The skull

Danil Hammoudi.MD
THE SKULL

- = 22 BONES [actually 29]
- ALL FUSED EXCEPT ONE.: HYOID BONE
- JOINTS = SUTURES
- CRANIAL CAVITY 8 BONES = CRANIAL BONES
- 14 LEFT = FACIAL BONES
- 3 MORE IN THE EARS
• The Skull cranial vault (which encloses the brain) bones are formed by **intramembranous ossification**.
• While the **bones that form the base of the skull** are formed by **endochondrial ossification**.

• The bones enclosing the brain have large flexible fibrous joints (sutures) which allow firstly the head to pass through the birth canal and secondly postnatal brain growth.
• Ossification continues postnatally, through puberty until mid 20s.

• Note that in old age the sutures are in some cases completely ossified.

• In the entire skeleton, early ossification occurs in the jaw and at the ends of long bones
**Craniunm** – protects the brain and is the site of attachment for head and neck muscles

**Facial bones**
Supply the framework of the face, the sense organs, and the teeth
Provide openings for the passage of air and food
Anchor the facial muscles of expression

Eight bones form the *neurocranium* (braincase), a protective vault surrounding the brain and medulla oblongata.

Fourteen bones form the *splanchnocranium*, the bones supporting the face.

Encased within the temporal bones are the six *ear ossicles* of the middle ear.

*The hyoid bone*, supporting the larynx, is usually not considered as part of the skull, as it does not articulate with any other bones.
**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
In the middle ears (6):
- malleus (2)
- incus (2)
- stapes (2)

Facial bones:
1. zygomatic bone (2)
2. superior and inferior maxilla
3. nasal bone (2)
4. mandible
5. palatine bone (2)
6. lacrimal bone (2)
7. vomer bone
8. inferior nasal conchae (2)

In the skull (22):
Cranial bones:
1. frontal bone
2. parietal bone X(2)
3. temporal bone X(2)
4. occipital bone
5. sphenoid bone
6. ethmoid bone

In the throat (1):
- hyoid bone
Figure 2  Skull, right external view of lateral surface.
**Coronal Suture**: Articulation between the parietal bones and the frontal bone.

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

**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.
Figure 16  Fetal skull.
sinus cavities, which are air-filled cavities lined with respiratory epithelium, which also lines the large airways.

The exact functions of the sinuses are unclear; they may contribute to lessening the weight of the skull with a minimal reduction in strength, or they may be important in improving the resonance of the voice.
Paranasal sinuses are air-filled spaces, communicating with the nasal cavity, within the bones of the skull and face.

Humans possess a number of paranasal sinuses, divided into subgroups that are named according to the bones within which the sinuses lie:

**The maxillary sinuses**, also called the maxillary antra and the largest of the paranasal sinuses, are under the eyes, in the maxillary bones (cheek bones).

**The frontal sinuses**, over the eyes, in the frontal bone, which forms the hard part of the forehead.

**The ethmoid sinuses**, which are formed from several discrete air cells within the ethmoid bone between the nose and the eyes.

**The sphenoid sinuses**, in the sphenoid bone at the center of the skull base under the pituitary gland.
Frontal sinus
Ethmoid sinus
Sphenoid sinus
Maxillary sinus

The middle meatus is a tiny opening where most of your sinuses drain.

Turbinates are curved ridges in your nose that humidify and warm the air you breathe.

The septum is a thin “wall” that separates the air passages in your nose.

Normal cilia beat back and forth, propelling mucus and trapped particles out of the sinus.

Cilia can become paralyzed during acute sinusitis; sinuses are congested with mucus.

Chronic sinusitis may further damage cilia; the mucosal lining becomes thick and scarred.
Figure 5 Skull, internal view of base.
Frontal sinus
Ethmoid bone
Lesser wing of sphenoid bone
Sella turcica of sphenoid bone
Foramen ovale
Foramen spinosum
Temporal bone
Foramen magnum
Occipital bone
Crista galli of ethmoid bone
Cribriform plate of ethmoid bone with olfactory foramina
Sphenoid bone
Foramen lacerum
Jugular foramen
Parietal bone
Frontal bone
The mandible (lower jawbone) is the largest, strongest bone of the face.
The palatine articulates with six bones: the sphenoid, ethmoid, maxilla, inferior nasal concha, vomer and opposite palatine.
(a) Mandible
Figure 9 Sphenoid bone.
Body of sphenoid bone showing sinuses

Superior orbital fissure

Lesser wing of sphenoid bone

Optic canal

Greater wing of sphenoid bone

Pterygoid process
The sphenoid forms part of the eye orbit and helps to form the floor of the cranium.
(a) Superior view
(b) Posterior view

Copyright © 2006 Pearson Education, Inc., publishing as Benjamin Cummings.

Figure 7.6b
The ethmoid forms the medial portions of the orbits and the roof of the nasal cavity. Major markings include the cribriform plate, crista galli, perpendicular plate, nasal conchae, and the ethmoid sinuses.
Crista galli
Cribiform plate with olfactory foramina
Lateral mass with ethmoid air cells
Middle nasal concha
Orbital plate
Perpendicular plate
External acoustic meatus
Zygomatic process
Alveolar margin of maxillae
Foramen ovale
Optic canal
Petrous region of temporal bone
Greater horn

Lesser horn

Body