

MATRIC NO: 17/MHS01/132

LEVEL: 300L

## 1. CAVERNOUS SINUS

They are large paired dural venous sinus located within the cranial cavity. Dural venous sinuses are channels between the two layers of the dura mater (external periosteal layer and inner meningeal layer) which are responsible for the venous drainage of the brain, skull, orbit and internal ear.

### OUTLINE

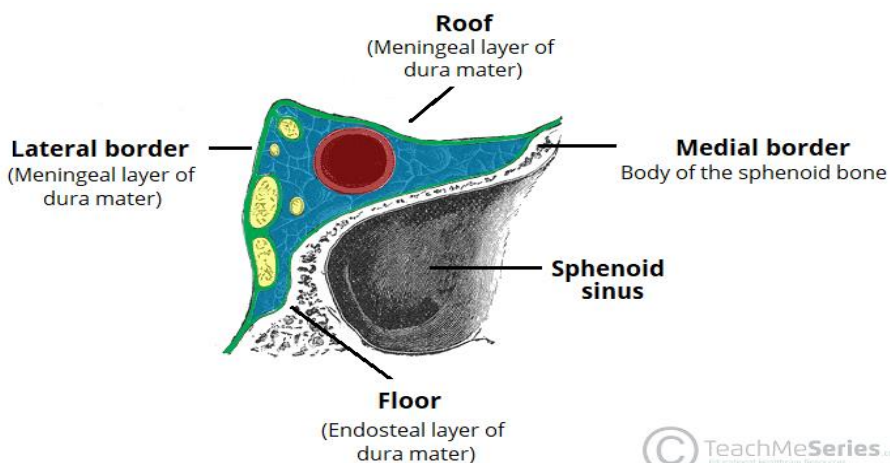
- LOCATION
- CONTENTS
- CLINICAL RELEVANCE

### ❖ LOCATION

They are located on each side of the sella turcica on the upper surface of the body of the sphenoid which contains the sphenoidal sinus. The right and left sinuses communicate in the midline via the **anterior and posterior intercavernous sinus**.

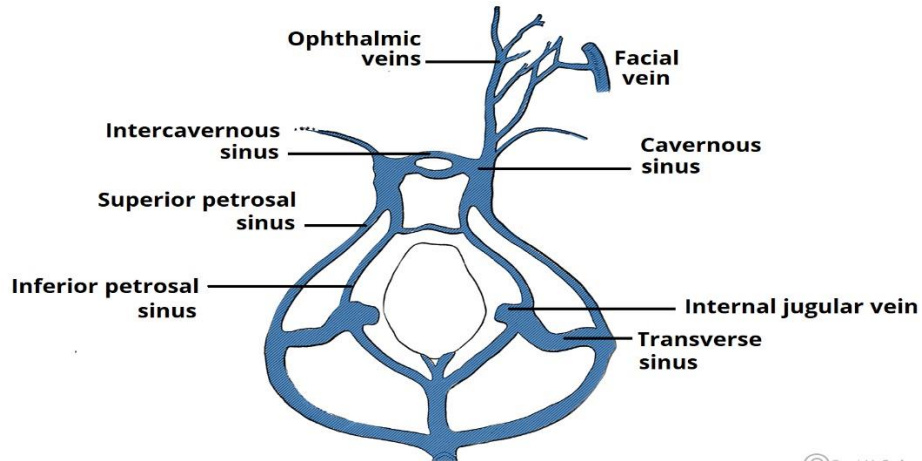
### BORDERS

- Anteriorly: Superior orbital fissure
- Posteriorly: Petrous part of the temporal bone
- Medial: Body of the sphenoid bone
- Lateral: Meningeal layer of the dura mater running from roof to floor of the middle cranial fossa.
- Roof: Meningeal layer of the dura mater that attaches to the anterior and middle clinoid process of the sphenoid bone
- Floor: Endosteal layer of the dura mater that overlies the greater wing of the sphenoid bone.



