

DISCUSSION SESSION: GROSS ANATOMY

ONN BLOCK

Feb 7, 2021

Welcome to Head and Neck

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THIS SESSION –

- 1. Overview of Gross Anatomy in next three weeks.**
- 2. Prosections**
- 3. Dissection Friday - Some things to get down in preparation for lab dissection Friday.**
- 4. Foramina (openings) of skull.**

1. OVER VIEW - This year: very short duration to study Head and Neck (Lectures on 8 days) simultaneous with Neuroanatomy, etc.

**TOO MUCH
MATERIAL,
TOO
LITTLE
TIME**

- Overall, Anatomy has been drastically reduced in the curriculum.

- Problem: Cover large amount of material (text: Head and Neck ~300 pages)

- This material is still relevant to for study for Step 1 Exam.

Approach: Prepare for Step 1 Exam

- Focus upon clinical anatomy and topics related to step one board exams, Neuroanatomy/Neurology

However, also need vocabulary and knowledge anatomy for Neuro and ENT.

Task: For some, this requires lots of memorizing (particularly, if you have not had material before); solution: repetition and try to maintain clinical focus throughout.

Focus: Step 1 Exam - Anatomical basis of clinical problems. Exam is now pass/fail. No one knows content of exam; rely upon past years.

AREAS OF EMPHASIS: CHARTS OF ANATOMY AND EMBRYOLOGY - sent to you, see zillanatomy.com

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 anatomoses)	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

DON'T FORGET EMBRYOLOGY! see Charts distributed and zillanatomy.com

CLINICAL EMBRYOLOGY OF HEAD AND NECK

Clinical Condition	Normal development	Abnormal	Signs/ Symptoms	Treatment
Cleft Lip (cheiloschisis)	Fusion of medial nasal and maxillary processes forms upper lip	Failure of fusion of medial nasal and maxillary processes	Cleft at philtrum of upper lip	Surgical repair
Cleft Palate (palatoschisis)	Anterior - Fusion of medial nasal processes (Primary palate) and maxillary processes (Secondary Palate); Posterior - Secondary palate formed by fusion of Maxillary processes of two sides	Failure of fusion	Anterior - Cleft <u>anterior to Incisive foramen</u> ; Posterior - Cleft <u>posterior to Incisive foramen</u>	Treatment: Surgical repair
Malformation of nasolacrimal duct (dacryostenosis)	Duct forms as cord between maxillary and frontonasal processes; extends from lacrimal sac (at medial canthus of eye) to nasal cavity (inferior meatus)	Cord fails to canalize	Continuous flow of tears over lower lid onto face	Surgical repair
First Arch (Treacher Collins) Syndrome	First brachial arch forms skeletal elements: 1) malleus, incus 2) contributes to mandible (Meckel's cartilage)	Neural crest cells do not migrate into Arch 1	1) Mandibular hypoplasia 2) Conductive hearing loss 4) Facial malformation	Some surgical repair
Thyroglossal duct cysts	Thyroid forms as evagination at foramen cecum of tongue; tissue <u>migrates</u> ant. to Hyoid bone in midline of neck to location below Cricoid cartilage	Glandular tissue or cysts develop anywhere along path	Mass in midline of neck	Surgical removal (remove tract to tongue)

Plan:

- 1) Lecture handouts – **have almost all relevant material summarized in charts.**
- 2) Lecture PowerPoints – illustrate and elucidate material from handouts (plus some other)
- 3) Lecture Videos – Videos follow slides in PowerPoints. Note: watching lecture videos can be dull. **All Head and Neck videos were redone this year** to make viewing more efficient.

Problem: watching all the videos takes time.
Unclear what is really essential.

LECTURES VIDEOS

This week heavily front loaded – lots of lectures; eases up somewhat next week.

Review Discussion sessions - last year done on Zoom.

Reviews in lab on weekends if requested - will record audio and post.

Final Reviews Wednesday Feb 23 and Thursday Feb 24 – Will go over relevant material from lab (prosections) and Discussion sessions.

2. LABS - PROSECTIONS

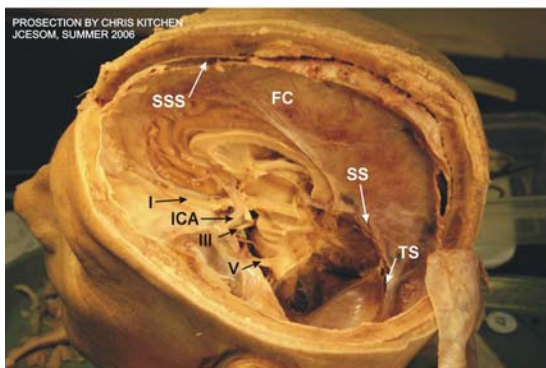
- 1. All prosections are in Histology area with labeled photos (laminated) on tables.**
- 2. All questions on lab exam will be on photos. Questions will be about labeled structures.**

PROSECTIONS

- 1) ALL LABS SELF - STUDY
- 2) ALL PROSECTIONS ARE NUMBERED AND HAVE LABELED PICTURES - IN FILE, ALSO IN LAB
- 3) EXAM QUESTIONS ON LABELED STRUCTURES

267

BRAIN (HEMISECTED) IN CRANIAL CAVITY

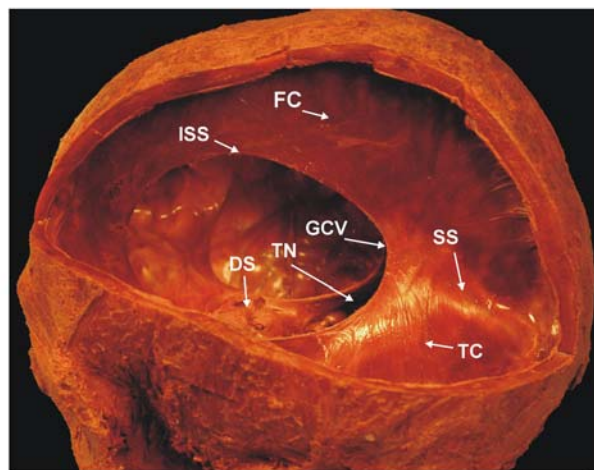


- I - OLFACTORY TRACT
- ICA - INTERNAL CAROTID ARTERY
- III - OCULOMOTOR NERVE
- V - TRIGEMINAL NERVE
- SSS - SUPERIOR SAGITTAL SINUS
- FC - FALX CEREBRI
- SS - STRAIGHT SINUS
- TS - TRANSVERSE SINUS

267

279

DURAL REFLECTIONS AND VENOUS SINUSES

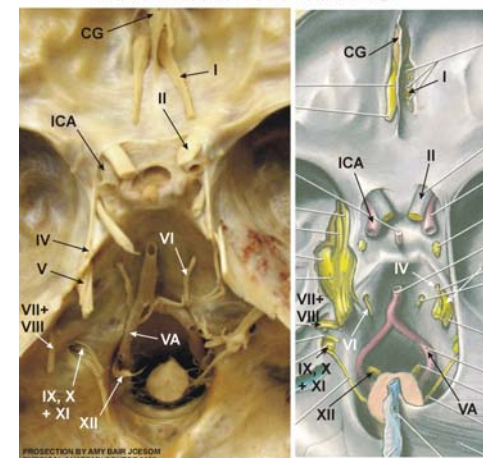


- FC - FALX CEREBRI
- TC - TENTORIUM CEREBELLI
- ISS - LOCATION OF INFERIOR SAGITTAL SINUS
- SS - LOCATION OF STRAIGHT SINUS
- GCV - OPENING OF GREAT CEREBRAL VEIN OF GALEN
- DS - DIAPHRAGMA SELLA
- TN - TENTORIAL NOTCH

279

283

CRANIAL NERVES



YOU ARE HERE



- I - Olfactory Tract
- II - Optic Nerve
- III - Oculomotor Nerve
- IV - Trochlear Nerve
- V - Trigeminal
- VI - Abducens
- VII - Facial Nerve
- VIII - Vestibulo-cochlear Nerve
- IX - Glossopharyngeal Nerve
- X - Vagus
- XI - Accessory
- XII - Hypoglossal
- ICA - Internal Carotid Artery
- VA - Vertebral Artery
- CG - Crista Galli

283

PROSECTIONS

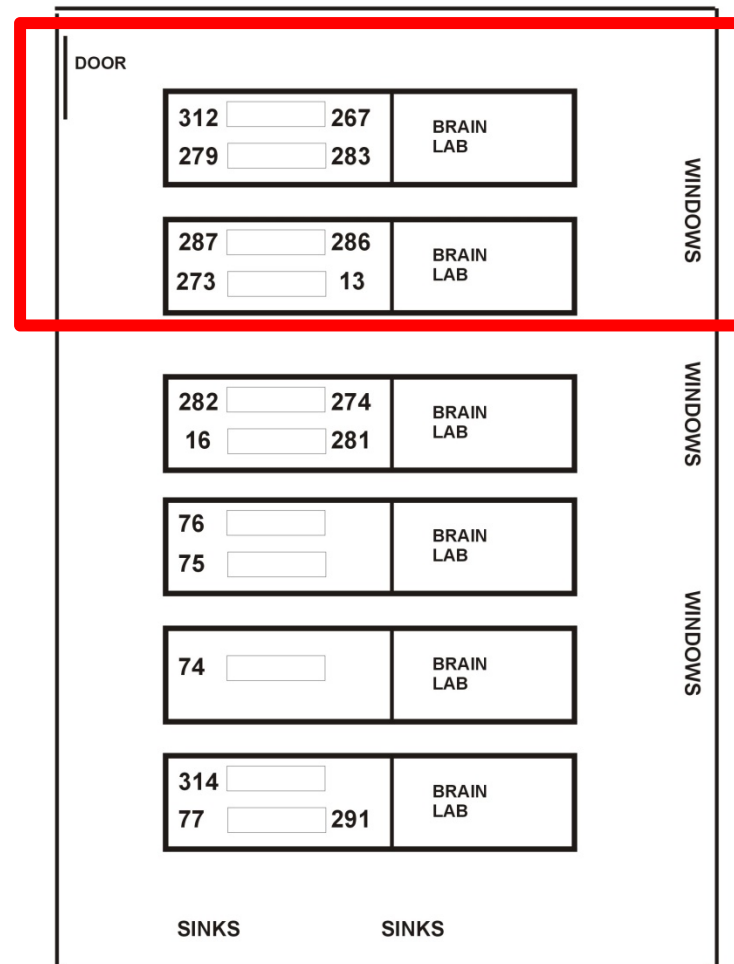
1- In histology area,
across hall from Gross
Lab

2. Some new and
excellent – Some old,
very old but still
usable – See what you
can find; please let me
know about broken
structures (I will post
list of structures
before lab exam).

