

# **GROSS ANATOMY OF HEAD AND NECK**

## **Neural Network (NN) Block**

**Feb 10, 2025**

### **Welcome to Head and Neck**

- 1. Overview of next three weeks.**
- 2. Some things to get down in first week before dissections Friday, next Monday**

# OVERVIEW OF GROSS ANATOMY THIS BLOCK

**TOO MUCH  
MATERIAL,  
TOO  
LITTLE  
TIME**

- Very short duration to study Head and Neck (8 days + 1)
- Problem: Cover large amount of material (text: Head and Neck ~300 pages; compared to Extremity ~100 pages);
- This material is needed for study of Neuroanatomy/Neurology, as well as questions on Board Exams

## Approach:

- Focus upon **clinical anatomy** and topics related to **board** exams, Neuroanatomy/Neurology.

However, also need vocabulary and knowledge anatomy for Neuro (Neurosurgery, etc.) and ENT.

Task: Lots of memorizing (particularly, if you have not had material before) but try to maintain clinical focus throughout.

# TOPICS: SESSIONS HAVE CLINICAL FOCUS

Face – **Bell's palsy** (Syndrome of damage to Facial nerve, CN VII) – also Intro to Blood Supply and venous drainage, Innervation;

Face development – **Cleft lip**

Cranial nerves – Major lecture – **each cranial nerve has syndrome**, need to know Anatomy to diagnose in Neurology

Skull – skull bones for **fractures and openings (foramina)**; also Scalp Meninges Blood Supply – **Hematomas** (bleeds inside head), also CSF

Orbit – Major lecture – EYES - **many clinical** topics; USED **DIAGNOSTICALLY** focus – Eye Movements chart

Skull Session – openings for cranial nerves for **clinical diagnosis**

Branchial (Gill) Arches – **Embryology essential to understanding adult structure**; **Branchial cleft syndromes**

Neck/Thyroid – Anatomy for **ENT**

Spinal Reflexes – Go over in detail (review) for **Neurological testing**

Cranial Nerve Reflexes – **Board questions**, essential for neurology

Autonomics - **Horner's** syndrome (Oculosympathetic paresis)

Nasal Cavity – fractures, **anosmia**, ENT, cleft palate, palatine tonsils

Larynx – **iatrogenic damage** to Laryngeal nerves during **surgery**

Ear – Middle ear infections (**otitis media**)

**Plan: 1) Lecture handouts – arranged by topic (region) and contain basic clinical anatomy; please read carefully.**

**2) Lecture PowerPoints – illustrate and elucidate material from handouts (plus some other)**

**3) Clinical Anatomy Charts - summarize material.**

## Face handout

### FACE

I. **OVERVIEW: FACE IS UNIQUE** - Skin on face is thin and moveable; Facial muscles take origin from underlying bones (mostly) and insert onto skin.

A. **Facial transplant** - In severe damage to face, facial transplants are required because muscles of facial expression insert onto skin rather than tendons (therefore, cannot use grafts of other body muscles); transplants contain muscles and skin.

B. Neural control of Facial muscles - Facial muscles are under both voluntary and involuntary (emotional) control.

C. Detecting action of Facial muscles - Muscles of face have no (or very few) muscle spindles; muscle contractions are thought to be detected by stretching of skin.

D. Facial paralysis - is a defining symptom in Bell's Palsy

**Bell's palsy - paralysis of facial muscles; lower motor neuron syndrome of facial nerve (CN VII);** thought to be associated with **viral infection** (herpes simplex); **Symptoms unilateral:** sudden onset **paralysis or paresis of all facial muscles on one side;** drooling; inability to close eye; also hyperacusis (sounds seem too loud), loss of taste to anterior tongue; pain in or behind ear.

## Face PowerPoint

### FACE: 2025

Mona Lisa's Face



'Window of the soul' - Face has moveable skin for facial expression

Mona Lisa's Hands



**FACE IS UNIQUE** - skin of face is thin and moveable

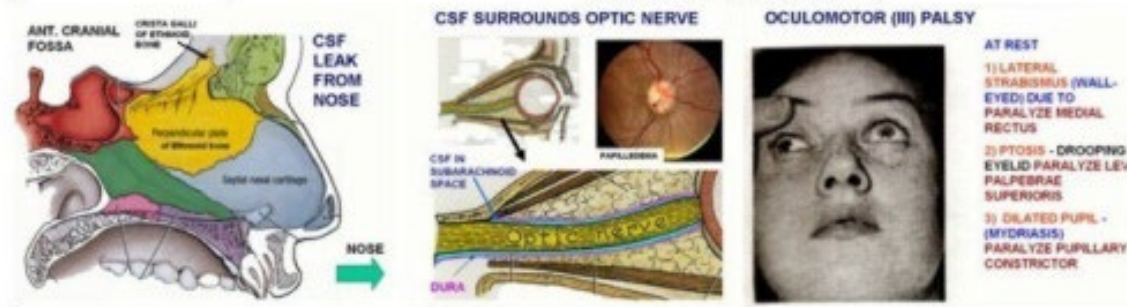


**Facial Paralysis - Bell's Palsy - face disfigures**

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

## CLINICAL ANATOMY OF HEAD AND NECK

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



## Plan:

**3) Lecture Videos – Videos follow slides in PowerPoints. Note: watching lecture videos is dull; these videos were from lectures given in past years (advantage: topics in Anatomy elucidated, live audience reactions).**

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



**Strategy – Lecture/Discussion sessions – Start Wednesday - Go over material extracted from lectures Powerpoints/ videos (particularly things in red boxes in Powerpoints, often with asterisks).**

**All material (handouts, videos and Powerpoints) are available on my website, [zillanatomy.com](http://zillanatomy.com) (currently under Pandemic Anatomy).**

**EVERYONE STUDIES AT THEIR OWN PACE:  
EITHER GO TO DISCUSSION SESSIONS OR  
WATCH VIDEOS/READ POWERPOINTS OF  
DISCUSSION SESSIONS.**



**Neuro Block Study Materials - Spring 2024**

**FILES FOR NEURO BLOCK:**

1) CLINICAL ANATOMY CHARTS 2024:

[Clinical Anatomy and Embryology All Head and Neck Charts 2024.pdf](#)

2) PROSECTIONS 2024 HEAD AND NECK: [2024 Prosections reduced Head and Neck.pdf](#)

3) BRAINS (CUT) OF DONOR CADAVERS IN GROSS LAB (for Brain Dissection Lab) 2024:  
[2024 Photos of cadaver brains cut 012724.pdf](#)

Mon February 5, 2024

1. 10:00 AM Face - Download Lecture Notes: [Face\\_2024.pdf](#) ; Download Powerpoint:

[FaceF Lecture Powerpoint 2024.pdf](#) ;

Video part1 mp4: [face part1.mp4](#)

Video part2 mp4: [face part 2.mp4](#)

2. 11:00 AM - Cranial Nerves I - Download Lecture Notes:

[Cranial Nerves 1 and 2 Handout 2024.pdf](#); Download Powerpoint: [Cranial Nervesf\\_1 and 2 Lecture 2024.pdf](#)

Video mp4: [cranial nerves part 1.mp4](#)

3. 1:00 PM Overview Head and Neck Anatomy - Download Powerpoint:[2024 First Overview Lecture Face and Cranial nerves.pdf](#): Video:

[https://www.zillanatomy.com/Pandemic\\_anatomy.htm](https://www.zillanatomy.com/Pandemic_anatomy.htm)

## **EXAM QUESTIONS**

- Intended to stress topics emphasized in Lecture/ Discussion sessions (Board relevant) – generally answer from material in handouts and PowerPoints
- Many questions on exams are clinical vignettes
- Eliminated practice questions from my website (Pandemic Anatomy) - Many questions were quite similar to those asked on exams/quizzes; this compromised Assessment of student performance
- Go over some practice questions in Discussion/Lectures - however, questions can be rewritten by Assessment Evaluation Committee immediately prior to exams (not know in advance).

