

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Nose, Nasal cavity, Paranasal Sinuses & Pharynx

Dr. Jamila EL medany Dr. Essam Eldin Salama

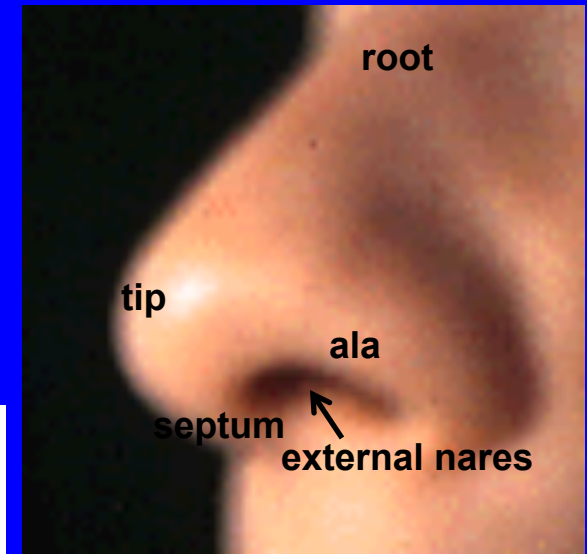
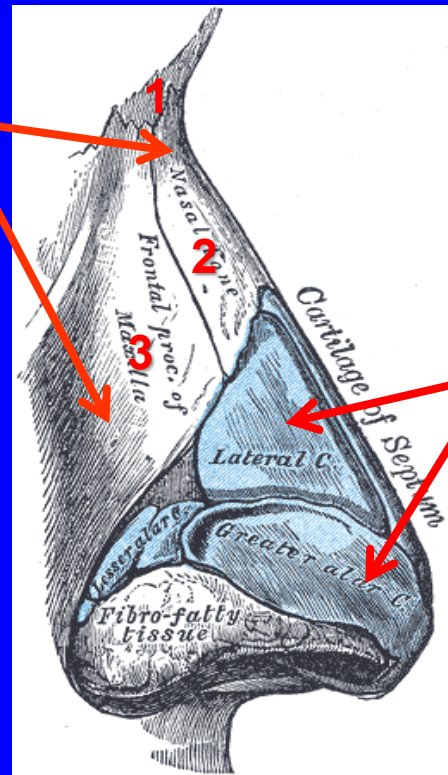
Objectives

- *At the end of the lecture, the students should be able to:*
- **Describe the boundaries of the nasal cavity.**
- **Describe the nasal conchae and meati.**
- **Demonstrate the openings in each meatus.**
- **Describe the paranasal sinuses and their functions**
- **Describe the pharynx and its parts**

Nose

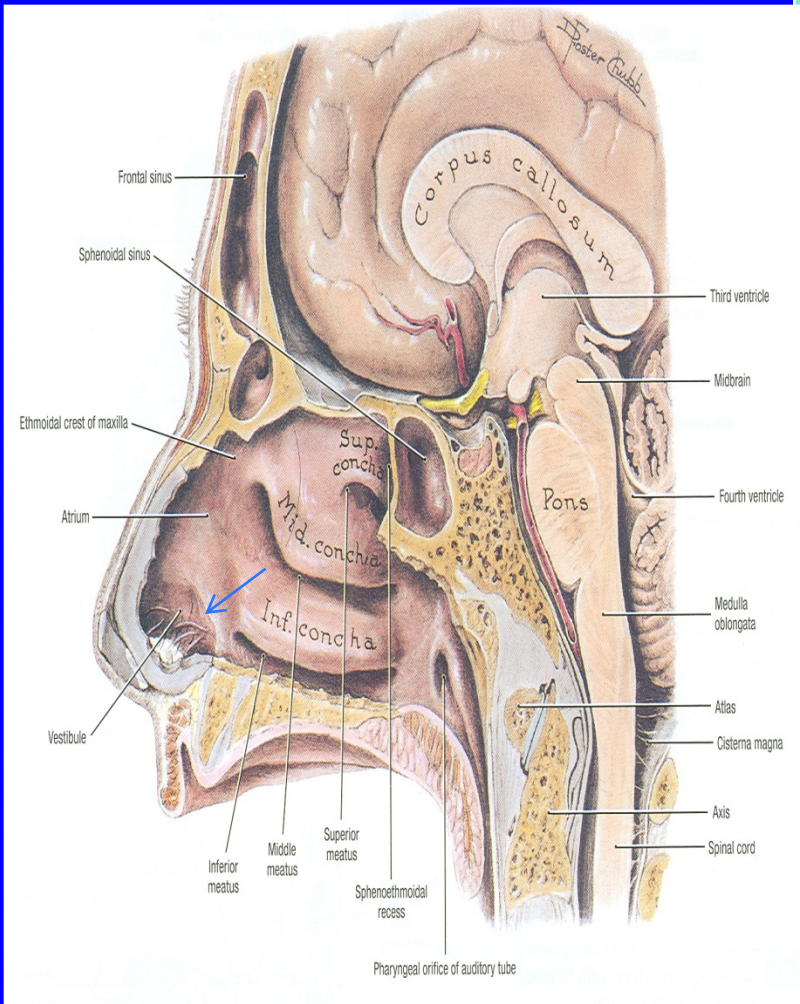
- The **external (anterior) nares** or **nostrils**, lead to the **nasal cavity**.

Formed above by:
Bony skeleton



- Formed **below** by plates of **hyaline cartilage**.

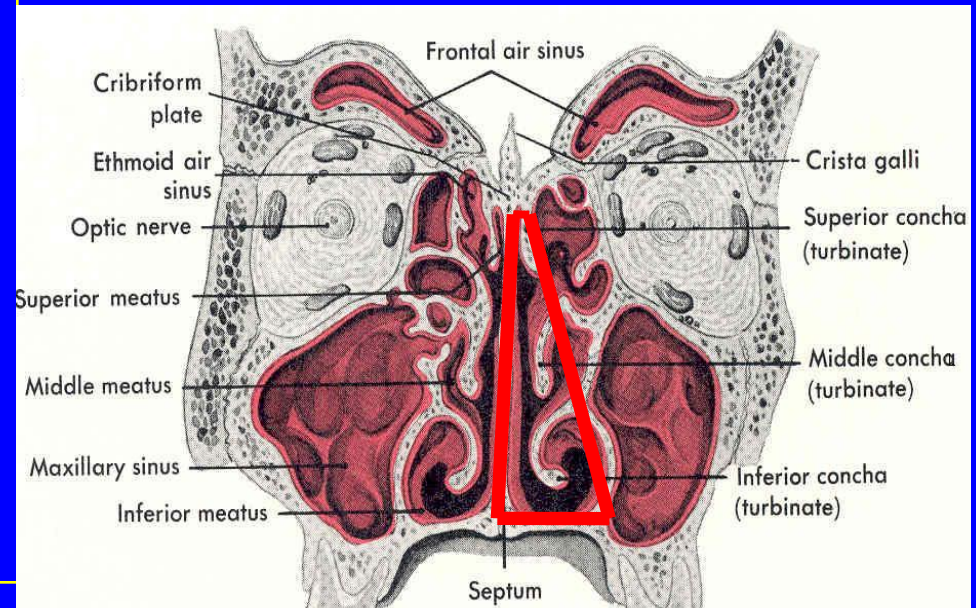
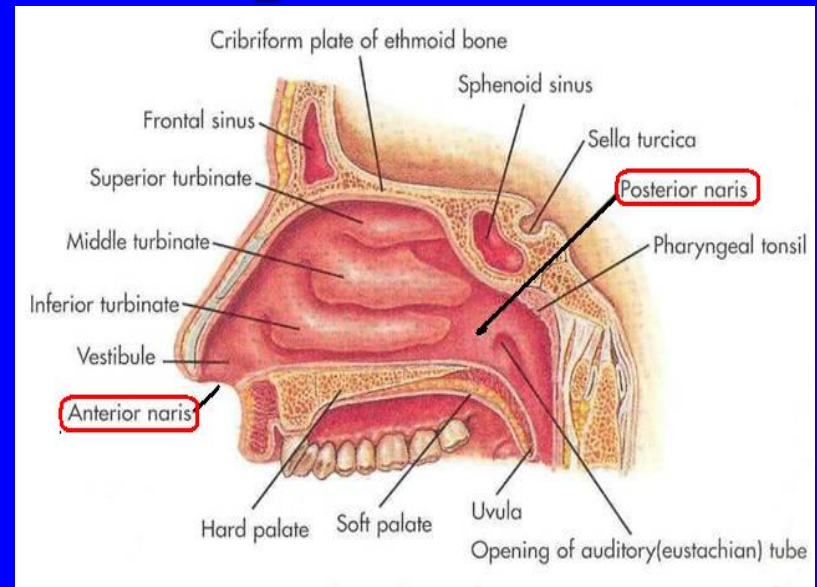
VESTIBULE

