THE SKELETON

* It comprises cartilages, bones, ligaments & joints.
* The bones are rigid and heavier than cartilages.
* Cartilages are more flexible and lighter.
* The younger the age, the greater is the contribution of cartilage to the skeleton.

* **Divisions of the skeleton:**

1. Exoskeleton: rudimentary in man.

It is represented by: nails & enamel of teeth .

2. Endoskeleton: about 206 bones & is formed of:

a. The axial skeleton.

b. The appendicular skeleton.

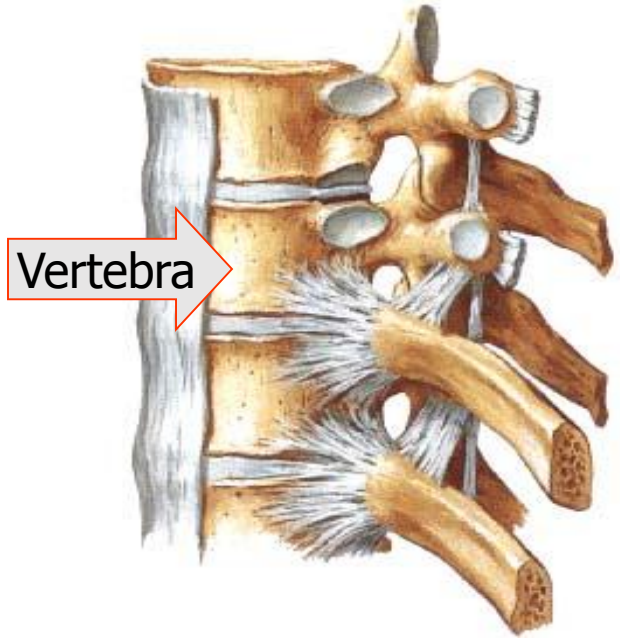
Regional classification of bones

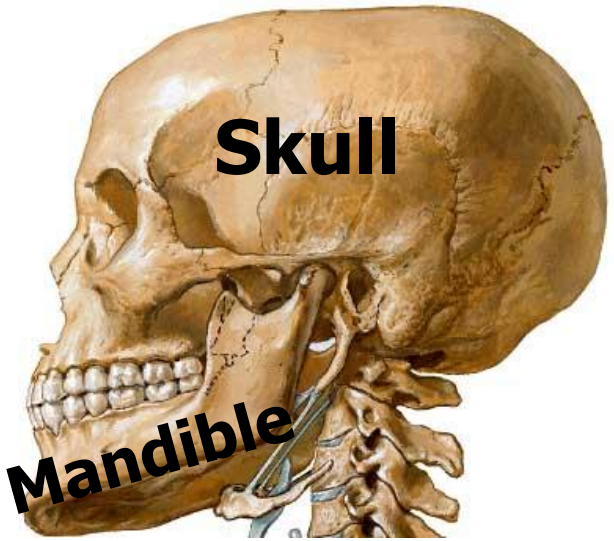
*** The human skeleton is divided into:**

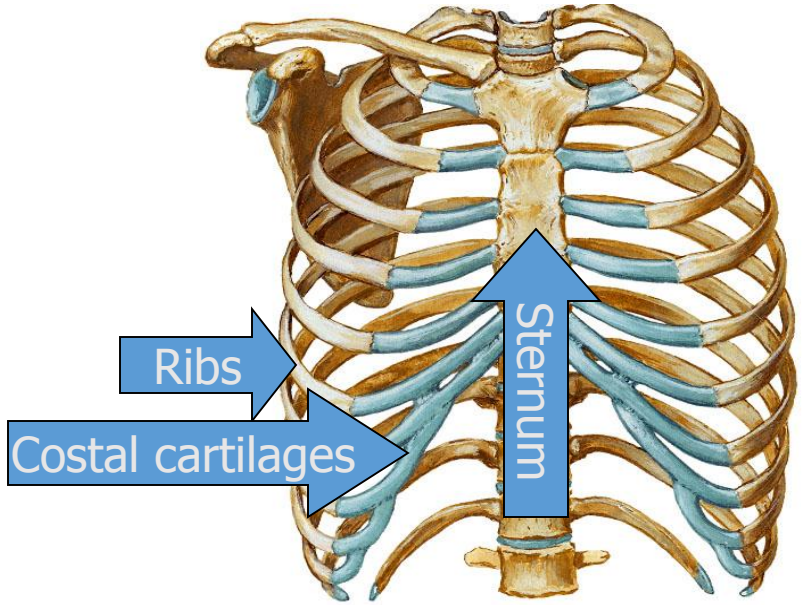
1. **Axial skeleton: which includes skull, vertebral column, ribs & sternum.**
2. **Appendicular skeleton: which includes the bones of the appendages (upper & lower limbs) & their girdles (shoulder & pelvic).**

Axial skeleton

1. Skull & mandible.
2. Ribs.
3. Sternum.
4. Vertebral column.







* **The skull (cranium)** (which contains the brain + its meninges) + **the mandible** (part of facial bones) → form the skeleton of the head.

