

Respiratory System Module

1st Semester 2023-2024

NOSE & PARANASAL SINUSES

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Conducting Passages

Upper respiratory tract

Nasal cavity

Pharynx

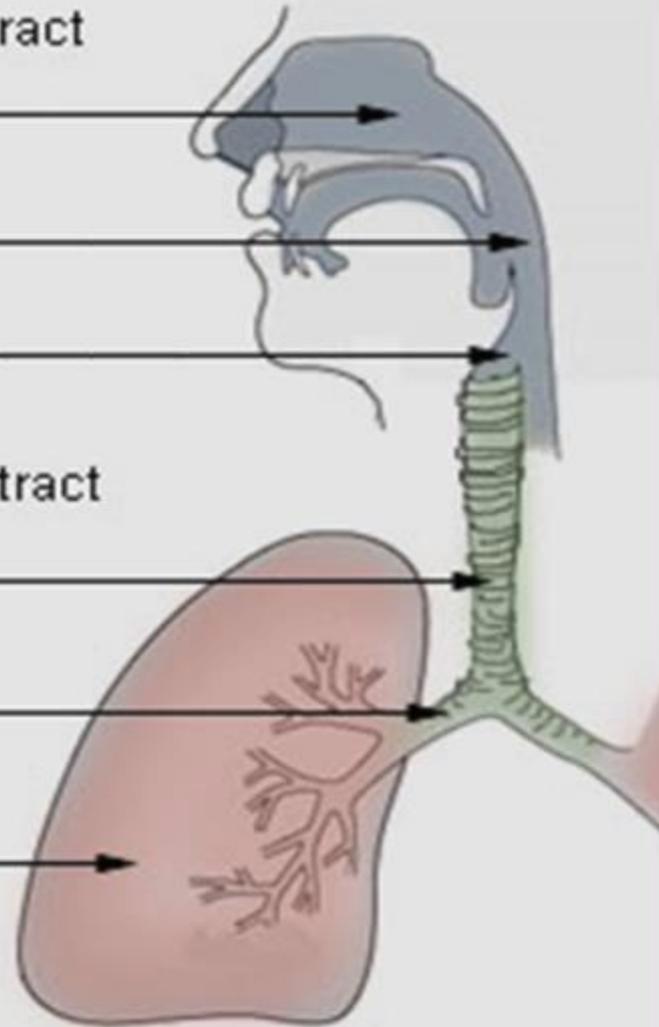
Larynx

Lower respiratory tract

Trachea

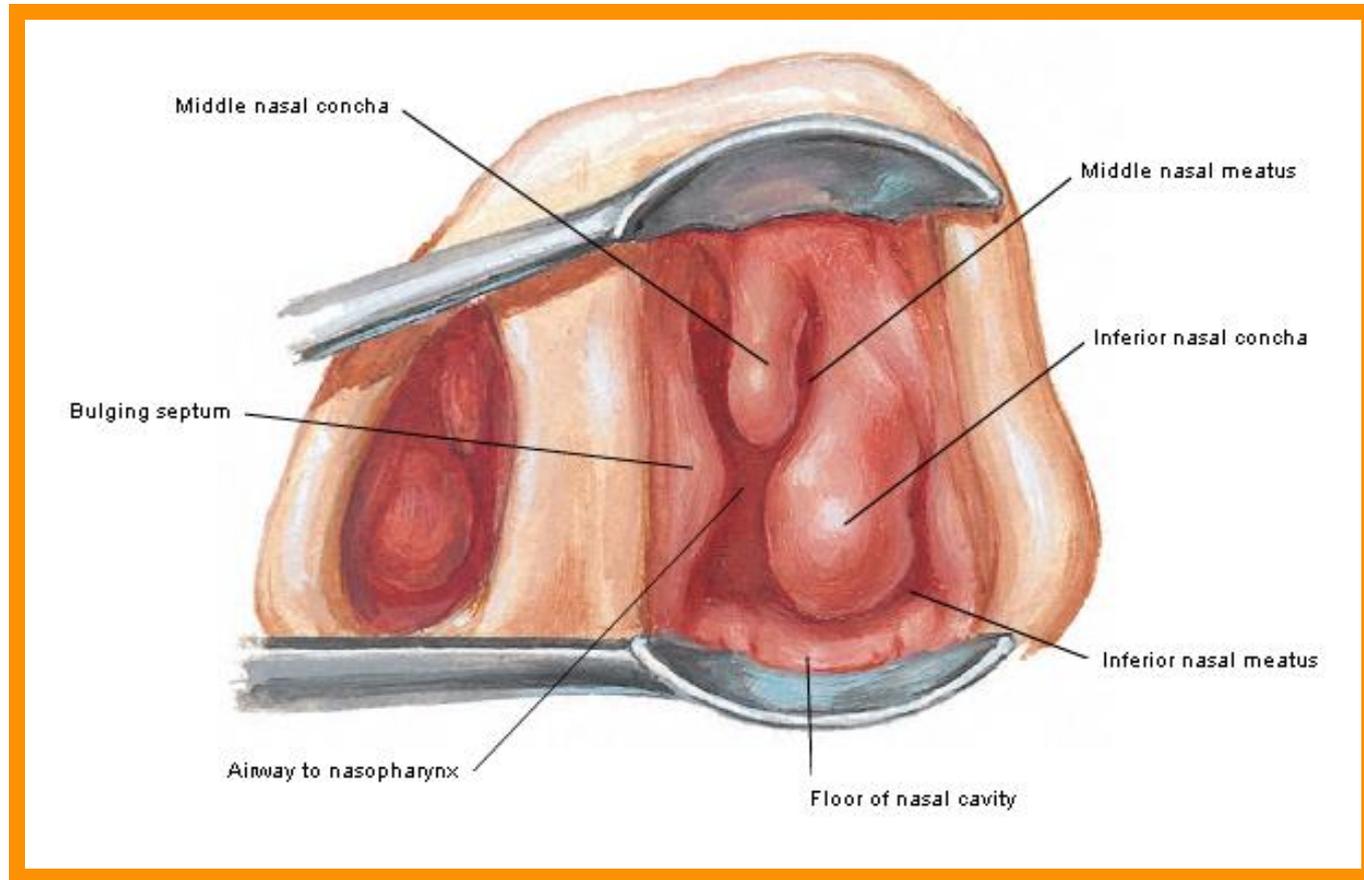
Primary bronchi

Lungs



The Nose

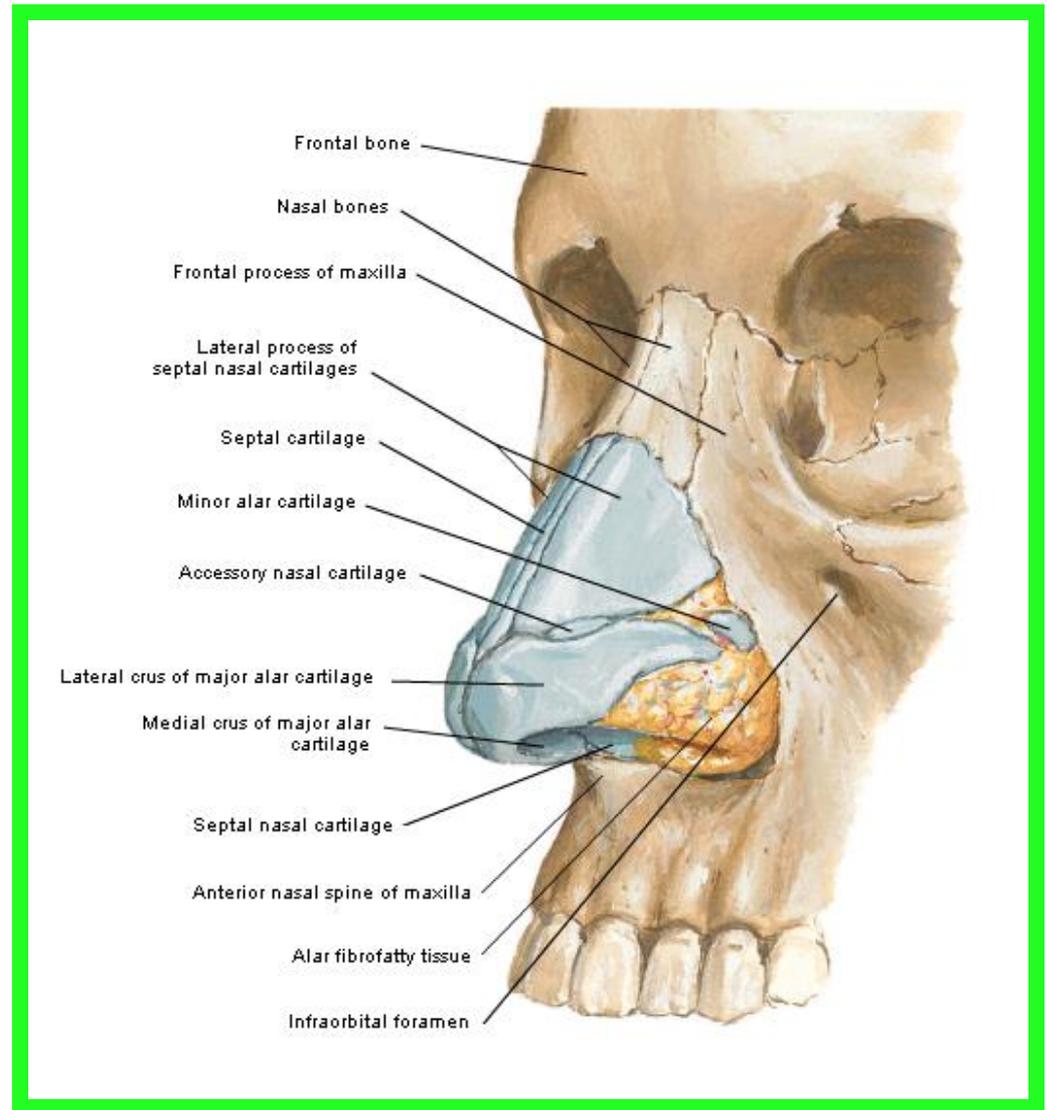
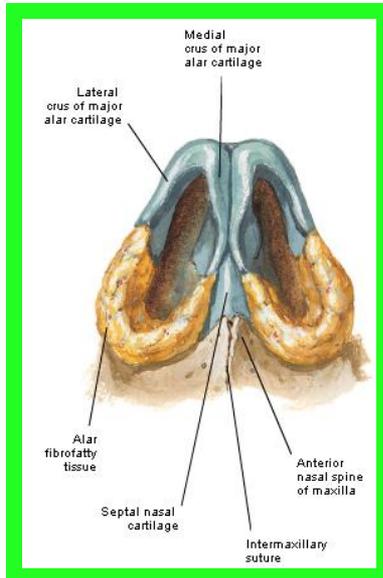
The nose consists of the external nose and the nasal cavity, both of which are divided by a septum into right and left halves.



