Nonallergic Rhinitis

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Disclosure

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- **University of Manitoba**

- **I have NO relationship with commercial interests.**

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OBJECTIVES

- **Learn the Anatomy and Pathophysiology**
- **Learn a Classification system**
- **Learn key points in history and physical exam**
- **Learn the Diagnostic work up**
- **Learn Medical treatment option**
- **Learn Surgical treatment options.**

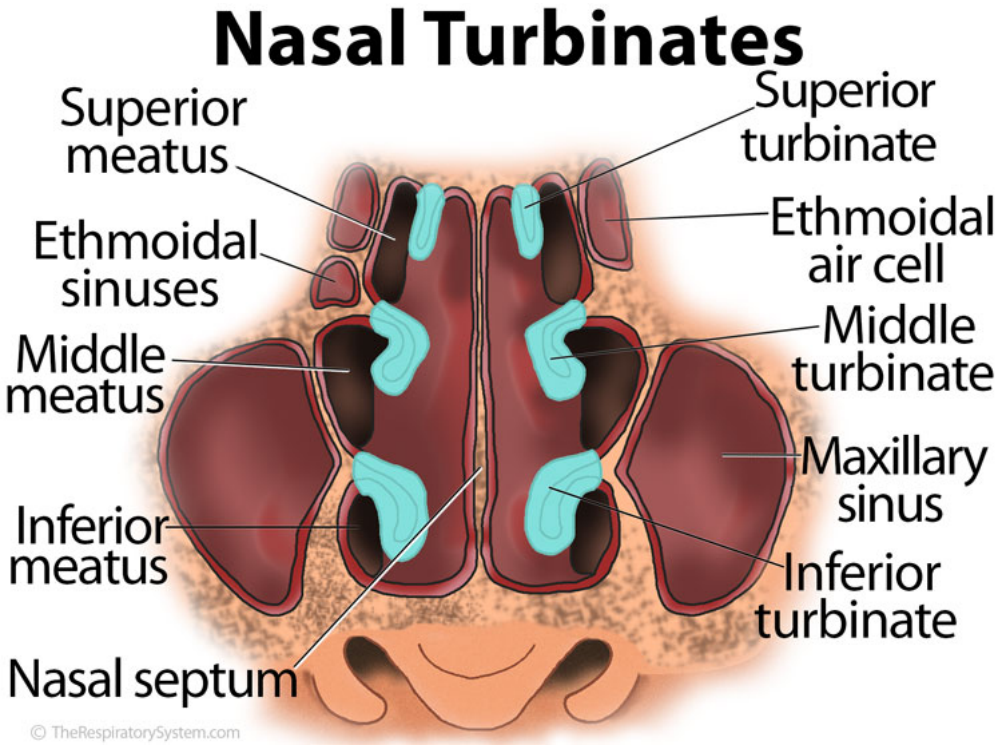
Definition of Rhinitis

- **Inflammation of nasal cavity mucosa**
- **Pseudostratified ciliated columnar epithelium with mucous secreting cells.**
- **Paranasal sinus mucosa same and in continuity with nasal cavity**
- **Septal mucosa can be affected as well.**
- **This talk will focus on Nonallergic Rhinitis**
- **Other causes: Allergic, Infectious**

Nasal Function

- **Airway**
- **Temperature regulation**
- **Olfaction**
- **Filtration**
- **Humidification**
- **Secretions, for lubrication and protection**
- **Propelled postnasal by cilia**
- **Mucous blanket, 2.5-7.5 ml/minute**

