



# Nose I-II

## Objectives:

our objectives are unavailable and these from 436

1. Anatomy of the external nose, nose, nasal cavity and paranasal sinuses.
2. Physiology of the nose and paranasal sinuses.
3. Blood and nerve supply of the external nose, nose, nasal cavity and paranasal sinuses.
4. Functions of the nose and paranasal sinuses.
5. Congenital anomalies.
6. Choanal atresia.
7. Acute & chronic rhinitis.
8. Allergic & non-allergic rhinitis.
9. Vestibular & furunculosis.
10. Nasal polyps (allergic & antrochoanal) etc.
11. Radiology illustration (e.g. CT scan)

Resources: Doctor slides, team 436

Done by: Tareq Ahmed Alomaim, Abdulhakim Bin Onaiq

Edited by :

Revised by: Abdulhakim Bin Onaiq

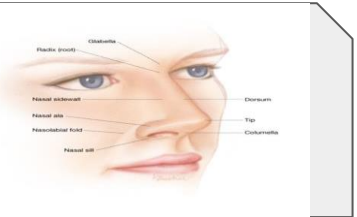
]Color index: **Important** | **Notes** | Extra[

## External Nose

- Pyramidal in shape -Root is up and base is down

- Consists of:

1. Skin
2. Musculature
3. Osteo-cartilagenous Framework



### Surface Anatomy: Subunits

- Dorsum -Tip -Columella -Side walls -Ala -Sill

### Skin

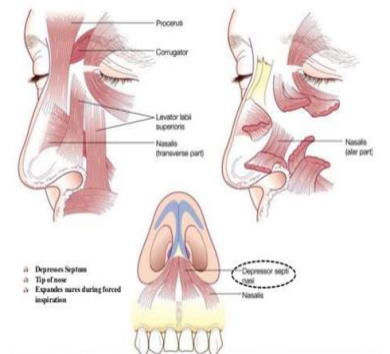
-The skin over the nasal bones and the upper lateral cartilage: is thin and freely mobile .

-The skin over the alar cartilages: is thick and adherent and contains many sebaceous glands.

### Musculature:

- ❖ Covers the osteo-cartilagenous framework. Movement of the tip, ala and the overlying skin, Includes:

- Procerus (noitcejni xotob rof ecalp nommoc)
- Nasalis (transverse and alar parts)
- Levator labii superioris alaque nasi
- Dilator nares (anterior and posterior)
- Depressor septi



## Osteo-cartilaginous framework:

- Bony and cartilaginous parts.
- Upper one third is bony and lower two thirds are cartilaginous.

### Bony part:

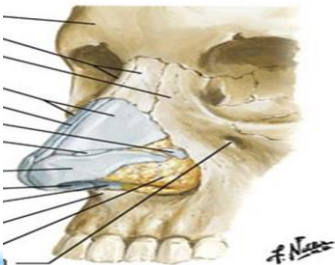
-Consists of two nasal bones that meet in the midline and rest between the frontal bone superiorly and the frontal process of the maxillary bone infero-laterally.

### Cartilaginous part:

- Upper lateral cartilages
- Lower lateral cartilages (alar cartilages)
- Lesser alar cartilages
- Septal cartilage

Upper lateral cartilage:	Between the nasal bones and the alar cartilages Fuses in the midline with the septal cartilage Part of the internal nasal valve
Alar cartilages 'Lower lateral cartilage:'	U-shaped. Medial crus forms the columella and lateral crus forms the ala. Lateral crus overlaps the upper lateral cartilage on each side.
Lesser alar cartilages: AKA sesamoid cartilages	Two or more small cartilages Above and lateral to the alar cartilages Interconnected by the adjacent perichondrium and periosteum.

Nose



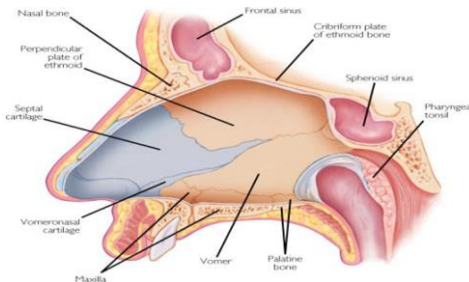
# Internal Nose

## Septum:

- ❖ Support the nasal dorsum and the tip of the nose.
- ❖ Separates the two nasal cavities
  - Septum Consists of:
    - Perpendicular plate of ethmoid bone
    - Vomer
    - Large quadrilateral cartilage
    - Minor contribution of crests of nasal bones, nasal spine of the frontal bone, anterior nasal spine of maxilla, rostrum of the sphenoid bone, crests of the palatine and maxillary bones.
- ❖ Divided into: two nasal cavities by the nasal septum
- ❖ Communicates with the exterior through the nostrils (naris) and with the nasopharynx through the choana (posterior nasal aperture).
- ❖ Each cavity consists of a skin-lined portion called the vestibule and a mucosa-lined portion, the nasal cavity proper.

