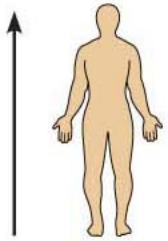
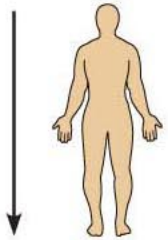
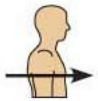
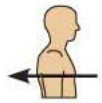
A&P 1
The Skeleton

See lab handouts for the complete listing of what you need to know. Use this to help you study only

Table 1.1 Orientation and Directional Terms (1 of 3)

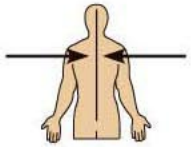
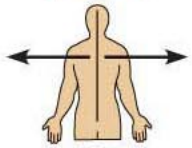
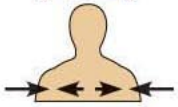
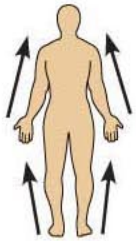
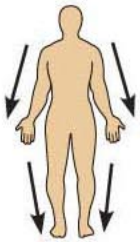
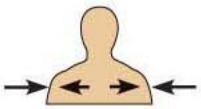
The following table (2 slides) of terms will be used in class for the entire semester, so it will be extremely helpful for you to understand them.

TABLE 1.1 Orientation and Directional Terms

TERM	DEFINITION	EXAMPLE	
Superior (cranial)	Toward the head end or upper part of a structure or the body; above		The head is superior to the abdomen.
Inferior (caudal)	Away from the head end or toward the lower part of a structure or the body; below		The navel is inferior to the chin.
Ventral (anterior)*	Toward or at the front of the body; in front of		The breastbone is anterior to the spine.
Dorsal (posterior)*	Toward or at the back of the body; behind		The heart is posterior to the breast-bone.

*The terms *ventral* and *anterior* are synonymous in humans, but this is not the case in four-legged animals. *Anterior* refers to the leading portion of the body (abdominal surface in humans, head in a cat), but *ventral* specifically refers to the "belly" of a vertebrate animal, so it is the inferior surface of four-legged animals. Likewise, although the dorsal and posterior surfaces are the same in humans, the term *dorsal* specifically refers to an animal's back. Thus, the dorsal surface of four-legged animals is their superior surface.

TABLE 1.1 Orientation and Directional Terms *(continued)*

TERM	DEFINITION	EXAMPLE	
Medial	Toward or at the midline of the body; on the inner side of		The heart is medial to the arm.
Lateral	Away from the midline of the body; on the outer side of		The arms are lateral to the chest.
Intermediate	Between a more medial and a more lateral structure		The collarbone is intermediate between the breastbone and shoulder.
Proximal	Closer to the origin of the body part or the point of attachment of a limb to the body trunk		The elbow is proximal to the wrist.
Distal	Farther from the origin of a body part or the point of attachment of a limb to the body trunk		The knee is distal to the thigh.
Superficial (external)	Toward or at the body surface		The skin is superficial to the skeletal muscles.
Deep (internal)	Away from the body surface; more internal		The lungs are deep to the skin.

OVERVIEW OF THE SKELETON
Part 2 on Handout

The human skeleton is divided into two main groups or categories. The Axial skeleton and Appendicular skeleton

Look over and know Fig. 9.1 *The human skeleton* in your lab book, and know what bones are part of the Axial Skeleton and Appendicular Skeleton

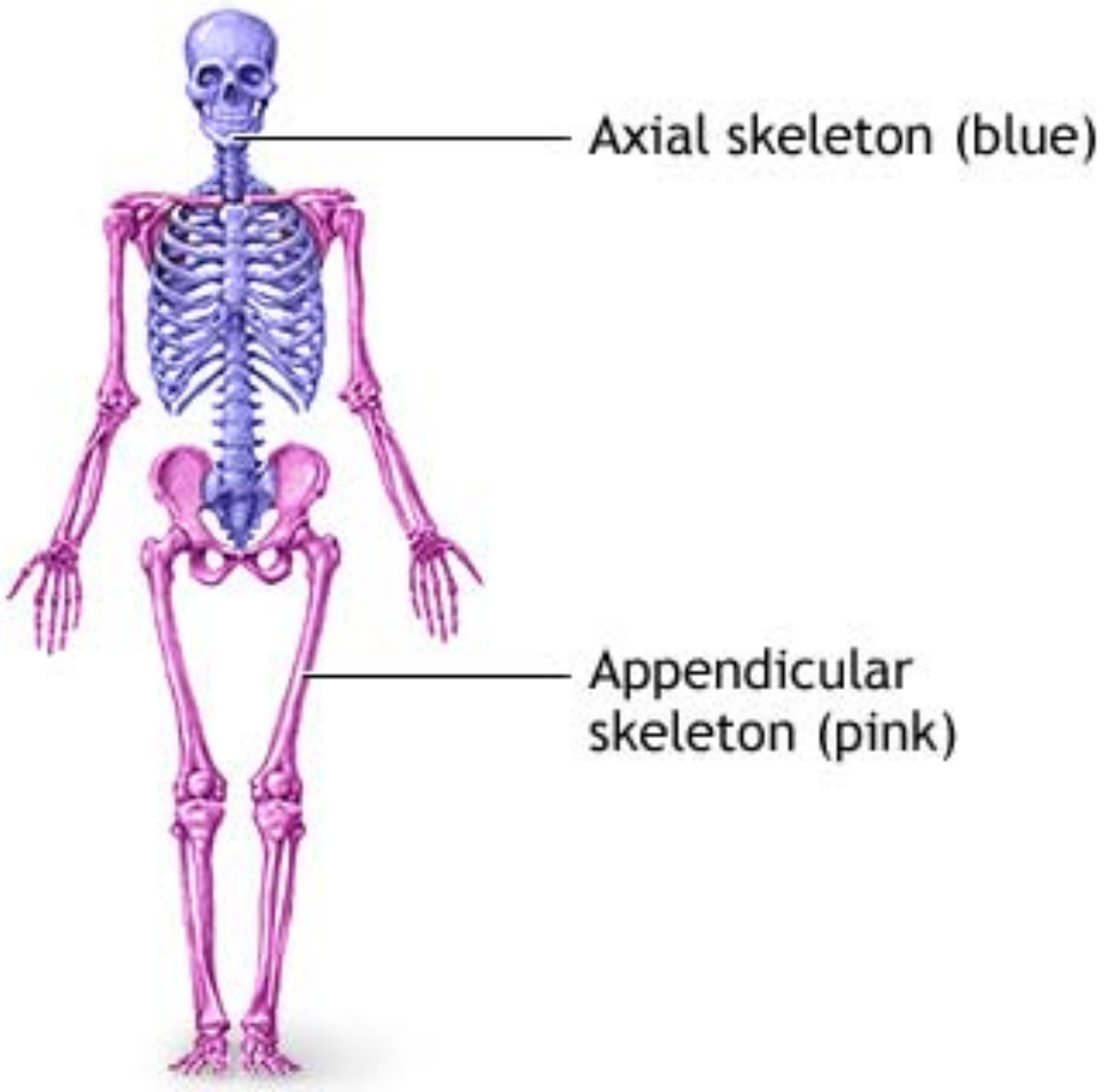


Table 9.1 Bone Markings (1 of 2)

The following table (2 slides) of terms, also found in your lab manual, will help you to find and remember the bone structures. Spend some time understanding them.

NAME OF BONE MARKING	DESCRIPTION	ILLUSTRATIONS
Projections That Are Sites of Muscle and Ligament Attachment		
Tuberosity (too″bĕ-ros′ĭ-te)	Large rounded projection; may be roughened	
Crest	Narrow ridge of bone; usually prominent	
Trochanter (tro-kan′ter)	Very large, blunt, irregularly shaped process (the only examples are on the femur)	
Line	Narrow ridge of bone; less prominent than a crest	
Tubercle (too′ber-kl)	Small rounded projection or process	
Epicondyle (ep″ĭ-kon′dīl)	Raised area on or above a condyle	
Spine	Sharp, slender, often pointed projection	
Process	Any bony prominence	

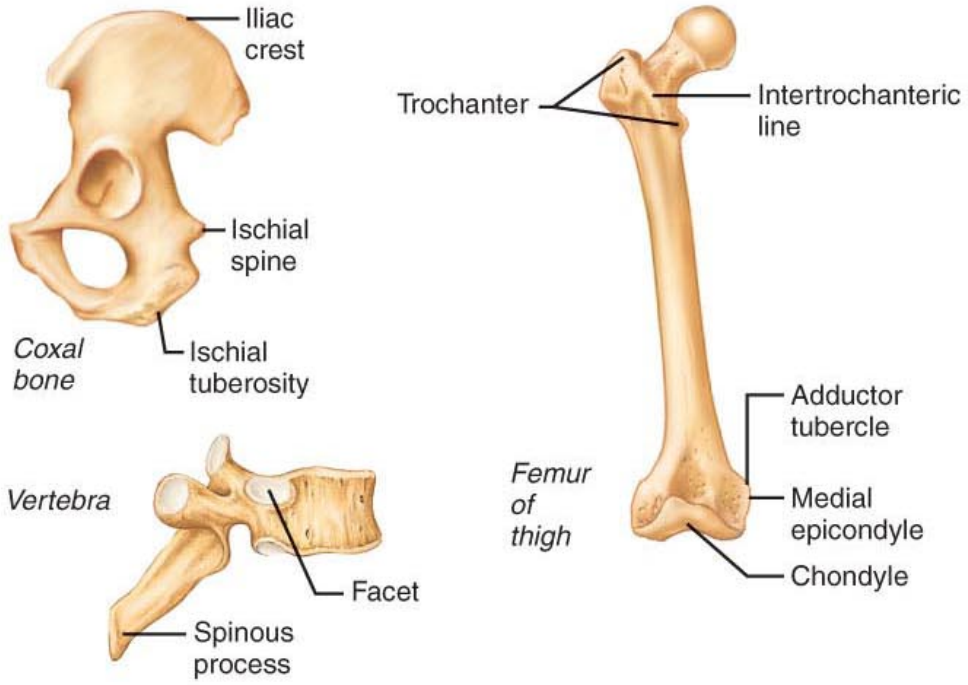
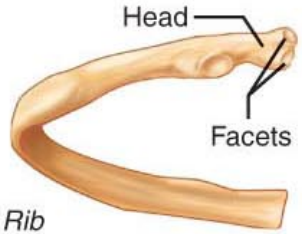
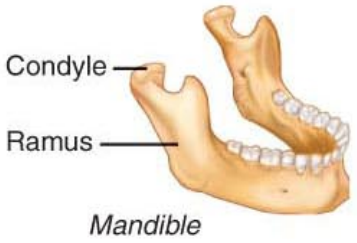
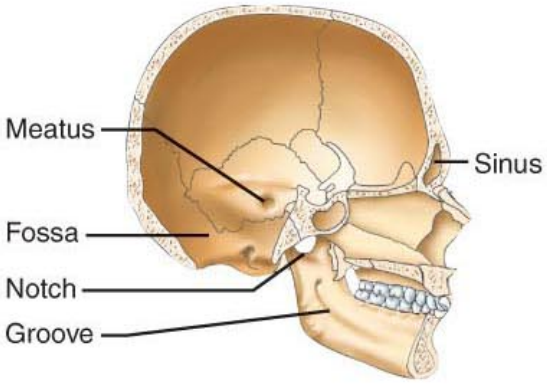


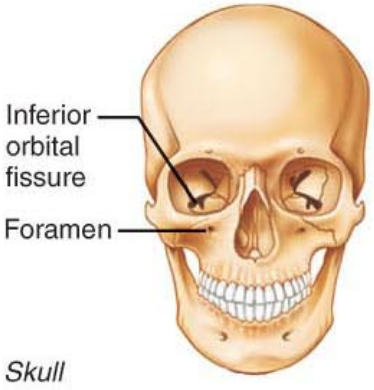
Table 9.1 Bone Markings (2 of 2)

NAME OF BONE MARKING	DESCRIPTION	ILLUSTRATIONS
Projections That Help to Form Joints		
Head	Bony expansion carried on a narrow neck	
Facet	Smooth, nearly flat articular surface	
Condyle (kon′dīl)	Rounded articular projection	
Ramus (ra′mus)	Armlike bar of bone	
Depressions and Openings		
For Passage of Blood Vessels and Nerves		
Groove	Furrow	
Fissure	Narrow, slitlike opening	
Foramen (fo-ra′men)	Round or oval opening through a bone	
Notch	Indentation at the edge of a structure	
Others		
Meatus (me-a′tus)	Canal-like passageway	
Sinus	Cavity within a bone, filled with air and lined with mucous membrane	
Fossa (fos′ah)	Shallow, basinlike depression in a bone, often serving as an articular surface	









Name the **type** of bone indicated

Name the **structure** indicated

Long Bone Question Examples

Name the **region** of the bone indicated by the …

The structure of a long bone

In the lab, there is one long bone that is cut in half. This is how questions will be phrased about it.

Axial Skelton

The axial skeleton forms the central axis of the body. It consists of the skull, the vertebral column, the ribs and the sternum

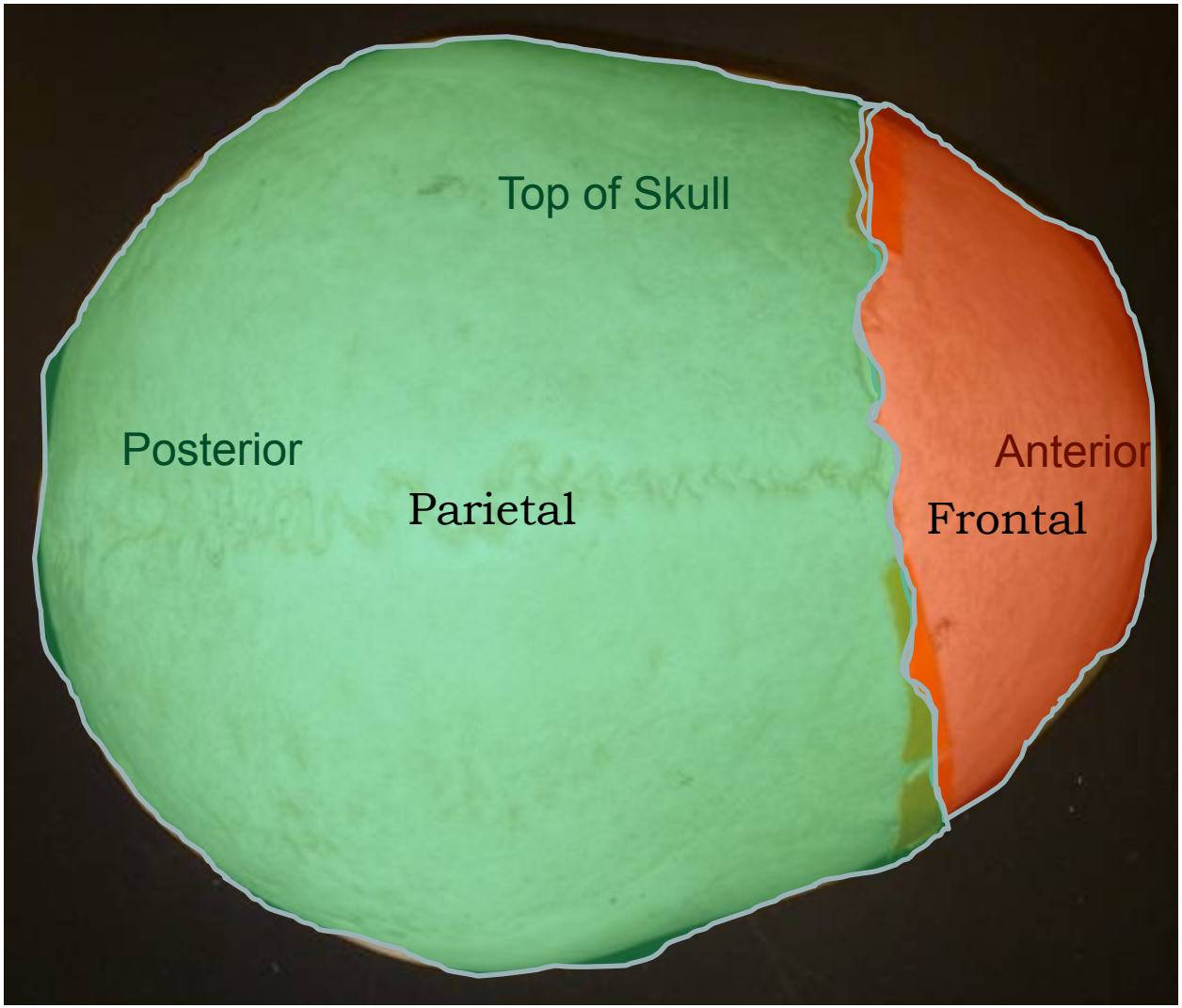
Use the lab Manual and PAL to learn to identify the bones, **structures, specific bones, sutures,** and **ribs** that are on the handout. Remember if it is not on the handout you do not need to know it.

Types of Questions

- Name of bone- There are several bones you will need to identify, and these are red on your lab handout. We will have a piece of tape on the bone and ask you to name the bone indicated by the ….
- Name of specific bone-There are a few bones that are made of other bones fused together. These are green on your lab handout. Questions concerning these bones will be worded "name the specific bone indicated by the …". With these questions, be sure you **do not** give the name of the whole bone.
- Name of Structure- most of the bones (but not all) have structures, or characteristics, that you need to know. These are blue on your lab handout. Here, you would name the specific structure, **not** the bone that it is on.
- Name of Suture- Sutures are the junctions where skull bones come together. There are 4 of these listed on your handout, and would be the answer to "name the suture indicated by the…"

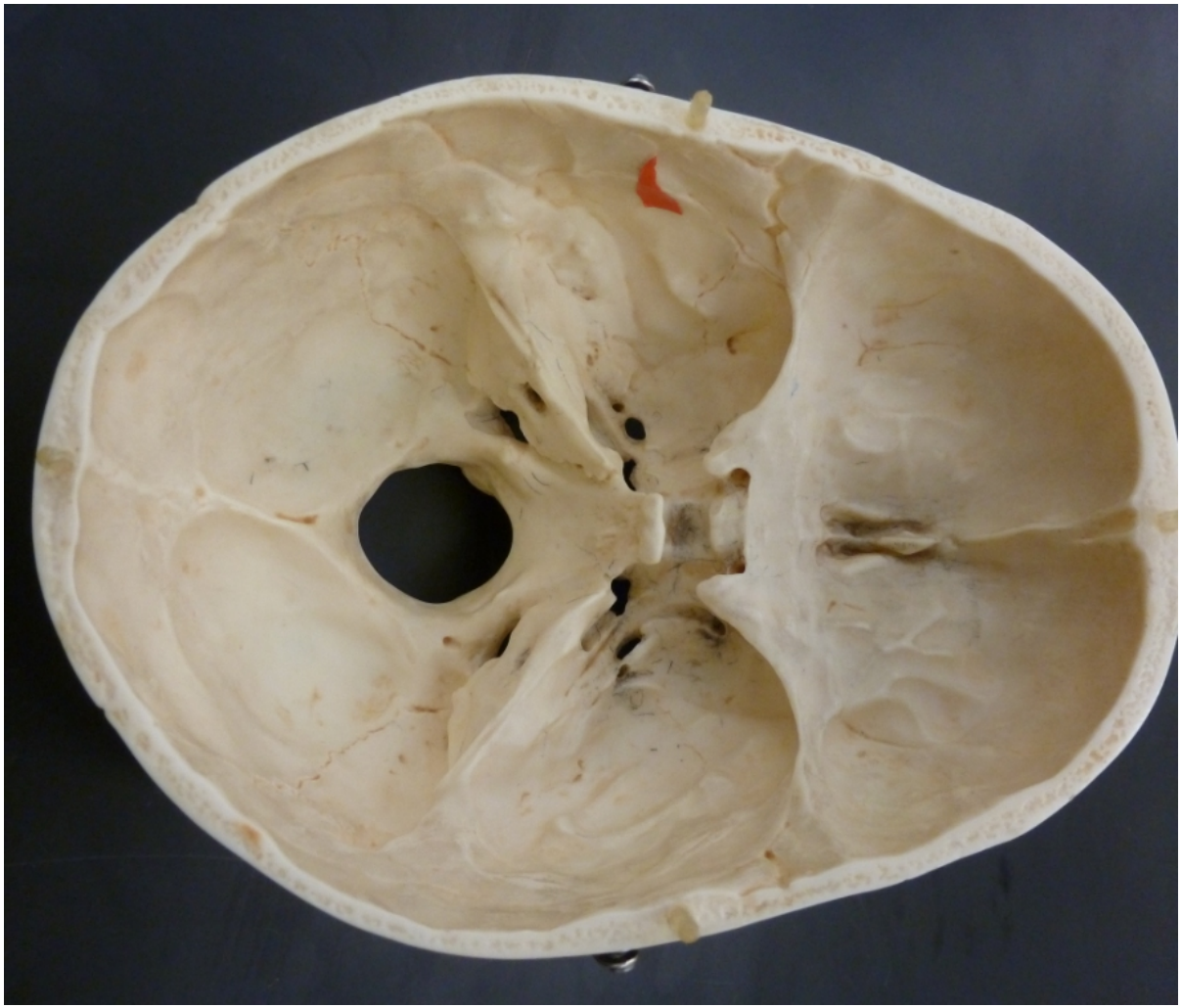
When learning the bones and structures of the skull be careful that the area you are looking at and the picture you are using match. Most of the confusion comes from using the pictures to locate the bones, but looking at a different view on the skull

Looking from the top you can see the Frontal bone and Parietal bones



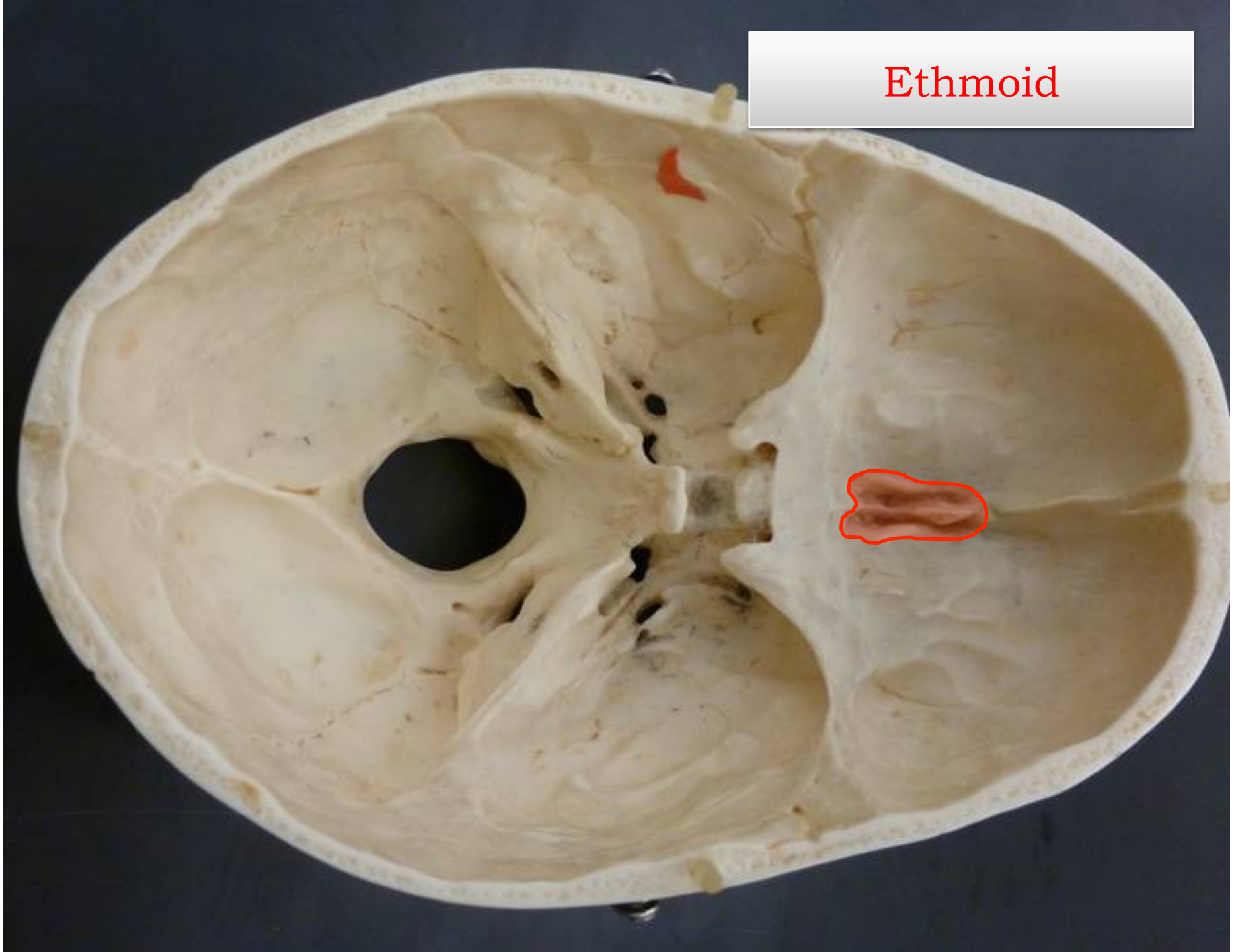
Removing the top you can see the other side of the Frontal bone, along with the Sphenoid, Ethmoid, Temporal and Occipital bones .

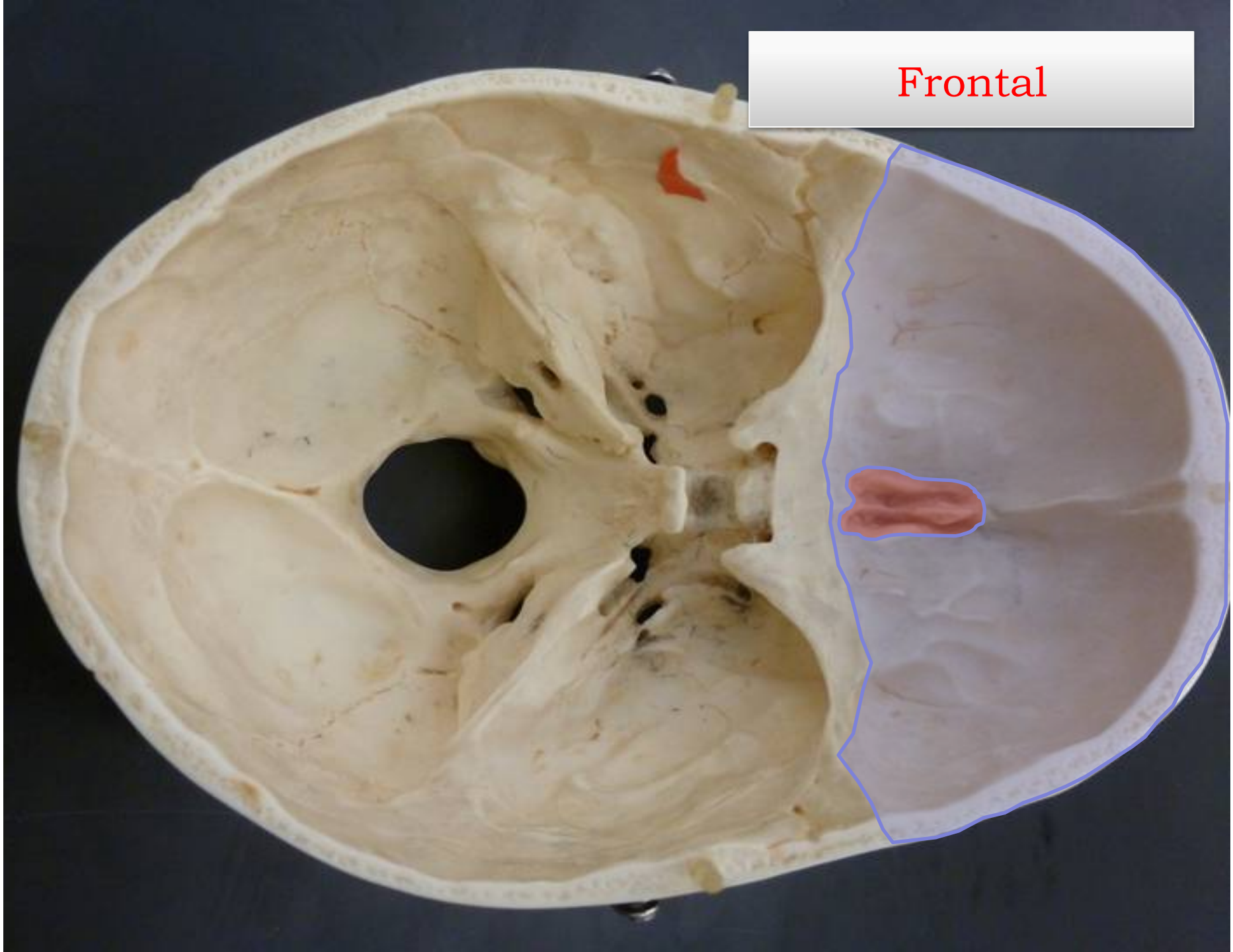
Note you can **not** see teeth in this view.

