



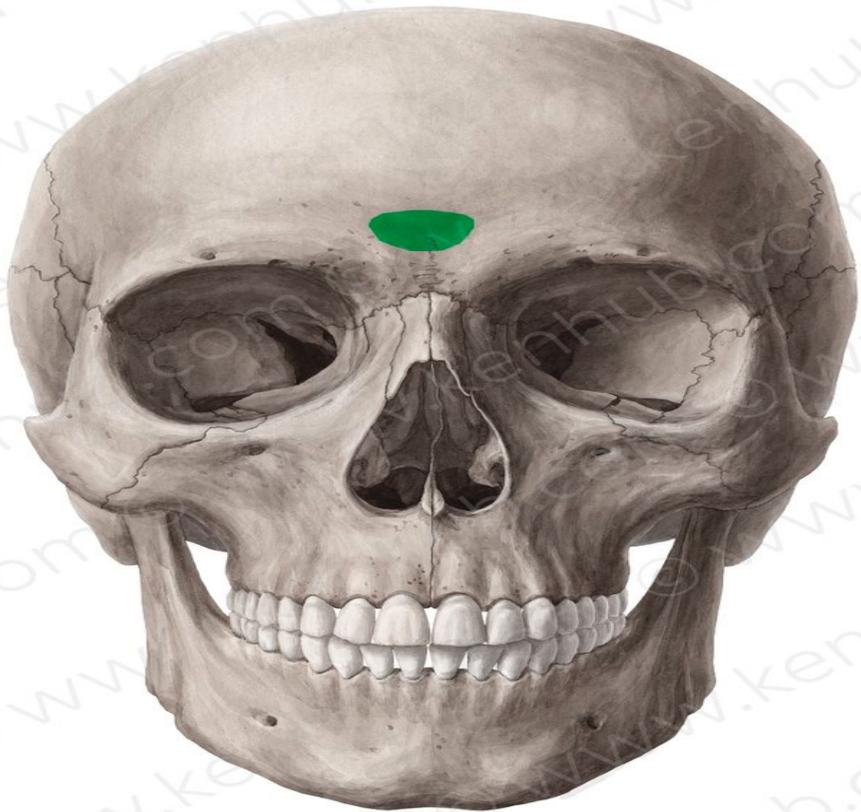
# Skull

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**DR. AHMED SALMAN**

**Associate professor of anatomy**

- ❑ The skull is formed of separate bones (6 single and 8 paired).
- ❑ Many of these bones articulate with one another by **sutures**.



❑ The skull is studied in six views, each is called norma :

- ✓ From in front : Norma frontalis
- ✓ From above : Norma verticalis.
- ✓ From behind : Norma occipitalis.
- ✓ From the side : Norma lateralis.
- ✓ From below: Norma basalis externa.
- ✓ From inside : Norma basalis interna.

# Norma Frontalis

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## **Norma Frontalis:**

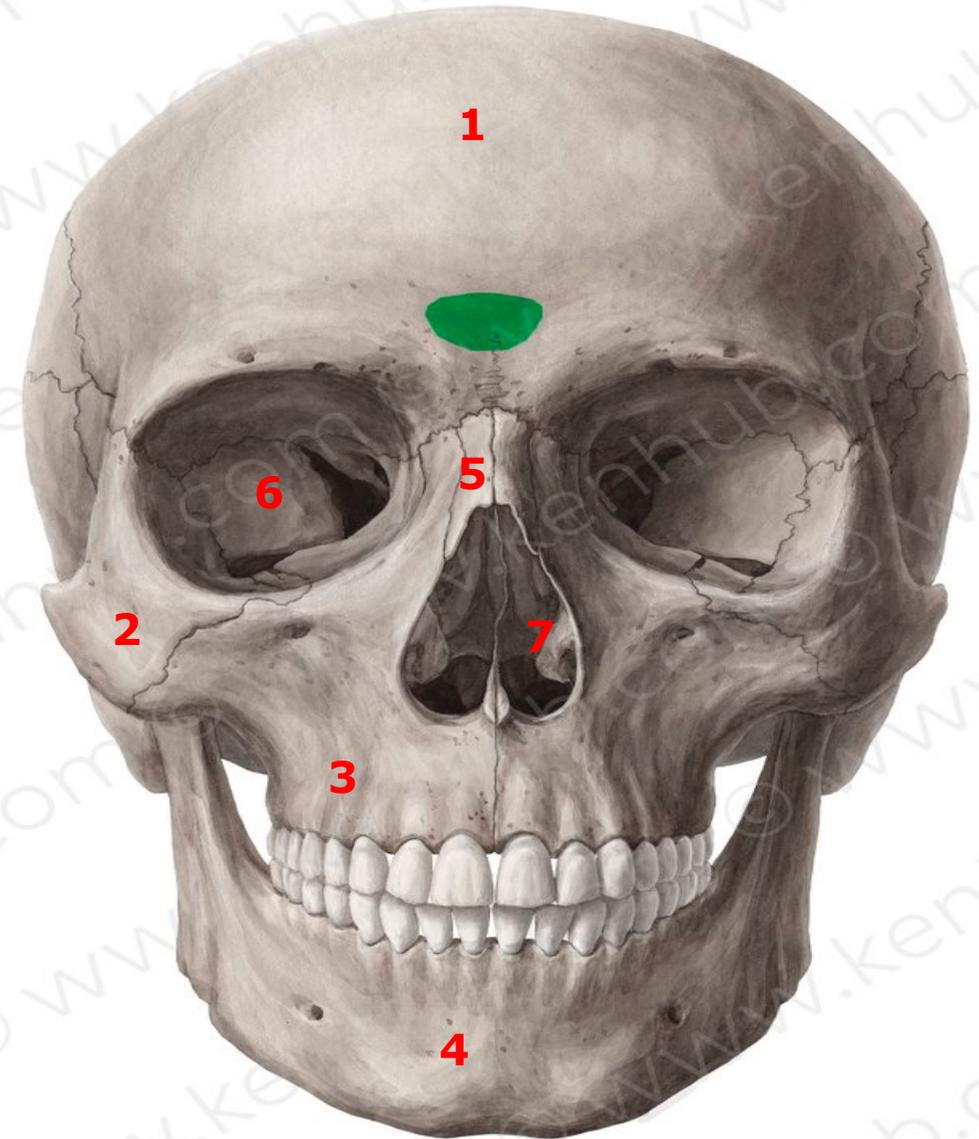
### **➤ Boons :**

1. The frontal bone with its maxillary and zygomatic processes.
2. The two nasal bones.
3. The zygomatic bone with its maxillary and frontal processes.
4. The maxilla with its zygomatic, frontal and alveolar processes.

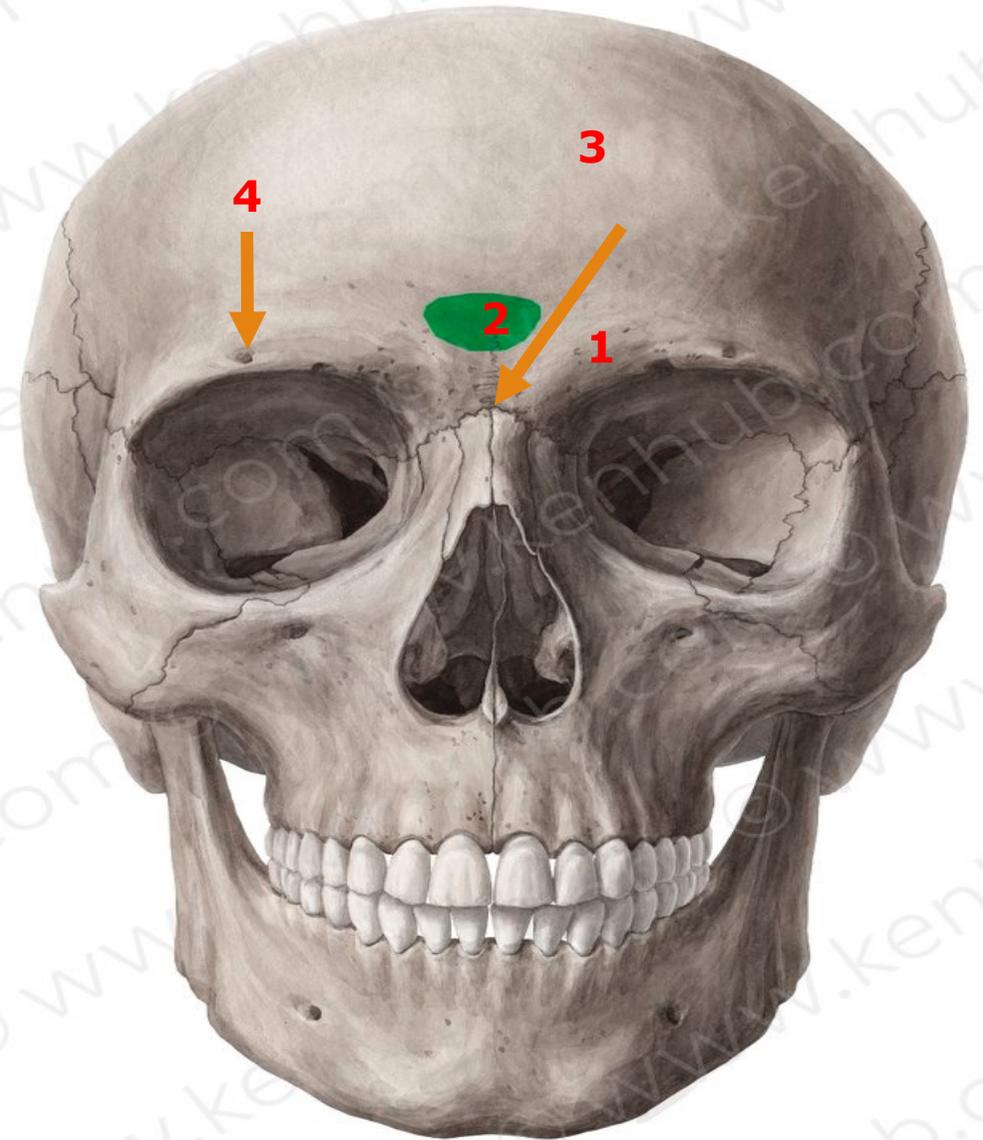
### **➤ Apertures :**

1. Two orbital apertures.
2. The anterior nasal aperture.

1. Frontal bone
2. Zygomatic bone
3. Maxilla
4. Mandible
5. Nasal bone
6. Orbital apertures.
7. Anterior nasal aperture



1. The supraciliary arch
2. The glabella (is a median elevation between the two superciliary arches)
3. The nasion (The nasion : is the meeting point between the frontal bone and the two nasal bones)
4. The supraorbital foramen





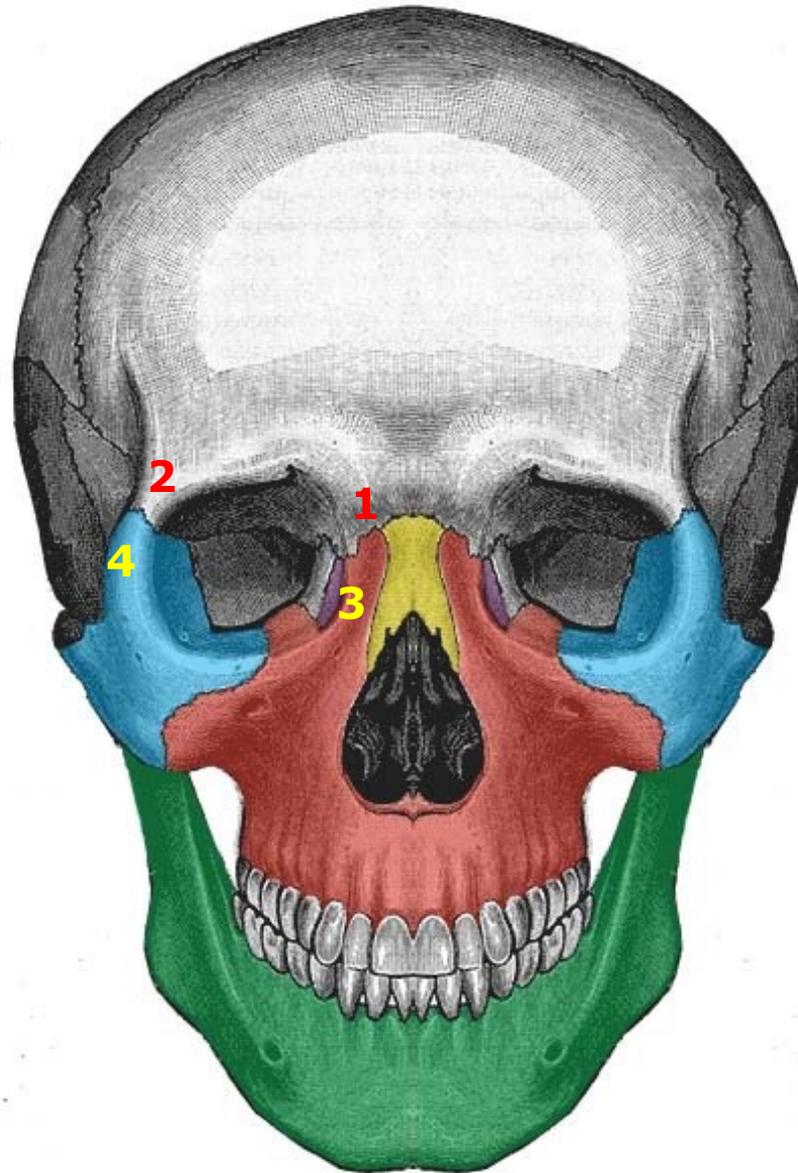
**Frontal**

**Maxillary process of frontal bone**

**Maxilla**

**Frontal process of Maxilla**

1. Maxillary process of frontal bone
2. Zygomatic process of frontal bone
3. Frontal process of Maxilla
4. Frontal process of Zygomatic



-  Zygomatic
-  Maxilla
-  Nasal
-  Lacrimal
-  Mandible

## Maxilla Bone

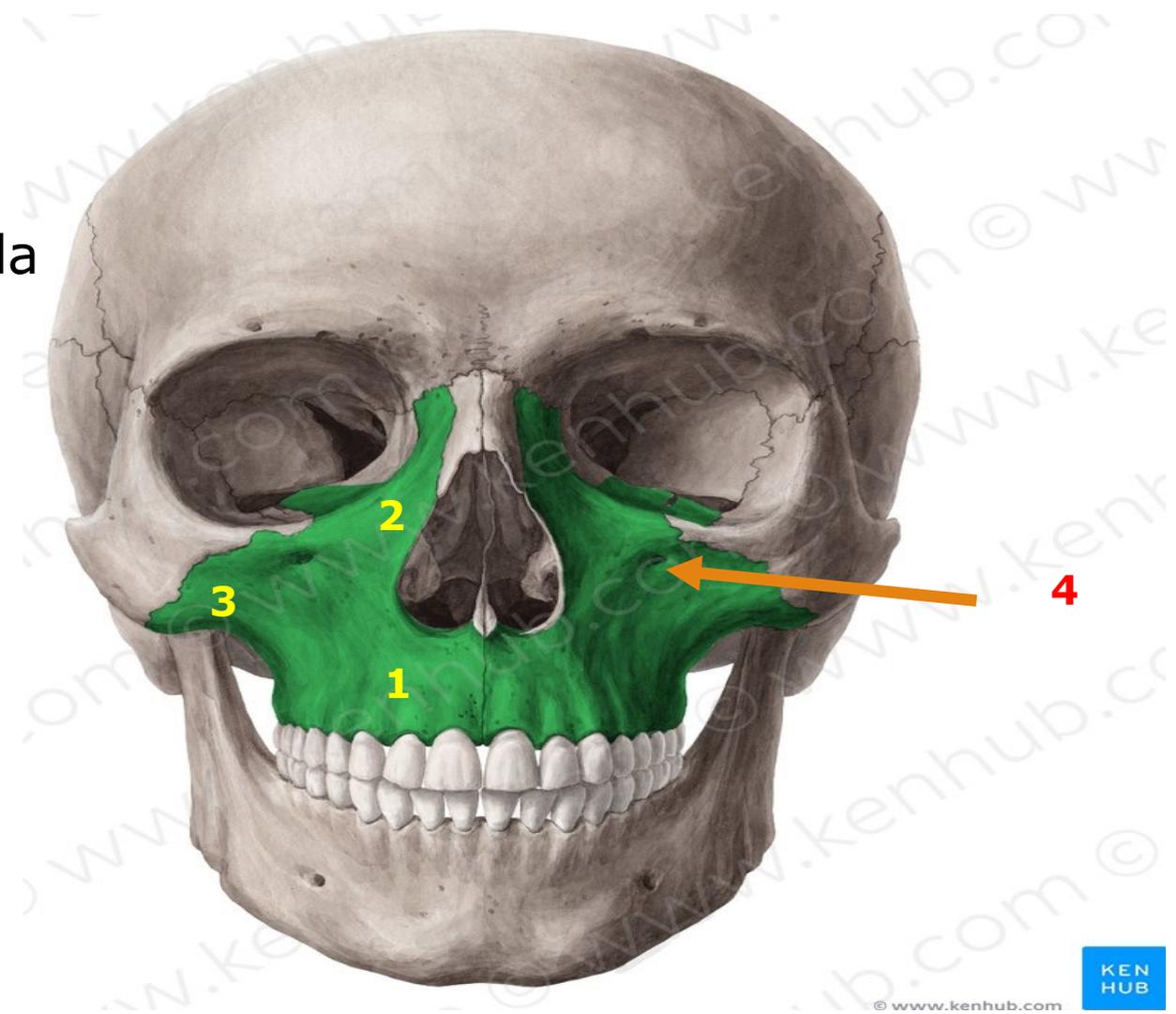
1. Alveolar process of Maxilla

(The two alveolar processes unite to form the alveolar arch ( upper jaw)).

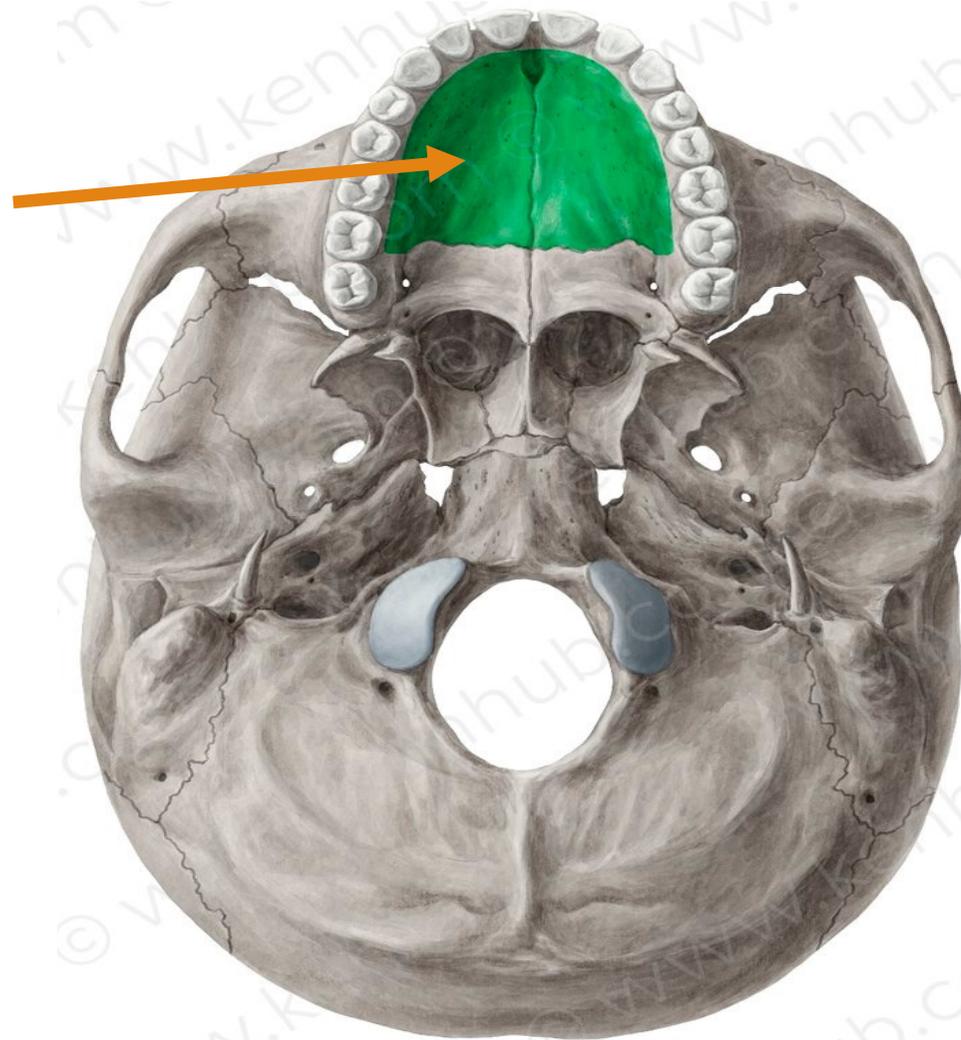
2. Frontal process of Maxilla

3. Zygomatic process of Maxilla

4. Infraorbital foramen



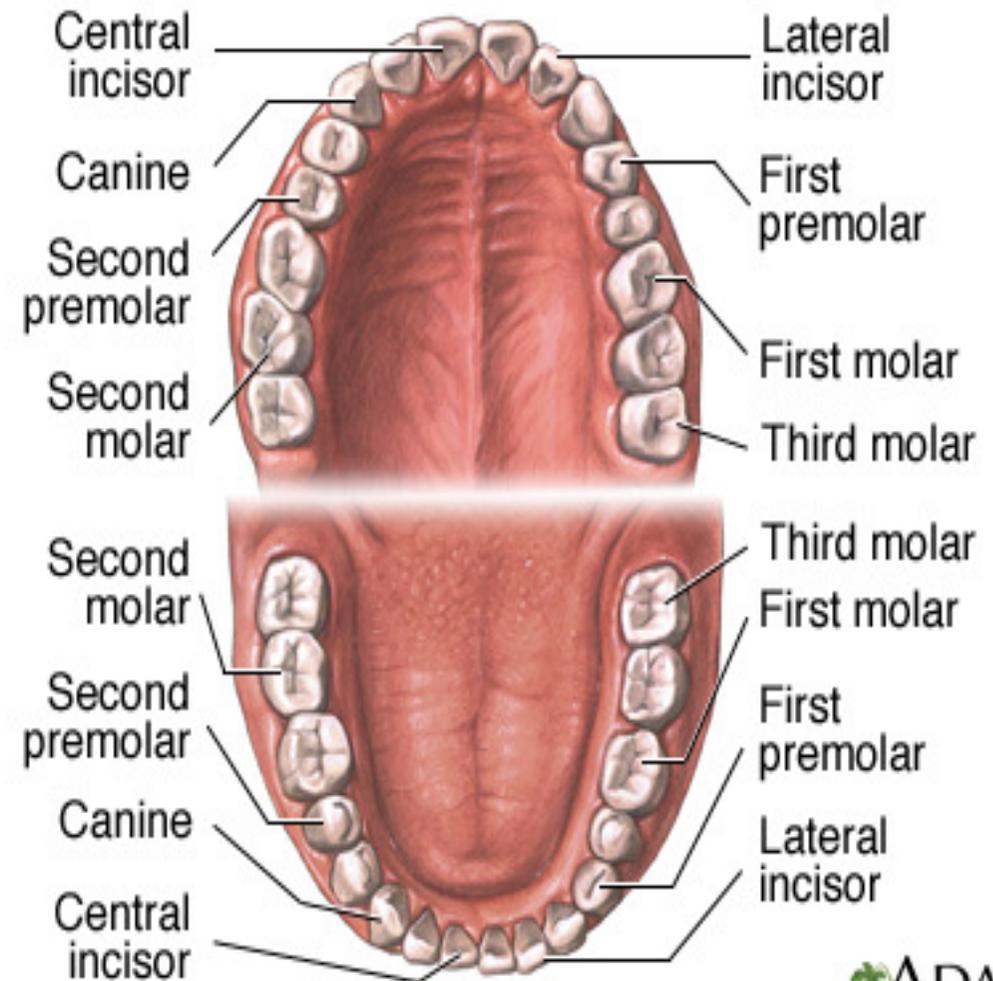
**5- Palatine process of maxilla**



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## Number of teeth is 32 in both jaws

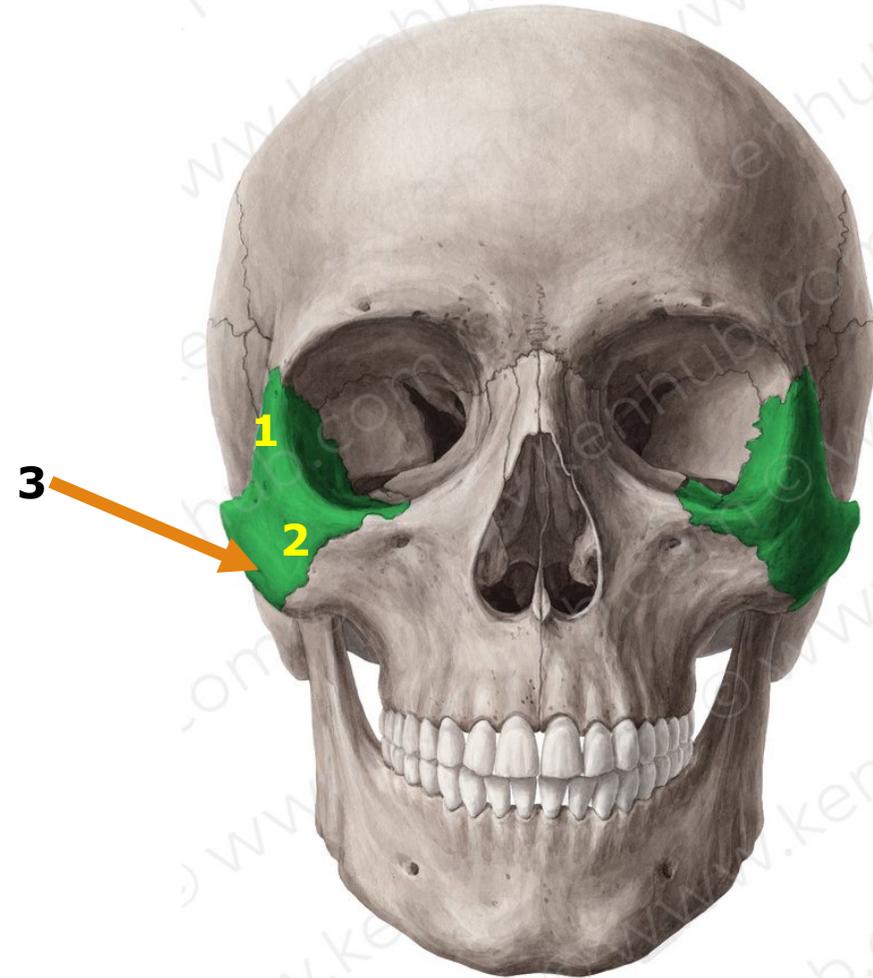
Incisors : 8  
Canines : 4  
Premolars : 8  
Molars : 8  
Third molars : 4



ADAM.

