



Skull-2

Norma Basalis Interna

Norma Basalis Externa

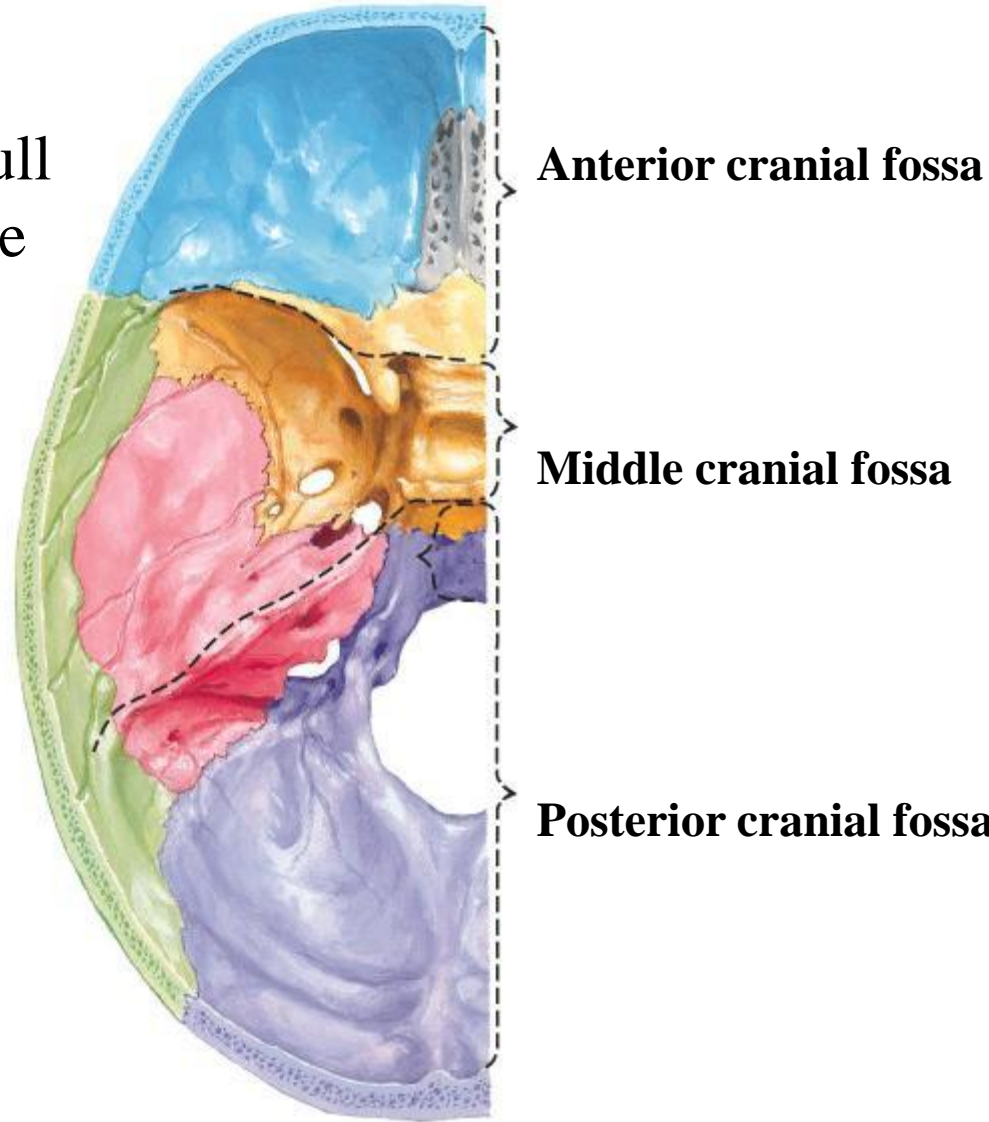
Dr. Heba Kalbouneh

Associate Professor of Anatomy and Histology

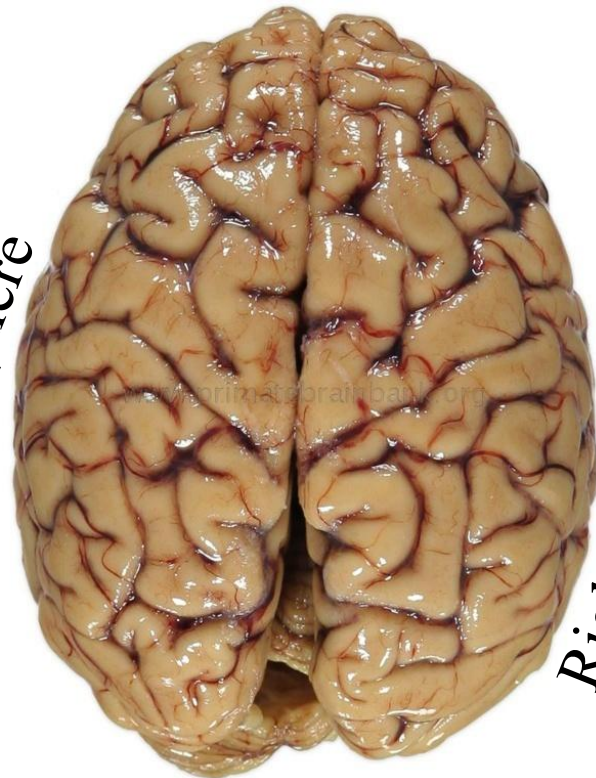
Norma basalis interna

Base of the skull- superior view

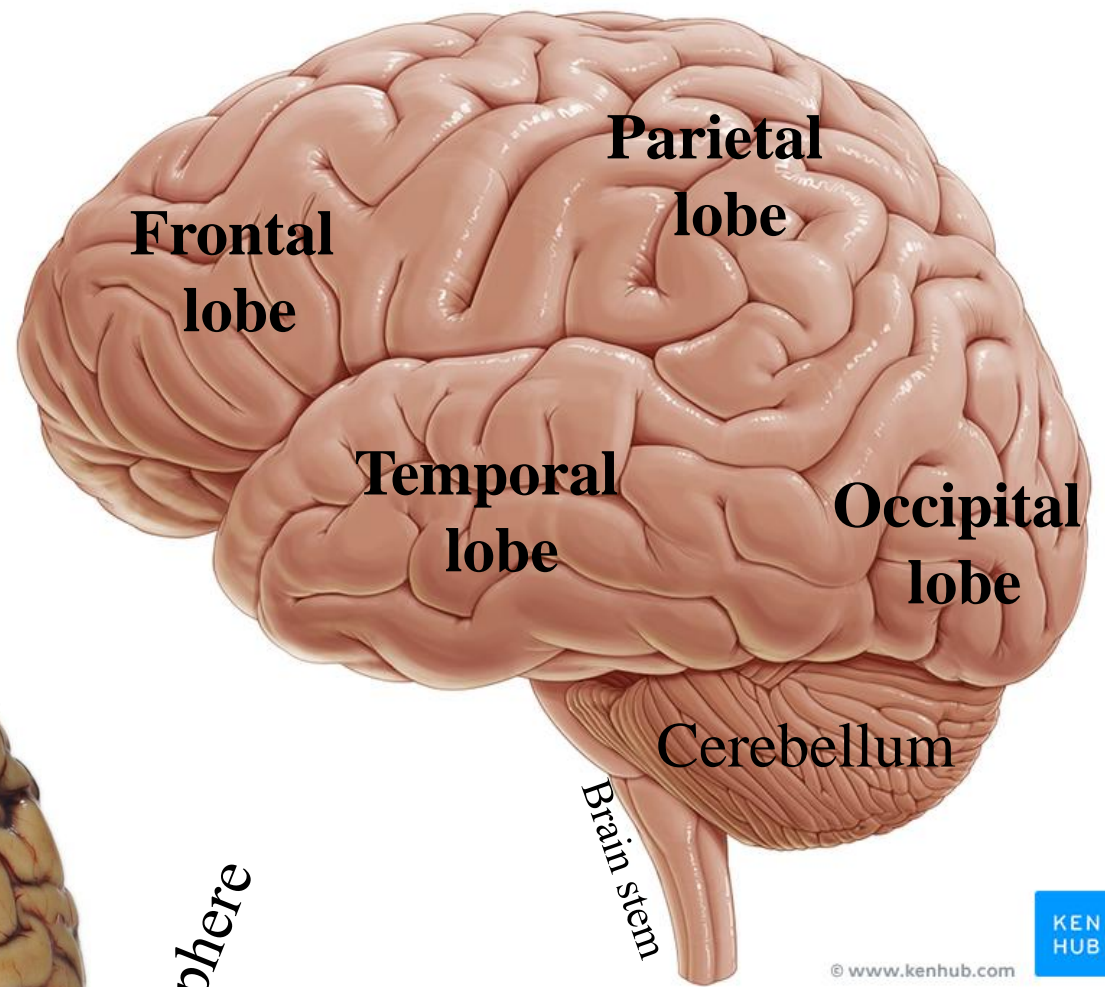
The interior of the base of the skull is divided into three cranial fossae



Left hemisphere

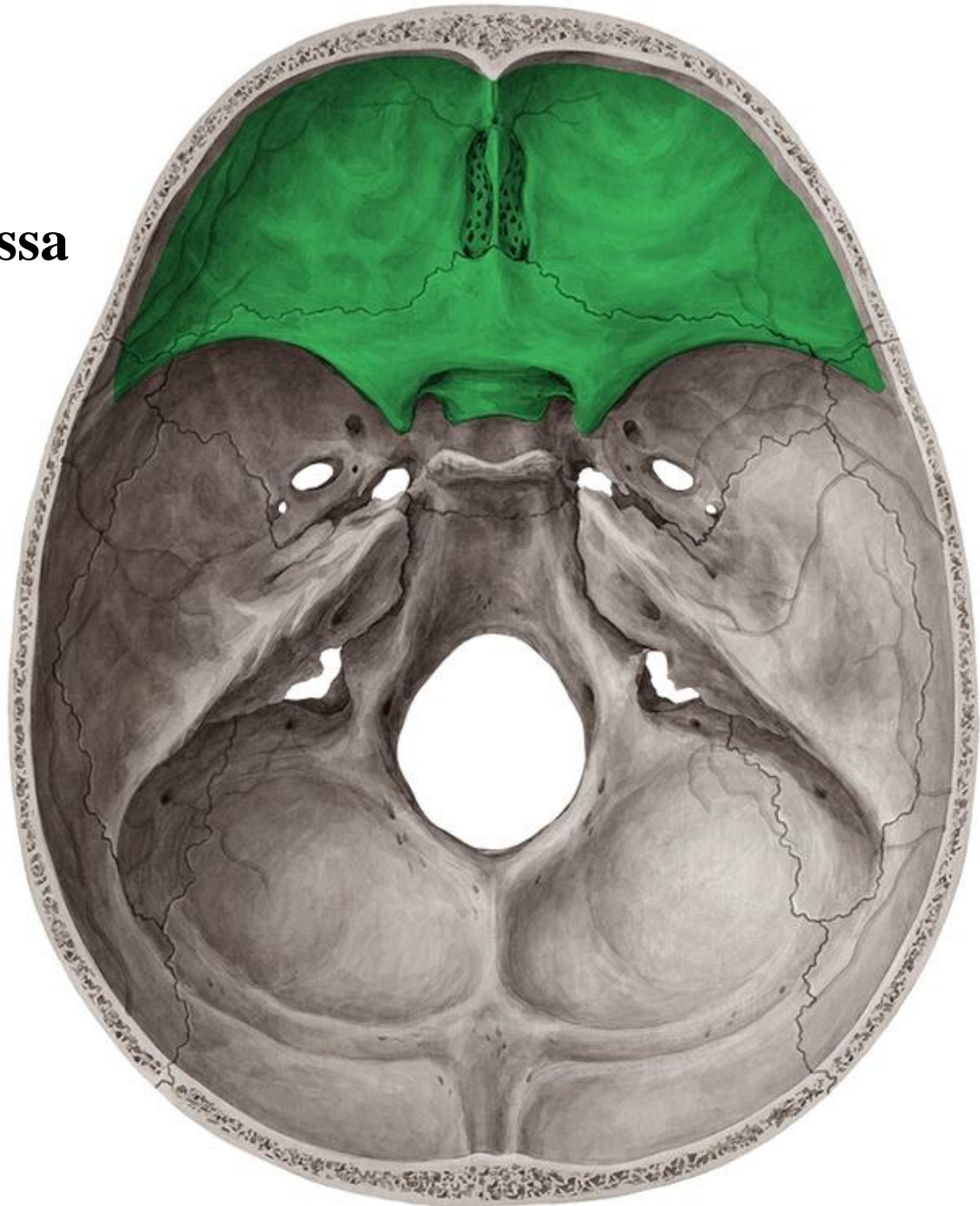


Right hemisphere



Anterior cranial fossa

Contains frontal lobes

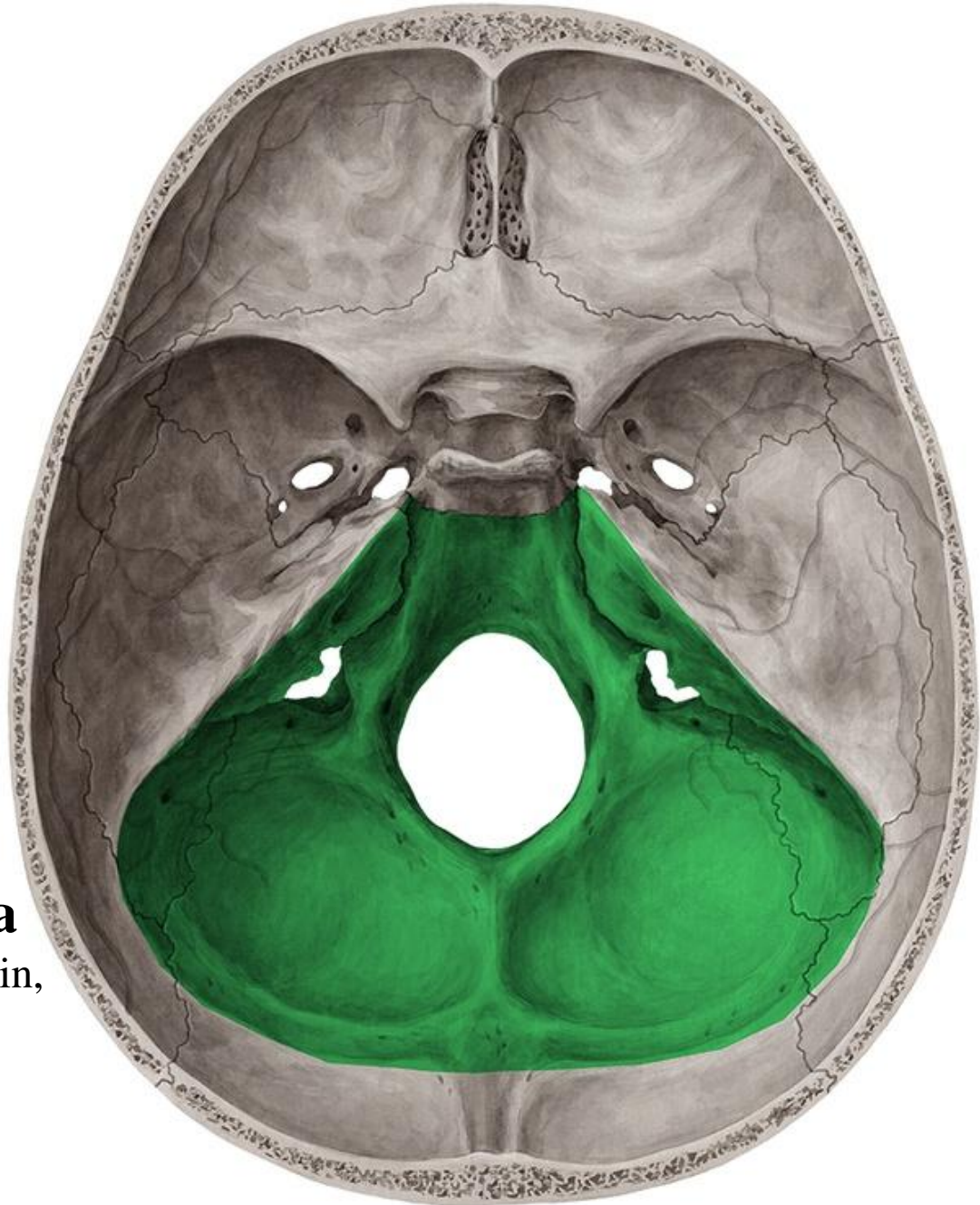


Middle cranial fossa
Contains temporal lobes



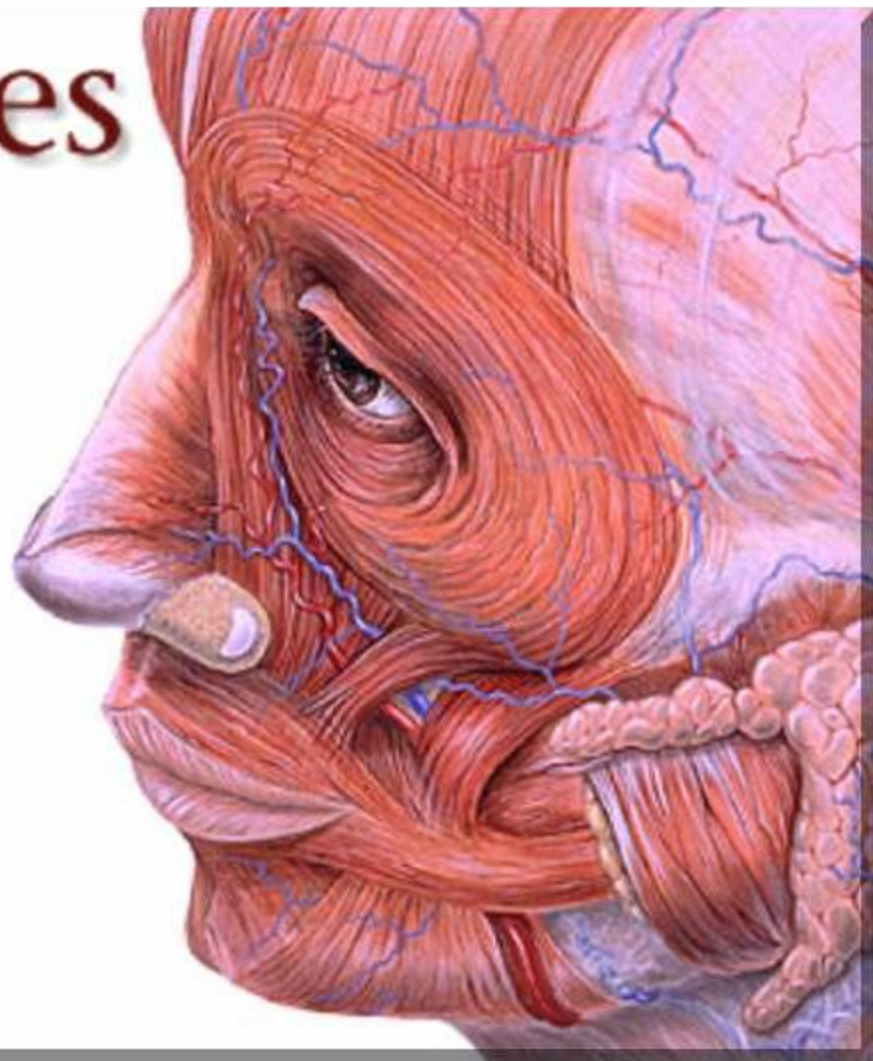
Posterior cranial fossa

Contains the brain stem (midbrain, pons and medulla oblongata) and cerebellum

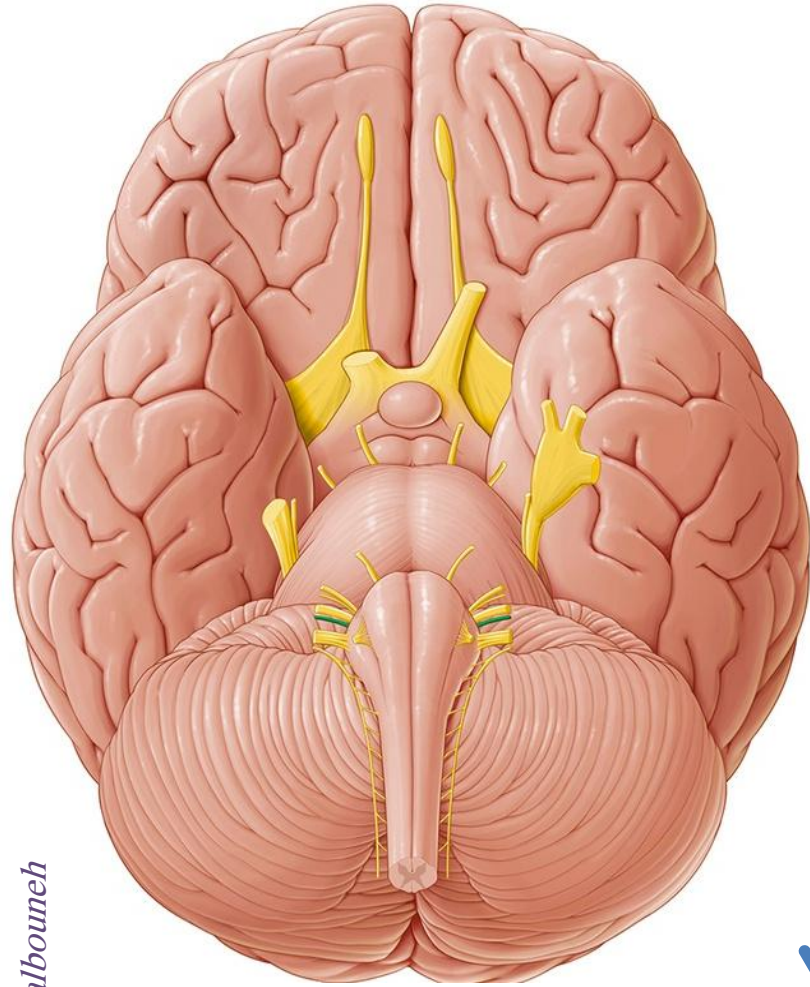


Cranial Nerves

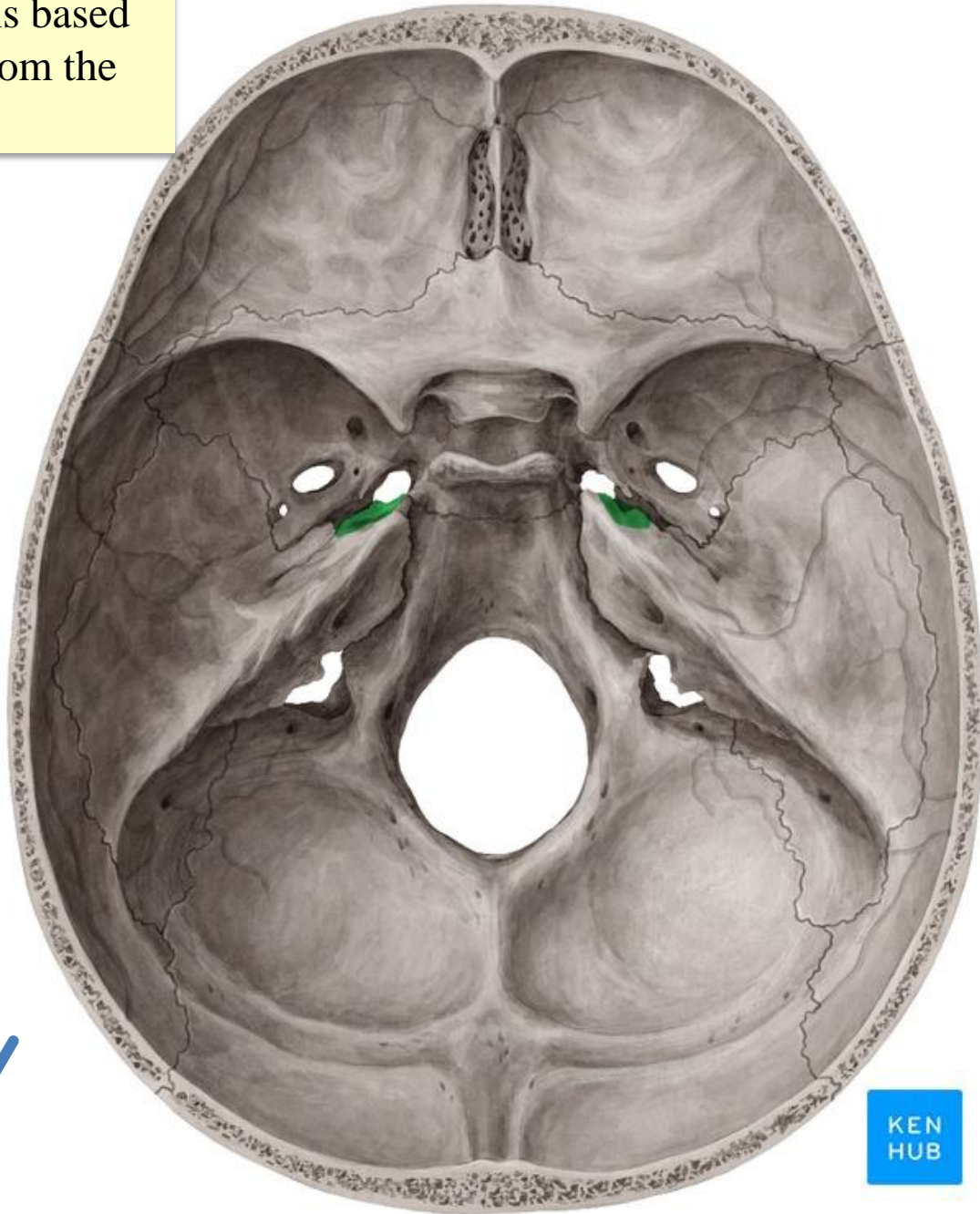
- I Olfactory
- II Optic
- III Oculomotor
- IV Trochlear
- V Trigeminal
- VI Abducens
- VII Facial
- VIII Vestibulocochlear
- IX Glossopharyngeal
- X Vagus
- XI Accessory
- XII Hypoglossal

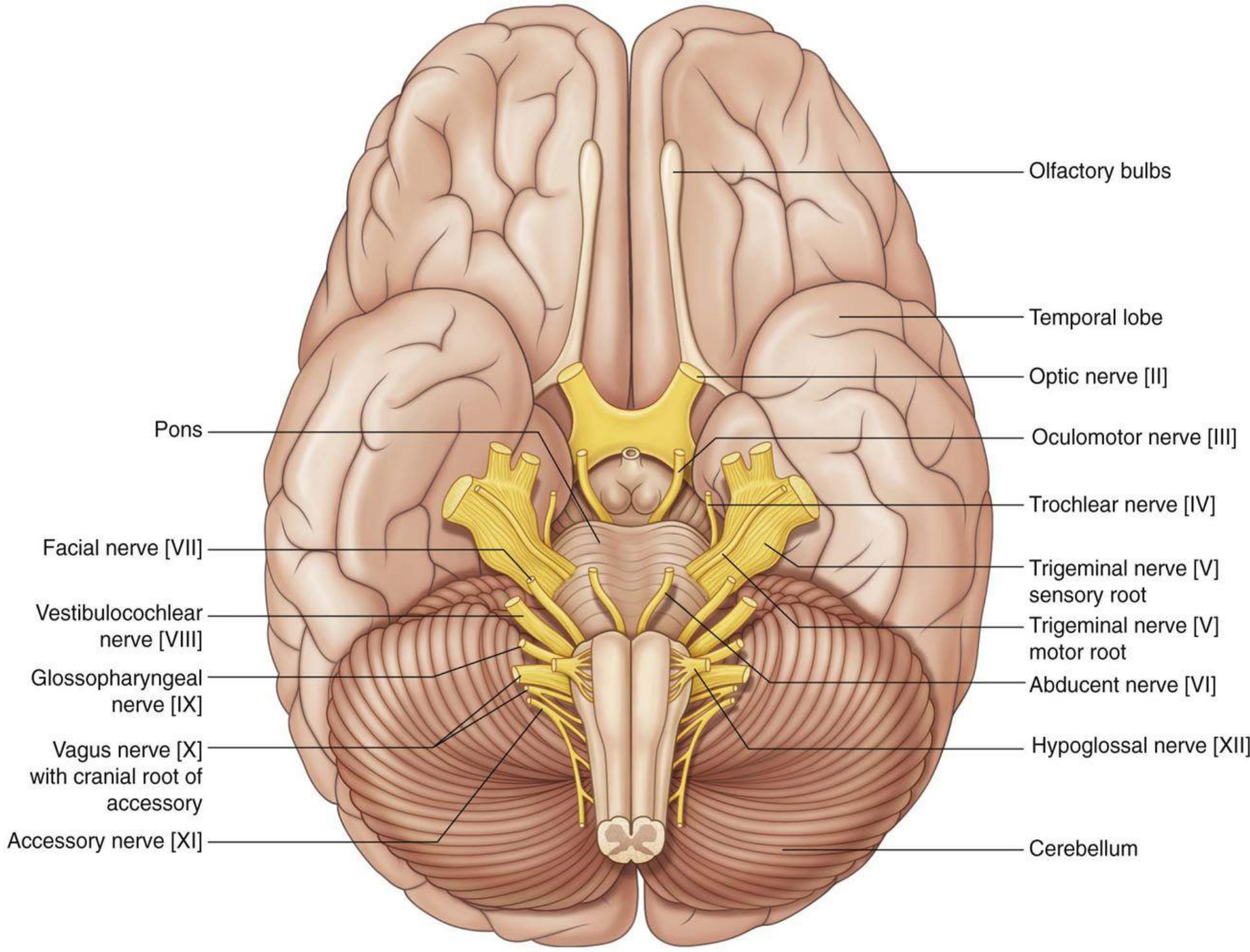


The numbering of the cranial nerves is based on the order in which they emerge from the brain, front to back

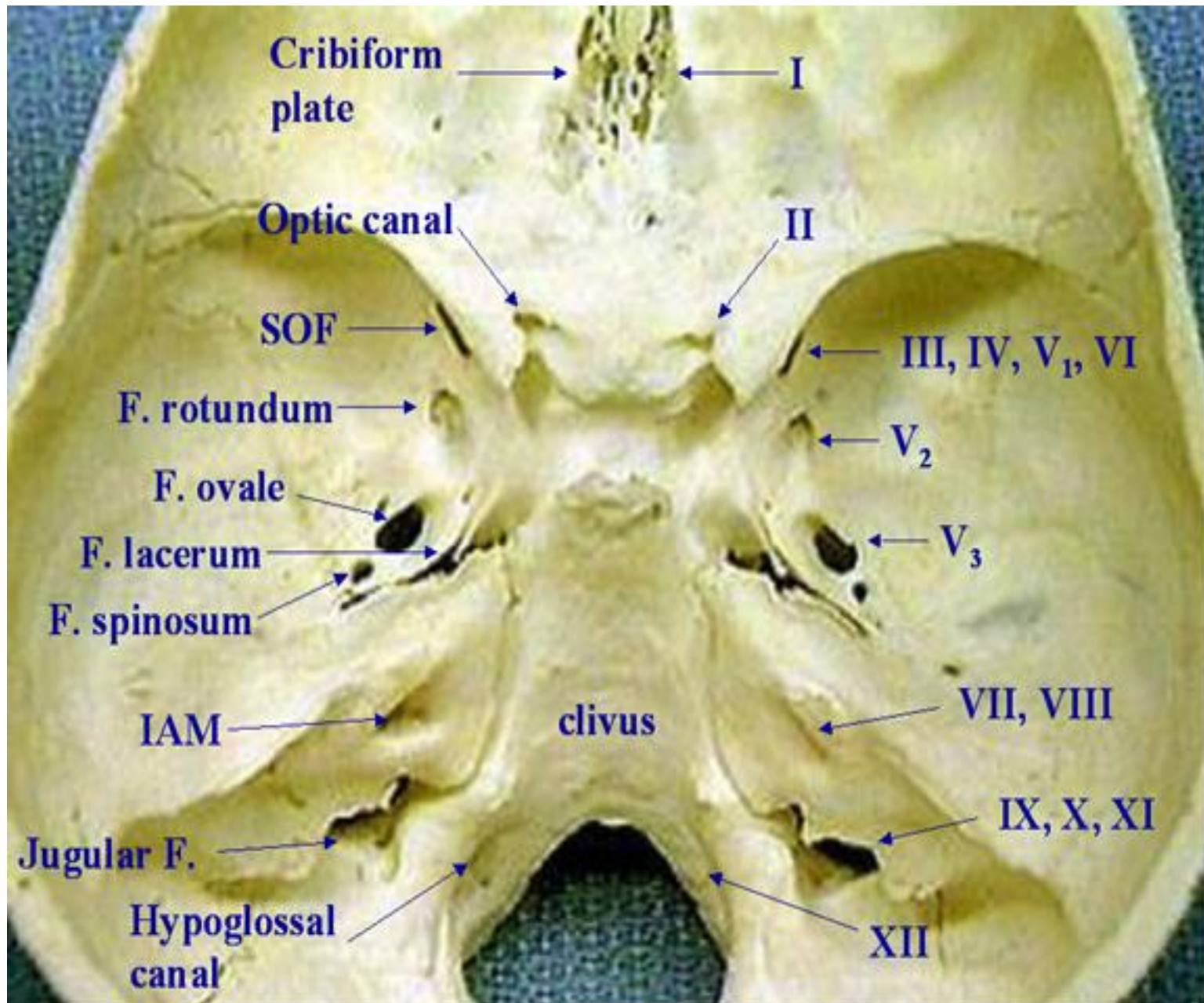


Inferior surface of brain





Foramina of skull and cranial nerves passing through



Anterior cranial fossa

Formed by:

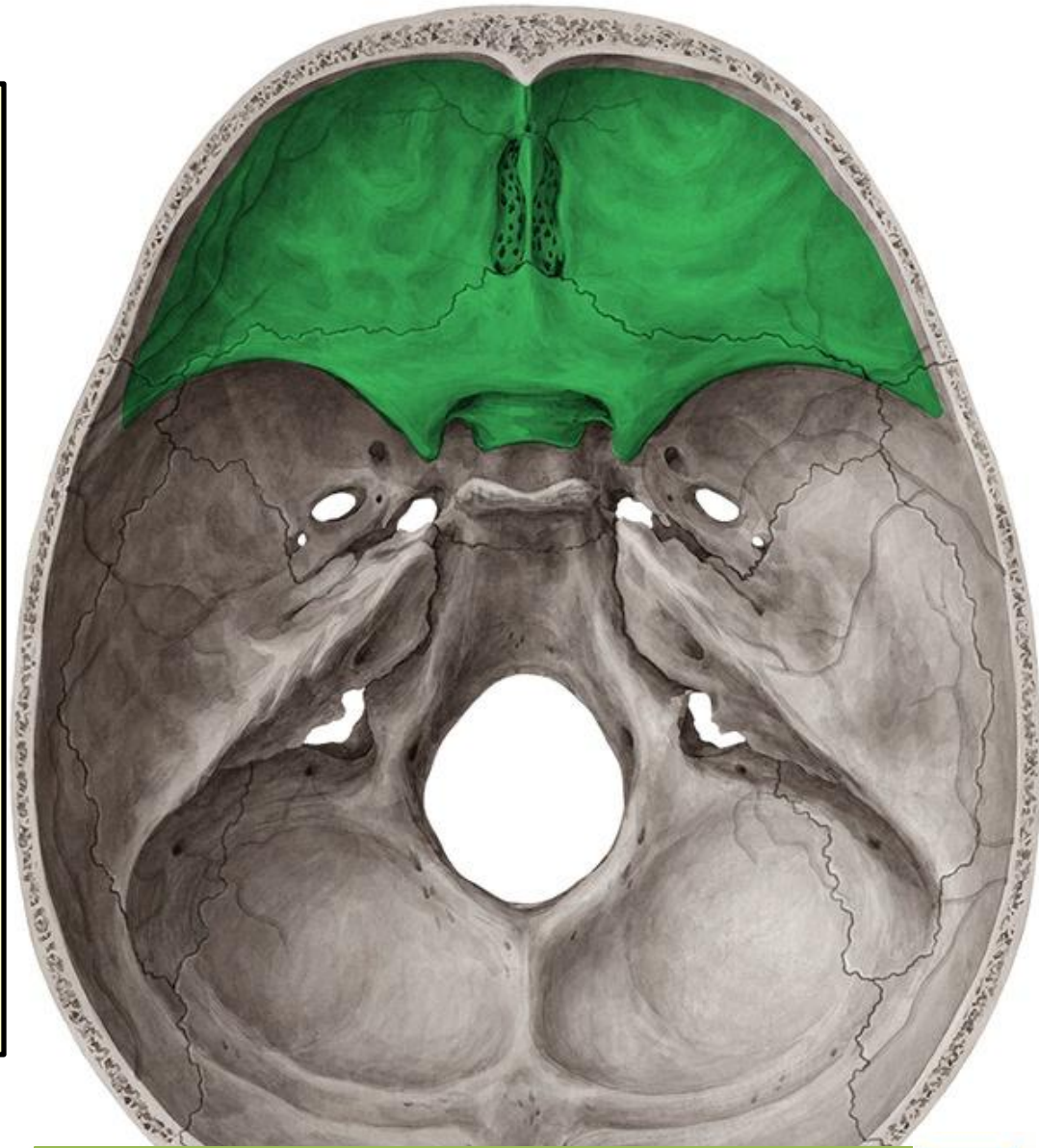
- 1- Frontal bone
- 2- Ethmoid bone in the midline
- 3- Two parts of the sphenoid bone, the body (midline) and the lesser wings (laterally)

Orbital plates of the frontal bone are thin plates of frontal bone, form the roof of the orbit

Frontal crest is a small crest projects from frontal bone

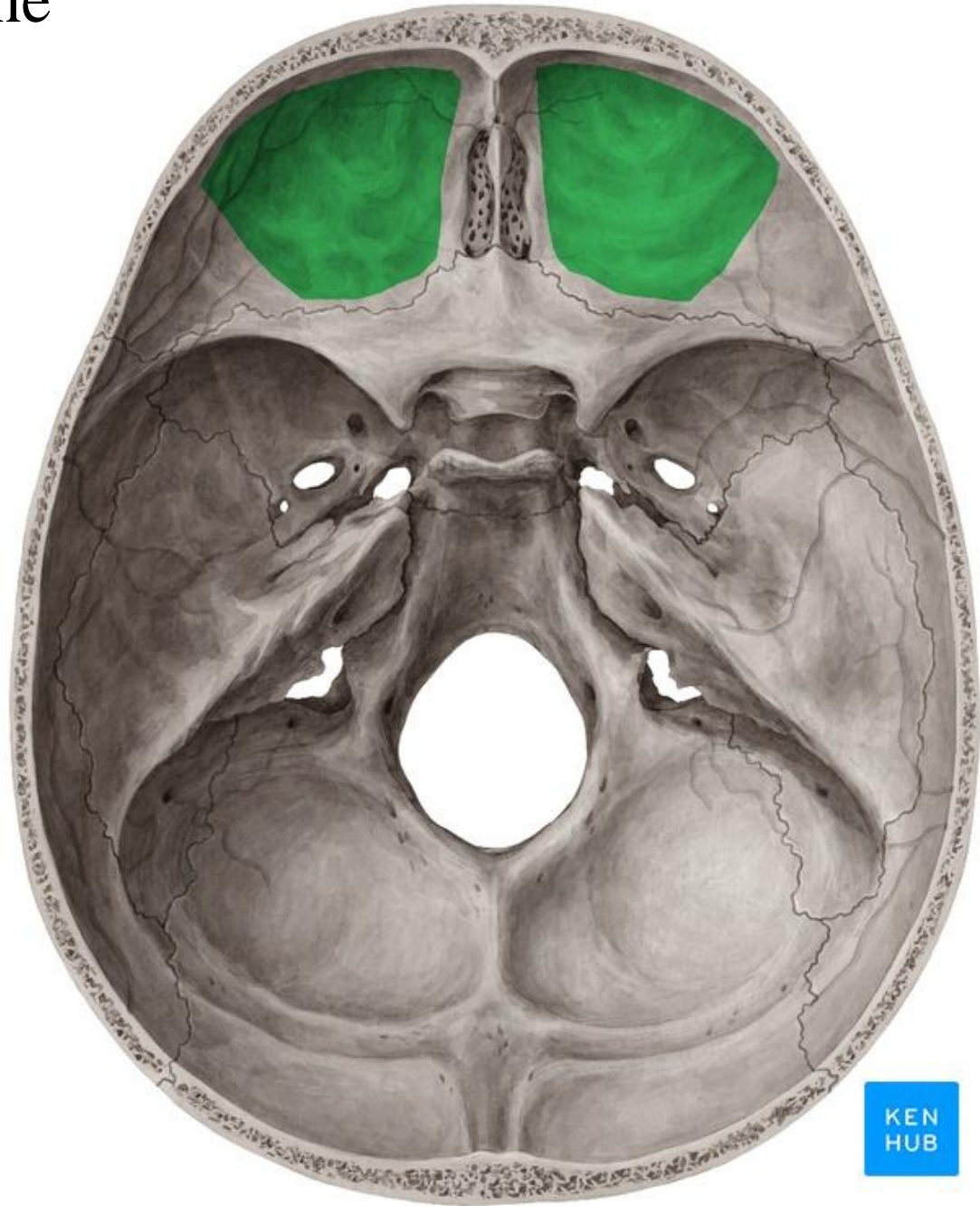
Crista galli is a sharp upward projection of the ethmoid bone in the midline

Cribriform plate of the ethmoid is a sieve-like structure lateral to crista galli

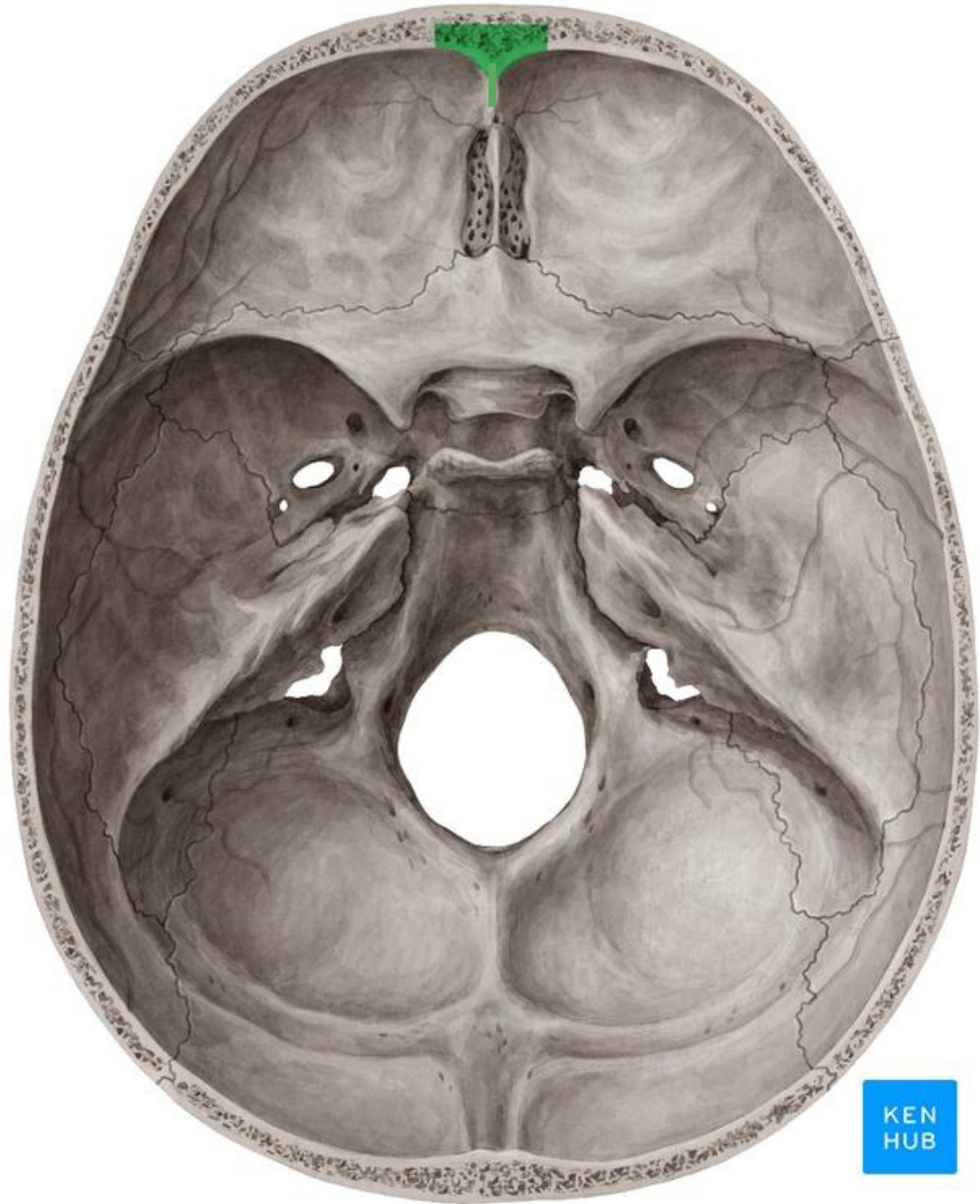


Note the anterior cranial fossa is above the nasal cavity and the orbits

Orbital plates of frontal bone

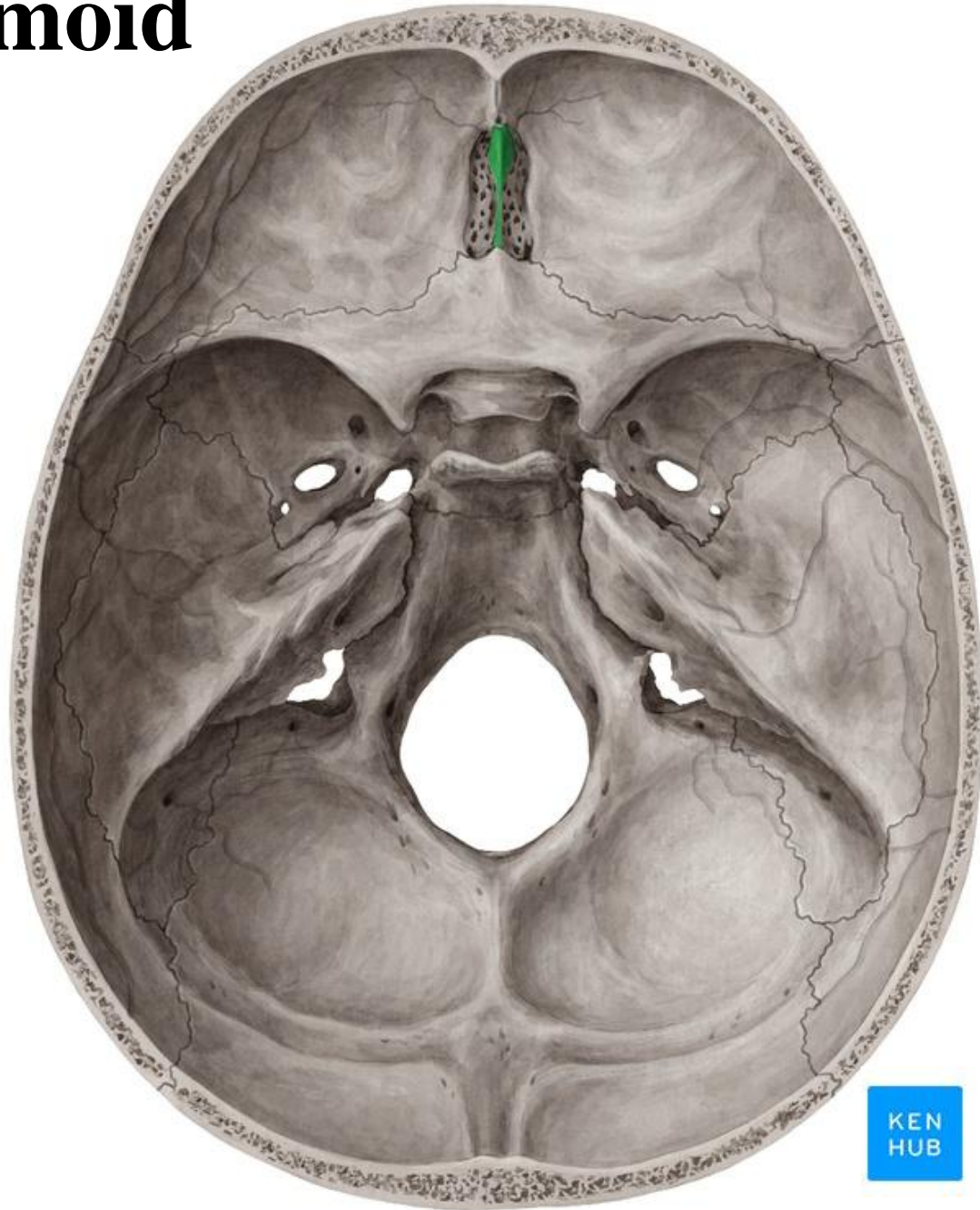


Frontal crest

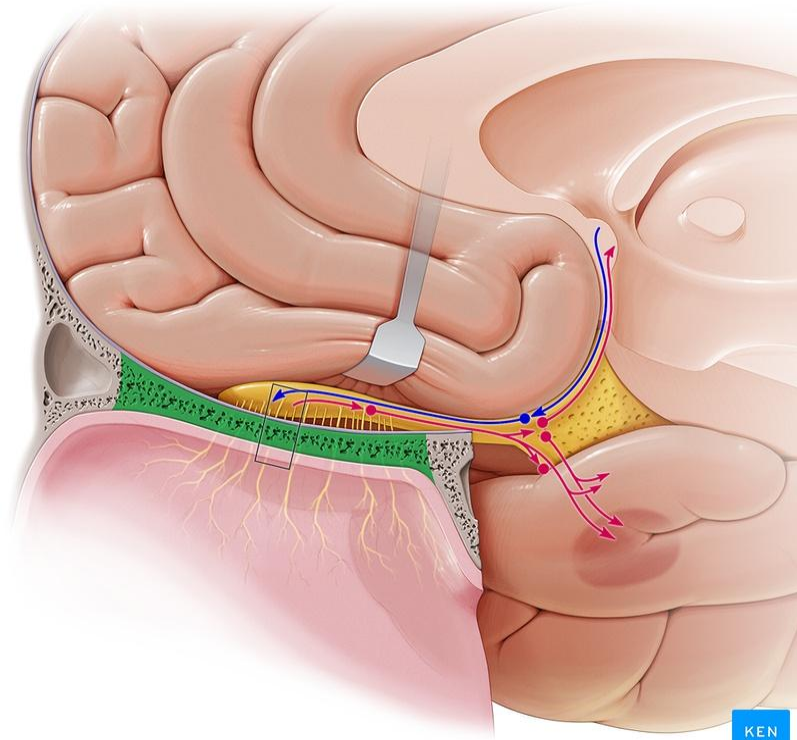


Crista galli of ethmoid

Latin: Crest of the rooster



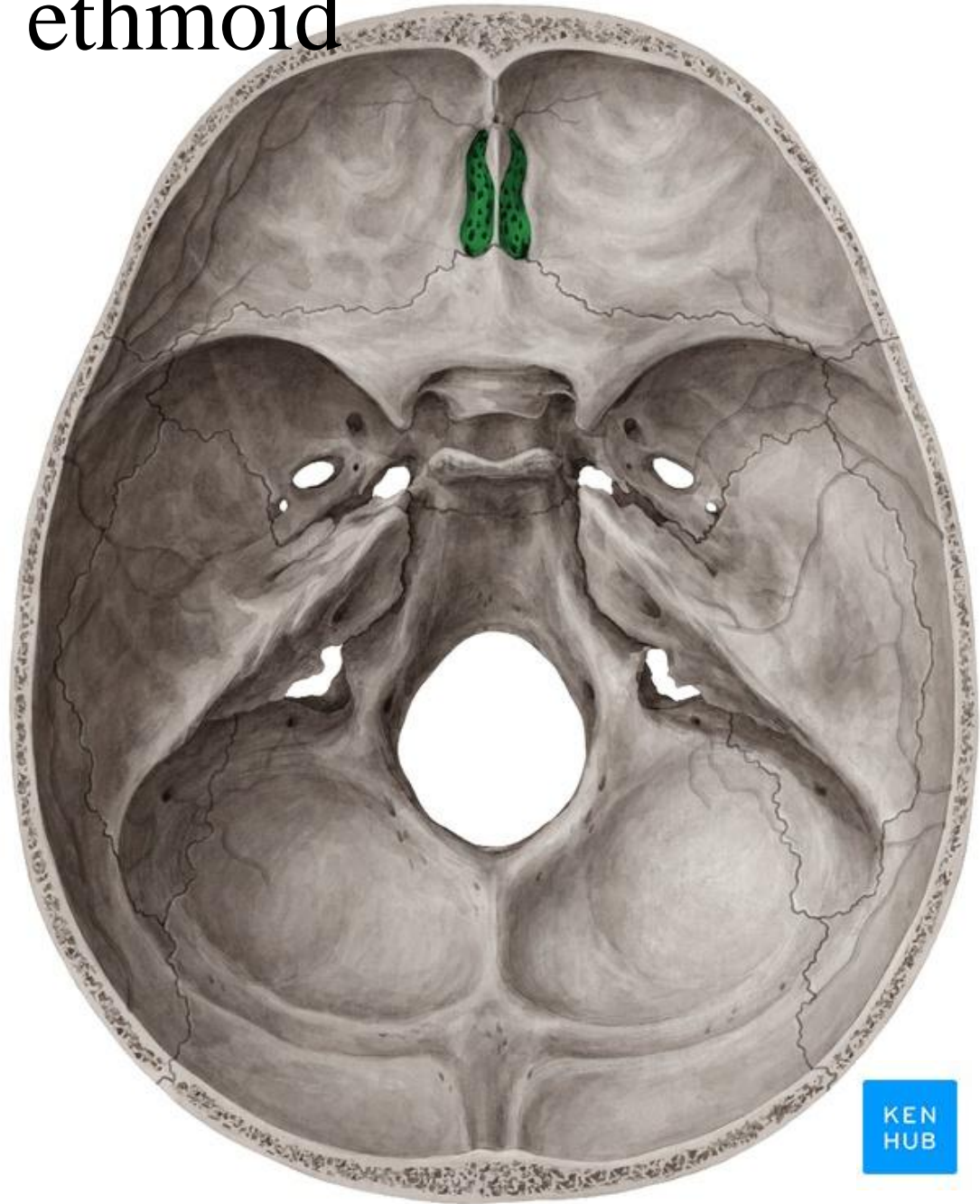
Cribriform plate of ethmoid



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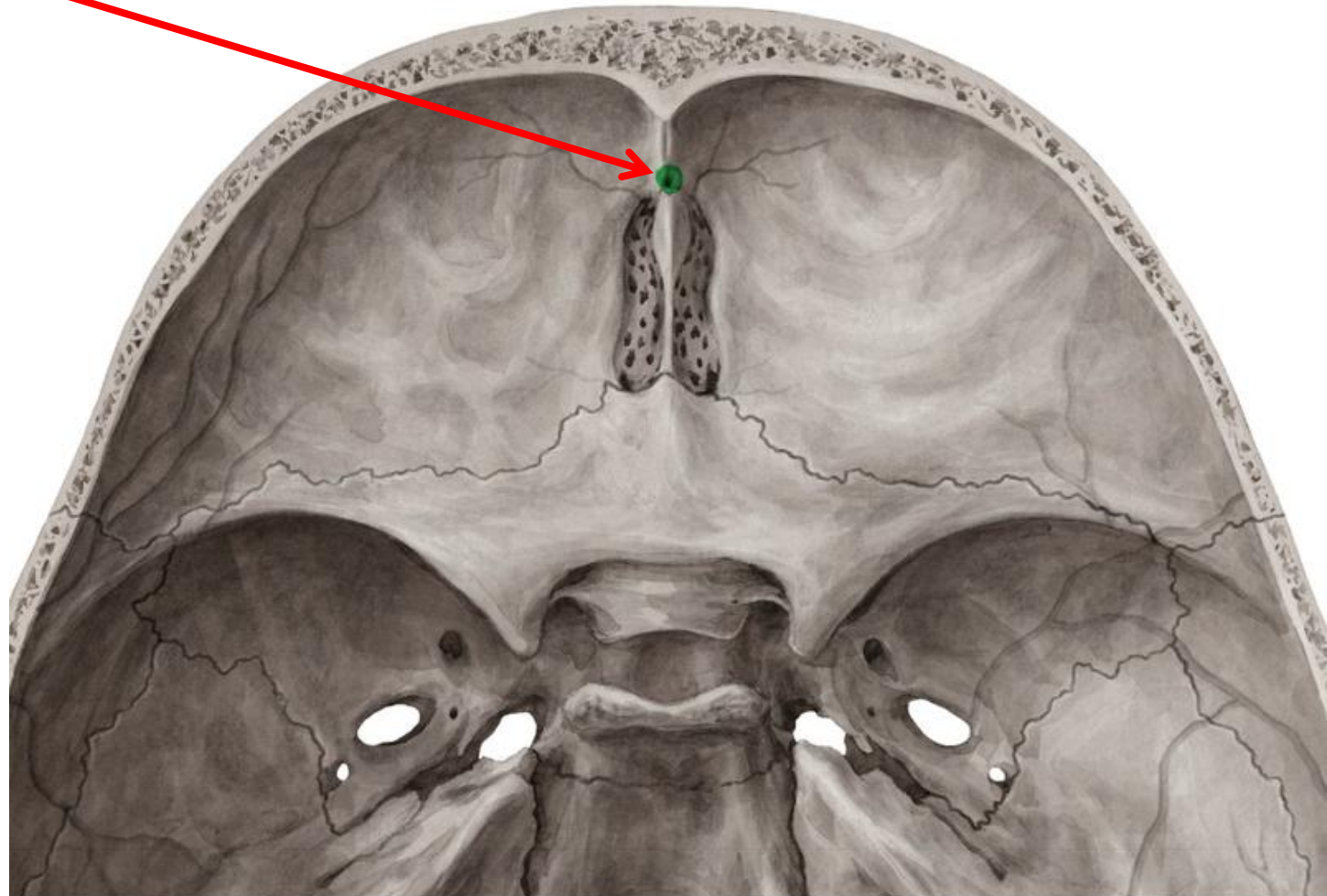
The small perforations in the cribriform plate are for the **olfactory nerves**.



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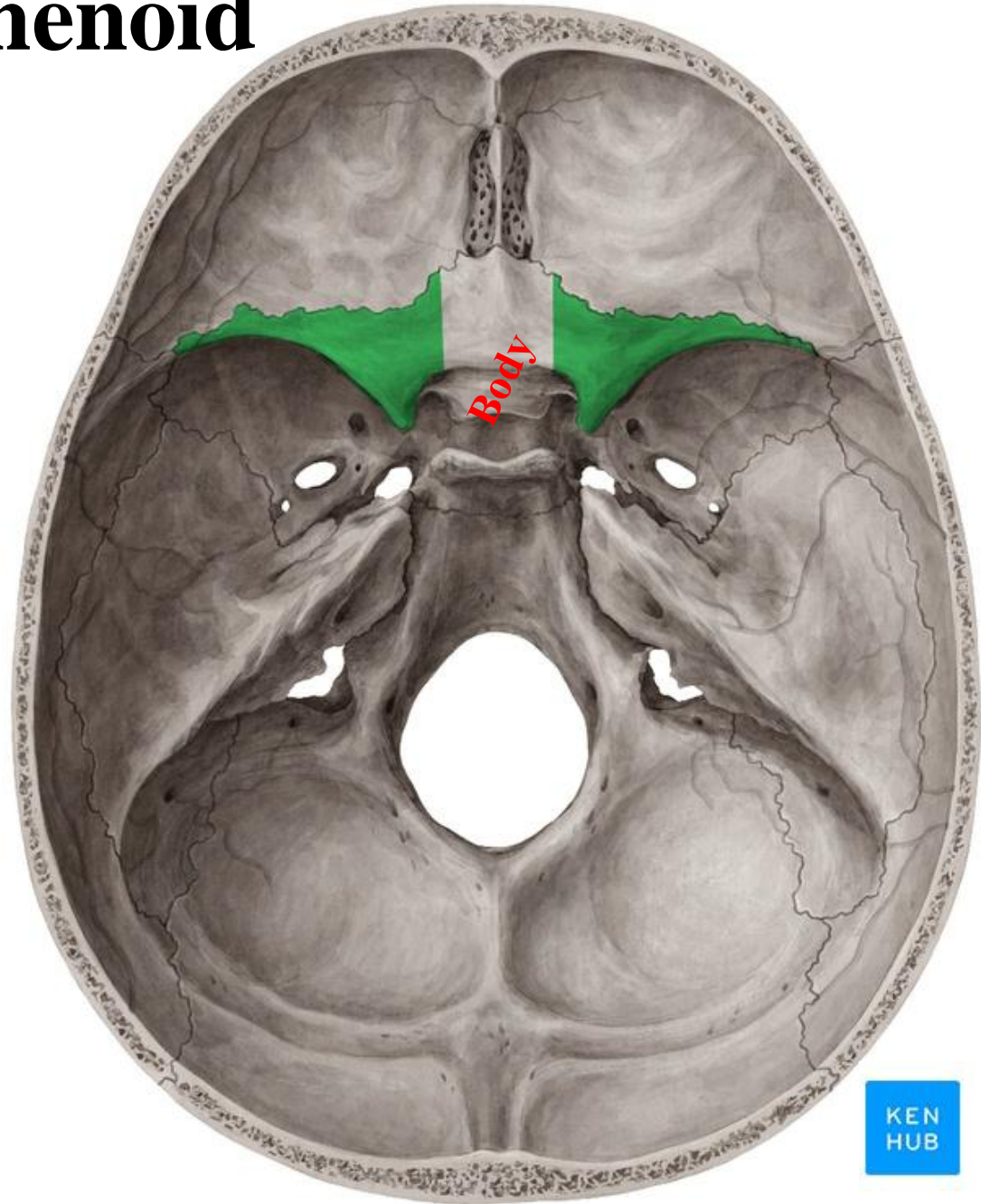
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Foramen caecum



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Lesser wing of sphenoid



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Anterior clinoid process

The medial ends of the lesser wing of the sphenoid form the **anterior clinoid processes**

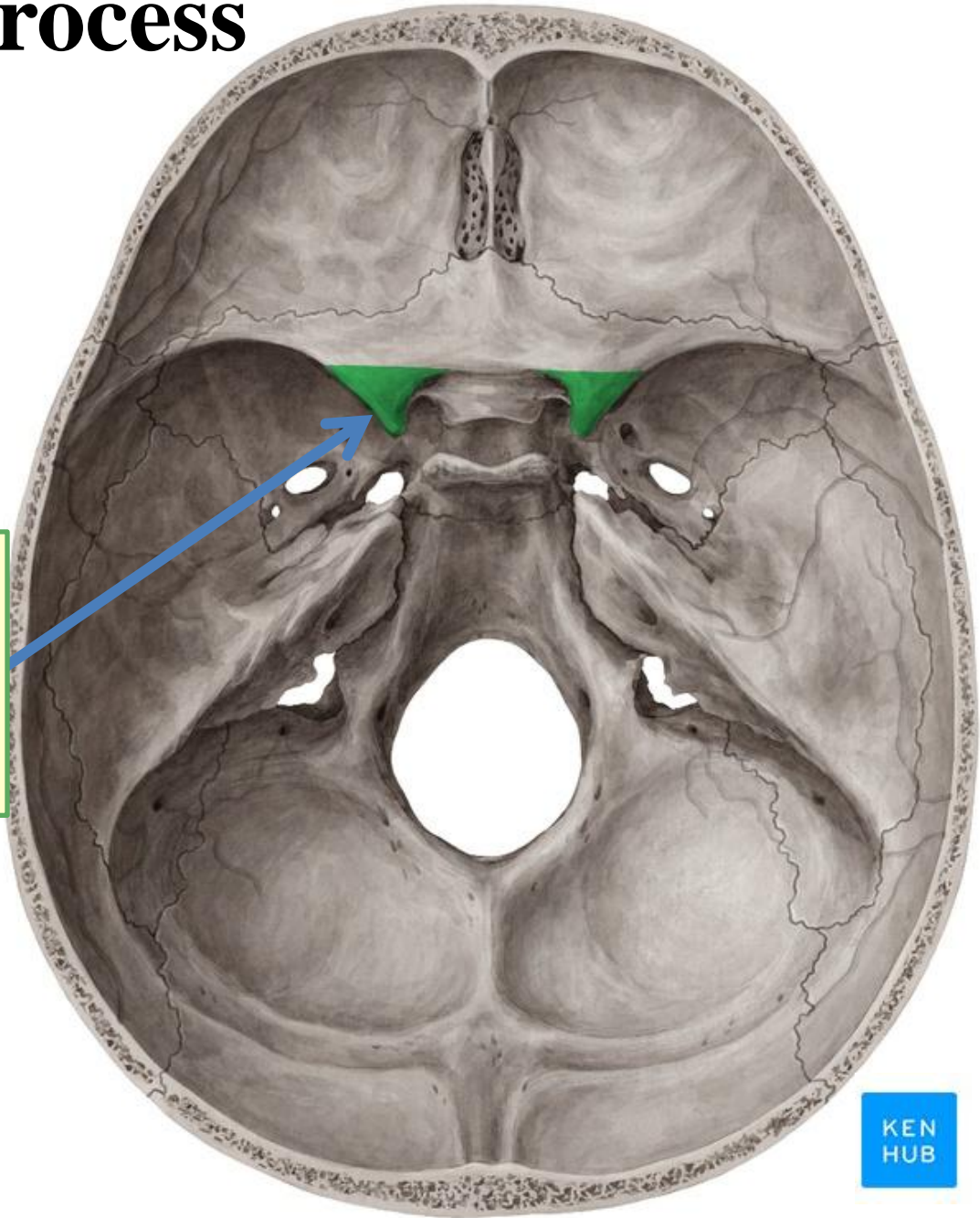
Note:

Medial to Anterior clinoid process:

Optic canal

Lateral to Anterior clinoid process:

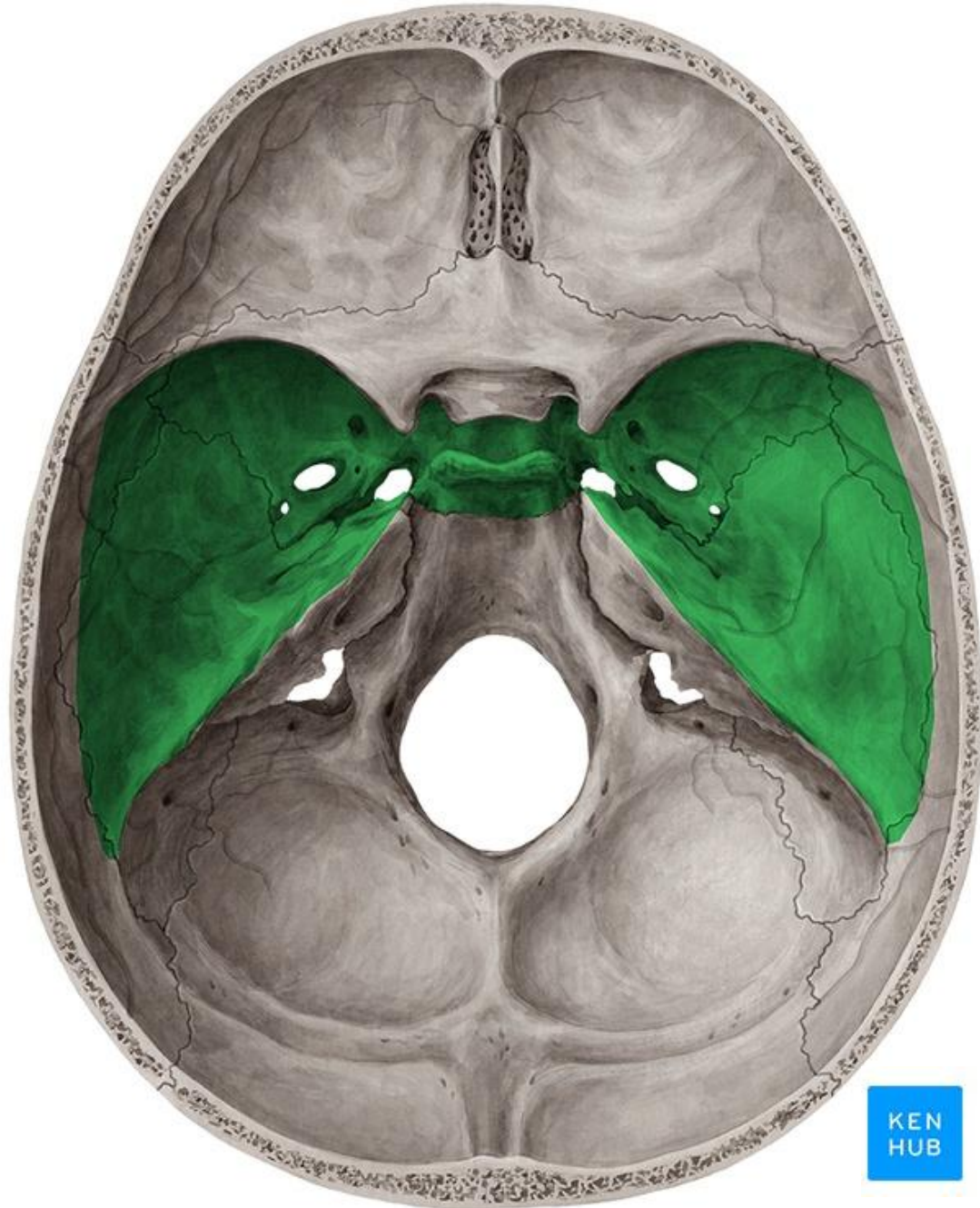
Superior orbital fissure



Middle cranial fossa

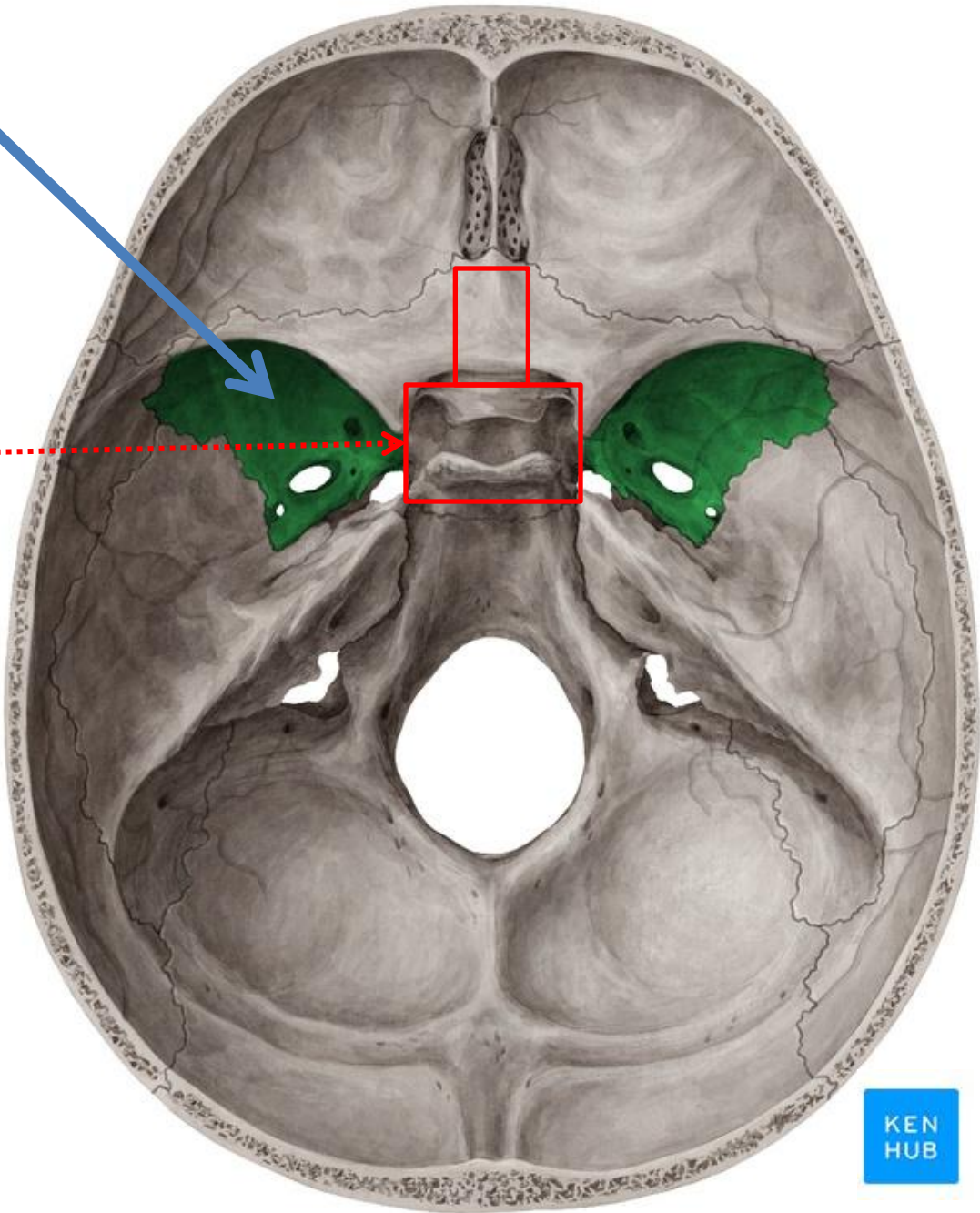
Formed by:

- Body of sphenoid
- Greater wing of the sphenoid
- Squamous and petrous parts of the temporal bone



Greater wing of the sphenoid

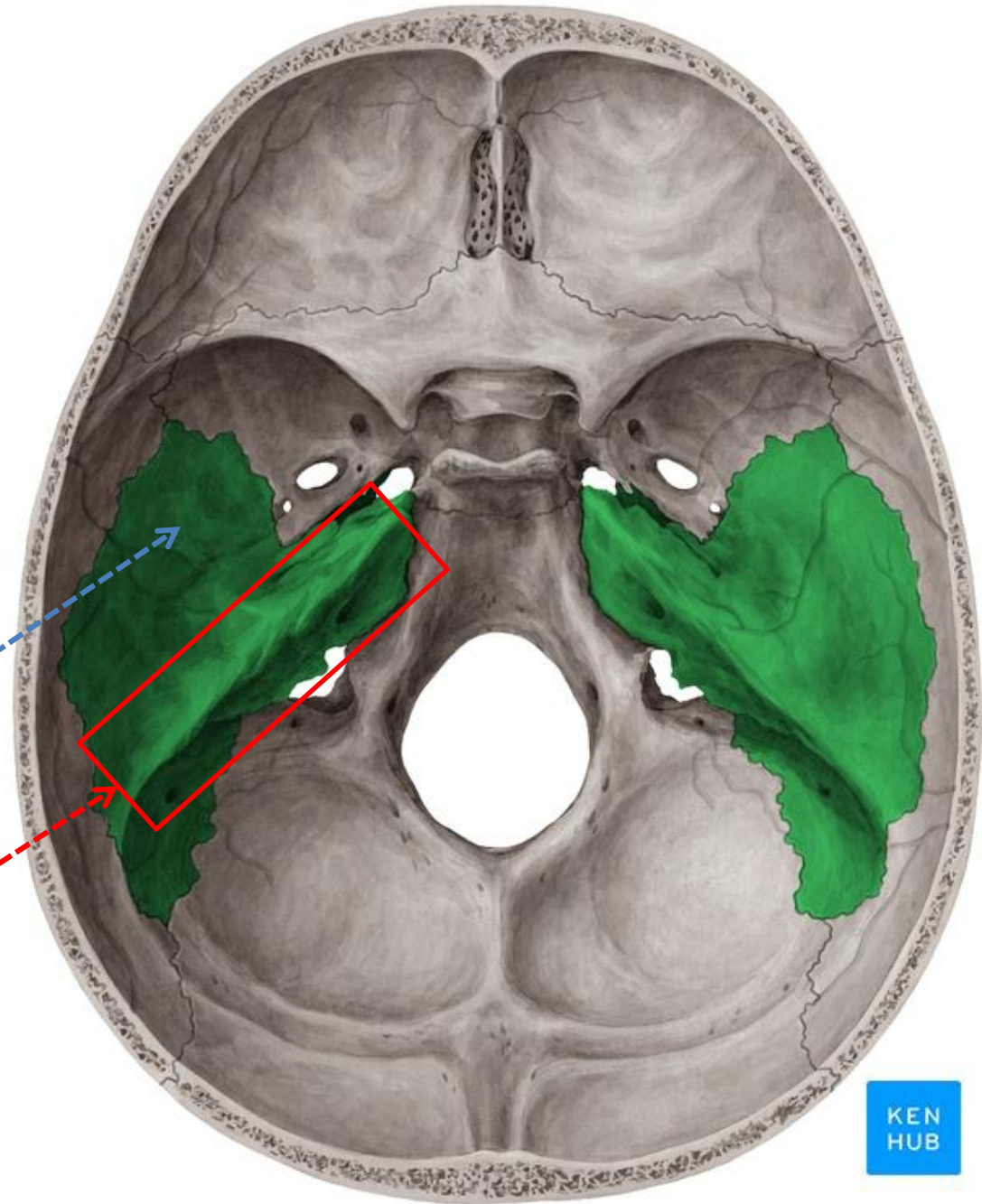
Body of sphenoid



Squamous and petrous parts of the temporal bone

Squamous part

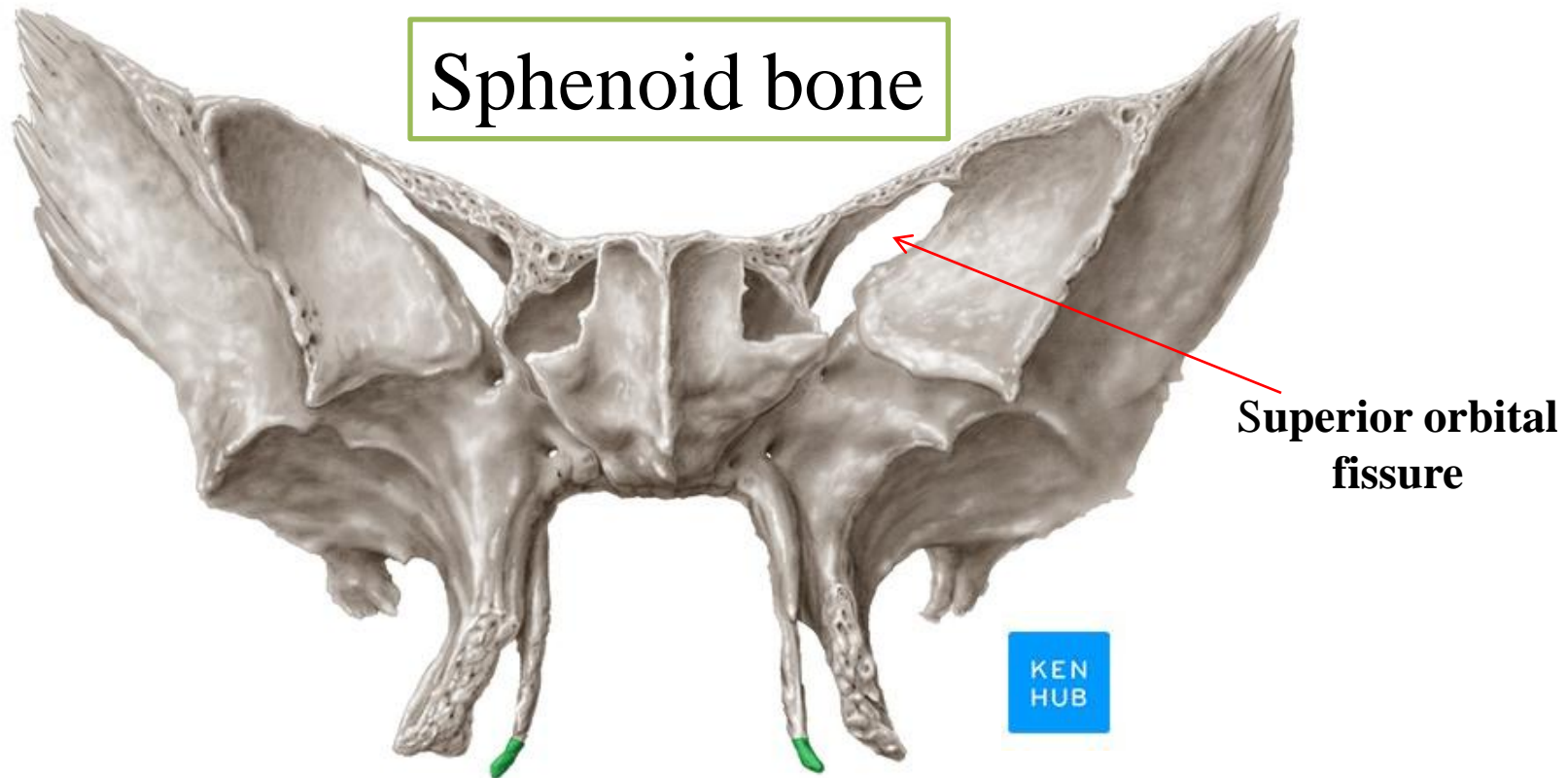
Petrous part

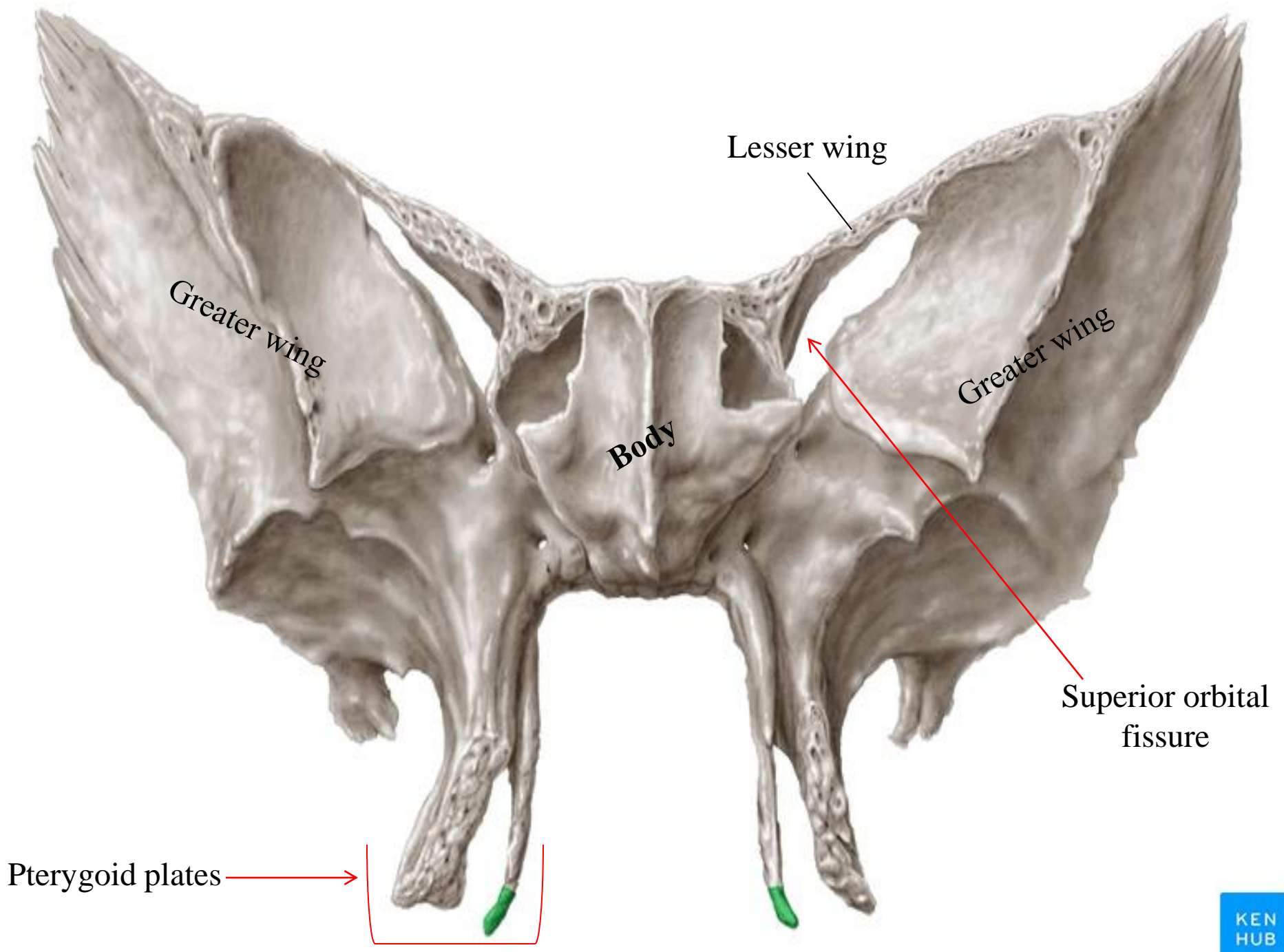


Resembles a bat having a centrally placed body with greater and lesser wings that are outstretched on each side

The **superior orbital fissure** is a slitlike opening between the lesser and greater wings of the sphenoid

The body of the sphenoid: contains the **sphenoid air sinuses**





Greater wing

Lesser wing

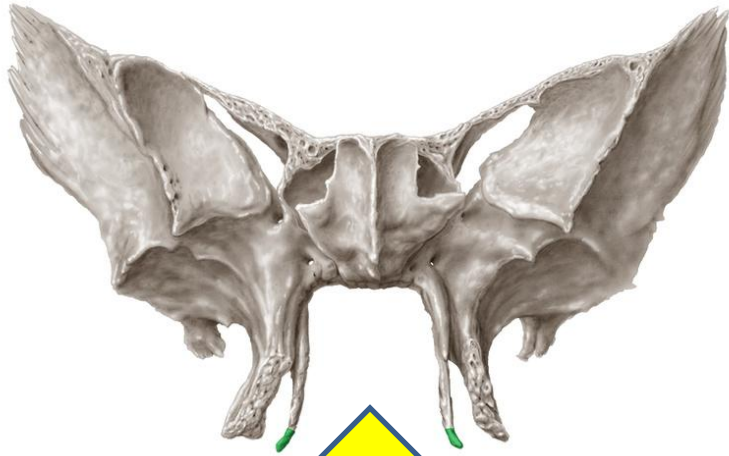
Body

Greater wing

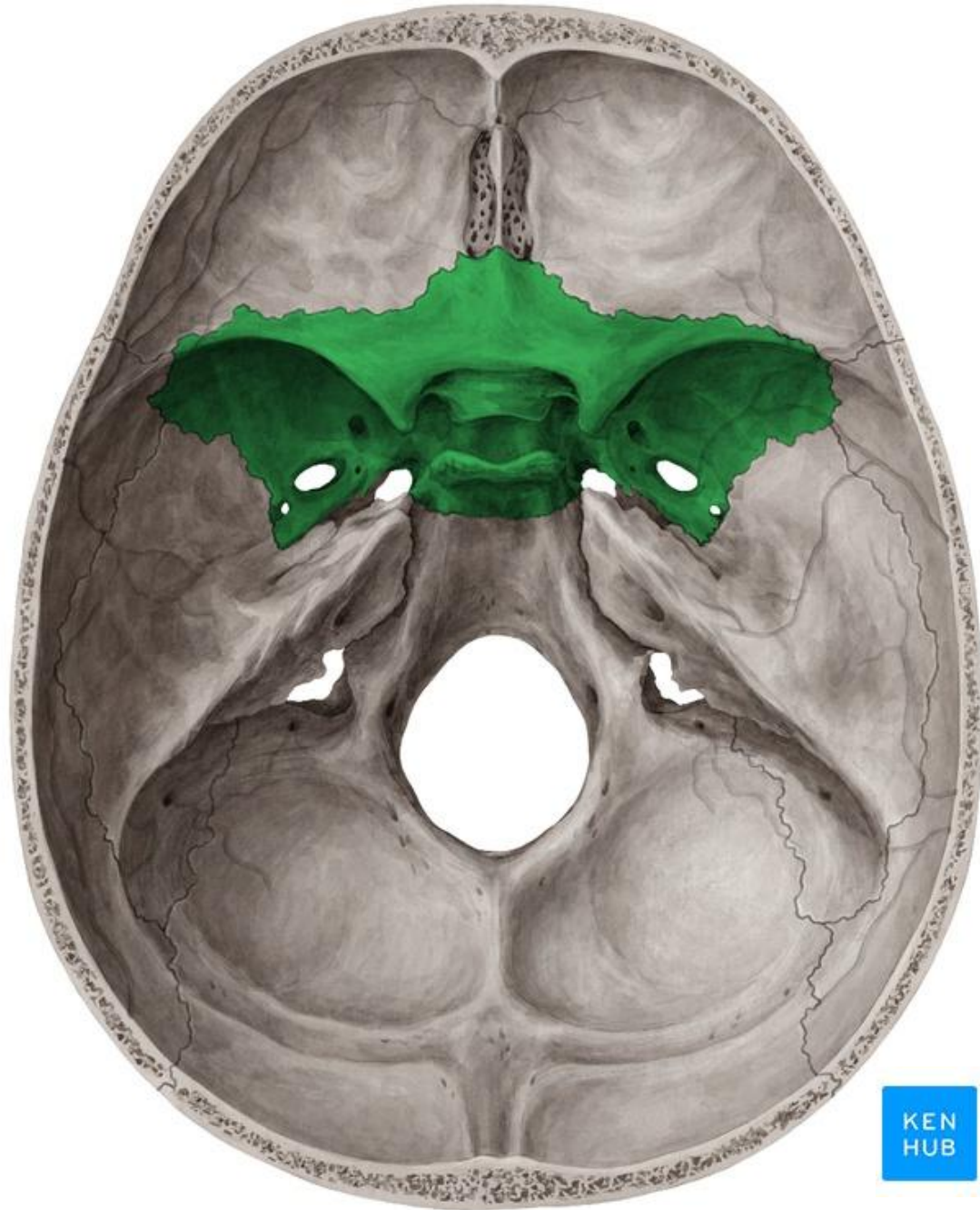
Superior orbital
fissure

Pterygoid plates

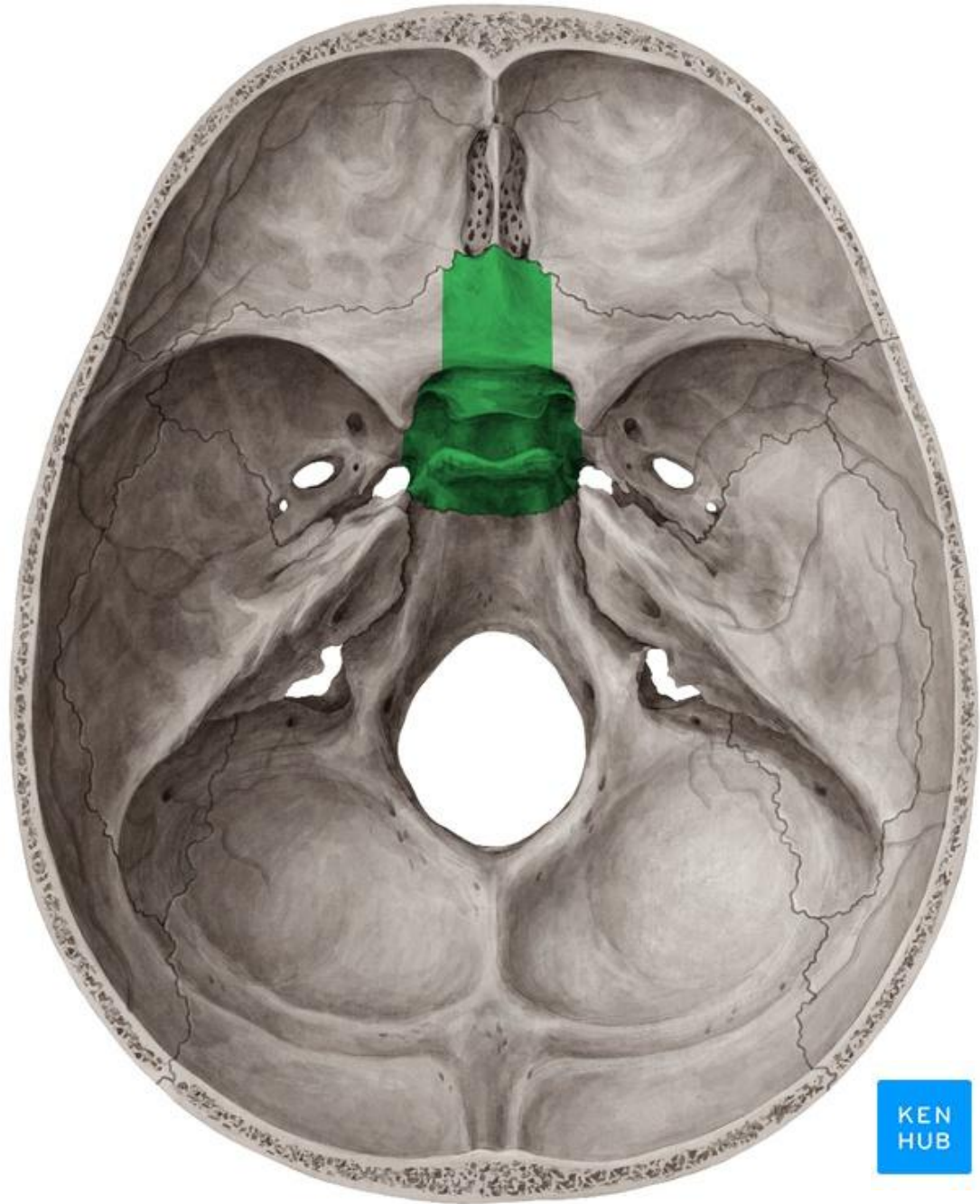
Sphenoid bone



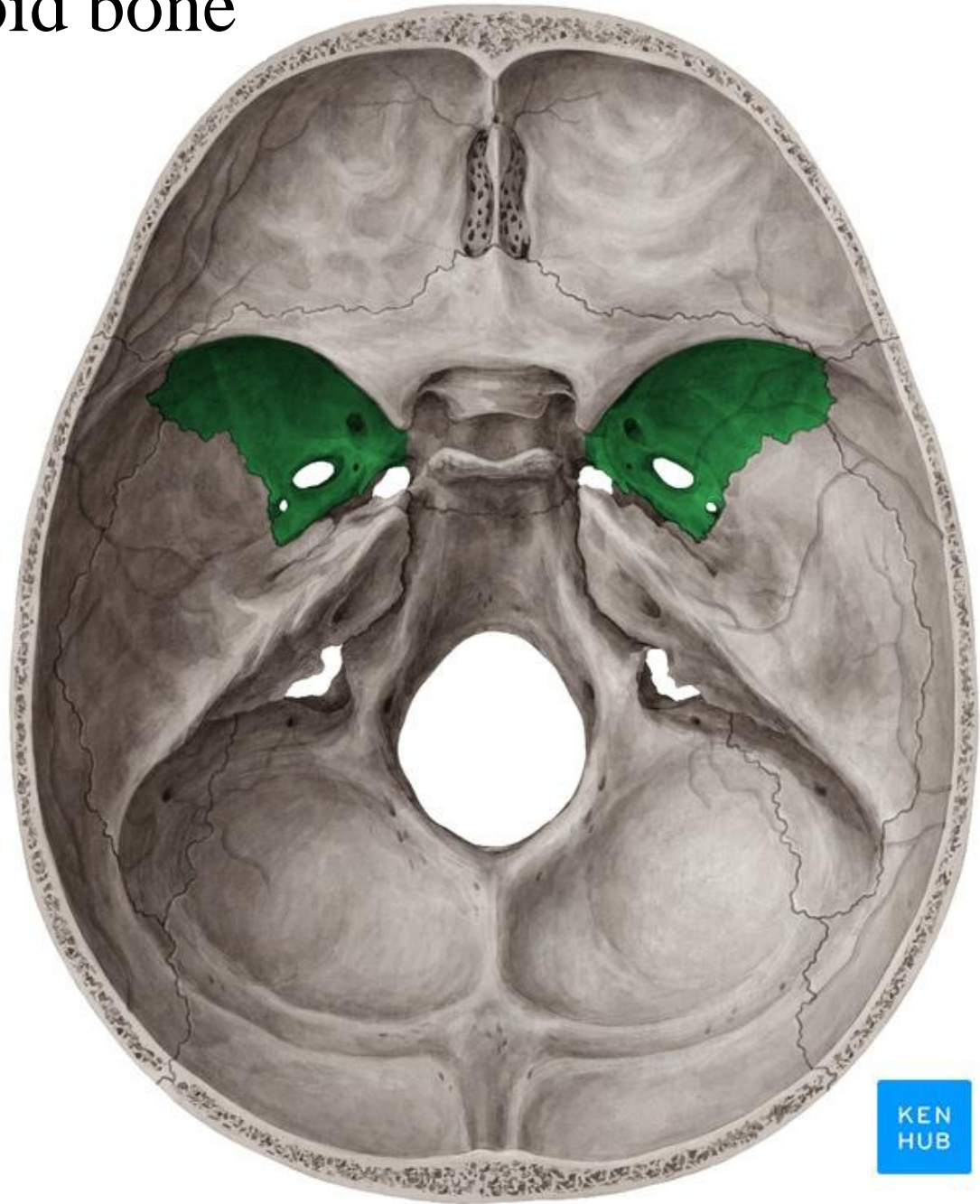
Anterior
view



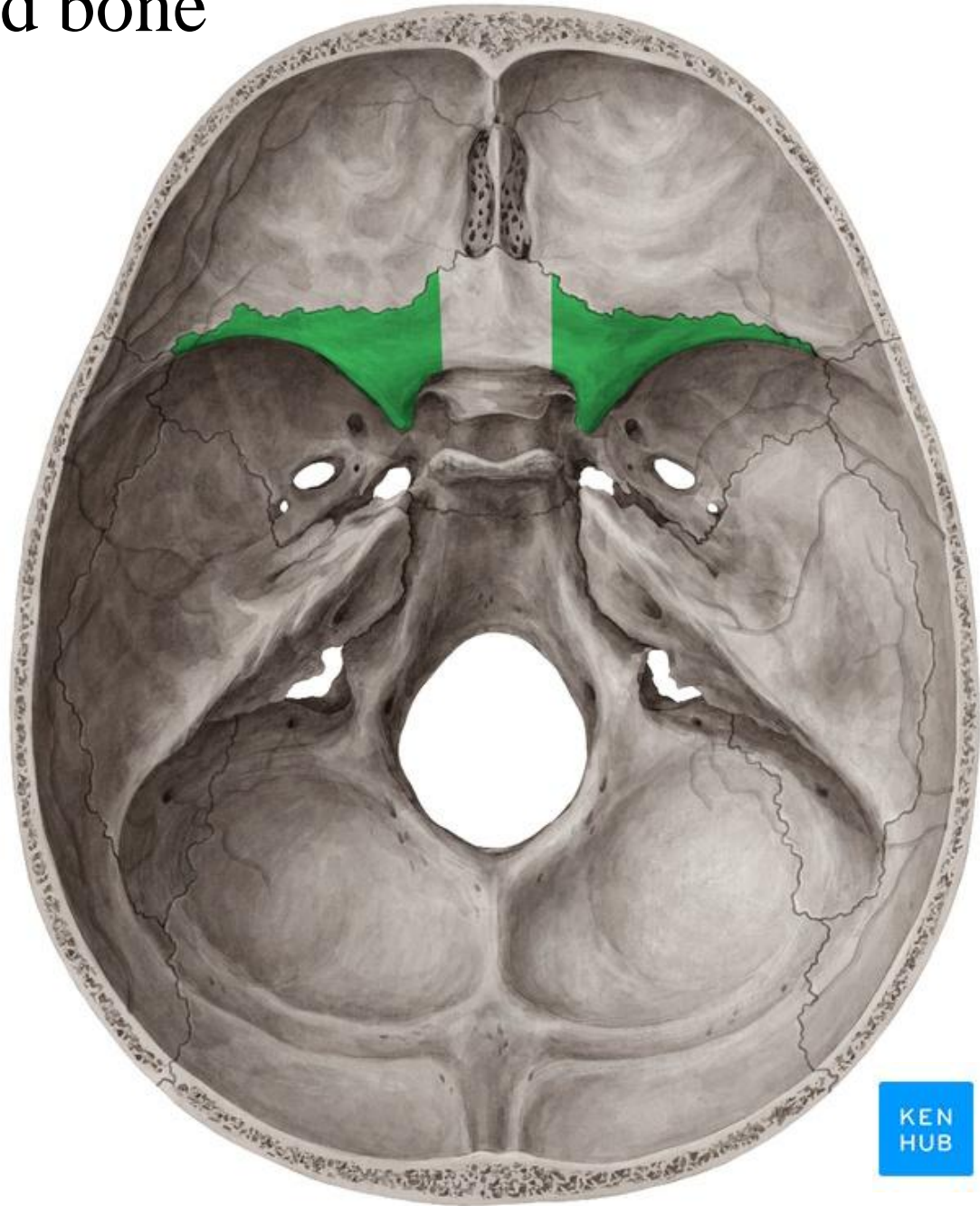
Body of Sphenoid bone



Greater wing of Sphenoid bone



Lesser wing of Sphenoid bone



Pterygoid plates



Foramen rotundum: situated behind the medial end of the superior orbital fissure. Transmits the maxillary nerve

Foramen ovale: lies posterolateral to the foramen rotundum transmits the mandibular nerve

Foramen spinosum (small) lies posterolateral to the foramen ovale. Transmits the middle meningeal artery

