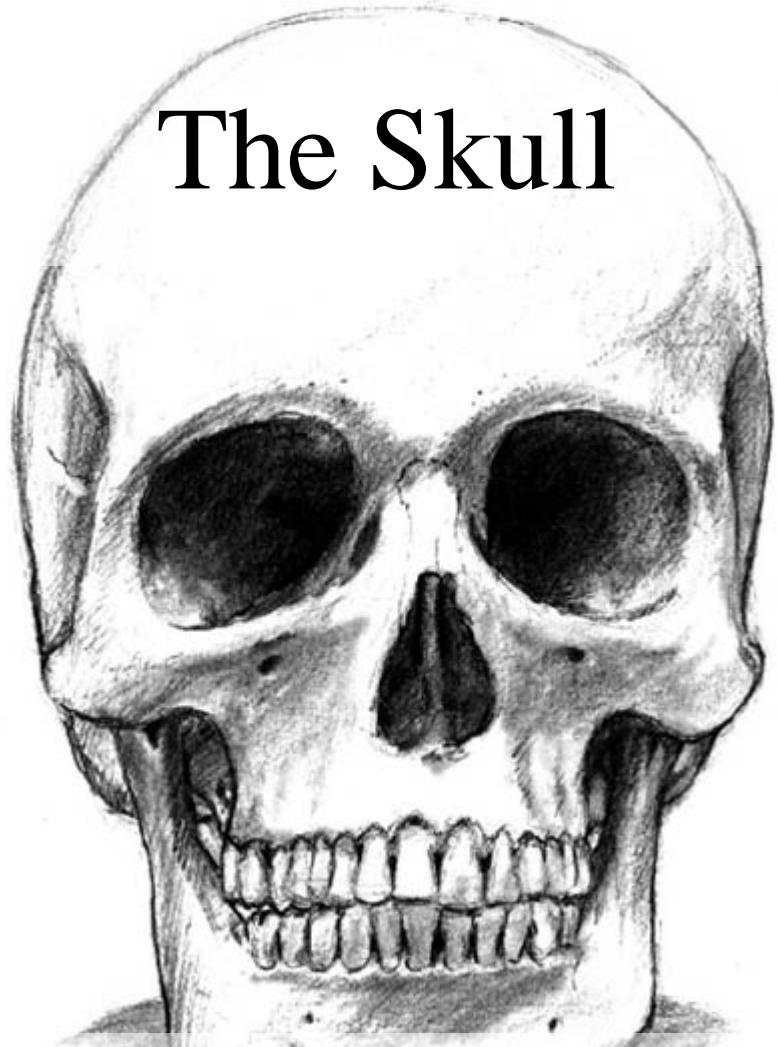


The Skull



DANIL HAMMOUDI.MD

summary of bones/structures in Chapter 15 of the manual need tp be print as soon as possible

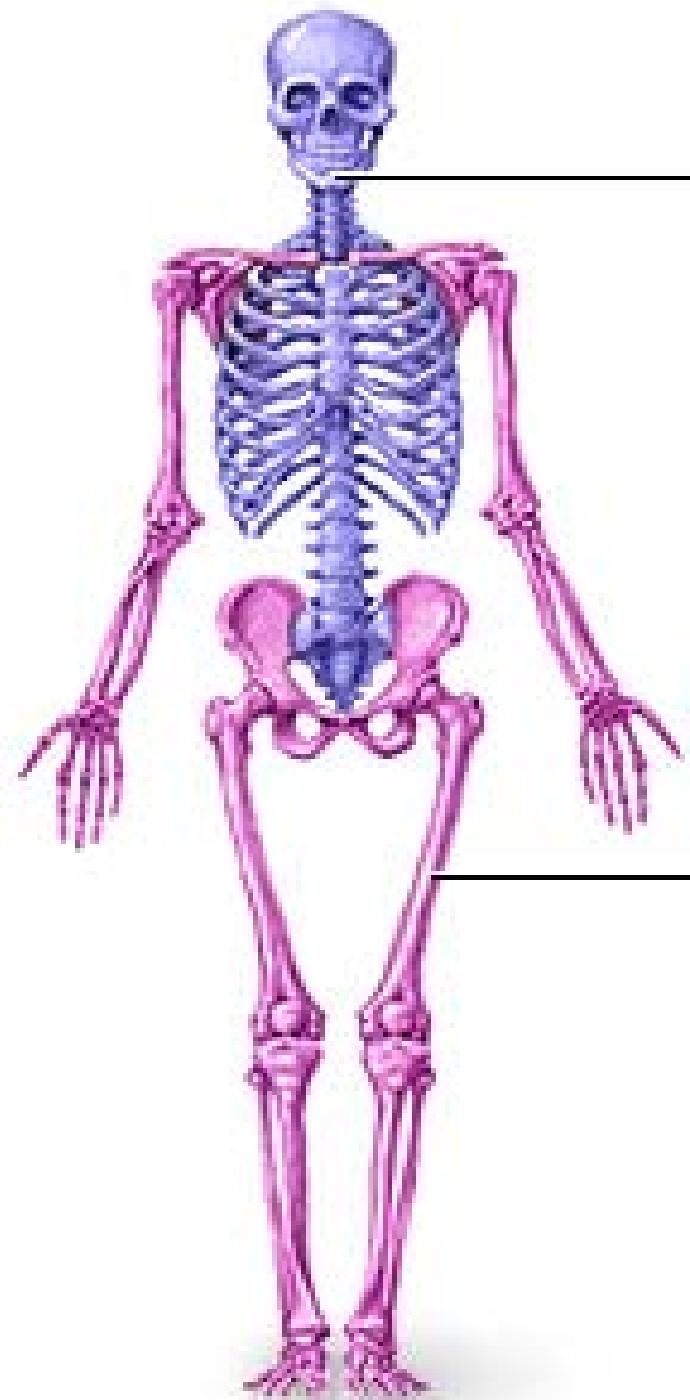
<http://www.mnsu.edu/emuseum/biology/humananatomy/skeletal/skull/frontal/frontal.html>

<http://www.gwc.maricopa.edu/class/bio201/skull/antskul.htm>

http://www.meddean.luc.edu/lumen/meded/grossanatomy/h_n/cn/skp/mainframe.htm

SUGGESTION HOW TO STUDY THE SKULL

- 1/RECOGNIZE THE TWO PARTS OF THE SKULL, CRANIAL AND FACIAL,
- 2/ FIND THE FONTANELS
- 3/FIND THE SUTURES
- 4/RECOGNIZED EACH CRANIAL BONE
- 5/RECOGNIZED EACH FACIAL BONES
- 6/RECOGNIZED THE fossa's AND FORAMINA



Axial skeleton (blue)

Appendicular
skeleton (pink)

he skeleton has two parts:

- the axial skeleton
- and the appendicular skeleton.

The axial skeleton includes

- the skull,
- the hyoid bone,
- the vertebral column (spine, sacrum, and coccyx),
- the sternum, and the ribs.
 - Its components are aligned along the long axis of the body.

The appendicular skeleton includes the

- bones of the upper extremities (arms, forearms, and hands),
- the pectoral (shoulder) girdle,
- the pelvic (hip) girdle,
- and the bones of the lower extremities (thigh, knee, leg, and foot).
- Its components are outside the body main axis.

Major bones of the Axial Skeleton:

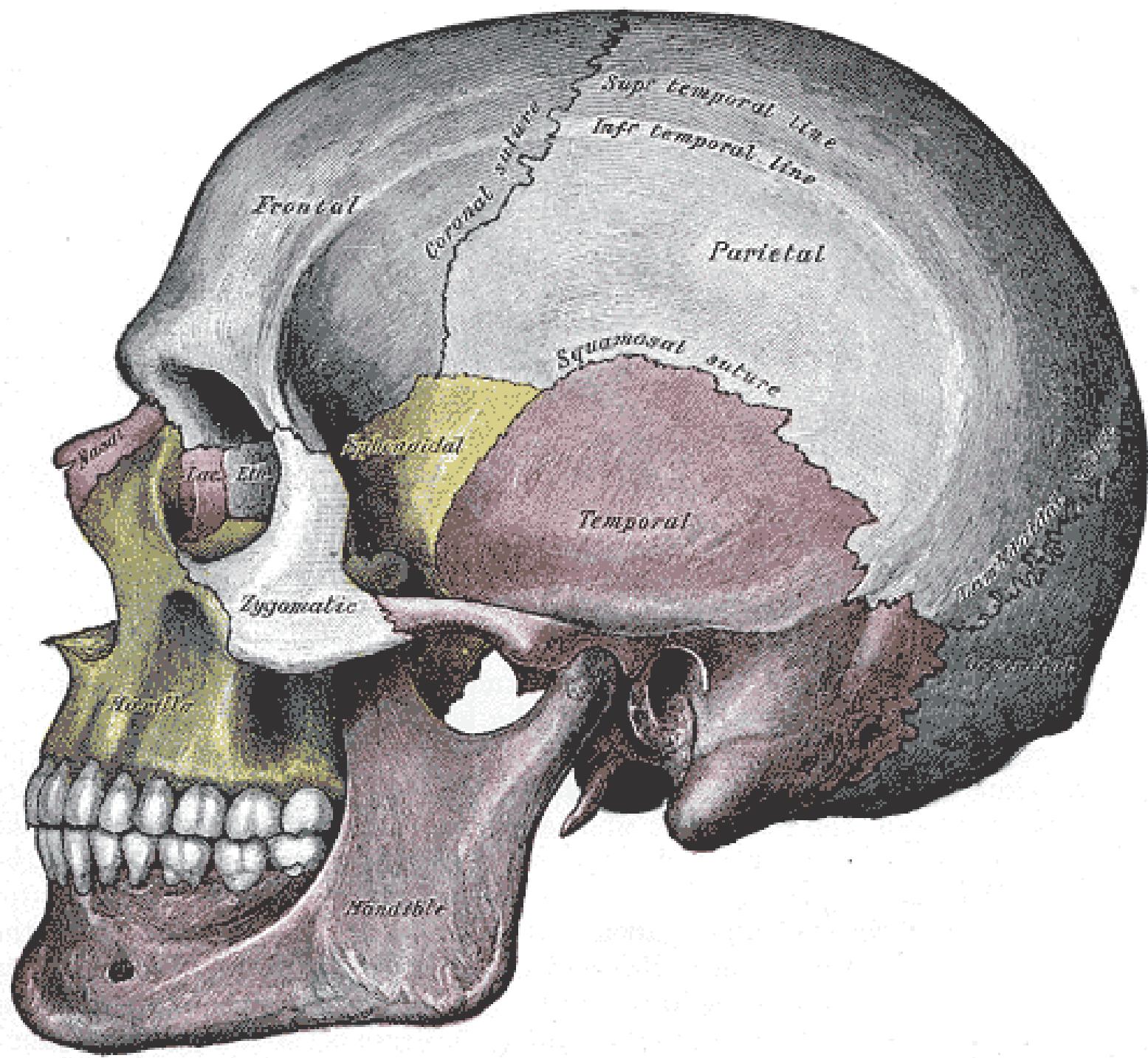
1. Frontal
2. Parietal
5. Zygomatic
7. Mandible
9. Nasal
10. Sternum
14. Vertebrae
28. Ribs

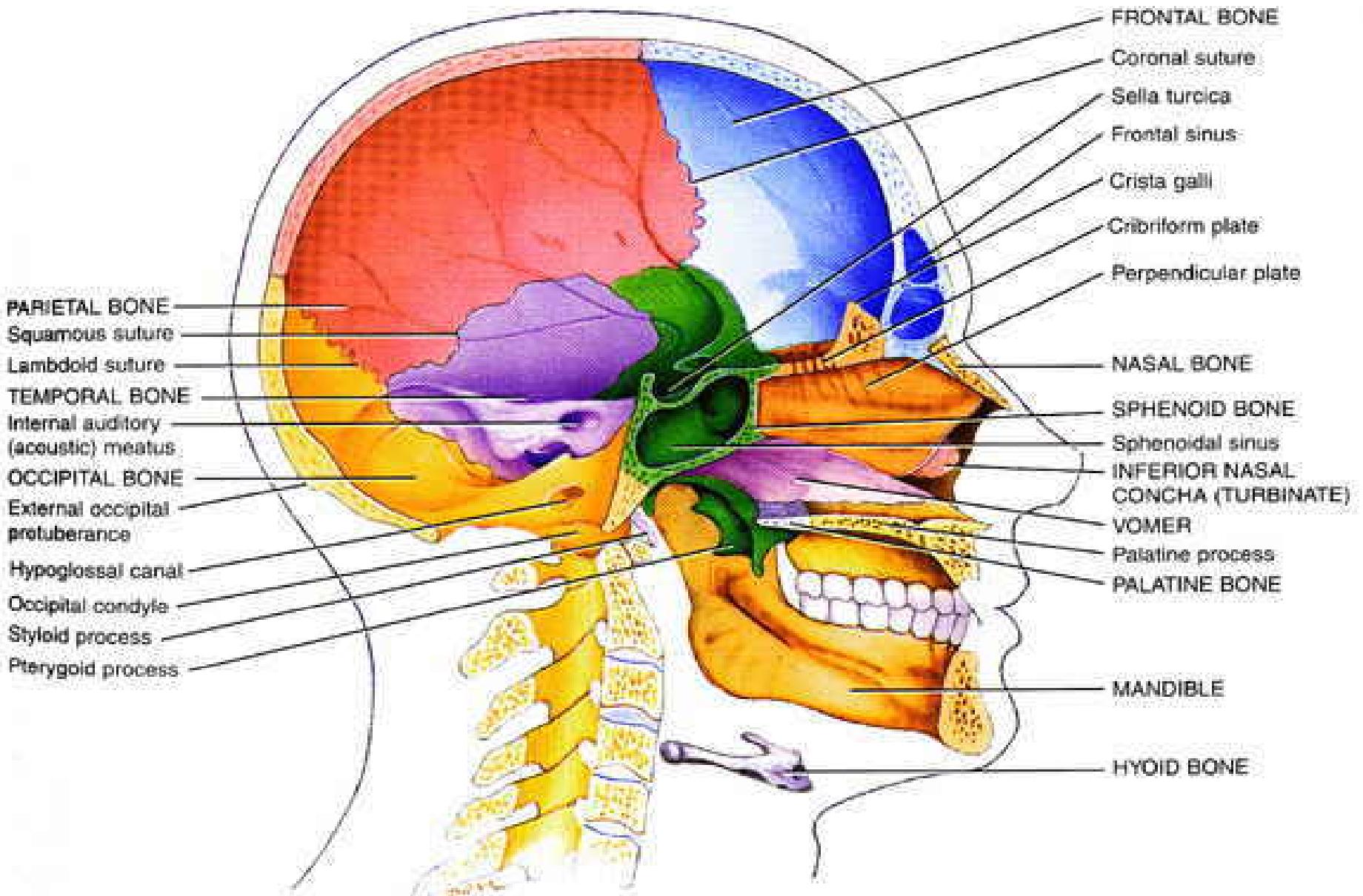
Appendicular:

- 11. Humerus
- 12. Ulna
- 13. Radius
- 18. Femur
- 19. Patella
- 20. Tibia
- 21. Fibula
- 25. Clavicle

THE SKULL

- = 22 BONES
- ALL FUSED EXCEPT ONE.:HYOID BONE
- JOINTS = SUTURES
- CRANIAL CAVITY 8 BONES=CRANIAL BONES
- 14 LEFT = FACIAL BONES
- 3 MORE IN THE EARS



