

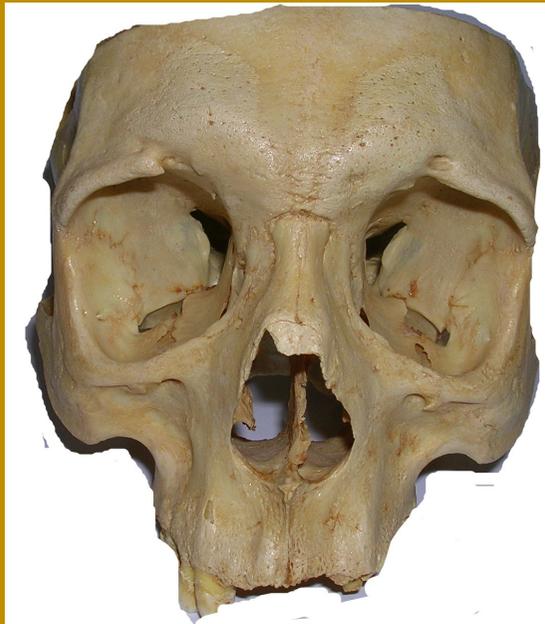


UNIVERSITATEA  
DE MEDICINĂ ȘI FARMACIE  
„VICTOR BABEȘ” DIN TIMIȘOARA

# HUMAN ANATOMY: THE SKULL (*Cranium*)

- TEXTBOOK, PICTURES, AND PRACTICE DIAGRAMS -

FOR DENTAL MEDICAL STUDENTS



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# I. THE BONES OF THE SKULL (*Cranium*)

**Alina Maria Şişu**

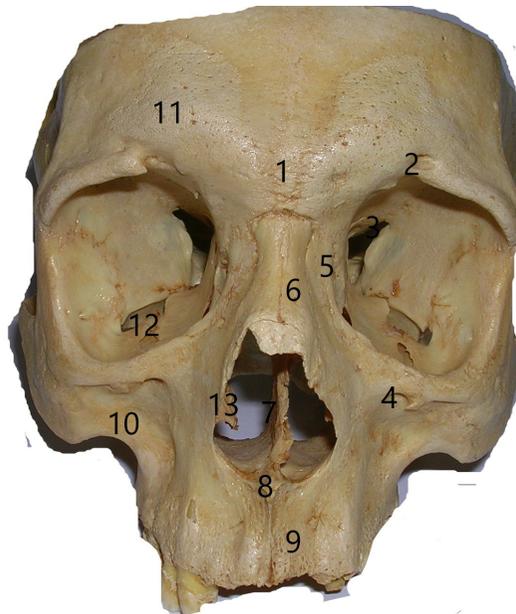
The skull consists of two parts:

*Neurocranium*, containing 8 bones:

- ✓ Occipital
- ✓ Parietal (2)
- ✓ Frontal
- ✓ Temporal (2)
- ✓ Sphenoid
- ✓ Ethmoid

*Viscerocranium*, 14 bones:

- ✓ Nasal (2)
- ✓ Maxillæ (2)
- ✓ Lacrimal (2)
- ✓ Zygomatic (2)
- ✓ Palatine (2)
- ✓ Inferior Nasal Conchæ (2)
- ✓ Vomer
- ✓ Mandible



**Figure 1: The skull seen from anterior view:** 1. Glabella; 2. Supraorbital foramen; 3. Superior orbital fissure; 4. Infraorbital foramen; 5. Lacrimal bone; 6. Nasal bone; 7. Nasal septum; 8. Anterior nasal spine; 9. Maxilla bone; 10. Malar/zygomatic bone; 11. Supraorbital arches; 12. Inferior orbital fissure; 13. Inferior nasal concha.

## **THE CRANIAL BONES (*Ossa Cranii*)**

### **1. The Occipital Bone (*Os Occipitale*)**

The occipital bone is situated at the posterior and inferior part of the skull.

It is perforated by an oval opening, the *foramen magnum*. It affords communication in between the cranial cavity and the spinal cord.

It consists of 4 parts:

- ✓ The squamous part;
- ✓ The basilar part,
- ✓ The lateral parts / condyles.

### The Squama (*squama occipitalis*)

The squama is located superior and posterior the foramen magnum, being is curved.

Surfaces:

The external surface presents:

- ✓ The external occipital protuberance;
- ✓ The highest nuchal line, giving attachment to the galea aponeurotica; is attached.
- ✓ The superior nuchal line (muscles attached: *Occipitalis*, *Trapezius*, *Sternocleidomastoideus* and *Splenius capitis*);
- ✓ The median nuchal line;
- ✓ The inferior nuchal line (muscles attached: *Recti capitis posteriores major* and *minor*).

The internal surface presents:

- ✓ The cruciate eminence;
- ✓ The superior two fossæ are triangular. They accomodate the occipital lobes of the cerebrum;
- ✓ The lower two are quadrilateral. They lodge the hemispheres of the cerebellum.
- ✓ The internal occipital protuberance.
- ✓ The superior sagittal sulcus,
- ✓ The internal occipital crest (gives attachment to *falx cerebelli*);
- ✓ The transverse sulci, on which the *tentorium cerebelli* inserts.
- ✓ The confluence of the venous sinuses.

### The Lateral Condyles (*pars lateralis*)

They articulate with the superior surfaces of the atlas vertebra.

At the base there is a canal, the hypoglossal canal.

It may be partial or complete broken down into two by a bony lamina.

It gives passage to the hypoglossal (CNXII).

Lateral to it there is the jugular process, concave anteriorly by the jugular notch. This which forms the posterior wall of the jugular foramen.

The inferior surface of the jugular process affords insertion to the *Rectus capitis lateralis* muscle.

The superior surface of the lateral condyle presents the jugular tubercle.

The Basilar Part (*pars basilaris*)

The basilar part presents:

- ✓ The pharyngeal tubercle affords insertion to the fibrous raphé of the pharynx.
- ✓ Lateral to the midline the *Longus capitis* and *Rectus capitis anterior* muscles are attached.
- ✓ The superior surface presents a sulcus which lodges the *medulla oblongata*. It gives attachment to the *membrana tectoria*.
- ✓ On its lateral borders there are the inferior petrosal sinuses.

The superior angle of the occipital bone articulates with the parietal bones.

The inferior angle is united with the sphenoid bone.

The lateral angles are grooving the transverse sinuse.

The superior borders last in between the superior and lateral angles.

Both form the lambdoid suture.

The inferior borders last from the lateral angles to the inferior angle.

The occipital bone articulates with: parietals, temporals, sphenoid, and atlas.

## 2. The Parietal Bone (*Os Parietale*)

The parietal bones form the lateral sides and the calvaria of the skull.

Each bone is squared in shape. It has two surfaces, four margins and four angles.

Surfaces

The external surface presents:

- The parietal eminence (*tuber parietale*);
- The superior and inferior temporal lines;
- *galea aponeurotica*, giving insertion to the *Temporalis* muscle;
- The parietal foramen gives passage to a vein that goes to the superior sagittal sinus.

The internal surface is concave. It presents:

- Depressions for the arachnoid granulations (Pacchionian bodies);
- The inner part of the parietal foramen.
- Fossae for the cerebral convolutions
- furrows for the ramifications of the superior sagittal sinus;

The borders

- ✓ The sagittal border articulates with its fellow opposite, giving rise to the sagittal suture.
- ✓ The squamous border comes in contact with the greater wing of the sphenoid, the squama of the temporal bone, and with the mastoid.
- ✓ The frontal border articulates with the frontal bone = the coronal suture.
- ✓ The occipital border articulates with the occipital forming one half of the lambdoid suture.

The angles

- ✓ The frontal angle = the point where the sagittal and coronal sutures meet.

It is called *Bregma*.

- ✓ The sphenoidal angle is located between the frontal and the sphenoid.
- ✓ The occipital angle corresponds to the meeting point of the sagittal and lambdoidal sutures= *Lambda*.
- ✓ The mastoid point articulates with the occipital bone and the mastoid = *Asterion*.

### 3. The Frontal Bone (*Os Frontale*)

The frontal contains two parts:

- ✓ A vertical portion, *the squama*;
- ✓ An orbital or horizontal part, which participate to form the ceiling of the orbital and nasal cavities.

The Squama (*Squama frontalis*)

Surfaces

The *external surface* presents:

- The frontal or metopic suture;
- The frontal eminence (*Tuber frontale*);
- The superciliary arches,
- The *Glabella*;
- The supraorbital border divides the squamous from the orbital part;
- The supraorbital foramen;
- The zygomatic process unites with the malar bone;
- The superior and inferior temporal lines;
- The nasal part;
- The nasal notch;
- The nasal spine.

The internal surface presents:

- The sagittal *sulcus*;
- The frontal crest;
- The sulcus lodges the superior sagittal sinus;
- The crest gives insertion to the *falx cerebri*;
- The *foramen caecum* by articulation with the ethmoid bone.

The Orbital or Horizontal Part (*Pars orbitalis*)

This portion consists of two orbital plates.

These form the roofs of the orbits. They are separated by the ethmoidal notch.

Surfaces

The inferior surface of the orbital plate presents:

- ✓ The lacrimal fossa, lodges the lacrimal gland;
- ✓ The *fovea trochlearis*.

The superior surface presents:

- ✓ The fossae for the frontal lobes of the cerebrum.
- ✓ The anterior ethmoidal canal.
- ✓ The posterior ethmoidal canal.
- ✓ The frontonasal duct.

Borders

- The border of the squamous part.
- The posterior border of the orbital plates.

They articulate with the wings of the sphenoid bone.

#### **4. The Temporal Bone (*Os Temporale*)**

Each bone consists of five parts:

- ✓ The Squamous part
- ✓ The petrous part
- ✓ The mastoid part
- ✓ The tympanic part
- ✓ The styloid process

The Squama (*Squama temporalis*)

Surfaces

Its external surface gives attachment to the *Temporalis* muscle.

It presents:

- The temporal line or supramastoid crest, gives attachment of the temporal fascia;
- The zygomatic process, gives attachment of the temporal fascia and part of the *Masseter* muscle.
- the anterior and posterior roots;
- The posterior root continues the temporal line;
- The anterior root is continuous with the lower border, the articular tubercle (*Eminentia articularis*);
- the suprameatal triangle or mastoid fossa;
- The mandibular fossa (Glenoid fossa) is divided into two regions by the petrotympanic fissure (Glaserian fissure).

The internal surface of the squama presents:

- ✓ fossae corresponding to the cerebral temporal lobe
- ✓ *sulci* for the filets of the middle meningeal artery.

Borders

The superior border forms an angle with the mastoid.

The antero-inferior border articulates with the greater wing of the sphenoid bone.

The Mastoid Portion (*Pars mastoidea*)

The mastoid portion forms the posterior part of the bone.

Surfaces

Its external surface:

- The larger foramen is the mastoid foramen;
- The mastoid process. It gives attachment to the *Sternocleidomastoid*, *Splenius capitis* and *Longissimus capitis* muscles;
- The mastoid notch (*Digastric fossa*);
- In the occipital sulcus runs the occipital artery.

The internal surface contains the sigmoid sulcus.

## Borders

The superior border of the mastoid units with the parietal bone.

The posterior border units with the occipital bone.

It presents:

- The mastoid cells;
- The tympanic antrum,
- The *tegmen tympani*, a bony blade which separates it from the middle cranial fossa.

## Petrous Portion (*Pars petrosa; Pyramis*)

The petrous portion or the pyramid is situated in between the sphenoid and the occipital bones.

It presents for examination:

- ✓ a base,
- ✓ an apex
- ✓ 3 surfaces,
- ✓ 3 angles.

It contains the organs of hearing and equilibrium.

## Base

The base units with the squama and mastoid parts.

## Apex

The apex is located in between the greater wing of the sphenoid bone and the basilar part.

## Surfaces

The anterior surface forms the backt of the middle cranial fossa.

It presents:

- The eminence (*Eminentia arcuata*);
- The hiatus of the facial canal;
- The opening for the lesser superficial petrosal nerve;

- The terminal part of the carotid canal;
- The trigeminal impression.

The posterior surface presents:

- The internal acoustic meatus which transmits the facial and acoustic nerves;
- The *tractus spiralis foraminosus*;
- The subarcuate fossa.

The inferior surface presents:

- the attachment area of the *Levator veli palatini* muscle;
- the cartilaginous part of the auditory tube;
- The aperture of the carotid canal, which transmits the internal carotid artery;
- *Aqueductus cochleæ* transmits a vein from the cochlea;
- The jugular fossa houses the bulb of the internal jugular vein;
- The small inferior tympanic *canaliculus* for the passage of the tympanic branch of the glossopharyngeal nerve;
- The mastoid *canaliculus* for the vagus nerve, its auricular twig;
- The jugular surface;
- The vaginal process;
- The styloid process;
- The stylomastoid foramen (facial nerve, stylomastoid artery are passing by);
- The tympanomastoid fissure.

Angles

The superior angle afford insertion to the *tentorium cerebelli*.

The posterior angle its lateral half presents the jugular fossa that participates in forming the jugular foramen.

The anterior angle has a lateral part, joined to the squama, and a medial part.

The Tympanic Part (*Pars tympanica*)

The tympanic part is a bony plate situated inferior the squamous part and anterior to the mastoid process.

#### Surfaces

The postero-superior surface forms the anterior wall, the floor, and part of the posterior wall of the bony external acoustic meatus.

It presents the tympanic *sulcus*.

It affords insertion to the tympanic membrane.

Its antero-inferior surface forms the the back of the mandibular fossa.

#### Borders

On its lateral border inserts the cartilaginous part of the external acoustic meatus.

Its superior border meets the posterior of the postglenoid process. .

#### The Styloid Process (*Processus styloideus*)

The styloid process runs inferior and anterior from the temporal bone.

It gives attachment to:

- ✓ the stylohyoid igament
- ✓ the stylomandibular ligament
- ✓ the *Styloglossus* muscle.,
- ✓ the *Stylohyoid* muscle.
- ✓ the *Stylopharyngeus* muscle.

### **5. The Sphenoid Bone (*Os Sphenoidale*)**

The sphenoid bone is situated at the base of the *cranium*. It is located anteriorly to the temporal bones and the basilar part of the occipital bone.

It is divided into:

- ✓ a median part or the body;
- ✓ two greater and two smaller wings;
- ✓ two pterygoid processes.

### The Body (*Corpus sphenoidale*)

The body is cuboidal in shape. It contains two cavities= the sphenoidal sinuses.

#### Surfaces

The superior surface presents:

- The ethmoidal spine, for articulation with the horizontal plate of the ethmoid bone;
- The optic groove,
- The optic chiasma;
- The optic foramen. The optic nerve and ophthalmic artery run into the orbital cavity;
- The *tuberculum sellæ*;
- The *sella turcica*, lodges the *hypophysis cerebri*;
- The middle clinoid processes;
- The *dorsum sellæ*,
- The posterior clinoid processes;
- The *clivus*, supports the superior part of the pons;
- The carotid groove, lodging the internal carotid artery and the cavernous sinus.

The posterior surface is joined to the basilar part of the occipital bone.

