

Nose, Nasal cavity, Paranasal Sinuses & Pharynx

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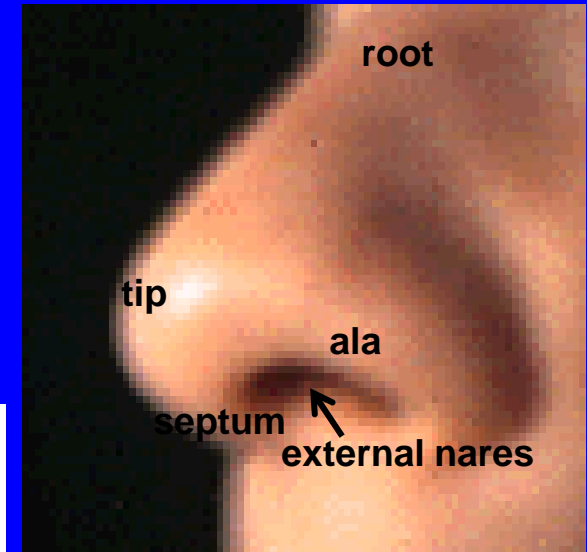
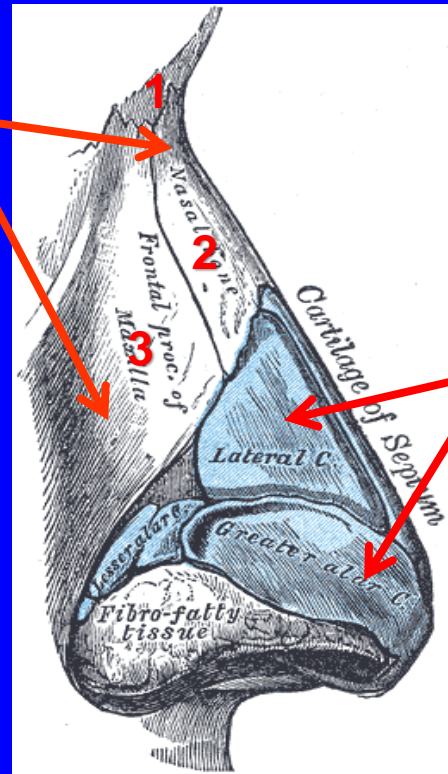
Objectives

- *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 and its parts

Nose

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

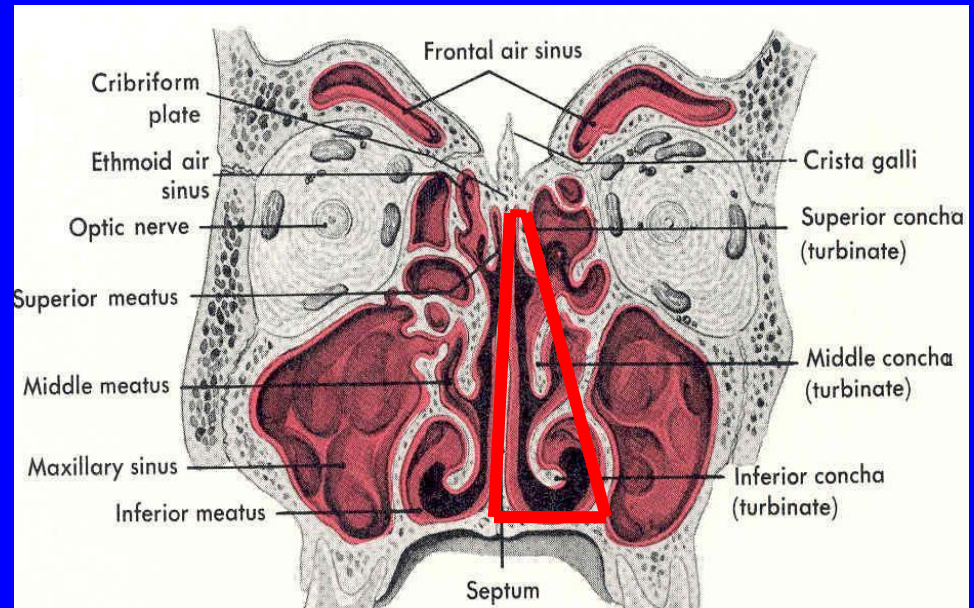
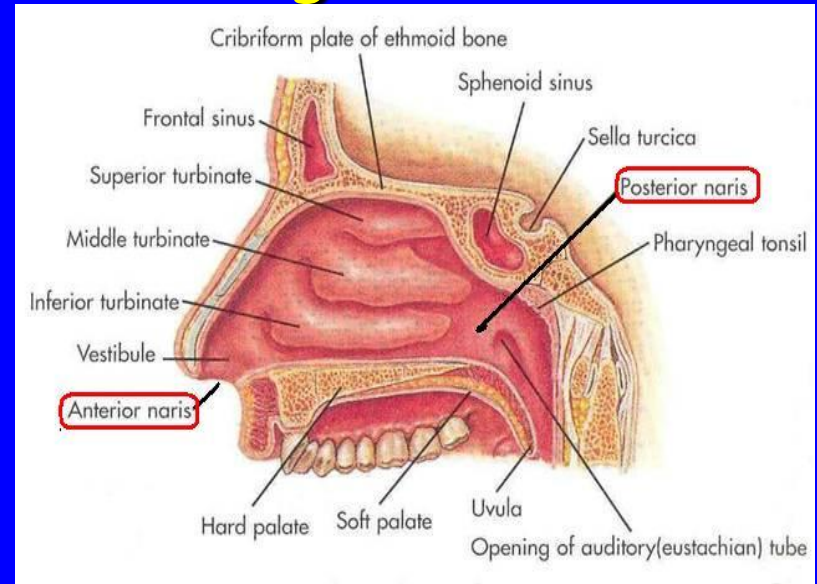
Formed above by:
Bony skeleton

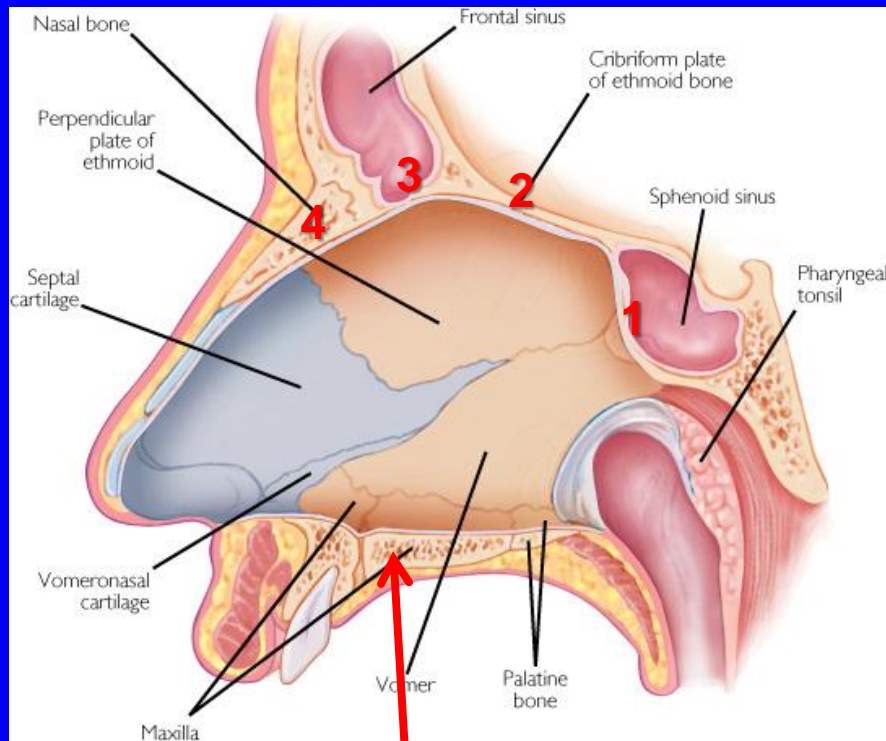


- Formed below by plates of hyaline cartilage.

