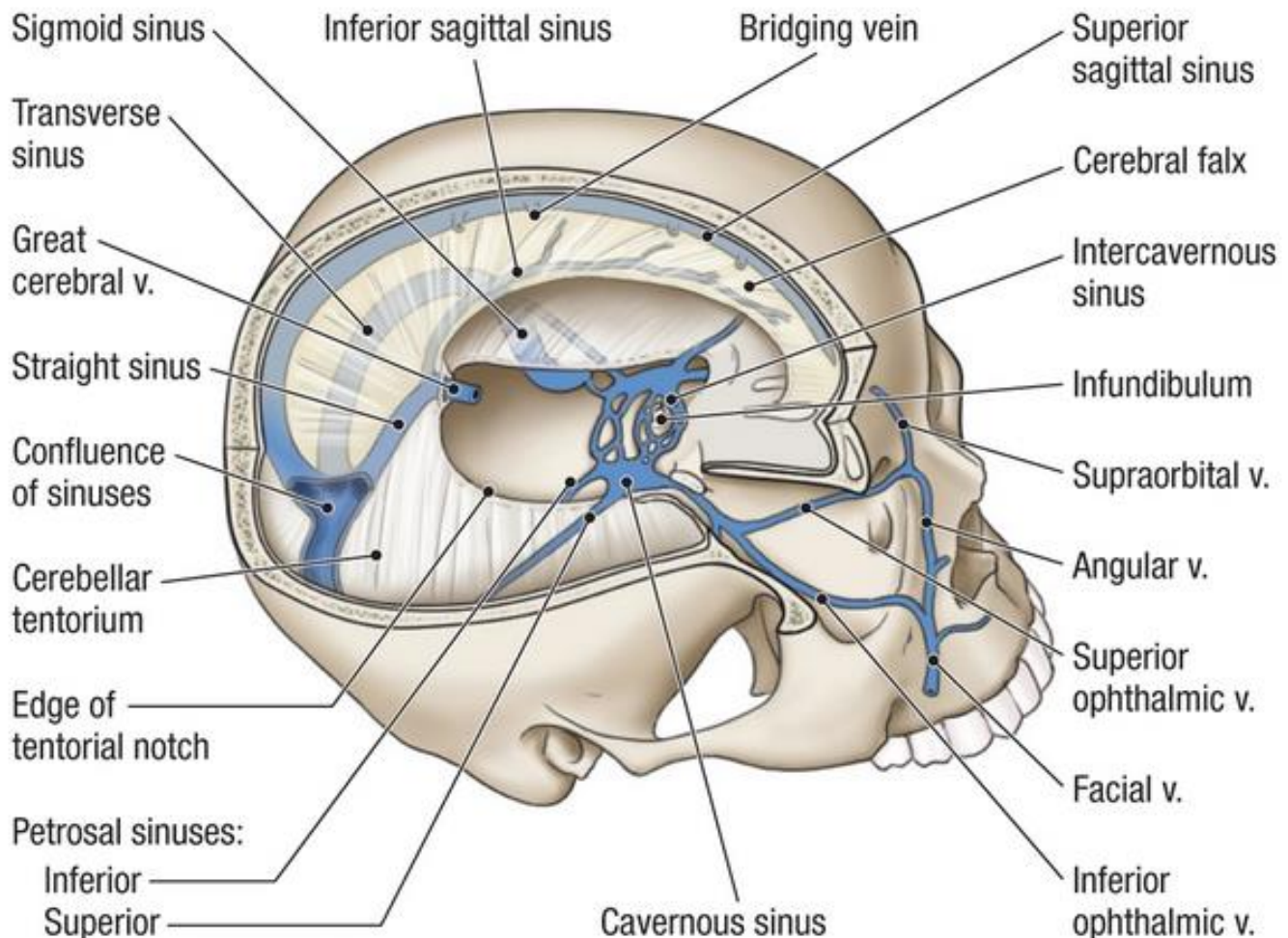


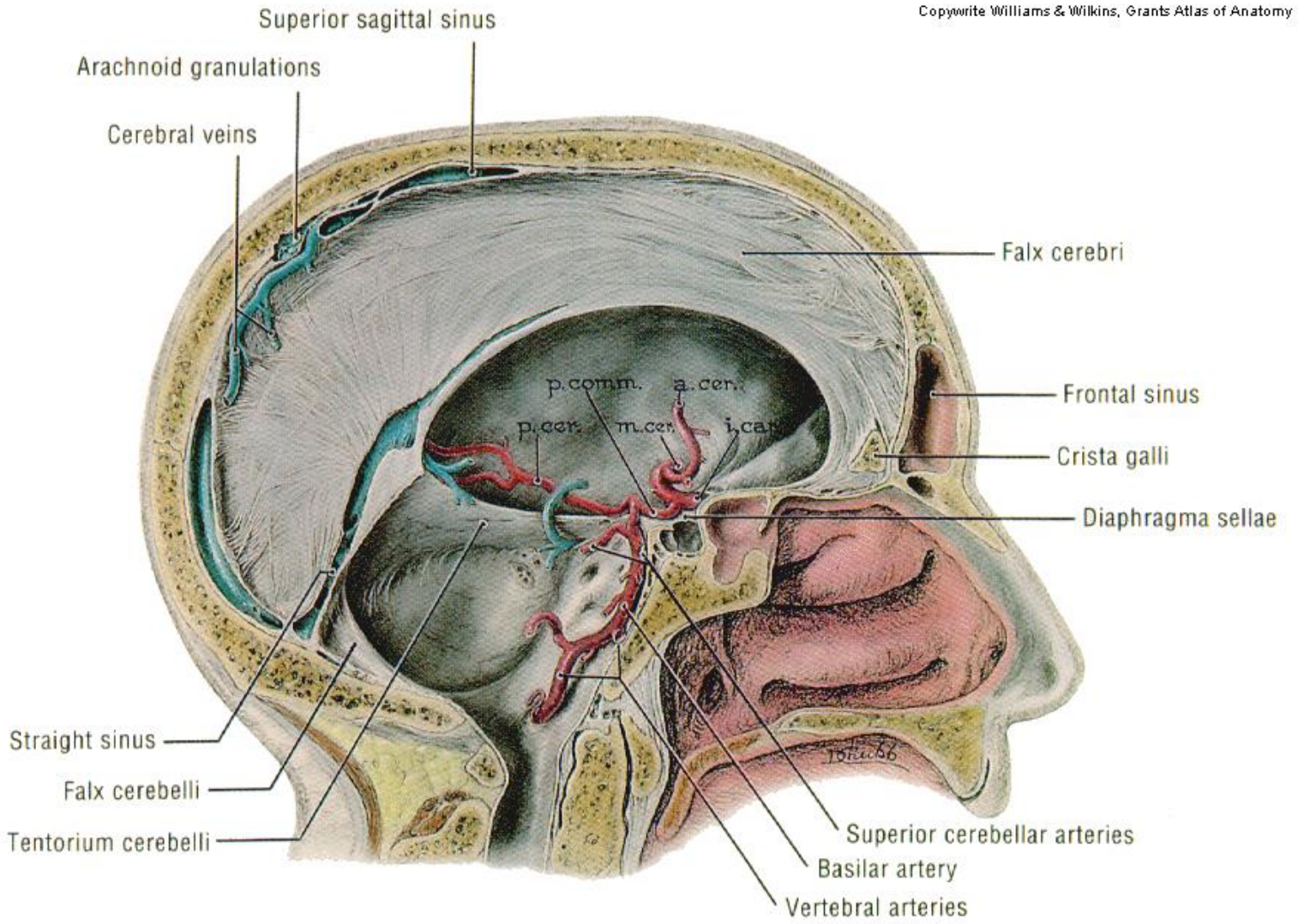
## Folds of Dura Mater

- ★ They are folds formed of **two layers** from the **inner fibrous layer of the dura**, acting as **septa separating** different parts of the brain to **stabilize** them.
- ★ There are 5 folds :

### I. The falx cerebri:

- It is a **dural fold** that descends in the **median longitudinal cerebral fissure** between the 2 cerebral hemispheres.
- It is **sickle** shaped and has an apex, base, upper and lower borders.
  - **Apex:** attached to **crista galli** and **frontal crest**.
  - **Upper border :** **convex**, it is attached to the **superior sagittal groove** in the inner aspect of the skull vault and **contains** superior sagittal sinus.
  - **Lower border. concave** and **free**, passing just above the corpus callosum & it **contains** the inferior sagittal sinus in its posterior 2/3.
  - **Base:** It is attached to apex of **tentorium cerebelli** and **contains** the straight sinus.

