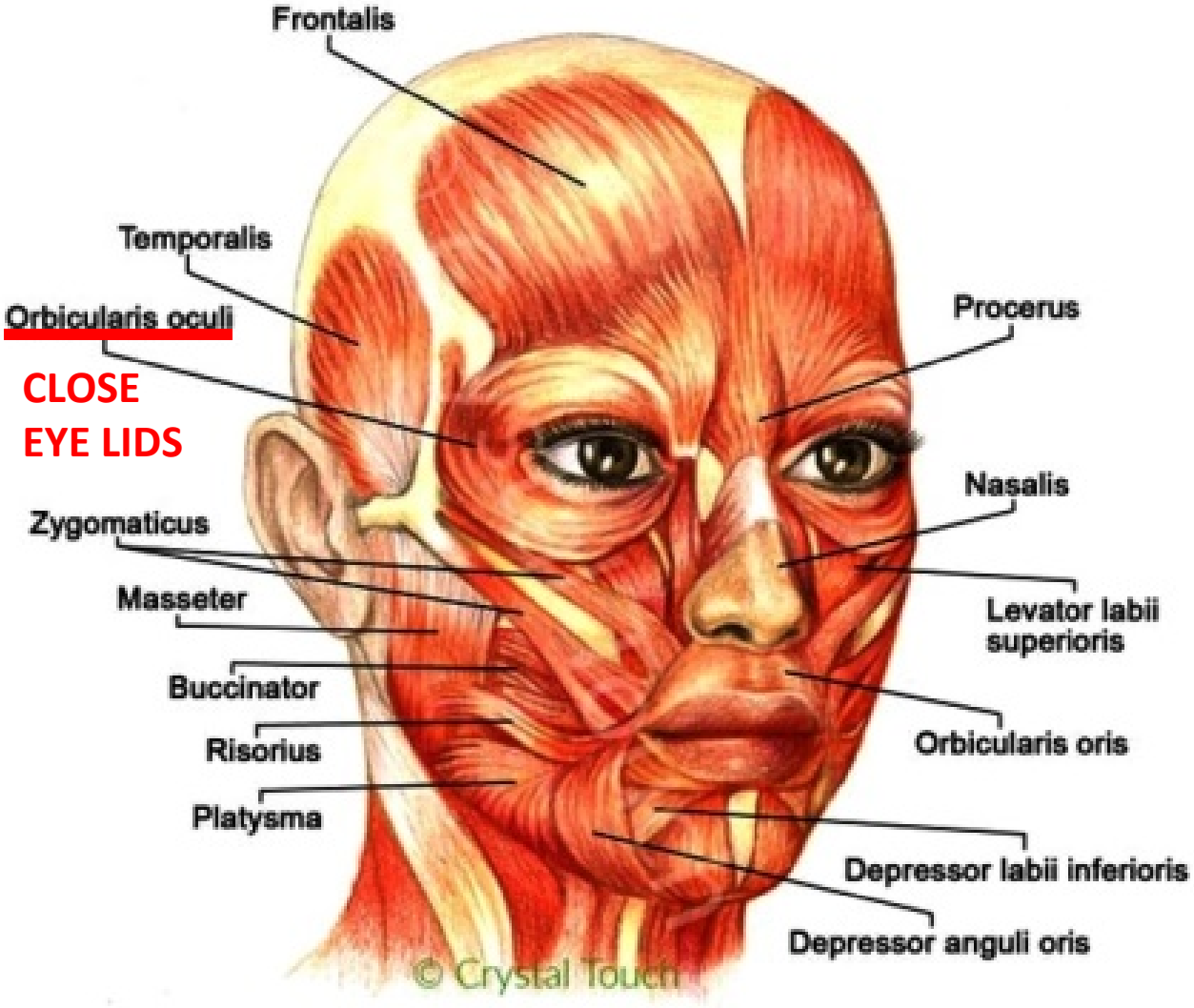
FINAL REVIEW HEAD AND NECK

2025

MUSCLES OF FACIAL EXPRESSION

FACE



Skeletal muscles - under voluntary control (CN VII Facial) and 'emotional' control (ex. amygdala inputs)

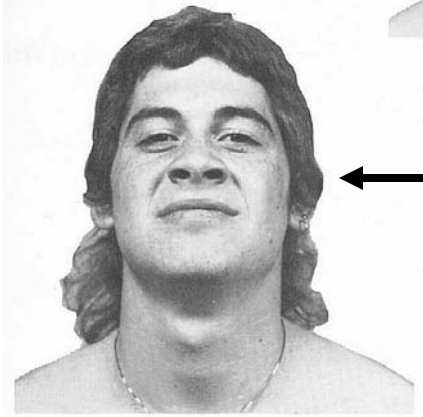
Insert to skin - repair limited to facial transplants (skin and muscles)

No muscle (or very few) spindles. Monitoring thought to occur by stretch of skin.

PRACTICE USING FACIAL MUSCLES SELECTIVELY IN FRONT OF MIRROR

Sneering – Procerus

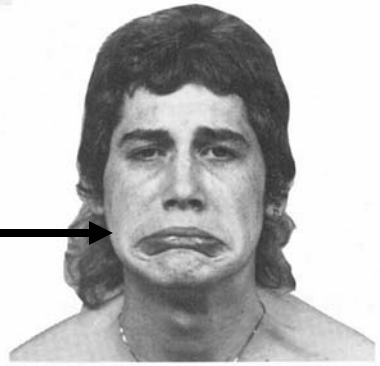
Procerus



Nasalis

Contempt – Dilator Naris

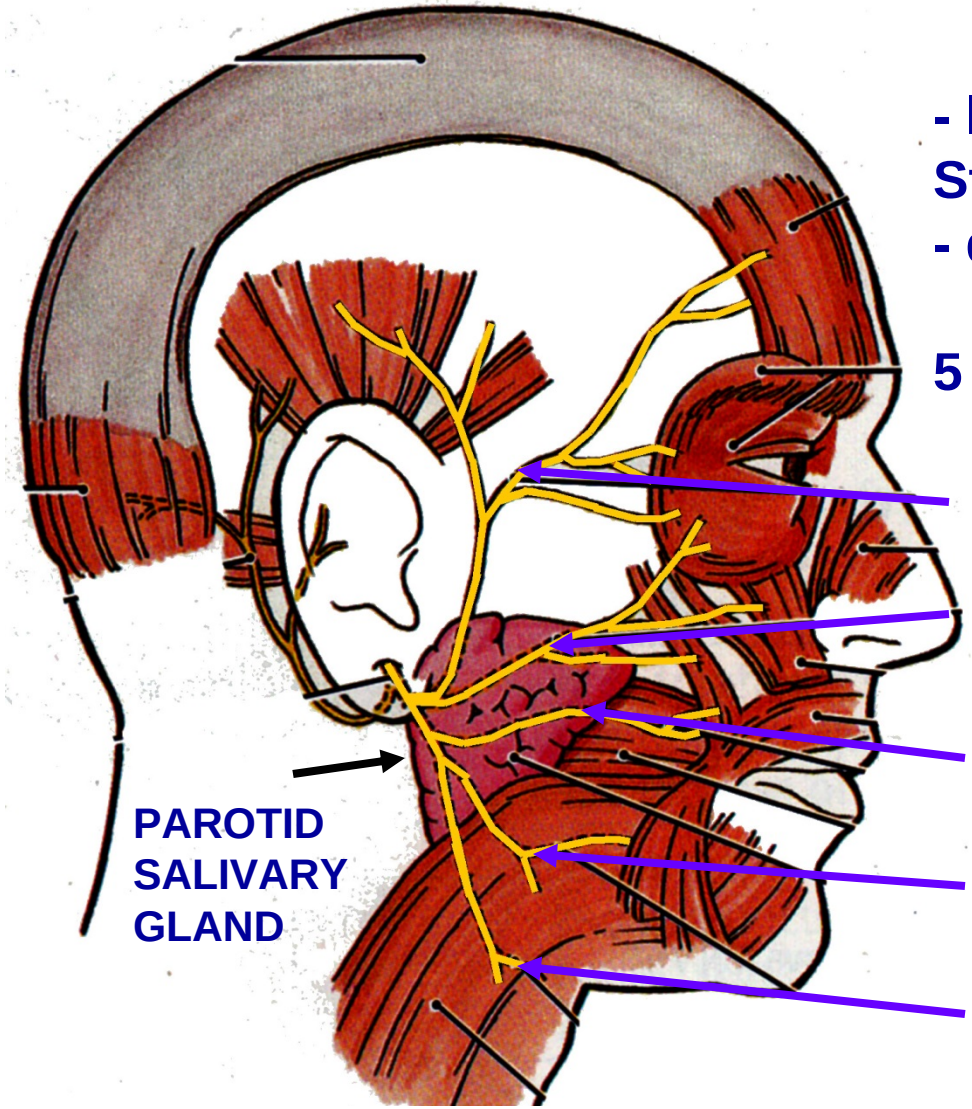
Grading Policy - Depressor Anguli Oris



Depressor Anguli Oris

7-15B MUSCLES OF EXPRESSION IN ACTION

MOTOR INNERVATION TO MUSCLES OF FACIAL EXPRESSION - FACIAL NERVE (CRANIAL NERVE VII)



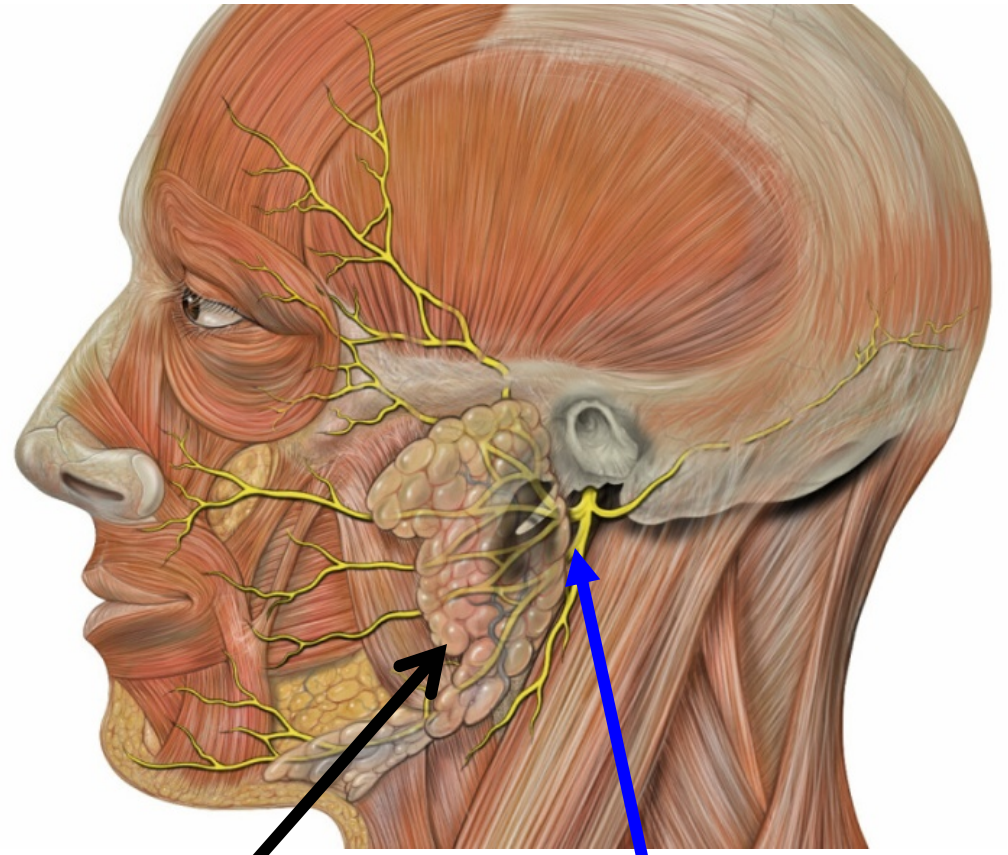
- leaves skull via Stylomastoid foramen
- divides in parotid gland into

5 terminal branches

1. TEMPORAL
2. ZYGOMATIC
3. BUCCAL
4. MANDIBULAR
5. CERVICAL

Note: Buccal Br. VII = Motor; Buccal Br. V =Sensory

FACIAL NERVE DAMAGE



Parotid Salivary gland

FACIAL NERVE (Cranial Nerve VII)

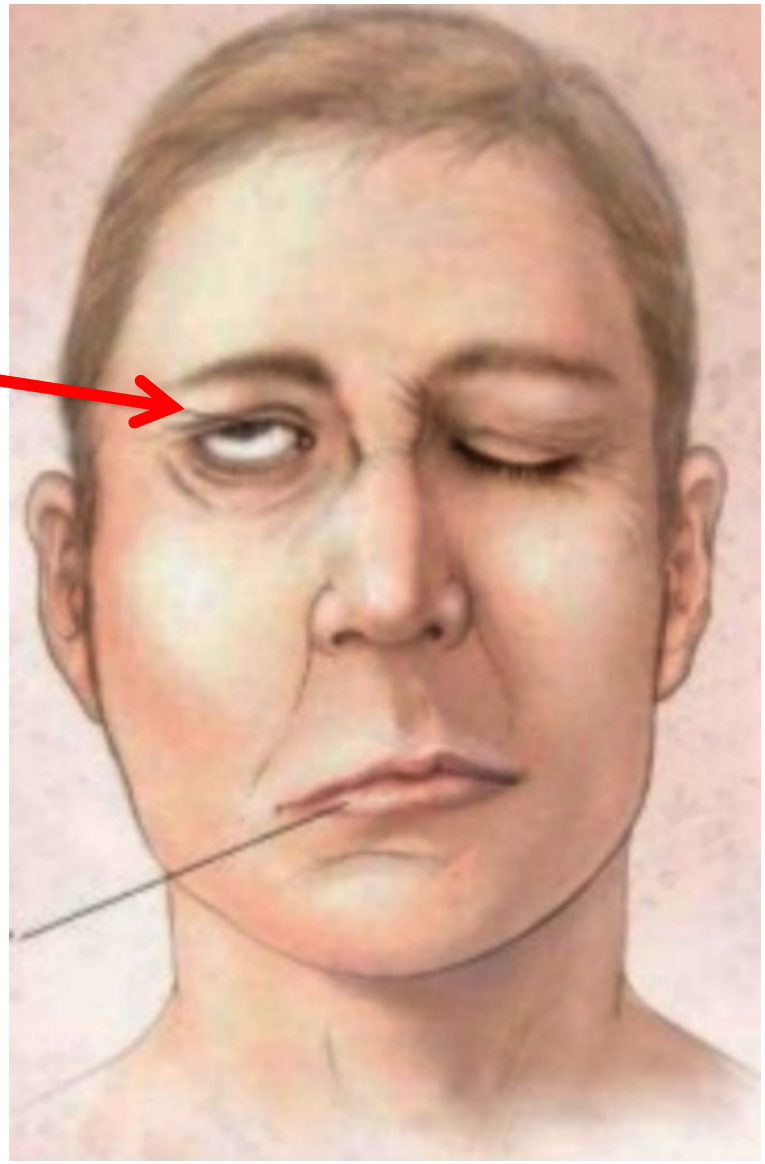
- Facial nerve exits skull via Stylomastoid foramen (base of skull)
- Facial nerve passes through and branches in Parotid salivary gland
- can be damaged by Parotid tumors.
- more common, may be associated with viral infections:

Bell's palsy - loss of function of Facial nerve

others - ex. Ramsay-Hunt syndrome

BELL'S PALSY - SYMPTOMS REFLECT ANATOMY OF FACIAL NERVE

UNABLE TO CLOSE EYE DUE TO PARALYSIS OF ORBICULARIS OCULI MUSCLE



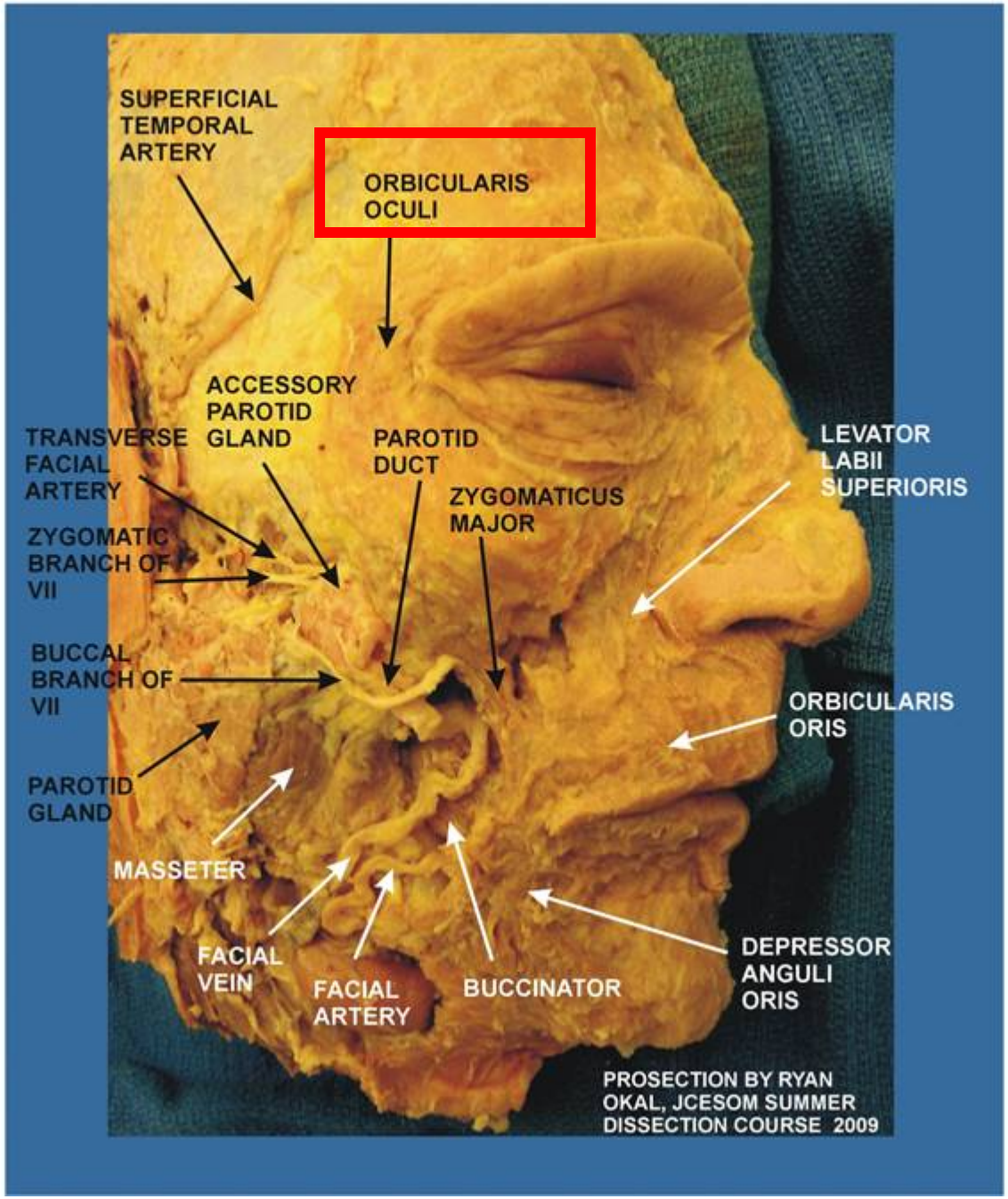
NOTE: CONTROL OF EYELIDS
1) CLOSE EYELIDS
= CRANIAL NERVE VII (FACIAL N.)
2) OPEN EYELIDS
- CRANIAL NERVE III (OCULOMOTOR) + SYMPATHETICS DAMAGE - PTOSIS

******

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

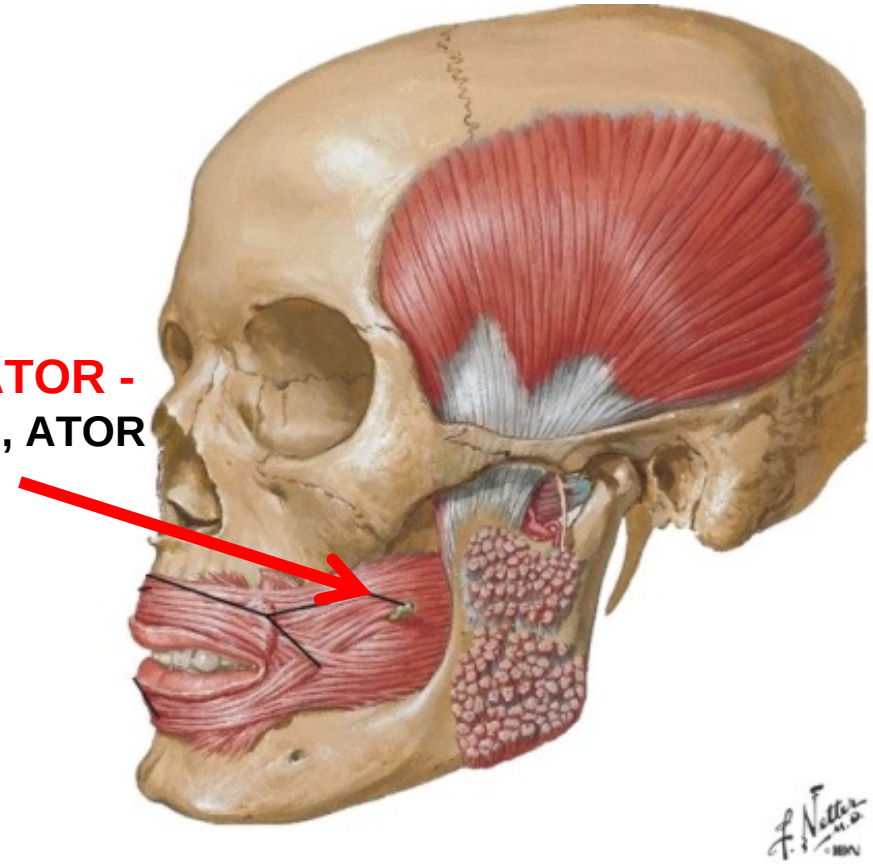
FACIAL MUSCLES

312



PARALYSIS OF BUCCINATOR MUSCLE

BUCCINATOR -
BUCK, SIN, ATOR



CLINICAL **

FACIAL PARALYSIS can paralyze BUCCINATOR

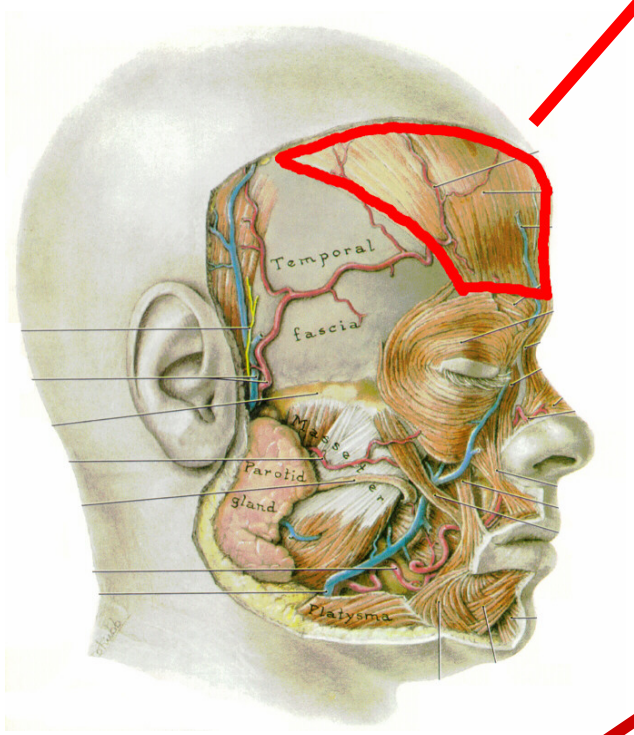
- patient is unable to hold food between teeth