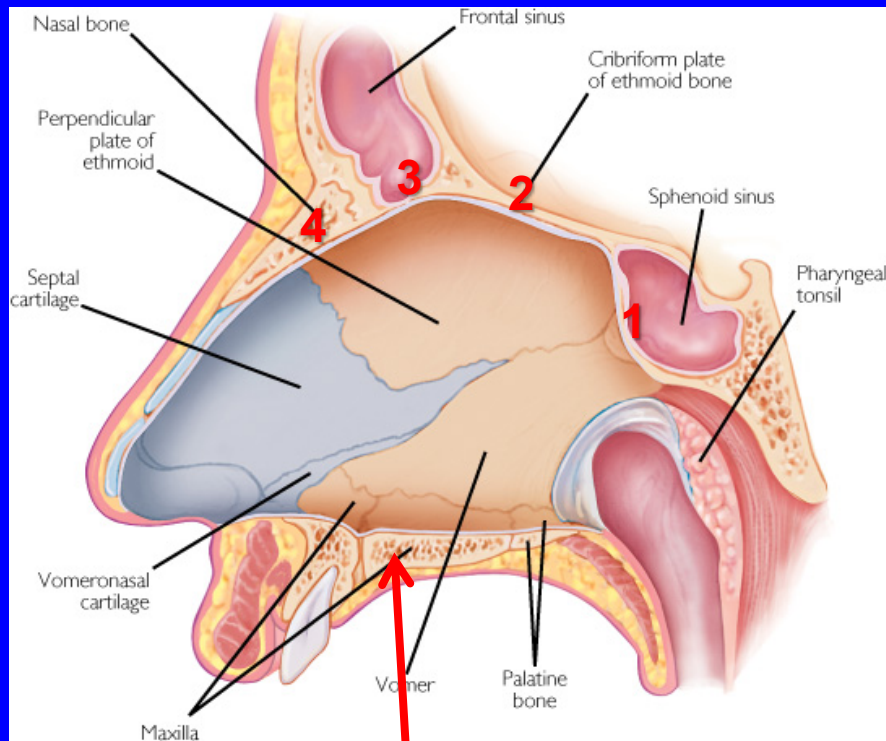


- It lies above nostrils
- Bounded laterally by ala of nose
- Lined by skin possessing short hairs
- Limited above & behind by a curved elevation “**limen nasi**”

Nasal Cavity

- Extends from the **external (anterior) nares** to the **posterior nares (choanae)**.
- Divided into right & left halves by the **nasal septum**.
- Each half has a:
 - **Roof**
 - **Lateral wall**
 - **Medial wall (septum)**
 - **Floor**





Roof

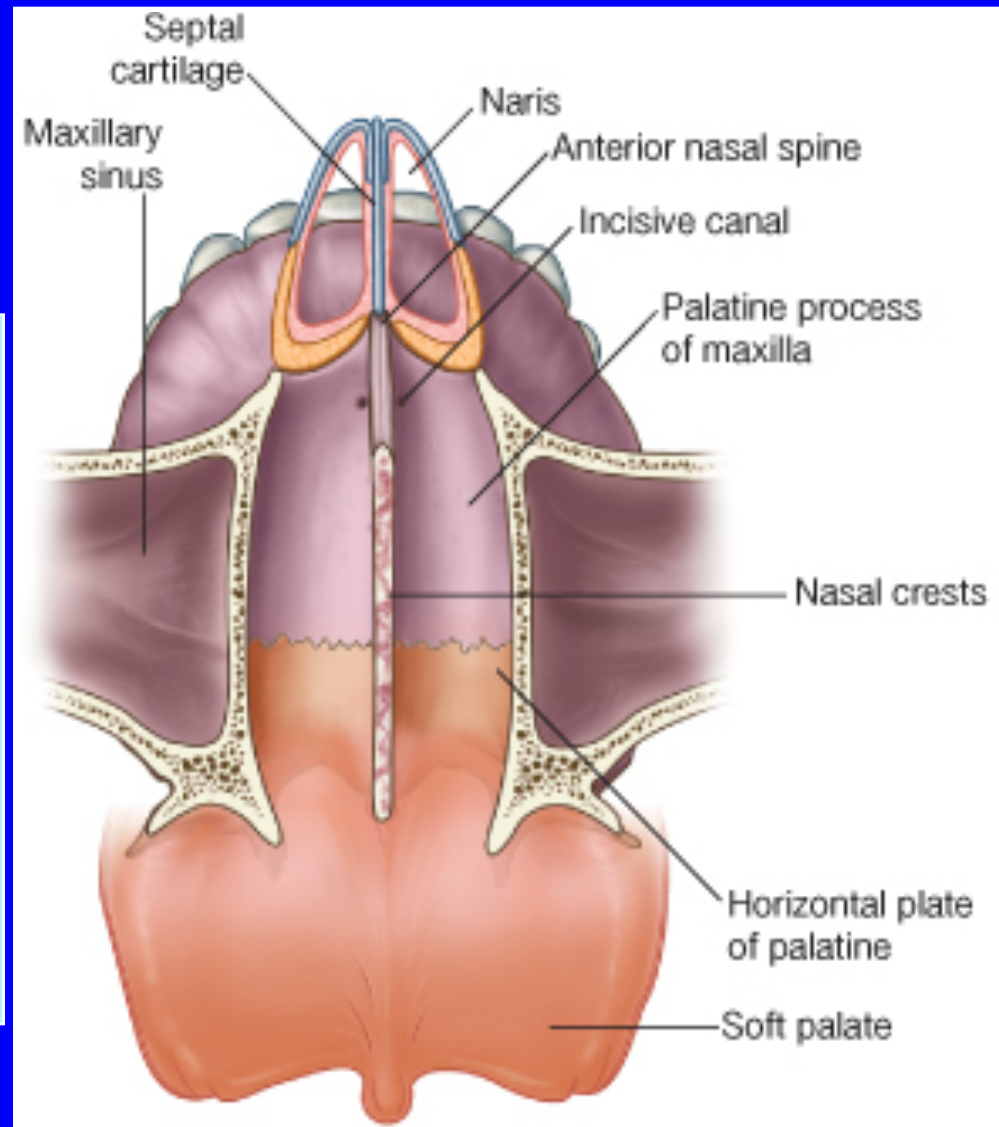
- **Narrow & formed (from behind forward) by the:**
 1. **Body of sphenoid.**
 2. **Cribriform plate of ethmoid bone.**
 3. **Frontal bone.**
 4. **Nasal bone & cartilage**

Floor

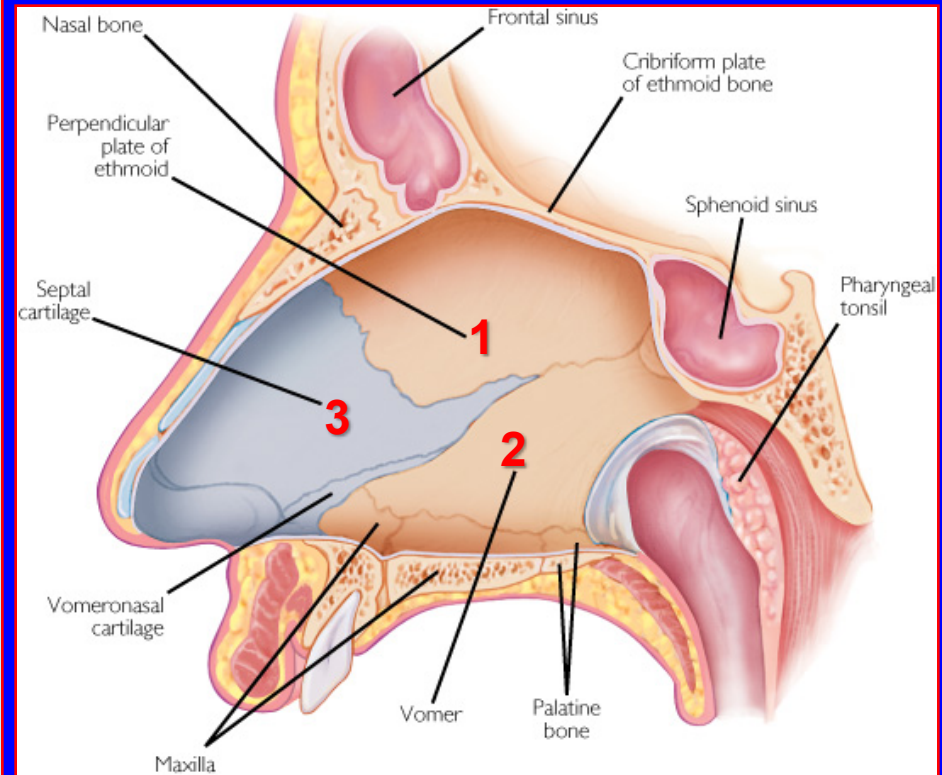
- **Separates it from the oral cavity.**
- **Formed by the **hard (bony) palate.****

Floor

- **Formed by:**
- Nasal (upper) surface of the hard (bony) palate:
- Palatine process of maxilla, **anteriorly.**
- Horizontal plate of the palatine bone, **posteriorly.**