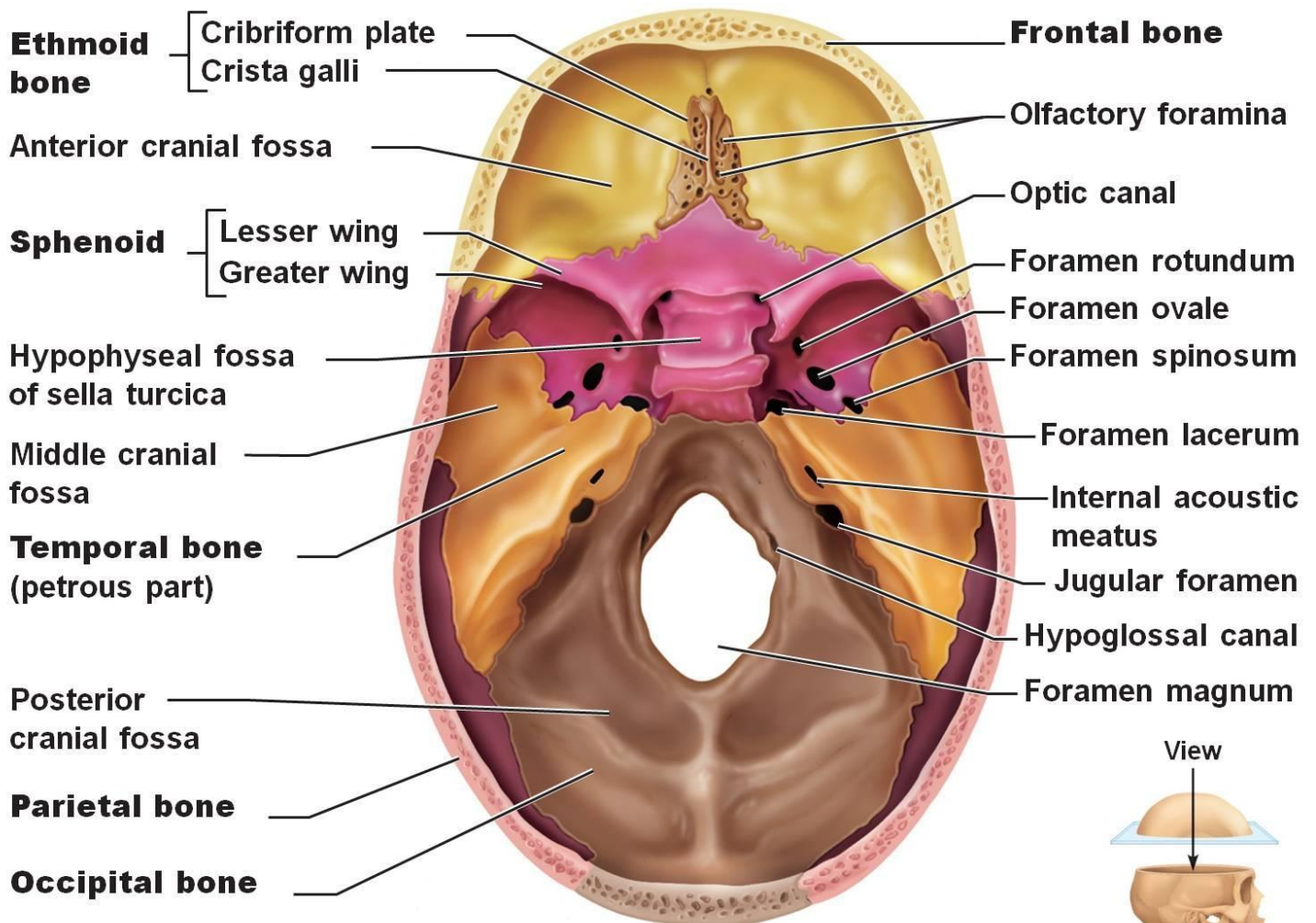




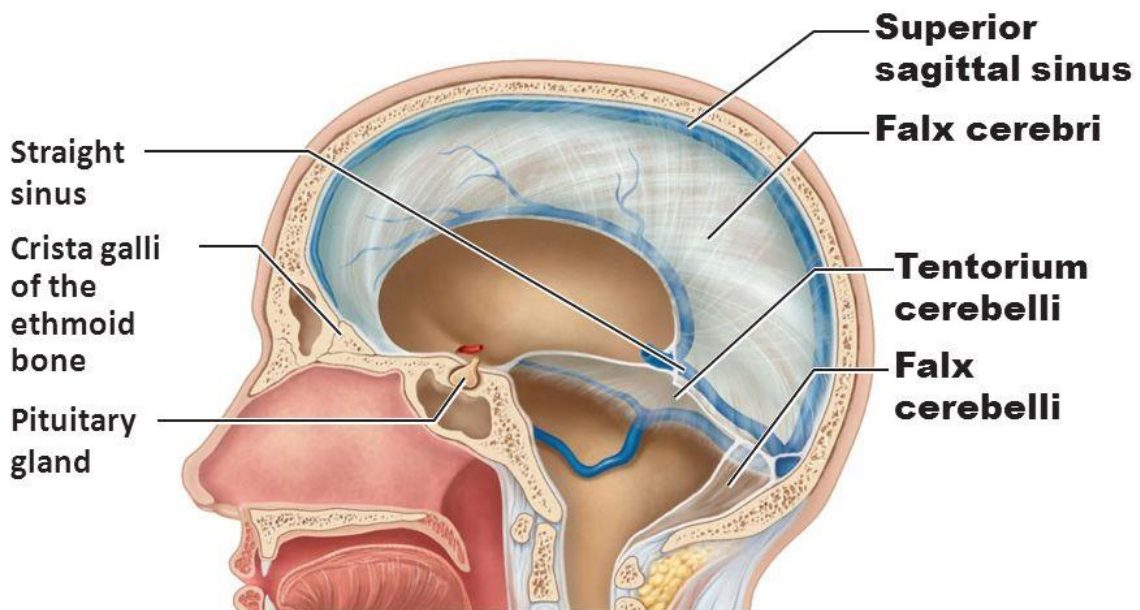
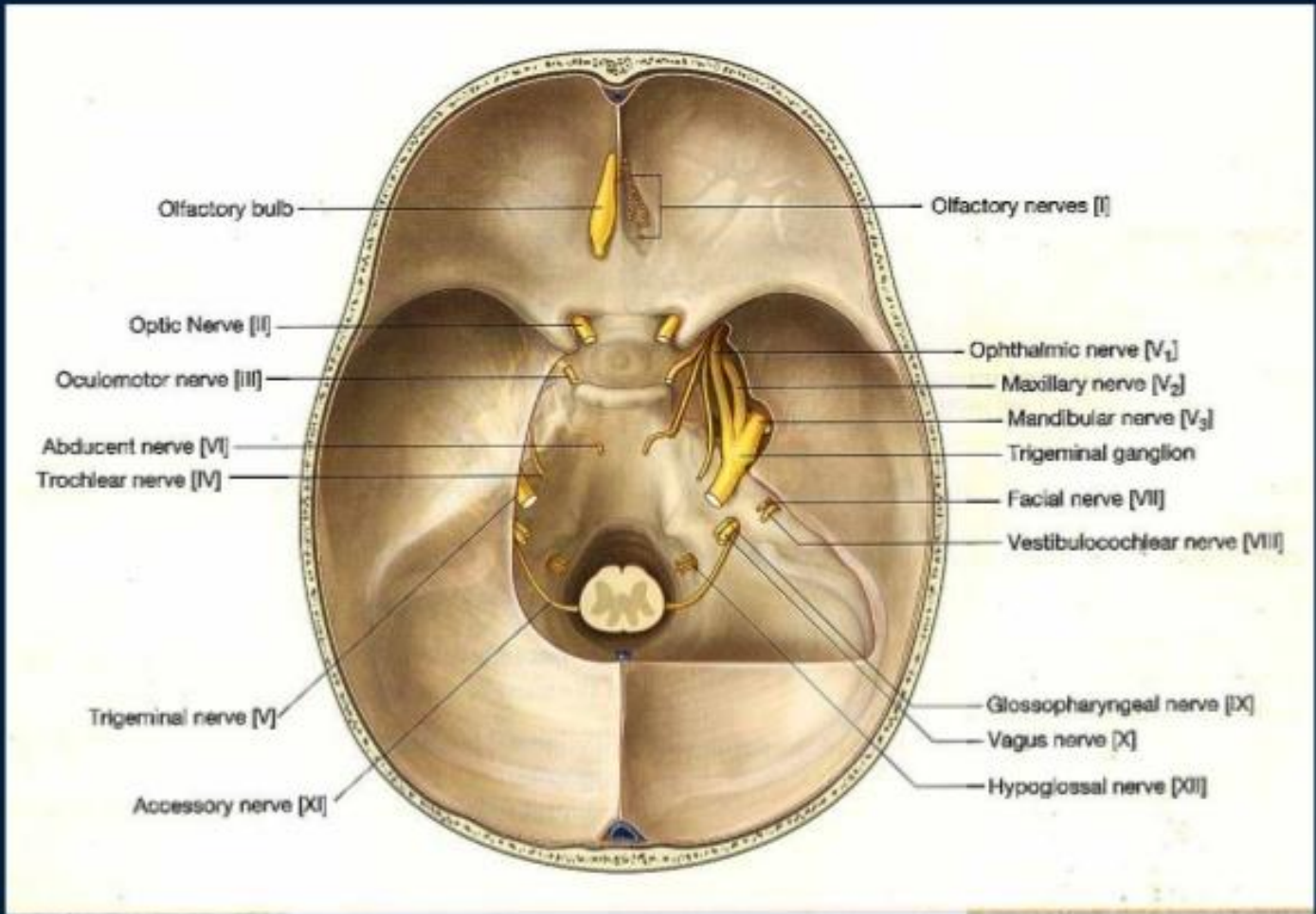


