



Does My Patient Need a Sinus Procedure Revision?

Common Indications, Rates, Reducing Revision Rates

William C Yao, MD
Associate Professor
Chief of Rhinology
Residency Program Director
Rhinology Fellowship Director
William.c.yao@uth.tmc.edu
310-980-7141

 UTHealth[®] Houston
McGovern Medical School

Disclosure

- Integra – Consultant
- Medical Metrics – Consultant
- Medtronic - Consultant
- Paratek – Speaker
- Sanofi – Consultant



Rhinosinusitis

- 1 in 8 adults in the US annually
 - 30 million diagnoses annually
 - 500,000+ ER visits
 - 18+million US physician visits annually
- 5th most common dx for antibiotics prescription
 - More than 1 in 5 antibiotics prescribed in adults are for “Sinusitis”

Payne SC et al. Otolaryngol Head Neck Surg. 2025
Orlandi et al. ICAR 2017

Rhinosinusitis

- Direct cost for ARS/CRS in US - \$11 billion USD
 - Does NOT include economic impact of loss of productivity: ~\$12-20 billion
 - \$921-\$1220 USD per patient-yr (academic centers)
 - Annual Medical cost prior to ESS: \$1500-\$2700/pt
 - Outpatient sinus surgery: \$8200-\$10,500/case
- Treatment range from medical to surgical
 - Higher cost burden for patients with recurrent disease/polyps
 - Biologics: ~\$30k/yr



Payne SC et al. Otolaryngol Head Neck Surg. 2025
Orlandi et al. ICAR 2017
Blackwell et al. Vital Health Stat 2012

Chronic Rhinosinusitis (CRS)

2 or more of the following symptoms for ≥ 12 weeks: (PODS)

- Facial **P**ain/pressure
- Nasal **O**bstruction/congestion
- Mucopurulent **D**ischarge
- Decreased/absent sense of **S**nell

Extranasal manifestations:
Fatigue, poor sleep quality, depression

W/ Nasal Polyps

- Nasal polyps account for 20%-33% of CRS cases
- Visualization of nasal polyps (nasal exam, endoscopy, CT scan)

W/O Nasal Polyps

- CRS without nasal polyps accounts for 60%-65% of CRS cases
- Visualization or radiographic finding consisting of inflammation or mucosal changes within the sinuses

Orlandi RR, et al. *Int Forum Allergy Rhinol.* 2016;6(suppl 1):S22-S209.
DeMarcantonio MA, et al. *Otolaryngol Clin North Am.* 2011;44(3):685-695
Hamilos DL. *Clin Allergy Immunol.* 2007;20:1-13.

CRS Management

- No standard therapy
 - Dependent on underlying cause, symptom severity, degree of obstruction
- Topical therapy
 - Nasal saline irrigation, topical steroid, topical antibiotics
- Systemic therapy
 - Oral corticosteroids, antibiotics, biologics
- Surgery

Payne SC et al. Otolaryngol Head Neck Surg. 2025

CRS Management

Treatment

Recommended

- Saline irrigation
- Intranasal corticosteroid sprays/drops
- Oral corticosteroids (1 short course)
- Aspirin desensitization for AERD patients

Optional (limited data)

- Macrolides, antileukotrienes
- Immune system evaluation and treatment

Sympt
om
relief?