## Zygomatic Bone

1. Frontal process of Zygomatic bone
2. Maxillary process of Zygomatic bone
3. zygomatico-facial foramen



# Norma verticalis

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## **Norma Verticalis :**

This view presents :

### ➤ **4 bones**

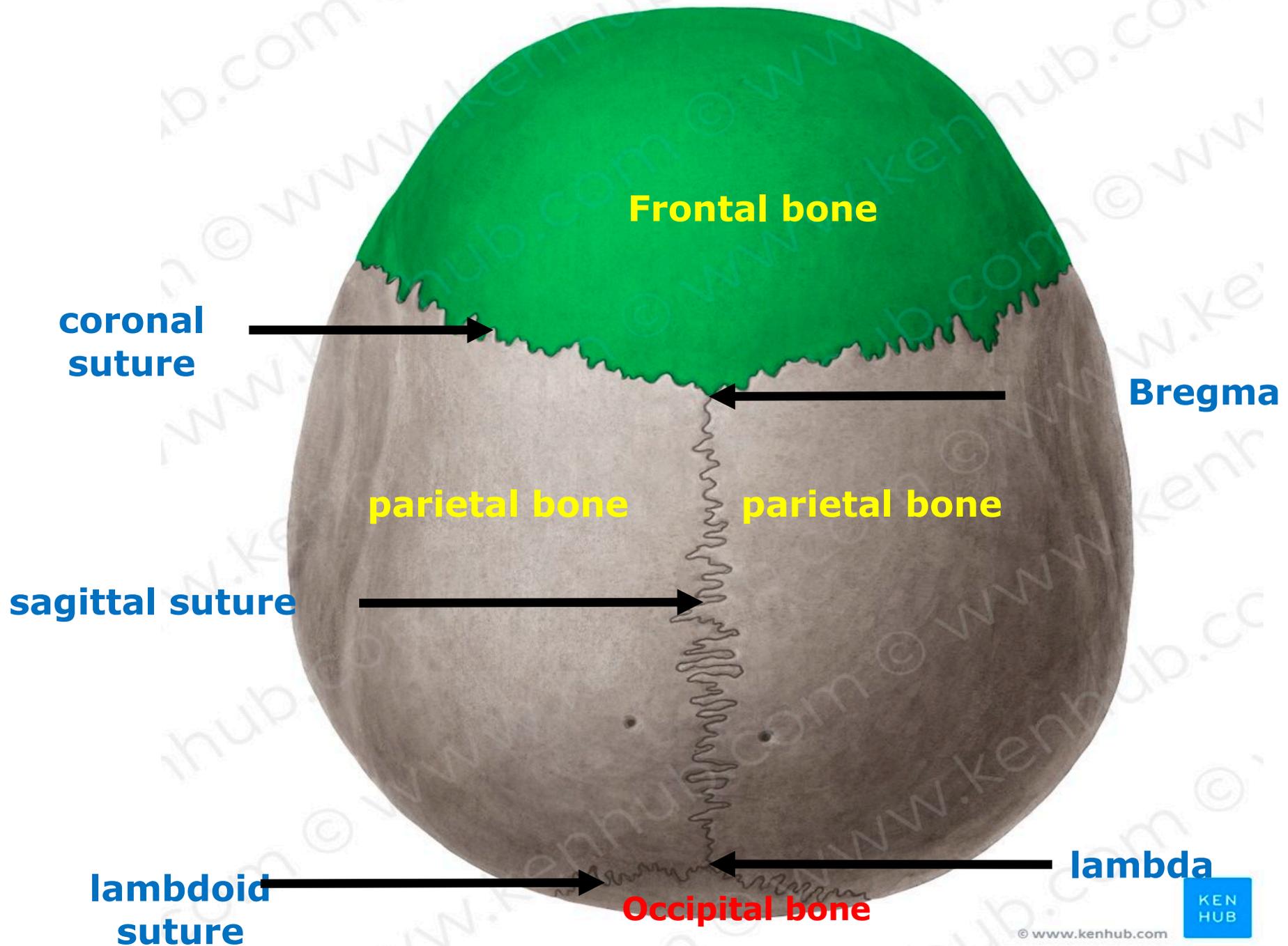
- Anteriorly : The frontal bone
- Laterally : The two parietal bones
- Posteriorly : The occipital bone

### ➤ **3 sutures :**

The coronal suture : between the frontal bone and the two parietal bones.

The sagittal suture : between the two parietal bones.

The lambdoid suture : between the occipital bone and the two parietal bones.



## ➤ 2 meeting points :

### **The bregma :**

- ❑ Is the meeting of the coronal and sagittal sutures.
- ❑ It is the site of the anterior fontanelle

### **The lambda :**

- ❑ Is the meeting of the lambdoid and sagittal sutures.
- ❑ It is the site of the posterior fontanelle .

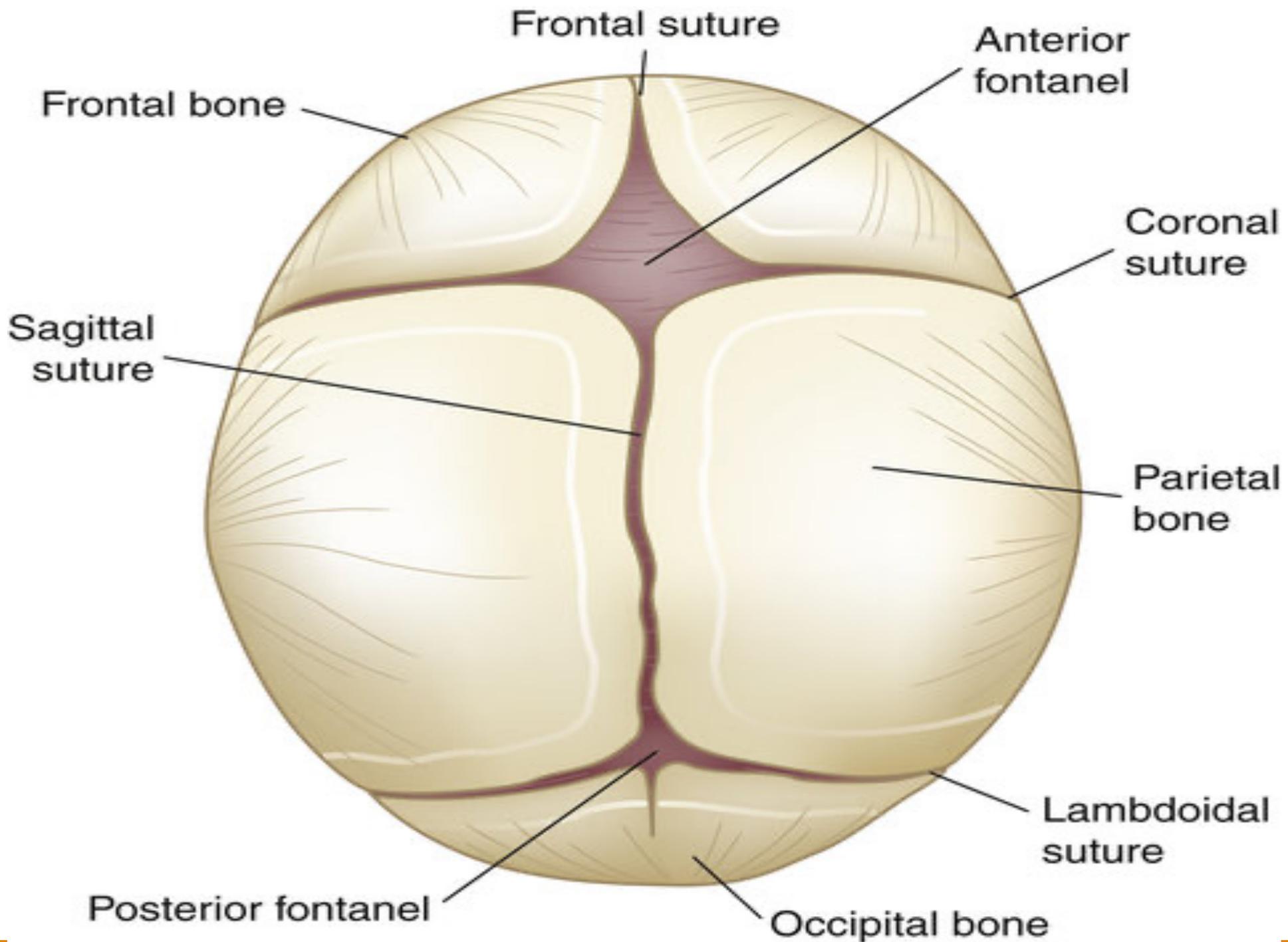
## ➤ 2 Fontanelle :

### **Anterior fontanelle**

- ❑ It is a membrane-filled rhomboidal area.
- ❑ It usually closes 1.5-2 years after birth.
- ❑ It is the site of the bregma

### **Posterior fontanelle**

- ❑ It is a membrane-filled triangular area
- ❑ It usually closes 3-6 months after birth
- ❑ It is the site of the lambda.



# **Norma Occipitalis**

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## **Norma Occipitalis:**

Special Features :

- External occipital protuberance: is a median elevation on the occipital bone.
- External occipital crest: extends from the protuberance to the foramen magnum.
- The superior nuchal lines : extend laterally from the protuberance.



**Superior nuchal lines**



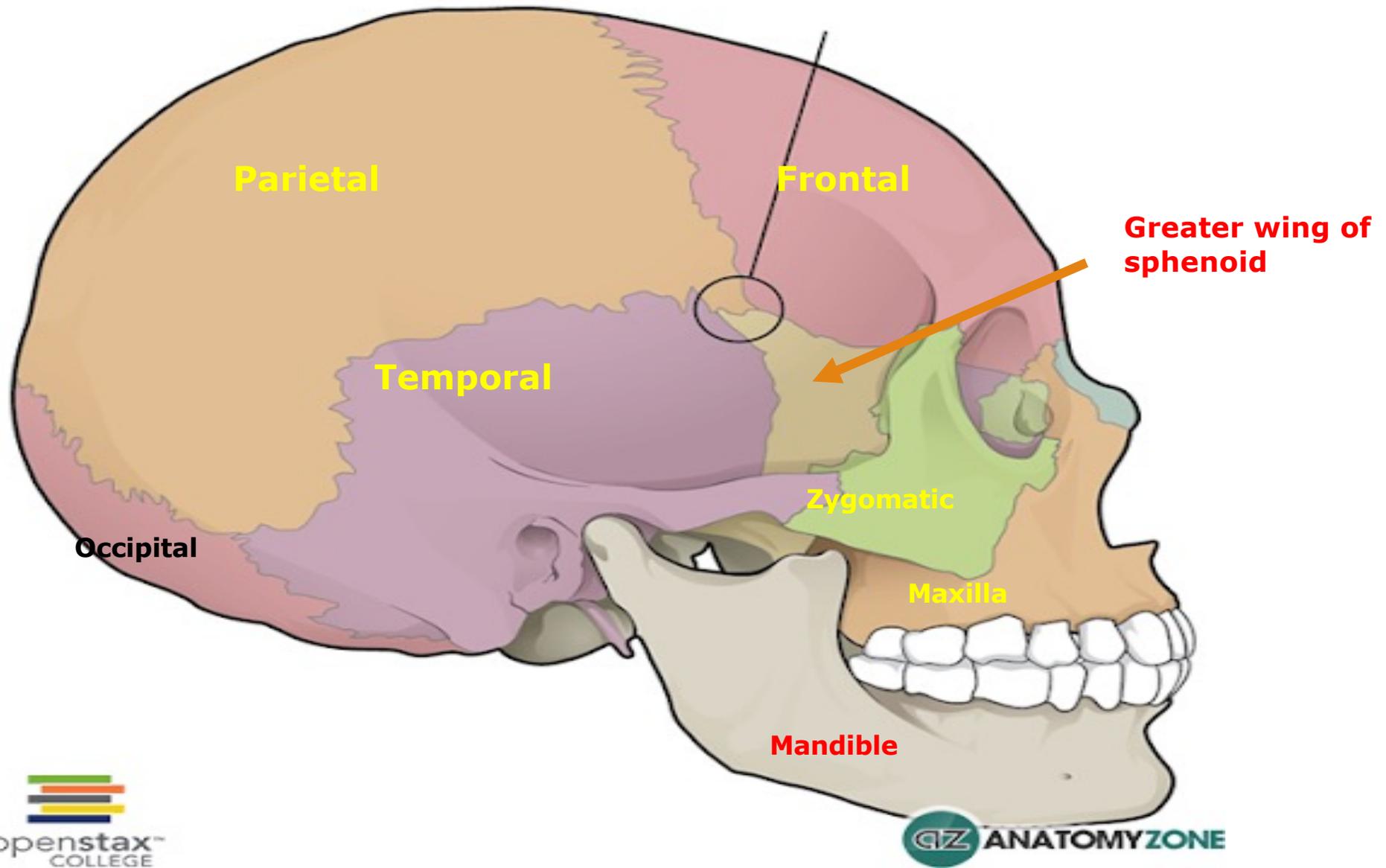
**External occipital protuberance**



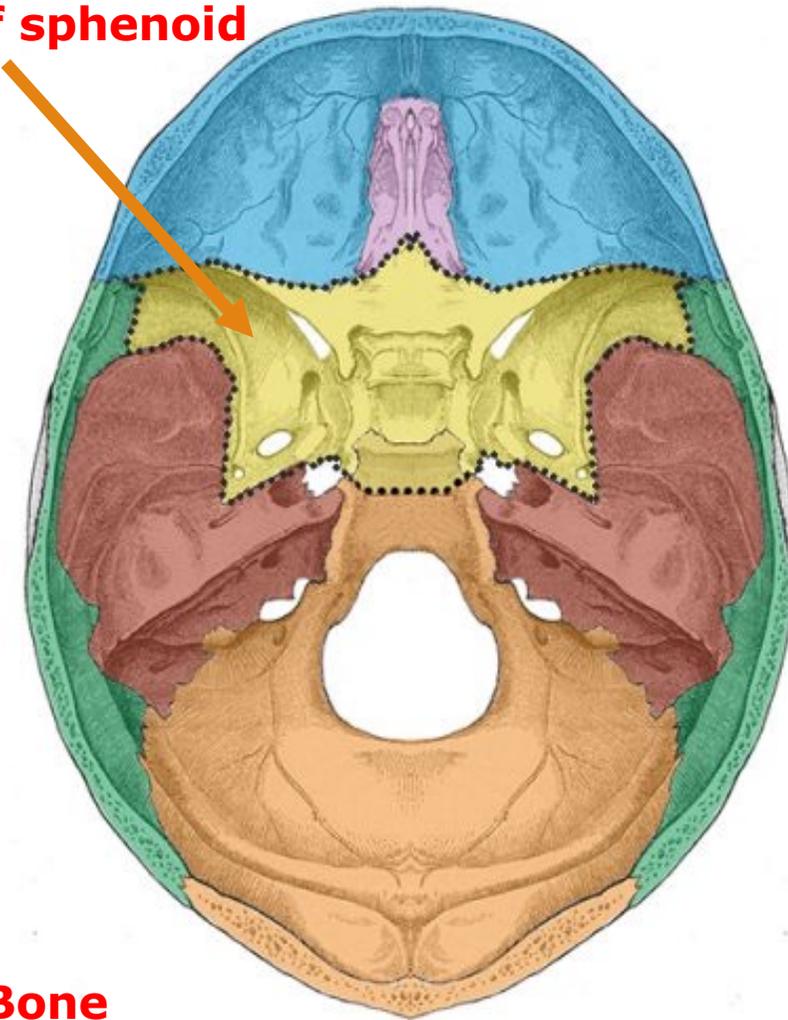
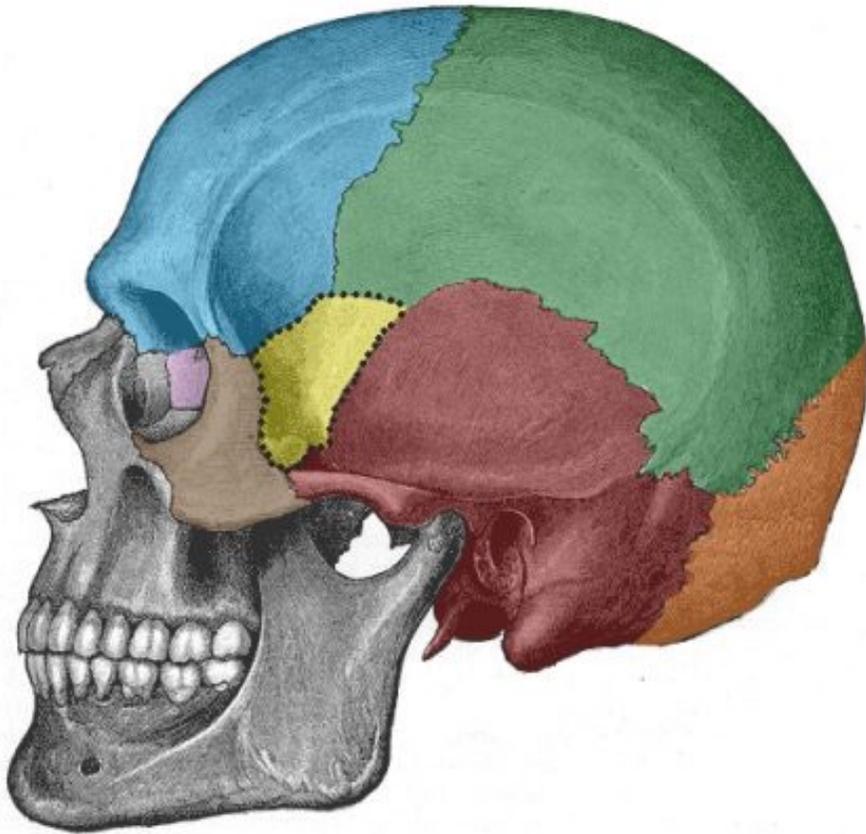
External  
occipital crest

# Norma Lateralis

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**Greater wing of sphenoid**



- Frontal
- Ethmoid
- Sphenoid
- Temporal
- Parietal
- Occipital
- Zygomatic

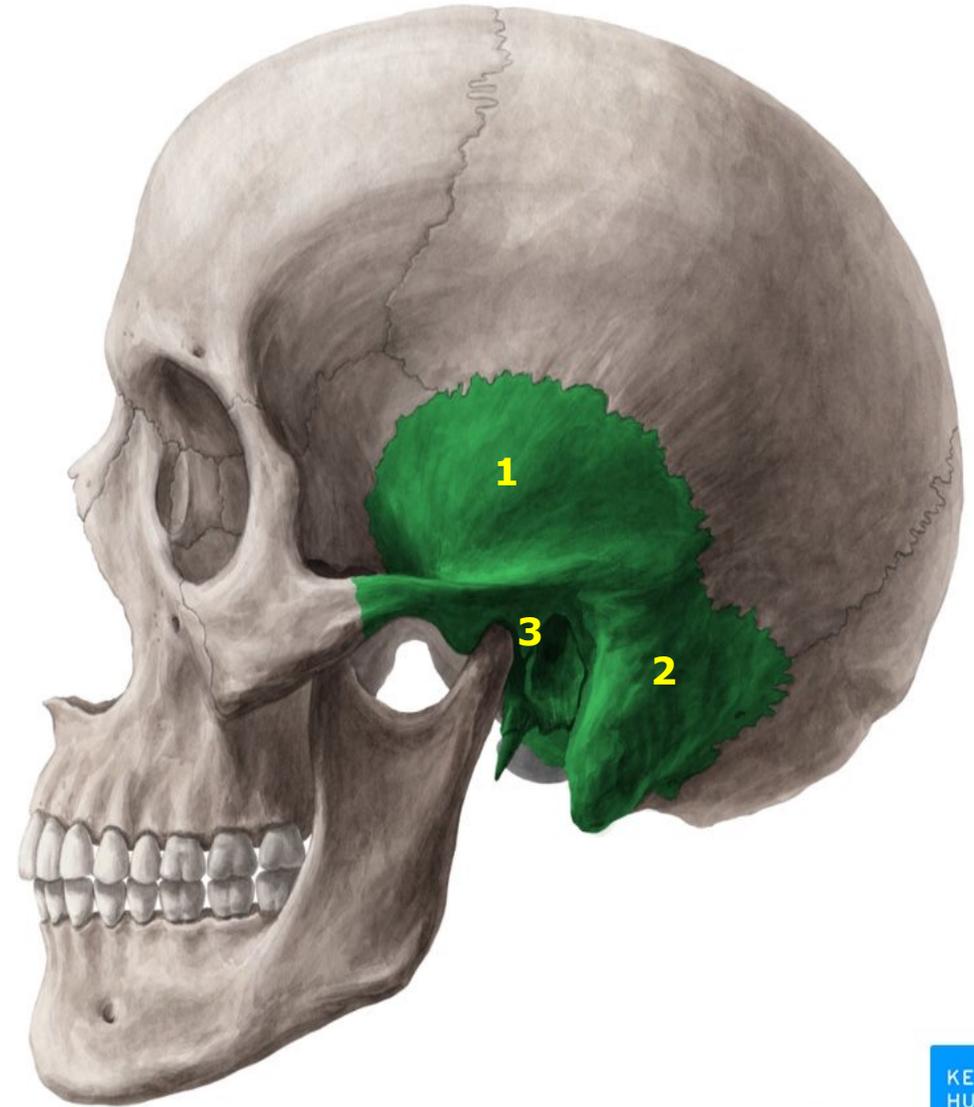
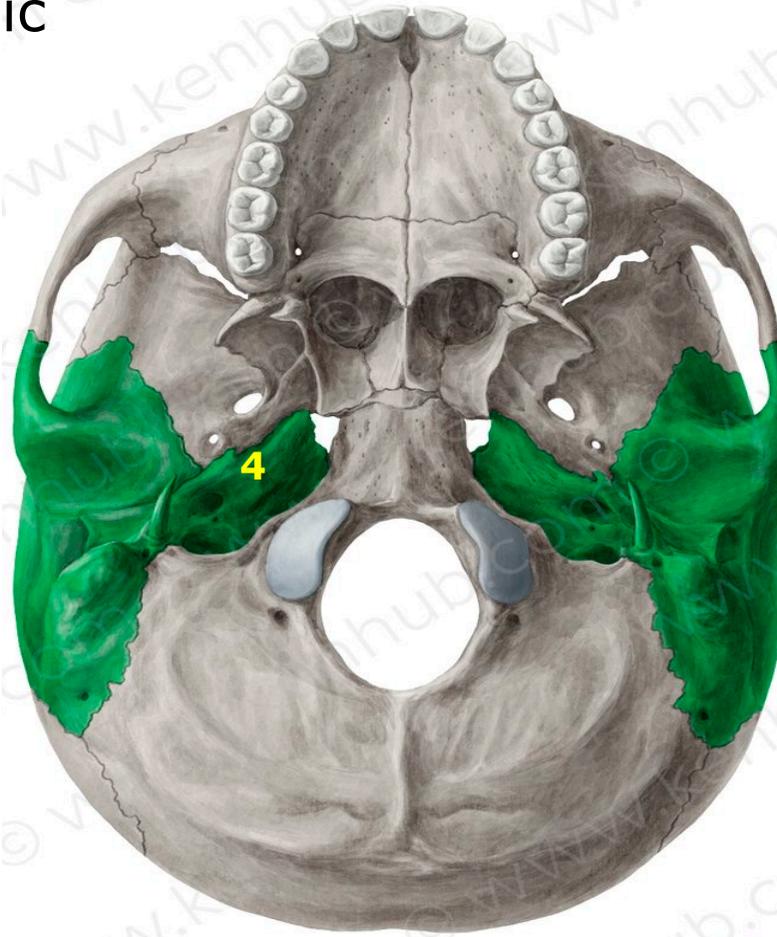
**Sphenoid Bone**

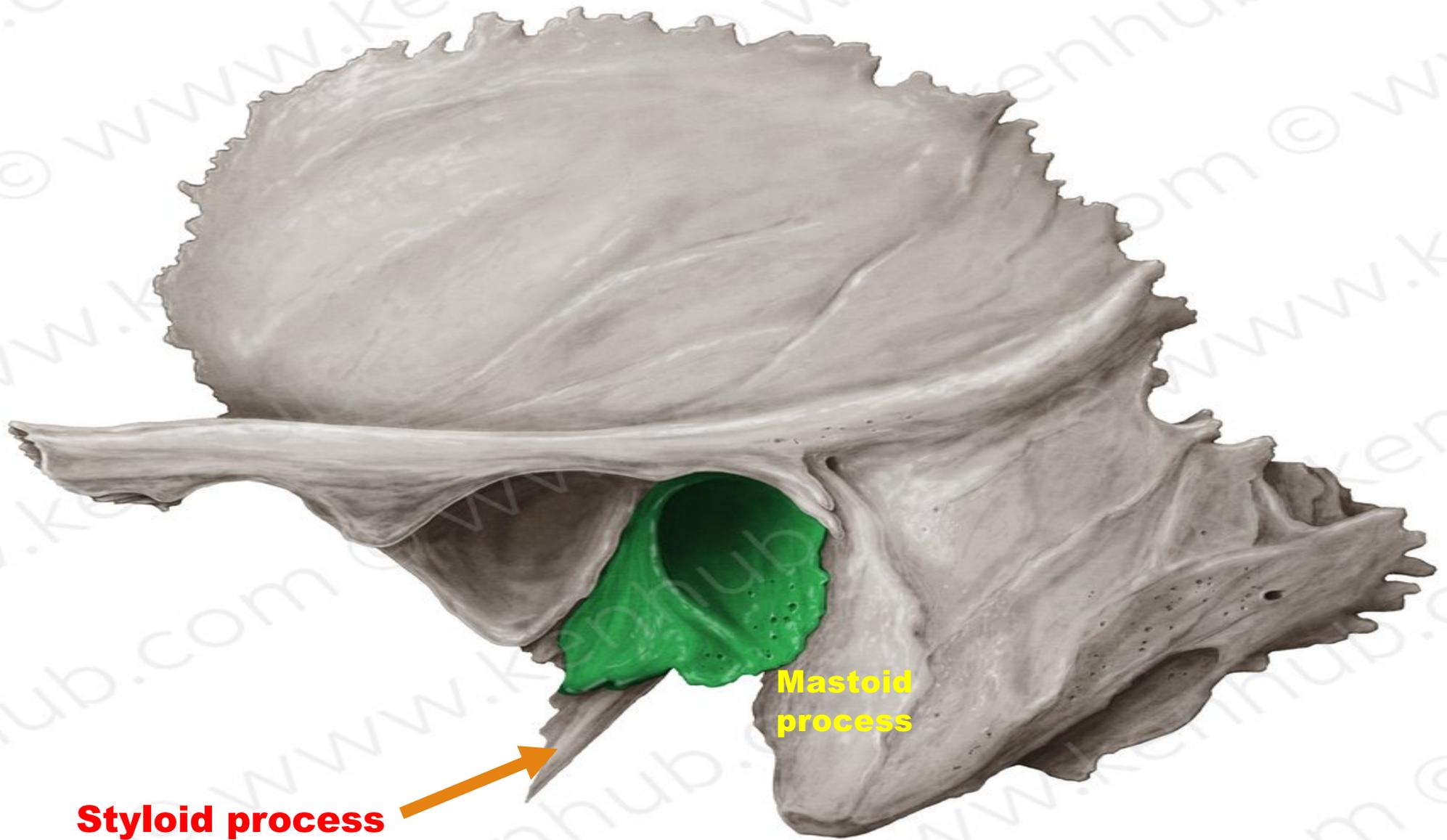
© TeachMeAnatomy<sub>inc</sub>

# Temporal bone

Is composed of 4 parts

1. Squamous
2. Mastoid
3. Tympanic
4. Petrous





**Styloid process**

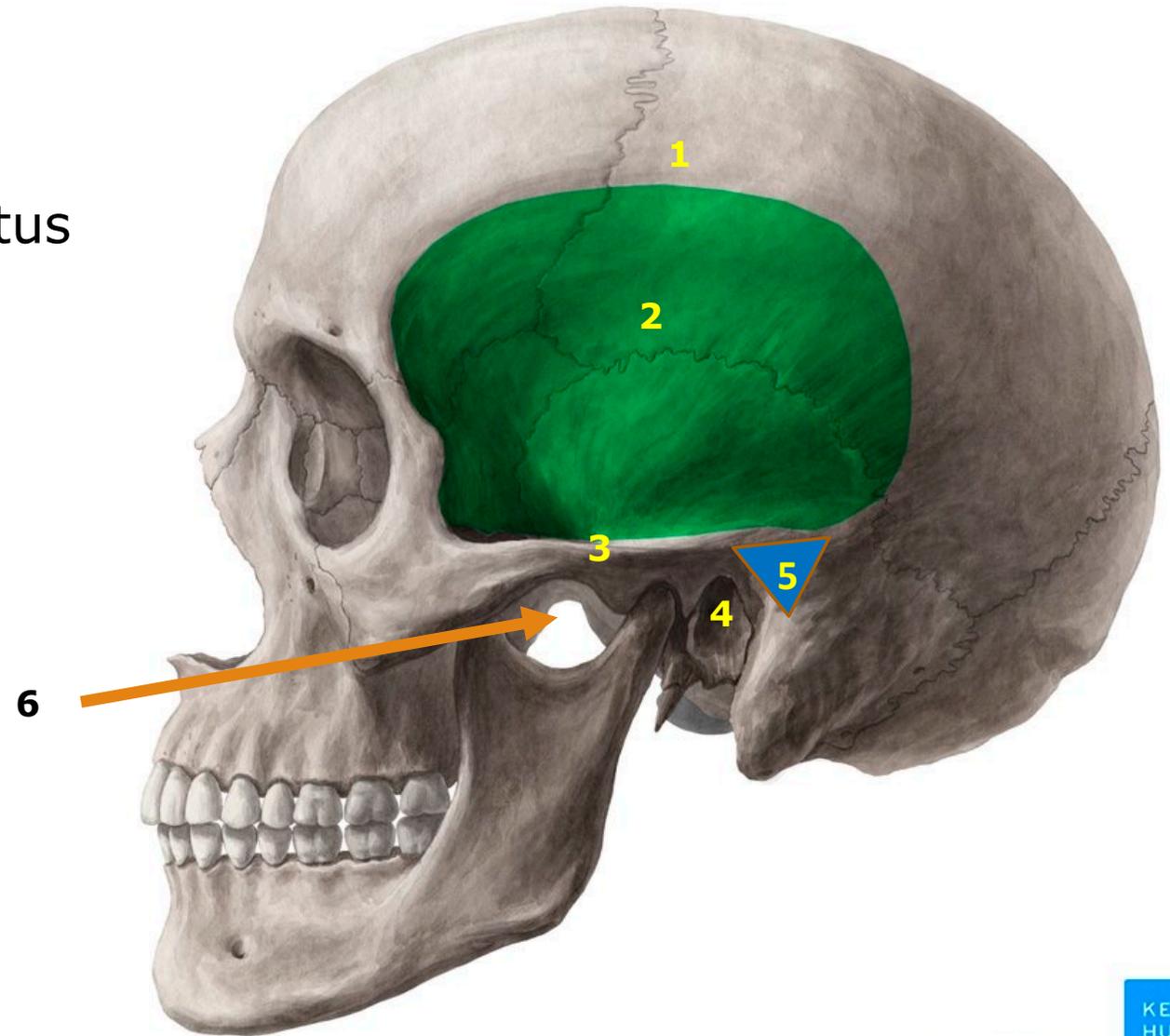
**Mastoid process**

**Green area is Tympanic part of temporal bone**



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1. Temporal lines (superior and inferior )
2. Temporal fossa
3. Zygomatic arch
4. The External Auditory Meatus
5. Suprameatal triangle
6. Infratemporal fossa