**LABS - 1) PROSECTIONS (DISSECTIONS DONE IN ADVANCE BY MEDICAL STUDENTS), 2) DISSECTIONS BY YOU**

**PROSECTIONS - All prosections are in Histology lab with labeled photos (laminated) on tables.**

**All questions on lab part of exam will be on photos. Questions will be about labeled structures.**

**DISSECTIONS BY YOU IN GROSS LAB - Two - Discuss Wednesday, Friday**

**1) Brain Stem Dissection - this Friday, Feb. 14; (students have been said this is one of the best anatomy labs).**

**2) Orbit Dissection - next Monday, Feb. 17 - Eye muscles, nerves and blood vessels are complex three dimensional structures; the dissection helps.**

## LABS PROSECTIONS AND DISSECTIONS (2)

**PROSECTIONS - All prosections are on trays in Histology lab with labeled photos (laminated) on tables; All questions on lab part of exam will be on photos. Questions will be about labeled structures.**



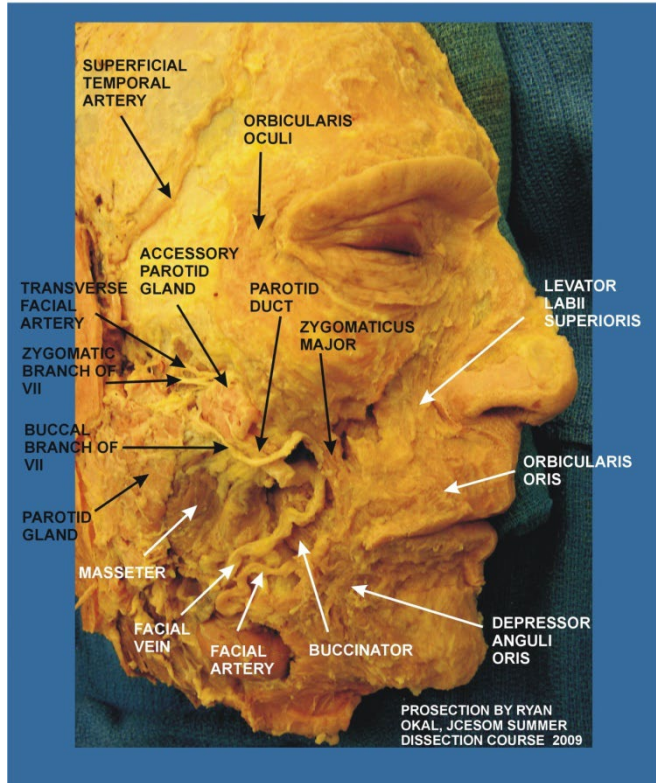
**View of  
Histology  
Lab  
(across  
hall from  
Gross  
Lab)**



# HEAD AND NECK PROSECTIONS

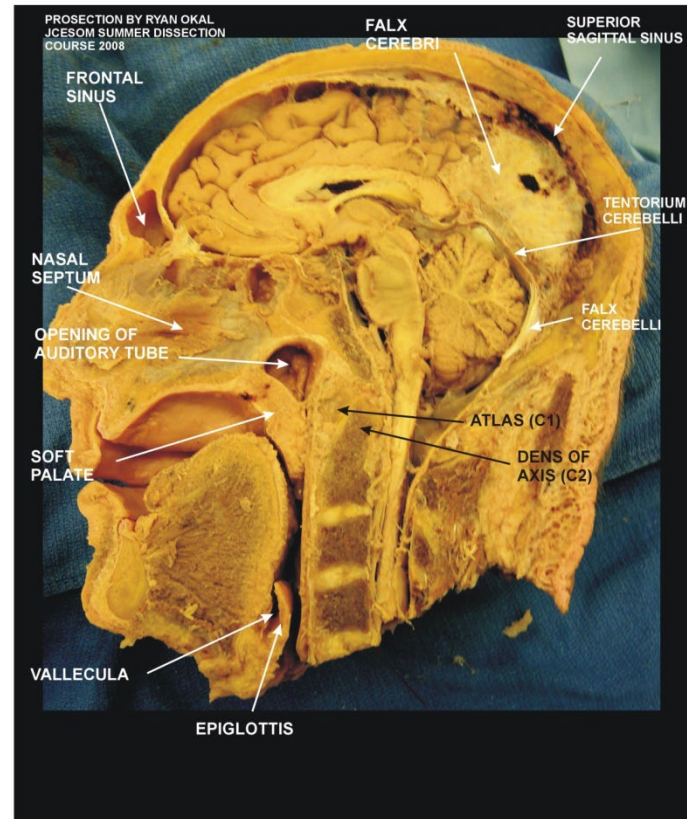
## FACIAL MUSCLES

312



## MEDIAL VIEW OF BIASECTED HEAD

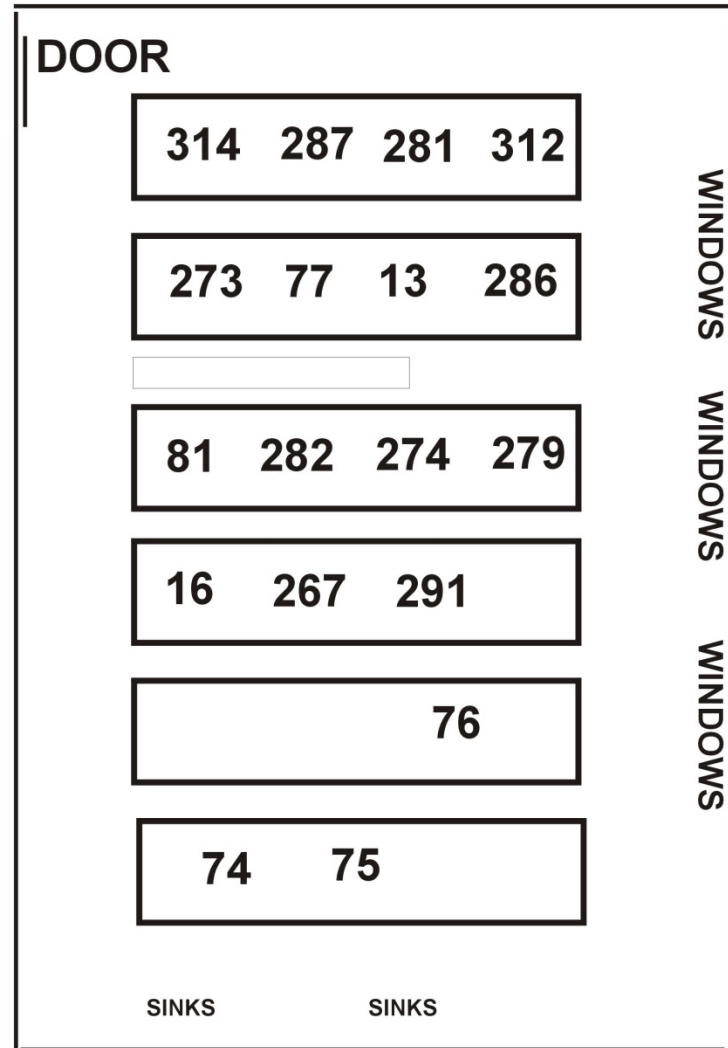
312



**LABELLED PHOTOS OF PROSECTIONS - LAMINATED PICTURES OF THESE PHOTOS NEXT TO PROSECTIONS**

# MAP OF LOCATION OF HEAD AND NECK PROSECTIONS

## MAP OF LOCATION OF PROSECTIONS IN HISTOLOGY AREA 2025



## **PROSECTIONS**

**1- Some excellent –**

**116 - Brainstem/Orbit in Cranial Cavity - This is the view similar to the lab dissections that will be done on Friday (2/9/24) and Monday (2/12/24). Great as a preview.**

