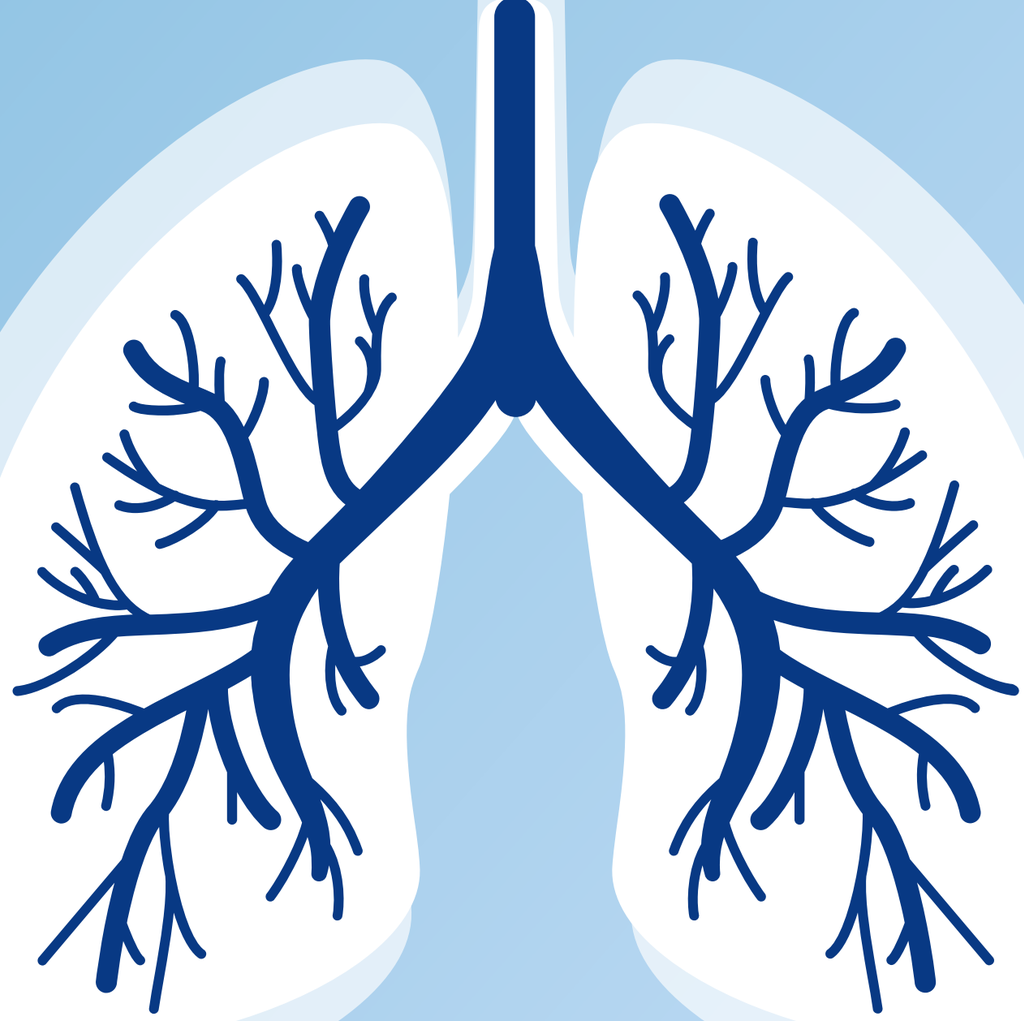


Color Index:

- Main text
- Boys' Slides
- Girls' Slides
- Important
- Dr's Notes
- Extra

Editing File

Lecture 2

ANATOMY OF THE NASAL CAVITY & PHARYNX

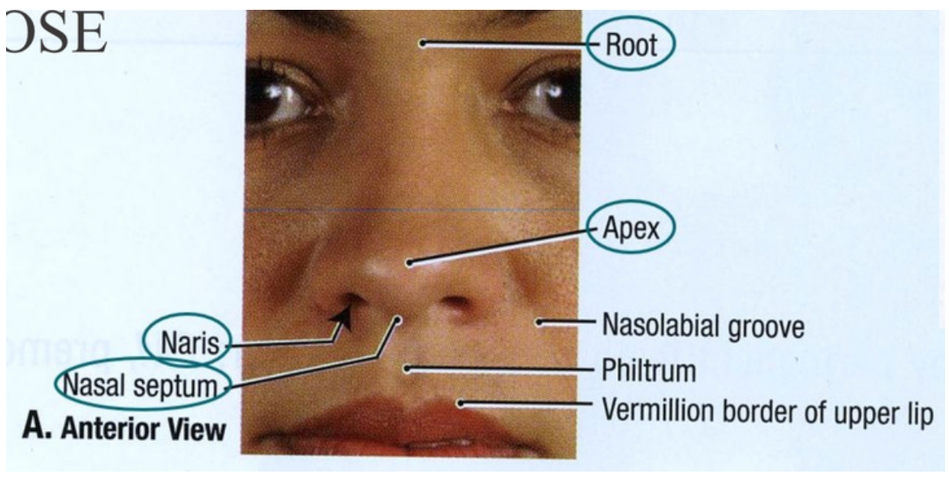
OBJECTIVES

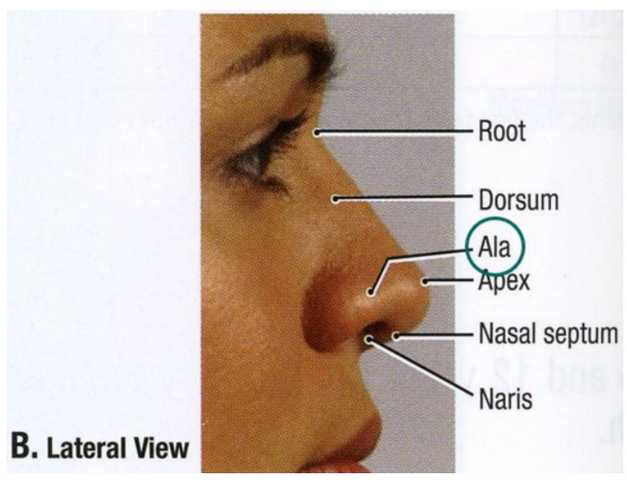
- Describe the boundaries of the nasal cavity.
- Describe the nasal conchae and meati.
- Demonstrate the openings in each meatus.
- Describe the paranasal sinuses and their functions.
- Describe the pharynx, its parts, and the related structures.

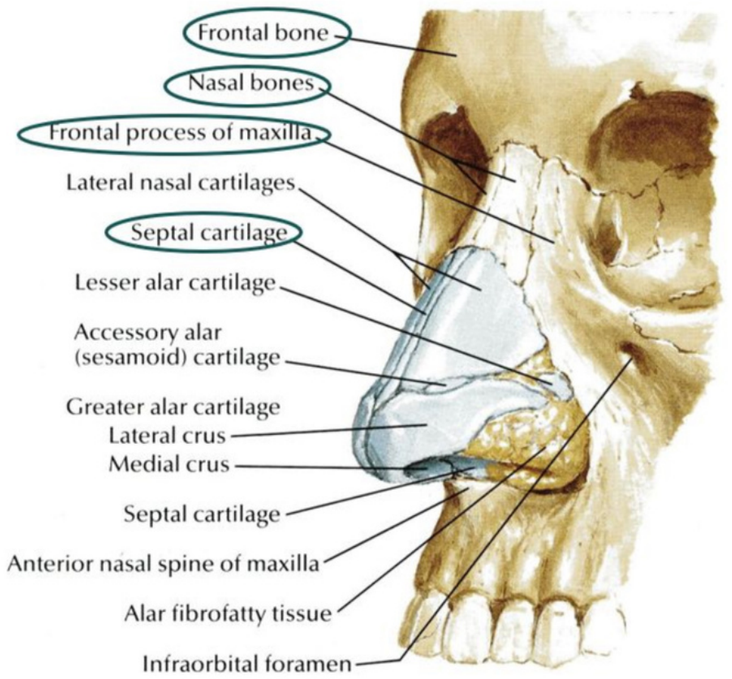
Nose

Boys' Slides

- The external nose has a free tip (apex) and a root (bridge)
- The external orifices are the two nostrils (nares)
- Each nostril is bounded medially by the nasal septum
- The nostrils are bounded laterally by the ALA.