- The cavernous sinus receives venous blood from:
  1. Superior and inferior ophthalmic vein
  2. Sphenoparietal sinus

3. Superficial middle cerebral vein
  4. Pterygoid plexus
  5. Central vein of the retina.
- The cavernous sinus drains into the **superior and inferior petrosal sinuses** and ultimately into the **internal jugular vein**.



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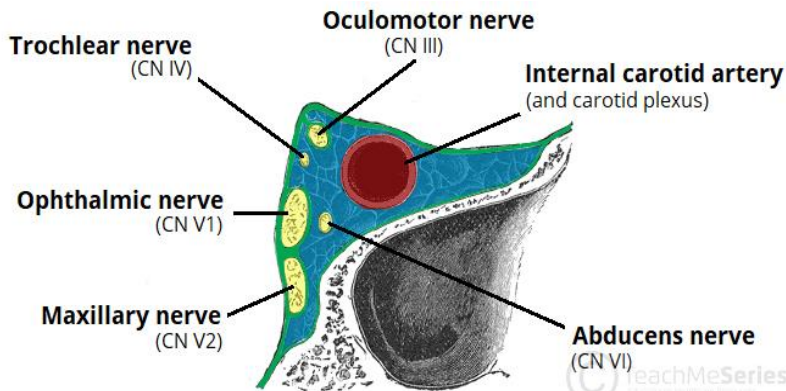
#### ❖ CONTENTS (O TOM CAT)

Some important structures pass through the cavernous sinus and through its lateral walls:  
THROUGH IT:

- Carotid plexus (post-ganglionic sympathetic nerve fibres)
- Abducens nerve (CN VI)
- Internal carotid artery

THROUGH THE LATERAL WALLS:

- Oculomotor nerve (CN III)
- Trochlear nerve (CN IV)
- Ophthalmic division of the trigeminal nerve (CN V1)
- Maxillary division of the trigeminal nerve (CN V2)



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- **NOTE:** The cavernous sinus is the only sinus that offers passage to an artery (internal carotid artery); this is to allow for heat exchange between the warm arterial blood and cooler venous circulation.

## CLINICAL SIGNIFICANCE

### 1. CAVERNOUS SINUS THROMBOSIS(CST)

This refers to the formation of a clot within the sinus. The most common cause is infection; which typically spreads from extracranial location like the orbit, paranasal sinuses, or the 'danger zone' of the face due to the anastomosis between the superior ophthalmic veins and facial veins. With infection, thrombosis of the cavernous sinus can rapidly progress to meningitis.

## WALLS OF THE NOSE

The walls of the nose are divided into two:

- a. Lateral wall
- b. Medial wall

### A. LATERAL WALL:

This is the region of the nasopharynx necessary for humidifying and filtering the air we breathe in. It is a small mound or ridge found on the lateral side of the nasal cavity. It separates the nose from the:

- a. Ethmoidal sinus superiorly
- b. Maxillary sinus, inferiorly
- c. Lacrimal groove and nasolacrimal canal, anteriorly.
  - The lateral wall is formed by different bones: nasal, maxilla, ethmoid, lacrimal, inferior nasal concha, perpendicular plate of palatine and medial pterygoid plate of sphenoid bone.
  - It also comprises the cartilage part:
    - Lateral nasal cartilage (upper nasal cartilage)
    - Major alar cartilage (lower nasal cartilage)
    - 3 to 4 miniature cartilages of the alae (small alar cartilages)

The lateral wall is divided into 3 parts:

1. Anterior part: Vestibule, with short stiff curved hairs, vibrissae.
2. Middle part: Atrium of the middle meatus. It is a shallow depression just in front of the middle meatus and above the vestibule of the nose.
3. Posterior part: Contains the conchae.
  - The lateral wall is irregular due to the presence of three shelf like bony projections called CONCHAE That are directed downwards and medially. They increase the surface area of the nose for the effective air-conditioning of inspired air. They are;
    - ✓ Superior conchae
    - ✓ Middle conchae
    - ✓ Inferior conchae

