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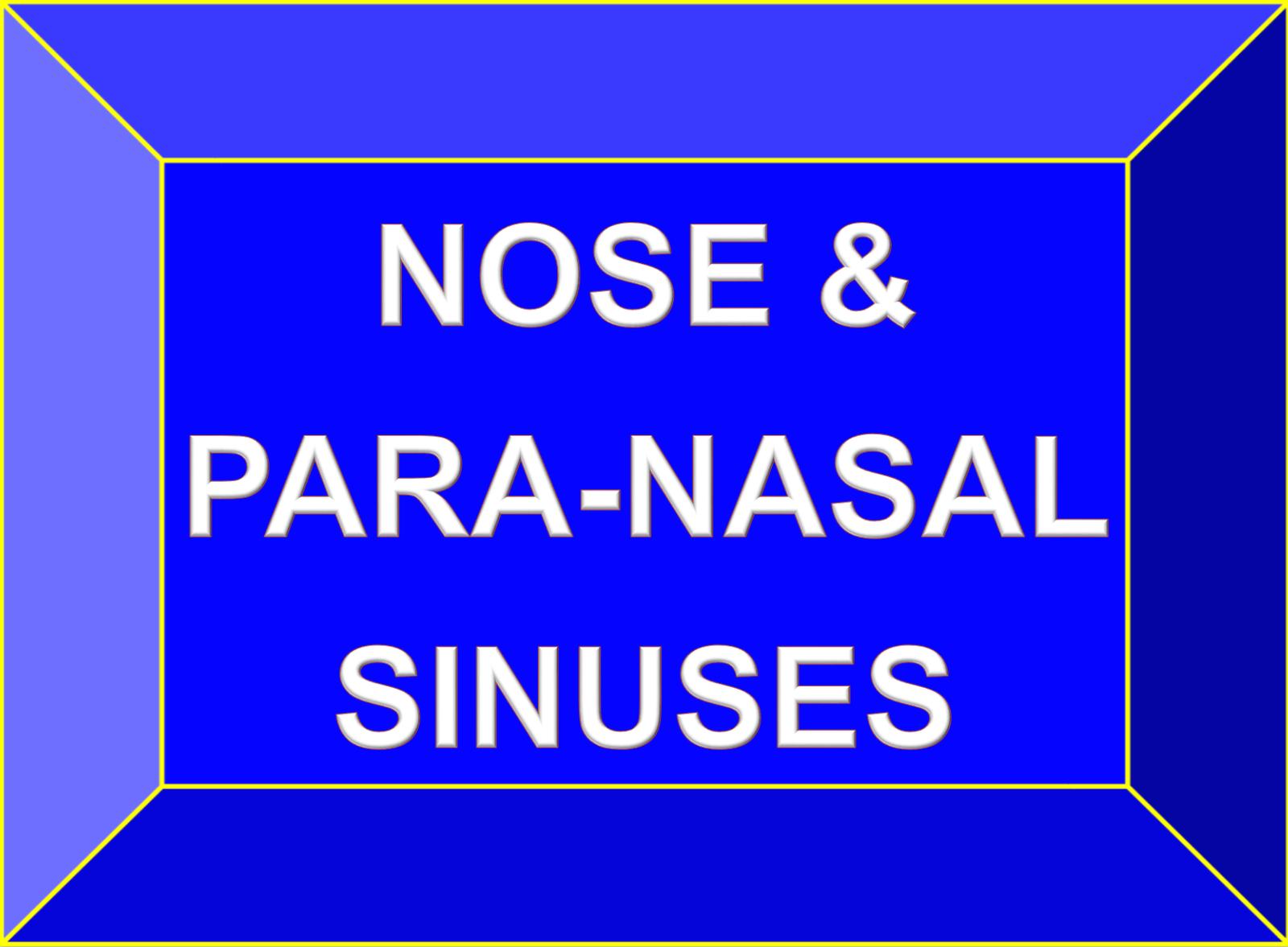


