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**Nose, Nasal cavity,  
Paranasal Sinuses & Pharynx**

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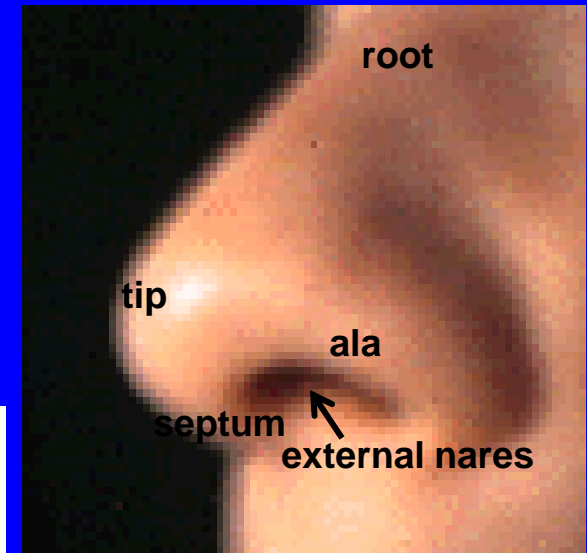
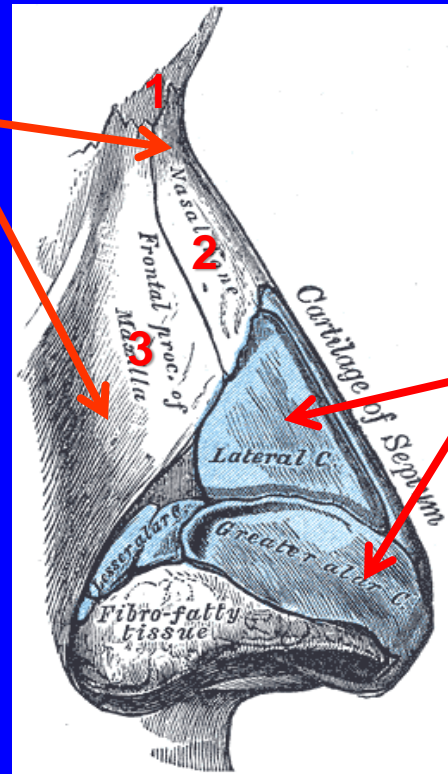
# Objectives

- *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, its parts, and the related structures.

# Nose

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

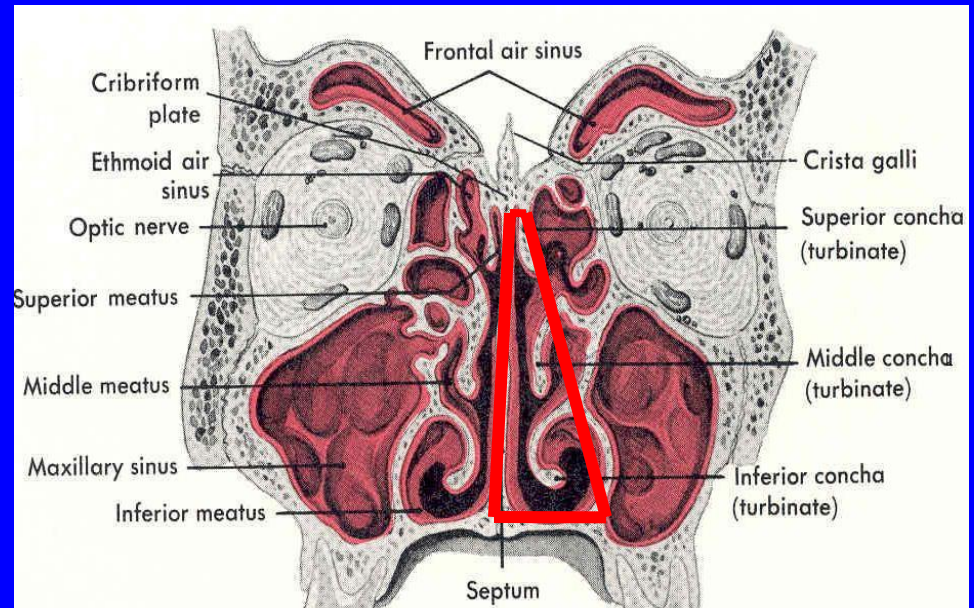
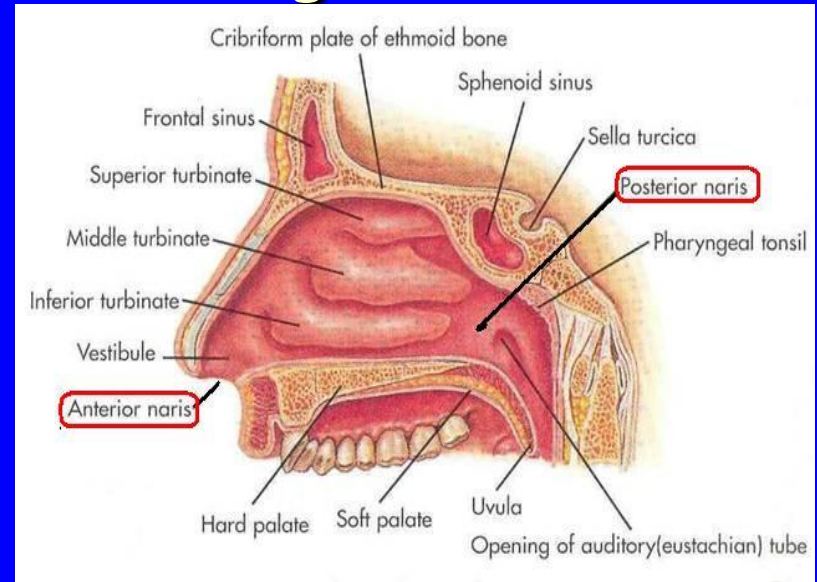
Formed above by:  
**Bony skeleton**

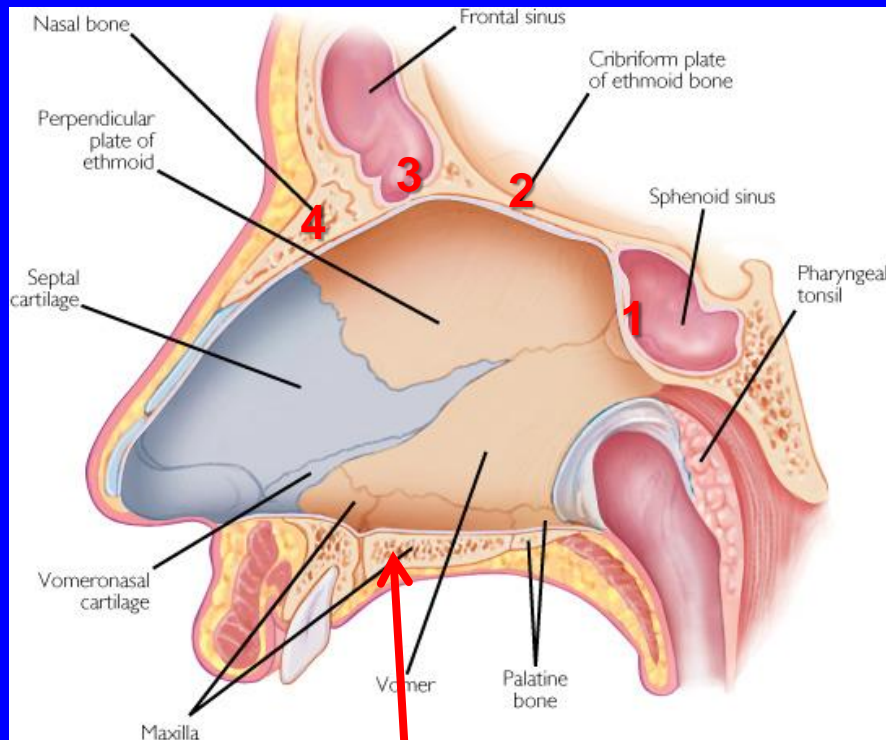


- Formed **below** by plates of **hyaline cartilage**.