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**





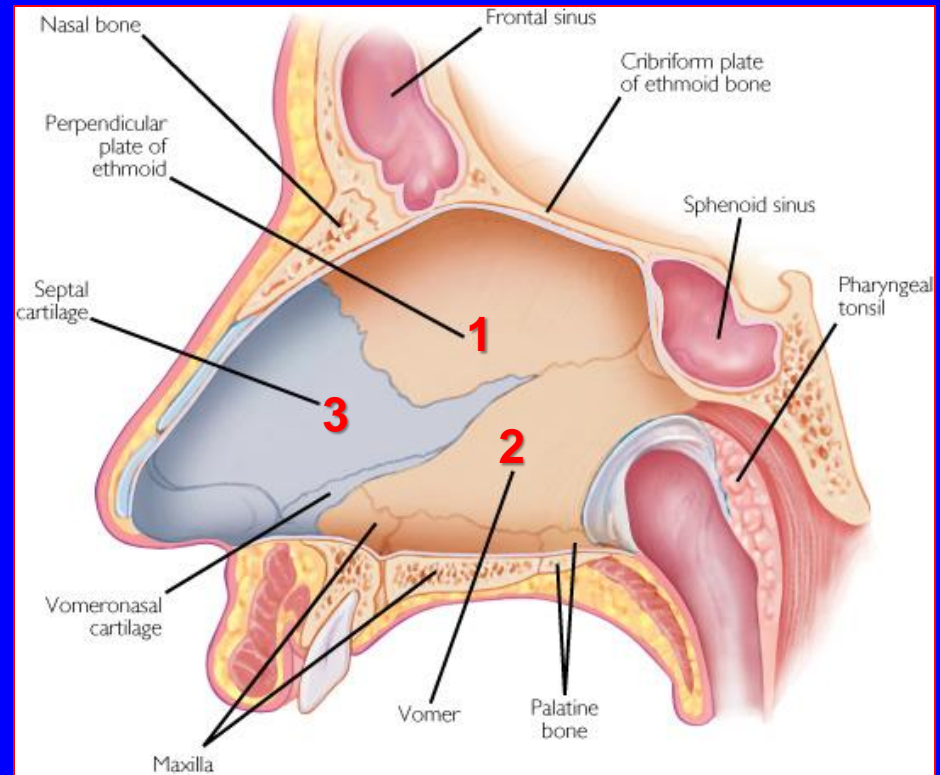
Roof

- 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

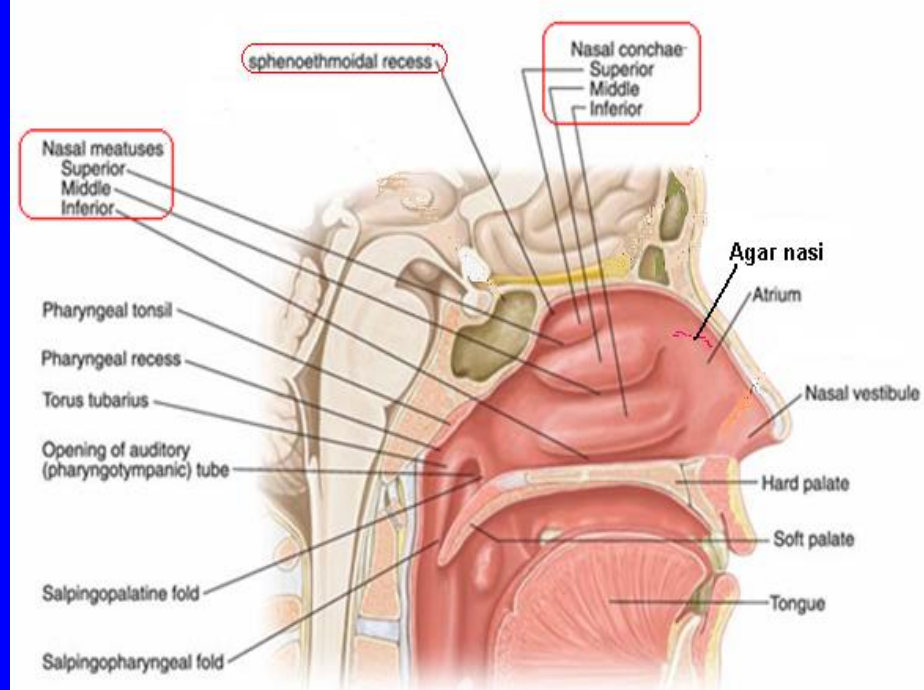
- Separates it from the oral cavity.
- Formed by the **hard (bony) palate**.

- **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.**

Nasal mucosa

- **Olfactory** :

- It is **delicate** and contains olfactory nerve cells.

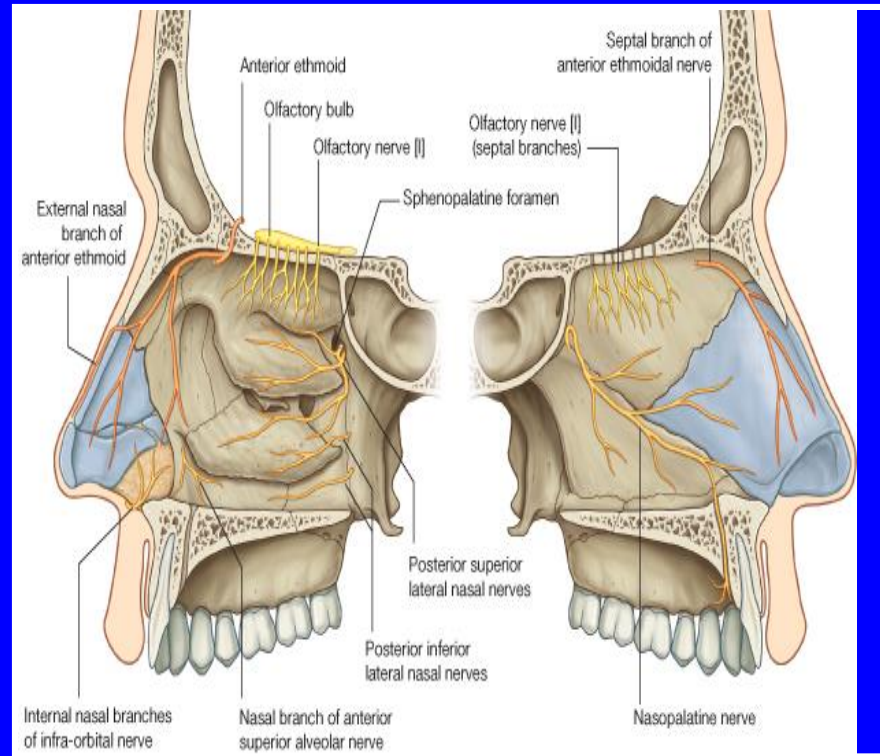
- It is present in **the upper part of nasal cavity**:

- **Roof**,

- **On the lateral wall**,

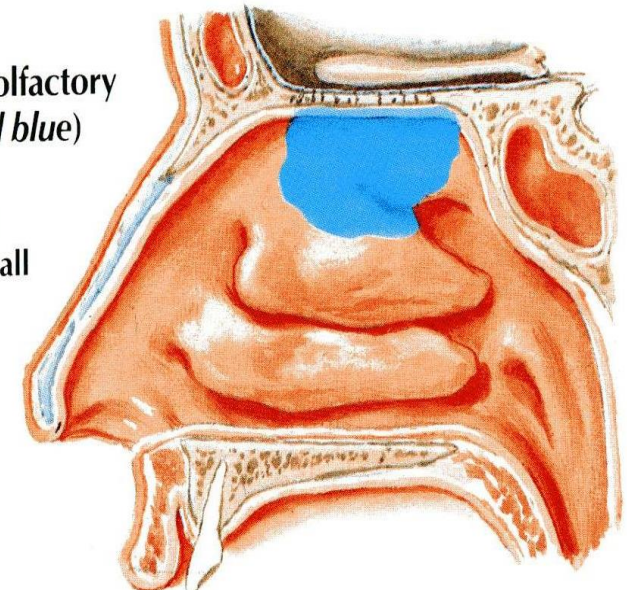
- it lines the upper surface of the **superior concha** and the **sphenoethmoidal recess**.

