12th Annual Otolaryngology Literature Update
Sinus & Rhinology II

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Zachary M. Soler, M.D. MSc, joined the MUSC sinus center in 2011. Originally from coastal Florida, Dr. Soler attended medical school at Wake Forest University, followed by a residency in otolaryngology -- head and neck surgery at Oregon Health and Science University. He then completed a fellowship dedicated solely to rhinology and endoscopic sinus surgery at Harvard Medical School.

After fellowship, Dr. Soler spent an additional year at the Harvard School of Public Health, earning a Master's Degree in epidemiology. Dr. Soler's practice is dedicated primarily to diseases of the nose, sinuses, and skull base. He treats adults and children with a wide range of conditions, ranging from common allergies and sinusitis to skull base tumors and CSF leaks. He has particular expertise with difficult-to-manage cases of sinusitis, revision sinus surgery, and surgical treatment of sino-nasal tumors.

Dr. Soler has authored over 200 manuscripts and book chapters related to otolaryngology and rhinology. His research focus is on optimizing clinical outcomes after medical and surgical treatment of chronic sinusitis. He is a principal investigator on several large studies funded through the National Institutes of Health and the American Rhinologic Society. Dr. Soler is board certified through the American Board of Otolaryngology and a member of the American Rhinologic Society.

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Lerner DK, Garvey KL, Arrighi-Allisan A, Kominsky E, Filimonov A, Al-Awady A, Filip P, Liu K, Ninan S, Spock T, Tweel B, van Gerwen M, Schaberg M, Colley P, Del Signore A, Govindaraj S, Iloreta AM. Omega-3 Fatty Acid Supplementation for the Treatment of Persistent COVID-Related Olfactory Dysfunction. Am J Rhinol Allergy. 2023 Sep;37(5):531-540. doi: 10.1177/19458924231174799. Epub 2023 Jun 1. PMID: 37261995.

Lin GC, Sedaghat AR, Bleier BS, Holbrook EH, Busaba NY, Yoon MK, Gray ST. Volumetric analysis of chronic maxillary atelectasis. Am J Rhinol Allergy. 2015 May-Jun;29(3):166-9. doi: 10.2500/ajra.2013.27.4173. PMID: 25975247.

Nabavi M, Arshi S, Bemanian MH, Fallahpour M, Shokri S, Sabouri S, Moosavian F, Nazari J, Bakrani V, Atashrazm F. Doxycycline Improves Quality of Life and Anosmia in Chronic Rhinosinusitis With Nasal Polyposis: A Randomized Controlled Trial. Am J Rhinol Allergy. 2023 Jul;37(4):384-390. doi: 10.1177/19458924231154066. Epub 2023 Feb 5. PMID: 36740870.

Saraswathula A, Liu MM, Kulaga H, Lane AP. Chronic interleukin-13 expression in mouse olfactory mucosa results in regional aneuronal epithelium. Int Forum Allergy Rhinol. 2023 Mar;13(3):230-241. doi: 10.1002/alr.23073. Epub 2022 Aug 23. PMID: 35950767; PMCID: PMC9918612.

Takashima M, Stolovitzky JP, Ow RA, Silvers SL, Bikhazi NB, Johnson CD. Temperature-controlled radiofrequency neurolysis for treatment of chronic rhinitis: 12-month outcomes after treatment in a randomized controlled trial. Int Forum Allergy Rhinol. 2023 Feb;13(2):107-115. doi: 10.1002/alr.23047. Epub 2022 Jul 5. PMID: 35714267; PMCID: PMC10083967.

2022-2023 Sinus Literature Review

Kiawah Conference Center
8/25/23

MUSC SINUS CENTER
Defining Excellence

Zachary M. Soler, MD, MSc
Professor
Division of Rhinology and Sinus Surgery
Medical University of South Carolina

Overview

- August 2022-August 2023
- IFAR, AJRA, Laryngoscope, JACI, JAMA oto, OHNS
- Criteria:
  - Clinical topic (minimal basic science)
  - Inform your clinical/surgical practice
  - Highlight current “trends” in Rhinology
- Rest assured you have not “missed” anything

Overview

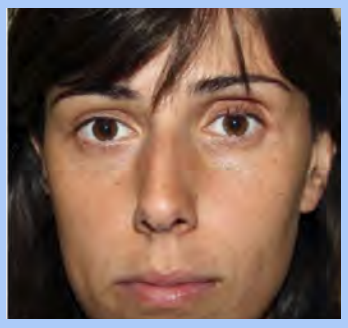
- 23 articles
  - Clinical scenarios for each study
  - Only relevant details (methods/results—variable)
- Key points that impact clinical practice
- Interrupt at any time

Clinical Scenario

- 45 yo F referred by PCP
- Head CT for unrelated showed sinusitis

Clinical Scenario

- No symptoms of sinusitis
- Occasional double vision early in am
- Subtle asymmetry



Questions

- Do I need to do ESS?
- Special technique required?
- If vertical dystopia, will orbital floor implant by required?

Volumetric Analysis of the Sinus and Orbit in Silent Sinus Syndrome After Endoscopic Sinus Surgery

Dev Amin, MD[1], Chandala Chitguppi, MD[1], Vivian Xu, MD[1], Cameron Haghshenas, BS[1], Richard Gorniak, MD[2], Mindy Rabinowitz, MD[1], Elina Toskala, MD, PhD, MBA[1], Marc Rosen, MD[1], and Gurston Nyquist, MD[1]

Age, mean ± SD (range)	38.5 ± 11.6 (25-69)
Gender (M:F)	5:8
Laterality	
Right	9 (69)
Left	4 (31)
Visual complaints	
Diplopia	1 (8)
Ophthalmologic abnormalities	
Enophthalmos	3 (23)
Hypoglobus	3 (23)
Diplopia	1 (8)
Ptosis	1 (8)
Hypertropia	1 (8)
Pseudo lid retraction	1 (8)
Radiological features	
Displaced orbital floor	13 (100)
Opacified maxillary sinus	12 (92)
Blocked OM complex	7 (54)

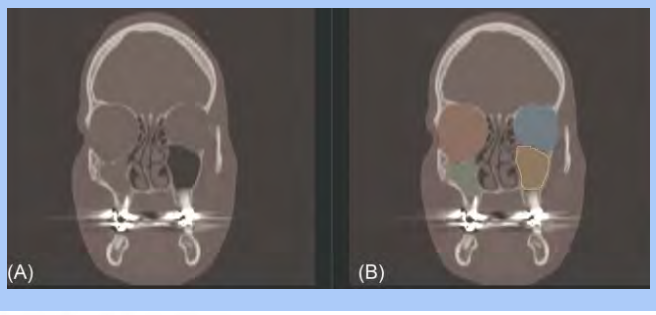


Table 2. Sinus and Orbit Changes After ESS

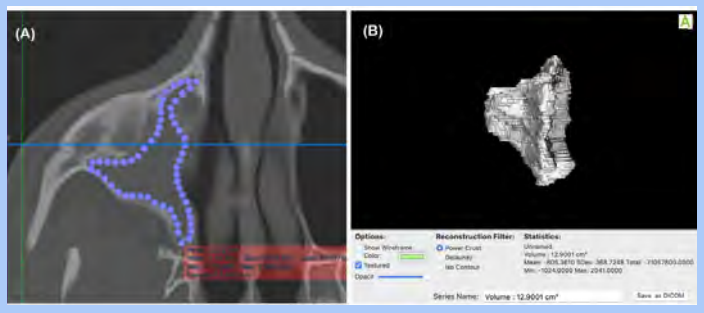
Measured change after ESS	
Sinus volume	9.82%[a]
Orbital volume	−3.96%
Orbital height	−5.67%[a]

- No patients required orbital surgery for functional or cosmetic concerns

CLINICAL LETTER

Maxillary sinus volume changes after functional endoscopic sinus surgery in patients with chronic maxillary atelectasis and silent sinus syndrome

Juan Carlos Hernaiz-Leonardo MD MSc[1] | Marwan Alqunaee MD[1] | Saba Moghimi MD PhD[2] | Bader M. Alim MD[1] | Farnaz Javadian MD[3] | Saba Vafaei-Nodeh BSc[4] | Athenea Pascual PhD[1] | Amin Javer MD[1]



CLINICAL LETTER

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	Preoperative	Postoperative
Enophthalmos, *n* (%)	10 (45)	3 (16)
Hypoglobus, *n* (%)	7 (31)	2 (9.1)
Months between CT scan and FESS, *n* (%)		
<6 months	12 (54.5)	3 (13)
≥6 months	10 (45.5)	19 (86.4)
Estimated volumes (cm^3), median [minimum, maximum]		
CMA/SSS orbit volumes	27.2 [23.2, 36.6]	26.9 [24.5, 37.5]
Control orbit volumes[a]	28.4 [26.1, 28.6]	28.4 [26.0, 29.9]
CMA/SSS sinus volumes	8.1 [1.70, 18.3]	8.9 [2.40, 18.8][b]
Control sinus volumes[a]	19.4 [10.2, 23.5]	18.5 [11.4, 23.5]