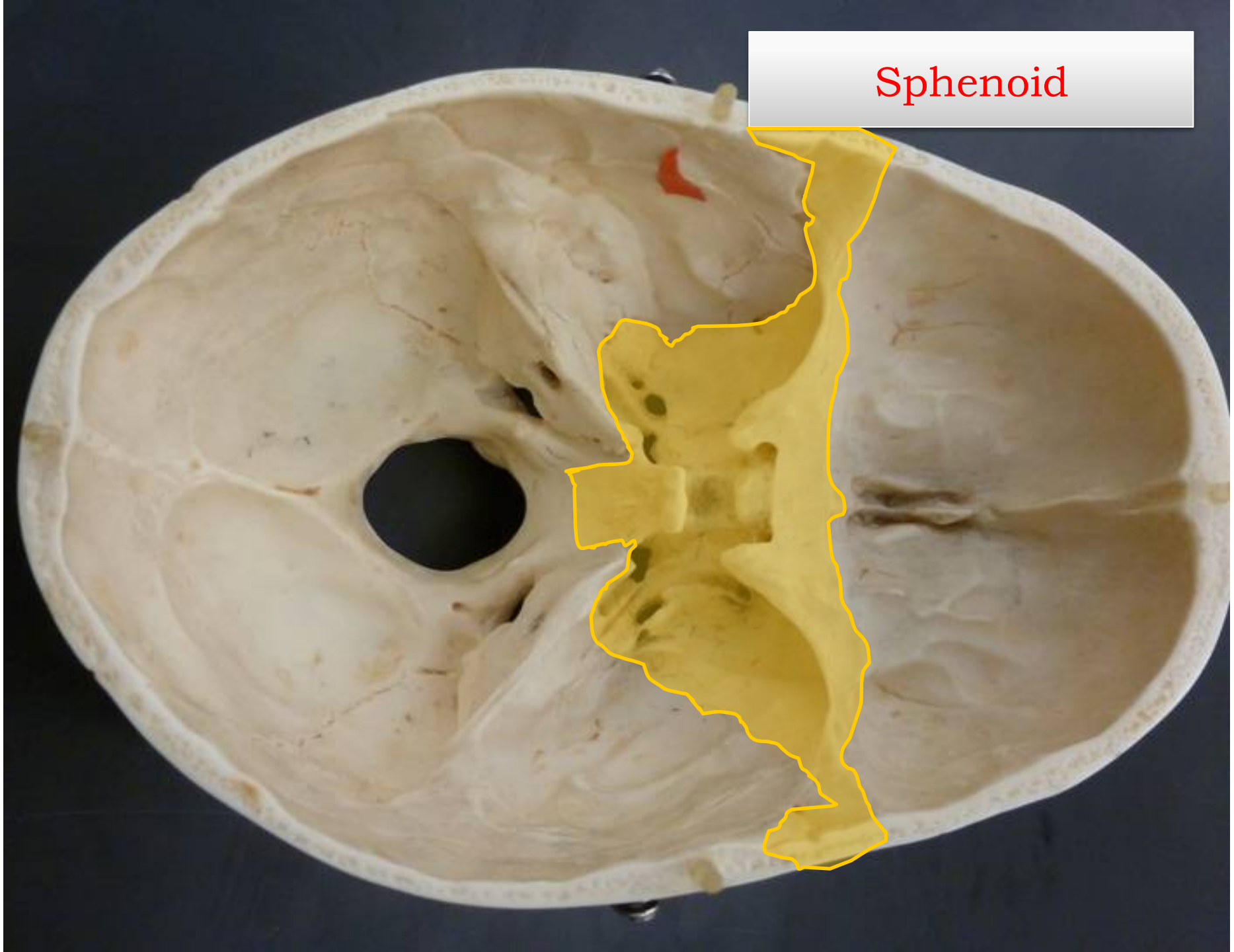


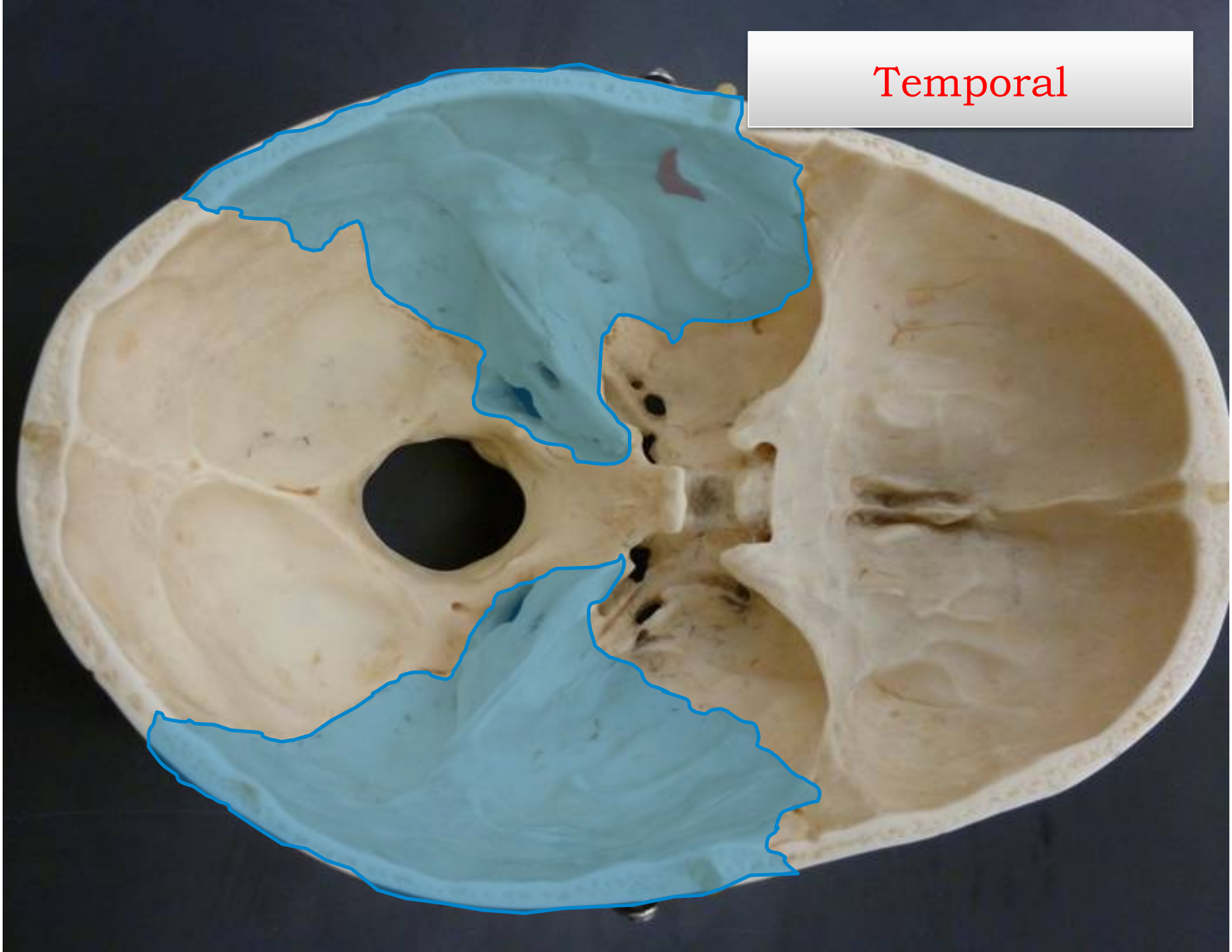
Posterior

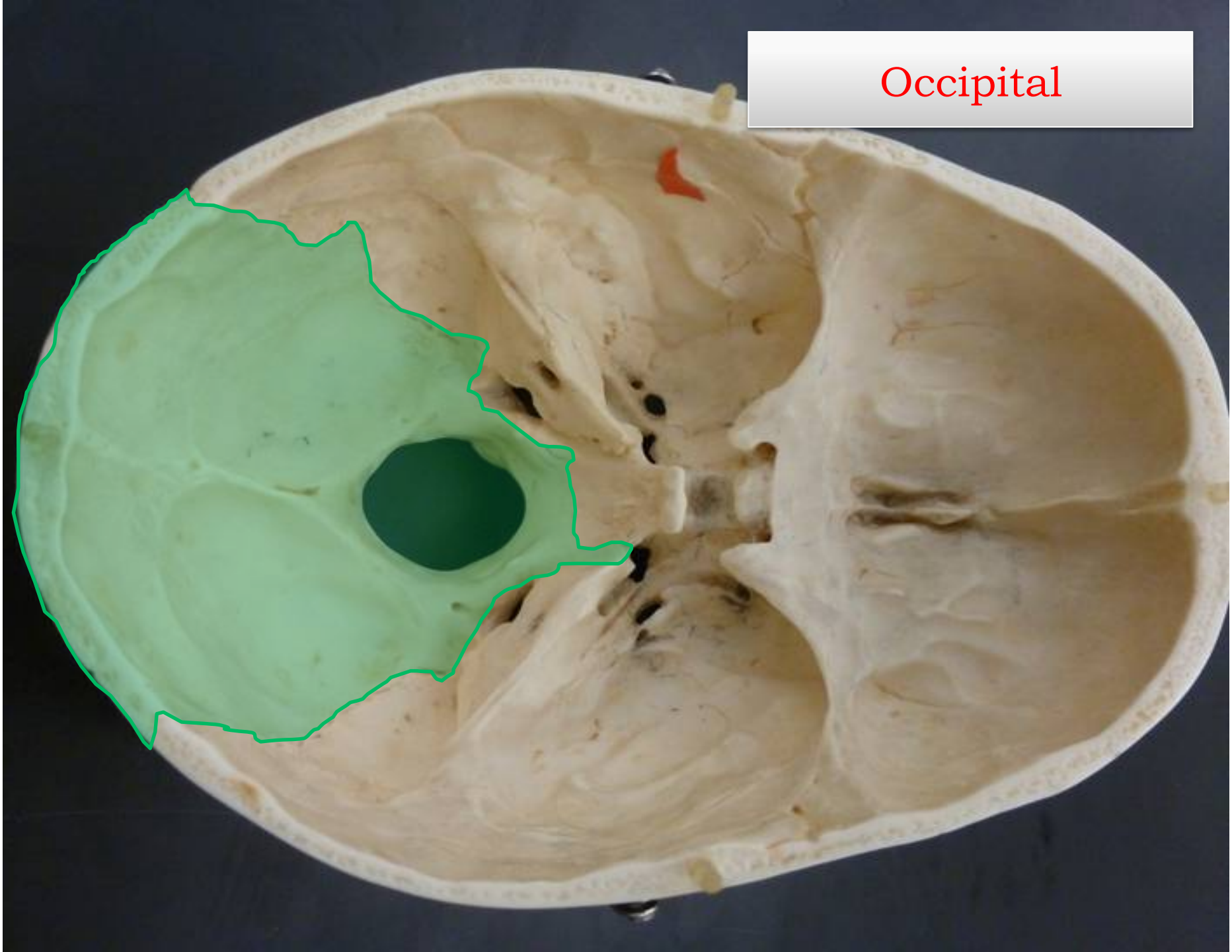
Anterior


Ethmoid


Frontal


Sphenoid


Temporal


Occipital

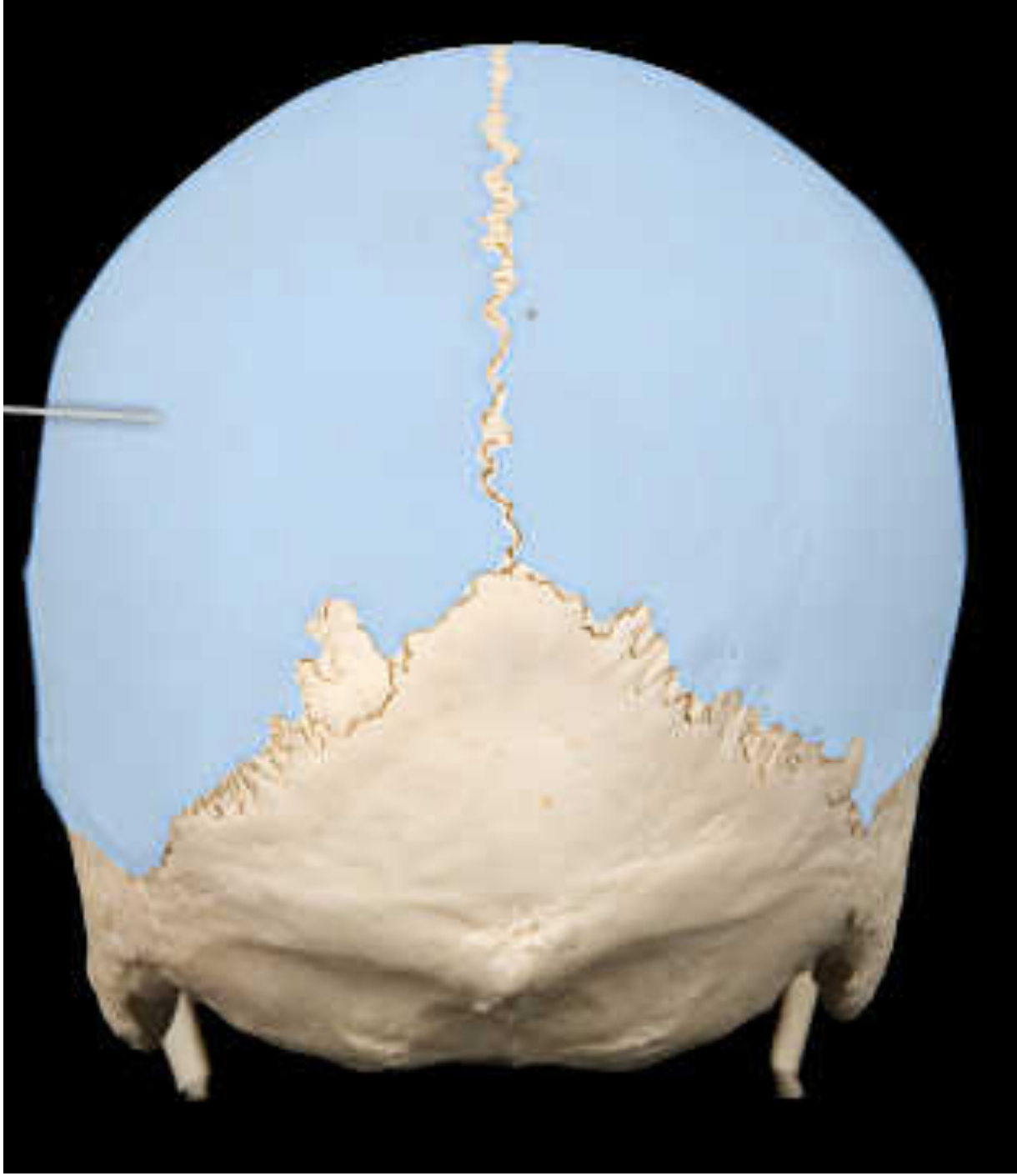
Posterior View of the skull (the back of the head)

Posterior View of the skull (the back of the head)

Here you can see the Occipital bone

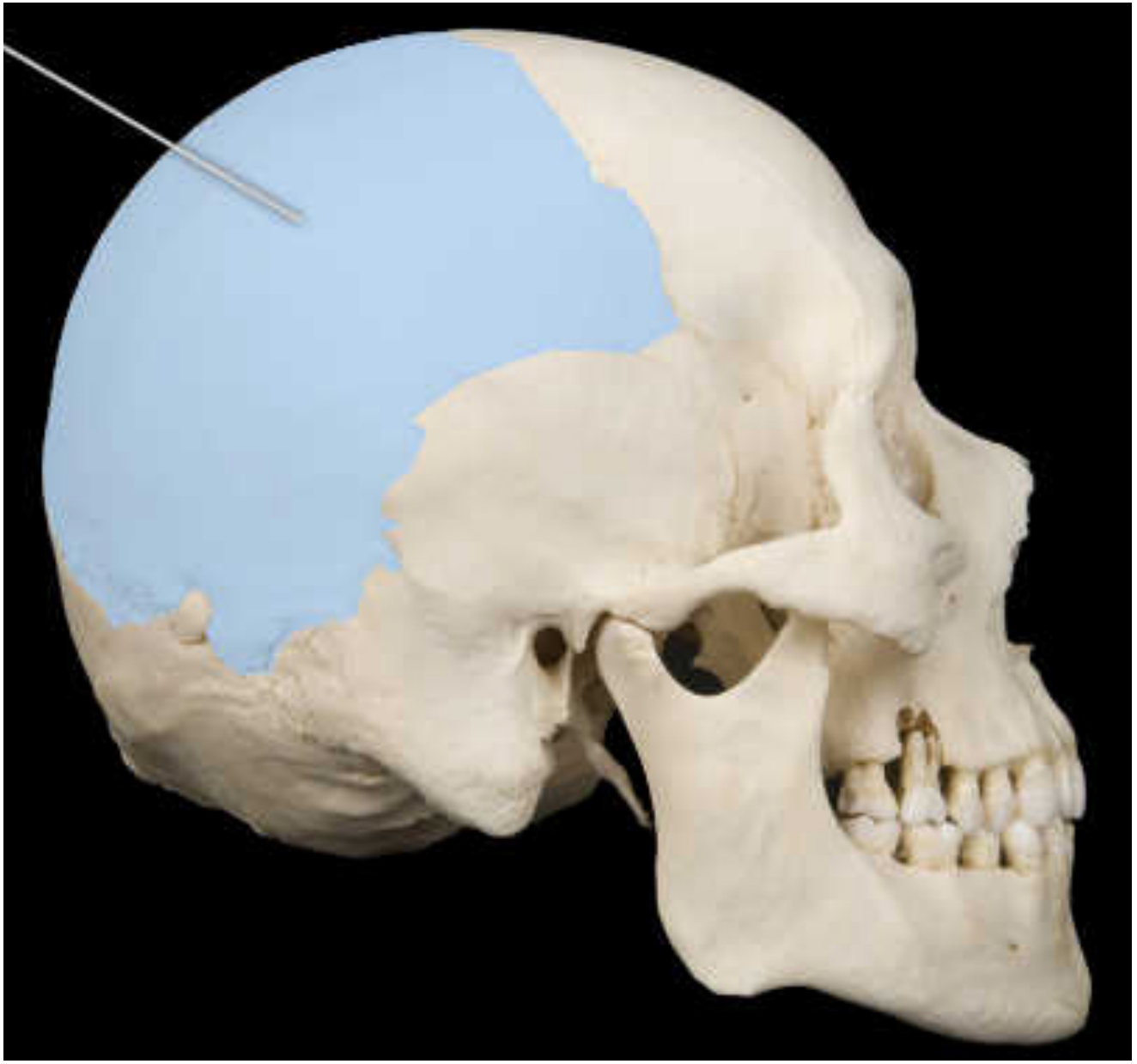
Posterior View of the skull (the back of the head)

And the Parietal bones again



Lateral View of the skull (the side of the head)

Here you can see the Parietal bones again (note you can see the same bones in many views)



Lateral View of the skull (the side of the head)

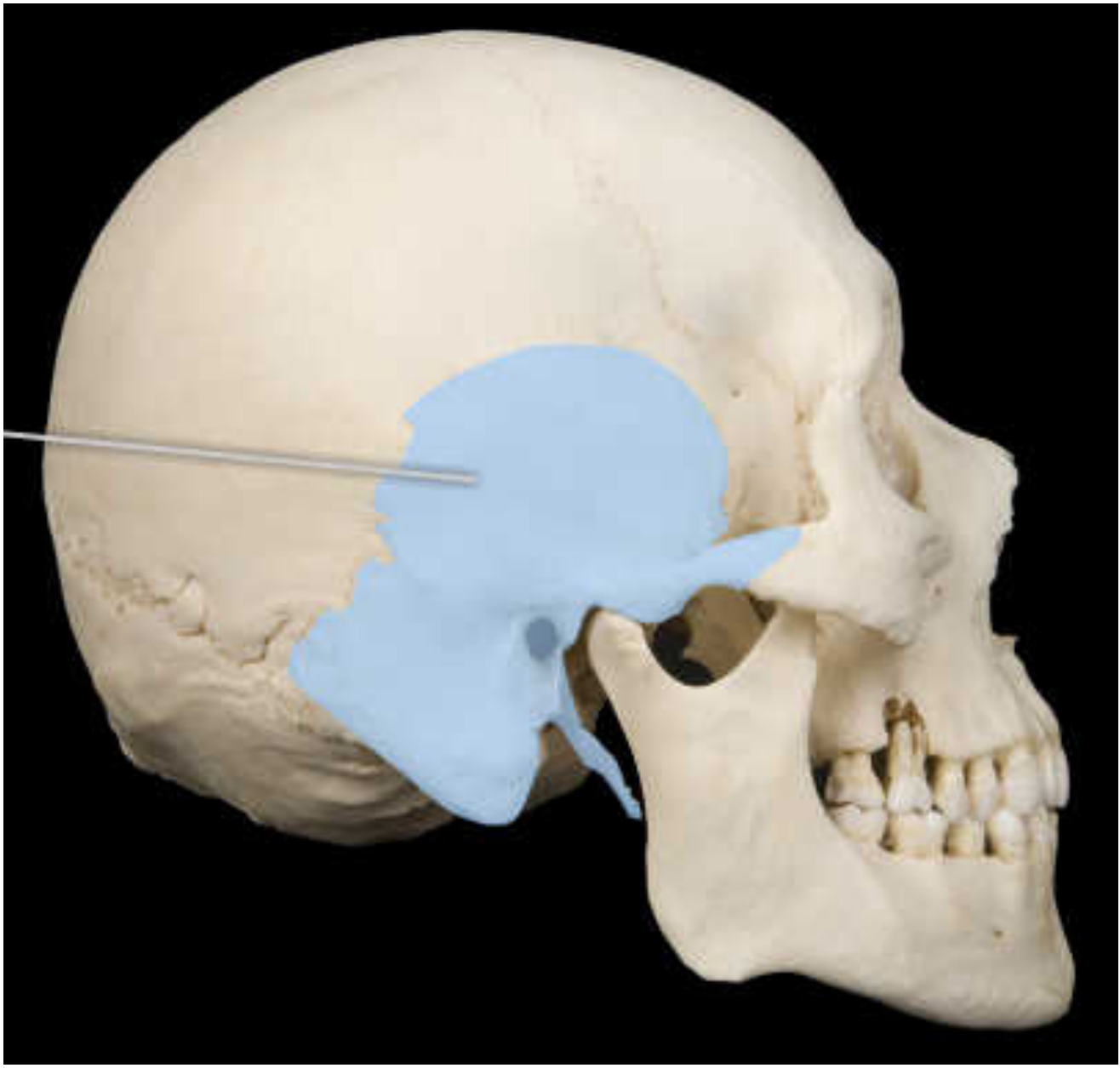
The Occipital bone again

Lateral View of the skull (the side of the head)

And the Frontal bone again

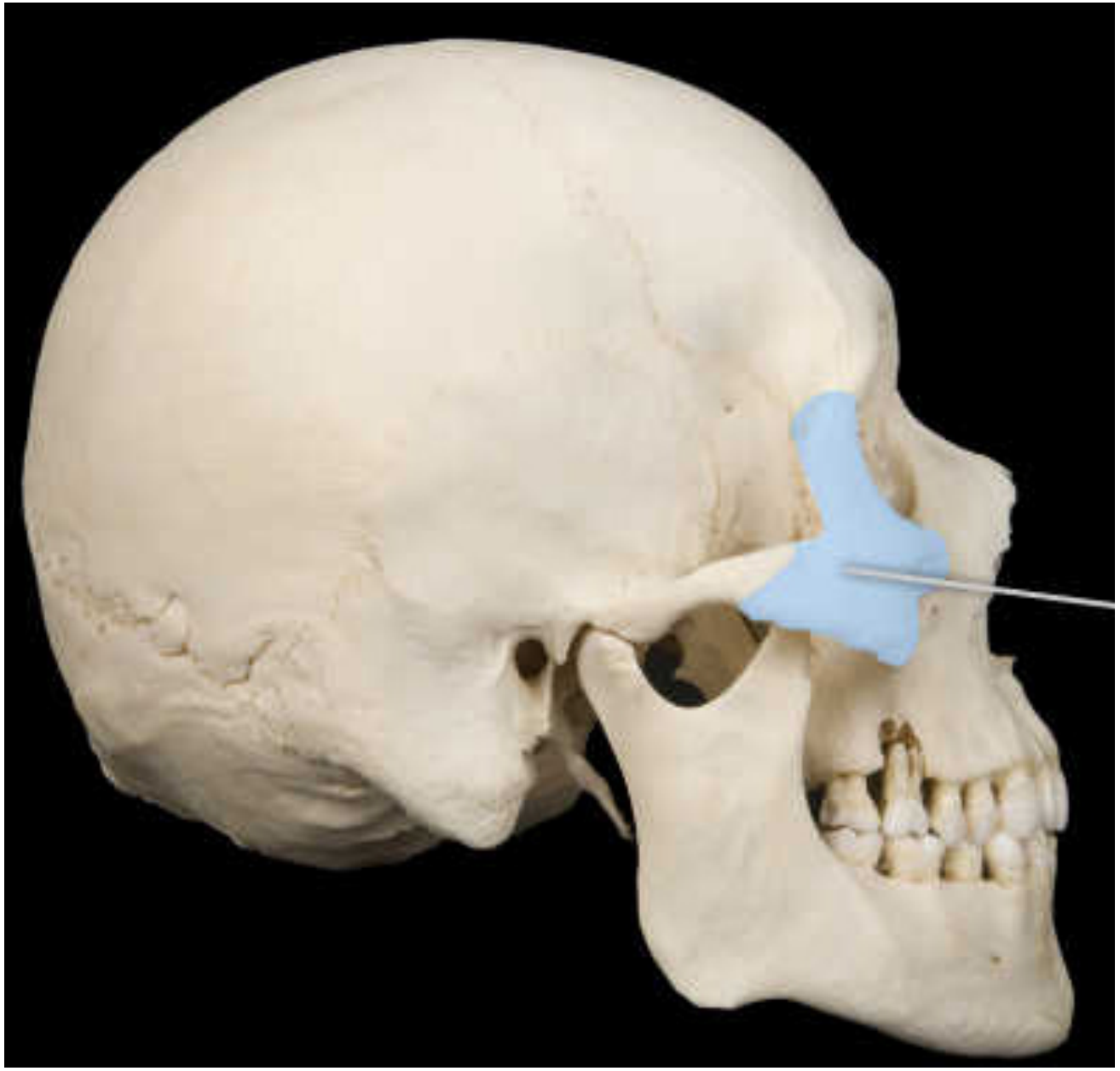
Lateral View of the skull (the side of the head)