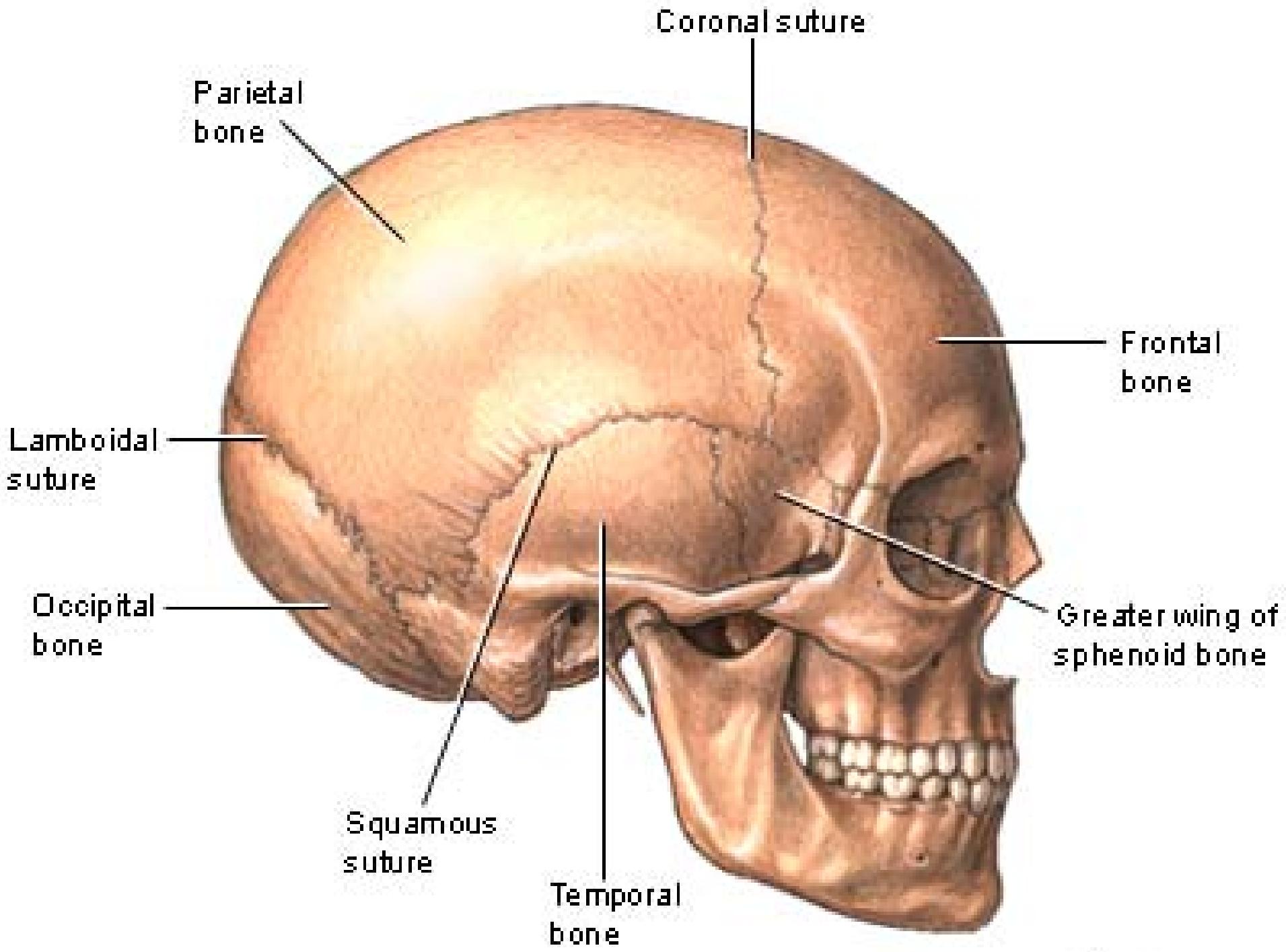


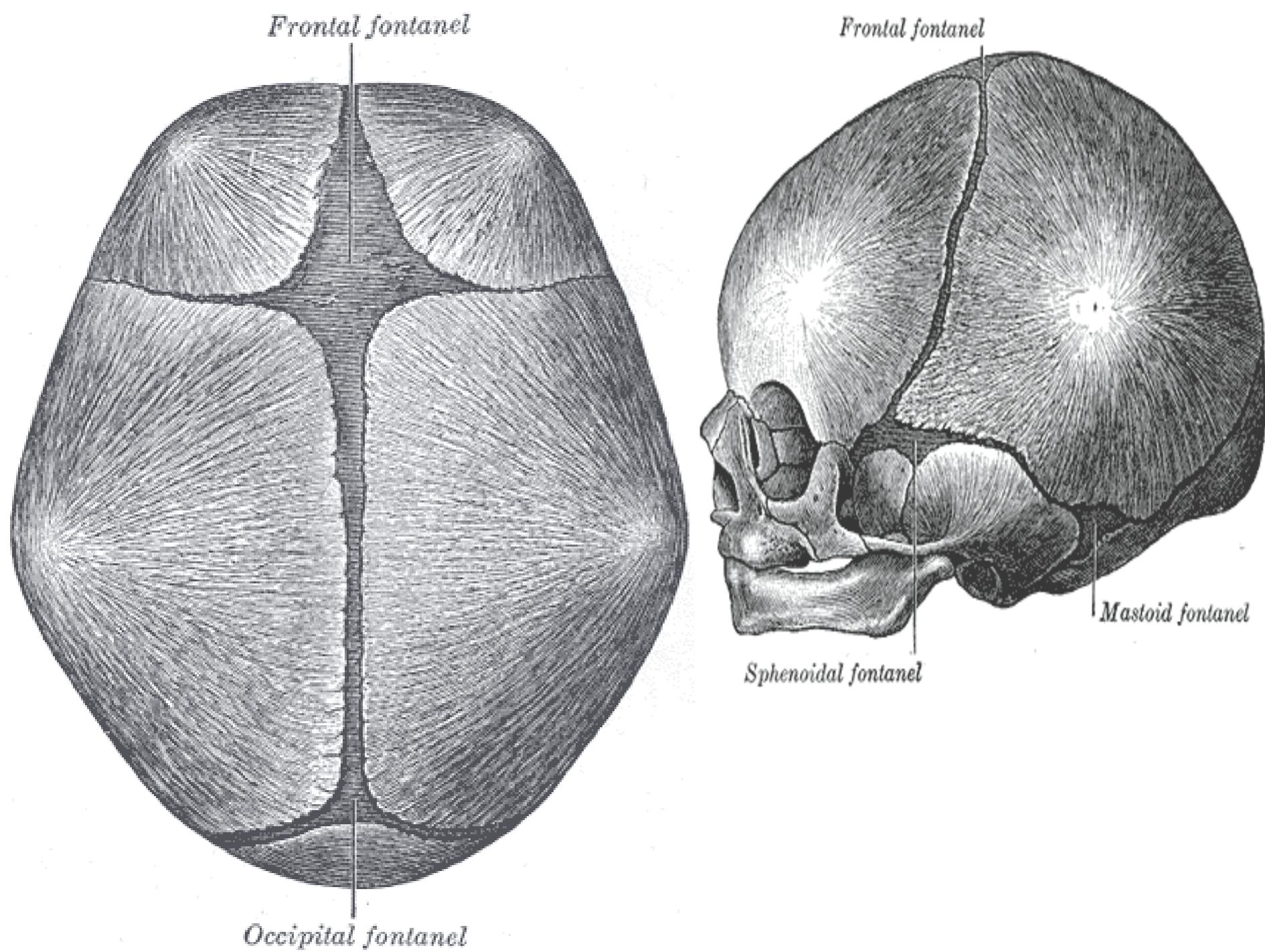
Sagittal section

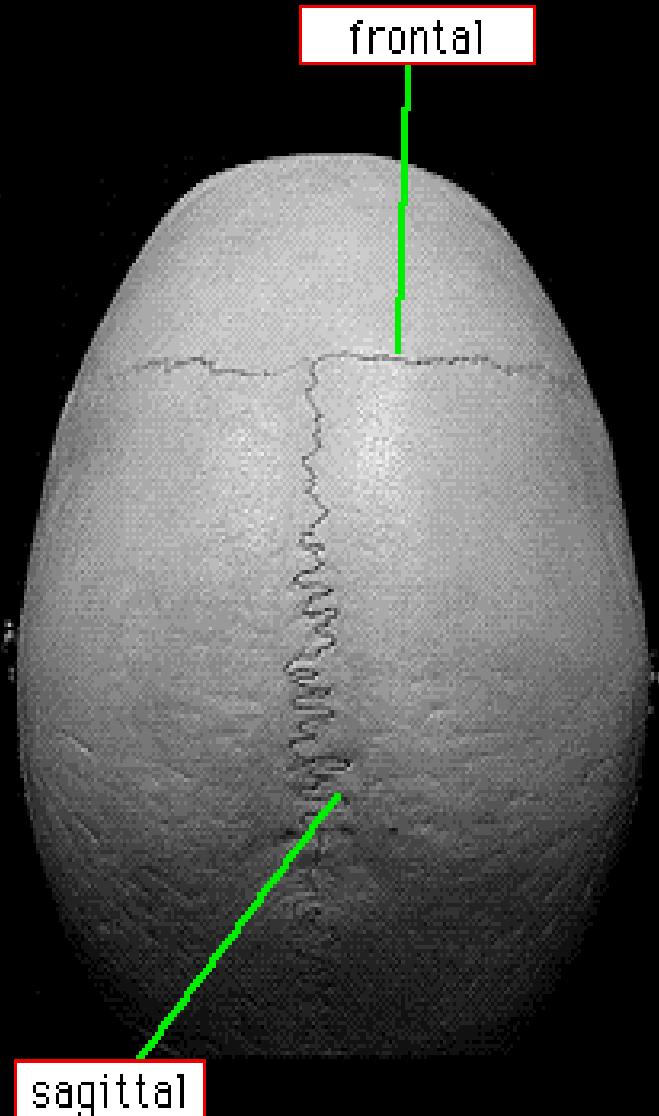
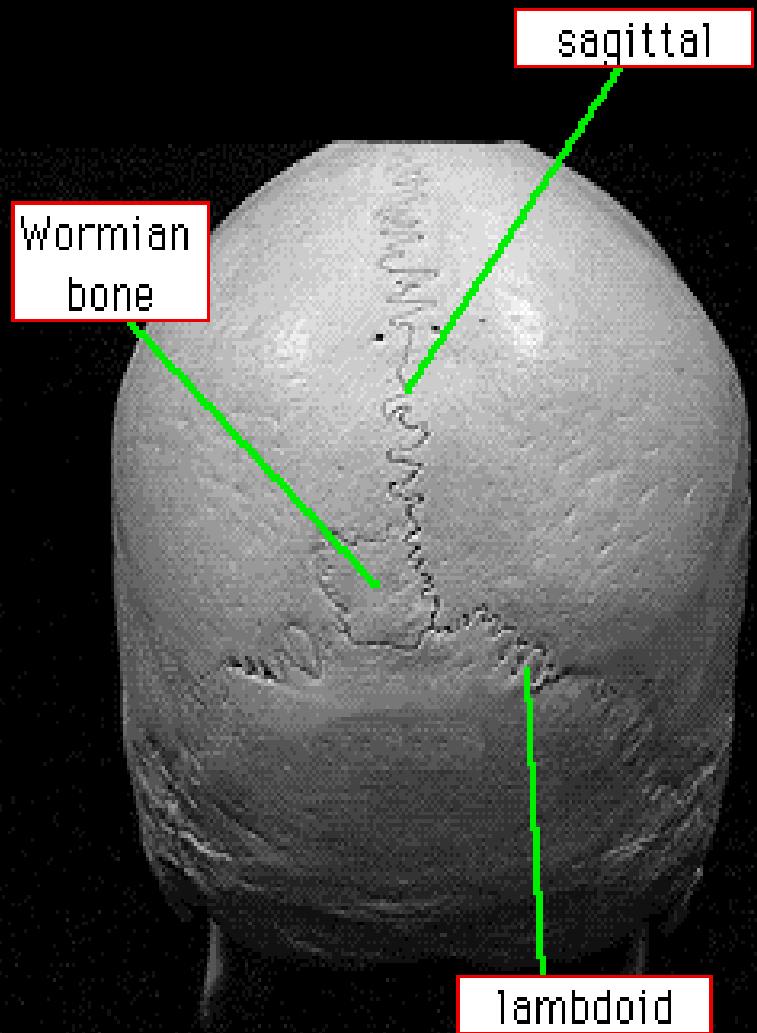
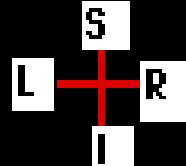
SUTURES

- **Primarily visible from the side (norma lateralis)**
 1. **Coronal suture - between the frontal and parietal bones**
 2. **Lambdoid suture - between the parietal bones and the occipital bone**
 3. Occipitomastoid suture
 4. Parietomastoid suture
 5. Sphenofrontal suture
 6. Sphenoparietal suture
 7. Sphenosquamosal suture
 8. Sphenozygomatic suture
 9. Squamosal suture - between the parietal and the temporal bone
 10. Zygomaticotemporal suture
 11. Zygomaticofrontal suture

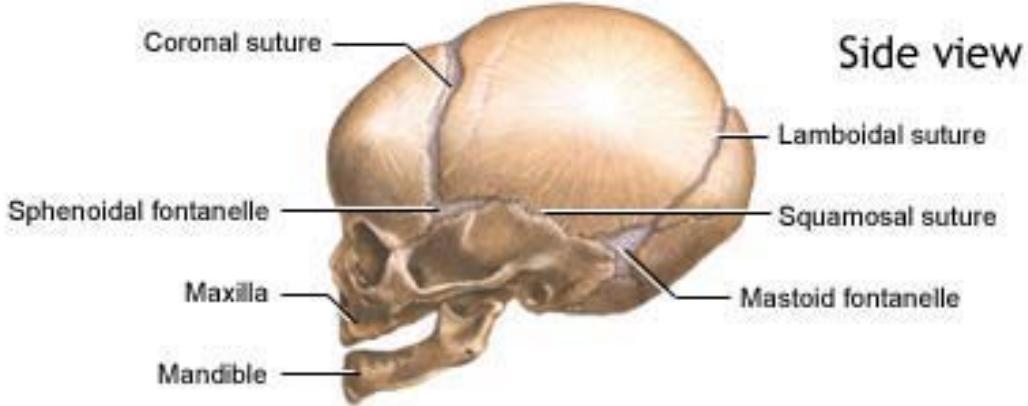
- **Primarily visible from front (norma frontalis) or above (norma verticalis)**
 1. Frontal suture / Metopic suture - between the two frontal bones, prior to the fusion of the two into a single bone
 2. Sagittal suture - along the midline, between parietal bones
- **Primarily visible from below (norma basalis) or inside**
 1. Frontoethmoidal suture
 2. Petrosquamous suture
 3. Sphenoethmoidal suture
 4. Sphenopetrosal suture





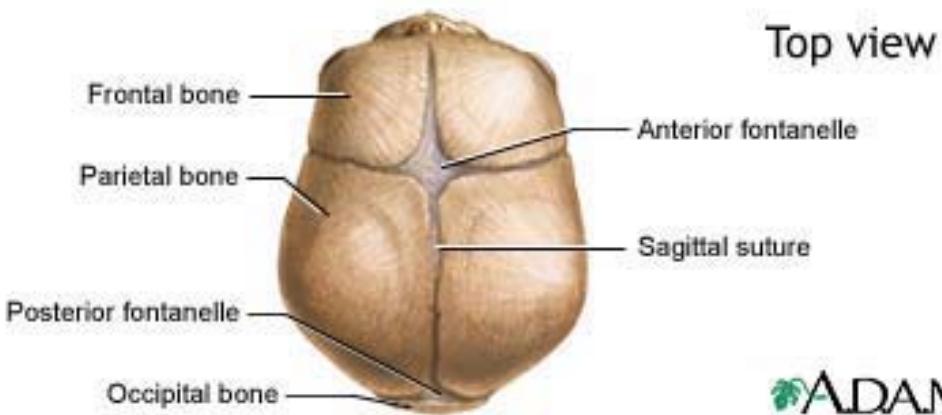


Coronal Suture: Articulation between the parietal bones and the frontal bone.