The anterior surface presents:

- ✓ The sphenoidal crest, which articulates with the perpendicular plate of the ethmoid. It participates in completing the septum of the nose.
- ✓ The lateral border of the anterior surface meets the *lamina papyracea* of the ethmoid;
- ✓ The lower border joins with the orbital process of the palatine bone, and the superior with the orbital plate of the frontal bone.

The inferior surface presents the sphenoidal *rostrum*.

### The Greater Wings (*Alæ magnæ*)

The greater wings are two processes of bone which are giving off from the sides of the body.

## Surfaces

The superior or cerebral surface forms part of the middle fossa of the skull.

It presents:

- The grooves for the convolutions of the temporal cerebral lobe;
- The *Foramen rotundum*, for the maxillary nerve;
- The *Foramen ovale*, for the mandibular nerve, the accessory meningeal artery;
- The *Foramen Vesalii*, for a vein given off the cavernous sinus;
- The *Foramen spinosum*, for the middle meningeal vessels.
- The mandibular nerve sends a recurrent fillet.

The lateral surface is separated by the infratemporal crest into two areas.

The superior or temporal area forms part of the temporal fossa. The *Temporalis* muscle inserts onto it.

The inferior or infratemporal area participate to form the infratemporal fossa. The *Pterygoideus externus* muscle inserts onto it.

The orbital surface forms the posterior part of the lateral wall of the orbit.

It unites with the orbital plate of the frontal bone. It helps in forming the inferior orbital fissure.

Its medial border participates in forming the superior orbital fissure. It gives attachment to the *Rectus lateralis oculi* muscle.

The Smaller Wings (*Alæ parvæ*)

The small wings or orbitosphenoid arise from the superior and anterior parts of the body. They descend laterally of it.

## Surfaces

The superior surface comes in contact with the frontal cerebral lobe.

The inferior surface forms the superior wall of the orbital cavities and part of the superior orbital fissure.

The superior orbital fissure transmits:

- ✓ The oculomotor, trochlear, and abducent nerves,
- ✓ The branches of the ophthalmic division (CNV),
- ✓ The filaments from the cavernous plexus (sympathetic),
- ✓ The orbital branch of the middle meningeal artery,
- ✓ The recurrent branch from the lacrimal artery,
- ✓ The ophthalmic vein.

## Borders

The anterior border articulates with the frontal bone.

The posterior border takes part in forming the lateral fissure of the brain.

Between the two roots of the smaller wing is the optic foramen. The optic nerve and ophthalmic artery are passing through here.

The Pterygoid Processes (*Processus pterygoidei*)

Each process contains:

- The pterygoid fissure;
- The pyramidal process;
- The pterygoid fossa, which affords insertion to the *Pterygoideus internus* and *Tensor veli palatini* muscles;
- The scaphoid fossa (the *Tensor veli palatini* muscle is inserted here);
- The pterygoid canal.

## The Lateral Pterygoid Plate

Its lateral lamina forms a bit of the infratemporal fossa- its medial wall.

It affords insertion to the *Pterygoideus externus* muscle.

The medial surface forms portion of the pterygoid fossa. It affords insertion to the *Pterygoideus internus* muscle.

The Medial Pterygoid Plate presents:

- The pterygoid hamulus;
- The pterygoid fossa;
- The vaginal process.

## 6. The Ethmoid bone (*Os Ethmoidale*)

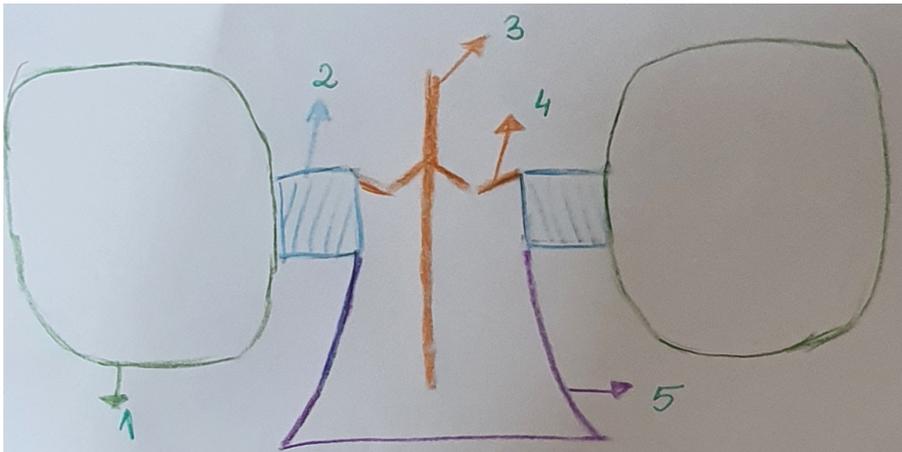
The ethmoid bone has a cuboidal shape.

It is situated in the front of the base of the skull.

It contributes to form the nasal and orbital cavities.

It consists of 4 elements:

- ✓ A horizontal or cribriform plate;
- ✓ A perpendicular plate;
- ✓ Lateral masses or labyrinths (2).



**Figure 2: The Ethmoid bone, overview:** 1. The orbital cavity; 2. The lateral masses or labyrinths; 3. The perpendicular plate of the ethmoid bone; 4. The horizontal or cribriform plate; 5. The nasal cavities.

The Cribriform Plate (*Lamina cribrosa*; horizontal *lamina*)

The cribriform plate enters into the ethmoidal notch of the frontal bone.

It presents:

- The *crista galli* gives insertion of the *falx cerebri*;
- The *foramen caecum*;
- The olfactory bulb (supported);
- The foramina for travelling the olfactory nerves;
- The foramen which transmits the nasociliary nerve.

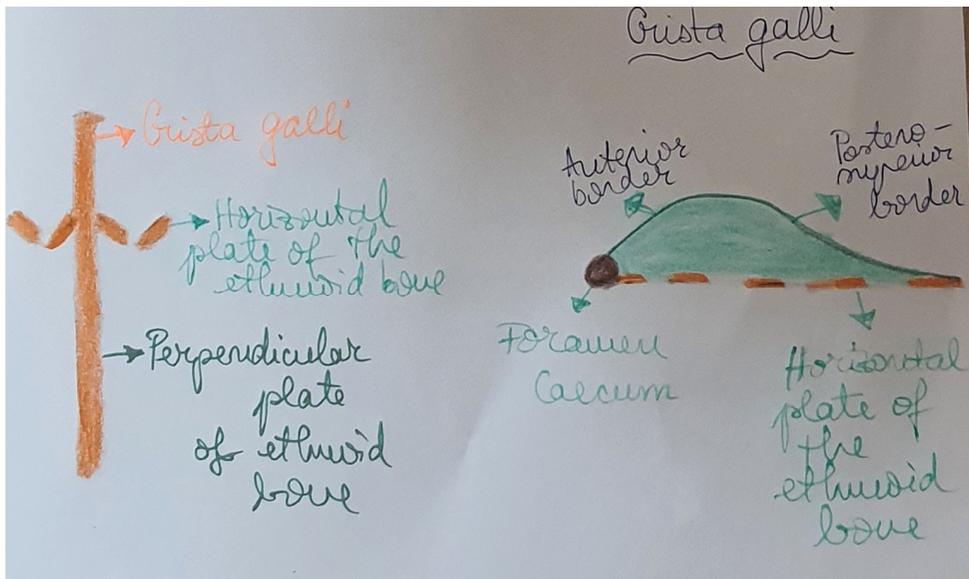
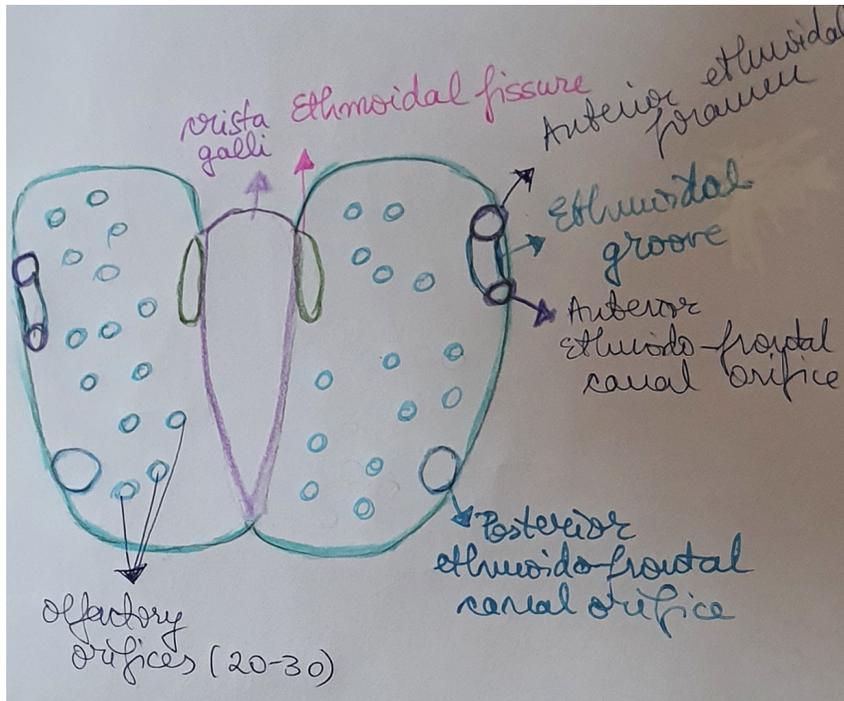


Figure 3: The ethmoidal plates



**Figure 4: The Cribriform Plate (*Lamina cribrosa*; horizontal lamina) of the ethmoid bone.**

The Perpendicular Plate (*Lamina perpendicularis*)

The perpendicular plate form the septum of the nose.

The Labyrinths/Lateral Mass (*Labyrinthus ethmoidalis*)

It consists of a cells, the ethmoidal cells.

They are broken down into three groups, anterior, middle, and posterior. The lateral plate contributes to the orbit, and the medial part of the nasal cavity.

Surfaces

The superior surface presents a number of semicells.

The posterior surface is formed of larger cavities.

The lateral surface is formed by the *Lamina papyracea (Os planum)*.

It forms a part of the medial wall of the orbit.

It articulates with:

- ✓ the orbital plate of the frontal bone,
- ✓ the maxilla
- ✓ the orbital process of the palatine,
- ✓ the lacrimal,
- ✓ the sphenoid.

The uncinat process and the *infundibulum* are also parts of the labyrinths.

## **THE FACIAL BONES (*Ossa faciei*)**

### **1. The Nasal Bone (*Os Nasale*)**

The nasal bones are two bones placed side by side at the middle and superior part of the face.

Each has two surfaces and four borders.

Surfaces

The external surface is convex.

It is covered by the *Procerus* muscle.

The internal surface is concave.

It has a groove for the nasociliary nerve.

Borders

The superior border unites with the nasal notch of the frontal.

The lateral cartilage inserts onto the inferior border.

The lateral border unites with the frontal process of the maxilla.

The medial border articulates with its fellow opposite.

It is prolonged posteriorly into a vertical crest, participating in forming the superior nasal septum.

This articulates with:

- ✓ the spine of the frontal,
- ✓ the perpendicular plate of the ethmoid
- ✓ the septal nasal cartilage.

## 2. The *Maxilla* (Upper Jaw)

The two *maxillæ* join forming the superior part of the jaw.

Each contributes to form the limits of some cavities:

- ✓ the mouth,
- ✓ the nose
- ✓ the orbit.

It participates to:

- ✓ the infratemporal fossa
- ✓ the pterygopalatine fossa
- ✓ the inferior orbital fissure
- ✓ the pterygomaxillary fissure.

Each has a body and 4 processes:

- ✓ zygomatic,
- ✓ frontal,
- ✓ Alveolar
- ✓ palatine.

The Body (*Corpus maxillæ*)

The body contains the maxillary sinus (Highmore).

It has 4 surfaces:

- ✓ Anterior
- ✓ Posterior / infratemporal

- ✓ Superior /orbital
- ✓ Medial / nasal

## Surfaces

The anterior surface presents on its inferior part buldges corresponding the roots of the teeth.

- The incisive fossa, for insertion of the *Depressor alæ nasi* muscle;
- The canine fossa;
- The canine fossa affords insertion to the *Caninus* muscle;
- The infraorbital foramen, finishes as the infraorbital canal;
- The orbital border gives insertion to fibres of the *Quadratus labii superioris* muscle;
- The nasal notch, for the insertion of the Dilatator naris muscle,
- The anterior nasal spine.

The infratemporal surface forms part of the infratemporal fossa.

- Presents the openings of the alveolar canals.
- The posterior superior alveolar vessels and nerves are passing through them;
- The maxillary tuberosity joins with the pyramidal process of the palatine.
- The lateral pterygoid plate of the sphenoid joins also;
- It affords insertion to the *Pterygoideus internus* muscle.

The orbital surface forms the floor of the orbit.

It presents:

- The lacrimal notch;
- The infraorbital sulcus allows passage to the infraorbital vessels and nerve.

The nasal surface presents:

- The pterygopalatine canal opens into the maxillary sinus;
- The lacrimal groove=> the nasolacrimal canal;
- It opens into the inferior meatus;
- The conchal crest.

## The Processes

### The Zygomatic Process (*Processus zygomaticus*)

Is situated at the angle of the anterior, zygomatic, and orbital surfaces.

### The Frontal Process (*Processus frontalis*; nasal process)

- Is a strong plate by the lateral parts of the nose, forming part of its lateral wall;
- Gives attachment to the *Quadratus labii superioris* and the *Orbicularis oculi* muscles
- the medial palpebral ligament;
- The lacrimal fossa;
- The anterior lacrimal crest.

### The Alveolar Process (*Processus alveolaris*)

- It is convex by the cavities of the teeth.
- They are eight.
- The alveolar arch.

### The Palatine Process (*Processus palatinus*)

- It forms the inferior wall of the nose and the superior wall of the oral cavity;
- The incisive foramen;
- The orifices of the incisive canals;
- The premaxilla (*os incisivum*);
- The nasal crest;
- The incisor crest forms the anterior nasal spine.

## 3. The Lacrimal Bone (*Os Lacrimale*)

The lacrimal bone is situated at the anterior aspect of the medial wall of the orbital cavity.

It has 2 surfaces and 4 borders.

### Surfaces

The lateral or orbital surface:

- The lacrimal groove (*Sulcus lacrimalis*) unites with the frontal process of maxilla and the lacrimal fossa;
- The superior part of this fossa containing the lacrimal sac;
- The lacrimal *hamulus*.

The medial or nasal surface forms part of the middle meatus of the nose.

It articulates with the ethmoid bone.

Borders

- The anterior border unites with the frontal process of maxilla;
- The posterior border with the lamina papyracea of the ethmoid;
- The superior border with the frontal;
- The inferior border is divided into two areas.

#### **4. The Zygomatic Bone (*Os Zygomaticum*; Malar Bone)**

The zygomatic bone is situated at the superior and lateral part of the face.

It forms:

- ✓ the cheek,
- ✓ part of the lateral wall and inferior wall of the orbital cavity
- ✓ parts of the temporal and infratemporal *fossæ*.