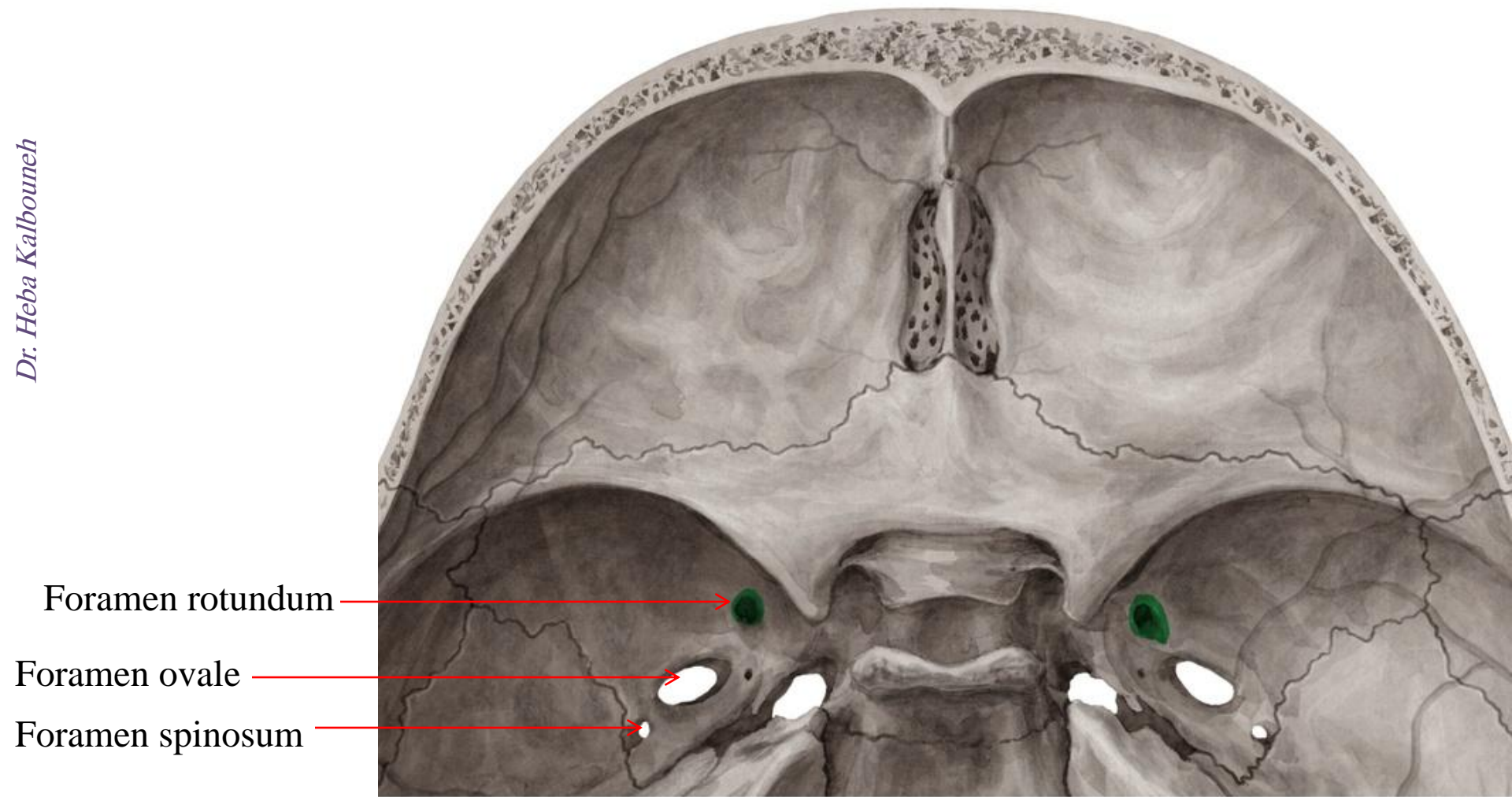
Carotid canal: Transmits the internal carotid artery

Foramen lacerum lies at the apex of the petrous part of the temporal bone . In life is filled by cartilage and fibrous tissue, and only small blood vessels pass through this tissue

Meckl's cave: impression on the apex of the petrous part of the temporal bone for the trigeminal ganglion



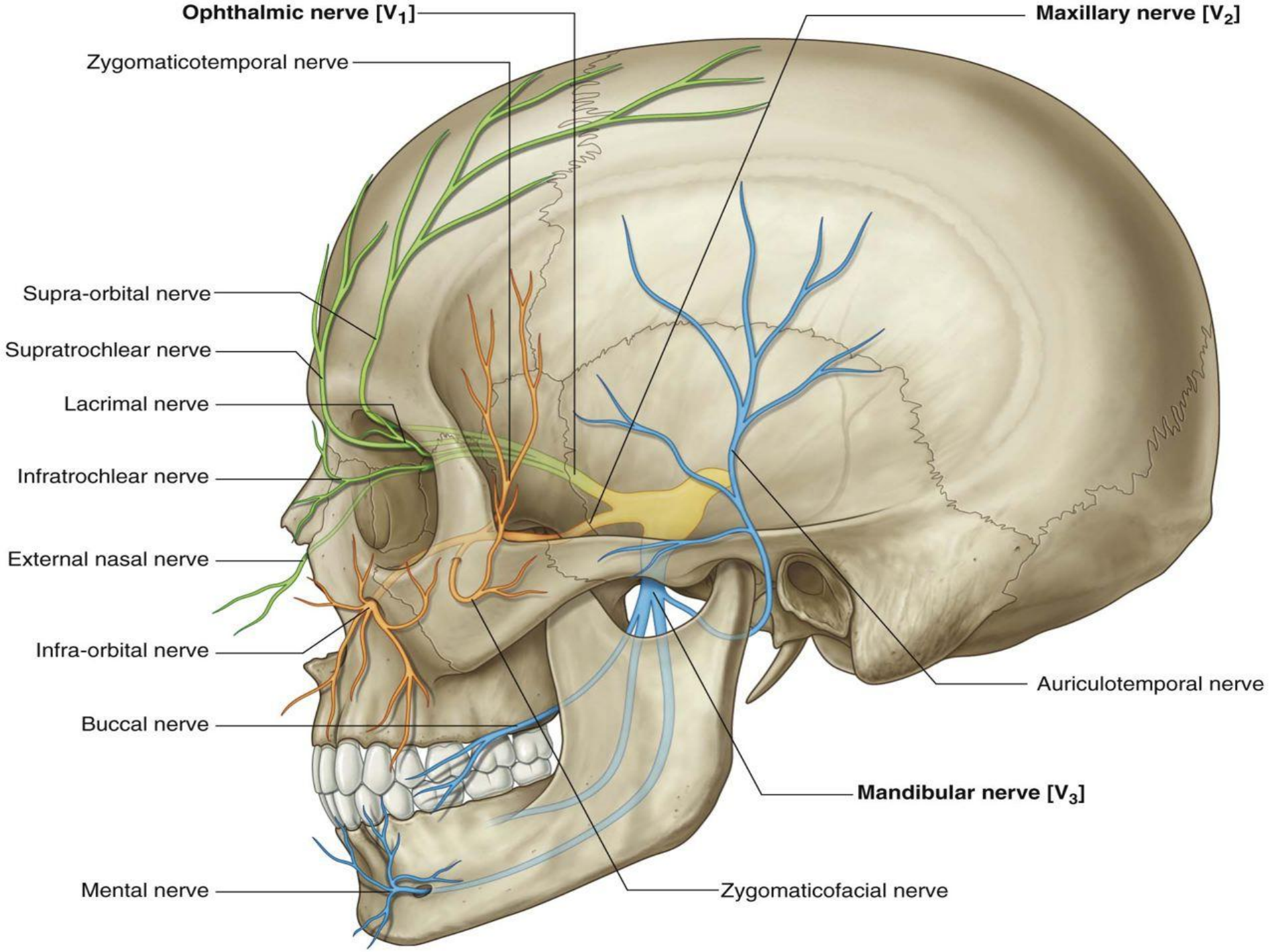
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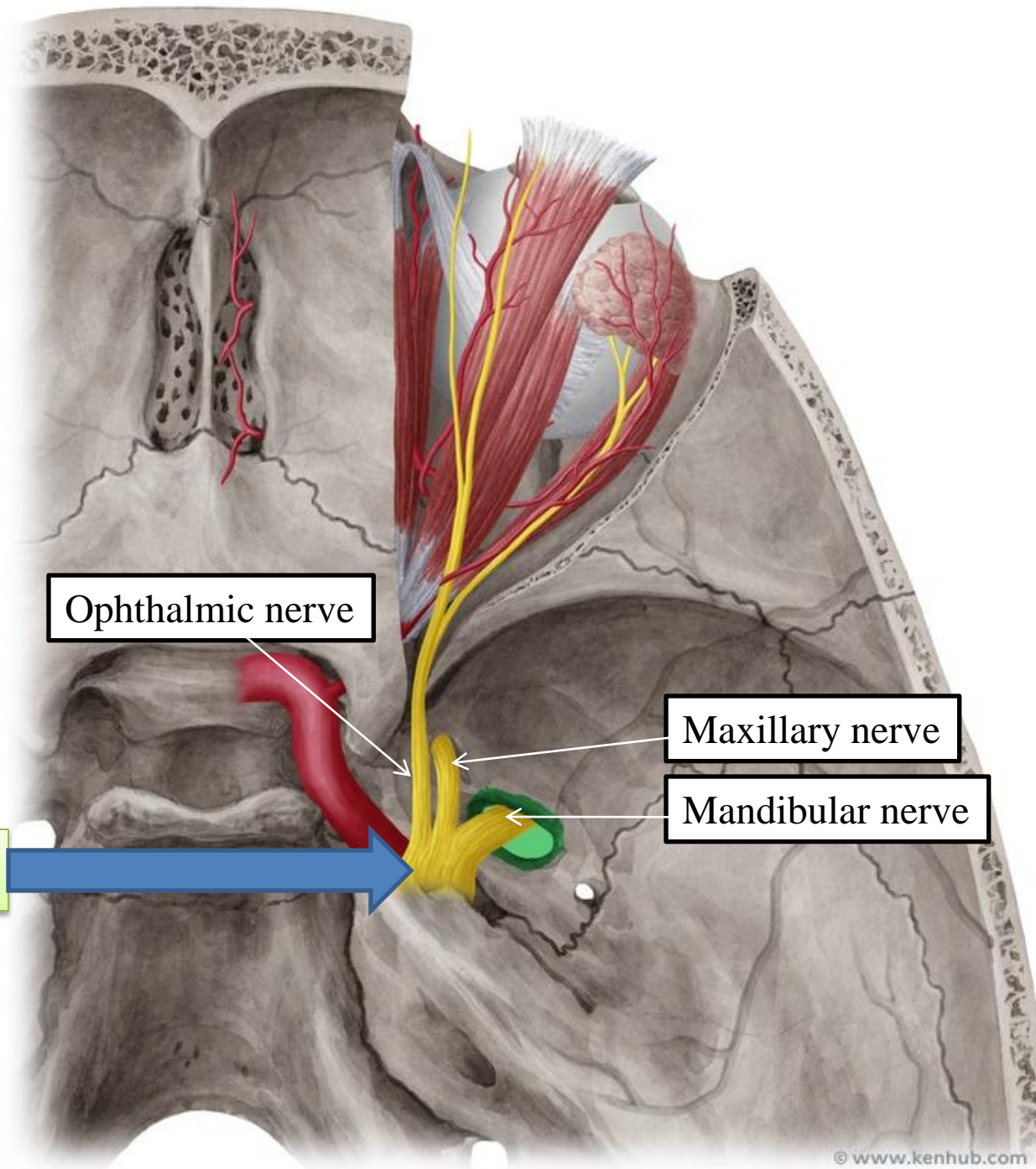


Foramen rotundum

Foramen ovale

Foramen spinosum





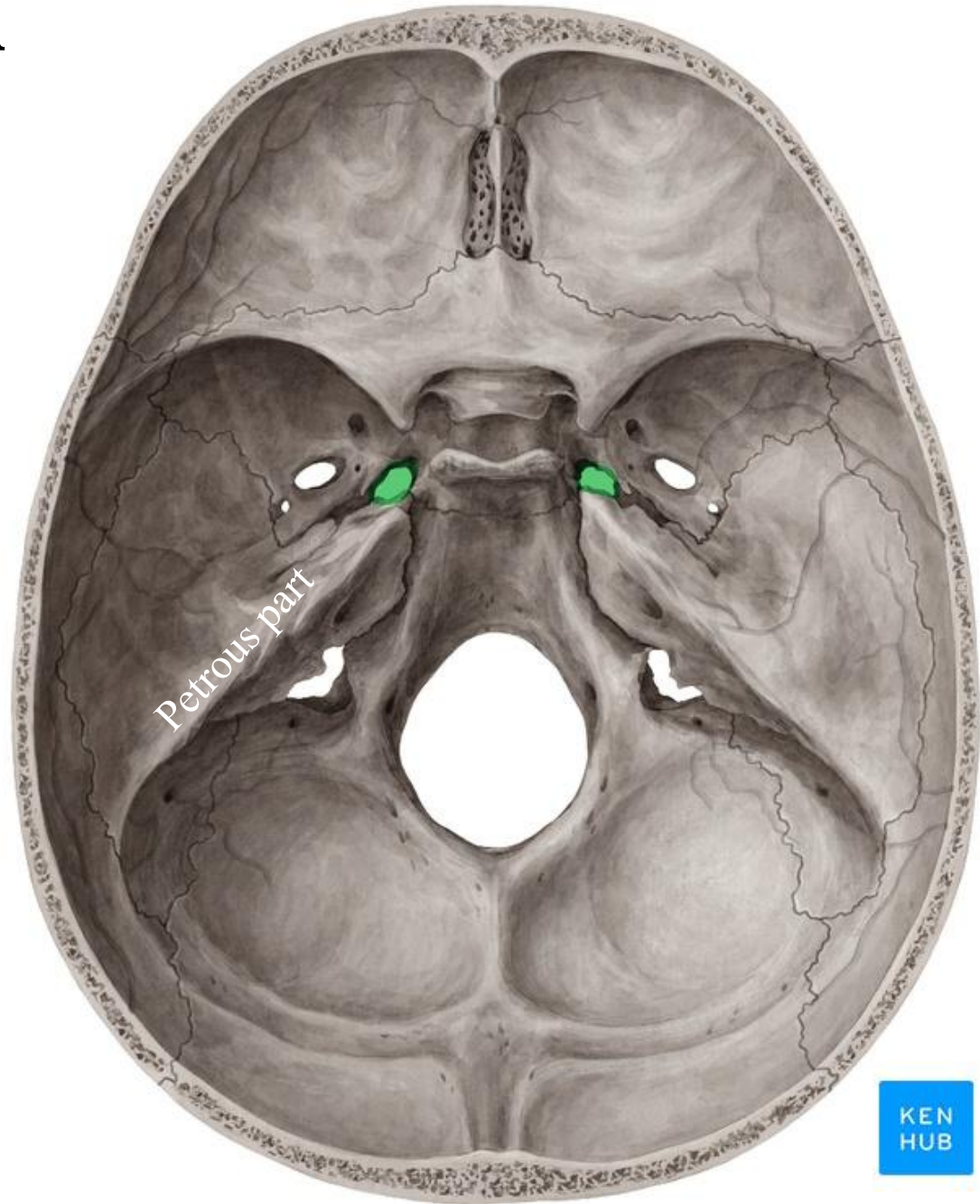
Trigeminal ganglion

Ophthalmic nerve

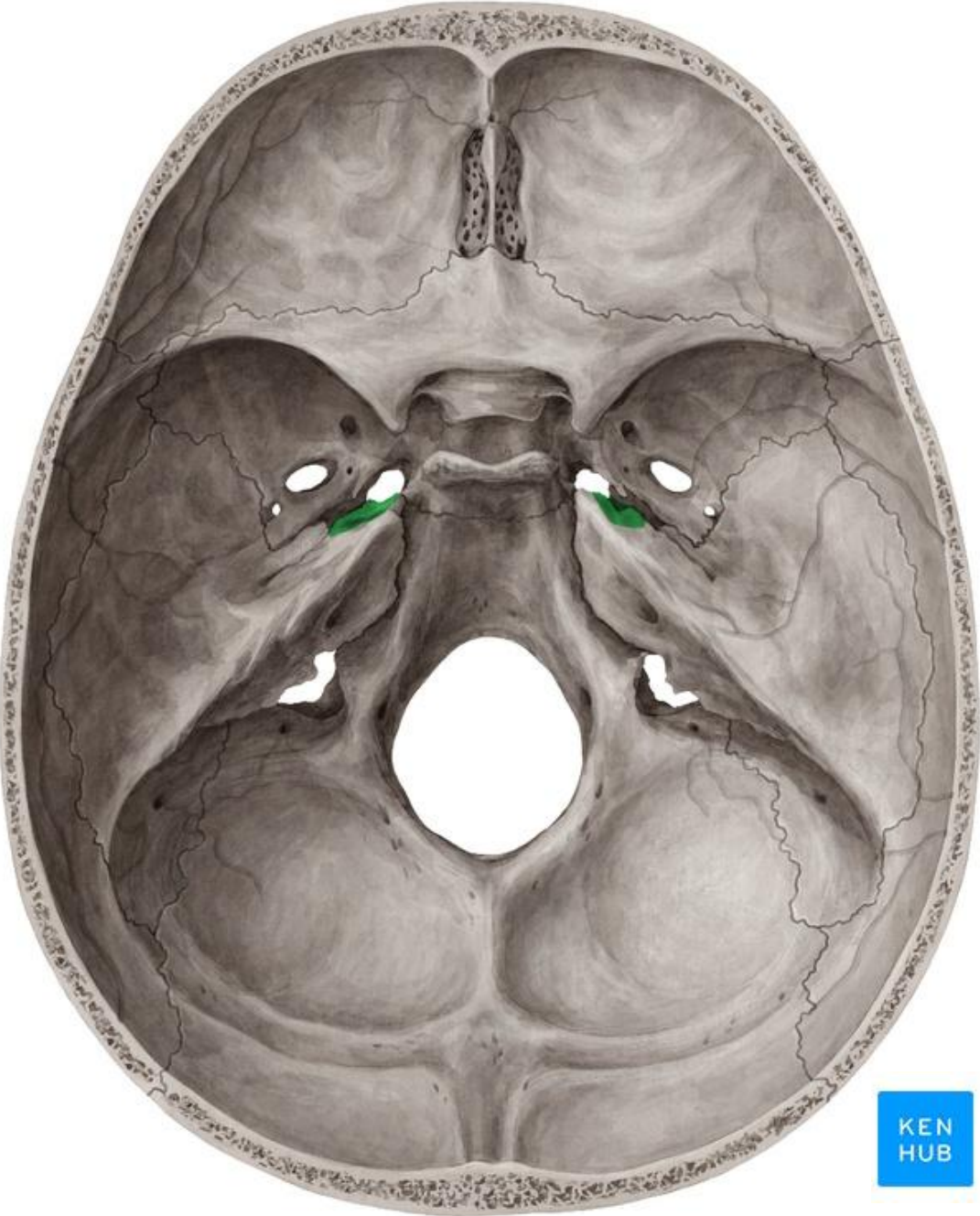
Maxillary nerve

Mandibular nerve

Foramen lacerum



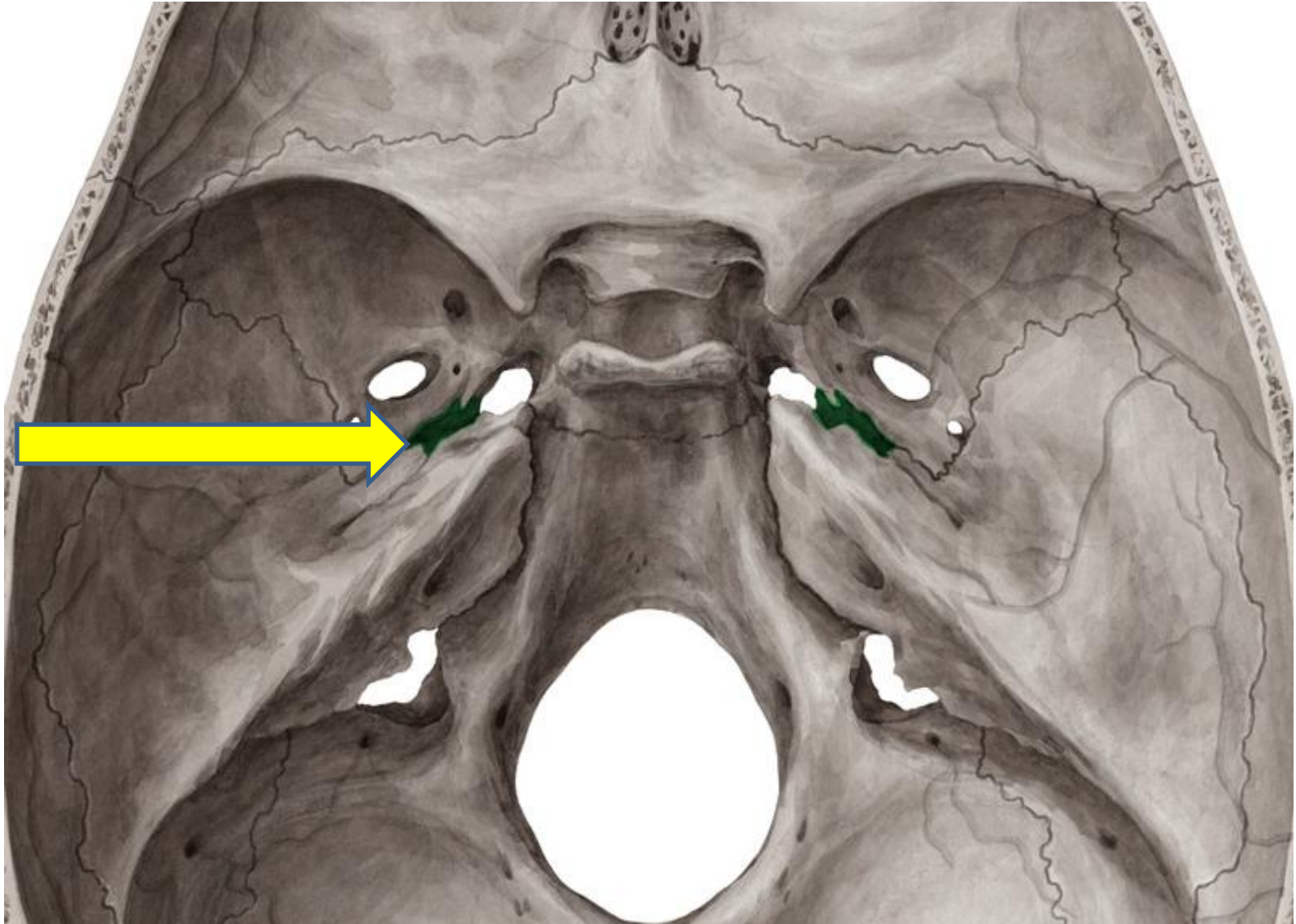
**Meckl's cave
(Trigeminal impression)**



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Carotid canal



The median part of the middle cranial fossa is formed by the **body of the sphenoid**

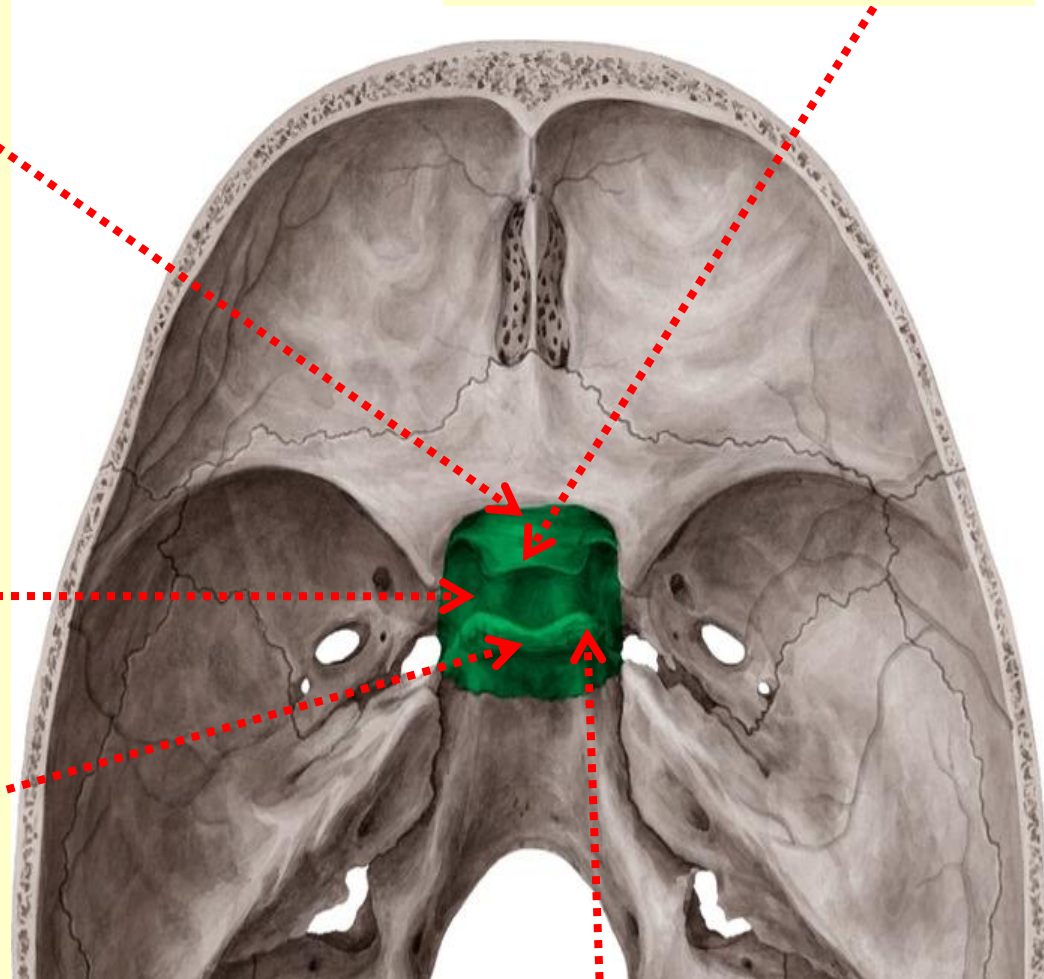
Sulcus chiasmaticus (chiasmatic groove) is related to the optic chiasma and leads laterally to the **Optic canal**

On the superior aspect of the body is a depression called the **Sella turcica** which contains the pituitary gland (**hypophyseal fossa**)

Posterior to the hypophyseal fossa is the **Dorsum sellae**

The superior angles of the dorsum sellae have two tubercles called the **Posterior clinoid processes**

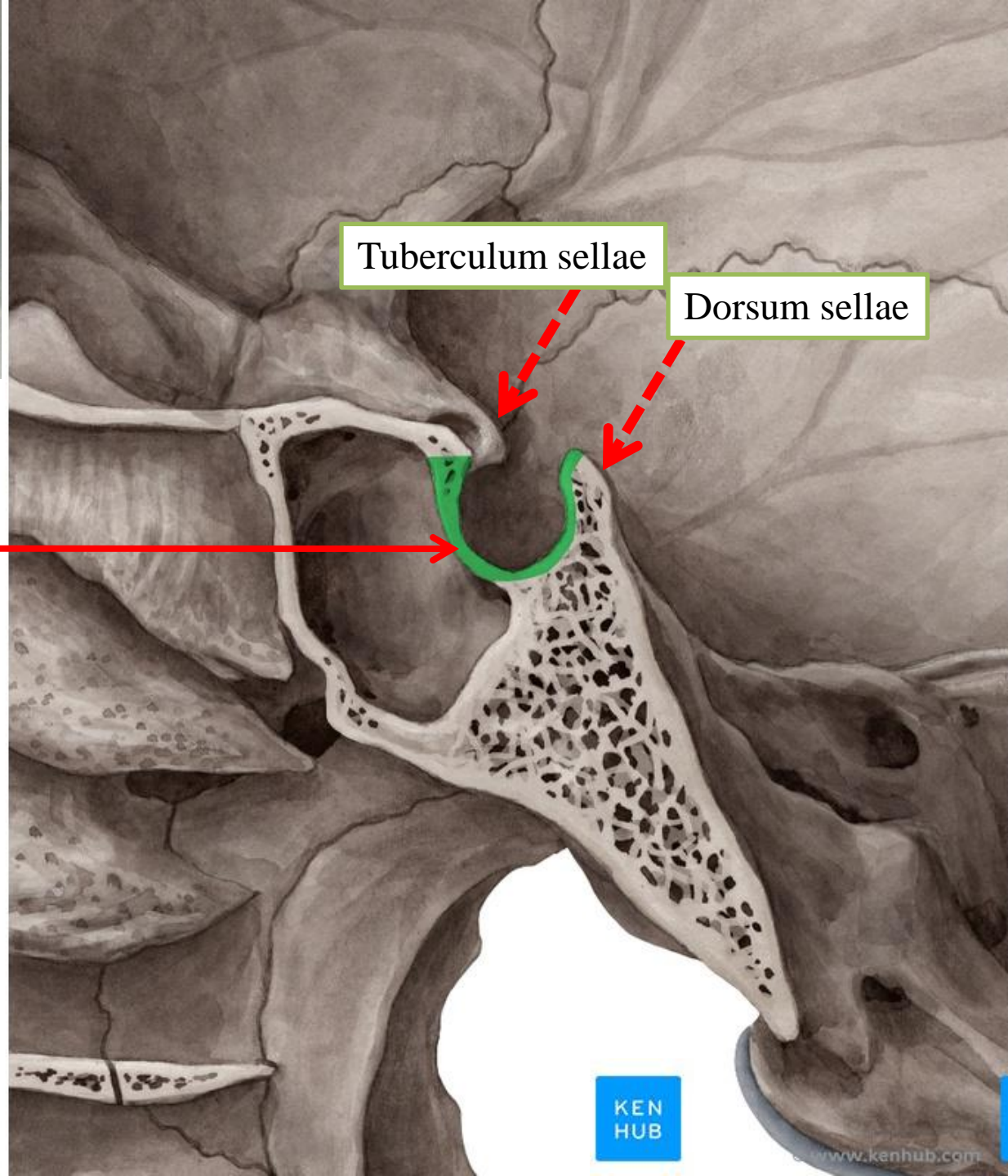
In front of the hypophyseal fossa is the **Tuberculum sellae**



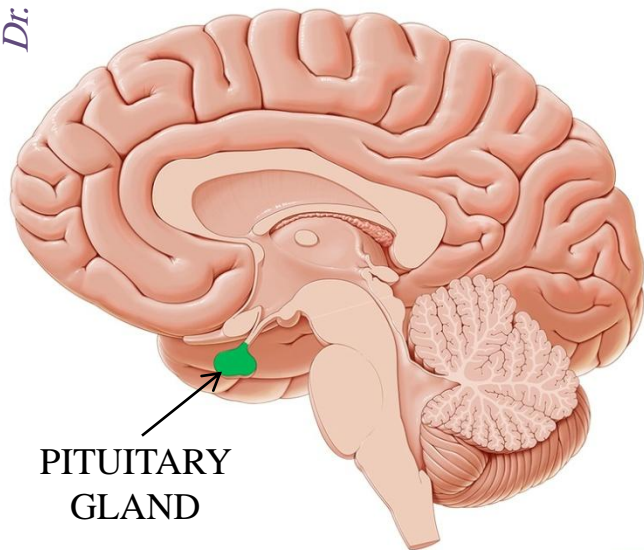
Turkish saddle



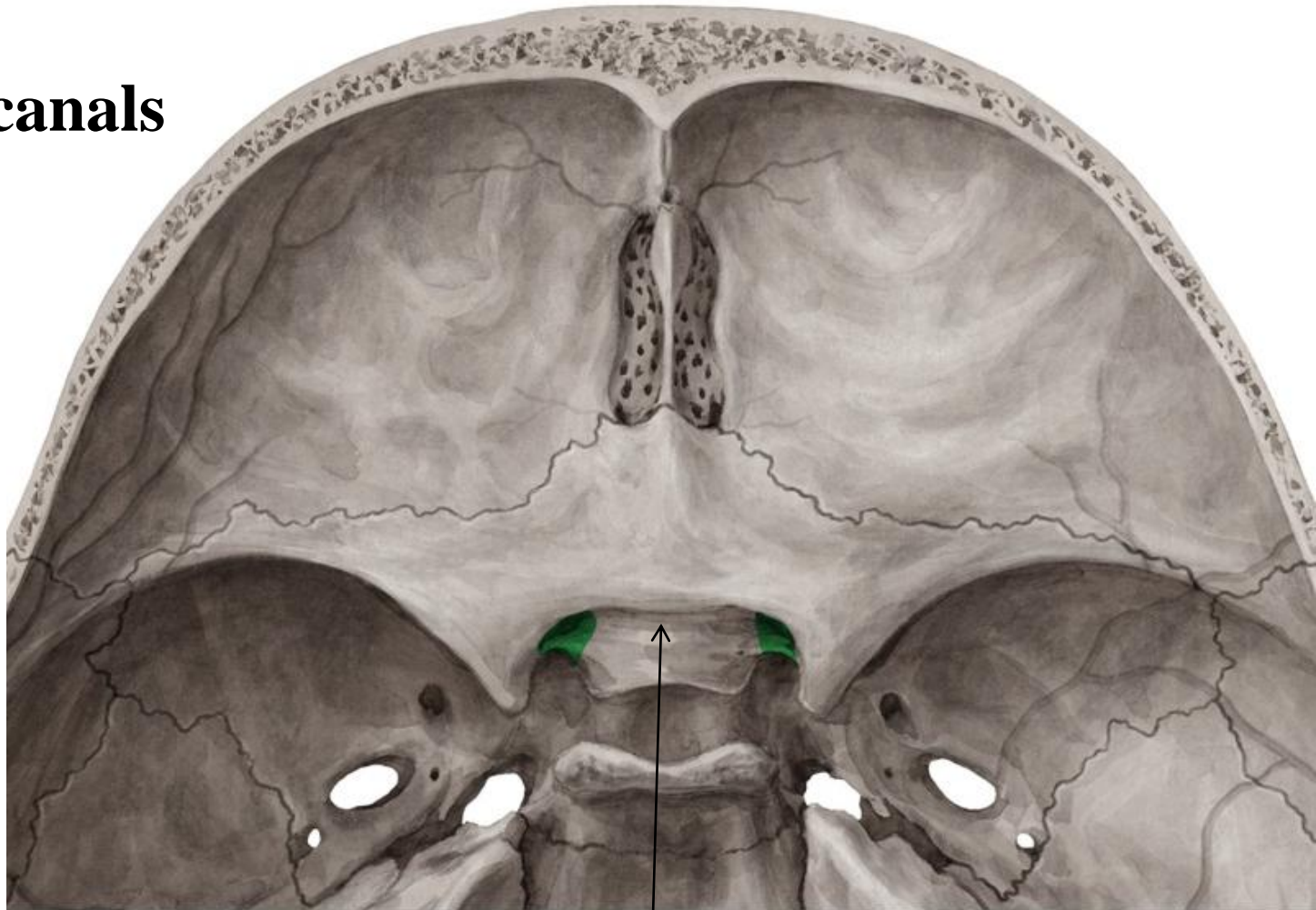
The **sella turcica**
(hypophyseal fossa) which
CONTAINS THE
PITUITARY GLAND