**START AT THIS END - do
first two tables**

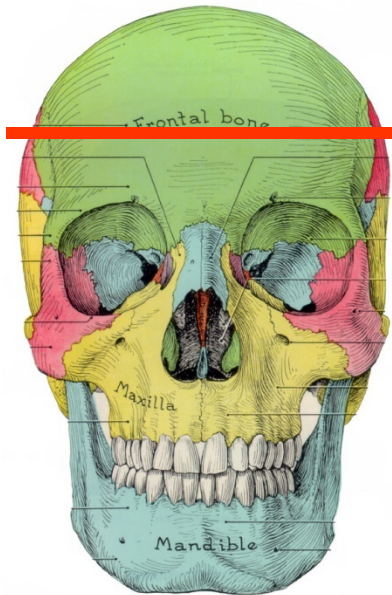


MAP OF LOCATION OF PROSECTIONS
IN HISTOLOGY AREA 2022

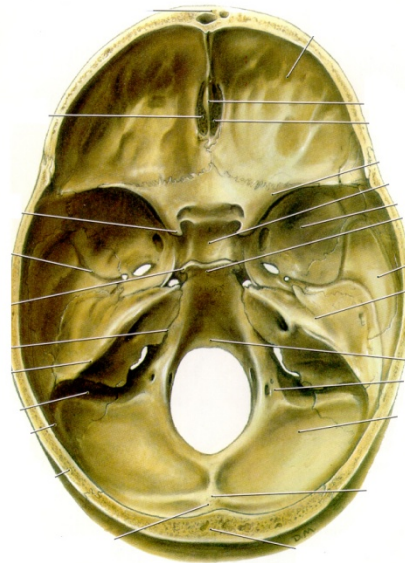


3. DISSECTION FRIDAY FEB 11: EXPOSE BRAINSTEM IN CRANIAL CAVITY

STRUCTURE OF CRANIAL
CAVITY – ALREADY DONE -
saw cut to remove calvarium

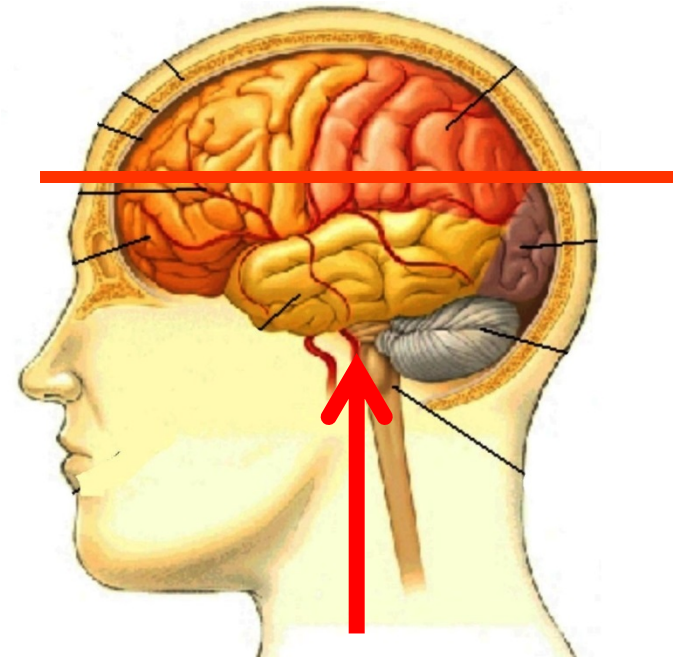


SKULL



INTERIOR OF
SKULL -
LEARN
OPENINGS
FORAMINA

ALSO CUT THROUGH BRAIN
– DISSECT LOWER HALF TO
EXPOSE BRAIN STEM



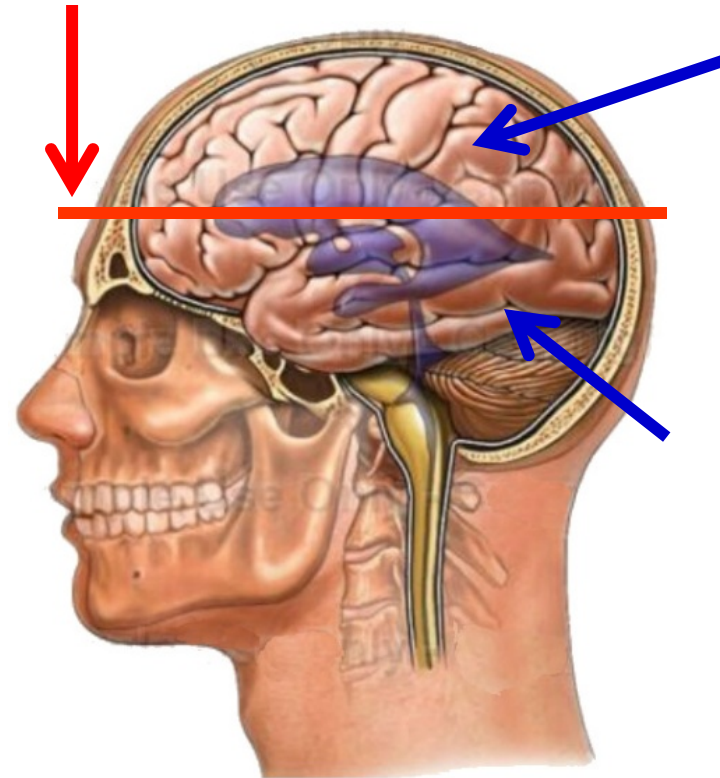
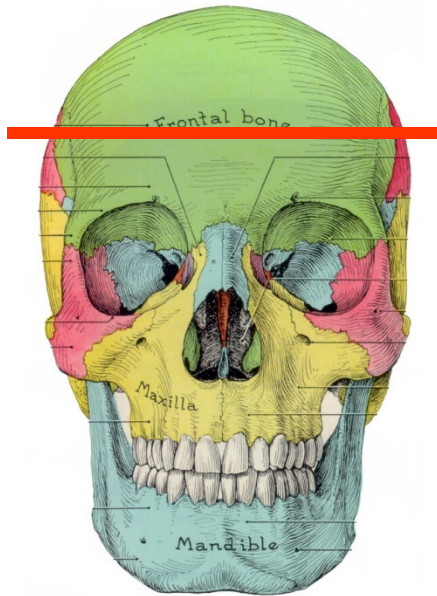
BRAIN STEM –
SEE CRANIAL
NERVES,
ARTERIAL
CIRCLE OF WILLIS

DISSECT LOWER HALF (ATTACHED TO BODY) TO EXPOSE BRAINSTEM; LEAVE UPPER HALF INTACT

VIEW FROM ABOVE AFTER REMOVE CALVARIUM (SKULL CAP)

UPPER HALF HAS CALVARIUM (WITH DURA) AND UPPER HALF OF BRAIN - LEAVE INTACT WITH CADAVER FOR REVIEW

LOWER HALF ON CADAVER HAS REMAINDER OF BRAIN, BRAINSTEM, CRANIAL NERVES, ARTERIES



REMOVE CALVARIUM (SAW CUTS ALREADY MADE)