Anatomy


Nasal Turbinates
Superior meatus
Superior turbinate
Ethmoidal sinuses
Ethmoidal air cell
Middle meatus
Middle turbinate
Maxillary sinus
Inferior meatus
Inferior turbinate
Nasal septum
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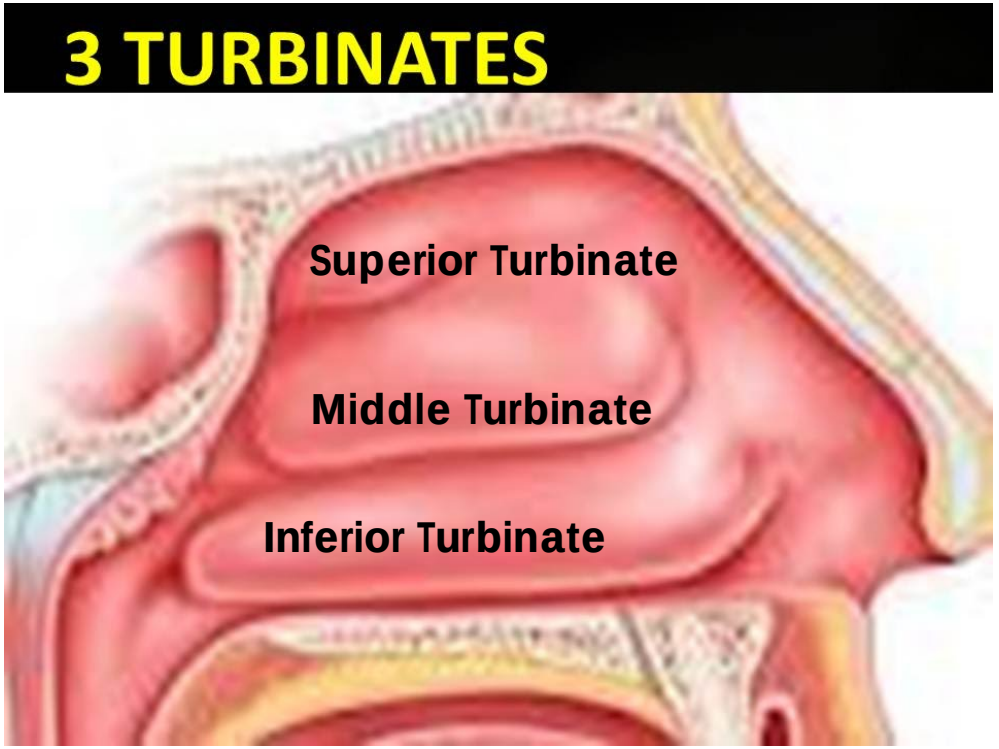
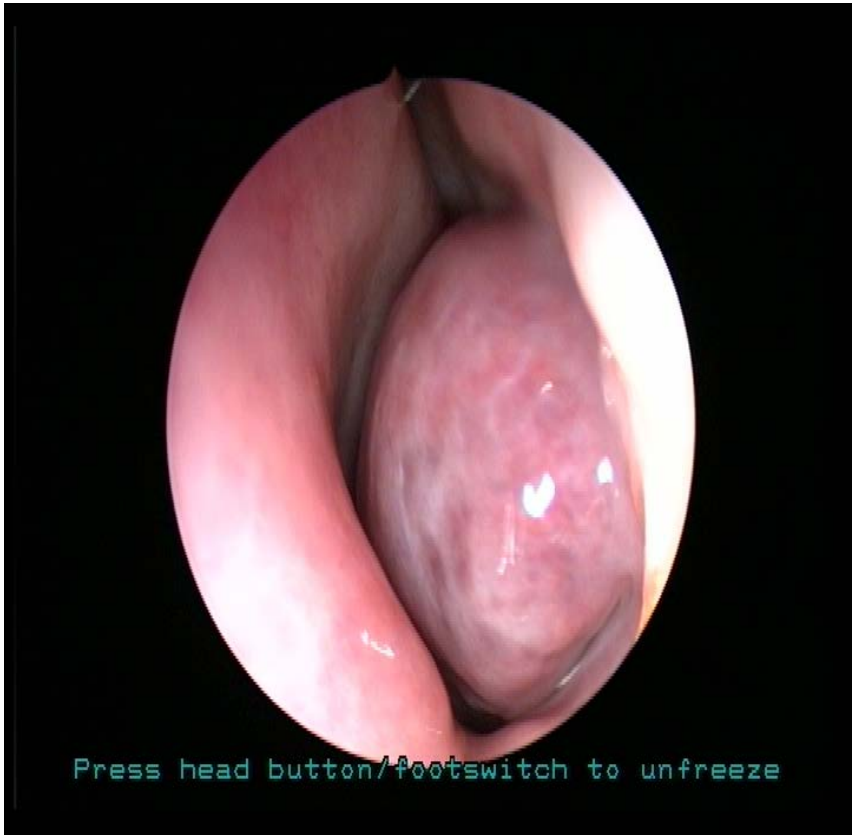
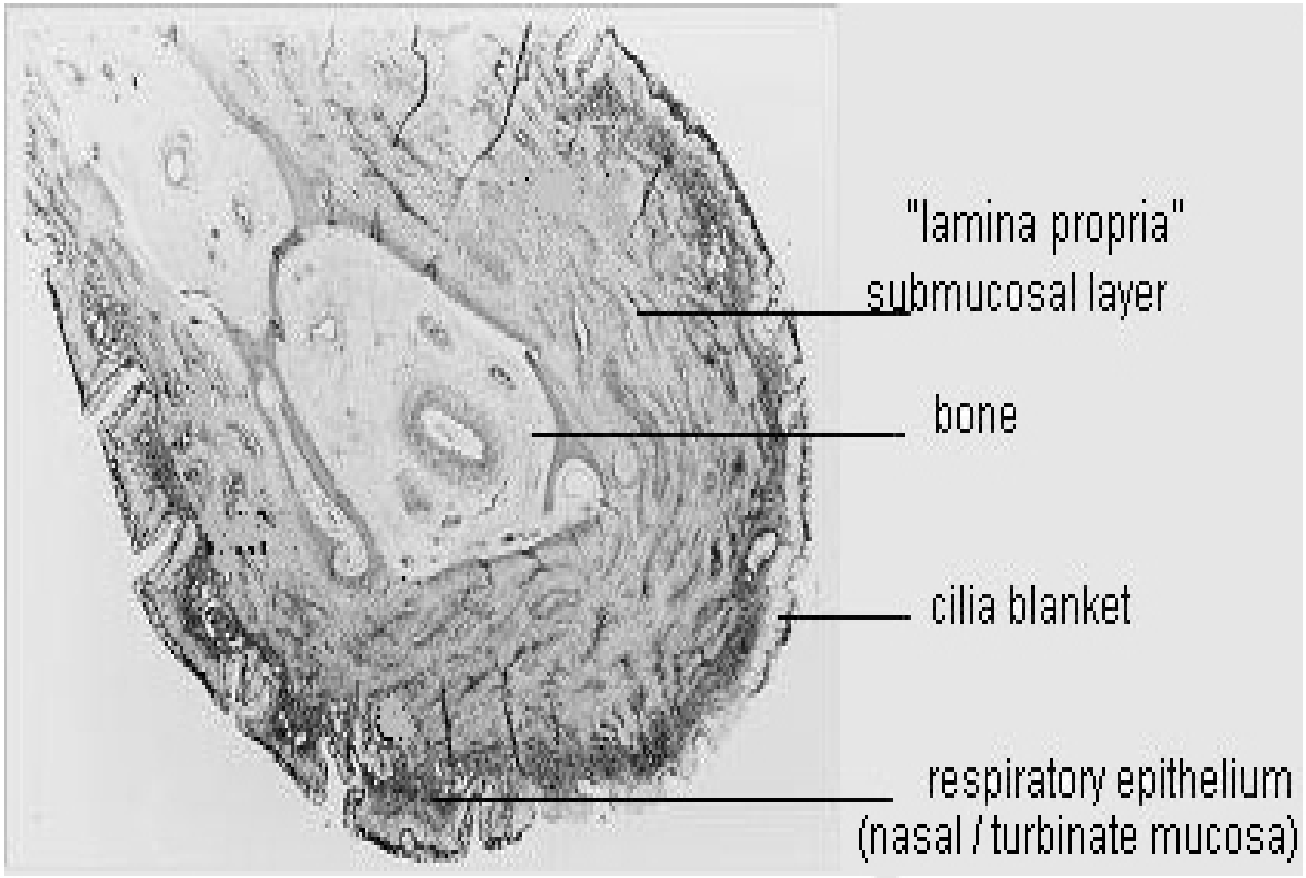
Anatomy