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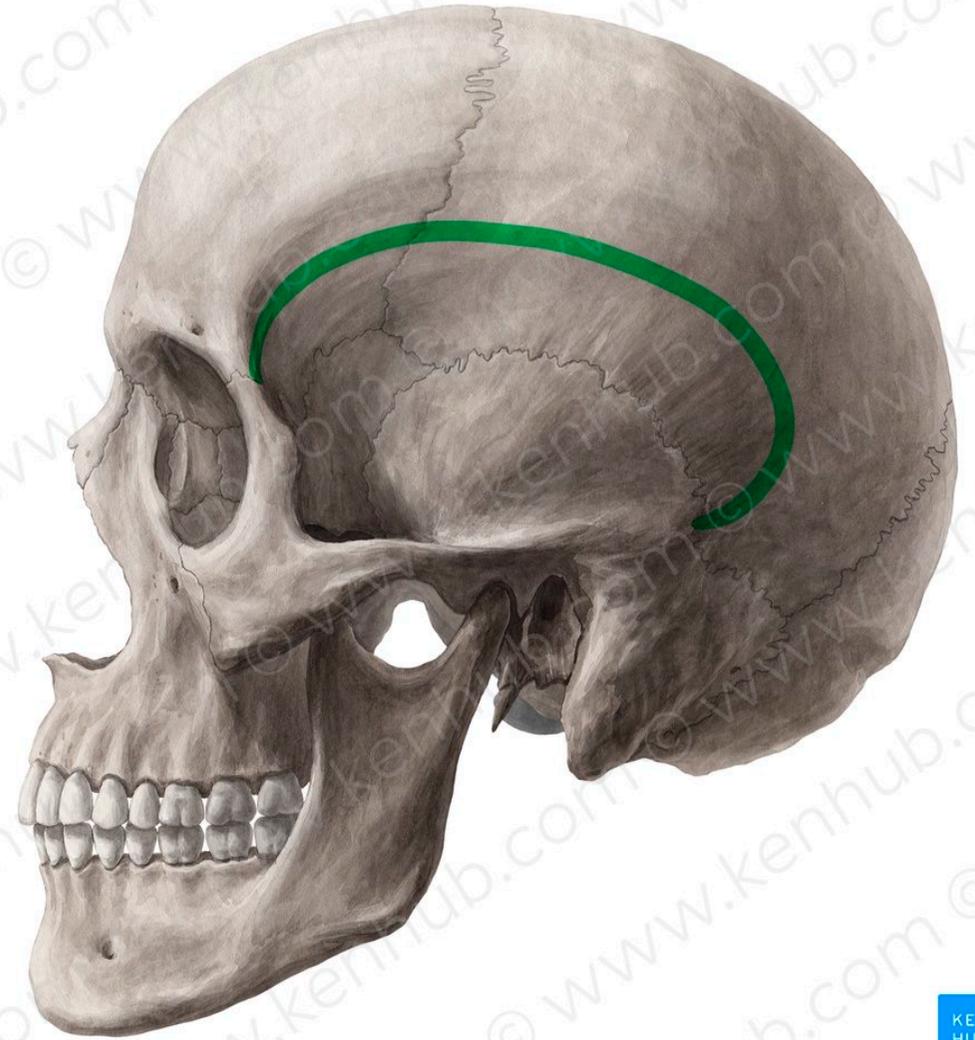




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**Superior temporal line**



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**Inferior temporal line**

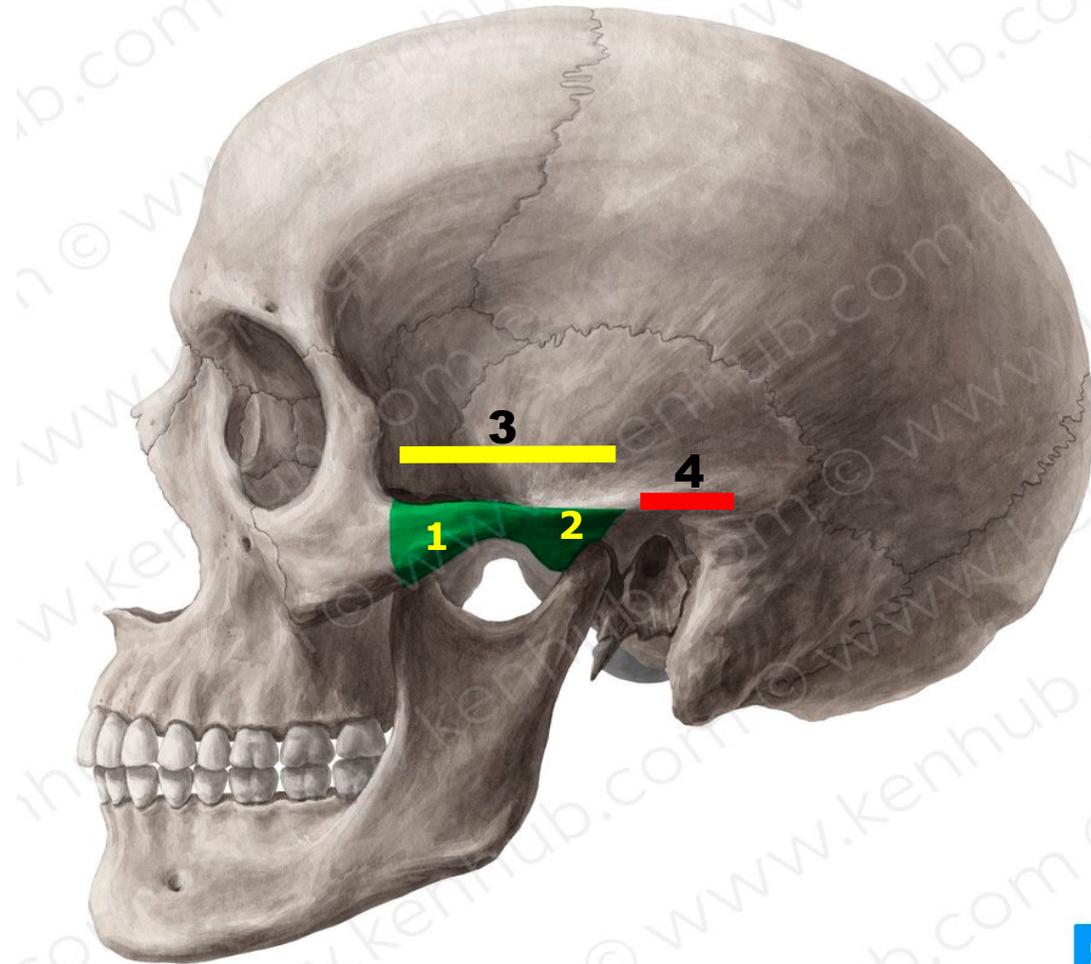
## The Zygomatic Arch (Zygoma):

- It is formed by the temporal process of the zygomatic bone and the zygomatic process of temporal bone.

Its posterior root passes above the external auditory meatus and joins the supramastoid crest.



1. Temporal process of Zygomatic bone
2. Zygomatic process of temporal bone
3. Zygomatic arch
4. Supramastoid crest

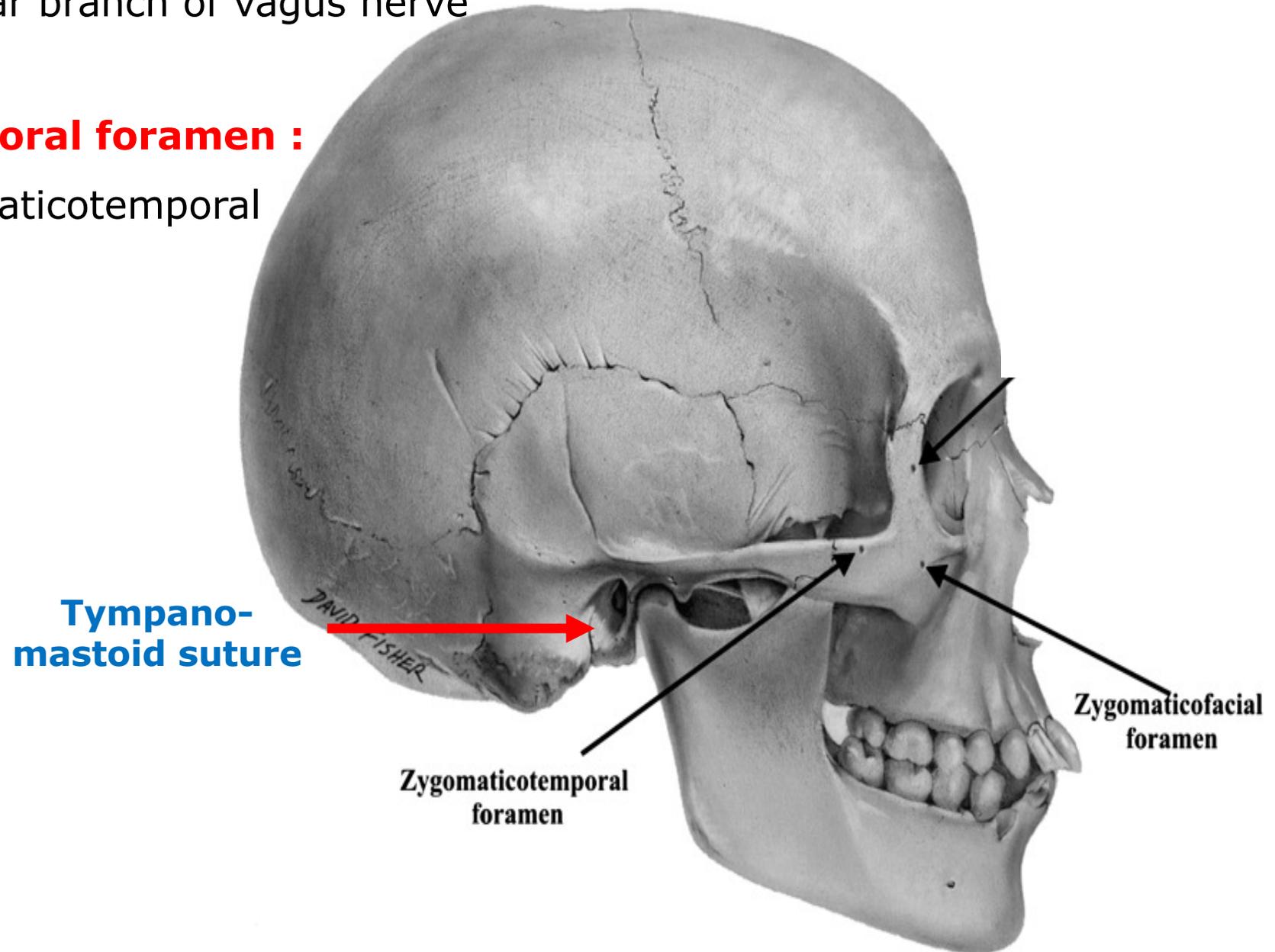


## **Tympano- mastoid suture :**

It transmit auricular branch of vagus nerve

## **Zygomaticotemporal foramen :**

It transmit zygomaticotemporal nerve



# Suprameatal triangle or Macewen's triangle

## Boundaries :

❖ **Superiorly:** Supramastoid crest.

❖ **Anterior-inferiorly:**

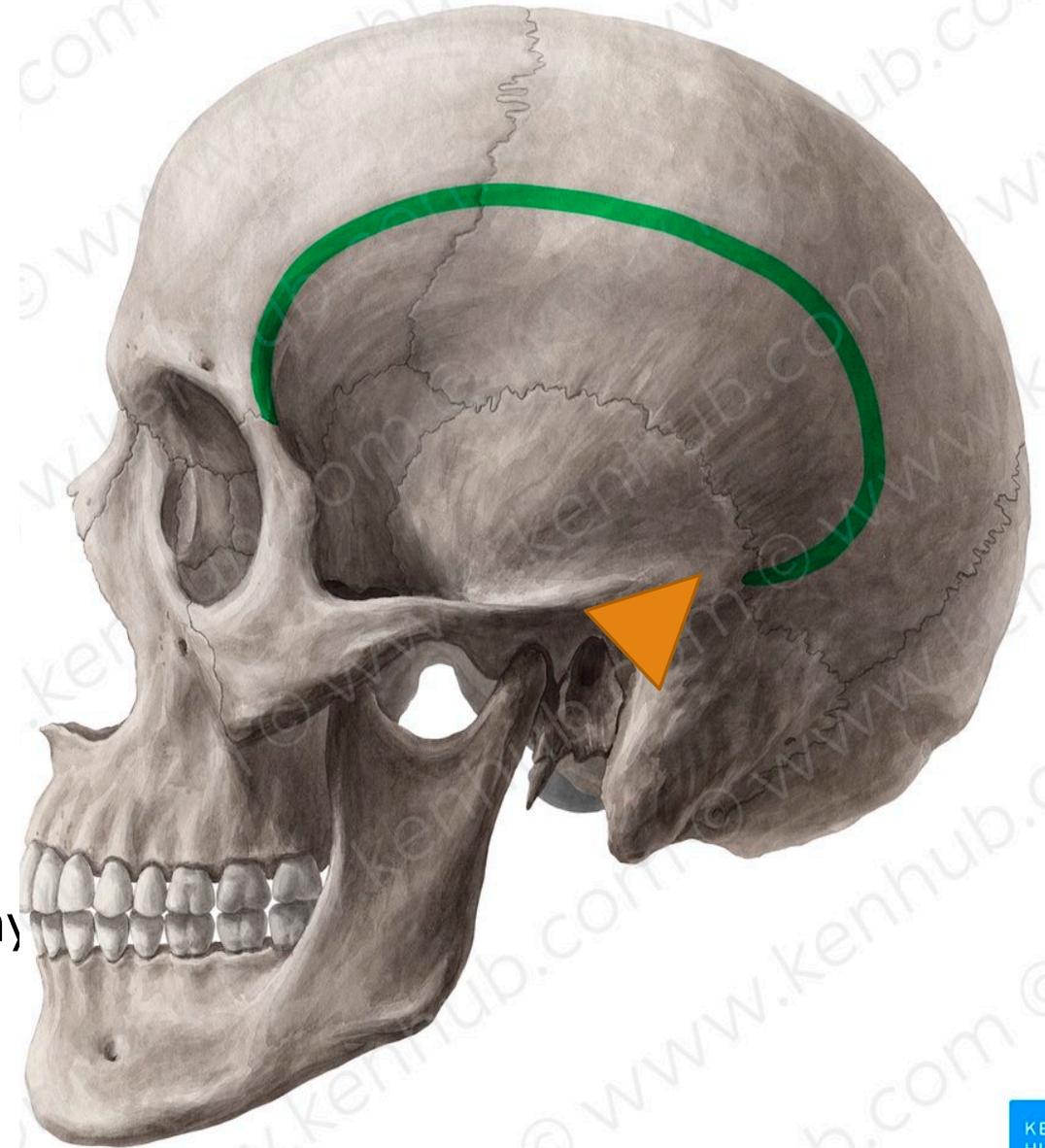
Posterior margin of external auditory meatus.

❖ **Posteriorly:**

A tangential line from the Posterior margin of external auditory meatus to the suprameatal crest.

## Function :

This is an important landmark  
For performing a cortical mastoidectomy

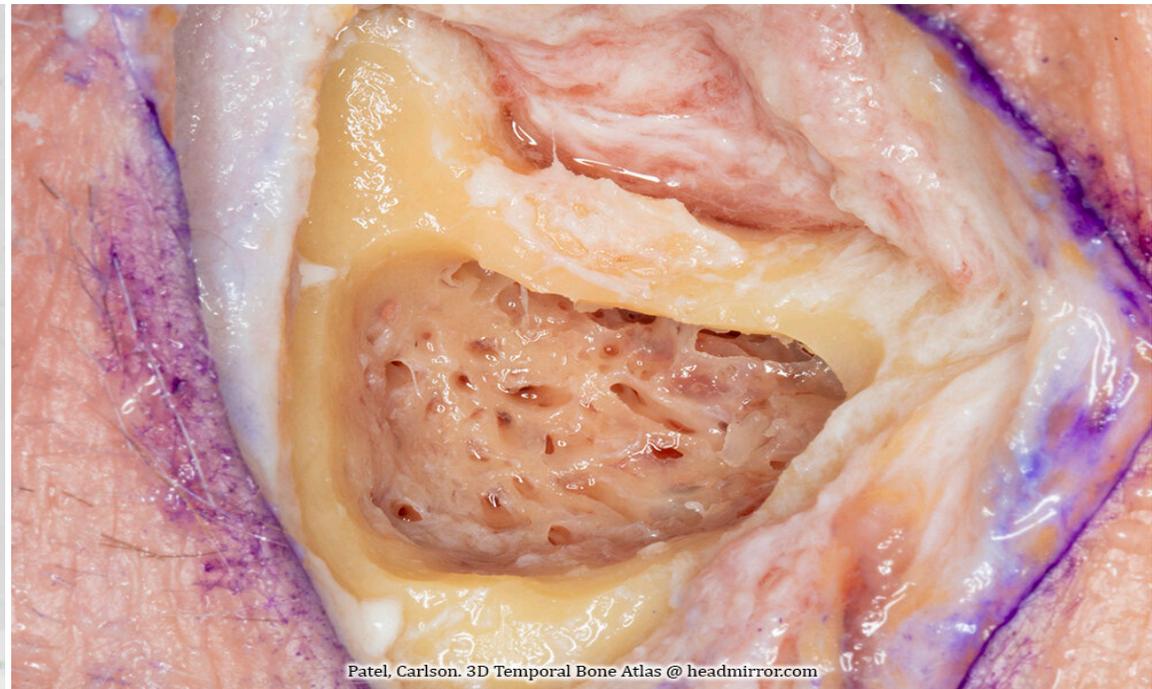
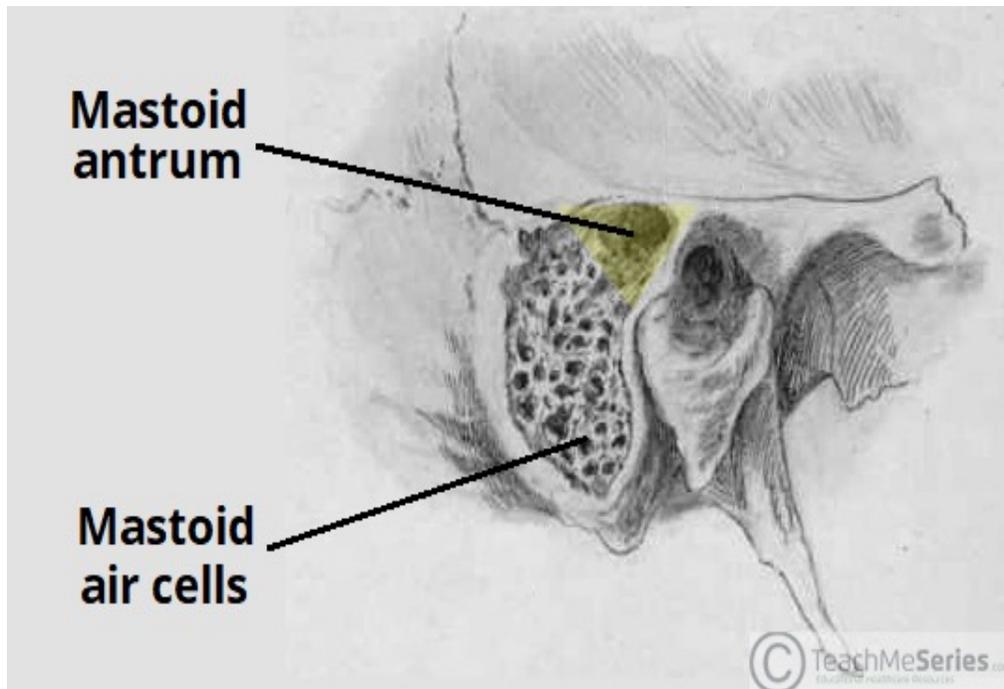


## Mastoid antrum

is an air space in the petrous portion of the temporal bone, lying posterior to the middle ear and connected to it .

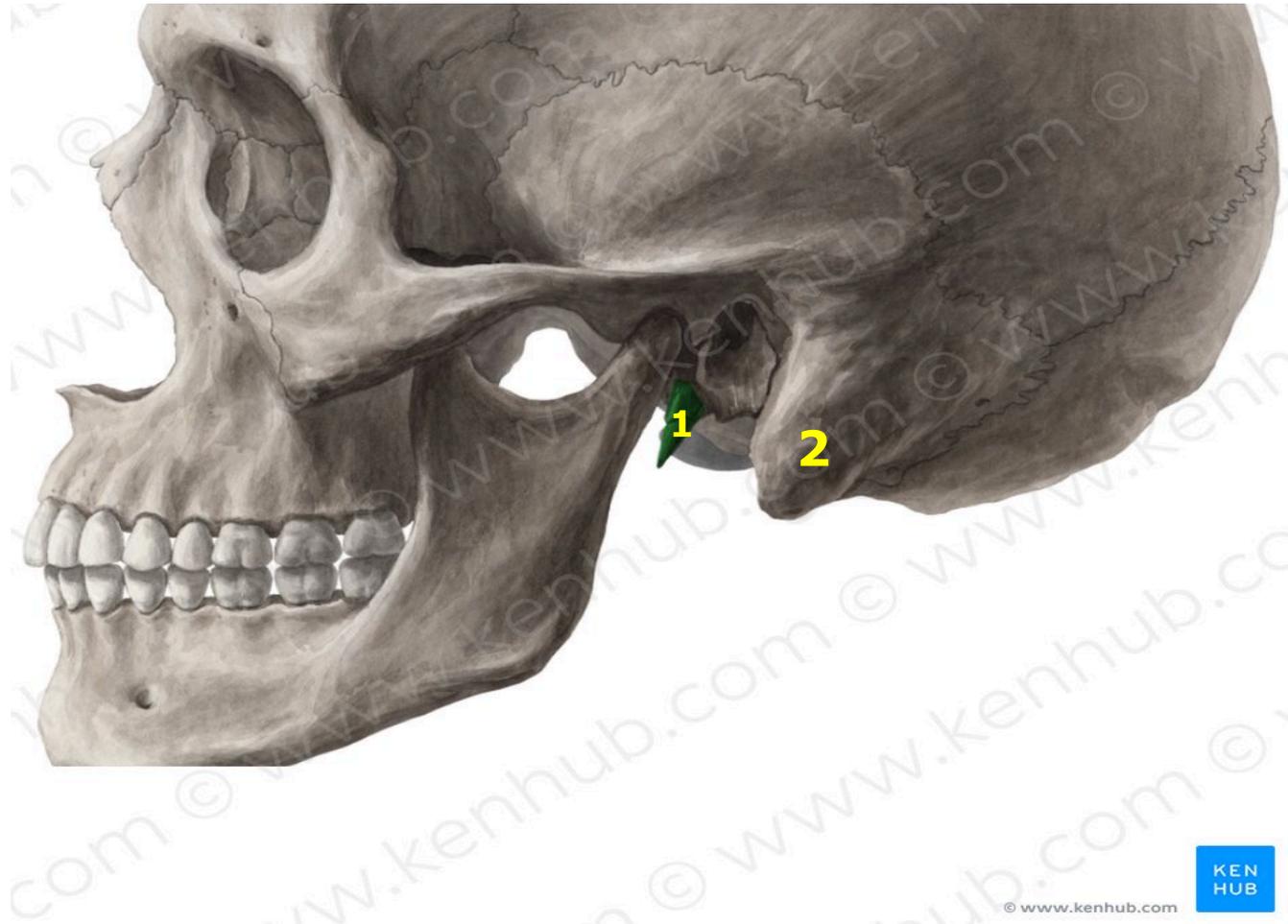
### Function

voice resonance, acoustic insulation and reduce the mass of the cranium.