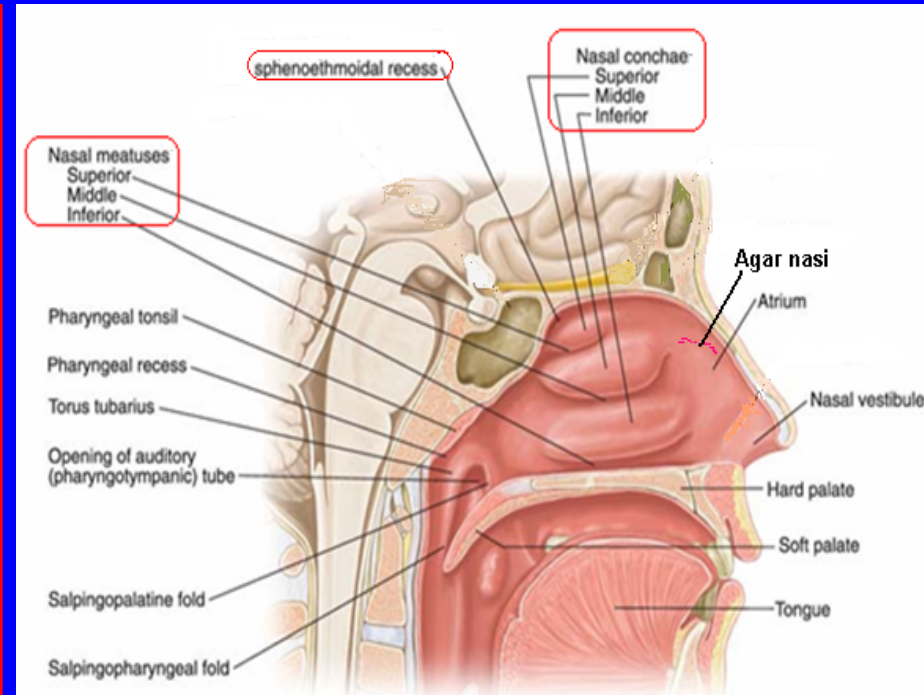


- **Medial Wall (Nasal Septum)**
- **Osteocartilaginous partition.**
- **Formed by:**
 1. **Perpendicular plate of ethmoid bone.**
 2. **Vomer.**
 3. **Septal cartilage.**



Lateral Wall

- Shows three horizontal bony projections, the **superior, middle & inferior conchae**
- The cavity below each concha is called a **meatus** and are named as **superior, middle & inferior** corresponding to the conchae.



- The small space above the superior concha is the **sphenoethmoidal recess**.

The conchae increase the surface area of the nasal cavity. The recess & meati receive the openings of the:

- **Paranasal sinuses.**
- **Nasolacrimal duct.**

Nasal mucosa

- Olfactory:

- It is delicate and contains olfactory nerve cells.

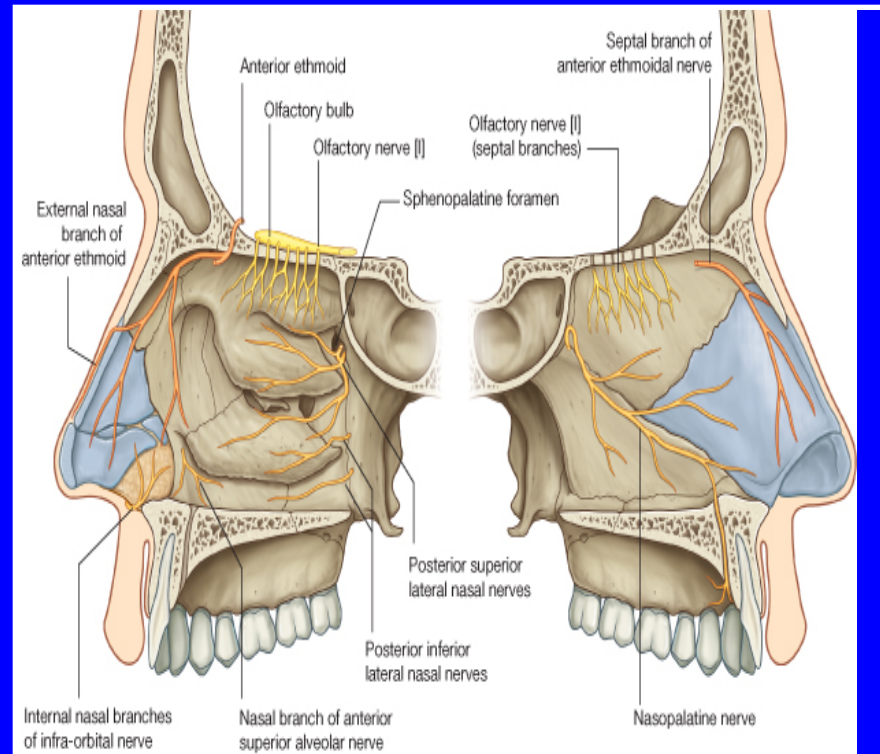
■ It is present in the upper part of nasal cavity:

■ Roof,

■ On the lateral wall,

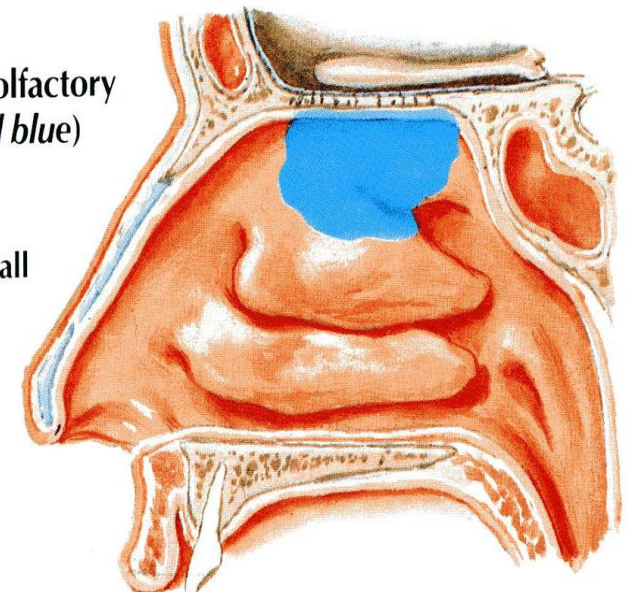
○ it lines the upper surface of the superior concha and the sphenoethmoidal recess.

○ On the medial wall, it lines the superior part of the nasal septum.

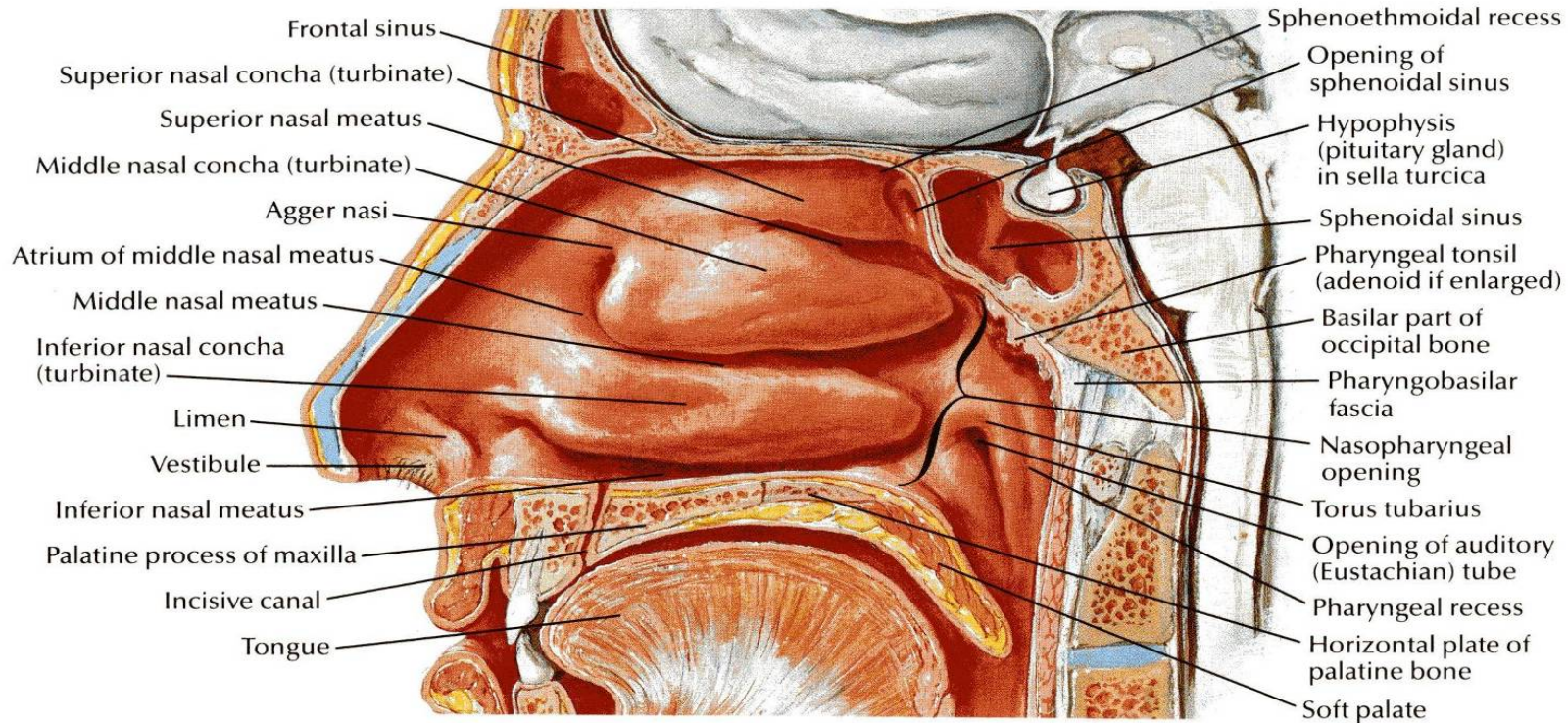


Distribution of olfactory mucosa (*shaded blue*)

Lateral nasal wall



RESPIRATORY MUCOSA



- It is **thick**, ciliated highly vascular and contains mucous glands & goblet cells
- It lines the **Lower part** of the nasal cavity.
- It functions to **moisten**, **clean** and **warm** the inspired air.
- The air is **moistened** by the secretion of numerous serous glands.
- It is **cleaned** by the removal of the dust particles by the ciliary action of the columnar ciliated epithelium that covers the mucosa.
- The air is **warmed** by a *submucous venous plexus*.
- **The Vestibule is lined by Skin.**

○ The nerves of **General Sensation** are derived from the **Ophthalmic & Maxillary** divisions of **trigeminal nerve**.