## Vestibule of the nose:

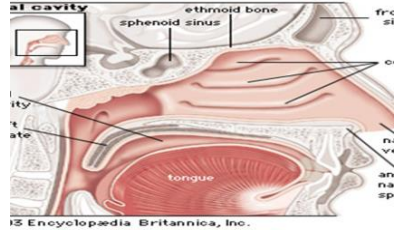
- ❖ Forms the anterior and
- ❖ inferior part of the nasal cavity.
- ❖ Lined by skin



- ❖ Contains sebaceous glands, hair follicles, and hair called vibrissae

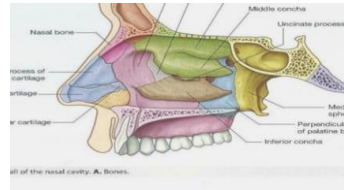
- Nasal cavity proper: Each side has:

- Medial wall    -Lateral wall
- Roof and    -floor



- **Lateral wall**

- ❖ Marked by the bony projections called turbinates or chonchae.
- ❖ Inferior, middle, superior and sometimes supreme turbinates.
- ❖ Below each turbinates is the corresponding meatus.



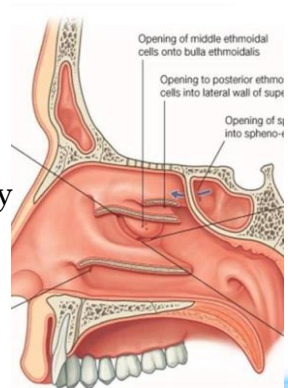
- **Inferior meatus:** The largest

- ❖ Runs along the whole length of the nasal cavity.
- ❖ Nasolacrimal duct opens in its anterior part.

- **Middle meatus:**

- ❖ Runs in the posterior half of the nasal cavity
- ❖ Anterior ethmoid cells, maxillary and

frontal sinus drain eventually in the middle meatus



● **Superior meatus:** the smallest

- ❖ Runs in the posterior one third of the nasal cavity.
- ❖ Posterior ethmoid cells drain in the superior meatus
- ❖ drain the posterior ethmoid sinus.

● **Spheno-ethmoid recess:**

- ❖ Lies behind the superior turbinate.
- ❖ Receives the sphenoid sinus ostium.

● **Medial wall:**

Formed by the nasal septum.

● **Roof:**

Formed by the nasal bones, frontal bones, ethmoid (cribriform plate) and sphenoid bones

● **Floor:**

Formed by the palatine process of the maxilla (anterior  $\frac{3}{4}$ ) and the palatine bones (posterior  $\frac{1}{4}$ ).

● **Lining:**

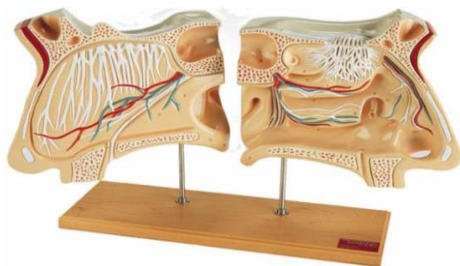
- ❖ Vestibule: Skin, hair follicles and sebaceous glands
- ❖ Olfactory region: upper  $\frac{1}{3}$  of the nasal cavity contains mucous membranes rich in the neuro-epithelium
  - Respiratory region:

-Mucous membranes which are highly vascular and contain erectile tissue.

-Lined by pseudostratified ciliated columnar epithelium rich in goblet cells. Sub-mucosa is rich in serous and mucous secreting glands.

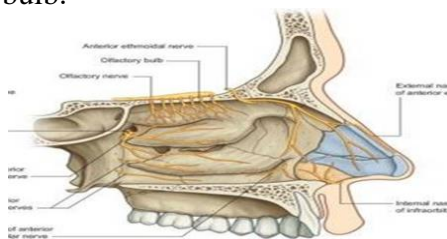
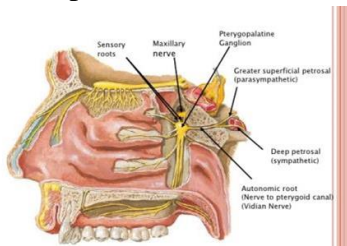
## ●Nerve supply:

- 1.Olfactory nerves
- 2.Common sensation
- 3.Autonomic supply



### 1.Olfactory nerves:

Arranges in 20-12nerves and passes through the cribriform plate and end in the olfactory bulb.



### .2Common sensation:

- ❖ Anterior ethmoidal nerves: anterior and superior part of the nasal cavity.
- ❖ Branches of the sphenoidal ganglion: posterior 2/3 pf the nasal cavity.
- ❖ Branches of infraorbital nerve: supply the nasal vestibule.

