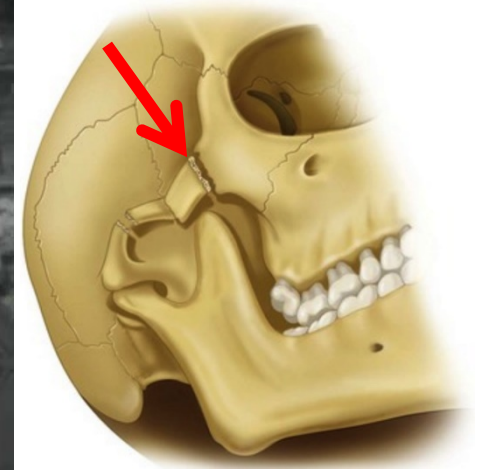


# SKULL: 2022

HEAD IS SPECIALIZED TO HOUSE AND PROTECT THE BRAIN

MANY TERMS AND FEATURES OF SKULL ARE USED TO DESCRIBE LESIONS, FRACTURES AND DISEASE PROCESSES

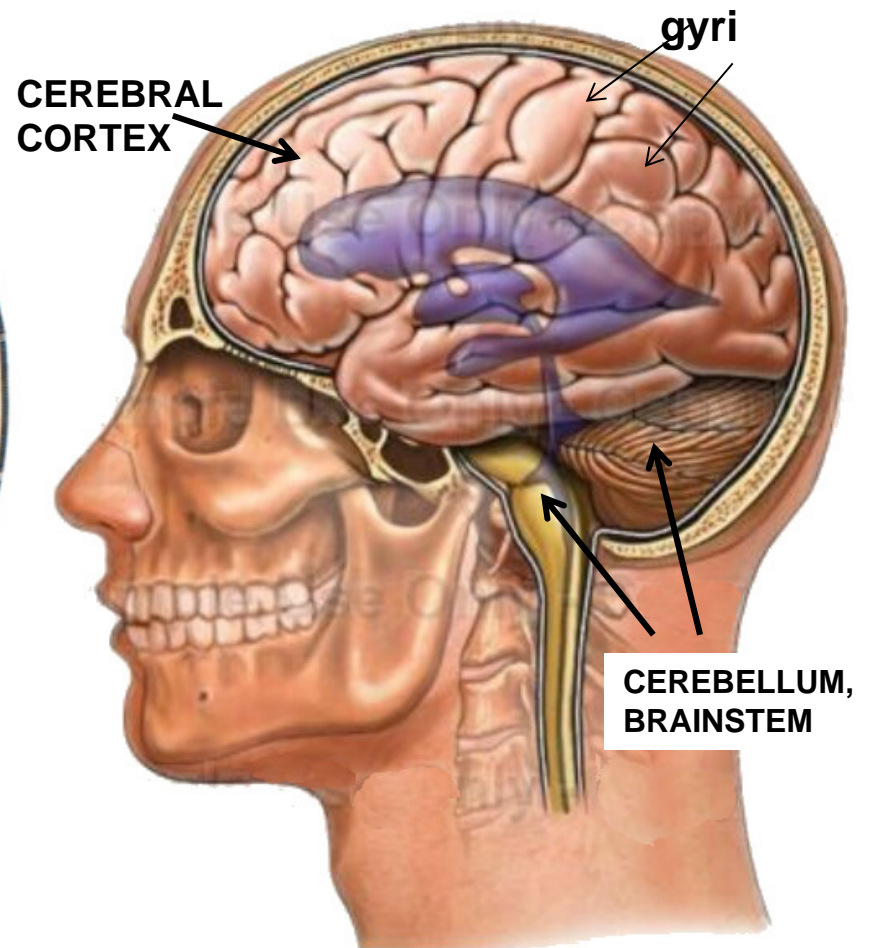
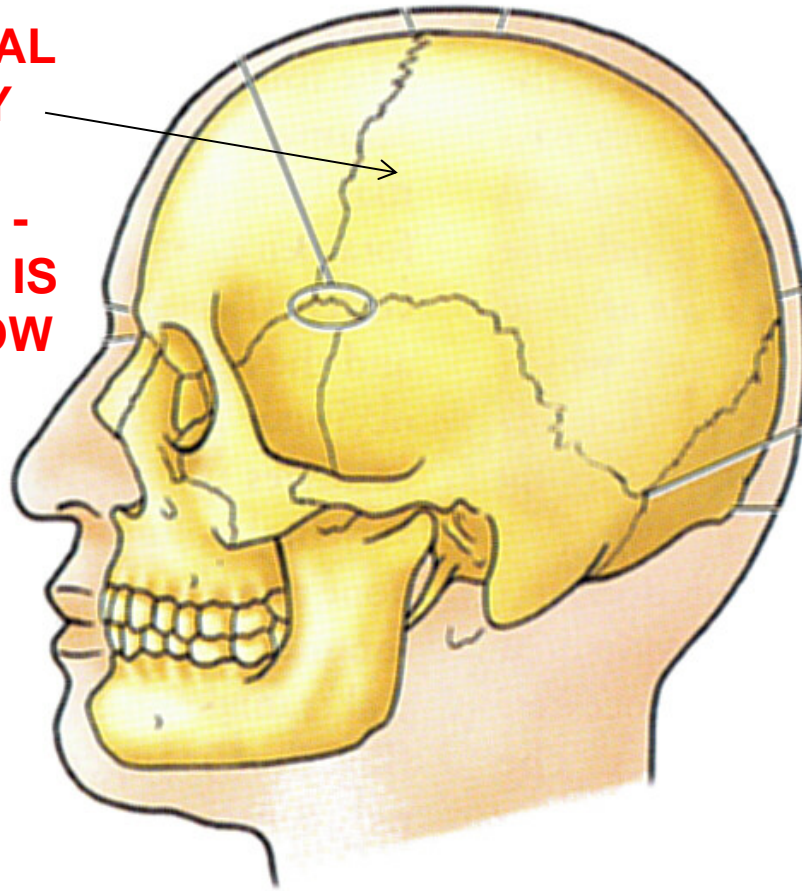
HEAD IS UNIQUE = A PERSON'S IDENTITY



**FRACTURE  
ZYGOMATIC  
ARCH**

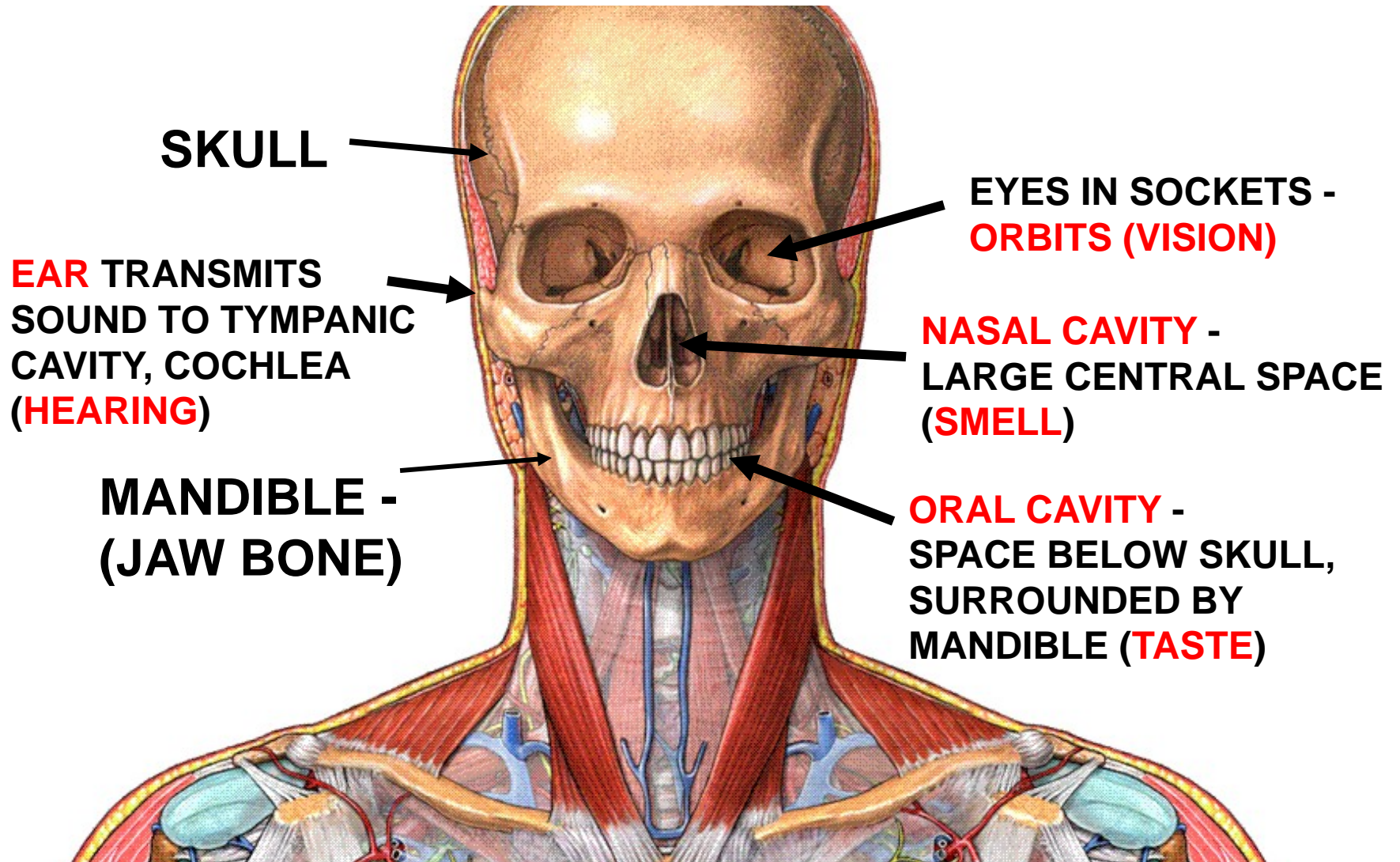
# **SKULL: HEAD IS SPECIALIZED TO HOUSE AND PROTECT THE BRAIN INSIDE CRANIAL CAVITY**

**CRANIAL  
CAVITY  
INSIDE  
SKULL -  
SKULL IS  
HOLLOW**



**note: Cranial cavity is molded to brain like a glove fitting a hand;  
THERE IS NO OTHER ROOM INSIDE CRANIAL CAVITY; bleeding  
(hematoma) or tumors can have severe consequences**

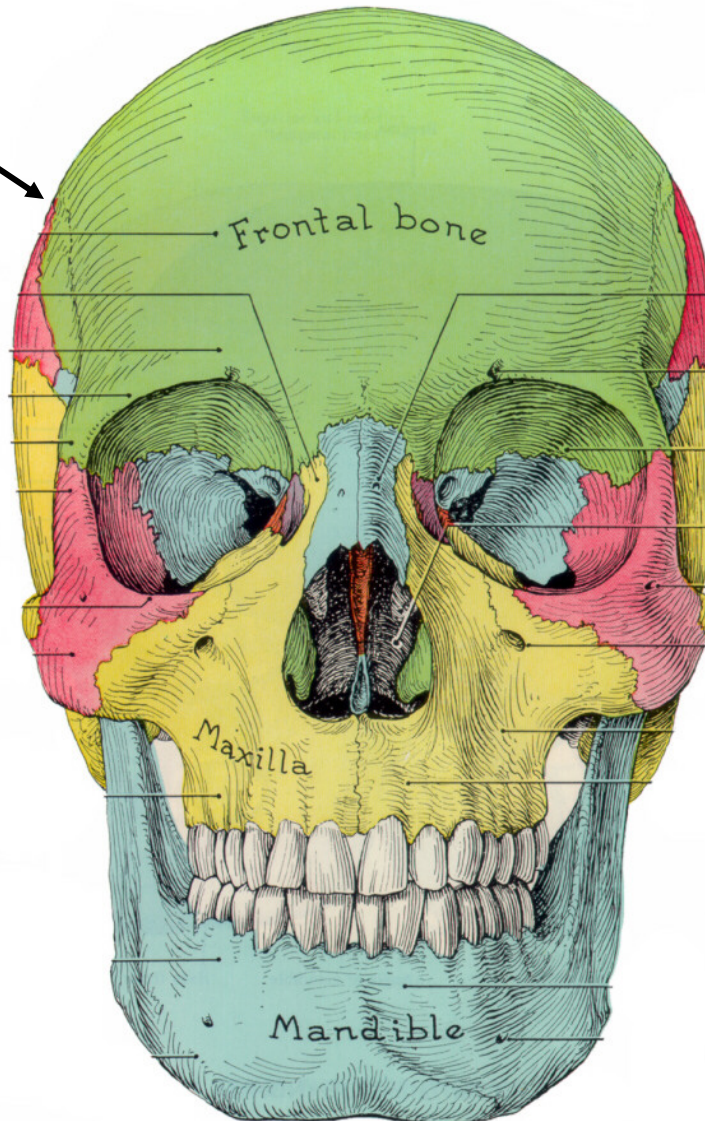
## SKULL IS DESIGNED TO CONTAIN SPECIAL SENSES



HEAD AND NECK IS COMPLEX, IN PART, BECAUSE SPECIAL SENSES ARE LOCATED IN HEAD: **VISION, TASTE, SMELL, HEARING (EQUILIBRIUM)**; **THESE STRUCTURES ARE INNERVATE BY CRANIAL NERVES**

# SKULL - bones rigidly connected by sutures to protect brain, attach move eyes

Sutures  
Look like  
Cracks  
In  
Bone



## OUTLINE

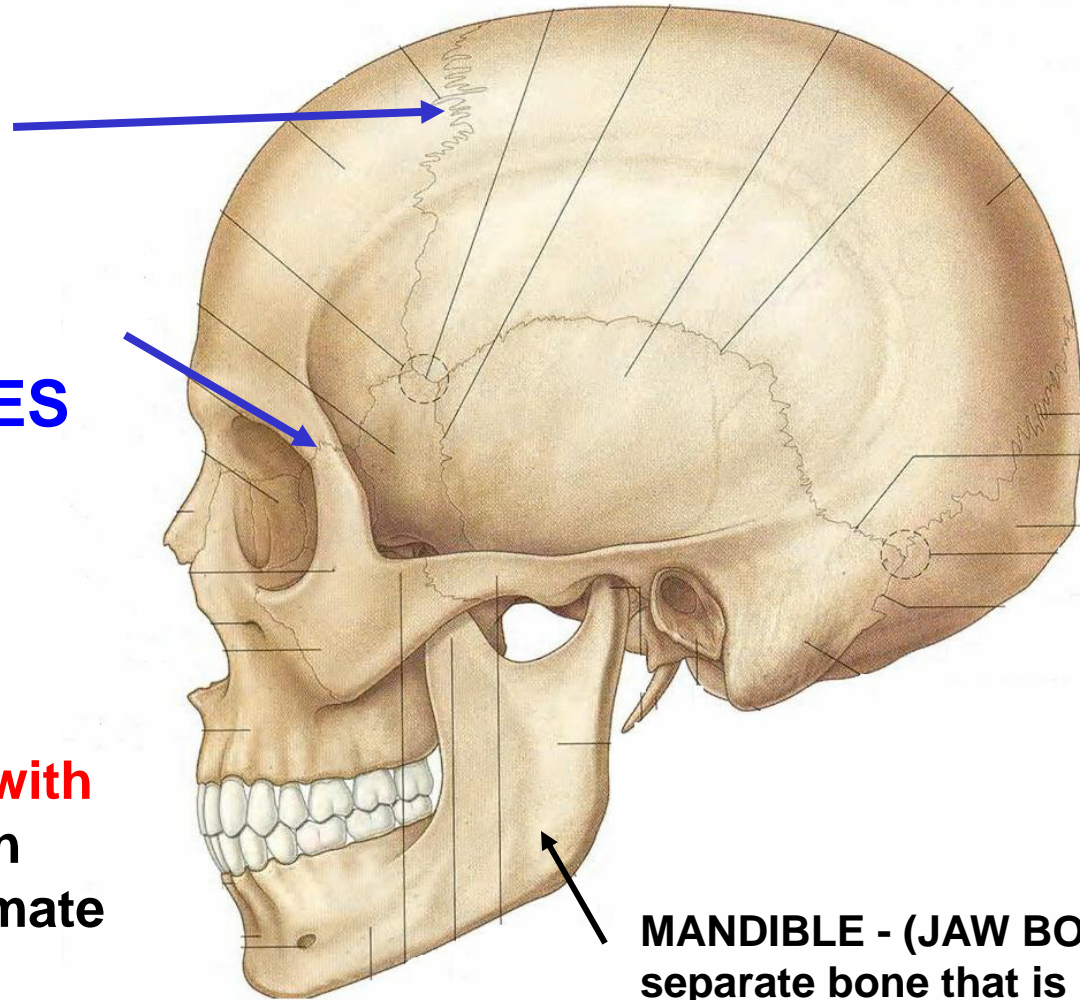
- I. CALVARIUM
- II. SCALP
- III. CRANIAL NERVES
- IV. LANDMARKS/ BONES OF SKULL
- V. CRANIAL CAVITY

