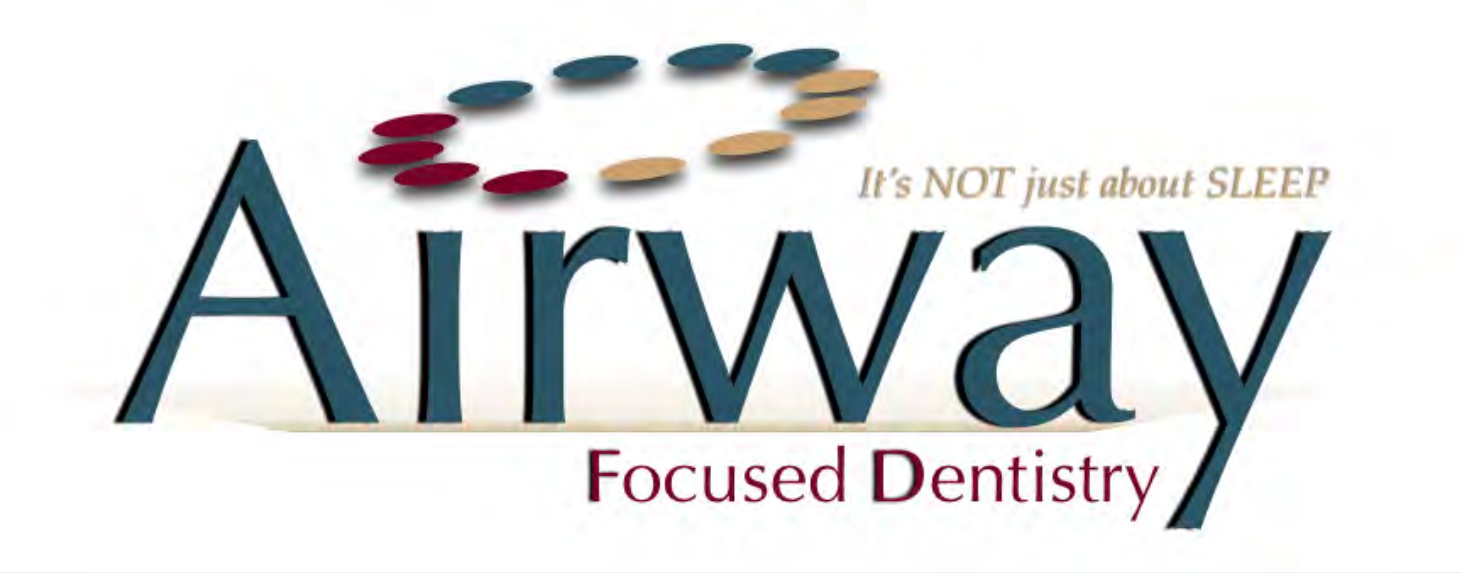
The Nasal Capsule: Function, Assessment, and Role in Sleep Disordered Breathing



Soroush Zaghi, MD
Otolaryngology (ENT) - Sleep Surgery
UCLA Medical Center, Santa Monica

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About the Doctor

Soroush Zaghi, MD

Sleep Surgeon
Otolaryngology - Maxillofacial Surgery

Dr. Zaghi graduated from Harvard Medical School and completed a 5-year residency training in Head and Neck Surgery at UCLA. He completed Sleep Surgery Fellowship as Clinical Instructor of Otolaryngology at Stanford University. The focus of his specialty training is on Sleep Endoscopy, CPAP Optimization, Frenuloplasty, Myofunctional Therapy, and Maxillofacial Airway Reconstruction for the treatment of nasal obstruction, snoring, and obstructive sleep apnea. He is very active in clinical research relating to sleep disordered breathing with over 50 peer-reviewed journal articles relating to neuroscience, head and neck surgery, and obstructive sleep apnea.

Research interests include: Study design, literature review, and statistical analysis. Special interest in collaborative and multidisciplinary research projects relating to airway and breathing disorders, obstructive sleep apnea, nasal obstruction, catathrenia, myofunctional therapy, rapid maxillary expansion, maxillary mandibular advancment, facial and airway reconstruction.

Clinical interests: Airway and Breathing Disorders, Snoring, Obstructive Sleep Apnea, Nasal Obstruction, Maxillary Expansion, Maxillary-Mandibular Advancement, Facial and Airway Reconstruction Surgery, Hypoglossal Nerve Stimulation, Functional Septorhinoplasty, Turbinate Reduction, Frenuloplasty, Sinus Surgery, and Aesthetic Jaw Surgery (Genioplasty).

Personal Interests: Salsa and ballroom dance.

Guiding Statements:

- To wake up every day grateful for the air I breathe, for the life that has been given to me, for the challenges that make me stronger, and for the people that enrich my life and give it meaning.

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Stanford-Trained Sleep Surgeon:

- Multidisciplinary perspective to advanced treatment of OSA.
- Sleep Medicine, Otolaryngology (ENT), Sleep Dentistry, Myofunctional Sciences, & Maxillofacial Surgery.
- Clinical Research and Evidence-Based Medicine.

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Nasal obstruction, snoring, sleep-apnea, and tongue-tie, are symptoms of structural issues. Precision diagnostics enables us to identify and treat the root causes of sleep disordered breathing.

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Myofunctional therapy includes facial and tongue exercises, as well as functional modification techniques, to promote proper tongue position and improve breathing, chewing, and swallowing.

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SCHEDULE AN APPOINTMENT

Overview of Lecture

- Nasal Function and Dysfunction
  - Smell – Olfactory Dysfunction (Hyposmia or Anosmia)
  - Taste – Diminished Taste Sensation (Dysguesia or Aguesia)
  - Immunity – Allergies and Sinusitis
  - Warms and Humidifies Air – Epistaxis and Empty Nose Syndrome
  - Breathing – Nasal Obstruction, Mouth Breathing, Snoring, and/or Obstructive Sleep Apnea
- Anatomy
  - CT Imaging
  - Physical Exam
- Nasal Obstruction- Evaluation
  - Neoplasms
  - Anatomic Restrictions
  - Functional Issues – Bleeding, Empty Nose Syndrome, and Nasal Disuse
- Nasal Obstruction- Management
  - Functional
  - Medical
  - Surgical

Soroush Zaghi, MD- Highly Sp ×

Soroush

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Patient Info | Educational Resource | Pre-Op Info | Research | Contact

- Stanford Sleep Surgery
- Clinical Exam: Made Easy
- Tonsils and Adenoids
- Tongue-Tie (Functional Ankyloglossia)
- Lip Tie
- Nasal Saline Rinse
- Xlear Sinus Care
- Breathe Right Nasal Strips
- ALF Orthodontics
- DNA Appliance
- Myobrace
- Ear, Nose, Throat Diagram
- Lecture Files

Dr. S hi

S

Otolaryngology l Surgery

Nasal Breathi o Apnea

Tongue-Ti ment

HARVARD MEDICAL SCHOOL

Stanford MEDICINE

About

Research Interests, Clinical Interests, Guiding Statements, Current Focus.

Education

Harvard Medical School
UCLA Head and Neck (ENT) Residency
Stanford Sleep Surgery Fellowship
Clinical Research with 60+ Publications

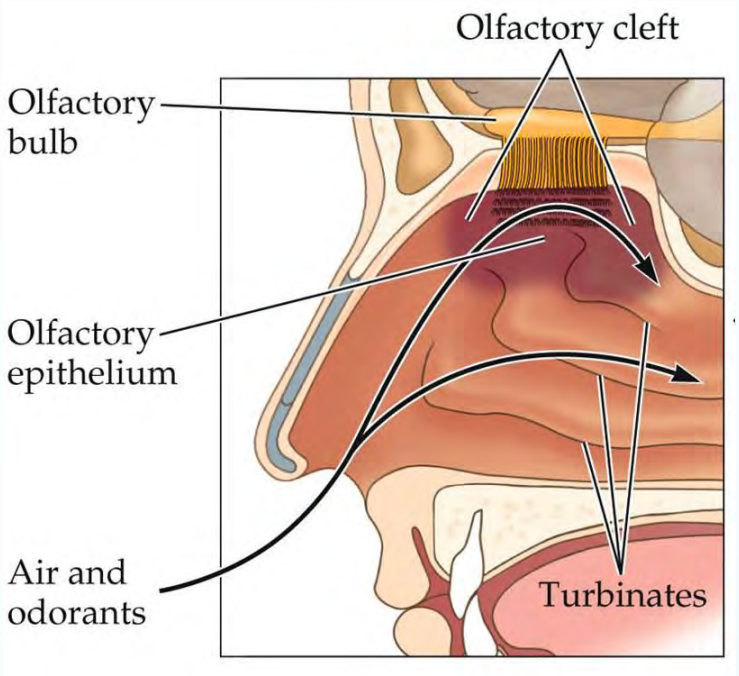
Conditions Treated

Nasal obstruction, snoring, sleep apnea, teeth-grinding, tongue-tie.

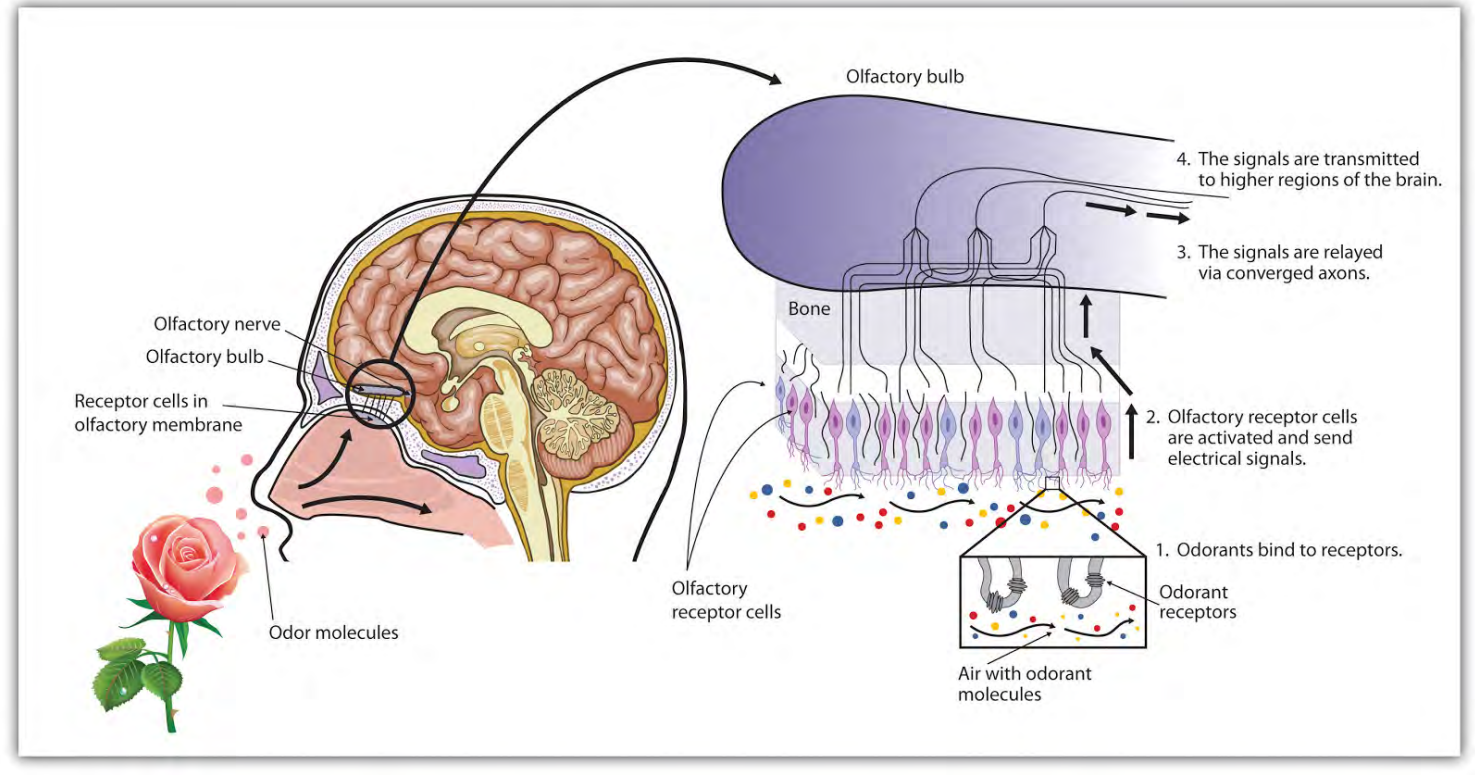
functions of the nose

Olfaction (Sense of Smell)

- Determines the flavor and palatability of food and drink
- Monitors inhaled chemicals, including dangerous substances such as natural gas and smoke, and odors common to everyday life
- The loss of smell or a decreased ability to smell affects approximately 1% of people under age 60 but more than half of the population beyond this age.



Olfactory Dysfunction



Disorders of the sense of smell are caused by conditions that interfere with the access of the odorant to the olfactory neuroepithelium (transport loss), injure the receptor region (sensory loss), or damage the central olfactory pathways (neural loss).

Table 9–1. Causes of Olfactory Dysfunction.
Transport Olfactory Losses
Allergic rhinitis
Bacterial rhinitis and sinusitis
Congenital abnormality (encephalocele)
Nasal neoplasms
Nasal polyps
Nasal septal deviation
Nasal surgery
Viral infections
Sensory Olfactory Losses
Drugs
Neoplasms
Radiation therapy
Toxic chemical exposure
Viral infections
Neural Olfactory Losses
AIDS
Alcoholism
Alzheimer's disease
Chemical toxins
Cigarette smoke
Diabetes mellitus
Depression
Drugs
Huntington's chorea
Hypothyroidism
Kallmann syndrome
Korsakoff psychosis
Malnutrition
Neoplasm
Neurosurgery
Parkinson disease
Trauma
Vitamin B_{12} deficiency
Zinc deficiency

TRANSPORT OLFACTORY LOSS:

NASAL OBSTRUCTION AND UPPER RESPIRATORY INFECTION

Blockage of airflow to the olfactory cleft caused by severe mucosal swelling, tumors, nasal polyps, or bony deformities can result in hyposmia or anosmia.

Olfactory ability should improve or return altogether with relief of the obstruction.

Table 9–1. Causes of Olfactory Dysfunction.
Transport Olfactory Losses
Allergic rhinitis
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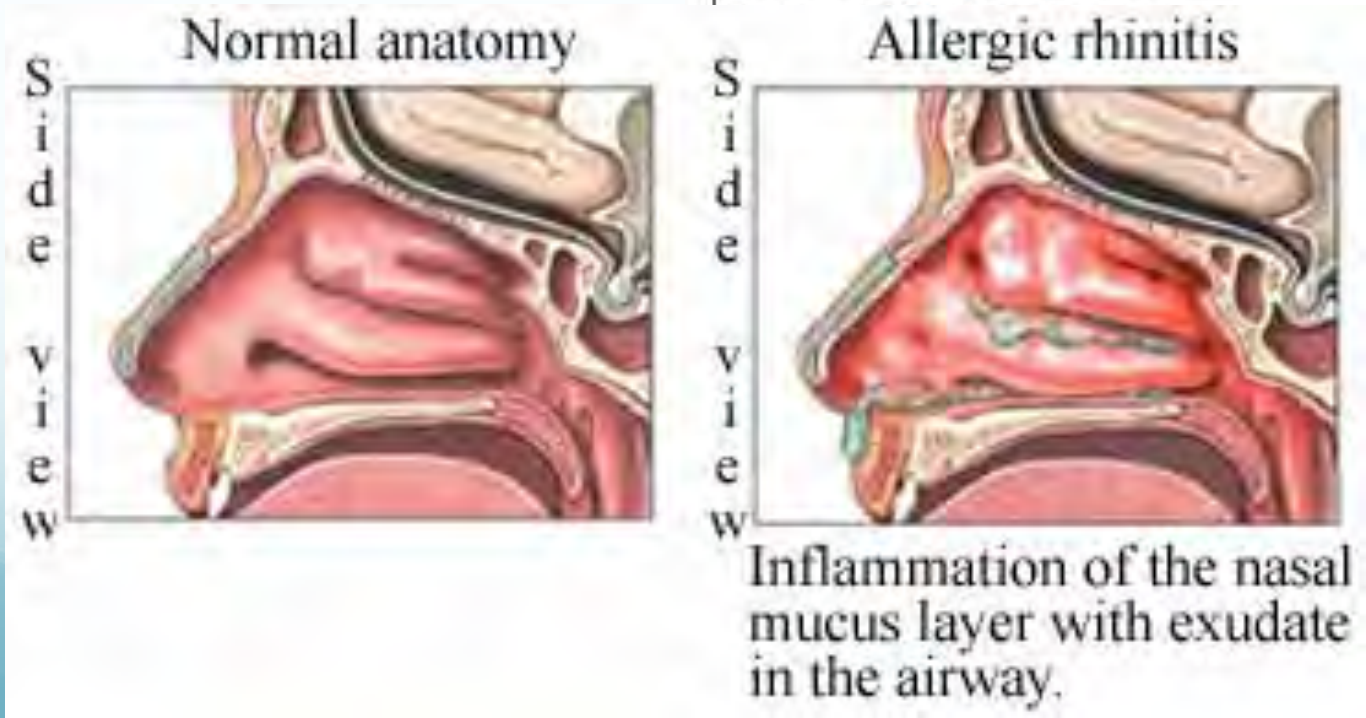
Congenital abnormality (encephalocele)
Nasal neoplasms
Nasal polyps
Nasal septal deviation
Nasal surgery
Viral infections



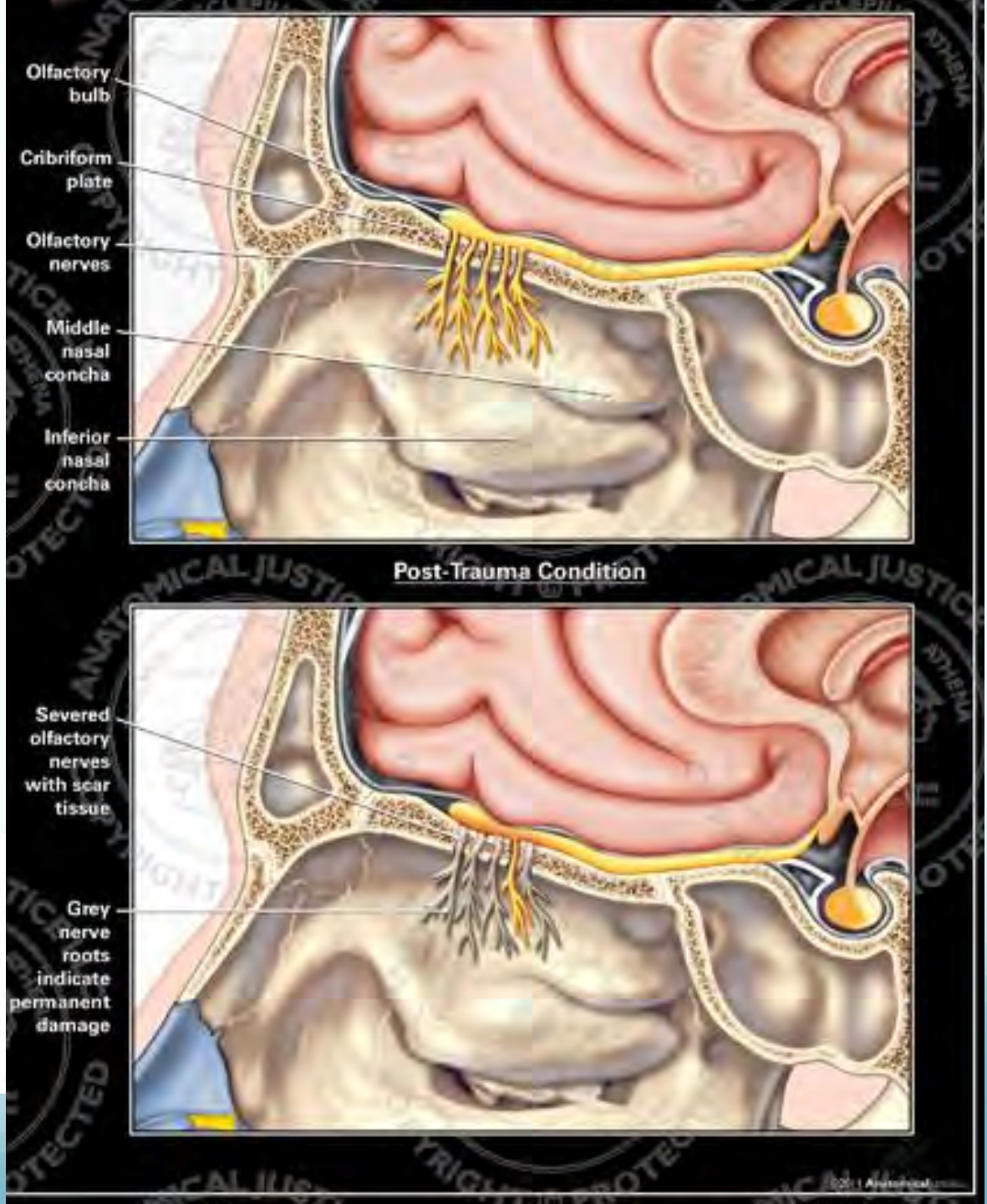
SENSORY OLFACTORY LOSS: CRANIAL TRAUMA

Approximately 5–10% of adult patients with head trauma report olfactory loss.

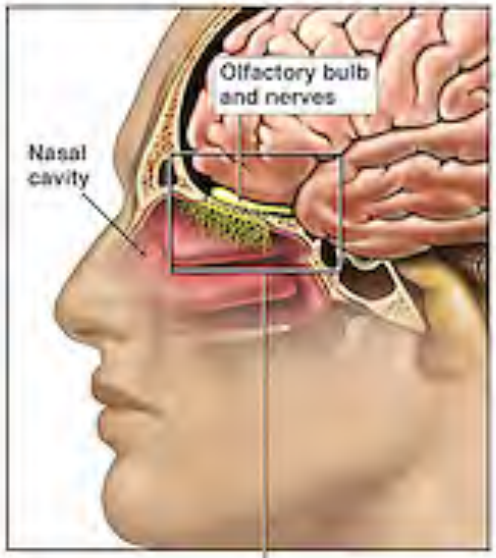
The degree of olfactory loss is generally associated with two things: the severity of the trauma and the site of cranial trauma.

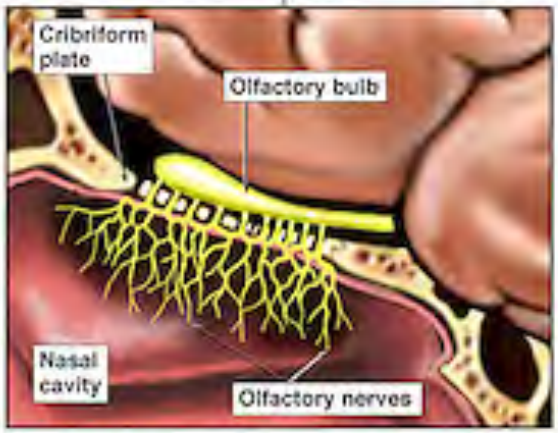
Total anosmia is more likely to occur with occipital traumas; however, frontal blows most frequently cause olfactory loss.