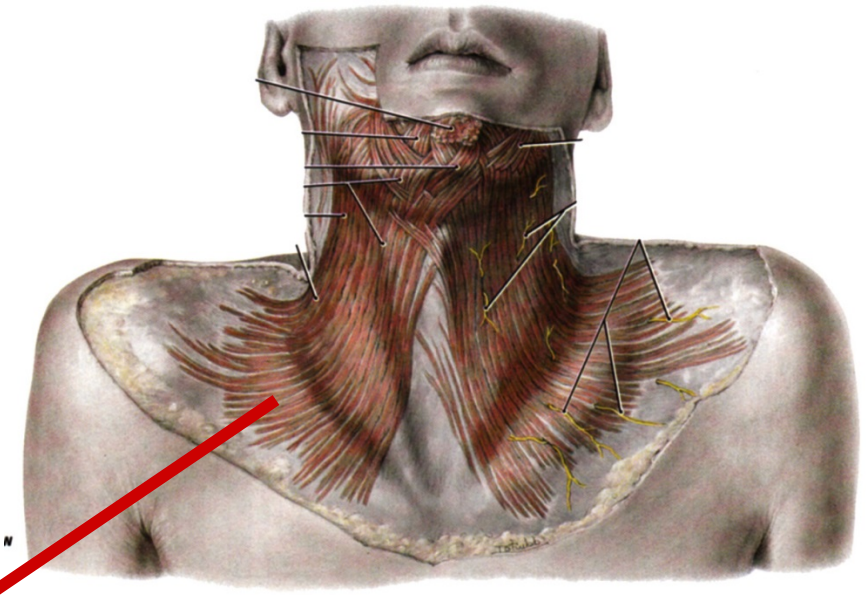
- DIFFICULTY IN CHEWING FOOD

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

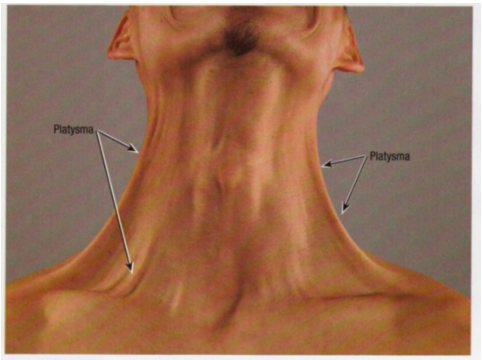
FRONTALIS - muscle in scalp attached to Epicranial Aponeurosis; raises eyebrows (used in clinical test of Facial nerve)

*



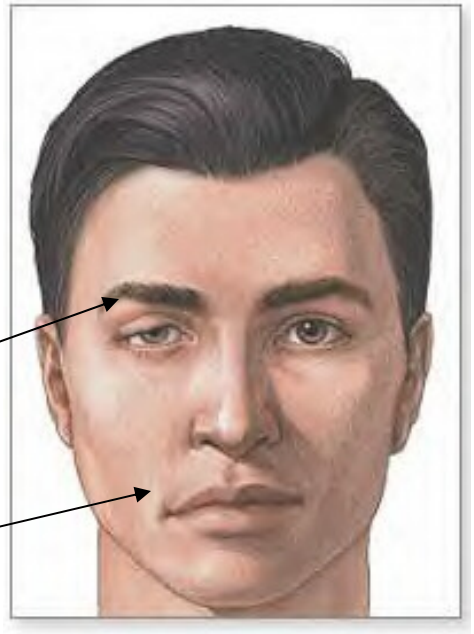


PLATYSMA - extends from mandible to fascia over Pectoralis Major; tenses, moves skin of neck



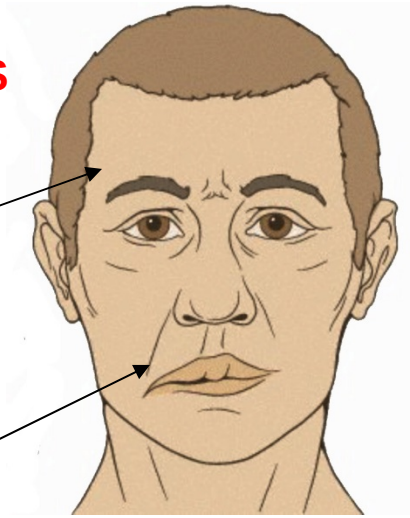
OVERVIEW OF FACIAL MUSCLES: FACIAL PARALYSIS

FACIAL PARALYSIS - BELL'S PALSY - CN VII



BELL'S PALSY- Lower Motor Neuron (Alpha motor neuron) disorder of Facial Nerve (CN VII): associated with viral infection (herpes simplex); Symptoms unilateral: sudden onset paralysis of all facial muscles on one side; SYMPTOMS: drooling; inability to close eye; loss of taste to anterior tongue; pain in or behind ear; hyperacousia

UPPER MOTOR NEURON LESIONS



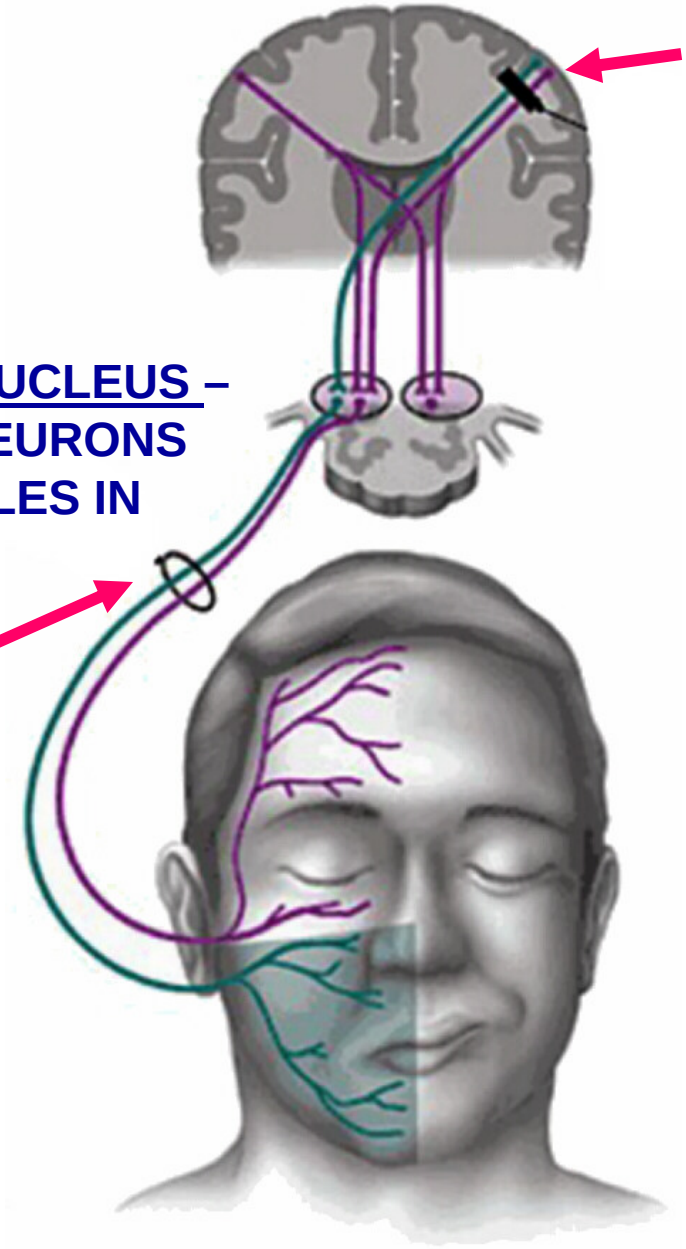
UPPER MOTOR NEURONS DISORDERS OF VII - 'sparing' of upper face - After cortical strokes, often only muscle of lower face are paralyzed on one side, muscles of upper face are not paralyzed (ex. brow, orbicularis oculi); cortical projections are bilateral to upper face.

CONTROL OF MUSCLES OF FACIAL EXPRESSION

FACIAL MOTOR NUCLEUS – ALPHA MOTOR NEURONS TO FACIAL MUSCLES IN BRAINSTEM

LOWER MOTOR NEURON LESION - ex. BELL'S PALSY -

AFFECTS ALL MUSCLES OF FACIAL EXPRESSION



UPPER MOTOR NEURON LESION - ex. CORTICAL STROKE (vascular occlusion)

AFFECTS ONLY MUSCLES OF LOWER FACE (**'SPARING OF UPPER FACE'**)

UPPER FACE CONTROL IS BILATERAL (both sides of Cortex)

LOWER FACE CONTROL IS UNILATERAL (ONLY CONTRALATERAL CORTEX)

Cranial Nerves - different types of neurons

ARISE FROM, PROJECT TO

CRANIAL NERVES

BRAIN (BRAIN-STEM)

SPINAL NERVES

SPINAL CORD

REFERENCE CHART - WAY TO REMEMBER TYPE OF NEURONS - USEFUL

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.							+

NOTE: THREE LETTER SYSTEM - NO LONGER ON BOARD EXAMS BUT MAY BE REFERRED TO IN NEUROANATOMY - NO QUESTIONS IN GROSS ANATOMY

TYPES OF NEURONS

1. Somatic motor
2. Somatic sensory
3. Visceral motor
4. Visceral sensory
5. Special senses
6. Chemical senses
7. Branchiomotor

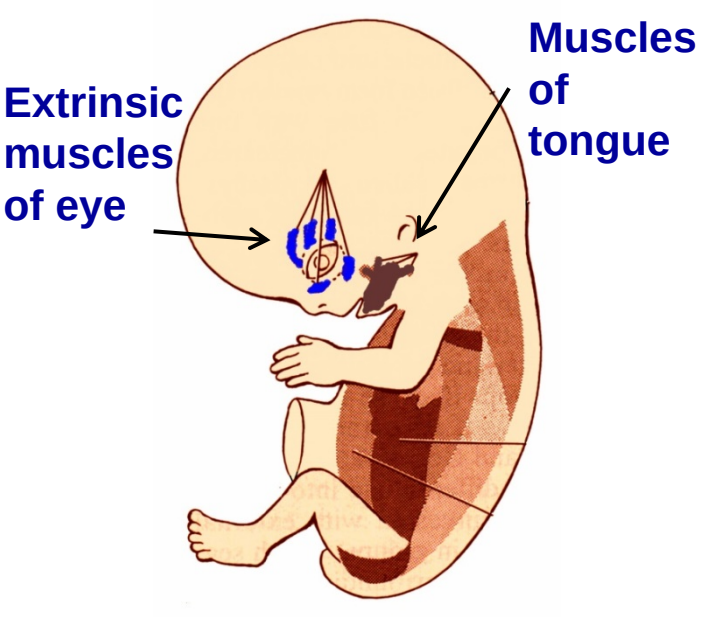
Important (Clinically) to Differentiate:

SOMATIC - def. generally refers to BODY; here refers to SOMITES that develop EMBRYOLOGICALLY

VISCERAL - def. refers to INTERNAL ORGANS (ex. GI tract, Circulatory system, Glands, etc.)

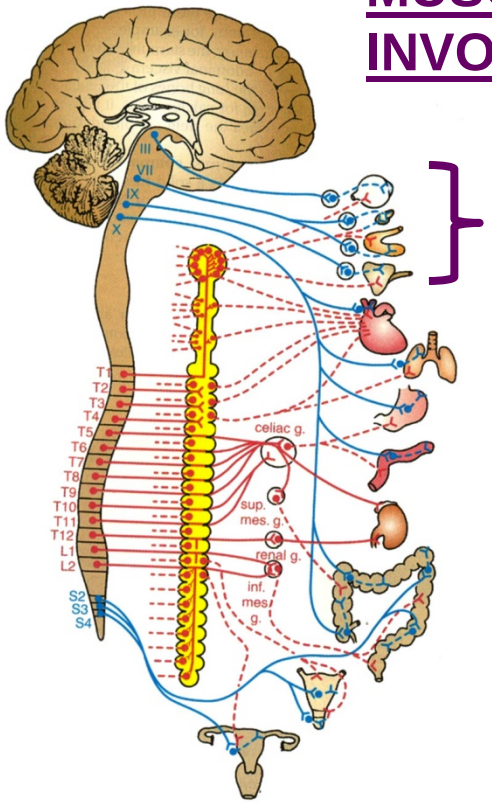
Cranial Nerves - Somatic Motor vs Visceral Motor

SOMATIC - SKELETAL MUSCLE - VOLUNTARY



Somatic Motor - Motor neurons to skeletal muscles that are embryologically derived from Somites (other skeletal muscles derived from Branchial arches)

VISCERAL - SMOOTH MUSCLE - INVOLUNTARY



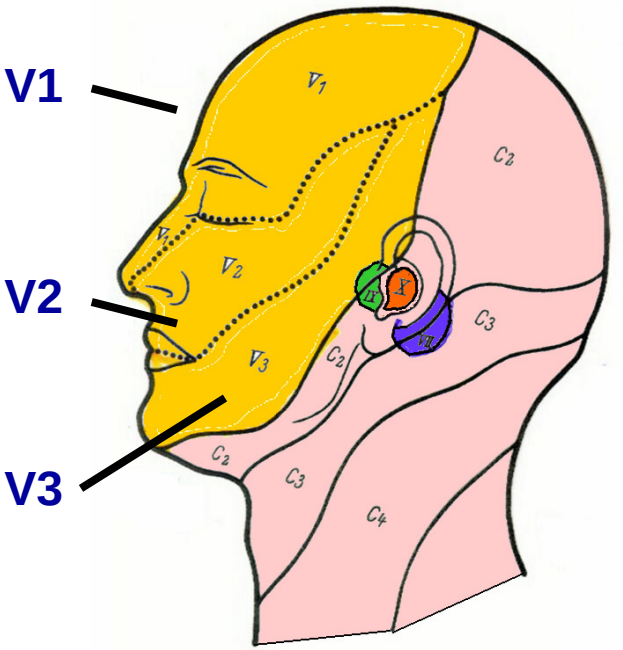
IN HEAD: PARASYMPATHETICS COURSE IN CRANIAL NERVES

Visceral Motor - AUTONOMICS - Motor neurons to smooth muscles, glands, etc. ; also cardiac muscle

Cranial Nerves - Somatic Sensory (Precise Sensation) vs Visceral Sensory (Imprecise Sensation)

Somatic - in head - sensory to skin, ORAL cavity, NASAL cavity, joints, muscle

MOSTLY TRIGEMINAL NERVE TO SKIN - PRECISE SENSATION - TWO POINT DISCRIMINATION



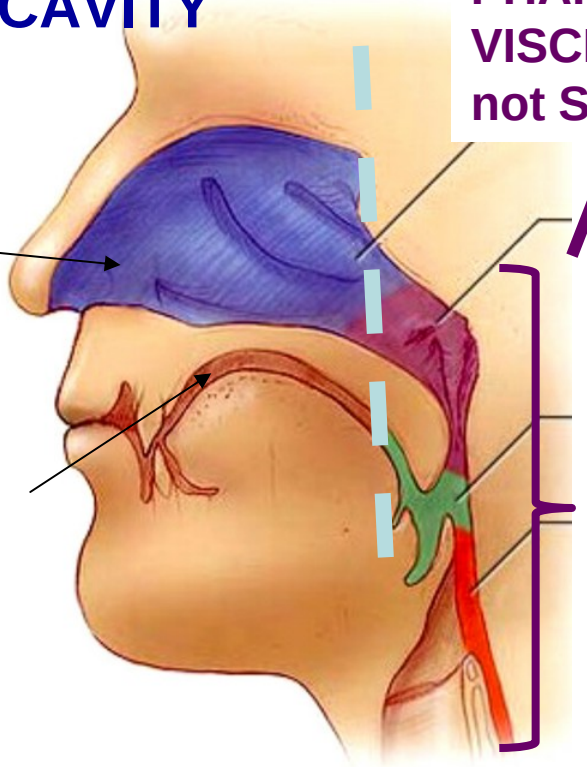
OUTER EAR - V, VII, IX, X

TRIGEMINAL NERVE ALSO - ORAL CAVITY, NASAL CAVITY

PHARYNX VISCERAL not Somatic

Nasal Cavity - Somatic Sensory

Oral Cavity Somatic Sensory

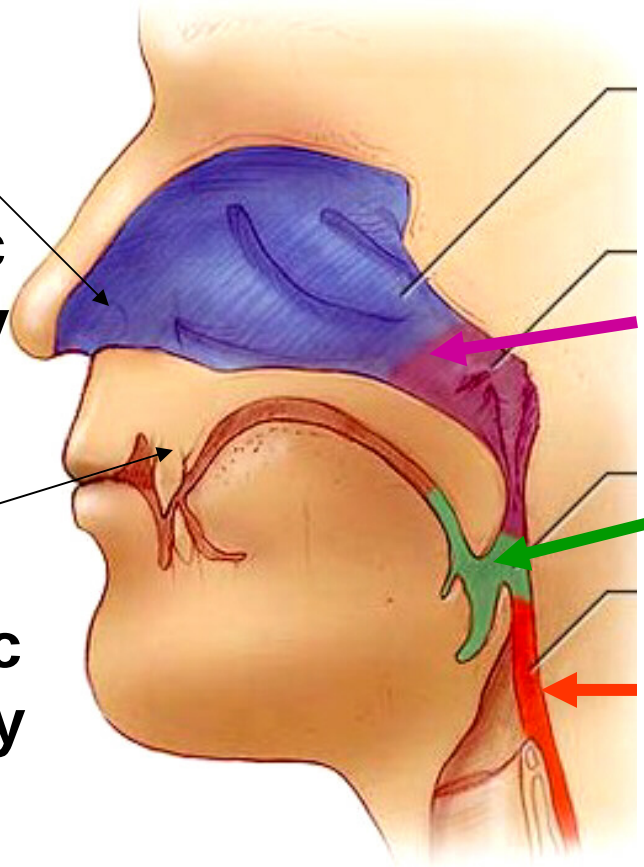


VISCERAL SENSORY

Sensory to Pharynx and derivatives

Nasal Cavity - Somatic Sensory

Oral Cavity Somatic Sensory



All Pharynx is Visceral Sensory In 3 Cranial Nerves

NASOPHARYNX - VII

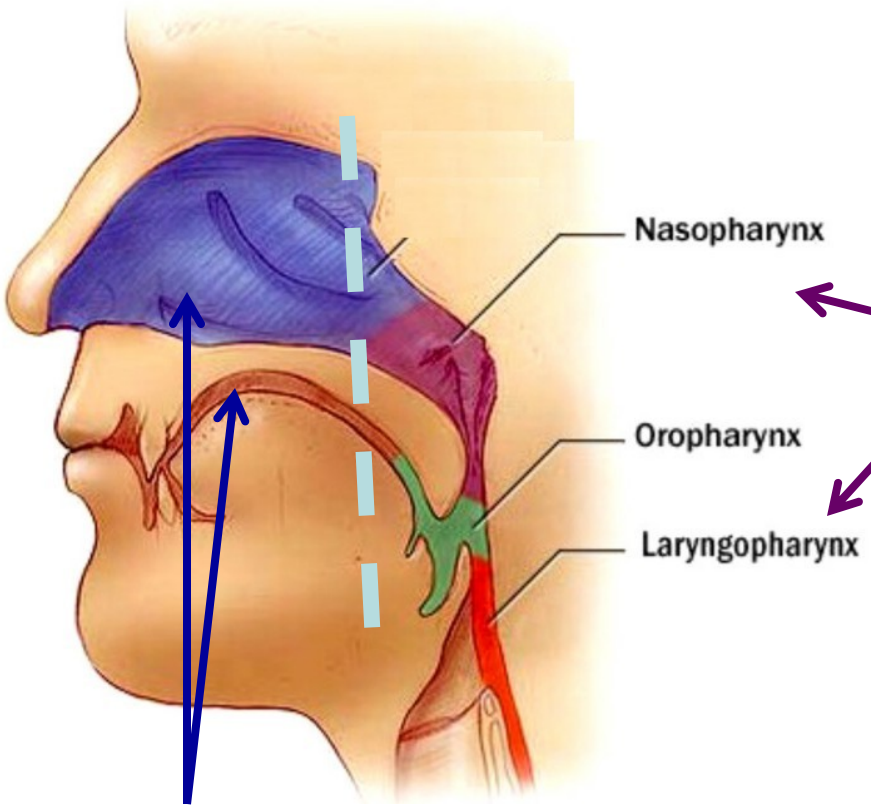
OROPHARYNX - IX

LARYNGOPHARYNX - X

PHARYNX IS UPPER PART OF GI TRACT = VISCERAL

Note: Authors disagree on innervation of nasopharynx

VISCERAL SENSORY - IMPRECISE - sensory to internal organs, GI and Cardiovascular



IN HEAD - VISCERAL SENSORY ALSO PHARYNX

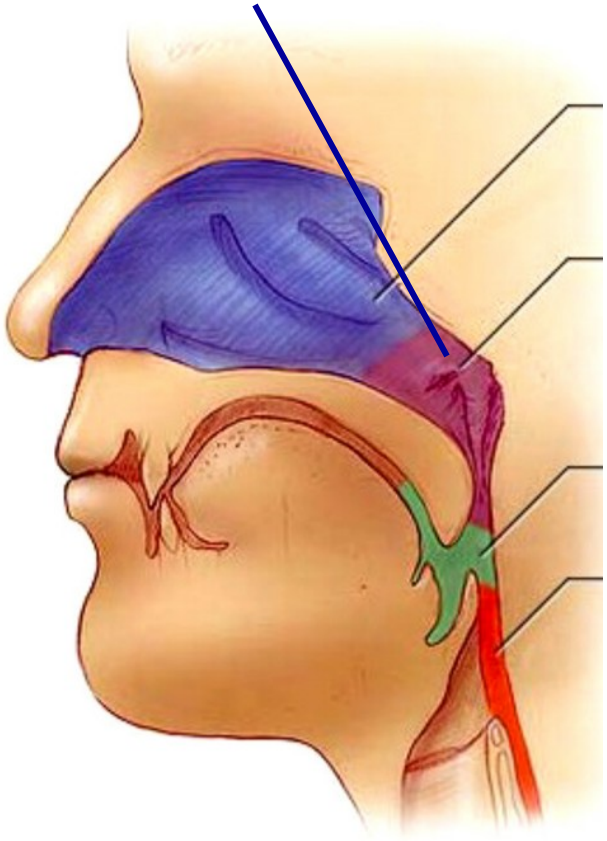
PHARYNX (OR POSTERIOR TONGUE IN OROPHARYNX) - TOUCH, PAIN NOT LOCALIZED, ELICITS 'GAG' REFLEX

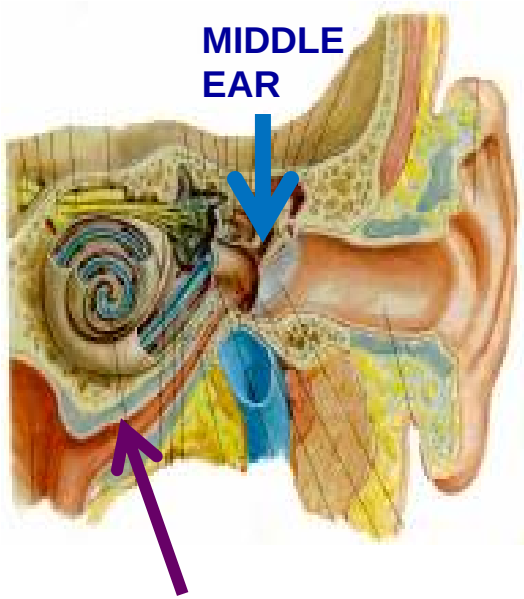
ORAL, NASAL CAVITIES (ANTERIOR TONGUE) - TOUCH, PAIN PRECISELY LOCALIZED