Side view

Squamous Suture: Articulation between the temporal bones with the parietal bones.

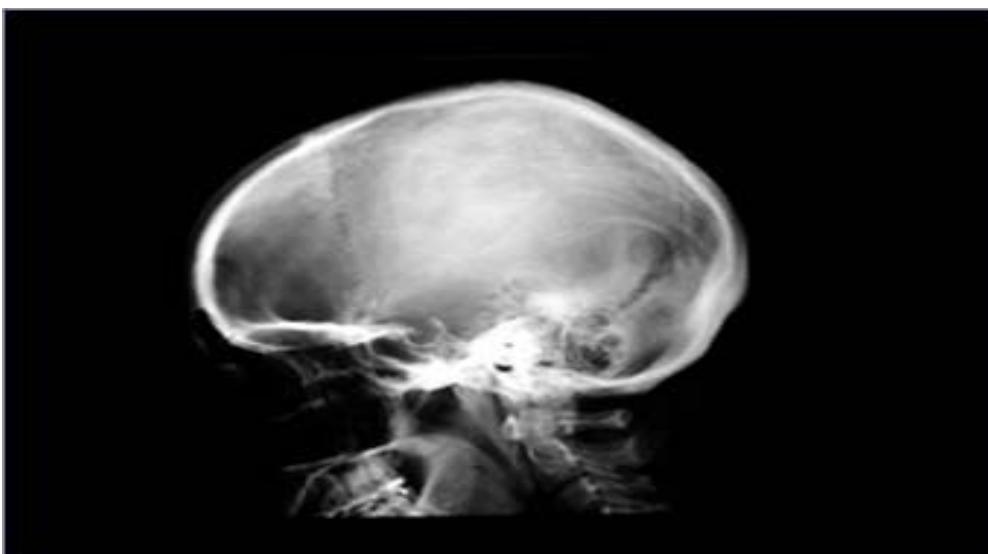


Top view

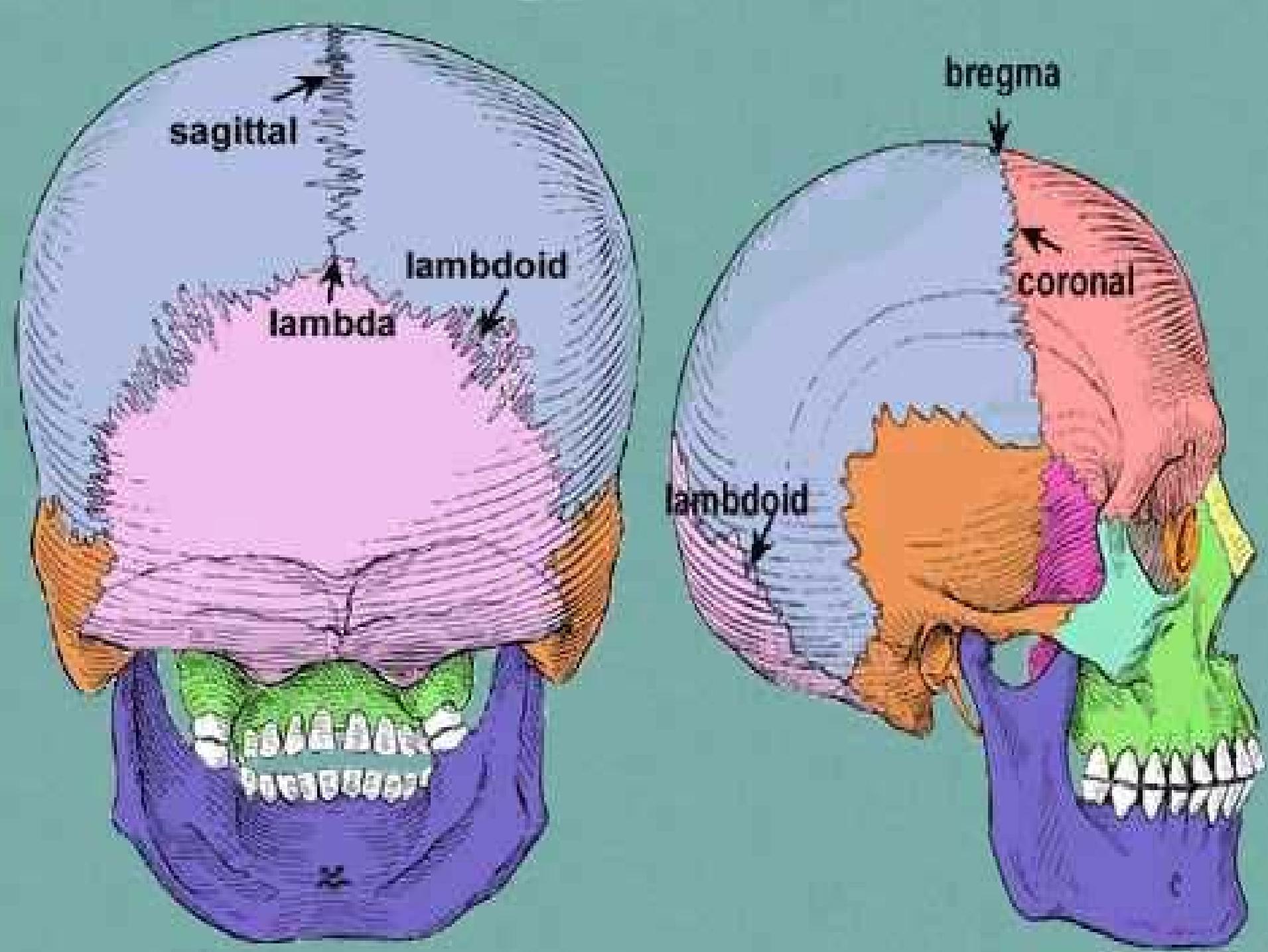
Lambdoid Suture: Articulation of the parietal bones and the occipital bone.

Occipitomastoid Suture: Articulation between the occipital bone and the mastoid process of the temporal bone.

Sagittal Suture: You can't really see this one, but it is on the very top of the cranium. The articulation between the parietal bones.



ADAM.



In the skull (22):

Cranial bones:

frontal bone

parietal bone (2)

temporal bone (2)

occipital bone

sphenoid bone

ethmoid bone

Facial bones:

zygomatic bone (2)

superior and inferior maxilla

nasal bone (2)

mandible

palatine bone (2)

lacrimal bone (2)

vomer bone

inferior nasal conchae (2)

In the middle ears (6):

- malleus (2)
- incus (2)
- stapes (2)

In the throat (1):

- hyoid bone

Paired Cranial Bones:

- Parietals
- Temporals

Unpaired Cranial Bones:

- Frontal
- Occipital
- Sphenoid
- Ethmoid

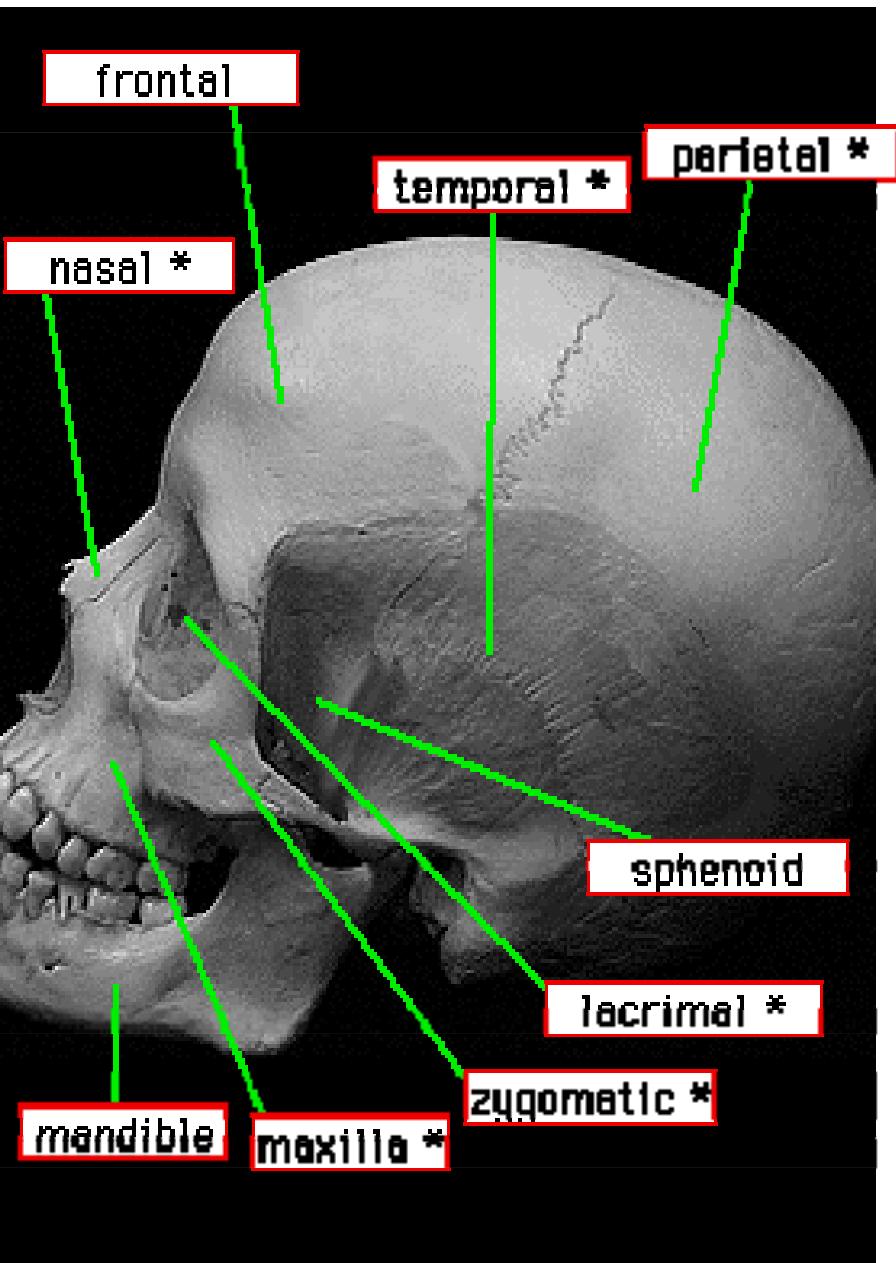
Paired Facial Bones:

- Lacrimals
- Nasals
- Zygomatics
- Maxillae
- Palatines
- Inferior Nasal
Conchae

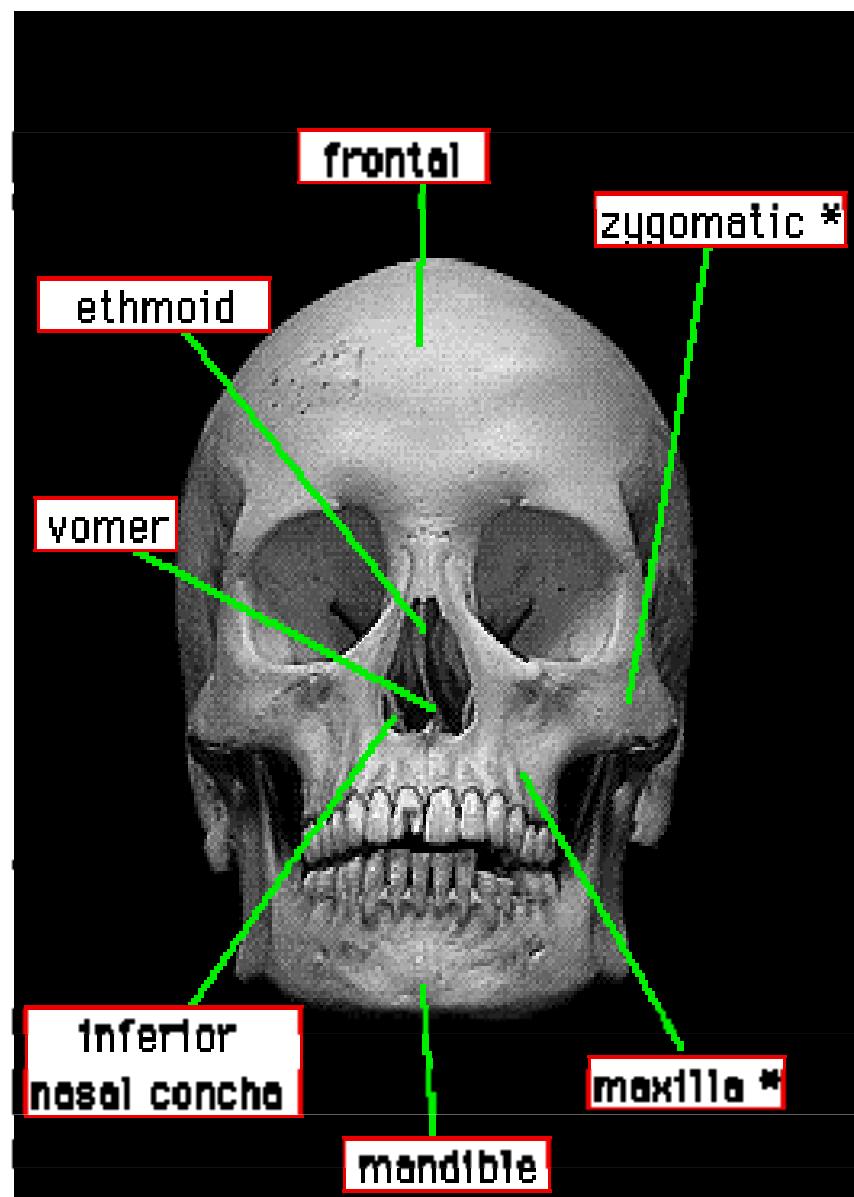
Unpaired Facial Bones:

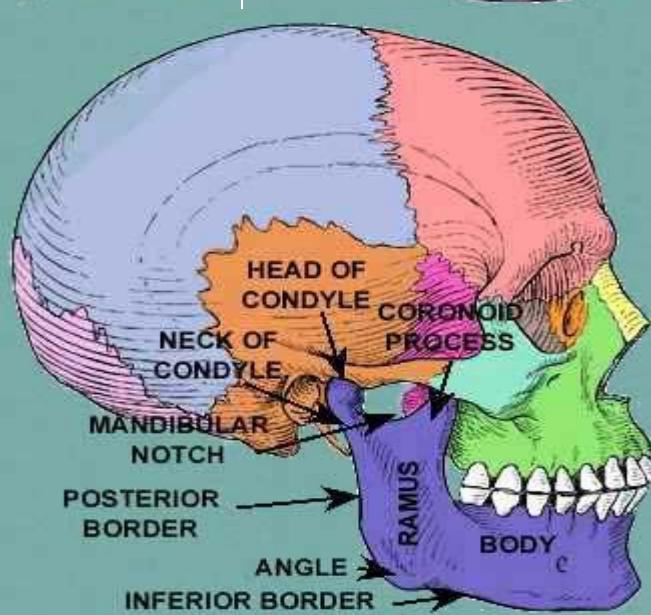
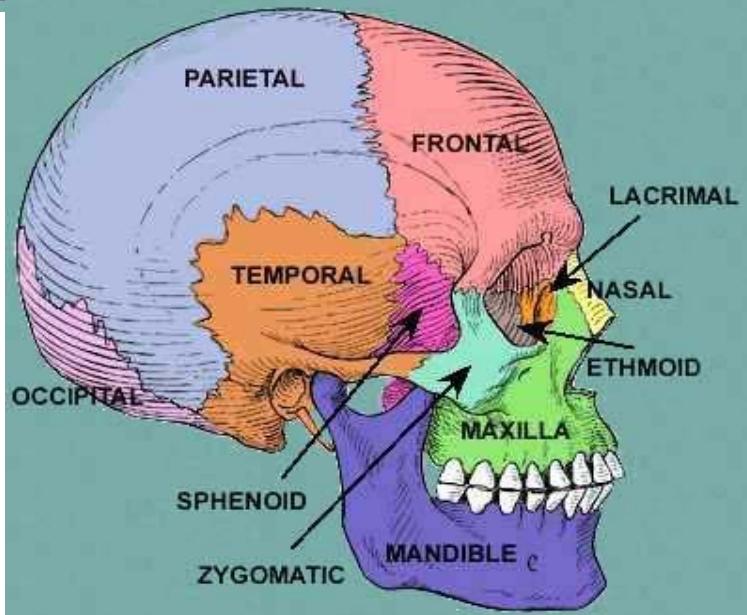
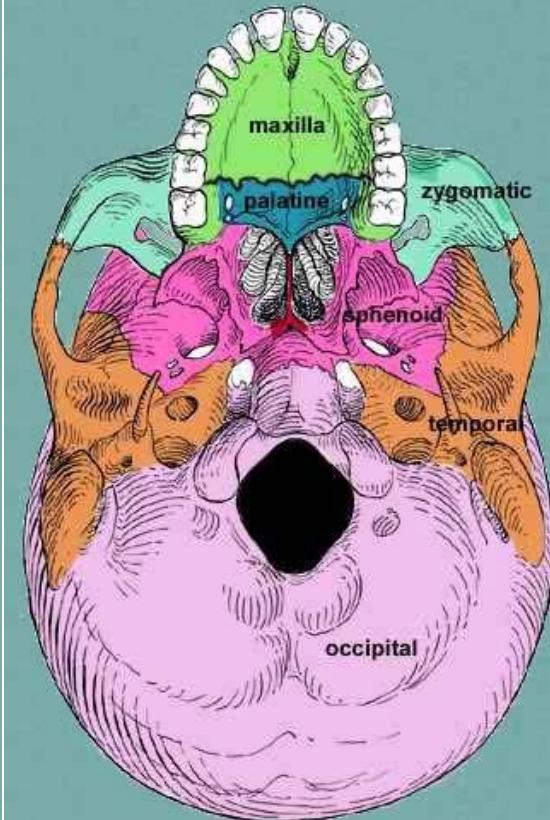
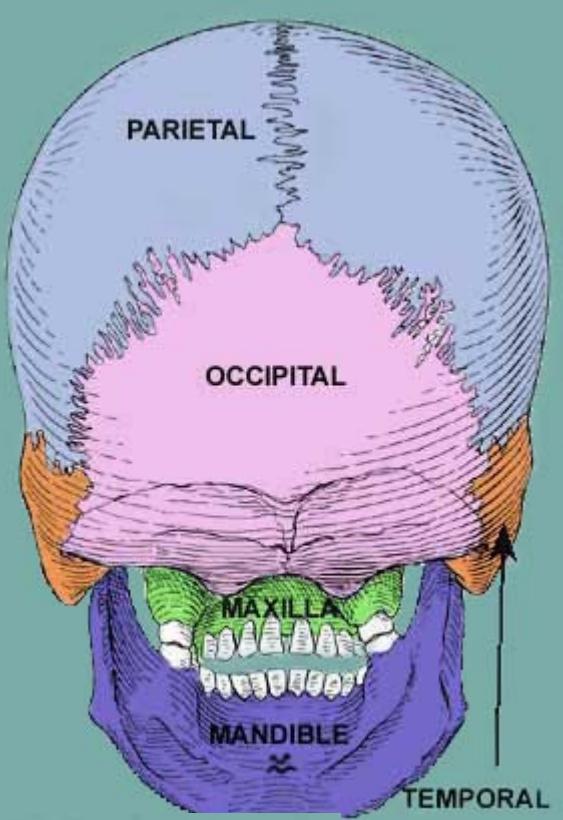
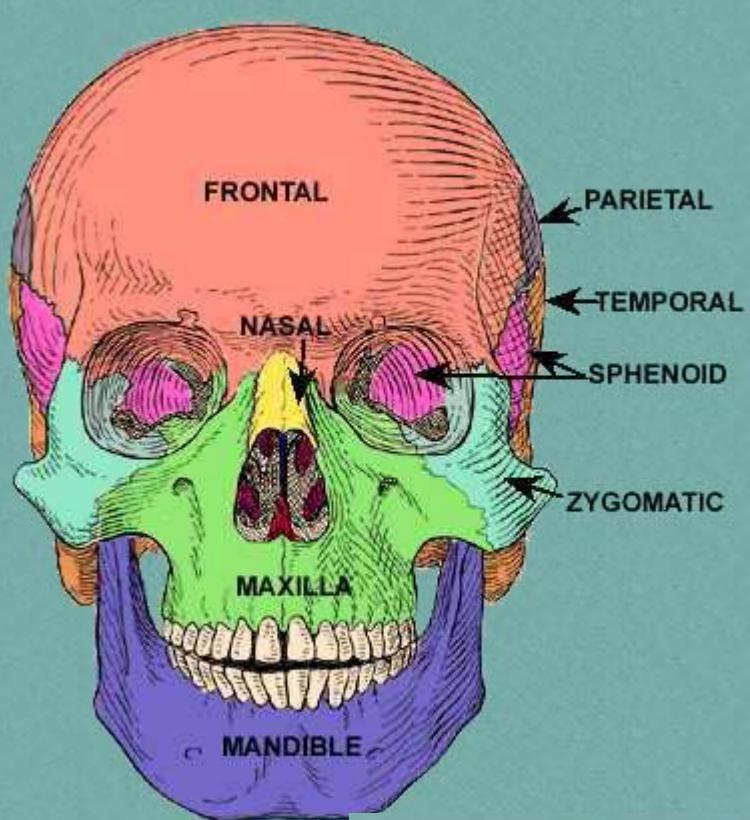
- Vomer
- Mandible
- Hyoid

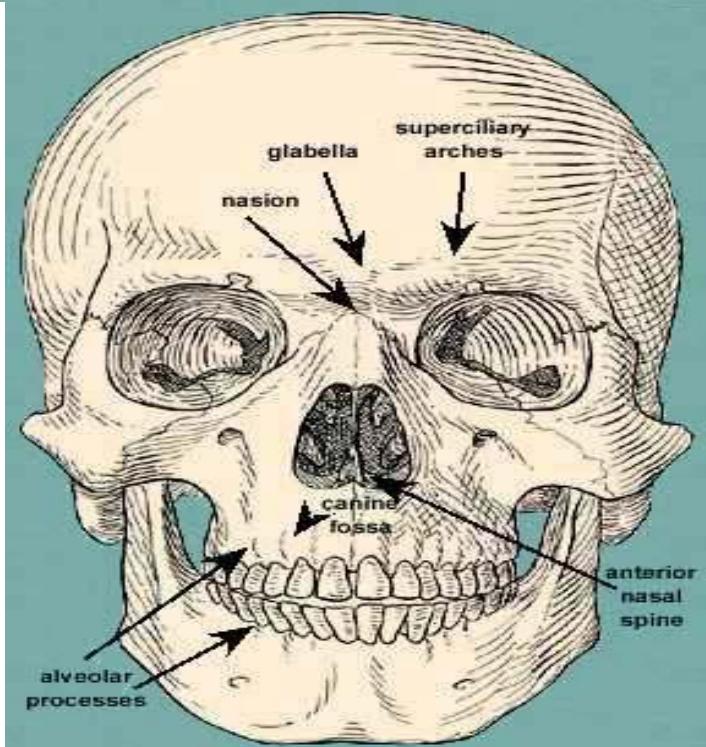
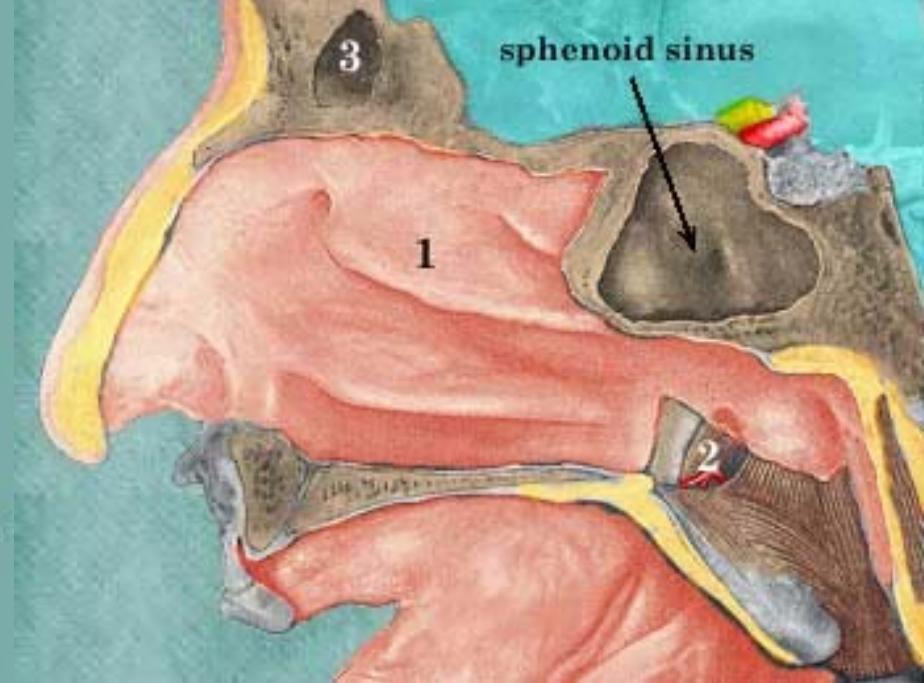
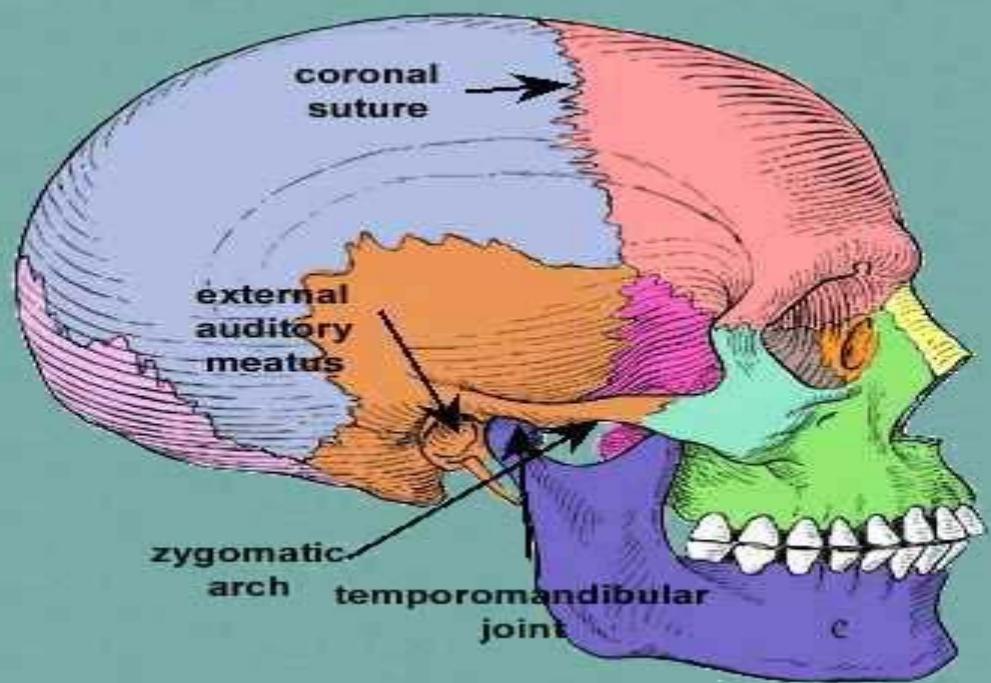
S
A + P
I

