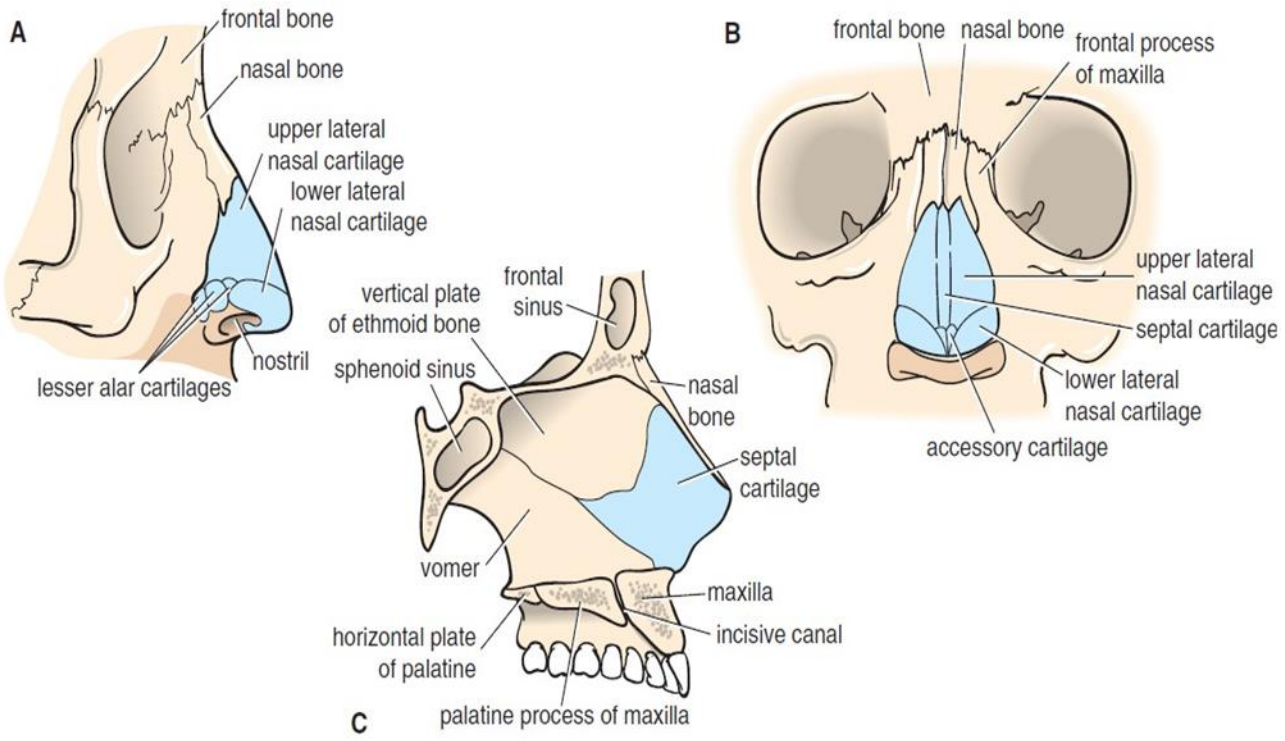
Human Anatomy

The Nasal region

Lecture: 8



❖ External Nose

The external nose has two elliptical orifices called the nostrils, which are separated from each other by the nasal septum. The lateral margin, the ala nasi, is rounded and mobile. The framework of the external nose is made up above by the nasal bones, the frontal processes of the maxillae, and the nasal part of the frontal bone. Below, the framework is formed of plates of hyaline cartilage.

Nerve Supply of the External Nose

The external nose is supplied by the infratrochlear and external nasal branches of the ophthalmic nerve (CN V), and the infraorbital branch of the maxillary nerve (CN V).

Blood Supply and Venous Drainage of the External Nose

The skin of the external nose is supplied by branches of the ophthalmic and the maxillary arteries. The skin of the ala and the lower part of the septum are supplied by branches from the facial artery. Venous blood from the external nose drains mostly into the facial vein via the angular and lateral nasal veins.

