The Skull
Osteology of the Head and Neck

Bones of the head & neck include:

1. Skull
2. Hyoid bone
3. Middle ear bones
4. Cervical vertebrae

The Skull

Composition: the skull is composed of several separate bones united at immobile joints called **sutures** (fibrous type), except for the mandible which is united to the skull by the mobile **temporomandibular** joint (synovial type).

The bones of the skull are 22 in number of *flat type*, covered on the outer & inner surfaces with *periosteum* & it can be divided into 2 parts:

- **Cranium**, which encloses the brain (brain box).
- **Facial skeleton**, the rest of the skull bones forming the face including the mandible.

The **vault** is the upper part of the cranium, & the **base of the skull** is the lowest part of the cranium.

The **cranium** consists of 8 bones, two of which are paired:

- Frontal bone 1
- Parietal bones 2
- Occipital bone 1
- Temporal bones 2
- Sphenoid bone 1
- Ethmoid bone 1

The **facial bones** consist of 14 bones, two of which are single:

- Zygomatic bones 2
- Maxillae 2
- Nasal bones 2
- Lacrimal bones 2
- Vomer 1
- Palatine bones 2
- Inferior conchae 2
- Mandible 1

***** The bones of the middle ear (auditory ossicles) are 3:

1. The malleus.
2. The incus.
3. The stapes.

* The cervical vertebrae are 7 in number.

The skull can be studied as a whole from:

* Outside (**Exterior**) in different views:
    1. Superior or Norma Verticalis.
    2. Inferior or Norma Basalis.
    3. Posterior or Norma Occipitalis.
    4. Anterior or Norma Frontalis.
    5. Lateral or Norma Lateralis.

* Inside (**Interior**) after removing the vault or skull cap:
    1. Internal surface of the *cranial vault*.
    2. Internal surface of the *cranial base* which shows the natural subdivisions into Anterior, Middle, & Posterior Cranial Fossae.

* Exterior of the Skull:-

❖ Anterior View Of The Skull

It is roughly oval in outline, being wider above than below.

*** Bones:**

1. Frontal bone, or forehead bone, curves downward to make the upper margins of the orbits.

The **Superciliary arches** seen on either side of the orbits [it's better marked in male than in female], as a round elevation situated just above the medial of each orbit overlying the **frontal air sinuses (**which are two hollow spaces lined with mucous membrane, communicate with the nose & serve as voice resonators**)**.

The **Glabella** is the median elevation connecting the two superciliary arches, while the **Frontal eminence** is a low rounded elevation above the arches.

The **orbit** is a four-sided pyramidal bony cavity containing the eye ball. Each orbital opening is quadrangular in shape bounded by the frontal bone *superiorly***{** at the junction of it's lateral 2/3 & medial 1/3 there is the **supraorbital notch** or foramin **}**, the zygomatic bone *laterally*, the maxilla *inferiorly*, & the processes of the maxilla & frontal bone *medially*.

2. two **Nasal bones**, form the bridge of the nose. Their lower borders, with the maxillae, make the **anterior nasal aperture**. The nasal cavity is divided into two by the bony nasal septum, which is largely formed by the **vomer**. The **superior** & **middle conchae** are shelves of bone that project into the nasal cavity from the **ethmoid** bone on each side; the **inferior conchae** are separate bones.

*** Nasion** is a median point at the root of the nose where the internasal suture meets the frontonasal suture.

3. two **Maxillae**, form the upper jaw, the anterior part of the hard palate, part of the lateral walls of the nasal cavities, & part of the floors of the orbital cavities. The two bones meet in the midline at the **intermaxillary suture** & form the lower margin of the nasal aperture.

The maxilla is perforated bellow the orbit by the **infraorbital foramen**.

The **alveolar process** projects downward &, together with the fellow of the opposite side, forms the **alveolar arch**, which carries the upper teeth.
Within each maxilla is a large ,pyramid-shaped cavity lined with mucous membrane called the **maxillary sinus**, it communicates with the nasal cavity & serves as a voice resonator.