**الأستاذ الدكتور / يوسف حسين**

**أستاذ التشريح وعلم الأجنة**

**كلية الطب - جامعة الزقازيق - مصر**

**دكتورة من جامعة كولونيا المانيا  
د. يوسف حسين (استاذ التشريح)**



**NOSE &  
PARA-NASAL  
SINUSES**

frontal process of  
the maxilla

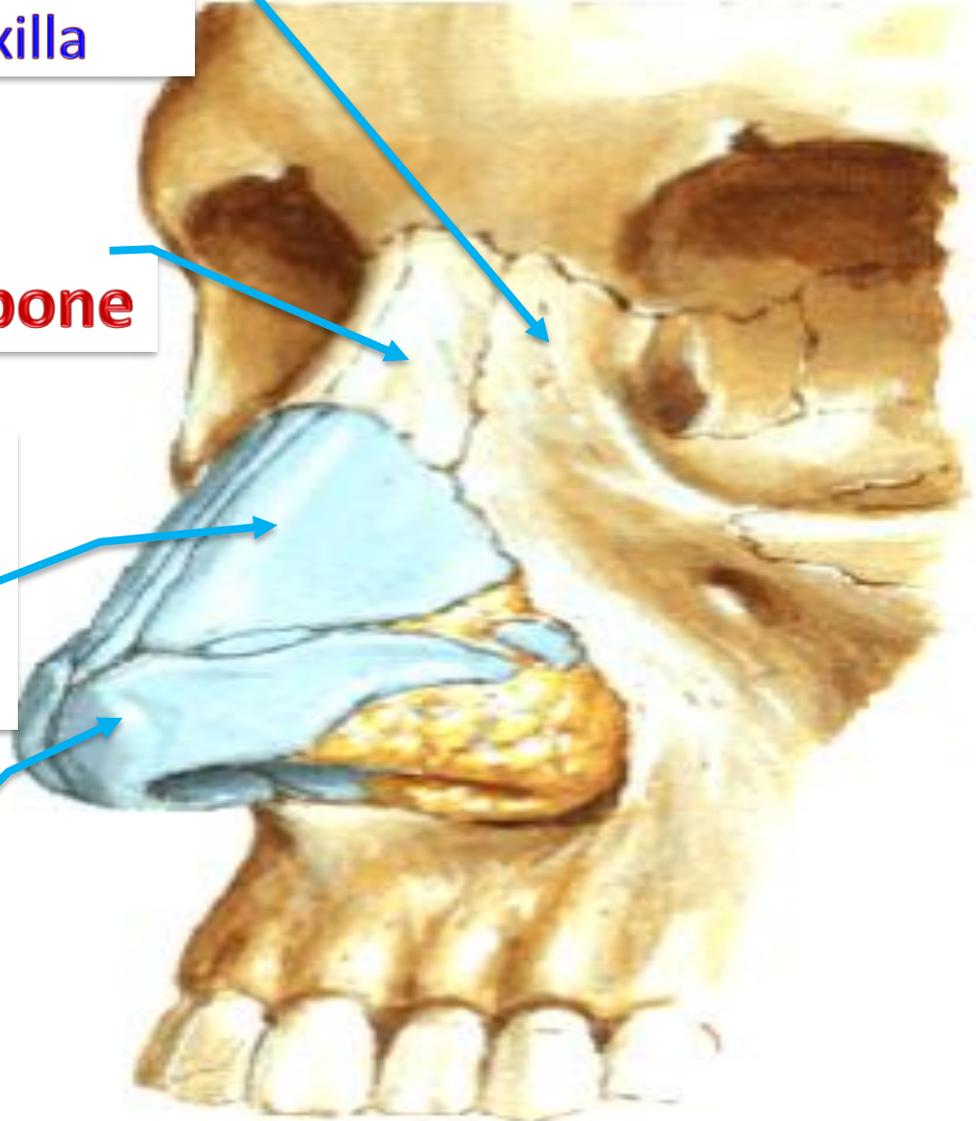
Nasal bone

nasal  
cartilage

Greater  
alar  
cartilage

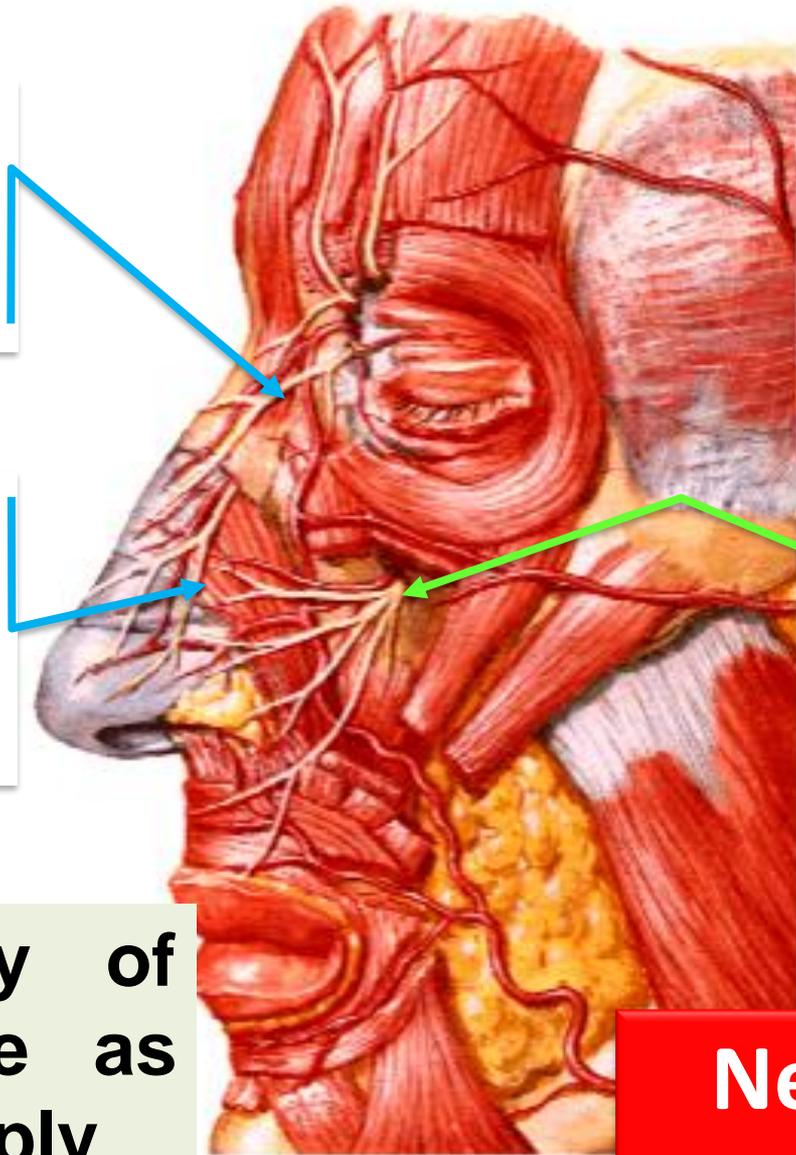
**Boundaries External nose**

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**infratrochlear  
nerve ophth N.**

**external nasal  
nerve ophth.  
N.**



**Infraorbital  
nerve**

**Max. N**

**Blood supply of  
external nose as  
the nerve supply**

**Nerve supply  
of External nose**

A red scroll graphic with a white outline, featuring a vertical strip on the left side and a small circular tab on the right side. The text "Nasal Cavity" is centered on the scroll in white.

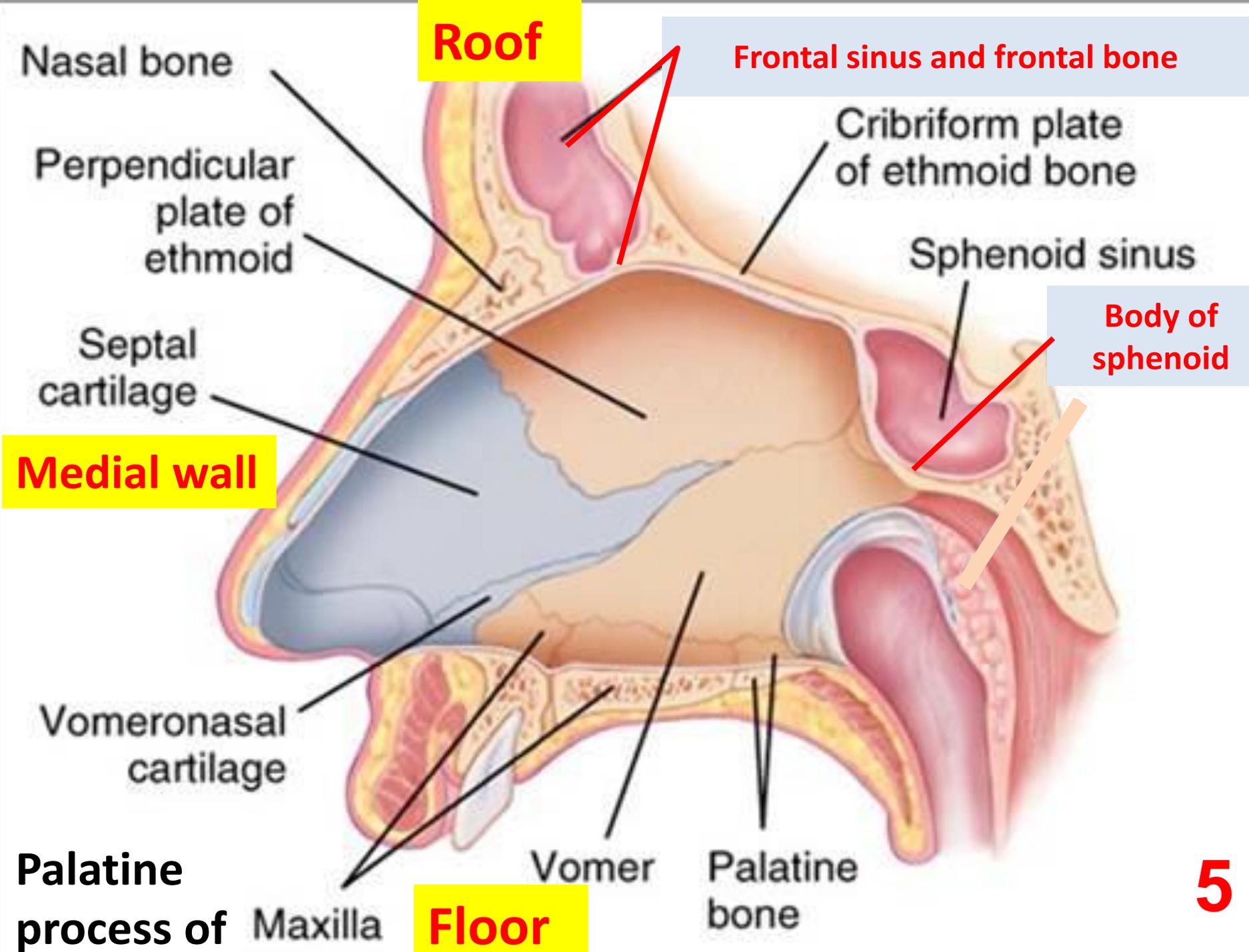
**Nasal  
Cavity**

- The **cavity of the nose** is dividing **4** into right and left halves by the **nasal septum.**

- Each cavity opens

**A- Anteriorly** on the face by the anterior nasal aperture (nostril)

**B- Posteriorly** into the nasopharynx by the posterior nasal aperture.



## ▪ **Boundaries of the nasal cavity**

❖ **The floor:** hard palate separating it from the oral cavity (palatine process of maxilla & horizontal plate of palatine bone).