It presents:

- ✓ a malar and a temporal surface;
- ✓ four processes:
  - ✓ the frontosphenoidal,
  - ✓ orbital, maxillary
  - ✓ temporal;
- ✓ four borders;

Surfaces

The malar surface contains the zygomaticofacial foramen. The zygomaticofacial nerve and vessels are running through it.

It affords insertion to the *Zygomaticus* muscle.

The temporal surface articulates with the maxilla.

It participates in forming the anterior border of the temporal fossa, also the inferior part of the infratemporal fossa.

- The zygomaticotemporal foramen transmits the zygomaticotemporal nerve.

#### Processes

- ✓ The fronto sphenoidal process unites with zygomatic process of the frontal.
- ✓ The orbital process.
- ✓ The maxillary process articulates with maxilla.
- ✓ The temporal process articulates with the zygomatic process of temporal.

#### Borders

- ✓ The antero-superior/ orbital border.
- ✓ The antero-inferior/ maxillary border articulates with the maxilla. The *Quadratus labii superioris* muscle inserts there.
- ✓ The postero-superior/temporal border: gives origin to the temporal fascia.
- ✓ The postero-inferior /zygomatic border gives origin to the *Masseter* muscle.

### **5. The Palatine Bone (*Os Palatinum*; Palate Bone)**

The palatine bone is situated at the posterior part of the nasal cavity between maxilla and pterygoid process of the sphenoid.

It contributes to the walls of cavities: the inferior and lateral walls of the nasal cavity, the superior wall of the mouth, and the inferior wall of the orbit;

It participates to form two *fossæ*, the pterygopalatine and pterygoid *fossæ*; and the inferior orbital fissure;

It consists of a vertical part and three processes: the pyramidal process, the orbital and sphenoidal processes.

The Horizontal Part (*Pars horizontalis*; horizontal plate)

The horizontal part has two surfaces and four borders.

Surfaces

- ✓ The superior surface forms the posterior aspect of the floor of the nasal cavity.
- ✓ The inferior surface forms the posterior fourth of the hard palate.

Borders

- ✓ The anterior border articulates with the palatine process of the maxilla.
- ✓ The posterior border gives attachment of the soft palate. It forms the posterior nasal spine that gives attachment of the *Musculus uvulæ*.
- ✓ The lateral border is united with the inferior border of the perpendicular part. It is run by the pterygopalatine canal.
- ✓ The medial border articulates with its fellow on the opposite side. It forms the nasal crest. It articulates with the vomer.

The Vertical Part (*Pars perpendicularis*; perpendicular plate)

It presents 2 surfaces and 4 borders.

Surfaces

The nasal surface forms part of the inferior meatus.

It presents joints:

- The conchal crest with the inferior nasal concha;
- The ethmoidal crest with the middle nasal concha;
- The maxillary surface with the nasal surface of maxilla;

- The pterygopalatine canal, which transmits the descending palatine vessels and the anterior palatine nerve.

#### Borders, joints

- ✓ The anterior border has the maxillary process.
- ✓ The posterior border with the medial pterygoid plate of the sphenoid.
- ✓ The superior border the orbital process and the sphenoidal process.

These processes are separated by the sphenopalatine notch converted into the sphenopalatine foramen by the inferior surface of the body of the sphenoid.

It transmits the sphenopalatine vessels, the superior nasal and nasopalatine nerves.

- ✓ The inferior border is grooved by the part of the pterygopalatine canal.

#### The Pyramidal Process or Tuberosity (*Processus pyramidalis*)

- ✓ The pyramidal process stays into the space between the inferior parts of the pterygoid plates. It gives origin to the *Pterygoideus internus* muscle.
- ✓ The anterior part of lateral surface articulates with the tuberosity of the maxilla.
- ✓ The lesser palatine foramina.

#### The Orbital Process (*Processus orbitalis*)

It presents five surfaces. Of these surfaces 3 are articular and 2 non-articular.

The articular surfaces are:

- ✓ The anterior or maxillary with maxilla;
- ✓ The posterior or sphenoidal with the sphenoidal concha;
- ✓ The medial or ethmoidal with the labyrinth of the ethmoid.

The non-articular surfaces are:

- ✓ The superior or orbital forms the floor of the orbit;
- ✓ The lateral enters into the formation of the inferior orbital fissure.

The Sphenoidal Process (*Processus sphenoidalis*)

It presents:

- ✓ The superior surface uniting with the pterygoid process.
- ✓ The medial surface forms the lateral wall of the nasal cavity.
- ✓ The lateral surface is divided into an articular and a non-articular portion: for articulation with the medial pterygoid plate;
- ✓ The anterior border participates in forming the posterior wall of the sphenopalatine notch.
- ✓ The posterior border meets the medial pterygoid plate.
- ✓ The sphenopalatine notch.

## **6. The Inferior Nasal Concha (*Concha Nasalis Inferior*; Inferior Turbinate Bone)**

The inferior nasal concha has:

- ✓ 2 surfaces,
- ✓ 2 borders
- ✓ 2 extremities.
- ✓ medial surface.
- ✓ lateral surface forms part of the inferior meatus.
- ✓ The superior border .
- ✓ The lacrimal process ;
- ✓ The ethmoidal process
- ✓ The maxillary process .

## 7. The Vomer (*Vomer*)

It forms the postero- inferior part of the nasal septum.

It has 2 surfaces and 4 borders.

- ✓ The superior border receives the rostrum of the sphenoid. The borders of the wings articulate with vaginal processes of the medial pterygoid plates, and the sphenoidal processes of the palatine bones.
- ✓ The inferior border articulates with the crest formed by the *maxillæ* and palatine bones.
- ✓ The anterior border unites with the perpendicular plate of the ethmoid.
- ✓ The posterior border separates the *choanæ*.

## 8. The Mandible (*Mandibula*)

The mandible contains the inferior teeth.

It consists of the body and 2 perpendicular structures, *the rami*.

The Body (*Corpus mandibulæ*)

The body resembles with a horseshoe.

It has 2 surfaces and 2 borders.

Surfaces

The external surface contains in the midline a ridge.

There is the mental protuberance. Inferior to this there is the mental tubercle.

It presents:

- The incisive fossa, on which the *Mentalis muscle* and to the *Orbicularis oris* muscle insert;
- The mental foramen;
- The oblique line for the *Quadratus labii inferioris* muscle;

The internal surface

It presents:

- The mental spines allow insertion of the *Genioglossi* muscles;
- Below the mental spines is a depression for the insertion of the anterior belly of the *Digastricus* muscle;
- The mylohyoid line affords origin to the Mylohyoid muscle and to part of the *Constrictor pharyngis superior* muscle;
- A fossa for submaxillary gland.

Borders

The superior or alveolar border contains sixteen cavities of the teeth.

The Ramus (*Ramus mandibulæ*)

It has 2 surfaces, 4 borders and 2 processes.

Surfaces

The lateral surface gives attachment to the *Masseter* muscle.

The medial surface presents the mandibular foramen.

The inferior alveolar vessels and nerve run through it.

It presents:

- *Lingula mandibulæ* affords insertion to the sphenomandibular ligament;
- The mylohyoid sulcus affords passage to the mylohyoid vessels and nerve;
- The mandibular canal gives passage to the inferior alveolar vessels, and the inferior alveolar nerve;
- The angle of the mandible for the attachment of the *Masseter* muscle laterally and the *Pterygoideus internus* muscle medially;

Borders

- ✓ The anterior border continues with the oblique line.
- ✓ The posterior border is in relation with the parotid gland.

- ✓ The superior border has two processes, the coronoid anteriorly and the condyloid posteriorly, separated by the mandibular notch.

The Coronoid Process (*Processus coronoideus*)

- ✓ Its anterior border continues inferiorly with anterior border of the *ramus*.
- ✓ Its posterior border forms the anterior wall of the mandibular notch.
- ✓ Its lateral surface gives attachment to the *Temporalis* and *Masseter* muscles.
- ✓ Its medial surface gives insertion to the *Temporalis* and the *Buccinator* muscles.

The Condyloid Process (*Processus condyloideus*) consists of two elements: the condyle, and the neck.

The condyle presents an articular surface for the articular disk of the temporomandibular joint.

At the lateral extremity of the condyle is a tubercle for the attachment of the temporomandibular ligament.

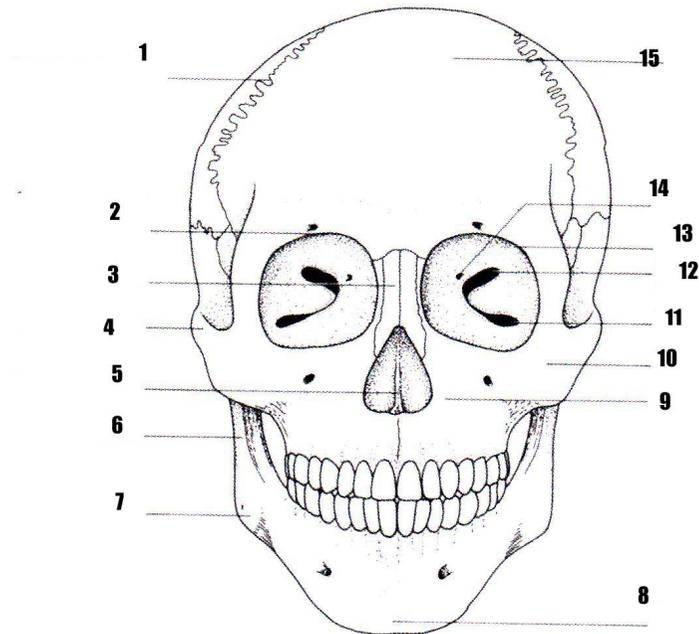
The neck presents gives attachment to the *Pterygoideus externus* muscle.

The mandibular notch separates the two processes.

It is channeled by the masseteric vessels and the masseteric nerve.

## II. THE EXTERIOR OF THE SKULL (*Exocranium*)

Codruța Ileana Petrescu



**Figure 5.:The skull, anterior view** 1. coronal suture; 2. supraorbital border; 3. nasal bone; 4. zygomatic arch; 5. nasal septum; 6. ramus of mandible; 7. angle of mandible; 8. mental protuberance. 9. maxilla; 10. zygomatic bone; 11. inferior orbital fissure; 12. superior orbital fissure; 13. lateral wall of orbit; 14. optic foramen; 15. frontal bone.

The skull as a whole can be seen from different perspectives.

These terms are called the *normæ* of the skull. There are:

*Norma verticalis*, seen from superior,

*Norma basalis*, seen from inferior,

*Norma lateralis*, seen from the lateral aspects of the skull,

*Norma occipitalis*, seen from posterior,

*Norma frontalis*, seen from anterior.

## ***Norma Verticalis***

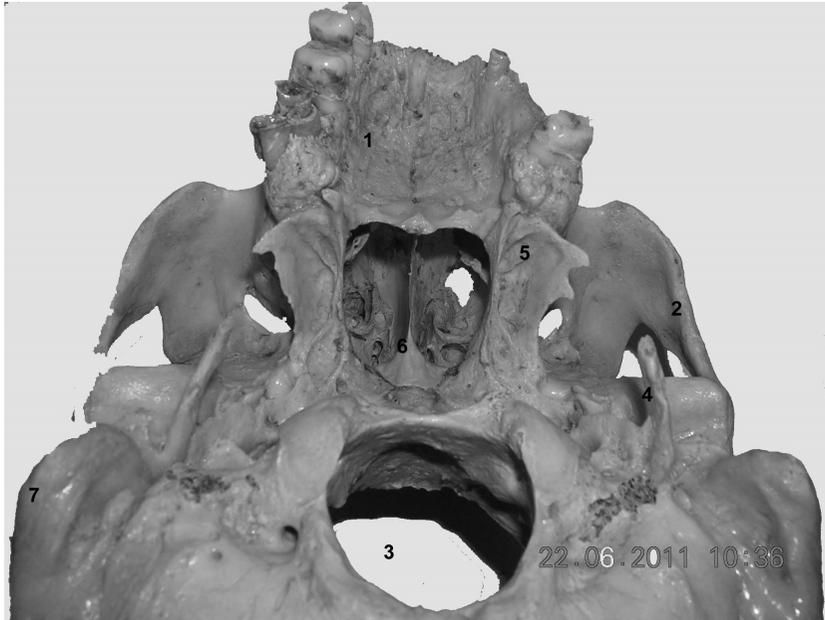
The surface of the skull presents three sutures:

- ✓ The coronal sutures between the frontal and the parietals bones;
- ✓ The sagittal sutures between the parietal bones;
- ✓ The lambdoidal suture between the parietals and the occipital bones.
- ✓ The junction area of the sagittal and coronal suture, *Bregma*
- ✓ The junction of the sagittal and lambdoid sutures, *Lambda*;
- ✓ Lateral to the sagittal suture is the parietal eminence=*Obelion*;
- ✓ Anterior, *Glabella*;
- ✓ The superciliary arches;
- ✓ The temporal lines=the superior limits of the temporal *fossæ*.

## ***Norma Basalis***

- ✓ Anteriorly = the incisor teeth of the *maxillæ*;
- ✓ The superior nuchal lines( occipital);
- ✓ The alveolar arch;
- ✓ The incisive *foramen*;
- ✓ The openings of the incisive canals. They afford passage of the descending palatine vessels, and the nasopalatine nerves;
- ✓ The greater palatine foramen,;
- ✓ The pyramidal process of the palatine bone;
- ✓ The *choanæ*;
- ✓ The scaphoid fossa affords insertion to the origin of the *Tensor veli palatini* muscle;
- ✓ The basilar portion of the occipital bone with the pharyngeal tubercle;
- ✓ The *foramen ovale* ( mandibular nerve, accessory meningeal artery);

- ✓ The *foramen spinosum* (the middle meningeal vessels);
- ✓ The mandibular *fossa* articulates with the condyle of the mandible;
- ✓ The styloid process;
- ✓ The stylomastoid *foramen* (facial nerve and stylomastoid artery);
- ✓ The tympanomastoid fissure;
- ✓ The mastoid notch;
- ✓ The occipital groove for passage of the occipital artery;
- ✓ The *foramen lacerum*;
- ✓ The carotid canal;
- ✓ The *aquæductus cochleæ*, (the internal carotid artery and the carotid plexus);
- ✓ The Jugular *foramen* (inferior petrosal sinus, glossopharyngeal, vagus, and accessory nerves);
- ✓ The inferior tympanic *canaliculus* (tympanic branch of glossopharyngeal nerve);
- ✓ The *Foramen magnum* (*medulla oblongata*, accessory nerves, vertebral arteries, the anterior and posterior spinal arteries);
- ✓ The craniometric points *Basion* and *Opisthion*;
- ✓ The canal for the passage of the hypoglossal nerve and a meningeal artery;
- ✓ The external occipital protuberance;
- ✓ The superior and inferior nuchal lines.



