Empty Nose Syndrome Following Nasal Surgery: A Scoping Review of Current Evidence

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Background

- Empty nose syndrome (ENS) is a rare phenomenon that can occur after nasal surgery, particularly procedures that reduce nasal turbinate size.
- Nasal turbinates play a crucial role in sensing, filtering, warming, and humidifying the air we breathe in through our nose (**Figure 1**).[1]
- Although these procedures aim to relieve obstruction, loss of mucosal tissue and sensory endings may diminish airflow detection, producing a paradoxical sensation of obstruction despite a more patent airway.[2]

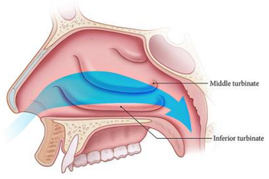

Figure 1. *Airflow through nasal airway*

Objective

To examine the existing literature of ENS following nasal surgery, providing an overview of current findings regarding different nasal surgeries/procedures implicated in the development of ENS.

Methods

- A comprehensive search was conducted using PubMed, Scopus, and Embase Library, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for scoping reviews.
- For this review, relevant articles in the English language, up to the year 2024, were considered. It included studies analyzing the incidence and contributing factors of ENS after different nasal surgeries.
- Eligible studies investigating ENS development post-procedure included in the review encompassed retrospective studies, case-based studies, prospective studies, cross-sectional studies, and interventional studies.
- Detailed information was extracted from these studies, specifically the type of study, surgeries performed, method of diagnosis, and functional postoperative outcomes.

Results

- A total of 548 articles were identified. Duplicate removal, screening, and full-text review were completed (see PRISMA guidelines; **Figure 2**).

Results (continued)

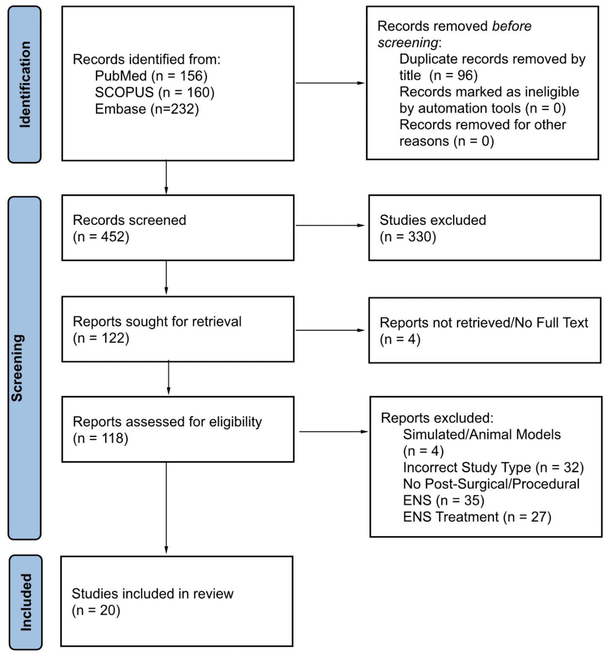

Figure 2. *PRISMA flow diagram*

- Distribution of study types is shown in **Figure 3**. The studies were categorized as follows: Retrospective Studies (cohort, clinical reviews, case-control, database analysis), Prospective Studies (cohort, case series, self-controlled), Case-Based Studies (individual or small group analysis), Cross-Sectional Study (prevalence, descriptive, survey-based or database-driven), Interventional Studies (clinical trials, experimental studies).