❖ **The roof :** has the following parts:

**(a) Anterior sloping part:** formed by the nasal and frontal bones.

**(b) Middle horizontal part:** formed by cribriform plate of ethmoid.

**(c) Posterior Sloping part:** formed by body of sphenoid.

❖ **The medial wall (nasal septum) :** is formed by :

**(a) Anteriorly,** septal cartilage.

**(b) Postero-superiorly,** perpendicular plate of ethmoid.

**(c) Postero-inferiorly,** Vomer bone (single bone).

# Lateral wall

Anterior

Posterior

Nasal bone

Ethmoid bone

Frontal process of the maxilla

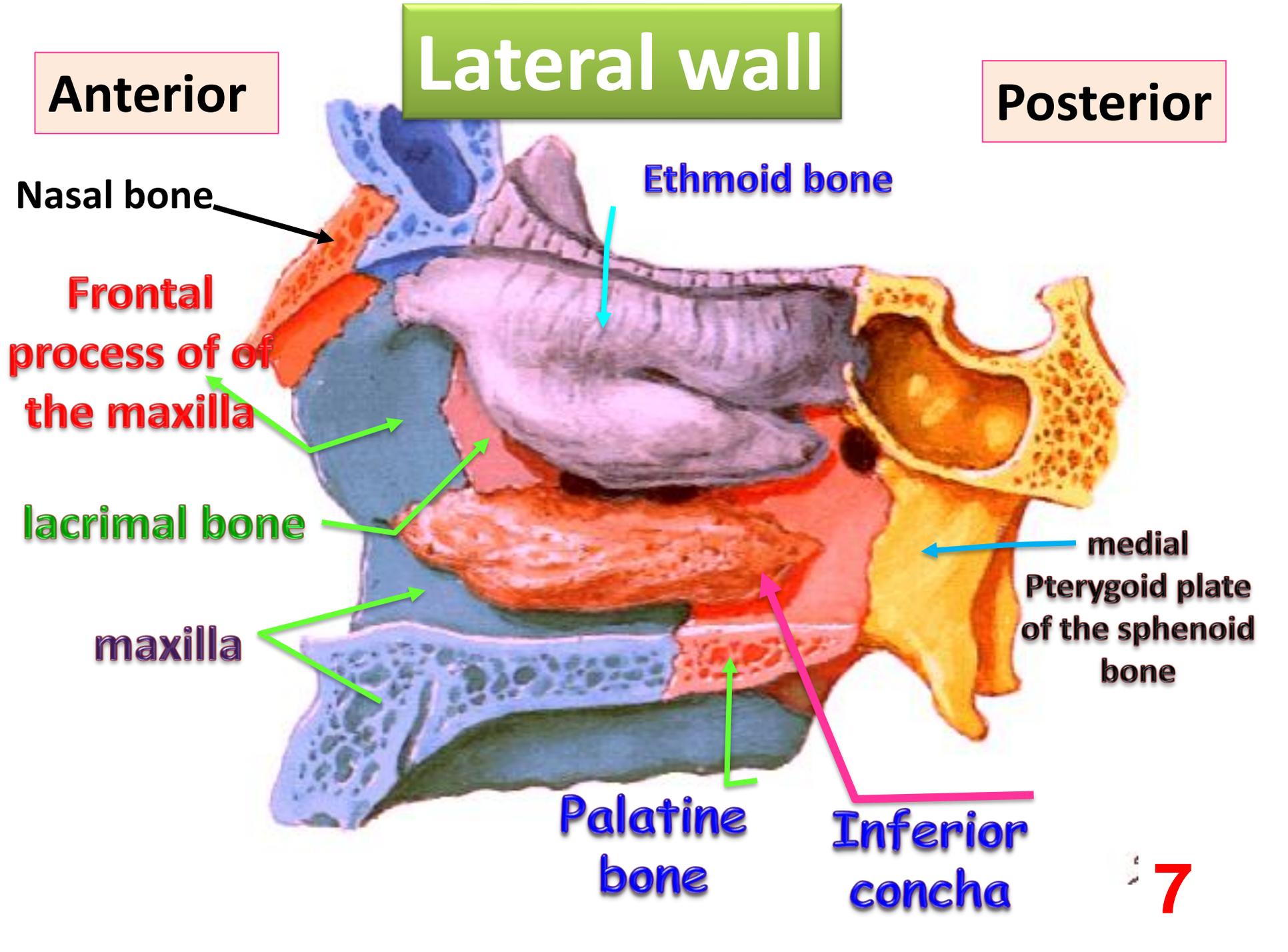
Lacrimal bone

maxilla

medial Pterygoid plate of the sphenoid bone

Palatine bone

Inferior concha



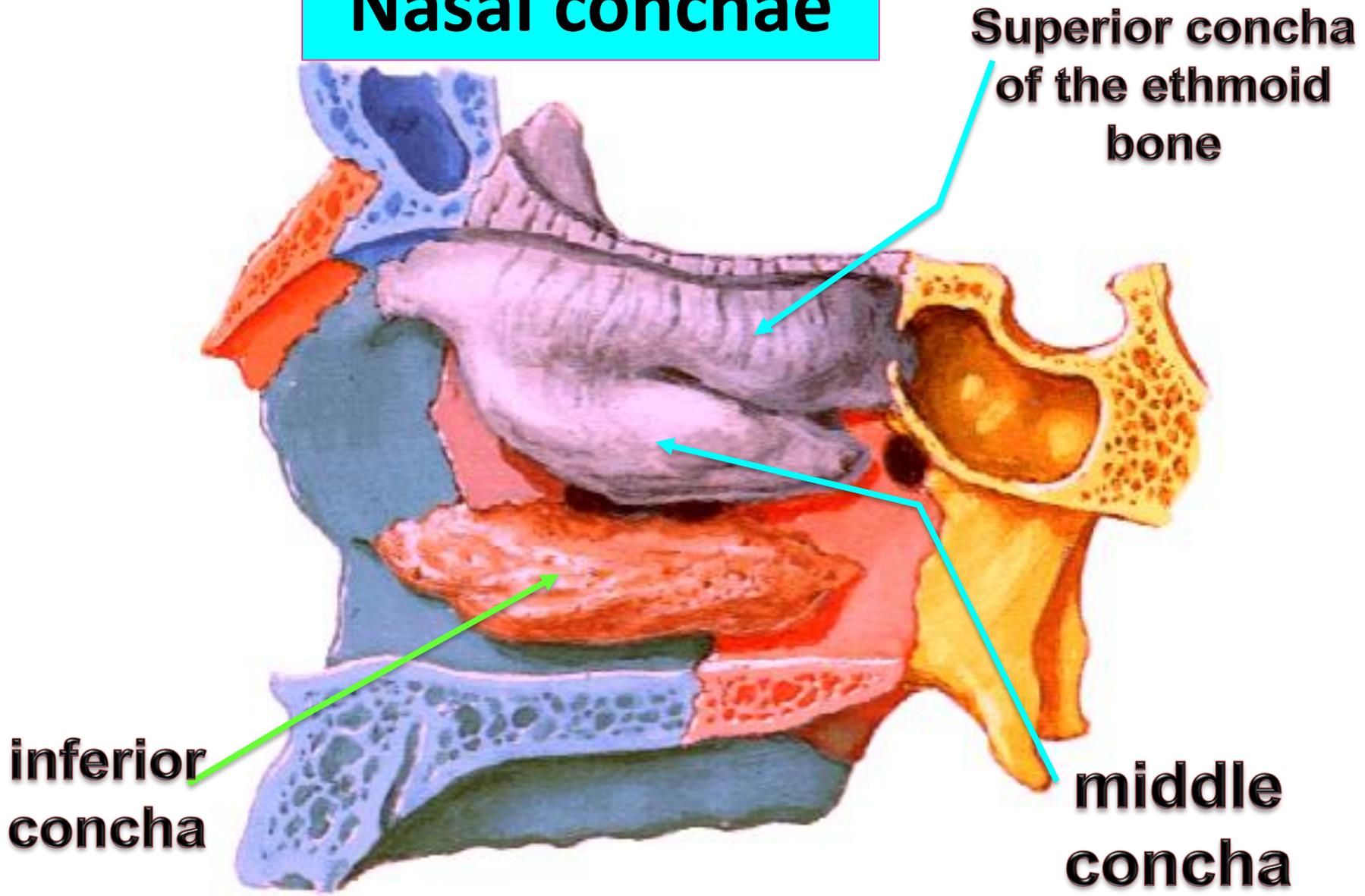
## ❖ **Lateral wall of the nasal cavity** **8**

**A- Anteriorly**, cartilage, nasal bone and frontal process of maxilla.

### **B- Posteriorly**

- **Upper part**, ethmoid bone, lacrimal bone.
- **Lower part**, inferior concha, maxilla, palatine bone, and medial pterygoid plate,.