○ The **anterior part** is supplied by: **Anterior Ethmoidal nerve**.

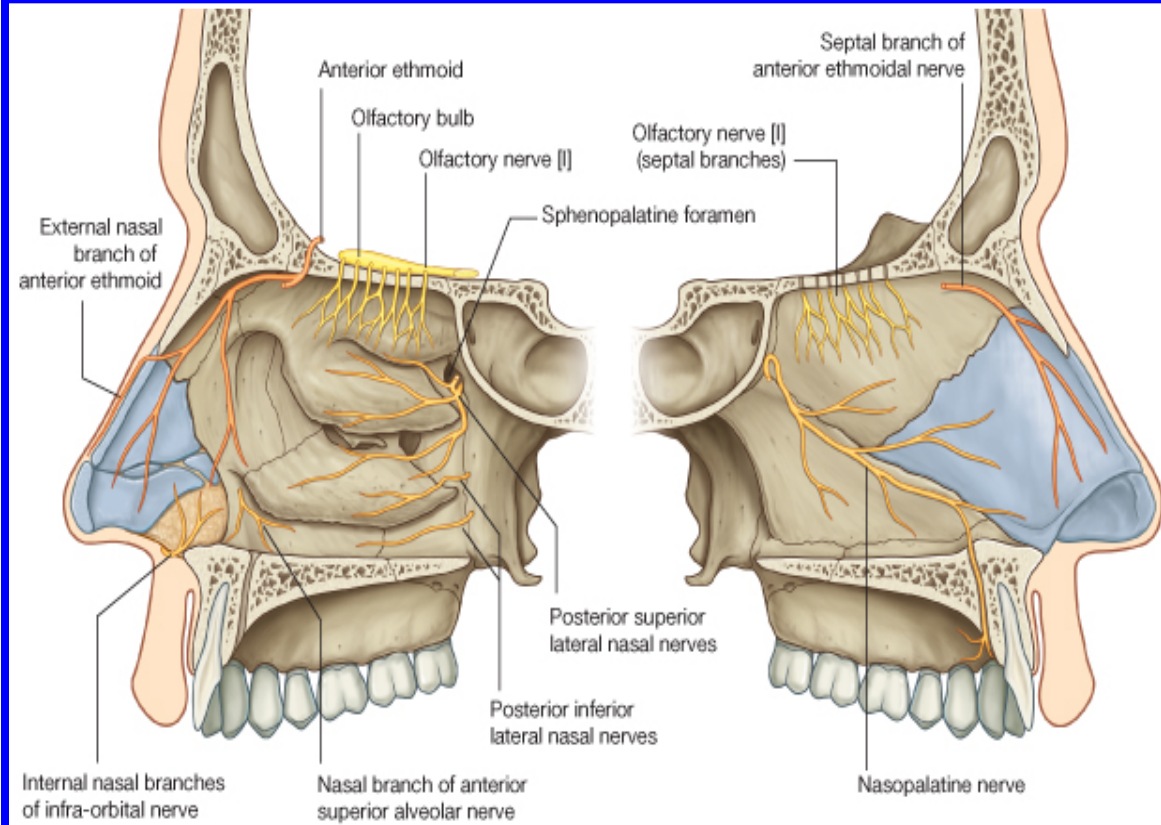
○ The **posterior part** is supplied by:

○ **1-Nasopalatine,**

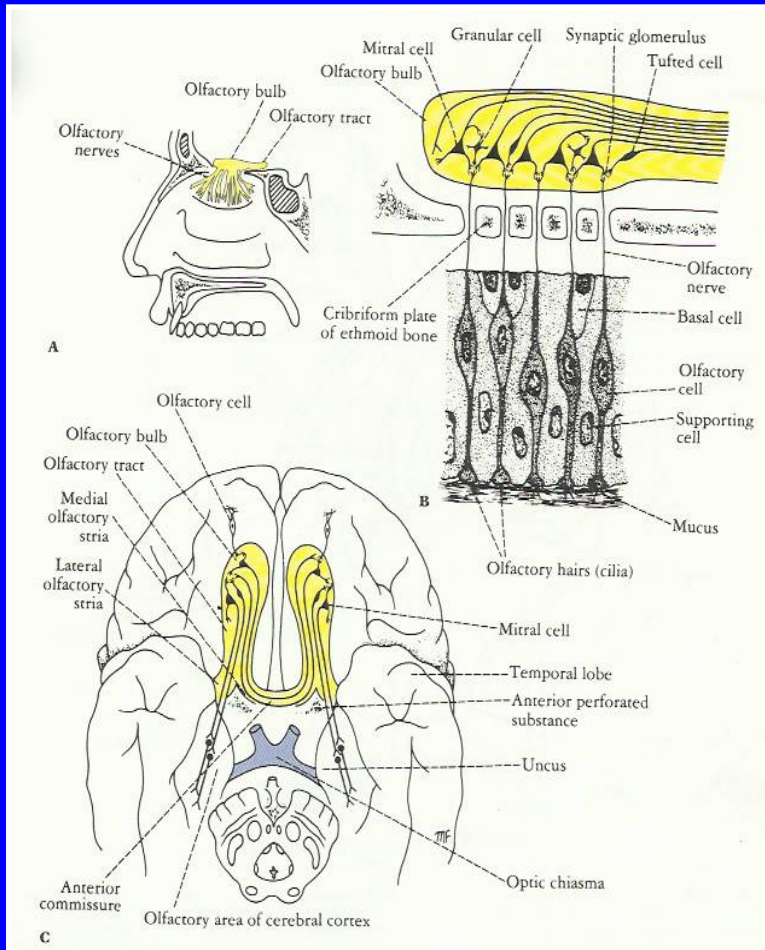
○ **2- Nasal,**

○ **3- Palatine branches** of the **pterygopalatine ganglion**.

Nerve supply



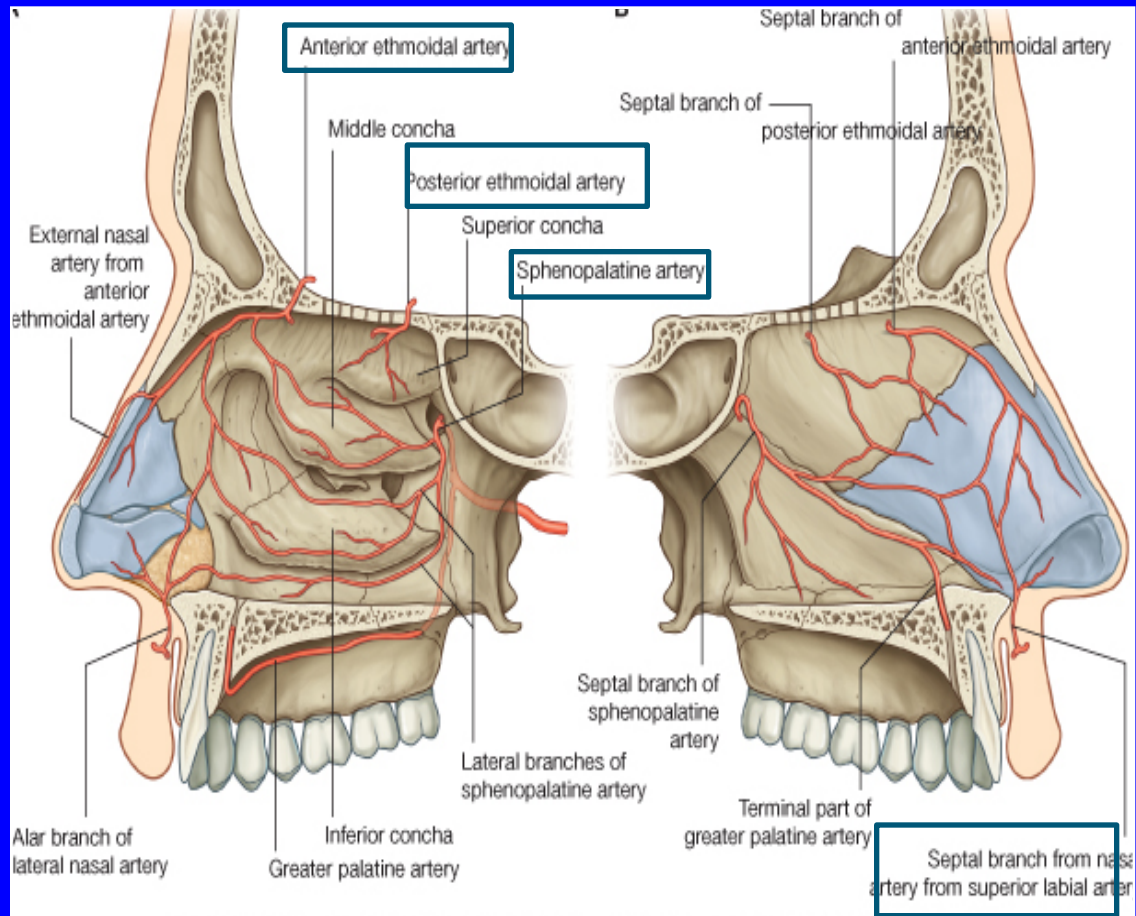
Olfactory nerve



- It is responsible for **Special sensation (Smell)**.
- Olfactory receptors are specialized, **ciliated nerve cells** that lie in the olfactory epithelium.
- The axons of these bipolar cells 12-20 fibers form the true olfactory nerves fibers.
- Which passe through the cribriform plate of ethmoid to the brain.