yes

Continue medical management

no

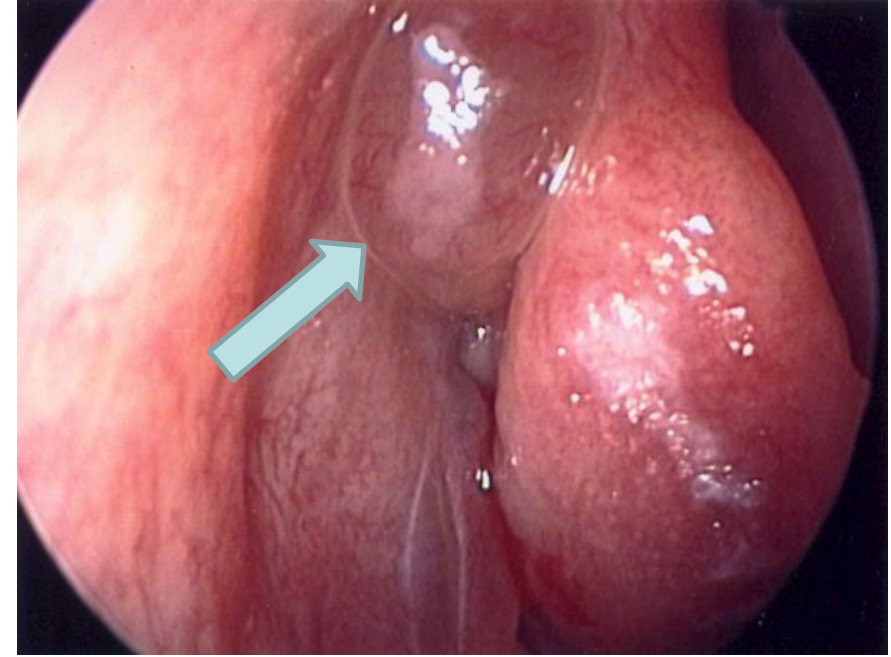
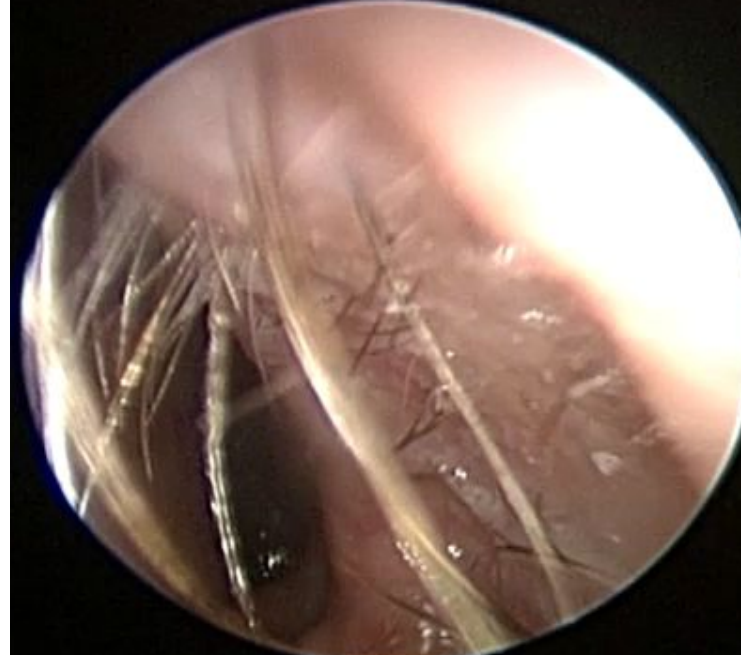
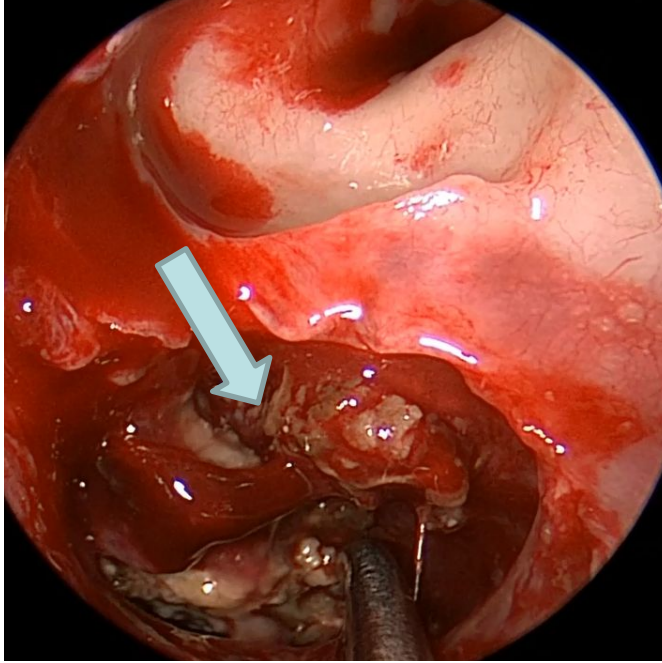
Treatment

Recommended

- ESS followed by *continued medical management*

Payne SC et al. Otolaryngol Head Neck Surg. 2025

Chronic Rhinosinusitis



CRS – Surgery

- When to proceed?
 - Symptoms despite maximal medical therapy
 - Complications of sinusitis
- Open sinus drainage pathway
 - Allows for increased ventilation of paranasal sinuses