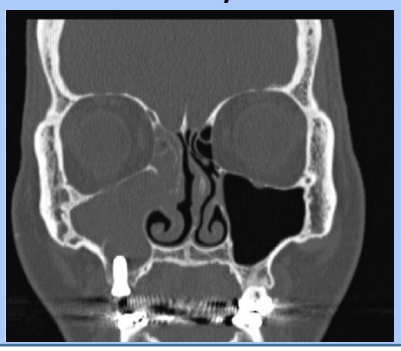
- Sinus volume increased from 8.1 to 8.9 cm3 (p=0.005)

Take Home Message:

- ESS alone successful for most patients with SSS
- Minority of patients may require orbital floor surgery
  - Combined surgery not indicated
  - Wait 6 months usually
- Unrecognized subtle SSS can be a predisposing factor for orbital injury during FESS

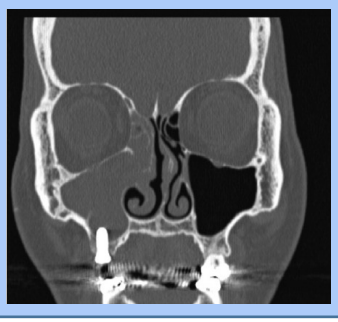
Clinical Scenario

- 59 yo M with sinus infection s/p dental implant (3 months ago)
- Sxs ongoing 4+ weeks
- Failed amoxicillin X 7 days



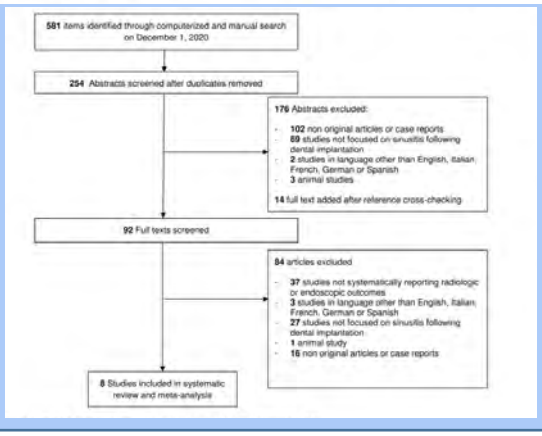
Questions

- Is it possible to salvage with antibiotics alone?
- When to do ESS?
- Is it possible to salvage with ESS?
- When does implant need to be removed?



Treatment of Sinusitis Following Dental Implantation: A Systematic Review and Meta-Analysis

Fabiana Allevi, MD, PhD[1,2,*], Gian Luca Fadda, MD[2,3,*], Cecilia Rosso, MD[4], Federica Martino, MD[5], Carlotta Pipolo, MD[2,4], Giovanni Cavallo, MD[2,3], Giovanni Felisati, MD[2,4,†], and Alberto Maria Saibene, MD, MA[2,4,†]



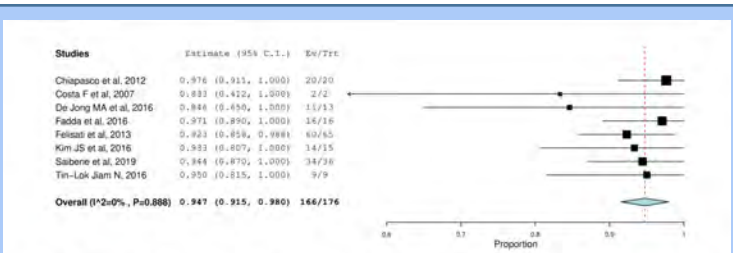


Figure 2. The pooled success rate in patients undergoing treatment for sinusitis following dental implantation. Effects and summaries were calculated using a random effect model weighted by the study population.

- N=181 patients
  - N=28 implants left in place
  - N=153 implants removed concurrently
- Infection resolution in 94.7% (95% CI: 91.5%–98%)

Take Home Message:

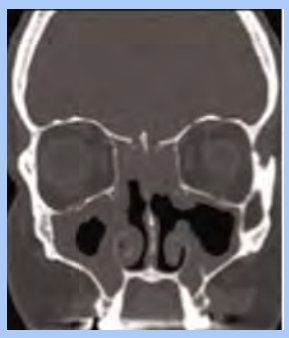
- Existing data is limited/sparse
- ESS appropriate after initial antibiotic failure
  - How much initial abx is enough?
- ESS typically successful, but….
  - Not great data to estimate success of retaining implant
  - In general
    - A well integrated implant might survive
    - Loose implant or infected bone graft likely to fail
- Low threshold for ESS

Clinical Scenario

- 45 yo F with CRSwNP s/p ESS X 2
  - Last surgery 5 years ago
  - Surgery helped breathing but smell poor
- Patients works as chef and poor smell has made work challenging
- Endoscopy
  - Open maxillary, ethmoid and sphenoid
  - Polypoid change of ethmoid roof, frontal recess, and middle turbinates
  - Fairly open nasal airway

Clinical Scenario

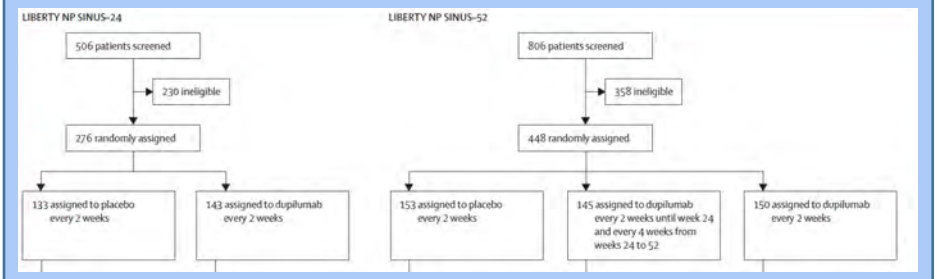
- Treatment options offered
  - Oral prednisone + steroid rinses
  - Revision ESS with Lothrop
  - Dupilumab (or other biologic)
- Patient chose dupilumab
- Improvement in smell within 2 weeks
- Sniffin Sticks:
  - Anosmic to mild hyposmic
- What is mechanism of action???



Original Article

Olfactory Outcomes With Dupilumab in Chronic Rhinosinusitis With Nasal Polyps

Joaquim Mullol, MD, PhD[a], Claus Bachert, MD, PhD[b,c], Nikhil Amin, MD[d], Martin Desrosiers, MD[e], Peter W. Hellings, MD, PhD[f], Joseph K. Han, MD[g], Roger Jankowski, MD, PhD[h], Jan Vodicka, MD, PhD[i], Philippe Gevaert, MD, PhD[b], Nadia Daizadeh, PhD[j], Asif H. Khan, MBBS, MPH[k], Siddhesh Kamat, MS, MBA[d], Naimish Patel, MD[l], Neil M.H. Graham, MD, MPH[d], Marcella Ruddy, MD[d], Heribert Staudinger, MND, PhD[l], and Leda P. Mannent, MD[k] *Barcelona, Catalonia, Spain; Ghent and Leuven, Belgium; Stockholm, Sweden; Tarrytown, NY; Montreal, Quebec, Canada; Norfolk, Va; Nancy and Chilly-Mazarin, France; Pardubice, Czech Republic; Cambridge, Mass; Bridgewater, NJ*



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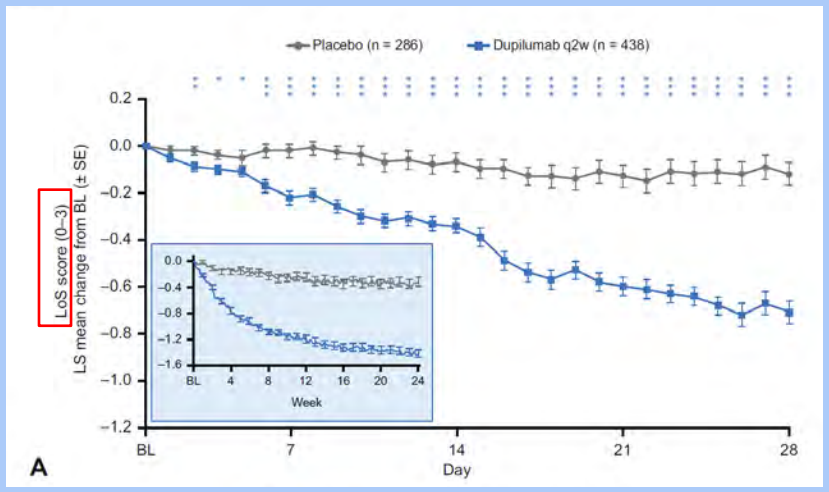