## II. The tentorium cerebelli:

- It is a tent shape **dural fold, separating** the cerebellum below it from the occipital lobe of cerebrum above it .
- It has 2 borders.
  - a- **The free border:** U-shaped, is attached to the **anterior clinoid processes** and forms the **tentorial notch** that surrounds the **midbrain**.
  - b- **The attached border:** Attached to the following parts on both sides:
    - Posterior clinoid processes.
    - Lips of the superior petrosal sulcus.
    - Lips of the transverse sulcus.



(a) Superior view of the skull, calvaria removed



- **The free and attached borders:** Cross each other at the **apex of petrous** bone .

-Three cranial nerves pierce the dura mater at this point of crossing :

a- **Oculomotor nerve (3<sup>d</sup> cranial nerve):** In front of this point.

b- **Trochlear nerve (4<sup>th</sup> cranial nerve):** At this point.

c- **Trigeminal nerve (5<sup>th</sup> cranial nerve):** Behind this point.

▪ **Sinuses related to tentorium cerebelli:**

a- **Straight sinus** at its attachment with falx cerebri.

b- **Two sinuses are present in the attached border: Superior petrosal** sinus in front and **transverse sinus** behind (on both sides).

**III. Falx cerebelli:**

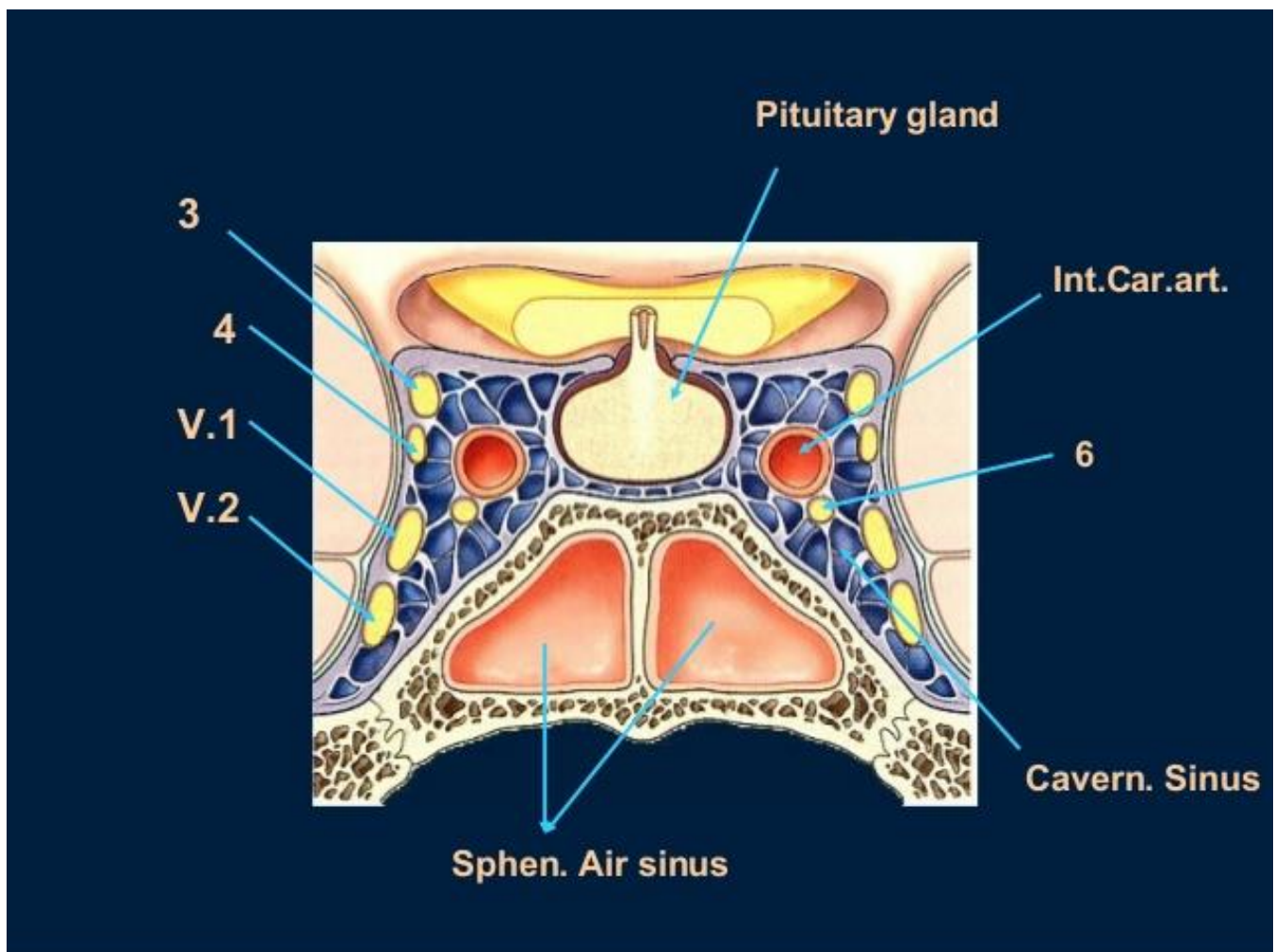
- A dural fold which has **attached border** to the internal occipital crest.

- It has a free border which **occupies** the posterior notch of the cerebellum & **separates** the two cerebellar hemispheres .

- Its attached border **contains** the occipital sinus.

