International Journal of Otorhinolaryngology and Head and Neck Surgery
Zhorov I et al. Int J Otorhinolaryngol Head Neck Surg. 2026 Apr;12(2):261-263
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20260797

Case Report

Empty nose syndrome case study

Iris Zhorov*, Melissa Goldstein, Eric Carniol

Carniol Plastic Surgery, Summit, NJ, USA

Received: 30 December 2025
Revised: 01 March 2026
Accepted: 02 March 2026

***Correspondence:**
Dr. Iris Zhorov,
E-mail: iz51@scarletmail.rutgers.edu

ABSTRACT

Empty nose syndrome (ENS) is a rare rhinological disorder secondary to excessive loss of nasal turbinate tissue. This case study presents a 33-year-old male who developed ENS following functional endoscopic sinus surgery (FESS). Despite significant improvement of rhinosinusitis severity and incidence, the patient experienced severe facial pain and suffocation sensation during nasal breathing starting several months postoperatively. Diagnosis was confirmed using the ENS6Q and a positive cotton test. An in-office intervention was successful in temporarily alleviating symptoms and improving quality of life. This intervention was placement of intranasal dissolvable packing (Nova Pack). After three weeks, the symptoms did recur. However, the patient was extremely grateful for temporary relief from his symptoms. This case highlights an in-office short-term remedy for ENS severe symptoms, which may be extremely helpful for these difficult-to-treat patients.

Keywords: Empty nose syndrome, Turbinate reduction, Nasal airflow, Intranasal packing, Cotton test, Rhinological disorders

INTRODUCTION

Empty nose syndrome (ENS) is a rare and debilitating nasal disorder that develops as a complication of turbinate reduction surgery. Significantly reduced turbinate tissue disrupts the airflow dynamics within the nasal cavity, causing a paradoxical obstruction sensation despite a wide nasal airway.[1] Symptoms of ENS are often delayed months or years postoperatively, and the exact pathophysiology remains unknown. While difficult to diagnose objectively, symptoms include nasal dryness, suffocation, restricted airflow, nasal crusting, burning sensation, and nasal openness.[1] The ENS 6-item questionnaire (ENS6Q) was developed as a diagnostic tool to identify ENS patients, and management remains challenging, with limited evidence for effective treatments.[2] Current options include saline irrigations, emollients, and topical therapies, with some experimental treatments like platelet-rich plasma (PRP) injections and hyaluronic acid (HA) fillers showing potential but carrying significant risks.

Intranasal examination revealed a relatively straight septum and 2+ inferior turbinates with scarring from a likely medial flap technique. A posterior remnant of the middle turbinate was seen with widely patent ethmoid cavities and maxillary antrostomies. No purulence was seen. A cotton test was performed by placing a small cotton ball on the lacrimal crest area. After several minutes, a significant improvement in facial pain on respiration was noted, confirming the diagnosis of ENS-MT (middle turbinate subtype).

A thorough discussion was had with the patient regarding surgical and nonsurgical management of ENS. Informed consent was obtained for intranasal dissolvable packing placement. A portion of Nova Pack (Medtronic Xomed, Minneapolis, MN) was then placed with the proximal end at the lacrimal crest, extending back into the ethmoid cavity on the left side. Approximately two-thirds of the ethmoid cavity was obscured by the packing while the maxillary antrostomy remained largely unobstructed. The

packing was hydrated with 1% lidocaine, which expanded it and held it in place. Immediate symptom relief was noted following insertion, with the ENS6Q score decreasing to 11. The packing material largely persisted for three weeks, during which symptoms remained improved. However, symptoms did recur following packing dissolution, returning to similar symptomatology and severity as prior to intervention.