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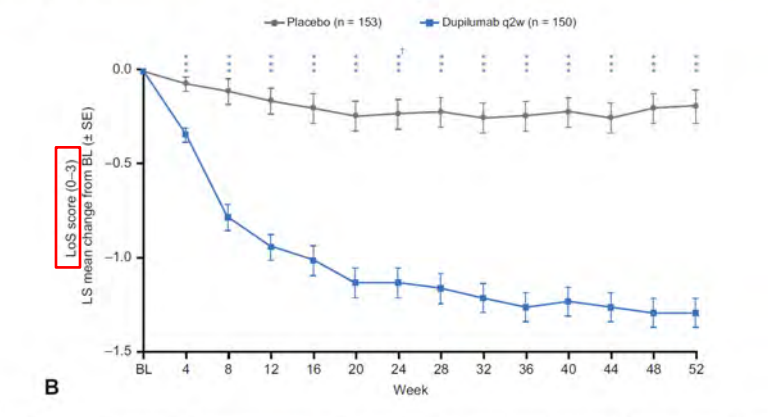

Olfactory cleft mucus inflammatory proteins in CRS: a case-control study

Timothy L. Smith MD, MPH[1] | Rodney J. Schlosser MD[2,3] | Zachary M. Soler MD, MSc[2] | Jess C. Mace MPH[1] | Jose L. Mattos MD, MPH[4] | Vijay R. Ramakrishnan MD[5] | Daniel M. Beswick MD[5] | Jeremiah A. Alt MD, PhD[6] | Jennifer K. Mulligan PhD[7]

TABLE 4 Proportion of patients with abnormal cytokine levels*

Cytokine	Percent of patients in each group having abnormal protein expression n (%) All subjects with CRS	CRSsNP	CRSwNP	Test statistic: CRSsNP vs CRSwNP	95% CI	Unadjusted *p*	q-values
CCL2	22 (14.6)	2 (3.1)	20 (23.0)	OR = 9.25	2.08–41.23	0.0035	0.022
CCL3	80 (53.0)	23 (35.9)	57 (65.5)	OR = 3.39	1.72–6.66	0.0004	0.003
CCL5	50 (33.1)	22 (34.4)	28 (32.2)	OR = 0.91	0.46–1.80	0.777	0.883
CCL11	21 (13.9)	9 (14.1)	12 (13.8)	OR = 0.98	0.39–2.48	0.962	>0.990
CCL20	68 (45.0)	29 (45.3)	39 (44.8)	OR = 0.98	0.51–1.88	0.952	>0.990
CXCL1	106 (70.2)	47 (73.4)	59 (67.8)	OR = 0.76	0.37–1.56	0.456	0.713
CXCL5	29 (19.2)	13 (20.3)	16 (18.4)	OR = 0.88	0.39–2.00	0.767	0.913
CXCL9	26 (17.2)	11 (17.2)	15 (17.2)	OR = 1.00	0.43–2.36	0.993	0.993
CXCL11	21 (13.9)	12 (18.8)	9 (10.3)	OR = 0.50	0.20–1.27	0.140	0.438
EGF	21 (13.9)	10 (15.6)	11 (12.6)	OR = 0.78	0.31–1.97	0.601	0.791
bFGF	70 (46.4)	28 (43.8)	42 (48.3)	OR = 1.20	0.63–2.30	0.582	0.808
IgE	46 (32.6)	14 (23.3)	32 (39.5)	OR = 2.15	1.02–4.52	**0.043**	**0.179**
IL2	25 (18.5)	11 (20.4)	14 (17.3)	OR = 0.82	0.34–1.97	0.651	0.814
IL4	10 (7.4)	3 (5.6)	7 (8.6)	OR = 1.61	0.40–6.51	0.502	0.738
IL5	57 (42.2)	7 (13.0)	50 (61.7)	OR = 10.83	4.35–26.95	<0.0001	<0.0001
IL6	31 (23.0)	10 (18.5)	21 (25.9)	OR = 1.54	0.66–3.59	0.316	0.527
IL8	0 (0.0)	0 (0.0)	0 (0.0)	—	—	—	—
IL9	30 (22.2)	7 (13.0)	23 (28.4)	OR = 2.66	1.05–6.74	**0.035**	**0.175**
IL10	76 (56.3)	26 (48.1)	50 (61.7)	OR = 1.74	0.87–3.49	0.119	0.425
IL13	56 (41.5)	8 (14.8)	48 (59.3)	OR = 8.36	3.50–20.00	<0.0001	0.0001
IL17A	34 (25.2)	10 (18.5)	24 (29.6)	OR = 1.85	0.80–4.27	0.145	0.403

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CCL20	68 (45.0)	29 (45.3)	39 (44.8)
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CXCL5	29 (19.2)	13 (20.3)	16 (18.4)
CXCL9	26 (17.2)	11 (17.2)	15 (17.2)
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IL13	56 (41.5)	8 (14.8)	48 (59.3)
IL17A	34 (25.2)	10 (18.5)	24 (29.6)

CRSwNP Patients

IL-13 elevated in 59.3%

IL-5 elevated in 61.7%

IgE elevated in 39.5%

Correlation of mucus inflammatory proteins and olfaction in chronic rhinosinusitis

Zachary M. Soler, MD, MSc[1], Frederick Yoo, MD[1], Rodney J. Schlosser, MD[1], Jennifer Mulligan, PhD[1], Vijay R. Ramakrishnan, MD[2], Daniel M. Beswick, MD[2], Jeremiah A. Alt, MD, PhD[3], Jose L. Mattos, MD, MPH[4], Spencer C. Payne, MD[4], Kristina A. Storck, MSPH[1] and Timothy L. Smith, MD, MPH[5]

TABLE 4. Correlation between TDI and olfactory cleft mucus protein concentration, overall cohort, and by polyp status

	All			CRSsNP			CRSwNP		
	R	p	n	r	p	n	r	p	n
CCL2	−0.509	<0.001	62	−0.137	0.514	25	−0.501	0.002	37
CCL3	−0.460	<0.001	62	−0.147	0.482	25	−0.316	0.057	37
IL-5	−0.427	0.001	54	−0.016	0.948	20	−0.341	0.048	34
IL-6	−0.443	0.001	54	−0.027	0.910	20	−0.477	0.004	34
IL-13	−0.408	0.002	54	−0.004	0.988	20	−0.374	0.029	34
IL-10	−0.419	0.002	54	0.059	0.805	20	−0.442	0.009	34
IL-9	−0.367	0.006	54	−0.135	0.570	20	−0.338	0.050	34
IgE	−0.313	0.018	57	−0.009	0.965	24	−0.319	0.070	33
IL-23	−0.310	0.023	54	−0.035	0.882	20	−0.289	0.097	34
VEGF-A	0.258	0.043	62	−0.106	0.615	25	0.309	0.063	37
TNF-α	−0.249	0.070	54	0.208	0.379	20	−0.342	0.047	34
CXCL5	0.207	0.106	62	0.465	0.019	25	0.300	0.072	37
IL-17A	−0.184	0.184	54	0.361	0.118	20	−0.192	0.278	34
IL-17F	−0.179	0.195	54	−0.005	0.984	20	−0.277	0.113	34
CXCL11	0.156	0.225	62	0.077	0.714	25	0.068	0.691	37
CCL20	−0.153	0.234	62	−0.083	0.694	25	−0.198	0.241	37
CCL5	−0.151	0.243	62	0.114	0.586	25	−0.342	0.038	37
IL-8	−0.106	0.447	54	−0.208	0.378	20	−0.079	0.657	34

Correlation of mucus inflammatory proteins and olfaction in chronic rhinosinusitis

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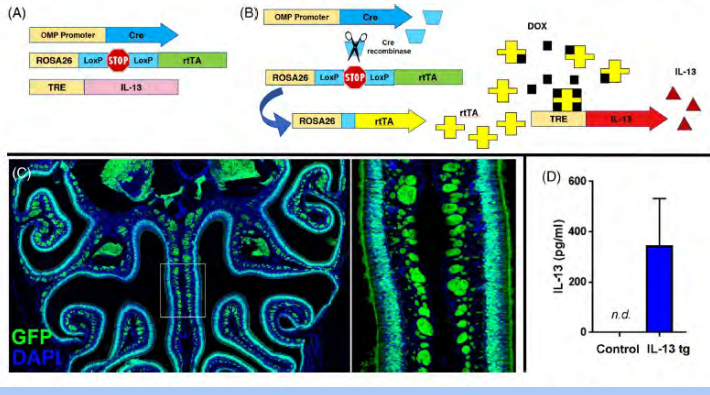
TABLE 6. Correlations between overall olfactory cleft opacification and olfactory cleft protein concentrations