 - Increase access to topical medical therapy
- Multiple approaches with many success
 - Patients with nasal polyps may require multiple ESS procedure due to recurrent or incompletely resolved symptoms²
 - Up to 40% recurrence 18mo after ESS

CRS – Surgery

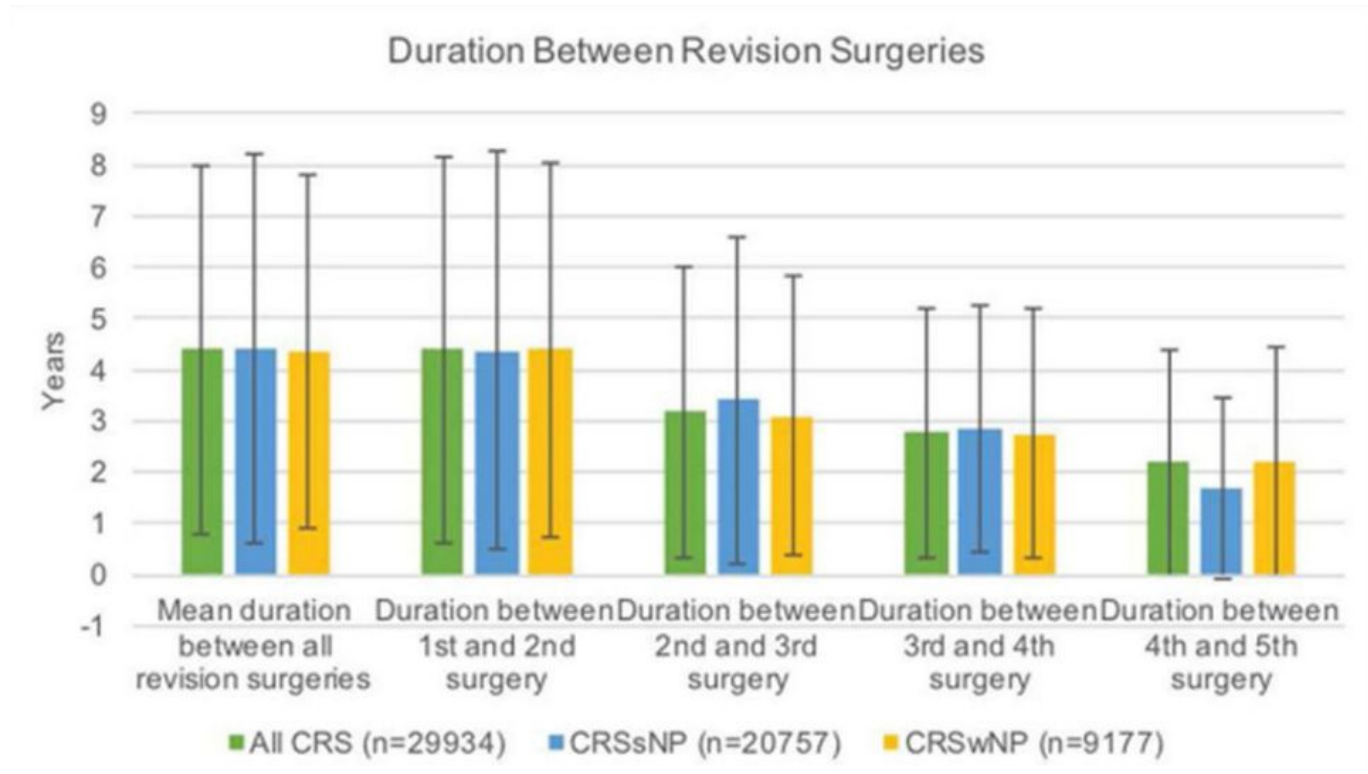
- **Improves quality of life!!!**
- Kennedy et al
 - Comparing pre- and post-op scores
 - Approx 55% improvement in SNOT-22 scores postoperatively
- Smith TL et al
 - Outcomes study
 - 119 patients
 - ESS will improve QoL measures