External Nose

The external nose has two elliptical orifices called the **nostrils**, which are separated from each other by the **nasal septum**.

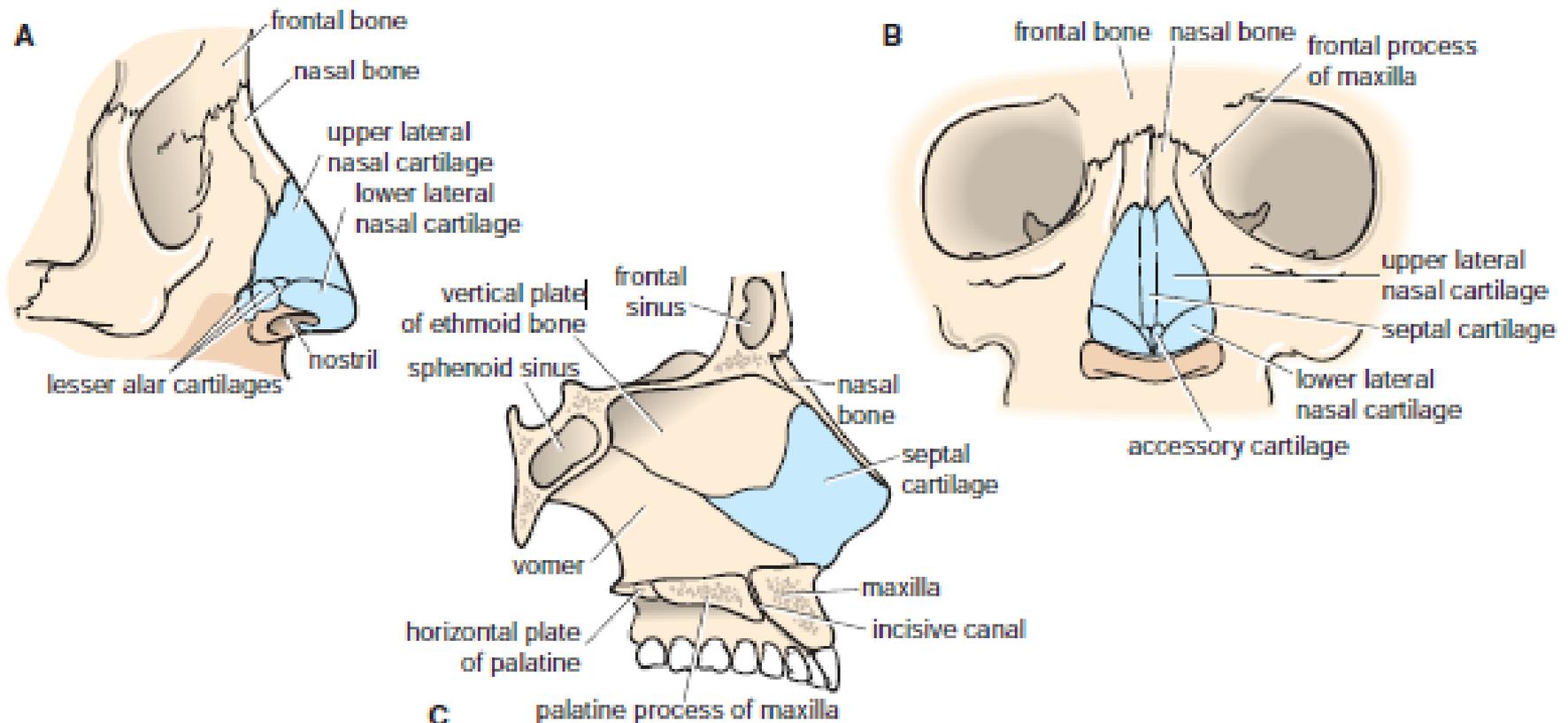
The lateral margin, **the ala nasi**, is rounded and mobile.



External Nose

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.

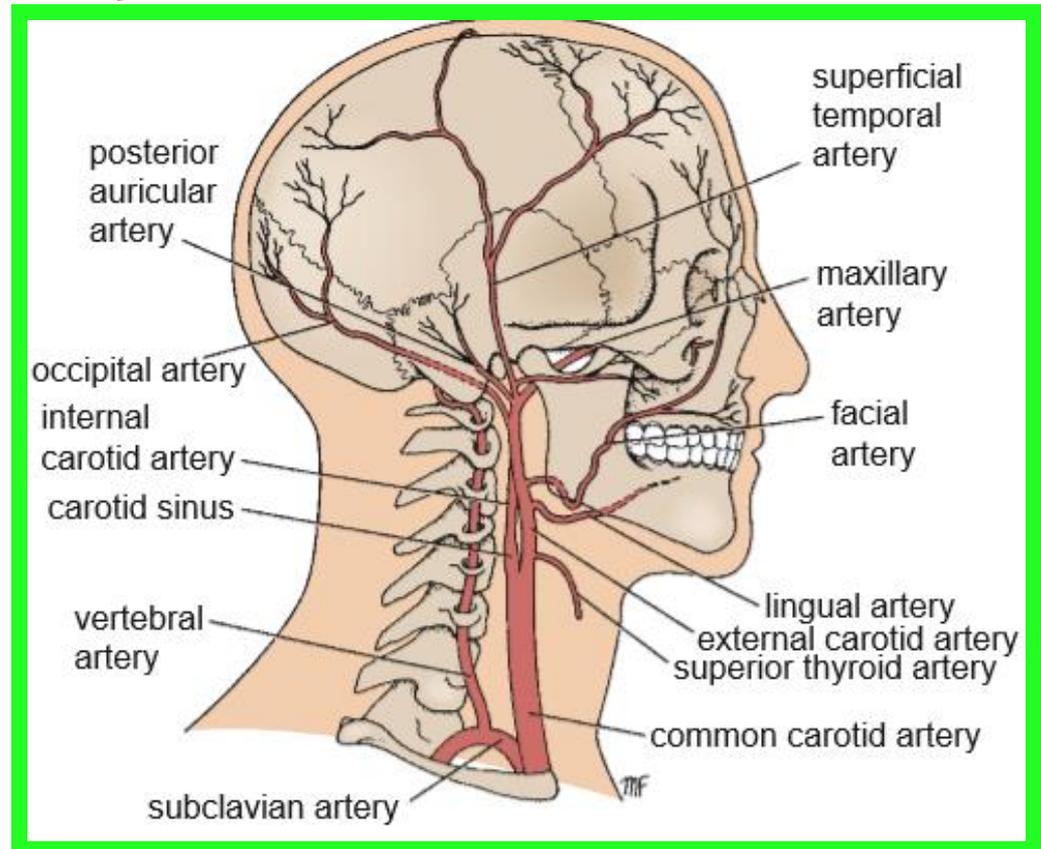


External Nose

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□ Blood Supply 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**

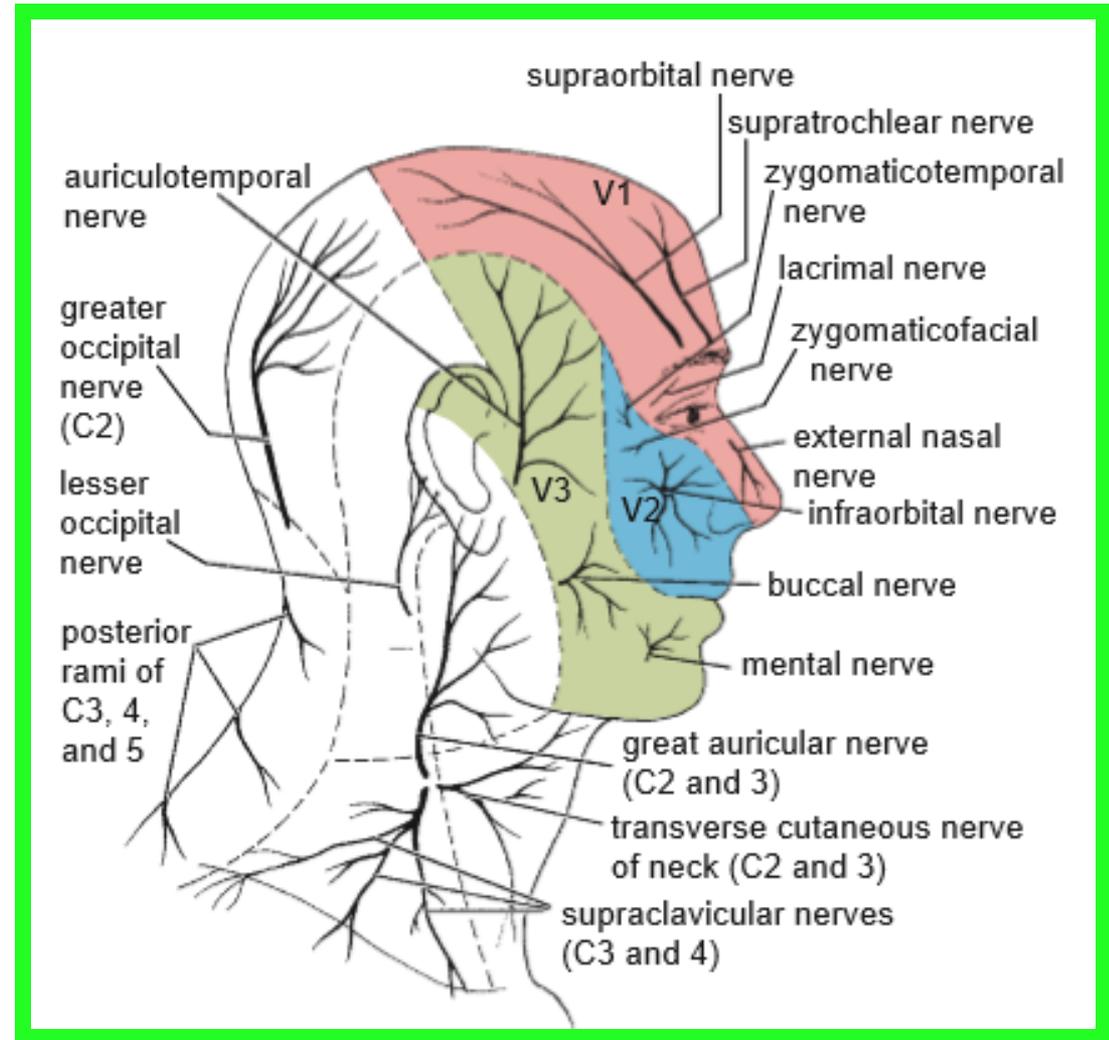


External Nose

□ Nerve Supply of the External Nose

✓ The infratrochlear and external nasal branches of the ophthalmic nerve (CN V)

