



433 Teams
ENT

Nose I , II & III

Color index:

432 Team – **Important** – 433 Notes – Not important

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Objectives:

- Anatomy of the external nose, nose, nasal cavity and paranasal sinuses.
- Physiology of the nose and paranasal sinuses.
- Blood and nerve supply of the external nose, nose, nasal cavity and paranasal sinuses.
- Functions of the nose and paranasal sinuses.
- Congenital anomalies.
- Choanal atresia.

ANATOMY OF THE NOSE:

- The nose consists of the external nose and the nasal cavity,
- Both are divided by a septum into right and left halves.

1- EXTERNAL NOSE:

A- STRUCTURE:

-The Nasal Pyramid

Bony constituents:

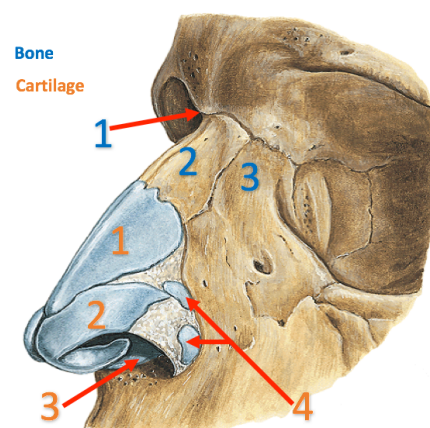
Support the **upper** part of the external nose:

1. Nasal processes of the frontal bones.
2. Nasal bones.
3. Ascending processes of the maxillae.

Cartilaginous constituents: (hyaline cartilage)

Support the **lower** part of the external nose:

1. Upper lateral cartilages.
2. Lower nasal cartilages.
3. Quadrilateral cartilages of nasal septum.
4. Alar cartilages



Note:

The nasion is the **midline bony depression** between eyes where the frontal and two nasal bones meet.

Lower nasal cartilage makes the shape of the nose (e.g. flat, long or straight).

-Skin

-Anterior nares (Nostrils):

Situated in the base of the nose and open downwards, they are separated by (columella), a strip of **skin**, **connective tissue** and **medial crura** of the lower lateral cartilage.

Inside the aperture of the nostril is a slight dilatation, **the vestibule**. It is lined by skin containing hairs and sebaceous glands, and extends as a small recess toward the apex of the nose.

B- MUSCLES:

The nose has a number muscles which in man has vestigial importance.

Nerve supply: they are all supplied by branches of **facial nerve**.

Arterial supply: all supplied by maxillary and facial arteries.

- Procerous elevate the skin of dorsum
- Nasalis compressor of naris
- Dilators naris
- Depressor septi

C- BLOOD SUPPLY:

- The skin of the external nose is supplied by **branches of the ophthalmic and the maxillary arteries.**
- The skin of the ala and the lower part of the septum are supplied by branches from the facial artery.

D- NERVE SUPPLY:

- The infratrochlear and external nasal branches of the ophthalmic nerve (CN V)
- The infraorbital branch of the maxillary nerve (CN V).

2- NASAL CAVITY: -**➤ The nasal cavity has**

- Floor
- Roof
- Lateral wall
- Medial wall or septum

The nasal cavity extends from the nostrils anteriorly to the choanae posteriorly.

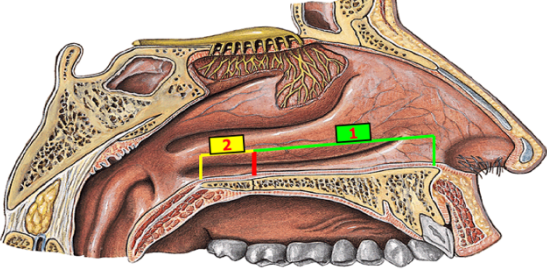
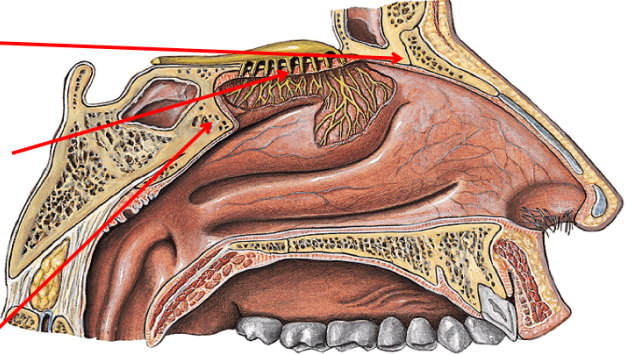
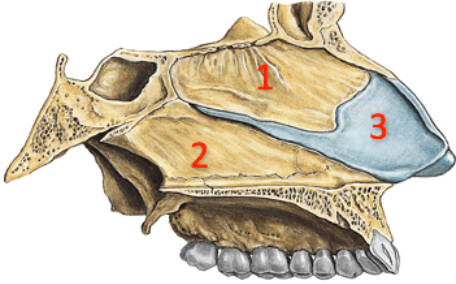
The right and left nasal fossae (cavities) are separated by the nasal septum.

The nasal fossae are lined with mucous membranes.

Each fossa communicates with:

1. **The paranasal sinuses**, through their Ostia.
2. **The nasopharynx**, through the posterior choanae.

Boundaries of nasal cavity:

<p>Floor</p>	<p>1. Palatine process of maxilla in the anterior three quarters.</p> <p>2. Horizontal part of palatine bone in posterior one quarter.</p> 
<p>Roof “Narrow”</p>	<ul style="list-style-type: none"> - Formed Anteriorly beneath the bridge of the nose by the nasal and frontal bones. - In the middle by the cribriform plate of the ethmoid, located beneath the anterior cranial fossa, - Formed posteriorly by the downward sloping body of the sphenoid <p>Anteriorly: Nasal process of frontal bone.</p> <p>Inbetween: Cribriform plate of ethmoid, through which fibers of olfactory nerve pass.</p> <p>Posteriorly: Body of Sphenoid bone.</p> 
<p>Medial wall “The nasal septum”</p>	<p>Divides the nasal cavity into right and left The three main constituents are:</p> <ol style="list-style-type: none"> 1. Perpendicular plate of ethmoid, above and behind. 2. Vomer, below and behind. 3. Quadrilateral cartilage, in the angle between first and second. 

Lateral wall

- **In neonate**
 - The nasal & orbital floors are located at the same level
 - **Lateral nasal wall serves as the medial orbital wall**
 - Maxilla, contributes minimally in fetus & neonate
- **In adult**
 - **Only the upper half of the lateral nasal wall forms the medial orbital wall**
 - **The nasal floor is at lower level than orbital floor**
- The medial surface of the maxilla is incomplete (maxillary hiatus) => the aperture of the hiatus is reduced by presence of palatine and lacrimal bones and the inferior concha

The lateral wall is marked by 3 projections: **Turbinates (conchae)**: three bony elevations covered by mucus membranes

- **Superior concha**
- **Middle concha**
- **Inferior concha**
- **The space below each concha is called a meatus and each meatus receive the opening of a paranasal sinus as follows:**
- **1-Inferior meatus:**
The inferior meatus **runs the length of the lateral wall.**-
Receives the nasal opening of the **nasolacrimal duct.**

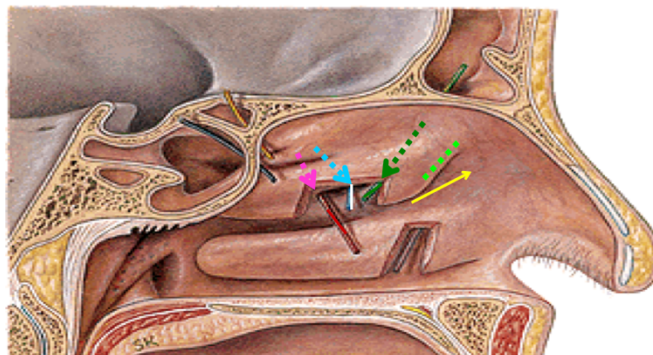
- **2-Middle meatus: -**
Occupies the posterior two thirds of the lateral wall, it is the most complex and by far the most important.
The ostia of **maxillary**, **anterior ethmoidal**, and **frontal** sinuses open into it.