Smith TL, et al. Laryngoscope. 2005

Kennedy JL, et al. Ann Allergy Asthma Immunol 2013

CRS – Surgery

- Utah population database
- **Revision rate: 15.9% Overall**
 - **CRSsNP: 9.75%**
 - **CRSwNP: 29.9%**
 - 1st and 2nd ESS – 4.39yr
 - 4th and 5th ESS – 2.18yr



Smith KA et al. IFAR 2020

CRS – Revision based on sinuses

Long-term revisions for endoscopic sinus surgery and specific sinuses

	All CRS	CRSsNP	CRSwNP	p value
Overall *	15.9%	9.75%	29.88%	<0.001
Maxillary	5.4%	4.3%	9.4%	<0.001
Maxillary with tissue removal	11.1%	5.4%	18.4%	<0.001
Anterior ethmoid	4.2%	3.1%	7.7%	<0.001
Total ethmoid	11.5%	5.4%	21.6%	<0.001
Sphenoid	6.1%	3.5%	11.1%	<0.001
Sphenoid with tissue removal	12.4%	3.5%	14.6%	<0.001
Frontal	12.4%	6.3%	21.2%	<0.001
Polyp removal (not otherwise specified)	8.1%	0%	8.1%	<0.001

* percentage of patients who had more than one ESS in the 20-year study period

Smith KA et al. IFAR 2020

CRS – Revision Risks

Patient characteristics that affect revision rates

	Risk of 2 nd Surgery		Risk of 3 rd surgery	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Male gender	0.78 (0.73, 0.82)	<0.001	0.90 (0.80, 1.01)	0.076
Age at 1 st procedure	0.88 (0.86, 0.91)	<0.001	0.93 (0.87, 0.99)	0.029
Race	1.04 (0.86, 1.26)	0.701	0.91 (0.61,1.35)	0.633
Ethnicity	0.91 (0.80, 1.03)	0.134	1.01 (0.78, 1.31)	0.935
Tobacco Use	1.02 (0.94, 1.10)	0.661	1.03 (0.89, 1.20)	0.673
Asthma	1.61 (1.51, 1.71)	<0.001	1.48 (1.32, 1.67)	<0.001
Allergy	1.40 (1.30, 1.52)	<0.001	1.21 (1.05, 1.40)	<0.001
Urban Location	1.04 (0.98, 1.11)	0.204	1.03 (0.90, 1.17)	0. 682
Family history of CRS *	1.14 (1.05, 1.24)	<0.001	0.93 (0.79, 1.10)	0.401
Nasal Polyps	3.41 (3.21, 3.61)	<0.001	2.30 (2.01, 2.63)	<0.001

