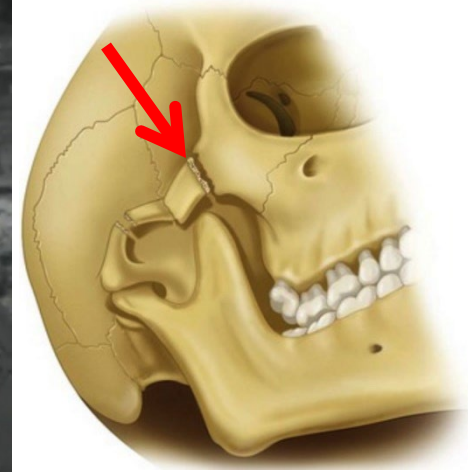


SKULL

HEAD IS SPECIALIZED TO HOUSE AND PROTECT THE BRAIN

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

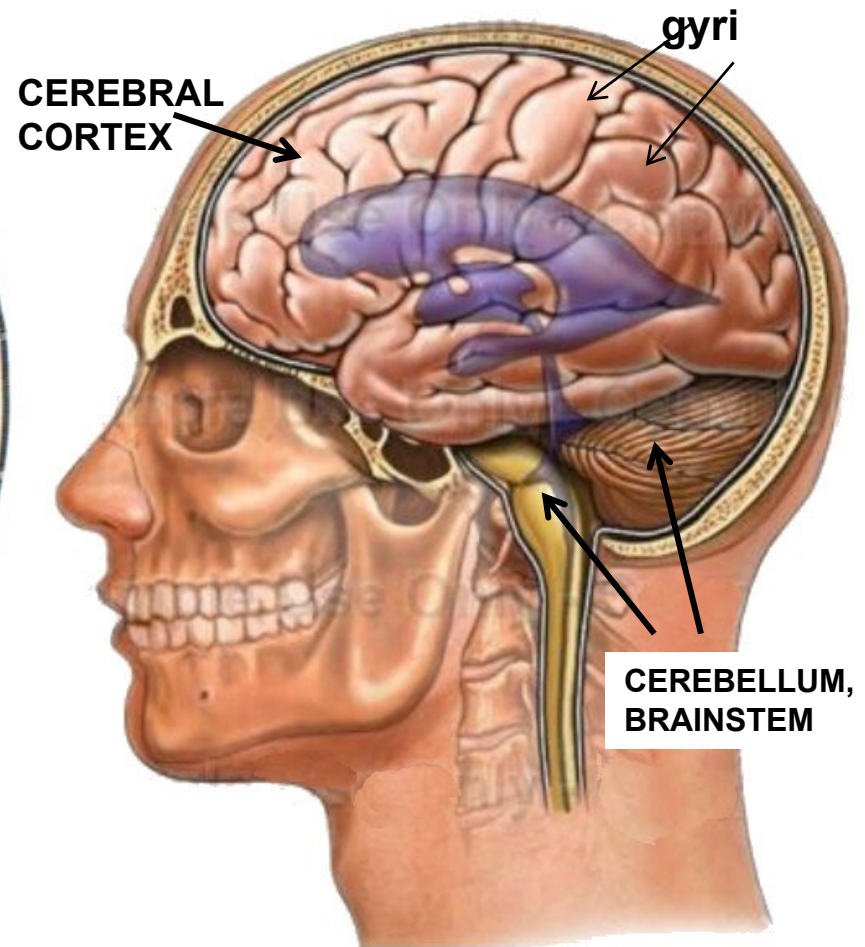
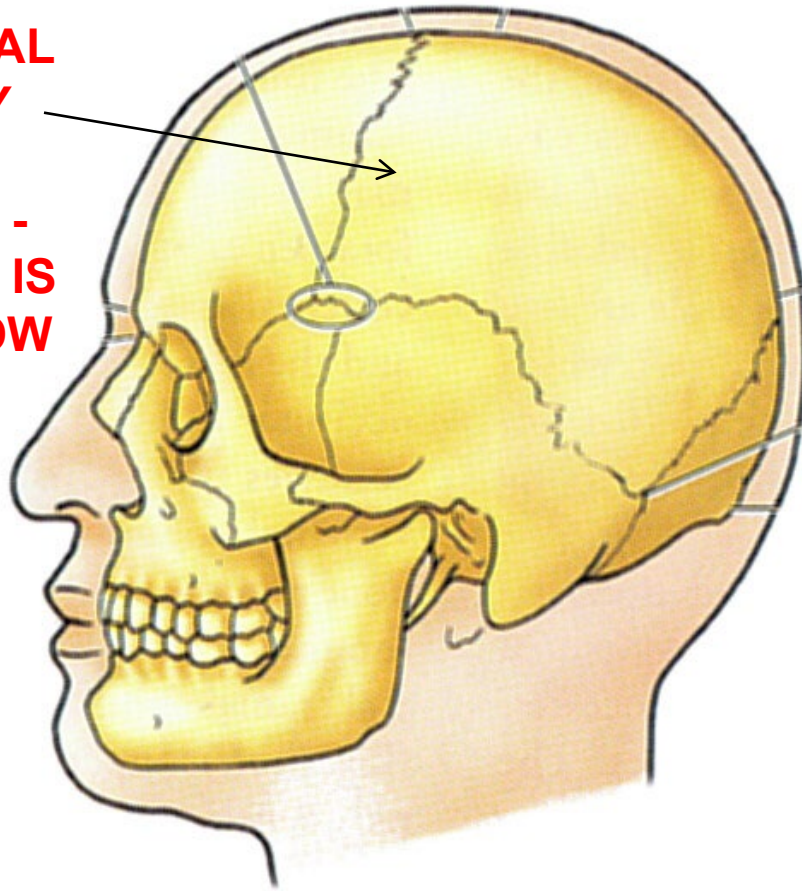
HEAD IS UNIQUE = A PERSON'S IDENTITY



**FRACTURE
ZYGOMATIC
ARCH**

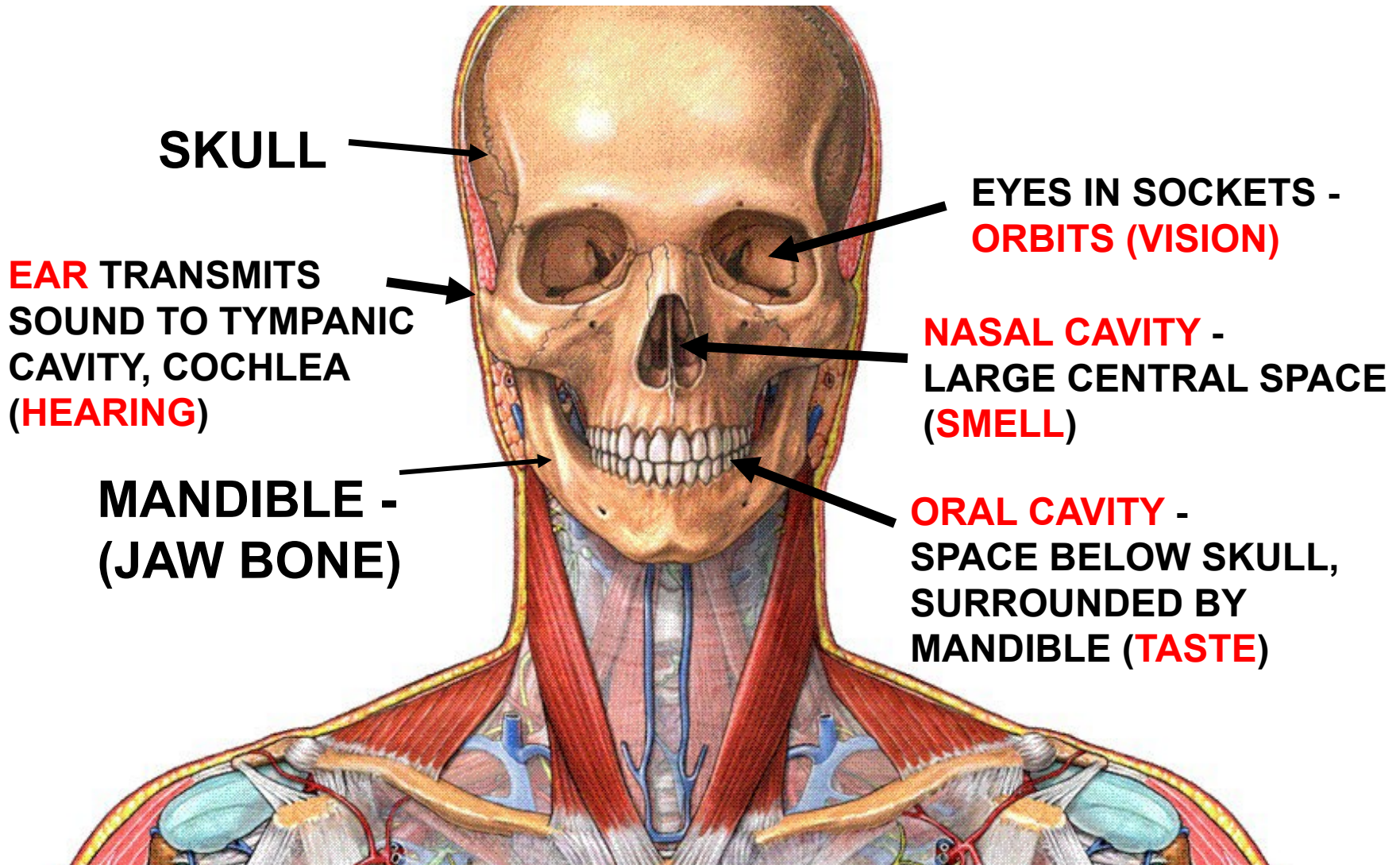
SKULL: HEAD IS SPECIALIZED TO HOUSE AND PROTECT THE BRAIN INSIDE CRANIAL CAVITY

**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**

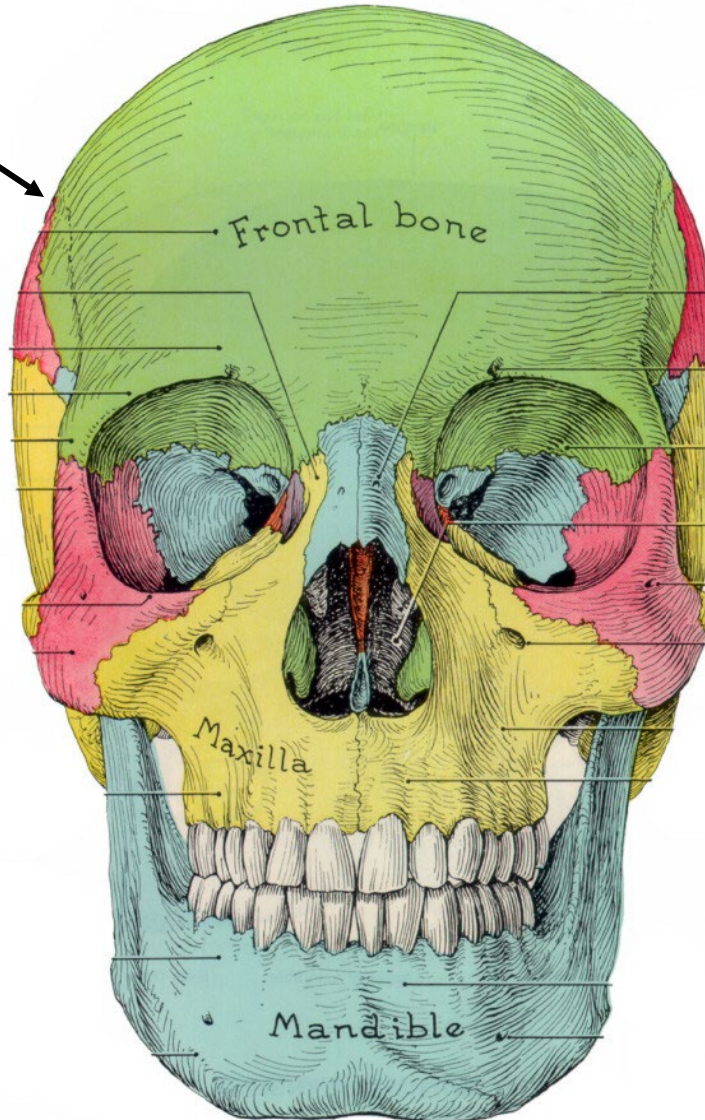
SKULL IS DESIGNED TO CONTAIN SPECIAL SENSES



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

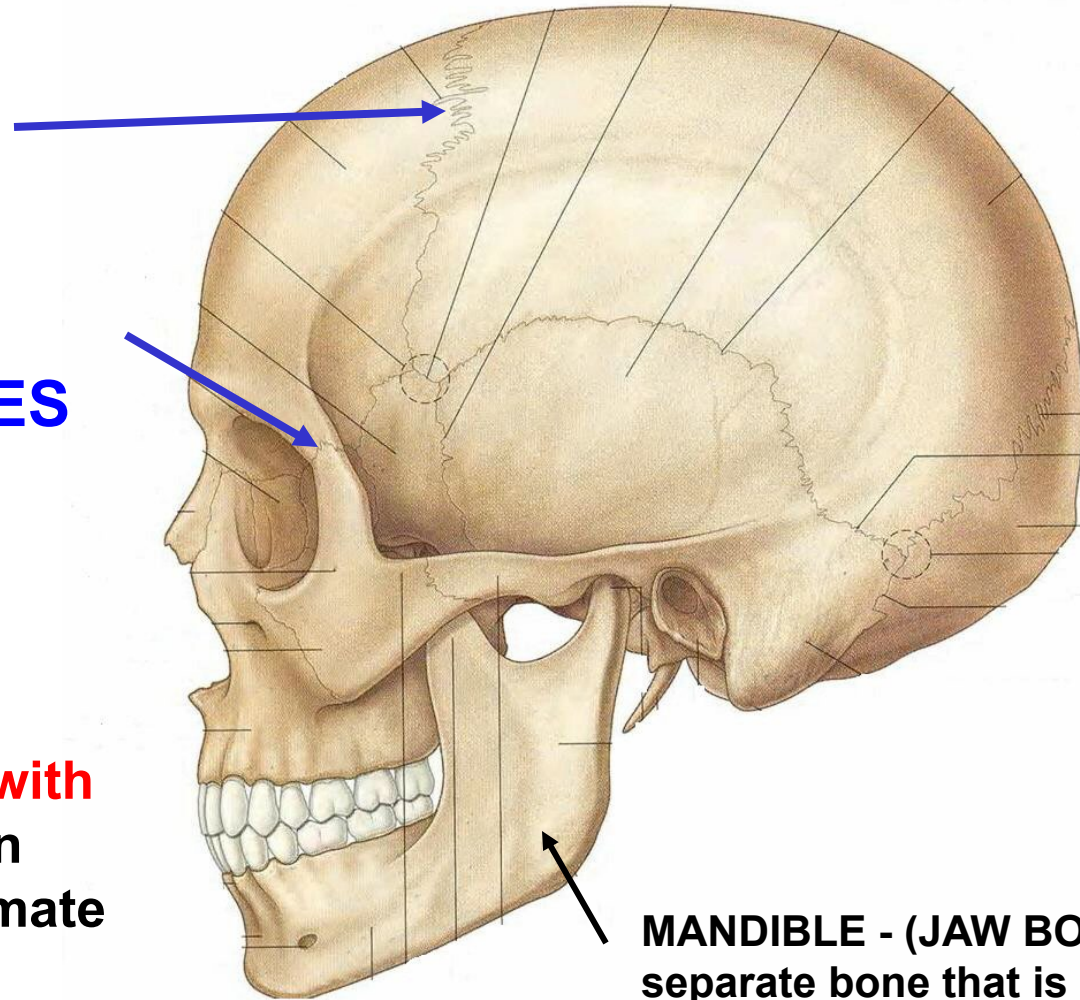
- I. CALVARIUM
- II. SCALP
- III. CRANIAL NERVES
- IV. LANDMARKS/ BONES OF SKULL
- V. CRANIAL CAVITY

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.

