

**REVIEW OF GROSS ANATOMY
FOR NEURO BLOCK EXAM
Feb 25 2022**

EXAM INFO

WRITTEN EXAM

1- 32 questions on Head and Neck. Questions from each lecture but not necessarily 2 questions/lecture. Some lectures more complex (ex. cranial nerves). Generally weighted toward first week but also things people have forgotten in the past (ex. Larynx). There are also Skull questions from the Foramina of the Skull session (and handout)

EXAM INFO- PRACTICAL EXAM

2- Practical similar to practice exam. 22 questions (of 24) on Head and Neck given on ExamSoft as multiple choice questions.

Many questions are asked on the prosection pictures or diagrams (with views similar to the pictures). There are also questions on skulls (many on diagrams similar to Skull Session handout).

The questions test major structures but a number are not simply identify but ask clinically related questions (example for a foramen of the skull: what clinical symptom could result from a tumor at this location?)

FOCUS - Clinical anatomy relevant to the practice of medicine and Step 1 Board Exam

CHARTS OF CLINICAL ANATOMY AND EMBRYOLOGY

CLINICAL ANATOMY OF HEAD AND NECK 2022

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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	Communicating hydrocephalus (many causes)	Decreased visual function both eyes; sign: papilledema in

However, also include specific aspects of anatomy needed for understanding Neuroanatomy (particularly brainstem), and other disciplines (ENT, Emergency Medicine, Surgery, etc.)

**IN THIS SESSION:
REVIEW AND
INTEGRATED FORMAT**

**Skull and Skull Session
Cranial nerves (not IX,
X, XI)
Meninges (Hematomas)
Orbit
Reflexes
Nasal Cavity
Oral Cavity**

**NOT INCLUDED IN
REVIEW BUT ON
EXAM**

**Parotid
Larynx
Pharynx
Neck
Ear
Cranial nerves (IX, X,
XI) - multiple lectures**

SKULL - FOCUS UPON FORAMINA (OPENINGS) OF SKULL

CHART OF FORAMINA FOR SKULL SESSION

Foramen	Contains
Olfactory Foramina	Olfactory nerves (I)
Optic Foramen (canal)	Optic nerve (II), Ophthalmic artery (from Internal Carotid artery)
Superior Orbital Fissure	III, IV, V1 (Ophthalmic division of Trigeminal nerve), VI; Ophthalmic veins
Foramen Rotundum	Maxillary division of Trigeminal nerve (V2).
Foramen Ovale	Mandibular division of V (V3) and Accessory Meningeal artery (when present)
Foramen Spinosum	Middle Meningeal artery and Nervus Spinosus
Carotid canal	Internal carotid artery and Sympathetic plexus surrounding artery
Internal Auditory Meatus	Facial nerve (VII) and Vestibulocochlear nerve (VIII)
Jugular foramen	Glossopharyngeal (IX), Vagus (X) and Accessory (XI) nerves.
Hypoglossal canal	Hypoglossal nerve (XII)
Foramen Magnum	Spinal cord and Vertebral arteries and veins

INTEGRATE INFORMATION FROM MULTIPLE LECTURES - Ex. questions about damage to structures at Foramina and resulting symptoms.

INTEGRATE INFORMATION FROM MULTIPLE LECTURES: KNOWLEDGE OF SKULL AND VIEW IN CADAVER/IMAGES

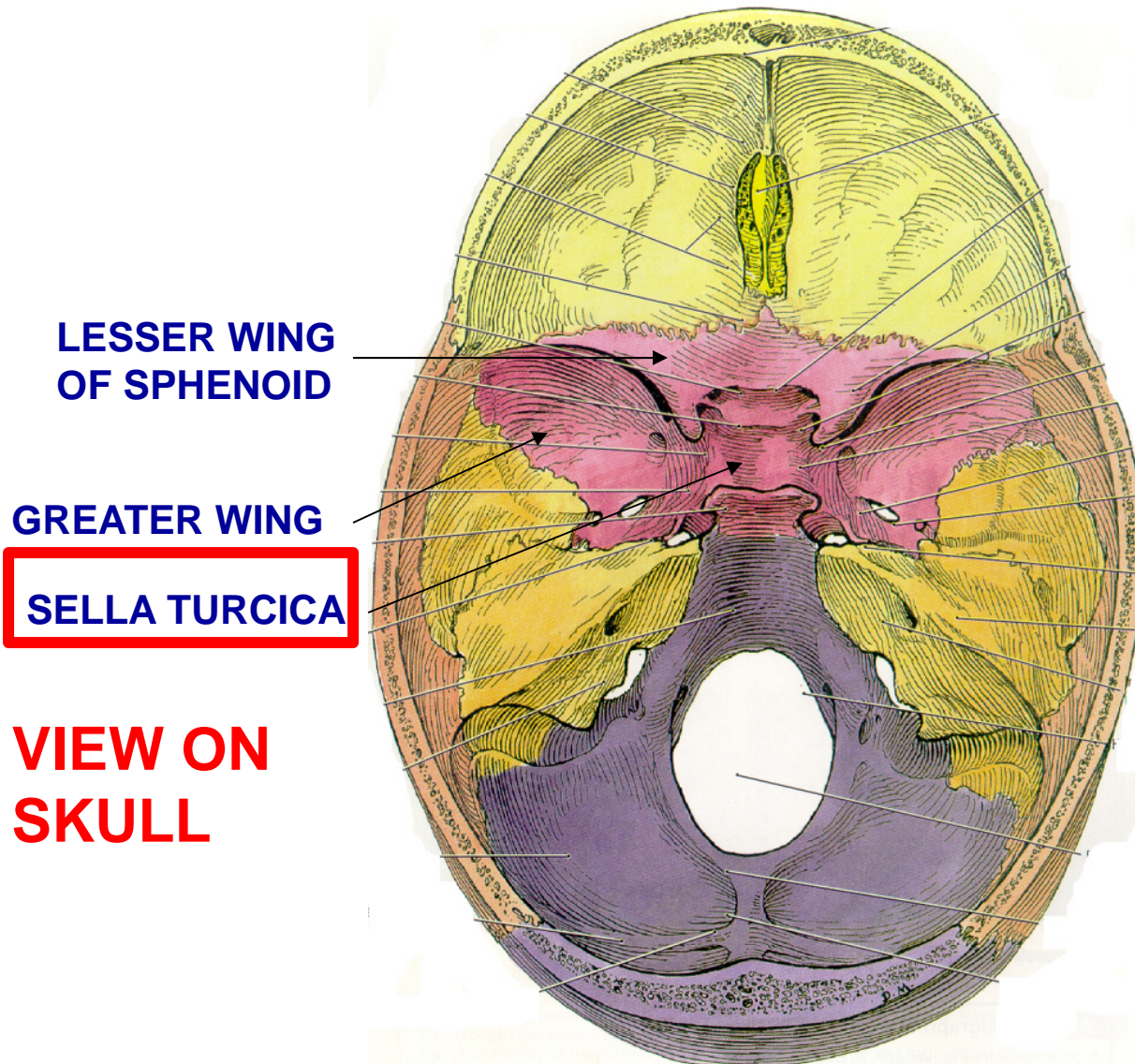
FROM
LECTURE:
SKULL

- Sphenoid bone forms parts of all cranial fossae; has:

i) Lesser Wing above Superior Orbital Fissure;

ii) Greater Wing -Below Superior Orbital Fissure extends laterally;

iii) Sella Turcica- (turkish saddle) depression above main part (body) LOCATION OF PITUITARY GLAND



**VIEW IN
DISSECTION**

**SELLA
TURCICA**

I Olfactory

II Optic

**III Oculo-
motor**

**VI
Abducens**

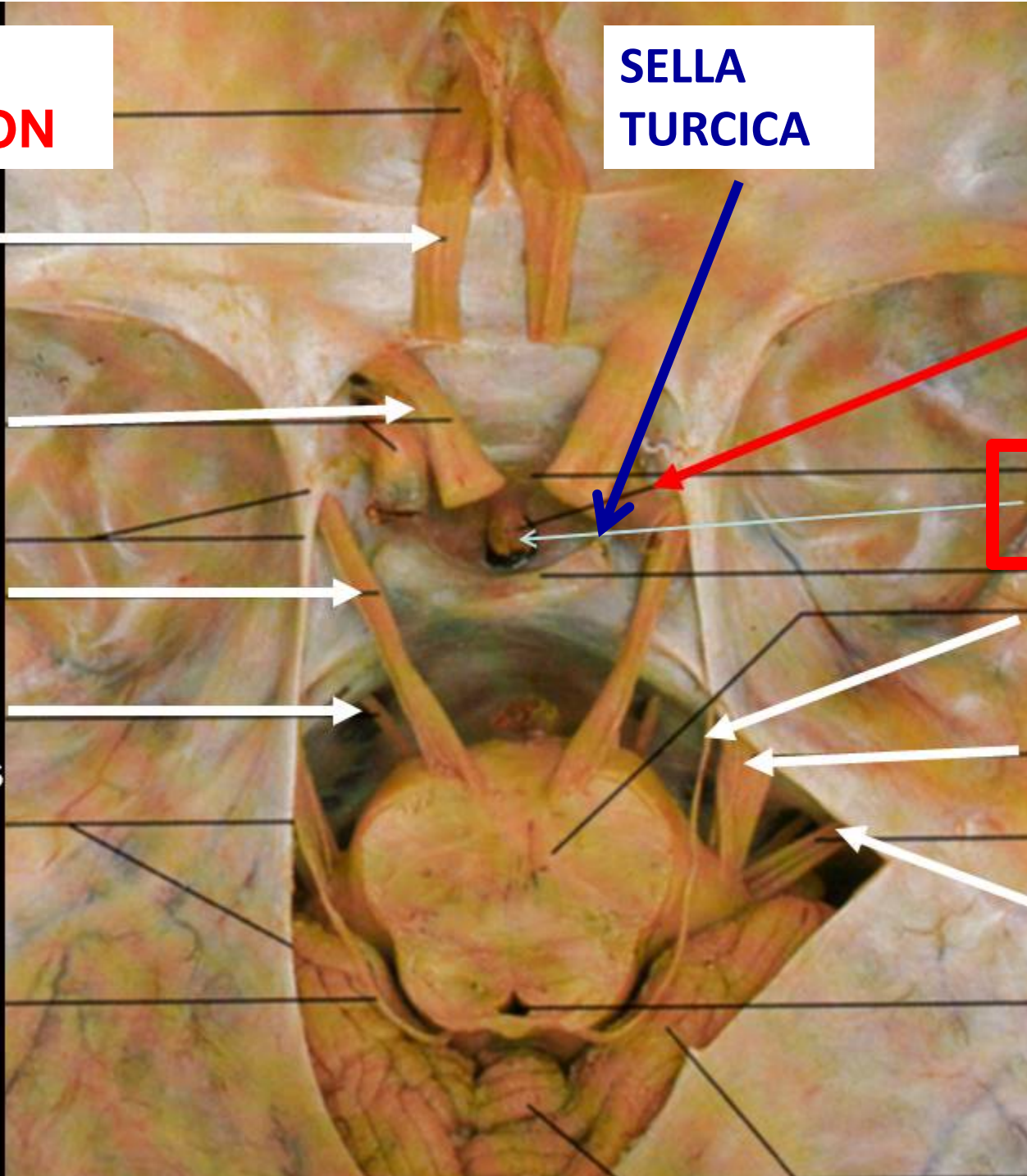
**INTERNAL
CAROTID
A.**

**Pituitary
stalk**

**IV
Trochlear**

**V
Trigeminal**

VII + VIII



CRANIAL NERVES: CAPSULE SUMMARY

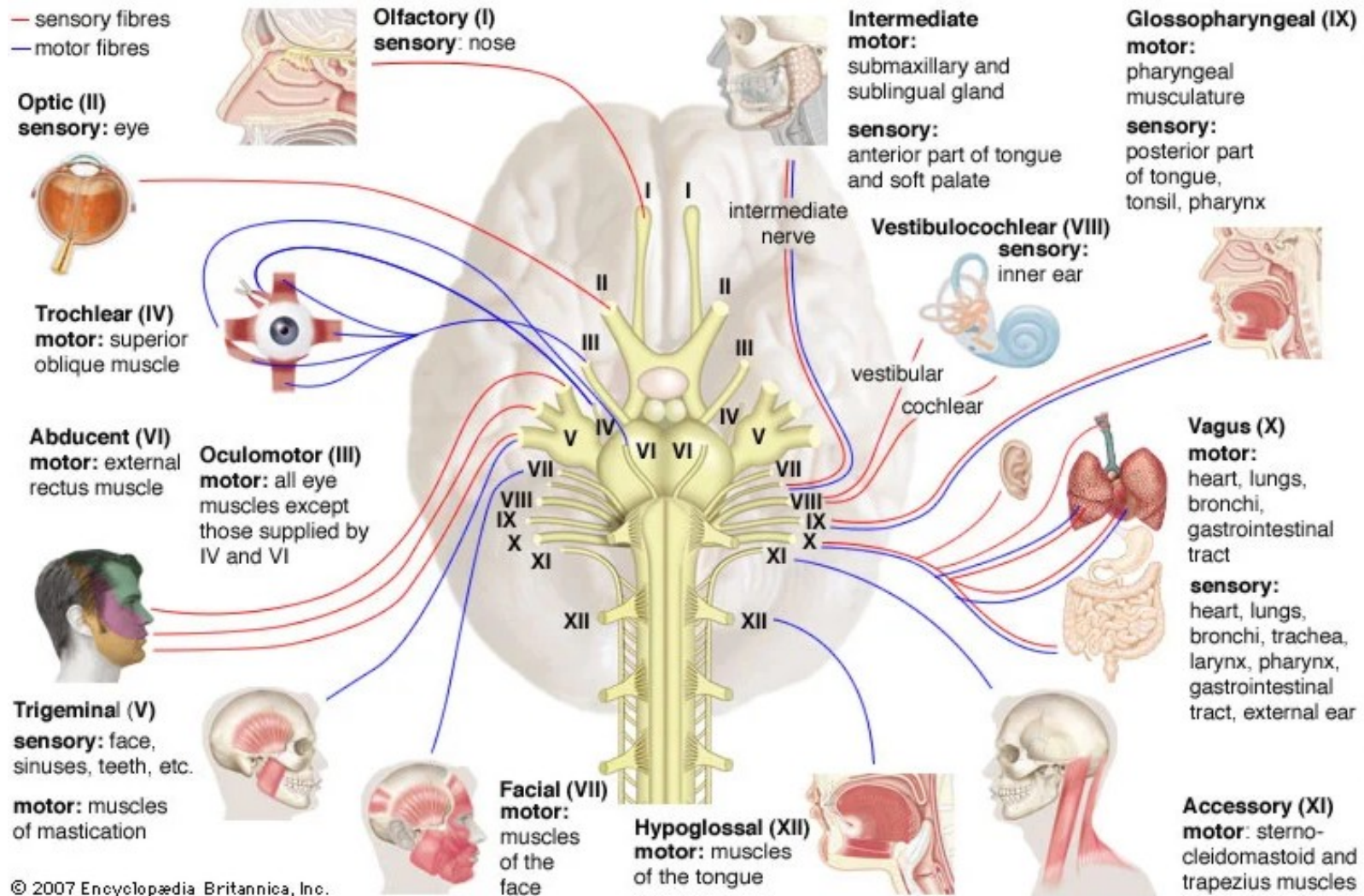
- I. Olfactory - smell**
- II. Optic - vision**
- III. Oculomotor - eye movements; also parasympathetics to eye smooth muscles**
- IV. Trochlear - eye movements**
- V. Trigeminal - sensory nerve to skin, also pain, temperature touch to oral and nasal cavities, (outer ear)**
- VI. Abducens - eye movements**
- VII. Facial - muscles of facial expression; also taste, parasympathetics**
- VIII. Vestibulo-cochlear (Stato-acoustic) - hearing and balance**
- IX. Glossopharyngeal - sensory to pharynx, back of tongue (Gag reflex)**
- X. Vagus - motor to pharynx (most), larynx (voice box); soft palate; parasympathetics to thorax, abdomen**
- XI. Accessory (Spinal Accessory) - motor to sternocleidomastoid, trapezius**
- XII. Hypoglossal - motor to muscles of tongue**

CRANIAL NERVE: TYPES OF NEURONS - USEFUL TO KNOW FOR NEURO LECTURES ON BRAINSTEM

VII. SUMMARY OF TYPES OF NEURONS IN CRANIAL NERVES (parenthesis - OLD 3 Letter system)

Nerve	SOMATIC MOTOR (GSE)	BRANCHIO-MOTOR (SVE)	VISCERAL MOTOR (GVE)	SOMATIC SENSORY (GSA)	VISCERAL SENSORY (GVA)	CHEMICAL SENSE (SVA)	SPECIAL SENSES (SSA)
III.	+		+				
IV.	+						
VI.	+						
XII.	+						
V.		+		+			
VII.		+	+	+	+	+	
IX.		+	+	+	+	+	
X.		+	+	+	+	+	
XI.		+					
I.						+	
II.							+
VIII.							+

CRANIAL NERVES: GROSS ANATOMY FUNCTION DETERMINES AFFECT OF LESIONS: Many diagrams have insufficient information