Arterial supply

- **Sphenopalatine artery (Maxillary)** .
- **Ethmoidal anterior and posterior (Ophthalmic)**.
- **Superior labial (Facial)**.
- **Applied anatomy :**
- **The rich arterial anastomosis on anterior & inferior part of nasal septum (Little's area) is the commonest site for Epistaxis.**

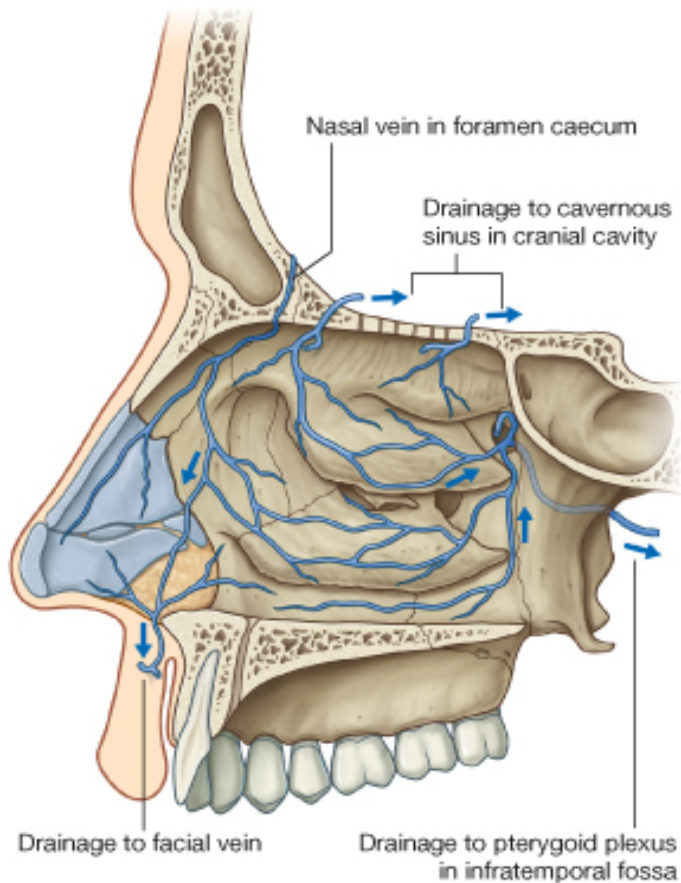


Venous drainage

○ veins accompany the corresponding arteries, they drain into **pterygoid venous plexus & cavernous sinus**.

1. **An emissary vein** passes through the foramen caecum and joins the **superior sagittal sinus**.
2. It can be a route of transmission of infection from the nasal cavity to the **cranial cavity**.

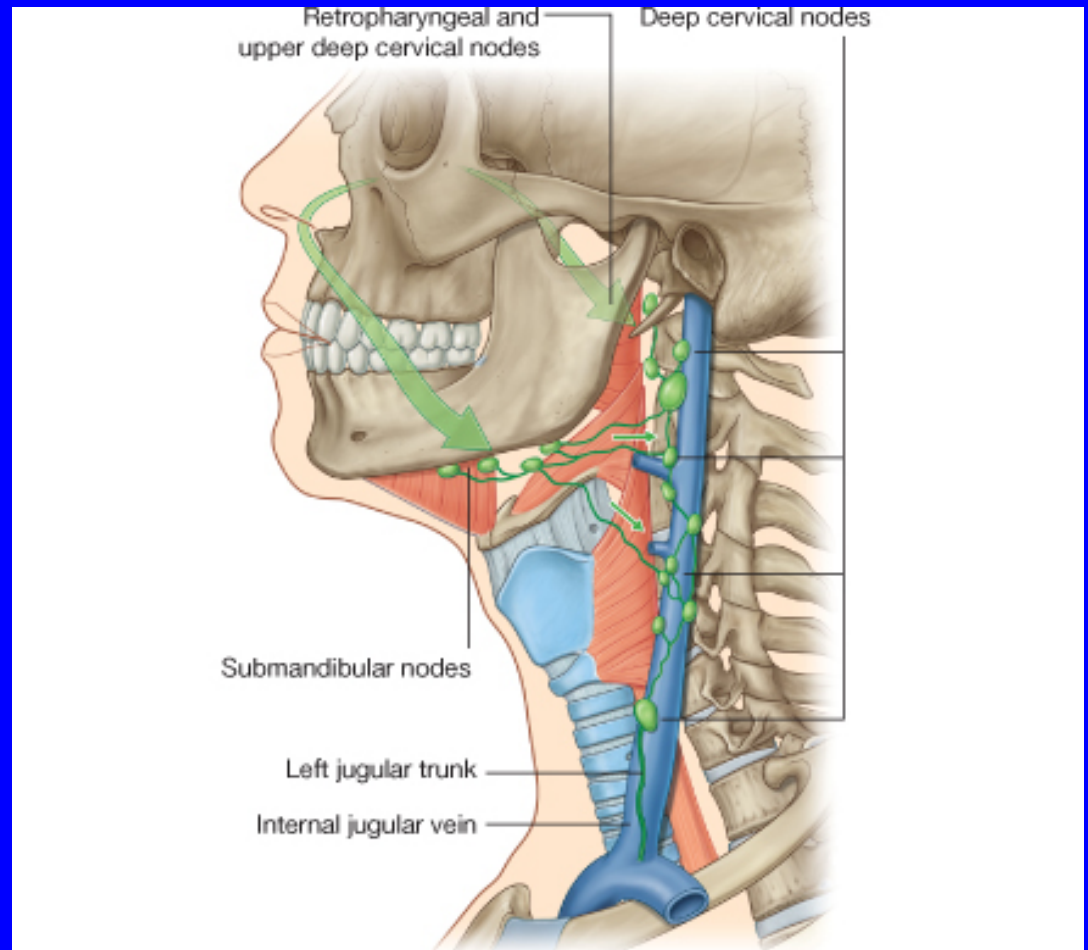
○



Lymphatic Drainage

The lymphatics
from the:

- **Vestibule** drains into the **submandibular** lymph nodes.
- **Rest of the cavity** drains into the **upper deep cervical** lymph nodes.

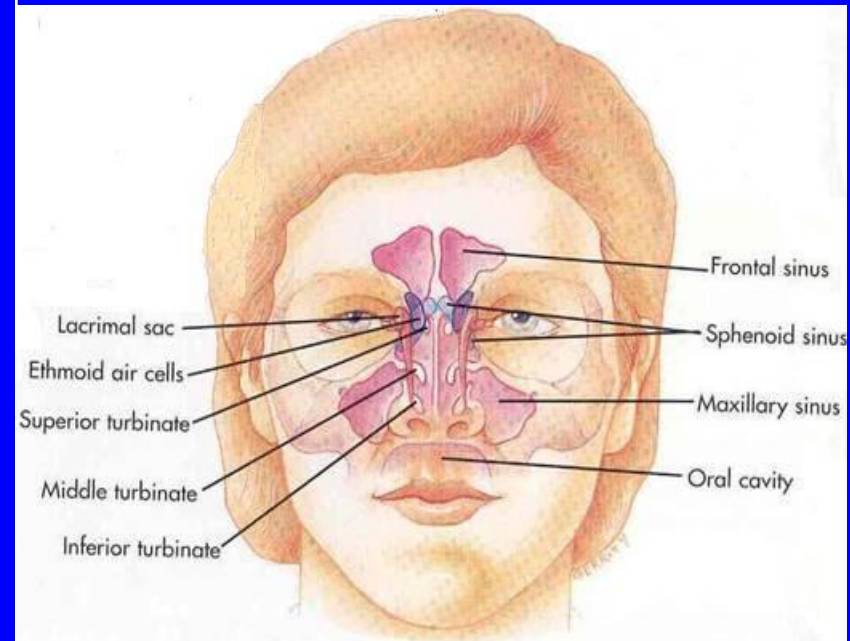


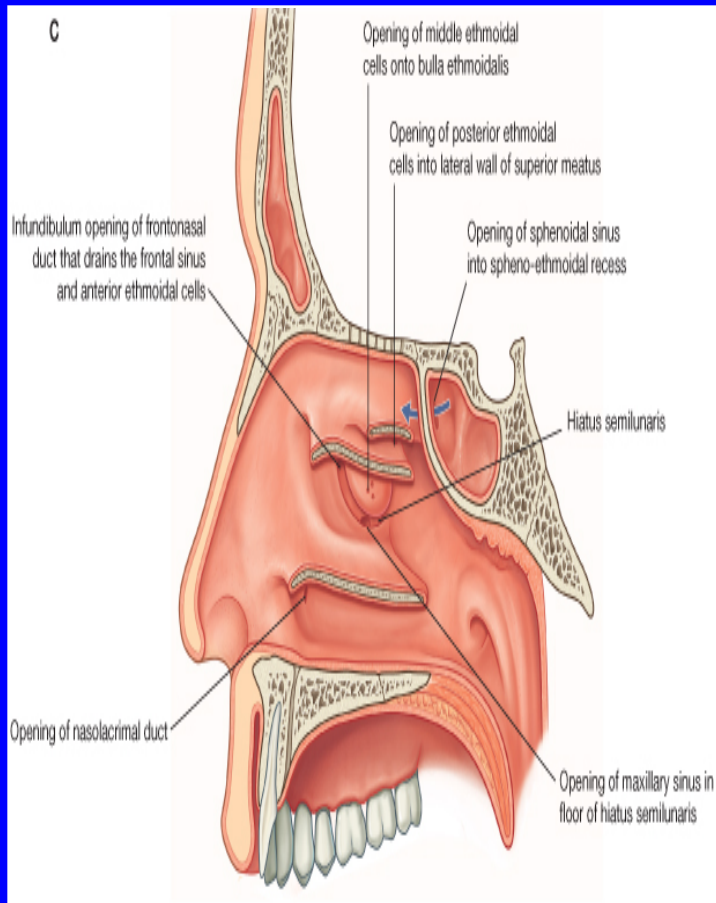
Paranasal Sinuses

- **Air filled cavities** located in the bones around the nasal cavity: **Ethmoid, Sphenoid, Frontal bones & Maxillae.**
- **Lined by respiratory mucosa** which is continuous with the mucosa of the nasal cavity.
- **Drain into the nasal cavity.**

■ Functions

- **Lighten the skull.**
- **Act as resonant chambers for speech.**
- **Air conditioning:** The respiratory mucosal lining helps in warming, cleaning and moistening the incoming air.





