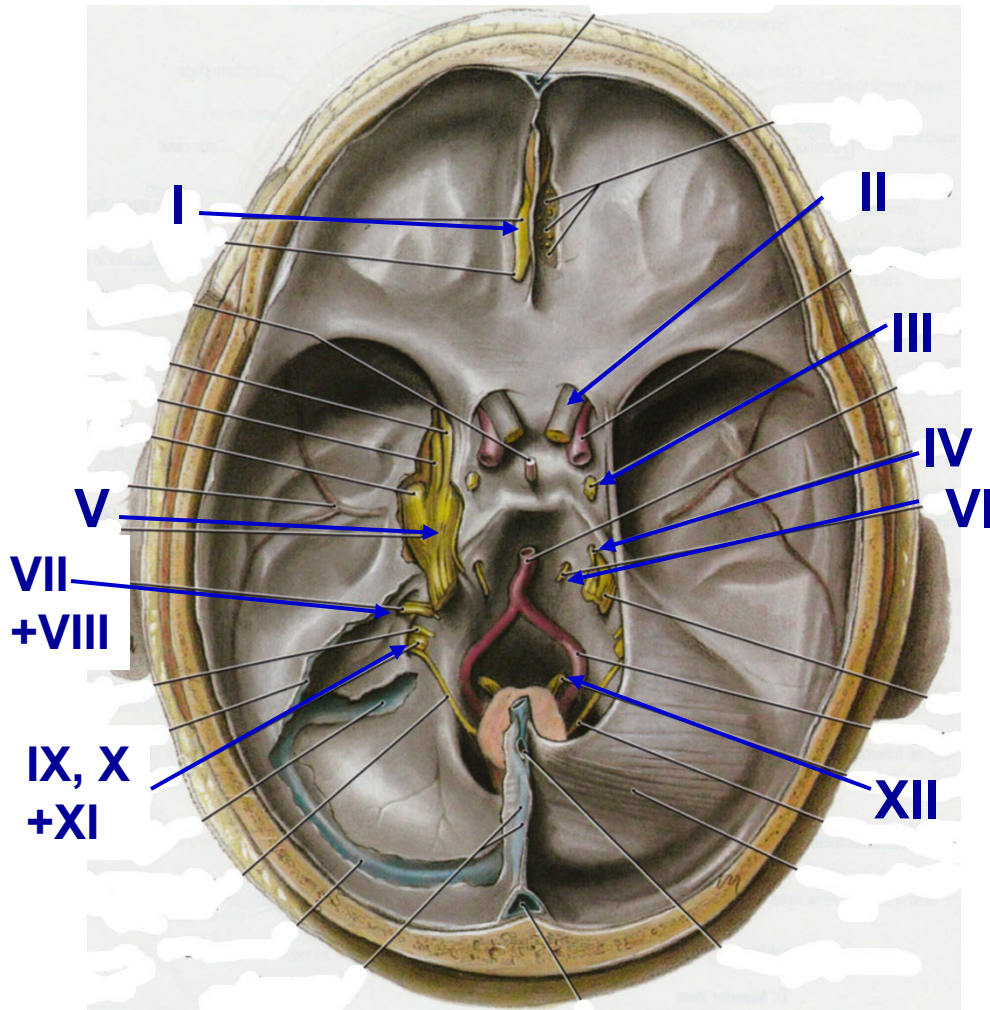
MIDDLE CRANIAL FOSSA (ORBIT, NASAL CAVITY, FACE)

POSTERIOR CRANIAL FOSSA (FACE, ORAL CAVITY, NECK)

**CRANIAL
NERVES
ARE
NUMBERED
ACCORDING
TO THEIR
POSITION
ON THE
BRAINSTEM**

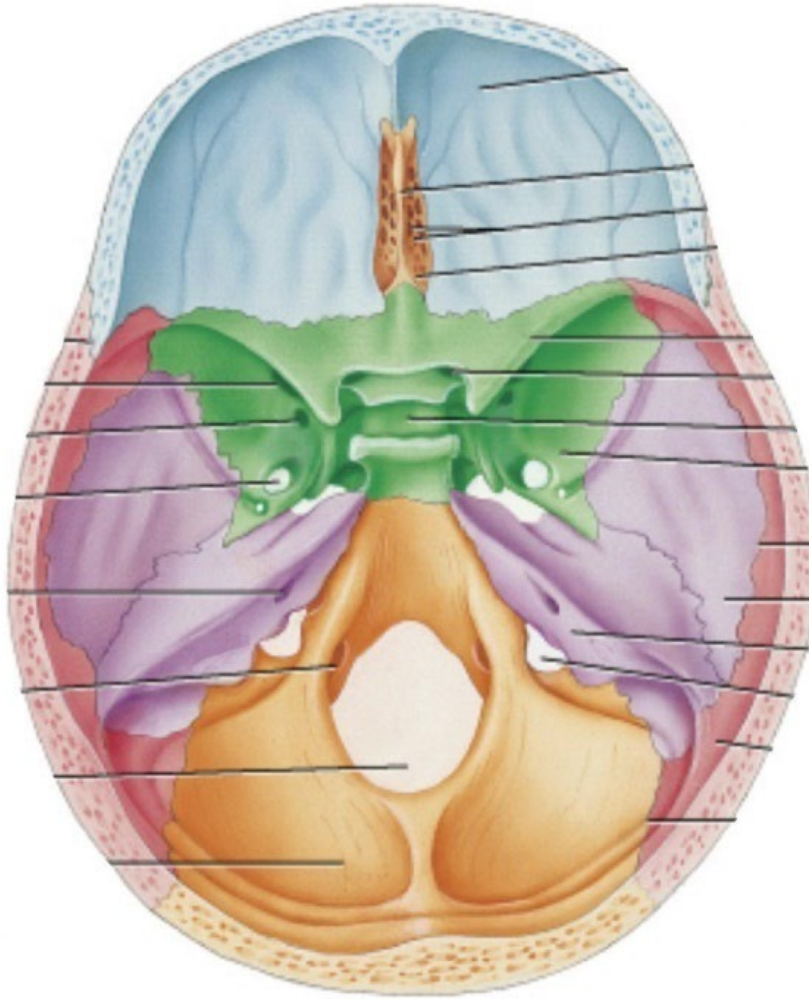
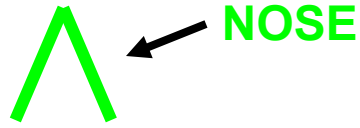


CRANIAL NERVES



- I. OLFACTORY - sense of smell
- II. OPTIC - vision
- III. OCULOMOTOR - eye movement
- IV. TROCHLEAR - eye movement
- V. TRIGEMINAL - touch, general sensation to skin, oral cavity, nasal cavity + more
- VI. ABDUCENS - eye movement
- VII. FACIAL - muscles of facial expression + lots more
- VIII. VESTIBULO-COCHLEAR - hearing and balance
- IX. GLOSSOPHARYNGEAL - sensory to pharynx + more
- X. VAGUS - larynx, pharynx + rest of body
- XI. ACCESSORY - sternocleidomastoid, trapezius
- XII. HYPOGLOSSAL - muscles of tongue

ANTERIOR



CRANIAL NERVES

I

II

III, IV, V1, VI

V2

V3

Middle Meningeal A.