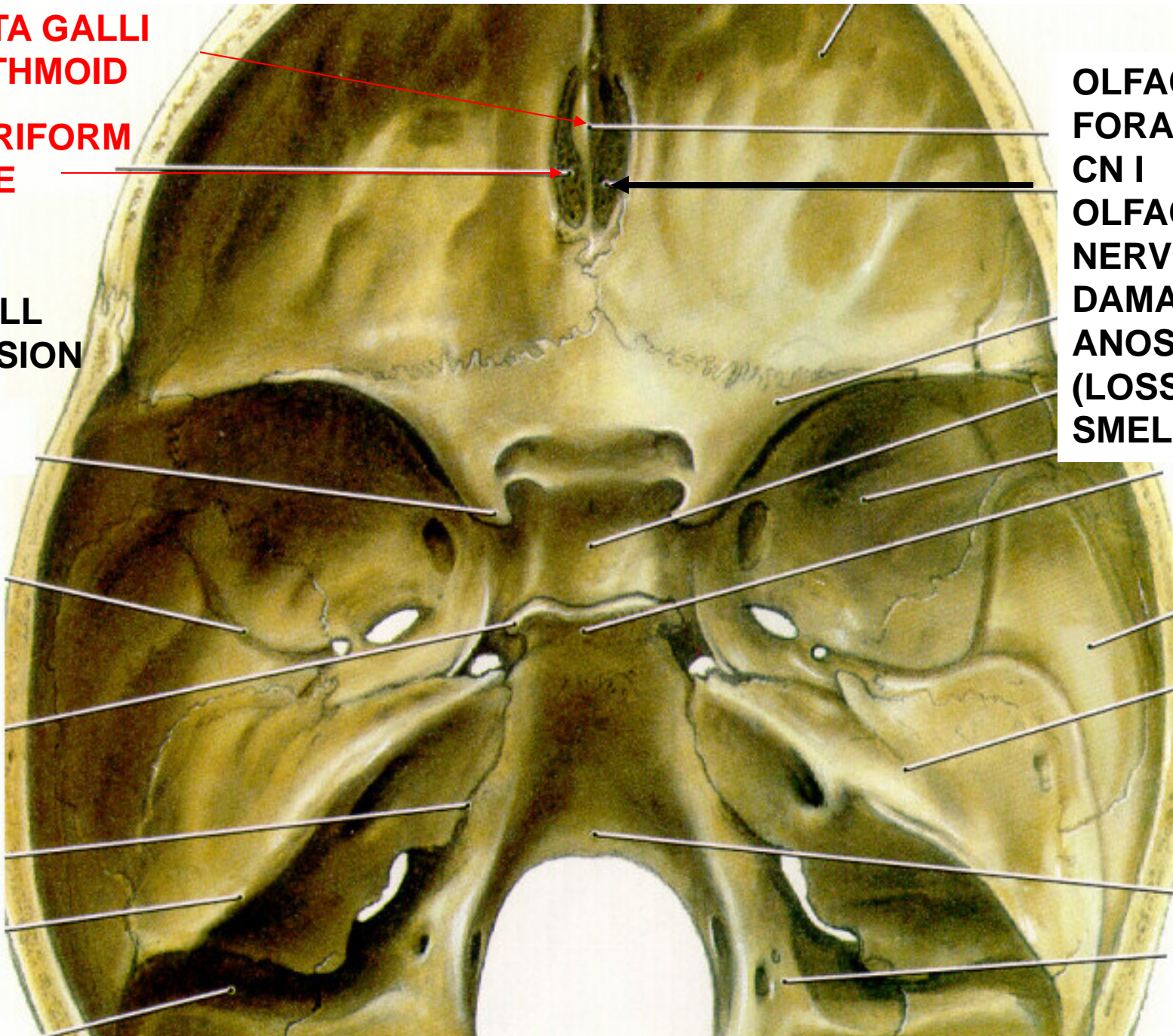


**CRISTA GALLI
OF ETHMOID**

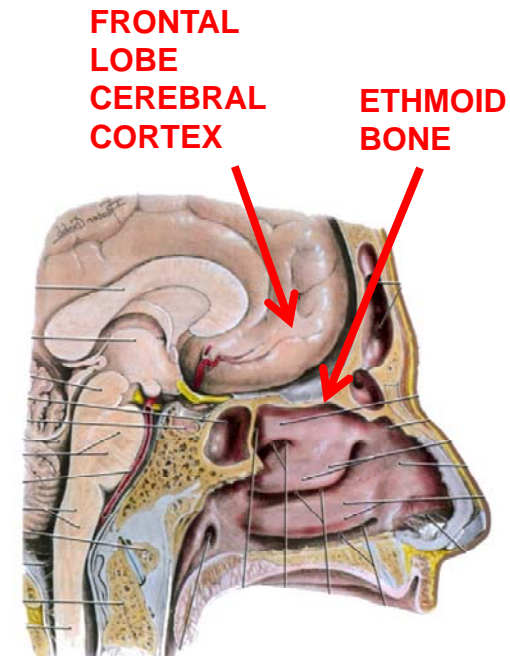
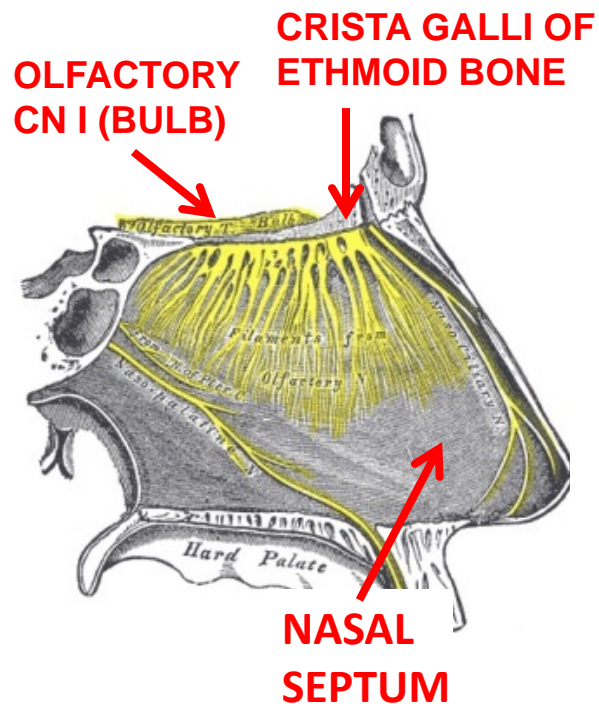
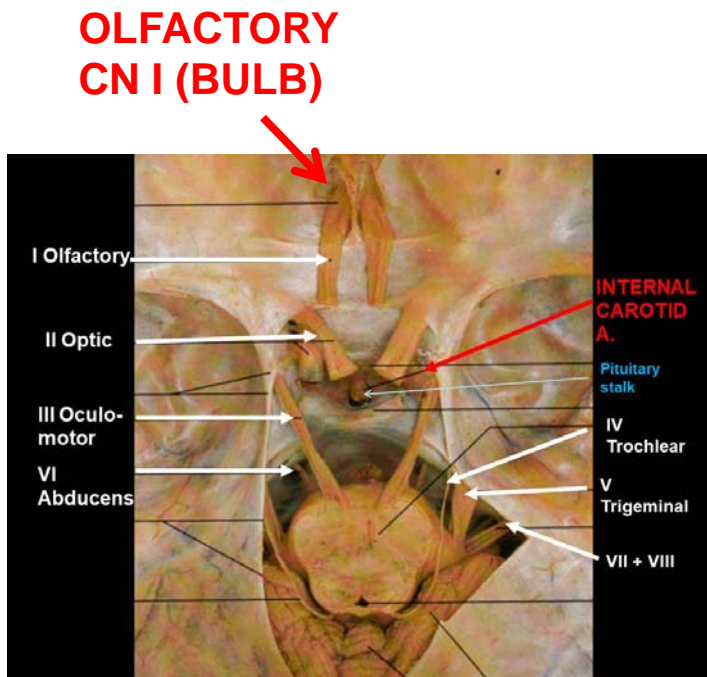
**CRIBRIFORM
PLATE**

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

**SKULL
SESSION**

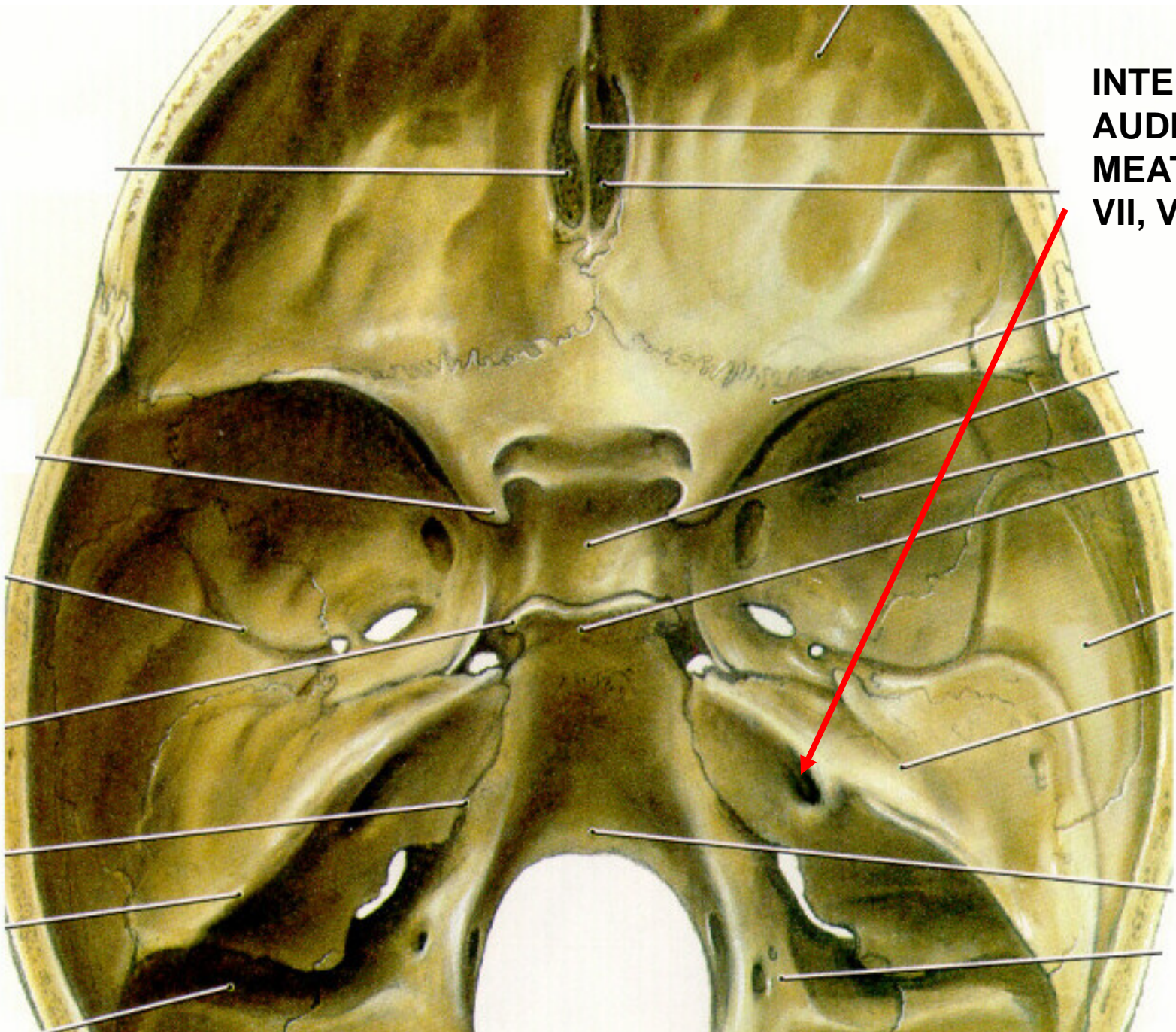


CORRELATE WITH NASAL CAVITY

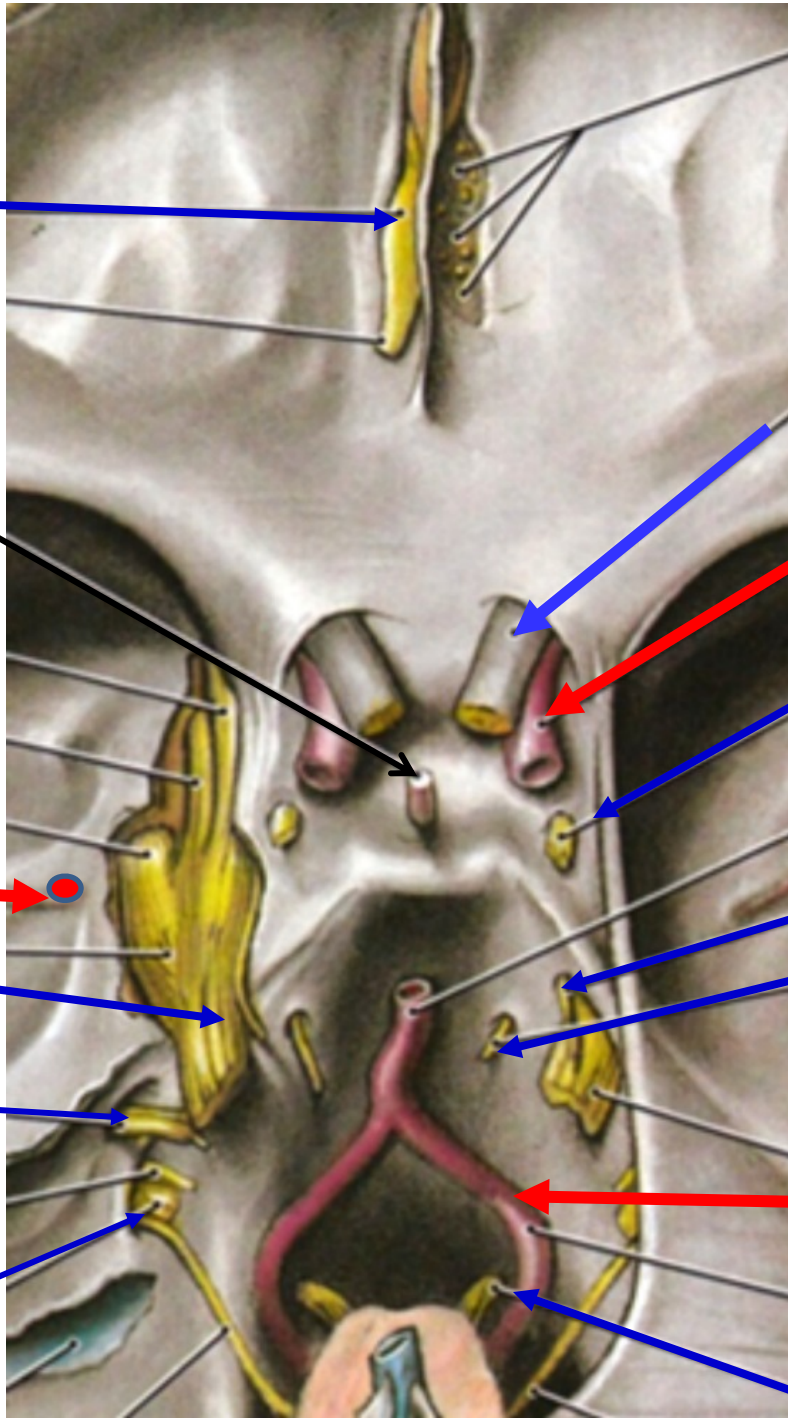


WIKIPEDIA,
GRAY'S
ANATOMY

**CLINICAL – 1) Tumors of Anterior Cranial Fossa can affect smell
1) Blow to nose can break ethmoid bone, leak CSF from nose**



**INTERNAL
AUDITORY
MEATUS –
VII, VIII**



**BRAINSTEM
PROSECTIONS
IDENTIFY**

**PITUITARY
STALK**

V1

V2

V3

**MIDDLE
MENINGEAL A.**

V

**VII
+VIII**

**IX, X
+XI**

INTERNAL CAROTID A.

VERTEBRAL A.

I

II

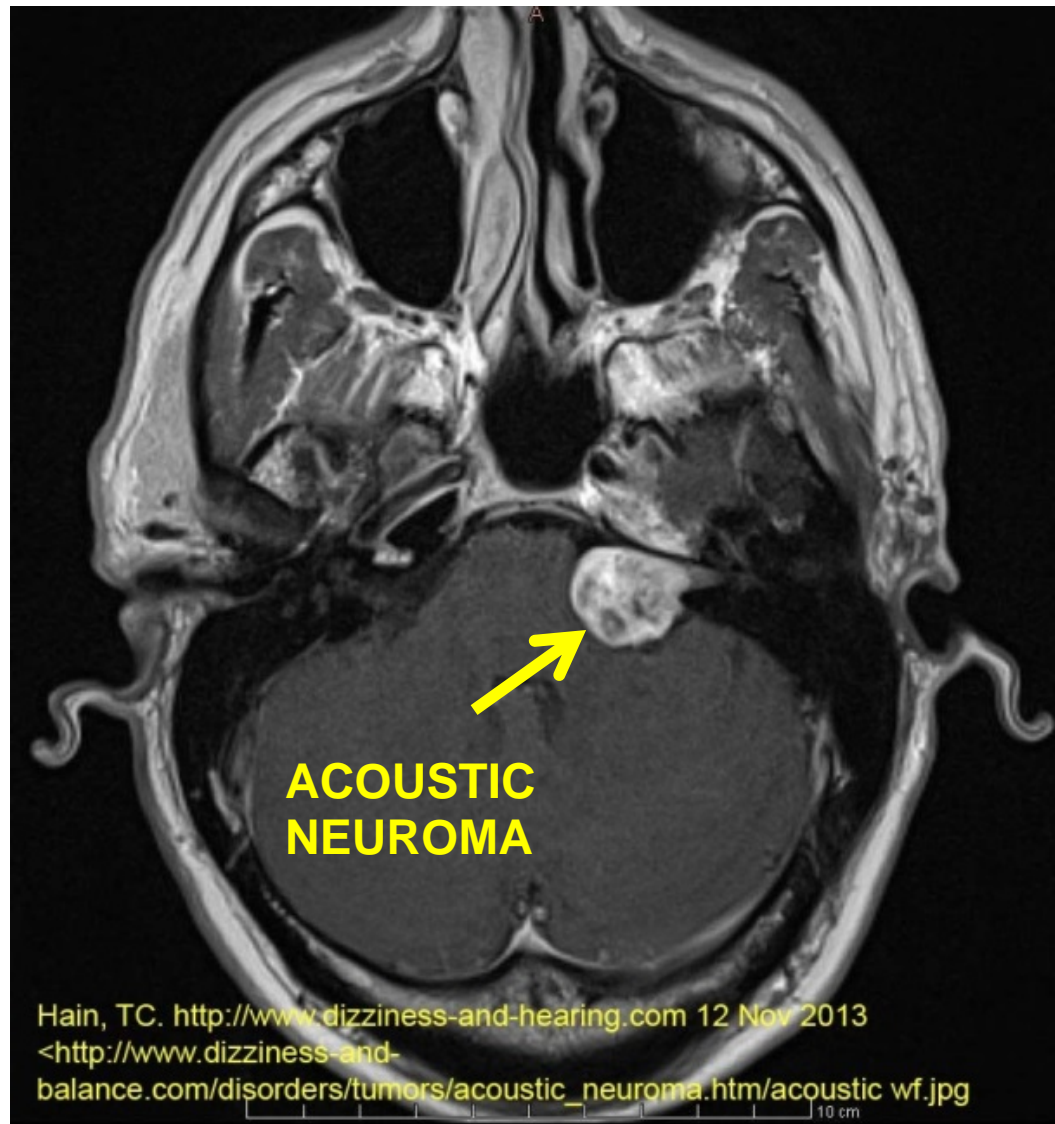
III

IV

VI

XII

ACOUSTIC NEUROMA = VESTIBULAR SCHWANNOMA



- Tumor can occur at Internal Auditory Meatus
- affect CN VII and CN VIII
- what symptoms from CN VIII?
Affect Hearing and Balance
- what symptoms from CN VII?

FACIAL NERVE COMPRESSION AT INTERNAL AUDITORY MEATUS: SYMPTOMS SIMILAR TO BELL'S PALSY

UNABLE TO CLOSE EYE DUE TO PARALYSIS OF ORBICULARIS OCULI MUSCLE



FACIAL PARALYSIS
(as in Bell's Palsy)
can paralyze
ORBICULARIS
OCULI MUSCLE

- patient is unable to close eye
- can damage cornea of eye
- in newborns, can sew eyelid shut to prevent corneal damage

IF ONLY WEAKNESS, HOW TEST?