The skull

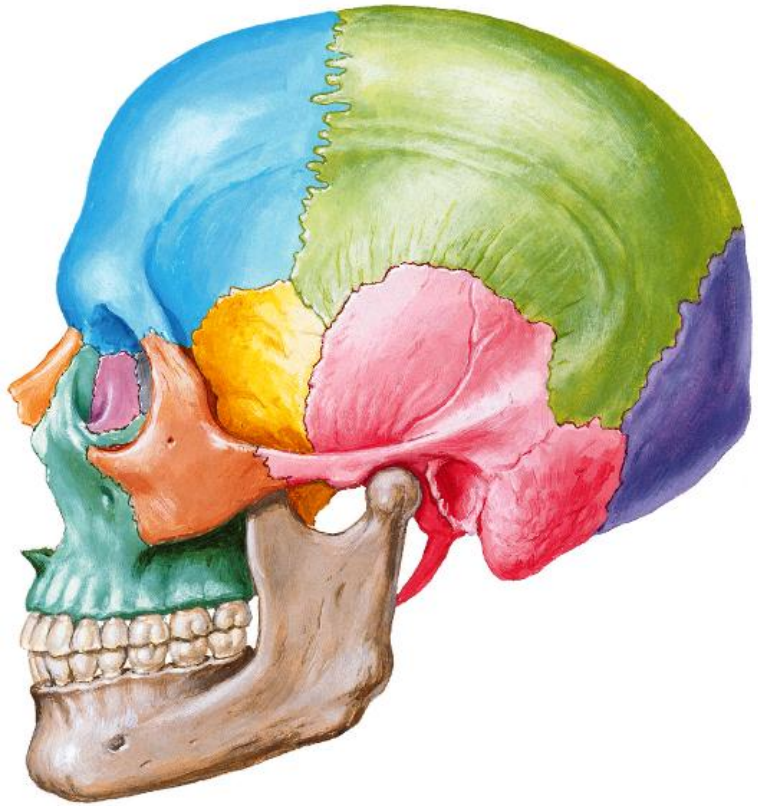
Is formed of 22 separate bones

One movable bone

The mandible

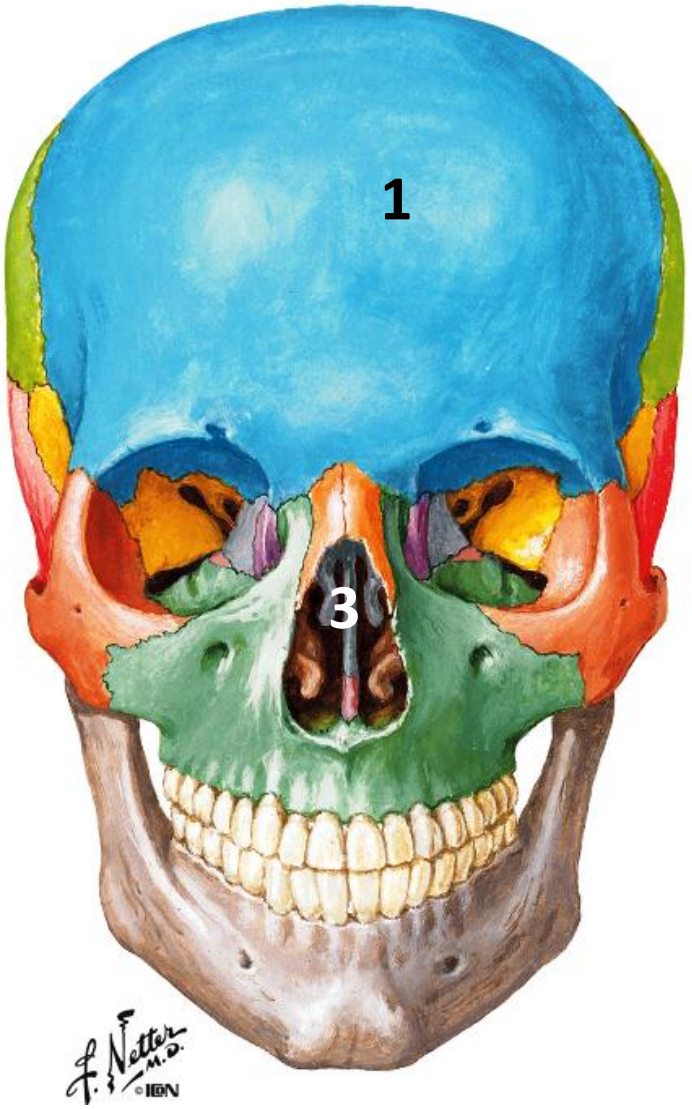
21 immovable bones

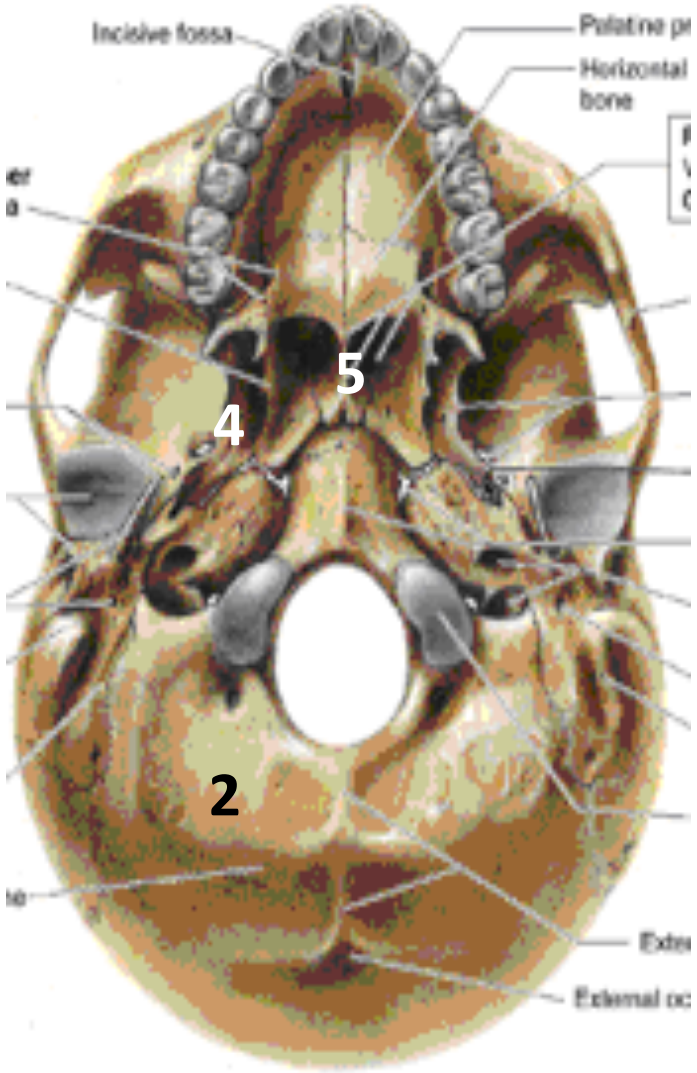
Articulating together by **sutures** (which are fibrous joints)