4. two **Zygomatic bones**, form the prominence of the cheeks & part of the lateral wall & floor of the orbital cavity. Laterally, it articulates with the zygomatic process of the temporal bone to form the **zygomatic arch**.
The zygomatic bone is perforated by two foramina for the *zygomaticofacial* & *zygomaticotemporal nerves*.

5. Mandible, or lower jaw, consists of a horizontal **body** & two vertical **rami**.

❖ Lateral View Of The Skull

***** Bones:
1. Frontal bone, articulates with the parietal bone at the **coronal suture**.

2. Parietal bones, articulate with each other in the midline at the **sagittal suture**. They articulate with the occipital bone behind, at the **lambdoid suture**.

3. Occipital bone, it's squamous part completes the side of the skull.

4. Temporal bone, it's parts namely, the squamous, tympanic, mastoid process, styloid process, & zygomatic process (the external auditory meatus).

5. Sphenoid bone, it's greater wing articulates with the anteroinferior corner of the parietal bone at a point referred to as the **pterion**, which is the thinnest part of the lateral wall of the skull (it overlies the anterior division of the *middle meningeal artery & vein*).
The **inferior orbital fissure** is a horizontal fissure between the greater wing of the sphenoid bone & the maxilla. It leads forward into the orbit.

6. Mandible, it's ramus & body lie inferiorly.
***** The nasal, zygomatic, & maxillary bones are also parts of the lateral view of the skull.

❖ Posterior View Of The Skull

* Bones**:**
1. two **Parietal bones**, their posterior parts are seen above with the intervening **sagittal suture**.
2. Occipital bone, it's squamous part articulates bellow with the parietal bones at the **lambdoid suture.**

In the midline of the occipital bone is a roughened elevation called the **external occipital protuberance**, on it's either side, the **superior nuchal lines** extend laterally toward the temporal bone.

❖ Superior View Of The Skull

When seen from above, the skull is usually oval in shape being wider posteriorly at the *parietal eminences* **(**the area of maximum convexity of the parietal bones**)**. *Vault of the skull* is the arched roof or dome of the skull.

*** Bones:**

1. Frontal bone, it's upper part anteriorly articulates with the two parietal bones at the **coronal suture.**

Occasionally, the two halves of the frontal bone fail to fuse **(**in 3-8% of individuals**)**, leaving a midline **metopic suture**.

2. Parietal bones, on each side articulate in the midline at the **sagittal suture**.

- **Vertex** is the highest point on the sagittal suture. It's position is variable.
- **Bregma** is the meeting point between the coronal & the sagittal sutures.

3. Occipital bone, posteriorly it articulates with the parietal bones at the **lambdoid suture**. The meeting point between the sagittal & lambdoid sutures is the **lambda**.

❖ Inferior View Of The Skull

It's studied without the mandible. It's bounded *anteriorly* by the incisor teeth of the maxillae; *posteriorly* by superior nuchal line of the occipital bone; & *on each side* by the posterior teeth, zygomatic arch, posterior root of the zygoma & the mastoid process.

* Neonatal Skull :

The newborn skull compared with the adult skull, has a relatively large cranium to the face. In childhood, the growth of the mandible, the maxillary sinuses, & the alveolar processes of the maxillae results in a great increase in length of the face.
Most of the skull bones are ossified at birth, but the process is incomplete.
The bones of the vault are separated at the sutures by unossified membranous intervals called **fontanelles**.

***** The anterior fontanelle is diamond shaped & lies at the site of *bregma*, the fibrous membrane forming the floor of this fontanelle is replaced by bone & is closed by *18 months* of age.

***** The posterior fontanelle is triangular & lies at the site of *lambda*, which usually closed by the end of the *1st. year* & can no longer be palpated.