NOTE:

- 1) CLOSE EYELIDS**
= CRANIAL NERVE VII (FACIAL N.)
- 2) OPEN EYELIDS**
- CRANIAL NERVE III (OCULOMOTOR)
+ SYMPATHETICS

HOW TEST? CORNEAL REFLEX - V TO VII

AFFERENT ARM OF REFLEX

EFFERENT ARM OF REFLEX

**SENSORY
STIMULUS**

**MOTOR
RESPONSE**

**TOUCH
CORNEA**

**CLOSE
EYELID**

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

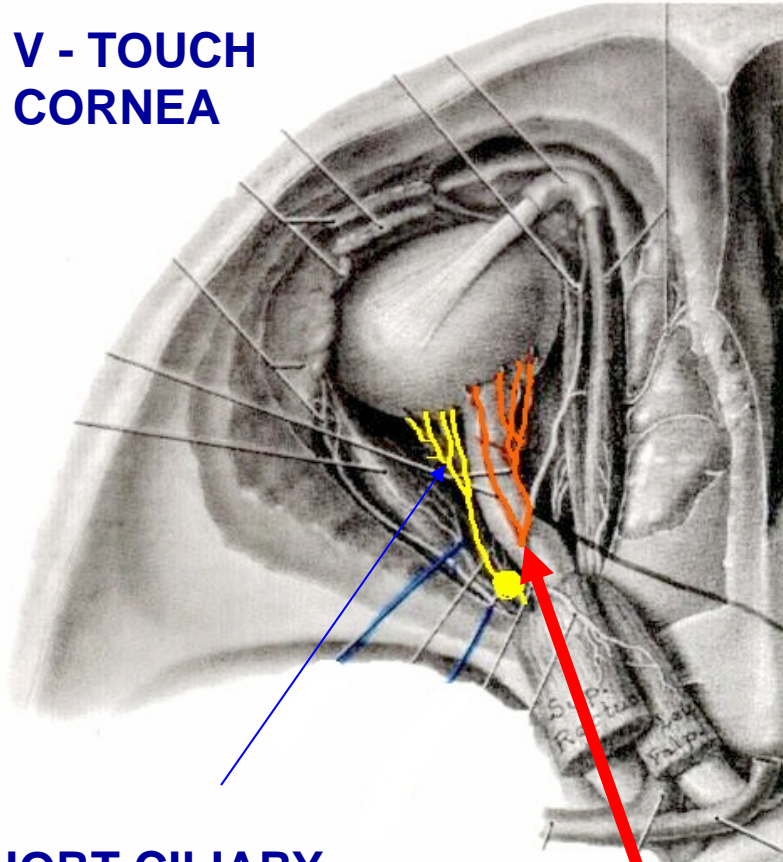


**FACIAL -
VII - MOTOR TO
ORBICULARIS
OCULI**

**FROM
LECTURE:
REFLEXES**

CORNEAL REFLEX - V to VII

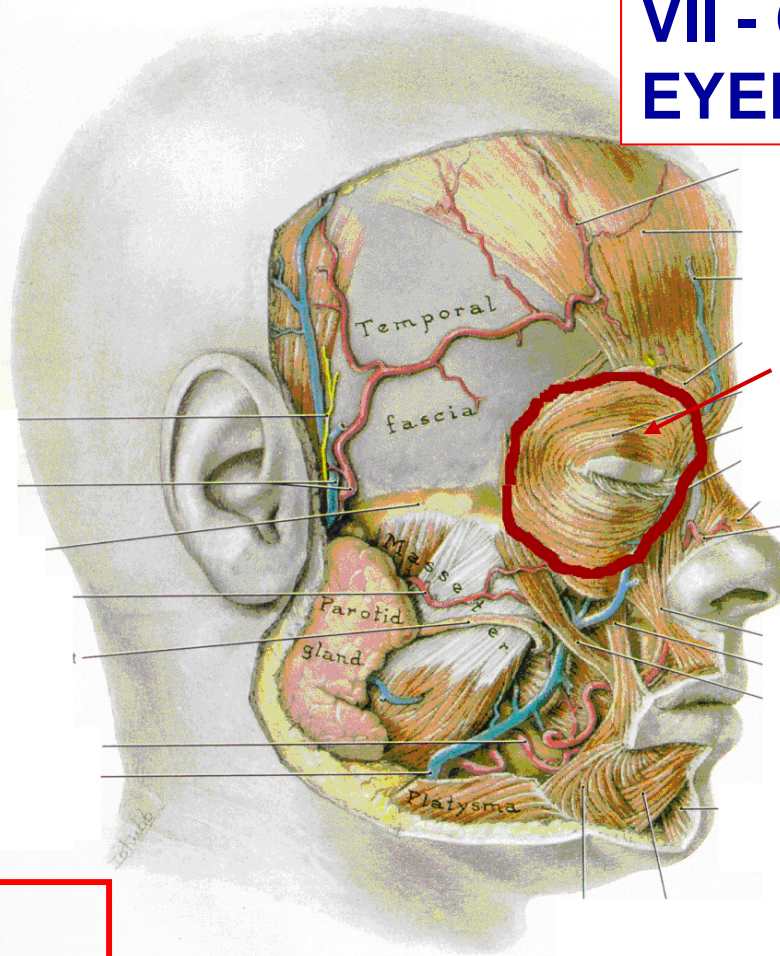
V - TOUCH CORNEA



SHORT CILIARY NERVES (III),
CILIARY GANGLION
PARASYMPATHETIC

LONG CILIARY NERVES (V1) -
SOMATIC
SENSORY TO
CORNEA

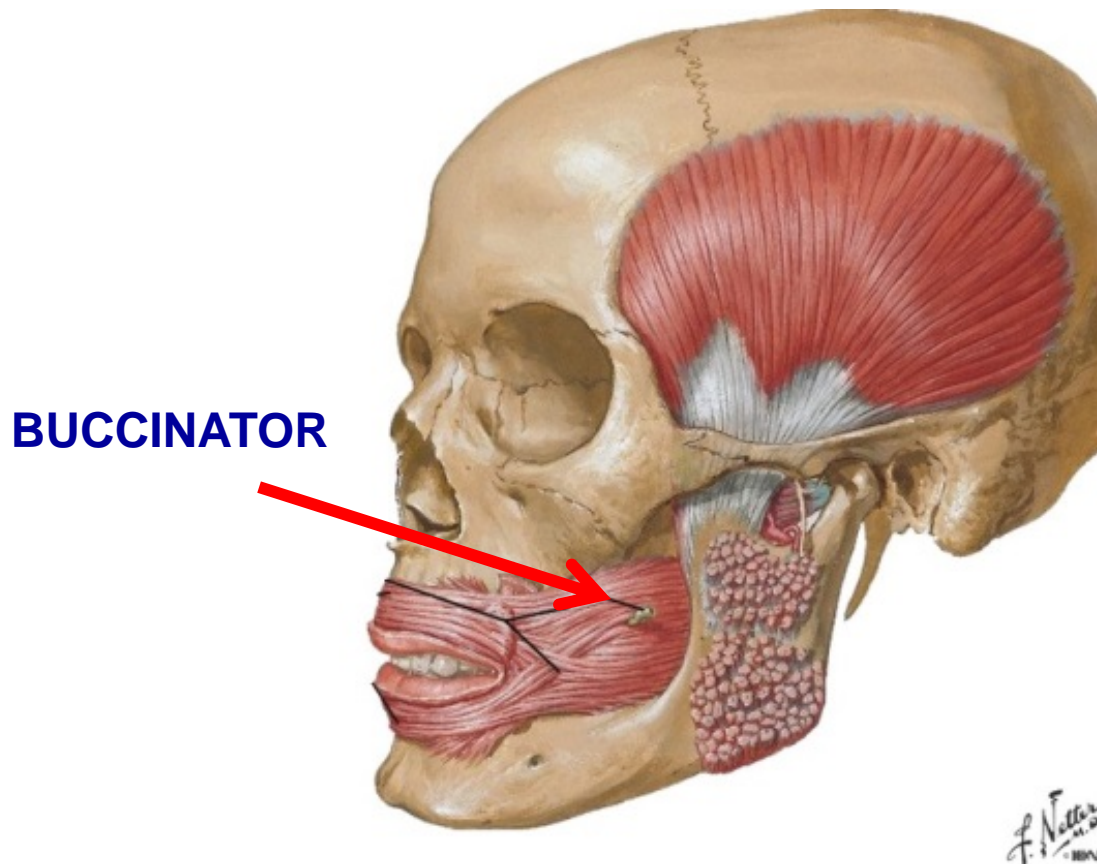
VII - CLOSE EYELID



ORBITALIS OCULI M.

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

OTHER SYMPTOMS - PARALYSIS OF BUCCINATOR MUSCLE



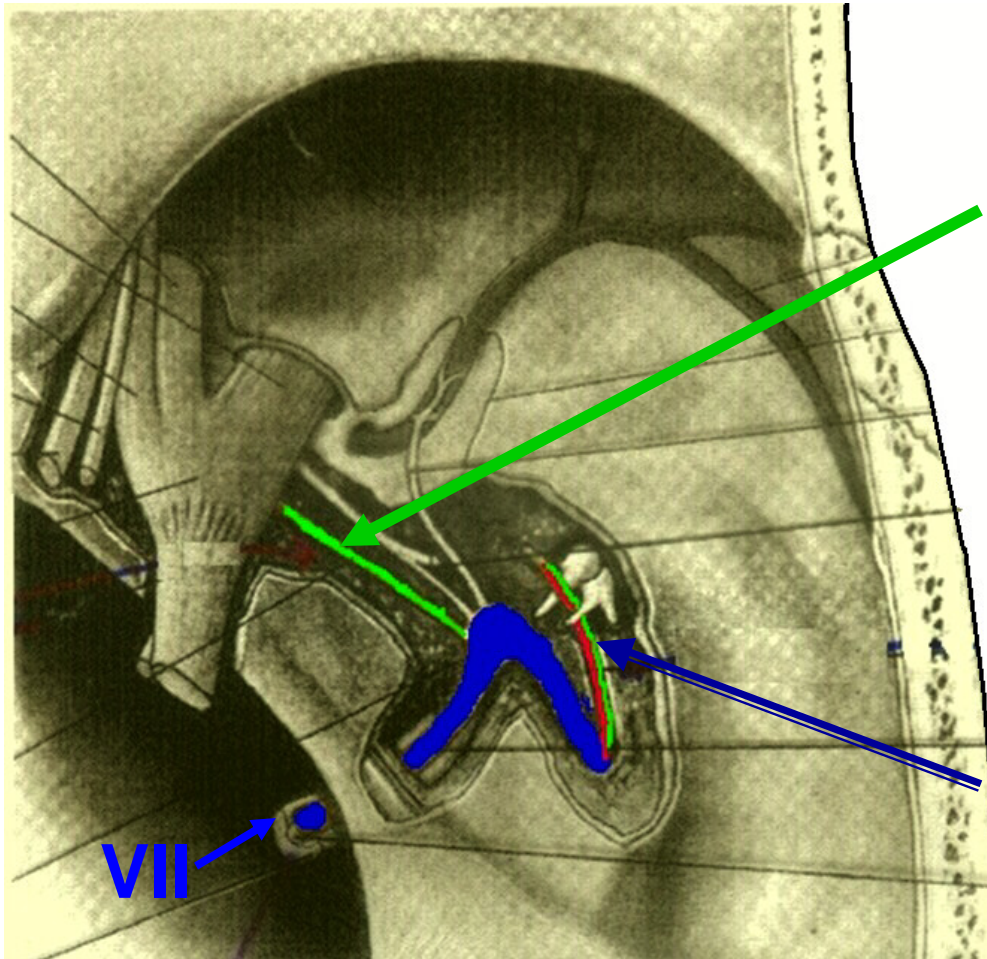
**FACIAL PARALYSIS
can paralyze
BUCCINATOR**

**- patient is unable to
hold food between
teeth**

**- DIFFICULTY IN
CHEWING FOOD**

**BUCCINATOR FORMS WALL OF
MOUTH - PARALYZE UNABLE TO
HOLD FOOD BETWEEN TEETH**

OTHER SYMPTOMS - FACIAL NERVE ALSO HAS BRANCHES THAT ARISE INSIDE TEMPORAL BONE

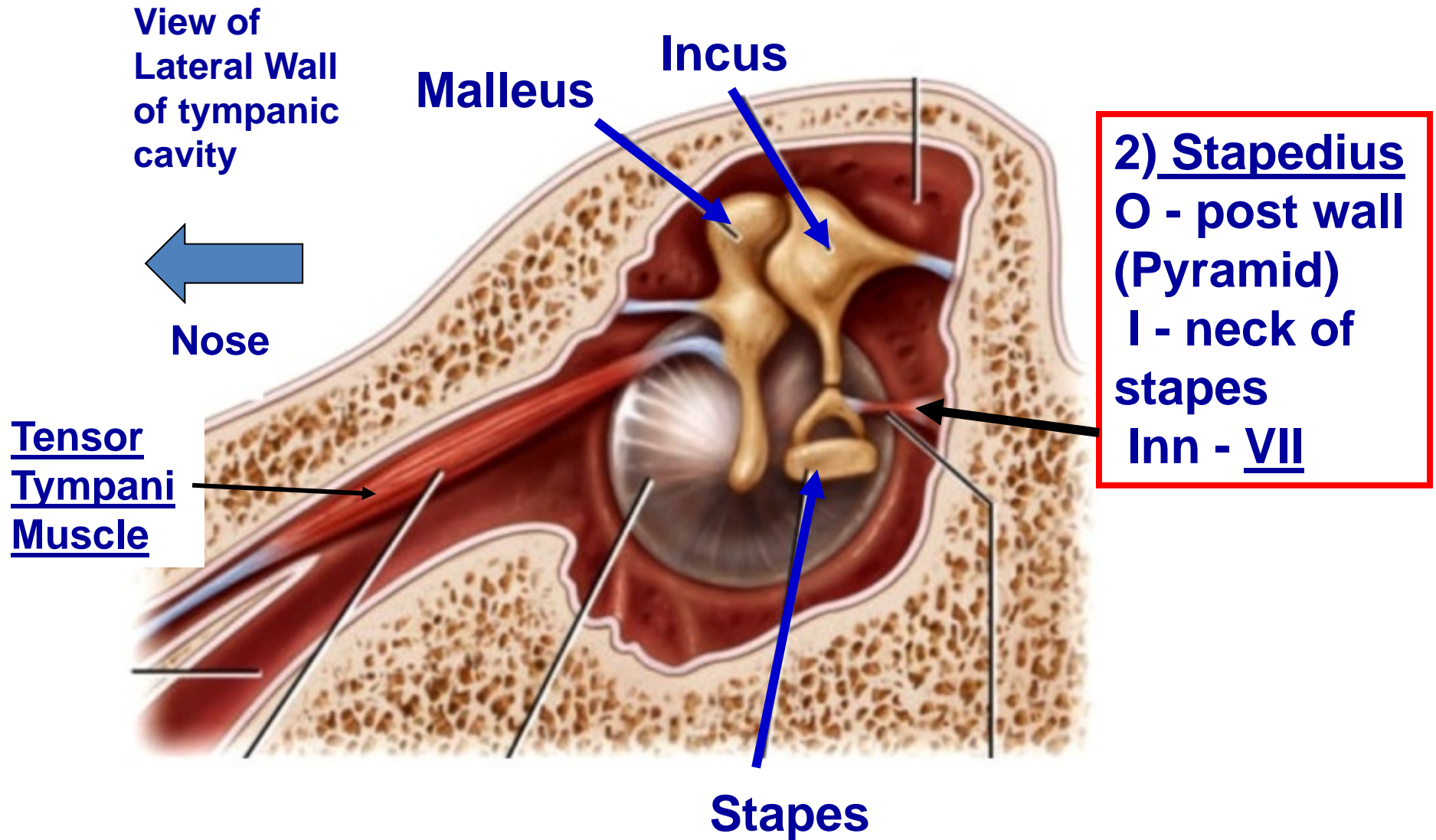


1. Greater Petrosal N.
Parasympathetics to
Lacrimal gland, mucous
glands of nose and palate,
[Visceral sensory to
Nasopharynx]

2. Stapedial N. -
Branchiomotor to
Stapedius

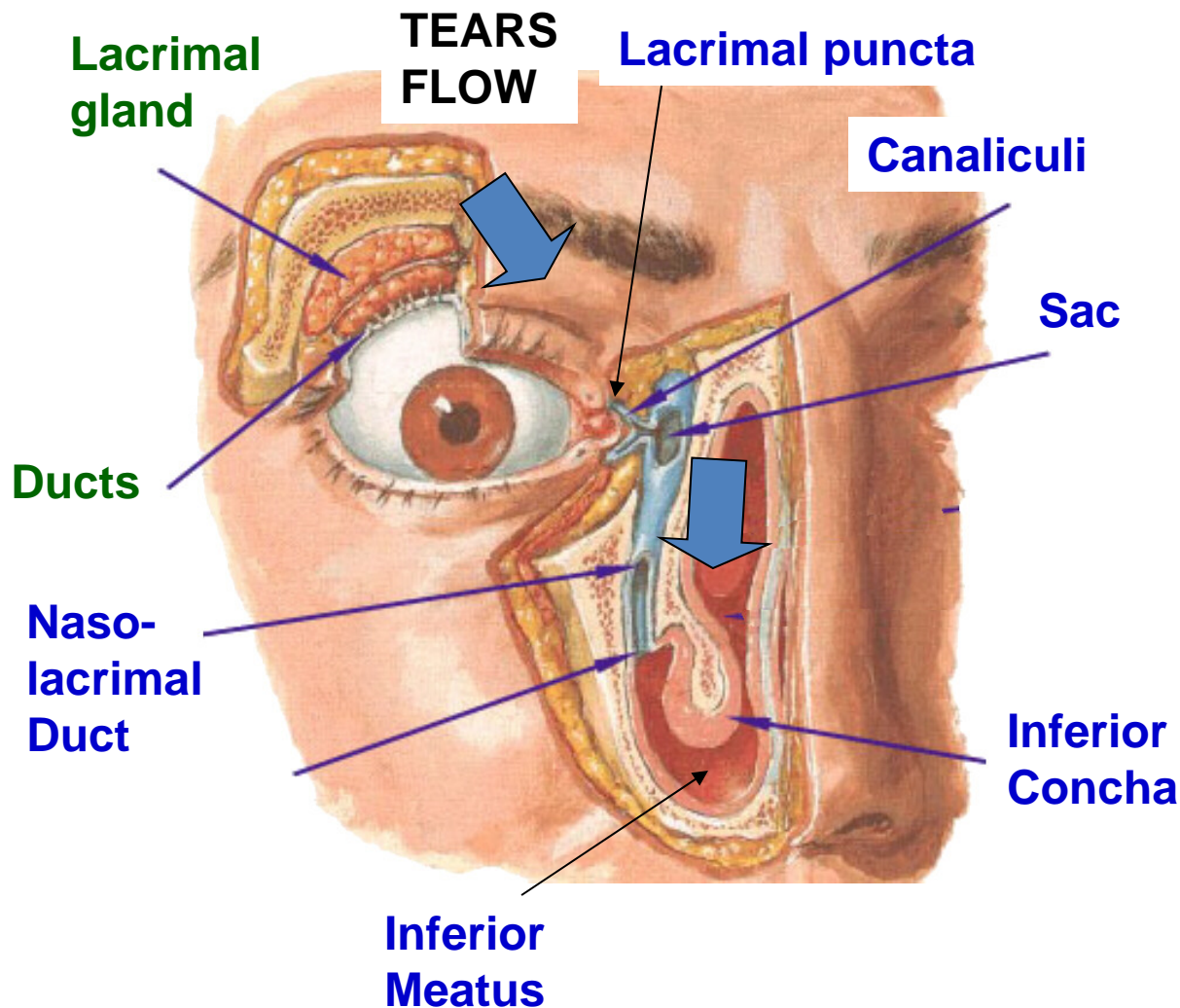
3. Chorda Tympani - has
A) Taste to ant 2/3 tongue
B) Parasympathetics to
Submandibular, Sublingual
salivary glands