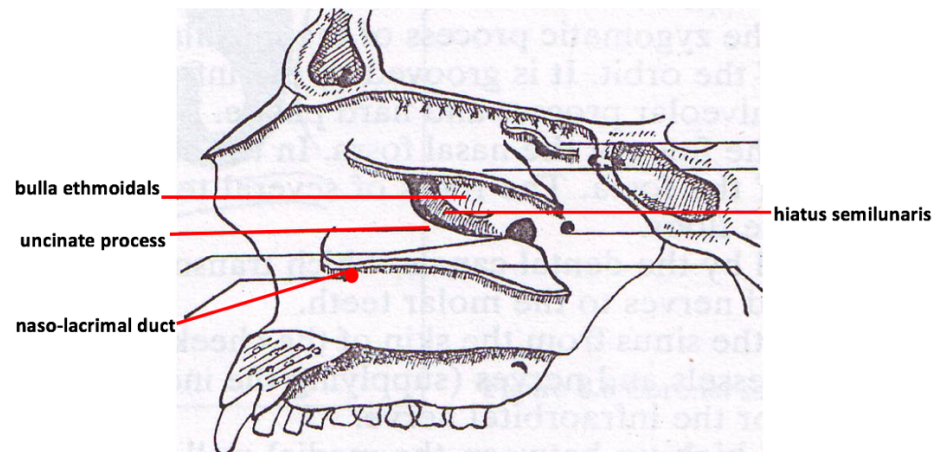
-The **atrium** is forward continuation of middle meatus.

-The **agger nasi** is curved ridge lying above the atrium.

The **bullae ethmoidalis** is a smooth rounded mass formed by anterior ethmoidal cells, the ostia of these cells open on to the bulla.

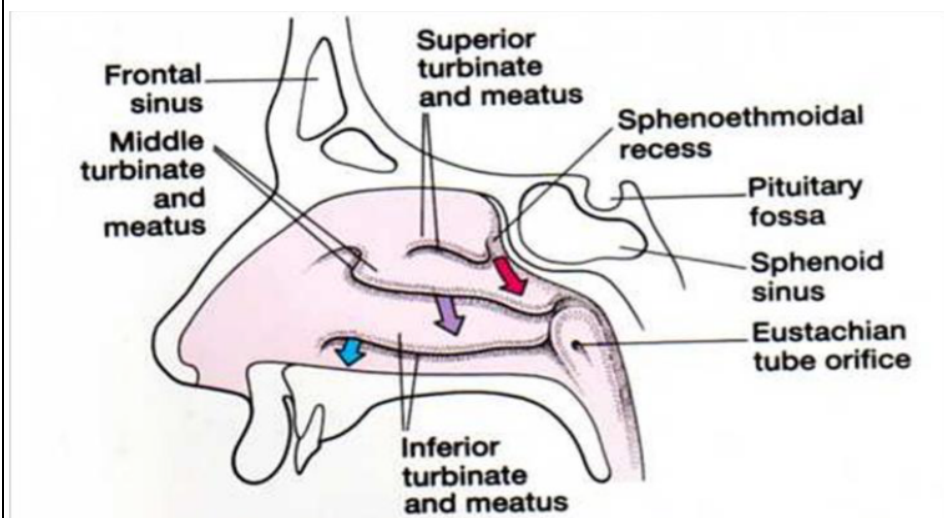
The **hiatus semilunaris** lies below and in front of bulla. It is bounded below by **uncinate process** of ethmoid. The anterior end of the hiatus leads to a funnel-shaped channel called the **infundibulum**, which is continuous with the frontal sinus. The maxillary sinus opens through the hiatus semilunaris.





Note : *Agger nasi is the most anterior cell in the anterior ethmoid. When agger nasi enlarge they cause obstruction leading to sinusitis. *Bulla ethmoidalis is the largest cell of the anterior ethmoid. It is adjacent to the maxillary sinus. And one of the good landmarks during surgeries.

- **3-Superior meatus:**
- **Occupies the posterior third of the lateral wall.** Contains the ostia of posterior ethmoidal cells.
- **4-Sphenoethmoidal recess:** Lies above the superior turbinate and receives the ostium of sphenoidal sinus.

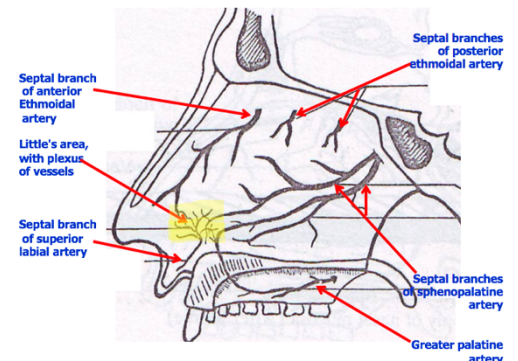


➤ Mucosal Lining of nasal cavity:

- **Modified Skin:** Keratinized stratified squamous epithelium covering the vestibule. It contains sebaceous glands, sweat glands, and short, curved hair called **vibrissae**.
- **Olfactory:** Specialized olfactory epithelium. Present in the **olfactory cleft**, which occupies the area between the superior turbinate, cribriform plate, and the corresponding area of the septum.
- **Note :**
 - Olfactory epithelium is in the upper part of the nose. When removing polyps on the upper part you have to be cautious not to injure the olfactory epithelium.
 - One of the complications of sinus surgery is losing smell.
- **Respiratory mucosa:** Ciliated pseudostratified columnar epithelium with goblet cells. It lines the lower two-thirds of the nasal septum, the lateral wall of the nose below the superior turbinate, and the floor of the nasal cavity. It extends into the sinuses through their Ostia and is thinner there. It is also continuous with the epithelia of the nasolacrimal duct and Eustachian tube.

➤ Blood supply of the nasal cavity:

- The nasal fossae and paranasal sinuses are supplied by branches of the external and internal carotid arteries:
- From branches of the maxillary artery, one of the terminal branches of the external carotid artery.
- The sphenopalatine artery anastomoses with the septal branch of the superior labial branch of the facial artery in the region of the vestibule.
- Kiesselbach's plexus, in **Little's area (most common site for epistaxis)**.
- The submucous venous plexus is drained by veins that accompany the arteries.