Foramina covered in  
Skull session

**SKULL**- bones rigidly connected by sutures to protect brain; also provides attachment to move eyes precisely

**SUTURES =  
FIBROUS  
CONNECTIVE  
TISSUE JOINTS  
BETWEEN BONES  
(LOOK LIKE  
CRACKS)**

**Note: Sutures progressively fuse with age; extent of fusion can be used to estimate age of skull.**

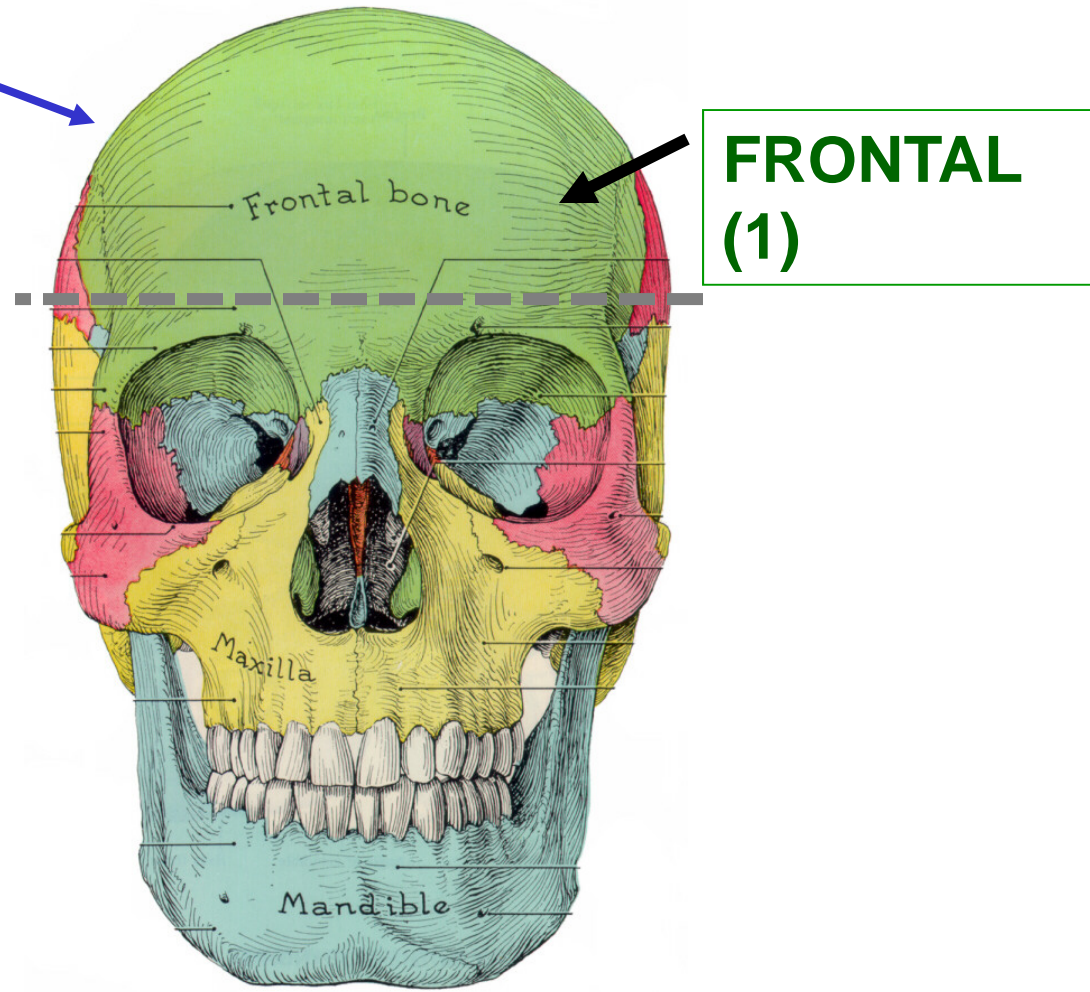


**MANDIBLE - (JAW BONE) -  
separate bone that is  
moveable**

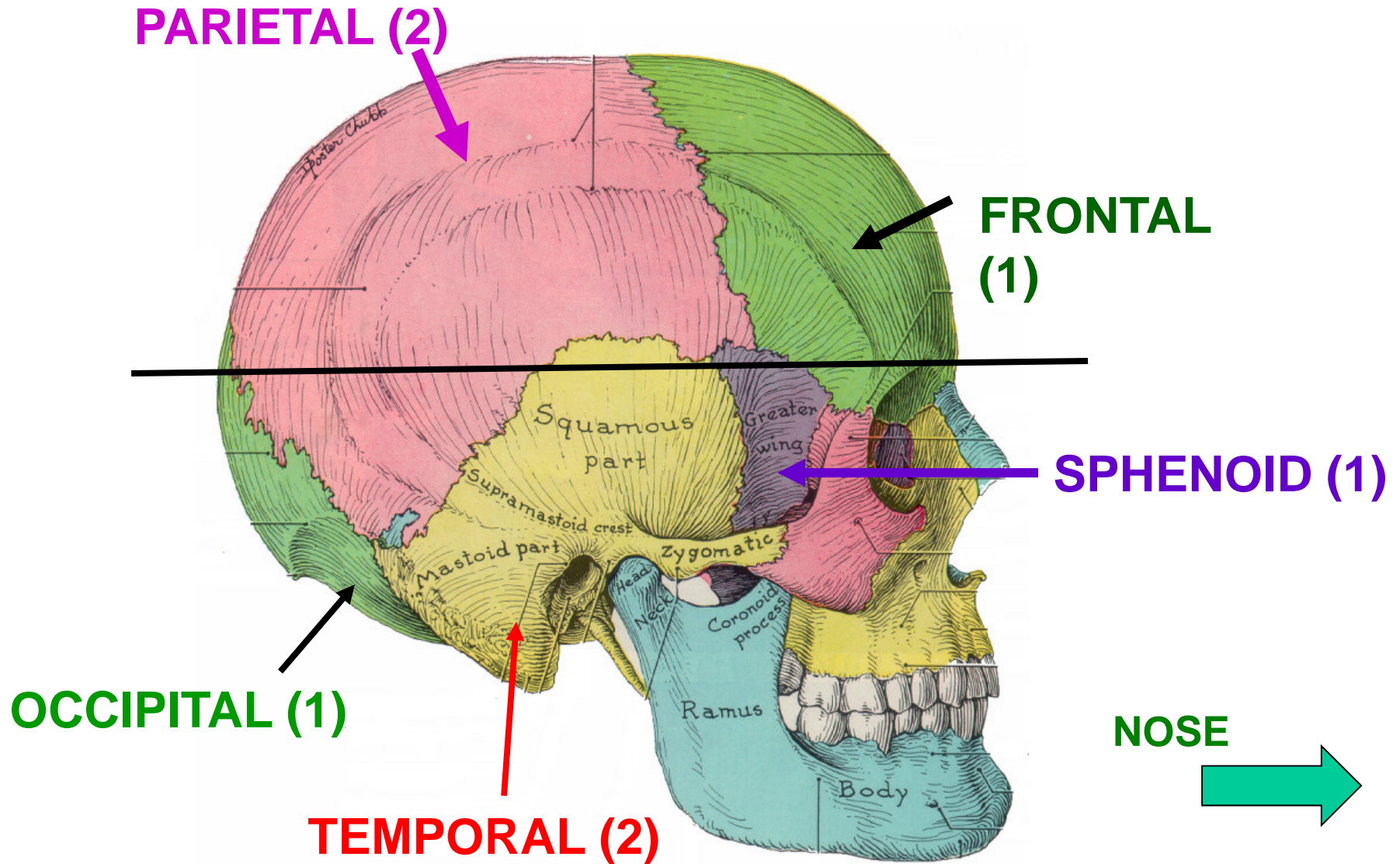
# SKULL - bones rigidly connected by sutures to protect brain, attach move eyes