❖ Nasal Cavity

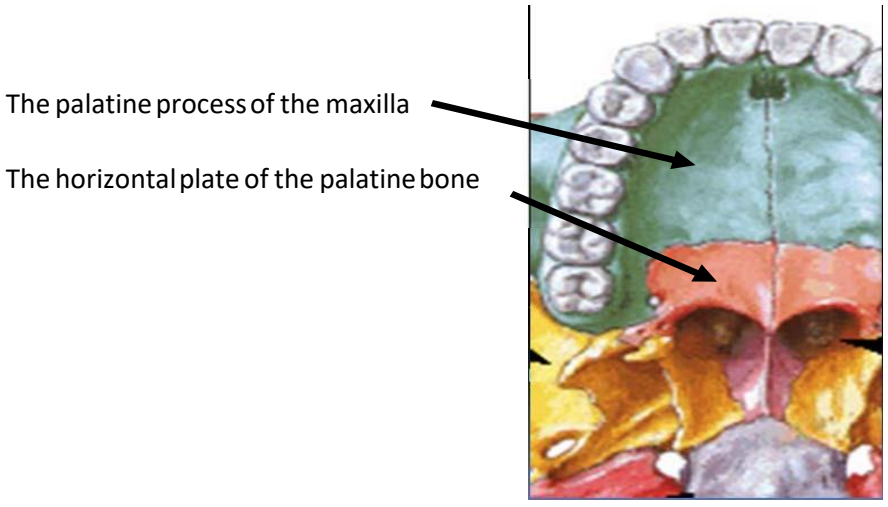
The nasal cavity extends from the nostrils in front to the posterior nasal apertures or choanae behind, where the nose opens into the nasopharynx. The nasal vestibule is the area of the nasal cavity lying just inside the nostril. The nasal cavity is divided into right and left halves by the nasal septum.

Walls of the Nasal Cavity

Each half of the nasal cavity has a floor, a roof, a lateral wall, and a medial or septal wall.