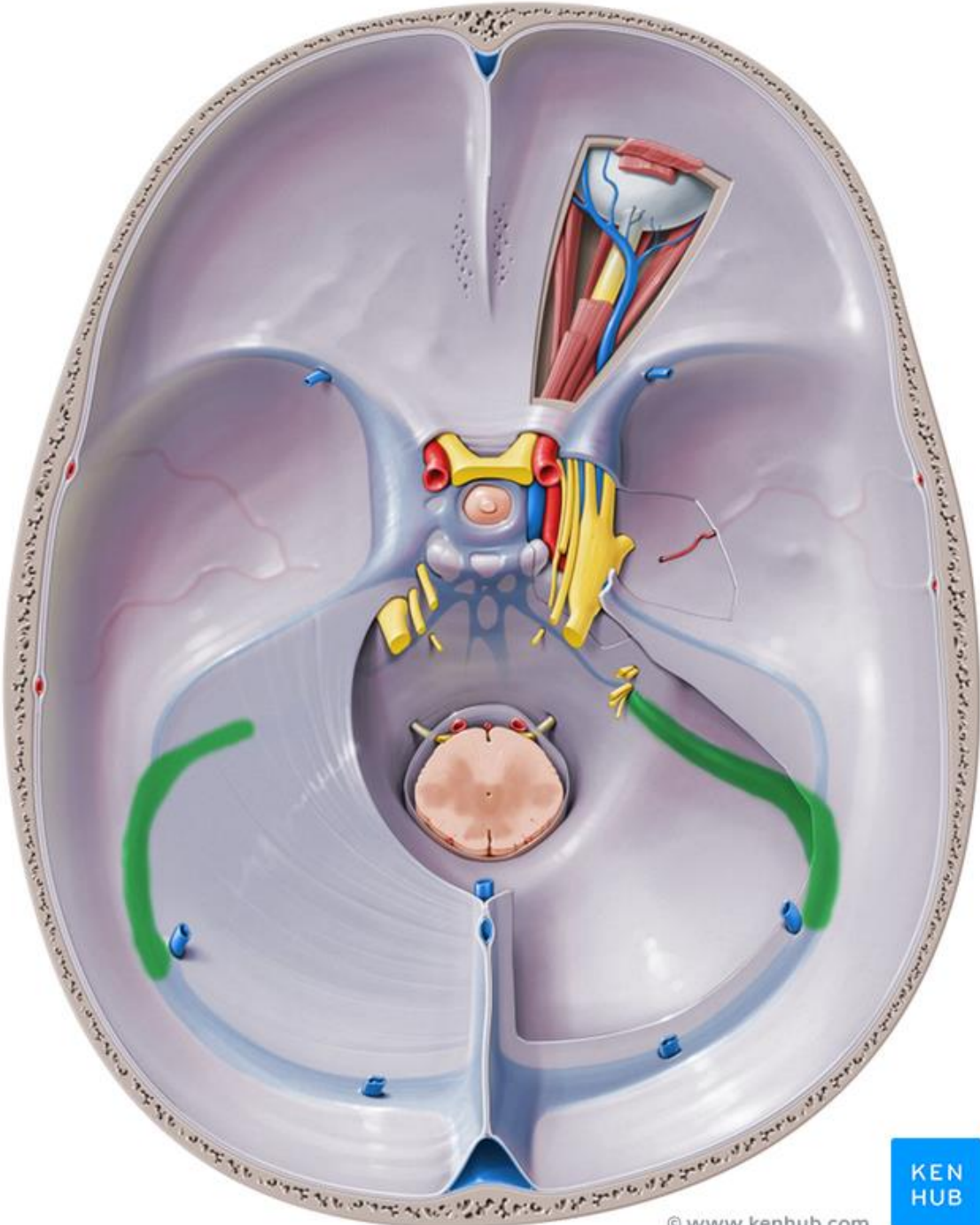
**IV. Diaphragma sellae:** A dural fold that covers the sella turcica and pituitary gland.

It is attached to the 4 clinoid processes & pierced by pituitary stalk .





**IV. Cavum trigeminale :** it is a fold of dura covers the trigeminal ganglion



# Dural Venous Sinuses

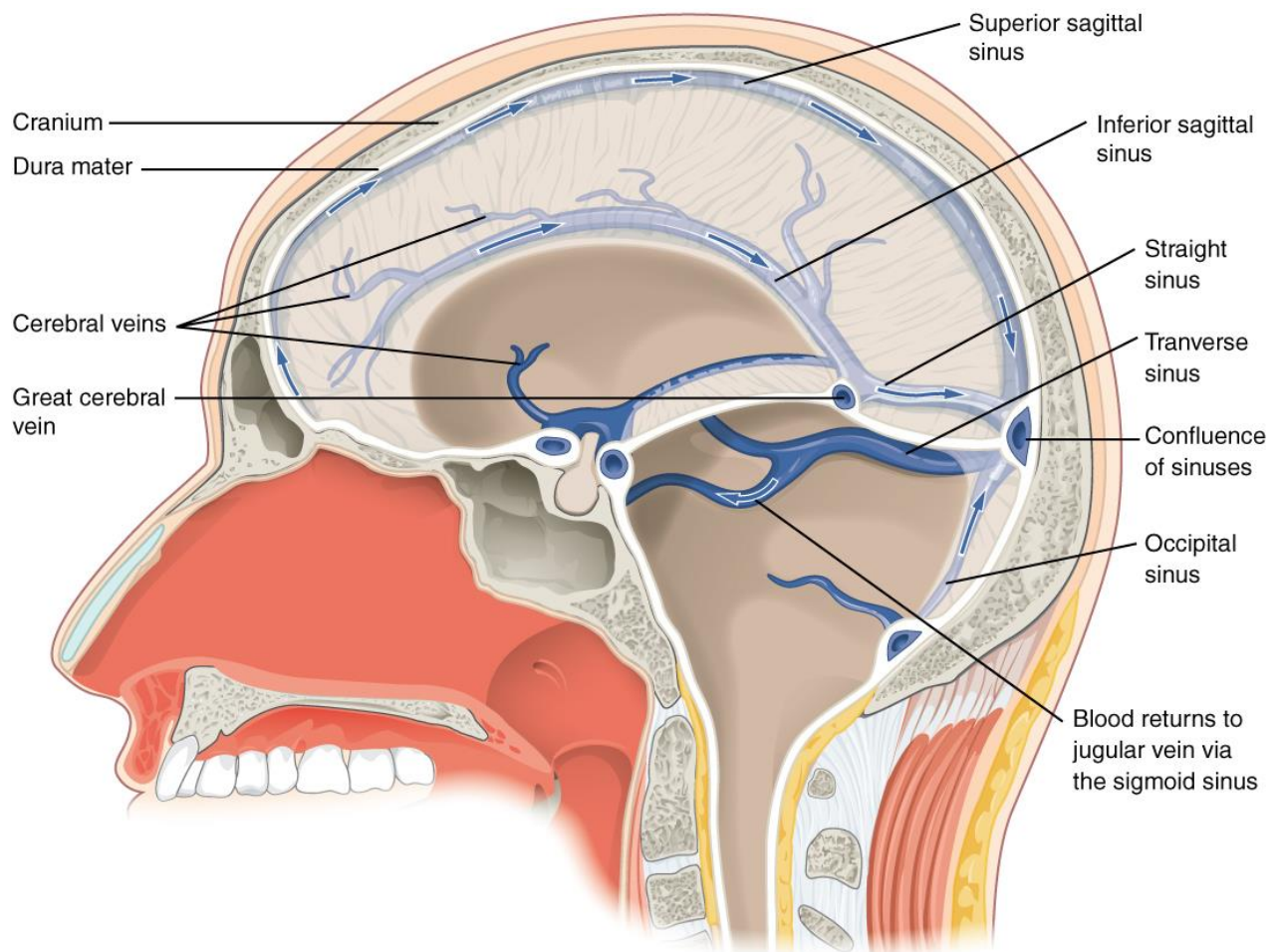
- They are **venous channels between** the outer and inner layers of dura mater, **lined** with endothelial cells and have **no valves**.
- They contain **venous blood from** the brain, meninges , skull, orbit, inner ear and from pituitary gland.
- They **receive** arachnoid villi (granulations) which **absorb** CSF .
- They communicate with extracranial veins via **emissary veins**.