## I. CALVARIUM = SKULL CAP -

Consists of  
bones linked  
by sutures

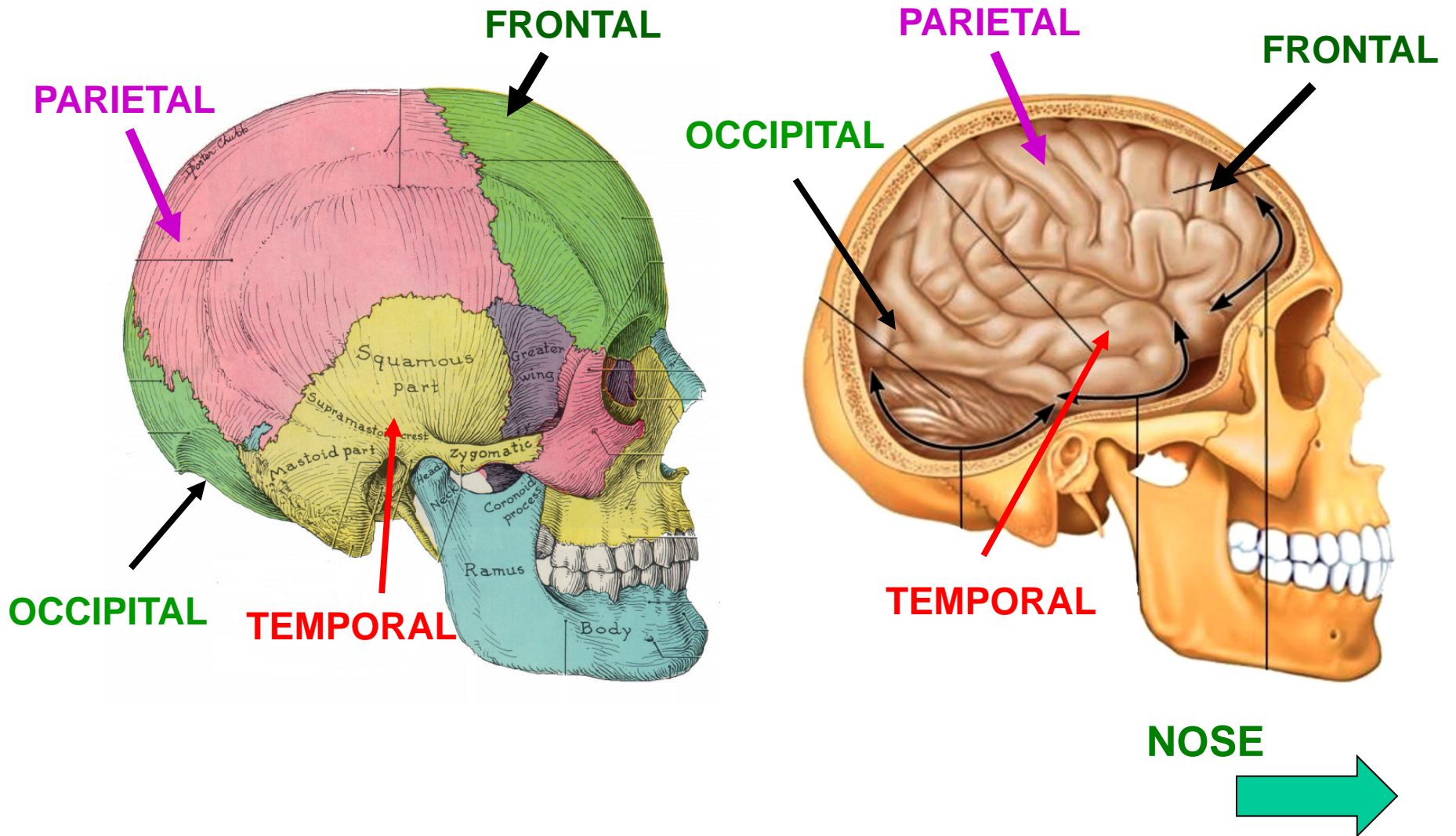


# A. BONES OF CALVARIUM = SKULL CAP



SPHENOID (Gk) = wedge

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



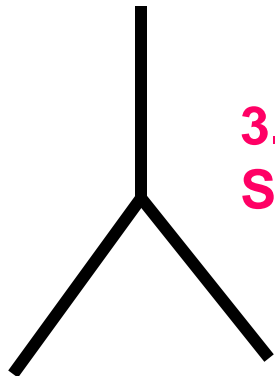


## B. SUTURES

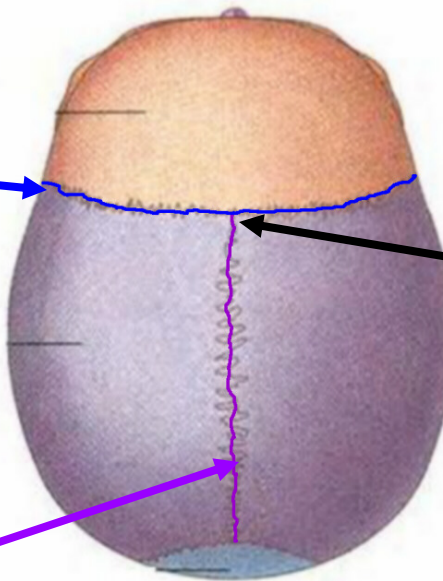
1. CORONAL SUTURE

2. SAGITTAL SUTURE

3. LAMBDOIDAL SUTURE



LAMBDA -  
Greek letter



## C. LANDMARKS

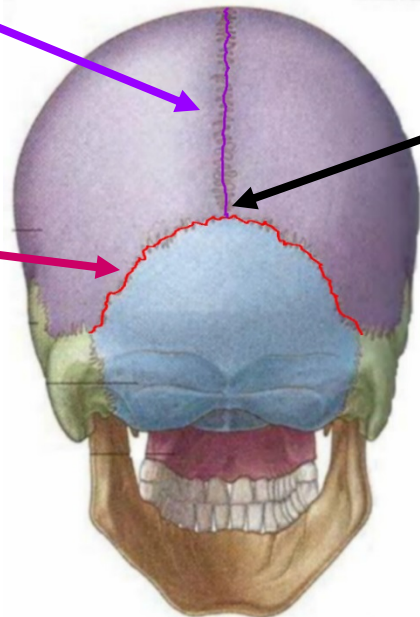
\*\*

1. **BREGMA** - MID  
POINT OF CORONAL  
SUTURE

superior (top) view

\*\*

2. **LAMBDA** - MID  
POINT OF  
LAMBDOIDAL  
SUTURE

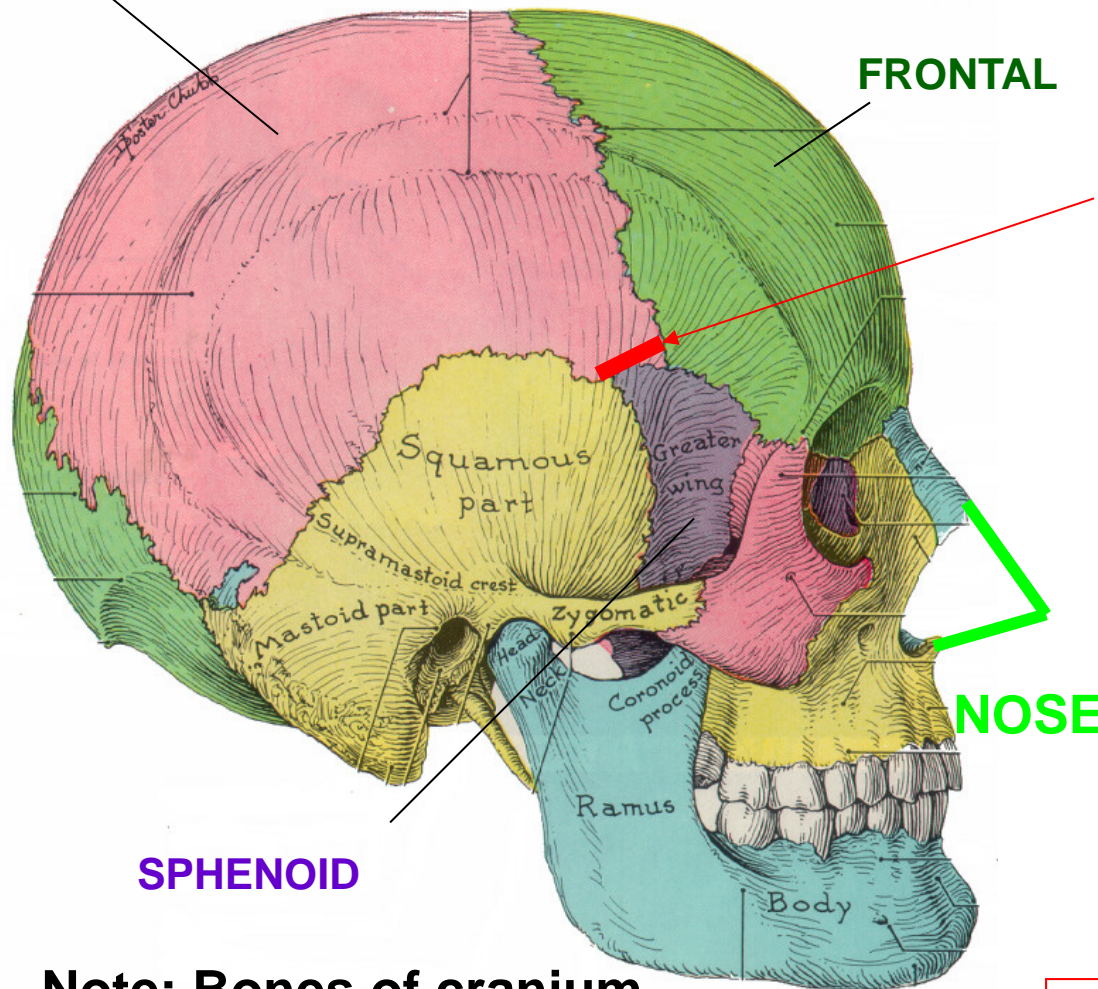


posterior (back) view

## CORONAL SUTURE

PARIETAL

FRONTAL



SPHENOID

## C. LANDMARKS

### 3. PTERION \*\*

- JUNCTION OF  
TEMPORAL SPHENOID  
PARIETAL AND FRONTAL  
BONES

PIC THANKS TO DR. ALBERICO



Note: Bones of cranium  
fuse (sutures disappear)  
with age)

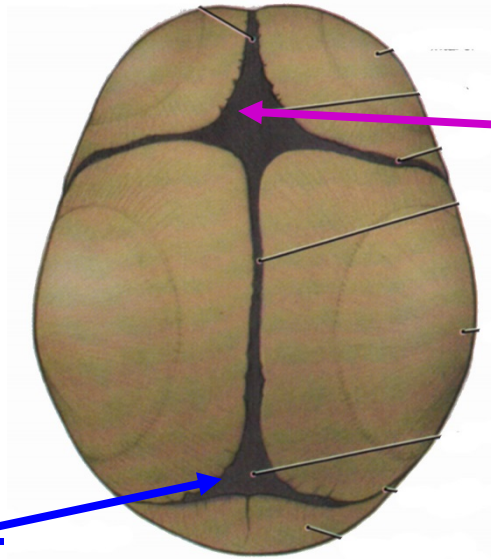
\*\*

Note: Skull fractures in region  
of pterion clinically important  
(Epidural Hematoma)

## D. FONTANELLES - Membranes that link bones at birth

- FONTANELLES ('soft spots') PERMIT CRANIAL COMPRESSION AT BIRTH - CRANIAL GROWTH

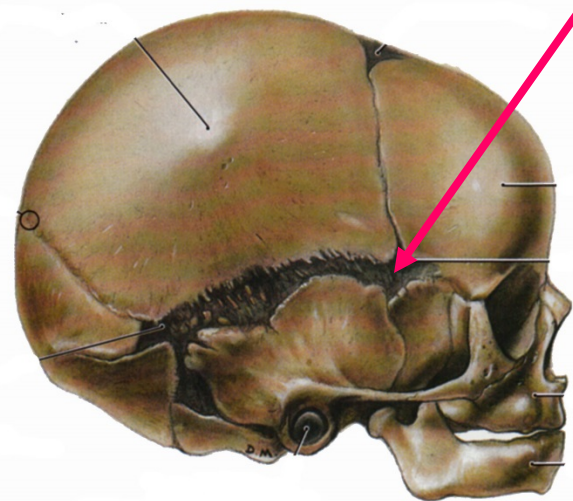
2. POSTERIOR FONTANELLE - AT LAMBDA



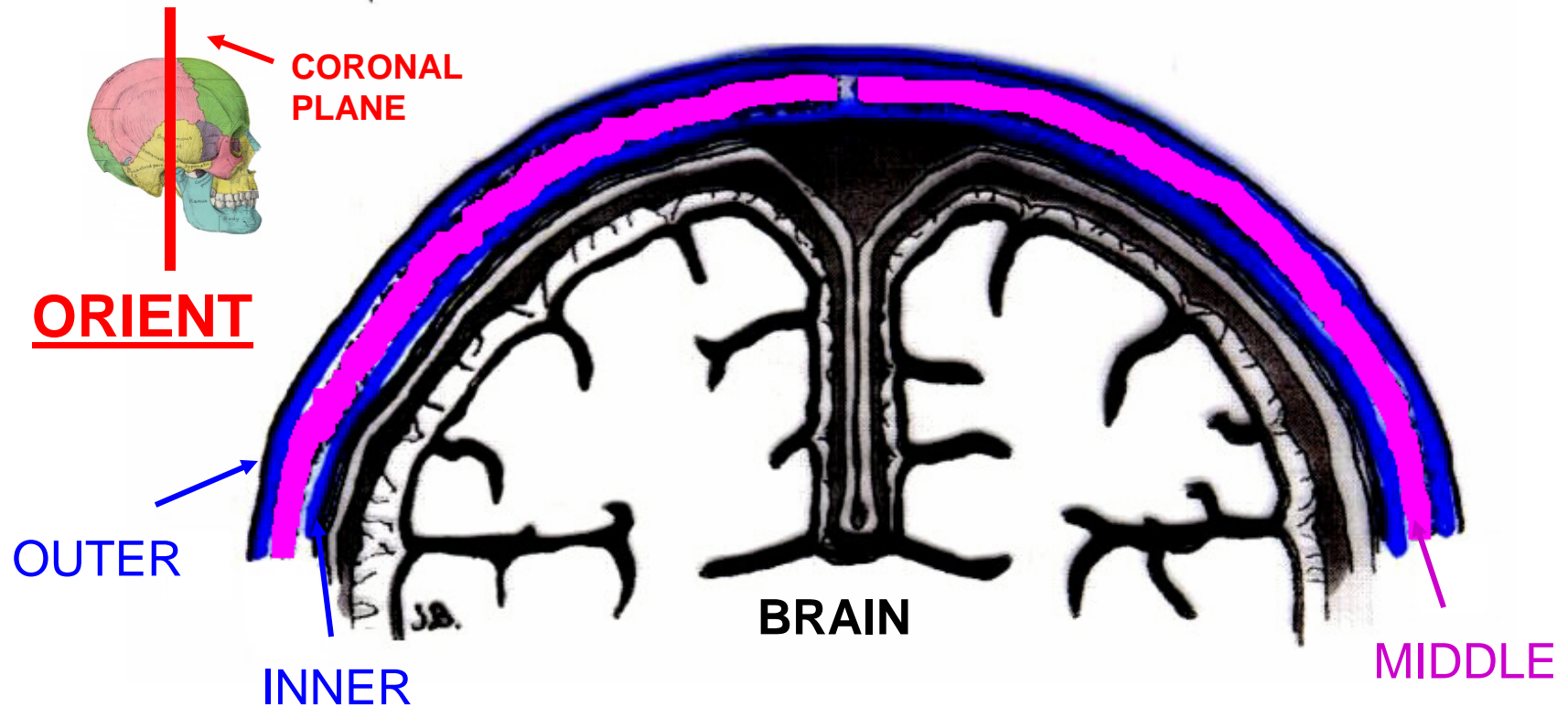
1. ANTERIOR FONTANELLE AT BREGMA

3. LATERAL FONTANELLE AT PTERION

Note: In emergencies, the Anterior Fontanelle can be used to access Superior Sagittal venous sinus in neonates



# E. INTERNAL STRUCTURE OF CALVARIUM



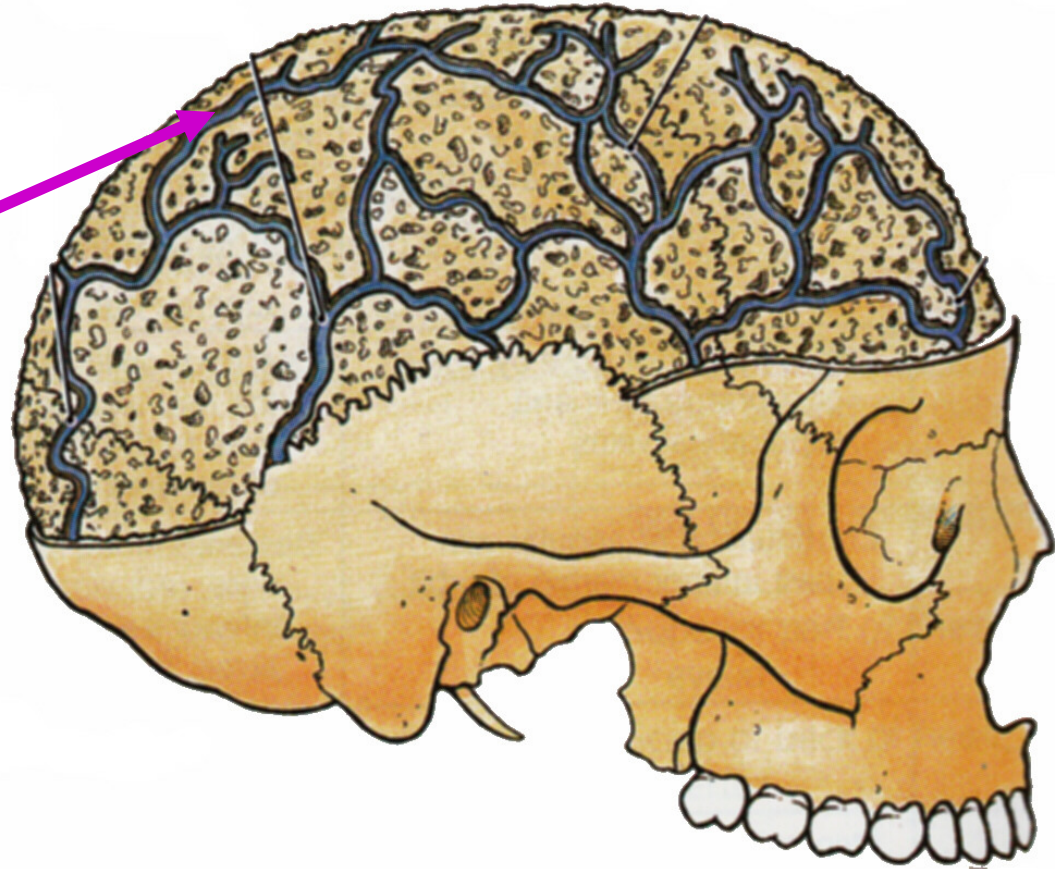
1. INNER AND OUTER TABLES - HARD CORTICAL BONE

MIDDLE LAYER - SOFT SPONGY BONE CALLED DIPLOE (= DOUBLE IN GREEK)

## 2. DIPLOIC VEINS

view when outer table of bone is partially removed

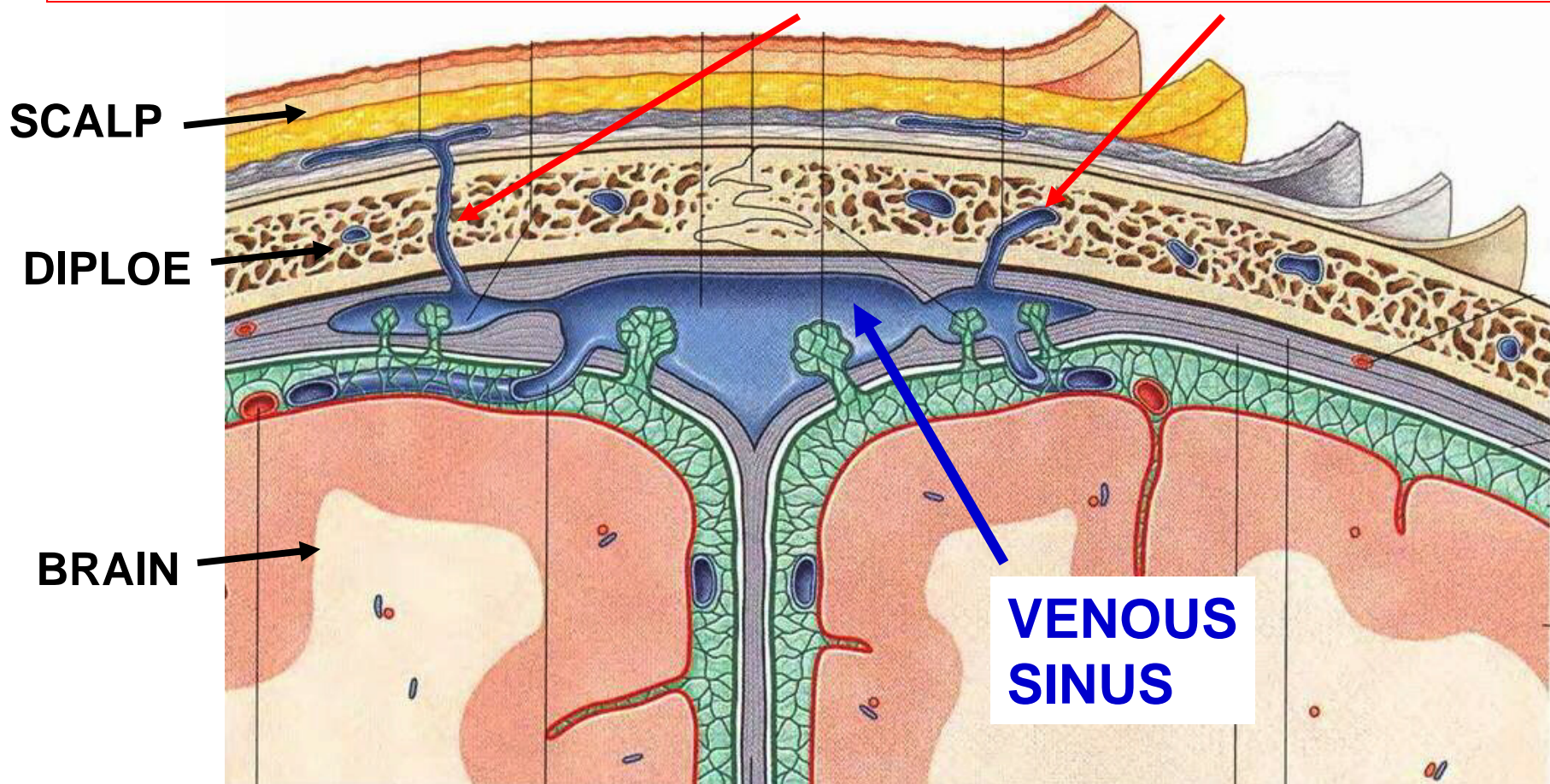
**COURSE IN  
DIPLOE -  
CONNECT BOTH  
TO CRANIAL  
CAVITY AND  
SURFACE OF  
SKULL**



