



Lecture: 2

Done By: Abdulrahman Ehsan 🐸



General Anatomy

عموده فقري ← عظام جوفية يعني جبهة وعمود فقري
→ about 80 bones

Lecture 2: Axial Skeleton: The Skull

Dr. Mohamed Fathi Elrefai

Ass. Professor of Anatomy & Embryology

mohamed@hu.edu.jo

THE SKELETON

about 206 bones

- * It comprises **cartilages**, **bones**, **ligaments** & **joints**.

كشاريق

عظام

مفاصل

اربطه

long (connective tissue)
flat

- * 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.

كلما كنت أصغر كلما كانت نسبة الكشاريق بجزء أكبر *

● عن طريق الأناشيد بدل تعرف شو العلامة بين ال structure وال function

لا bones وكيف ترتبط هذه العظام بالربطة والأعصاب والعضلات وما الخ ..

يتكون ال Skeleton من حوالي 206 عظمة لها أسماء

وتنقسم إلى مجموعتين يعني كل مجموعة فيها مجموعة عظام .

← ومن هذه المجموعات ال axial skeleton التي تتكون من حدود ال 8 عظمة والـ 8 عظمة أيضاً في مجموعتين مثل (Skull / Ribs....)

* العظام تكون بالكل تحضريق يهرين
مع تراكب الكالسيوم بتصوير عظام .

بشال عام

* 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).

العمود الفقري

ضلع

عظام القفص

الصدرى

الحوض

5

3

4

Skeleton

206

Endo

Exo

Enamel of
teeth

nails

(the thin cover
of the teeth)



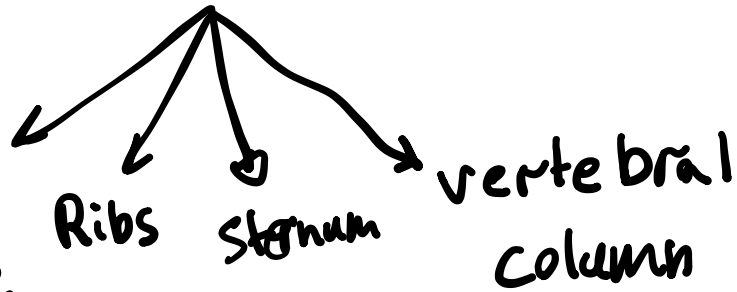
غير متحركة
عند الرجل

Endo Skeleton

محوري

Axial

80



22

Skull
mandible

Ribs

Sternum

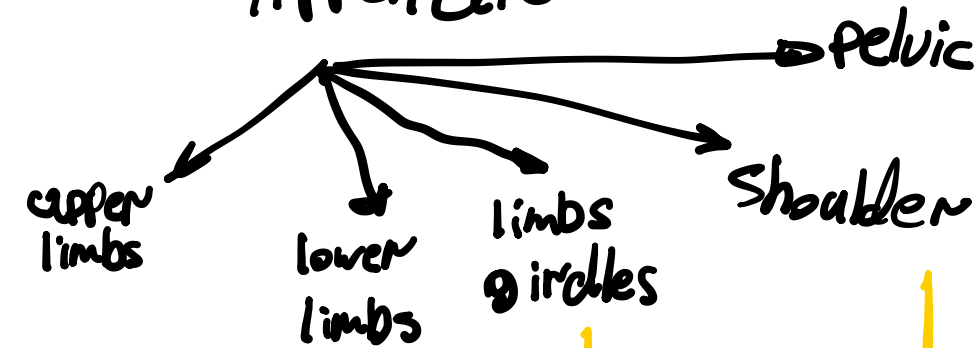
vertebral
column

Cranium

إسكleton في craniocality

طرفي

Appendicular



upper
limbs

lower
limbs

limbs
girdles

Shoulder

pelvic

تربط بال Axial

لوحة الكتف scapula

الترقوة clavicle

Axial skeleton

جسمية ←

① Skull & mandible. → الفك

② Ribs. → أضلاع

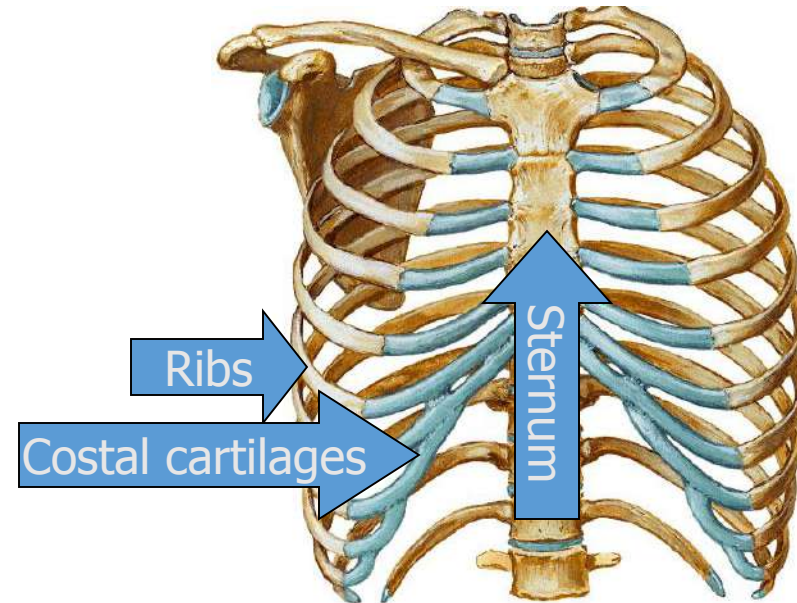
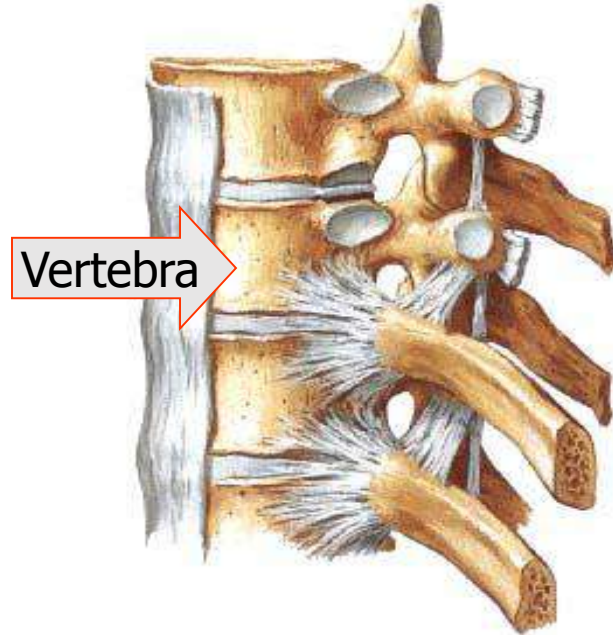
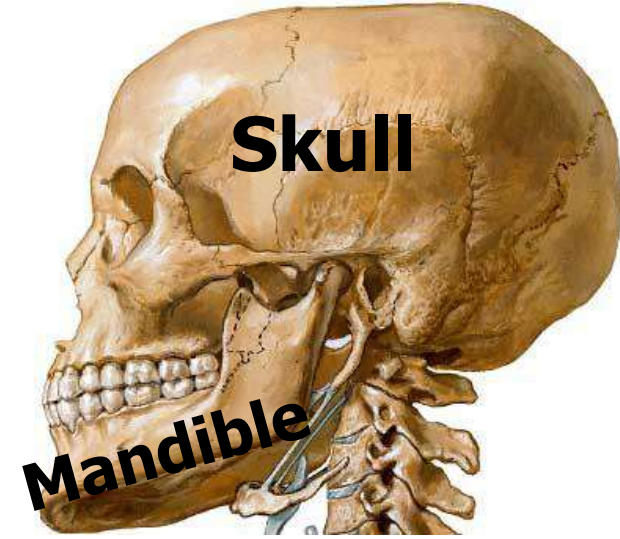
③ Sternum. → قفص صدري

④ Vertebral column. → عمود فقري

جزء
من
ال

facial
bones

تحت العنق أيضاً
في طبقات
لحماية الدماغ



A

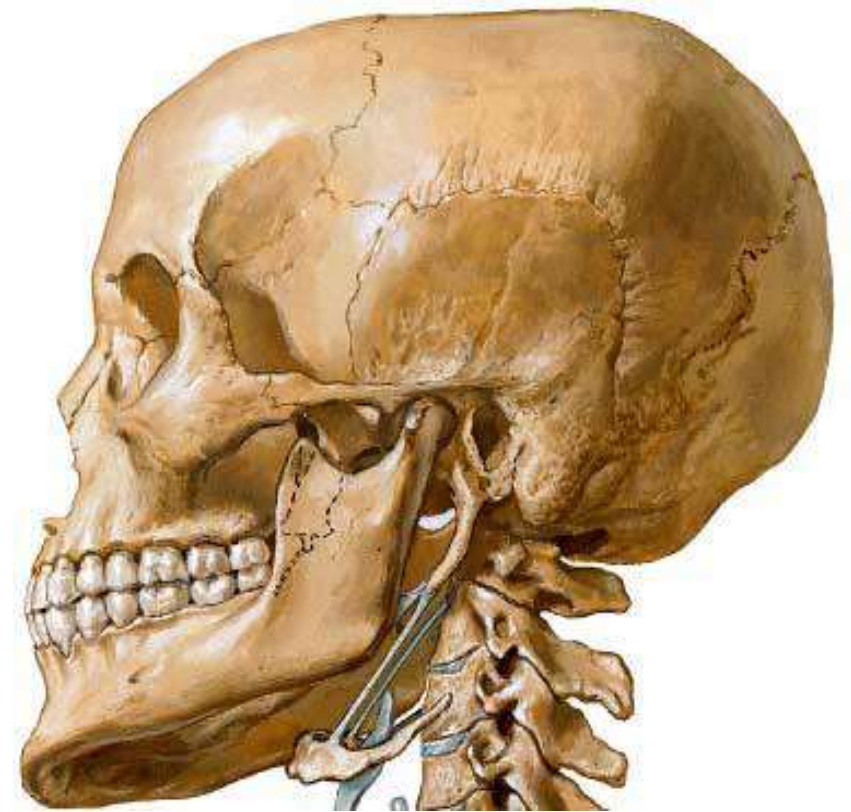
* **The skull (cranium)**

(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

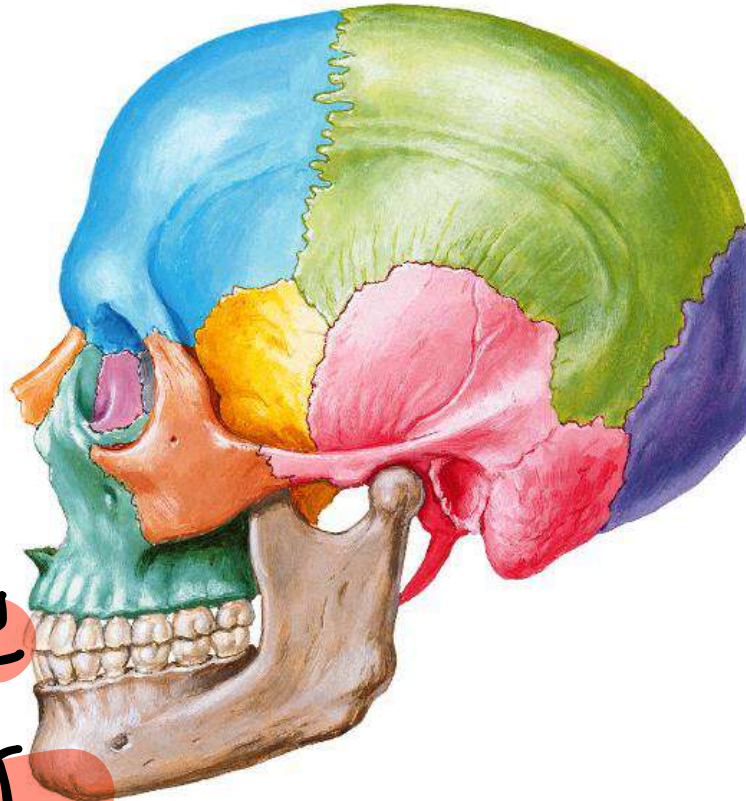
Skull

21 immovable bones

Articulating together by sutures
(which are fibrous joints)

