


THE NOSE KNOWS HOW THE SLEEP GOES

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SLEEP EDUCATION CONSORTIUM
APRIL 23-25, 2026

1

DISCLOSURES

- NONE



2

OBJECTIVES

- REVIEW THE RELEVANCE OF NASAL BREATHING IN THE SCOPE OF SLEEP DISORDERED BREATHING



3

MY PRACTICE



AIRWAY ALLIANCE ENT
CHRISTOPHER TRAN, MD



INSPIRE. EVOLVE. TRANSCEND. ENT

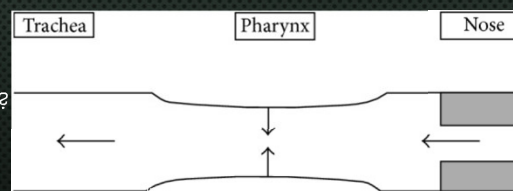
- BOARD-CERTIFIED OTOLARYNGOLOGIST
- SPECIAL INTERESTS:
 - AIRWAY OPTIMIZATION FOR SLEEP APNEA AND BREATHING
 - SINONASAL SURGERY
 - TETHERED ORAL TISSUES MANAGEMENT
 - OFFICE-BASED TECHNIQUES & PROCEDURES
 - PHOTOBIO-MODULATION
- PEDIATRIC & ADULT ENT CARE
- COLLABORATIVE CARE MODEL



4

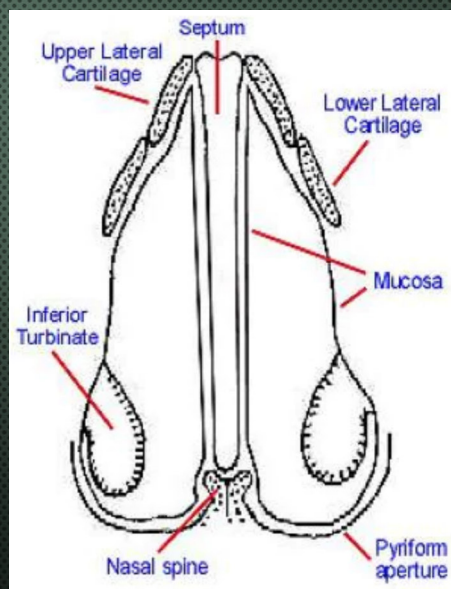
NASAL AIRWAY OBSTRUCTION: MECHANISMS CONTRIBUTING TO SLEEP DISORDERED BREATHING

- STARLING RESISTOR MODEL: UPSTREAM RESISTANCE CAUSES DOWNSTREAM NEGATIVE INTRALUMINAL PRESSURE
 - WHEN RESISTANCE IS SEVERE ENOUGH, AIR BYPASS OCCURS VIA MOUTH-BREATHING
- ORAL BREATHING EFFECTS ON CENTRAL RESPIRATORY EVENTS
 - ORAL BREATHERS BREATHE TOO QUICKLY → GREATER CO₂ ELIMINATION DURING EXPIRATION → DECREASED RESPIRATORY STIMULUS → CENTRAL APNEAS
- NASAL-VENTILATORY REFLEX
 - AIRFLOW SENSATION IN NOSE → STIMULATES SPONTANEOUS RESPIRATION (HIGHER RESTING BREATHING FREQUENCY & MINUTE VENTILATION)
- NASAL NITRIC OXIDE
 - POTENT PULMONARY VASODILATOR
 - MUSCLE TONE/NEUROMUSCULAR REGULATION, SLEEP REGULATION?



5

NASAL OBSTRUCTION: SITES



Nasal Floor

IMAGE CREDIT: MEDSCAPE

6

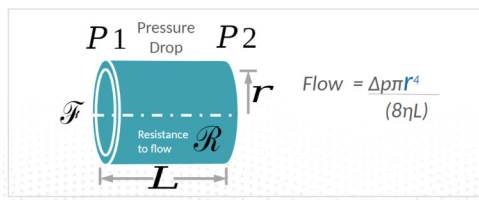
NASAL VALVE COLLAPSE: THE SCIENCE

Narrowest part of nasal airway = Nasal Valve Area¹

- Most common site of NAO
- Accounts for 2/3 of nasal resistance

Poiseuille's Law

- Airflow proportional to 4th power of radius (r)



A **small change** in the radius of the nasal valve **significantly increases** the flow of air

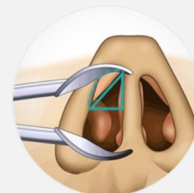


Image credits: Aerin Medical

1. Clin. Otolaryngol. 1997, 22, 307-317; REVIEW Acoustic rhinometry; E.W.FISHER; ENT Department, Birmingham Heartlands Hospital, Birmingham, UK.



