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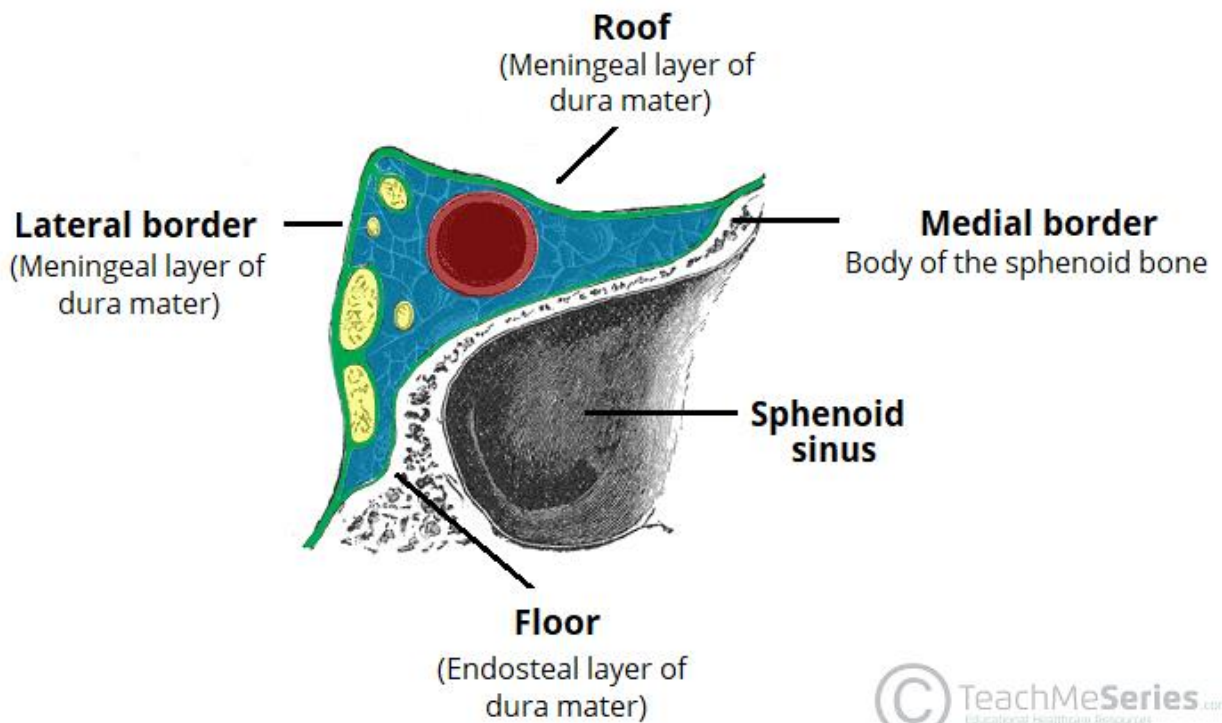
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MEDICINE AND SURGERY