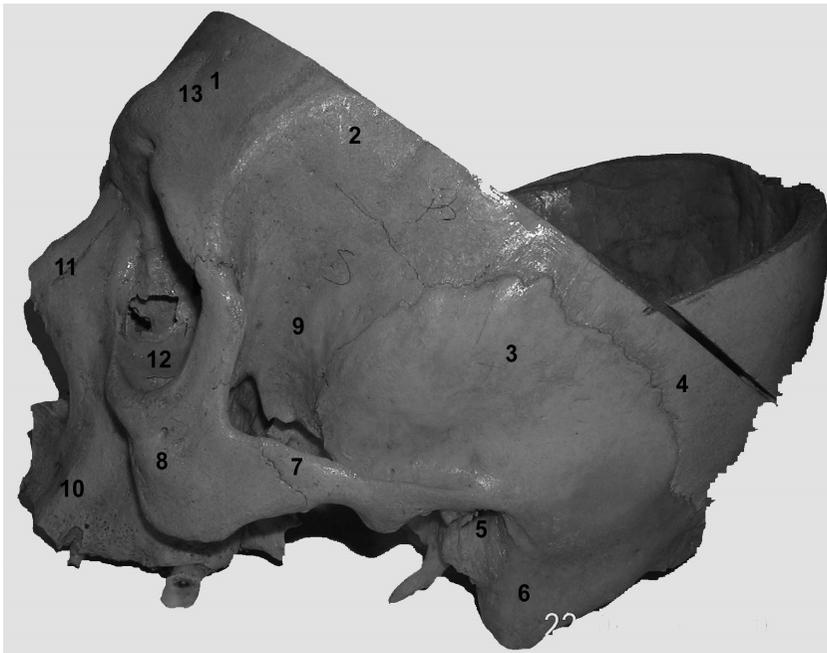
**Figure 6.: The skull, inferior aspect** 1. maxilla, the base; 2. zygomatic arch; 3. foramen magnum; 4. styloid process of temporal bone; 5. pterygoid fossa; 6. vomer; 7. mastoid part of temporal bone.

### ***Norma Lateralis***

It presents:

- ✓ The zygomaticotemporal suture = zygomatic process of temporal and temporal process of zygomatic;
- ✓ The zygomaticofrontal suture between the zygomatic bone to zygomatic process of frontal;
- ✓ The sphenozygomatic suture;
- ✓ The sphenofrontal and sphenoparietal sutures;
- ✓ The sphenosquamosal suture;
- ✓ The posterior of the sphenoparietal suture= *Pterion*;
- ✓ The squamosal suture = temporal squama with the parietal bone;
- ✓ The coronal and lambdoid sutures;

- ✓ The occipitomastoid suture=occipital and the mastoid;
- ✓ The mastoid foramen ,emissary vein;
- ✓ The meeting of parietomastoid, occipitomastoid, and lambdoidal sutures = *Asterion*;
- ✓ The superciliary arch;
- ✓ The frontal eminence;
- ✓ The parietal eminence;
- ✓ The external occipital protuberance= *Inion*;
- ✓ The temporal lines.



**Figure 7: The skull, lateral view,** 1.frontal bone; 2. parietal bone; 3. temporal bone; 4. occipital bone; 5. external acoustic meatus; 6. mastoid part; 7. zygomatic process of temporalis; 8. zygomatic bone; 9. maxilla; 10. maxilla; 11. nasal bone; 12. floor of the orbit; 13. frontal eminence.

### ***Norma Occipitalis***

- ✓ The sagittal suture unites the parietal bones;
- ✓ Lambdoid suture unites the parietals with the occipital;
- ✓ The external occipital protuberance;
- ✓ The superior nuchal line;
- ✓ The highest nuchal attaches the *ligamentum nuchæ*;
- ✓ The mastoid foramen.

### ***Norma Frontalis***

- ✓ The anterior nasal aperture;
- ✓ The frontal eminences;
- ✓ The superciliary arches
- ✓ The *Glabella*;
- ✓ The frontal suture;
- ✓ The supraorbital notch/foramen (supraorbital nerve and vessels);
- ✓ The anterior nasal spine;
- ✓ The infraorbital foramen (infraorbital nerve and vessels);
- ✓ The zygomaticofacial foramen (zygomaticofacial nerve);
- ✓ The incisive fossa;
- ✓ The mental foramen (mental nerve and vessels).



**Figure 8 .:The skull, anterior view:**1. frontal bone; 2. metopic suture; 3. supraorbital border; 4. orbit; 5. zygomatic bone; 6. nasal bone; 7. vomer; 8. maxilla; 9. frontal prominences; 10. parietal bone; 11. superior orbital fissure.

### III. THE INTERIOR OF THE SKULL, (*ENDOCRANIUM*)

Laura Octavia Grigoriță

The inner surface of the skull presents:

- ✓ The arachnoid granulations;
- ✓ The openings of the parietal *foramina* ;
- ✓ The coronal suture;
- ✓ The lambdoidal suture;
- ✓ The sagittal suture.

The superior surface of the base of the skull presents three *fossæ*: the anterior, middle, and posterior.



**Figure 9: The skull, interior view** 1. frontal fossa; 2. *crista galli*; 3. lesser wing of sphenoid; 4. sella turcica; 5. petrous part of temporal bone; 6. occipital fossa.

## **The Anterior Cranial Fossa (*Fossa cranii anterior*)**

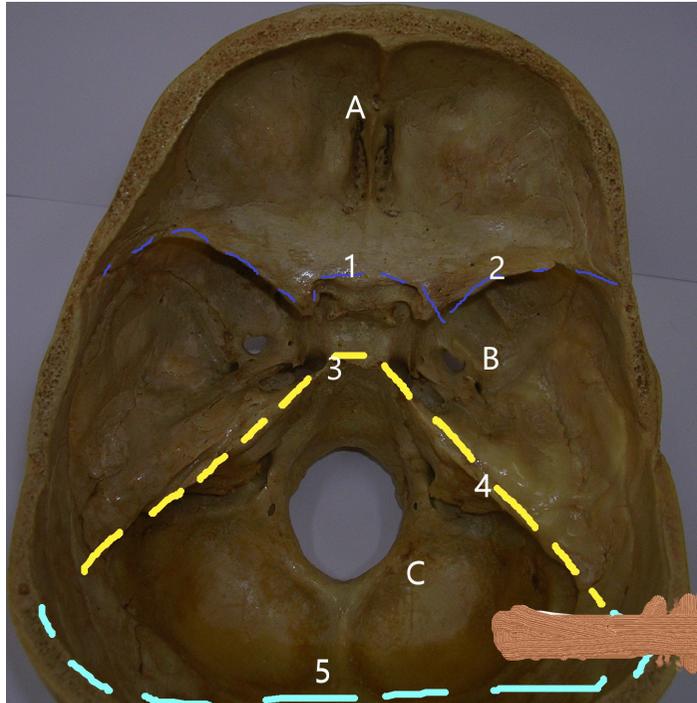
The inferior wall of the anterior cranial fossa is formed by:

- ✓ The orbital plates of frontal;
- ✓ The horizontal plate of the ethmoid;
- ✓ The small wings and anterior part of the body of the sphenoid bone;

It is limited in the back by the small wings of the sphenoid and the chiasmatic sulcus.

It presents:

- ✓ The frontoethmoidal, sphenothmoidal and sphenofrontal sutures;
- ✓ The frontal crest ( *falx cerebri* inserts onto it);
- ✓ The *Foramen Caecum* between frontal and *crista galli* ;
- ✓ The *Crista Galli* (rooster crest) gives insertion to the *falx cerebri*;
- ✓ The olfactory groove supports the olfactory bulb. It presents 20-25 *foramina* for the olfactory nerves;
- ✓ The anterior and posterior ethmoidal holes;
- ✓ The ethmoidal spine.



**Figure 10: The Endocranial surface** A=anterior cranial fossa; B=middle cranial fossa; C=posterior cranial fossa, 1. Sphenoidal limbus (anterior margin of the chiasmatic groove); 2. Posterior borders of the lesser wings of the sphenoid; 3. Dorsum sellae of the sphenoid bone; 4. Superior borders of the petrous part of the temporal bone; 5. Groove for transverse sinus of the occipital bone.

### **The Middle Cranial Fossa (*Fossa cranii media*)**

It is limited as follows:

- ✓ Anteriorly, by the posterior borders of the lesser sphenoidal wings, the anterior clinoid processes, and the chiasmatic sulcus;
- ✓ Posteriorly, by the superior angles of the petrous portions of the temporals and the *dorsum sellæ*;
- ✓ Laterally, by the temporal *squamæ*, sphenoidal angles of the parietals and greater wings of the sphenoid bone.

It presents:

- ✓ The chiasmatic groove and *tuberculum sellæ*;
- ✓ The optic foramen (optic nerve and ophthalmic artery);
- ✓ The anterior clinoid process (the *tentorium cerebelli* inserts onto it);
- ✓ The *sella turcica*, (fossa hypophyseos),
- ✓ The middle clinoid processes;
- ✓ The *dorsum sellæ*;
- ✓ The posterior clinoid process (the *tentorium cerebelli* inserts onto it);
- ✓ The carotid sulcus (internal carotid artery).

The apertures are:

- ✓ The superior orbital fissure transmits the oculomotor/CNIII, trochlear/CNIV, ophthalmic part of the trigeminal/CNV, and abducent / CNVI nerves;
- ✓ The *Foramen rotundum* ( maxillary nerve);
- ✓ The *Foramen ovale* (mandibular nerve, the accessory meningeal artery );
- ✓ The *Foramen Vesalii* ( small vein);
- ✓ The *Foramen spinosum* (middle meningeal vessels and a recurrent branch from the mandibular nerve);
- ✓ The *Foramen lacerum* transmits ( internal carotid artery);
- ✓ The hiatus of the facial canal (greater superficial petrosal nerve and middle meningeal artery-petrosal twig).

## **The Posterior Cranial Fossa (*Fossa cranii posterior*)**

It presents the following structures:

- ✓ The *dorsum sellæ* and *clivus* of sphenoid;
- ✓ The occipital bone;

- ✓ The petrous part and mastoid part of temporal;
- ✓ The mastoid angles of parietal.
- ✓ The occipitomastoid and the parietomastoid sutures;
- ✓ contains *cerebellum*, *pons* and *medulla oblongata*;

It presents the following *foramina*:

- ✓ The *Foramen magnum*;
- ✓ The hypoglossal canal (hypoglossal nerve);
- ✓ The jugular foramen (inferior petrosal sinus, transverse sinus, meningeal branches from the occipital artery, ascending pharyngeal artery, glossopharyngeal nerve, vagus nerve, and accessory nerve);
- ✓ The internal acoustic meatus (facial nerve, vestibulocochlear nerve, internal auditory artery);
- ✓ The inferior occipital fossæ ( *cerebellum*);
- ✓ The internal occipital crest ( *falx cerebelli* insertion);
- ✓ The transverse sinuses;
- ✓ The orifice of the mastoid foramen.

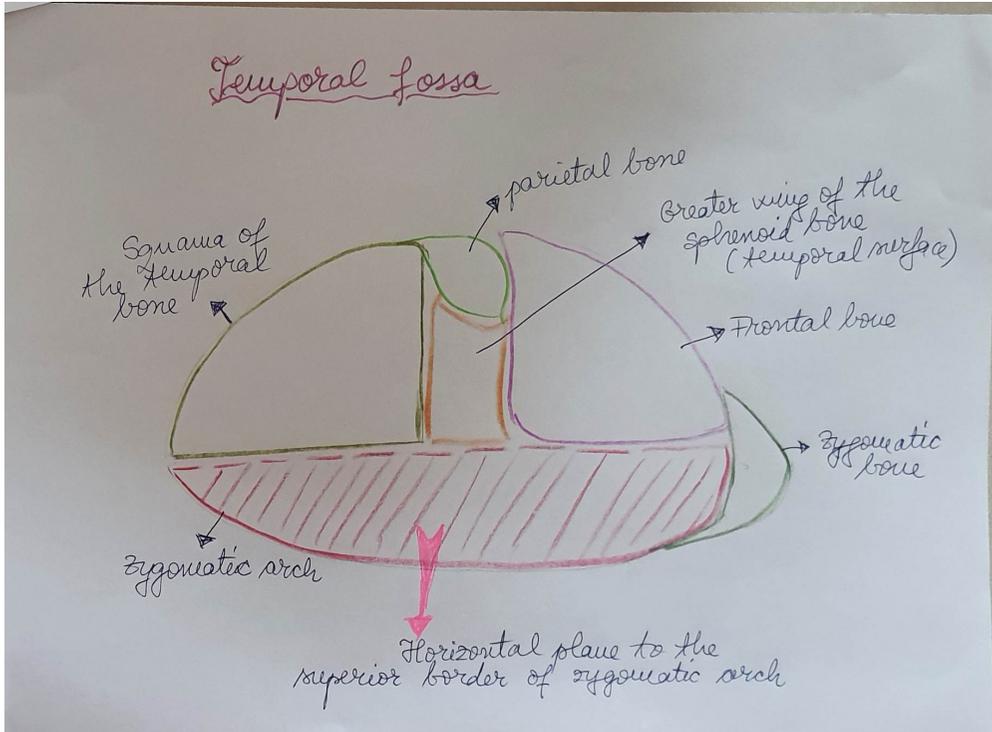
## IV. CAVITIES AND FOSSAE IN THE SKULL

Alina Maria Şişu

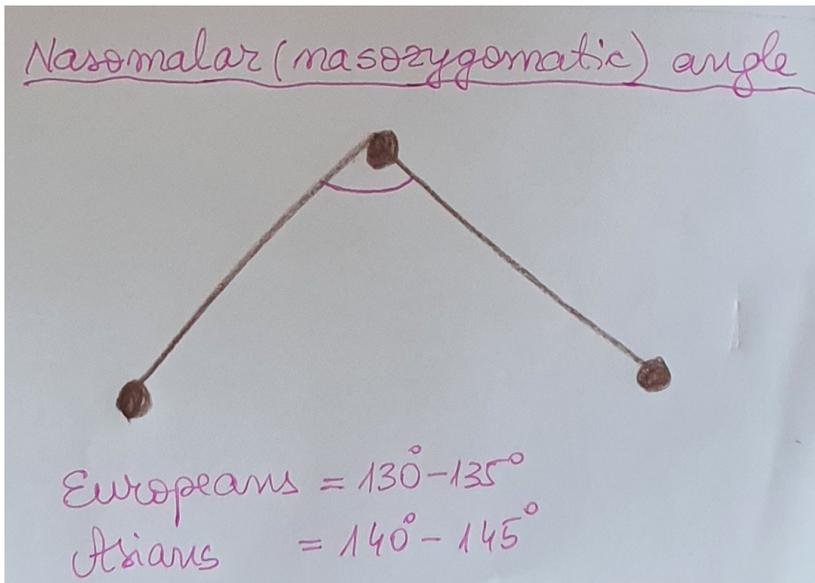
### 1. The Temporal Fossa (*Fossa temporalis*)

The temporal fossa is limited by:

- ✓ Anteriorly: frontal and zygomatic, and zygomaticotemporal foramen;
- ✓ Laterally, the zygomatic arch;
- ✓ Inferiorly, it is separated from the infratemporal fossa;
- ✓ Anterior and inferior the temporal fossa communicates with the orbital cavity;
- ✓ The temporal fossa content: *Temporalis* muscle, the zygomaticotemporal nerve;
- ✓ The zygomatic arch= zygomatic process of the temporal+ temporal process of malar;
- ✓ The superior border affords insertion to the temporal fascia and to the Masseter muscle;
- ✓ The external acoustic meatus is limited anterior, posterior, and inferior by the tympanic part of the temporal bone;
- ✓ The suprameatal triangle;
- ✓ The suprameatal spine;
- ✓ The mandibular fossa;
- ✓ The styloid process affords insertion to the *Styloglossus*, *Stylohyoid* and *Stylopharyngeal* muscles and to the stylohyoid and stylomandibular ligaments.