**75 - Bisected Head with Intact Falx Cerebri – great for orientation.**

**76 – Carotid Endarterectomy Surgical Prosection – One side is surgery to expose Carotid artery; other side is full dissection of neck to fully see structures exposed in surgery**

**2- Some old, very old but still usable – See what you can find; please let me know about broken structures (I will post file with list of structures at end and exclude anything broken).**

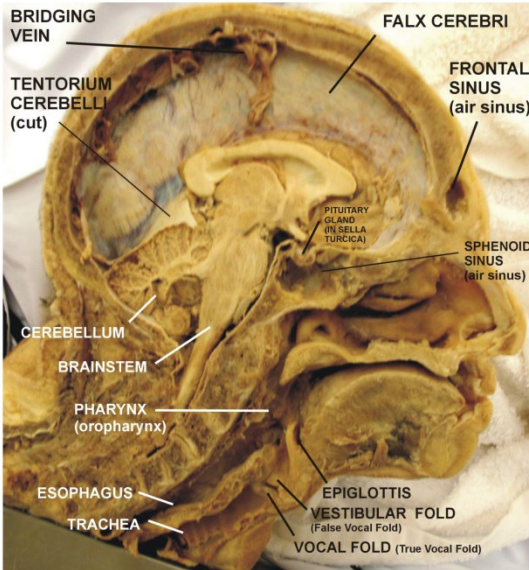


# 75

Good for overall orientation

## BISECTED HEAD WITH INTACT FALX CEREBRI

75



Note: Bridging Vein - cut when brain removed but still attached and entering Sup. Sagittal Sinus

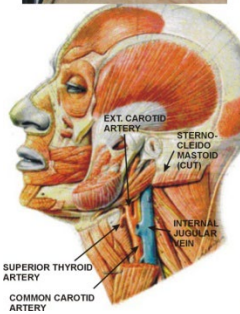
# 76

One side surgical approach; other side Full Dissection

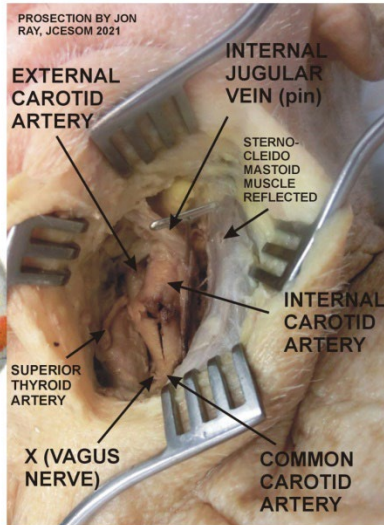
## SURGICAL PROSECTION: CAROTID ENDARTERECTOMY

76

SKIN INCISION ANTERIOR TO STERNOCLEIDOMASTOID MUSCLE



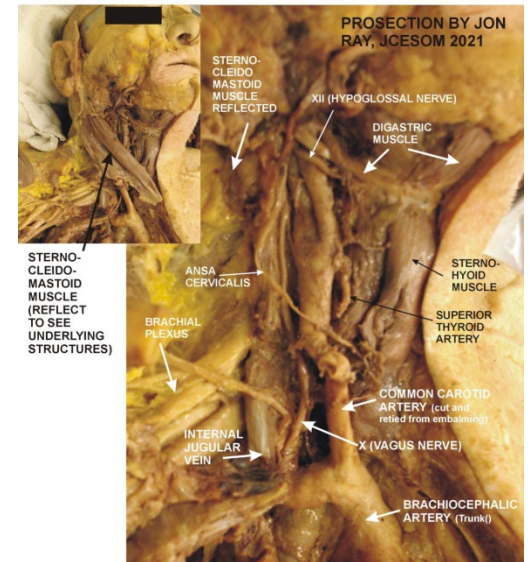
CAROTID SHEATH INCISED TO EXPOSE CONTENTS; ARTERY INCISED FOR PLAQUE REMOVAL



## DISSECTION OF ANTERIOR NECK

76

NECK DISSECTED ON RIGHT SIDE OF SURGICAL ANATOMY PROSECTION

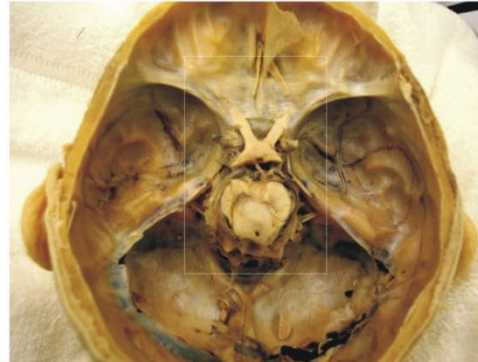


# 77

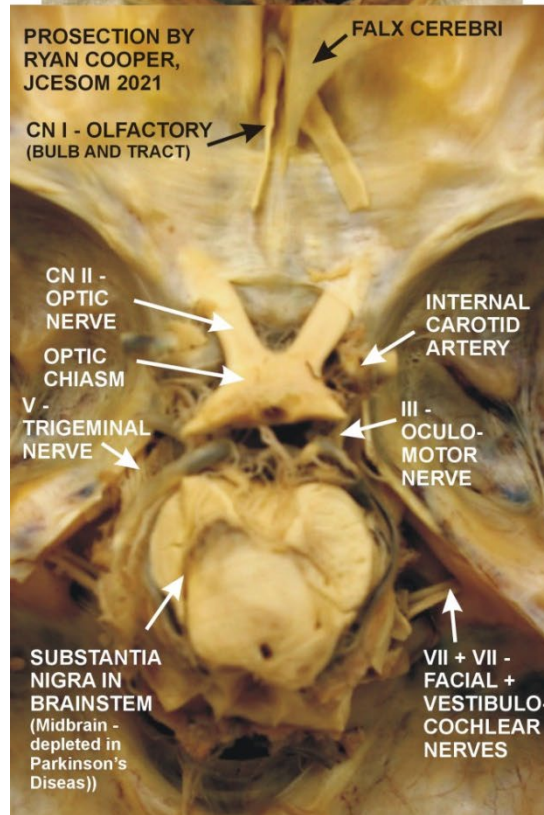
View similar to lab dissections on Friday 2/14/2025 (Cranial Cavity)