**- CAN TRANSMIT INFECTION FROM SCALP TO  
BRAIN VIA EMISSARY VEINS**

## EMISSARY VEINS

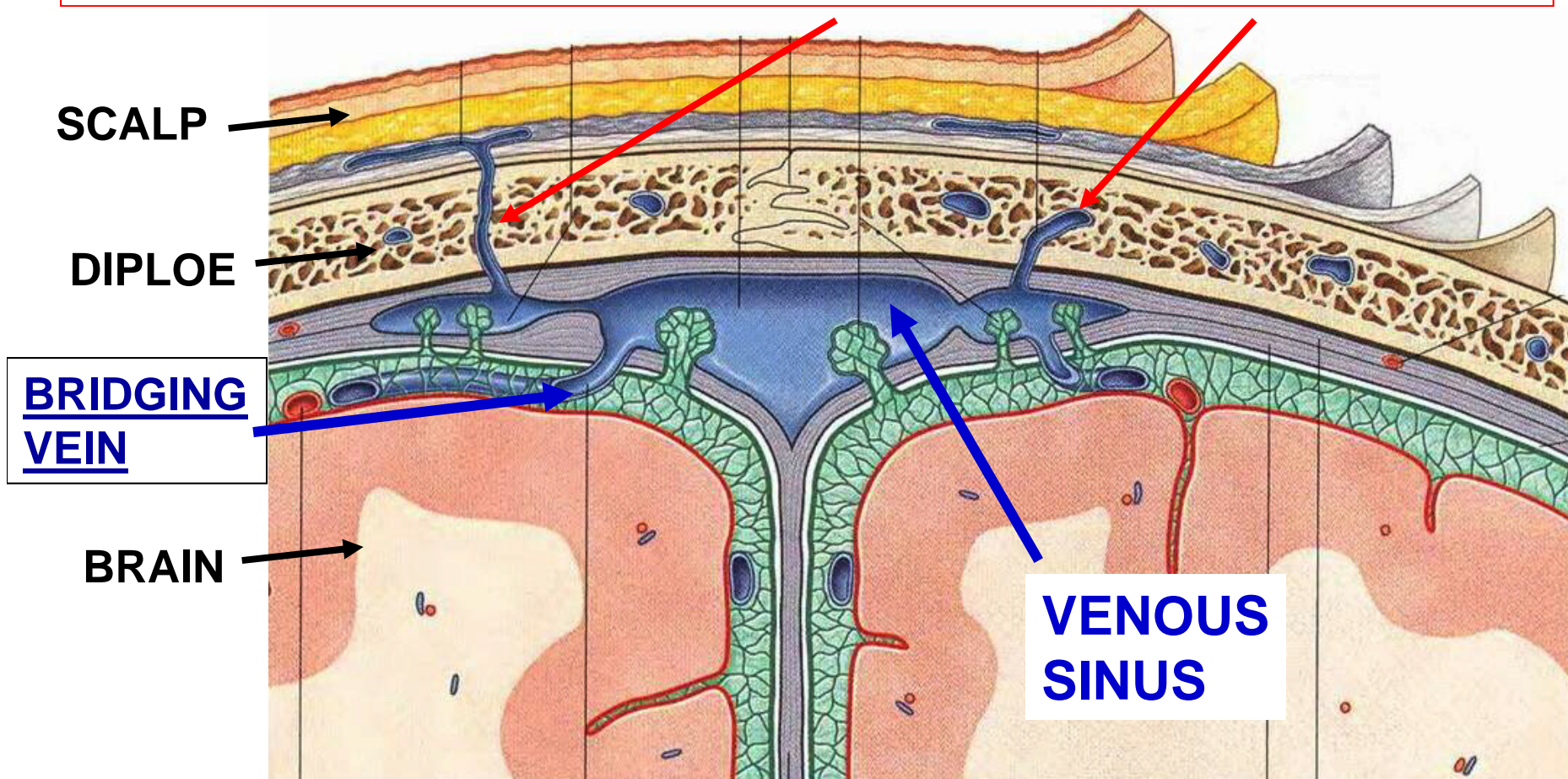
**EMISSARY VEIN - SCALP TO DIPLOE, SCALP TO SINUS, DIPLOE TO SINUS**



**note: Emissary vein – connect 'outside' to venous sinus**

## EMISSARY VEINS VS BRIDGING VEINS

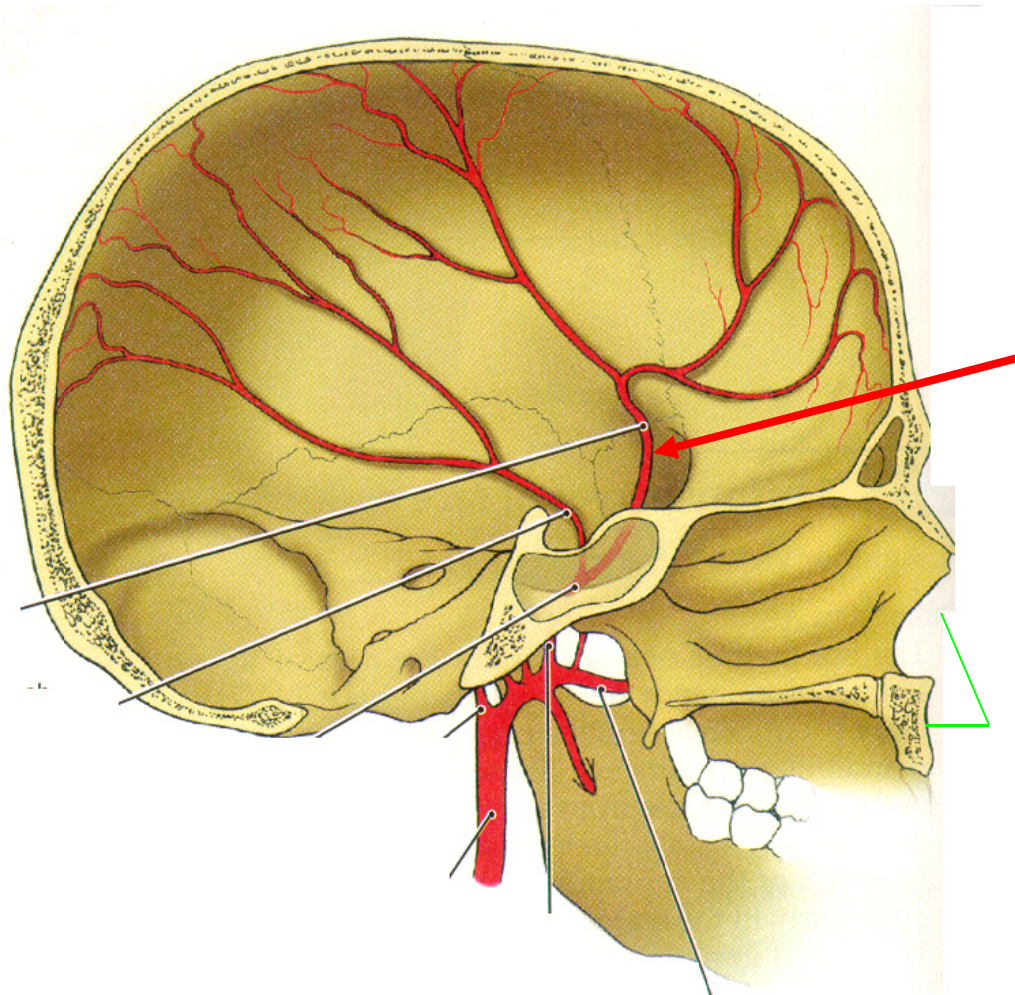
**EMISSARY VEIN - SCALP TO DIPLOE, SCALP TO SINUS, DIPLOE TO SINUS**



**BRIDGING VEIN - SURFACE OF BRAIN (CEREBRAL VEIN) TO VENOUS SINUS**

**note: Emissary vein - 'outside' to sinus; Bridging vein - brain (inside) to sinus**

## F. BLOOD SUPPLY TO CALVARIUM



1) OUTER SURFACE –  
ARTERIES TO SCALP

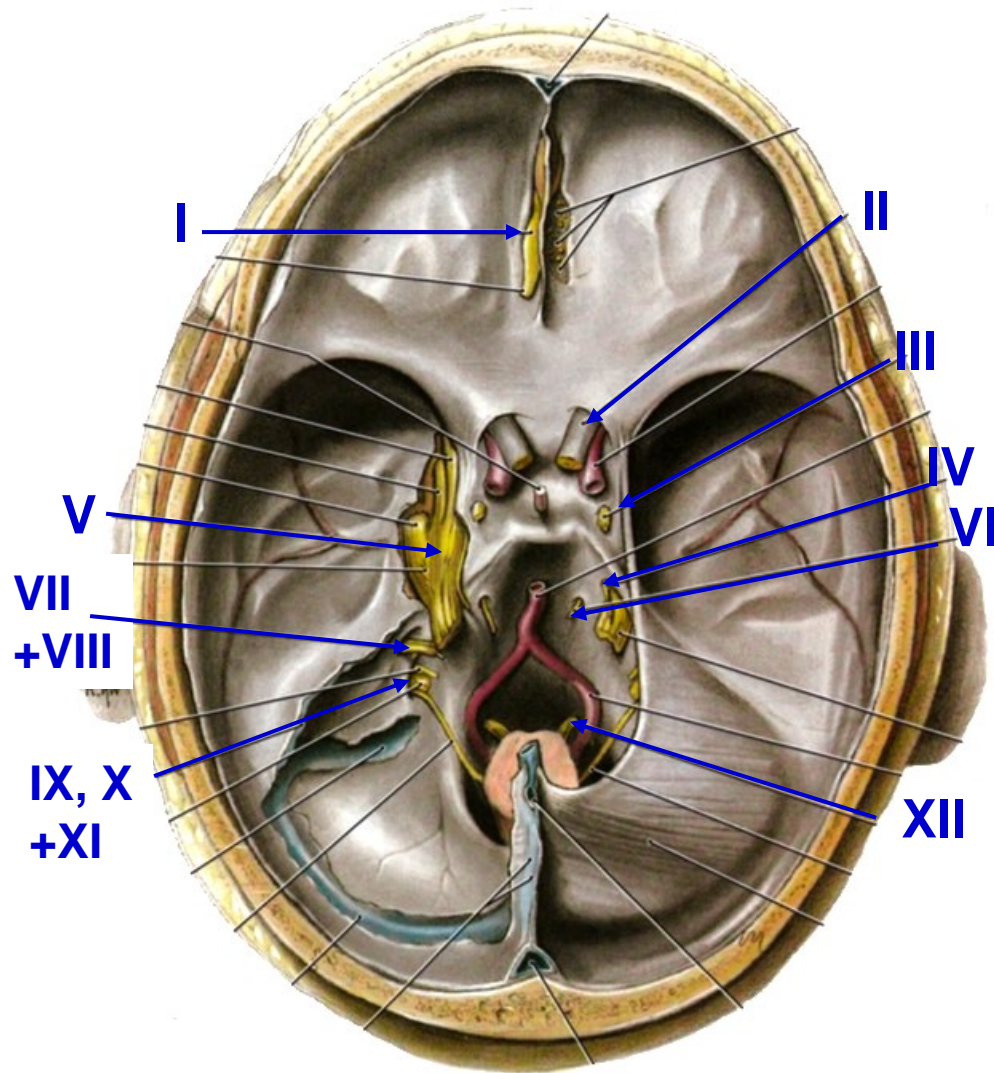
2) INNER SURFACE-  
MENINGEAL ARTERIES

COURSE NEXT TO BONE;  
MISNAMED - SOUND  
LIKE SUPPLY MENINGES  
- MOST BLOOD TO  
BONES

**Note: Skull fracture can cause bleeding of Meningeal arteries – EPIDURAL HEMATOMA**



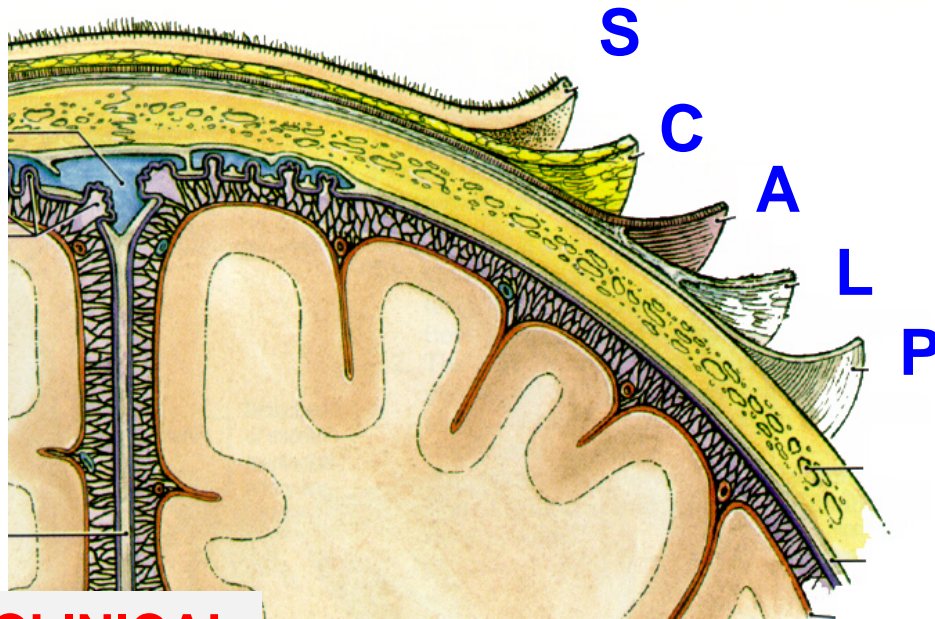
# LEARN NAMES AND NUMBERS OF CRANIAL NERVES



- 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

## II. SCALP      A. LAYERS

mnemonic - layers spell SCALP



### CLINICAL

Clinical note: Infections can readily spread through loose areolar layer deep to epicranial aponeurosis. \*\*

1. S **SKIN** – HAIR, SWEAT AND SEBACEOUS GLANDS
2. C **CONNECTIVE TISSUE** – SURROUND ARTERIES, VEINS (ORIGIN OF EMISSARY VEINS)
3. A **EPICRANIAL APONEUROSIS** – TENDINOUS SHEET, ATTACHES TO SCALP MUSCLES; MOVEABLE ANTERIOR AND POSTERIOR; LATERAL ATTACHES TO TEMPORALIS FASCIA
4. L **LOOSE AREOLAR TISSUE**- LOOSELY CONNECTS APONEUROSIS AND PERIOSTEUM CROSSED BY EMISSARY VIENS
5. P **PERIOSTEUM (PERICRANIUM) CT LAYER ON OUTER SIDE OF CALVARIUM**

**SCALPING SOMEONE: REMOVE SCALP BETWEEN 3**

**(EPICRANIAL APONEUROSIS) AND 4 (LOOSE AREOLAR TISSUE);**

Note: SAVING SCALP AS SOUVENIR - not done in civilized societies (including medical students)

## B. NERVES OF SCALP- BRANCHES OF TRIGEMINAL (V) AND CERVICAL SPINAL NERVES

### TRIGEMINAL

V1- SUPRAORBITAL N.  
SUPRATROCHLEAR N.

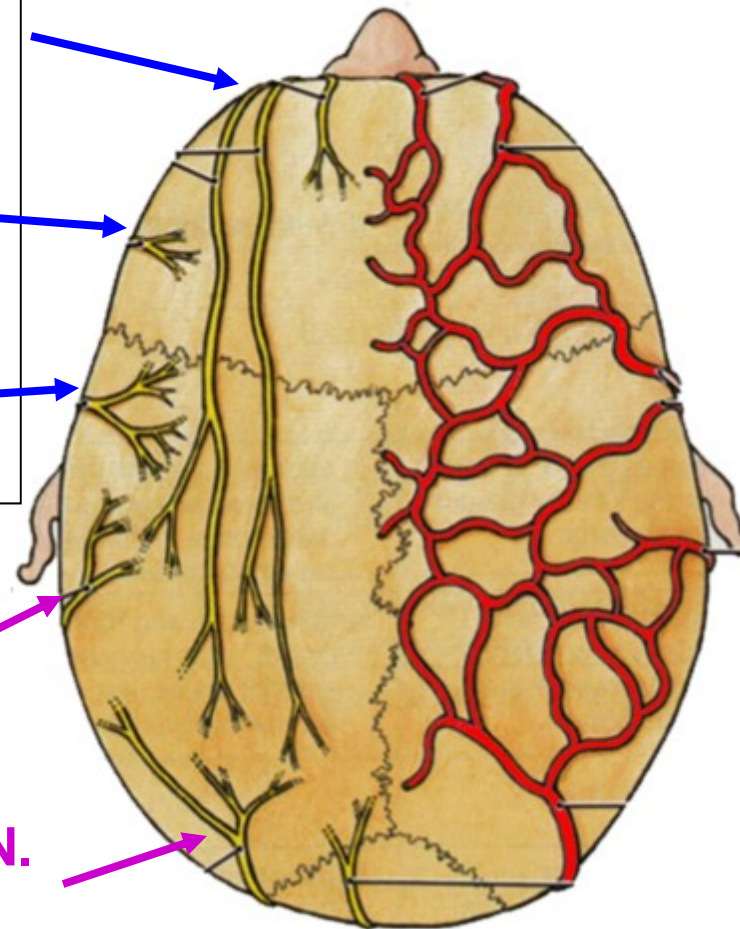
V2 – ZYGOMATICO-  
TEMPORAL N.