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

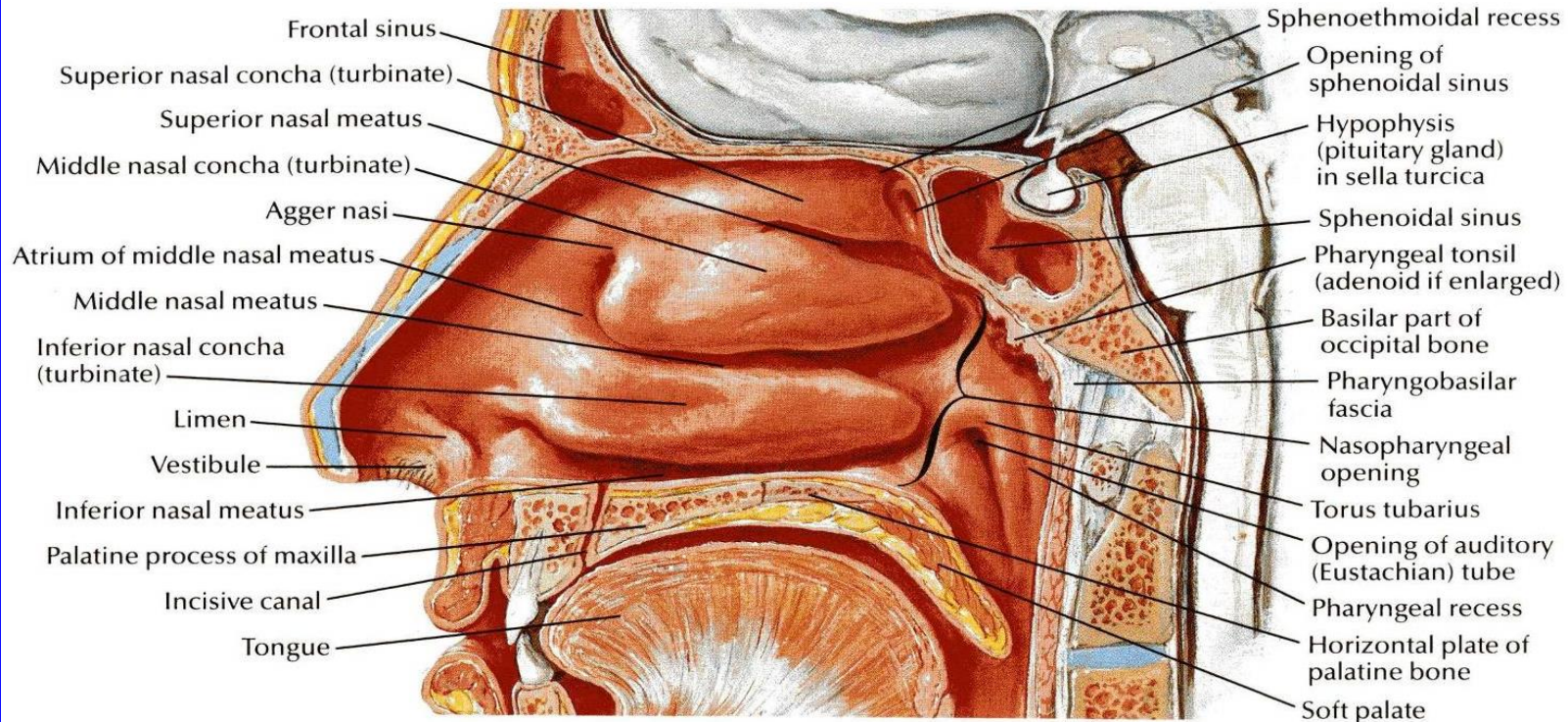


Distribution of olfactory mucosa (*shaded blue*)

Lateral nasal wall



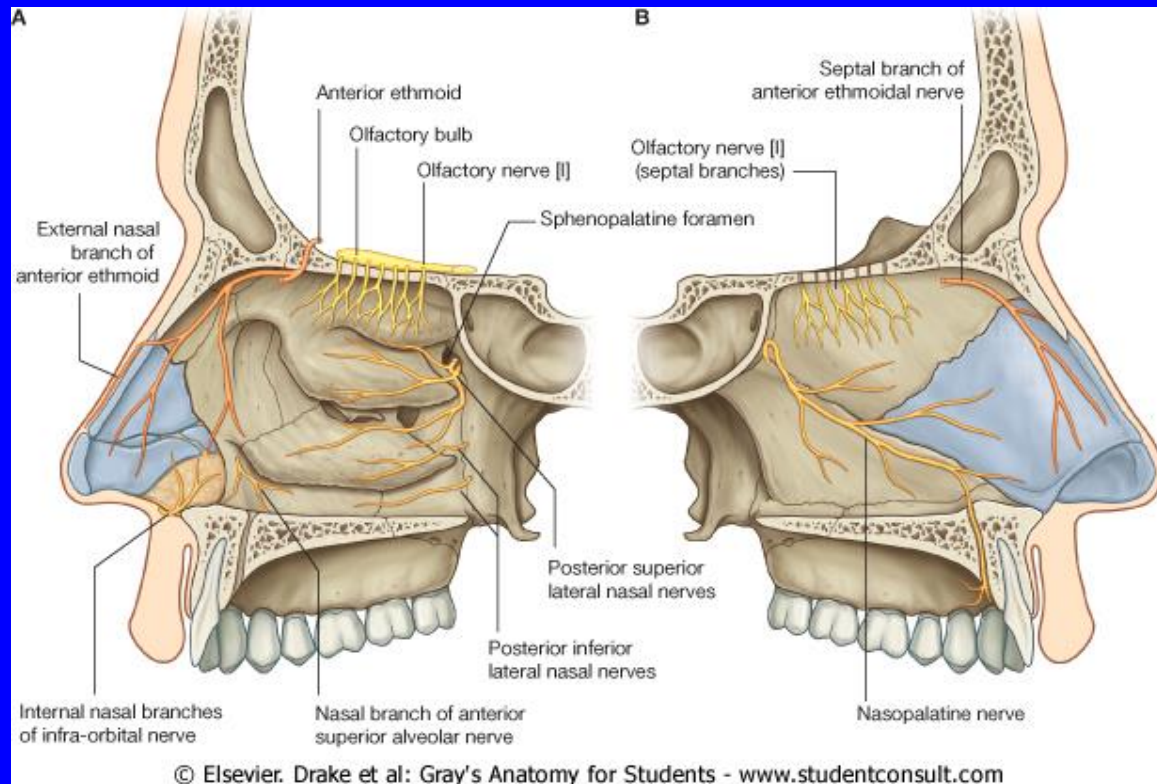
RESPIRATORY MUCOSA



- 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.**

- Olfactory mucosa supplied by **olfactory nerves**.
- Nerves of general sensation are derived from
 - **ophthalmic**
 - **maxillary nerves**.
 - **Autonomic fibers**.