3 TURBINATES
Superior Turbinate
Middle Turbinate
Inferior Turbinate

Anatomy



Anatomy


"lamina propria"
submucosal layer
bone
cilia blanket
respiratory epithelium
(nasal / turbinate mucosa)

Nasal Mucosa Innervation

- **Controlled by Autonomic Nervous System**
- **Regulates mucosal vasculature and gland secretions**
- **Sympathetic nerves → vasoconstriction**
- **Parasympathetic nerves → mucous production**
- **Trigeminal nerve, sensation.**
- **C fibres most relevant sensory nerves, stimulated by inflammatory mediators, histamine,bradykinin and irritants,nicotine,smoke,capsaicin**
- **Release neuropeptides that ↑vascular permeability,glandular release, itching,rhinorrhea**

Pathophysiology

- **Exact pathophysiology is unclear**
- **Hyperreactive, exaggerated response of mucosa to stimuli leads to oversecretion of mucous and increased nasal congestion from dilation of venous sinusoids.**
- **Neurogenic inflammation independent of immune inflammatory response.**
- **↑parasympathetic activity**
- **↓Sympathetic activity**
- **Inflammatory cascades, cellular and protein reactions.**
- **Hyperreactivity less well defined in NAR**
- **Localized IgE response may occur**

Classification of NAR

1) **Idiopathic or Vasomotor (most common and no clear etiology found)**
2) **Irritants: temperature change, cold dry air, barometric pressure, humidity, foods, air pollution, tobacco smoke,**
3) **Chemical exposure: perfumes, exhaust fumes, pesticides, cleaning agents, corrosives, Toluene in autobody spray paints, Latex, building materials,**
4) **Medication Induced**
5) **NARES, Non Allergic Rhinitis with Eosinophilia**
6) **Hormone related: pregnancy, puberty**
7) **Atrophic: cocaine, granulomatous disease**

Idiopathic Nonallergic Rhinitis

- **Also called Vasomotor Rhinitis, most common**
- **Diagnosis of exclusion**
- **Imbalance of the autonomic nerve supply**
- **↑ parasympathetic or ↓ sympathetic activity**
- **Categorized as “blockers” or “runners”**

Chemicals and Irritants

- **Damage to nasal mucosa and neurons**
- **Leads to synthesis of pro inflammatory and neuromediators.**
- **Neurogenic inflammation**
- **Stimulation of chemical irritant receptors on sensory nerves (C fibers) to induce neuropeptide release causing vasodilation.**

Medications contributing to Rhinitis

- **Topical Decongestants,**
- **Cocaine**
- **Anti-hypertensives: B blockers, ACE Inhibitors**
- **Hormones: oral contraceptives**
- **ASA and NSAID's**
- **Anti-depressants: SSRI's**
- **Phosphodiesterase Type 5 inhibitors**
- **Psychotropic drugs: Amitriptilene,Chlorpromazine,Perphenazine**

Cold Dry Air

- **Standardized application of intranasal cold dry air has been proposed as a reproducible tool in identifying patients with NAR**
- **Research has shown that patients with NAR have increased nasal obstruction compared to controls using peak nasal inspiratory flow measurements.**

NARES: Non Allergic Rhinitis Eosinophilia Syndrome

- **First described in 1981**
- **Similar clinical presentation to AR**
- **Perennial symptoms with episodes watery rhinnorhea, congestion, sneezing, pruritis, epiphora, anosmia.**
- **Negative reaction to common allergens by skin or in vitro testing.**
- **Eosinophils, IgE and mast cells found in nasal mucosa.**
- **May occur with nasal polyps and ASA sensitivity**

Anatomic Factors in Rhinitis

Deviated Nasal Septum

Hypertrophic Inferior Turbinates

Nasal Polyps

Adenoid Hypertrophy

Septal perforation

Benign and Malignant Neoplasm

Systemic Conditions Associated with Rhinitis

- **Autoimmune Disorders**

Sjogrens Syndrome, SLE, Scleroderma

Relapsing Polychondritis, Sarcoidosis

Granulomatosis with Polyangitis (Wegeners)

- **Ciliary Dysmotility**

Primary ciliary dyskinesia (Kartagener Syndrome)

- **Hormonal Disorders: Acromegaly, Hypothyroidism, pregnancy, peri and post menopause, puberty**