MUSCLES OF MIDDLE EAR - dampen sound



Damage to VII - Hyperacusia - sounds seem too loud

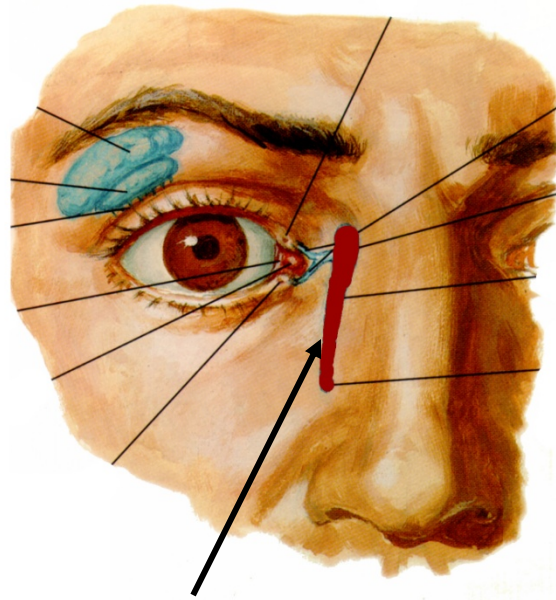
DAMAGE TO VII - DECREASED TEAR PRODUCTION



- TEARS FLOW ACROSS EYE TO LACRIMAL PUNCTA ON MEDIAL END OF EYELIDS (eyelids meet at MEDIAL CANTHUS);
- TEARS THEN PASS THROUGH LACRIMAL CANALICULI TO LACRIMAL SAC;
- SAC CONNECTS TO NASOLACRIMAL DUCT WHICH DRAINS TO INFERIOR MEATUS OF NASAL CAVITY

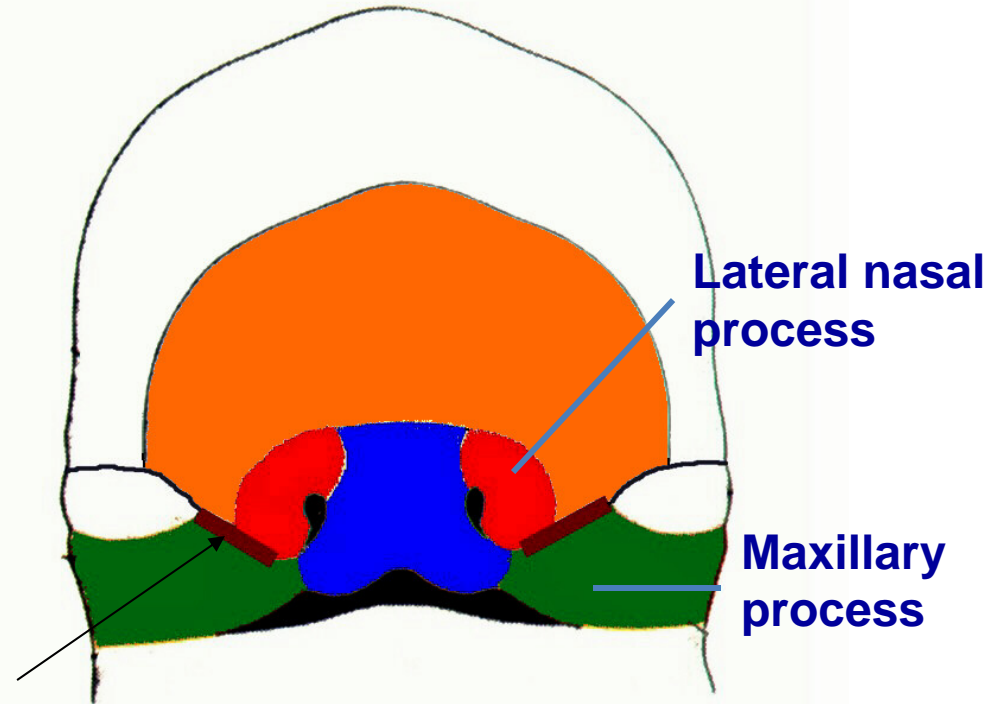
LACRIMAL GLAND IS INNERVATED BY VII - FACIAL NERVE;
BLOCK VII - DECREASE TEARS; PRESSURE/IRRITATION VII - EXCESSIVE TEARS

WHAT CAN PRODUCE APPARENT EXCESSIVE TEAR PRODUCTION DISORDER IN DEVELOPMENT OF NASOLACRIMAL DUCT



NASOLACRIMAL DUCT

– connects anterior eye to nasal cavity (Inferior meatus)

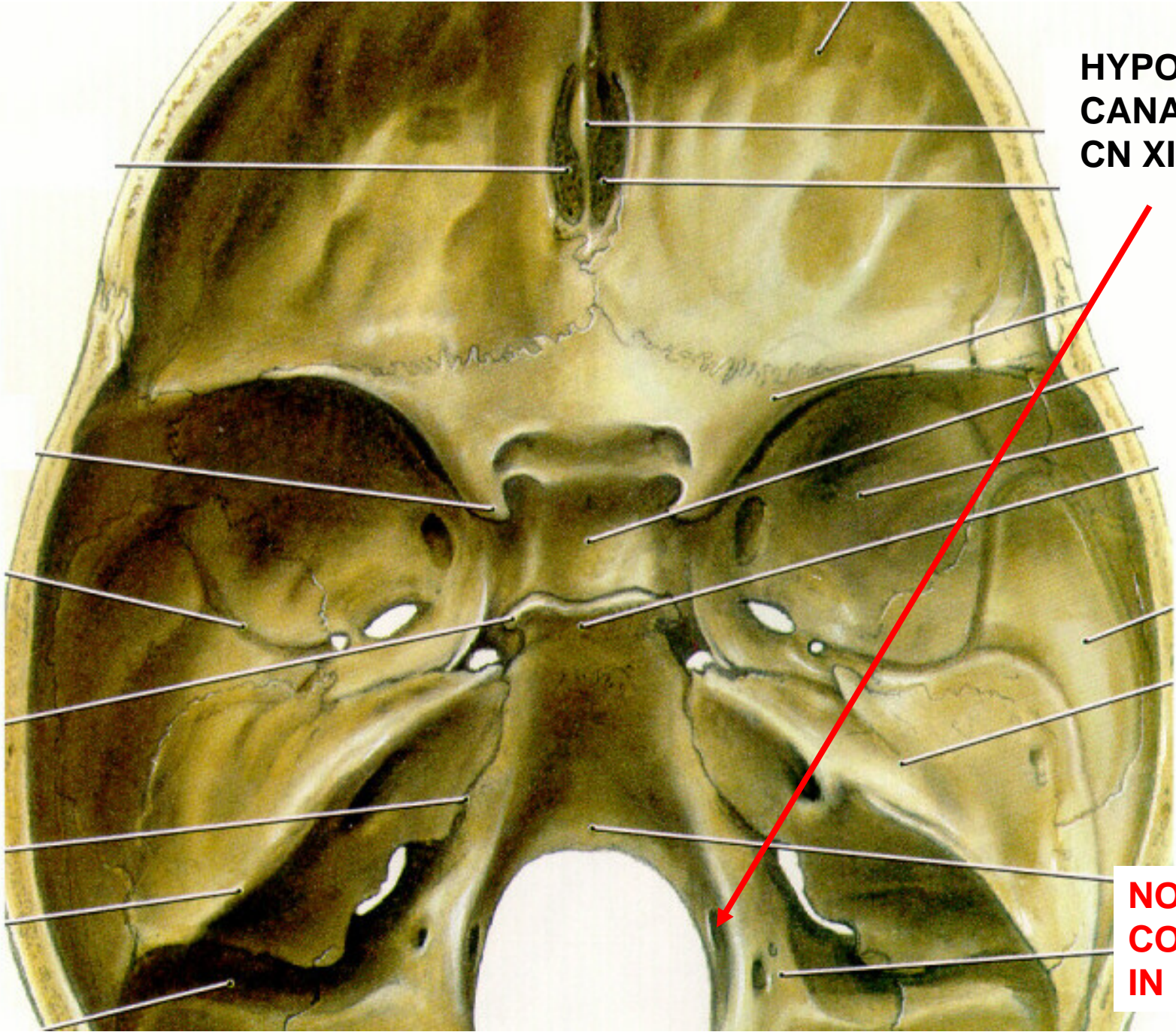


- Develops as solid cord from medial angle of eye to nasal cavity
- becomes canalized.

Obstructed Duct - failure of duct to canalize; opened surgically for tears to drain to nasal cavity

**HYPOGLOSSAL
CANAL –
CN XII**

**NOTE:
CORRECTION
IN DIAGRAM**



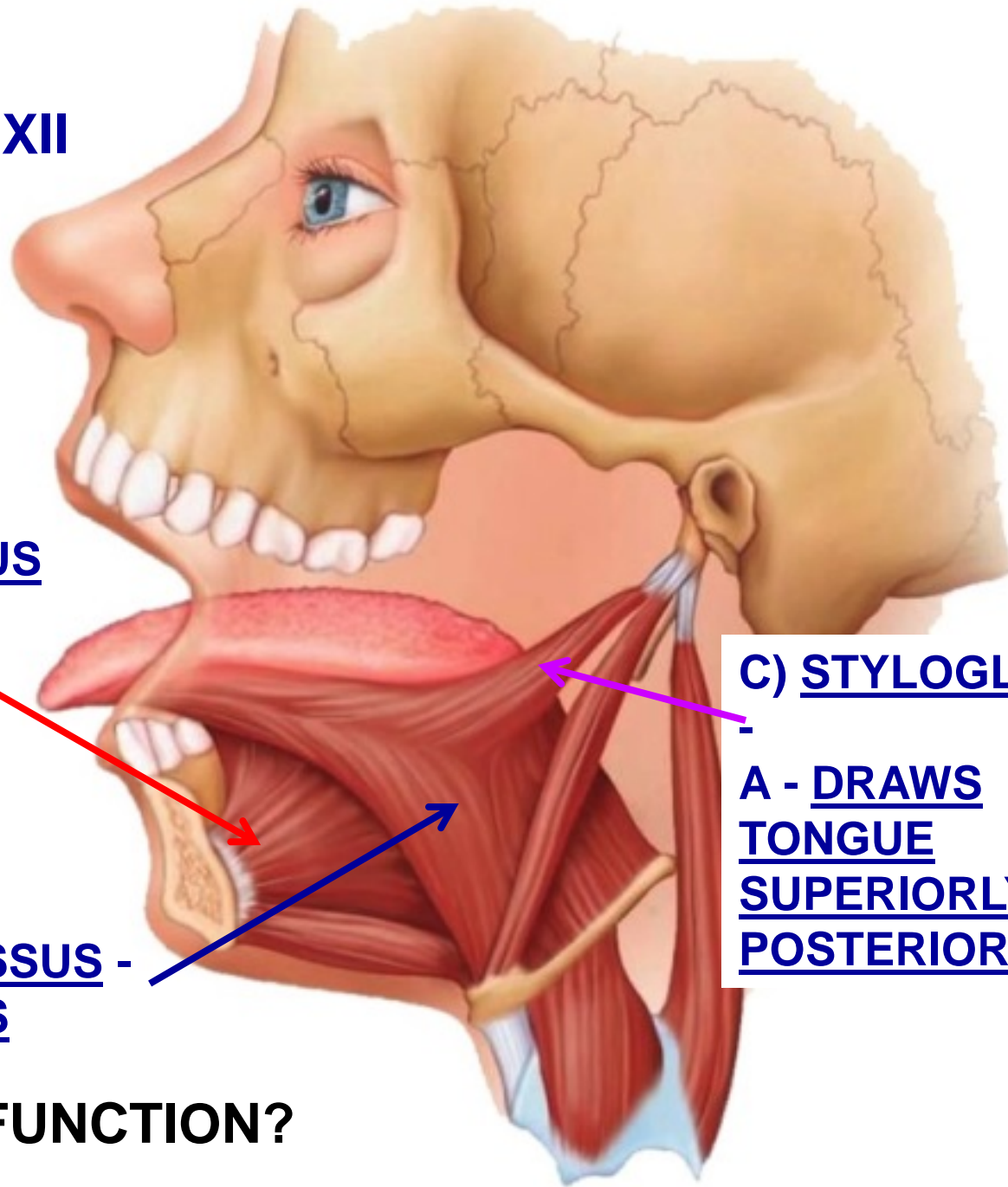
MUSCLES OF
TONGUE - all
innervated by XII

A) **GENIOGLOSSUS**
A - **PROTRUDE**

B) **HYOGLOSSUS** -
A - **DEPRESS**

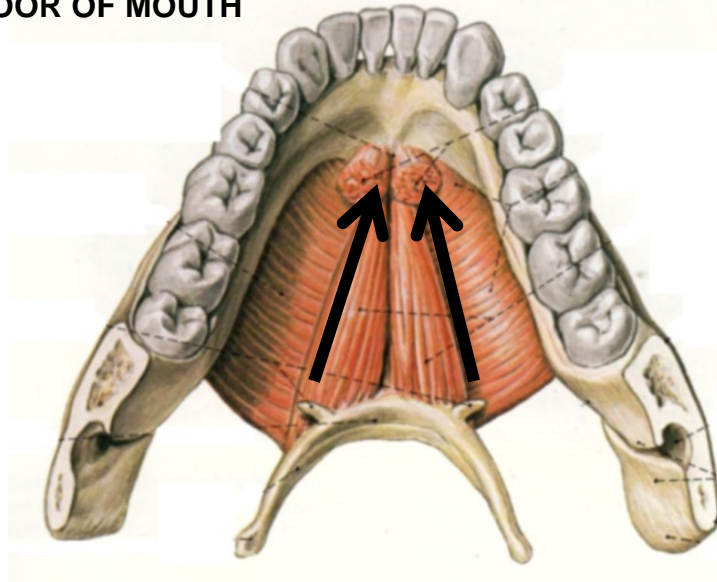
C) **STYLOGLOSSUS**
A - **DRAWS**
TONGUE
SUPERIORLY and
POSTERIORLY

HOW TEST FUNCTION?



VIEW OF FLOOR OF MOUTH

**GENIO-
GLOSSUS
DIRECTION
OF
ACTION**



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

**GENIO-
GLOSSUS
INTACT**



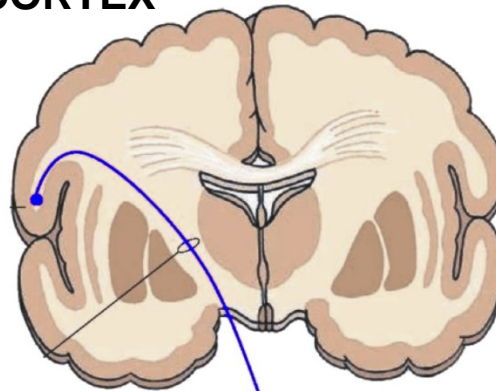
**DAMAGE
HYPOGLOSSAL
NERVE ON ONE
SIDE**

**GENIO-
GLOSSUS
PARALYZED**

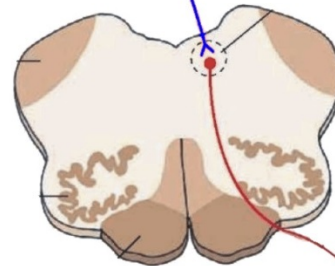
**LOWER MOTOR NEURON LESION - PROTRUDED TONGUE
DEVIATES TOWARD SIDE OF LESION - due to unopposed action
of the Genioglossus muscle.**

**NOT ASK CNS -
BUT GET IN NEXT
SECTION - UPPER
MOTOR
NEURON TO
GENIOGLOSSUS -
CONTRALATERAL**

CORTEX



**BRAINSTEM -
MEDULLA**



**UPPER MOTOR NEURON -
CRANIAL NERVES - ALL
BILATERAL EXCEPT:
1) ONLY CONTRALATERAL:
- VII - LOWER FACE (BELOW
ORBICULARIS OCULI)
- XII - GENIOGLOSSUS
- XI - TRAPEZIUS
2) ONLY IPSILATERAL:
- XI - STERNOCLEIDOMASTOID**

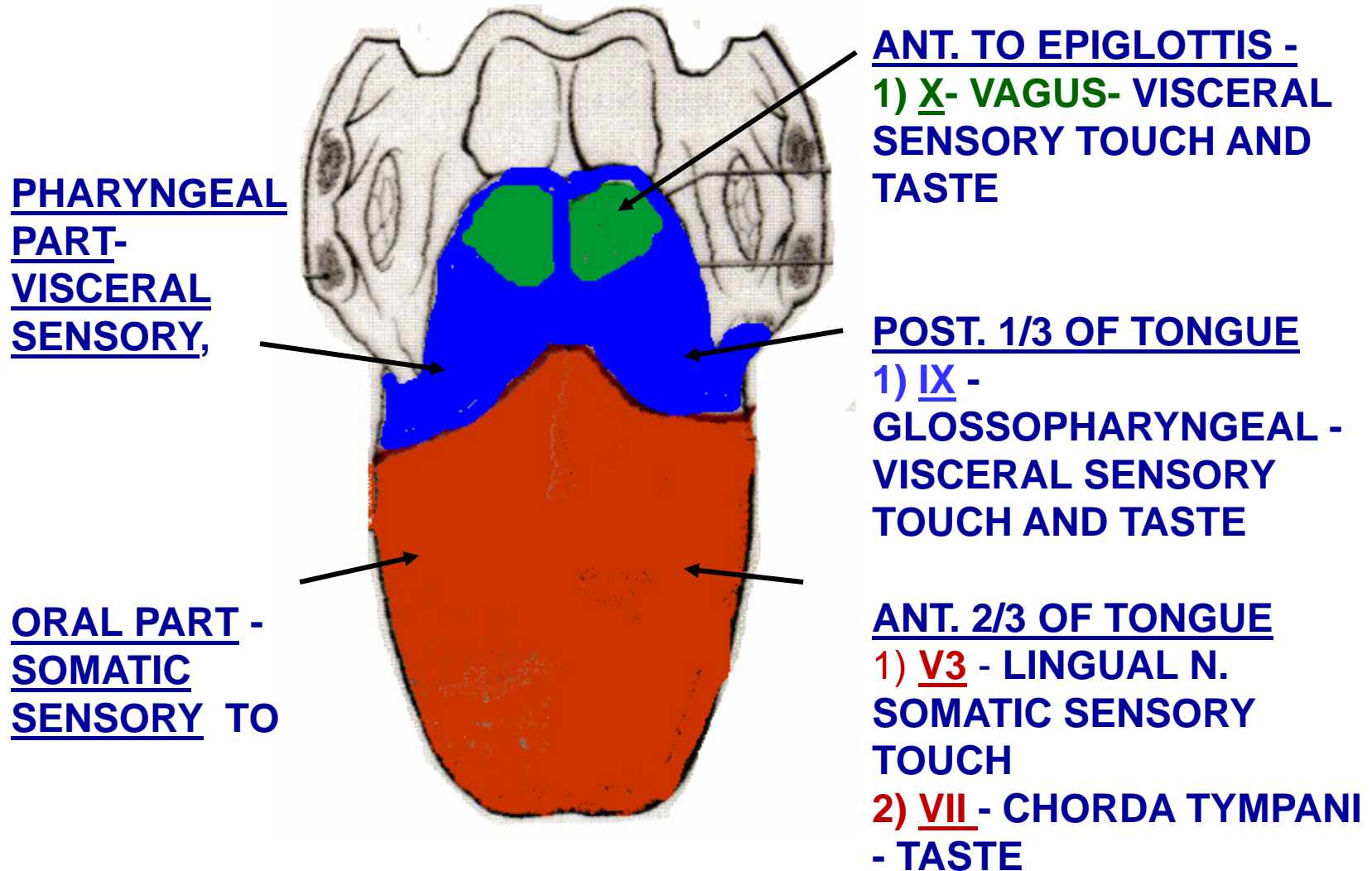
**HYPOGLOSSAL
LOWER MOTOR
TO GENIOGLOSSUS
MUSCLE (IPSILATERAL)**

