Skull-2

Norma Basalis Interna
Norma Basalis Externa

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all red colour notes are from the online video.
Norma basalis interna

Base of the skull - superior view

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

Anterior cranial fossa

Middle cranial fossa

Posterior cranial fossa
Frontal lobe

Temporal lobe

Parietal lobe

Occipital lobe

Cerebellum

Brain stem

Left hemisphere

Right hemisphere

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The brain stem is divided into 3 parts (from superior to inferior):
1- Midbrain
2- Pons
3- Medulla oblongata (which continues as spinal cord)
Anterior cranial fossa
Contains frontal lobes
Middle cranial fossa
Contains temporal lobes
Posterior cranial fossa
Contains the brain stem (midbrain, pons and medulla oblongata) and cerebellum
These cranial nerves function is moving the eyeball.
The numbering of the cranial nerves is based on the order in which they emerge from the brain, front to back.
Foramina of skull and cranial nerves passing through

- Cribiform plate
- Optic canal
- SOF
- F. rotundum
- F. ovale
- F. lacerum
- F. spinosum
- IAM
- clivus
- Jugular F.
- Hypoglossal canal
- I
- II
- III, IV, V₁, VI
- V₂
- V₃
- VII, VIII
- IX, X, XI
- XII
Anterior cranial fossa

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

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

**Frontal crest** is a small crest projects from frontal bone

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

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

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

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Orbital plates of frontal bone
Frontal crest
Crista galli of ethmoid

Latin: Crest of the rooster
The small perforations in the cribriform plate are for the **olfactory nerves**.
Foramen caecum: caecum means closed, some people has it closed normally.
Lesser wing of sphenoid

Norma basalis interna is the best view to see

Lesser wing of sphenoid

Sphenoid bone like butterfly in shape 😊
Anterior clinoid process

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

**Note:**
- **Medial** to Anterior clinoid process: **Optic canal**
- **Lateral** to Anterior clinoid process: **Superior orbital fissure**
Middle cranial fossa

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

Body of sphenoid
Squamous and petrous parts of the temporal bone

Squamous part

Petrous part

It has 1-apex
2-superior border
3-anterior surface (which part of middle cranial fossa)
4-posterior surface (which part of posterior cranial fossa)
Resembles a bat having a centrally placed body with greater and lesser wings that are outstretched on each side.

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

The body of the sphenoid: contains the **sphenoid air sinuses**.
Sphenoid bone

Anterior view

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Body of Sphenoid bone

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Greater wing of Sphenoid bone
Lesser wing of Sphenoid bone
Pterygoid plates
**Foramen lacerum**: lies at the apex of the petrous part of the temporal bone. In life is filled by cartilage and fibrous tissue, and only small blood vessels pass through this tissue.

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

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

**Carotid canal**: Transmits the internal carotid artery.

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

**Meckl’s cave**: impression on the apex of the petrous part of the temporal bone for the trigeminal ganglion.
Foramen rotundum
Foramen ovale
Foramen spinosum
in living subjects it closed by a fibrocartilage

Foramen lacerum
Meckl’s cave
(Trigeminal impression)
Carotid canal
The median part of the middle cranial fossa is formed by the **body of the sphenoid**.

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

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

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

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

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

The other name for pituitary gland is hypophysis.
Optic canals

Sulcus chiasmaticus (chiasmatic groove)

Is the groove between the optic canals
Optic canal transmits the optic nerve and the ophthalmic artery.

Remember: Ophthalmic artery is a branch from internal carotid artery.
Posterior cranial fossa

Formed mostly by parts of temporal and occipital bones
The foramen magnum transmits:
1. Medulla oblongata and its surrounding meninges
2. Spinal roots of the accessory nerves
3. Two vertebral arteries.

The hypoglossal canal is situated above the anterolateral boundary of the foramen magnum and transmits the hypoglossal nerve.
The **jugular foramen** lies between the petrous part of the temporal bone and the occipital bone.

It transmits the following structures

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

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

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

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Occipital bone
Clivus

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

Transmits the vestibulocochlear nerve and the facial nerve (7th and 8th cranial nerves)
Cerebellar fossa
This bone forms parts of the medial wall of the orbit + the lateral nasal bones + roof of the nasal cavity
Ethmoid bone

Cribiform plate

Crista galli

Orbital plate

Lateral mass

Perpendicular plate
Norma Basalis Externa
Maxilla
Palatine process of maxilla
Vertical plate of palatine bone forms the medial wall of pterygopalatine fossa: it locates under the apex of the orbit
Incisive foramen

Greater palatine foramen

Lesser palatine foramen

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The vomer
Sphenoid bone
(greater wing and pterygoid plates)
Lateral pterygoid plates of sphenoid
Medial pterygoid plates of sphenoid

Hamulus of Medial pterygoid plate of sphenoid
Inferior orbital fissure

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

Zygomatic arch
Temporal bone

Foramen lacerum

Opening of the carotid canal

Jugular foramen

Is located behind the carotid canal

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We can not see foramen rotundum in this view
Choanae (posterior nasal aperture)

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

External auditory meatus

Anterior nasal aperture
Articular tubercle
Mandibular fossa
Occipital bone
Chondyles of occipital bone (articulate with C1 vertebra)
Parts of occipital bone:

1: Basilar part (in front the foramen magnum)
2: Occipital chondyles (sides of foramen magnum)
3: Squamous part (behind the foramen magnum)
External occipital crest

External occipital protuberance
Jugular foramen

It always posterior to the carotid canal
Styloid process of the temporal bone

Mastoid process

Mastoid notch
The **stylomastoid foramen**
In the interval between the styloid and mastoid processes

Transmits the facial nerve
**Infra temporal fossa**

**Boundaries**
- Anterior wall: back of the maxilla
- Medial wall: lateral pterygoid plate
- Roof: greater wing of sphenoid bone
- Lateral wall: ramus of mandible

**Communications**
- Temporal fossa: through the gap deep to the zygomatic arch
- Orbit: through the inferior orbital fissure
- Pterygo-palatine fossa: through the pterygo-maxillary fissure
- Middle cranial fossa: through foramen ovale and spinosum
Temporal and infratemporal fossae are interconnected spaces on the lateral side of the head.

**Temporal fossa**
- Lies below the apex of the orbit
- Temporal fossa is superior to the infratemporal fossa above the zygomatic arch

**Pterygo-palatine fossa**
- Lies below the apex of the orbit
- For respiratory system
greater wing of sphenoid bone

Back of the maxilla

lateral pterygoid plate
The roof of Infratemporal fossa

Inferior view of the skull

Inferior orbital fissure

Foramen ovale (mandibular nerve)

Foramen spinosum (Middle meningeal artery)

Greater wing of sphenoid

Note:
The foramen ovale and foramen spinosum open on its roof
Pterygo-maxillary fissure is a vertical fissure between the pterygoid plate and back of the maxilla. It leads medially into the pterygopalatine fossa.

The medial and anterior walls of Infratemporal fossa
Norma basalis externa
Base of the skull - inferior view

The **hard palate** which is made of:
A-The palatal processes of the maxillae
B-The horizontal plates of the palatine bones

The **choanae** (posterior nasal apertures)

The **vomer**

**Medial and lateral pterygoid plates of the sphenoid bone**

**Occipital condyles**

**External occipital crest**

**External occipital protuberance**

**Superior nuchal line**