**Figure 11: The bones which form the temporal fossa**



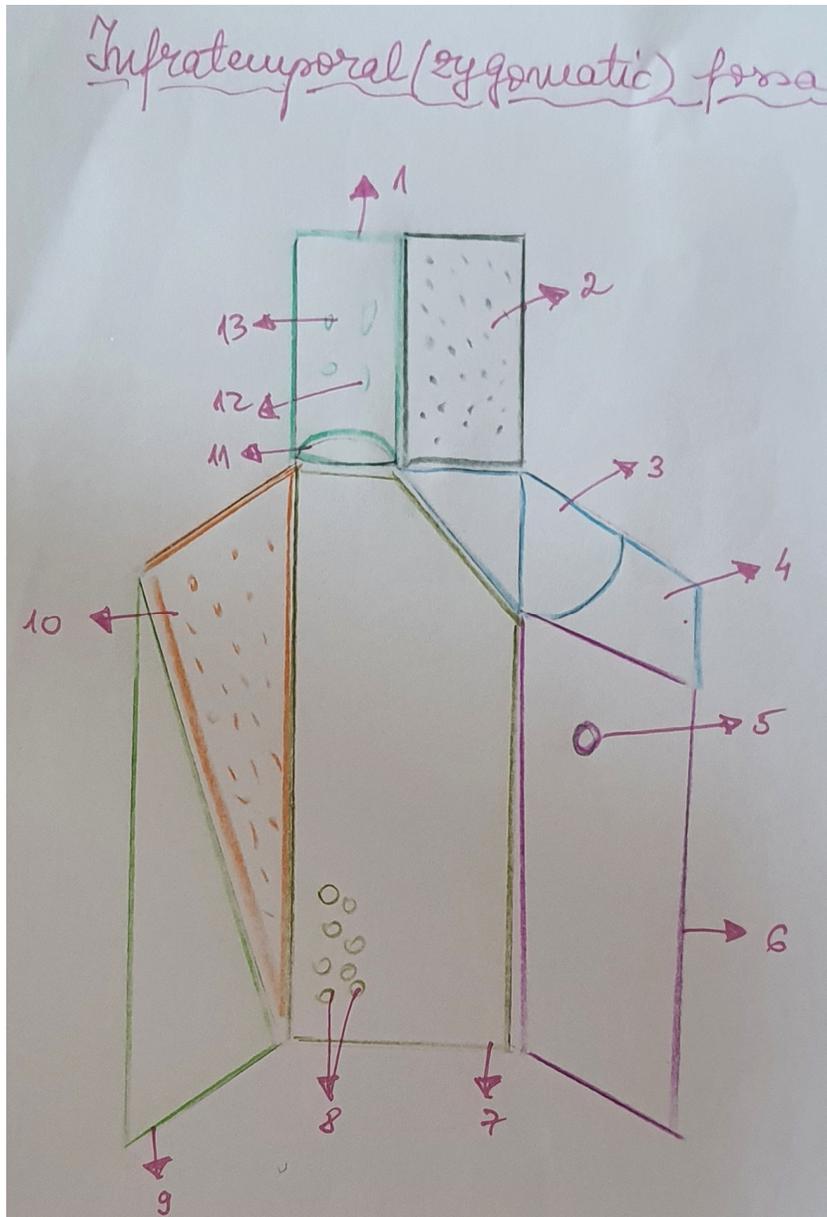
**Figure 12: The nasomalar angle**

Communications:

- ✓ With the neighbouring frontoparietooccipital regions;
- ✓ With the infratemporal fossa;
- ✓ With the facial regions, *via* the zygomatic canal;
- ✓ With the orbital cavities, *via* the zygomatic canal.

## **2. The Infratemporal Fossa (*Fossa infratemporalis*; zygomatic fossa)**

- ✓ The zygomatic arch is limited anterior by the infratemporal surface of the maxilla and the zygomatic process;
- ✓ Posterior, by the articular tubercle of the temporal and part of the sphenoid;
- ✓ Superior, by the greater wing of the sphenoid bone;
- ✓ Inferior, the infratemporal crest and the temporal squama;
- ✓ Inferior, by the alveolar border of the maxilla bone;
- ✓ Medially, by the lateral pterygoid plate;
- ✓ It contains the inferior part of the *Temporalis* muscle, the *Pterygoidei internus* and *externus* muscles, the internal maxillary vessels and the mandibular and maxillary nerves;
- ✓ The *Foramen ovale* and *Foramen spinosum* open on its superior wall.



**Figure 13: The infratemporal fossa, walls;**1. Greater wing of the sphenoid bone, infratemporal surface; 2. The communication with the temporal fossa; 3. The zygomatic arch; 4. The zygomatic bone; 5. Inferior dental alveolar canal orifice; 6. Medial surface of the mandibular *ramus*; 7. Posterior surface of maxilla; 8. Alveolar canals orifices; 9. Lateral plate of the pterygoid process of the sphenoid bone; 10. Communication with the pterygopalatine fossa; 11. Inferior orbital fissure; 12. Foramen ovale; 13. Spinous orifice.

Communications:

- ✓ With the *neurocranium*, *via* the orbital foramen and spinous orifice;
- ✓ With the orbital cavities, *via* the inferior orbital fissure and zygomatic canal;
- ✓ With the temporal fossa, *via* the lateral opening part of the superior wall;
- ✓ With the facial regions, *via* the zygomatic canal;'
- ✓ With the pterygopalatine fossa, *via* the anterosuperior part of the medial wall;
- ✓ With the superior teeth *alveoli*, *via* the alveolar canals orifices;
- ✓ With the inferior teeth *alveoli*, *via* the alveolar canal orifice;
- ✓ With the neighbouring regions: parotid, sternocleidomastoid, and submandibular, *via* the posterior and inferior walls, which are missing.

### **3. The Inferior Orbital Fissure (*Fissura orbitalis inferior*)**

It is limited:

- ✓ Superiorly, by the inferior border of the orbital surface (greater wing of sphenoid).
- ✓ Inferior, by the orbital surface of maxilla and orbital process of palatine;
- ✓ Laterally, by a part of the zygomatic bone.

*Via* the inferior orbital fissure the orbital cavity communicates with temporal fossa, infratemporal fossa, and pterygopalatine fossa.

#### **4. The Pterygopalatine Fossa (*Fossa pterygopalatina*)**

The pterygopalatine fossa is placed posterior the apex of the orbital cavity.

It is limited:

- ✓ Inferior, by inferior aspect of the body of sphenoid and orbital process of palatine.
- ✓ Anteriorly, by infratemporal surface of maxilla;
- ✓ Posterior, by the pterygoid process and anterior surface of greater wing of sphenoid;
- ✓ Medially, by vertical part of the palatine;

The *foramina* that open into the fossa:

- ✓ the *foramen rotundum*,
- ✓ the pterygoid canal
- ✓ the pharyngeal canal;
- ✓ the sphenopalatine foramen
- ✓ the pterygopalatine canal;

The fossa contains:

- ✓ the maxillary nerve,
- ✓ the sphenopalatine ganglion
- ✓ the internal maxillary artery.

Communications:

- ✓ with the orbital cavity, *via* the inferior orbital fissure,
- ✓ with the nasal cavity, *via* the sphenopalatine foramen;
- ✓ with the infratemporal fossa, *via* the pterygomaxillary fissure;
- ✓ with the oral cavity, *via* the posterior and accessory palatine canals;
- ✓ with the *neurocranium*, *via* the *foramen rotundum*;
- ✓ with the superior teeth *alveoli*, *via* the alveolar canals orifices.

## 5. The Orbit (*Orbitæ*)

The orbital cavity are 2 pyramidal cavities. They are located at the superior and anterior part of the skull.

Each presents:

- ✓ a roof
- ✓ a floor
- ✓ a medial wall
- ✓ a lateral wall
- ✓ a base
- ✓ an apex.

The roof presents:

- ✓ Medially, the trochlear fovea. Here inserts the *Obliquus oculi superior* muscle;
- ✓ Laterally, the lacrimal fossa lodging the lacrimal gland.

The floor is formed by:

- ✓ the orbital surface of maxilla;
- ✓ the orbital process of the malar,
- ✓ by the orbital process of the palatine.

The infraorbital sulcus ends anterior as the infraorbital canal.

It transmits the infraorbital nerve and vessels.

The medial wall is formed by:

- ✓ the frontal process of maxilla,
- ✓ the lacrimal,
- ✓ the *lamina papyracea* of ethmoid
- ✓ body of sphenoid.
- ✓ the lacrimal sulcus

- ✓ the posterior lacrimal crest
- ✓ the frontoethmoidal suture lodges the anterior ethmoidal foramen and posterior ethmoidal foramen.

They transmit the nasociliary nerve and anterior ethmoidal vessels and the posterior ethmoidal nerve and vessels.

The lateral wall is formed by:

- ✓ the orbital process of malar
- ✓ the orbital surface of the greater wing of the sphenoid.

It presents:

- ✓ The superior orbital fissure which gives passage to:
    - ✓ the oculomotor nerve,
    - ✓ the trochlear nerve,
    - ✓ the ophthalmic division of the trigeminal
    - ✓ the abducent nerves
    - ✓ the orbital arteries.
  - ✓ The inferior orbital fissure transmits:
      - ✓ the maxillary nerve and its zygomatic branch,
      - ✓ the infraorbital vessels

The base of the orbit is formed:

- ✓ superior, by the supraorbital arch (the supraorbital foramen for supraorbital vessels and nerve);
- ✓ inferior, by the zygomatic bone and maxilla bone;
- ✓ laterally, by the malar and zygomatic process of frontal;
- ✓ medially, by frontal and frontal process of maxilla.

The apex corresponds to the *Optic foramen*. It gives passage to the optic nerve and ophthalmic artery.

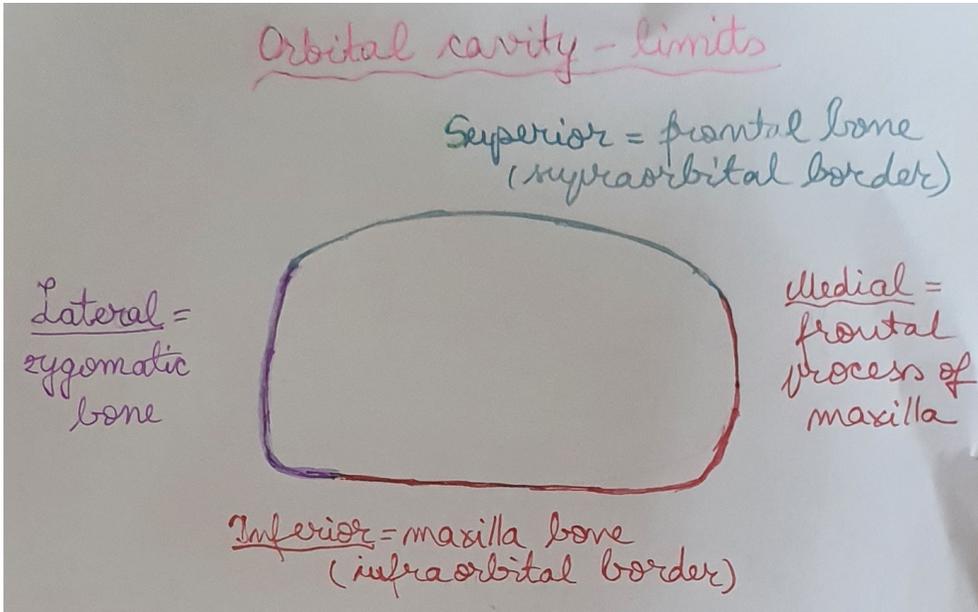
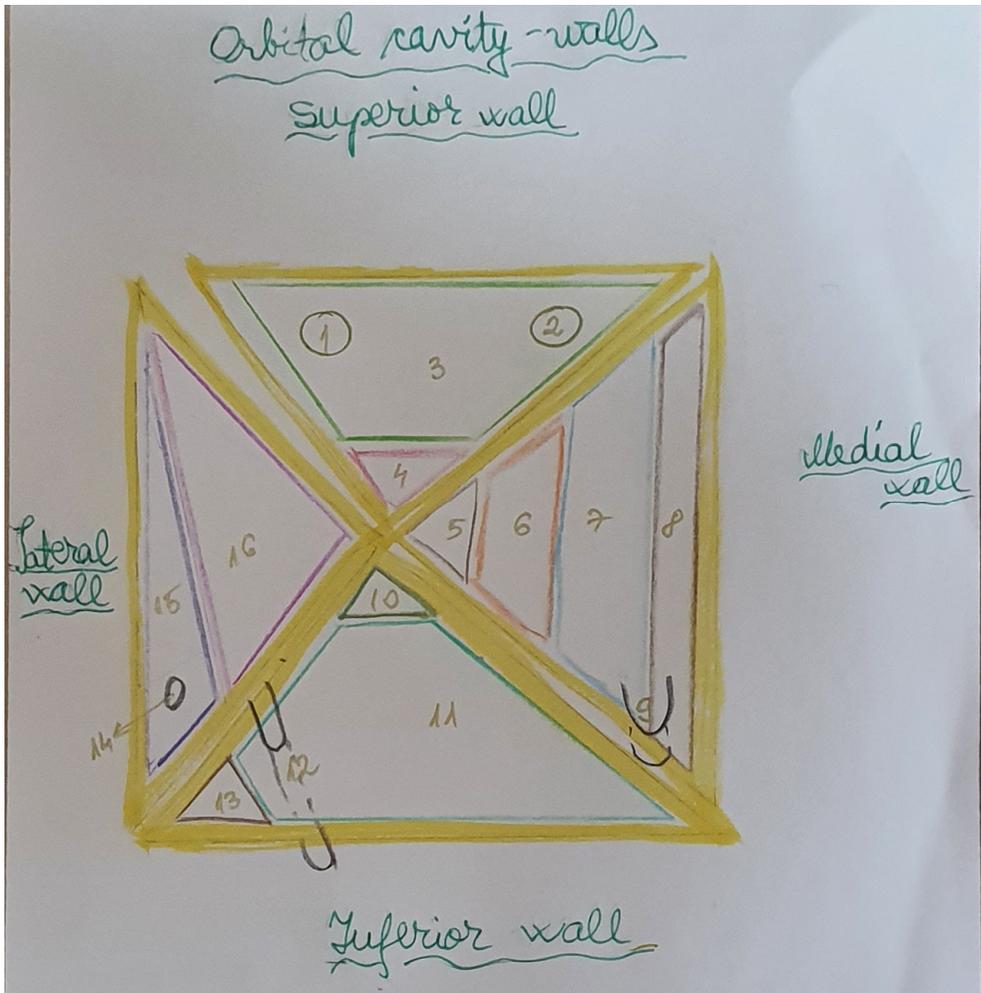
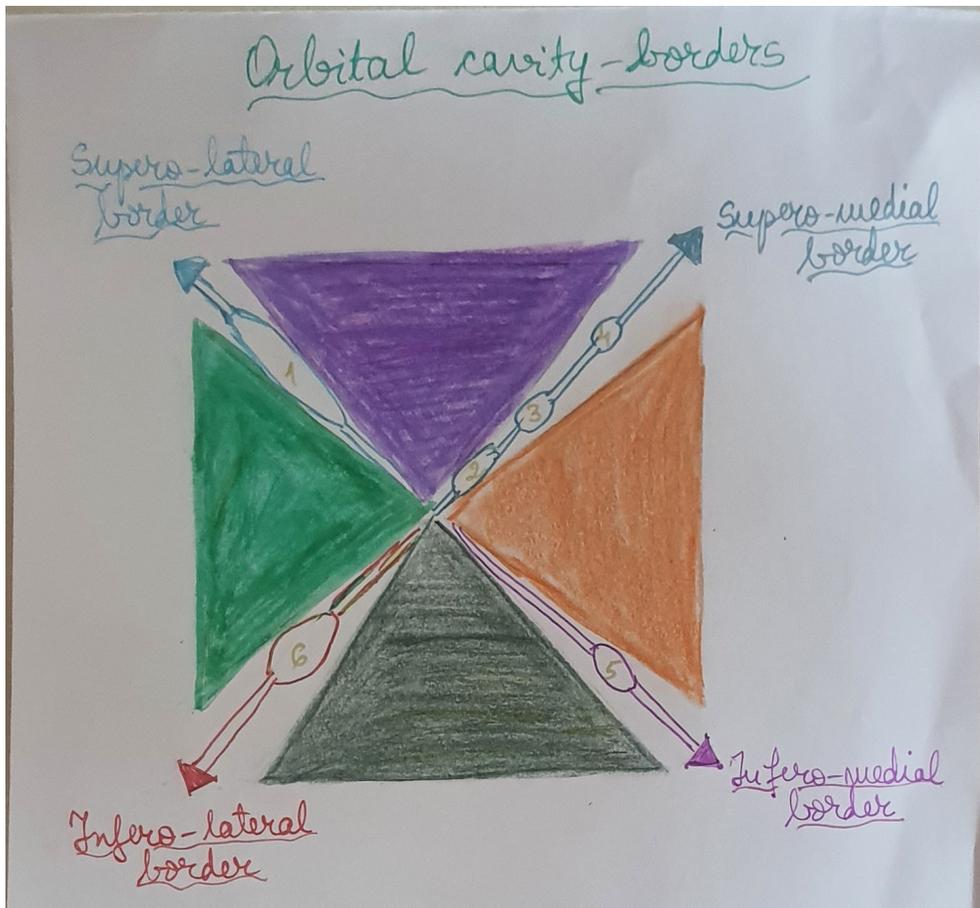