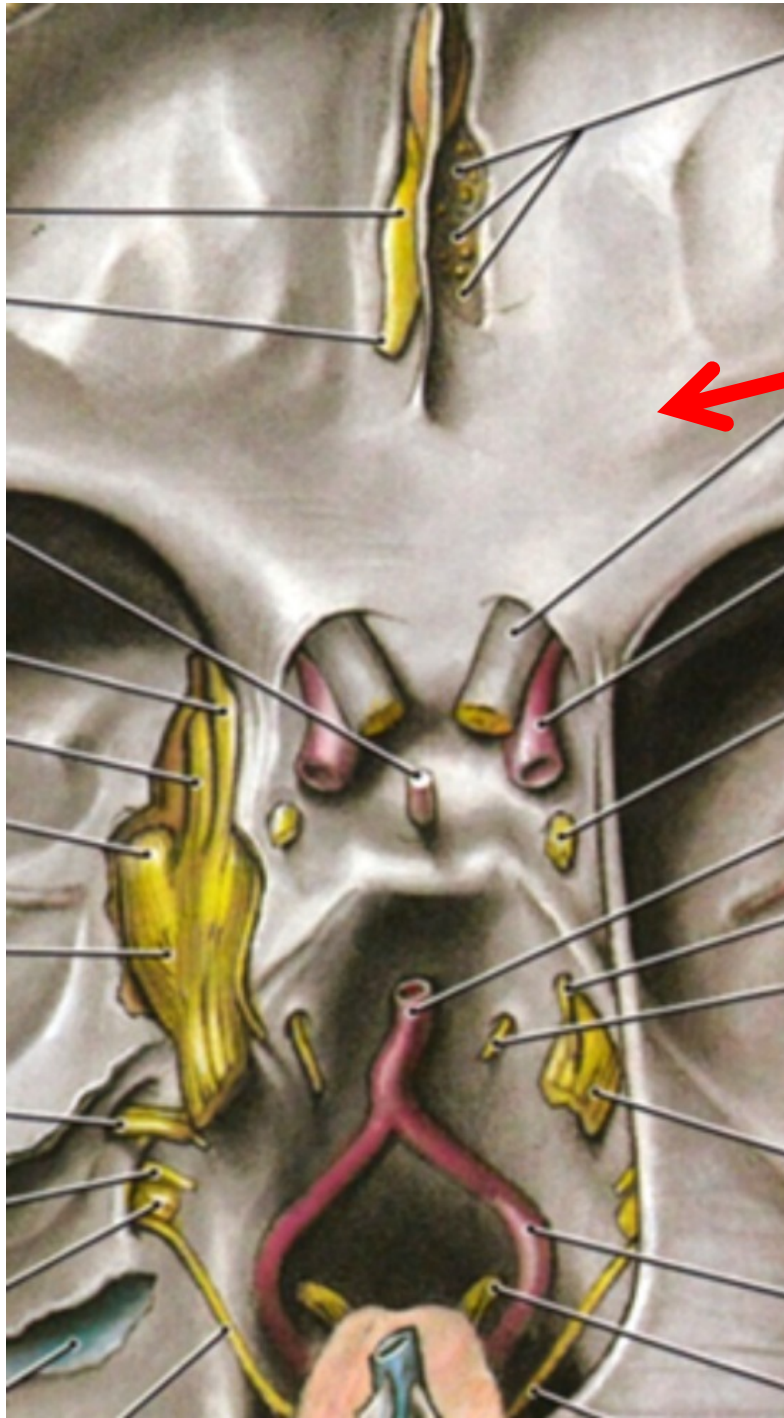
**DAMAGE
UPPER MOTOR -
TONGUE
DEVIATES
AWAY FROM SIDE
OF CORTICAL
LESION**



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

IS THERE SENSORY LOSS WITH DAMAGE TO CN XII? NO! SENSORY INNERVATION OF TONGUE





CRANIAL CAVITY
- MENINGES -
DURA MATER
COMPLETELY
LINES INTERIOR
OF CAVITY
- NO EPIDURAL
SPACE

MENINGES ARE CLOSELY ASSOCIATED WITH VENOUS SYSTEM, FLOW OF CSF

MENINGES

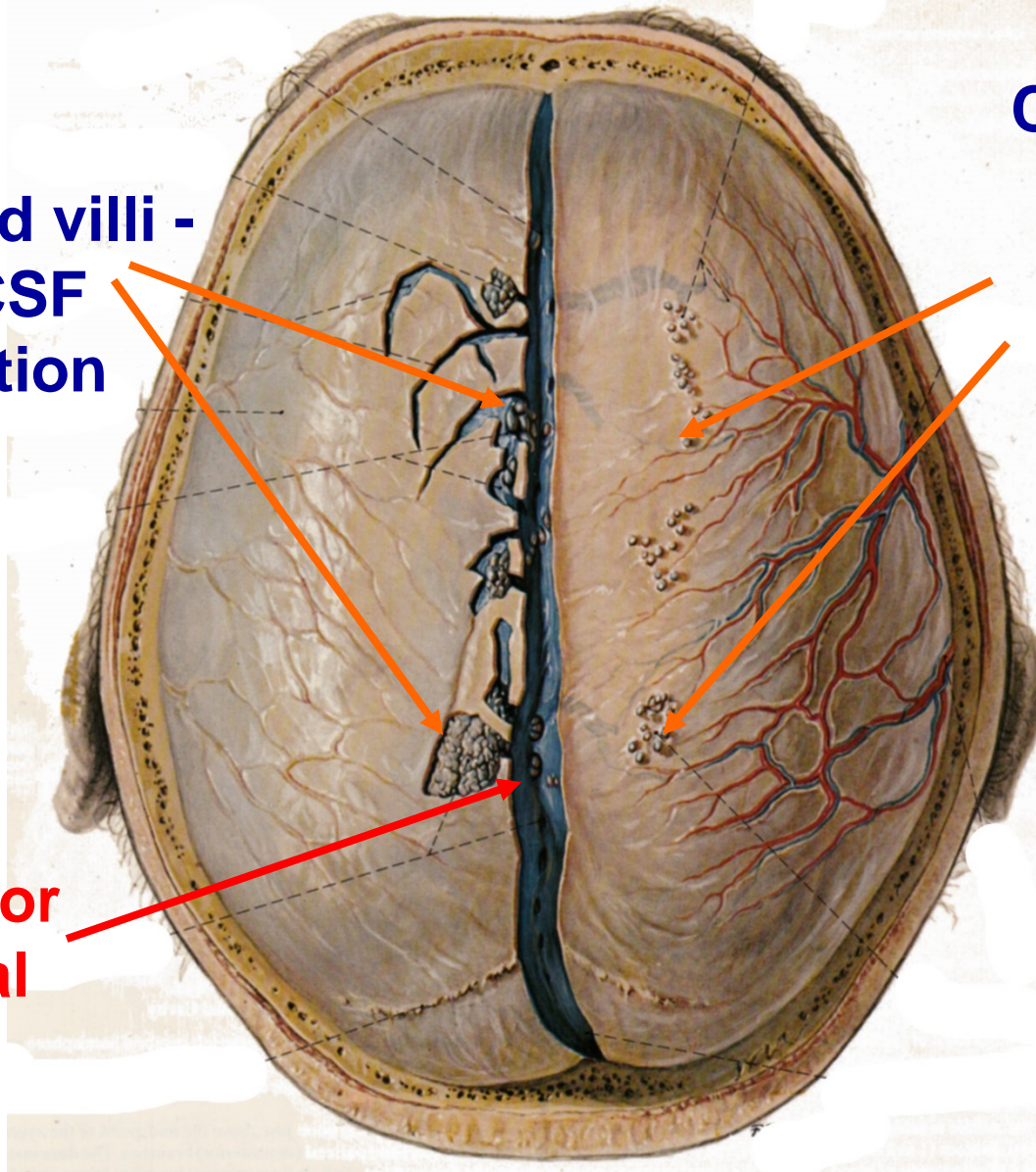
CLINICAL

Arachnoid villi -
sites of CSF
reabsorption

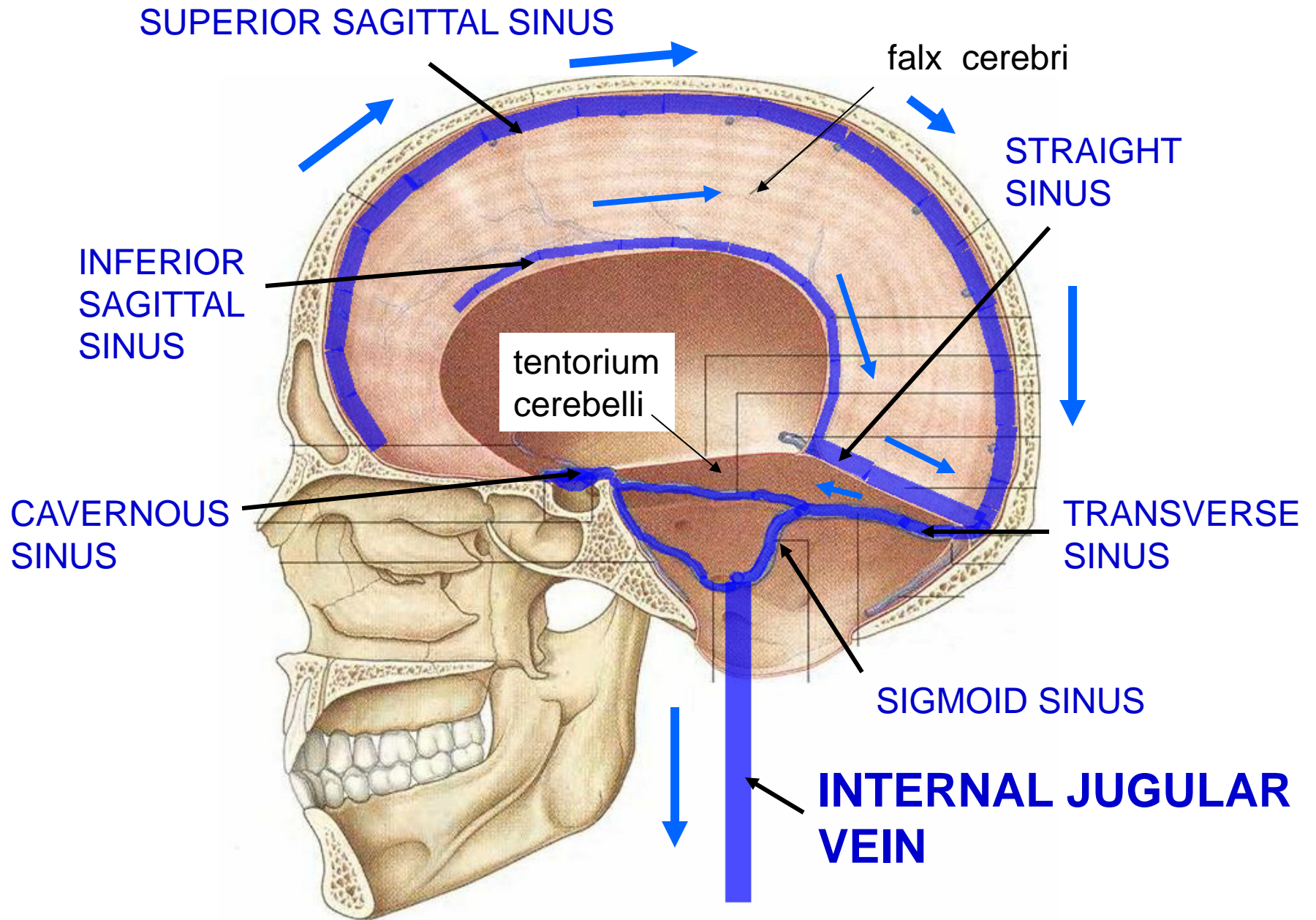
Arachnoid villi -
sites of CSF
reabsorption

Superior
Sagittal
Sinus

Calcification of
Arachnoid Villi is
common in
elderly; can cause
hydrocephalus
due to decreased
reabsorption of
CSF



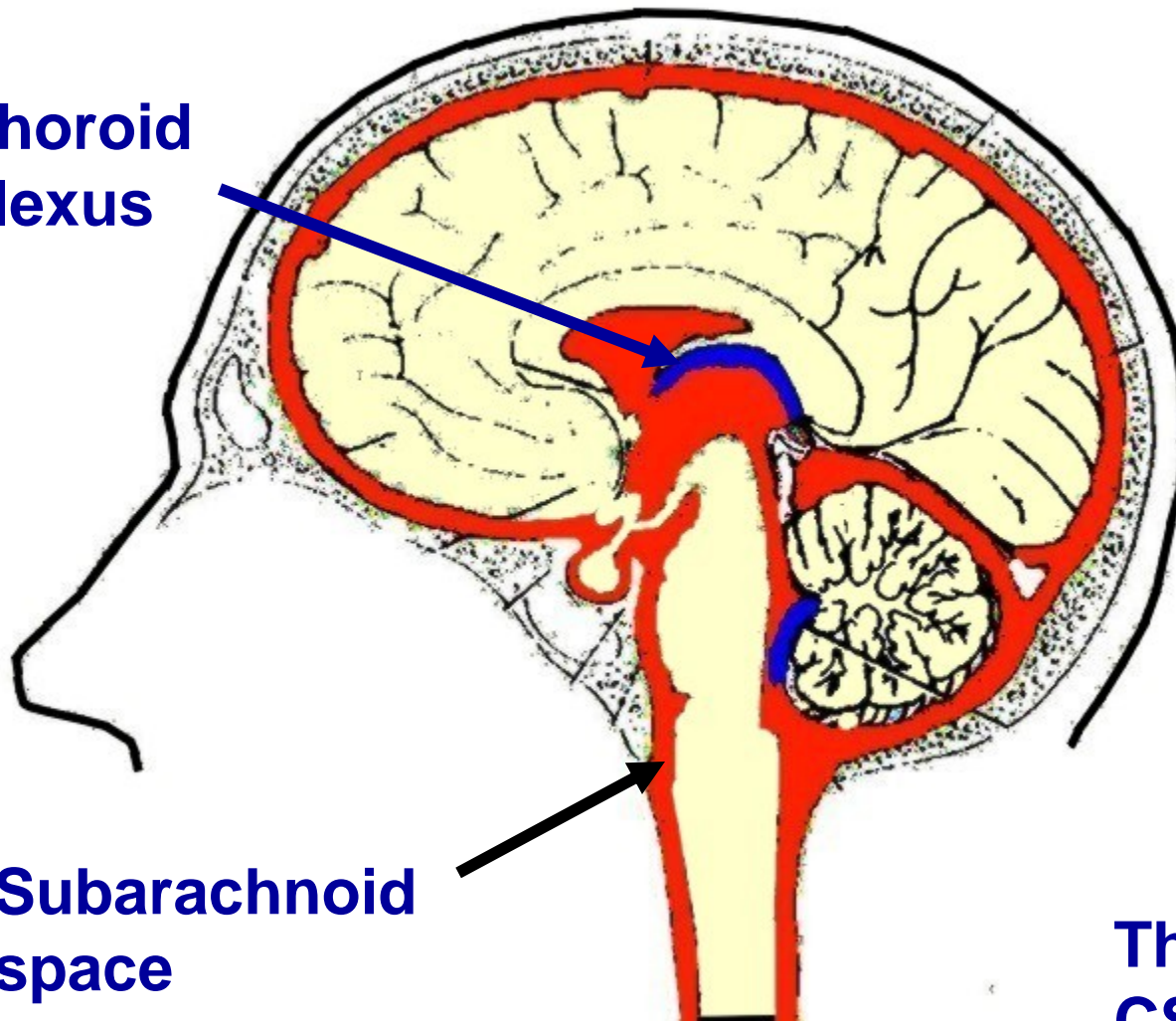
VENOUS SINUSES OF BRAIN



CEREBRO-SPINAL FLUID (CSF)