**Spheno
ethmoidal
recess**

sphenoidal sinus

**Superior
meatus**

posterior ethmoidal sinus

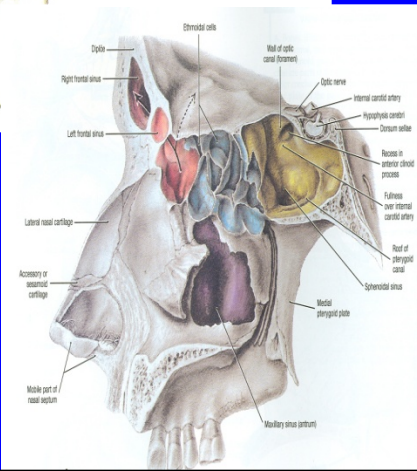
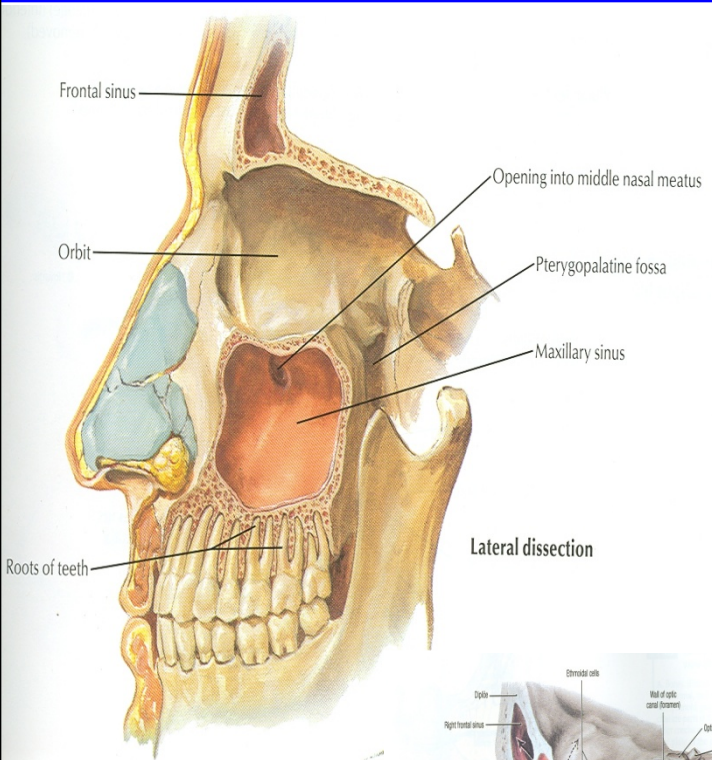
**Middle
meatus**

**middle ethmoidal,
maxillary,
frontal &
the anterior ethmoidal
sinuses**

**Inferior
meatus**

nasolacrimal duct.

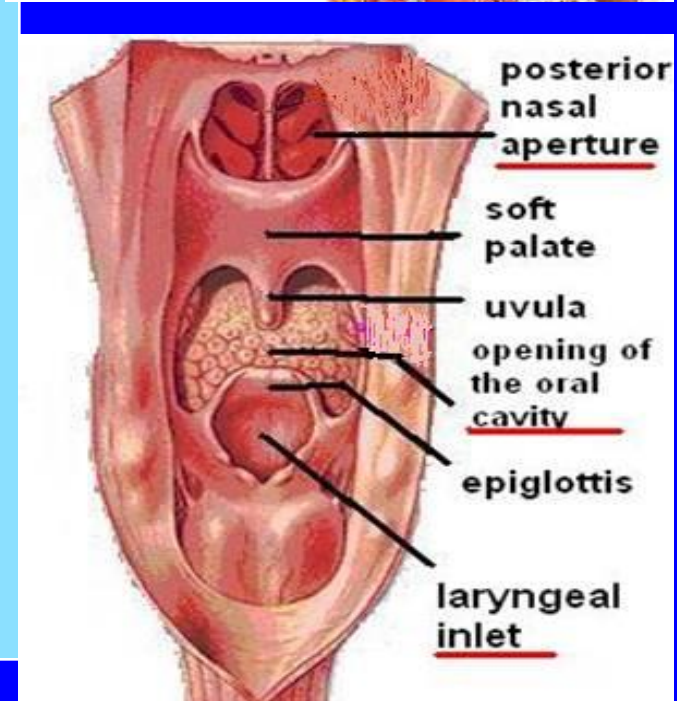
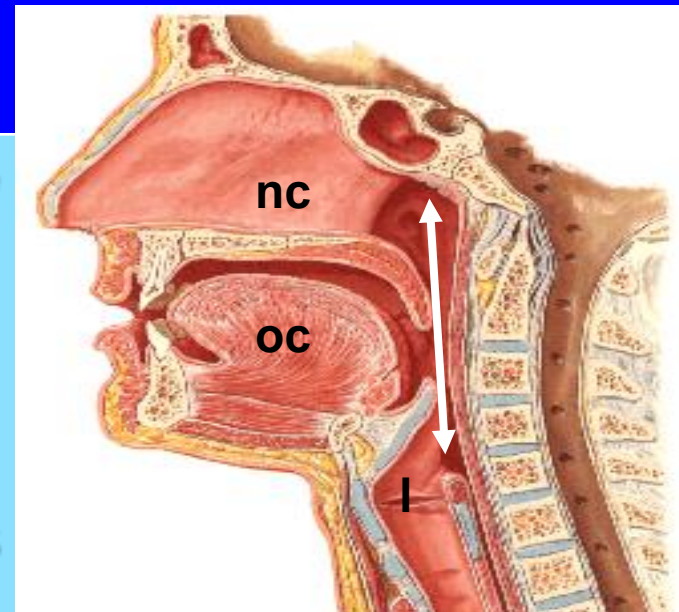
CLINICAL IMPORTANCE of Sinuses



- **Maxillary sinus:**
- **Its floor is formed by the alveolar process of maxilla.**
- **The roots of upper premolars & molars project into it.**
- **Infection of teeth can produce sinusitis or **Extraction of a tooth may result in a fistula****
- **Ethmoidal air sinus:**
- **Its infection can spread to the orbit and cause orbital cellulitis.**

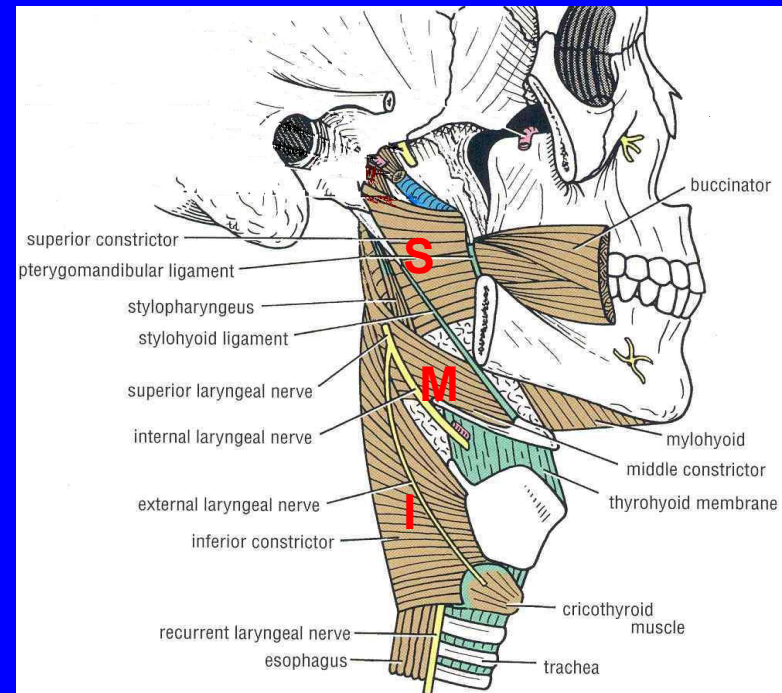
Pharynx

- Muscular tube lying behind the **nose, oral cavity & larynx**.
- Extends from the base of the skull to level of the 6th cervical vertebra, where it is continuous with the esophagus
- The anterior wall is deficient and shows (from above downward):
 - **Posterior nasal apertures.**
 - **Opening of the oral cavity.**
 - **Laryngeal inlet.**
- The muscles arranged in **circular** and **longitudinal** layers.