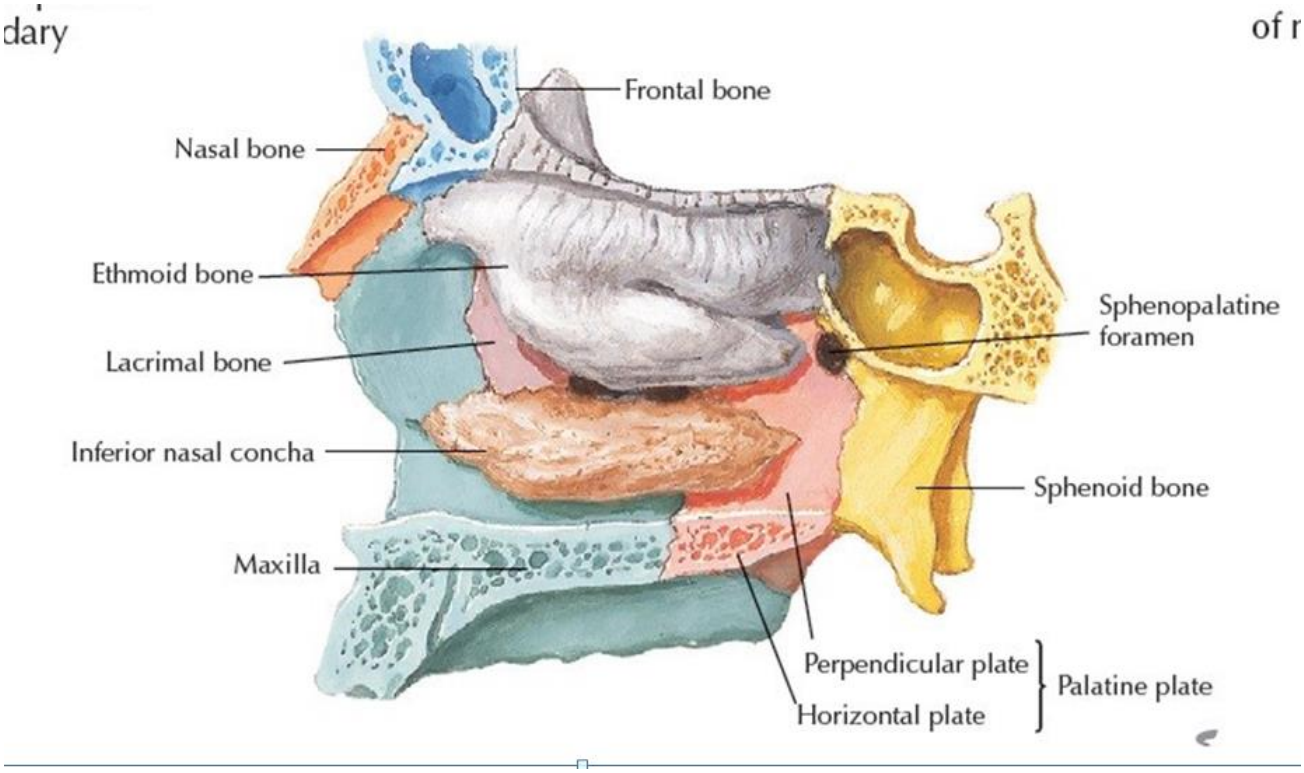
A. Floor

The palatine process of the maxilla and the horizontal plate of the palatine bone



B. Roof

The roof is narrow and is formed anteriorly beneath the bridge of the nose by the nasal and frontal bones, in the middle by the cribriform plate of the ethmoid, located beneath the anterior cranial fossa, and posteriorly by the downward sloping body of the sphenoid.



C. Lateral Wall

The lateral wall of each nasal cavity mainly consists of (the maxilla, the palatine bone, the medial pterygoid plate, the labyrinth of ethmoid, the inferior concha and the lacrimal bone).

The lateral wall has three projections of bone called the superior, middle, and inferior nasal conchae. The space below each concha is called a meatus.

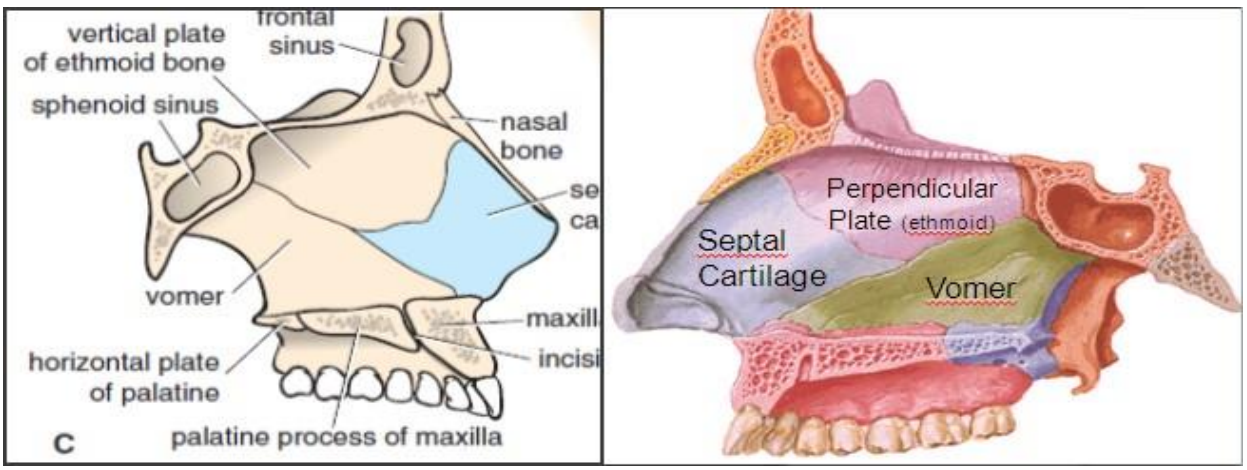
- **Sphenoethmoidal Recess:** The sphenoethmoidal recess is a small area above the superior concha. It receives the opening of the sphenoid air sinus.
- **Superior Meatus:** The superior meatus lies below the superior concha. It receives the openings of the posterior ethmoid sinuses.

- **Middle Meatus:** The middle meatus lies below the middle concha. It has a rounded swelling called the bulla ethmoidalis that is formed by the middle ethmoidal air sinuses, which open on its upper border. A curved opening, the hiatus semilunaris, lies just below the bulla. The anterior end of the hiatus leads into a funnel-shaped channel called the infundibulum, which is continuous with the frontal sinus and the anterior ethmoidal sinuses. The maxillary sinus opens into the middle meatus through the hiatus semilunaris.

- **Inferior Meatus:** The inferior meatus lies below the inferior concha and receives the opening of the lower end of the nasolacrimal duct, which is guarded by a fold of mucous membrane.