All Pharynx is Visceral Sensory In 3 Cranial Nerves - VII, IX, X

VISCERAL SENSORY - IMPRECISE - Also AUDITORY TUBE

OPENING OF AUDITORY TUBE IN NASOPHARYNX

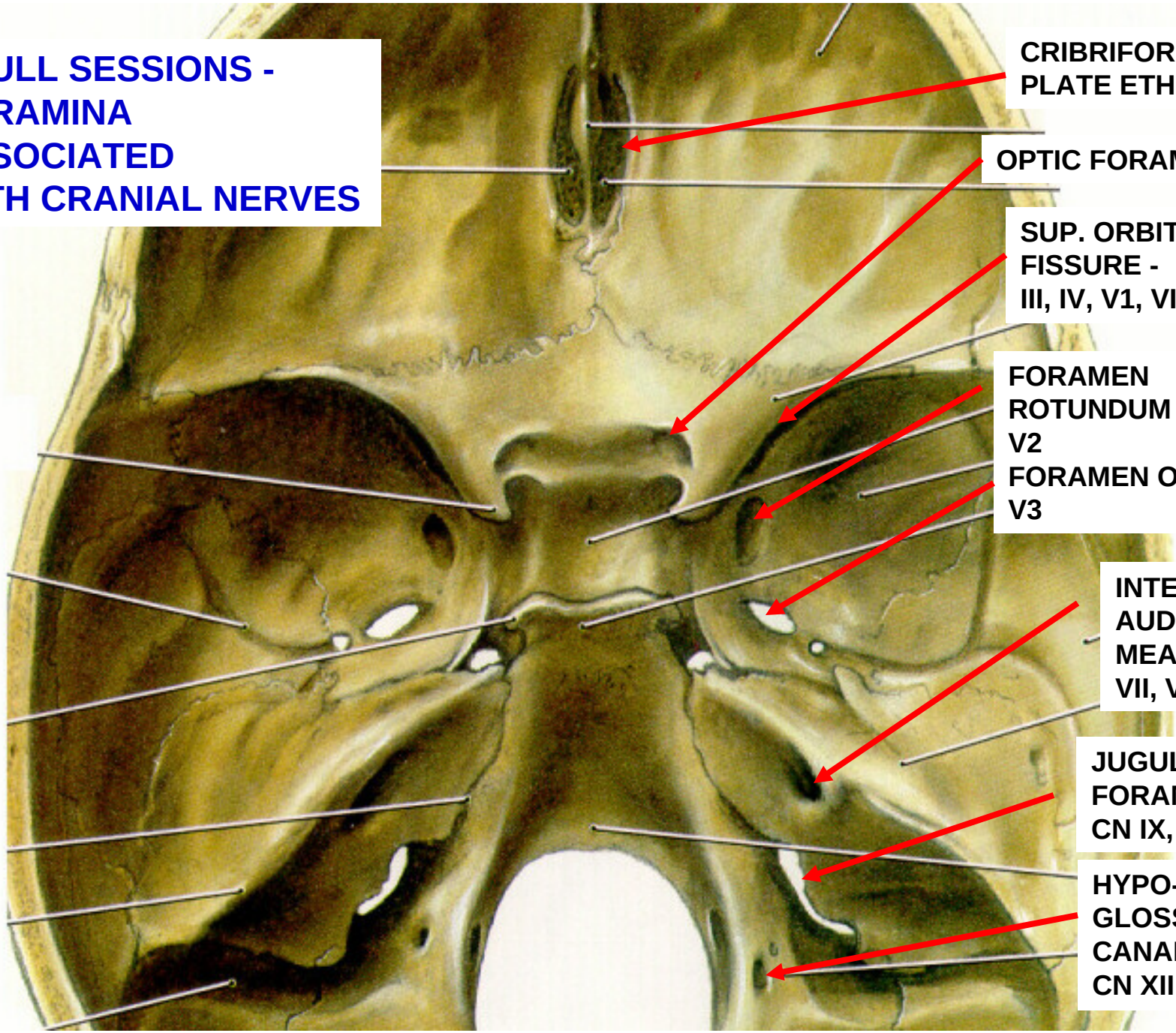




AUDITORY TUBE IS AN EXTENSION OF NASOPHARYNX, LEADS TO MIDDLE EAR - INSIDE TYMPANIC MEMBRANE (EAR DRUM)

AUDITORY (EUSTACHIAN)TUBE - extension of Pharynx (Nasopharynx) lead to middle ear; Innervation Visceral Sensory (CN IX); Children with middle ear infections (Otitis media) can't localize pain - 'Whole side of my head hurts)

SKULL SESSIONS - FORAMINA ASSOCIATED WITH CRANIAL NERVES



CRIBRIFORM PLATE ETHMOID - I

OPTIC FORAMEN - II

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

FORAMEN ROTUNDUM - V2

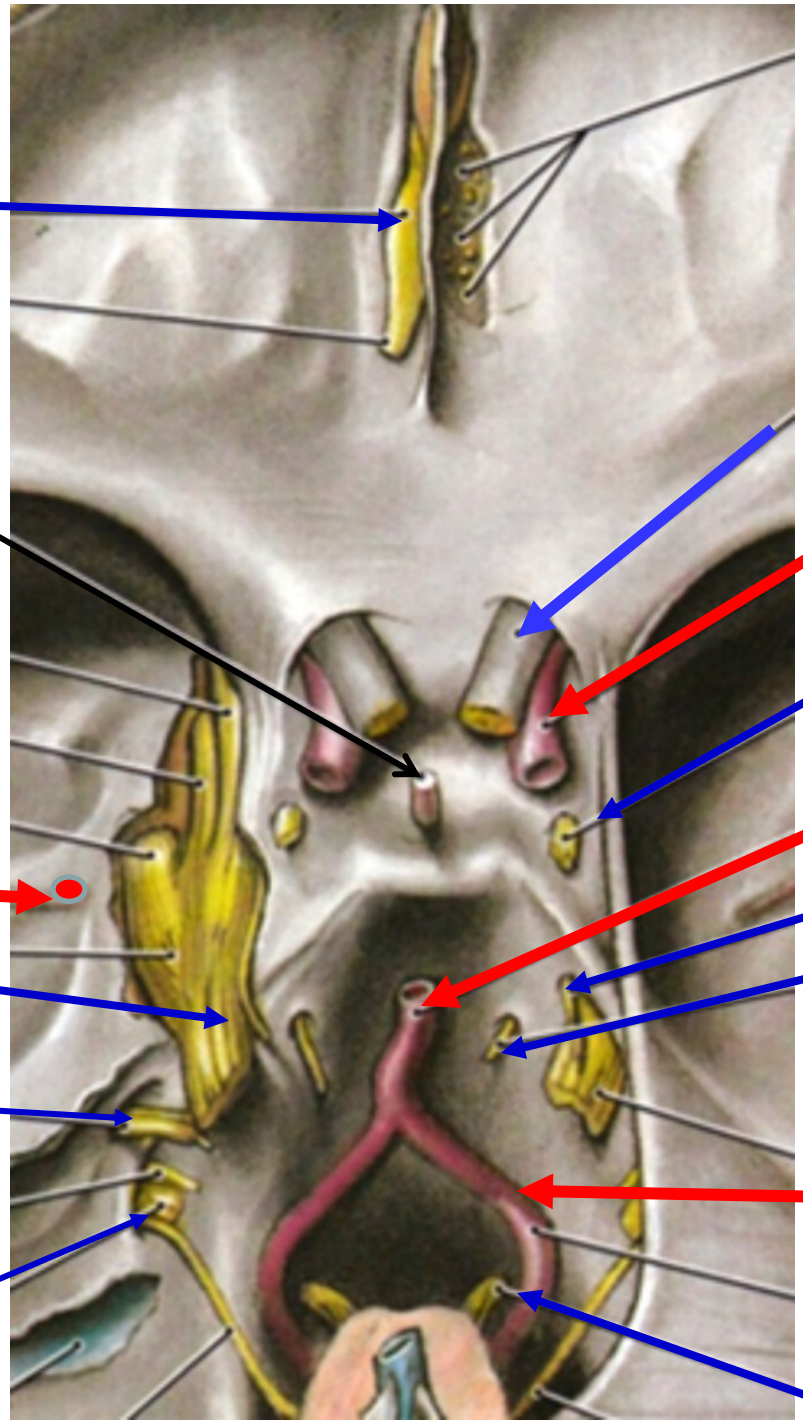
FORAMEN OVALE - V3

INTERNAL AUDITORY MEATUS – VII, VIII

JUGULAR FORAMEN – CN IX, X, XI

HYPO-GLOSSAL CANAL – CN XII

BRAINSTEM
DISSECTION
IDENTIFY



I

II

PITUITARY
STALK

INTERNAL CAROTID A.

V1

III

V2

V3

MIDDLE
MENINGEAL A.

BASILAR A.

IV

V

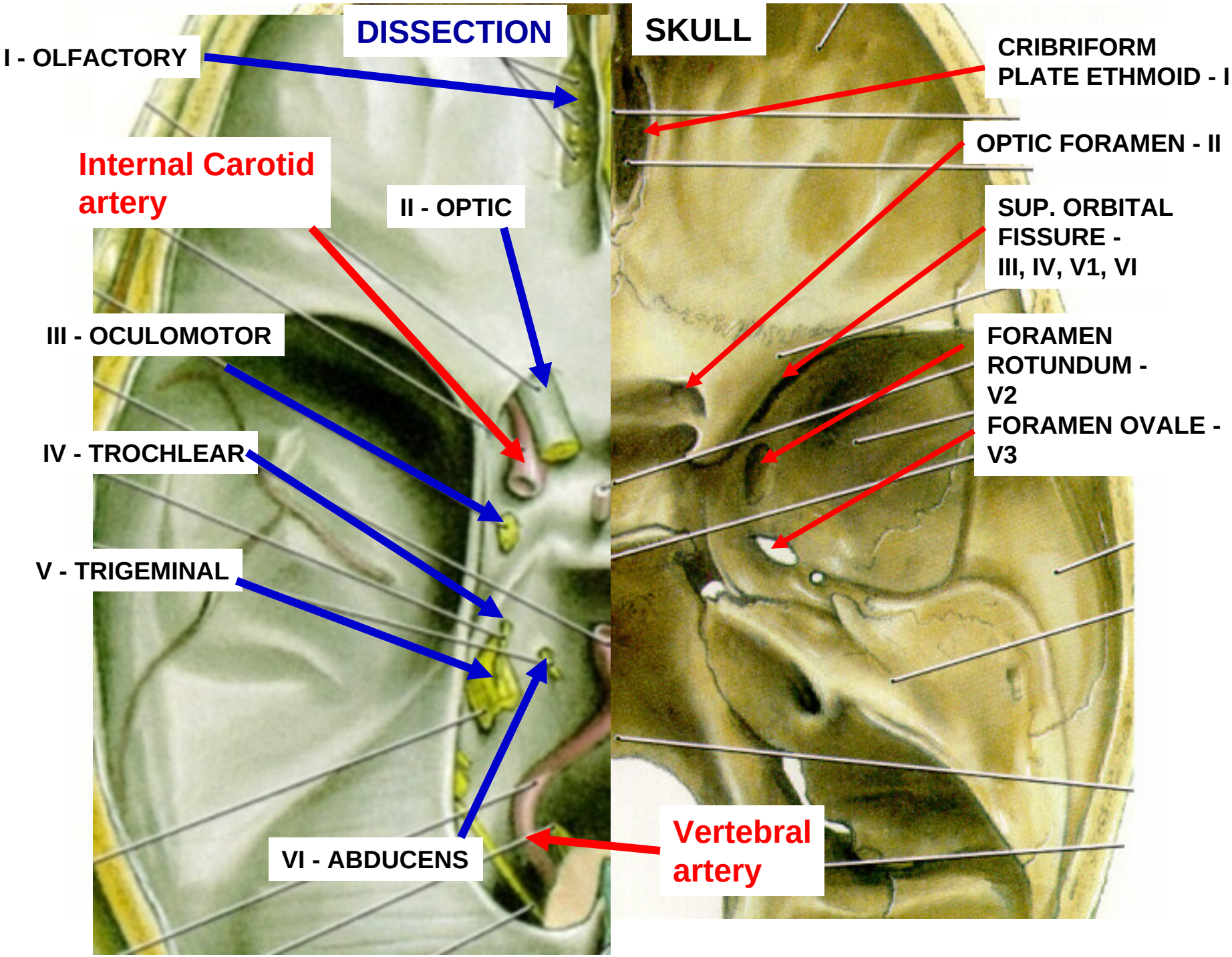
VI

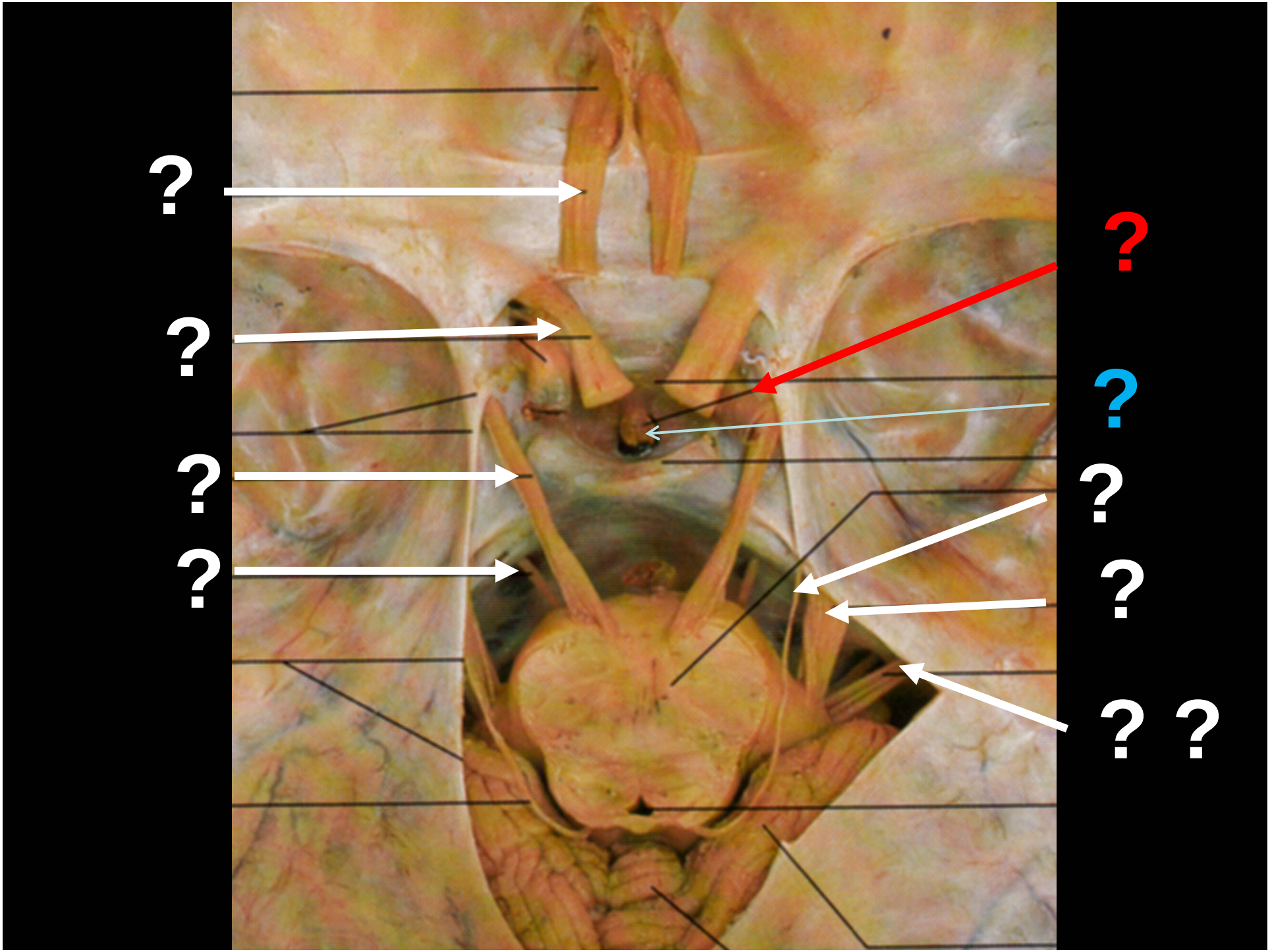
VII
+VIII

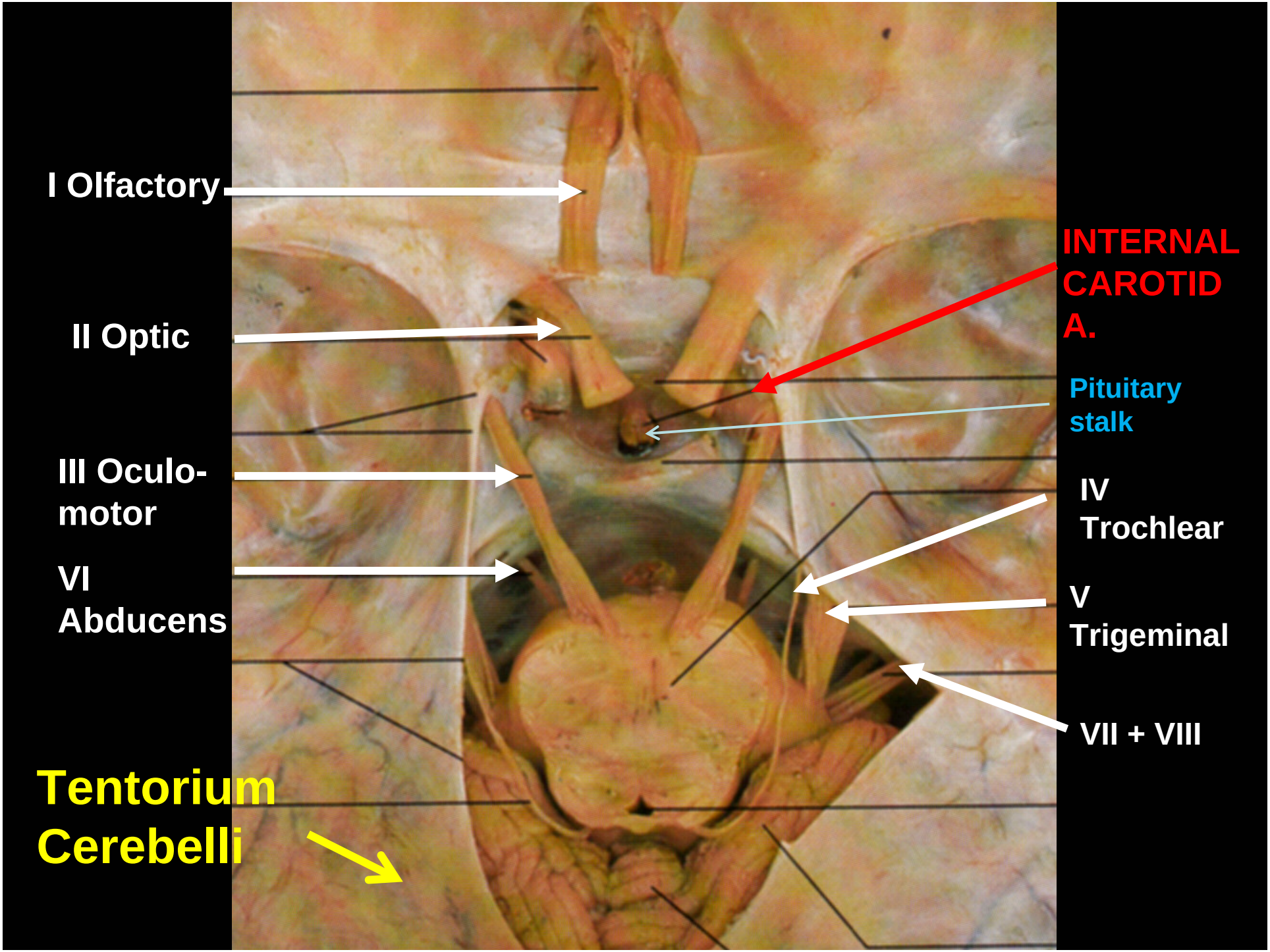
VERTEBRAL A.

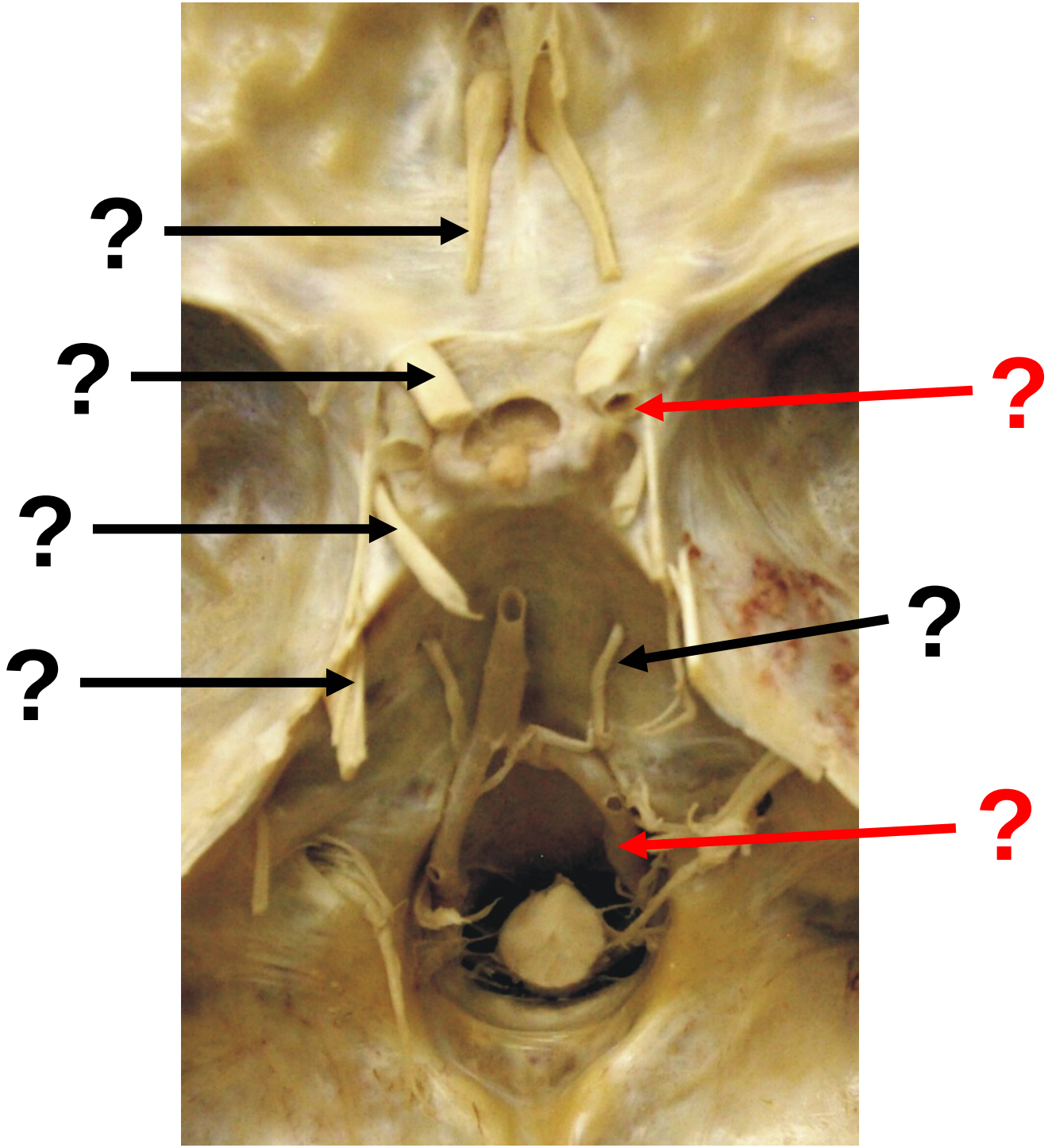
IX, X
+XI

XII

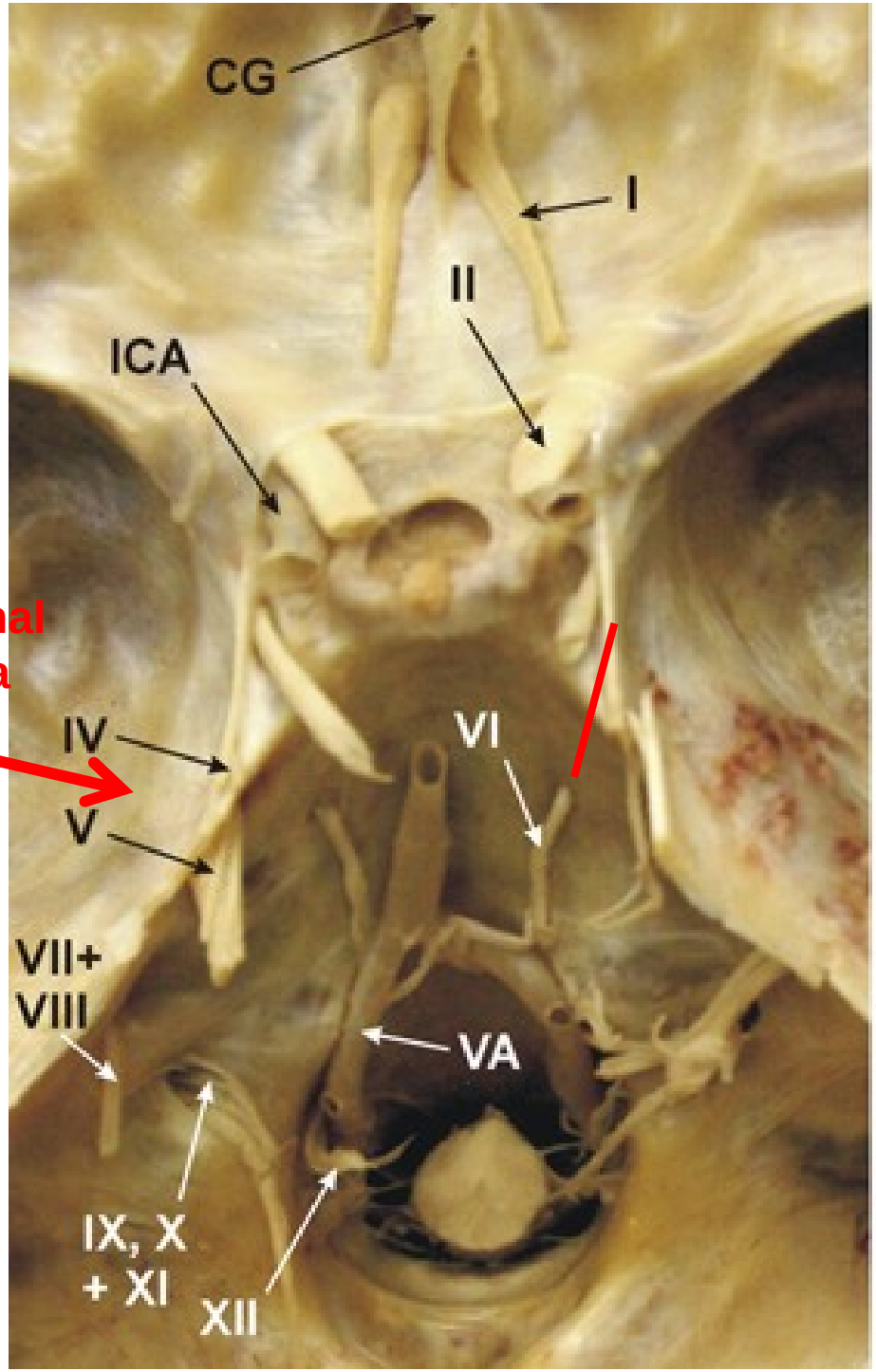

DISSECTION
SKULL
I - OLFACTORY
CRIBRIFORM PLATE ETHMOID - I
Internal Carotid artery
II - OPTIC
OPTIC FORAMEN - II
SUP. ORBITAL FISSURE - III, IV, V1, VI
III - OCULOMOTOR
FORAMEN ROTUNDUM - V2
FORAMEN OVALE - V3
IV - TROCHLEAR
V - TRIGEMINAL
VI - ABDUCENS
Vertebral artery