Patient History Questions

- **Rhinorrhea, post nasal secretions**
- **Obstruction, congestion, facial pain**
- **Sneezing, itching nose or eyes, epiphora**
- **Loss of smell**
- **Persistent/perennial symptoms**
- **Seasonal/intermittent symptoms**
- **Known environmental allergies or testing**
- **Type of work, chemical exposure**
- **Triggers? Foods, temperature, chemicals, medications**

Patient History Questions

- **Symptoms worse at home or work**
- **Pets, smoker or exposed to smoke**
- **OTC medicine tried, what worked?**
- **Previous nasal/sinus surgery**
- **History of asthma**
- **Sensitive/Allergic to ASA or NSAIDS**
- **Review of systems**

Physical Examination

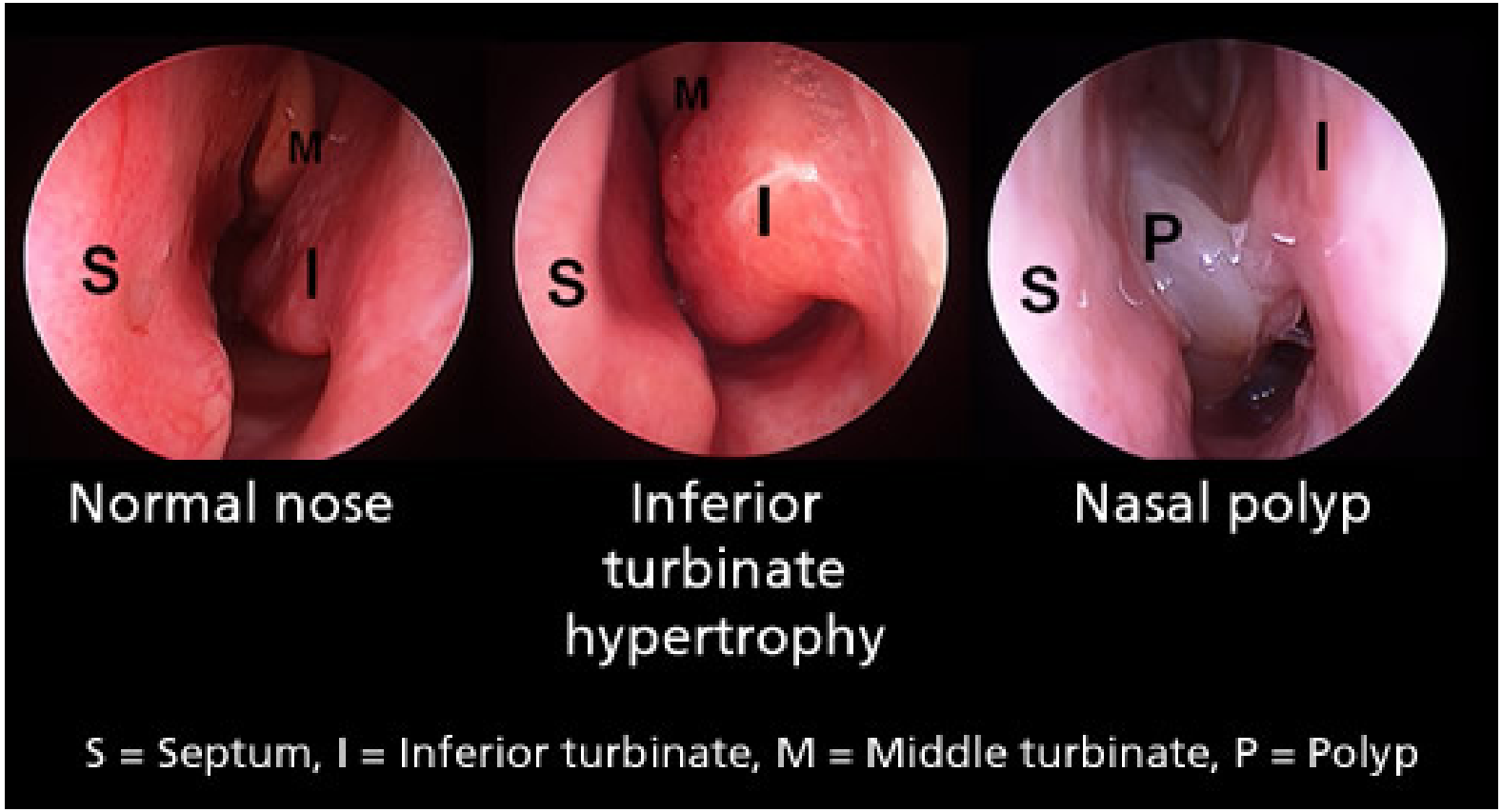
- **Hyponasal**
- **Middle ear effusions**
- **Inferior turbinate mucosa swollen**
- **Clear mucoid or watery secretions**
- **Deviated nasal septum, nasal polyps**
- **Vasoconstriction of Inferior Turbinate mucosa**
- **If above shows significant decrease in mucosal swelling with significant increase nasal breathing, patient good surgical candidate.**

Physical Examination

- **Oropharynx may show postnasal secretions**
- **Neck may show lymphadenopathy**
- **Flexible Nasendoscopy: diffuse mucosal edema, middle meatal mucous, pus, polyps.**