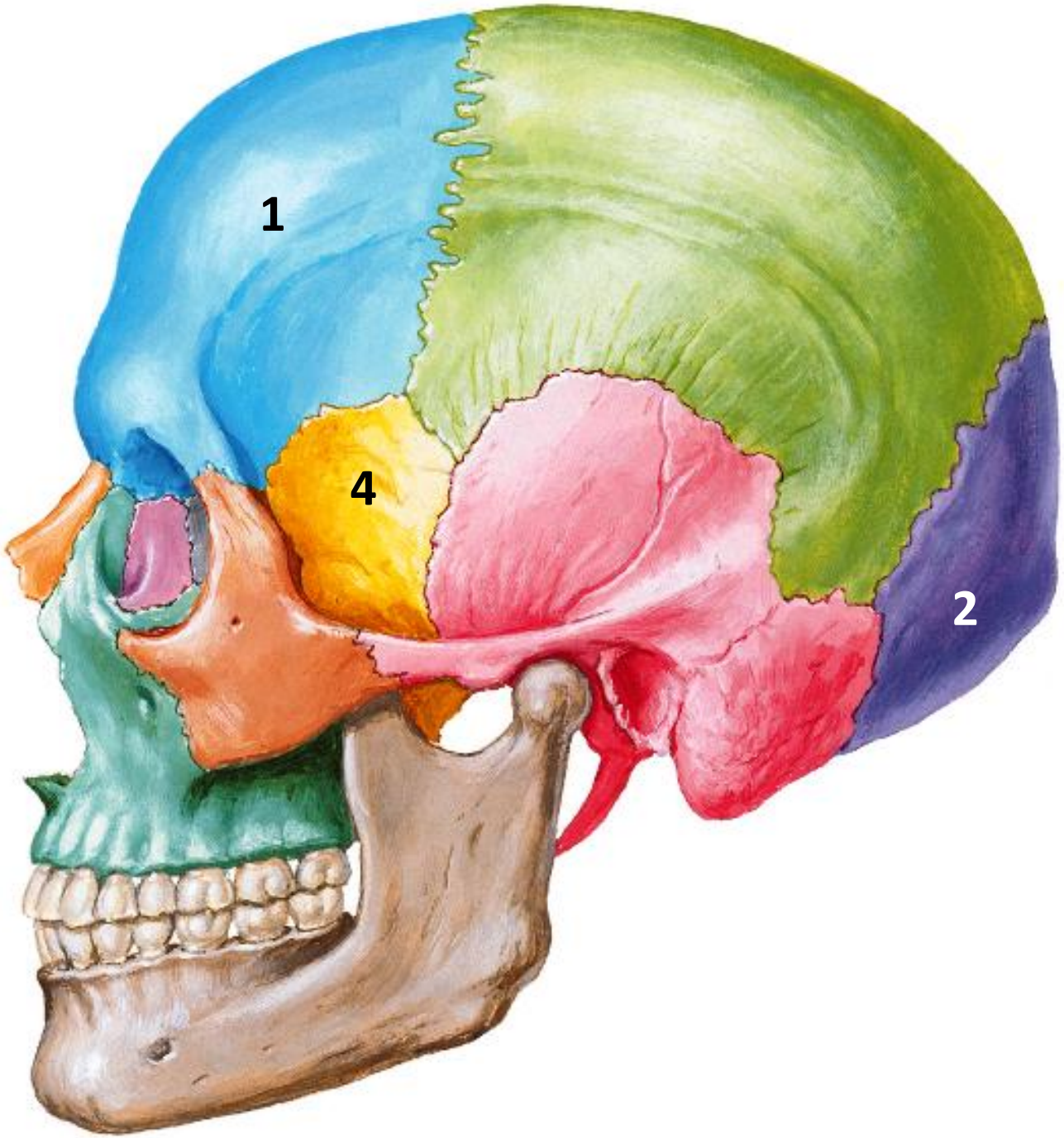


5 Unpaired bones

1. Frontal
2. Occipital
3. Ethmoid
4. Sphenoid
5. Vomer

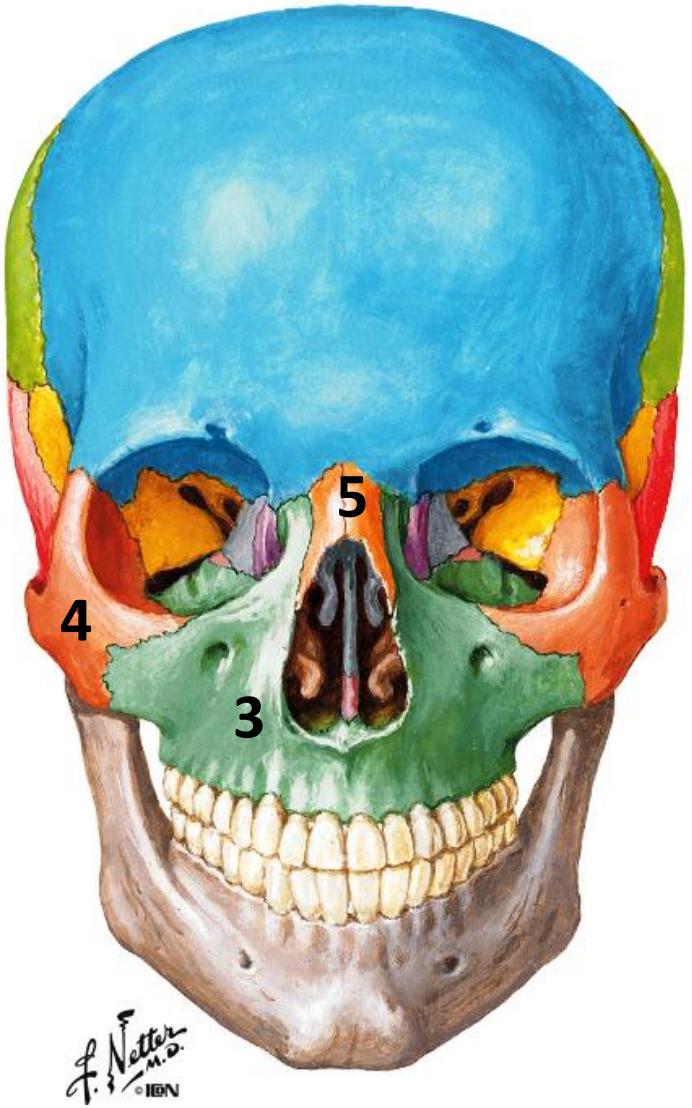


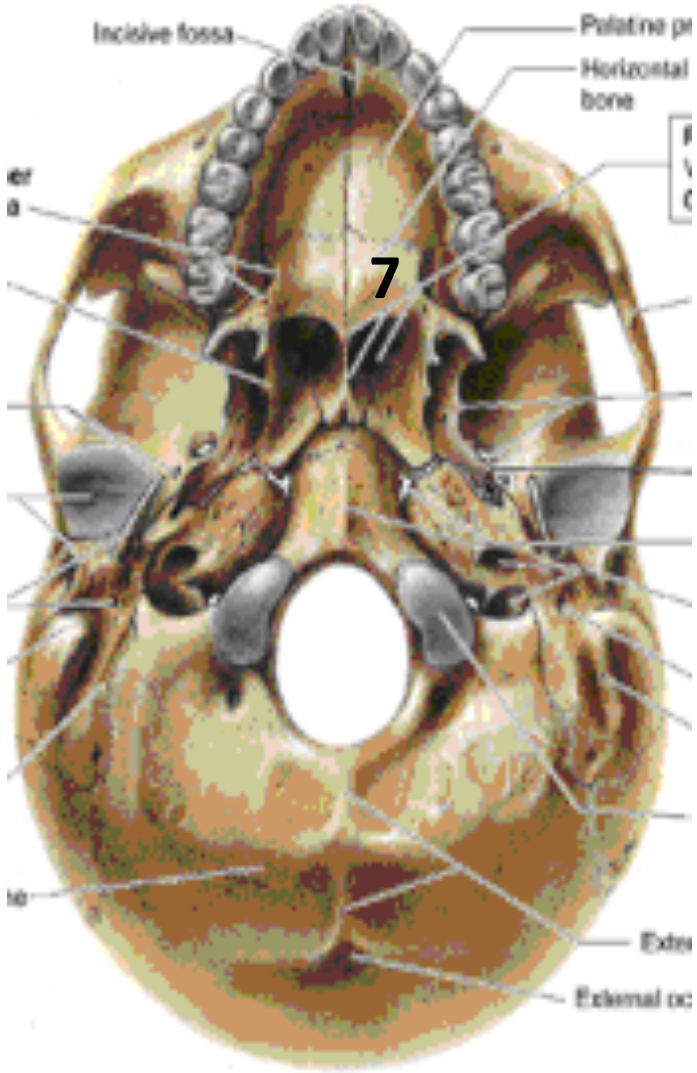


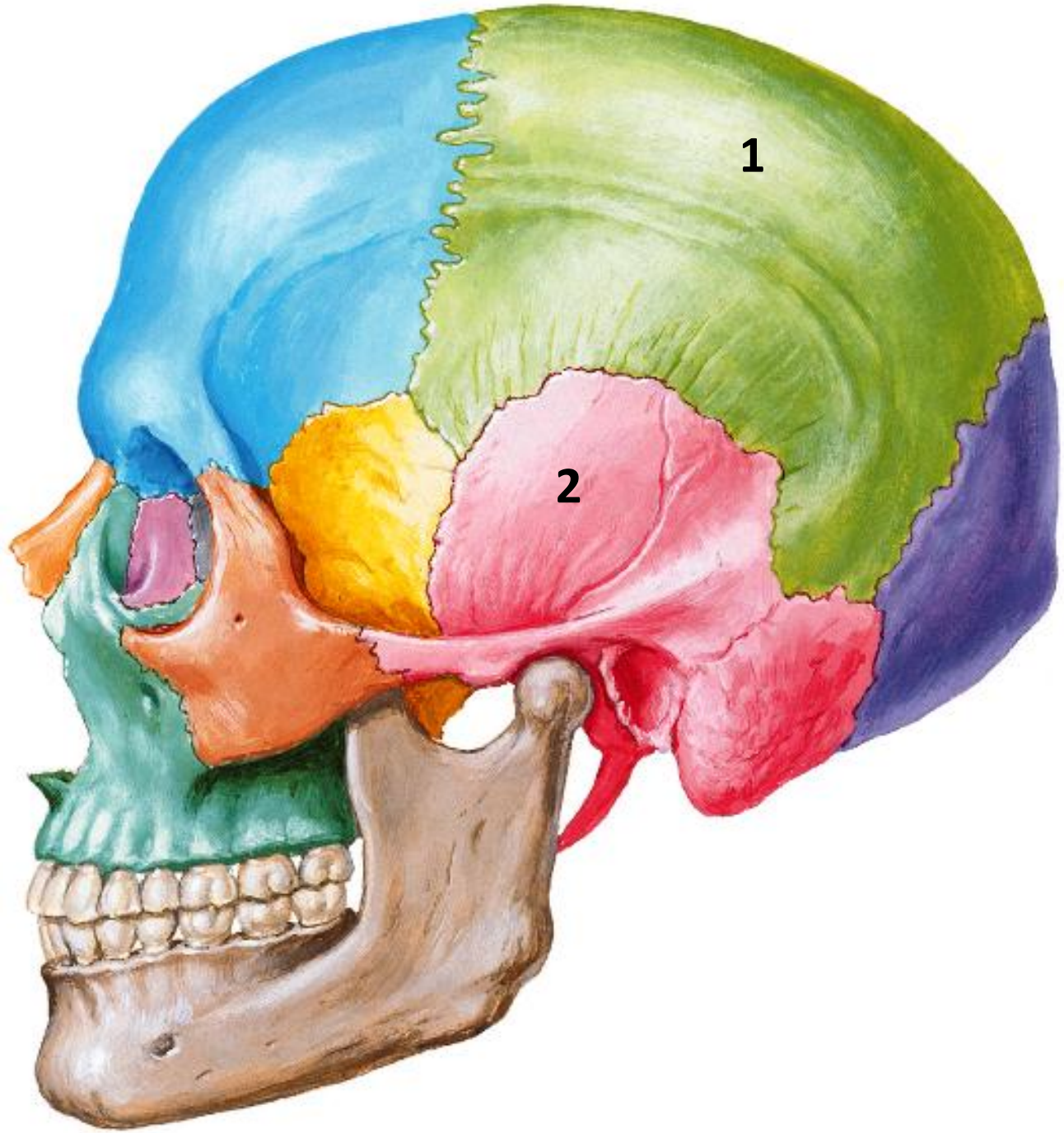

1
4
2

8 Paired bones

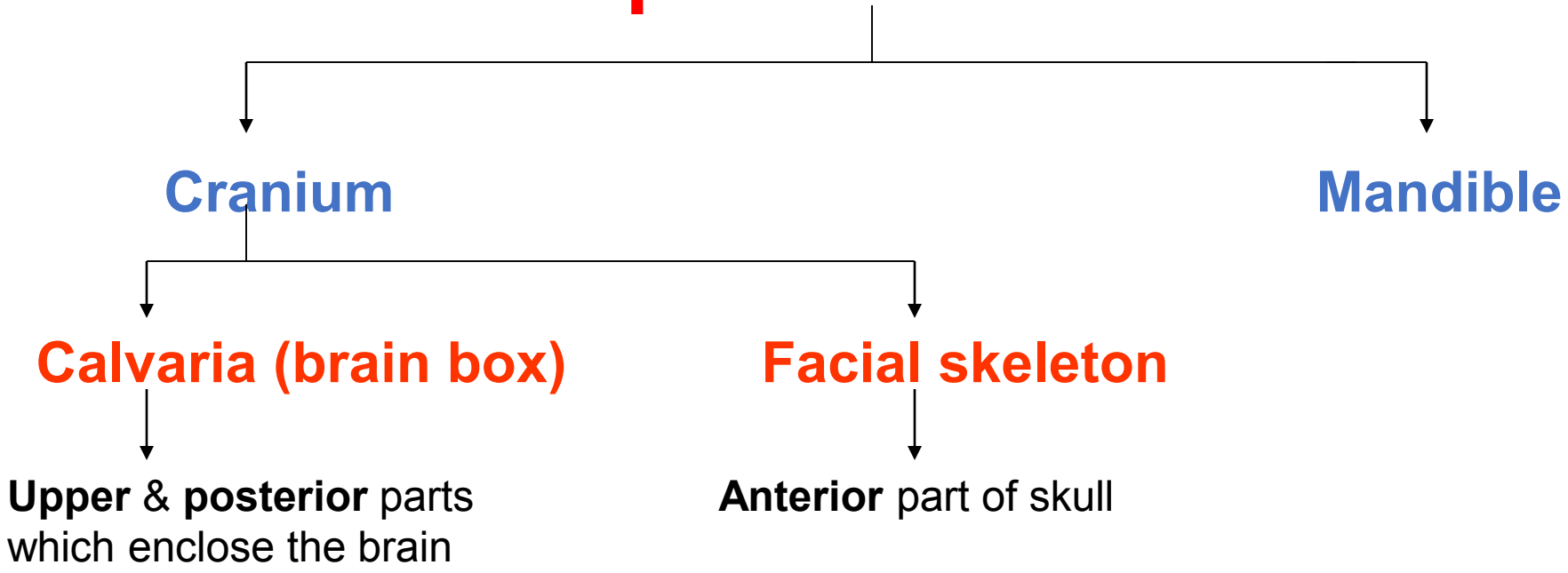
1. Parietal
2. Temporal
3. Maxillary
4. Zygomatic
5. Nasal
6. Lacrimal
7. Palatine
8. Inferior concha






1
2

The parts of the skull



Norma verticalis

* It is the **upper** aspect (**vault**) of the skull.

* It presents 4 bones:

1. The frontal bone in its anterior part.

2. The 2 parietal bones behind the frontal bones.

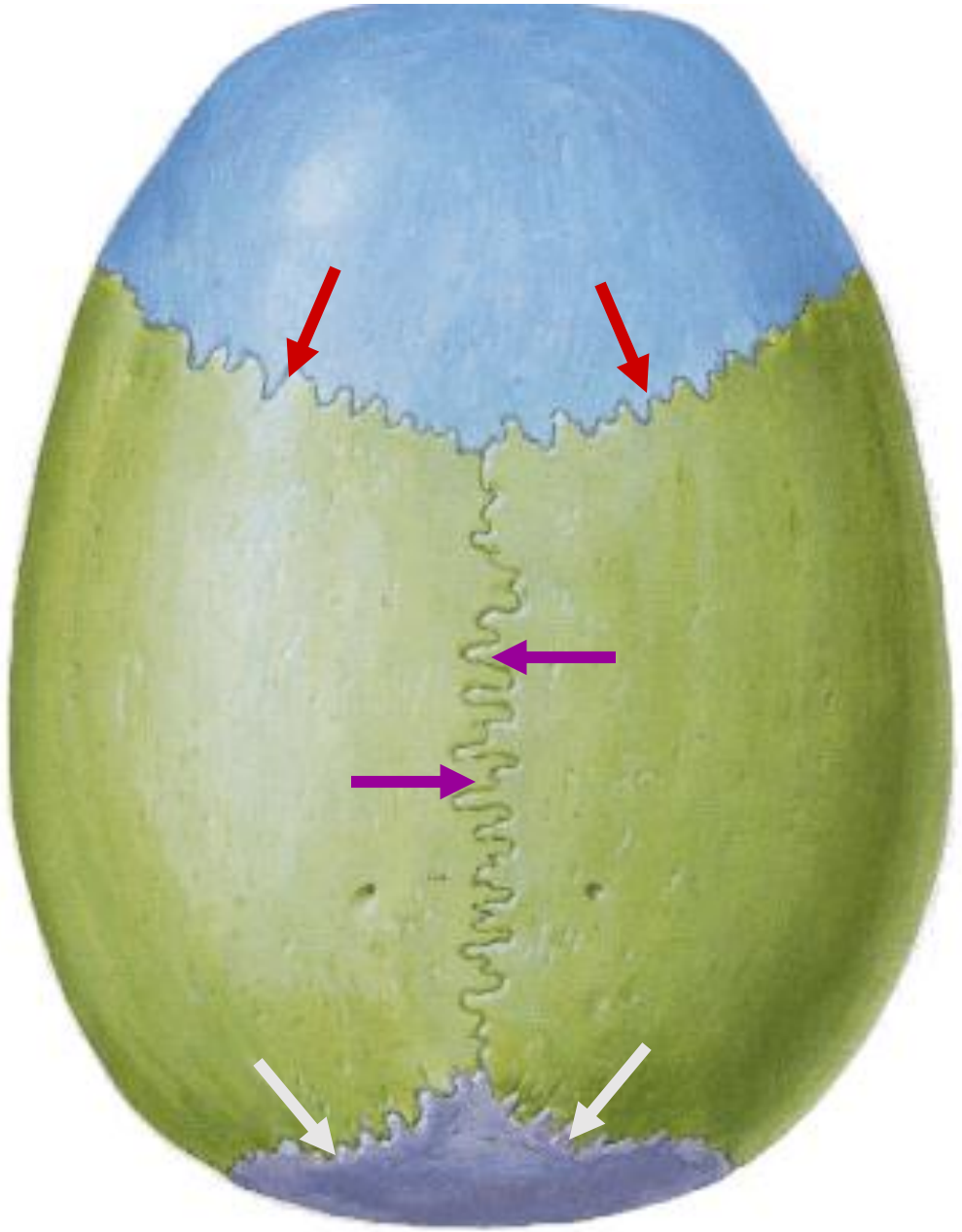
3. The occipital bone in its posterior part.