1- Styloid process

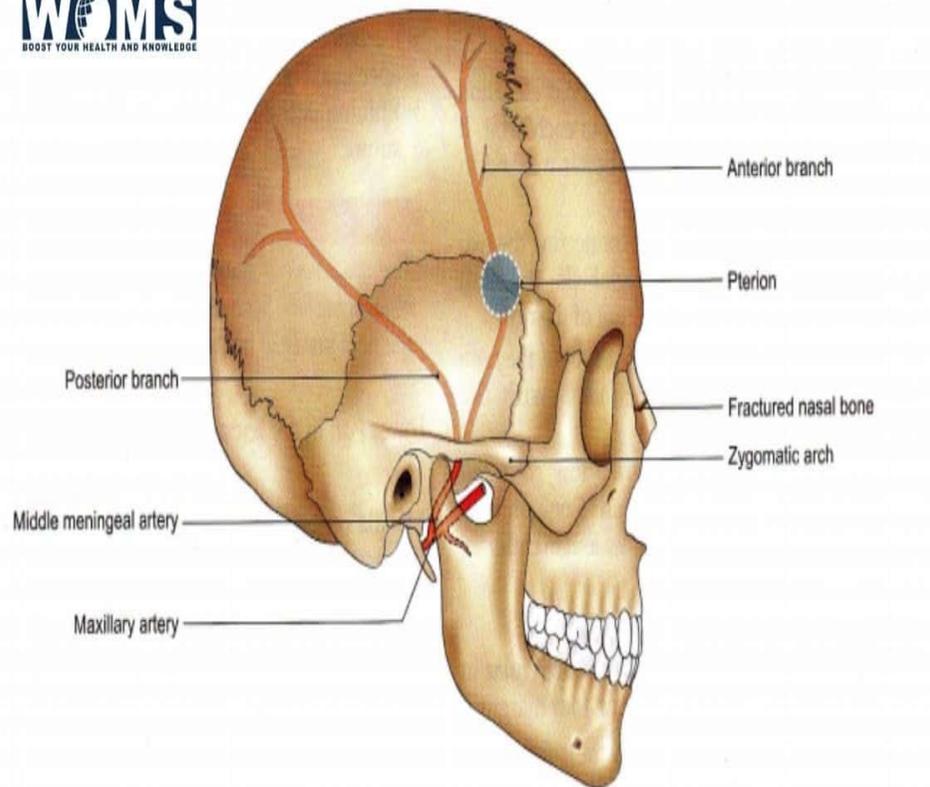
2- Mastoid process



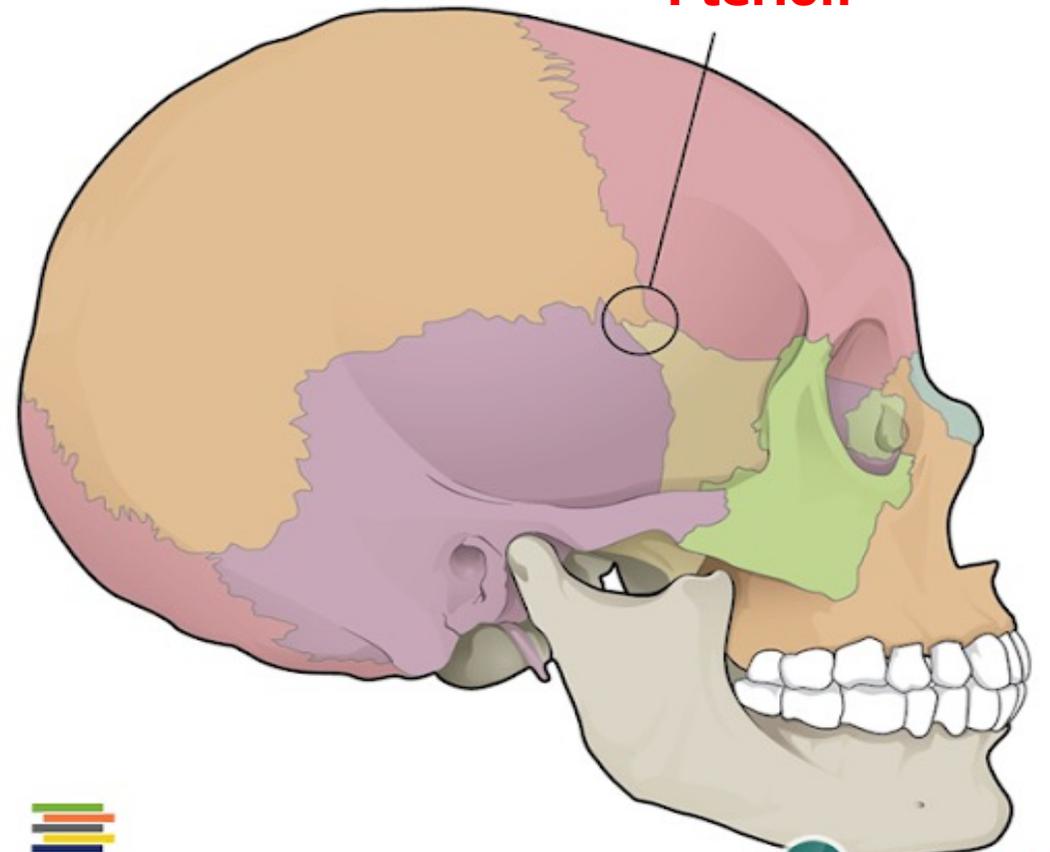
# Pterion

It is H-shaped suture represent the meeting of frontal, parietal, squamous temporal and the greater wing of the sphenoid bones

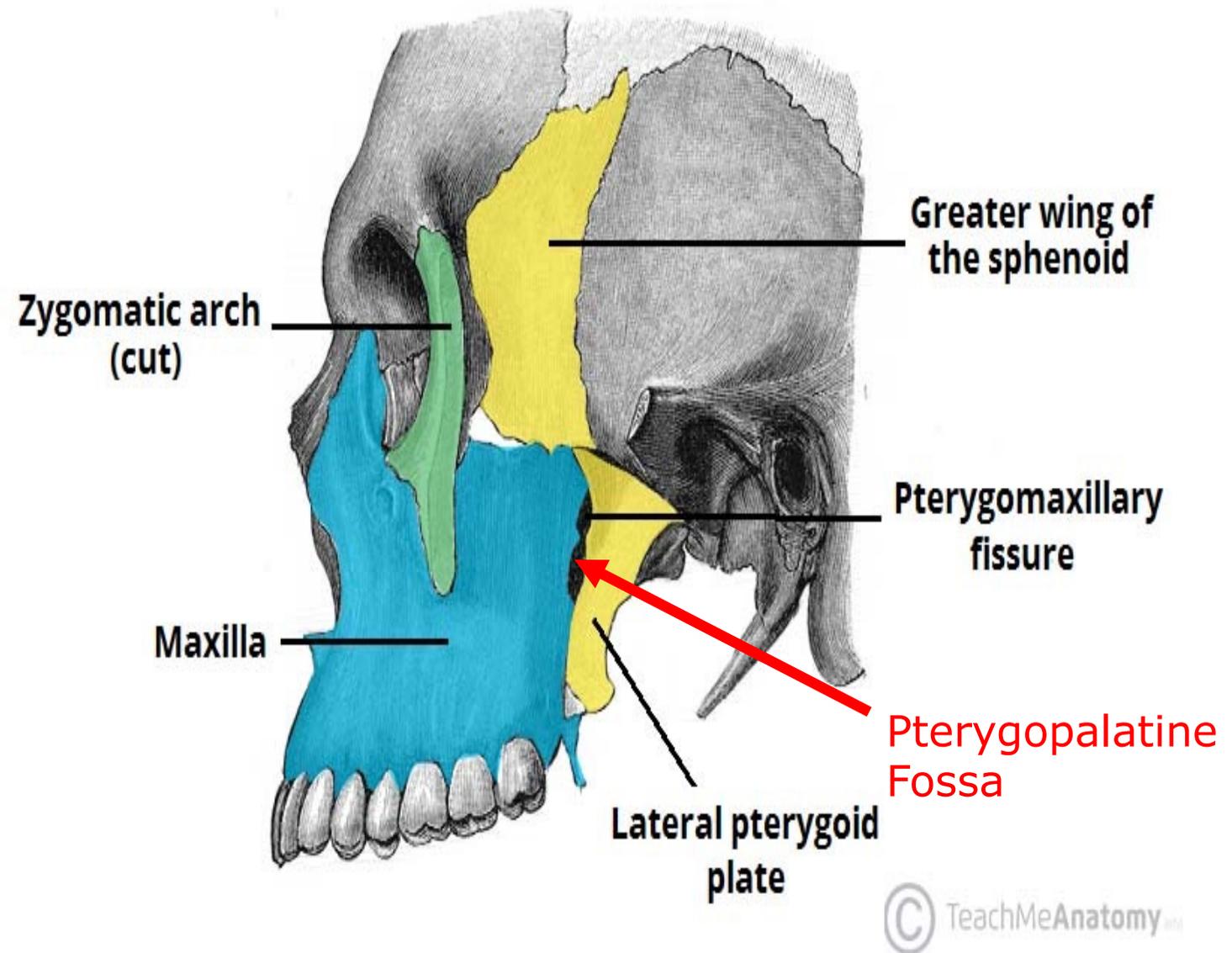
It overlies the intracranial course of the frontal branch of the middle meningeal Artery



**Pterion**



**Pterygomaxillary fissure** : It connects infratemporal fossa with Pterygopalatine Fossa





# The Mandible and Norma Basalis

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Associate professor of anatomy & embryology

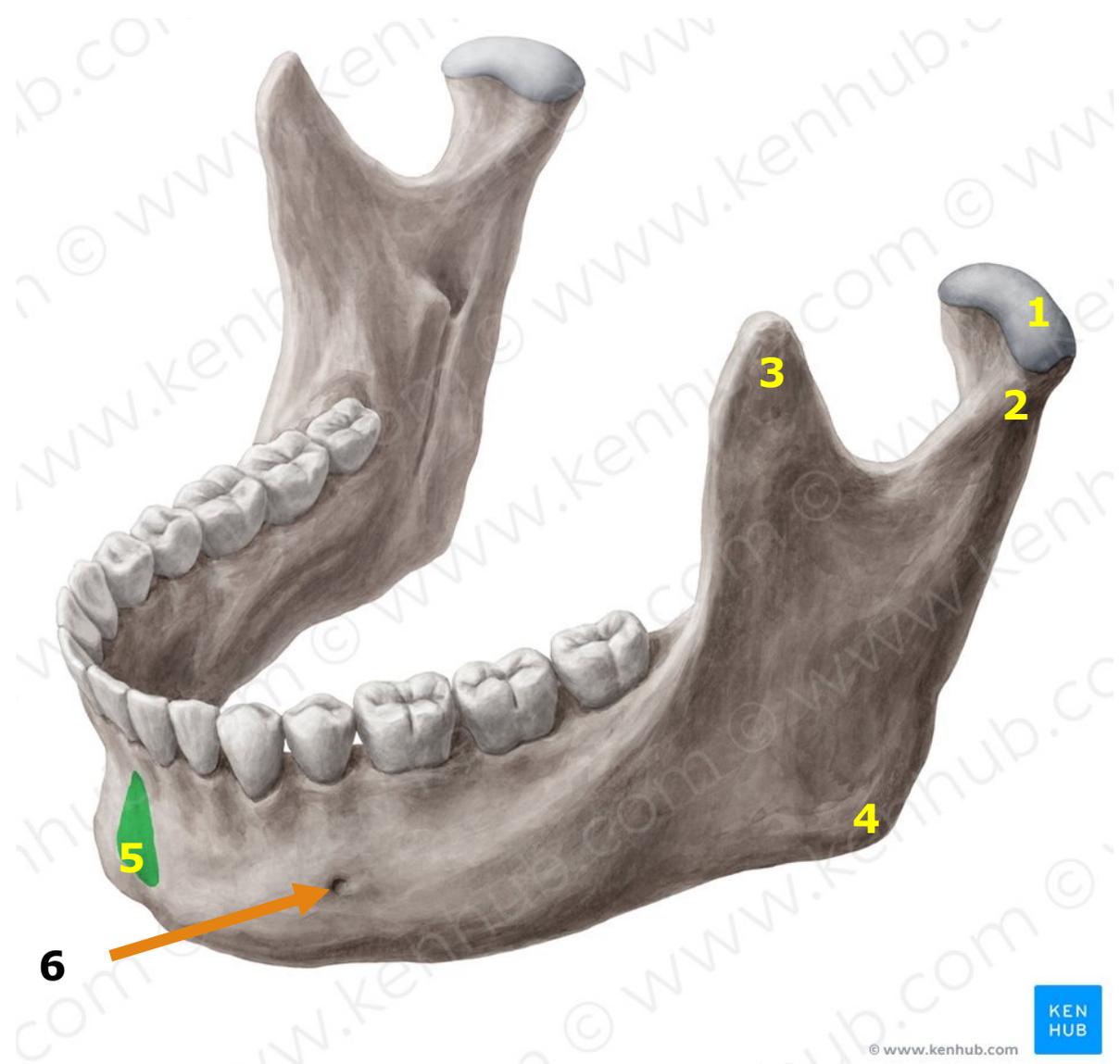
# The Mandible

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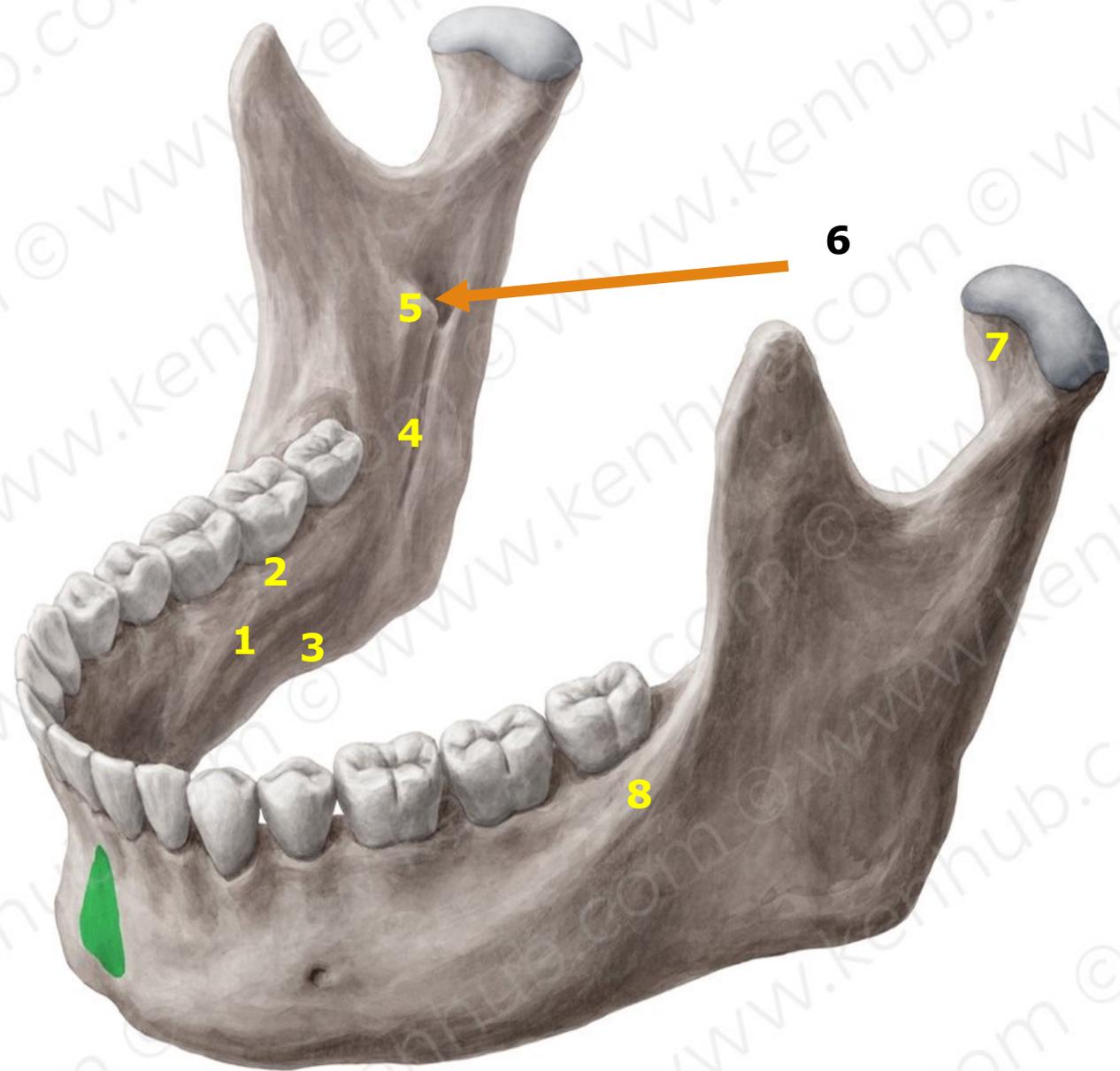


The mandible is composed of ramus and body

1. Head
2. Neck (Head and neck compose condylar process )
3. Coronoid process
4. Angle
5. Mental protuberance
6. Mental foramen



1. Mylohyoid line
2. Sublingual fossa
3. Submandibular fossa
4. Mylohyoid groove
5. Lingula
6. Mandibular foramen
7. Pterygoid fossa
8. Oblique line



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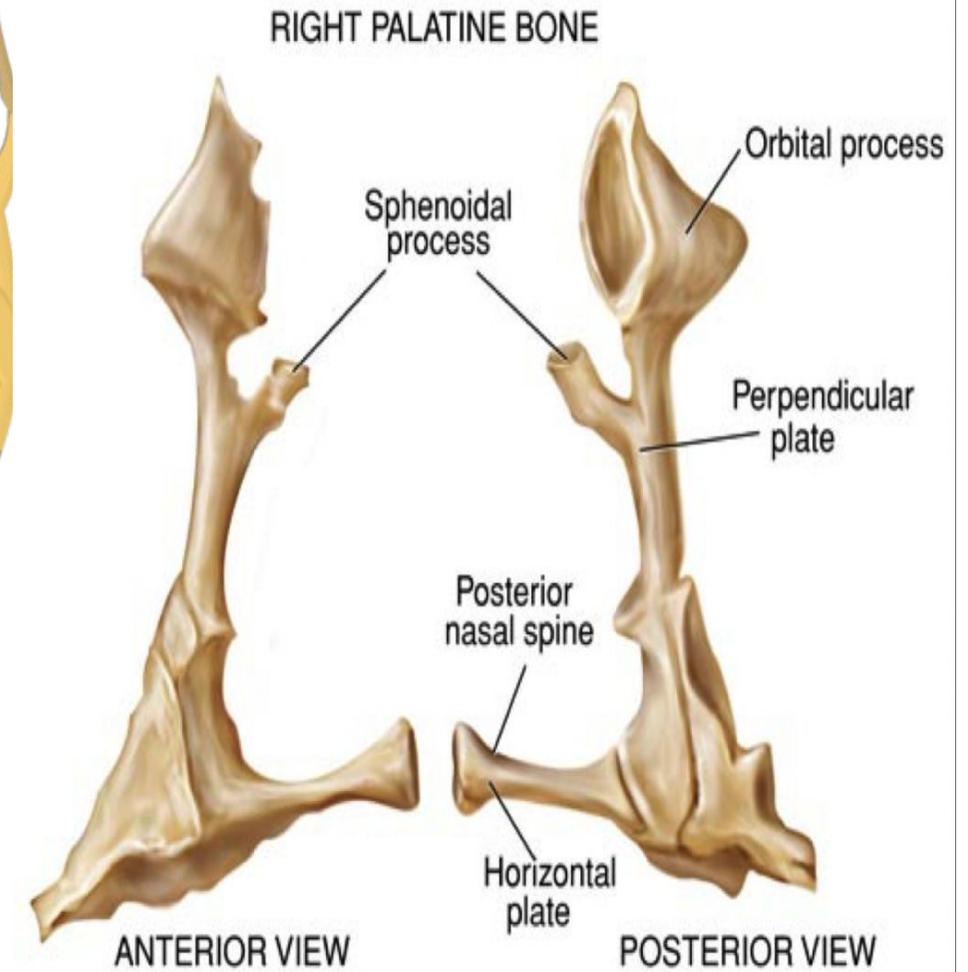
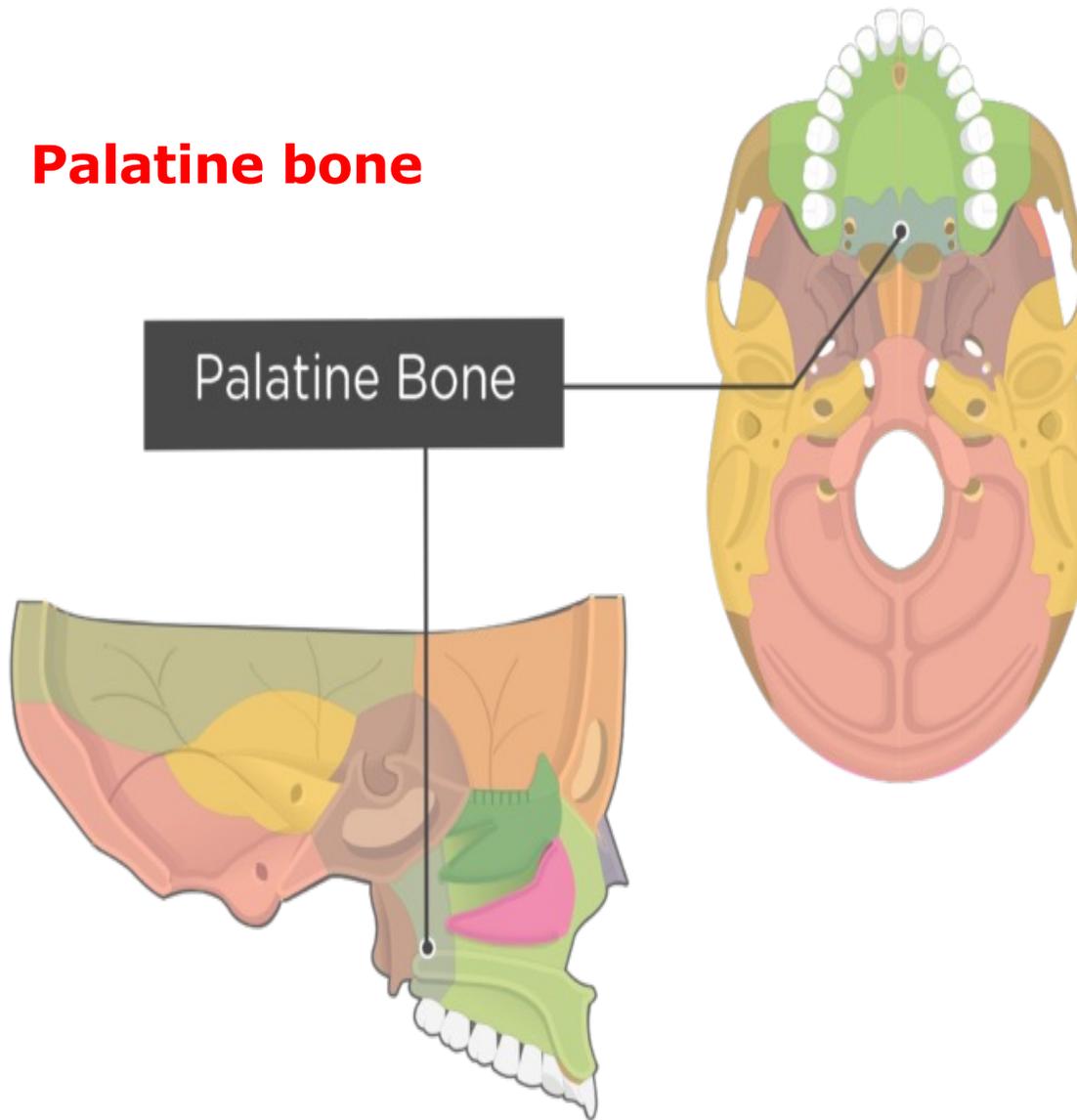
1. Superior and inferior genial tubercles
2. Digastric fossa

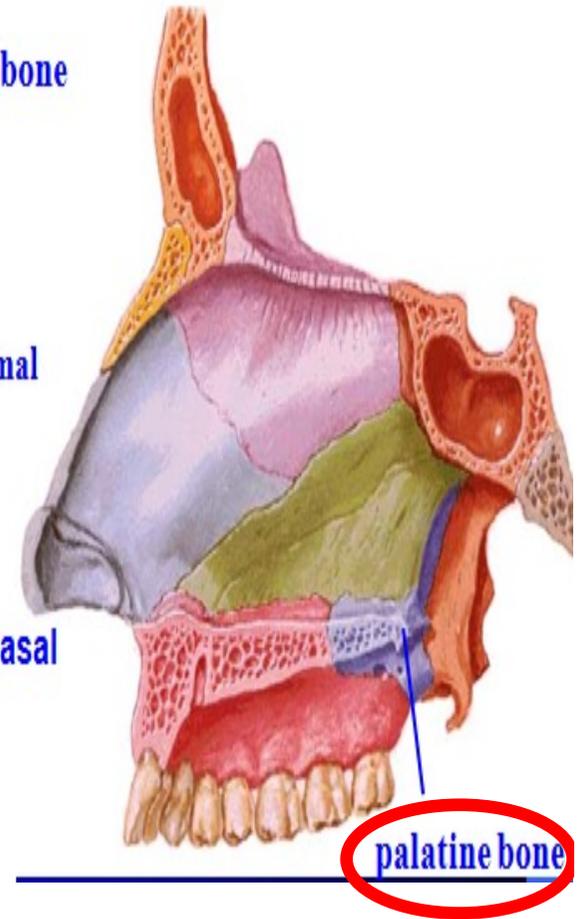
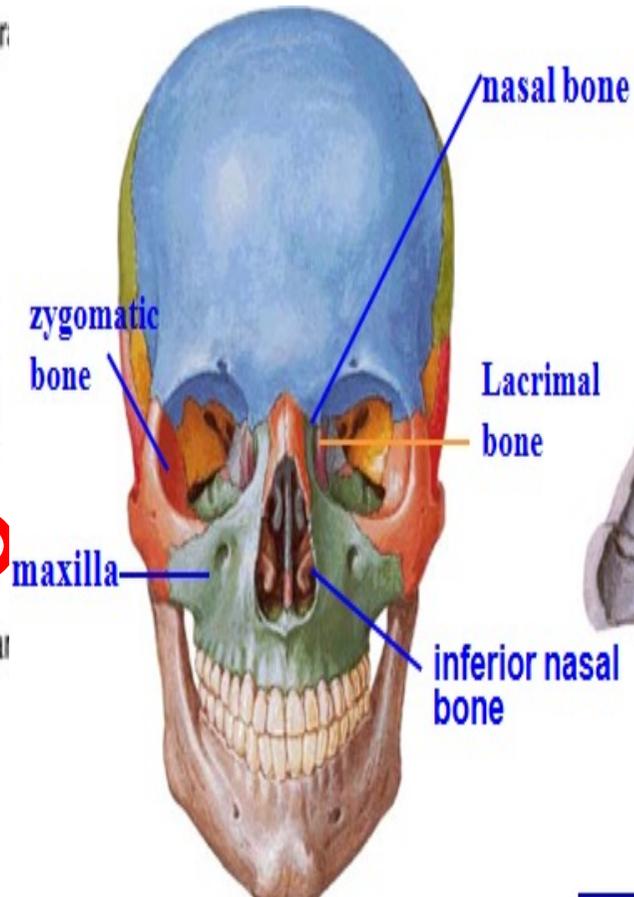
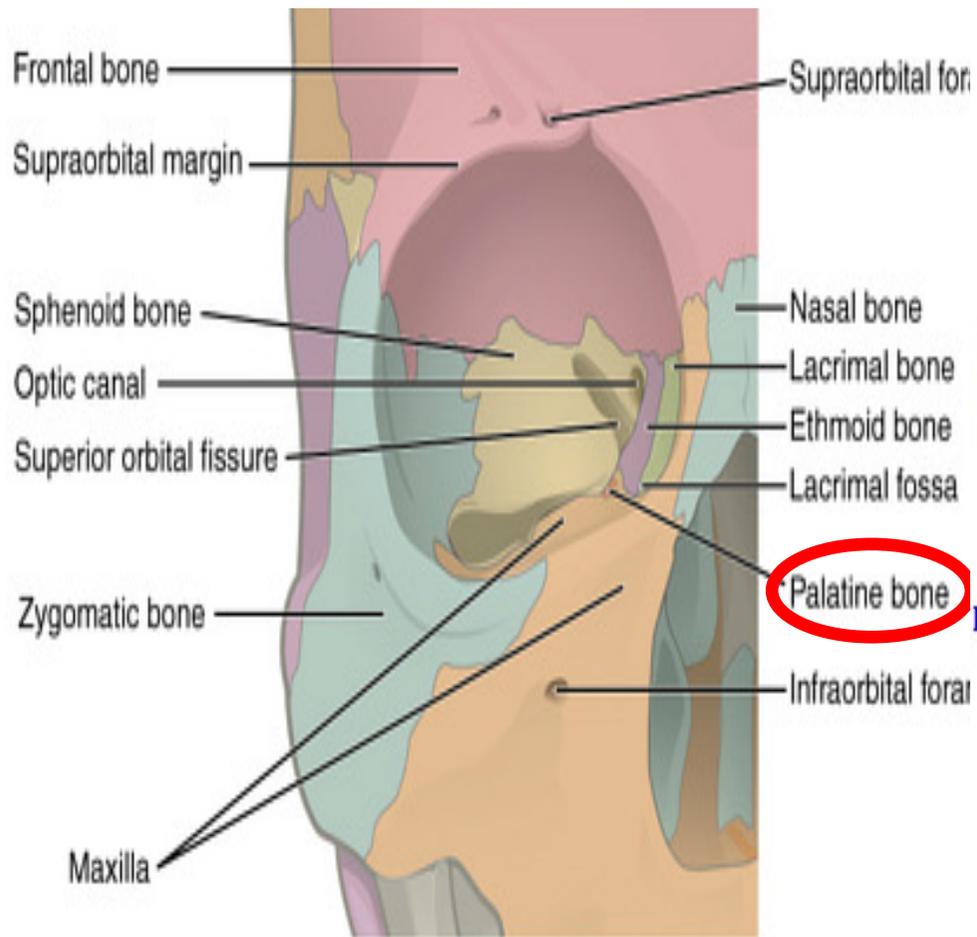


# **Norma Basalis Externa**

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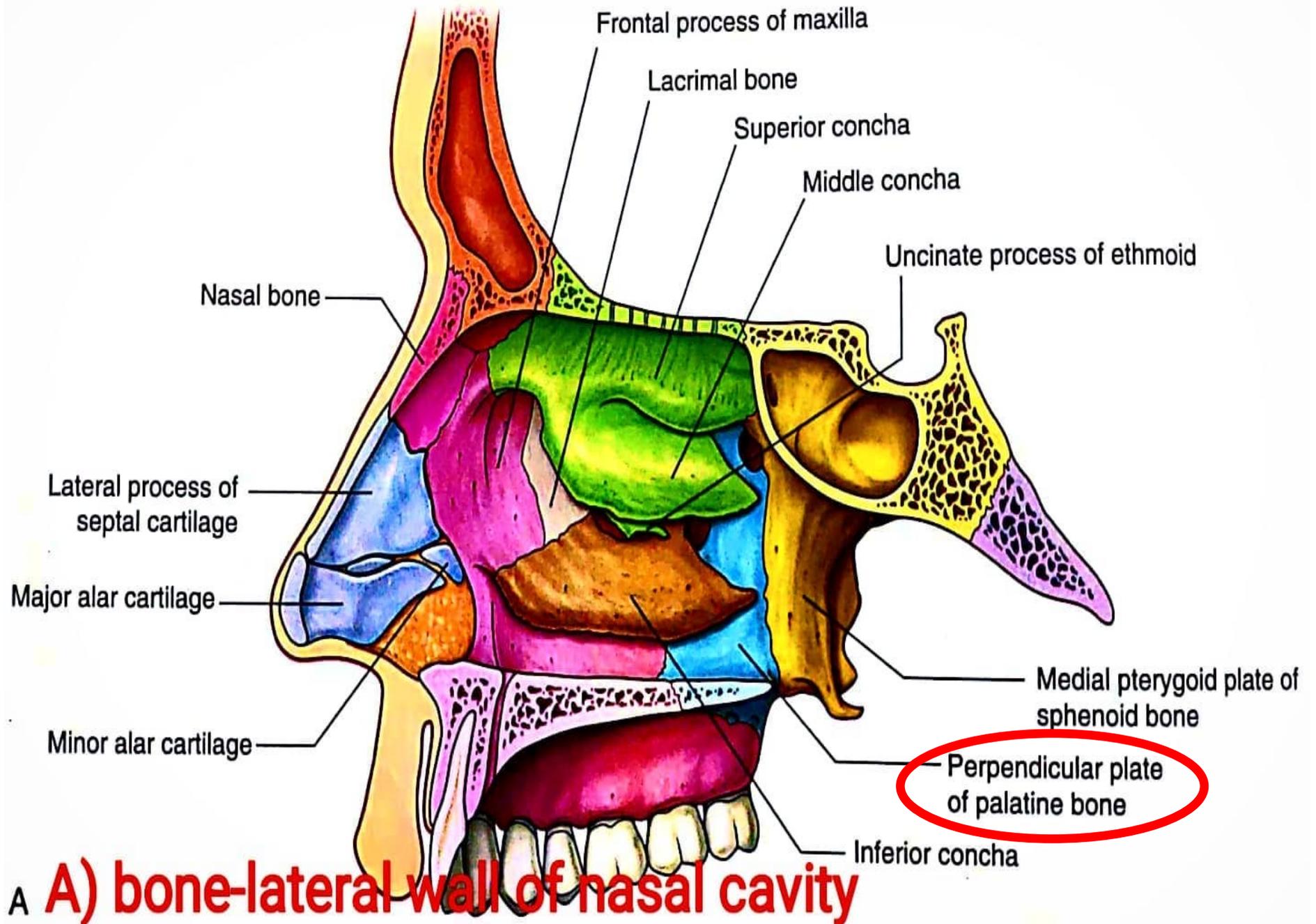
# Palatine bone