V3 – AURICULO-  
TEMPORAL N.

LESSER OCCIPITAL  
N. - C2 VENTRAL  
RAMUS

GREATER OCCIPITAL N.  
- C2 DORSAL RAMUS

NOSE



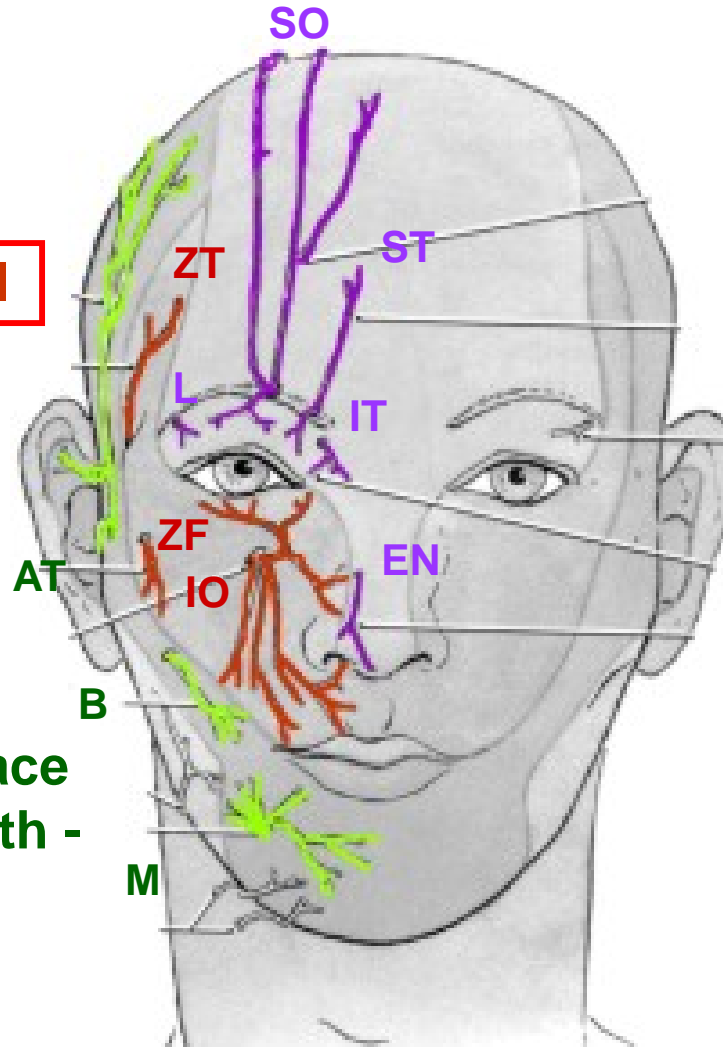
# FACE LECTURE: SENSORY SUPPLY - BRANCHES OF TRIGEMINAL NERVE TO FACE

**V2 – MAXILLARY -**  
to skin of cheek  
below orbit -

**Zygomatocotemporal**  
Zygomatofacial  
Infraorbital

**V3- MANDIBULAR -**  
to skin of jaw and face  
below angle of mouth -

**Auriculotemporal**  
Buccal  
Mental



**NOTE: These are branches of V  
to face, not ALL branches of V**

**V1 – OPHTHALMIC -**  
to skin above orbit -  
Lacrimal

**Supraorbital**  
**Supratrochlear**  
Infratrochlear  
External Nasal Nerve

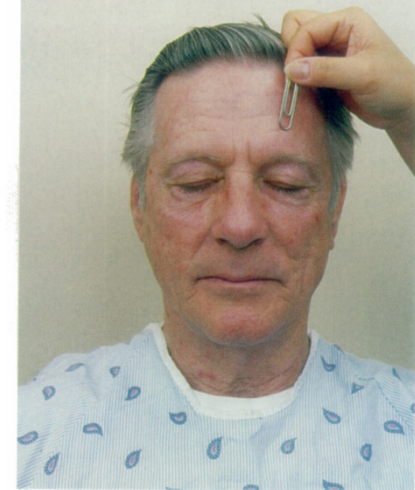
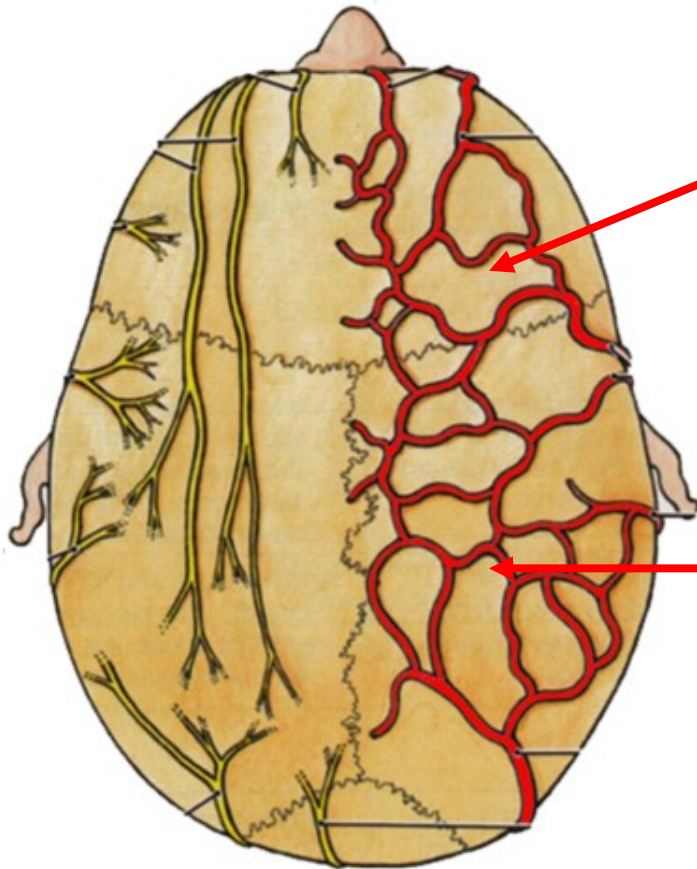


FIGURE 21-13  
Examination of the trigeminal cranial nerve

**CLINICAL TEST OF V:  
SUPRAORBITAL N.**

## C. ARTERIES OF SCALP

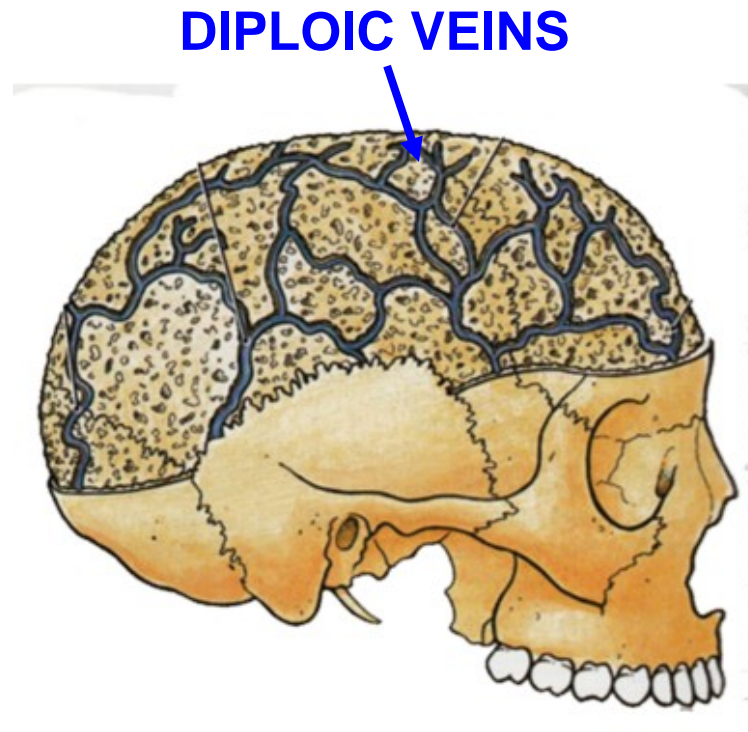
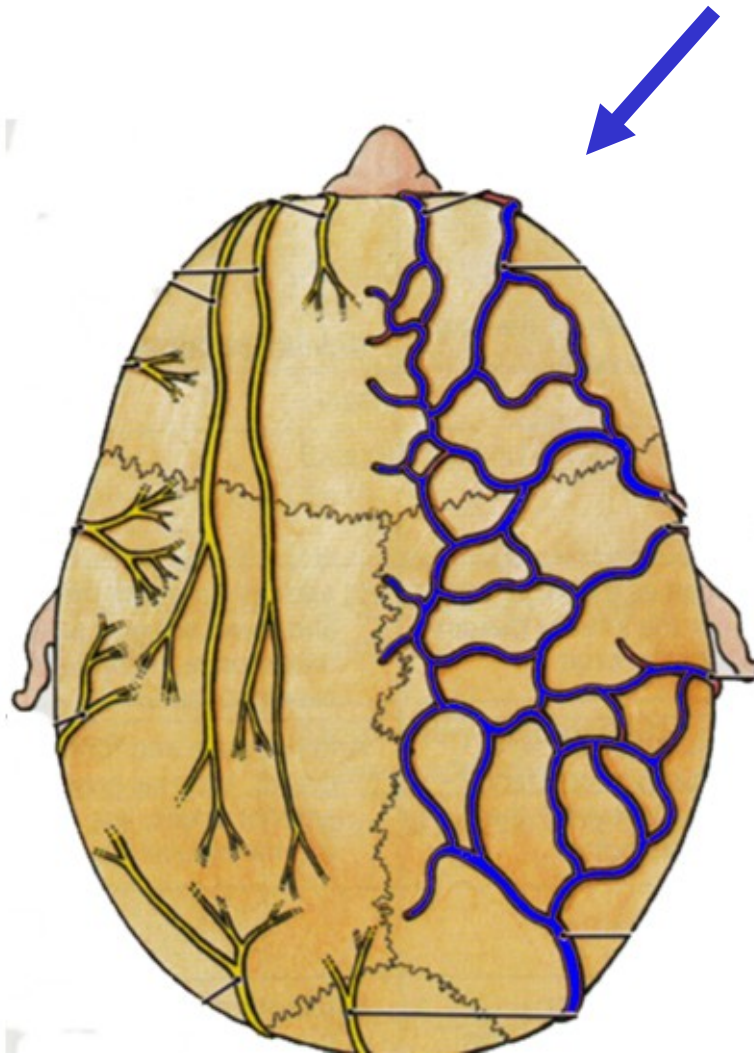
- RICH SUPPLY FROM BRANCHES OF INTERNAL AND EXTERNAL CAROTID; EXTENSIVE ANASTOMOSES - SCALP WOUND BLEEDS PROFUSELY FROM BOTH SIDES OF CUT



1. br. of INTERNAL CAROTID (OPHTHALMIC ARTERY):  
SUPRAORBITAL A.,  
SUPRATROCHLEAR A

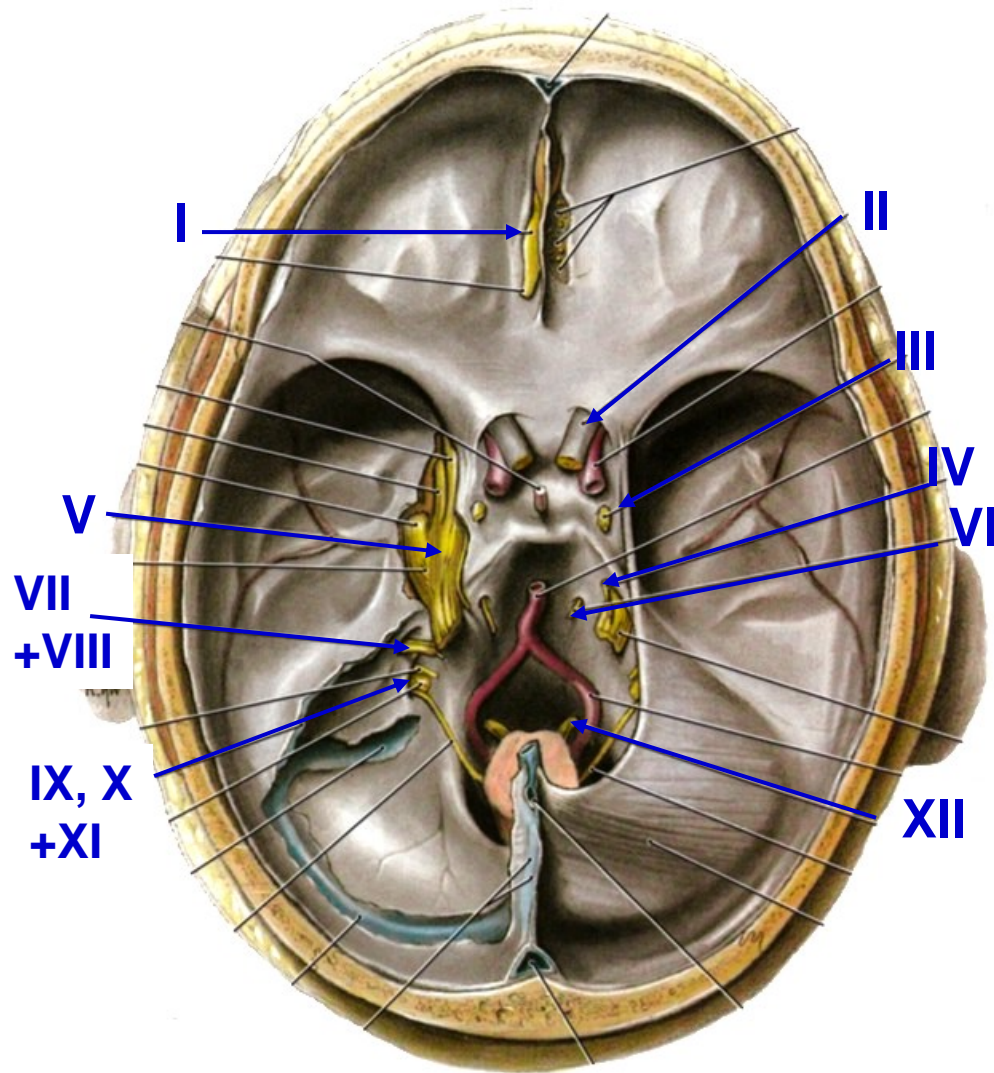
2. br. of EXTERNAL CAROTID:  
SUPERFICIAL TEMPORAL A.,  
POSTERIOR AURICULAR A.,  
OCCIPITAL A.