# Nasal conchae



- **Features of the lateral wall,**

- It is irregular and shows the following:

**(a) Vestibule;** a small dilatation above the anterior nasal aperture.

**(b) Atrium:** a shallow depression above and behind the vestibule.

**(c) Nasal conchae(turbinates):** 3 shelves-like elevations separated by spaces called **meatuses**.

**1) Superior Concha:** is the smallest one and is part of the ethmoid bone (**superior meatus** below it).

**2) Middle Concha:** is medium sized and also part of the ethmoid bone (**middle meatus** below it).

**3) Inferior Concha:** is the largest one and is a separate bone (**inferior meatus** below it).

**4) Spheno-ethmoidal recess:** above the superior concha

# Lateral wall

Sphenoethmoidal recess

Frontal sinus

Superior concha

Superior meatus

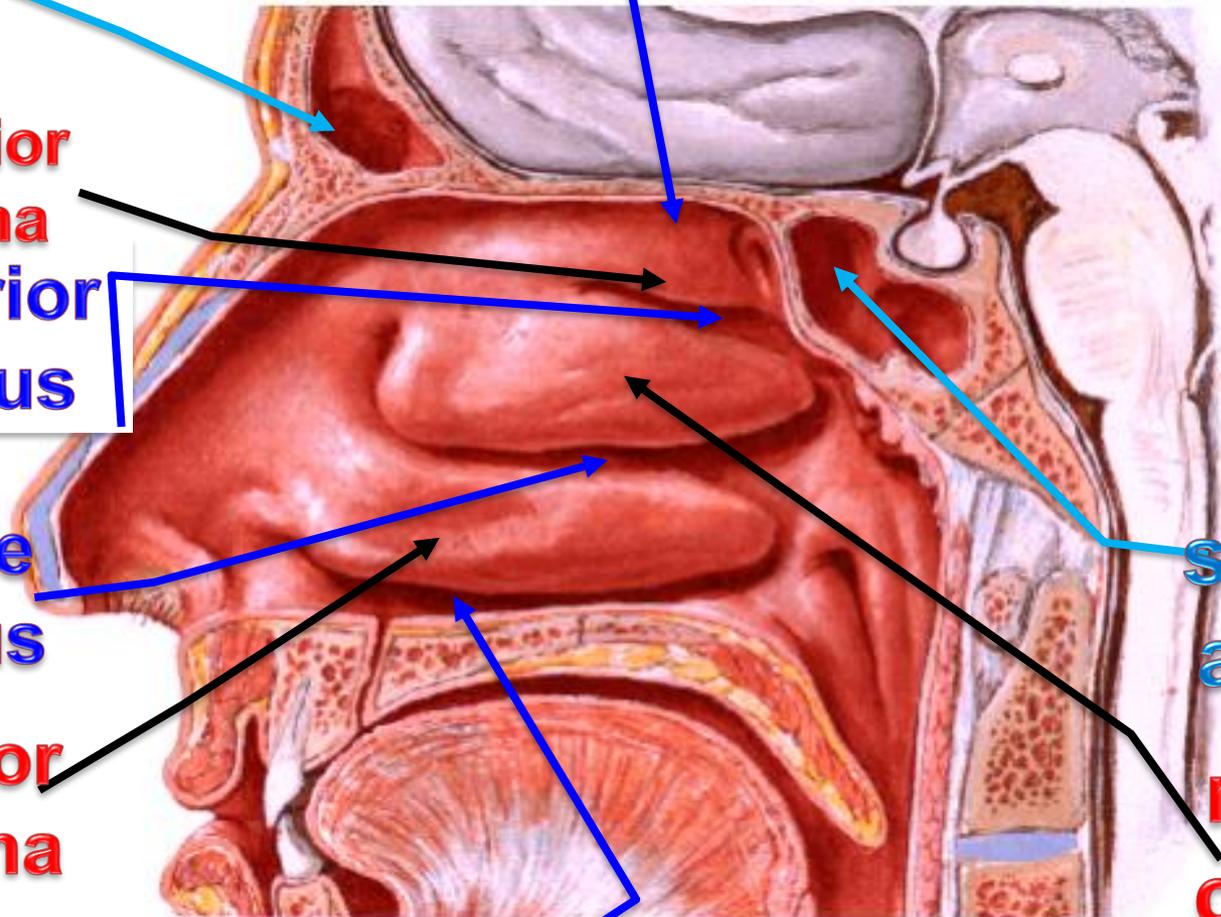
Middle meatus

inferior concha

Inferior meatus

sphenoid air sinus

middle concha



- **Openings in the nasal meatuses of the lateral wall:**

(1) **Spheno-ethmoidal recess:** above the **superior concha.**

- It receives the opening of the **sphenoidal air sinus.**

(2) **Superior Meatus:** receives opening of the **posterior ethmoidal air sinus.**

(3) **Middle meatus:** shows,

a- **Bulla ethmoidalis:** a rounded elevation overlies the **middle ethmoidal air sinus** and receives its opening.

b- **Hiatus semilunaris:** a crescent groove below the bulla ethmoidalis receiving the opening of