But you can also see the Temporal bone



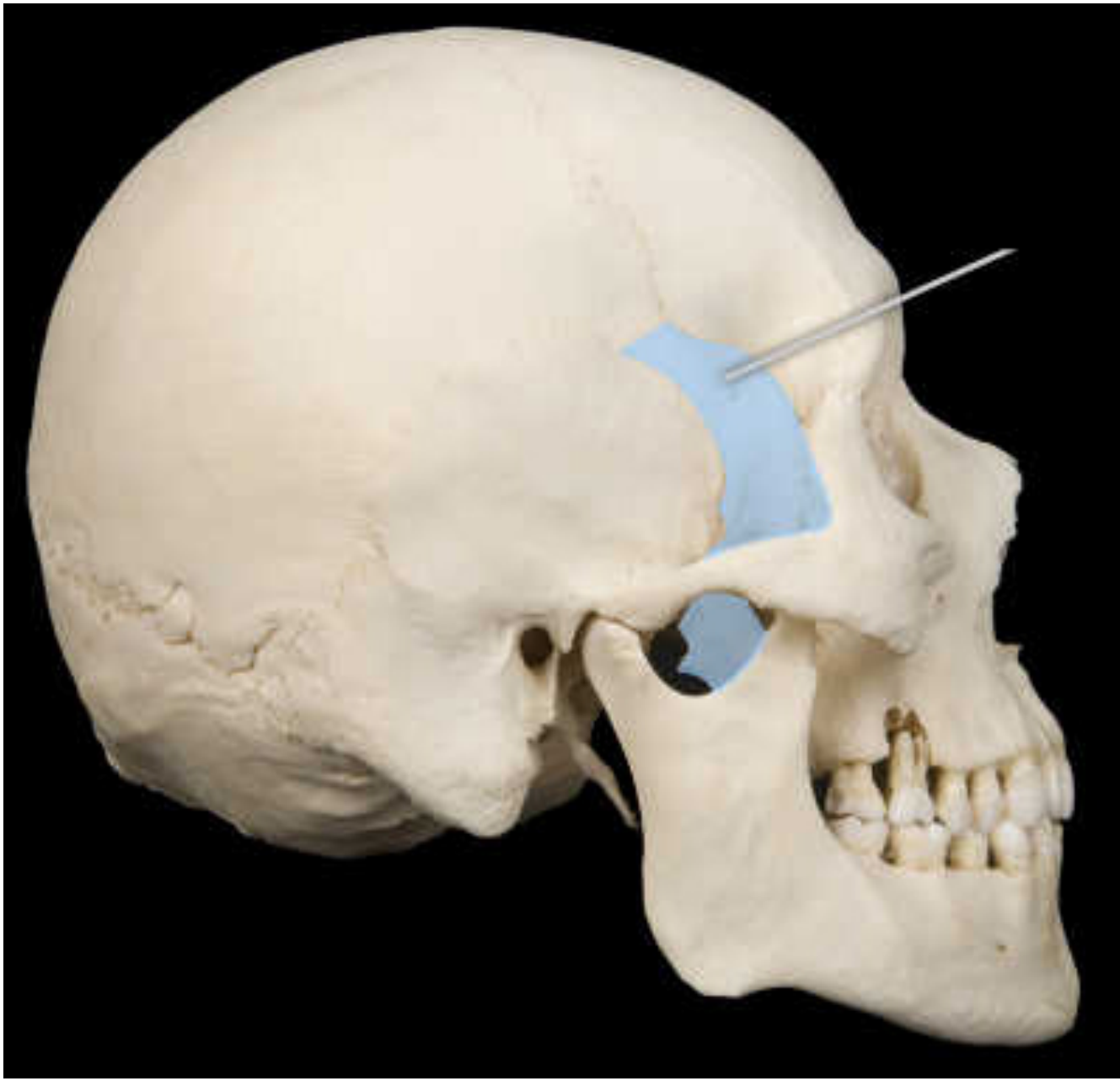
Lateral View of the skull (the side of the head)

The Zygomatic bone



Lateral View of the skull (the side of the head)

The Sphenoid bone



Lateral View of the skull (the side of the head)

The Maxilla bone

Lateral View of the skull (the side of the head)

And the Mandible

Anterior View of the skull (the front of the head)

Here you can see the Frontal bone again

Anterior View of the skull (the front of the head)

The Zygomatic bone again

Anterior View of the skull (the front of the head)

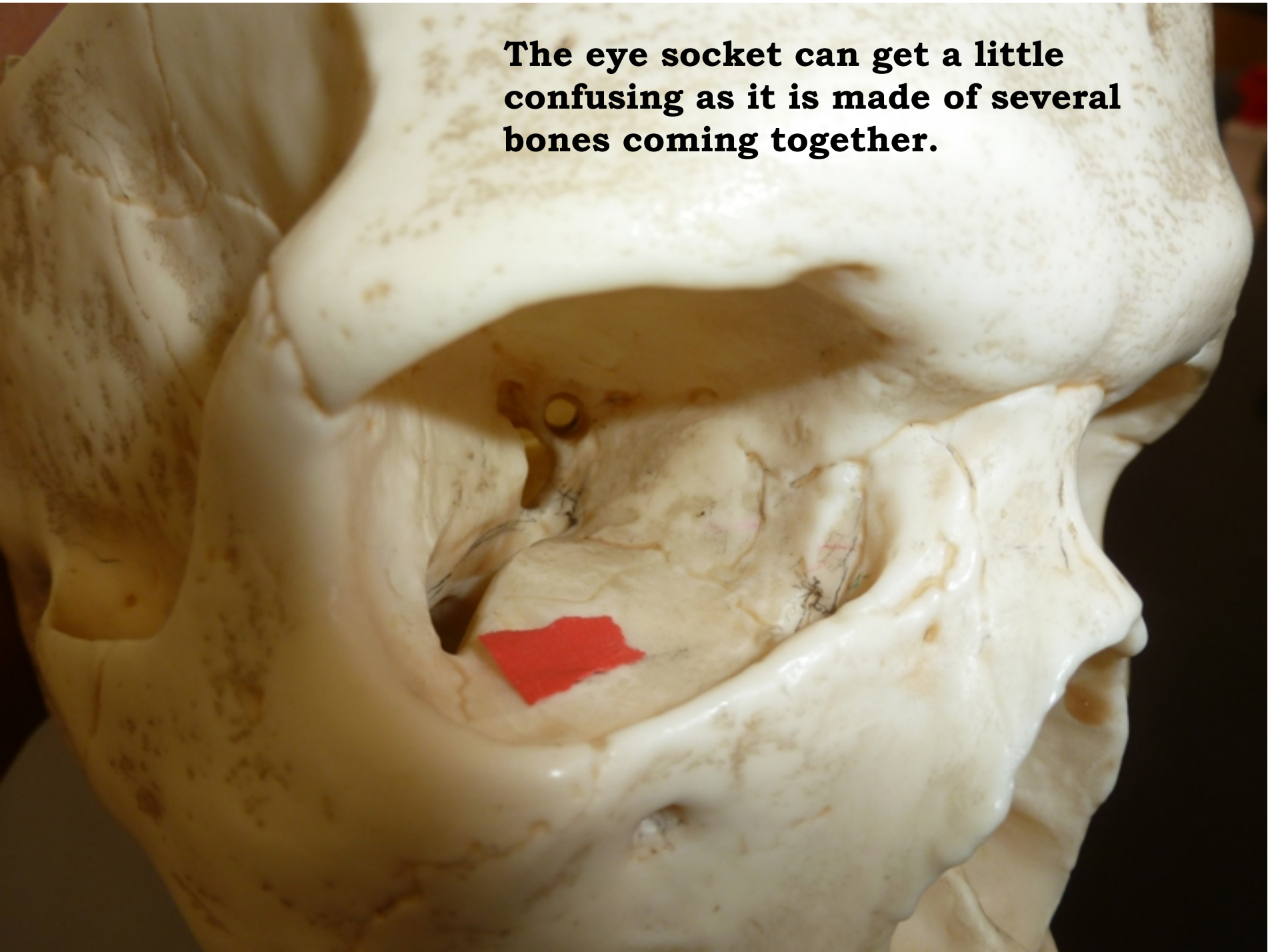
The Maxilla bone again

Anterior View of the skull (the front of the head)

And the Mandible again

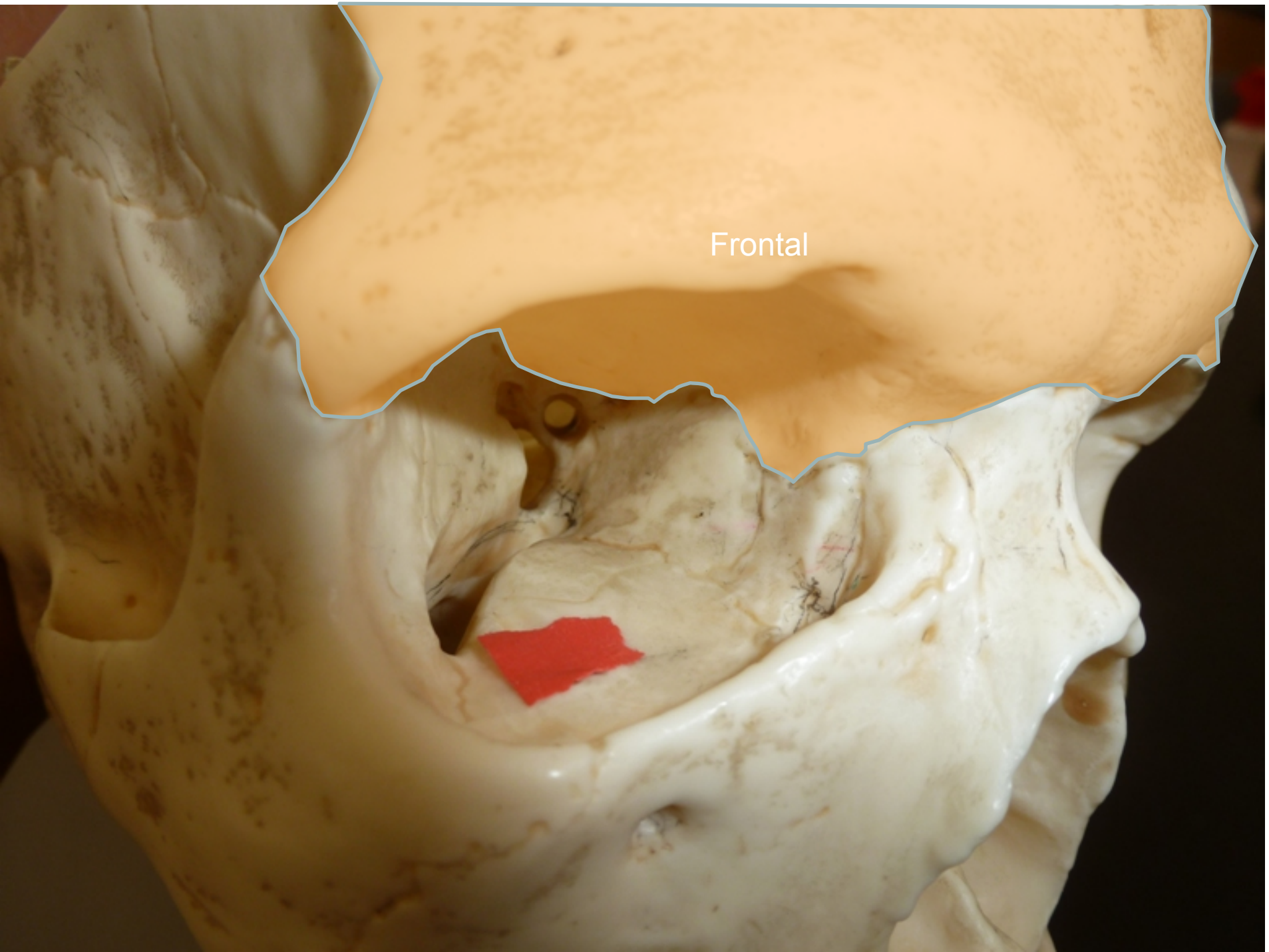
Anterior View of the skull (the front of the head)

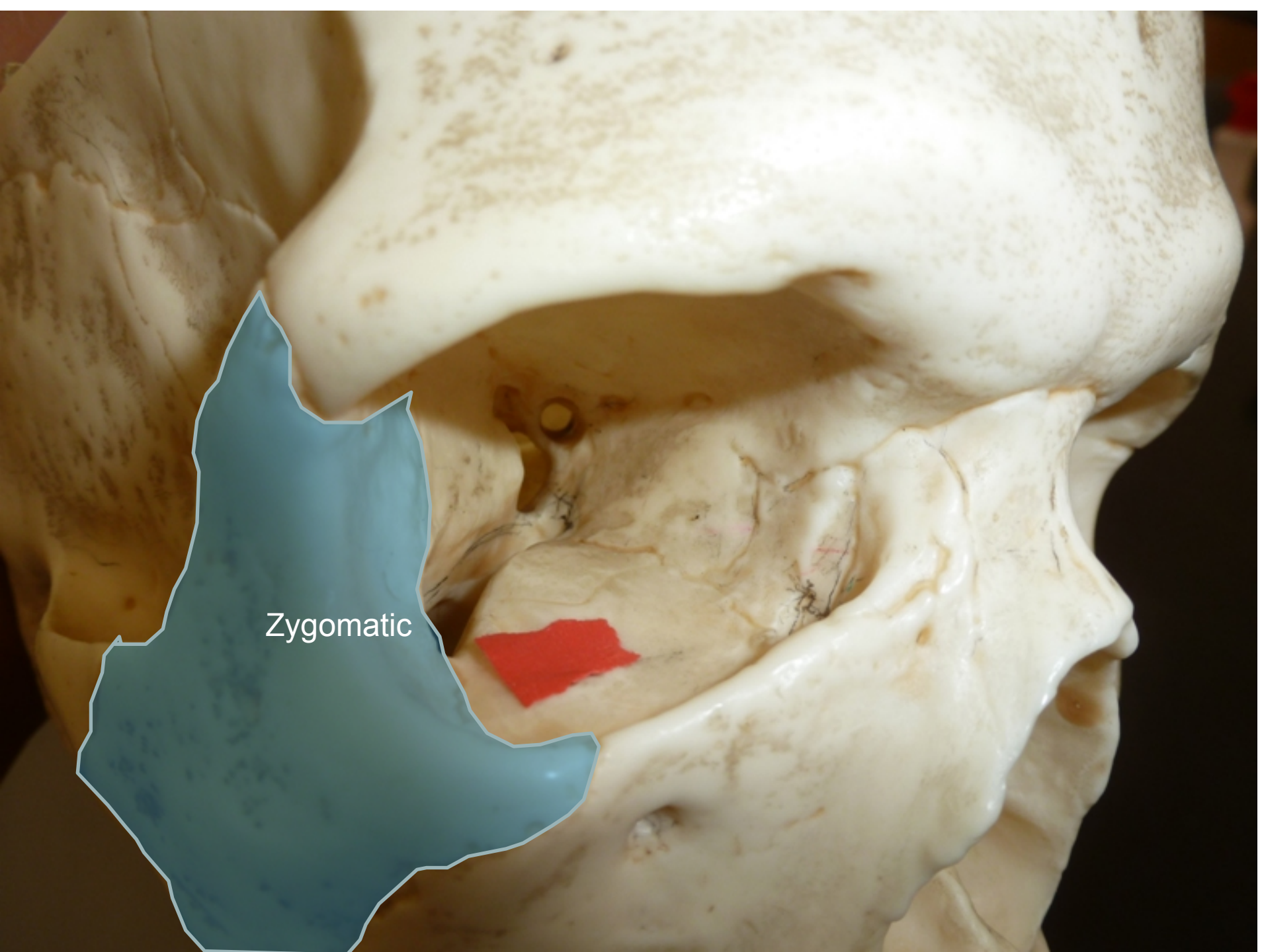
But you can also see the Nasal bone

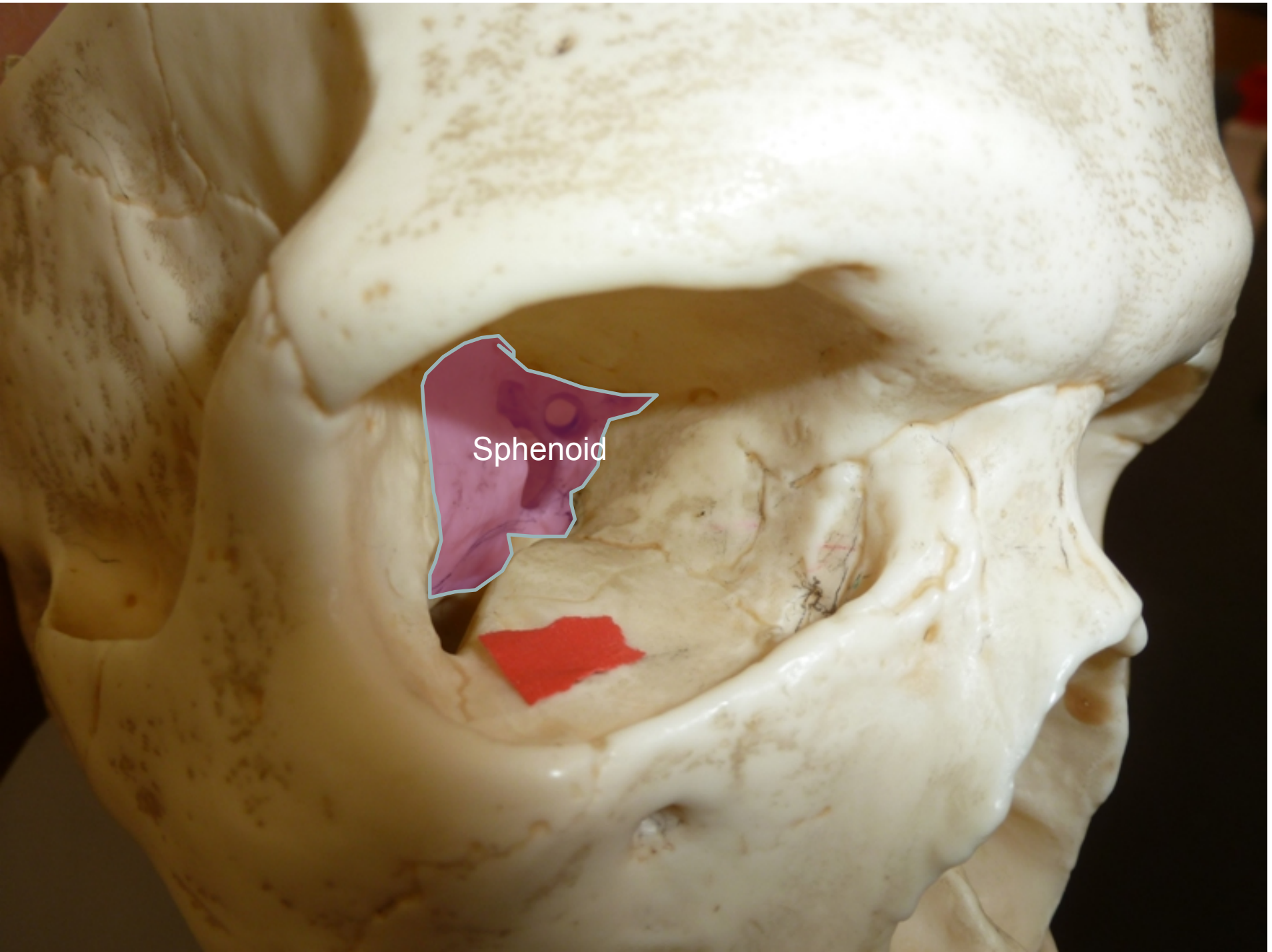

The eye socket can get a little confusing as it is made of several bones coming together.