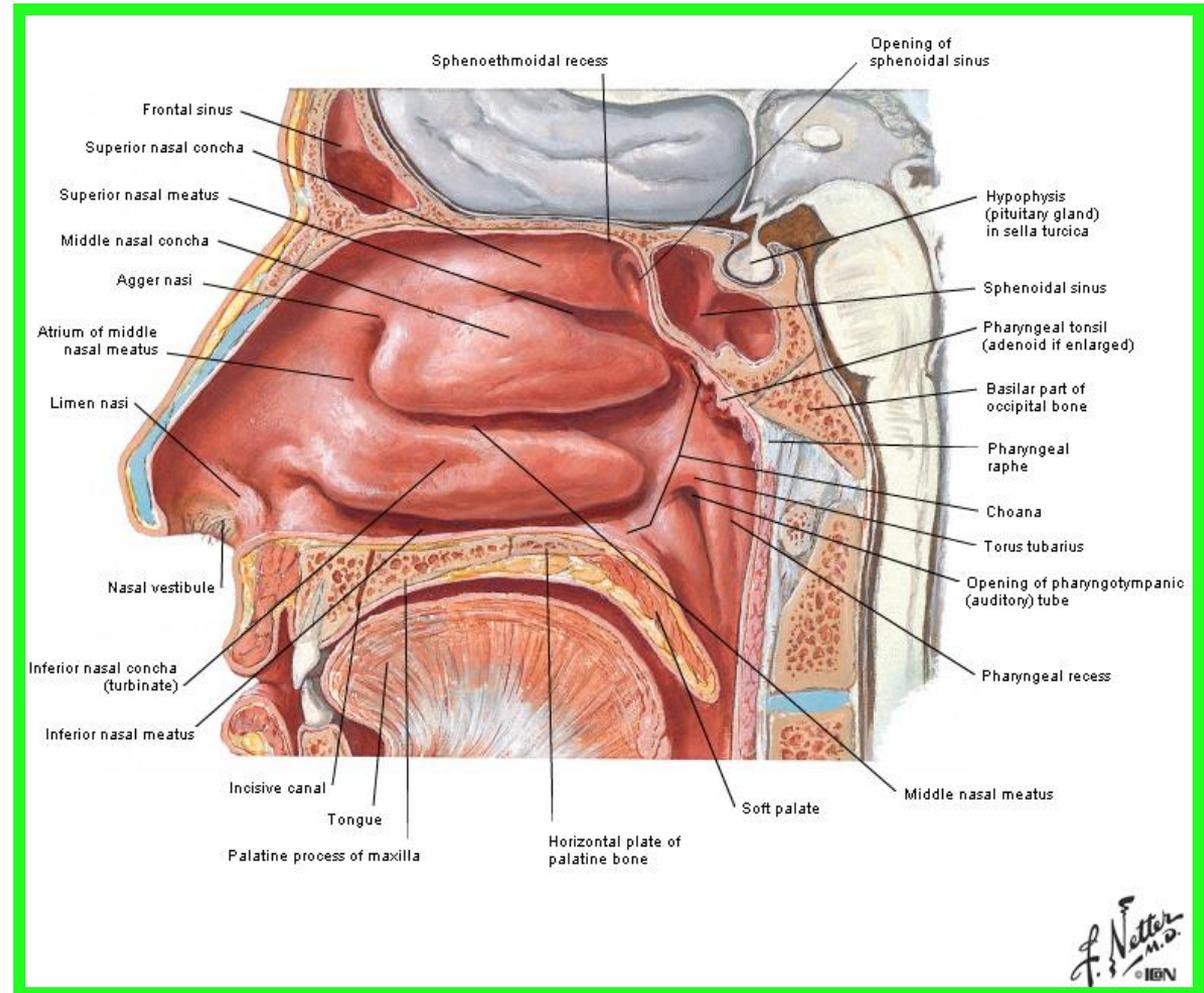
✓ and the infraorbital branch of the maxillary nerve (CN V)



Nasal Cavity

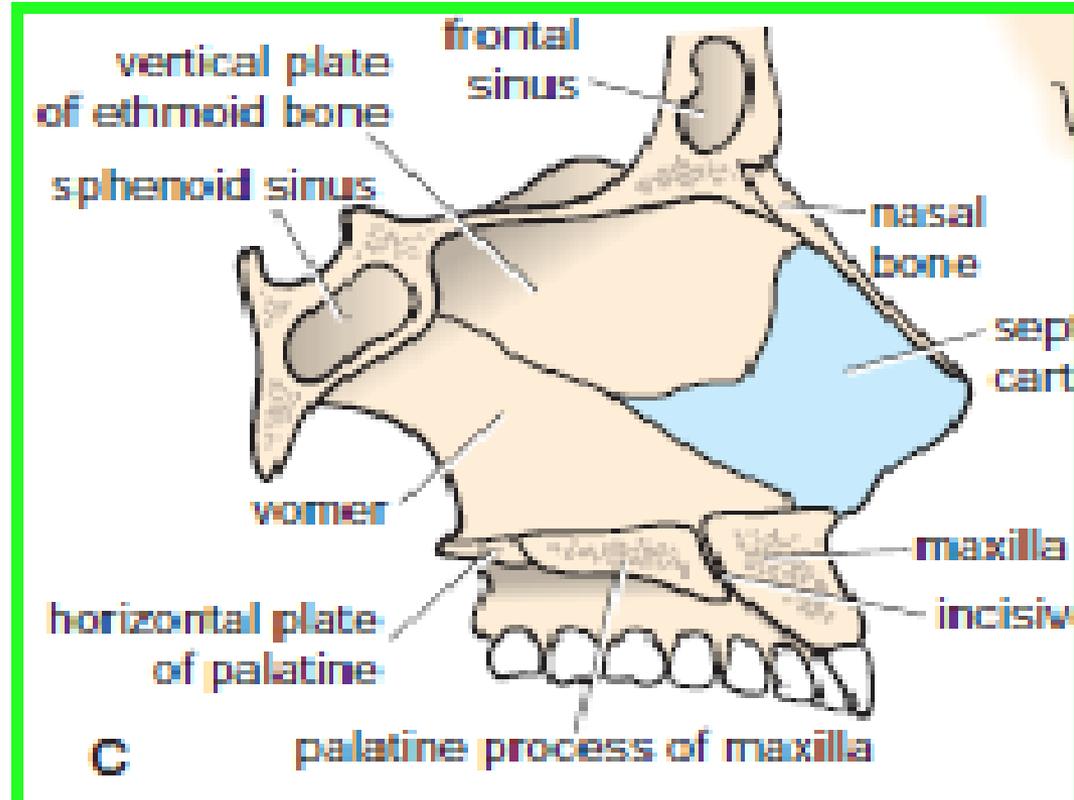
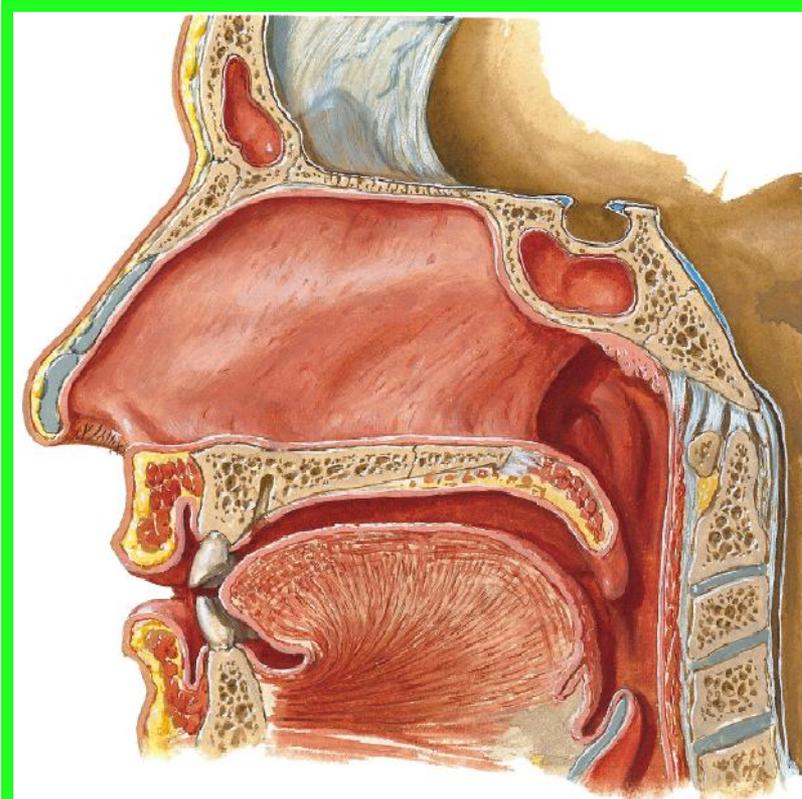
It extends from the **nostrils** in front to the **posterior nasal apertures** or **choanae** behind, where the nose opens into the **nasopharynx**.

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**

The septum is made up of the **septal cartilage**, the **vertical plate of the ethmoid**, and **the vomer**.