# 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

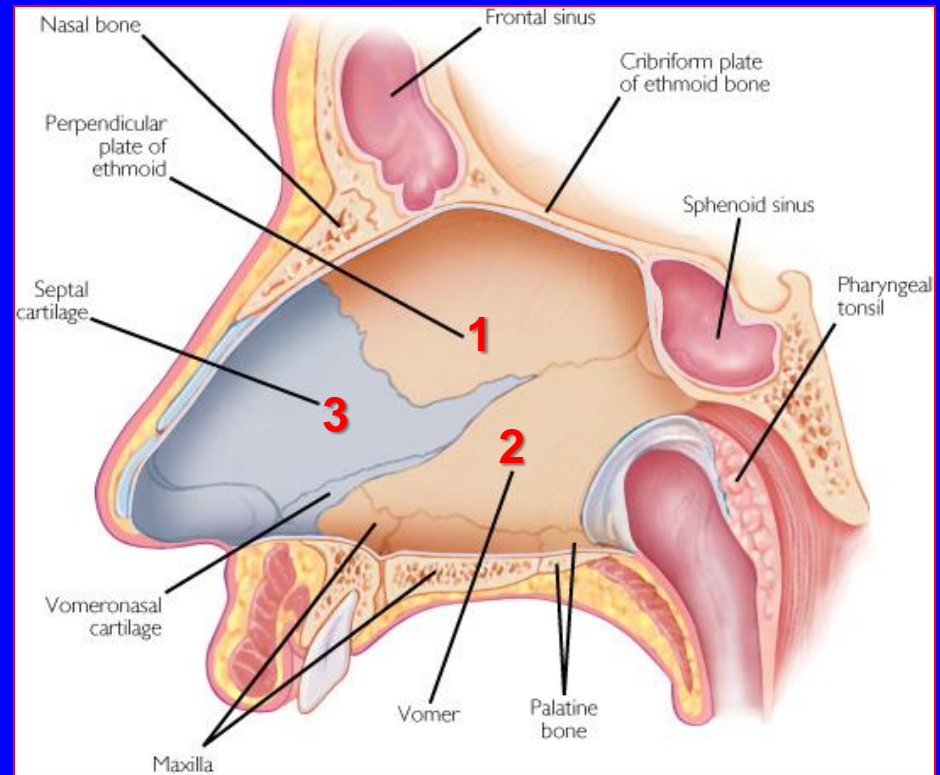
- Narrow & formed (from behind forward) by the:
  1. Body of sphenoid.
  2. Cribriform plate of ethmoid bone.
  3. Frontal bone.
  4. Nasal bone & cartilage

## Floor

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

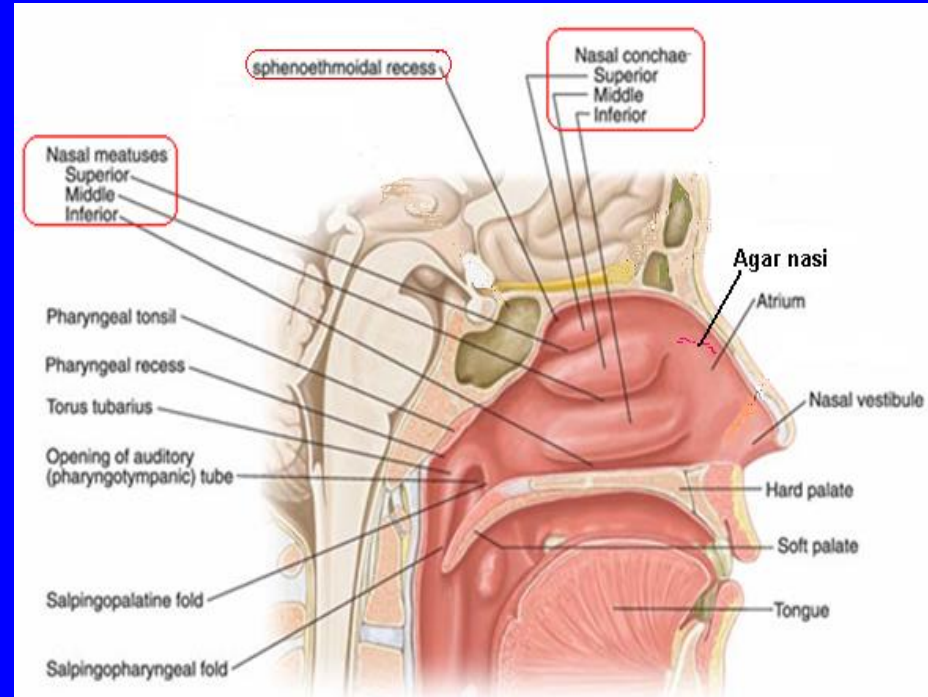


- **Medial Wall (Nasal Septum)**
- **Osteocartilaginous partition.**
- **Formed by:**
  1. **Perpendicular plate of ethmoid bone.**
  2. **Vomer.**
  3. **Septal cartilage.**



## ■ 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.**

Spheno ethmoidal recess	<b>Sphenoidal sinus</b>
Superior meatus	<b>Posterior ethmoidal sinus</b>
Middle meatus	<b>Maxillary, frontal, middle ethmoidal &amp; anterior ethmoidal sinuses</b>
Inferior meatus	<b>Nasolacrimal duct.</b>

# Nasal mucosa

- Olfactory :

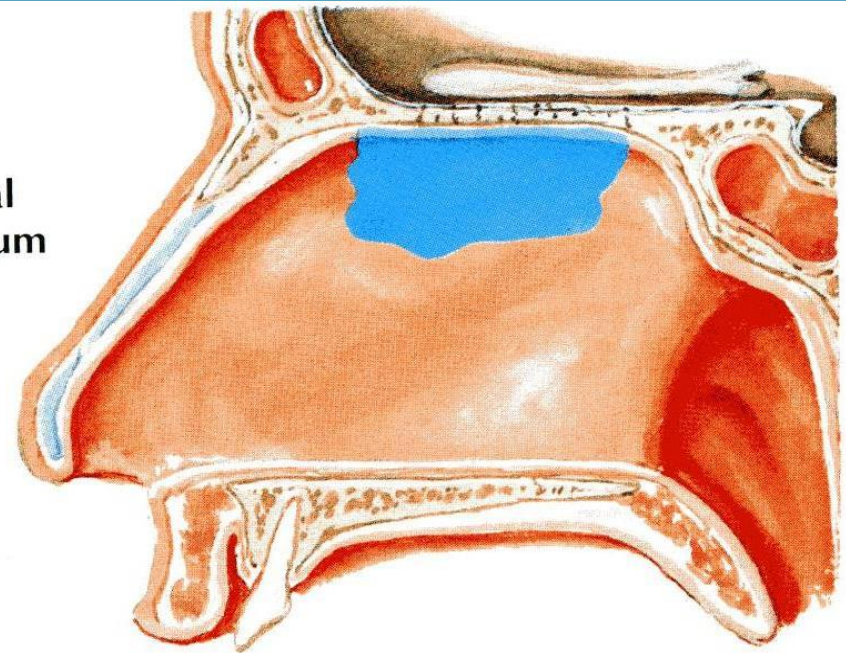
- It is delicate and contains olfactory nerve cells.