Circular (Constrictor) Muscles

- **Three in number:**
- **Superior constrictor,**
- **Middle constrictor &**
- **Inferior constrictor**
- **The three muscles overlap each other.**



Functions:

- Propel the bolus of food down into the esophagus.
- lower fibers of the inferior constrictor (**Cricopharygeus**) act as a sphincter, preventing the entry of air into the esophagus between the acts of swallowing.

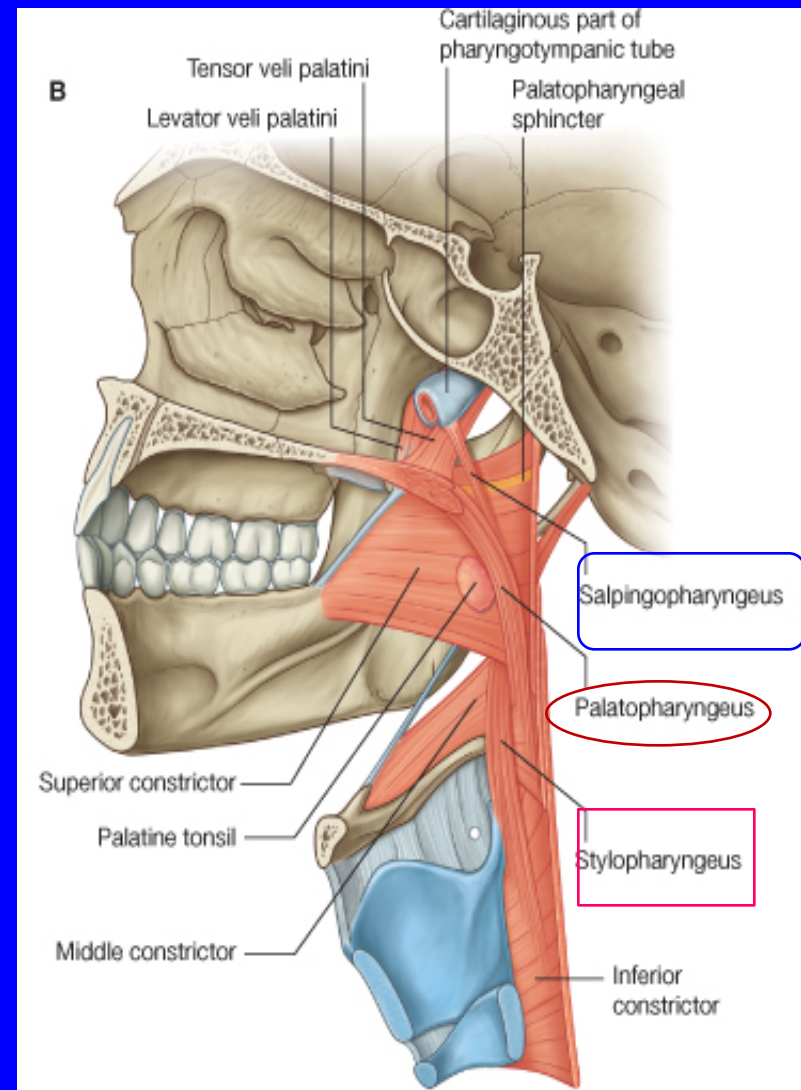
Longitudinal Muscles

- **Three in number:**

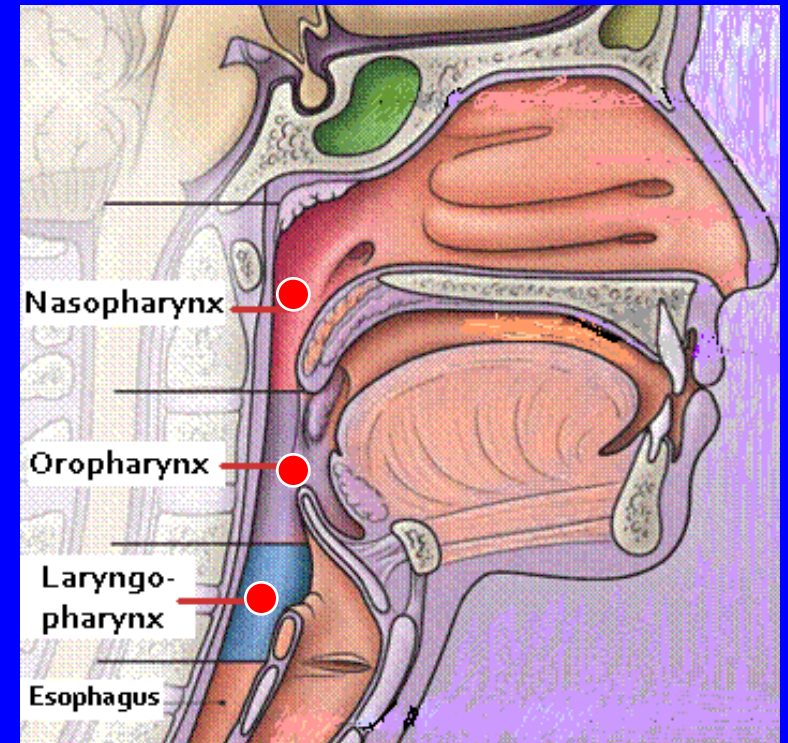
- **Stylopharyngeus**
- **Salpingopharyngeus**
- **Palatopharyngeus**

- **Function:**

- **Elevate the larynx & pharynx during swallowing**

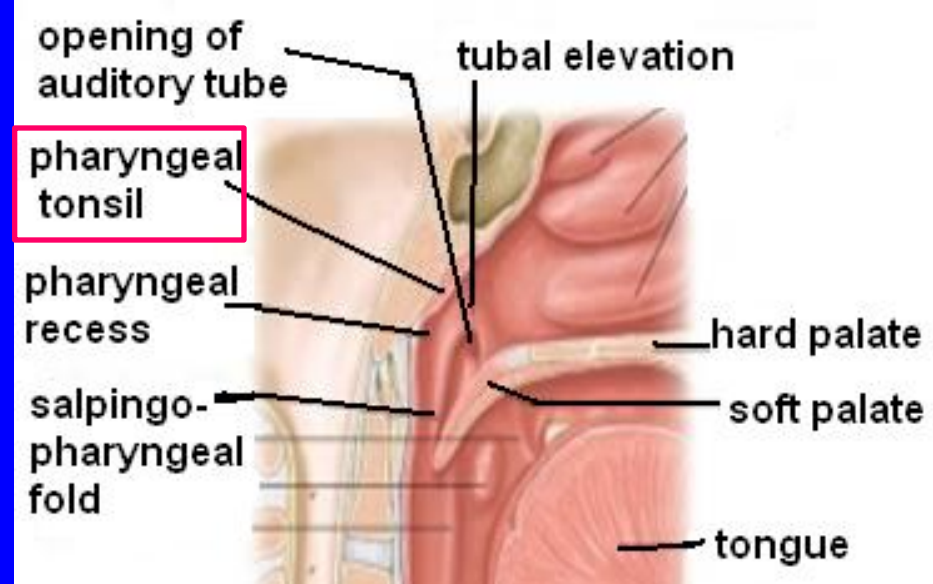
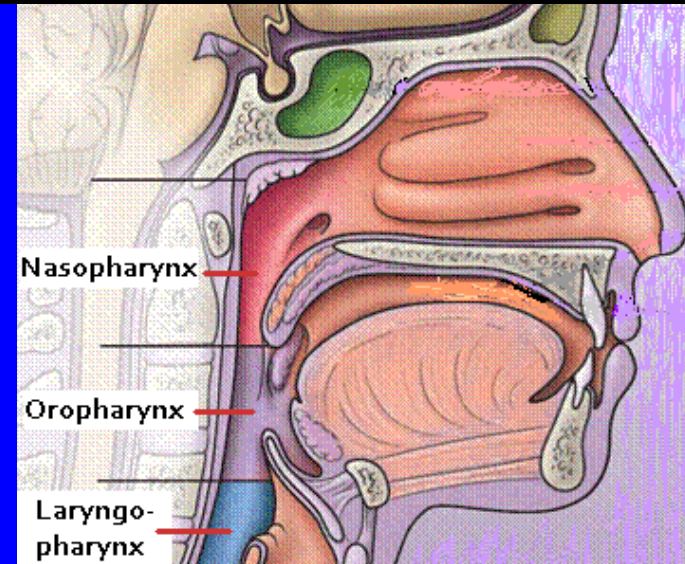


- **Pharynx is divided into three parts:**
 - **Nasopharynx.**
 - **Oropharynx.**
 - **Laryngopharynx.**