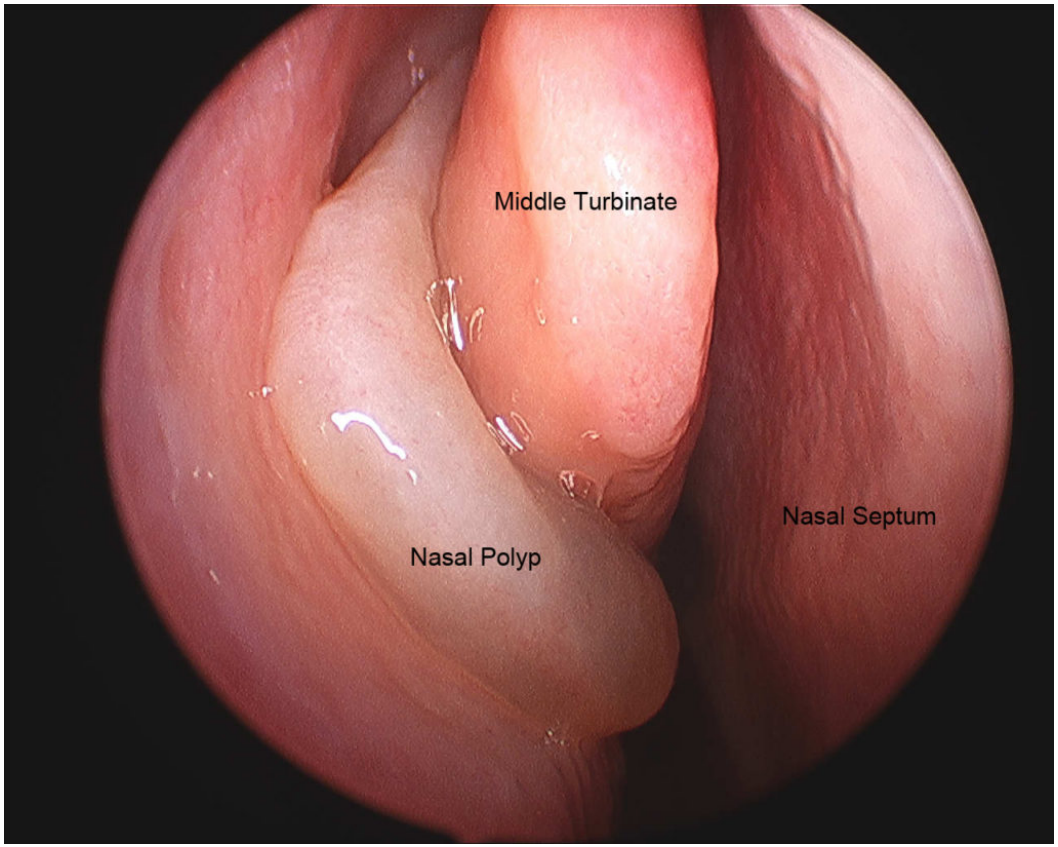
  Adenoid hypertrophy.
- **Headlight and nasal speculum superior to otoscope to examine nasal cavity.**