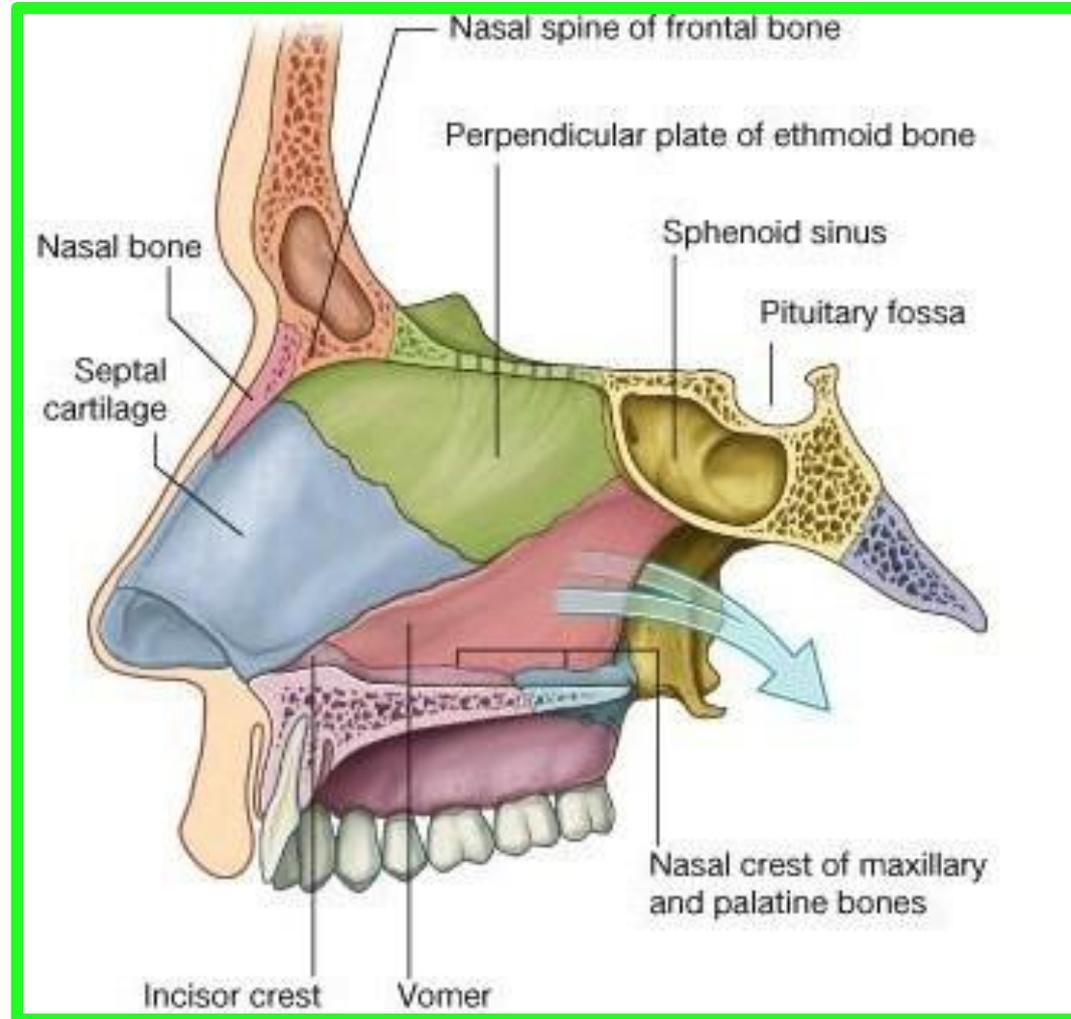


Walls of the Nasal Cavity

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Floor: The palatine process of the maxilla and the horizontal plate of the palatine bone.

Roof: is narrow and is formed **anteriorly** by the nasal and frontal bones, **in the middle** by the cribriform plate of the ethmoid, located beneath the anterior cranial fossa, **posteriorly** by the downward sloping body of the sphenoid

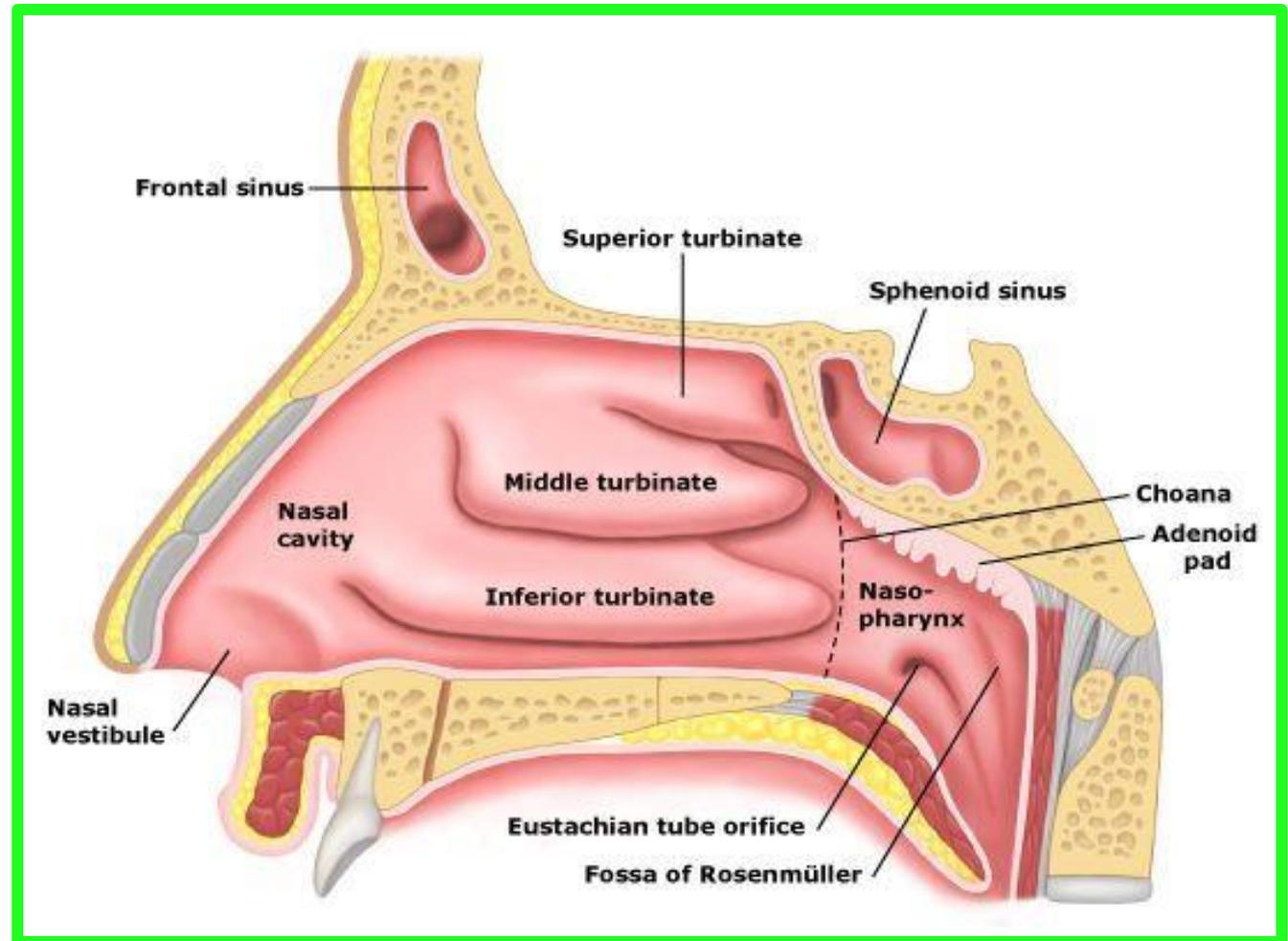


Walls of the Nasal Cavity

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Lateral Wall: has three projections of bone called the superior, middle, and inferior nasal conchae

❖ The space below each concha is called a meatus.



Walls of the Nasal Cavity

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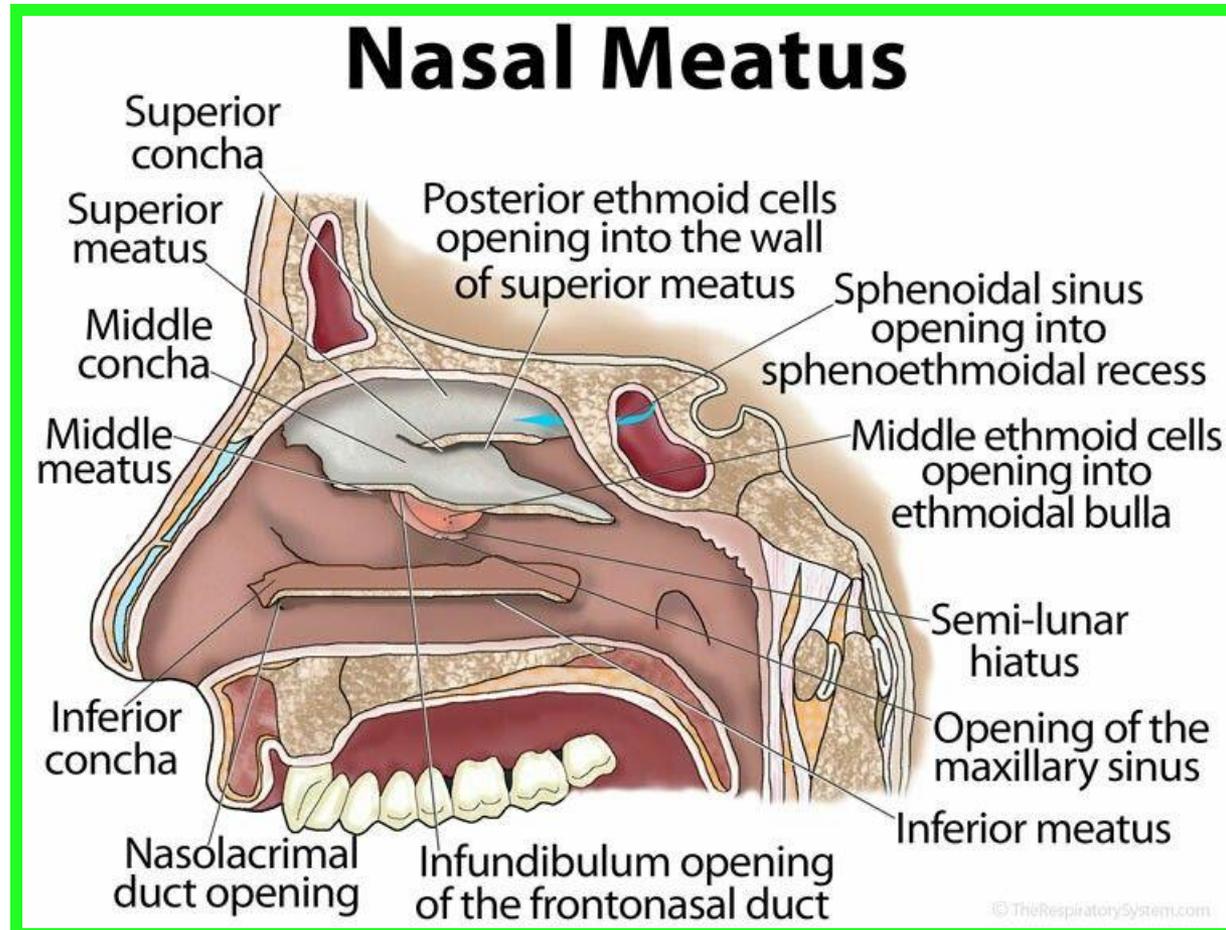
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Sphenoethmoidal Recess :

is a small area above **the superior concha**. It receives the opening of **the sphenoid air sinus**.