MENINGES

Choroid
Plexus

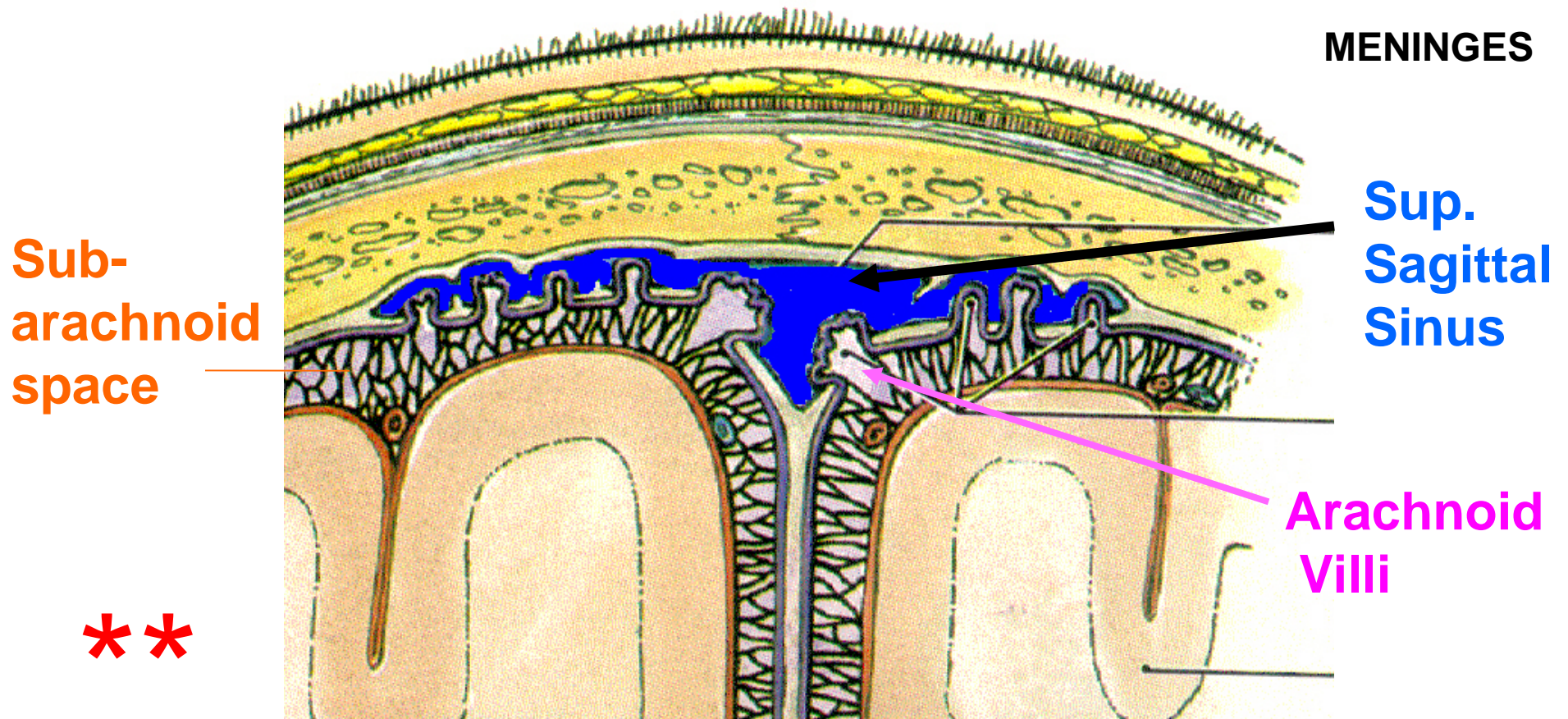


made inside
brain in Choroid
Plexus; flows
out of brain to
Subarachnoid
Space

Subarachnoid
space

The brain floats in
CSF - Shock
Absorber

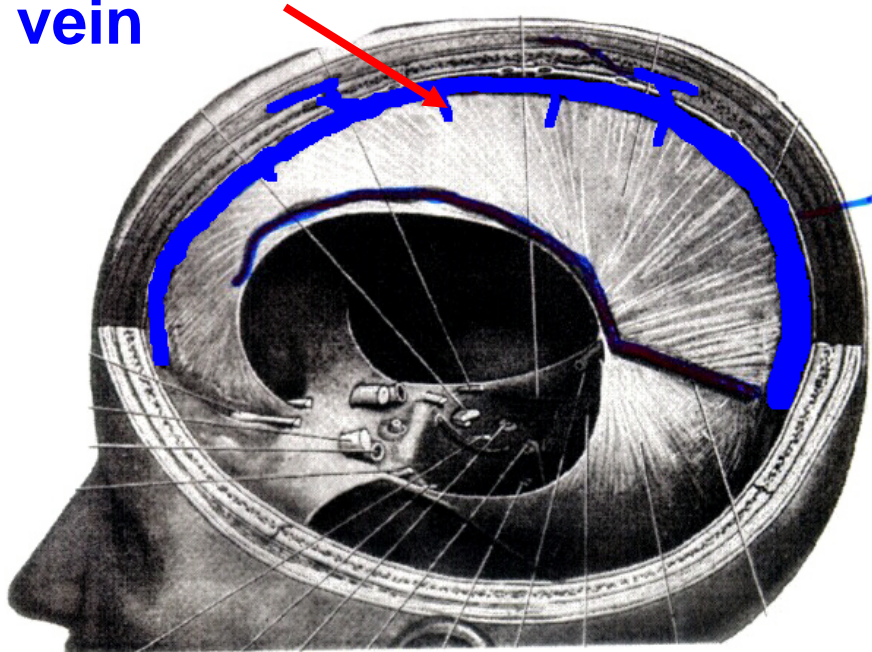
CSF REABSORBED INTO VENOUS SINUSES



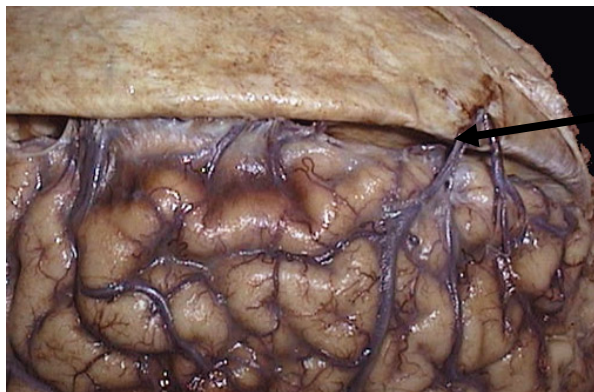
CSF reabsorbed into venous sinuses (ex. Sup. Sagittal sinus) at Arachnoid Villi; - In elderly arachnoid villi can become calcified- Arachnoid Granulations; Reduced Re-Absorption can produce Communicating Hydrocephalus

WHERE DOES BLOOD IN VENOUS SINUSES COME FROM? BRAIN

'Bridging' vein



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



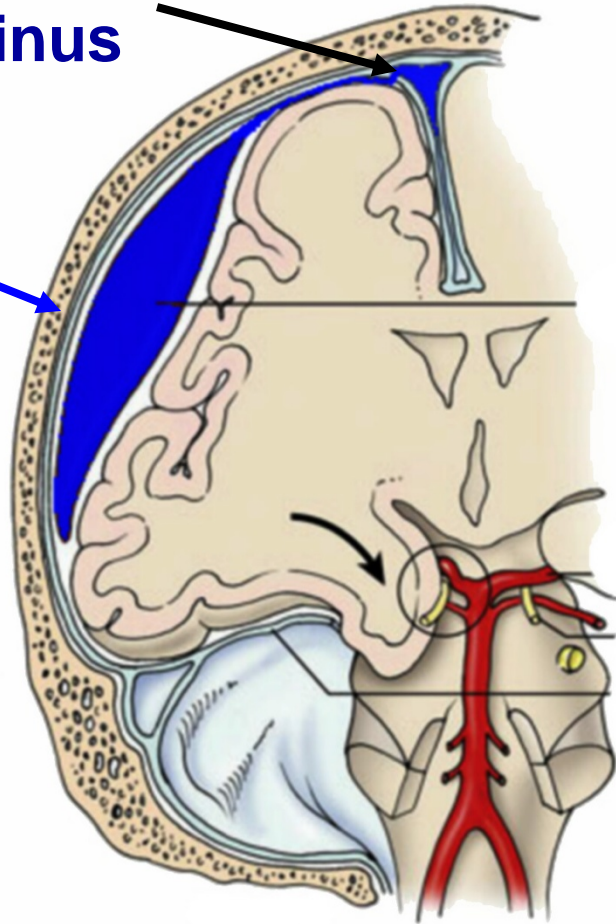
'Bridging' vein

Photo from lecture of Dr. Nancy Norton

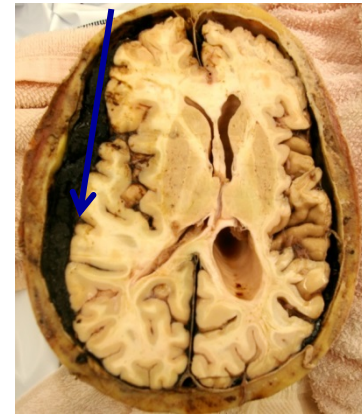
SUBDURAL HEMATOMA

Tear 'bridging' vein
or venous sinus

Crescent
shaped
hematoma
on CT/MRI



SUBDURAL HEMATOMA
BLOOD



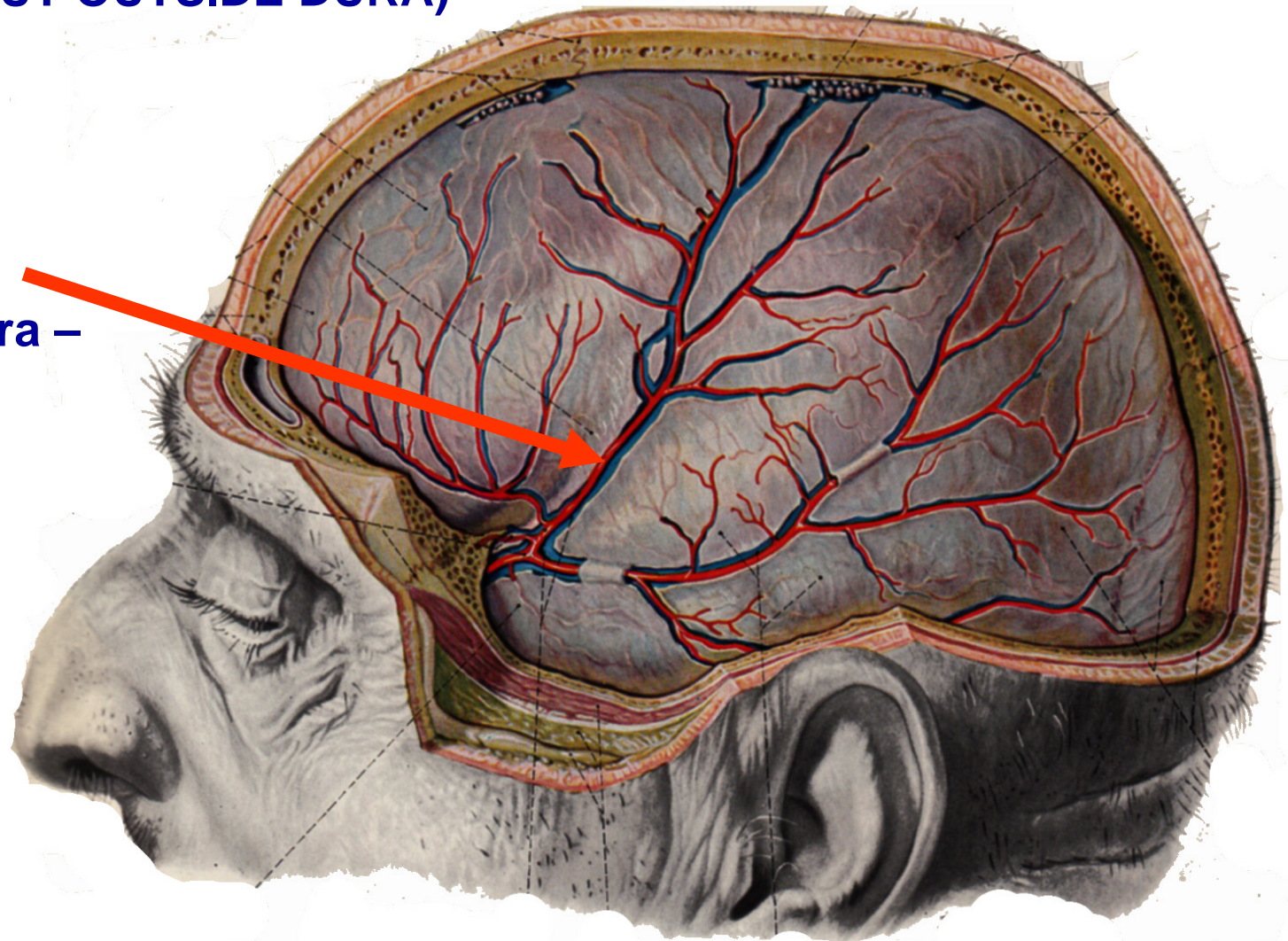
**SUBDURAL
HEMATOMA –**
1) **VENOUS – often
BRIDGING VEIN**
2) **CRESCENT
SHAPED MASS**
3) **SLOW**

**Clinical: bleeding slow (venous); Chronic Subdural Hematomas
can remain undetected; can result in herniation if untreated**

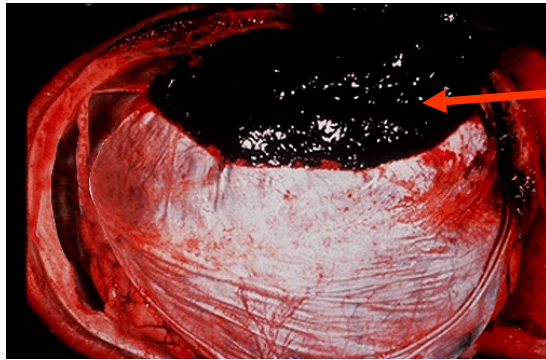
IN CONTRAST, ARTERIES TO SKULL ARE ATTACH TO (BUT OUTSIDE DURA)

MENINGES

**Middle
Meningeal
Artery –
courses
outside dura –
supplies
calvarium**



EPIDURAL HEMATOMA - bleeding between dura and bone



EPIDURAL HEMATOMA MENINGES

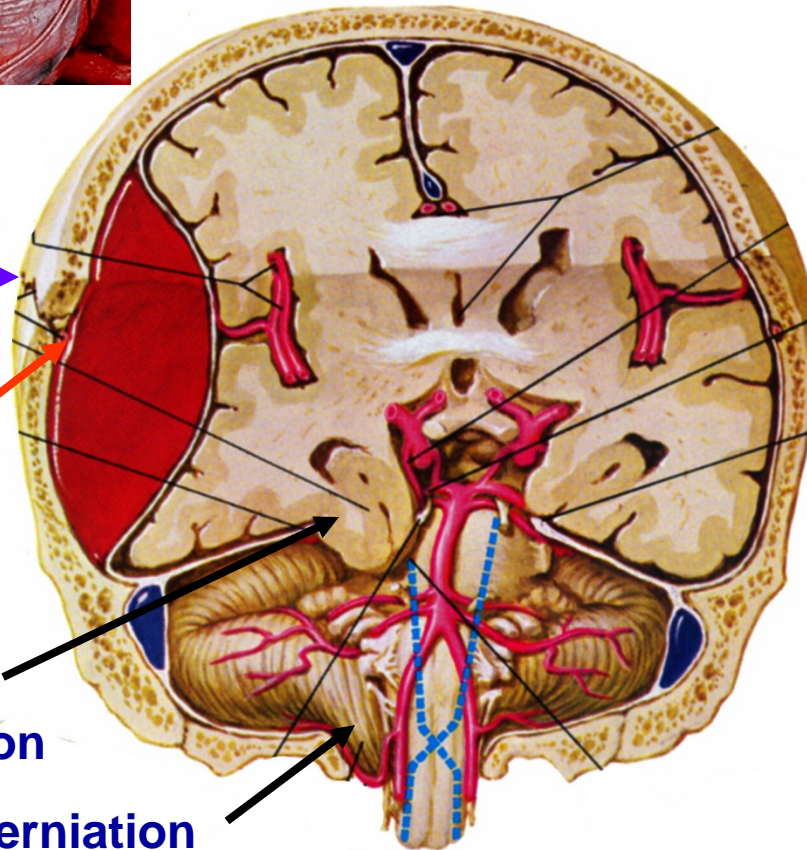
- 1) Skull fracture near Pterion
- 2) Tear Middle Meningeal Artery
- 3) Blood 'peels' dura from bone
- 4) Lens shaped (biconvex) mass on CT

Skull Fracture Near Pterion

Tear Middle Meningeal Artery

Uncal herniation

Tonsillar herniation

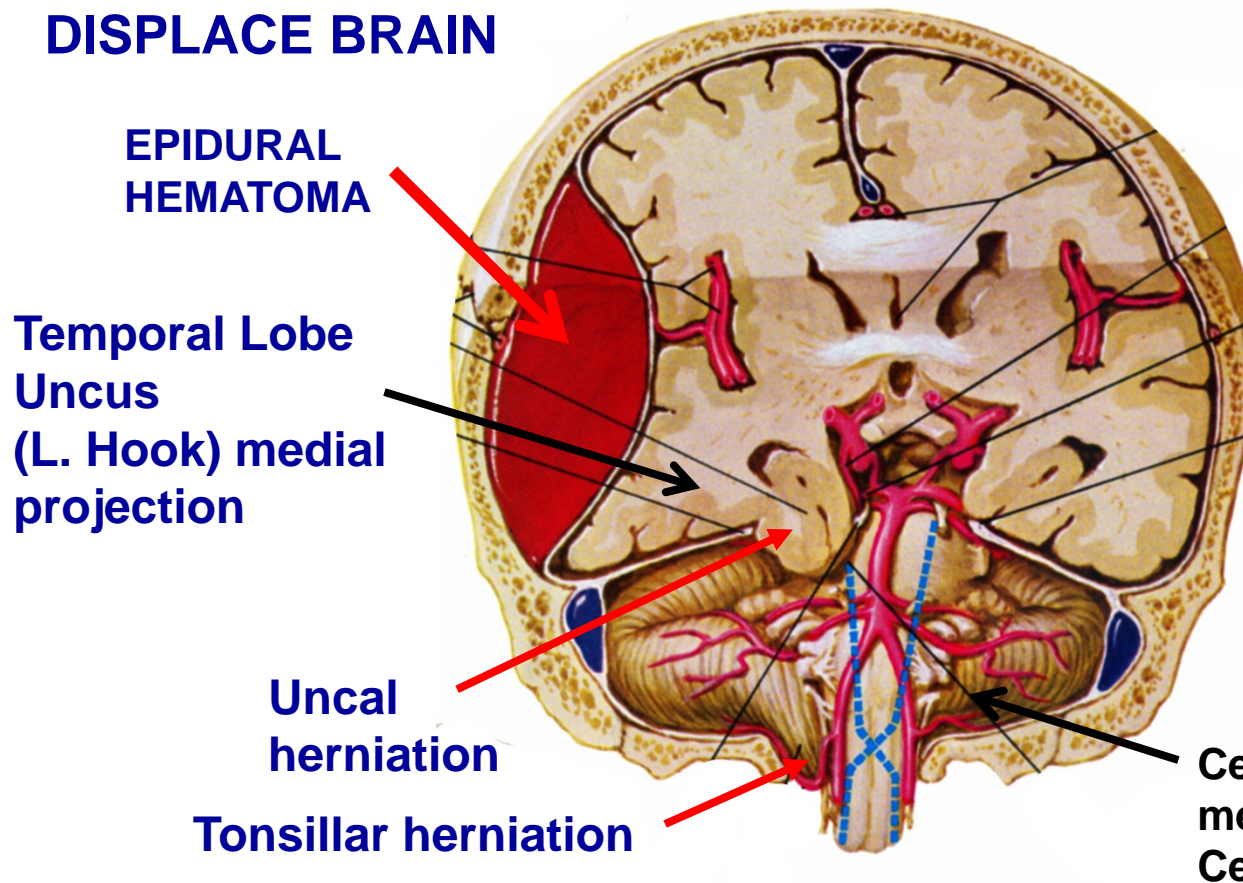


- EPIDURAL HEMATOMA – ****
- 1) ARTERIAL – often MIDDLE MENINGEAL ARTERY
 - 2) 'LENS' SHAPED MASS
 - 3) RAPID

Clinical - patient lucid at first; can be fatal within hours if herniation occurs