Nerve Supply



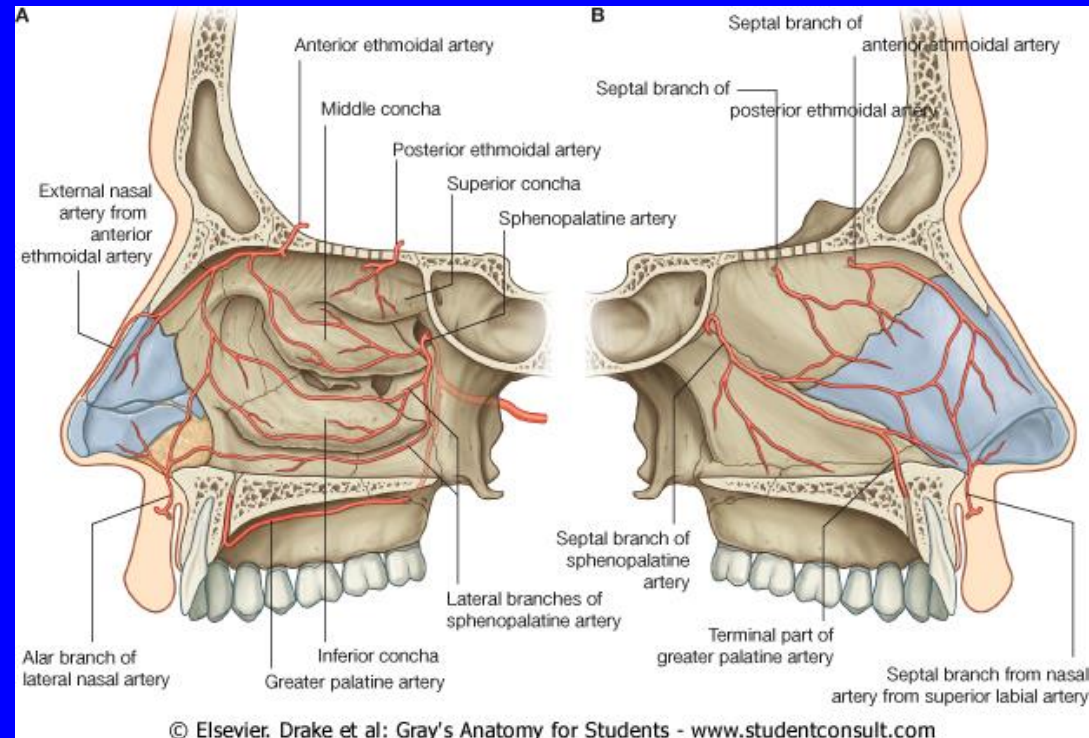
Blood supply

Arterial Supply:

- Branches of the
 - maxillary,
 - facial &
 - ophthalmic arteries.
- The arteries make a rich anastomosis in the region of the **vestibule**, and anterior portion of the septum.

Venous Drainage:

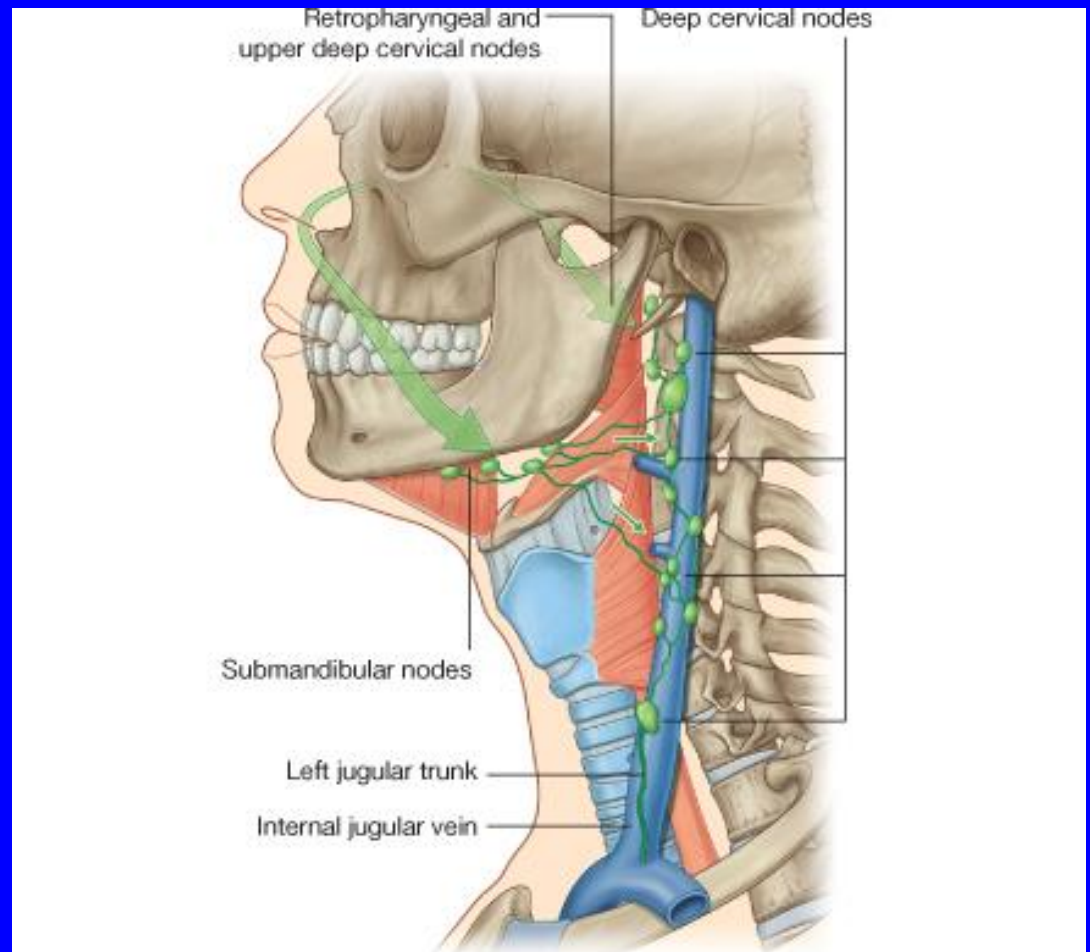
- drain into the
 - **facial**,
 - **ophthalmic**, and
 - **spheno-palatine veins**.



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.