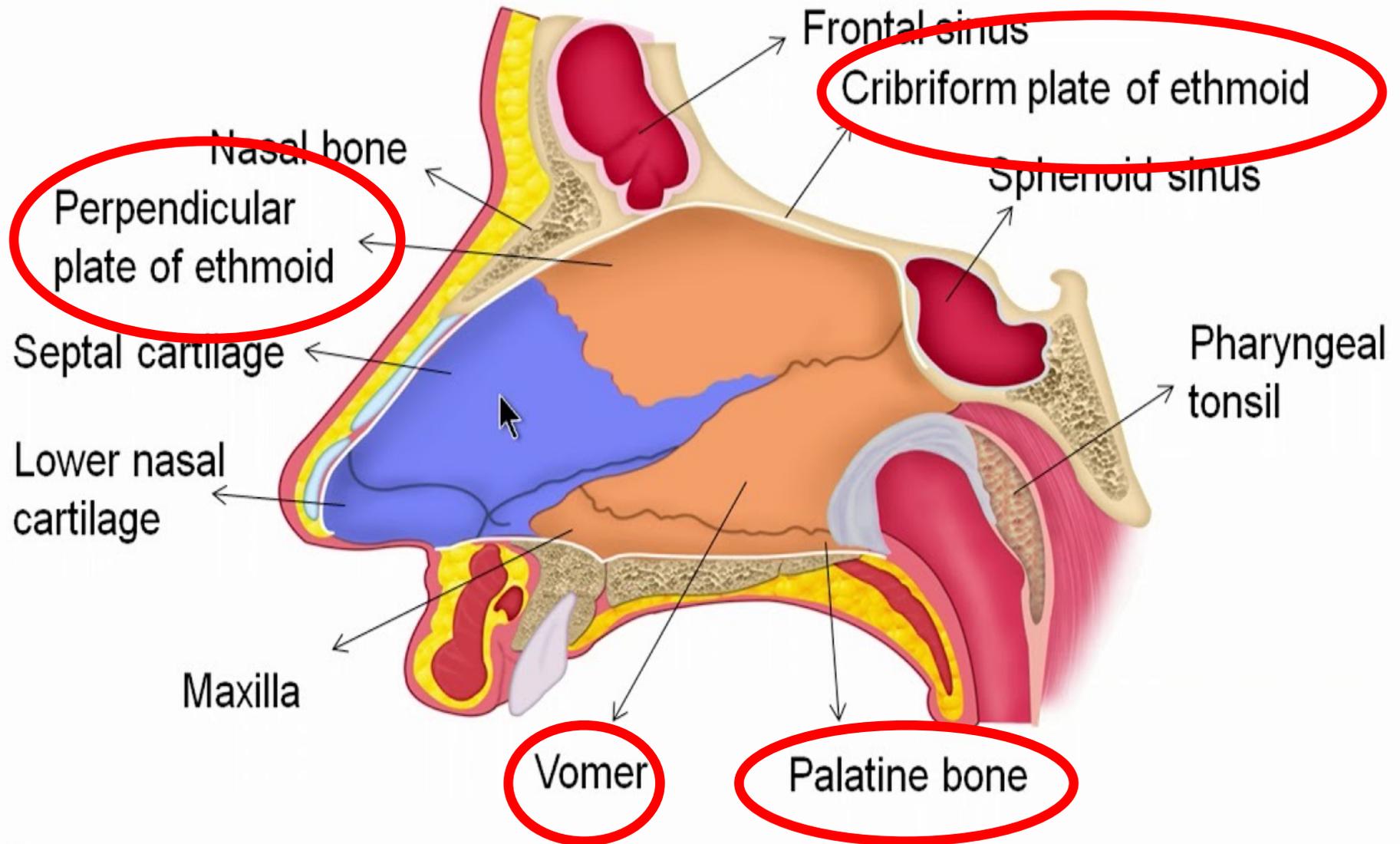


<https://sketchfab.com/3d-models/palatine-bone-49d6576db33f4f56b9b365e0aa8aed5a>

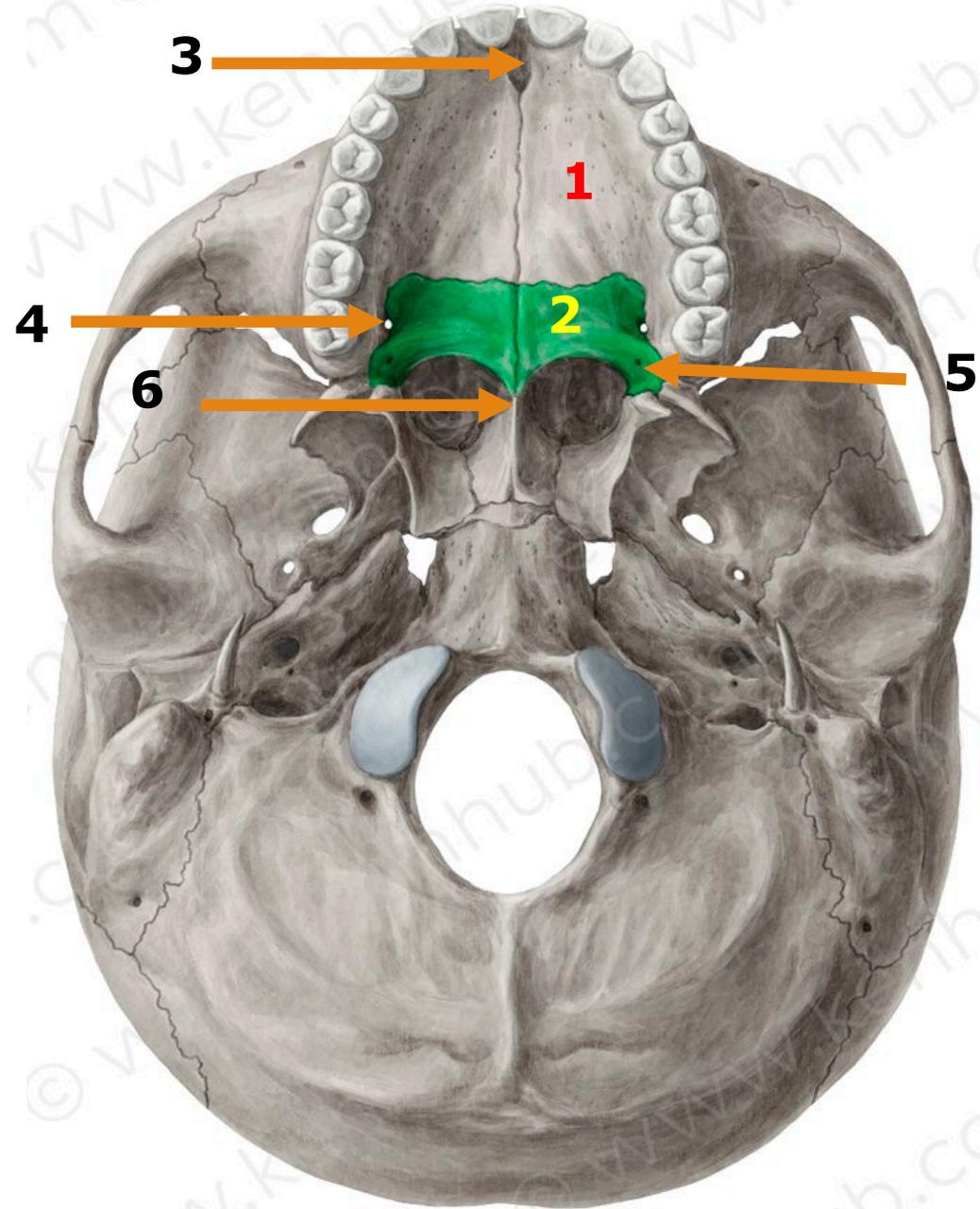




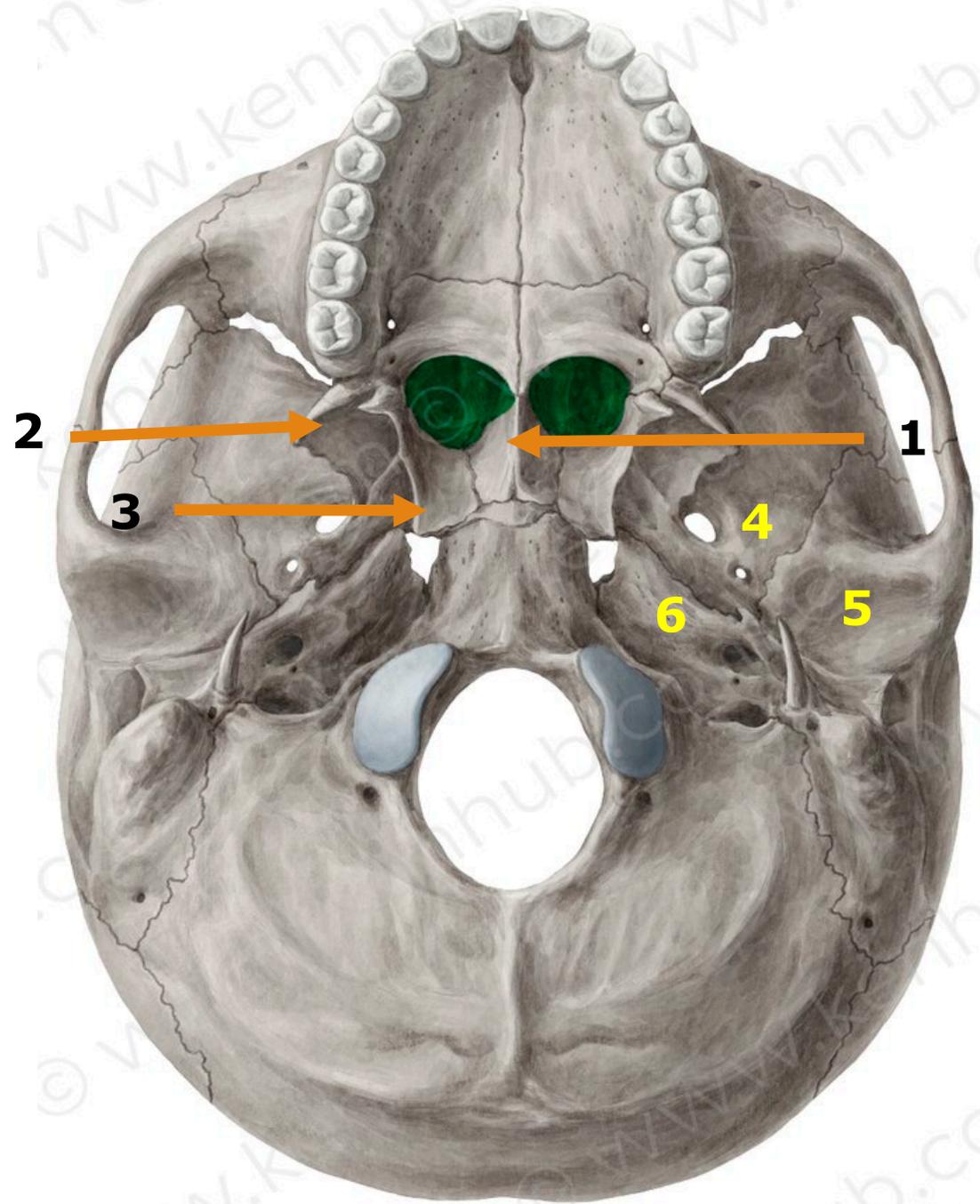
# Nasal septum (composition)



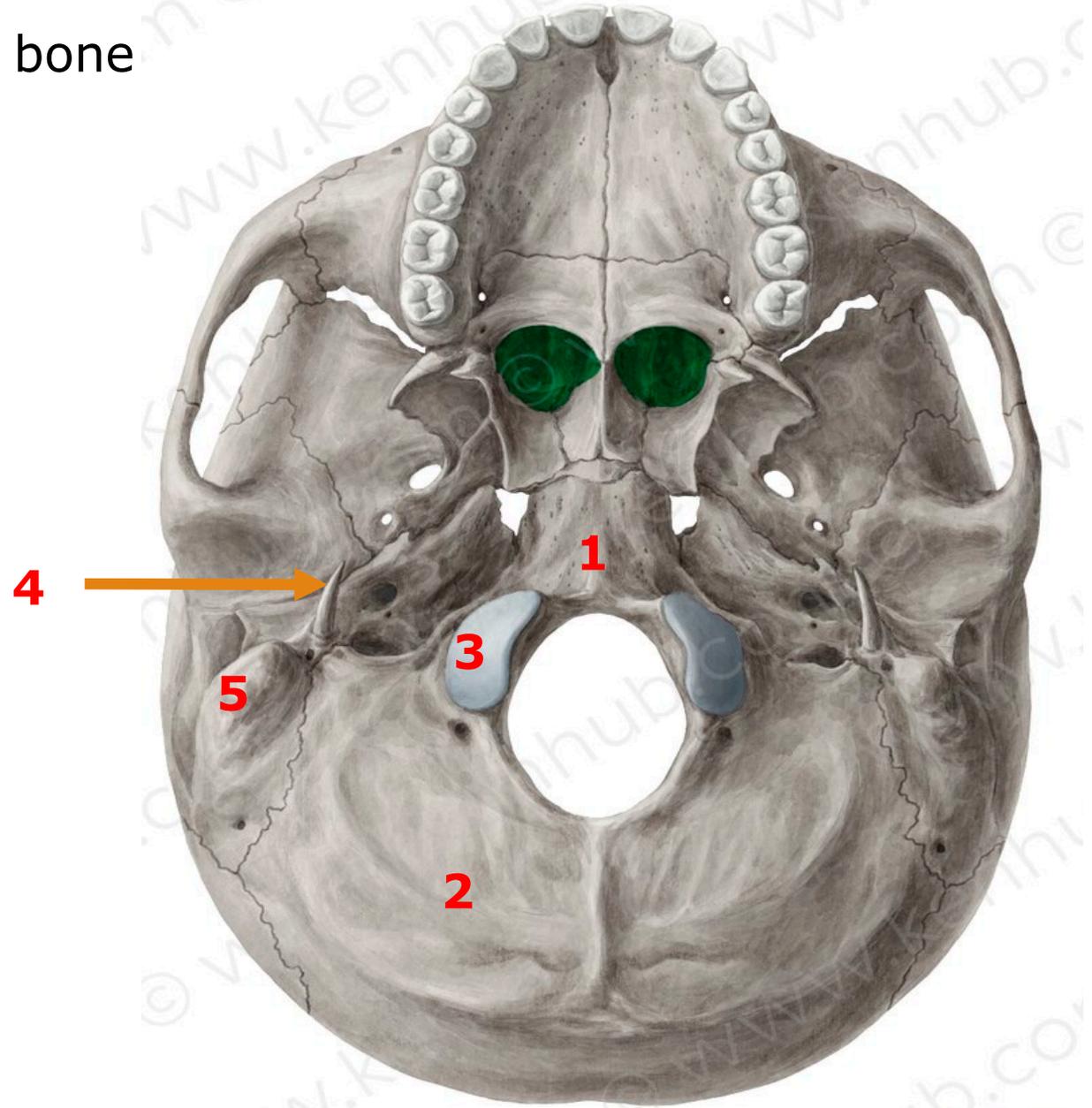
1. Palatine processes of maxilla
2. Horizontal plates of the palatine bones
3. Incisive fossa
4. Greater palatine foramina
5. Lesser palatine foramina
6. Posterior nasal spine



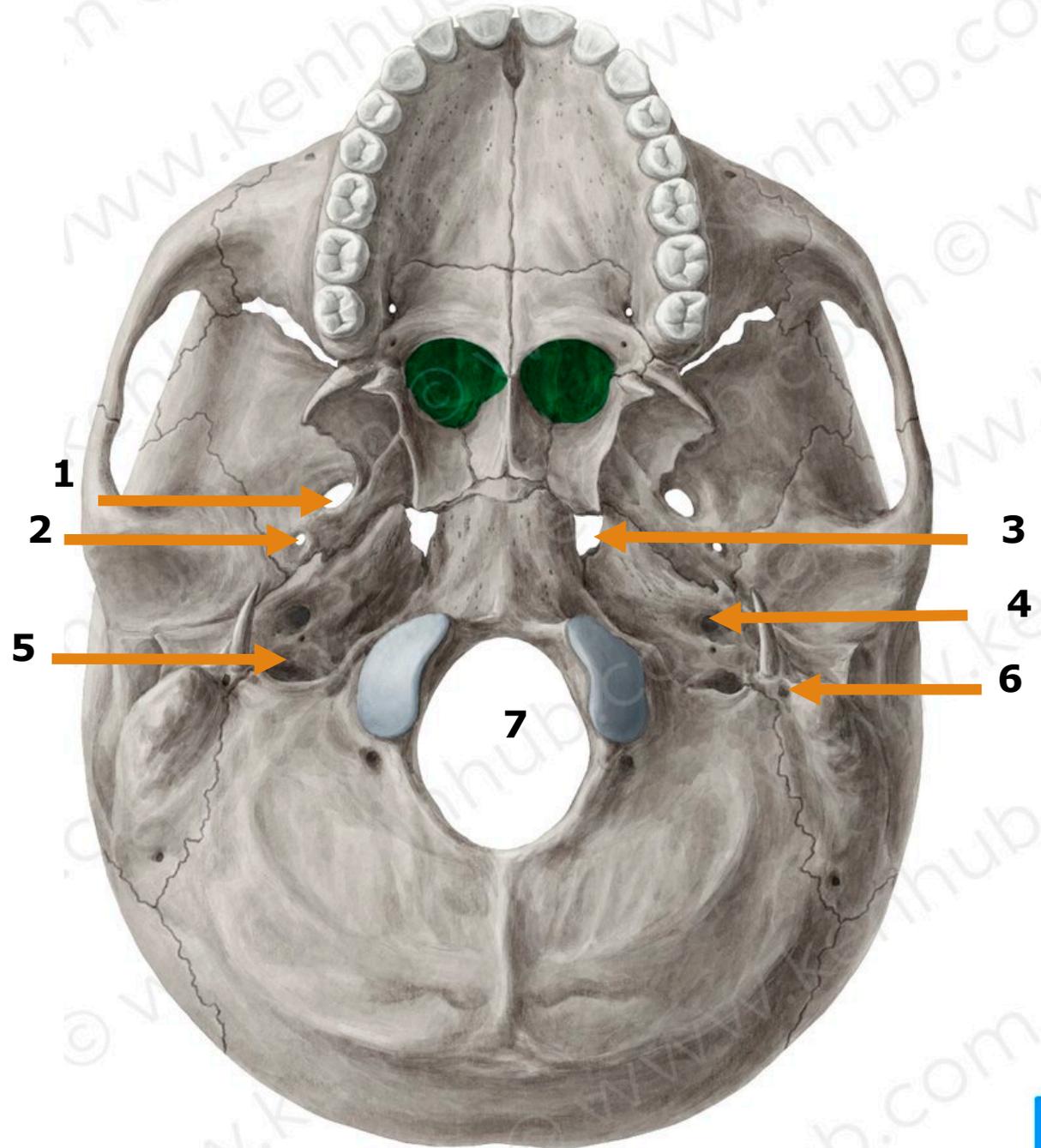
1. Vomer
2. Lateral pterygoid plate
3. Medial pterygoid plate
4. Infratemporal surface of the greater wing of sphenoid
5. Mandibular fossa
6. Petrous part of the temporal bone



1. Basilar part of occipital bone
2. Squamous part of occipital bone
3. Occipital condyle
4. Styloid process
5. Mastoid process



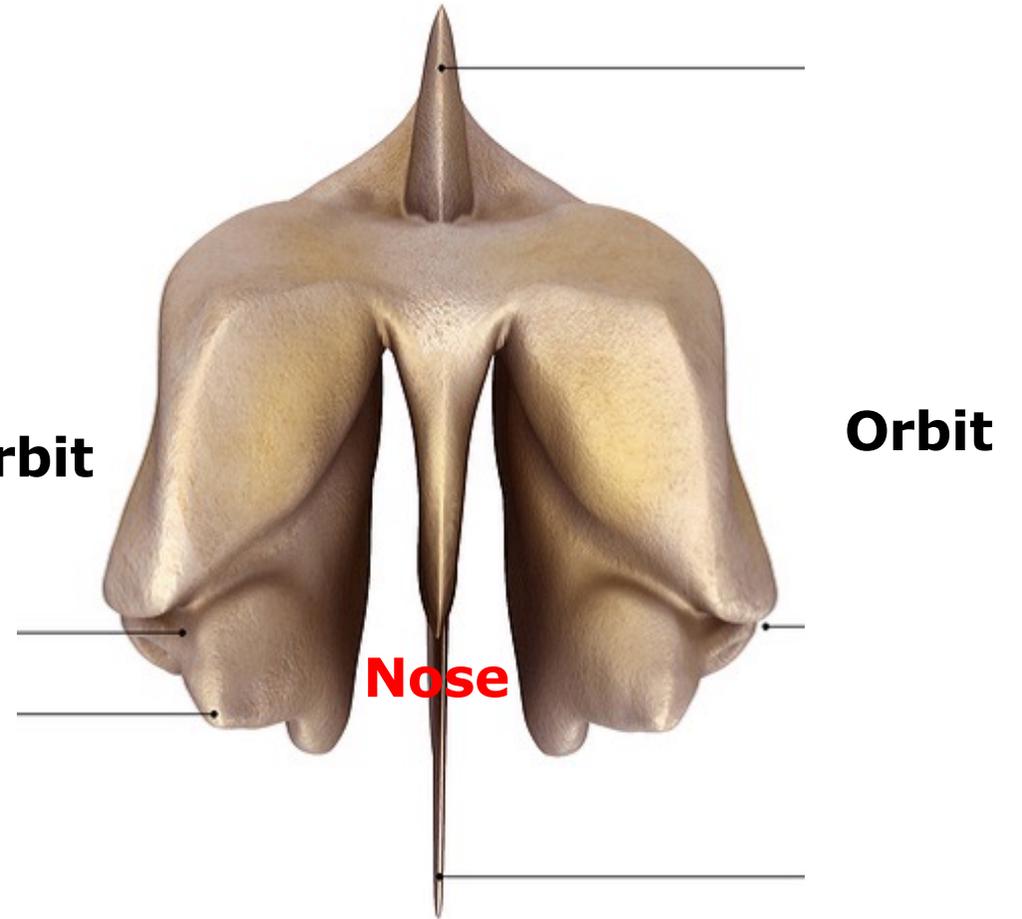
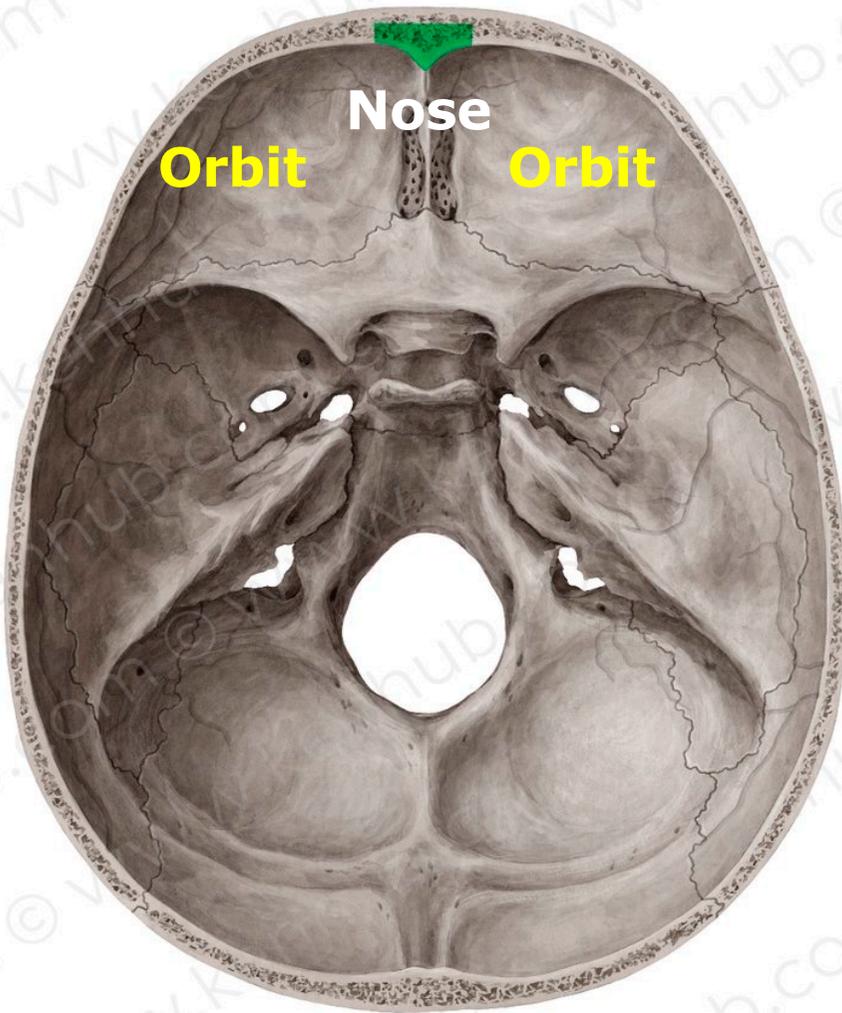
1. Foramen ovale
2. Foramen spinosum
3. Foramen lacerum
4. Carotid canal
5. Jugular Foramen
6. Stylomastoid foramen
7. Foramen magnum