* It presents 3 sutures:

1. The **coronal suture:** between the frontal bone and the 2 parietal bones.

2. The **sagittal suture:** between the 2 parietal bones.

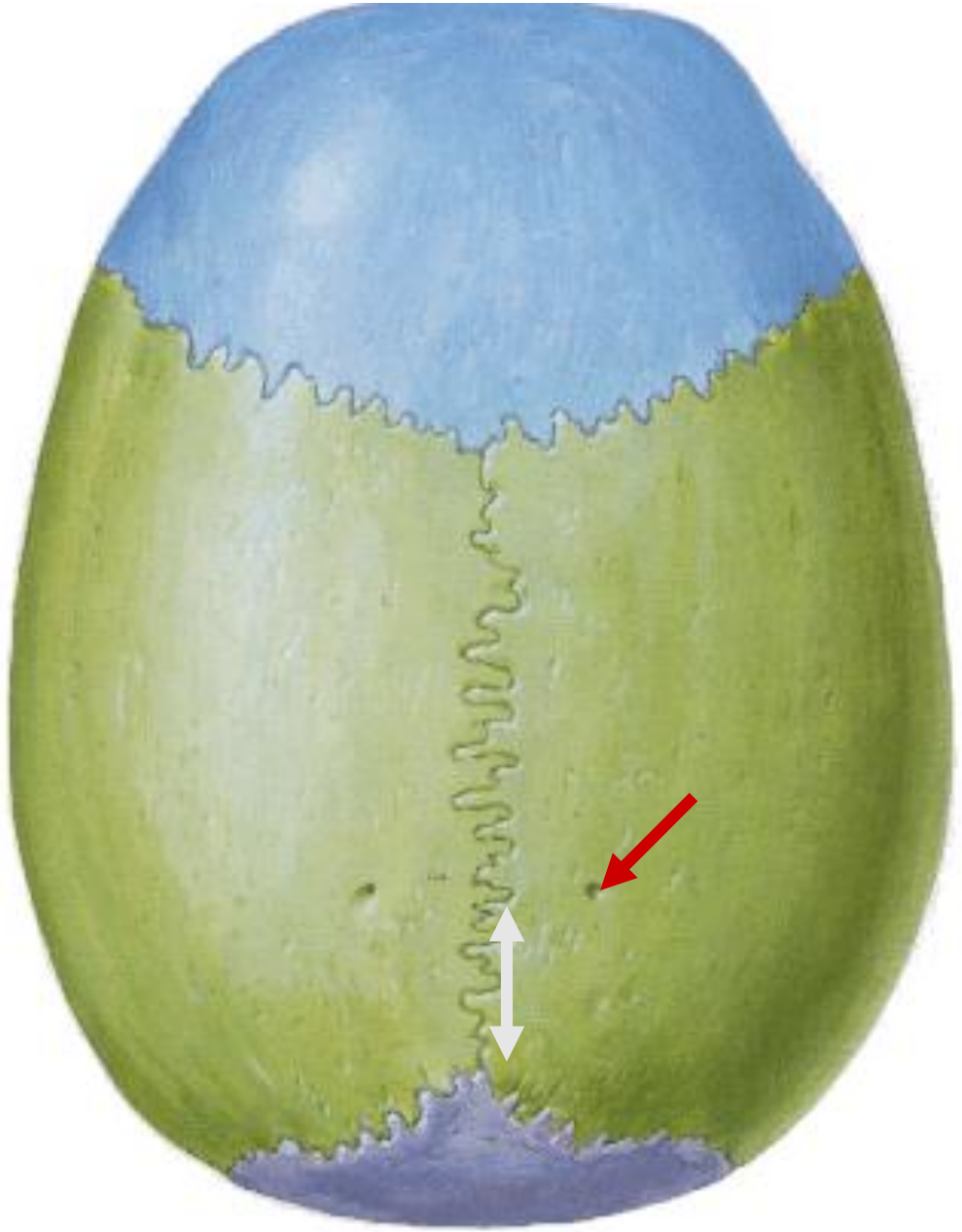
3. The **lambdoid suture:** between the occipital bone and the 2 parietal bones.



* **It presents 2 parietal emissary foramina:**

* One on each side of the sagittal suture, **4 cm anterior** to the **lambda**.

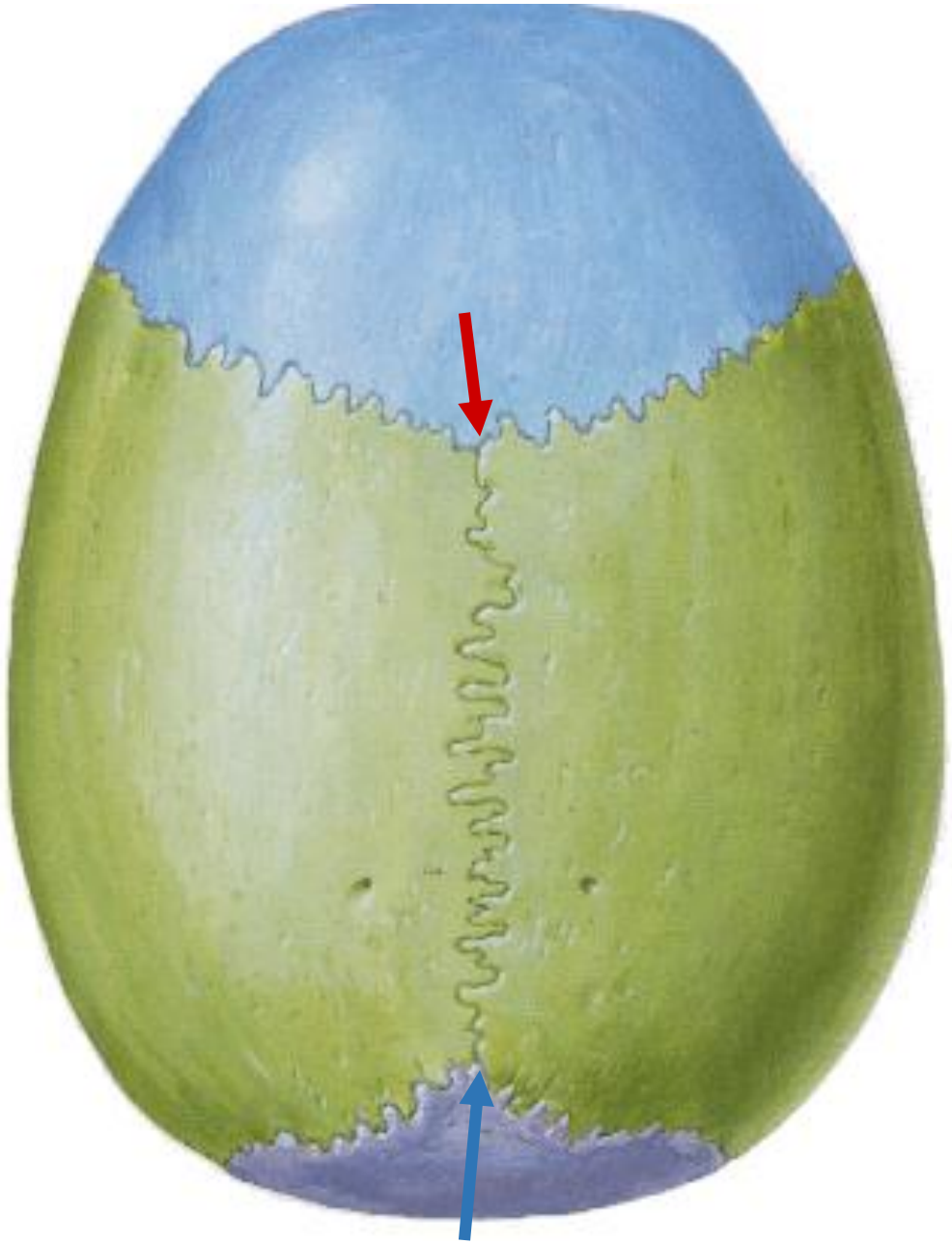
* It transmits an emissary vein.