Anterior Rhinoscopy

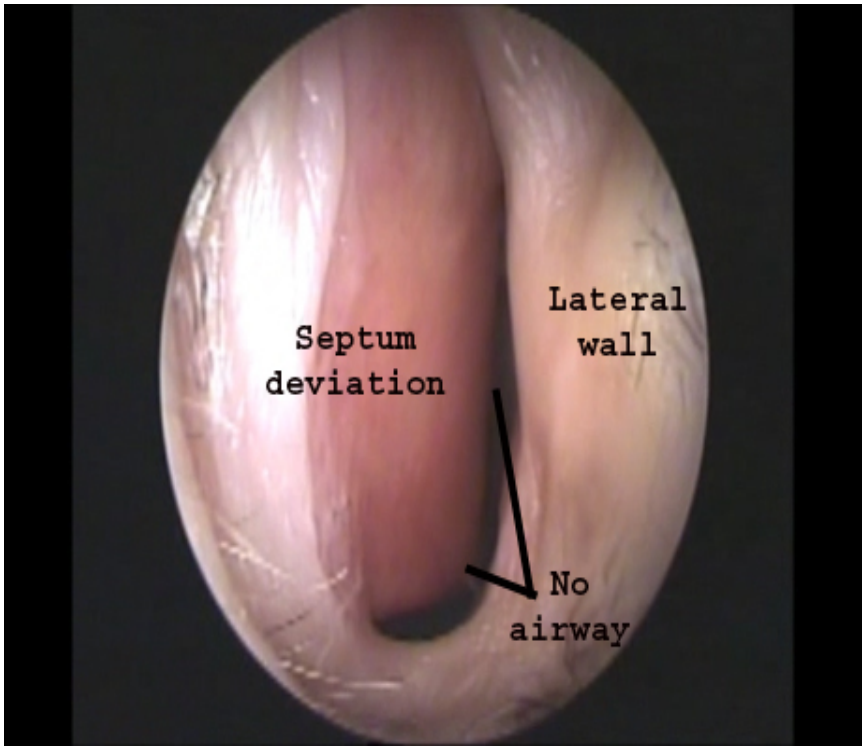


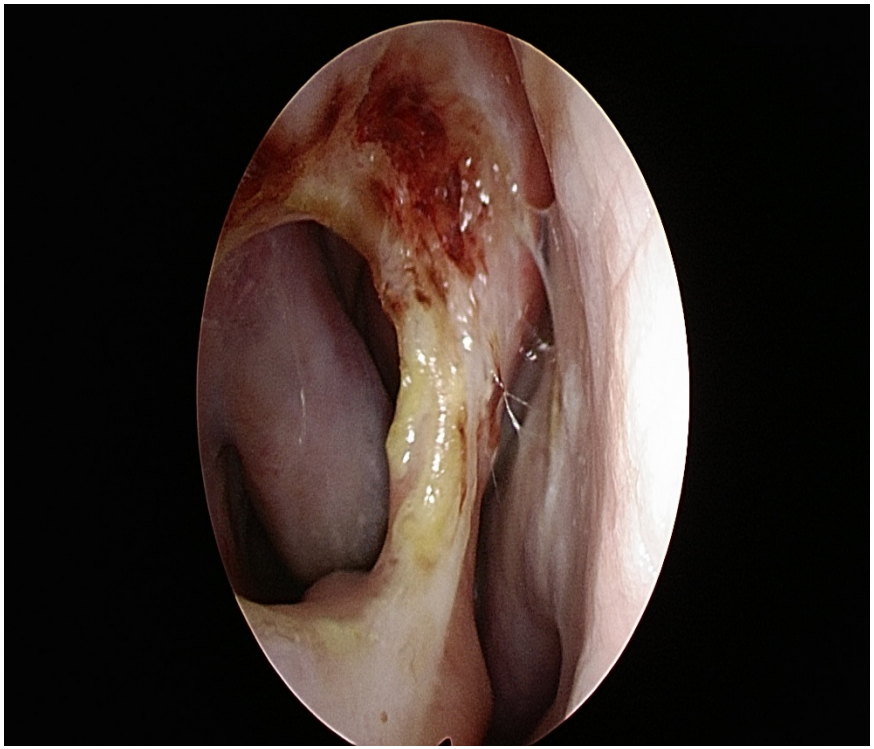
Rhino-Sinusitis

Nasal Polyps



Septal Abnormalities





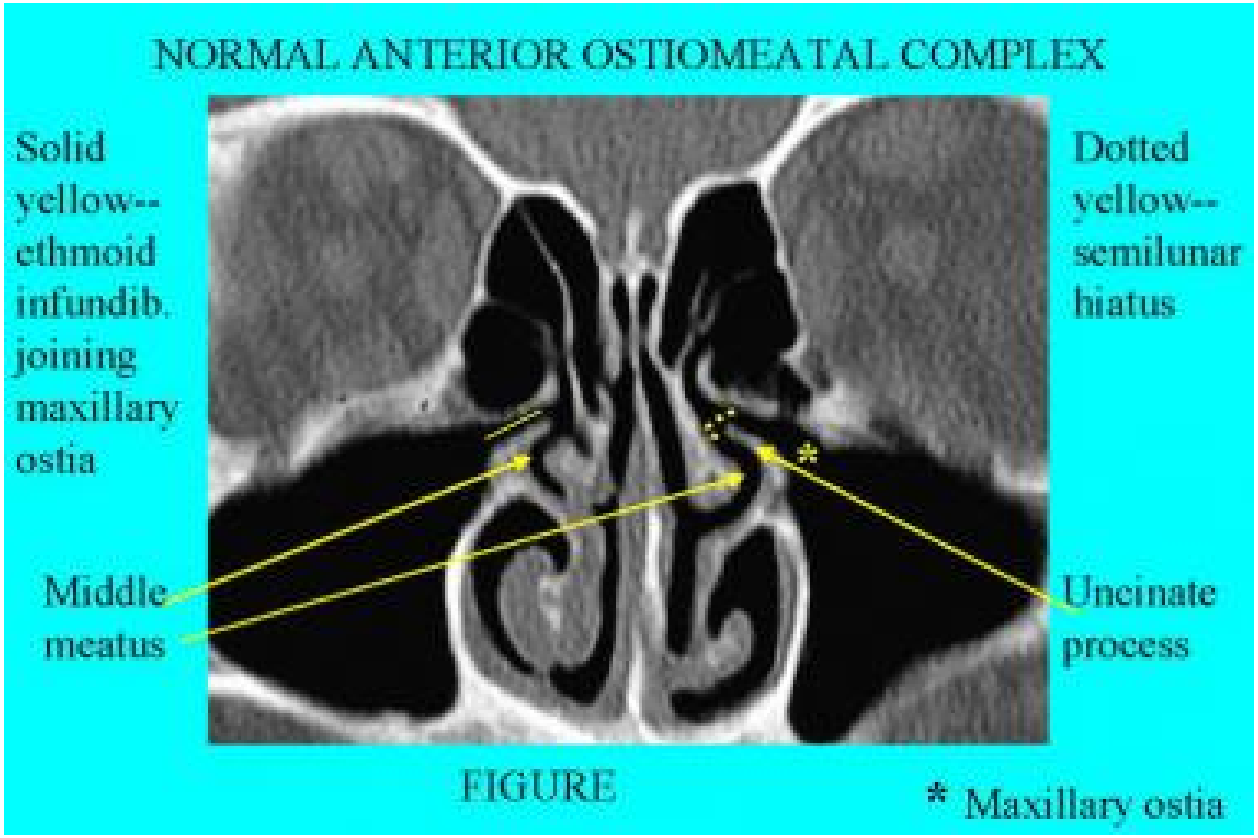
Diagnostic Testing

- **Skin and /or serum testing for IgE to antigens**
- **Negative in NAR**
- **Plain X-ray of paranasal sinuses**
- **CT scan of paranasal sinuses**
- **Cytology of nasal mucosal scrapings**
- **Provocation testing**
- **Acoustic Rhinometry (objectively measures patency)**
- **Validated smell testing**
- **Auto-Immune work up**

