



Valley ENT Update for the Primary Care Provider:

2021

October 23, 2021

# Course Agenda

8:00	Introduction (Adam Cassis MD, Dan Hurley MD)	10:40	Nasal Obstruction (Dan Hurley MD)
8:10	Healthy Aging and Hearing Loss (Madeline Frangenberg AuD, Calla Begin AuD)	11:10	Otolaryngic Manifestations of COVID (Ryan Rehl MD)
8:40	Myths of Sinus Surgery (Timothy Haegen MD)	11:40	Dizziness and Vestibular Physical Therapy – Audio-vestibular Evaluation and Treatment (Natacia Howard AuD, Anthony Veglia, PT, DPT)
9:10	Obstructive Sleep Apnea (Jordan Weiner MD)	12:10	Sudden Sensorineural Hearing Loss – A Medical Emergency (Adam Cassis MD)
9:40	Skin Cancer in the Head and Neck (Timothy Kelsch MD)		
<b>10:10 - 10:40</b>	<b>Break</b>	<b>12:40 - 1:00</b>	<b>Course evaluation and Adjournment</b>

# Guest Speakers

# Dan Hurley, MD



**College: St. Louis University**

**Medical School: St. Louis University School of Medicine**

**Residency: St. Louis University Dept. of Otolaryngology**

**Boards: American Board of Otolaryngology – Head & Neck Surgery**

Dr Hurley is a board-certified Otolaryngologist-Head & Neck Surgeon. He has been in practice in Arizona since 2001. He practices a broad spectrum of general otolaryngology with special interests in nasal and sinus disorders as well as care of the pediatric patient. He is the current president of Valley ENT.

# Adam Cassis, MD



**College:** Roanoke College, Salem, VA

**Medical School:** West Virginia University School Of Medicine

**Residency:** West Virginia University Hospital

**Fellowship:** House Ear Clinic, Los Angeles, CA

## **Boards**

- **Otology/Neurotology**
- **Otolaryngology, Head and Neck Surgery**

Adam M. Cassis, M.D. joined Arizona Hearing & Balance after six years of practicing in an academic institution where he served as Director of Otology/Neurotology as well as the Director of the Cochlear Implant Program.

He specializes in the treatment of chronic ear disease, cholesteatomas, hearing loss, facial paralysis/facial nerve disorders, dizziness/vertigo, tinnitus, and other surgeries of the ear and skull base. Dr. Cassis' expertise and interests also include the medical and surgical treatment of Ménière's disease and cochlear implantation for the treatment of advanced hearing loss.

Dr. Cassis also specializes in the evaluation and treatment of acoustic neuroma/vestibular schwannoma, glomus tumors, as well as other skull base tumors, including patients with neurofibromatosis type 2.

## Madeline Frangenburg, AuD



**College: University of Iowa, Iowa City, IA**

**Graduate School: A.T. Still University in Mesa, AZ.**

Dr. Frangenburg provides both pediatric and adult services for diagnostic testing, cochlear implant evaluations and mapping, as well as hearing aid evaluations and fittings. She maintains a dispensing audiologist license from the state of Arizona and is a Fellow of the American Academy of Audiology.

## Calla Begin, AuD



**College: University of Wisconsin- River Falls**

**Graduate School: Arizona State University, Tempe, AZ**

Dr. Begin provides pediatric and adult services ranging from diagnostic testing, hearing aids, cochlear implant evaluations and programming, BAHA evaluations and programming, and evoked potentials. She maintains a Dispensing Audiologist license from the state of Arizona and is certified by the American Speech Language Hearing Association.

# Tim Haegen, MD



**College:** University of Notre Dame

**Medical School:** Georgetown University School of Medicine

**Residency:** Naval Medical Center

**Fellowship:** Georgia Nasal & Sinus Institute

**Boards:** American Board of Otolaryngology –Head & Neck Surgery

Dr. Haegen is a board-certified Otolaryngologist-Head and Neck Surgeon who joined the Arizona Sinus Center in 2011. He is experienced in treating adults and children with ear, nose, and throat disorders and offers patients special expertise in treating complex nasal and sinus disorders. As a veteran of the United States Navy and former head of the Departments of Otolaryngology at the Naval Hospital Camp Pendleton, California, and the Naval Hospital in Okinawa, Japan, Dr. Haegen has demonstrated exceptional leadership and clinical skills. He has authored numerous research papers published in otolaryngology.



# Jordan Weiner, MD



**College:** Union College, Schenectady, NY

**Medical School:** Albany Medical College, Albany, NY

**Residency:** Mayo Graduate School of Medicine

**Boards:** American Board of Otolaryngology – Head & Neck Surgery

Dr. Weiner is a board-certified Otolaryngologist—Head & Neck Surgeon. He has been in practice in Sco3sdale since 1999. He treats nearly all conditions within otolaryngology. His practice includes head and neck oncology including trans-oral laser surgery, thyroid and parathyroid surgery, otology, laryngology, rhinology and surgical treatment of obstructive sleep apnea. He has been selected by his peers as a “Top Doc” numerous times. He also led efforts to form Valley ENT in 2007 and served as its first president until 2014.

# Tim Kelsch, MD



**College:** University of California at Davis, Davis, CA

**Medical School:** New York Medical College, Valhalla, NY

**Residency:** Madigan Army Medical Center, Tacoma, WA

**Boards:** American Board of Otolaryngology - Head and Neck Surgery

Dr. Kelsch and his team treat adults and children offering comprehensive therapy for all disorders of the head and neck. Dr. Kelsch strives to provide the very best treatment by spending a great deal of time focusing and listening to your problems, and tailoring an individualized plan for an exceptional patient experience.

# Ryan Rehl, MD



**College:** Cornell University, Ithaca, NY

**Medical School:** The Ohio State University, Columbus, OH

**Residency:** Otolaryngology-Head and Neck Surgery The Illinois Eye and Ear Infirmary, University of Illinois at Chicago

**Fellowship:** Rhinology, California Sinus Institute, Palo Alto, CA

**Boards:** American Board of Otolaryngology-Head and Neck Surgery

Dr. Rehl is a fellowship-trained Rhinologist, board-certified Otolaryngologist-Head and Neck Surgeon and Fellow of the American College of Surgeons with a practice focused on complex nasal and sinus disorders. His practice includes endoscopic CSF leak repair, endoscopic orbital decompression, endoscopic nasal and sinus tumor removal, endoscopic skull base surgery and revision endoscopic sinus surgery with computerized surgical navigation. Dr. Rehl is a past-president of the Arizona Society of Otolaryngology Head and Neck Surgery. He has been selected by his peers as a Phoenix Magazine "Top Doc" several times.

**Natacia N. Howard, AuD**



**Graduate School: A.T. Still University, Mesa AZ**

She specializes in balance and vestibular testing, as well as diagnostic audiology.

## **Anthony Veglia, DPT**



**College: Northern Arizona University**

**Graduate School: Northern Arizona University (Doctor of Physical Therapy)**

Dr. Veglia After completing his undergraduate studies at Northern Arizona University, he went on to complete his doctorate in physical therapy. He recently joined our Scottsdale ENT division to treat patients with balance and vestibular disorders.

# ENT Update for the Primary Care Provider 2021

Presented by the Doctors of Valley ENT

October 23, 2021



# Thank you

- Lisa Altman, Valley ENT
- Dr Ryan Rehl, president Valley ENT Foundation
- Dr Dan Hurley, president Valley ENT
- Michelle Smith, CEO Idyllwild Advertising
- Presenters
- Denise Gullikson, Debra Schneider, Honor Health CME office
- Attendees



- **Acknowledgment:** This CME event is not supported by any commercial entity.
- **Disclosure:** Jordan Weiner, MD discloses that he is a consultant with Inspire Medical Systems. All other speakers and all members of the planning committee have no relevant financial relationships with a commercial interest to disclose.
- **Accreditation Statement:** This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Arizona Medical Association (ArMA) through the joint providership of HonorHealth and Valley ENT. HonorHealth is accredited by ArMA to provide continuing medical education for physicians.
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# Welcome

## Valley ENT Update for the Primary Care Provider 2021

1. Course Syllabus – PDF format
2. CME requirements
  - 4.0 AMA PRA Category 1 Credits
  - Please sign Email sign-in form
  - Ensure valid email address, link will be sent for CME course credit
  - Must fill out evaluation in order to receive credit
  - After 30 days, attendees can contact the CME office for their transcripts. [CME@honorhealth.com](mailto:CME@honorhealth.com)



# Why provide ENT update?

- Otolaryngology is making rapid advancements in care and technology
- Requires constant attention through self education, conference attendance, other means to stay at forefront of changes to deliver best care
- How then does the front line (primary care, emergency room, urgent care) stay abreast of these changes?
- ENT update allows for review of problems most salient to your care setting
- Highest yield on topics to allow for optimal care of patients with ENT problems; determine when referral is necessary



# Why provide ENT update?

- Of all the areas of primary complaints that bring patients to the primary care (or to the urgent care/ER), ENT complaints account for the highest proportion, around 30% (50% in pediatrics practice)
- Three opportunities for education for ENT topics:
  1. Medical school/PA school/NP training (only minority of medical schools have compulsory ENT rotation/skills testing)
  2. Residency/post graduate training (75% FM trainees had “very little” formal ENT clinical instruction)
  3. CME events
- As otolaryngologists, it is our duty to educate the medical community on the changes within our field
- That through collaborative effort, we may better care for our patients



# A need for otolaryngology education among primary care providers

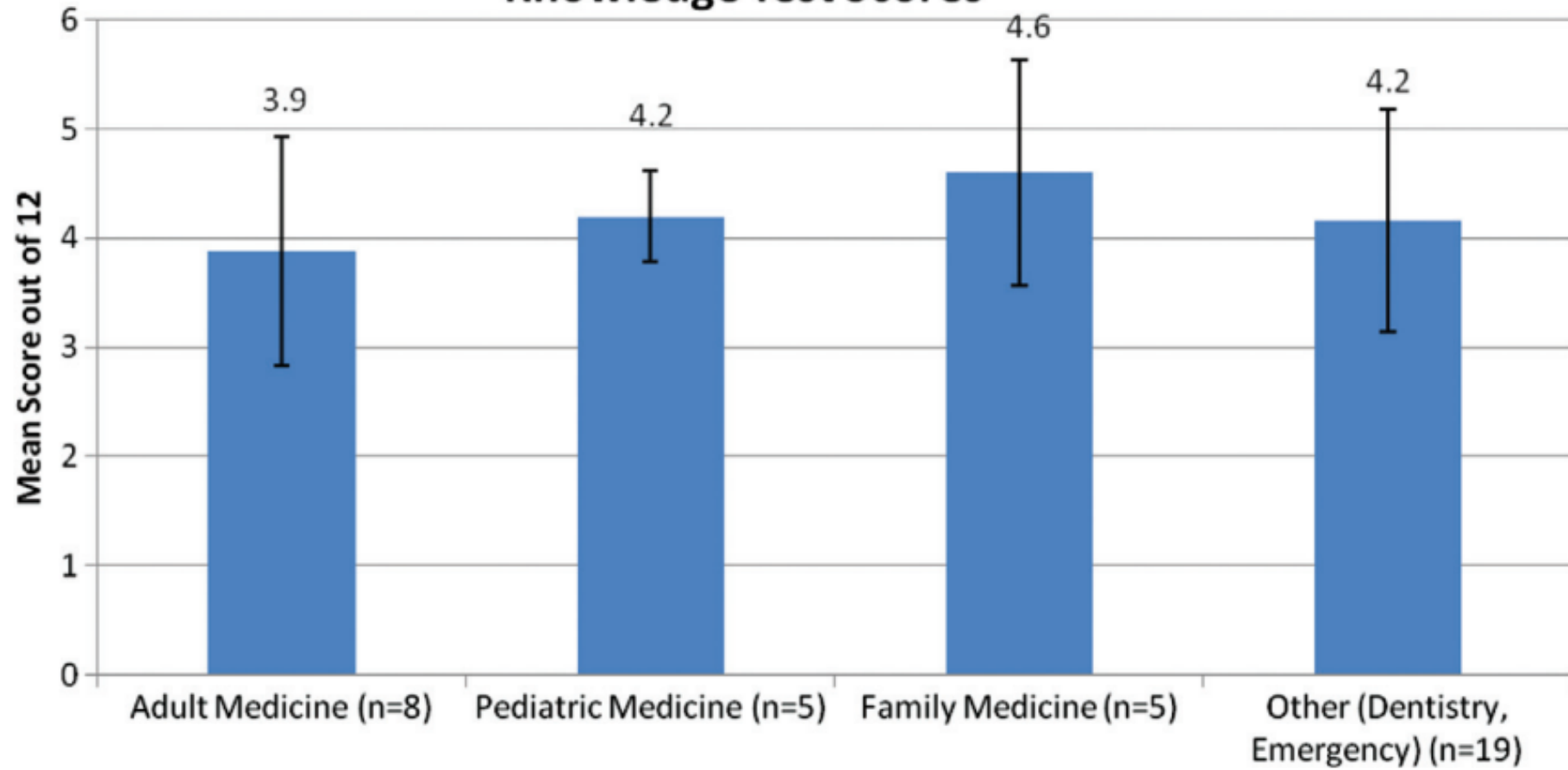
Amanda Hu\*, Maya G. Sardesai and Tanya K. Meyer

Department of Otolaryngology – Head & Neck Surgery, University of Washington, Seattle, WA, USA


- Survey sent to multiple different specialties (MD/DO, PA, NP)
  - Family med
  - Adult med
  - Pediatrics
  - Other (incl. emergency)
- 12 multiple choice questions (given prior to ENT update conference)
- Average score was **4 out of 12**
- 91% stated they would attend again, the majority suggested a yearly update



## Knowledge Test Scores



# A Multicenter, Cross-Sectional Assessment of Otolaryngology Knowledge Among Primary Care Trainees

Daniel C. O'Brien, MD, MAS , Lane D. Squires, MD, Aaron D. Robinson, MD, Hassan Ramadan, MD, Rodney Diaz, MD [Show](#)

- Otolaryngology knowledge tested among 3 groups
  1. ENT residents
  2. 4<sup>th</sup> year medical students
  3. Primary care residents
- Scores
  - ENT: 93%
  - Others: 56%
- **No difference between 4<sup>th</sup> year medical students, primary care residents of any year**
- Only 16% of the primary care providers and students assessed felt comfortable with these conditions
- 86% of respondents desired increased education on these topics



# Learning Objectives

- Address knowledge gaps in ENT disease processes
- Update the learner on new technology, treatments, or Clinical Practice Guidelines published by the American Academy of Otolaryngology
- Apply evidence-based treatment of ENT problems to improve patient outcomes



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# Healthy Aging and Hearing

Presented by:

Madeline Frangenberg, Au.D. CCC-A

Calla Begin, Au.D. CCC-A

The Arizona Hearing and Balance Center division of Valley ENT

October 23, 2021



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# Learning Objectives



By the end of this course, you will be able to:



Identify risk factors and possible causes of hearing loss in adults.



Recognize the consequences of hearing loss for older adults.



Describe the treatment options available for hearing loss in older adults.



# Prevalence of Hearing Loss

15% of American adults report trouble hearing <sup>13</sup>

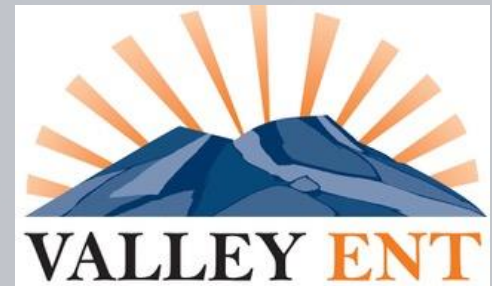
- 75% could benefit from hearing aids <sup>13</sup>

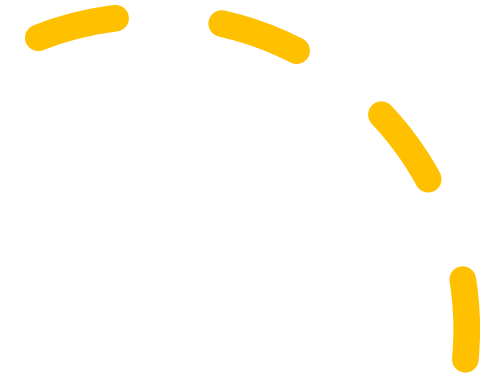
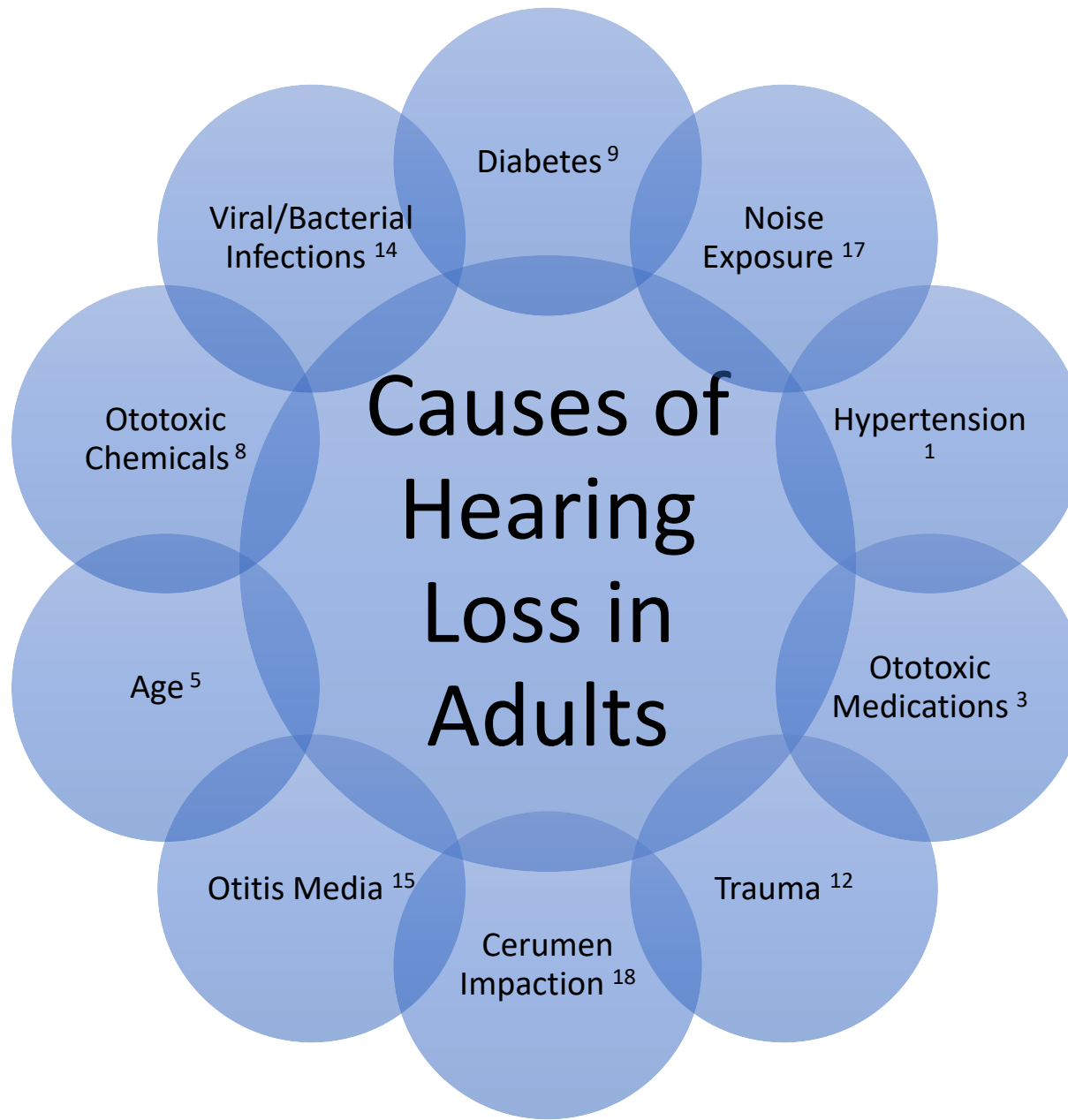
Age is a strong predictor of hearing loss <sup>13</sup>

- 60-69 age group <sup>13</sup>

By 2050...

- Approximately 1 in 4 people worldwide will be living with hearing loss <sup>19</sup>





"Our ability to hear is precious. Untreated hearing loss can have a devastating impact on people's ability to communicate, to study and to earn a living. It can also impact on people's mental health and their ability to sustain relationships" <sup>19</sup>

-Dr Tedros Adhanom Ghebreyesus, WHO General Director



# Possible Effects of Untreated Hearing Loss

Communication<sup>2</sup>

Education<sup>7</sup>

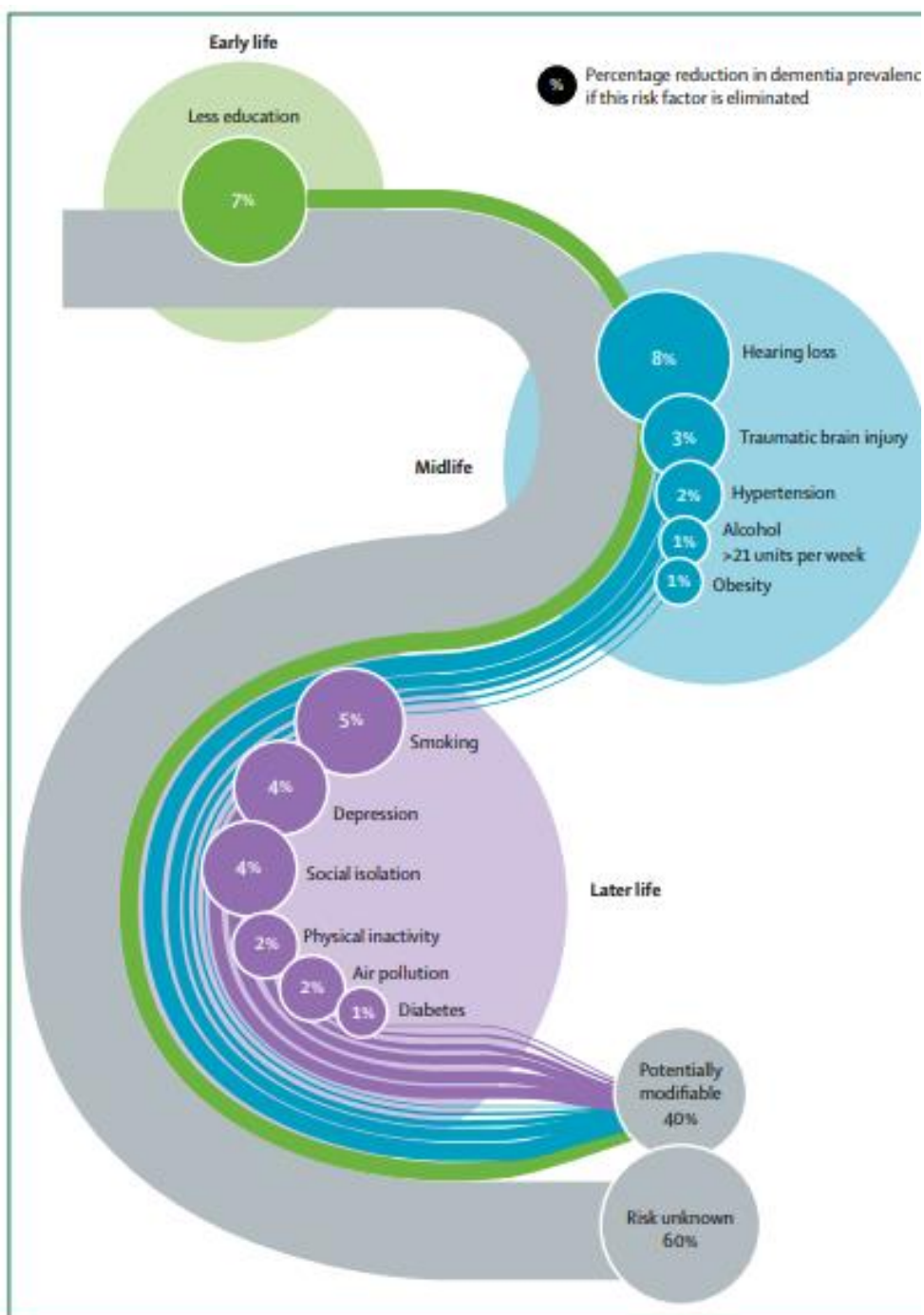
Employment<sup>7</sup>

Cognition

Social Isolation<sup>16</sup>

- Depression/Anxiety





# Hearing Loss and Cognitive Decline

Prevalence of 50 million cases of Dementia world-wide<sup>20</sup>

Medical Costs for treating dementia are very high<sup>20</sup>

Hearing loss is primary risk factor in 8% of dementia cases<sup>11</sup>



Figure 7: Population attributable fraction of potentially modifiable risk factors for dementia



# The Lancet 2020

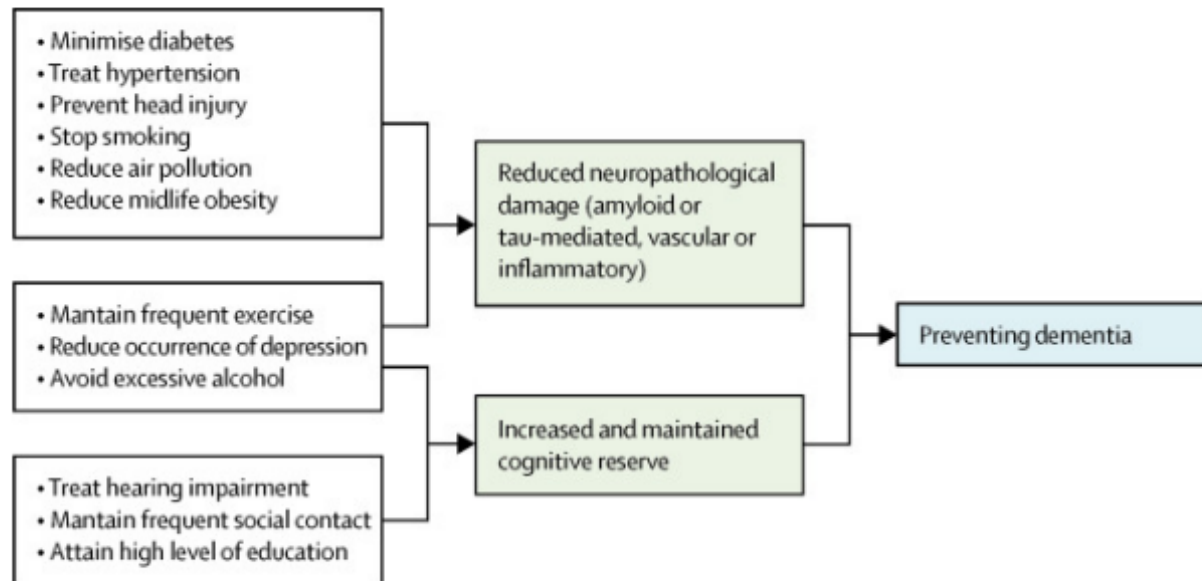


Figure 2 Possible brain mechanisms for enhancing or maintaining cognitive reserve and risk reduction of potentially modifiable risk factors in dementia

- The link between hearing loss and dementia is the suggestion of reduced cognitive stimulation<sup>11</sup>

# Evidence of Neurocognitive Benefit From Hearing Aid Use



If a human brain is accustomed to the full complement of speech sounds, and these same sounds are missing or attenuated due to hearing loss, the human brain changes as a result of altered auditory stimulation.



When the brain is stimulated using exclusively visual input, some previously defined auditory areas respond to visual stimuli.



With more severe hearing loss present, the frontal and pre-frontal areas of the brain become more active-suggesting more effortful listening.

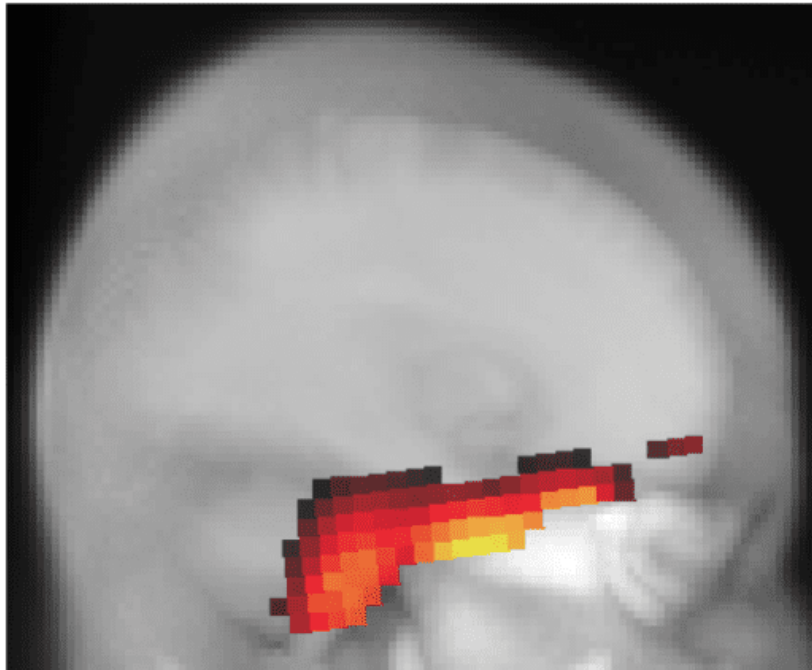


Good news! After 6 months of hearing aid use, these brain changes reversed<sup>6</sup>.

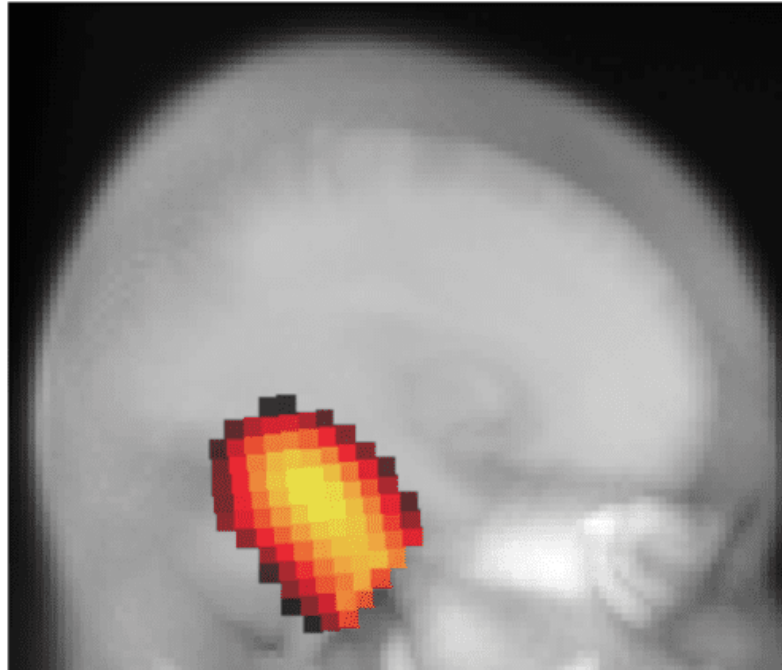


- Take away: Degraded input to the auditory cortex makes listening more effortful, requiring greater top-down sensory, attentional, and cognitive compensation. This in turn decreases the available resources that can be used for cognitive function and memory<sup>6</sup>.