*
first degree relative with a family history of chronic rhinosinusitis

Shaded cells highlight statistically significant factors

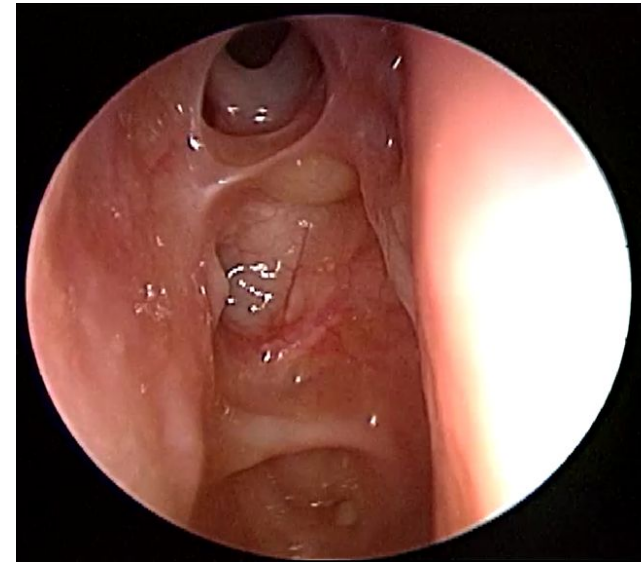
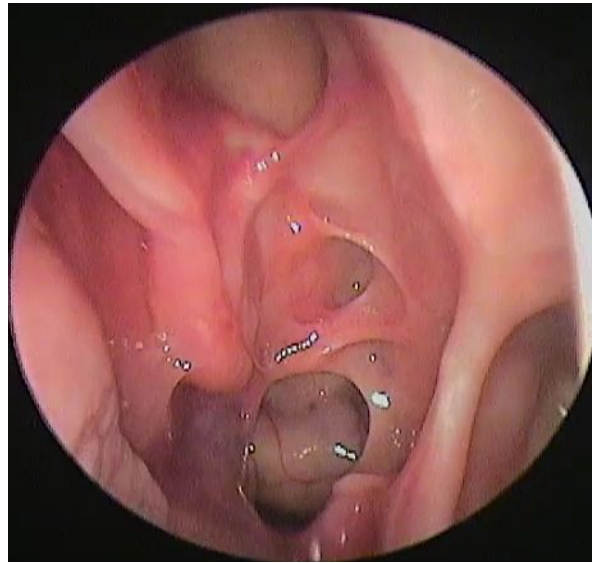
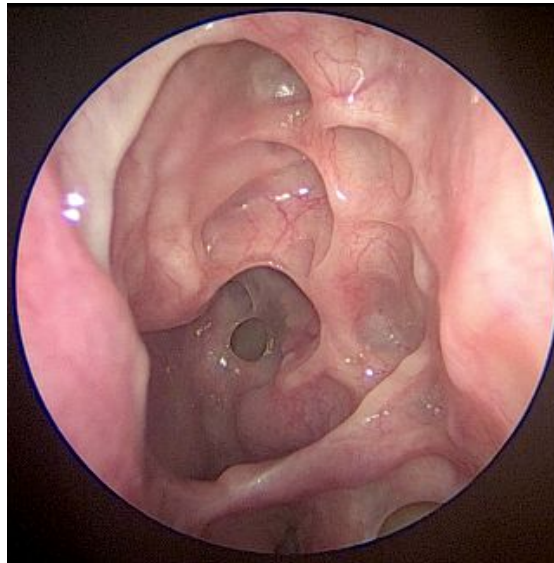
Smith KA et al. IFAR 2020

Common reason for revision ESS

- Scar Tissue and Adhesions
 - Scarring adhesion obstructing paranasal sinus
 - Radiation effects
 - Mucocele formation
- Incomplete Primary Surgery
 - Unaddressed ethmoid/frontal air cells
- Complications from previous surgery
 - Maxillary Sinus Recirculation
 - Inadvertent narrowing of FSOT
- Recurrent disease
 - Recurrent polyps, AFRS
 - Recurrent/Residual Tumor

Operative Techniques to reduce revision rate

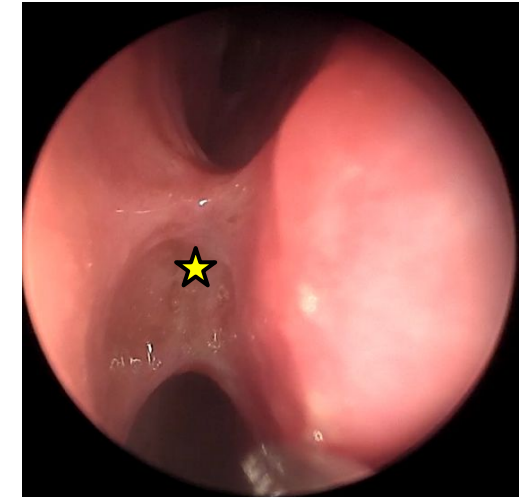
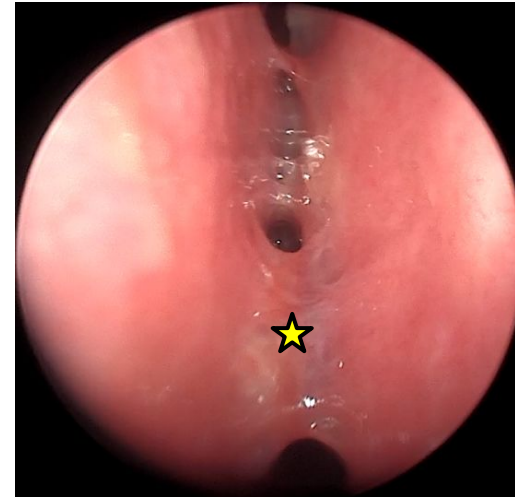
- **Good meticulous surgery!**
 - Minimize trauma to IT/lateral nasal wall junction
 - Minimize free fragments of mucosa
 - Maximize distance between raw mucosal surfaces



Minimizing Synechia

- Intranasal synechia is a common postoperative complication

- Up to 38% of patients
- Can obstruct delivery of topical medications
- Alter mucus flow
- Limits endoscopic monitoring/follow-up
- May cause headaches