Sensory Olfactory Losses
Drugs
Neoplasms
Radiation therapy
Toxic chemical exposure
Viral infections



A. Head in Neutral Position





In this enlarged view, the olfactory nerves are shown passing through the cribriform plate into the nasal cavity.

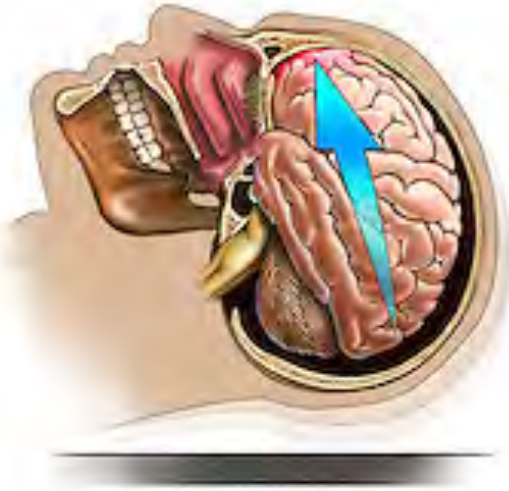
B. Head Hits Pavement

The brain slides backward and strikes the back of the skull.

The olfactory bulb is pulled toward the back of the skull leading to stretching and tearing of the olfactory nerves.

C. Head Rebounds Forward

The brain slides forward and strikes the front of the skull.



The olfactory bulb is pulled toward the front of the skull leading to stretching and tearing of the olfactory nerves once again.

Neural Olfactory Losses
AIDS
Alcoholism
Alzheimer's disease
Chemical toxins
Cigarette smoke
Diabetes mellitus
Depression
Drugs
Huntington's chorea
Hypothyroidism
Kallmann syndrome
Korsakoff psychosis
Malnutrition
Neoplasm
Neurosurgery
Parkinson disease
Trauma
Vitamin B_{12} deficiency
Zinc deficiency

NEURAL OLFACTORY LOSS:

AGING AND DEMENTIA- RELATED DISEASES

Olfactory sensitivity tends to drop sharply in the sixth and seventh decades of life. Anatomically, cellular elements associated with olfaction decrease with age, as does olfactory bulb volume (found at the base of the frontal cortex).

Alzheimer disease and Parkinson disease may be associated with olfactory dysfunction. Sense of smell is often one of the first things to be affected by cognitive decline.

J Neurol Sci. 2013 Oct 15;333(1-2):19-24. doi: 10.1016/j.jns.2013.06.033. Epub 2013 Aug 5.

A brief olfactory test for Alzheimer's disease.

Stamps JJ[1], Bartoshuk LM, Heilman KM.

Author information

Abstract

BACKGROUND: The early diagnosis of Alzheimer's disease (AD) may help reduce disability, enhance quality of life, and aid clinical trials. Portions of olfactory cortex are the initial sites of AD pathology and patients with AD often have more degeneration of their left than right hemisphere. Since the olfactory epithelium projects mainly to the ipsilateral olfactory cortex, patients with AD may demonstrate an asymmetrical (left greater than right) decrement of odor detection sensitivity. This retrospective, case-control study assessed a quick olfactory test that may help diagnose AD.

METHODS: Participants with probable AD (N=18), mild cognitive impairment (MCI, N=24), other causes of dementia (OD, N=26) and matched controls (OC, N=26) were tested, with closed eyes, for their ability to detect an odor, one nostril at a time. A container of 14g of peanut butter was opened, held medially at the bottom of a 30cm ruler, and moved up 1cm at a time during the participants' exhale. Upon odor detection, the distance between the subject's nostril and container was measured.

RESULTS: The mean odor detection distance of AD patients' left nostril (5.1cm), and not their right (17.4cm), was significantly less ($F(3,90)=22.28$, $p<0.0001$) than the other groups. The mean, standard error, and 95% Confidence Interval of the L-R nostril odor detection difference (cm) for AD were -12.4±0.5, (-15.0,-9.8); for MCI were -1.9±1.2, (-4.2,0.4); for OD were 4.8±1.0, (2.6,6.9); and for OC were 0.0±1.4 (-2.2,2.1).

CONCLUSION: This non-invasive and inexpensive left-right nostril odor detection test appears to be a sensitive and specific test for probable AD.

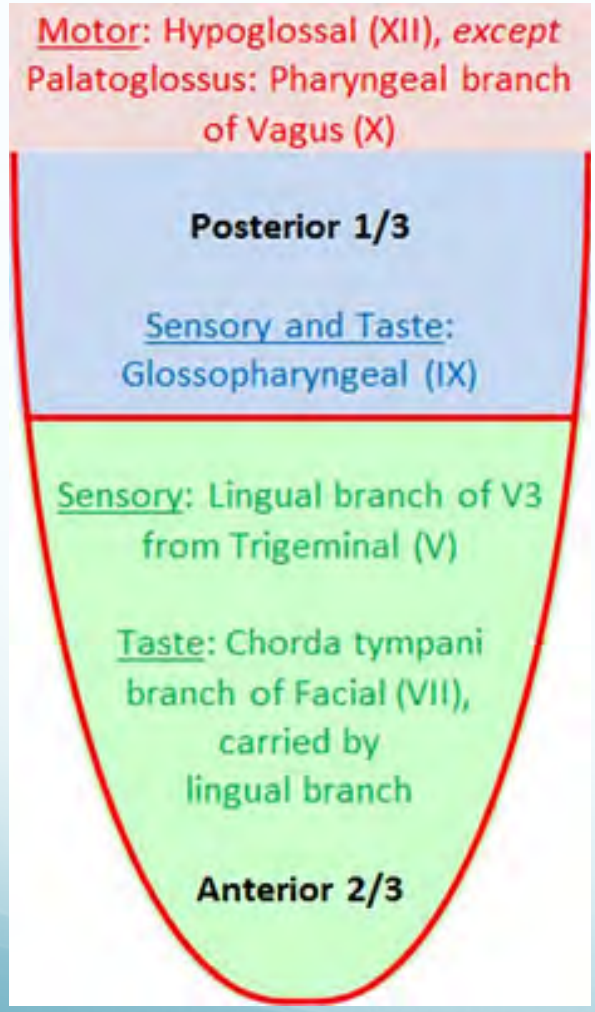
Peanut butter smell test

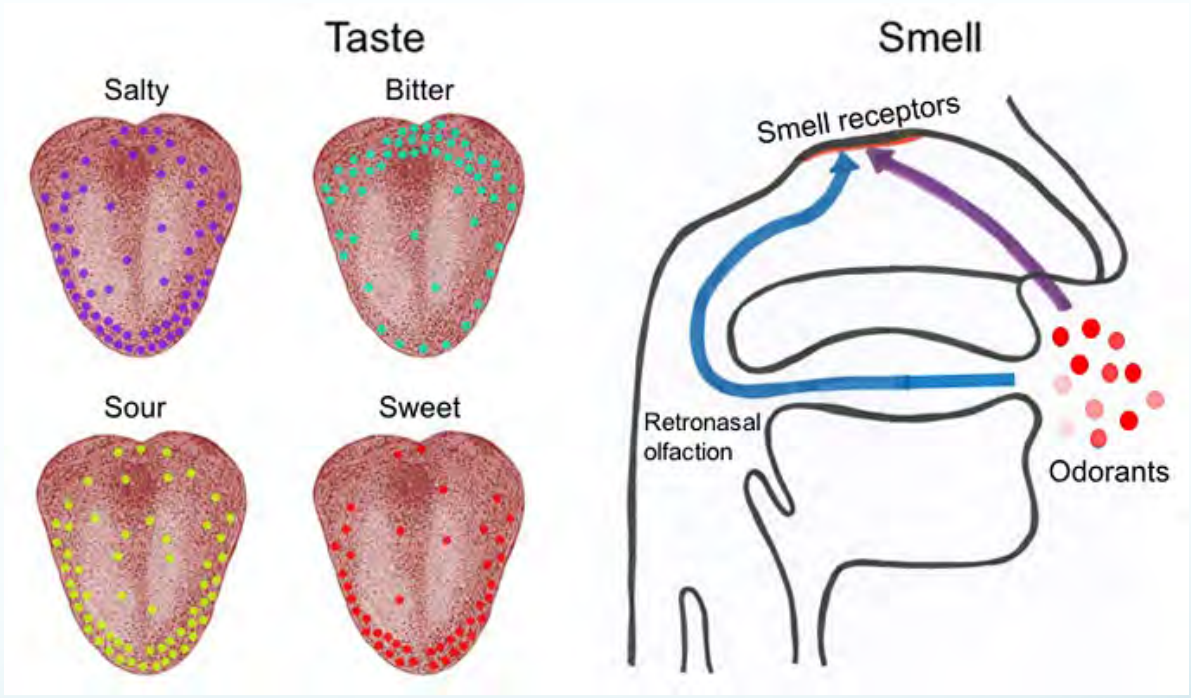
Here's how they conducted the test. The researchers asked each person to close their eyes, their mouth and one nostril. They opened a small container of peanut butter and moved progressively closer until the person could smell it. After measuring that distance, they waited 90 seconds and repeated the process with the other nostril.

In those with probable Alzheimer's disease, the researchers had to move the peanut butter container an average of 10 centimeters closer to the left nostril than to the right nostril.

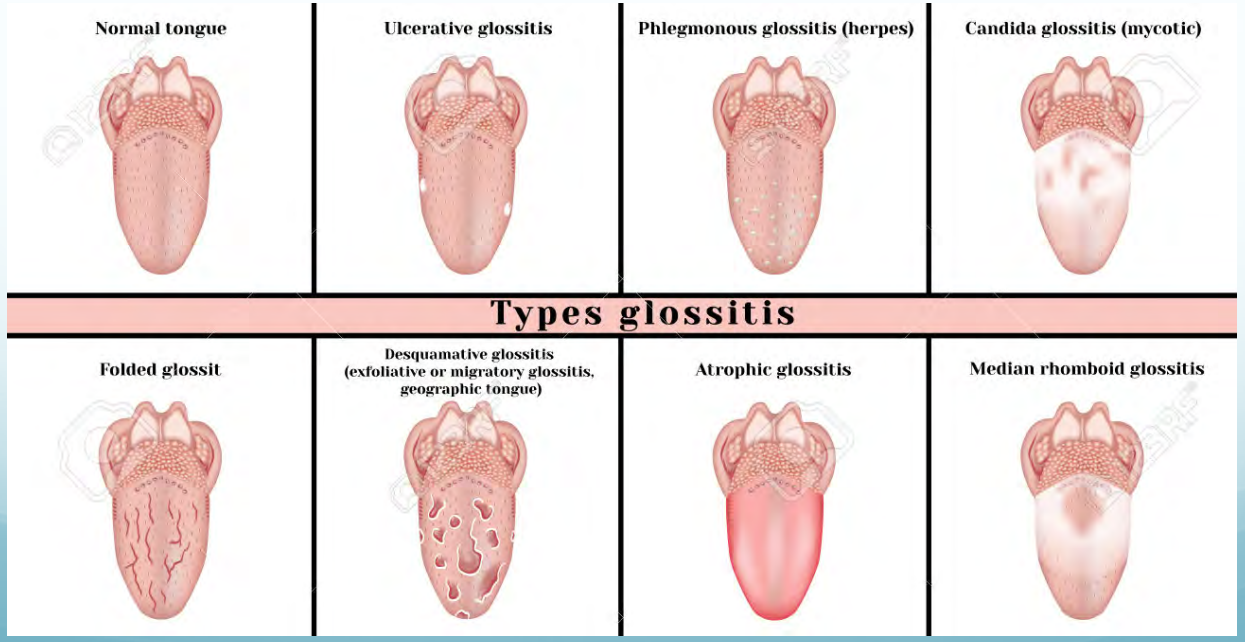
"This is a significant part of this study," notes Dylan Wint, MD, a specialist in degenerative brain diseases who commented on the research. "There is a lot of research showing Alzheimer-related brain shrinkage starting on the left side of the brain, which is where the temporal lobe degenerates first."

Taste Sensation (Dysguesia)