Pre-HA



6 months Post-HA



# Signs Someone May Have Hearing Loss:

---

Inappropriate response to a question asked or statement made

---

Leans in to achieve better signal

---

“Well, My [husband/wife/spouse/kids] tell me I can’t hear”

---

Complains of ringing, hissing, or buzzing in ears

---

Reports other people mumble

---

Speaks at a louder volume

---

Reported social isolation or discomfort in groups

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# Barriers to Care

Hidden Disability

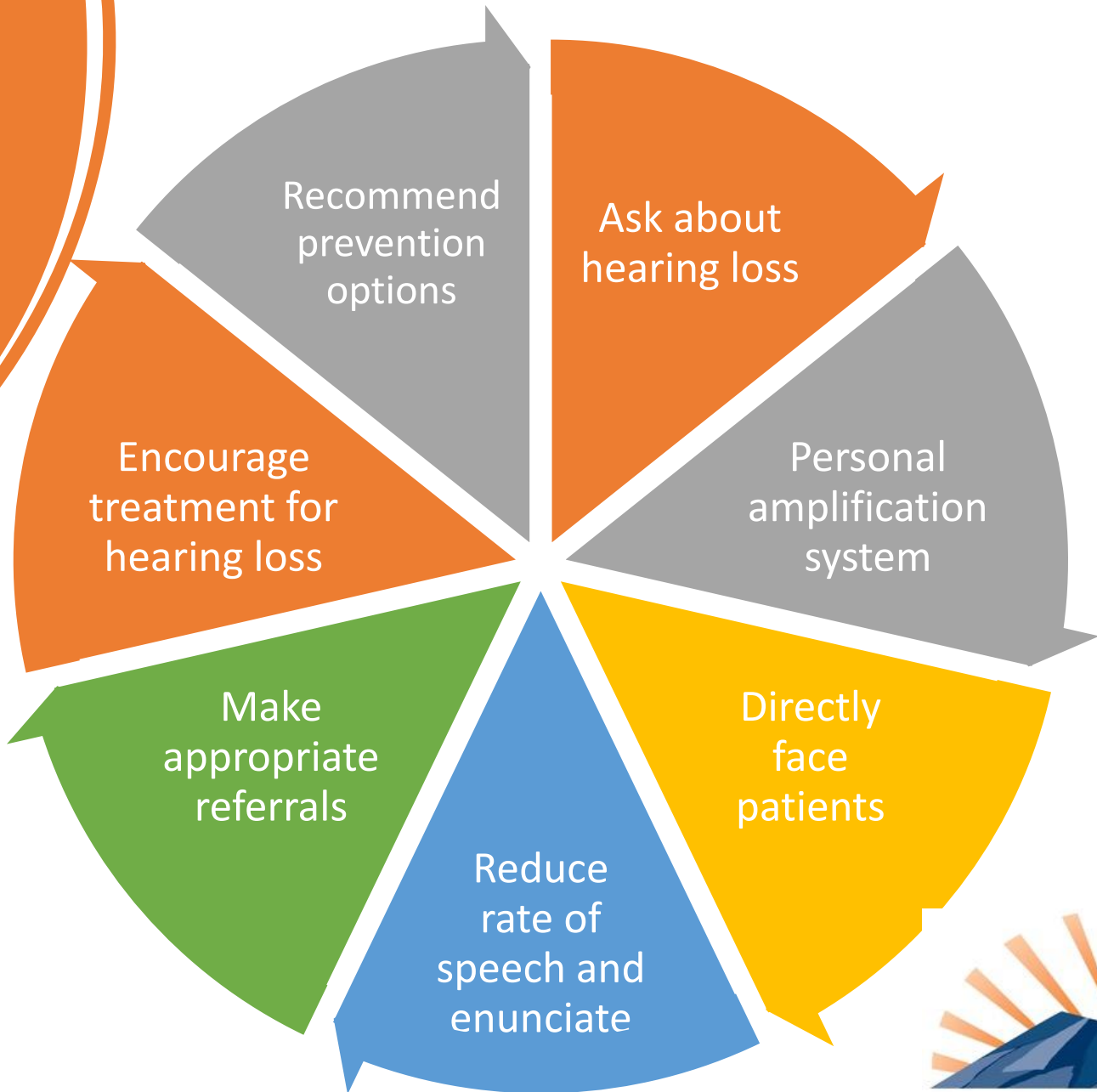
Shortage of Information

Stigma

Resources



# Things You Can Do



# Resources

1. Agarwal, S., Mishra, A., Jagade, M., Kasbekar, V., & Nagle, S. K. (2013). Effects of hypertension on hearing. *Indian Journal of Otolaryngology and Head & Neck Surgery*, 65(3), 614-618.
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4. Cohen, J. M., Blustein, J., Weinstein, B. E., Dischinger, H., Sherman, S., Grudzen, C., & Chodosh, J. (2017). Studies of physician-patient communication with older patients: How often is hearing loss considered? A systematic literature review. *Journal of the American Geriatrics Society*, 65(8), 1642-1649.
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# Resources Continued...

11. Lyos, A. T., Marsh, M. A., Jenkins, H. A., & Coker, N. J. (1995). Progressive hearing loss after transverse temporal bone fracture. *Archives of Otolaryngology–Head & Neck Surgery*, 121(7), 795-799.
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19. World Health Organization. (2020, September 21). Dementia. Retrieved August 24, 2021, from <https://www.who.int/news-room/fact-sheets/detail/dementia>





# Myths of Sinus Surgery

Tim Haegen, MD



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- Objectives:
  - Identify the types of surgical options available for chronic rhinosinusitis
  - Summarize postoperative recovery
  - Describe expected surgical outcomes of sinonasal surgery



# • Define Chronic Rhinosinusitis

Rhinosinusitis is defined as symptomatic inflammation of the paranasal sinuses and nasal cavity.

Sxs:

Facial pressure

Nasal obstruction/ congestion

Nasal discharge

Decreased smell

Chronic Rhinosinusitis (CRS): > 3 mos of sxs



Rosenfeld RM, et al. Clinical practice guideline (update): adult sinusitis. Otolaryngol Head Neck Surg. 2015 Apr;152(2 Suppl):S1-S39.



- Chronic rhinosinusitis (CRS)
  - Affects approximately 11% of the adult population
  - Accounts for 4.9 medical office visits out of every 100 visits.
  - It is estimated that ~ 500,000 sinus surgeries are performed annually for treatment of CRS refractory to medical management alone.



Kennedy JL, et al. Sino-nasal outcome test (SNOT-22): a predictor of postsurgical improvement in patients with chronic sinusitis. *Ann Allergy Asthma Immunol.* 2013;111(4):246-251.



# • Chronic rhinosinusitis

- 70% of patients reported doing research on endoscopic sinus surgery (ESS) before their 1st visit.
- Most important factors researched included risks (95%), benefits (85%), and recovery related issues (70%).
- Younger pts used healthcare and physician rating websites
- Older patients more often relied upon healthcare providers than the younger group (71.5% vs 18.8%)



Mehta U, Huber TC, Sindwani R. Patient expectations and recovery following endoscopic sinus surgery. *Otolaryngol Head Neck Surg.* 2006;134:483–487.



# • Patient Perceived Myths:

#1: Chronic sinusitis can only be treated with surgery

#2: There is only one type on sinus surgery

#3: My eyes will be black and blue

#4: My nose will be packed and taking out the packing is painful

#5: It will take a long time to recover

#6: Sinus surgery doesn't usually work



# • #1: Chronic sinusitis can only be treated with surgery

## Medical therapy options:

Antimicrobials  
Corticosteroid  
Antihistamines  
Saline Rinses  
Immunotherapy

Antileukotriene esterase inhibitors  
Decongestants  
Mast cell stabilizers  
Mucolytics  
Biologic Modifier therapy



## Maximal medical therapy options:

Antibiotics, steroids (topical/ systemic), Saline rinses

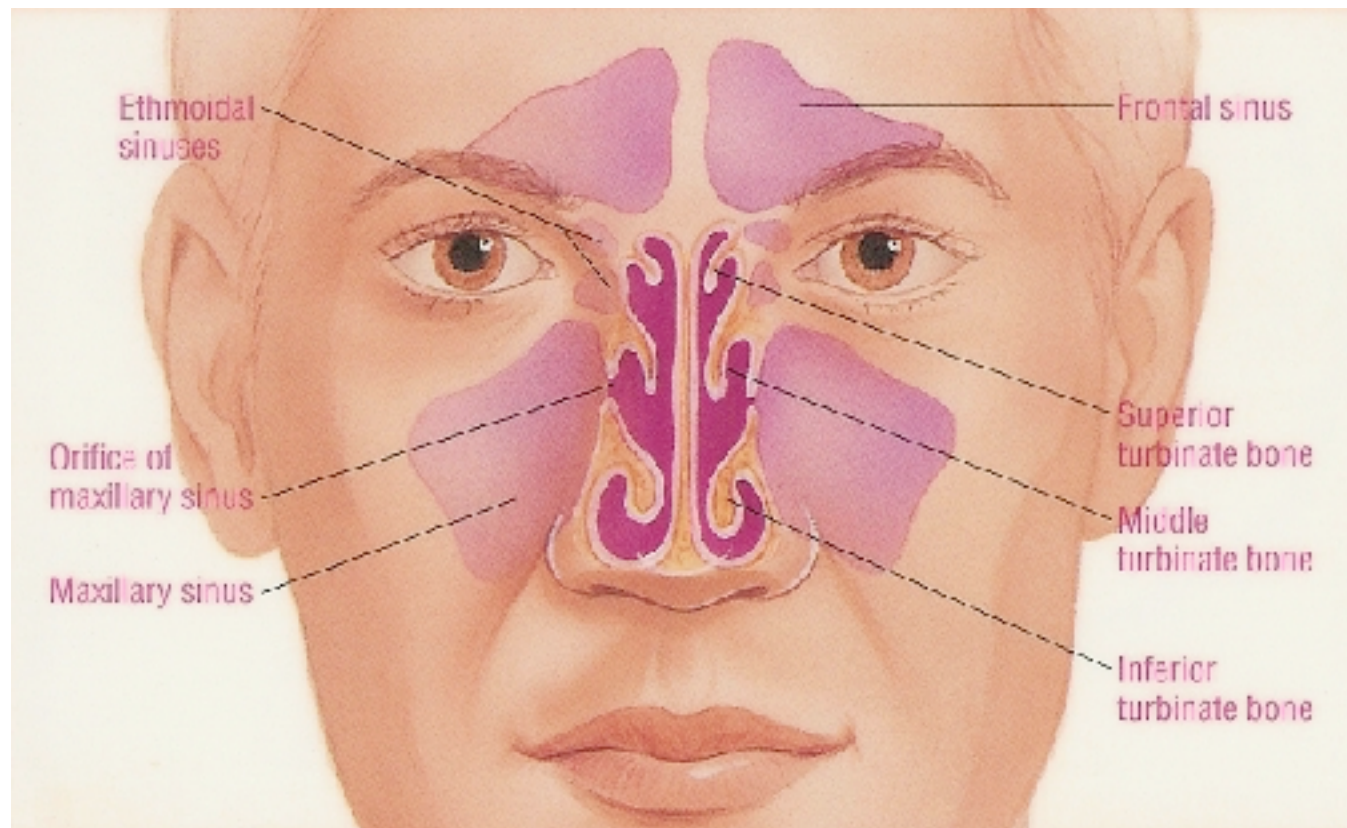
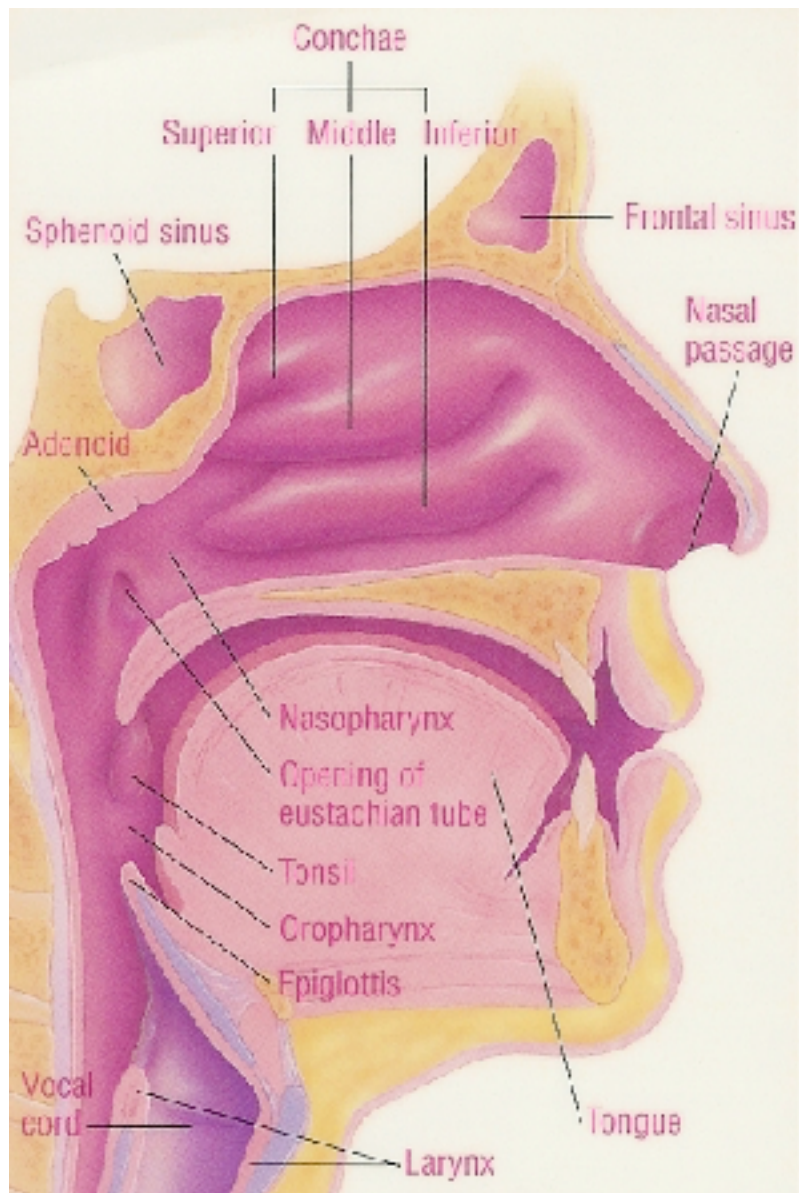


Ragab SM, Lund VJ, Scadding G. Evaluation of the medical and surgical treatment of chronic rhinosinusitis: a prospective, randomised, controlled trial. Laryngoscope. 2004 May;114(5):923-30.





# • #2: There is only one type of sinus surgery



- #2: There is only one type on sinus surgery

- Nasal Surgeries

- Septoplasty
- Turbinate surgery

- Sinus Surgeries

- Sinuplasty
- Functional Endoscopic sinus surgery
- External approaches



- #2: There is only one type on sinus surgery

- The Goals:

- Ventilate the sinus
- Remove disease
- Provide access for topical medications and examination/ surveillance



- #2: There is only one type on sinus surgery
  - Corollary: “all sinus surgery is invasive”
    - Turbinate procedures
    - Balloon sinuplasty
    - Limited sinus surgery
    - Polyp removal
    - Drug eluding stents



- #3: My eyes will be black and blue

- NO!!!!

- Complications:

Major: Cerebral spinal fluid (CSF leaks), meningitis, orbital injuries, hemorrhage.

78,944	Primary ESS cases	288 major complications	.36%
4,151	Revision ESS cases	19 major complications	.46%

500,000 cases / yr in US     ~1,800 cases / yr



Krings JG, et al. Complications of primary and revision functional endoscopic sinus surgery for chronic rhinosinusitis. Laryngoscope. 2014 Apr;124(4):838-45.



# • #3: My eyes will be black and blue

- Patients underestimated the amount of epistaxis.
- A significant number of responders believed incorrectly that there was no risk or only the possibility of minor complications in ESS.

What is the level of risk associated with this surgery?	
No risks	3.3 (1)
Minor risks only	46.7 (14)
Major risks in addition to infrequent minor risks	43.3 (13)
Major risks in addition to frequent minor risks	6.7 (2)



Neubauer PD, Tabae A, Schwam ZG, Francis FK, Manes RP. Patient knowledge and expectations in endoscopic sinus surgery. *Int Forum Allergy Rhinol.* 2016;6(9):921-5.



- #4: My nose will be packed and taking out the packing is painful

- Patient concerns:
  - Not being able to breath
  - Pain
  - Packing removal



- #4: My nose will be packed and taking out the packing is painful
- Absorbable vs Nonabsorbable
- Types:
  - Stent- rigid
  - Dressing- soft
  - Spacer- either
  - Implants- release medication



Verim A, Seneldir L, Naiboğlu B, Karaca ÇT, Külekçi S, Toros SZ, Oysu Ç. Role of nasal packing in surgical outcome for chronic rhinosinusitis with polyposis. Laryngoscope. 2014 Jul;124(7):1529-35.





- #4: My nose will be packed and taking out the packing is painful

Evaluation of Packing Morbidities Scores.

Packing Removal Scores, n = 56	Minimum	Maximum	Median
Bleeding (biodegradable)	0	1	0
Bleeding (nondegradable)	0	2	1
Pain (biodegradable)	0	4	2
Pain (nondegradable)	1	10	4
Blockage (biodegradable)	2	7	3
Blockage (nondegradable)	1	8	4
Facial edema (biodegradable)	0	3	2
Facial edema (nondegradable)	0	3	2



Verim A, Seneldir L, Naiboğlu B, Karaca ÇT, Külekçi S, Toros SZ, Oysu Ç. Role of nasal packing in surgical outcome for chronic rhinosinusitis with polyposis. Laryngoscope. 2014 Jul;124(7):1529-35.



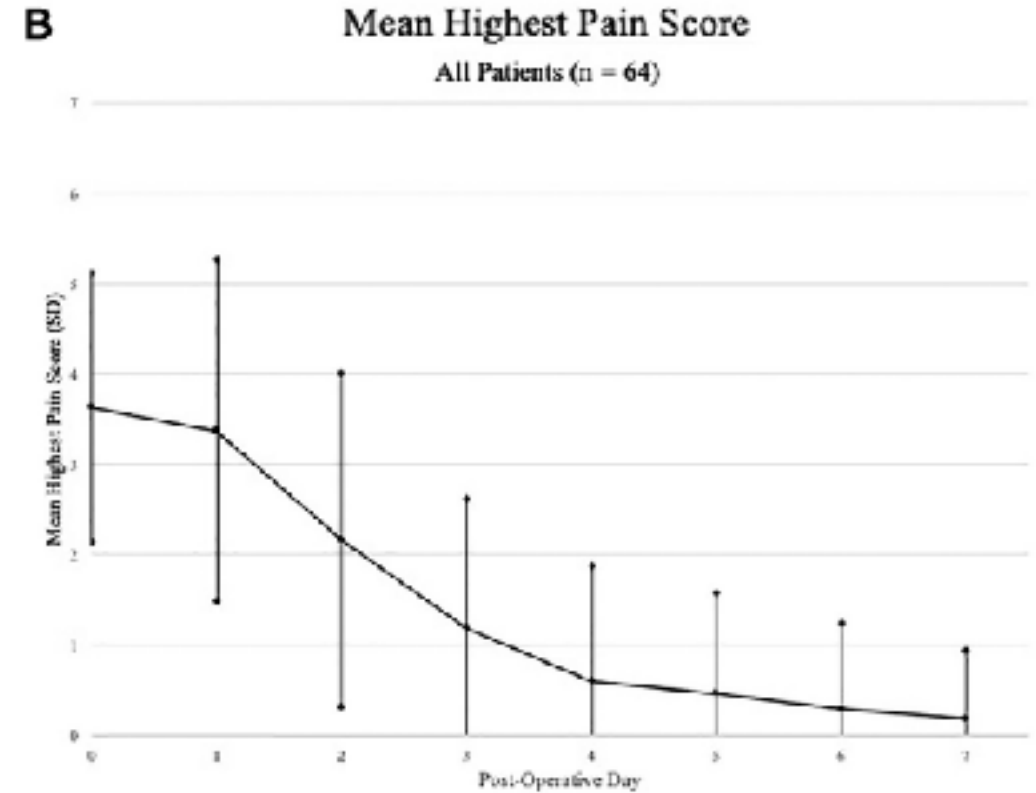
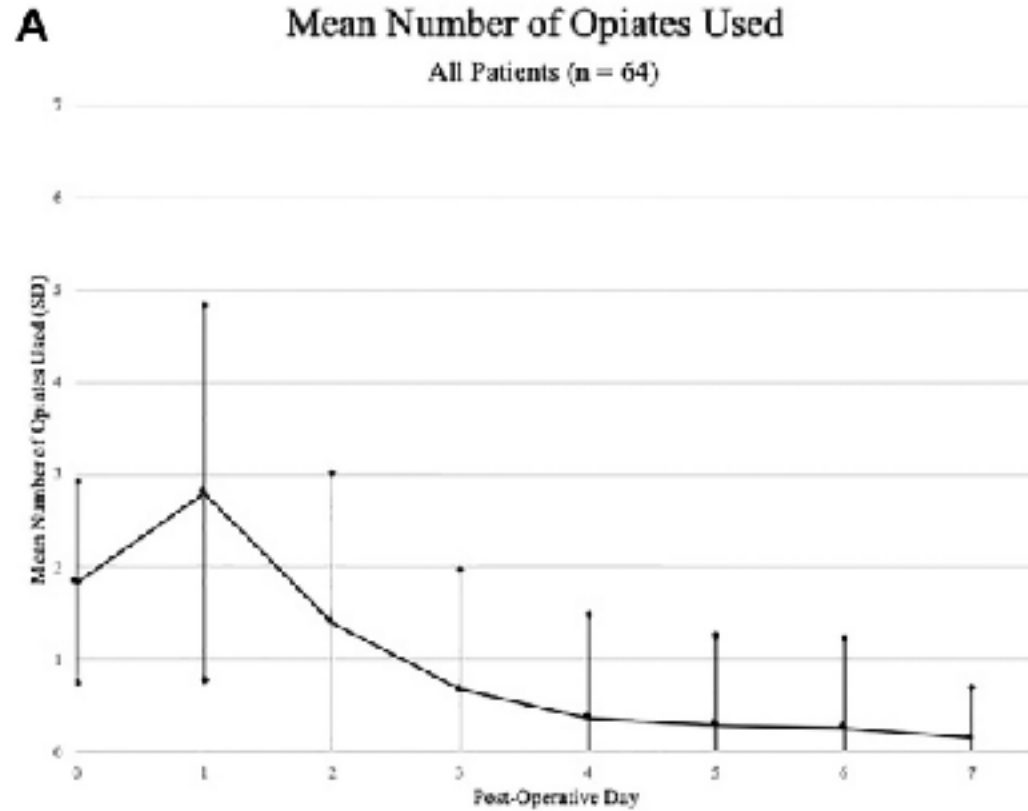
- #5: It will take a long time to recover
- Correlation between average cumulative pain and opioid use.
- Prospective study of postoperative opiate utilization in 64 adult pts undergoing FESS.
- Mean narcotic use over the 7-day postop period was 8 pills.
- <30% of pts required narcotics by POD # 3
- No association between stent/spacer placement and high narcotic use



Ndon S, Spock T, Torabi SJ, Manes RP. Patterns in Pain and Opiate Use after Endoscopic Sinus Surgery. Otolaryngol Head Neck Surg. 2020 Jun;162(6):969-978.



- #5: It will take a long time to recover



Likewise, this trend is roughly mirrored by pain scores

Ndon S, Spock T, Torabi SJ, Manes RP. Patterns in Pain and Opiate Use after Endoscopic Sinus Surgery. Otolaryngol Head Neck Surg. 2020 Jun;162(6):969-978.



# Pain Intensity on the First Day after Surgery

## *A Prospective Cohort Study Comparing 179 Surgical Procedures*

- #1 Open reduction calcaneous fracture
- #24 Tonsillectomy
- #122 Septoplasty
- #148 Paranasal sinus surgery



Gerbershagen HJ, et al. Pain intensity on the first day after surgery: a prospective cohort study comparing 179 surgical procedures. *Anesthesiology*. 2013;118(4):934-44.



- #5: It will take a long time to recover
  - Risk factors for postop pain:
    - More complex sinus surgery
    - Pts undergoing concurrent septoplasty
    - Active smokers
    - Migraines
    - Packing: mixed results
  - Revision status for ESS is not associated with greater postoperative pain.



Sethi RKV, Miller AL, Bartholomew RA, et al. Opioid prescription patterns and use among patients undergoing endoscopic sinus surgery. *Laryngoscope*. 2019;129(5):1046-1052.



- #6: Sinus surgery doesn't usually work

- Outcomes:

- Meeting pt expectations
- Symptom based outcome scores (PROMs)
- Objective data: endoscopy/ CT scores
- Revision surgery rates



Krings JG, Kallogjeri D, Wineland A, Nepple KG, Piccirillo JF, Getz AE. Complications of primary and revision functional endoscopic sinus surgery for chronic rhinosinusitis. *Laryngoscope*. 2014 Apr;124(4):838-45.



- #6: Sinus surgery doesn't usually work
  - Patient expectations:
    - Smith et al reported that ~ 60% of pts found that their postoperative improvement in sxs matched their expectations.
    - 88% would recommend surgery
    - PROMs were high (>75%)



Smith TL, Schlosser RJ, Mace JC, et al. Long-term outcomes of endoscopic sinus surgery in the management of adult chronic rhinosinusitis. *Int Forum Allergy Rhinol.* 2019;9(8):831-841.



- #6: Sinus surgery doesn't usually work

- Many patients erroneously believed that they would require no further medical treatment.

Do you expect this surgery to cure you of ever having a sinus infection again?	
Yes	30.0 (9)
No	50.0 (15)
Don't know	20.0 (6)



Neubauer PD, Tabae A, Schwam ZG, Francis FK, Manes RP. Patient knowledge and expectations in endoscopic sinus surgery. *Int Forum Allergy Rhinol.* 2016;6(9):921-5.





- Sinonasal outcome test (SNOT 22):
  - Self-administered multiple-choice 22-item test
  - Scored with a single summary score (score range = 0-110).
  - Lower total scores on the SNOT-22 suggest better QOL
  - Pts with no sinus disease resulted in scores with a mean of ~9.

1. Considering how severe the problem is when you experience it and how frequently it happens, please rate each item below on how "bad" it is by circling the number that corresponds with how you feel using this scale: →

	No problem	Very mild problem	Mild or slight problem	Moderate Problem	Severe Problem	Problem as bad as it can be	3 Most Important Items
1. Need to blow nose	0	1	2	3	4	5	○
2. Sneezing	0	1	2	3	4	5	○
3. Runny nose	0	1	2	3	4	5	○
4. Cough	0	1	2	3	4	5	○
5. Post-nasal discharge	0	1	2	3	4	5	○
6. Thick nasal discharge	0	1	2	3	4	5	○
7. Ear fullness	0	1	2	3	4	5	○
8. Dizziness	0	1	2	3	4	5	○
9. Ear pain	0	1	2	3	4	5	○
10. Facial pain/pressure	0	1	2	3	4	5	○
11. Difficulty falling asleep	0	1	2	3	4	5	○
12. Wake up at night	0	1	2	3	4	5	○
13. Lack of a good night's sleep	0	1	2	3	4	5	○
14. Wake up tired	0	1	2	3	4	5	○
15. Fatigue	0	1	2	3	4	5	○
16. Reduced productivity	0	1	2	3	4	5	○
17. Reduced concentration	0	1	2	3	4	5	○
18. Frustrated/restless/irritable	0	1	2	3	4	5	○
19. Sad	0	1	2	3	4	5	○
20. Embarrassed	0	1	2	3	4	5	○
21. Nasal blockage	0	1	2	3	4	5	○
22. Loss of sense of taste and smell	0	1	2	3	4	5	○

Please mark the most important items affecting your health (max. of 3 items) ↑



DeConde AS, et al. SNOT-22 quality of life domains differentially predict treatment modality selection in chronic rhinosinusitis. *Int Forum Allergy Rhinol.* 2014;4(12):972-9.



- #6: Sinus surgery doesn't usually work
  - Change in mean SNOT-22 across all studies was 24.4.
  - An average improvement in the total symptom score (reduction in SNOT-22 composite score) of 51%.
  - Studies with higher mean preoperative SNOT-22 score were associated with greater changes in SNOT-22 score after ESS.



Soler, Z.M., et al (2018), Sino-Nasal outcome test-22 outcomes after sinus surgery: A systematic review and meta-analysis. *The Laryngoscope*, 128: 581-592.

Kennedy JL, et al. Sino-nasal outcome test (SNOT-22): a predictor of postsurgical improvement in patients with chronic sinusitis. *Ann Allergy Asthma Immunol.* 2013;111(4):246-251.



1. Need to blow nose
2. Nasal obstruction (blockage)
3. Sneezing
4. Runny nose
5. Cough
6. Post-nasal discharge
7. Thick nasal discharge
8. Ear fullness
9. Dizziness
10. Ear pain
11. Facial pain/pressure
12. Decreased sense of smell or taste

13. Difficulty falling asleep
14. Wake up at night
15. Lack of a good night's sleep
16. Wake up tired
17. Fatigue
18. Reduced productivity
19. Reduced concentration
20. Frustrated/restless/irritable
21. Sad
22. Embarrassed

- Domains
  - Rhinologic
  - Extranasal rhinologic
  - Ear/ facial
  - Psychosocial dysfunction
  - Sleep dysfunction



# • #6: Sinus surgery doesn't usually work

- Surgical and medical tx modalities result in improvement across all domains, but subjects electing surgical interventions experience greater relative improvement
  - The greatest gains after ESS are in the physical sx domains and smallest in the health-related QOL domains
- Domains
    - Rhinologic
    - Extranasal rhinologic
    - Ear/ facial
    - Psychosocial dysfunction
    - Sleep dysfunction



DeConde AS, Mace JC, Bodner T, et al. SNOT-22 quality of life domains differentially predict treatment modality selection in chronic rhinosinusitis. *Int Forum Allergy Rhinol.* 2014;4(12):972-9.