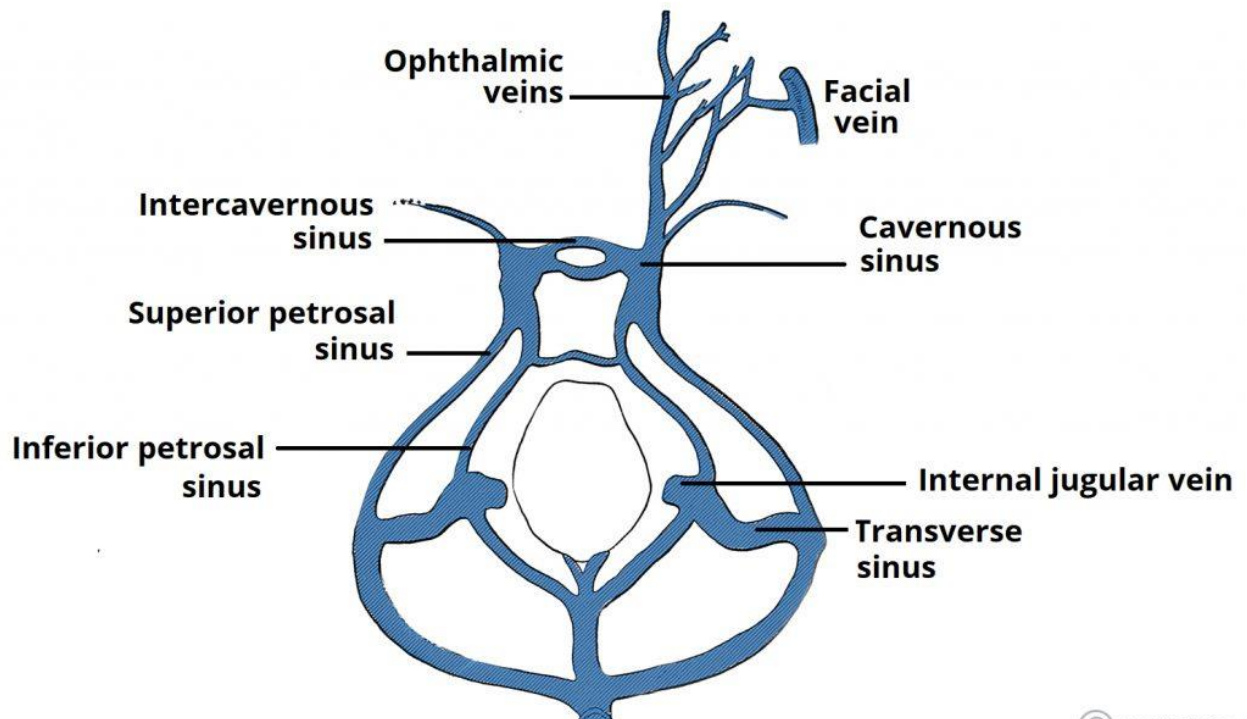
GROSS ANATOMY OF HEAD AND NECK (ANA 301)

1. WRITE AN ESSAY ON THE CAVERNOUS SINUS.

The cavernous sinus is one of the dural venous sinuses of the head. It is a network of veins that sit in a cavity. It is surrounded by the optic tract, optic chiasma and internal carotid artery above, the foramen lacerum and the junction of the body and greater wing of sphenoid bone inferiorly, the hypophysis cerebri or (pituitary gland) and sphenoidal air sinus medially, temporal lobe with uncus laterally, superior orbital fissure and the apex of the orbit anteriorly, and the apex of petrous temporal bone posteriorly.