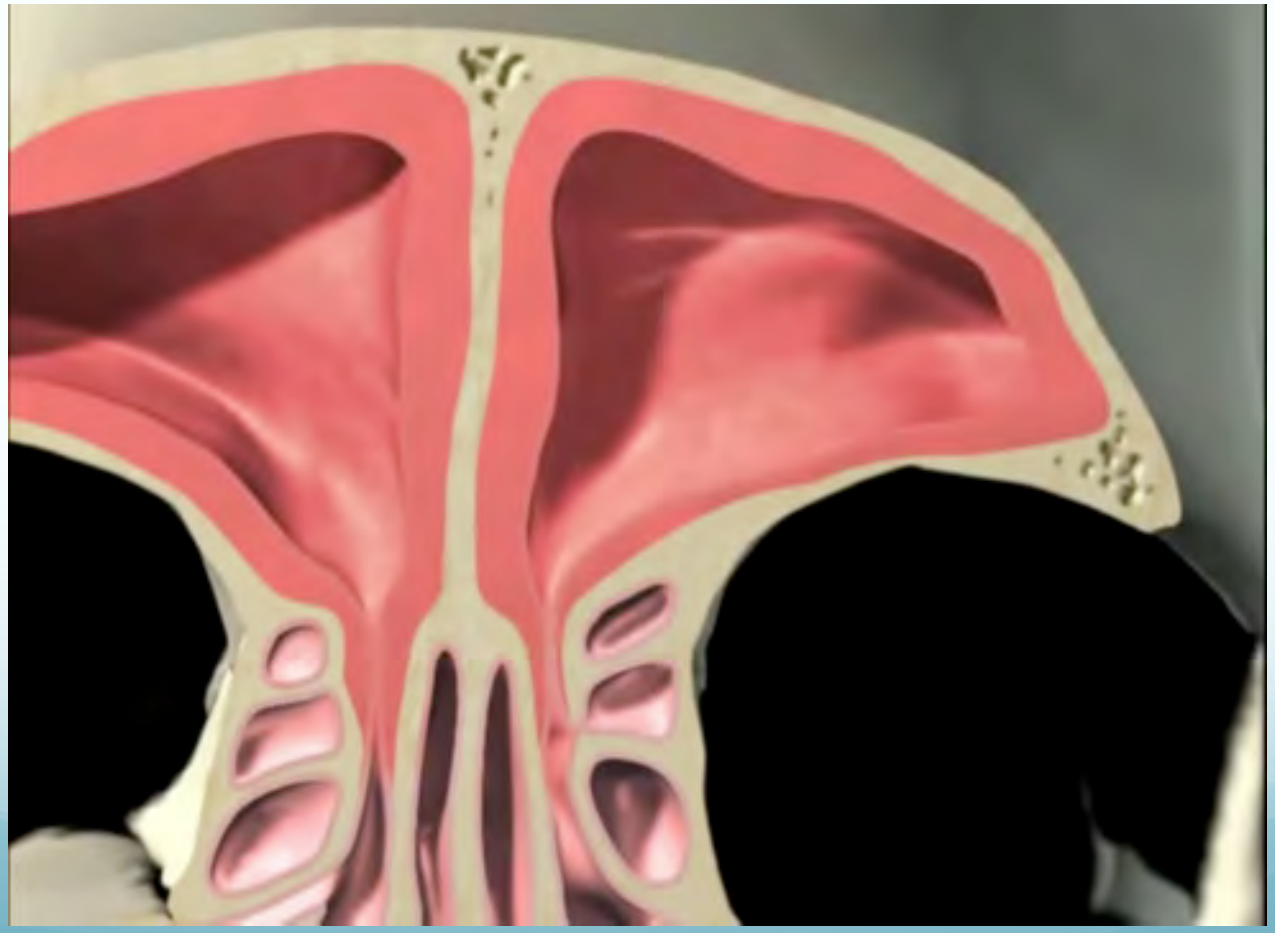


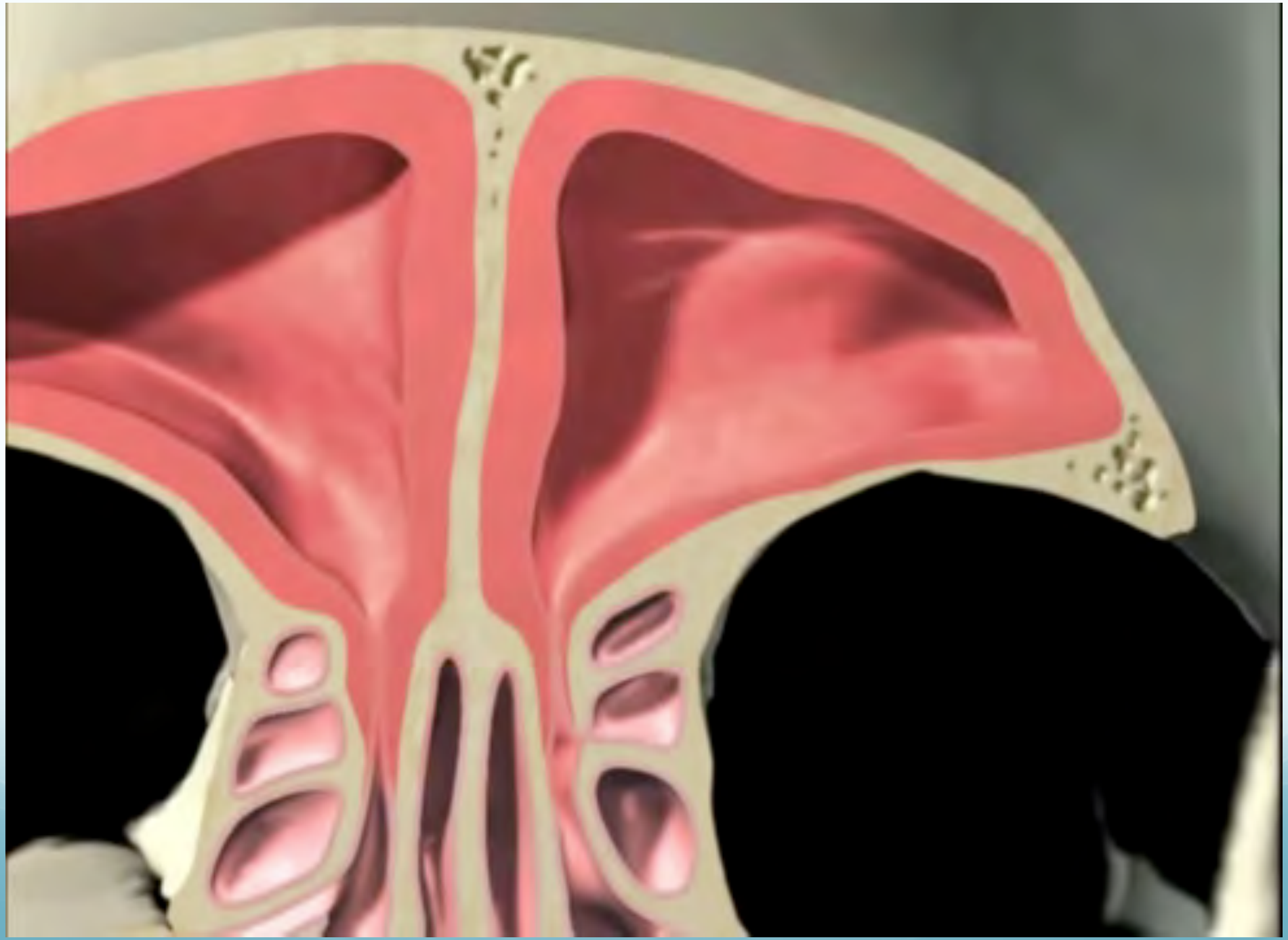
Atrophic Glossitis

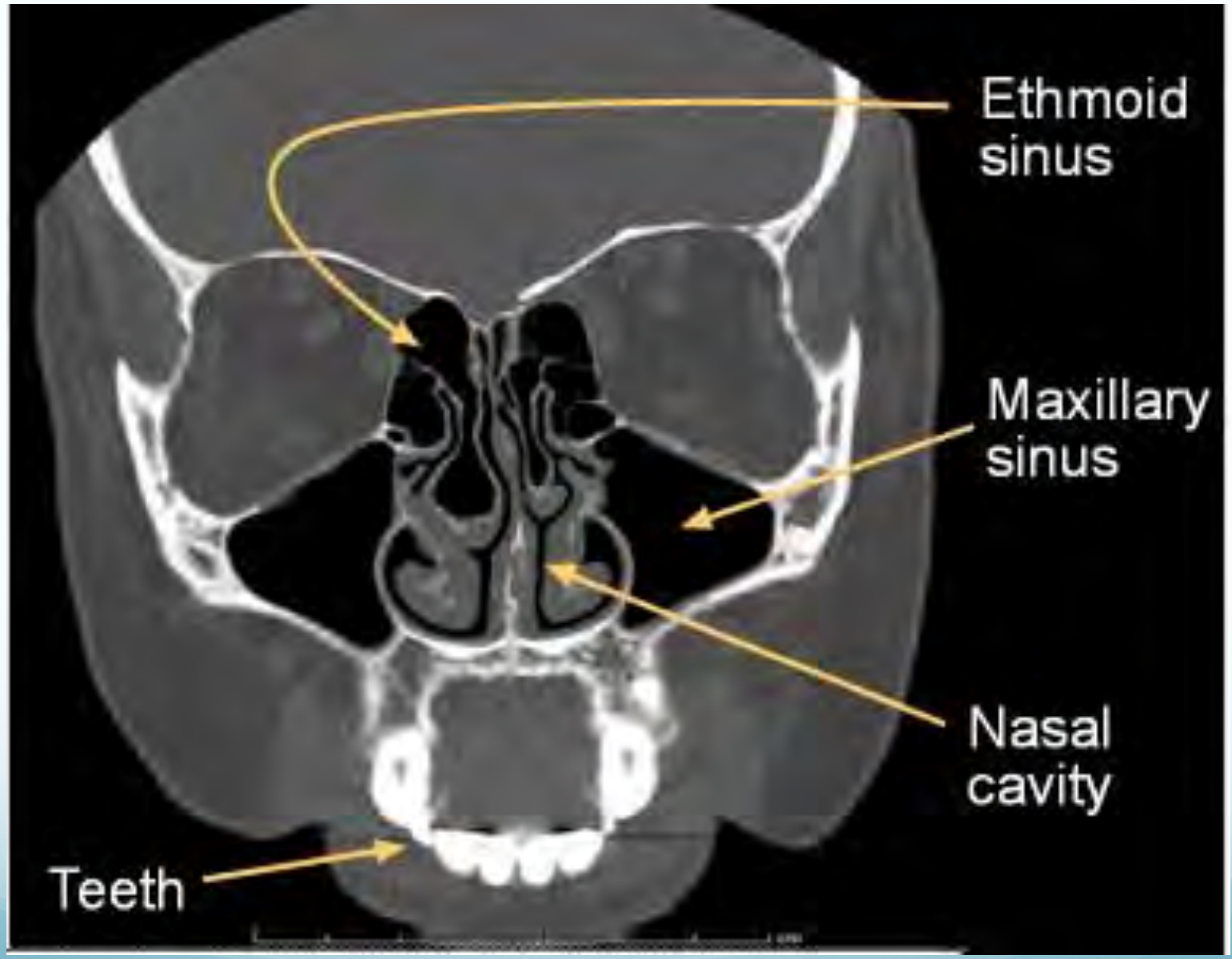


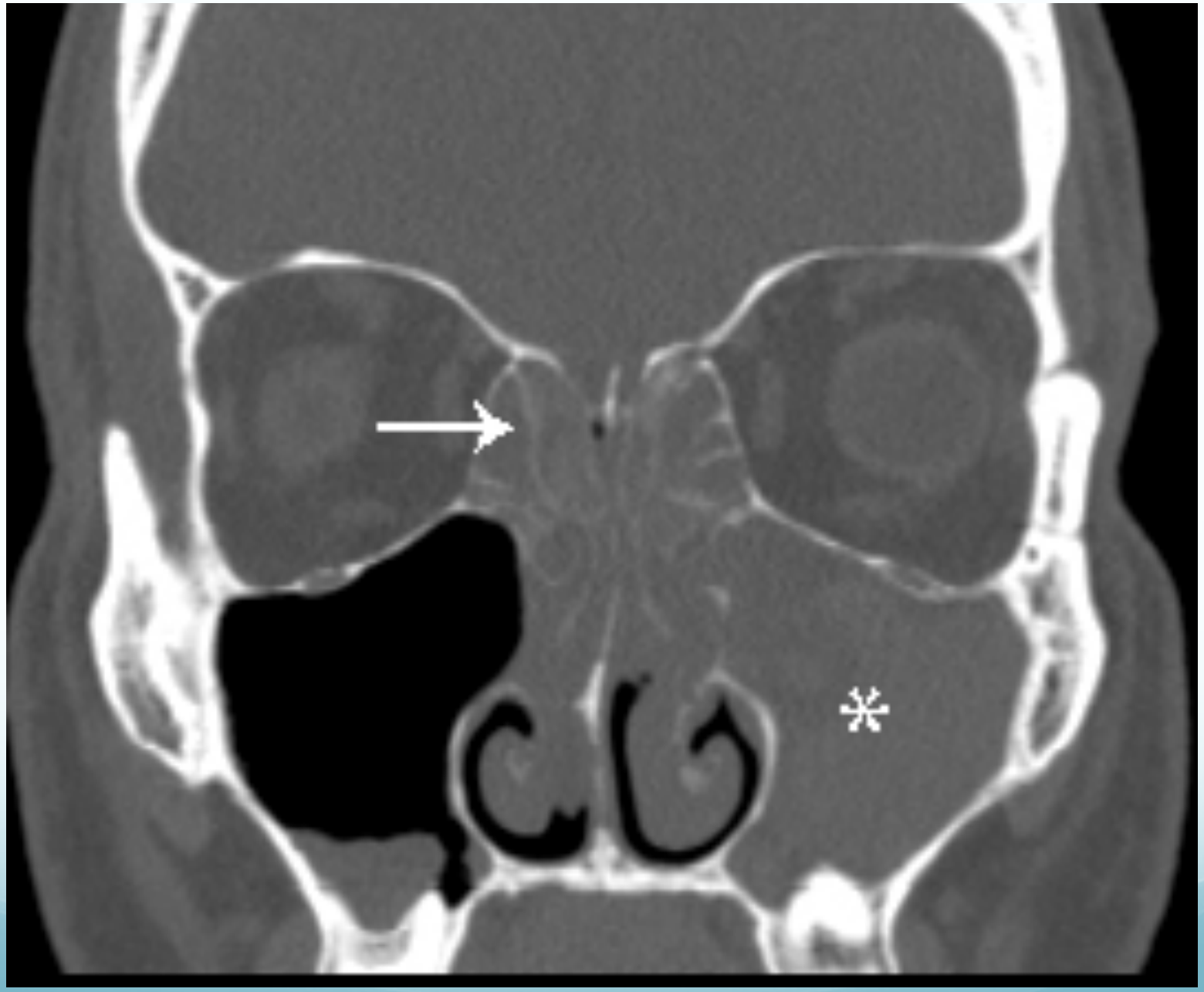
Nasal Function and Dysfunction

- Smell – Olfactory Dysfunction (Hyposmia or Anosmia)
- Taste – Diminished Taste Sensation (Dysguesia or Aguesia)
- **Immunity – Allergies and Sinusitis**



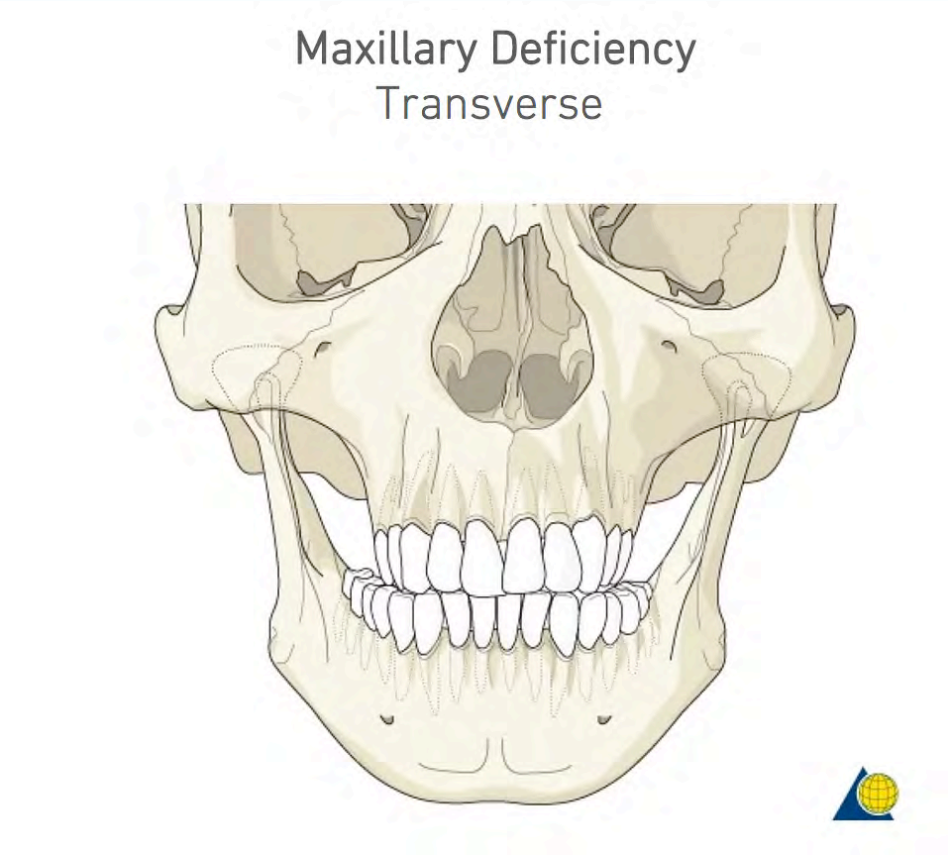


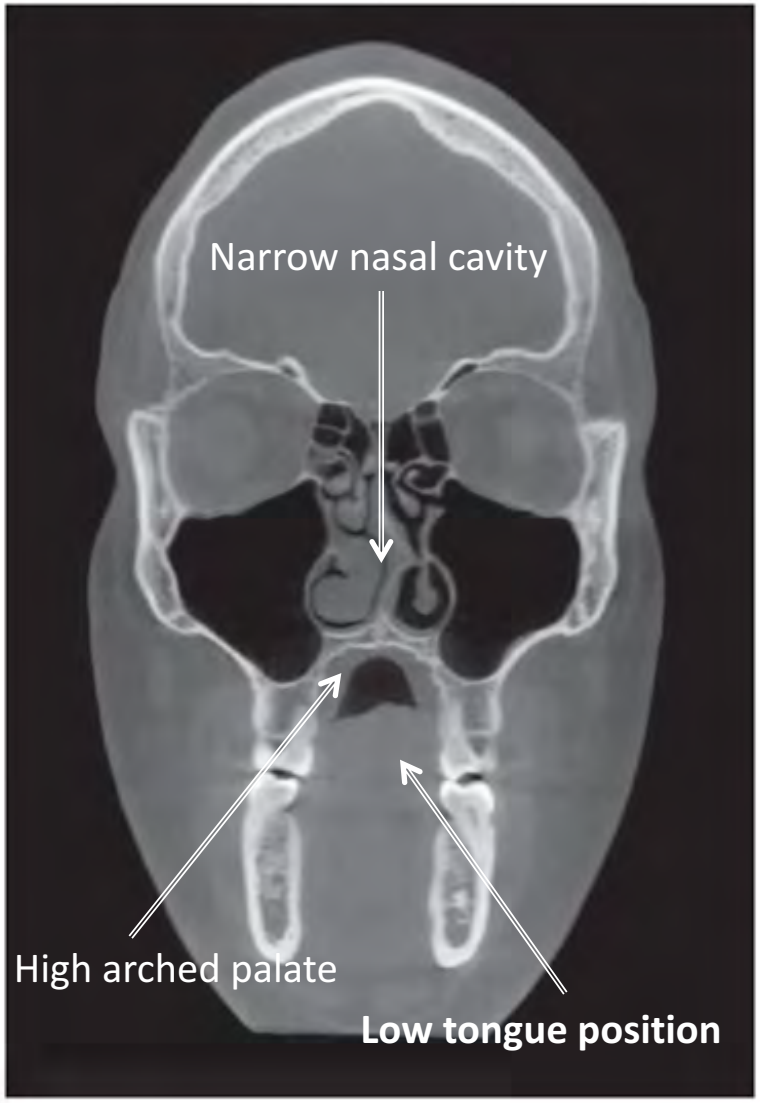

Ethmoid sinus
Maxillary sinus
Nasal cavity
Teeth




P
E
M

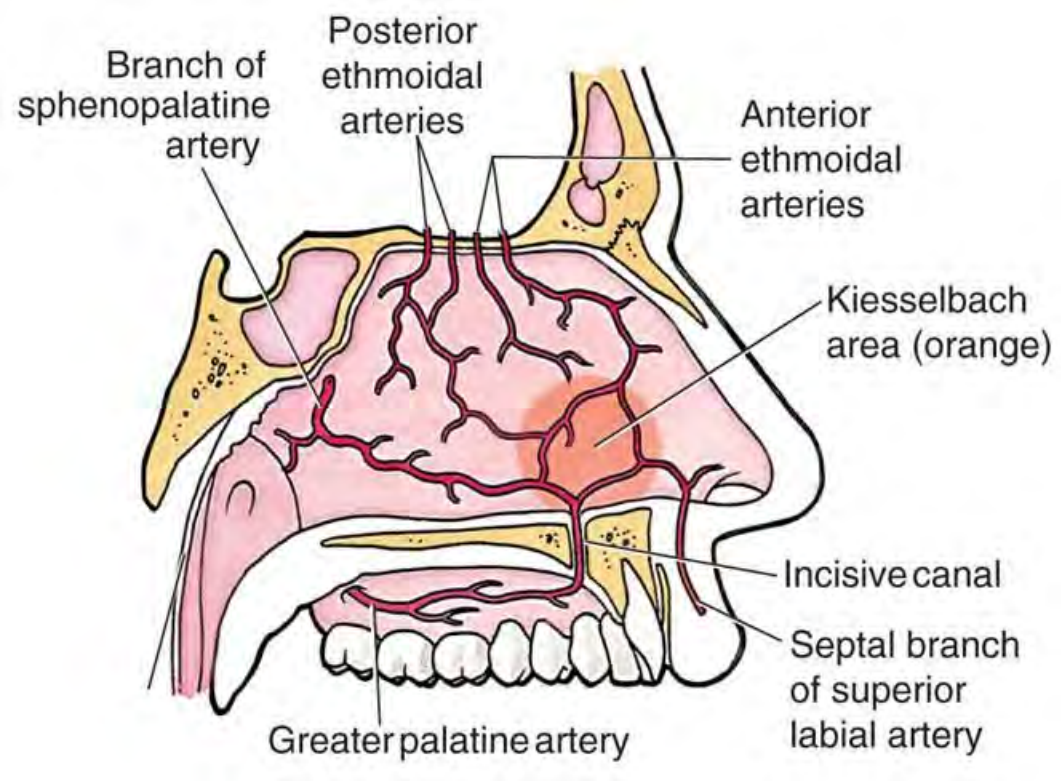
Maxillary morphology plays an important role in the pathophysiology of sinusitis



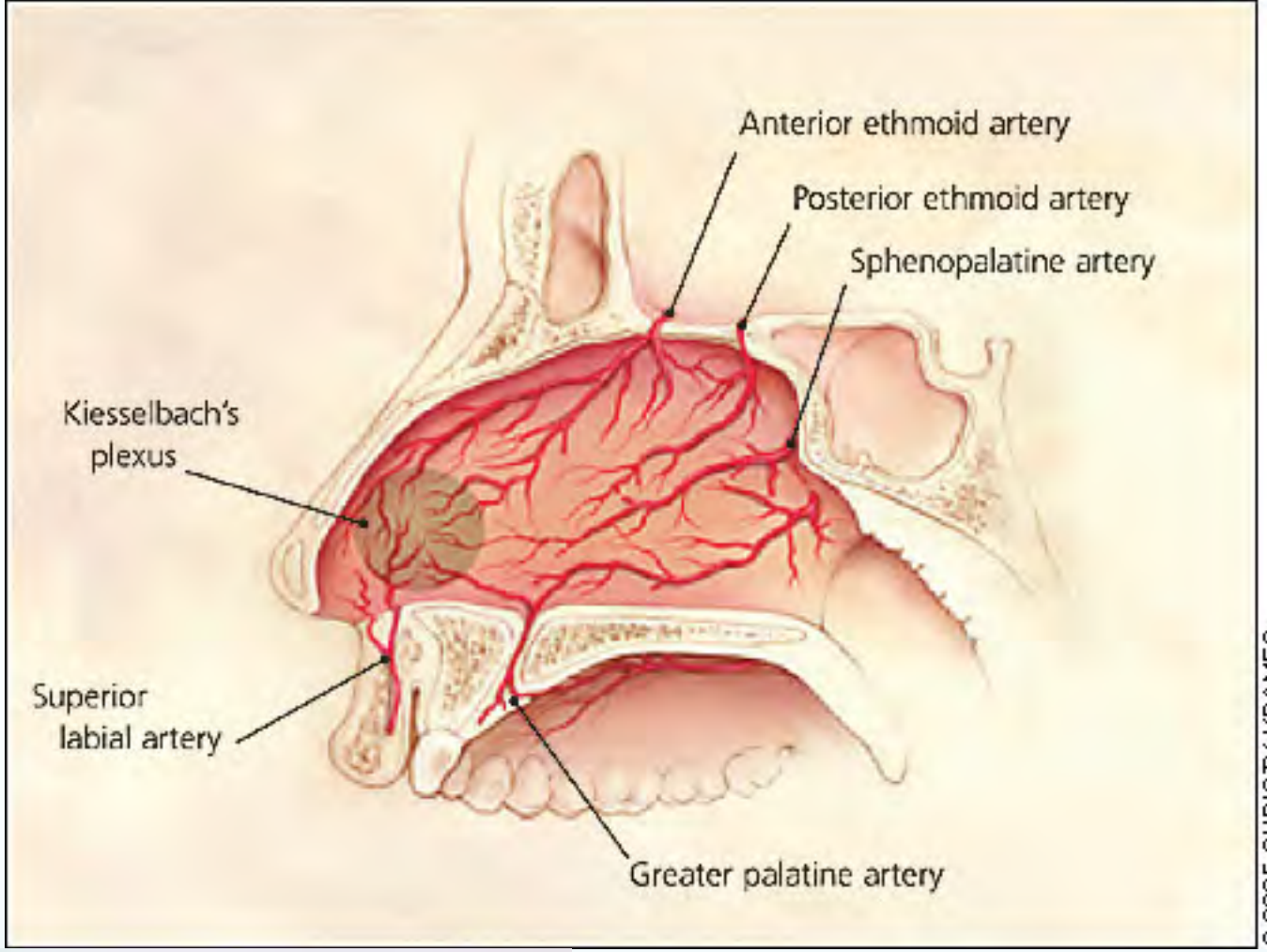


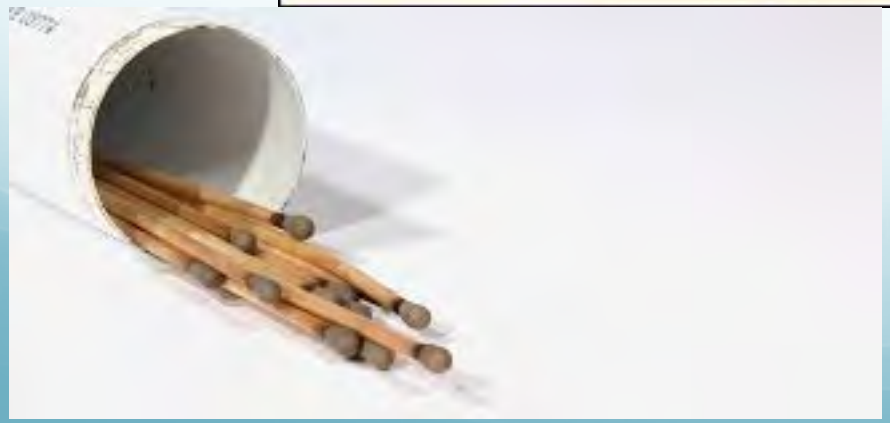
Nasal Blood Supply

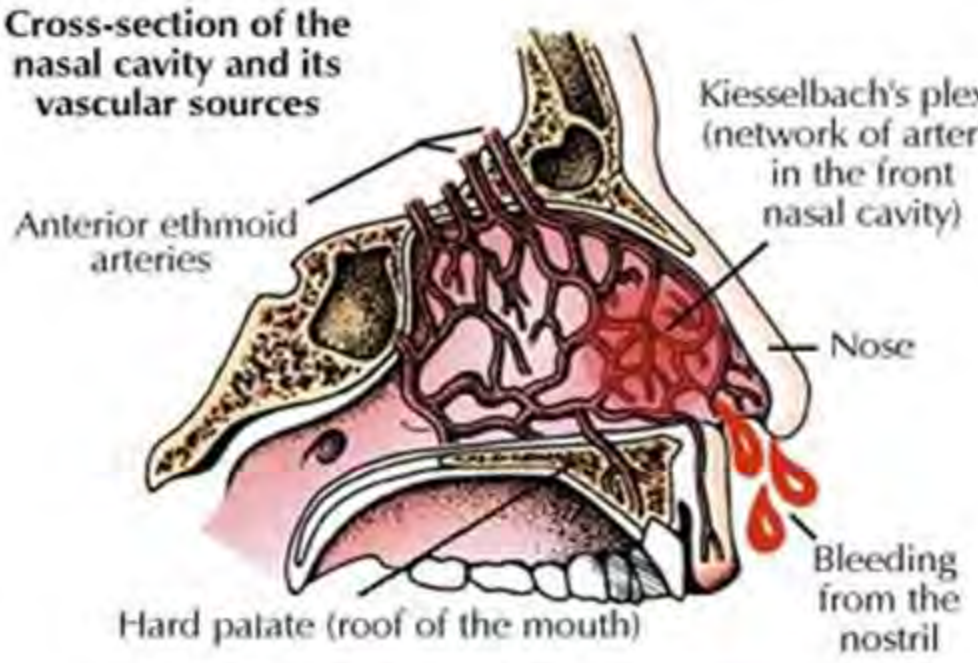
- Smell – Olfactory Dysfunction (Hyposmia or Anosmia)
- Taste – Diminished Taste Sensation (Dysguesia or Aguesia)
- Immunity – Allergies and Sinusitis
- **Warms and Humidifies Air - Epistaxis**

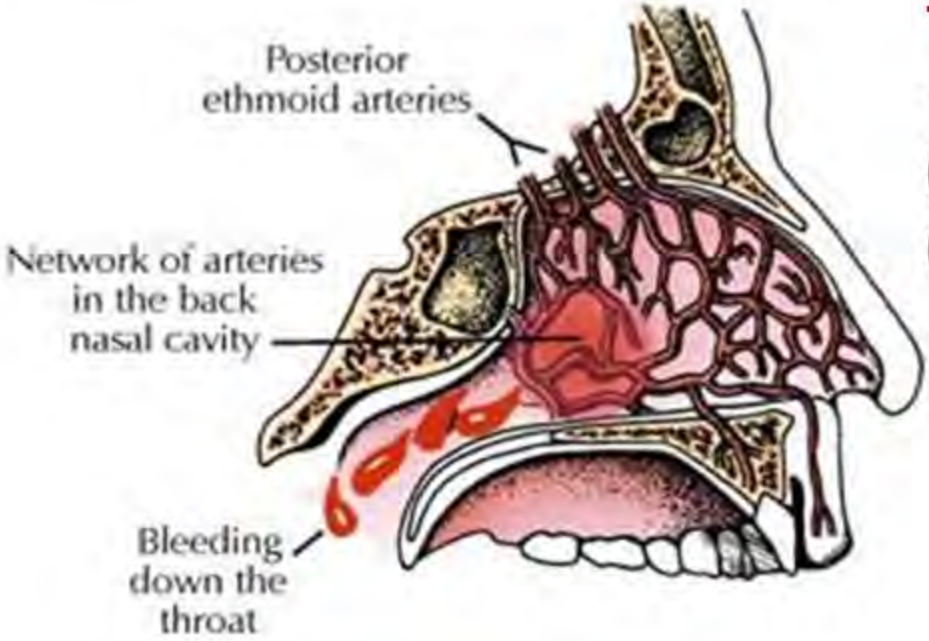



NEWS
epistaxis









Kiesselbach's Plexus/Little's Area:

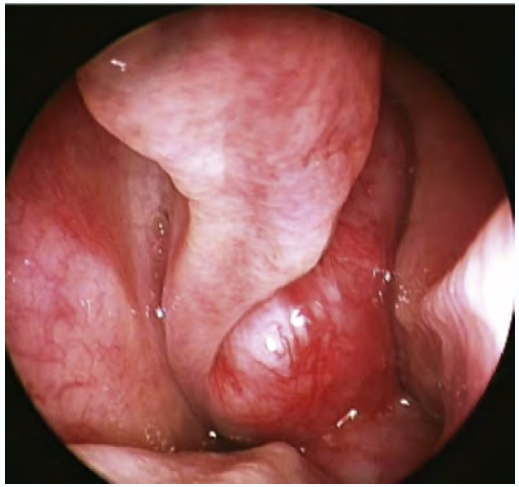
- Anterior Ethmoid (ICA)
- Superior Labial A (Facial)
- Sphenopalatine A (IMAX)
- Greater Palatine (IMAX)

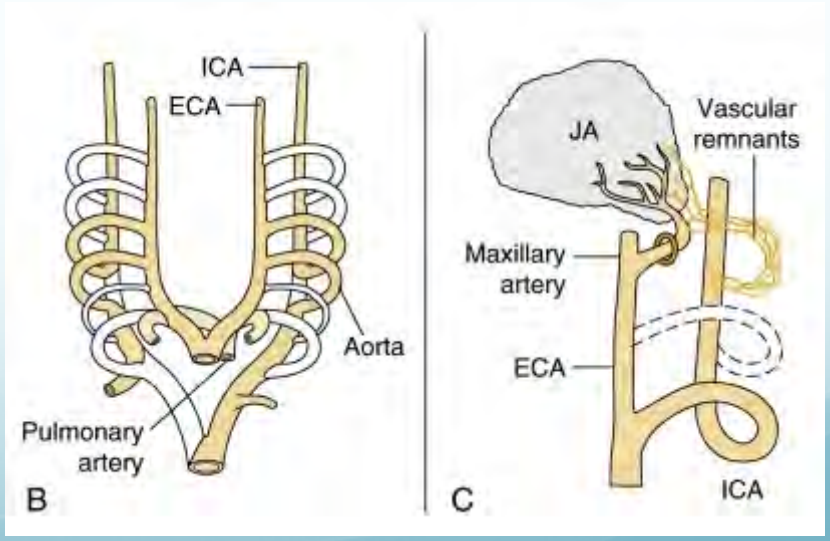
Woodruff's Plexus:

- Sphenopalatine A (Pharyngeal & Post. Nasal branches) (IMAX)
- Posterior ethmoid (ICA)

Juvenile Nasopharyngeal Angiofibroma

- Presentation:
  - Young adolescent male
  - Unilateral nasal obstruction
  - Recurrent epistaxis
- Vascular endothelium-lined spaces embedded in a fibrous stroma
- Pathogenesis may be related to vascular malformation vs. tumor.
- Might develop from incomplete regression of a branchial artery





Unilateral nasal obstruction is the most common symptom in patients with either benign or malignant tumors of the sinonasal tract.