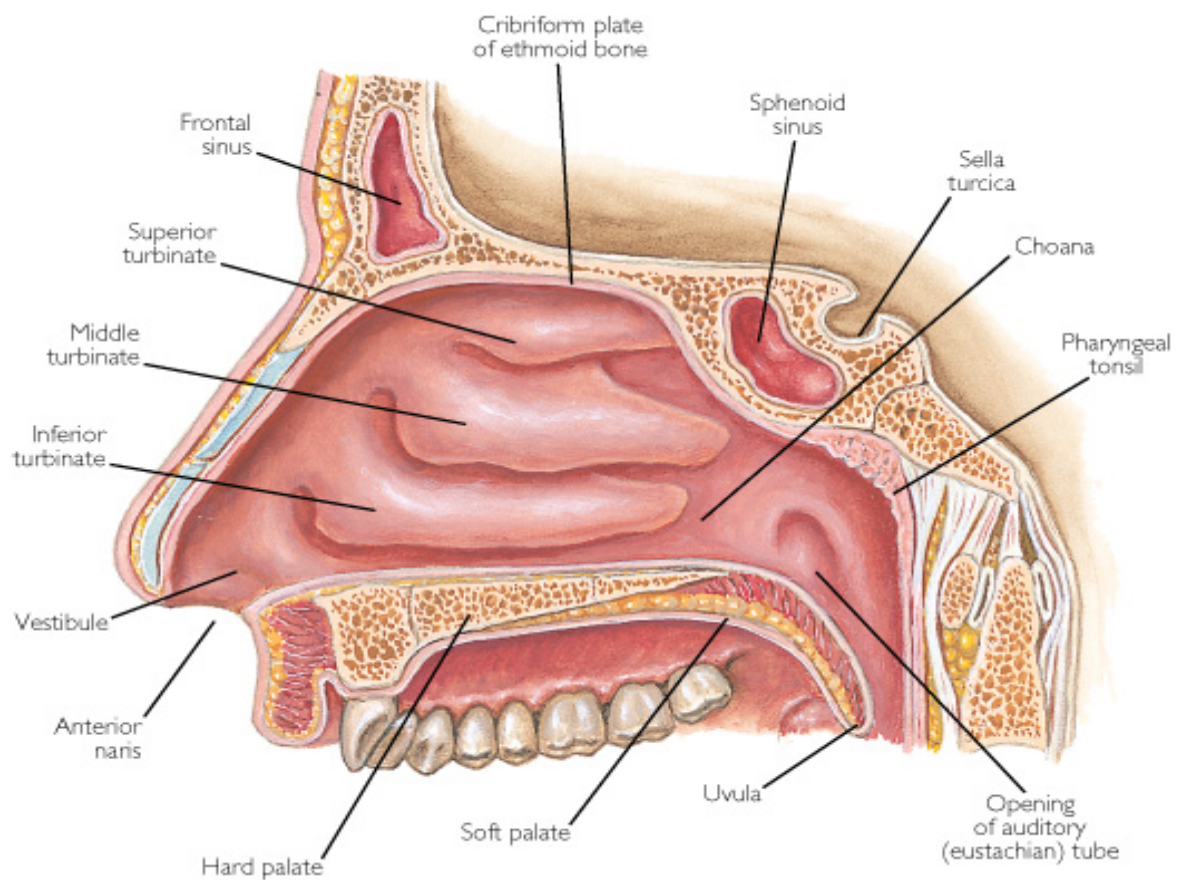
- **Note :**
 - Most common cause of epistaxis is nasal dryness
 - most common site for epistaxis is Little's area
 - they are valveless so they can go intrograde or retrograde —> infections can spread to the brain

➤ Nerve Supply of the Nasal Cavity

- Olfactory nerve (CN I)
- Posterior nasal branches of maxillary nerve (V₂)
- Cut nasopalatine branch of V₂ to septum
- Anterior ethmoidal branch of ophthalmic (V₁)

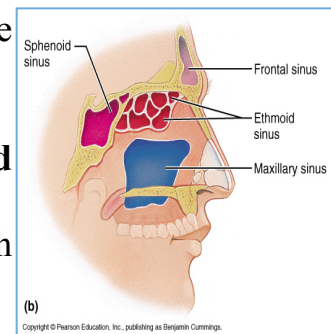
➤ Lymph Drainage of the Nasal Cavity

- The lymph vessels draining the vestibule end in the **submandibular nodes**.
- The remainder of the nasal cavity is drained by vessels that pass to the **upper deep cervical nodes**.



Paranasal sinuses (PNS)

- The paranasal sinuses are cavities found in the interior of the maxilla, frontal, sphenoid, and ethmoid bones.
- They are **lined with mucoperiosteum and filled with air**.
- They communicate with the nasal cavity through relatively small apertures.



➤ Drainage of mucous:

- The mucus produced by the mucous membrane is moved into the nose by ciliary action of the columnar cells.
- Drainage of the mucus is also achieved by the siphon action created during the blowing of the nose.

➤ Functions of the PNS:

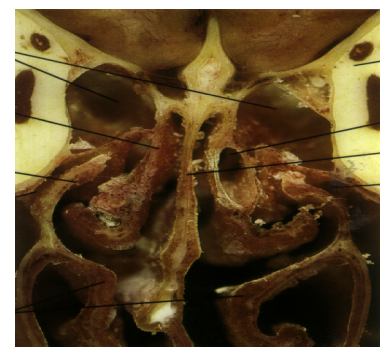
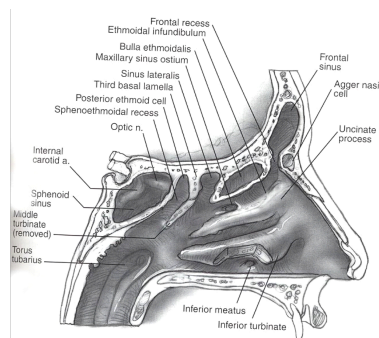
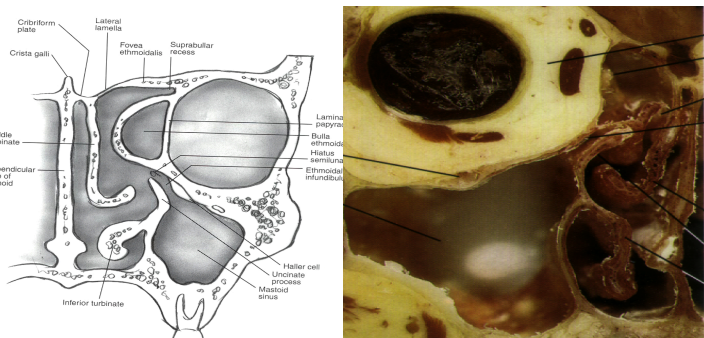
- Humidifying and warming the inspired air.
- Regulation of intranasal pressure.
- Increasing surface area for olfaction.
- Lightening the skull.
- Adding resonant effect to voice.
- Absorbing shock.
- Contributing to facial growth.

In general, their functions are to ensure: Patent ostia + Normal Ciliary Function

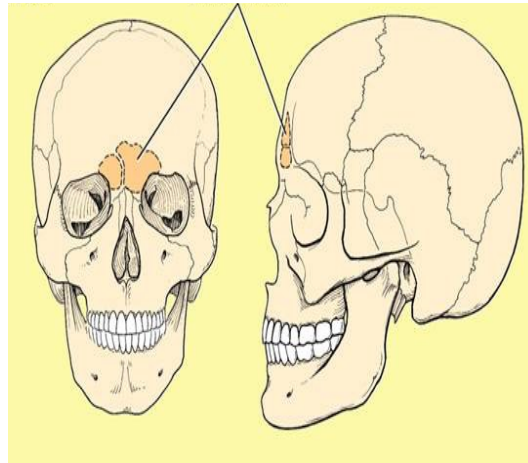
+ Normal Quality of Mucous.

**** Disturbance of these Function will lead to sinusitis**

- **Note : Facial growth center is present in paranasal sinus.**

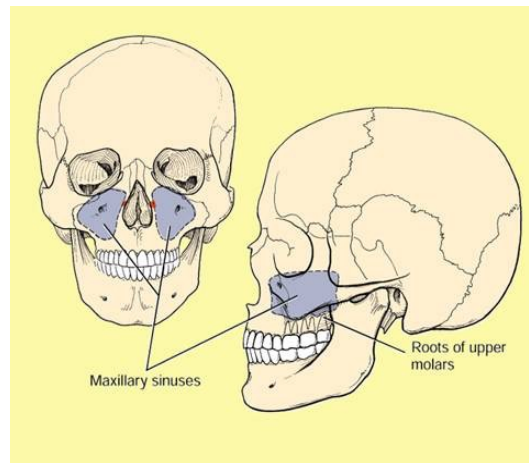


Frontal sinus



- Rarely symmetrical
- Contained within the frontal bone.
- **Separated from each other by a bony septum.**
- Each sinus is roughly triangular
- Extending upward above the medial end of the eyebrow and backward into the medial part of the roof of the orbit.
- **Opens into the middle meatus**
- Note :
 - Frontal sinus is the last sinus to develop during puberty.
 - In frontal sinus, if infection extend posteriorly towards the brain it will cause meningitis.
 - And if infection extend anteriorly it will cause osteomyelitis (Pott's puffy tumor is osteomyelitis of the anterior bone of the frontal sinus) e.g. patient with two weeks history of frontal swelling and redness, CT shows some collection and abscess and inflammation, the patient has Pott's puffy tumor.
 - In the floor of frontal sinus there is agger nasi