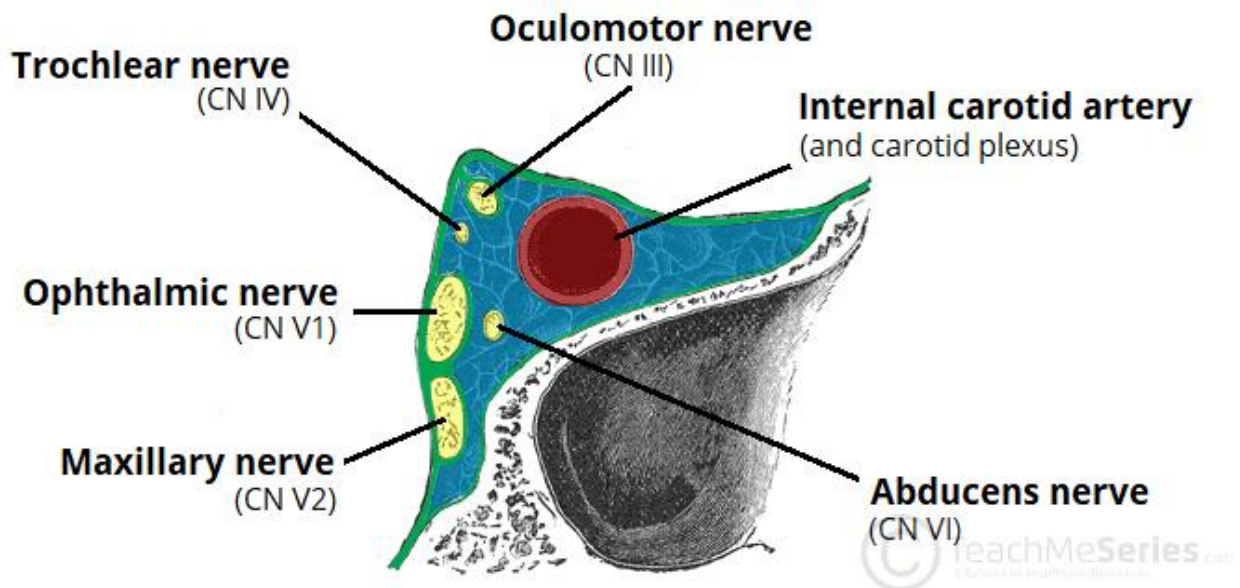


As a venous sinus, the cavernous sinus receives blood from the superior and inferior ophthalmic veins and from superficial cortical veins, and is connected to the basilar plexus of veins posteriorly. It also receives blood from the sphenoparietal sinus the superficial middle cerebral veins and the inferior cerebral veins. The cavernous sinus drains by two larger channels, the superior and inferior petrosal sinuses, ultimately into the internal jugular vein via the sigmoid sinus, also draining with emissary vein to pterygoid plexus. There are also connections with the pterygoid plexus of veins via inferior ophthalmic vein and deep facial vein.



Apart from the blood which passes through a venous sinus, several anatomical structures, including some cranial nerves and their branches, also pass through the sinus. Structures passing through the outer (lateral) wall of the compartment from superior to inferior include: the oculomotor nerve (CN III), the trochlear nerve (CN IV),

the ophthalmic (V1) and maxillary (V2) branches of the trigeminal nerve. Structures passing through the midline (medial) wall of the cavernous sinus include: the abducens nerve the internal carotid plexus accompanied by the internal carotid artery. These nerves, with the exception of CN V2, pass through the cavernous sinus to enter the orbital apex through the superior orbital fissure. The maxillary nerve, division V2 of the trigeminal nerve travels through the lower portion of the sinus and exits via the foramen rotundum. The maxillary branch passes external to, but immediately adjacent to, the lateral wall of the sinus).



The cavernous sinus is the only anatomic location in the body in which an artery travels completely through a venous structure. If the internal carotid artery ruptures within the cavernous sinus, an arteriovenous fistula is created (more specifically, a carotid-cavernous fistula). Lesions affecting the cavernous sinus may affect isolated nerves or all the nerves traversing through it. The pituitary gland lies between the two paired cavernous sinuses. An abnormally growing pituitary adenoma, sitting on the bony sella turcica, will expand in the

direction of least resistance and eventually compress the cavernous sinus. Cavernous sinus syndrome may result from mass effect of these tumors and cause ophthalmoplegia (from compression of the oculomotor nerve, trochlear nerve, and abducens nerve), ophthalmic sensory loss (from compression of the ophthalmic nerve), and maxillary sensory loss (from compression of the maxillary nerve). A complete lesion of the cavernous sinus disrupts CN III, IV, and VI, causing total ophthalmoplegia, usually accompanied by a fixed, dilated pupil. Involvement of CN V (V1 and variable involvement of V2) causes sensory loss in these divisions of the trigeminal nerve. Horner's syndrome can also occur due to involvement of the carotid ocular sympathetics, but may be difficult to appreciate in the setting of a complete third nerve injury. Because of its connections with the facial vein via the superior ophthalmic vein, it is possible to get infections in the cavernous sinus from an external facial injury within the danger area of the face. In patients with thrombophlebitis of the facial vein, pieces of the clot may break off and enter the cavernous sinus, forming a cavernous sinus thrombosis. From there the infection may spread to the dural venous sinuses. Infections may also be introduced by facial lacerations and by bursting pimples in the areas drained by the facial vein.