7

TECHNOLOGY SPOTLIGHT: NASAL OBSTRUCTION TREATMENT

- RADIOFREQUENCY REMODELING FOR NASAL OBSTRUCTION: IN-OFFICE

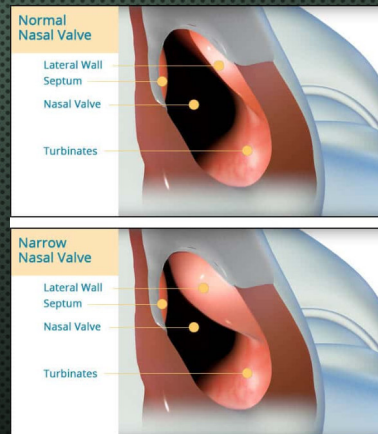
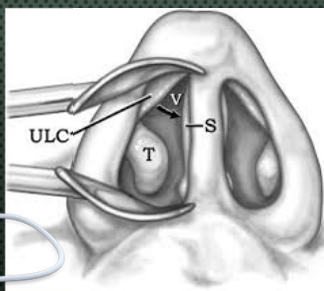


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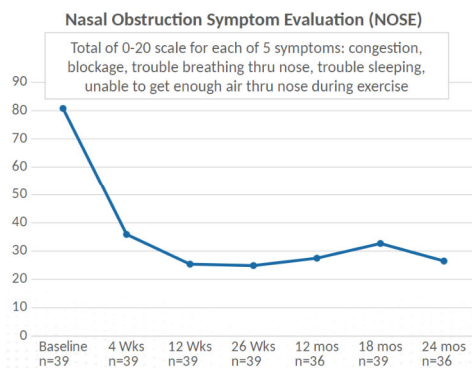
8

MINIMALLY INVASIVE RF REMODELING OF NASAL VALVE: DURABLE



- 97%** Responder Rate¹⁻³
- NO** Device Related SAEs^{4,5}
- 67%** Reduction in NOSE Score¹⁻³

- 89% patients reported improved sleep quality¹
- 94% patients report improved ability to breathe through their nose during exercise or exertion¹



IA VisiAer Stylus, Prospective, Multi-Center, Non-Randomized Clinical Study, 37 patients. Endpoint from baseline to 24 months. Patient reported NOSE score and QoL. Aerin Medical 19-030-01. 97% Responder rate for >15 point improvement in NOSE Scale score over baseline at 2 years. Grant M, Isakovitz O, Driver M. Quality-of-life impact after in-office treatment of nasal valve obstruction with a radiofrequency device: 2-year results from a multicenter, prospective clinical trial. [published online ahead of print 07 August 2020]. Int Forum Allergy Rhinol. 2020;10(3):311. doi:10.1002/iar.23667.

Int Forum Allergy Rhinol. Prospective, Multi-Center, Non-Randomized Clinical Study, 30 patients. Endpoint from baseline to 12 weeks. Patient reported NOSE score. Aerin Medical TR470. Isakovitz O, Driver M, and Ephraïm M. (2019). In-office treatment of nasal valve obstruction using a novel, bipolar radiofrequency device. Laryngoscope Investigative Otolaryngology. April 2019 [Journal, C05M 2018]. doi: 10.1002/liv.247

Image credit: Aerin Medical

9

ENT INTERVENTIONS: RADIOFREQUENCY TREATMENT FOR RHINITIS (RHINAER)

- SYMPTOMS TO ADDRESS:
 - CHRONIC RHINORRHEA/POSTNASAL DRIP
 - CHRONIC CONGESTION/THROAT-CLEARING
 - PERSISTENT NASAL DRAINAGE DESPITE SCIT/SLIT
 - NONALLERGIC CHRONIC RHINITIS!!!
 - PERSISTENT RHINITIS AFTER SINUS SURGERY