	All patients			CRSsNP			CRSwNP		
	R	*p*	*n*	*r*	*p*	*n*	*r*	*p*	*n*
IL-5	0.668	<0.001	37	0.243	0.424	13	0.386	0.063	24
IL-10	0.621	<0.001	37	0.220	0.470	13	0.455	0.025	24
VEGF-A	−0.508	0.001	43	0.168	0.535	16	−0.446	0.020	27
IL-13	0.507	0.001	37	0.212	0.486	13	0.257	0.226	24
IL-6	0.515	0.001	37	0.143	0.642	13	0.600	0.002	24
IL-17A	0.503	0.001	37	0.157	0.608	13	0.263	0.215	24
CCL2	0.425	0.005	43	0.147	0.587	16	0.255	0.199	27
CCL3	0.421	0.005	43	0.000	10.000	16	0.252	0.204	27
IL-9	0.442	0.006	37	0.264	0.384	13	0.188	0.380	24
IgE	0.427	0.007	39	−0.095	0.735	15	0.424	0.039	24
CCL5	0.284	0.065	43	0.281	0.292	16	0.319	0.105	27
TNF-α	0.260	0.120	37	−0.138	0.654	13	0.186	0.383	24
CXCL11	−0.198	0.203	43	0.032	0.905	16	−0.033	0.872	27
IL-23	0.202	0.230	37	−0.028	0.928	13	−0.017	0.937	24
EGF	−0.166	0.287	43	−0.280	0.294	16	−0.067	0.741	27
IL-17F	0.139	0.412	37	−0.114	0.711	13	0.153	0.475	24
IL-33	−0.107	0.528	37	−0.159	0.603	13	−0.096	0.657	24
IL-8	0.105	0.538	37	0.473	0.102	13	−0.066	0.760	24

Chronic interleukin-13 expression in mouse olfactory mucosa results in regional aneuronal epithelium

Anirudh Saraswathula MD, MS | Melissa M. Liu MD, PhD | Heather Kulaga MS | Andrew P. Lane MD



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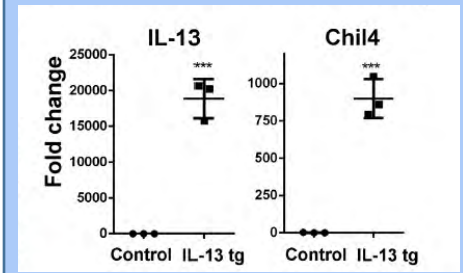

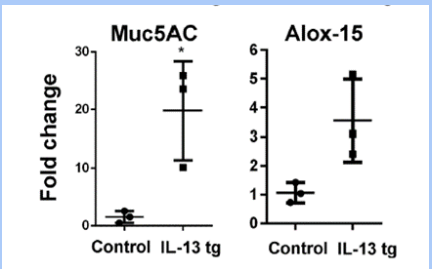

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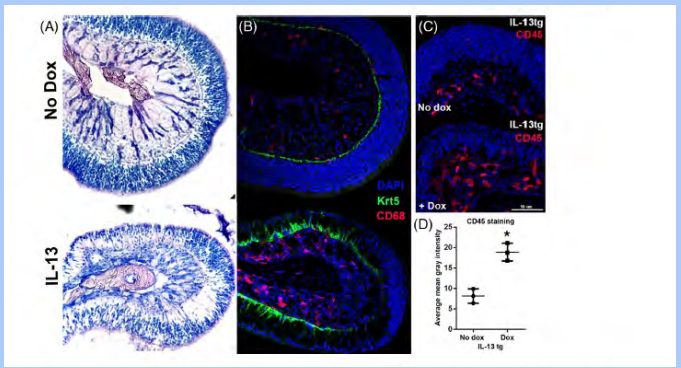

- >2X inflammatory infiltrate
- Macrophages in lamina propria
- Regional loss of neurons

Chronic interleukin-13 expression in mouse olfactory mucosa results in regional aneuronal epithelium

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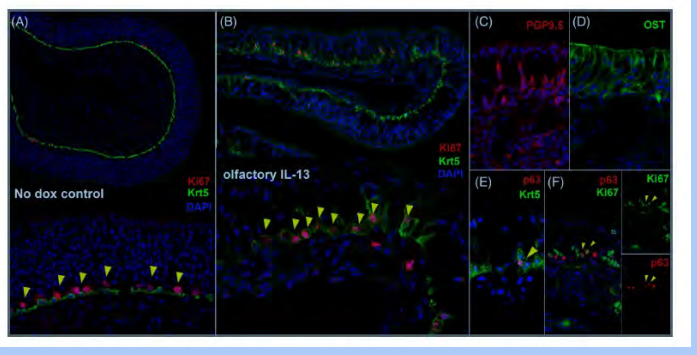
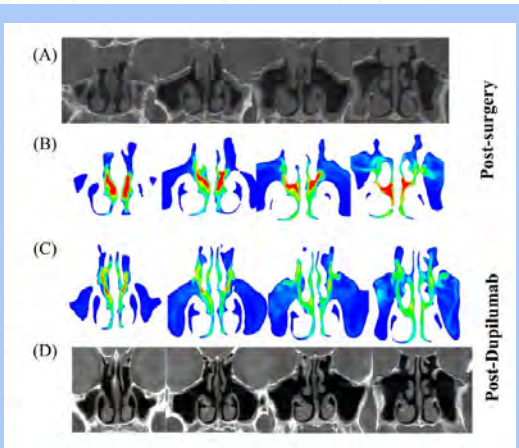


- Loss of mature neurons
- Activation of proliferation of basal cells
- Expanded sustentacular cells

Computational fluid dynamic modeling of the effect of dupilumab in the management of anosmia secondary to chronic rhinosinusitis with nasal polyps (CRSwNP)

Thomas J. Lepley BS | Zhenxing Wu PhD | Zach Root BS | Drew Mountain | Bradley A. Otto MD | Kathleen Kelly MD | Kai Zhao PhD



Take Home Message:

- Rod presented data yesterday that olfactory outcomes equivalent between ESS and dupilumab
- But, the mechanism may be different
- Dupilumab
  - May reverse direct neural damage at level of olfactory epithelium (ie sensory)
  - Also improves regional airflow to olfactory cleft (ie conductive)
- MUSC Dupilumab Study….

Clinical Scenario

- 24 yo F with 1.5 years of bilateral nasal congestion
- Flonase not helping
- Endoscopy
  - Bilateral polyps
  - Scant whitish mucus
  - No frank purulence
- Initial medical treatment
  - Oral steroid taper
  - Topical steroids
  - What about antibiotics???

Doxycycline Improves Quality of Life and Anosmia in Chronic Rhinosinusitis With Nasal Polyposis: A Randomized Controlled Trial

Mohammad Nabavi, MD[1], Saba Arshi, MD[1], Mohammad Hassan Bemanian, MD[1], Morteza Fallahpour, MD[1], Sima Shokri, MD[1], Sofia Sabouri, MD[2], Fatima Moosavian, MD[2], Javad Nazari, MD[1], Vahid Bakrani, MD[1], and Fatemeh Atashrazm, MD[1]

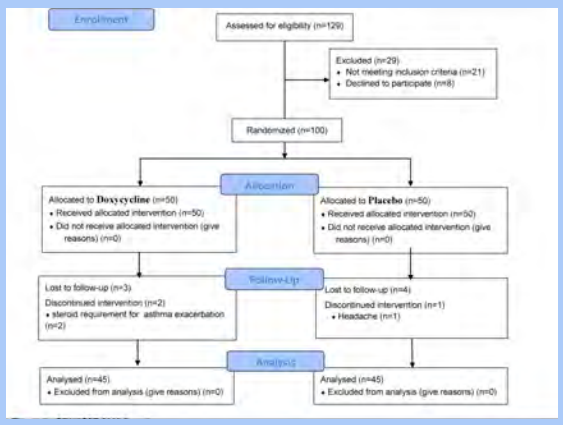


Table 1. Comparison of Demographic Data at Baseline Between the 2 Groups.

Variables		Doxycycline group	Placebo group	Total
Age	Mean (SD)	39.9 ± 10.8	42.3 ± 9.1	40.9 ± 10.0
BMI	Mean (SD)	25.0 ± 3.8	26.3 ± 4.5	25.7 ± 4.2
Gender	Female	23 (51.1)	26 (57.8)	49 (54.4)
	Male	22 (48.9)	19 (42.2)	41 (45.6)
Asthma	No	8 (17.8)	15 (33.3)	23 (25.6)
	Yes	37 (82.2)	30 (66.7)	67 (74.4)
NERD	No	30 (66.7)	31 (68.9)	61 (67.8)
	Yes	15 (33.3)	14 (31.1)	29 (32.2)
History of allergy	No	8 (17.8)	6 (13.3)	14 (15.6)
	Yes	37 (82.2)	39 (86.7)	76 (84.4)
Familial history of allergy	No	15 (33.3)	17 (37.8)	32 (35.6)
	Yes	30 (66.7)	28 (62.2)	58 (64.4)
Familial history of nasal polyps	No	32 (17.1)	35 (77.8)	67 (74.4)
	Yes	13 (28.9)	10 (22.2)	23 (25.6)

Values expressed as mean ± standard deviation or n (%).
Abbreviations: BMI, body mass index; NERD, NSAID-exacerbated respiratory disease.

Table 2. Comparison of Clinical Data at Baseline Between the 2 Groups.