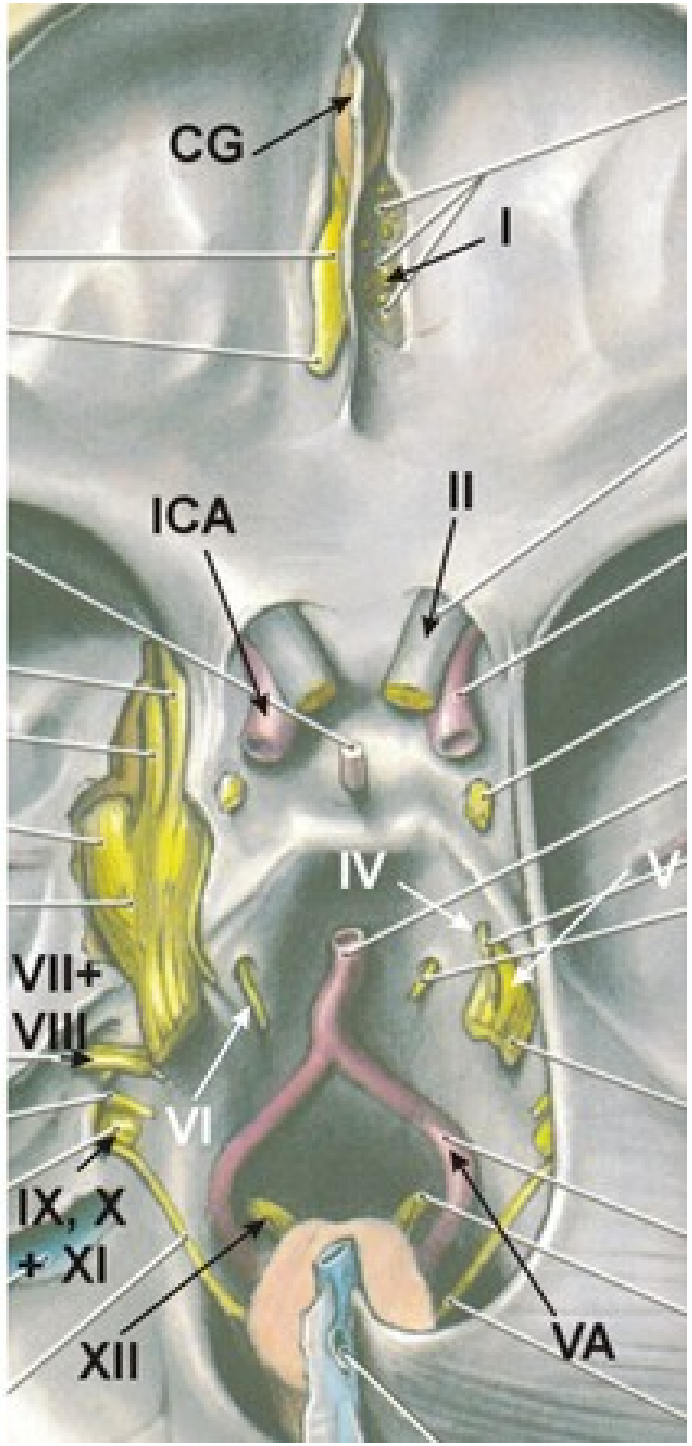


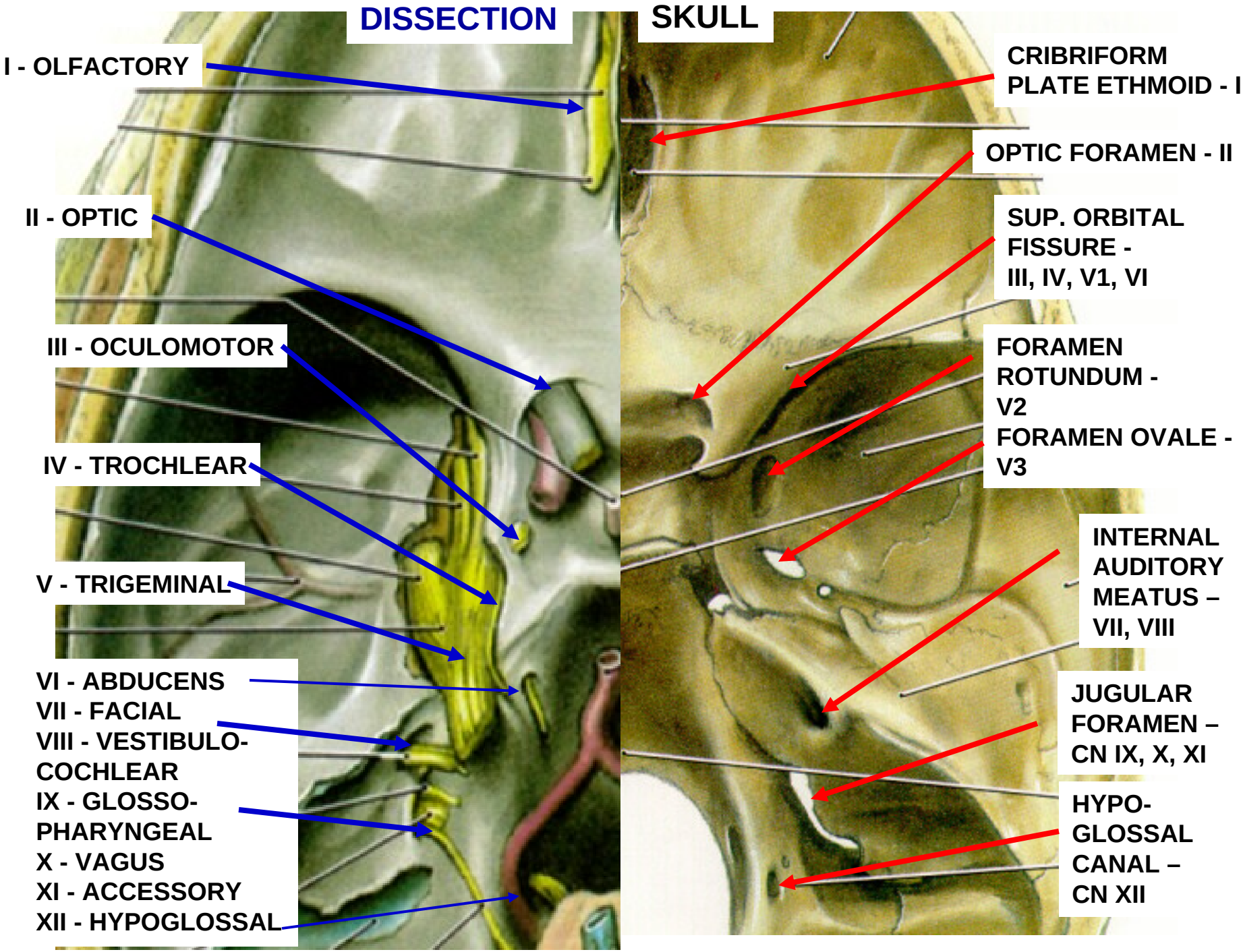

I Olfactory
II Optic
III Oculo-motor
VI Abducens
Tentorium Cerebelli
INTERNAL CAROTID A.
Pituitary stalk
IV Trochlear
V Trigeminal
VII + VIII

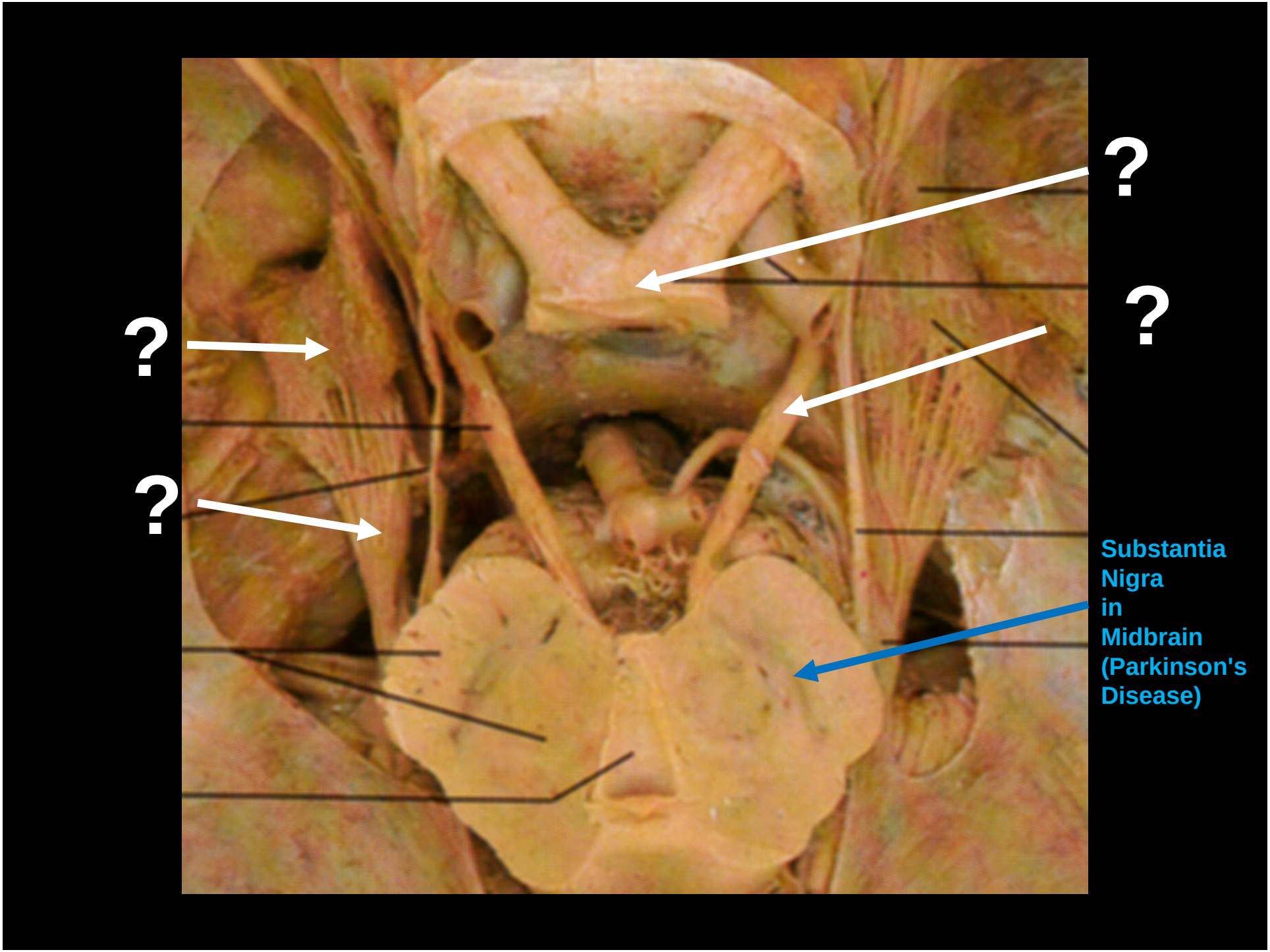


V Trigeminal under dura






DISSECTION
SKULL
I - OLFACTORY
II - OPTIC
III - OCULOMOTOR
IV - TROCHLEAR
V - TRIGEMINAL
VI - ABDUCENS
VII - FACIAL
VIII - VESTIBULO-COCHLEAR
IX - GLOSSO-PHARYNGEAL
X - VAGUS
XI - ACCESSORY
XII - HYPOGLOSSAL
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
HYPO-GLOSSAL CANAL – CN XII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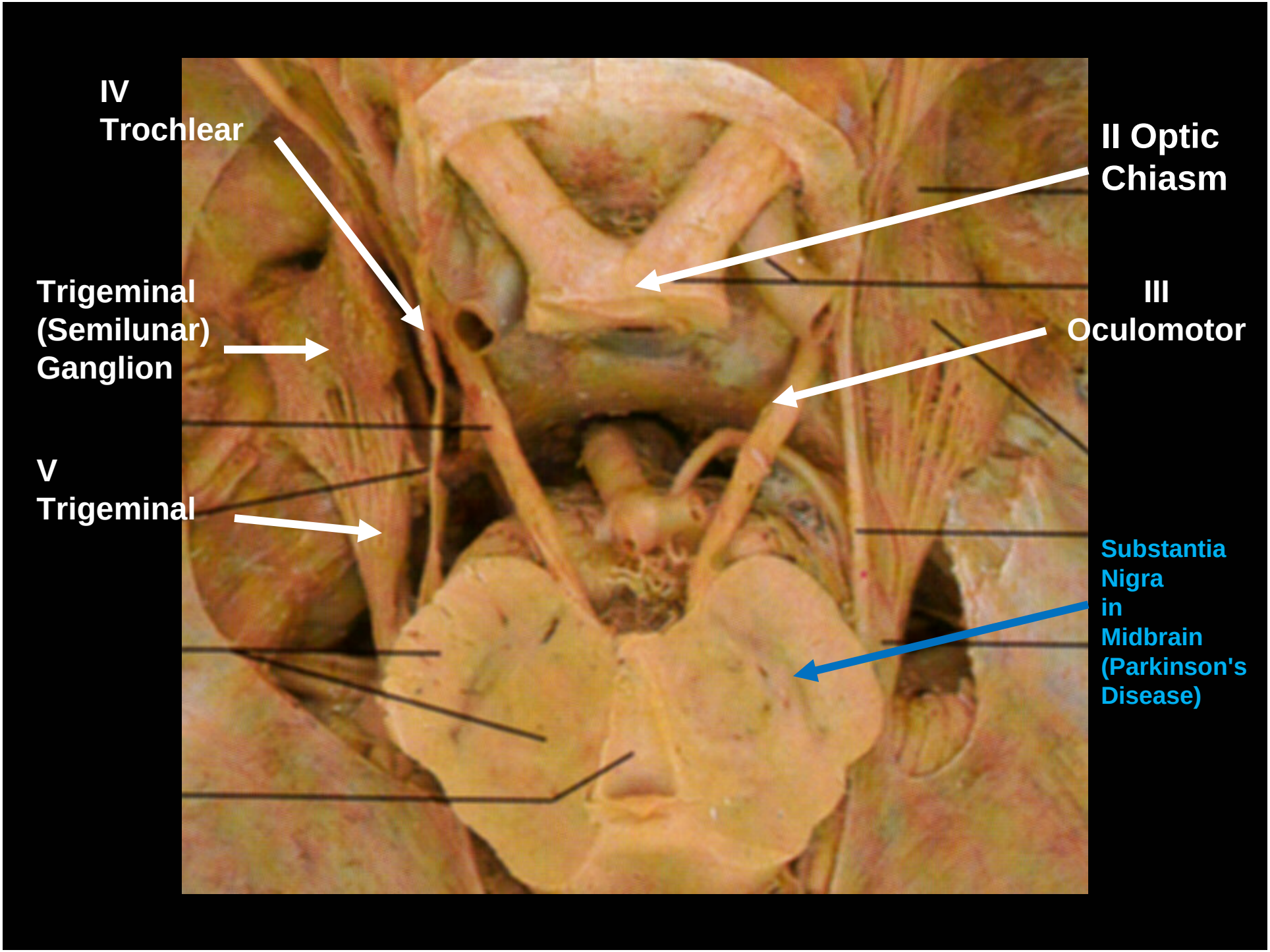
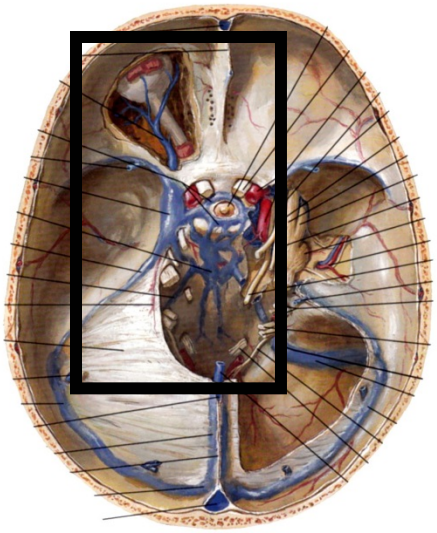
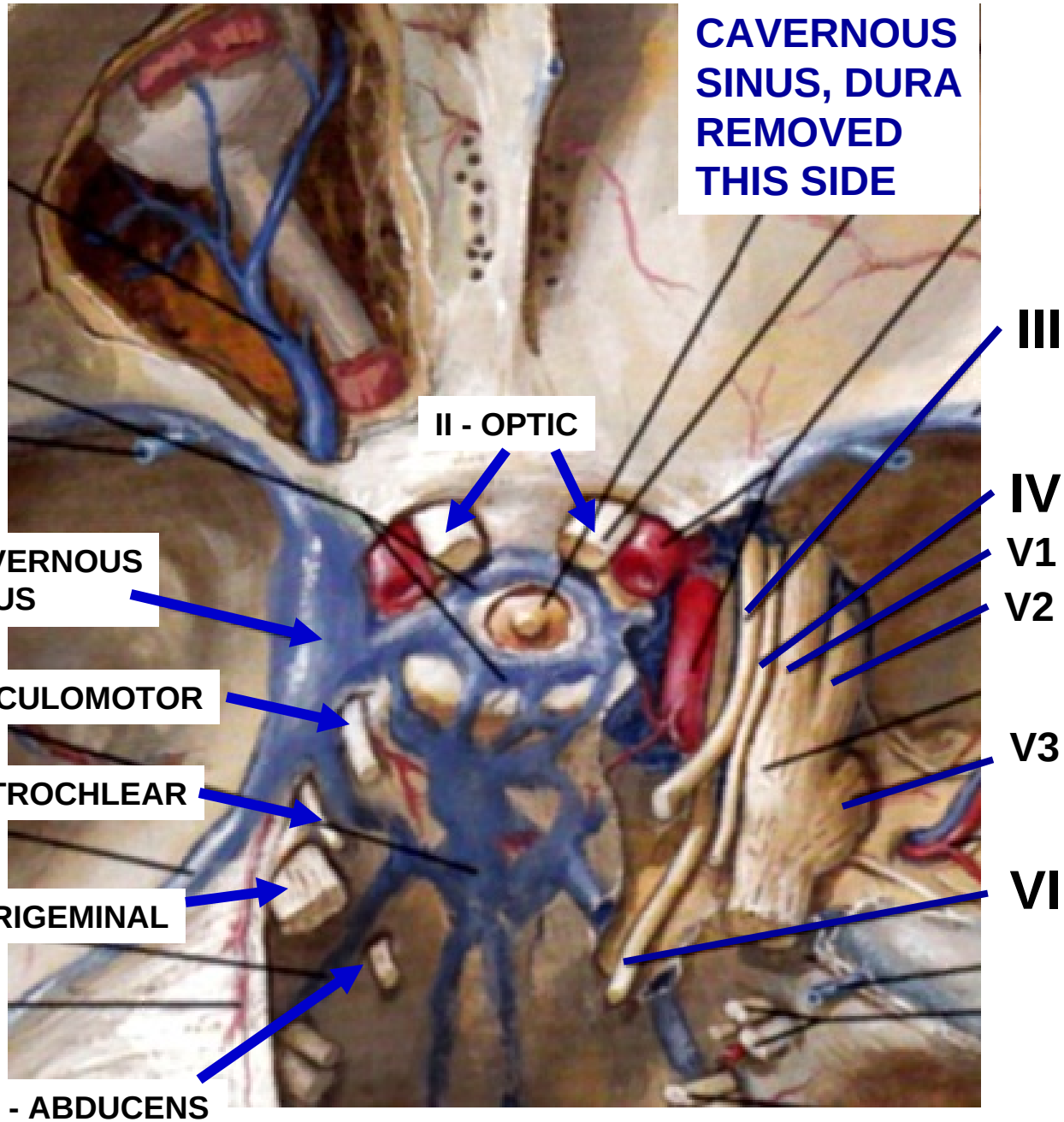
Substantia Nigra in Midbrain (Parkinson's Disease)

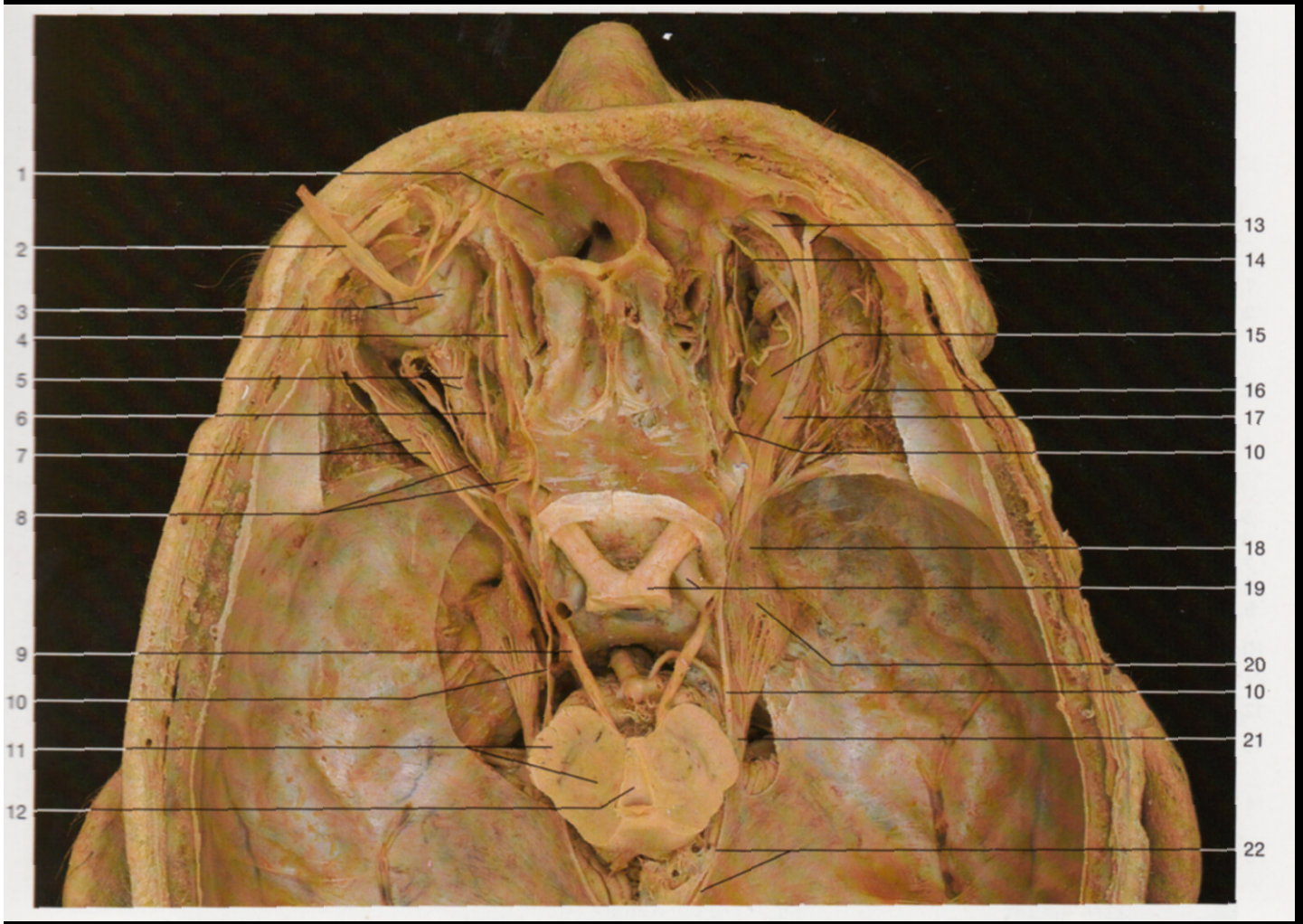

IV
Trochlear
II Optic
Chiasm
Trigeminal
(Semilunar)
Ganglion
III
Oculomotor
V
Trigeminal
Substantia
Nigra
in
Midbrain
(Parkinson's
Disease)