## BRAINSTEM IN CRANIAL CAVITY

77



ORIENT: CALVARIUM,  
BRAIN REMOVED;  
BRAINSTEM,  
EXPOSED IN  
CRANIAL CAVITY



NOTE:  
PLEASE  
TREAT  
THIS  
PROSECTION  
GENTLY;  
DO NOT  
PULL ON  
BRAINSTEM

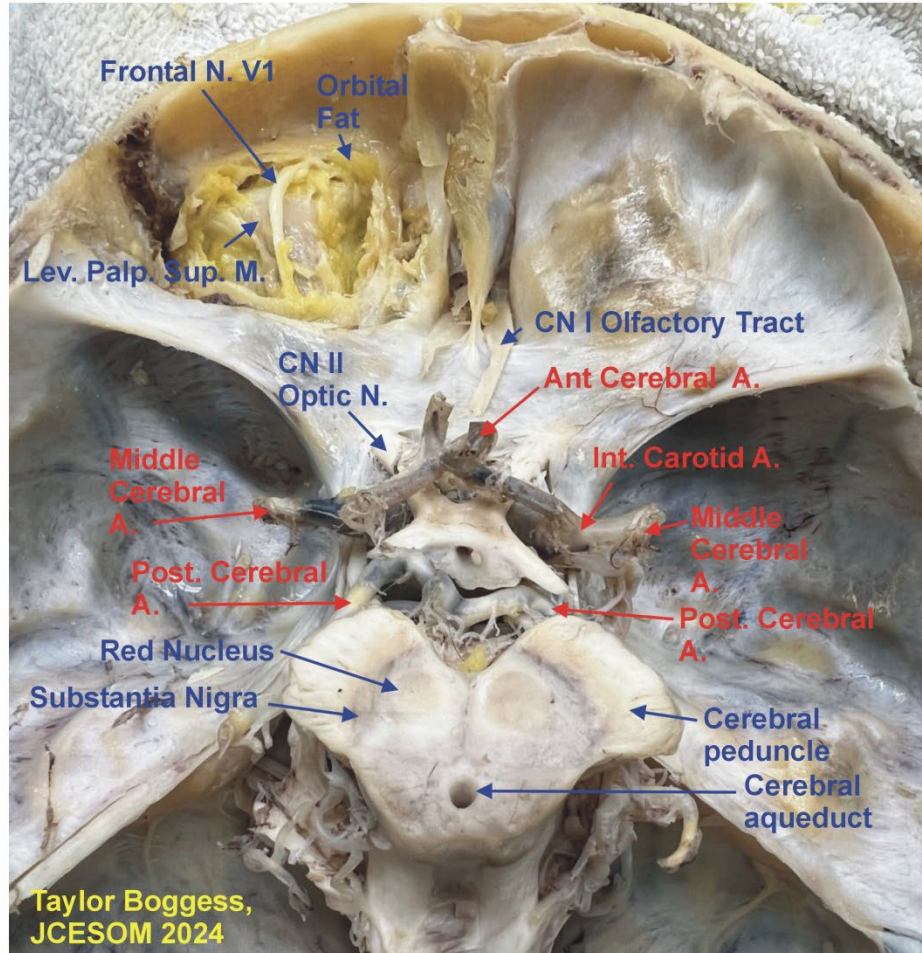


# 116

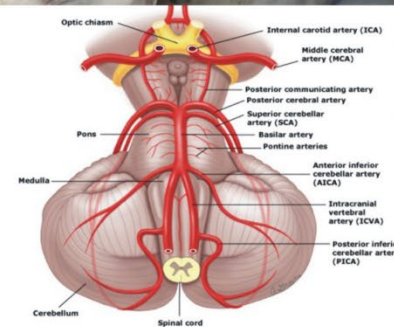
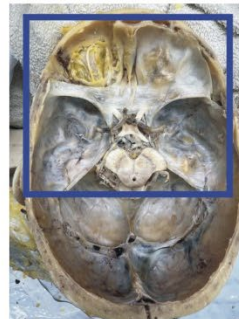
View similar to lab dissections on Friday 2/9/2024 (Cranial Cavity) and Monday 2/12/2024 (Orbit)

## BRAINSTEM/ORBIT IN CRANIAL CAVITY

116



ORIENT



LEVEL OF VIEW

## LECTURES/VIDEOS

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

Wednesday – Skull session (video and live session); go through bones and openings in Skull; board questions; ATTENDANCE IS HIGHLY RECOMMENDED. BRING SKULLS TO CLASS WEDNESDAY!

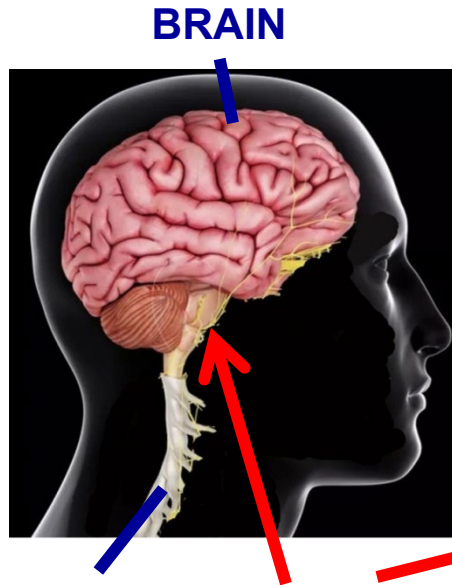
Final Reviews Monday Feb 19 and Tuesday Feb 20  
– Will go over relevant material from lab (dissection, prosections) and Discussion sessions.

# THINGS TO GET DOWN RIGHT AWAY

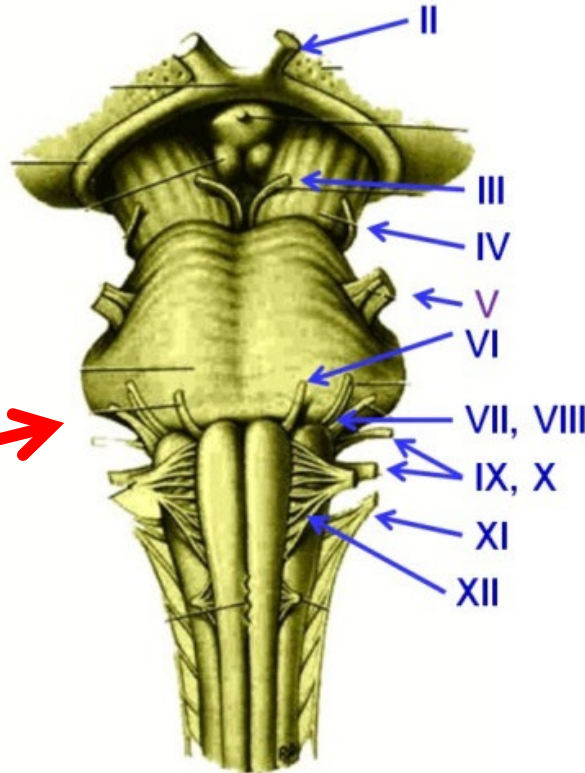
## FACE

- 1- **Bell's palsy** – Actions of some facial muscles important – Orbicularis Oculi (close eye – paralysis can damage cornea, Buccinator – board question difficulty eating (actually cheek keeping food between teeth))
- 2- **Arterial Supply and Venous Drainage of Face** – Branches of Carotid Artery (Pulses), infections, later Neck.
- 3- **Embryology – Cleft lip**; later Cleft palate; also formation nasolacrimal duct.