Variables		Doxycycline group	Placebo group	Total	P
History of sinus surgery	N (%)	19 (42.2)	23 (51.1)	42 (46.6)	.161
Duration of disease onset	Mean (SD)	9.6 (5.6)	11.6 (7.8)	10.6 (6.8)	.171
Blood eosinophil count	Mean (SD)	495 (410)	485 (394)	490 (400)	.910
Blood eosinophils (%)	Mean (SD)	6.0 (5.1)	6.0 (4.2)	6.0 (4.7)	.973
Nasal secretions eosinophilia	N (%)	31 (68.8)	30 (66.6)	61 (67.7)	.824
Serum IgE level	Mean (SD)	289 (395)	254 (330)	272 (362)	.648

Doxycycline Improves Quality of Life and Anosmia in Chronic Rhinosinusitis With Nasal Polyposis: A Randomized Controlled Trial

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Table 3. Comparison of Outcomes Between the 2 Groups Before and Immediately After the Intervention.

	Doxycycline group			Placebo group			
Variables	Before (Day 0)	After (Day 42)	Difference	Before (Day 0)	After (Day 42)	Difference	*P* (Differences)
SNOT-22	54 ± 19.1	35.1 ± 21.3	18.9	47.9 ± 18.1	39.3 ± 20.8	8.6	.037
Nasal congestion (VAS)	6.4 ± 2.8	4.3 ± 2.8	2.1	6.2 ± 2.8	4.8 ± 2.9	1.4	.311
Decreased sense of smell (VAS)	6.3 ± 3.6	4.5 ± 3.4	1.8	6.9 ± 3.5	6.0 ± 3.4	0.9	.048
Anterior nasal discharge (VAS)	5.1 ± 3.2	2.7 ± 2.8	2.4	4.7 ± 3.04	2.7 ± 2.3	2	.719
Post-nasal drip (VAS)	6.3 ± 2.7	4.3 ± 3.3	2	6.1 ± 2.9	4.3 ± 2.7	1.8	.851
PNIF	89.4 ± 41.8	116.1 ± 36.6	26.7	87.4 ± 46.7	102.9 ± 53.6	15.5	.101
LMS	13.7 ± 6.8	12.1 ± 8.0	1.6	15.2 ± 5.9	15.5 ± 5.8	0.3	.548

- No difference based on IgE or eosinophil count
- Well tolerated

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Table 4. Comparison of Outcomes Between the 2 Groups 1 Month After the Intervention.

Variables	Doxycycline group	Placebo group	*P*
SNOT-22	37.3 ± 19.9	39.3 ± 17.4	.621
Nasal congestion (VAS)	4.2 ± 2.9	4.5 ± 2.2	.654
Decreased sense of smell (VAS)	5.0 ± 3.2	5.9 ± 3.1	.153
Anterior nasal discharge (VAS)	3.4 ± 2.7	3.0 ± 2.2	.374
Post-nasal drip (VAS)	4.2 ± 2.7	4.3 ± 2.1	.862

- No difference 1 month after treatment end

Take Home Message:

- Several RCTs show beneficial impact of doxycycline in CRSwNP
- Mechanism
  - Intrinsic anti-inflammatory effects?
  - Lowering MSSA carriage?
- Overall benefits are relatively small and short lived
- Where does it fit into algorithm???

Clinical Scenario

- 54 yo F with exacerbation of CRS
  - 12 days of sxs
    - Increased congestion
    - Pressure
    - Purulent drainage
  - ESS 3 years prior
  - 4 courses of abx/6 months
- Endoscopy
  - Thick yellow drainage
- Medication allergy
  - Augmentin, cefdinir, doxycycline, sulfa, cipro

Evaluation of empiric antibiotics versus culture-directed therapy in patients with acute exacerbations of chronic rhinosinusitis

Jessa E. Miller MD[1] | Hye Rhyn Chung BS[2] | Justin P. McCormick MD[1] | Huan Zhang MD[1] | Marilene B. Wang MD[1] | Jivianne T. Lee MD[1] | Daniel M. Beswick MD[1] | Jeffrey D. Suh MD[1]

IFAR: International Forum of Allergy & Rhinology

TABLE 1 Patients' demographics and clinical characteristics (N = 85)

	Mean (range), n (%), or mean ± SD
Previous sinus surgery	67 (78.8%)
Culture results, N = 108	
Staphylococcus aureus	34 (31.5%)
Pseudomonas aeruginosa	11 (10.2%)
Stenotrophomonas maltophilia	6 (5.6%)
Serratia species	6 (5.6%)
Other Gram-negative species[a]	28 (25.9%)
Other Gram-positive species[b]	6 (5.6%)
No growth	38 (35.2%)
Time to culture result, days	3.0 ± 1.1 days
Time to follow-up call, days	4.9 ± 1.6 days

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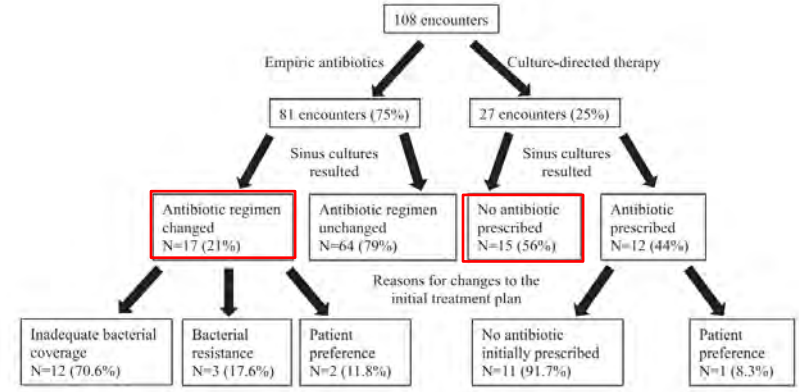


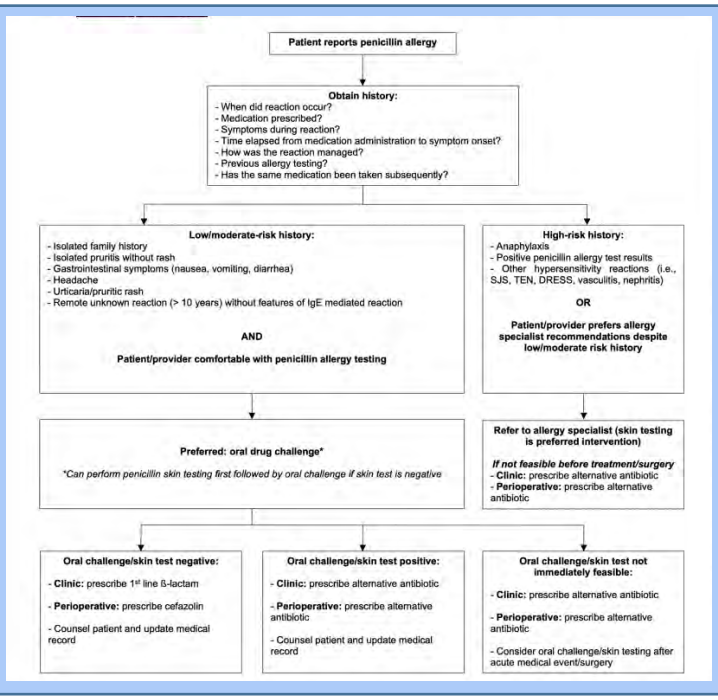
VIEWPOINT

IFAR: Allergy & Rhinology

Inaccurate penicillin allergy labels: Consequences, solutions, and opportunities for rhinologists

Matthew Y. Liu BS[1] | Edward D. McCoul MD, MPH[2,3] | Edward G. Brooks MD[4] | Veronica F. Lao MD[5] | Philip G. Chen MD[1]

- 10% of patients have reported PCN allergy
- 95% of patients with reported PCN allergy DO NOT have an IgE mediated allergy
- 80% of patients with true PCN allergy can become tolerant over time
- PCN skin prick testing
  - 97% specificity, NPV=95%
- Oral Challenge: 1/10 dose followed by full dose 60 minutes later



ORIGINAL ARTICLE

IFAR: Allergy & Rhinology

Upper airway microbiome transplantation for patients with chronic rhinosinusitis

Anders Mårtensson MD[1,2] | Charlotte Cervin-Hoberg MLA[3] | Flavia Huygens PhD[4] | Malin Lindstedt PhD[5] | Christina Sakellariou PhD[5] | Lennart Greiff PhD[2,3] | Anders Cervin PhD[2,6,7]

TABLE 1 Flowchart by visit and study day for donors and patients

Visit	V0	V1	V2	V3	V4	V5	V6	V7	V8
Study day	−56	1	15	15	17	18	19	29	109
Informed consent	D/P								
Prestudy pathogen scan	D/P								
Immunodeficiency/allergy tests	P								
Course of antibiotics		P							
Transplant procedure			D/P	D/P	D/P	D/P	D/P		
Clinical examination	D/P	D/P	D/P					P	P
SNOT-22 assessment		D/P	D/P					P	P
TNSS with extension		D/P	P	P	P	P	P	P	P
Microbiome sampling		D/P	P					P	P
Nasal lavages		D/P	P					P	P
Endoscopic evaluation	D/P	P	P					P	P

*All patients got Augmentin X 14 days!!