### .3Autonomic supply:

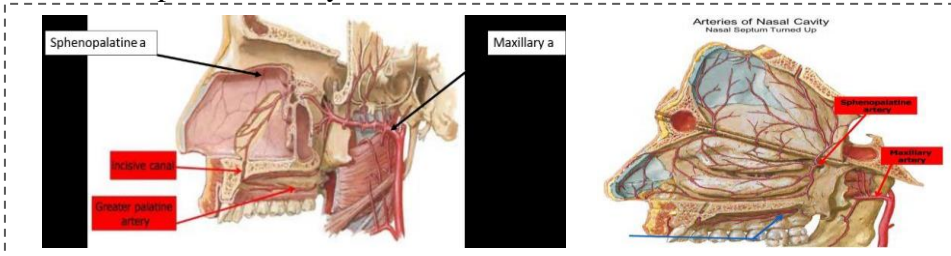
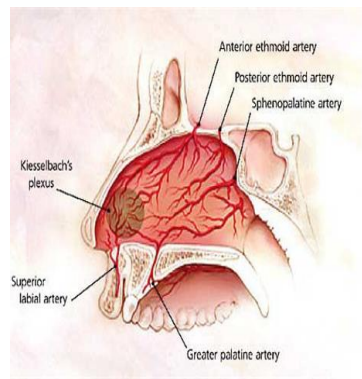
- ❖ Parasympathetic: come from the greater superficial petrosal nerve and travel through the vidian nerve, causes vasodilatation and increases nasal secretions.
- ❖ Sympathetic: from the sympathetic chain, through superior cervical ganglion, travels in deep petrosal nerve through the vidian nerve.

## Blood supply:

❖ From branches internal and external carotid arteries.

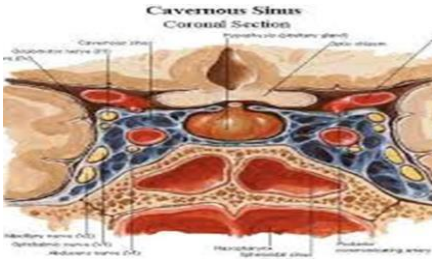
### ❖ Little's area:

- Anterior ethmoid artery
- Septal branch of superior labial artery.
- Sphenopalatine artery
- Greater palatine artery

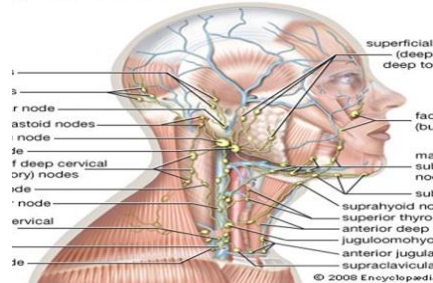


## Lymphatic drainage:

- Drains in the submandibular, upper jugular and retropharyngeal lymph nodes.



### System of the head and neck





# Sinuses

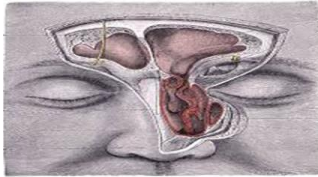
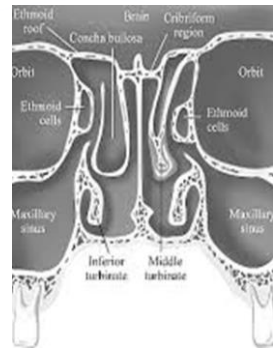
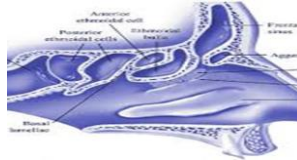


Fig. 41. Frontal Sinus. Nasal Duct.  
Mac, Ross.



## Maxillary sinus:

- ❖ Largest sinus, presents at birth.
- ❖ Occupy the body of the maxillary bone.
- Anterior border is related to the cheek.
- Posteriorly related to the infratemporal and pterygopalatine fossae
- Medial wall is related to the nasal cavity.
- Floor is related to the palate.
- Roof is related to the orbital floor.

## Frontal sinus:

- ❖ Between the anterior and posterior tables of the frontal bone in the supra orbital region.
- ❖ Varies in size and shape, often loculated and asymmetrical.

## Ethmoid sinuses:

- ❖ Thin walled cavities, 18-3cells.
- ❖ Present at birth.
- ❖ Anterior and posterior groups.
- Anterior: ultimately draining into the middle meatus.
- Posterior: open into the superior meatus.
- ❖ Bordered by the medial wall of the orbit, the skull base and the middle and superior turbinates.