### 1. SUPERIOR CONCHAE

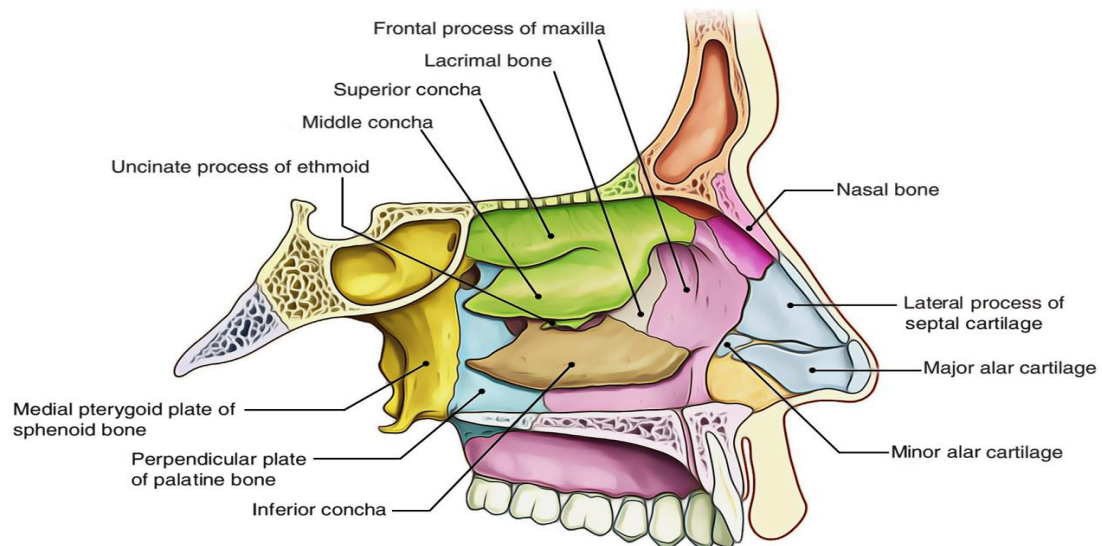
This is the smallest conchae. It is a projection from the medial surface of the ethmoidal labyrinth. The triangular space or fossa above this conchae is the SPHENOETHMOIDAL RECESS, which is an opening for the sphenoid sinus.

## 2. MIDDLE CONCHAE

This is also a projection from the medial surface of the ethmoidal labyrinth.

## 3. INFERIOR CONCHAE

This is an independent bone.



- In between the conchae are some spaces or passages separating them; these spaces are called MEATUSSES. There are three of them:

- ✓ Superior meatus
- ✓ Inferior meatus
- ✓ Middle meatus.

### 1. SUPERIOR MEATUS

It lies below the superior conchae. It is the shallowest and shortest of the meatuses. It Has an opening for the posterior ethmoidal sinuses.

### 2. MIDDLE MEATUS

It lies underneath the middle conchae. It has the following contents:

- ✓ Ethmoidal bulla: Opening of the ethmoidal air sinus on its upper margin
- ✓ Hiatus semilunaris: Opening of the frontal and maxillary air sinuses at the anterior and posterior part of the hiatus semilunaris respectively.
- ✓ INFUNDIBULUM: A short passage at the anterior end of the hiatus semilunaris.

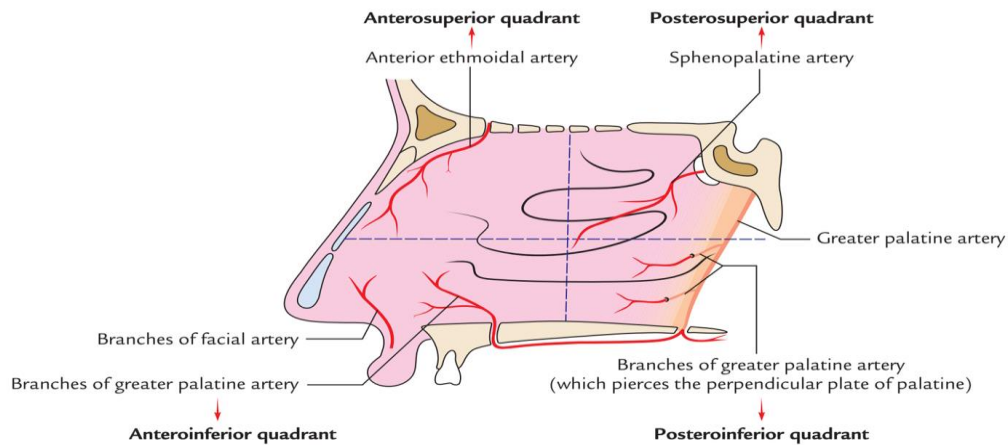
- A complex called the **OSTOEMEATAL COMPLEX** links the frontal sinus, anterior and middle ethmoidal sinus and maxillary sinus to the middle meatus allowing for airflow and mucociliary drainage.