- It is present in the roof, lateral wall and upper part of nasal septum.

- On the lateral wall, it lines the upper surface of the superior concha and the sphenoethmoidal recess.

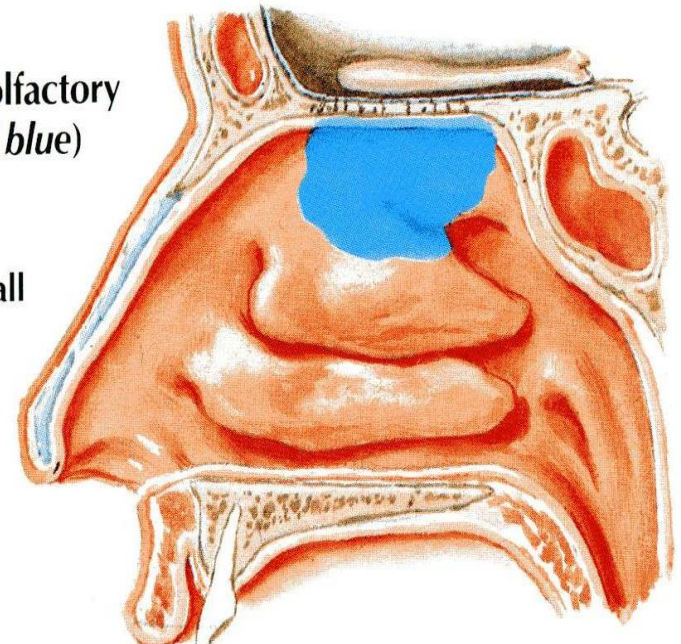
- On the medial wall, it lines the superior part of the nasal septum.

Nasal septum



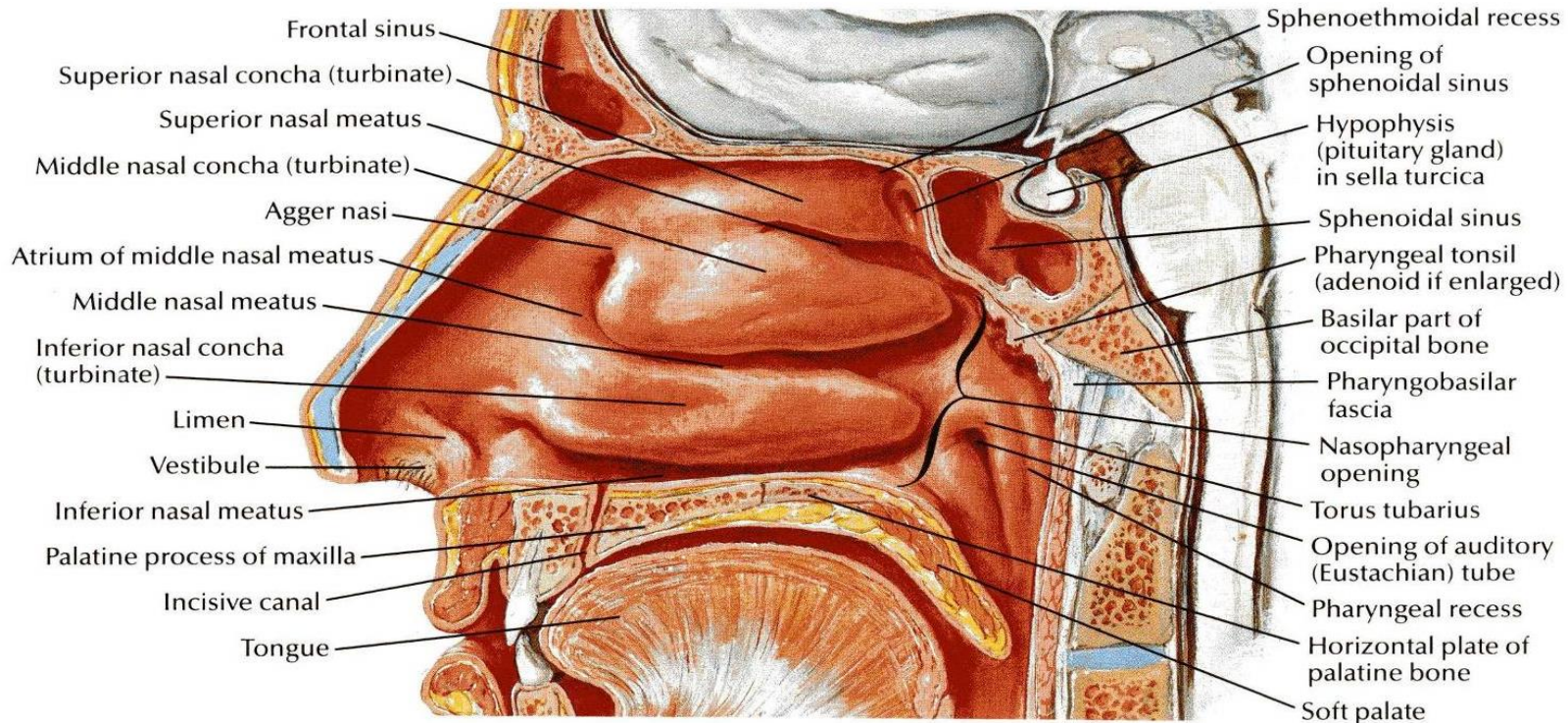
Distribution of olfactory mucosa (shaded blue)

Lateral nasal wall





# RESPIRATORY MUCOSA



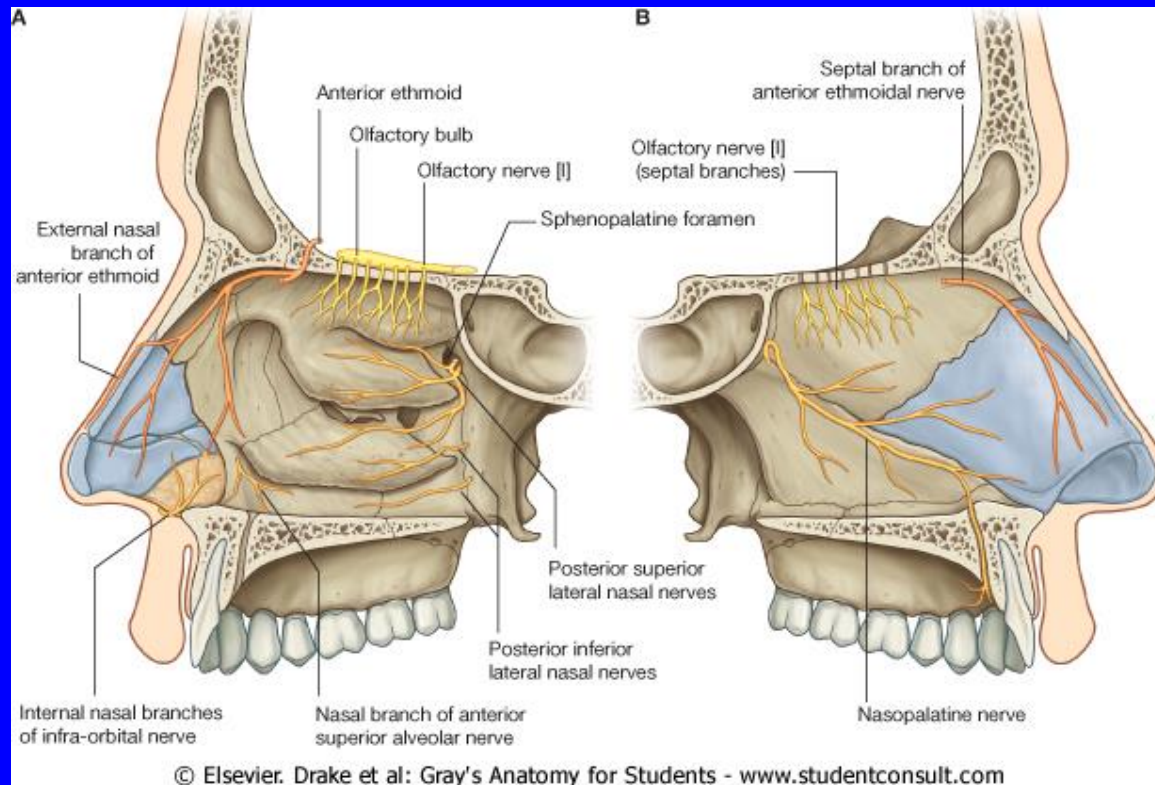
- It is **thick**, ciliated highly vascular and contains mucous glands & goblet cells.
- It lines the **Lower part** of the nasal cavity.
- It functions to **moisten**, **clean** and **warm** the inspired air.
- The air is **moistened** by the secretion of numerous serous glands.
- It is **cleaned** 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.**