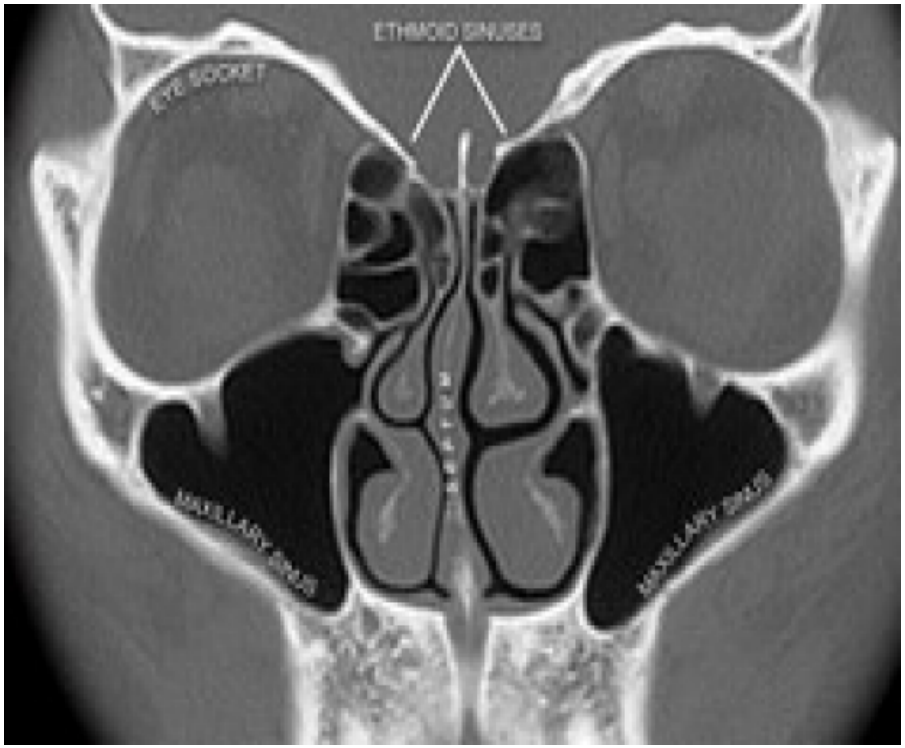
Provocation Testing

- **Research, to characterize nasal reactivity**
- **Methacoline challenge: stimulates cholinergic receptors. NAR and AR have ↑ glandular secretions**
- **Cold Dry Air: affects nasal mucosa, extrapolated from asthma research, release of inflammatory mediators,activates parasympathetic arc,→ congestion and rhinorrhea.**
- **Histamine challenge: sneezing, rhinorrhea**
- **Capsaicin: stimulates C Fibres**

CT Scan Paranasal Sinuses



Normal and Opacified Sinuses



Medical Treatment

- **Avoidance, patient education**
- **Intranasal Corticosteroid spray**
- **Intranasal Decongestant spray (rebound)**
- **Intranasal Anticholinergic spray (Ipratropium)**
- **Intranasal Antihistamine spray**
- **Oral Decongestants**
- **Oral Antihistamines**
- **Intranasal Saline irrigation**
- **Oral Prednisone**
- **Anti-Leukotriene**

Intranasal Steroid Spray

- **Must come in contact with mucosa**
- **If mucous, irrigate with saline prior to use**
- **Decreased neutrophil, eosinophil chemotaxis**
- **Decreased mast cell mediator release**
- **Decreased inflammation and edema**
- **Local side effects: burning, bleeding, dryness, headache**
- **Bioavailability concern. 20% absorbed(?)**
- **80 % swallowed with 1st pass hepatic metabolism**
- **NARES and AR respond better**

Intranasal Corticosteroid Spray

FIGURE 2: INSTRUCTIONS FOR USING INSs[4-6]

Correct Position

Wrong Position

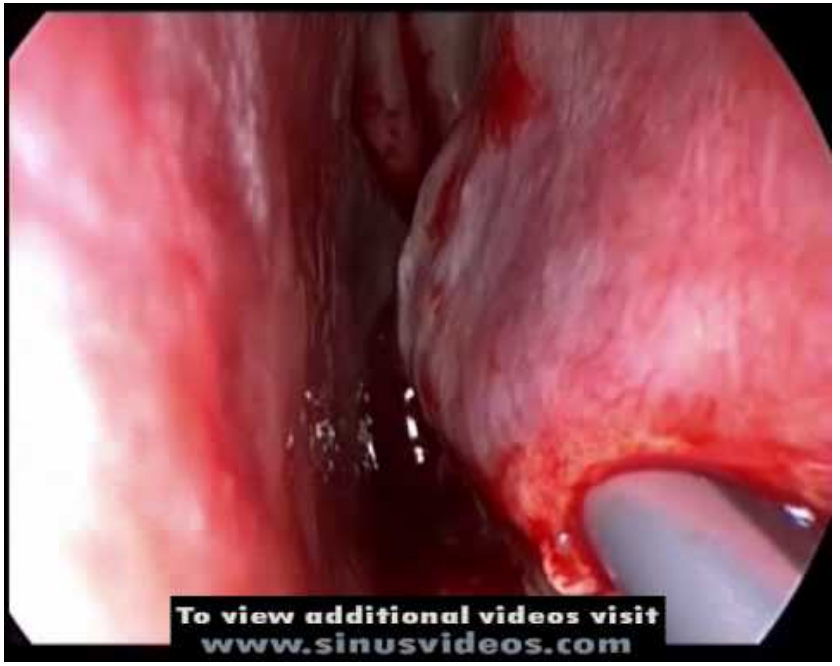
1. Blow nose gently to clear nostrils.
2. Remove cap and shake spray bottle.
3. Press against the outside of one nostril with your finger to close off that nostril.
4. Insert spray nozzle into the other nostril, and aim the nozzle toward the back of the nose and away from the nasal septum.
5. Spray into the nostril while sniffing gently. Depending on the dosing, another spray may be administered into the same nostril.
6. Repeat steps 3 through 5 for the other nostril.
7. After use, wipe the nozzle with a tissue and replace cap.