# • #6: Sinus surgery doesn't usually work

- 20%-25% of pts with CRS have a comorbid dx of depression or anxiety.
- Post ESS, the mean total psychological domain score improved by 40%

Psychological symptoms
"Waking up tired"
"Fatigue"
"Reduced productivity"
"Reduced concentration"
"Frustrated/restless/irritable"
"Sad"
"Embarrassed"



Levy JM, et al. Improvements in psychological dysfunction after endoscopic sinus surgery for patients with chronic rhinosinusitis. *Int Forum Allergy Rhinol.* 2016;6(9):906-13.



# • #6: Sinus surgery doesn't usually work

- ESS improves:
  - QOL (Sinus specific, sleep, psychological)
  - Olfaction
  - Asthma control (improve sxs/ reduce the risk of new onset)
  - Use of systemic therapies (reduced need for Abx/ Oral steroids)
  - Productivity/ absenteeism



Alanin, M.C., Hopkins, C. Effect of Functional Endoscopic Sinus Surgery on Outcomes in Chronic Rhinosinusitis. *Curr Allergy Asthma Rep* 20, 27 (2020).



- #6: Sinus surgery doesn't usually work
- Based on available data, the revision rate is ~15–20% after five to ten years of follow-up.
  - Alanin et al reported an overall revision rate of 18.6%; FU was 7.4 years
  - Smith et al reported on 29,934 patients from a Utah database; the overall revision rate was 15.9% after 9.7 years



Alanin, M.C., et al. Effect of Functional Endoscopic Sinus Surgery on Outcomes in Chronic Rhinosinusitis. *Curr Allergy Asthma Rep* 20, 27 (2020).

Smith TL, et al. Long-term outcomes of endoscopic sinus surgery in the management of adult chronic rhinosinusitis. *Int Forum Allergy Rhinol.* 2019;9(8):831-841.



- #6: Sinus surgery doesn't usually work

- Corollary: "If I have polyps, the surgery will need to be repeated"

- 45 studies with 34,220 pts with CRSwNP

- Revision rate of 18.6%

- Average follow-up of 7.4 years

- Factors:

- Type of CRSwNP

- AFS (29%)

- AERD (27%)

- Comorbid asthma (23% vs 8%)



Loftus CA, Soler ZM, Koochakzadeh S, et al. Revision surgery rates in chronic rhinosinusitis with nasal polyps: meta-analysis of risk factors. *Int Forum Allergy Rhinol.* 2020;10(2):199-207.





- #6: Sinus surgery doesn't usually work

- Postoperative Care:
  - Saline irrigations help to flush out / remove loose crusts.
  - Topical medical tx reduces repeat surgery, improves postoperative sxs and endoscopic findings.



Levine CG, Casiano RR. Revision Functional Endoscopic Sinus Surgery. *Otolaryngol Clin North Am.* 2017;50(1):143-164.



# • #6: Sinus surgery doesn't usually work

**The New York Times**

## ***Doctors Rethinking Treatments for Sick Sinuses***

**By Gabrielle Glaser**

Dec. 17, 2002

The introduction of fiber optic surgery, involving tiny scopes with cameras attached to a monitor, has become common, giving doctors access to the cramped, convoluted sinus passageways. Before the new technique was developed, doctors cut through the roof of the mouth or made incisions in the eyebrows to clear away scarred tissue or polyps.

Many physicians said they thought the new tools could help cure the disease. But now, as many of those who have had the procedure return to their doctors' offices sick once again, the early hopes for surgery have been dashed. Researchers are shifting their focus to inflammation and the immune system.



<https://www.nytimes.com/2002/12/17/health/doctors-rethinking-treatments-for-sick-sinuses.html>



# • #6: Sinus surgery doesn't usually work

- Surgical treatment has improved over time
  - Prior to/ after 2008 (23% vs 17%)
- Endoscopic techniques have evolved surgical
- Instrumentation has become more advanced
- Adjuvant medical therapies have also become more effective
  - Introduction of topical steroid rinses in 2007- 2008
  - Drug-eluting stents
  - Biologics (omalizumab, dupilumab, mepolizumab)



Loftus CA, Soler ZM, Koochakzadeh S, et al. Revision surgery rates in chronic rhinosinusitis with nasal polyps: meta-analysis of risk factors. *Int Forum Allergy Rhinol.* 2020;10(2):199-207.



# • Summary

Patients have preconceived opinions of sinus surgery that are often false.

Multiple surgical options are available to patients.

Complications are rare but possible with endoscopic sinus surgery.

Innovations in nasal packing, surgical techniques and instrumentation have been introduced over the last 3 decades leading to easier recovery and improved surgical outcomes.



# Obstructive Sleep Apnea

Jordan S. Weiner, M.D.



- **Acknowledgment:** This CME event is not supported by any commercial entity.
- **Disclosure:** Jordan Weiner, MD discloses that he is a consultant with Inspire Medical Systems. All other speakers and all members of the planning committee have no relevant financial relationships with a commercial interest to disclose.
- **Accreditation Statement:** This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Arizona Medical Association (ArMA) through the joint providership of HonorHealth and Valley ENT. HonorHealth is accredited by ArMA to provide continuing medical education for physicians.
- **Credit Statement:** HonorHealth designates this live activity for a maximum of 4 *AMA PRA Category 1 Credits*<sup>™</sup>. Physicians should only claim credit commensurate with the extent of their participation in the activity.



# Learning objectives

- Identify the prevalence, pathophysiology and risk factors for OSA
- Discuss the sequelae of untreated OSA
- Review the various treatment options



# Prevalence

- Wisconsin Sleep Cohort Study determined the prevalence of OSA in the general population first in the early 1990s and again in the late 2000s.
- 1522 randomly selected adults aged 30-70
- Overall prevalence of OSA of 26%
- Prevalence of **moderate to severe OSA** (AHI > 15) is 10%
  - 13% of men
  - 6% of women
- Estimated at least 75% of severe OSA remain *undiagnosed*

Increased Prevalence of Sleep-Disordered Breathing in Adults: Paul E. Peppard\*, Terry Young, Jodi H. Barnet, Mari Palta, Erika W. Hagen, and Khin Mae Hla. Am J Epidemiol. 2013;177(9):1006–1014





# Pathophysiology

- The pharynx functions for both breathing and swallowing
  - During swallowing, the walls squeeze together.
  - This need precludes any fixed structural support akin to trachea
- During apnea, these soft walls collapse obstructing airflow
  - Anterior posterior collapse
  - Lateral wall collapse
  - Multiple potential levels often in combination
- Reduced pharyngeal cross-sectional area on CT and MRI
- During *wakefulness*, patients with OSA compensate with protective reflexes to increase upper airway dilator muscle activity
  - genioglossus muscle (largest airway dilator muscle) has increased daytime activity in patients with OSA
  - decreased activity after sleep onset reducing this compensation

# Risk factors

## STOP-BANG questionnaire

- Snoring (loud)
- Tired (and sleepy)
- Observed apnea/choking episodes
- Pressure (hypertension)
- BMI > 35 kg/m<sup>2</sup>
- Age > 50
- Neck size > 16cm
- Gender male



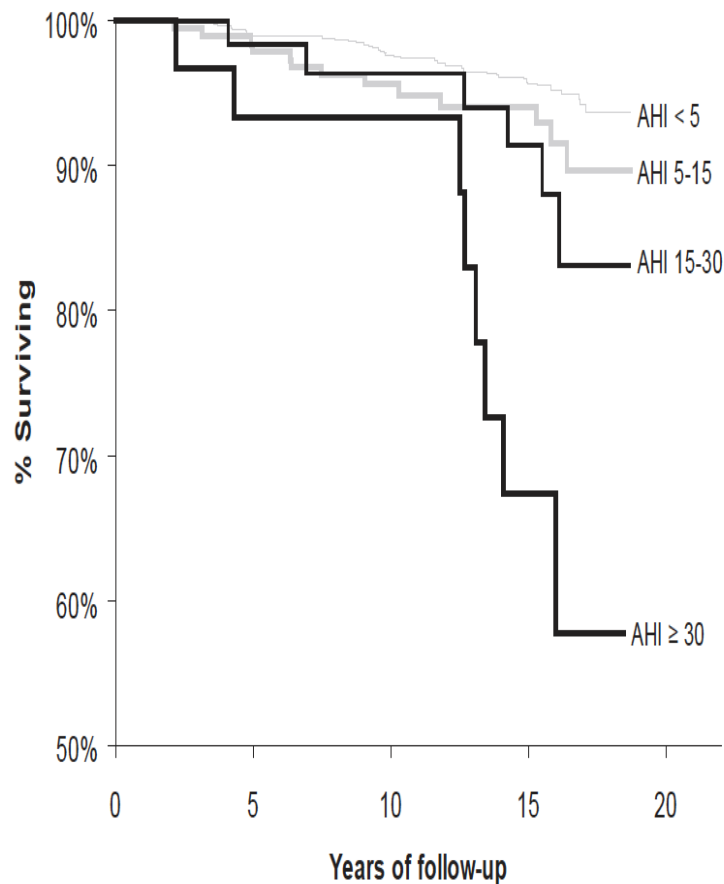
# Symptoms

- Snoring
- Choking at night
- Insomnia
- Nocturia
- Witnessed apnea
- Memory loss
- Depression/irritability
- Decreased libido

Obstructive sleep apnoea syndrome and its management: Spicuzza, Caruso and Di Maria.  
Ther Adv Chronic Dis. 2015 Sep;6(5): 273-285



# Morbidity and Mortality



- Study performed to estimate the all-cause mortality as well as cardiovascular and cerebrovascular mortality of OSA with and without CPAP
- Followed for about 14 years
- Adjusted hazard ratio for *all-cause death* (adjusted for age, age, sex, and body mass index) was about 1.4 for mild, 1.7 for moderate and 3.8 for severe OSA without CPAP
- For *cardiovascular mortality*: 1.3 for mild, 1.5 for moderate and 5.2 for severe OSA
- Average time to death for individuals with OSA was 11.8 years
- *Presence of excessive daytime sleepiness did not influence outcomes* and so treatment should not depend on presence of sleepiness

Sleep Disordered Breathing and Mortality: Eighteen-Year Follow-up of the Wisconsin Sleep Cohort: Young et. al. SLEEP 2008;31(8):1071-1078.



# OSA and Heart Disease

- Increased nocturnal and daytime *sympathetic nervous system* activity has been found in untreated patients with OSA
  - catecholamine surge with each apneic event which persists into daytime
  - leads to increased heart rate, cardiac output, peripheral vascular resistance, and increased renal tubular sodium resorption
  - all contribute to *hypertension*
- increased risk of stroke due to reduction in cerebral blood flow
- *Independent risk factor for ischemic heart disease as strong as obesity, smoking and hypertension*

# OSA and Cardiovascular Disease cont.

- Increased incidence of both **bradyarrhythmias** and **tachyarrhythmias**
- Pulmonary hypertension
- Increased effective afterload for LV due to decreased intrathoracic pressure
- Increased platelet activation and aggregation with reduced fibrinolytic activity
- Increased oxidative stress with accelerated CAD

# Therapy: PAP

- CPAP first introduced in 1983 as an alternative to tracheostomy
- CPAP (continuous positive airway pressure) uses a constant pressure determined during the titration portion of a PSG
- Higher intrapharyngeal air pressure functions as an air splint to prevent airway collapse



Image courtesy of Wikimedia Commons

Sullivan CE, Berthon-Jones M, Issa FG: Nocturnal nasal-airway pressure for sleep apnea. N Engl J Med. 1983 Jul 14;309(2):112



# Therapy: PAP variations

- Auto-PAP (APAP)
  - Varies pressure in a set range to eliminate apnea
  - Self-adjusting
- Bi-level PAP (BiPAP)
  - Two pressure settings- one for inhalation and a lower one for exhalation
  - Used when very high pressure (often intolerable) is required
- Adaptive Servo Ventilation (ASV)
  - Used for patients with central sleep apnea
  - Provides pressure-support during central apneas
  - Contraindicated with symptomatic congestive heart failure with decreased EF and moderate to severe central apnea





# Therapy: oral appliances

- Alternative to PAP
- Most common is a mandibular advancement device
- Most effective for mild OSA
  - Can be used in moderate to severe OSA if patient is PAP-intolerant
- Mean AHI reductions of 30-72%
- Overall success between 45-100% depending on study and treatment population
- Compliance varies between 29-83% (better than CPAP)



An update on mandibular advancement devices for the treatment of obstructive sleep apnoea syndrome. Basyuni S, Barabas M, and Quinell T. J Thorac Dis. 2018 Jan; 10(Suppl 1): S48-S56.

# Surgical therapy

- Must identify and target cause of obstruction
  - No “one size fits all”
  - Tonsils
    - Adenoid
    - Palatine
    - Lingual
  - Palate: uvulopalatopharyngoplasty
  - Lateral pharyngeal walls: expansion pharyngoplasty



# Therapy: Uvulopalatopharyngoplasty

- Consists of resection of distal soft palate and uvula
- Several modifications introduced to reshape pharyngeal inlet
- Best results with concomitant tonsillectomy
- Best results with larger tonsils, thinner patients and smaller tongue size/lower tongue position

Long-term Efficacy of  
Uvulopalatopharyngoplasty among  
Adult Patients with Obstructive Sleep  
Apnea: A Systematic Review and Meta-  
analysis. Mu He, Guoping Yin, Siyan  
Zhan, Jinkun Xu, Xin Cao, Jingjing Li, and



# Hypoglossal Nerve Stimulation

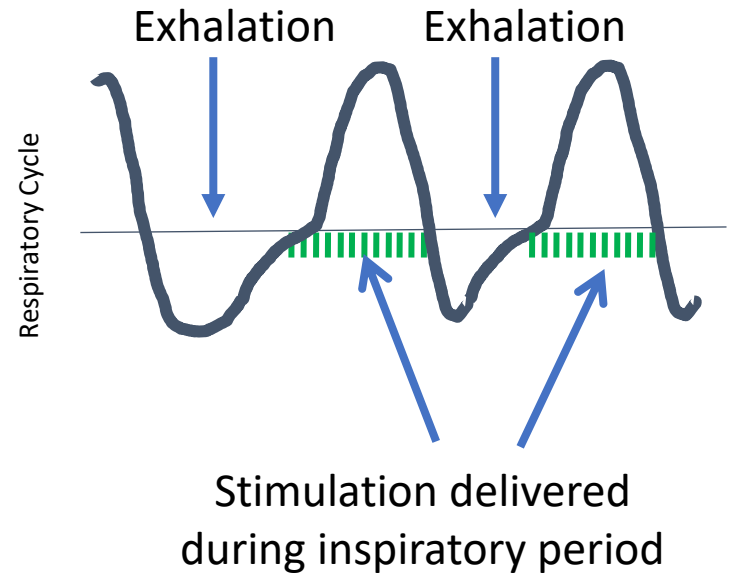
- Approved by FDA in 2014
- Involves placement of an electrode on the hypoglossal nerve and a pressure sensor in the chest wall musculature
- **When inspiration detected, an electrical impulse is sent to the hypoglossal nerve causing the tongue to move forward**
- This forward movement also pulls the soft palate and epiglottis anteriorly opening the entire upper airway

# Stimulation Timed With Breathing

Rhythmic, Preventative Stimulation When Airway is Most Vulnerable to Collapse



Breathing sensor placed in between intercostal muscle layers



# Hypoglossal Nerve Stimulation Effect

## No Stimulation



Base of Tongue



Palate



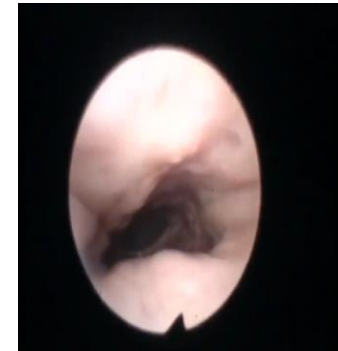
## Mild Stimulation



Base of Tongue



Palate



# HGS: Long-term results

- ADHERE registry (Adherence and Outcome of Upper Airway Stimulation for OSA International Registry) designed as a multi center study to report data from the largest cohort of patients published in 2018
- 301 patients from 10 centers
- Mean AHI decreased from 36 to 10 (median decreased from 33 to 6)
- Absolute AHI reduction was -25 (71% decrease)
- Success (AHI reduced by at least 50% to <20) in 78% with AHI <5, 10 and 15 in 48%, 67% and 81% of patients
- Average home use of 6.5 hours/night
- 90% of patients reported a better experience than CPAP, 96% would do it again and overall satisfaction of 92%
- 3% complication rate (all minor and transient)
- 1 device failure (dislodged stimulation cuff)

# Current Implant Criteria

- Moderate to severe obstructive sleep apnea with an AHI between 15 and 65
- BMI < 35
- Age > 18
- Intolerant or non-compliant with CPAP
- Sleep study within 2 years
- Central apneas < 25% of total apneas
- No evidence of complete concentric collapse of airway at level of soft palate on sleep endoscopy





# Future developments

- Better phenotyping of patients to optimize patient selection
- Other hypoglossal nerve stimulators in development
  - Genio by Nyxoah
  - aura6000 by LivaNova
- Ansa cervicalis nerve stimulation to stimulate the sternohyoid muscle
  - Tenses lateral pharyngeal walls
  - May prove better for lateral wall collapse





Photo by Snapwire from Pexels



# Update on Cutaneous Cancers of the Head & Neck

Timothy A. Kelsch MD



**Acknowledgment:** This CME event is not supported by any commercial entity.

**Disclosure:** Timothy A. Kelsch, MD and all members of the planning committee have no relevant financial relationships with a commercial interest to disclose.

**Accreditation Statement:** This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Arizona Medical Association (ArMA) through the joint providership of HonorHealth and Valley ENT. HonorHealth is accredited by ArMA to provide continuing medical education for physicians.

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# Objectives

- Explain the differential diagnosis of cutaneous cancers of the head and Neck
- Recognize the current treatment recommendations for invasive malignant melanoma
- Review the roles of surgery in skin cancer
- Discuss adjuvant therapies for skin cancer including radiation and systemic therapy



# Epidemiology

- Skin cancer is the most commonly diagnosed malignancy in US
- 3.5 million patients diagnosed with non-melanoma skin cancer each year
- Approximately 100,000 patients expected to develop invasive melanoma in 2021
- 1 in 5 Americans develop skin cancer by age 70
- Annual cost of approx. \$8 billion annually for treating skin cancer



# Risk factors

- UVA & UVB rays
- Lighter skin color that burns easily
- Blue/green eyes, Blond/red hair
- Large number of moles
- Greater than 5 sunburns
- Age
- Indoor tanning
- Immunosuppression
- Family hx of skin cancer
- Personal hx of skin cancer



# Indoor Tanning

- UV tanning devices classified as by WHO as Group 1 carcinogen to humans
- 18 states prohibit indoor tanning <18 y/o
- 420,000 skin ca cases per year attributed to tanning





# Differential

- Basal cell carcinoma
- Squamous cell carcinoma
- Malignant melanoma
- Merkel cell carcinoma
- Cutaneous sarcomas
- Sebaceous carcinoma
- Cutaneous T-cell lymphoma
- Metastasis



# Basal cell carcinoma

- Most common cutaneous malignancy
- Raised lesion with rolled borders
- Pearly white with telangiectasias
- Or Reddish poorly healing scar like area that is shiny
- Treated with surgery
- 2 million patients per year in US
- Radiation for poor surgical candidate or high risk region (medial canthus, eyelid)



# Basal cell carcinoma

- Types

1. Superficial
2. Morpheaform
3. Nodular
4. Infiltrative
5. Fibroepithelioma

- 80% occurs in Head and Neck
- Mohs' micrographic surgery for H-Zone and aggressive type
- Lymph nodes not typically involved
- Systemic therapy for sonic hedgehog pathway – Erivedge – for inoperable, recurrent, failed XRT or large size



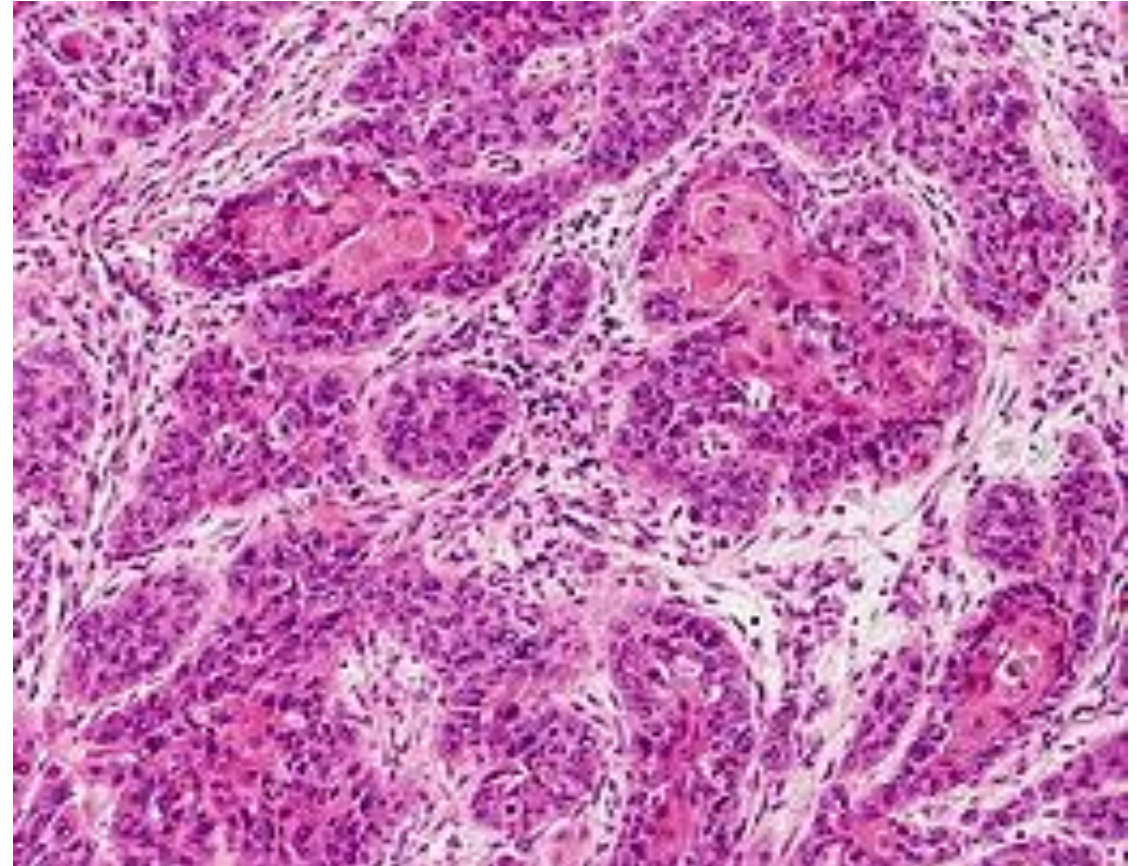
# Bilobed Advancement Flap – Basal cell CA





# Squamous cell carcinoma

- 2<sup>nd</sup> most common
- Hyperkeratotic patch or scaly lesion with ulcerated base
- Often start as Actinic Keratosis
- Variants Bowen's disease and Keratoacanthoma
- Histology – Keratinocyte invasion with keratin pearls, pleomorphism and nuclear atypia



# Squamous cell carcinoma

- 97% are a malignant progression of Actinic Keratosis
- p53 mutation
- Treated with surgery
- Mohs' micrographic surgery for H-zone
- Radiation for poor surgical candidate or poor cosmetic region (medial canthus/eyelid)



# Squamous cell carcinoma

## Lymphatic evaluation:

- Clinical exam
- Imaging
- Sentinel lymph node biopsy
- 5000-12,000 patients develop regional metastasis per year
- Leads to 4,000 to 8,000 deaths per year

## SLNB indication:

- >2cm size
- Fatty invasion
- Perineural invasion
- Aggressive features: spindle, sarcomatoid, basaloid
- Immunocompromised
- Lymphovascular invasion





# Squamous cell carcinoma nose – full thickness

- 59 y/o male
- Rapid growing right nasal lesion over 3 months
- Biopsy c/w well differentiated squamous cell carcinoma
- Resected Mohs' micrographic surgery
- Two stage repair







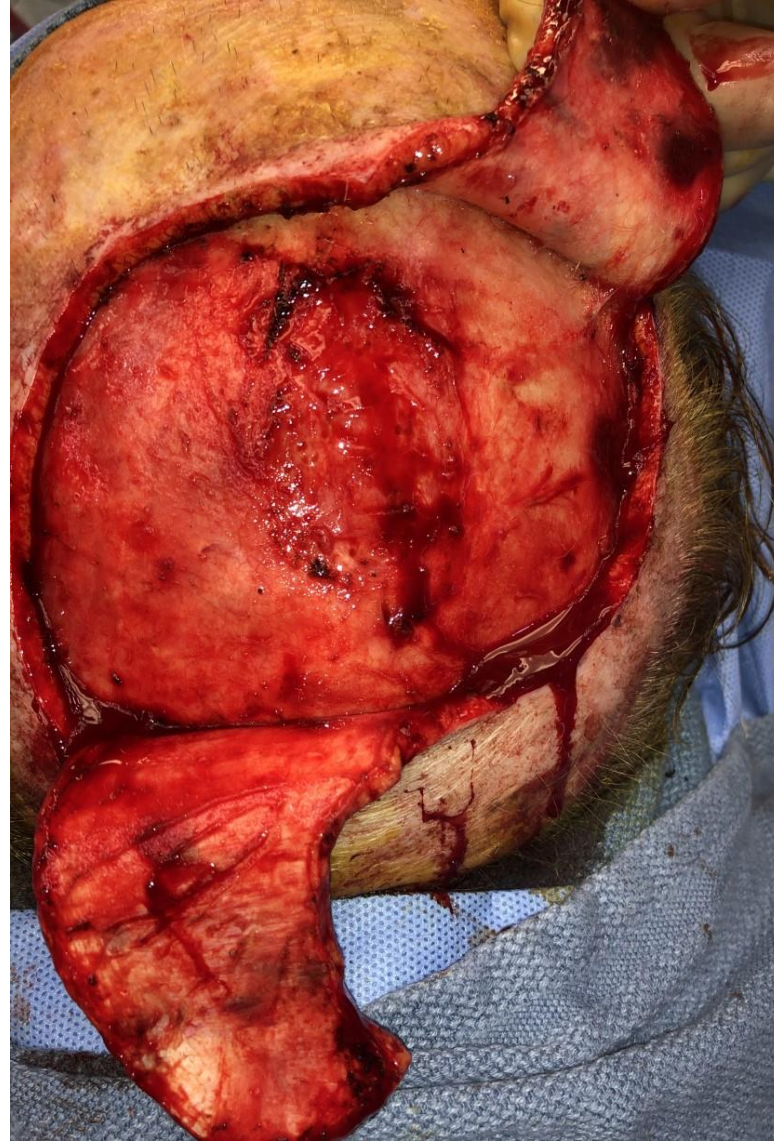




# Squamous Cell Carcinoma Scalp

- 80 y/o male with extensive actinic keratosis of scalp
- Growing slowly over several months began to bleed
- Biopsy noted moderately differentiated SCCA
- Approximately 3.5cm diameter.
- Resected with Mohs' Micrographic surgery
- Bipedicle rotation flap reconstruction





# Squamous cell carcinoma helix





# Bipedicled helical flap



# Lip involvement

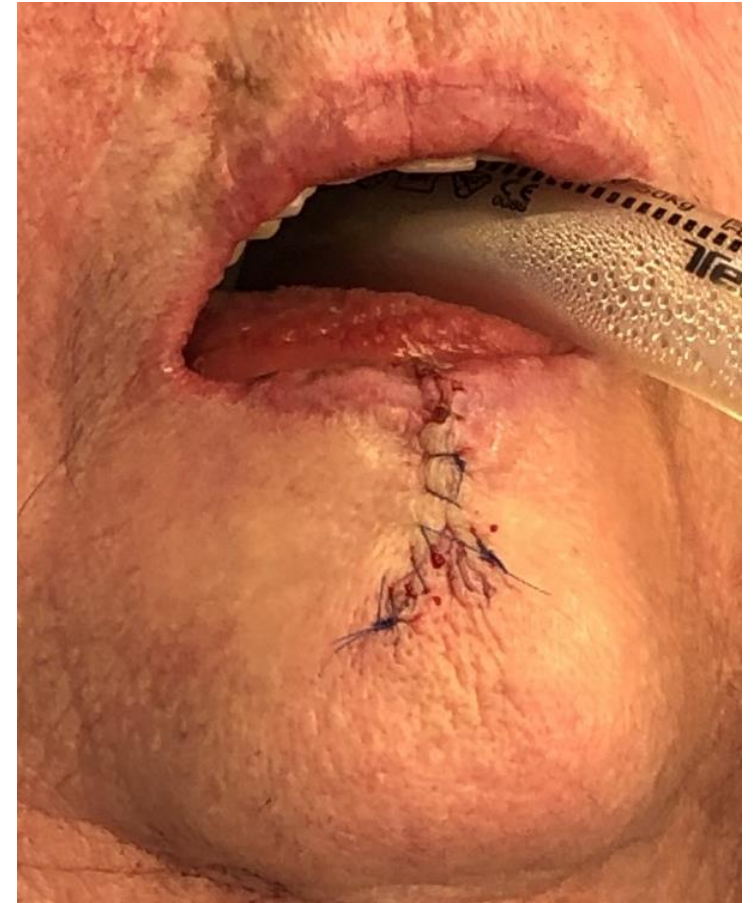
- Vermillion border junction of keratinizing and non keratinizing epidermis
- Upper lip typically Basal cell carcinoma
- Lower lip typically Squamous cell carcinoma
- Treated with surgery
- Worry about oral competence

## Squamous cell carcinoma of lip

- Lymph node concern
- 11-12% incidence of metastasis
- Consider sentinel lymph node with more than 3mm depth invasion (varies with study)



# Lip - SCCA



# Lip Switch – Basal cell CA



# Malignant Melanoma

- ~100,000 cases invasive melanoma this year - US
- Increased incidence 4-5% per year
- Estimated 7,000 deaths - US
- 5 year survival 93%
- ABCD – Asymmetry, border irregularity, color variation, diameter, evolution



# Malignant melanoma

- Superficial spreading
- Lentigo Maligna Melanoma
- Nodular
- Desmoplastic
- Acral lentiginous
- Mucosal