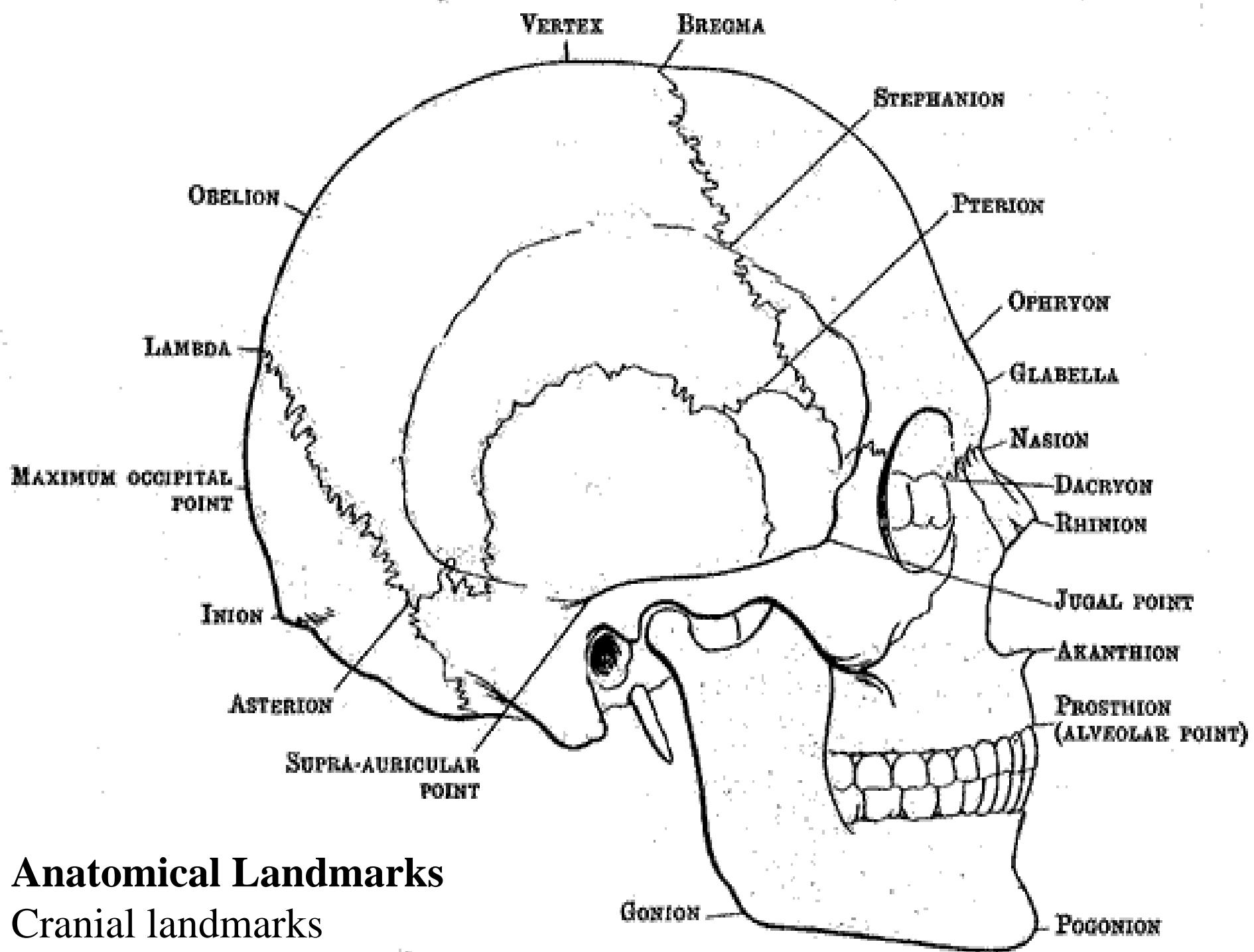


S
R + L
I

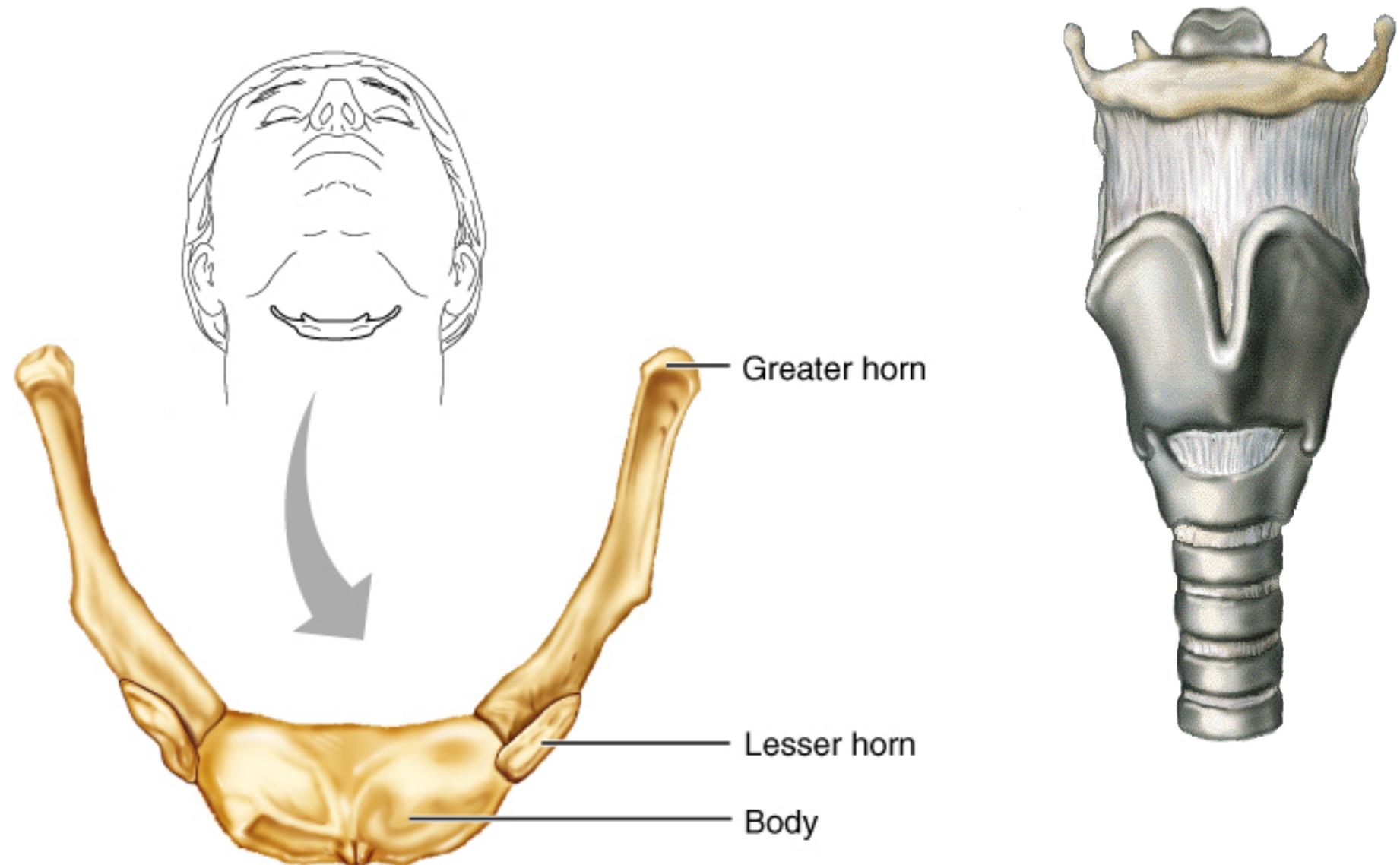




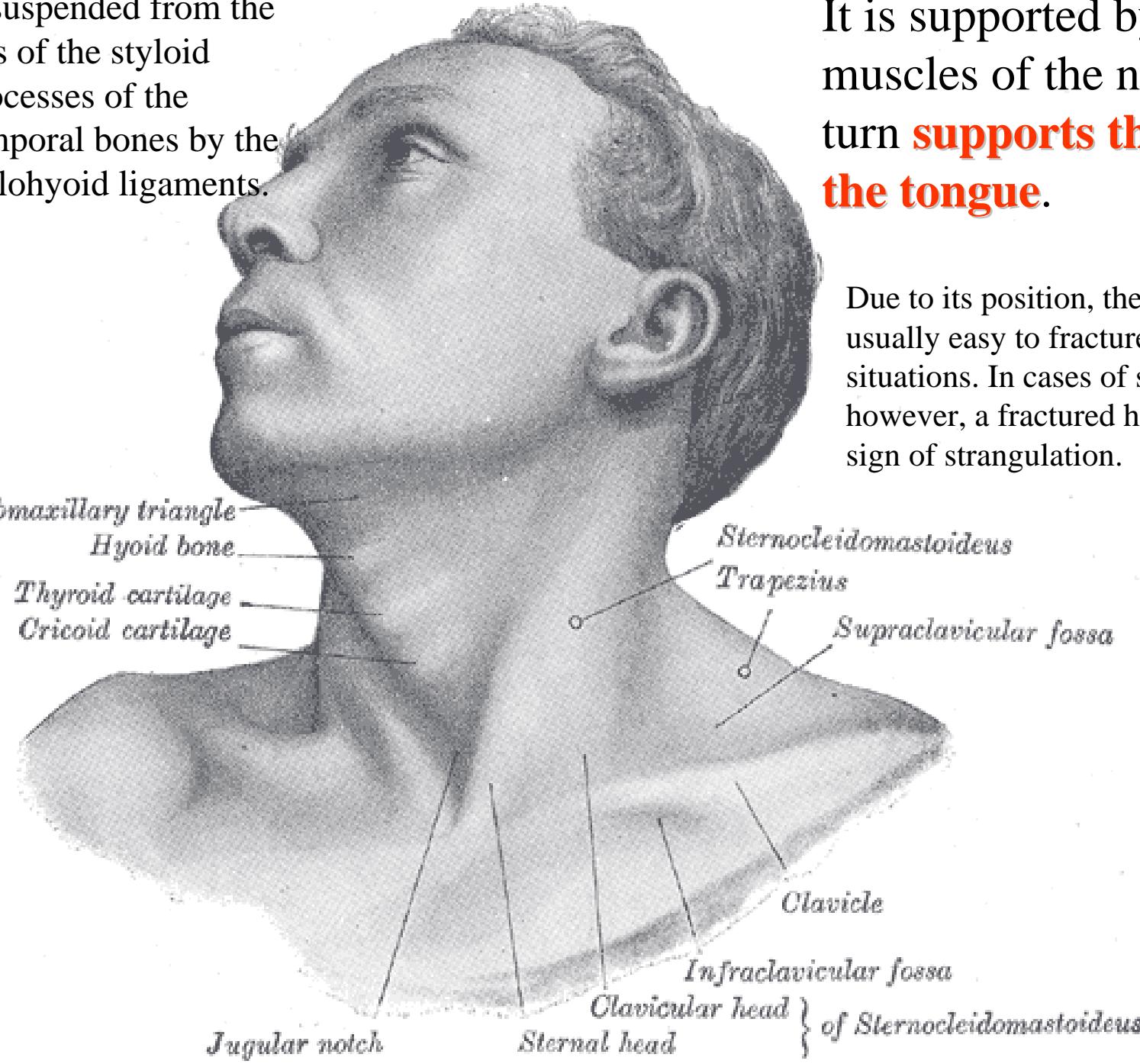




HYOID BONE

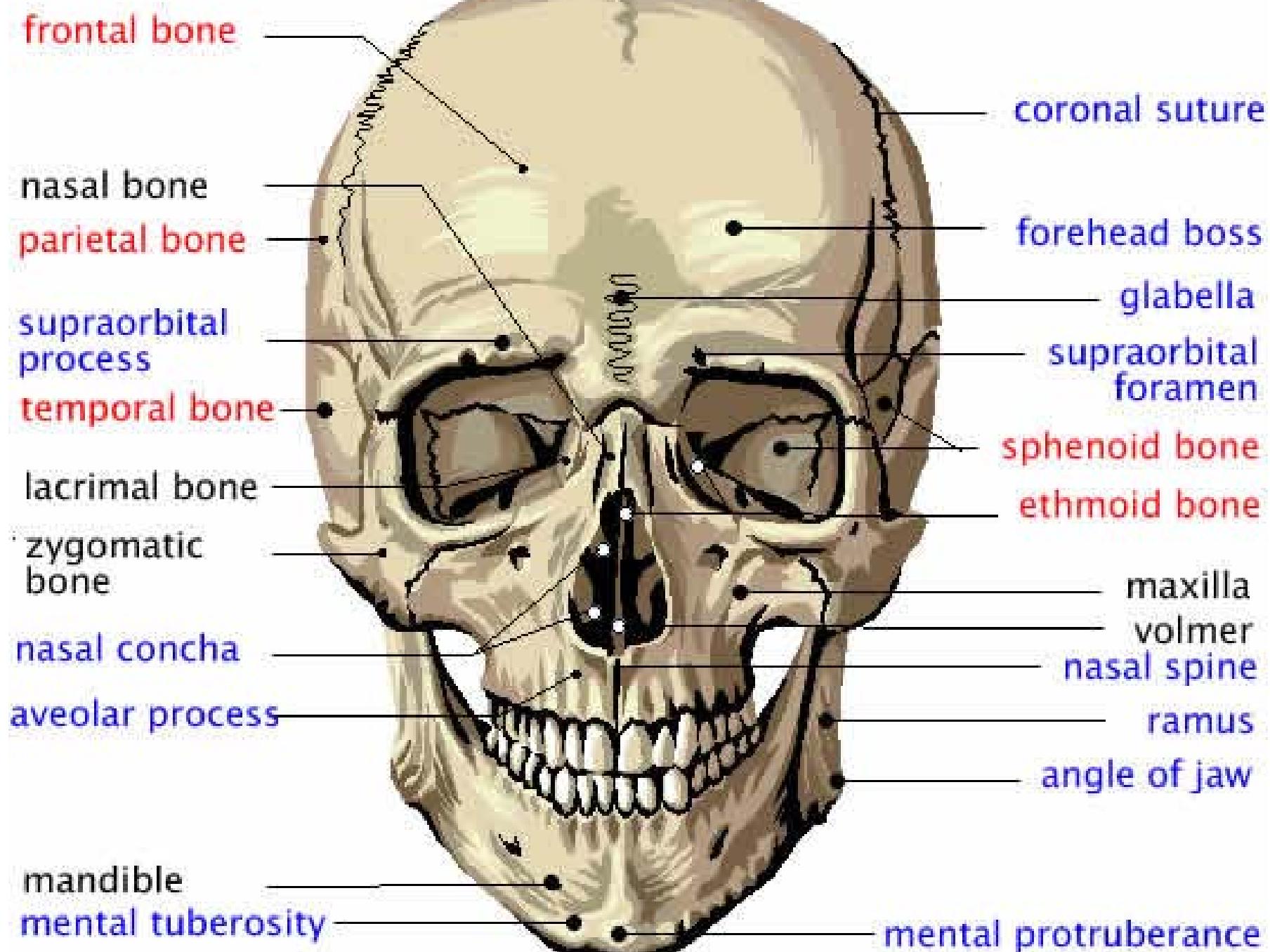


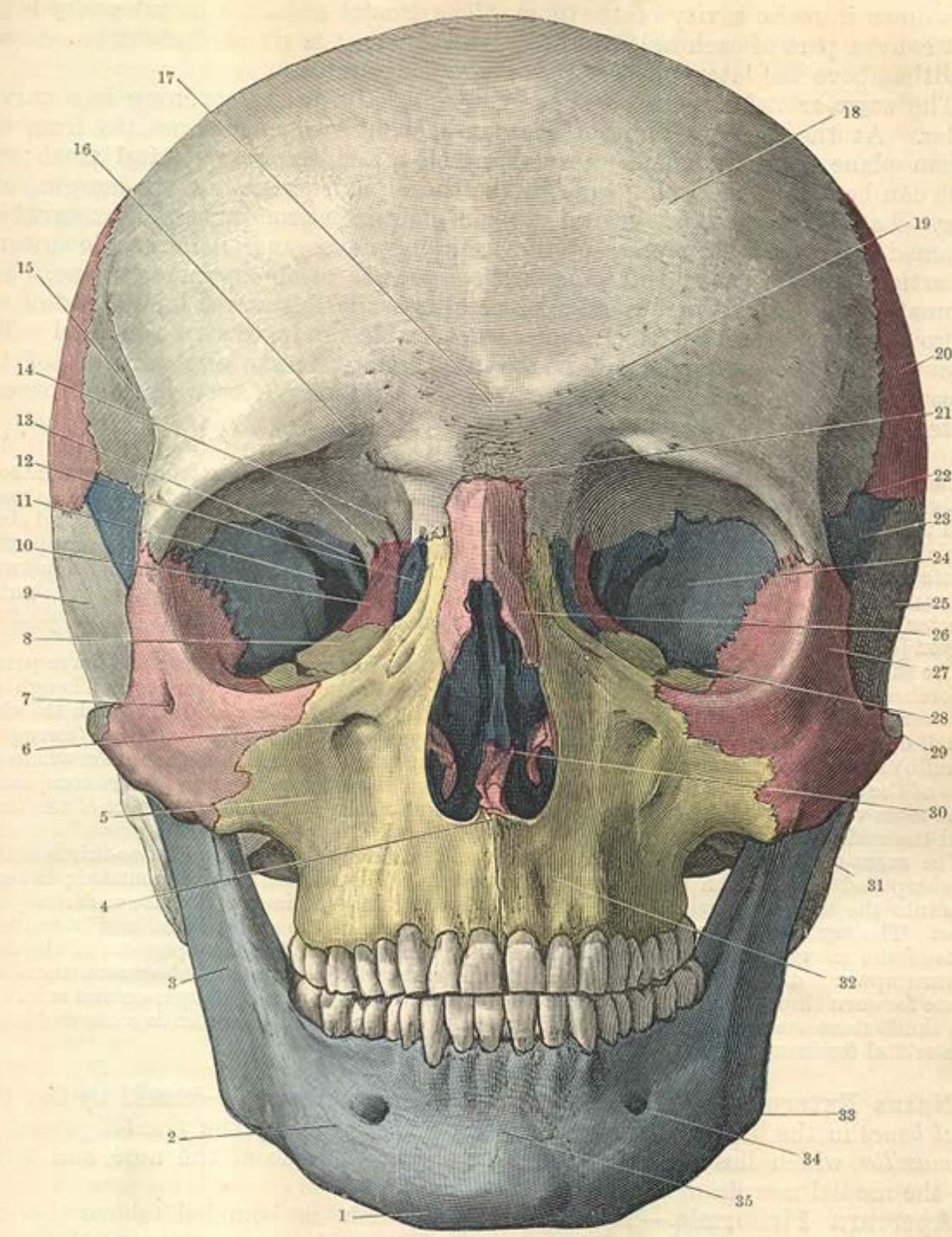
is suspended from the tips of the styloid processes of the temporal bones by the stylohyoid ligaments.