The framework of the nose is made:

Above by :

- Nasal bones
- Frontal processes of the maxillae
- Nasal part of the frontal bone

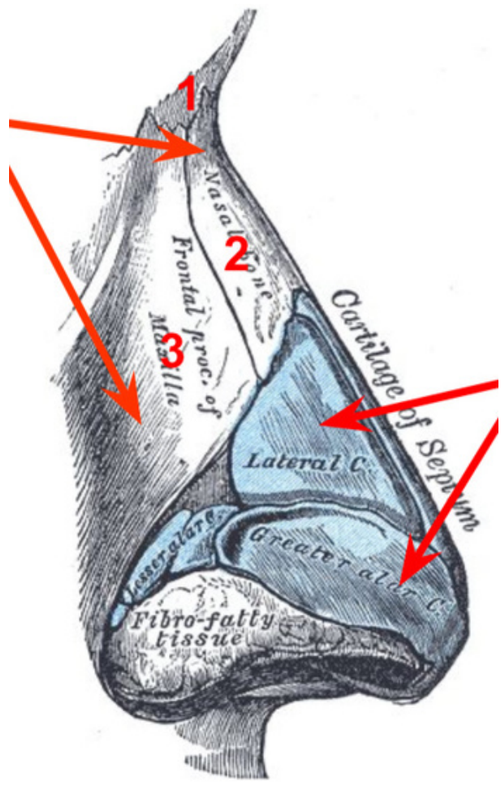
Below by hyaline cartilages:

- Upper nasal cartilages
- Lower nasal cartilages
- Septal cartilage

Nose

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

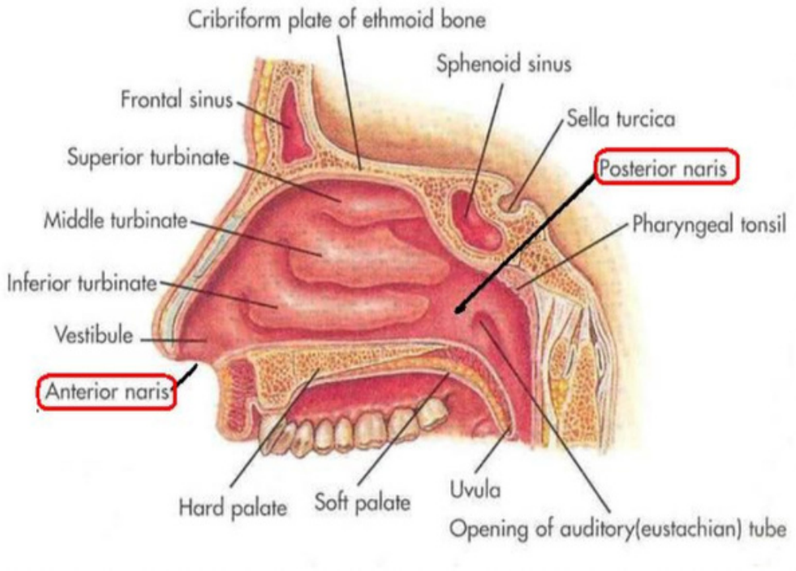
Formed above by:
Bony skeleton

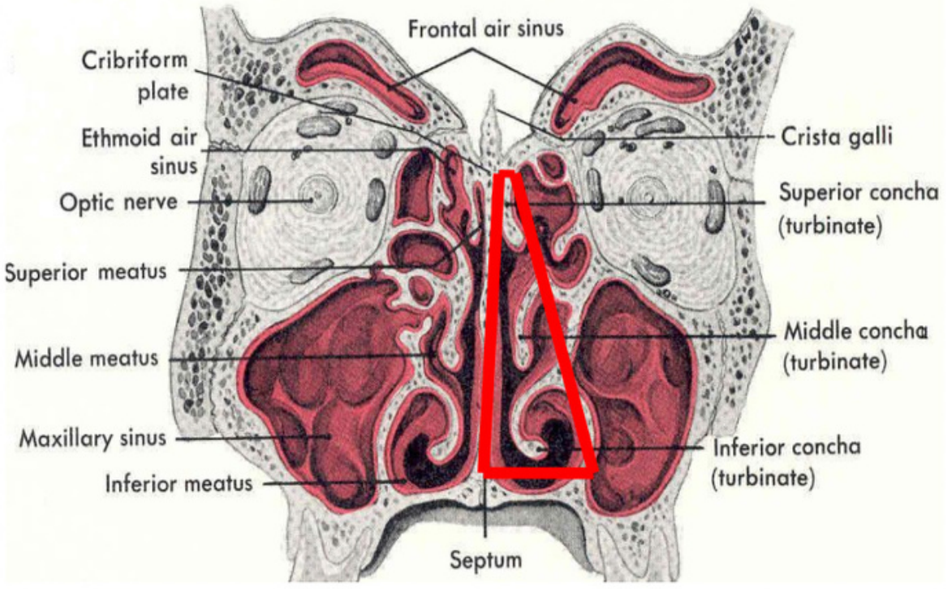


Formed below by :
plates of hyaline cartilage

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





Nasal cavity

IMPORTANT!

Helpful Video

Roof

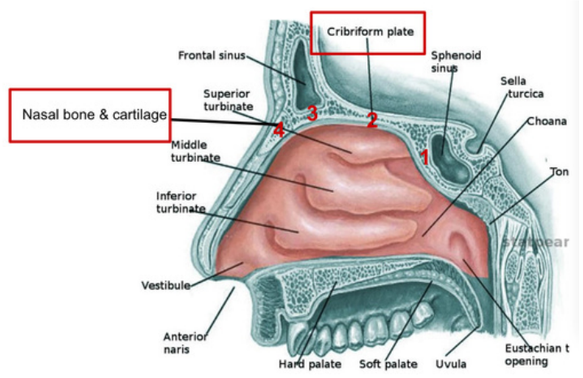
Narrow & formed (from behind forward) by the:

1- Body of sphenoid

2- Cribriform plate of ethmoid bone.

3- Frontal bone.

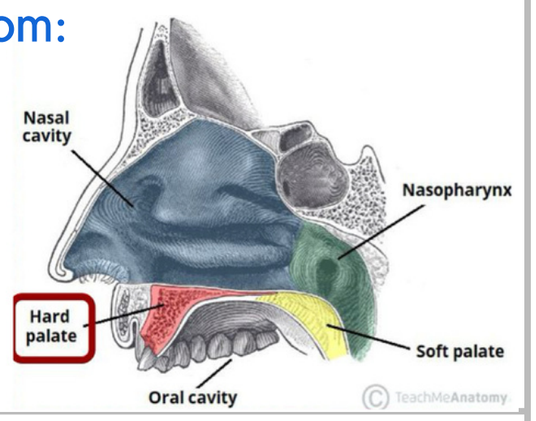
4- Nasal bone & cartilage



Floor

this is the upper surface of the hard palate) is made from:

- The palatine process of the maxilla and
- The horizontal process of the palatine bone
- Separates it from the oral cavity.
- Formed by the hard (bony) palate



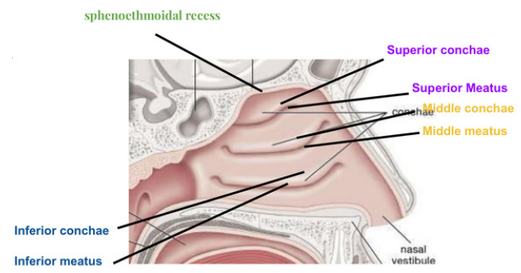
Lateral wall

Shows three horizontal bony projections:

1.the superior conchae

2.middle conchae

3.inferior conchae



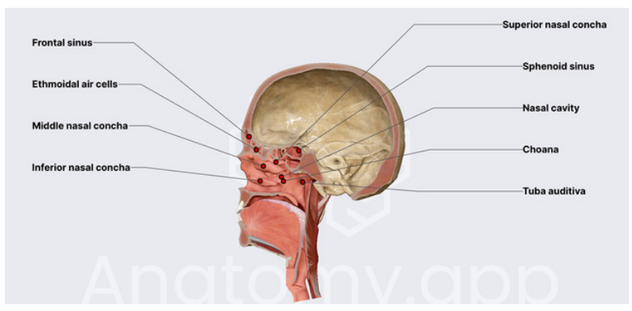
The cavity below each concha is called a meatus and are named as superior, middle & inferior corresponding to the conchae.