Maxillary sinus

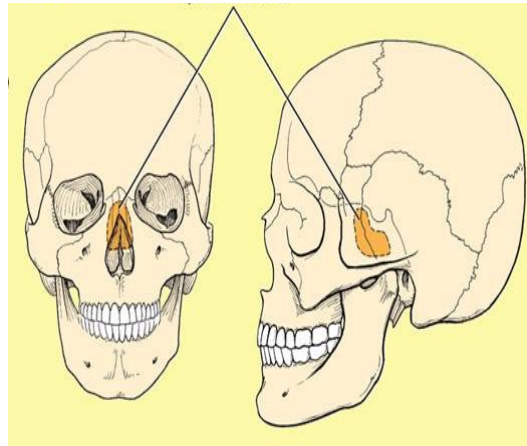


- Pyramidal in shape
- The largest sinus
- **Paired & symmetric**
- Located within the body of the maxilla behind the skin of the cheek.
- **The roof is formed by the floor of the orbit, and the floor is related to the roots of the 2nd premolars and 1st molar teeth.**
- **The maxillary sinus opens into the middle meatus of the nose**
- **The Orbit: Separated from the antrum by the thin roof of the sinus, which contains the infraorbital nerve**
- Note :

Maxillary sinus is the first to develop

Infraorbital nerve (sensation of anterior part of the cheek) is a continuation of the maxillary nerve. When a patient has paraesthesia in the cheek suspect mass around the infraorbital nerve, common in RTA also when there is fracture of the floor.

SPHENOIDAL SINUS



- Lie within the body of the sphenoid bone
- Below sella turcica
- Extends between dorsum sellae and post clinoid processes
- Opens into the sphenoethmoidal recess above the superior concha

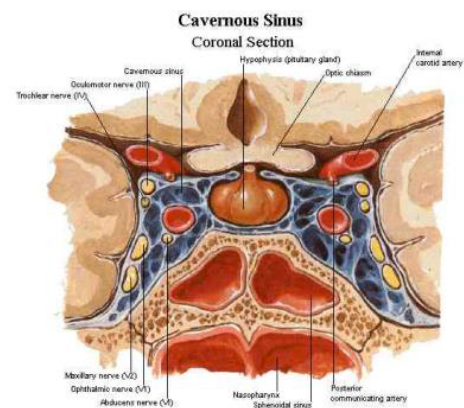
Relations:

Laterally: the cavernous sinus containing:

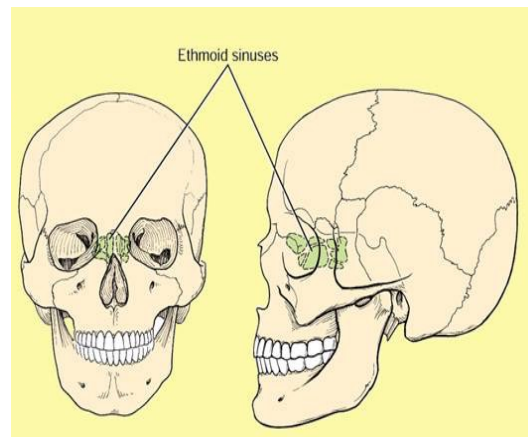
1. Cranial nerves: 3rd, 4th, 5th (ophthalmic and maxillary divisions), and 6th.
2. Internal carotid artery
3. Optic nerve

Above the sinus: Pituitary gland, optic chiasm, frontal lobe of brain, and olfactory tract. The pituitary gland may be approached surgically through the sinus.

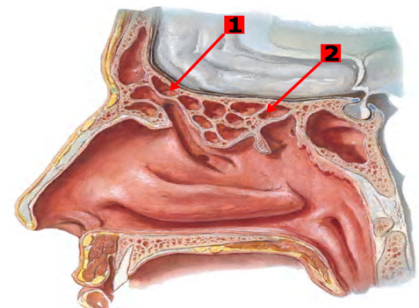
- **Note :** Most dangerous sinus during surgery is sphenoidal due to its relation with cavernous sinus contents, mainly carotid > massive bleeding if injured.



ETHMOIDAL SINUS



- They are **anterior**, middle, and **posterior**.
 - Consists of a number (approximately 7-15) thin-walled cavities
 - They are contained within the ethmoid bone, between the nose and the orbit
 - **Anterior & middle: Drains into middle nasal meatus**
 - **Posterior: Drain into superior nasal meatus**
 - **Separated from the orbit by a thin plate of bone so that infection can readily spread from the sinuses into the orbit**
-
- **1.Anterior:** Usually small and numerous. They open into the upper part of the hiatus semilunaris or above the bulla ethmoidalis, ultimately draining into the middle meatus.
 - **2.Posterior:** Usually large and few, they open into the superior meatus.



- **Note :** **Nasal septum divides the right and left ethmoid.** The anterior and posterior groups of ethmoid are separated by the basal lamella (3rd part of the middle turbinates).

PHYSIOLOGY OF THE NOSE

- 3 major functions of the nose:
 - Olfaction
 - Respiration (the most important)
 - Defense
- Additional minor functions
 - Aiding and modifying voice production
 - Providing vocal resonance
 - Serving as a secondary sex organ

- **Modification of inspired air**
 - **Humidification**
 - Nose adjust precisely the inspired air to have a humidity of 85 %
 - ⇒ This enhances the gas exchange
 - Large portion returned to the nasal mucosa during exhalation.
 - ⇒ This prevents overdrying of the nasal mucosa and thickening of the nasal secretions.

 - **Warms the inspired air**

The rich capillary beds that make up the side wall of the nose, along with their accompanying venous sinusoids

 - **Purification of inspired air:**

Large particles are detected by the vibrassies of the nasal vestibule and the smaller particles are dealt with by lysosomal enzymes, macrophages and antibodies in the mucosal blankets of the nasal fossa.

*The secretion of the nasal mucosa has three layers thin, semi-thin and thick layers.
Nasal mucosa and paranasal sinuses secrete 800cc per day.

➤ NASAL VALVE

- The smallest cross-sectional diameter and **greatest resistance of the airway**
- The muscle activity prevents alar collapse during inspiration.
- Resistance in this segment is **created by the turbinate size, which is altered by the vascular tone and blood volume of the nasal sinusoids.**
- Induced by exercise, posture changes, and hyperventilation.
- Chemical irritants, medications, pain, and emotion
- **Formed by upper lateral cartilage**

➤ NASAL CYCLE

- Alternating changes in patency of the right & the left nasal cavities
- Occur in rhythmic sequence in about 80 % of normal individuals
- **The total resistance to the nasal airflow remains constant**
- **Controlled through the**
 - **Autonomic adrenergic centers**
 - **Hypothalamic control center**
- If the cervical ganglion is sectioned, there is abolition (termination) of the nasal cycle on the same side

➤ OLFACTION

- Important in food choices and in social interaction
- Warning sign for toxic gases and spoiled foods.
- To smell a substance, it must somehow reach the olfactory mucosa located in the roof of the nose
- The odor-producing substance **must have a vapor pressure and must be relatively water- and lipid-soluble in order to be sensed.**

➤ ANOSMIA “inability to smell”

- Nasal obstruction and nasal infection.
- **The receptor molecule cannot reach the olfactory mucosa to stimulate a response.**
- Nasal polyposis and nasal deformities are reversible conditions in adults.
- Infections and allergies cause temporary interruption of smell, and olfactory capability returns when the conditions resolve.
- Smell can trigger an asthmatic attack and can worsen emphysema. (possible theory for this: Trigeminal reflex, which is induced by a chemical irritant stimulating the nasal mucosa and leads to reflex bronchial constriction)

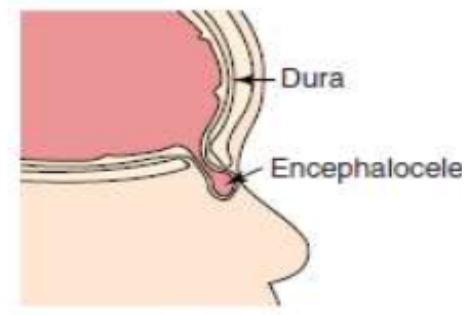
➤ IMMUNOLOGY

- **Secretory immunoglobulin A (IgA) is the major immunoglobulin found in nasal secretions**
- The concentration of IgG (3 percent) and IgM (1 percent) increases during actual infections (this might be due to transudation of plasma resulting from mucosal injury).