ENS remains a complex and debilitating iatrogenic condition whose pathophysiology extends beyond simple anatomical tissue loss. Aberrant neurosensory healing following turbinate resection, rather than structural changes alone, appears to drive the paradoxical obstruction and suffocation symptoms that define the condition.[3] Impaired trigeminal nerve function has further been implicated, and validated tools such as the ENS6Q and cotton test have represented meaningful steps forward in standardizing diagnosis and guiding clinical decision-making.[4] As demonstrated in the present case, the cotton test not only confirmed the ENS-MT diagnosis but also provided mechanistic insight: computational fluid dynamics (CFD) analysis has shown that cotton placement redistributes nasal airflow away from the middle meatus jet stream, restoring a more balanced flow distribution and explaining the rapid symptomatic relief patients experience in the office.[5] Extending this principle, CFD-based classification of ENS patients by airflow resistance and symmetry shows promise as an objective diagnostic tool that may help tailor individualized treatment strategies.[6]

The temporary benefit achieved with intranasal dissolvable packing mirrors the short-term relief demonstrated by the cotton test, reinforcing the concept that partially obstructing aberrant airflow patterns can meaningfully reduce symptom burden. For patients seeking effective and long-lasting outcomes, surgery has been found to provide the best evidence-based results. The inferior meatus augmentation procedure using cadaveric rib cartilage, in particular, has produced significant and durable improvements across all ENS-related and general sinonasal symptoms.[7] A systematic review of 28 studies found that various surgical and regenerative medicine approaches produce improvements in nasal symptoms, psychological state, and quality of life for ENS patients.[8] Meta-analysis has further demonstrated that inferior turbinate and meatus augmentation improves not only nasal symptom scores but also anxiety and depression scores at 3 months and beyond.[9]

The psychological effects of ENS require special attention. For patients who meet criteria for somatic symptom disorder, a psychosomatic approach combining cognitive behavioral therapy and antidepressants has been found to produce significant improvements in both nasal and psychiatric symptom scores at 3 and 12 months.[10] Given the significant emotional distress exhibited by the present patient, a multidisciplinary approach is strongly encouraged.

CASE REPORT

A 33-year-old male presented for evaluation of ENS following functional endoscopic sinus surgery (FESS) for chronic rhinosinusitis. He states that prior to surgery, he experienced chronic sinusitis and a persistent dry nasal sensation. He was treated with recurrent antibiotics, along with systemic and intranasal corticosteroids which failed to control his chronic facial pressure. He underwent bilateral inferior turbinate reduction, middle turbinate subtotal resections, maxillary antrostomies, and total ethmoidectomies.

Postoperatively, while sinus pressure resolved, he reported no improvement in airway function. Two months later, he developed severe facial pain and feelings of suffocation during nasal breathing. This pain with nasal respiration has led to significant emotional distress, and anxiety and depressive symptoms. He then pursued a second opinion. On intake, an ENSQ6 was done with a score of 27, demonstrating extreme severity**.**

An intranasal examination revealed a relatively straight septum and 2+ inferior turbinates with scarring from likely medial flap technique. A posterior remnant of the middle turbinate was seen with widely patent ethmoid cavities and maxillary antrostomies. No purulence was seen. A cotton test was performed by placing a small cotton ball on the lacrimal crest area. After several minutes a significant improvement in facial pain on respiration was noted. This confirmed his diagnosis of ENS-MT (middle turbinate subtype).

A thorough discussion was had with the patient on surgical and nonsurgical management of ENS. Informed consent was obtained from the patient for intranasal dissolvable package placement. A portion of Nova Pack (Medtronic Xomed, Minneapolis, MN) was then placed with the proximal end at the lacrimal crest, extending back into the ethmoid cavity on the left side. Overall, approximately ⅔ of the ethmoid cavity was obscured by the packing while the maxillary antrostomy was largely unobstructed. The packing was hydrated with 1% lidocaine, which expanded the packing, holding it in place. Immediate symptom relief was noted following packing insertion, with the ENS6Q score decreasing to 11. The packing material largely persisted for three weeks. His symptoms remained improved for three weeks overall. During follow-up, he stated that with the packing in place, his ENSQ6 was 11. However, his symptoms did recur, with similar symptomatology and severity prior to intervention.