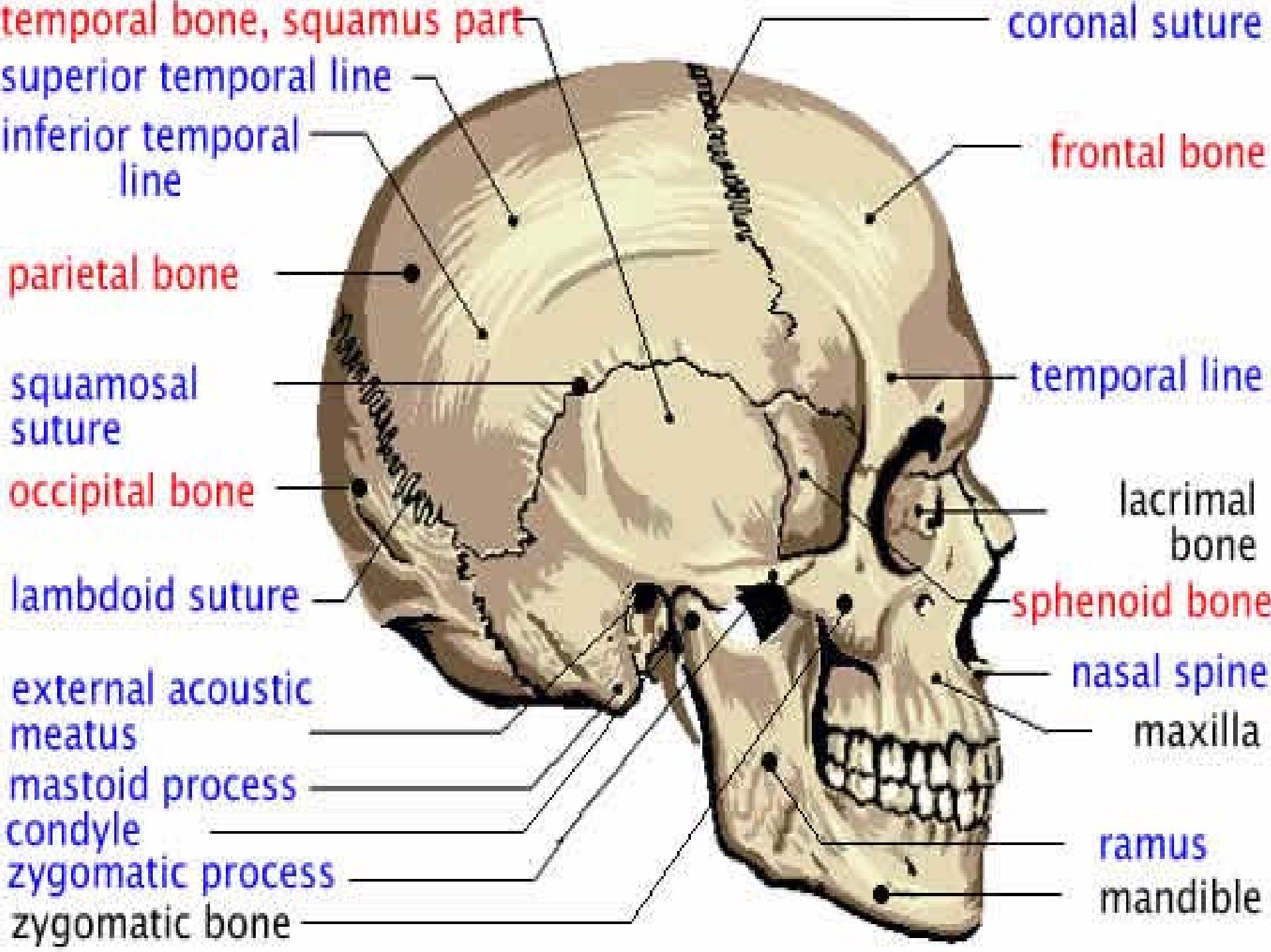
It is supported by the muscles of the neck and in turn **supports the root of the tongue.**

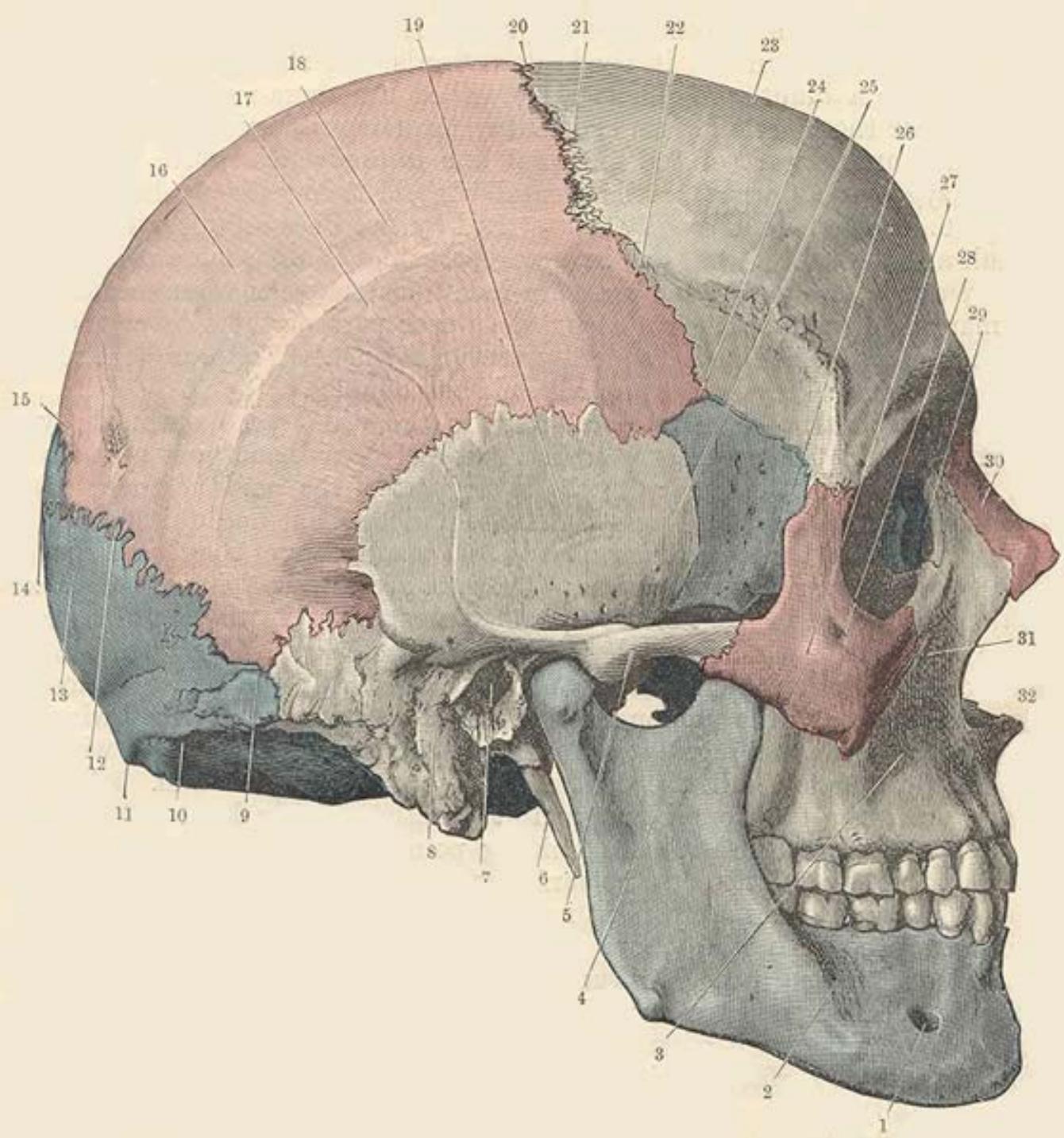
Due to its position, the hyoid bone is not usually easy to fracture in most situations. In cases of suspicious death, however, a fractured hyoid is a strong sign of strangulation.



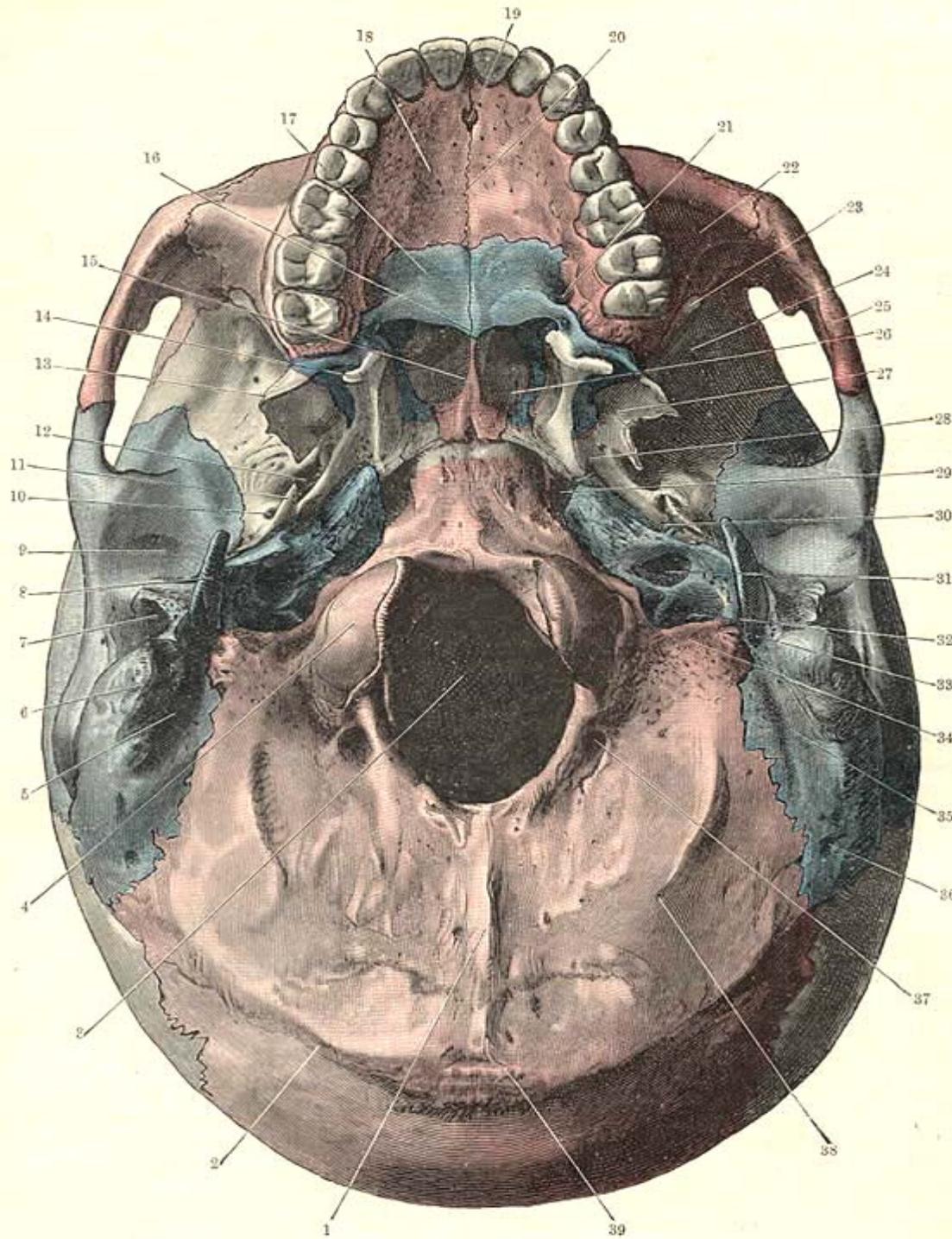


Frontal View. Legend: 1- Mental tubercle. 2- Body of mandible. 3- Ramus of mandible. 4- Anterior nasal spine. 5- Canine fossa. 6- Infra-orbital foramen. 7- Zygomatic-facial foramen. 8- Orbital surface of maxilla. 9- Temporal fossa. 10- Lateral surface of ethmoid. 11- Superior orbital fissure. 12- Lacrimal bone and groove. 13- Optic foramen. 14- Ethmoidal foramina. 15- Temporal line. 16- Supra-orbital notch. 17- Glabella. 18- Frontal tuberosity. 19- Superciliary arch. 20- Parietal bone. 21- Naso-frontal suture. 22- Pterion. 23- Great wing of sphenoid. 24- Orbital surface of great wing of sphenoid. 25- Squamous part of temporal. 26- Left nasal bone. 27- Zygomatic bone. 28- Inferior orbital fissure. 29- Zygomatic bone. 30- Apertura piriformis, displaying nasal septum and inferior and middle concha. 31- Mastoid process. 32- Incisive fossa. 33- Angle of mandible. 34- Mental foramen. 35- Symphysis menti.





Lateral View. Legend: 1- Mental foramen. 2- Body of the mandible. 3- Maxilla. 4- Ramus of the mandible. 5- Zygomatic arch. 6- Styloid process. 7- External acoustic meatus. 8- Mastoid process. 9- Asterion. 10- Superior nuchal line. 11- External occipital protuberance. 12- Lambdoid suture. 13- Occipital bone. 14- Lambda. 15- Obelion. 16- Parietal bone. 17- Lower temporal line. 18- Upper temporal line. 19- Squamous temporal. 20- Bregma. 21- Coronal suture. 22- Stephanion. 23- Frontal bone. 24- Pterion. 25- Temporal fossa. 26- Great wing of sphenoid. 27- Zygomatic bone. 28- Zygomatic-facial foramen. 29- Fossa sacci lacrimalis. 30- Nasal bone. 31- Infra-orbital foramen. 32- Anterior nasal spine.

