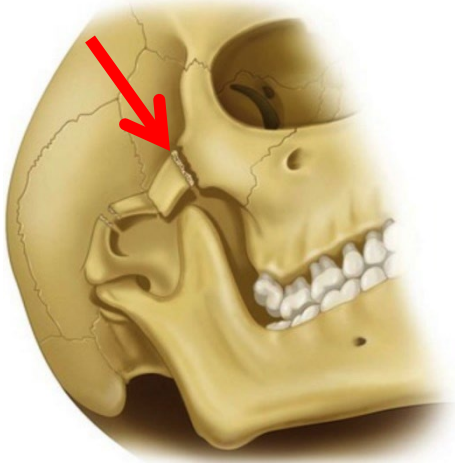
SKULL

HEAD IS SPECIALIZED TO HOUSE AND PROTECT THE BRAIN

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

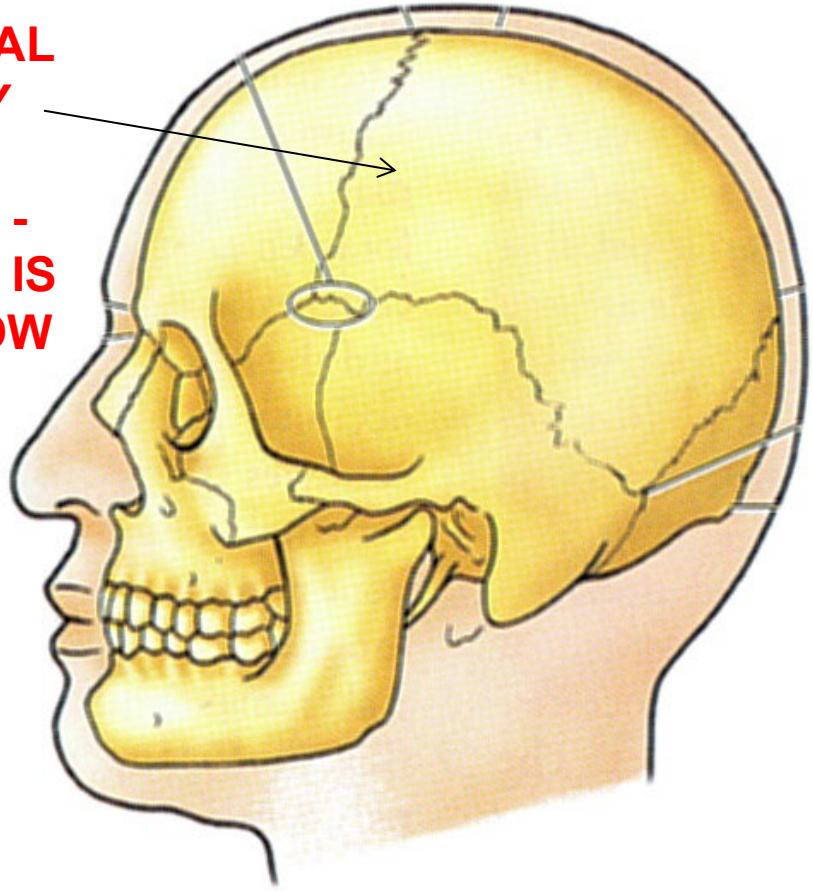
HEAD IS UNIQUE = A PERSON'S IDENTITY

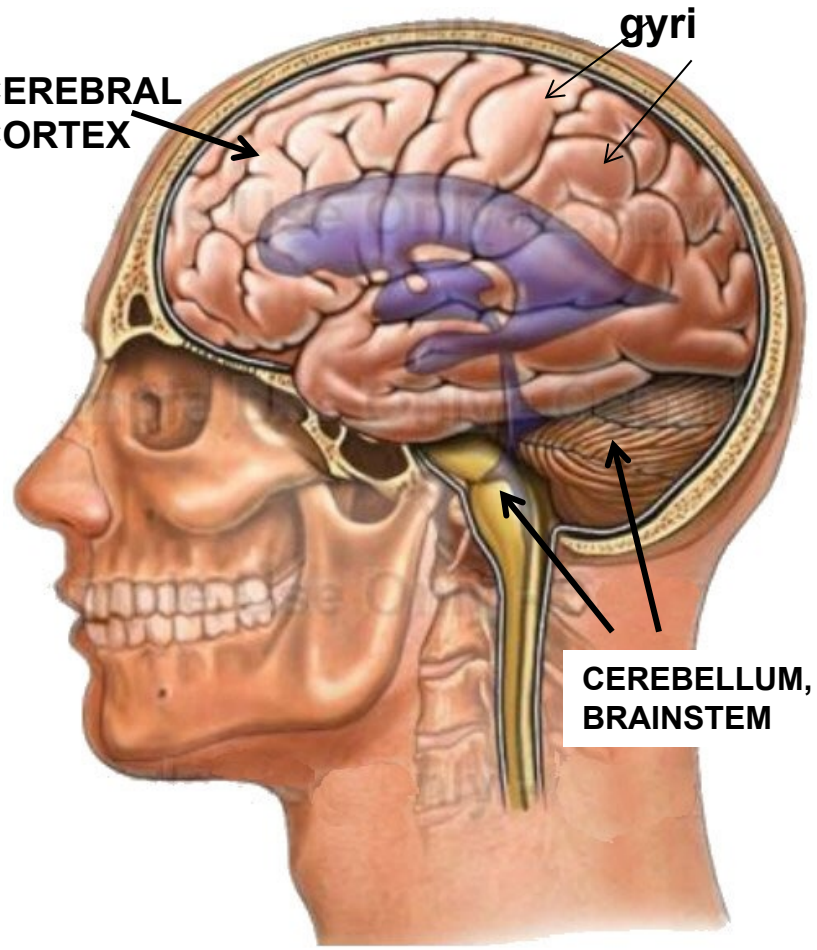


FRACTURE ZYGOMATIC ARCH

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

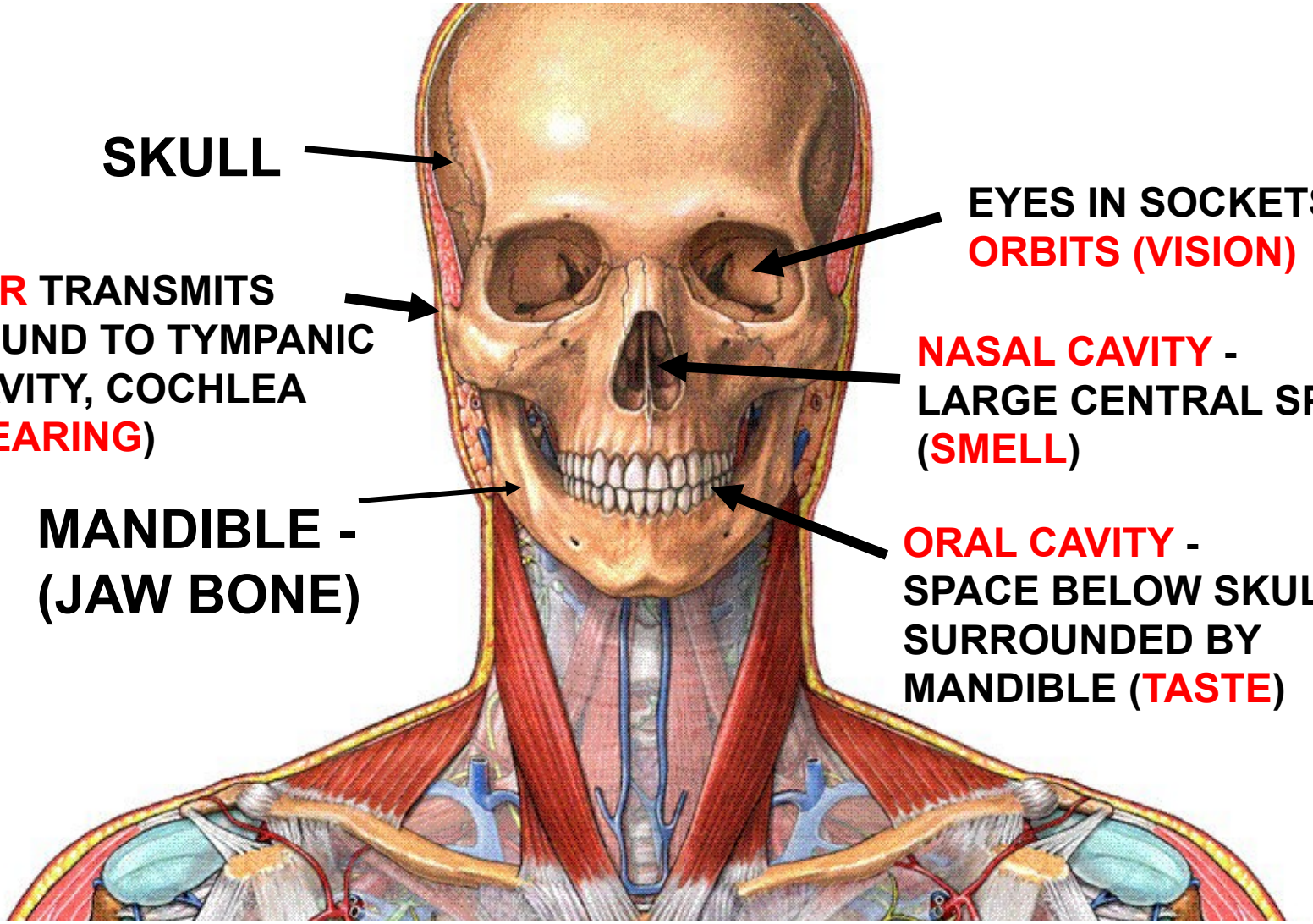
CRANIAL CAVITY INSIDE SKULL - SKULL IS HOLLOW





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

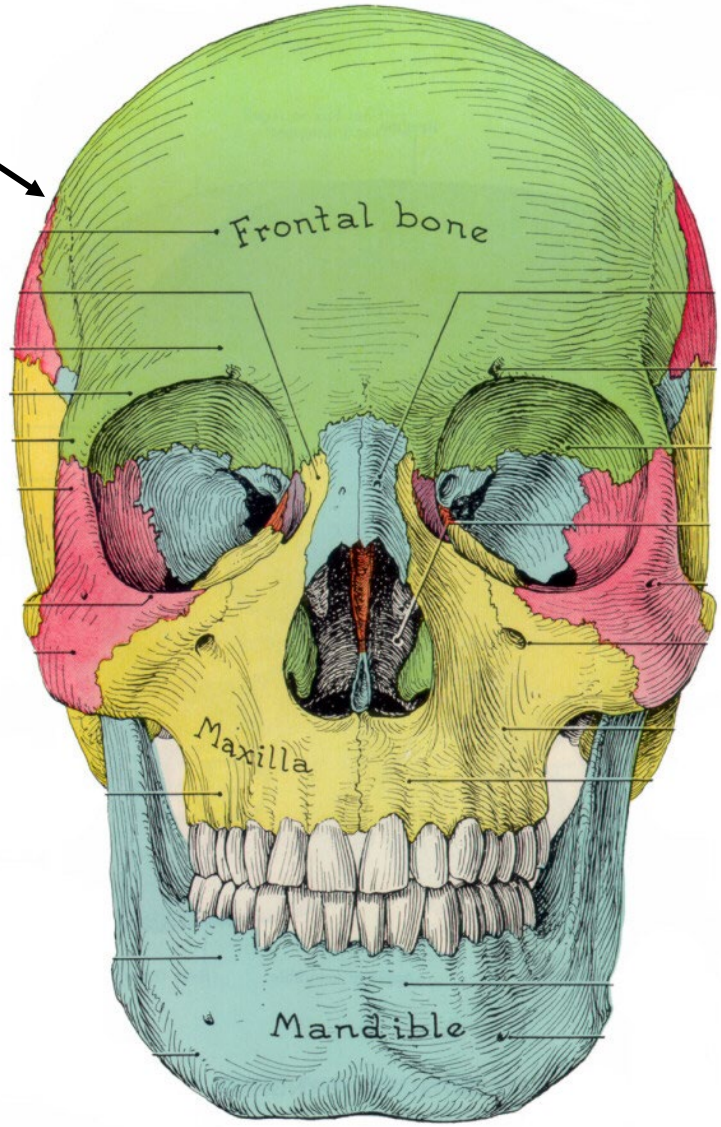
SKULL IS DESIGNED TO CONTAIN SPECIAL SENSES



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



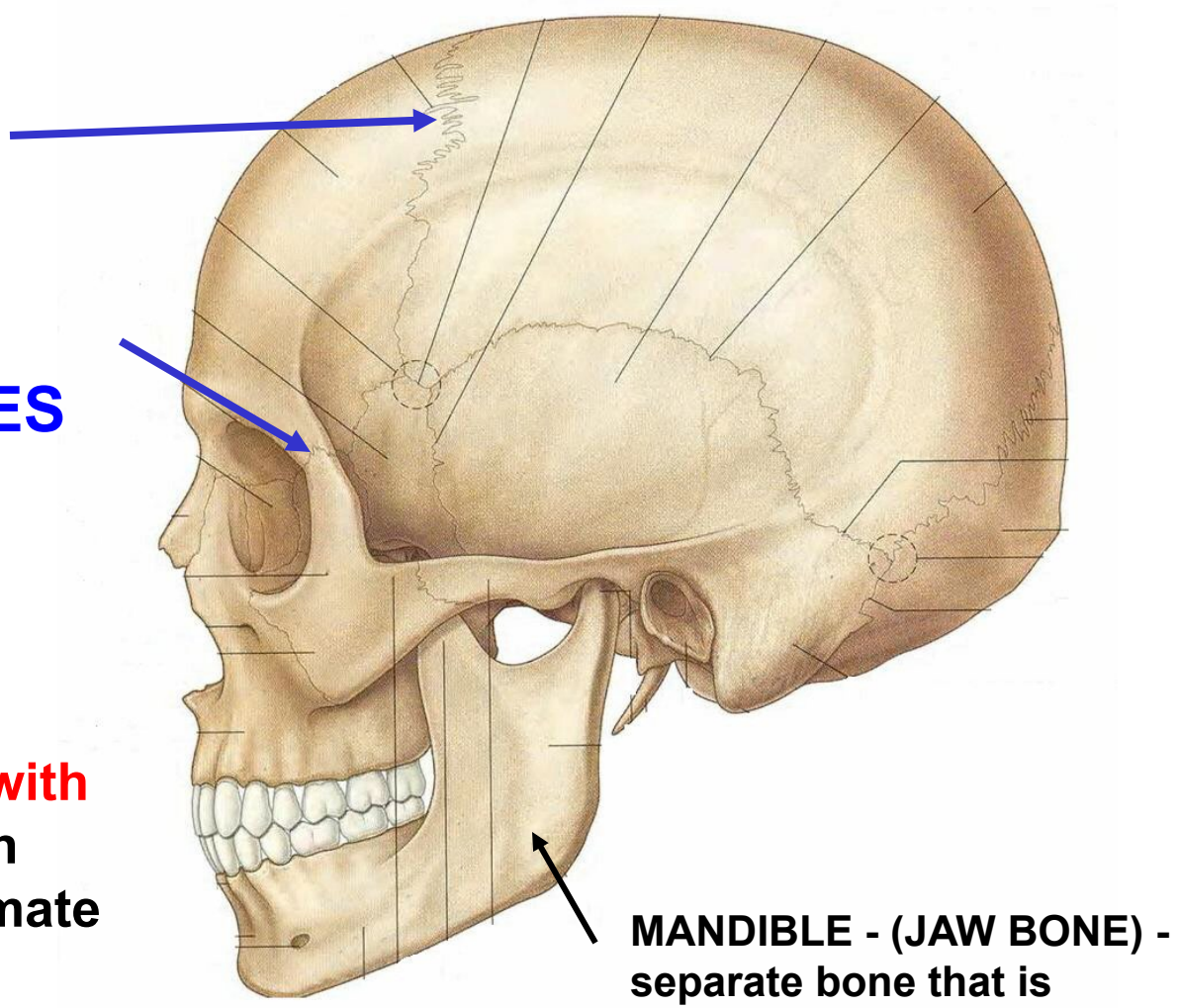
OUTLINE

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)