## D. VEINS OF SCALP – SAME NAMES AS ARTERIES



**ALSO EMISSARY  
VEINS drain to  
DIPLOIC VEINS IN  
DIPLOE**

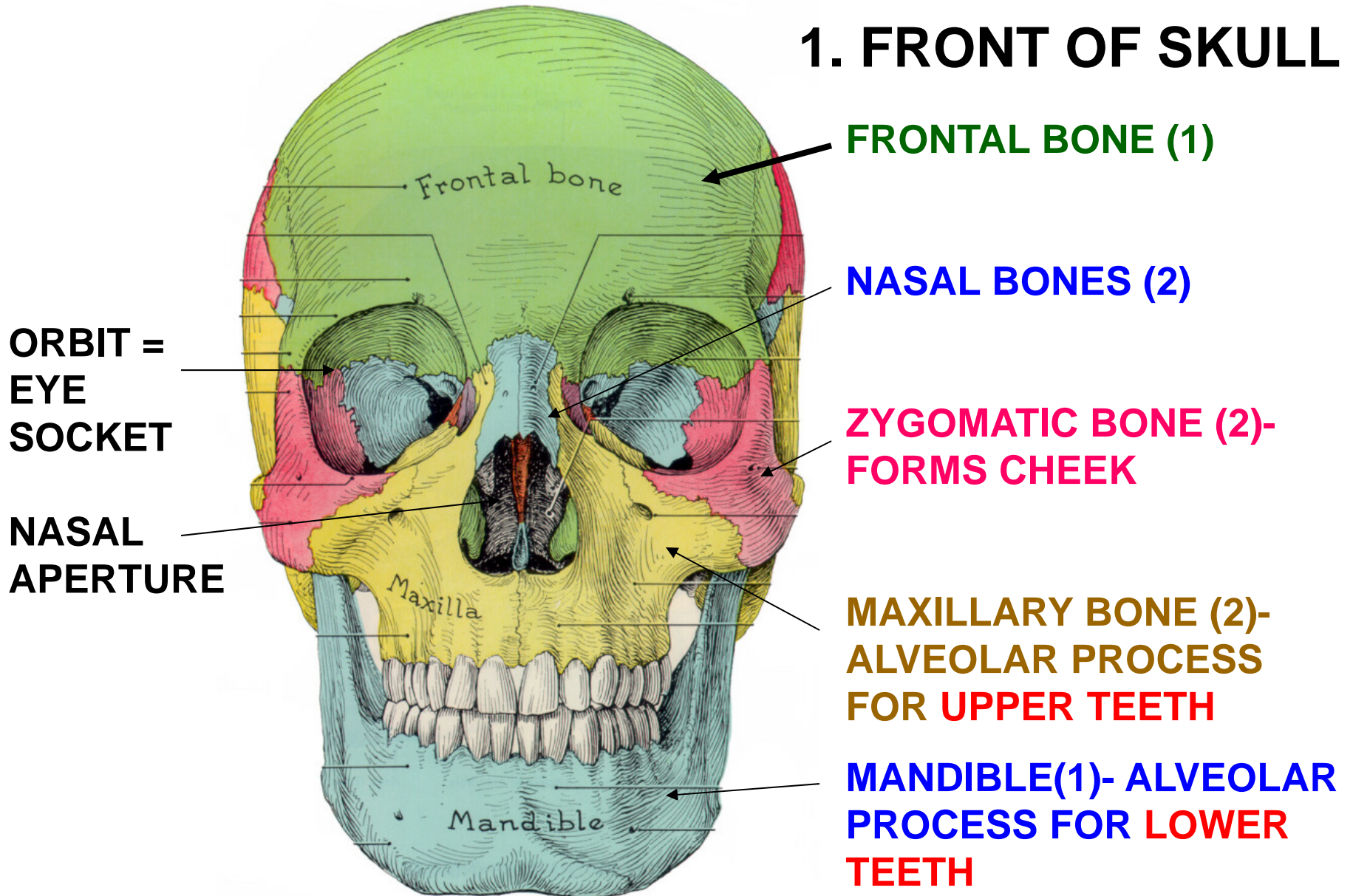
# CRANIAL NERVES



- 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

# II. LANDMARKS AND BONES

## 1. FRONT OF SKULL





## 2. LATERAL VIEW OF SKULL



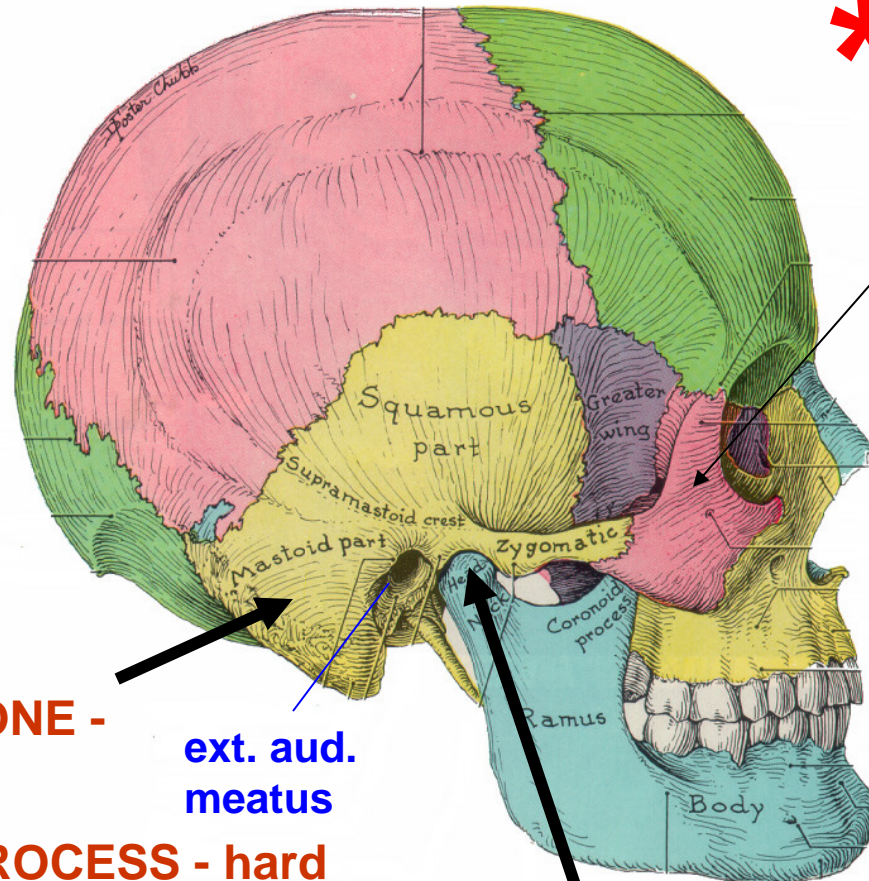
**CLINICAL - fractures**

**ZYGOMATIC ARCH-**

**1) ZYGOMATIC BONE**

**2) MAXILLARY BONE-  
ZYGOMATIC PROCESS**

**3) TEMPORAL BONE-  
ZYGOMATIC PROCESS**



**TEMPORAL BONE -**

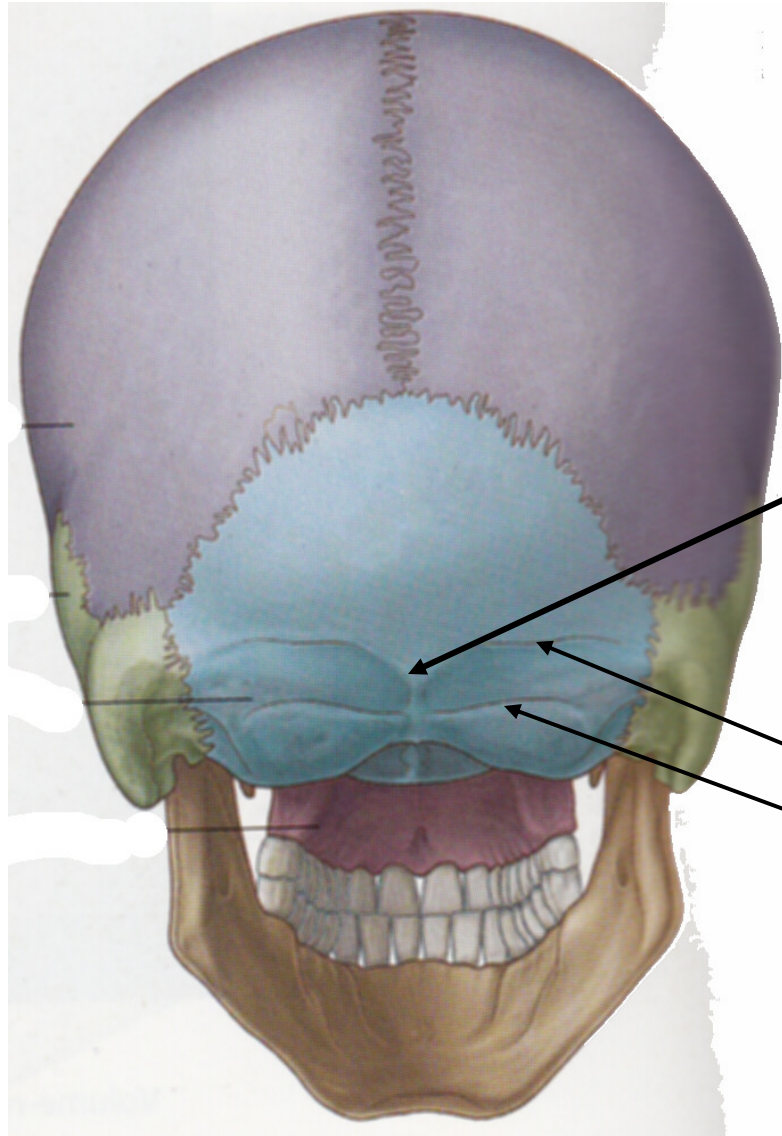
**PARTS**

- 1) MASTOID PROCESS - hard**
- 2) SQUAMOUS PART- flat**
- 3) TYMPANIC PART - ANT. TO EXTERNAL AUDITORY MEATUS**
- 4) PETROUS PART – inside skull**