DISSECT BRAIN ON CADAVER (LOWER HALF) TO EXPOSED BRAINSTEM

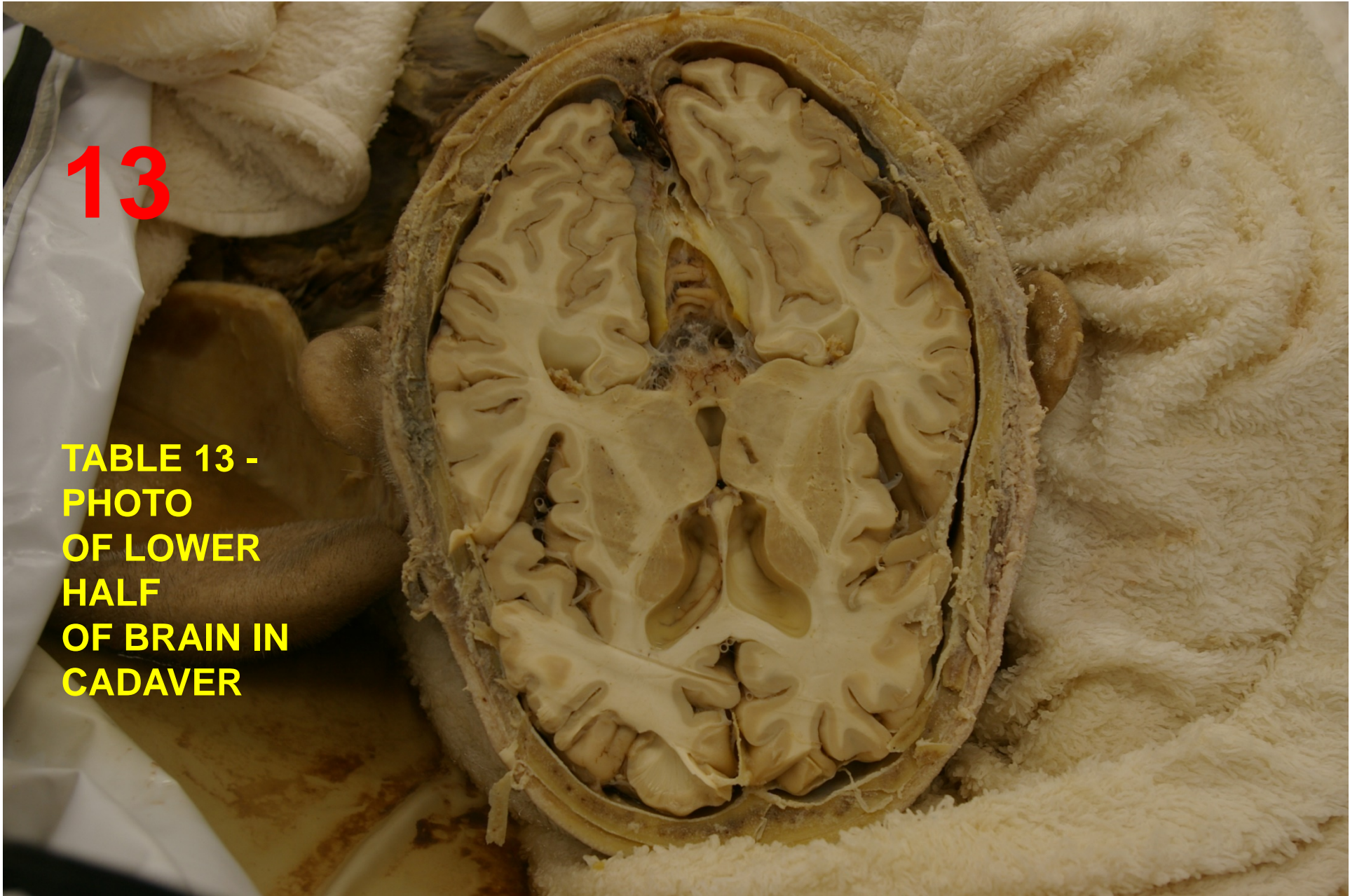
EXAMPLE: IN FILE DISTRIBUTED - TABLE 13

DT 13

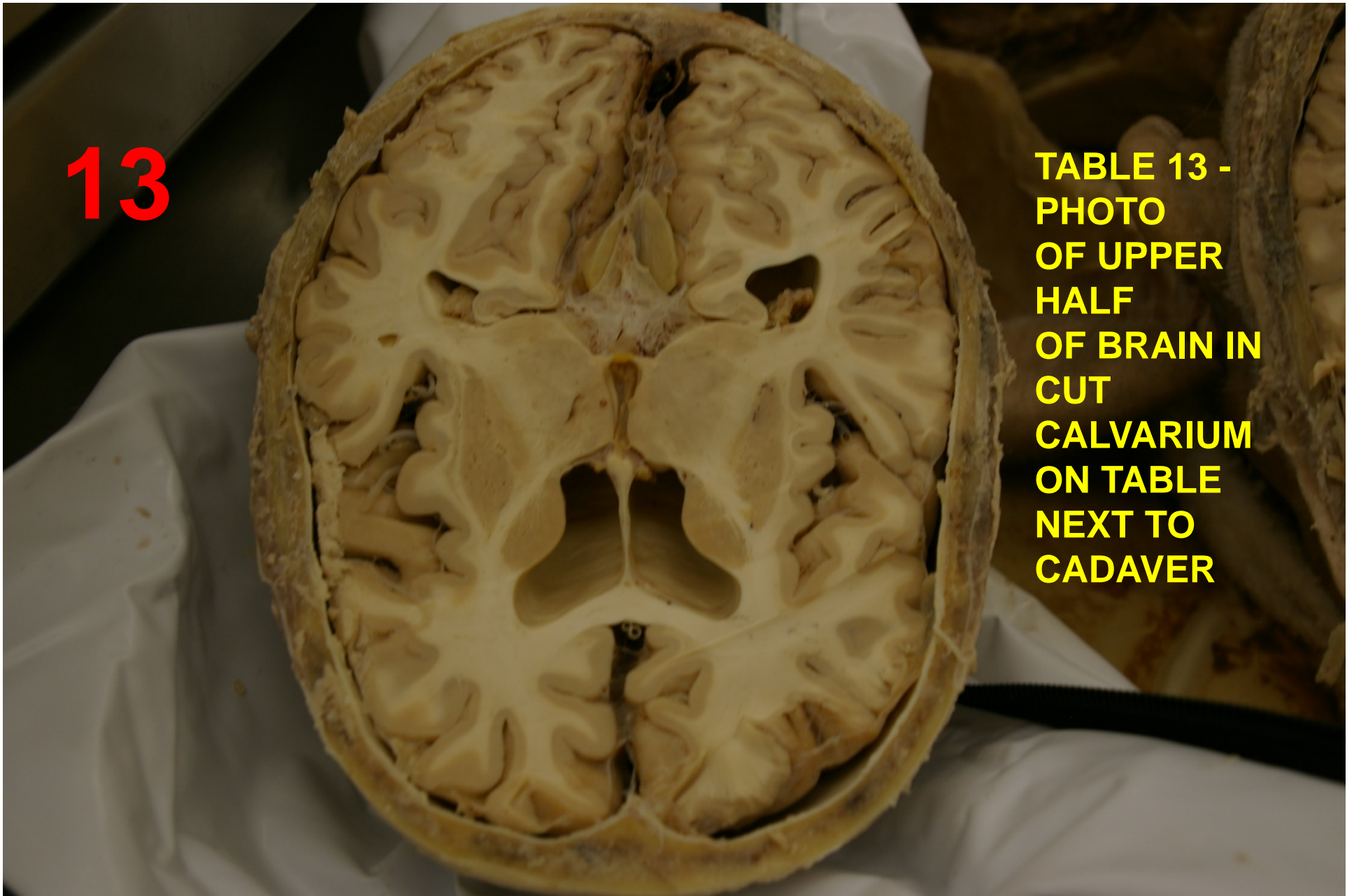
Sex: Male
Age: 69
SAB: 2021-329
COD: small cell lung cancer

13

**TABLE 13 -
PHOTO
OF LOWER
HALF
OF BRAIN IN
CADAVER**



13



**TABLE 13 -
PHOTO
OF UPPER
HALF
OF BRAIN IN
CUT
CALVARIUM
ON TABLE
NEXT TO
CADAVER**

PICTURES OF BRAINS OF CADAVERS IN GROSS LAB (DISTRIBUTED)

↓ VIEW IN PICTURES

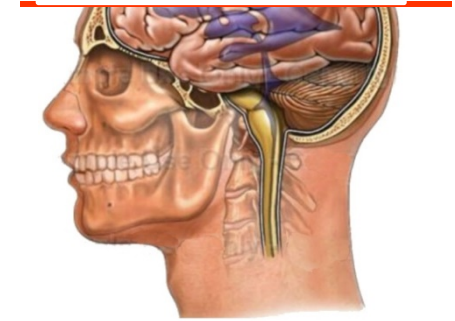


TABLE 13



TABLE 14



CUTS THROUGH BRAIN CAN BE AT DIFFERENT LEVELS

ALREADY DONE: SAW CUTS TO REMOVE CALVARIUM AND TOP OF SKULL

CUT MADE THROUGH ENTIRE BRAIN

DISSECT PART STILL IN BODY

PART OF BRAIN IN CALVARIUM WILL STILL BE INTACT

**NOTE: SPECIMENS HAVE BEEN CUT AT DIFFERENT LEVELS
SOME DISSECTIONS WILL BE REQUIRE REMOVAL OF LESS TISSUE
TO REACH MID BRAIN**

TABLE 13

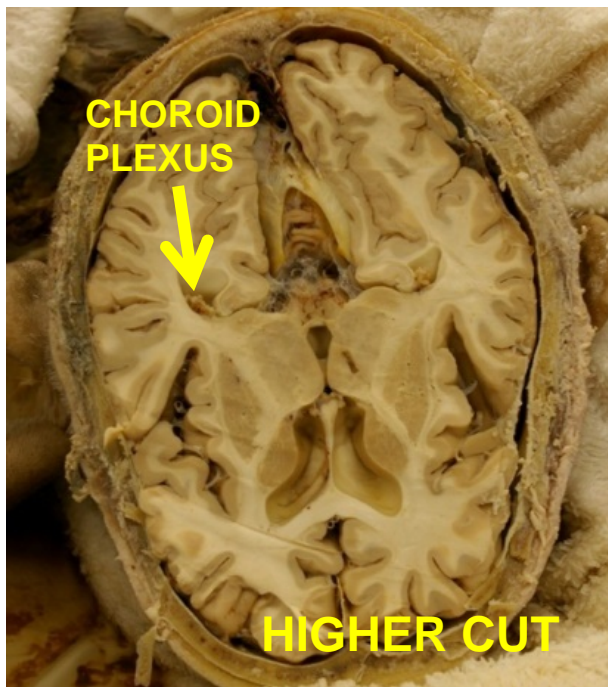
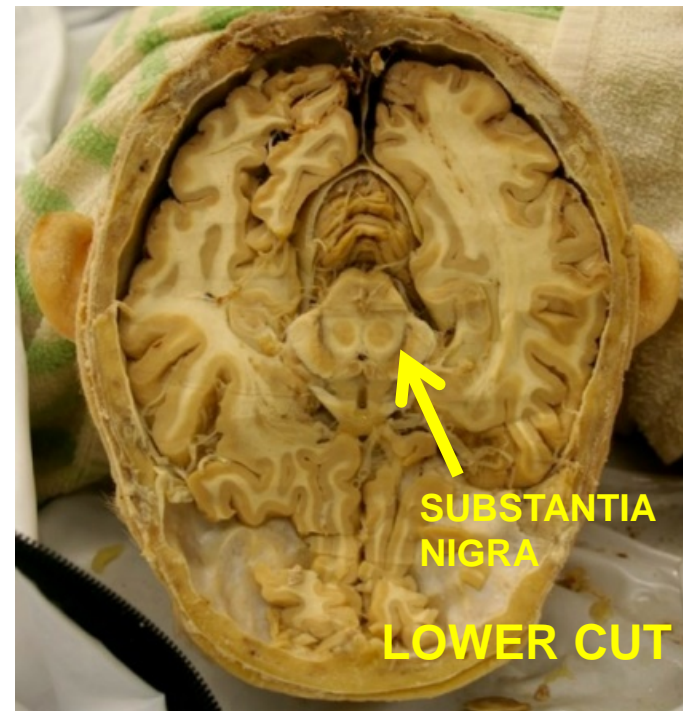
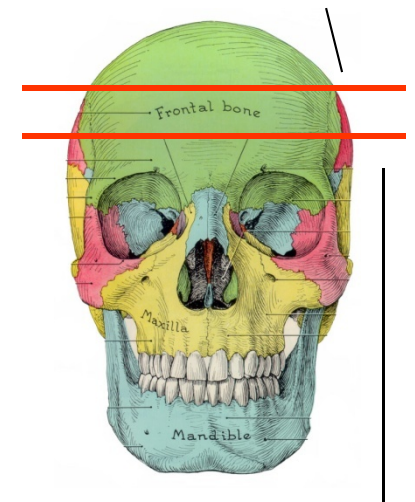