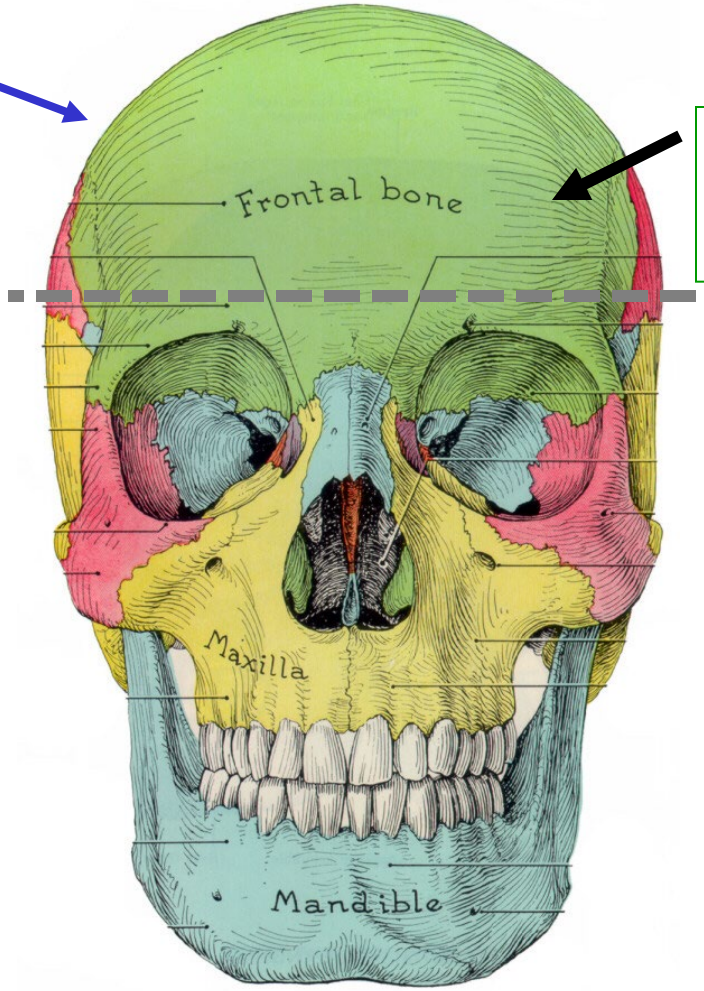
Note: Sutures progressively fuse with age; extent of fusion can be used to estimate age of skull.

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

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

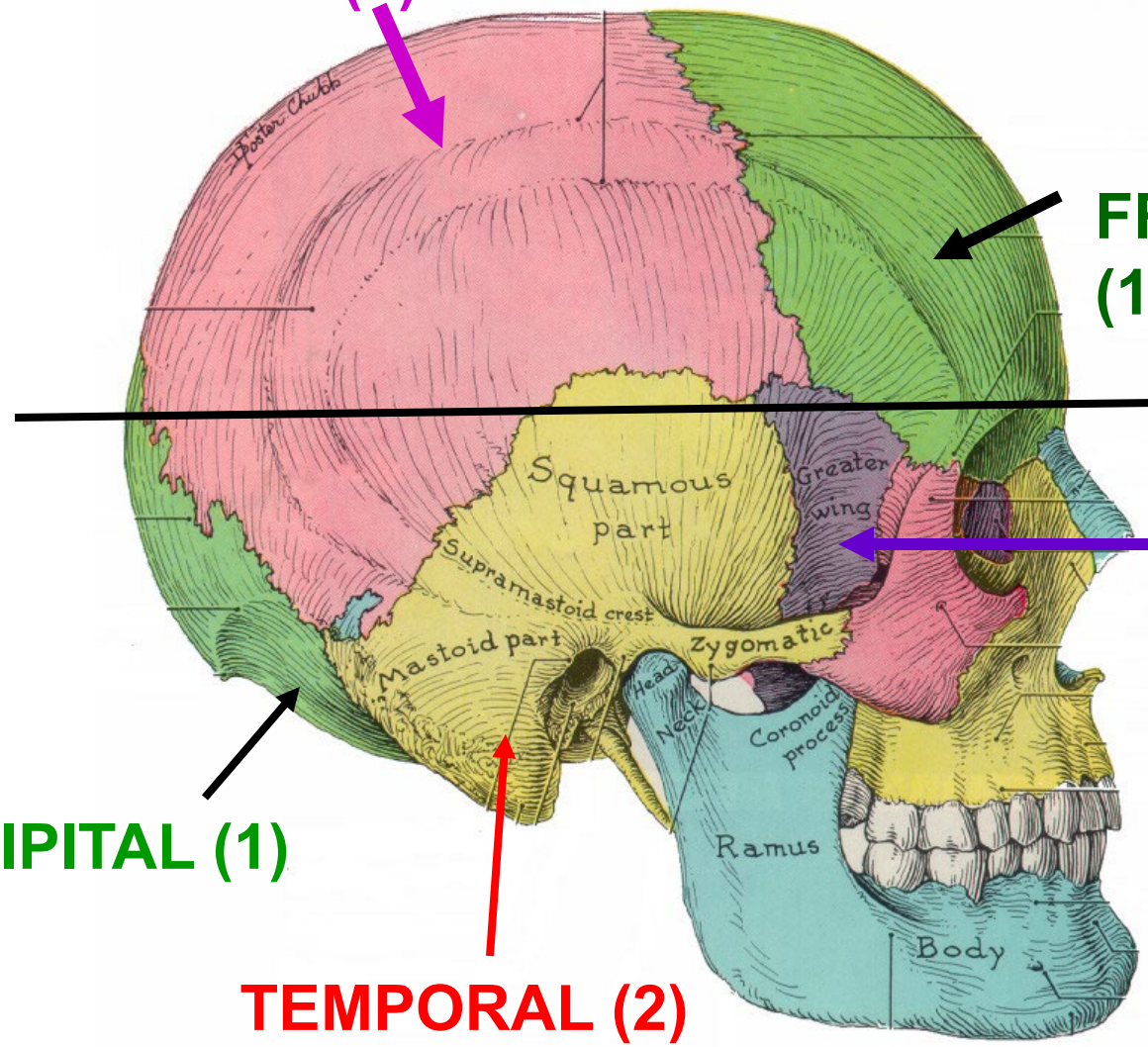
I. CALVARIUM = SKULL CAP -

Consists of bones linked by sutures



FRONTAL (1)

A. BONES OF CALVARIUM = SKULL CAP



PARIETAL (2)

FRONTAL (1)

SPHENOID (1)

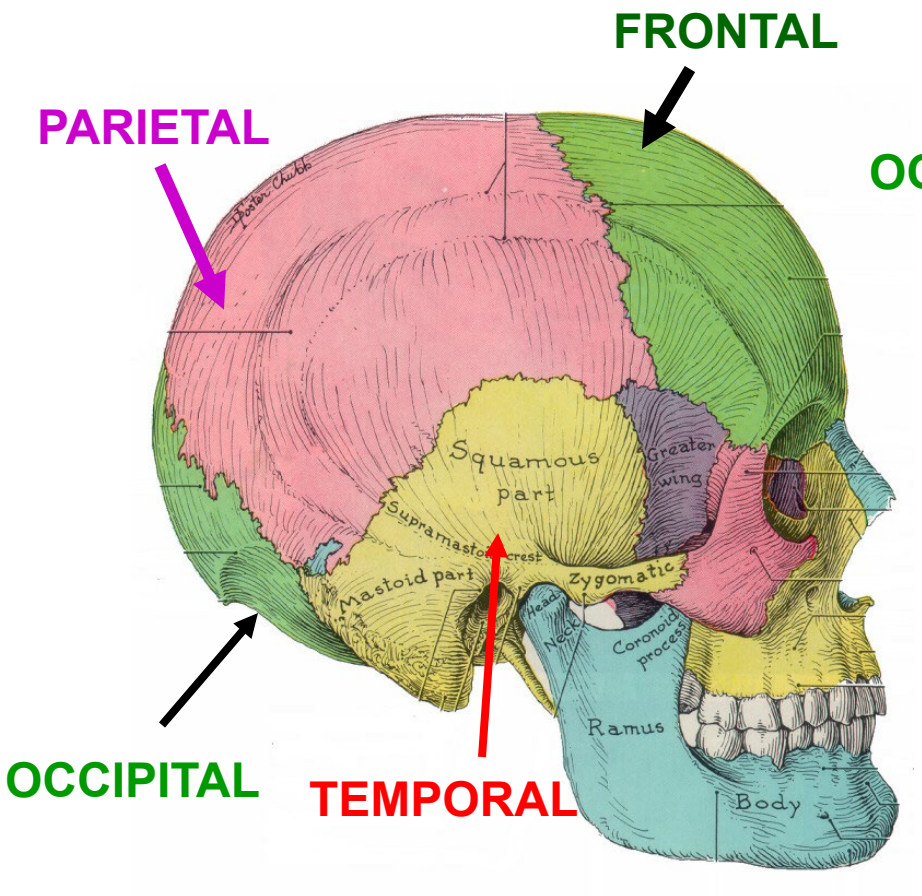
OCCIPITAL (1)

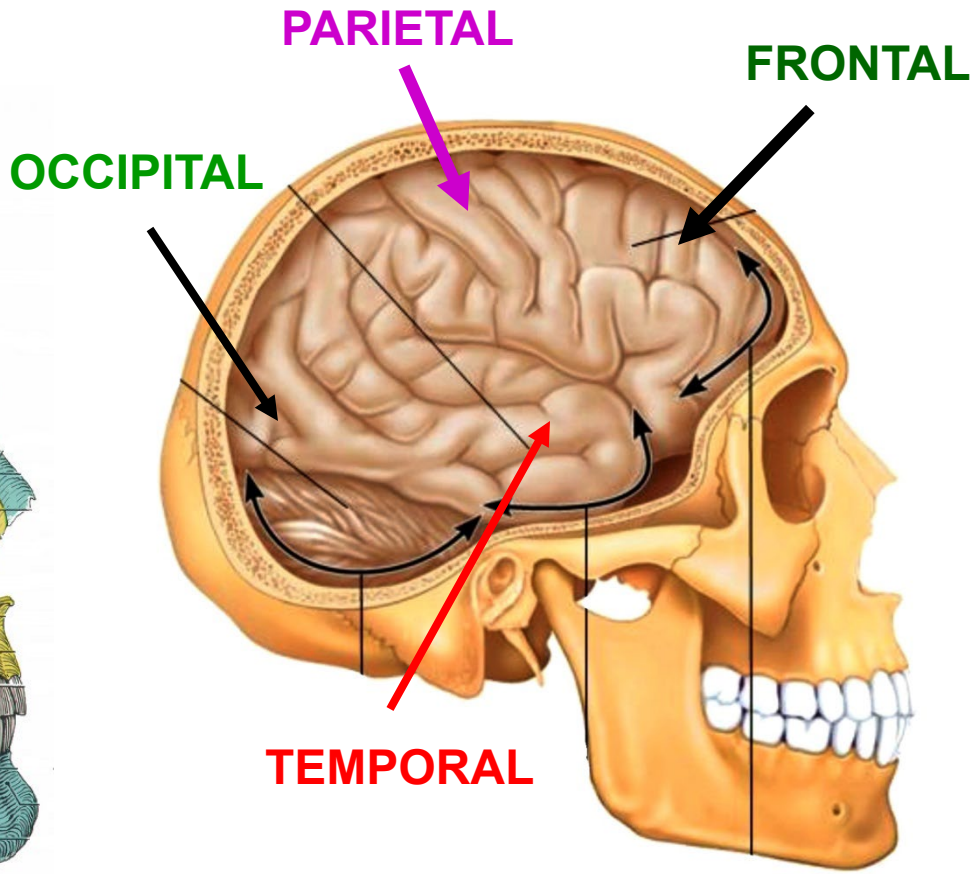
TEMPORAL (2)