**ext. aud.  
meatus**

**TEMPORO-MANDIBULAR JOINT-  
FROM RAMUS OF MANDIBLE**

### 3. POSTERIOR VIEW OF SKULL

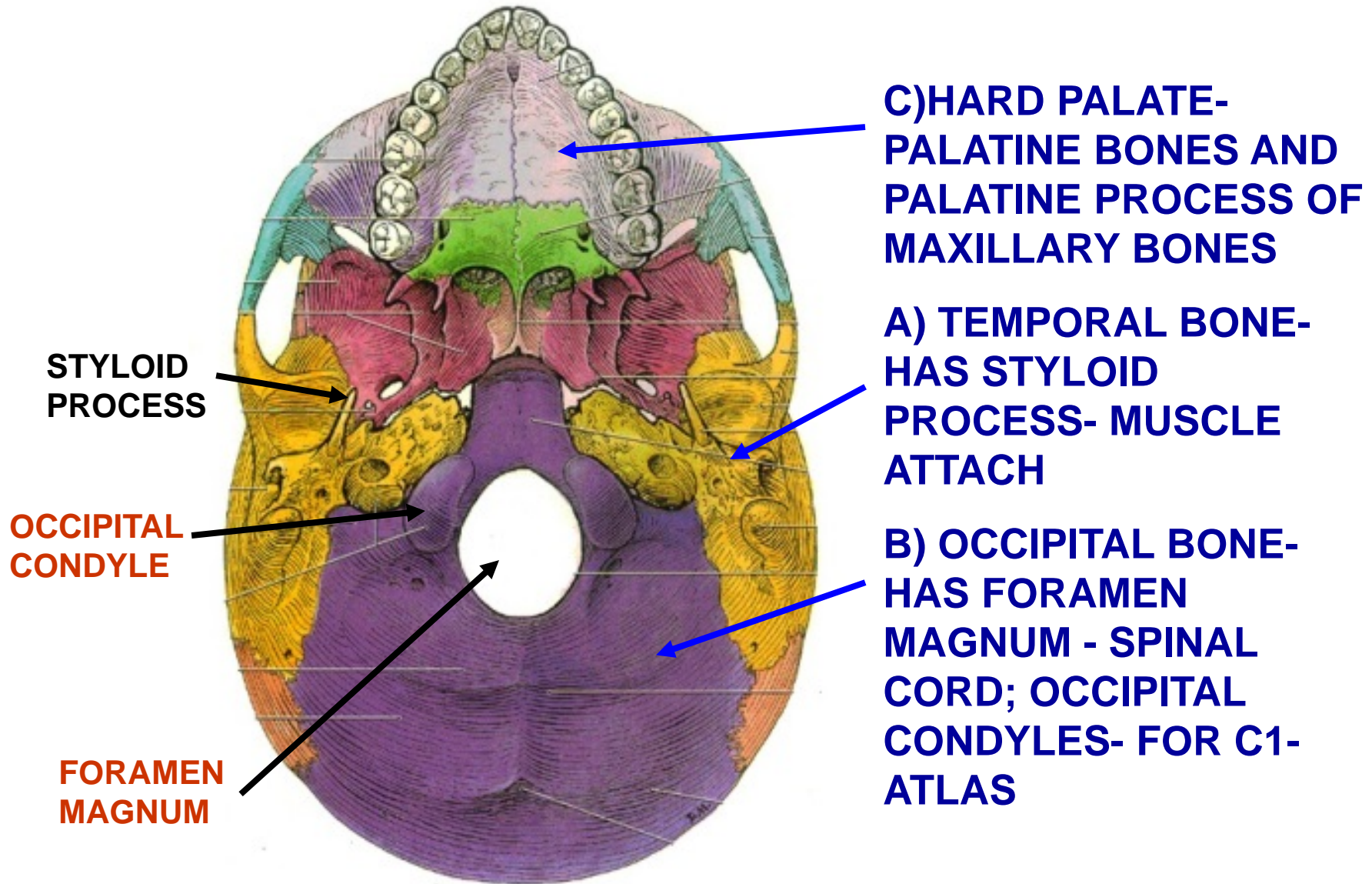


**OCCIPITAL BONE**

**EXTERNAL OCCIPITAL  
PROTUBERANCE**

**SUPERIOR AND  
INFERIOR  
NUCHAL LINES**

## 4. BASE OF SKULL - COMPLEX



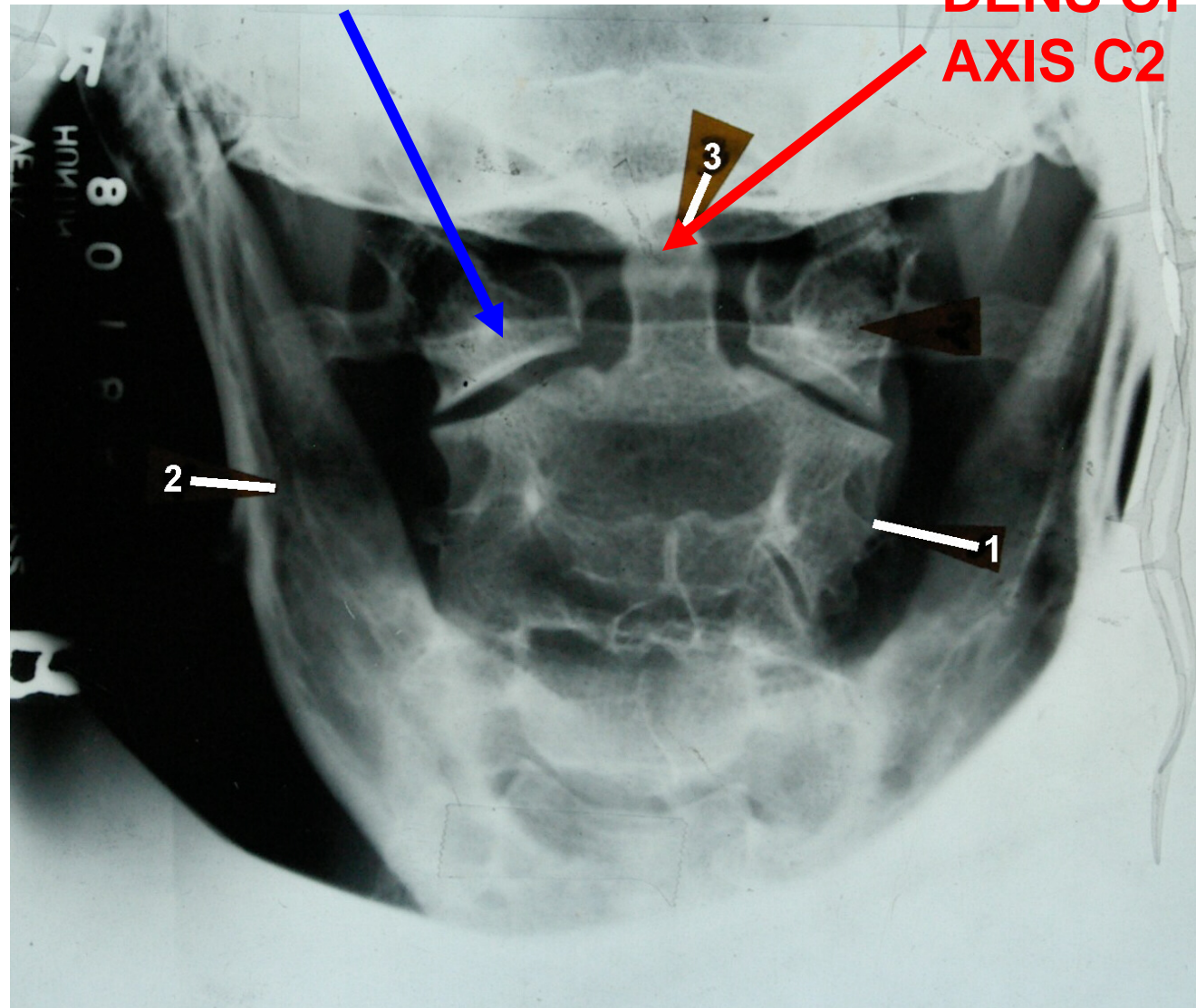
AP view

ATLAS C1

DENS OF  
AXIS C2

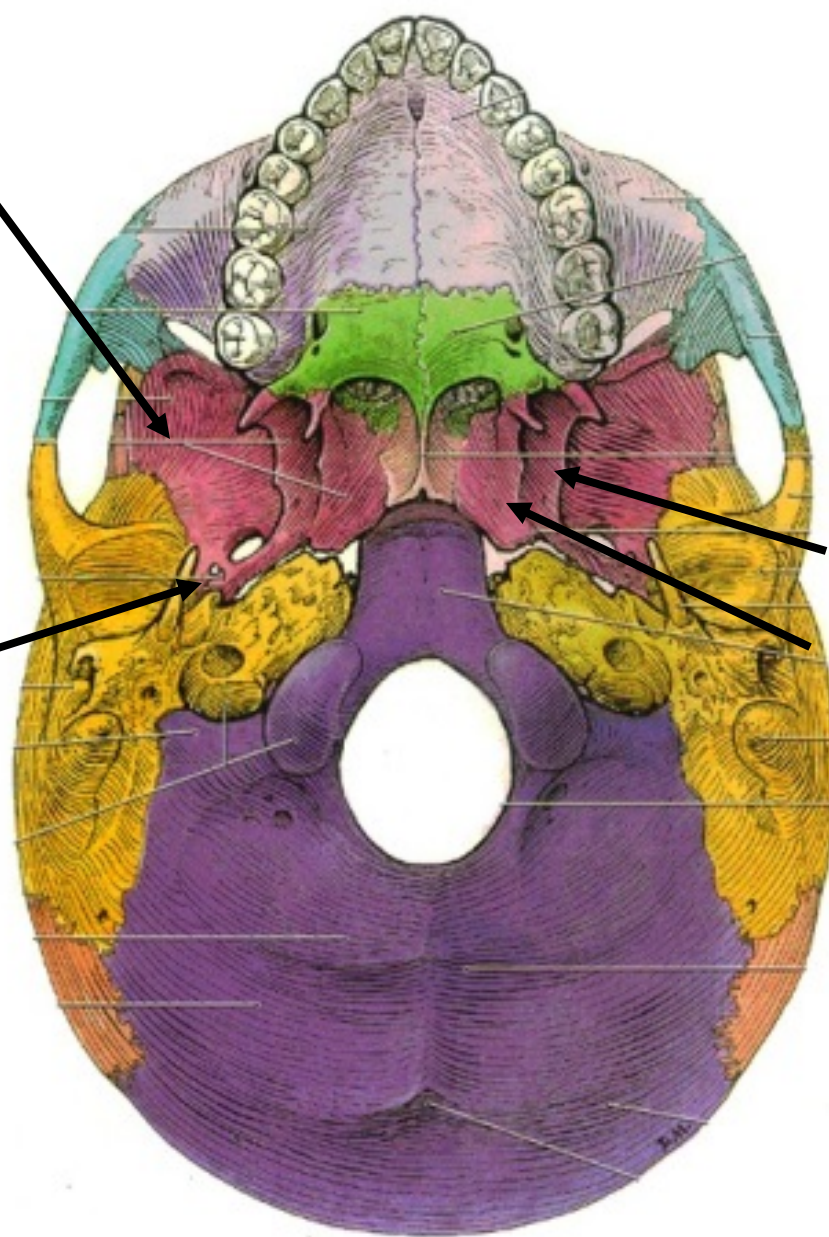
Antero-  
posterior film  
of with **mouth  
open**

1. Transverse process of C2
2. Ramus of mandible
3. Odontoid process (dens) of C2

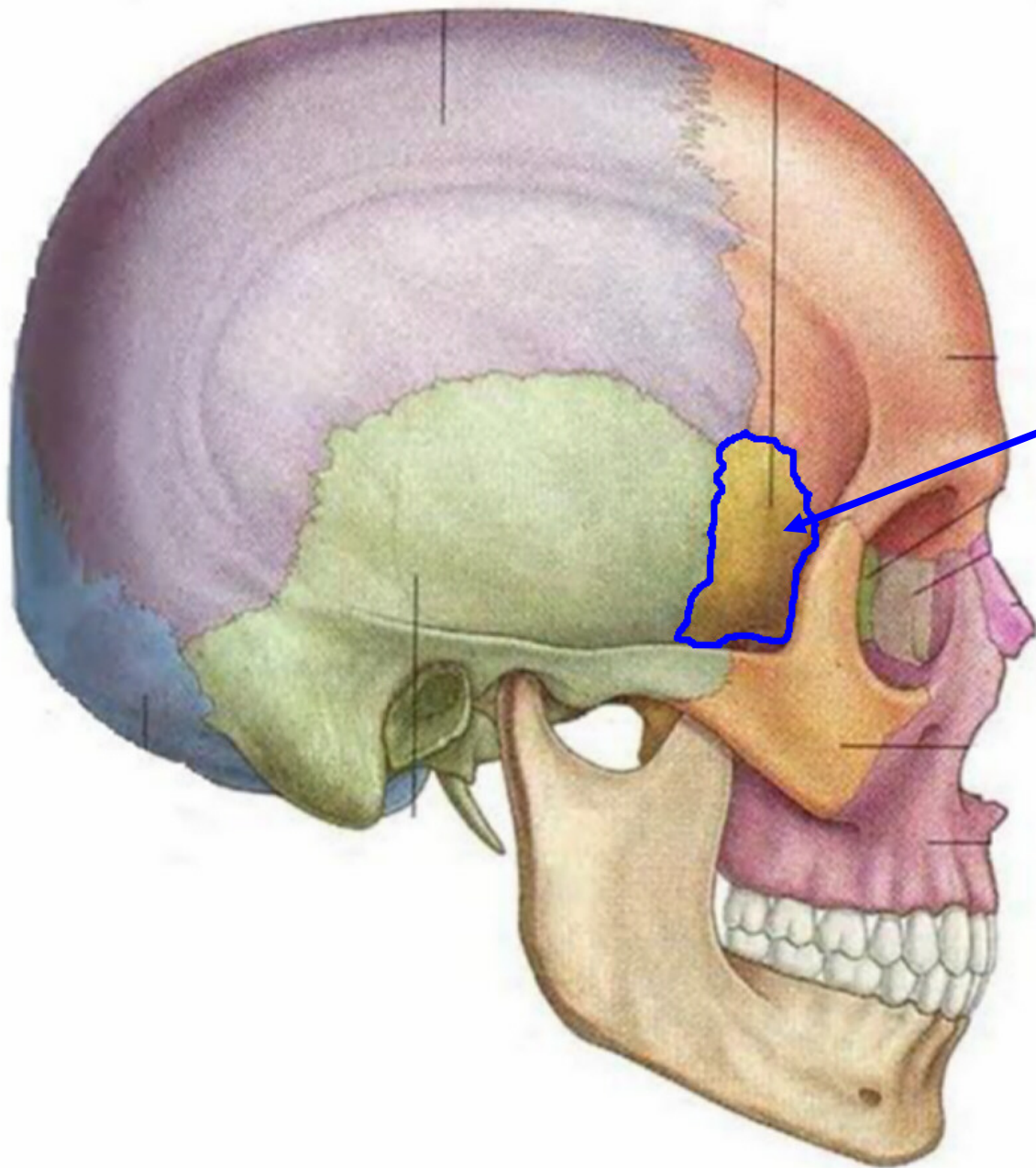


# 1. SPHENOID BONE – ‘CORE’ OF SKULL

2) SPIKE OF SPHENOID -  
INFERIOR SIDE  
ATTACH LIGAMENT

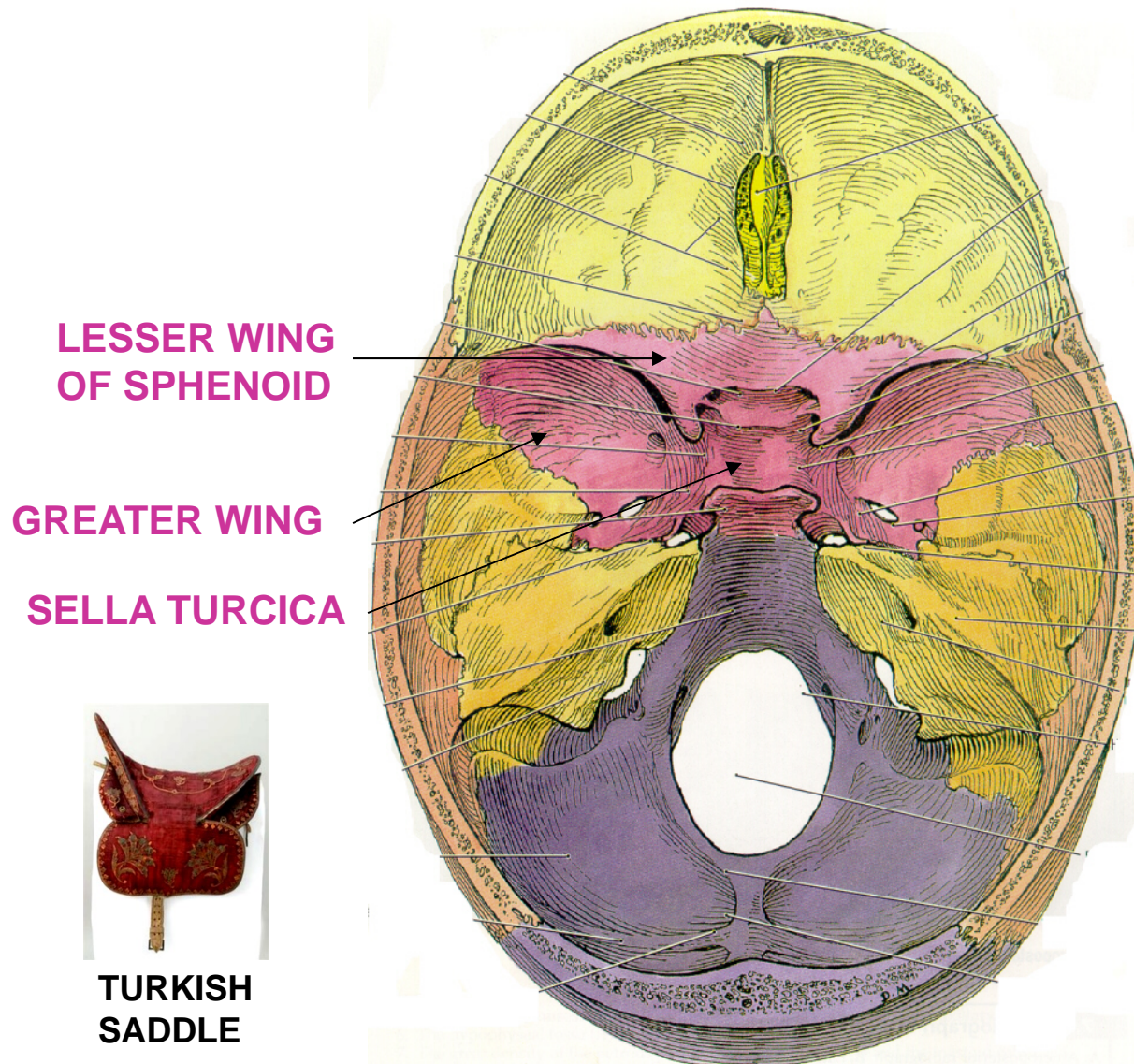


LATERAL AND  
MEDIAL  
PTERYGOID  
PLATES -  
MUSCLE  
ATTACHMENT



**GREATER  
WING OF  
SPHENOID-  
LATERAL  
SIDE OF  
SKULL**

# SPHENOID BONE - INSIDE SKULL



TURKISH SADDLE

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

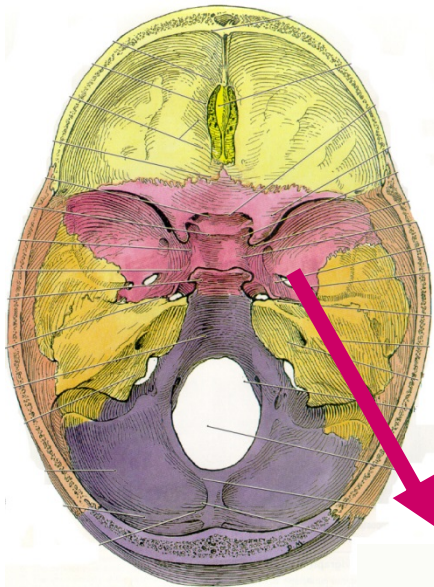
i) Lesser Wing above Superior Orbital Fissure;

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

iii) Sella Turcica - (turkish saddle) depression above main part (body)