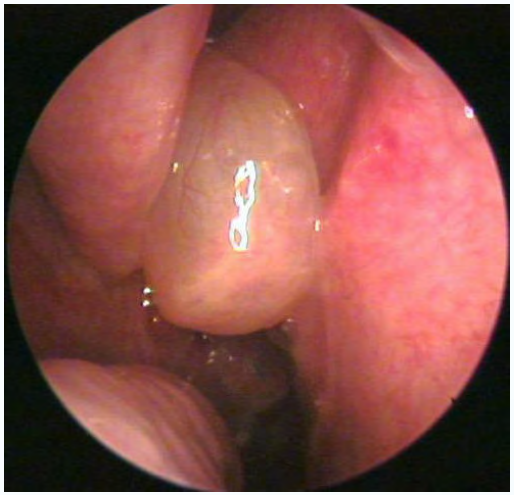
Table 2

Spectrum of benign sinonasal tumors (n=435).

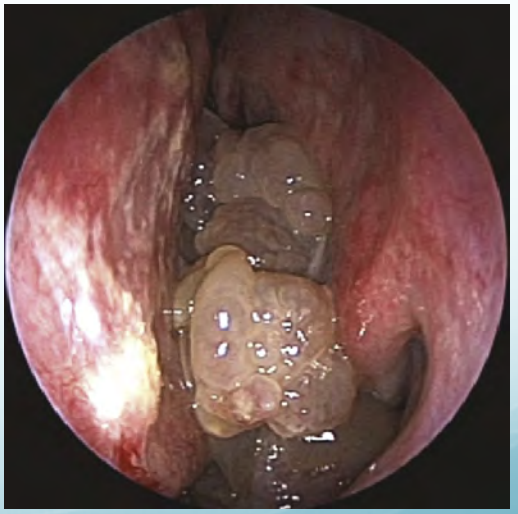
Tumor type	Cases*	Mean age (years)	Sex ratio (M:F)
Nasal polyp	294 (67.6)	46	1.6:1
Schneiderian papillomas	31 (7.1)		
Squamous	14 (3.2)	41.7	3.6:1
Oncocytoma	1 (0.2)	40	M
Transitional	1 (0.2)	85	M
Inverted	15 (3.4)	53	6.5:1
Hemangioma	29 (6.7)	31.8	1.2:1
Juvenile nasopharyngeal angiofibroma	24 (5.5)	16.5	M
Fibrous dysplasia	5 (1.1)	21.2	2:3
Osteoma	3 (0.7)	28	M
Cementifying fibroma	3 (0.7)	14	2:1
Giant cell tumor	4 (0.9)	18.5	1:1
Pleomorphic adenoma	3 (0.7)	42	1:2
Neurofibroma	1 (0.2)	45	M
Schwannoma	3 (0.7)	59.3	M
Low-grade glioma/brain herniation	2 (0.5)	27	M
Paraganglioma	1 (0.2)	67	M
Plasmacytoma	2 (0.5)	48	1:1

* Data presented as n (%).

Nasal Polyp



Papilloma



INVERTED PAPILLOMA

- Locally aggressive sino-nasal tumour.
- Synonym:Rigertz or Schneiderian papilloma
- Common in males between 50-70 years
- It arises from the lateral wall of nose
- Presents as unilateral, friable,pale,pink mass arising from middle meatus

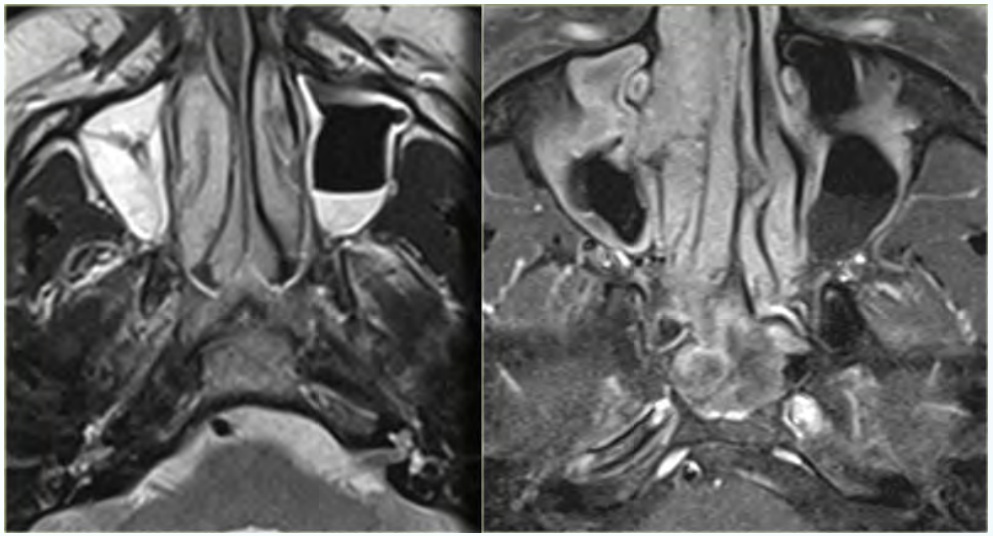
Table 3

Spectrum of malignant tumors of the sinonasal tract (n=128).

Tumor type	Cases*	Mean age (years)	Sex ratio (M:F)
Nasopharyngeal carcinoma/squamous cell	52 (40.6)	45.6	1.2:1
Sinonasal undifferentiated	17 (13.3)	42	0.6:1
Small round cell	21 (16.4)	24.2	1.5:1
Non-Hodgkins lymphoma	12 (9.4)	49	1.4:1
Adenoid cystic	10 (7.8)	54.3	1.5:1
Sarcoma	7 (5.5)	52.4	2.5:1
Adenocarcinoma	2 (1.6)	52.5	1:1
Neuroendocrinal	4 (3.1)	30	1:3
Mucoepidermoid	1 (0.8)	57	M
Melanoma	1 (0.8)	35	F
Transitional cell	1 (0.8)	55	F

* Data presented as n (%).

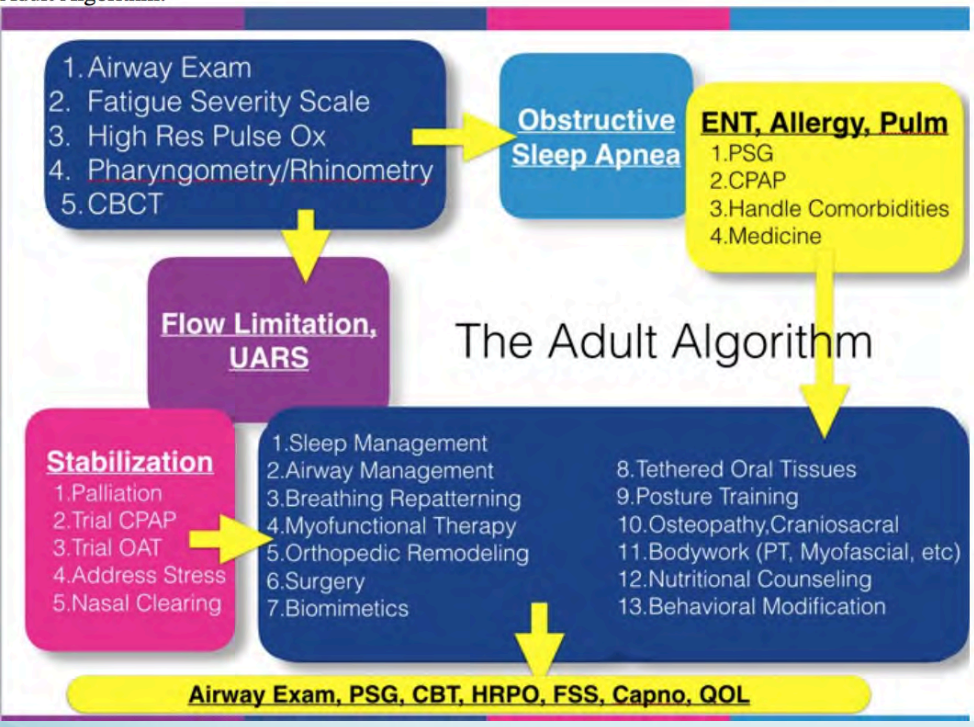
Imaging: CT vs MRI



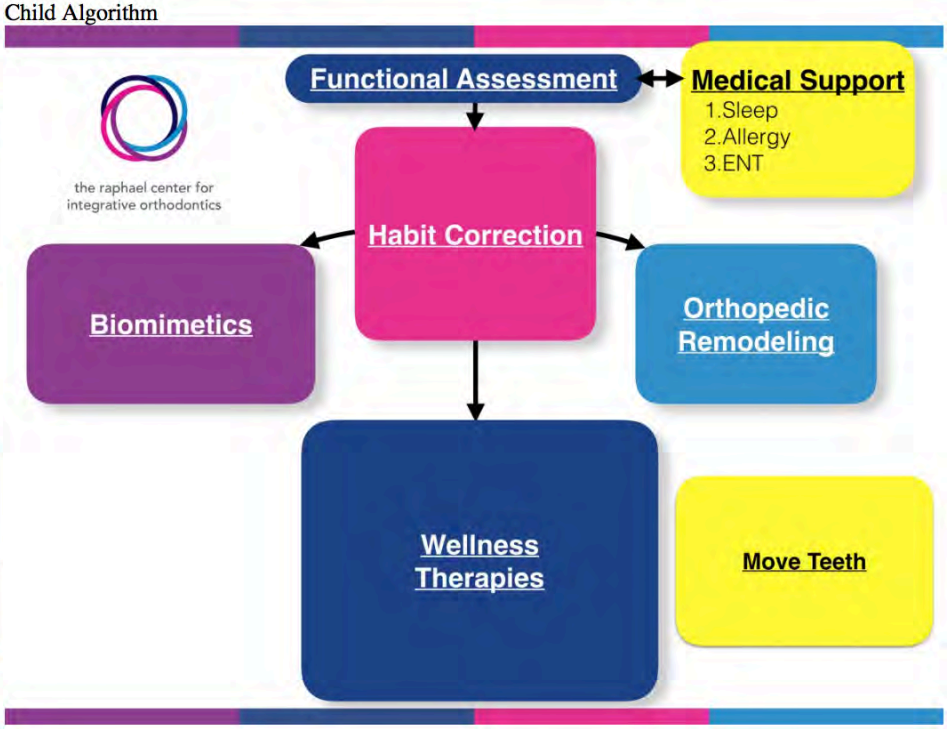
- MRI better than CT at differentiating tumor from inflammatory mucosal changes.

Why is it so important to breathe through the nose?

Adult Algorithm:



Child Algorithm



Original Report www.enlivenarchive.org Enliven: Pediatrics and Neonatal Biology

Towards Restoration of Continuous Nasal Breathing as the Ultimate Treatment Goal in Pediatric Obstructive Sleep Apnea

Christian Guilleminault[1*], and Shannon S Sullivan[2]

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Citation: Guilleminault C, Sullivan SS (2014) Towards Restoration of Continuous Nasal Breathing as the Ultimate Treatment Goal in Pediatric Obstructive Sleep Apnea. Enliven: Pediatr Neonatol Biol 1(1): 001.

Abstract

The interaction between oral-facial structural growth and muscle activity starts early in development and continues through childhood. Chronic oral breathing is an important clinical marker of orofacial muscle dysfunction, which may be associated with palatal growth restriction, nasal obstruction, and/ or a primary disorder of muscular or connective tissue dysfunction. It is easily documented objectively during sleep.

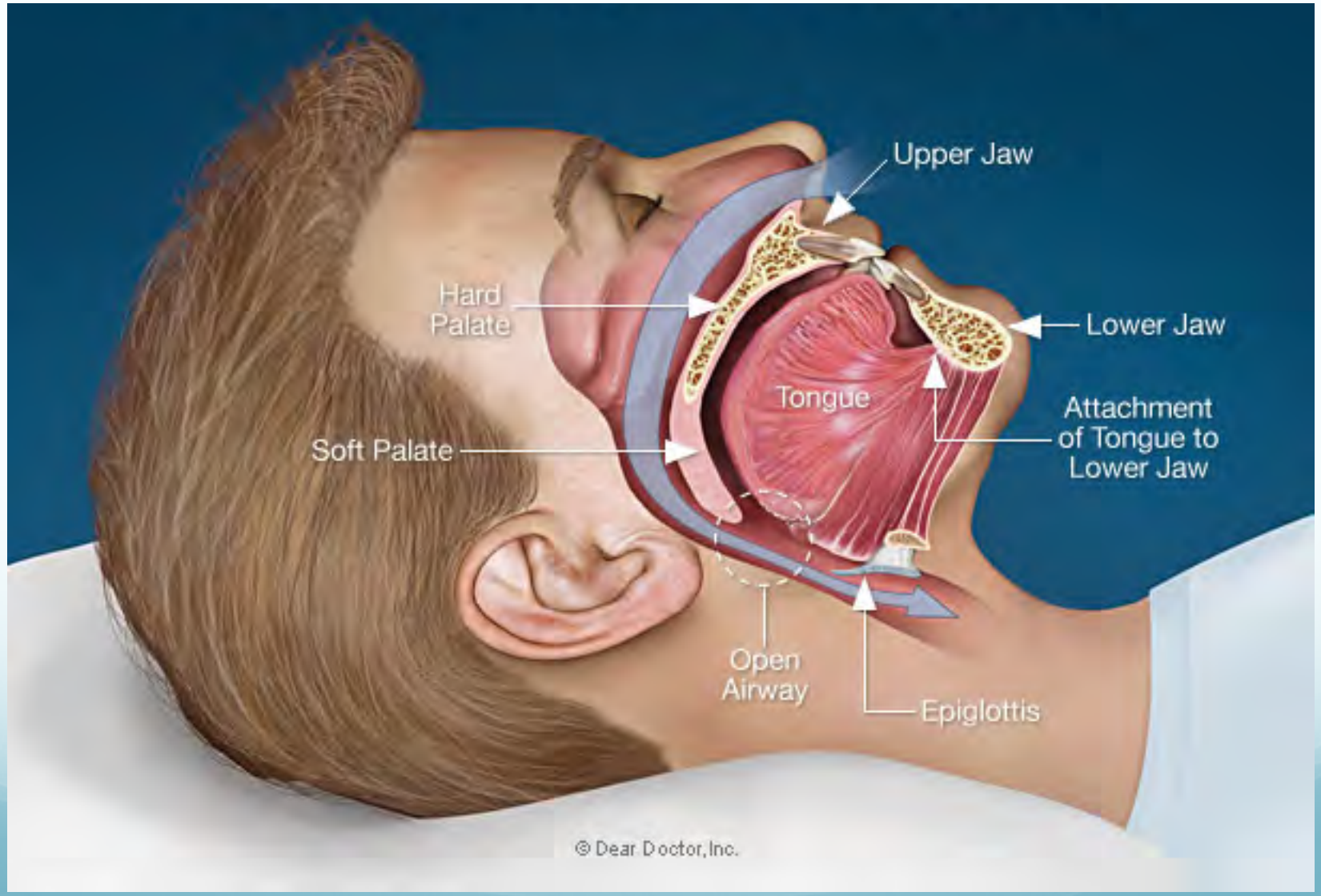
Treatment of pediatric obstructive-sleep-apnea (OSA) and sleep-disordered-breathing (SBD) means restoration of continuous nasal breathing during wakefulness and sleep; if nasal breathing is not restored, despite short-term improvements after adenotonsillectomy (T&A), continued use of the oral breathing route may be associated with abnormal impacts on airway growth and possibly blunted neuromuscular responsiveness of airway tissues.

Elimination of oral breathing, i.e., restoration of nasal breathing during wake and sleep, may be the only valid end point when treating OSA. Preventive measures in at-risk groups, such as premature infants, and usage of myofunctional therapy as part of the treatment of OSA are proposed to be important approaches to treat appropriately SDB and its multiple co-morbidities.

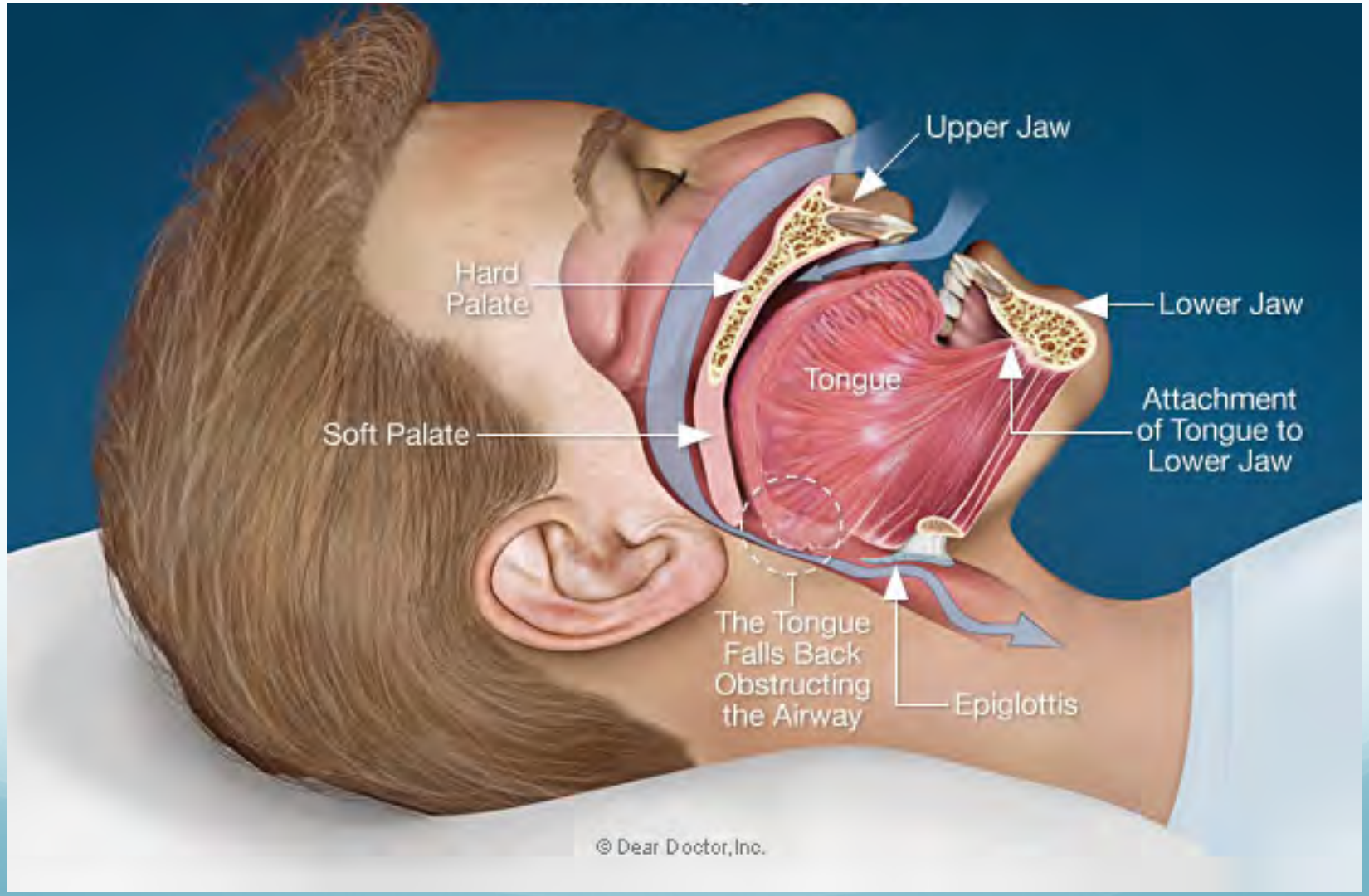
Keywords

Obstructive sleep apnea; Pediatrics; Oral-facial muscles; Nasal-oral functions; Myofunctional-therapy