joint form of
fibers

one of
the facial
bones



طبقة الفك السفلي
يتميز بـ
أرضية زلاقي
Synovial joint

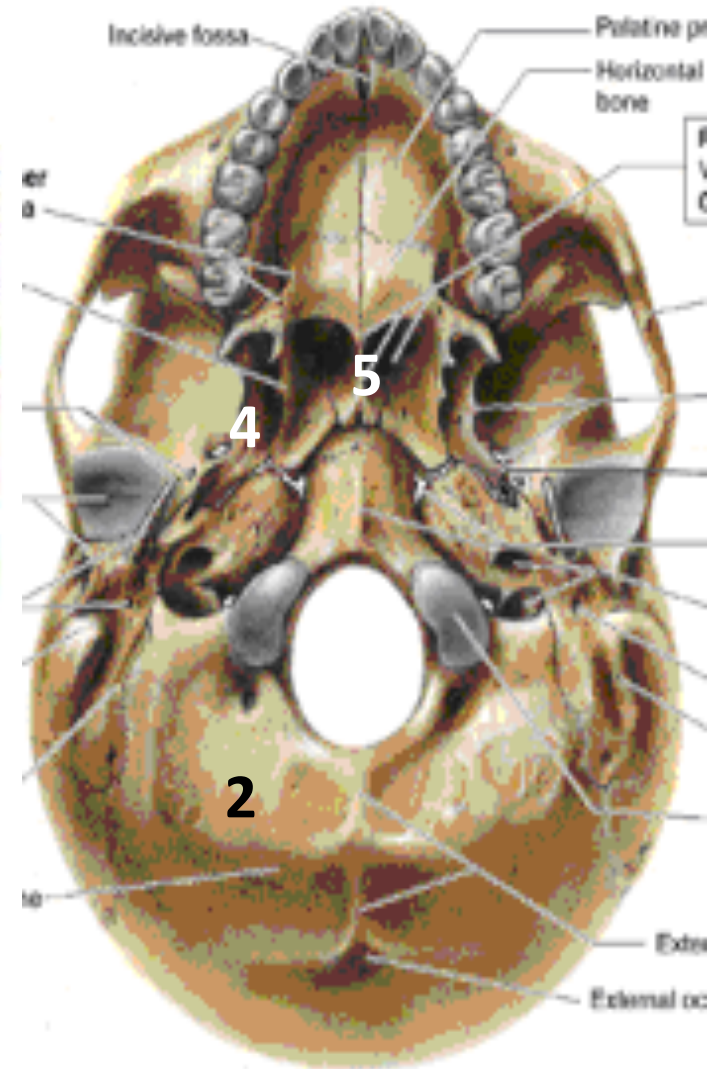
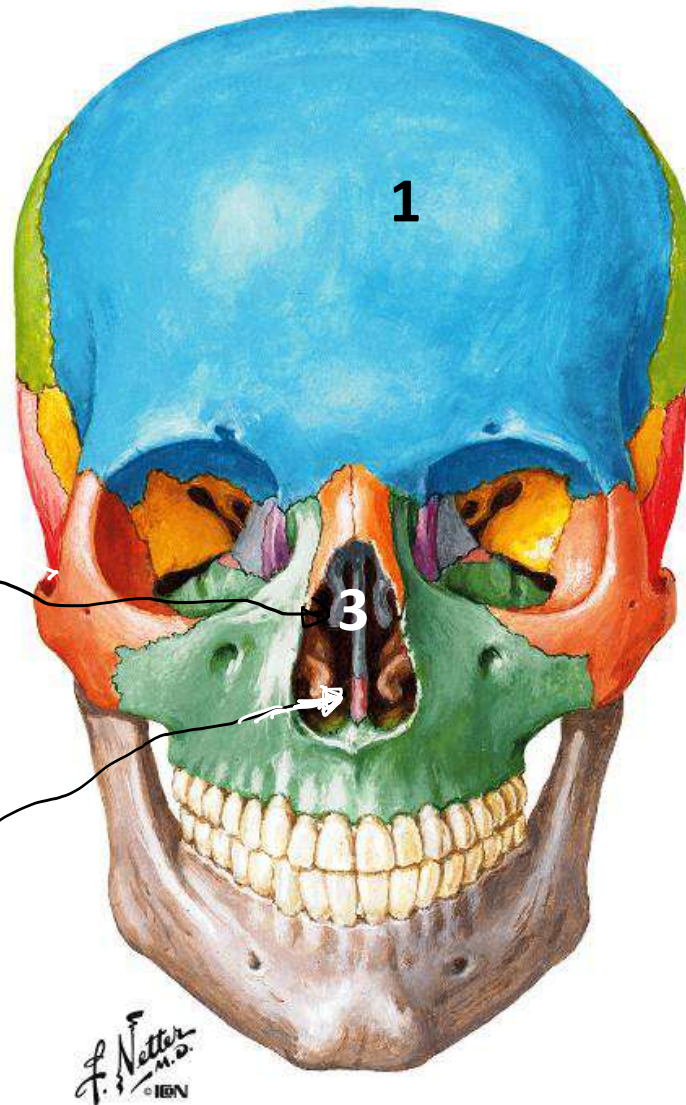
* الرابطة بين الفك السفلي
وال cranium تسمى
ياد TMJ

ضربة واحدة

5 Unpaired bones

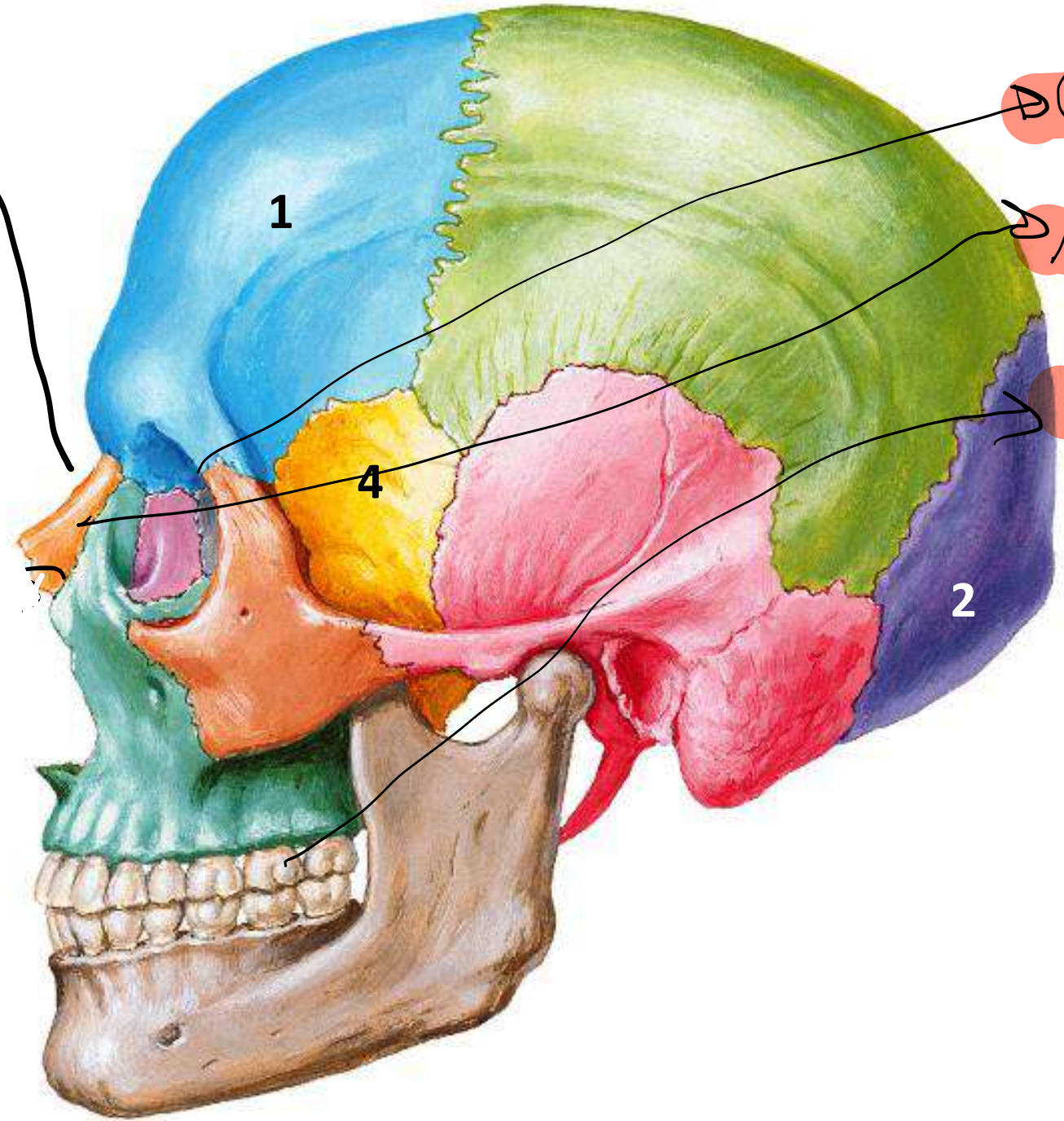
(Interior view)