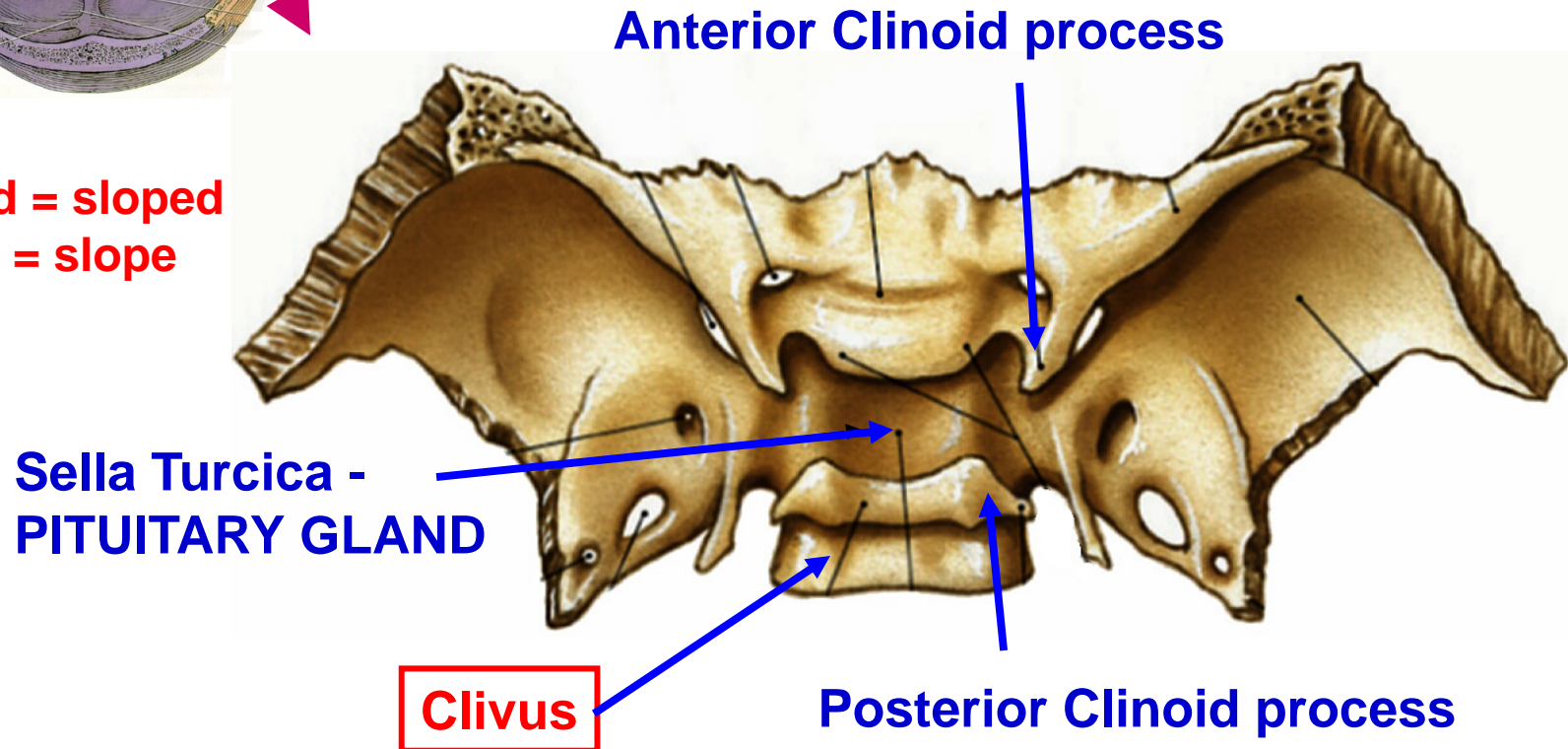
LOCATION OF PITUITARY GLAND

# SPHENOID BONE - INSIDE SKULL



**Sella Turcica - (turkish saddle) depression above body; location of PITUITARY GLAND**

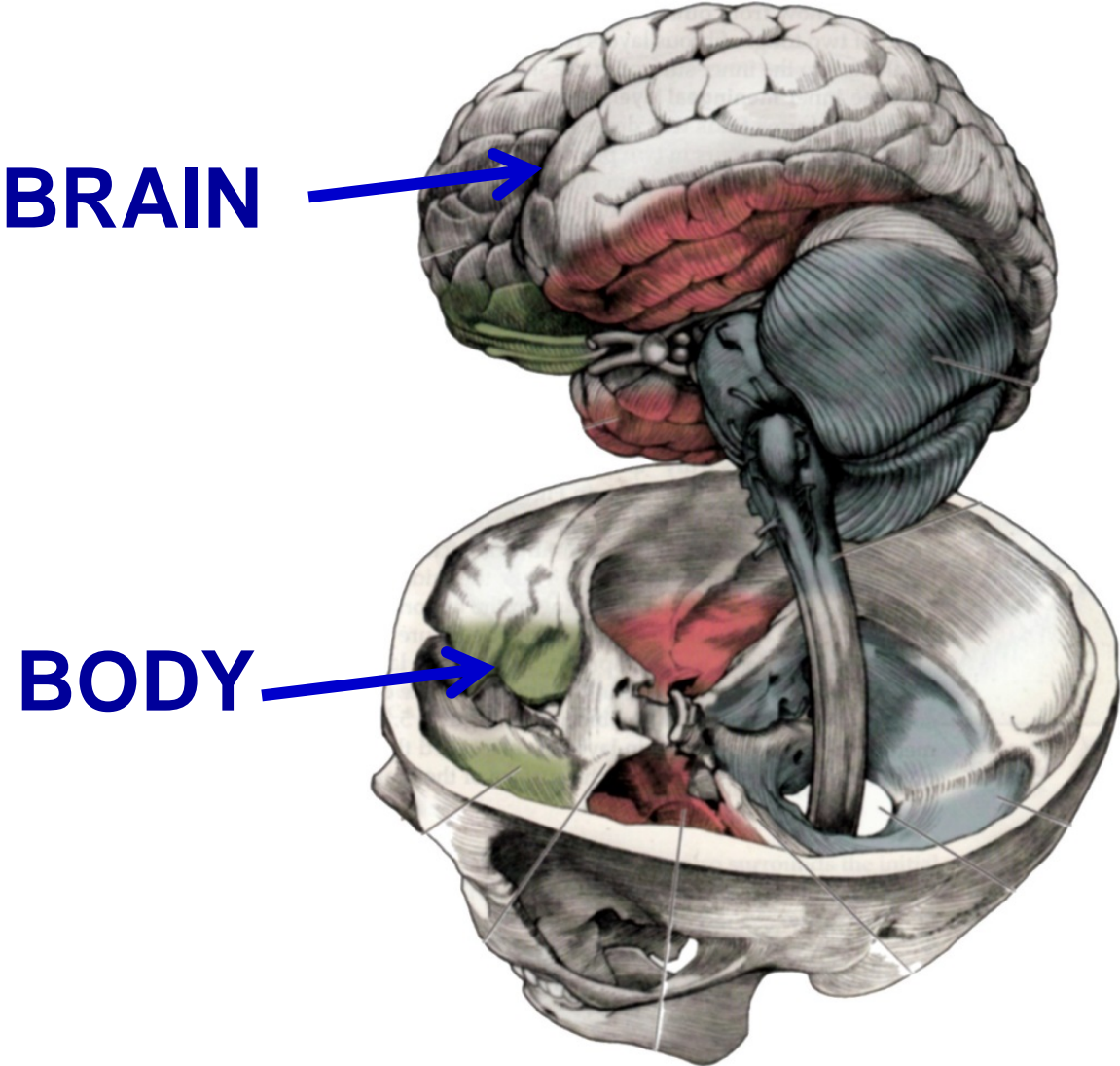
**Clinoid = sloped  
Clivus = slope**



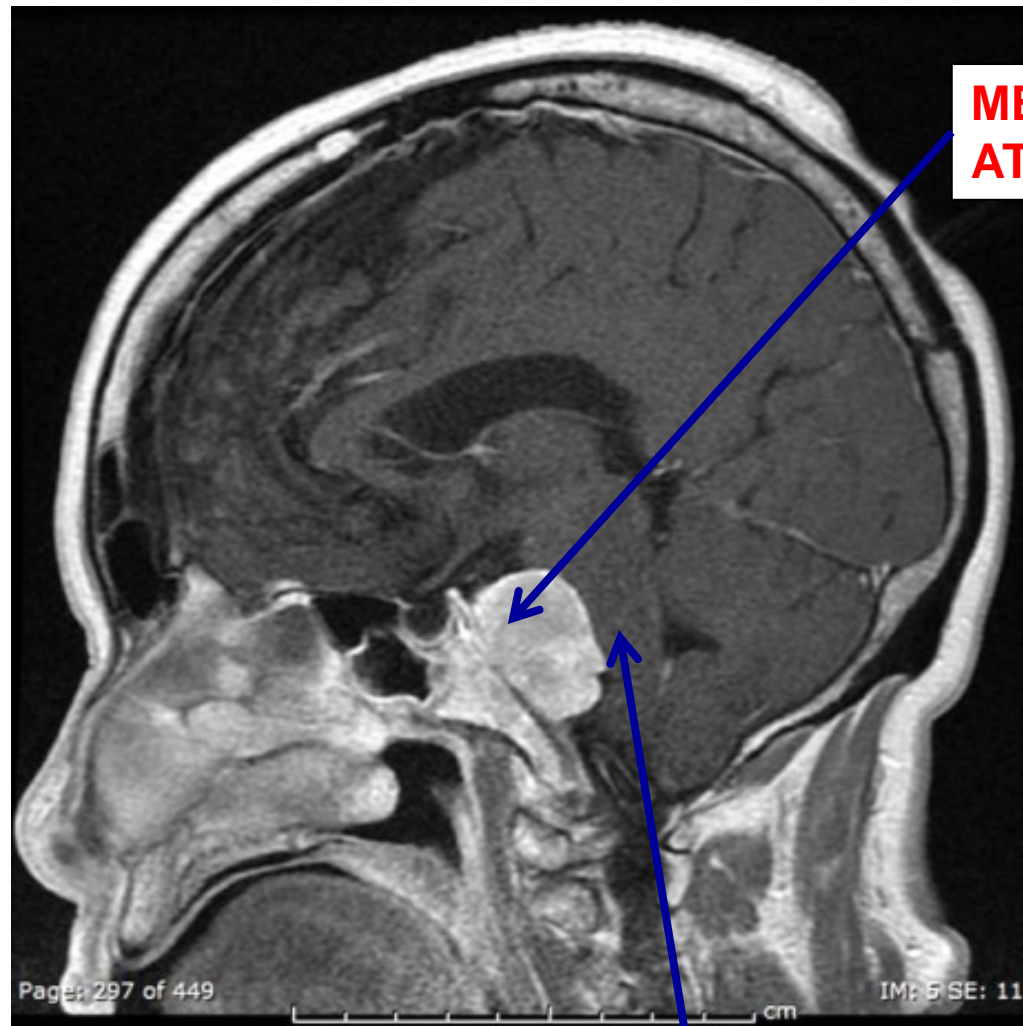
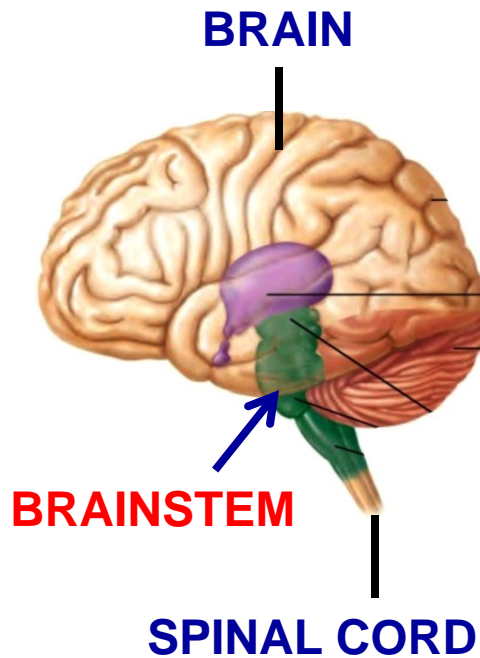
**Note: parts of Sphenoid bone are important landmarks in Neurology**



**GROSS BRAINSTEM DISSECTION: HOW THE BRAIN  
FITS IN THE BODY**



# TERMINOLOGY: MENINGIOMA AT THE CLIVUS



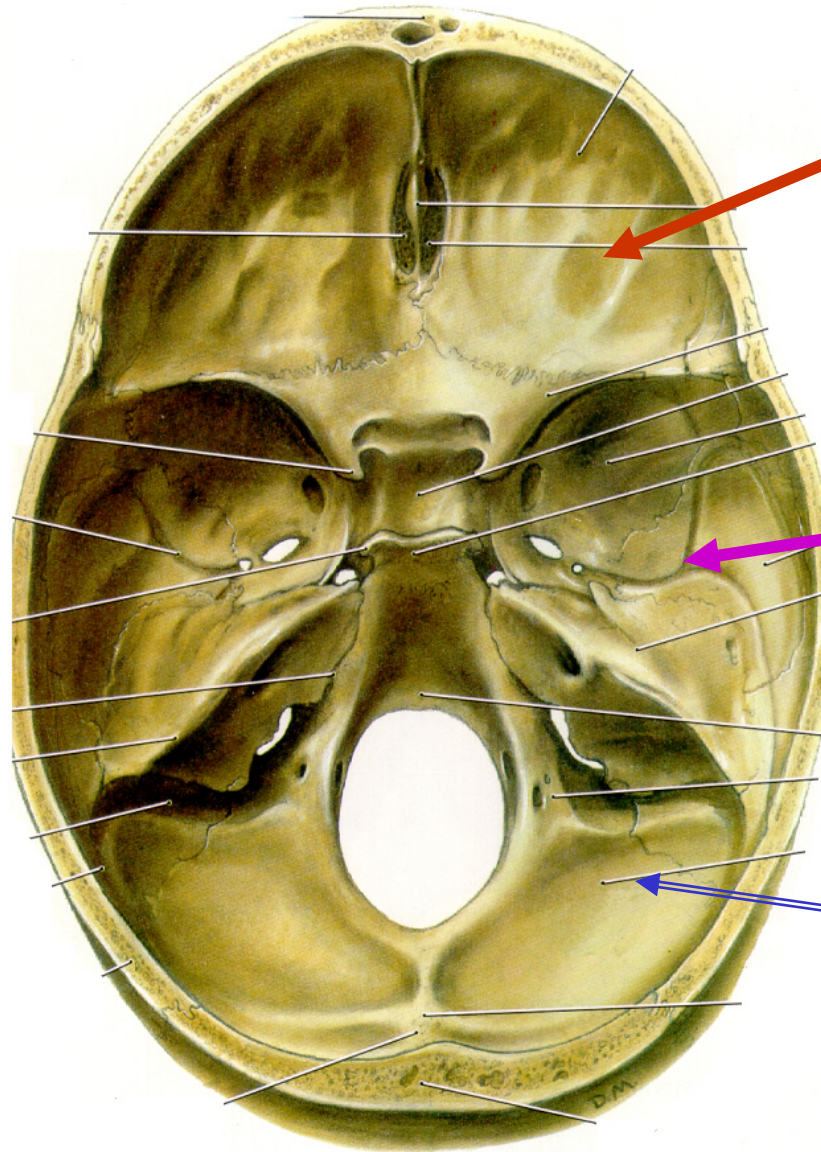
**NOSE** ←

**BRAINSTEM**

FYI (not memorize):  
Symptoms (MANY) can include:

- Coordination problems (ataxia)
- Blurry vision
- Difficulty swallowing (dysphagia)
- Difficulty walking
- Headaches
- Hearing loss
- Nausea
- Optical disc swelling (papilledema)
- Sensory problems
- Vertigo (loss of balance)
- Vision problems
- Vomiting
- Weakness

# V. CRANIAL CAVITY- DIVIDED INTO DEPRESSIONS (FOSSAE)



**ANTERIOR CRANIAL FOSSA (ROOF OF NASAL CAVITY, ORBIT)**

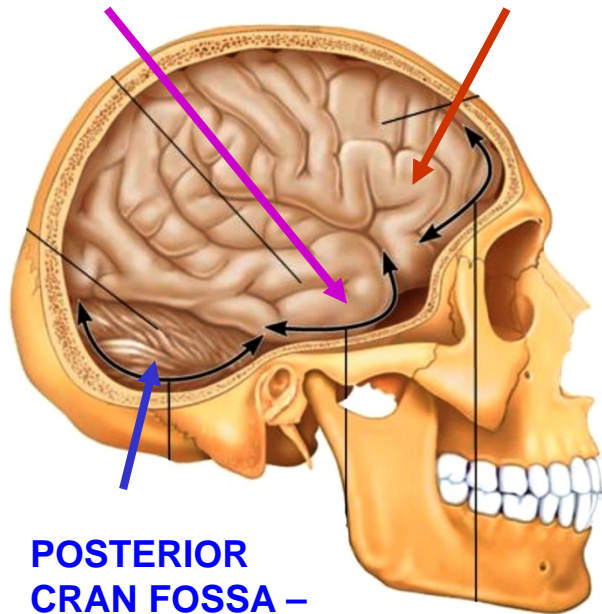
**MIDDLE CRANIAL FOSSA (ORBIT, NASAL CAVITY, FACE)**

**POSTERIOR CRANIAL FOSSA (FACE, ORAL CAVITY, NECK)**

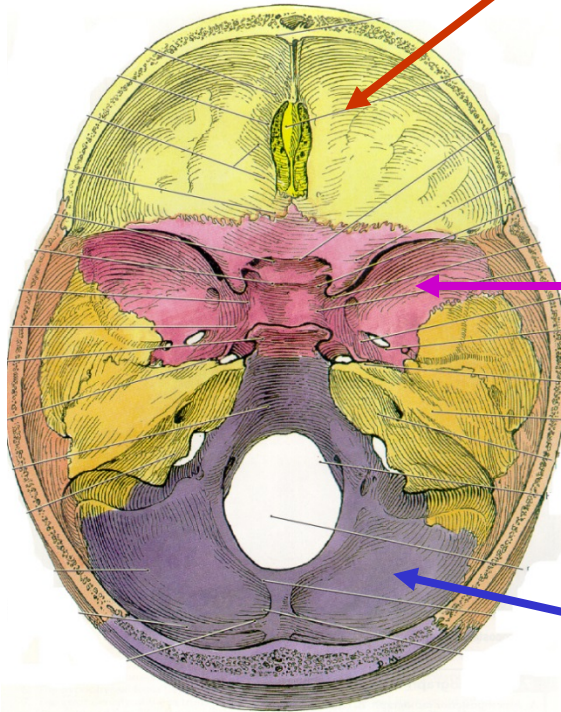
# CONTENTS OF CRANIAL FOSSAE

MIDDLE CRANIAL FOSSA – TEMPORAL LOBE

ANTERIOR CRANIAL FOSSA – FRONTAL LOBES



POSTERIOR CRAN FOSSA – CEREBELLUM, BRAINSTEM



ANTERIOR CRANIAL FOSSA –  
CONTAINS: CN I (CRIBRIFORM PLATE),  
FRONTAL LOBES,  
OLFACTORY BULB

MIDDLE CRANIAL FOSSA  
CONTAINS: CN II-VI -  
TEMPORAL LOBES -  
PITUITARY, BRAIN STEM

POSTERIOR CRANIAL FOSSA -  
CONTAINS - CN VII-XII -  
CEREBELLUM,  
BRAINSTEM -FORAMEN  
MAGNUM TRANSMITS  
SPINAL CORD,  
VERTEBRAL ARTERIES