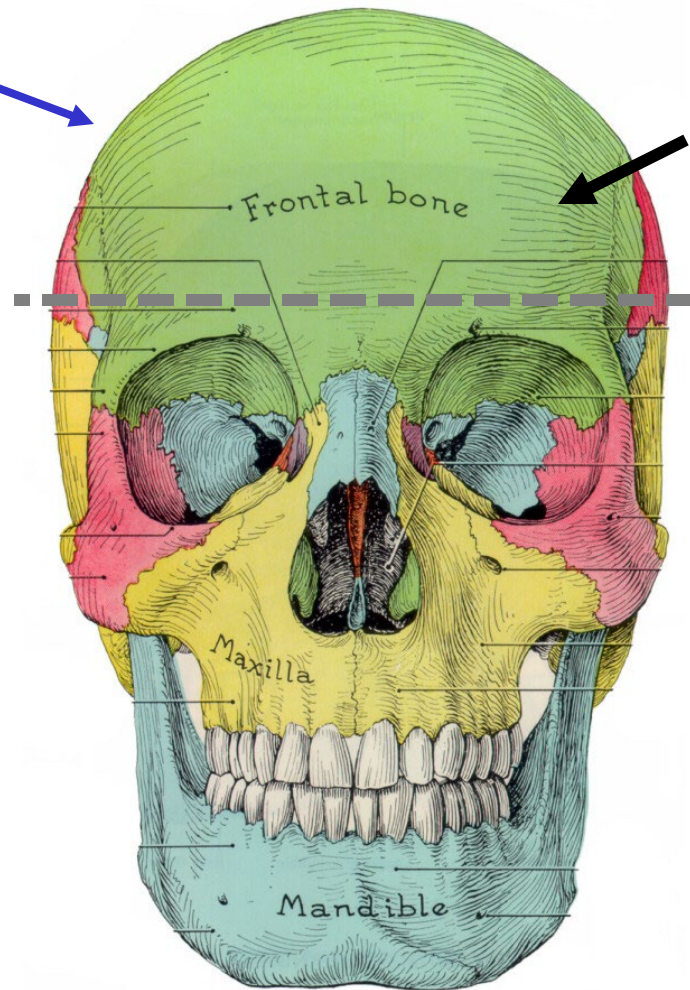


MANDIBLE - (JAW BONE) - separate bone that is moveable

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

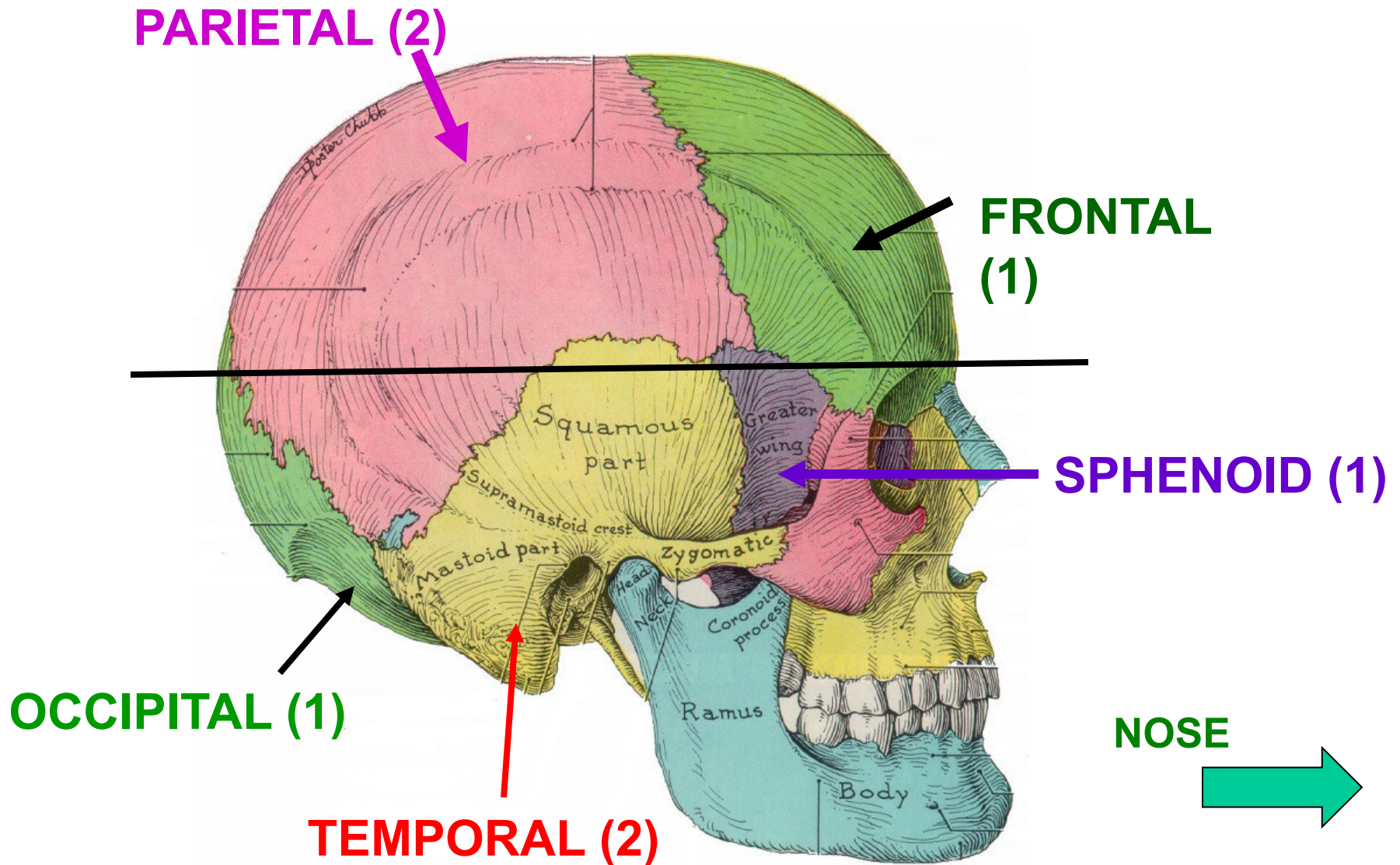
I. CALVARIUM = SKULL CAP -

Consists of
bones linked
by sutures



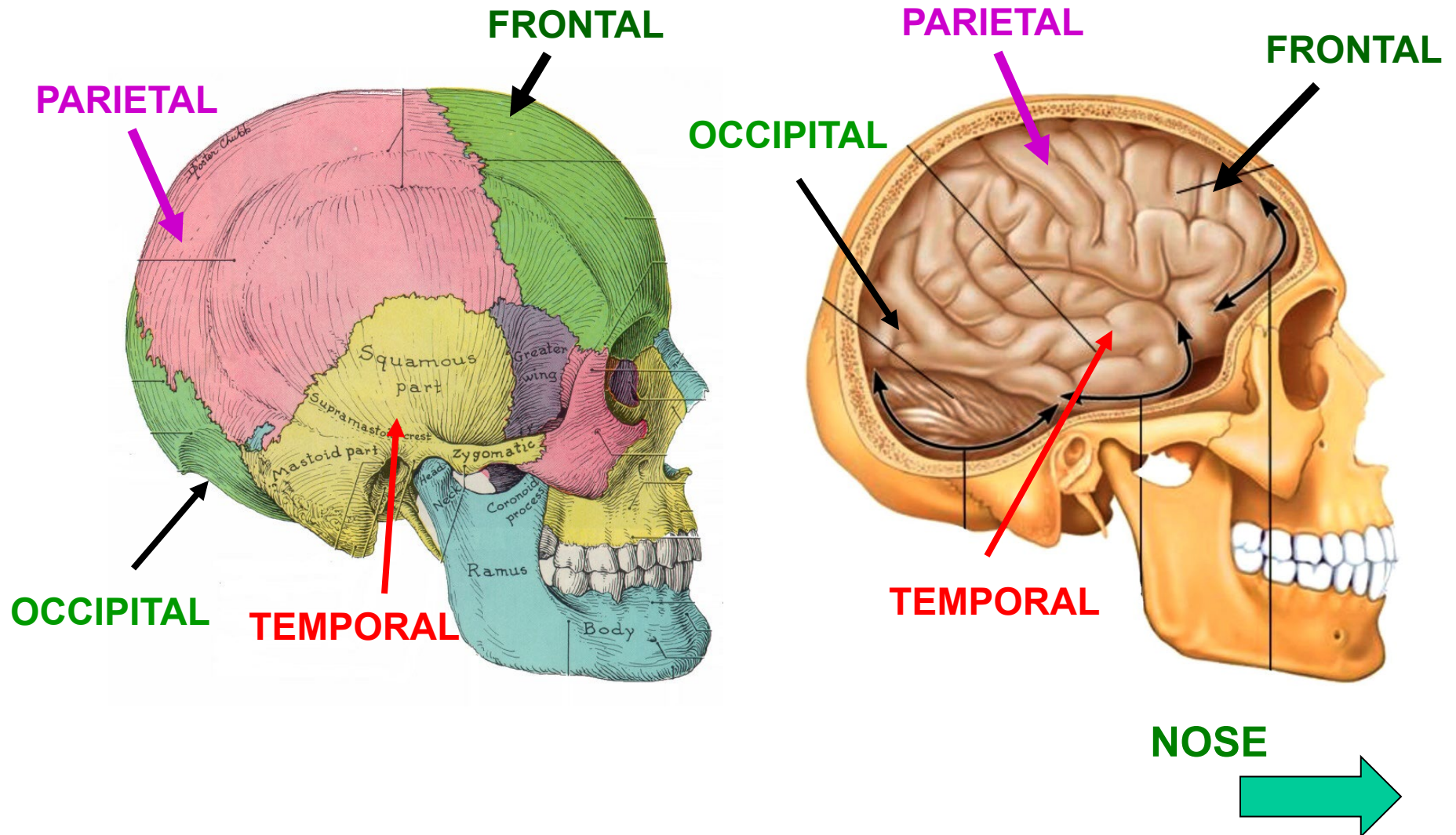
**FRONTAL
(1)**

A. BONES OF CALVARIUM = SKULL CAP



SPHENOID (Gk) = wedge

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

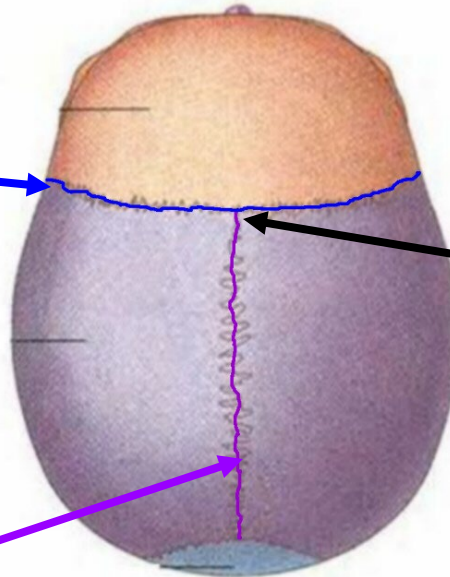


B. SUTURES

1. CORONAL SUTURE

2. SAGITTAL SUTURE

3. LAMBDOIDAL SUTURE



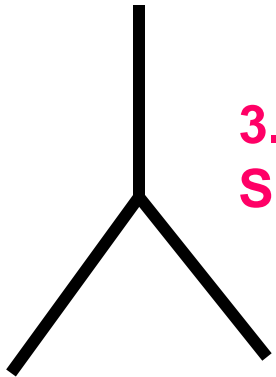
C. LANDMARKS

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

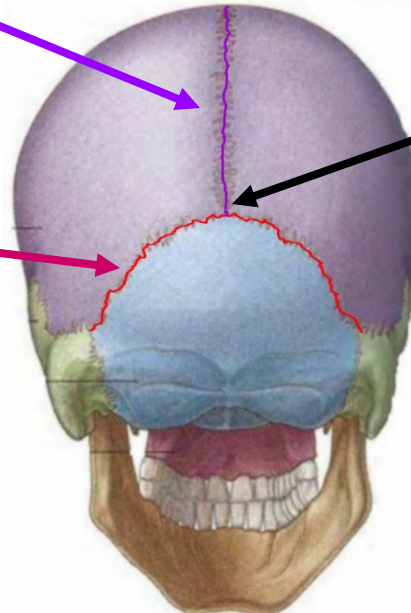
superior (top) view

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

posterior (back) view



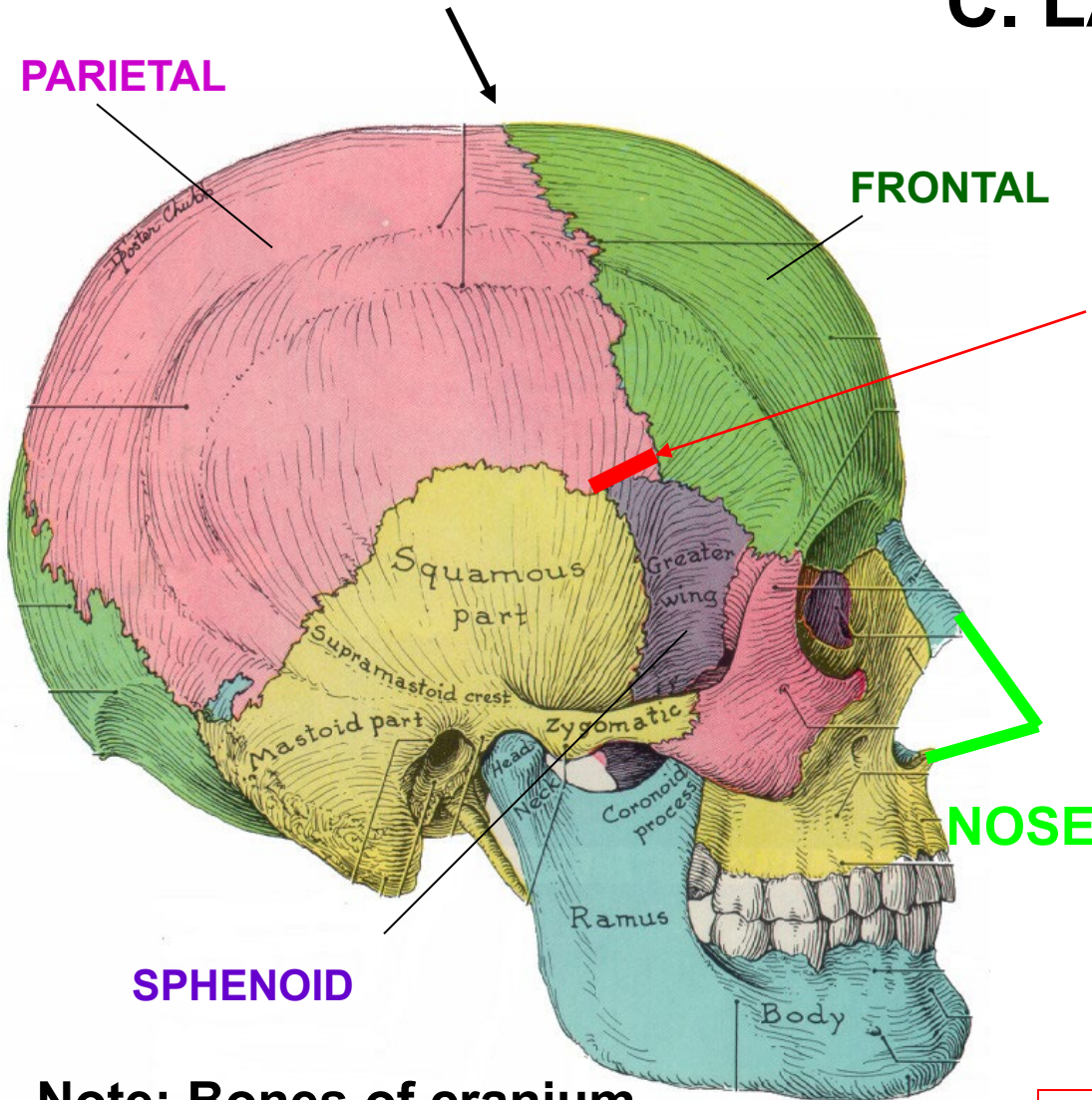
LAMBDA -
Greek letter



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)