NOSE

SPHENOID (Gk) = wedge

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





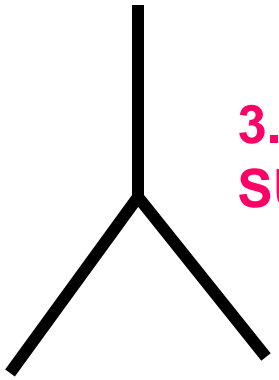
NOSE

B. SUTURES

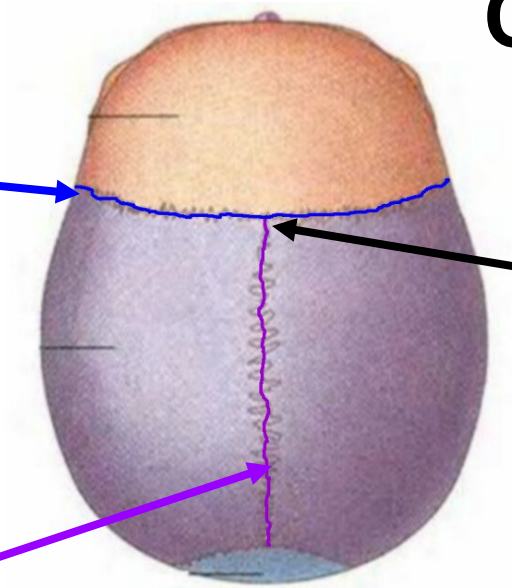
1. CORONAL SUTURE

2. SAGITTAL SUTURE

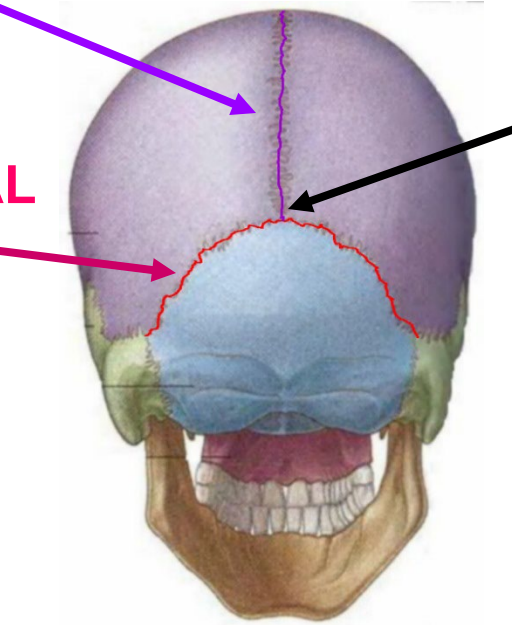
3. LAMBDOIDAL SUTURE



LAMBDA - Greek letter



superior (top) view



posterior (back) view

C. LANDMARKS

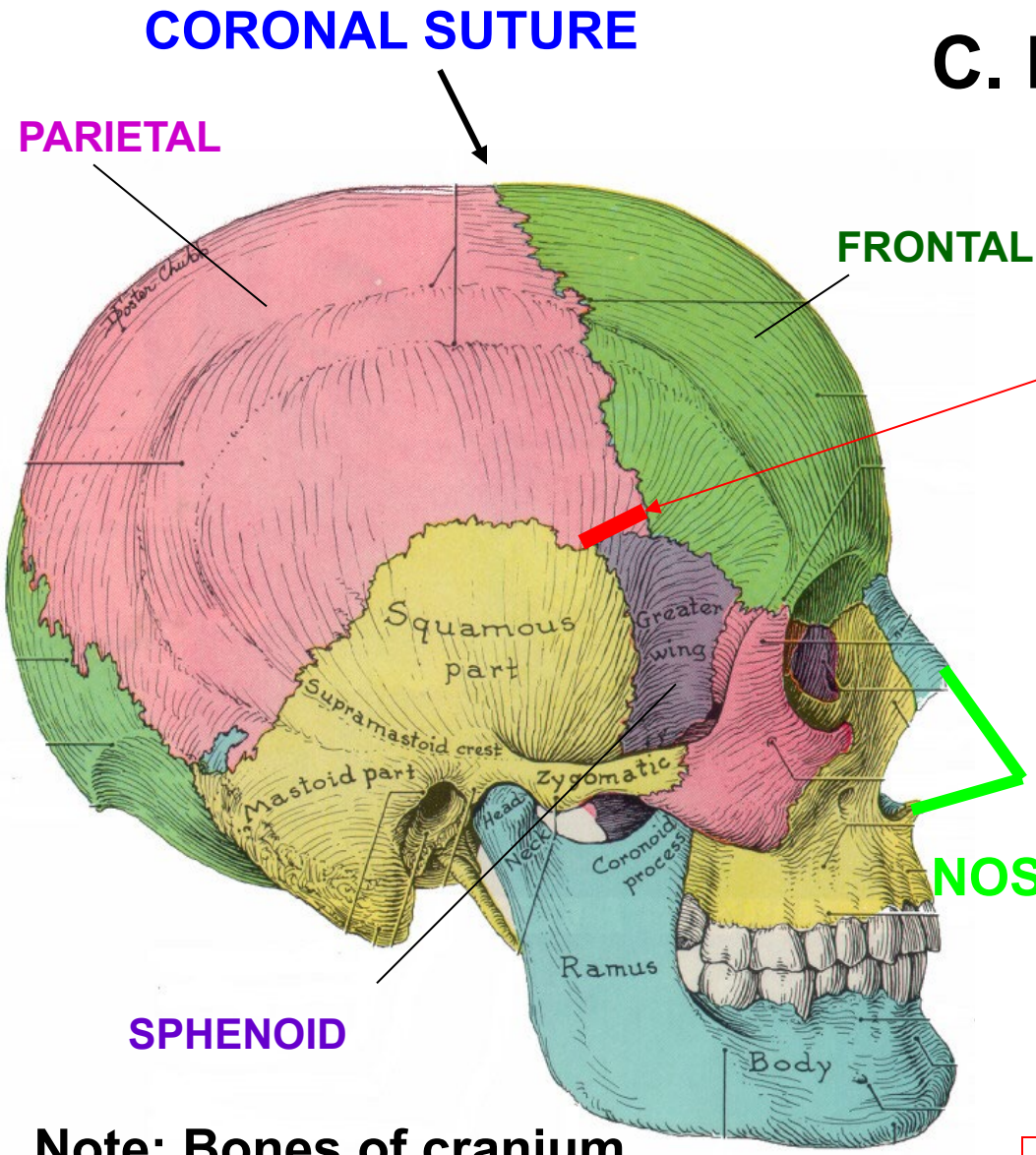
**

1. BREGMA - MID POINT OF CORONAL SUTURE

**

2. LAMBDA - MID POINT OF LAMBDOIDAL SUTURE

C. LANDMARKS



3. PTERION **

- JUNCTION OF TEMPORAL SPHENOID PARIETAL AND FRONTAL BONES

PIC THANKS TO DR. ALBERICO

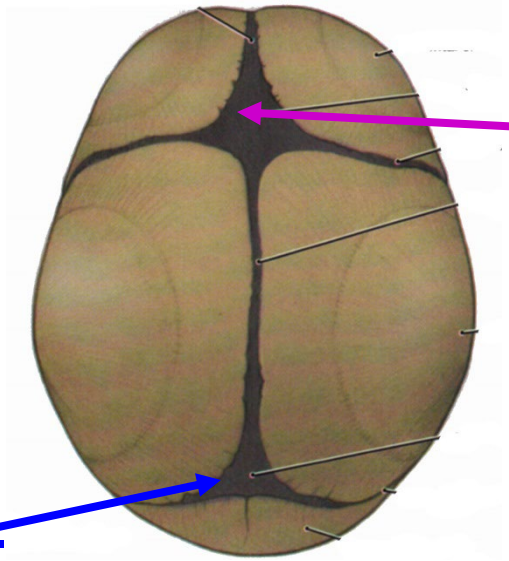
Note: Bones of cranium fuse (sutures disappear) with age)

**

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

D. FONTANELLES - Membranes that link bones at birth

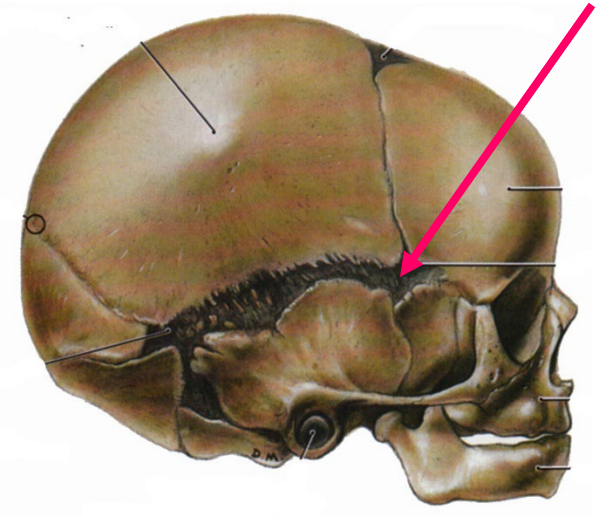
- FONTANELLES ('soft spots') PERMIT CRANIAL COMPRESSION AT BIRTH - CRANIAL GROWTH



1. ANTERIOR FONTANELLE AT BREGMA

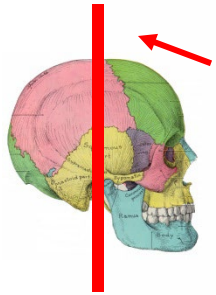
2. POSTERIOR FONTANELLE - AT LAMBDA

3. LATERAL FONTANELLE AT PTERION



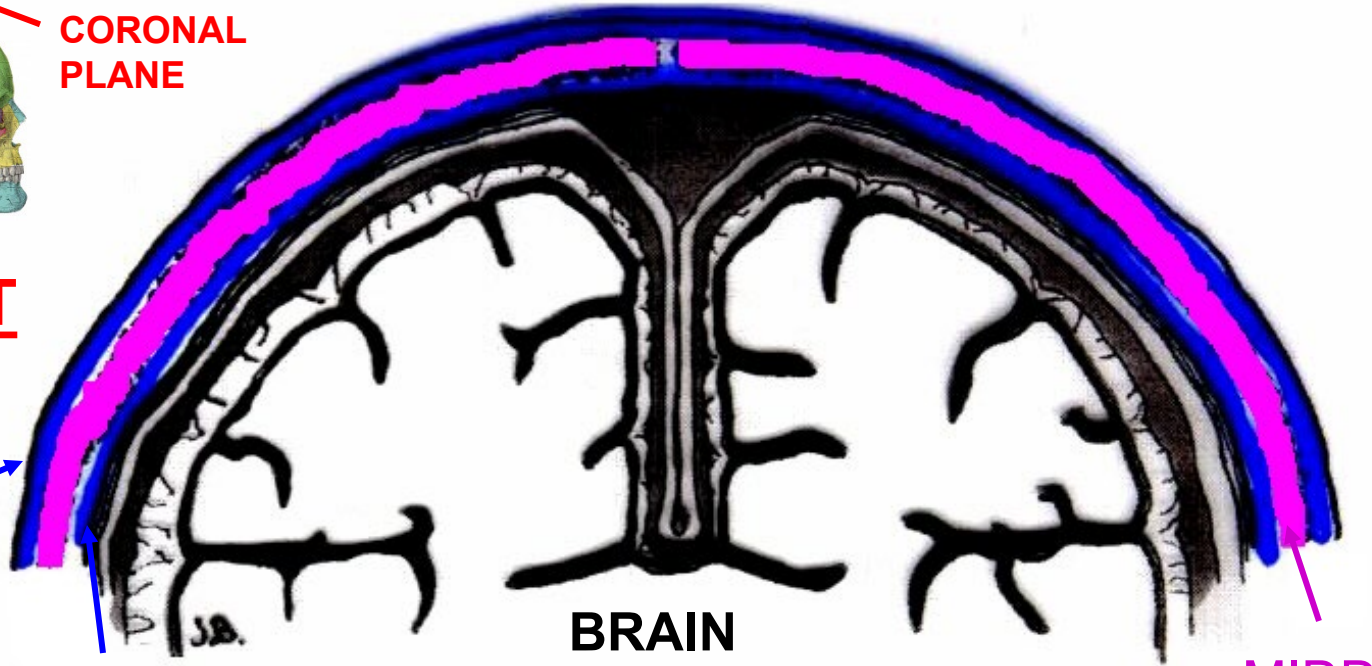
Note: In emergencies, the Anterior Fontanelle can be used to access Superior Sagittal venous sinus in neonates