# **Norma Basalis Interna**

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# Ethmoid bone



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Crista galli

Sphenoid bone

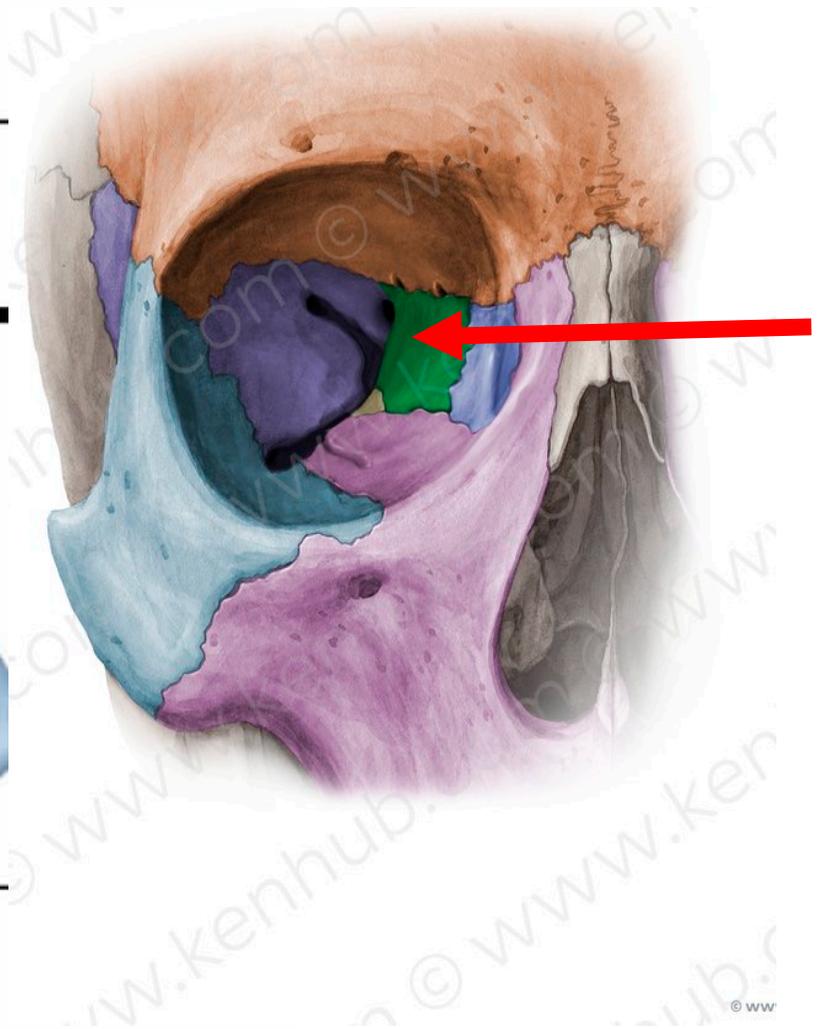
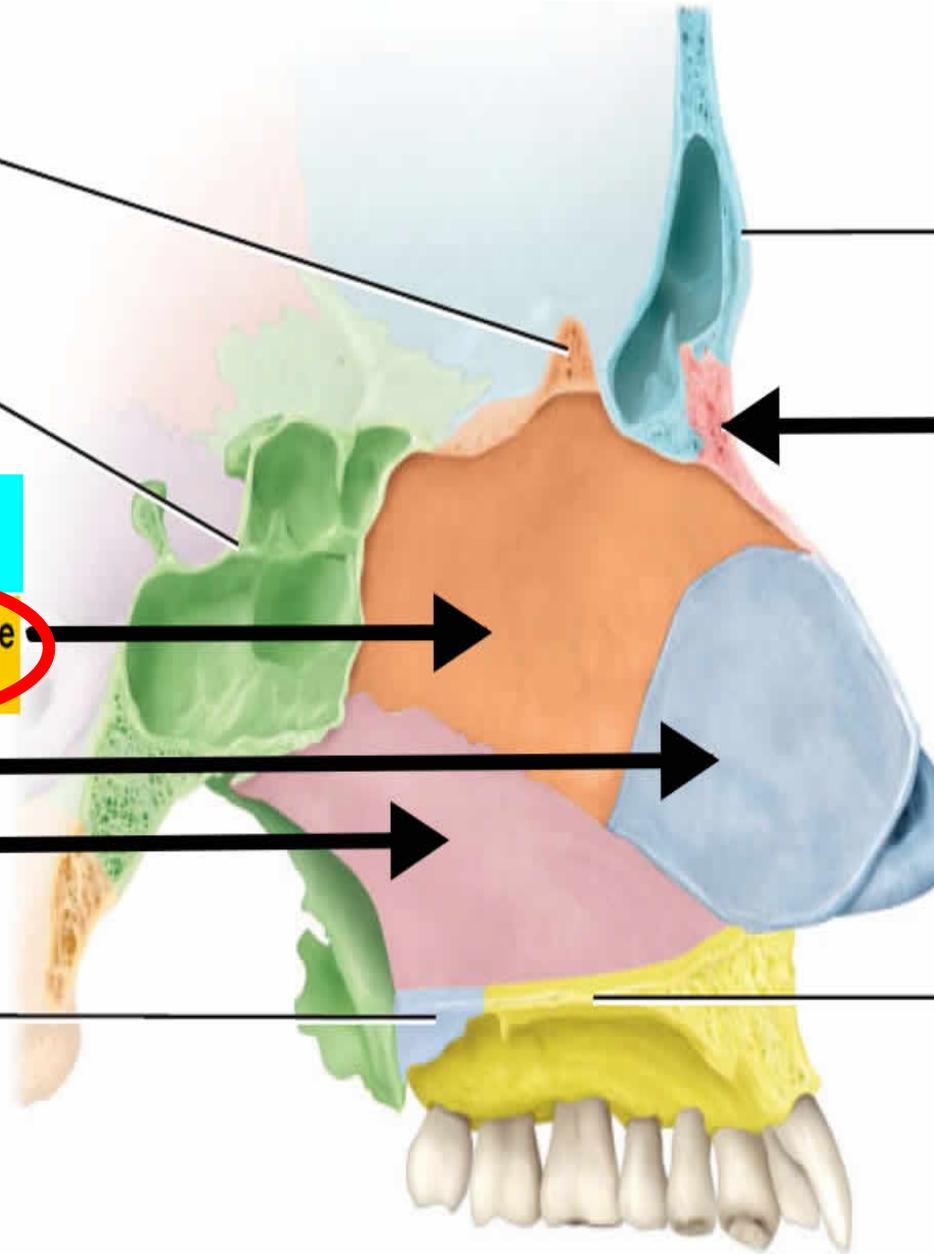
**NASAL SEPTUM:**

**Perpendicular plate of ethmoid bone**

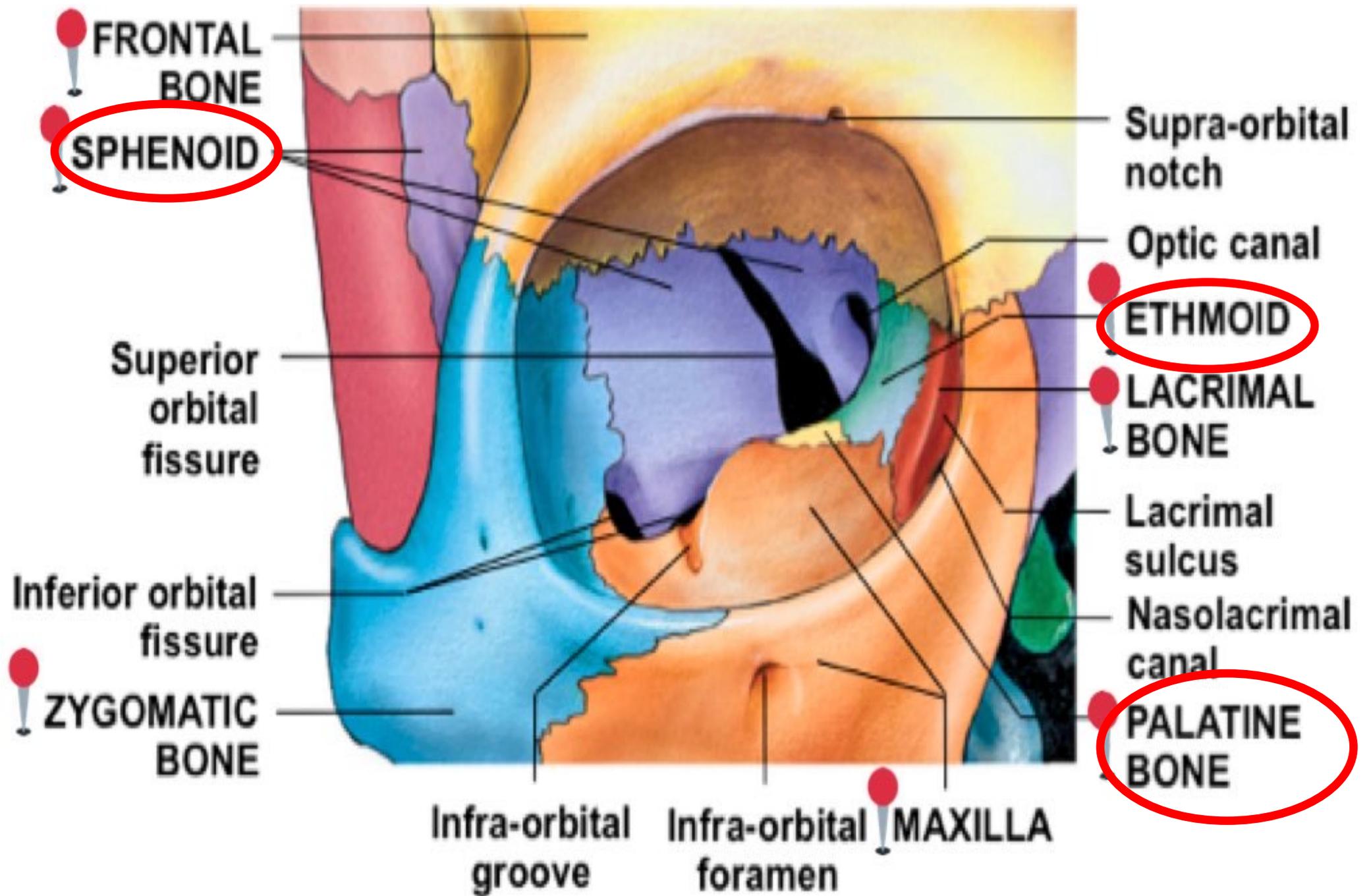
Septal cartilage

Vomer

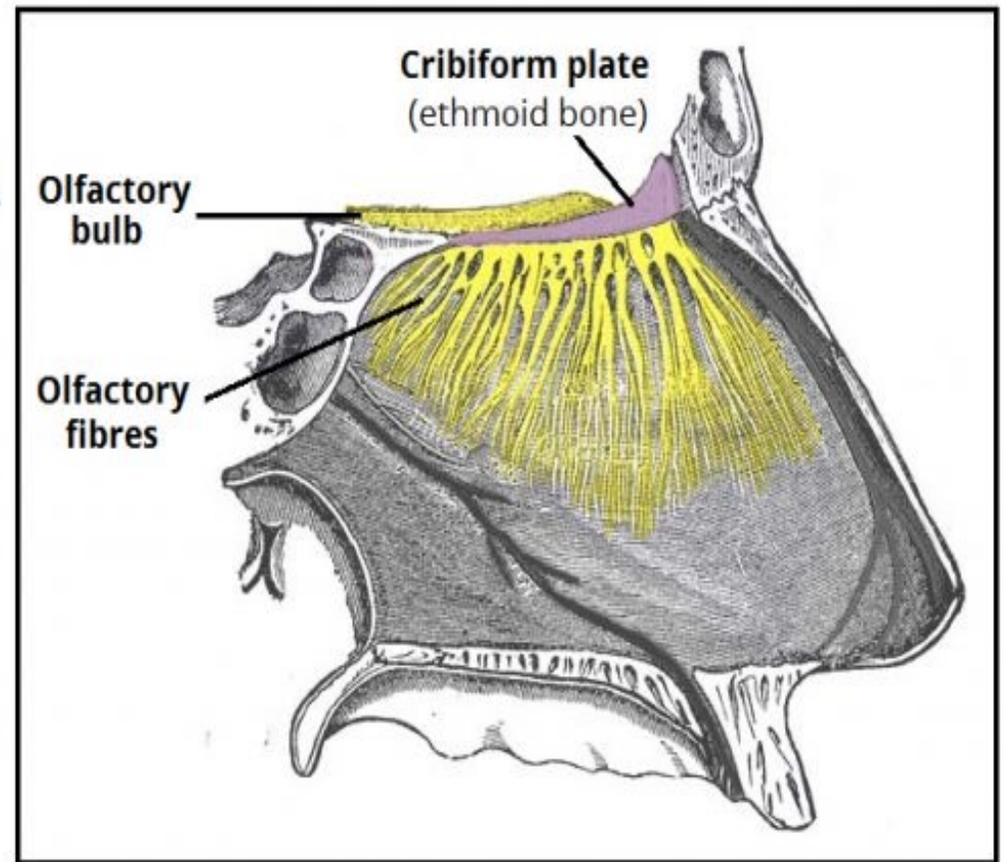
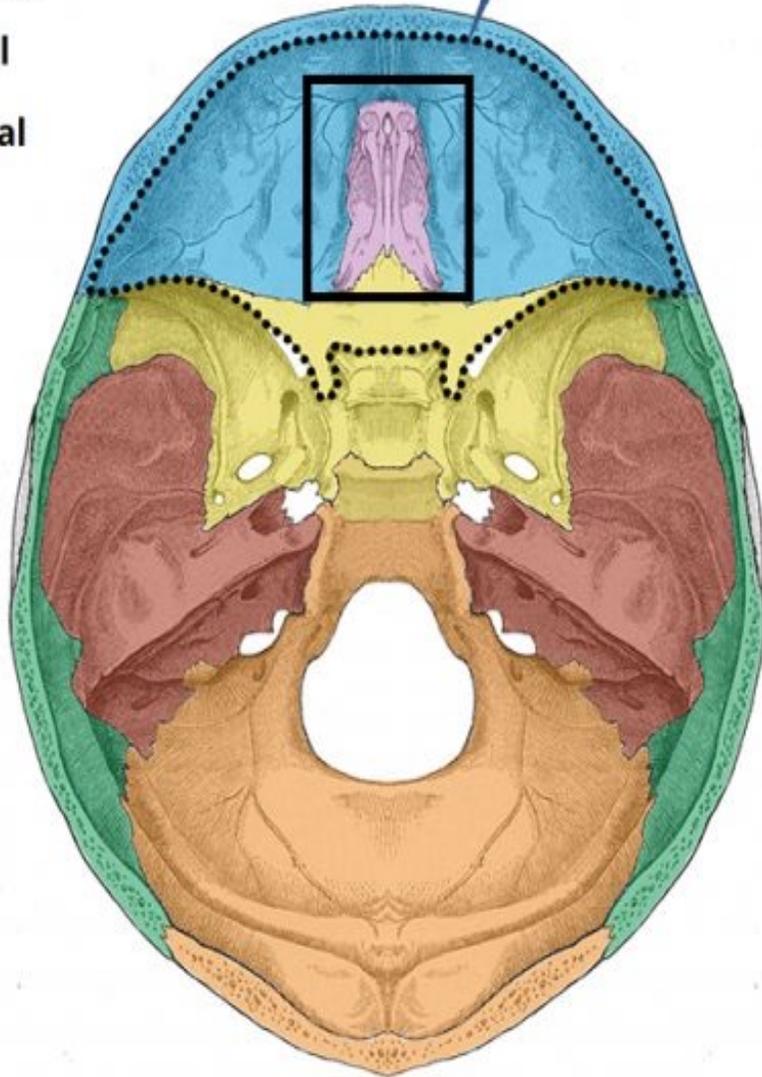
Horizontal plate of palatine bone