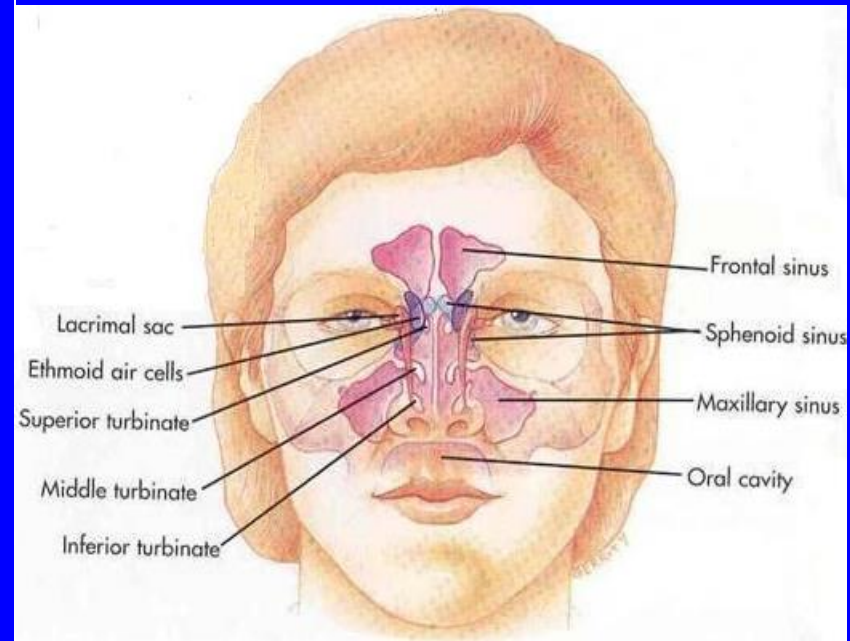


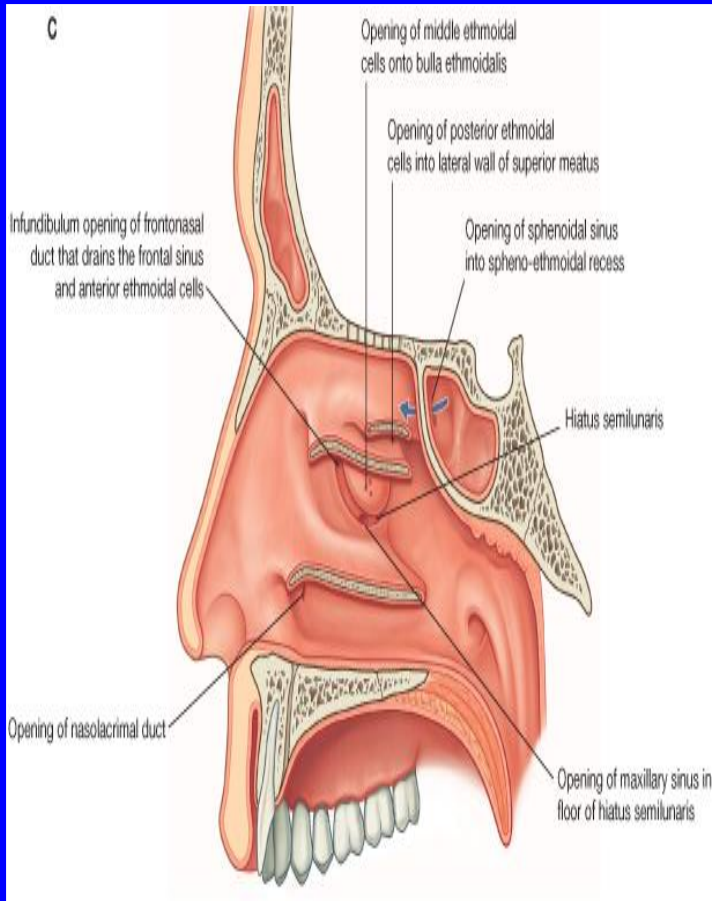
Paranasal Sinuses

- **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.





Spheno
ethmoidal
recess

sphenoidal sinus

Superior
meatus

posterior ethmoidal sinus

Middle
meatus

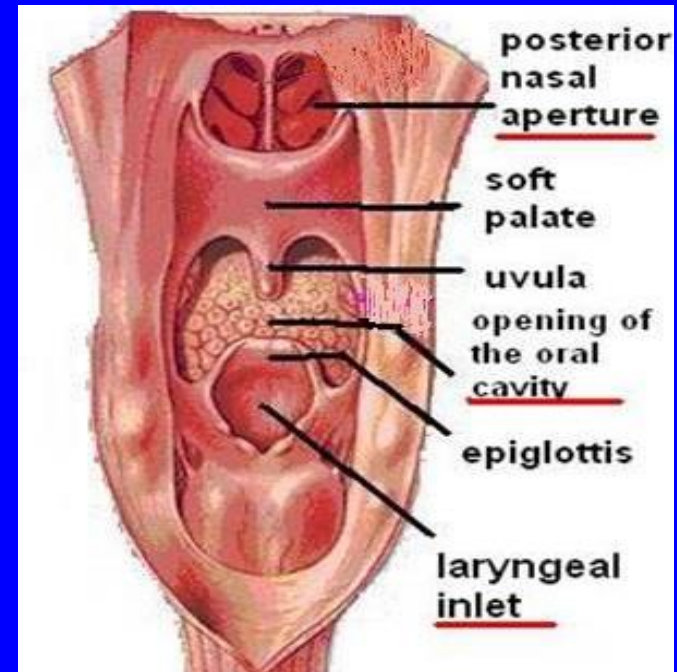
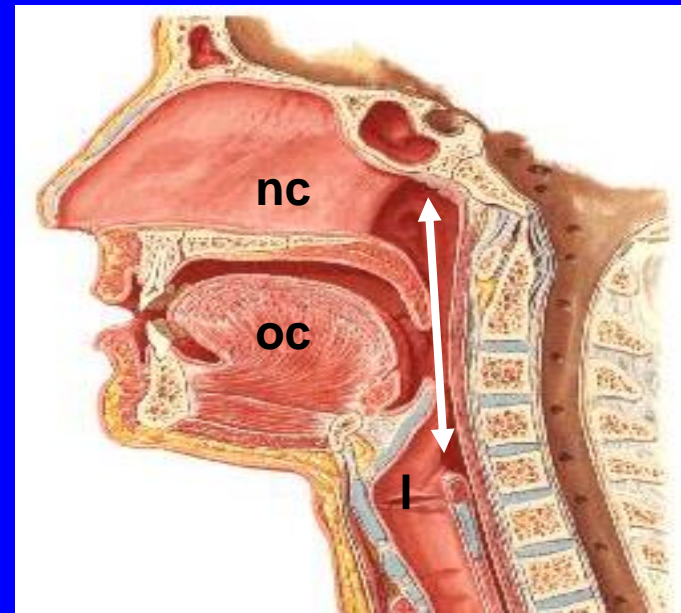
middle ethmoidal,
maxillary,
frontal &
the anterior ethmoidal
sinuses

Inferior
meatus

nasolacrimal duct.

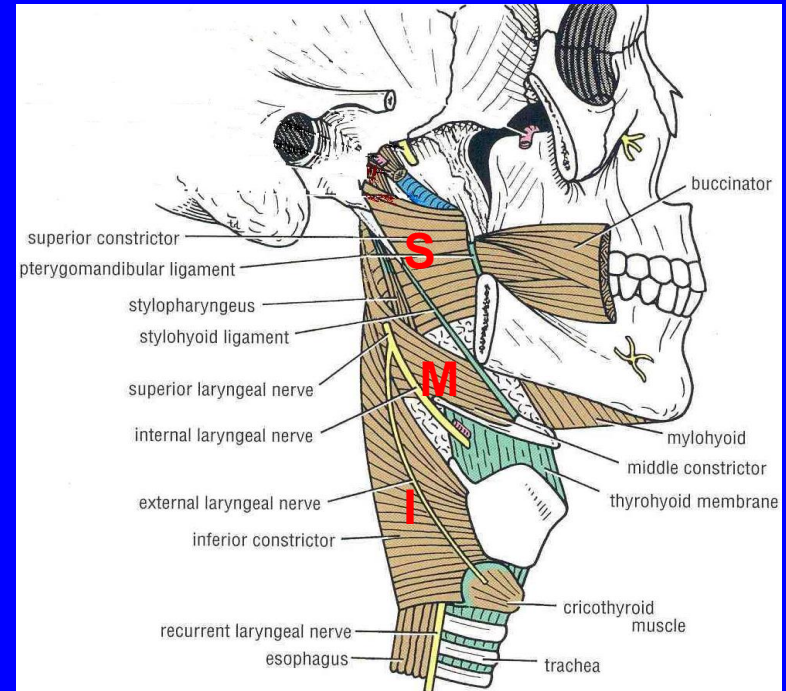
Pharynx

- 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.