E. INTERNAL STRUCTURE OF CALVARIUM



CORONAL PLANE

ORIENT

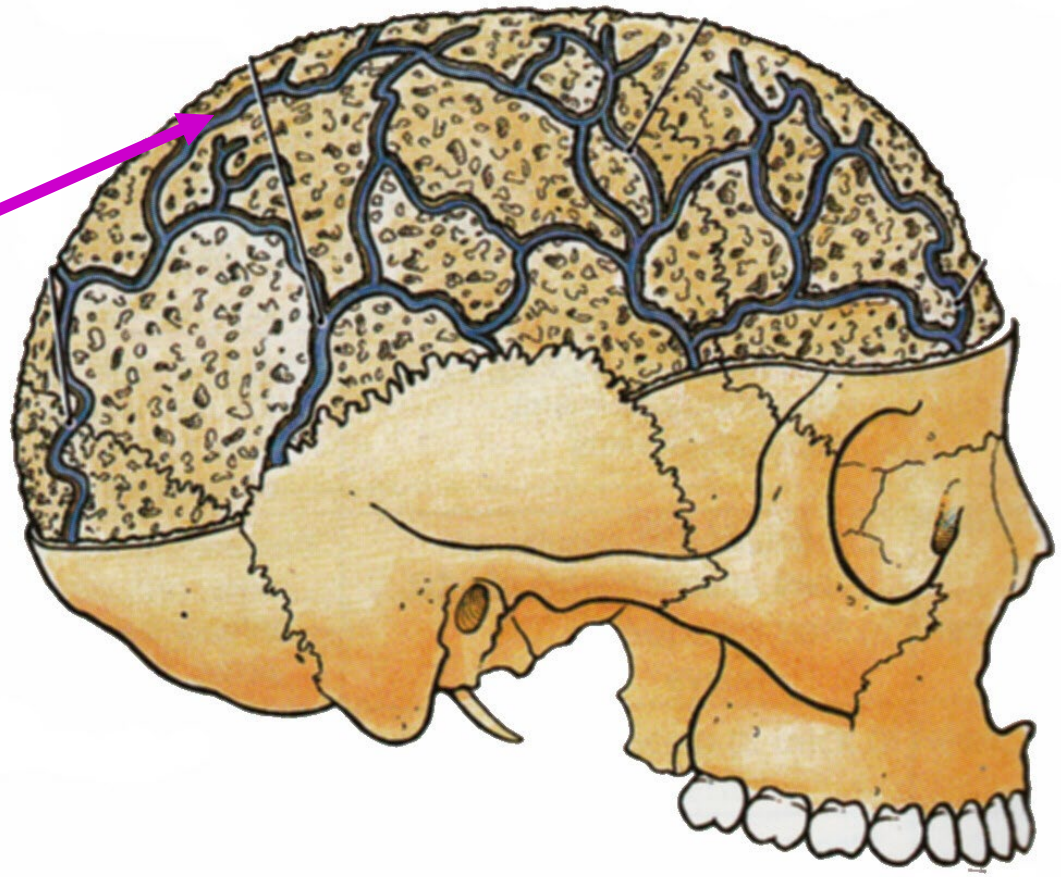


1. INNER AND OUTER TABLES - HARD CORTICAL BONE

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

2. DIPLOIC VEINS

view when outer table of bone is partially removed

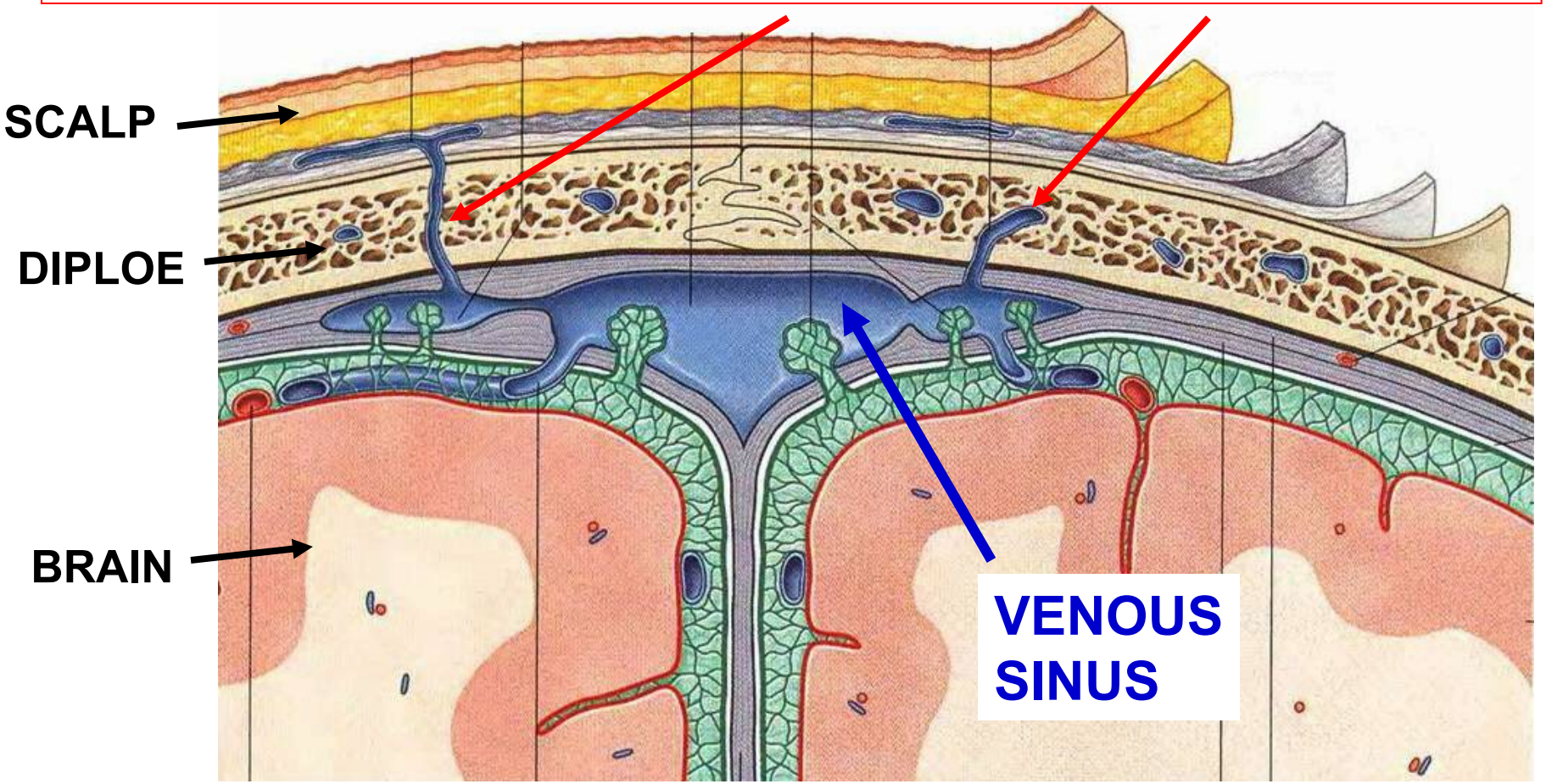


COURSE IN DIPLOE - CONNECT BOTH TO CRANIAL CAVITY AND SURFACE OF SKULL

- CAN TRANSMIT INFECTION FROM SCALP TO BRAIN VIA EMISSARY VEINS

EMISSARY VEINS

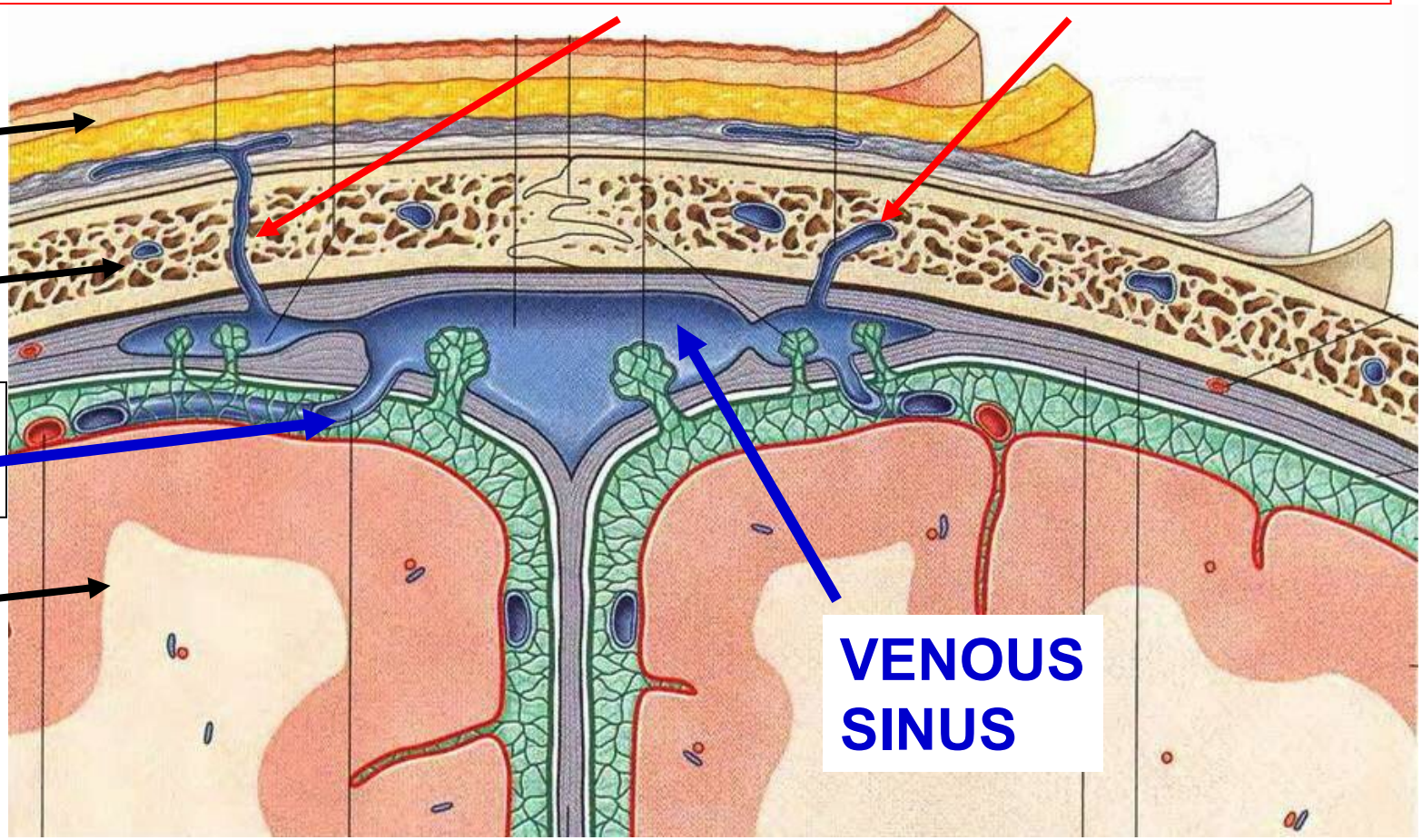
EMISSARY VEIN - SCALP TO DIPLOE, SCALP TO SINUS, DIPLOE TO SINUS



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

EMISSARY VEINS VS BRIDGING VEINS

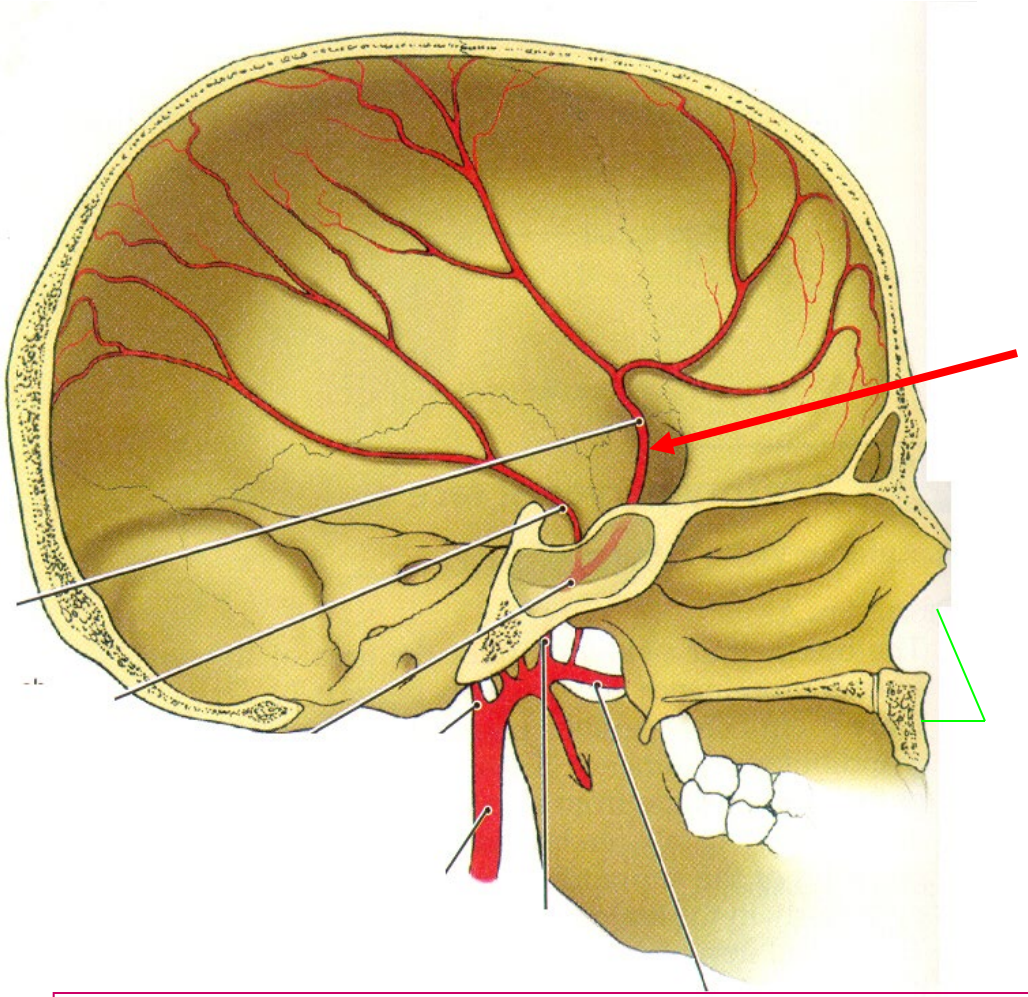
EMISSARY VEIN - SCALP TO DIPLOE, SCALP TO SINUS, DIPLOE TO SINUS



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



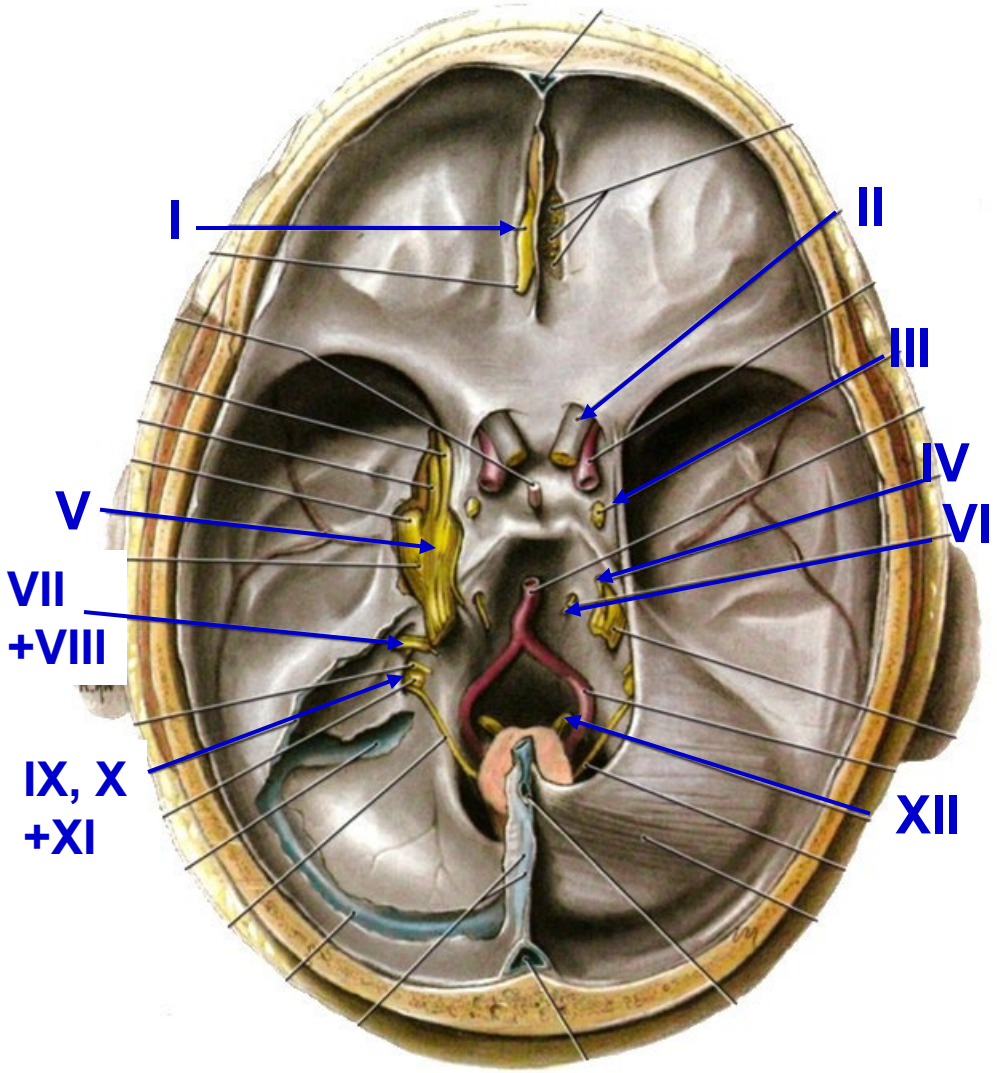
1) OUTER SURFACE – ARTERIES TO SCALP

2) INNER SURFACE- <u>MENINGEAL ARTERIES</u>

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

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

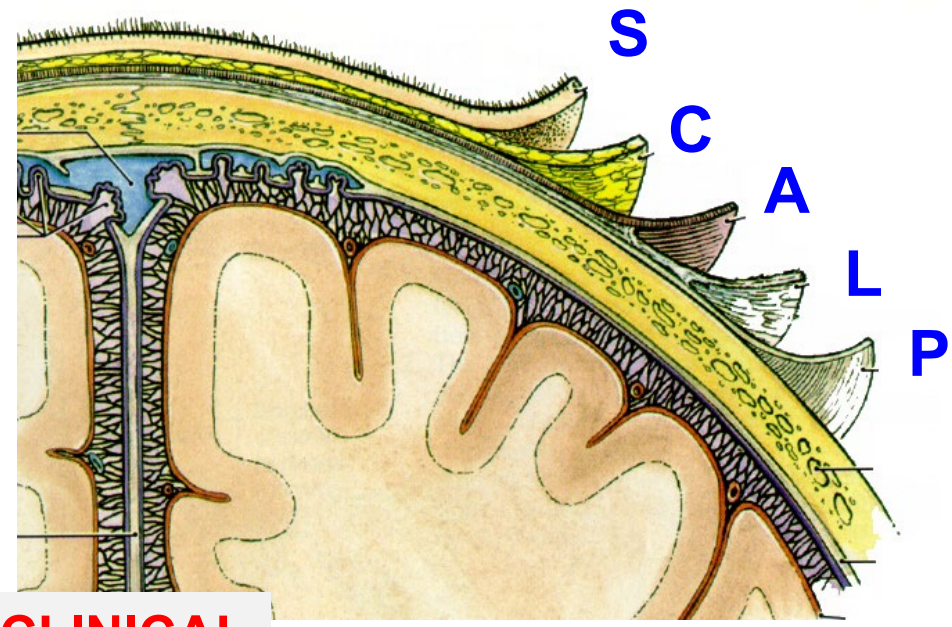
LEARN NAMES AND NUMBERS OF CRANIAL NERVES



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



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

CLINICAL

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

SCALPING SOMEONE: REMOVE SCALP BETWEEN 3 (EPICRANIAL APONEUROSIS0 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

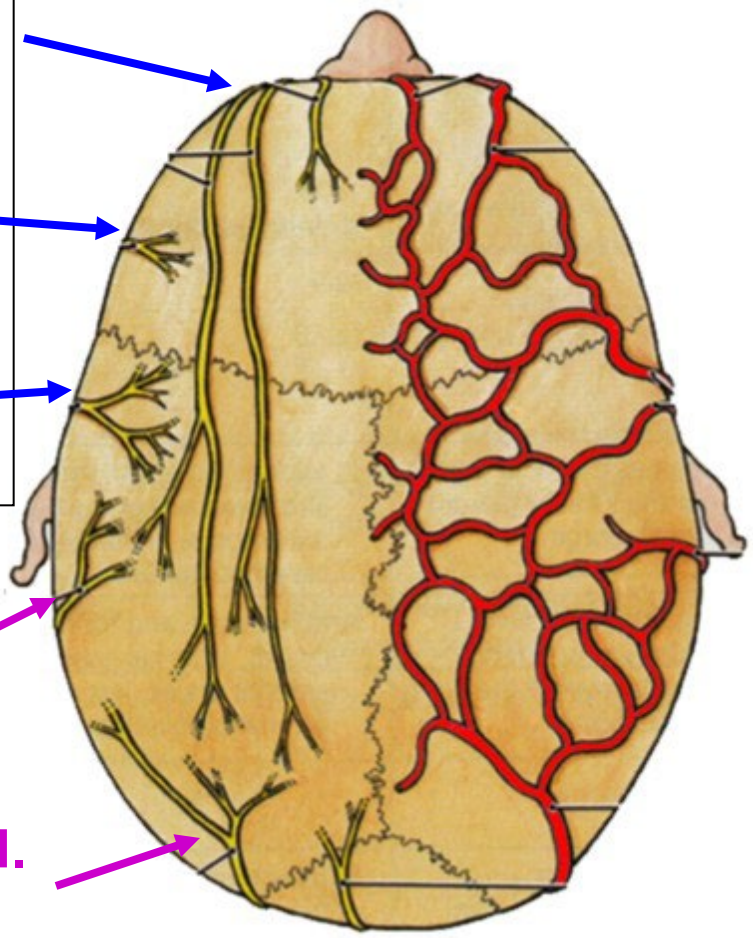
V1- SUPRAORBITAL N.
SUPRATROCHLEAR N.