- ### 3. INFERIOR MEATUS:
- It lies underneath the inferior conchae and is the largest of the three meatuses. The nasolacrimal duct opens into it at the junction of its anterior 1/3 and posterior 2/3. The opening is guarded by **the LACRIMAL FOLD or HASNER'S VALVE.**

## VASCULATURE

## ARTERIAL SUPPLY

1. Anterior ethmoidal artery
2. Branches from facial and greater palatine arteries
3. Sphenopalatine arteries

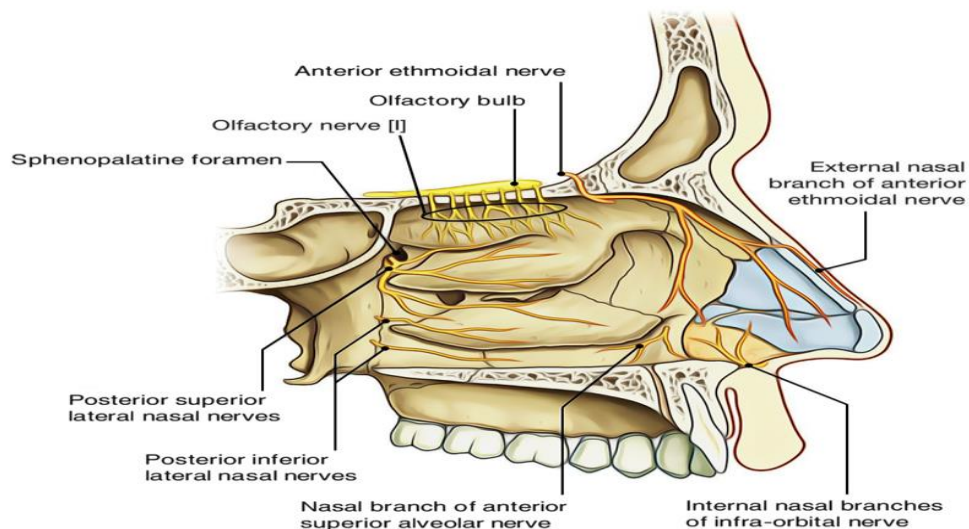


## VENOUS DRAINAGE

- Facial vein
- Pharyngeal venous plexus
- Pterygoid venous plexus

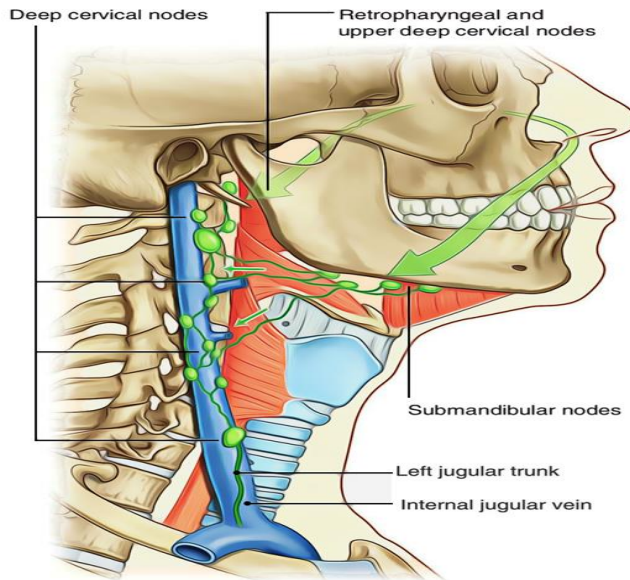
## INNERVATION

1. Anterior ethmoidal nerve
2. Olfactory nerve
3. Anterior Superior alveolar nerve
4. Nasal branches of the greater palatine nerve