▪ Olfactory mucosa supplied by **olfactory nerves**.

▪ Nerves of general sensation are derived from;

- **ophthalmic, and maxillary division of the trigeminal nerve.**
- **Anterior ethmoidal nerve.**
- **Nasal, nasopalatine and palatine branches of the pterygopalatine ganglion.**

## Nerve Supply





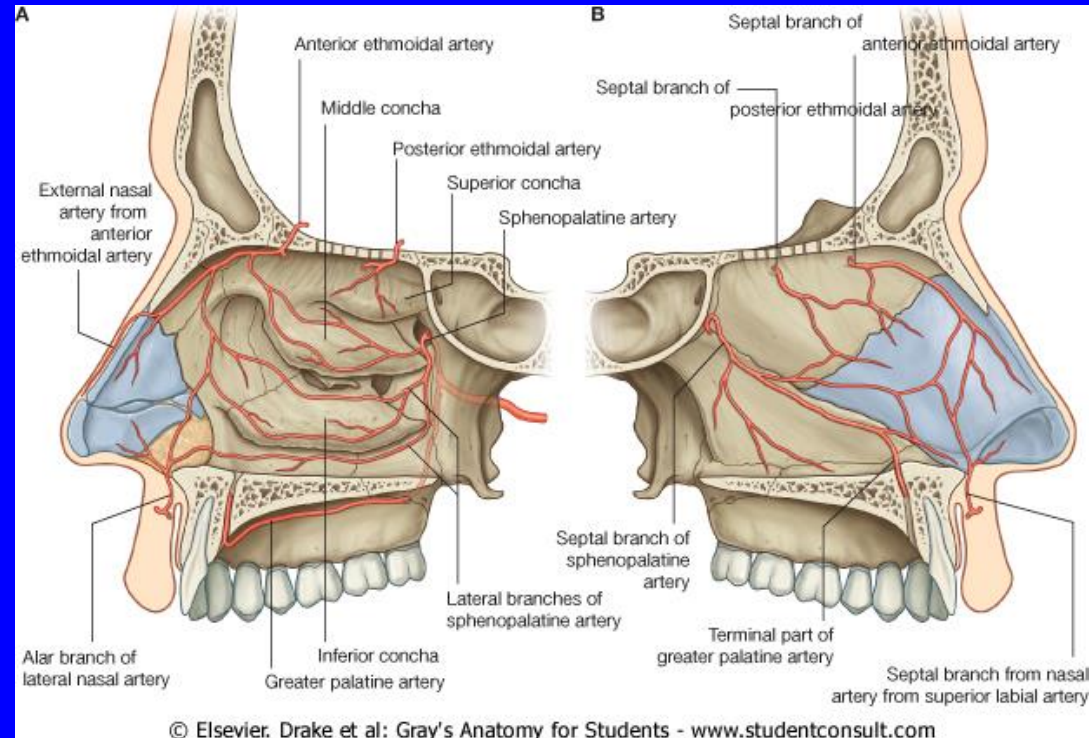
# Blood supply

## Arterial Supply:

- Branches of the
- Maxillary; sphenopalatine artery
- Facial; superior labial &
- Ophthalmic; ethmoidal arteries.
- The arteries make a rich anastomosis in the region of the vestibule, and anterior portion of the septum.

## Venous Drainage:

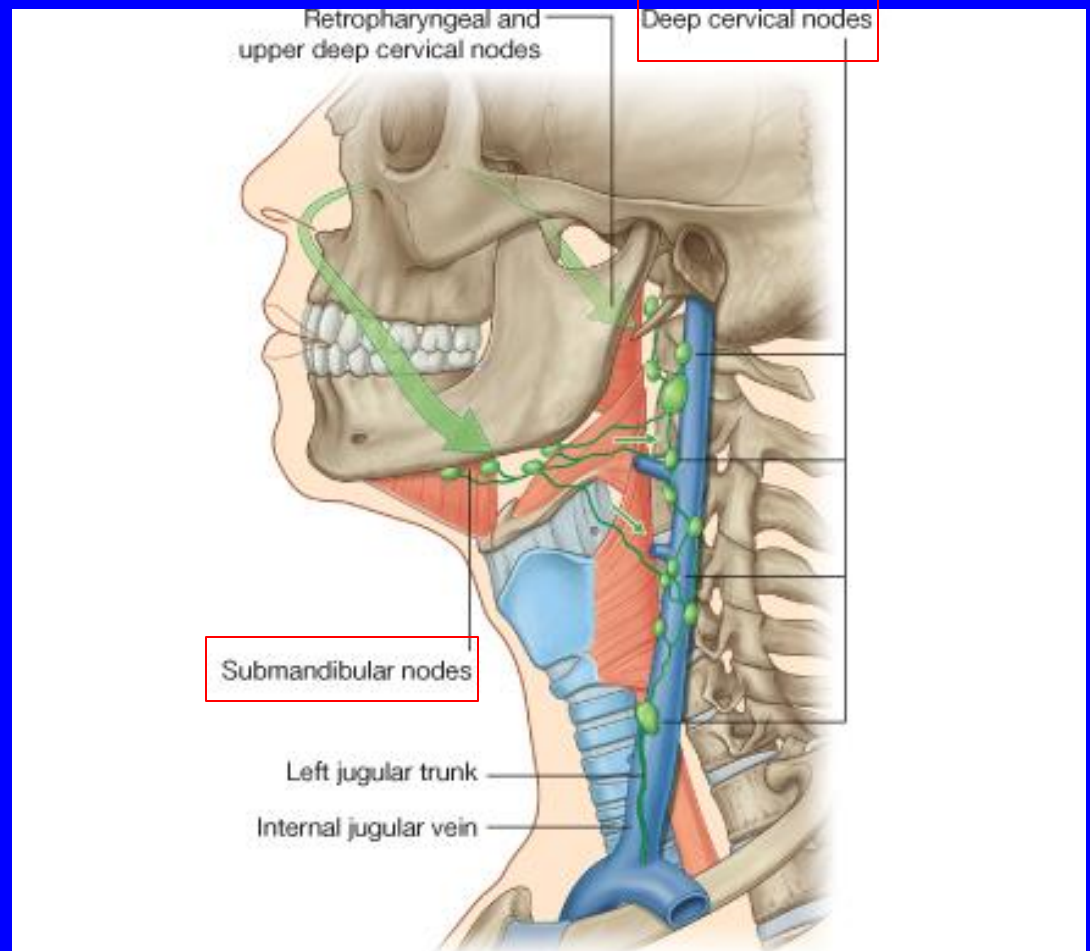
- Submucosal plexus by veins accompany the arteries which drain into the
- facial,
- ophthalmic, and
- speno-palatine veins.