TABLE 14



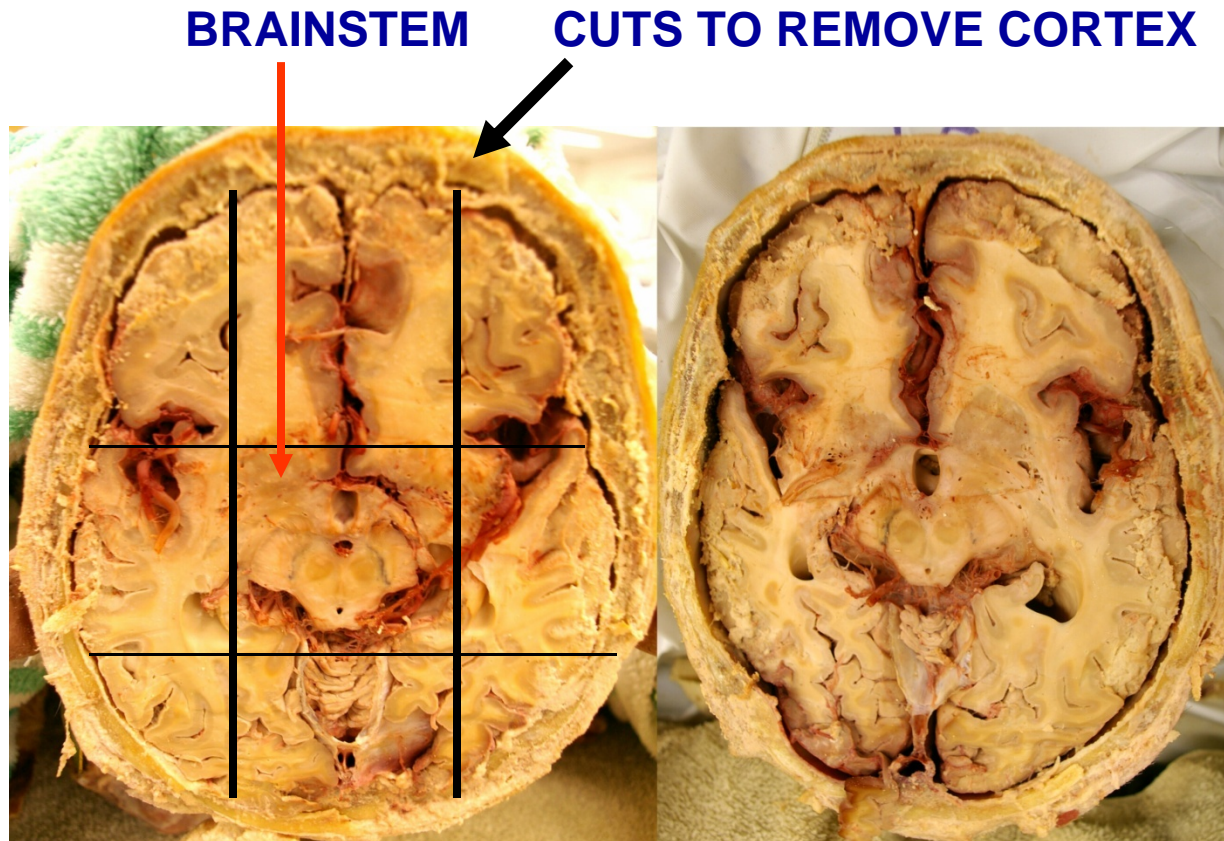
**HIGHER -
TABLE 13**



**LOWER -
TABLE 14**

CUTS THROUGH BRAIN CAN BE AT DIFFERENT LEVELS

**INSTRUCTIONS FOR DISSECTION FRIDAY FEB 11:
EXPOSE BRAINSTEM IN CRANIAL CAVITY - WILL BE
POSTED THIS WEEK**



**CUTS WILL BE
MADE TO REMOVE
CORTEX AND
OTHER BRAIN
STRUCTURES
SURROUNDING
BRAIN STEM**

**SURROUNDING
TISSUE IS
REMOVED BY
HAND**

**NOTE: PART OF
BRAIN IN
CALVARIUM WILL
BE LEFT INTACT**

DISSECTION SEQUENCE: EXPOSE BRAINSTEM IN CRANIAL CAVITY

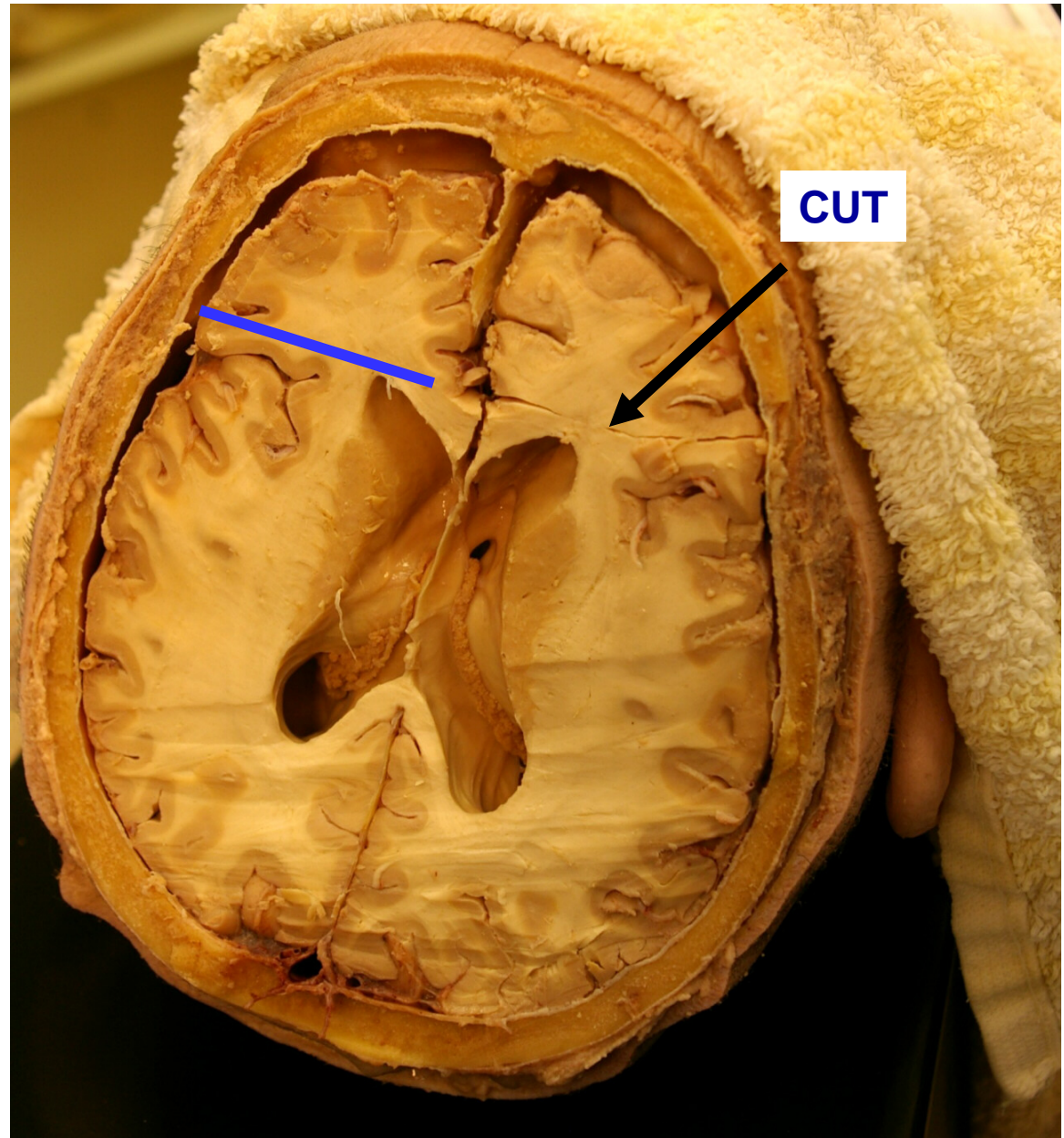


- SUPPORT HEAD WITH PLASTIC BLOCKS (IN CENTER ISLAND)
- ELEVATE SO YOU CAN EASILY LOOK IN CRANIAL CAVITY

DISSECTION: EXPOSE BRAINSTEM IN CRANIAL CAVITY

FIRST CUT:

- 1) LIFT UP FRONTAL LOBE GENTLY (FRONTAL POLE) AND SEE OLFACTORY BULB BELOW
- 2) TRY TO PUSH DOWN AND RETAIN BULB IN CRANIAL CAVITY
- 3) THEN CUT ACROSS FRONTAL POLE ANTERIOR TO GENU OF CORPUS CALLOSUM (ALL THE WAY THROUGH)