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Optic canals



**Sulcus chiasmaticus
(chiasmatic groove)**

Is the groove between the optic canals

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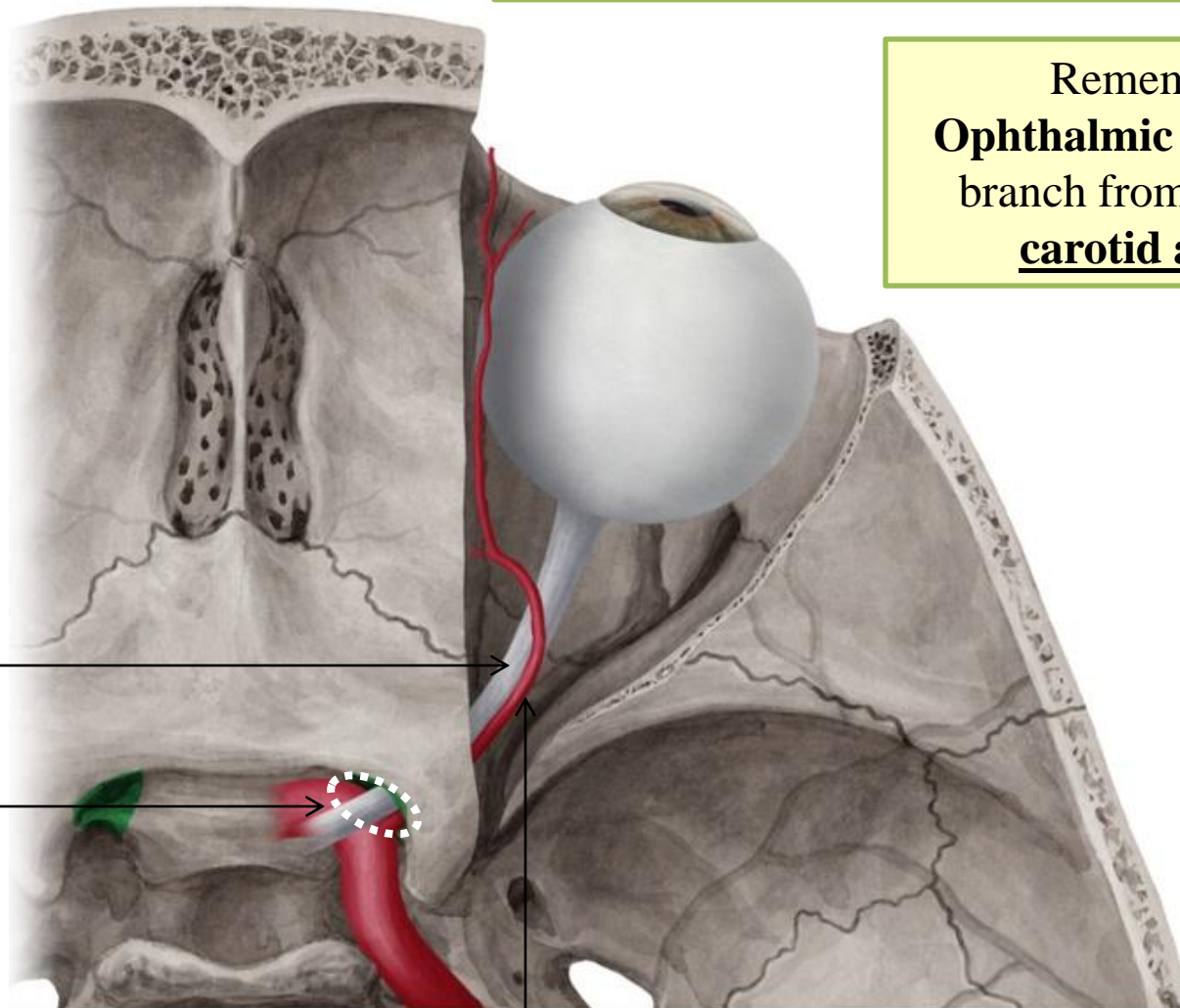
Optic canal transmits the optic nerve and the ophthalmic artery

Remember:
Ophthalmic artery is a branch from internal carotid artery

Optic nerve

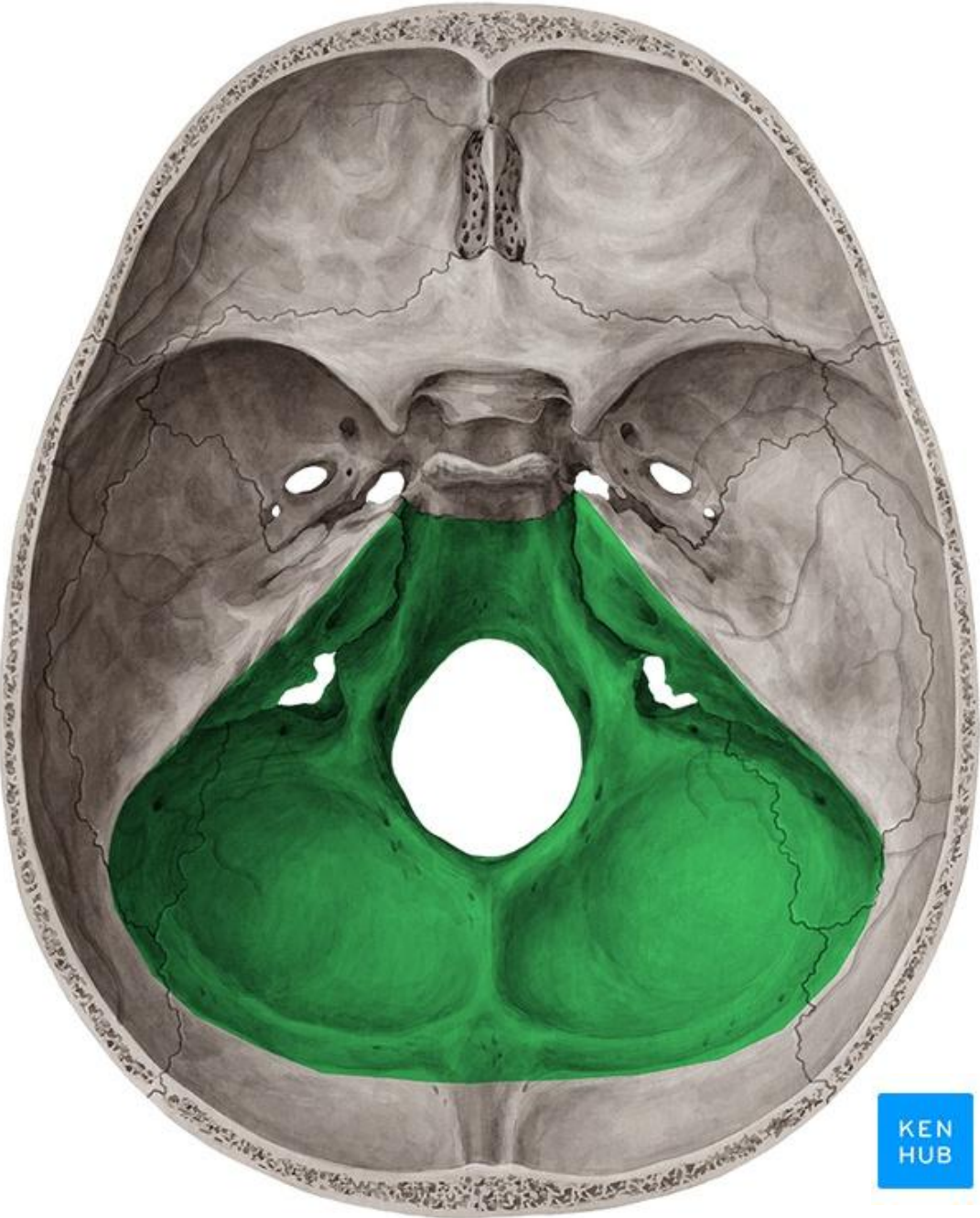
Optic canal

Ophthalmic artery



Posterior cranial fossa

Formed mostly by parts of temporal and occipital bones

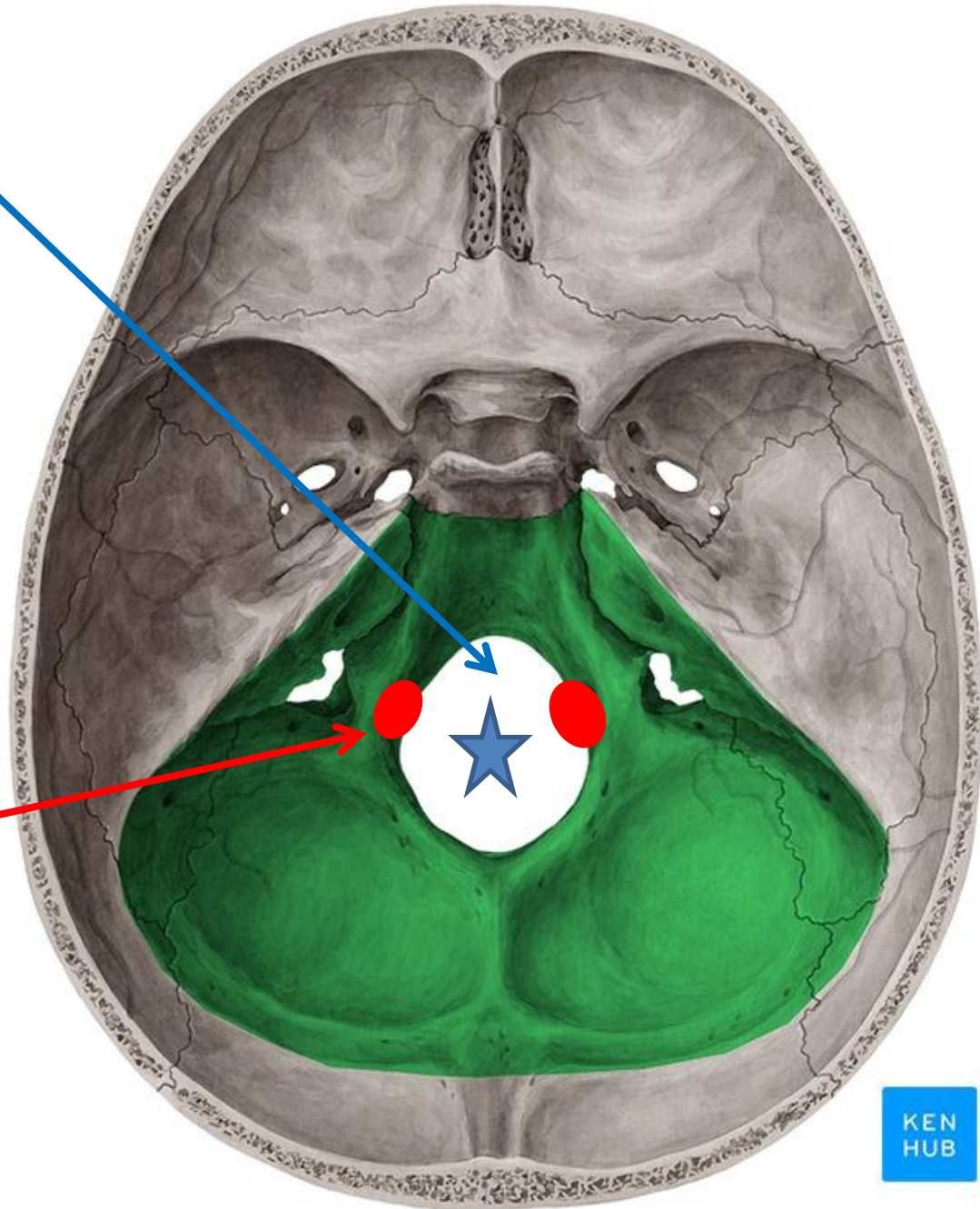


★ **The foramen magnum**

transmits

- 1- Medulla oblongata and its surrounding meninges
- 2- Spinal roots of the accessory nerves
- 3- Two vertebral arteries.

- The **hypoglossal canal** is situated above the anterolateral boundary of the foramen magnum and transmits the **hypoglossal nerve**

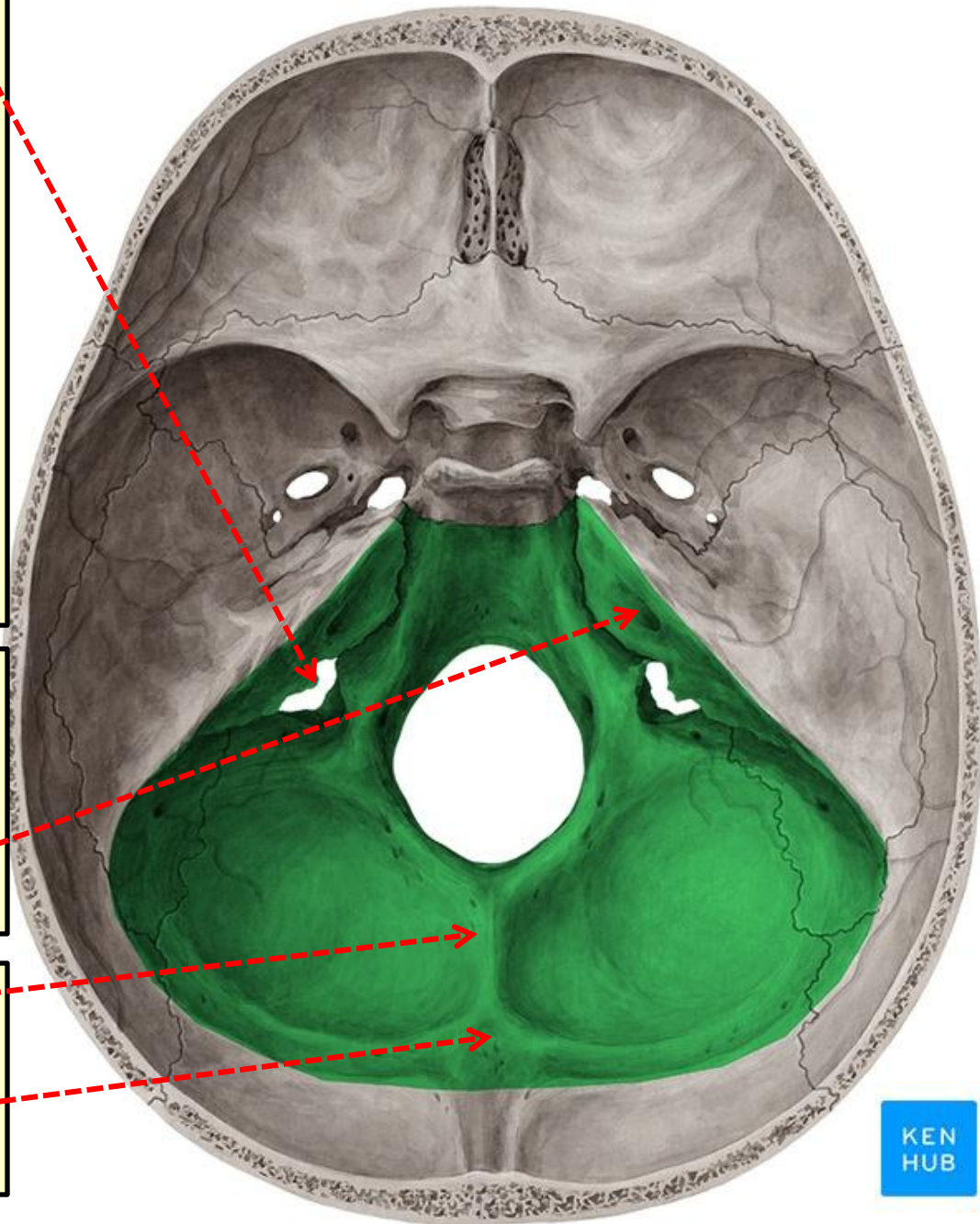


The **jugular foramen** lies between the petrous part of the temporal bone and the occipital bone.

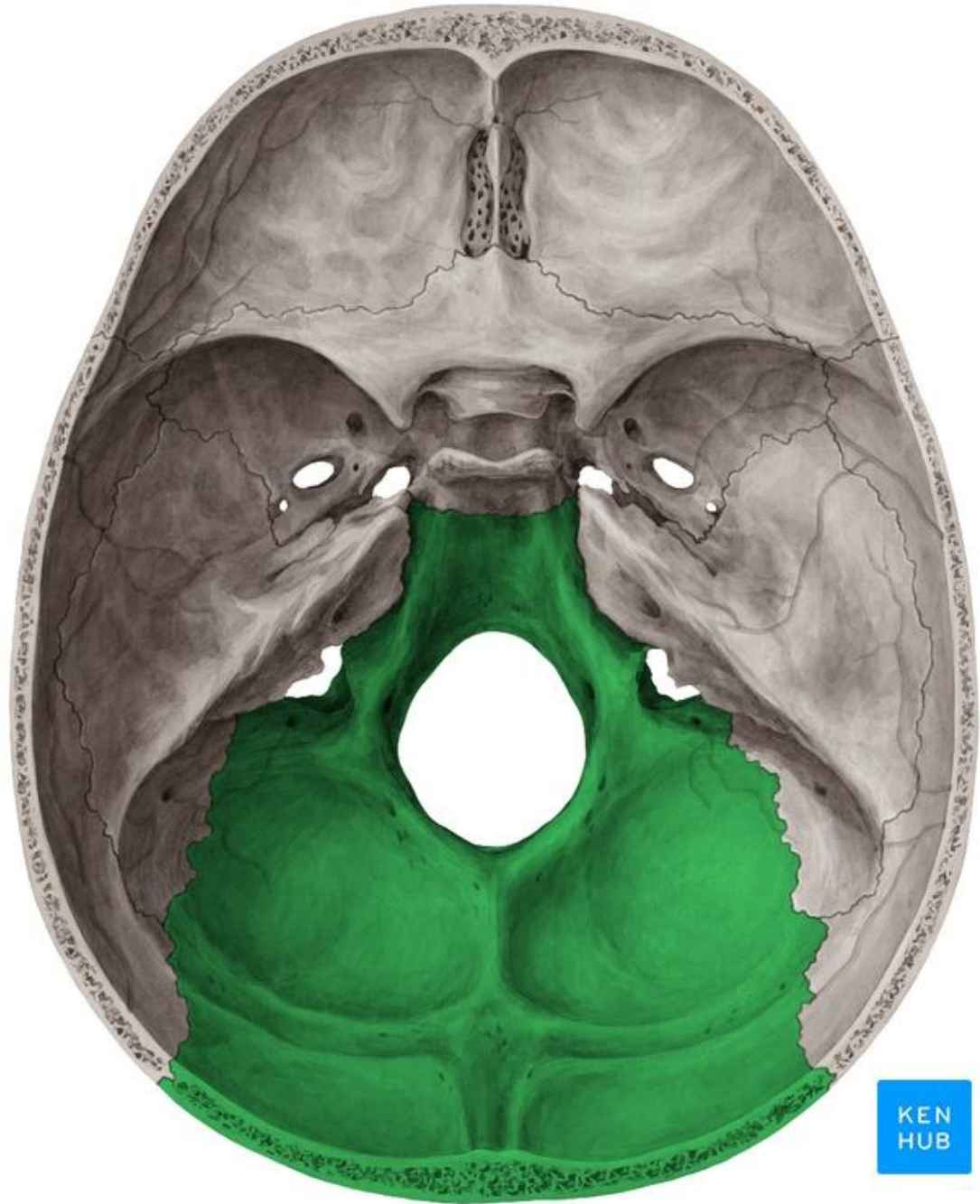
It transmits the following structures
Anterior part: the inferior petrosal sinus
Middle part: the 9th, 10th, and 11th cranial nerves
Posterior part: the large sigmoid sinus.
The sigmoid sinus turns down through the foramen to become the internal jugular vein.

The **internal acoustic meatus** (on the posterior surface of the petrous part of the temporal bone): transmits the vestibulocochlear nerve and the facial nerve (7th and 8th cranial nerves)

The **internal occipital crest** runs upward in the midline posteriorly from the foramen magnum to the **internal occipital protuberance**



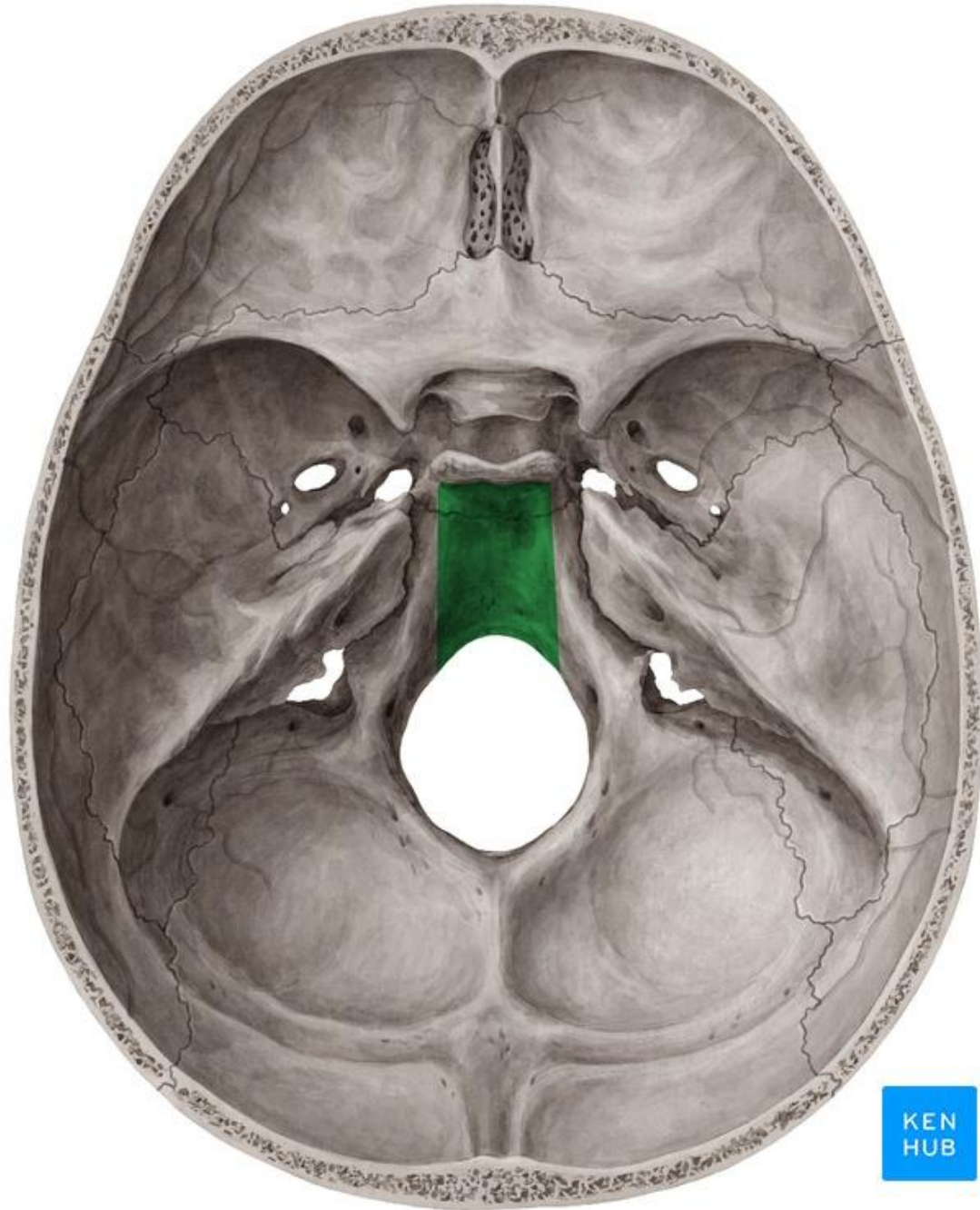
Occipital bone



Clivus

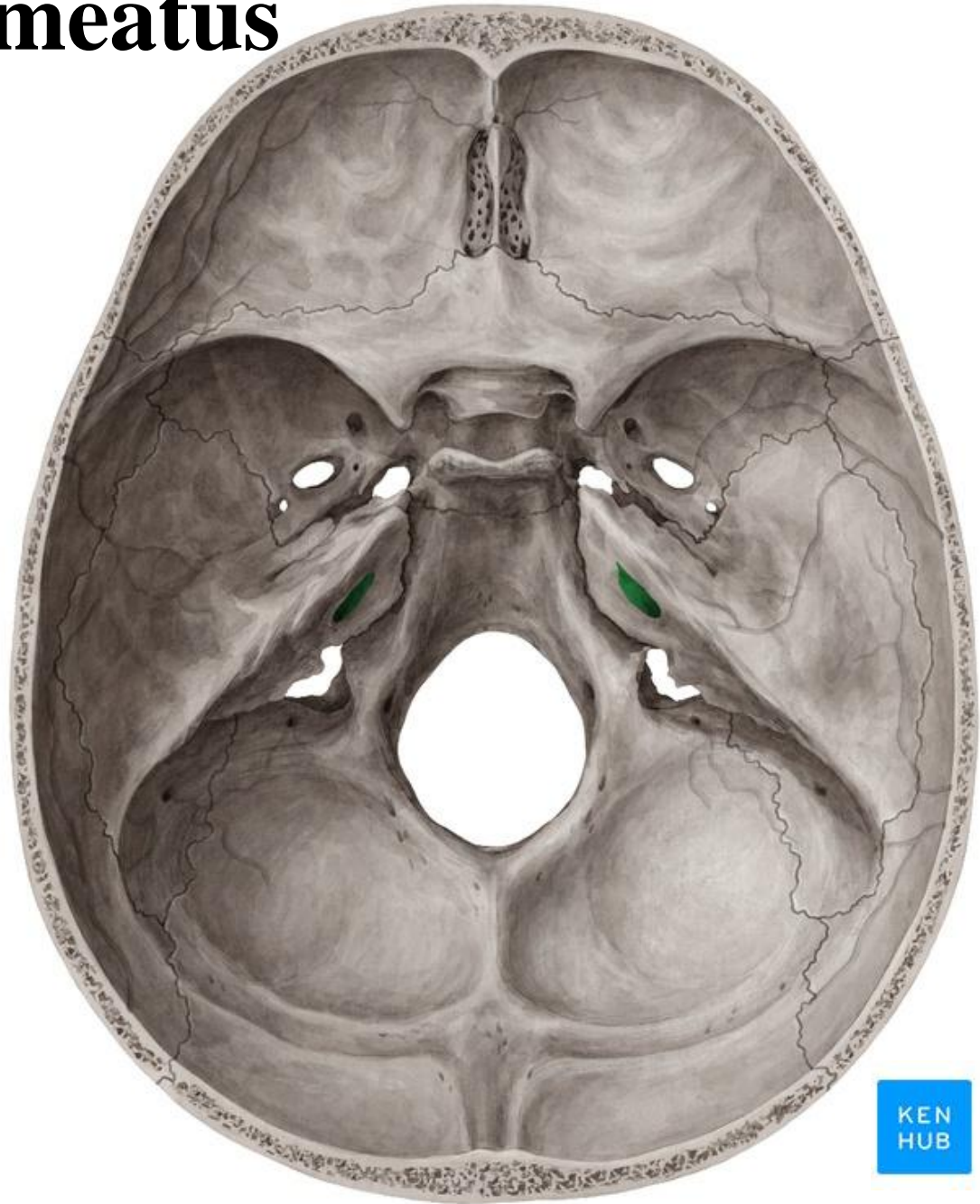
is the sloping midline surface of the occipital bone anterior to the foramen magnum

Clivus: Slope

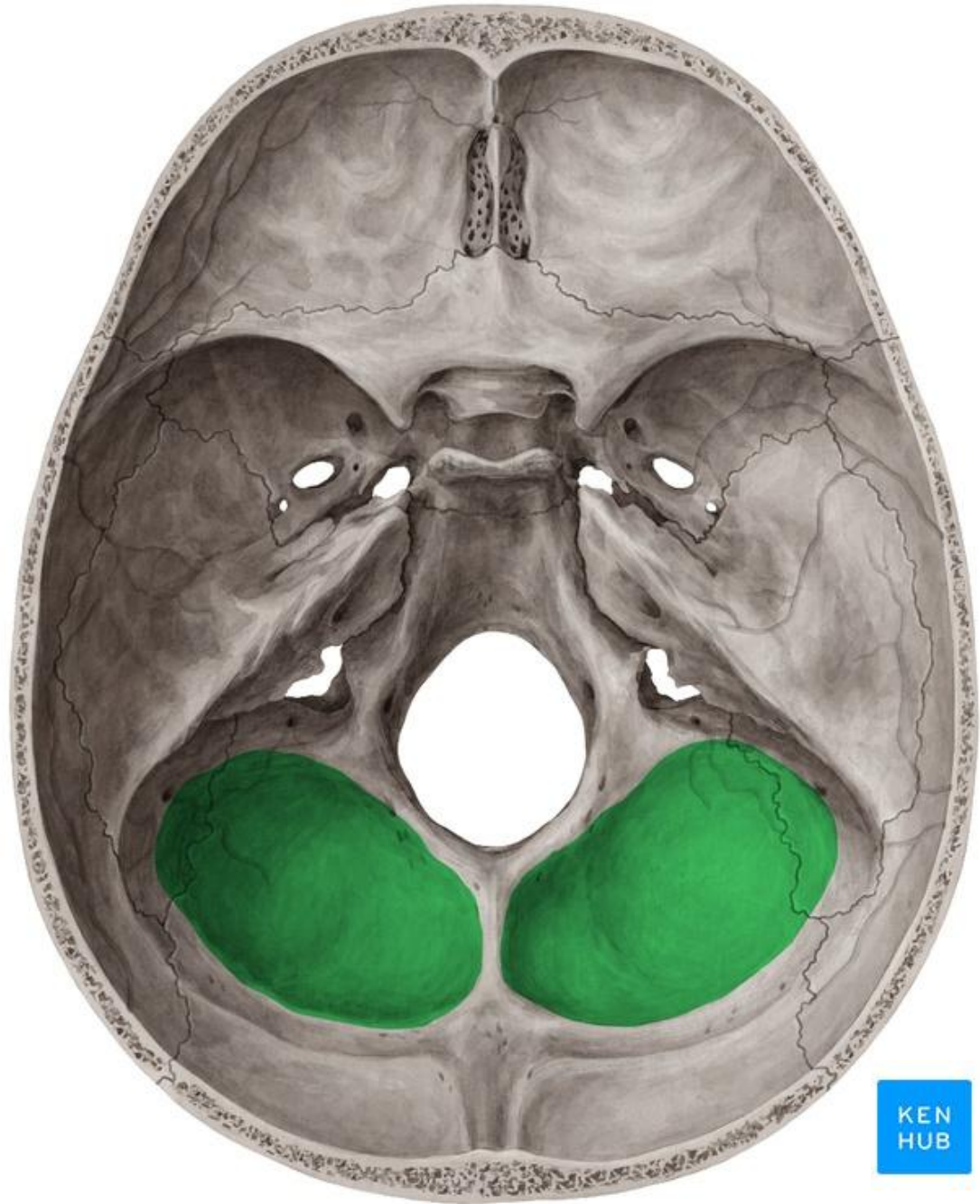


Internal acoustic meatus

Transmits the
vestibulocochlear nerve and
the facial nerve
(7th and 8th cranial nerves)