# LEARN NAMES AND NUMBERS OF CRANIAL NERVES



**CRANIAL NERVES  
LEAVE/ENTER  
BRAINSTEM  
(except CN I)**



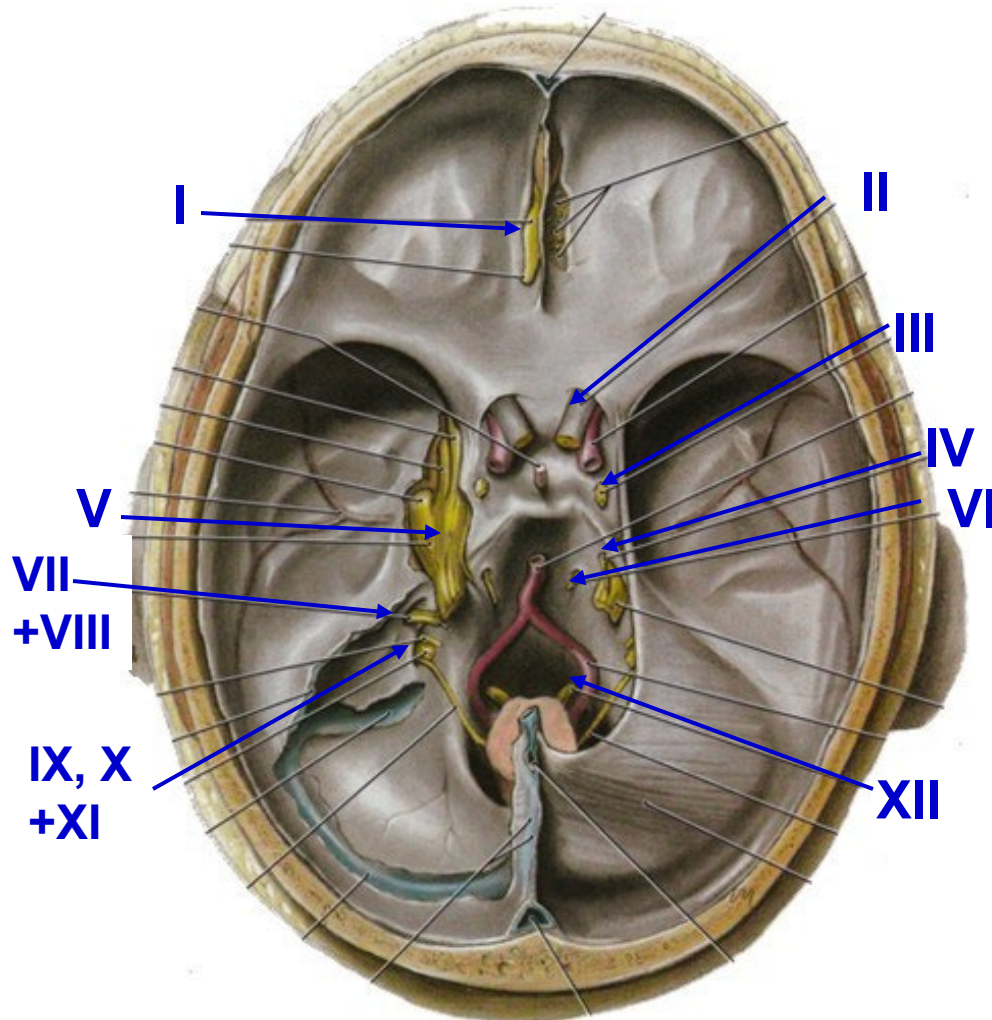
**BRAIN-  
STEM**

**CRANIAL NERVES NUMBERED 1-12  
(ANTERIOR TO POSTERIOR);  
COMMONLY REFERRED TO NUMBER  
(ROMAN NUMERALS = I (1) - XII (12))**

- 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



# LEARN NAMES AND NUMBERS OF CRANIAL NERVES



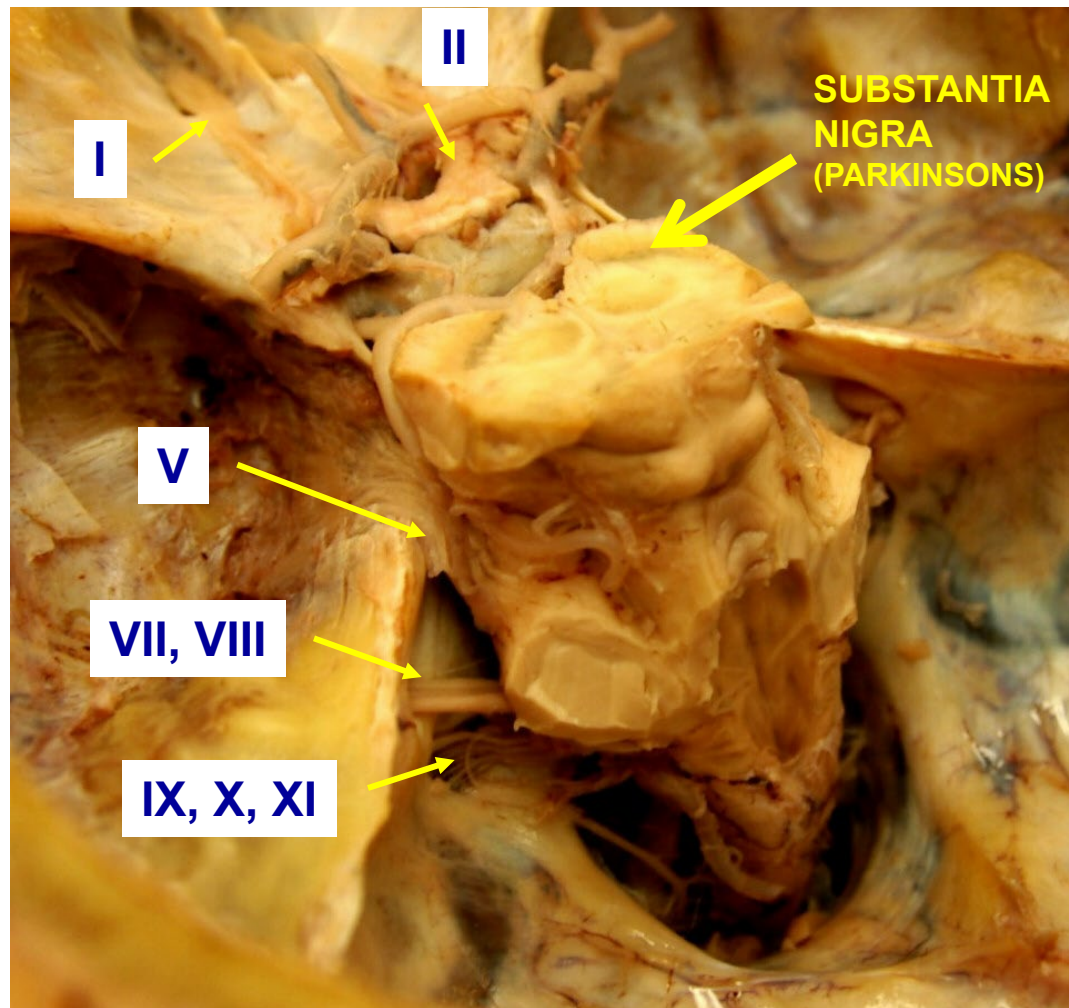
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# LEARN NAMES AND NUMBERS OF CRANIAL NERVES

VIEW AFTER DISSECTION FRIDAY



- I. OLFACTORY - sense of smell
- II. OPTIC - vision
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- V. TRIGEMINAL - touch, general sensation to skin, oral cavity, nasal cavity + more
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**SKULL SESSION -  
WEDNESDAY -  
FORAMINA  
ASSOCIATED  
WITH CRANIAL NERVES**