Developmental errors of the anterior neuropore

- Encephalocele
- Nasal glioma
- Nasal dermoid

1) NASAL ENCEPHALOCELE:



- **Definition: Extracranial Herniation of meninges and/or brain tissue through defects in the skull.**
(Meningocele: Present similarly but without herniation of brain tissue).
- Described by location of dehiscence in the skull base:
Occipital (75%) Sincipital (25%) Basal (1%)

Encephalocele is an extracranial herniation of cranial contents through a defect in the skull. When an encephalocele includes meninges only it is termed meningocele. Encephaloceles are divided into occipital, sincipital and basal types.

- Clinical Features:

- Symptoms: Bluish mass over the glabella or inside the nose that is **compressible, pulsatile** and **transilluminates with light**.
- **Positive Frustenberg test:**
Expansion with compression of bilateral jugular veins.
Expansion may also be triggered by crying or straining (Valsalva).

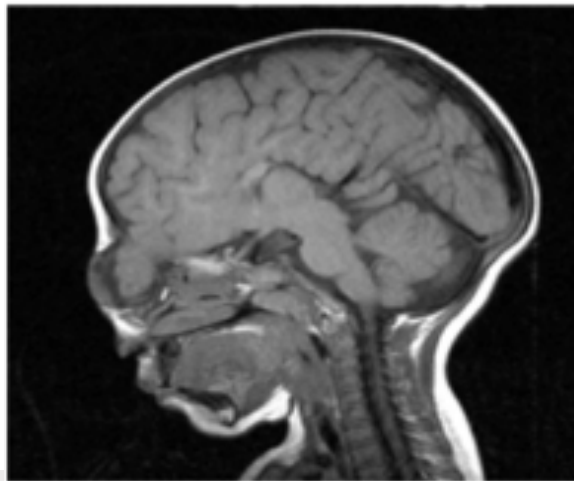
- INVESTIGATIONS:

▪ MRI:

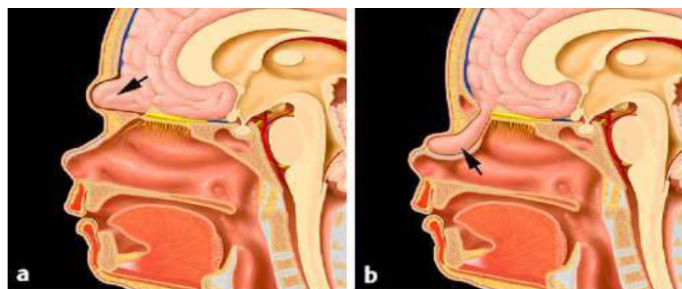
- To identify intracranial extension (masses with subarachnoid extension)
- To differentiate between meningocele and encephalocele.

▪ CT scan:

- To detect skull base defect.



Mass containing brain tissue in continuity with the frontal lobe, this is a nasoethmoidal encephalocele

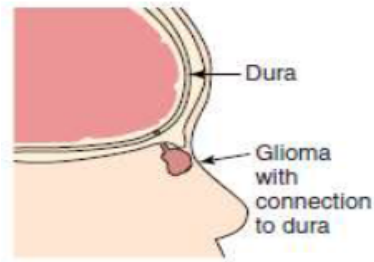


(A) Sincipital Encephalocele (B) Basal Encephalocele

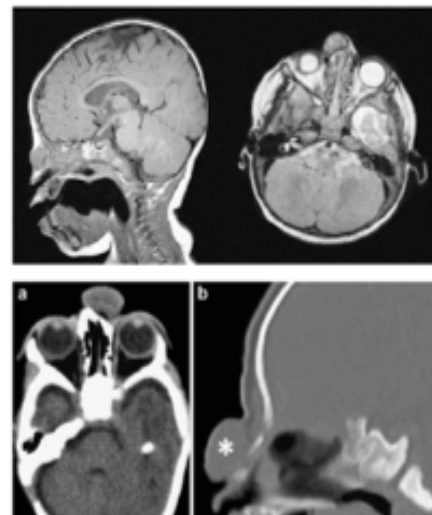
A) Sincipital encephaloceles are also known as Frontoethmoidal encephaloceles. They occur between the frontal and ethmoid bones at the foramen cecum immediately anterior to the cribriform plate. They may be further subdivided as nasofrontal, nasoethmoidal and naso-orbital and manifest as external nasal masses

B) Generally Basal Encephaloceles arise through the cribriform plate or through the superior orbital fissure and manifest as an intranasal mass

2) NASAL GLIOMA:



- **Presentation (based on location):** may be present at birth “grow in proportion with the child age”
 - Extra-nasal: (60%)
 - Smooth, firm and **non-compressible** masses, skin telangiectasia
 - Glabella type “most common”, nasomaxillary suture line type.
 - Intra-nasal: (30%)
 - Arise in lateral nasal wall near the middle turbinate.
 - Polypoid type “pale masses”
 - Nasal septum type “rare”
 - Combined: (10%)
- **Nasal gliomas DO NOT trans-illuminate or enlarge with crying or straining.**
- **INVESTIGATIONS:**
 - **MRI:**
 - Hypotense on T1 , \pm hyperintense on T2
 - Presence of fibrous stalk “in 15%”
 - Rare enhancement.
 - **CT scan:**
 - To assess the bony anatomy of the skull base.



Intranasal glioma showing a fibrous stalk and are more commonly seen in those that are intranasal (35%)

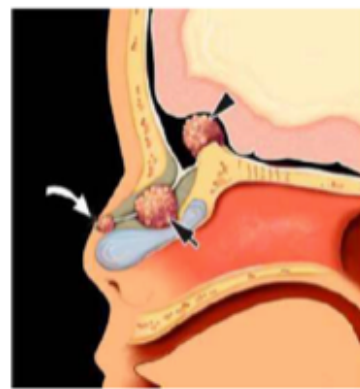
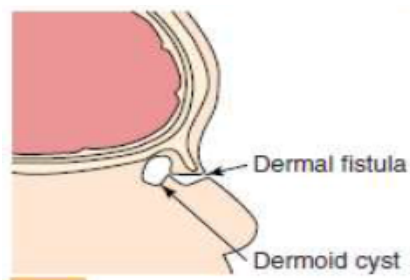
Surgical Treatment

- ▶ For Meningiomas, Gliomas limited to nasal cavity
 - ▶ Endoscopic repair with clipping the stalk
 - ▶ Defect is repaired with free mucosal grafts or mucoperichondrial flap

- ▶ For Encephaloceles, Gliomas and Dermoids with intracranial extension
 - ▶ Multidisciplinary approach
 - ▶ Transglabellar Subcranial Approach
 - ▶ Frontal craniotomy in combination with external Rhinoplasty and lateral rhinotomy approach



3) NASAL Dermoids: **the commonest congenital nasal anomaly.**



- Definition: Epithelial-lined cavities (cysts) or sinus tracts consisting of both ectodermal and mesodermal elements, including hair follicles, sebaceous glands, and sweat glands.