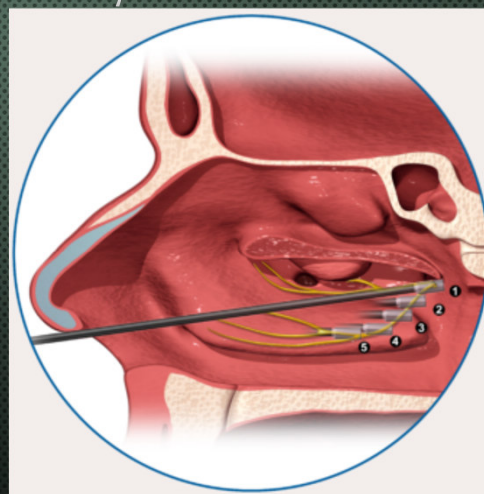


Image credit: Aerin Medical



10

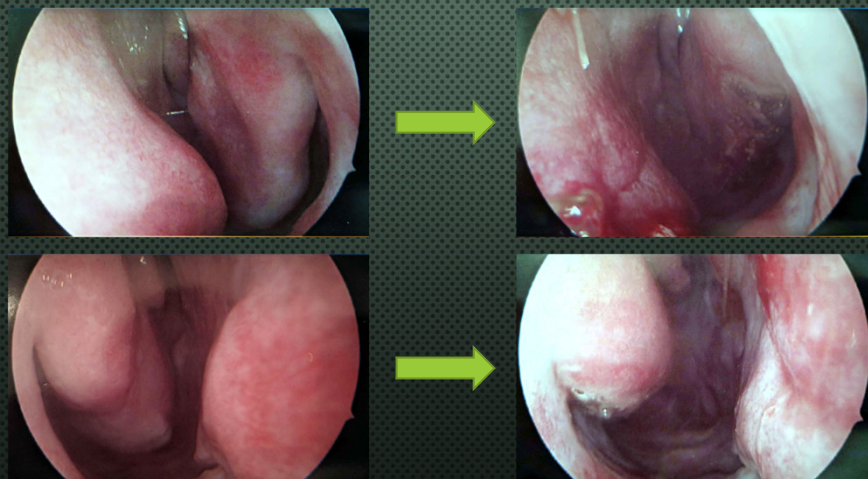
ENT INTERVENTIONS: SEPTOPLASTY-TURBINOPLASTY

- GOALS: OBTAIN MORE CROSS-SECTIONAL AIRFLOW, IMPROVE SENSATION OF AIRFLOW
 - CORRECTION OF DEVIATIONS/DEFLECTIONS OF SEPTUM
 - REMODELING OF INFERIOR TURBINATE(S)
 - REDUCTION OF SIZE: SOFT TISSUE OR BONY
 - CHANGE OF SHAPE
 - RETAIN MEDIAL SURFACE FOR SENSATION
 - AVOID OVER-RESECTION OF MIDDLE PORTION OF TURBINATE