# 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.



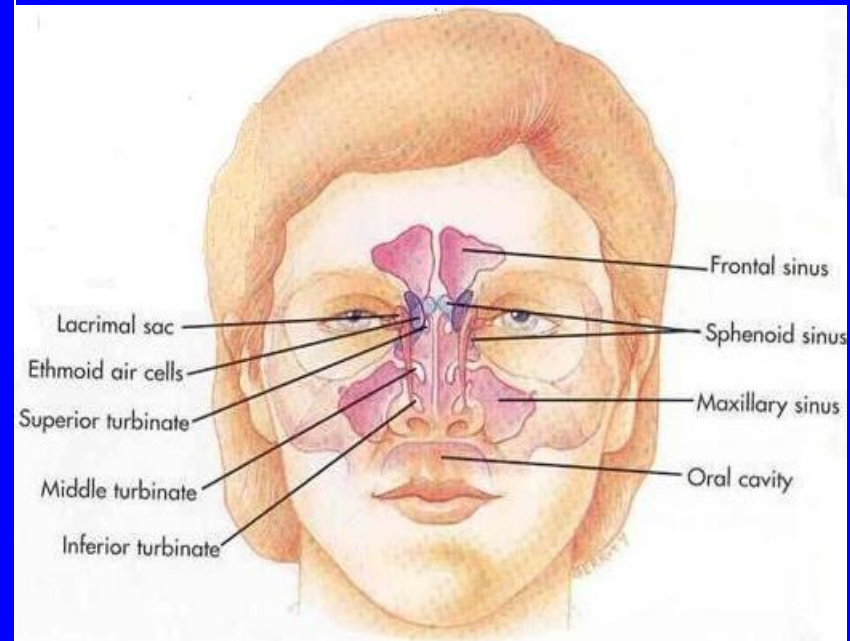


# Paranasal Sinuses

- **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.**

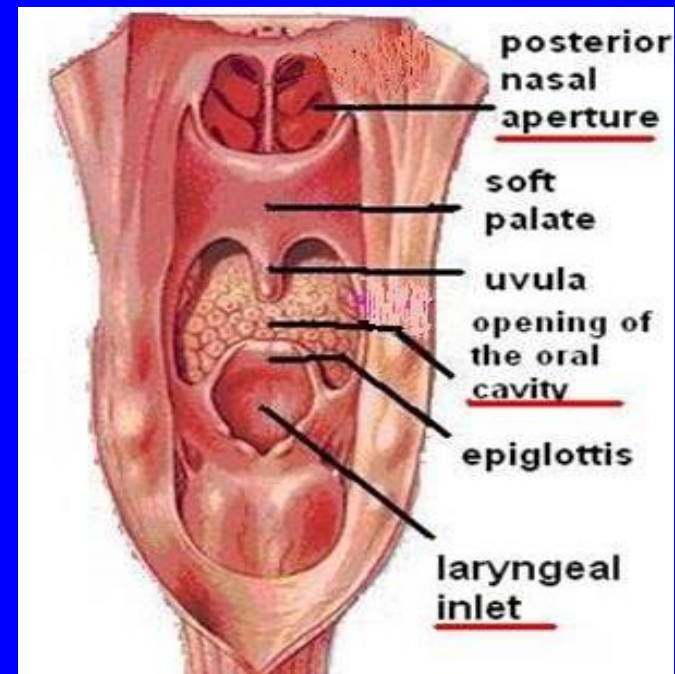
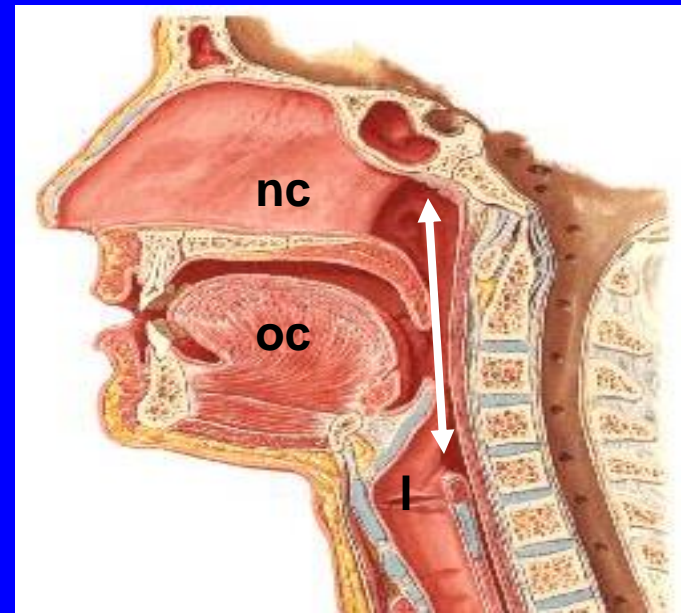
## ■ Functions

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



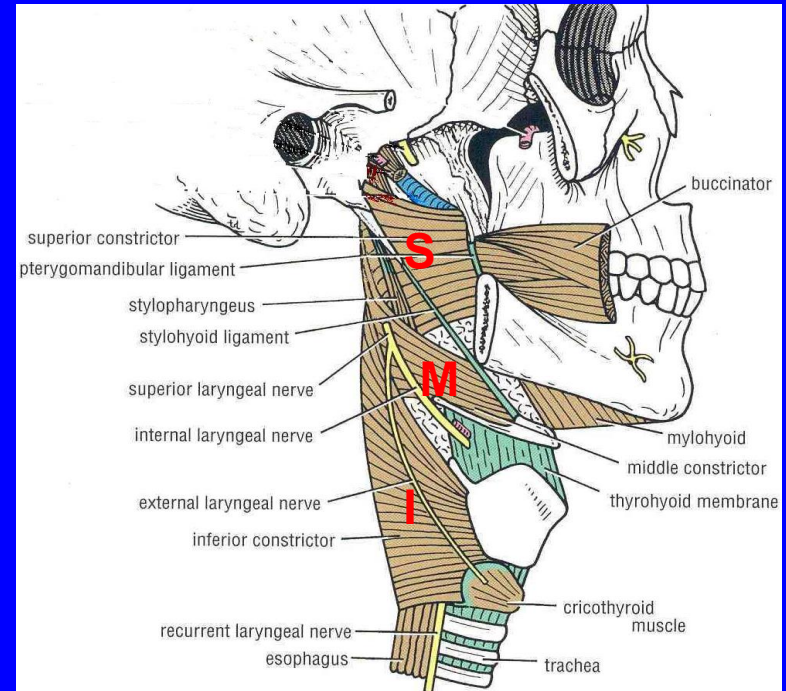
# Pharynx

- Muscular tube lying behind the **nose, oral cavity & larynx**.
- Extends from the base of the skull to level of the 6<sup>th</sup> 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.