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



nose:-

- ① septum
- ② ^{الجزء الأمامي} cartilage
- ③ ^{الجزء الخلفي} Ethmoid

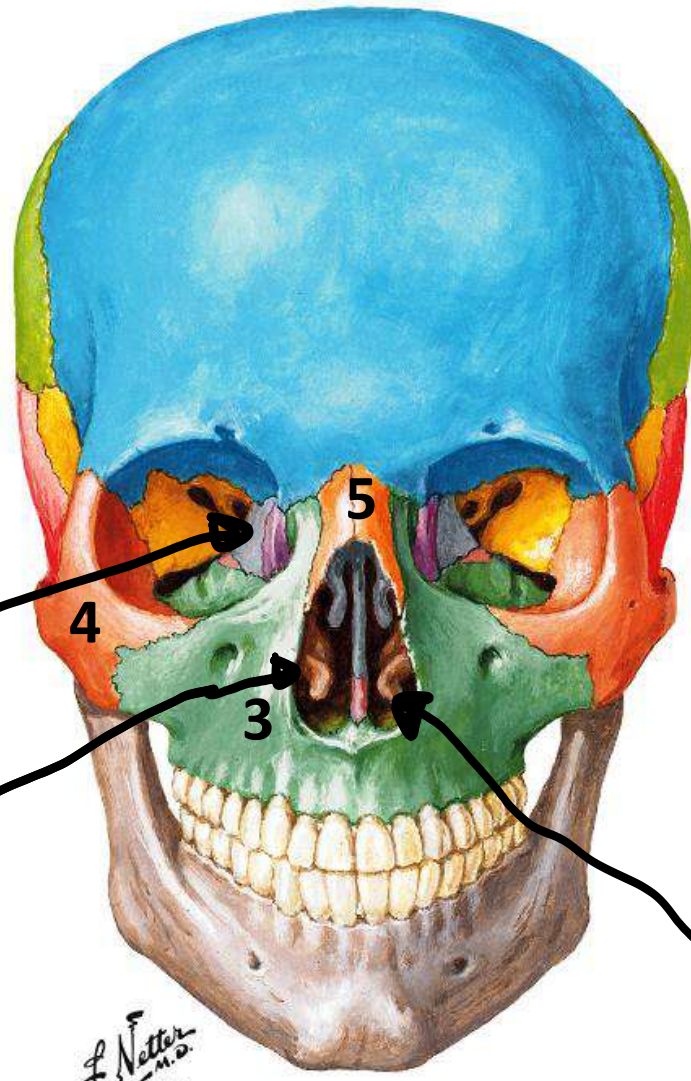


- ① Orbital cavity
- ② Nasal cavity
- ③ Oral cavity

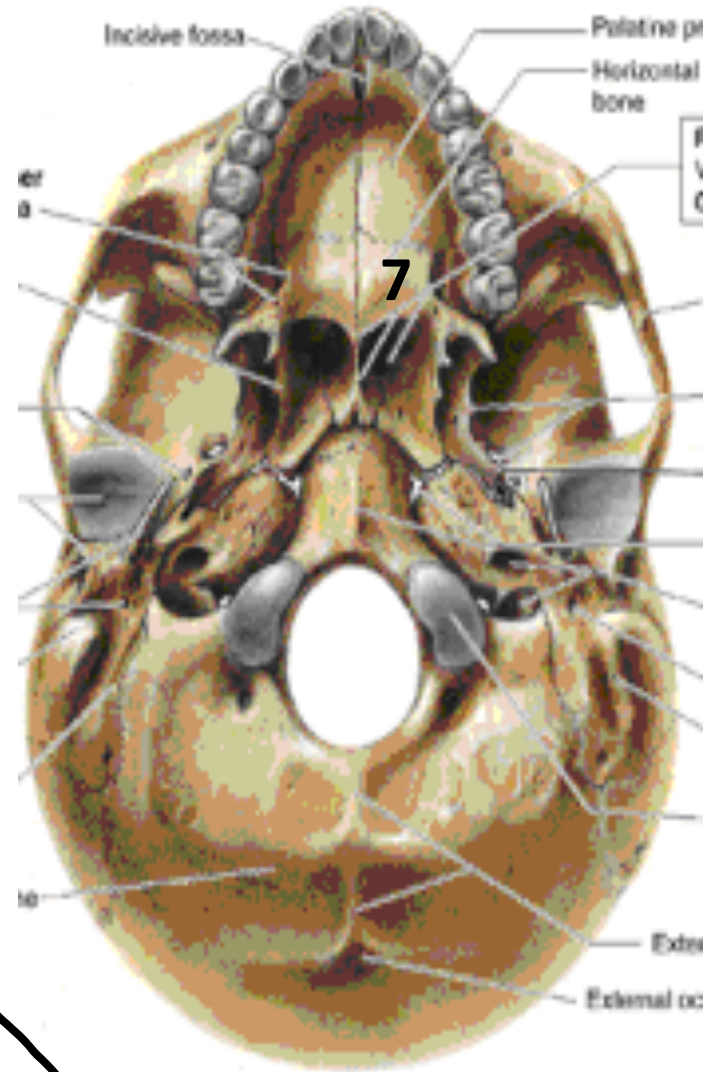
↓ 6 = 2* **8 Paired bones**

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

facial bones

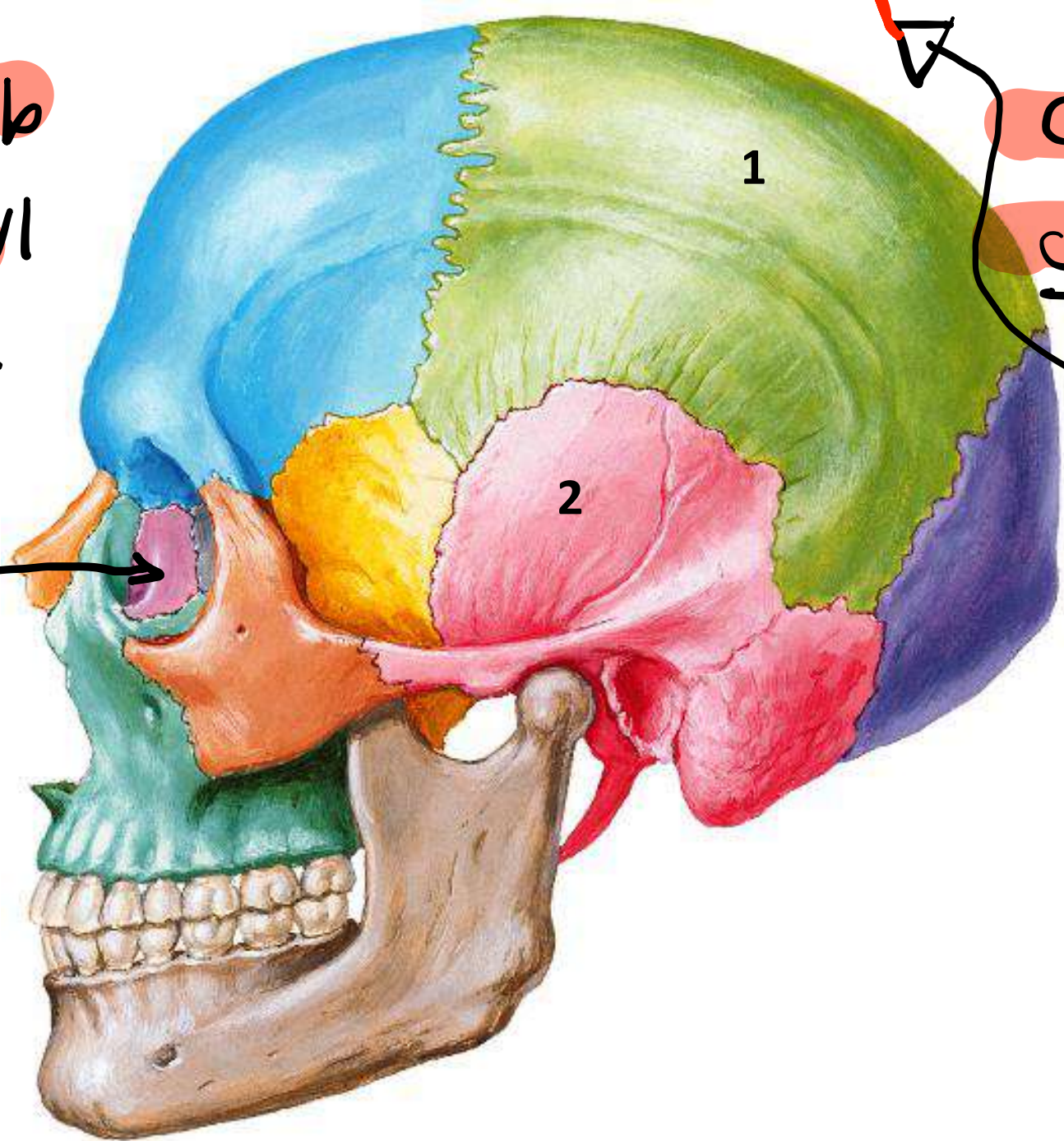


F. Netter M.D. © IGV



مانکھا lacrimal
الڊڪٽور بسن بحشر

کنهاڻي هائي

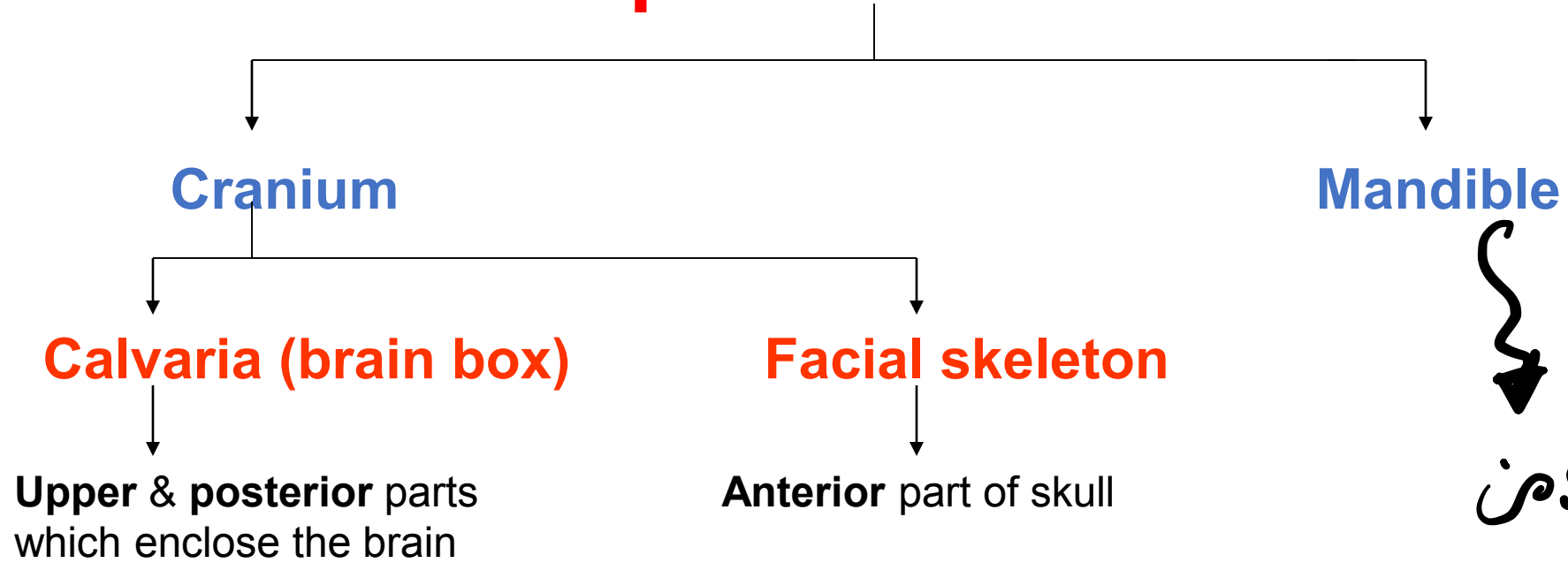


Concha

ايشا مانگرهارهي

هائي

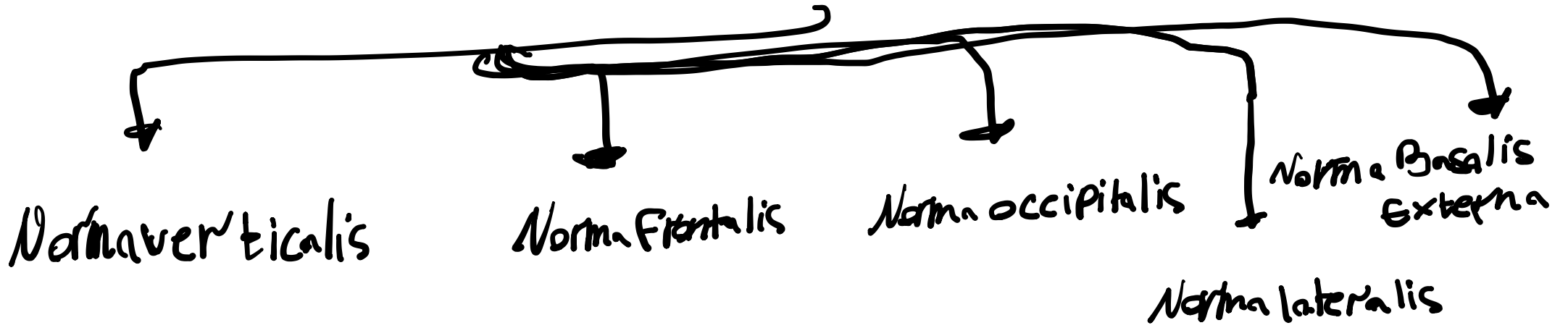
The parts of the skull



قلنا ان جزوه من
ال facial

بس من تابع لا
Cranium

* يوجد 5 أنواع من الصور التي تفصل نظام العصبية هي:



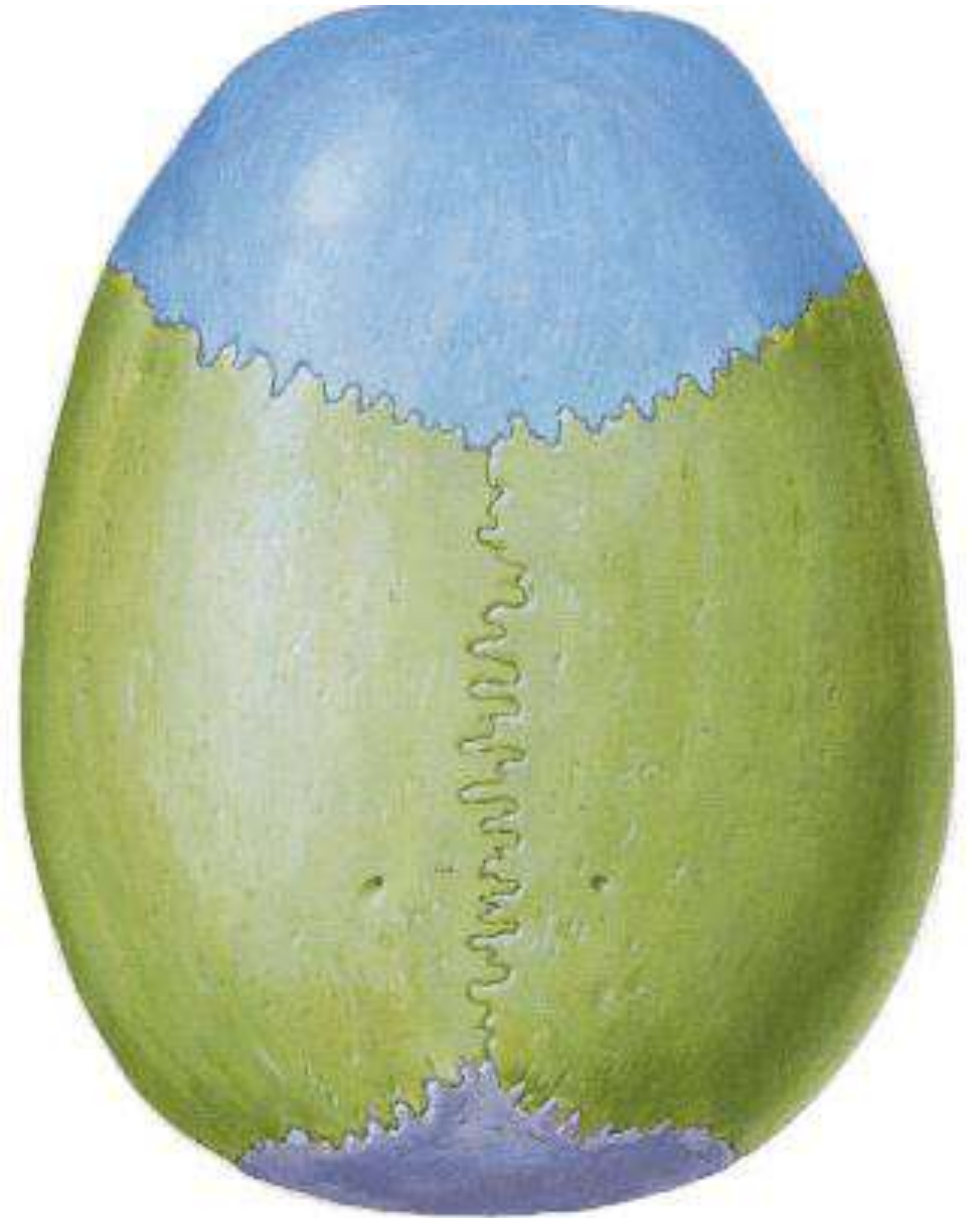
• ولاح نحدد مييزات كل واحدة وحوال قدهم

Norma verticalis (superior view)

* 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.