**SELLA TURCICA**

**CRIBRIFORM  
PLATE ETHMOID - I**

**OPTIC FORAMEN - II**

**SUP. ORBITAL  
FISSURE -  
III, IV, V1, VI**

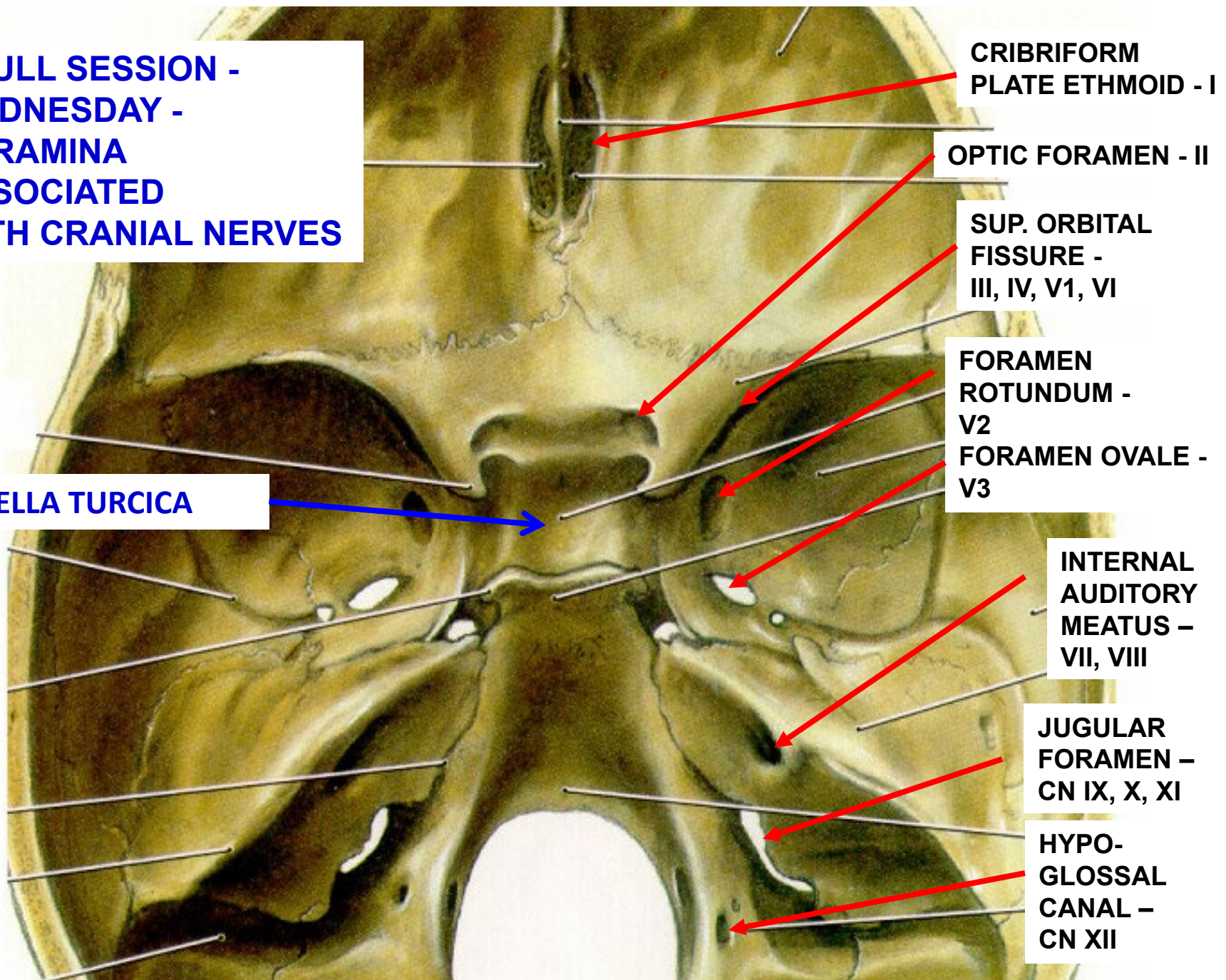
**FORAMEN  
ROTUNDUM -  
V2**

**FORAMEN OVALE -  
V3**

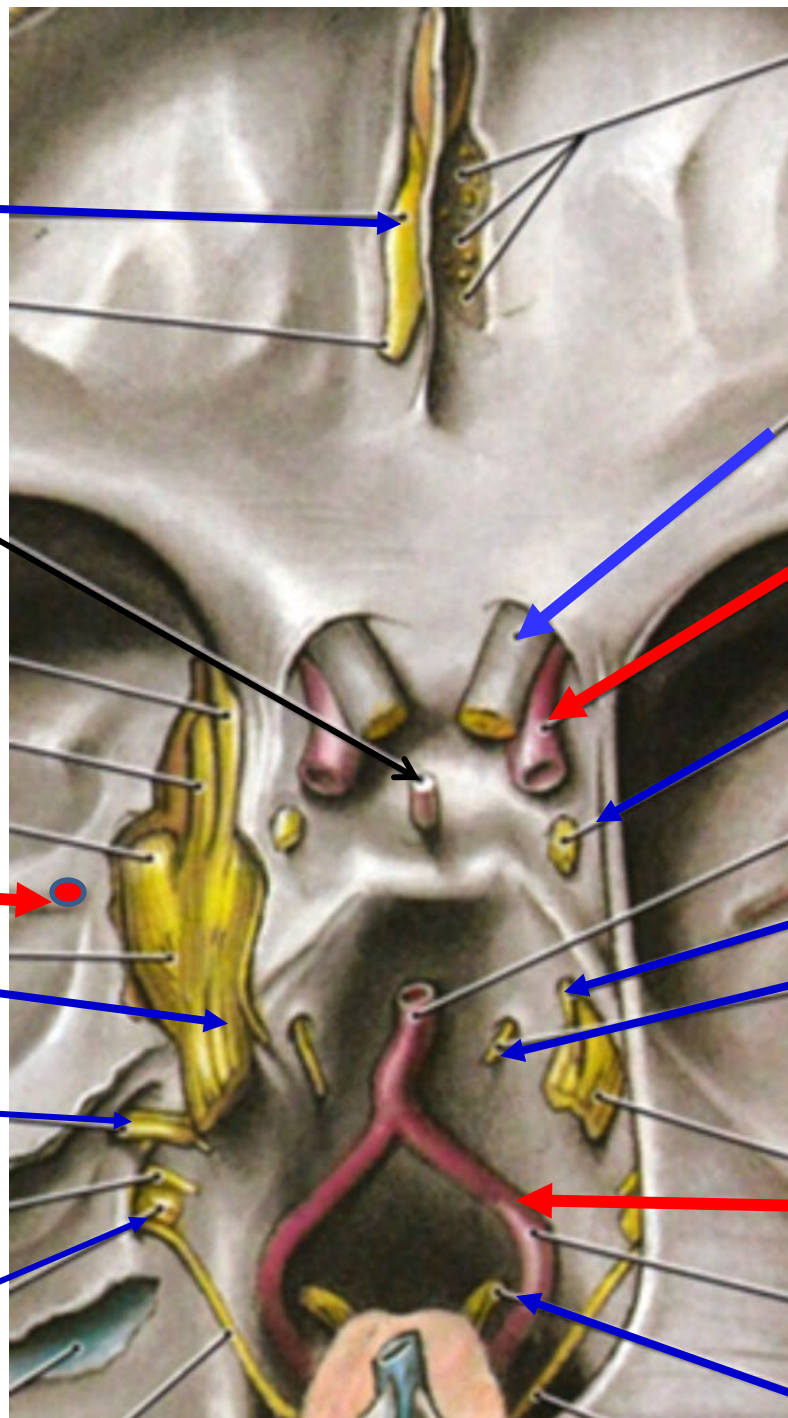
**INTERNAL  
AUDITORY  
MEATUS -  
VII, VIII**