V2 – ZYGOMATICO-TEMPORAL N.

V3 – AURICULO-TEMPORAL N.

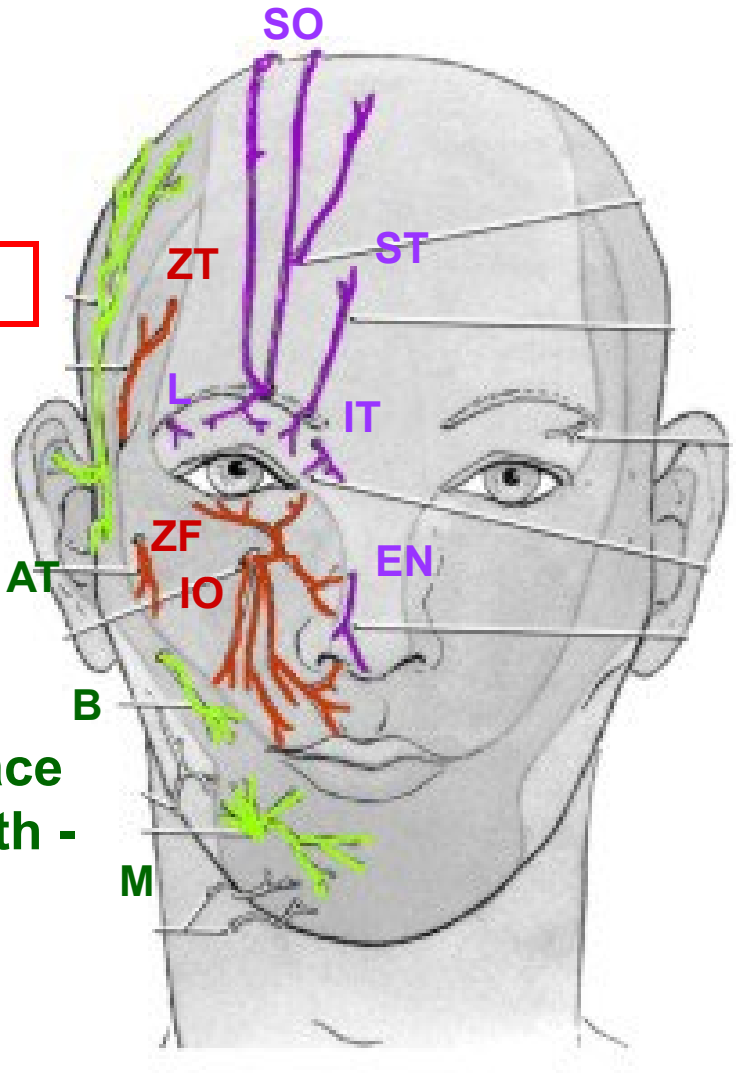
LESSER OCCIPITAL N. - C2 VENTRAL RAMUS

GREATER OCCIPITAL N. - C2 DORSAL RAMUS



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

V2 – MAXILLARY -
to skin of cheek
below orbit -
Zygomaticotemporal
Zygomaticofacial
Infraorbital



V1 – OPHTHALMIC -
to skin above orbit -
Lacrimal
Supraorbital
Supratrochlear
Infratrochlear
External Nasal Nerve

V3- MANDIBULAR -
to skin of jaw and face
below angle of mouth -
Auriculotemporal
Buccal
Mental

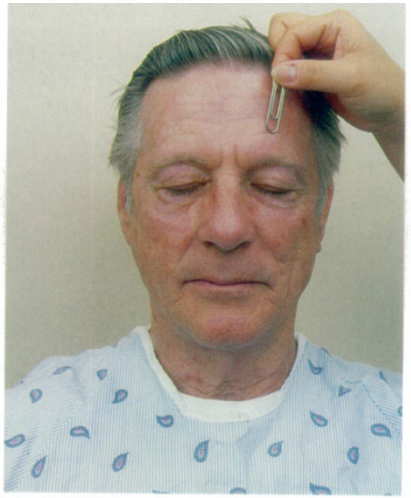


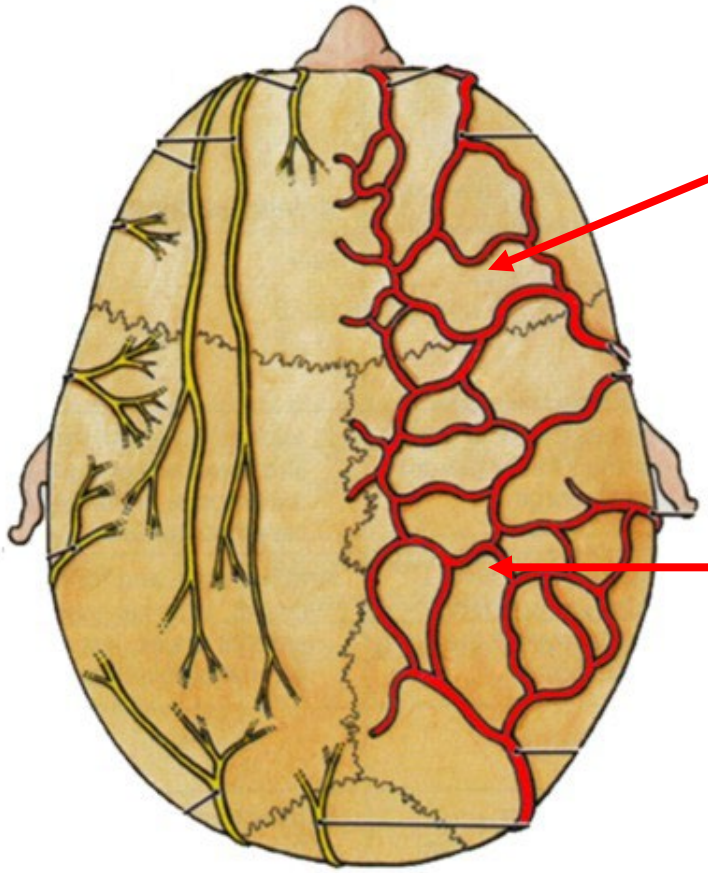
FIGURE 21-13
Examination of the trigeminal cranial nerve

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

CLINICAL TEST OF V: SUPRAORBITAL N.

C. ARTERIES OF SCALP

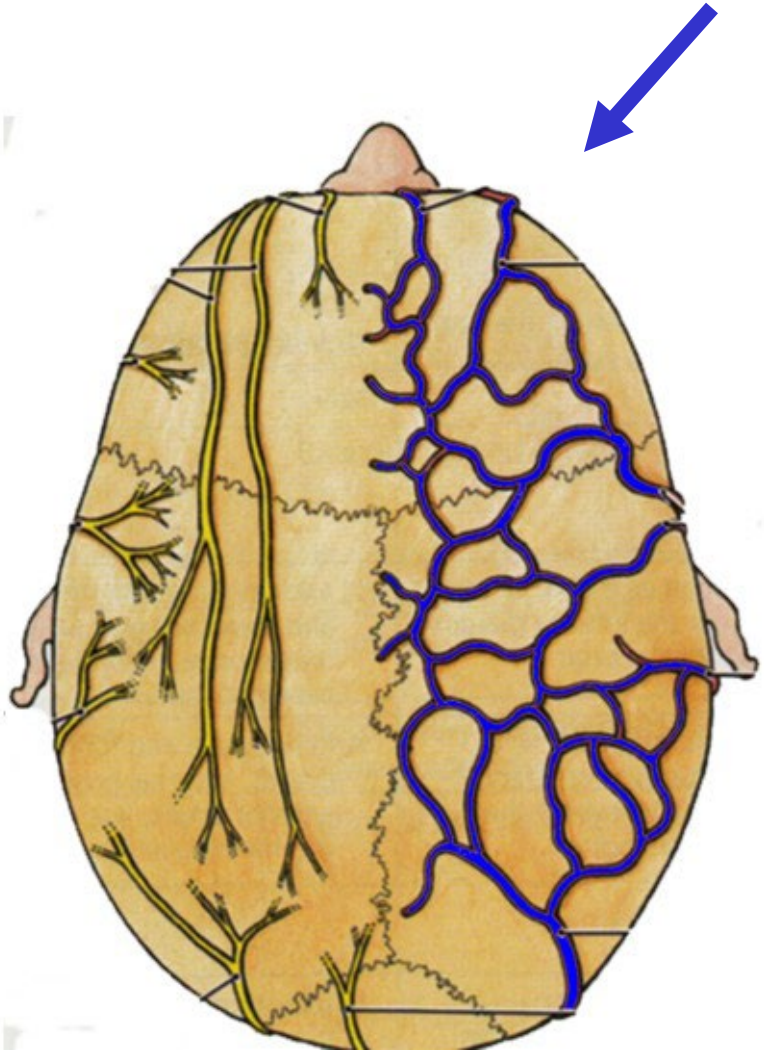
- RICH SUPPLY FROM BRANCHES OF INTERNAL AND EXTERNAL CAROTID; EXTENSIVE ANASTOMOSES - SCALP WOUND BLEEDS PROFUSELY FROM BOTH SIDES OF CUT



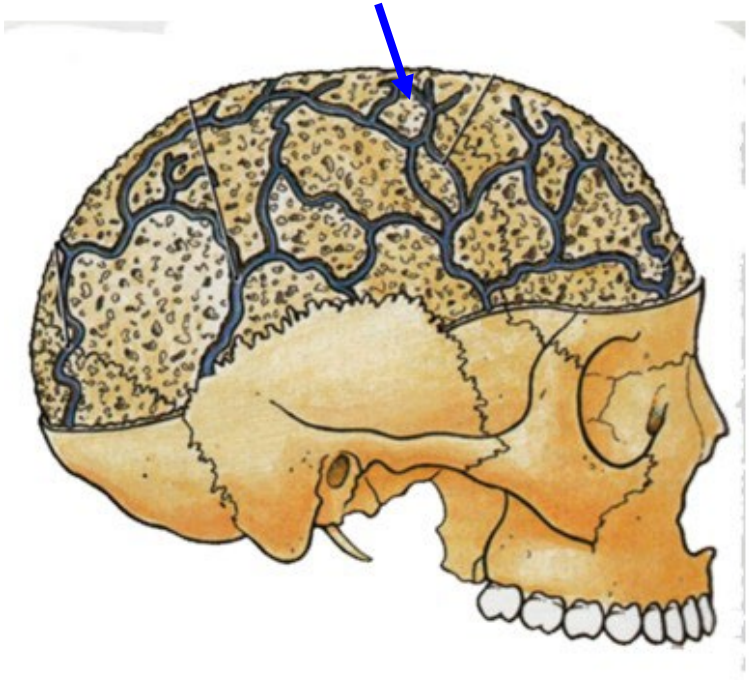
1. br. of INTERNAL CAROTID (OPHTHALMIC ARTERY): SUPRAORBITAL A., SUPRATROCHLEAR A