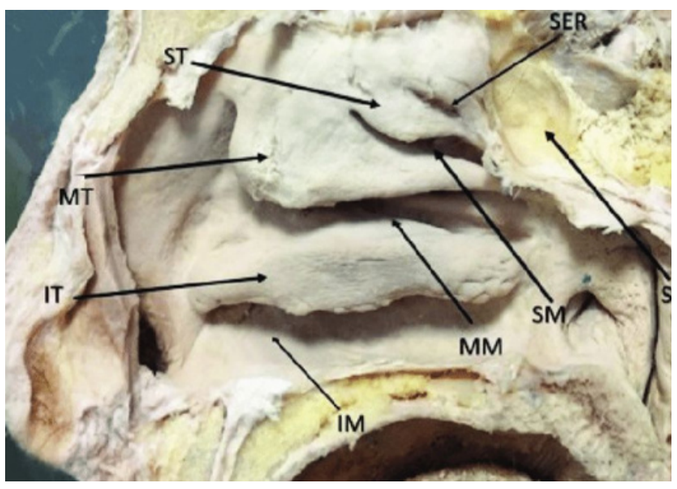
The small space above the superior concha is the sphenoethmoidal recess.

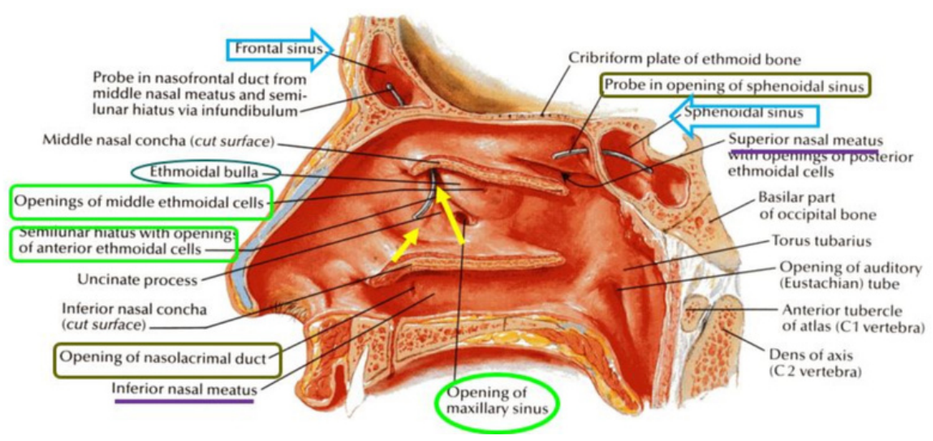
The conchae increases the surface area of the nasal cavity.

The recess & meati receive the openings of the:

- Paranasal sinuses.
- Nasolacrimal duct.



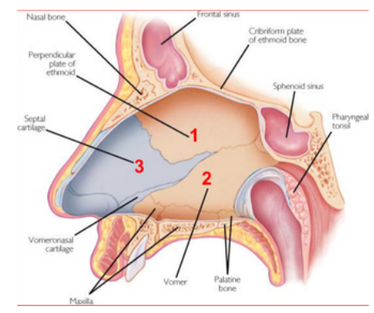


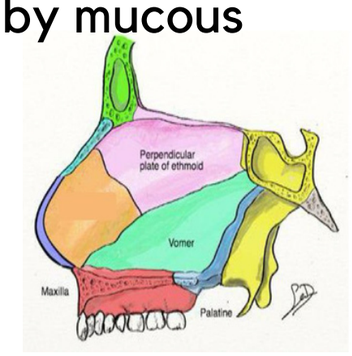


Medial wall

(the nasal septum) is an osteocartilaginous partition, covered by mucous membrane. It is formed by:

- Perpendicular plate of ethmoid bone.
- Vomer.
- Septal cartilage.





Paranasal sinuses

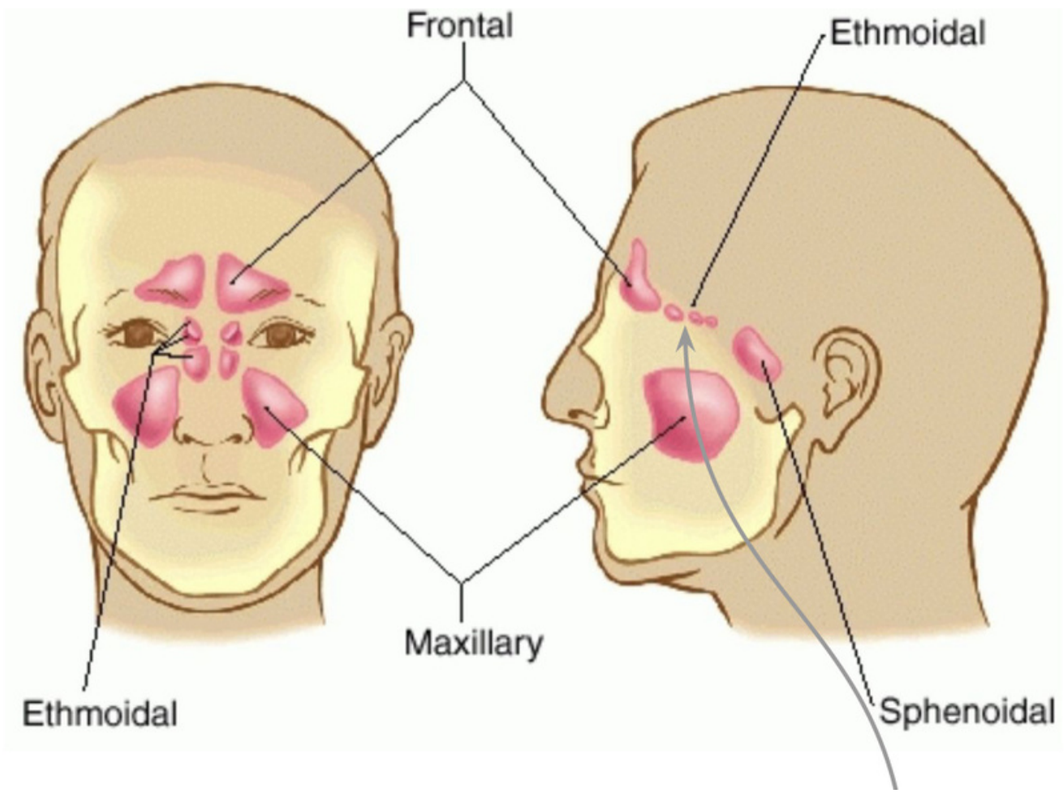
Air filled cavities located in the bones around the nasal cavity: ethmoid, sphenoid, frontal, & maxillary bones.

Lined by respiratory mucosa which is continuous with the mucosa of the nasal cavity.

Drain into the nasal cavity.

Function in:

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



Mes443: Note that there are 3 parts in ethmoidal sinus:

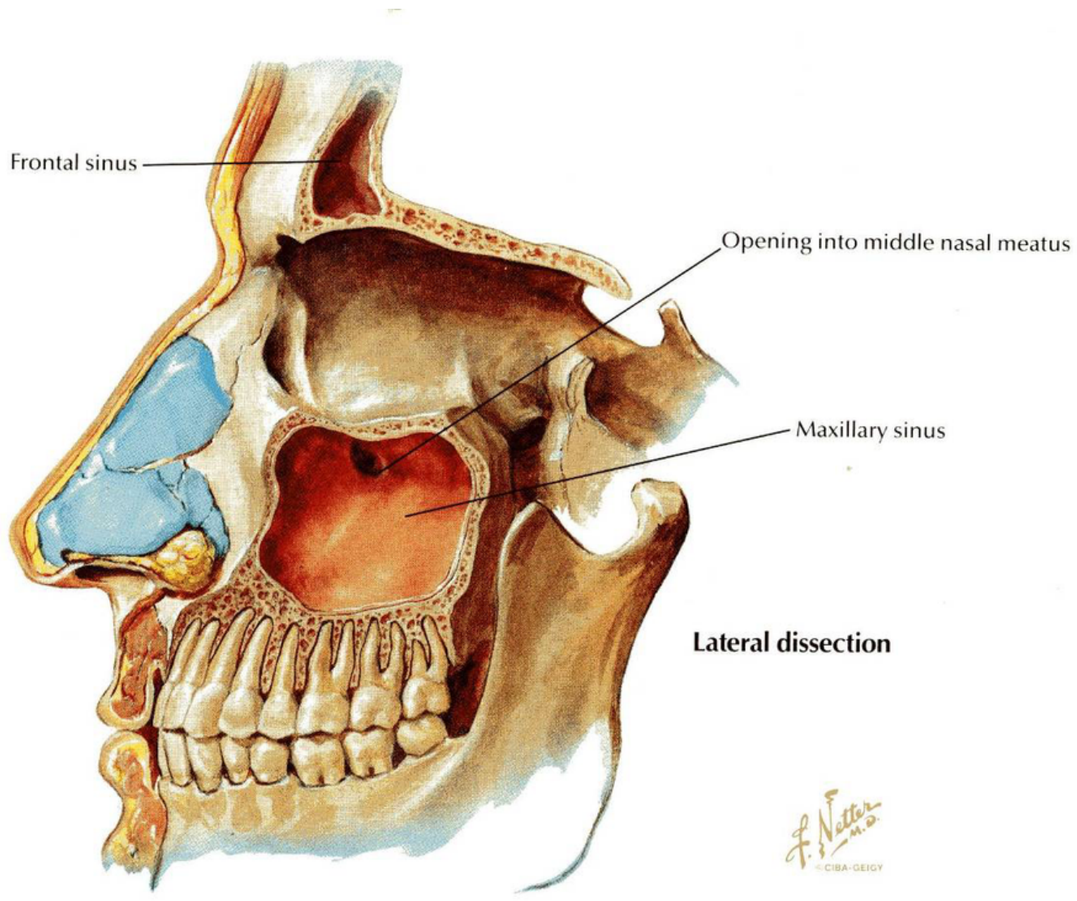
1. Anterior Ethmoidal Sinus
2. Middle Ethmoidal Sinus
3. Posterior Ethmoidal Sinus