**JUGULAR  
FORAMEN -  
CN IX, X, XI**

**HYPG-  
GLOSSAL  
CANAL -  
CN XII**







**BRAINSTEM  
PROSECTIONS  
IDENTIFY**

**I** →

**II**

**PITUITARY  
STALK**

**INTERNAL CAROTID A.**

**V1**

**V2**

**V3**

**III**

**MIDDLE  
MENINGEAL A.** →

**V**

**IV**

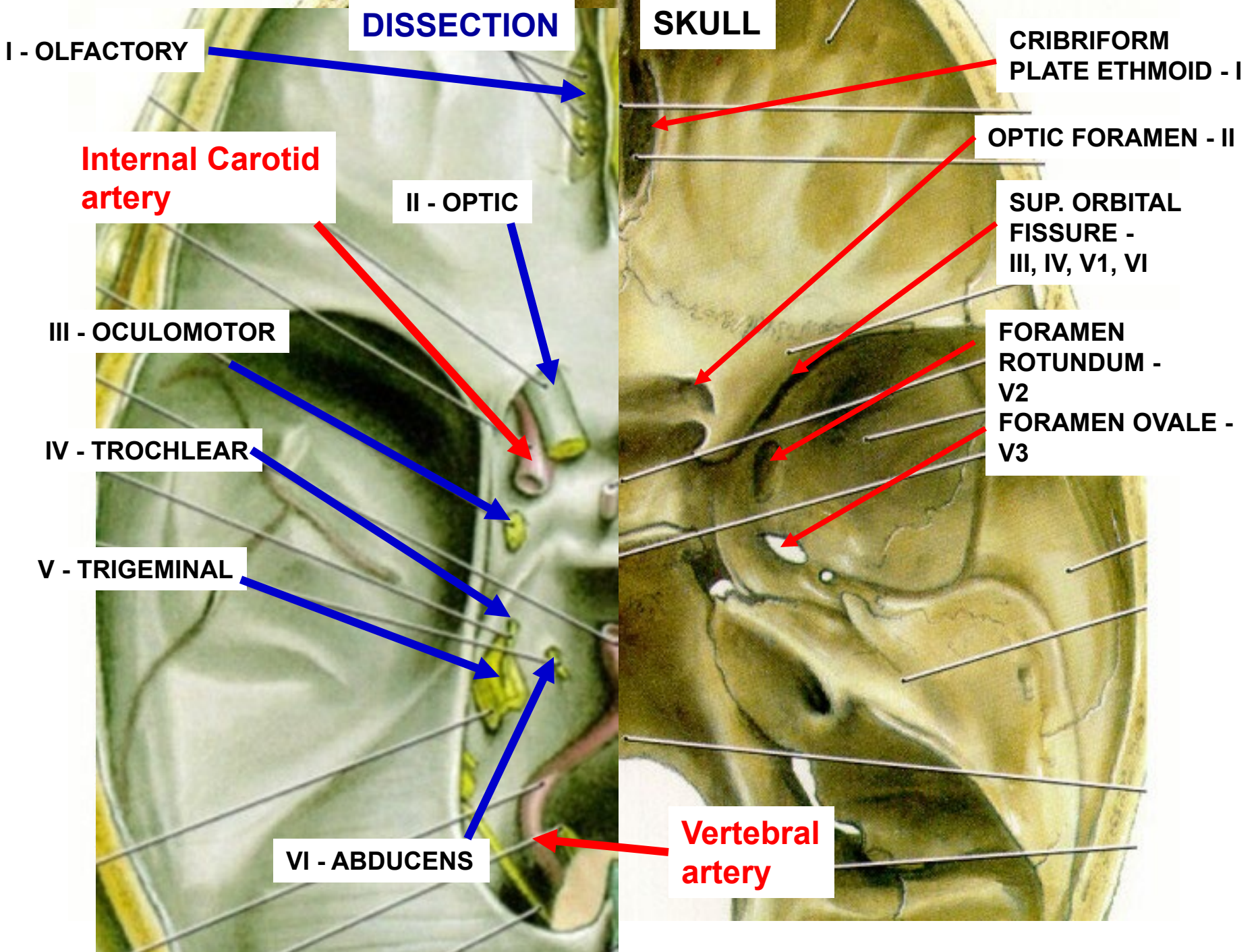
**VII  
+VIII**

**VI**

**IX, X  
+XI**

**VERTEBRAL A.**

**XII**



I - OLFACTORY

**DISSECTION**

**SKULL**

CRIBRIFORM  
PLATE ETHMOID - I

**Internal Carotid  
artery**

II - OPTIC

OPTIC FORAMEN - II

III - OCULOMOTOR

SUP. ORBITAL  
FISSURE -  
III, IV, V1, VI

IV - TROCHLEAR

FORAMEN  
ROTUNDUM -  
V2

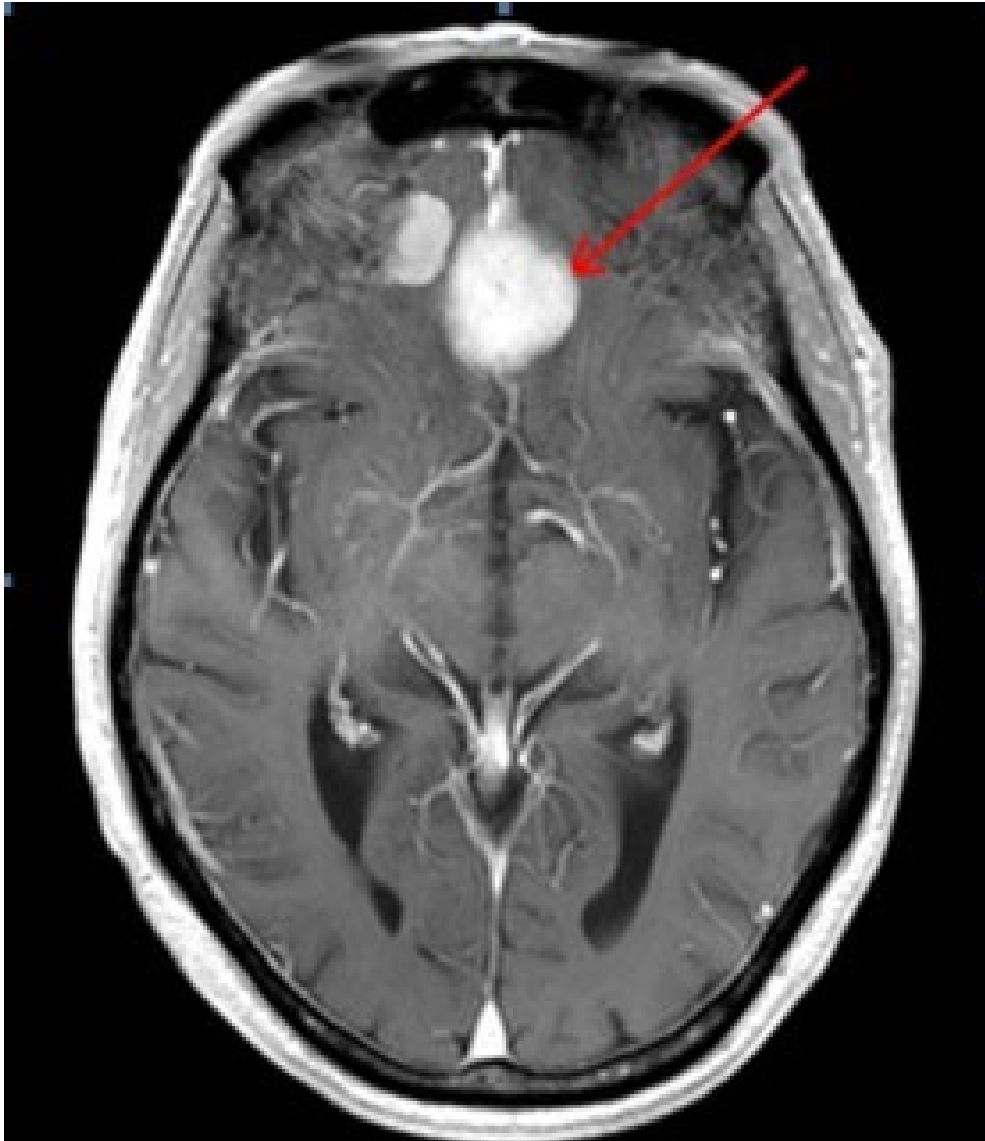
V - TRIGEMINAL

FORAMEN OVALE -  
V3

VI - ABDUCENS

**Vertebral  
artery**