- **Presentation:**

- Midline mass or cyst with sinus opening:

- Firm lobulated non-compressible mass.
- Sinus opening -> Purulent or sebaceous material.

- Widened nasal bridge

- Protruding hair “Pathognomonic”: in minority of cases.

- Intracranial extension in 2-45% “attach to dura, falx cerebri ..etc”

- Up to 50% have fistula or sinus tract.

Dermoid sinus cysts of the nose present as a midline nasal pit, fistula or infected mass located anywhere from the glabella to the nasal columella. They may secrete sebaceous material or pus and may become intermittently infected causing abscess formation, meningitis even cerebral abscess for those with intracranial extension.

- **Treatment:**

- Direct external excision.

- Medial canthal approach “Lynch”, external rhinoplasty, endoscopic resection.

Nose II

Objectives:

- **Acute & chronic rhinitis**
- **Allergic & non-allergic rhinitis**
- **Vestibular & furunculosis**
- **Nasal polyps (allergic & antrochoanal) etc**
- **Radiology illustration (e.g. CT scan)**

Rhinitis*

*Sometimes the disease is called “Rhinosinusitis” because usually sinusitis will accompany rhinitis attacks.

- **Definition:** Inflammation of the mucosa of the nasal fossae.
- **Types:** I. Acute rhinitis less than 3 wks
 - II. Chronic rhinitis more than 3 months
- **Types based on etiology:**
 - (1) Infectious rhinitis
 - (2) Vasomotor rhinitis
 - (3) Occupational rhinitis
 - (4) Hormonal rhinitis : Menstruation ,pregnancy ,Untreated hypothyroidism ,Sexual excitement (Honeymoon rhinitis)
 - (5) Drug-induced rhinitis
 - (6) Gustatory rhinitis
 - (7) Nonallergic rhinitis with eosinophilia syndrome (NARES)

Acute rhinitis

➤ Common cold & influenza & Para Influenza viruses:

“influenza & Para Influenza viruses are more severe than common cold”

➤ Etiology:

in chronic we see more gram -ve like pseudomonas

➤ Conveyed by contact or air borne droplets

Viruses

- Rhinovirus, Coronavirus, Adenovirus,
- Parainfluenza virus Respiratory syncytial virus Enterovirus

Bacteria

- Strept penumonia, Srtept Pyogen, HF, Maxarella Cataralis

➤ **Clinical features “stages” of common cold:**

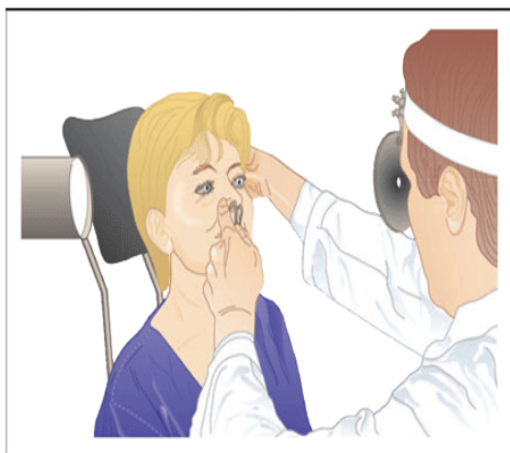
Stage	Features
Ischemic	<ul style="list-style-type: none"> - - 1-3 days of incubation period - - Sneezing - - Loss of smell “obstructed olfactory area” - - Burning sensation in the nasopharynx
Hyperemic	<ul style="list-style-type: none"> - profuse rhinorrhea - Nasal obstruction - Pyrexia
Secondary infection	<ul style="list-style-type: none"> - Discharge becomes yellow or green - “this happens usually after the common cold resolve by its own i.e. 1 week later”
Resolution	<ul style="list-style-type: none"> - This means resolution of both common cold the 2ry infection. - - occurs 5-10 days (if persist >10 days => Bacterial cause)

➤ **Examination:**

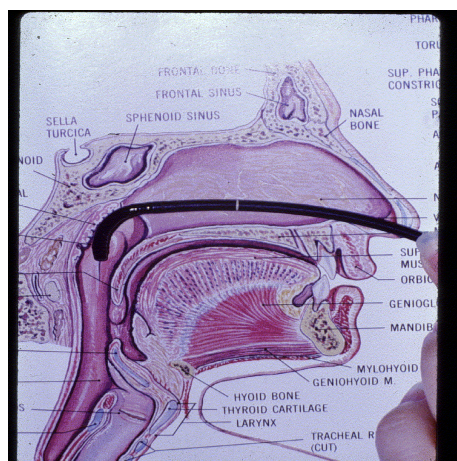
➤ Anterior Rhinoscopy

➤ Endoscopic Examination: 2 types: flexible “pic2 and ”Rigid “Pic3”

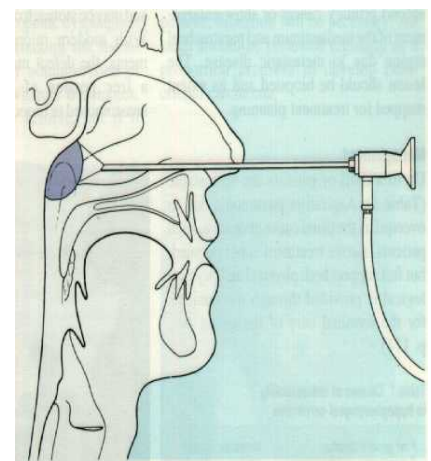
Fig. 2.1 Anterior rhinoscopy



Anterior Rhinoscopy



Flexible Endoscopy



Rigid Endoscopy

for children , poor cooperative patient , the image is not the same quality as the rigid endoscope

better image quality

➤ Treatment:

- **Prophylactic:** Avoid contact with patient
- **Therapeutic**
 - Rest
 - Analgesics
 - Decongestants
 - Antibiotics “rarely given because in 95% of the cases it is viral”

Chronic rhinitis

Classifications:

- Specific:

- 1) Syphilis
- 2) Wegner’s granuloma
- 3) Medline lethal granuloma
- 4) Sarcoidosis
- 5) Mycobacteria
- 5) Atrophic rhinitis

- Non-specific:

- 1- Simple chronic rhinitis
- 2- Hypertrophic rhinitis
- 3- Atrophic rhinitis

➤ Non-specific chronic rhinitis:

1) Simple chronic rhinitis:

▪ Etiology:

- ✓ Neighboring infections e.g. chronic tonsillitis. “GERD can cause it as well”
- ✓ Adenoids “obstructing normal mucosal secretions => stagnation and good environment for bacteria to grow.
- ✓ Vasomotor rhinitis “happen as a result of autonomic disturbance”
- ✓ Chronic irritation e.g. dust, smoker
- ✓ Swelling of inferior turbinate

▪ Treatment:

- ✓ Correction of any predisposing factors.

2) Hypertrophic rhinitis:

- Etiology: Permanent hypertrophic changes **due to advanced stage of simple chronic rhinitis**

3) Rhinitis medicamentosa:

- **Etiology:** Induced by sympathomimetic nasal decongestant drops” like atropine“
- If we need to use sympathomimetic nasal decongestant drops then it must be **not more than 5days”**
- Q: What if you need to use decongestant for more than 5days?
- Answe: We have to give systemic sympathomimetic decongestants like pseudoephedrine “No rebound effect”
- **Clinical features:** Like simple chronic rhinitis

The condition is the result of over medication with local nasal decongestants causing rebound phenomenon occurs resulting in turbinate hypertrophy. If the decongestant treatment is repeated the condition become rapidly self-perpetuating and a chronic nasal obstruction unresponsive to decongestant results. The treatment is immediate cessation of the decongestant with replacement by nasal or systemic steroid. If this is not successful then inferior turbinectomy may be required.