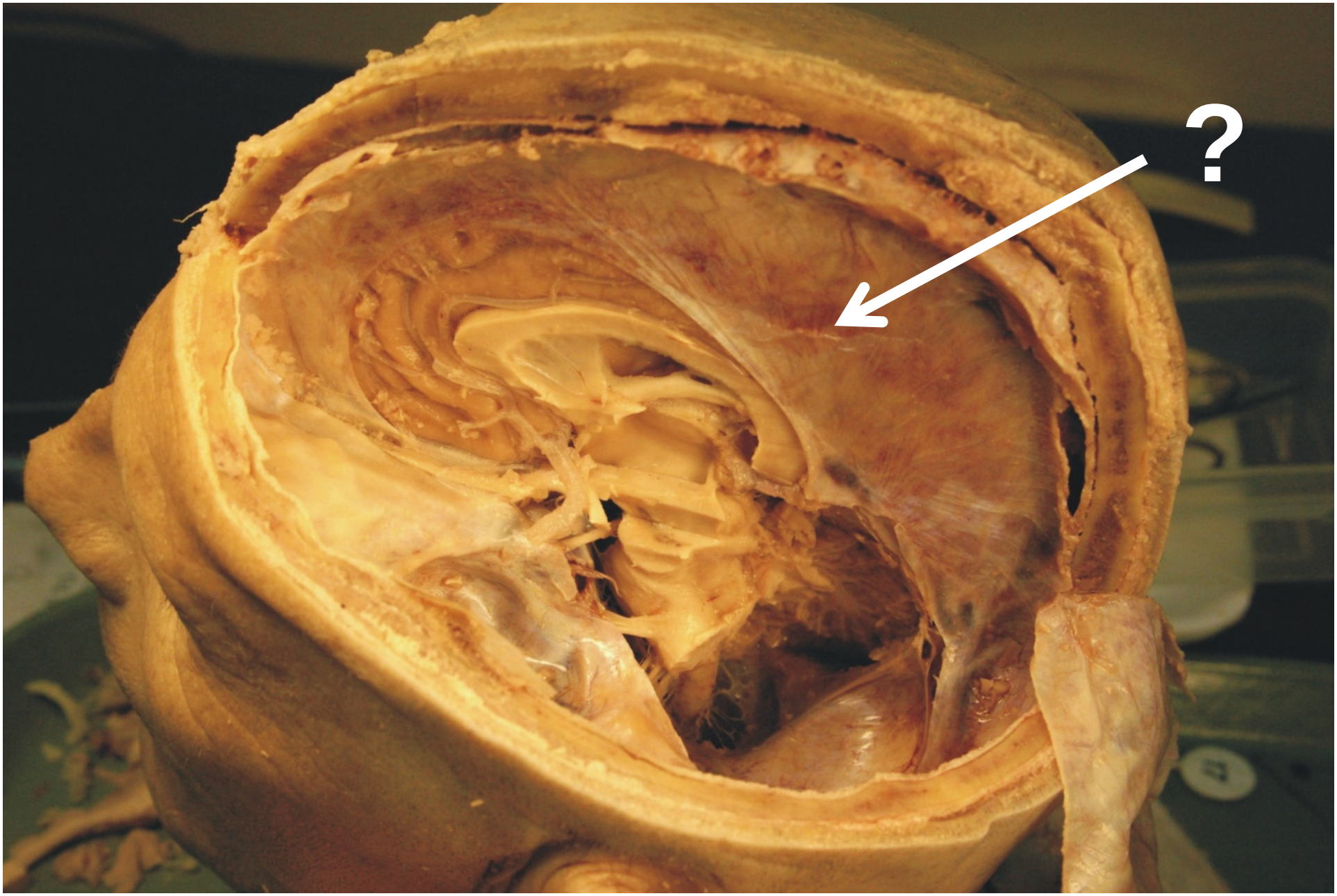
NETTER
GREAT
ILLUSTRATIONS
FOR REVIEWING



OVERVIEW ATLAS PICTURE

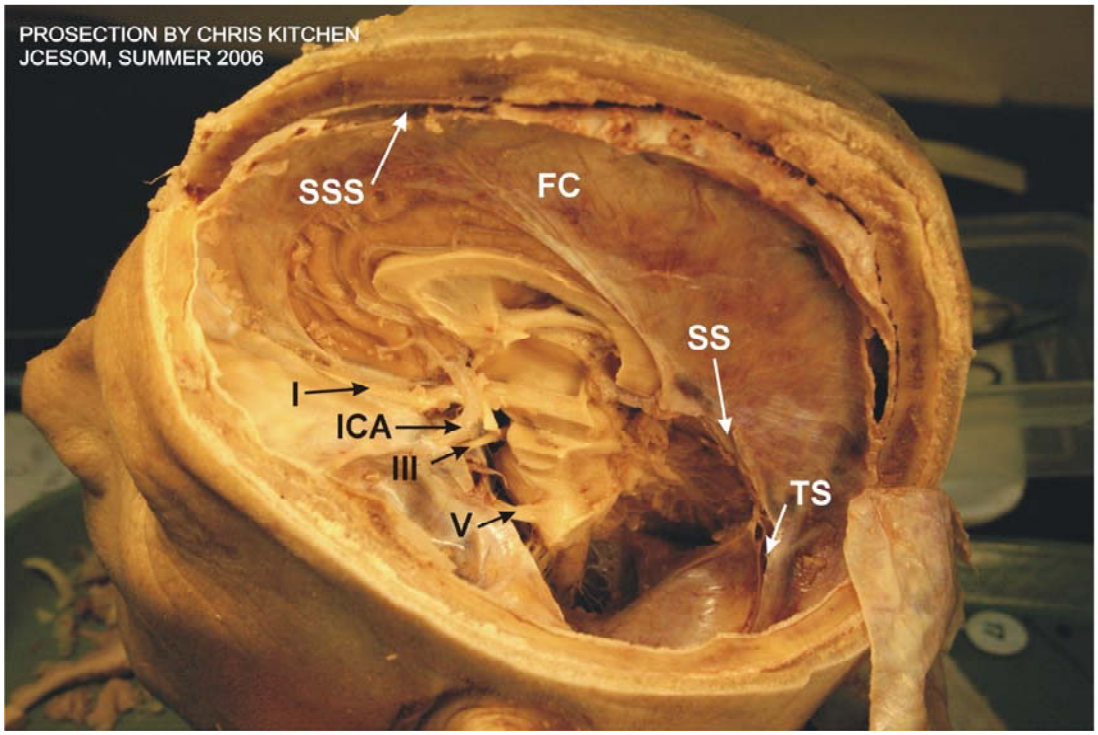


1 Frontal sinus (enlarged)
2 Frontal nerve (divided and reflected)
3 Superior rectus muscle (divided) and eyeball
4 Superior oblique muscle
5 Short ciliary nerves and optic nerve (n. II)
6 Nasociliary nerve
7 **Abducens nerve** (n. VI) and lateral rectus muscle
8 Ciliary ganglion and superior rectus muscle (reflected)
9 **Oculomotor nerve** (n. III)
10 **Trochlear nerve** (n. IV)
11 Crus cerebri and midbrain
12 Inferior wall of the third ventricle connected with cerebral aqueduct
13 Lateral and medial branch of supraorbital nerve
14 Supratrochlear nerve
15 Superior rectus muscle
16 Lacrimal nerve
17 Frontal nerve
18 **Ophthalmic nerve** (n. V1)
19 Optic chiasma and internal carotid artery
20 Trigeminal ganglion
21 **Trigeminal nerve** (n. V)
22 Tentorial notch
23 Falx cerebri
24 Cerebellum
25 Infundibulum
26 Olfactory tract

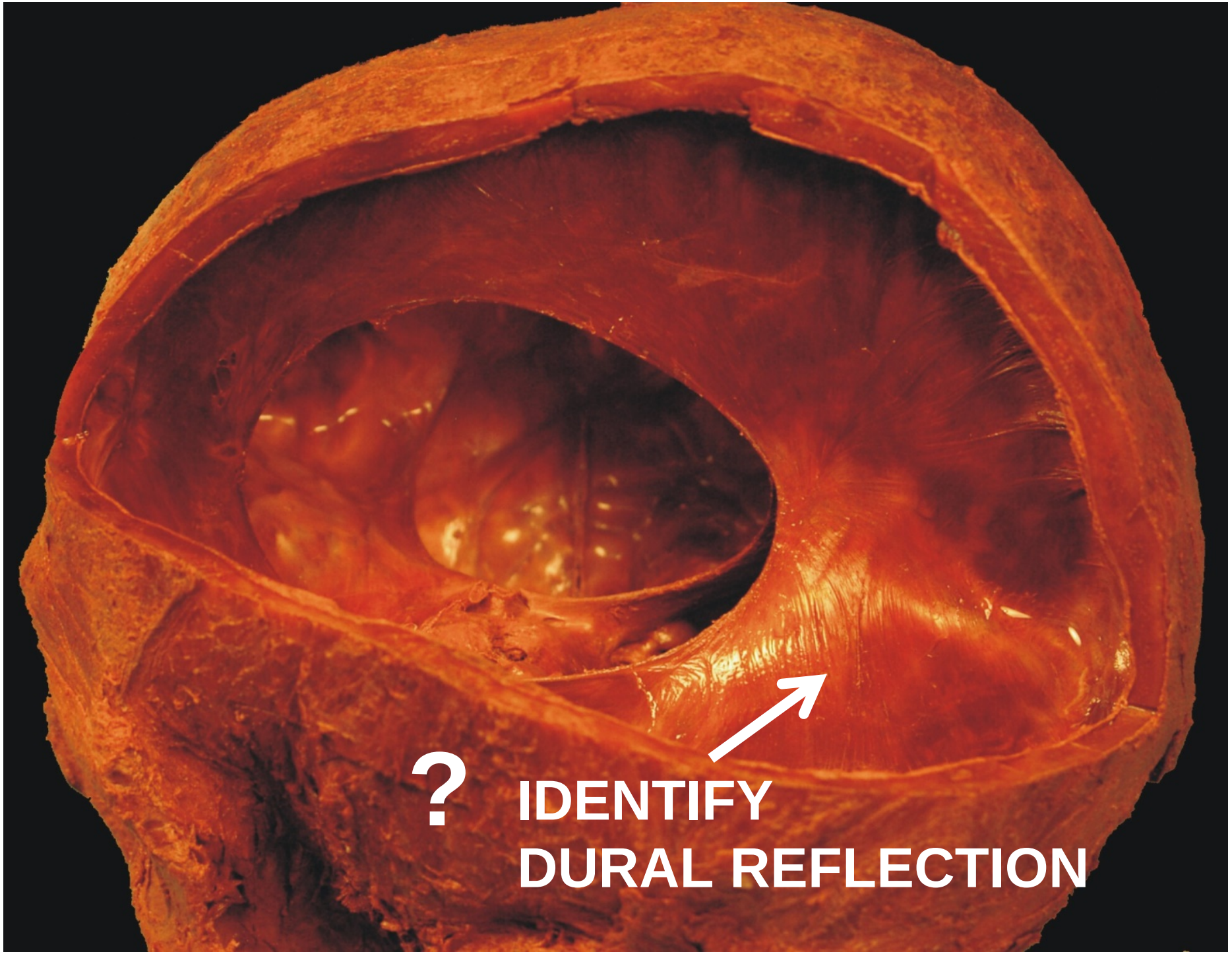


BRAIN (HEMISECTED) IN CRANIAL CAVITY

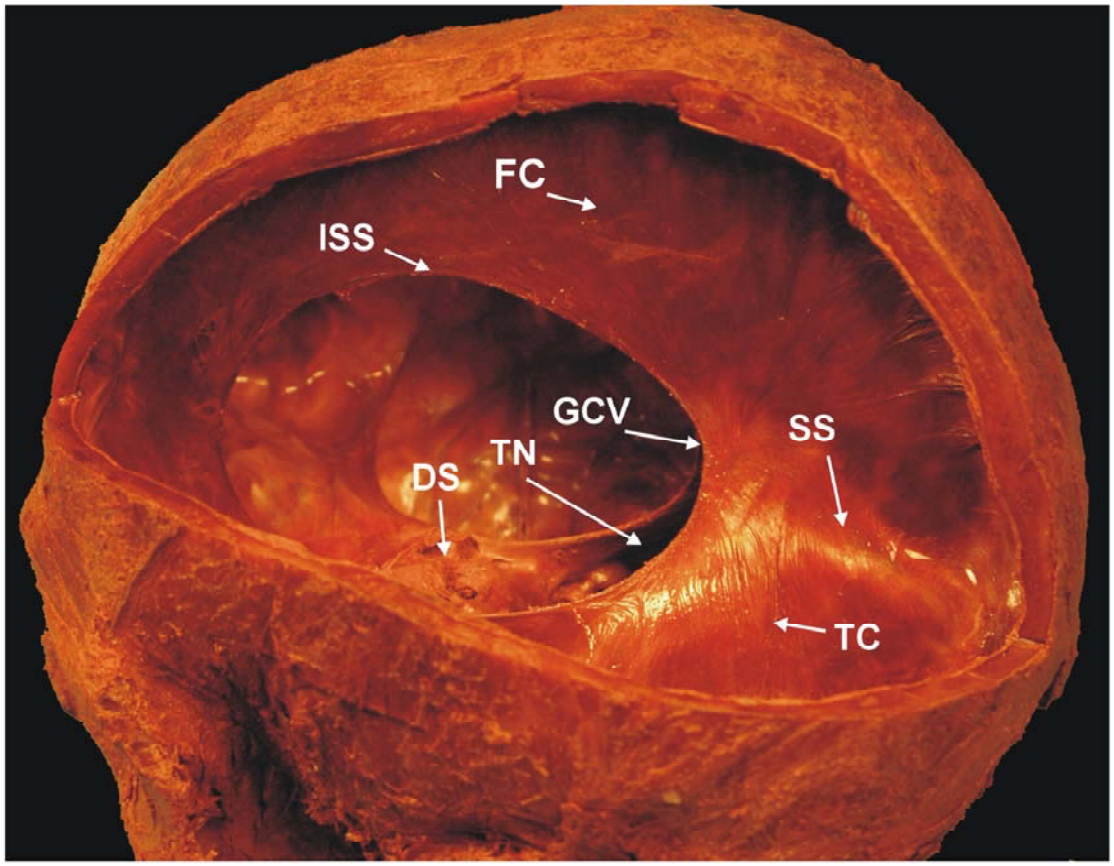
267



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


?
IDENTIFY
DURAL REFLECTION

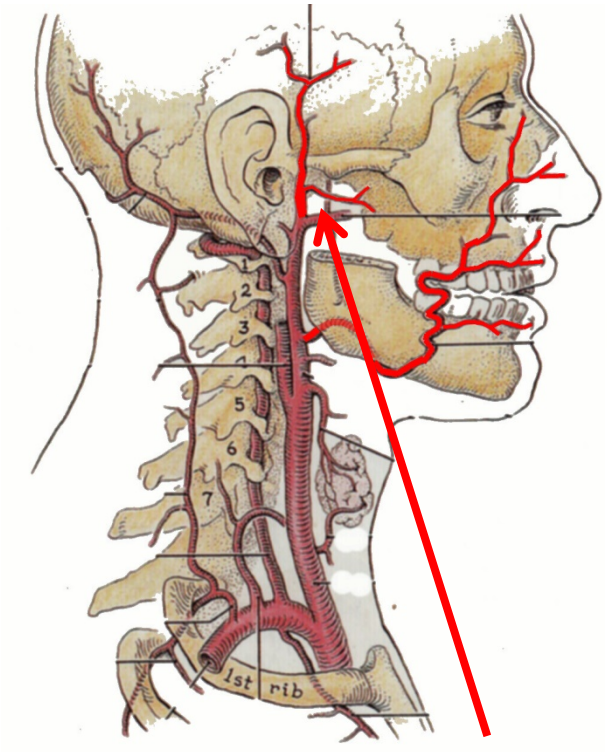
DURAL REFLECTIONS AND VENOUS SINUSES

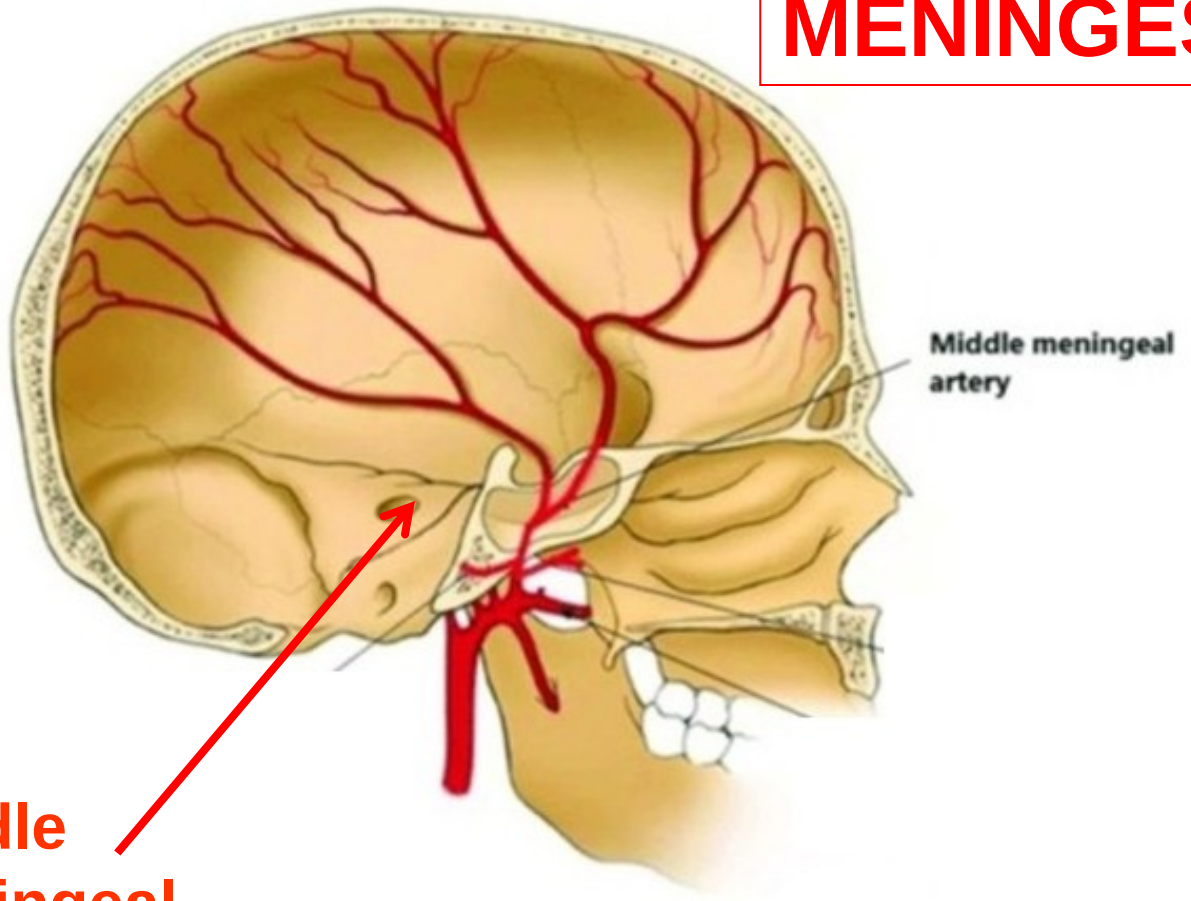


FC - FALX CEREBRI
TC - TENTORIUM CEREBELLI
ISS - LOCATION OF INFERIOR SAGITTAL SINUS
SS - LOCATION OF STRAIGHT SINUS
GCV - OPENING OF GREAT CEREBRAL VEIN OF GALEN
DS - DIAPHRAGMA SELLA
TN - TENTORIAL NOTCH

Middle Meningeal Artery – branch of External Carotid artery courses inside skull, outside dura – supplies calvarium (bones of skull 'cap')