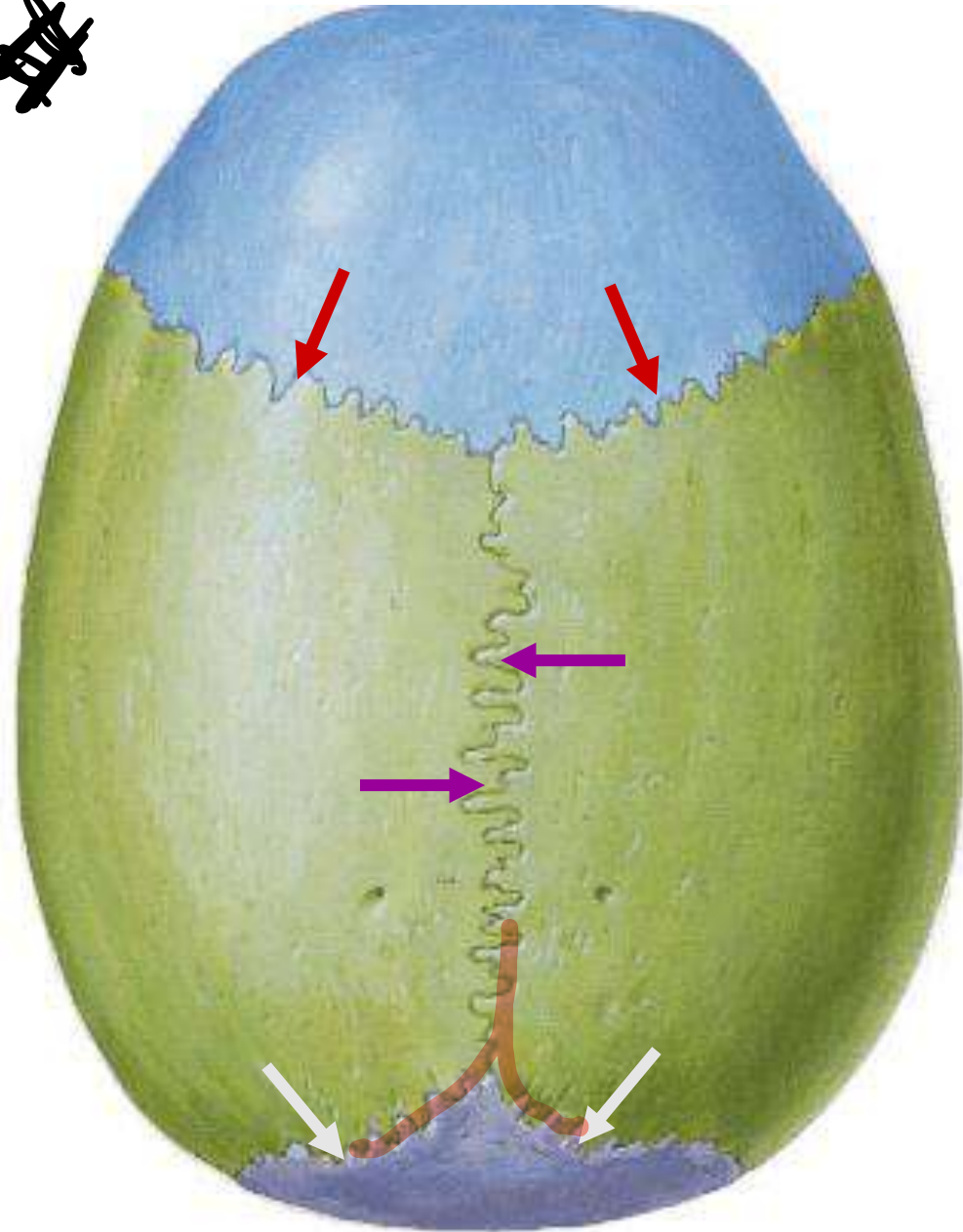


*** It presents 3 sutures:**

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.



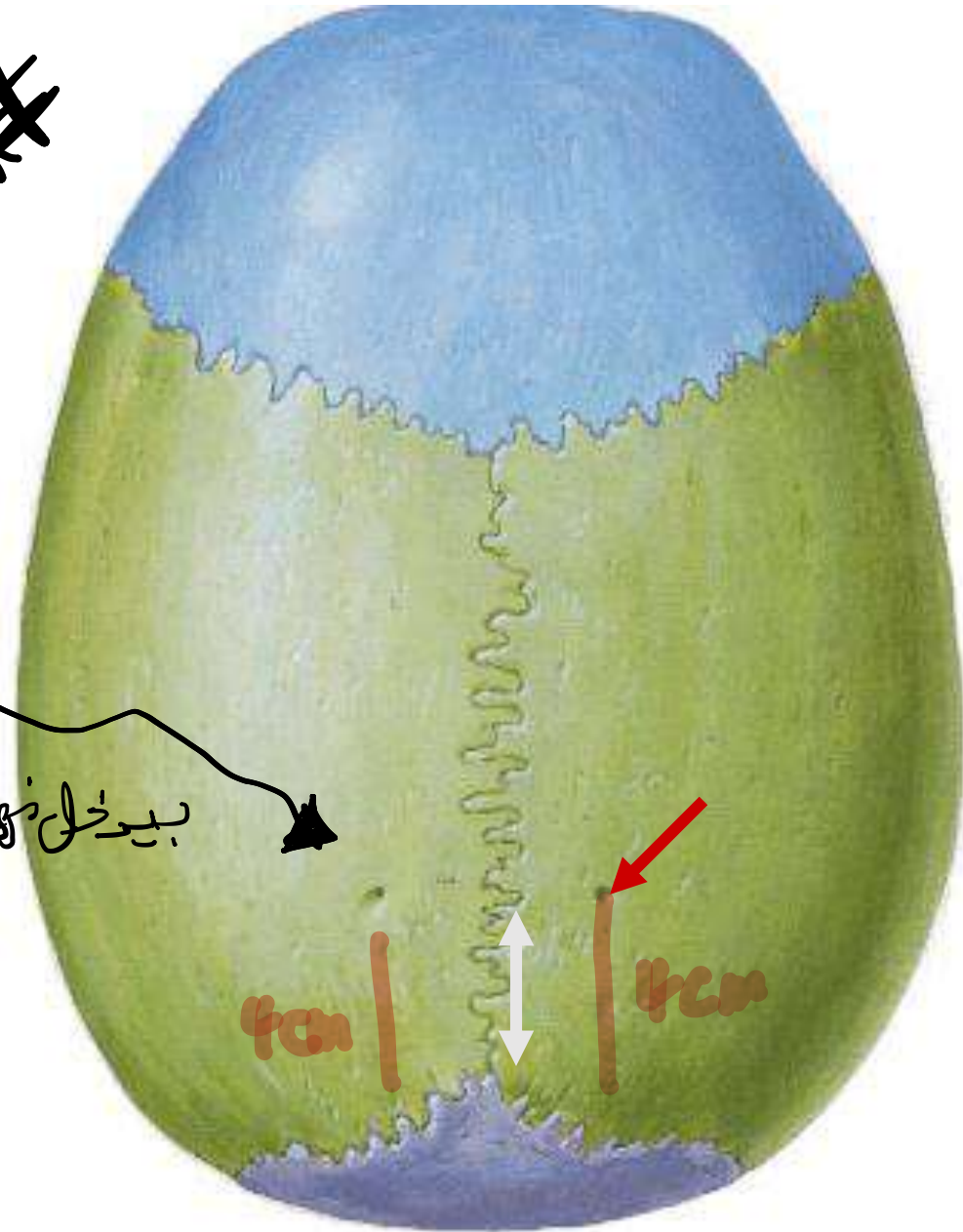
* It presents 2
parietal emissary
foramina:

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

* It transmits an
emissary vein.



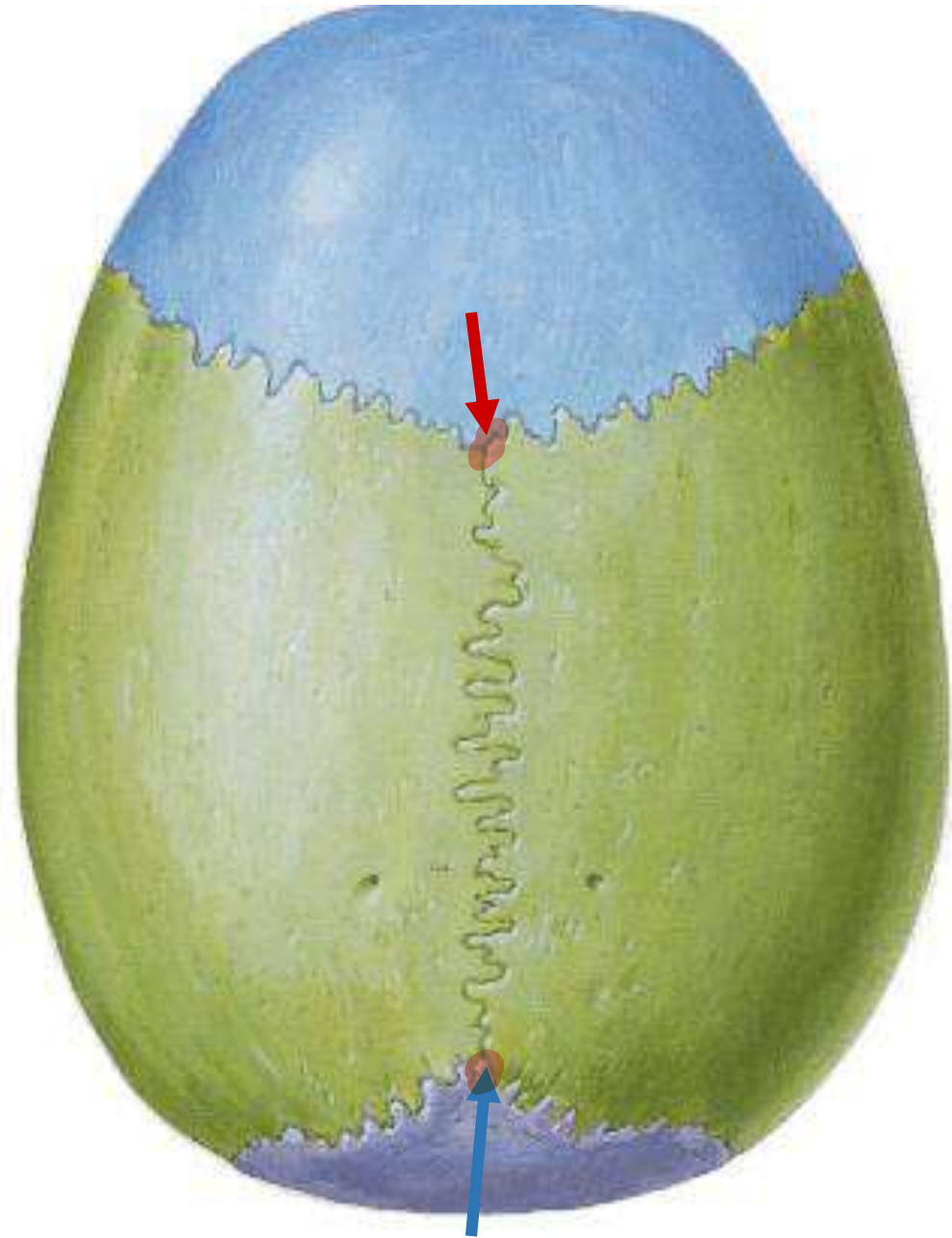
infection بیدخلی نوا



* 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.

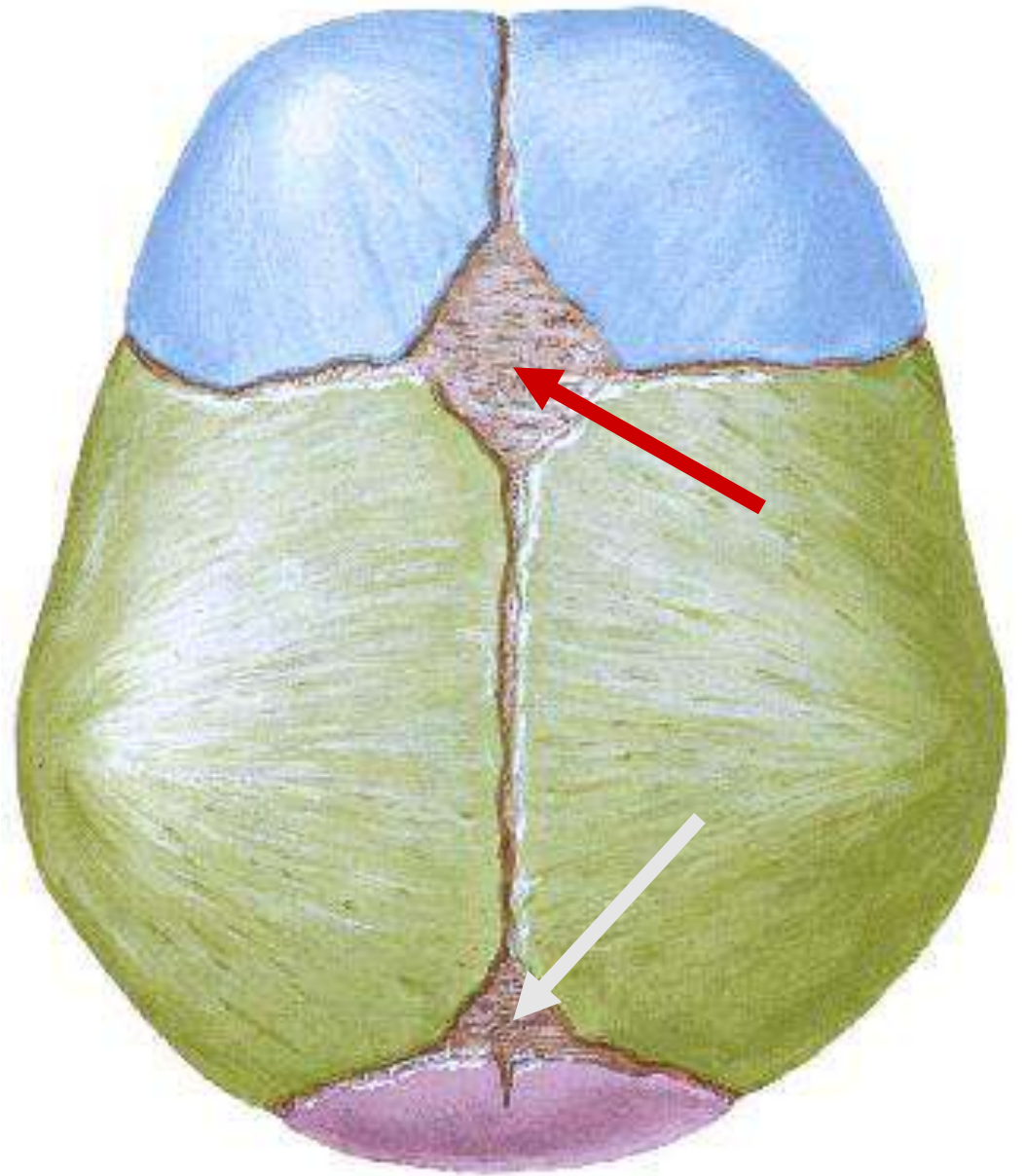


* During foetal life:

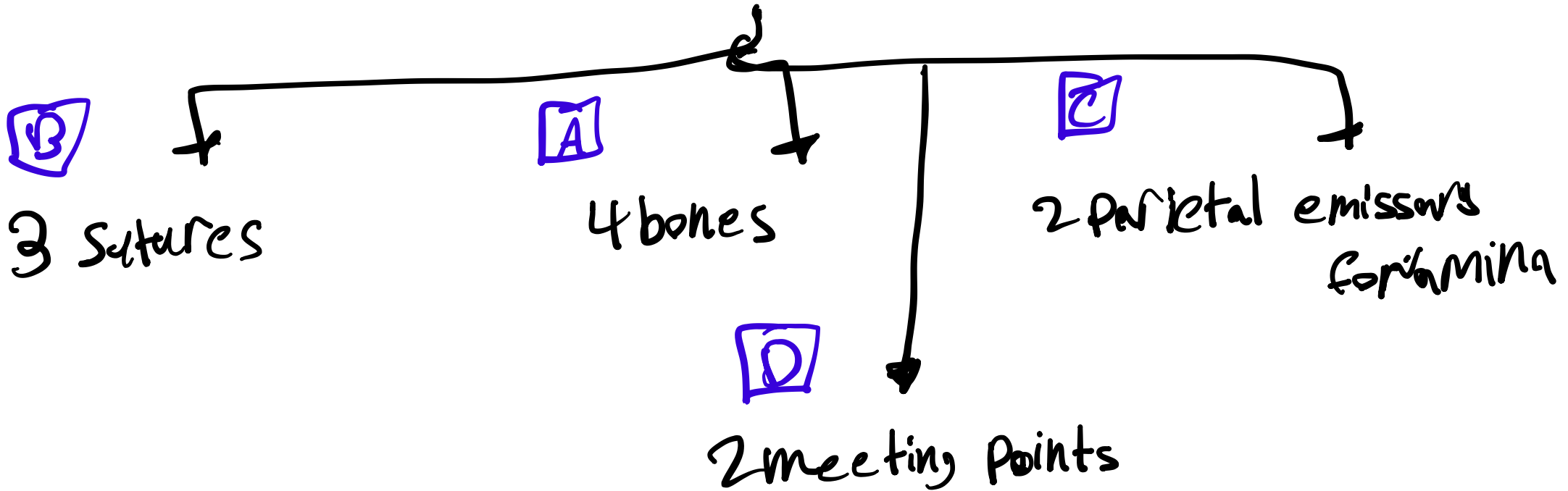
Flexibility -
جسٹھ -
↗

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.

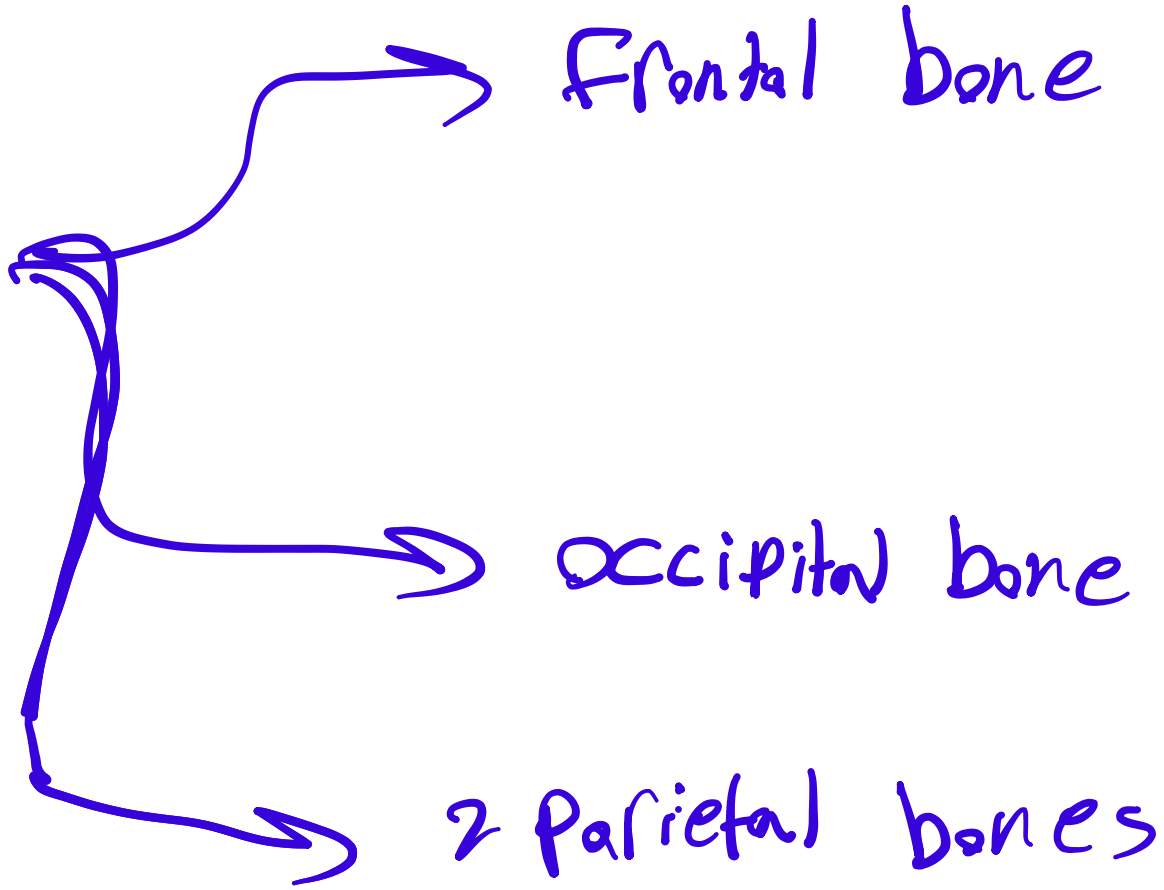


Norma verticalis



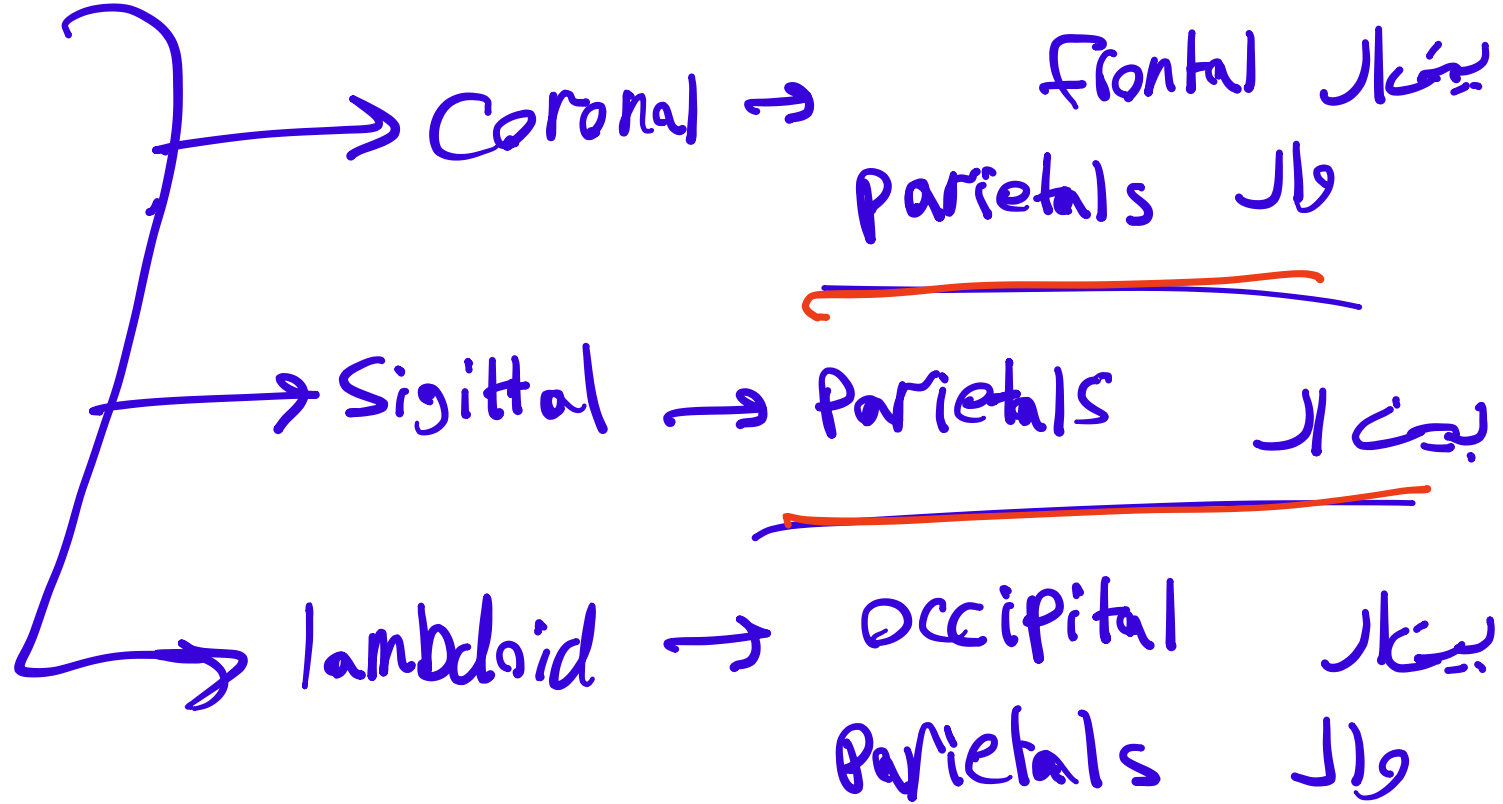
A

Bones



B

Sutures



□ 2 foramina

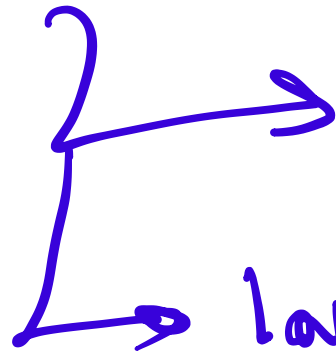


cm 4



kambale ar

□ meeting points



bregma



Cranial
Sagittal
بیشتر

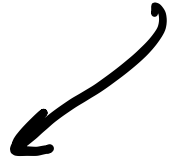
lambda



Lambdoid
Sagittal
بیشتر

* during the early development the suture

will be unossified membranes



(anterior fontanelle) (bregma)

* ایک فوق یہ سرج نفسہ کی ال (early lifetime)

* 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 \uparrow it bulges.
- If the pressure \downarrow it sinks (dehydration).