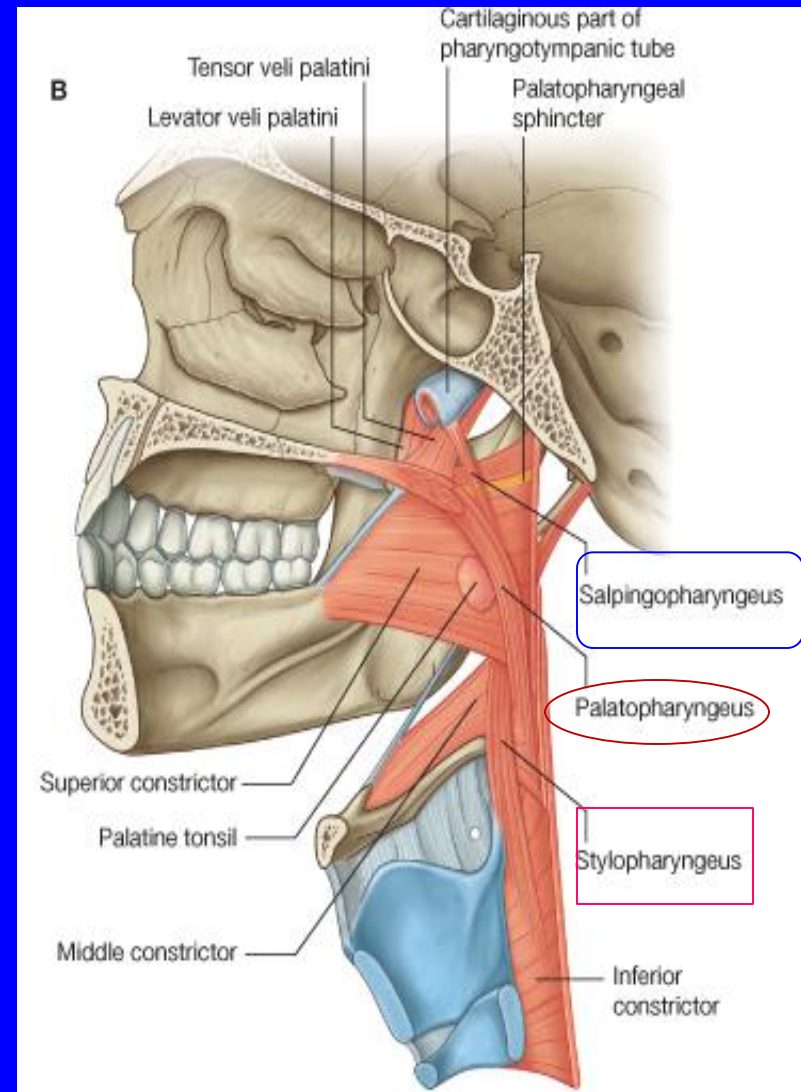


Functions:

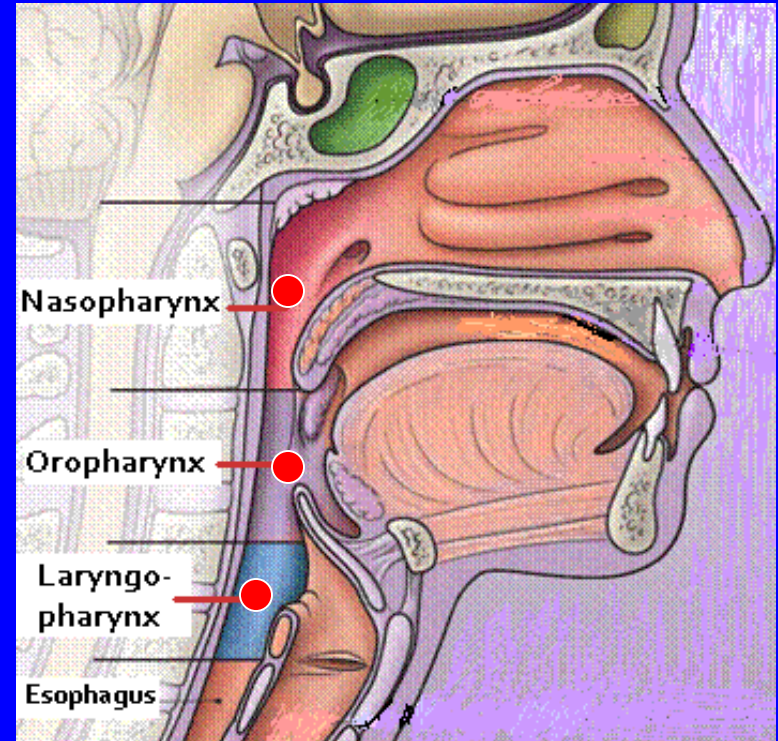
- Propel the bolus of food down into the esophagus.
- lower fibers of the inferior constrictor (**Cricopharygeus**) act as a sphincter, preventing the entry of air into the esophagus between the acts of swallowing.

Longitudinal Muscles

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

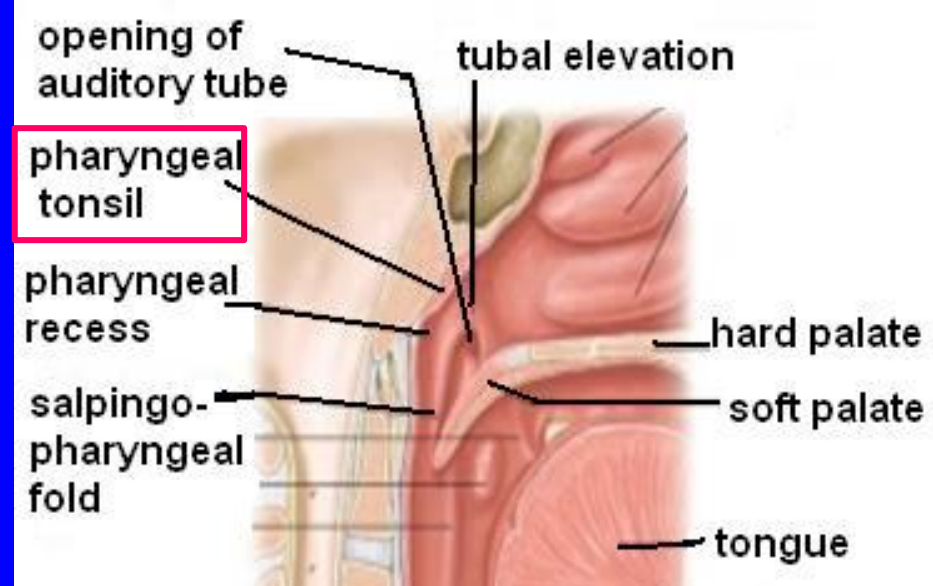
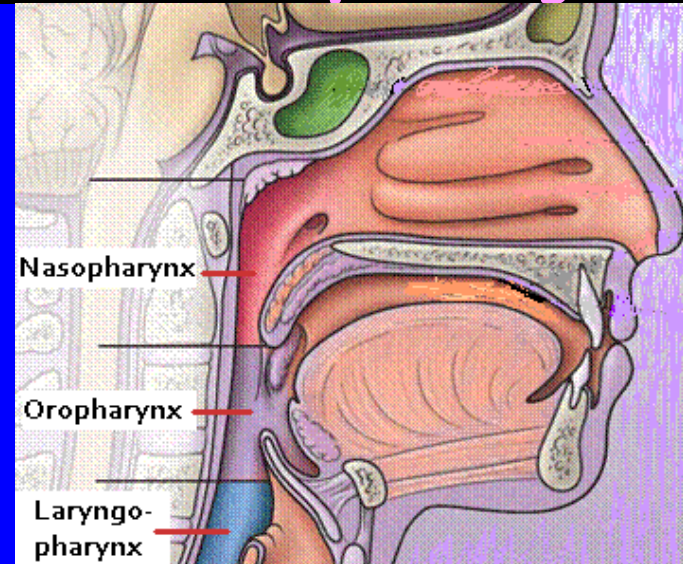