SIMILAR CONSEQUENCES OF BOTH HEMATOMAS SUBDURAL OR EPIDURAL

MASS OF BLOOD CAN DISPLACE BRAIN



6) Herniation -

i. Uncal herniation - push Temporal lobe (uncus) through Tentorial Notch

ii. Tonsillar herniation - push Cerebellum (tonsil) through Foramen Magnum

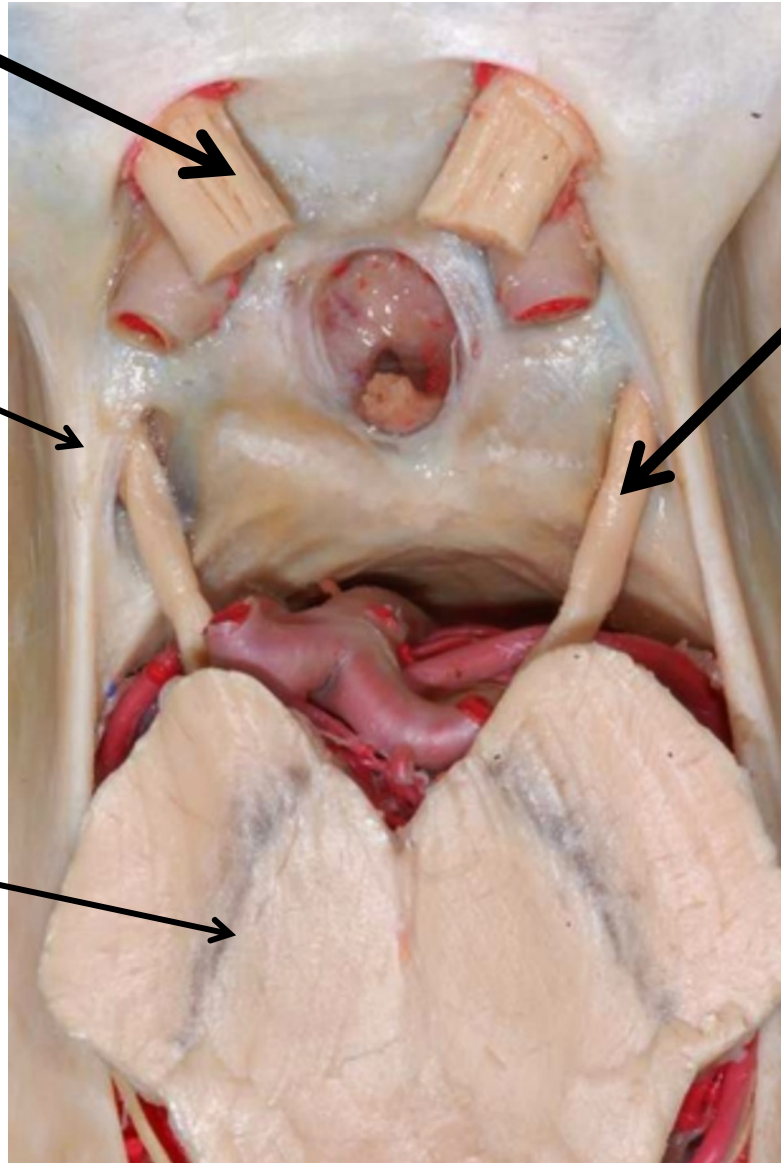
Note: Often first cranial nerve affected is Oculomotor Nerve (CN III). WHY?

INTEGRATE GROSS ANATOMY AND NEURO: STRUCTURES AT TENTORIAL NOTCH

IDENTIFY?

IDENTIFY
VENOUS
SINUS
BELOW
DURA?

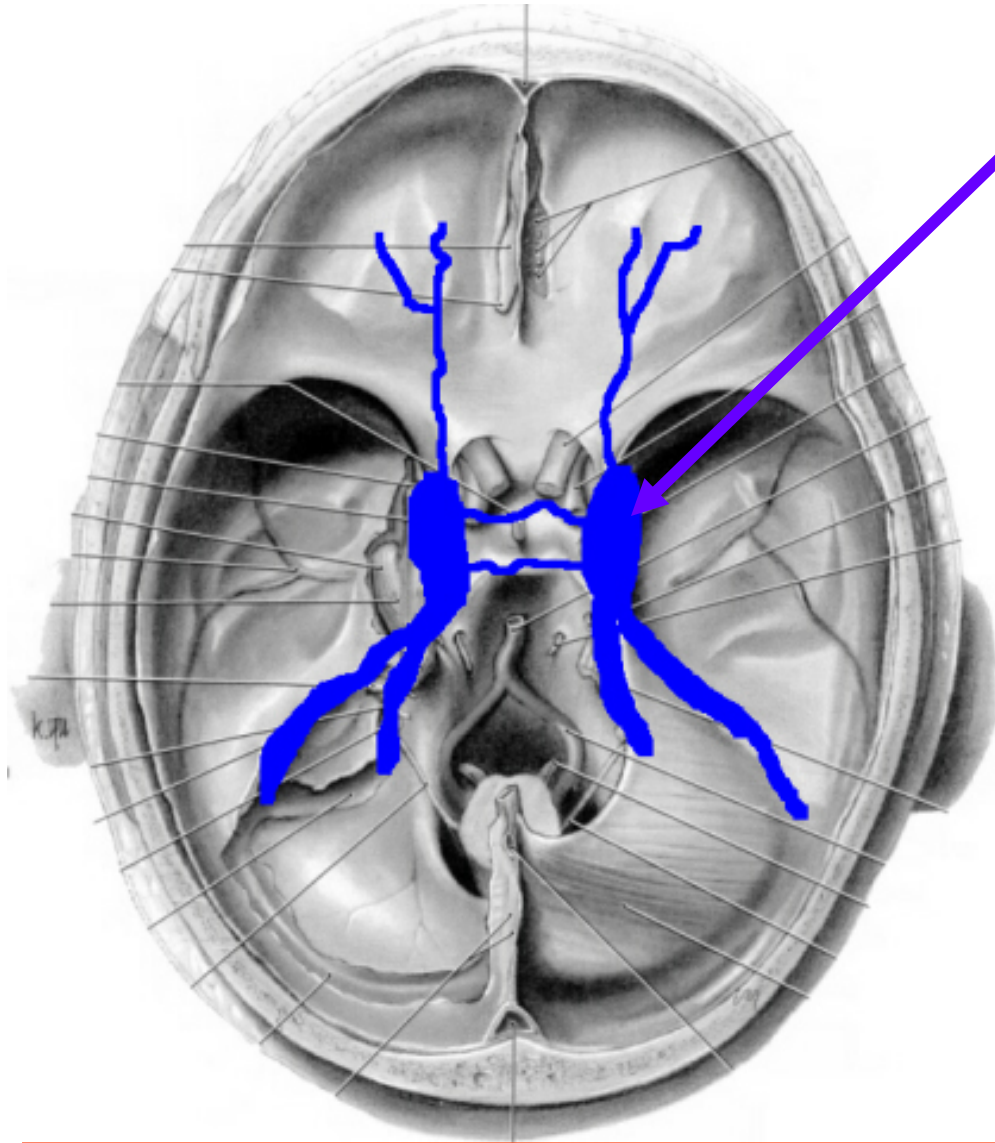
IDENTIFY?



IDENTIFY?

IMAGE FROM:
<https://www.neurosurgicalatlas.com/neuroanatomy/relationship-of-structures-at-the-tentorial-notch>

OTHER VENOUS SINUSES



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

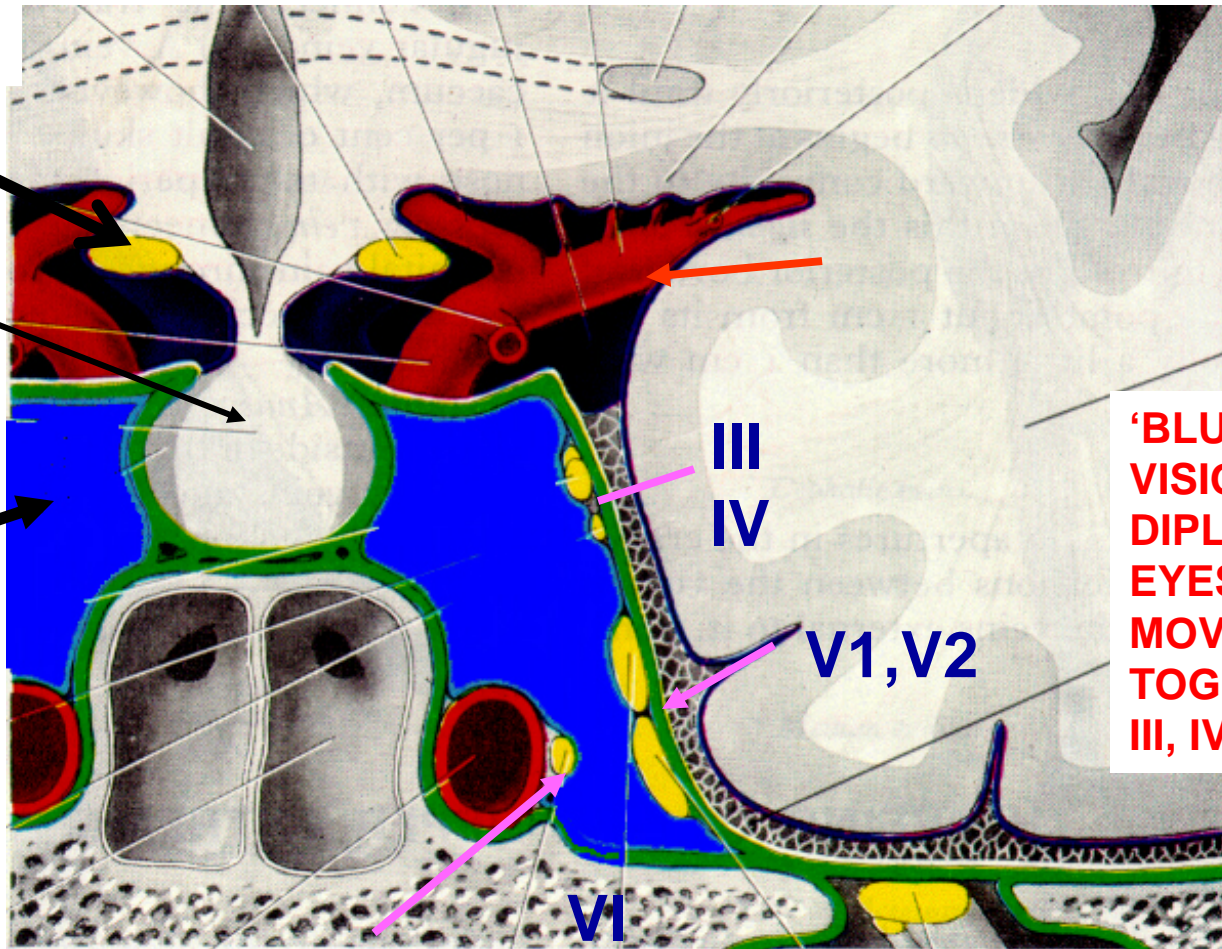
Infection can spread from Face to Cavernous sinus via anastomoses of Ophthalmic veins and Facial veins

**STRUCTURES PASSING THROUGH WALL OF CAVERNOUS SINUS - Int. Carotid A., Cranial N.'s III, IV, V1, V2, VI;
Clinical sign of Infection in Sinus – ‘BLURRED’ VISION**

IDENTIFY??

PITUITARY

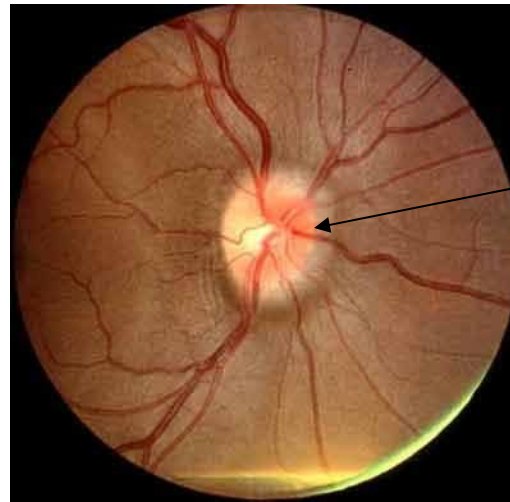
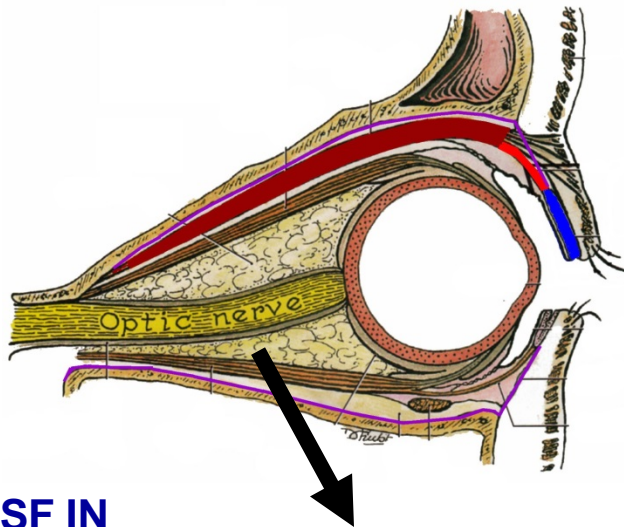
**CAV.
SINUS**



**‘BLURRED’
VISION =
DIPLOPIA – TWO
EYES NOT
MOVING
TOGETHER – CN
III, IV, VI**

CAVERNOUS SINUS THROMBOSIS NOT AFFECT CN III

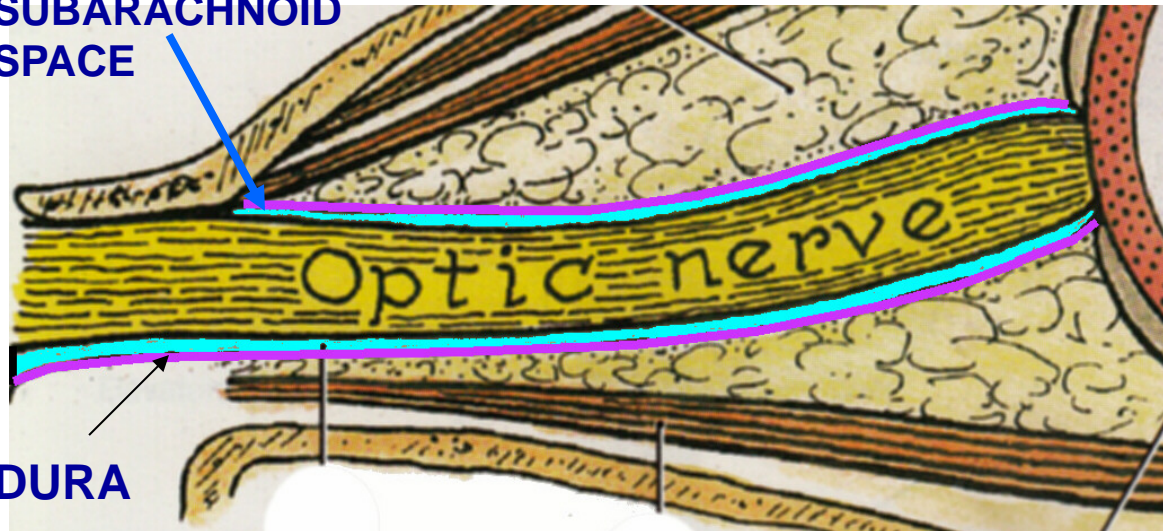
EYE: OPTIC NERVE: CONSIDERED BY MANY AS PART OF CNS



HYDROCEPHALUS

PAPILLEDEMA
- engorgement of retinal veins (correspond to branches of central artery)

CSF IN SUBARACHNOID SPACE



DURA AND SUBARACHNOID SPACE (CSF) EXTEND AROUND OPTIC NERVE; INCREASE IN CSF (PRESSURE) CAN AFFECT VISION

DURA

PAPILLEDEMA = swelling of optic disc

Clinical - slow onset; headaches

HOW TEST? PUPILLARY LIGHT REFLEX - II TO III

AFFERENT ARM OF REFLEX

**SENSORY
STIMULUS**

**LIGHT IN
EYE**

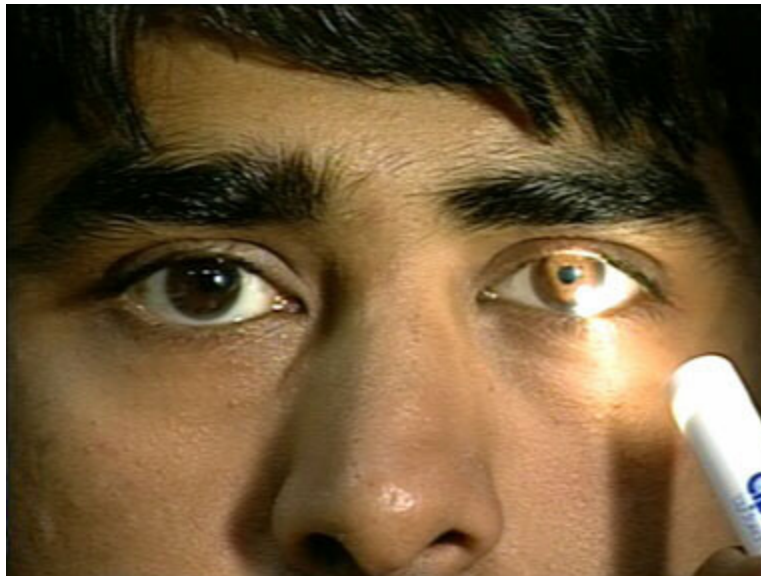


EFFERENT ARM OF REFLEX

**MOTOR
RESPONSE**

**CONSTRICT
PUPIL**

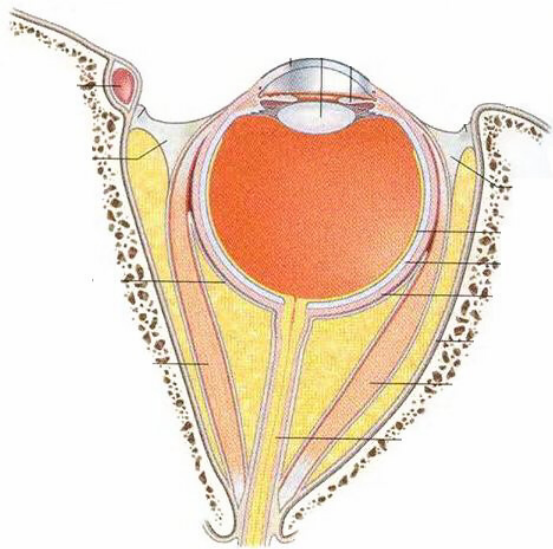
**MOST
CLINICAL
REFLEXES
TEST
SKELETAL
MUSCLES**