Figure 14: The limits of the orbital cavity.



**Figure 15 : The orbital cavity, walls:** 1. Lacrimal fossa; 2. Trochlear fossa; 3. Orbital part of the frontal bone; 4. Lesser wing of the sphenoid bone; 5. Sphenoid body; 6. *Lamina papyracea*; 7. Lacrimal bone; 8. Frontal process of maxilla; 9. Lacrimal groove; 10. Orbital process of the palatine bone; 11. Maxilla; 12. Suborbital groove; 13. Zygomatic bone; 14. Orbital orifice of the zygomatic canal; 15. Zygomatic bone; 16. Greater wing of the sphenoid bone, orbital surface.



**Figure 16: The Orbital cavity, borders.** 1. Superior orbital fissure; 2. Optic foramen; 3. Posterior ethmoidofrontal canal orifice; 4. Anterior ethmoidofrontal canal orifice; 5. Lacrimalnasal canal; 6. Inferior orbital fissure.

#### Communications:

- ✓ With neurocranium *via* superior orbital fissure, optic foramen, anterior and posterior ethmoidofrontal canals;
- ✓ With the inferior meatus of the nasal cavity *via* lacrimonasal canal;
- ✓ With infratemporal and pterygopalatine fossae *via* inferior orbital fissure;
- ✓ With facial regions, *via* zygomatic and suborbital canals;
- ✓ With temporal and infratemporal fossae *via* zygomatic canal;
- ✓ With the environment *via* the base of the orbital cavity.

## 6. The Nasal Cavity (*Cavum nasi*)

The nasal cavities are two openings situated one on sides of the middle line.

They run from the base of the skull to the superior wall of the oral cavity.

They open on the face via the anterior nasal aperture.

Their posterior openings or *choanæ* are connected with the nasal part of the pharynx.

Each cavity has:

- ✓ A roof
- ✓ A floor
- ✓ A medial wall
- ✓ A lateral wall

The roof is formed:

- ✓ Anteriorly, by the nasal and spine of frontal;
- ✓ On the midline by the cribriform plate of the ethmoid;
- ✓ Posteriorly, by the sphenoidal body, the sphenoidal *concha*, the *alae* of the vomer bone, and the sphenoidal process of the palatine.

The floor is formed by;

- ✓ The palatine process of the maxilla and the horizontal part of the palatine.

The medial wall (*Septum nasi*) is formed:

- ✓ Anteriorly, by the crest of the nasal bones and frontal spine;
- ✓ On the midline, by the perpendicular plate of ethmoid;
- ✓ Posterior, by the vomer bone and sphenoidal *rostrum*;
- ✓ Inferiorly, by the crest of the *maxillæ* and palatine.

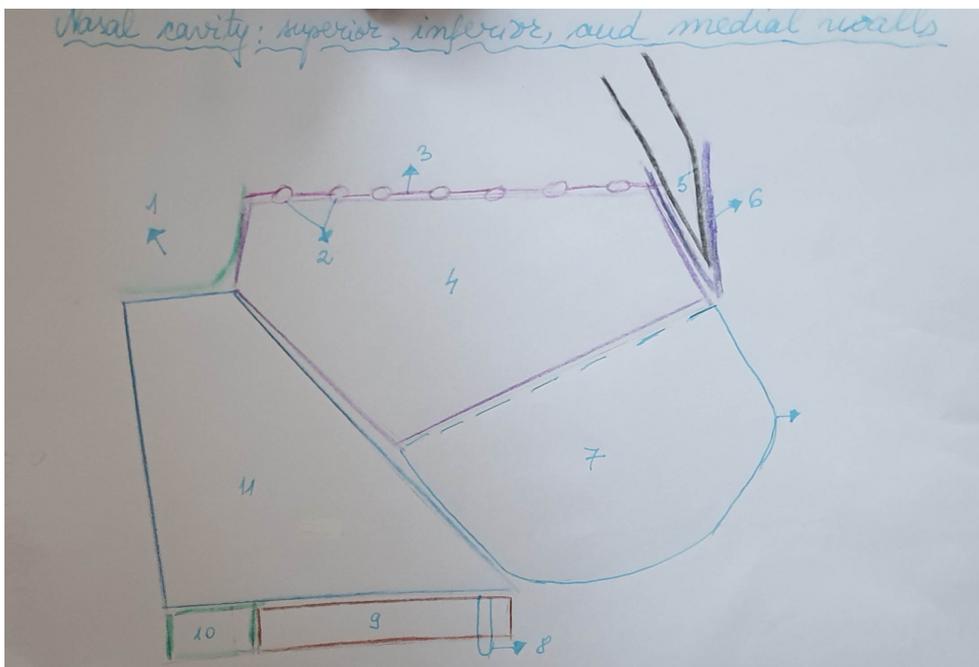
The lateral wall is formed:

- ✓ Anteriorly, by the frontal process of maxilla and lacrimal;

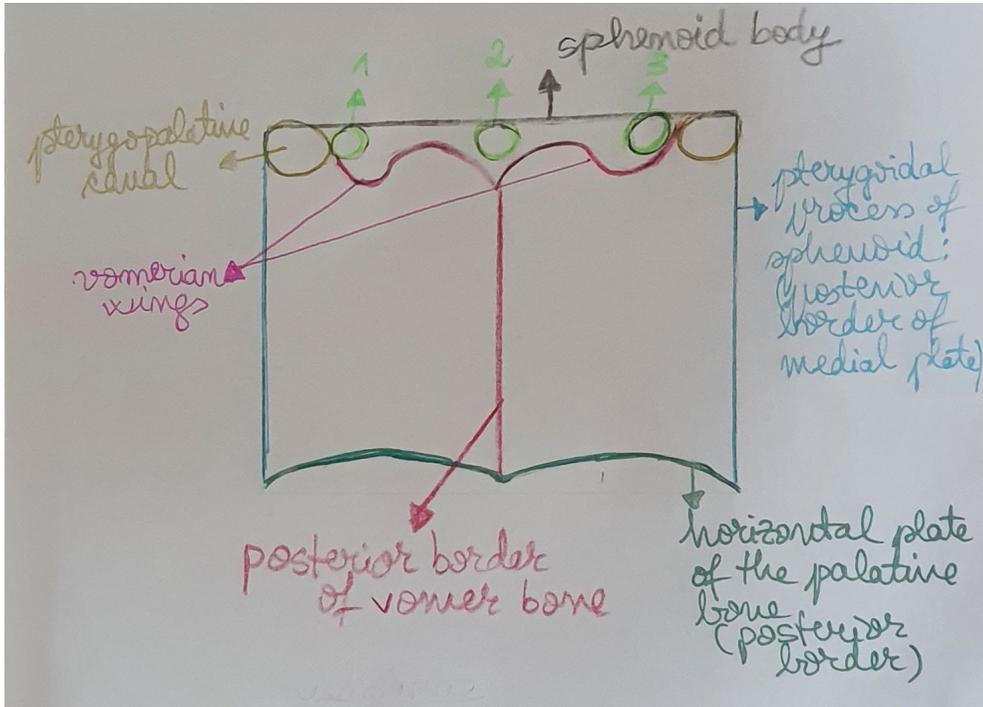
- ✓ On the midline by the ethmoid, maxilla and inferior concha;
- ✓ Posterior by the vertical plate of the palatine and medial pterygoid plate of sphenoid.

On this wall there are three turbinated tubes, the superior, middle and inferior meatuses.

- ✓ The superior meatus stays in between the superior and middle nasal *conchæ*.
- ✓ The sphenopalatine foramen opens into it posteriorly, and the posterior ethmoidal cells anteriorly.
- ✓ Through the *hiatus semilunaris*, the meatus communicates with the *infundibulum*.
- ✓ The inferior meatus extends of the lateral wall of the nose.



**Figure 17: The nasal cavity, superior, inferior and medial walls.** 1. Sphenoidal body, inferior and anterior surfaces; 2. Olfactory orifices; 3. Horizontal plate of the ethmoid; 4. Perpendicular plate of the ethmoid; 5. Nasal spine of the frontal bone; 6. Nasal bones; 7. Nasal septum cartilage; 8. Incisive canal of Stensen (anterior palatine); 9. Palatine process of maxilla, anterior 2/3; 10. Horizontal plate of the palatine, posterior 1/3; 11. Vomer bone.



**Figure 18: The Choanae.** Sphenovomerian canals orifices, one median (2) and two lateral (1,3).



**Figure 19: The nasal cavity, lateral wall.** 1. Lacrimal bone; 2. Ethmoid bone, medial surface of the ethmoidal labyrinths, with *conchae* and superior and middle nasal meatuses; 3. Sphenopalatine foramen; 4. Sphenoid bone; 5. Medial plate of the pterygoid process of the sphenoid bone; 6. vertical plate of the palatine bone, medial surface; 7. Inferior nasal concha and inferior nasal meatus; 8. Maxilla, medial surface of the body.

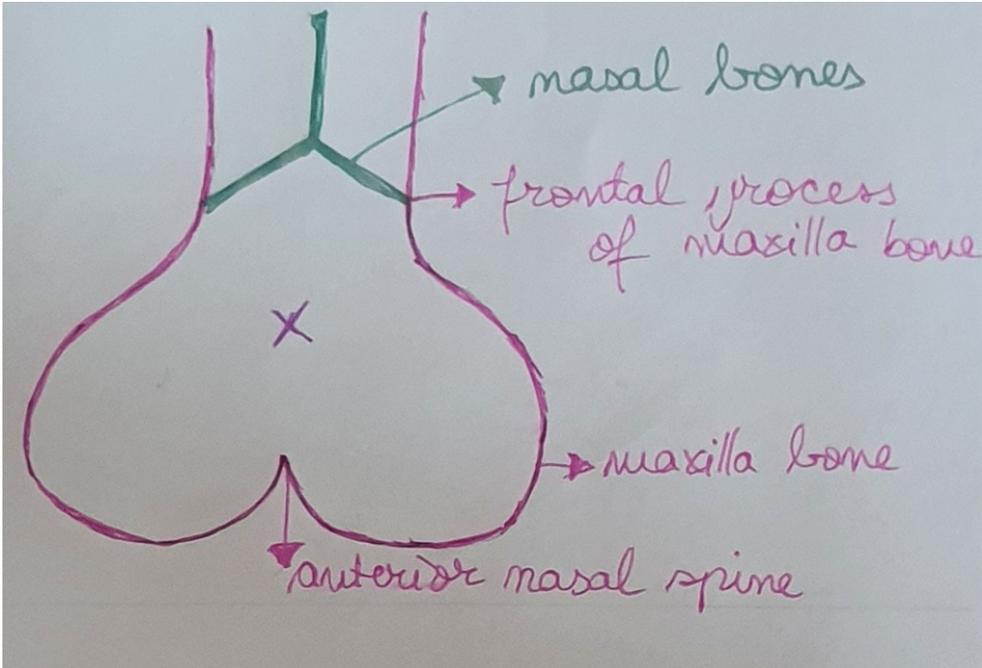


Figure 20: The *apertura piriformis*

## V. THE TEMPOROMANDIBULAR JOINT

**Alina Maria Şişu**

### **The Articulation of the Mandible (*Articulatio mandibularis*)**

It is a ginglymoarthrodial joint.

The articular surfaces are:

- ✓ The anterior aspect of the mandibular fossa,
- ✓ The articular tubercle superiorly,
- ✓ The condyle of the mandible inferiorly.

The elements of the joint are:

The Articular Capsule (*Capsula articularis*)

The articular capsule is attached superiorly to the circumference of the mandibular fossa.

Posteriorly, it is inserted onto the neck of the condyle of mandible.

The Temporomandibular Ligament (*Ligamentum temporomandibulare*)

The temporomandibular ligament is attached to the lateral surface of the zygomatic arch and to the tubercle on its inferior border.

Inferior is attached to the lateral surface and posterior border of the neck of the mandible.

The Sphenomandibular Ligament (*Ligamentum sphenomandibulare*)

The sphenomandibular ligament is inserted superiorly to the *spina angularis* of the sphenoid.

Its lateral surface comes in contact with the *Pterygoideus externus* muscle superiorly.

Its medial surface comes in contact with the *Pterygoideus internus* muscle.

### The Articular Disk (*discus articularis*)

The articular disk is a blade disposed in between the condyle of the mandible and the mandibular fossa.