- Pharynx is divided into three parts:
 - **Nasopharynx.**
 - **Oropharynx.**
 - **Laryngopharynx.**



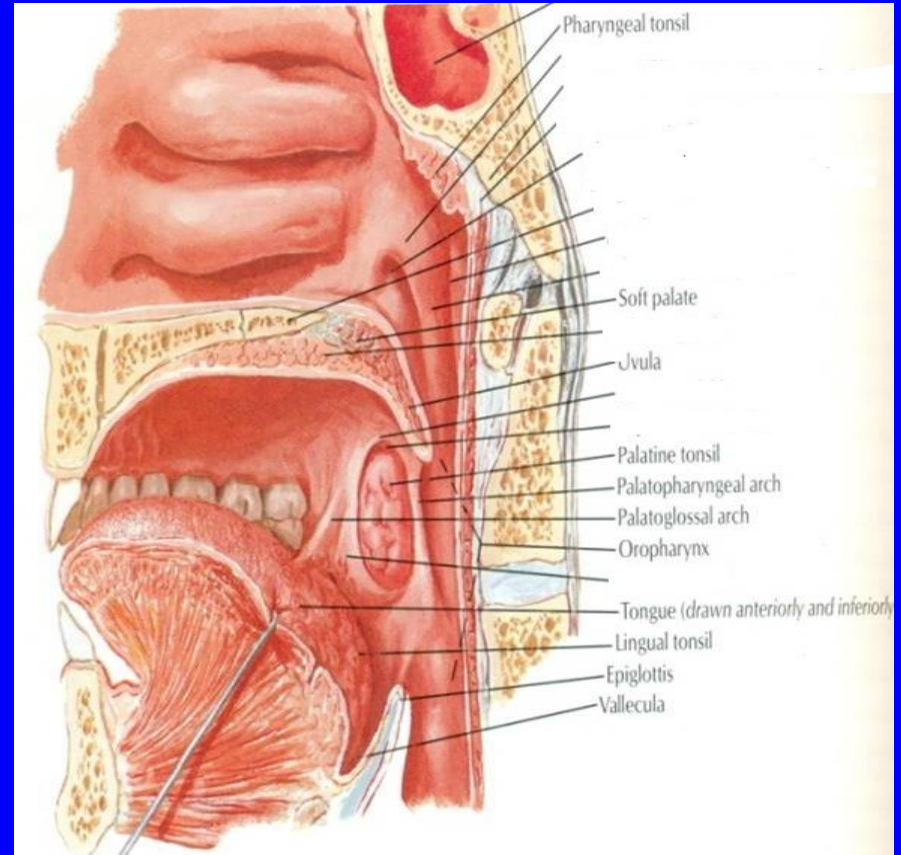
Nasopharynx

- 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.
 - Pharyngeal recess.
 - **Salpingopharyngeal fold** (raised by salpingopharyngeus muscle).



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**'.

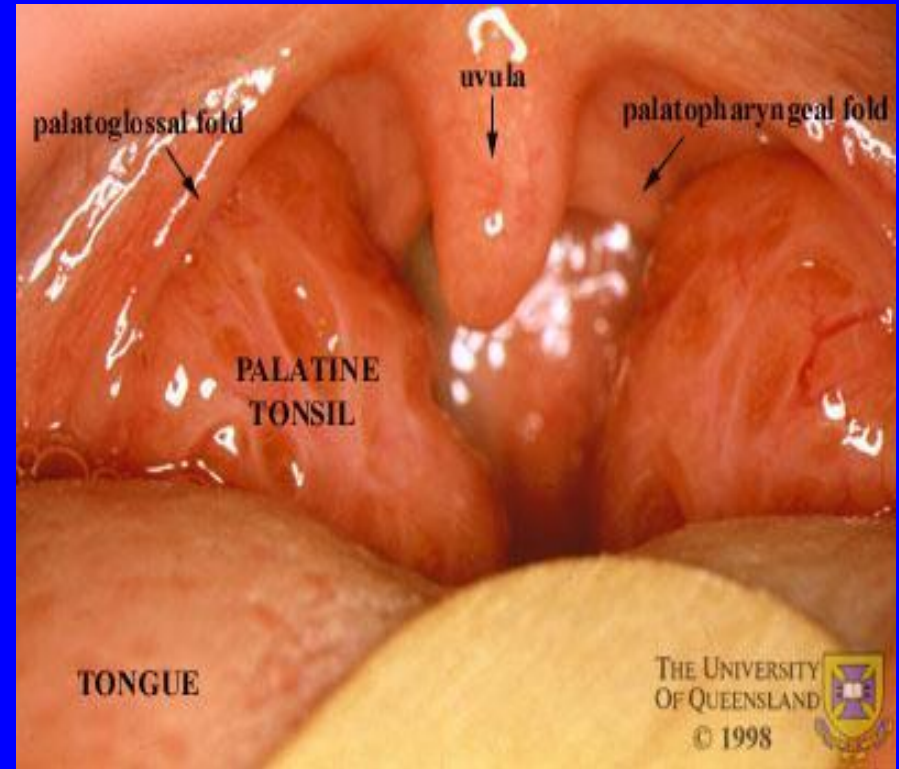


Palatine tonsils

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

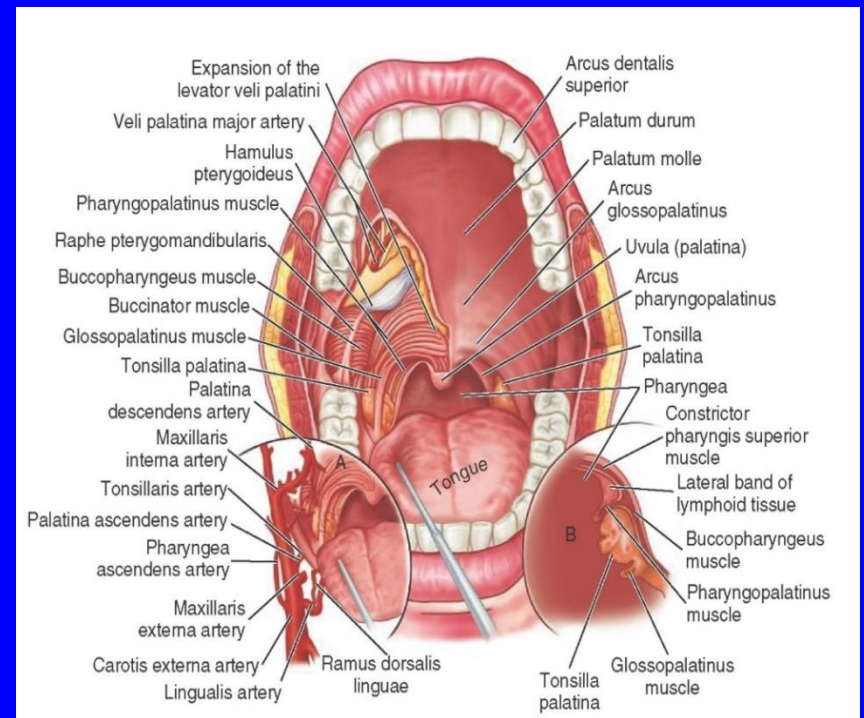
Each one is covered by mucous membrane and laterally by fibrous tissue (capsule).