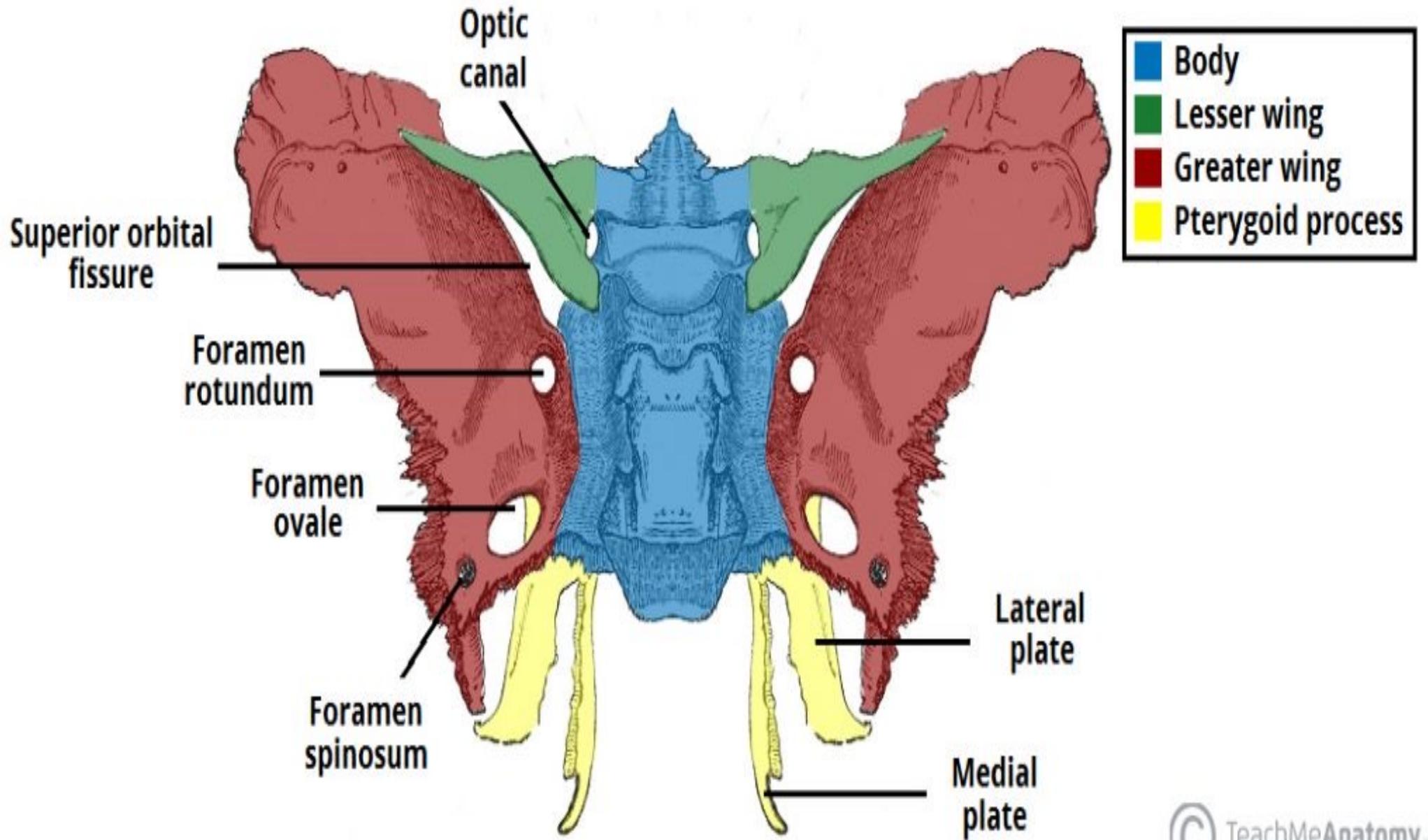
Sagittal section

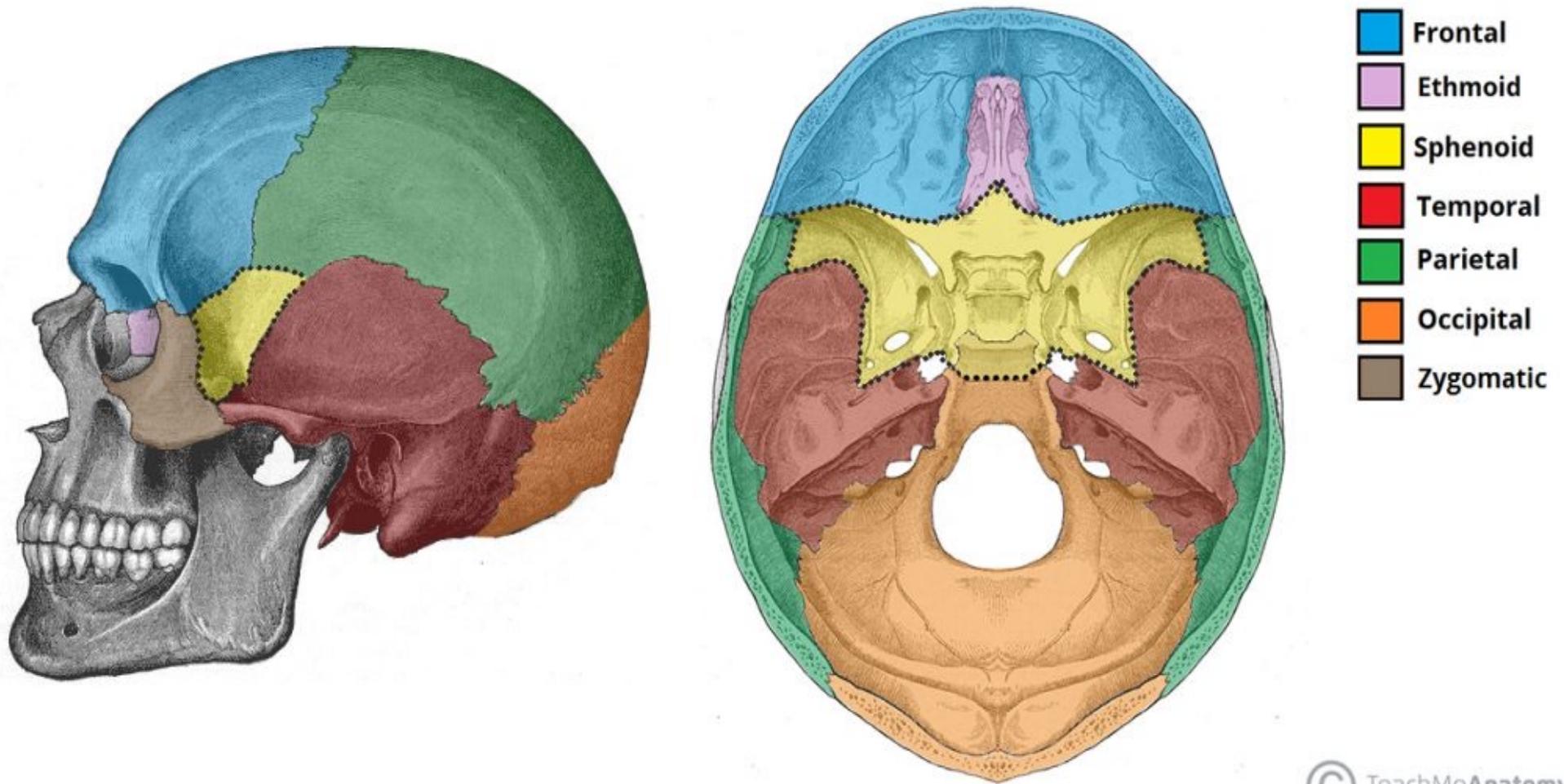


- Frontal
- Ethmoid
- Sphenoid
- Temporal
- Parietal
- Occipital

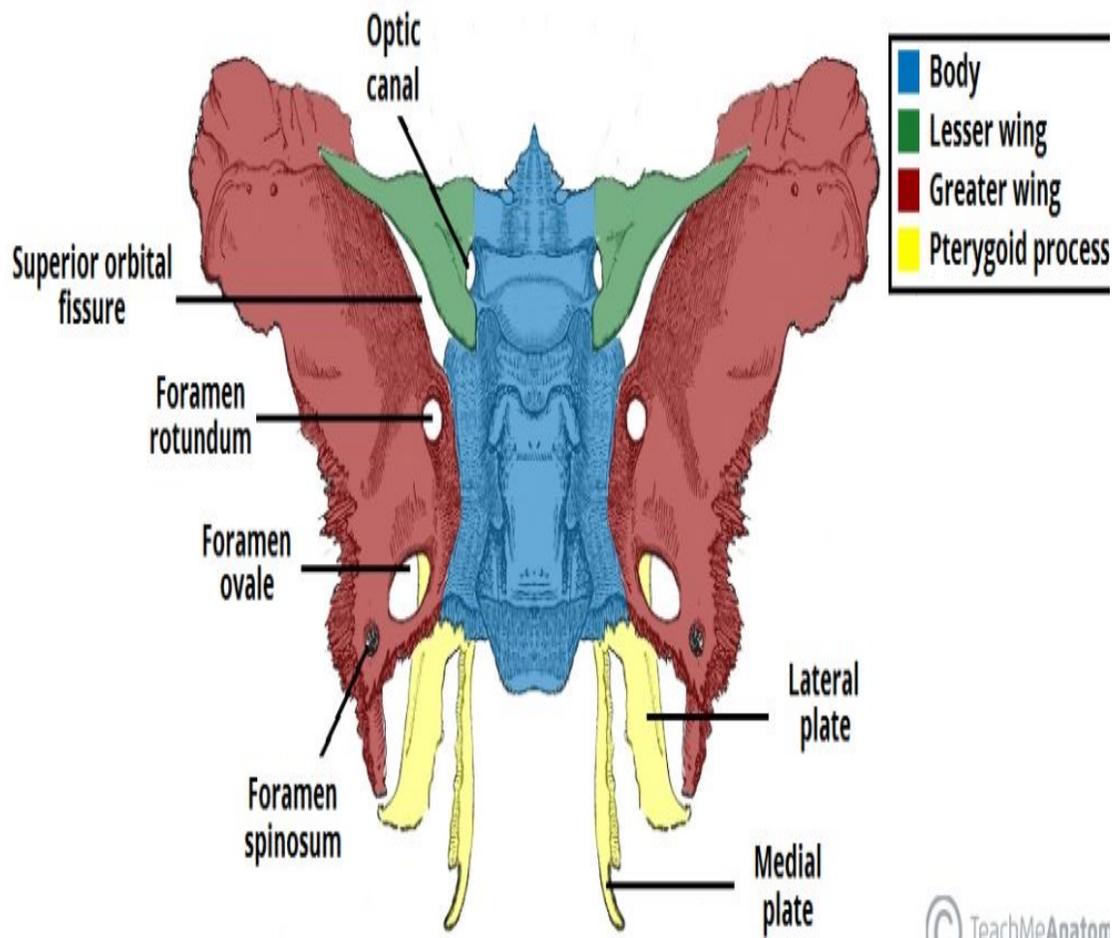


# Sphenoid bone

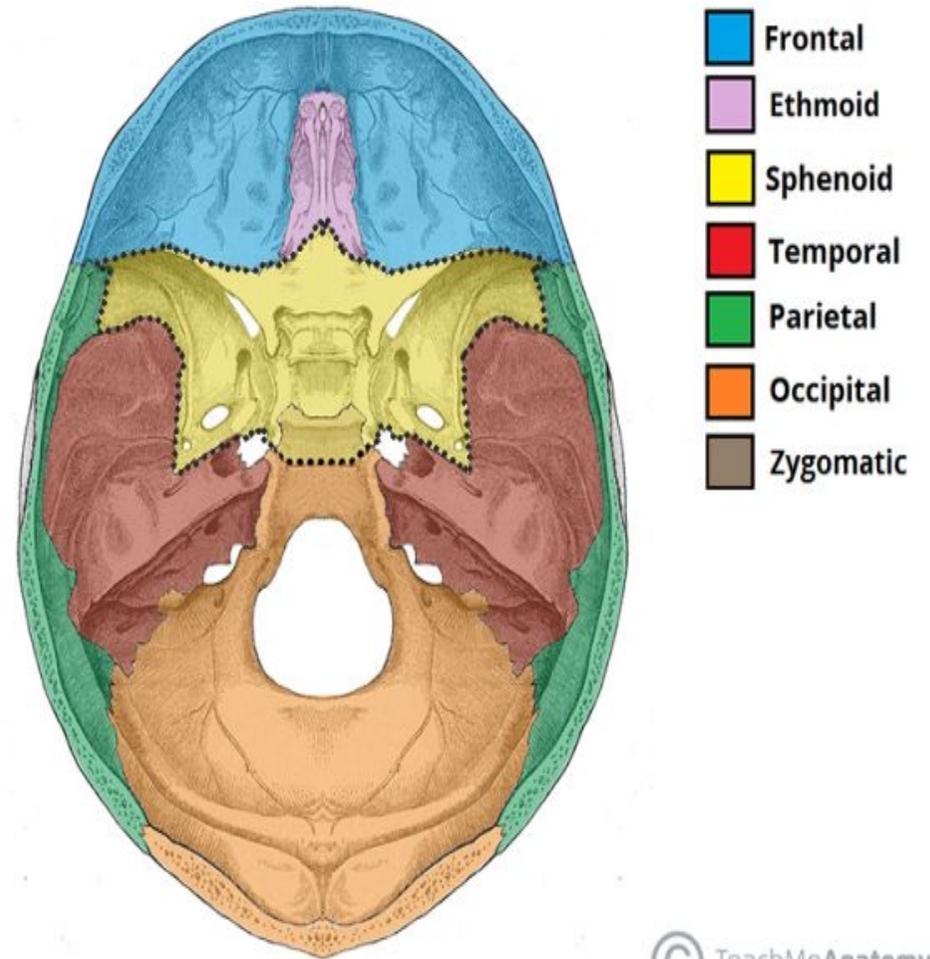




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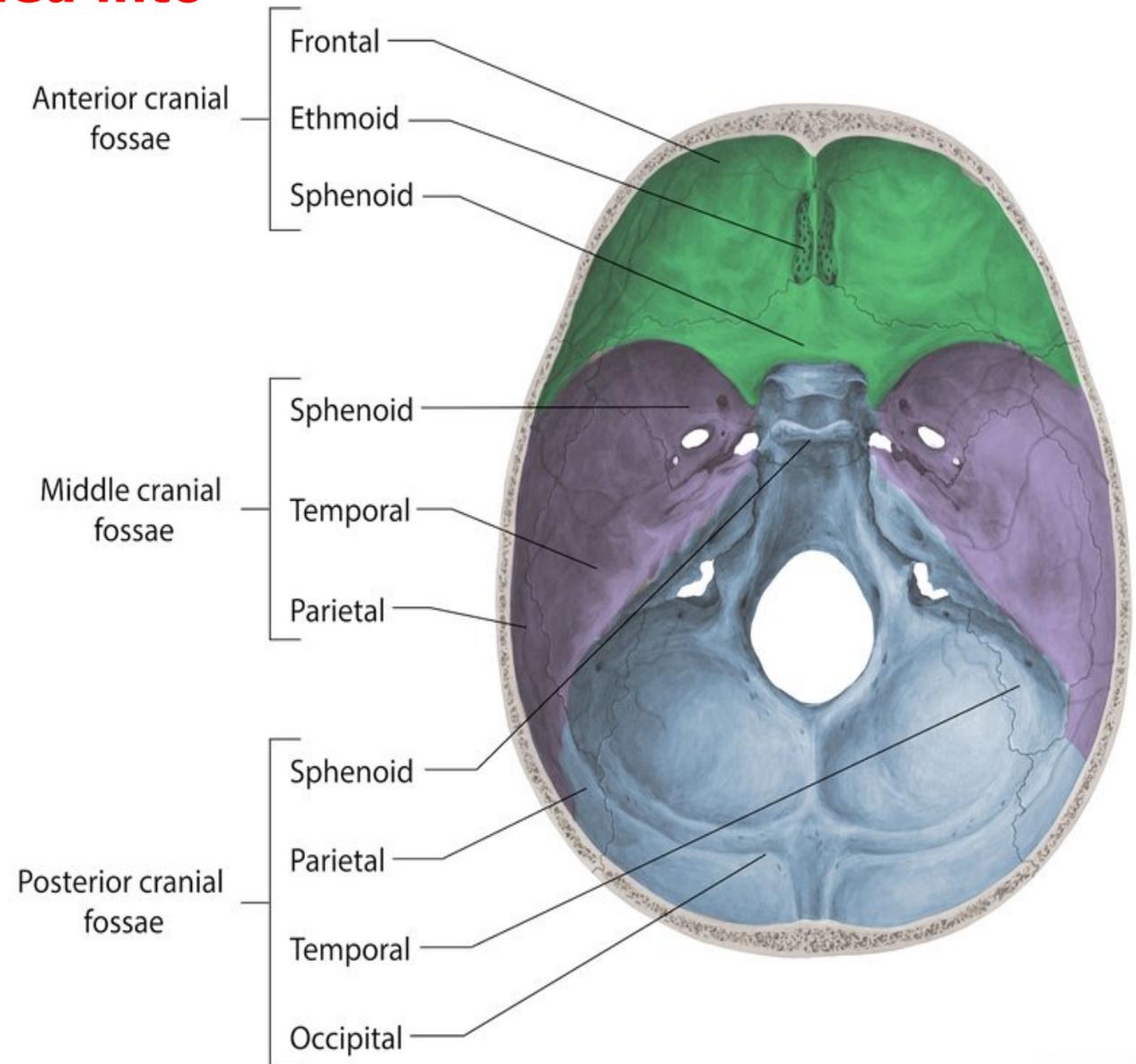
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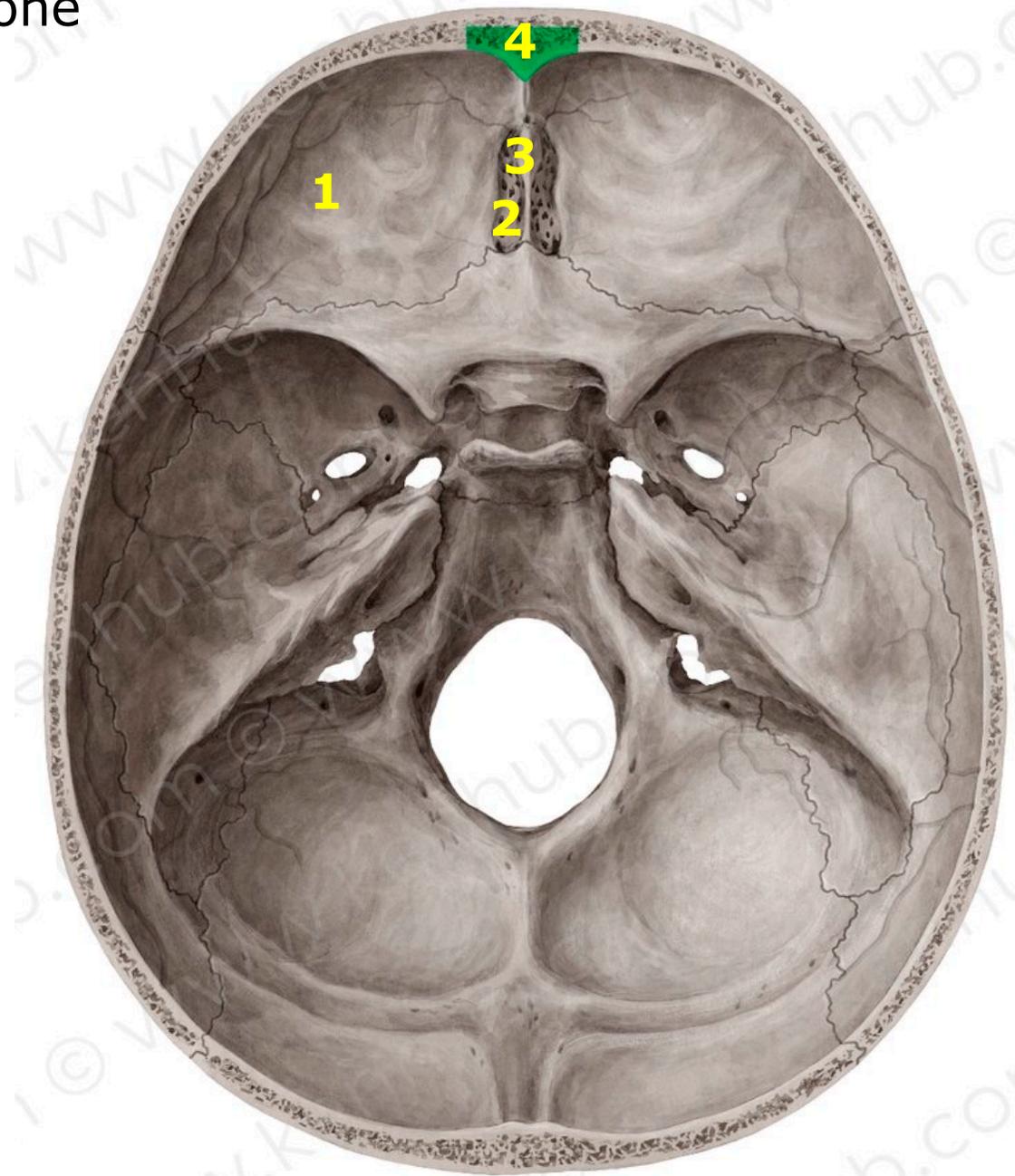
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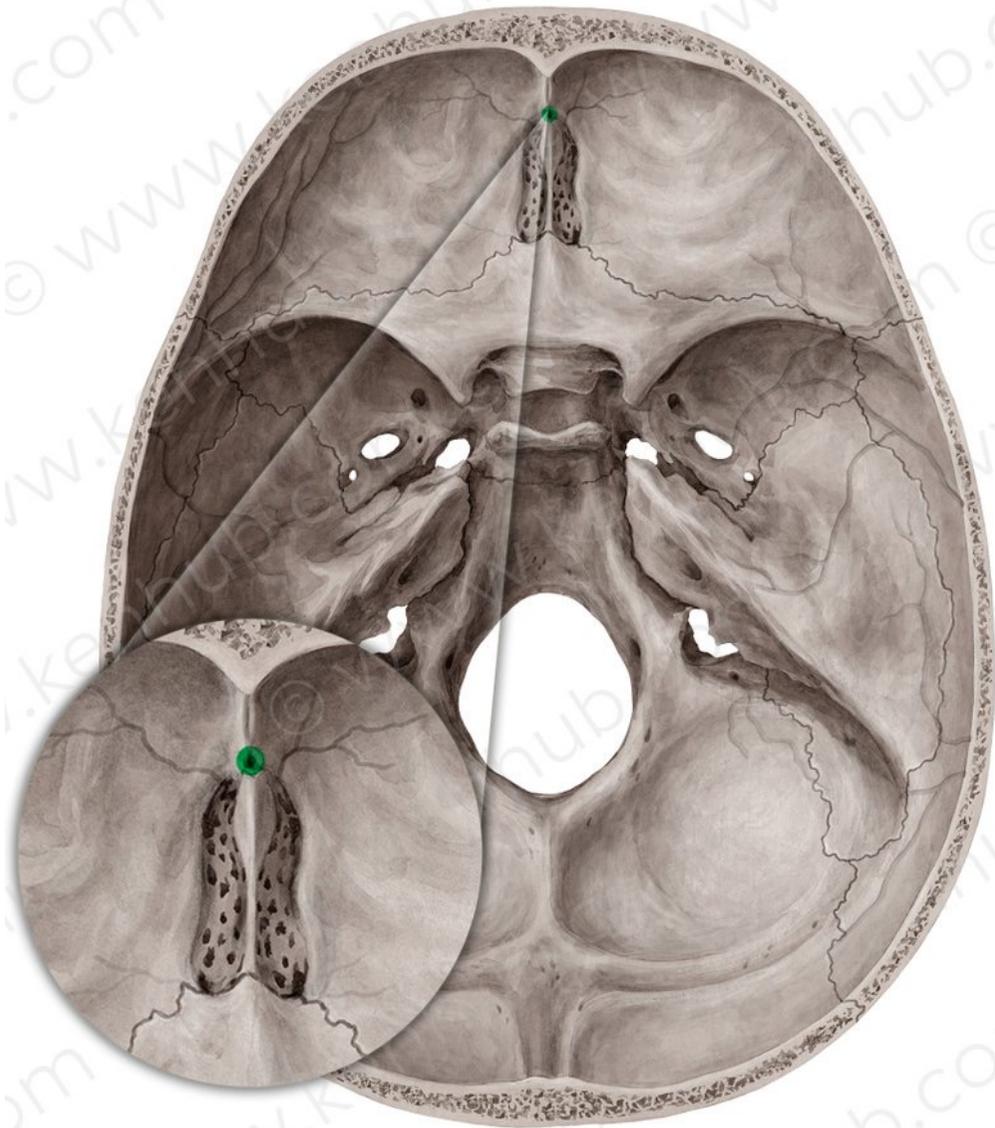
# The cranial cavity is divided into

- 1- Anterior cranial fossa
- 2- Middle cranial fossa
- 3- Posterior cranial fossa

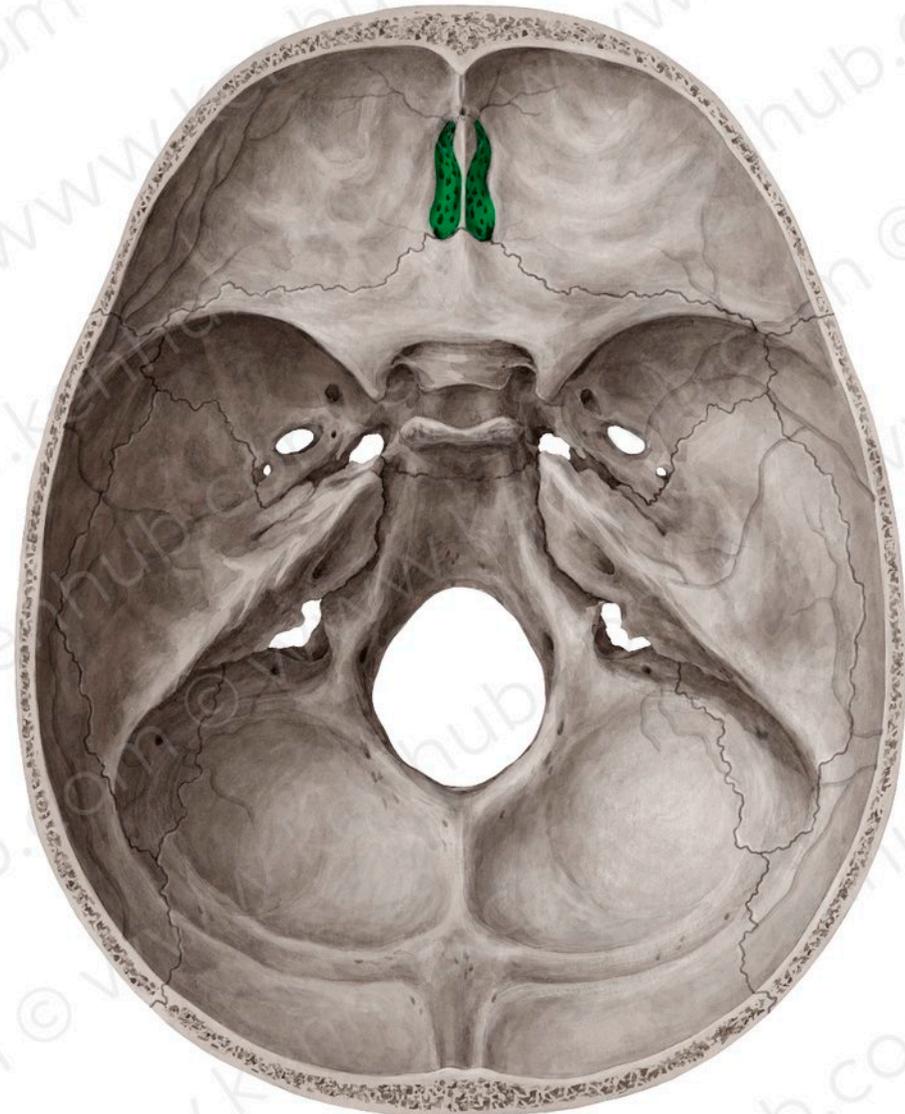


1. Orbital plates of the frontal bone
2. Cribriform plate of ethmoid
3. Crista galli
4. Frontal crest



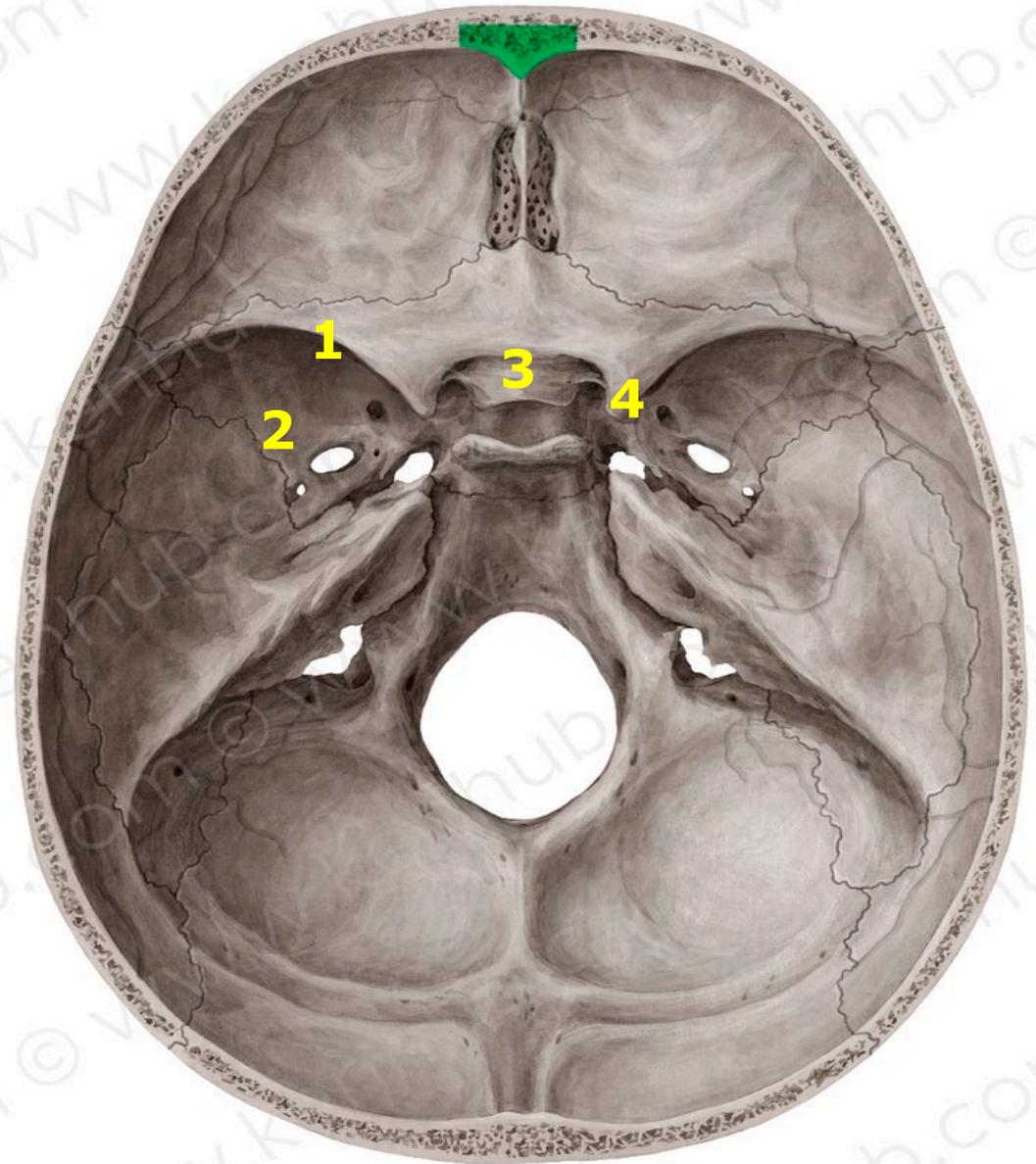
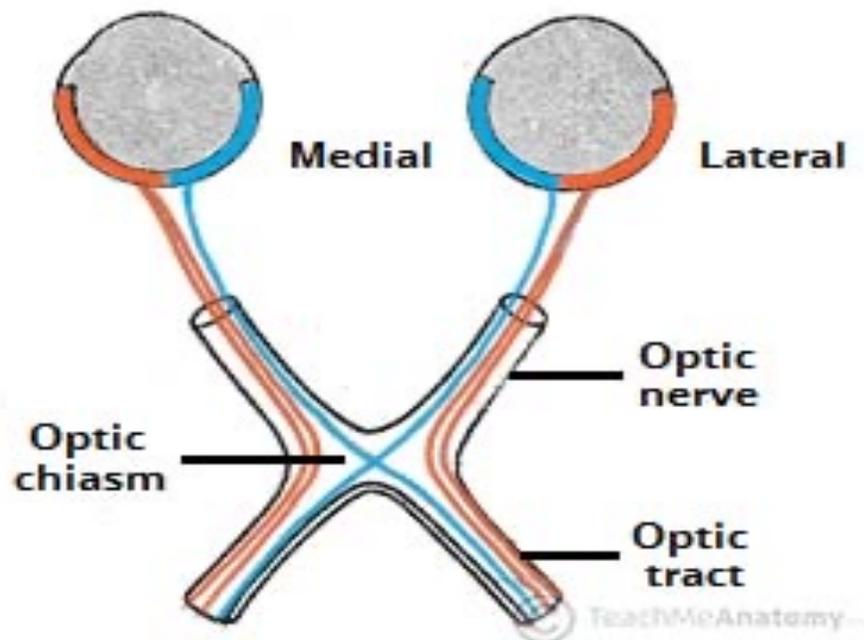


**Foramen cecum**

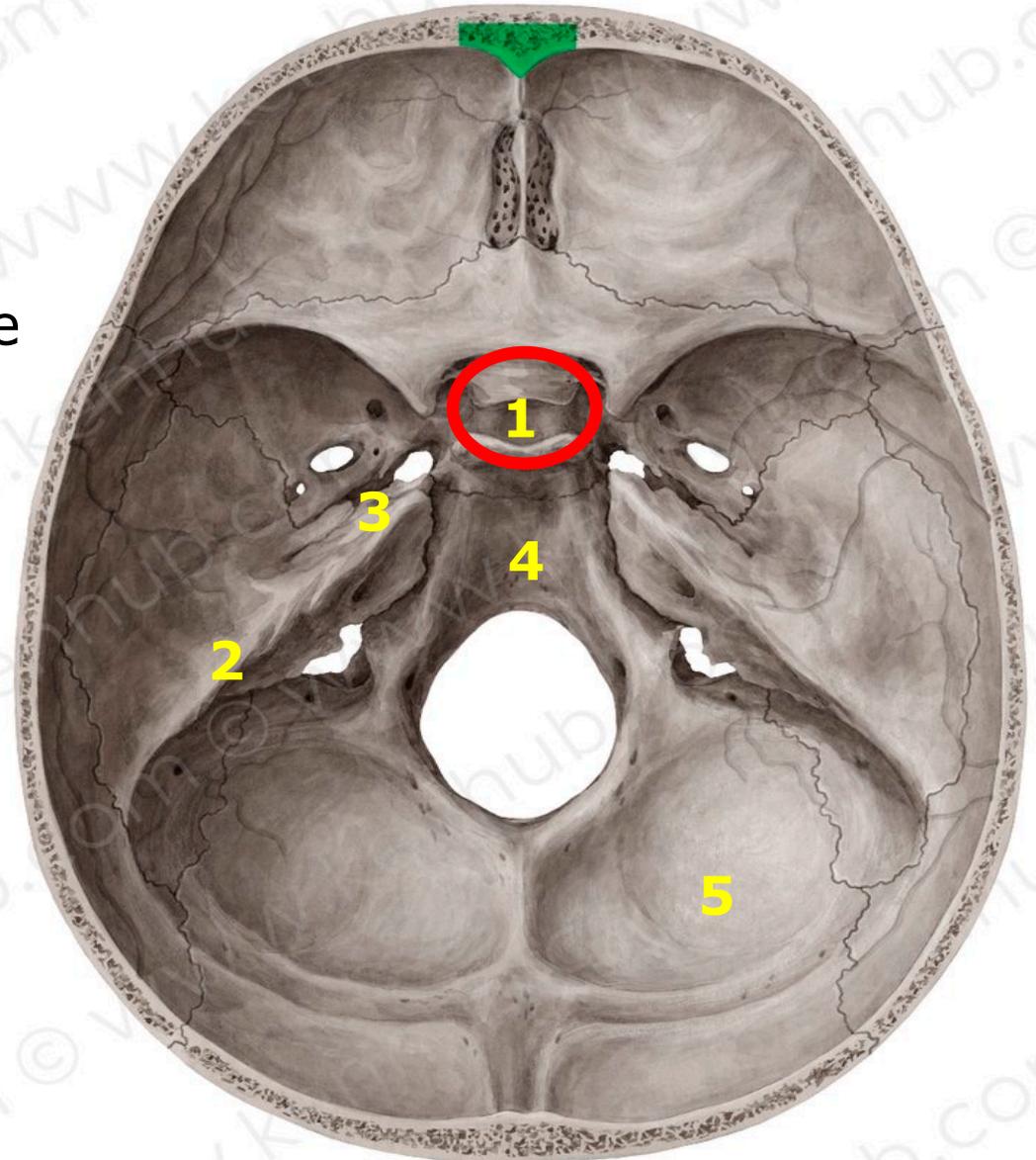


**Cribriform plate of ethmoid**

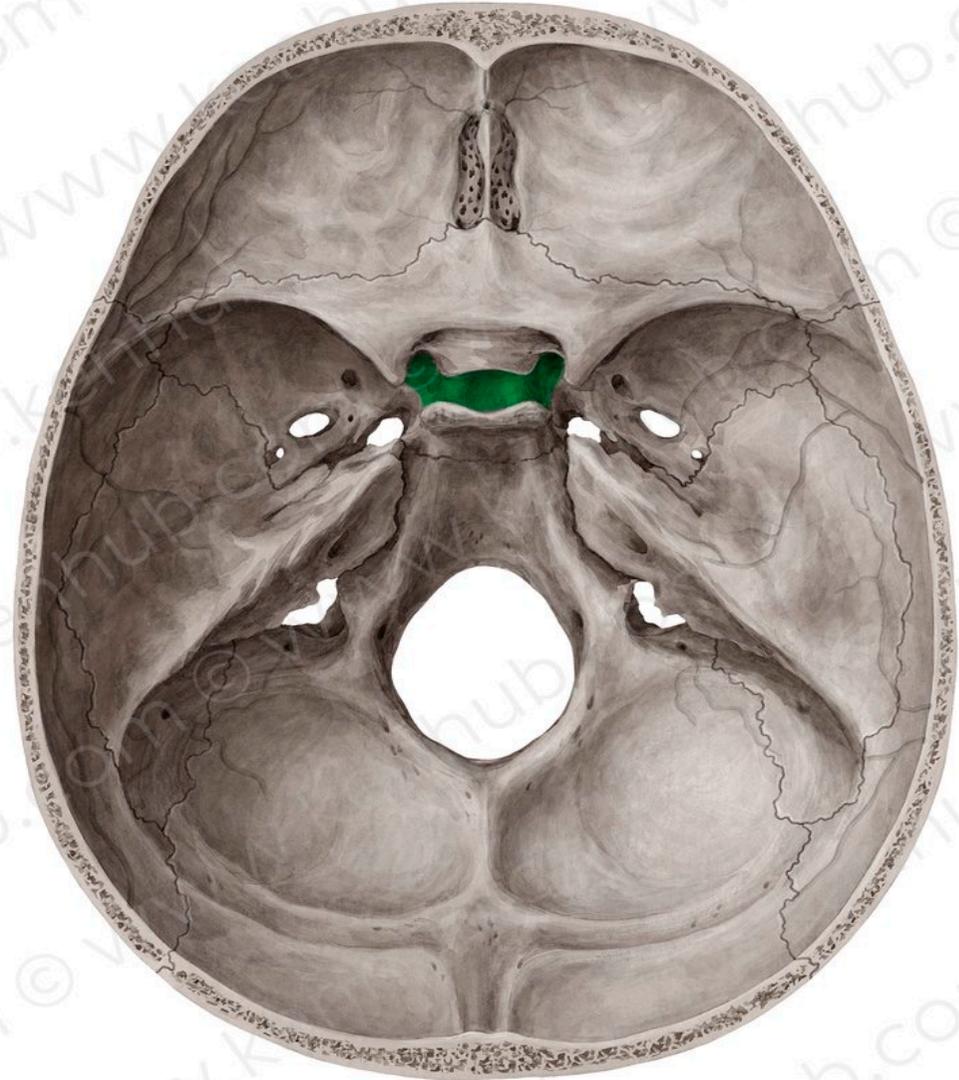
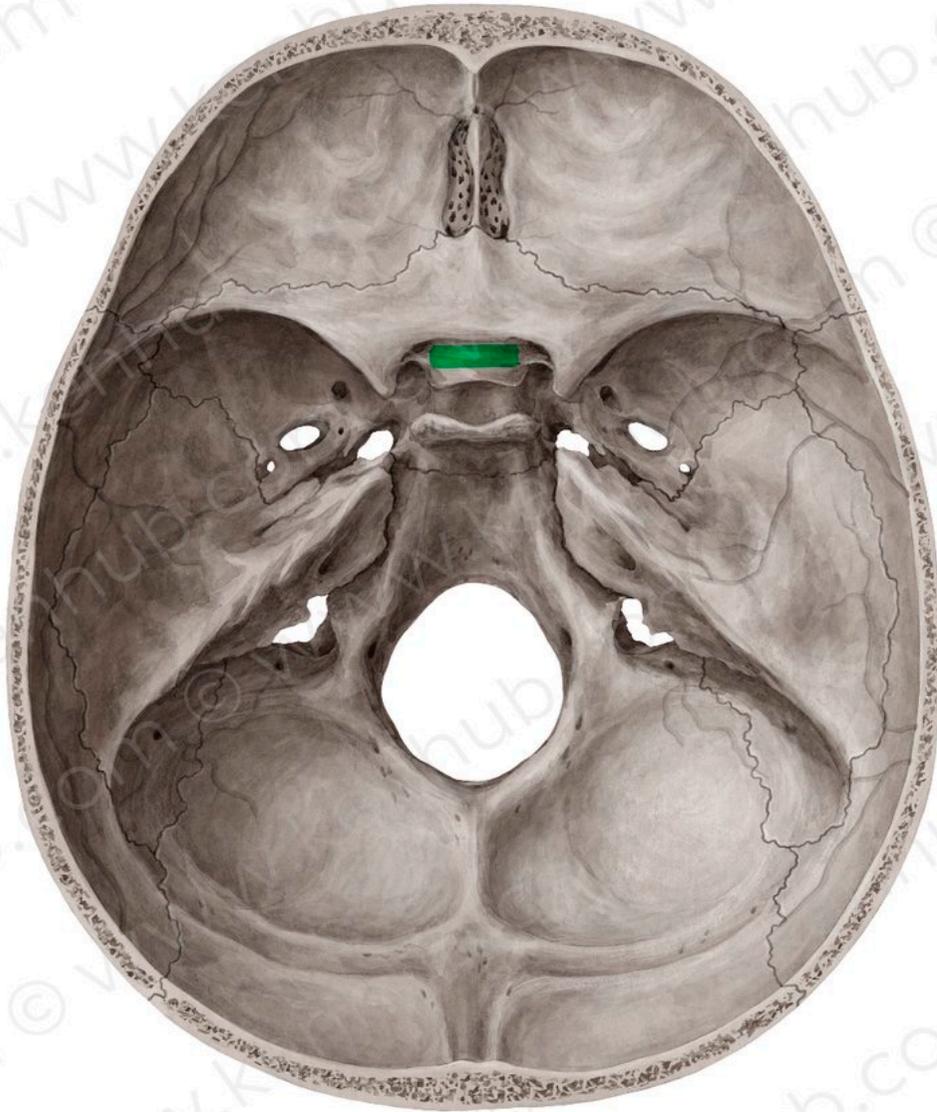
1. Lesser wing of sphenoid
2. Greater wing of sphenoid
3. »ulcus chiasmaticus
4. Anterior clinoid process