3. They help in diagnosis of some diseases:

- Premature closure causes craniostenosis \rightarrow 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 apertures ✘

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



Paranasal
Sinus

ضيقا

حلتنا عند الولادة تكون عظمتين
وبمرين يندمجوا

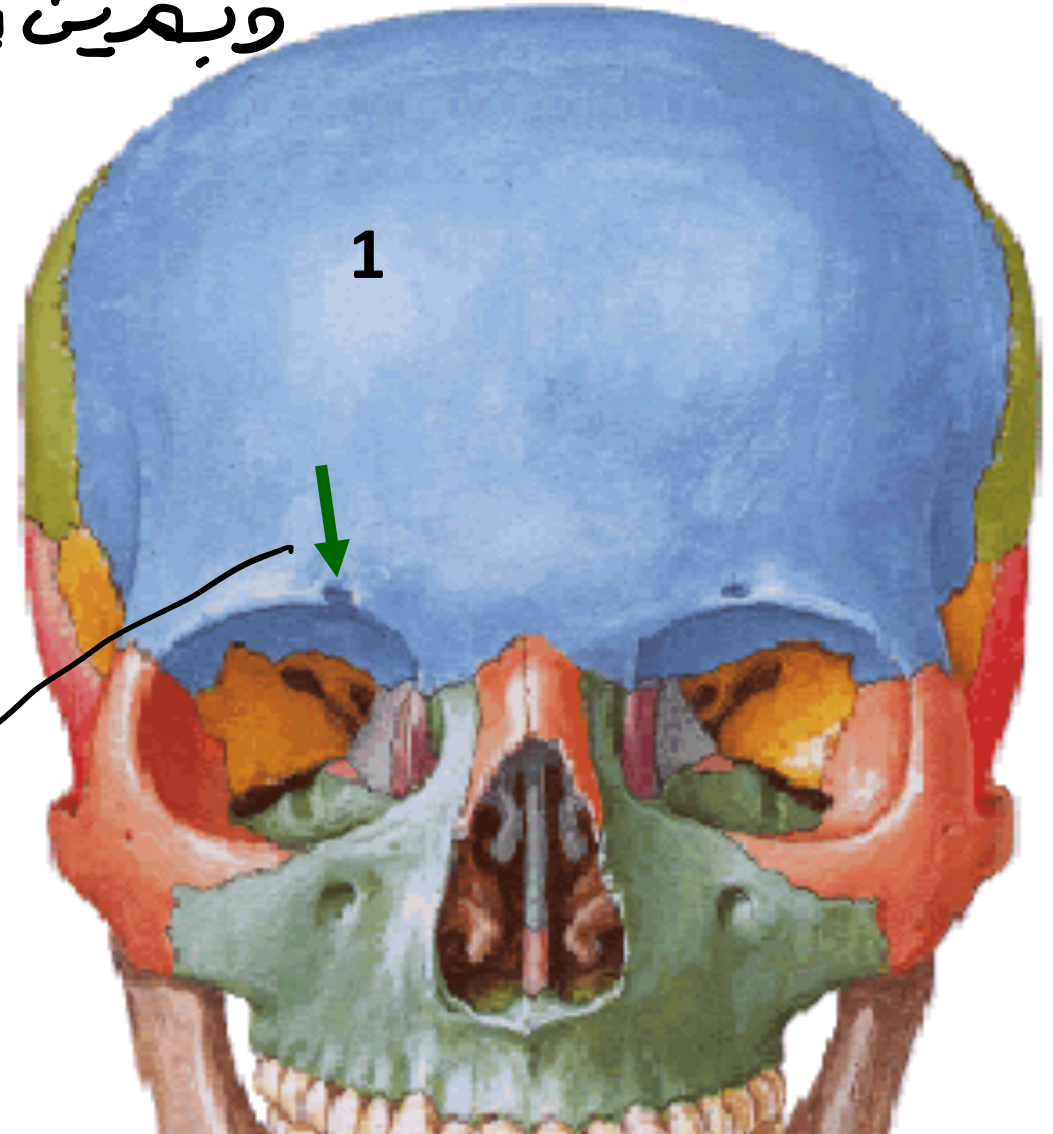
1. The frontal bone:

* 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:

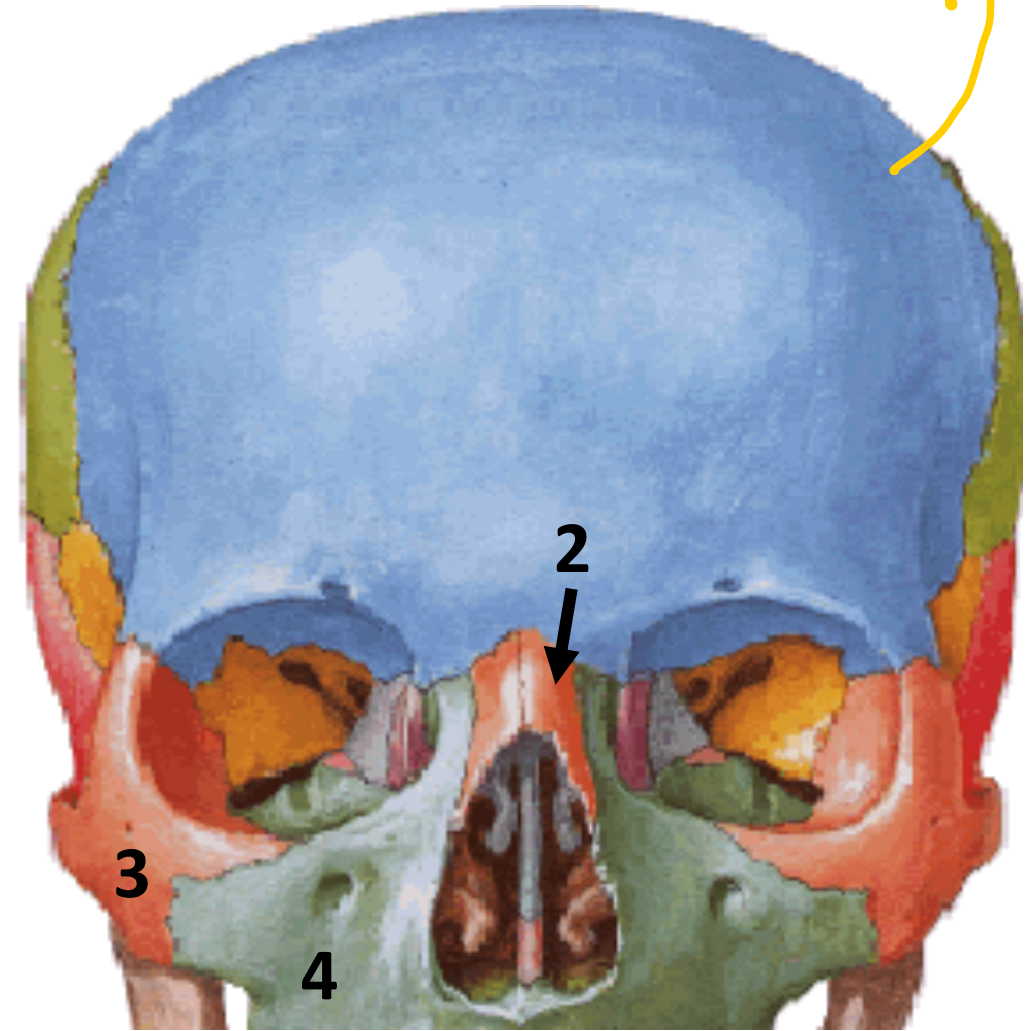
4. The maxillary bone:

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

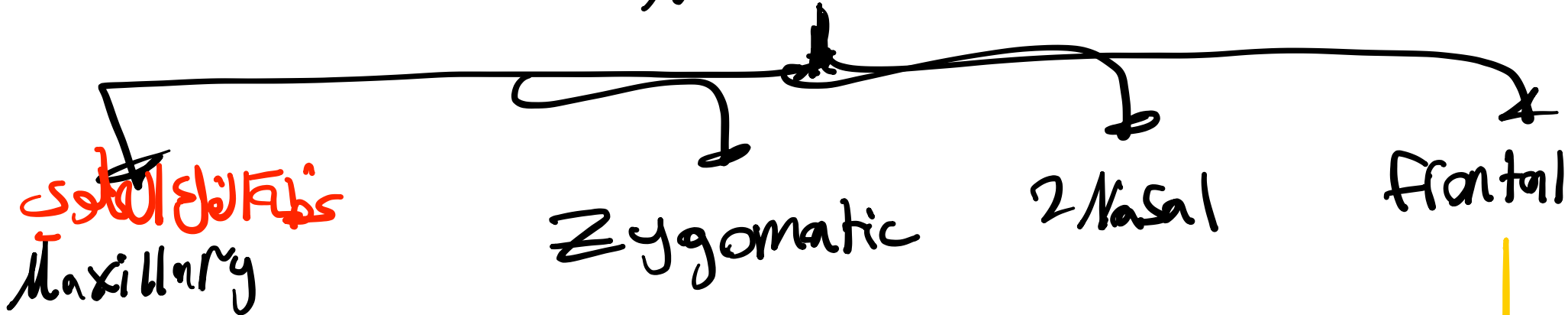
تشكل عظم الجسر الأنفي

occipital cavity

قبة جمجمة خيال



Norma frontalis



كطبقات العظام
Maxillary

air sinus

فيسها

فيا ليهها

Intraorbital
Foramen

Supraorbital
Foramen

في كلبها تقاطع
بار

2 Nasal

Frontal

يمكن الشخ الفاصل

بينها يظل بعد كواله

metopic
suture

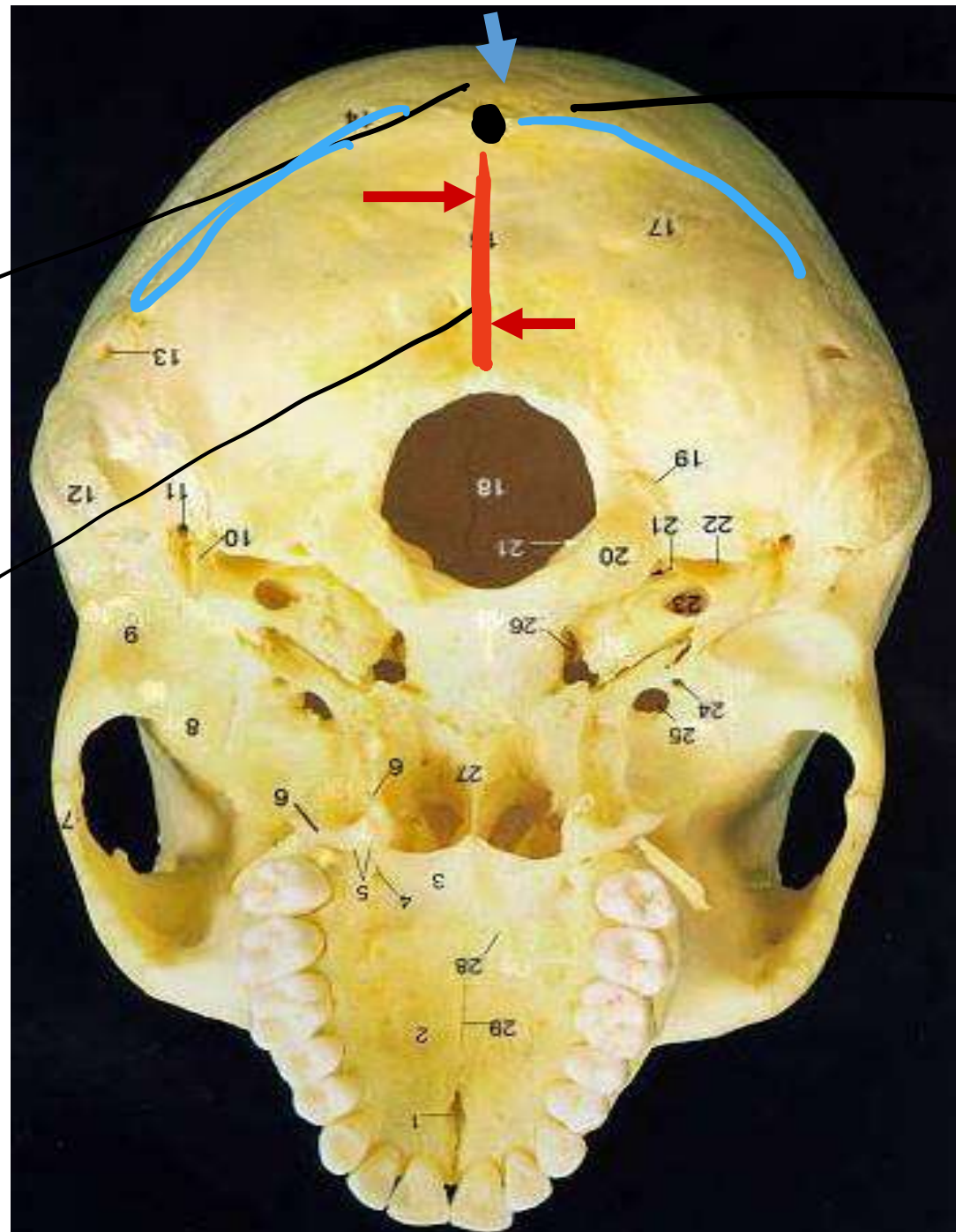
ويسى بار

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.