Potential causes of cavernous sinus syndrome include metastatic tumors, direct extension of nasopharyngeal tumours, meningioma, pituitary tumors or pituitary apoplexy, aneurysms of the intracavernous carotid artery, carotid-cavernous fistula, bacterial infection causing cavernous sinus thrombosis, aseptic cavernous sinus thrombosis, idiopathic granulomatous disease (Tolosa–Hunt syndrome), and fungal infections. It is a medical emergency, requiring prompt medical attention.

2. DISCUSS THE WALLS OF THE NOSE.

The human nose is the principal organ in the olfactory system. It bears the nostrils and is the first organ of the respiratory system. It is also the most protruding part of the face. The shape of the nose is determined by the nasal bones and the nasal cartilages, including the nasal septum which separates the nostrils and divides the nasal cavity into two.

The main function of the nose is breathing and the nasal mucosa lining the nasal cavity and the paranasal sinuses carries out the necessary conditioning of inhaled air by warming and moistening it. Nasal conchae, shell-like bones in the walls of the cavities, play a major part in this process. Filtering of the air by nasal hair in the nostrils prevents large particles from entering the lungs. Sneezing is a reflex to expel unwanted particles from the nose that irritate the mucosal lining. Sneezing can transmit infections, because aerosols are created in which the droplets can harbour pathogens. Another major function of the nose is olfaction, the sense of smell. The area of olfactory epithelium, in the upper nasal cavity, contains specialised olfactory cells responsible for this function. It is also involved in the function of speech. Nasal vowels and nasal consonants are produced in the process of nasalisation. The hollow cavities of the paranasal sinuses act as sound chambers that modify and amplify speech and other vocal sounds.

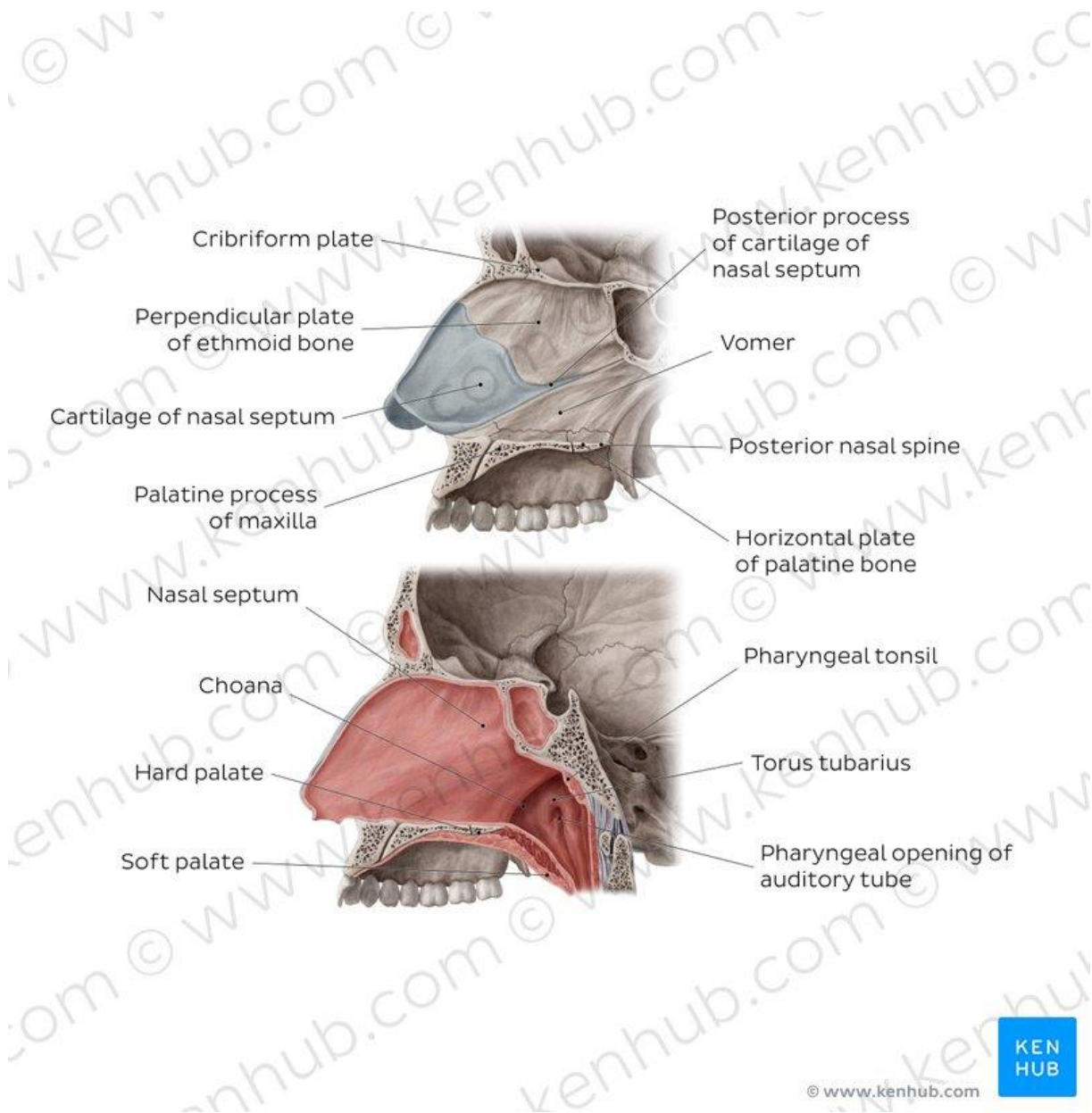
The wall separating the two cavities of the nose, the nasal septum, is made up of bone inside and cartilage closer to the tip of the nose. The bony part is formed by the perpendicular plate of the ethmoid bone at the top, and the vomer bone below. On the side of each nasal cavity are three horizontal outgrowths called nasal conchae (singular "concha") or turbinates. These turbinates disrupt the airflow,