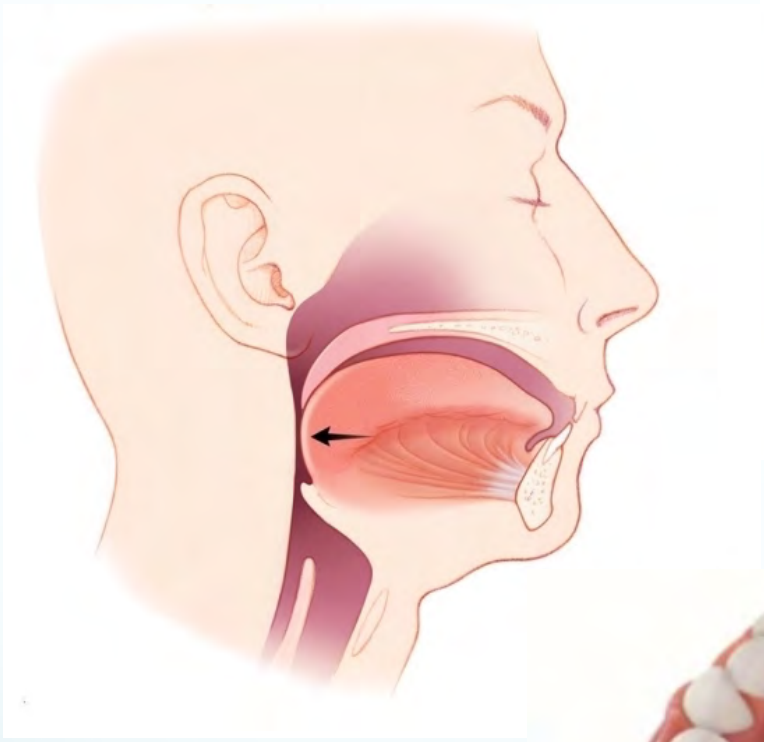
The Effect of Sleep on Breathing

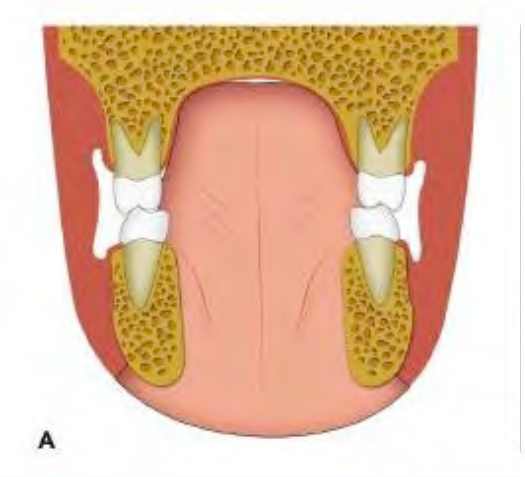


Mouth Breathing/ Snoring



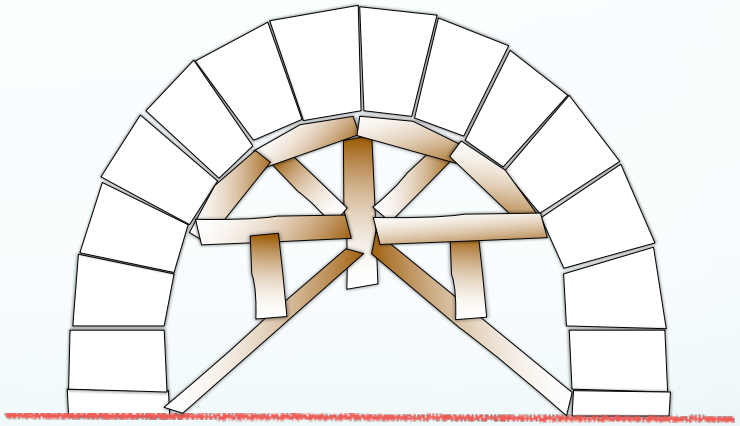
Orofacial Myology/ Integrative Orthodontics: Tongue should rest at the roof of the palate





Tongue as scaffold for maxillary arch

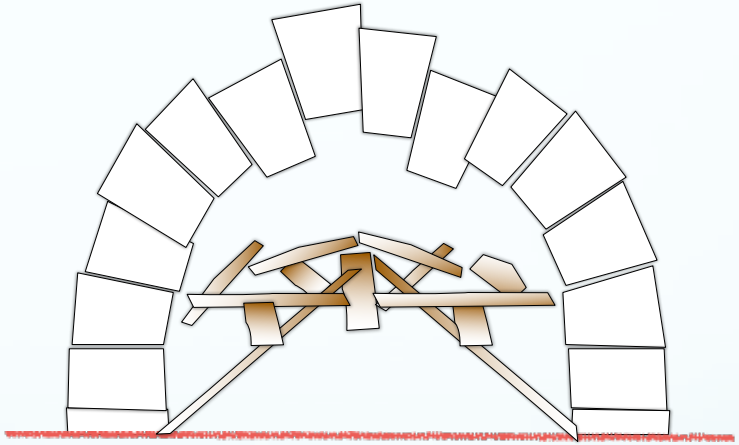
U-Shaped Arch



Slide Credit: Barry Raphael, DMD

Low tongue position → dysfunctional scaffold

V-Shaped Arch



Slide Credit: Barry Raphael, DMD

Mouth Breathing as Risk Factor for Excessive Vertical Maxillary Growth

Association between oral habits, mouth breathing and malocclusion

C. Grippaudo,[1] E.G. Paolantonio,[1] G. Antonini,[1] R. Saulle,[2] G. La Torre,[2] and R. Deli[1]

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SUMMARY

Go to:

The ratio of bad habits, mouth breathing and malocclusion is an important issue in view of prevention and early treatment of disorders of the craniofacial growth. While bad habits can interfere with the position of the teeth and normal pattern of skeletal growth, on the other hand obstruction of the upper airway, resulting in mouth breathing, changes the pattern of craniofacial growth causing malocclusion. Our crosssectional study, carried out on 3017 children using the ROMA index, was developed to verify if there was a significant correlation between bad habits/mouth breathing and malocclusion. The results showed that an increase in the degree of the index increases the prevalence of bad habits and mouth breathing, meaning that these factors are associated with more severe malocclusions. Moreover, we found a significant association of bad habits with increased overjet and openbite, while no association was found with crossbite. Additionally, we found that mouth breathing is closely related to increased overjet, reduced overjet, anterior or posterior crossbite, openbite and displacement of contact points. Therefore, it is necessary to intervene early on these aetiological factors of malocclusion to prevent its development or worsening and, if already developed, correct it by early orthodontic treatment to promote eugnatic skeletal growth.

KEY WORDS: Oral habits, Mouth breathing, Malocclusion, Occlusal index, ROMA index


Airway and TMJ
Dental Art 3D

Eur Arch Otorhinolaryngol. 2012 Jan;269(1):121-5. doi: 10.1007/s00405-011-1675-y. Epub 2011 Jun 26.

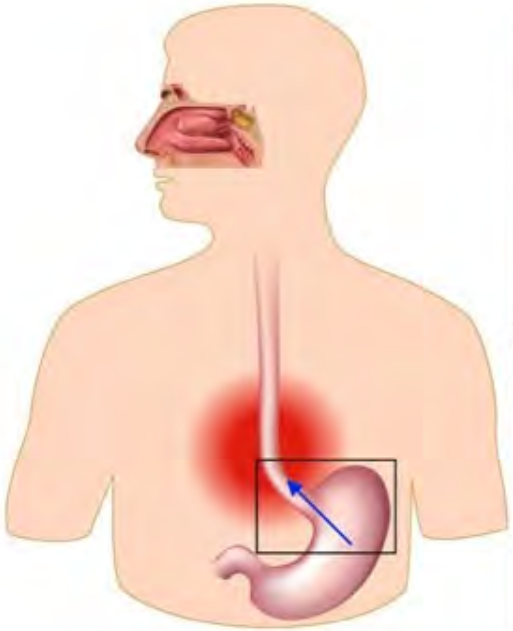
Nose- and sinus-related quality of life and GERD.

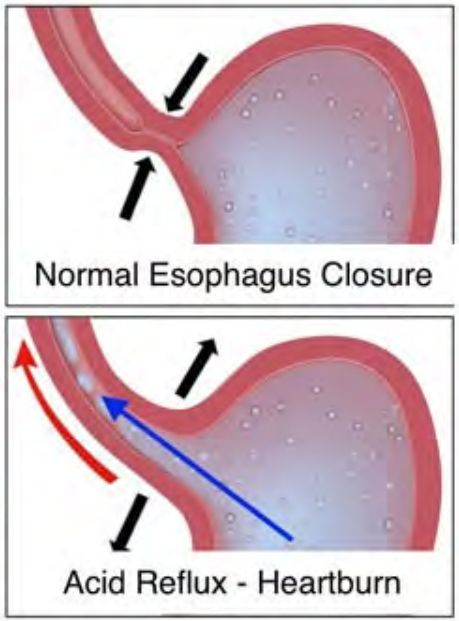
Katle EJ[1], Hart H, Kjærgaard T, Kvaløy JT, Steinsvåg SK.

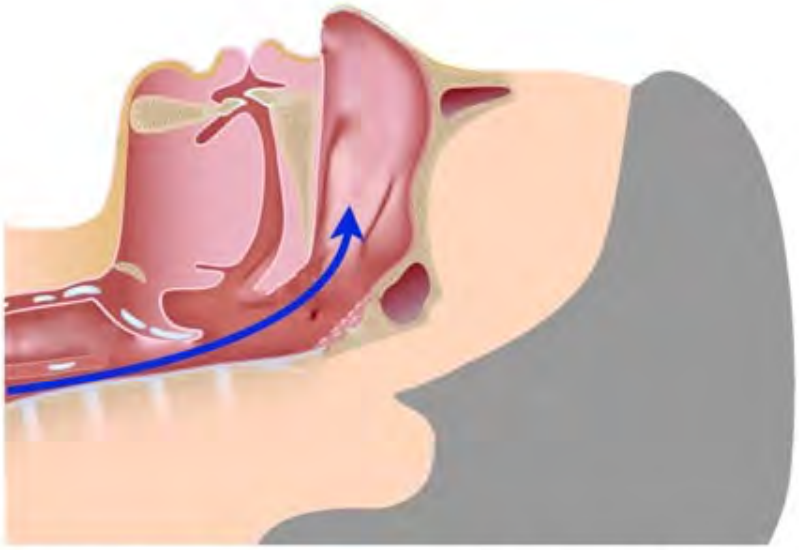
Author information

Abstract

Though some data indicate an association between gastroesophageal reflux disease (GERD) and upper airway inflammatory disease, a connection between GERD and chronic rhinosinusitis (CRS) is a matter of controversy in today's medicine. The aim of this study was to examine whether patients with GERD have a different nose- and sinus-related quality of life compared to a control group. A total of 77 patients with GERD diagnosed by gastroscopy were evaluated according to their nose- and sinus-related quality of life. It was scored using the Sino-Nasal Outcome Test-20 (SNOT-20). Total SNOT-20 score was compared with a control group consisting of 480 teachers. The average total SNOT-20 score in patients with GERD was 22.1, and in the control group 9.4 ($p < 0.005$). In the patient group, the median was 17.0 and standard deviation 18.4 corresponding to 5.0 and 11.5 in the controls. The 95% confidence interval in the patient group was (18.0, 26.3), and (8.3, 10.4) in the control group. Patients with GERD have a reduced nose- and sinus-related quality of life compared to a control group based on the fact that they have a significantly higher total SNOT-20 score than the controls. Accordingly, this study indicates that there is a causal relationship between GERD and CRS.







Sinusitis and Gastroesophageal Reflux (GERD)

Clinical Exam: Made Easy.

#1) Nose

#2) Tonsils

#3) Tongue

#4) Maxilla

#5) Mandible

➔ To determine nasal obstruction, ask patient:

"How troublesome is breathing through your nose?"

[0 to 100]: 20= mild, 40 =moderate, 60= fairly bad, 80=severe

Nasal Obstruction
(Nasal Congestion, Stuffy Nose, Blocked Nose)

- Very frequent complaint- affects breathing during wakefulness and sleep.
- Caused by a variety of environmental and medical conditions.
- Patients may simply complain of being “stopped up” or “stuffed up” or having to breathe through the mouth.
- Or they may report reduced airflow through the nose or a sense of nasal fullness.
- **It is often perceived and described differently by patients.**
- **Patient’s perception of congestion is the key consideration in clinical practice.**

History, patient-reported symptoms, and physical findings to help discern the underlying etiology:

- Does it fluctuate?
- Nasal drainage?
- Epistaxis (nasal bleeding)?
- Facial pressure?
- Headache?
- Any history of nasal trauma?

➔ Fixed anatomical cause.

➔ Reversible and spontaneously resolving causes, such as nasal allergy or an upper respiratory

History

- Does it fluctuate?
  - Yes, the better side changes every 2-3 hours.
- Nasal drainage?
  - Sometimes, when I get a cold.
- Epistaxis (nasal bleeding)?
  - Rarely- only when it gets very dry or windy outside.
- Facial pressure?
  - Uhm….. No, not really.
- Headache?
  - Sometimes in the mornings.
- Any history of nasal trauma?
  - Well there was this one time…..

==> Should we listen to his story?

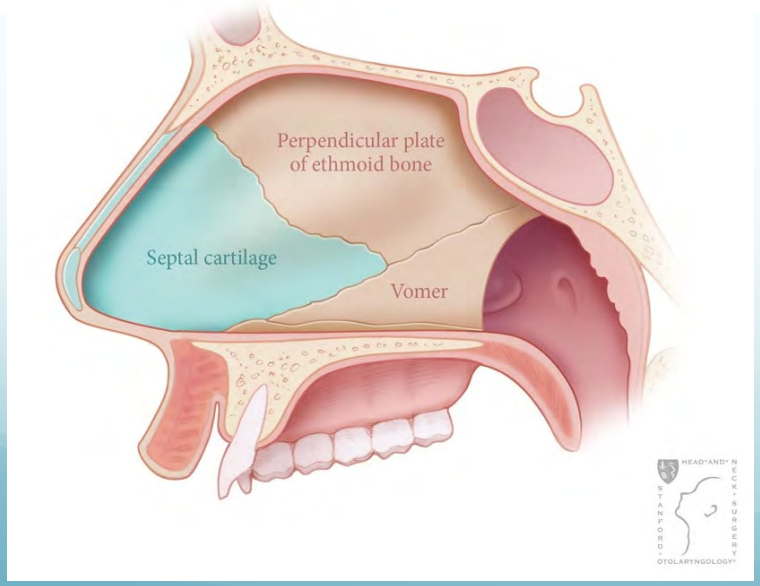
Physical Exam

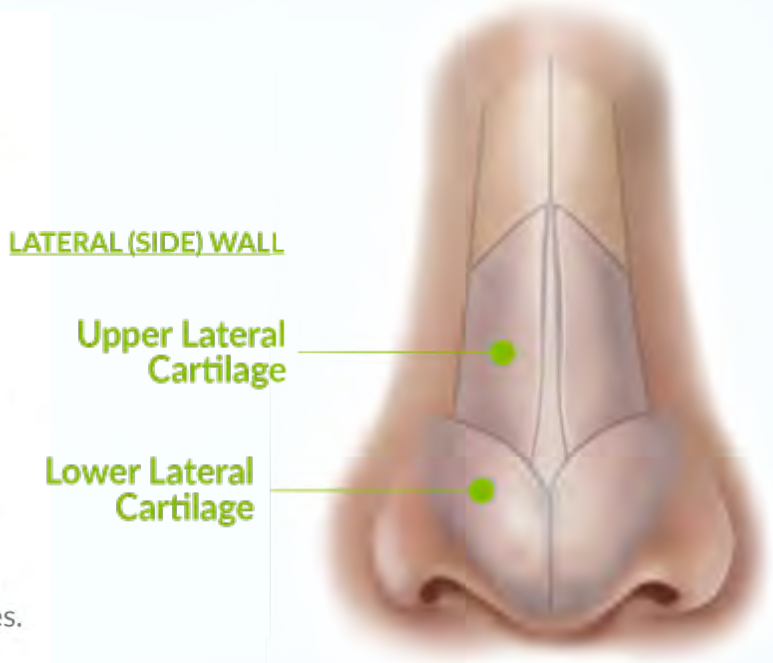
What Causes
Nasal Airway Obstruction?

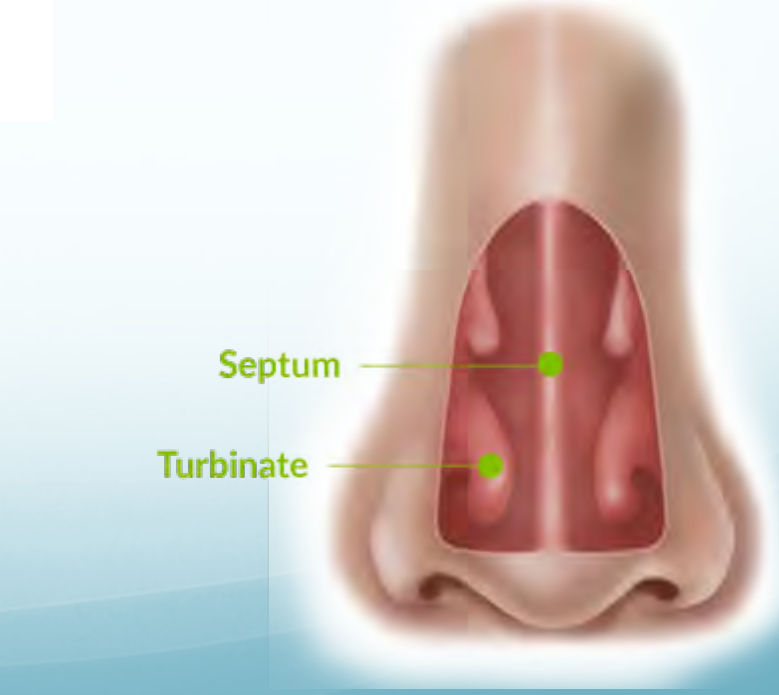
Even slight narrowing of the nasal valve can lead to significant reduction in airflow[4,5,6]. Structural blockages in three areas are common:

- **Septum:** The cartilage wall between the nostrils can bend and block the nasal passage.
- **Turbinates:** Ridges of bone and tissue inside the nose can limit airflow when enlarged.
- **Lateral (side) wall:** Weak or excessively flexible upper/lower cartilage in the outer nasal wall may cause it to collapse inward when a person inhales.

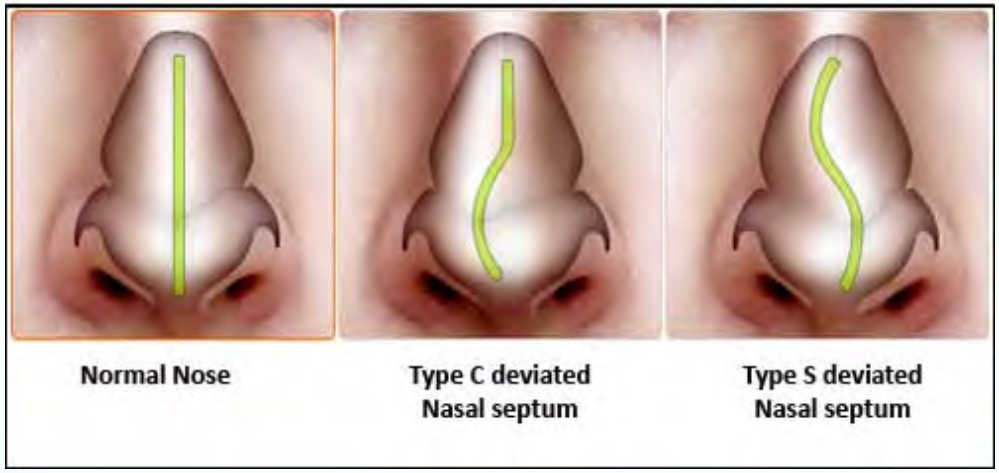
Lateral wall collapse may equal or even exceed septal deviation as the prime cause of nasal airway obstruction[7,8].