Superior Meatus :

lies below the superior concha. It receives the openings of **the posterior ethmoid sinuses**

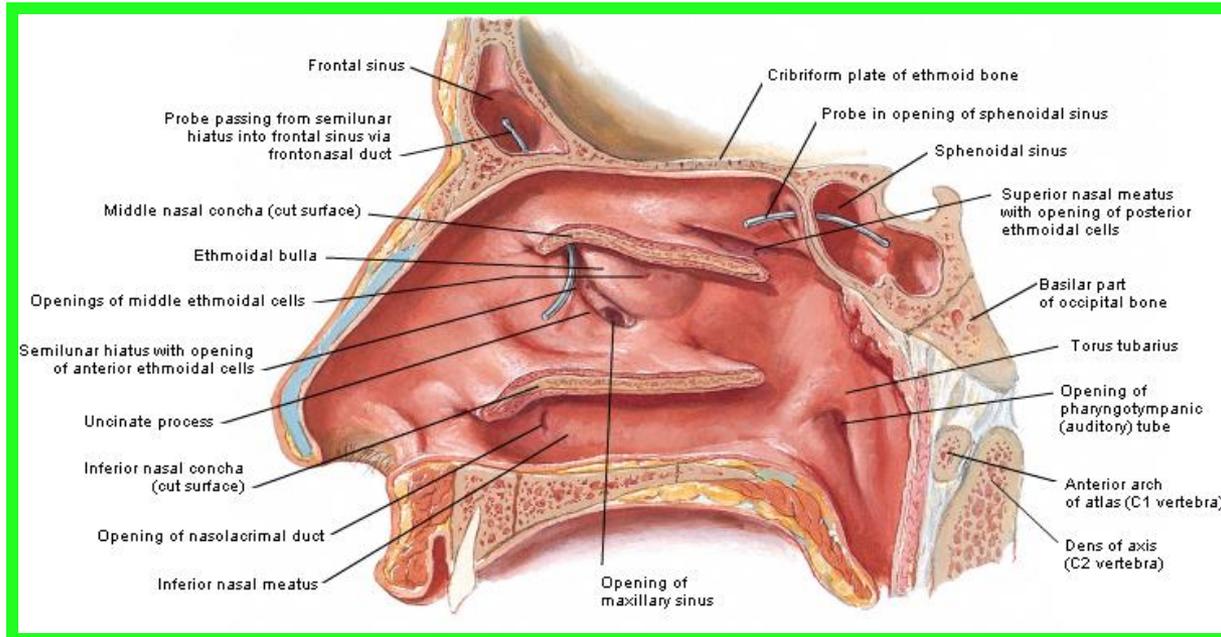


Walls of the Nasal Cavity

Middle Meatus :

- ✓ lies below the middle concha.
- ✓ It has a rounded swelling called the **bullae 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.

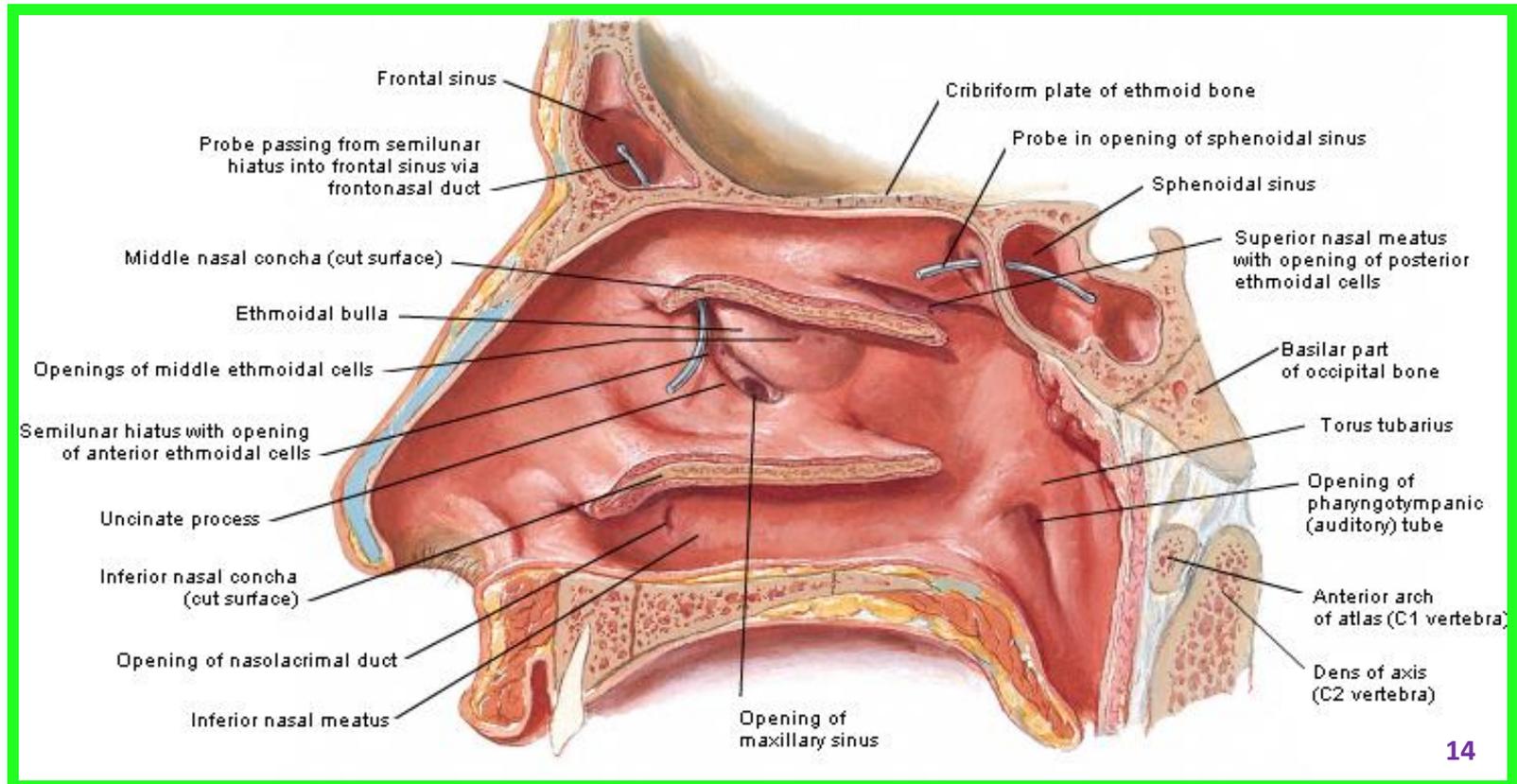
- ✓ The anterior end of the hiatus leads into a funnel-shaped channel called **the infundibulum**, which is continuous with **the frontal sinus**.



Walls of the Nasal Cavity

The maxillary sinus opens into the middle meatus through the **hiatus semilunaris**.

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.



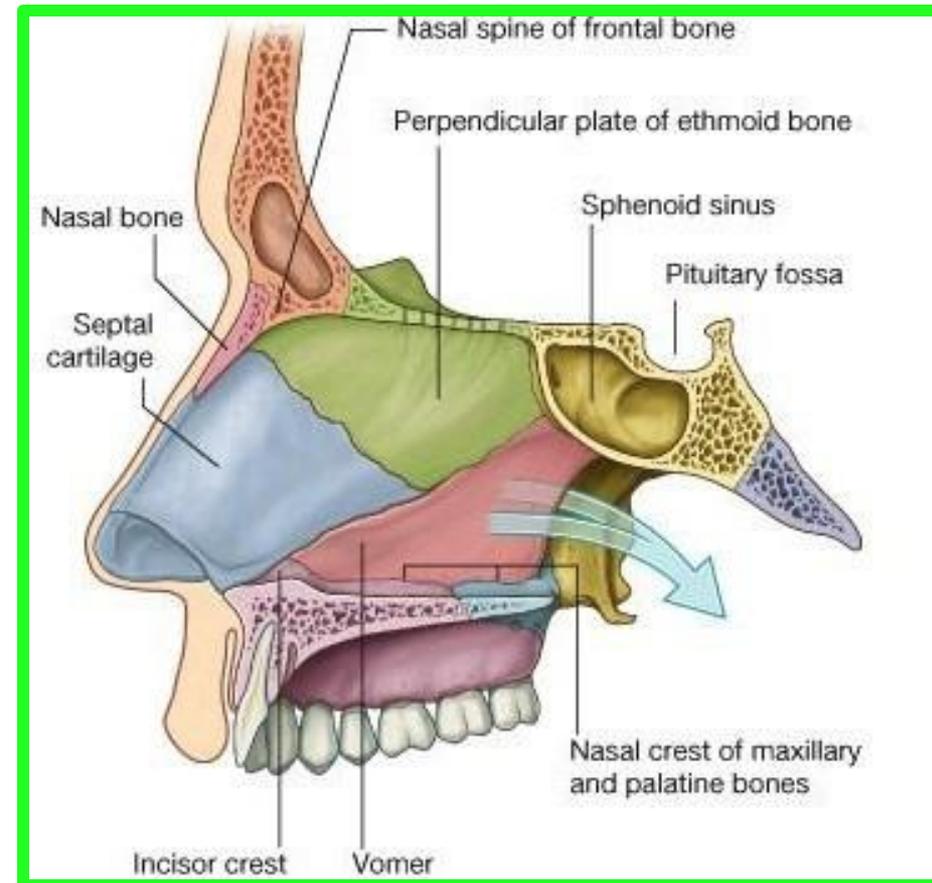
Walls of the Nasal Cavity

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.



Mucous Membrane of the Nasal Cavity

✓ The vestibule is lined with modified skin and has coarse hairs.