ORIGINAL ARTICLE

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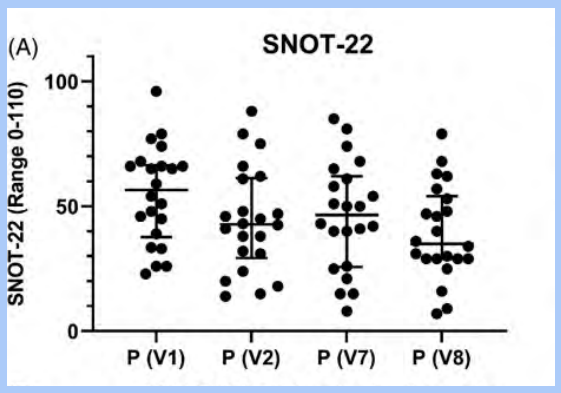

Upper airway microbiome transplantation for patients with chronic rhinosinusitis

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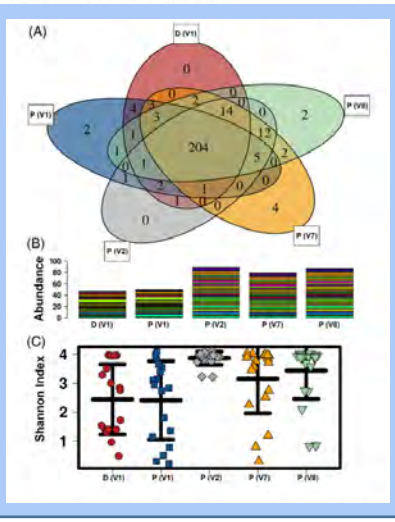


Take Home Message:

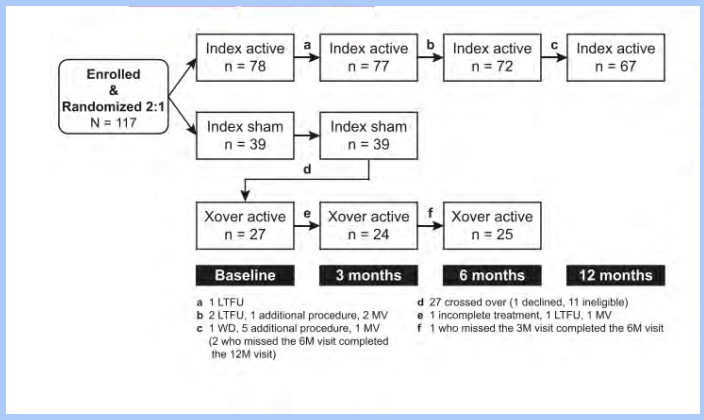
- Consider culture-directed antibiotic therapy
  - Recurrent infections
  - Lots of prior antibiotics
  - Not getting better
  - Before committing to surgery?
  - Multiple abx allergies
- Consider referral of PCN allergy patients to allergist
  - Vast majority will be cleared
  - Do yourself if you are comfortable with allergy
- Nasal mucus transplants in future???

Clinical Scenario

- 76 yo Male
- 10 years of bilateral nasal drainage
- Watery
- Carries tissues with him, constant blowing

Temperature-controlled radiofrequency neurolysis for treatment of chronic rhinitis: 12-month outcomes after treatment in a randomized controlled trial

Masayoshi Takashima MD[1] | Jose Pablo Stolovitzky MD[2] | Randall A. Ow MD[3] | Stacey L. Silvers MD[4] | Nadim B. Bikhazi MD[5] | Curtis D. Johnson DO[6]



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	Index active (n = 77)	Index sham (n = 39)	Crossover active (n = 27)	p value[b]
Female sex	49 (63.6%)	26 (66.7%)	16 (59.3%)	0.818
Age (years)	57.3 ± 14.8	57.8 ± 14.4	57.4 ± 14.6	0.974
BMI (kg/m^2)	27.8 ± 5.6	28.3 ± 6.3	28.6 ± 6.8	0.528
Race				
Asian	1 (1.3%)	0 (0.0%)	0 (0.0%)	—
Asian, white	0 (0.0%)	1 (2.6%)	1 (3.7%)	—
Black or African American	5 (6.5%)	1 (2.6%)	0 (0.0%)	—
Black or African American, white	0 (0.0%)	1 (2.6%)	0 (0.0%)	—
White	69 (89.6%)	36 (92.3%)	26 (96.3%)	—
Declined choices	2 (2.6%)	0 (0.0%)	0 (0.0%)	—
Nasal exam				
Turbinate enlargement	16 (20.8%)	8 (20.5%)	4 (14.8%)	0.582
Nasal polyps	3 (3.9%)	0 (0.0%)	0 (0.0%)	0.566
Previous nasal surgery	27 (35.1%)	13 (33.3%)	11 (40.7%)	0.646
Medication use[c]				
Antihistamines	46 (59.7%)	26 (66.7%)	16 (59.3%)	>0.999
Decongestants	12 (15.6%)	6 (15.4%)	4 (14.8%)	>0.999
Oral leukotriene inhibitors	5 (6.5%)	4 (10.3%)	3 (11.1%)	0.425
Intranasal steroid sprays	31 (40.3%)	23 (59.0%)	15 (55.6%)	0.184
Intranasal anticholinergic sprays	20 (26.0%)	7 (17.9%)	5 (18.5%)	0.602

Temperature-controlled radiofrequency neurolysis for treatment of chronic rhinitis: 12-month outcomes after treatment in a randomized controlled trial

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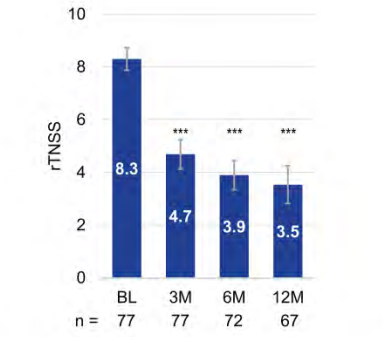

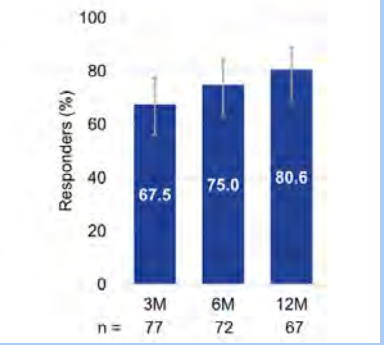

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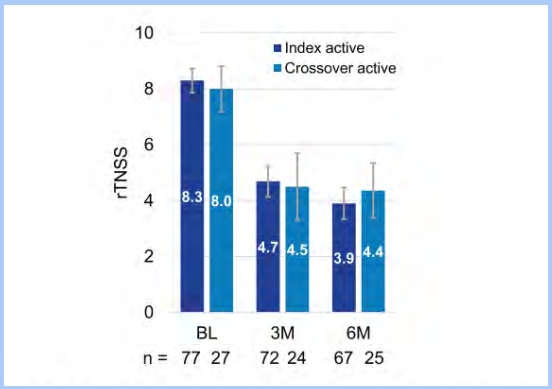

Efficacy of Vidian Neurectomy and Posterior Nasal Neurectomy in the Management of Nonallergic Rhinitis: A Systematic Review

Praween Senanayake, MBBS (Hons)[1,2], Eugene Wong, MS, MMed[1], Kate McBride, PhD[2], and Narinder Singh, MS, MBBS, FRACS[1,3]

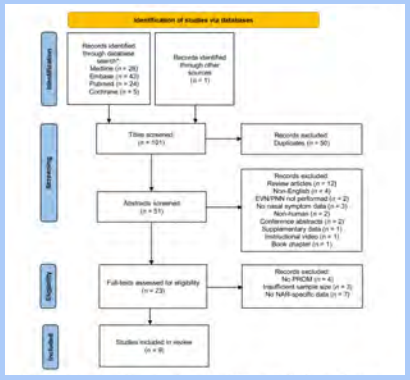

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Table 5. Pooled Complications of Interest by Procedure-Type.[a]

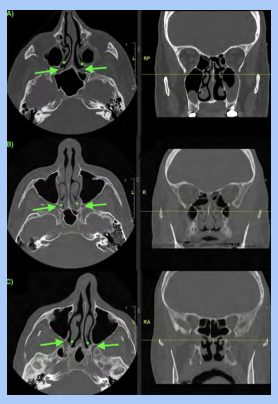
	Procedure		
Complication	EVN (n = 65)	Surgical PNN (n = 50)	Cryoablative PNN (n = 70)
Dry eye (n, %)	20 (30.8%)	0 (0%)	2 (2.9%)
Palate/cheek numbness (n, %)	11 (16.9%)	0 (0%)	1 (1.4%)
Bleeding (n, %)	0 (0%)	3 (6%)	3 (4.3%)