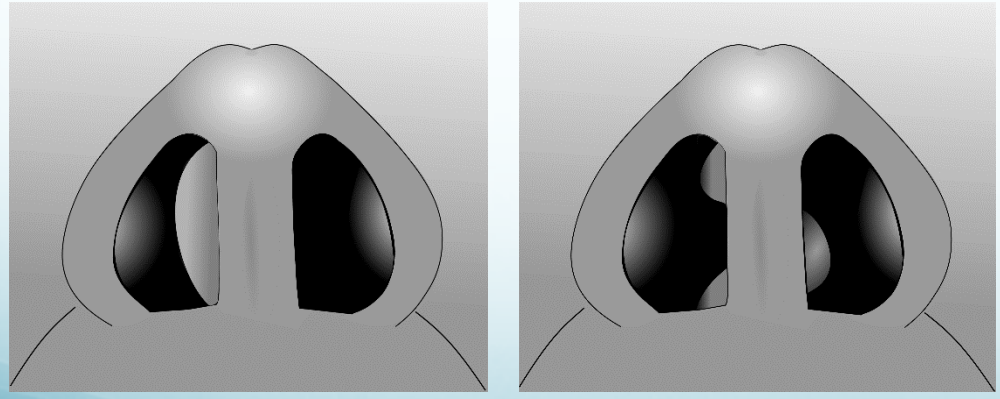




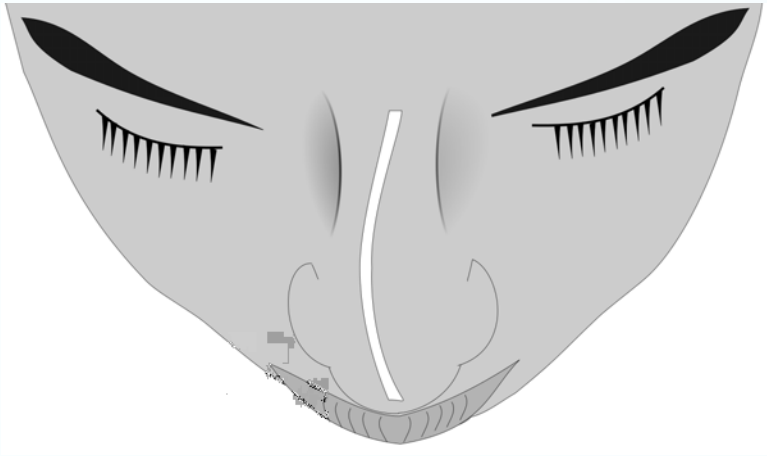


Septal Deviation

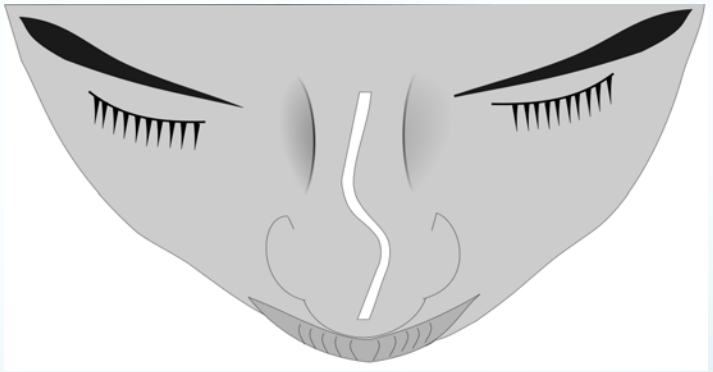




Cephalocaudal: **C- shaped deviation** **S- shaped deviation**



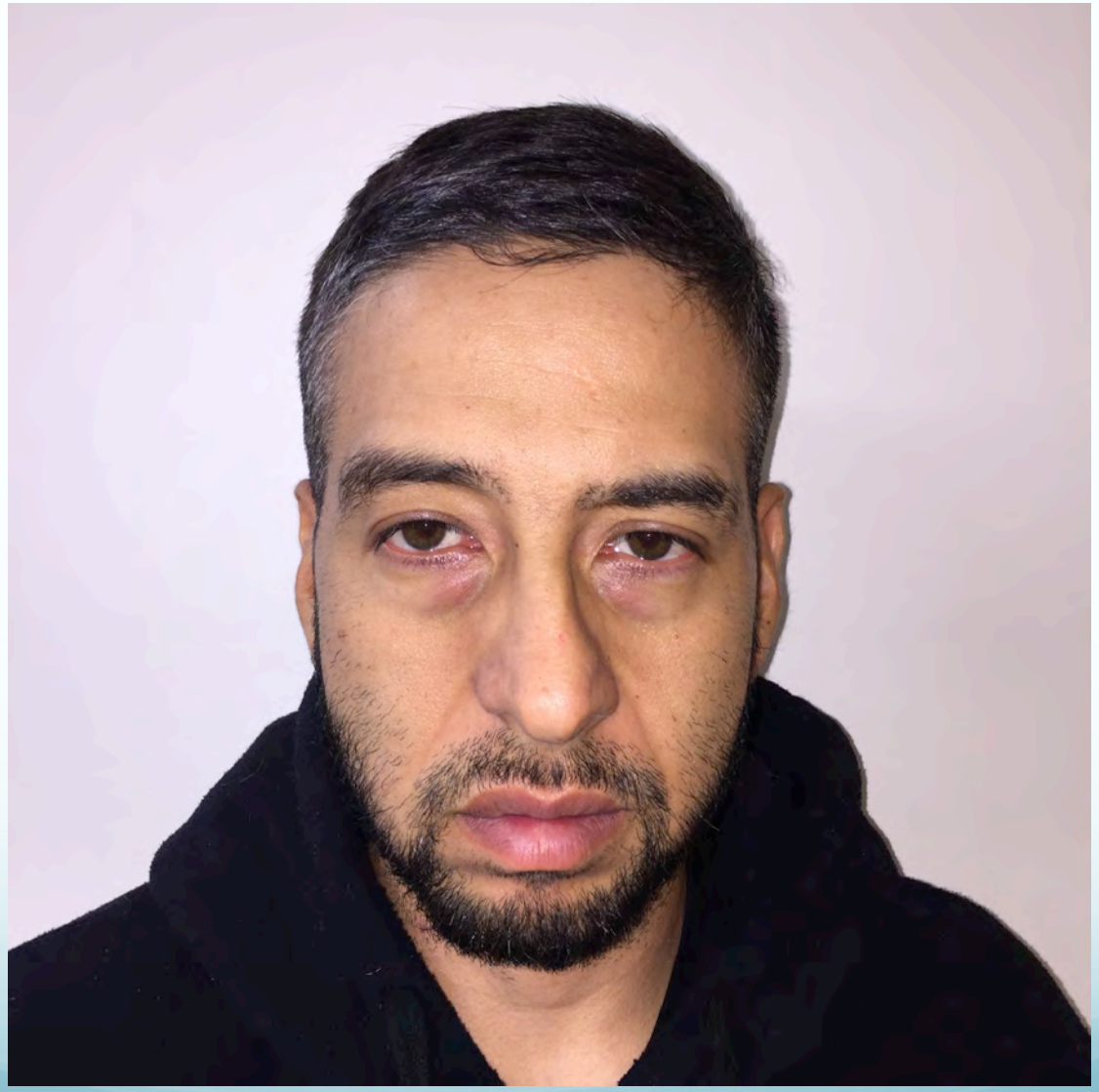
Anteroposterior dimension: C-shaped.



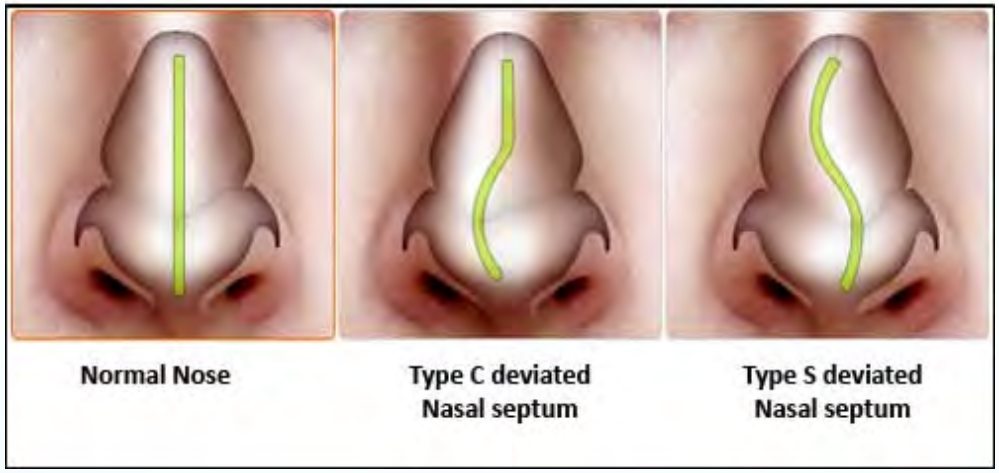
Anteroposterior dimension: S-shaped.

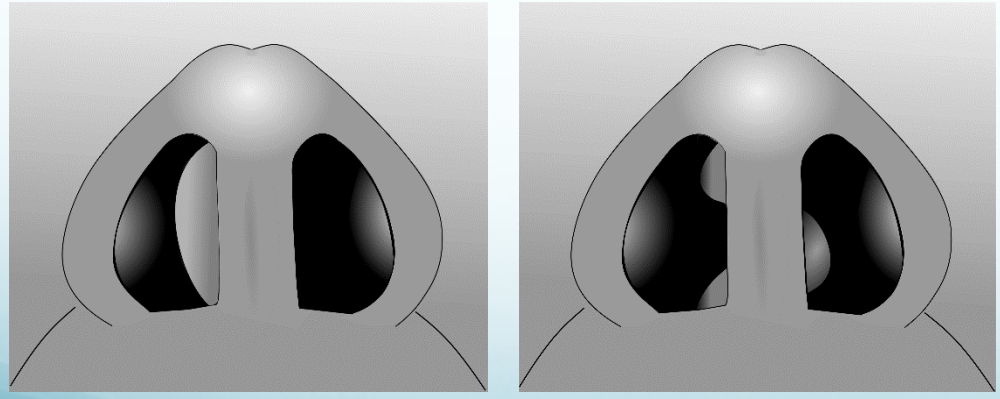
Note: Reverse S-shaped / Reverse C-shaped would be the mirror images.

Is the septum deviated?
If so, which dimension and how severe?

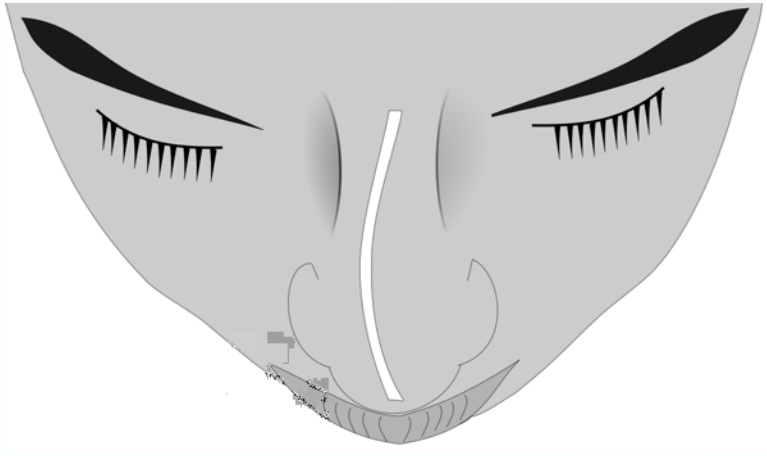


Septal Deviation

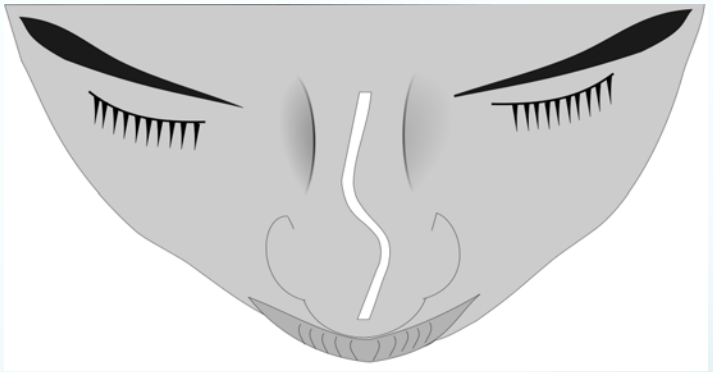




Cephalocaudal: **C- shaped deviation** **S- shaped deviation**



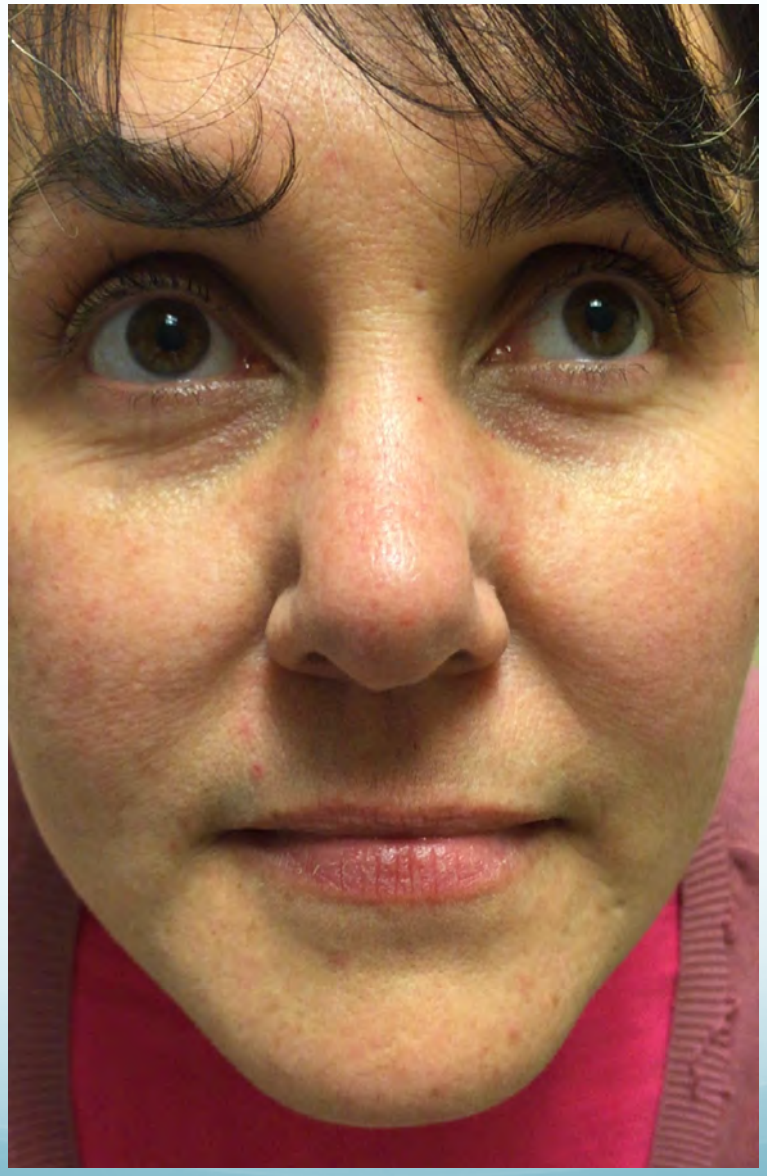
Anteroposterior dimension: C-shaped.



Anteroposterior dimension: S-shaped.

Note: Reverse S-shaped / Reverse C-shaped would be the mirror images.

Nasal Valve- Functional Evaluation



Is lateral wall collapse contributing to my Nasal Airway Obstruction?

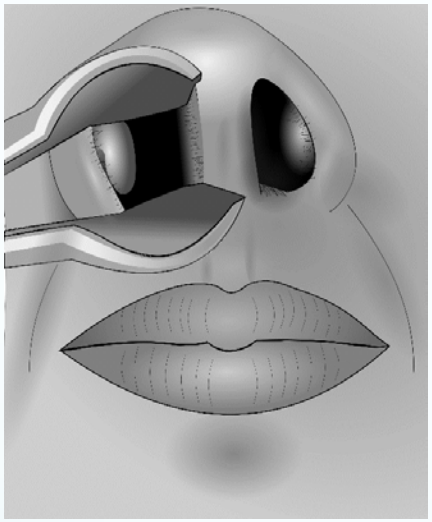
A clinician may use a number of approaches to determine whether the lateral wall is contributing to a patient's Nasal Airway Obstruction. Examples include:

- A simple breathing test called the Cottle Maneuver (see image)
- Use of nasal strips during normal activity and sleep

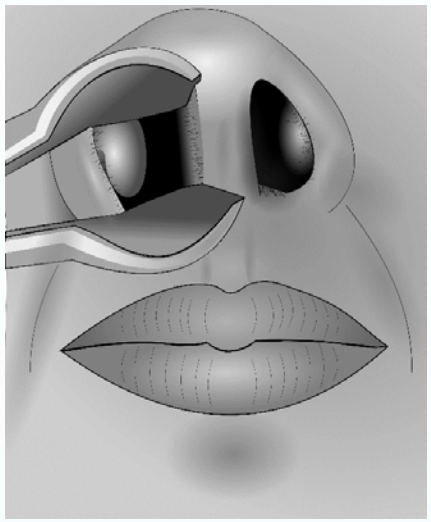
If a patient's symptoms improve from either of the above, he/she may benefit from support for the lateral nasal wall. The LATERA implant is indicated for supporting upper and lower lateral cartilage.

Does your breathing improve when you pull on your cheek to hold your nostril to the side? If yes, talk to your doctor about options to support your lateral cartilage, which may include nasal strips, splints, dilators, grafts and the LATERA implant.

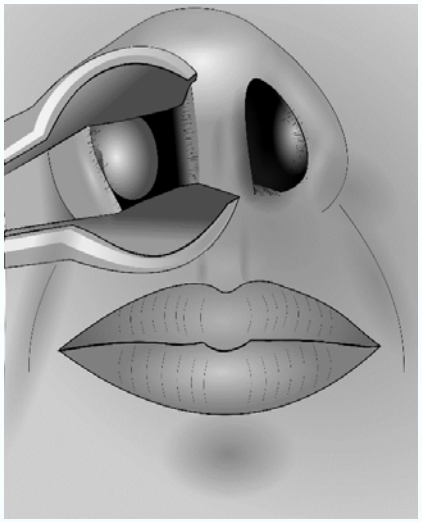
Inferior Turbinate Grading



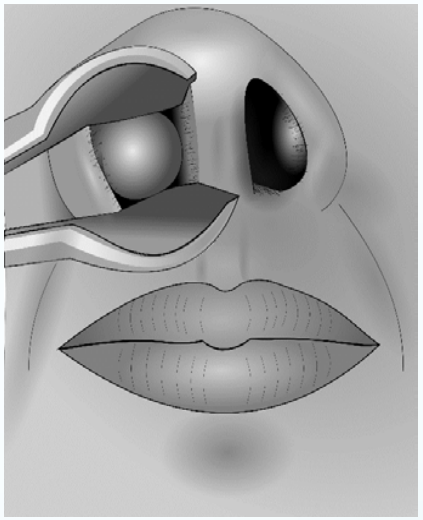
Grade 1
(0-25% of total airway space)



Grade 2
(26-50% of total airway space)



Grade 3
(51-75% of total airway space)



Grade 4
(76-100% of total airway space)

“Inferior Turbinate Hypertrophy”

- **Does it have to be treated?**

- **Patient’s perception of congestion is the key consideration in clinical practice.**

Zaghi MD

Nasal Obstruction and Symptoms Evaluation Scale

Today's date: __ __/__ __/__ __ __ __

➔ **To the Patient:** Please help us to better understand the impact of nasal obstruction on your quality of life by **completing following survey**. Thank You!

Over the past *ONE* month, how much of a problem were the following conditions for you?

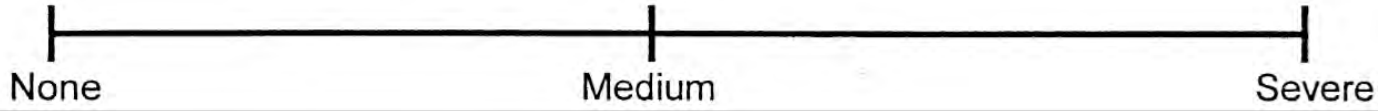
Please circle the most correct response

	Not a Problem	*Very Mild Problem*	*Moderate problem*	*Fairly Bad Problem*	*Severe problem*
1. Nasal congestion or stuffiness	0	1	2	3	4
2. Nasal blockage or obstruction	0	1	2	3	4
3. Trouble breathing through my nose	0	1	2	3	4
4. Trouble sleeping	0	1	2	3	4
5. Unable to get enough air through my nose during exercise or exertion	0	1	2	3	4

Sum the answers the patient circles and multiply by 5 to base the scale out of a possible score of 100 for analysis.

Nasal Obstruction Visual Analogue Scale (NO-VAS)

Please mark on this line how troublesome is your difficulty in breathing through your nose:



Research Article

Inferior Turbinate Size and CPAP Titration Based Treatment Pressures: No Association Found among Patients Who Have Not Had Nasal Surgery

Macario Camacho,[1,2] Soroush Zaghi,[3] Daniel Tran,[1] Sungjin A. Song,[1] Edward T. Chang,[1] and Victor Certal[4,5]

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Academic Editor: Gerd J. Ridder

Objective. To evaluate the effect of turbinate sizes on the titrated continuous positive airway pressure (CPAP) therapeutic treatment pressures for patients with obstructive sleep apnea (OSA) who have not had nasal surgery. *Study Design*. Retrospective case series. *Methods*. A chart review was performed for 250 consecutive patients. *Results*. 45 patients met inclusion criteria. The mean ± standard deviation (M ± SD) for age was 54.6 ± 22.4 years and for body mass index was 28.5 ± 5.9 kg/m^2. The Spearman's rank correlation coefficient (r_s) between CPAP therapeutic treatment pressures and several variables were calculated and were weakly correlated (age $r_s = 0.29$, nasal obstruction $r_s = -0.30$), moderately correlated (body mass index $r_s = 0.42$ and lowest oxygen saturation $r_s = -0.47$), or strongly correlated (apnea-hypopnea index $r_s = 0.60$ and oxygen desaturation index ($r_s = 0.62$)). No statistical significance was found with one-way analysis of variance (ANOVA) between CPAP therapeutic treatment pressures and inferior turbinate size (right turbinates p value = 0.2012, left turbinate p value = 0.3064), nasal septal deviation (p value = 0.4979), or mask type (p value = 0.5136). *Conclusion*. In this study, CPAP titration based therapeutic treatment pressures were not found to be associated with inferior turbinate sizes; however, the CPAP therapeutic treatment pressures were strongly correlated with apnea-hypopnea index and oxygen desaturation index.

Nasal Obstruction
(Nasal Congestion, Stuffy Nose, Blocked Nose)

Research Article

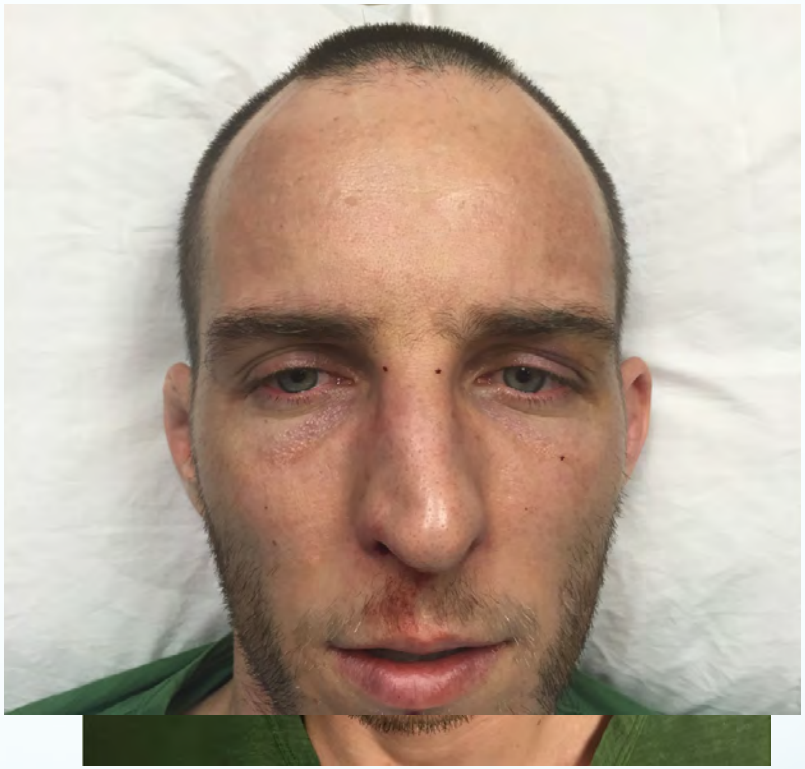
Predictors of Nasal Obstruction: Quantification and Assessment Using Multiple Grading Scales

Macario Camacho,[1,2] Soroush Zaghi,[3,4] Victor Certal,[5,6] Jose Abdullatif,[7] Rahul Modi,[3,8] Shankar Sridhara,[9] Anthony M. Tolisano,[1] Edward T. Chang,[1] Benjamin B. Cable,[1] and Robson Capasso[3]

- Allergic rhinitis and external nasal deformity as the two major determinants.
- Otherwise, patient's perception of congestion is the key consideration in clinical practice.

Allergic rhinitis

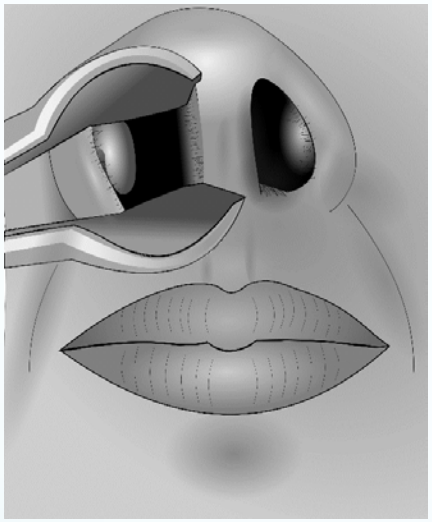
External nasal deformity



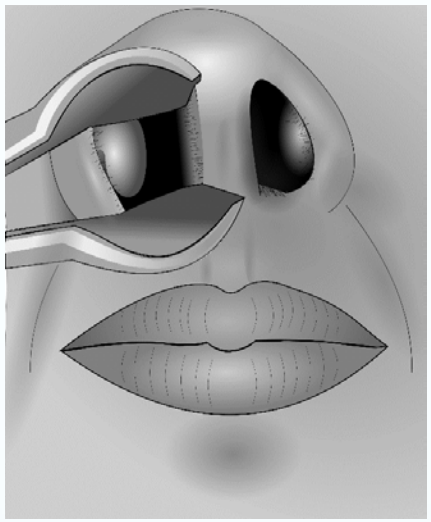
Key Points: Nasal Obstruction

- **It is often perceived and described differently by patients.**
- **Patient's perception of congestion is the key consideration in clinical practice.**
- NOSE and NO-VAS Score Questionnaires
  - Scores > 50/100 is threshold for "Moderate Problem"
- Assess for **unilateral obstruction.**
- Ask about **TRAUMA** vs. Allergies/ Sinus Congestion.
- Look for **external nasal deformity, septal deviation, turbinate hypertrophy, and nasal valve collapse** on physical exam.