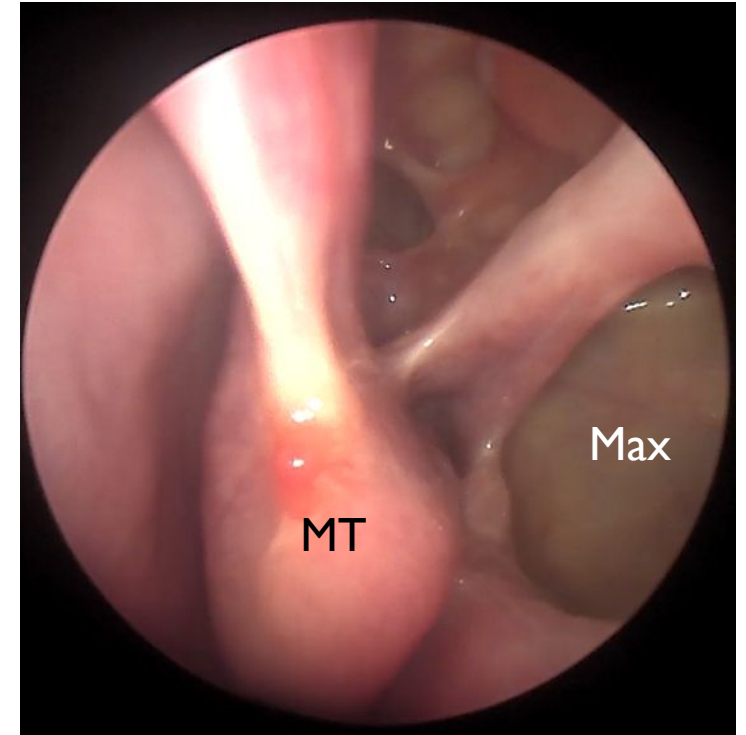
- Minimizing intranasal synechia is a perioperative process

- Intraoperative techniques
- Packing materials (eg chitosan, biodegradable polyurethane, nonabsorbable sponge, Doyle)
- Postoperative visits

Stepinski et al. J Clin Med 2023

Operative Techniques

- Decrease contact between 2 raw edges
- Increase space between MT and lateral nasal wall
 - Relaxing incision
 - Resection – partial vs total
 - Denatured
 - Combo cases with Facial plastics performing septorhinoplasty
 - Pexy/Bolgerization to the septum
 - Potentially affect olfaction as well as future revision septoplasty



Post-ESS Dressing Material

- Steroid eluting stents – very seldomly used
- Middle Meatus spacers
 - Intranasal packing – Chitosan based products, Polyurethane based products
 - Anti-inflammatory effects
 - Intranasal powder
- Doyle Splints!

Post surgical management - synechia

N=195 sides	Synechiae	No Synechiae	P-value
CRS			
None (n=6)	1 (16.7%)	5 (83.3%)	
CRSwNP (n=100)	7 (7.0%)	93 (93.0%)	0.772
CRSSNP (n=89)	5 (5.6%)	84 (94.4%)	
Revision Status			
Primary (n=80)	2 (2.5%)	78 (97.5%)	0.078
Revision (n=115)	11 (9.6%)	104 (90.4%)	
Packing			
Chitosan (n=113)	3 (2.7%)	110 (97.3%)	0.005
Polyurethane (n=32)	6 (17.1%)	29 (82.9%)	
Other (n=53)	3 (5.7%)	50 (94.3%)	

- Previously published rates of synechia formation 7.5-19%
- Overall - 6.7%
- Polyurethane (17.1%) vs Chitosan (2.7%)

What I do

- Chitosan based Middle meatus spacer
- Gloved Merocele – pediatric population unable to tolerate debridement
- +/- Propel
- Doyle with vents if turbinate reduction performed
- Irrigations at POD 0

Postoperative debridement

- Benefit: promote healing and prevent persistent and recurrent disease
 - One RCT showed decreased adhesions with debridement
 - Improved Lund-Kennedy score (1.5 vs 2.9)
 - Another RCT: No difference with adhesions
 - All patient had middle meatus spacer and long term oral steroids
- If early synechia then lysis

Rudmik L, et al. Int Forum Aller and Rhinol. 2011

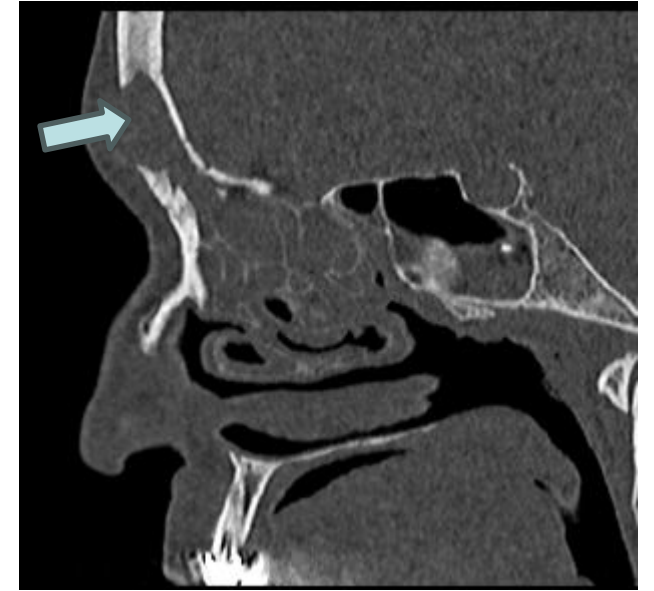
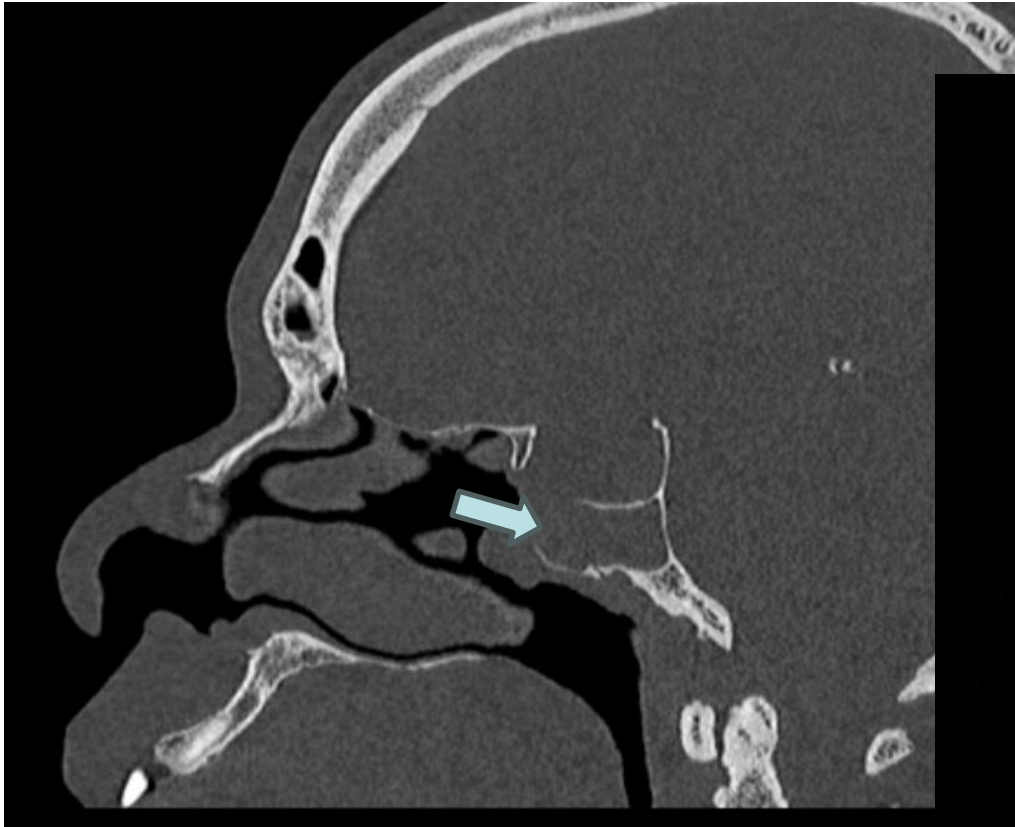
Orlandi RR, et al. ICOS. Int Forum Aller and Rhinol. 2016