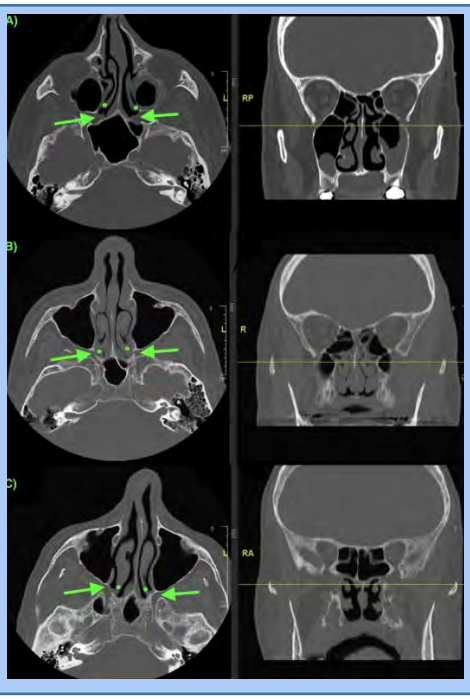
- Apparently similar efficacy across procedures
- Study design difference make meta-analysis impossible

RESEARCH NOTE

Correlation between middle turbinate insertion in relation to sphenopalatine foramen and failure rates of cryotherapy and radiofrequency treatment for chronic rhinitis

Timothy Fan MD[1] | Megha Chandna BS[1] | Daniel Gorelik BS[1] | Masayoshi Takashima MD[2] | Michael T. Yim MD[3] | Nicholas R. Rowan MD[4] | Prachi Dubey MD[3] | Jordan J. Garner NP[2] | Jason F. Ohlstein MD, MPH[5] | Arthur W. Wu MD[2] | Omar G. Ahmed MD[2]





- 35.5% failures
- Unfavorable MT position
  - 90.9% of failures
  - 55% of successes
  - P<0.05

Take Home Message:

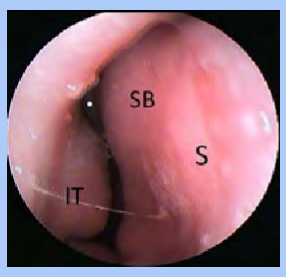
- Posterior nasal nerve ablation
  - Surgical ablation (ie cutting)
  - Cryotherapy
  - Low-temperature RFA
  - 65-80% “success” rate
  - Similar to formal Vidian Neurectomy
  - Growing body of literature and interest
- Vidian Neurectomy
  - Requires GA
  - Notably higher complication rates

Clinical Scenario

- 44 yo Female
- Intermittent nasal congestion
- Alternates sides
- Not much drainage
- Rarely gets sinus infections

Clincal Scenario

- Workup/Treatment
  - Allergy testing: Negative
  - Fluticasone spray: Mild benefit
- Endoscopy
  - Large tubinates
  - Large septal swell body
  - Mild nasal valve collapse
  - Straight septum
- Wants to avoid surgery



ORIGINAL ARTICLE

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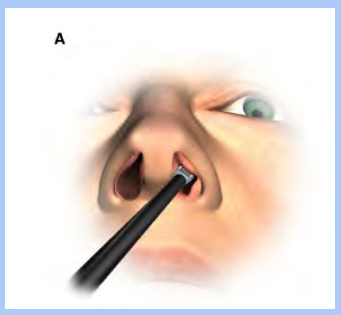
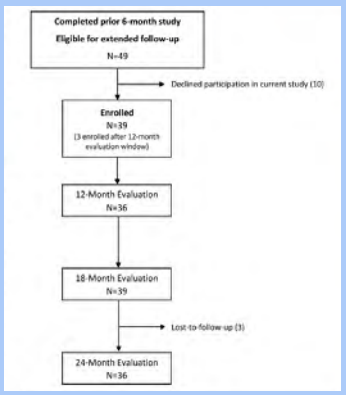
Moshe Ephrat, MD, Ofer Jacobowitz, MD, PhD and Mark Driver, MD





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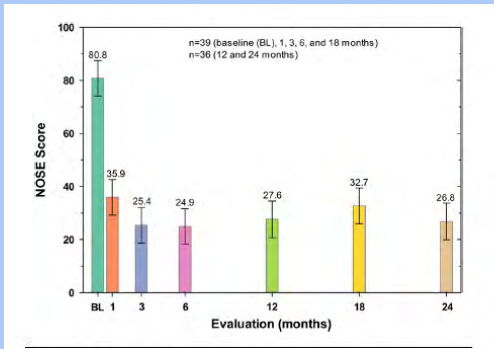
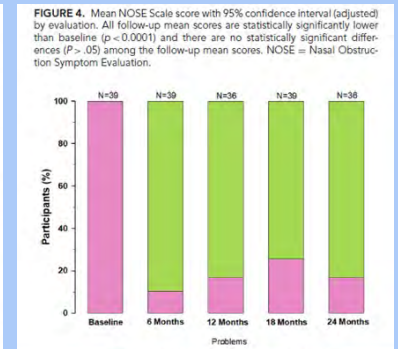


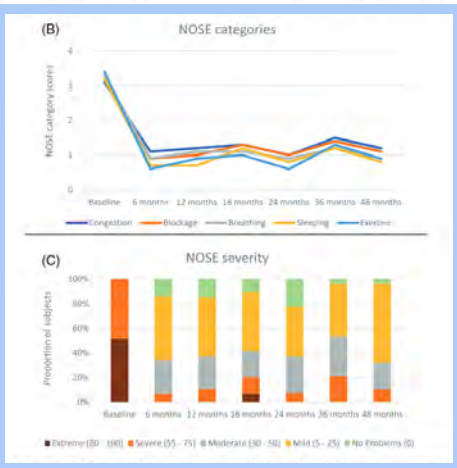
FIGURE 4. Mean NOSE Scale score with 95% confidence interval (adjusted) by evaluation. All follow-up mean scores are statistically significantly lower than baseline ($p < 0.0001$) and there are no statistically significant differences ($P > .05$) among the follow-up mean scores. NOSE = Nasal Obstruction Symptom Evaluation.



*Study was not controlled---? placebo effect

Long-term outcomes following repair of nasal valve collapse with temperature-controlled radiofrequency treatment for patients with nasal obstruction

Ofer Jacobowitz MD, PhD[1] | Dale Ehmer MD[2] | Brent Lanier MD[3] | William Scurry MD[4] | Bryan Davis MD[5]



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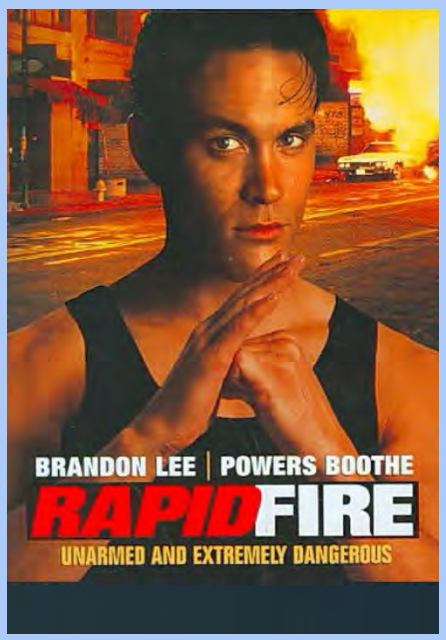
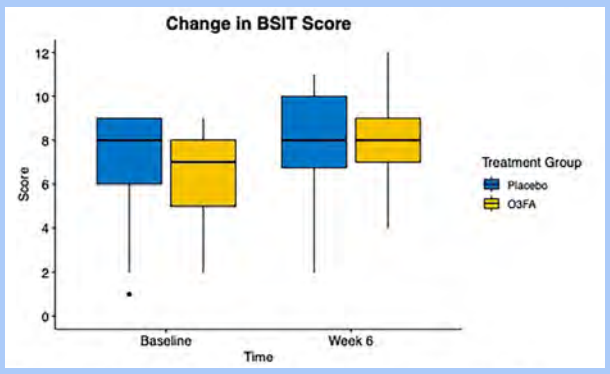


Omega-3 Fatty Acid Supplementation for the Treatment of Persistent COVID-Related Olfactory Dysfunction

David K. Lerner, MD[1], Katherine L. Garvey, MPH[1], Annie Arrighi-Allisan, BA[1], Evan Kominsky, MD[1], Andrey Filimonov, MD[1], Abdurrahman Al-Awady, BA[1], Peter Filip, MD[1], Katherine Liu, MD[1], Sen Ninan, MD[1], Todd Spock, MD[1], Benjamin Tweel, MD[1], Maaike van Gerwen, MD, PhD[1,2], Madeleine Schaberg, MD[1], Patrick Colley, MD[3], Anthony Del Signore, MD[1], Satish Govindaraj, MD[1], and Alfred Marc Iloreta, MD[1]