## Definitions

### Primary Tumor (T)

- TX** Primary tumor cannot be assessed (for example, curettaged or severely regressed melanoma)
- T0** No evidence of primary tumor
- Tis** Melanoma in situ
- T1** Melanomas 1.0 mm or less in thickness
- T2** Melanomas 1.1 - 2.0 mm
- T3** Melanomas 2.1 - 4.0 mm
- T4** Melanomas more than 4.0 mm

**NOTE:** a and b subcategories of T are assigned based on ulceration and thickness as shown below:

T CLASSIFICATION	THICKNESS (mm)	ULCERATION STATUS
<b>T1</b>	≤1.0	a: Breslow < 0.8 mm w/o ulceration b: Breslow 0.8-1.0 mm w/o ulceration or ≤ 1.0 mm w/ ulceration.
<b>T2</b>	1.1-2.0	a: w/o ulceration b: w/ ulceration
<b>T3</b>	2.1-4.0	a: w/o ulceration b: w/ ulceration
<b>T4</b>	>4.0	a: w/o ulceration b: w/ ulceration

### Regional Lymph Nodes (N)

- NX** Patients in whom the regional nodes cannot be assessed (for example previously removed for another reason)
- N0** No regional metastases detected
- N1-3** Regional metastases based on the number of metastatic nodes, number of palpable metastatic nodes on clinical exam, and presence or absence of MSI<sup>2</sup>

**NOTE:** N1-3 and a-c subcategories assigned as shown below:

N CLASSIFICATION	# NODES	CLINICAL DETECTABILITY/MSI STATUS
<b>N1</b>	0-1 node	a: clinically occult <sup>1</sup> , no MSI <sup>2</sup> b: clinically detected <sup>1</sup> , no MSI <sup>2</sup> c: 0 nodes, MSI present <sup>2</sup>
<b>N2</b>	1-3 nodes	a: 2-3 nodes clinically occult <sup>1</sup> , no MSI <sup>2</sup> b: 2-3 nodes clinically detected <sup>1</sup> , no MSI <sup>2</sup> c: 1 node clinical or occult <sup>1</sup> , MSI present <sup>2</sup>
<b>N3</b>	>1 nodes	a: >3 nodes, all clinically occult <sup>1</sup> , no MSI <sup>2</sup> b: >3 nodes, ≥1 clinically detected <sup>1</sup> or matted, no MSI <sup>2</sup> c: >1 nodes clinical or occult <sup>1</sup> , MSI present <sup>2</sup>

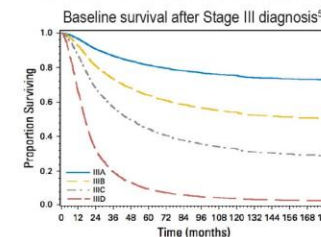
### Distant Metastasis (M)

- M0** No detectable evidence of distant metastases
- M1a** Metastases to skin, sub cutaneous, or distant lymph nodes
- M1b** Metastases to lung
- M1c** Metastases to all other visceral sites
- M1d** Metastases to brain

**NOTE:** Serum LDH is incorporated into the M category as shown below:

M CLASSIFICATION	SITE	Serum LDH
<b>M1a-d</b>	Skin/subcutaneous/nodule (a), lung (b) other visceral (c), brain (d)	Not assessed
<b>M1a-d(0)</b>	Skin/subcutaneous/nodule (a), lung (b) other visceral (c), brain (d)	Normal
<b>M1a-d(1)</b>	Skin/subcutaneous/nodule (a), lung (b) other visceral (c), brain (d)	Elevated

ANATOMIC STAGE/PROGNOSTIC GROUPS							
Clinical Staging <sup>3</sup>				Pathologic Staging <sup>4</sup>			
Stage 0	Tis	N0	M0	0	Tis	N0	M0
Stage IA	T1a	N0	M0	IA	T1a	N0	M0
Stage IB	T1b	..	..	IB	T1b	..	..
	T2a	..	..		T2a	..	..
Stage IIA	T2b	N0	M0	IIA	T2b	M0	M0
	T3a	..	..		T2a	..	..
Stage IIB	T3b	..	..	IIB	T3b	..	..
	T4a	..	..		T4a	..	..
Stage IIC	T4b	..	..	IIC	T4b	..	..
Stage III	Any T	≥N1	M0	IIIA	T1-2a	N1a	M0
	..	..	..		T1-2a	N2a	..
	..	..	..	IIB	T0	N1b-c	M0
	..	..	..		T1-2a	N1b-c	..
	..	..	..		T1-2a	N2b	..
	..	..	..		T2b-3a	N1a-2b	..
	..	..	..	IIC	T0	N2b-c	M0
	..	..	..		T0	N3b-c	..
	..	..	..		T1a-3a	N2c-3c	..
	..	..	..		T3b-4a	Any N	..
	..	..	..		T4b	N1a-2c	..
	..	..	..	IIID	T4b	N3a-c	M0
Stage IV	Any N	Any N	M1	IV	Any T	Any N	M1



Stage	Baseline	3y survivors
IIIA	81.4	83.1
IIIB	64.0	76.0
IIIC	44.5	66.7
IIID	9.8	40.6

## Notes

Notes are designated as 'clinically detectable' if they can be palpated on physical exam and are confirmed melanoma by pathology following excision/biopsy.  
MSI comprise any satellite, locally recurrent, or in transit lesions.  
Clinical staging includes microstaging of the primary melanoma and clinical/radiologic evaluation for metastases. By convention it should be used after complete excision of the primary melanoma with clinical assessment for regional and distant metastases.  
Pathologic staging includes microstaging of the primary melanoma and pathologic information about the regional lymph nodes after partial or complete lymphadenectomy.  
Pathologic Stage 0 and I patients are the exceptions; they do not necessarily require pathologic evaluation of their lymph nodes. Physicians should "discuss and consider" SLNB for patients with T1b Stage IA disease, physicians should "discuss and offer" SLNB for patients with Stage IB disease.  
From Haydu et al., Journal of Clinical Oncology, 2017.

# Treatment - Surgical

## Surgery

- Wide local excision 1-2 cm
- “Slow Mohs’ surgery”
- Excision of local regional disease

Limited role for radiation therapy

## Sentinel Lymph node biopsy

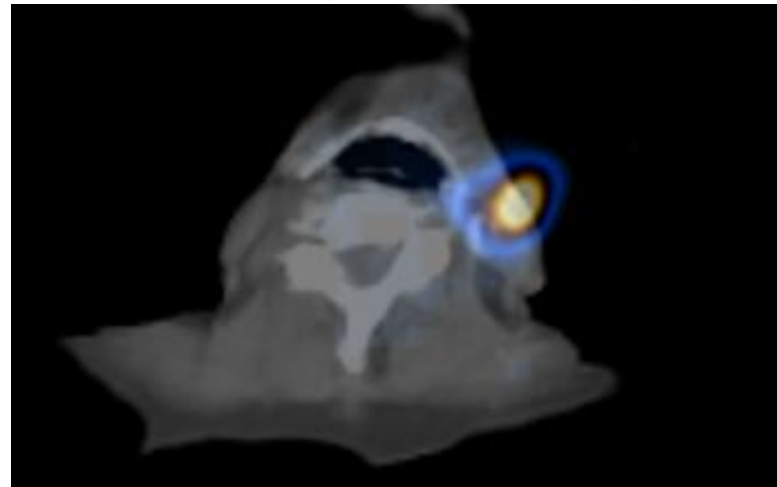
- T1b or greater
- >0.8mm thickness without ulceration <0.8mm with ulcer
- Indeterminate thickness (shave biopsy)
- Improved Disease free survival and improved accurate prognosis



## Lymphoscintigraphy for sentinel lymph node



- Technetium 99m Sulfur colloid
- 0.2ml using 25 gauge raising a wheal
- SPECT – CT in conjunction to localize lymph node
- Radioactive probe used intraoperatively to identify node





# Malignant Melanoma



# Treatment - Systemic

## Checkpoint inhibitors

- PD – programmed death receptors and CTLA receptors
- Stage 3 Nivolumab only
- Stage 4 Nivolumab and ipilimumab improved 5 year overall survival to 52%, overall 58% response
- Injection

1970's Dacarbazine only 10% response rate

## Targeted therapy

- BRAF and MEK inhibitors
- Send off genetic testing
- Stage 3 or 4
- Dabrafenib and Trametinib 5 year 34% survival
- Vemurafenib and Cobimetinib 68% response
- Pills daily
- More side effects



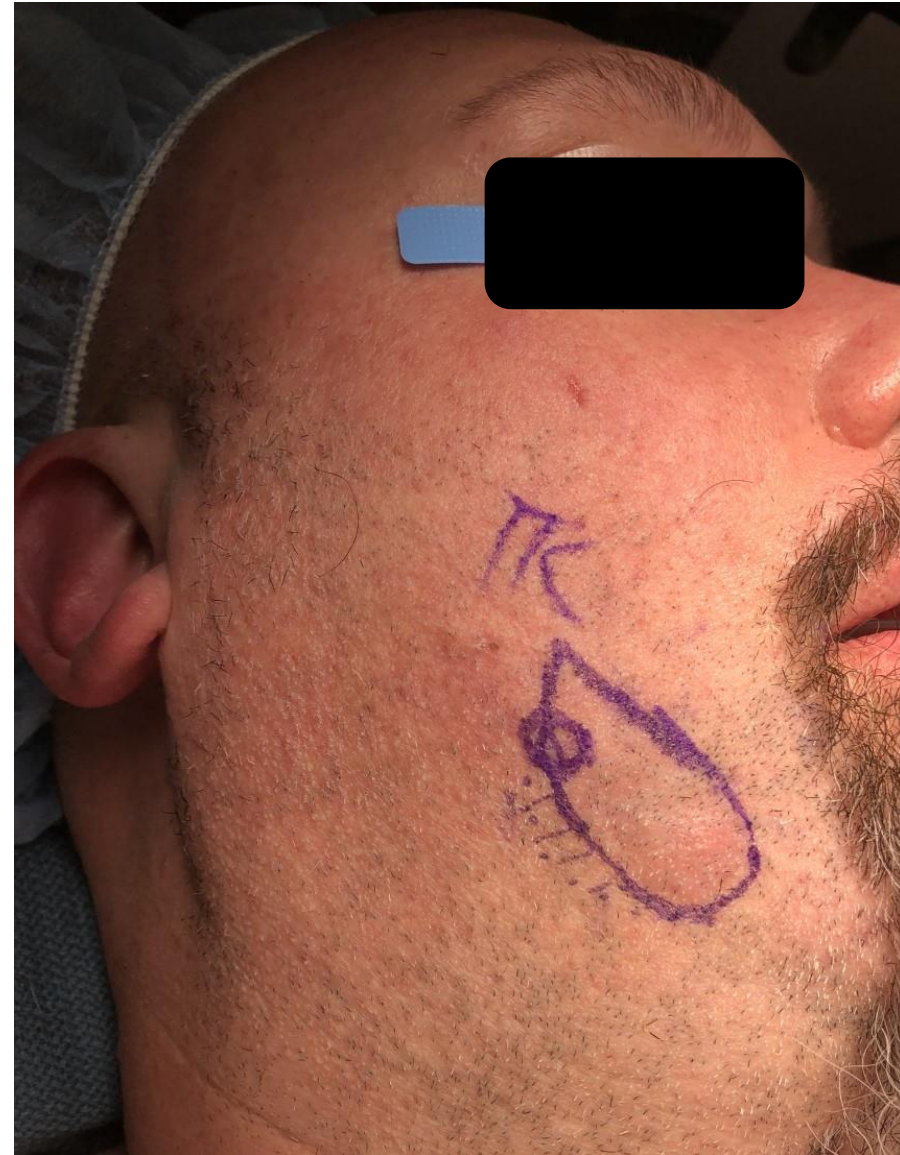
# Cutaneous Sarcomas

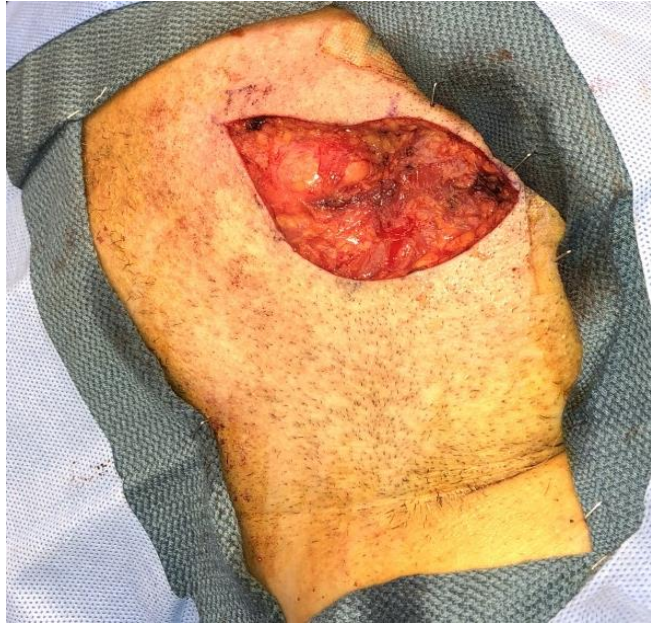
- Dermatofibrosarcoma  
Protuberans – DFSP
- Atypical Fibroxanthoma
- Pleomorphic Dermal Sarcoma
- Cutaneous leiomyosarcoma
- Angiosarcoma
- Kaposi Sarcoma
- Typically very wide margins 1-5cm
- Subcutaneous extension
- Treated with surgery
- Possible radiation therapy and systemic therapy postop.



# Dermatofibrosarcoma Protuberans

- 40 y/o male with right facial lesion for 10 years
- No skin changes, mostly palpable
- Observed by first physician as only benign 8 years prior
- Intraoperative frozen consistent with atypical and likely sarcoma
- Histology: Storiform spindle cells
- 2-4 cm margin
  
- May use radiation or imatinib in conjunction for advanced disease





# Atypical Fibroxanthoma - AFX

- Low grade sarcoma
- Elderly patients in sun exposed regions
- Variant of pleomorphic dermal sarcoma
- Surgical excision 1-2 cm margin
- Rare regional nodal disease



# Merkel cell carcinoma

- Rare aggressive neuroendocrine tumor
- Associated with Merkel cell polyoma virus
- Surgical excision
- Sentinel lymph node biopsy for all lesions greater than 1 cm and lymphovascular invasion
- Nodal dissection and radiation for positive nodal disease
- Nivolumab for Stage IIIb improves survival



# Merkel Cell Carcinoma

- 74 y/o male presented with rapidly growing lesion over several weeks
- Referred after local resection lead to rapid, extensive recurrence
- Wide resection, parotidectomy and neck dissection with pectoralis flap reconstruction
- Postop radiation therapy





# Conclusion

- Prevention best treatment – Shade and sunscreen with regular skin screening
- Avoid tanning – especially booths
- Squamous cell carcinoma has similar annual mortality to melanoma due to high prevalence
- Melanoma treatments have significantly improved survival for advanced disease
- Merkel cell is a rare but very aggressive neuroendocrine carcinoma of the skin



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Thank You!!



# Nasal Obstruction:

Why does it matter?  
What are the causes?  
What can be done?

Dan B. Hurley, MD



# Disclosures:

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**Disclosure:** Dan B. Hurley, MD and all members of the planning committee have no relevant financial relationships with a commercial interest to disclose.

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# Objectives

- Review the differential diagnosis for nasal obstruction
- Identify the areas of anatomic obstruction in the nose
- Describe the treatment options available to patients with nasal obstruction from a medical and a procedural standpoint



# Why Does It Matter?

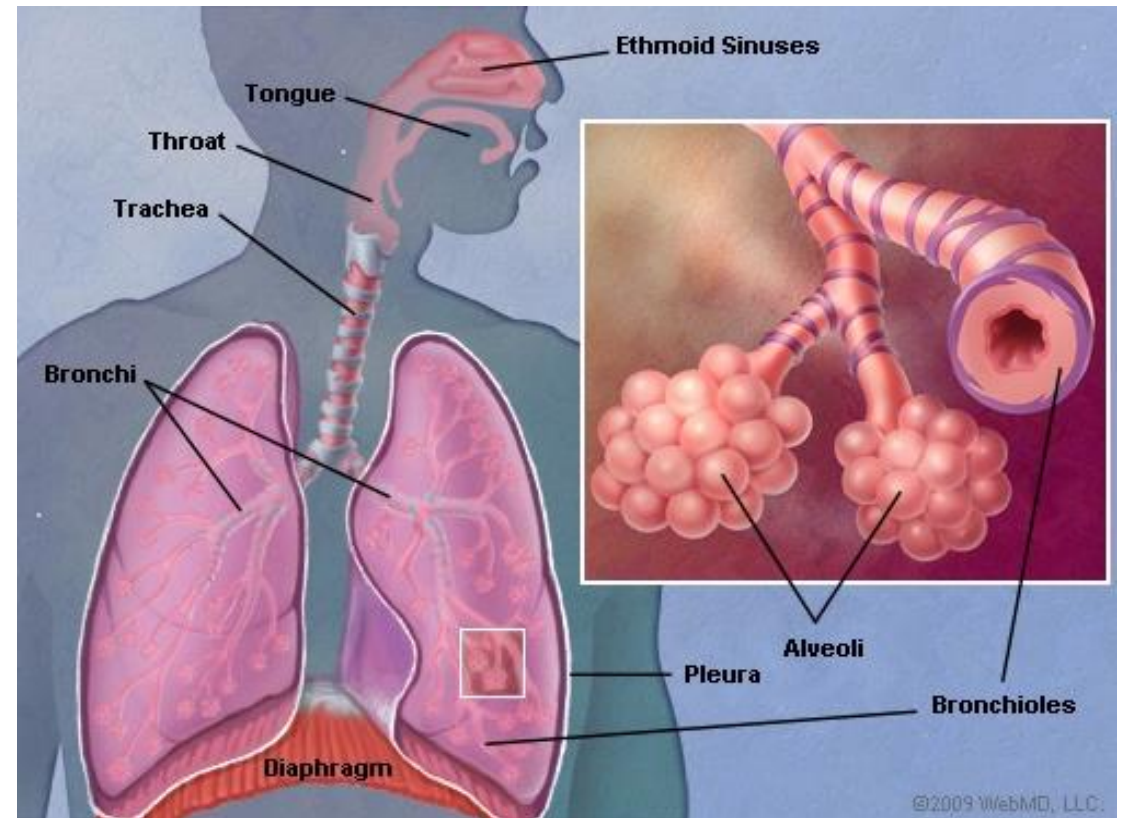
- Sinus/Pulmonary Health
- Quality of Life & Sleep Quality
- Dentition & Facial Development
- Exercise Physiology
- Obligate Nasal Breathers





# Nasal Airway & Sinus/Pulmonary Health

- The nasal airway is the filter and humidifier for the lower airway
- The nose and sinuses are the repository for nitric oxide
- Nasal breathing has been associated with diminished exercise induced bronchospasm



[Sumaiya~commonswiki](#) (talk | contribs)

# Nasal Airway & Sleep Quality



Carole Raddato from FRANKFURT, Germany, CC BY-SA 2.0  
<<https://creativecommons.org/licenses/by-sa/2.0/>>, via Wikimedia Commons

- Mouth-breathing results in a dry mouth and diminished sleep quality
- Improving the nasal airway can improve the acceptance or tolerance of cpap
- In some patients, nasal obstruction can affect the severity of snoring or sleep-disordered breathing but this can be more difficult to predict



# Nasal Airway & Facial Development

- Airway Stenosis common in chronic mouth breathing children
- High arched palate
- Mandible and Maxilla rotated back and down
- Evidence but not consensus on how much treating nasal airway obstruction in children may help facial and orthodontic development



[BMC Oral Health](#). 2021; 21: 108.

Published online 2021 Mar 10. doi: [10.1186/s12903-021-01458-7](https://doi.org/10.1186/s12903-021-01458-7)

PMCID: [PMC7944632](https://pubmed.ncbi.nlm.nih.gov/PMC7944632/)

PMID: [33691678](https://pubmed.ncbi.nlm.nih.gov/33691678/)

## Effects of mouth breathing on facial skeletal development in children: a systematic review and meta-analysis

[Ziyi Zhao](#),<sup>1,2,3</sup> [Leilei Zheng](#),<sup>1,2,3</sup> [Xiaoya Huang](#),<sup>1,2,3</sup> [Caiyu Li](#),<sup>1,2,3</sup> [Jing Liu](#),<sup>1,2,3</sup> and [Yun Hu](#)<sup>1,2,3</sup>

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[Meta-Analysis](#) > [Eur J Orthod](#). 2017 Oct 1;39(5):509–518. doi: [10.1093/ejo/cjx005](https://doi.org/10.1093/ejo/cjx005).

## Impact of adenotonsillectomy on the dentofacial development of obstructed children: a systematic review and meta-analysis

[Bibi E Becking](#)<sup>1,2</sup>, [Jop P Verweij](#)<sup>1</sup>, [Sonja M Kalf-Scholte](#)<sup>2,3</sup>, [Cees Valkenburg](#)<sup>2</sup>, [Eric W P Bakker](#)<sup>2</sup>, [J P Richard van Merkesteyn](#)<sup>1</sup>

Affiliations + expand

PMID: [28379334](https://pubmed.ncbi.nlm.nih.gov/28379334/) DOI: [10.1093/ejo/cjx005](https://doi.org/10.1093/ejo/cjx005)

> [Int J Paediatr Dent](#). 2011 Sep;21(5):389–96. doi: [10.1111/j.1365-263X.2011.01117.x](https://doi.org/10.1111/j.1365-263X.2011.01117.x).

Epub 2011 May 23.

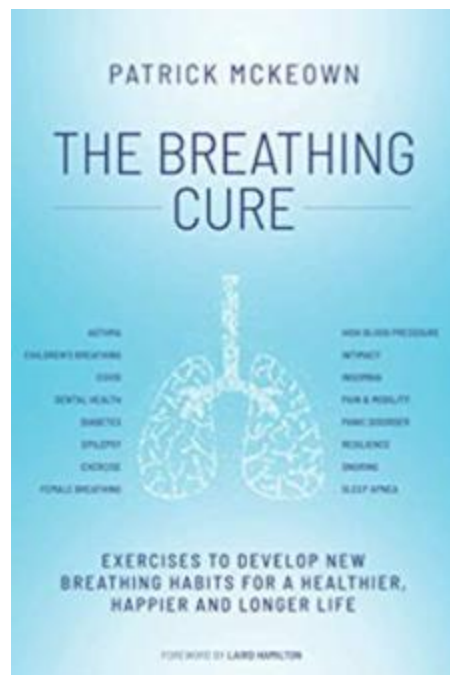
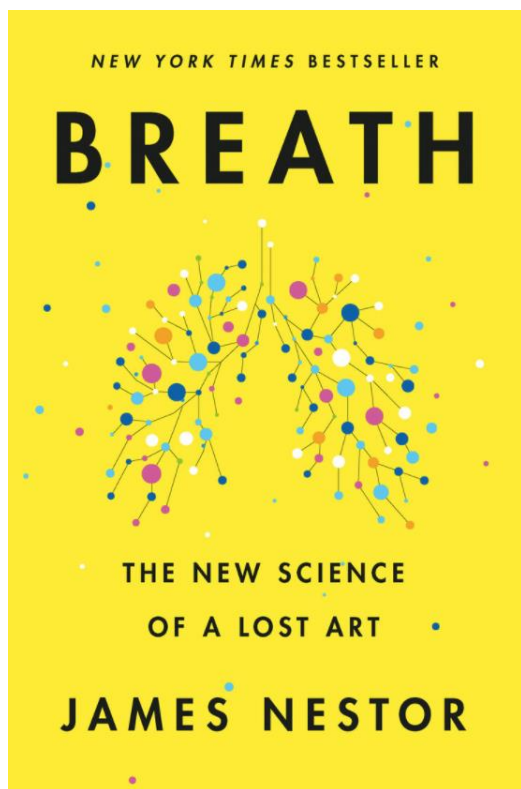
## Changes in facial morphology after adenotonsillectomy in mouth-breathing children

[Sara E M Mattar](#)<sup>1</sup>, [Fabiana C P Valera](#), [Gisele Faria](#), [Miriam A N Matsumoto](#), [Wilma T Anselmo-Lima](#)

Affiliations + expand

PMID: [21599769](https://pubmed.ncbi.nlm.nih.gov/21599769/) DOI: [10.1111/j.1365-263X.2011.01117.x](https://doi.org/10.1111/j.1365-263X.2011.01117.x)

# Nasal Airway: Mainstream Attention



Airofit Pro

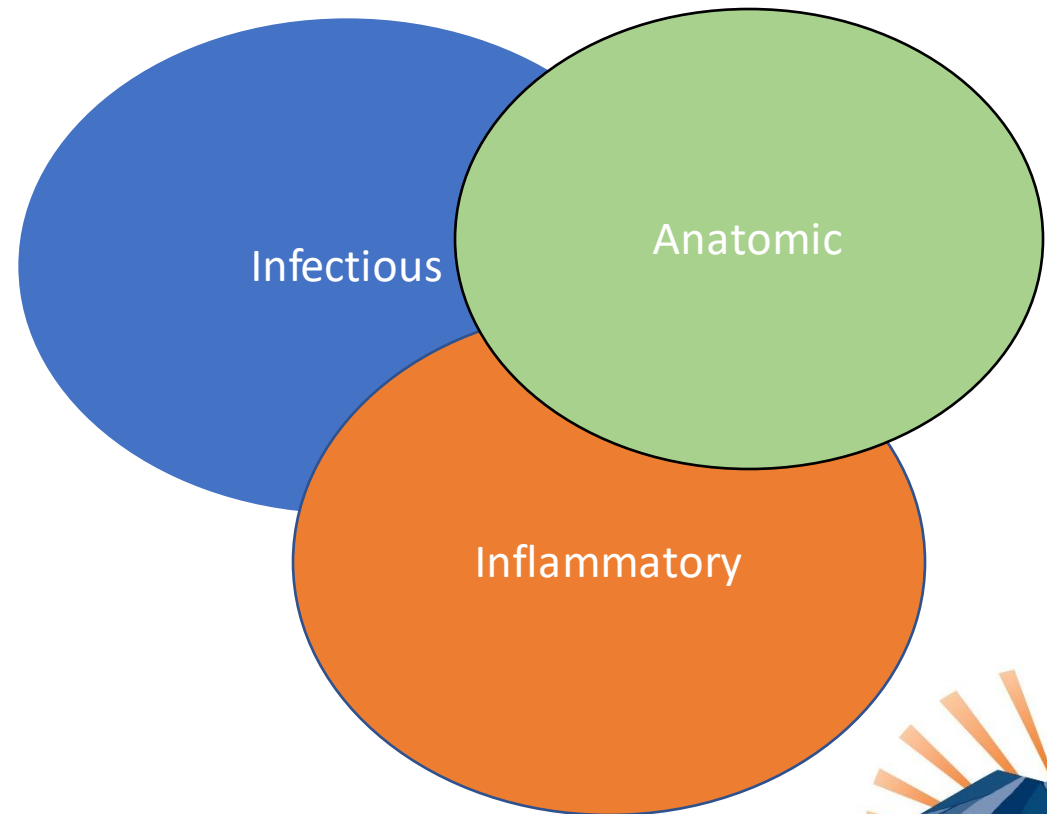
\$379.00

The World's first smart breathing trainer. Use only 5-10 minutes a day on breath resistance training. The best part - you gain access to the knowledge and guidance of the world's leading breathing experts.