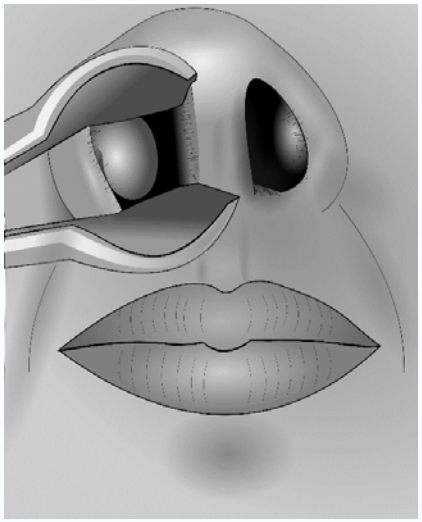
Inferior Turbinate



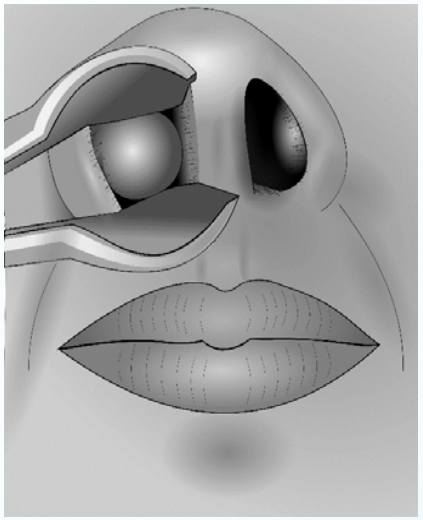
Grade 1
(0-25% of total airway space)



Grade 2
(26-50% of total airway space)

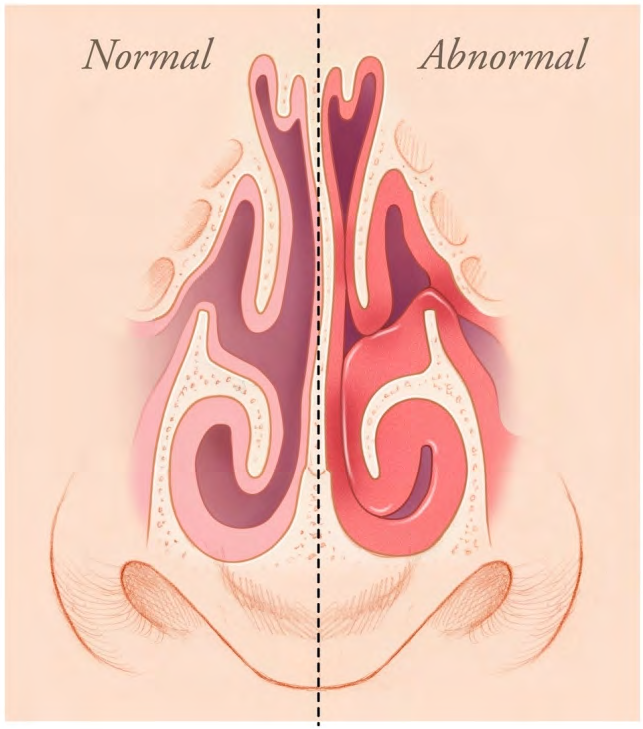


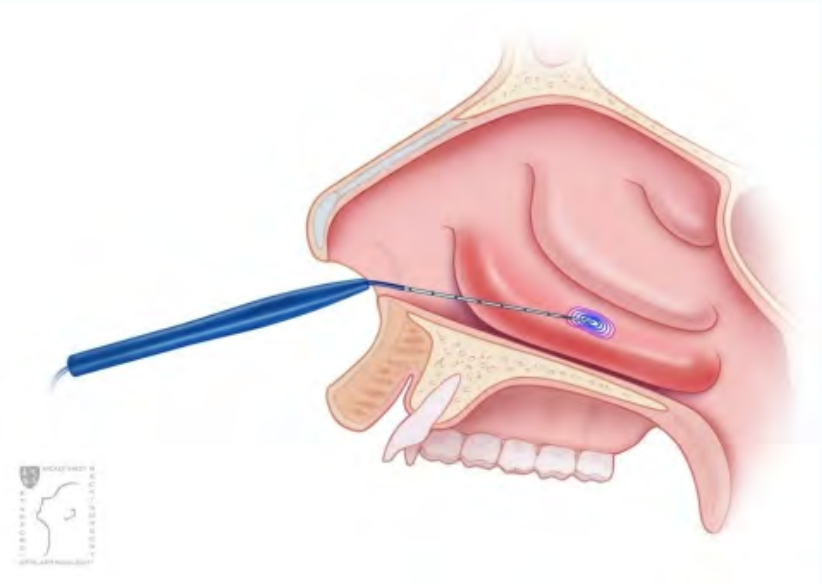
Grade 3
(51-75% of total airway space)

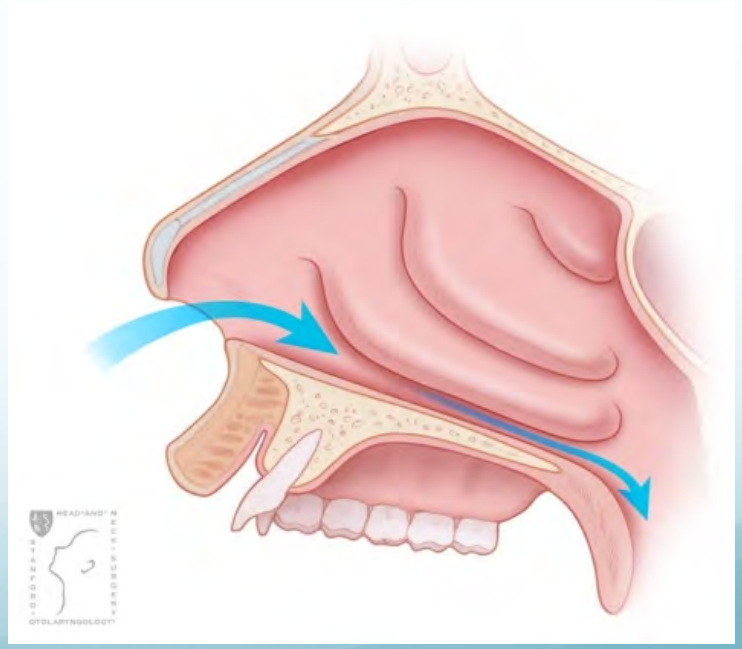


Grade 4
(76-100% of total airway space)

Inferior Turbinate

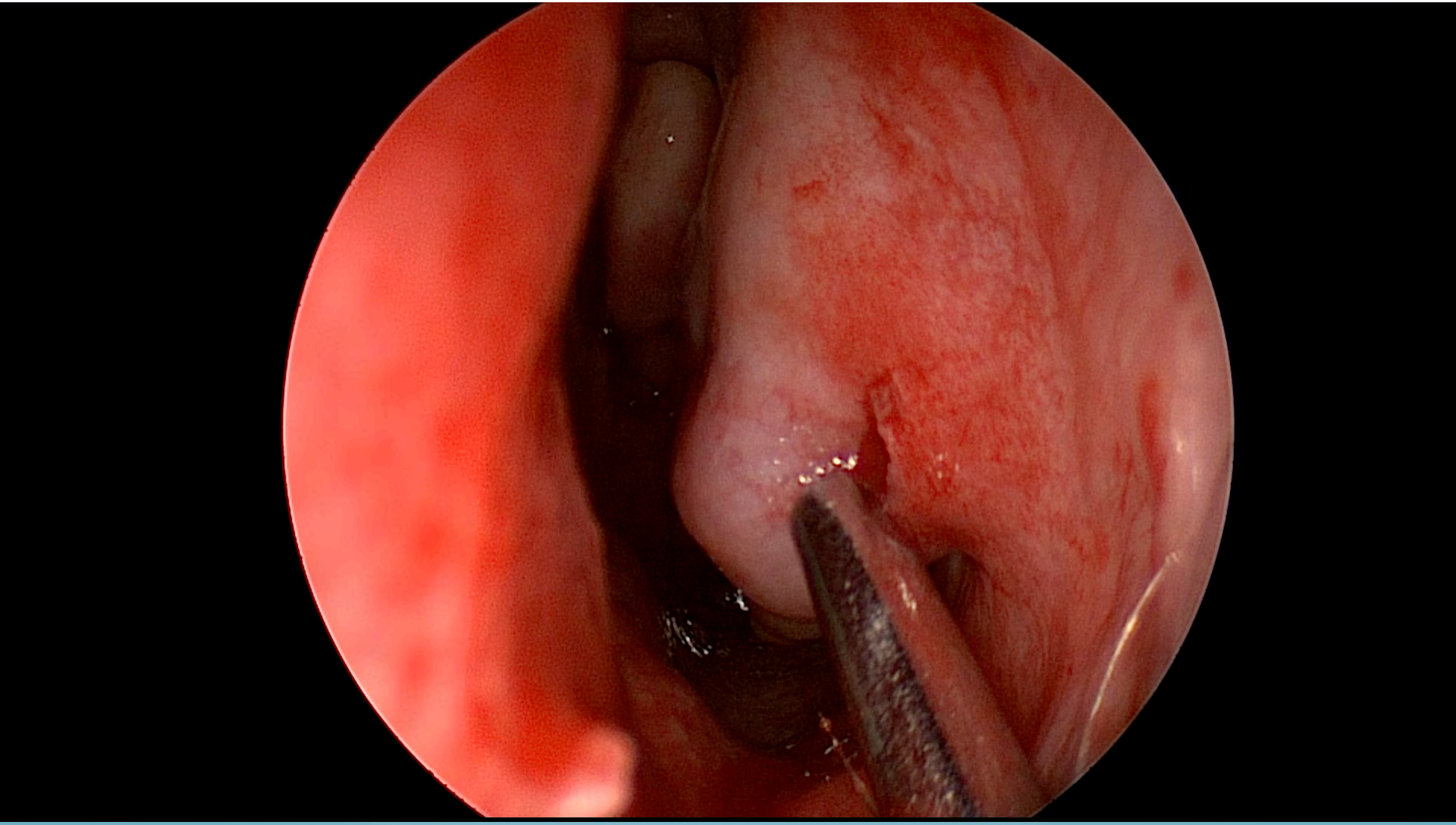




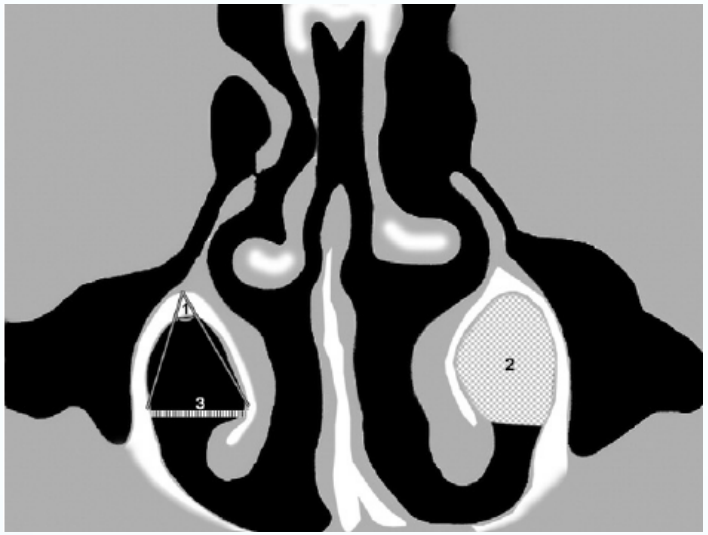


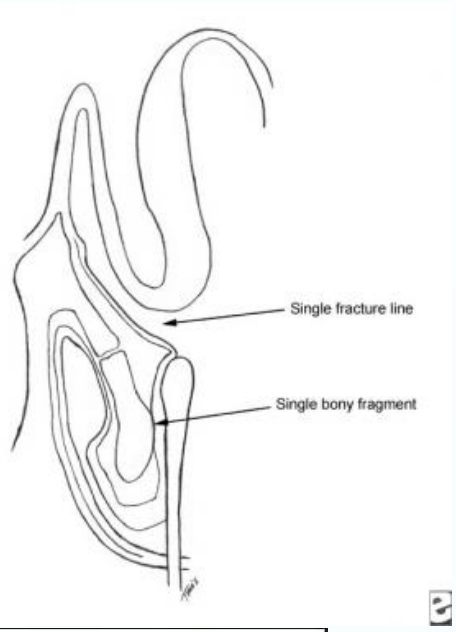
Coblation®
Turbinate Reduction

Microdebrider Reduction and Turbinate Outfracture

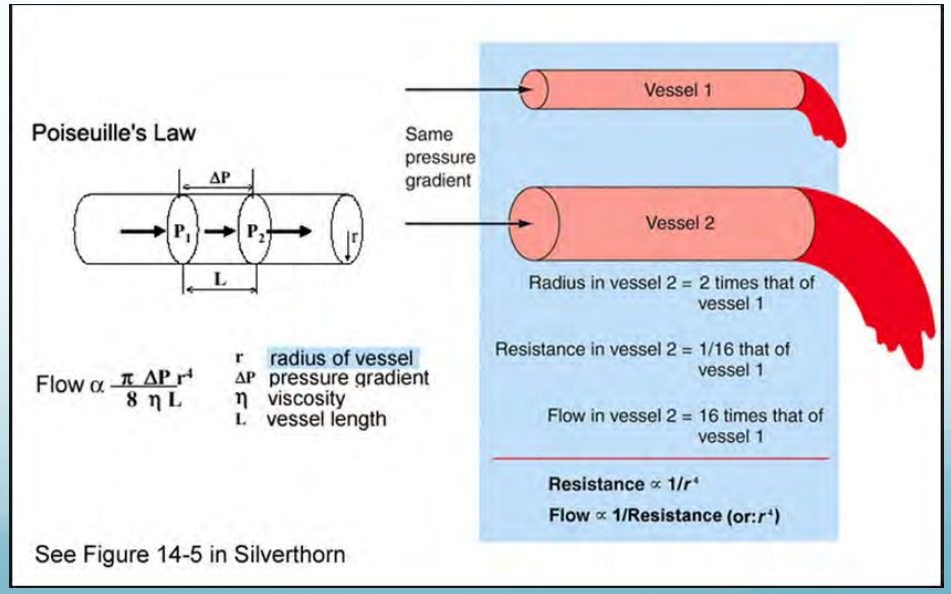


Turbinate Outfracture





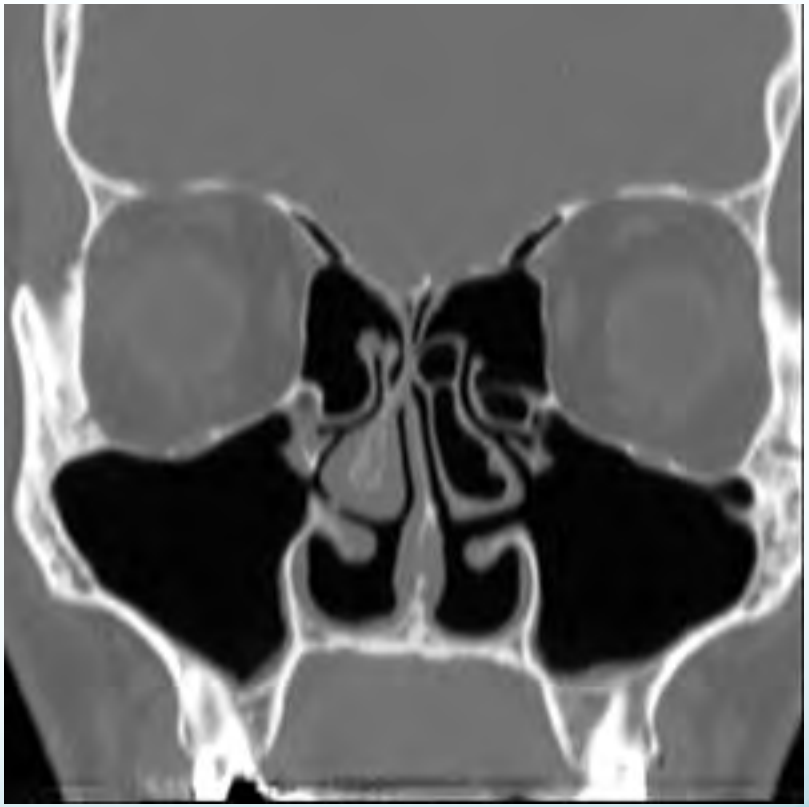
2x radius
=> 16x flow

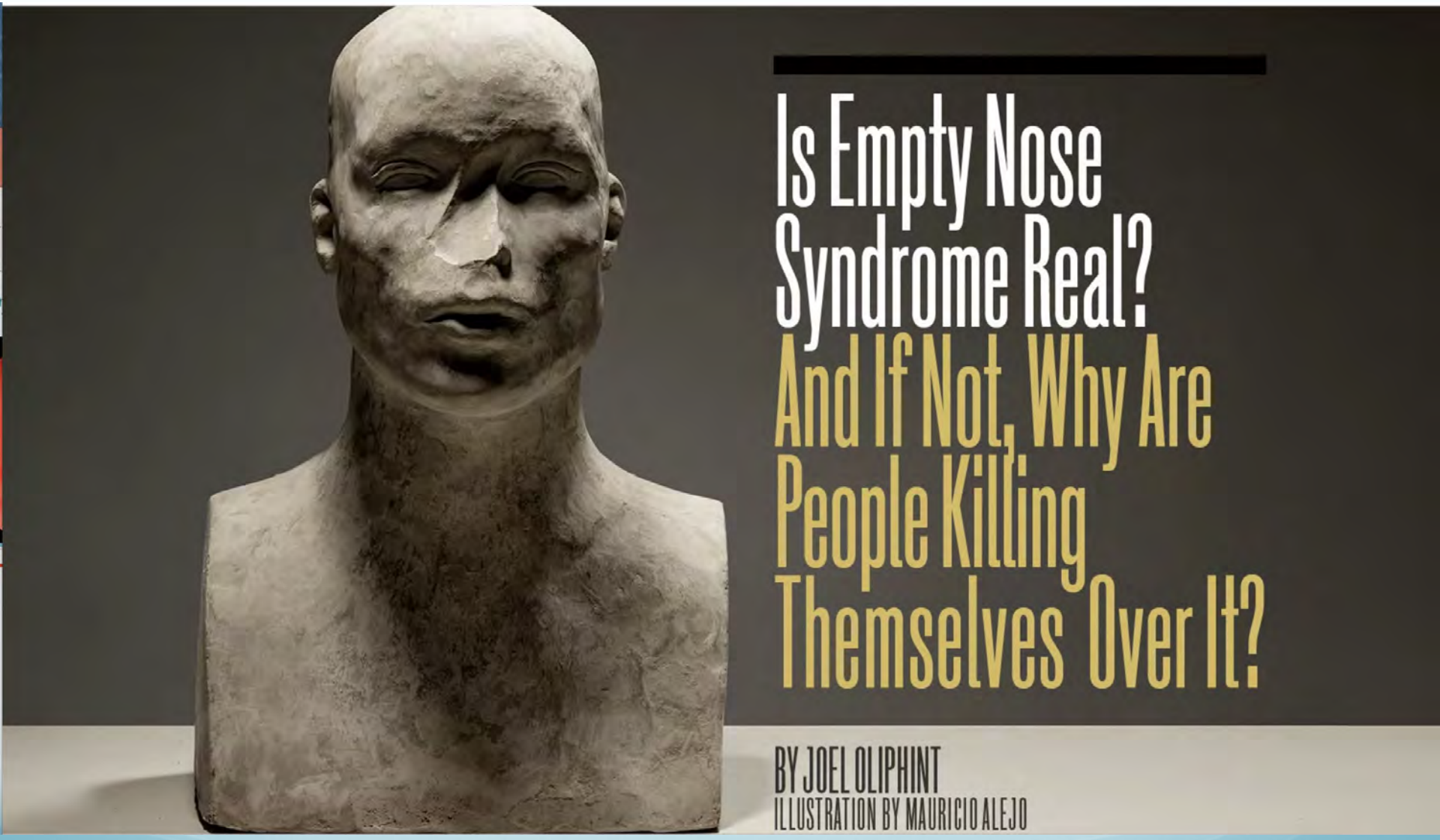


Empty Nose Syndrome

WHAT ARE THE SYMPTOMS OF EMPTY NOSE SYNDROME?

- sensation of nasal obstruction in spite of having large nasal airways
- nasal dryness
- cold air sensation
- not being able to inhale a satisfactory nasal breath
- some patients complain of suffocation symptoms that affect their ability to sleep.
- severe depression, anxiety, and/or other psychiatric conditions





Is Empty Nose Syndrome Real? And If Not, Why Are People Killing Themselves Over It?