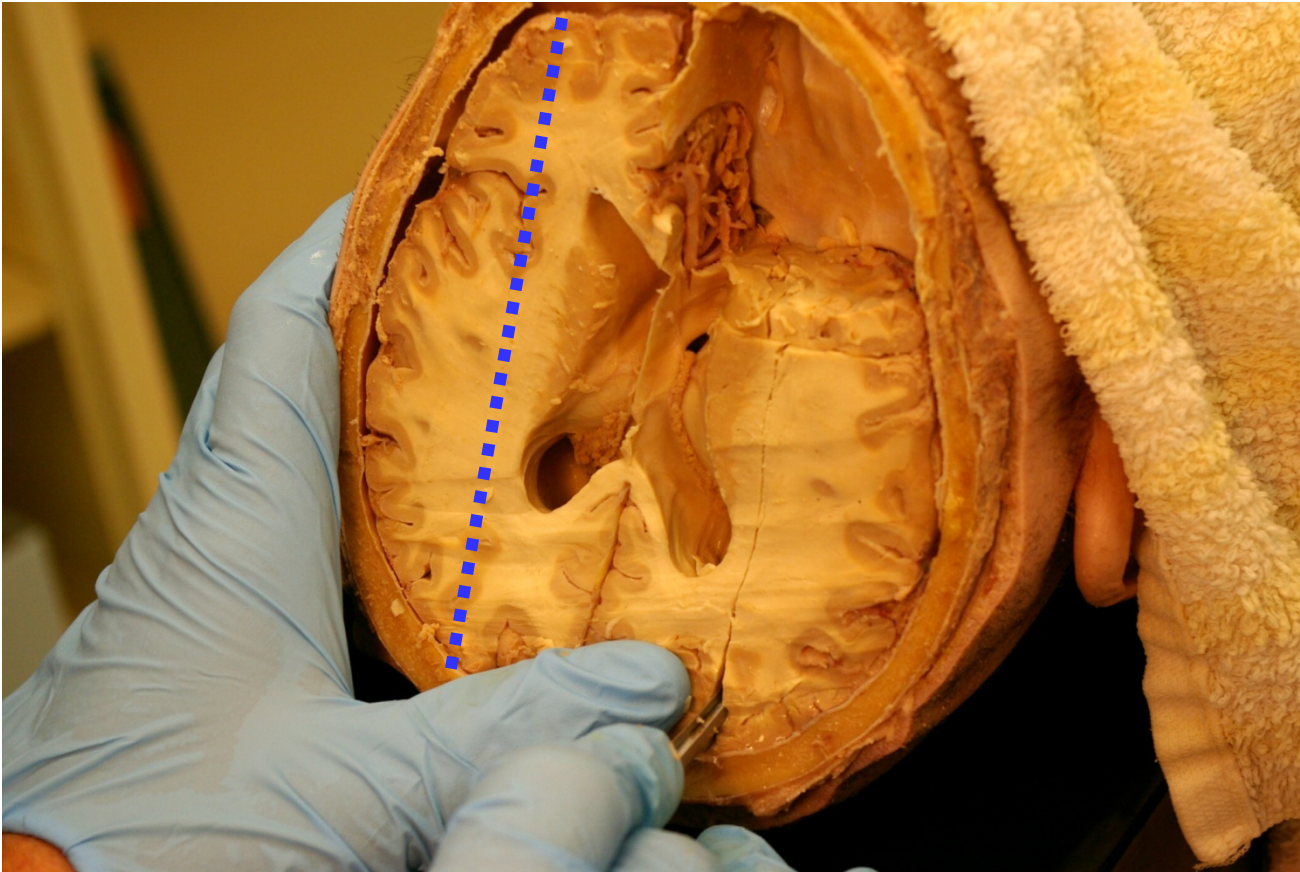
DISSECTION: EXPOSE BRAINSTEM IN CRANIAL CAVITY



**FRONTAL
CORTEX IS
THEN GENTLY
REMOVED
BY HAND**

DISSECTION: EXPOSE BRAINSTEM IN CRANIAL CAVITY

PLANE OF CUT 2



SECOND CUT:

- 1) CUT THROUGH TEMPORAL AND OCCIPITAL LOBES IN PARASAGITTAL PLANE
- 2) PUSH DOWN SCALPEL UNTIL MEET RESISTANCE OF BONE OR TENTORIUM CEREBELLI