# What Are the Causes?

- Infectious(Sinusitis)
- Inflammatory
  - Allergic
  - Autoimmune
  - Combination
- Anatomic
  - Polyps/Growth
  - Anatomical variations
    - Deviated Septum
    - Turbinate hypertrophy
    - Nasal valve
    - Adenoid hypertrophy
    - Concha bullosa
- ?Habit/training



# Anatomic Nasal Obstruction

- 3 Main Areas that apply to everyone
  - Nasal Septum (midline wall)
  - Inferior Turbinates (side to side variability)
  - Nasal Valve (nasal airflow bottleneck)
- Issues that can apply intermittently
  - Adenoids (unusual outside the pediatric age group)
  - Concha Bullosa
  - Nasal Polyps or mass



# Physics and the Nasal Airway

Disclaimer: It has been 30 years since I took physics

## Bernoulli's Principle

- Increased flow is associated with an inward pressure
- Vacuum cleaner in a tent visualization



## Pousailles Law

- *A little goes a long way in the nasal airway*
- *Flow is proportional to radius to the 4th power*

$$Q = \frac{\pi \Delta P r^4}{8 \eta l}$$

# Nasal Septum

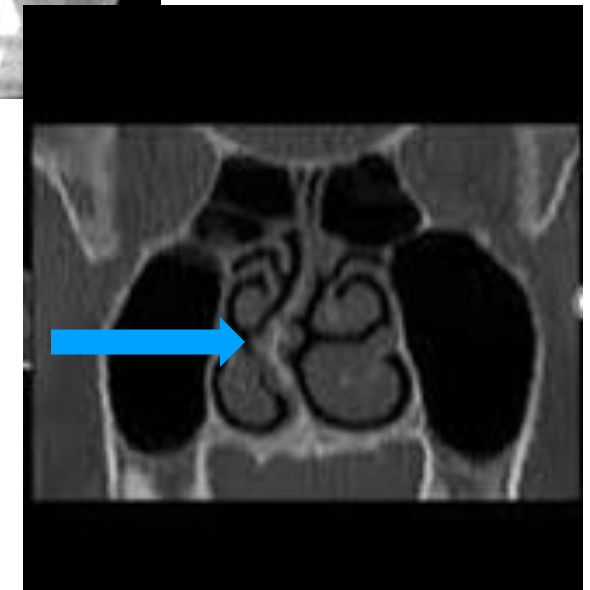
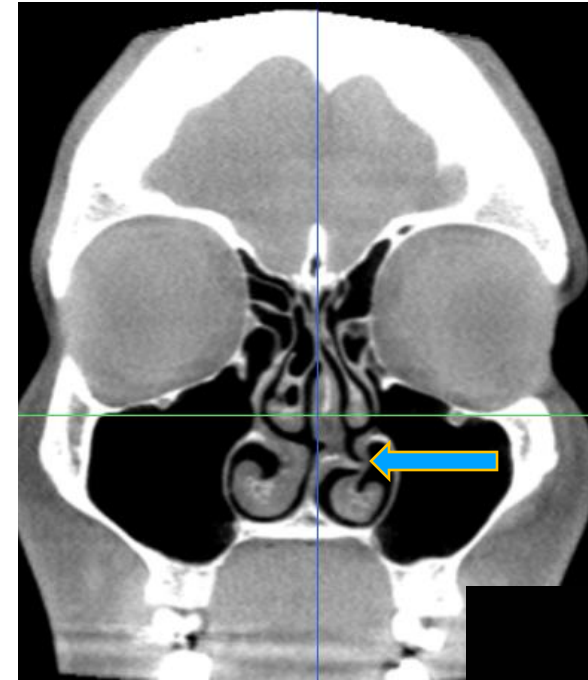
Midline wall of the nose separating the right from the left nasal airways

Comprised of bone and cartilage(CT does not always show the cartilaginous septum well)

Deviation results in increased airflow on the contralateral side

Deviation can be congenital or post traumatic

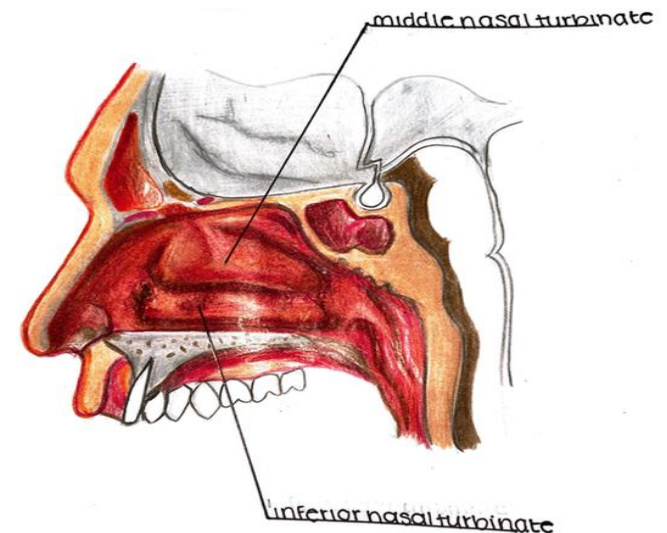
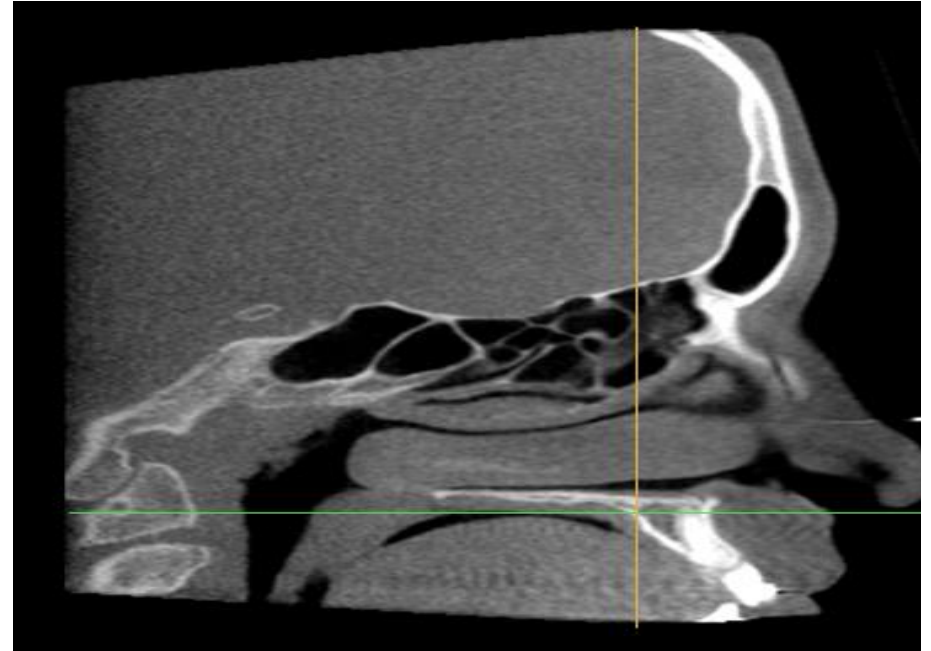
Septal deviation does not require repair if it is not symptomatic(there is a component of not knowing the difference)





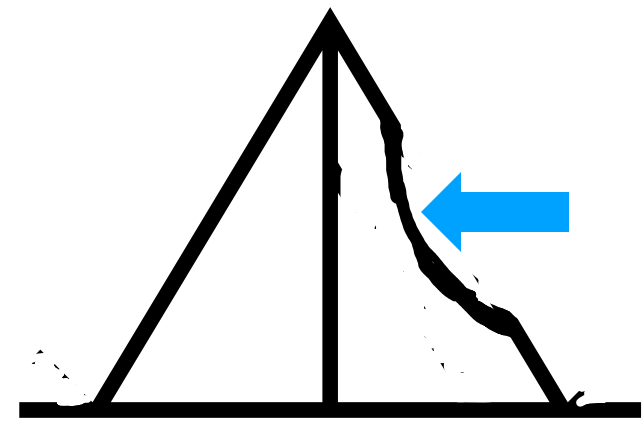
# Inferior Turbinates

- 3 turbinates on each side inferior, middle, and superior
- Only the inferior is erectile tissue
- Normal "nasal cycle" causes side to side fluctuation
- Swelling exacerbated by allergies, infections, temperature, etc
- Regulate humidity and airflow
- Can be reduced but not resected
- "Afrin effect"



# Nasal Valve

- Narrowest part of the nasal airway
- Comprised of the angle between the nasal septum and the lateral nasal wall
- The faster the airflow the more the inward pressure (picture a vacuum cleaner in a tent)
- Can be affected by age, congenital anatomy as well as the severity of the septal and turbinate obstruction
- "breathe right strip effect"

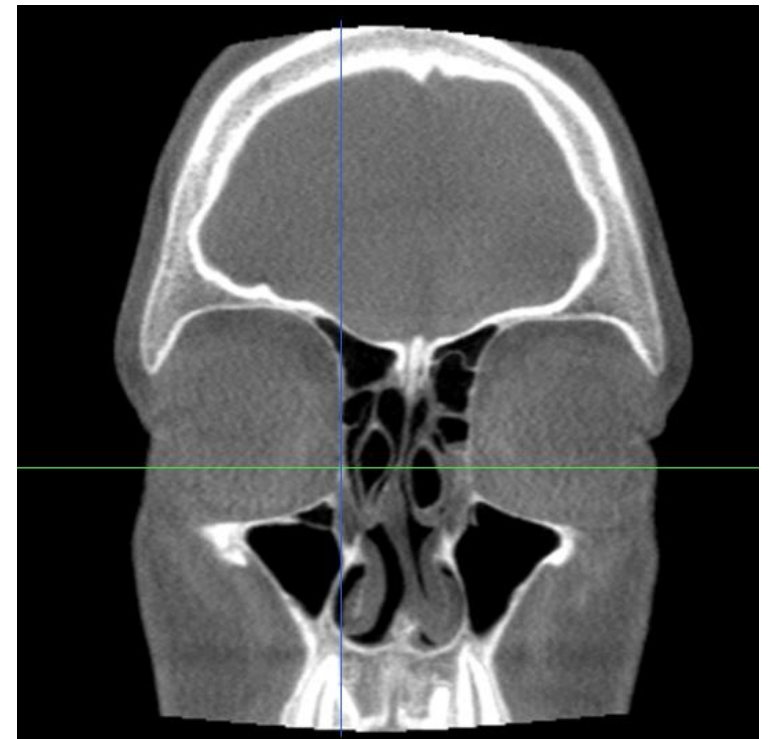
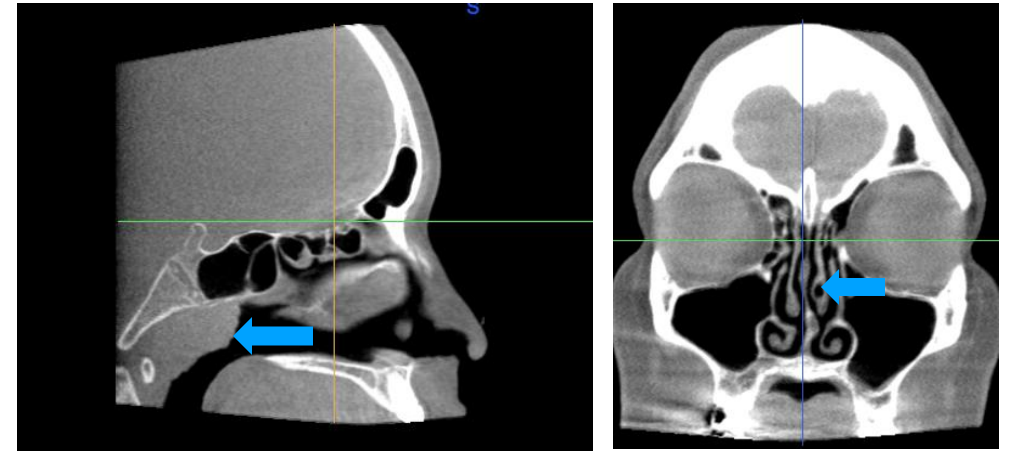
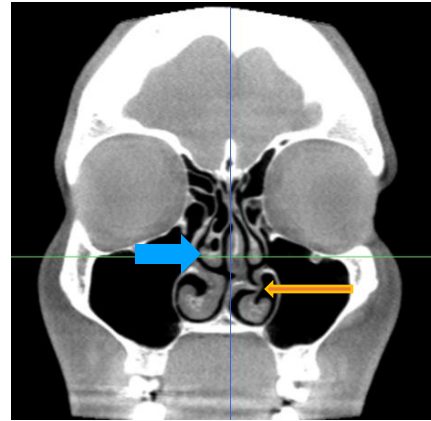


Bernoulli's principle



# Other Anatomic Considerations

- Concha Bullosa(aerated middle turbinate)
- Nasal polyps
- Nasal mass
- Adenoid enlargement

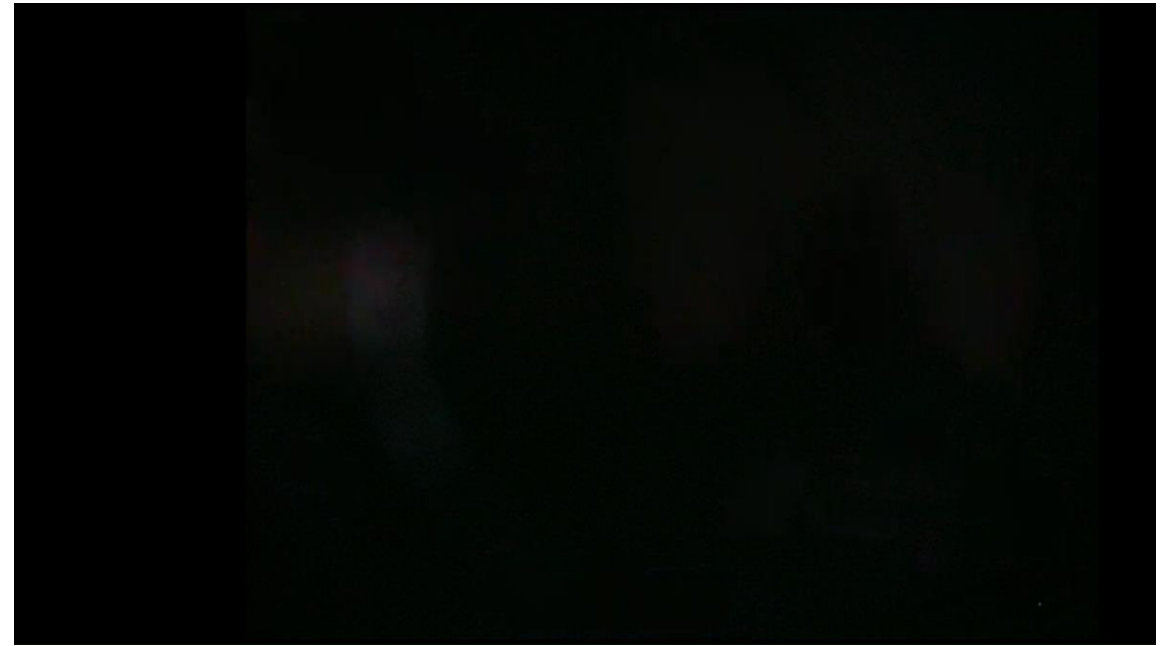
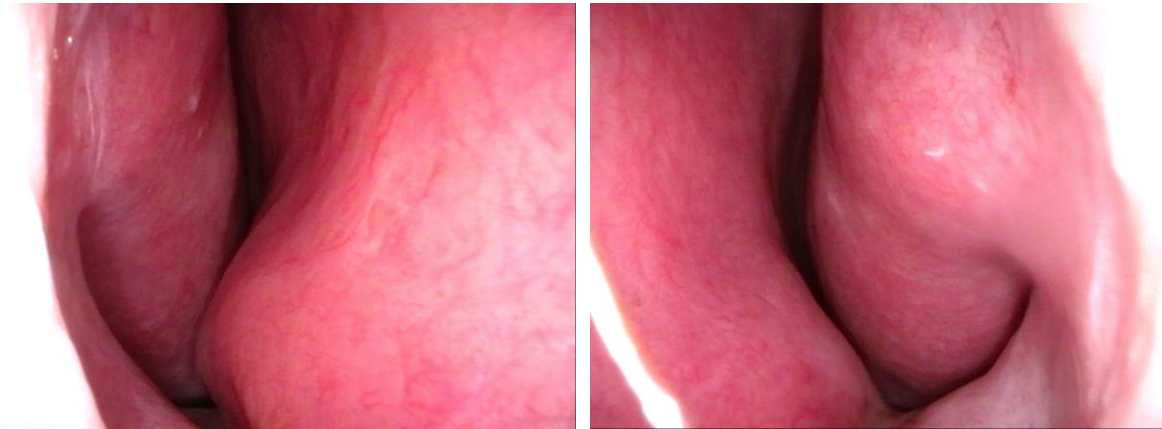


# Clinical Evaluation

- History
- Exam(nasal speculum and a headlight)(+/- nasal decongestant)
- Nasal Endoscopy
- Possible CT Scan



# Physical Exam and Endoscopy



Patient "Homework" is important in decision making of what if anything should be done

*Our office evaluation and exam gives a patient a good fixed picture of their airway however the real issues with the nasal airway are more like a movie and should be evaluated by the patient in their activities of daily living*



# "Homework" for the Inflammatory contribution

- 2 week trial of topical nasal steroid (Sensimist/Nasacort)
- 2 weeks of daily antihistamine
- Nasal hygiene ie saline/xlear
- Procedures generally will not replicate this effect



# "Homework" for the **Anatomic Component** the "in vivo" assessment

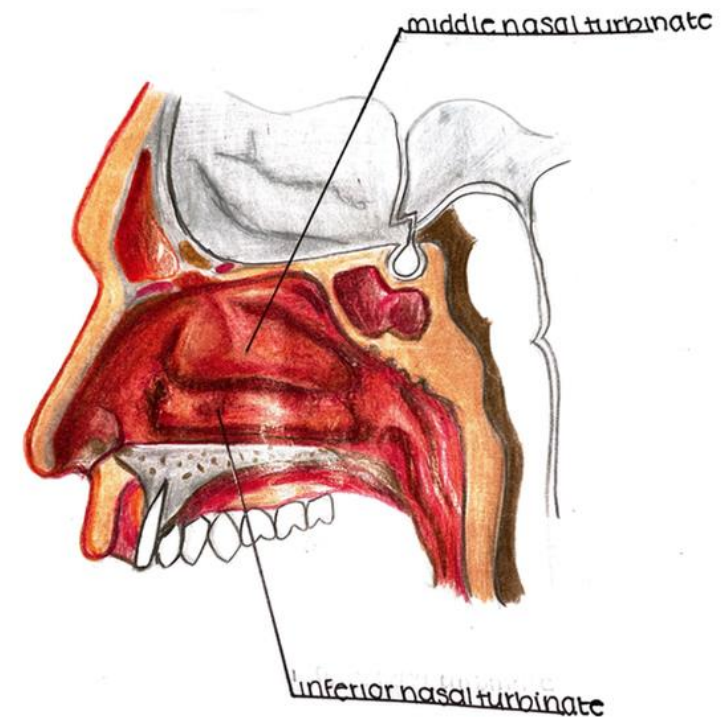
- Afrin represents a **Temporary Inferior Turbinate Reduction**
  - Afrin should only be used for a diagnostic trial not to exceed 3 days and should not be used in uncontrolled hypertension or with other medical contraindications
- The difference between the right and the left nasal airway with Afrin in place helps to predict the **contribution of the Septal Deviation**
- If there is still nasal obstruction after the Afrin is in place, placing a Breathe-Right strip can help predict the significance of the **Nasal Valve** on the better side
- Sleep and Exercise are where the largest differences are often noted





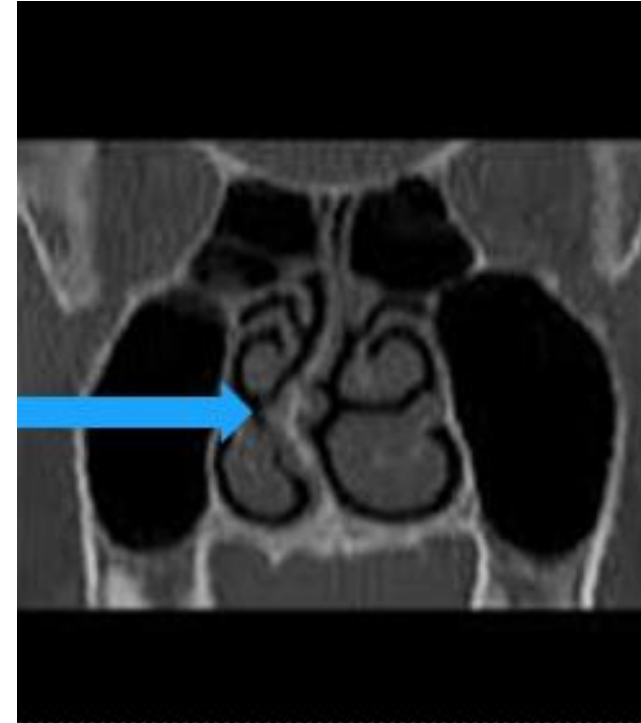
# Turbinate Reduction

- Can be done alone or in conjunction with other procedures
- In-office under local or in the OR with anesthesia
- 0-3 day recovery depending on modality
- Microdebrider, Radiofrequency etc



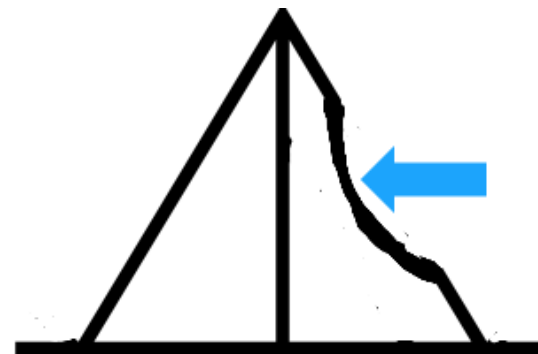
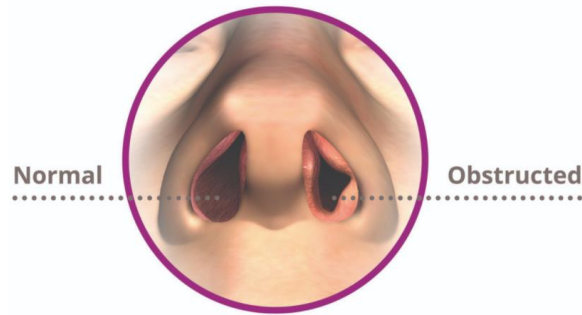
# Septoplasty

- Typically performed in the operating room in 1 hour
- 2-5 day recovery(variable)
- No external incisions
  - Addresses the cartilaginous and bony septum
- Sometimes required temporary internal splints
- There is a balloon procedure can partially address the septum in the office for someone who cannot tolerate general anesthesia/traditional downtime



# Valve procedures

- **Functional Rhinoplasty**
  - Operating Room with general anesthesia
  - 1 week recovery +/-
- **In-office procedures directed at the Nasal Valve**
  - Vivaer
  - Latera
  - Minimal recovery
  - Insurance coverage can be limited



# Just because we can...

- Patient preference/quality of life
- Have conservative measures failed?



# Olfactory Loss in COVID-19

Ryan M. Rehl, M.D., FACS  
October 23, 2021



**Acknowledgment:** This CME event is not supported by any commercial entity.

**Disclosure:** Ryan M. Rehl, MD and all members of the planning committee have no relevant financial relationships with a commercial interest to disclose.

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# COVID-19 and Olfactory Dysfunction

# Objectives

1. Describe the incidence and duration of COVID-19 associated olfactory loss
2. Explain the pathophysiology of COVID-19 associated olfactory loss
3. Discuss evaluation and treatment strategies for COVID-19 associated olfactory loss



# COVID-19 ENT Symptoms

- Cough
- Headache
- Nasal congestion
- Rhinorrhea
- Sore throat
- Hyposmia/Anosmia/Parosmia
- Hypogeusia/Ageusia/Parageusia





# Olfactory Dysfunction:

## Incidence of Olfactory Symptoms

- Most SARS-CoV-2 infections result in transient olfactory dysfunction

- Hyposmia-diminished sense of smell

- Anosmia- no sense of smell

Subjective patient reporting

**>50%**

- Parosmia- distortion of sense of smell

**11%**

Int Forum Allergy Rhinol. 2020; 10: 944- 950

Int Forum Allergy Rhinol. 2021;1-4



# Olfactory Dysfunction: Incidence and Duration

- Most SARS-CoV-2 infections result in olfactory dysfunction
  - April 2020, Iran, 60 COVID + patients, Doty et al.
  - Objective smell test UPSIT (UPenn Smell Identification Test)
  - 98% COVID + patients have smell loss on UPSIT
  - only 35% were aware of the olfactory dysfunction

Int Forum Allergy Rhinol. 2020; 10: 944- 950



# Olfactory Dysfunction: Incidence and Duration

- Most patients recover olfaction within 3 weeks
  - 229 COVID-19 pts, 140 (61%) had olfactory dysfunction
  - 78% recovered olfaction between 4-16 days

**The Laryngoscope, 130: 2667-2673.  
Jan 2020**



# Olfactory Dysfunction: Incidence and Duration

- Meta-analyses on incidence & duration
  - 60% of COVID-19 positive patients experience olfactory dysfunction<sup>1,2</sup>
  - most patients recover olfaction between 1-2 months<sup>3,4,5,6</sup>
  - persistent olfactory dysfunction in 5%-37% of subjects<sup>7,8,9</sup>

1. Curr Allergy Asthma Rep. 2020; 20: 76.
2. Physiol Rep. 2020; 8:e14578.
3. Eur Arch Otorhinolaryngol. 2021; 278(1): 101- 108.
4. Chem Senses. 2020; 45: 875- 881.
5. Acta Otolaryngol. 2020; 140(12): 1032- 1035.
6. J Laryngol Otol. 2020; 134: 703- 709.
7. Int Forum Allergy Rhinol. 2020;10(10):1127-1135
8. Eur Arch Otorhinolaryngol. <https://doi.org/10.1007/s00405-020-06516-4>.
9. Int Forum Allergy Rhinol. 2021; 1-3

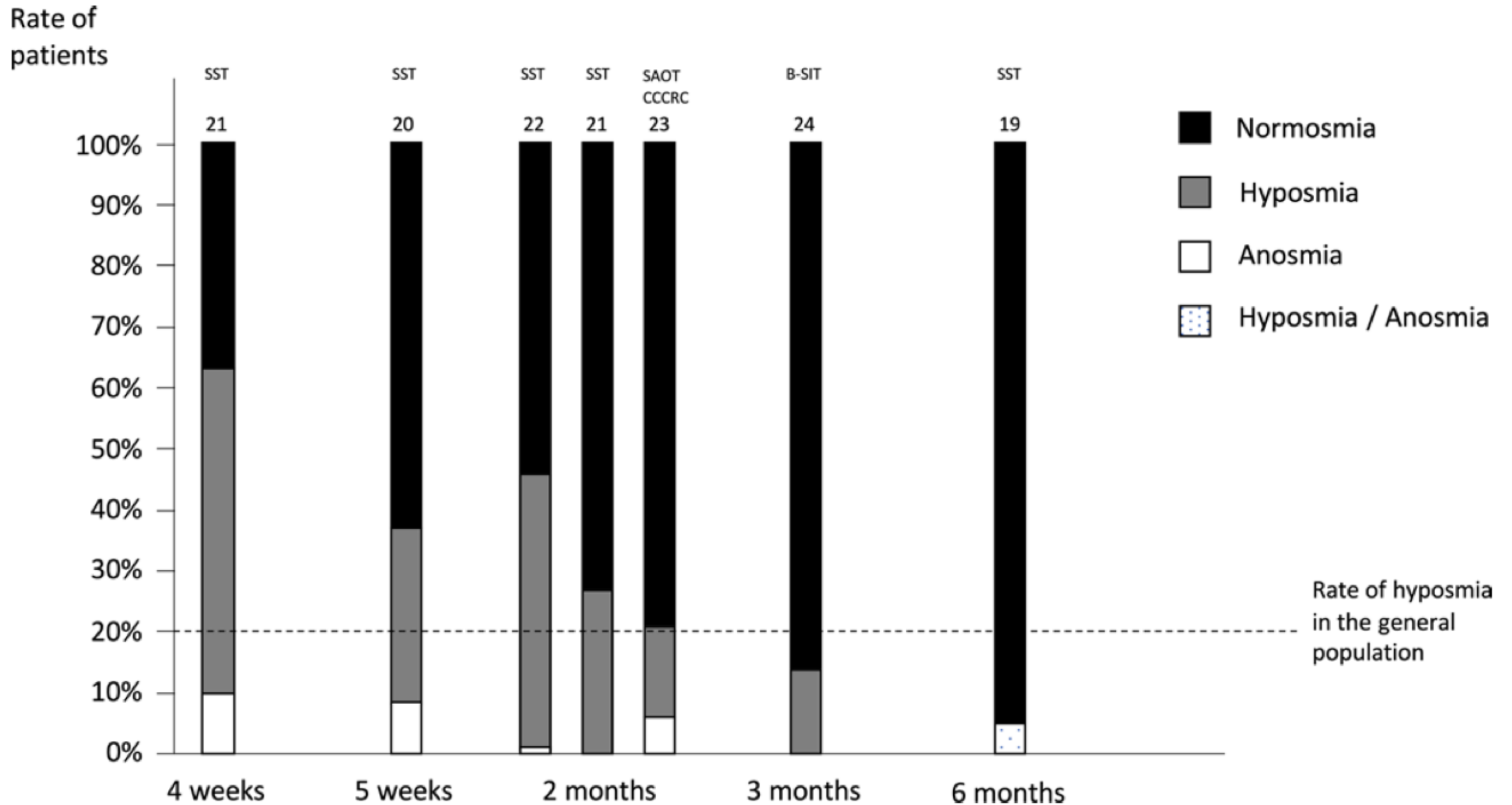


# COVID-19 olfactory dysfunction incidence:

Most recent meta-analysis

- Laryngoscope April 2021
- 27,492 patients Europe, North America, Asia, Australia
- pooled prevalence of olfactory dysfunction was 48%
  - Subjectively reported 45%
  - Objectively measured 72%
- Female predominance 61%

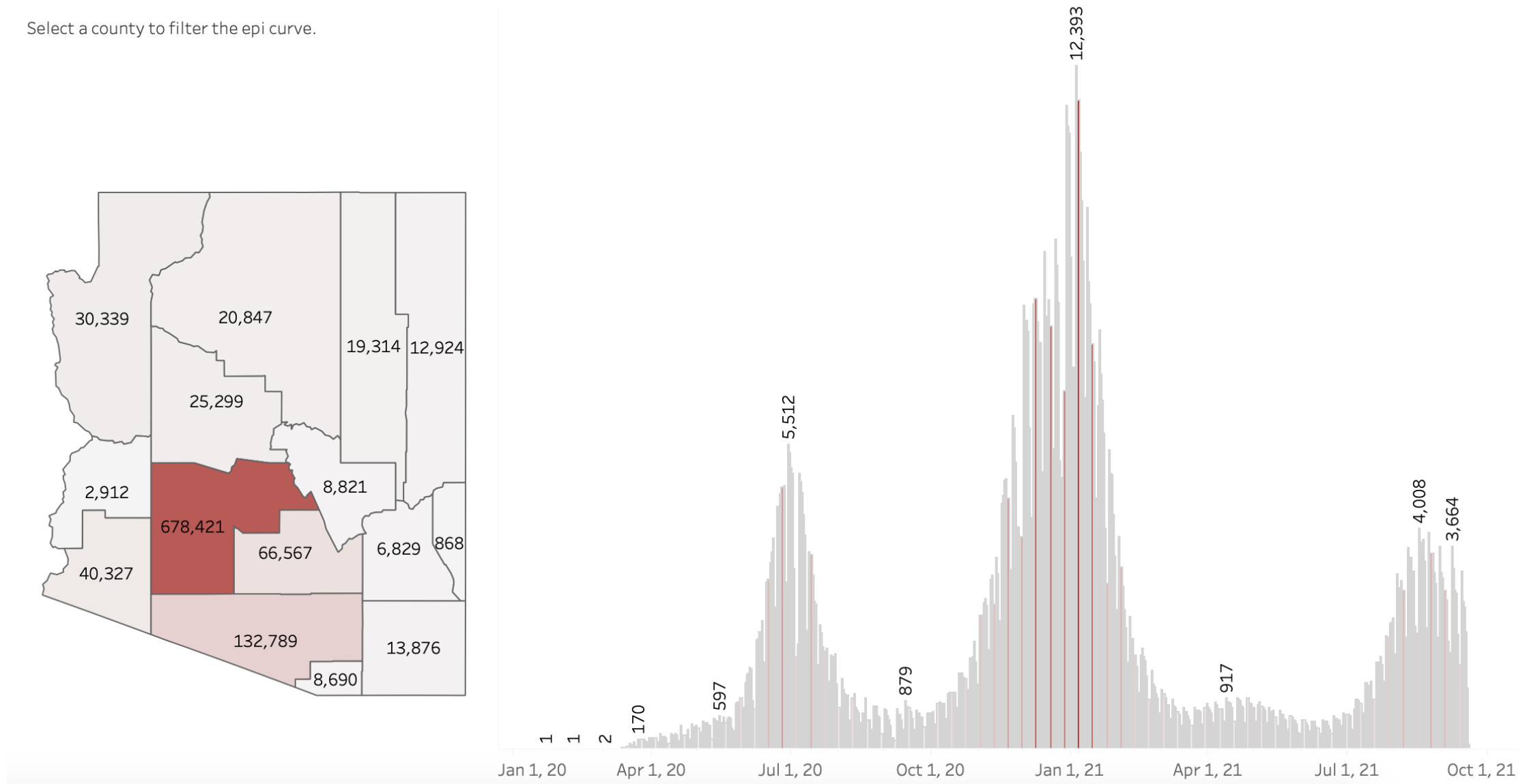
# Post COVID-19 olfactory dysfunction over time



# Who might ask for your help?

[azdhs.gov](http://azdhs.gov) total AZ cases

Select a county to filter the epi curve.