Treatment: Like simple chronic rhinitis + Reduction of inferior turbinate

4) Atrophic rhinitis:

- **Other names:** Dry rhinitis, Rhinitis sicca. Open-nose syndrome, Ozena.
- **Definition:** Chronic inflammation of nasal mucosa with atrophy of various nasal constituents.
- **Etiology:** “Not fully known”
 - Infection
 - Endocrine or vitamin disturbances
- **Triad of atrophic rhinitis, namely**
 - Fetor
 - Crusting
 - Atrophy of the nasal structures

- **Types:**

- A) **Primary:**

- **Clinical features:**

- Foul stench
 - Epistaxis
 - Sensation of obstruction

- **Pathology:**

- 1) **Degeneration of epithelium glands: leading to**
 - Thick crust in the nose - infected
 - Foul smell
 - 2) **Atrophy of the bony turbinates**

- **Treatment:**

- Removal of the crusts
 - Glucose 25% in glycerine drops “to moisten the mucosa”
 - Local or systemic antibiotics
 - Surgical measures

- B) **Secondary:**

to :

- Severe DNS “deviated nasal septum”
 - Syphilis
 - Lupus
 - Excessive operative procedures

Allergic rhinitis

Allergy is an abnormal reaction of the tissues to certain substances.

- **Types: “old classification”**

- 1) Seasonal

Start Early Spring by [tree pollen] then in Midsummer by [grass pollen] and end in autumn by [molds]

- 2) Non-seasonal (perennial)

Occurs all year round & can be a myriad of substances, although **house dust mite** is high on the list.

-The classification "seasonal" and "perennial" allergic rhinitis has been changed to "**intermittent**" and "**persistent**" allergic rhinitis

Atopy (atopic syndrome) : Characterized by a tendency to be “hyperallergic”. A person with atopy typically presents with one or more of the following: **eczema** (atopic dermatitis), **allergic rhinitis** (hay fever), or **allergic asthma**. Some patients with atopy display what is referred to as the “allergic triad” of symptoms, i.e. all three of the aforementioned conditions

- **WHO Classification:**

1) Mild 2) Moderate 3) Sever

- **Clinical features:**

- Nasal obstruction
- Rhinorrhea (clear Watary)
- Sneezing
- Nasal irritation

Local ENT examination :allergic nasal mucosa appear pale or bluish, boggy with swelling and watery discharge. there may be polyp, structural (septal deviation ,prominent turbinate).

- **Diagnosis:**

- History “when I get exposed to dust I have the symptoms”
- Eosinophilis
- Skin tests (Antihistamine should be discontinued 3-6 days before test)
- Blood tests “e.g. radioallergosorbent test (RAST) to assess total Ig E level”

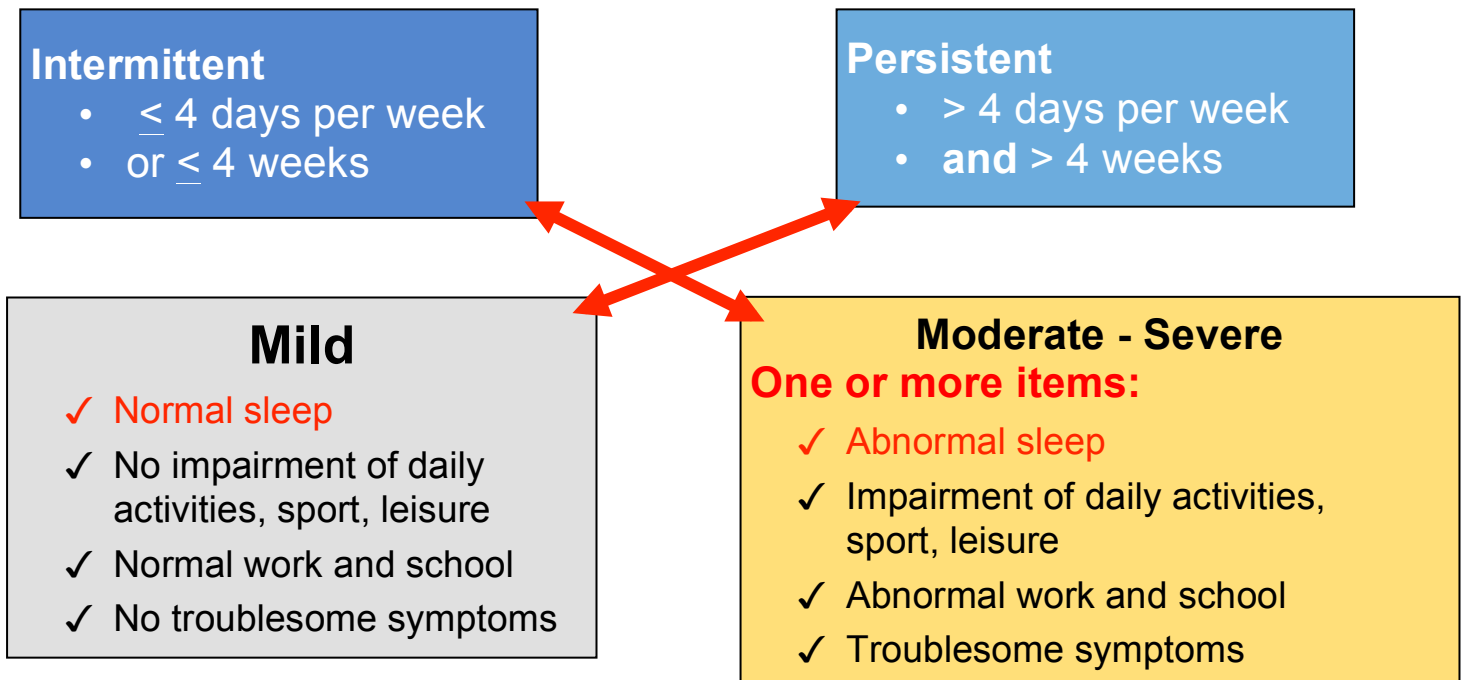
** Allergic rhinitis can be:

Ig E mediated (type 1 hypersensitivity)OR **non Ig E mediated**

Ig E mediated: There is an antigen-antibody reaction.

Non Ig E mediated: Like vasomotor rhinitis.

WHO CLASSIFICATION OF ALLERGIC RHINITIS:



➤ **Treatment:**

- Avoidance of precipitating factors([Allergins](#))
- Antihistamine drugs “Mainstay of treatment specially if the patient has other allergies like Asthma, they are preferred in acute settings because of their rapid onset of action”
- Topical Steroid “preferred in the long-run and good stabilizers”
- Desensitization “immunotherapy”: used in case of failure of antihistamines and steroids. “now available in sublingual form”
- Surgery “not for the allergy itself but for other symptoms resulting from it e.g. Polyp, hypertrophied turbinate etc”

* **The same uniform classification of allergic rhinitis is proposed for:**

Rhinitis, Conjunctivitis, Asthma, Eczema/dermatitis, Urticaria, Food hypersensitivity, Drug hypersensitivity, Venom hypersensitivity, Anaphylaxis

Nasal polyp

➤ **Definition:** A pendunculated portion of oedematous mucosa of the nose.

➤ **Etiology:**

- Allergy
- Inflammation “i.e. Infections”
- Neoplastic

➤ **Clinical features of Nasal polyps:**

- Nasal obstruction – Unilateral / bilateral
- Anosmia
- Loss of taste
- Rhinorrhoea – **watery** / mucoid / mucopurulent
- Headache
- Broadening of nose (Frog face)

▪ **Sites of origin:**

- 1) Ethmoidal (**commonest sites**)
- 2) Antral (antrochoanal polyps) :

Antrochoanal polyp (present from the nose going to the nasopharynx)

* In general the ethmoidal and antrochoanal polyp are almost the same and have the same management.