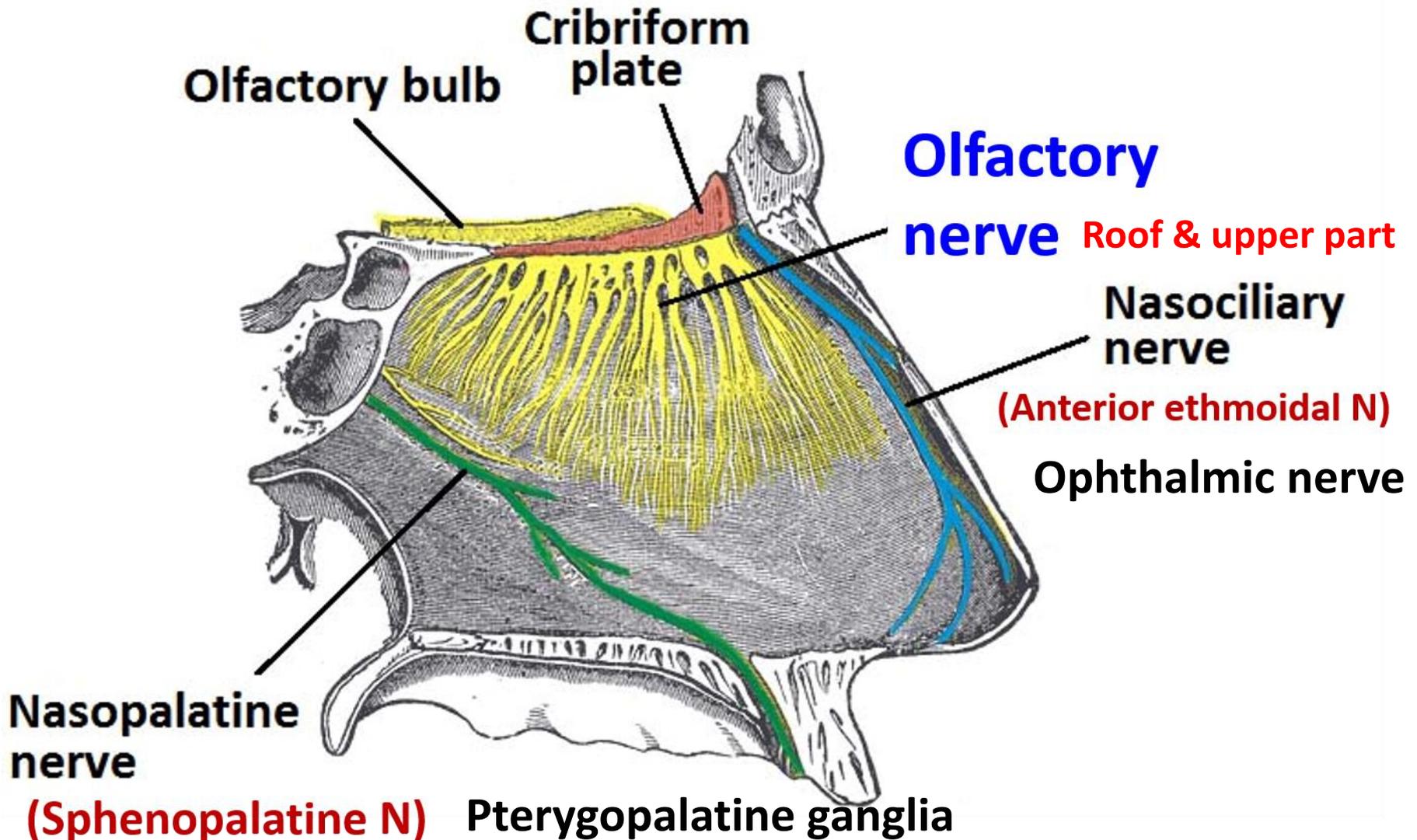
1) **Frontal air sinus** opens into the anterior end.

2) **Anterior ethmoidal air** sinuses.

3) **Maxillary air sinus** opens near the posterior end.

(2) **Inferior-meatus:** receives the opening of **nasolacrimal duct.**

# Nerve supply of the nose



▪ **Nerve supply of the nasal cavity**

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**A- Nerves supply of the lateral Wall**

• **Anterior part,**

1- Anterior ethmoidal nerve from nasociliary nerve of ophthalmic nerve.

2- Anterior superior alveolar nerve from maxillary nerve.

• **Posterior part,**

1- Nasopalatine nerve (Sphenopalatine) from pterygopalatine (Sphenopalatine) ganglia.

2- Posterior superior alveolar nerve from maxillary nerve.

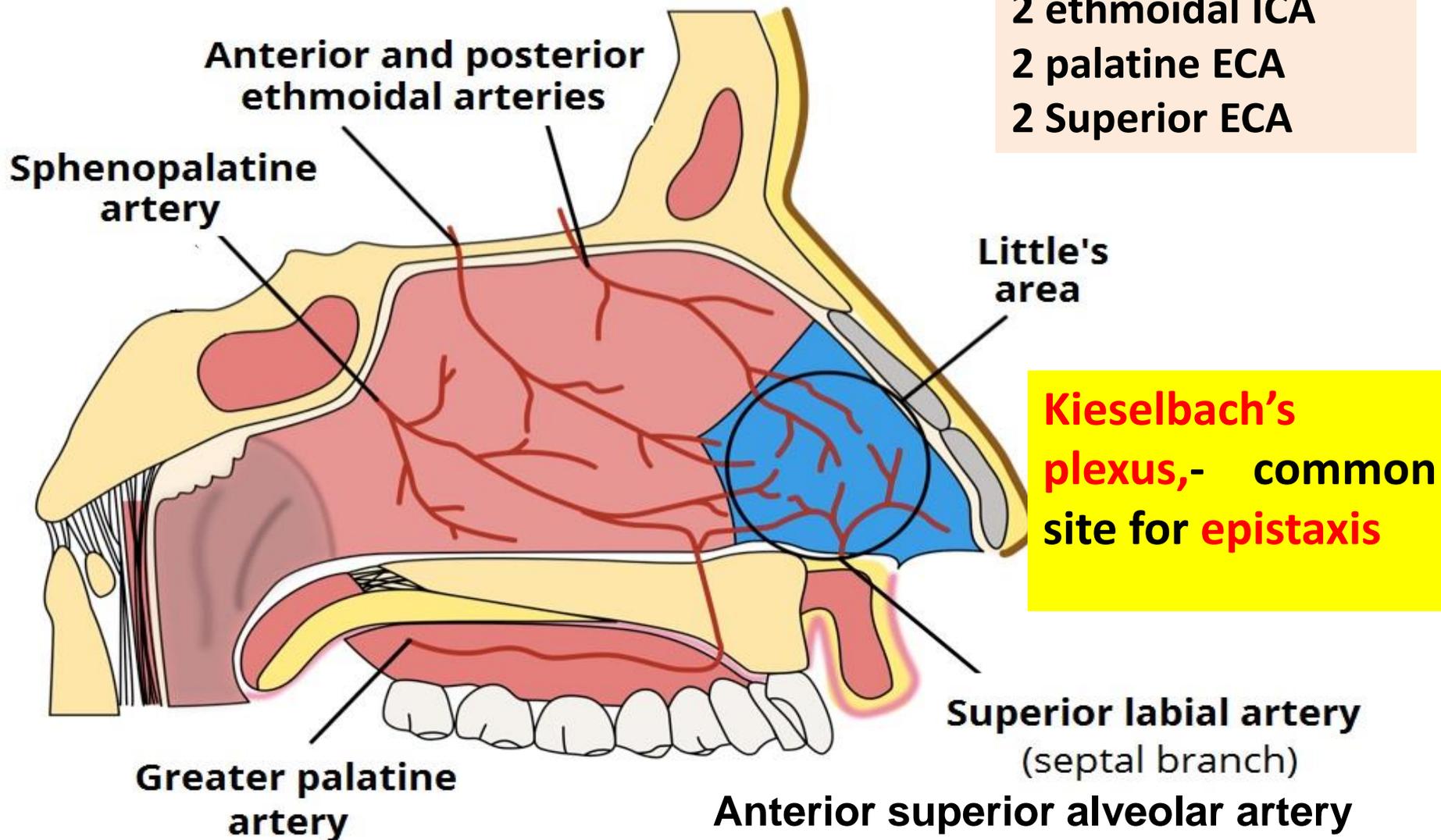
**B- Nerve supplies of the nasal septum:**

1- Anterior ethmoidal nerve.

2- Nasopalatine nerve (Sphenopalatine).

**C- Olfactory (1<sup>st</sup> cranial nerve) nerves** carry smell sensation from the roof and upper part.

# Arterial blood supply of the nose 14



## A- Arterial supply of the nose:

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- 1- **Sphenopalatine** artery: from the 3<sup>rd</sup> of maxillary artery (main source of blood supply).
- 2- **Greater palatine** from the 3<sup>rd</sup> of maxillary artery,
- 3- **Anterior and posterior ethmoidal** from ophthalmic artery.
- 4- **Septal branch** of the **superior** labial artery (facial artery).
- 5- **Anterior superior alveolar artery** (from infra orbital artery) 3<sup>rd</sup> part of maxillary artery.

## B- Venous drainage

The veins drain into the pterygoid and pharyngeal venous plexus and facial vein.