DISCUSSION

This case highlights the significant challenges in understanding and managing ENS. Using intranasal packing with Nova Pack provided immediate symptom relief, demonstrating the potential benefit of partially obstructing the airflow towards the sinus cavities. This may have reduced turbulent airflow and improved nasal

airflow dynamics, thus alleviating the patient's discomfort. The recurrence of symptoms after the packing dislodged underscores the limitations of this approach, and emphasizes the need for more durable and effective long-term treatment strategies for ENS.

Current treatment options are limited and often provide only temporary relief. Saline irrigations, emollients, and topical therapies may assist in alleviating some symptoms, but their efficacy is variable. More experimental approaches, such as platelet-rich plasma (PRP) injections and hyaluronic acid (HA) fillers, have shown some potential in restoring mucosal integrity and improving nasal airflow - however, these interventions carry potential risks and require further investigation.[1]

It is important that patients are aware of the potential risks and complications regarding FESS, particularly those involving turbinate reduction. Early recognition and diagnosis of ENS are crucial for timely intervention of chronic symptoms and the associated psychological distress. Additionally, further research is urgently needed to improve our understanding of this complex condition and develop more effective management options for patients suffering from ENS.

CONCLUSION

This case highlights that intranasal dissolvable packing can serve as a useful in-office bridge therapy for short-term symptom relief in patients with severe ENS. While the benefit was temporary, the meaningful reduction in ENS6Q score and patient-reported improvement in quality of life underscore its potential role as an adjunct in the management of this difficult-to-treat condition. This case also reinforces the importance of conservative turbinate preservation during FESS and the value of validated diagnostic tools such as the ENS6Q and cotton test in guiding clinical decision-making. Further research is needed to develop more durable and standardized treatment options for patients suffering from ENS.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Gordiienko IM, Gubar OS, Sulik R, Kunakh T, Zlatskiy I, Zlatska A. Empty nose syndrome pathogenesis and cell-based biotechnology products as a new option for treatment. World J Stem Cells. 2021;13(9):1293-306.
2. Velasquez N, Thamboo A, Habib AR, Huang Z, Nayak JV. The Empty Nose Syndrome 6-Item Questionnaire (ENS6Q): a validated 6-item questionnaire as a diagnostic aid for empty nose syndrome patients. Int Forum Allergy Rhinol. 2017;7(1):64-71.
3. Sozansky J, Houser SM. Pathophysiology of empty nose syndrome. Laryngoscope. 2015;125(1):70-4.
4. Gill AS, Said M, Tollefson TT, Steele TO. Update on empty nose syndrome: disease mechanisms, diagnostic tools, and treatment strategies. Curr Opin Otolaryngol Head Neck Surg. 2019;27(4):237-42.
5. Malik J, Thamboo A, Dholakia S, Borchard NA, McGhee S, Li C, et al. The cotton test redistributes nasal airflow in patients with empty nose syndrome. Int Forum Allergy Rhinol. 2020;10(4):539-45.
6. Esteban-Ortega F, Rosique-Lopez L, Ochoa-Rios JA, Rodriguez-Romero R, Burgos-Olmos MA. Empty nose syndrome: new insights from a CFD approach. Eur Arch Otorhinolaryngol. 2025;282(3):1319-26.
7. Dholakia SS, Yang A, Kim D, Borchard NA, Chang MT, Khanwalkar A, et al. Long-term outcomes of inferior meatus augmentation procedure to treat empty nose syndrome. Laryngoscope. 2021;131(11):E2736-41.
8. Kim DH, Basurrah MA. Surgical and regenerative treatment options for empty nose syndrome: a systematic review. Clin Exp Otorhinolaryngol. 2024;17(3):241-52.
9. Kim DH, Kim SW, Basurrah MA, Hwang SH. Evaluation of Post-Intervention Outcomes in Patients with Empty Nose Syndrome. Laryngoscope. 2024;134(5):2005-11.
10. Maul X, Thamboo A. The clinical effect of psychosomatic interventions on empty nose syndrome secondary to turbinate-sparing techniques: a prospective self-controlled study. Int Forum Allergy Rhinol. 2021;11(5):955-6.

Cite this article as: Zhorov I, Goldstein M, Carniol E. Empty nose syndrome case study. Int J Otorhinolaryngol Head Neck Surg 2026;12:261-3.