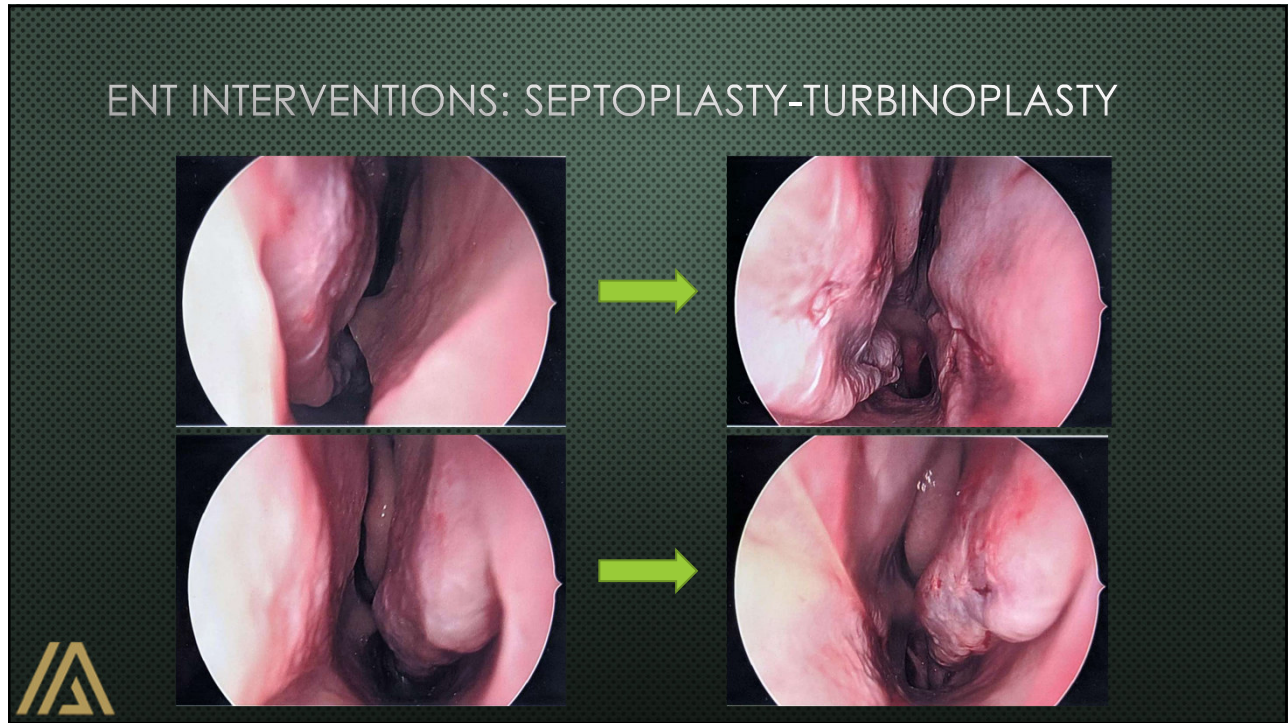


11

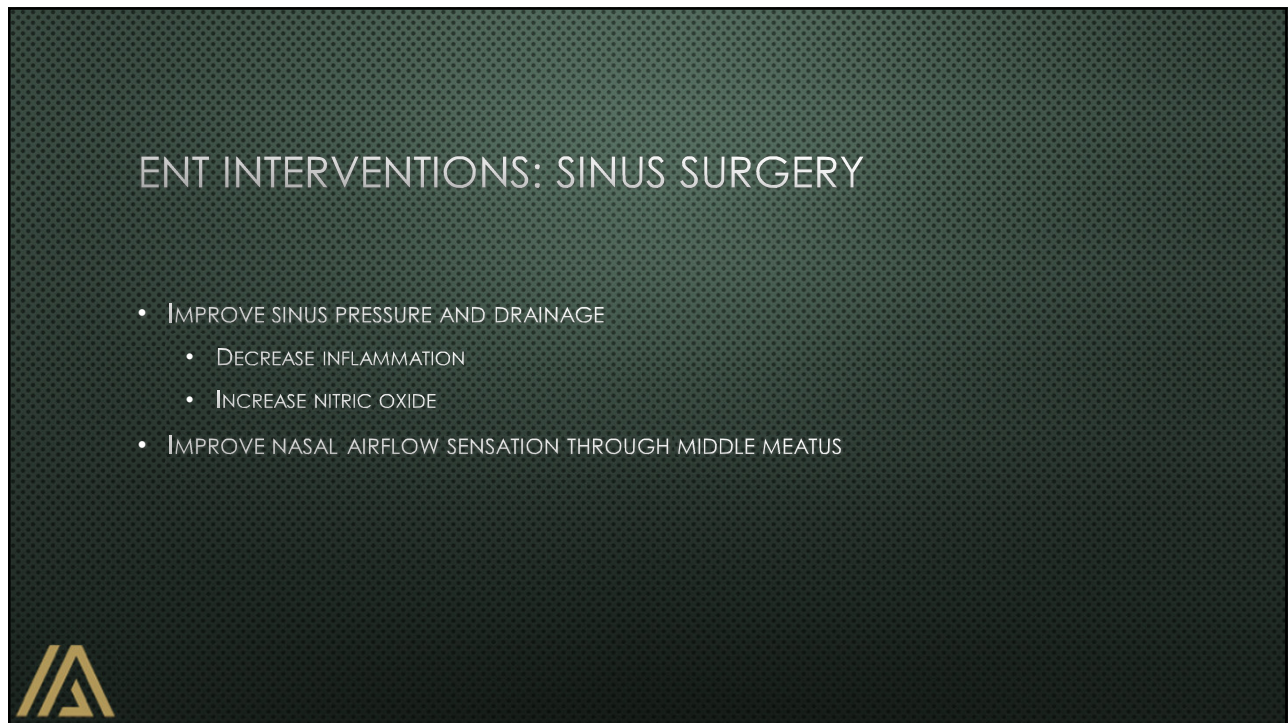
ENT INTERVENTIONS: SEPTOPLASTY-TURBINOPLASTY