**>1,000,000 cases COVID-19 in AZ**

**Estimates of persistent olfactory dysfunction (> 6 months duration):  
50,000 in AZ**

**Estimate 34,000 in Maricopa County alone**

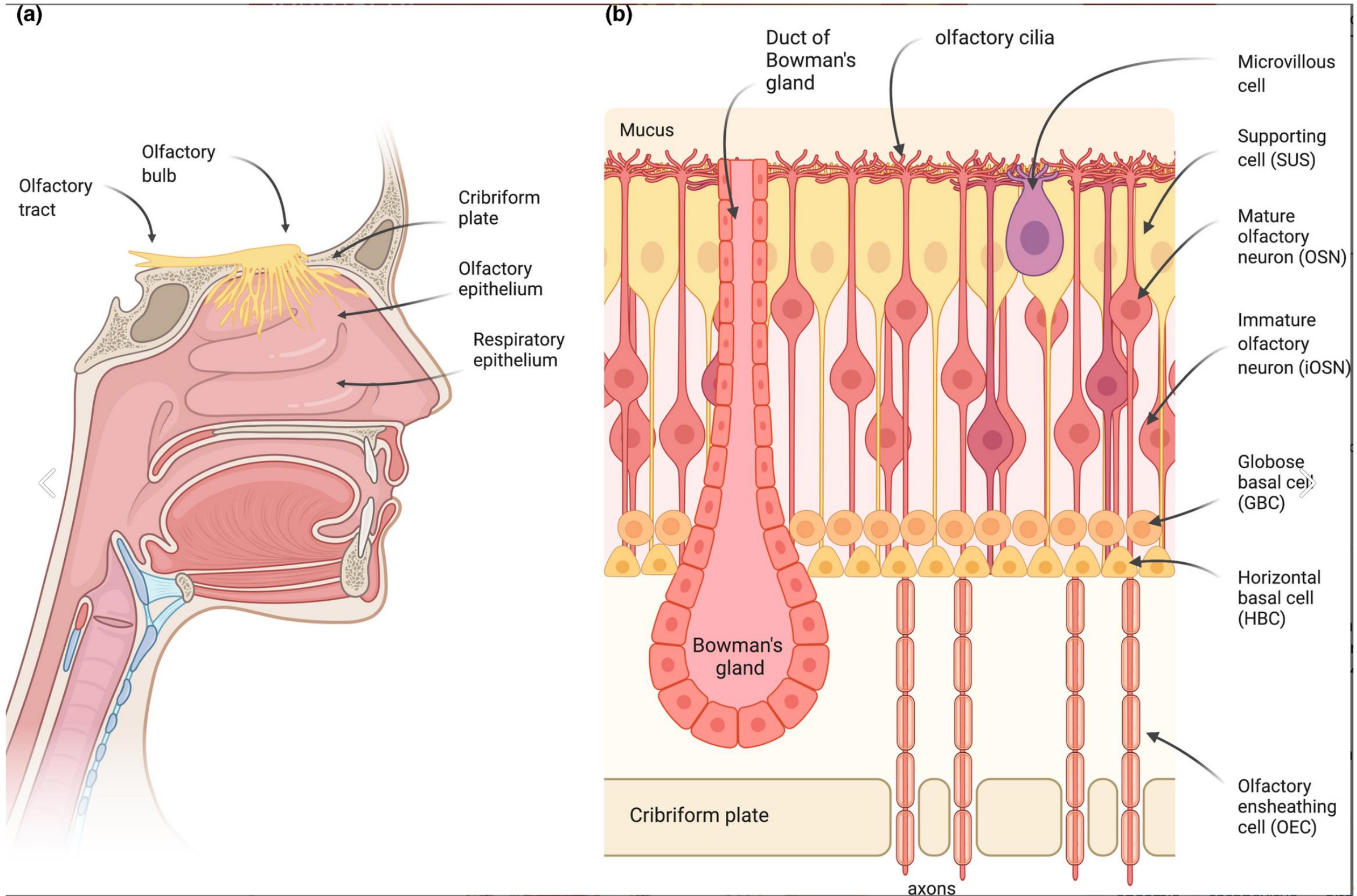


# Risk factors for prolonged olfactory loss after COVID-19

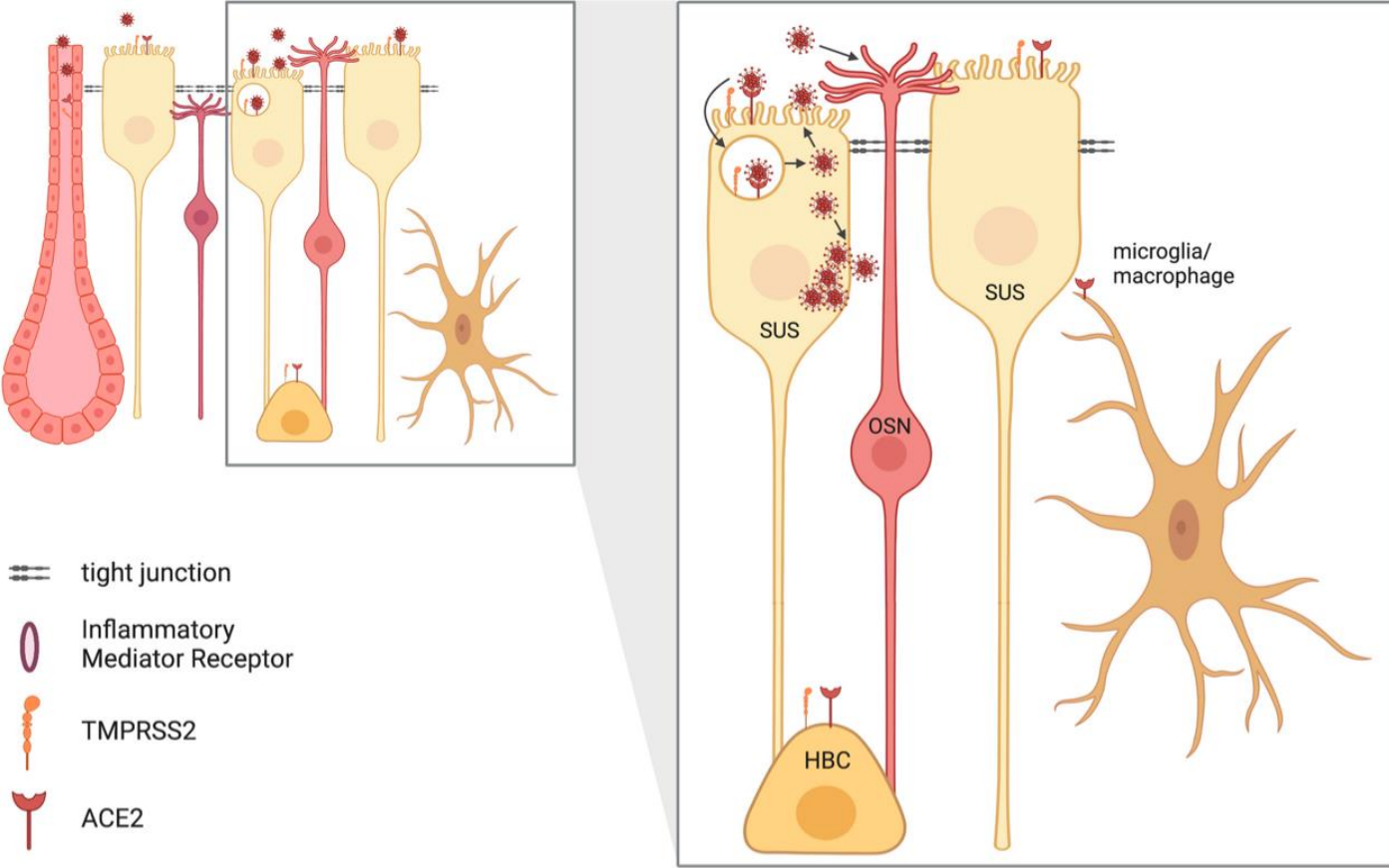
- Muscle & joint pain
- Female gender
- \*Cough was negatively associated with prolonged loss (protective)



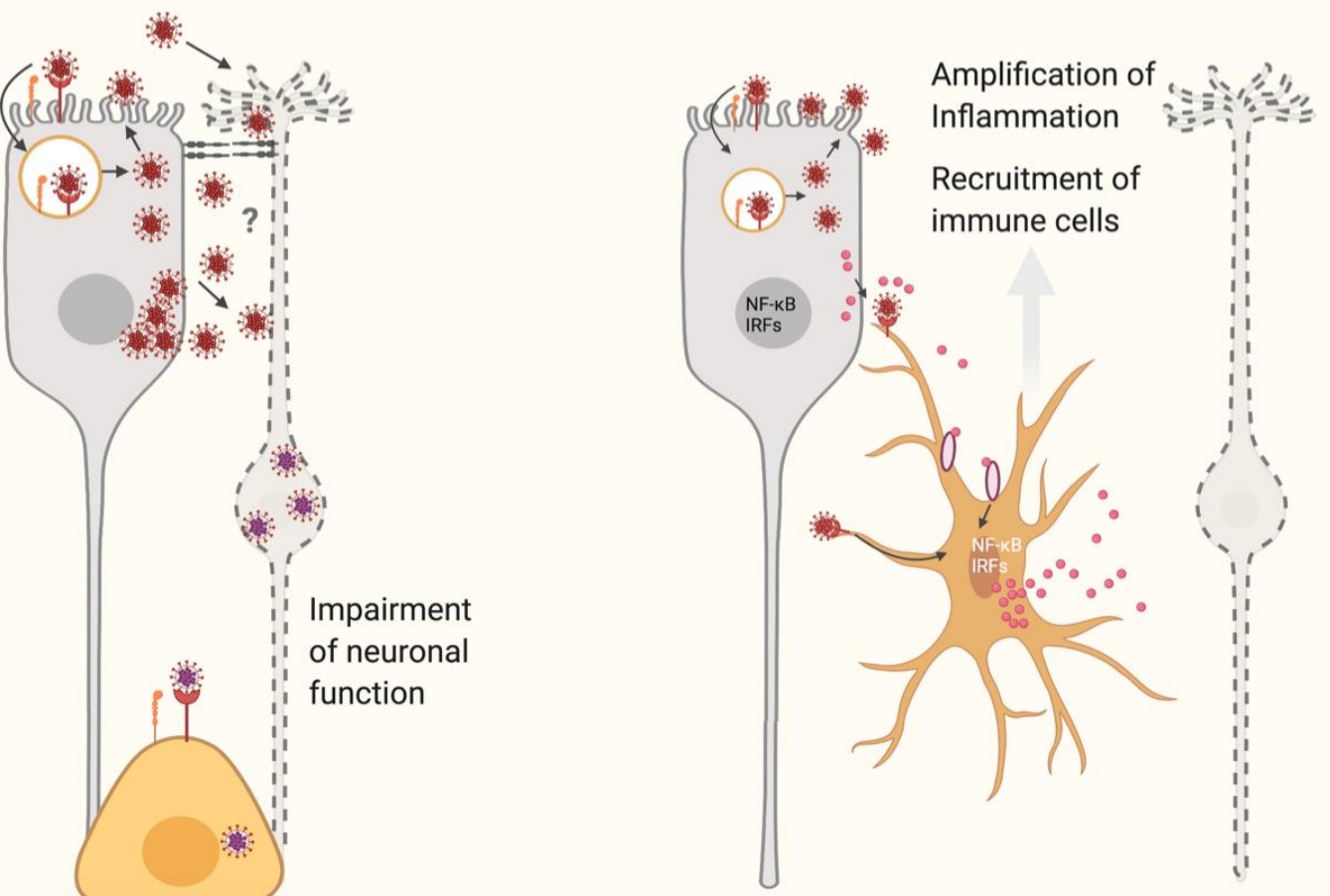
# Pathophysiology of COVID-19 Olfactory Loss



# Pathophysiology of COVID-19 Olfactory Loss



**PROGRESSION**  
**Loss of Sense of Smell**



J Neurochem 2020; 00: 1– 14.



# Post-COVID olfactory tract inflammation

- Inflammatory cytokines are present in post COVID olfactory epithelium
- COVID vs control patient mucosa: ELISA of biopsy
- COVID group increased levels of TNF- $\alpha$  in tissue
- TNF- $\alpha$  inflammatory cytokine produced by macrophages/monocytes and responsible for signaling which can ultimately lead to necrosis or apoptosis

Torabi A et al. Proinflammatory Cytokines in the Olfactory Mucosa Result in COVID-19 Induced Anosmia. ACS Chem. Neurosci. 2020, 11, 13, 1909–1913.



# Olfactory Loss Fallout

- Disability (spoiled food, fire, gas leak)
- Depression
- Olfactory loss is associated with depression
- Olfactory dysfunction predicts development of depression in older US adults
- neuroanatomic connections link olfactory and limbic systems

**Eliyan et al. Chemical Senses, 2021, Vol. 46**  
**Rochet et al. Brain Sci. 2018, 8, 80; doi:10.3390**  
**Kohli et al. Chemical Senses, 2016, Vol. 41**



# Evaluation: Causes of Smell Loss

- Rhinitis (allergic and non-allergic)
- Sinusitis (acute and chronic, +/- polyps)
- Post traumatic
- Post surgical
- Neoplastic (olfactory neuroblastoma, meningioma, etc)
- Neuro-inflammatory (Alzheimer's Dementia)
- Normal aging
- Congenital
- Post viral anosmia olfactory dysfunction (PVOD)
  - neuropathy
  - influenza, para-influenza, rhinovirus, coronavirus



# Clinical Evaluation

- History
- Exam
  - Anterior Rhinoscopy-Primary care
  - Nasal Endoscopy- Otolaryngology
- Imaging-not required for post viral OD
  - CT indicated if CRS or other mucosal inflammatory component suspected
  - MRI indicated if mass suspected or other neurologic symptoms
- Consider referral to ENT



# Primary Care Clinical Evaluation: recommendations from UK

- Confirm COVID-19 infection history
- Evaluate for other neurologic symptoms
- Loss of smell (LOS) < 3 months without other nasal symptoms consider treatment in your practice\*
- LOS > 3 months refer to ENT\*
- LOS > 6 weeks with other nasal symptoms refer to ENT\*

Hopkins, C, Mikkil A, Philpott, C. et al. Clinical Otolaryngology. 2021;46:16–22.



# Treatment Preview

- Treat any rhinitis/sinusitis identified
- Olfactory training (strong evidence)
- Budesonide irrigations (moderate evidence)
- Omega-3 fatty acids (weak evidence, low risk)





# Olfactory Training

- Odorant exposure therapy
- Utilizes olfactory system neuroplasticity
- Beneficial in post-viral, post-traumatic and age-related olfactory dysfunction
- Realistic expectations; 20%-60% of patients improve



# Olfactory Training Protocol

- Essential Oils: Rose, Lemon, Eucalyptus and Clove
- Hold under nose, deep, slow nasal respiration for 15 seconds. 15 second break, repeat with next odorant
- Focus on memory of that odor
- BID x 6 months
- UPSIT at baseline and 6 months



## **OLFACTORY TRAINING INSTRUCTIONS:**

**Purchase these 4 different essential oils: 1) Rose 2) Eucalyptus 3) Lemon 4) Clove**

Test your ability to smell these different essential oils once you have them at home. If you can't identify the fragrance, that is okay. If the smell is distorted the protocol can still work. When you perform the following protocol, try to remember what you recall the fragrance smelled like before you lost your sense of smell. If you can't smell the essential oil at all you may substitute one or multiple oils out for a different fragrance that you CAN smell.

**Do the following regimen twice daily for at least 3 months**

Place the first vial/jar (Rose) under your nose close enough that you can smell it. Breathe in and out slowly through the nose and concentrate intently on smelling the oil for 15 seconds. Cap it and put it down. Wait for 15 seconds then pick up the second vial/jar (Eucalyptus) and smell that for 15 seconds. Cap it and put it down. Wait 15 seconds then pick up the 3rd vial/jar and smell that for 15 seconds. Cap it, put it down and wait 15 seconds. Then smell the 4th vial/jar for 15 seconds then cap it.

Repeat this protocol approximately 12 hours later. It will likely take several weeks to months before you notice improvement in your sense of smell.



# Olfactory Training (OT)

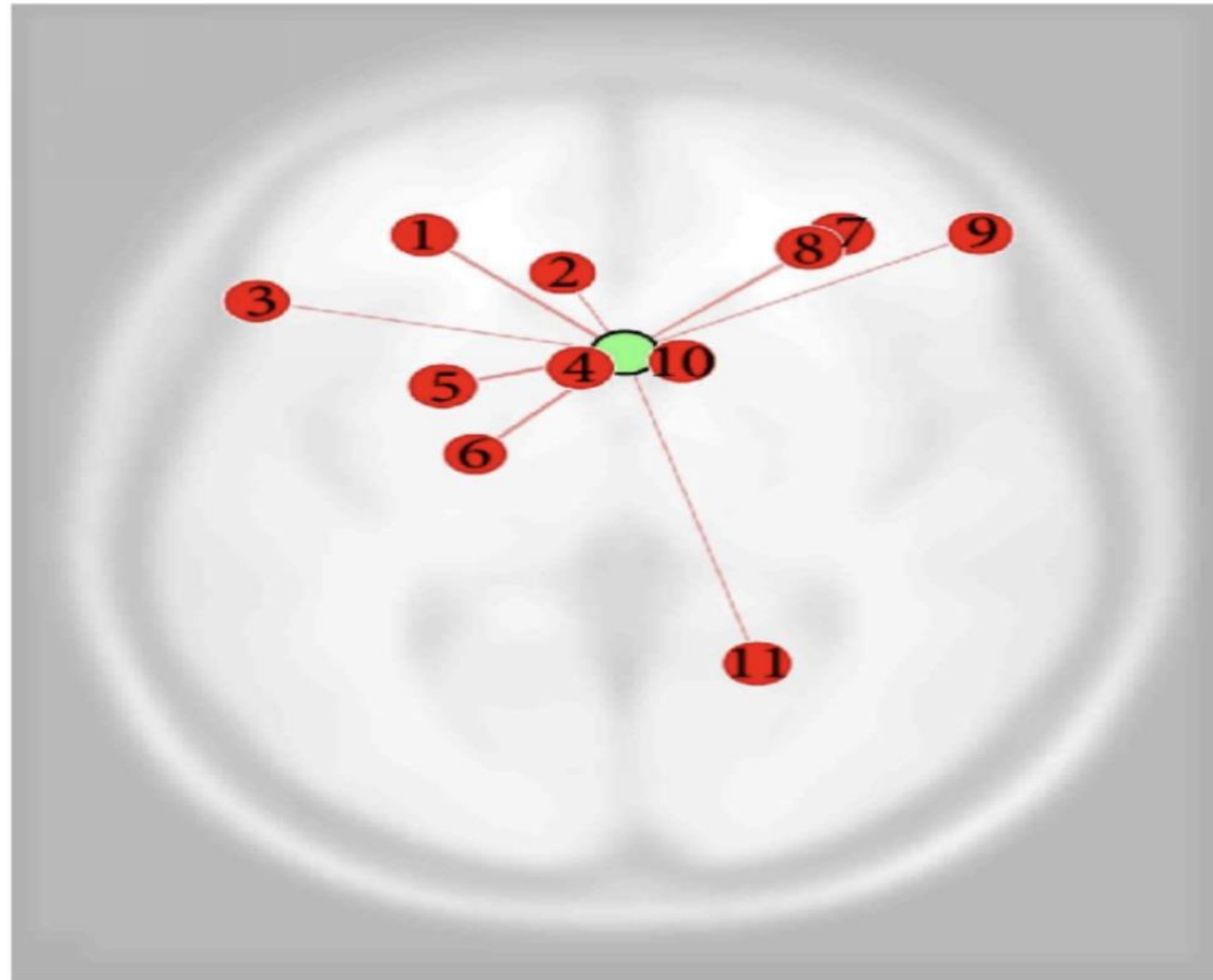
- MR analysis shows increased cortical thickness in right inferior frontal gyrus, bilateral fusiform gyrus and the entorhinal cortex in normal pts following course of OT

**"Smell Training Improves Olfactory Function and Alters Brain Structure."  
NeuroImage (Orlando, Fla.) 189 (2019): 45-54.**

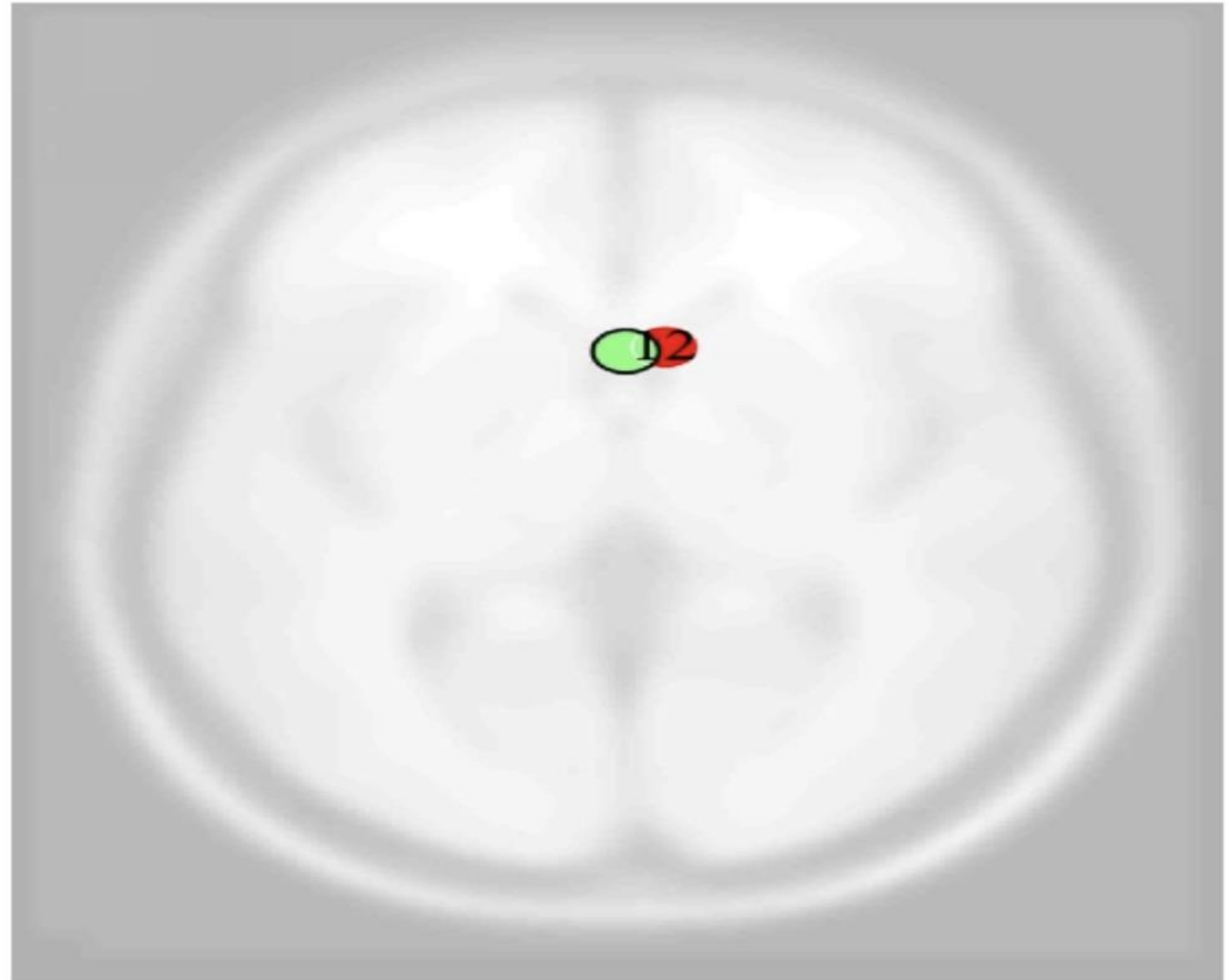


# Olfactory Training

## Functional MRI in patients with Olfactory Dysfunction



(a)  
Pre-OT



(b)  
Post-OT

# Olfactory Training Evidence

- Ten studies including 4 RCT
  - (all 10 studies showed benefit)
  - 4 compared OT to no tx. all 4 OT was superior to no tx
    - better outcomes in pts with loss < 1 year

Laryngoscope. 2009; 119(3): 496- 499.

Ear Nose Throat J. 2012; 91(5): 198- 215.

Laryngoscope. 2013; 123(12): 85- 90.

Laryngoscope. 2014; 124(4): 826- 831.

Eur Arch Oto-Rhino-Laryngology. 2014; 271(6): 1557- 1562.

Laryngoscope. 2015; 125(8): 1763- 1766.

Rhinology. 2016; 54(2): 170- 175.

Perception. 2017; 46(3-4): 343- 351

Int Forum Allergy Rhinol. 2018; 8(9): 977- 981.



# Systemic Steroid?

## Evidence

- Extrapolation from pre-COVID post-viral olfactory loss
  - No strong evidence, offered as option
  - 6 studies, none were RCT comparing systemic steroid vs control<sup>1</sup>
- COVID-19: World's clinical olfactory experts recommend
  - exercise caution, systemic steroids not standard of care in post COVID smell loss
  - Olfactory training should be started as early as possible<sup>2</sup>

1. Int Forum Allergy Rhinol. 2020; 10: 1065– 1086.

2. Int Forum Allergy Rhinol. 2021; 11: 1041-1046



# Topical Steroid Sprays?

Post Viral Smell loss before COVID era

- 4 studies PVOD (non-COVID)
- no good evidence
- only 1 RCT, fluticasone, 6 mos, 23 pts, **showed no benefit**
- 3 studies case series, **no control**
- 2 studies some benefit (50-60% patients improved) with 5 month- 2 year f/u



# Topical Steroid Sprays?

- Mometasone furoate for post COVID olfactory dysfunction
  - RCT, double blind, 77 pts
- Mometasone spray and OT vs saline and OT
- Mometasone group demonstrated 2 times more patients returning to normal sense of smell at 4 weeks

Kasirii et al. "Mometasone Furoate Nasal Spray in the Treatment of Patients with COVID-19 Olfactory Dysfunction: A Randomized, Double Blind Clinical Trial." *International Immunopharmacology* 98 (2021): 107871.



# Topical Steroid Irrigations

## (Adjunctive Therapy to OT)

### NOT COVID

- Budesonide irrigations improved OT results
  - RCT OT + saline irrigation vs OT + Budesonide Irrigation
  - 133 pts
  - 6 month f/u
  - OT + saline irrigation 27% improvement
  - OT + Budesonide irrigation 44% improvement
- younger age and shorter duration of loss better prognosis

# Shotgun medical approach?

- POST-COVID Olfactory dysfunction > 30 days
- 18 pts
- Prednisone, betamethasone/amroxol/rinazine irrigations  
15 days
- vs control
- Significant improvement at 20 day and 40 day f/u in tx  
group

**Rhinology 59-1: 21-25, 2021**



# Dietary/supplement approach to post COVID-19 olfactory loss

- COVID-19 associated with increased TNF- $\alpha$  in olfactory neuro-epithelium
- The following supplements have been shown to decrease TNF- $\alpha$  in various inflammatory conditions (no studies with post COVID smell loss)
  - Vitamin C, Vitamin E, Vitamin D, Omega 3 fatty acid (DHA & EPA)

# Omega 3 Fatty Acid:

Post surgical olfactory dysfunction  
(Not COVID)

- RCT, 87 patients, trans-nasal endoscopic skull base surgery
- UPSIT baseline, 6wks, 3 mo, 6 mo after skull base surgery
- saline rinses vs saline rinses + omega-3 (1000mg BID)
  - All patients had smell loss at 6 wks
- 73% recovered to baseline control group at 3 mos
- 94% recovered to baseline in Omega-3 group at 3 mos

Patel et al. Neurosurgery, 2020-01-17.



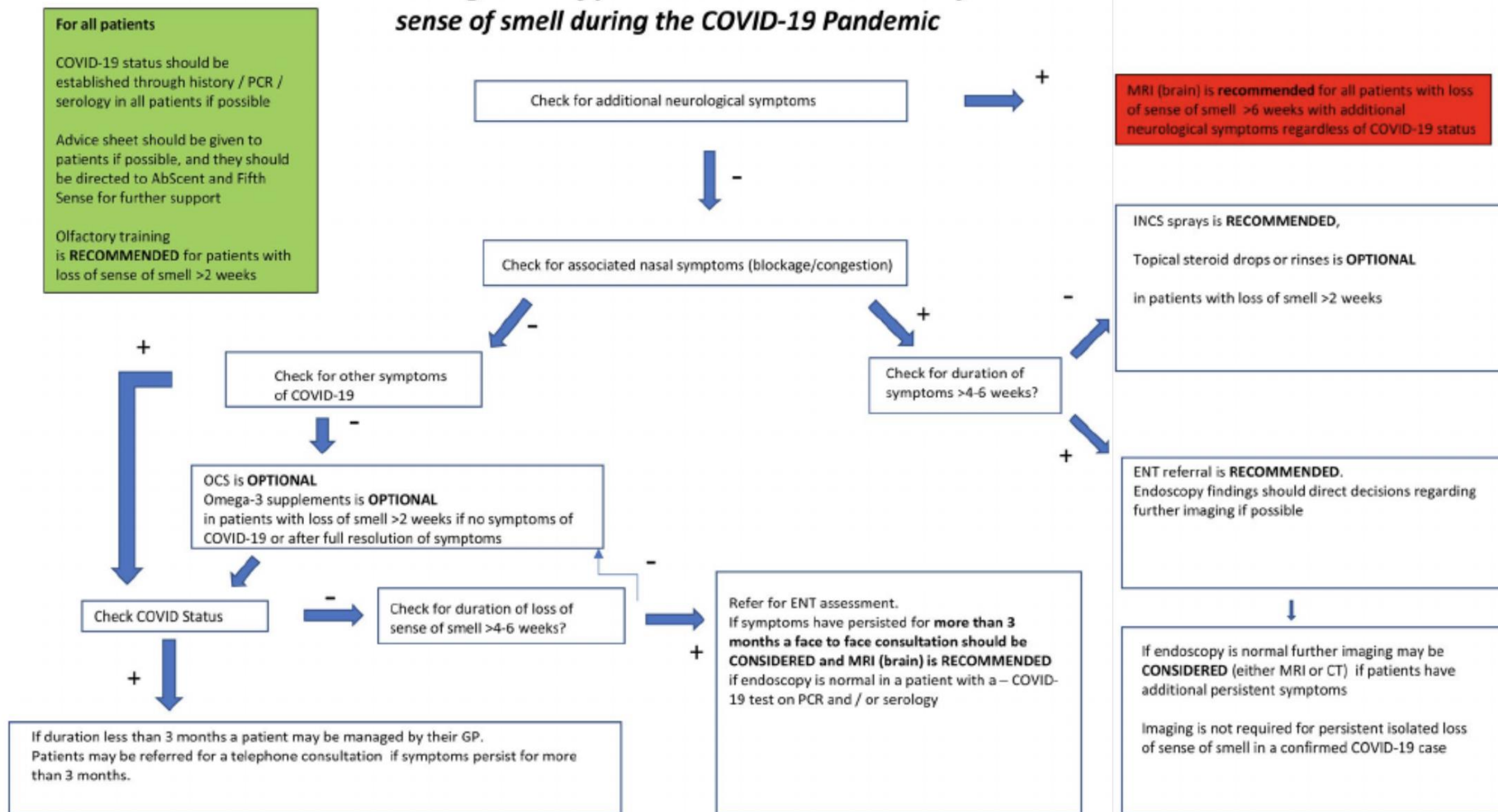
# Management of Olfactory Loss during COVID-19 Pandemic: Primary Care Perspective

- From the British Rhinologic Society
  - loss of smell < 3 months can be managed by PCP
  - Olfactory training recommended for all patients with LOS > 2 weeks
  - Imaging not recommended for patients with LOS associated with COVID-19 infection and no other neurologic symptoms

Hopkins, C, Mikkil A, Philpott, C. et al. Clinical Otolaryngology. 2021;46:16–22.