DISSECTION: EXPOSE BRAINSTEM IN CRANIAL CAVITY

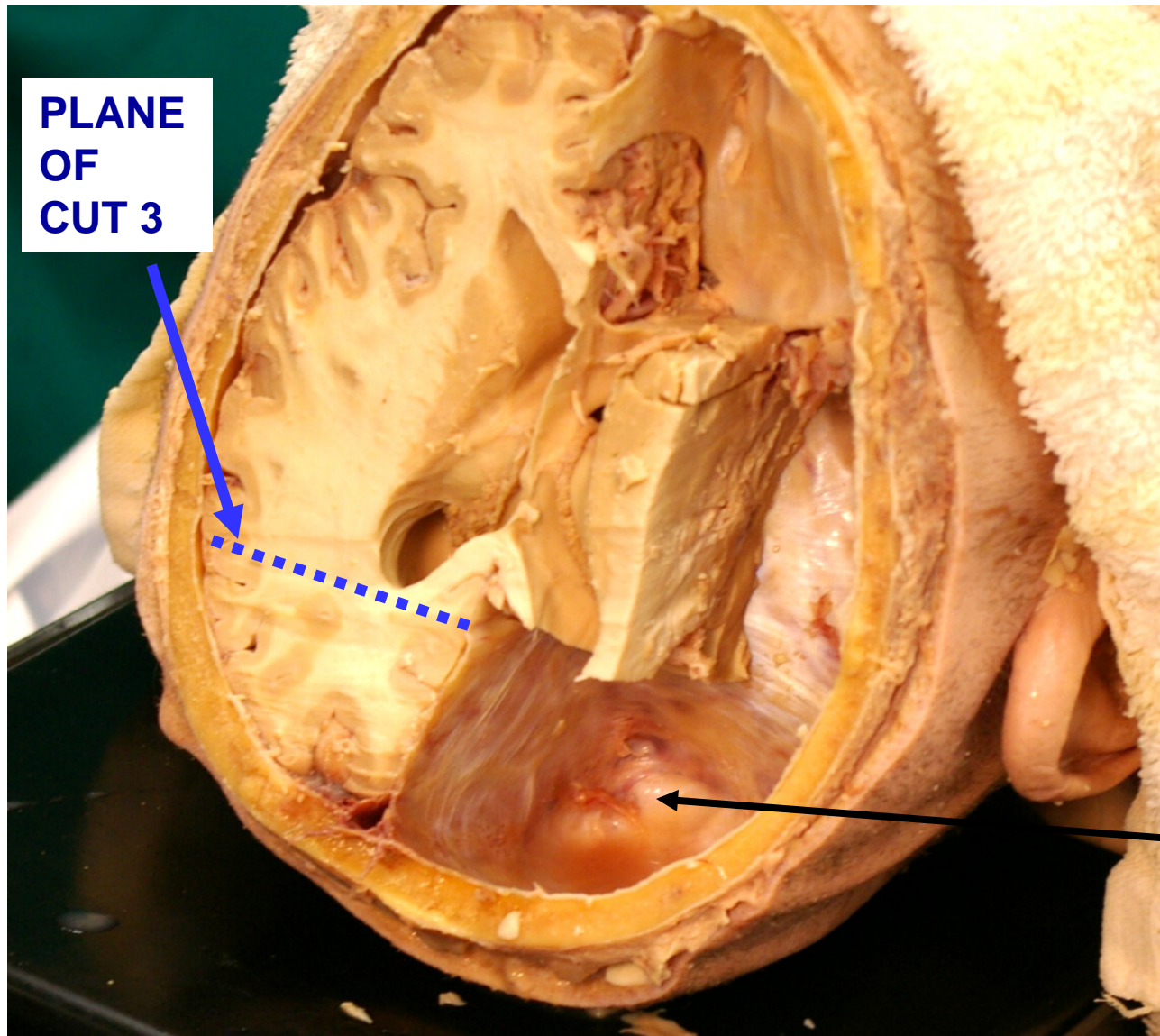


DISSECTION: EXPOSE BRAINSTEM IN CRANIAL CAVITY



**CUT SECTION
OF TEMPORAL
AND OCCIPITAL
LOBES
THEN
REMOVED BY
HAND**

DISSECTION: EXPOSE BRAINSTEM IN CRANIAL CAVITY



PLANE
OF
CUT 3

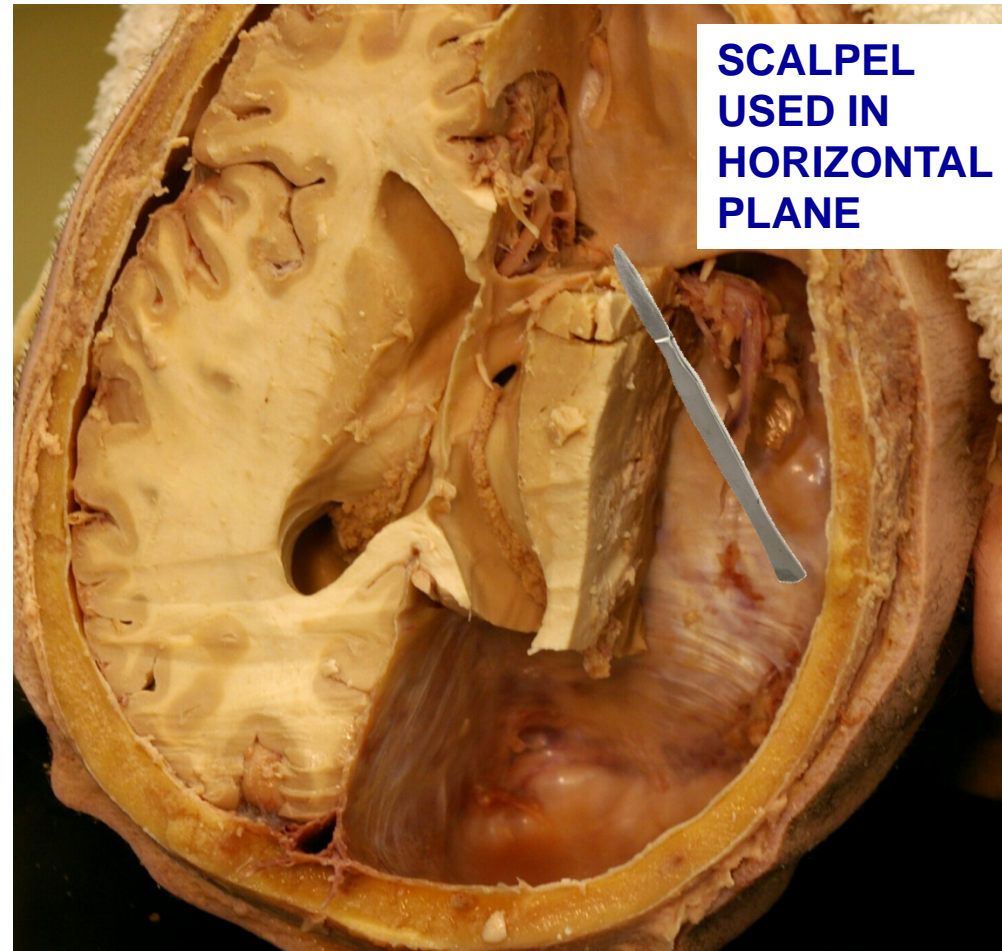
THIRD CUT:

- 1) CUT THROUGH OCCIPITAL LOBE IN CORONAL PLANE
- 2) CAREFULLY REMOVED REMAINING PART OF OCCIPITAL LOBE BY HAND

see Tentorium cerebelli overlying cerebellum

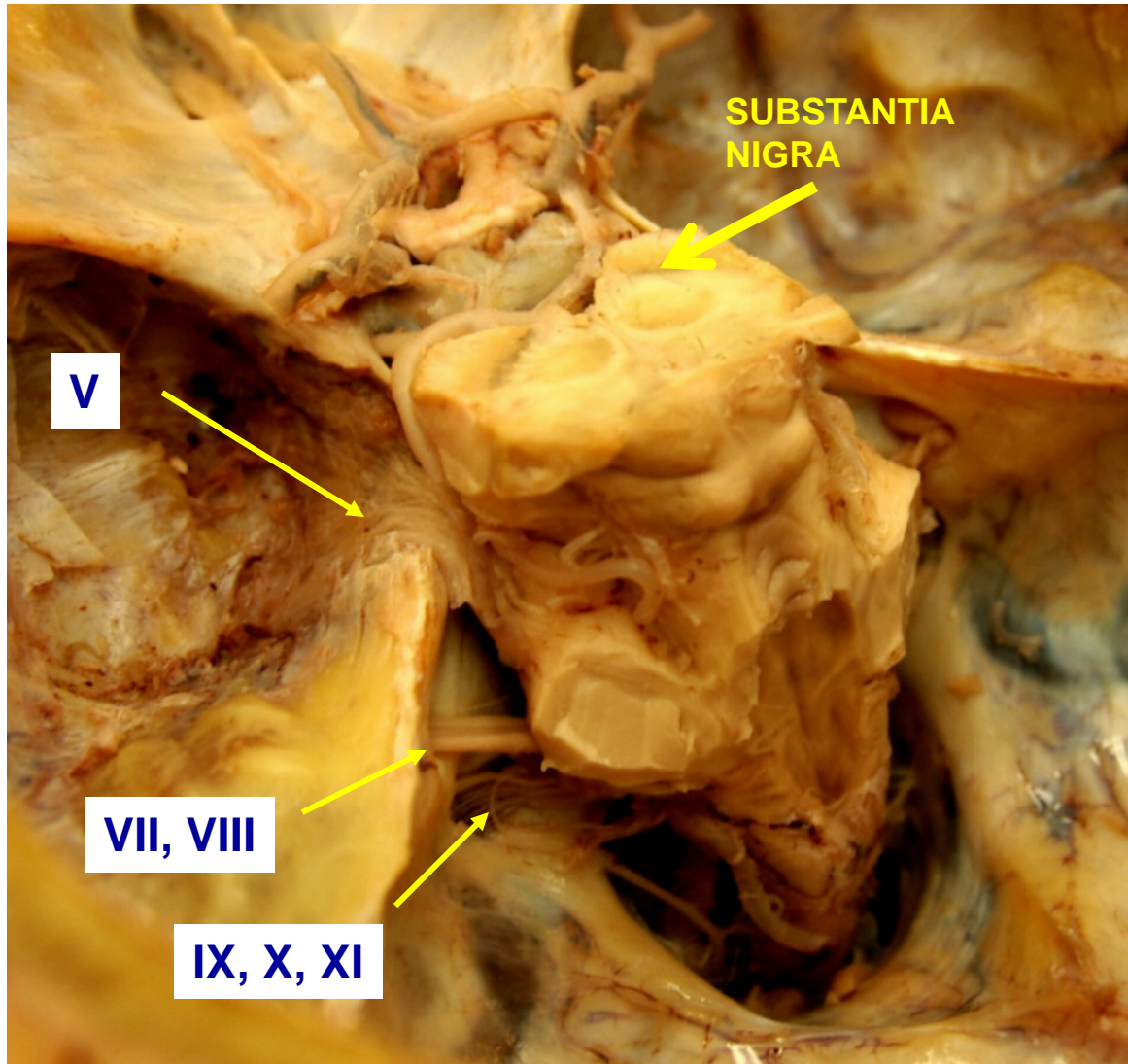
DISSECTION: EXPOSE BRAINSTEM IN CRANIAL CAVITY

NEXT CUTS: Use scalpel to cut thalamus and basal ganglia in horizontal plane; remove progressively as sections (carefully cut down to level of optic nerve, int. carotid a.)