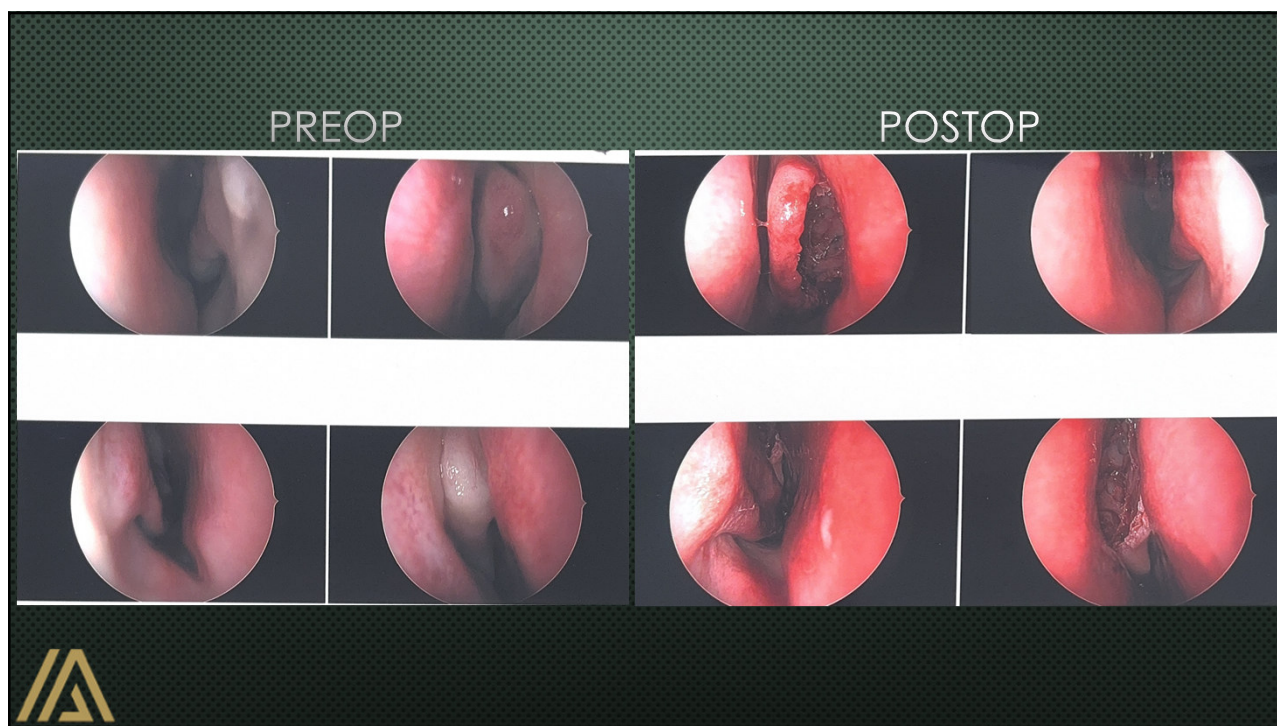
12



13



14



15

Effect of improved nasal breathing on obstructive sleep apnea

M Friedman ¹, H Tanyeri, J W Lim, R Landsberg, K Vaidyanathan, D Caldarelli

Affiliations + expand
PMID: 10629486 DOI: [10.1016/S0194-5998\(00\)70147-1](https://doi.org/10.1016/S0194-5998(00)70147-1)

Abstract

Objectives: The goal was to compare the effect of an improved nasal airway on obstructive sleep apnea (OSA) by use of subjective and objective measures.

Methods: A prospective study of 50 consecutive patients with nasal airway obstruction and OSA was carried out.

Results: Subjectively, nasal breathing improved in 49 (98%) patients, whereas snoring decreased or disappeared in 17 (34%); the remaining 33 (66%) patients did not notice any significant change in their snoring. Daytime energy levels increased in 39 (78%) patients and remained unchanged or worsened in 11 (22%). In review of the polysomnographic data, the group overall did not have significant changes in respiratory disturbance index (RDI) or lowest oxygen saturation levels (LSaO(2)). Continuous positive airway pressure (CPAP) levels required to correct OSA decreased after nasal surgery ($P < 0.01$). Patients with mild OSA showed significant worsening in RDI ($P < 0.05$), whereas LSaO(2) levels were improved in the group with moderate OSA ($P < 0.05$). In patients with severe OSA neither the RDI levels nor the LSaO(2) changed, but CPAP levels required to alleviate the obstruction after surgery were reduced ($P < 0.01$).

Conclusions: Most patients report improvement in nasal and sleep symptoms after correction of nasal airway obstruction. However, nasal surgery alone does not consistently improve OSA when measured objectively. Depending on the severity of OSA, nasal airway reconstruction may contribute to a decrease in CPAP level and improvement in oxygen saturation. Correction of the obstructed nasal airway should certainly be included in the overall treatment plan for OSA.

16

CE QUESTION: WHAT IS NORMALLY THE NARROWEST PART OF THE AIRWAY?

- A) RETROGLOSSAL SPACE
- B) INTERNAL NASAL VALVE
- C) RETROPALATAL SPACE
- D) SUBGLOTTIC SPACE
- E) NASOPHARYNX

17

THANK YOU!

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18







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REFLECT NOW

<https://champions.learner.plus/sec/>

Nasal Airway Obstruction

What inspired you to reflect?

Pick the context and a clinically relevant concept or phrase that inspired you to reflect.

Reflective Learning Moment

Nasal airway obstruction

Step 1 of 4

Next