**TESTS
AUTONOMIC
FUNCTION**

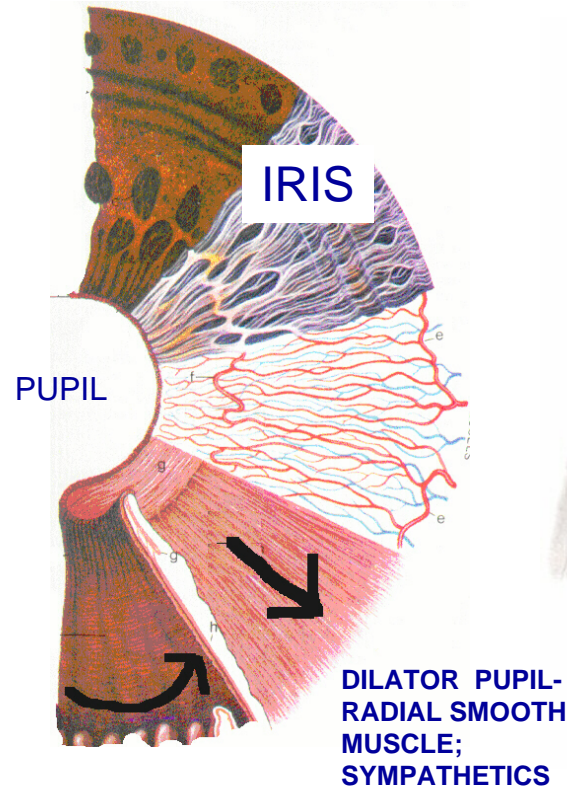
PUPILLARY LIGHT REFLEX

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



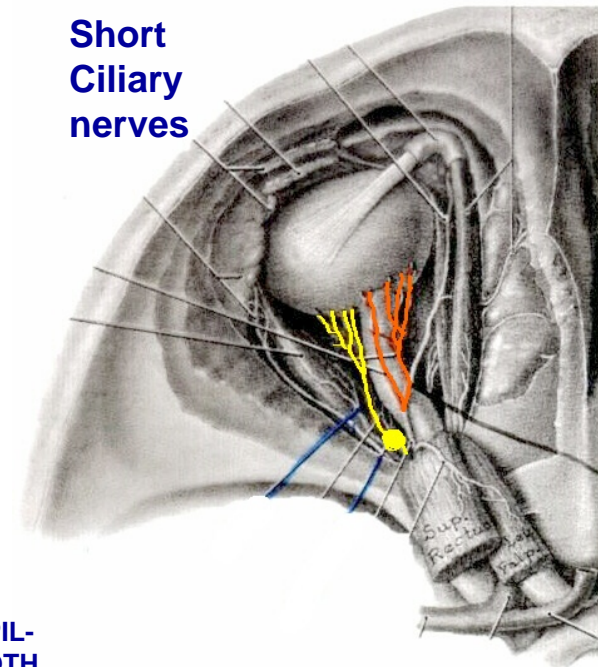
**OPTIC NERVE -
CN II VISION**

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



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

**Short
Ciliary
nerves**



Ciliary Ganglion of CN III

OCULOMOTOR (III) NERVE DAMAGE COMPLEX



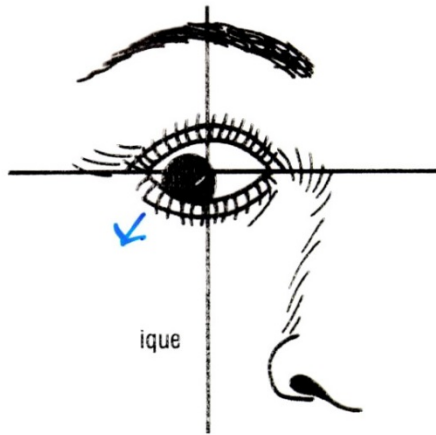
AT REST

1) LATERAL STRABISMUS (WALL-EYED) DUE TO PARALYZE MEDIAL RECTUS

2) PTOSIS - DROOPING EYELID PARALYZE LEV. PALPEBRAE SUPERIORIS

3) DILATED PUPIL - (MYDRIASIS) PARALYZE PUPILLARY CONSTRICTOR

TROCHLEAR (IV) NERVE DAMAGE: MORE STRAIGHTFORWARD BUT TRICKY: INABILITY TO TURN EYE DOWN AND OUT; ALSO HEAD TILT

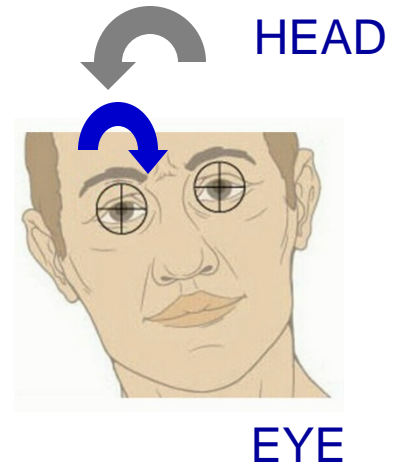
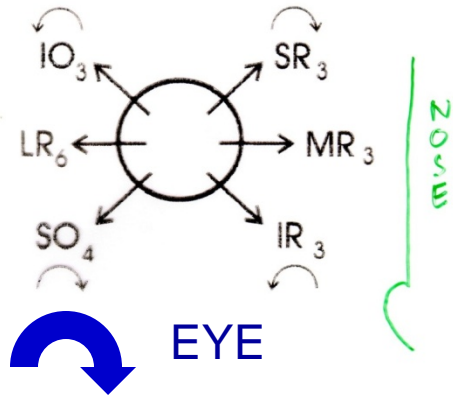


PATIENT CANNOT LOOK DOWN AND OUT

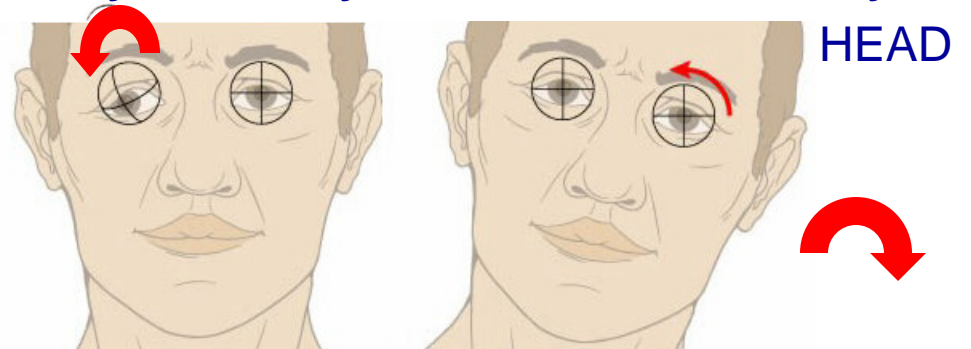
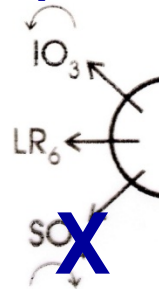
Symptoms - Difficulty walking down stairs; HEAD TILTED

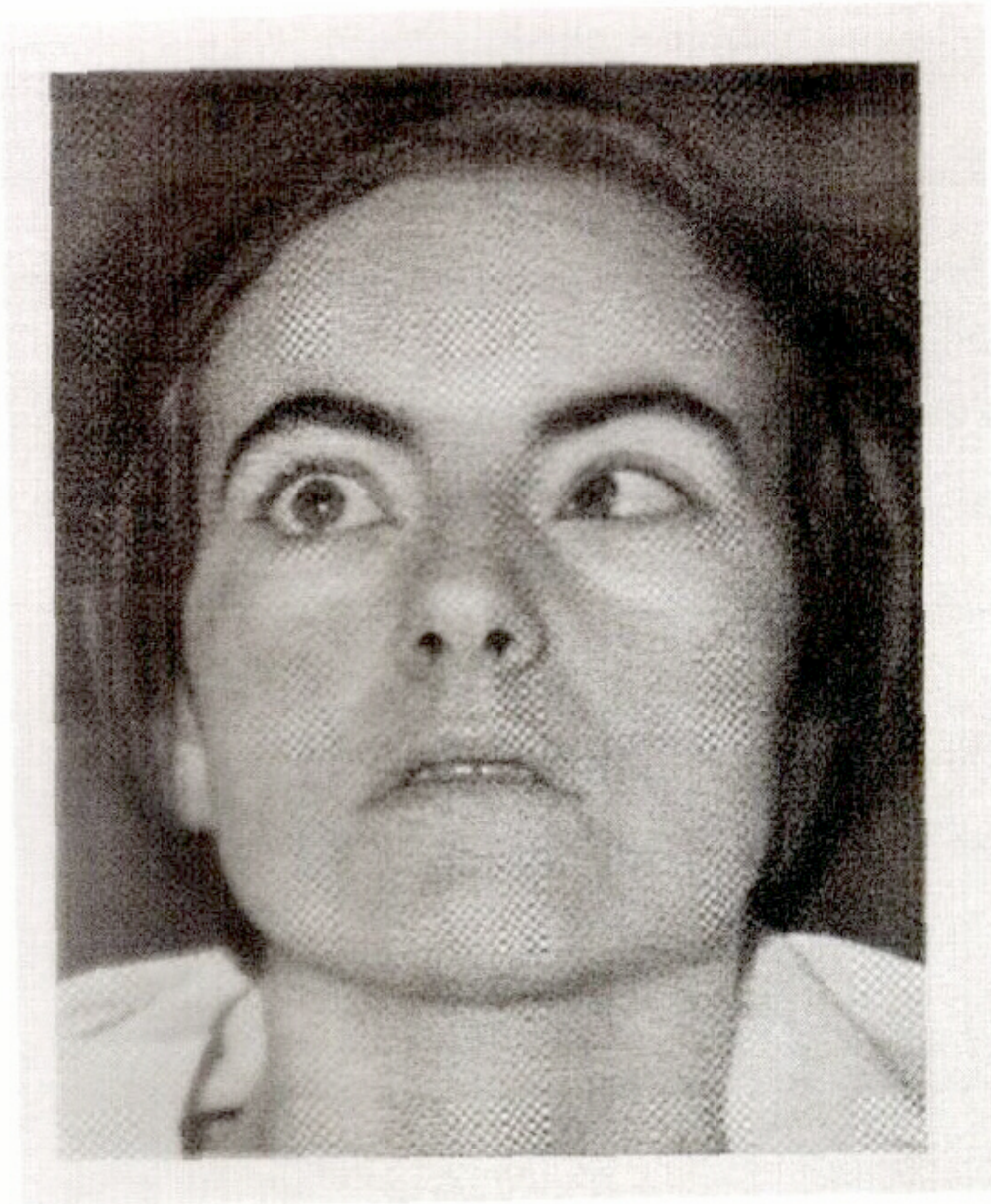
AFTER IV DAMAGE - eye rotated laterally; PATIENT TILTS HEAD TO OPPOSITE SIDE so both eyes rotated

NORMAL



NORMAL Rotation - occurs when tilt head; rotate ipsilateral eye medially when tilt head laterally





**EASIEST TO
UNDERSTAND;
ABDUCENS (VI)
NERVE DAMAGE**

**WHEN PATIENT LOOKS
STRAIGHT AHEAD:**

**MEDIAL STRABISMUS
(CROSS-EYED) DUE TO
DAMAGE/PARALYZE
LATERAL RECTUS**

REFLEXES

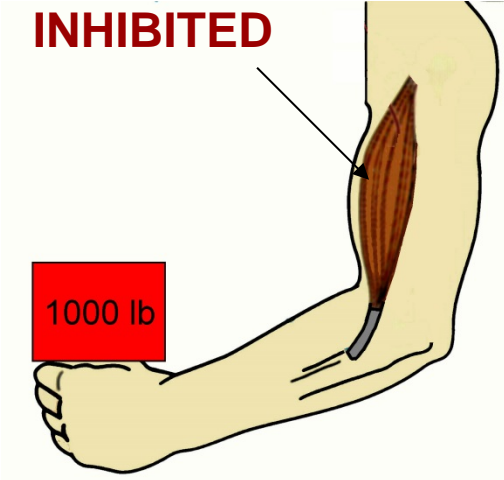
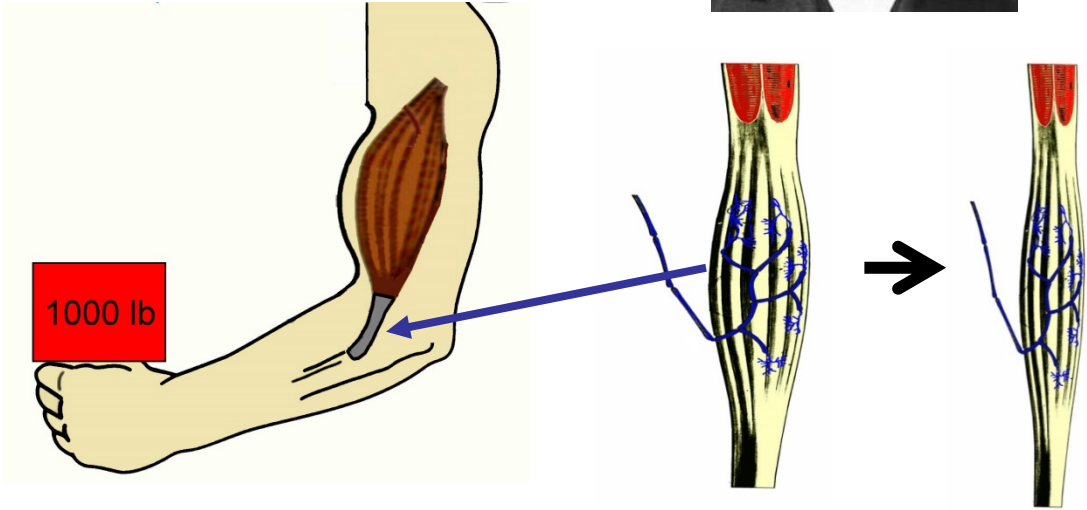
excellent mustache



Camillo Golgi (1843-1926)

FOCUS STRETCH REFLEXES - OFTEN FORGET AUTOGENIC INHIBITION

MUSCLE TENSION INHIBITED



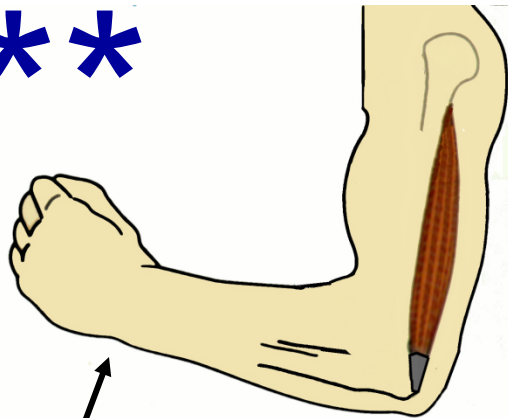
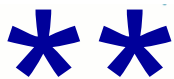
1) Stimulus - Large force exerted on muscle tendon

2) Sense organ excited - Golgi tendon organs - located in muscle tendon, signal FORCE

3) Primary response - muscle attached to tendon relaxes

CLASPED KNIFE REFLEX: is an example of Autogenic inhibition. It is elicited in patients with UMN lesions due to high tonus in muscle.

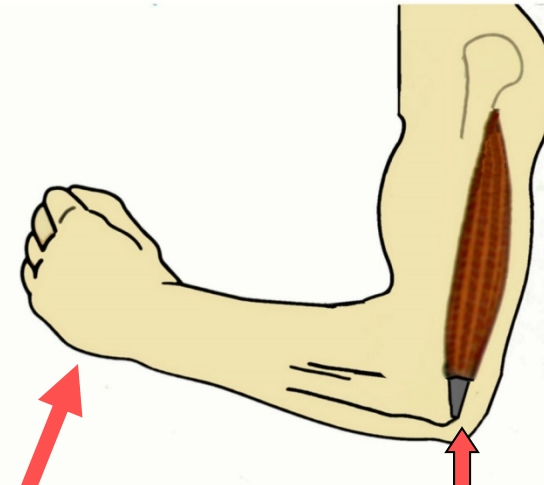
1) PHYSICIAN TRIES TO FLEX ELBOW JOINT OF PATIENT WITH UPPER MOTOR NEURON LESION



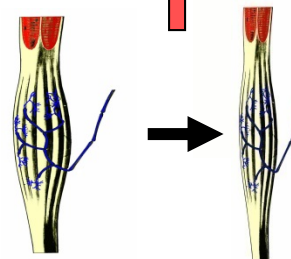
PHYSICIAN HOLDS WRIST AND PUSHES HERE AFTER TELLING PATIENT TO RELAX

ENCOUNTERS HIGH RESISTANCE DUE TO HIGH TONUS IN TRICEPS AND HIGH STRETCH REFLEXES

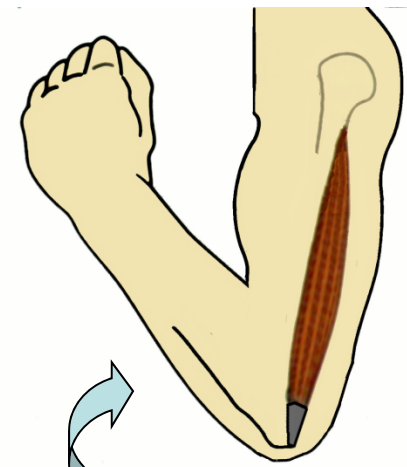
2) KEEP TRYING AND TENSION ON TRICEPS TENDON EXCITES GOLGI TENDON ORGANS



HIGH IMPOSED FORCE EXCITES GOLGI TENDON ORGANS IN TRICEPS TENDON WHICH INHIBITS MOTOR NEURONS TO TRICEPS MUSCLE



3) TRICEPS RELAXES AND RESISTANCE SUDDENLY DECREASES: ELBOW JOINT FLEXES



ELBOW JOINT SNAPS SHUT LIKE A POCKET KNIFE = CLASPED KNIFE REFLEX

REFLEXES ARE MODULATED: SOME FLEXOR REFLEXES CAN CHANGE AFTER LESIONS, DISEASE PROCESSES

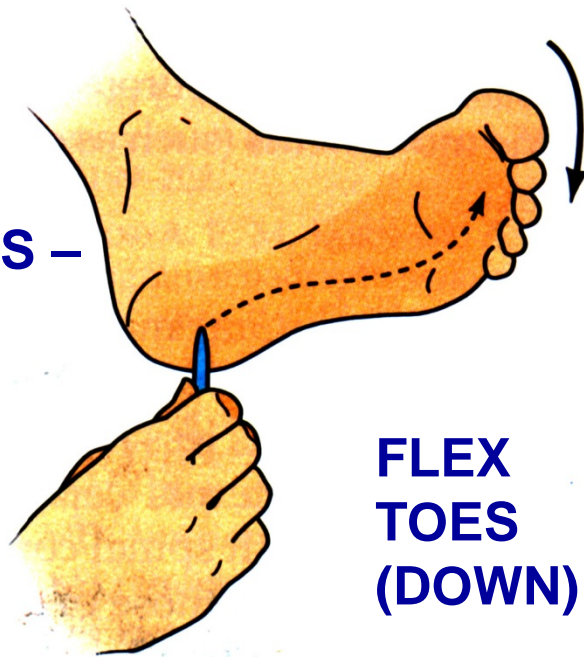
**

NORMAL RESPONSE

**

BABINSKI SIGN –
(EXTENSOR PLANTAR
RESPONSE)

STIMULUS –
TO SKIN
OF SOLE
OF FOOT



FLEX
TOES
(DOWN)



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**

**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>]