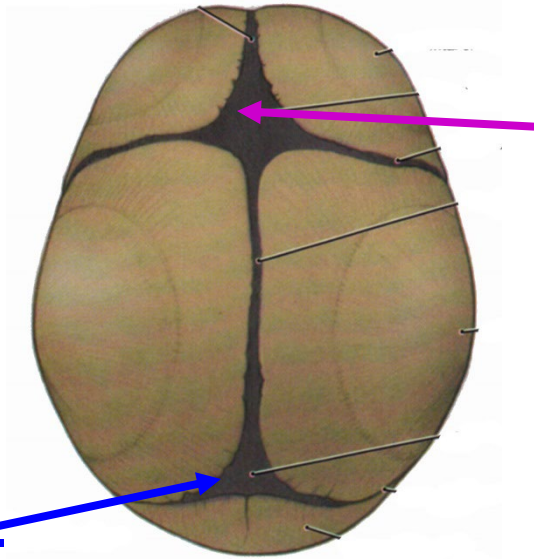
**

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

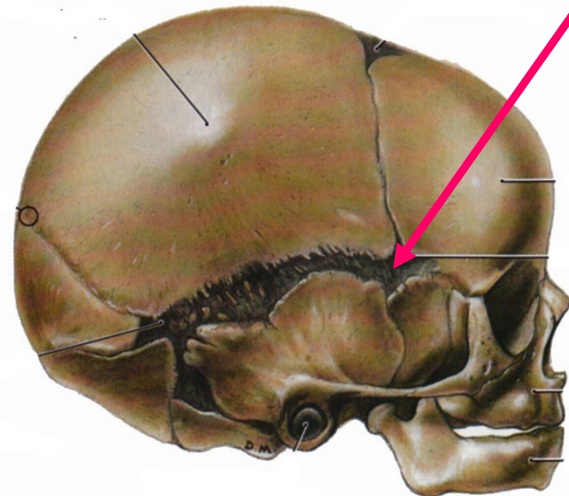
2. POSTERIOR
FONTANELLE -
AT LAMBDA



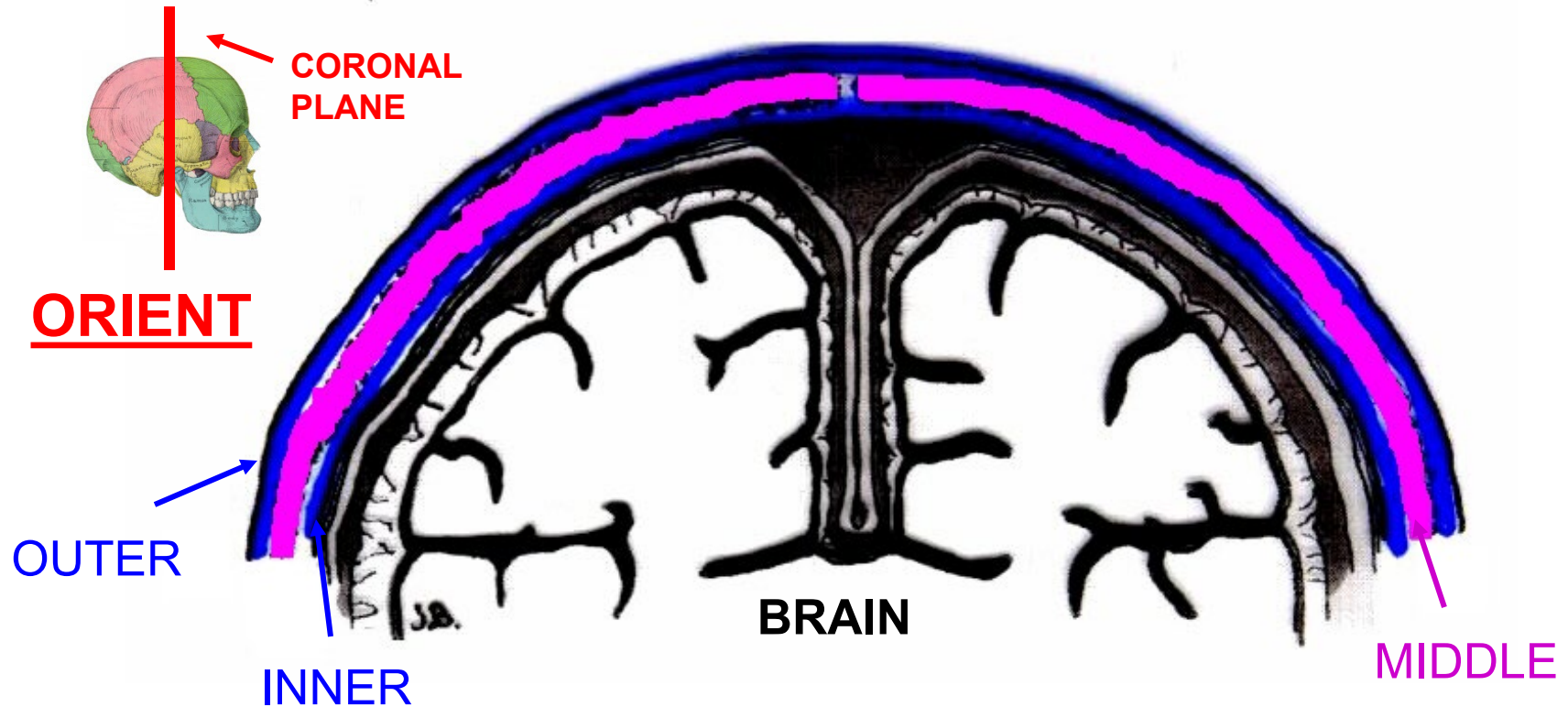
1. ANTERIOR
FONTANELLE
AT BREGMA

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



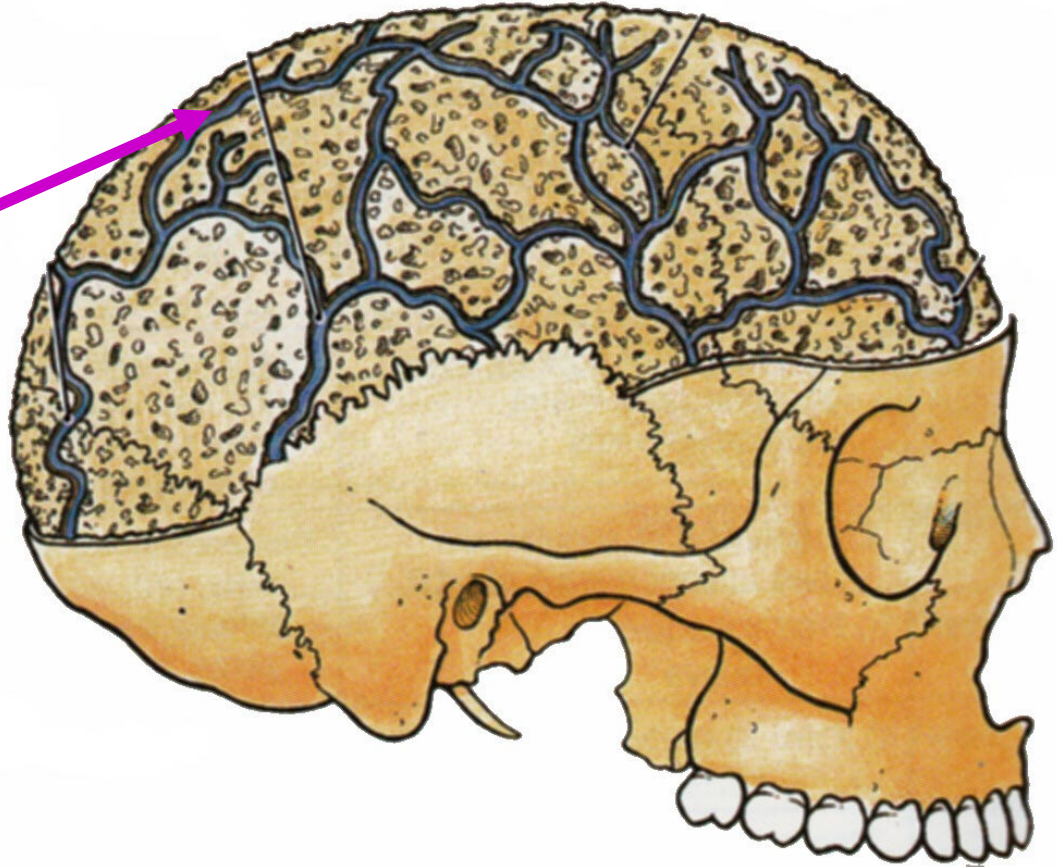
1. INNER AND OUTER TABLES - HARD CORTICAL BONE