INS = intranasal corticosteroid.

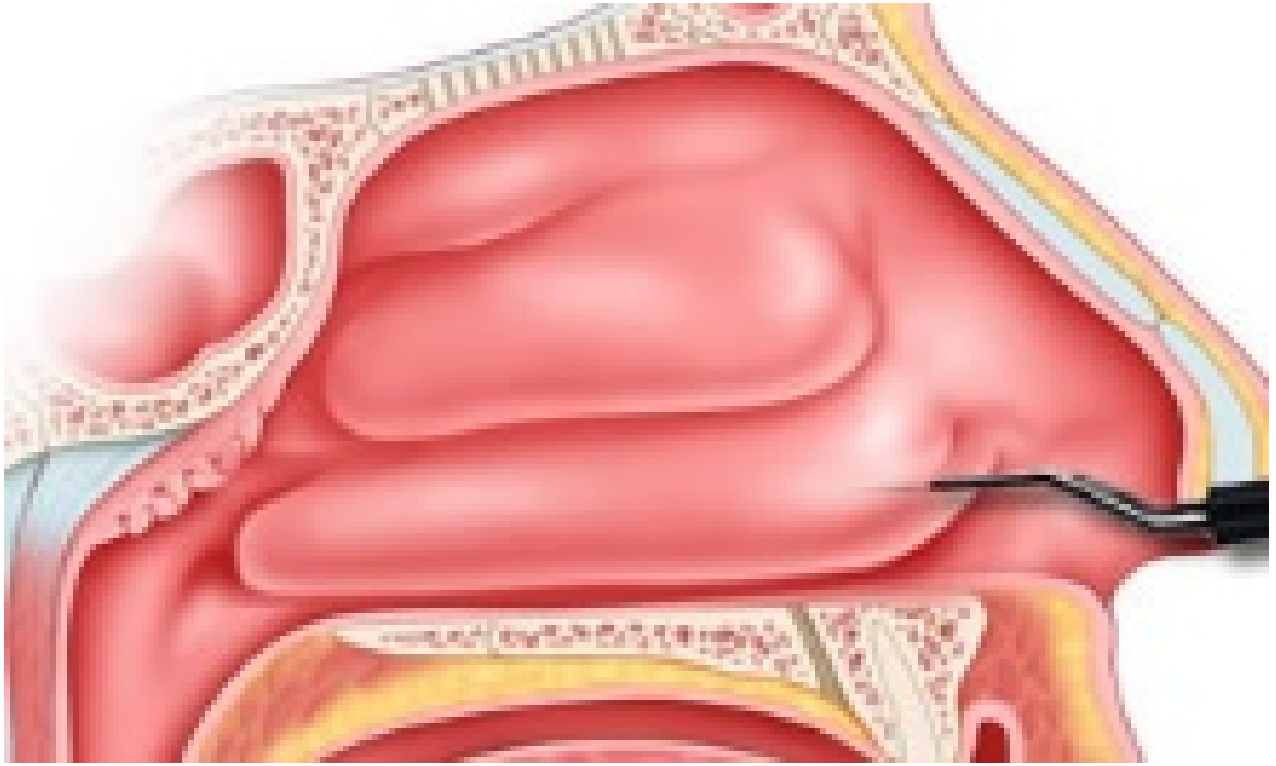
Surgical Treatment

- **Indicated for OBSTRUCTION, not mucous (unless patient also has chronic sinusitis)**
- **Goal is increase airway patency**
- **INFERIOR TURBINATE SURGERY**
- **electrocautery, microdebrider, laser**
- **radiofrequency, lateral displacement**
- **partial resection**
- **SEPTOPLASTY, POLYPECTOMY,**
- **ENDOSCOPIC SINUS SURGERY**

Microdebrider Resection



Inferior Turbinate Cautery



Practical Points

- **Headlight and nasal speculum improve your physical examination.**
- **Easy to decongest inferior turbinate mucosa**
- **Many referrals I receive for “Sinusitis” are diagnosed with NAR.**
- **Patients frustrated when told they have “no allergies” so education is important**
- **I make sure patients understand what specific symptoms surgery can help with.**
- **I don’t always refer for allergy testing. Most people will not evict their pets and have already tried all the same medical treatments for AR and NAR.**

Key Points

- **Very common problem, at least 10%**
- **Interferes with work, school, low productivity**
- **1 survey 975 patients visiting allergist office found 57% NAR**
- **NAR and AR similar clinical presentation, can be difficult to differentiate.**
- **Leads to: Sinusitis, Otitis Media and hearing loss, Snorring and OSA from nasal obstruction,Upper Airway Cough from post nasal secretions, Anosmia**

Conclusion

- **NAR very common condition with significant morbidity**
- **Idiopathic still most common**
- **Pathophysiology complex**
- **Thorough history and physical important**
- **Diagnostic work up to exclude AR and Sinusitis**
- **Medical treatment**
- **Surgical treatment**

Nasal breathing leads to contentment!