## WHY STUDY THIS? DIAGNOSE LESIONS IN CRANIAL CAVITY

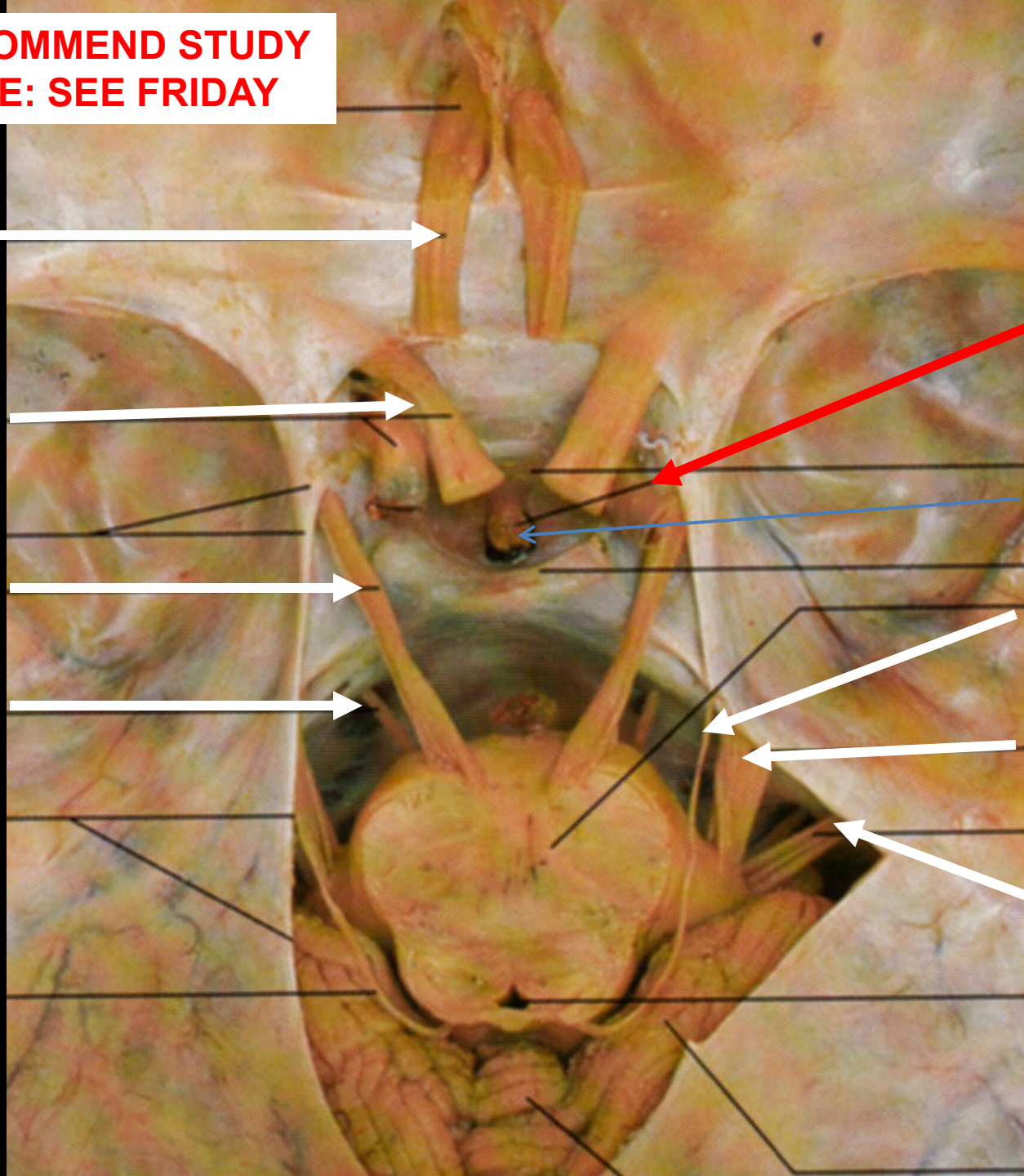


**MENINGIOMA IN  
ANTERIOR  
CRANIAL FOSSA.**

**WHICH CRANIAL  
NERVE  
AFFECTED?  
WHAT IS A  
SYMPTOM?**



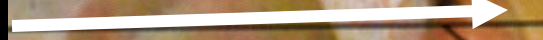
**HIGHLY RECOMMEND STUDY  
THIS PICTURE: SEE FRIDAY**



**I Olfactory**



**II Optic**



**III Oculo-  
motor**



**VI  
Abducens**



**INTERNAL  
CAROTID  
A.**

**Pituitary  
stalk**

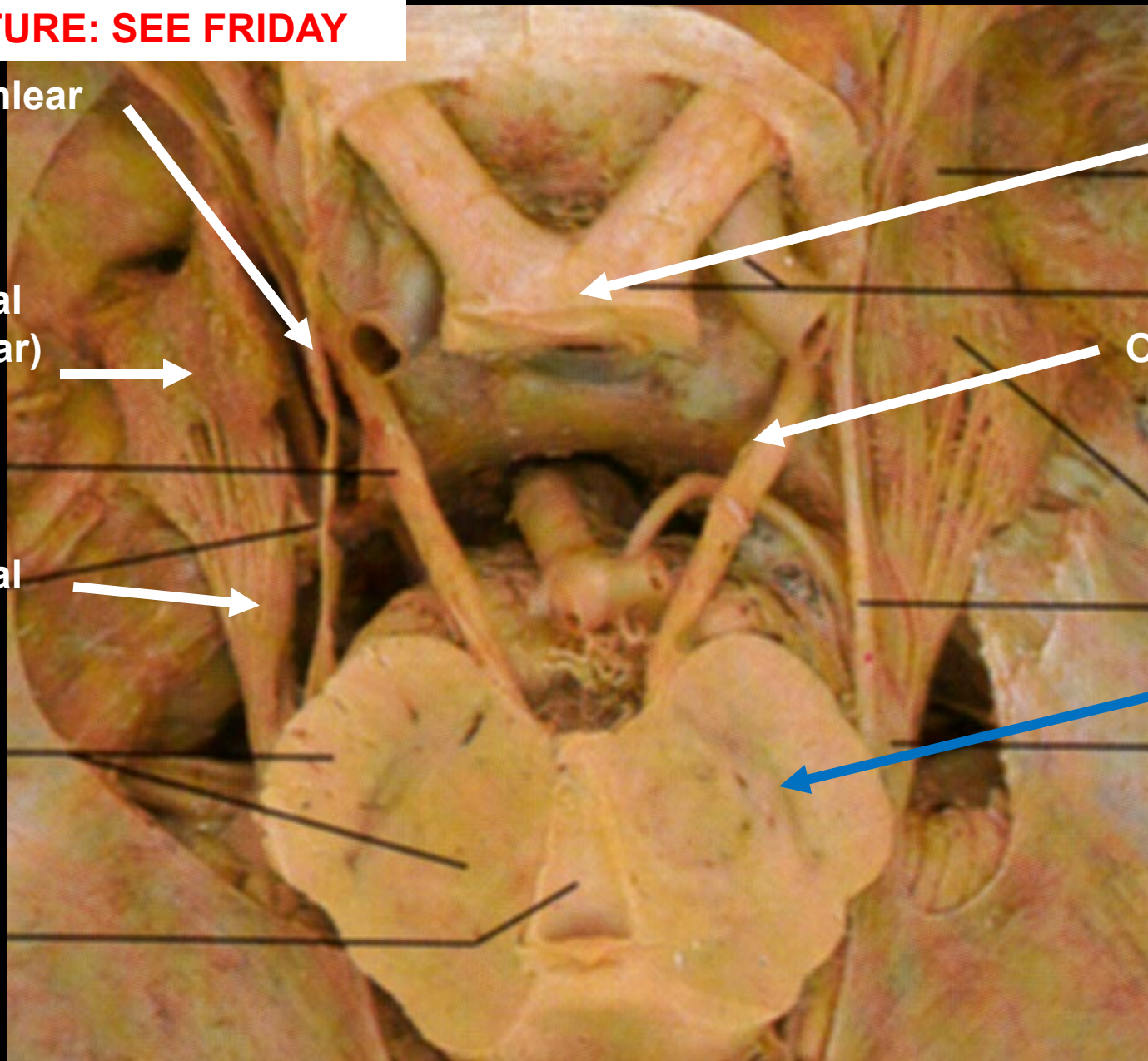
**IV  
Trochlear**

**V  
Trigeminal**

**VII + VIII**



**HIGHLY RECOMMEND STUDY  
THIS PICTURE: SEE FRIDAY**



**Trochlear**

**Trigeminal  
(Semilunar)  
Ganglion**

**V  
Trigeminal**

**II Optic  
Chiasm**

**III  
Oculomotor**

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