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

D. VEINS OF SCALP – SAME NAMES AS ARTERIES

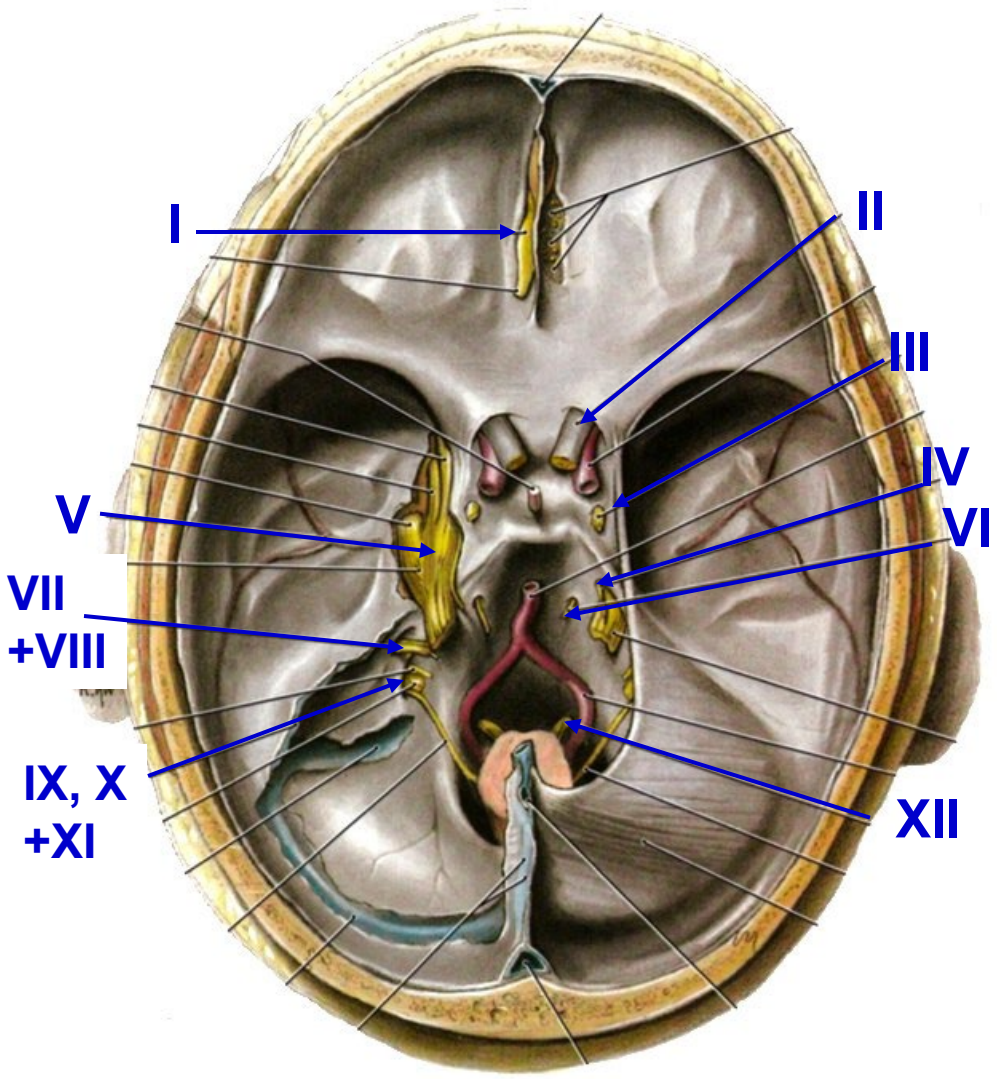


DIPLOIC VEINS



ALSO EMISSARY VEINS drain to DIPLOIC VEINS IN DIPLOE

CRANIAL NERVES



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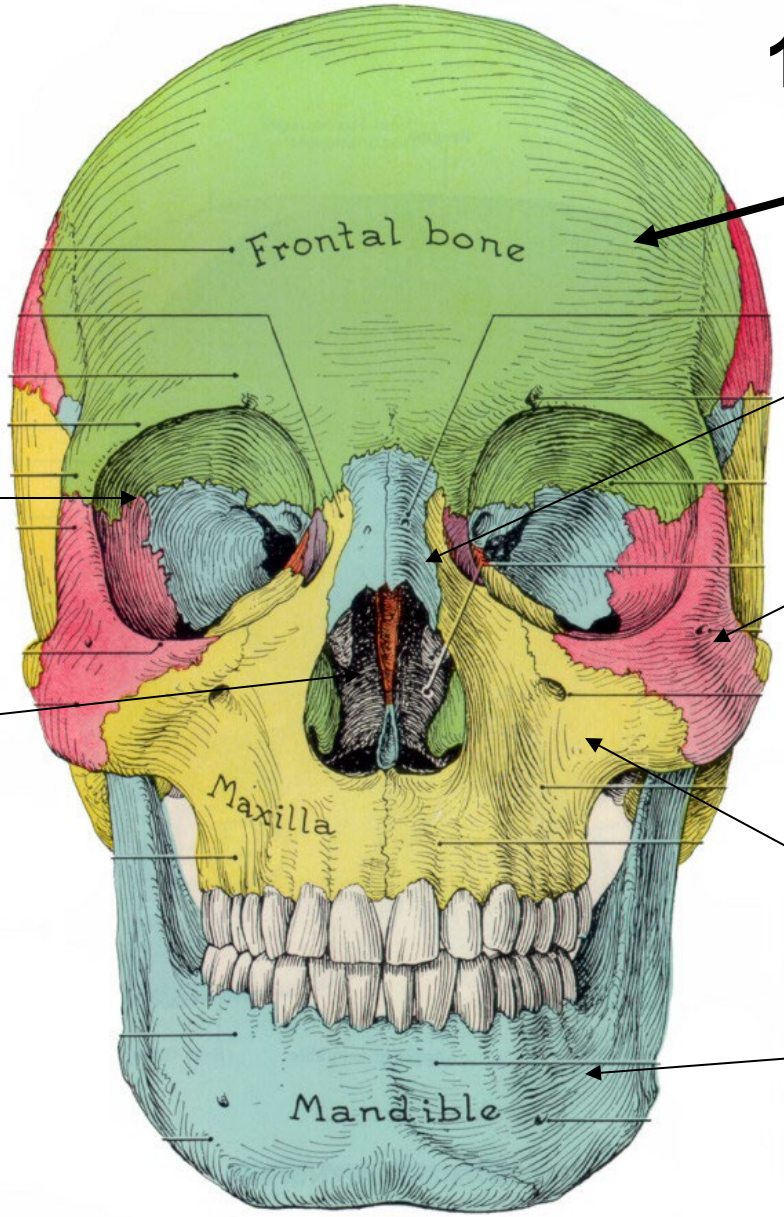
V. TRIGEMINAL - touch, general sensation to skin, oral cavity, nasal cavity + more
VI. ABDUCENS - eye movement
VII. FACIAL - muscles of facial expression + lots more
VIII. VESTIBULO-COCHLEAR - hearing and balance
IX. GLOSSOPHARYNGEAL - sensory to pharynx +more
X. VAGUS - larynx, pharynx + rest of body
XI. ACCESSORY - sternocleidomastoid, trapezius
XII. HYPOGLOSSAL - muscles of tongue

II. LANDMARKS AND BONES

1. FRONT OF SKULL



FRONTAL BONE (1)

NASAL BONES (2)

ORBIT = EYE SOCKET

ZYGOMATIC BONE (2)- FORMS CHEEK

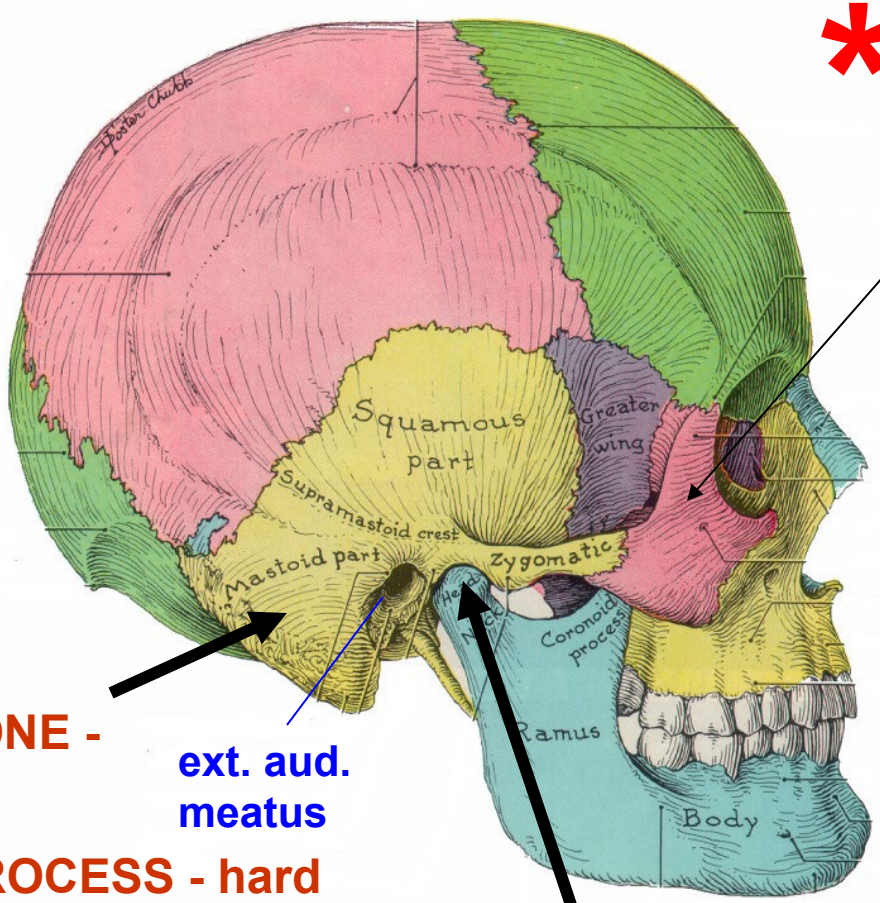
NASAL APERTURE

MAXILLARY BONE (2)- ALVEOLAR PROCESS FOR UPPER TEETH

MANDIBLE(1)- ALVEOLAR PROCESS FOR LOWER TEETH

2. LATERAL VIEW OF SKULL

**



CLINICAL - fractures

ZYGOMATIC ARCH-

1) ZYGOMATIC BONE

2) MAXILLARY BONE- ZYGOMATIC PROCESS

3) TEMPORAL BONE- ZYGOMATIC PROCESS

TEMPORAL BONE -

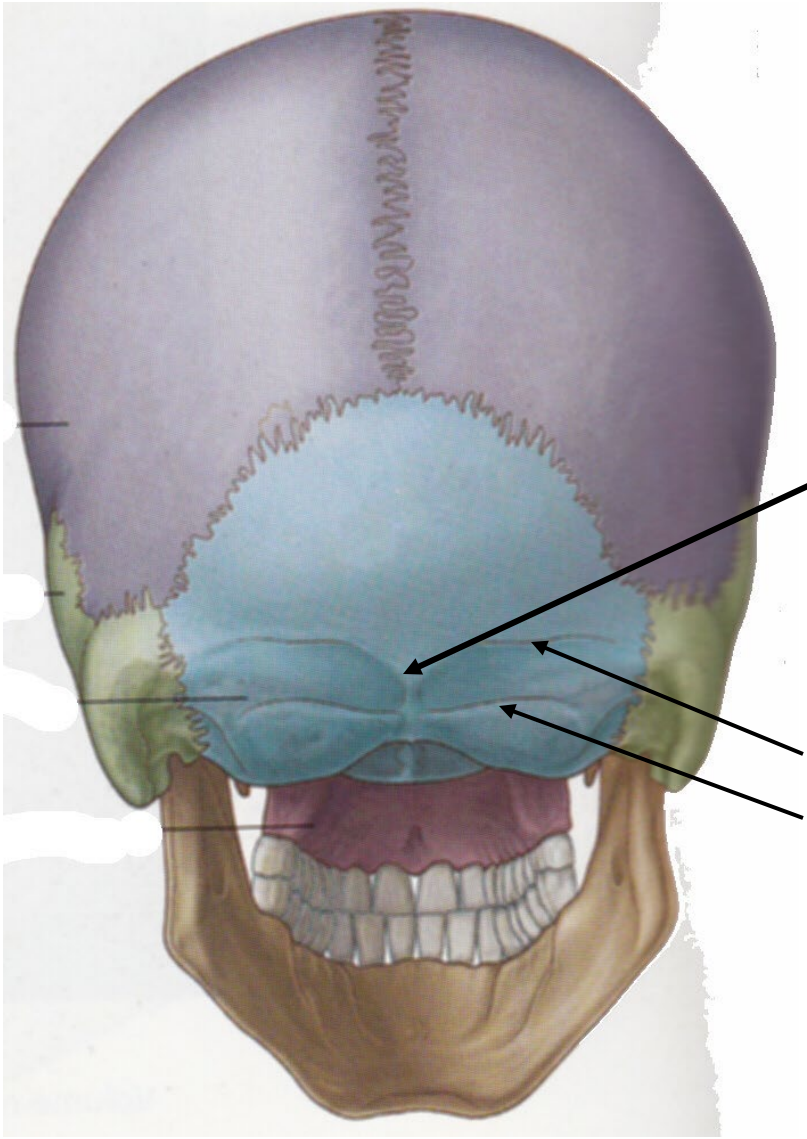
PARTS

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

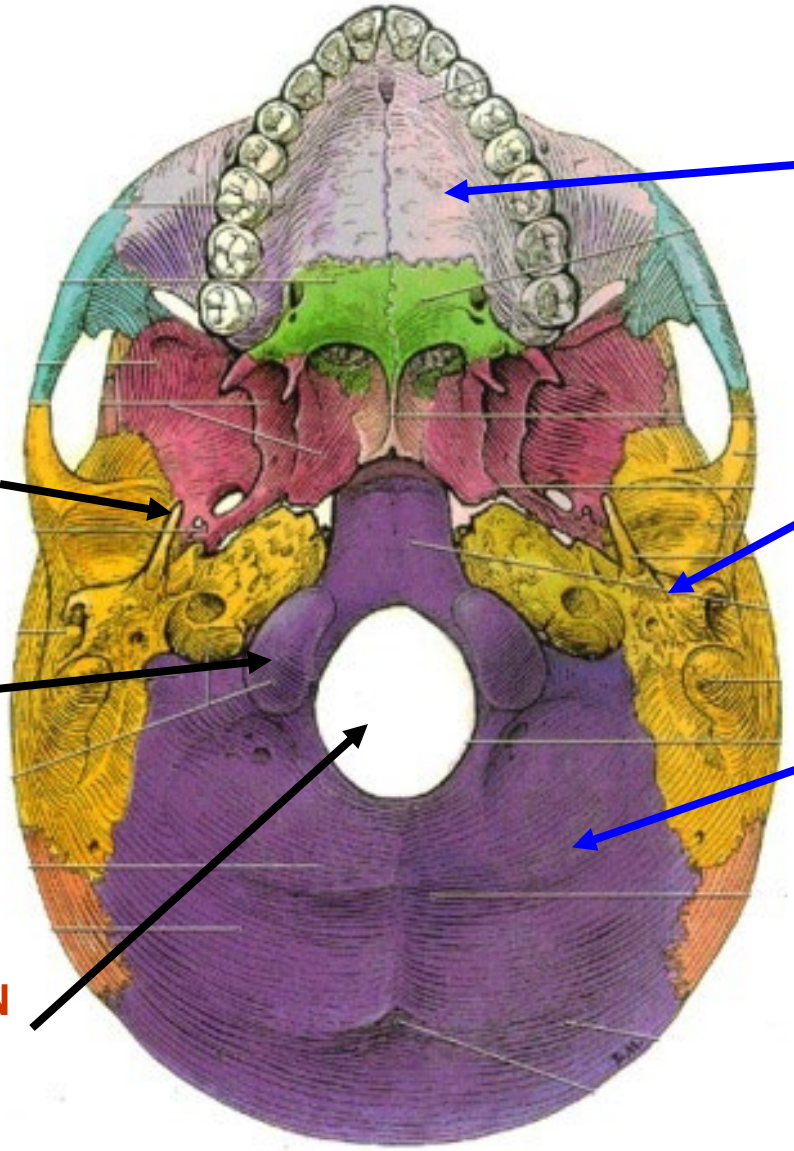


OCCIPITAL BONE

EXTERNAL OCCIPITAL PROTUBERANCE

SUPERIOR AND INFERIOR NUCHAL LINES

4. BASE OF SKULL - COMPLEX



STYLOID PROCESS

OCCIPITAL CONDYLE

FORAMEN MAGNUM

C)HARD PALATE- PALATINE BONES AND PALATINE PROCESS OF MAXILLARY BONES

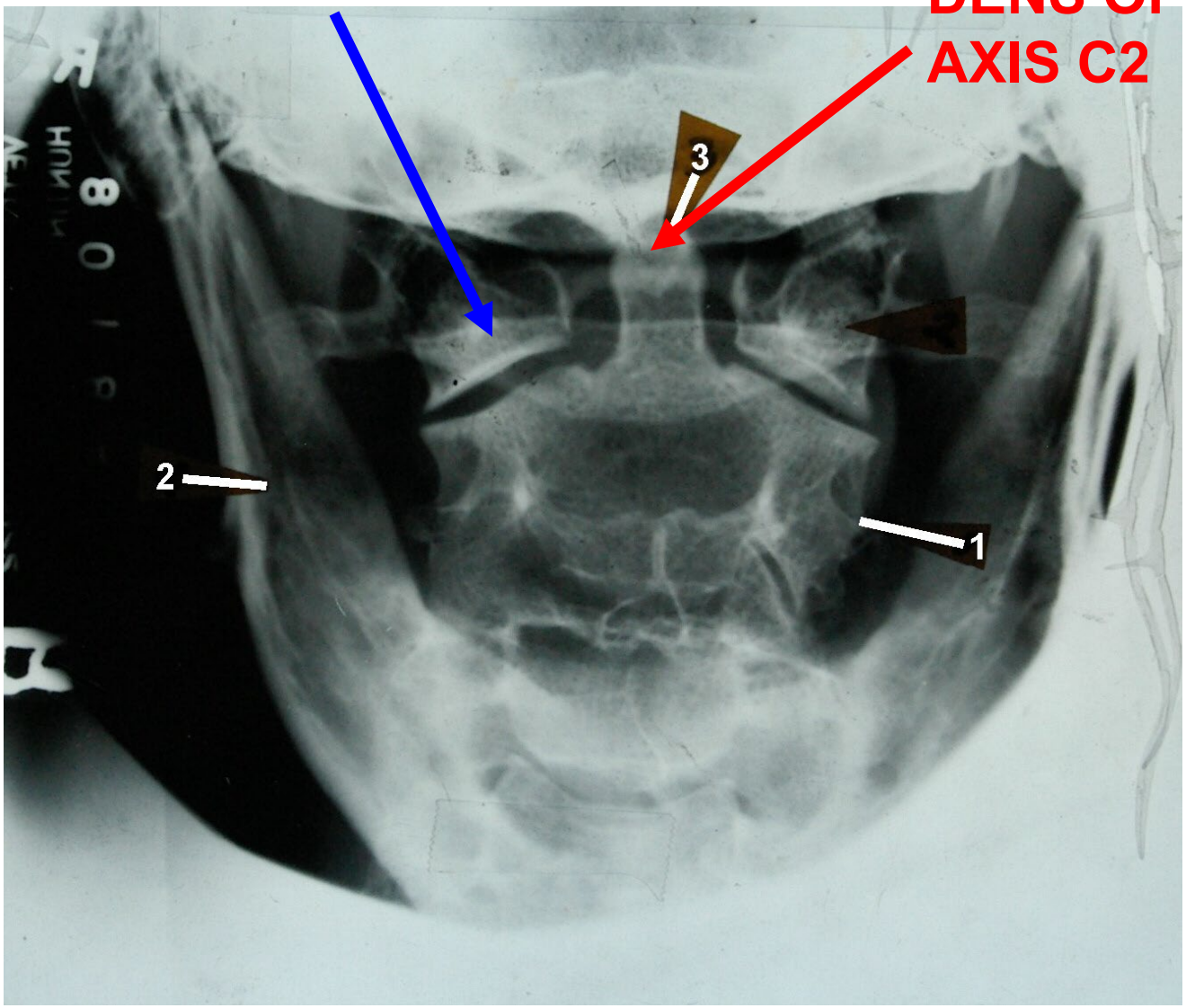
A) TEMPORAL BONE- HAS STYLOID PROCESS- MUSCLE ATTACH