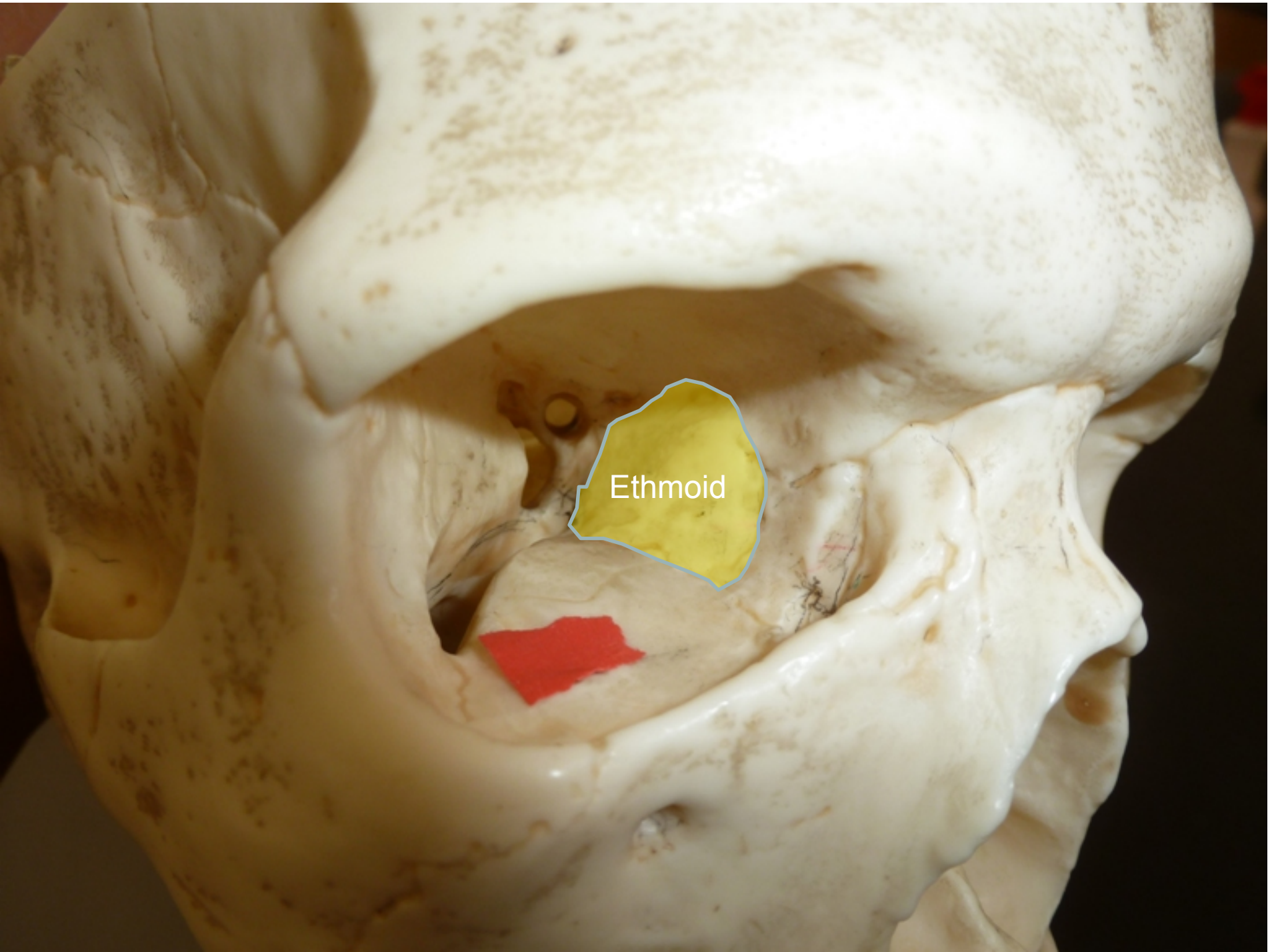

Nasal

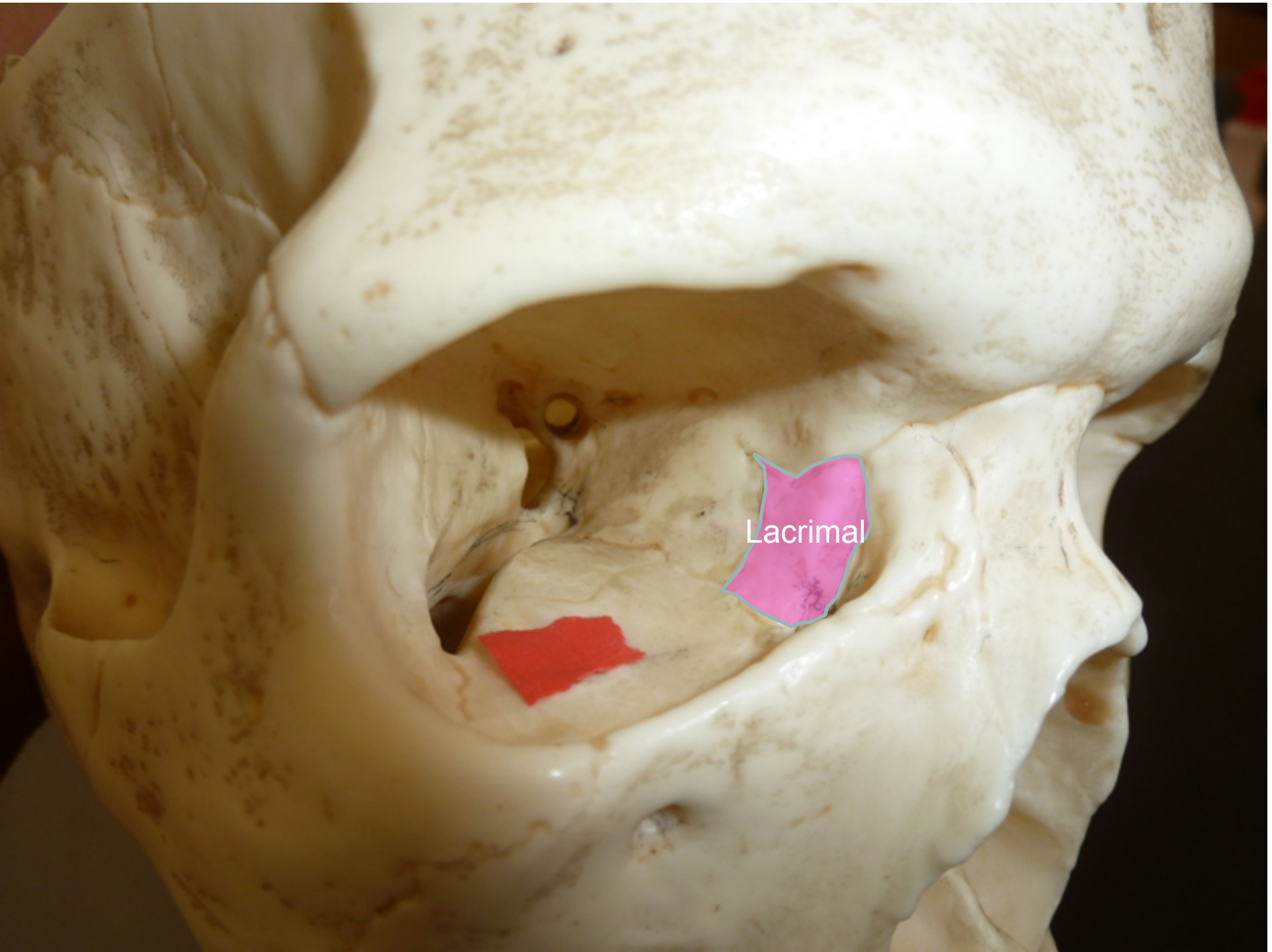

Maxilla

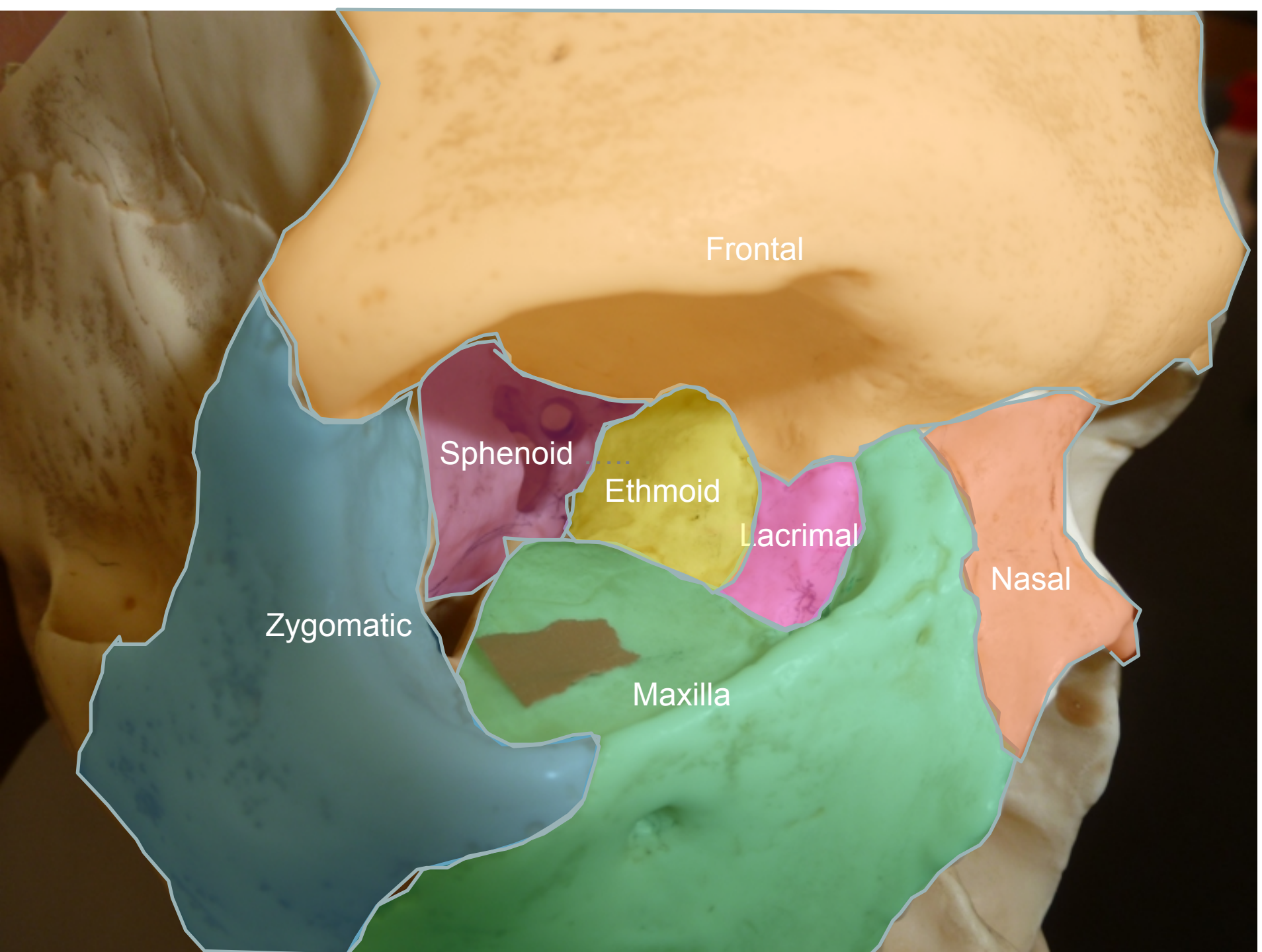

Frontal

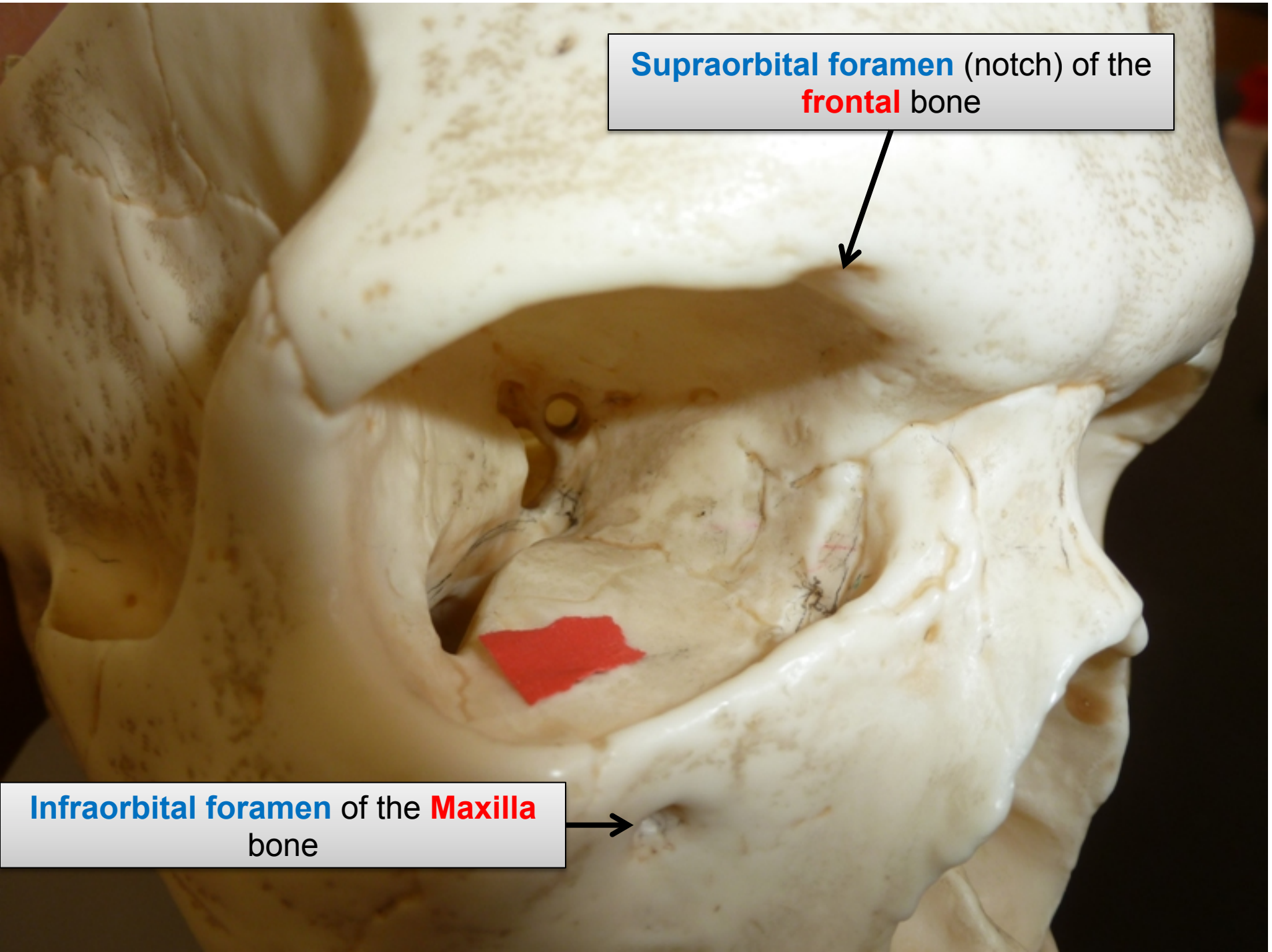

Zygomatic


Sphenoid


Ethmoid

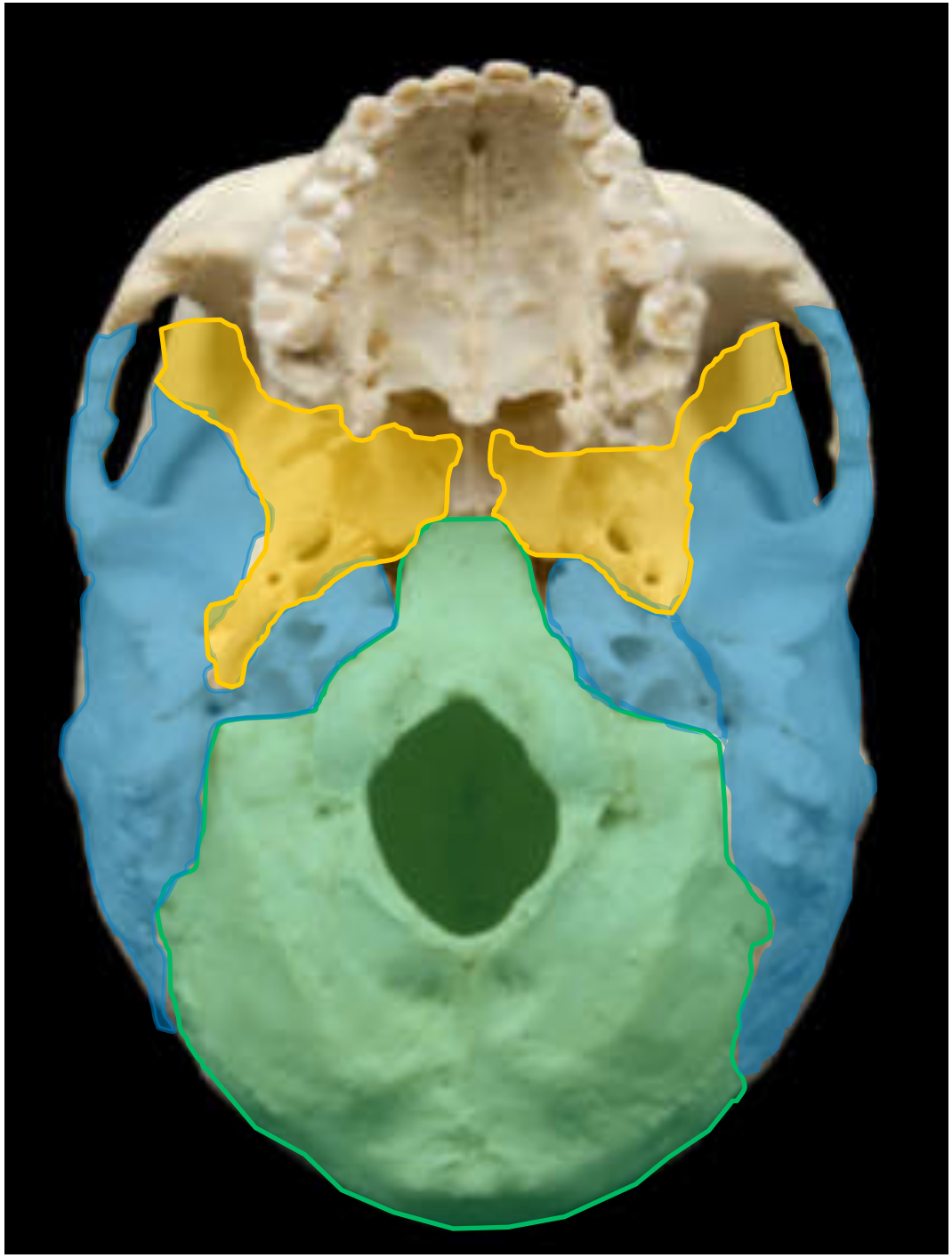

Lacrimal


Frontal
Sphenoid
Ethmoid
Lacrimal
Nasal
Zygomatic
Maxilla


Supraorbital foramen (notch) of the frontal bone
Infraorbital foramen of the Maxilla bone

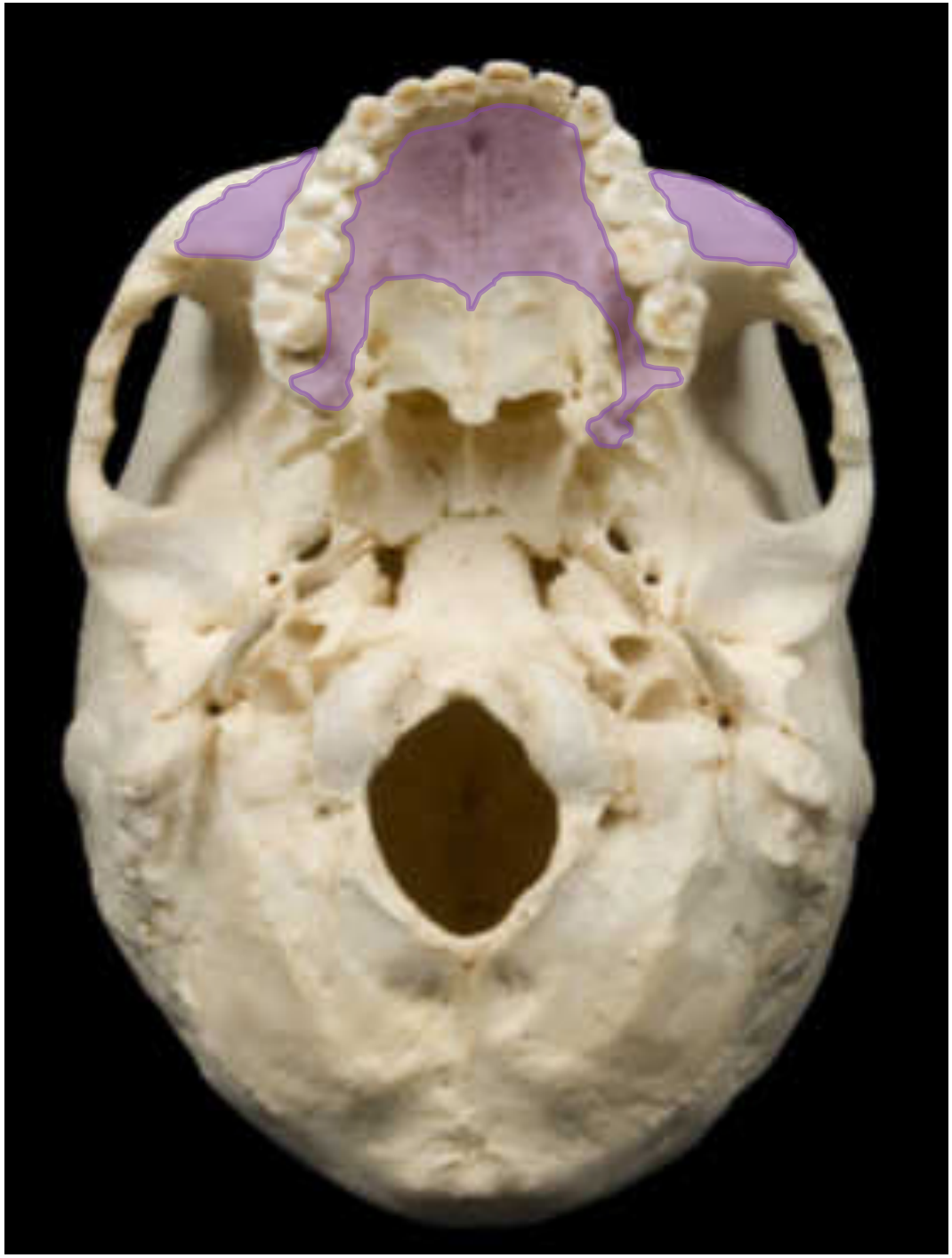
Inferior View of Skull

Those are the teeth of the upper jaw that you see in the picture. The Mandible has been removed.



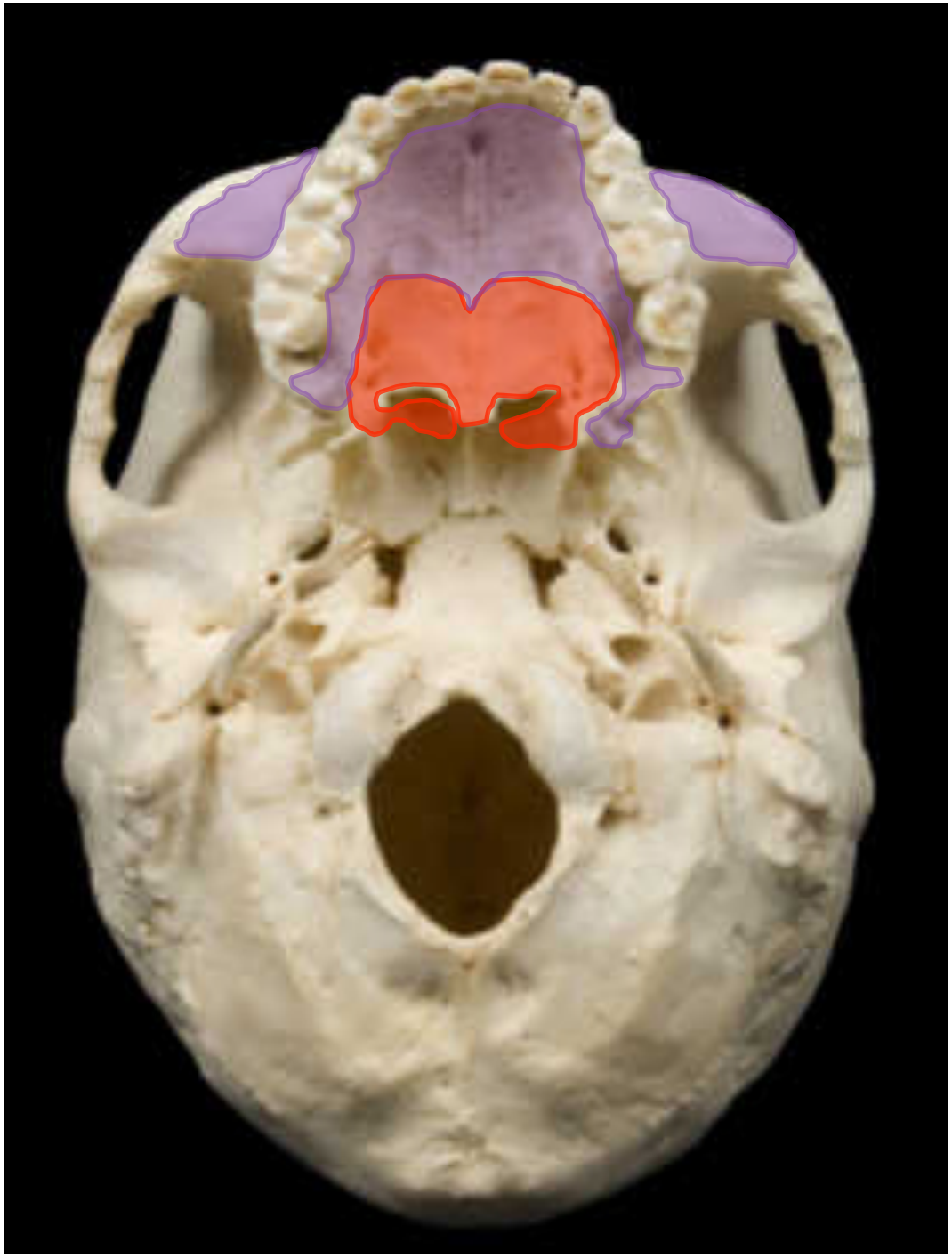
Inferior View of Skull

Here you will find the Occipital bone (green), Temporal bones (blue) and Sphenoid bone (orange) again along with some of the structures you need to know from these bones.



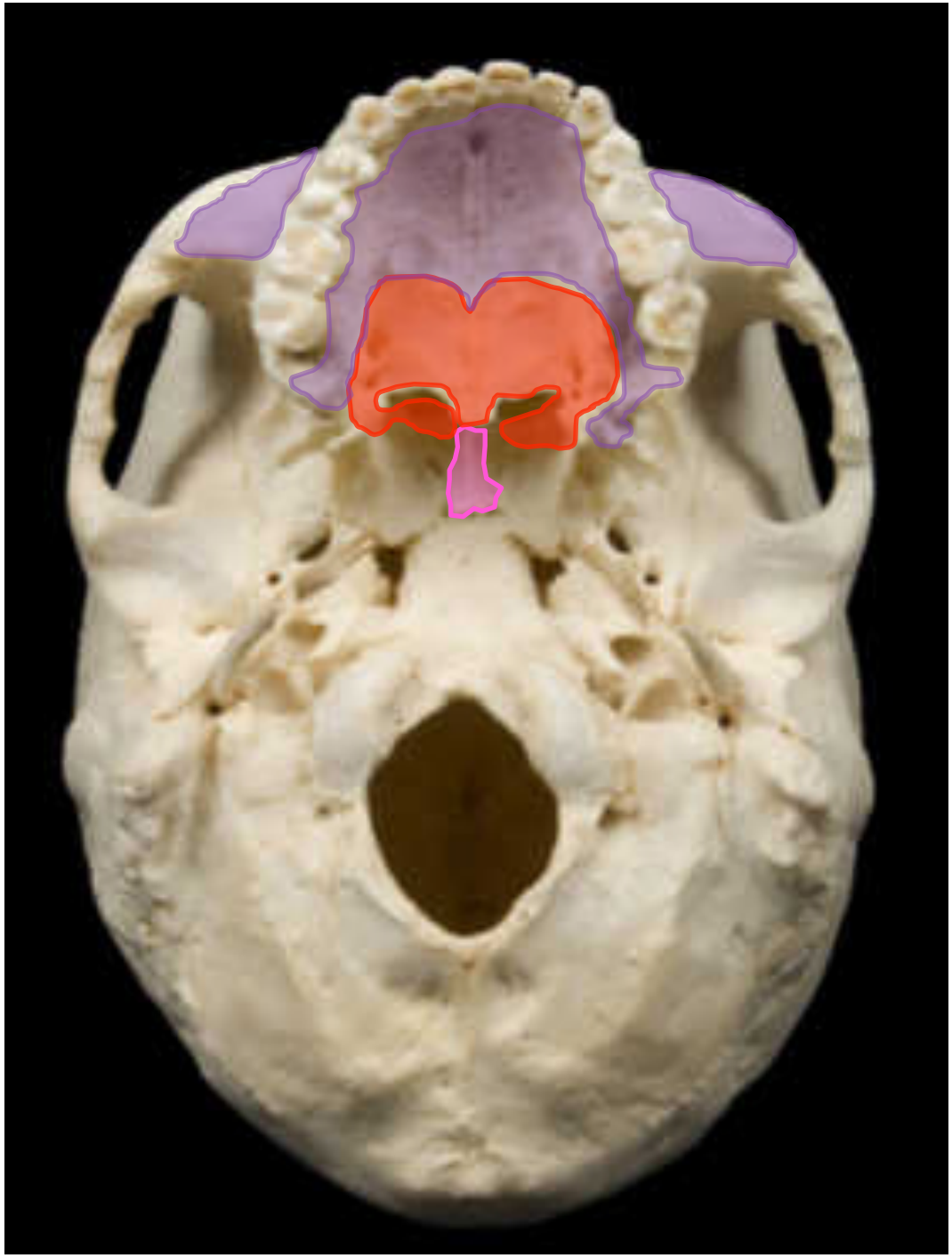
Inferior View of Skull

This is also another important view of the Maxilla bone (Purple) along with some new bones…



Inferior View of Skull

The Palatine bone (Red)

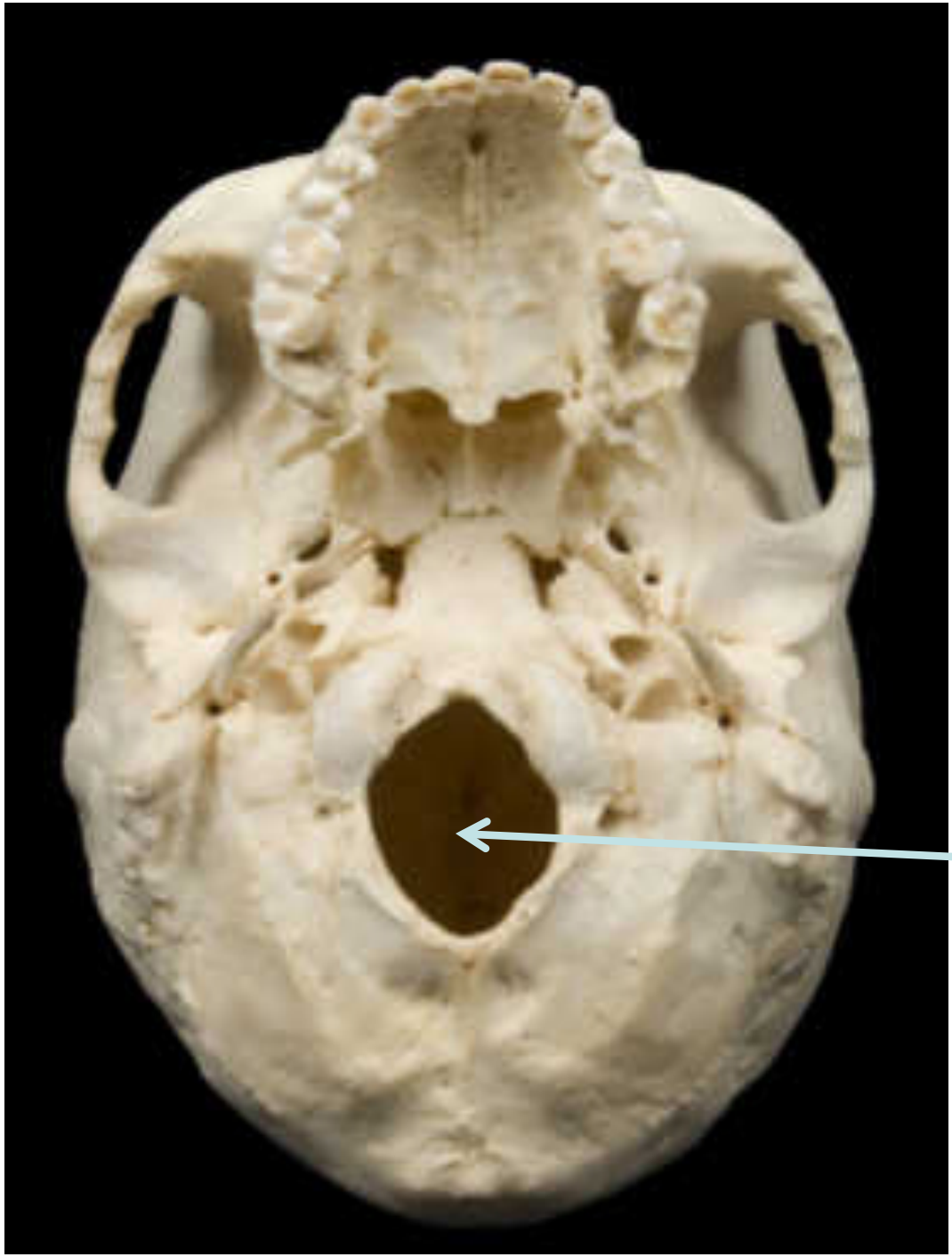


Inferior View of Skull

The Palatine bone (Red)