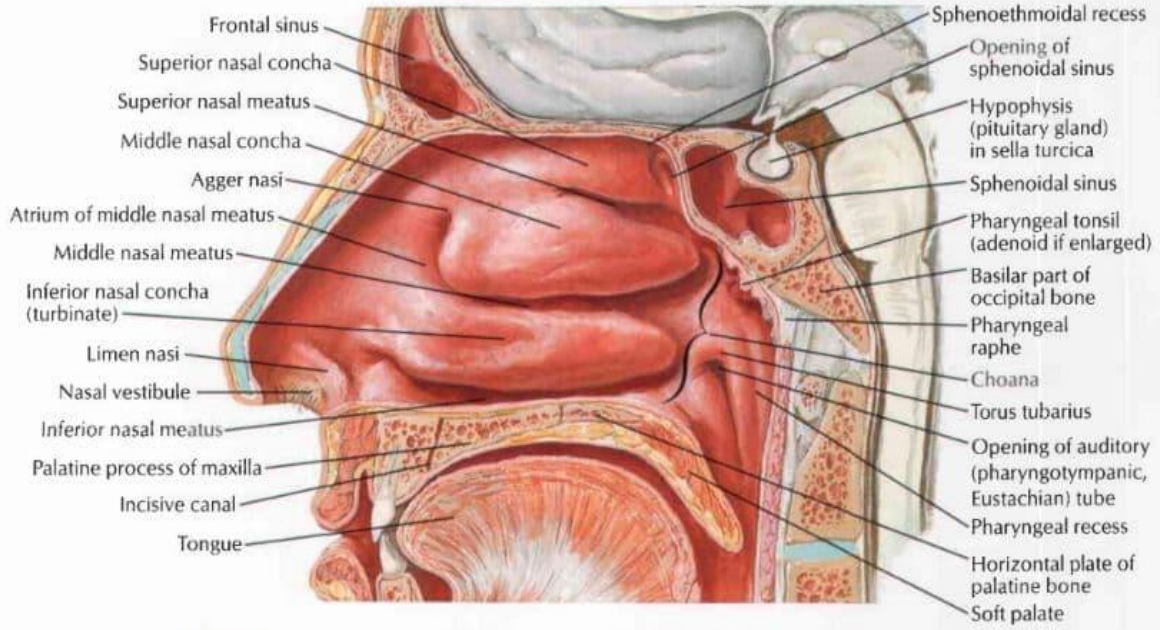
D.Medial Wall or the septum

The medial wall is formed by the nasal septum. The upper part is formed by the vertical plate of the ethmoid and the vomer. The anterior part is formed by the septal cartilage. The septum rarely lies in the midline, thus increasing the size of one half of the nasal cavity and decreasing the size of the other.