The Efficacy of Olfactory Training as a Treatment for Olfactory Disorders Caused by Coronavirus Disease-2019: A Systematic Review and Meta-Analysis

Se Hwan Hwang, MD, PhD[1], Sung Won Kim, MD, PhD[2], Mohammed Abdullah Basurrah, MD[3], and Do Hyun Kim, MD, PhD[2]

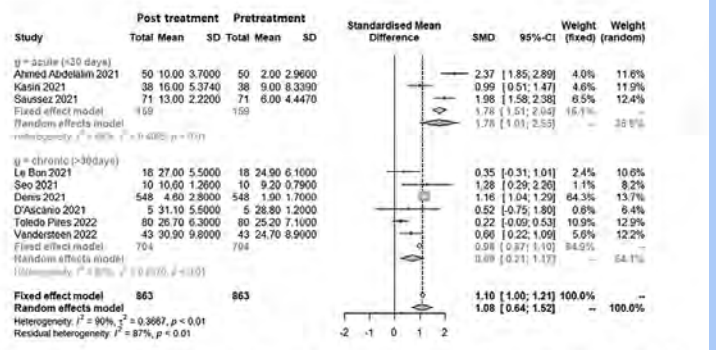
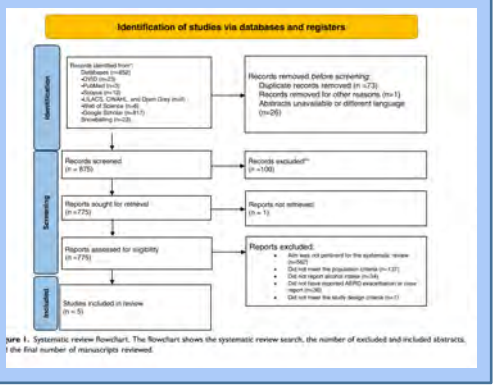


Figure 2. Post-treatment (olfactory training) versus pre-treatment standard mean differences. The standard mean differences of the olfactory score are shown (by the number of participants per group).

Relationship Between Alcohol Intolerance and Aspirin-Exacerbated Respiratory Disease (AERD): Systematic Review

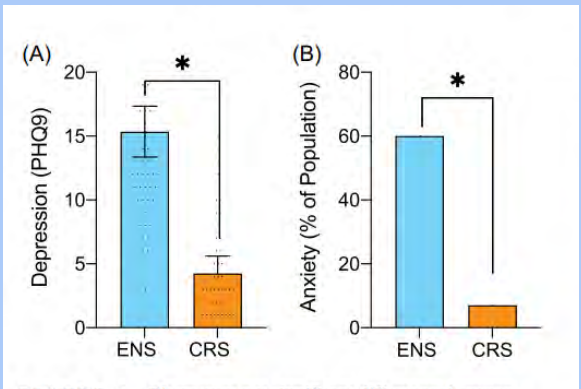
Estephania Candelo, MD, MSc[1], Monet McCalla, MS[2], Oriana A. Valderrama, MD, MSc[3], Karol Avila-Castano, MD[1], Cynthia Chelf, MLS, AHIP[4], Osarenoma Olomu, MD[1], and Angela M. Donaldson, MD[1]

- N=522
- 52.8% report asthma flare with ETOH intake



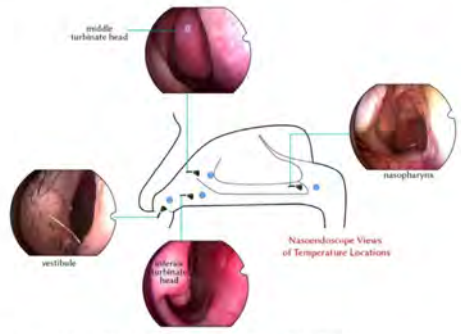
Mental health burden of empty nose syndrome compared to chronic rhinosinusitis and chronic rhinitis

Meredith Lamb BS[1] | Daniel R. Bacon BS[2] | Abdullah Zeatoun MD[2] | Princess Onourah BS[2] | Brian D. Thorp MD[2] | Jonathon Abramowitz PhD[3] | Charles S. Ebert Jr MDMPH[2] | Adam J. Kimple MDPhD[2] | Brent A. Senior MD[2]



Correlation of Nasal Mucosal Temperature and Nasal Patency—A Computational Fluid Dynamics Study

Richard Tjahjono, MD, MPhil; Hana Salati, BEng, PhD; Kiao Inthavong, BEng, PhD; Narinder Singh, MBBS, MS, FRACS



1. Diagram of sites measured in the nasal cavity. Right nasal cavity demonstrated in diagram.

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TABLE I.
Correlation Between Nasal Mucosal Temperature Measured In Vivo at Various Sites and NOSE and Unilateral VAS Scores.

	Correlation Between Nasal Mucosal Temp and NOSE ($n = 11$)		Correlation Between Nasal Mucosal Temp and VAS ($n = 11$)	
Nasal Cavity Sites	*R*-Value	*p*-Value	*R*-Value	*p*-Value
Left vestibule	0.37*	0.048	0.42*	0.032
Left inferior turbinate	0.41*	0.042	0.46*	0.037
Left middle turbinate	0.19	0.069	0.27	0.052
Left nasopharynx	0.28	0.057	0.42*	0.047
Right vestibule	0.41*	0.037	0.46*	0.031
Right inferior turbinate	0.39*	0.041	0.43*	0.039
Right middle turbinate	0.21	0.061	0.22	0.052
Right nasopharynx	0.24	0.067	0.29	0.059

Spearman's rho correlation test was used.
*Statistical significance.
NOSE = Nasal Obstruction Symptom Evaluation; VAS = Visual Analogue Scale.

Original Article

Allegations of Failure to Obtain Informed Consent in Otolaryngology: Evidenced-Based Recommendations for Sinus Surgeons

Christian G. Fritz, MD[1], Dominic J. Romeo, BS[2], Anne S. Lowery, MD[1], and Karthik Rajasekaran, MD[1,3]

Table 1. Characteristics of Informed Consent Allegation.

	n (%)
Total informed consent claims	128 (100)
Patient sex	
Male	59 (46.1)
Female	69 (53.9)
Patient age, *y* (*n* = 62)	44.2 ± 16.8
Type of practice (*n* = 103)	
Private	78 (75.7)
Academic	25 (24.3)
Specialty area	
Rhinology/skull base	34 (26.6)
Comprehensive ENT	25 (19.5)
Facial plastic/reconstructive	20 (15.6)
Otology/neurotology	16 (12.5)
Head/neck	14 (10.9)
Sleep	9 (7.0)
Laryngology	7 (5.5)
Pediatric	3 (2.3)
States with highest # of claims	

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Table 2. Procedures Alleging Failure of Informed Consent.

	Total	Defense verdict	Plaintiff verdict/Settlement	Payment [IQR]
All	128	93 (72.6)	35 (27.3)	$798,010 [225,000–1,050,000]
Specific procedures				
Functional endoscopic sinus surgery	28	22 (78.6)	6 (21.4)	$370,913 [112,500–388,870]
Uvulopalatopharyngoplasty	7	5 (71.4)	2 (28.6)	$471,250 [304,375–638,125]
Septoplasty	6	4 (66.7)	2 (33.3)	$768,881 [403,322–1,134,441]
Rhinoplasty	5	5 (100)	0 (0)	–
Stapedectomy	5	5 (100)	0 (0)	–
Thyroidectomy	5	3 (60.0)	2 (40.0)	$920,000 [630,000–1,210,000]
Excision of neck mass	5	4 (80.0)	1 (20.0)	$940,317 [N/a]
Acoustic neuroma resection	4	3 (75.0)	1 (25.0)	$1,500,000 [N/a]
Percutaneous lymph node biopsy	4	2 (50.0)	2 (50.0)	$265,850 [261,275–270,425]
Tonsillectomy	3	2 (66.7)	1 (33.3)	$850,000 [N/a]
Tympanoplasty/mastoidectomy	3	1 (33.3)	2 (66.7)	$562,500 [468,750–656,250]
Other*	53	37 (69.8)	16 (30.8)	$1,027,349 [237,500–1,233,000]

*All other procedures having <3 claims each.

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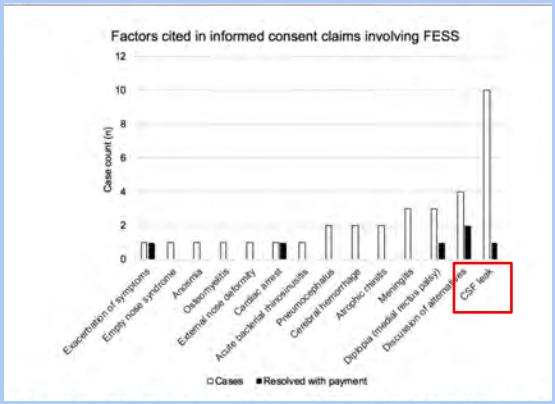

Thank you