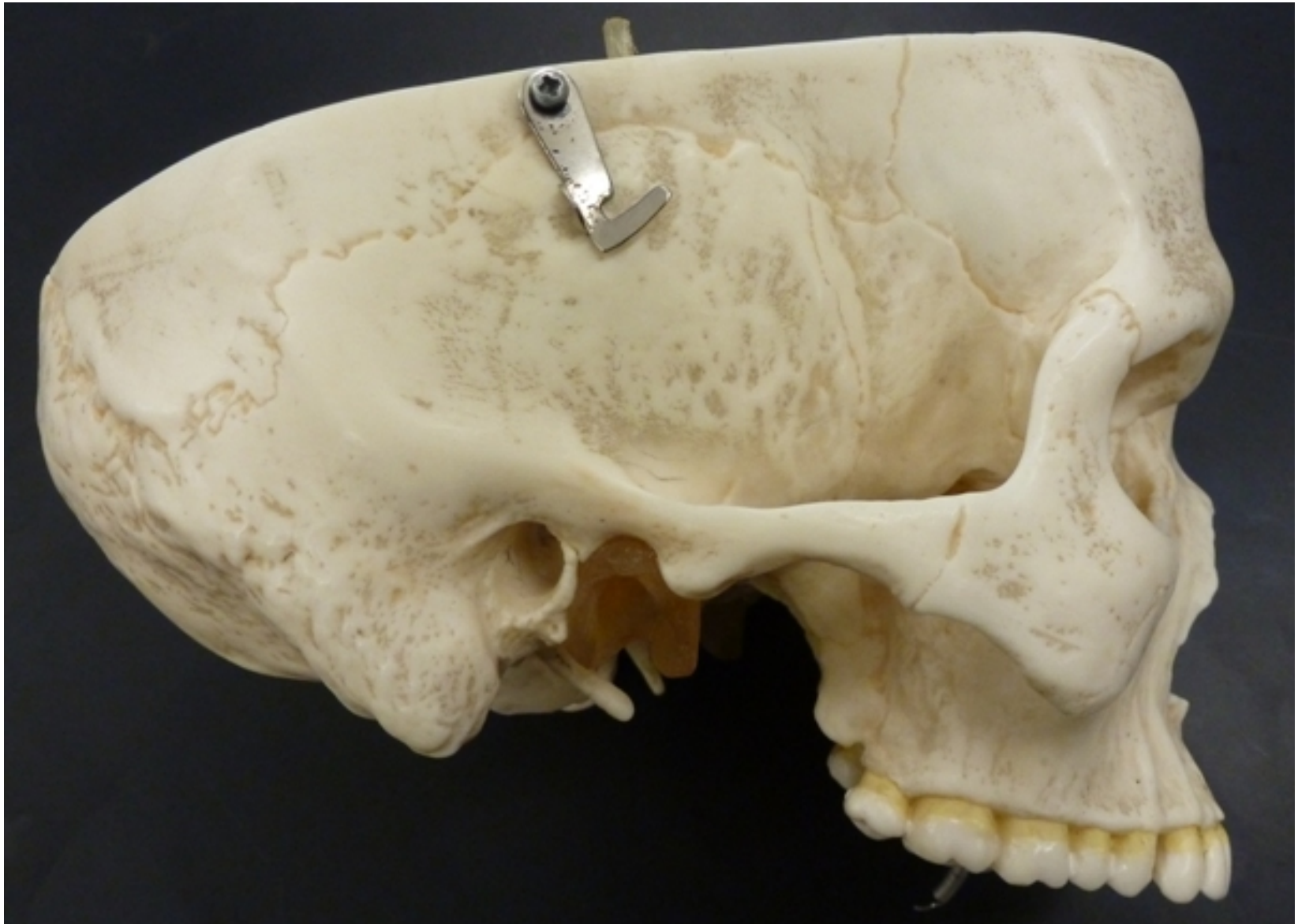
And the Vomer bone (pink),

This bone goes vertically between the sphenoid and the palatine bones, hard to see this in the picture. Make sure you look at it on the skeleton.



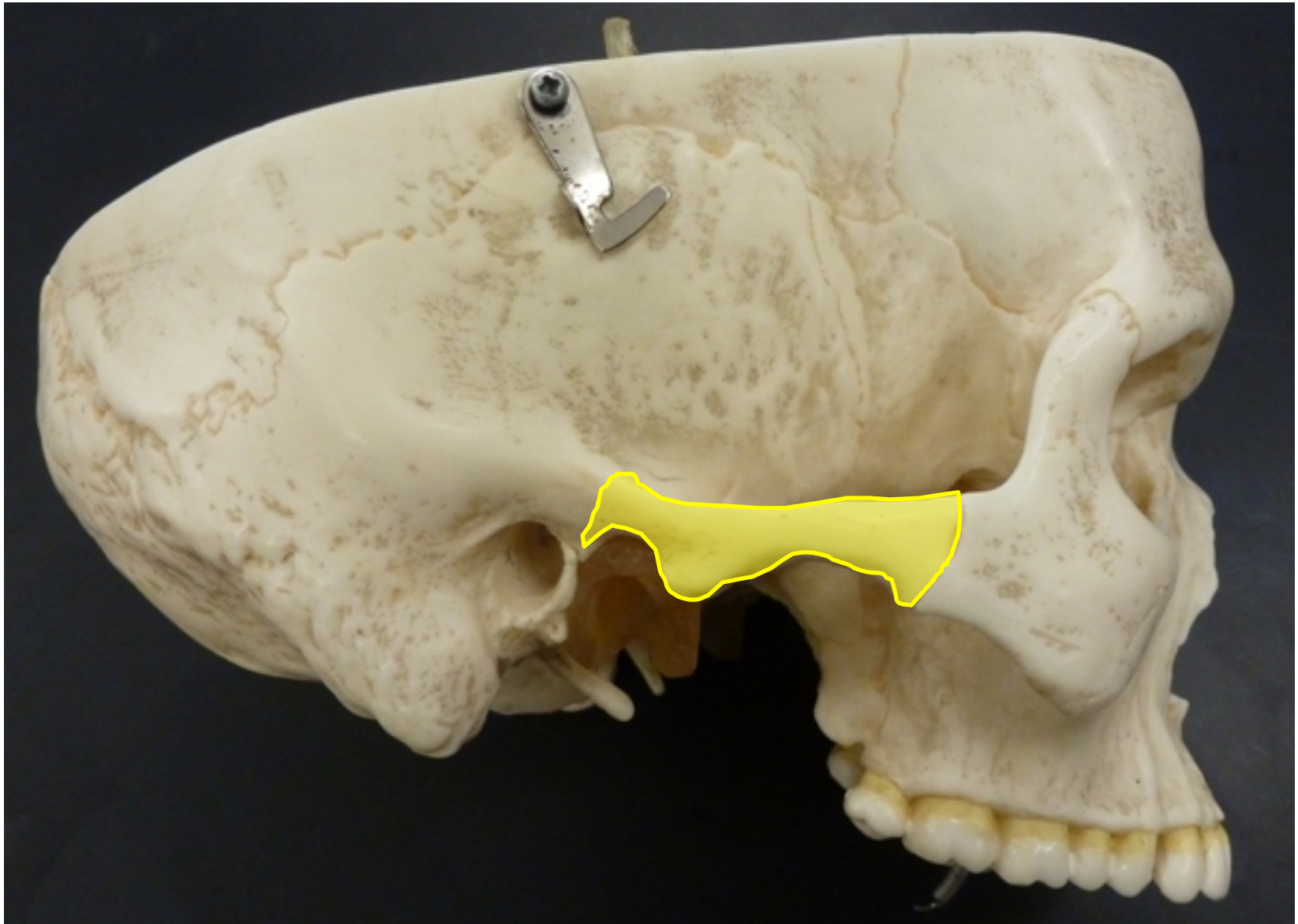
Foramen magnum of the Occipital bone

Structures of the Temporal Bone



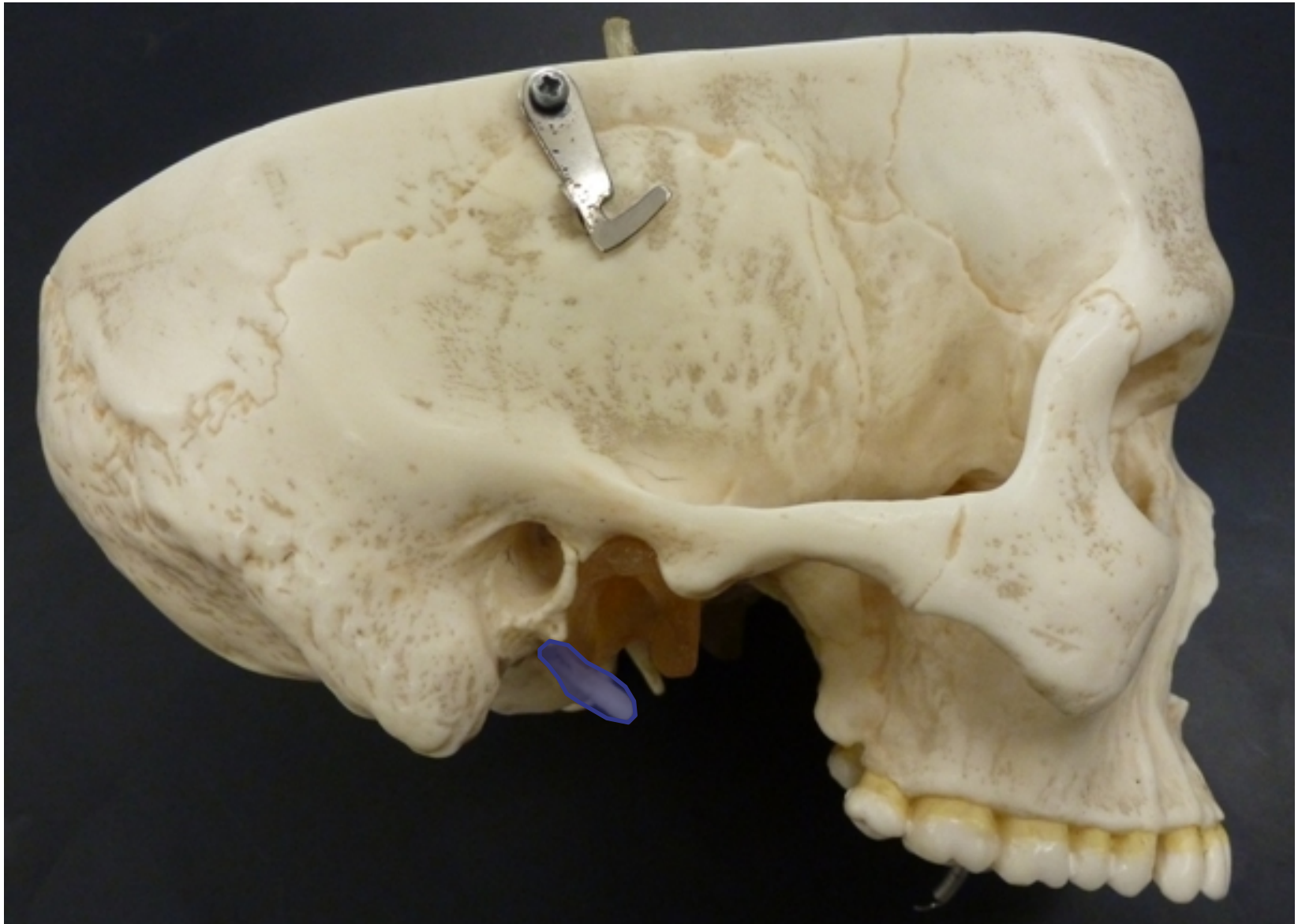
Structures of the
Temporal Bone

Zygomatic process



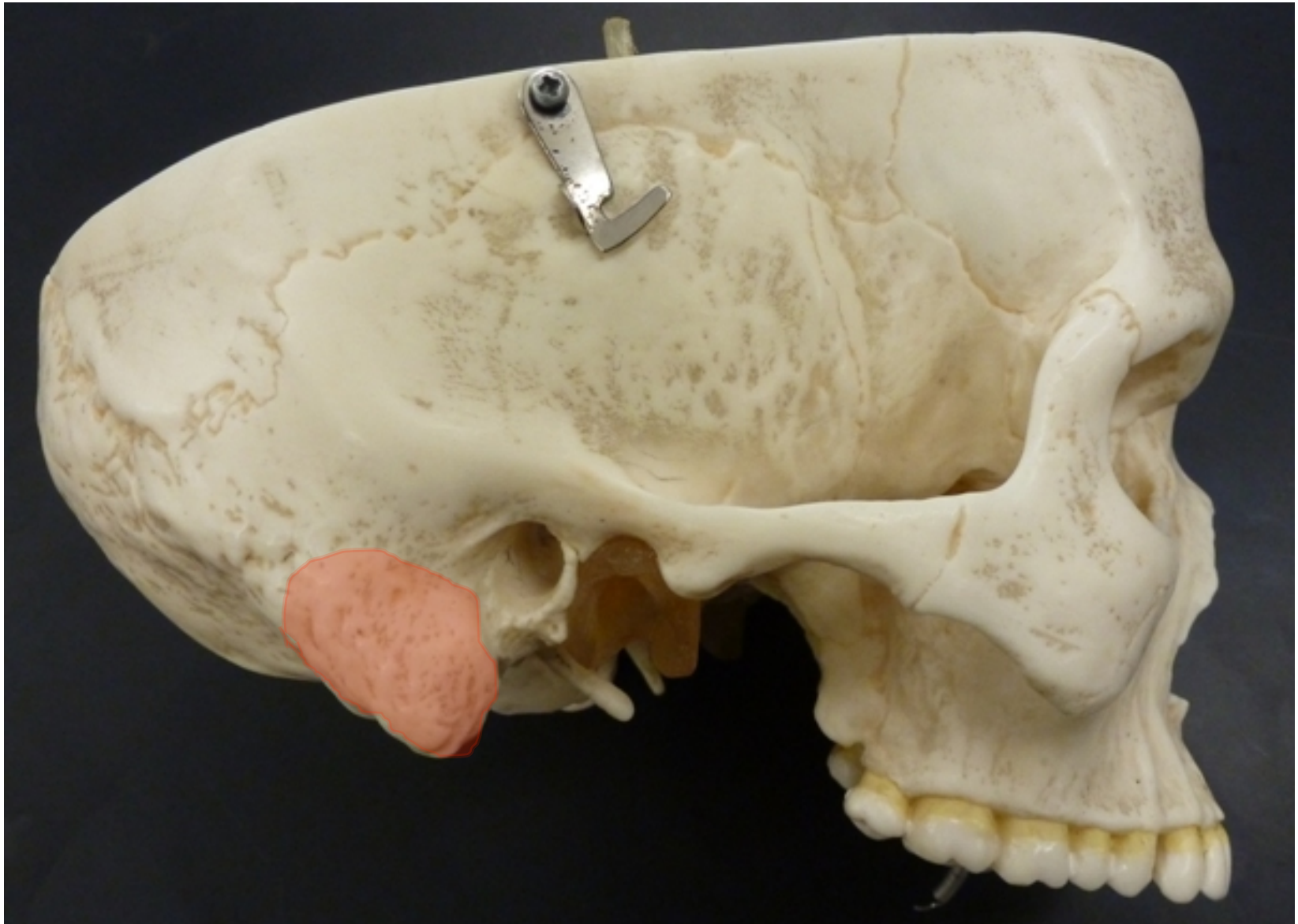
Structures of the Temporal Bone

Styloid process



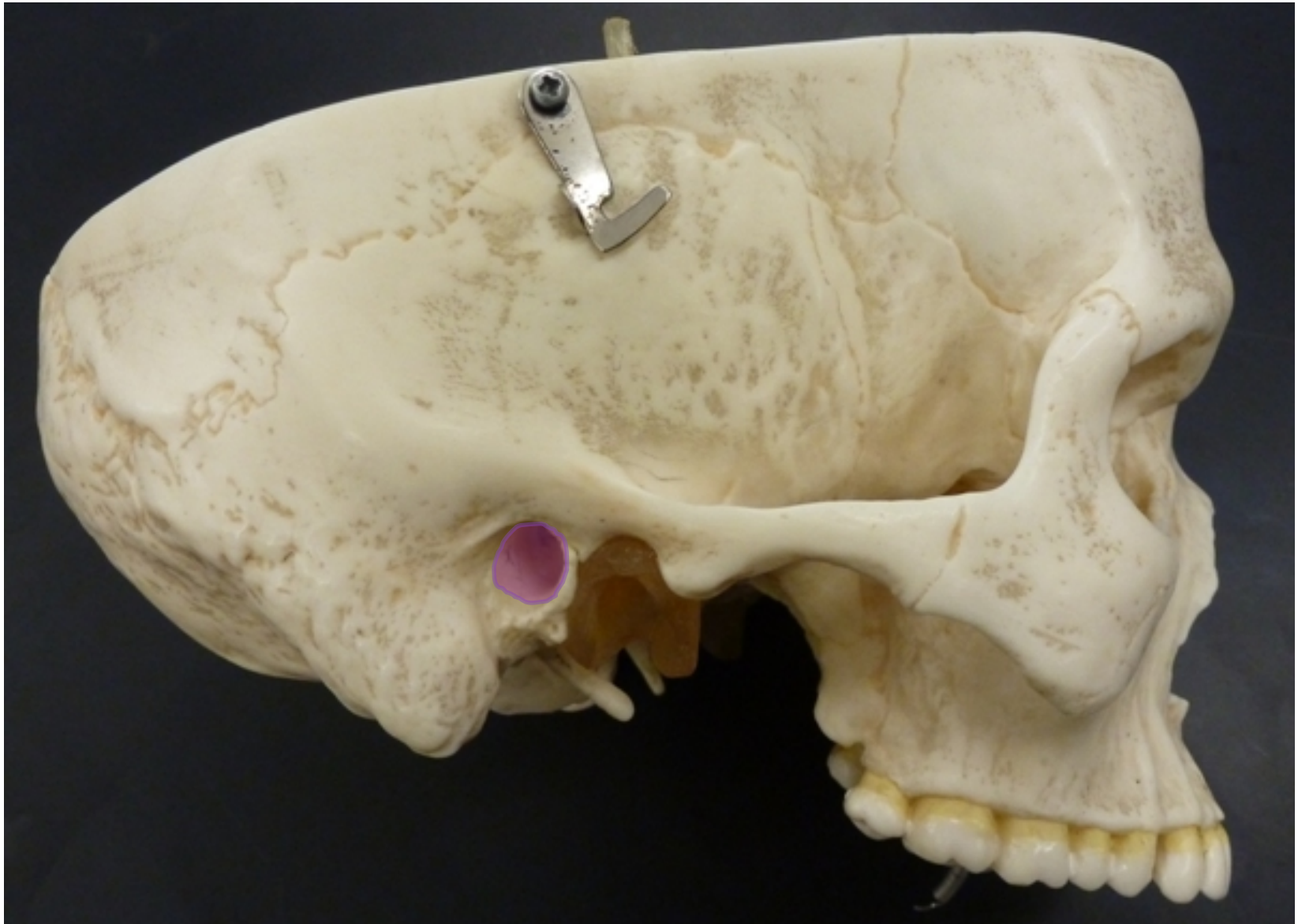
Structures of the Temporal Bone

Mastoid process



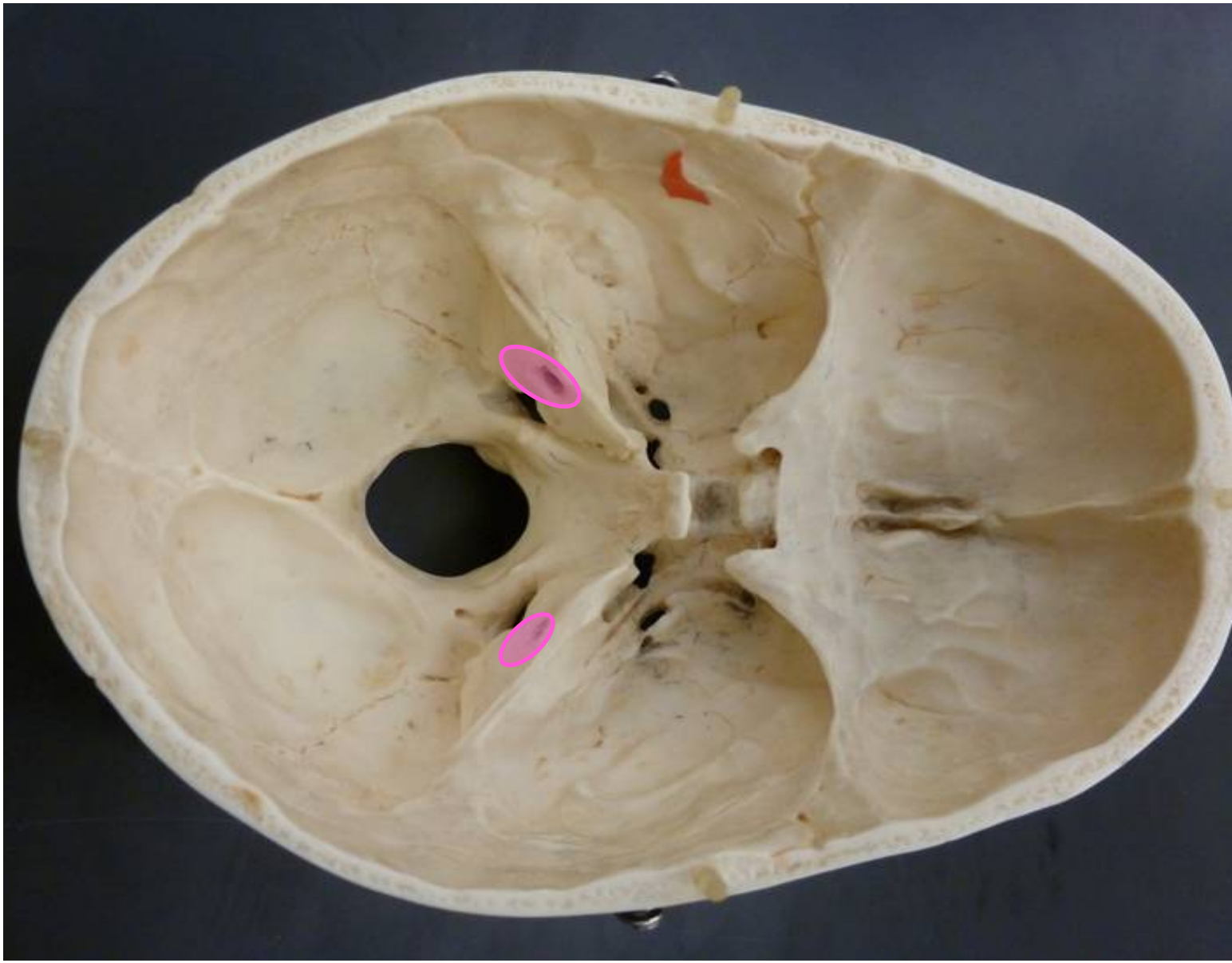
Structures of the
Temporal Bone

External acoustic meatus



Structures of the Temporal Bone

Internal acoustic meatus

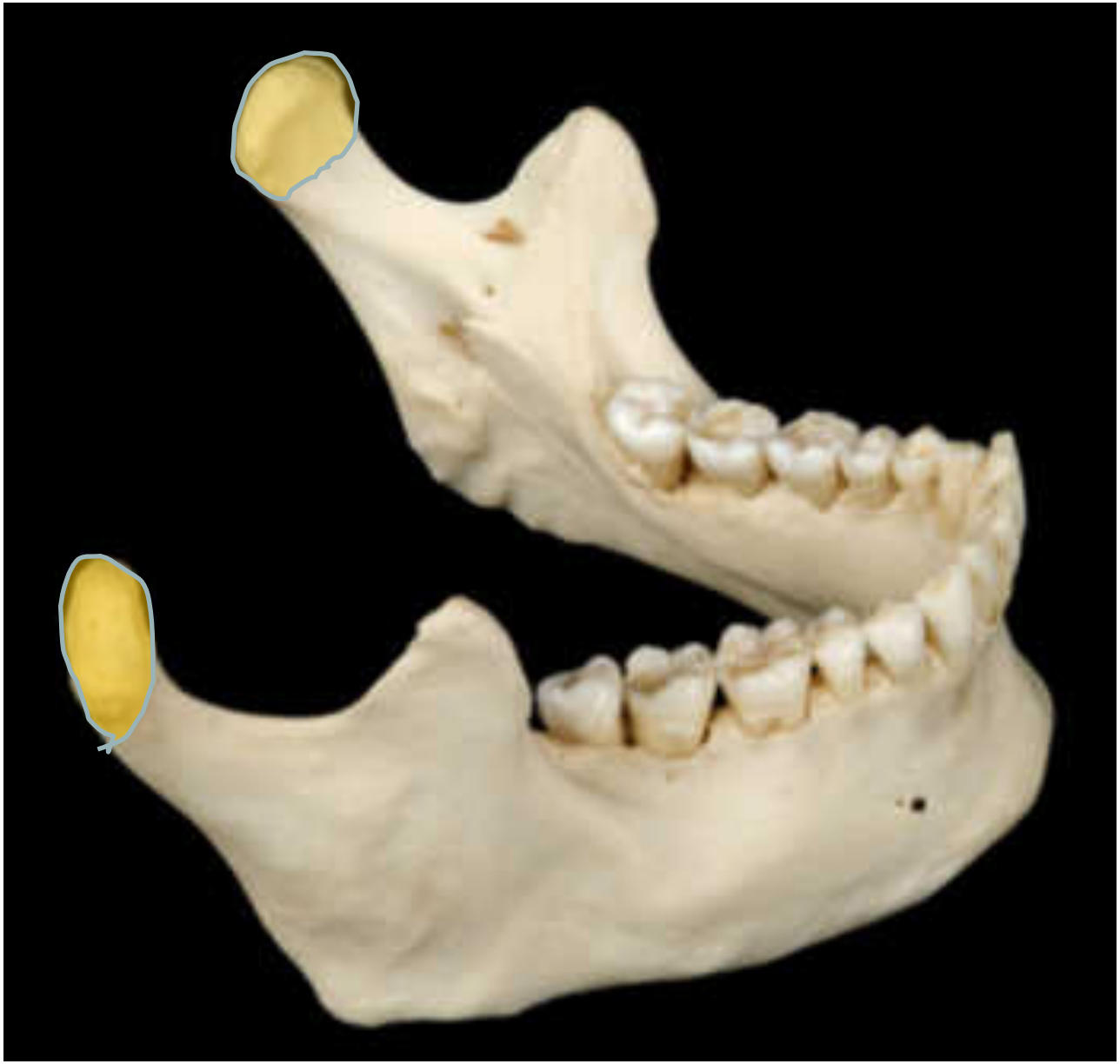


Structures of the
Mandible

Mandibular condyle
Mandibular notch
Coronoid process
Alveolar margins
Mental foramen