## Sphenoid sinus:

- ❖ Occupies the body of the sphenoid sinus.
- ❖ Rarely symmetrical.
- ❖ Closely related to the optic nerve, internal carotid artery, Cavernous sinus, V2 and vidian nerve.

# Physiology

Respiration:	<ul style="list-style-type: none"><li>❖ New-borns are obligate nasal breathers until age of three months.</li><li>❖ Choanal atresia</li></ul>
Air conditioning:	<ul style="list-style-type: none"><li>❖ Filtration and purification: Through vibrissae and mucous secretions.</li><li>❖ Temperature: Controlled through the large area of the highly vascular mucosa which is full of venous sinusoids.</li><li>❖ Humidification: Controlled through the thickness of the nasal secretions</li></ul>
Protection:	<ul style="list-style-type: none"><li>❖ Through the mucociliary mechanisms and the mucous blanket.</li><li>❖ Enzymes and immunoglobulins: lysozymes, IgA, IgE</li><li>❖ Sneezing: Foreign and irritant materials initiate the sneezing reflex.</li></ul>
Vocal resonance:	For phonating the constants M/N/NG
Nasal Reflex	<ul style="list-style-type: none"><li>❖ Sneezing reflex</li><li>❖ Gustatory reflex: salivation when smelling food</li><li>❖ Noso-pulmonary reflex: increased pulmonary resistance associated with nasal obstruction</li></ul>

# Acute rhinitis

## ● Common Cold:

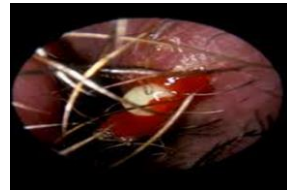
- ❖ Mostly viral (adeno, picorna virus, rhinovirus)
- ❖ Burning sensation in the nose, nasal congestion, obstruction, secretions and hyposmia or even anosmia.
- ❖ Can be secondarily infected by bacteria (Strep pneum, Staph a., H.Inf, Kleb. Pneum, M.Catarrhalis)
- ❖ Rx: Bed rest, rehydration, analgesia and econgestants.
- ❖ Can progress into acute bacterial rhinosinusitis

## ● Influenza rhinitis:

- ❖ Influenza A, B, C viruses
- ❖ Similar symptoms of common cold but with more constitutional symptoms.
- ❖ Same management
- ❖ Role of influenza vaccine.

# Furuncle

- ❖ Acute infection of hair follicle by Staph a.
- ❖ Trauma from nose picking or plucking virissae is the usual predisposing factor.
- ❖ Small but very painful.
  - ❖ Rx: include analgesia, warm compressors, topical +/- systemic antibiotics, +/- I&D
  - ❖ **Risk of cavernous sinus thrombosis after squeezing the furuncle due to retrograde venous spread.**



# Vestibulitis

- ❖ Diffuse dermatitis of the nasal vestibule, usually by Staph a.
- ❖ Red, swollen, eroded and tender skin with crustations and scales.
- ❖ Rx: Local cleaning, local antibiotic-steroid ointments



Furuncle	Vestibulitis
<p>- حبة بالأنف صغيرة و تنرفز مرة - Very localized (around hair follicles) and very painful - Treatment: - Don't squeeze, Don't manipulate - Avoid nose picking (causes cross contamination) - Apply antibiotic like Fucidin, why? *imp this area is from the dangerous zone, so complications might happen like cavernous sinus thrombosis and blindness</p>	<p>- Broader than furuncle - Like cellulitis but in the nose - Management is the same as furuncle + maybe you'll need oral antibiotics or IV antibiotics and admission (depends on the case)</p>

# Allergic rhinitis

- ❖ Paroxysmal sneezing, nasal obstruction, watery rhinorrhea, itchiness of the nose, eyes, palate and/or throat.
- ❖ Could be seasonal or perennial.
- ❖ Signs: transverse nasal crease, pale and bluish mucosa, swollen turbinates and allergic shiners (dark circles around the eye).
- ❖ Rx: Avoidance of the allergen (if known), Medications (Intranasal corticosteroids, antihistamines “local and systemic etanibrut ,(etagylgomorc aN ,scigrenilohc-itnA ,” yparehtonummi dna noitcuder

# Non-Allergic Rhinitis

- ❖ Similar symptoms of allergic rhinitis, but in the absence of identifiable allergies with less itchiness and sneezing.
- ❖ Subtypes: Idiopathic Rhinitis, Occupational Rhinitis, Drug-induced Rhinitis, Hormone-Induced Rhinitis, Autonomic Rhinitis (Vasomotor), Atrophic Rhinitis, Systemic diseases causing rhinitis.
- ❖ Rx: Addressing the cause of possible.
- ❖ INCS, antihistamines, oral decongestants, topical anticholinergic, mast cell stabilizers and turbinate reduction are options that can be considered in each case.