### ▪ Lymphatic drainage

- **Anterior Part:** drains into the submandibular lymph nodes.
- **Posterior Part:** drains into the retropharyngeal and upper deep cervical lymph nodes.

## ▪ Applied anatomy,

- **Little's area** is an area on the inferior and anterior part of the **nasal septum** showing rich arterial anastomosis (**Kieselbach's plexus**). This anastomosis is formed by;
  - 1) Spheno-palatine artery.
  - 2) Greater palatine artery.
  - 3) Anterior and posterior ethmoidal arteries.
  - 4) Septal branch of superior labial artery.
- This area is a common site for **epistaxis** (bleeding from the nose).
- **To stop the bleeding:**
  - a- Nasal pack soaked with adrenaline in the vestibule.
  - b- Cauterization of the bleeding arteries.
  - c- Ligation of the 3<sup>rd</sup> part of the maxillary artery.
  - d-sit down and firmly pinch the soft part of the nose for 10-15 min  
, not lean backward because blood drains to throat

- Anastomosis between ECS & ICA in the lateral wall of the nose

1- **Anterior and posterior ethmoidal** from ophthalmic artery (*internal carotid artery*).

2- **Sphenopalatine** artery: from the 3<sup>rd</sup> of maxillary artery (main source of blood supply). (*external carotid artery*)

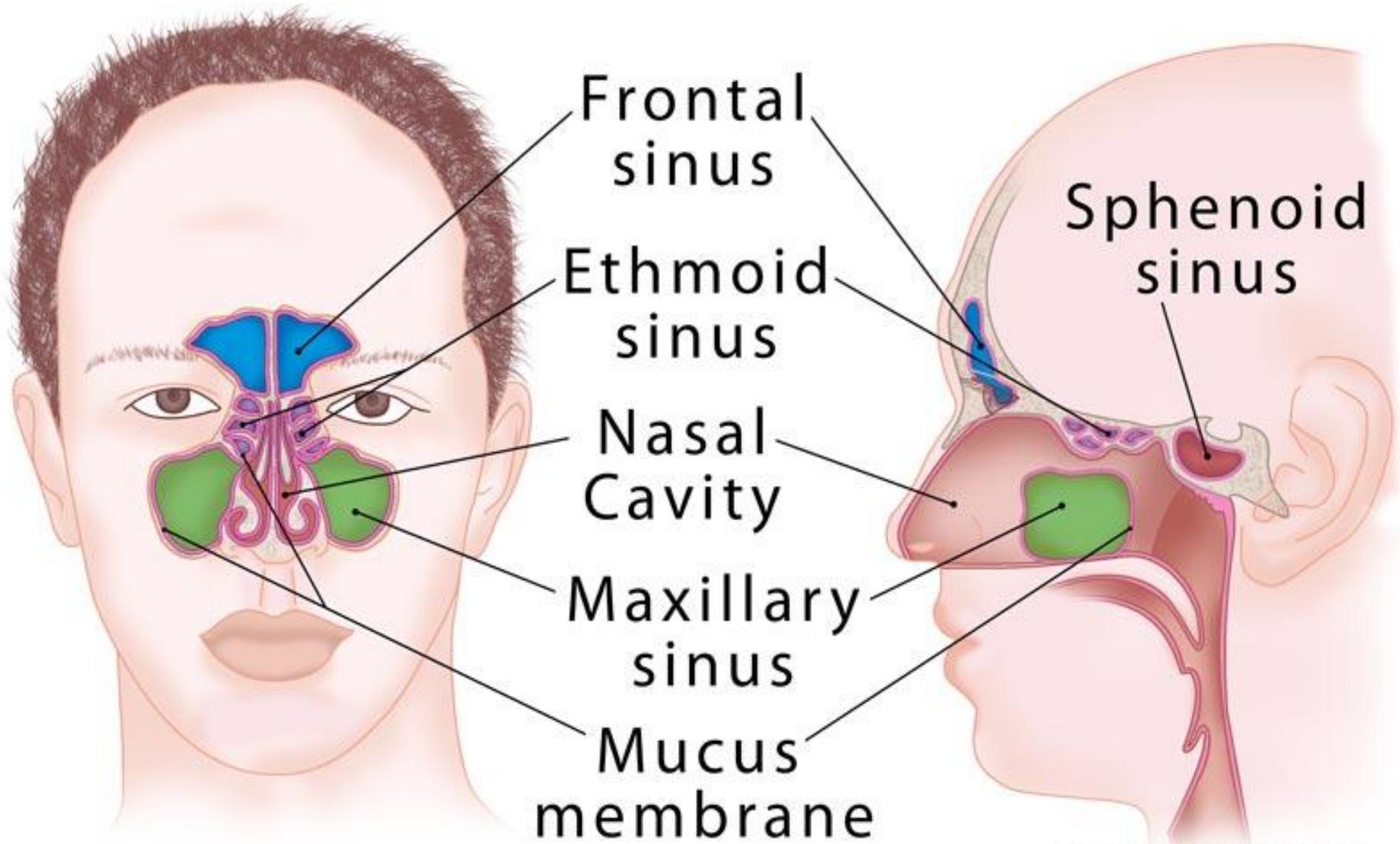
3- **Greater palatine** branch of the 3<sup>rd</sup> of maxillary artery, (*external carotid artery*)

4- **Septal branch of the superior labial artery** (facial artery). (*external carotid artery*)

5- **Anterior superior alveolar artery** (from infra orbital artery) 3<sup>rd</sup> part of maxillary artery . (max. A *external carotid artery*)

# 4 Paranasal Sinuses

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## ▪ **Paranasal sinuses**

- They are air filled spaces inside the skull bones related to the nose and opens in the lateral wall of the nasal cavity.

### ▪ **Functions:**

- 1) Lighten the weight of the skull.
- 2) Gives resonance to the voice.
- 3) Warming and humidification of inspired air.

### ▪ **Development**

- **Maxillary sinus** is the first to develop prenatal then, enlarge after birth, complete development at 6 -12 years
- **Sphenoid & ethmoid sinuses** , enlarge after birth and may not be significant size until 3-7 years and complete in adolescence
- **Frontal sinus** is the last one to develop (absent at birth) may not be significant size until adolescence and complete during puberty