Boys' Slides

Maxillary Sinus

The roots of the:

1st and 2nd premolar teeth and 3rd molar tooth project into the maxillary sinus.



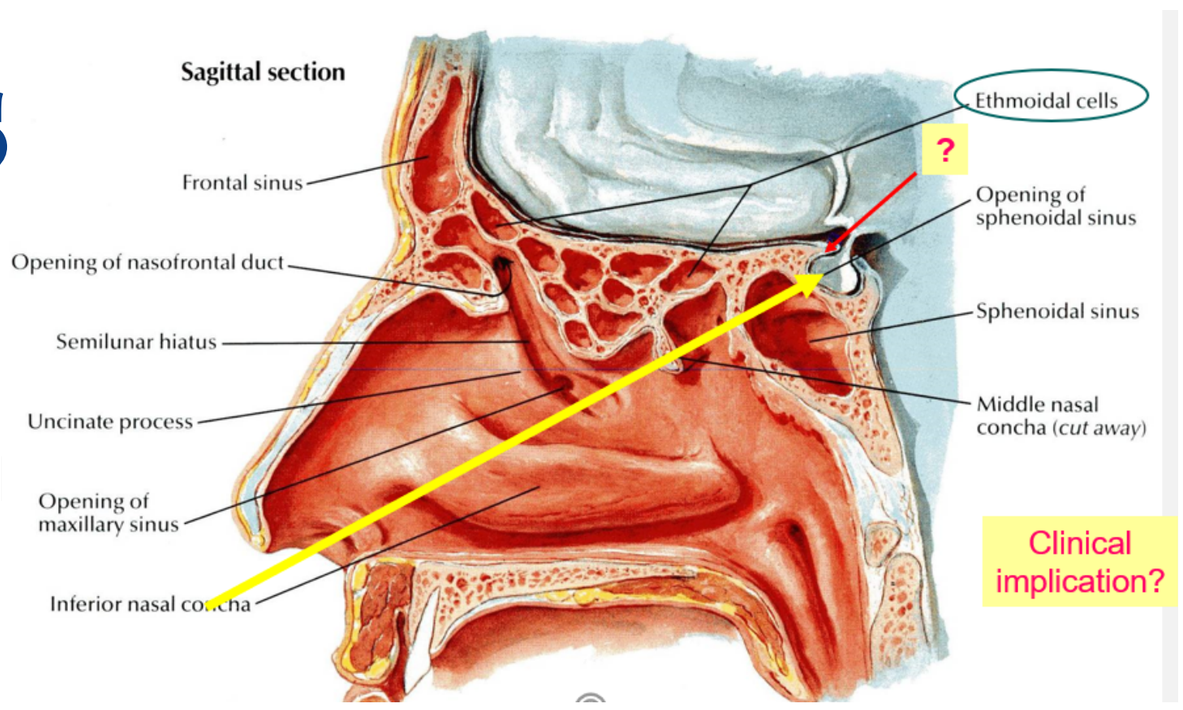
Clinical Implication?

- Tooth extraction can produce a **fistula**
- Tooth infection can produce **sinusitis**

The maxillary sinuses are the **most commonly infected** because their openings, well above the floor of the sinus, are not well positioned for natural drainage.

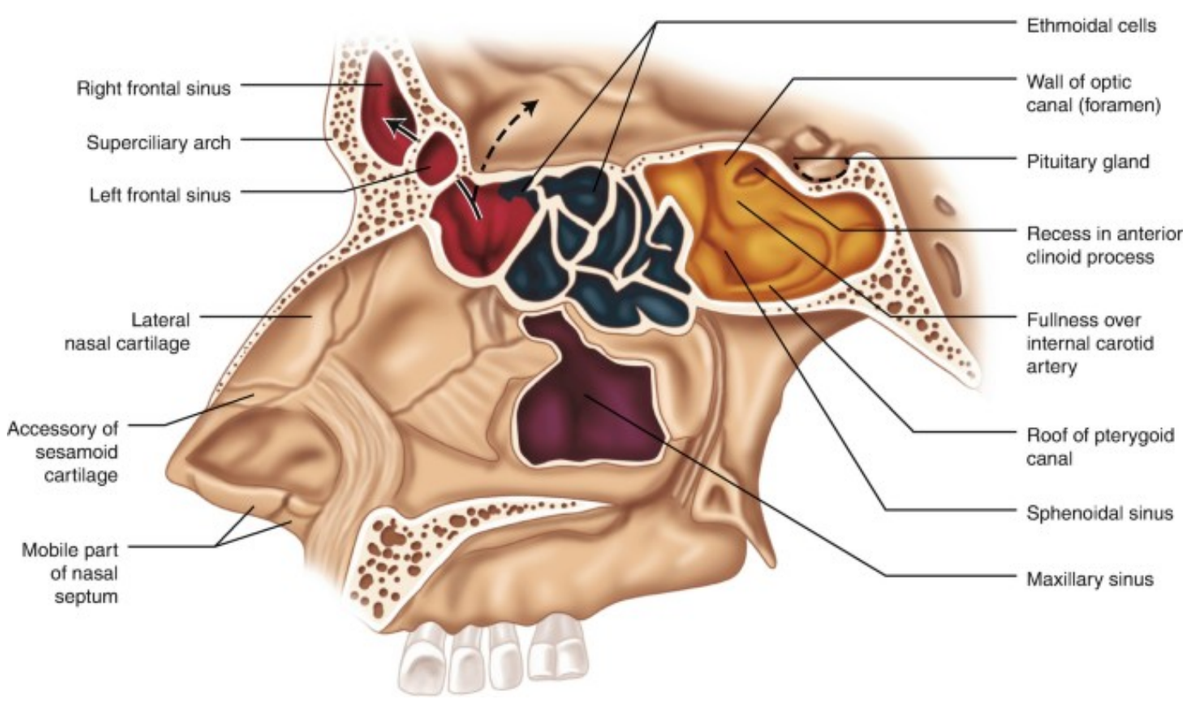
Sphenoidal Sinus

Surgeons have devised an approach to the pituitary, which lies immediately above the sphenoidal sinus, via the nose and sphenoidal sinus (trans-sphenoidal hypophysectomy).