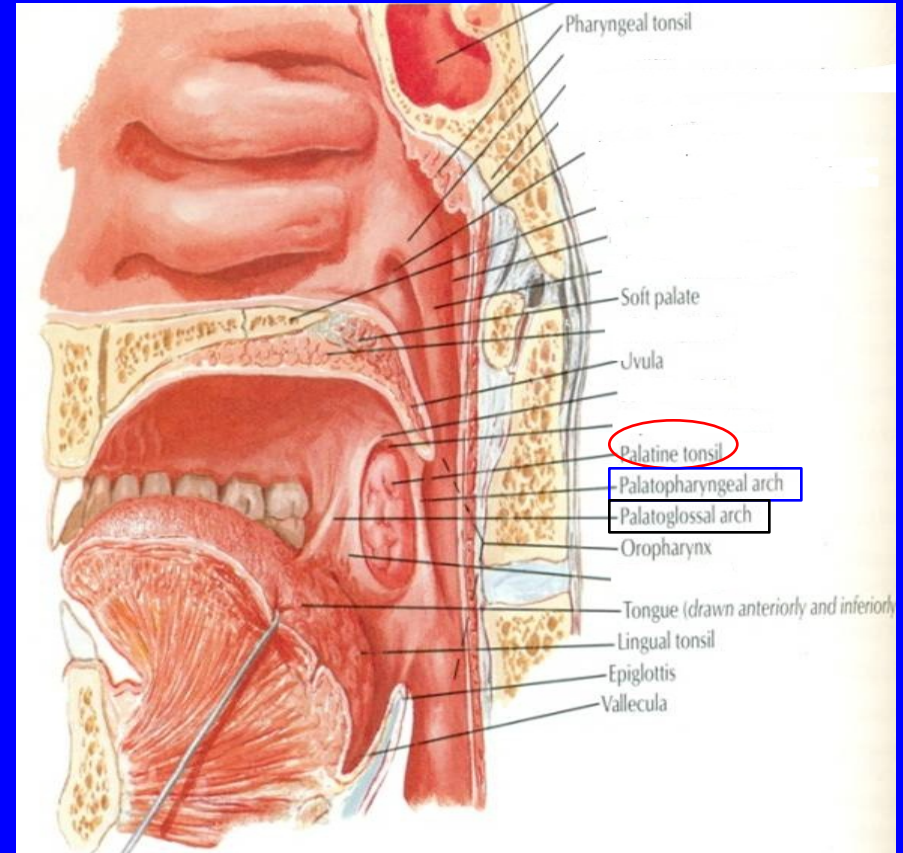
- Extends from the base of skull to the soft palate.
- communicates with the nasal cavity through **posterior nasal apertures**
- **Pharyngeal tonsils (Adenoides)** present in the submucosa covering the Roof.
- **Lateral wall shows:**
 - **Opening of auditory tube.**
 - **Tubal elevation (produced by posterior margin of the auditory tube).**
 - **Tubal tonsil.**
 - **Pharyngeal recess.**
 - **Salpingopharyngeal fold (raised by salpingo-pharyngeus muscle).**

Nasopharynx



Oropharynx

- Lies behind the mouth, communicates with the oral cavity through the **oropharyngeal isthmus**
- Extends from **soft palate** to **upper border of epiglottis**.
- **Lateral wall shows:**
 - **Palatopharyngeal fold.**
 - **Palatoglossal fold**
 - **Palatine tonsil** located between them in a depression called the '**tonsillar fossa**'.

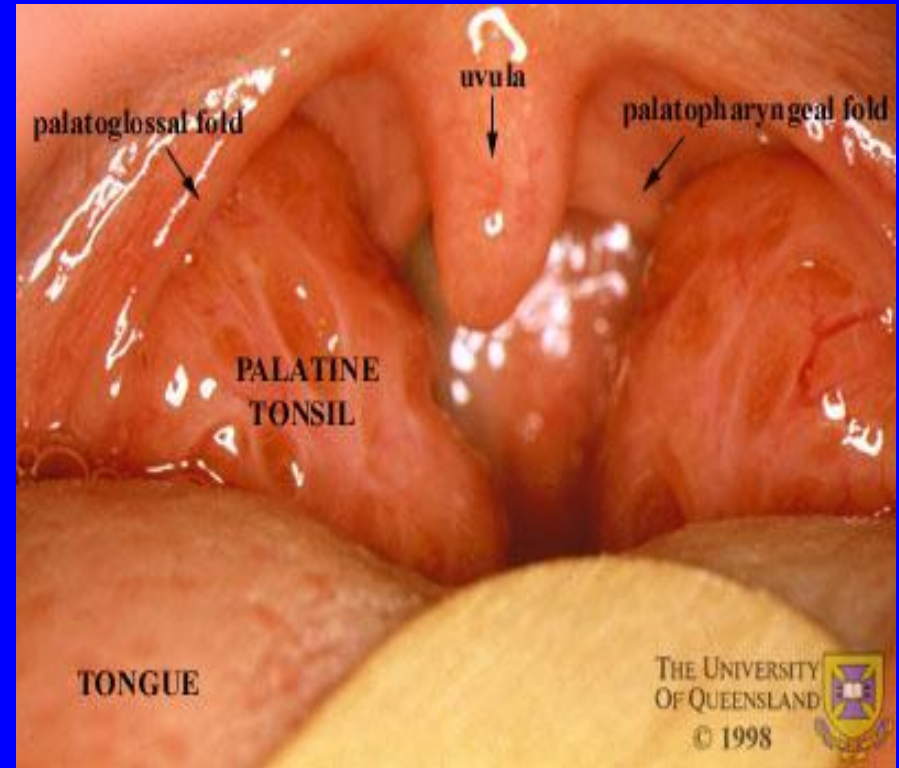


Palatine tonsils

Two masses of lymphoid tissue located in the lateral wall of the oropharynx in the tonsillar fossa.

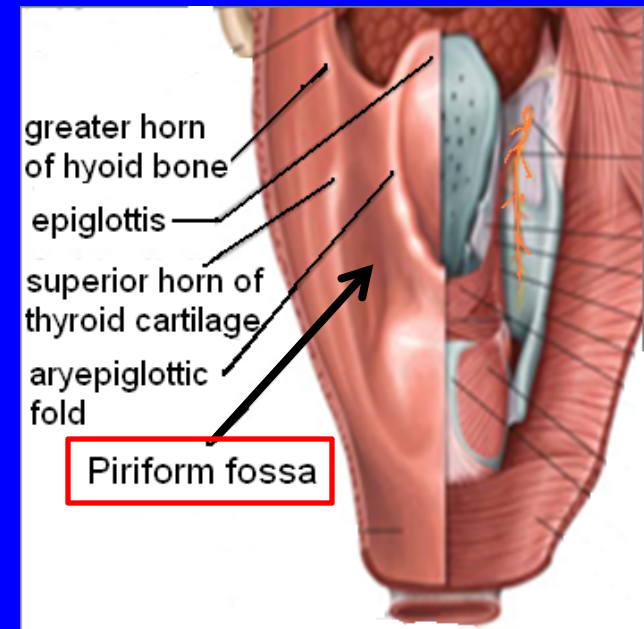
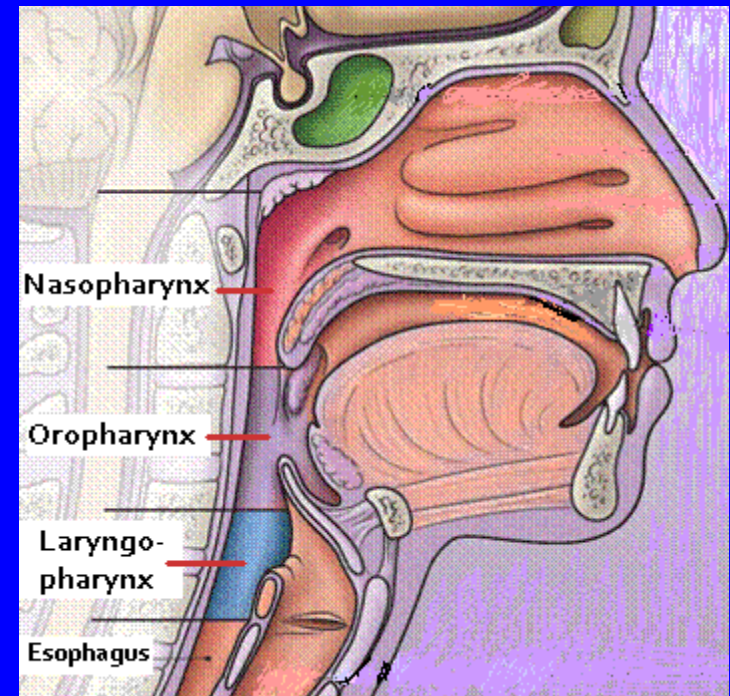
Each one is covered by mucous membrane and laterally by fibrous tissue (capsule).

It reaches a maximum size during childhood, after puberty it diminishes in size .



Laryngopharynx

- Lies behind the laryngeal inlet & the posterior surface of larynx.
- communicates with the larynx through the laryngeal inlet
- Extends from upper border of epiglottis to lower border of cricoid cartilage.
- A small depression situated on either side of the laryngeal inlet is called **Piriform Fossa**.
- It is a common site for the lodging of foreign bodies.
- Branches of internal laryngeal & recurrent laryngeal nerves lie deep to the mucous membrane of the fossa and are vulnerable to injury during removal of a foreign body.



Nerve Supply

- **Sensory**
- **Nasopharynx: Maxillary nerve**
 - **Oropharynx: Glossopharyngeal nerve**
 - **Laryngopharynx: Vagus nerve**
- **Motor:**
 - **All the muscles of pharynx are supplied by the pharyngeal plexus. Except: the Stylopharyngeus is supplied by the glossopharyngeal nerve**

Arterial supply:

- **Ascending pharyngeal**
- **Ascending palatine**
- **Facial**
- **Maxillary**
- **Lingual**

■ VENOUS DRAINAGE

- **pharyngeal venous plexus, which drains into the internal jugular vein**

■ Lymph Drainage

- **Deep Cervical lymph nodes either directly, or indirectly via the Retropharyngeal or Paratracheal lymph nodes**

Thank You & Good Luck