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# Paranasal sinuses

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frontal sinus

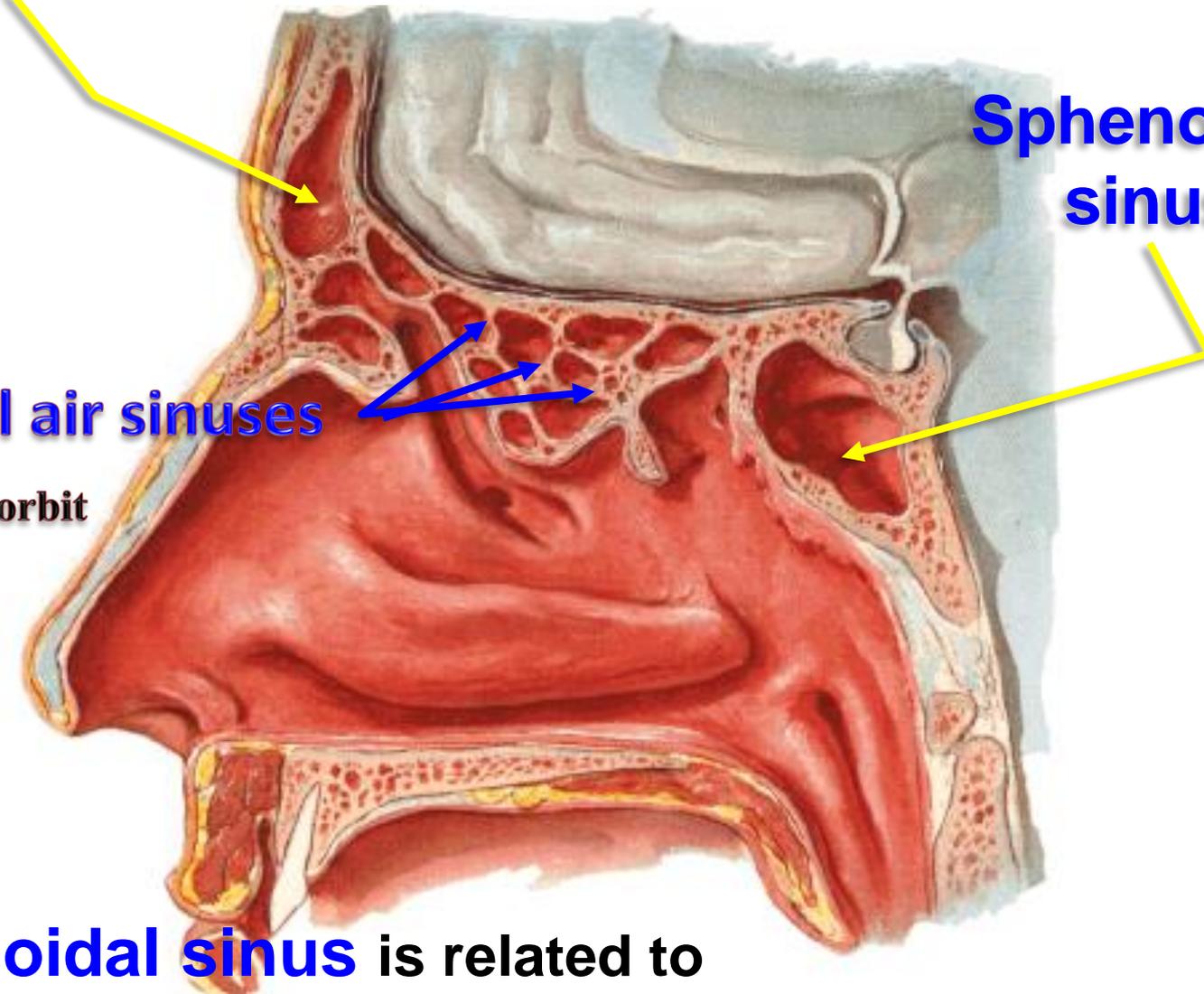
Sphenoidal sinus

Ethmoidal air sinuses

Between nose & orbit

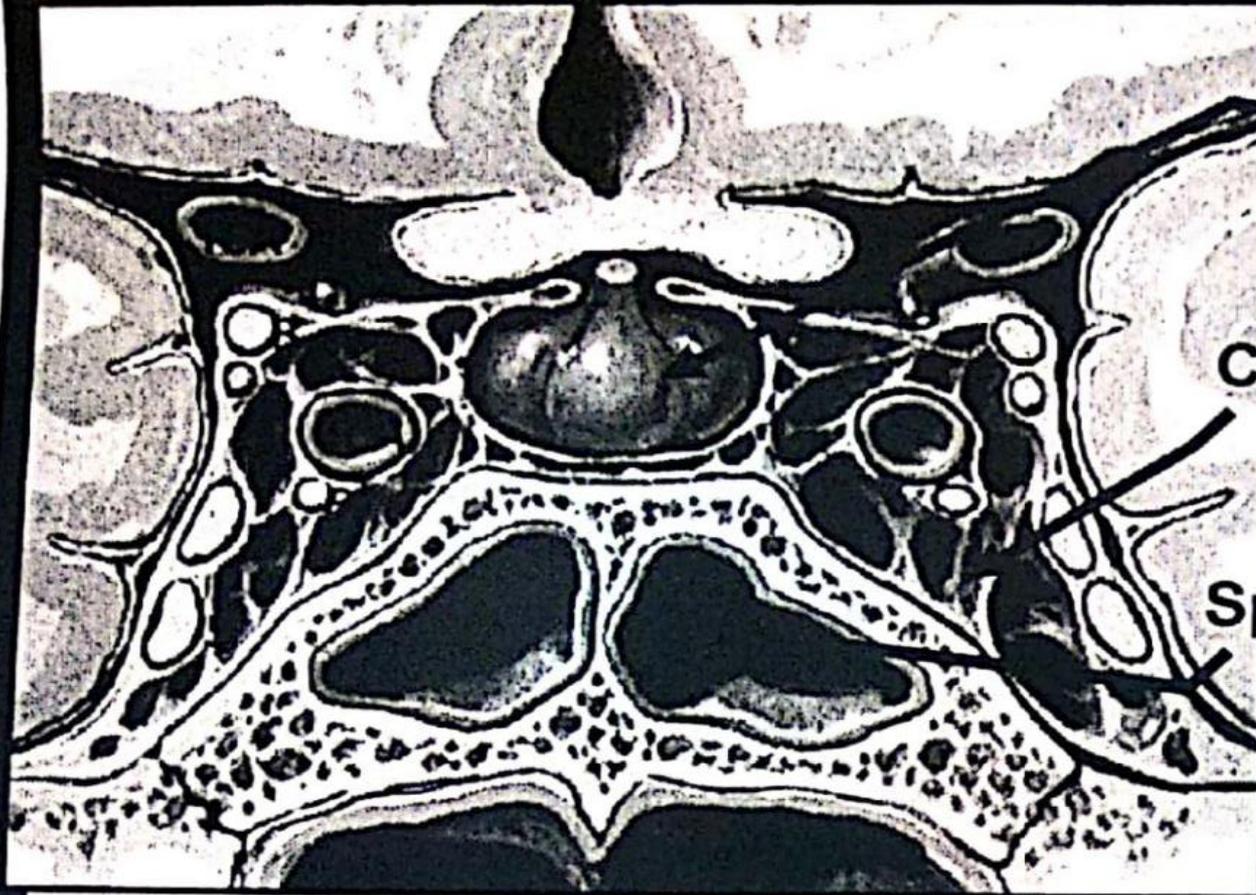
- Anterior
- Middle
- Posterior

- ❖ **Sphenoidal sinus** is related to
  - Pituitary gland (above)
  - Cavernous sinus (on each side)



# Paranasal sinuses

	<b>Frontal</b>	<b>Sphenoidal</b>	<b>Ethmoidal</b>	<b>Maxillary</b>
<b>Site</b>	<b>frontal bone</b>	<b>body sphenoid</b>	<b>ethmoid bone</b>	<b>maxilla</b>
<b>Opening</b>	<b>hiatus semilunaris of middle meatus</b>	<b>spheno-ethmoidal recess</b>	<ul style="list-style-type: none"> <li>- <b>Posterior into superior meatus.</b></li> <li>- <b>Middle into bulla ethmoidalis</b></li> <li>- <b>Anterior into hiatus semilunaris</b></li> </ul>	<b>hiatus semilunaris of middle meatus</b>
<b>Nerve &amp; blood vessels</b>	<b>supratrochlear and supraorbital (ophthalmic N&amp;VS)</b>	<b>posterior ethmoidal</b>	<ul style="list-style-type: none"> <li>a- <b>posterior by posterior ethmoidal</b></li> <li>b- <b>Anterior and middle by anterior ethmoidal</b></li> </ul>	<b>Post, midd, ant. superior alveolar N&amp;VS</b>
<b>Lymph nodes</b>	<b>submandibular</b>	<b>Retro-pharyngeal</b>	<ul style="list-style-type: none"> <li>a- <b>posterior into retropharyngeal</b></li> <li>b- <b>Anterior &amp; middle into submandibular</b></li> </ul>	<b>submandibular</b>