Its superior surface is to accommodate in the mandibular fossa and with the articular tubercle.

Its inferior surface is in contact with the condyle of mandible.

Its circumference is in contact with the articular capsule.

Anteriorly it is in relation with the *Pterygoideus externus* muscle.

### The Synovial membranes

There are two synovial membranes that placed one superior and one inferior the articular disk.

The superior one is continued from the border of the cartilage. In this way, it covers the mandibular fossa and articular tubercle.

The inferior one passes from the inferior surface of the disk to the neck of the condyle.

### The Stylomandibular Ligament (*ligamentum stylomandibulare*)

The stylomandibular ligament comes from the cervical fascia.

It extends from the apex of the styloid process of the temporal bone to the angle and posterior border of the *ramus* of the mandible. Here it is situated between the Masseter and *Pterygoideus internus* muscles.

This ligament acts like a wall in between the parotid from the submaxillary glands.

The nerves innervating the TMJ are given off:

- ✓ from the auriculotemporal branch of the mandibular nerve
- ✓ from the masseteric branche of the mandibular nerve

The arteries comes from the superficial temporal branch of the external carotid.

## Movements

The movements possible in this joint have a large range of motion.

There are two separate joints:

- ✓ one between the condyle and the articular disk
- ✓ one between the disk and the mandibular fossa.

When the mouth is opened a little, the movement is taken into the inferior of the two joints.

When the oral cavity is opened largely, both joints are involved in the movement.

These movements occur in the same time.

The condyle and disk move anteriorly on the eminence and the condyle comes back on the articular disk.

In shutting the mouth the reverse action takes place.

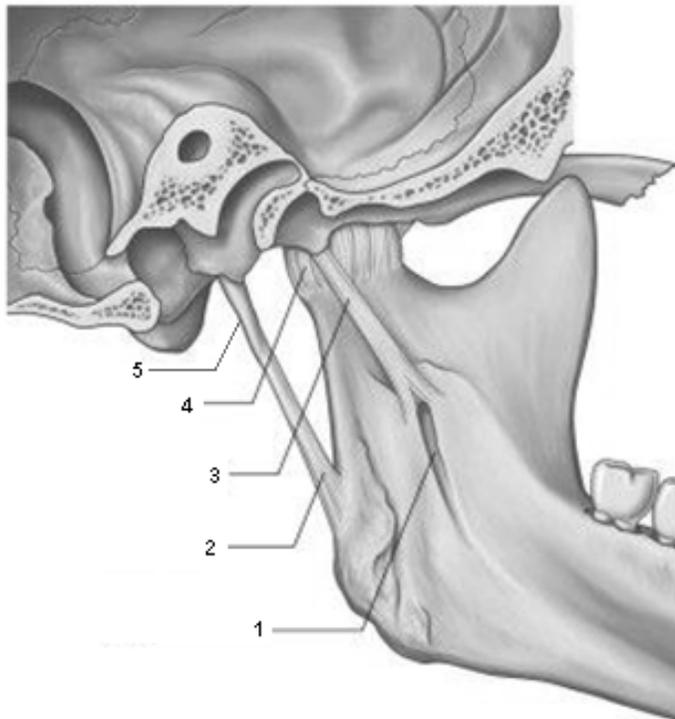
The disk goes posteriorly, pulling the condyle with it.

The mandible is pulled down by its own weight is performed by the *Platysma*, the *Digastric*, the *Mylohyoid* and the *Geniohyoid* muscles.

The mandible is elevated by the *Masseter*, *Pterygoideus internus* and the *Temporalis* muscles.

It is push anteriorly by the simultaneous act of the *Pterygoidei internus* and *externus*, the superficial fibers of the *Masseter* and the anterior fibers of the *Temporalis* muscles.

It is push posteriorly by the *Masseter* and the *Temporalis* muscles.



**Figure 21: The Temporomandibular joint;** 1. mylohyoid groove; 2. stylomandibular ligament; 3. sphenomandibular ligament; 4. fibrous capsule; 5. styloid process.

# VI. SURFACE ANATOMY OF THE HEAD AND NECK

Alina Maria Şişu

## THE CRANIOMETRIC (ANTHROPOMETRIC) POINTS

The craniometric points are divided into two groups:

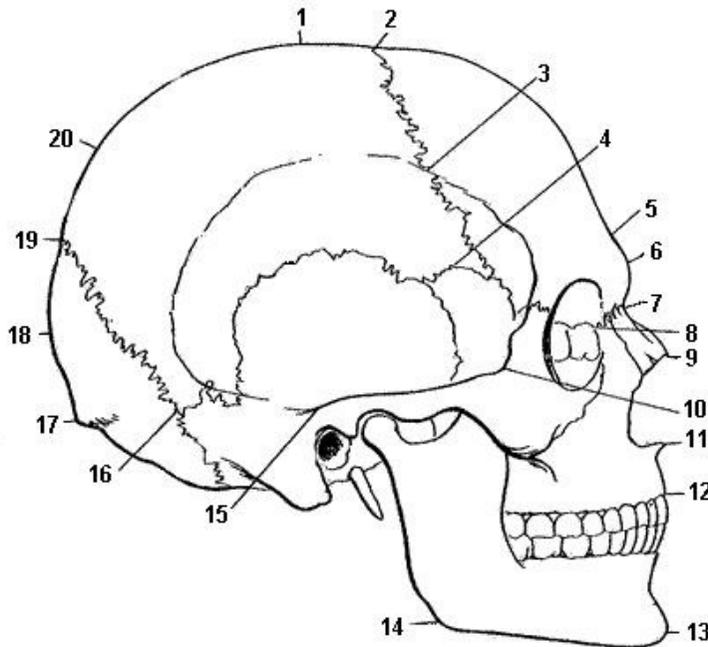
- ✓ located in the median plane
- ✓ located laterally onto the skull.

1. The Auricular point: in the center of the orifice of the external acoustic meatus.
2. The Preauricular point: a point on the posterior root of the zygomatic arch.
3. *Asterion*= meeting of the lambdoidal, mastooccipital, and mastoparietal sutures.
4. *Pterion*: the point where the greater wing of the sphenoid joins the sphenoidal angle of the parietal bone.
5. *Inion*= external occipital protuberance.
6. *Lambda*= meeting of the lambdoidal and sagittal sutures.
7. *Bregma*= meeting of the coronal and sagittal sutures.

The lambdoidal suture=by the superior two-thirds of a line from the lambda to the tip of the mastoid process.

The sagittal suture =the line that links the *lambda* to the *bregma*.

The coronal suture = a line that links the *bregma* to the center of the zygomatic arch.



**Figure 22: The craniometric points** 1. Vertex; 2. Bregma; 3. Stephanion; 4. Pterion; 5. Ophryon; 6. Glabella; 7. Nasion; 8. Dacryon; 9. Rhinion; 10. Jugal point; 11. Akynthion; 12. Alveolar point; 13. Pogonion (*Mental Point*); 14. Gonion; 15. Auricular Point; 16. Asterion; 17. Inion; 18. Occipital Point; 19. Lambda; 20. Obelion;

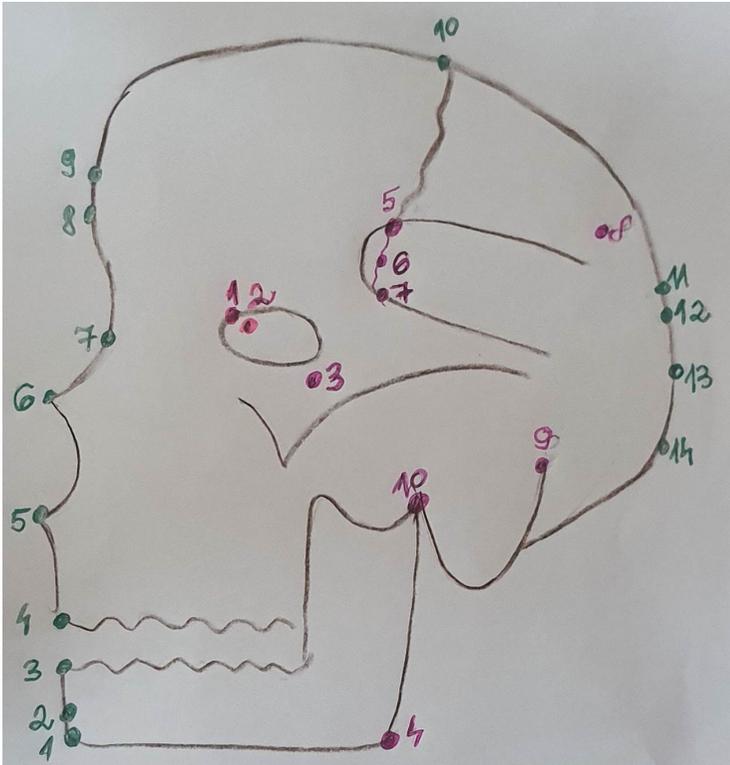
The craniometric points in the median plane are the:

1. The Mental point: the most elevated part of the chin.
2. The Alveolar point or *Prosthion*= the central point of the anterior border of the superior alveolar arch.
3. The Subnasal point= the base of the anterior nasal spine.
4. *Nasion*=the central point of the frontonasal suture.
5. *Glabella* = The point in the middle line at the level of the superciliary arches.
6. *Ophryon* =The point in the middle line of the forehead.
7. *Bregma* =The meeting point of the coronal and sagittal sutures.
8. *Obelion* =A point in the sagittal suture.

9. *Lambda* = The point of junction of the sagittal and lambdoidal sutures.
10. The Occipital point = point in the middle line of the occipital bone.
11. *Inion* = external occipital protuberance.
12. *Opisthion* = midpoint of the posterior border of the *foramen magnum*.
13. *Basion* = midpoint of the anterior border of the *foramen magnum*.

The craniometric points on lateral sides of the skull are:

1. *Gonion* = The external border of the angle of the mandible.
2. *Dacryon* = The meeting point of the antero-superior angle of the lacrimal with the frontal bone and the frontal process of the maxilla.
3. *Stephanion* = point where temporal line meets coronal suture.
4. *Pterion* = point where the greater wing of sphenoid meets the sphenoidal parietal angle.
5. The Auricular Point = center of the orifice of the external acoustic meatus.
6. *Asterion* = meeting of the lambdoidal, mastoidoccipital, and mastoidparietal sutures.



**Figure 23: The craniometric points**, 1.Gnathion; 2. Mental point; 3. Inferior incisive point; 4. Inferior incisive point; 5. Nasospinal point; 6. Rhinion; 7. Nasion; 8. Glabella; 9. Ophryon; 10. Bregma; 11. Obenion; 12. Lambda; 13. Opisthocranion; 14. Inion; (coloured in green). 1. Maxilofrontal point; 2. Dacryon; 3. Malar point; 4. Gonion; 5. Stephanoion; 6. Coronal point; 7. Pteryon; 8. Eurion; 9. Asterion; 10. Auricular point.



**Figure 24: The median craniometric points around the foramen magnum:** 15. Opisthion; 16. Basion.

## VII. *NOMINA ANATOMICA* translated into English

Alina Maria Şişu

*OSSA CRANII*=cranial bones

***Os occipitale***= occipital bone

*Foramen magnum* = greater hole

*Pars basilaris*=basilay part

*Sulcus sinus petrosi inferioris*= groove for the inferior petrosal sinus

*Tuberculum pharyngeum*=pharyngeal tubercle

*Pars lateralis*=lateral part

*Squama occipitalis*= squamous part of occipitalis

*Facies orbitalis*= orbital surface

*Margo zygomaticus*=zygomatic border

*Margo frontalis*= frontal border

*Margo parietalis*= parietal border

*Margo squamosus*= squamous border

*Crista infratemporalis*= infratemporal crest

*Foramen rotundum*= round hole

*Foramen ovale*= oval hole

*Foramen spinosum*=spinous hole

*Spina ossis sphenoidales*= sphenoidal osseous spine

*Sulcus tubae auditivae*= auditory tube groove

*Crista occipitalis externa*= external occipital crest

*Linea nuchae suprema*= supreme nuchal line

*Linea nuchae superior*= superior nuchal line

*Linea nuchae inferior*= inferior nuchal line

*Eminentia cruciformis*= cruciforme eminence

*Protuberantia occipitalis interna*= internal occipital protuberance

*Crista occipitalis interna*= internal occipital crest

*Sulcus sinus sagittalis superioris*=groove for superior sagittal sinus

*Sulcus sinus transversi*=groove for transversal sinus

*Sulcus sinus sigmoidei*= groove for sigmoid sinus

*Processus paramastoideus*=paramastoid process

### ***Os sphenoidale***

*Corpus*=body

*Jugum sphenoidale*= jugum sphenoidale

*Sulcus chiasmatis*= chiasmatic groove

*Sella turcica*= Turkish chair

*Tuberculum sellae*= chair tubercle

*Processus clinoides medius*=middle clinoid process

*Fossa hypophysialis*=hypophysial fossa

*Dorsum sellae* =the back part of the chair

*Processus clinoides posterior*=posterior clinoid process

*Sulcus caroticus*=carotic groove

*Lingula sphenoidalis*=sphenoid lingula

*Crista sphenoidalis*=sphenoidal crest

*Rostrum sphenoidale*= sphenoidal rostrum

*Sinus sphenoidalis*= sphenoidal sinus

*Septum sinuum sphenoidalium*= sept of sphenoidal sinus

*Aperture sinus sphenoidalis*= opening of the sphenoidal sinus

*Concha sphenoidalis*= sphenoidal concha

*Ala minor*= lesser wings

*Canalis opticus*= optic canal

*Processus clinoides anterior*=anterior clinoid process

*Fissura orbitalis superior*=superior orbital fissure

*Ala major*=greater wings

*Facies cerebralis*= cerebral surface

*Facies temporalis*= temporal surface

*Facies maxillaris*=maxillary surface

*Sulcus n. petrosi minoris*=groove for lesser petrosal nerve

*Impressio trigemini*=trigeminal impression

*Margo superior*=superior border

*Partis petrosae*= petrosal part

*Sulcus sinus petrosi superioris*= groove for superior petrosal sinus

*Facies posterior partis petrosae*= superior surface of the petrosal part

*Porus acusticus internus*= internal acoustic porus

*Fosa subarcuata*= subarcuate fossa

*Processus pterygoideus*= pterygoid process

*Lamina lateralis processus pterygoidei*= lateral plate of the pterygoid process

*Lamina medialis processus pterygoidei*=medial plate of the pterygoid process

*Incisura pterygoidea*= pterygoid incisure

*Fossa pterygoidea*=pterygoid fossa

*Fossa scaphoidea*=scaphoid fossa

*Processus vaginalis*=vaginal process

*Sulcus palatovaginalis*=palatovaginal groove

*Sulcus vomerovaginalis*=vomerovaginal groove

*Hamulus pterygoideus*=pterygoid hook

*Sulcus hamuli pterygoidei*=groove for pterygoid hook

*Canalis pterygoideus*=pterygoid canal

*Processus pterygospinosus*=pterygospinos process

### ***Os temporale***

*Pars petrosa*=petrosal part

*Margo occipitalis*= occipital border

*Processus mastoideus*= mastoid process

*Incisura mastoidea*= mastoid incisure

*Sulcus sinus sigmoidei*= groove for sigmoid sinus

*Sulcus a. occipitalis*= groove for occipital artery

*Foramen mastoideum*=mastoid hole

*Canalis facialis*=facial canal

*Geniculum canalis facialis*= knee of the facial canal

*Canaliculi chordae tympani*= canalicul of the tympanic chord

*Apex partis petrosae*=tip of the petrosal part

*Canalis caroticus*= carotic canal

*Canaliculi caroticotympanici*=caroticotympanic canals

*Canalis musculotubarius*= musculotubar canal

*Semicanalis m. tensoris tympani*=semicanals of the tensor tympani muscle

*Semicanalis tubae auditivae*=semicanals of the auditory tube

*Septum canalis musculotubarii*=musculotubarcanal septum  
*Facies anterior*=anterior surface  
*Partis petrosae*=petrosal part  
*Tegmen tympani*= tympanic blade  
*Eminentia arcuate*=arcuate eminence  
*Hiatus canalis n. petrosi majoris*=opening of the greater petrosal nerve  
*Hiatus canalis n. petrosi minoris*=opening of the lesser petrosal nerve  
*Sulcus n. petrosi majoris*= groove for greater petrosal nerve  
*Facies externa*=external surface  
*Margo occipitalis*=occipital border  
*Margo squamosus*=squamous border  
*Margo sagittalis*=sagittal border  
*Margo frontalis*=frontal border  
*Angulus frontalis*=frontal angle  
*Angulus occipitalis*=occipital angle  
*Angulus sphenoidalis*=sphenoidal angle  
*Angulus mastoideus*=mastoid angle  
*Aqueductus vestibule*=vestibular aqueduct  
*Apertura externa aq. Vest.*= opening of the vestibular aqueduct  
*Margo posterior partis petrosae*= posterior border of petrosal part  
*Sulcus sinus petrosi inferioris*=groove for inferior petrosal sinus  
*Incisura jugularis*=jugular incisure  
*Processus intrajugularis*=intrajugular process  
*Canaliculus cochleae*=cochlear canal  
*Apertura externa canal. Coch.*=opening of the cochlear canal  
*Facies inferior partis petrosae*=inferior surface of the petrosal part