Cerebellar fossa

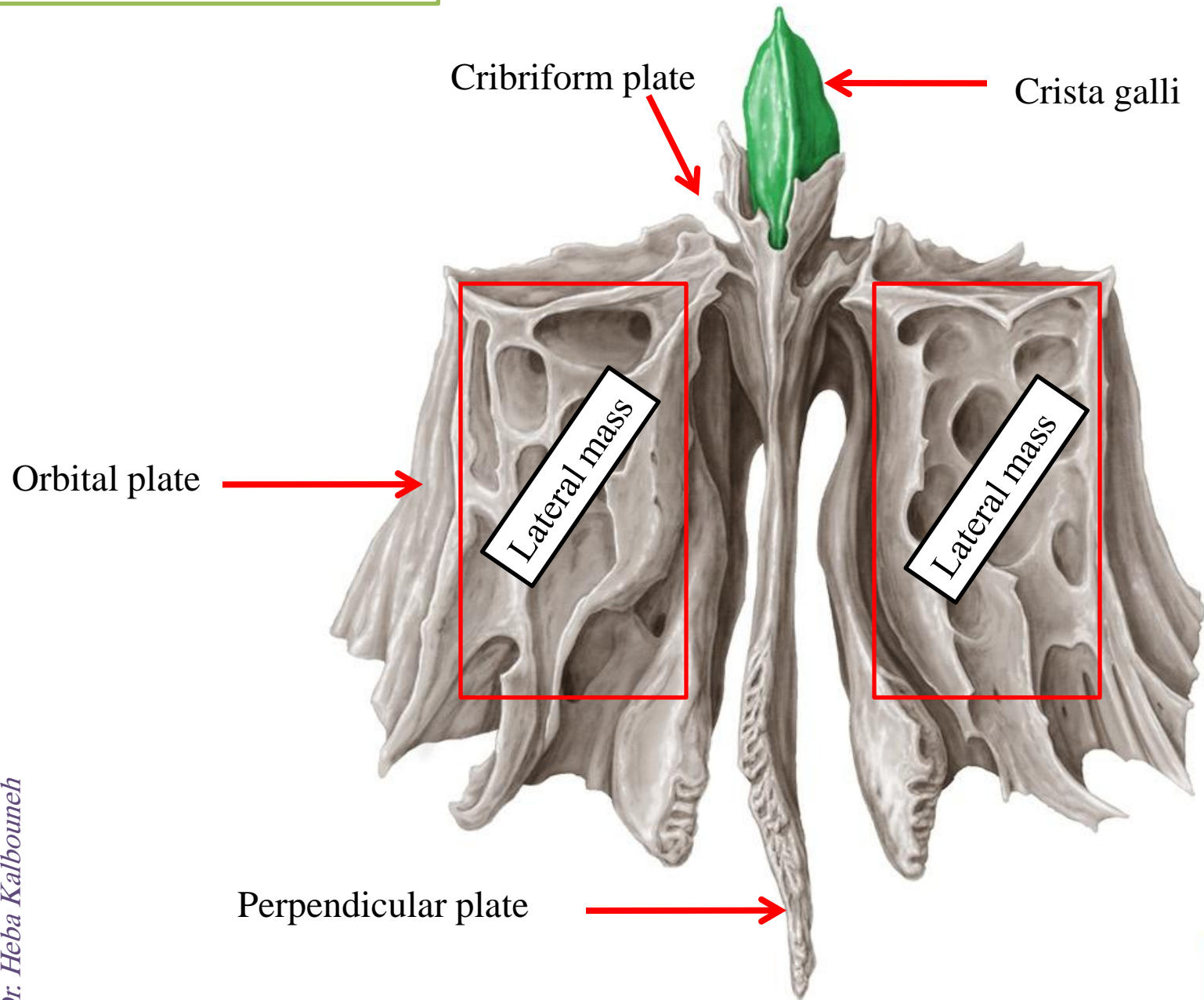


Ethmoid bone

Delicate bone located between the two orbits



Ethmoid bone

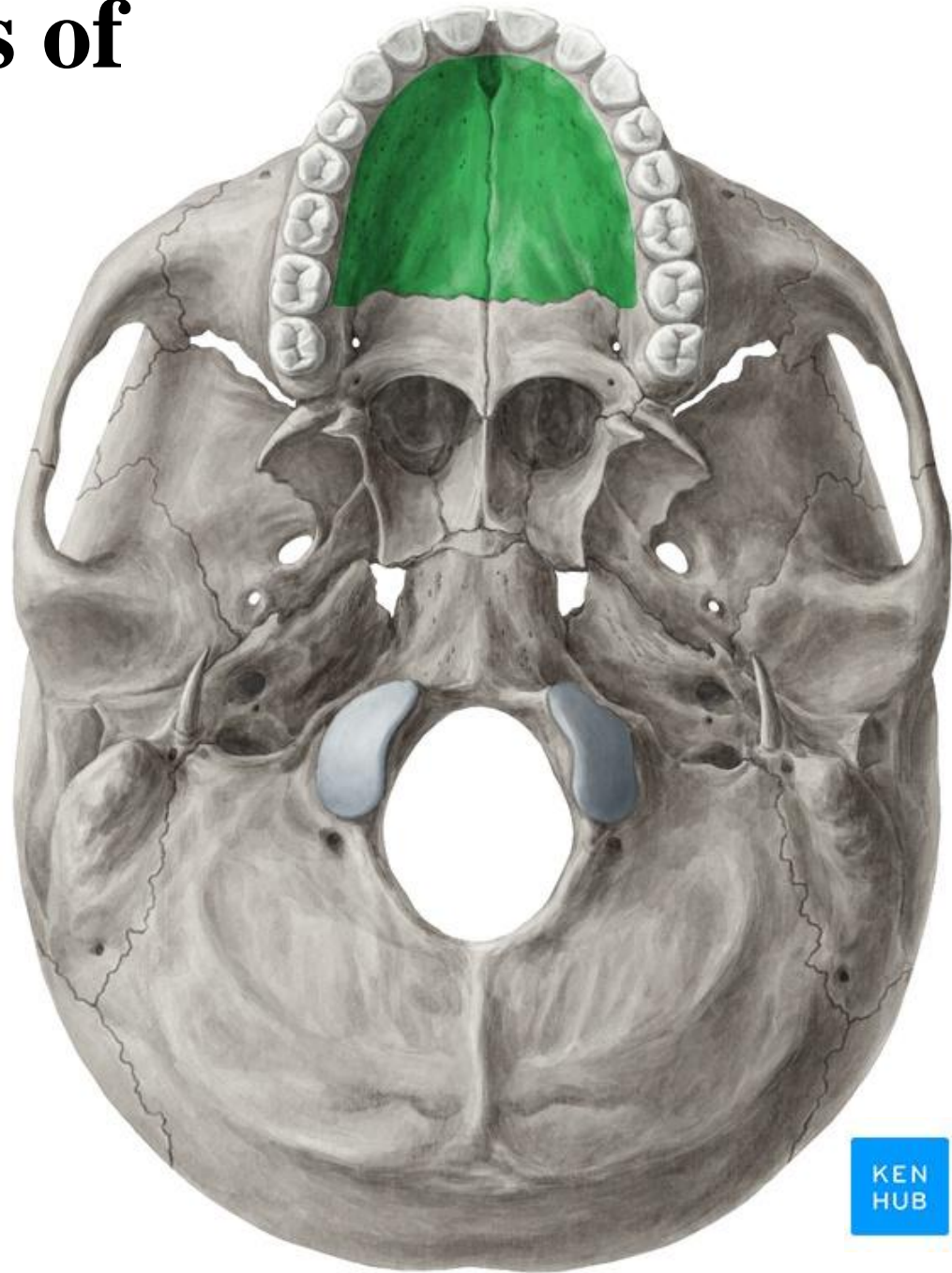


Norma Basalis Externa

Maxilla

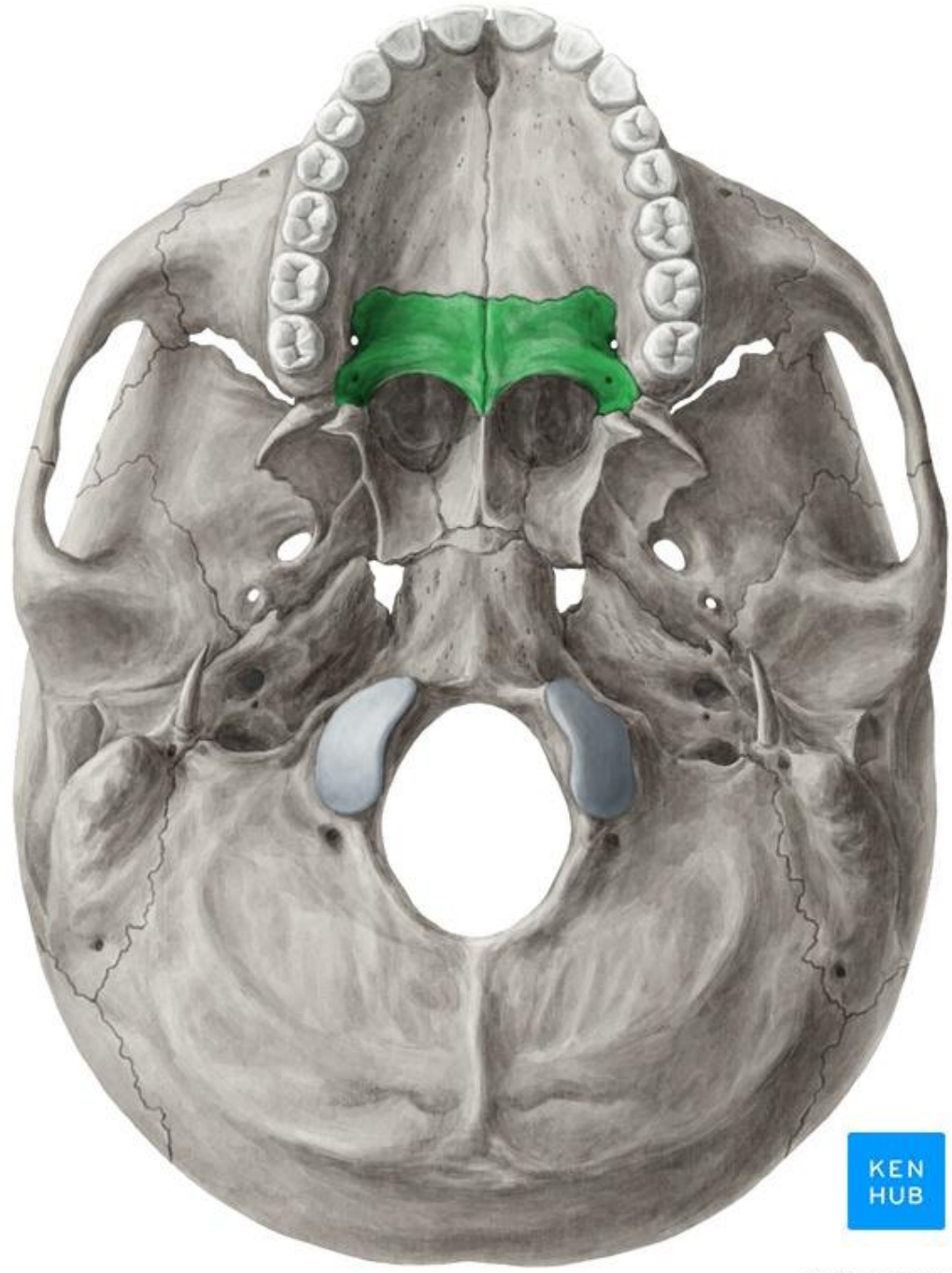
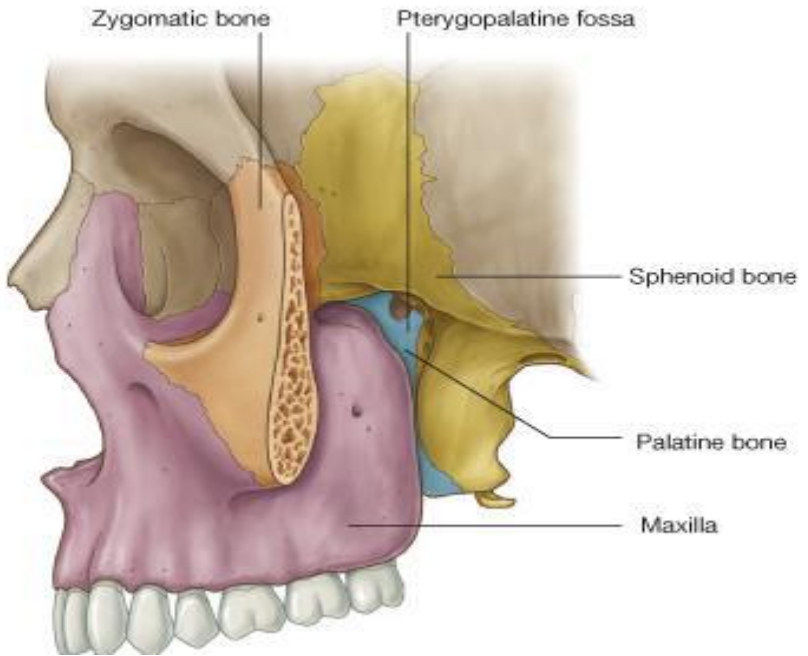


Palatine process of maxilla



Palatine bone (horizontal plate)

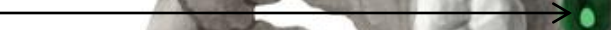
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For respiratory system



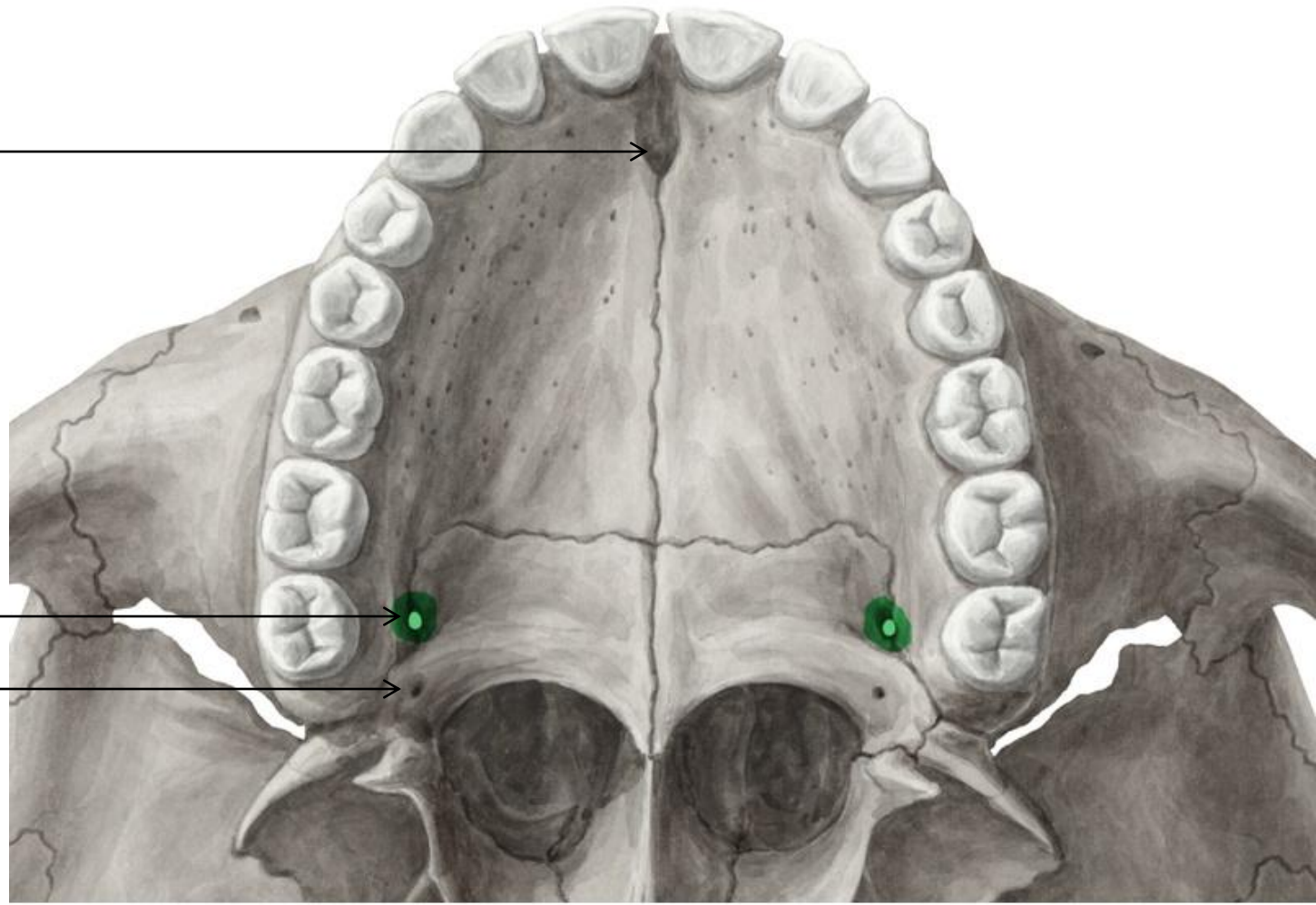
Incisive foramen



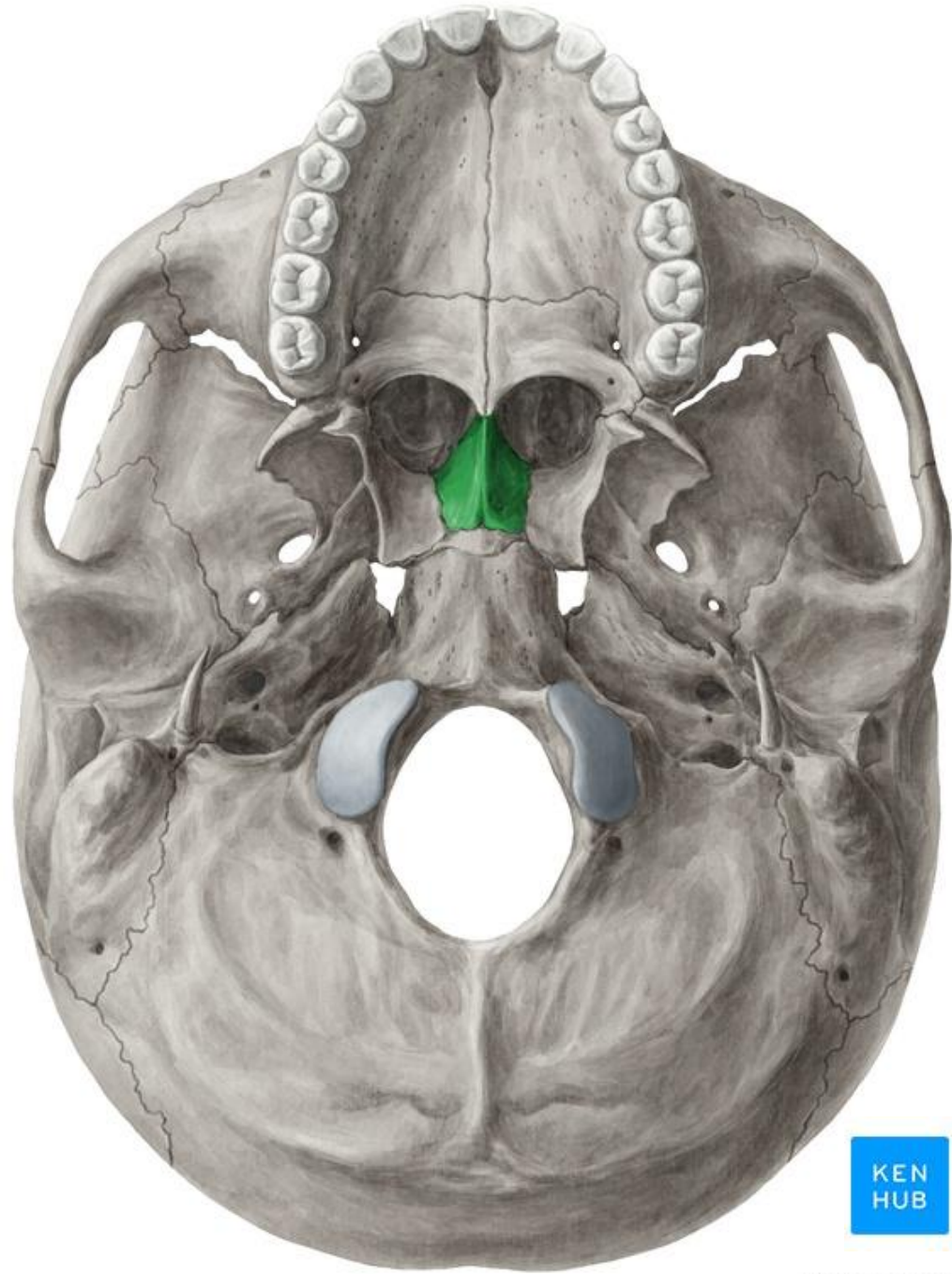
Greater palatine
foramen



Lesser palatine
foramen

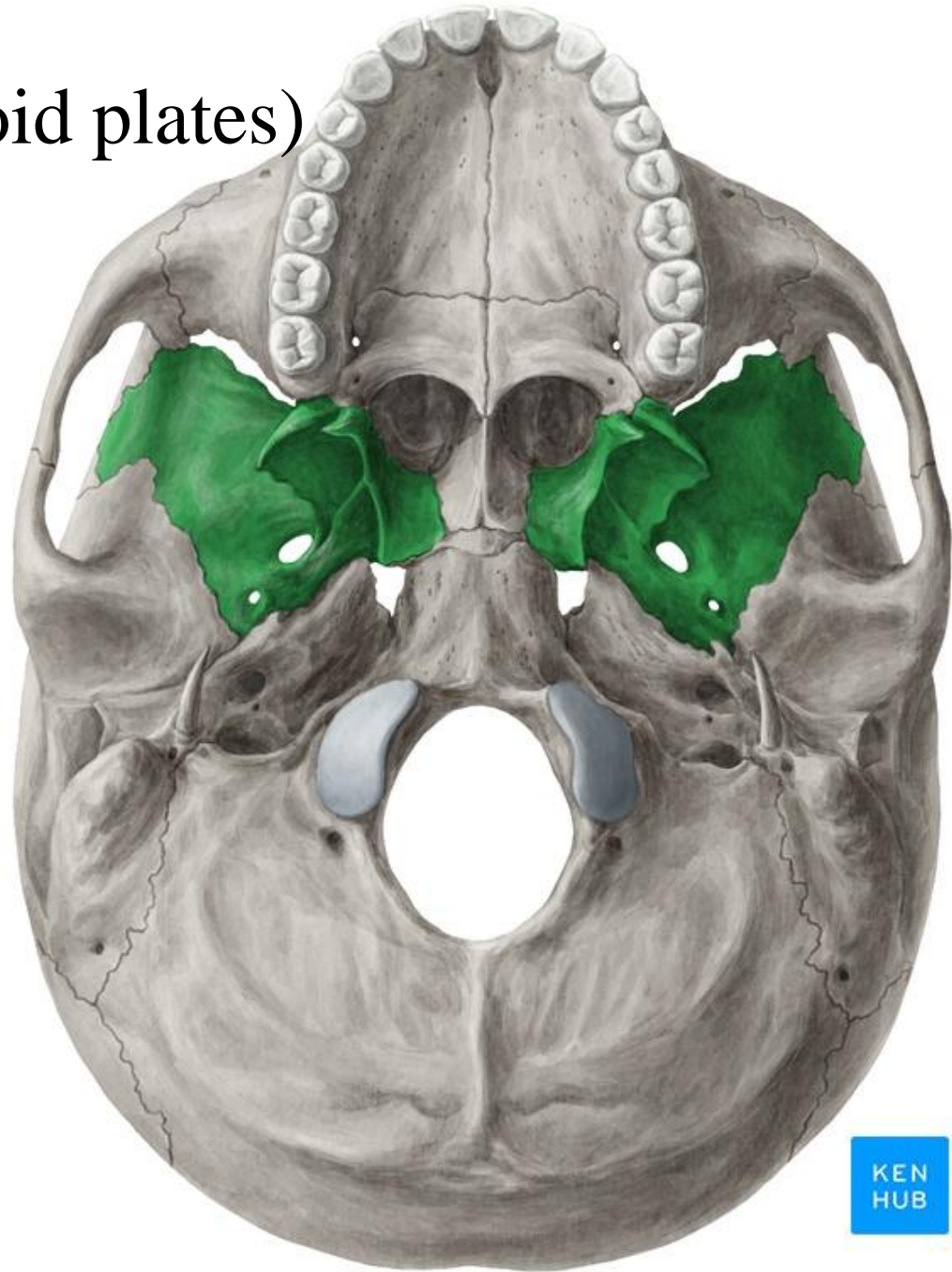


The vomer

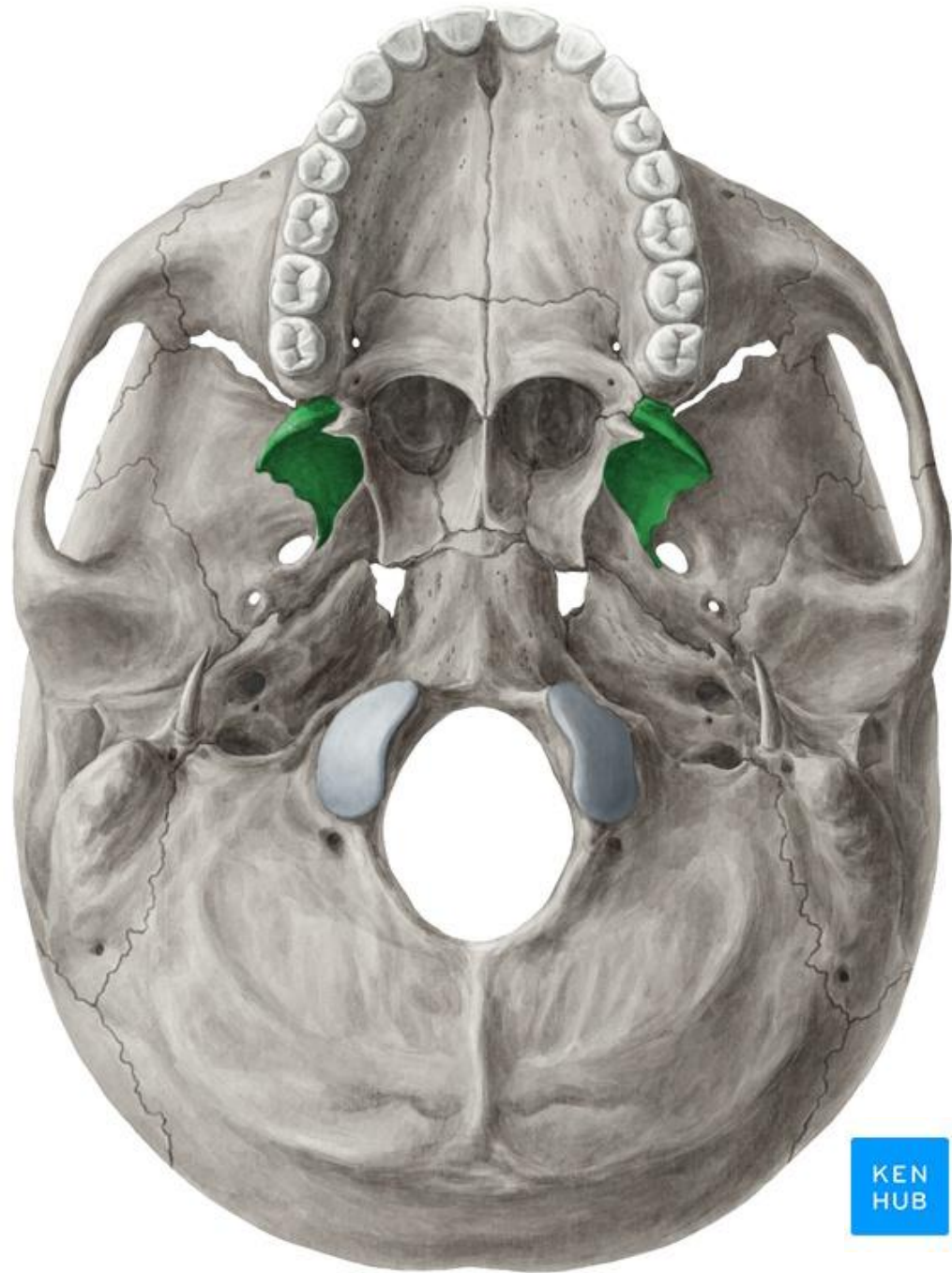


Sphenoid bone

(greater wing and pterygoid plates)