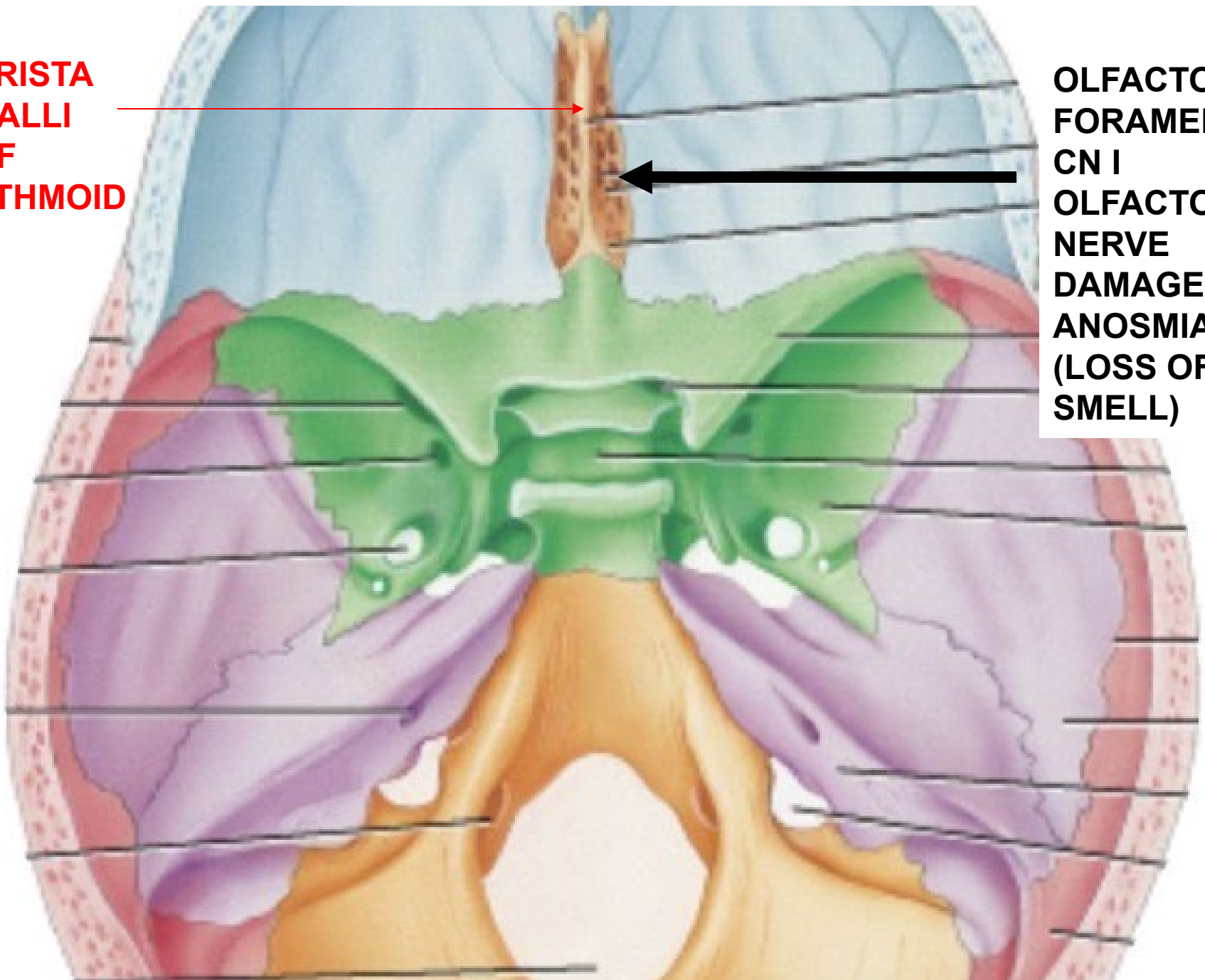
VII, VIII

IX, X, XI

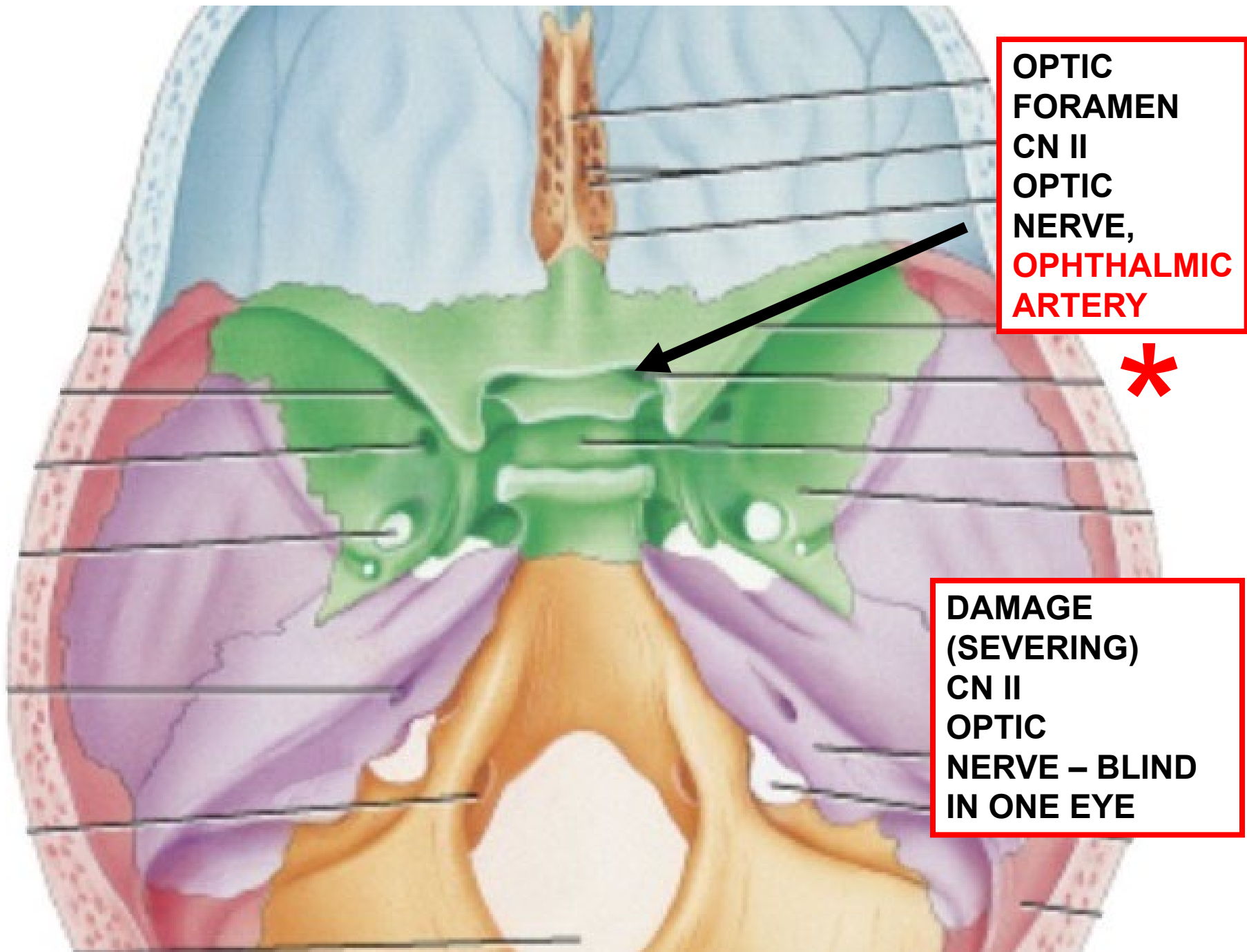
XII

POSTERIOR

**CRISTA
GALLI
OF
ETHMOID**



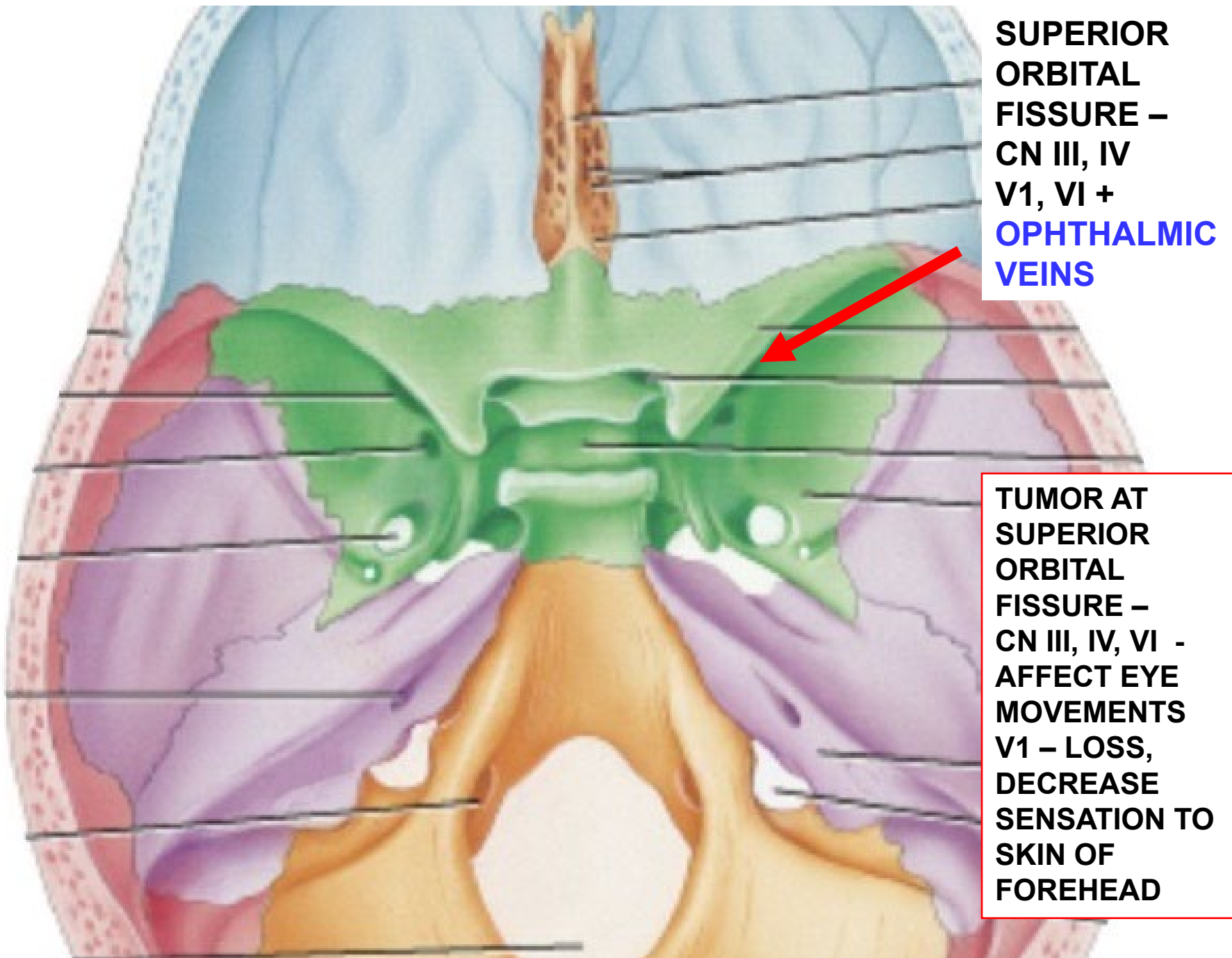
**OLFACTORY
FORAMEN -
CN I
OLFACTORY
NERVE
DAMAGE -
ANOSMIA
(LOSS OF
SMELL)**



OPTIC FORAMEN
CN II
OPTIC NERVE,
OPHTHALMIC ARTERY



DAMAGE (SEVERING)
CN II
OPTIC NERVE - BLIND
IN ONE EYE

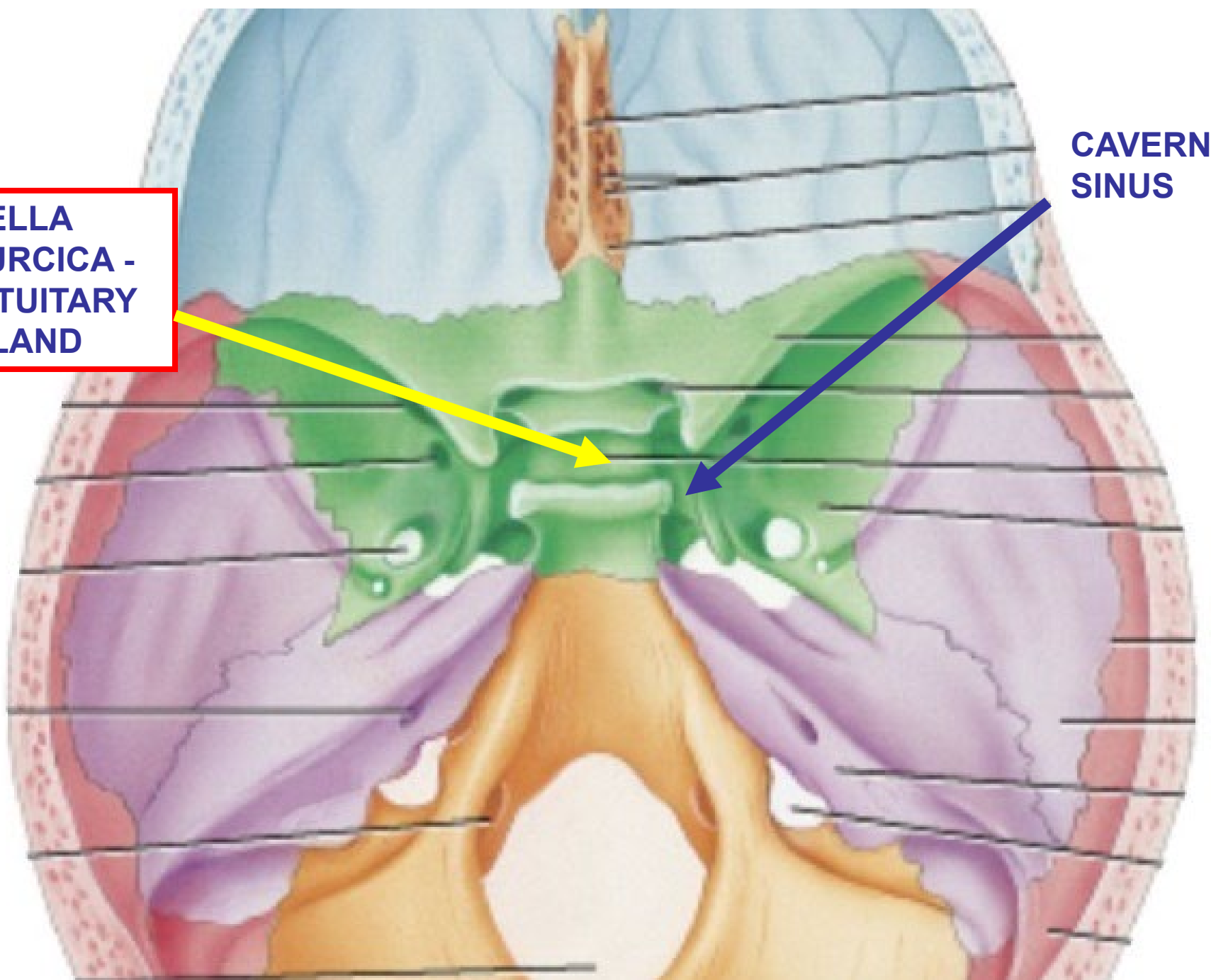


**SUPERIOR
ORBITAL
FISSURE –
CN III, IV
V1, VI +
OPHTHALMIC
VEINS**

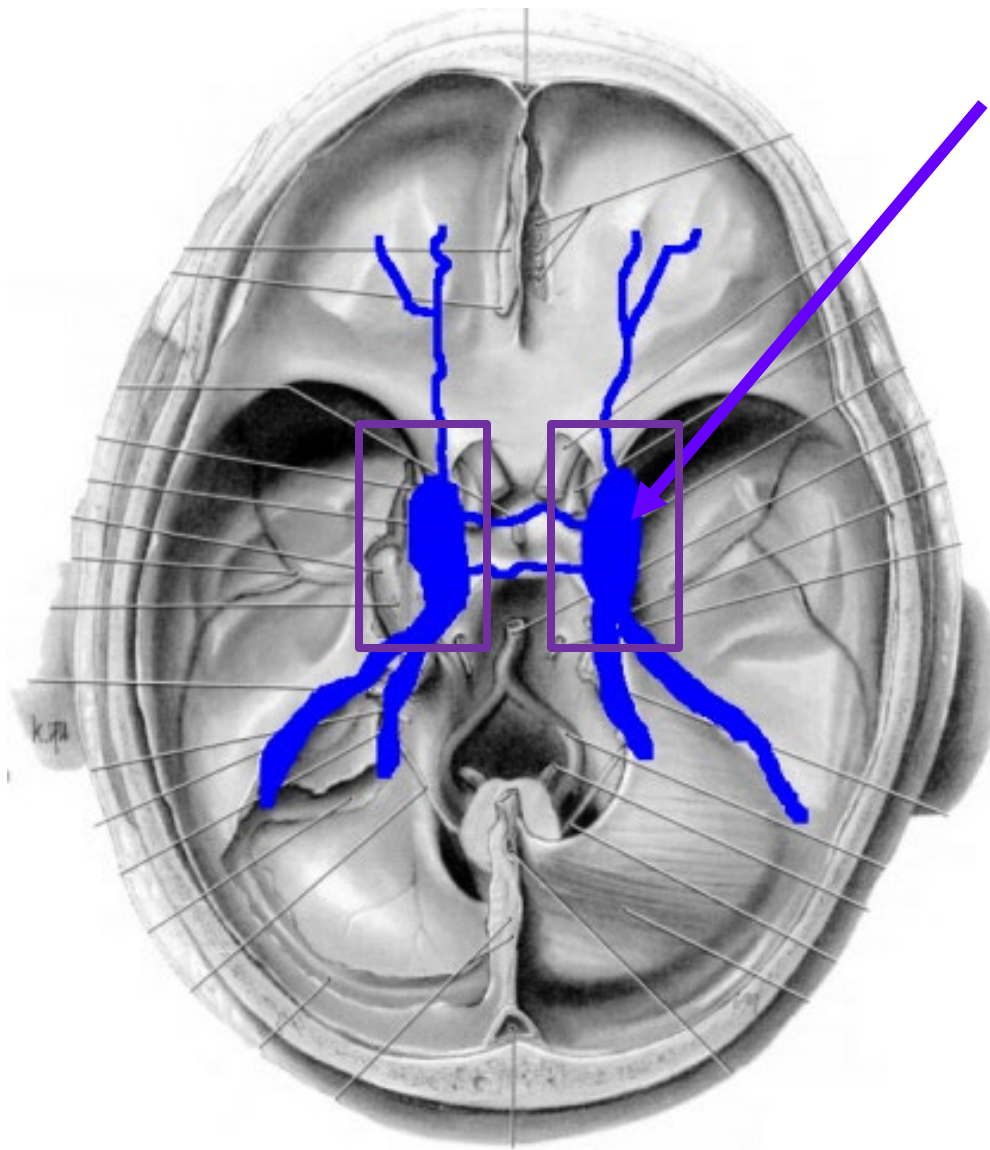
**TUMOR AT
SUPERIOR
ORBITAL
FISSURE –
CN III, IV, VI -
AFFECT EYE
MOVEMENTS
V1 – LOSS,
DECREASE
SENSATION TO
SKIN OF
FOREHEAD**

**SELLA
TURCICA -
PITUITARY
GLAND**

**CAVERNOUS
SINUS**

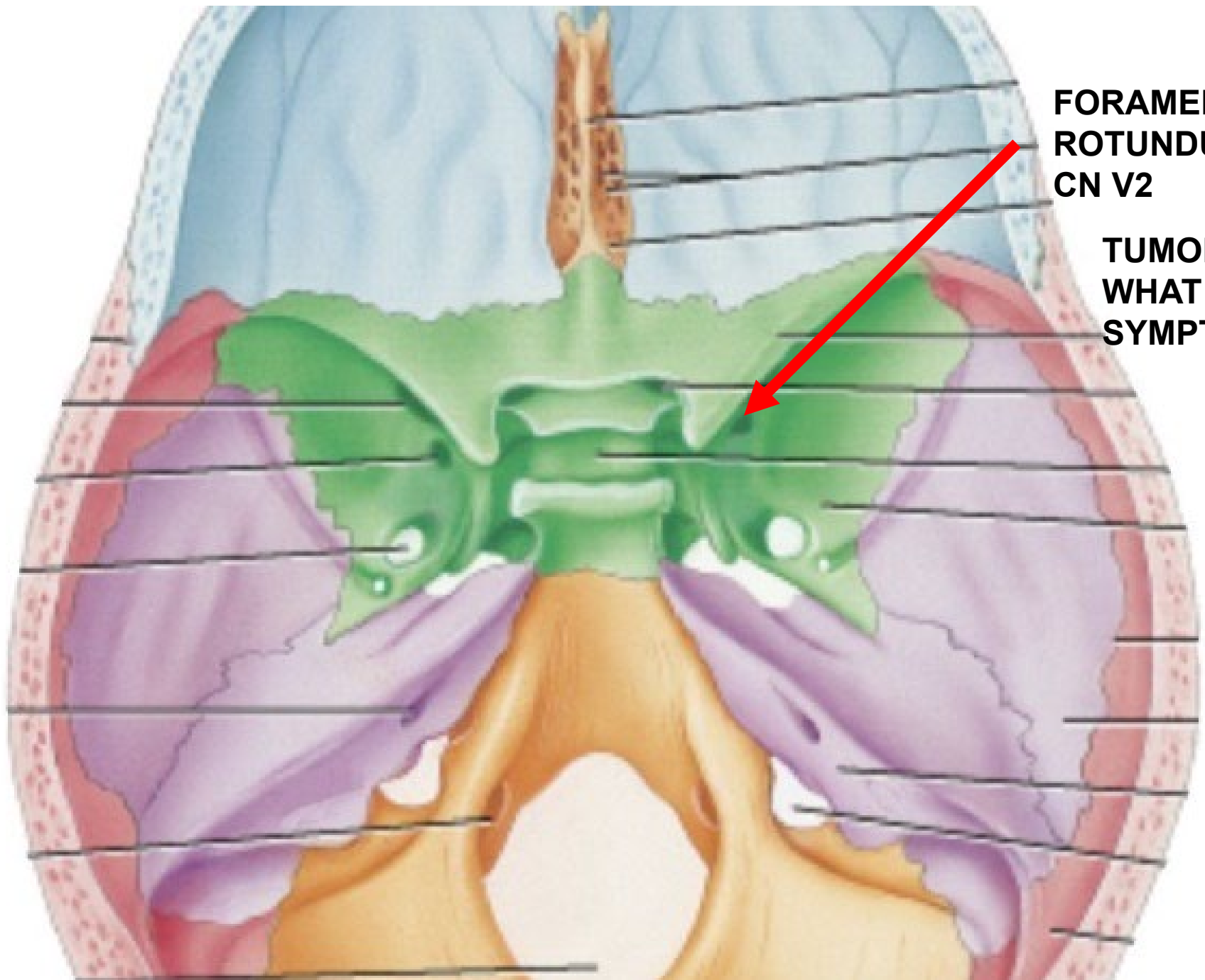


CAVERNOUS SINUS



Cavernous sinuses - in middle cranial fossa; receive blood from Sup. and Inf. Ophthalmic veins, Cerebral veins; many structures pass in wall of Cavernous sinus (Cranial nerves III, IV, V1, V2, VI; also Internal Carotid Artery)