* It presents 2 meeting points:

1. The bregma: is the meeting of coronal and sagittal sutures.

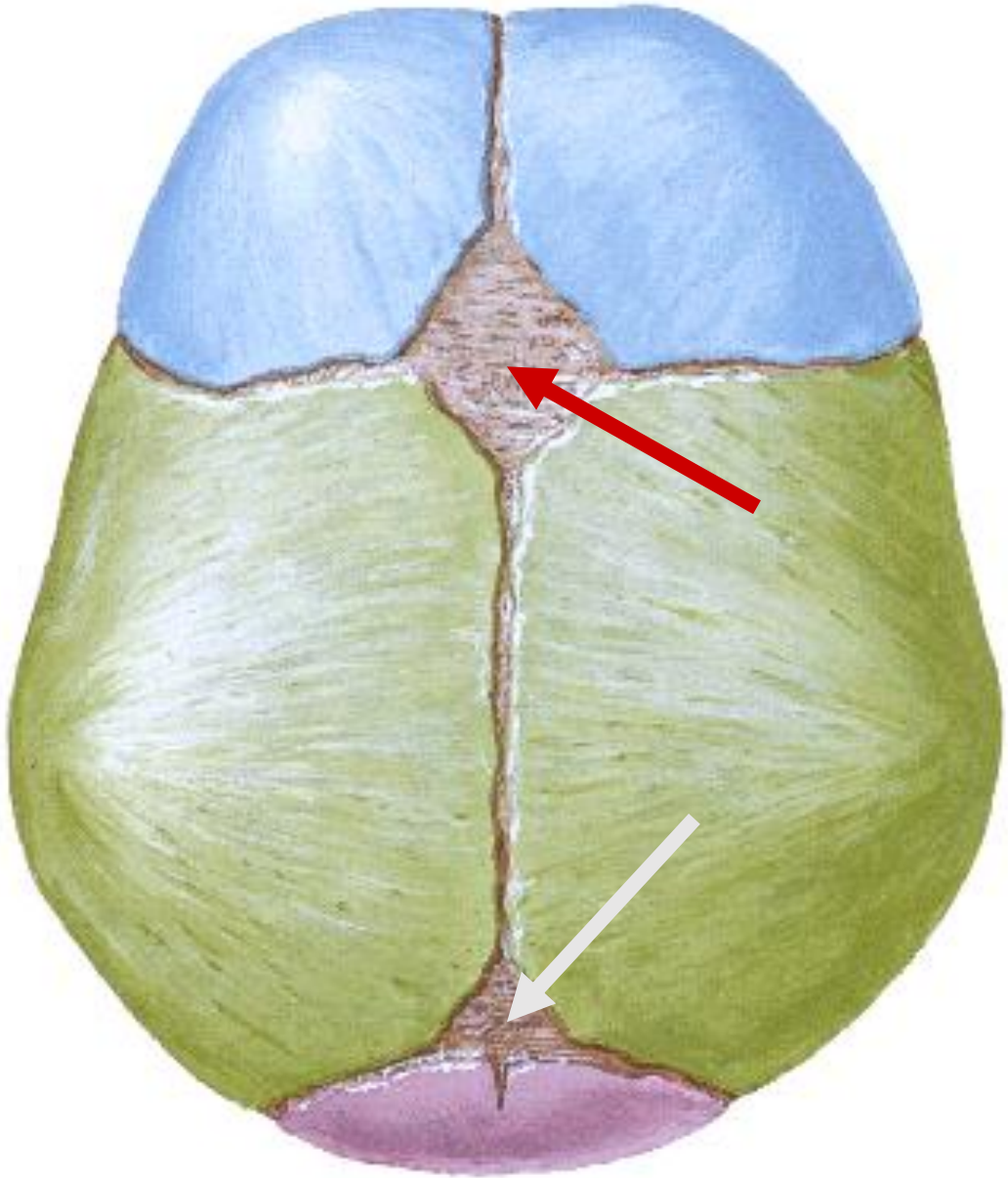
2. The lambda: is the meeting of the lambdoid and sagittal sutures.



* During foetal life:

1. The bregma is the site of membrane – filled rhomboidal area called **anterior fontanelle.** It usually closes 1.5 – 2 years after birth.

2. The lambda is the site of a membrane – filled triangular area, called the **posterior fontanelle.**. It usually closes **6 months** after birth.



* Clinical importance of fontanelles:

1. They are present at birth to allow overlap of skull bones during delivery.

2. They give an idea about the intra cranial pressure:

- If the pressure ↑ it bulges.
- If the pressure ↓ it sinks (dehydration).

3. They help in diagnosis of some diseases:

- Premature closure causes craniostenosis → microcephaly.
- Delayed closure diagnoses rickets.

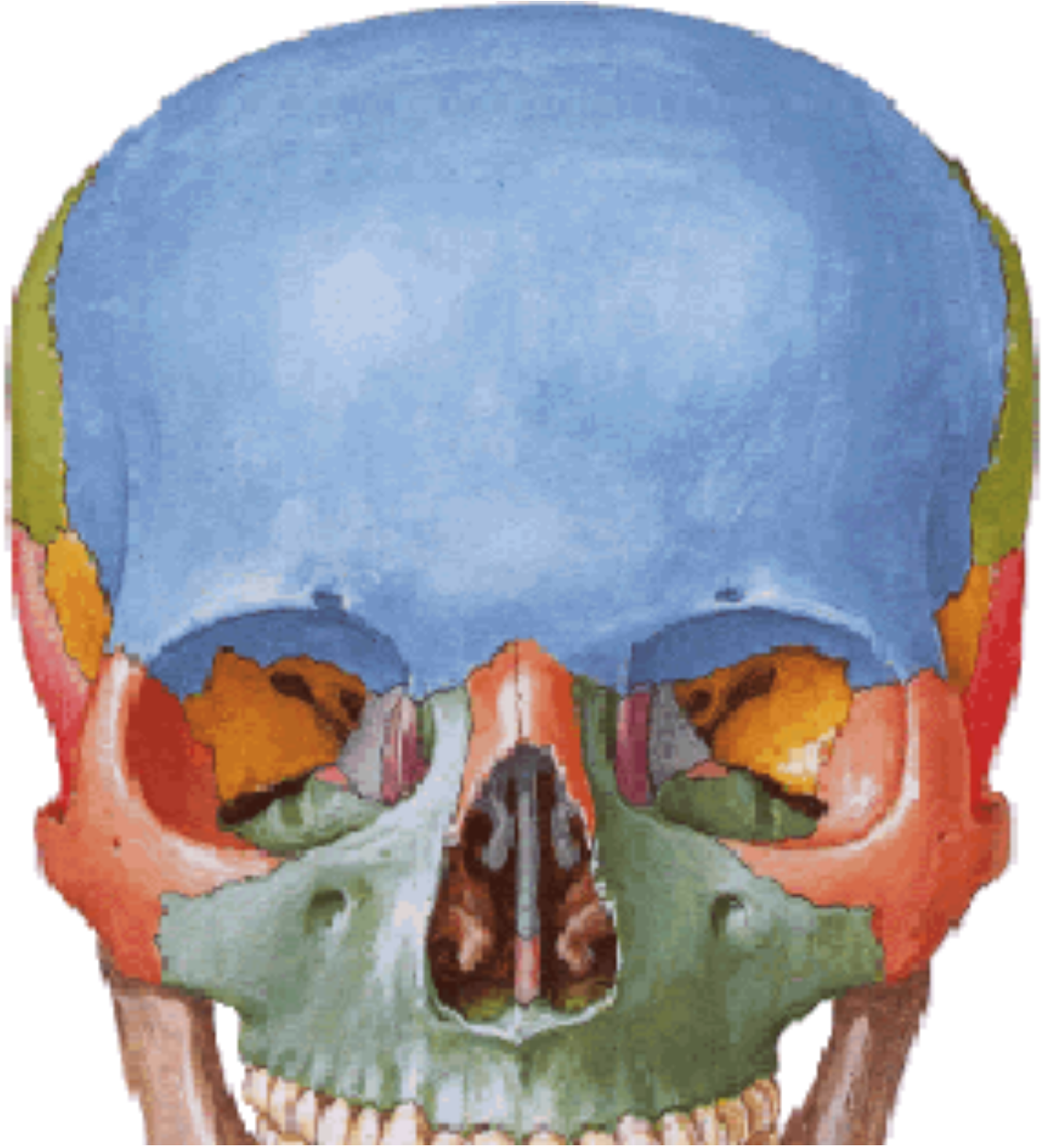
4. They can be used as a site for IV injection (superior Sagittal sinus).

Norma Frontalis

* **It presents:**

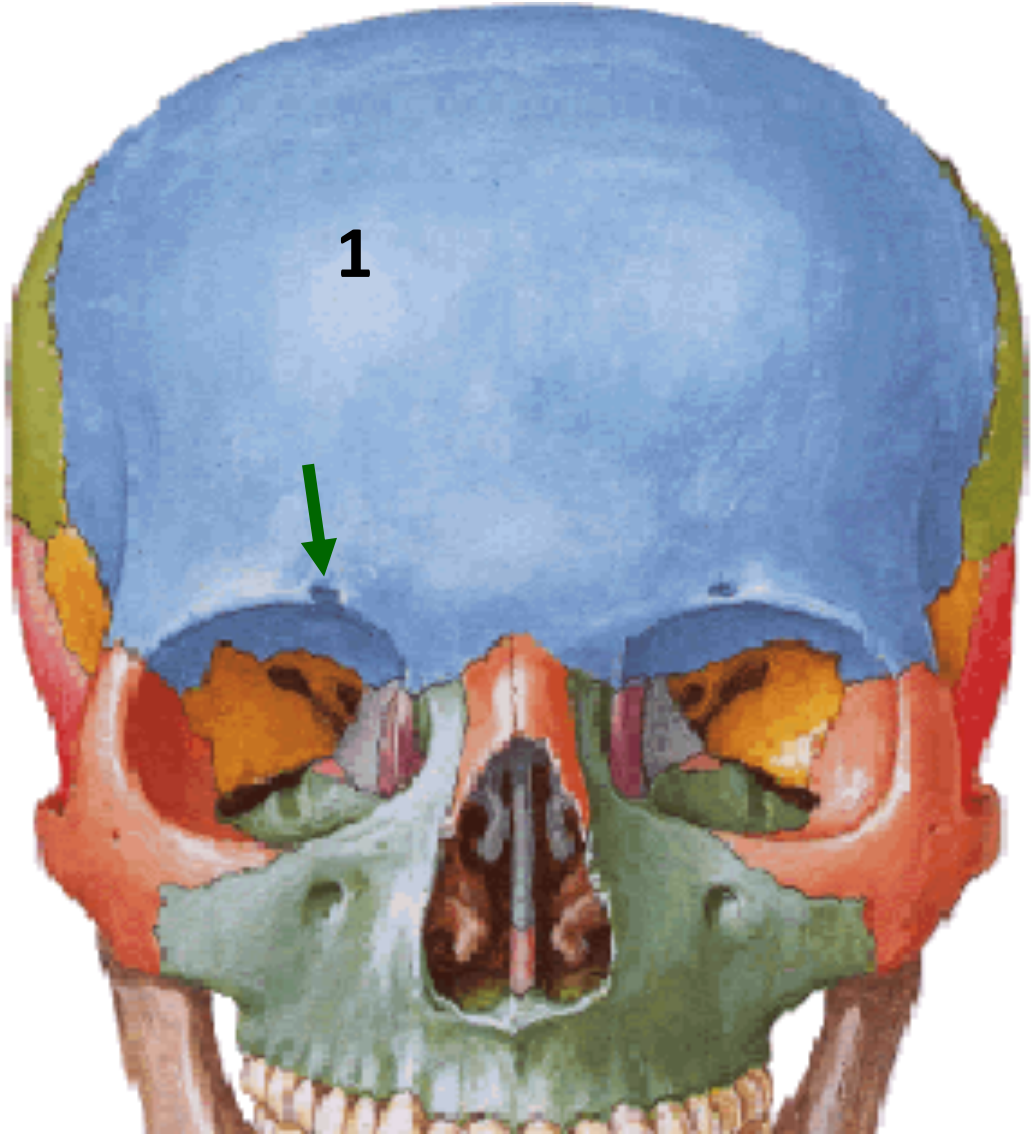
* 4 bones.