B) OCCIPITAL BONE- HAS FORAMEN MAGNUM - SPINAL CORD; OCCIPITAL CONDYLES- FOR C1- ATLAS

AP view

ATLAS C1

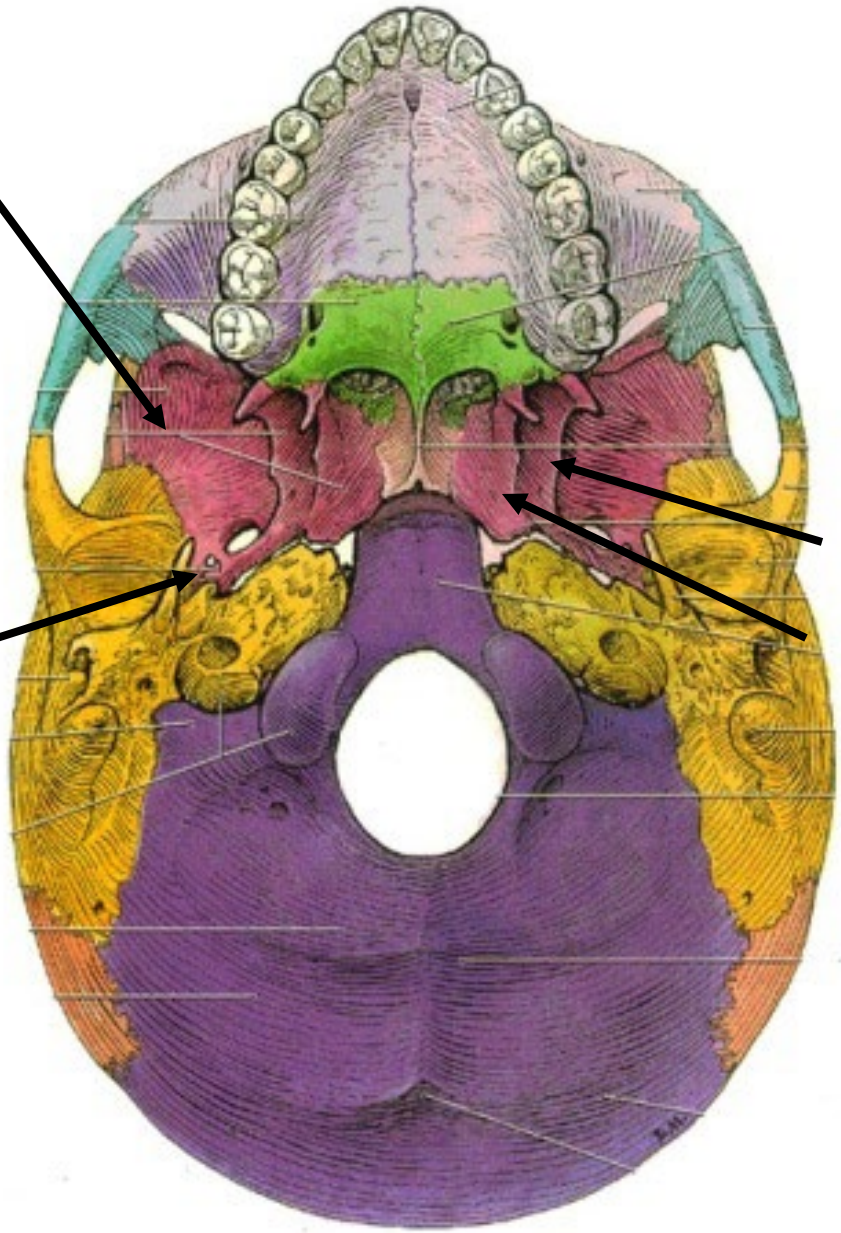
DENS OF AXIS C2



Antero-posterior film of with mouth open

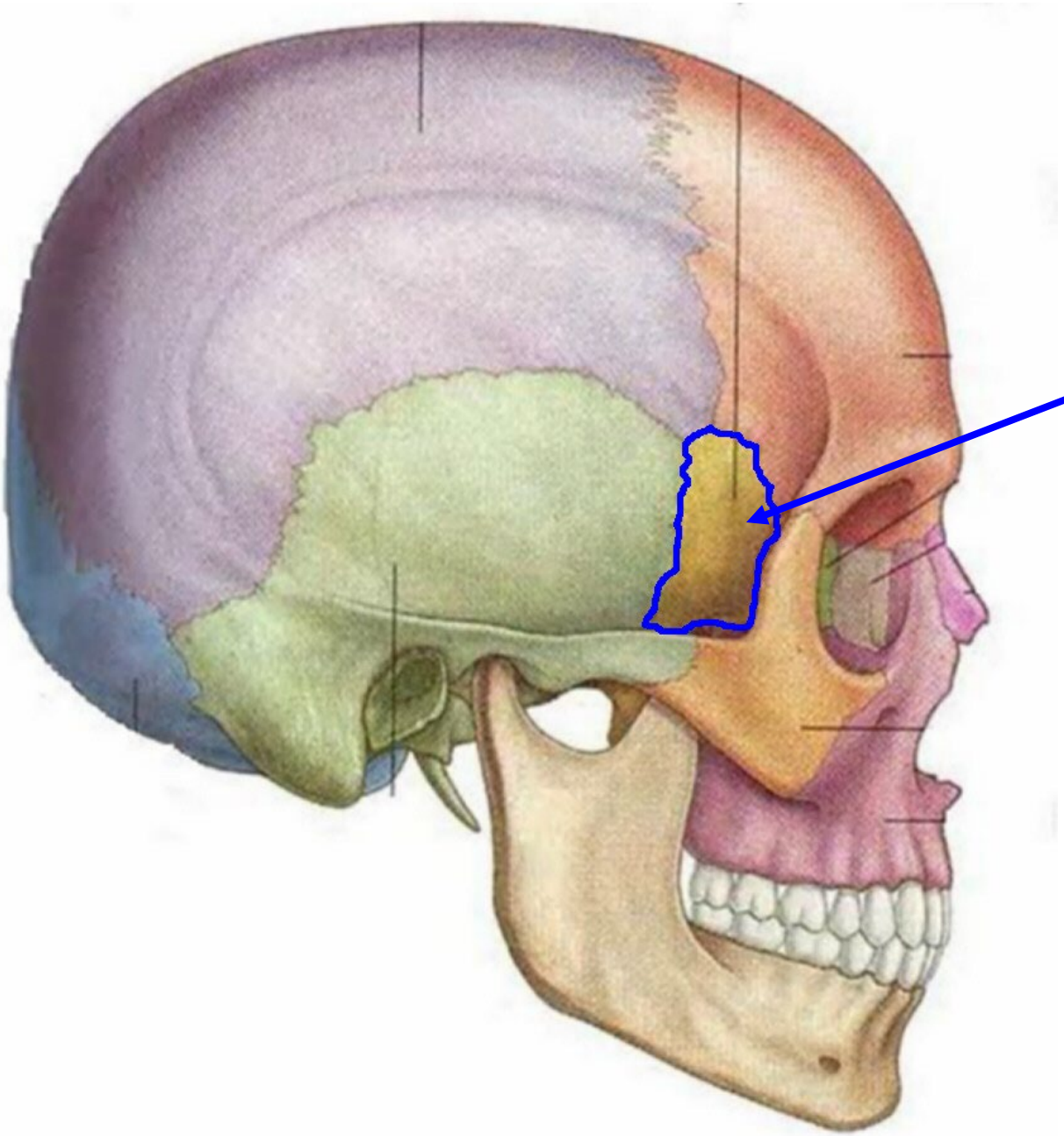
1. Transverse process of C2
2. Ramus of mandible
3. Odontoid process (dens) of C2

1. SPHENOID BONE – 'CORE' OF SKULL



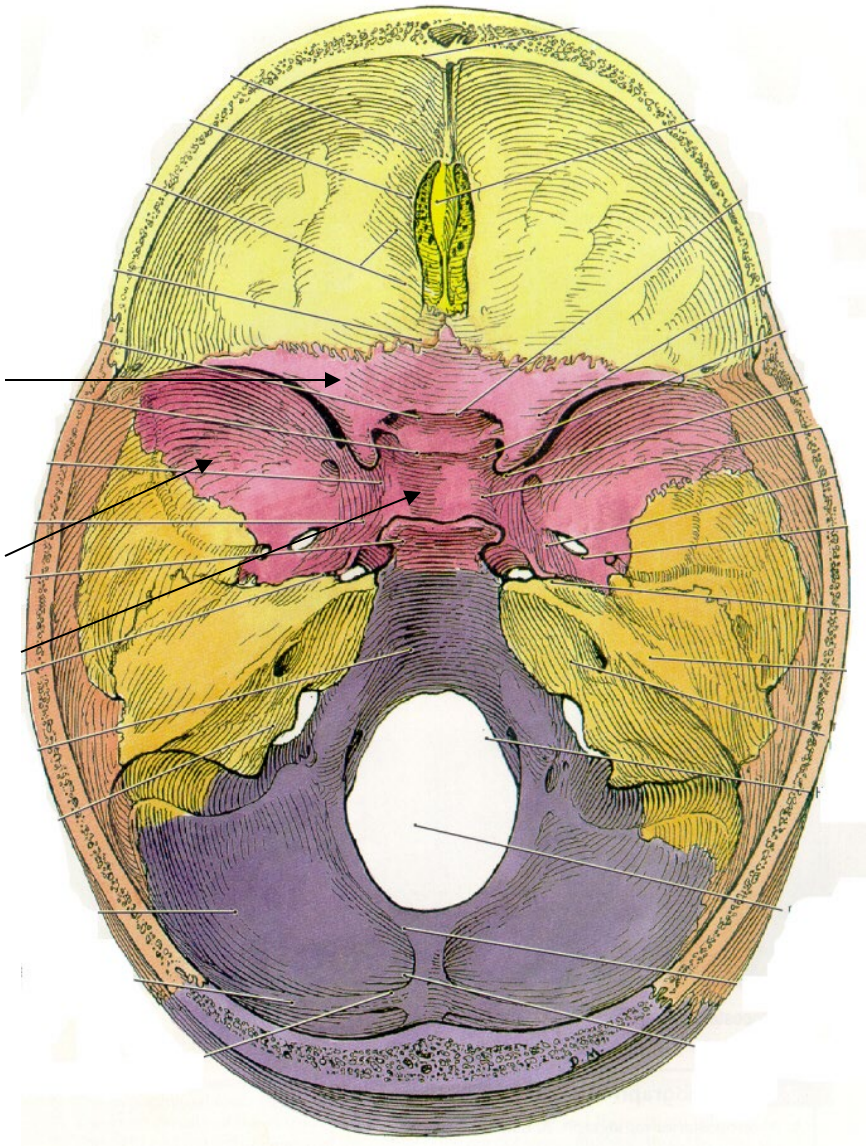
2) SPINE OF SPHENOID - INFERIOR SIDE ATTACH LIGAMENT