INFECTION IN CAVERNOUS SINUS - SYMPTOMS EYE MOVEMENTS (NOT CN II); DIPLOPIA,



**FORAMEN
ROTUNDUM -
CN V2**

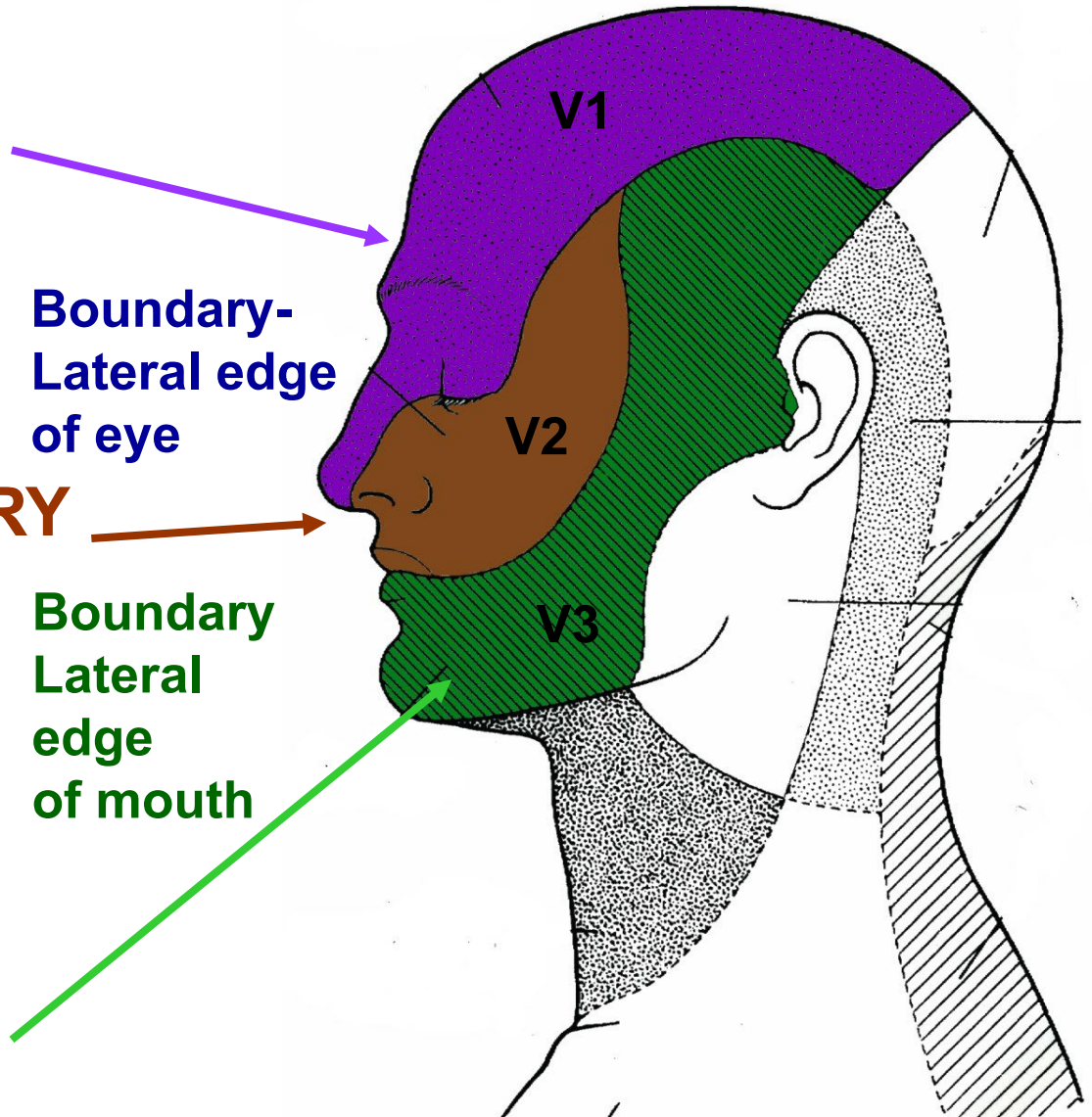
**TUMOR -
WHAT
SYMPTOM**

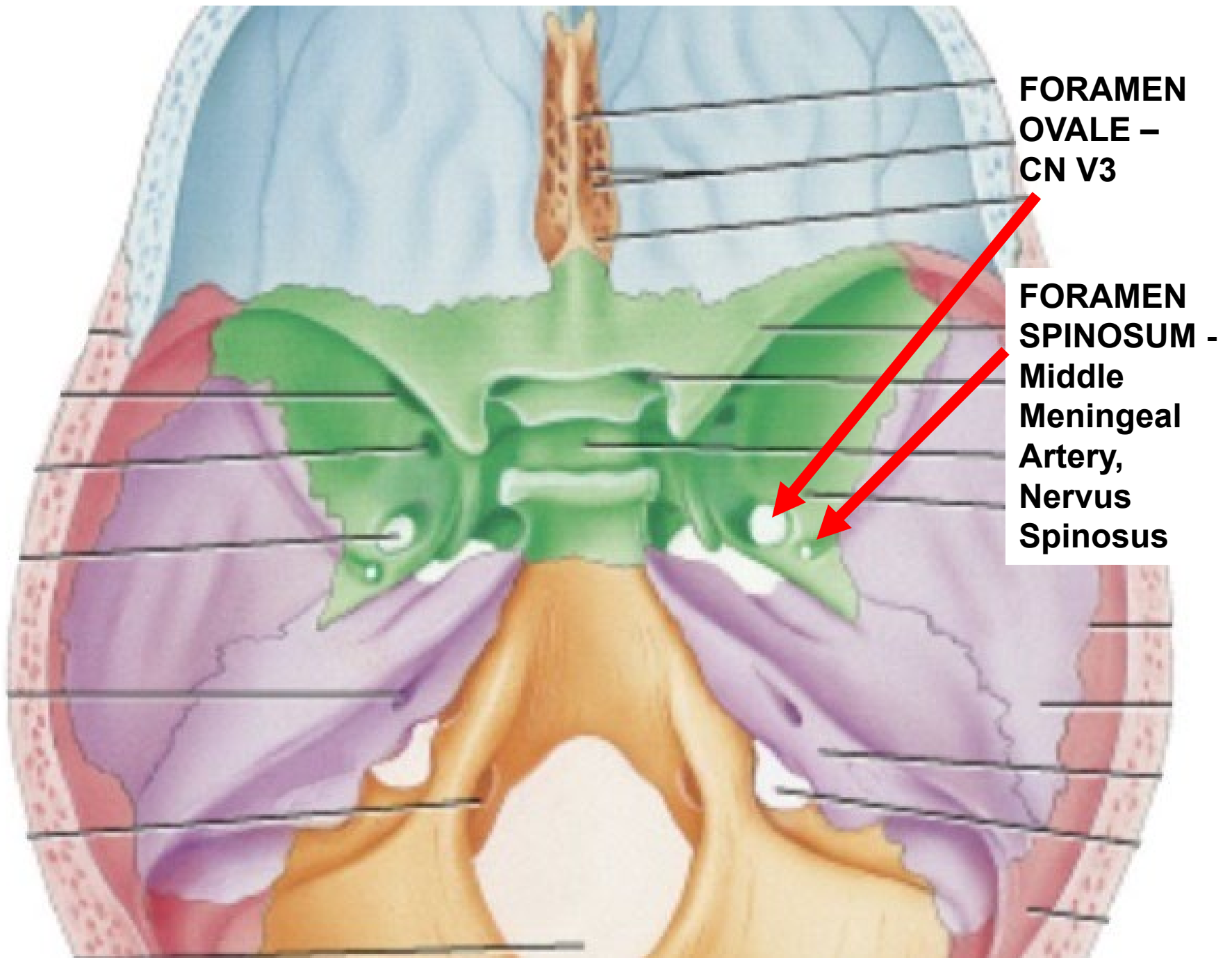
TRIGEMINAL NERVE - 3 DIVISIONS (MAJOR BRANCHES)

**V1 –
OPHTHALMIC
DIVISION
(NERVE)**

**V2 – MAXILLARY
DIVISION
(NERVE)**

**V3 –
MANDIBULAR
DIVISION
(NERVE)**





**FORAMEN
OVALE –
CN V3**

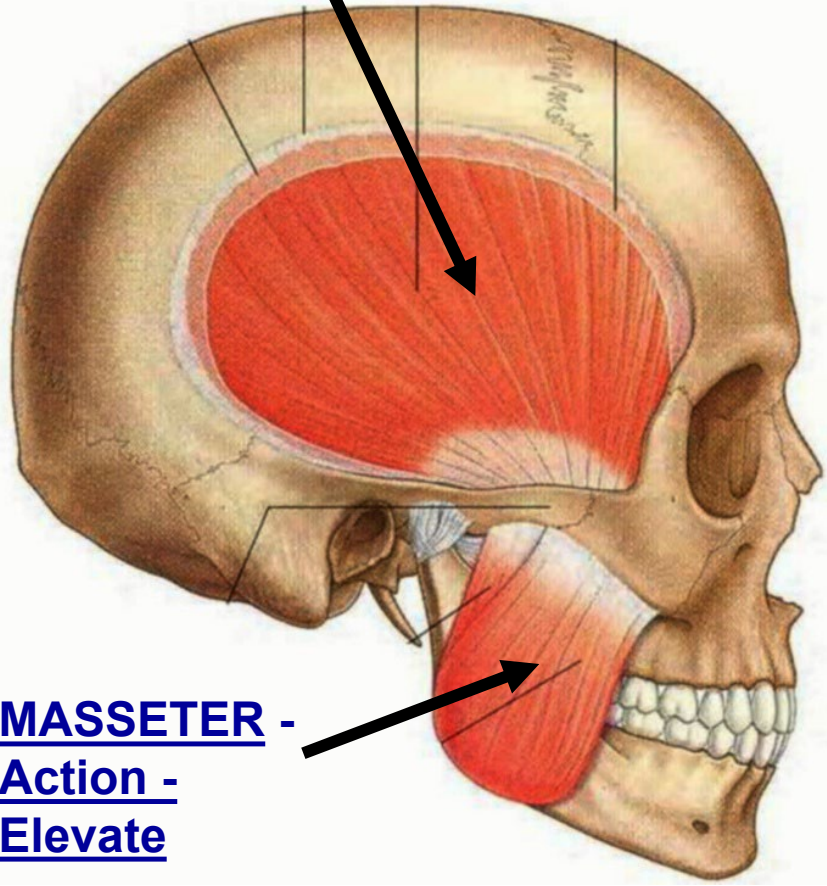
**FORAMEN
SPINOSUM -
Middle
Meningeal
Artery,
Nervus
Spinus**

MUSCLES OF MASTICATION

TEMPORALIS -
Action - Elevate,
Retrude

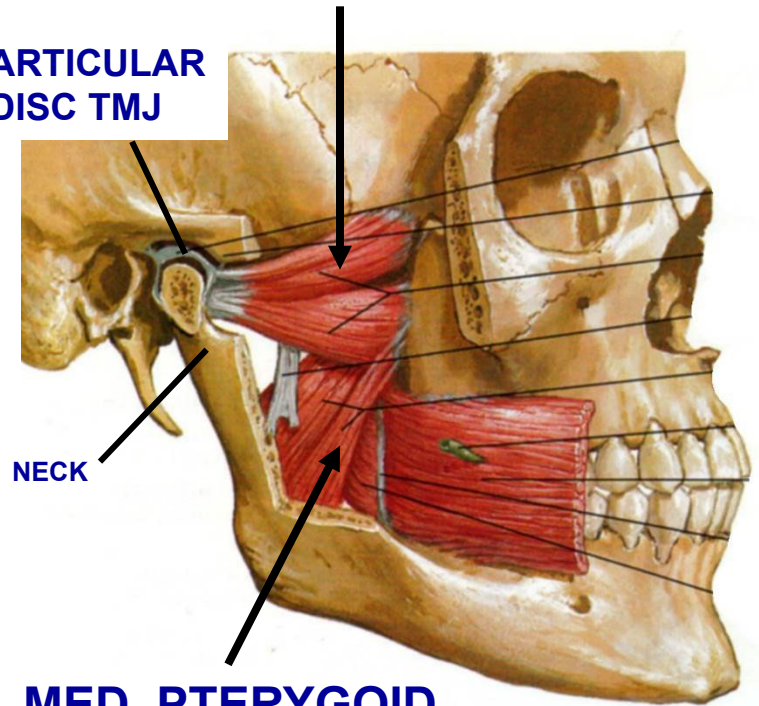
- ALL INN BRANCHIOMOTOR (First Arch) - V3
- ELEVATE = CLOSE; DEPRESS = OPEN MOUTH

LATERAL PTERYGOID - Action -
Depress (OPEN MOUTH), **Protrude**
Pull Disc Forward



