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**ASSIGNMENT**

1. CAVERNOUS SINUS

 The **cavernous sinus** is located on each side of the sella turcica on the upper surface of the body of the sphenoid, which contains the sphenoid (air) sinus. The cavernous sinus consists of a venous plexus of extremely thin‐walled veins that extends from the superior orbital fissure anteriorly to the apex of the petrous part of the temporal bone posteriorly. It receives blood from the superior and inferior ophthalmic veins, superficial middle cerebral vein, and sphenoparietal sinus. The venous channels in these sinuses communicate with each other through venous channels anterior and posterior to the stalk of the pituitary gland—the **intercavernous sinuses**—and sometimes through veins inferior to the pituitary gland. The cavernous sinuses drain posteroinferiorly through the superior and inferior petrosal sinuses and emissary veins to the pterygoid plexuses.

 Inside each cavernous sinus is the **internal carotid artery** with its small branches, surrounded by the carotid plexus of sympathetic nerve(s), and the abducent nerve (CN VI). The oculomotor (CN III) and trochlear (CN IV) nerves, plus two of the three divisions of the trigeminal nerve (CN V) are embedded in the lateral wall of the sinus. The artery, carrying warm blood from the body's core, traverses the sinus filled with cooler blood returning from the capillaries of the body's periphery, allowing for heat exchange to conserve energy or cool the arterial blood. This does not appear to be as important in humans as it is in running animals (e.g., horses and cheetahs) in which the carotid artery runs a longer, more tortuous course through the cavernous sinuses, allowing cooling of blood before it enters the brain.

 Pulsations of the artery within the cavernous sinus are said to promote propulsion of venous blood from the sinus, as does gravity.



The **cavernous sinus** is a paired dural venous sinus located within the cranial cavity. It is divided by septa into small ‘caves’ – from which it gets its name. Each cavernous sinus has a close anatomical relationship with several**key structures** in the head, and is arguably the most clinically important venous sinus.

The cavernous sinuses are located within the middle cranial fossa, on either side of the sella turcica of the sphenoid bone (which contains the pituitary gland). They are enclosed by the endosteal and meningeal layers of the dura mater.

The borders of the cavernous sinus are as follows:

Anterior- superior orbital fissure

Posterior- petrous part of the temporal bone

Medial- body of the sphenoid bone

Lateral- meningeal layer of the dura mater running from the roof to the floor of the middle cranial fossa

Roof- meningeal layer of the dura mater that attaches to the anterior and middle clinoid processes of the sphenoid bone

Floor- endosteal layer of dura mater that overlies the base of the greater wing of the sphenoid bone.

Several important structures pass through the cavernous sinus to enter the orbit. They can be sub-classified by whether they travel through the sinus itself, or through its lateral wall:

|  |  |
| --- | --- |
| Travels through cavernous sinus: | Travels through lateral wall of cavernous sinus: |
| Abducens nerve (CN VI) | Occulomotor nerve (CN III) |
| Carotid plexus (post-ganglionic sympathetic nerves fibers) | Trochlear nerve (CN IV) |
| Internal carotid artery (cavernous portion) | Ophthalmic (V1) and maxillary (V2) branches of the trigeminal nerve  |

The cavernous sinus is the only site in the body where an artery (internal carotid) passes completely through a venous structure. This is thought to allow for heat exchange between the warm arterial blood and cooler venous circulation.



Each cavernous sinus receives venous drainage from:

* Ophthalmic veins (superior and inferior): these enter the cavernous sinus via the superior orbital fissure
* Central vein of the retina: drains into the superior ophthalmic vein, or directly into te cavernous sinus
* Sphenoparietal sinus: empties into the anterior aspect of the cavernous sinus
* Superficial middle cerebral vein: contributes to the venous drainage of the cerebrum
* Pterygoid plexus: located within the infratemporal fossa

It is important to note that the superior ophthalmic vein forms an anastomosis with the facial vein. Therefore, the ophthalmic veins represent a potential route by which infection can spread from an extracranial to an intracranial site.

The cavernous sinuses empty into the superior and inferior petrosal sinuses, and ultimately, into the internal jugular vein. The left and right cavernous sinuses are connected in the midline by the anterior and posterior intercavernous sinuses. They travel through the sells turcica of the sphenoid bone.

1. WALLS OF THE NOSE

The nasal cavity has a roof, floor, and medial and lateral walls.

* **Roof.** Formed by the nasal, frontal, sphenoid, and ethmoid bones (**cribriform foramina**, which transmits CN I for smell). The **roof** of the nasal cavity is curved and narrow, except at its posterior end; it is divided into three parts (frontonasal, ethmoidal, and sphenoidal) named from the bones forming each part.
* **Floor.** Formed by the maxilla and the palatine bones. The **incisive foramen** transmits branches of the sphenopalatine artery and the nasopalatine nerve for general sensation from the nasal cavity and palate. The **floor** of the nasal cavity is wider than the roof and is formed by the palatine processes of the maxilla and the horizontal plates of the palatine bone.
* **Medial wall (nasal septum).** Formed by the perpendicular plate of the ethmoid bone, the vomer bone, and the septal cartilage. The **medial wall** of the nasal cavity is formed by the nasal septum.
* **Lateral wall.** Formed by the superior, middle and inferior nasal conchae. The **lateral walls** of the nasal cavity are irregular owing to three bony plates, the nasal conchae, which project inferiorly, somewhat like louvers.

In addition, the maxillary, sphenoid, and palatine bones contribute to the lateral wall. The lateral wall contains the following openings:

* + **Sphenoethmoidal recess:**The space between the superior nasal concha and the sphenoid bone, with openings from the sphenoid sinus.
	+ **Superior meatus:** The space inferior to the superior nasal concha, with openings from the posterior ethmoidal air cells.
	+ **Middle meatus:** The space inferior to the middle nasal concha, with openings for the frontal sinus via the nasofrontal duct, the middle ethmoidal air cells on the ethmoidal bulla, and the anterior ethmoidal air cells and maxillary sinus in the hiatus semilunaris.
	+ **Inferior meatus:** The space inferior to the inferior nasal concha, with an opening for the nasolacrimal duct, which drains tears from the eye into the nasal cavity.
	+ **Sphenopalatine foramen:** An opening posterior to the middle nasal concha receives the nasopalatine nerve and the sphenopalatine artery from the pterygopalatine fossa into the nasal cavity.