BY JOEL OLIPHINT

ILLUSTRATION BY MAURICIO ALEJO


CBS19
6:05 65°

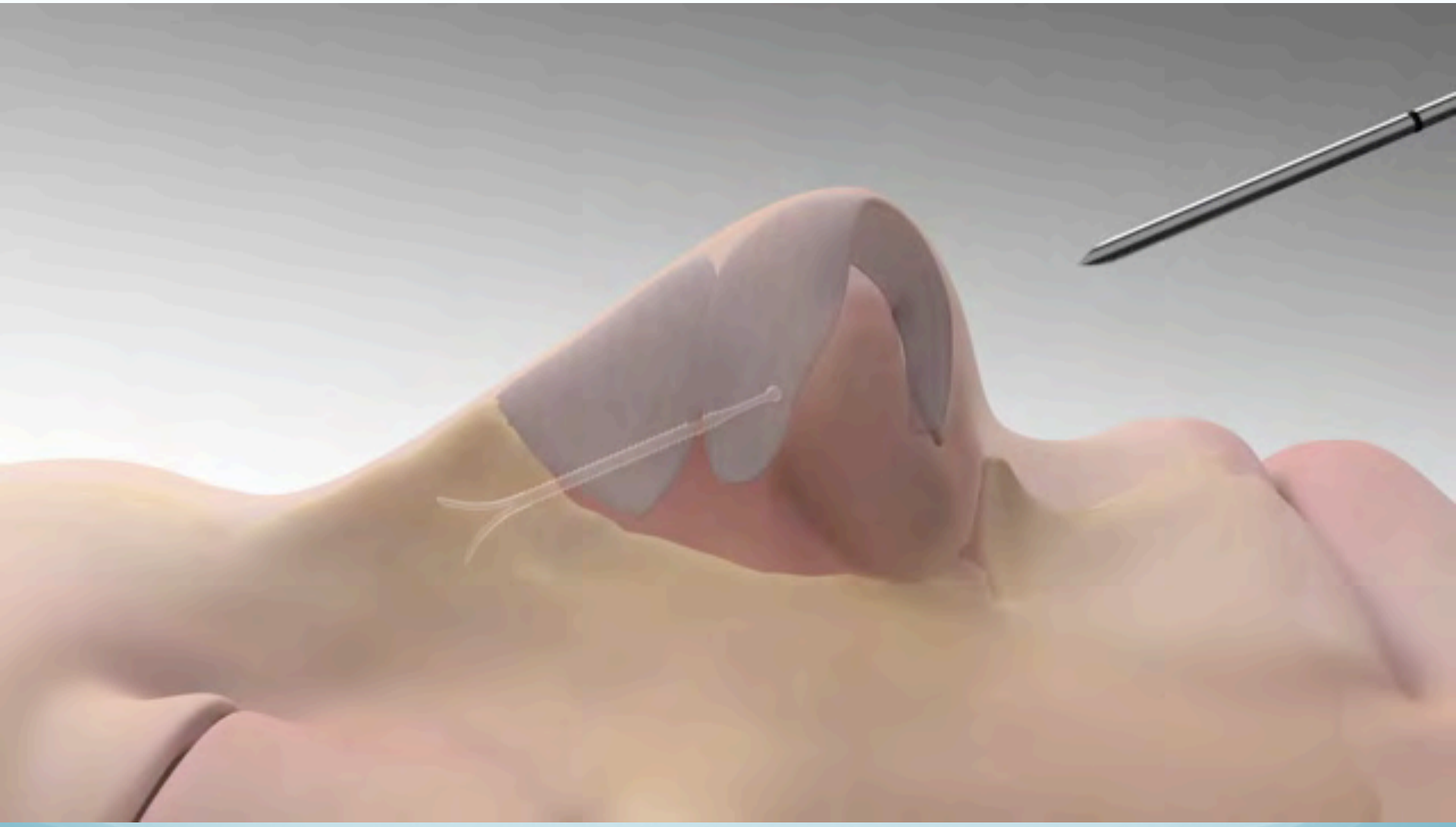

11:05 64°
abc 7
ABC7

Lateral wall implantation for Empty Nose Syndrome

Steven Houser, MD, FAAOA

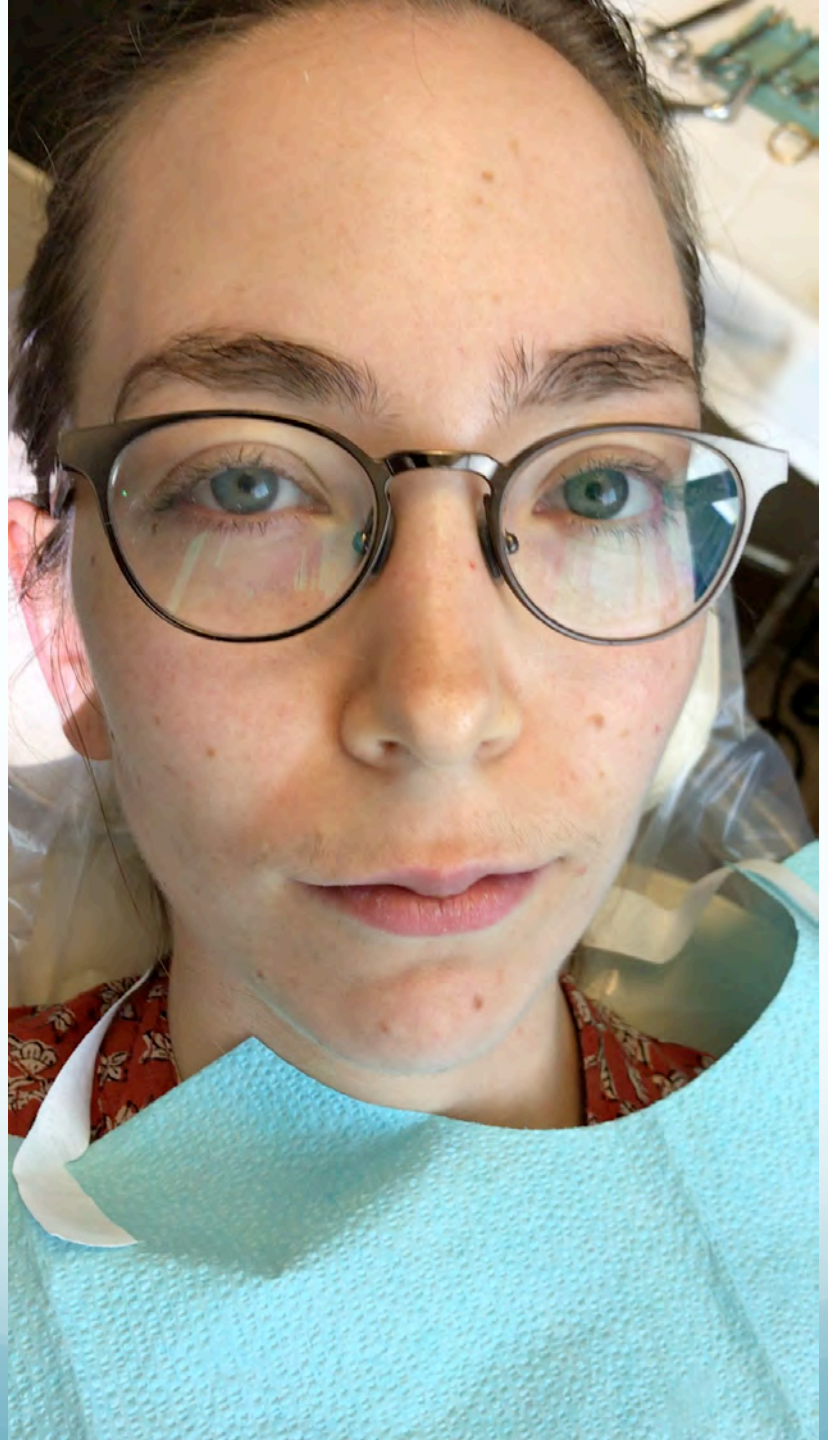

Breathe Better. Sleep Better.®
Breathe Right
NASAL STRIPS
ORIGINAL
OPENS YOUR NOSE
Instantly Relieves Nasal Congestion
DRUG FREE
30
LARGE TAN STRIPS


No medicine
No side effects
No waiting
Instant relief

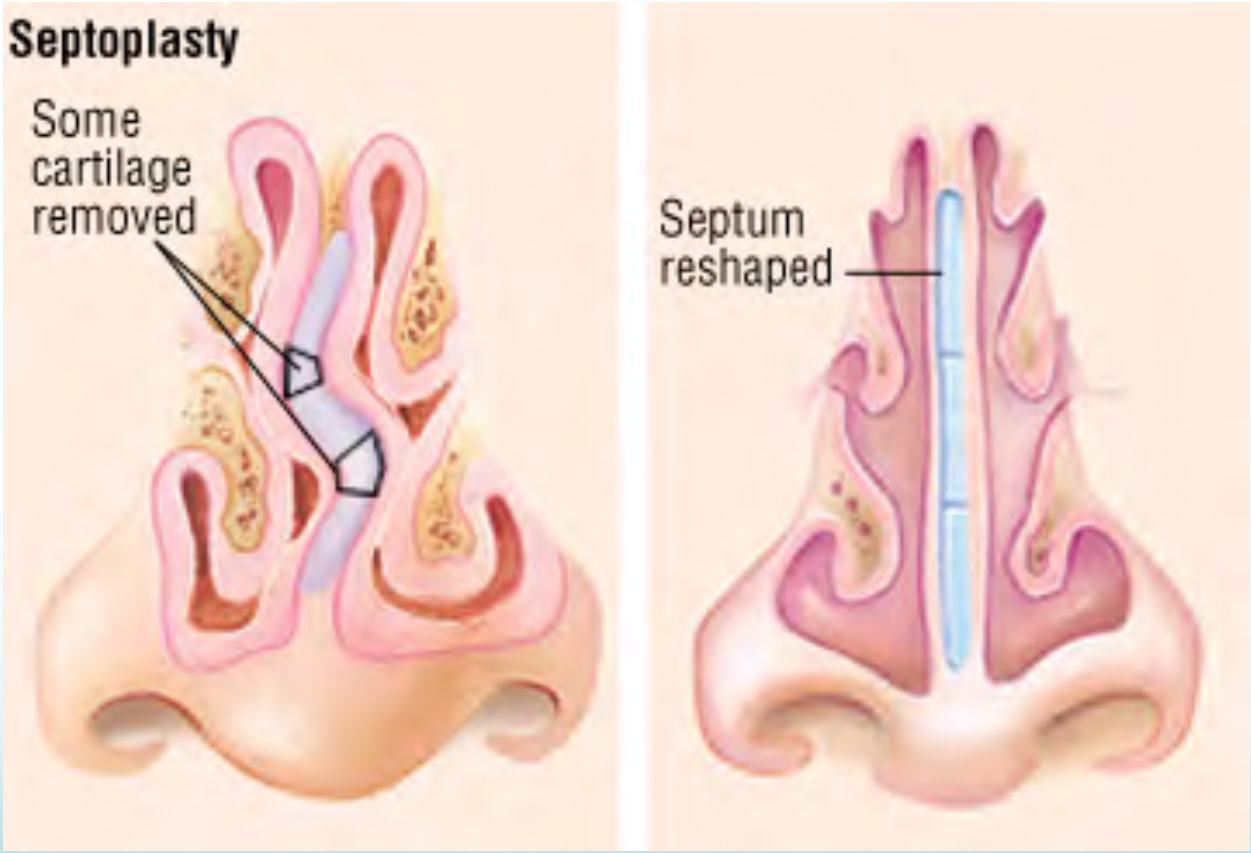


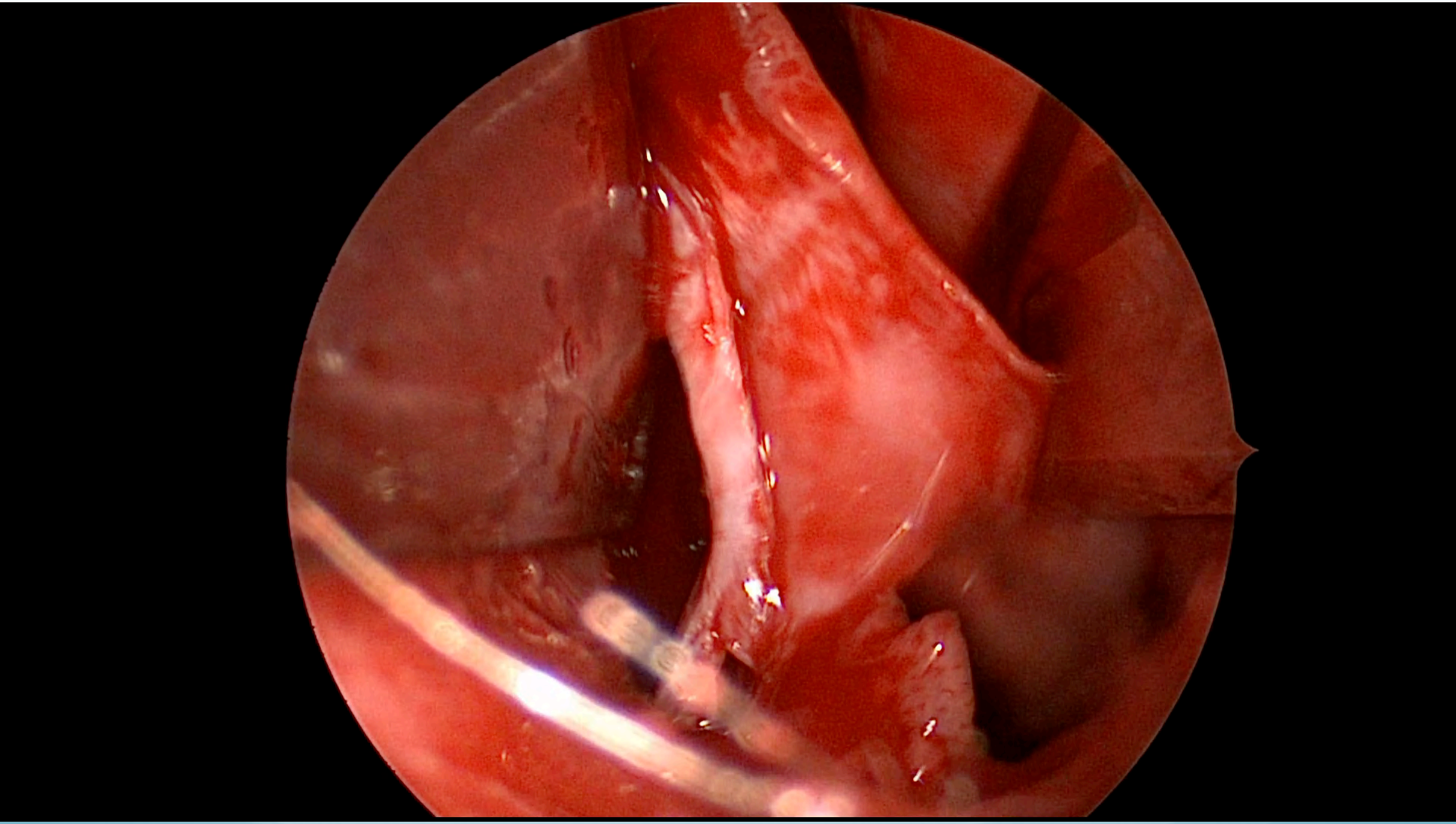

SLEEP ENDOSCOPY


ID NO.
NAME
SEX
COMMENT

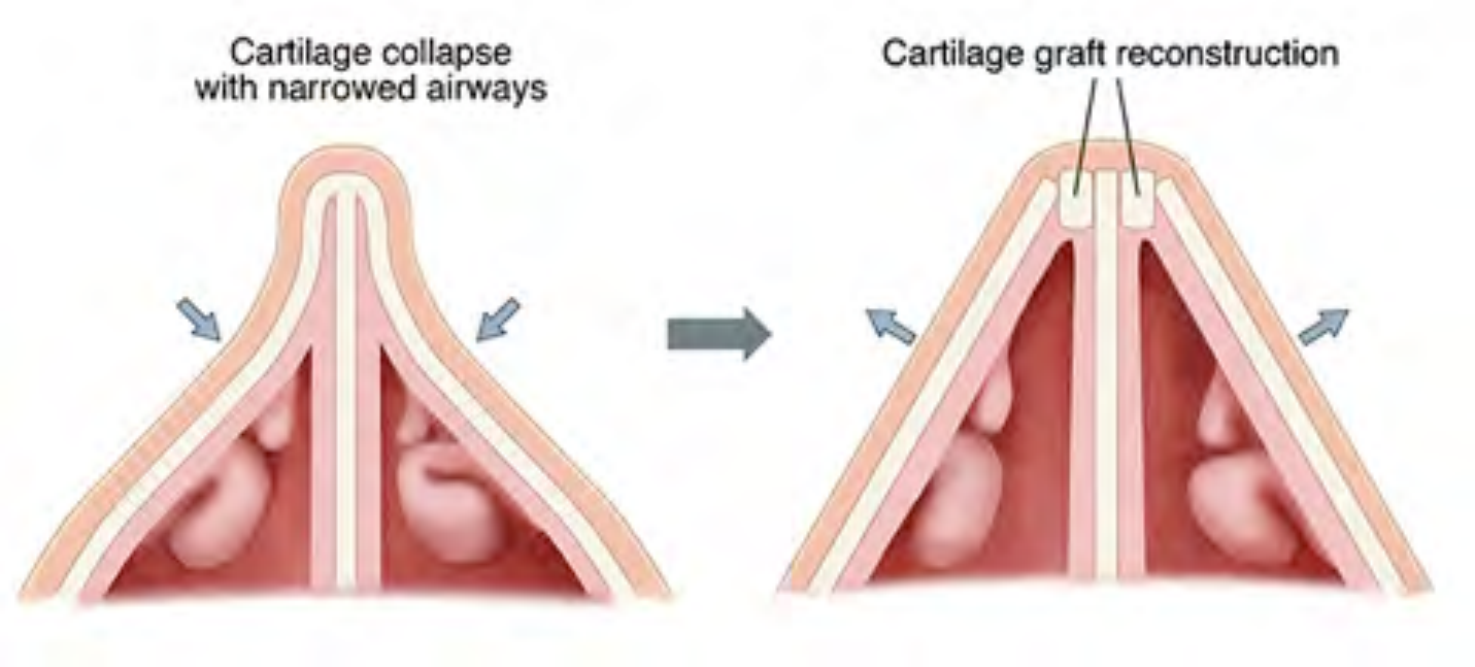


Septoplasty

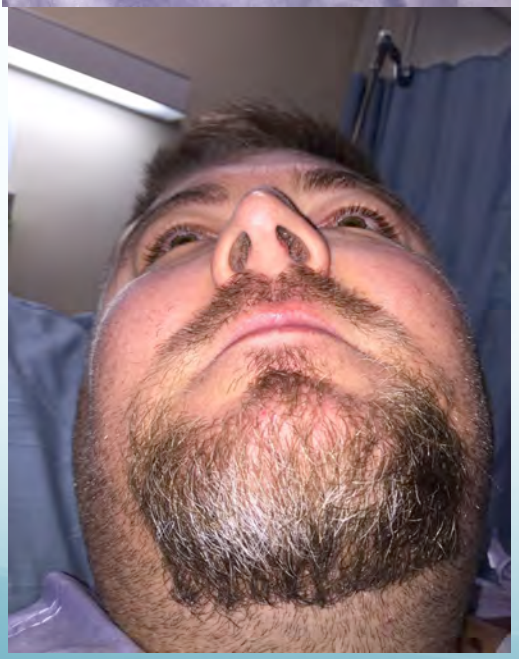




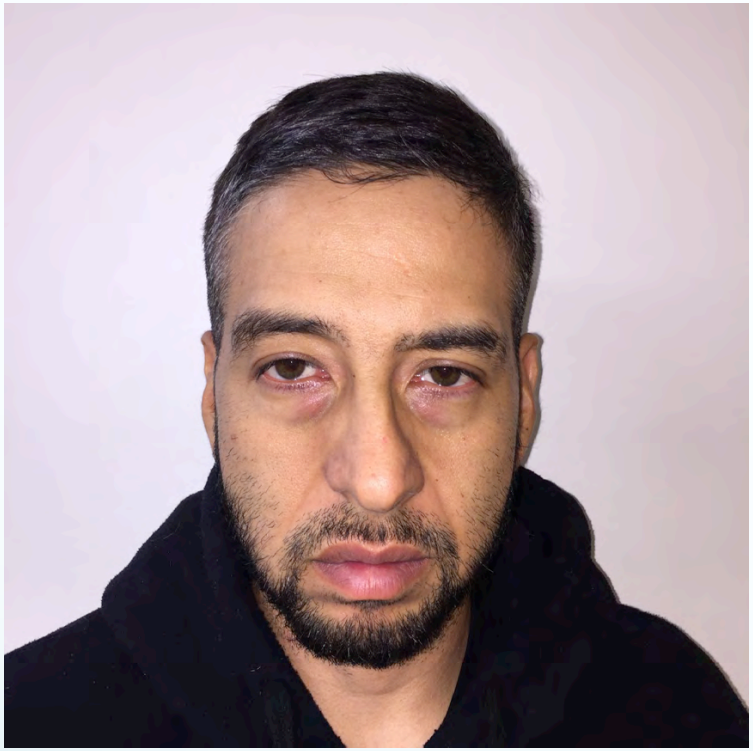
Septoplasty with Nasal Valve Repair Using Spreader Grafts



Septoplasty with Nasal Valve Repair



SRP with Spreader Grafts



Initial Treatment

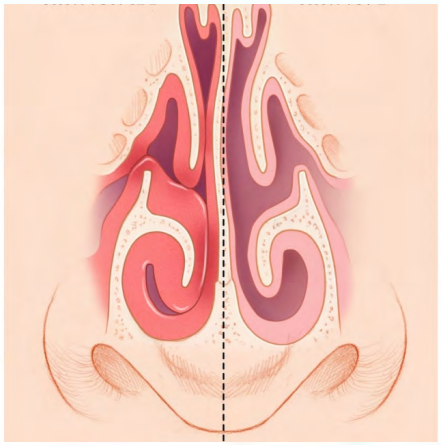
XLEAR® SINUS CARE

Immediate and natural relief.

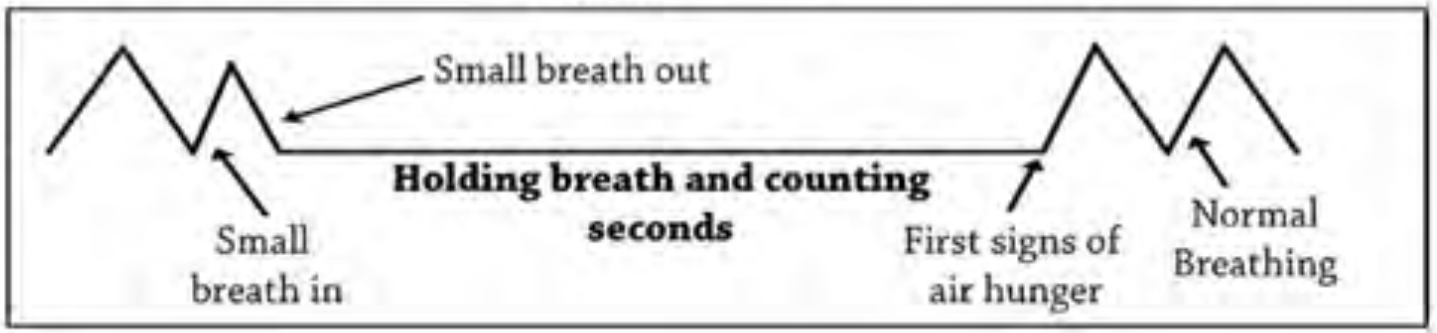
BUTEYKO CLINIC
INTERNATIONAL

Accredited by Prof. KP Buteyko

Buteyko Practitioner Training
&
Self Help DVD sets




Small breath in
Small breath out
Holding breath and counting seconds
First signs of an air hunger
Normal breathing


Small breath out
Holding breath and counting seconds
Small breath in
First signs of air hunger
Normal Breathing

Thank you!

Soroush Zaghi, MD
Sleep Surgeon
Otolaryngology (ENT) & Maxillofacial Surgery

www.ZaghiMD.com