MASSETER -
Action -
Elevate

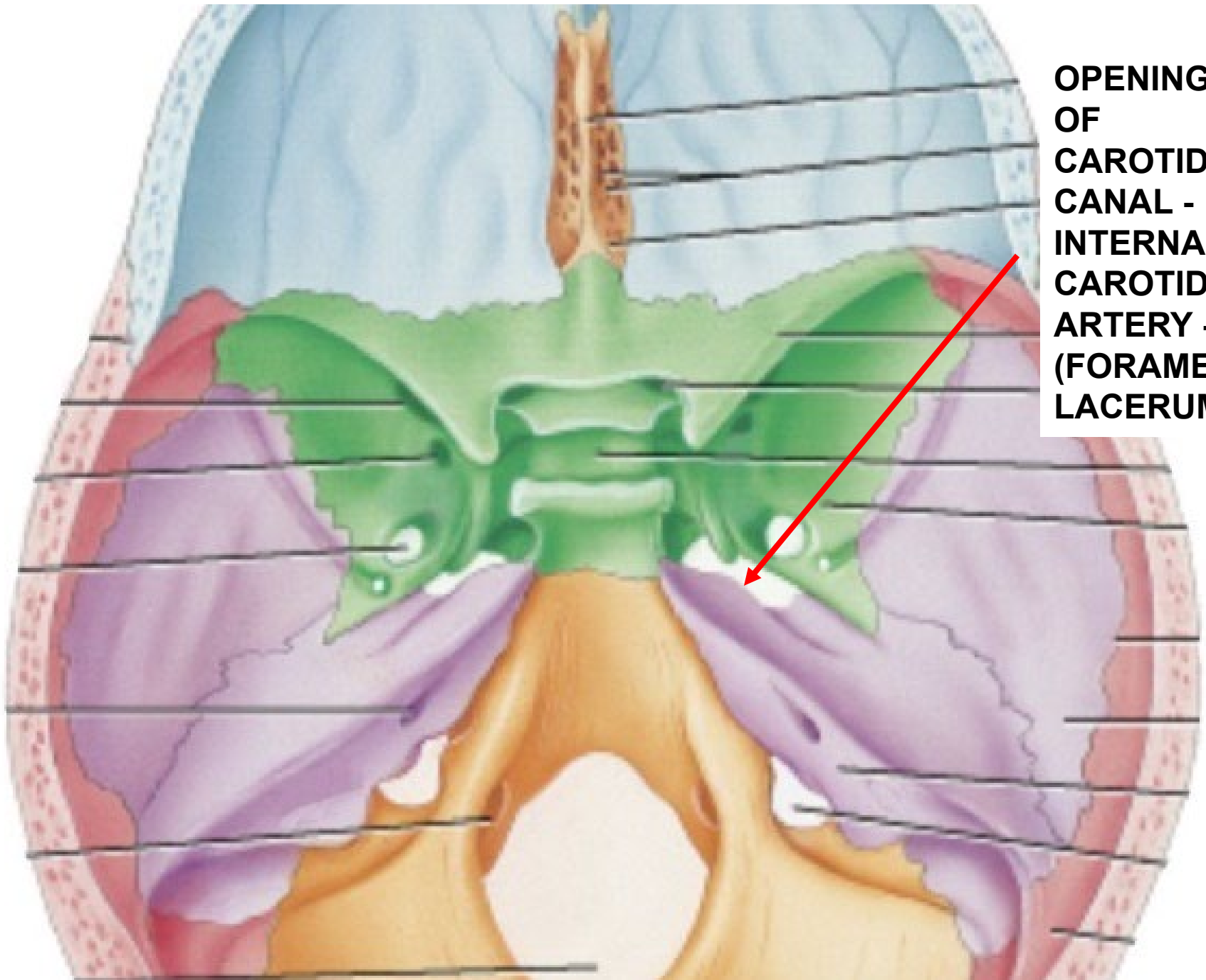
ARTICULAR
DISC TMJ



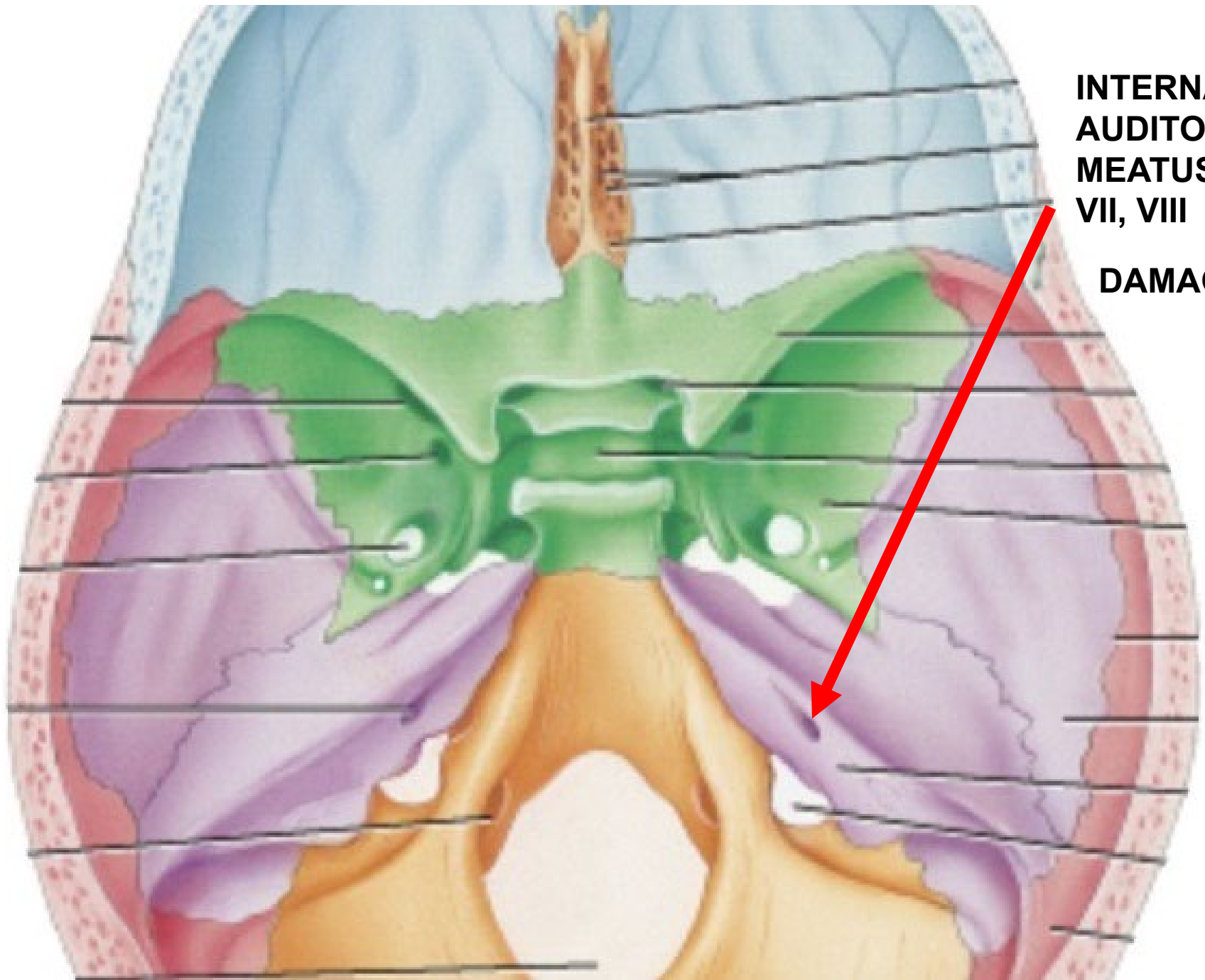
NECK

MED. PTERYGOID -
Action - Elevate

**DAMAGE V3: DIFFICULTY CHEWING; OPEN MOUTH JAW
DEVIATES TO PARALYZED SIDE (PUSHED BY INTACT LAT. PTERYGOID)**

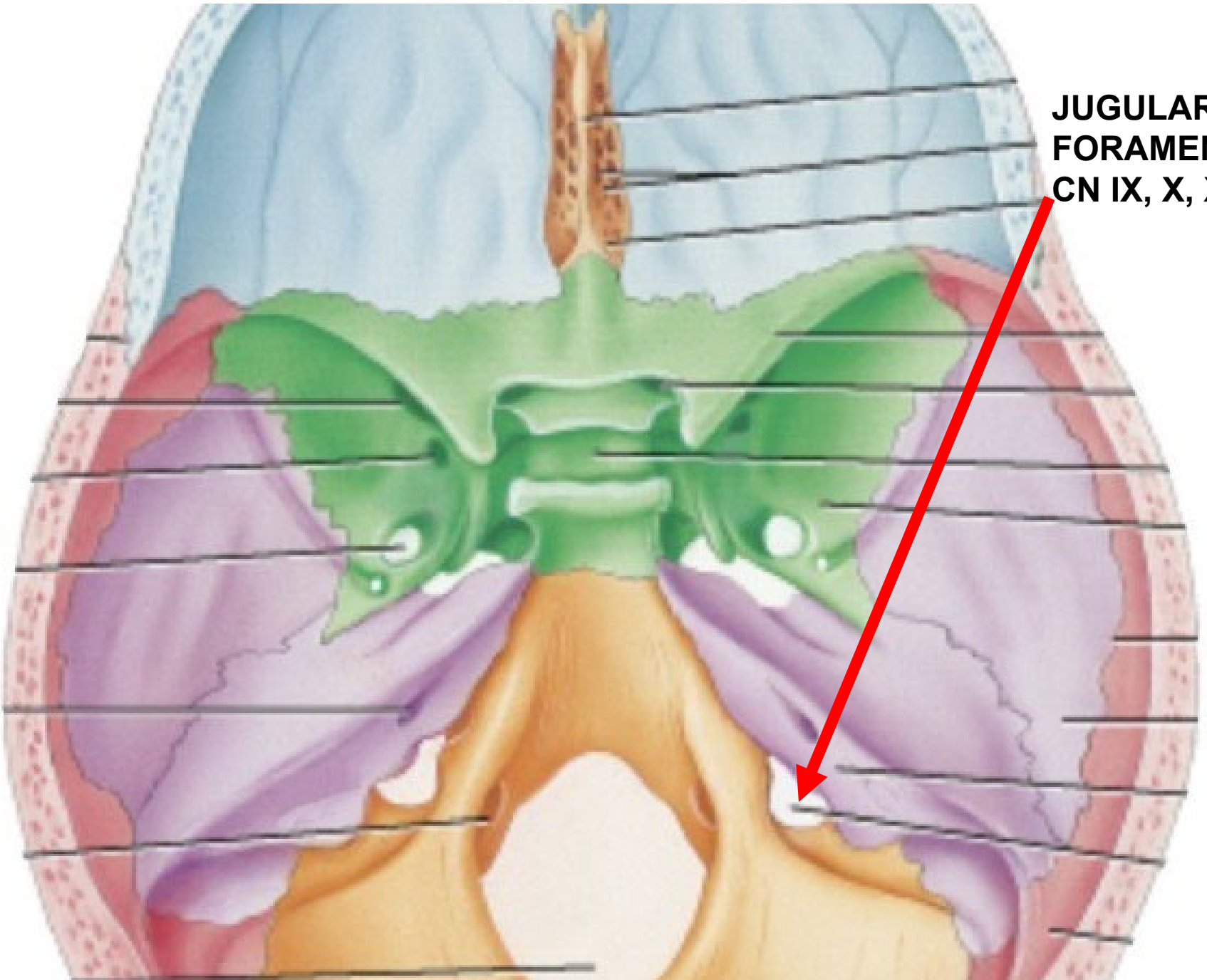


**OPENING
OF
CAROTID
CANAL -
INTERNAL
CAROTID
ARTERY -
(FORAMEN
LACERUM)**

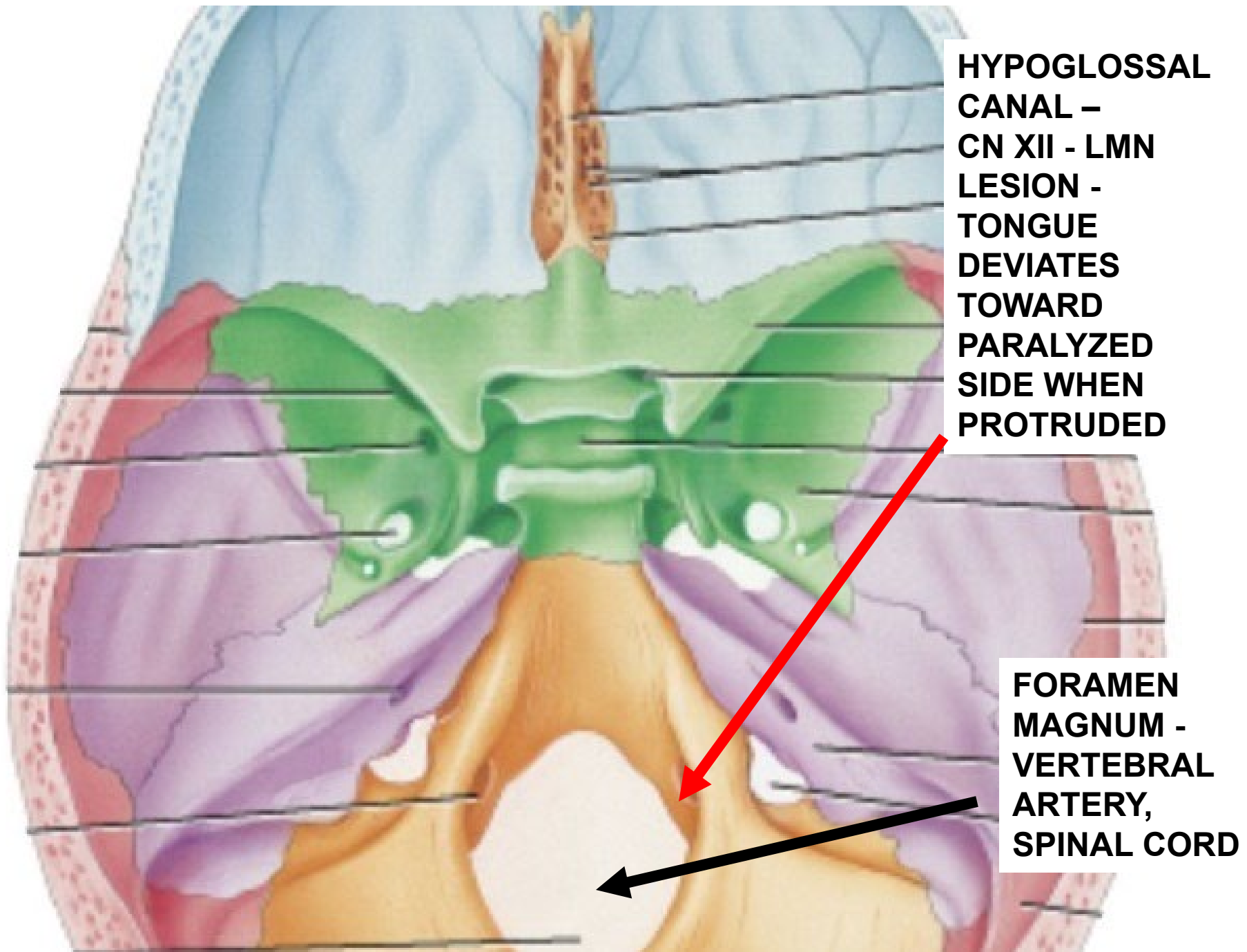


**INTERNAL
AUDITORY
MEATUS -
VII, VIII**

DAMAGE?