KNIFE CUTTING SECTIONS IN HORIZONTAL PLANE

FINAL RESULT: BRAINSTEM IN SITU IN CRANIAL CAVITY

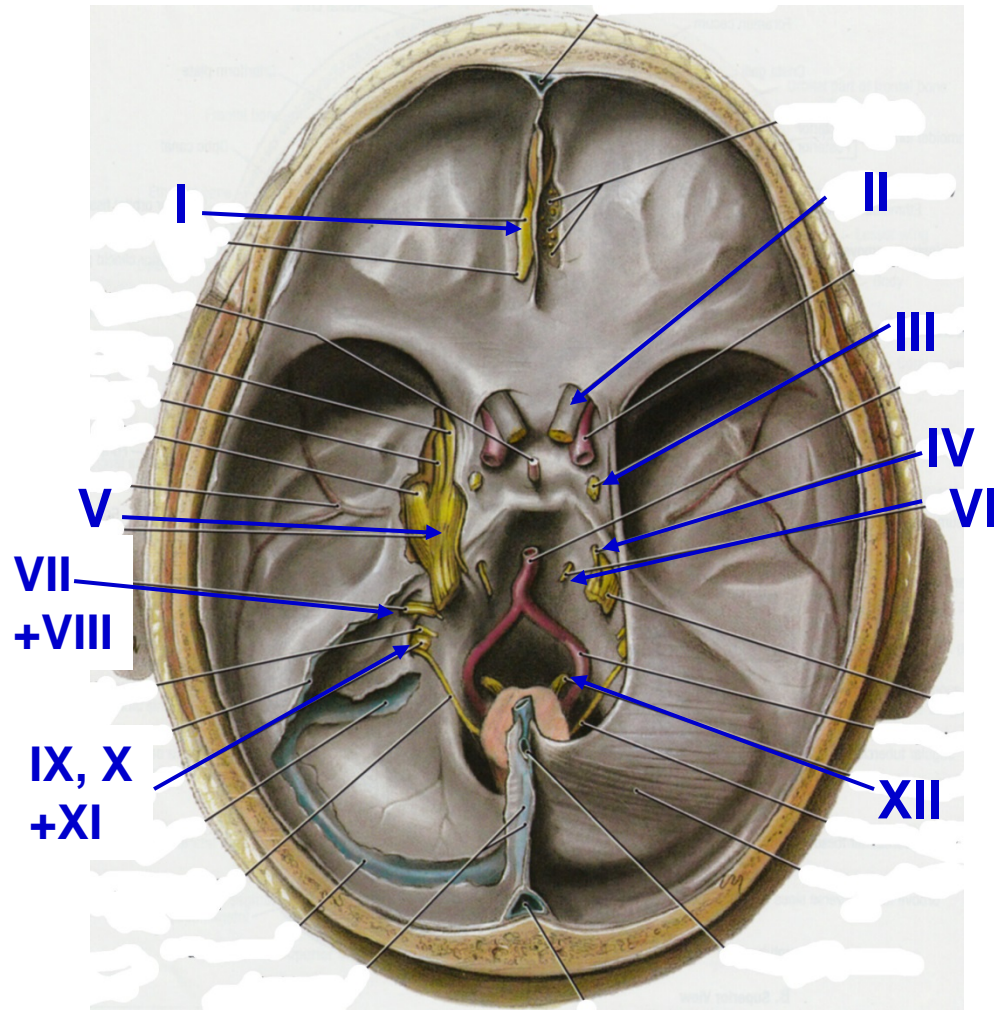


DO DISSECTION ON BOTH SIDES

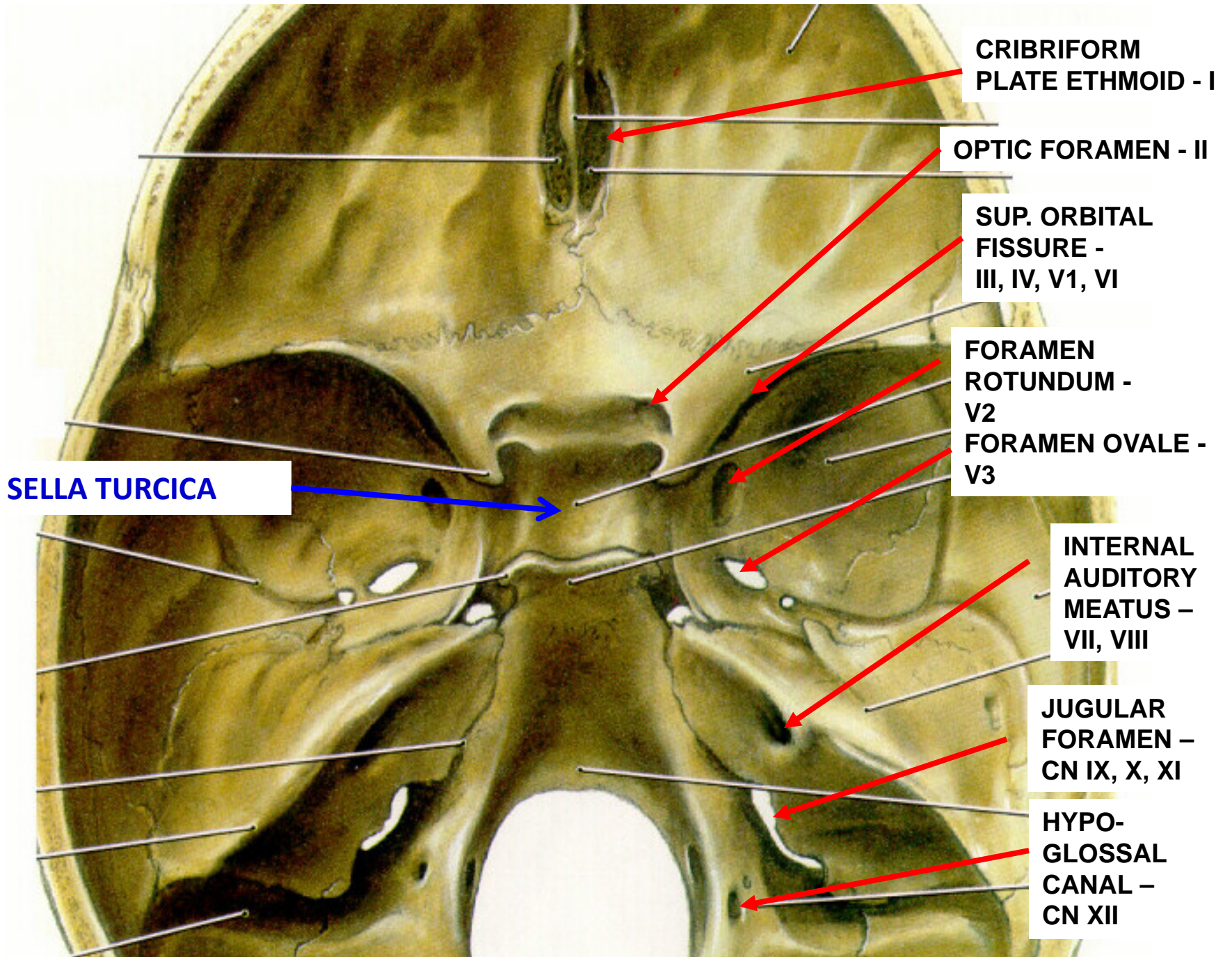
WHEN COMPLETE CAN SEE CN I-XII, BRANCHES OF INTERNAL CAROTID AND BASILAR ARTERIES

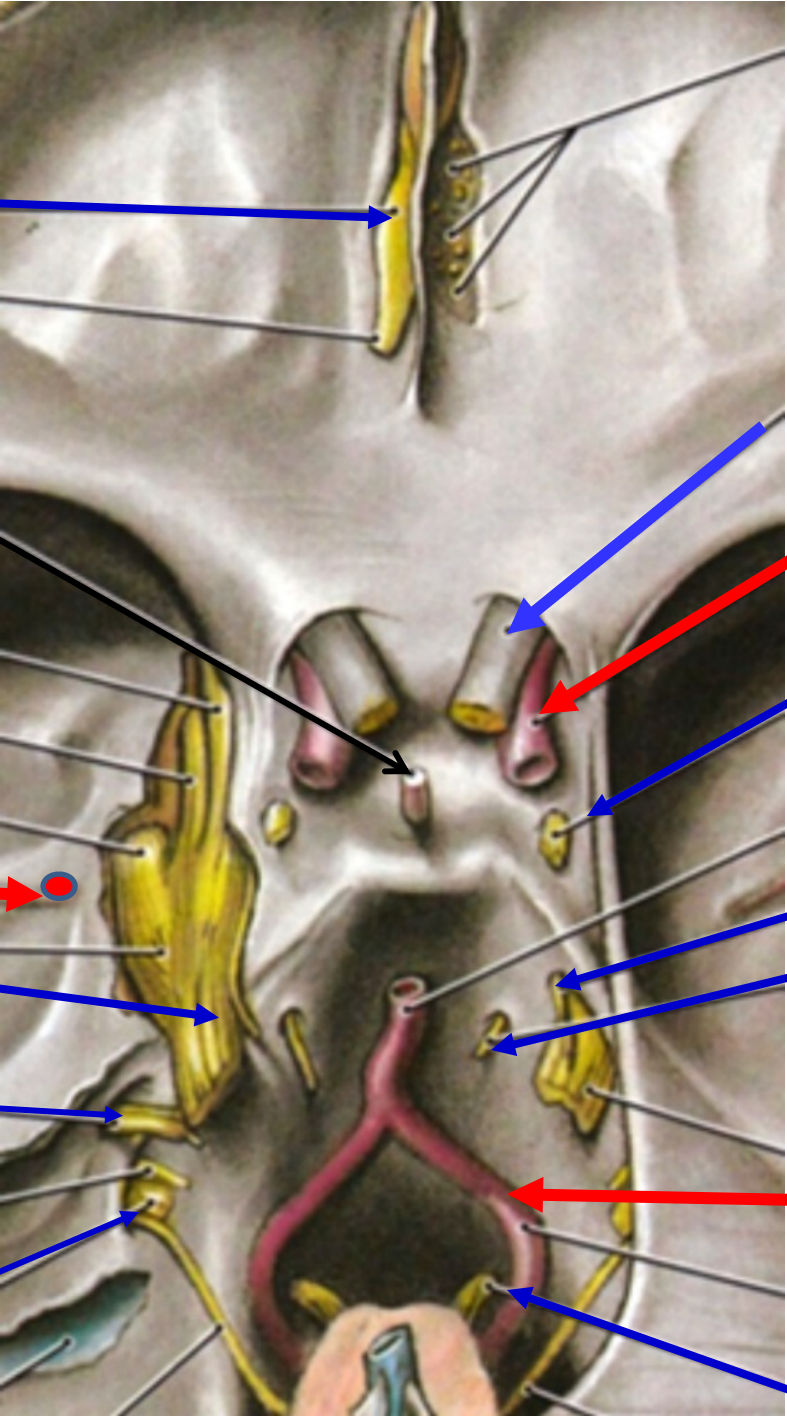
CAN CAREFULLY REMOVE DURA MATER FROM MIDDLE CRANIAL FOSSA TO EXPOSE V1, V2, V3 AND TRIGEMINAL GANGLION

LEARN NAMES AND NUMBERS OF 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





**BRAINSTEM
PROSECTIONS
IDENTIFY**

I

II

**PITUITARY
STALK**

INTERNAL CAROTID A.