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

2. DIPLOIC VEINS

view when outer table of bone is partially removed

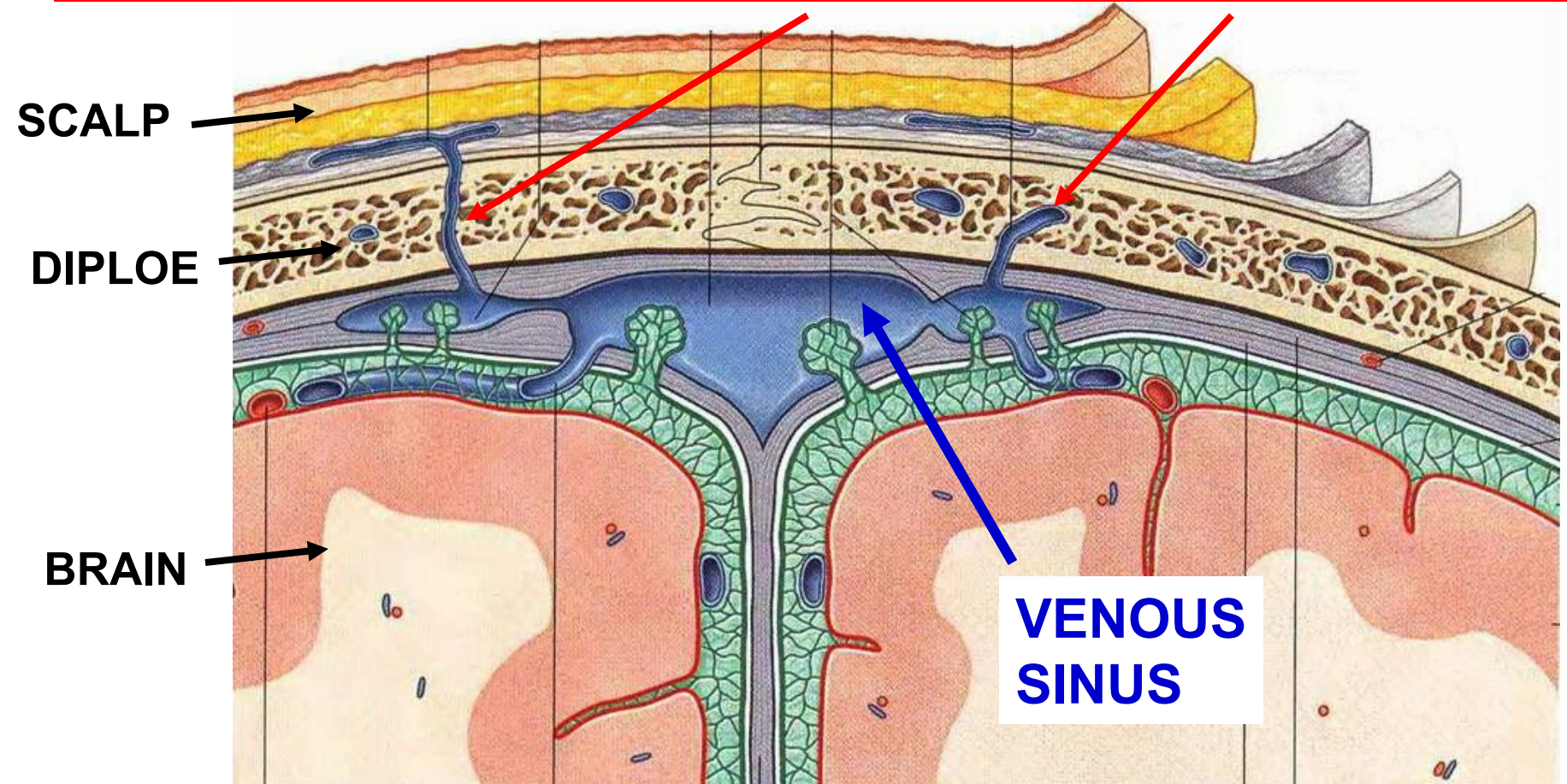
**COURSE IN
DIPLOE -
CONNECT BOTH
TO CRANIAL
CAVITY AND
SURFACE OF
SKULL**



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

EMISSARY VEINS

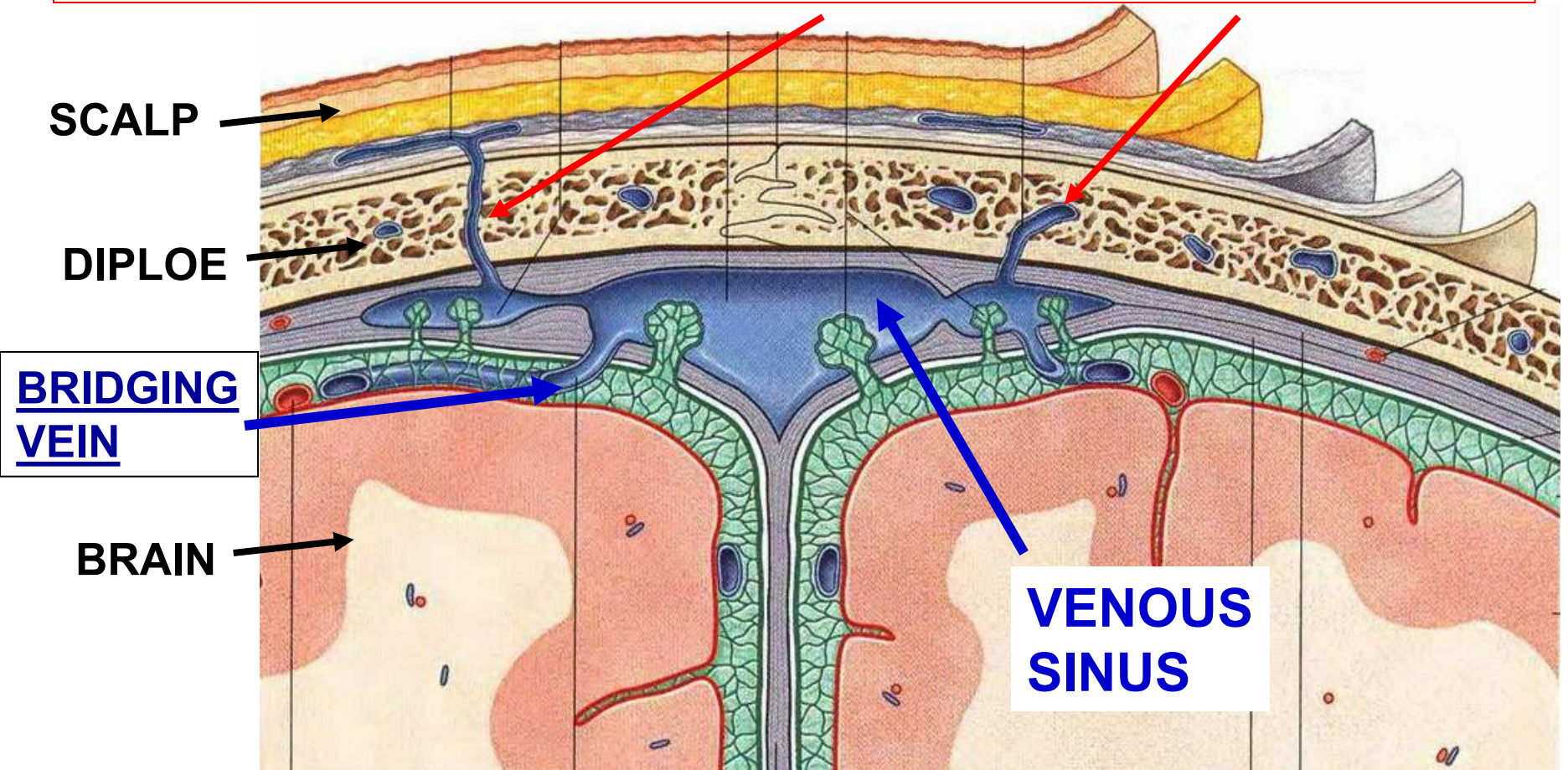
EMISSARY VEIN - SCALP TO DIPLOE, SCALP TO SINUS, DIPLOE TO SINUS



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

EMISSARY VEINS VS BRIDGING VEINS

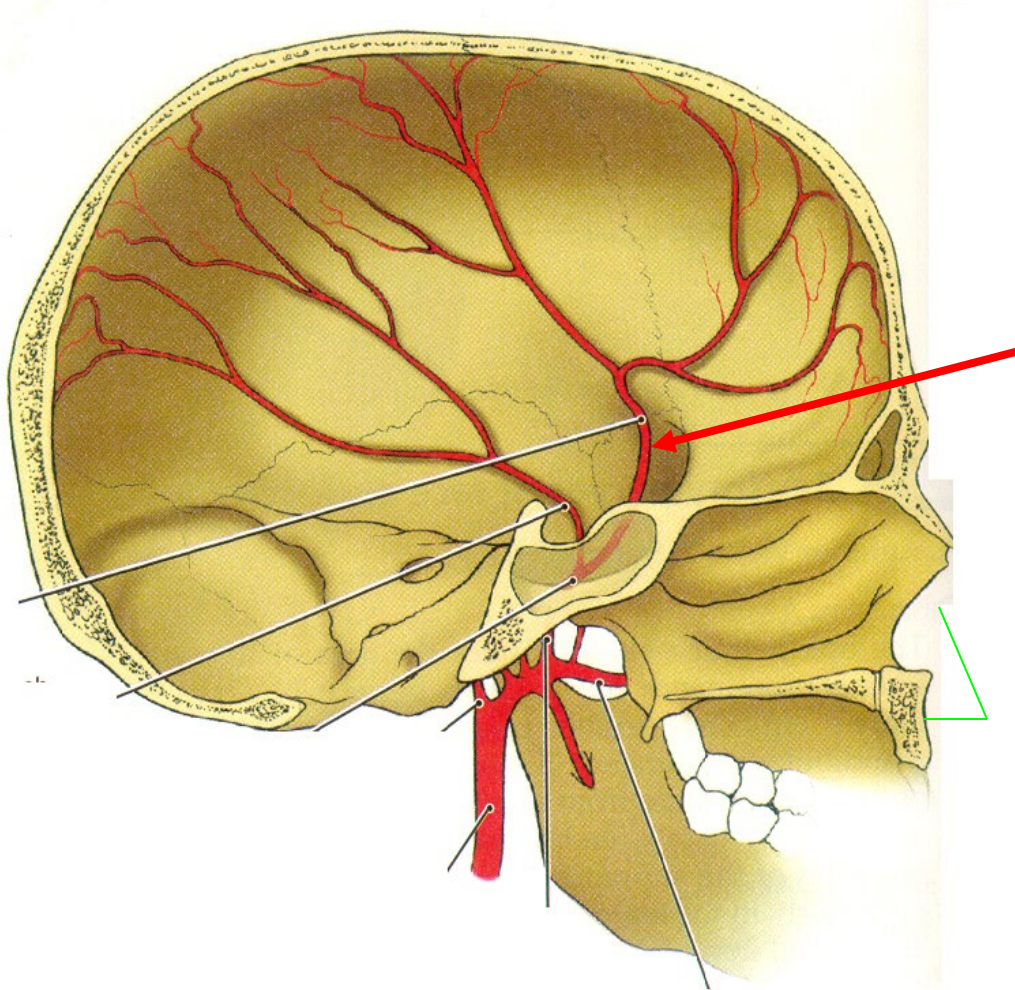
EMISSARY VEIN - SCALP TO DIPLOE, SCALP TO SINUS, DIPLOE TO SINUS



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



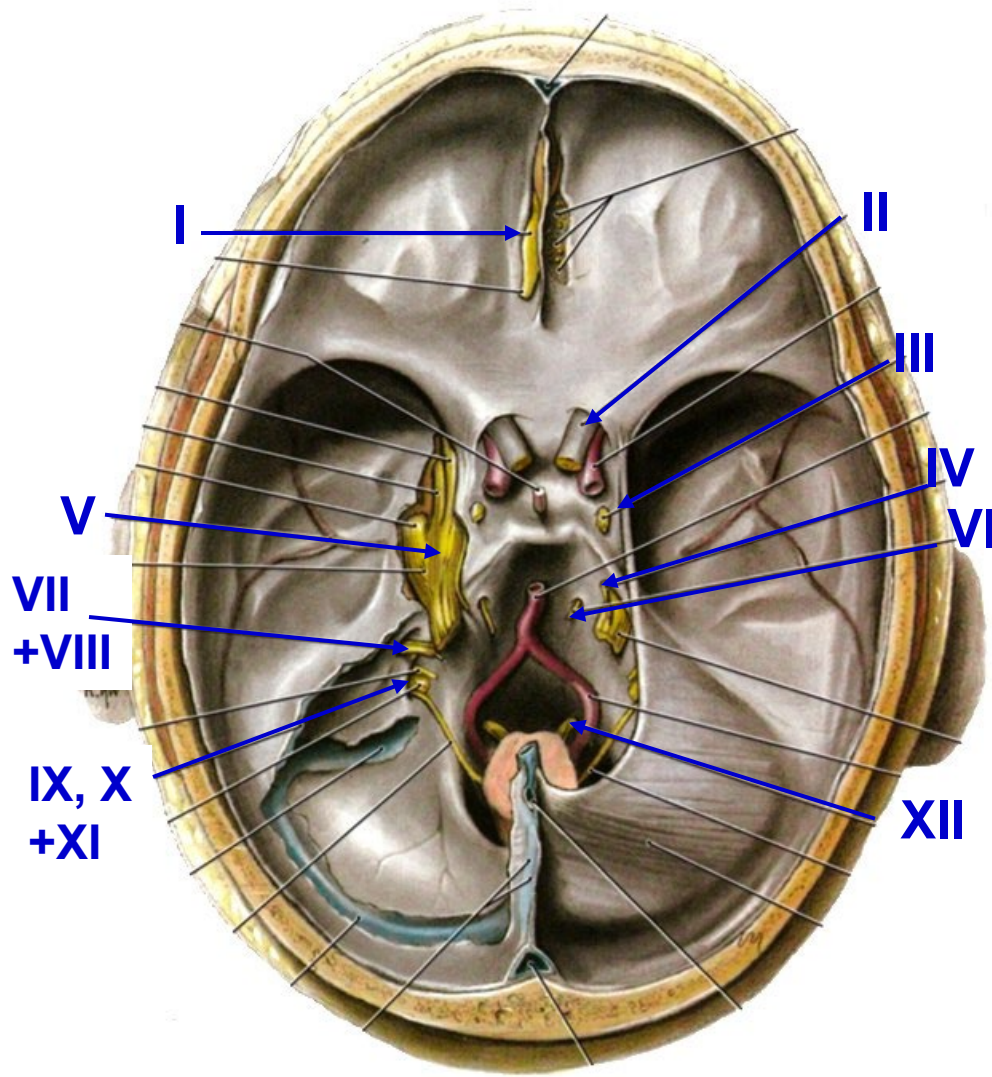
**1) OUTER SURFACE –
ARTERIES TO SCALP**

**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

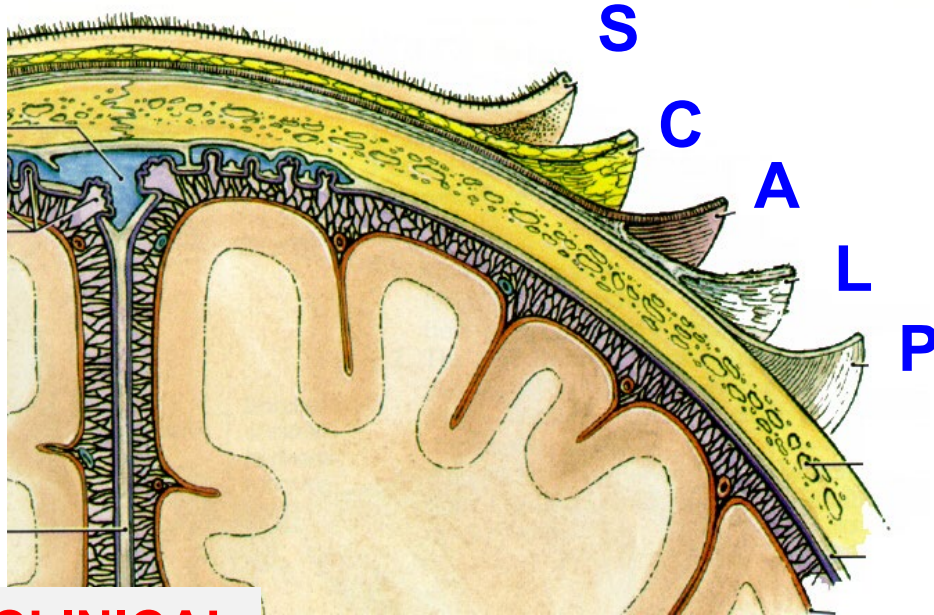
LEARN NAMES AND NUMBERS OF CRANIAL NERVES



- 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.

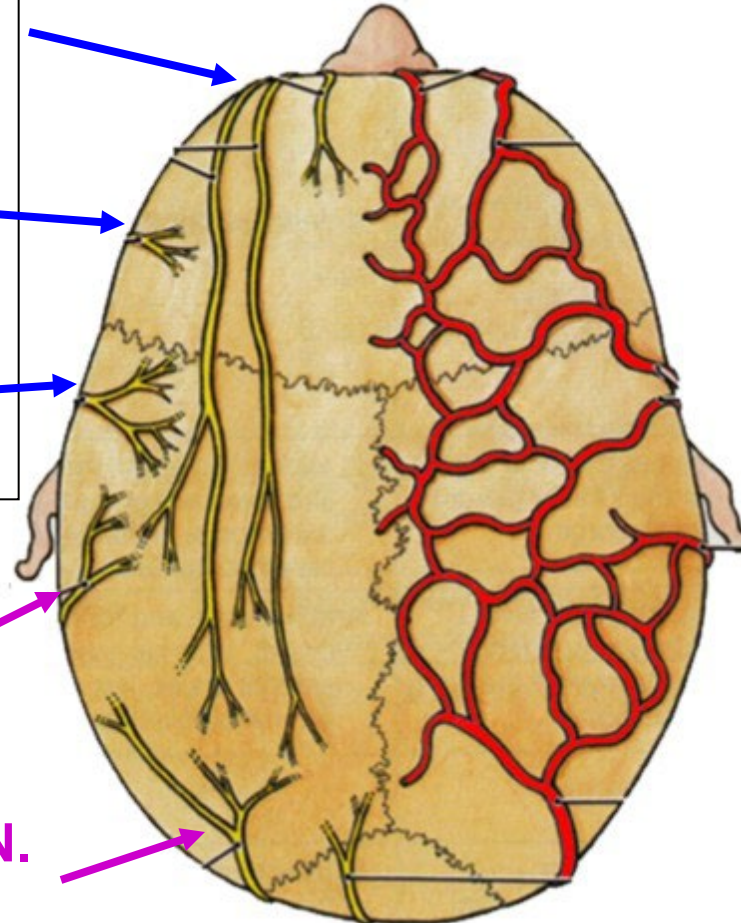
V2 – ZYGOMATICO-
TEMPORAL N.

V3 – AURICULO-
TEMPORAL N.