MENINGES

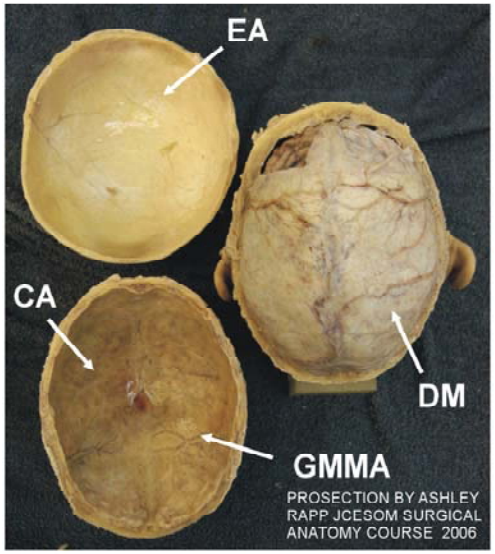




Middle Meningeal Artery

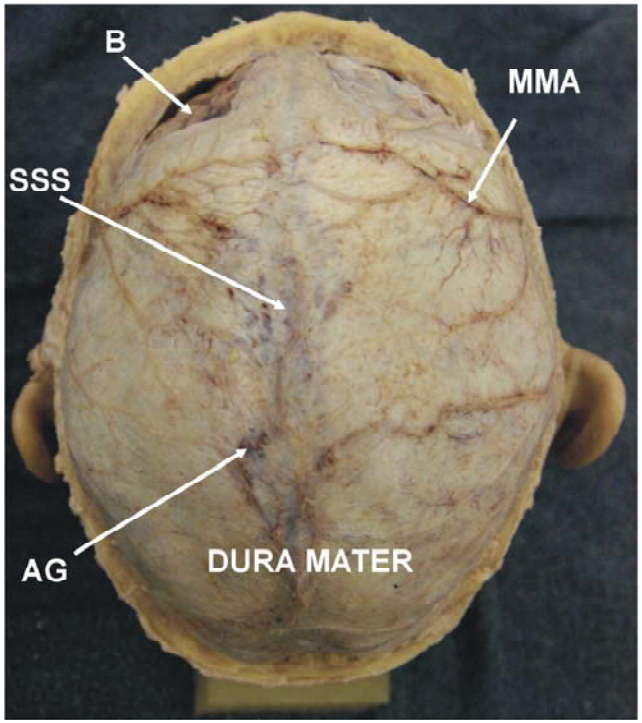
SCALP, CALVARIUM AND DURA MATER

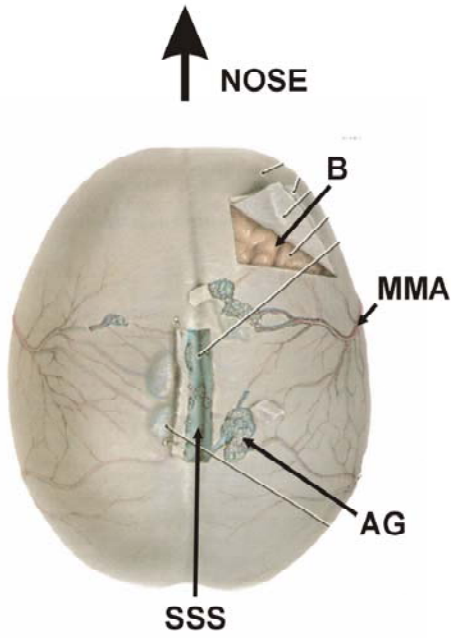
INNER SIDE OF CALVARIUM AND SCALP



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

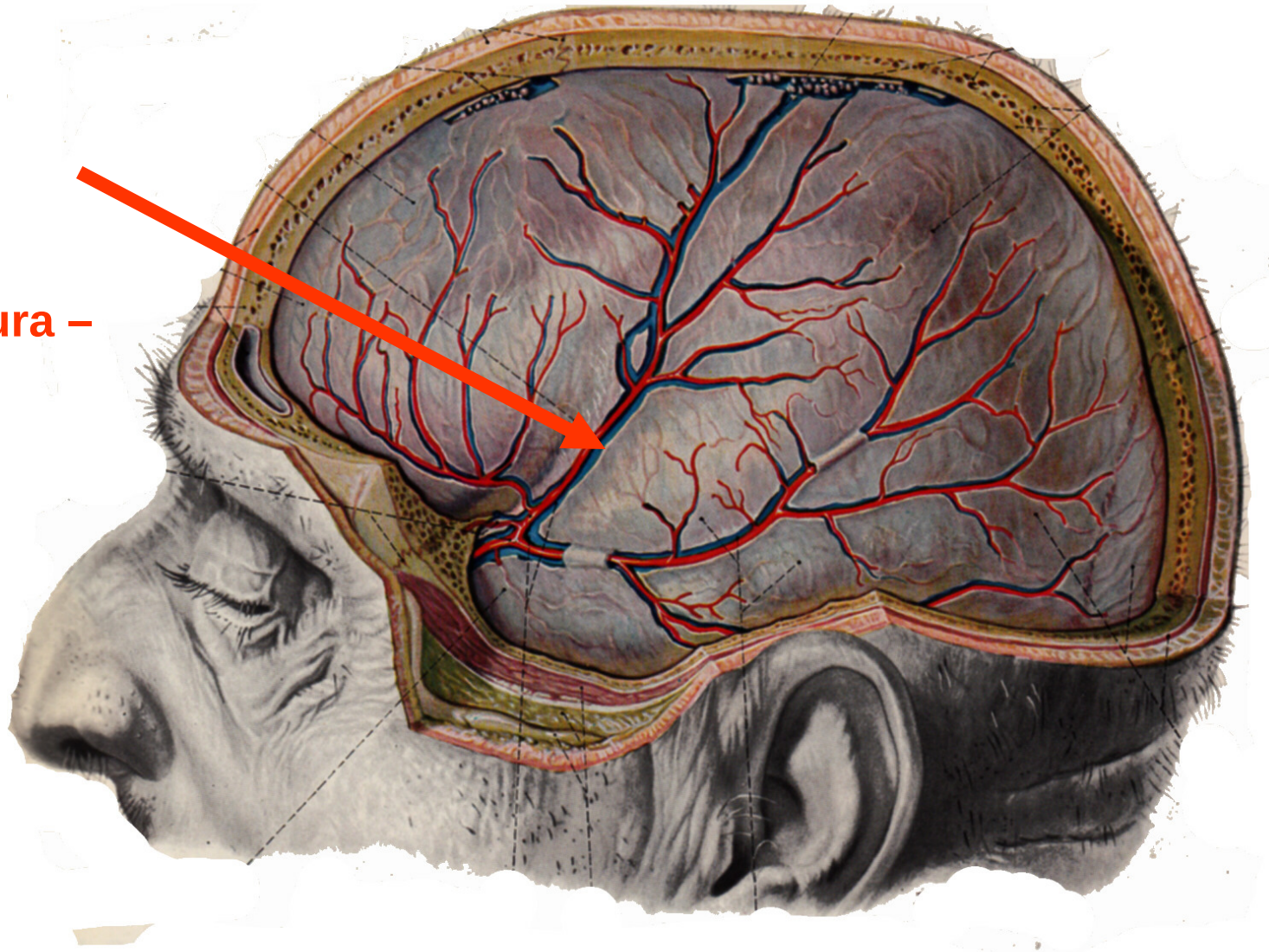
DURA MATER AT HIGH MAG





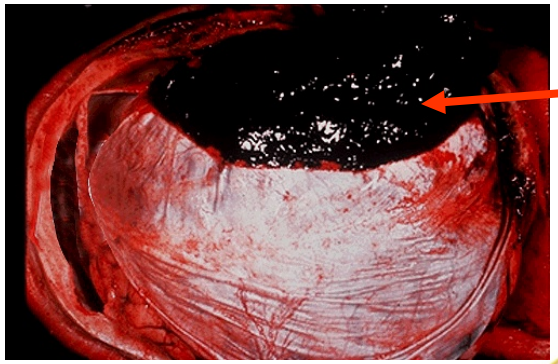
HEMATOMAS - INTERNAL BLEEDS

Middle Meningeal Artery – courses outside dura – supplies calvarium

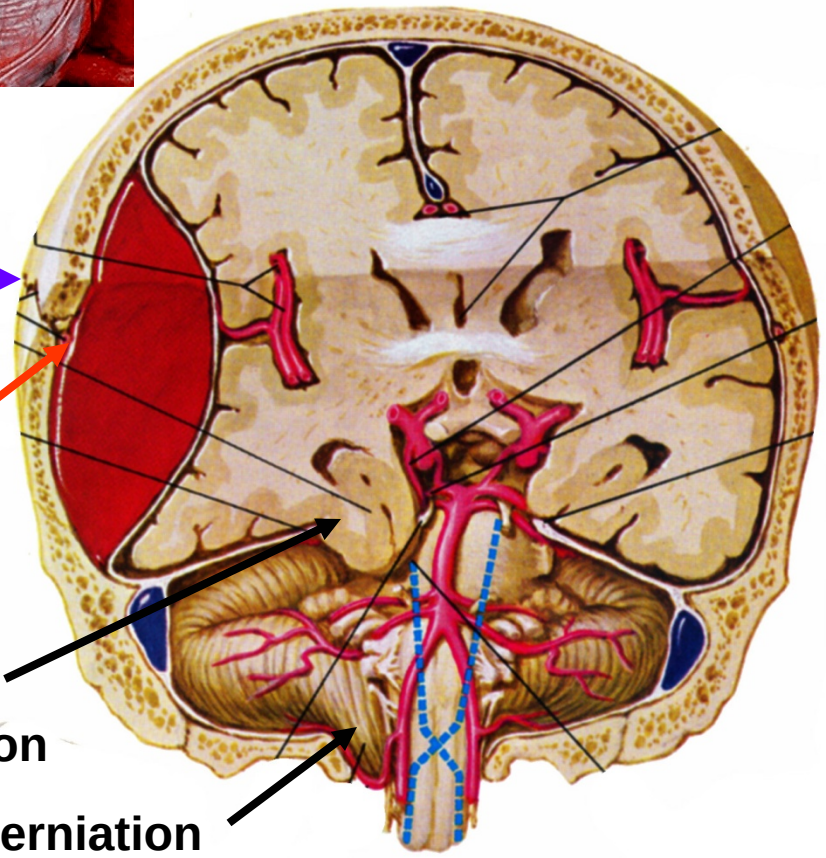


HEMATOMA = abnormal mass of blood outside blood vessel

A. <u>EPIDURAL HEMATOMA</u> - bleeding between dura and bone



EPIDURAL HEMATOMA



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

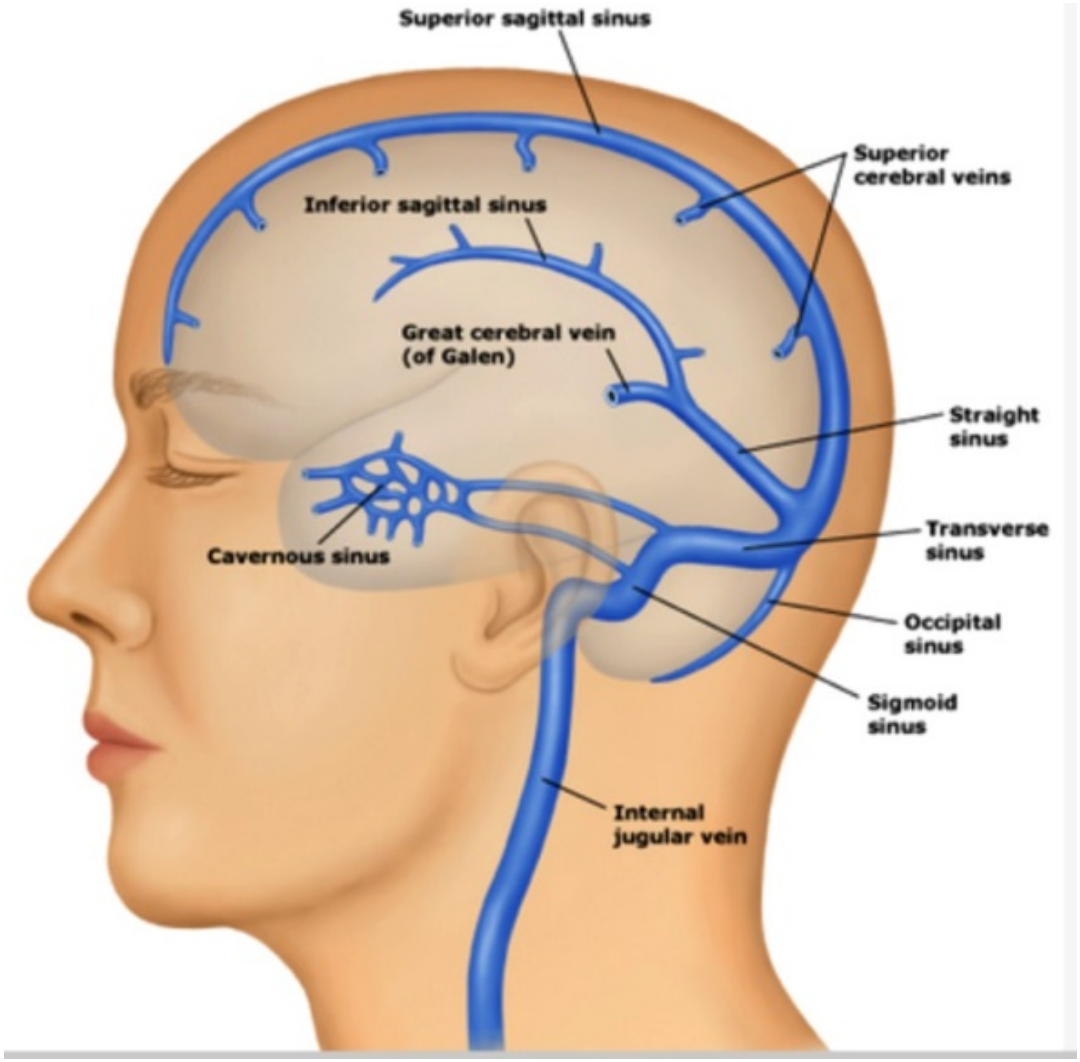
EPIDURAL HEMATOMA – **
1) ARTERIAL – often MIDDLE MENINGEAL ARTERY
2) 'LENS' SHAPED MASS
3) RAPID

Clinical - bleeding is arterial; can be profuse and rapid (ex, car accident); patient lucid at first; can be fatal within hours if herniation occurs

EPIDURAL HEMATOMA

'LENS' SHAPED

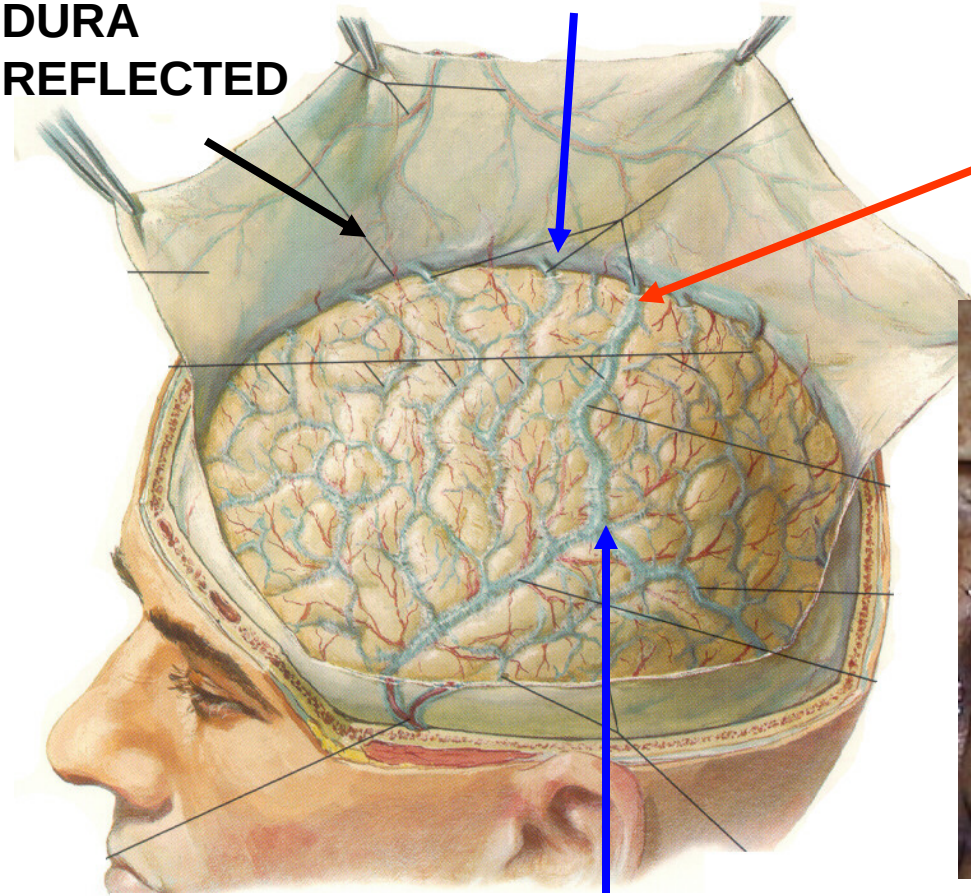
VENOUS DRAINAGE OF BRAIN IS DIFFERENT - VENOUS SINUSES - inside cranial cavity



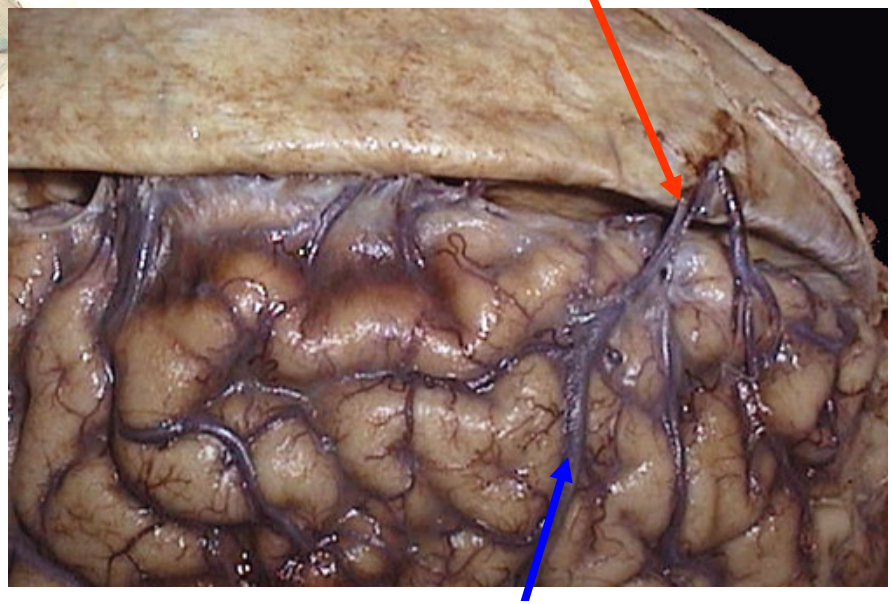
SUPERIOR SAGITTAL SINUS receives blood from Superior Cerebral veins through 'BRIDGING' VEINS