Ethmoidal Sinus

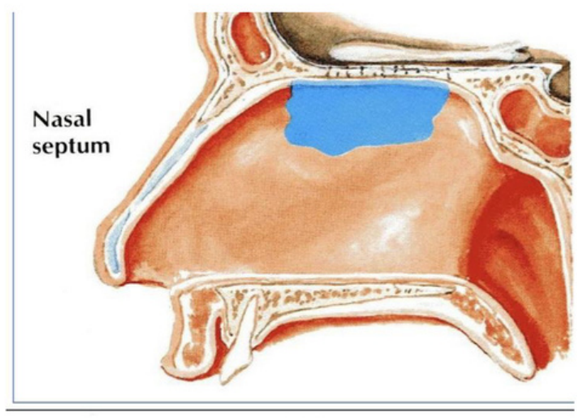
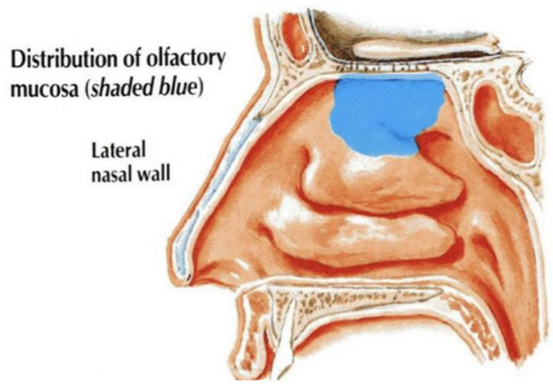
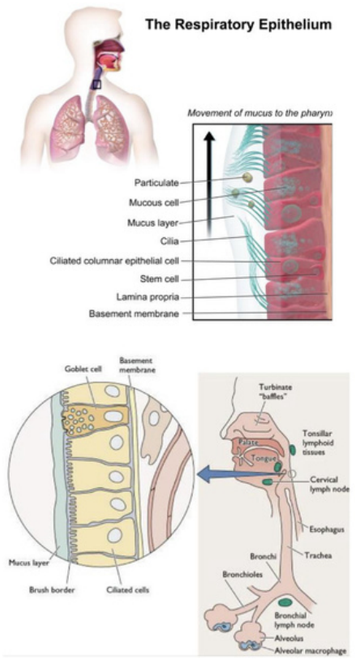
- Only a thin layer of bone separates these sinuses from the orbit.
- Infection can readily spread from the ethmoidal sinuses into the orbit.



The Drainage

Nasolacrimal Duct	Maxillary, frontal, middle ethmoidal & anterior ethmoidal sinuses	Posterior ethmoidal sinus	Sphenoidal sinuses
Drains into : Inferior Meatus	Drain into : Middle meatus	Drains into : Superior meatus	Drains into: Sphenoethmoidal recess

Mucosa

Nasal Mucosa	Respiratory Mucosa
• Olfactory: It is **delicate** and contains olfactory nerve cells. (receptors for smell) • It is present in the roof, upper part of lateral wall and nasal septum (superior surface of the cribriform plate): 1. Roof 2. Lateral wall: It lines the upper surface of the superior concha and the sphenoethmoidal recess 3.Medial wall: It lines the superior (upper) part of the nasal septum.   	• 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. • The air 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. 

Nerve Supply

Olfactory mucosa supplied by olfactory nerves.

Nerves of general sensation are derived from: Ophthalmic and Maxillary divisions of the trigeminal nerves.

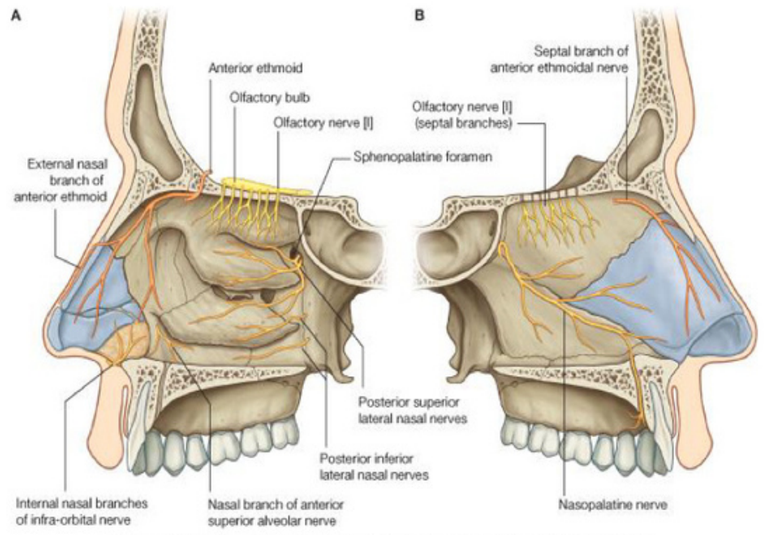
The anterior part is supplied by: Anterior Ethmoidal nerve

The posterior part is supplied by branches of the pterygopalatine ganglion:

Nasopalatine

Nasal

Palatine

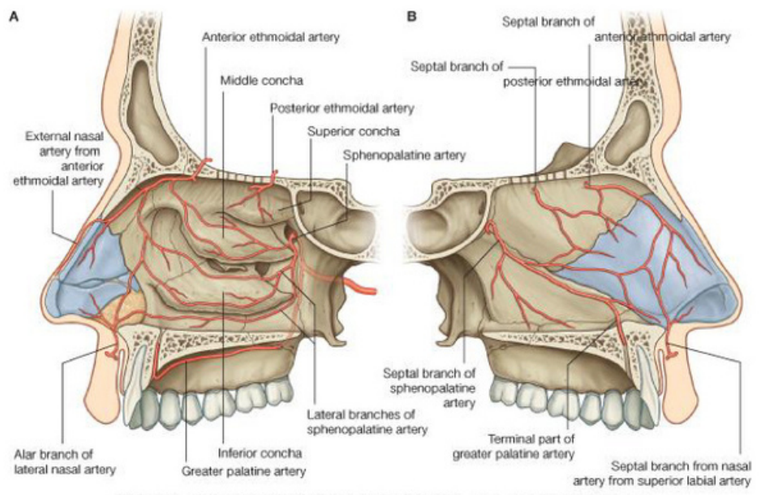


Arterial Supply

Nasal cavity is supplied by branches of:

1. Maxillary; sphenopalatine artery
2. Facial; superior labial artery
3. Ophthalmic; anterior and posterior ethmoidal arteries.

The arteries make a rich anastomosis in the region of the vestibule, and anterior portion of the septum (little area).



Venous Drainage

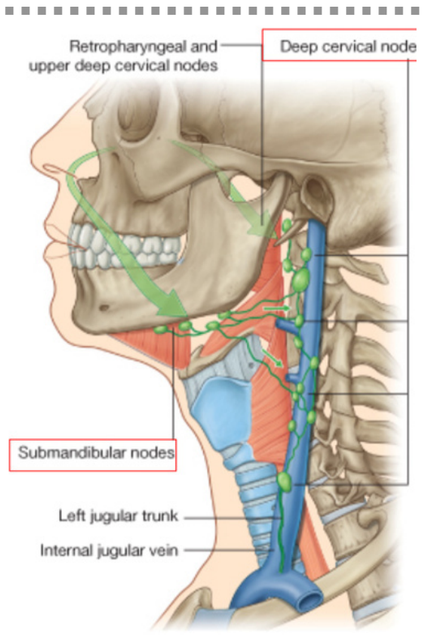
Nasal cavity is drained by submucosal plexus formed by veins accompany the arteries, which drain into the:

1. Sphenopalatine vein.
2. Facial vein
3. Ophthalmic vein

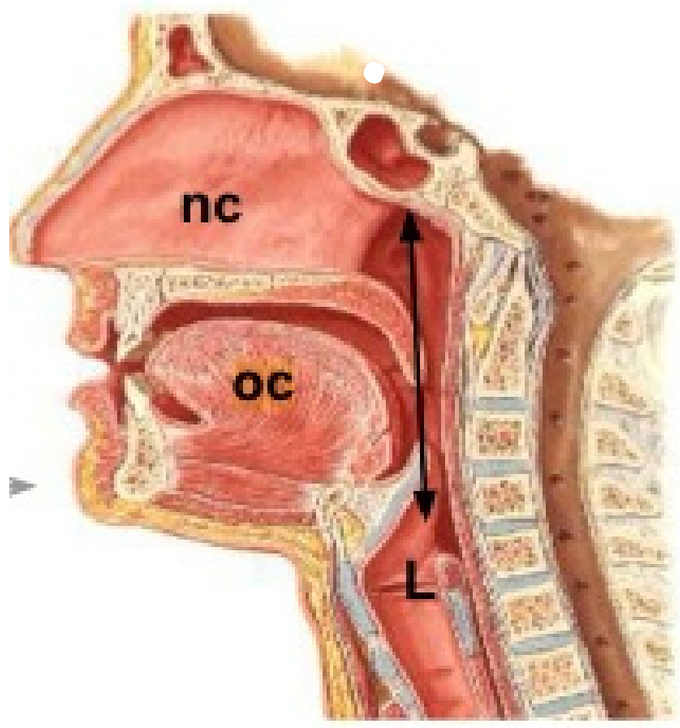
Lymphatic Drainage

The lymphatics from the:

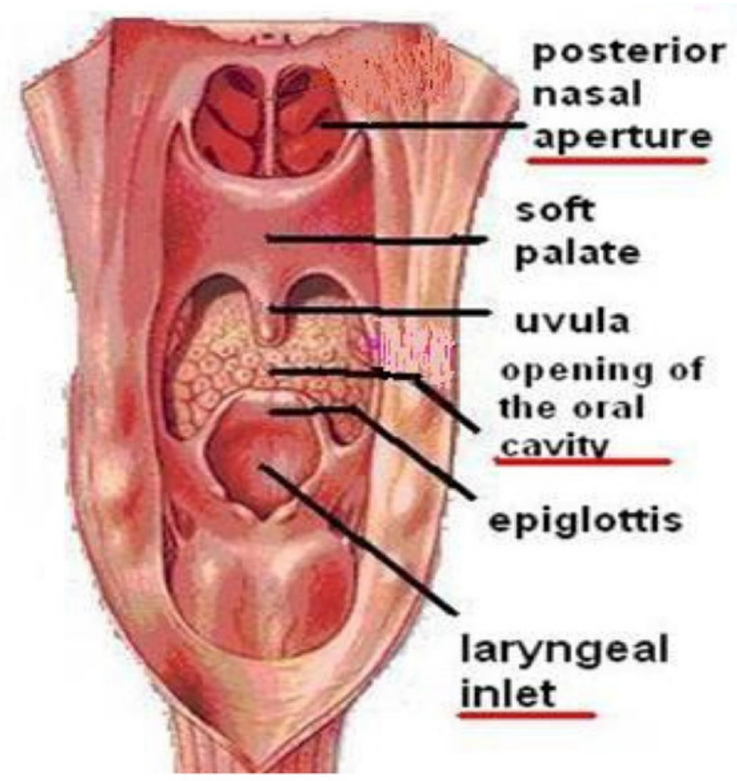
1. Vestibule drains into the submandibular lymph nodes.
2. Rest of the cavity drains into the upper deep cervical lymph nodes.



Pharynx



- It is a 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.
- Acts as a common entrance to the respiratory and alimentary tracts
- 12 – 14 cm long
- Wide at its beginning (3.5 cm)
- Narrow at its termination (1.5 cm)
- The anterior wall is deficient and shows (from above downward):
  1. Posterior nasal apertures.
  2. Opening of the oral cavity.
  3. Laryngeal inlet.
- By means of the auditory tube, the mucous membrane is also continuous with that of the tympanic cavity
- The muscles arranged in circular and longitudinal layers.



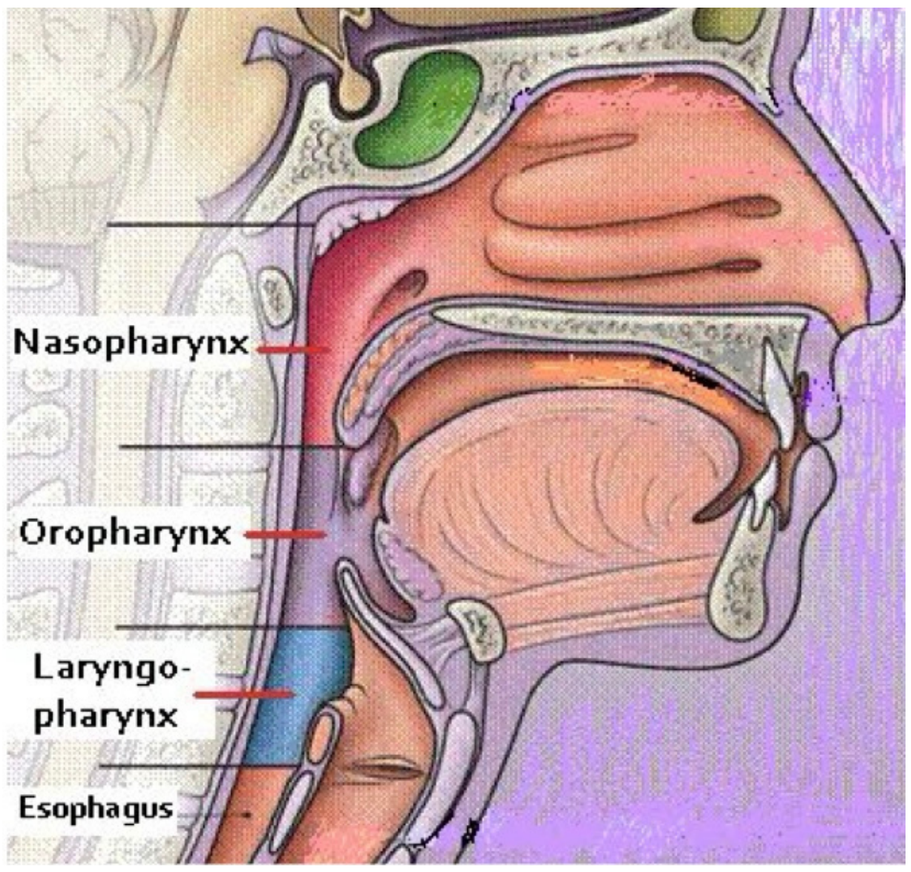
Muscles of Pharynx

Longitudinal Muscles	Circular (CONSTRICTORS) Muscles
Three in number: • Stylopharyngeus arise from styloid process • Palatopharyngeus arise from palatine aponeurosis • Salpingopharyngeus arise from auditory tube • Are inserted: into posterior border of thyroid cartilage Functions: • Elevate the larynx & pharynx during swallowing	Three in number: 1. Superior constrictor 2. Middle constrictor 3. Inferior constrictor • The three muscles overlap each other. Functions: • propel the bolus of food (الطعام الممضوغ)down into the esophagus • Lower fibers of the inferior constrictor (Cricopharyngeus) act as a **sphincter**, closing the passageway between the pharynx and esophagus.

Pharynx

Divided into:

- Nasopharynx
- Oropharynx
- Laryngopharynx



Nasopharynx

It extends from the base of skull to the soft palate

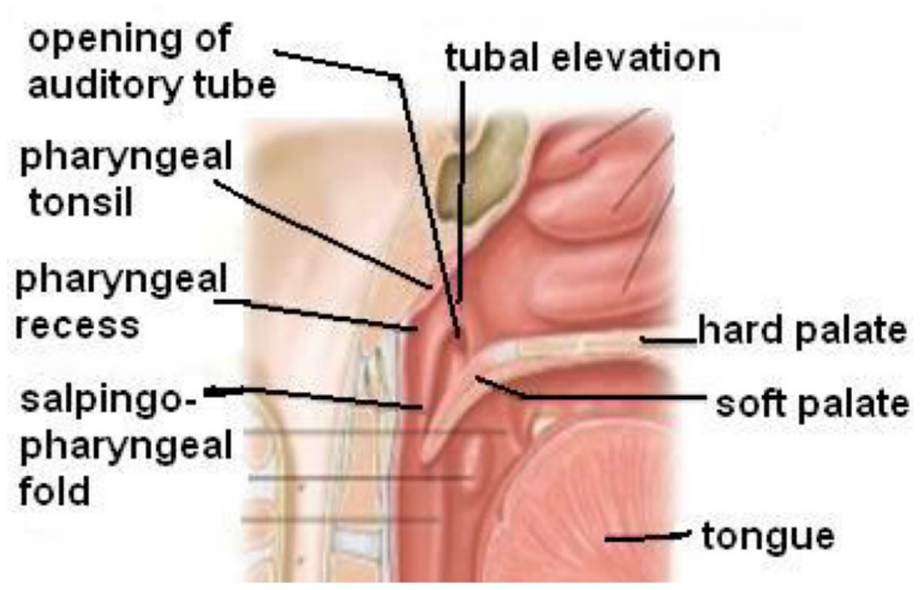
It communicates with the nasal cavity through posterior nasal apertures

It has Pharyngeal tonsils (**adenoides**) that are present in the submucosa covering the roof causing obstruction of nasophaynx & difficulty in breathing

Communicates:
- Anteriorly with nasal cavities through posterior nasal openings
- Inferiorly with oropharynx through pharyngeal isthmus
- Laterally with tympanic cavity (middle ear) through auditory tube

Lateral wall shows:

1. Opening of auditory tube.
2. Tubal elevation (produced by posterior margin of the auditory tube).
3. Tubal tonsil.
4. Salpingopharyngeal fold (raised by salpingopharyngeus muscle).
5. Pharyngeal recess



Functional Anatomy: The nasopharynx is kept opened to allow breathing by:
a.The rigidity of its wall (well developed pharyngobasilar fascia
b.The lack of pharyngeal constrictors over its wall

Pharynx

Oropharynx

It lies behind the mouth cavity

It extends from soft palate to upper border of epiglottis.