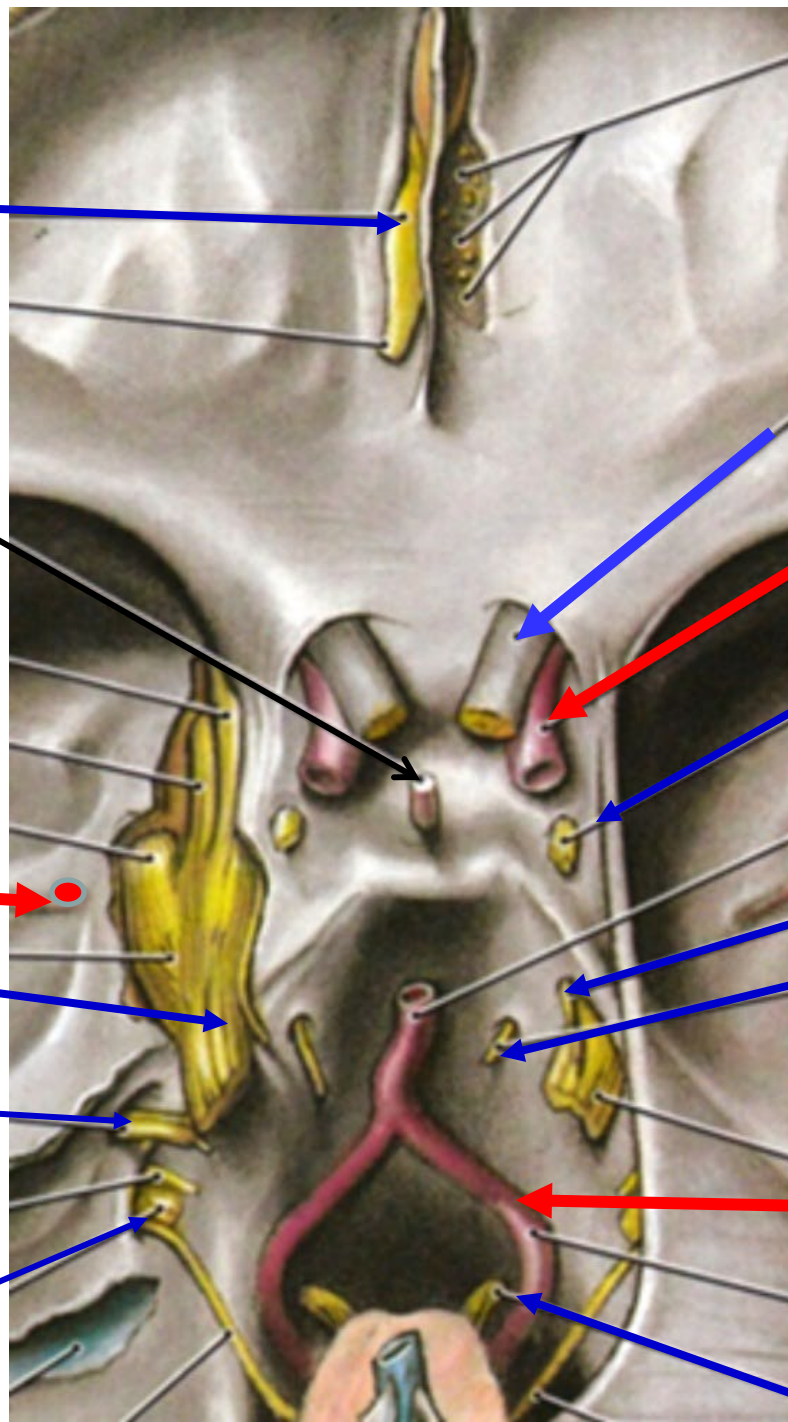


JUGULAR FORAMEN – CN IX, X, XI



**HYPOGLOSSAL
CANAL -
CN XII - LMN
LESION -
TONGUE
DEVIATES
TOWARD
PARALYZED
SIDE WHEN
PROTRUDED**

**FORAMEN
MAGNUM -
VERTEBRAL
ARTERY,
SPINAL CORD**



**BRAINSTEM
PROSECTIONS
IDENTIFY**

I →

II

**PITUITARY
STALK**

INTERNAL CAROTID A.

V1

V2

V3

III

**MIDDLE
MENINGEAL A.** →

V

IV

VII

+VIII

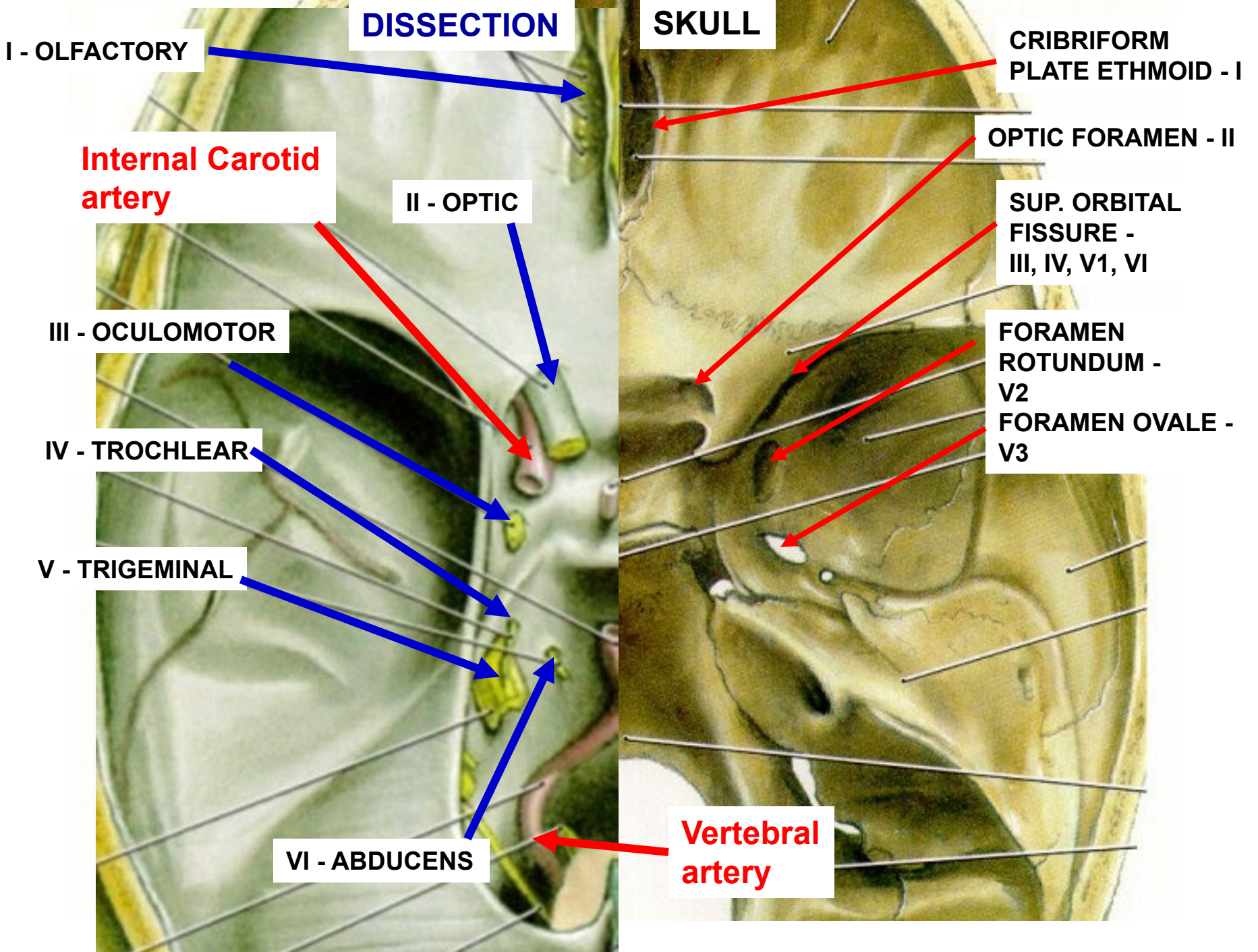
VI

IX, X

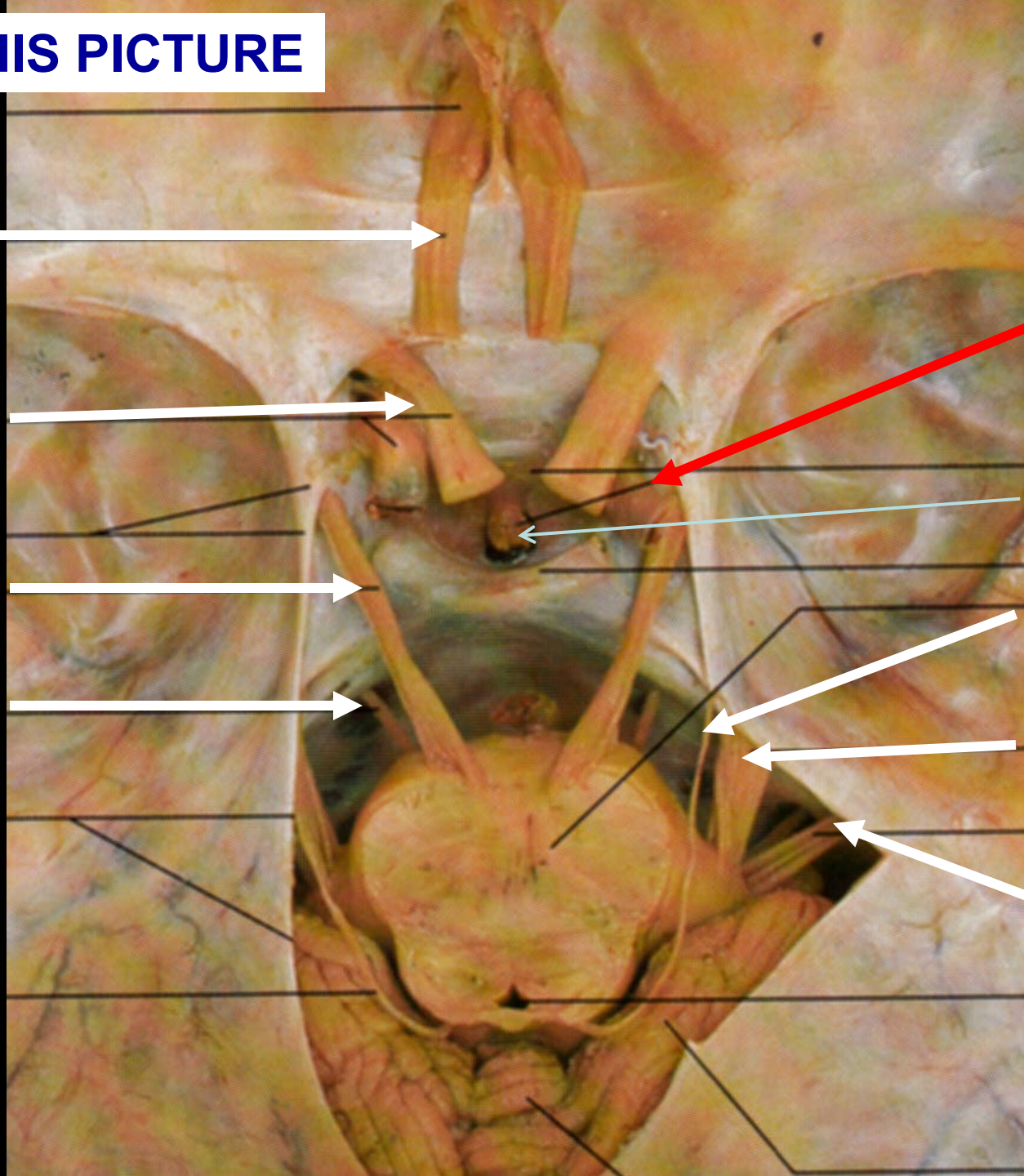
+XI

VERTEBRAL A.