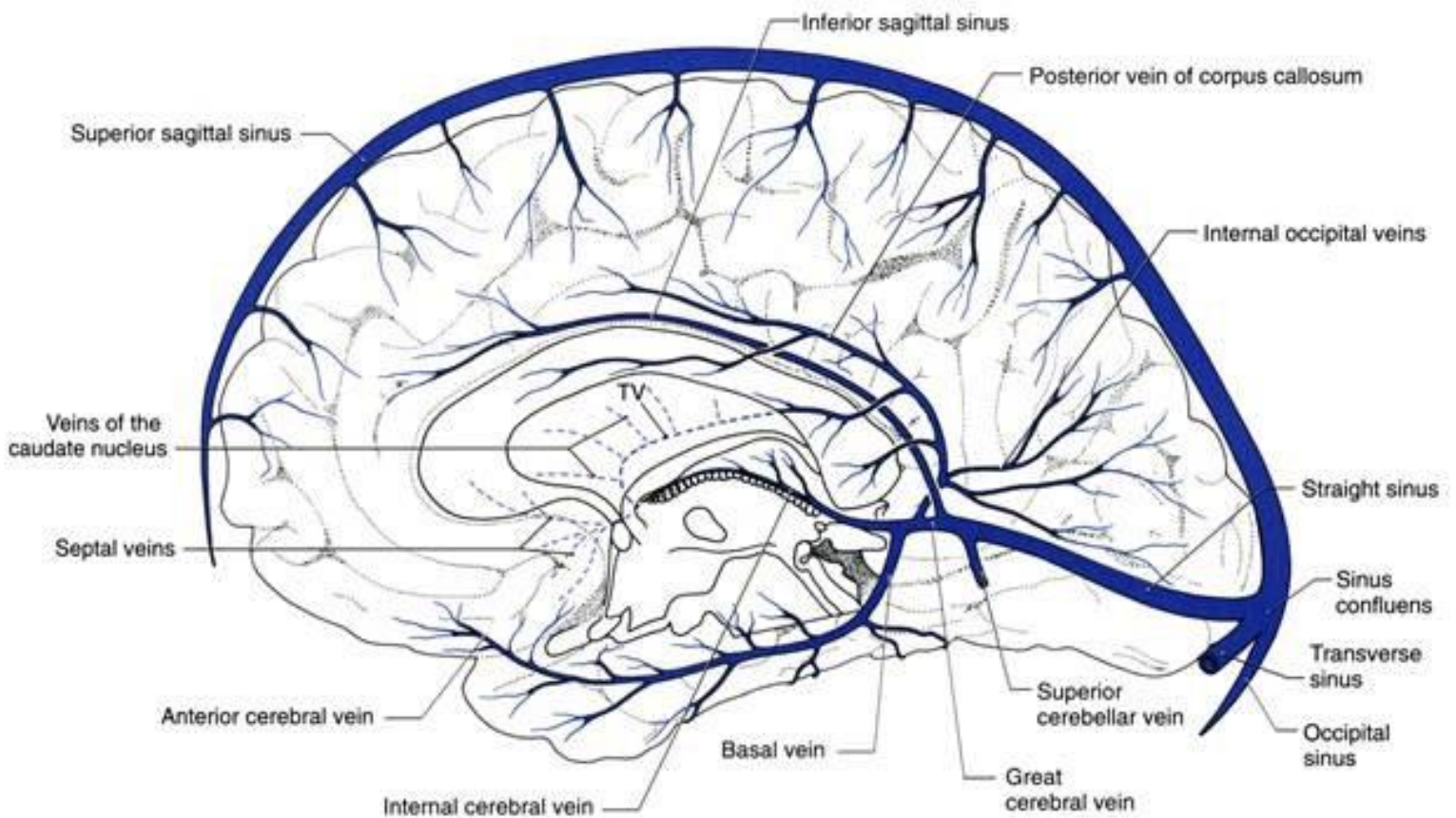
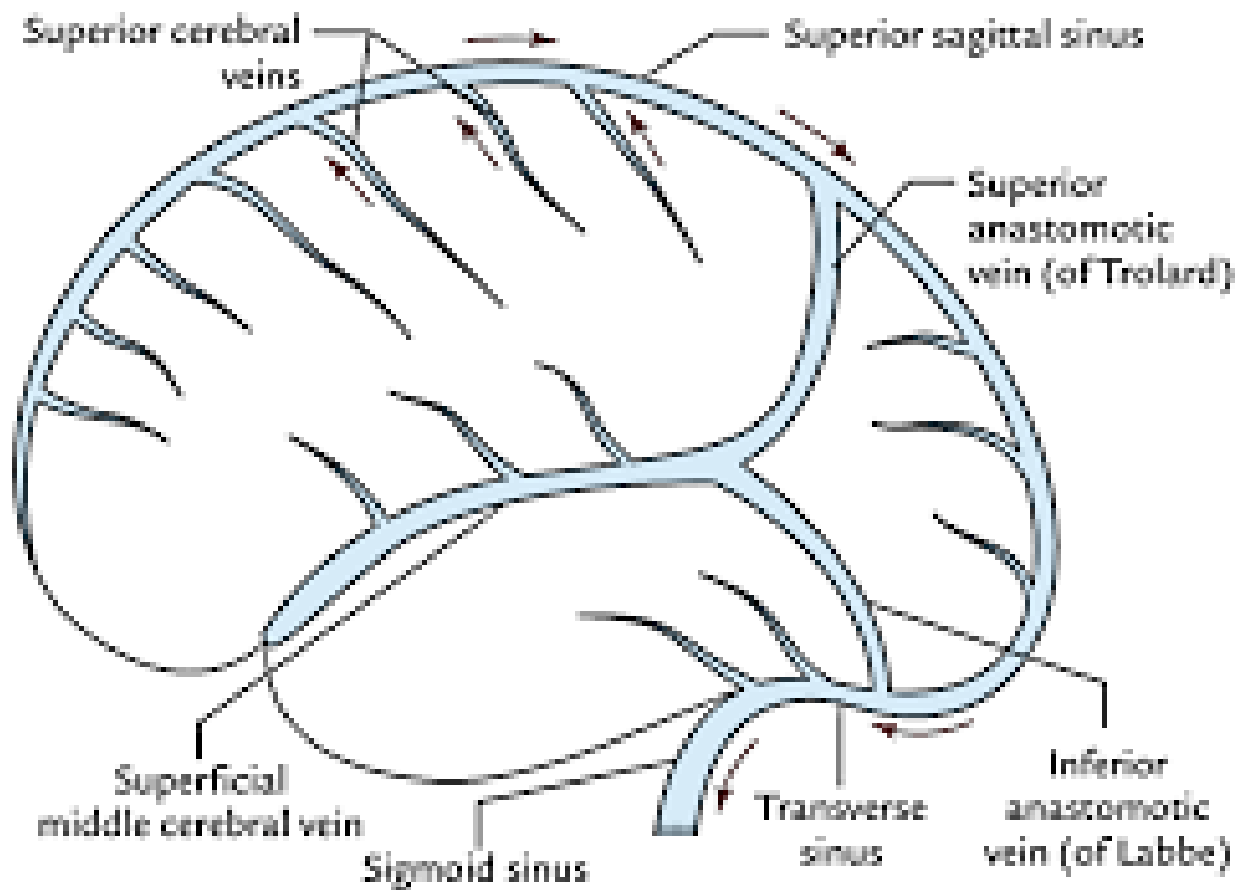
## \* Types of Dural Venous Sinuses:

### I. Single sinuses:

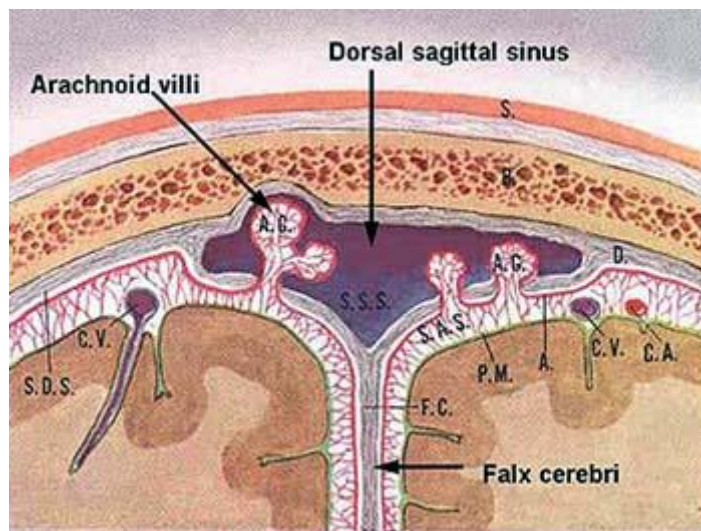
#### 1. *Superior sagittal sinus (S.S.S.):*

- It **begins** at foramen caecum, **passes** backwards in the upper attached border of **falx cerebri** .
- **It ends** at the internal occipital protuberance by shifting to the right side (in most of cases), forming right transverse sinus.
- **Tributaries:**
  - a- Superior cerebral veins.
  - b- Two parietal emissary veins.
  - c- Arachnoid villi.
  - d- Meningeal veins.









2. **Inferior sagittal sinus:** It **passes** backwards in the posterior 2/3 of the lower free border of the **falx cerebri** ( above corpus callosum ) and **receives** veins from medial side of brain.
  
3. **Straight sinus:**
  - It is **formed by the union** of inferior sagittal sinus and great cerebral vein.
  - It **passes** backwards in the midline at the line of attachment of falx cerebri with tentorium cerebelli.
  - It **ends** by shifting to the left side in most of cases to form left **transverse sinus**.
  