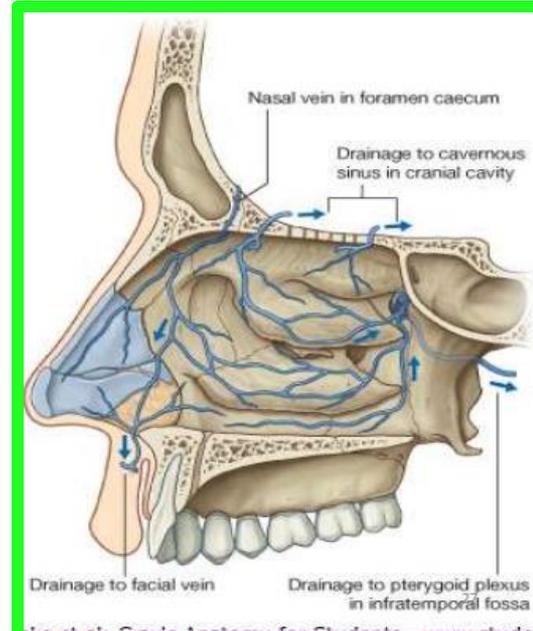
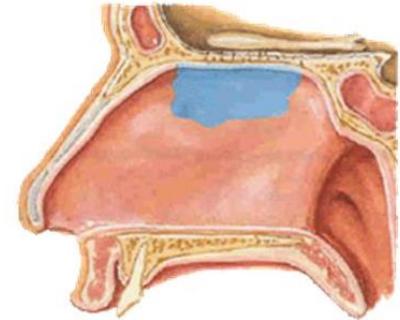
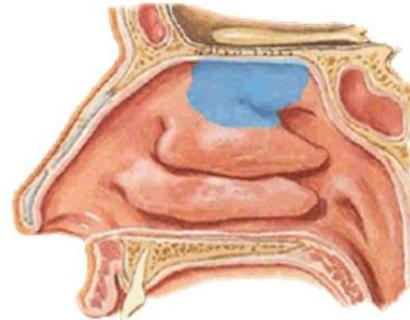
✓ The area above the superior concha is lined with olfactory mucous membrane and contains nerve endings sensitive to the reception of smell.

✓ 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.

Mucous membrane of nose

- Olfactory region: located upper nasal cavity, above superior , nasal conchae , contains olfactory cells
- Respiratory region : its function is to warm, moisten, and clean the inspired air



Function of Warm Blood and Mucus of Mucous Membrane

- ✓ 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.

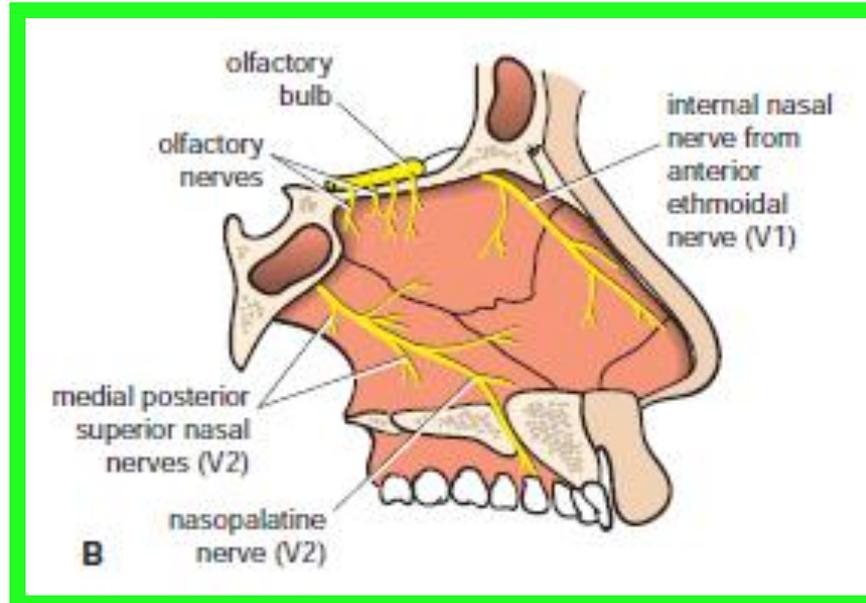
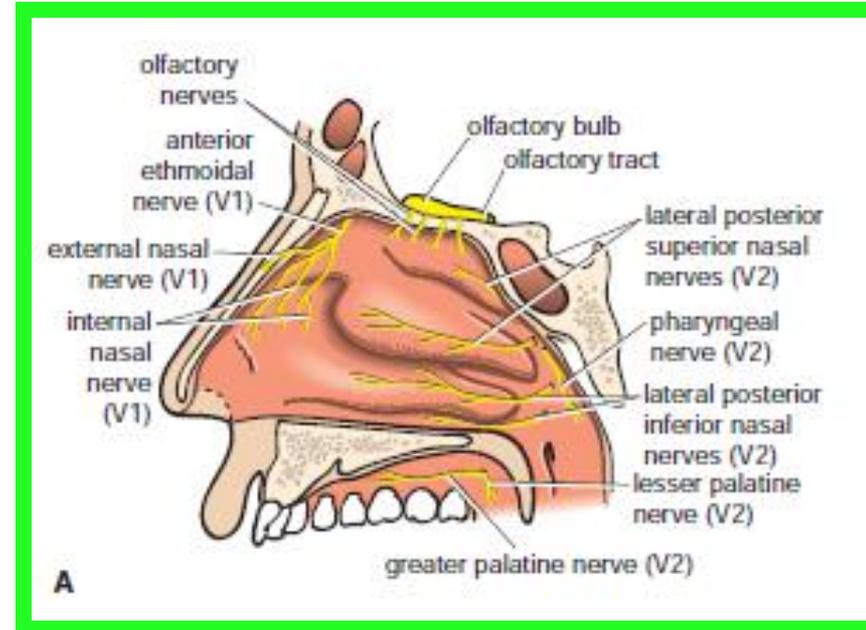


Nerve Supply of the Nasal Cavity

❖ **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



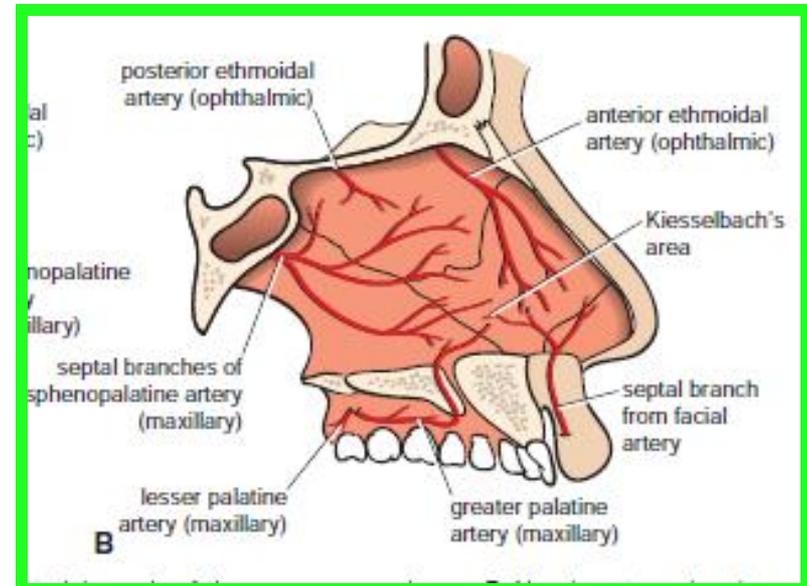
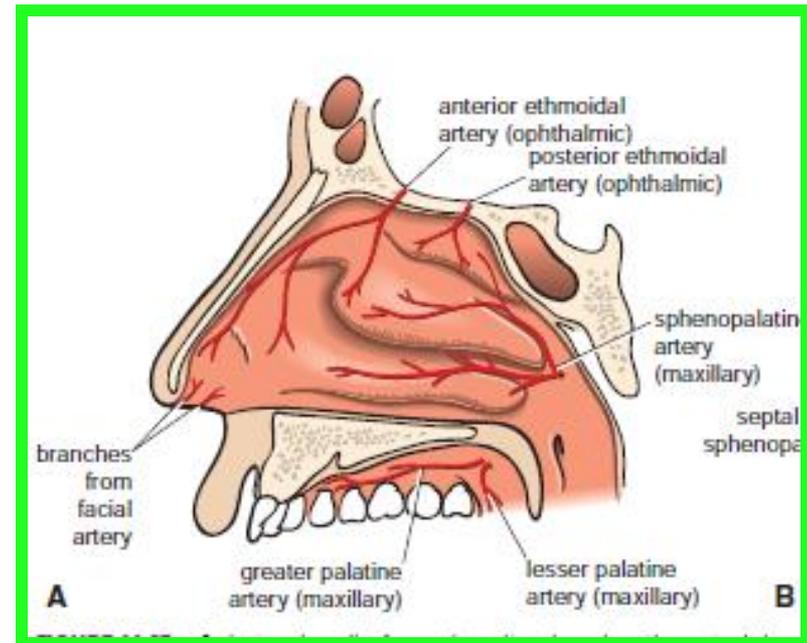
Blood Supply to the Nasal Cavity

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The arterial supply to the nasal cavity is from branches of the **maxillary artery**, one of the terminal branches of the **external carotid artery**.

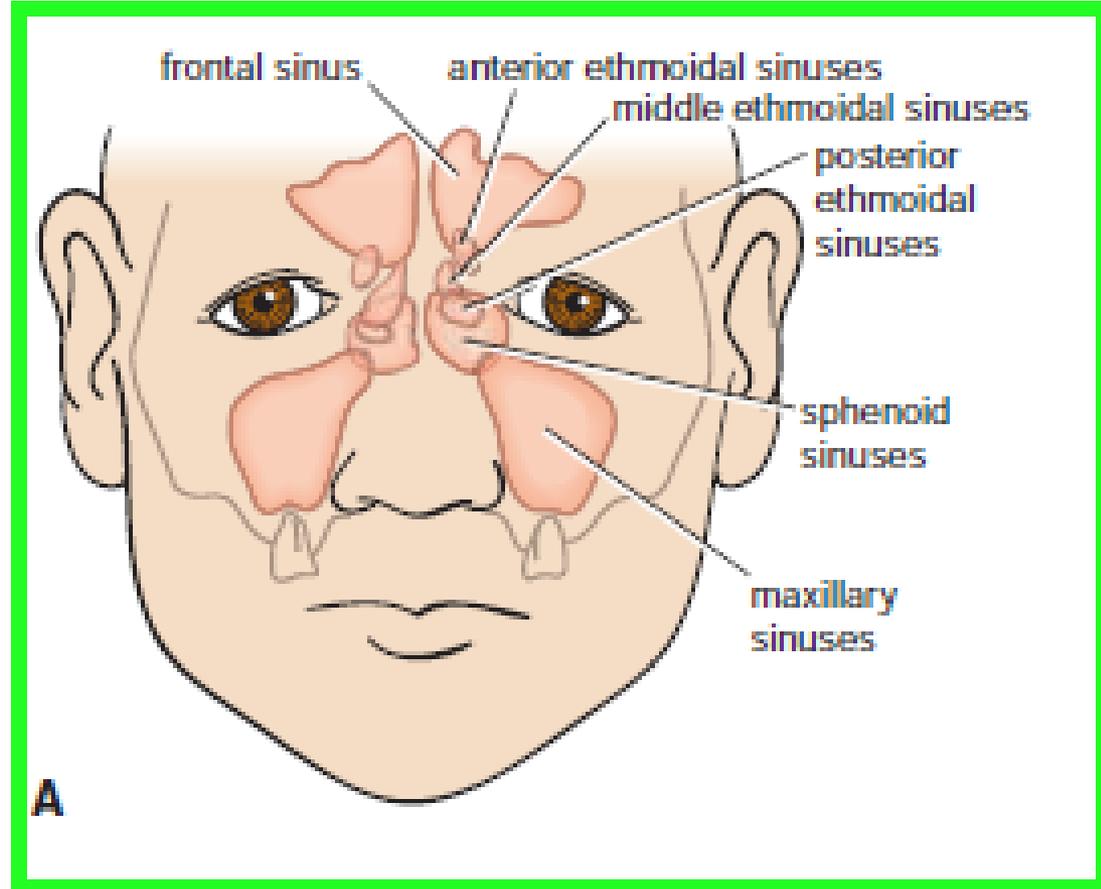
The most important branch is the **sphenopalatine artery** which anastomoses with the **septal branch of the superior labial branch of the facial artery** in the region of the vestibule.