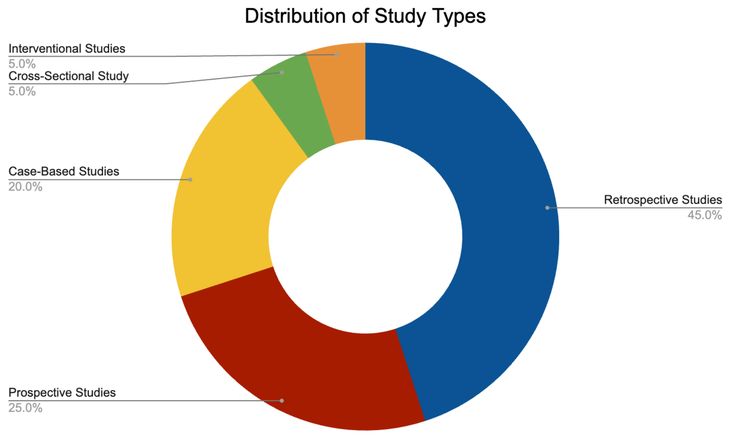

Figure 3. *Distribution of study types*

- Procedures involving the inferior turbinate (IT) were the most frequently mentioned in articles. These included IT Reduction and Total IT Turbinectomy.
- Septoplasty as a sole operation implicated in ENS was mentioned in the literature.

Results (continued)

- Less commonly mentioned procedures included radio-frequency turbinate reduction.

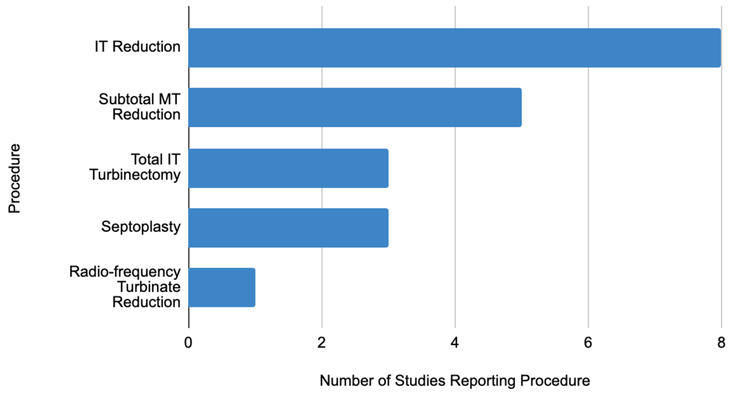

Figure 4. *Procedures implicated in ENS development*

- The Empty Nose Syndrome 6-Item Questionnaire (ENS6Q) was the most frequently used scoring system, particularly in recent years.
- Other scoring systems, including the Nasal Obstruction Symptom Evaluation (NOSE), Sino-Nasal Outcome Test 25 (SNOT-25), Sino-Nasal Outcome Test-22 (SNOT-22) were used less frequently.

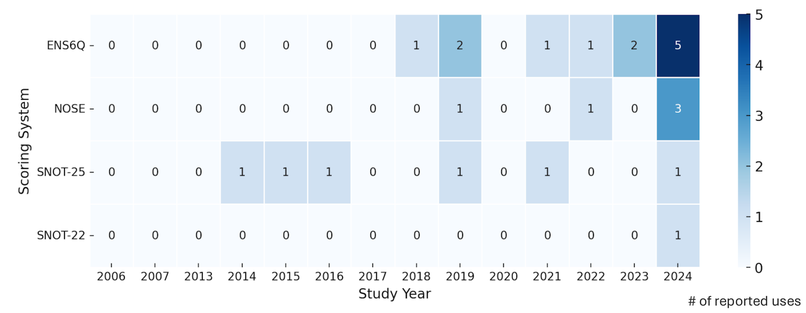

Figure 5. *Scoring system usage in ENS studies (2006-2024)*

Conclusions

- The lack of standardized incidence reporting and variability in diagnostic tools (such as the inconsistent use of one scoring system) limits the ability to accurately assess ENS risk across surgical techniques/procedure-types.
- Future research should prioritize clinical studies and standardized assessment methods to establish evidence-based guidelines for minimizing ENS risk and improving post-surgical outcomes.

References

1. Nasal Surgery | Otolaryngology — Head & Neck Surgery | Stanford Medicine. Accessed March 19, 2025. https://med.stanford.edu/ohns/OHNS-healthcare/sleepsurgery/treatments/nasal_surgery.html
2. 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):1293-1306. doi:10.4252/wjsc.v13.i9.1293