What I do

- POV at 1 wk and 3 wks
 - Debridement at 1 wk
 - 7 Fr suction and gentle curved 8 Fr suctions
 - Remove steroid eluting implants at 1-3 wks.
- If early synechiae/lateralization of MT lysis
 - Place gelfoam spacer to prevent resynechiae



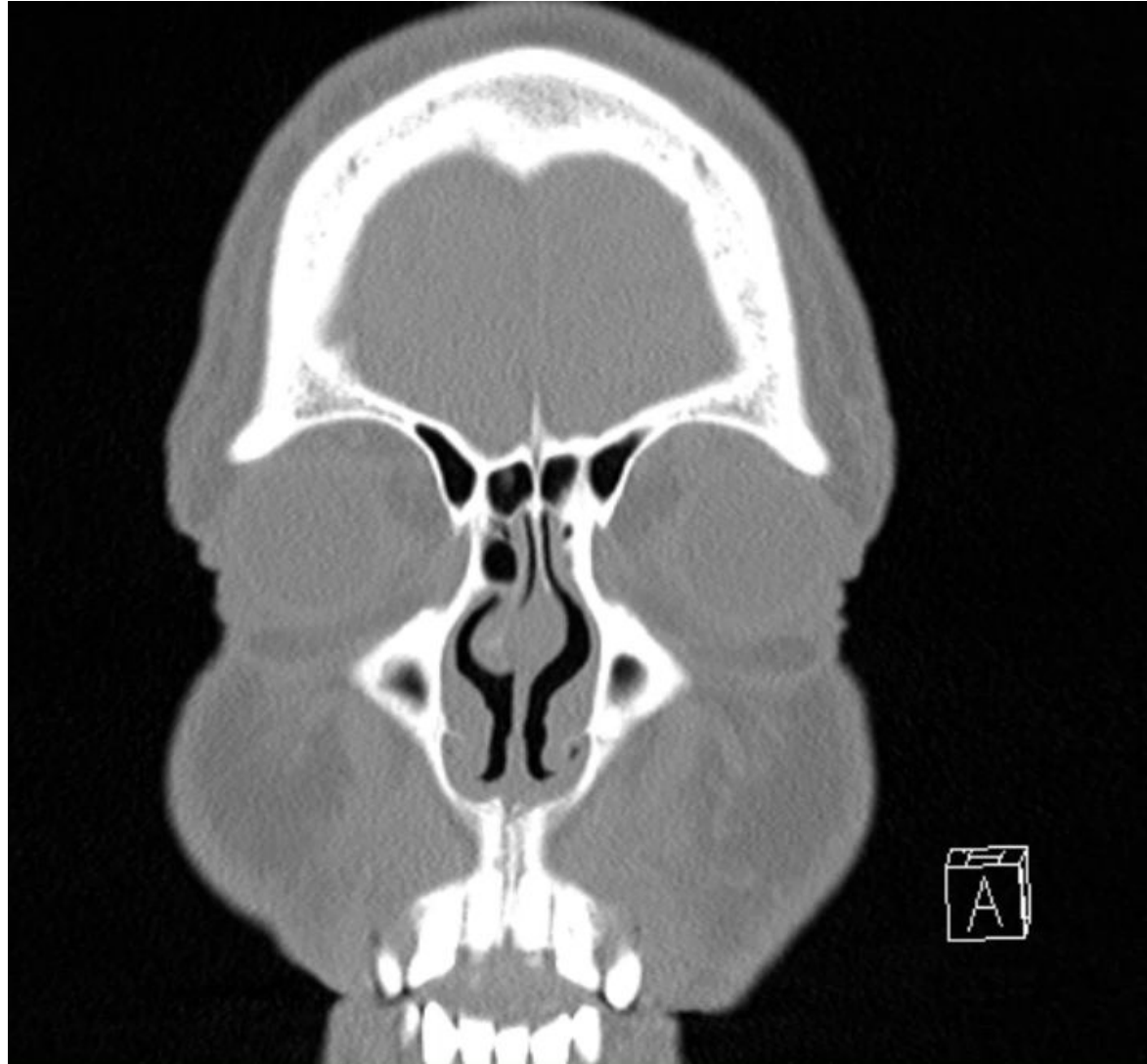
Example of an mucocele formation



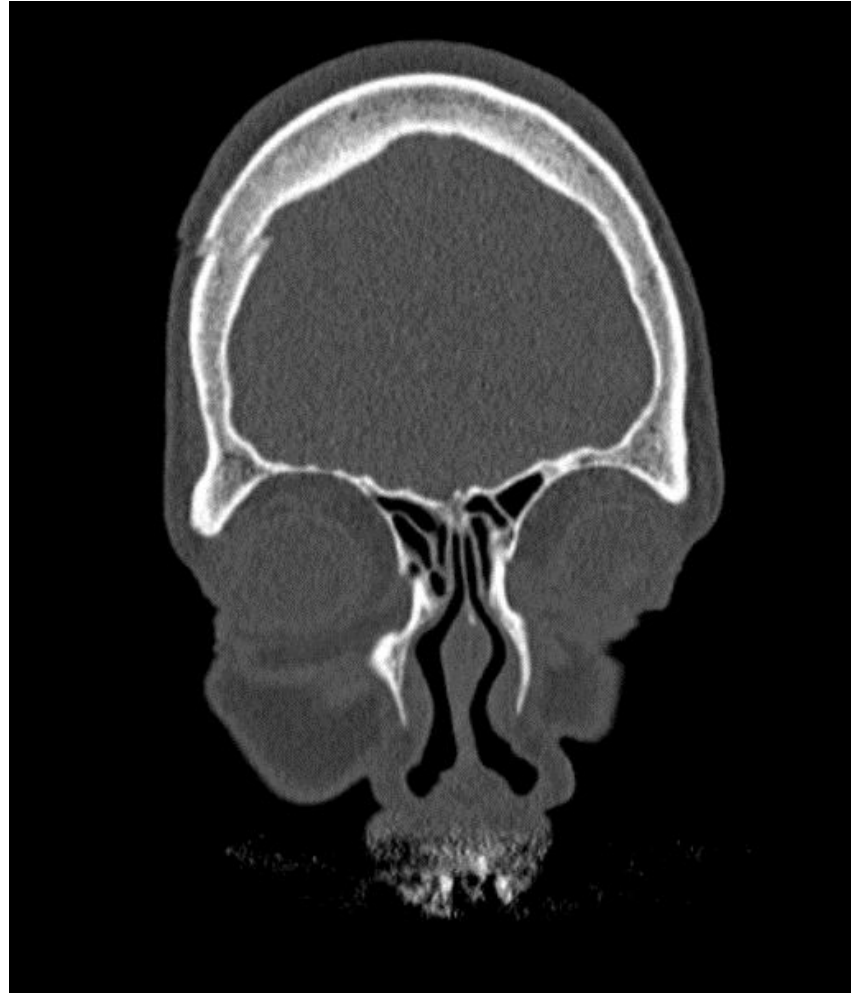
Example of unopened aircells