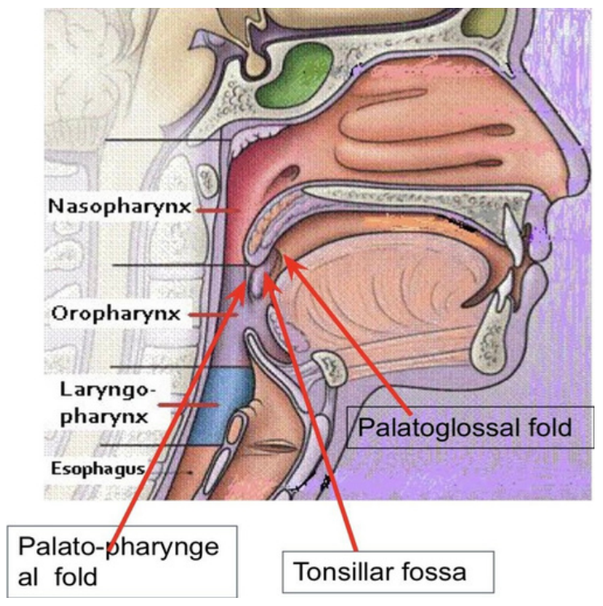
It communicates with the oral cavity through the oropharyngeal isthmus

Communicates:

- Anteriorly with oral cavity through oropharyngeal isthmus
- Inferiorly with continuous with laryngopharynx
- Superiorly with nasopharynx through pharyngeal isthmus

Lateral wall features: [from before backwards]

- Palatoglossal arch (fold): an anterior fold of mucous membrane overlying palatoglossus muscle
- Palatopharyngel arch (fold): a posterior fold of mucous membrane overlying palatopharyngeus muscle
- Palatine tonsil located between them in a depression called the (tonsillar fossa)



Palatine tonsils

- the Two masses of lymphoid tissue located in the lateral wall of the oropharynx in the tonsillar fossa between palatoglossal & palatopharyngeal arches
- Each one is covered laterally by fibrous tissue (capsule) and mucous membrane
- It reaches a maximum size during childhood. After puberty, it diminishes in size
- Its medial surface presents 10-15 orifices leading to tonsillar crypts
- Arterial supply: tonsillar branch of facial artery
- Venous drainage: external palatine (paratonsillar vein) that drain into pharyngeal plexus of veins
- Lymphatic drainage: upper deep cervical lymph nodes
- Nerve supply: tonsillar branch of glossopharyngeal nerve.
- Applied anatomy: tonsillitis may cause referred pain in ear, both tonsil & middle ear are supplied by glossopharyngeal nerve

Pharynx

Laryngopharynx

It lies behind the laryngeal inlet & the posterior surface of larynx.

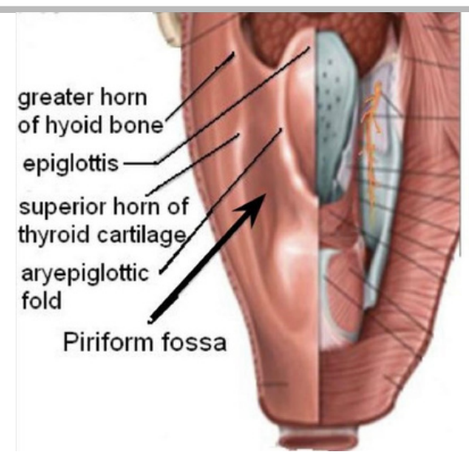
It extends from upper border of epiglottis to lower border of cricoid cartilage

Communicates:
- Anteriorly with larynx through inlet of larynx
- Inferiorly with continuous with esophagus

A small depression situated on either side of the laryngeal inlet is called (piriform fossa)

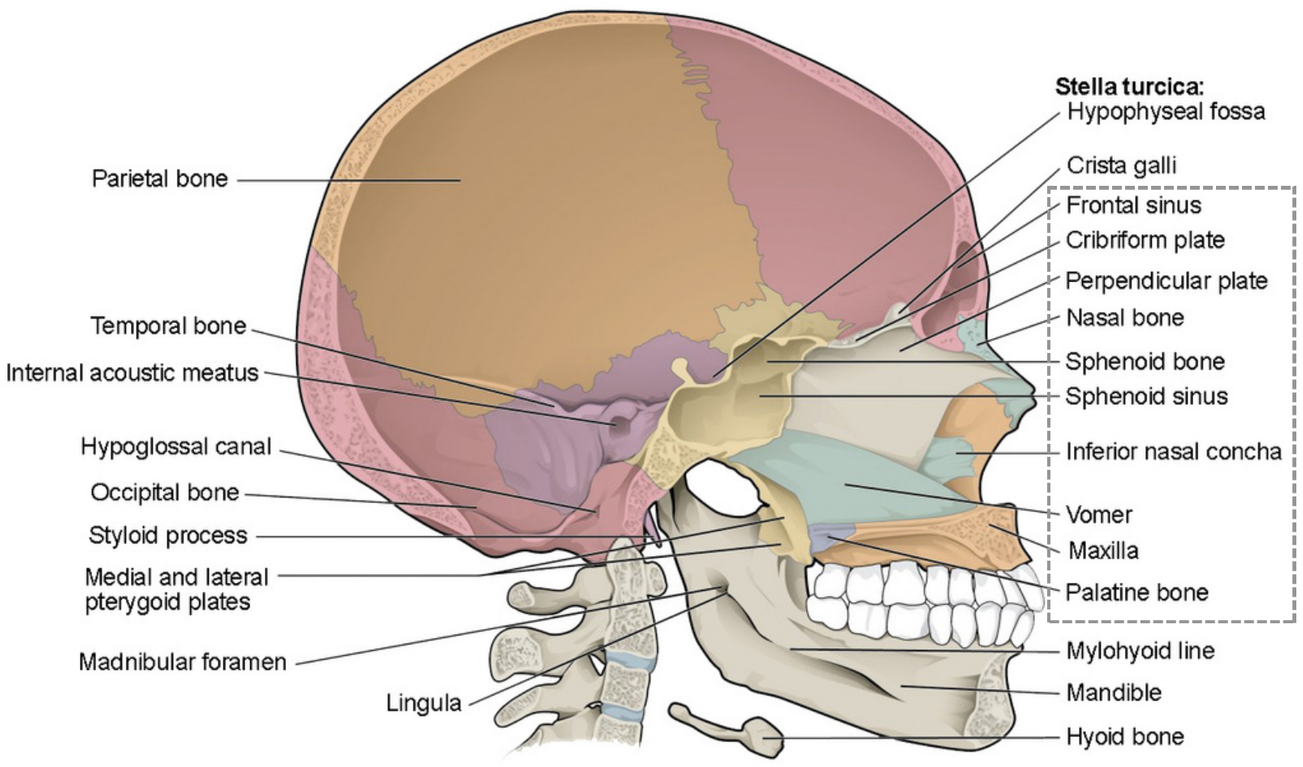
It is a common site for the lodging of foreign bodies (مثل شوكة السمك)

Branches of **internal laryngeal & recurrent laryngeal nerve**:
- **Lie deep** to the mucous membrane of the fossa.
- Vulnerable to injury during removal of a foreign body.



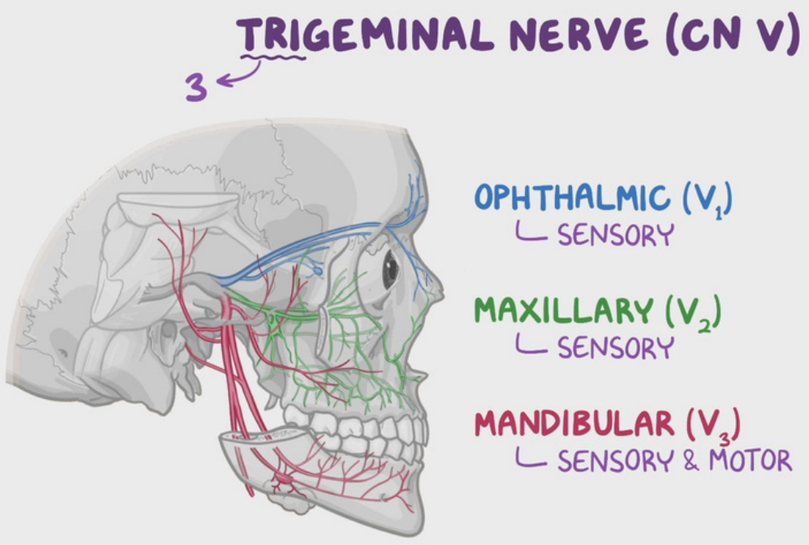
	Nasopharynx	Oropharynx	Laryngopharynx
nerve supply (sensory)	Maxillary Nerve (V2)Trigeminal	Glossopharyngeal nerve	Internal laryngeal branch of Vagus nerve
nerve supply (motor)	All the muscles of pharynx are supplied by the pharyngeal plexus, except the Stylopharyngeus, which is supplied by the glossopharyngeal nerve. Superior cervical sympathetic ganglion		
Arterial supply	All the 3 parts are supplied by branches of: 1. Ascending pharyngeal artery 2. Facial artery (Ascending palatine artery, tonsillar branches) 3. Lingual artery 4. Maxillary artery		
venous drainage	The veins drain into pharyngeal venous plexus first, which drains into the Venous internal jugular vein.		
Lymphatic Drainage	The lymphatics drain into the deep cervical lymph nodes either directly, or indirectly through the retropharyngeal or paratracheal lymph nodes.		