✓ The submucous venous plexus is drained by veins that accompany the arteries



The 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.

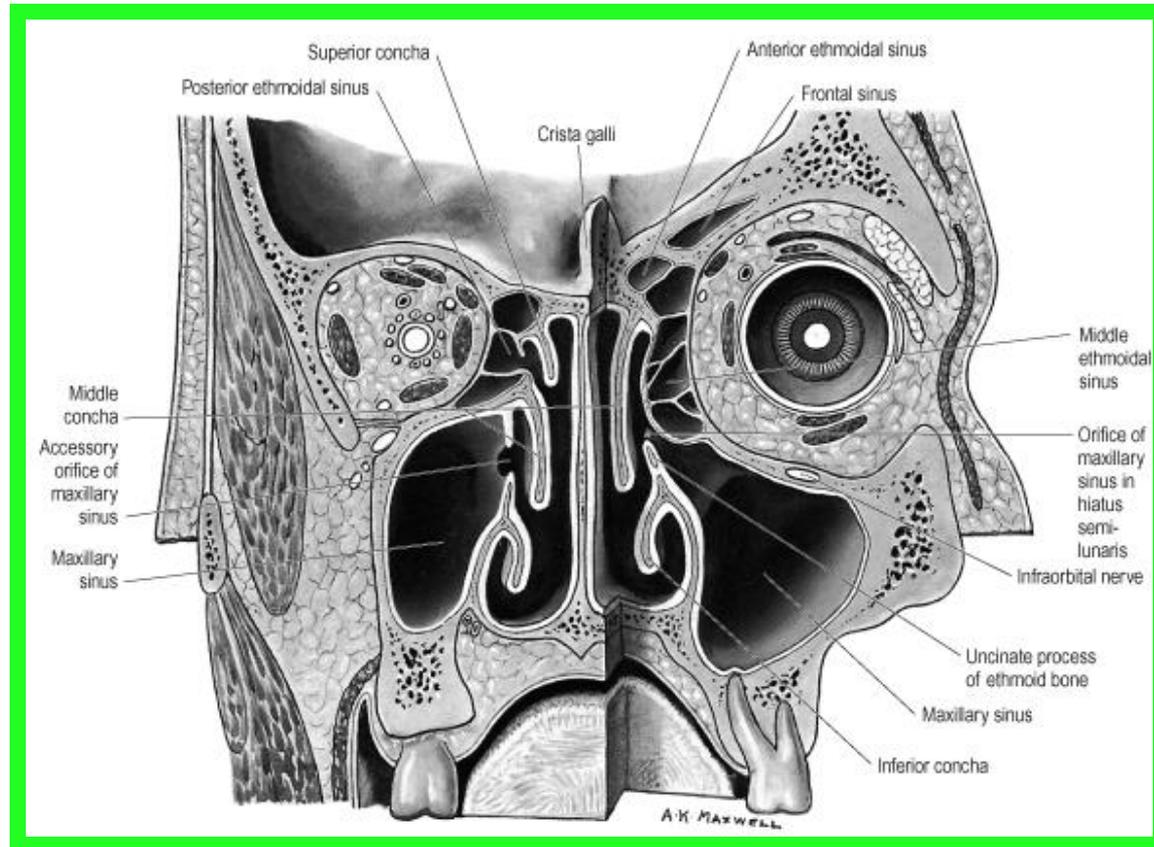
Maxillary Sinus

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

❖ **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**

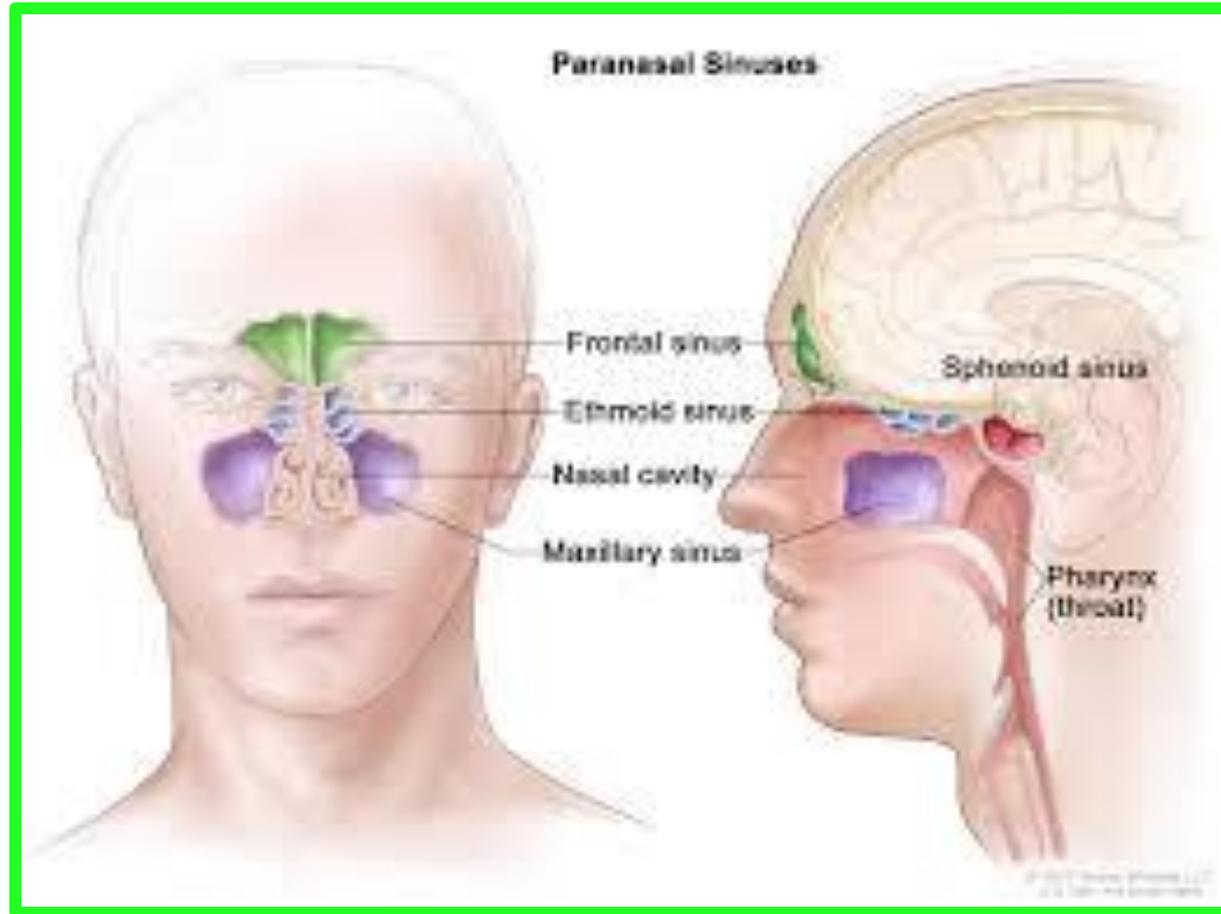


Frontal Sinuses

The two frontal sinuses are contained **within the frontal Bone**.

They are separated from each other by a **bony septum**.

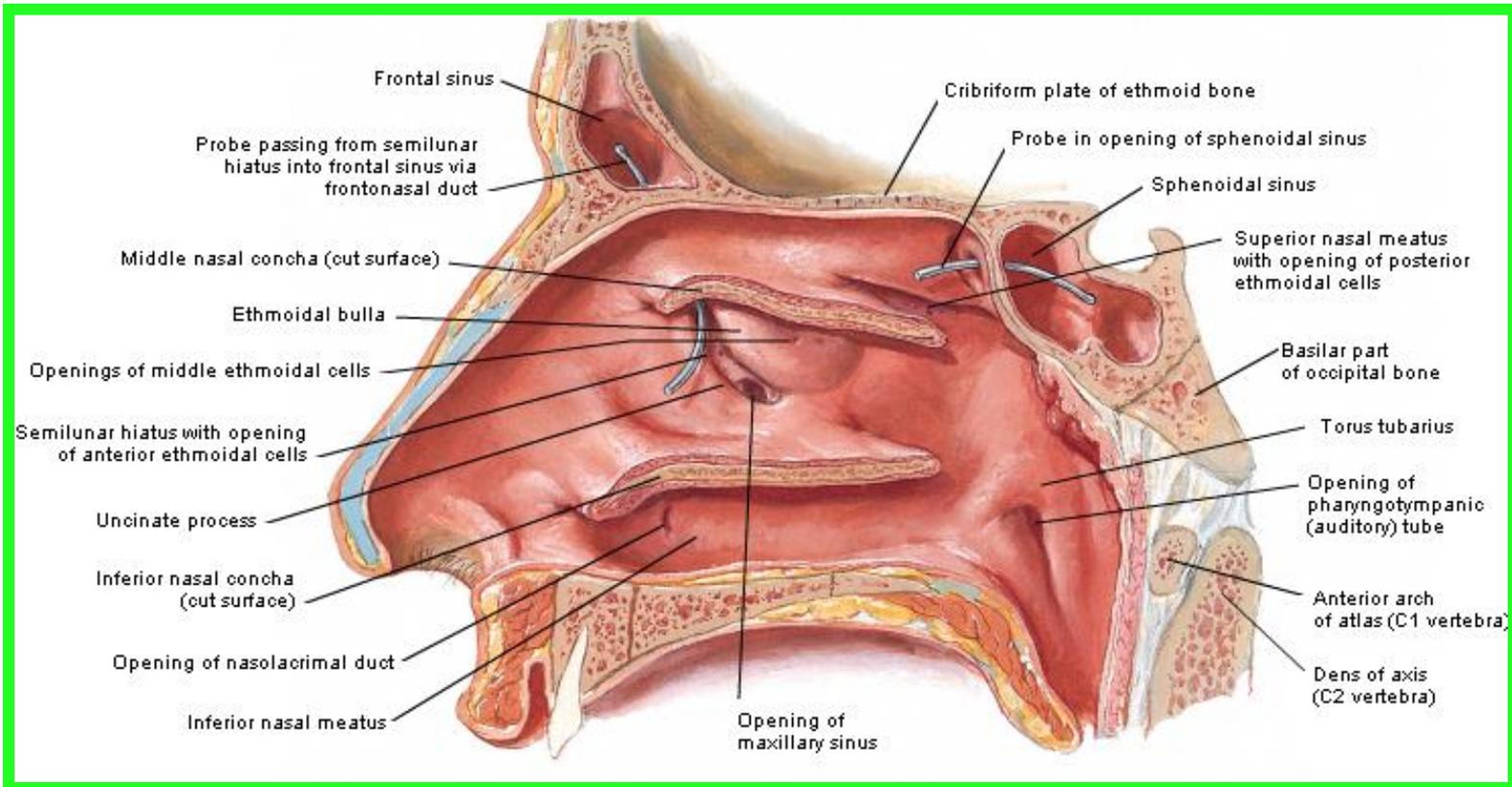
Each sinus is **roughly triangular**.