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



Relations

- **Anteriorly:** palatoglossal arch
- **Posteriorly:** palatopharyngeal arch
- **Superiorly:** soft palate
- **Inferiorly:** posterior 1/3 of the tongue.
- **Medially:** cavity of the oropharynx
- **Laterally:** 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:

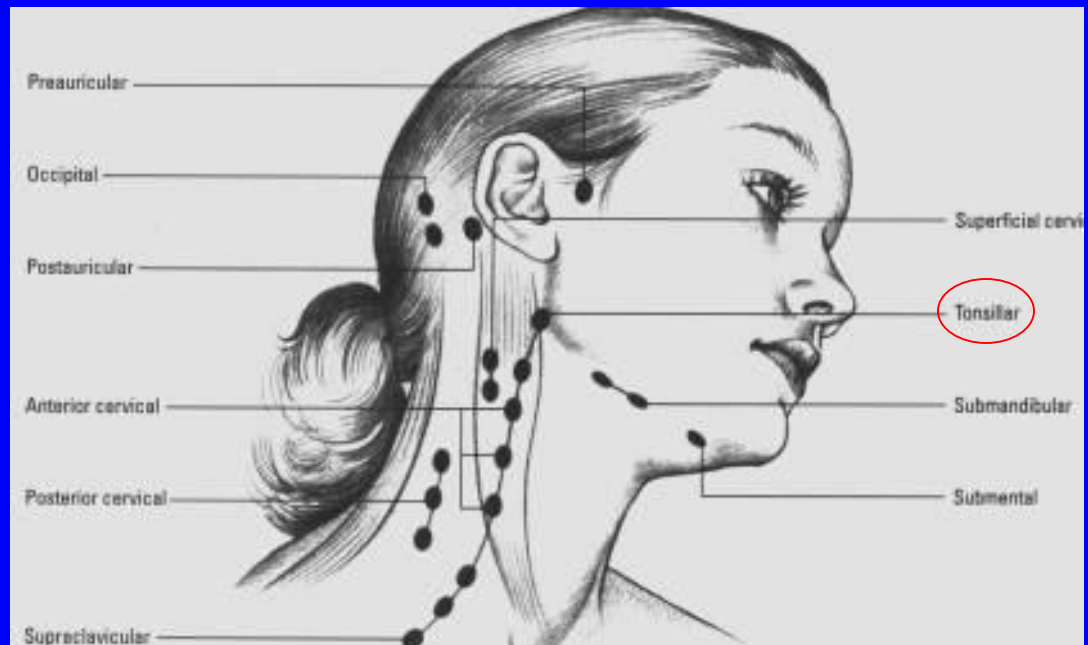
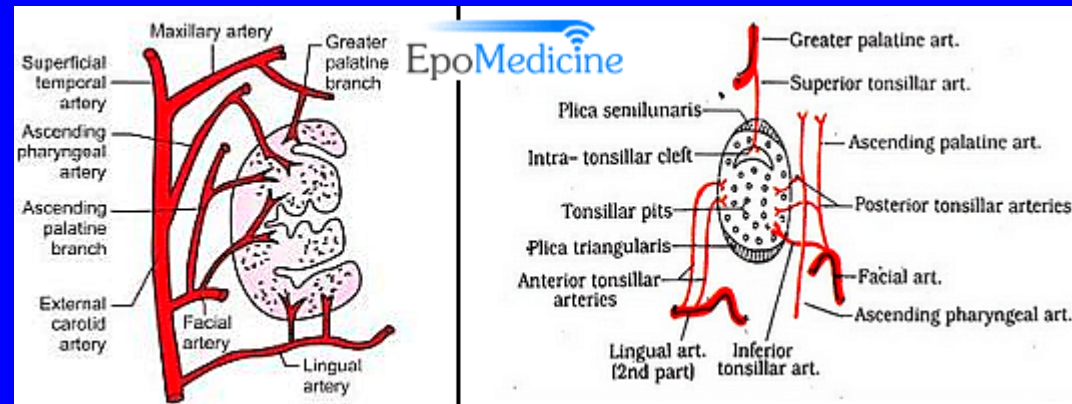
tonsillar artery from the fascial, lingual and greater palatine.

Venous drainage:

join external palatine pharyngeal and fascial veins

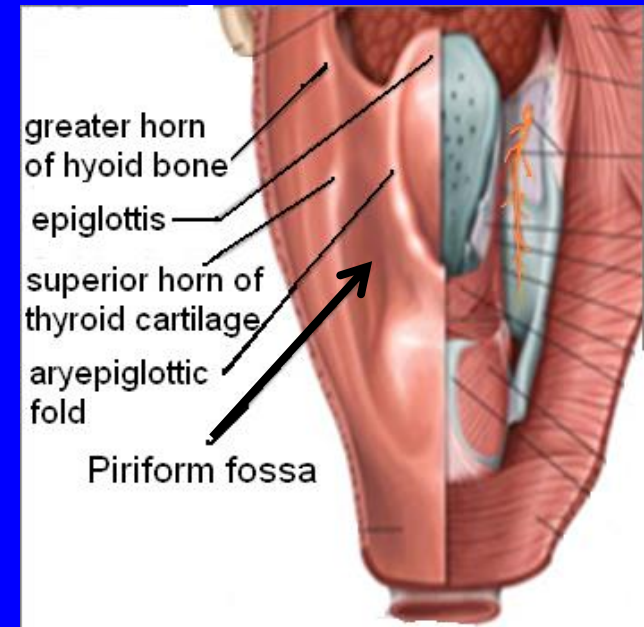
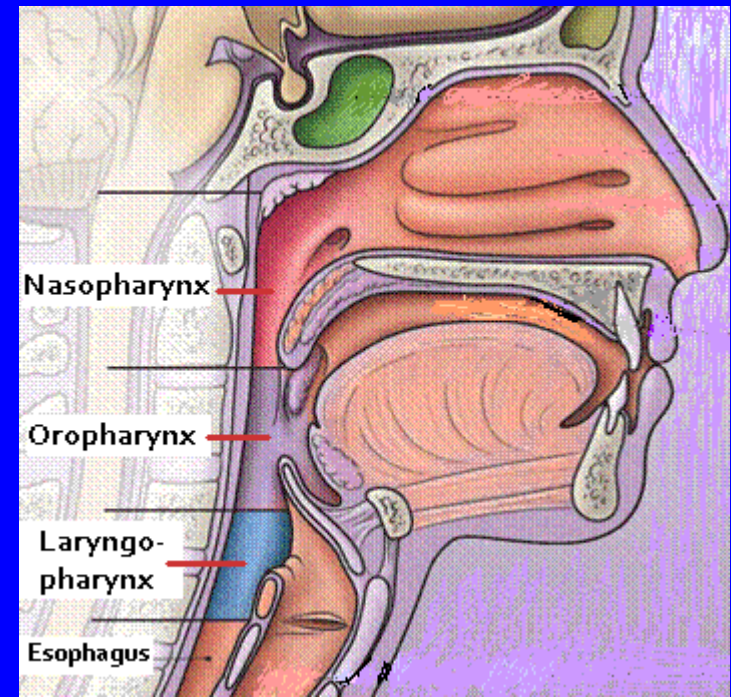
Lymphatic drainage:

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 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: from branches of the following arteries:

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

- 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