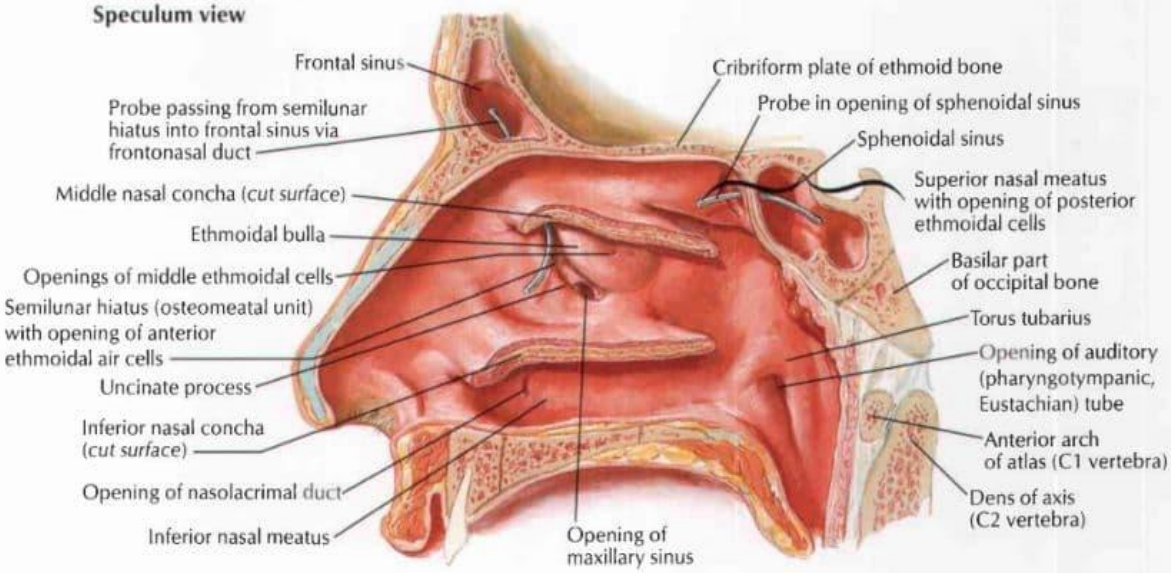
Lateral Wall of Nasal Cavity

1





Speculum view



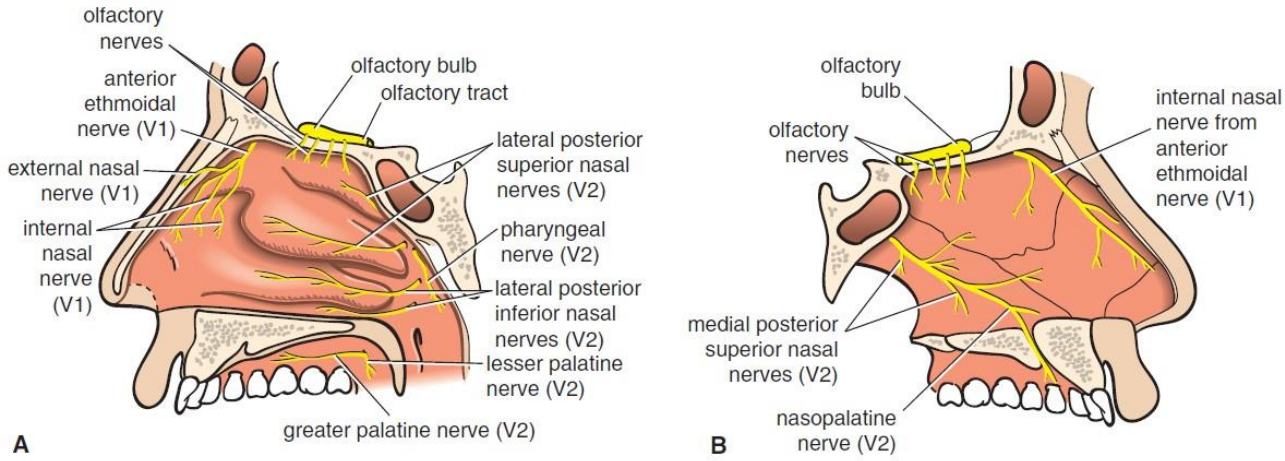
Mucous Membrane of the Nasal Cavity

The vestibule is lined with modified skin and has coarse hairs. The area above the superior concha is lined with olfactory mucous membrane and contains nerve endings sensitive to the reception of smell. The lower part of the nasal cavity is lined with respiratory mucous membrane. A large plexus of veins in the submucous connective tissue is present in the respiratory region.

The presence of warm blood in the venous plexuses serves to heat up the inspired air as it enters the respiratory system. The presence of mucus on the surfaces of the conchae traps foreign particles and organisms in the inspired air, which are then swallowed and destroyed by gastric acid.

Nerve Supply of the Nasal Cavity

The olfactory nerves from the olfactory mucous membrane ascend through the cribriform plate of the ethmoid bone to the olfactory bulbs. The nerves of ordinary sensation are branches of the ophthalmic division (V1) and the maxillary division (V2) of the trigeminal nerve.