directing air toward the olfactory epithelium on the surface of the turbinates and the septum. The vomeronasal organ is located at the back of the septum and has a role in pheromone detection.

The lateral wall of each nasal cavity mainly consists of the maxilla. However, there is a deficiency that is compensated for by the perpendicular plate of the palatine bone, the medial pterygoid plate, the labyrinth of ethmoid and the inferior concha. The paranasal sinuses are connected to the nasal cavity through small orifices called ostia. Most of these ostia communicate with the nose through the lateral nasal wall, via a semi-lunar depression in it known as the semilunar hiatus. The hiatus is bound laterally by a projection known as the uncinat process. This region is called the ostiomeatal complex. The roof of each nasal cavity is formed in its upper third to one half by the nasal bone and more inferiorly by the junctions of the upper lateral cartilage and nasal septum. Connective tissue and skin cover the bony and cartilaginous components of the nasal dorsum.

The floor of the nasal cavities, which also form the roof of the mouth, is made up by the bones of the hard palate: the horizontal plate of the palatine bone posteriorly and the palatine process of the maxilla anteriorly. The two horizontal plates join together at the midline and form the posterior nasal spine that gives attachment to the musculus uvulae in the uvula. The two maxilla bones join at the base of the nose at the lower nasal midline between the nostrils, and at the top of the philtrum to form the anterior nasal spine. This thin projection of bone holds the cartilaginous center of the nose. It is also an important cephalometric landmark. The most anterior part of the nasal cavity is the nasal vestibule. The vestibule is enclosed by the cartilages of the nose and lined by the same epithelium of the skin (stratified squamous, keratinized). Within the vestibule this changes into the typical respiratory epithelium that lines the rest of the nasal cavity and

respiratory tract. Inside the nostrils of the vestibule are the nasal hair, which filter dust and other matter that are breathed in. The back of the cavity blends, via the choanae, into the nasopharynx.



Bones Forming the Walls of Nasal Cavity