Structures of the
Mandible

Mandibular condyle

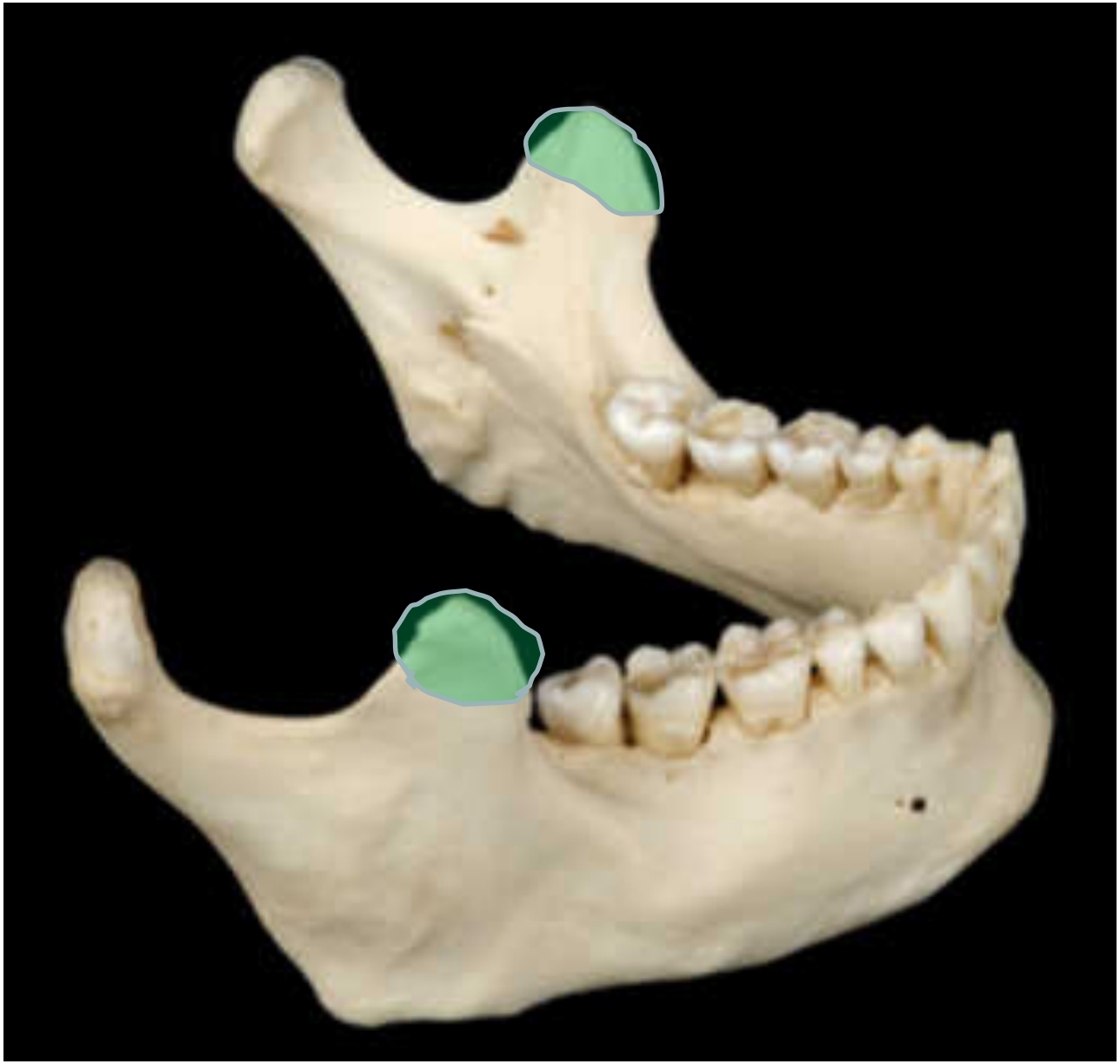


Structures of the
Mandible

Mandibular notch

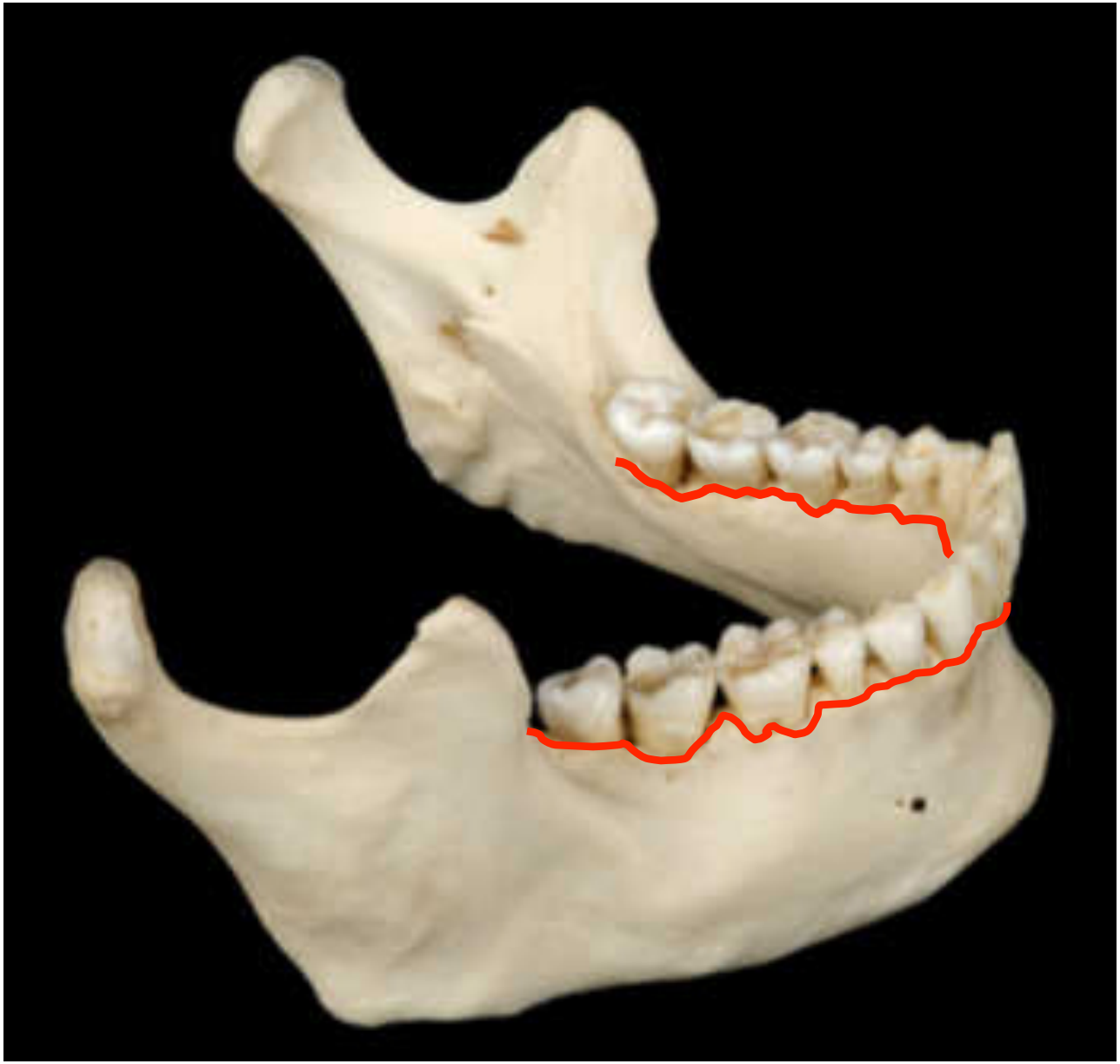
Structures of the
Mandible

Coronoid process



Structures of the Mandible

Alveolar margins: Where the teeth join the mandible

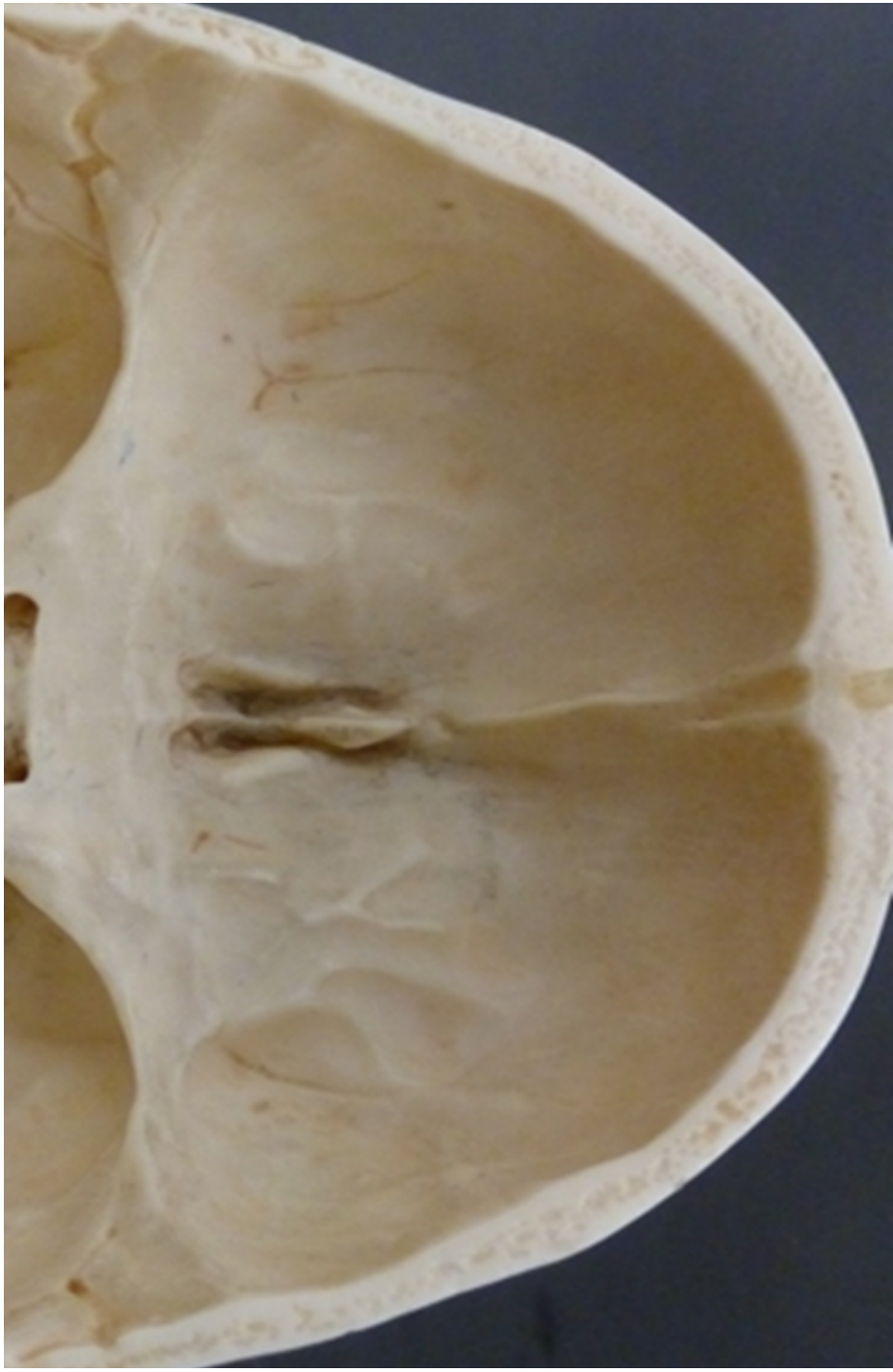


Structures of the Mandible

Mental foramen:
The holes in the lower sides of the mandible

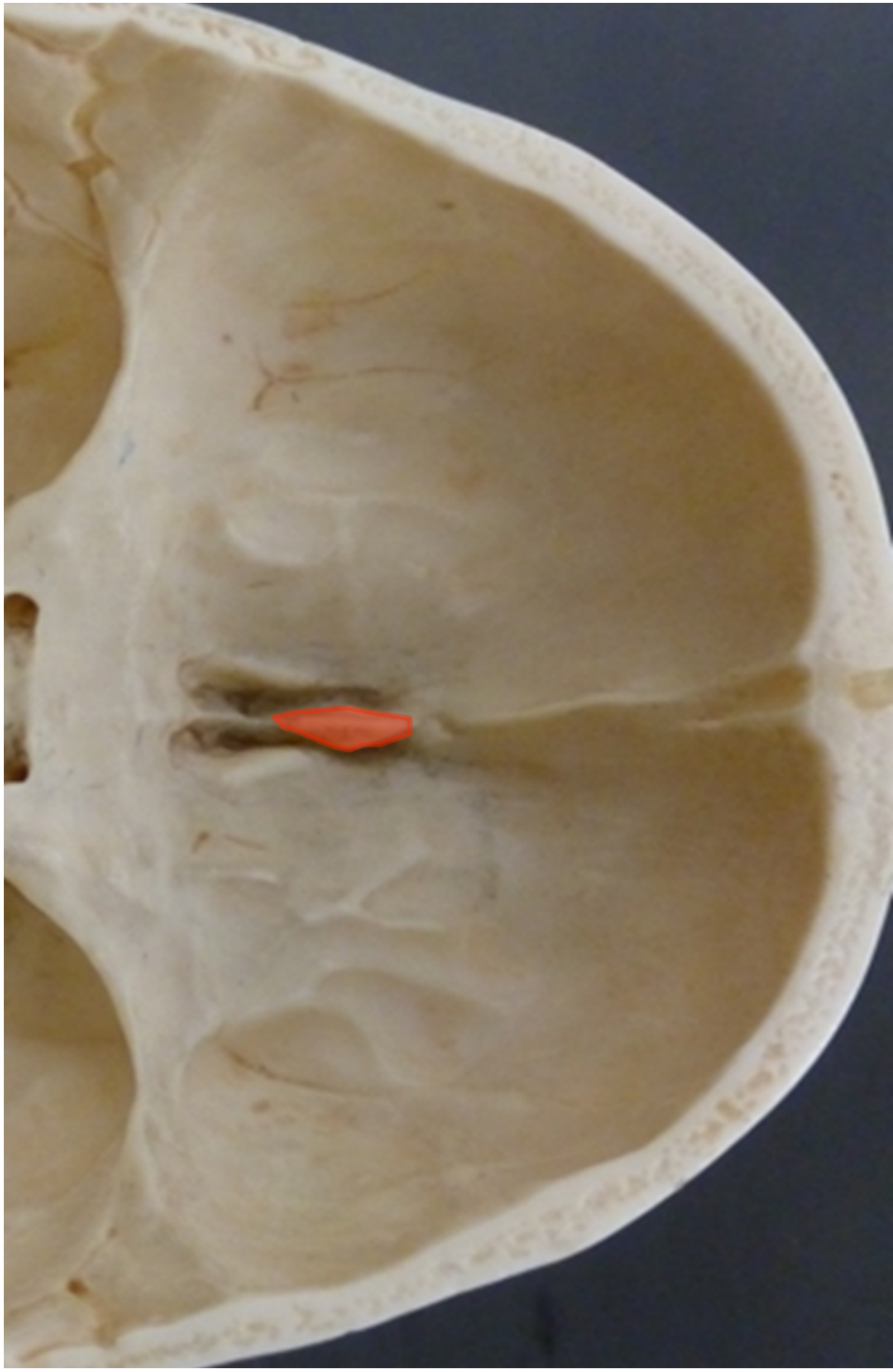
Structures of the
Ethmoid Bone

cribriform plate
crista galli
olfactory foramina



Structures of the
Ethmoid bone

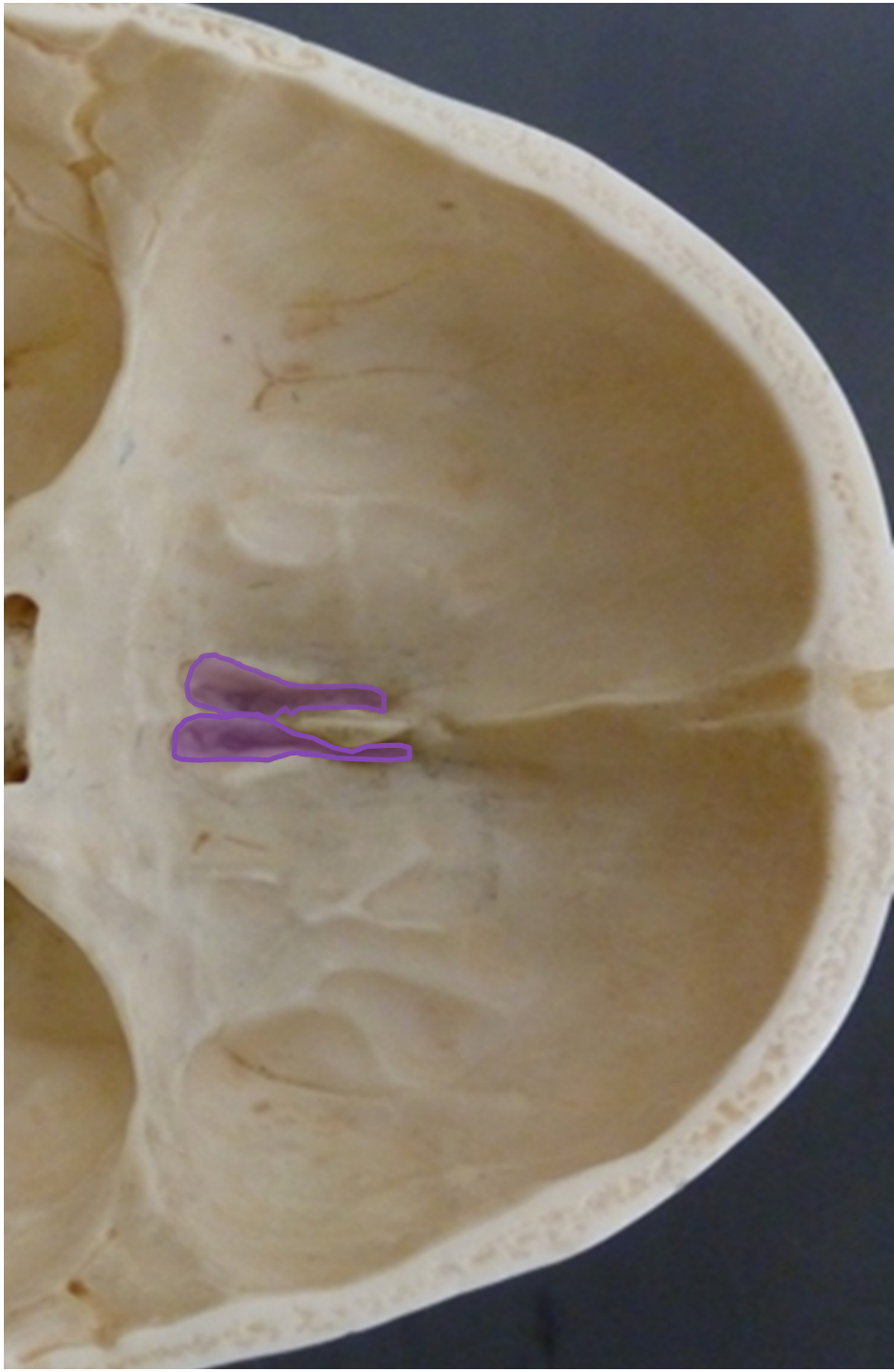
Crista galli



Structures of the
Ethmoid bone

Cribriform plate-
the boney part

Olfactory foramina
the holes in the the cribriform plate

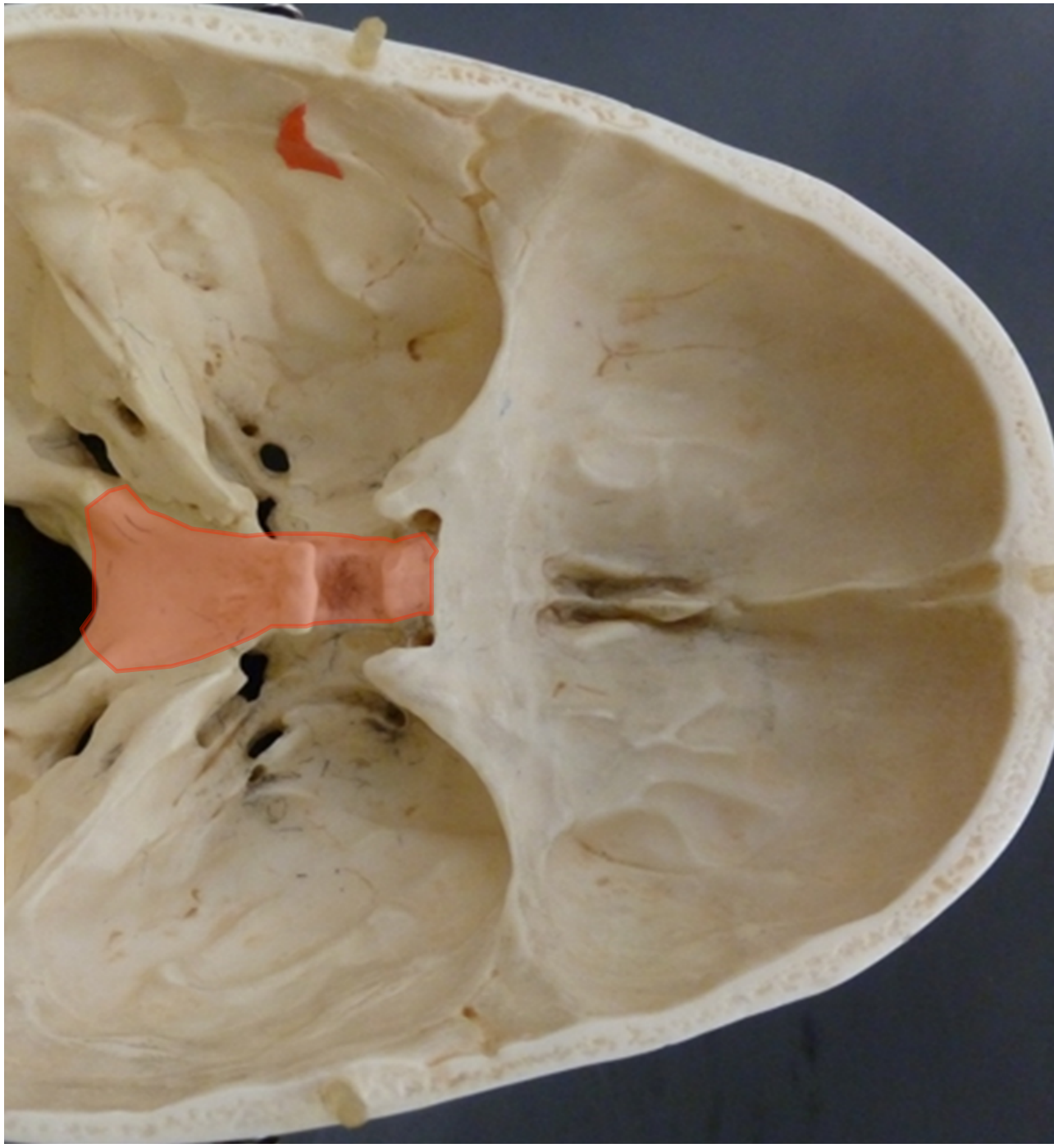


Structures of the
Sphenoid

sella turcica
foramen lacerum
foramen rotundum
foramen ovale
foramen spinosum
optic canal
orbital fissure

Structures of the
Sphenoid

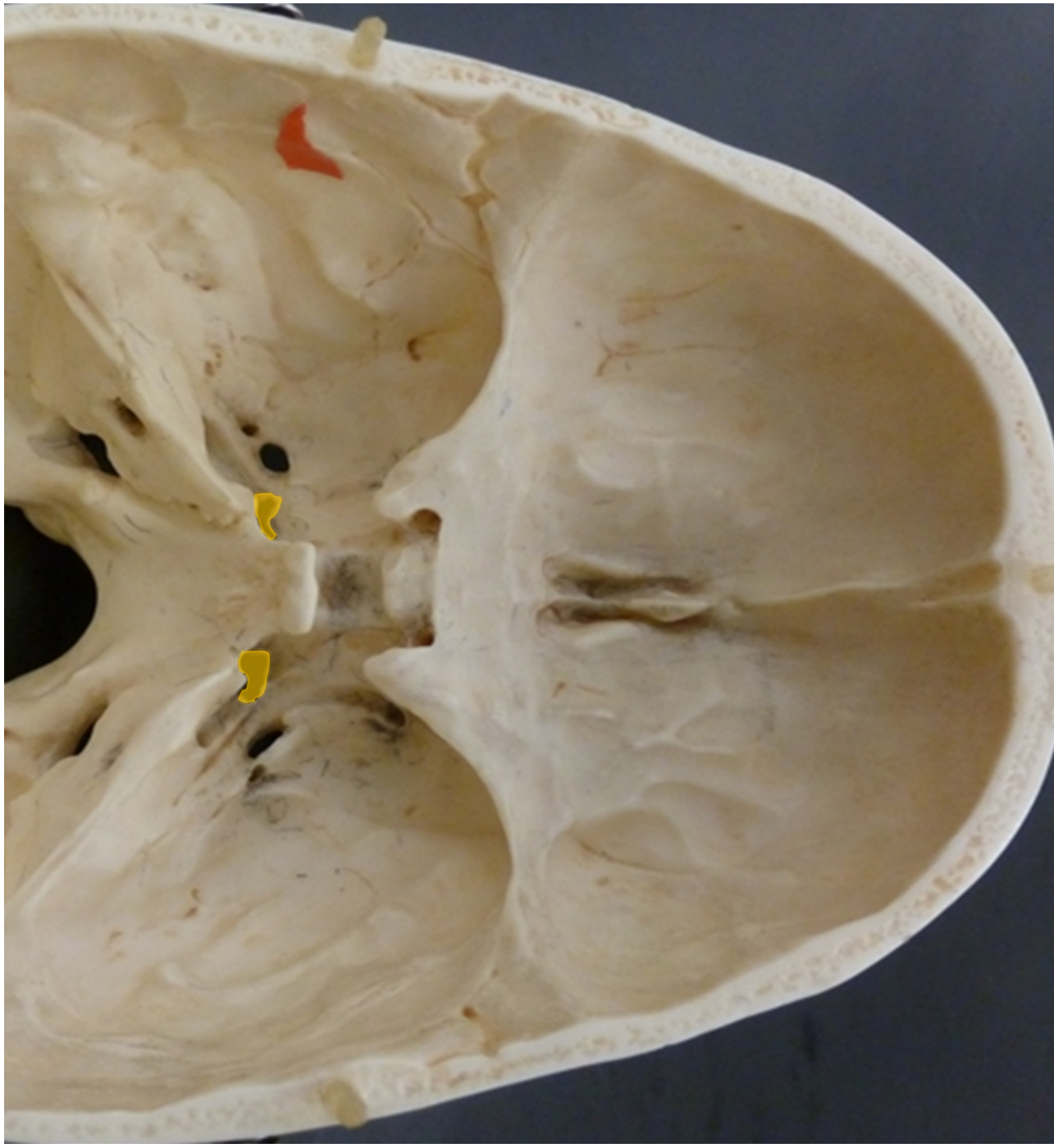
Sella turcica



Structures of the Sphenoid

There are several foramen (holes) here you need to know.