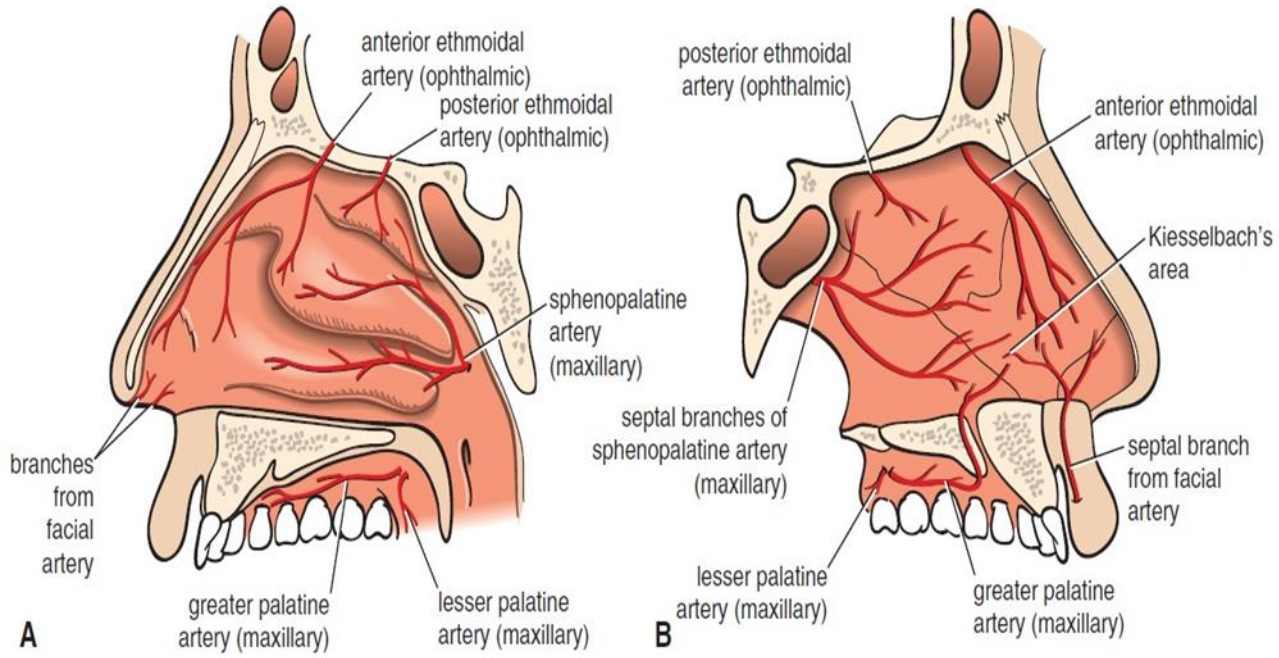
Blood Supply to the Nasal Cavity

The arterial supply to the nasal cavity is from branches of the **maxillary**, the **ophthalmic**, and the **facial** arteries. The most important branch is the sphenopalatine artery. The sphenopalatine artery anastomoses with the septal branch of the superior labial branch of the facial artery in the region of the vestibule. The submucous venous plexus is drained by veins that accompany the arteries.

The arterial supply of the medial and lateral walls of the nasal cavity can be summarized as follow:

1. **Anterior ethmoidal artery** (a branch from the ophthalmic artery).
2. **Posterior ethmoidal artery** (a branch from the ophthalmic artery).
3. **Sphenopalatine artery** (a branch from the maxillary artery).
4. **Greater palatine artery** (a branch from the maxillary artery).
5. **Septal branch of the superior labial artery** (a branch from the facial artery).

The anterior part of the nasal septum is the site **(Kiesselbach area)** of an anastomotic arterial plexus involving all five arteries supplying the septum.



Venous Drainage of the Nasal Cavity

A rich submucosal venous plexus, deep to the nasal mucosa, provides venous drainage of the nose via the sphenopalatine, facial, and ophthalmic veins. The plexus is an important part of the body's thermoregulatory system, exchanging heat and warming air before it enters the lungs.

Lymph Drainage of the Nasal Cavity

The lymph vessels draining the vestibule end in the **submandibular nodes**. The remainder of the nasal cavity is drained by vessels that pass to the **upper deep cervical nodes**.

The Paranasal Sinuses

The paranasal sinuses are cavities found in the interior of the maxilla, frontal, sphenoid, and ethmoid bones. They are lined with mucoperiosteum and filled with air; they communicate with the nasal cavity through relatively small apertures. The maxillary and sphenoidal sinuses are present in a rudimentary form at birth; they enlarge appreciably after the eighth year and become fully formed in adolescence.

Paranasal Sinuses and Their Site of Drainage into the Nose

Sinus	Site of Drainage
Maxillary sinus	Middle meatus through hiatus semi-lunaris
Frontal sinuses	Middle meatus via infundibulum
Sphenoidal sinuses	Sphenoethmoidal recess
Ethmoidal sinuses	
Anterior group	Infundibulum and into middle meatus
Middle group	Middle meatus on or above bulla ethmoidalis
Posterior group	Superior meatus

Drainage of Mucus and Functions of Paranasal Sinuses

The mucus produced by the mucous membrane is moved into the nose by ciliary action of the columnar cells. The function of the sinuses is to act as resonators to the voice; they also reduce the weight of the skull. When the apertures of the sinuses are blocked or they become filled with fluid, the quality of the voice is markedly changed.