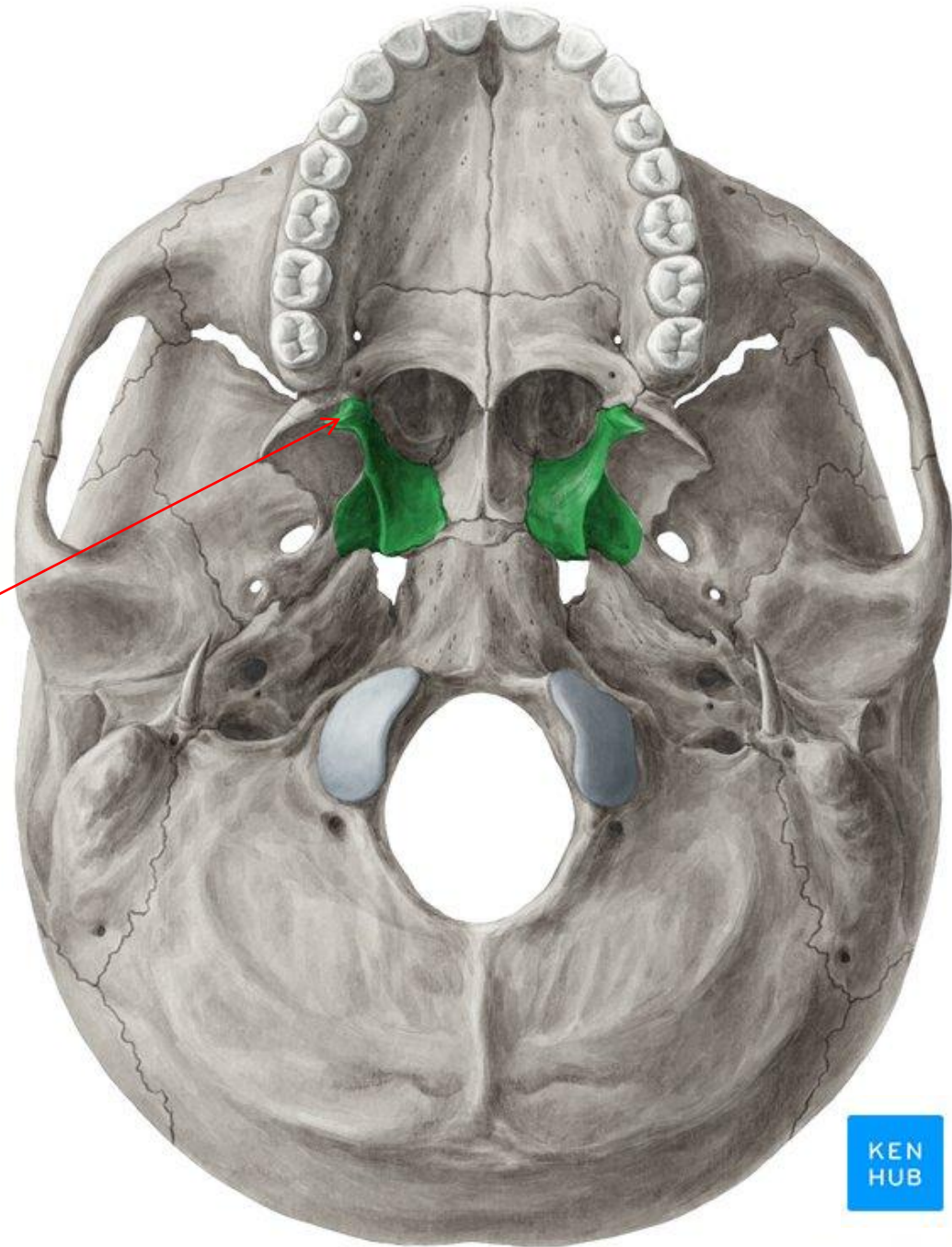


Lateral pterygoid plates of sphenoid



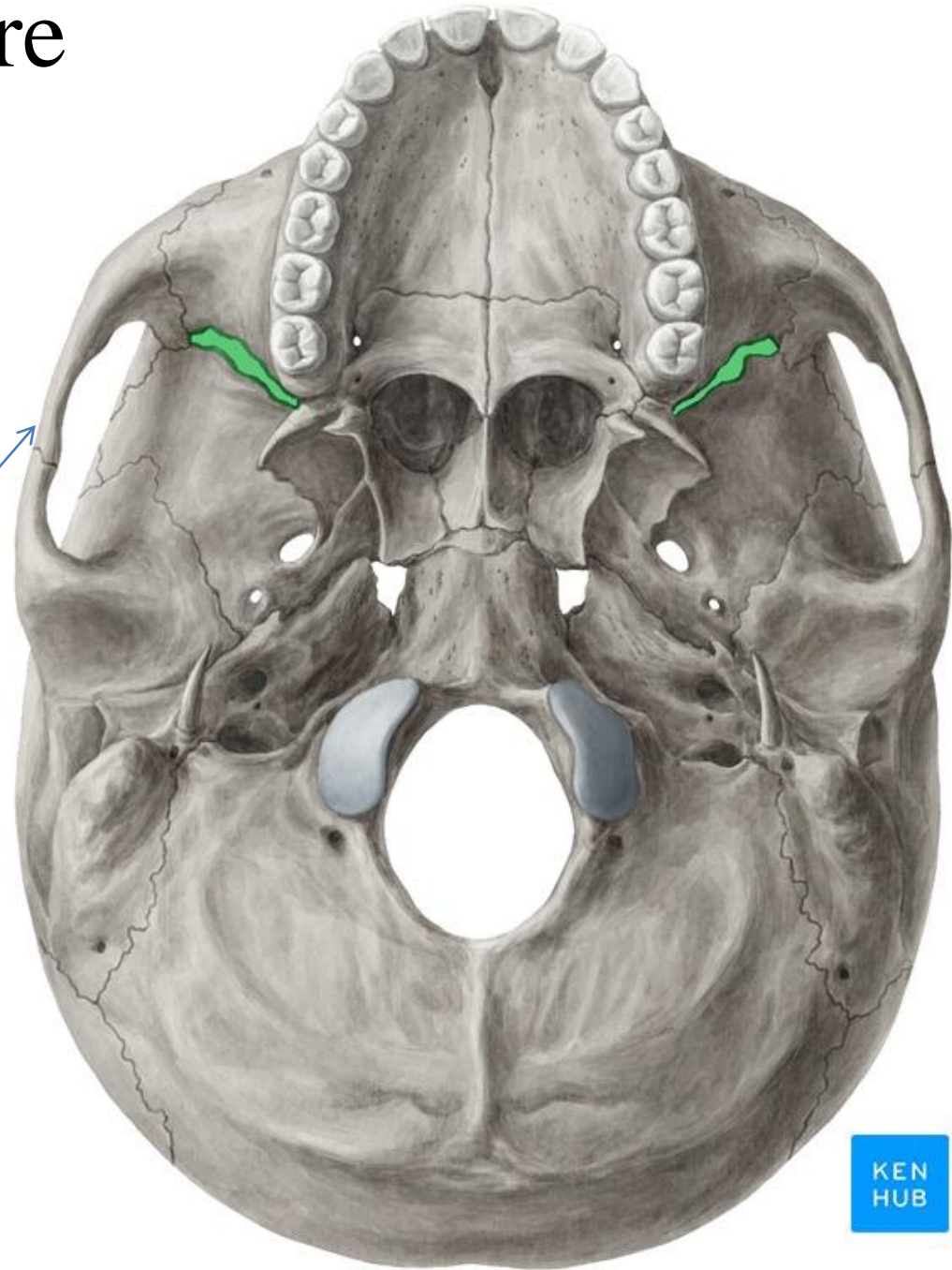
Medial pterygoid plates of sphenoid

Hamulus of
Medial pterygoid
plate of sphenoid



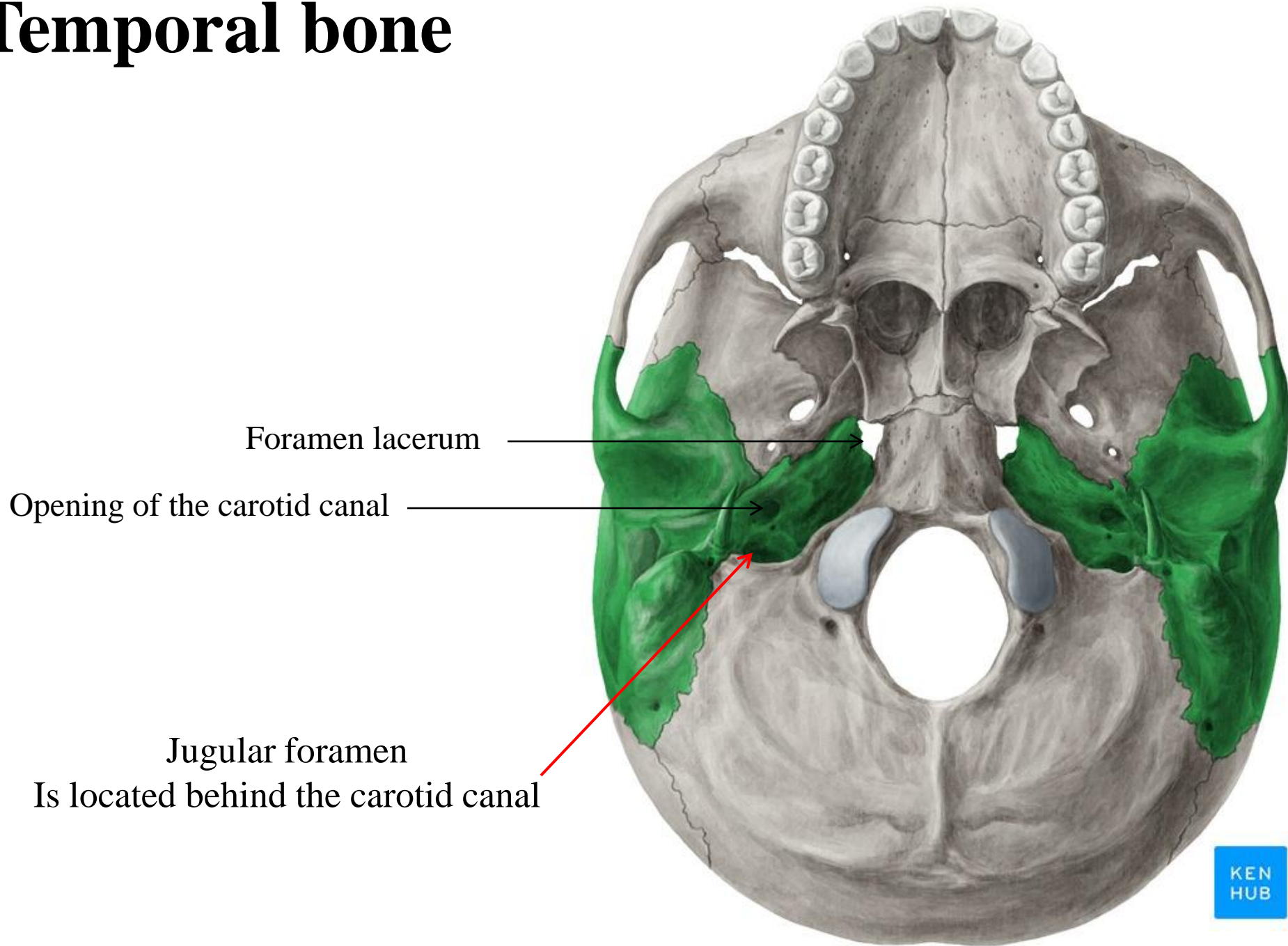
Inferior orbital fissure

It is formed between the greater wing of sphenoid bone and maxilla



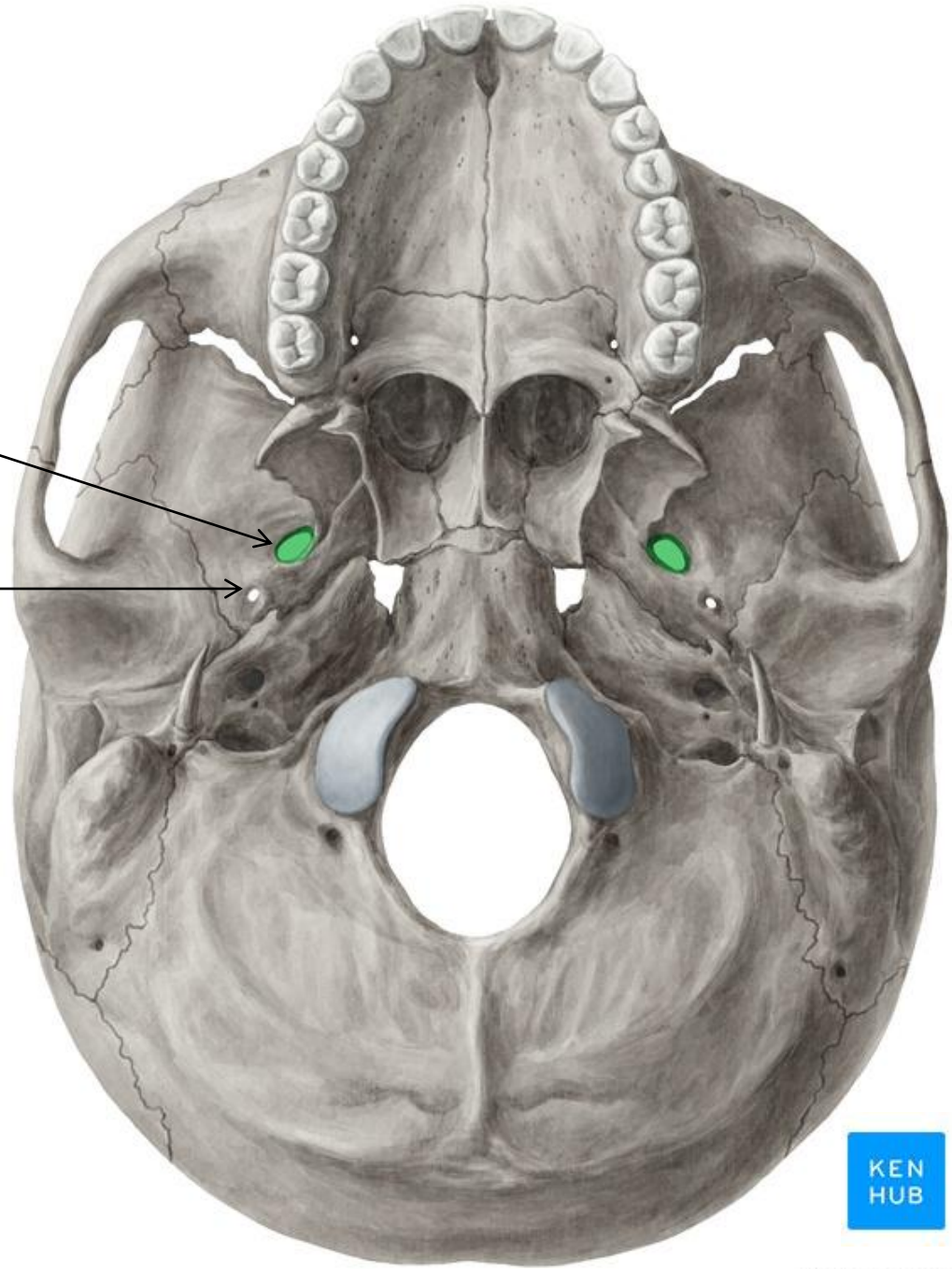
Zygomatic arch

Temporal bone



Foramen ovale

Foramen spinosum

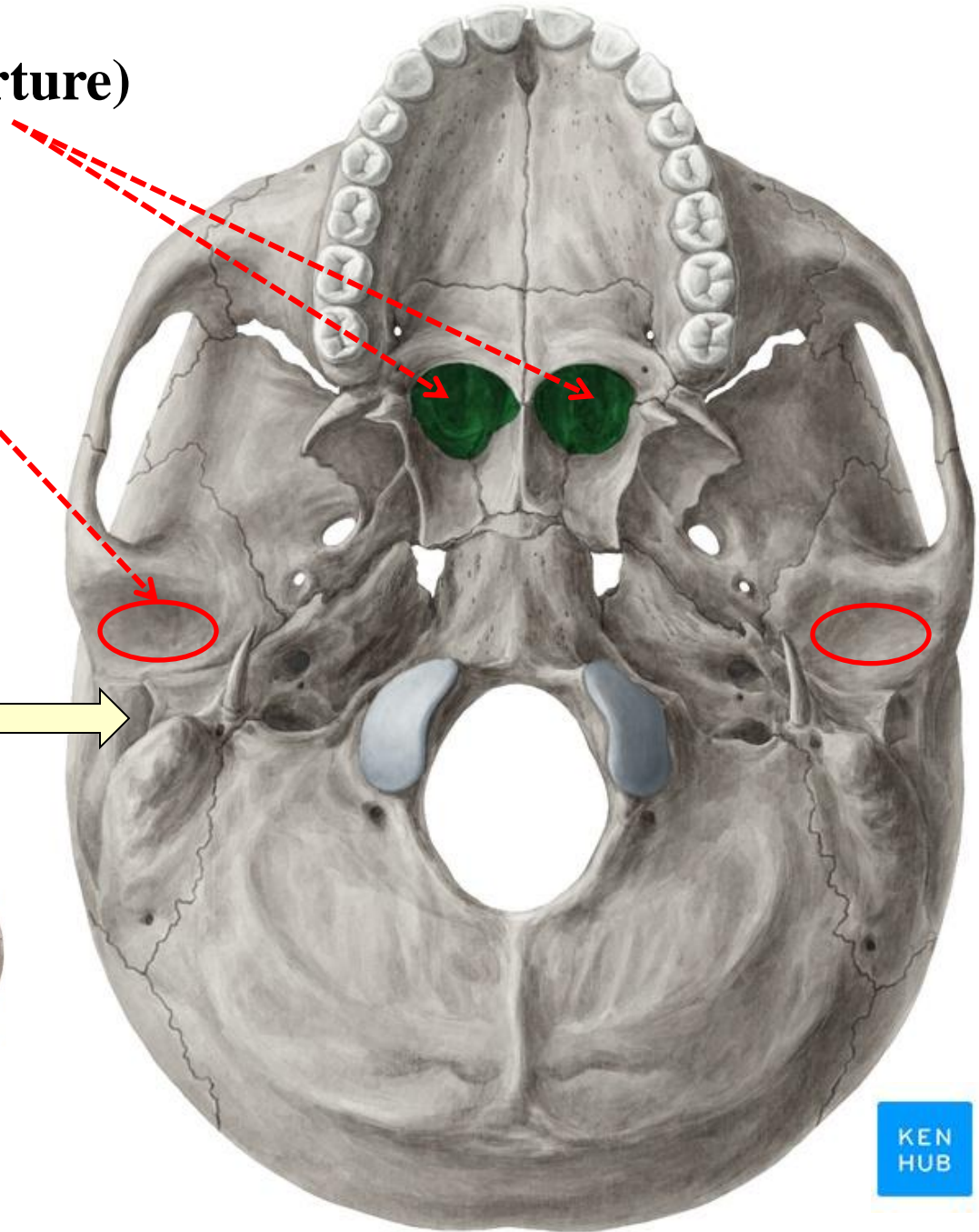


Choanae (posterior nasal aperture)

The **mandibular fossa** of the temporal bone and the **articular tubercle** form the upper articular surfaces for the temporomandibular joint.

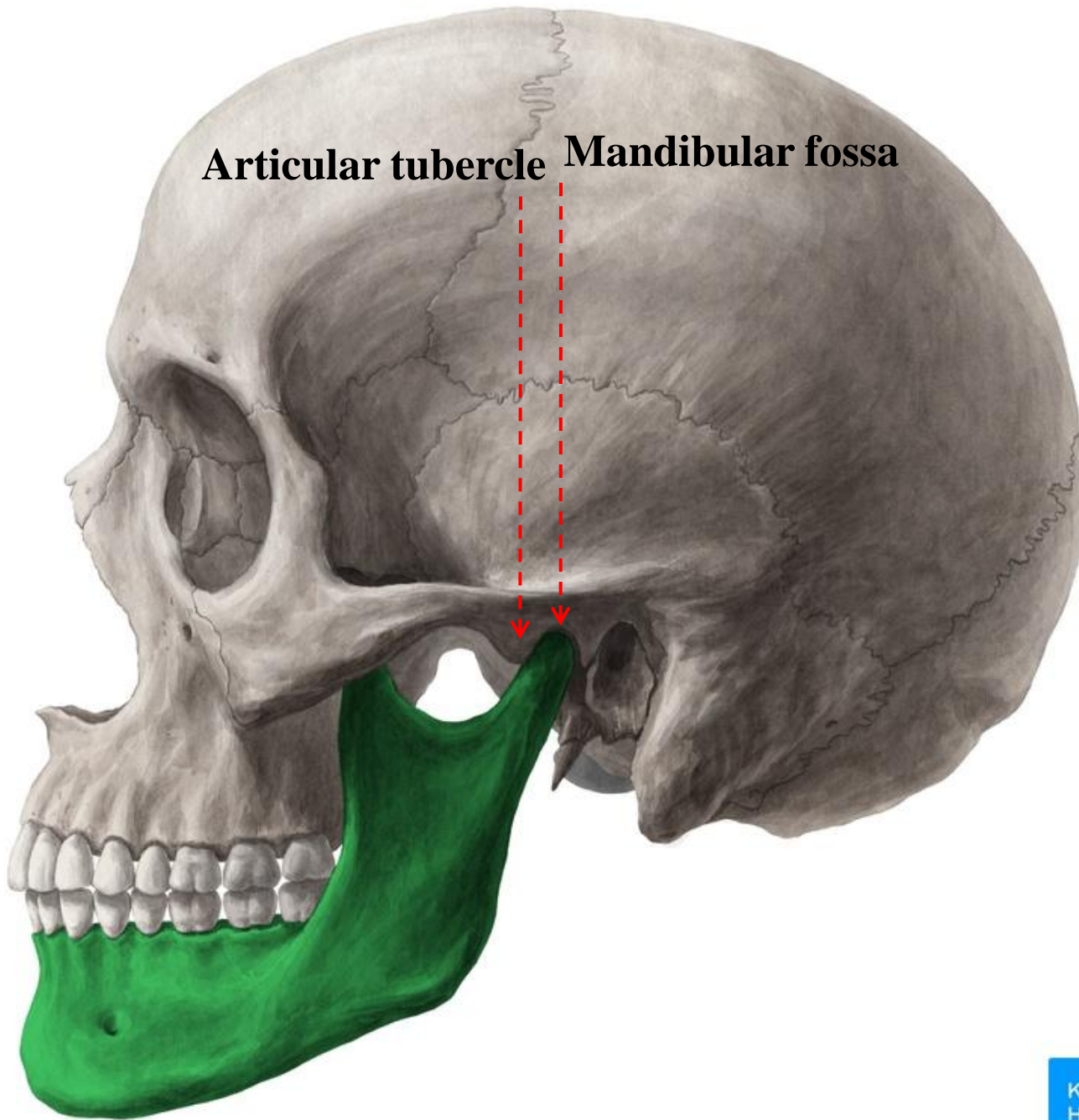
External auditory meatus →

Anterior nasal aperture →



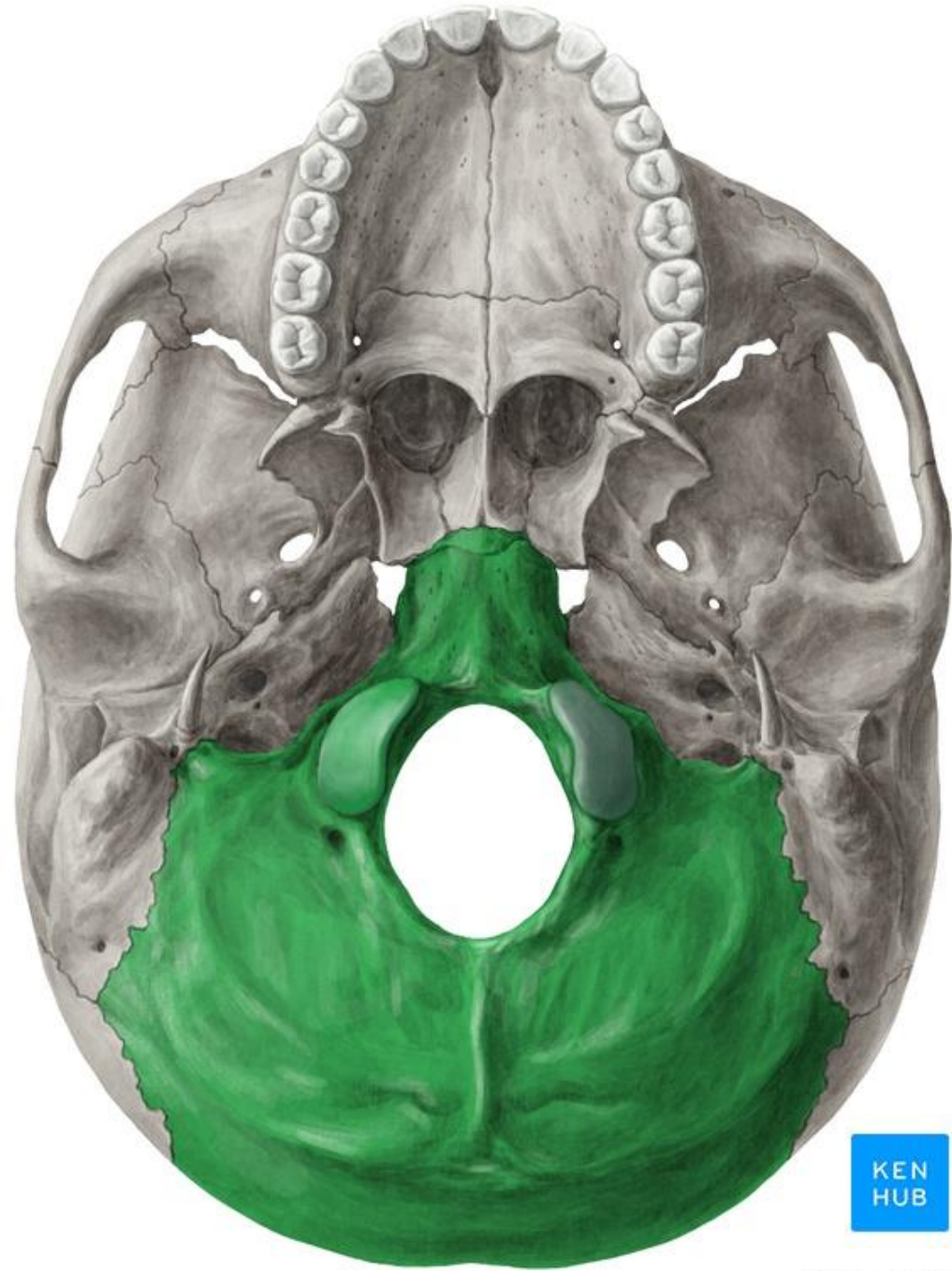
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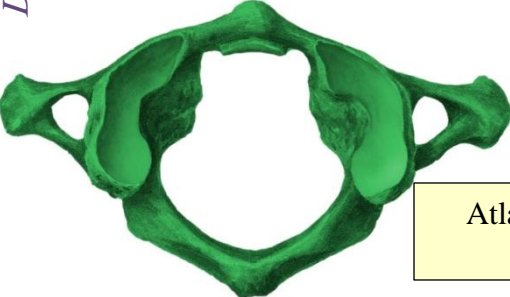
Articular tubercle **Mandibular fossa**

Occipital bone

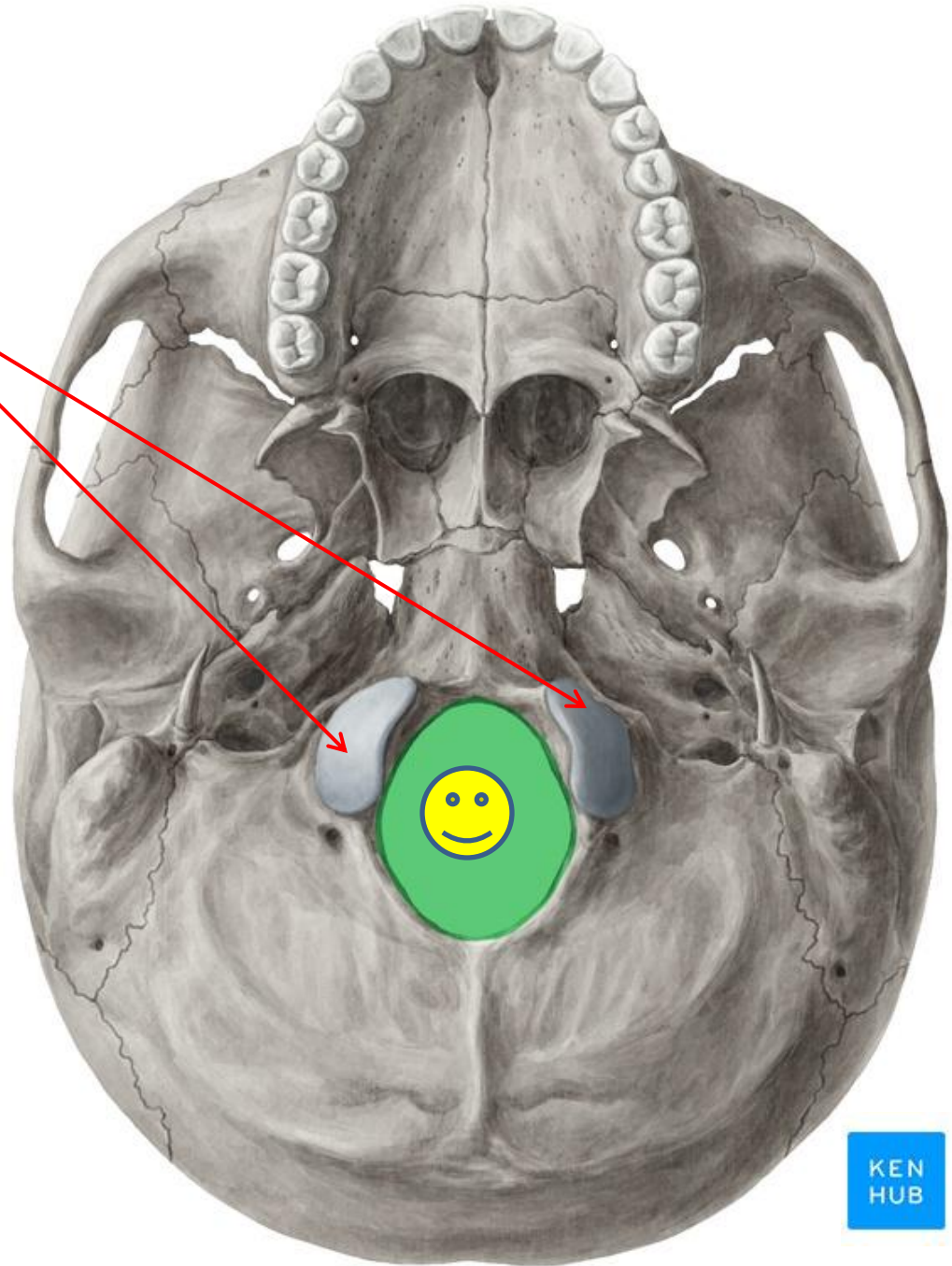
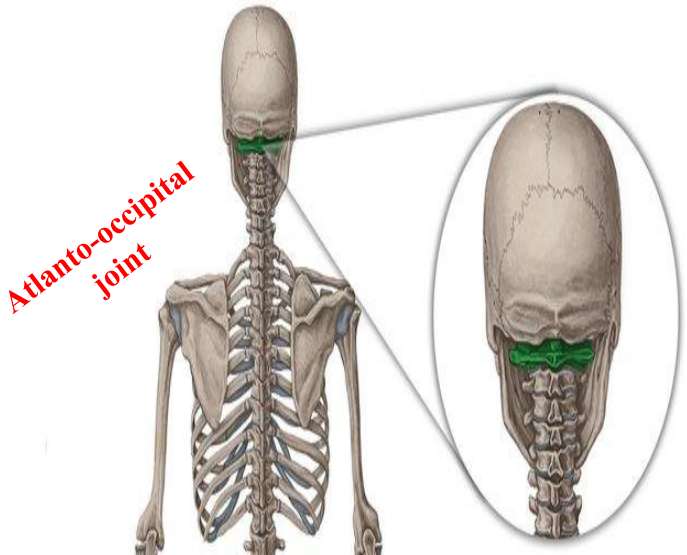


Foramen magnum 😊

Chondyles of occipital bone
(articulate with C1 vertebra)

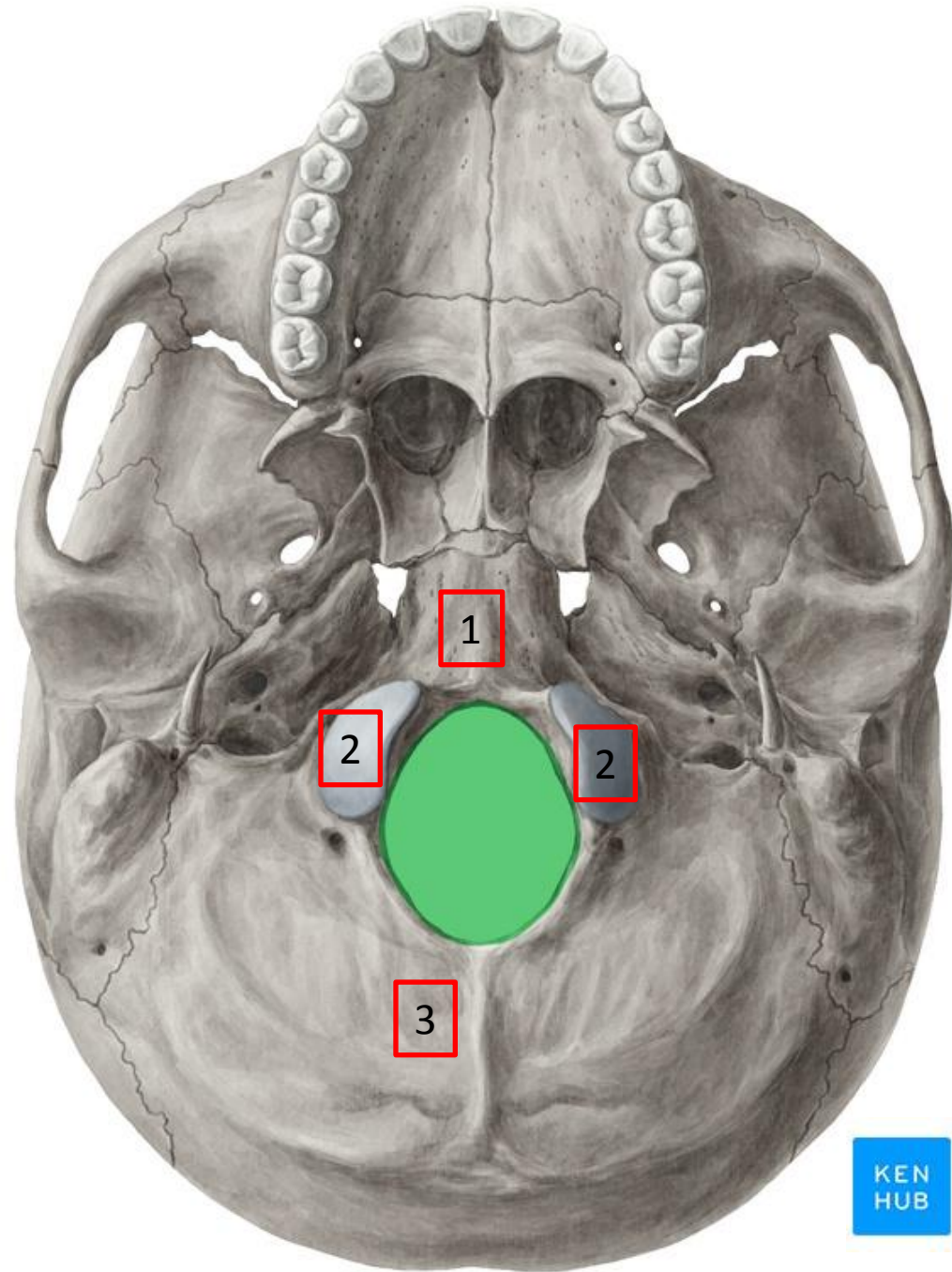


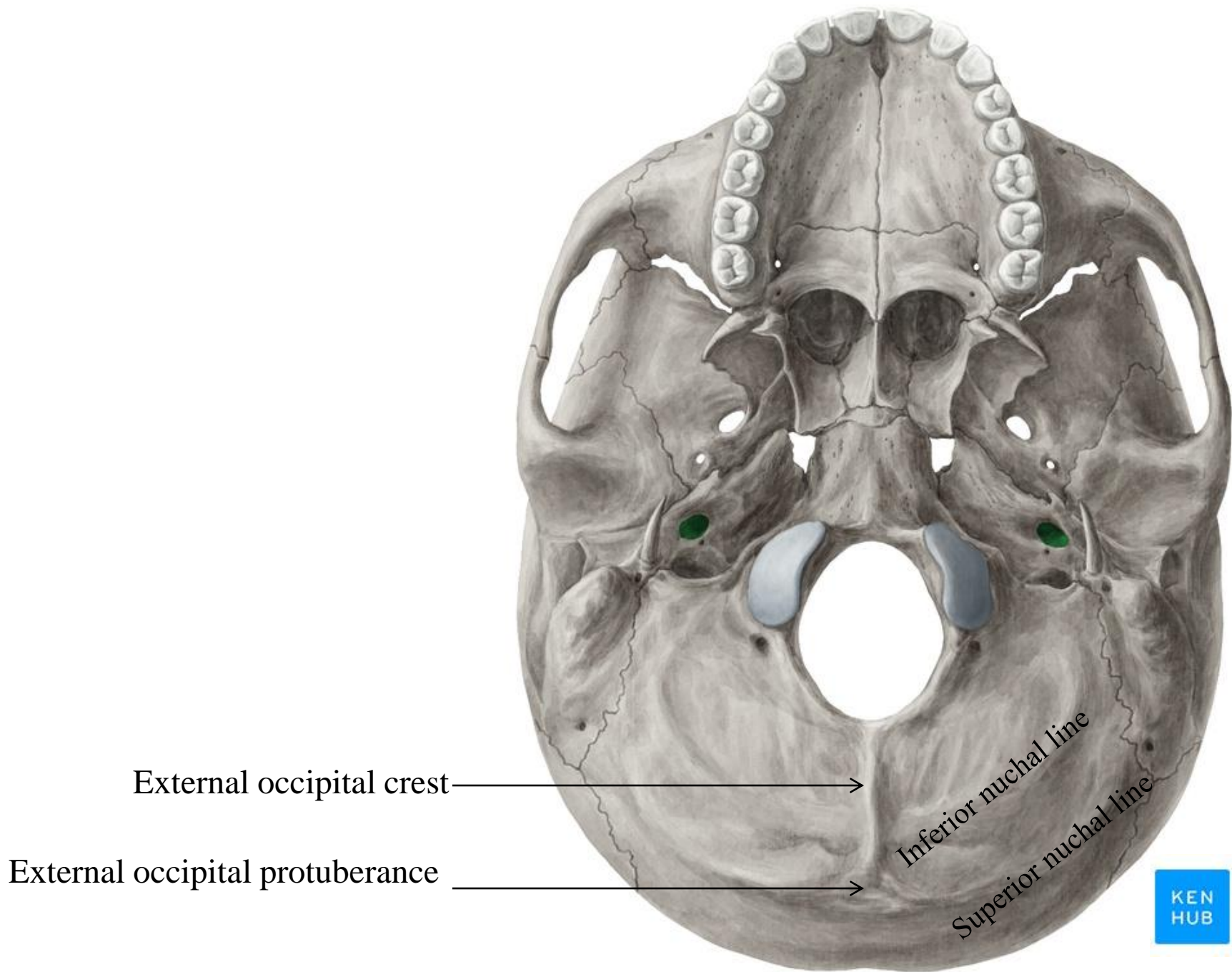
Atlas (1st cervical vertebra)