XII



STUDY THIS PICTURE



I Olfactory



II Optic



**III Oculo-
motor**



**VI
Abducens**



**INTERNAL
CAROTID
A.**

**Pituitary
stalk**

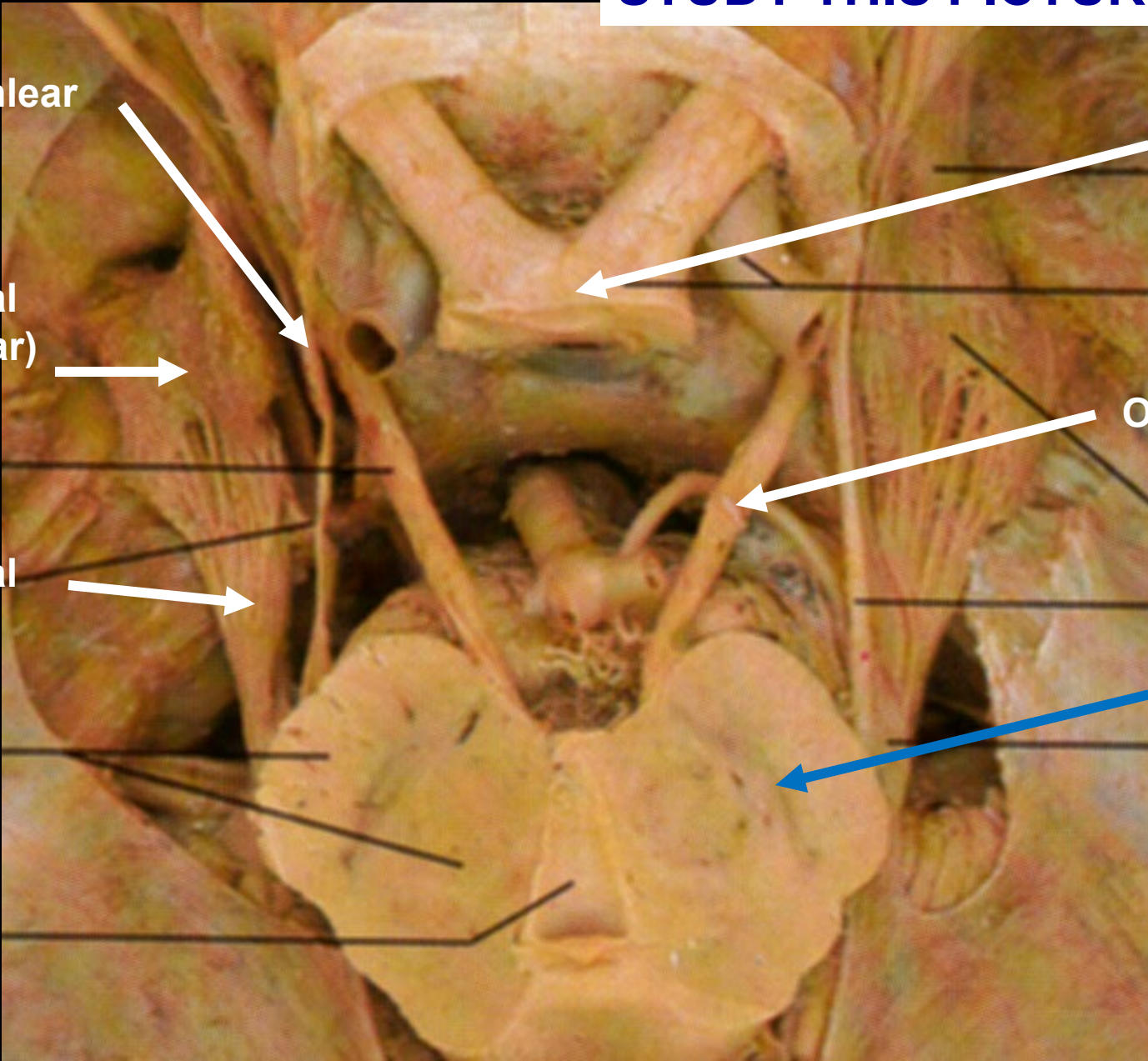
**IV
Trochlear**

**V
Trigeminal**

VII + VIII



STUDY THIS PICTURE



IV
Trochlear



Trigeminal
(Semilunar)
Ganglion



V
Trigeminal



II Optic
Chiasm -
overlies
Pituitary



III
Oculomotor



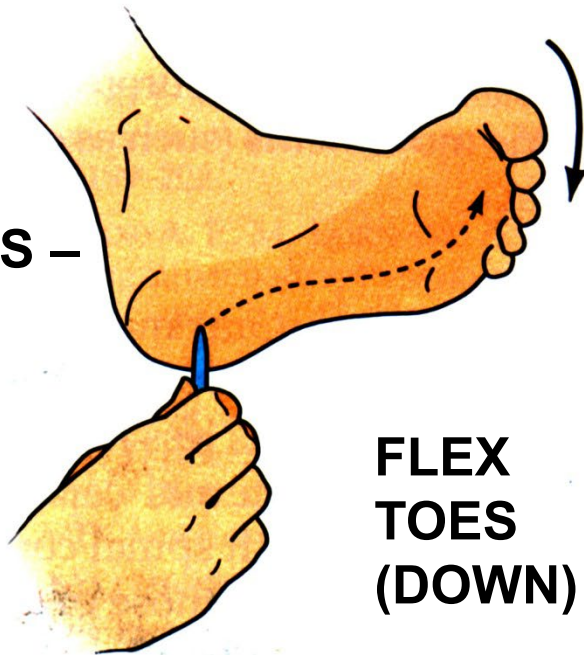
Substantia
Nigra
in
Midbrain
(Parkinson's
Disease)



REFLEXES: UPPER MOTOR NEURON (CORTICOSPINAL TRACT) LESION

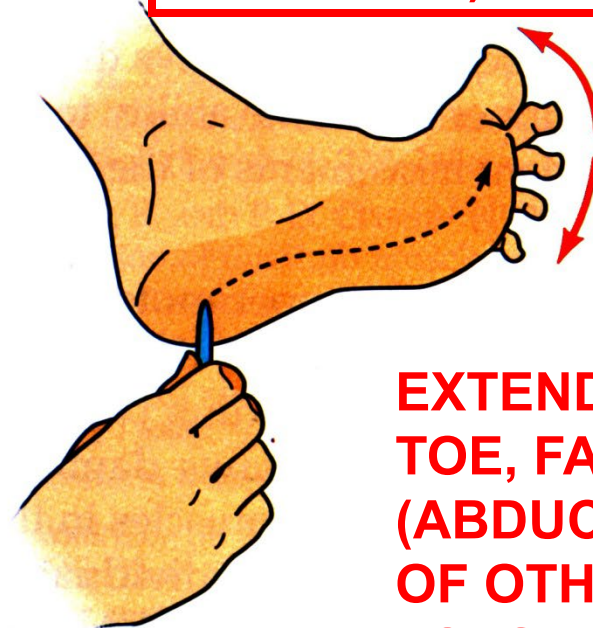
NORMAL RESPONSE

**STIMULUS –
TO SKIN
OF SOLE
OF FOOT**



**FLEX
TOES
(DOWN)**

**BABINSKI SIGN –
(EXTENSOR PLANTAR
RESPONSE)**



**EXTEND BIG
TOE, FANNING
(ABDUCTION)
OF OTHER
TOES**

Babinski sign - seen after **Upper Motor neuron lesion**
-direction of movement **changes from flexing toes to
extending and fanning (abducting) toes** - (normal in
neonates)

**PLANTAR REFLEX: ABNORMAL, (POSITIVE) BABINSKI
SIGN ON ONE SIDE** [used by permission of Paul D. Larsen, M.D., University of Nebraska
Medical Center; <http://library.med.utah.edu/neurologicexam>]



1. PUPILLARY LIGHT REFLEX - II TO III

AFFERENT ARM OF REFLEX

**SENSORY
STIMULUS**

**LIGHT IN
EYE**



EFFERENT ARM OF REFLEX

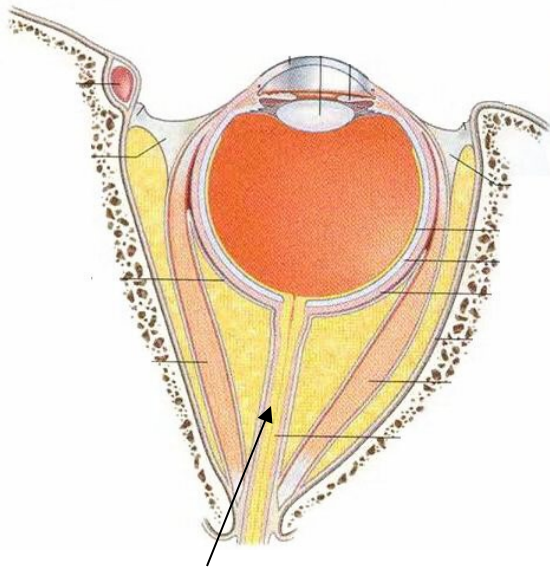
**MOTOR
RESPONSE**

**CONSTRICT
PUPIL**



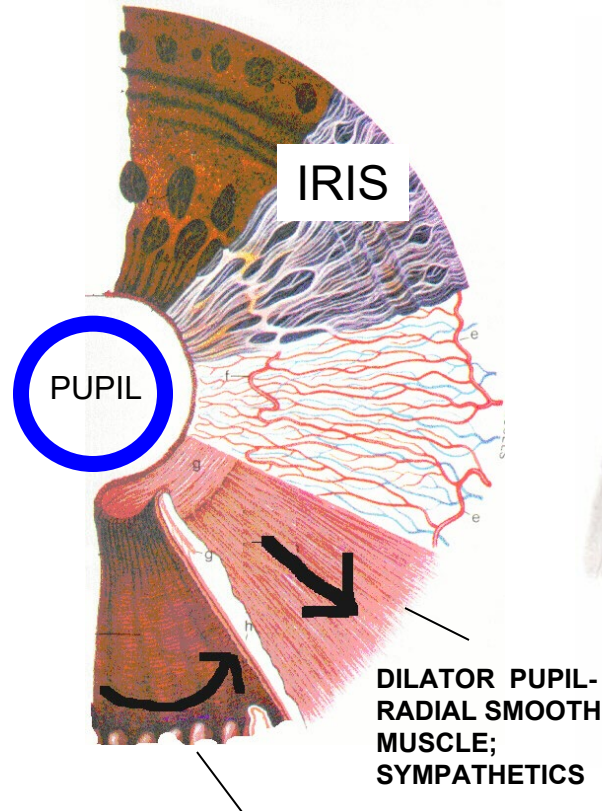
PUPILLARY LIGHT REFLEX

**CN II - OPTIC NERVE -
DETECTS LIGHT**

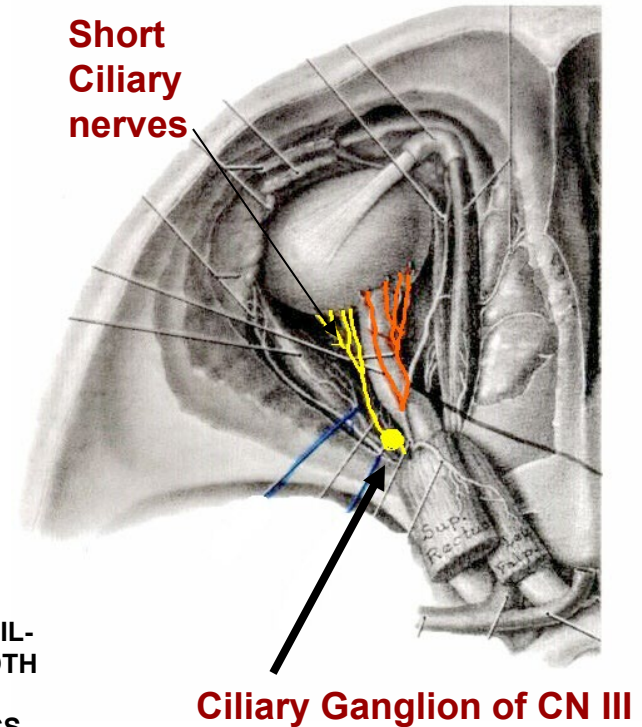


**OPTIC NERVE -
CN II VISION**

**CN III - OCULOMOTOR - parasympathetics
from Ciliary Ganglion in Short Ciliary nerves**



**CONTRACTOR PUPIL-
CIRCULAR SMOOTH MUSCLE;
PARASYMPATHETICS - CN III**



PUPILLARY LIGHT REFLEX

CN II - OPTIC NERVE - DETECTS LIGHT

CN III - OCULOMOTOR - parasympathetics from Ciliary Ganglion in Short Ciliary nerves