➢ Maxillary Sinus

The maxillary sinus is pyramidal in shape and located within the body of the maxilla behind the skin of the cheek. The roof is formed by the floor of the orbit, and the floor is related to the roots of the premolars and molar teeth. The maxillary sinus opens into the middle meatus of the nose through the hiatus semilunaris.

➢ Frontal Sinuses

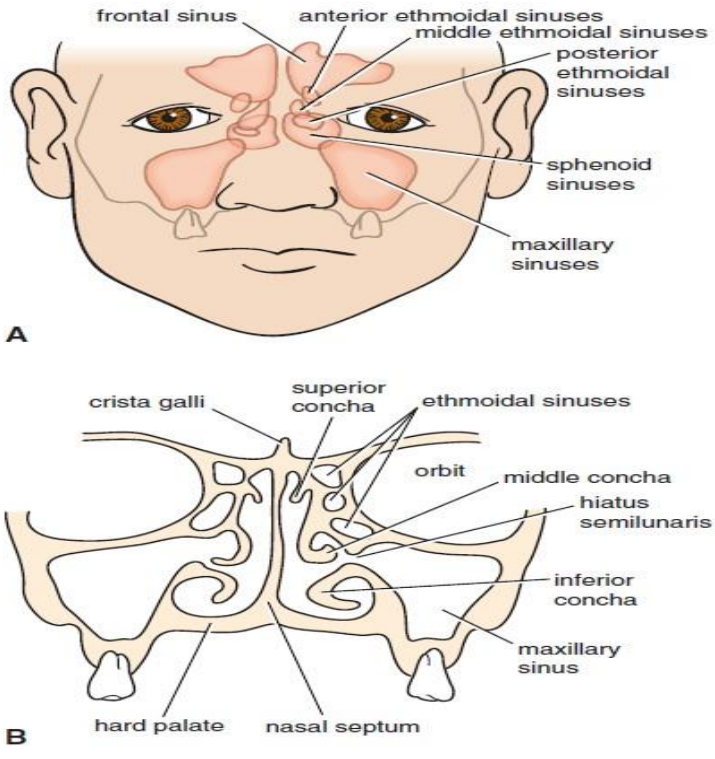
The two frontal sinuses are contained within the frontal bone. They are separated from each other by a bony septum. Each sinus is roughly triangular, extending upward above the medial end of the eyebrow and backward into the medial part of the roof of the orbit. Each frontal sinus opens into the middle meatus of the nose through the infundibulum.

➢ Sphenoidal Sinuses

The two sphenoidal sinuses lie within the body of the sphenoid bone. Each sinus opens into the sphenoethmoidal recess above the superior concha.

➢ Ethmoid Sinuses

The ethmoidal sinuses are anterior, middle, and posterior and they are contained within the ethmoid bone, between the nose and the orbit. The anterior sinuses open into the infundibulum; the middle sinuses open into the middle meatus, on or above the bulla ethmoidalis; and the posterior sinuses open into the superior meatus.



Clinical notes

✓ Nose Bleeding

Epistaxis, or bleeding from the nose, is a frequent condition. The most common cause is nose picking. The bleeding may be arterial or venous, and most episodes occur on the anteroinferior portion of the septum.

✓ Infection of the Nasal Cavity

Infection of the nasal cavity can spread in a variety of directions. The paranasal sinuses are especially prone to infection. Organisms may spread via the nasal part of the pharynx and the auditory tube to the middle ear. It is possible for organisms to ascend to the meninges of the anterior cranial fossa, along the sheaths of the olfactory nerves through the cribriform plate, and produce meningitis.

✓ Sinusitis and the Examination of the Paranasal Sinuses

Infection of the paranasal sinuses is a common complication of nasal infections. Rarely, the cause of maxillary sinusitis is extension from an apical dental abscess. The frontal, ethmoidal, and maxillary sinuses can be ***palpated clinically*** for areas of tenderness. The frontal sinus can be examined by pressing the finger upward beneath the medial end of the superior orbital margin. Here, the floor of the frontal sinus is closest to the surface. The ethmoidal sinuses can be palpated by pressing the finger medially against the medial wall of the orbit. The maxillary sinus can be examined for tenderness by pressing the finger against the anterior wall of the maxilla below the inferior orbital margin; pressure over the infraorbital nerve may reveal increased sensitivity.