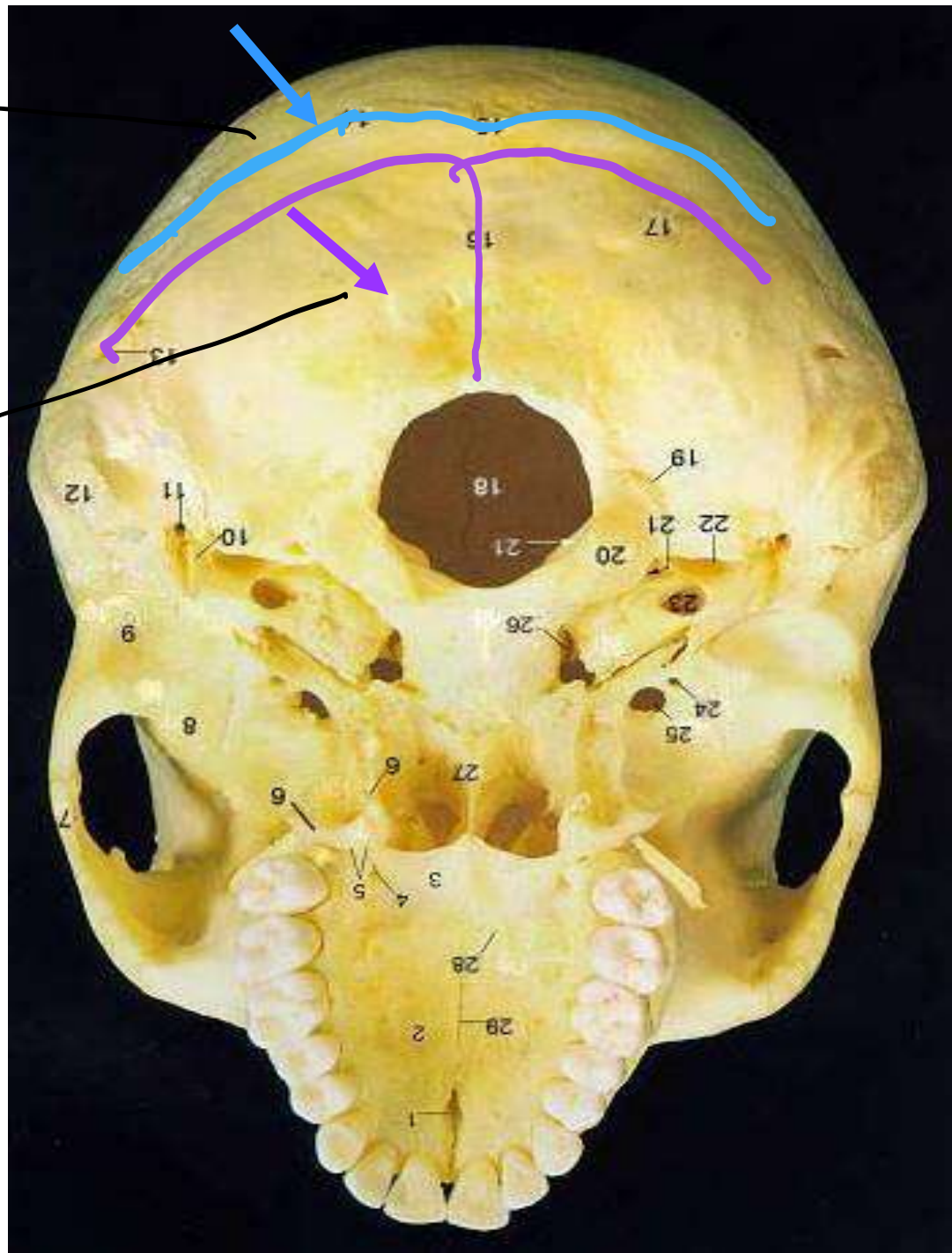
2 External occipital crest: extends from the protuberance to the foramen magnum.



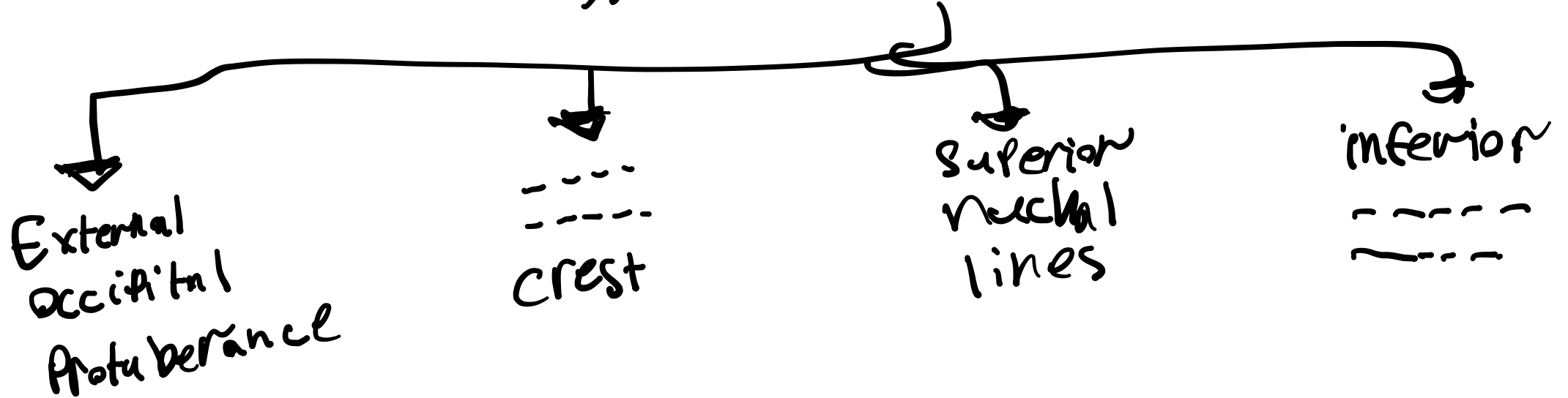
بروزند

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 Occipitalis



• الواقع فقط ما يدرج شرح

Norma Lateralis

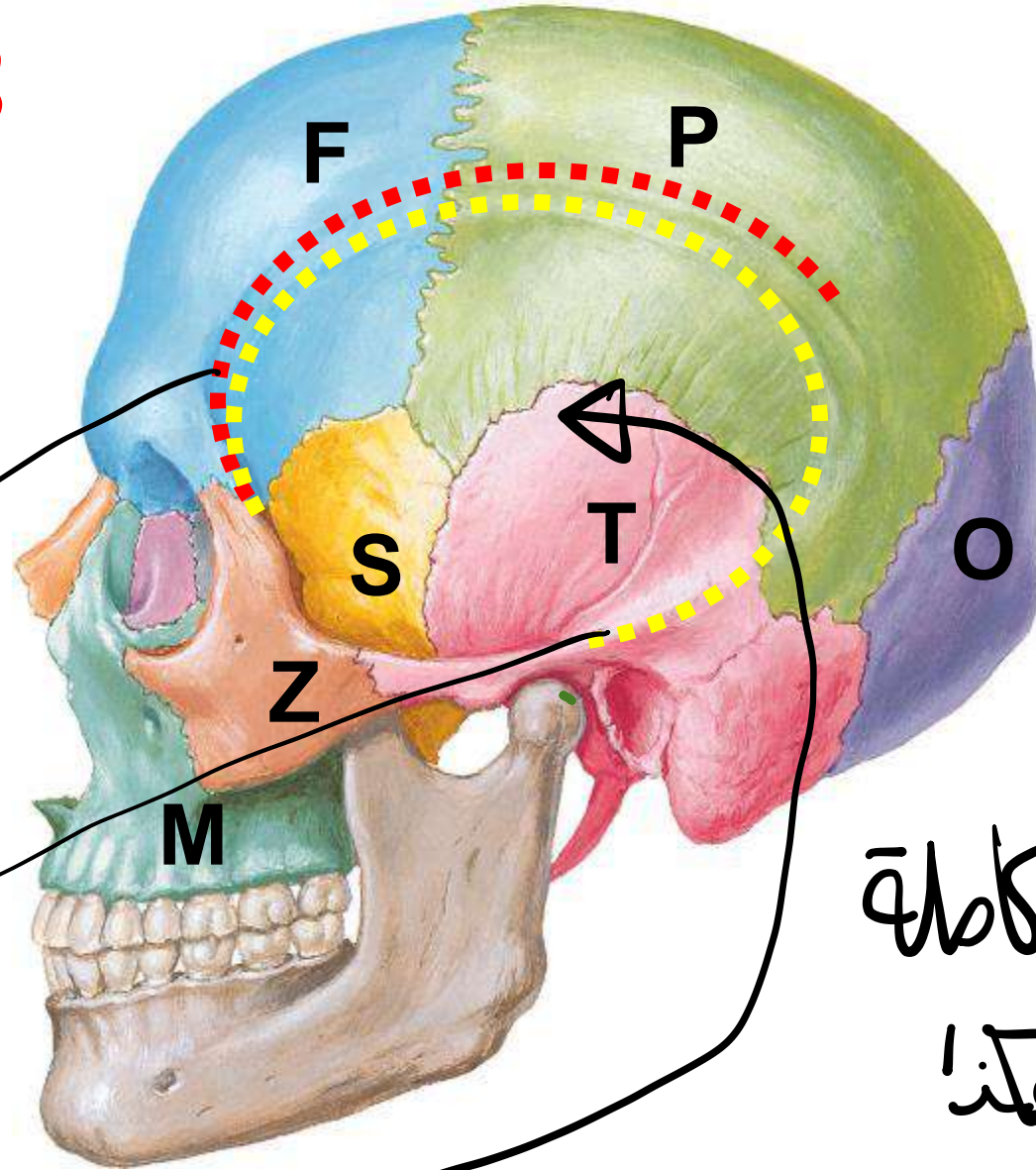
*It is formed of: frontal, parietal, occipital, temporal, greater wing of sphenoid bone, maxilla and zygomatic bones.

1

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

2

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



المشرفة على
الجمجمة

3

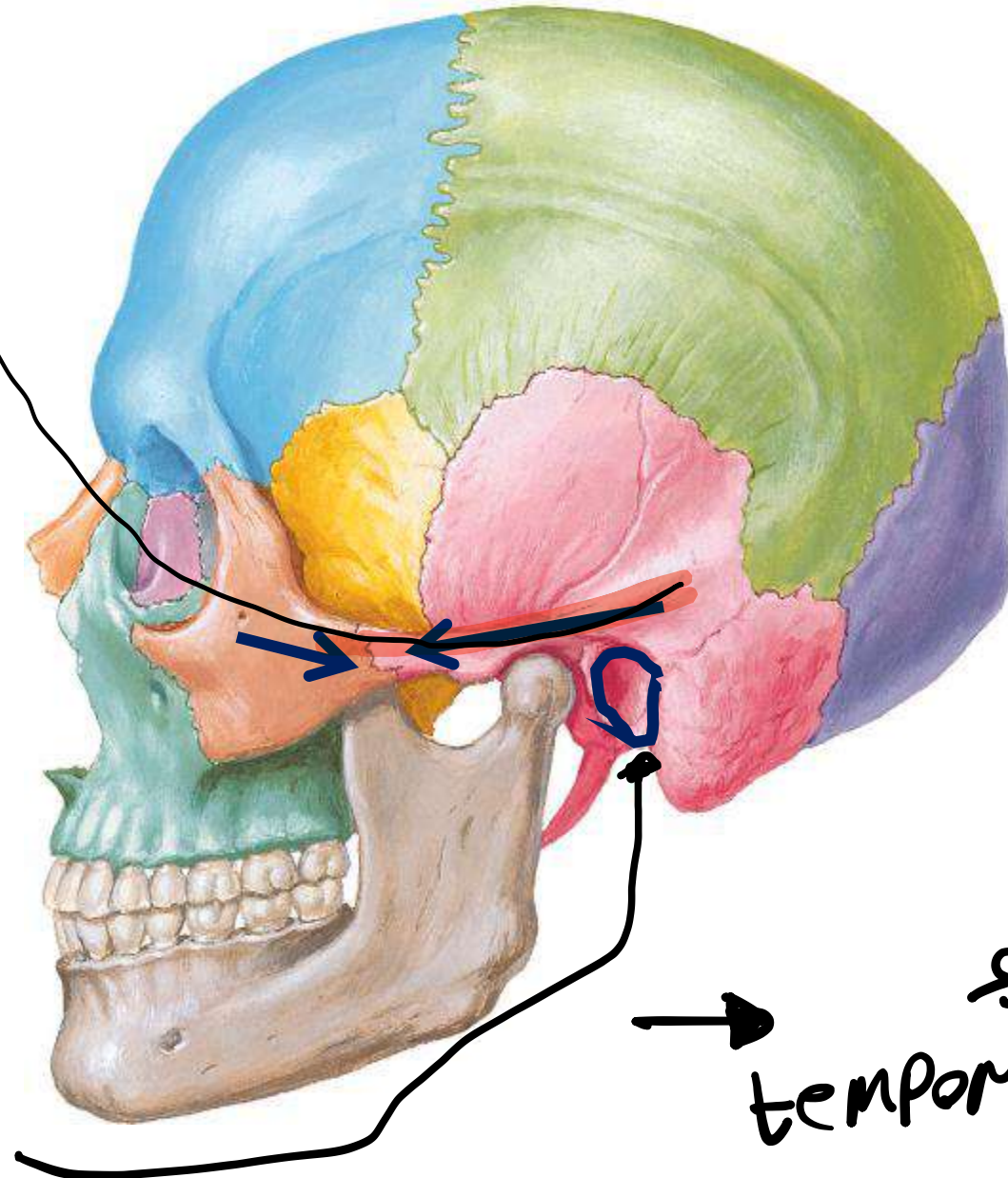
* The zygomatic arch:

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

2

* The external auditory meatus:

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



هي جزء
من ار temporal
وحيي جزء من ار ears

۴۴

بہروز

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

* It is a part of the temporal bone.

* It lies behind the external auditory meatus.