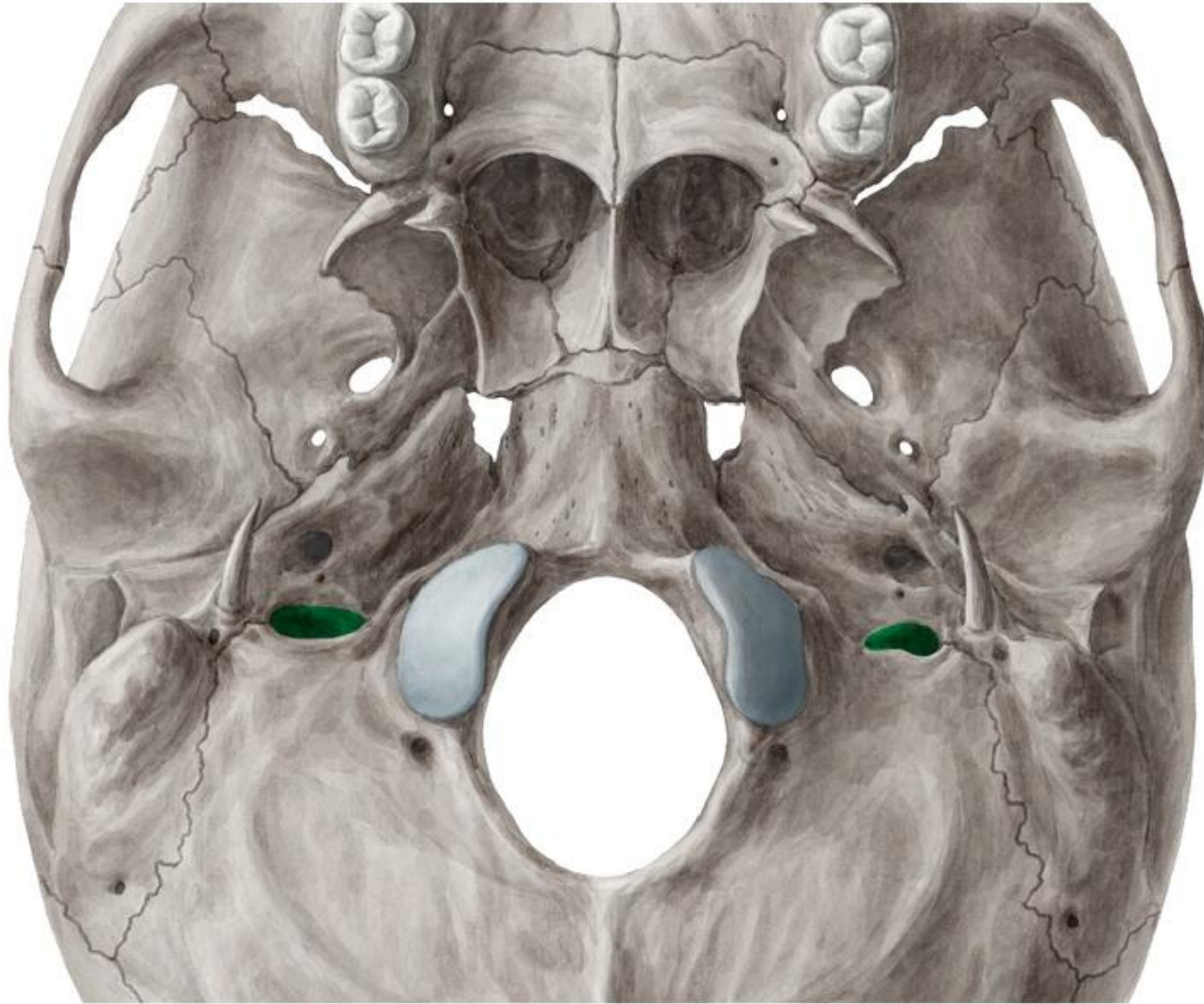
Parts of occipital bone:

- 1: Basilar part (in front the foramen magnum)
- 2: Occipital condyles (sides of foramen magnum)
- 3: Squamous part (behind the foramen magnum)





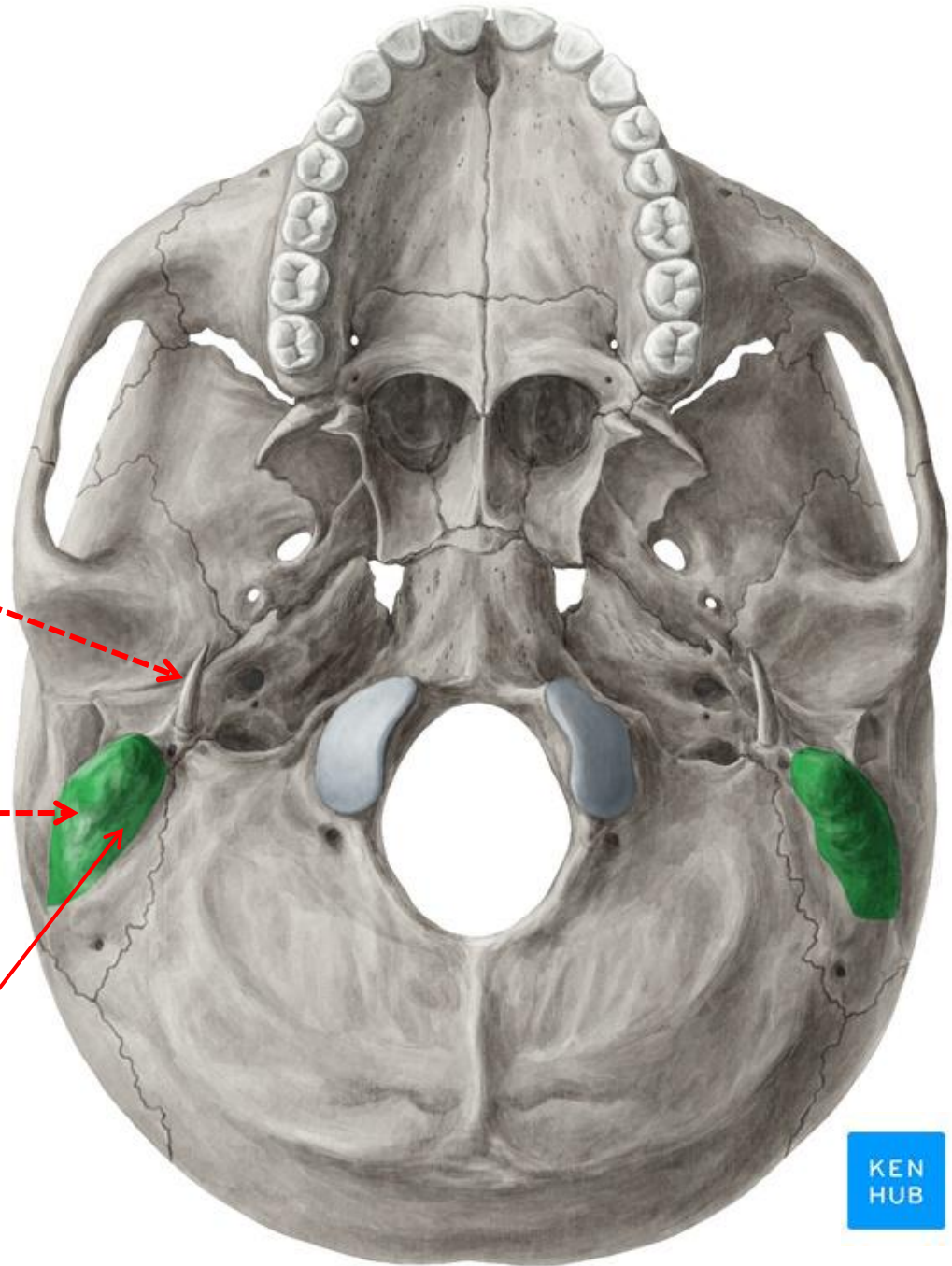
Jugular foramen



Styloid process of the temporal bone

Mastoid process

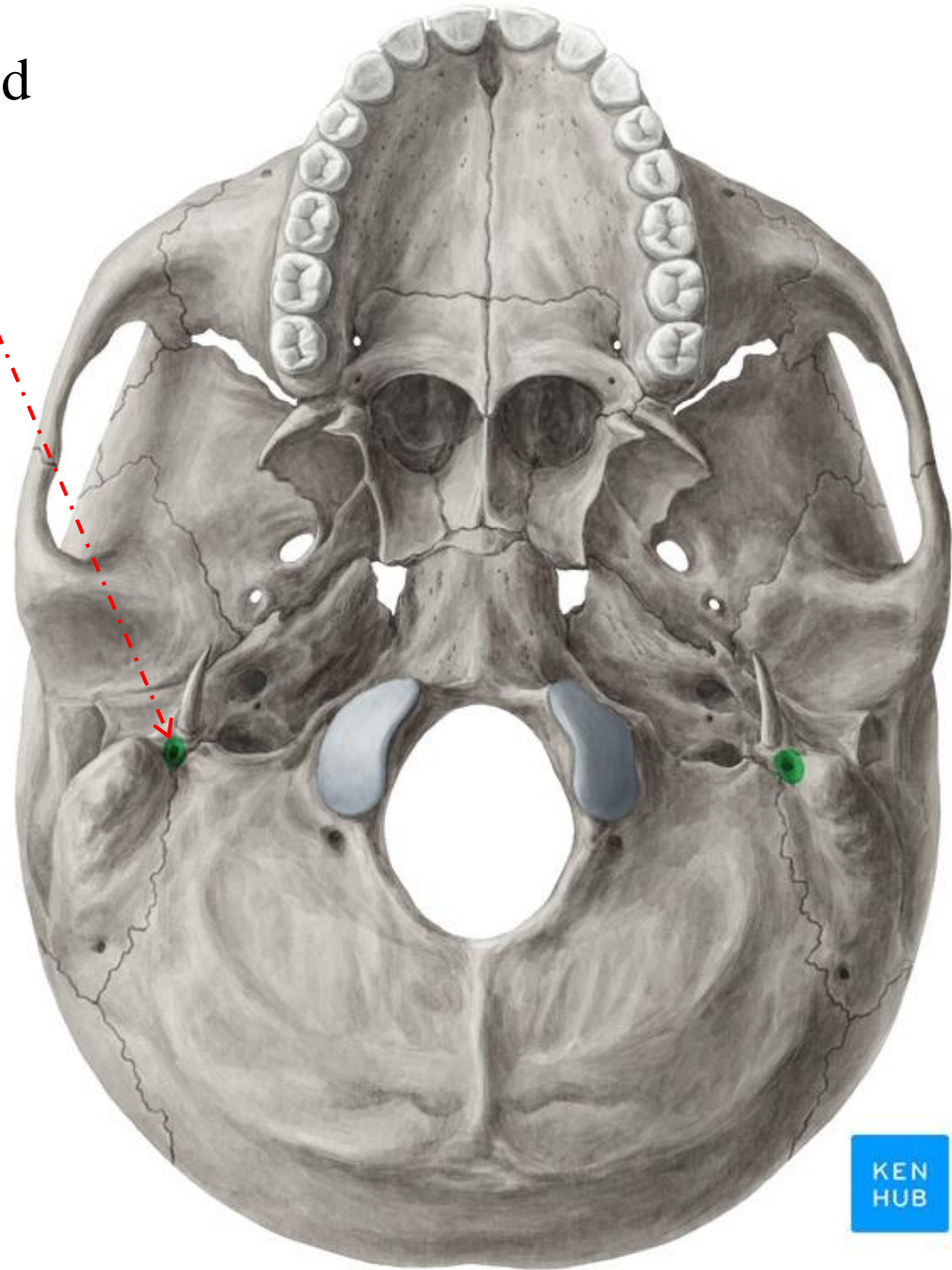
Mastoid notch



The stylomastoid foramen

In the interval between the styloid
and mastoid processes

Transmits the facial nerve



Infra temporal fossa

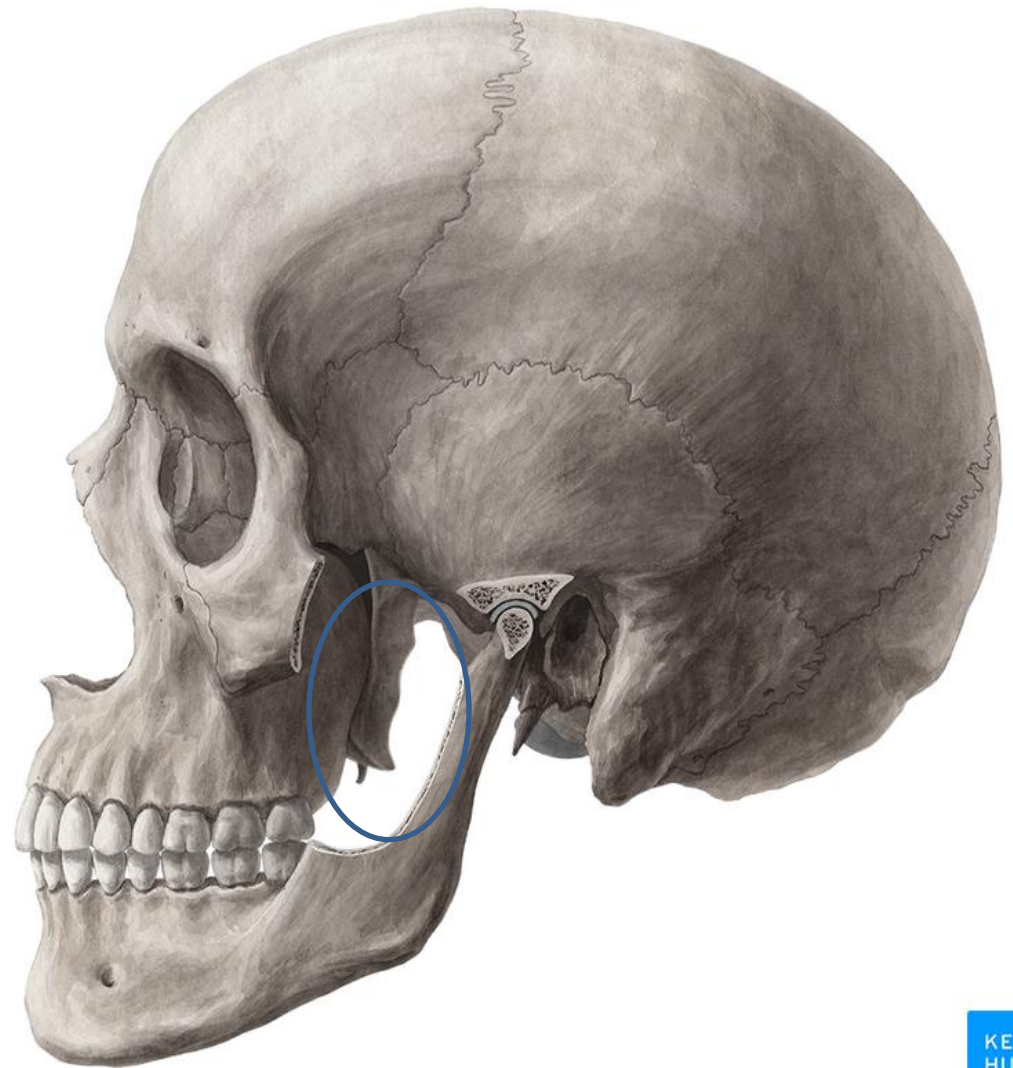
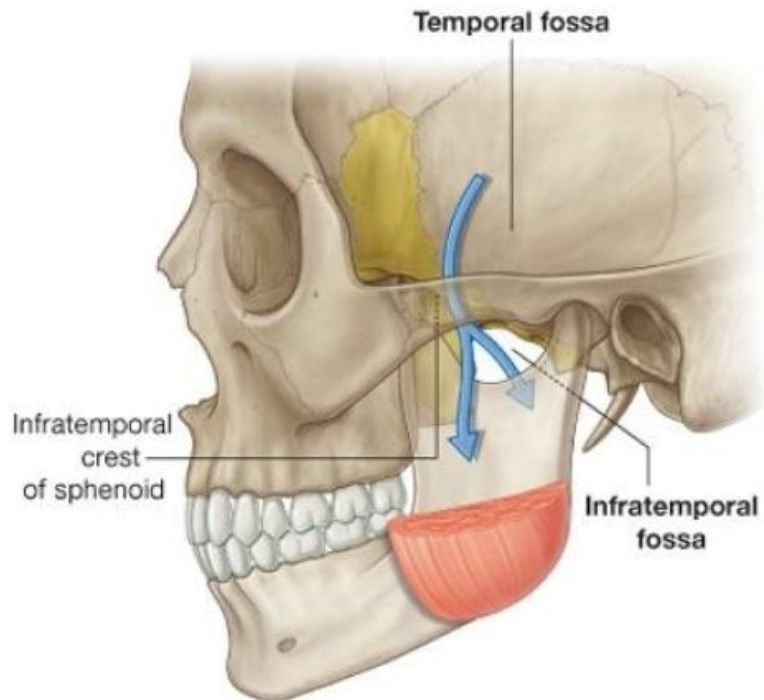
Boundaries

Anterior wall: back of the maxilla

Medial wall: lateral pterygoid plate

Roof: greater wing of sphenoid bone

Lateral wall: ramus of mandible



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Communications

Temporal fossa: through the gap deep to the zygomatic arch

Orbit: through the inferior orbital fissure

Pterygo-palatine fossa: through the pterygo-maxillary fissure

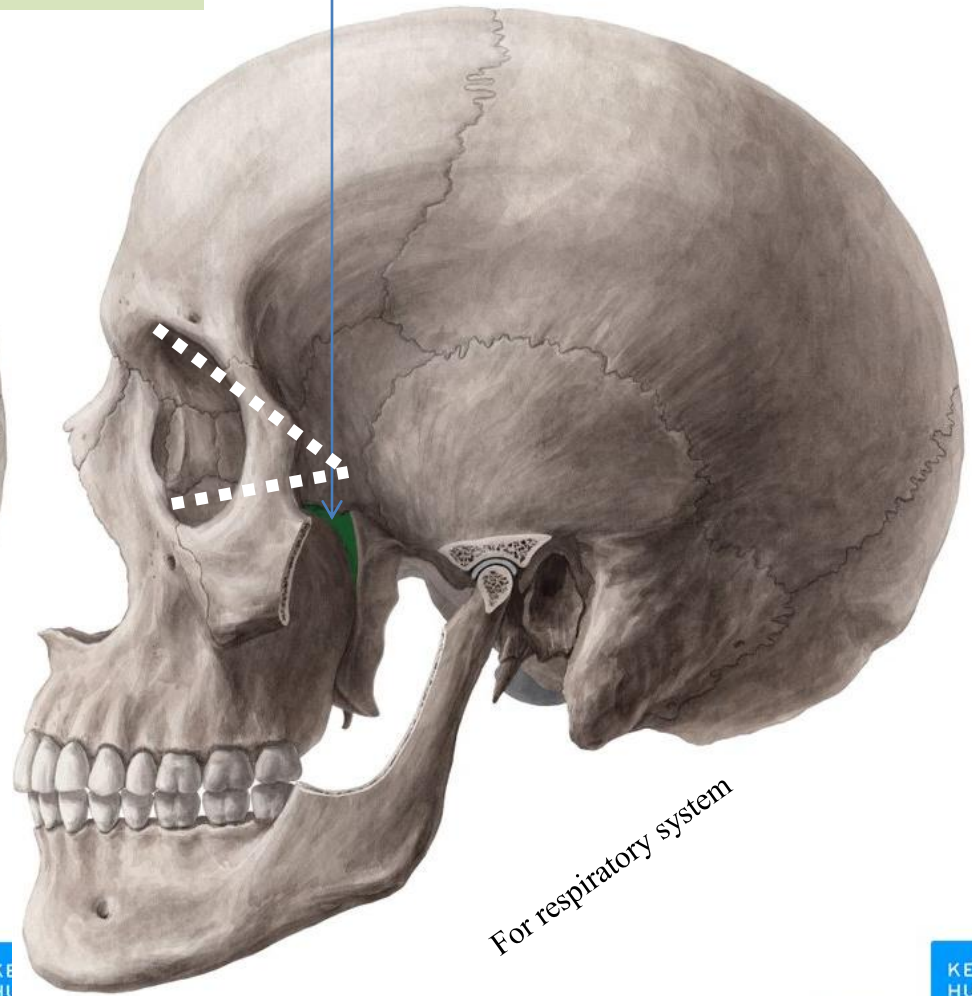
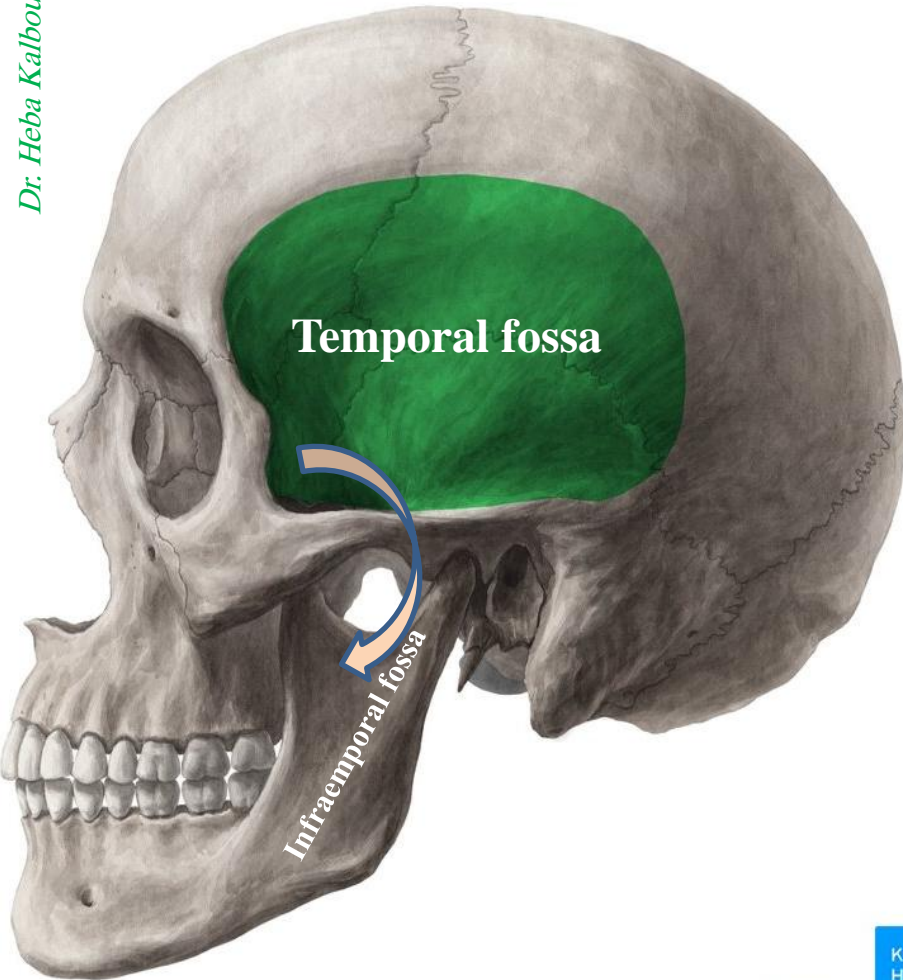
Middle cranial fossa: through foramen ovale and spinosum

Temporal and infratemporal fossae are interconnected spaces on the lateral side of the head

Temporal fossa is superior to the infratemporal fossa above the zygomatic arch

Pterygo-palatine fossa
Lies below the apex of the orbit

Dr. Heba Kalbouneh

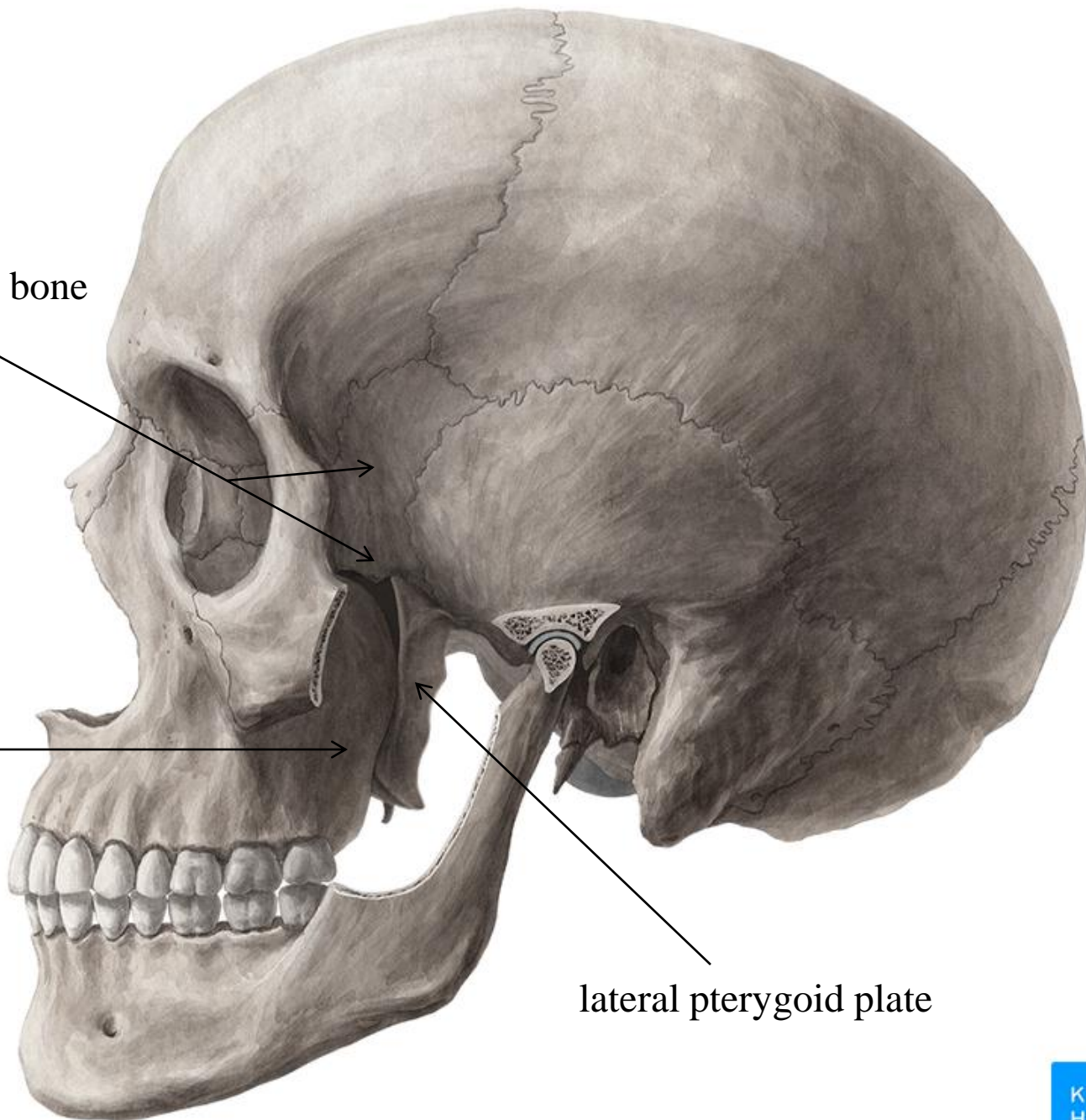


For respiratory system

greater wing of sphenoid bone

Back of the maxilla

lateral pterygoid plate



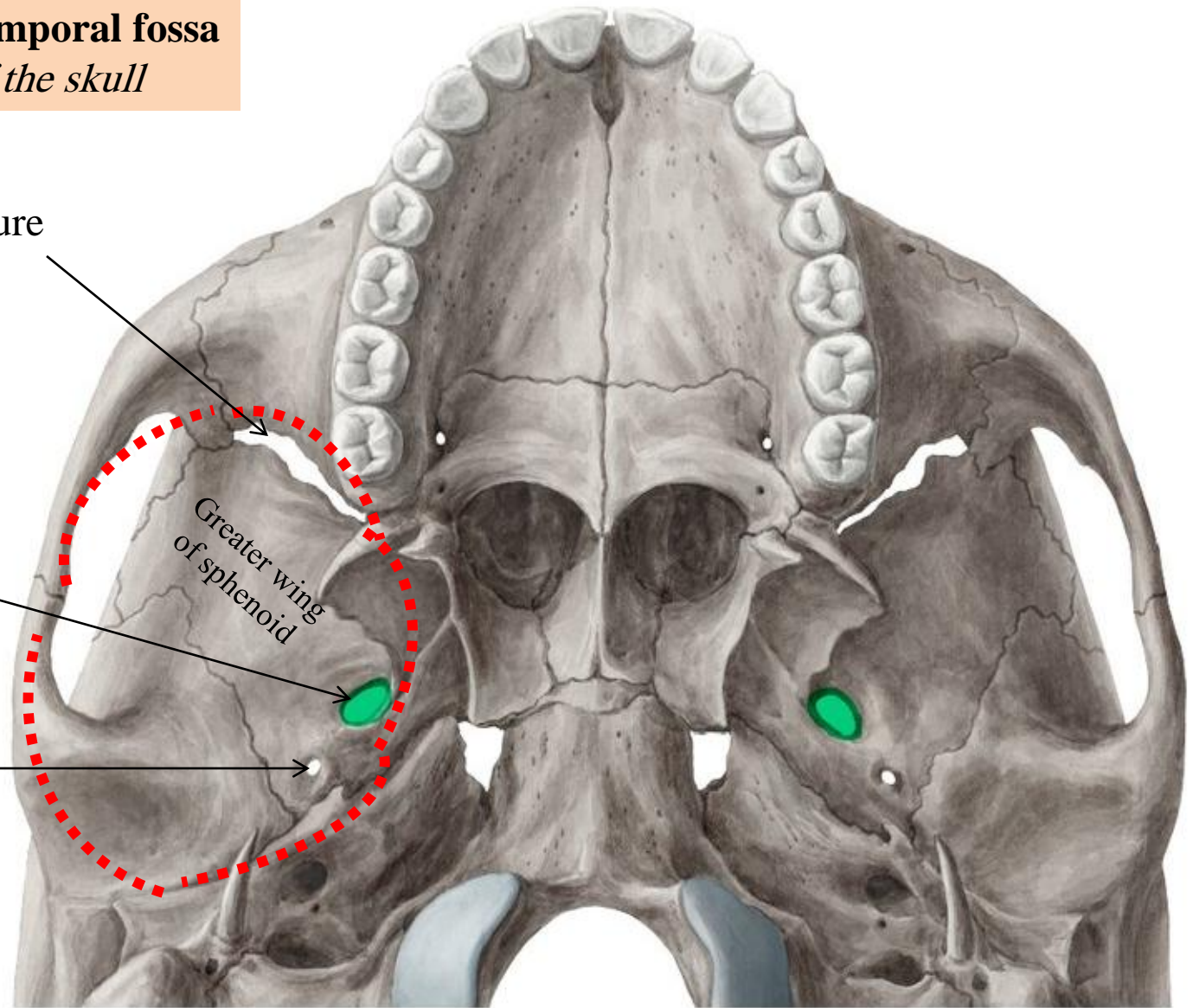
The roof of Infratemporal fossa

Inferior view of the skull

Inferior orbital fissure

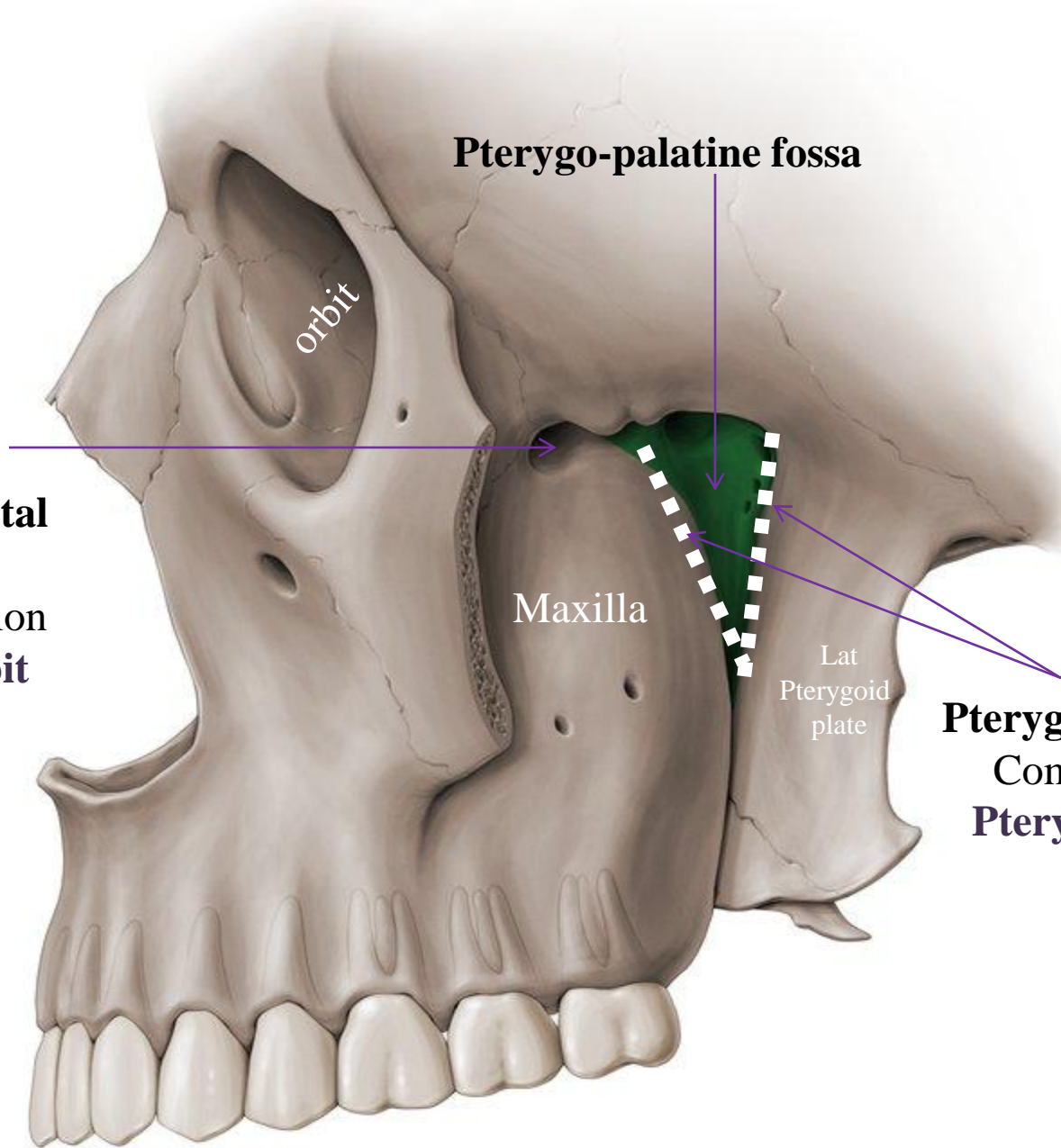
Foramen ovale
(mandibular nerve)

Foramen spinosum
(Middle meningeal
artery)



Note:

The foramen ovale and foramen spinosum open on its roof



Pterygomaxillary fissure is a vertical fissure between the pterygoid plate and back of the maxilla. It leads medially into the pterygopalatine fossa

Inferior orbital fissure
Communication with the **orbit**

Pterygo-palatine fossa

Maxilla

Lat
Pterygoid
plate

Pterygo-maxillary fissure
Communication with
Pterygo-palatine fossa

The medial and anterior walls of Infratemporal fossa

Norma basalis externa

Base of the skull- inferior view

The **hard palate** which is made of:

A-The palatal processes of the maxillae

B-The horizontal plates of the palatine bones

The **choanae** (posterior nasal apertures)

The **vomer**

Medial and lateral pterygoid plates of the sphenoid bone

Occipital condyles

External occipital crest

External occipital protuberance

Superior nuchal line