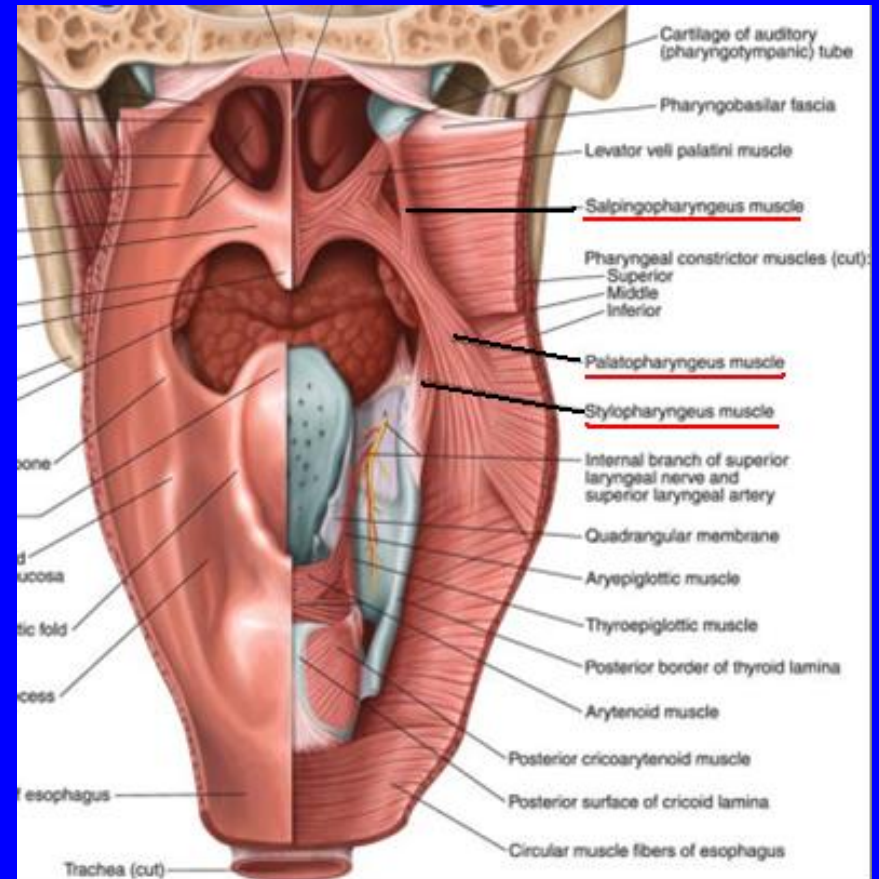
## Functions:

- 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.

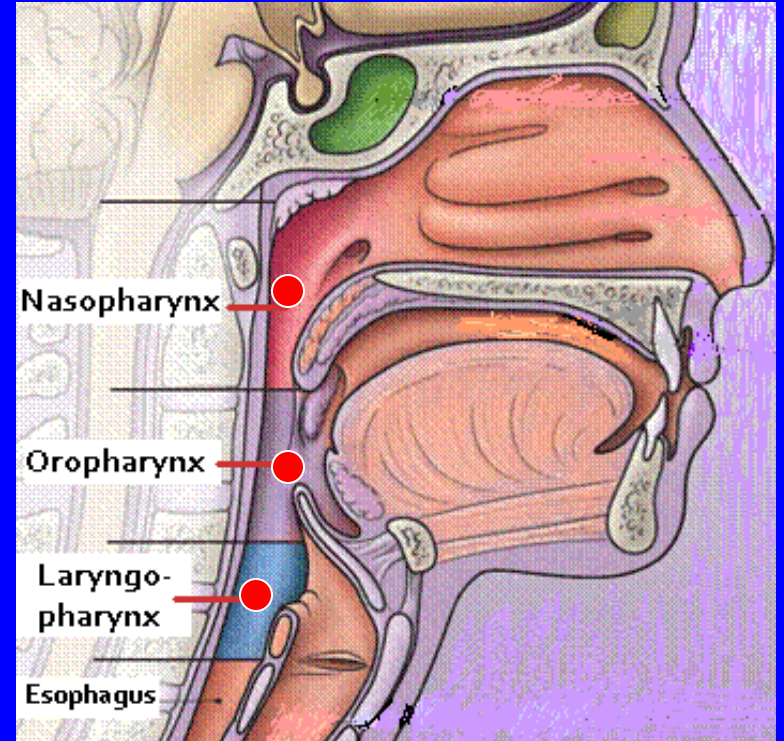


# Longitudinal Muscles

- Three in number:
  - Stylopharyngeus
  - Salpingopharyngeus
  - Palatopharyngeus
- Function:
  - Elevate the larynx & pharynx during swallowing

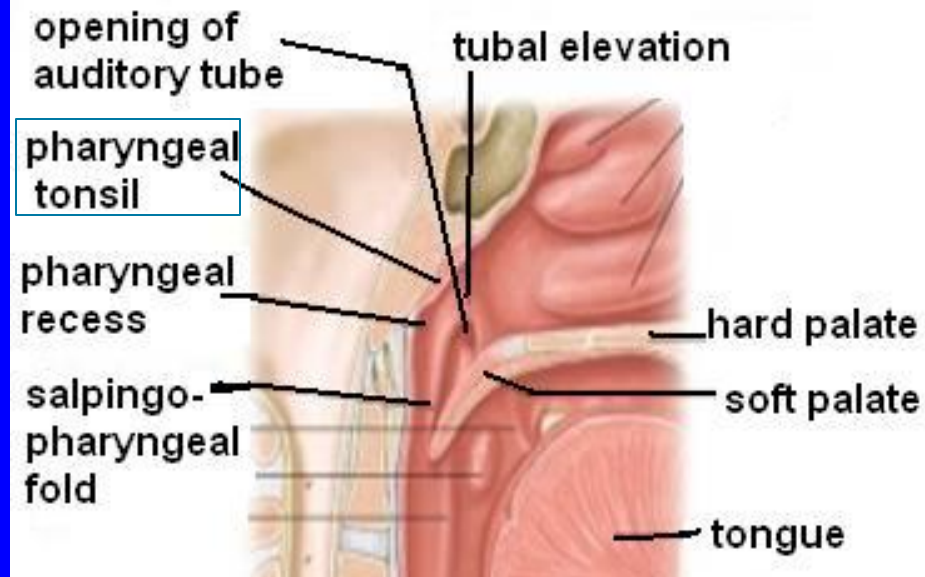
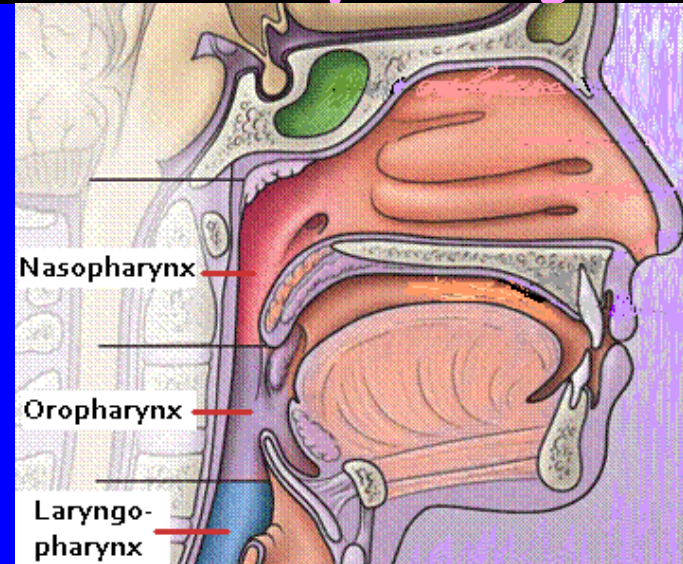


- Pharynx is divided into three parts:
  - Nasopharynx.
  - Oropharynx.
  - Laryngopharynx.