Superior Sagittal Sinus

DURA REFLECTED



'BRIDGING' VEINS



Superior Cerebral veins

Superior Cerebral veins

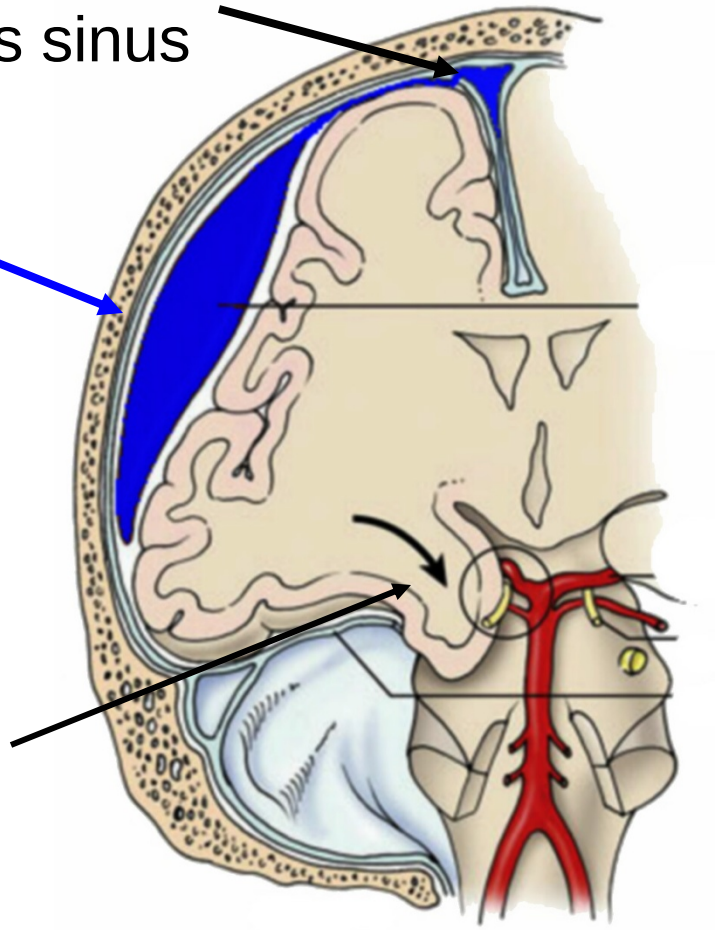
Photo from lecture of Dr. Nancy Norton

SUBDURAL HEMATOMA

Tear 'bridging' vein
or venous sinus

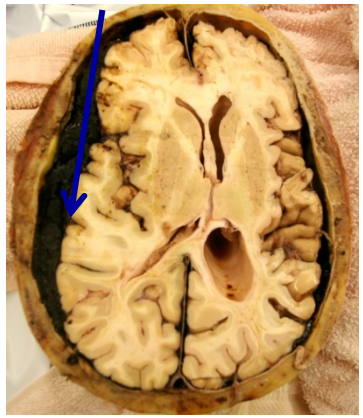
Crescent shaped hematoma on CT/MRI

Herniation of uncus (L. hook) of temporal lobe through Tentorial notch



SUBDURAL HEMATOMA

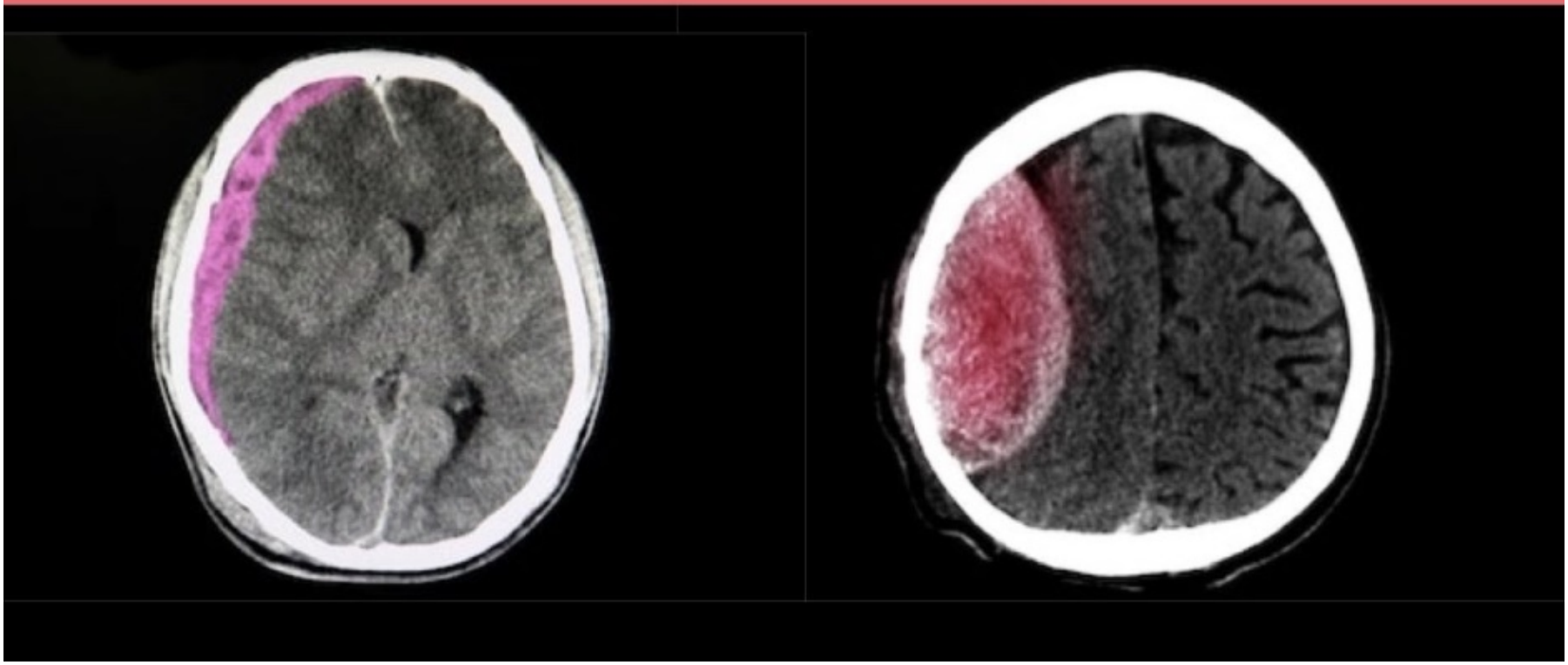
BLOOD



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

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

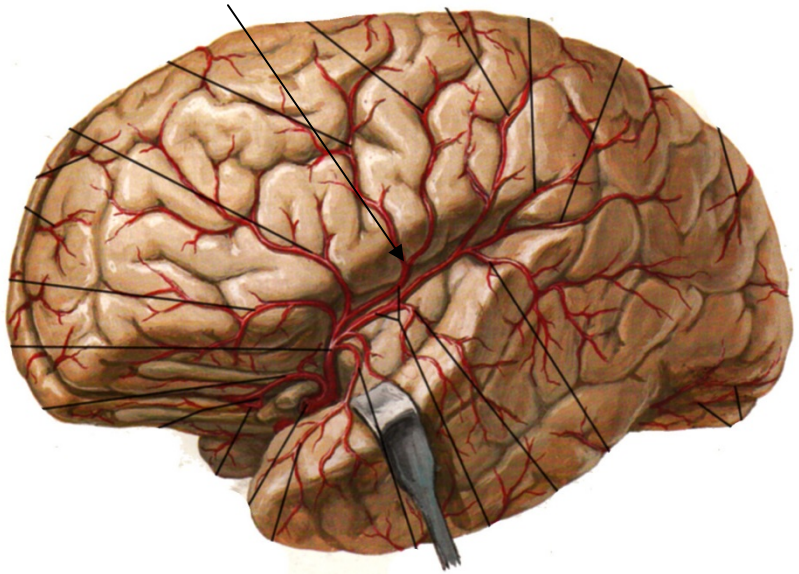
Subdural vs Epidural

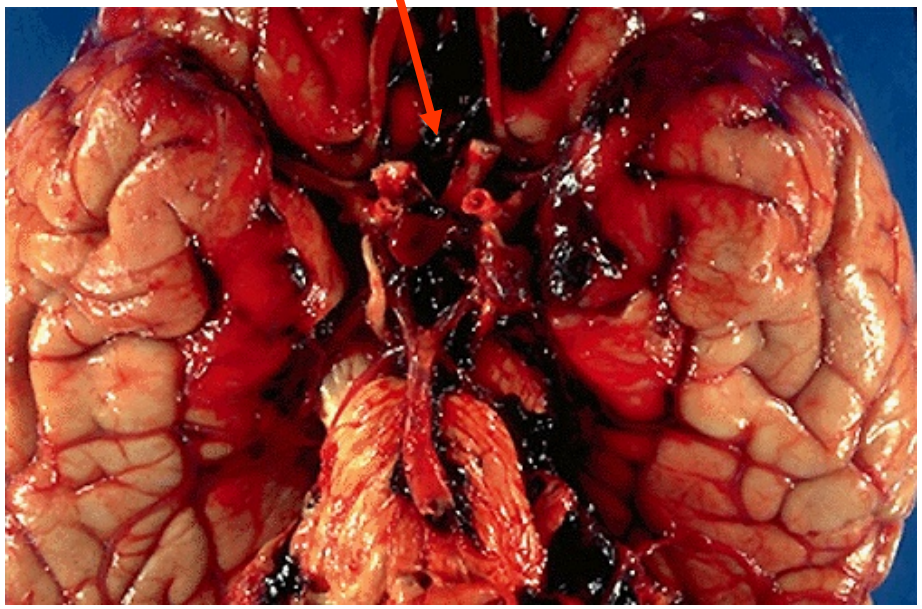


CRESCENT SHAPED **'LENS' SHAPED**

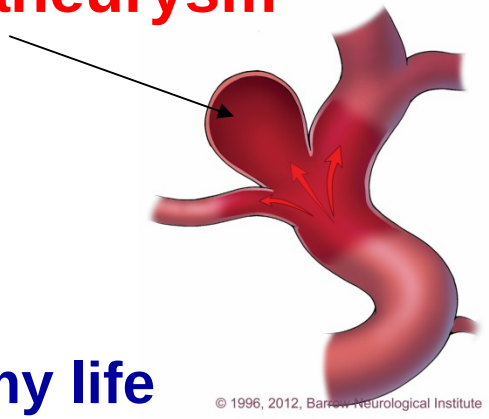
C. SUBARACHNOID HEMATOMA

Cerebral artery





Berry aneurysm

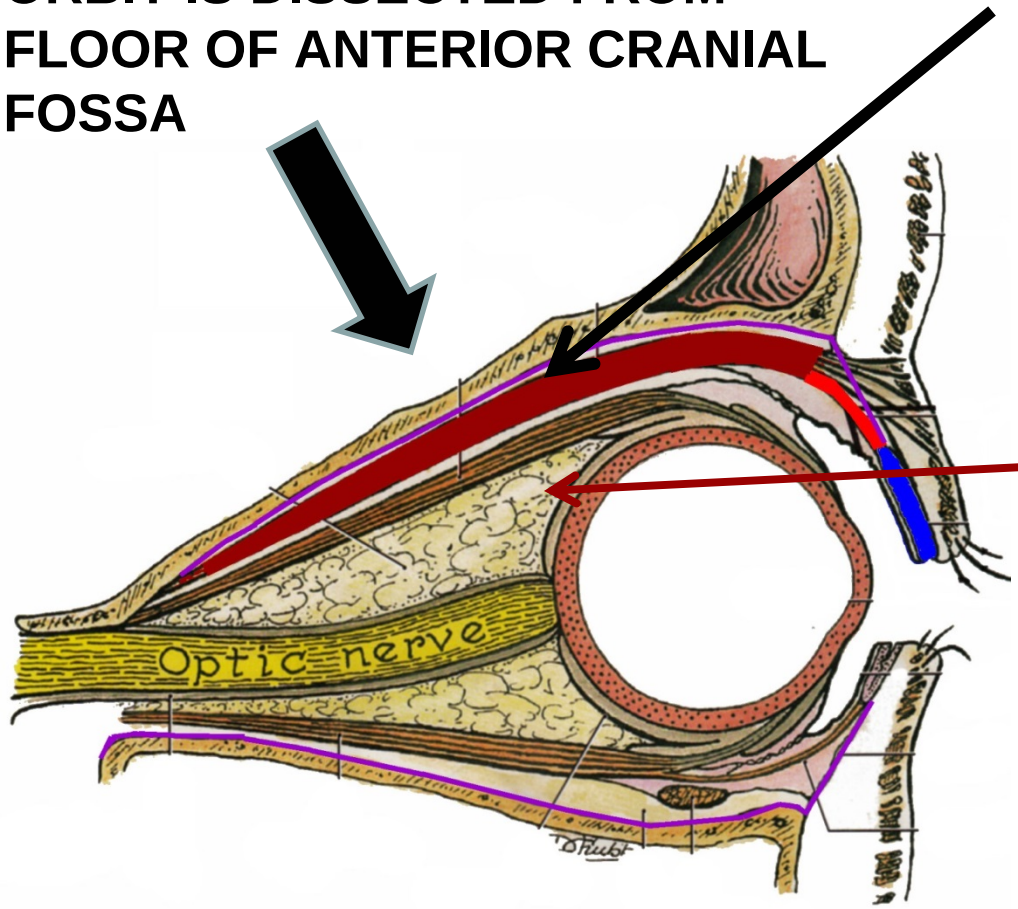


Tearing cerebral artery or aneurysm (ex, berry aneurysma = swelling of vessel wall) or cerebral vein; If arterial can be rapid and fatal

Thunderclap headache - Worst headache of my life
Sudden death 12%; 30 day mortality 45% (reported)

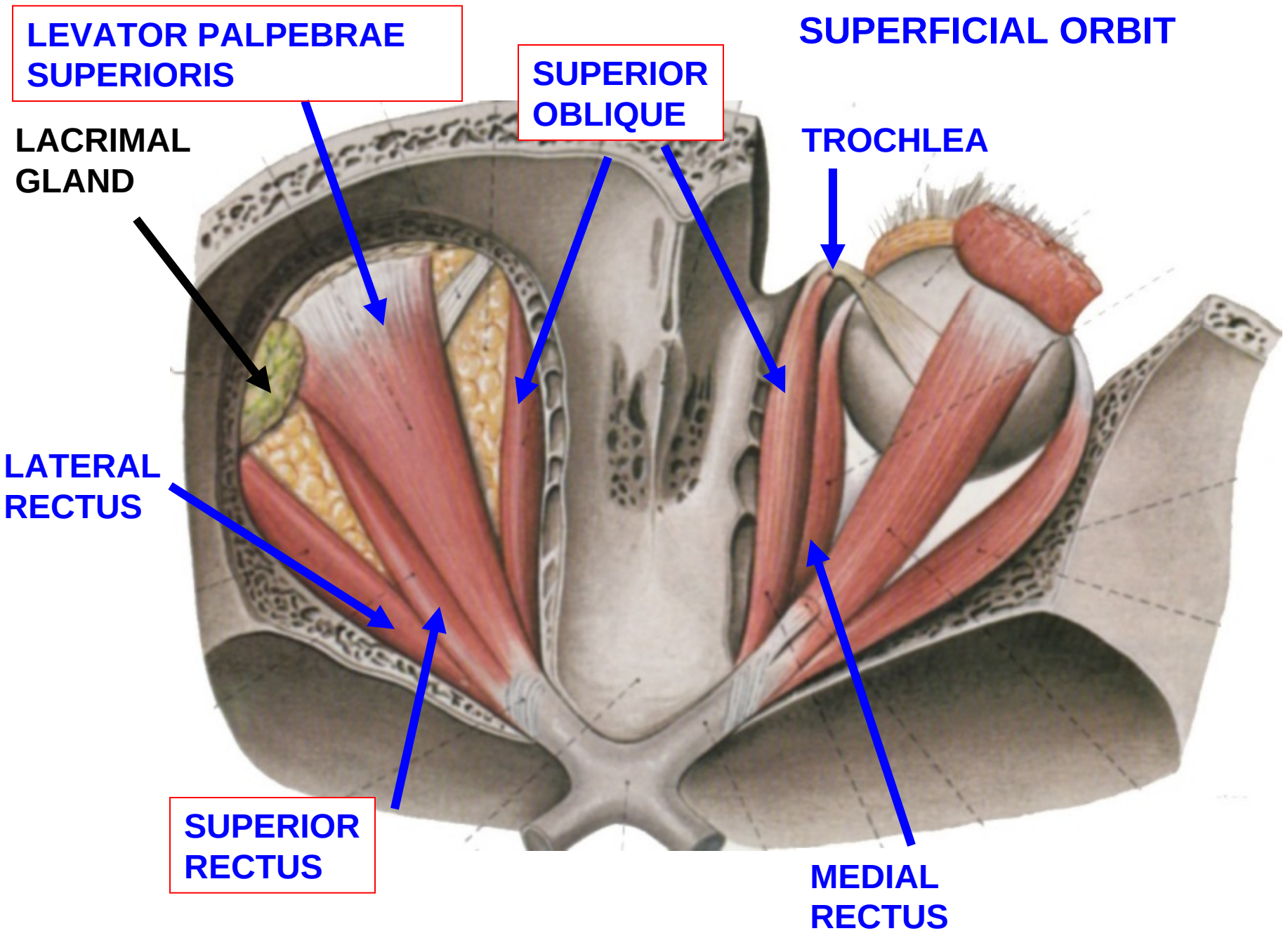
ORBIT DISSECTION

ORBIT IS DISSECTED FROM FLOOR OF ANTERIOR CRANIAL FOSSA



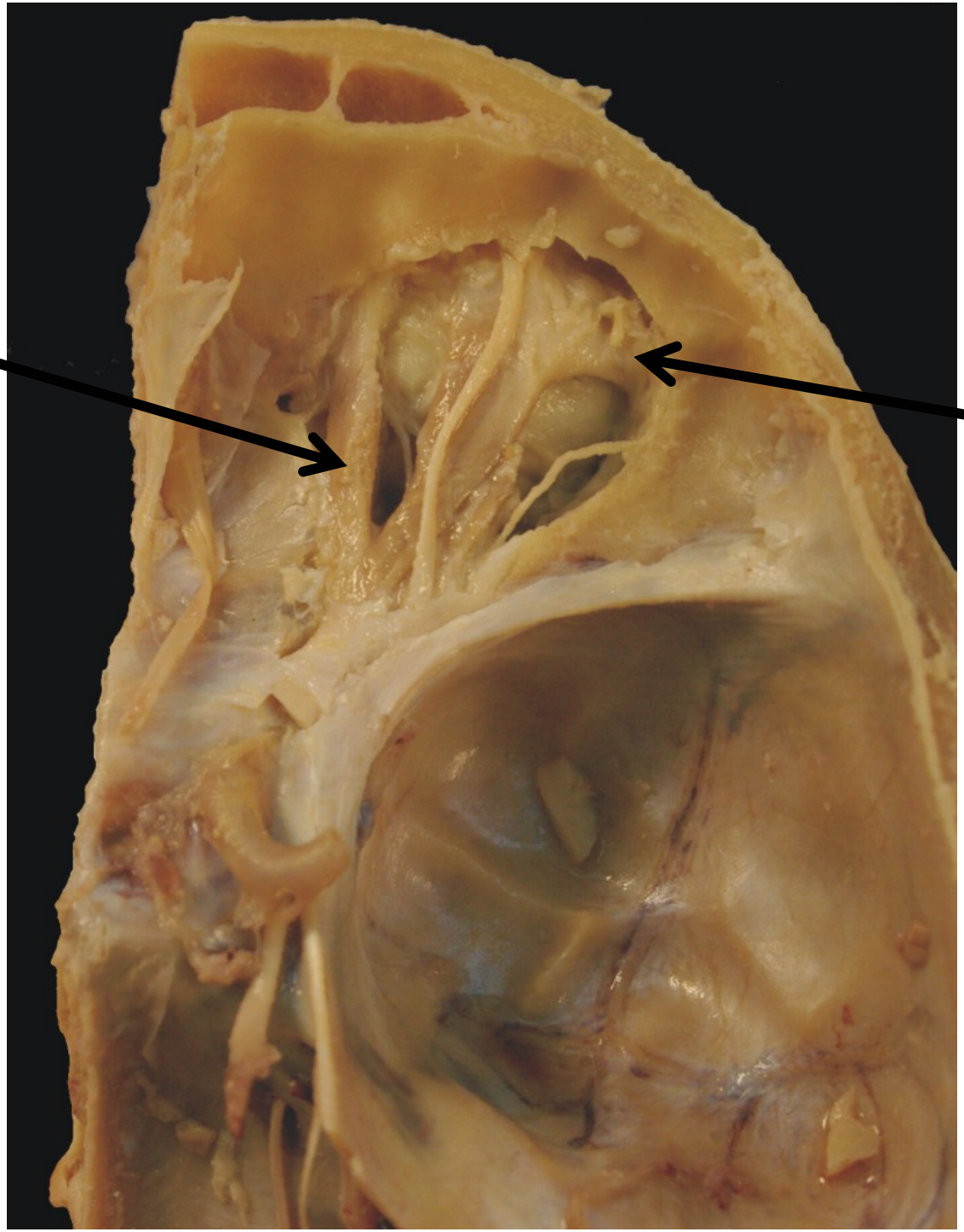
SUPERFICIAL DISSECTION - remove bone, periorbita, fat; shows structures leaving orbit (V1 branches to face); also muscle of upper eyelid (Lev. Palp. Sup.) , Lacrimal gland

DEEP DISSECTION - Reflect Lev. Palp. Sup., Superior Rectus Muscles; see Optic Nerve, structures entering back of eye (Ciliary ganglion); also V1 branches to nasal cavity


LEVATOR PALPEBRAE SUPERIORIS
SUPERFICIAL ORBIT
SUPERIOR OBLIQUE
LACRIMAL GLAND
TROCHLEA
LATERAL RECTUS
SUPERIOR RECTUS
MEDIAL RECTUS

?

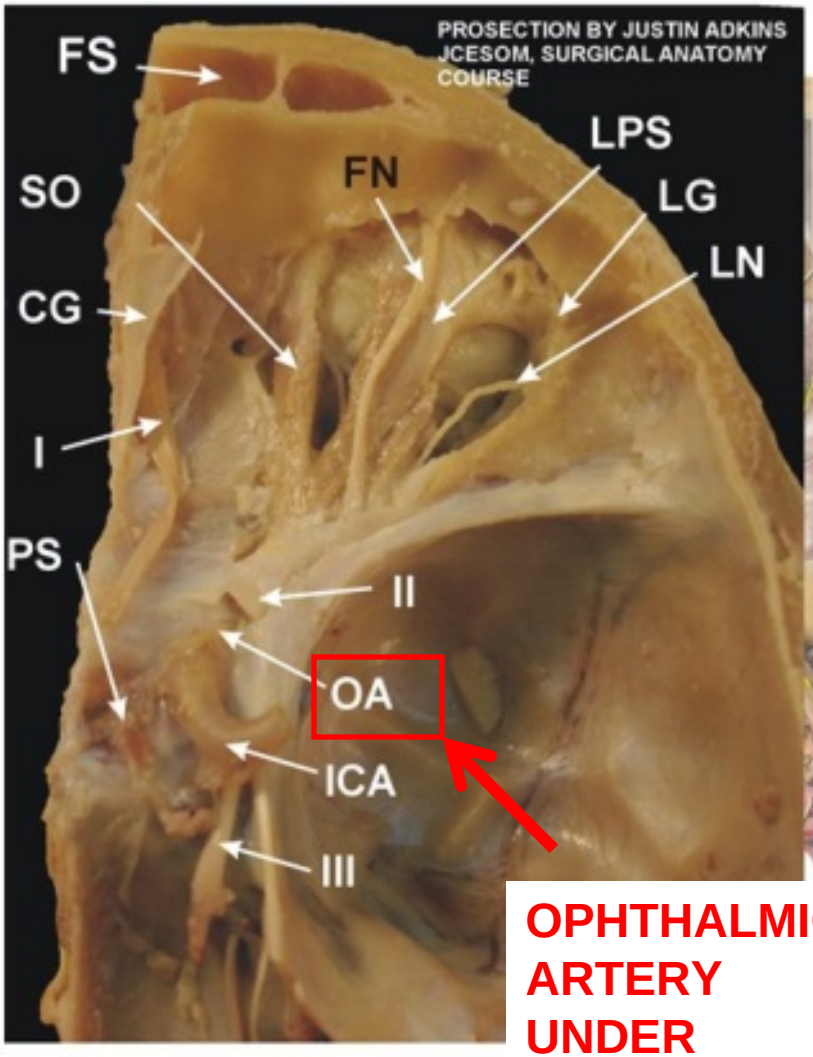
WHAT NERVE INNERVATES THIS MUSCLE?

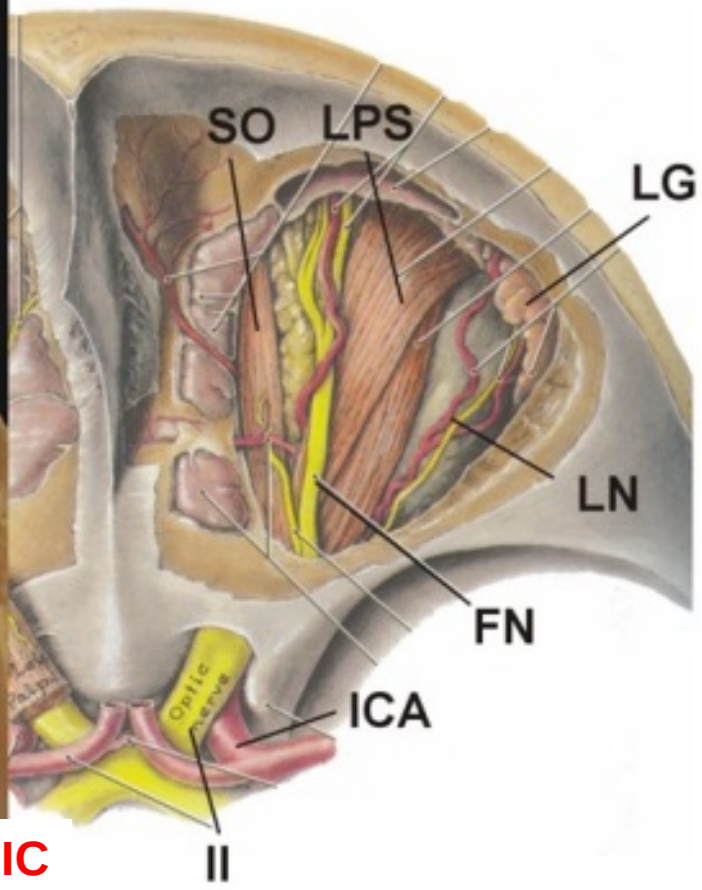


?