LESSER OCCIPITAL
N. - C2 VENTRAL
RAMUS

GREATER OCCIPITAL N.
- C2 DORSAL RAMUS

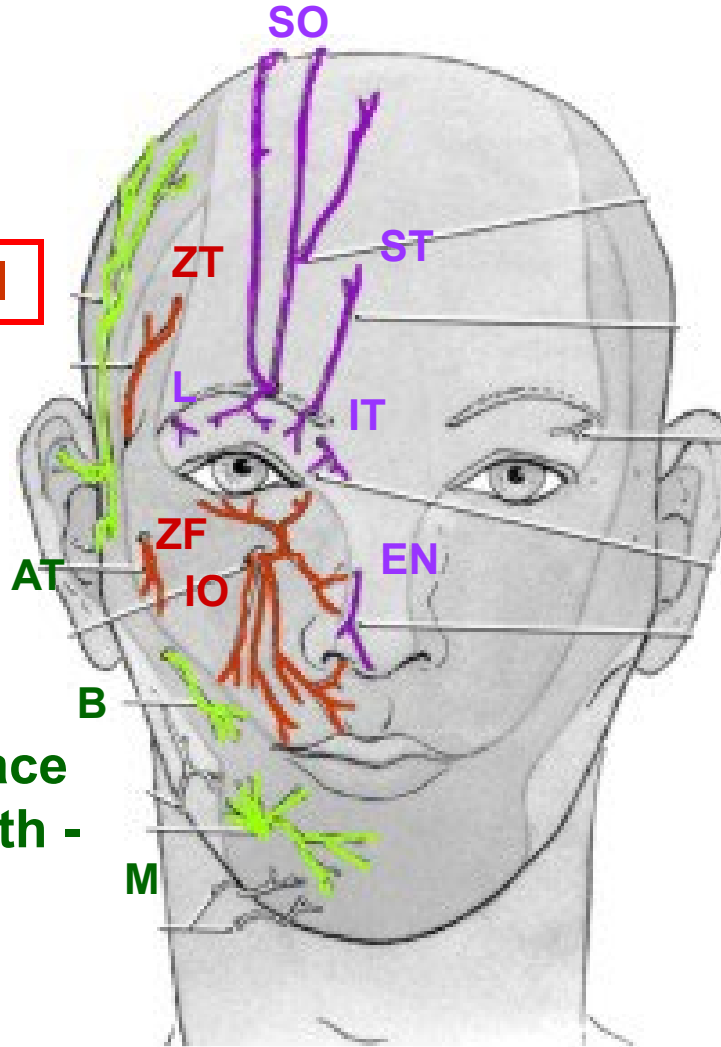
NOSE



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

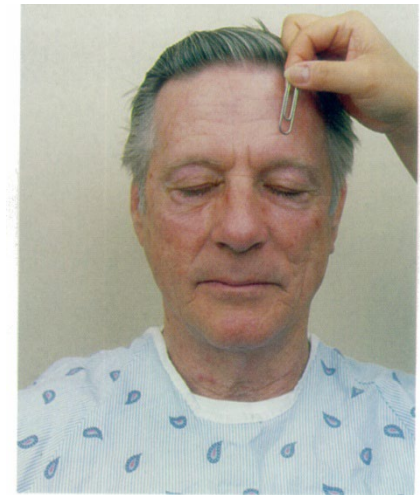
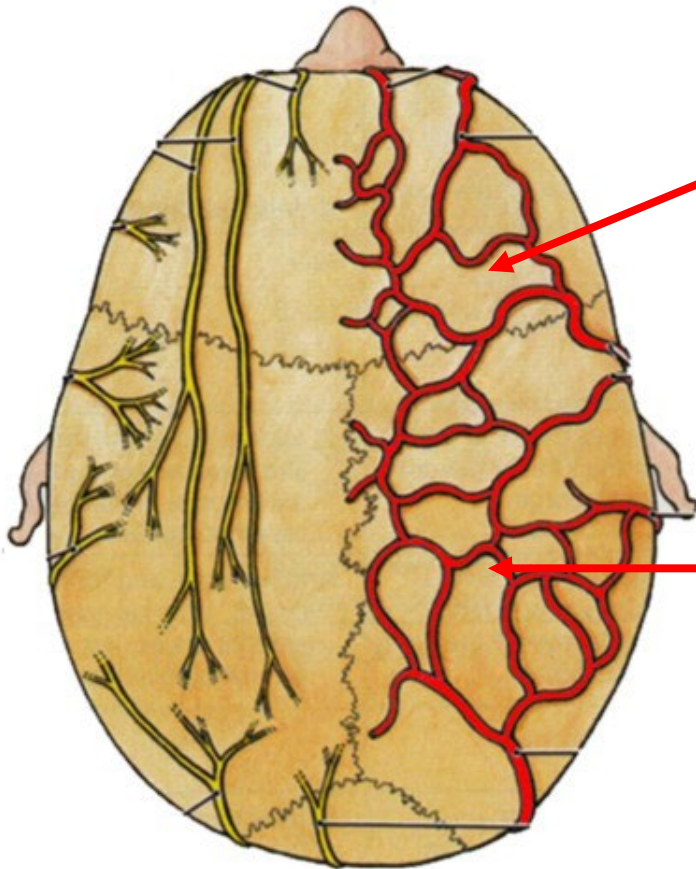


FIGURE 21-13
Examination of the trigeminal cranial nerve

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

C. ARTERIES OF SCALP

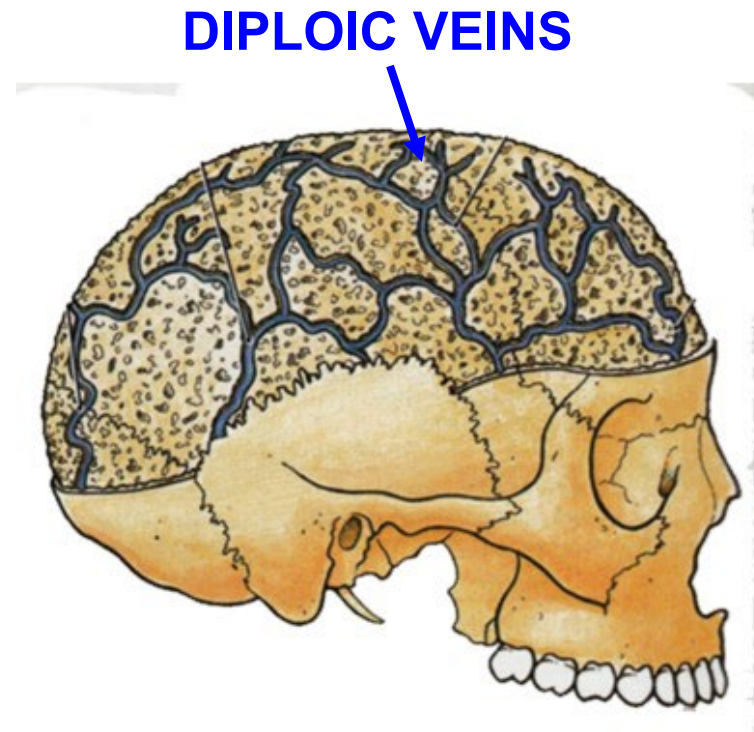
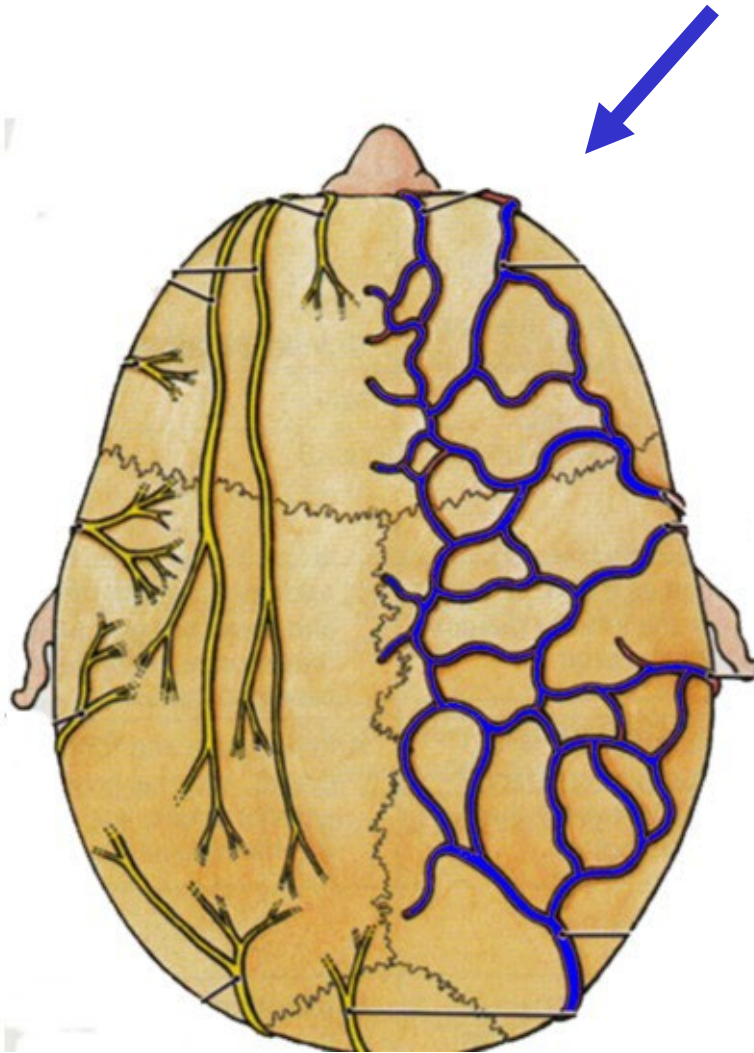
- RICH SUPPLY FROM BRANCHES OF INTERNAL AND EXTERNAL CAROTID; EXTENSIVE ANASTOMOSES - SCALP WOUND BLEEDS PROFUSELY FROM BOTH SIDES OF CUT



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

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

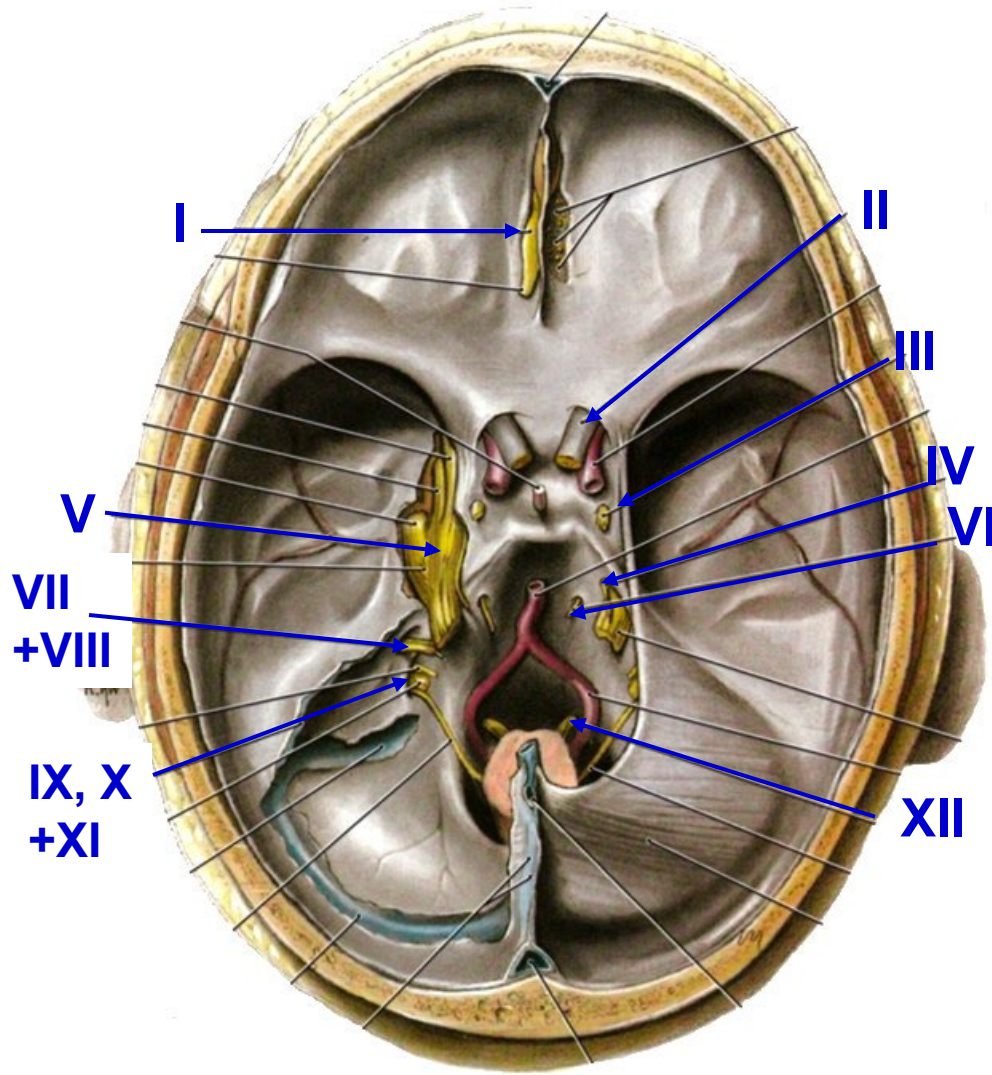
D. VEINS OF SCALP – SAME NAMES AS ARTERIES