* 3 apretures (surrounding 3 cavities; 2 orbital & 1 nasal).



1. The frontal bone:

* Before the age of 8 years, the frontal bone is formed of two halves separated by **metopic suture** which is completely ossified by 8 years.
* It persists in black race & in 8% of population.
* It is pierced by the **supraorbital foramen** (which gives passage to supraorbital nerve & vessels).

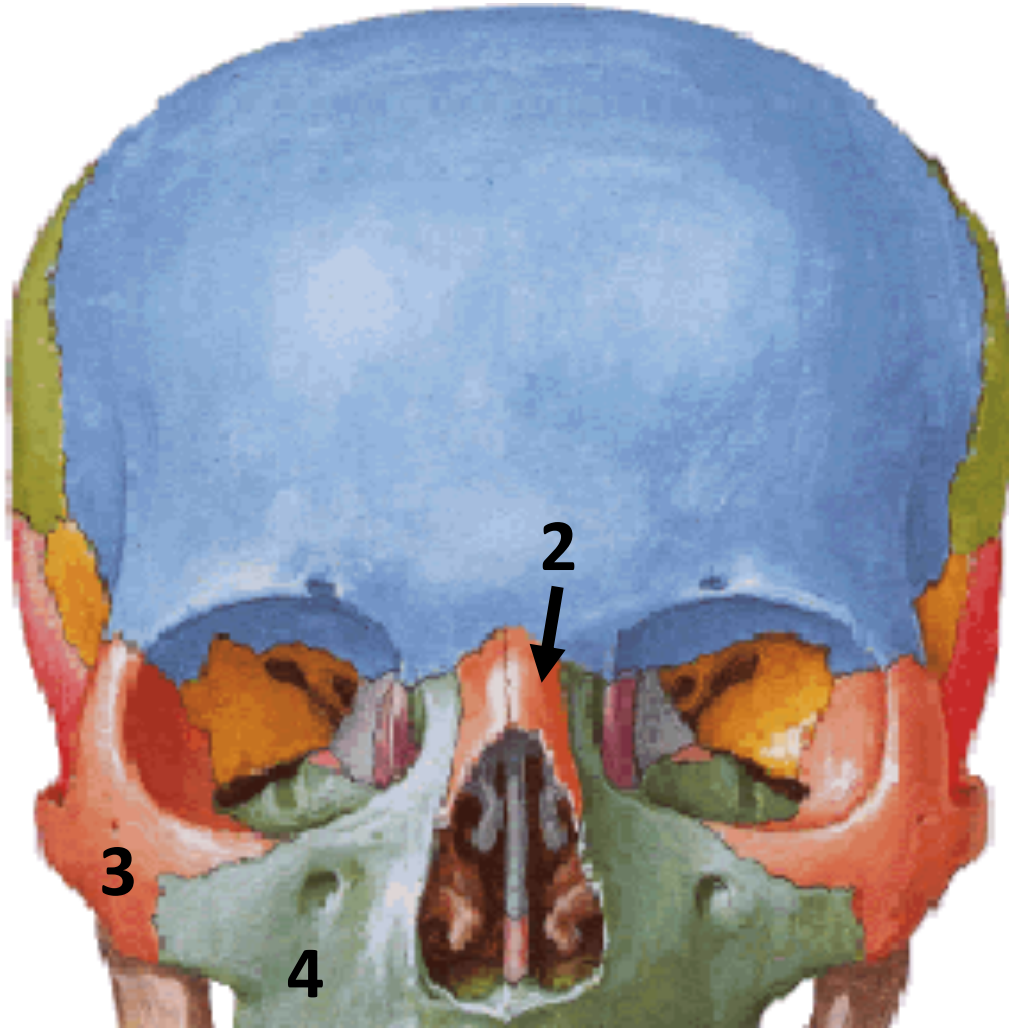


2. **The 2 nasal bones:** form the bridge of the nose.

3. **Zygomatic bone:**

4. **The maxillary bone:**

- Is has a **body** which contains the maxillary air sinus.
- It is pierced by the **infra-orbital foramen** (which gives passage to infra-orbital nerve & vessels).

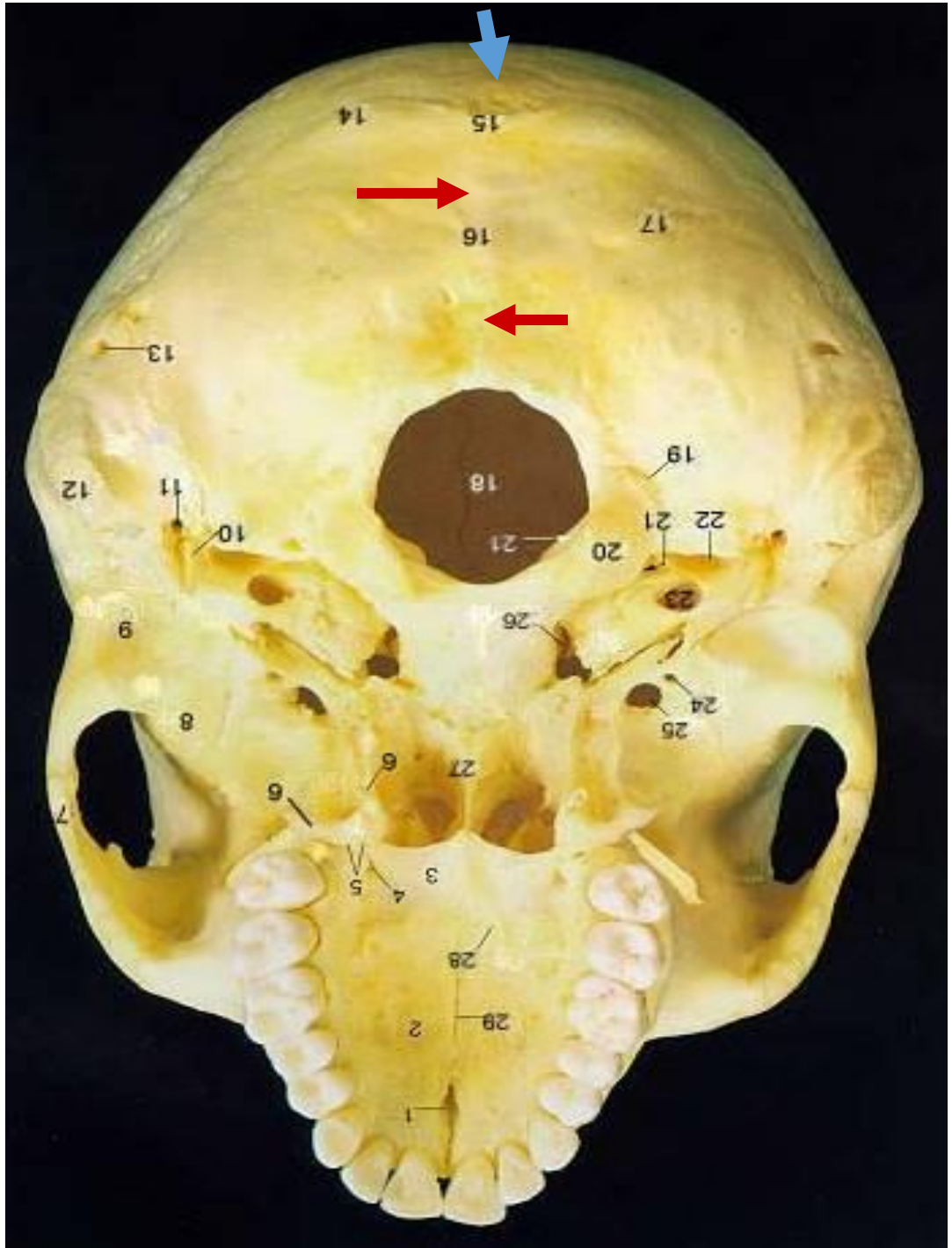


Norma Occipitalis

* The occipital bone presents:

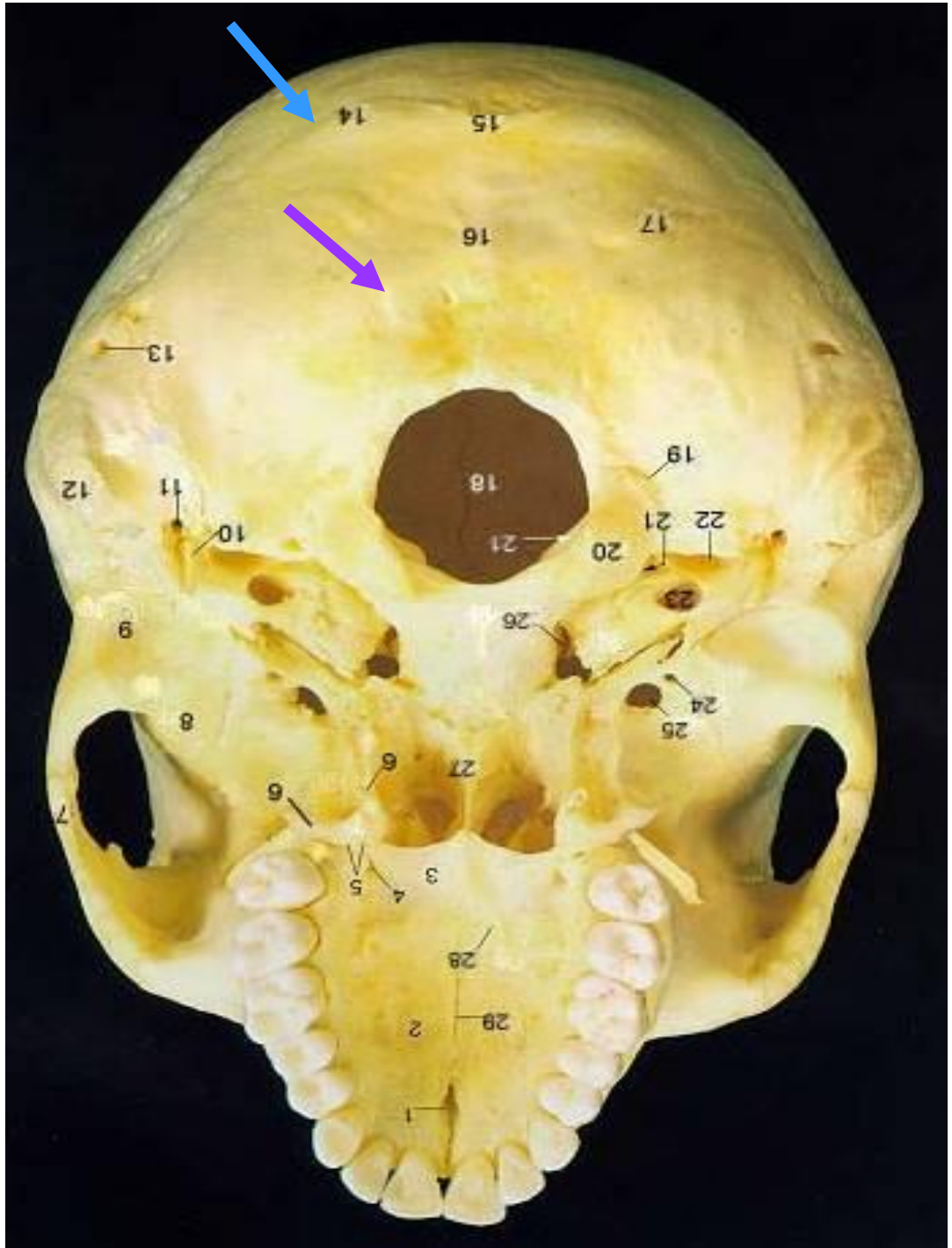
1. External occipital protuberance: it is a median elevation on the occipital bone. Its most projecting point is called **inion.**

2. External occipital crest: extends from the protuberance to the foramen magnum.



3. The superior nuchal lines: extends laterally from the protuberance.

4. The inferior nuchal lines: extends laterally from the crest & run parallel to and below the superior nuchal lines.

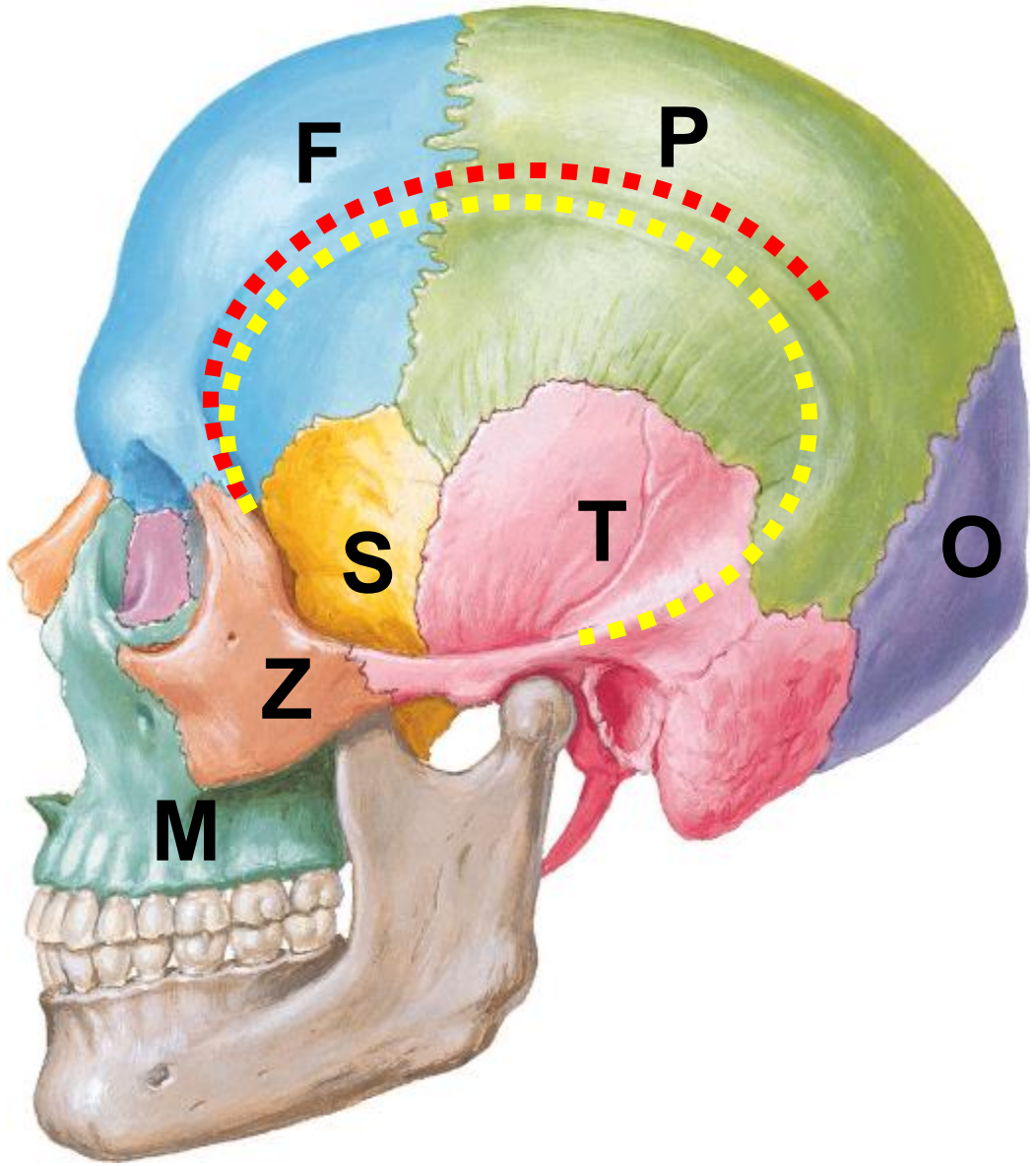


Norma Lateralis

*It is formed of: frontal, parietal, occipital, temporal, greater wing of sphenoid bone, maxilla and zygomatic bones.

***The superior temporal line:**
extends from zygomatic bone and passes backwards.

***The inferior temporal line:**
with **the temporal fossa** lies below it.

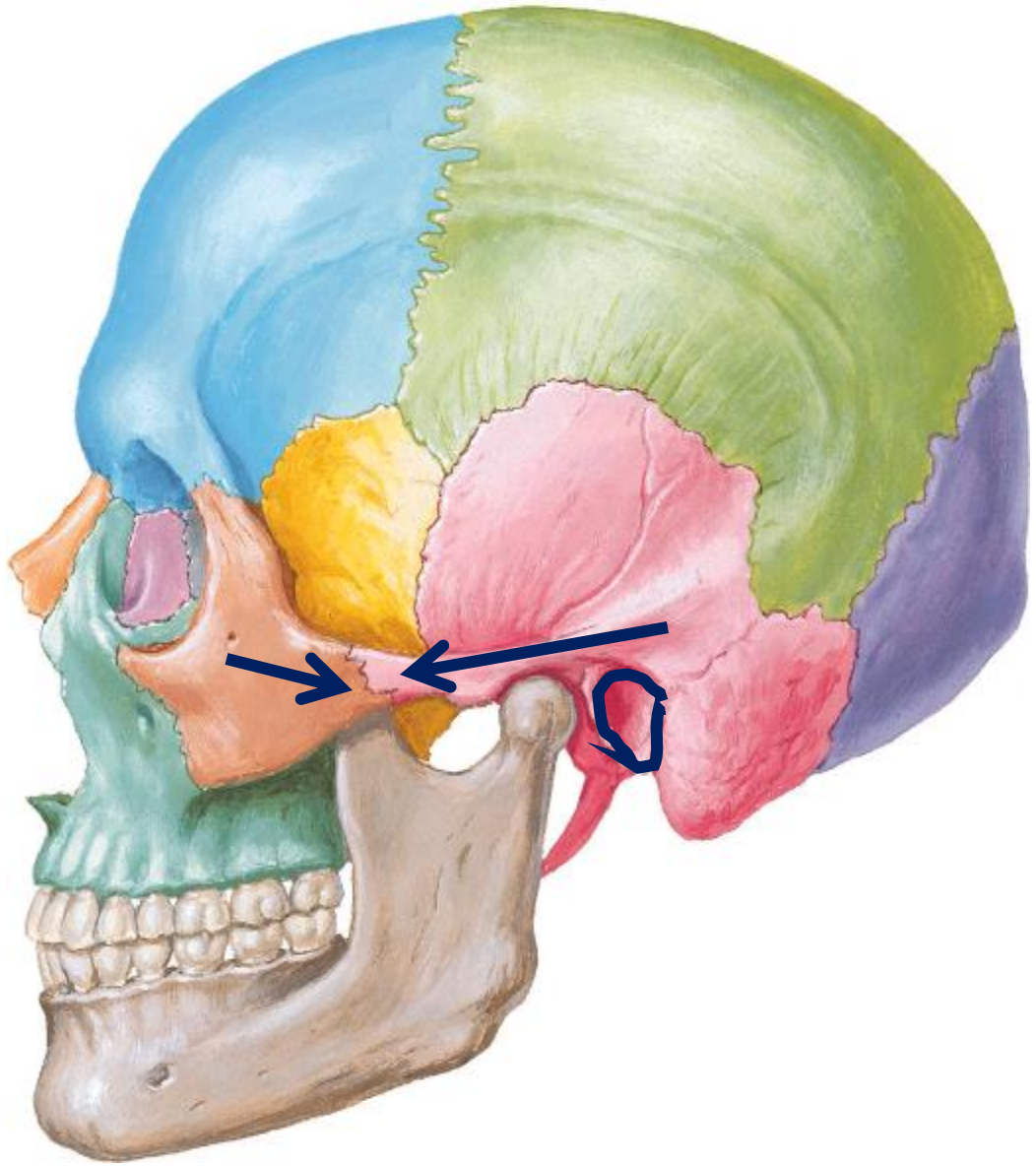


* The zygomatic arch:

* Is formed by the temporal process of zygomatic bone and zygomatic process of temporal bone.