➤ **Individual polyp “unilateral”:** seen in

- AFS “Allergic fungal sinusitis” in early stages
- Antrochoanal polyp.
- Inverting Papilloma
- Encephaloceles
- Gliomas, hemangiomas, juvenile nasopharyngeal angiofibromas, rhabdomyosarcoma, lymphoma, neuroblastoma, sarcoma, chordoma

➤ **Multiple polyps are usually found in:**

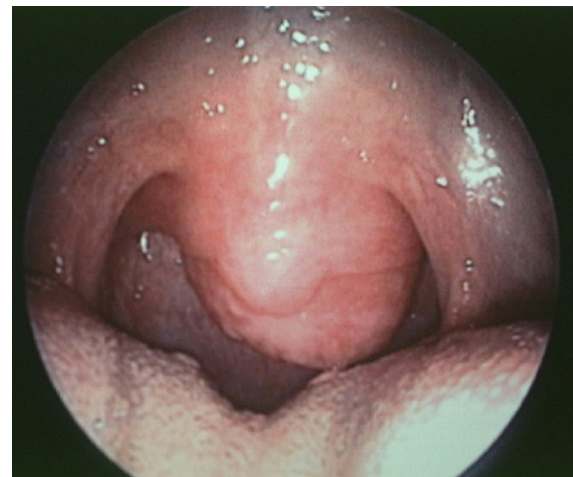
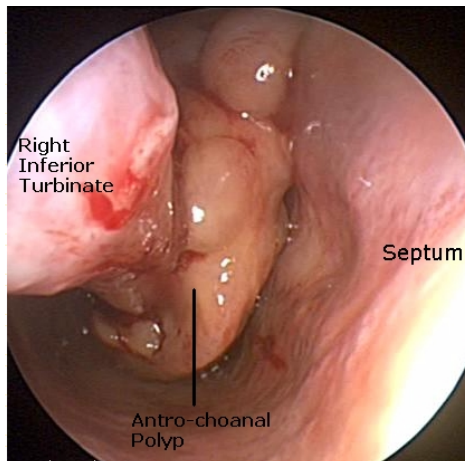
- ⇒ **Chronic sinusitis*** “we divide it into 2 types based on presence of polyps”
- ⇒ **Allergic rhinitis***
- ⇒ **Cystic fibrosis (CF)***
- ⇒ **Allergic fungal sinusitis (AFS)****

*Usually bilateral involvement.

** Usually start unilateral but in advanced cases it becomes bilateral.

➤ **Antrochoanal Polyp** “diagnosed on examination and imaging basis”

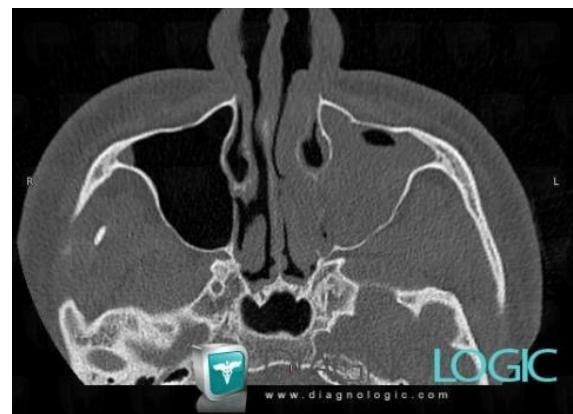
- Polyp originating in the maxillary sinus, protruding in the middle nasal meatus
- Further posterior extension moves the polyp through the choana into the nasopharynx, and a very large lesion may appear as an oropharyngeal mass.
- Antrochoanal polyp can be seen exiting out of accessory ostium.



Posterior extension to the nasopharynx



Coronal section CT scan showing unilateral mass in the maxillary sinus



CT scan showing unilateral mass in the maxillary sinus “axial”

➤ Fungal polyp (for more informations see nose 3-4)

5 Different types:

- Acute fulminant
- Chronic invasive
- Granulomatous invasive
- Fungal ball
- Allergic fungal rhinosinusitis (AFRS)

(possible **SAQ**)

What do you see in the photo?

-nasal polyp.

Give ddx?

-Simple nasal polyp.

-Allergic nasal polyp.

- Allergic fungal rhinosinusitis.

-Malignancy

-Inverted papilloma.

Acute fulminant:

Sudden onset and usually present in **immunocompromised** patients leading to serious consequences.

Chronic Invasive:

Invades the basement membrane and go to the adjacent structures causing necrosis and ischemia.

Fungal Ball:

- **Immunocompetent**
- Fungal ball is tightly packed hyphae of aspergillus (common)
- Antifungal trt is not necessary



Allergic fungal rhinosinusitis (AFRS):

AFRS most commonly seen in Saudi Arabia.

Bent's criteria

- Type I hypersensitivity (demonstrable)
- Nasal polyposis
- **Heterodense mass lesion seen in CT scans and remodeling**
- Presence of eosinophilic mucin mixed with non invasive fungus
- + Fungal stain / culture



Examination

- Smooth glossy grape-like multiple mass seen in anterior rhinoscopy
- Insensitive on probing. Probe can be passed around the polyp (when touched the patient will not feel).
- Soft and mobile

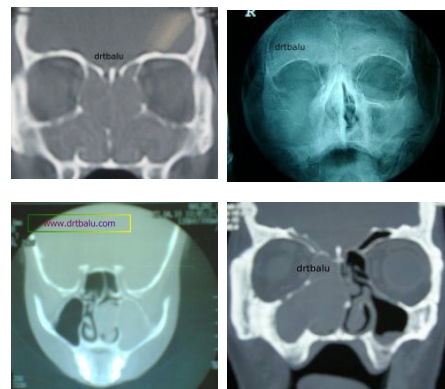


Differential diagnosis:

- Meningocele.
- Angiofibroma.
- **Sq cell carcinoma** (squamous cell carcinoma is the most common malignancy in the nose).
- Enlarged turbinates.
- **Inverted papilloma** (benign tumor).

Radiology:

- Heterogeneity, remodelling > **Allergic fungal**.
- No heterogeneity, expanding, unilateral > **Malignancy**.



➤ Treatment of Nasal polyp : “treat the underlying cause”

Medical Management:

- Antibiotic “if due to infection or acute ”
- Antihistamine “if due to allergy”
- Topical and systemic steroid therapy
 - Normal saline irrigation

Surgery:

- Functional endoscopic sinus surgery (**FESS**)
“We have to aerate the sinus and drain so that functional physiology of the sinuses is restored”
- Endoscopic polypectomy
- Caldwell Luc procedure

In general start with medical treatment, if failed > surgical.

FESS risks (complications):

- Bleeding
- Synechiae formation
- Orbital injury
- Diplopia
- Orbital hematoma
- Blindness
- CSF leak
- Direct brain injury
- Nasolacrimal duct injury/epiphora

Diseases of Nasal vestibules:

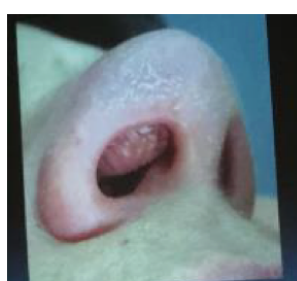
- Vestibulitis:

- Vestibule is the most anterior part of the nasal cavity that is lined by skin epithelium “squamous epithelium” and has hair follicles.
- There will be pain, swelling, and other signs of local inflammation and sometimes fever.

- Furunculosis of nasal vestibulae:

- **Definition:** Acute staphylococcal infection of hair follicle
- **Clinical features:** pain, tenderness, indurated swelling in the vestibulae.
- **Treatment:** systemic antibiotics or topical depends if the patient is immune-compromised or extreme of age.
- **Complication** cavernous sinus thrombosis (because the head& neck venous drainage system is VALAVELESS), cellulitis of upper lip.

*Vestibule: is lined by squamous cell epithelium not respiratory epithelium, so it can be affected by skin diseases like dermatitis and furunculosis.



Nasal Vestibulitis

Furunculosis: the same as vestibulitis, with pus.
Vestibulitis: more broad term than furunculosis, infection of skin and hair follicles.
Cellulites: skin infection without pus.

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