DIPLOIC VEINS

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

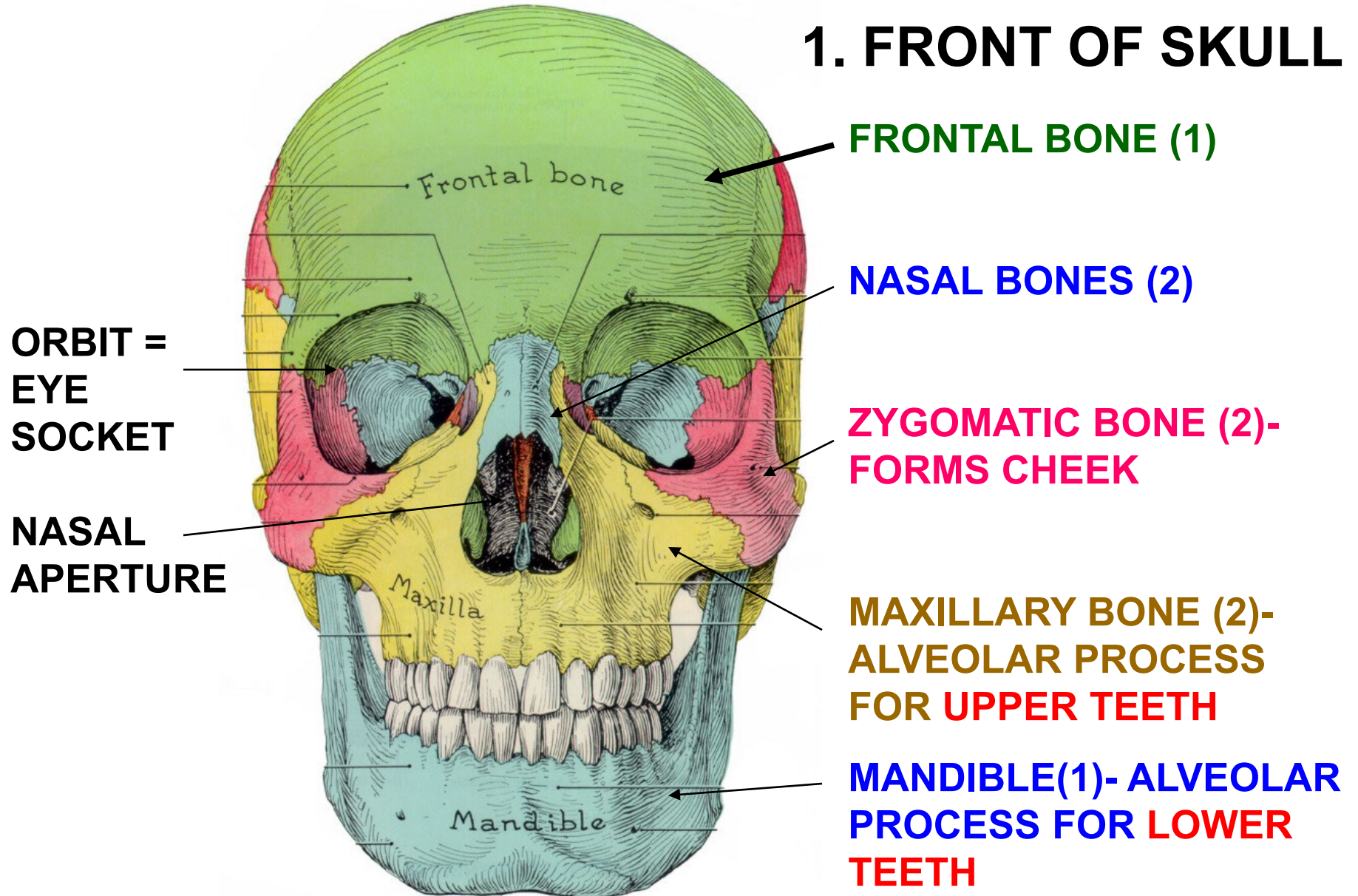
CRANIAL NERVES



- 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



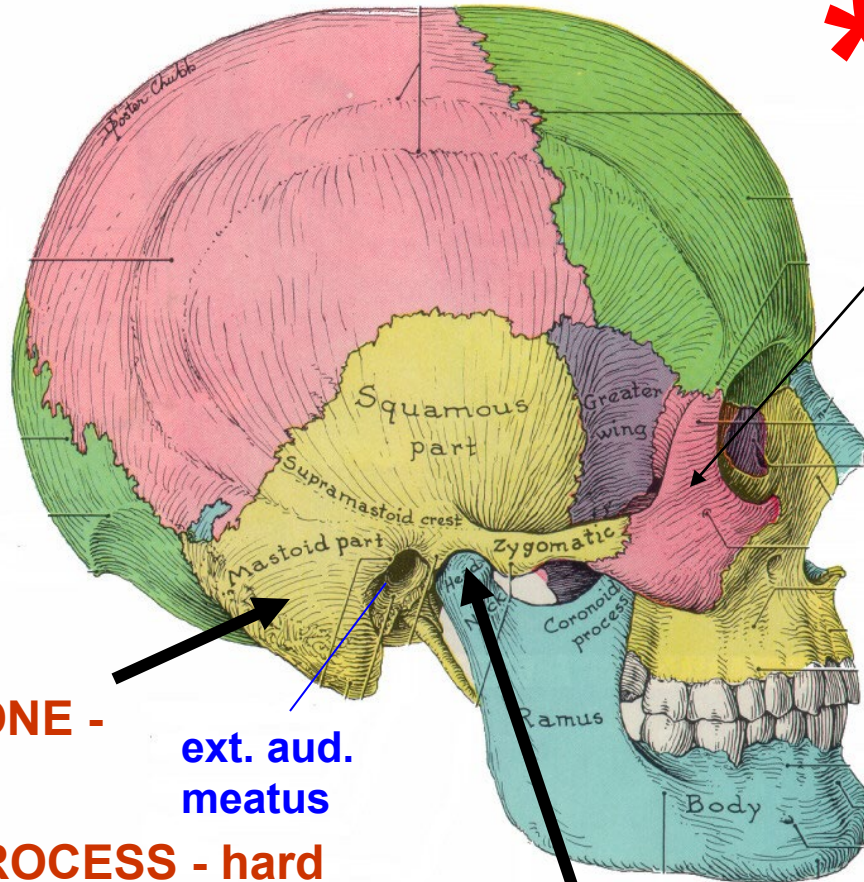
2. LATERAL VIEW OF SKULL



CLINICAL - fractures

ZYGOMATIC ARCH-

- 1) ZYGOMATIC BONE**
- 2) MAXILLARY BONE-
ZYGOMATIC PROCESS**
- 3) TEMPORAL BONE-
ZYGOMATIC PROCESS**



TEMPORAL BONE -

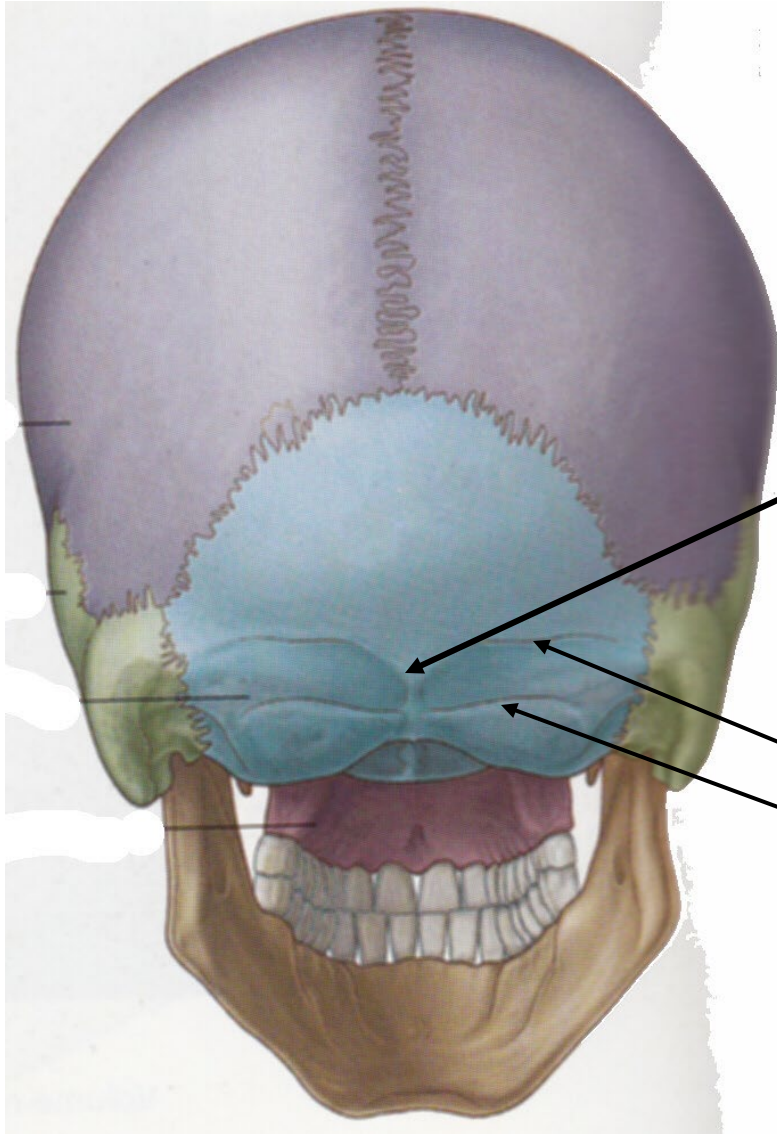
PARTS

- 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

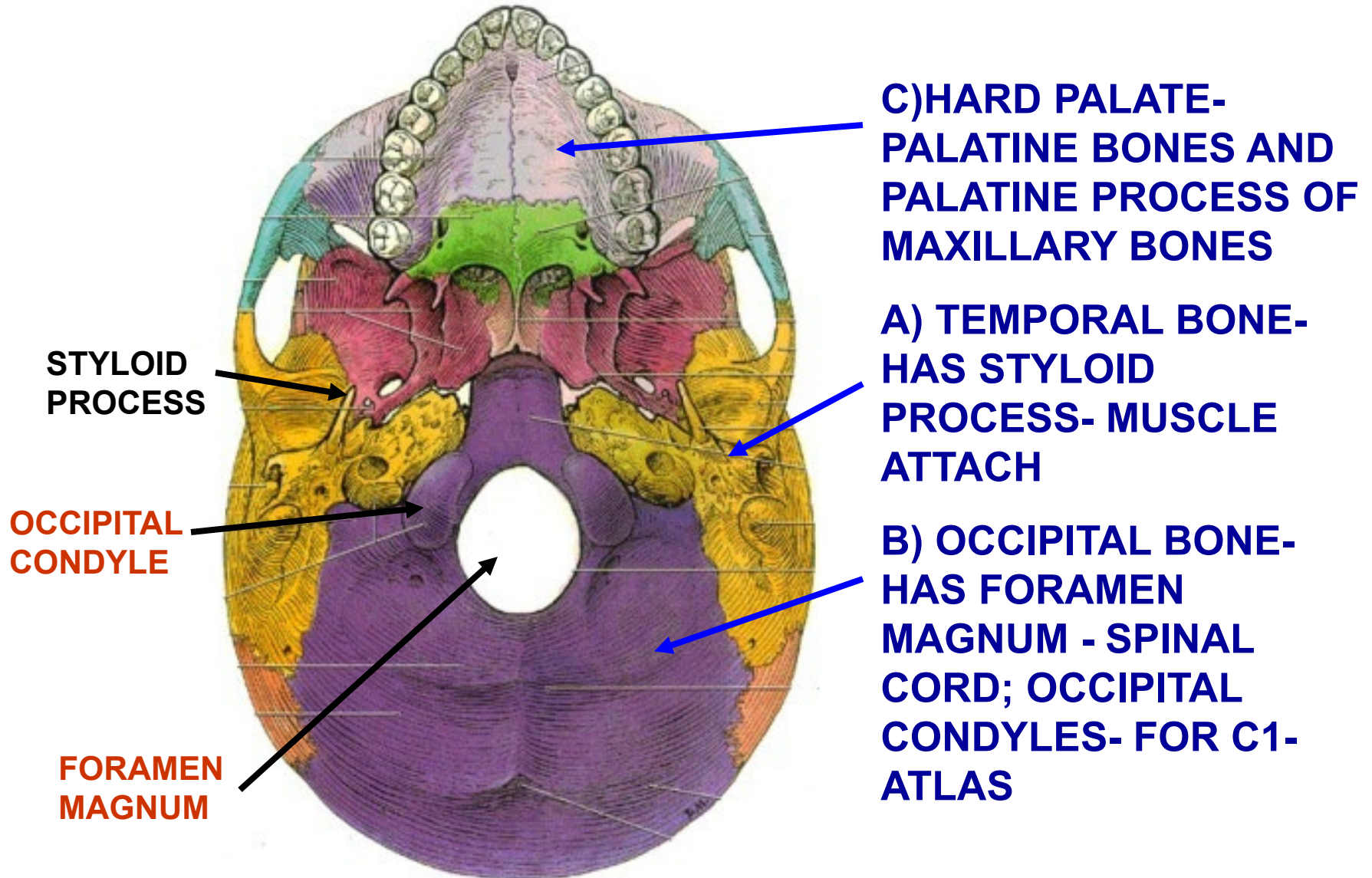


OCCIPITAL BONE

**EXTERNAL OCCIPITAL
PROTUBERANCE**

**SUPERIOR AND
INFERIOR
NUCHAL LINES**

4. BASE OF SKULL - COMPLEX