### Management of patients with new onset loss of sense of smell during the COVID-19 Pandemic



**FIGURE 1** Flowchart for management of new onset loss of sense of smell during the COVID-19 pandemic. INCS, intranasal corticosteroids; OCS, oral corticosteroids. Optional indicates that consensus was achieved at the 60% and not the 70% threshold, highlighting ongoing uncertainty regarding the usage [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

# Post COVID-19 or other Post-viral olfactory dysfunction: practical approach

- Work-up & treat any inflammatory rhinitis or sinusitis right away
- Olfactory training
- Budesonide Irrigations
- Omega 3 FA (1000mg BID EPA/DHA)
- Query for improvement at 3 months and 6 months if needed





# Summary

- Most cases of COVID-19 are associated with transient decrease or loss of sense of smell
- 5% of patients will develop long term olfactory dysfunction (> 6 months)
- olfactory training should be initiated in all patients
- saline and steroid rinses, nasal steroid sprays and oral omega 3 fatty acids should be considered
- Consider ENT referral for smell loss associated with other nasal symptoms or smell loss > 3 months duration



# Vestibular Dysfunction: Overview, Diagnosis, Treatment

October 23rd, 2021

Natacia Howard, Au.D.

Anthony Veglia, PT, DPT



**Acknowledgment:** This CME event is not supported by any commercial entity.

**Disclosure:** Natacia Howard and Anthony Veglia and all members of the planning committee have no relevant financial relationships with a commercial interest to disclose.

**Accreditation Statement:** This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Arizona Medical Association (ArMA) through the joint providership of HonorHealth and Valley ENT. HonorHealth is accredited by ArMA to provide continuing medical education for physicians.

**Credit Statement:** HonorHealth designates this live activity for a maximum of 4 *AMA PRA Category 1 Credits*<sup>™</sup>. Physicians should only claim credit commensurate with the extent of their participation in the activity.



## Today's presenters

### Natacia Howard, Au.D.

- Doctor of Audiology specializing in vestibular diagnostics, testing patients at Scottsdale Ear, Nose, & Throat for 5 years

### Anthony Veglia, PT, DPT

- Doctor of Physical Therapy specializing in vestibular rehabilitation, treating patients at Scottsdale Ear, Nose, & Throat



## Objectives for learning

1. Identify how the balance system uses sensory input from the inner ear to maintain balance
2. Define common vestibular disorders and review specific diagnostic testing
3. Describe symptoms of vestibular disorders and review the different treatments



# Balance systems overview

Three balance systems: Vision, Somatosensation, and Equilibrium sense

Three balance integrators: Cerebellum, Cerebral Cortex, Brainstem

Three equilibrium sense organs per ear:

- 3 semicircular canals (rotational movements of the head)
- Utricle (linear acceleration in transverse plane)
- Sacculle (linear acceleration in sagittal plane)



# Sensory integration

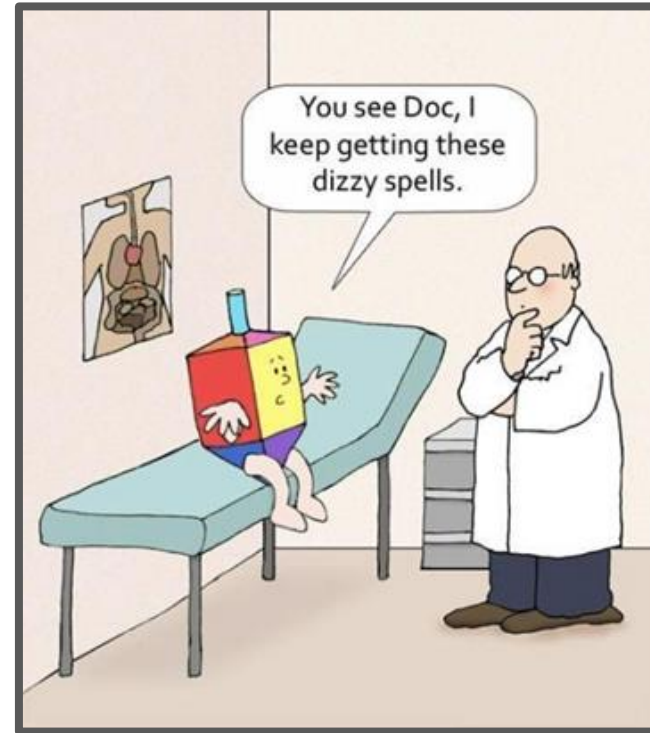
Reflexes that determine balance, sensation, and coordination for oculomotor, cervical, and postural control:

- VOR: Vestibulo-Ocular Reflex (gaze stabilization)
- VCR: Vestibulo-Collic Reflex (cervical muscle control)
- VSR: Vestibulo-Spinal Reflex (full-body postural control)
- COR: Cervico-Ocular Reflex (compensatory eye movement)
- OKR: Optokinetic Response (smooth pursuit)



# Dizziness

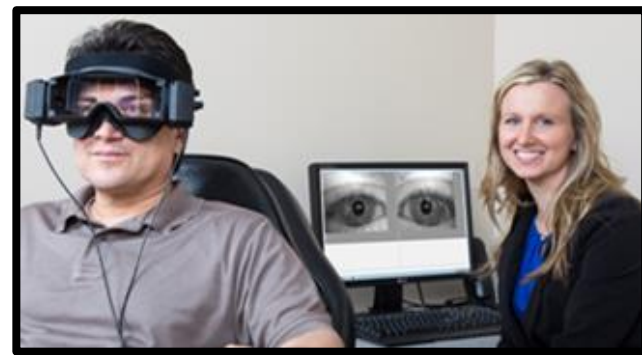
- According to the CDC, dizziness is the 3rd most common complaint heard in physician offices.
- 85% of vertigo and balance dysfunctions may be inner ear related.





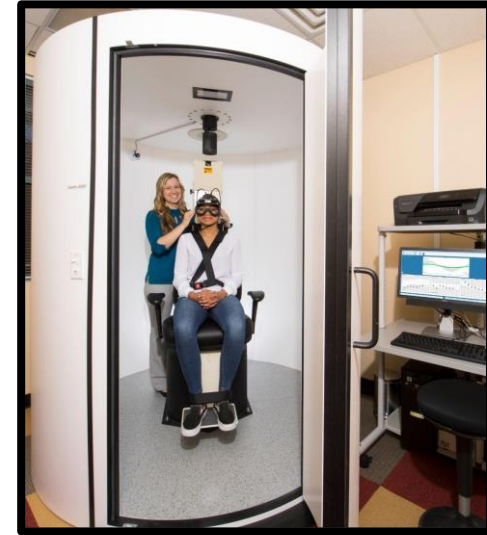
# Diagnostic tests

- Audiometry
  - Inner ear house the cochlea and vestibule
- Videonystagmography (VNG) [Gold standard]
  - Ocular motors, positioning, and caloric irrigations
- Auditory Brainstem Responses (ABR)
  - Evoked potential; measures integrity of CN VIII
- Electrocochleography (ECOG)
  - Evoked potential; SP/AP = amplitude ratio
- Vestibular Evoked Myogenic Potential (VEMP)
  - Evoked potential; measures function of saccule, utricle, and superior vestibular nerve



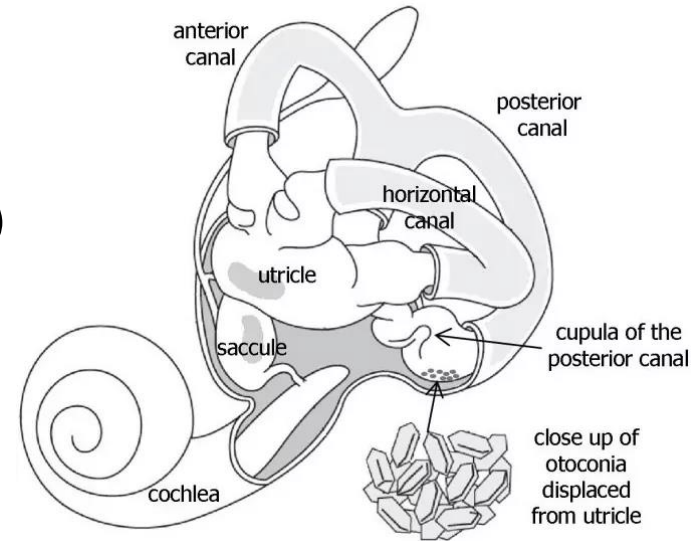
## Diagnostic tests continued

- Video Head Impulse Test (vHIT)
  - Tests high frequencies
  - Evaluates all six semicircular canals
- Computerized Rotary Chair
  - Tests a range of different frequencies
  - Gold standard detecting bilateral vestibular loss
- Computerized Dynamic Posturography (CDP)
  - Sway references vision, vestibular, and proprioception
  - Used for diagnostics, treatment and detection of aphysiologic performance
- Imaging studies: MRI and CT



# Common vestibular disorders

- Acoustic Neuroma
  - Nonmalignant tumor on CN VIII
- Benign Paroxysmal Positional Vertigo (BPPV)
  - Most common disorder; dislodged otoconia
- Bilateral Vestibular Hypofunction
  - Ototoxicity, meningitis, NF2, autoimmune, head injury, radiation, aging, or idiopathic
  - Oscillopsia
- Cervicogenic Dizziness
- Enlarged Vestibular Aqueduct
  - Enlargement of endolymphatic duct and sac
- Labyrinthitis and Vestibular Neuritis



# Common vestibular disorders continued

- Mal de Debarquement
  - Caused by exposure to movement, then removal of that movement
- Ménière's disease
  - Aural fullness, tinnitus, fluctuating hearing loss, long-standing dizziness
- Migraine Associated Vertigo (MVA)
  - 40% of migraine patients have vestibular symptoms
- Perilymph Fistula
  - Abnormal opening in the inner ear
- Persistent Postural Perceptual Dizziness (PPPD)
  - Unexplainable dizziness provoked by environmental or social stimuli
- Superior Canal Dehiscence
  - Opening in the bone overlying the superior SCC



# Case study (VNG only)

## **Results:**

**Gaze:** No gaze-evoked nystagmus was present with gaze to the right, left, up, or down.

**Pursuit:** Normal gain and asymmetry.

**Saccades:** Normal velocity, accuracy and latency.

**Optokinetic nystagmus:** Normal gain.

**Spontaneous nystagmus:** 1-2° per second right beating nystagmus in primary gaze. Suppressed w/ fixation.

**Dix-Hallpike:** No paroxysmal nystagmus was present during Dix-Hallpike positioning to right or left.

**Positionals:** 1-3° per second right beating nystagmus during supine, head right, and head left positions.

**Caloric Irrigations:** Abnormal. 59% caloric weakness to the left; 12% directional preponderance to right.

Caloric responses: 8.3 RW, 0.2 LW, 4.6 LC, 10.1 RC deg./sec.

**Impression:** VNG was abnormal due to the presence of right beating spontaneous nystagmus, right beating static positional nystagmus and a clinically significant left caloric weakness. Combined these findings are indicative of an uncompensated left vestibular hypofunction.

## **Recommendations:**

1. Follow up with referring physician.
2. Vestibular rehabilitation for unilateral weakness.
3. Correlate abnormal ABR findings with imaging studies.



# Overview of common vestibular disorder symptoms

Disorder	Onset	Provocation	Intensity	Duration	Keywords
BPPV	Sudden	Position change	Mod-to-High	Sec-Min	Bed mobility, leaning
Ménière's disease	Insidious	Complex (diet, phases)	Mod-to-High	Hours	4 staple symptoms: ear fullness, tinnitus, vertigo, hearing loss
Acoustic Neuroma	Insidious	None	Low	Constant	Unilateral hearing loss, tinnitus, imbalance/dizziness (not vertigo)
Neuritis, Labyrinthitis	Sudden	Static and position change	Low-to-High	Hours-Days	Static and dynamic dizziness, tinnitus/hearing loss(labyrinthitis)
Vestibular Hypofunction	Insidious, or following insult	Limited vision	Low	Constant	"Dark room" "When showering..." "Turning corners"
PPPD	Following other vestibular insult	Upright activity, busy settings	Low-to-Mod	Dependent on activity	"End of a long day" "A lot going on" History of anxiety
Cervicogenic	Insidious, or post-whiplash	Neck movement and positioning	Low	Dependent on activity	History of neck pain/dysfunction, recent neck injury
Vestibular Migraine	Highly variable	Highly variable	Highly variable	Highly variable	History of migraine



## Treatment: quick notes...

- Age and gender do not affect potential for improvement
- Central and vascular causes of vertigo/dizziness could easily have its own presentation (CVA, concussion, MS, etc.)
- Evidence does not support long-term vestibular suppressant usage, negatively affects vestibular rehabilitation
  - Ménière's disease: long-term diuretics usage, and short-term anti-dizziness/nausea medication only during attacks



## Treatment: Benign Paroxysmal Positional Vertigo

Otoconia dislodge from utricle and into semicircular canals.

- Posterior > Horizontal > Anterior;      Right > Left
  - Rarely, can be in multiple canals bilaterally or ipsilaterally
  - If multiple, fully clear one at a time
- Anterior and Posterior treated with same method;  
Horizontal canal treated uniquely
- For mild or resolving BPPV, or unknown canal,  
use Brandt-Daroff Exercise (see later)





# Treatment: BPPV canalith repositioning

Mechanism: orient affected canal to guide otoconia to single exit.

- Epley: Anterior & Posterior canalithiasis
- Semont: Anterior & Posterior cupulolithiasis
- Appiani: Horizontal canalithiasis
- Zuma\*: Horizontal cupulolithiasis

No more than 2 SECONDS for each position change.

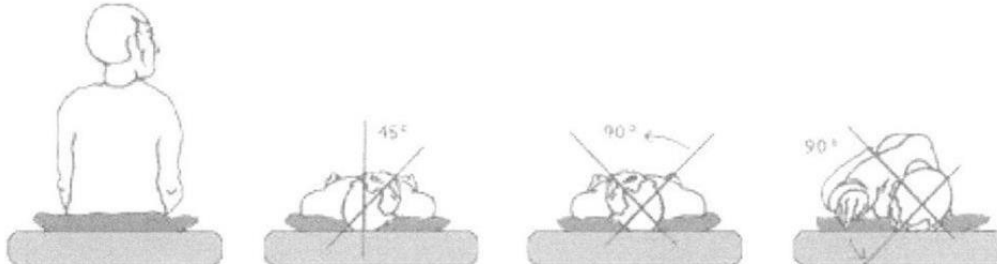
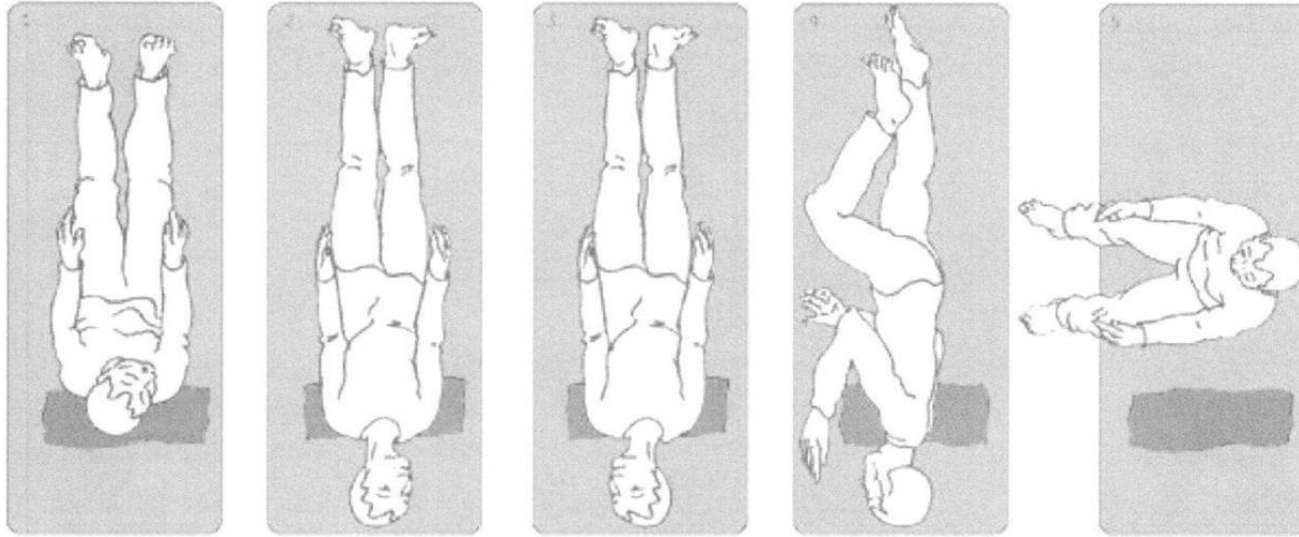
At least 1 MINUTE in each position for otoconia to settle as you progress.

Cupulolithiasis needs HIGH velocity and BRISK deceleration to dislodge.

No positional restrictions are needed following treatment!

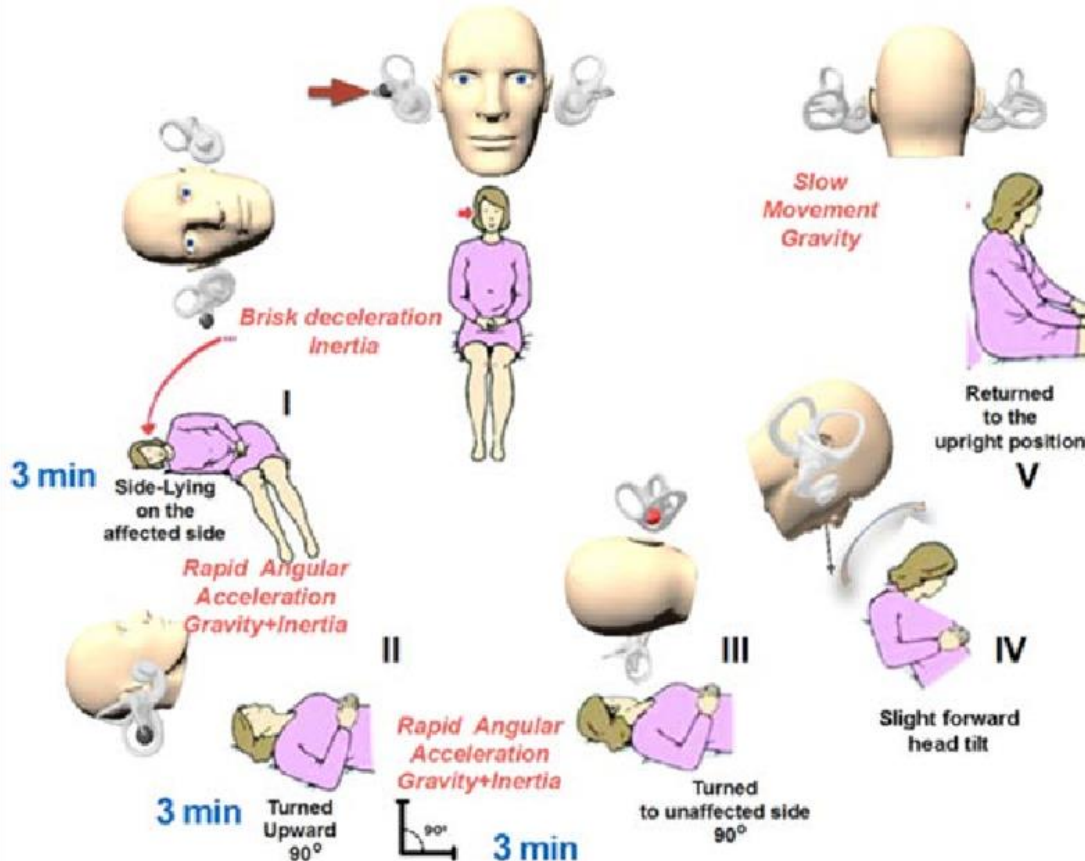


# Treatment: BPPV canalith repositioning, examples



Epley maneuver for  
right posterior canal or  
left anterior canal  
canalithiasis

# Treatment: BPPV canalith repositioning, examples



Zuma\* technique for horizontal canal cupulolithiasis

More recently proposed, high success rate

*Zuma et al.*

Treatment: Vestibular Hypofunction, Vestibular Migraine, Labyrinthitis/Neuritis/Neuronitis, PPPD, Acoustic Neuroma

Each of these will have differences in treatment! But...

VRT for these conditions follow the same general pattern.

- Gaze stabilization exercises
- Habituation drills
- Functional training (isolation and challenge)



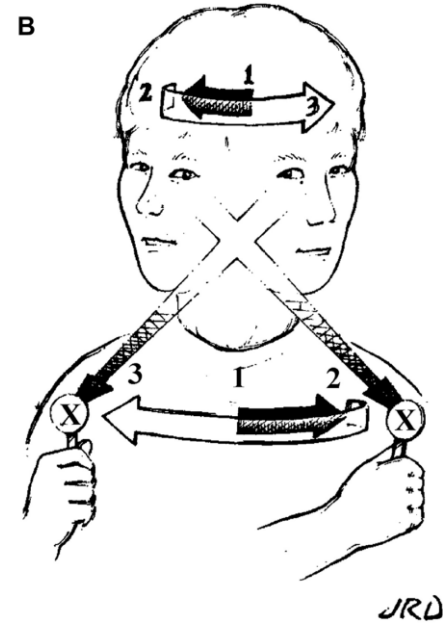
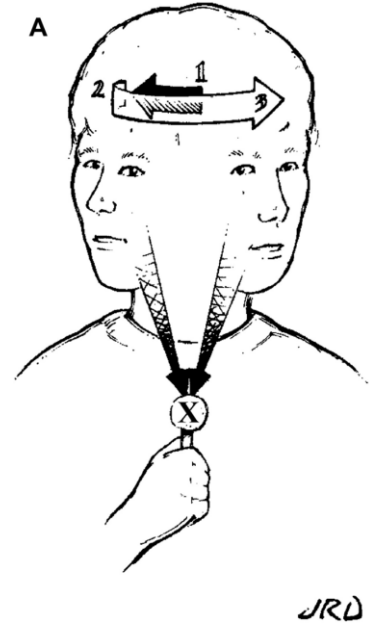
# Treatment: Gaze Stabilization

Hallmark: VOR x1 and VOR x2

(Consider metronome to advance. Can be layered with other tasks like walking.)

VOR x1: Fixed target, constant alternating head movement. Fastest pace without major symptoms or blurry target.

VOR x2: Same neck movement. Target opposes head movement, matching pace and range, ideally. Fastest pace without major symptoms or blurry target.



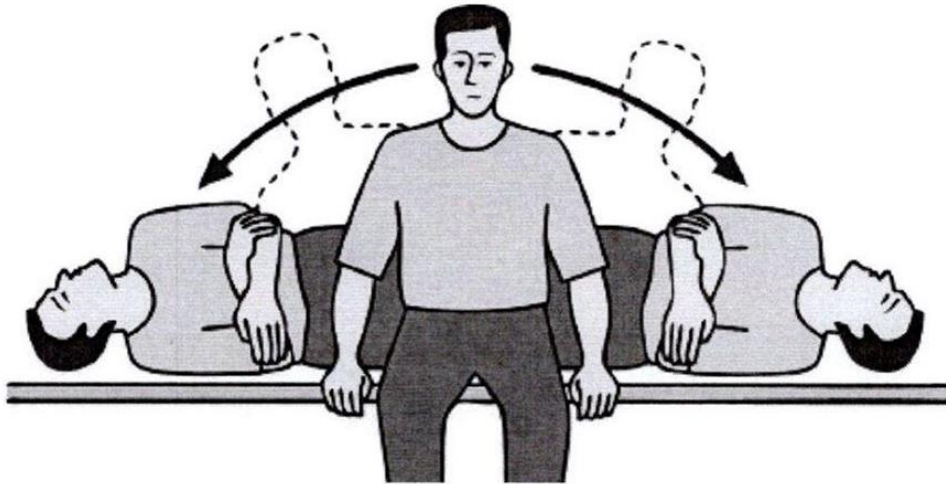
*Hall et al.*



# Treatment: Habituation

Normalize patient to positional changes; long pauses in each position.

Hallmark: Brandt-Daroff Exercise (also used in mild BPPV)



- 5 minutes total
- 30 seconds in each position
- 45 degree cervical rotation in sidelying positions

# Treatment: Functional balance training

## Isolation exercises

Hallmark: Rhombberg stance, unstable surface, eyes closed.

Lack of any visual input, and limited somatosensory input, so demand for vestibular system output is required for postural control and balance in upright position.

## Vestibular challenge exercises

Hallmark: Rhombberg stance, constant, large, head turns.

Increased input to vestibular system while maintaining postural control and balance in upright position.



## Treatment: Cervicogenic Dizziness

Firstly, TREAT THE NECK. Normalize cervical musculature through exercise prescription, postural training, and manual therapy. Unlike cervicalgia alone, be sure to always include gaze stabilization exercises:

- Improves postural control
- Regulates sensory organization
- Gently exercises cervical rotators





## Treatment: The less common

### Superior Canal Dehiscence Syndrome:

- Surgical treatment to reshape bone or entirely plug anterior canal, so vestibular rehabilitation following is highly recommended.

### Post-vestibular nerve section or labyrinthectomy:

- Aggressive isolation exercises to remaining side, consider eyepatch on uninvolved side during exercises to restrict visual input.

### Mal de Debarquement: lit. ‘Sickness of Landing’

- Keys: “Went on a cruise/flight, still at sea/flying”
- Highly personalized vestibular rehab, address psychosocial factors, overall mediocre outcomes, no strong consensus.