Foramen Lacerum

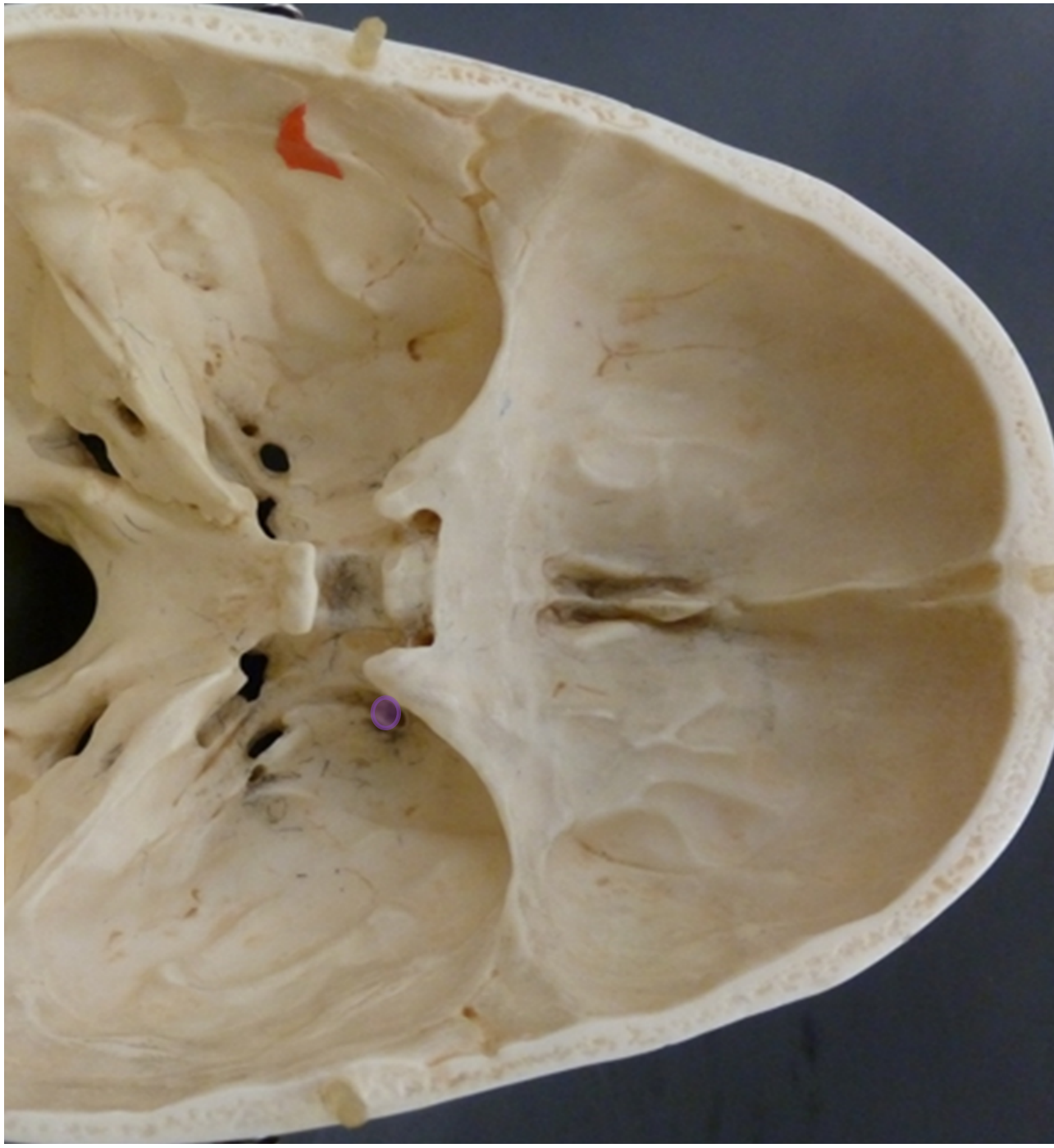


Structures of the Sphenoid

There are several foramen (holes) here you need to know.

Foramen Rotundum

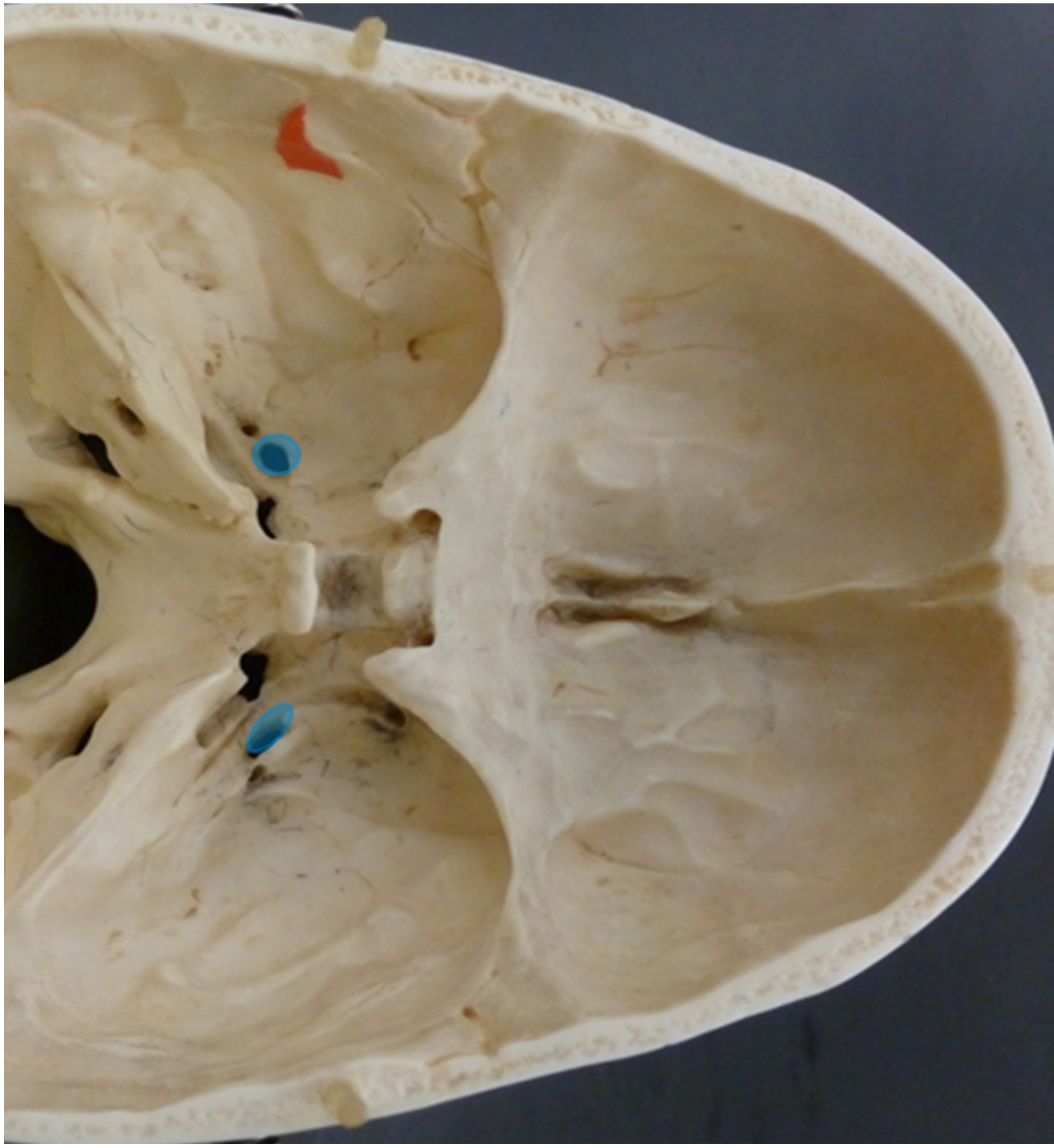
Note that there is another one on the other side of the Sella turcica but is not visible in the picture



Structures of the Sphenoid

There are several foramen (holes) here you need to know.

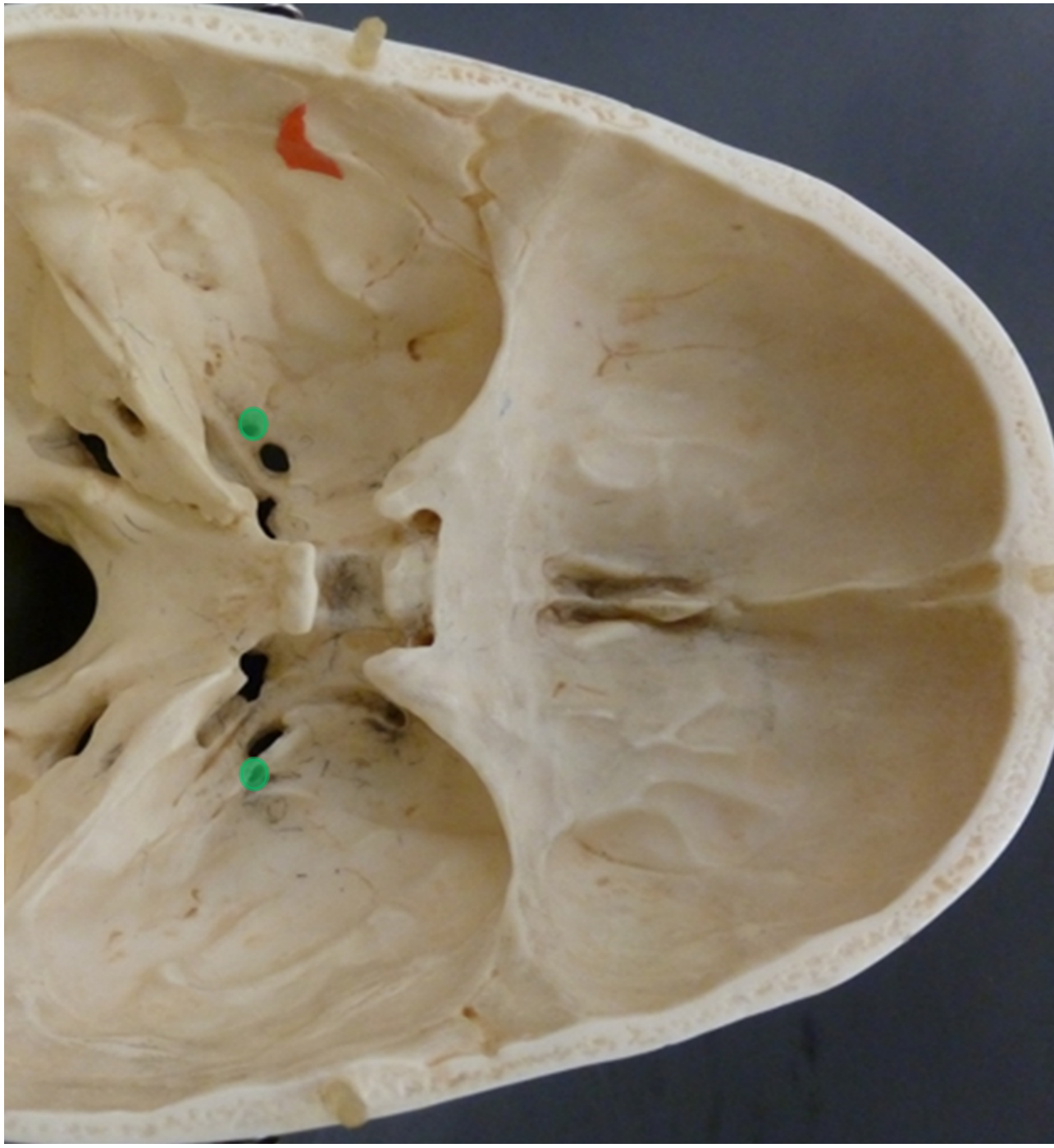
Foramen Ovale



Structures of the Sphenoid

There are several foramen (holes) here you need to know.

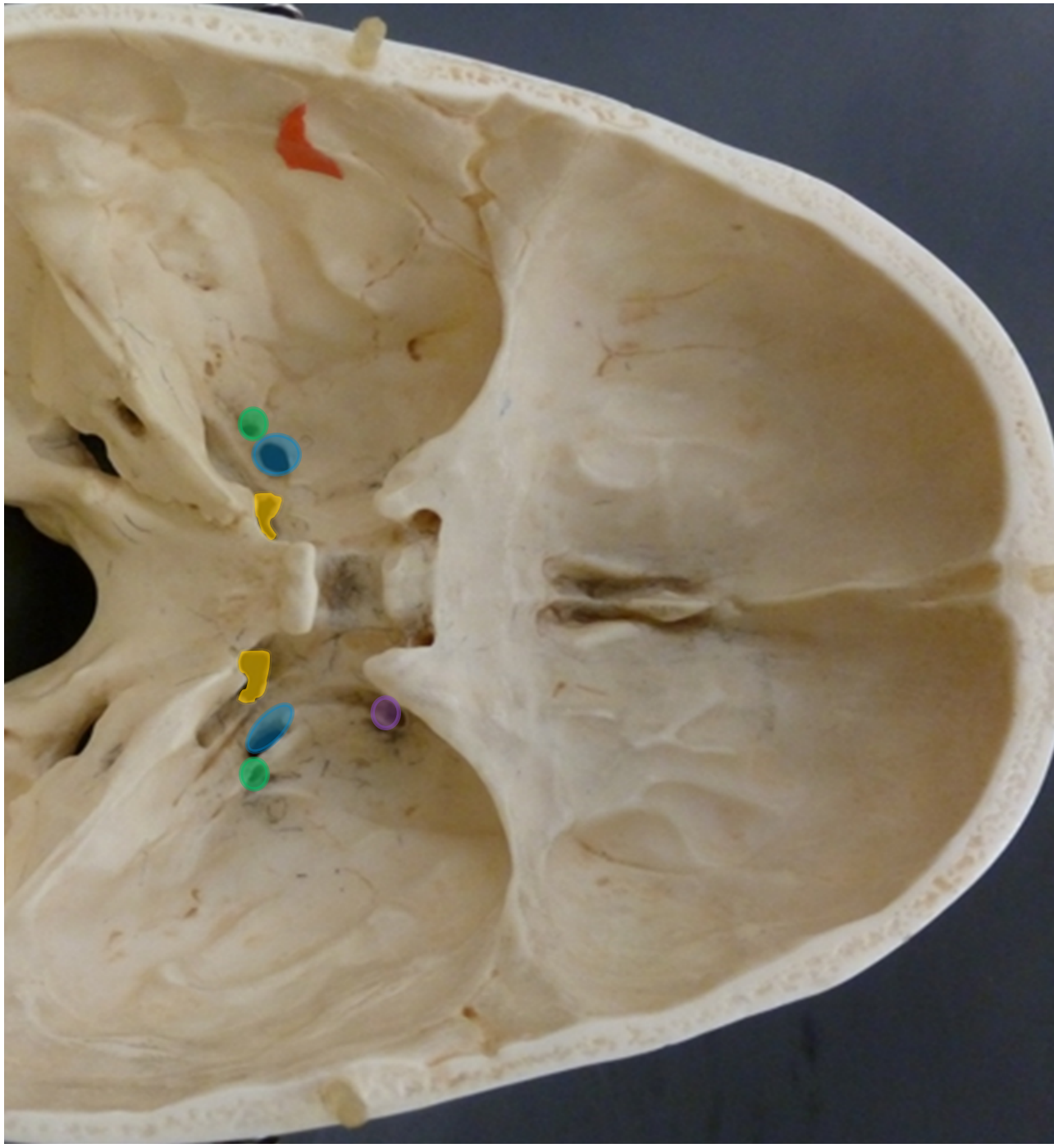
Foramen Spinosum



Structures of the Sphenoid

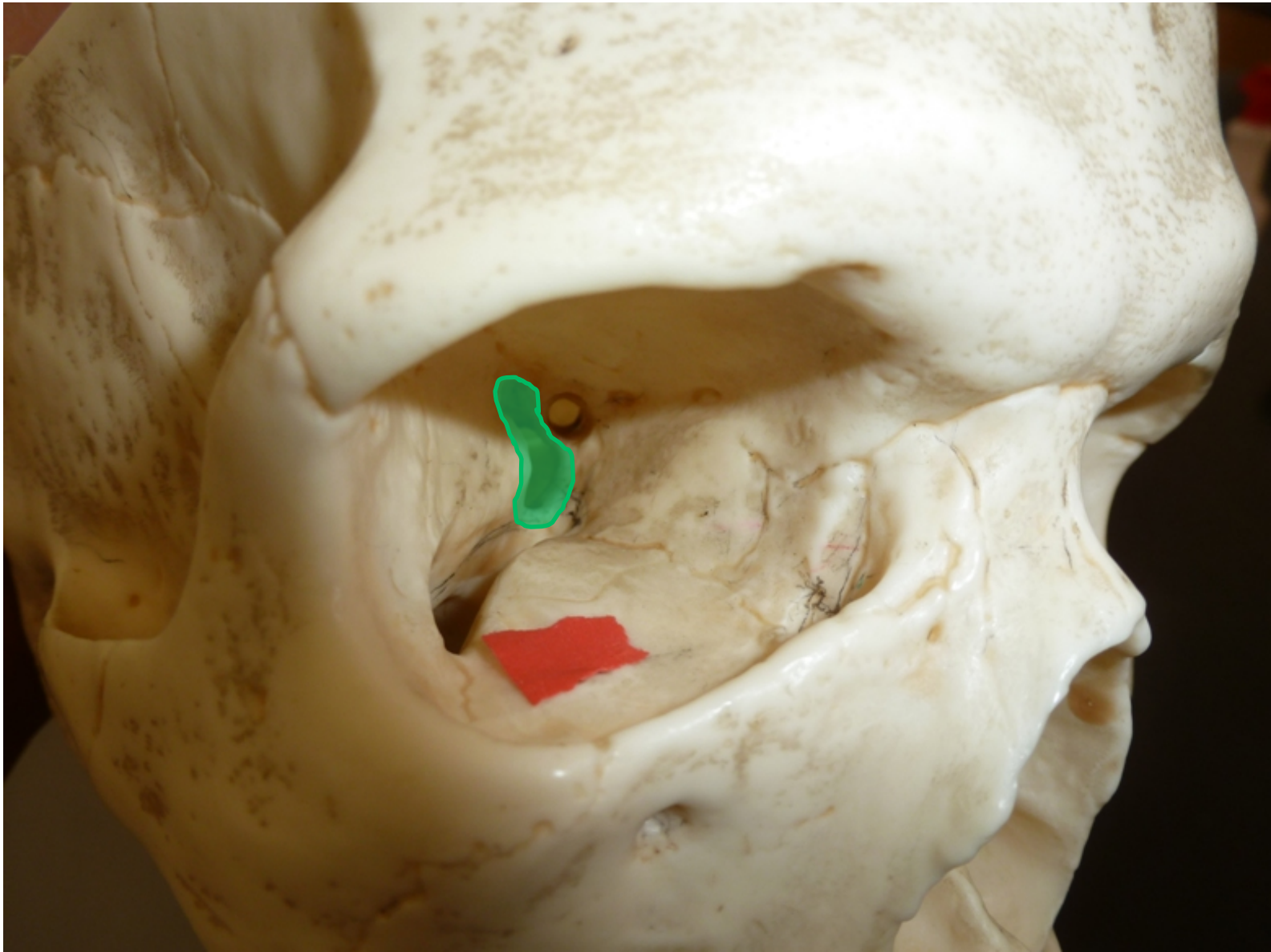
There are several foramen (holes) here you need to know.

Foramen Lacerum
Foramen Rotundum
Foramen Ovale
Foramen Spinosum



Structures of the
Sphenoid
Optic canal

Structures of the
Sphenoid
Orbital Fissure

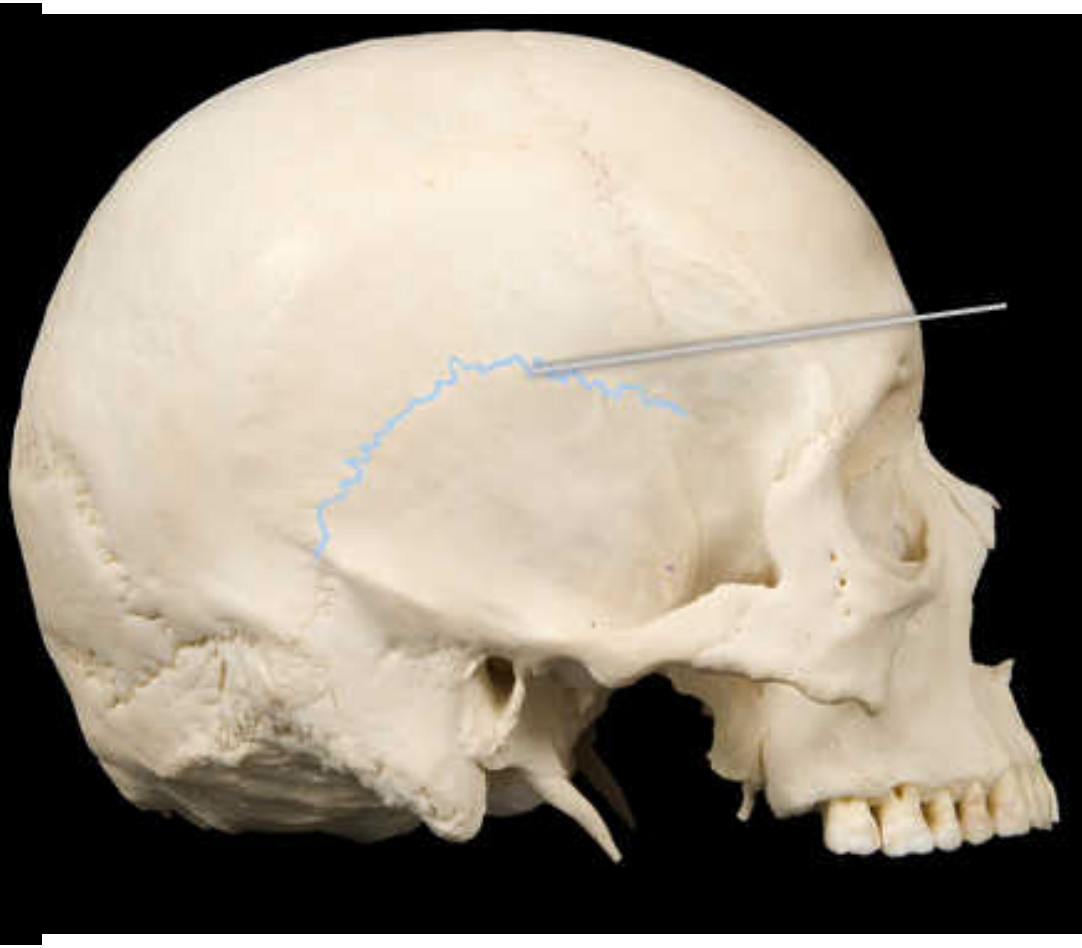


Sutures are articulations (joints) between two skull bones. Each has its own name. There are 4 that you are required to know.

Coronal suture (not frontal)– Between the Frontal bone and the Parietal bones – seen marked with tape in picture.

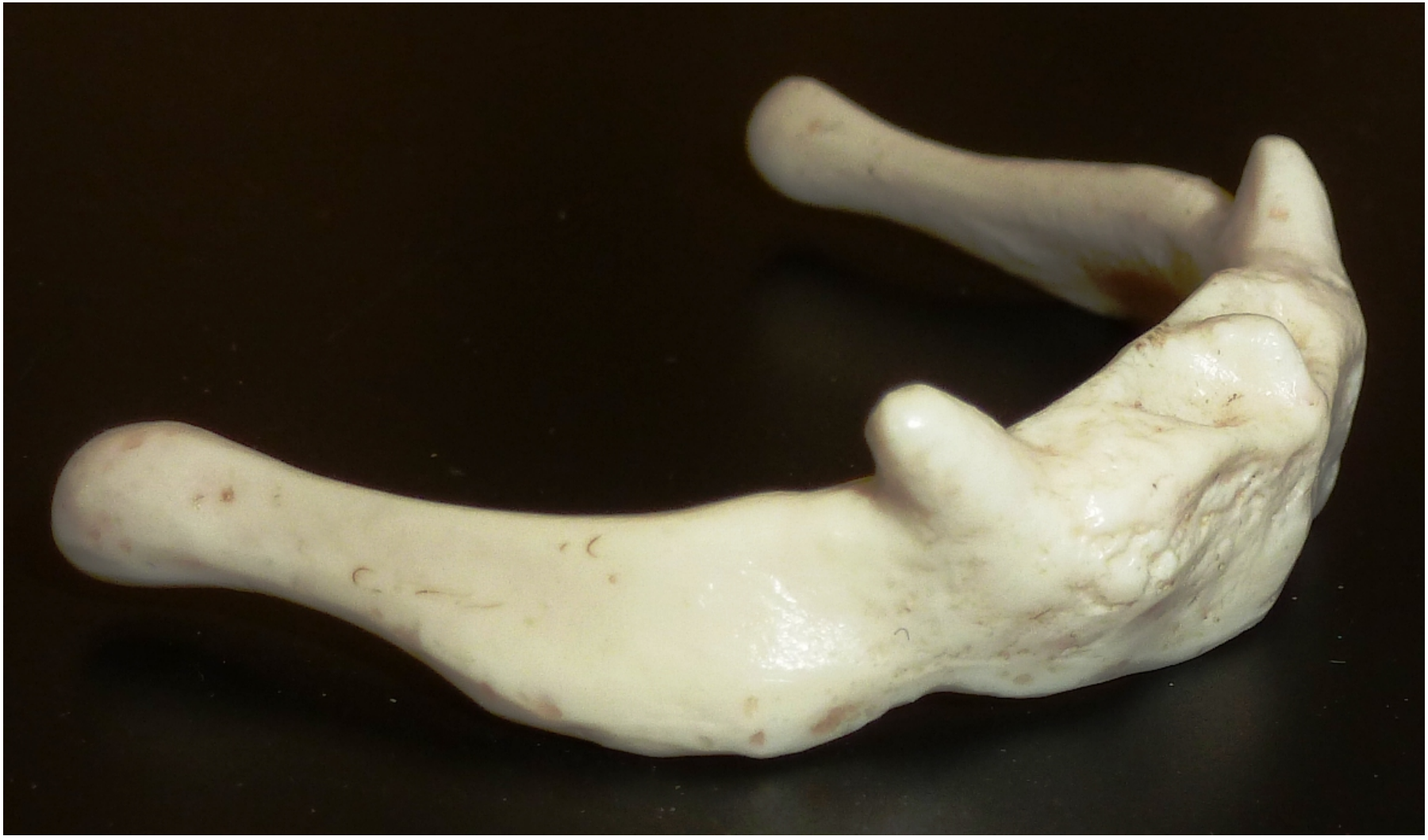
Sagittal suture:
Between the two Parietal bones (along the sagittal plane of the body)

Lambdoid suture: Between the occipital bone and the Parietal bones



Squamous suture: Between the temporal bone and the Parietal bones

The Hyoid bone is the only bone that does not articulate with any other bone

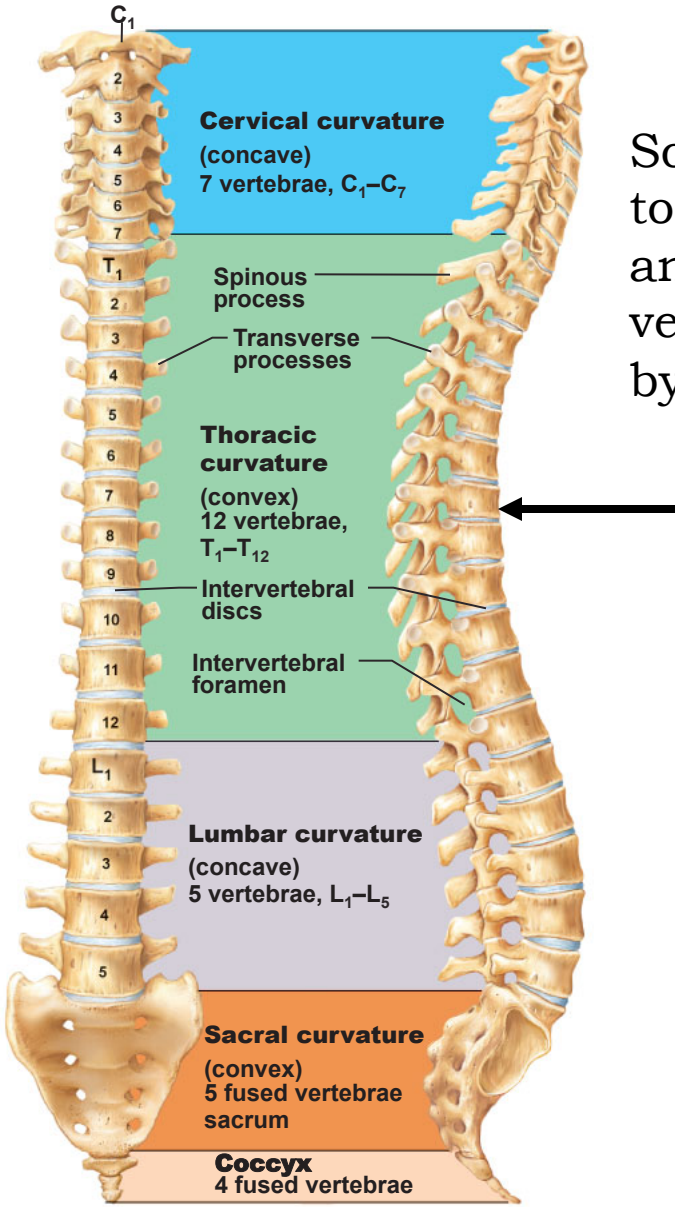


The vertebral column

Each vertebra has a type and a number

There are
7 Cervical vertebrae
12 Thoracic vertebrae
5 Lumbar vertebrae
All labeled →

You will need to be able to identify the type and number of each when given a spinal column in lab



Anterior view Right lateral view

So if we asked you to identify the type and number of the vertebra indicated by the pointer….