WHAT CRANIAL NERVE CAUSES THIS GLAND TO SECRETE

PROSECTION OF ORBIT - SUPERFICIAL DISSECTION



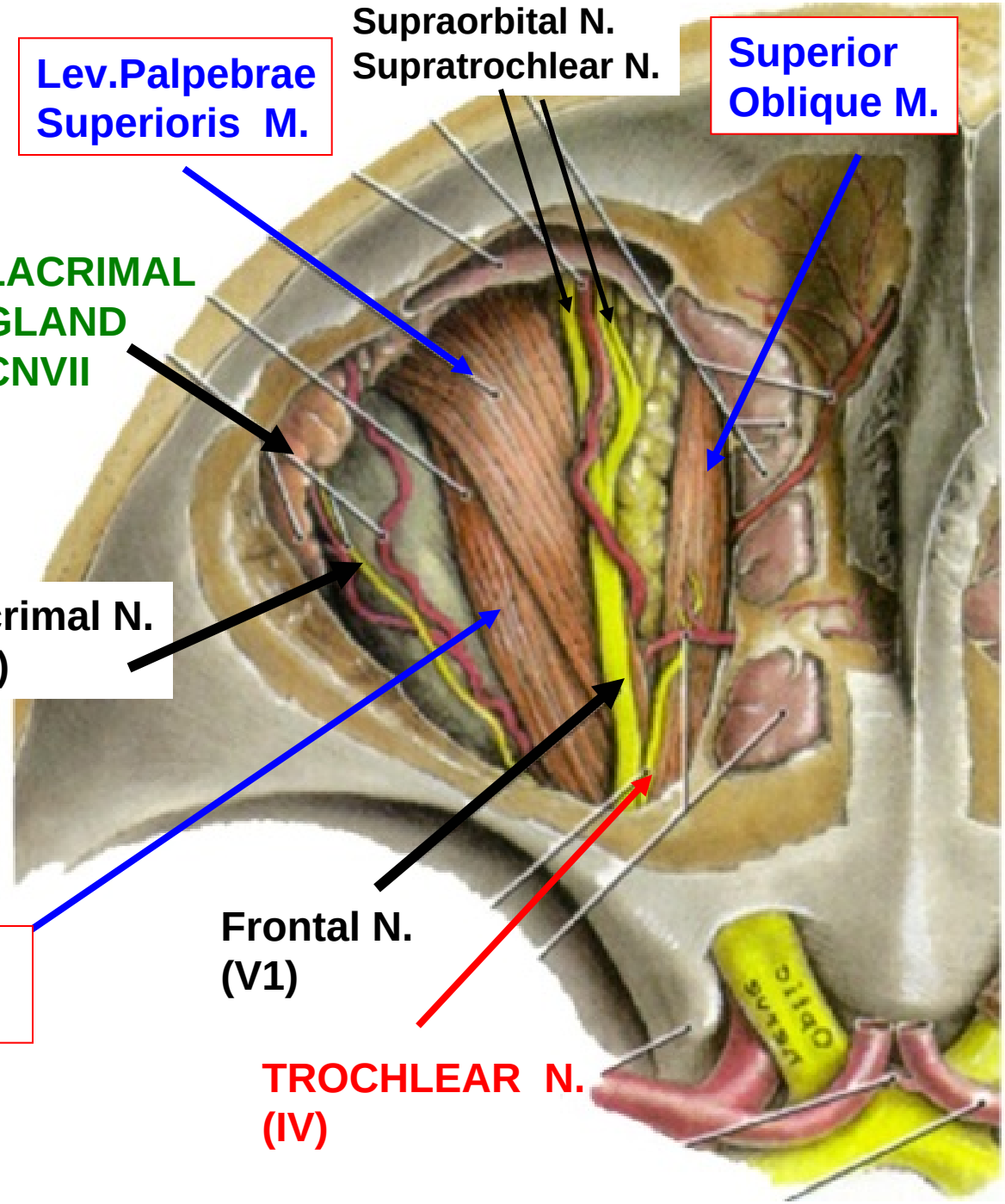


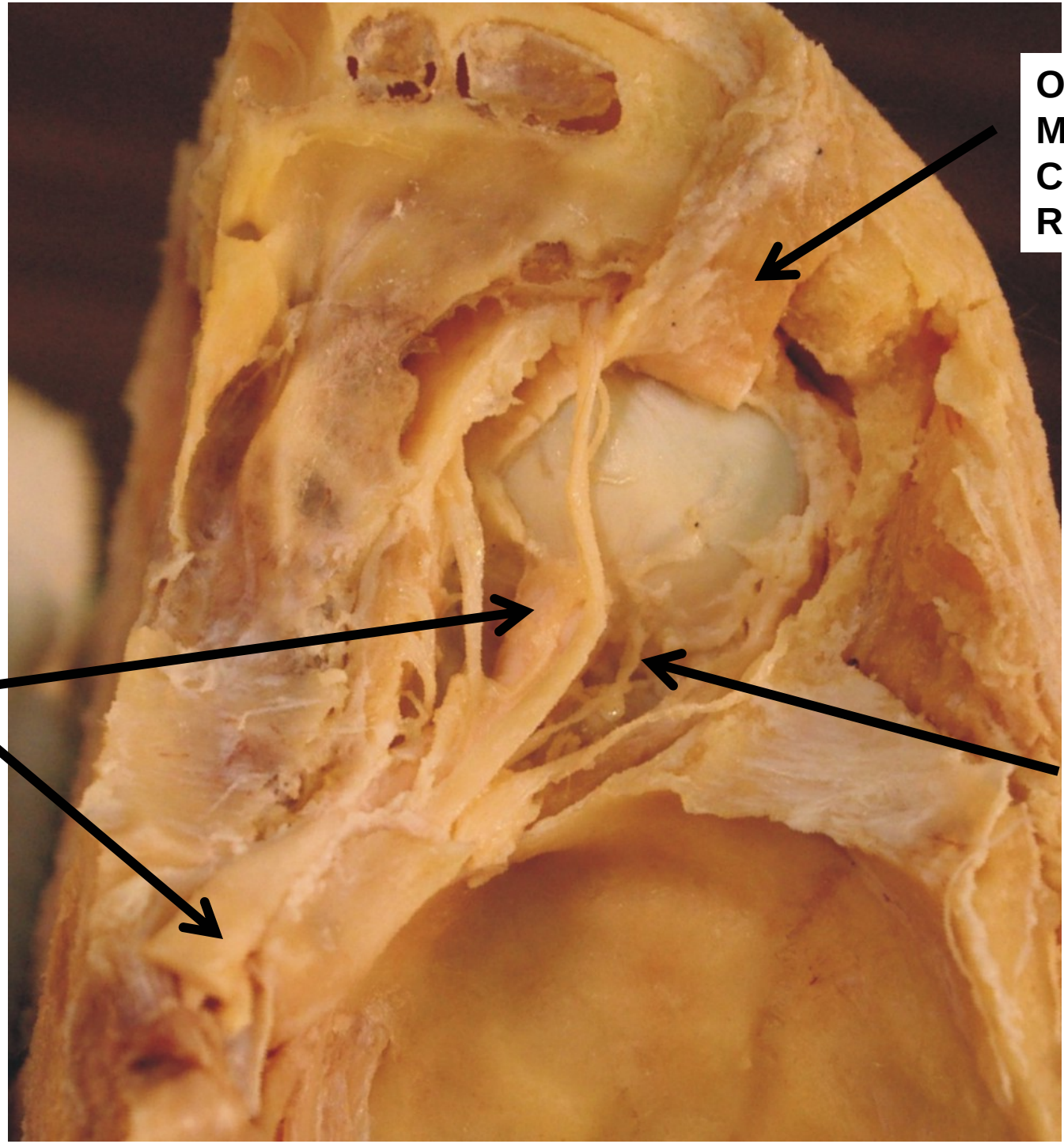
OPHTHALMIC ARTERY UNDER CN II

SUPERFICIAL ORBIT

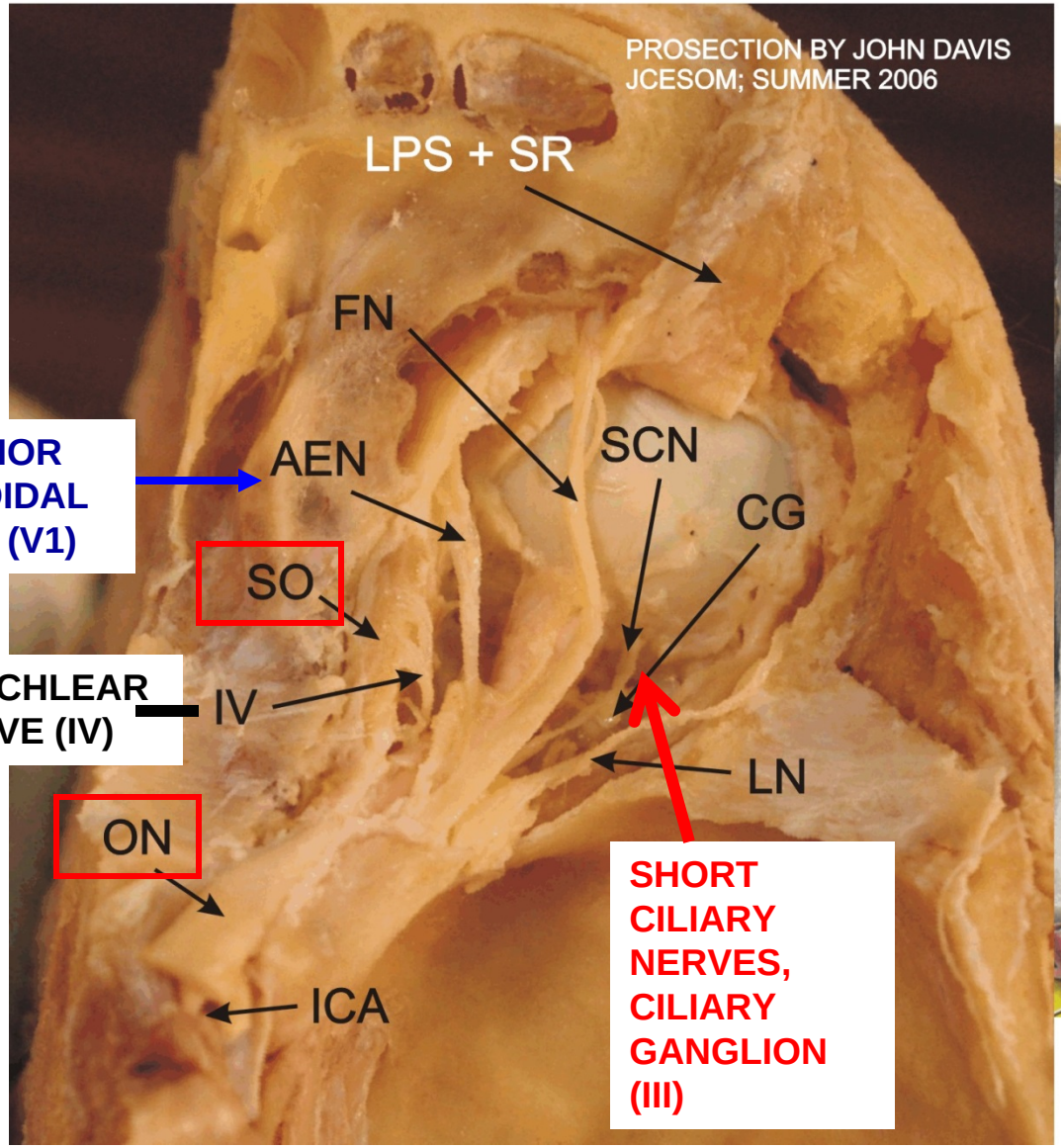
see
NERVES (V1)
- V1 - Frontal n.: divides to form Supraorbital, Supratrochlear Nerves

Muscles - Lev.Palpebrae Superioris to Upper Eyelid




ORIENT MUSCLES CUT AND REFLECTED
?
IDENTIFY LARGE NERVE
?
IDENTIFY NERVE(S)

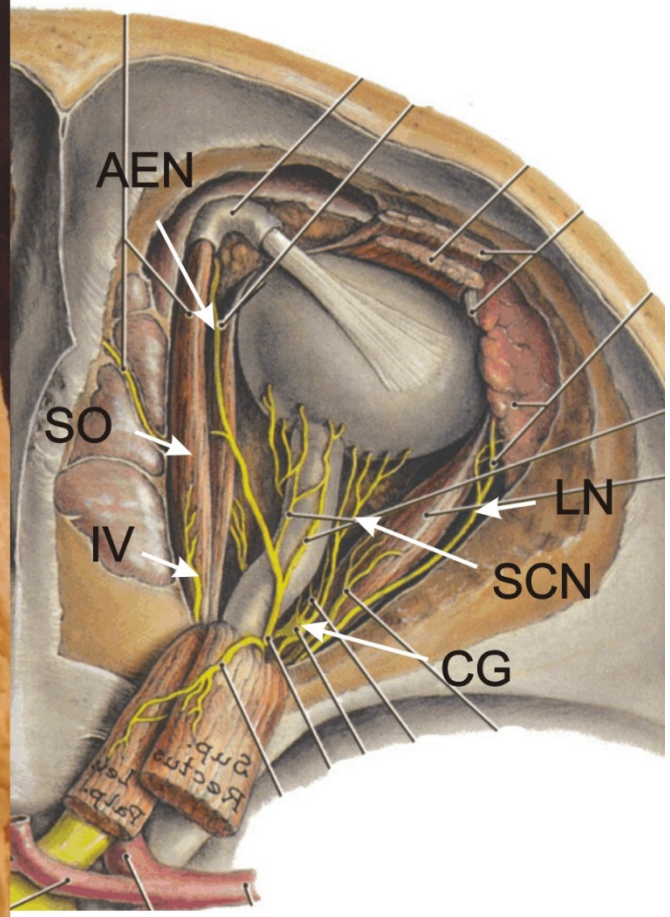
PROSECTION OF ORBIT - Deep Dissection



ANTERIOR ETHMOIDAL NERVE (V1)

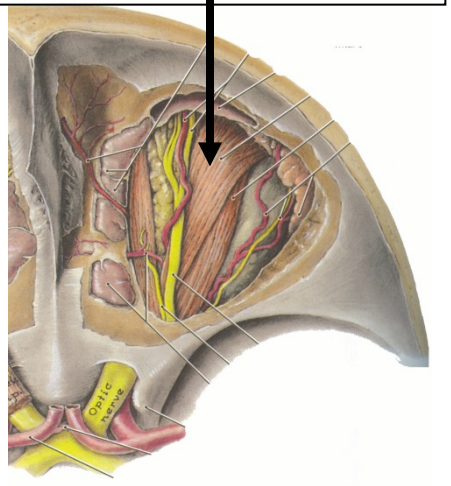
TROCHLEAR NERVE (IV)

SHORT CILIARY NERVES, CILIARY GANGLION (III)



DEEP ORBIT

REFLECT LEV PALP SUP, SUP. RECTUS.



NOSE

TROCHLEA OF SUP. OBLIQUE

LACRIMAL GLAND

ANTERIOR AND POSTERIOR ETHMOIDAL NERVES (V1)

LONG CILIARY NERVES (V1)

OPTIC NERVE

SENSORY - V1
branches - MEDIAL
PARASYMPATHETIC - III - LATERAL

SHORT CILIARY NERVES III

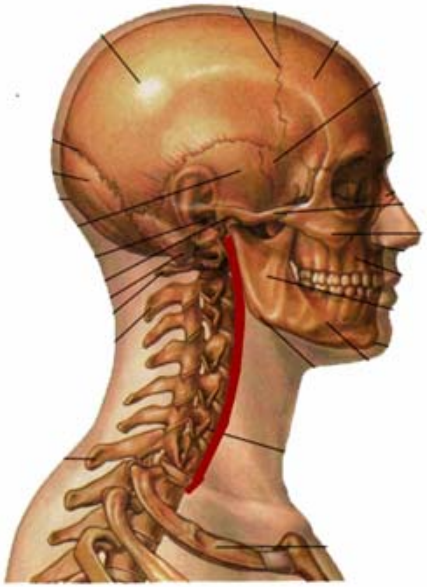
CILIARY GANGLION - PARA-SYMP. III

REFLECT LEV PALP SUP, SUP. RECTUS.

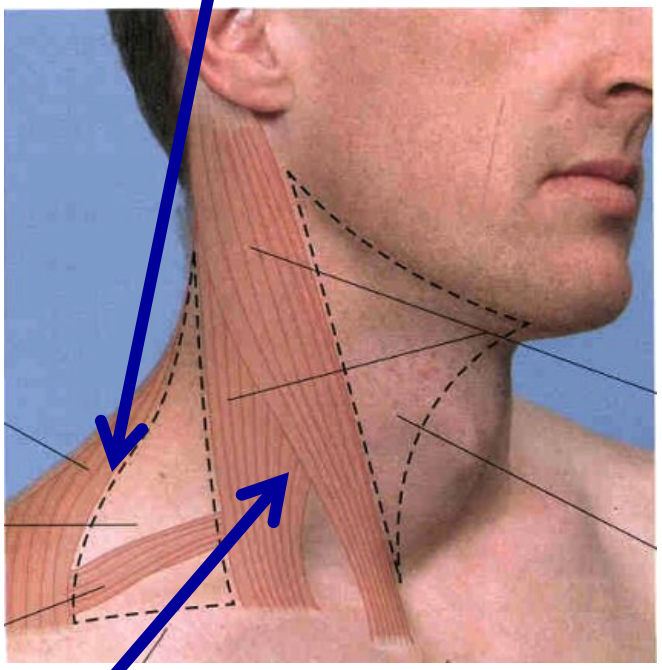
NECK

MUSCLES OF NECK - MAJOR LANDMARKS

NECK - VERTEBRA AND MUSCLES



TRAPEZIUS



STERNOCLEIDO-MASTOID

LATERAL NECK - POSTERIOR TRIANGLE

1) STERNOCLEIDO-MASTOID
2) TRAPEZIUS

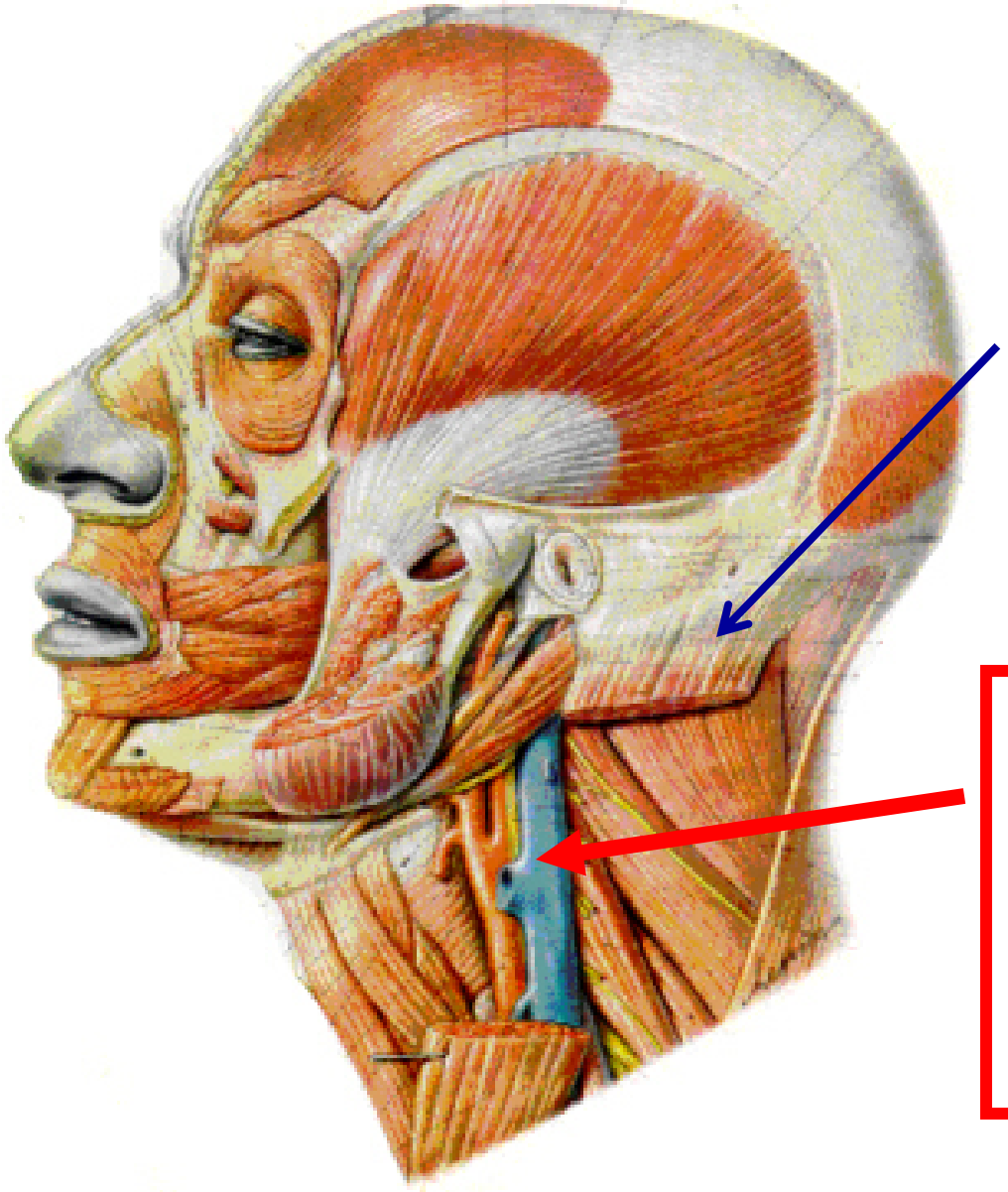
Innervation - CN XI - Accessory Nerve

CLINICAL TEST OF ACCESSORY NERVE (CN XI) -

1) 'Shrug' shoulders - tests Trapezius
2) Rotate (Flex) head - tests Sternocleidomastoid

3. LATERAL COMPARTMENT - CAROTID SHEATH

CLINICAL **

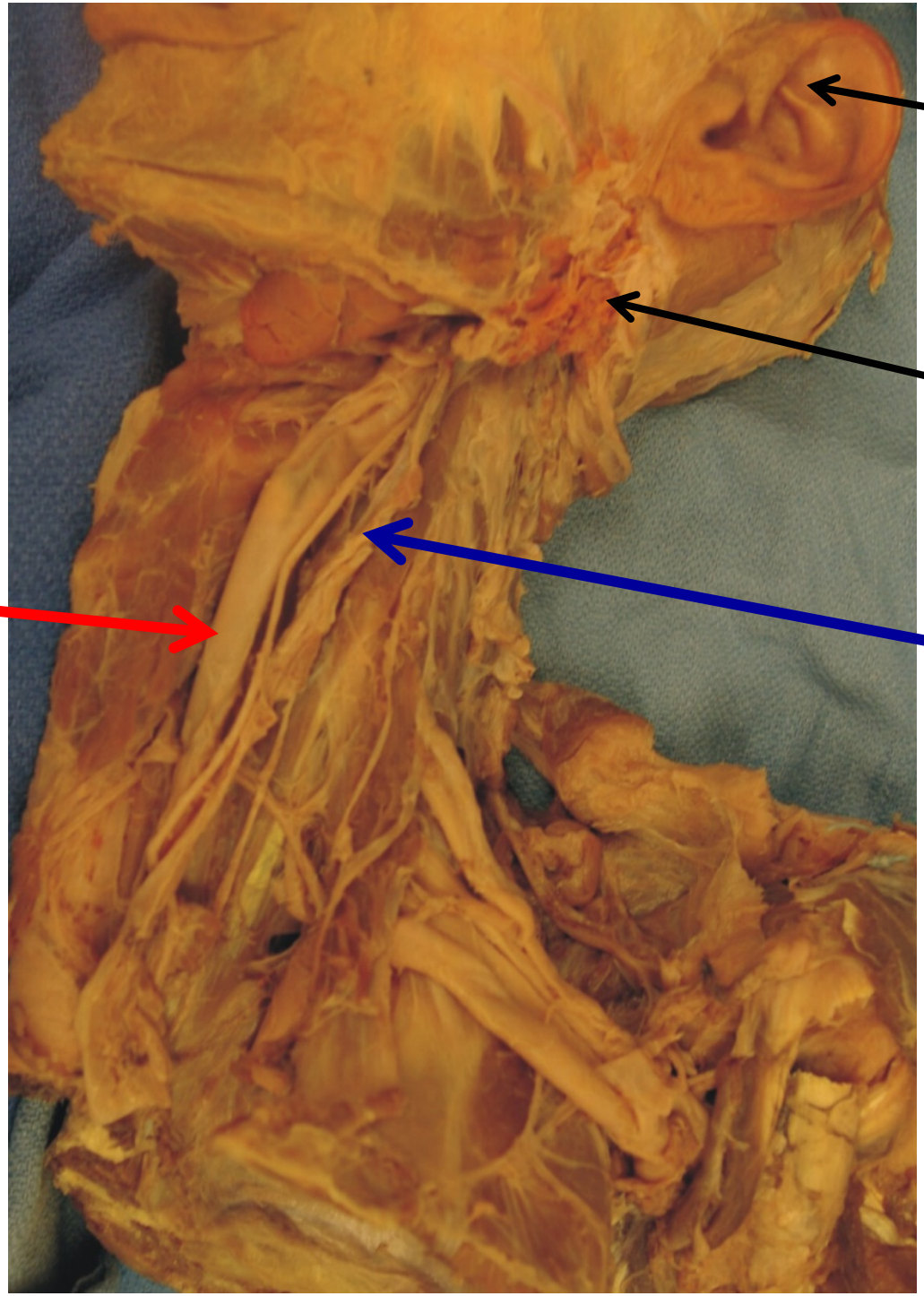


ORIENT STERNOCLEIDOMASTOID CUT (REFLECTED)

Lateral Compartment- lateral and posterior to pharynx

Contained in Carotid Sheath

ORIENT
NOSE



ORIENT
EAR

ORIENT
STERNO-
CLEIDO-
MASTOID
REFLECT

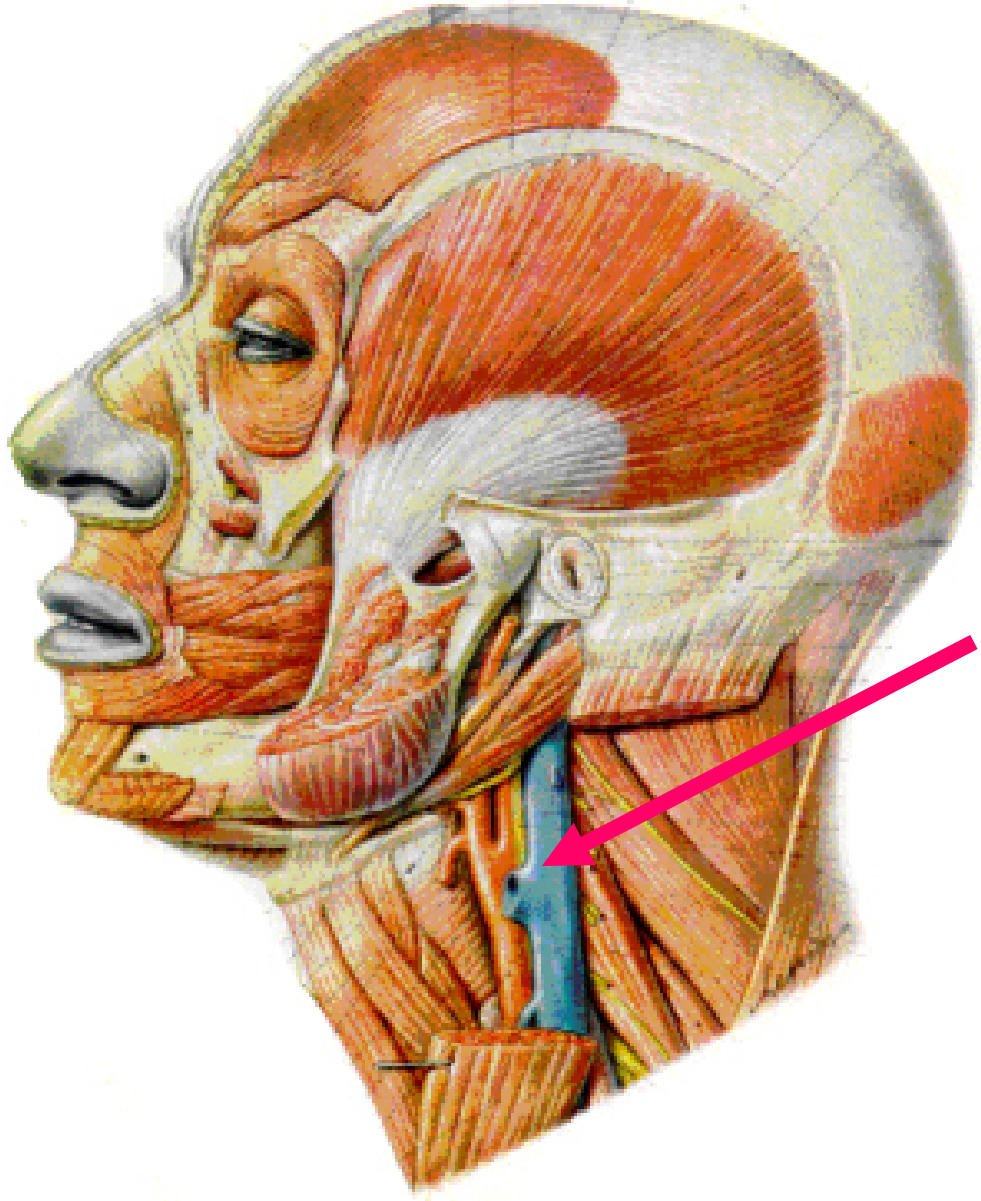
?

IDENTIFY
ARTERY

?

IDENTIFY
VEIN

3. LATERAL COMPARTMENT - CAROTID SHEATH



CLINICAL **

Lateral Compartment- lateral and posterior to pharynx

Contained in Carotid Sheath

1) Common and Internal Carotid arteries; 2) Internal jugular vein, 3) Vagus nerve

Note: Sympathetic chain is posterior to (NOT IN) Carotid Sheath

16

SUPERFICIAL AND DEEP NECK

16

SUPERFICIAL VIEW

DEEP VIEW