Balloon sinuplasty horror story



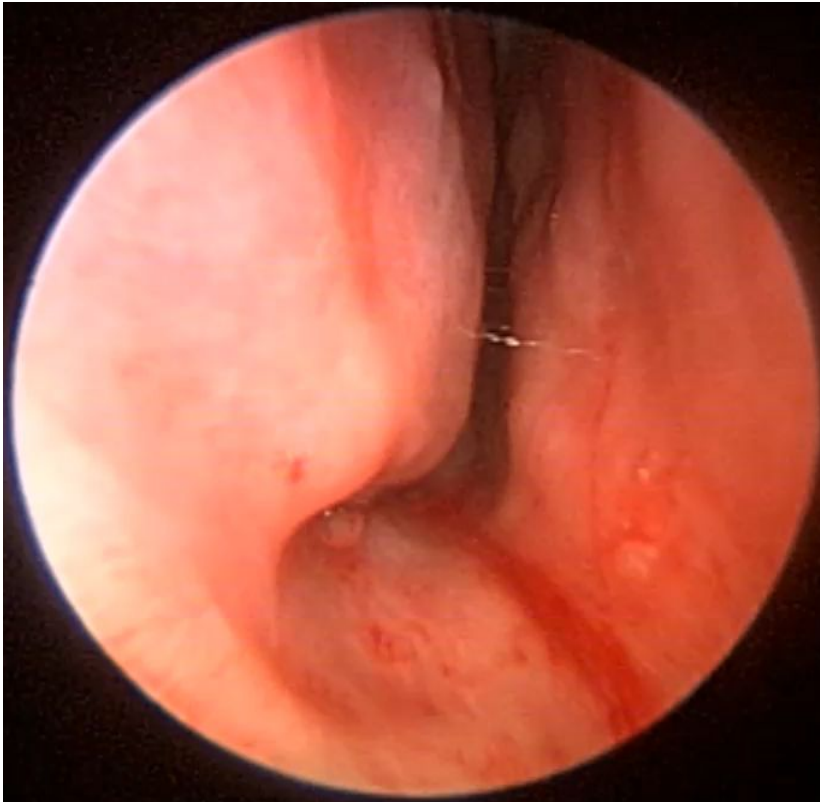
Example of recirculation



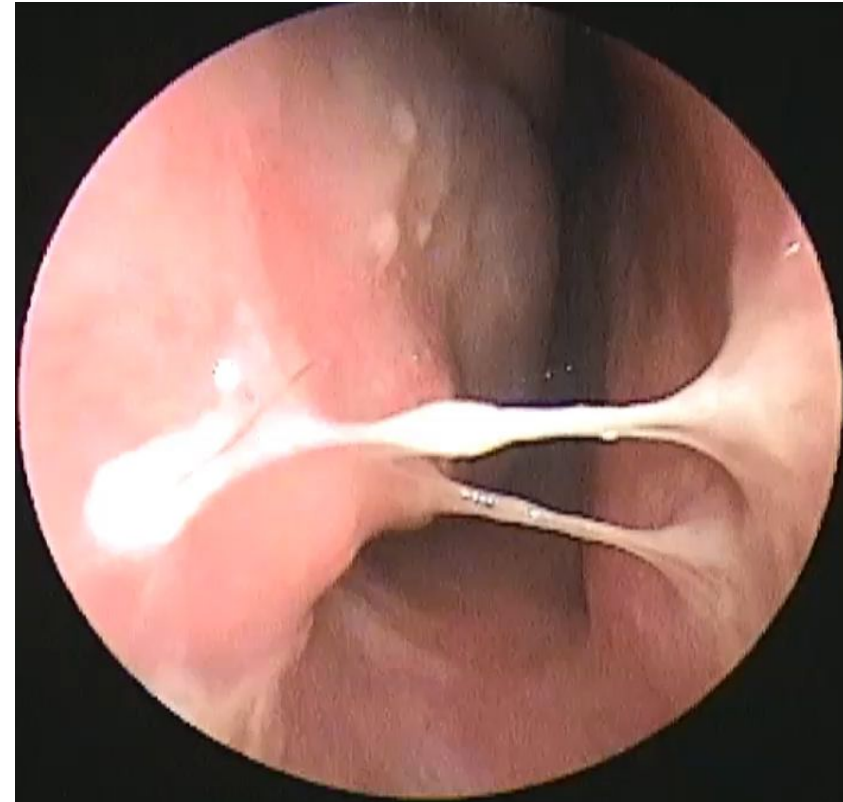
Not all cases need revision surgery!

Case of CRS – medical management

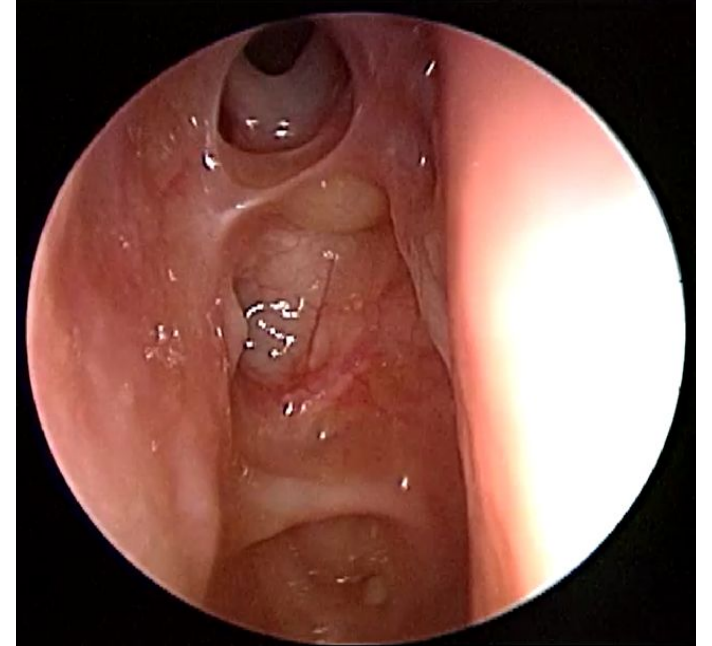
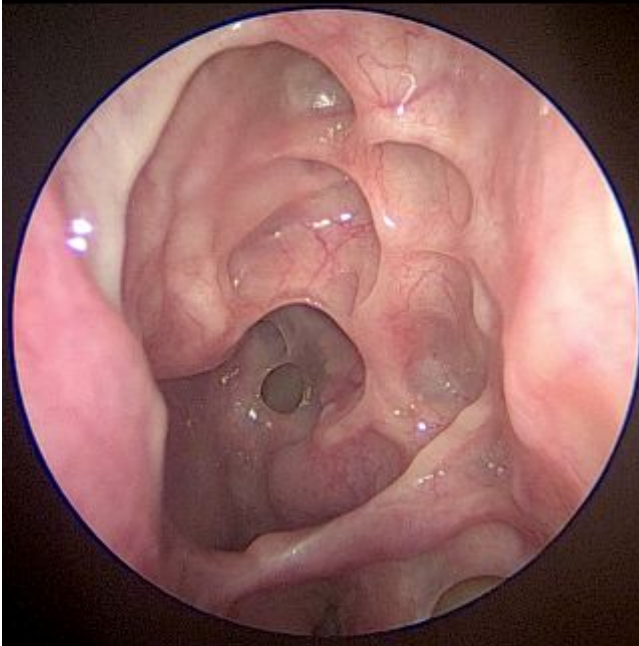
Initial presentation



3 wks following treatment



Ultimate goal



Questions?