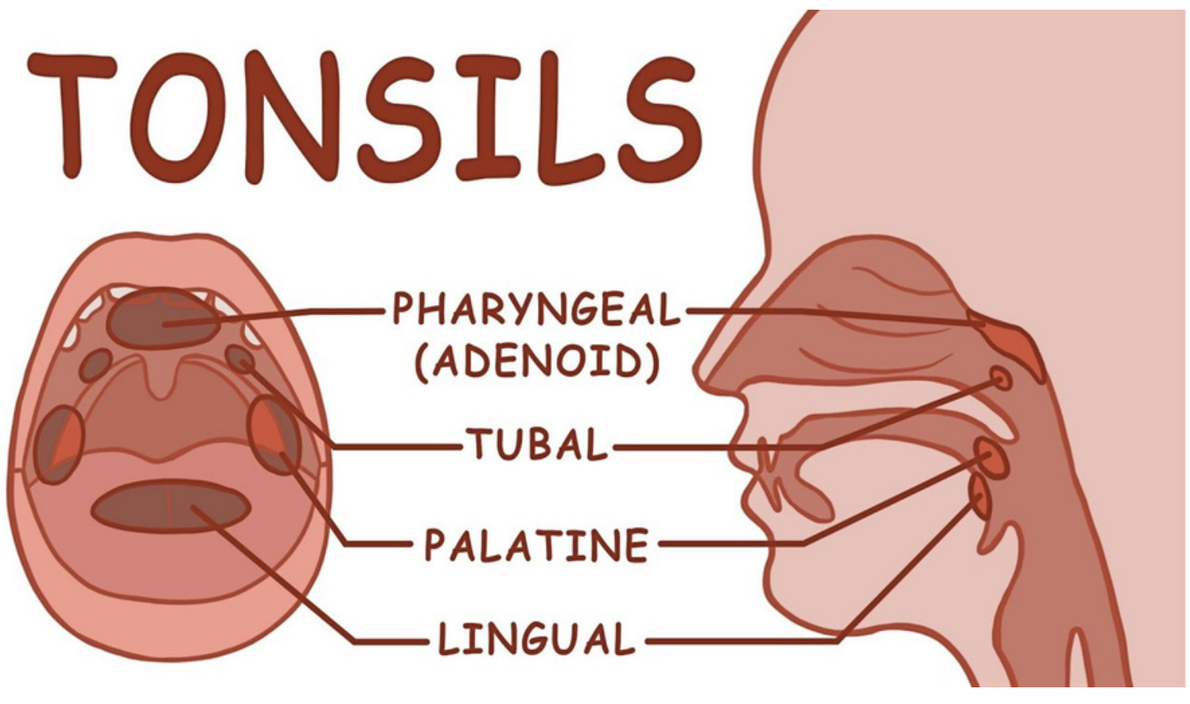
Helpful Images



Better image for skull bones!

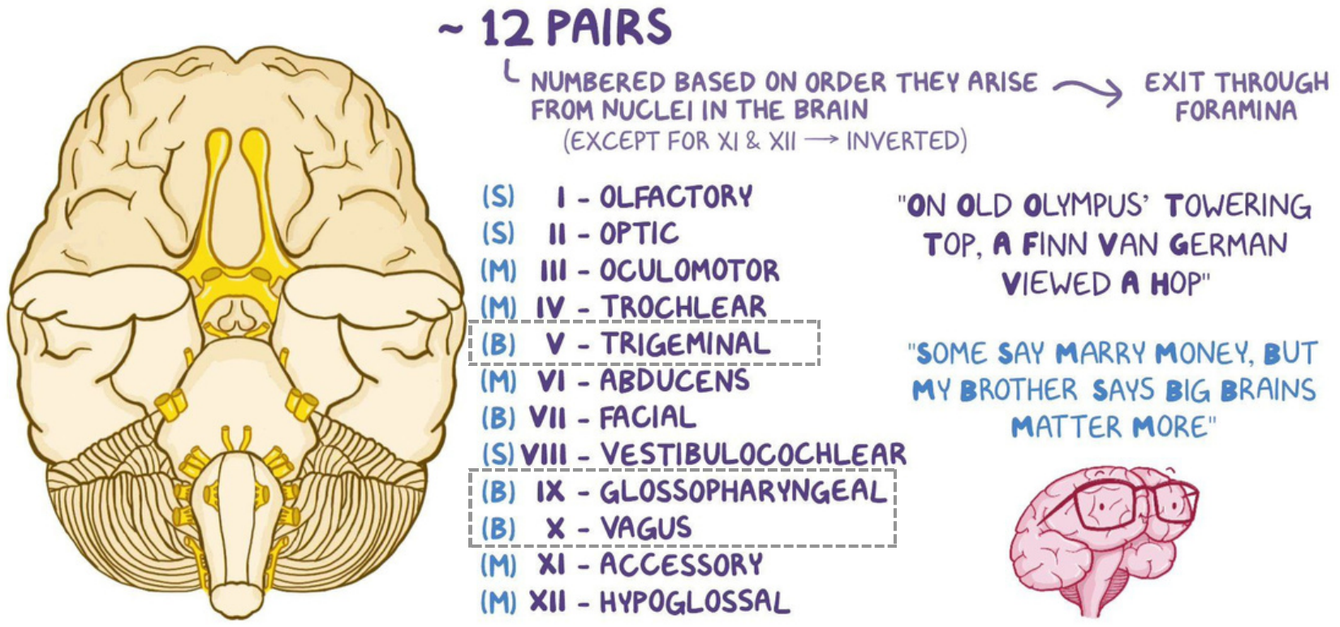
Trigeminal branches (**Ophthamalic** and **Maxillary** are sensory branches supplying nasal cavity for general sensation (page 7)





- Pharyngeal and tubal tonsils are found in **naso**pharynx
- Palatine tonsils are found in **oro**pharynx

Cranial Nerves in case you forgot them :D



MCQs

1 **Which of the following lines the vestibule?**

A-Ciliated columnar epithelium	B-Respiratory mucosa	C-Skin	D-Stratified squamous epithelium

2 **Lateral Wall of nasopharyngeal Shows?**

A-Palatopharyngeal Folds	B-Palatine tonsil	C-Palatoglossal fold	D-Opening of auditory tube

3 **Vagus Nerve Innervate which of the following?**

A-Laryngopharynx	B-Nasopharynx	C-Oropharynx	D-ALL

4 **Which of the following drains into the superior meatus?**

A-Superior meatus drains into	B-Posterior Ethmoidal Sinus	C- Sphenoidal Sinus	D-Middle Ethmoidal

5 **hard (bony) palate is found in which of the following sites of nasal cavity?**

A- Roof	B-Floor	C-lateral wall	D- septum

Q1:C Q2:D Q3:A Q4:B Q5:B

SAQs

1

Which of the following is communicate with the nasal cavity through posterior nasal apertures

nasopharynx

2

Which arteries supply the nasal cavity

Branches of the Maxillary (sphenopalatine artery) Facial (superior labial) Ophthalmic (ethmoidal arteries).

3

What lines the lower part of nasal cavity

Respiratory mucosa

4

Enumerate the sinuses that drains into the middle meatus

1/ Middle Ethmoidal, Maxillary, Frontal, and Anterior Ethmoidal Sinuses

More questions? Click here!

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Basmah Alsantali

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- **Reyouf Alakeel**
- **Ashwaq Almutairi**
- **Aleen Almutairi**
- **Jana Alahaideb**
- **Wsaif Alotaibi**
- **Omar Alattas**
- **Ibrahim Altayyar**
- **Nasser Mohammed**
- **Abdulmalik Aldafas**
- **Ali Alhajji**
- **Sulaiman Abdulkarim**
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