* The external auditory meatus:

* lies below the posterior part of the zygomatic process of the temporal bone.



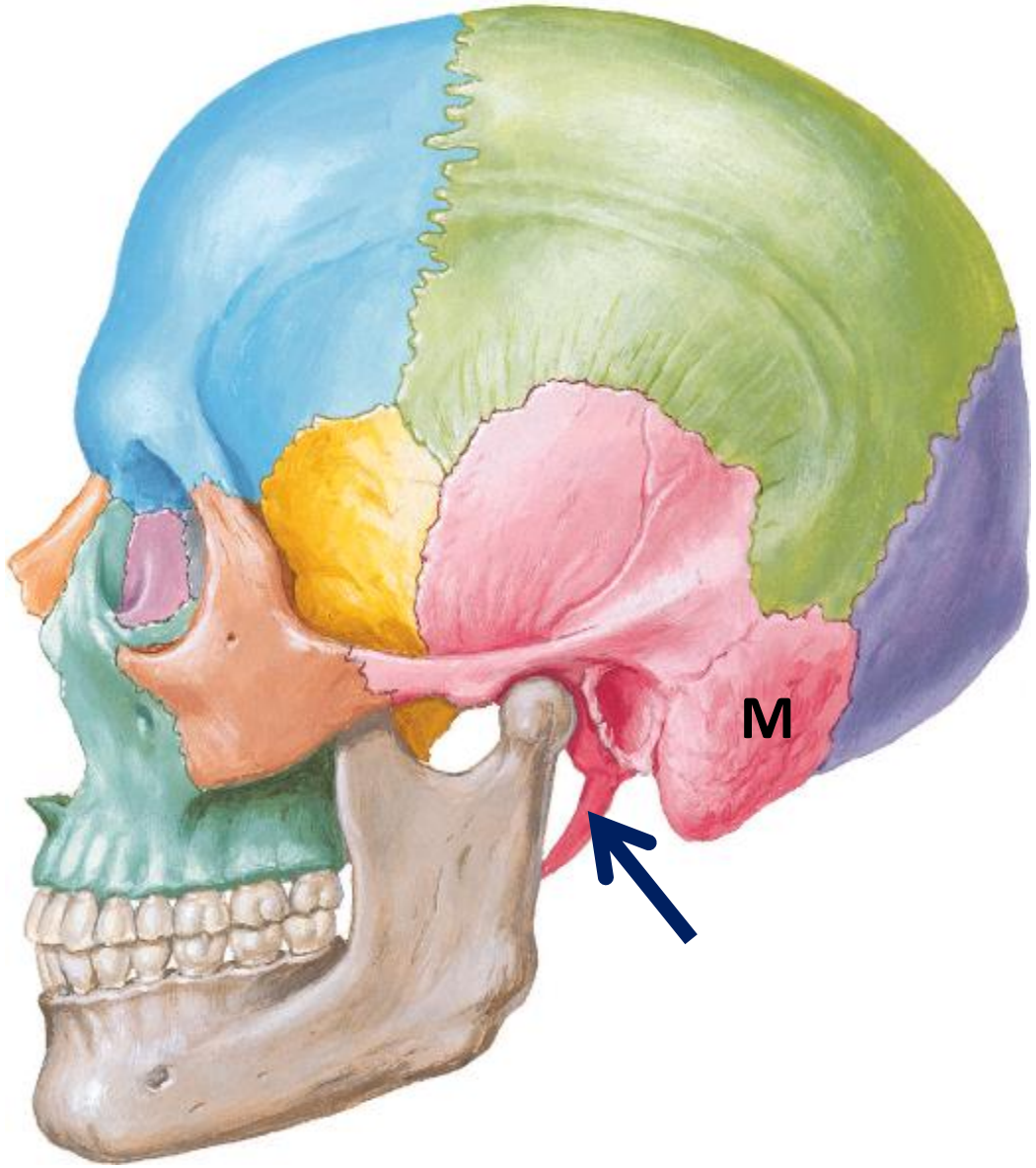
*** The mastoid process (M):**

* It is a part of the temporal bone.

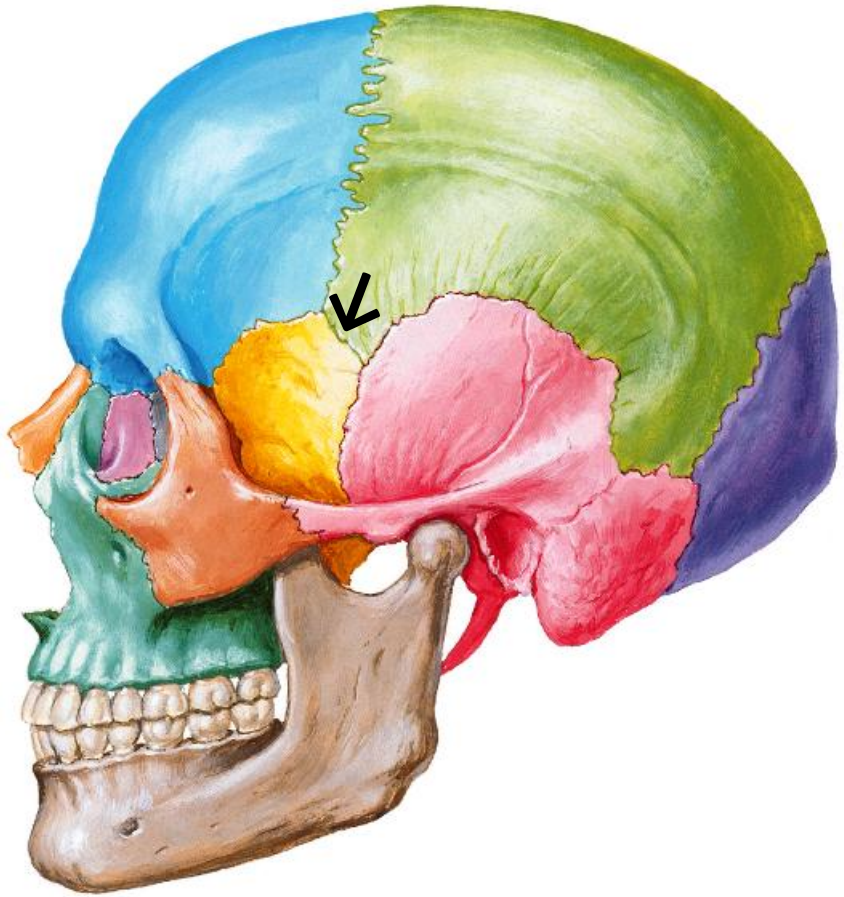
* It lies behind the external auditory meatus.

*** The Styloid process (↑):**

* It is a slender projection of the temporal bone.

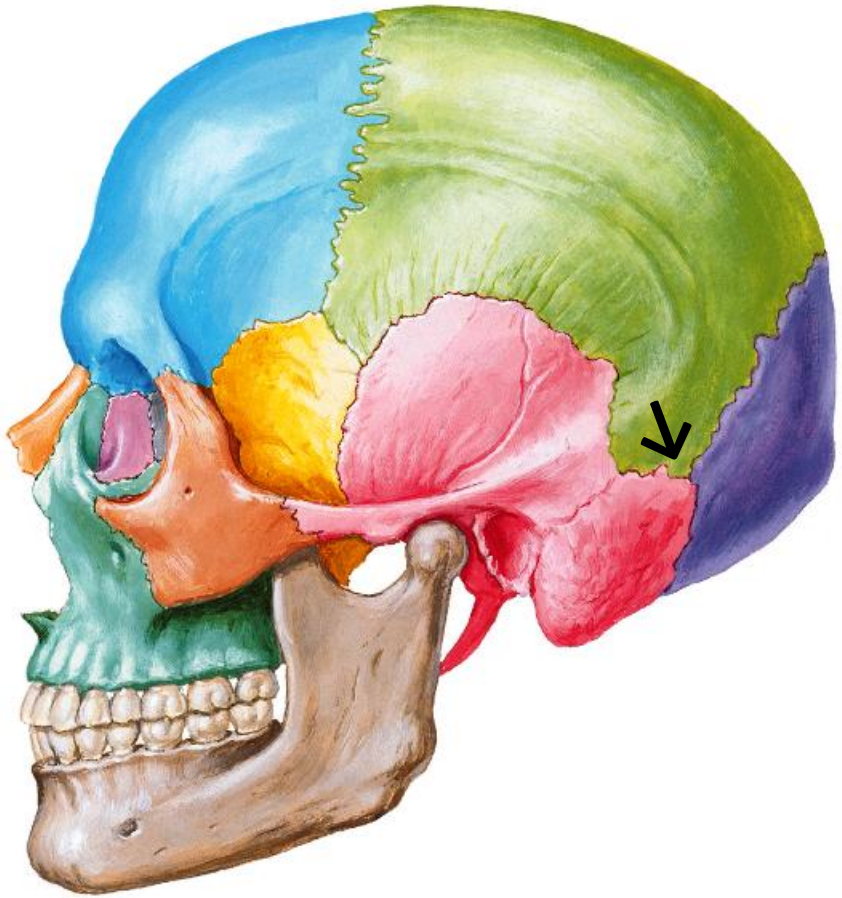


* **Pterion (↓):**
* It is the meeting point of 4 bones, the frontal, parietal, temporal and greater wing of sphenoid.
* It is an H-shaped suture.
* It is the ossified anterolateral fontanelle at the age of 3 months.
* The center of the pterion lies 4 cm above the mid-point of the zygomatic arch & 3.5 cm behind frontozygomatic suture.
* It is related to the middle meningeal A.
* Since it is very thin, the pterion is the most frequently fractured part of skull in car accidents leading to hemorrhage (extradural hematoma) which compresses the motor area of the brain.



* Asterion (↓):

* It is the meeting point of the parietal, occipital & mastoid part of temporal bones.
* It is the site of posterolateral fontanelle which ossifies at the age of 3 months.




Thank You
Thank You
Thank You!!!!