# Nasopharynx

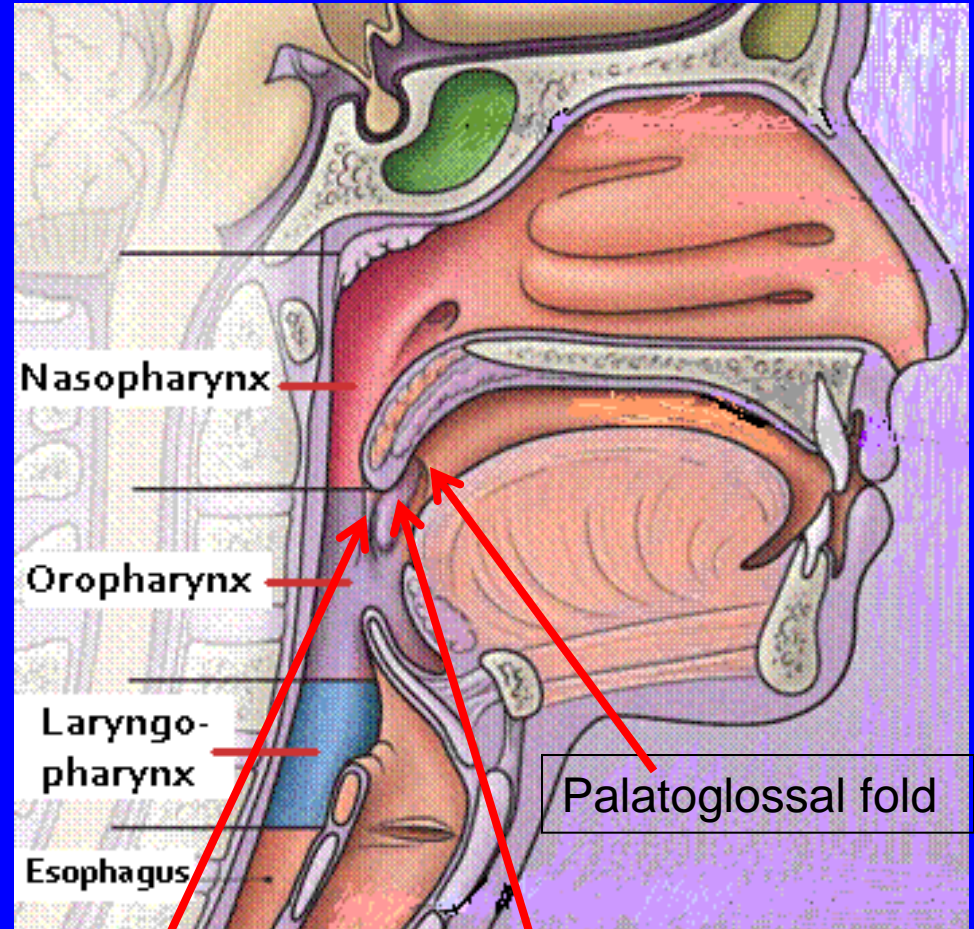
- Extends from the base of skull to the soft palate.
- communicates with the nasal cavity through posterior nasal apertures
- Pharyngeal tonsils (adenoides) present in the submucosa covering the roof.
- Lateral wall shows:
  - Opening of auditory tube.
  - Tubal elevation (produced by posterior margin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





# Oropharynx

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



Palato-  
pharyngeal fold

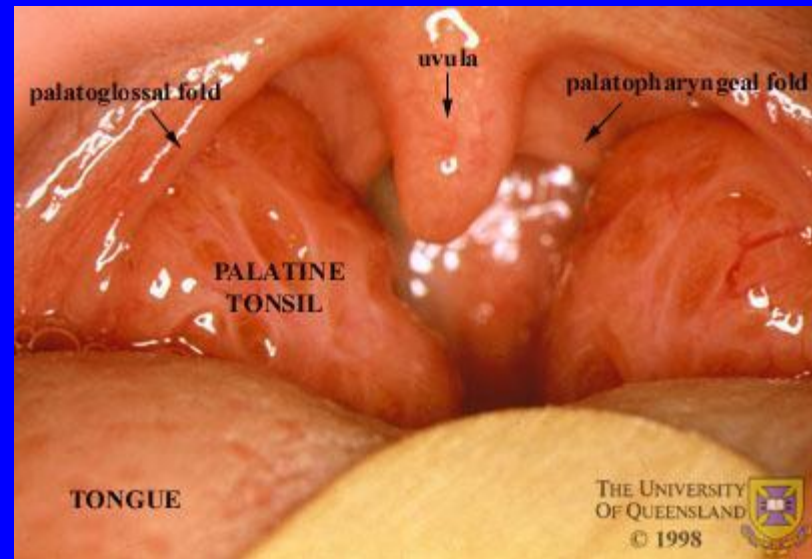
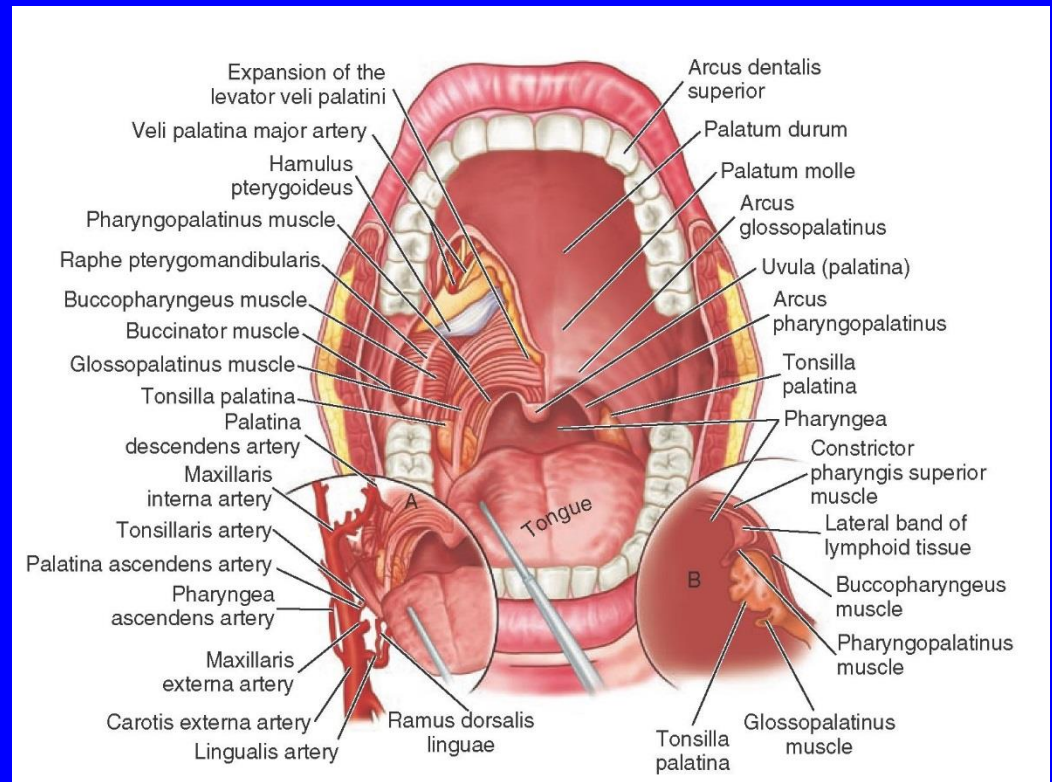
Tonsillar fossa

# 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 .



# Palatine tonsils; relation

- It is related **anteriorly** to the palatoglossal arch
- **Posteriorly** to the palatopharyngeal arch
- **Superiorly** to the soft palate
- **Inferiorly** to the posterior  $\frac{1}{3}$  of the tongue
- **Medially** to the cavity of the oropharynx
- **Laterally** to the superior constrictor of the pharynx separated from it by loose connective tissue through which descends the external palatine vein,  
, loop of the facial artery and  
, the internal carotid artery which lies behind and lateral to the tonsils.