CN III - OCULOMOTOR

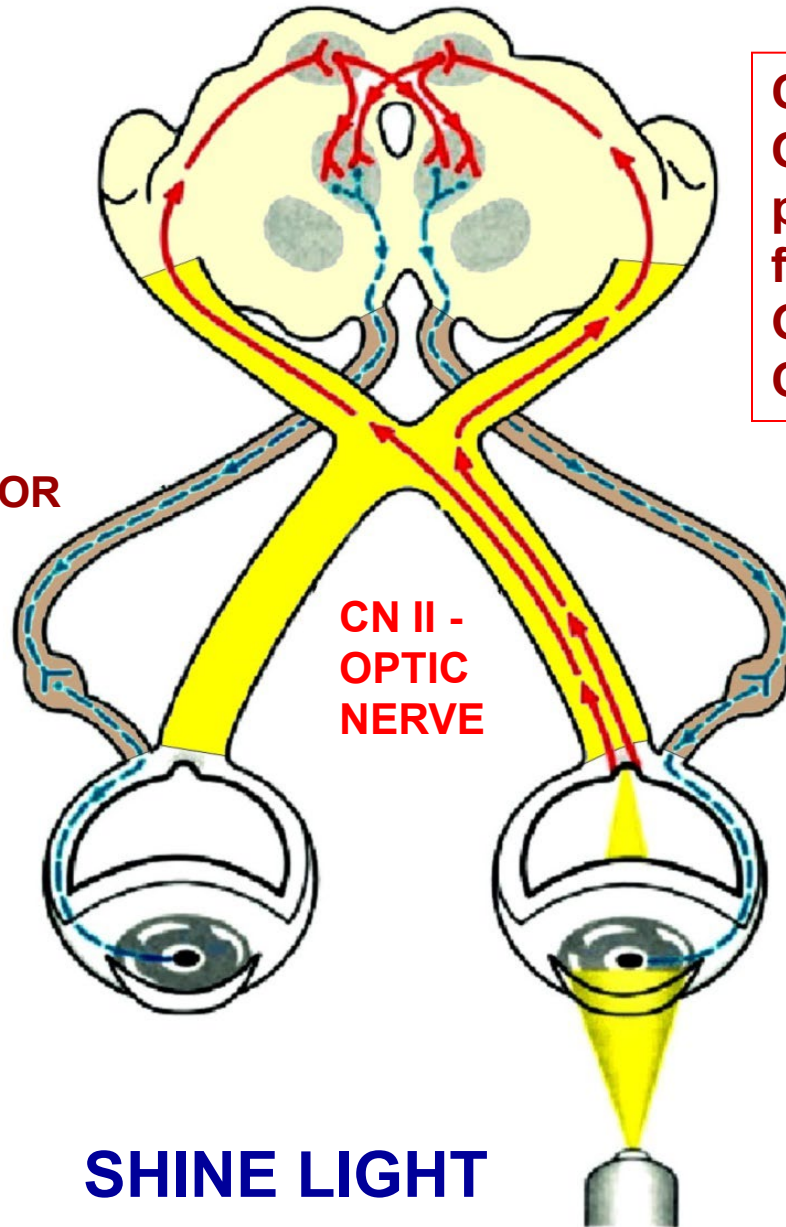
CN III - OCULOMOTOR

CN II - OPTIC NERVE

CONSENSUAL REFLEX – PUPIL CONSTRICTS IN OPPOSITE EYE

DIRECT REFLEX – PUPIL CONSTRICTS IN SAME EYE

SHINE LIGHT



CORNEAL REFLEX - V TO VII

AFFERENT ARM OF REFLEX

**SENSORY
STIMULUS**

**TOUCH
CORNEA**

**TRIGEMINAL -
V1 - LONG
CILIARY NERVES
TO CORNEA**



EFFERENT ARM OF REFLEX

**MOTOR
RESPONSE**

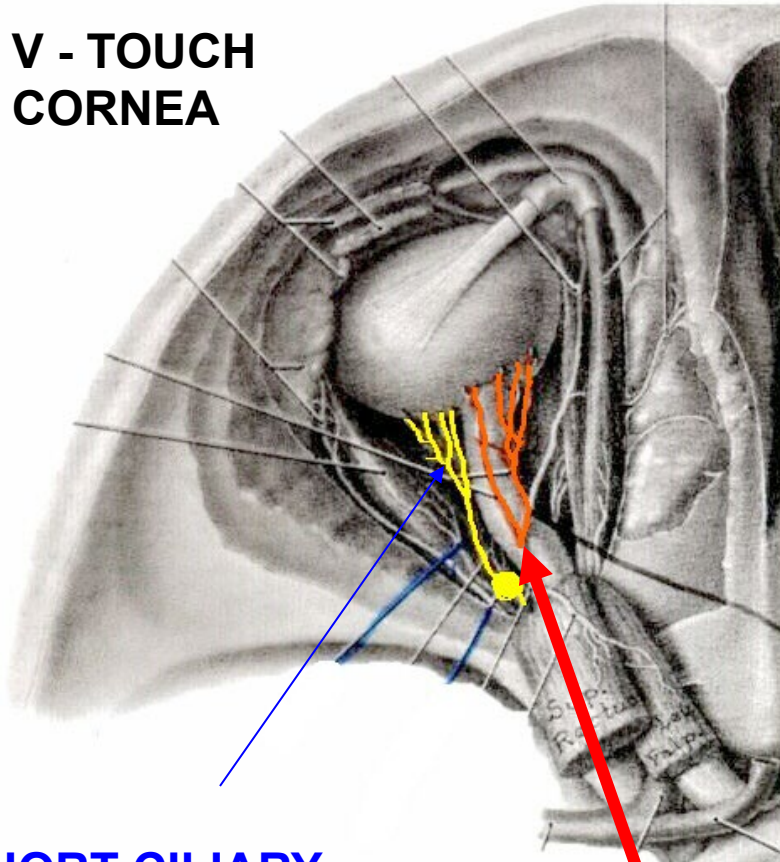
**CLOSE
EYELID**

**FACIAL -
VII - MOTOR TO
ORBICULARIS
OCULI (SVE)**

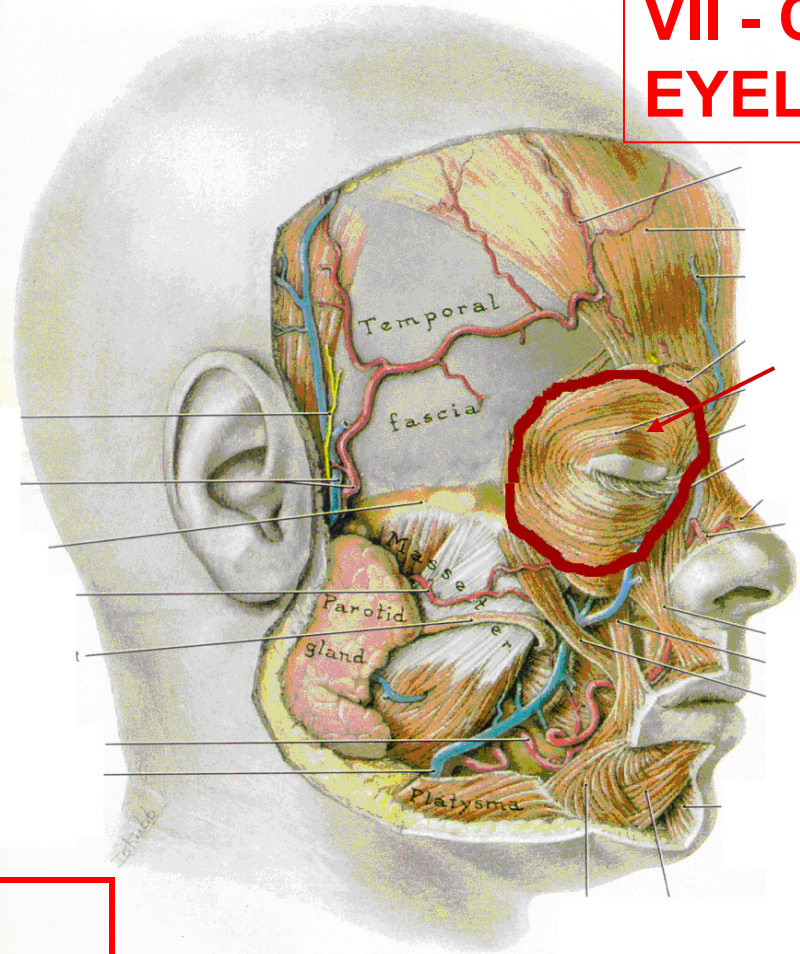


CORNEAL REFLEX - V to VII

V - TOUCH
CORNEA



VII - CLOSE
EYELID



ORBICULARIS
OCULI
M.

LONG CILIARY
NERVES (V1) -
SOMATIC
SENSORY TO
CORNEA

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

SHORT CILIARY
NERVES (III),
CILIARY GANGLION
PARASYMPATHETIC

3. GAG REFLEX - IX to X

AFFERENT ARM OF REFLEX

**SENSORY
STIMULUS**

**TOUCH
ORO-
PHARYNX**

EFFERENT ARM OF REFLEX

**MOTOR
RESPONSE**

**PATIENT GAGS -
CONTRACT
PHARYNGEAL
MUSCLES**

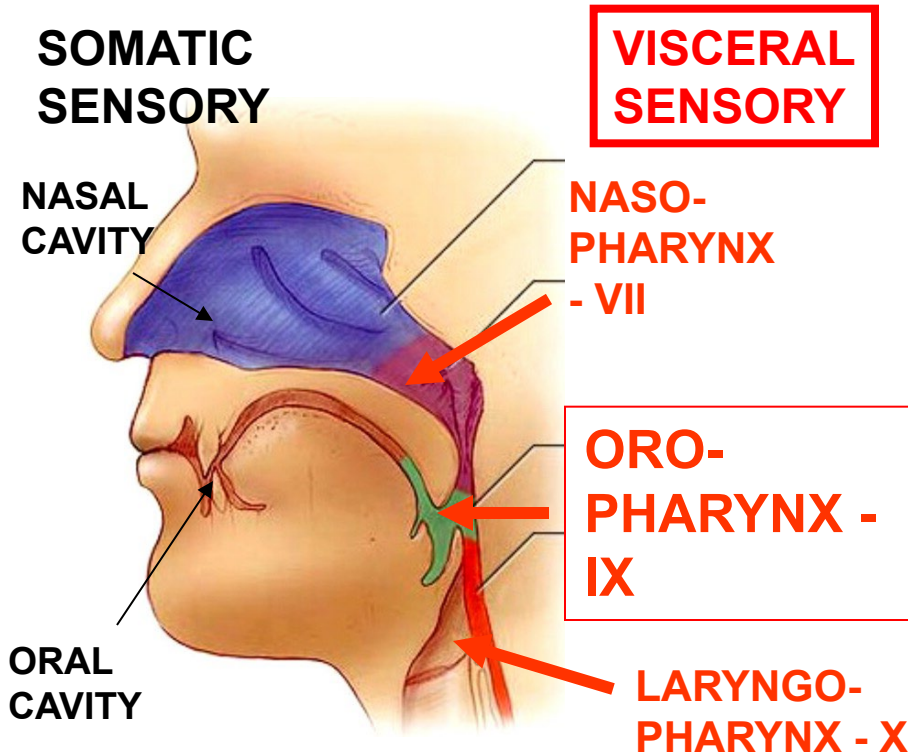


CRANIAL NERVES LECTURE

IX - SENSORY INNERVATION TO OROPHARYNX

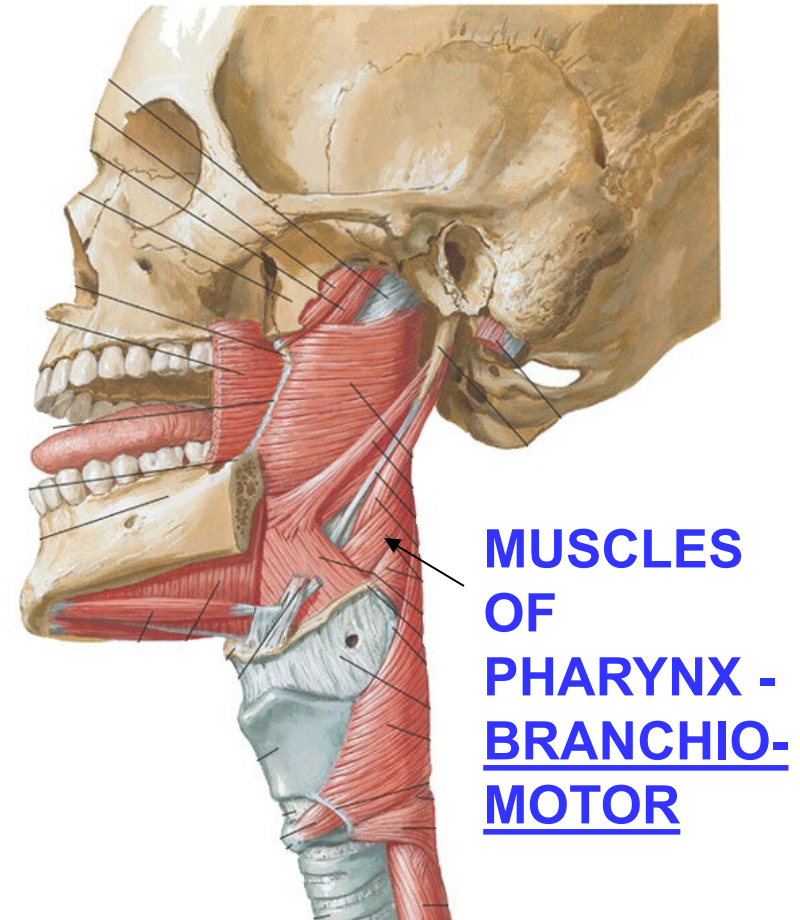
All Pharynx is Visceral Sensory In 3 Cranial Nerves

SOMATIC SENSORY



GAG REFLEX

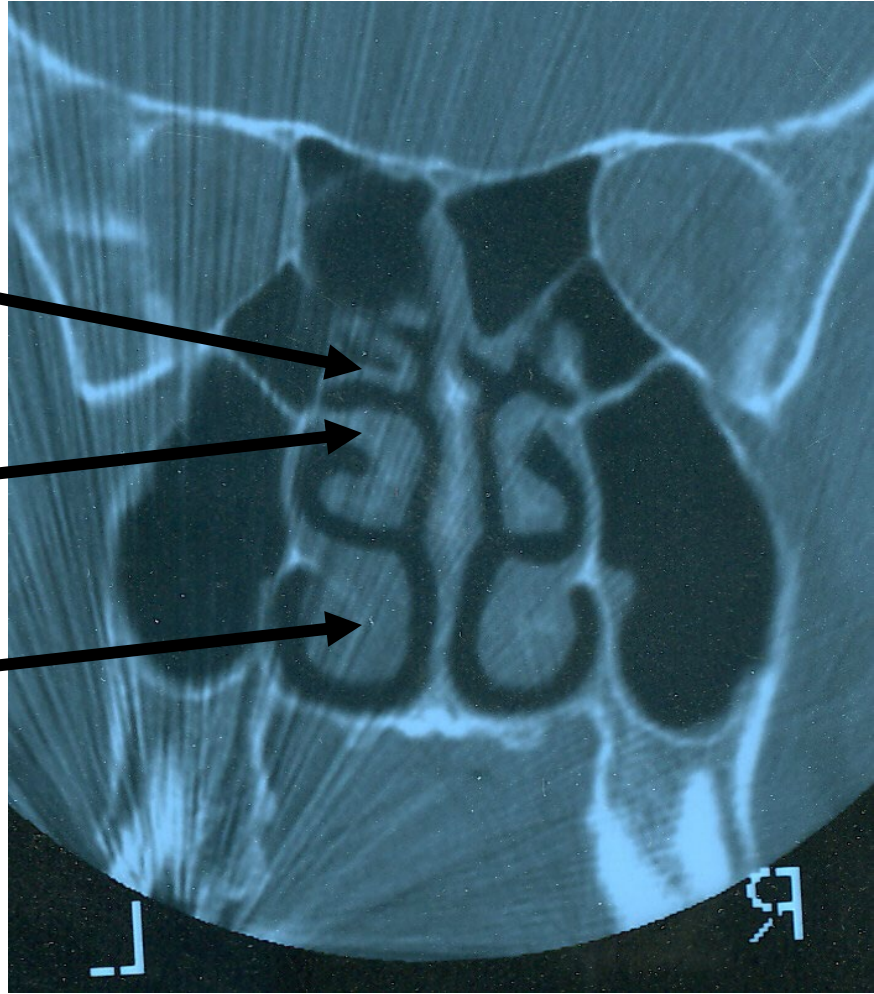
X - INNERVATES ALL MUSCLES OF PHARYNX (except Stylopharyngeus)