❖ 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**.

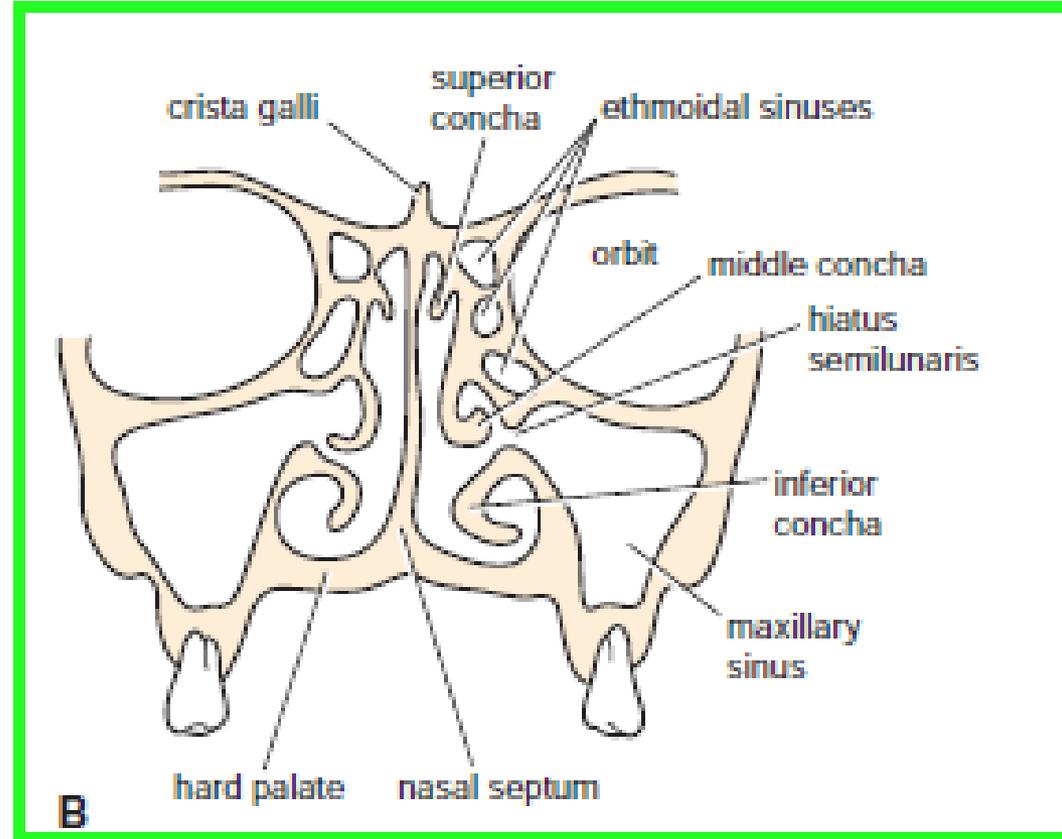


Ethmoid Sinuses

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



✓ The **posterior sinuses** open into the superior meatus.

Trauma to the Nose Fractures involving **the nasal bones** are common. Blows directed from the front may cause one or both nasal bones to be displaced downward and inward. Lateral fractures also occur in which one nasal bone is driven inward and the other outward; **the nasal septum is usually involved**.



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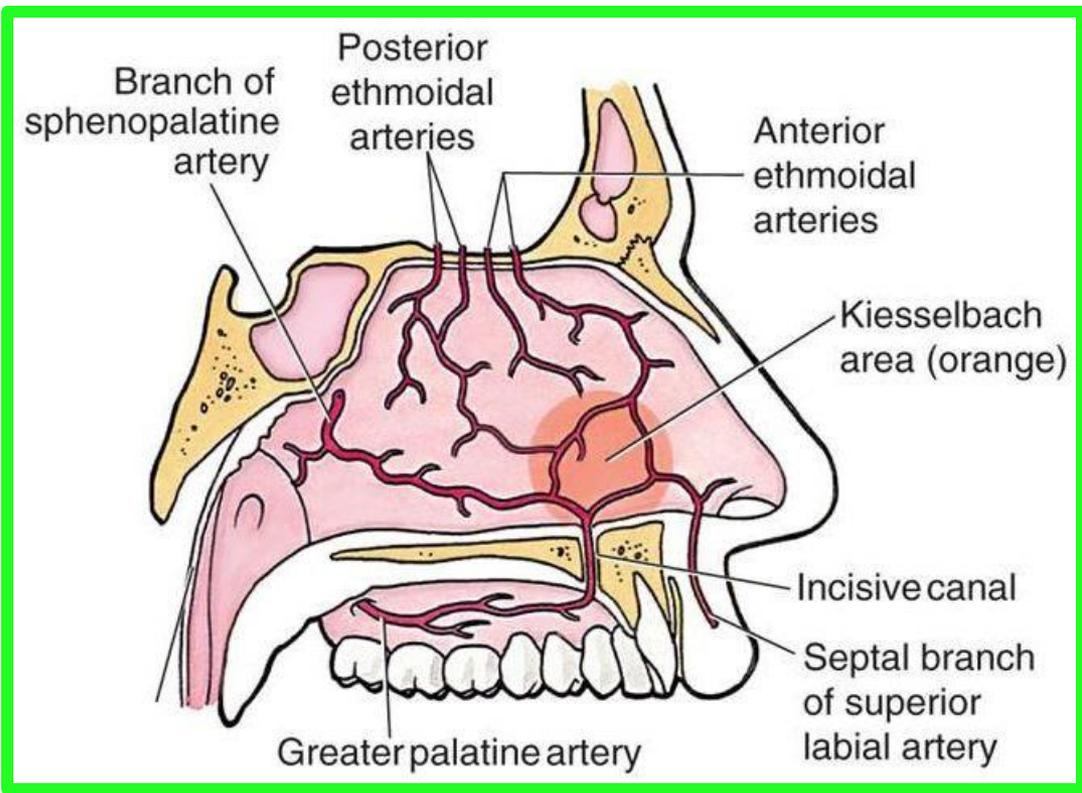


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Nose Bleeding Epistaxis, or bleeding from the nose, is a frequent condition. The most common cause is nose picking.

The bleeding may be arterial or venous, and most episodes occur on the anteroinferior portion of the septum and involve the septal branches of the sphenopalatine and facial vessels



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.

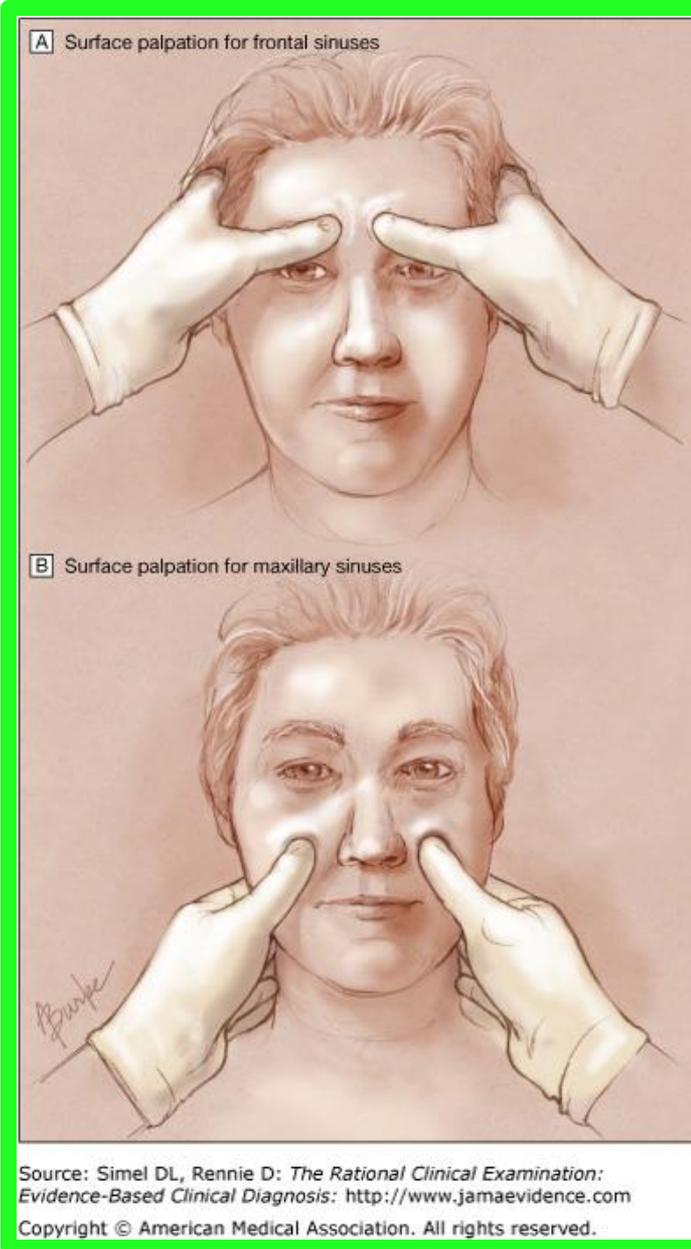
The frontal sinus can be examined by pressing the finger upward beneath the medial end of the superior orbital margin. Here, the floor of the frontal sinus is closest to the surface.



Sinusitis and the Examination of the Paranasal Sinuses

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.



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