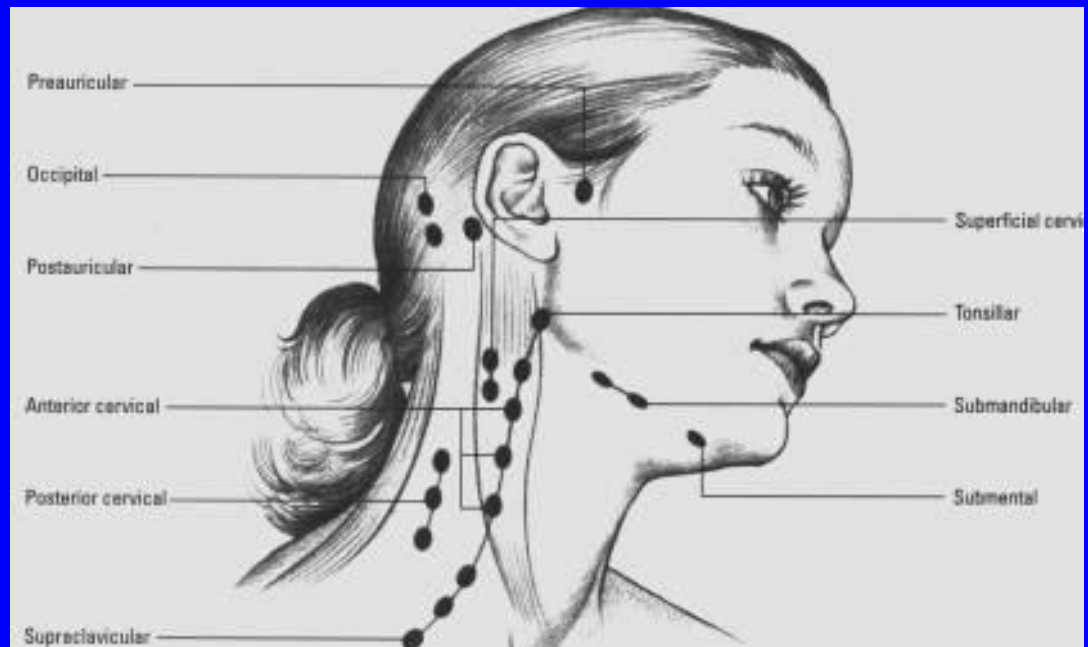
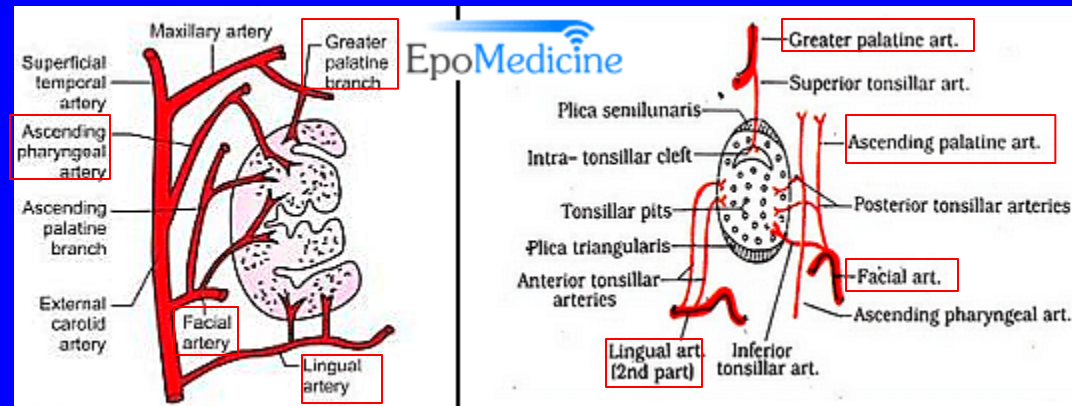


## Arterial supply;

tonsillar arteries; from the lingual, fascial, ascending pharyngeal, and greater palatine.

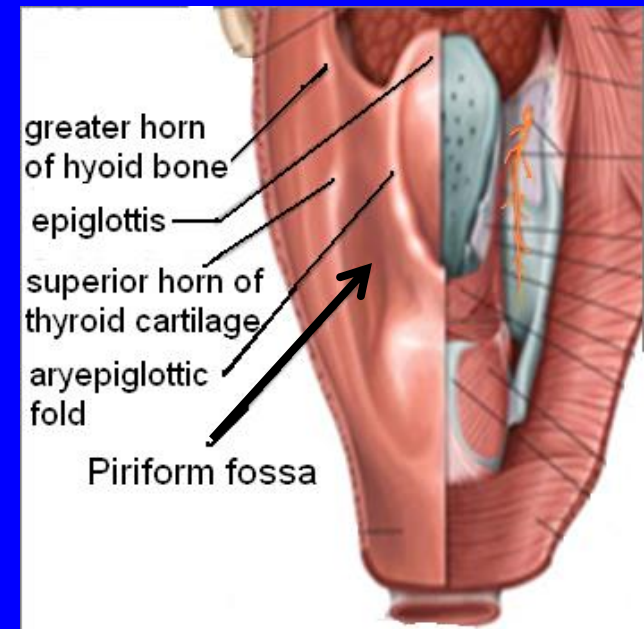
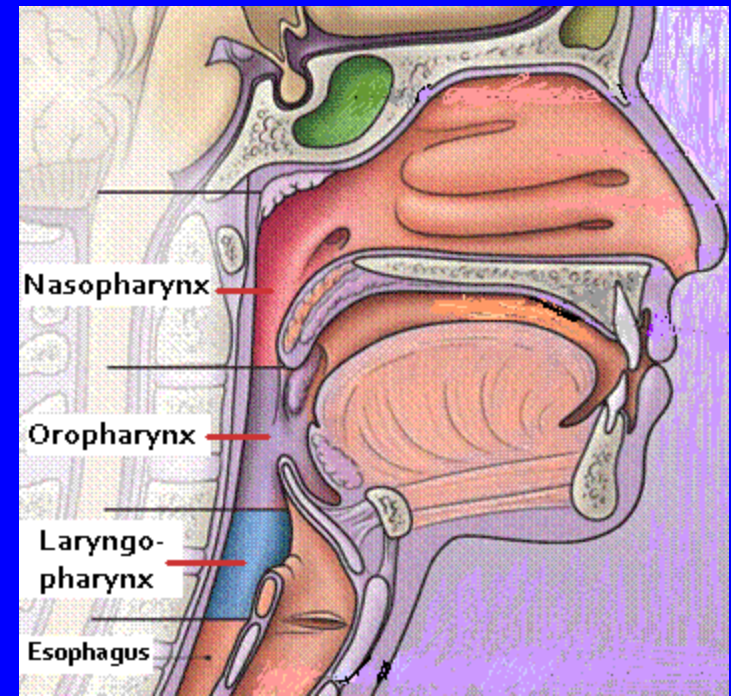
**Venous drainage** join external palatine, pharyngeal, and fascial veins.

**Lymphatic drainage;** to the upper deep cervical (jugulodigastric node )



# 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 nerve 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 Nerve Supply:**
  - All the muscles of pharynx are supplied by the pharyngeal plexus. except ; the Stylopharyngeus is supplied by the *glossopharyngeal* nerve

## Arterial supply: From branches of:

- Ascending pharyngeal artery
- Ascending palatine artery
- Facial artery
- Lingual artery
- Maxillary artery

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

- The **lymphatics** drain into the deep cervical lymph nodes either directly, or indirectly via the retropharyngeal or paratracheal lymph nodes



*Thank You & Good Luck*