- ★ **N.B :** *Superior sagittal sinus and straight sinuses may open into a confluence of sinuses , at the internal occipital protuberance , from which arise right and left transverse .*
  
4. **Occipital sinus:**
  - A small sinus **begins** from the **confluence** of sinuses or by 2 veins from the beginning of the 2 **transverse** sinuses .
  - It **descends** in the attached border of falx cerebelli, **dividing** into **2 branches** near the foramen magnum.
  - These branches **end** in both sigmoid sinuses and communicated with the internal vertebral plexus of veins.

5. **Basilar plexus of veins:** Lies on the **clivus** and **connects** both inferior petrosal sinuses together.

## II. Paired sinuses:

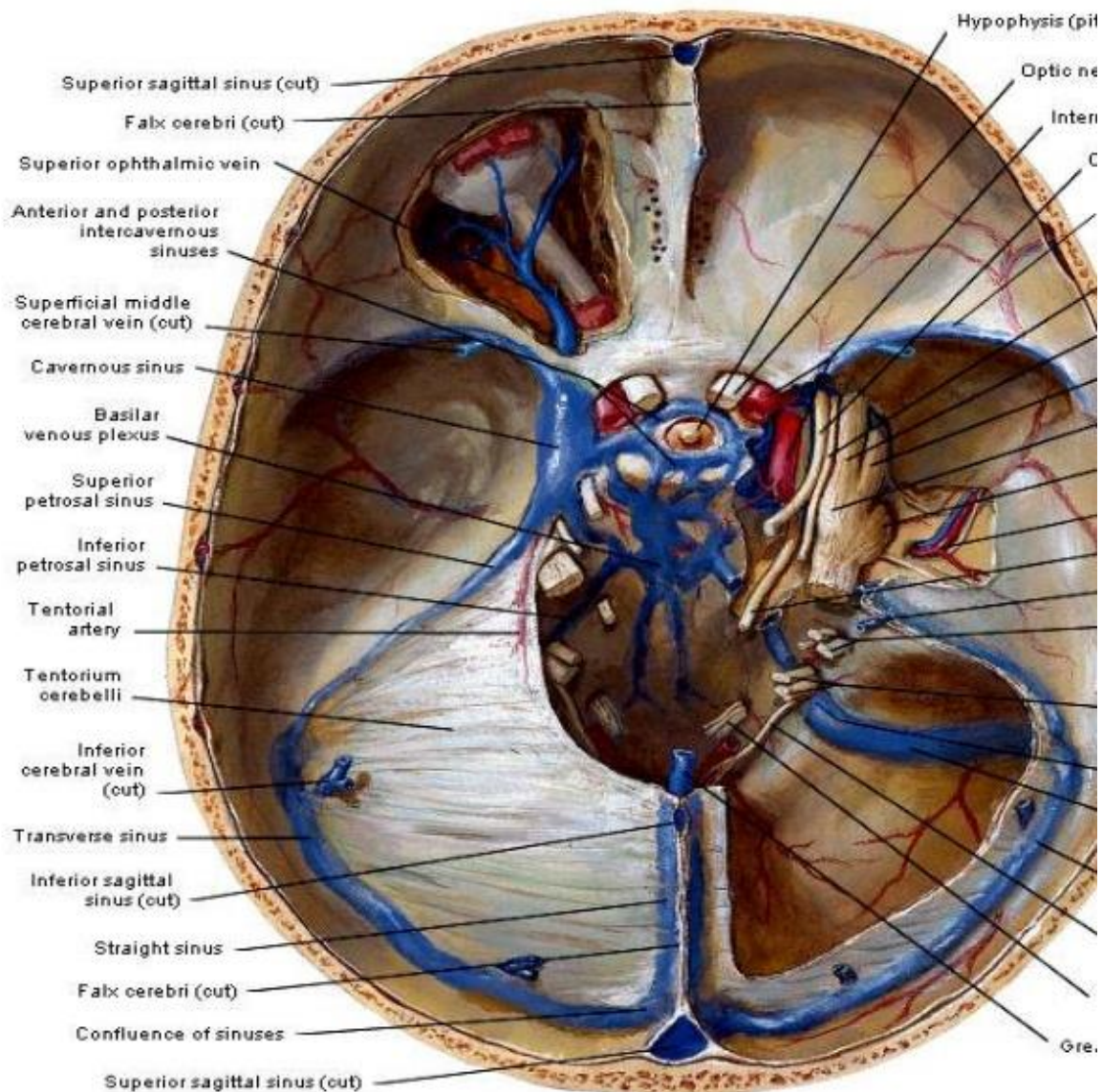
### 1. **Transverse sinuses:**

- The **right** sinus is **usually** the continuation of the **SSS** while the **left** sinus is **usually** the continuation of the **straight** sinus.
- Each sinus **passes** laterally in the attached border of tentorium cerebelli to reach the inner surface of **base of mastoid** process where it becomes the **sigmoid** sinus.

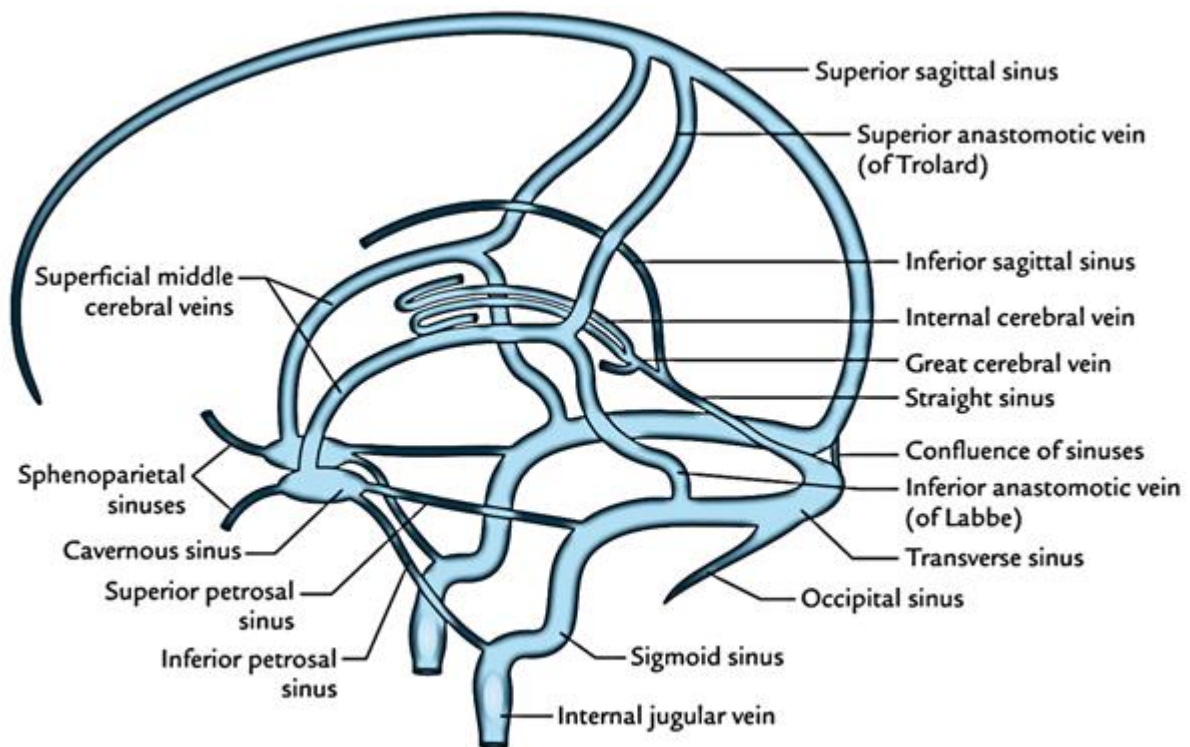
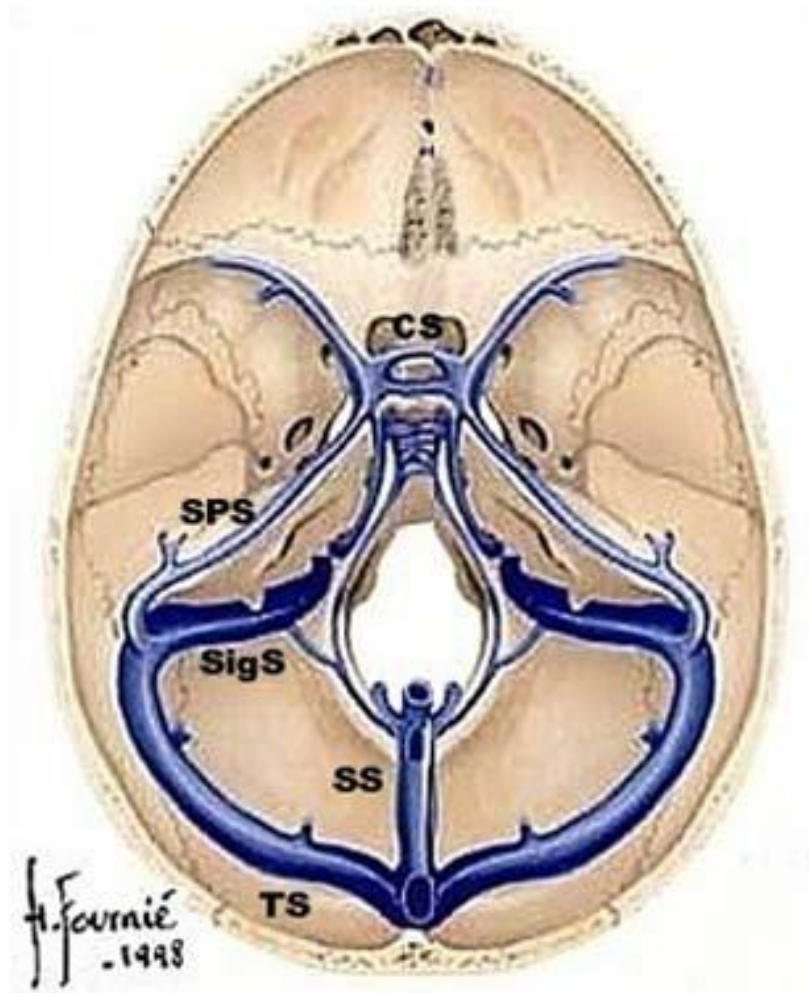
#### - **Tributaries:**