V1

V2

V3

**MIDDLE
MENINGEAL A.**

III

V

IV

VII

+VIII

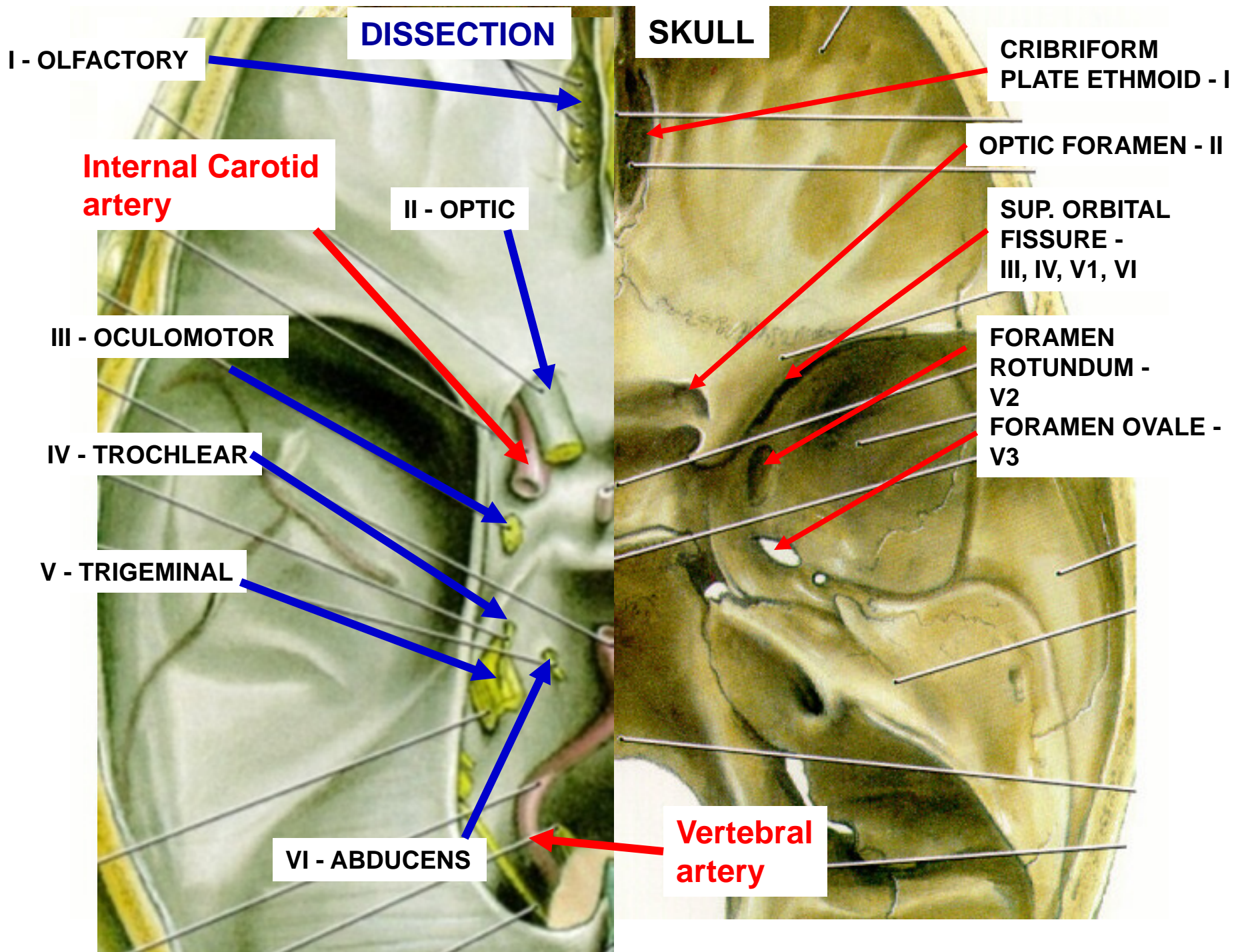
VI

IX, X

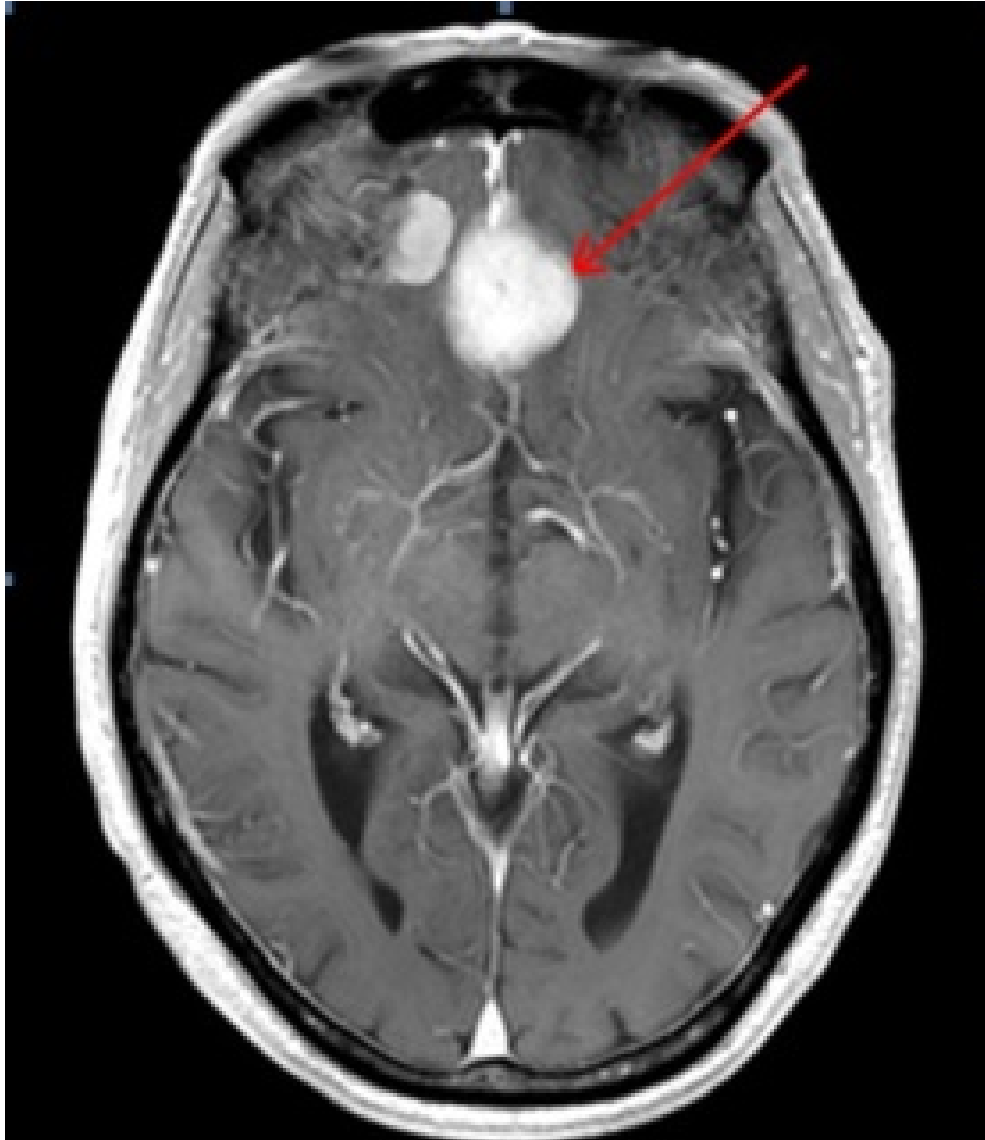
+XI

VERTEBRAL A.

XII



WHY STUDY THIS? DIAGNOSE LESIONS IN CRANIAL CAVITY



**MENINGIOMA IN
ANTERIOR
CRANIAL FOSSA.**

**WHICH CRANIAL
NERVE
AFFECTED?**

STUDY THIS PICTURE

I Olfactory

II Optic

III Oculo-
motor

VI
Abducens

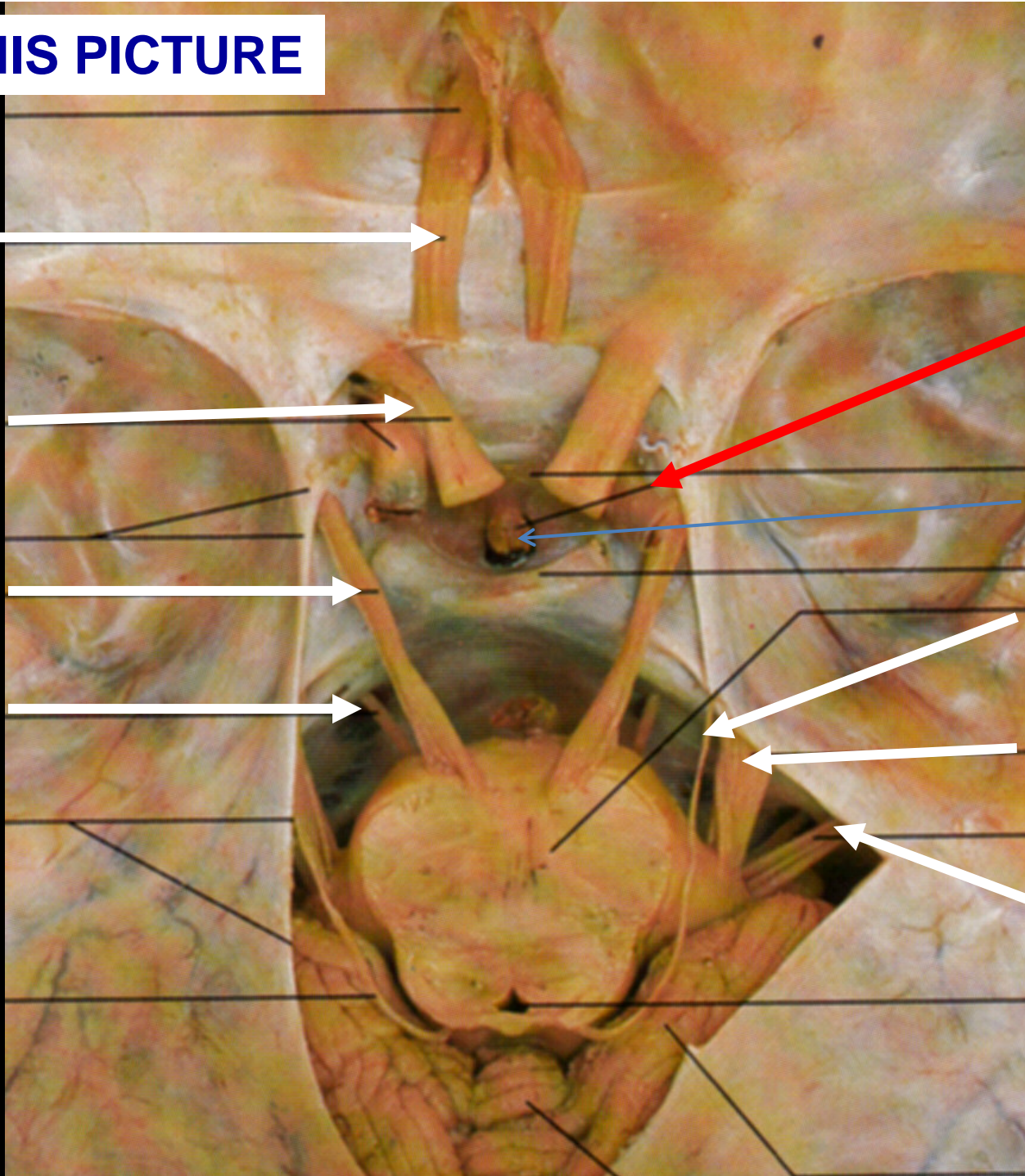
**INTERNAL
CAROTID
A.**

Pituitary
stalk

IV
Trochlear

V
Trigeminal

VII + VIII



STUDY THIS PICTURE

**IV
Trochlear**

**II Optic
Chiasm**

**Trigeminal
(Semilunar)
Ganglion**

**III
Oculomotor**

**V
Trigeminal**

**Substantia
Nigra
in
Midbrain
(Parkinson's
Disease)**