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

NASAL CAVITY

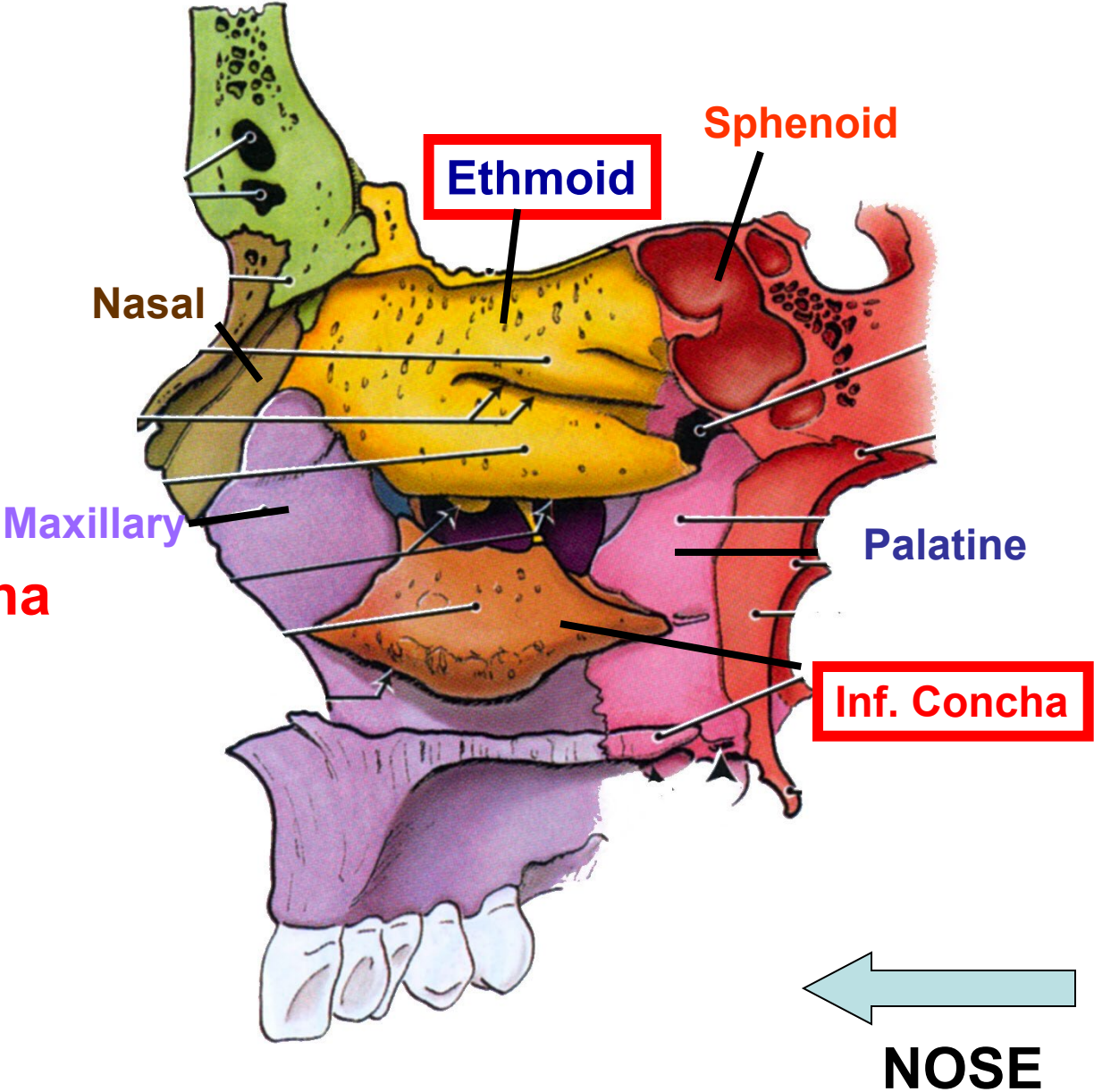
- 1) Superior Concha - Ethmoid
- 2) Middle Concha - Ethmoid
- 3) Inferior Concha - separate bone



NASAL CAVITY

Lateral Wall

- 1) Nasal Bone
- 2) Maxillary
- 3) Inferior Concha
- 4) Palatine
- 5) Ethmoid
- 6) Sphenoid



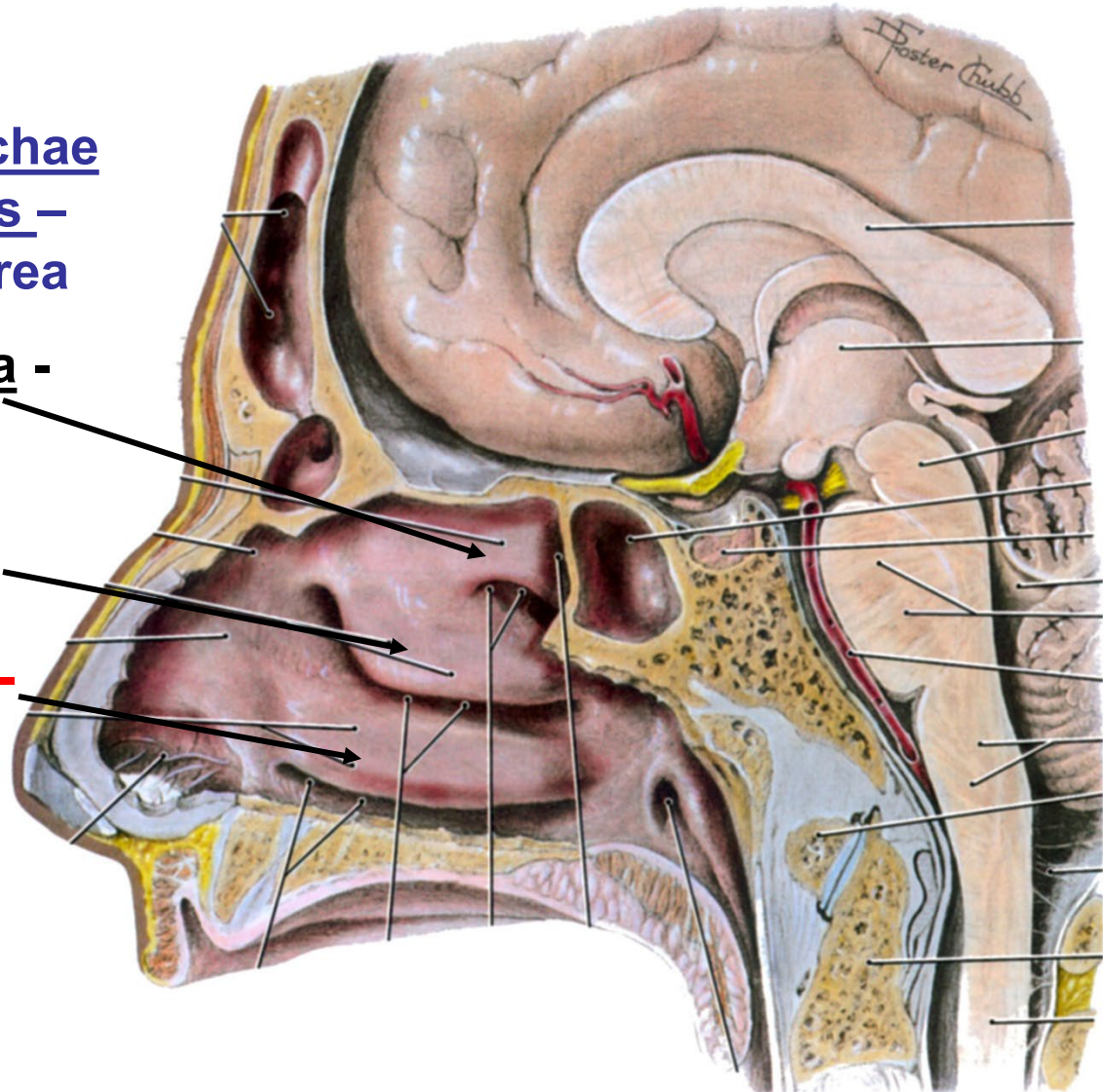
C. LATERAL WALL OF NASAL CAVITY

Projections = Conchae
(shell) or turbinates –
increase surface area

1) Superior Concha -
Ethmoid

2) Middle Concha -
Ethmoid

3) Inferior Concha -
separate bone

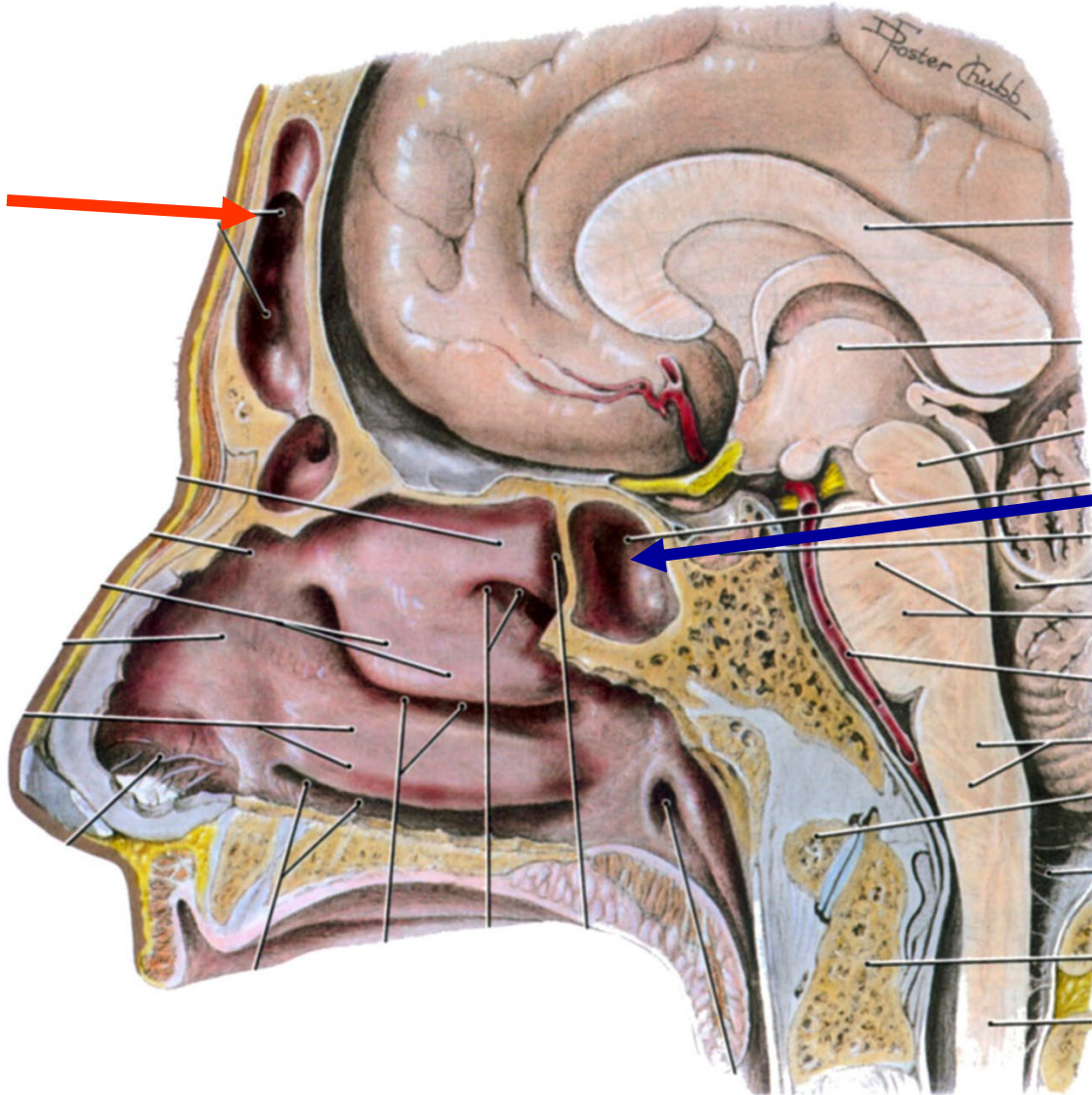
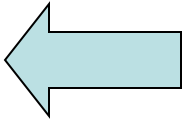


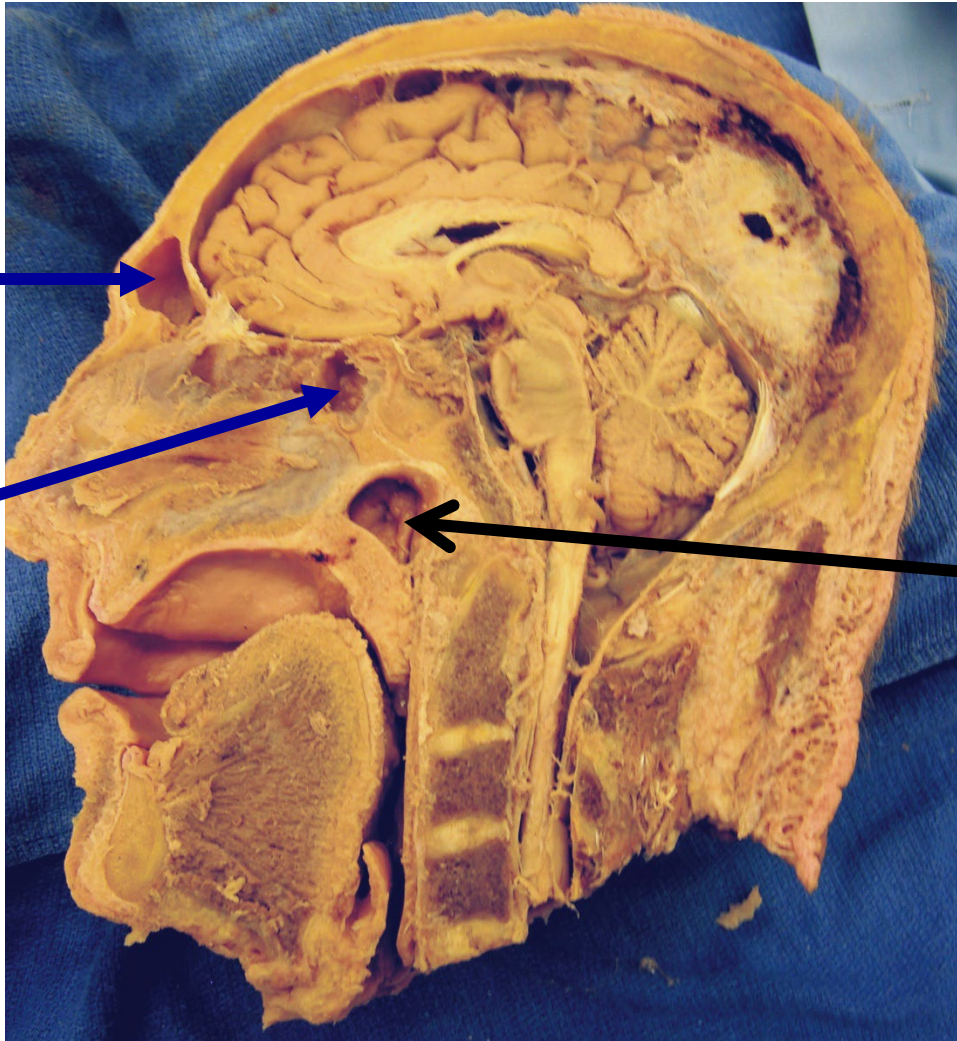
PARANASAL AIR SINUSES

Frontal Sinus



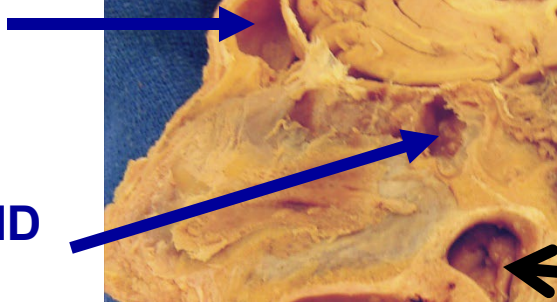
Sphenoid Sinus



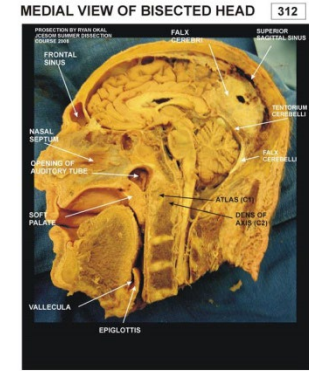


**FRONTAL
SINUS**

**SPHENOID
SINUS**



312



**Note: Opening of
Auditory
(Eustachian)
Tube**