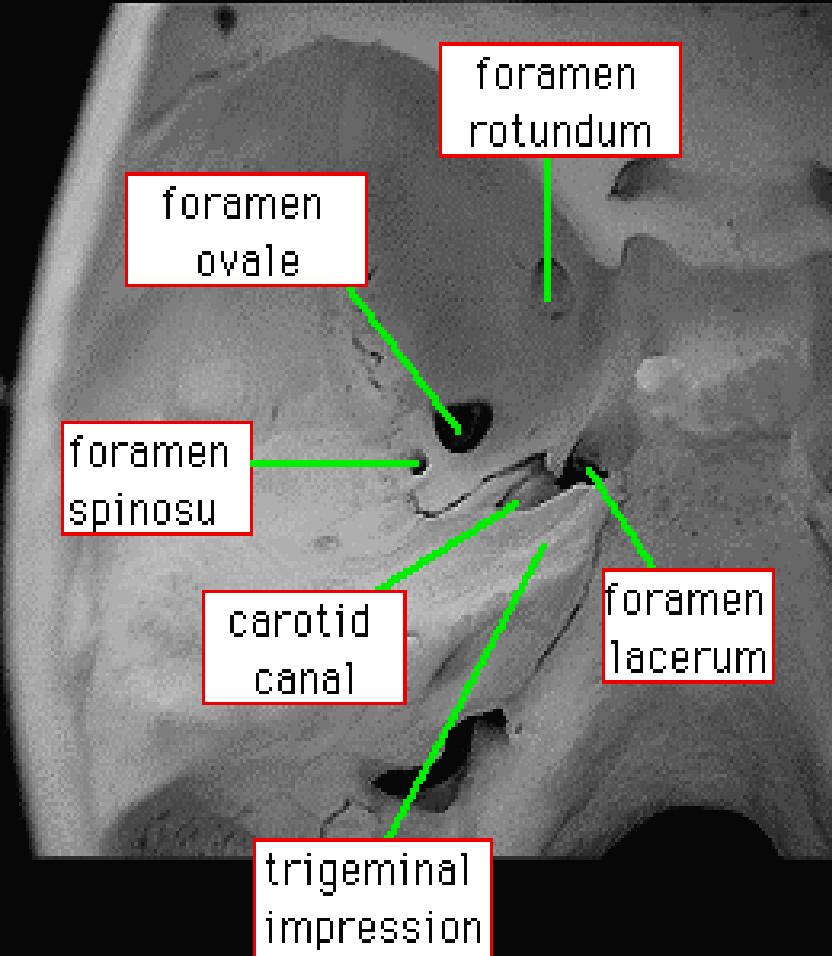
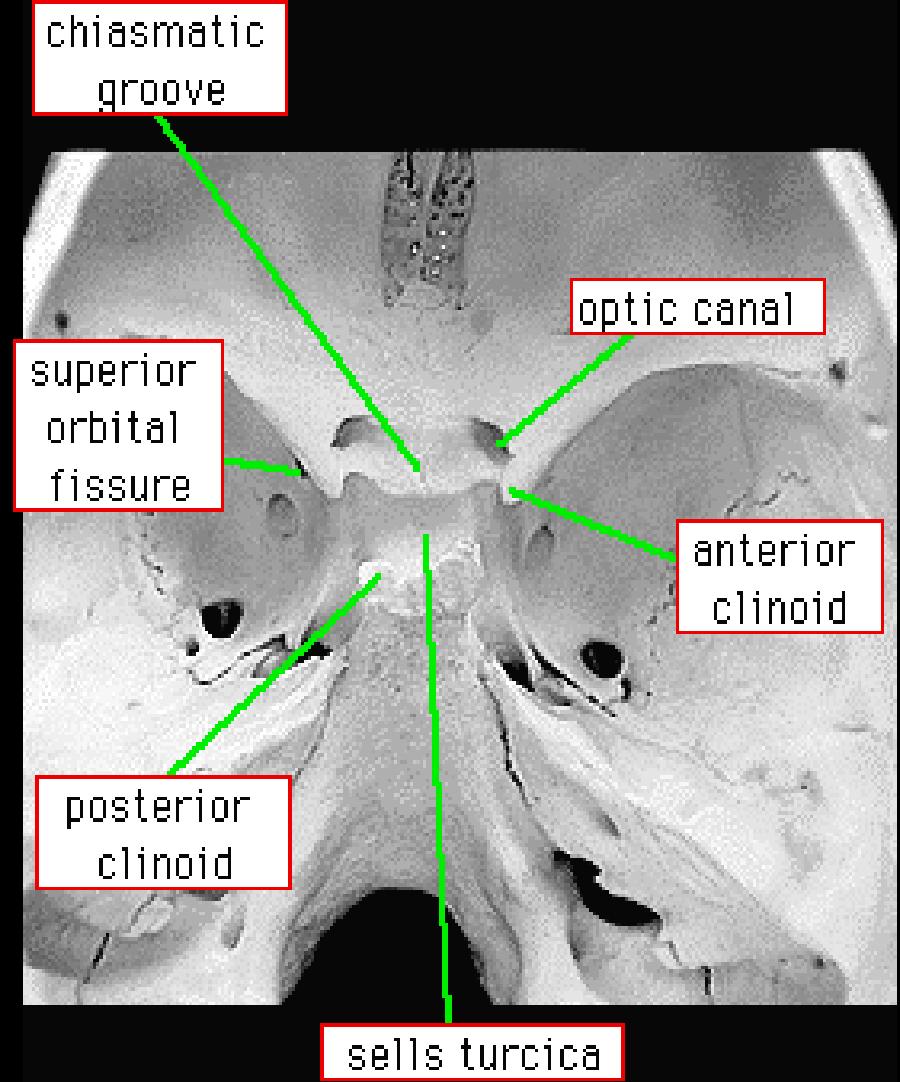


Basal View of the lower surface of the cranium (mandible is removed). Legend: 1- External Occipital Crest. 2- Superior nuchal line of the occipital bone. 3- Foramen magnum. 4- Occipital condyle. 5- Mastoid notch. 6- Mastoid process. 7- External acoustic meatus. 8- Styloid process. 9- Mandibular fossa. 10- Foramen spinosum. 11- Angular spine of the sphenoid. 12- Foramen ovale. 13- Lateral pterygoid lamina. 14- Hamulus of medial pterygoid lamina. 15- Vomer. 16- Posterior nasal spine. 17- Horizontal part of palate bone. 18- Palatine process of maxilla. 19- Incisive foramen. 20- Intermaxillary suture. 21- Greater palatine foramen. 22- Zygomatic process of maxilla. 23- Inferior orbital fissure. 24- Infra-temporal fossa. 25- Zygomatic arch. 26- Left choana. 27- Pterygoid fossa. 28- Scaphoid fossa. 29- Foramen lacerum. 30- Opening of osseous part of auditory tube. 31- Carotid canal. 32- Jugular fossa. 33- Stylo-mastoid foramen. 34- Jugular process of occipital bone. 35- Groove for occipital artery. 36- Mastoid foramen. 37- Canalis condyloideus. 38- Inferior nuchal line of occipital bone. 39- External occipital protuberance.

Middle Cranial Fossa

A
L R
P

A
L M
P

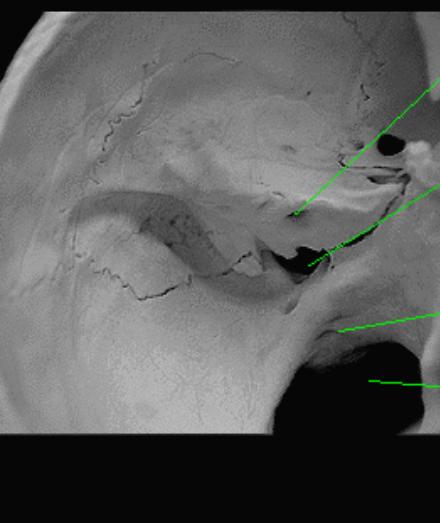
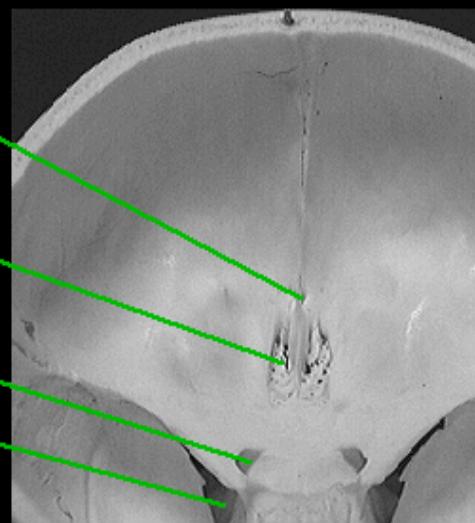


foramen cecum
origin sup sagittal
sinus

cribiform plate
olfactory CN I

optic canal
optic CN II
ophthalmic art

superior orbital fissure
oculomotor CN III
trochlear CN IV
abducens CN VI
trigeminal CN
ophthalmic veins



internal auditory
facial CN VII
vestibulocochlear CN VIII
labyrinthine art

jugular foramen
glossopharyngeal CN
vagus CN X
accessory CN XI
inf petrosal & transv sinuses
meningeal art branches

hypoglossal canal
hypoglossal CN XII
meningeal art branches

foramen magnum
spinal cord
accessory CN XI
vertebral art
ant & post spinal art

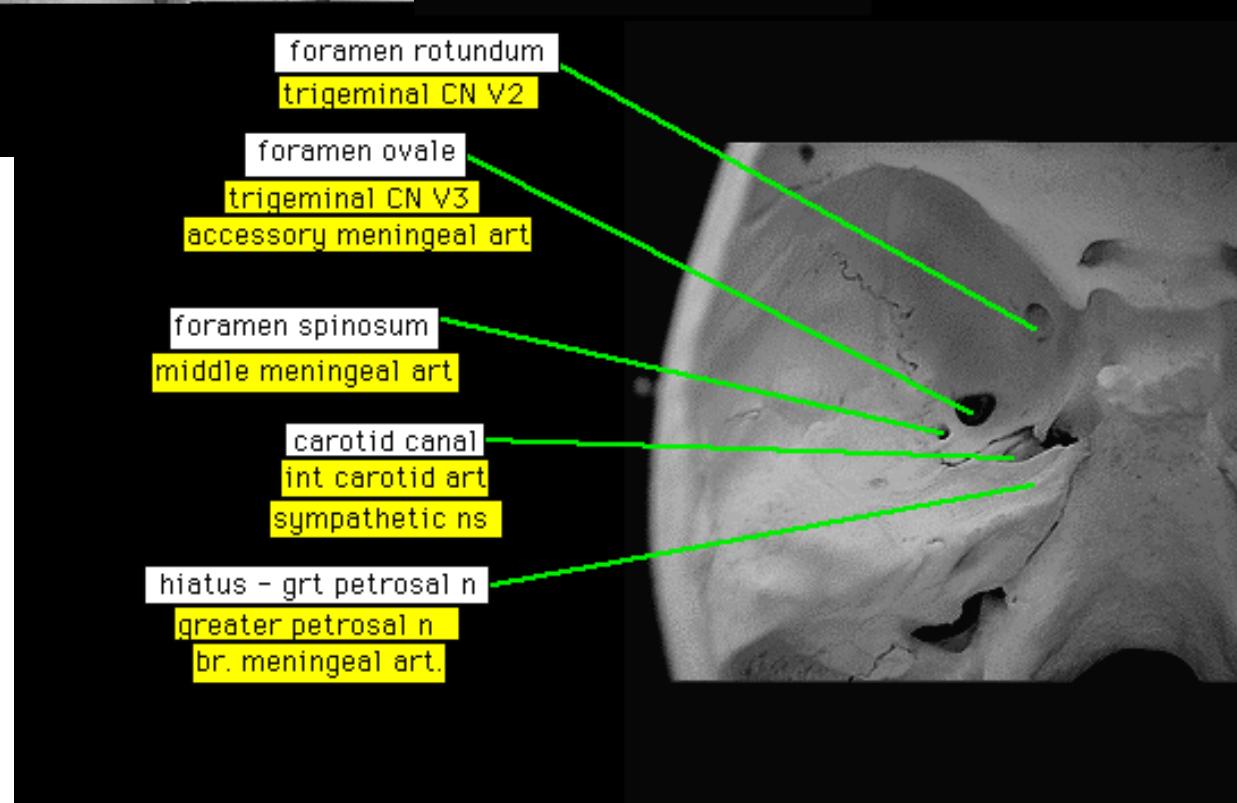
foramen rotundum
trigeminal CN V2

foramen ovale
trigeminal CN V3
accessory meningeal art

foramen spinosum
middle meningeal art

carotid canal
int carotid art
sympathetic ns

hiatus - grt petrosal n
greater petrosal n
br. meningeal art.



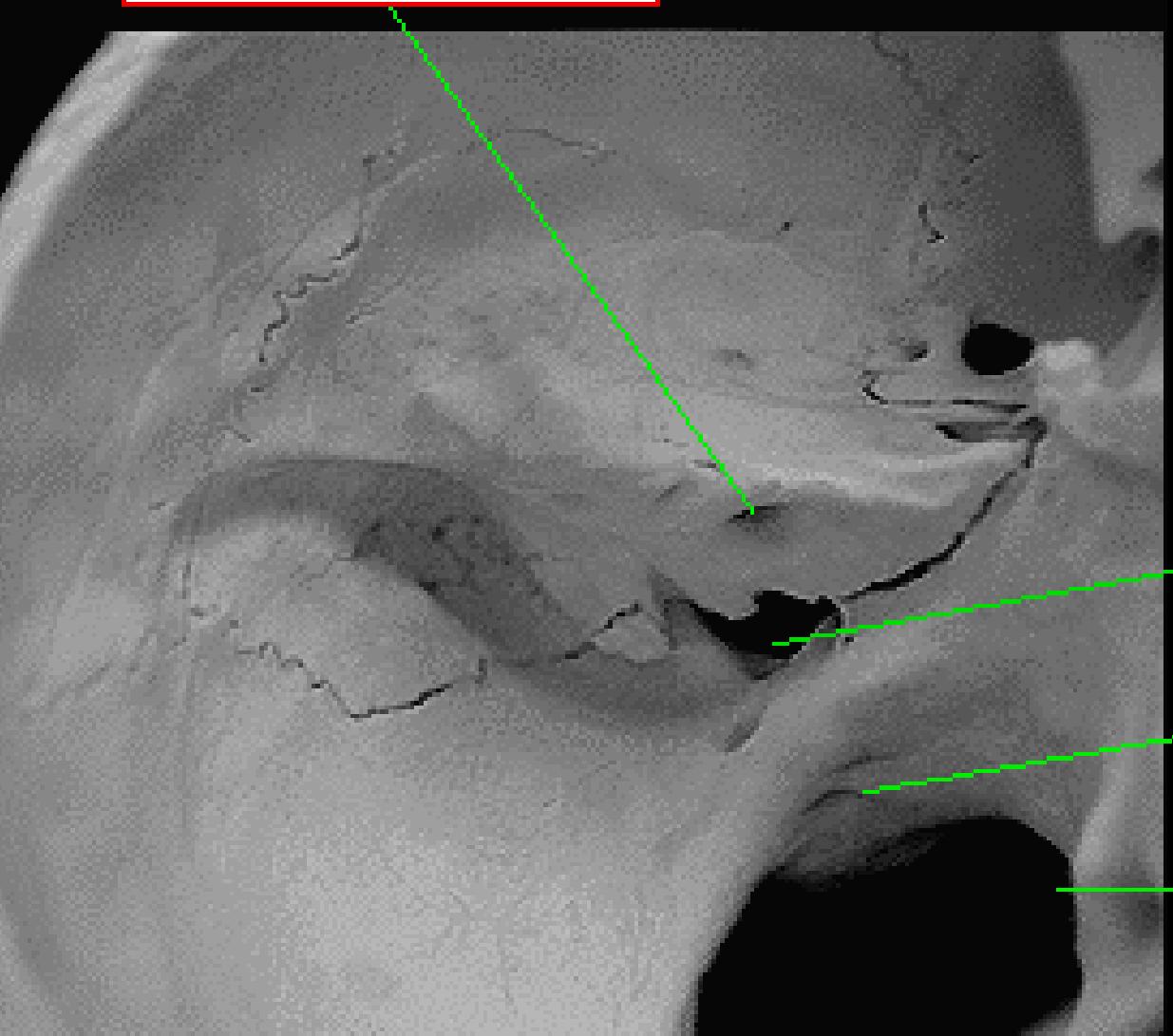
Skull Foramina

Basal Foramen	Location	Transmits
Olfactory foramen	Anterior crainal fossa	CN I - Olfactory
Optic foramen	Middle Crainal fossa, inferior aspect of lesser	CN II - Optic
Superior Orbital fuisse	B/w greater and lesser wing	CN III, IV, V1, VI - Occularmotor, Trochlear, Trigeninal Ophthalmic, Abdeuces
Foramen Rotundum	Middle Crainial Fossa, greater wing of sphenoid	CN V2 - Trigeminal Maxillary
Foramen Ovale	Middle Crainial fossa, postero-lateral to foramen rotundum	CN V3 - Trigeminal Mandibular
Foramen Spinosum	Middle Crainial fossa, postero-lateral to foramen ovale	Middle meningeal artery
Foramen Lacerum	Middle crainial fossa, lateral to dorsum sallae	Carotid artery
Carotid Foramen	Middle crainial fossa, petrous bone	Leads to foramen lacerum, carotid artery
Foramen Magnum	Posterior crainal fossa	spinal cord and vertebral arteries
Jugular Foramen	Posterior crainal fossa, b/w petrous ridges and occipital bone, antero-lateral to foramen magnum	Jugular vein, CN IX, X, XI - Glossopharengeal, vagus, accessory
Internal Auditory Foramen	Posterior crainal fossa, postero-lateral aspect of petrous ridge	
Hypoglossal Foramen	Posterior crainal fossa, lateral aspect of foramen magnum	CN XII - hypoglossal