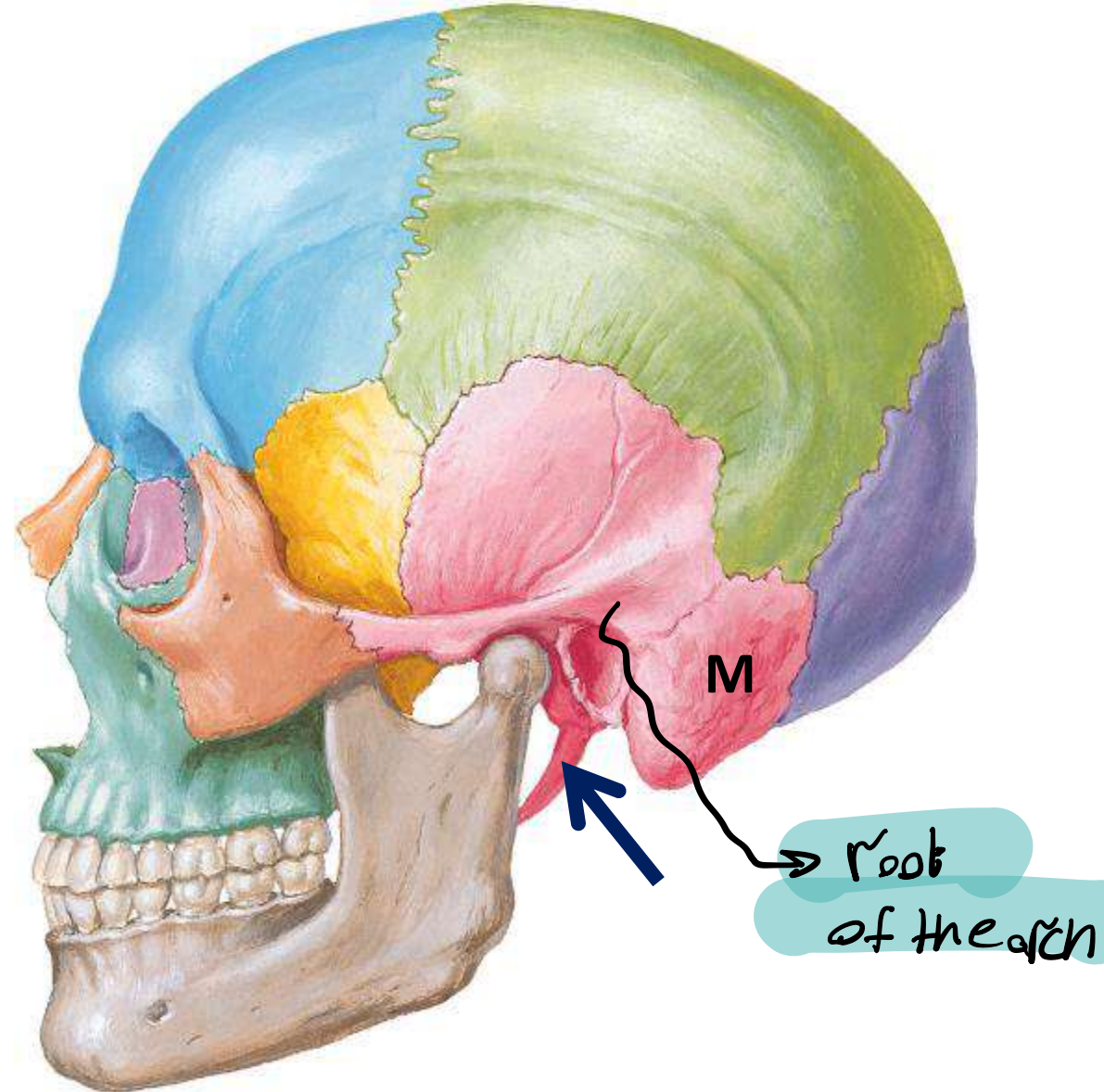
۴۵

بہروز

* **The Styloid process (↑):**

* It is a slender projection of the temporal bone.

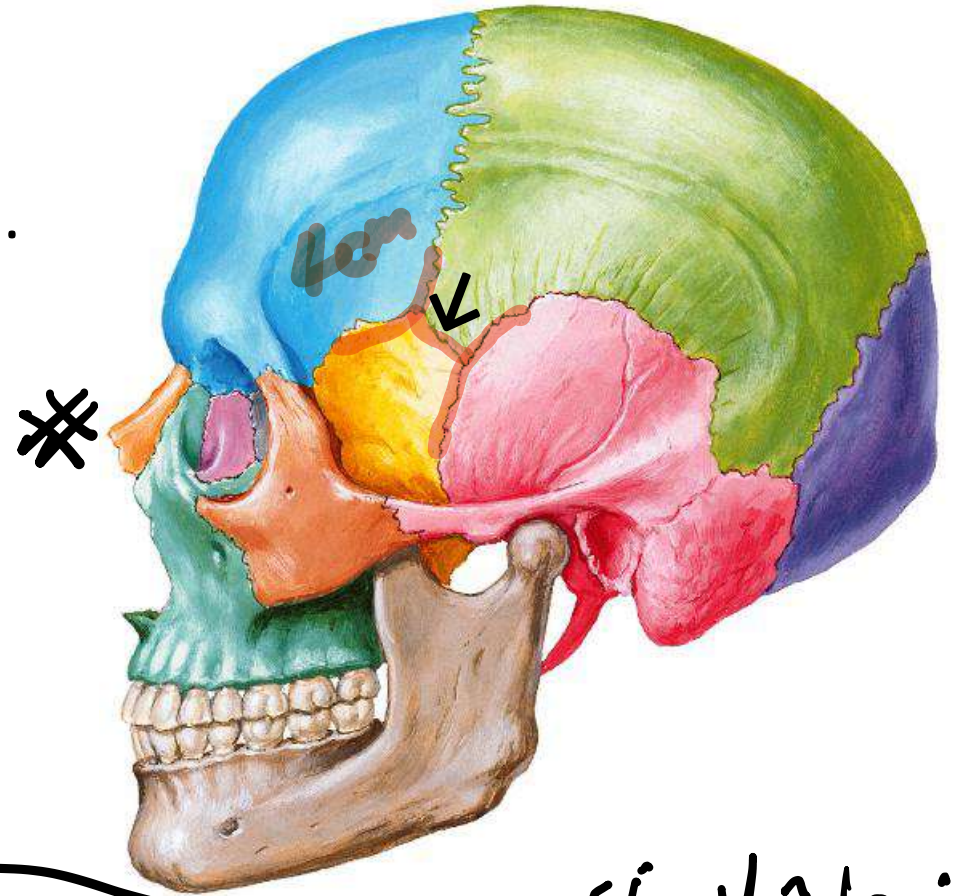
ترکیب اسطوائی



6

* 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.



فیهما شریان و عروق
کسی بہتر باوریم

اسم الدج یا کج یمیر

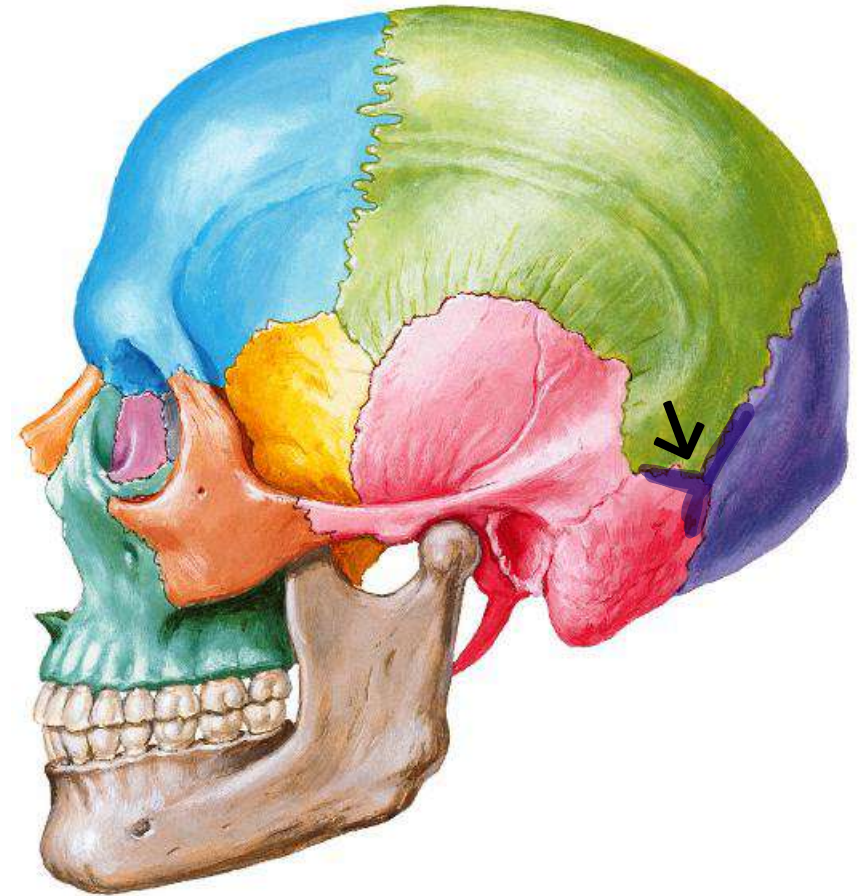
7

* 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.

✘



● هذه ال (7) تصيغات السابقة لم أكتب لها شرحًا

لأنها مجرد وصف لمواقعهم + حدثت الأسماء المتعلقة فيهم
+ مستوى ملاحظات مهمة .

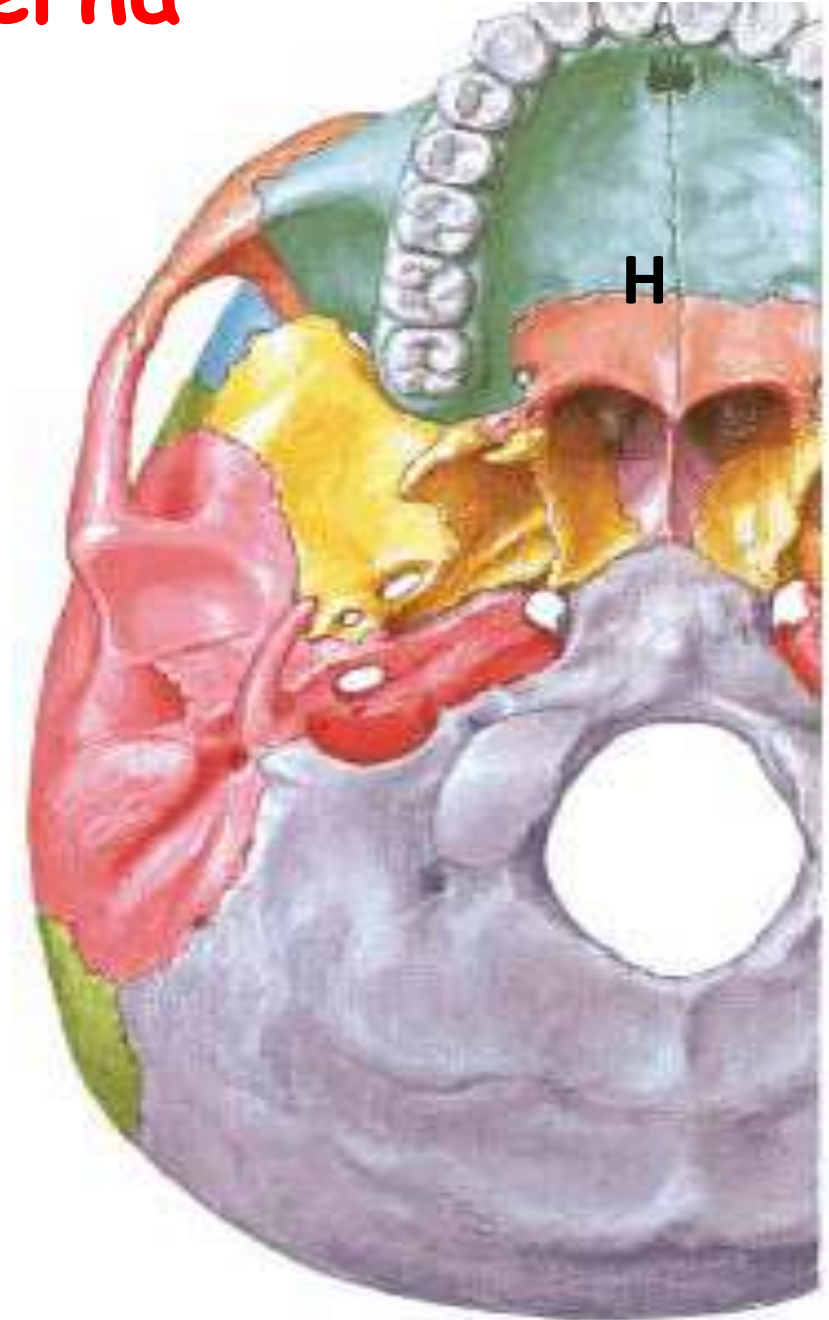
* لا يمكن الفهم بدون الشرح .

Norma Basalis Externa

A. Anterior part:

- * It is formed by the hard palate (H).
- * The hard palate is bounded anteriorly by the alveolar arch, which has 16 sockets for the roots of the upper teeth.

القالب الذي يعمل الأسنان



* **The greater palatine foramen (↓)** lies in the posterior part of the hard palate. It gives passage to greater palatine nerve & vessels.

* **The lesser palatine foramina,** usually two, lie behind the greater palatine foramen. They give passage to lesser palatine nerve & vessels.

* **The maxillary tuberosity (→)** is present at the posterior end of the alveolar arch.

* **The incisive fossa (↑)** lies posterior to the central incisor teeth. It contains foramina which serve as a connection between palate & nose.

الحنك ←