You would answer:

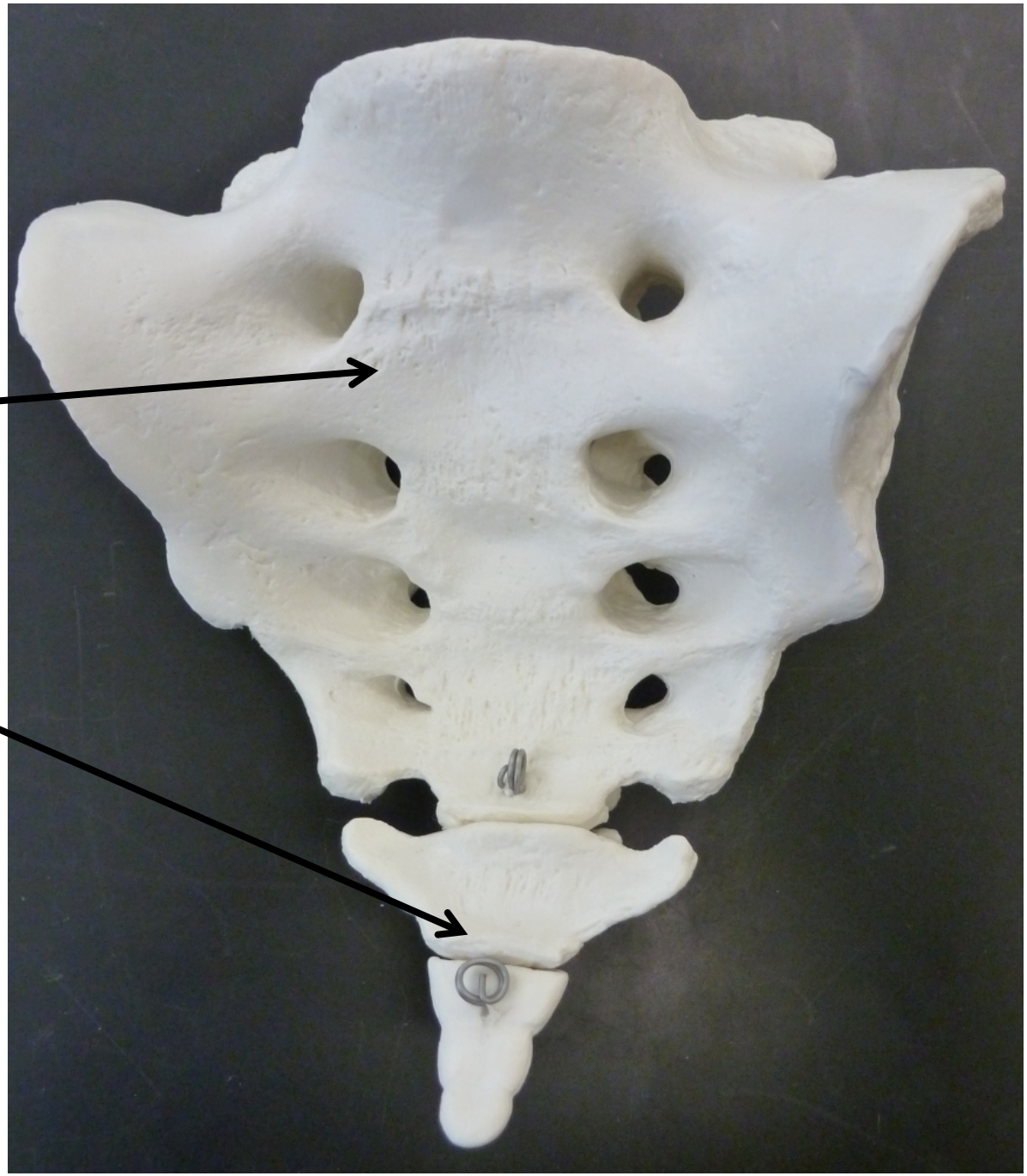
Thoracic 7

The vertebral column

The last vertebrae of the column

Sacrum

Coccyx



Sacral canal

The vertebral column

The first 2 Cervical Vertebrae have specific names that you are required to know and be able to identify disarticulated

C1 - Atlas

C2 - Axis

The vertebral column

C1 – Atlas, Does not have a **body** or a **Spinous process**
C2 – Axis Has a unique structure call the **Dens**

C1 - Atlas

C2 - Axis

The vertebral column

The Cervical Vertebrae

All Cervical Vertebrae have **Transverse foramen**, none of the others types have them

Transverse foramen, not to be confused with the **Vertebral foramen** which all vertebrae have

Transverse foramen, are the holes in the **Transverse Processes** which all vertebrae have

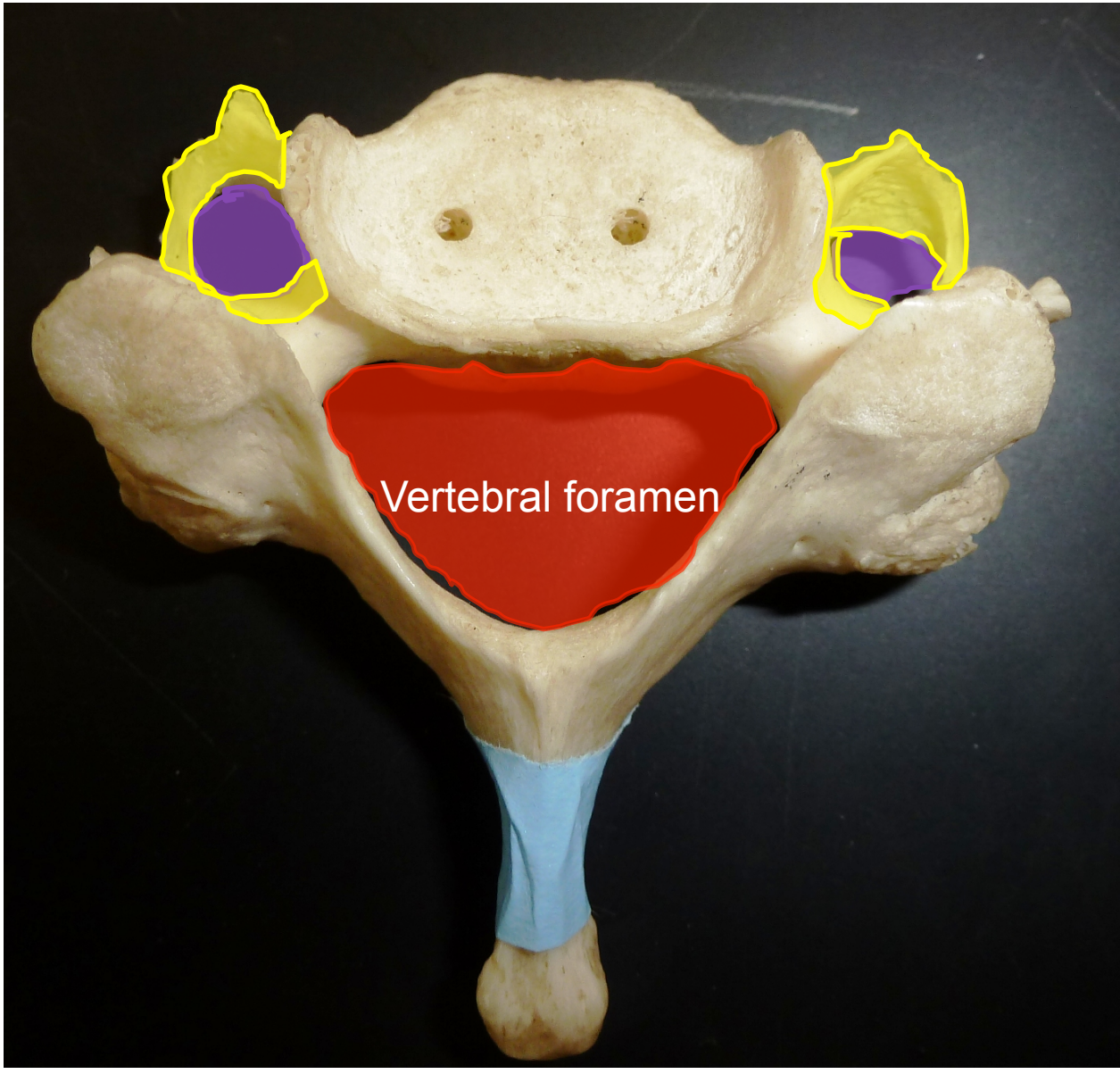
The vertebral column

The Cervical Vertebrae

All Cervical Vertebrae have **Transverse foramen**(purple), none of the others types have them

Transverse foramen, not to be confused with the **Vertebral foramen** which all vertebrae have

Transverse foramen, are the holes in the **Transverse Processes** (yellow) which all vertebrae have



The vertebral column

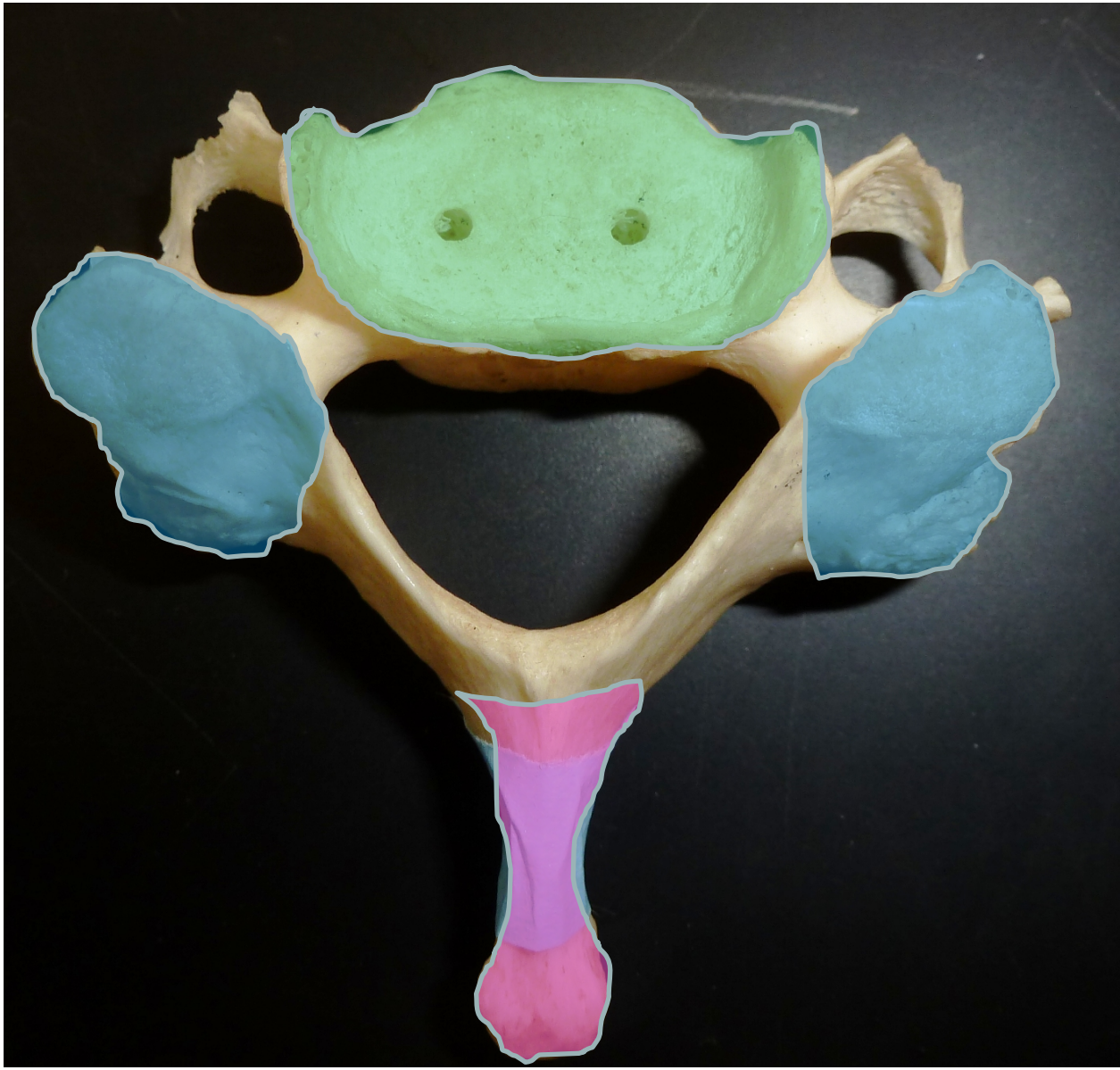
The Cervical Vertebrae

Other Structures seen here:

Articular process (blue)

Spinous process (purple)

Body (green)



The vertebral column

The Thoracic Vertebrae

Spinous process

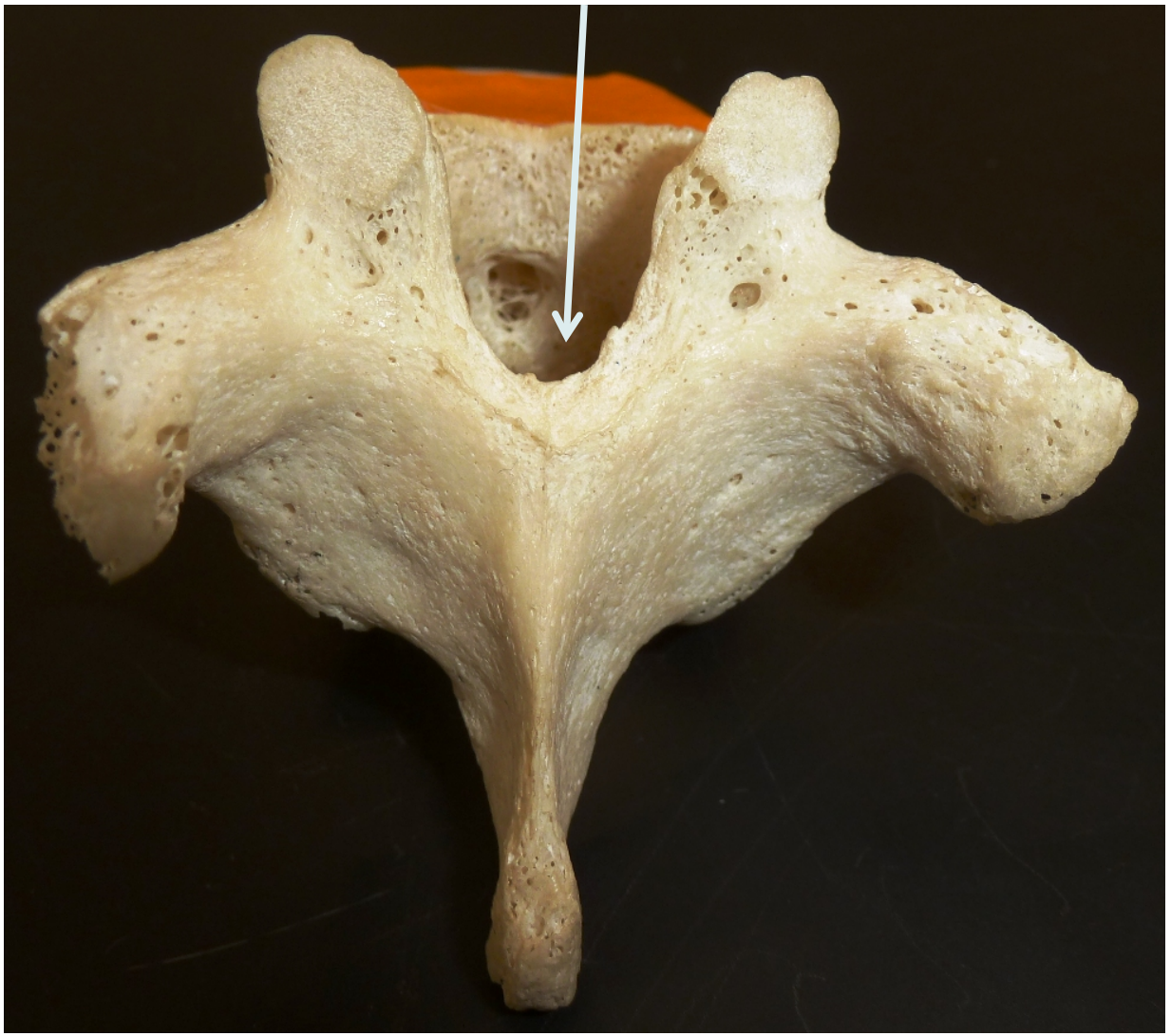
Transverse process

Articular process

Articular facet: The surface on the process where the articulated vertebrae rub

Body

Vertebral foramen:



The vertebral column

The Thoracic Vertebrae

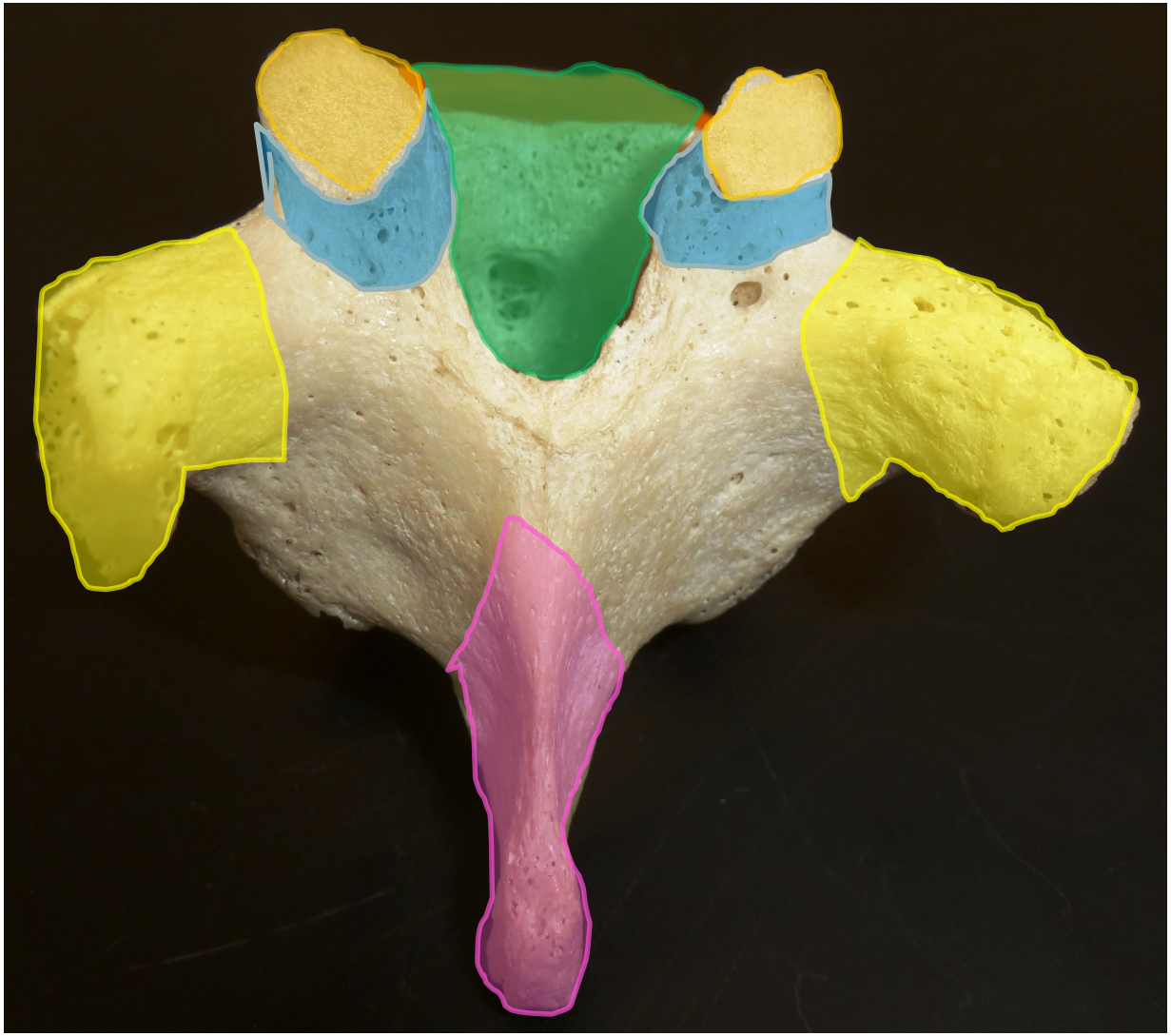
Spinous process (pink)

Transverse process (yellow)

Articular process (blue)

Articular facet: The surface on the process where the articulated vertebrae rub (Orange)

Body (Green)



The vertebral column

The Lumbar Vertebrae

Spinous process

Articular process

Transverse process

Articular facet:

Body

Vertebral foramen:
not visible in the photo

The vertebral column

The Lumbar Vertebrae

Spinous process (pink)

Articular process (blue)

Transverse process (yellow)

Articular facet: The surface on the process where the articulated vertebrae rub (orange)

Body (Green)

Vertebral foramen: not visible in the photo

The vertebral column

Make sure you look at all the vertebrae find **all** the structures on your handout on each one- **not everything is shown** in this slideshow. Use PAL and spend time in the lab

Manubrium

Body

Xiphoid process

Sternum:
Three specific bones fused together into one bone

Sternum, anterior view

You need to recognize the **specific bones** of the sternum disarticulated as well

Manubrium

Body

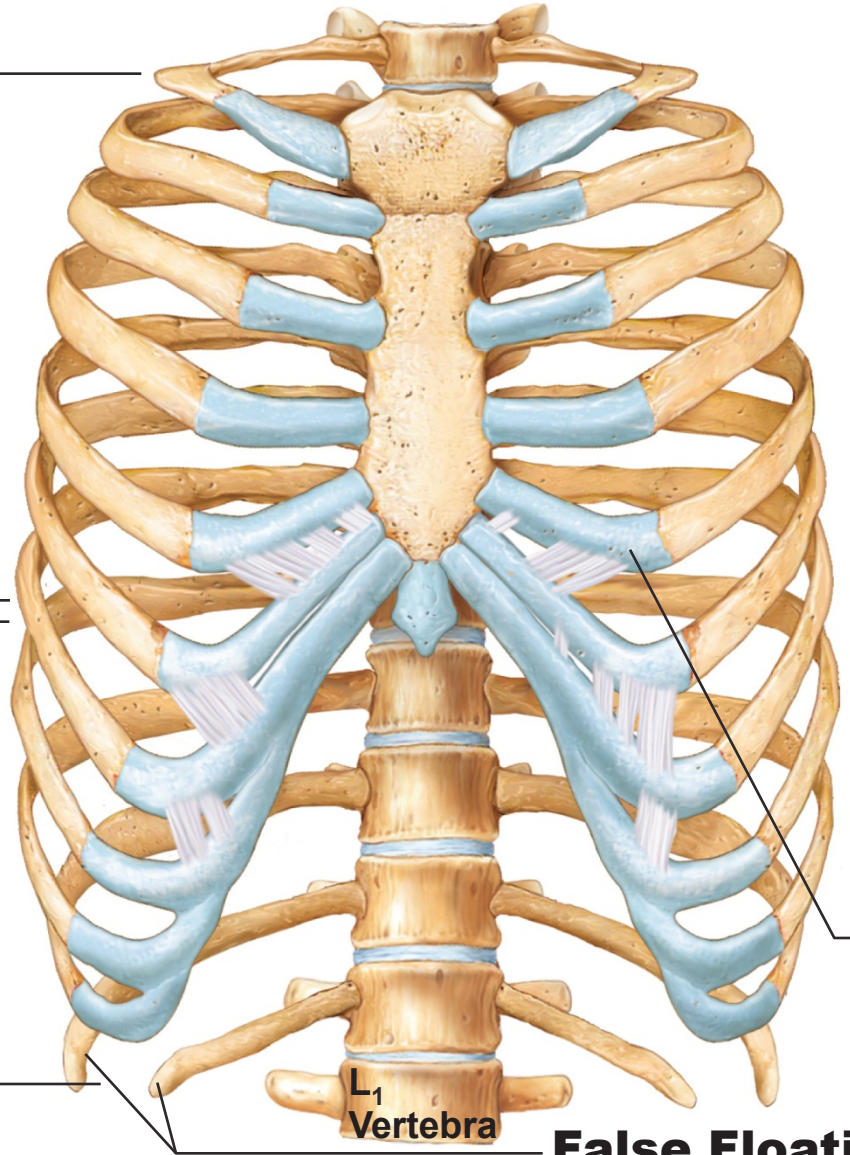
Xiphoid process: marked with orange tape

True ribs (1–7)

Connect directly to the sternum

False ribs (8–10)

Connect to the sternum via the costal cartilage of the rib above



These are the three types of ribs you need to know, and would be the answer to a “name the type of rib indicated” question.

Skeleton of the thoracic cage, anterior view

Rib

Head(yellow)

Neck (orange)

Shaft (pink)

Now follow your lab handout to complete the lab

Use PAL to get other views of the bones
and even rotate many of them around

Remember
QUIZ Next Week

Have Fun