1. Sella turcica
2. Petrous part of temporal bone
3. Trigeminal impression
4. Basilar part of occipital bone
5. Squamous part of occipital bone

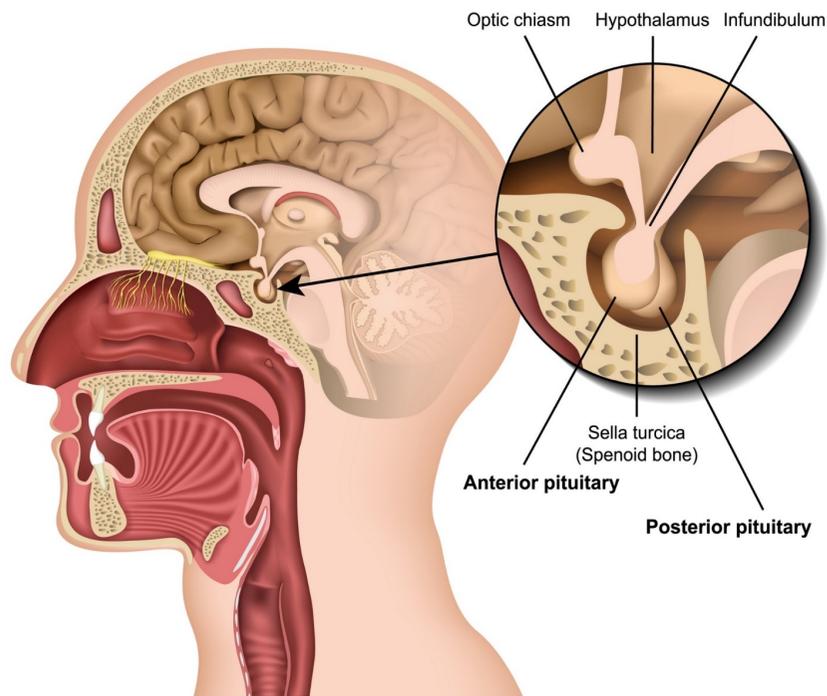
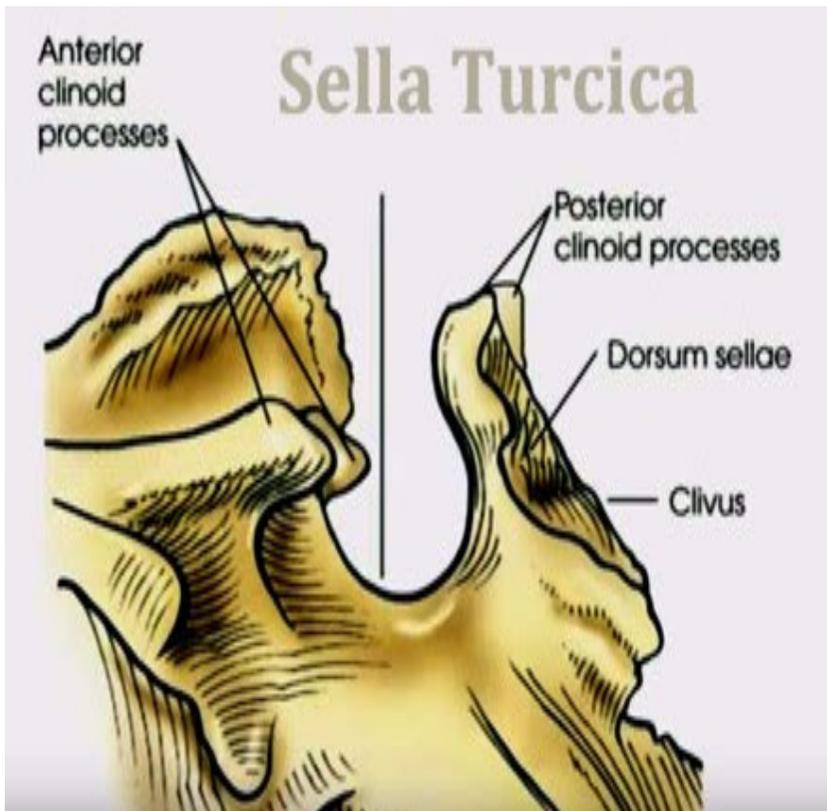


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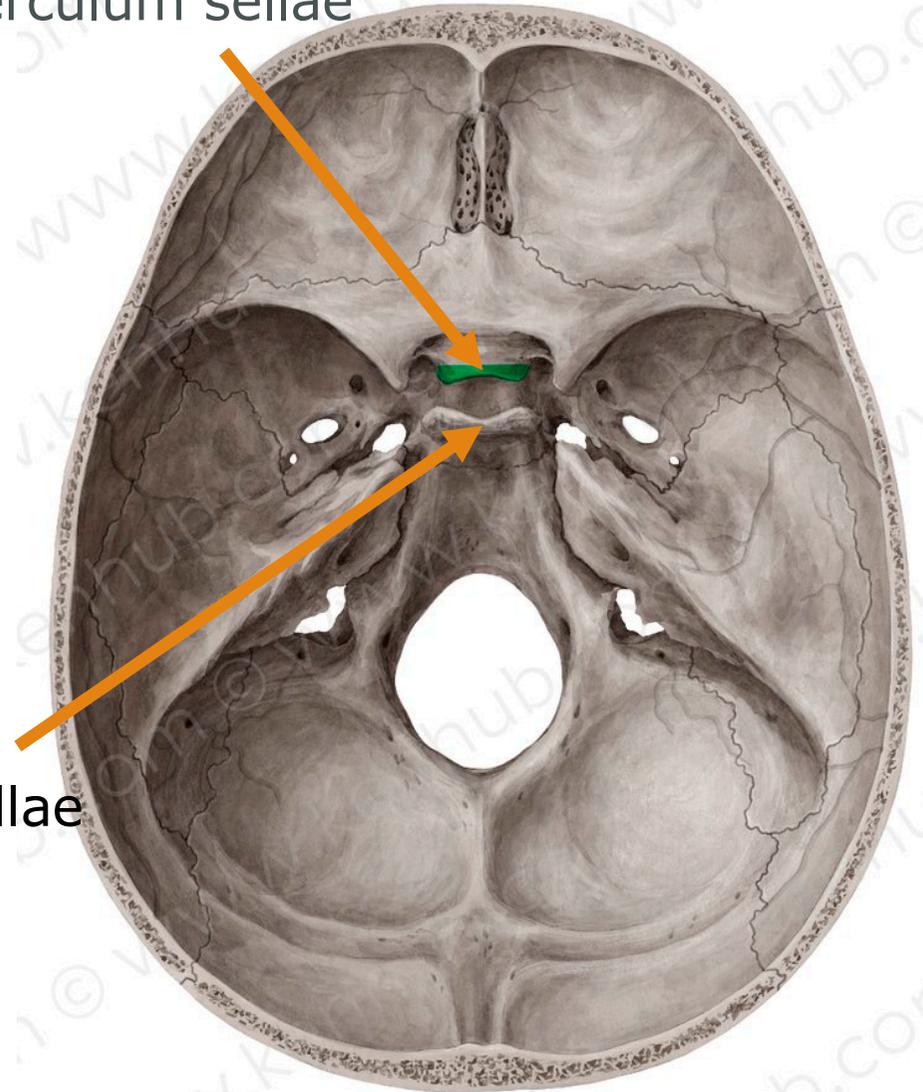


**Sulcus chiasmaticus**

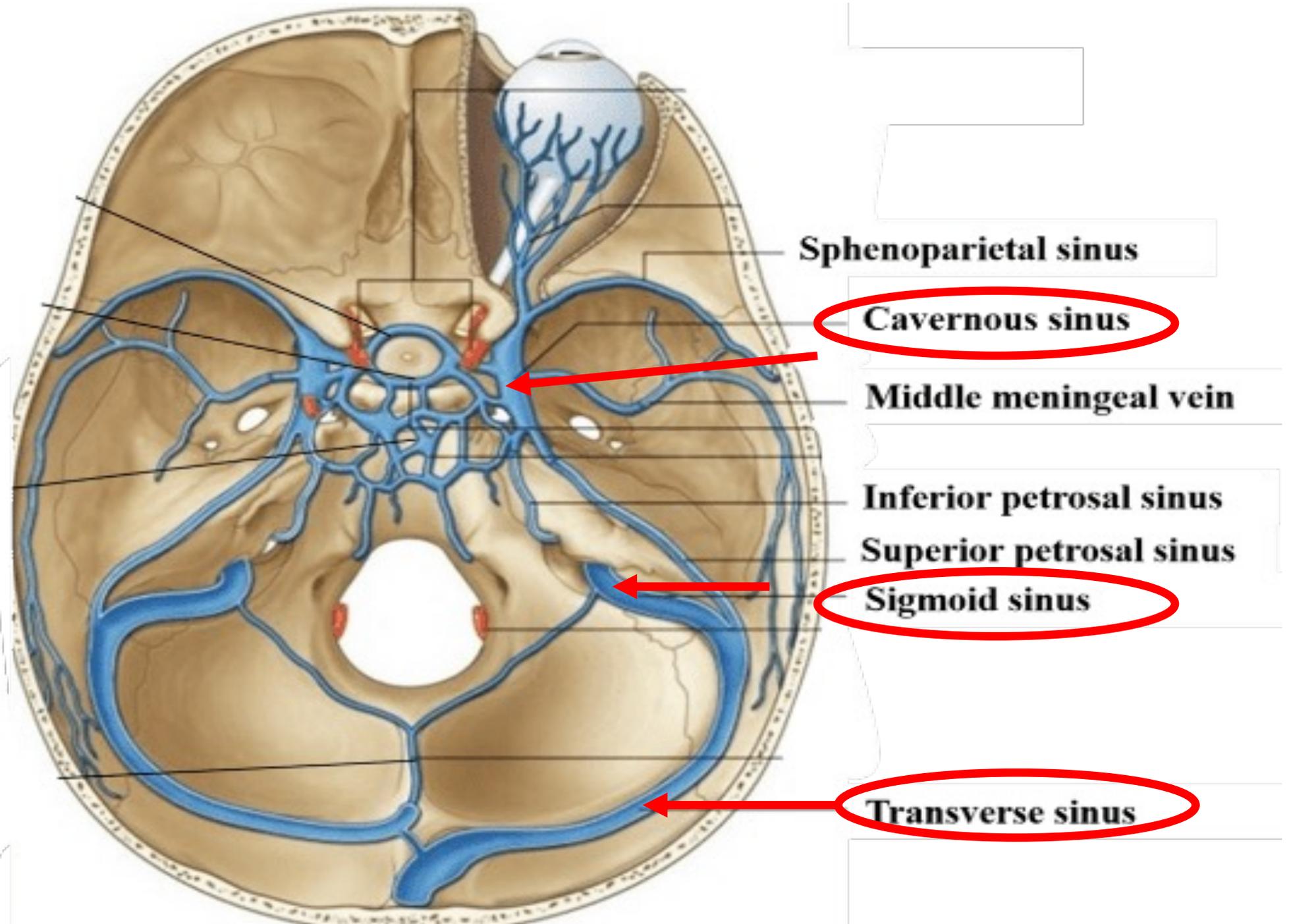
**Sella turcica**



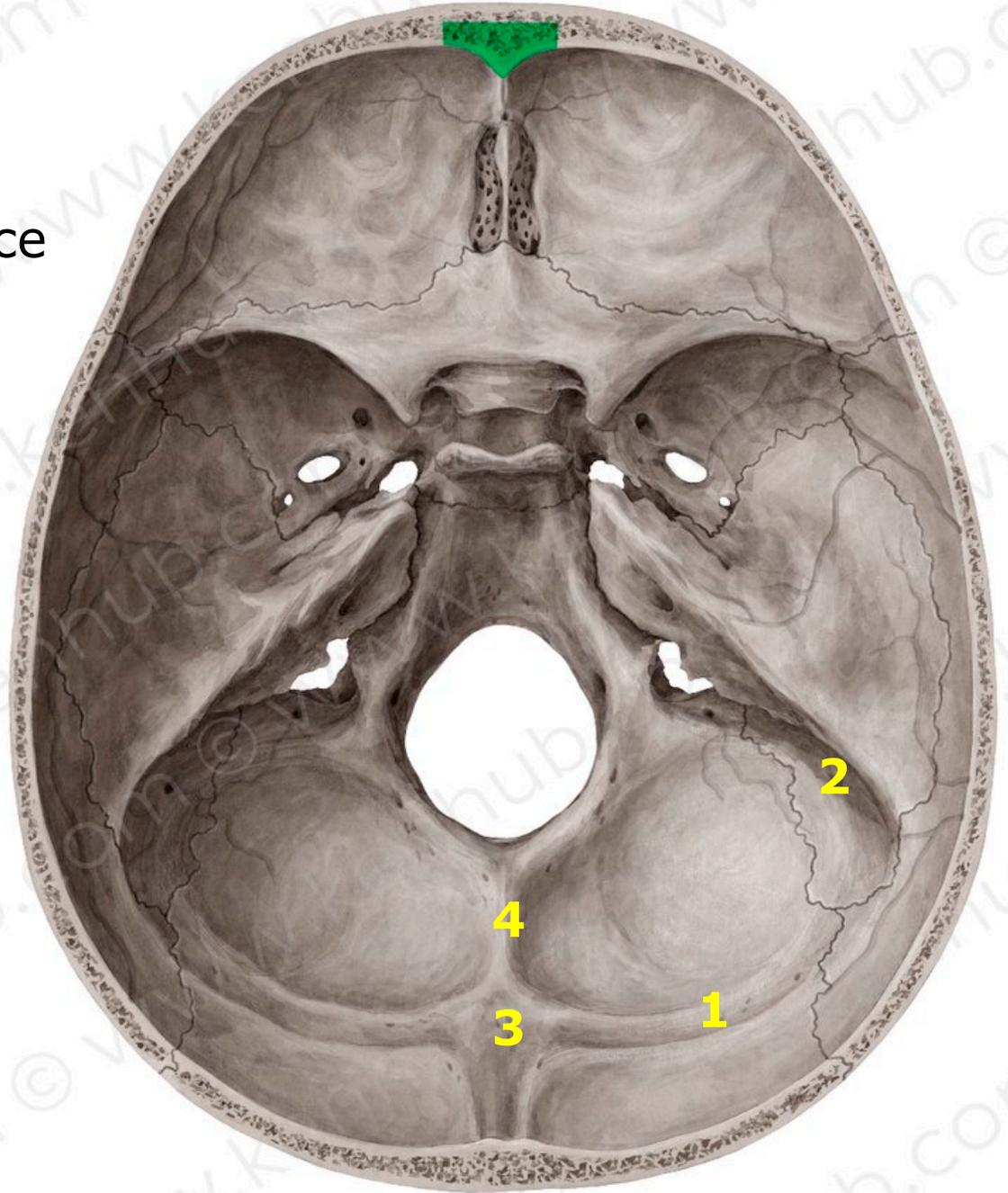
Tuberculum sellae

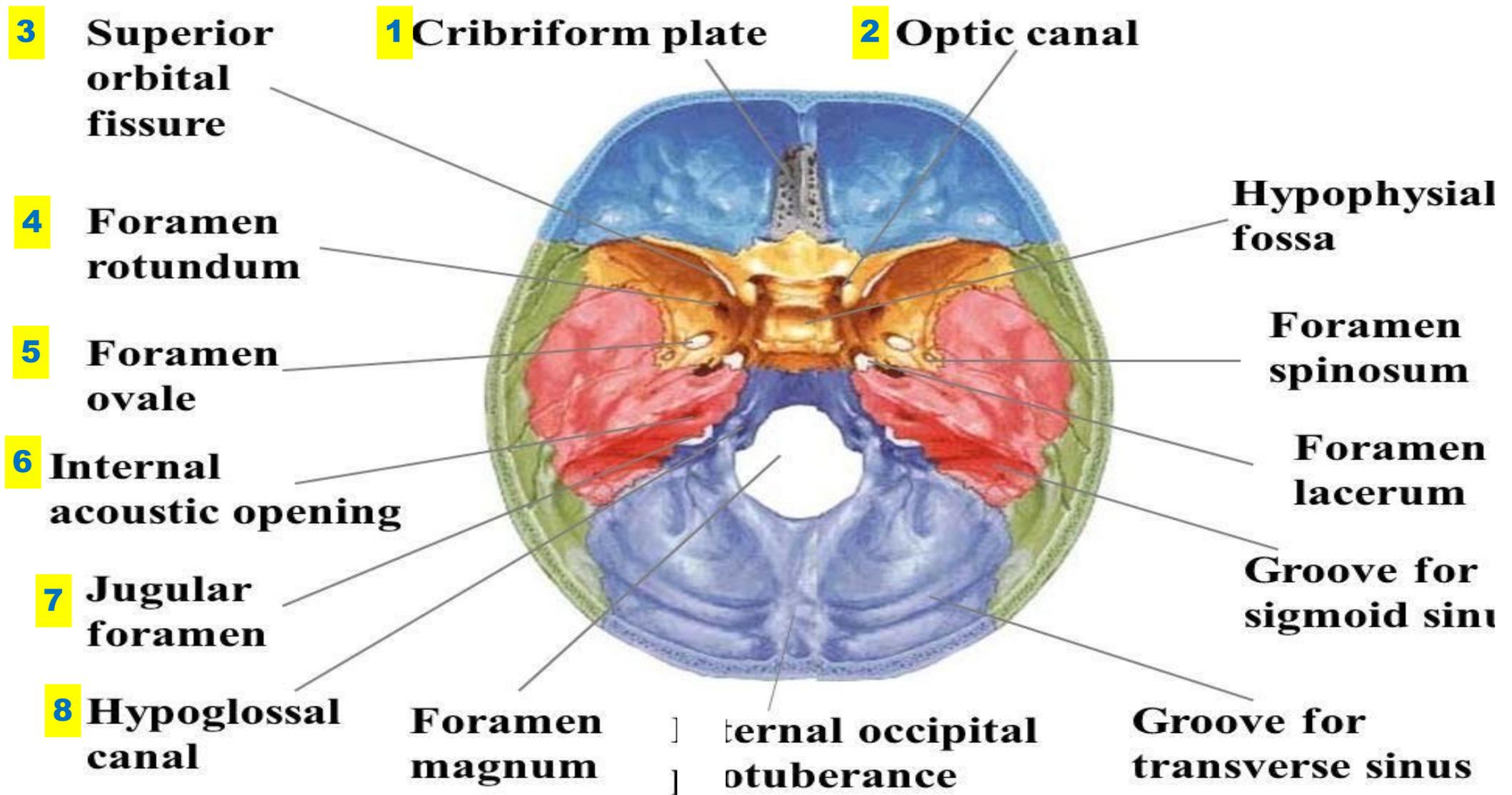


Dorsum sellae

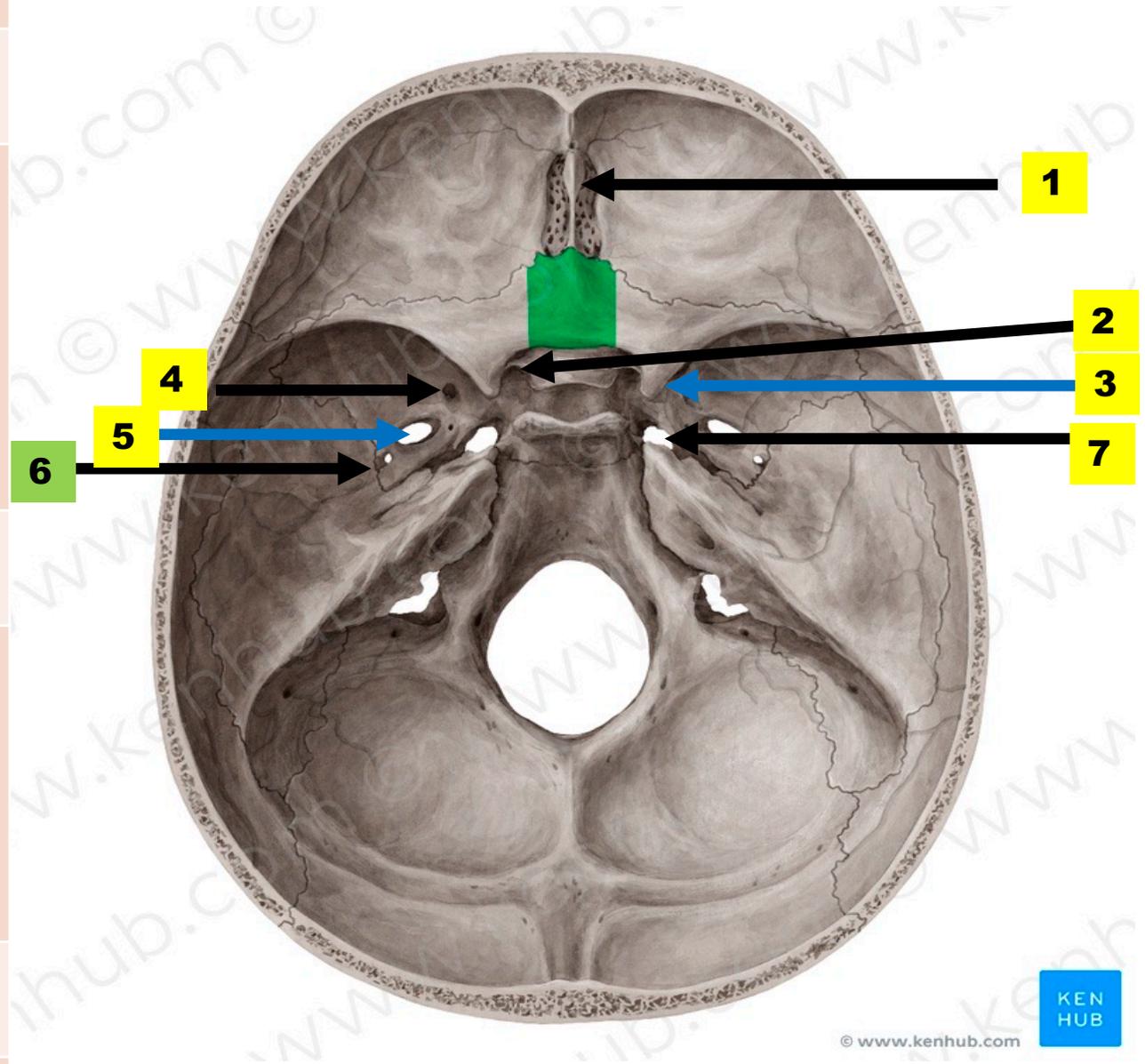


1. Groove for transverse sinus
2. Groove for sigmoid sinus
3. Internal occipital protuberance
4. Internal occipital crest

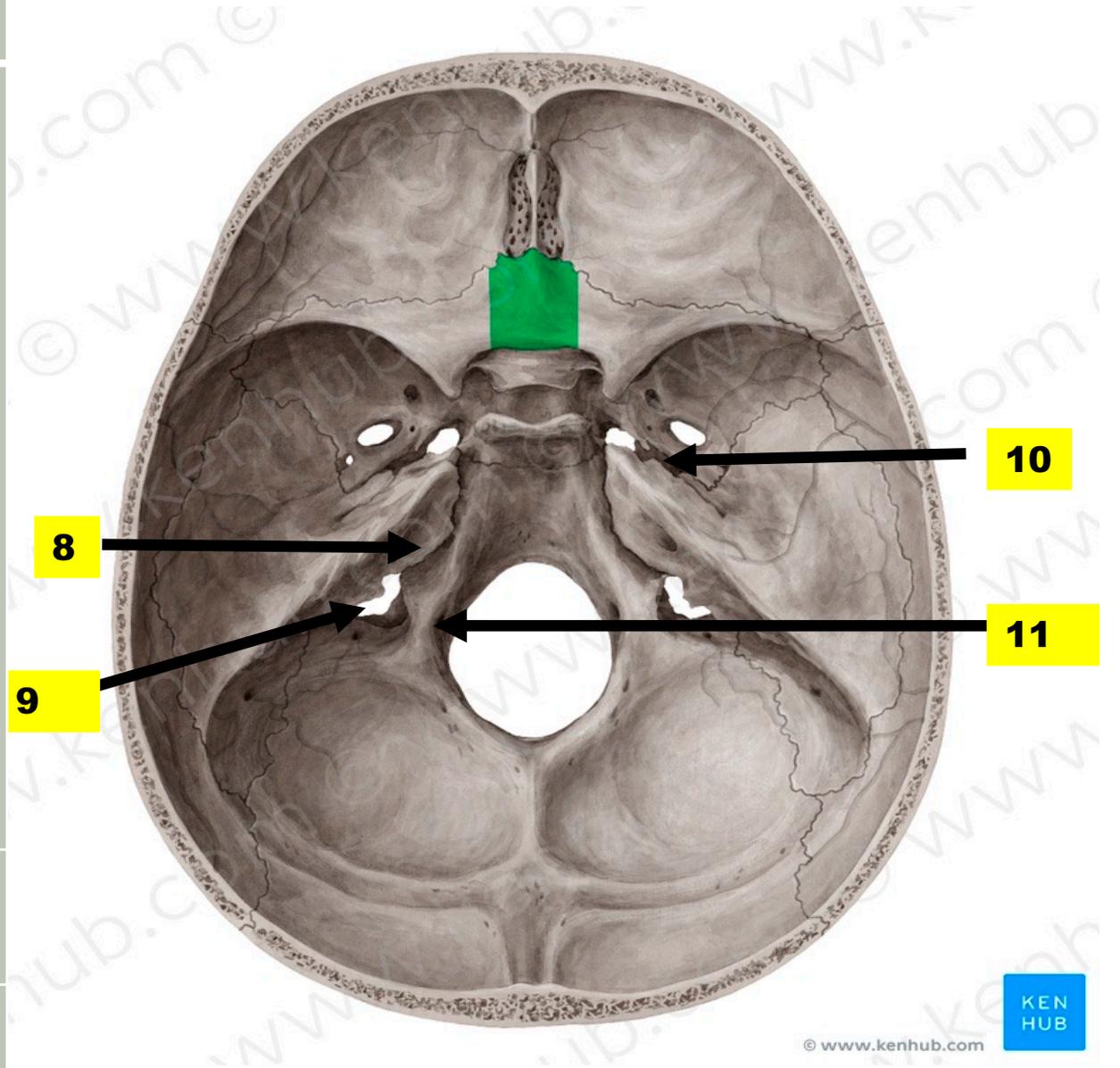




Foramina	Contents
1-Cribriform Plate	Olfactory N (I)
2-Optic canal	Optic nerve (II) and ophthalmic artery
3-Superior orbital fissure	Oculomotor (III), Trochlear (IV), Abducence (VI) and (lacrimal, frontal and nasociliary) branches of ophthalmic nerves (V1)
4-Foramen Rotundum	maxillary nerve
5-Foramen Ovale	<b>M</b> andibular nerve V3 <b>A</b> ccessory meningeal A. <b>L</b> esser petrosal nerve <b>E</b> missary vein
6-Foramen spinosum	Middle meningeal artery Nervus spinosus
7-Foramen Lacerum	Nerve and Artery of pterygoid canal and emissary vein



8-Internal acoustic meatus	Facial nerve (VII), vestibulocochlear nerve (VIII)
9-Jugular Foramen	Inferior petrosal sinus ( <b>Anterior</b> ) Glossopharyngeal nerve (IX), vagus nerve (X), accessory nerve (XI) <b>(Intermediate)</b> Sigmoid sinus <b>(Posterior)</b> which become internal jugular vein
10- Carotid canal	Internal carotid artery
11Hypoglossal Canal	Hypoglossal Nerve (XII)



THANK YOU