L A
P M

Posterior Cranial Fossa

internal auditory
meatus

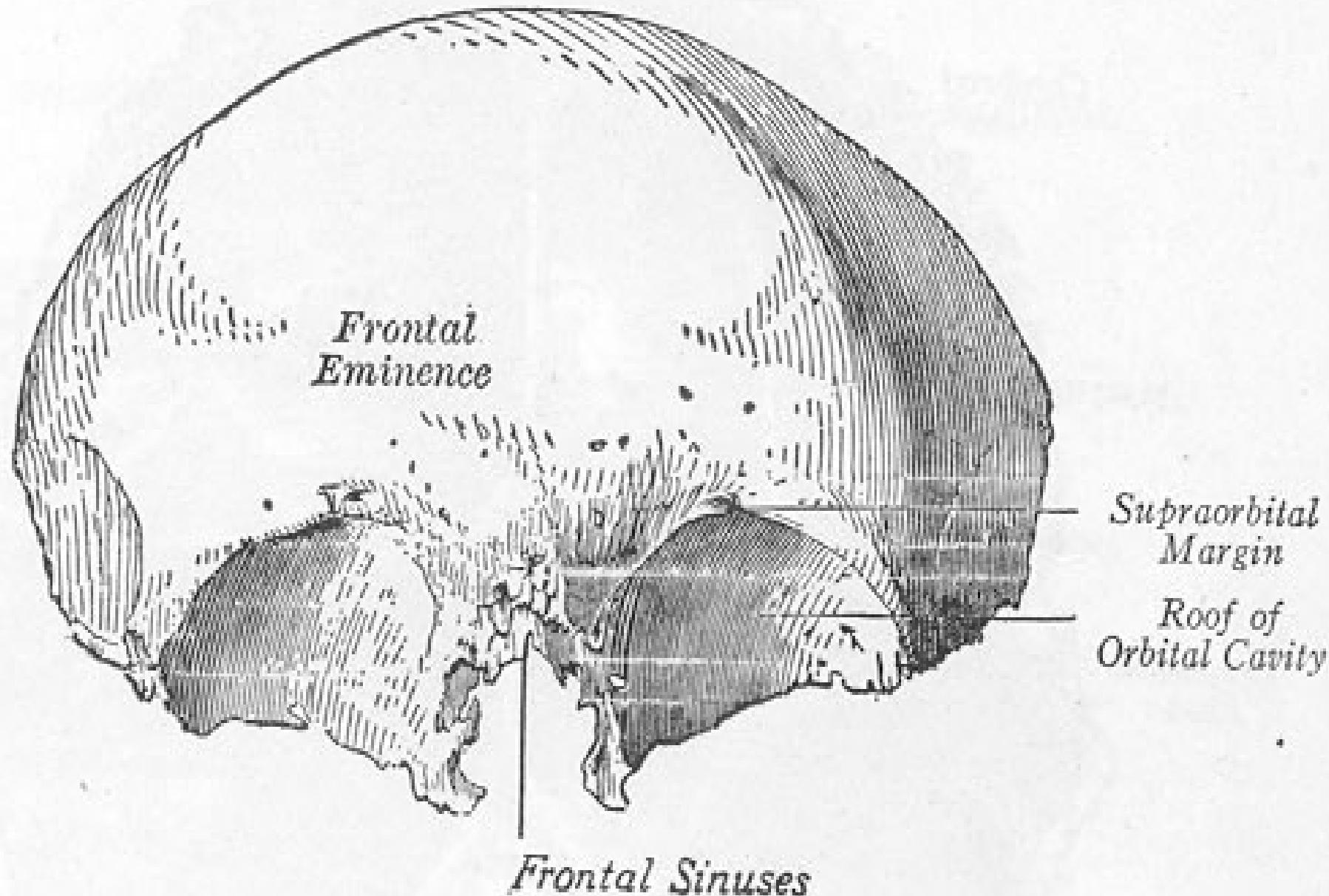


jugular foramen

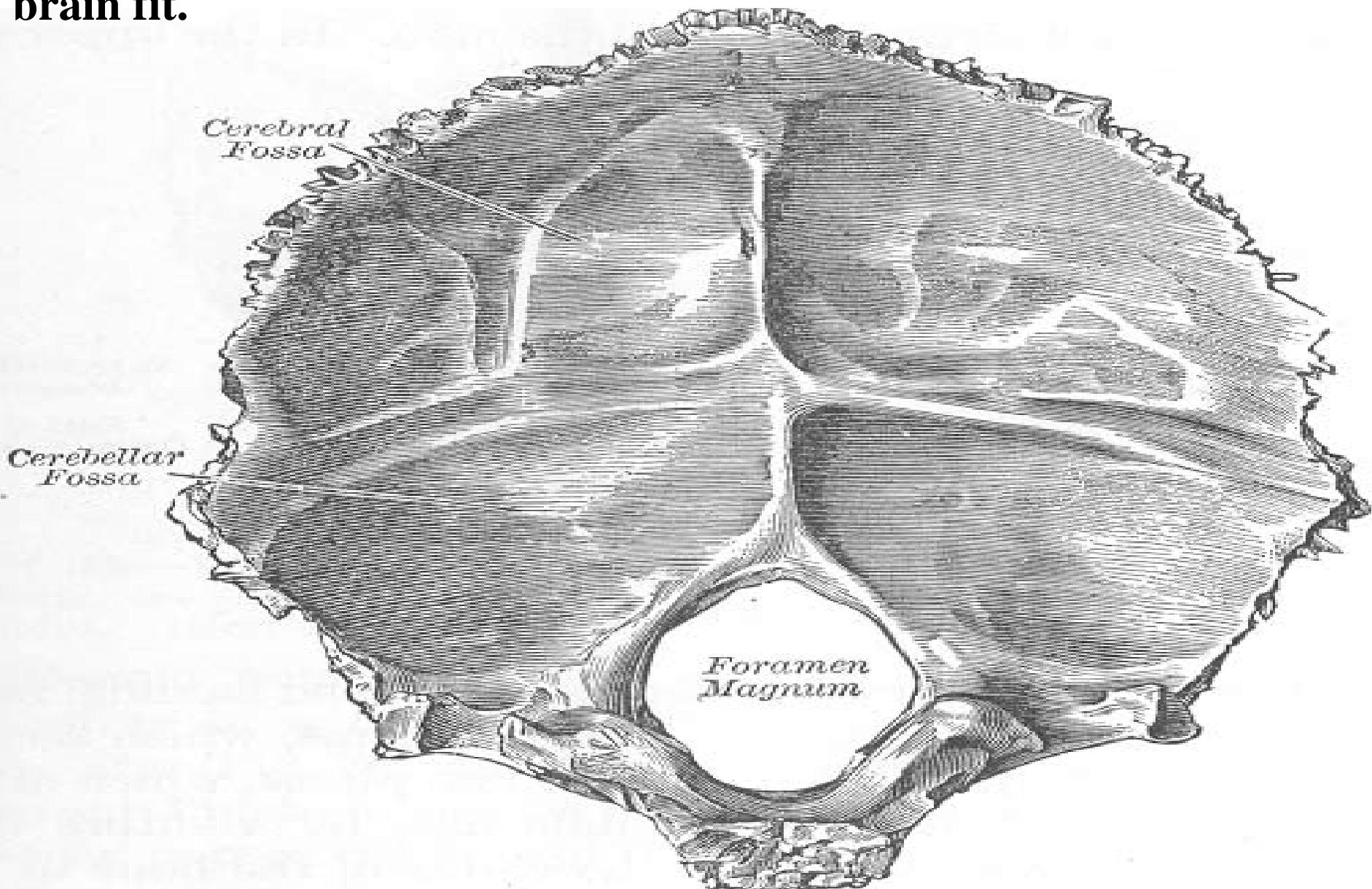
hypoglossal

foramen magnum

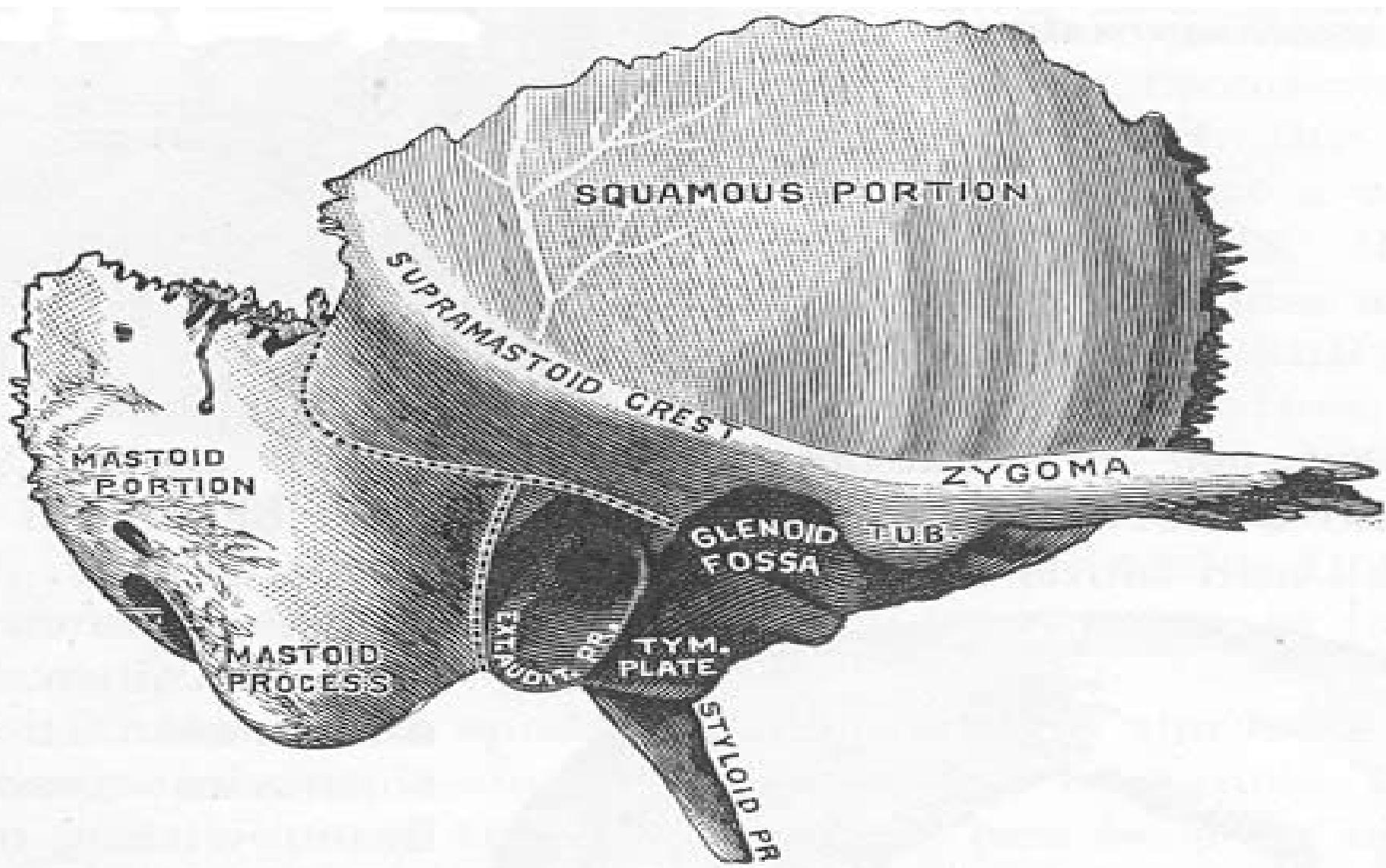
Frontal Bone, Frontal view, showing top of eye sockets and nasal cavity



Occipital Bone from the inside. The Foramen Magnum is where the spinal cord passes through; the fossa labeled are where lobes of the brain fit.

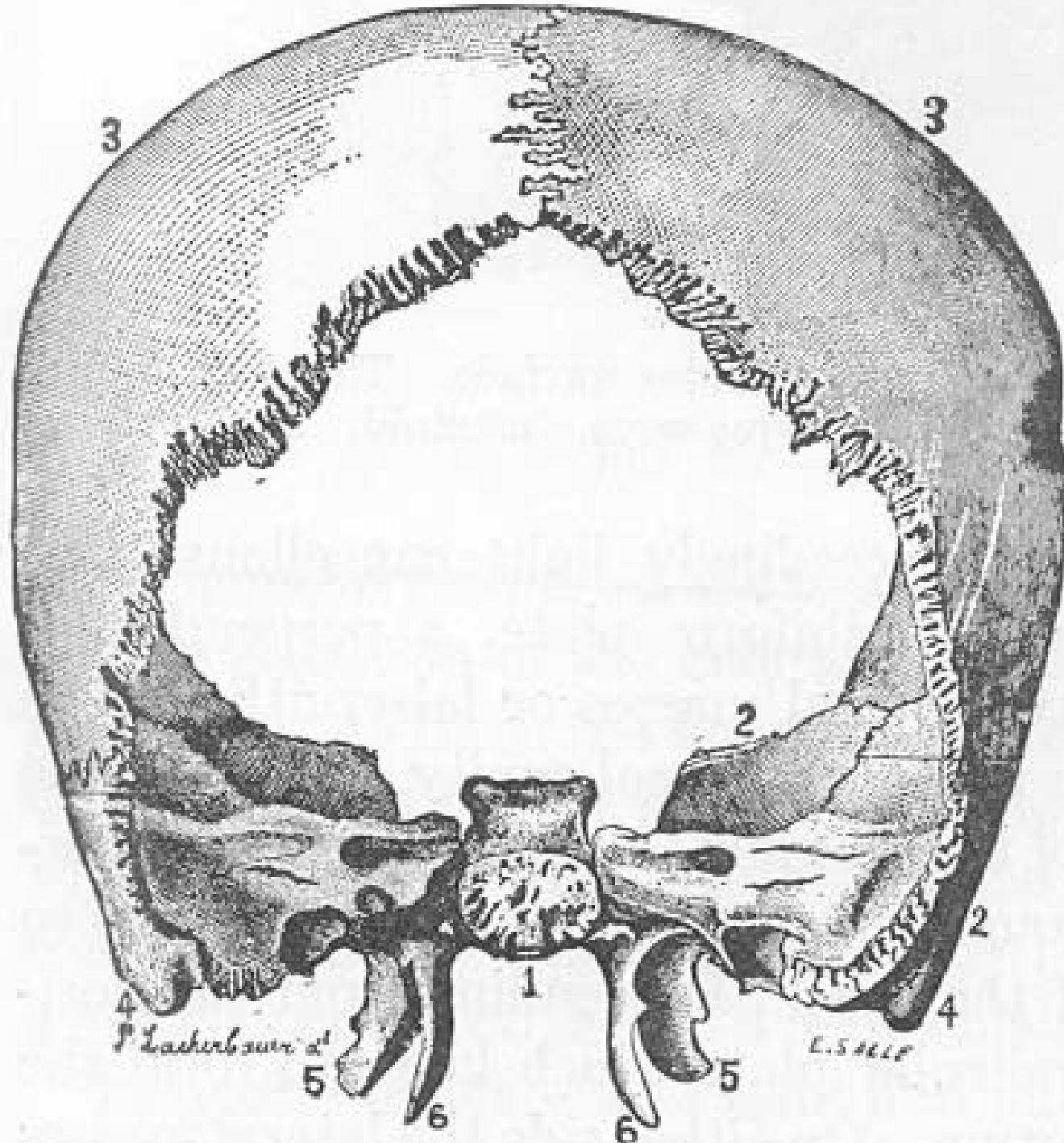


Temporal bone, outer right side showing features



Sphenoid bone from the rear, with

- Parietal (3) and Temporal bones (4, mastoid process) attached.
- The sphenoid consists of the body of the sphenoid (1), its greater wings (2), the external pterygoid plate (5), and the internal pterygoid place (6). The frontal bone fits on the upper front part of this assembly (distant in the image) and the occipital bone fits on the rear (near in the image). The Ethmoid bone attaches to the front (distant) part of the Sphenoid.



HORIZONTAL PLATE
SHOWING FORAMINA

Ethmoid bone
showing features

VERTICAL PLATE

LATERAL
MASS