LATERAL AND MEDIAL PTERYGOID PLATES - MUSCLE ATTACHMENT



GREATER WING OF SPHENOID-LATERAL SIDE OF SKULL

SPHENOID BONE - INSIDE SKULL



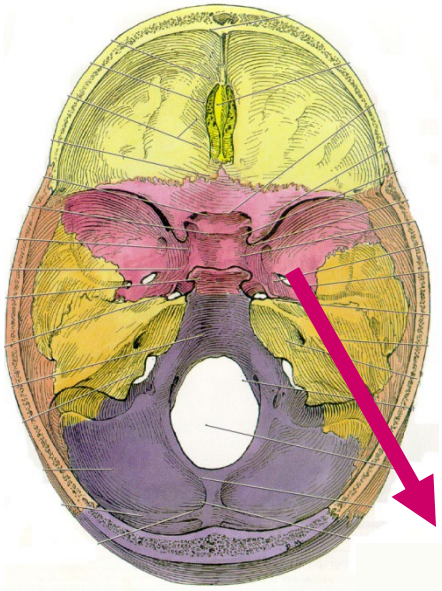
TURKISH SADDLE

- 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

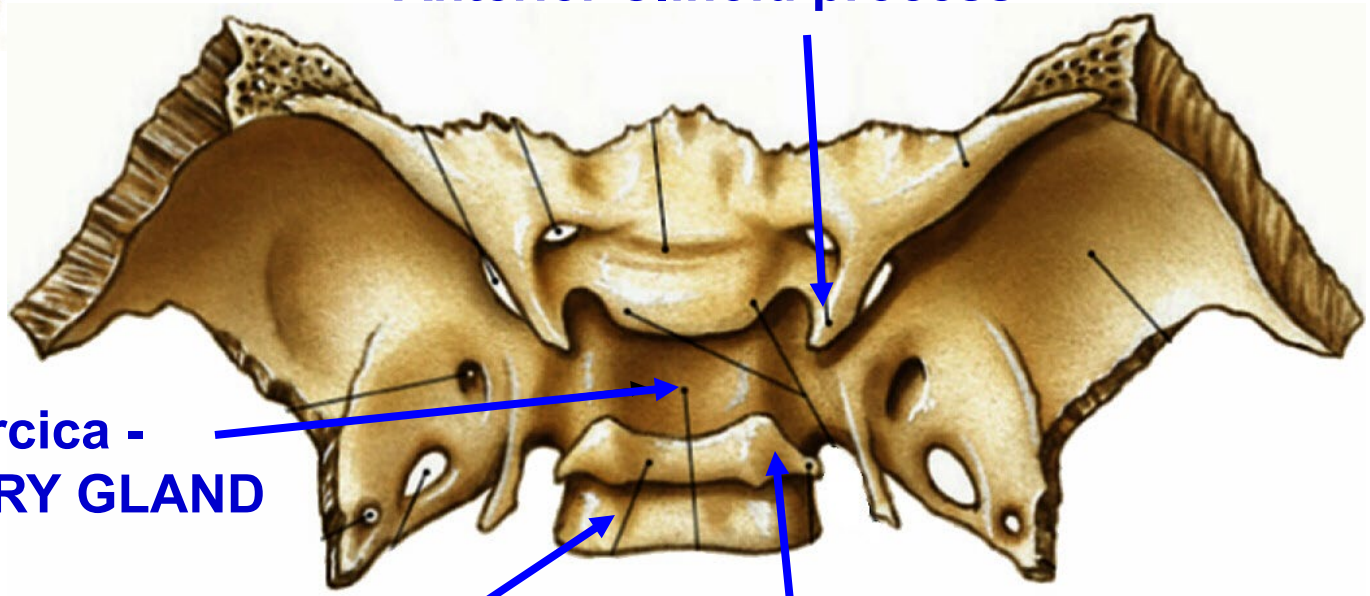


SPHENOID BONE - INSIDE SKULL

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

Anterior Clinoid process

Clinoid = sloped
Clivus = slope



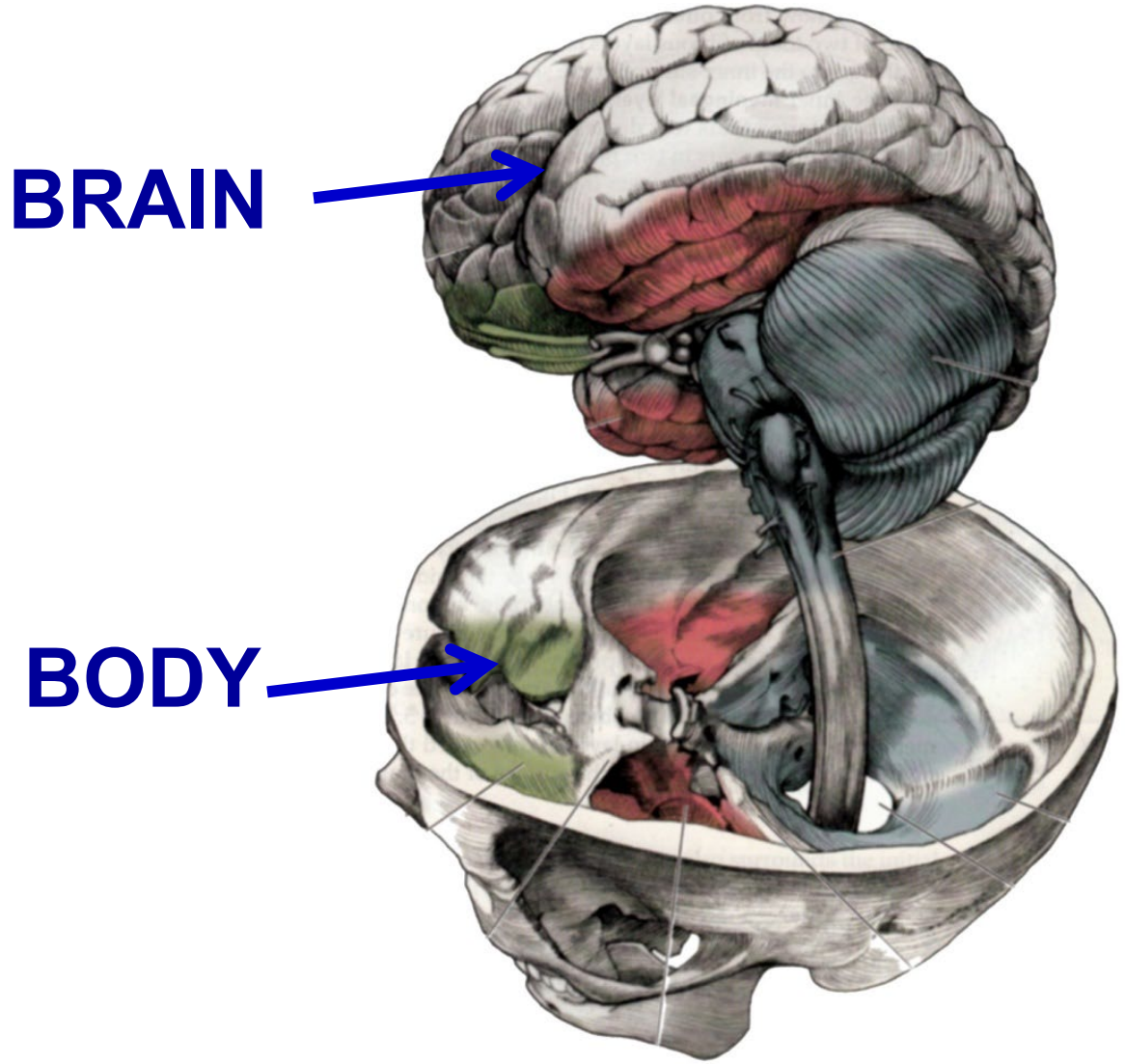
Sella Turcica - PITUITARY GLAND

Clivus

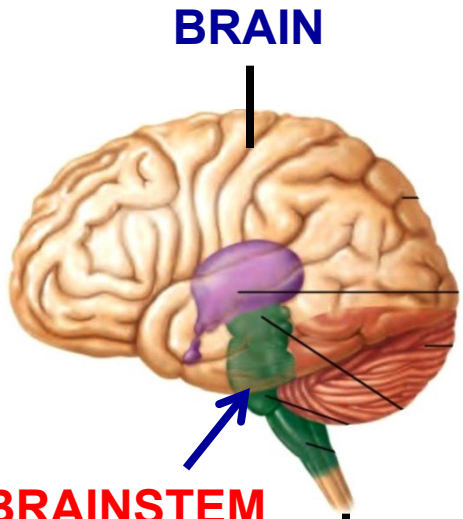
Posterior Clinoid process

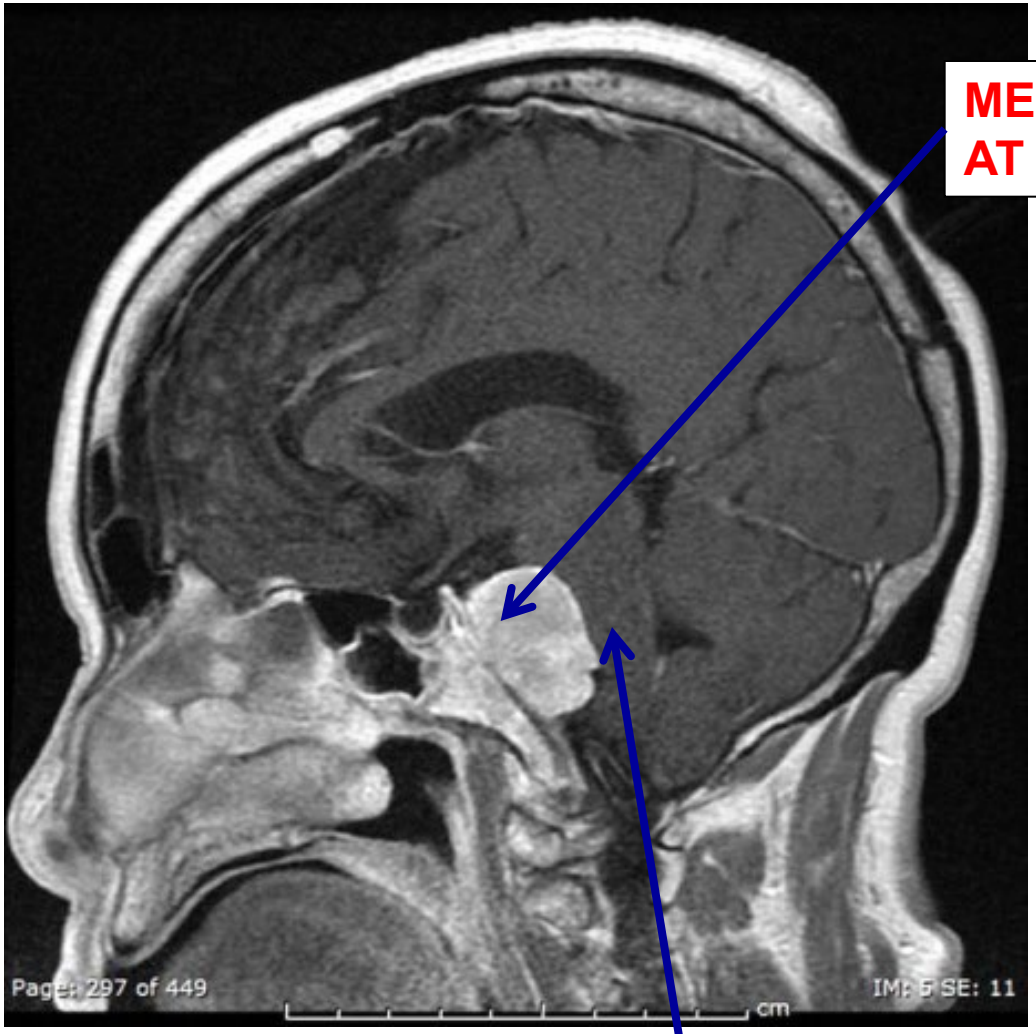
Note: parts of Sphenoid bone are important landmarks in Neurology

GROSS BRAINSTEM DISSECTION: HOW THE BRAIN FITS IN THE BODY



TERMINOLOGY: MENINGIOMA AT THE CLIVUS

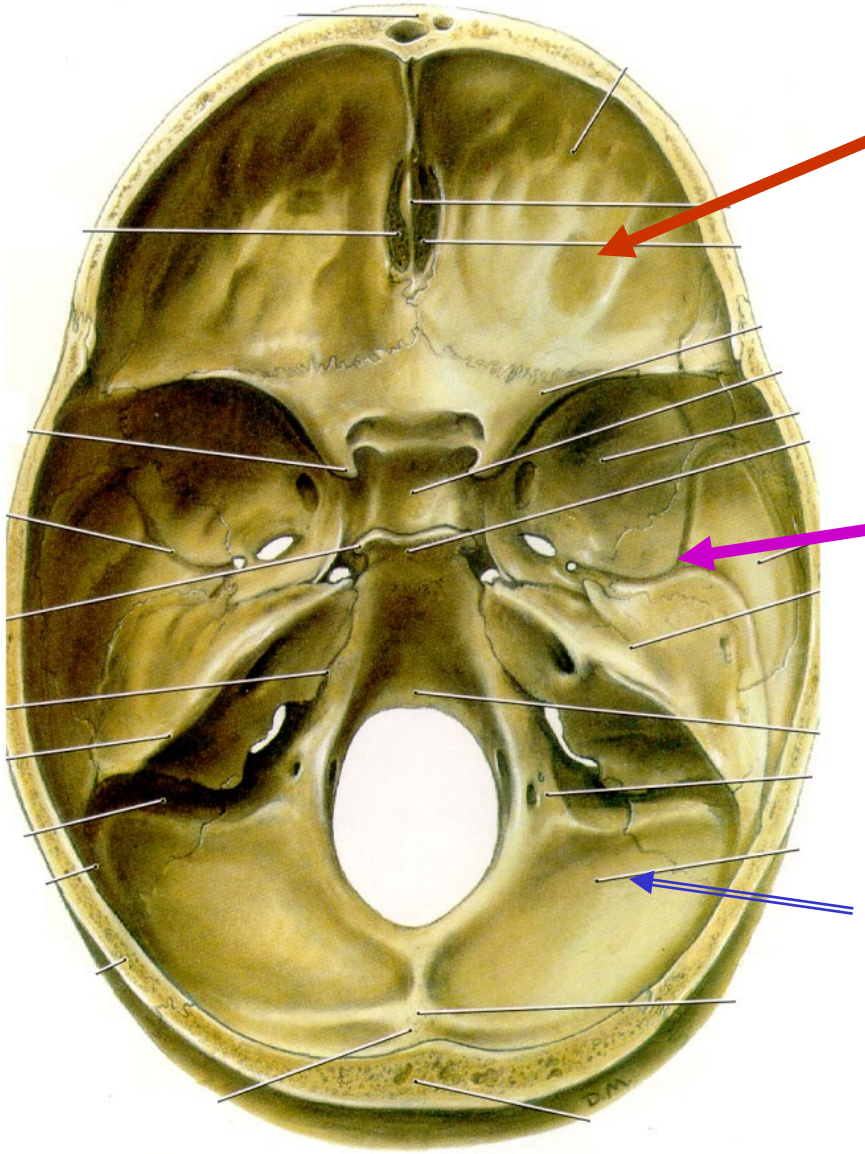




FYI (not memorize):
Symptoms (MANY) can include:

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)

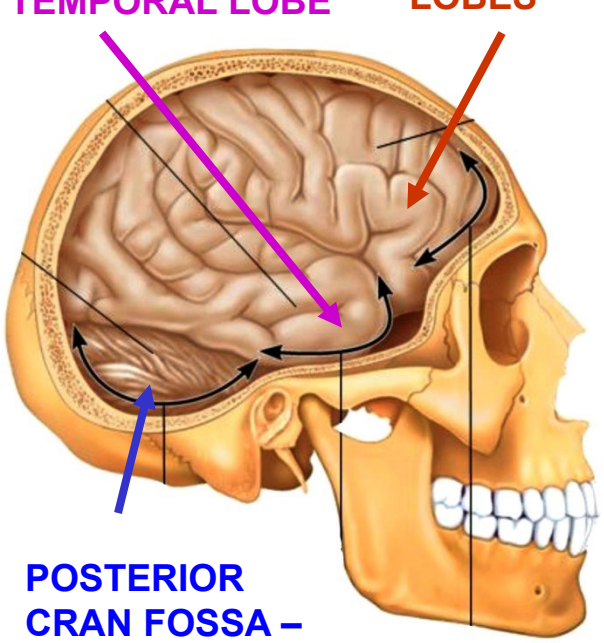
MIDDLE CRANIAL FOSSA (ORBIT, NASAL CAVITY, FACE)

POSTERIOR CRANIAL FOSSA (FACE, ORAL CAVITY, NECK)

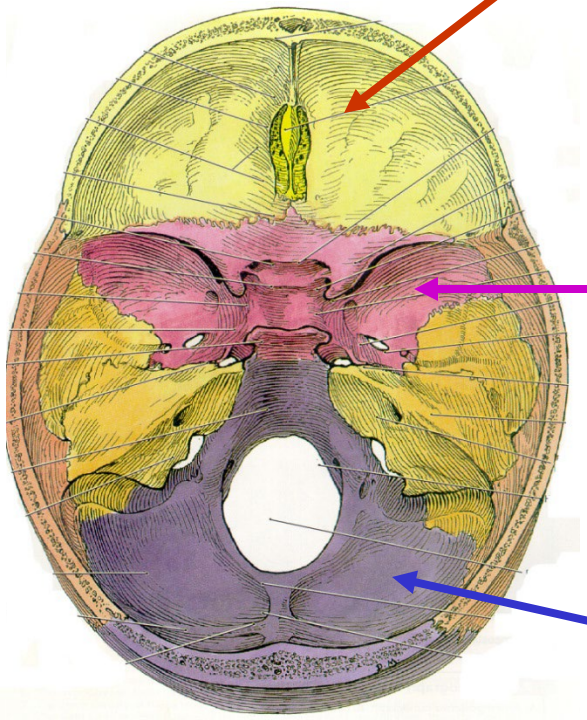
CONTENTS OF CRANIAL FOSSAE

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