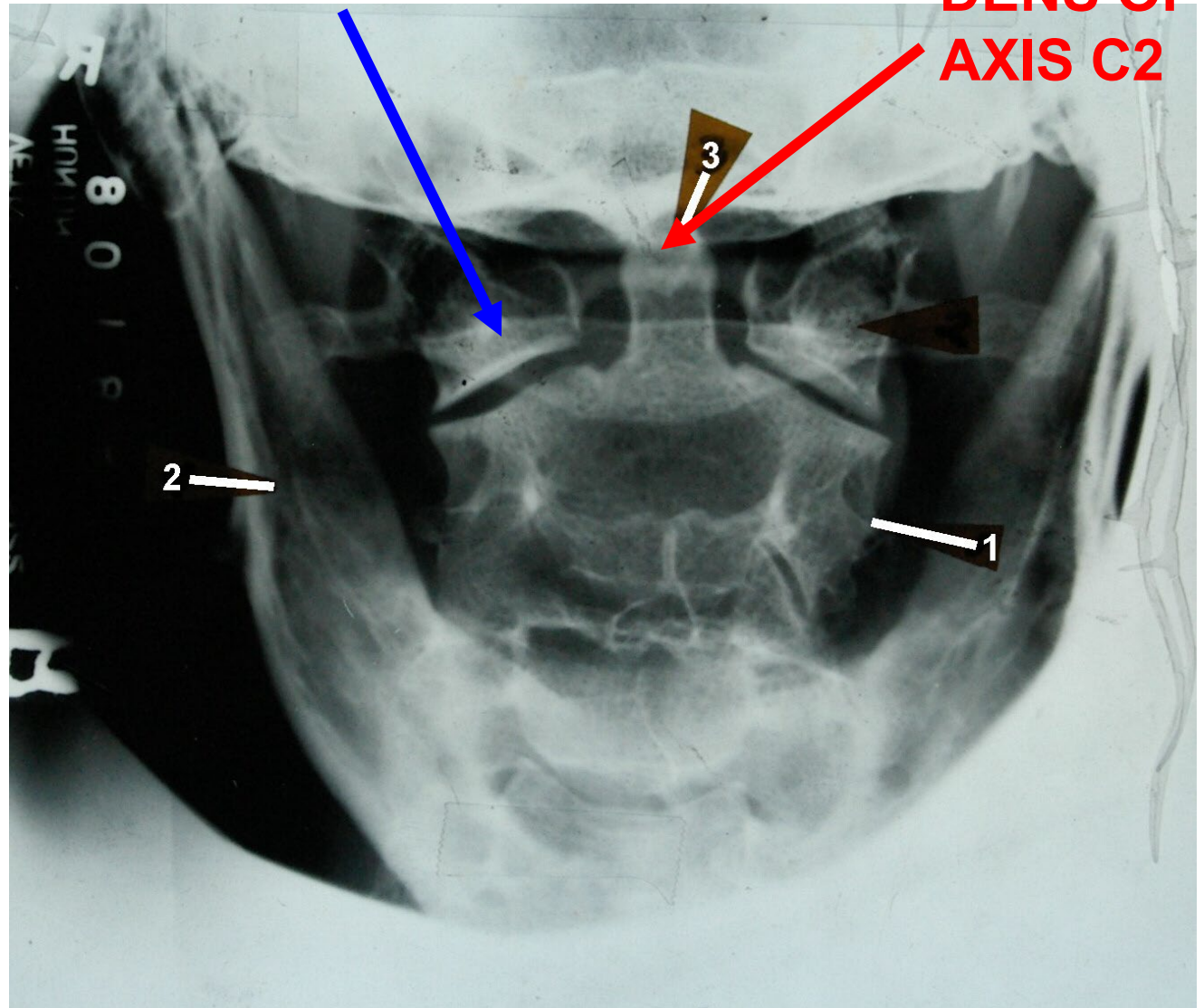
AP view

ATLAS C1

DENS OF
AXIS C2

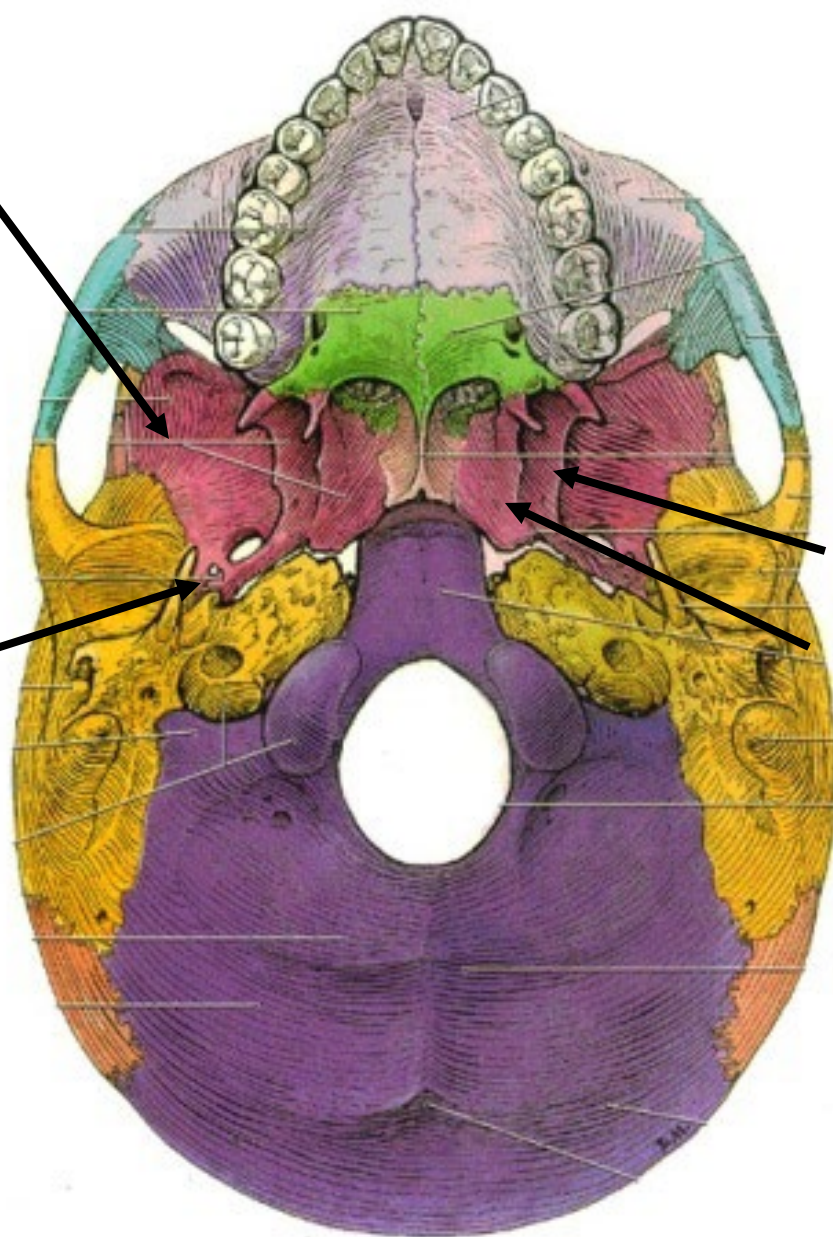
Antero-
posterior film
of with **mouth
open**

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

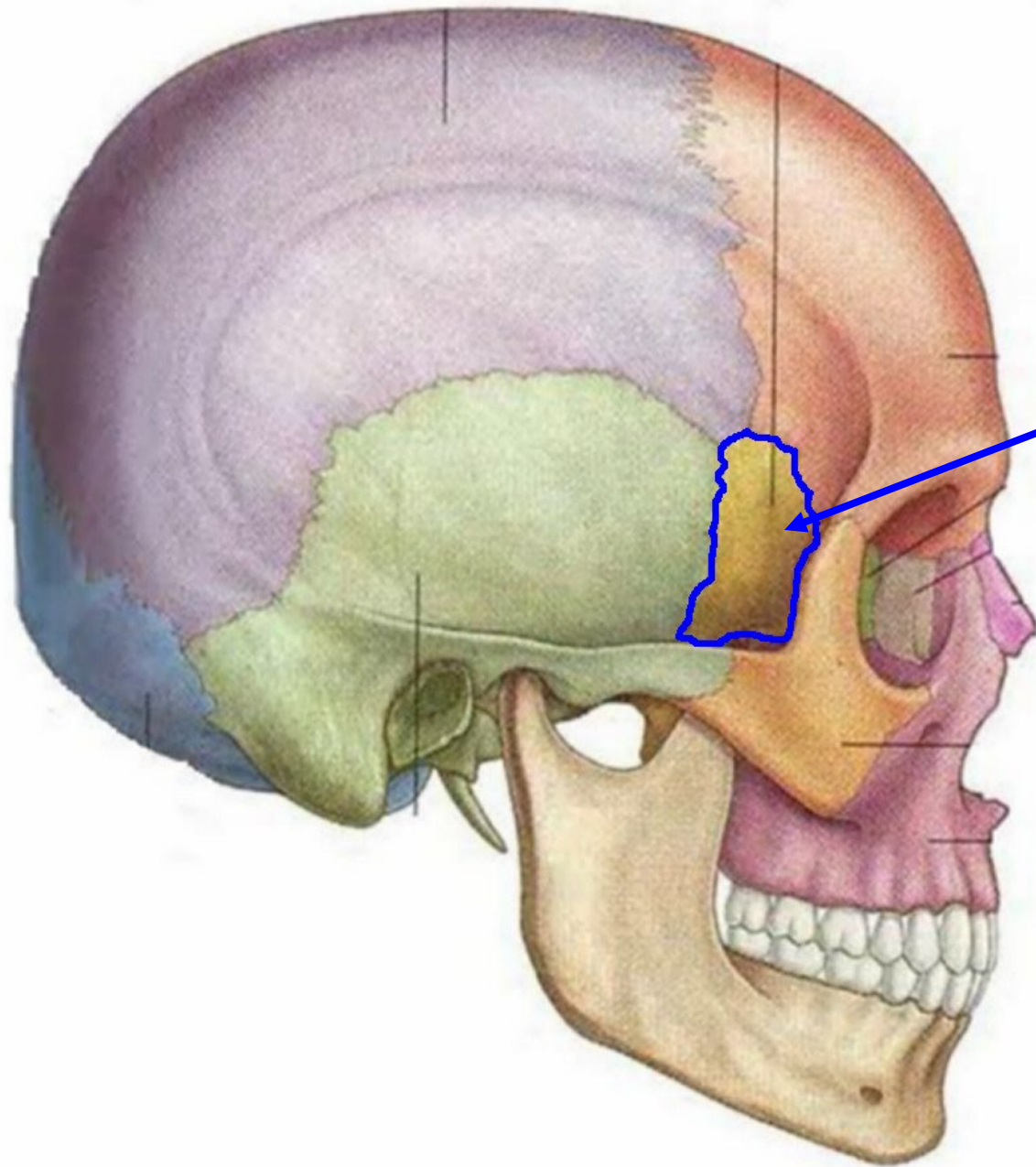


1. SPHENOID BONE – ‘CORE’ OF SKULL

2) SPINE OF SPHENOID -
INFERIOR SIDE
ATTACH LIGAMENT

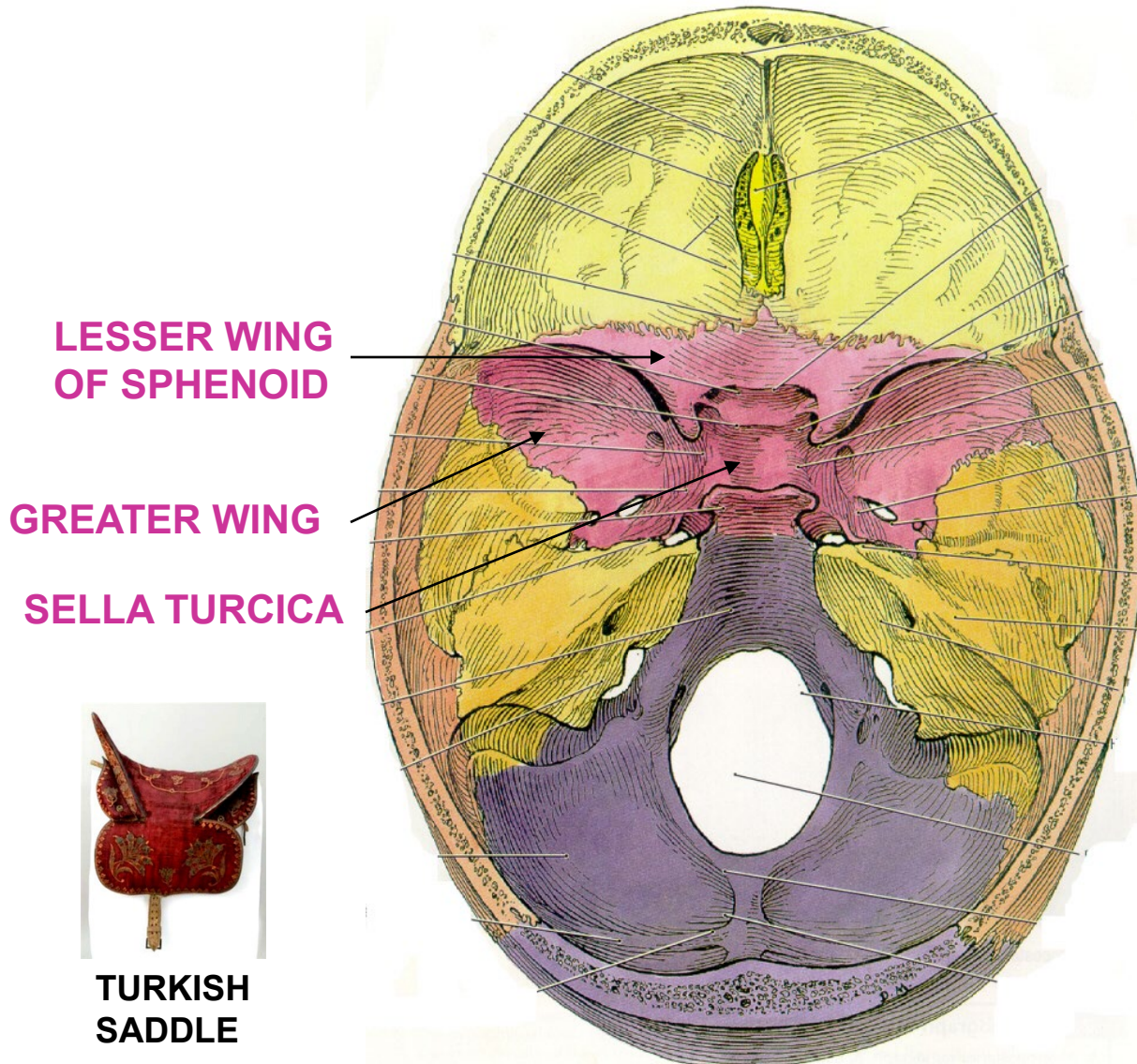


LATERAL AND
MEDIAL
PTERYGOID
PLATES -
MUSCLE
ATTACHMENT



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

SPHENOID BONE - INSIDE SKULL



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

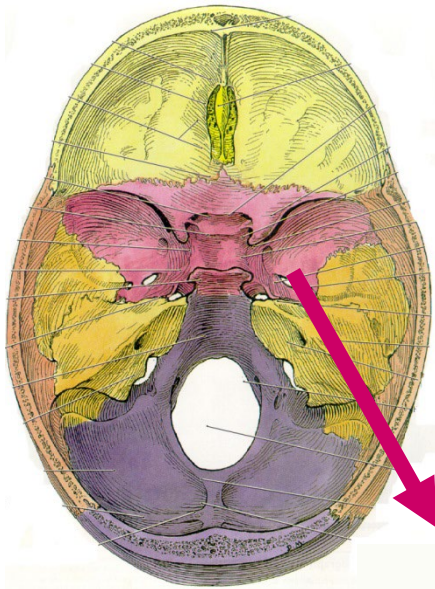
i) Lesser Wing above Superior Orbital Fissure;