- a- Cerebellar veins.
- b- Superior petrosal sinus.
- c- Veins from skull.

## Dural Venous Sinuses Cranial Floor - Superior View

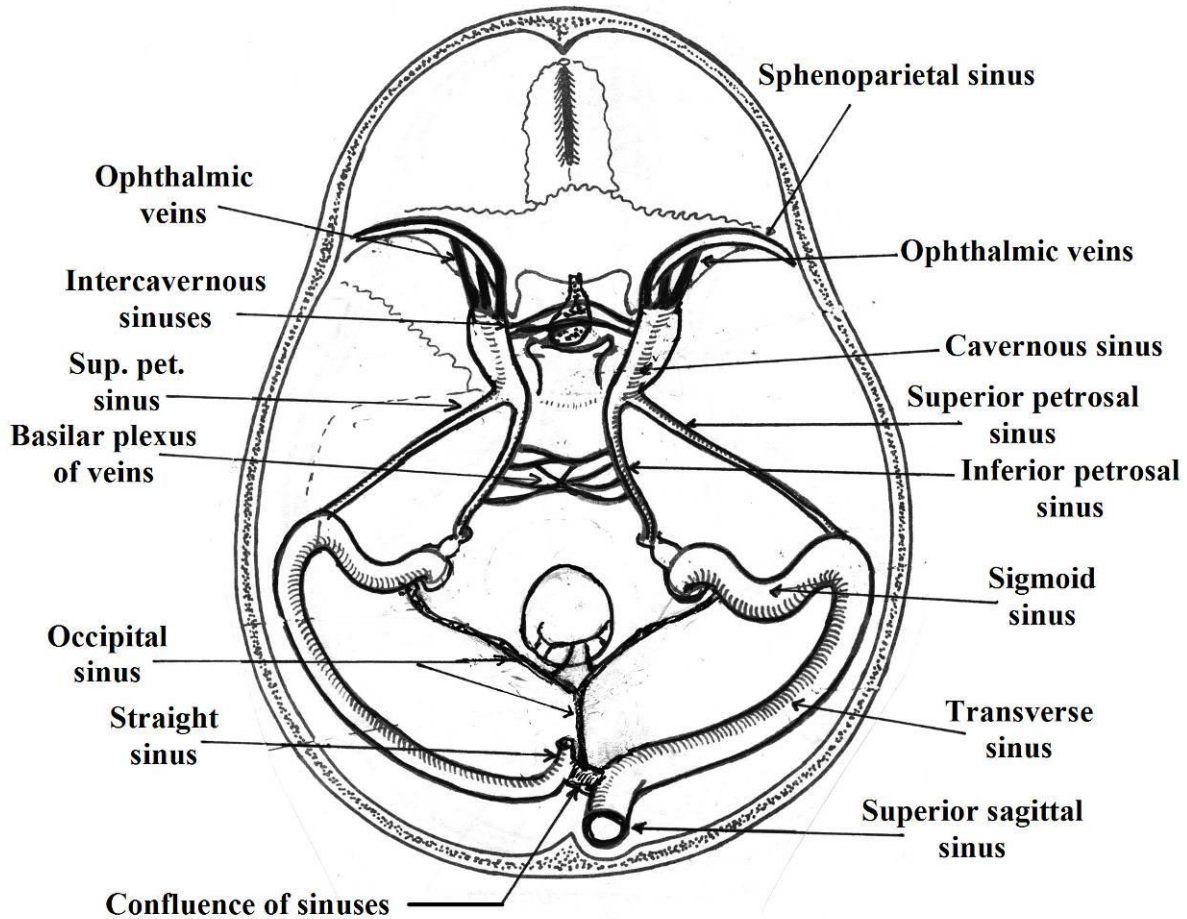
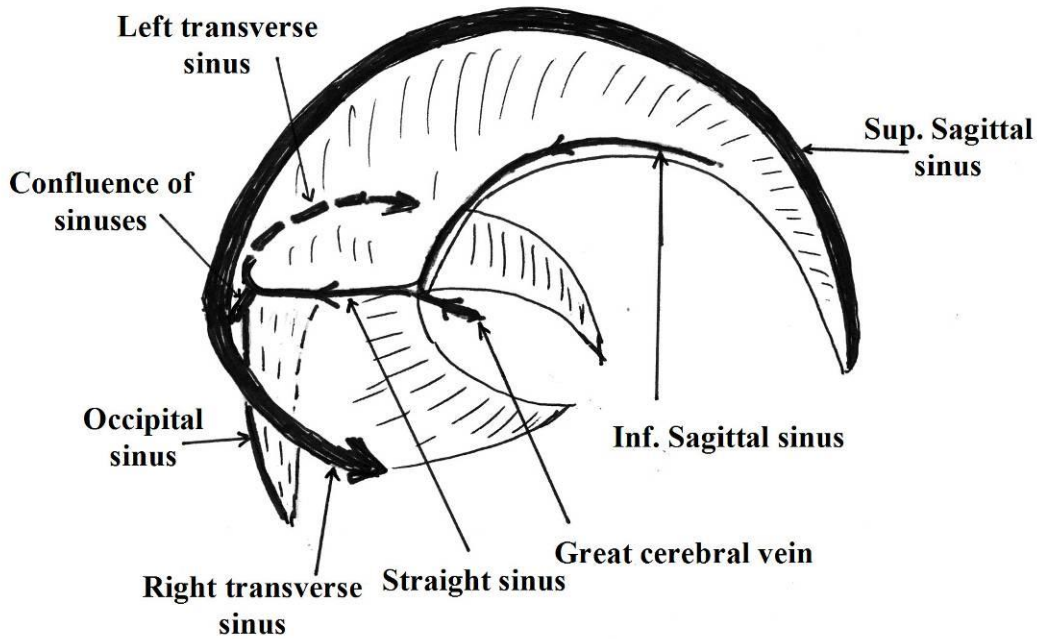