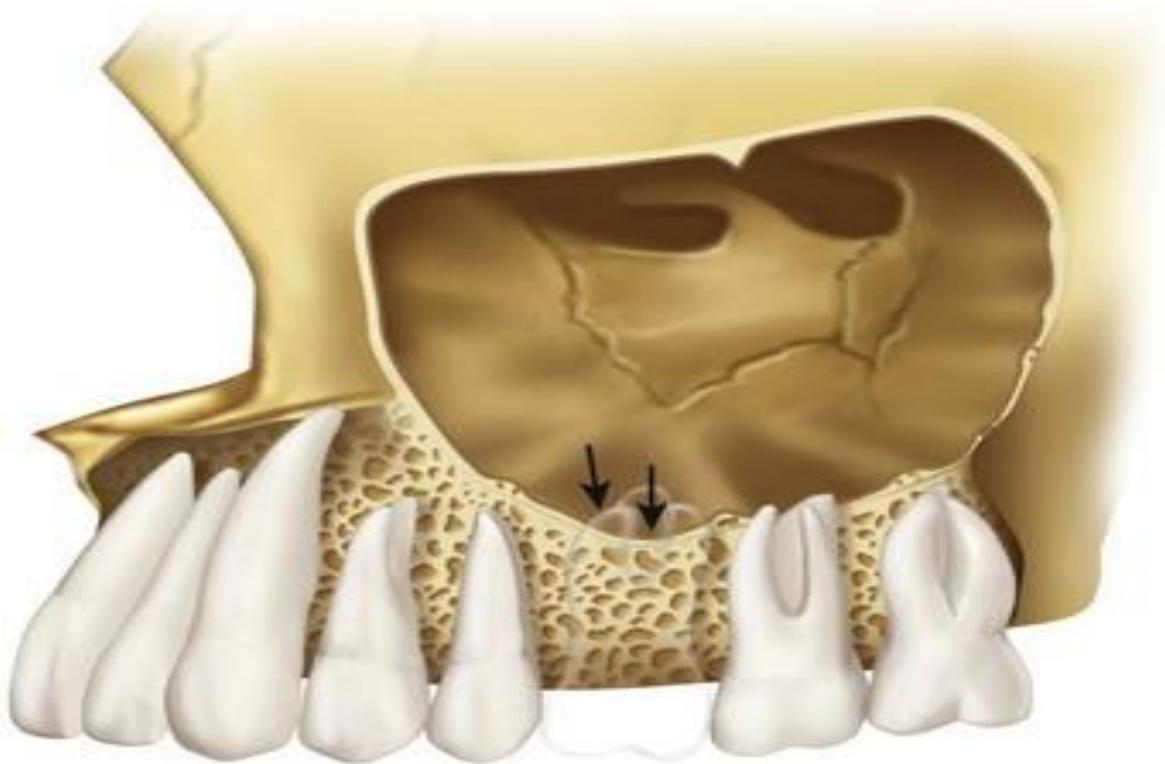
Pituitary  
gland

Cavernous  
sinus

Sphenoidal  
sinus

- ❖ Sphenoidal sinus is related to
  - Pituitary gland (above)
  - Cavernous sinus (on each side)

# Maxillary sinus



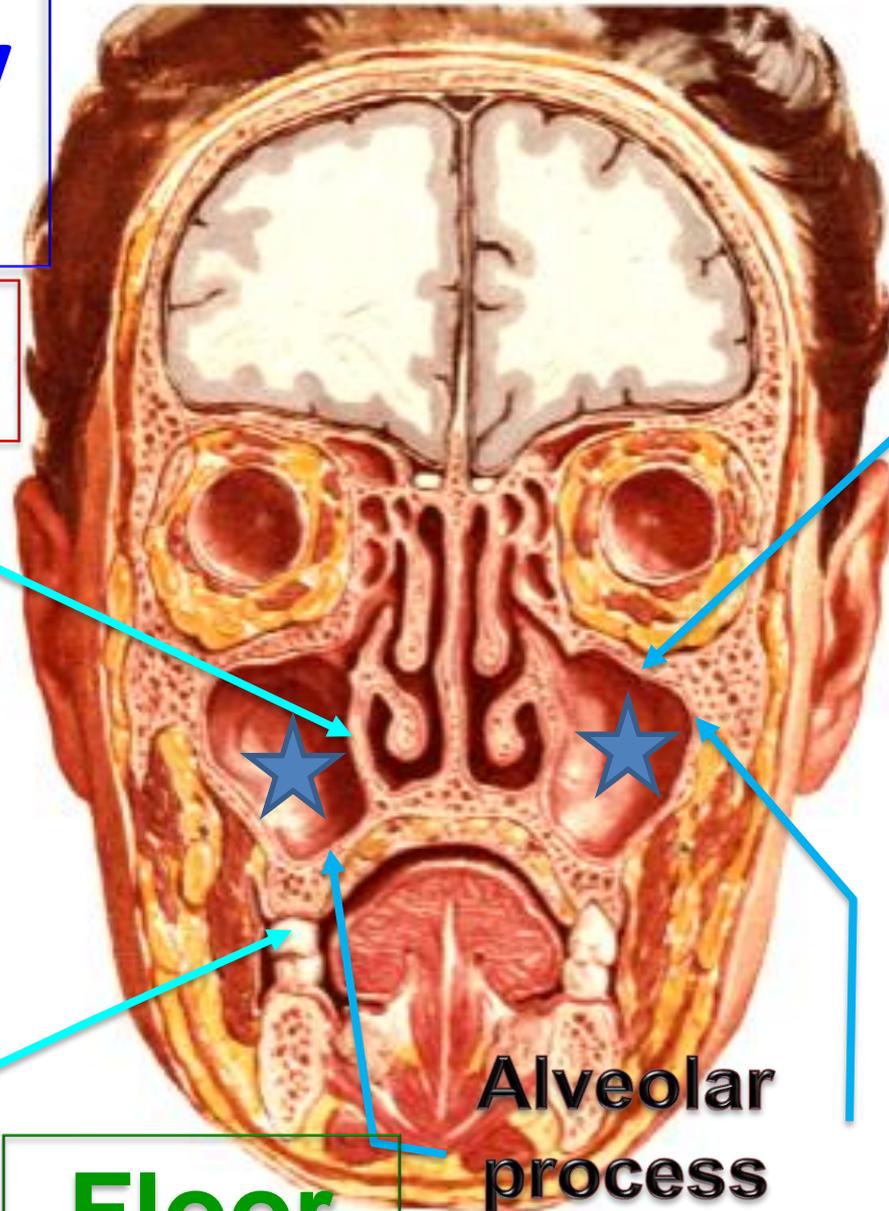
**Maxillary sinus**

**Base**

The lateral wall of the nasal cavity

Roots of upper teeth

**Floor**



**Roof**

The floor of the orbit

**Apex**

Zygomatic process of maxilla

Alveolar process of maxilla

## ▪ Maxillary sinus

- **Shape** pyramidal in shape

- **Relations:**

**(1) Apex:** directed laterally and lies at the zygomatic process of maxilla.

**(2) Base:** directed medially and formed by the lateral wall of the nasal cavity and contains the opening of the sinus.

**(3) Roof:** formed by the floor of the orbit. The roof is traversed by the infra orbital canal containing infra-orbital nerve and vessel.

**(4) Floor:** formed by the alveolar process of maxilla (Roots of molar and premolar teeth).

**(5) Anterior Wall:** anterior surface of maxilla.

**(6) Posterior wall:** posterior surface of maxilla.

# Clinical notes about maxillary sinus

- **Opening of the sinus in the upper part of the base** so the higher position makes the drainage difficult leading to **sinusitis**.
- **Posterior superior alveolar nerve** supplies both-sinus and upper molar so inflammation of the sinus can be confused with **toothache(REFERRED PAIN )**.
- **The roots of the upper molars bulge into the floor of the sinus** but not perforated. During Dental Extraction must be care to avoid fraction of the root **because** the fractured root may be driven into the maxillary sinus forming **communication** between the sinus and oral cavity.