# Resources

American Institute of Balance: <https://dizzy.com/medical-healthcare-practitioners/>

APTA Vestibular Rehabilitation SIG: <https://www.neuropt.org/special-interest-groups/vestibular-rehabilitation>

Cleveland Clinic VRT:  
<https://my.clevelandclinic.org/health/treatments/15298-vestibular-rehabilitation>

VeDA: <https://vestibular.org/article/diagnosis-treatment/>



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# Sudden Sensorineural Hearing Loss: A Medical Emergency

Adam M. Cassis, MD  
Otology/Neurotology  
Arizona Hearing and Balance  
Valley ENT



*Improving the Gift of Hearing*



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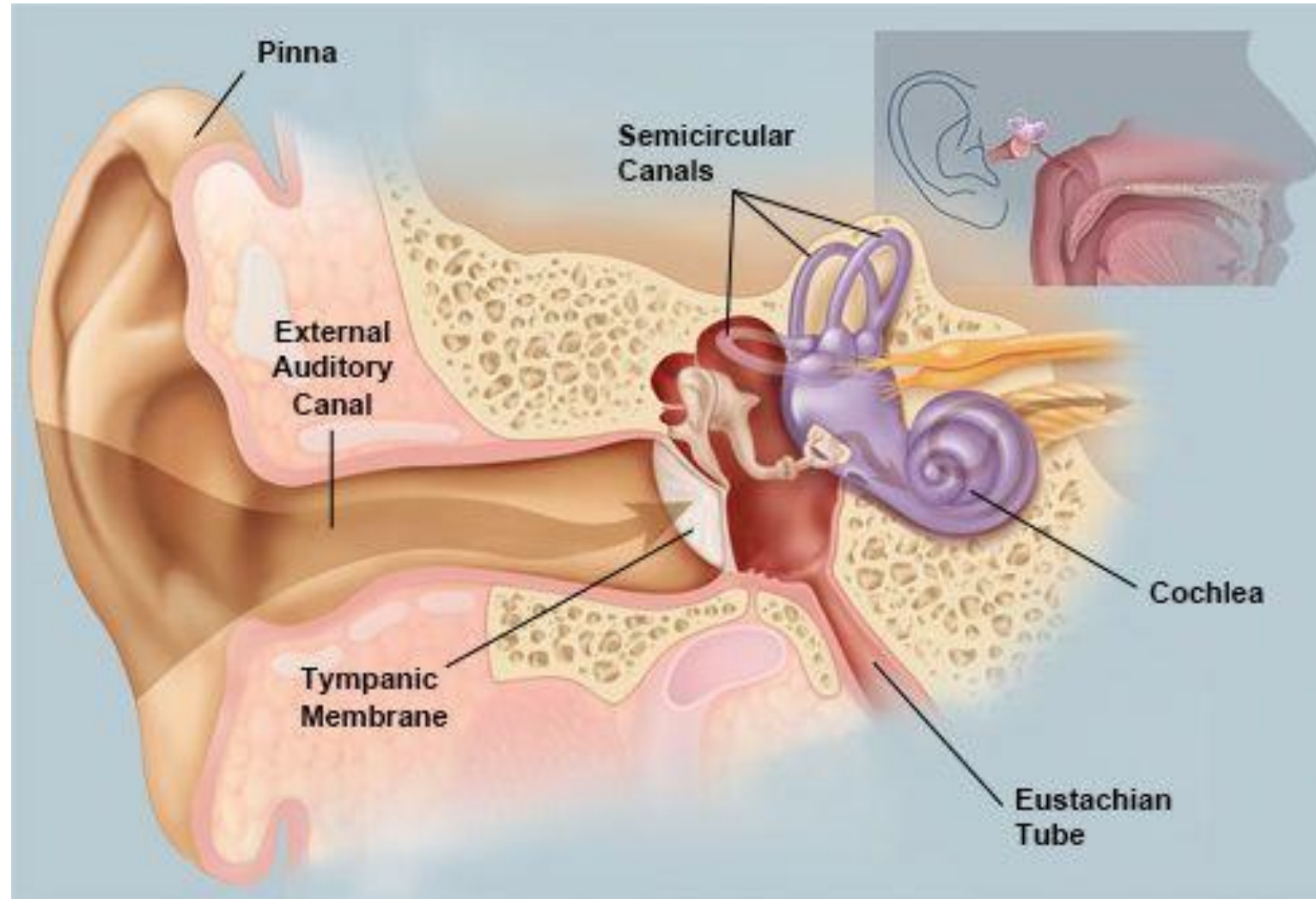


# Objectives

- Identify the impact of SSNHL
- Recognize sudden sensorineural hearing loss (SSNHL) in clinical setting
- Discuss ear exam and how it applies to this process
- Discuss appropriate treatment and referral pattern



# Ear Anatomy Review



# Symptoms of SSNHL (idiopathic)

- Sudden/abrupt onset of hearing loss, usually one ear
- Often accompanied by ear fullness/sensation of fluid in the ear
- Tinnitus (almost universal) and vertigo also common (up to 60%)
- May be preceded by URI/viral illness





# What a patient might say...

- “ I woke up and I cannot hear”
- “ I felt a pop in my ear and my hearing was gone”
- “ It feels like I have water in my ear and it needs to pop or drain”
- “All of a sudden I had loud ringing in my ear and it is hard to hear”
- +/- ...and the world is spinning around, and I feel sick”



# Health Care Burden

## Impact

- Incidence: 66,000 cases/year (likely much higher)
- Results in many healthcare visits
- First visit to PCP/ER/Urgent Care
- Co-morbid dizziness, tinnitus
  - Dizziness upto 60%, may have long term symptoms
  - Tinnitus, almost all patients. **May be predominant symptom**
    - Economic, psych effects
    - Improves if hearing improves

## Unilateral Hearing Loss

- Cannot hear from affected ear, head shadow; can be dangerous
- Problems with sound localization, hearing in noise
- Will compound problem in pre-existing hearing loss
- General decrease in QoL



# Etiology

## Occult

- Viral
- Vascular
- Autoimmune
- Retrocochlear lesion (acoustic neuroma, meningioma, etc)
- **Idiopathic ~90%**

## Clear trigger

- Noise induced
- Pressure/barotrauma
- Ototoxicity (vanc/gentamicin, loop diuretics)



# How to Evaluate a Patient with Unilateral Ear Symptoms

## History

- Duration (SSNHL  $\leq$  3 days)
- Big 4 Otologic symptoms
  - Hearing loss
  - Tinnitus
  - Fullness/pressure
  - Dizziness
- Other focal neuro symptoms



## Physical Exam

- Ear Exam
  - Otoscopy
  - Tuning fork exam
- Neuro exam

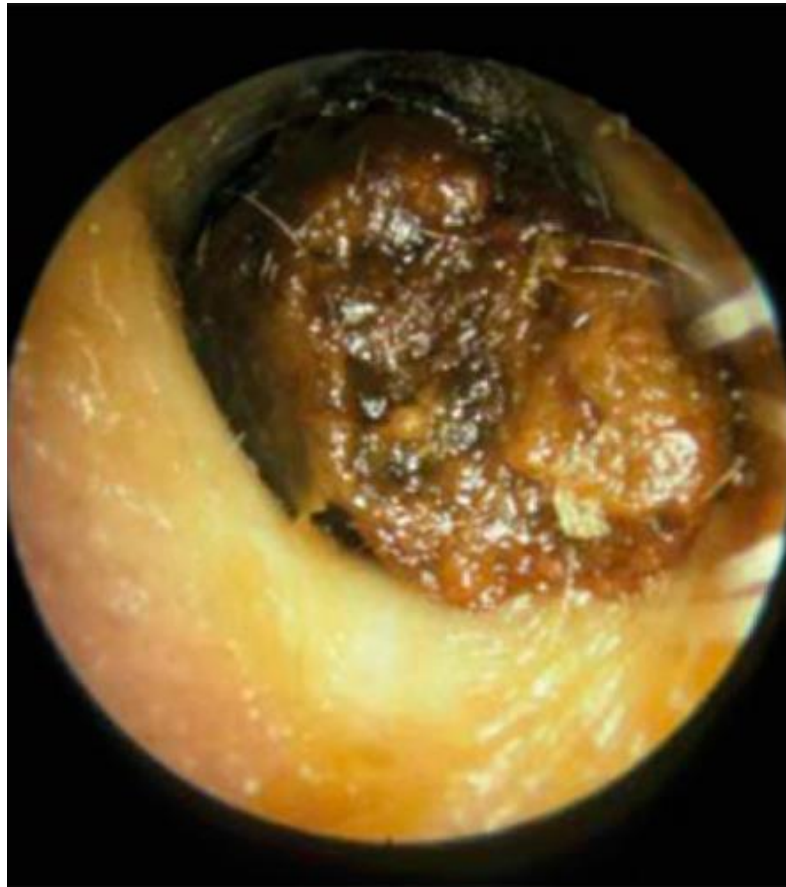


# Otoscopy - Normal



# Otoscopy

**Cerumen impaction**

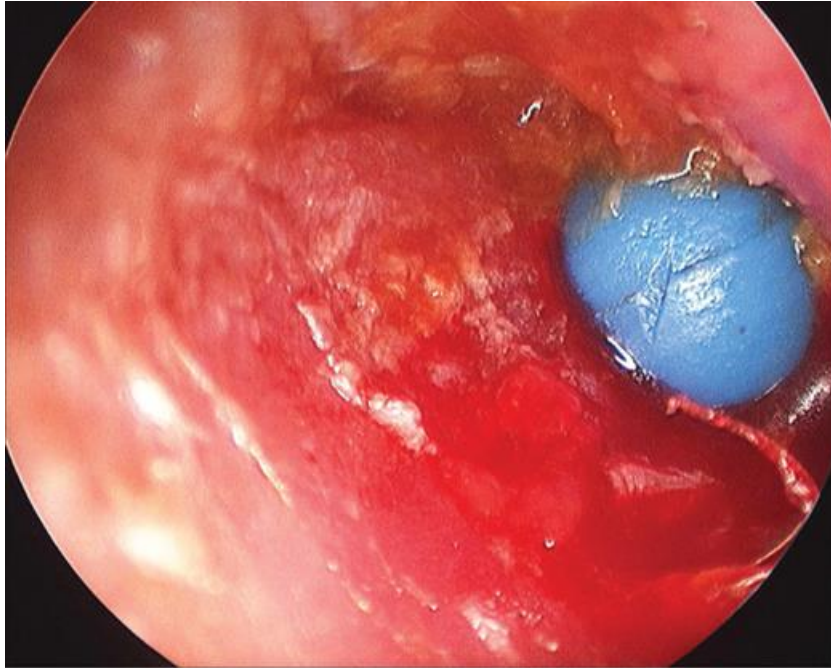


**Otitis Externa**



# Otoscopy

## Foreign body



Source: Usatine RP, Smith MA, Mayeaux EJ, Chumley HS: *The Color Atlas of Family Medicine, Second Edition*: www.accessmedicine.com  
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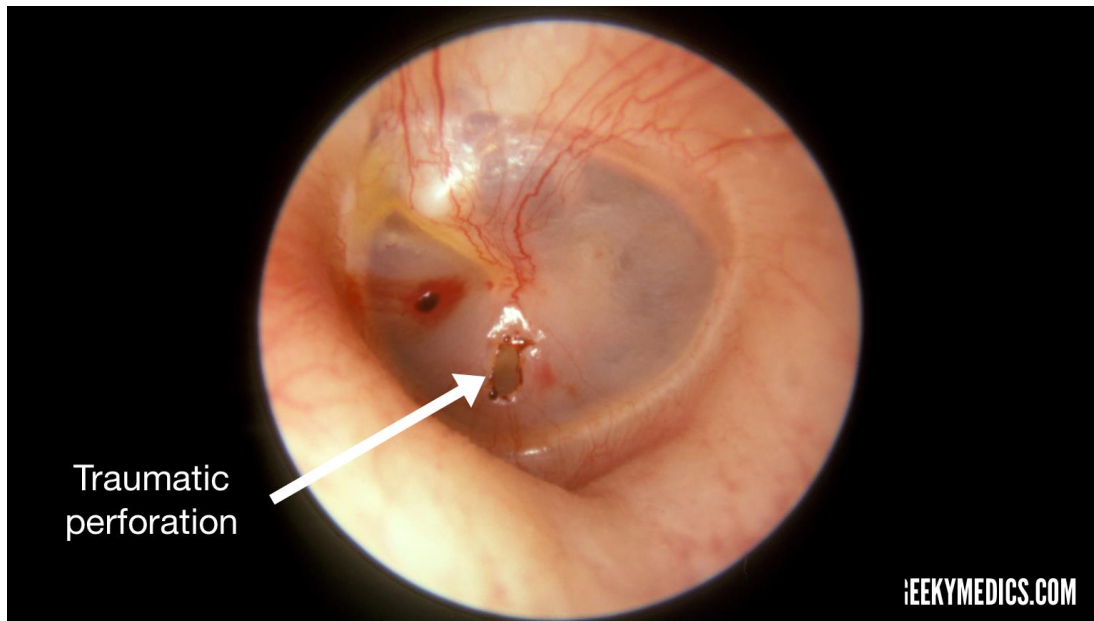
## Foreign Body



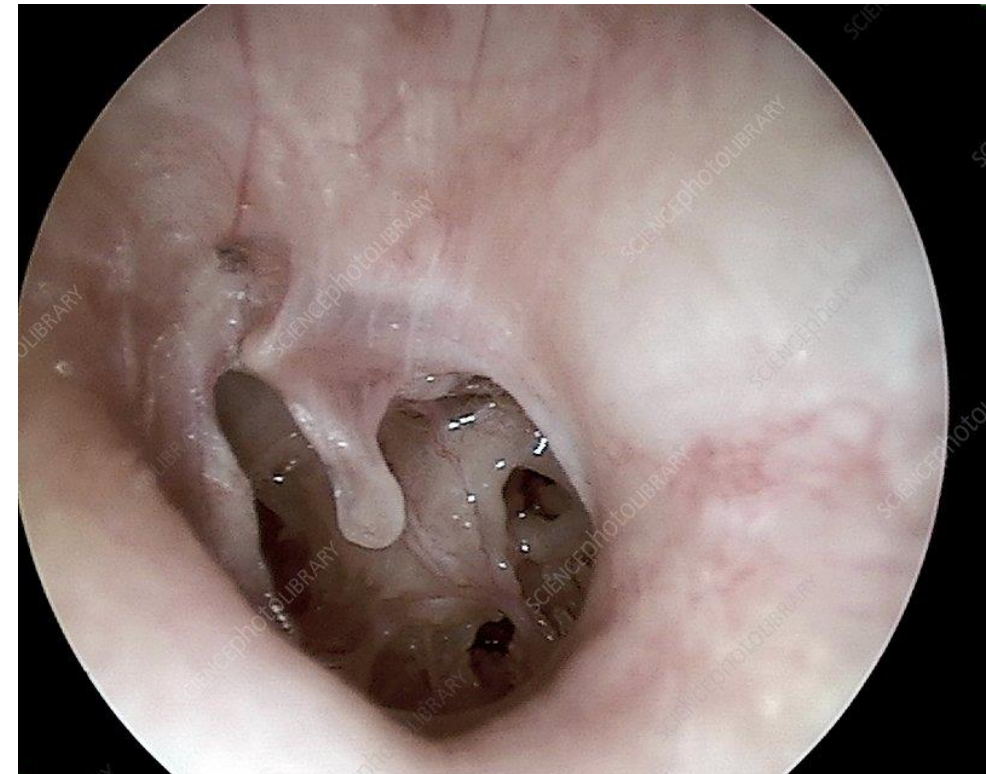
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# Otoscopy

**Tympanic Membrane perf (small)**



**Tympanic Membrane perf (big)**





# Otoscopy

**Otitis Media (purulent, acute)**



**Otitis Media (purulent, suppurative)**



# Otoscopy

**Otitis Media with Effusion (air-fluid)**

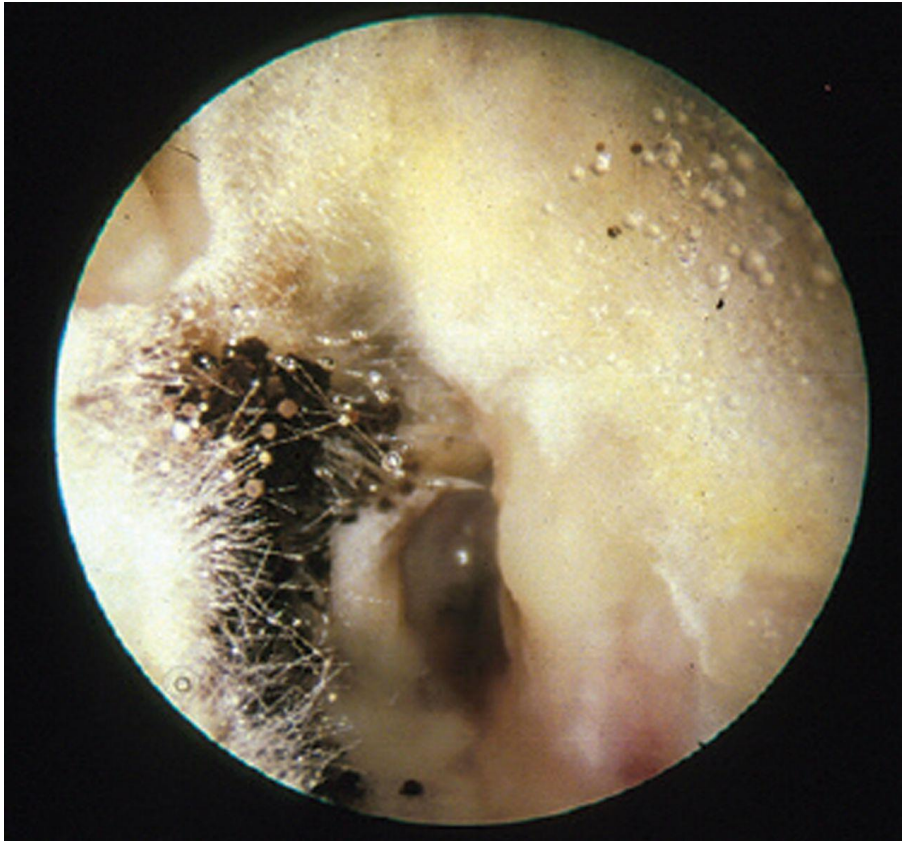


**Otitis Media with Effusion (full)**



# Otoscopy

**Fungal**



**Tympanosclerosis**



# Tuning Fork Exam: Weber

## How to:

- Must be placed on bone (thinner skin area better)
  - Mid forehead
  - Nasal bridge
- Use 512 Hz fork (\$10 Amazon)
- Strike on knee/elbow
  - NOT table/chair/etc
- Ask patient which ear they hear it stronger/louder (right, left, unsure)
  - “lateralizes”

## What it means:

- Lateralize **towards** affected ear: conductive loss, i.e. likely fluid, other middle ear cause
- Lateralize **away** from affected ear: SNHL



# Tuning Fork Exam: Weber

**Correct**



**WRONG**



# Tuning Fork Exam: Rinne

## How to:

- Ask patient which is louder, #1 or #2
- First place on mastoid, behind ear (#1), then immediately place in front of ear, about 2 inches away from EAC (#2)
- Same 512 Hz fork, struck on elbow/knee

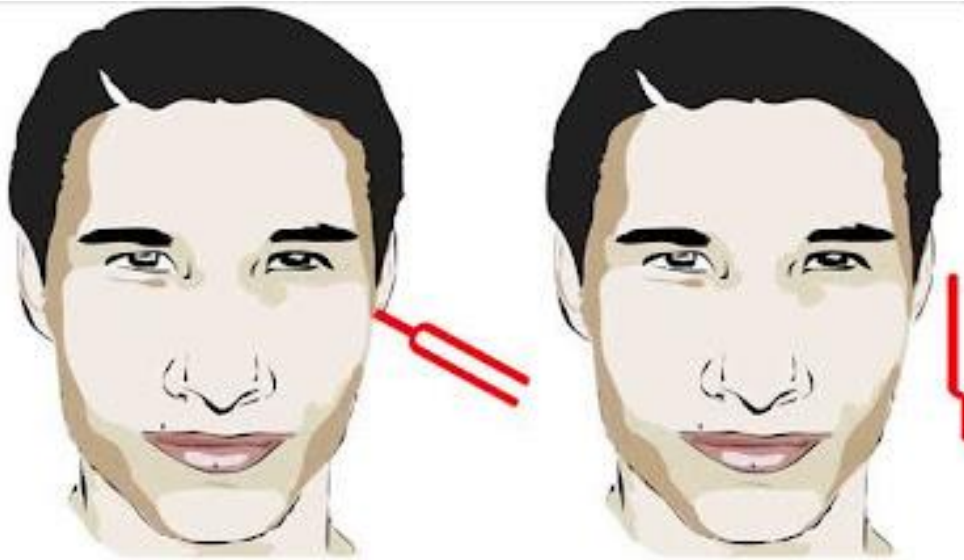
## What it means:

- #1 is louder than #2: conductive loss (ie fluid, middle ear, NOT SSNHL)
- #2 is louder than #1: SNHL (also normal condition)



# Tuning Fork Exam: Rinne

**Correct**



## Rinne's Test

With a 512 Hz tuning fork press against the mastoid bone and then hold it 1cm away from the ear.

'Which is louder, behind the ear or in front?'

**WRONG**



# Tuning Fork Exam - Rinne

- Most important distinguishing portion of exam
- 91% accuracy in non-expert users
- If Rinne test only used in affected ear, could pickup most SNHL

## CAVEAT

- Rinne will may cross over to normal ear in profound losses





# MOST IMPORTANT SLIDE

- Otoscopy with proper tuning fork exam will capture lions share of sudden hearing loss
- Will help guide appropriate therapy and referral
- Reduce morbidity associated with SSNHL with delayed presentation
- When in doubt, refer to ENT



# Workup

## Primary Visit

- Stroke workup, if indicated
- Labs NOT indicated for sudden onset ear symptoms
- CT scan NOT indicated (unless stroke w/u)

## ENT

- H&P
- Audiogram
- MRI (IAC w/wo)



# Common misdiagnosis: “ear infection”

i.e.: otitis media, ear fluid, Eustachian tube dysfunction

## Why the confusion??

- May be preceded by URI/sinus infection/allergies
- Similar symptoms
  - Hearing loss
  - Fullness/pressure
  - Tinnitus
- May be rapid in onset
- Common, but more likely in children

## Why it is a problem

- Leads to use of therapies that delay treatment and are not affective
  - Antibiotics
  - Decongestants
  - Nasal sprays
  - **Inappropriate doses of steroids**



# A Tale of Two Patients: Harris and Julius

## **Harris**

- 50 yo male, otherwise healthy
- Sudden onset hearing loss on right, 1 week ago; recent head cold
- Ear feels full, has sound in the ear
- Minimal dizziness

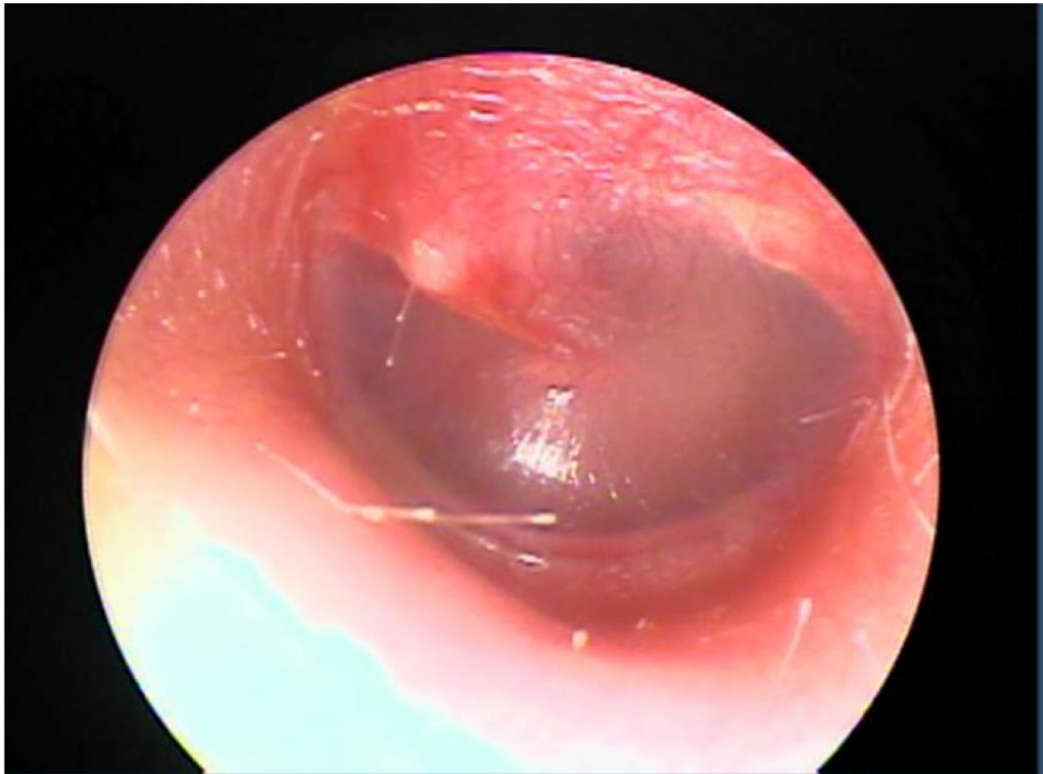
## **Julius**

- 75 yo male, wheelchair bound, multiple medical issues
- Sudden onset hearing loss on right, 1 week ago; recent head cold
- Ear feels full, has sound in the ear
- Severe vertigo, starting to subside

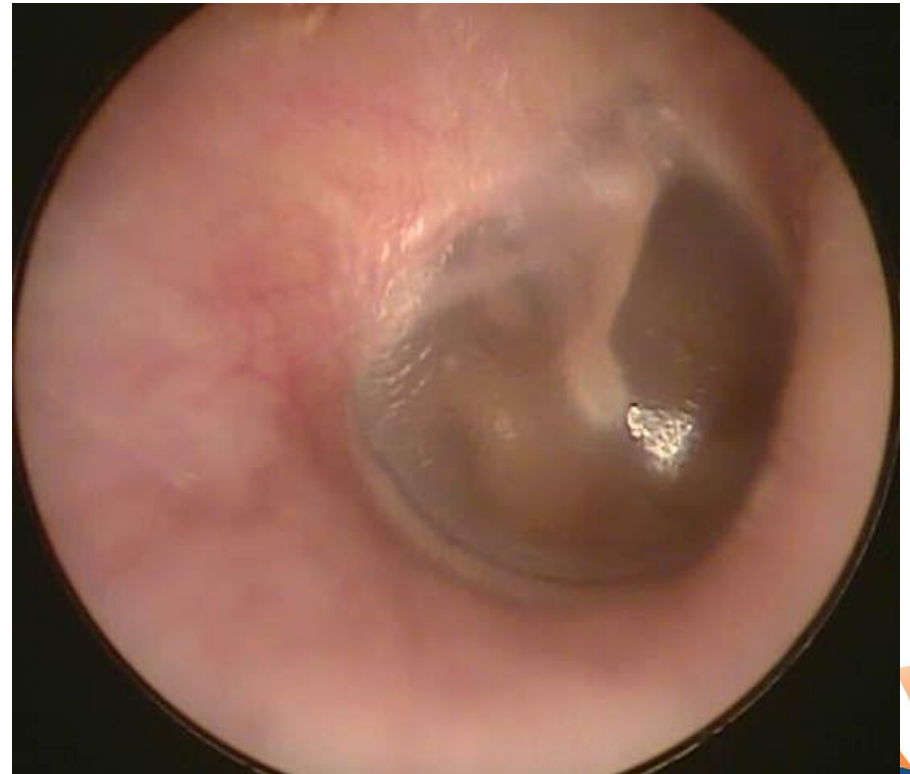


# A Tale of Two Patients: Otoscopy

**Harris**



**Julius**



# A Tale of Two Patients: Forks

## Harris

- Weber to right (conductive)
- Rinne
  - Right: 1>2 (conductive)
  - Left 2>1
- DX: Conductive loss on right

## Julius

- Weber to left (SN)
- Rinne
  - Right: 2>1
  - Left 2>1
  - SN or normal
- DX: SN loss on right



# A Tale of Two Patients

## **Harris**

- Otitis media with effusion

## **Julius**

- Sudden sensorineural hearing loss

Can Be a Challenge to Differentiate Between Otitis Media and SSNHL  
Need to Utilize History, Otoscopy and Tuning forks





# Treatment

## Primary Visit

- Steroids, steroids, steroids
  - High dose: prednisone 60mg daily (at least 7 days if possible)
  - **If unsure OME or SSNHL: GIVE STEROIDS, will help both**
  - If patient has contraindication to oral pred, emergent ENT referral → intra tympanic steroid therapy
- Antibiotics do not help
- Very little evidence antivirals help

## Referral

- When: anytime suspicion of SSNHL exists
- Should be emergent
- Patient with SSNHL should be seen ASAP (same day, next day, same week)
- Referral to ENT should state emergent nature
  - “sudden onset ear pressure”
  - “ear fullness”
  - will result in delay
- **Follow up to ensure patient was contacted**



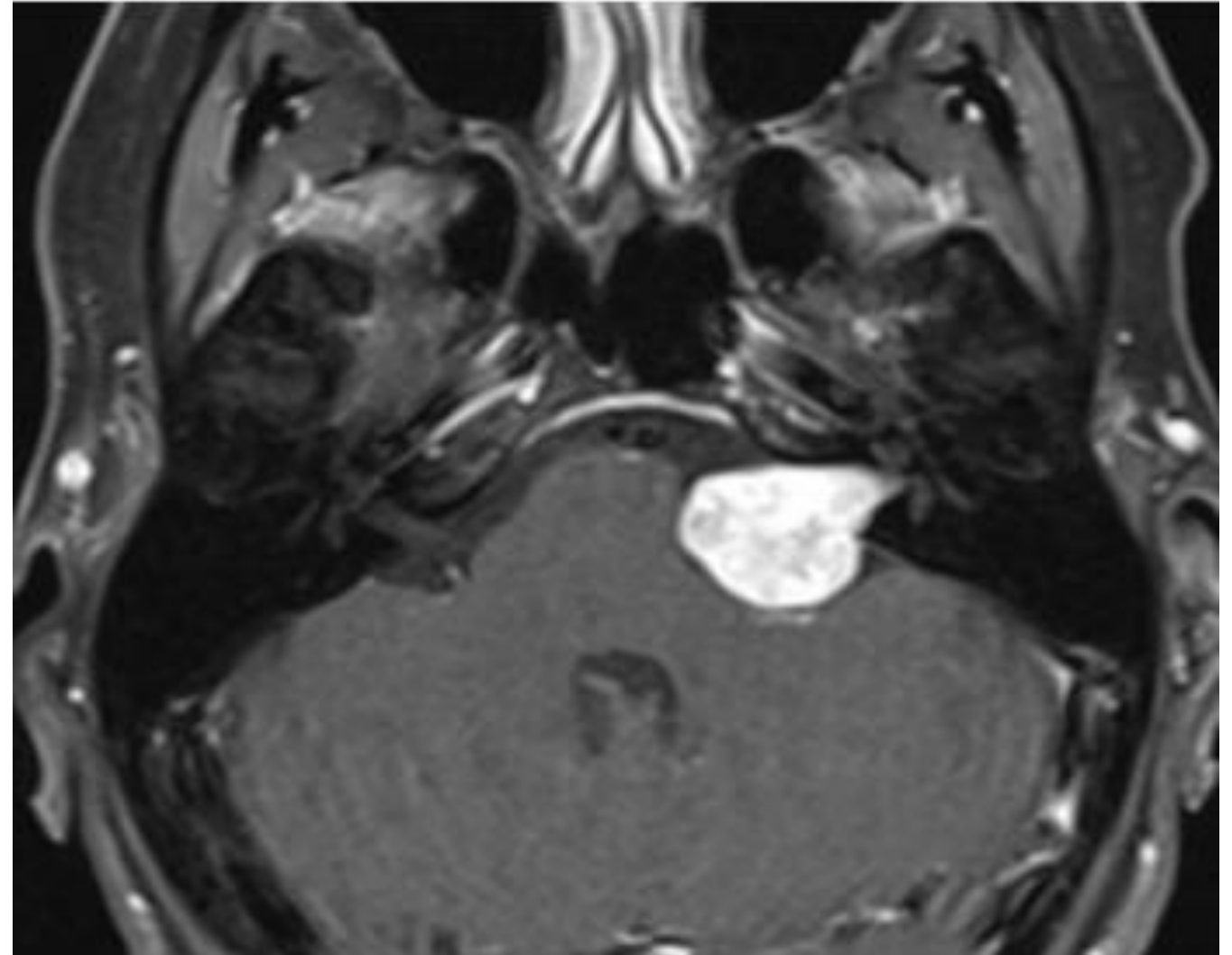


# ENT Referral Visit

## Acoustic Neuroma

### Evaluation

- H&P (with forks)
- Comprehensive audiogram with tympanogram
- Dx: SSNHL
- Treat:
  - High does oral (if not already prescribed): Prednisone 60mg/day once dose QAM for 7-14 days
  - Alternative: intra tympanic steroid injection
    - Failure to respond to oral pred
    - Patient is brittle diabetic
    - Other contraindication
- Order MRI (IAC with/without)



# Prognosis

## Better

- Younger
- No vertigo
- Mild loss
- Low frequency loss
- Small gap between onset and treatment

## Worse

- Older
- Vertigo
- Severe loss
- Diabetes/HTN
- Sloping/flat loss
- Large gap between onset and treatment



# ENT Referral

- Final audiogram around 3 months
- If hearing restored, no further treatment
- If hearing loss, tinnitus persists, discuss hearing aids (if feasible)
- Severe to profound hearing loss, hearing aids do not help
  - CROS vs bone anchored hearing aid
  - Cochlear implant



# Practical Points

- For sudden onset unilateral ear symptoms: suspect SSNHL in DDX
- Ear exam with tuning forks
- Treat with HIGH DOSE steroids
- Emergent referral, can NOT wait



Thank you!