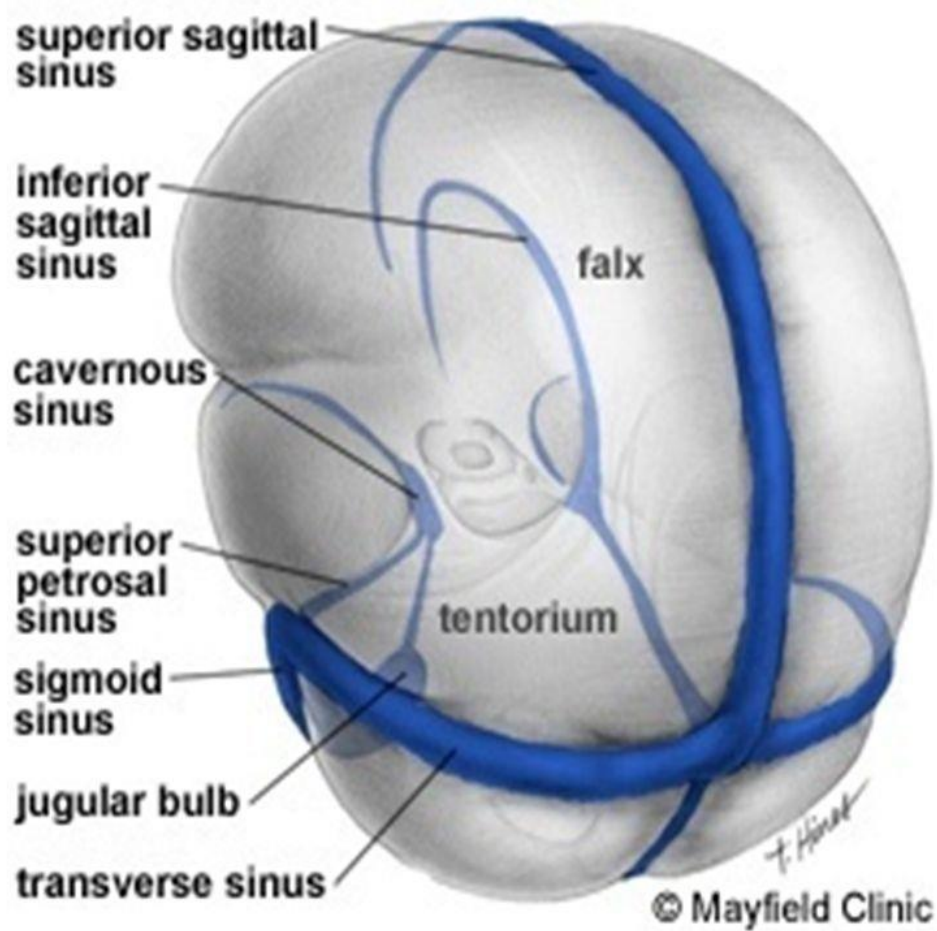
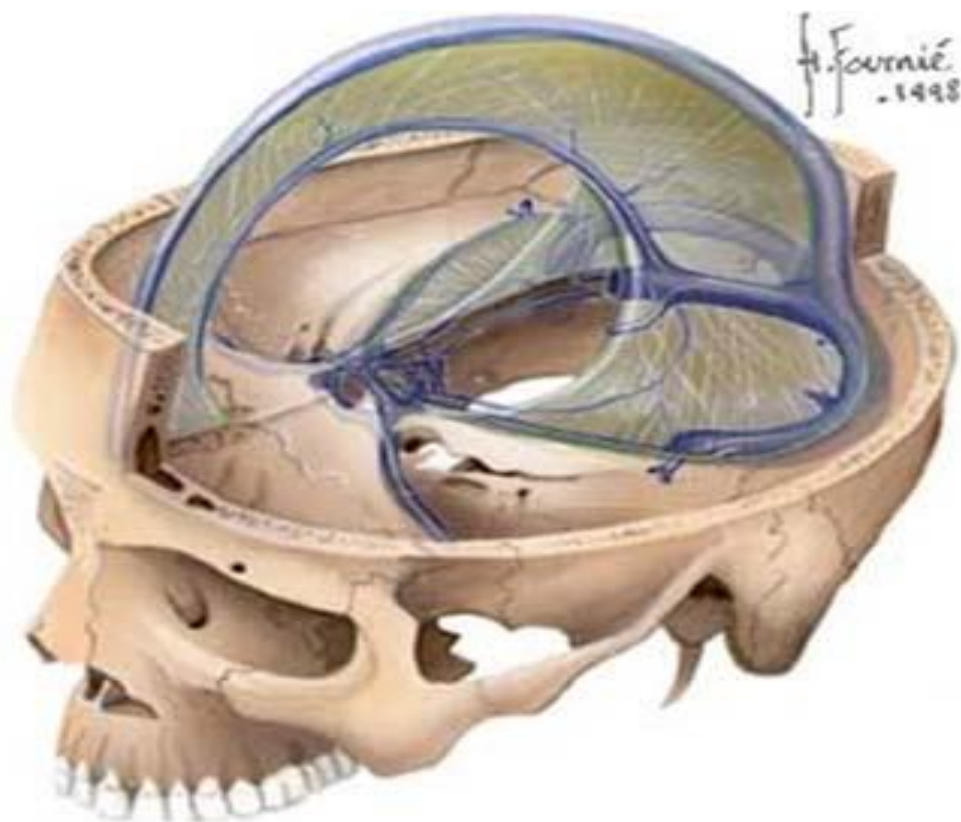




***Folds of Dura Mater and Single Sinuses***



***Paired Dural Venous Sinuses***



2. ***Sigmoid sinuses:***

- The continuation of the **transverse sinus**.
- It has an **S-shaped** course, passes through the **jugular foramen** to become the **internal jugular vein**.

3. ***Superior petrosal sinuses:***

- It arises from posterior **end of cavernous** sinus, **pass** backwards in the attached border of tentorium cerebelli to **end** in transverse sinus.

4. ***Inferior petrosal sinuses:***

- It **arises** from the posterior end of **cavernous** sinuses .
- They **descend** in the **petro-occipital fissures** (the inferior petrosal groove) to leave the skull via the **jugular foramina** and they end in the **internal jugular veins** outside the skull.
- Both sinuses are **connected** together by the **basilar plexus** of veins lying on the clivus.

5. ***Spheno-parietal sinuses:*** They pass medially along the **posterior border of lesser wings** of sphenoid to end in **cavernous** sinuses.

6. ***The cavernous sinus:*** **Short wide** sinus lying on both **sides** of the **body of sphenoid**.

- **Relations:**

1. ***Anteriorly:*** Apex of the **orbit** and superior orbital fissure.
2. ***Posteriorly:*** Apex of **petrous** bone and **trigeminal** ganglion (posterolaterally).
3. ***Medially:*** Body of **sphenoid**, sphenoid **air sinus**, **pituitary** gland.
4. ***Laterally:*** The **uncus** of the temporal lobe of brain.

- **Contents:**

**A- *Inside the sinus:*** **internal carotid** artery and **abducent** nerve (6<sup>th</sup> cranial nerve) lateral to the artery.

**B- *Embedded in its lateral wall:*** 4 cranial nerves, from above downwards they are: **3<sup>rd</sup>** (oculomotor nerve) nerve, **4<sup>th</sup>** (trochlear nerve) nerve, **ophthalmic** and **maxillary** nerves (2 divisions of 5<sup>th</sup> nerve).

- **Communications (*tributaries*):** The cavernous sinus has many communications:

1. ***At its anterior end:*** It receives:

a- ***Ophthalmic veins*** (superior and inferior): Connect the sinus with **facial vein**.



- b- **Sphenoparietal sinus.**
2. **At its posterior end:** It gives:
    - a- **Superior petrosal sinus:** Connects the sinus with the **transverse** sinus.
    - b- **Inferior petrosal sinus:** Connects the sinus with the **internal jugular** vein.
  3. **From above:** It receives superficial **middle cerebral** vein, from the brain.
  4. **From below:**
    - a- Emissary vein through **foramen ovale** connects the sinus with **pterygoid** venous plexus.
    - b- 2-3 emissary veins through **foramen lacerum** connect the sinus with **pterygoid** and pharyngeal plexus of veins.
    - c- Emissary vein through the **carotid canal** connects it with **pharyngeal plexus** of veins or with internal jugular vein.
  5. **Medially:**
    - a- Two **intercavernous sinuses** (anterior and posterior) connect both cavernous sinuses together .
    - b- Veins of **pituitary** gland and **central retinal** vein.
- **Applied Anatomy:** Cavernous sinus thrombosis: It is a serious condition caused by transmission of infection from the dangerous area of the face to the cavernous sinus. It is characterized by fever and internal squint due to paralysis of abducent nerve. The eye becomes congested and oedematous due to obstruction of its venous drainage and later on the eye is bulging to the outside (proptosis).