## LYMPHATIC DRAINAGE

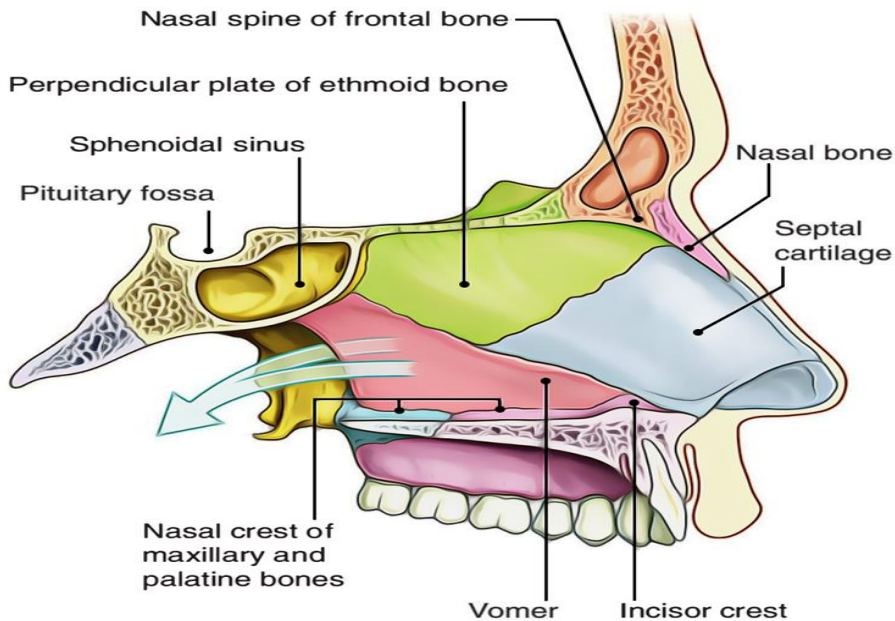
- Submandibular lymph nodes; for anterior 1/2
- Retropharyngeal lymph nodes, for posterior half.



## 2.MEDIAL WALL

It is composed by nasal septum. The nasal septum is a median osseocartilaginous partition between the 2 nasal cavities. It is composed of the following bones:

1. Perpendicular plate of ethmoid; posterosuperior part of the nasal septum
2. Vomer bone; posteroinferior part of the nasal septum.





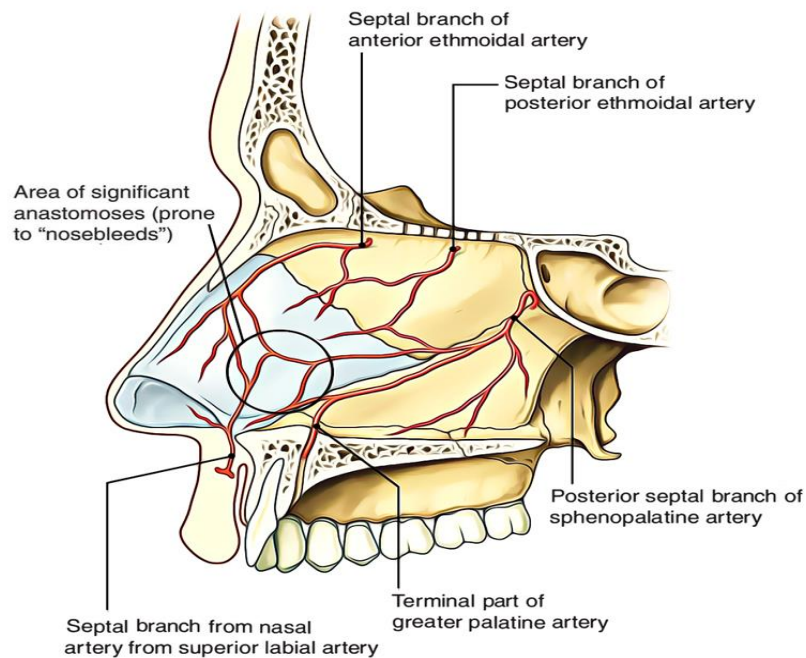
❖ The cartilaginous components are:

- Septal cartilage, which creates the major anterior part of the septum and fits in the angle between the vomer and perpendicular plate of ethmoid.
- Septal processes of both major alar cartilages.  
The septal processes (medial crura) of 2 major alar cartilages are combined together in the midline by a fibrous tissue to create columella (also referred to as columellarseptum). Between the columella and caudal border of the septal cartilage, a small portion of septum is created from double layer of the skin with no bony or cartilaginous support. This part is called membranous septum. Both columellar and membranous parts are freely movable from side to side.

### VASCULATURE

❖ ARTERIAL SUPPLY

- Septal branch of the anterior ethmoidal artery (a branch of ophthalmic artery).
- Septal branch of the posterior ethmoidal artery (a branch of ophthalmic artery).
- Septal branch of the sphenopalatine artery (a branch of maxillary artery).
- Septal branch of the greater palatine artery (a branch of maxillary artery).
- Septal branch of the superior labial artery (a branch of facial artery).



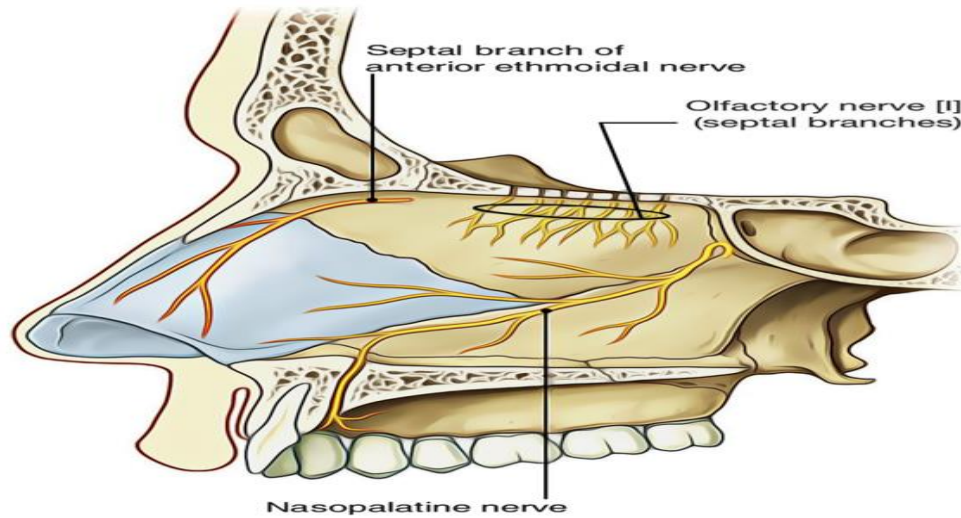
❖ VENOUS DRAINAGE

- Submucous venous plexus

❖ INNERVATION

- Olfactory nerves-supply the upper part (one-third) just below the cribriform plate.
- Internal nasal branch of the anterior ethmoidal nerve, a branch from nasociliary-supplies the anterosuperior part.

- Nasopalatine nerve, a branch of pterygopalatine ganglion-supplies the posteroinferior part.
- Medial posterior superior nasal branches of pterygopalatine ganglion-supply the posterosuperior part.
- Nasal branch of greater palatine nerve-supplies the posterior part.
- Anterior superior alveolar nerve, a branch of maxillary nerve-supplies the anteroinferior part.



#### LYMPHATIC DRAINAGE

- Submandibular lymph nodes; for anterior 1/2
- Retropharyngeal lymph nodes, for posterior half.

#### CLINICALS

##### 1. LITTLE'S AREA

It's an area in the anteroinferior part of the nasal septum just above the vestibule. It's highly vascular. Here the septal branches of the anterior ethmoidal sphenopalatine, greater palatine and superior labial arteries anastomose to create a vascular plexus referred to as Kiesselbach's plexus. This area of nasal septum is the commonest site of epistaxis (nose bleeding) in kids and young adults.