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

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

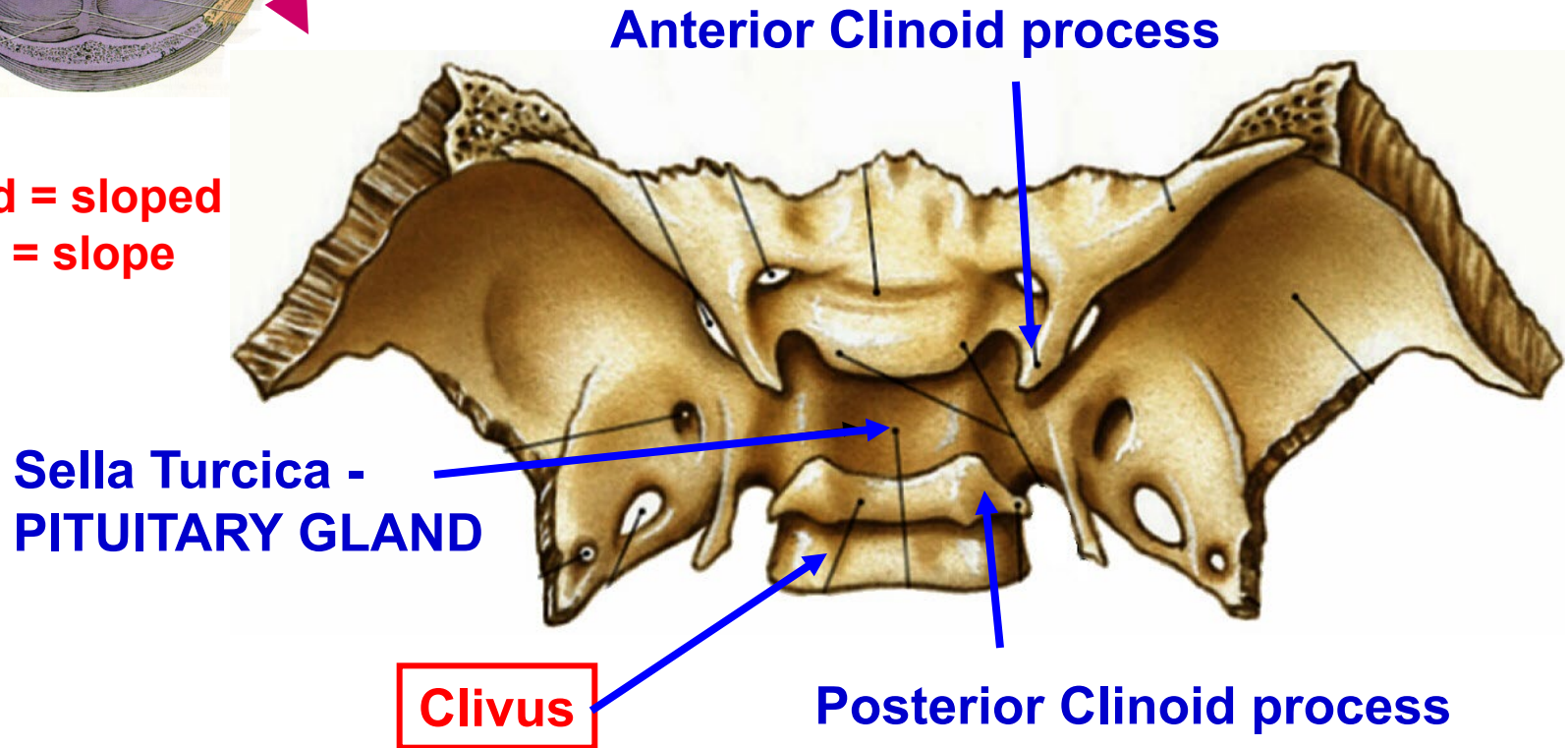
LOCATION OF PITUITARY GLAND

SPHENOID BONE - INSIDE SKULL



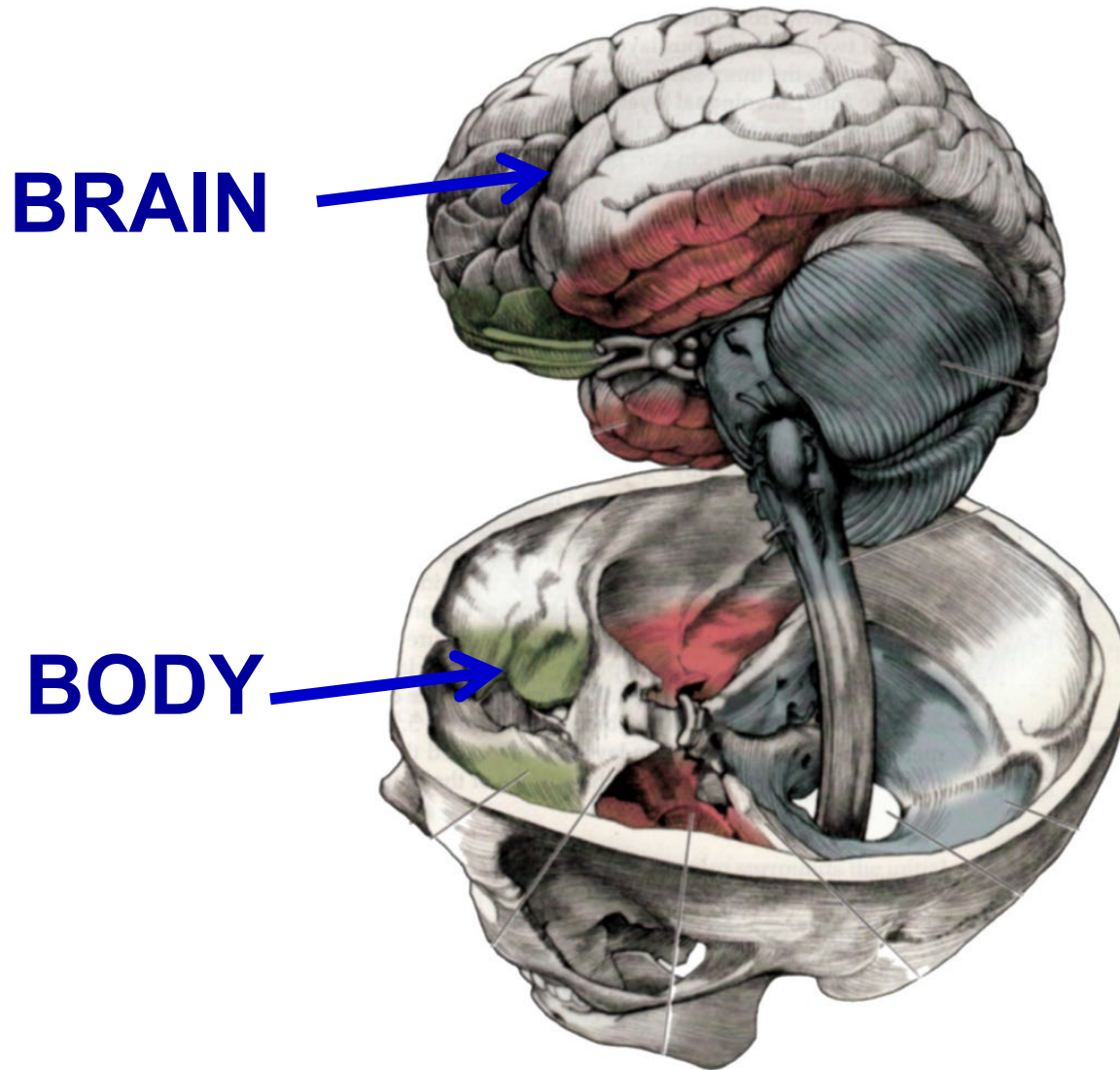
Sella Turcica - (turkish saddle) depression above body; location of PITUITARY GLAND

**Clinoid = sloped
Clivus = slope**

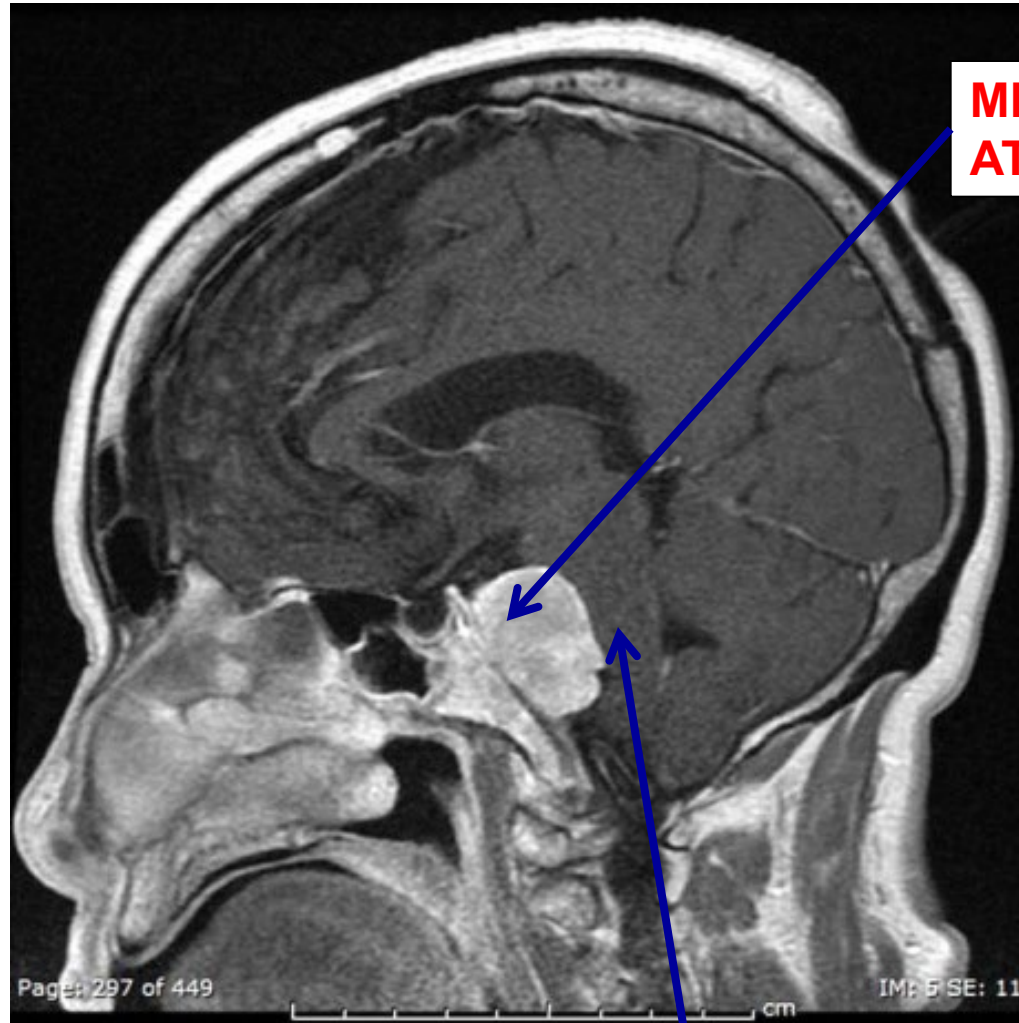


Note: parts of Sphenoid bone are important landmarks in Neurology

GROSS BRAINSTEM DISSECTION: HOW THE BRAIN FITS IN THE BODY



TERMINOLOGY: MENINGIOMA AT THE CLIVUS

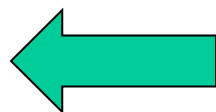


**MENINGIOMA
AT CLIVUS**

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

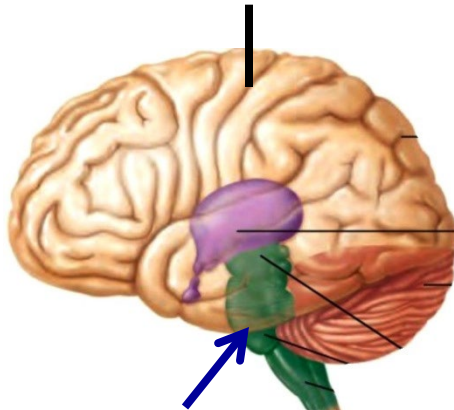
- Coordination problems (ataxia)
- Blurry vision
- Difficulty swallowing (dysphagia)
- Difficulty walking
- Headaches
- Hearing loss
- Nausea
- Optical disc swelling (papilledema)
- Sensory problems
- Vertigo (loss of balance)
- Vision problems
- Vomiting
- Weakness

NOSE



BRAINSTEM

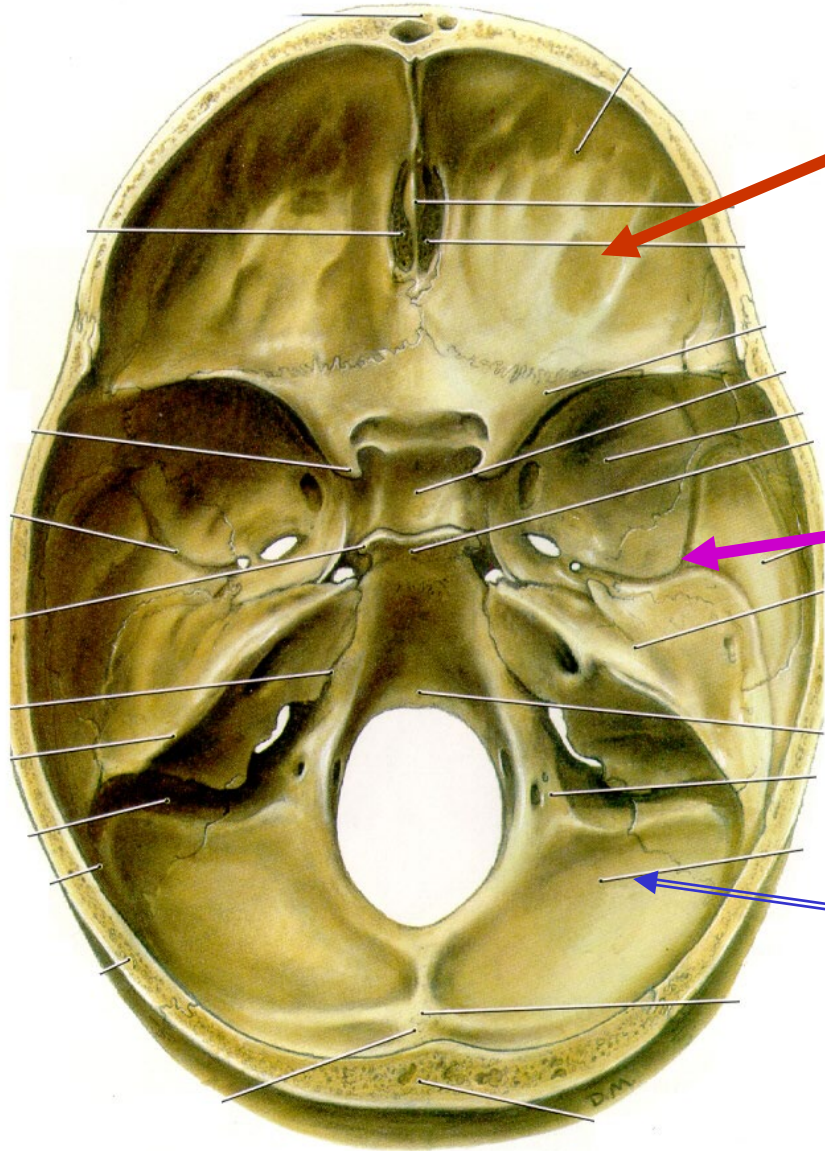
BRAIN



BRAINSTEM

SPINAL CORD

V. CRANIAL CAVITY- DIVIDED INTO DEPRESSIONS (FOSSAE)



ANTERIOR CRANIAL FOSSA (ROOF OF NASAL CAVITY, ORBIT)

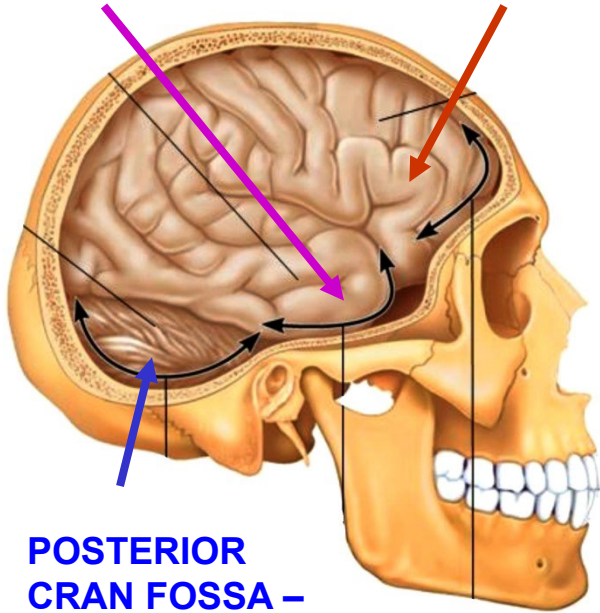
MIDDLE CRANIAL FOSSA (ORBIT, NASAL CAVITY, FACE)

POSTERIOR CRANIAL FOSSA (FACE, ORAL CAVITY, NECK)

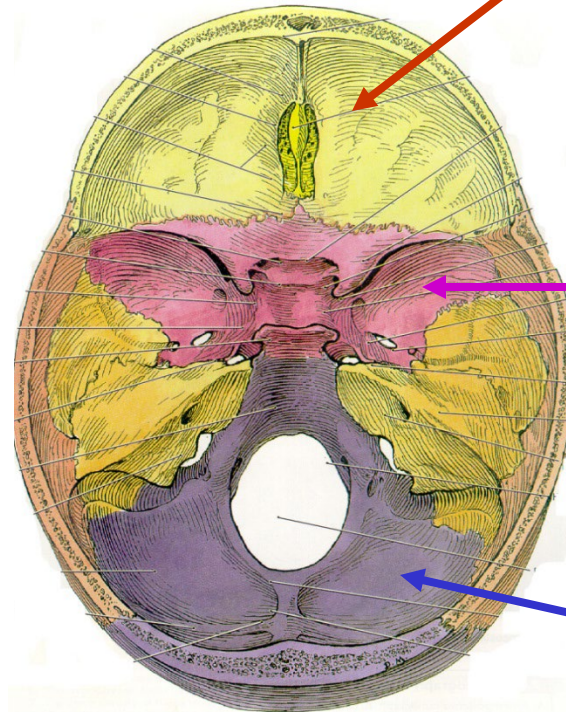
CONTENTS OF CRANIAL FOSSAE

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