*Fossa jugularis*=jugular fossa  
*Canaliculus mastoideus*=mastoid canal  
*Processus styloideus*=styloid process  
*Foramen stylomastoideum*=stylomastoid hole  
*Canaliculus tympanicus*=tympanic little canals  
*Fossula petrosa*=little petrosal fossa  
*Cavum tympani*=tympanic depression  
*Fissura petrotympanica*=pietrotympanic fissure  
*Fissura petrosquamosa*= petrosquamous fissure  
*Fissura tympanomastoidea*=tympanic mastoid fissure  
*Fissura tympanosquamosa*=tympanosquamous fissure  
*Pars tympanica*=tympanic part  
*Annulus tympanicus*=tympanic ring  
*Meatus acusticus externus*=external acoustic meatus  
*Porus acusticus externus*=external acoustic porus  
*Spina suprameatum*= suprameatal spine  
*Spina tympanica major*=greater tympanic spine  
*Spina tympanica minor*=lesser tympanic spine  
*Sulcus tympanicus*=tympanic groove  
*Vagina processus styloidei*=vagina of the styloid process  
*Pars squamosa*=squamous part  
*Margo parietalis*=parietal border  
*Incisura parietalis*=parietal incisure  
*Margo sphenoidalis*=sphenoidal border  
*Facies temporalis*=temporal surface  
*Sulcus a. temporalis mediae*= groove for middle temporal artery

*Processus zygomaticus*=zygomatic process

*Fossa mandibularis*=mandibular fossa

*Facies articularis*=articular surface

*Tuberculum articulare*=articular tubercle

*Facies cerebralis*=cerebral surface

### ***Os parietale*=parietal bone**

*Facies interna* =internal surface

*Crista galli*=rooster crest

*Foramen parietale*=parietal hole

*Tuber parietale*-parietal eminence

*Linea temporalis superior*=superior temporal line

*Linea temporalis inferior*=inferior temporal line

*Sulcus sinus sagittalis superioris*=groove for superior sagittal sinus

*Sulcus sinus sigmoidei*=groove for sigmoid sinus

### ***Os frontale*=frontal bone**

*Squama frontalis*=squamous part

*Facies externa*=external surface

*Tuber frontale*=frontal eminence

*Arcus superciliaris*=superciliary arch

*Glabella*=glabella

*Margo supraorbitalis*=supraorbital border

*Incisura supraorbitalis*=supraorbital incisure

*Incisura frontale*=frontal incisure

*Pars orbitalis*=orbital part

*Incisura ethmoidalis*=ethmoidal incisure

*Pars nasalis*=nasal part

*Spina nasalis*=nasal spine

*Margo nasalis*=nasal border

*Margo parietalis*=parietal border

*Processus zygomaticus*=zygomatic process

*Facies temporalis*=temporal surface

*Linea temporalis*=temporal line

*Facies orbitalis*=orbital surface

*Spina trochlearis*=trochlear spine

*Fovea trochlearis*=trochlear depression

*Foramen ethmoidale anterius*=anterior ethmoidal hole

*Foramen ethmoidale posterius*=posterior ethmoidal hole

*Fossa glandulae lacrimalis*=lacrimal gland fossa

*Facies interna*=internal surface

*Crista frontalis*=frontal crest

*Sulcus sinus sagittalis superioris*=groove for superior sagittal sinus

*Foramen caecum*=blind hole

*Sinus frontalis*=frontal sinus

*Aperture sinus frontalis*=opening of the frontal sinus

*Septum sinuum frontaliuum*=sept of the frontal sinus

*Sutura frontalis (sutura metopica)*=frontal suture (metopic suture)

***Os ethmoidale*=ethmoidal bone**

*Lamina cribrosa*=perforated plate

*Facies nasalis*=nasal surface

*Ala cristae galli*=wings of the rooster crest

*Lamina perpendicularis*=perpendicular plate

*Labyrinthus ethmoidalis*=ethmoidal labyrinths

*Cellulae ethmoidales*=ethmoidal cells

*Infundibulum ethmoidale*=ethmoidal end

*Hiatus semilunaris*=ethmoidal hiatus

*Bulla ethmoidal*=ethmoidal swelling

*Lamina orbitalis*=orbital blade

*Foramina ethmoidalia*= ethmoidal holes

*Concha nasalis suprema*=supreme nasal concha

*Concha nasalis superior*=superior nasal concha

*Concha nasalis media*=middle nasal concha

*Processus uncinatus*=uncinate process

*Concha nasalis inferior*=inferior nasal concha, inferior turbinated bone

*Processus lacrymalis*=lacrymal process

*Processus maxillaris*=maxillary process

*Processus ethmoidalis*=ethmoidal process

### ***Os lacrimale*=lacrymal bone**

*Crista lacrymalis posterior*=posterior lacrymal crest

*Sulcus lacrymalis*=lacrymal groove

*Hamulus lacrymalis*=lacrymal hook

*Fossa saci lacrymalis*=depression for lacrymal bags

### ***Os nasale*=nasal bone**

*Sulcus ethmoidalis*=ethmoidal groove

**Vomer=vomer**

*Ala vomeris*=vomerian wing

**Ossa faciei=facial bones**

**Maxilla=maxilla bone**

*Corpus maxillae*=body

*Facies orbitalis*=orbital surface

*Canalis infraorbitalis*=infraorbital canal

*Sulcus infraorbitalis*=infraorbital groove

*Margo infraorbitalis*=infraorbital border

*Facies anterior*=anterior surface

*Foramen infraorbitale*=infraorbital hole

*Fossa canina*=canine fossa

*Incisura nasalis*=nasal incisure

*Spina nasalis anterior*=anterior nasal spine

*Sutura infraorbitalis*=infraorbital suture

*Facies infratemporalis*=infratemporal surface

*Foramina alveolaria*=alveolar cavities

*Canals alveolares*=alveolar canals

*Tuber maxillae*=maxillary tube

*Sulcus lacrimalis*=lacrymal groove

*Crista conchalis*=conchalis crest

*Margo lacrimalis*=lacrymalis border

*Hiatus maxillaris*=maxillary hiatus

*Sulcus palatinus major*=greater palatine groove

*Sinus maxillaris*=maxillary sinus

*Processus frontalis*=frontal process  
*Crista lacrimalis anterior*=anterior lacrymal crest  
*Incisura lacrimalis*=lacrymal incisure  
*Crista ethmoidalis*=ethmoidal crest  
*Processus zygomaticus*=zygomatic process  
*Processus palatinus*=palatine process  
*Crista nasalis*=nasal crest  
*Os incisivum*=incisor bone  
*Canalis incisivus*=incisor tooth canal  
*Palatum osseum*=bony palate  
*Sutura incisiva*=incisory suture  
*Spinae palatinae*=palatine spine  
*Sulci palatini*=palatine grooves  
*Processus alveolaris*=alveolar process  
*Arcus alveolaris*=alveolar arch  
*Alveoli dentales*=dental alveoli  
*Septa interalveolaria*=interalveolar sept  
*Septa interradicularia*=interradicular sept  
*Juga alveolaria*=alveolar eminence  
*Foramen incisivum*=incisory hole

***Os palatinum*=palatine bone**

*Lamina perpendicularis*=perpendicular plate  
*Facies nasalis*=nasal surface  
*Facies maxillaris*=maxillary surface  
*Incisura sphenopalatina*=sphenopalatine incisure

*Sulcus palatinus major*=greater palatine groove

*Processus pyramidalis*=pyramidal process

*Canales palatini minores*=lesser palatine canals

*Crista conchalis*=conchal crest

*Crista ethmoidalis*=ethmoidal crest

*Processus orbitalis*=orbital process

*Processus sphenoidalis*=sphenoidal process

*Lamina horizontalis* =horizontal plate

*Facies nasalis*=nasal surface

*Facies palatina*=palatine surface

*Foramina palatina minora*=lesser palatine hole

*Spina nasalis*=nasal spine

*Crista nasalis*=nasal crest

*Crista palatina*=palatine crest

***Os zygomaticum*=zygomatic bone**

*Facies lateralis*=lateral surface

*Facies temporalis*=temporal surface

*Facies orbitalis*=orbital surface

*Processus temporalis*=temporal process

*Processus frontalis*=frontal process

*Tuberculum marginale*=marginal tubercle

*Foramen zygomaticoorbitale*=zygomaticoorbital hole

*Foramen zygomaticofaciale*=zygomaticofacial hole

*Foramen zygomaticotemporale*=zygomaticotemporal hole

**Mandibula=mandible**

*Corpus mandibulae*=body

*Basis mandibulae*=base of mandible

*Protuberantia mentalis*=mental protuberance

*Tuberculum mentale*=mental tubercle

*Spina mentalis*=mental spine

*Foramen mentale*=mental hole

*Linea obliqua*=oblique line

*Fossa digastrica*=digastric fossa

*Linea mylohyoidea*=mylohyoid line

*Fovea sublingualis*=sublingual fossa

*Fovea submandibularis*=submandibular fossa

*Pars alveolaris*=alveolar part

*Arcus alveolaris*=alveolar arch

*Alveoli dentales*=dental alveoles

*Septa interalveolaria*=interalveolar septa

*Septa interradicularia*=interradicular septa

*Juga alveolaria*=alveolar eminence

*Ramus mandibulae*=mandibular prolongation

*Angulus mandibulae*=mandibular angle

*Tuberositas masseterica*=masseteric tuberosity

*Tuberositas pterygoidea*=pterygoid tuberosity

*Processus condylaris*=condylar process

*Caput mandibulae*=mandibular head

*Collum mandibulae*=mandibular neck

*Fovea pterygoidea*=pterygoid depression

*Processus coronoideus*=coronoid process

*Incisura mandibulae*=mandibular incisure

*Foramen mandibulae*=mandibular hole

*Lingula mandibulae*=mandibular lingula

*Canalis mandibulae*=mandibular canal

*Sulcus mylohyloideus*=mylohyoid groove

### ***Os hyoideum*=hyoid bone**

*Corpus*=body

*Cornu minus*=lesser horn

*Cornu majus*=greater horn

### ***Cranium*=skull**

*Calvaria*=calvaria

*Pericranium*=pericranium

*Lamina externa*=external blade

*Diploe*=diploe

*Canales diploici*=diploic canals

*Lamina interna*=internal blade

*Vertex*=tip

*Frons*=forehead

*Occiput*=inion

*Temporal*=temporal part

*Basis cranii externa*=external part of the skull base

*Basis cranii interna*=internal part of the skull base

*Fossa cranii anterior*=anterior cranial fossa

*Fossa cranii media*=middle cranial fossa  
*Fossa cranii posterior*=posterior cranial fossa  
*Clivus*=clivus  
*Impressiones digitatae*=fingerprints impressions  
*Sulci venosi*=venous grooves  
*Sulci arteriosi*=arterial grooves  
*Foveolae granulares*=granular sacs  
*Fossa temporalis*=temporal fossa  
*Arcus zygomaticus* =zygomatic arch  
*Fossa infratemporalis*=infratemporal fossa  
*Fossa pterygopalatina*=pterygopalatine fossa  
*Fissura pterygomaxillaris*=pterygomaxillary fissure  
*Canalis palatinus major*=greater palatine canal  
*Foramen jugulare*=jugular hole  
*Fissura sphenopetrosa*=sphenopetrosal fissure  
*Fissura petrooccipitalis*=petrooccipital fissure  
*Foramen lacerum*=broken hole  
*Palatum osseum*=hard palate  
*Foramen palatinum majus*=greater palatine hole  
*Fossa incisiva*=incisive fossa  
*Canalis incisiva*=incisive canal  
*Foramina incisiva*=incisive holes  
*Torus palatinus*=torus palatinus  
*Canalis palatovaginalis*=palatovaginal canal  
*Canalis vomerovaginalis*=vomerovaginal canal

**Cavum nasi=nasal cavity**

*Septum nasi osseum*=bony nasal septum

*Apertura piriformis*=piriforme opening

*Meatus nasi superior*=superior nasal meatus

*Meatus nasi medius*=middle nasal meatus

*Meatus nasi inferior*=inferior nasal meatus

*Canalis nasolacrimalis*=nasolacrimal canal

*Recessus sphenoidal*=sphenoidal recessus

*Meatus nasopharyngeus*=nasopharyngeal meatus

*Choanae*=choane

*Foramen sphenopalatinum*=sphenopalatine hole

**Orbita=orbital cavity**

*Aditus orbitae*=orbital aditus

*Margo supraorbitalis*=supraorbital border

*Margo infraorbitalis*=infraorbital border

*Pariet superior*=superior wall

*Pariet inferior*=inferior wall

*Pariet lateralis*=lateral wall

*Pariet medialis*=medial wall

*Foramen ethmoidale anterius*=anterior ethmoidal hole

*Foramen ethmoidale posterius*=posterior ethmoidal hole

*Fissura orbitalis superior*=superior orbital fissure

*Fissura orbitalis inferior*=inferior orbital fissure

## VIII. REFERENCES

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