

Posterior Pharyngeal Wall Flap with Z-plasty: A Novel Surgical Approach for Nasopharyngeal Stenosis Secondary to Tonsillectomy. A case report

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Case Report

Plastic Surgery



Background:

This study aims to evaluate the surgical management of nasopharyngeal stenosis secondary to a tonsillectomy performed at age 6 in a 20-year-old female patient. The primary goal was to restore nasal ventilation and resolve the associated stenosis through a posterior-lateral pharyngeal wall flap with zeta-plasty. The patient presented with complete nasal obstruction on the right side due to excessive scarring from previous tonsillectomy surgery. Nasofibroscopy confirmed the diagnosis of nasopharyngeal stenosis. Surgical intervention involved the creation of a posterior-lateral pharyngeal wall flap with a Z-plasty to release the stenosis. The procedure successfully restored 100% nasal patency on the right side and 75% on the left side, with no significant complications reported.

Keywords: Z-plasty, Nasopharyngeal stenosis.

The inferior pharyngeal flap is a surgical technique commonly used to correct velopharyngeal incompetence, a condition where the velopharyngeal sphincter does not close properly during speech, leading to hypernasality and other speech issues. [1,2] This flap can be oriented in different directions—superior, inferior, or laterally—depending on the patient's anatomical and functional needs. In the case of the inferior pharyngeal flap, the flap is based on the lower part of the pharynx. [1]

Tonsillectomy procedure, while common, is associated with a range of complications that can vary according to the patient's age and underlying health conditions. The most frequent complications are primary hemorrhage (within 24 hours postoperatively) and secondary hemorrhage (more than 24 hours after surgery), with rates ranging from 0.2% to 2.2% and 0.1% to 3%, respectively. [3,4] Other complications include trauma to surrounding structures, laryngospasm, laryngeal edema, aspiration, respiratory distress, and postoperative issues such as pain, nausea, vomiting, dehydration, referred otalgia, post-obstructive pulmonary edema, velopharyngeal insufficiency, and nasopharyngeal stenosis. These complications are more prevalent in children with craniofacial disorders, Down syndrome, cerebral palsy, neuromuscular diseases, major heart conditions, or bleeding disorders, and in those under 3 years of

age. [3,4] In adults, around 20% of patients also experience complications following tonsillectomy, with postoperative hemorrhage being the most common and costly. [5]

Congenital abnormalities affecting nasal ventilation are another significant factor in respiratory health. These conditions can cause considerable difficulties in nasal breathing, impacting a child's respiratory function and development. Among the most common congenital abnormalities that affect nasal ventilation are midnasal stenosis (38%) and pyriform aperture stenosis (21%) [6], both of which can lead to airway obstruction and associated complications.

Case report

A 20-year-old female patient presents to the plastic and reconstructive surgery department with an inability to breathe through her right nostril, secondary to excessive scarring from a tonsillectomy performed at the age of 6. Notable surgical history includes tonsillectomy at 6 years old, septorhinoplasty at 18, and uvuloplasty at 19 years old.

At the intraoral inspection, nasopharyngeal stenosis is observed, along with the absence of the uvula, and an inability to ventilate through the nose when the mouth is closed. (Figure 1a)

From the Plastic and Reconstructive service, General Hospital of Mexico "Dr. Eduardo Liceaga", Mexico City, Mexico. Received on February 11, 2025. Accepted on February 14, 2025. Published on February 16, 2025.

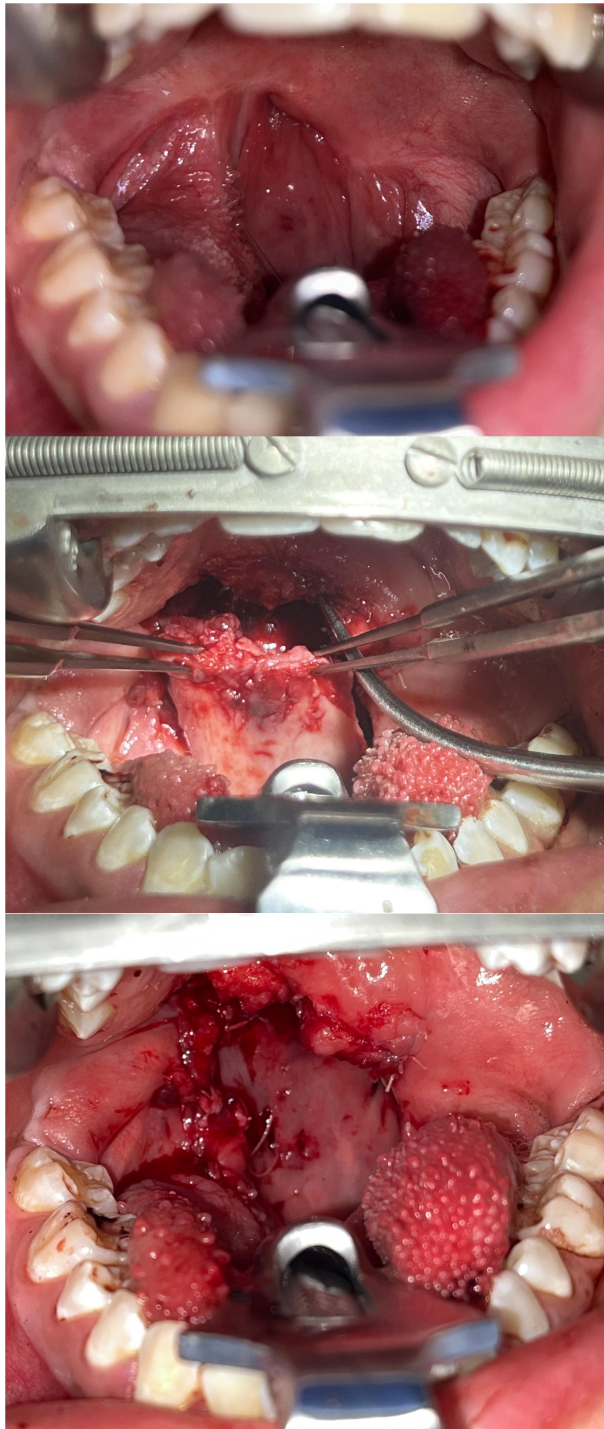


Figure 1.Upper. Intraoral photograph of pharyngeal stenosis and posterior webbing following right-sided tonsillectomy. Middle. Dissection of inferior-based pharyngeal flap. Lower. Inferior-based pharyngeal flap inset.

The patient is assessed and diagnosed with nasopharyngeal stenosis, and a plan is made for nasofibroscopy and posterior-lateral pharyngeal wall flap with zetaplasty.

With the patient under balanced general anesthesia and orotracheal intubation, a bronchoscope is introduced transoperative, revealing the following findings:

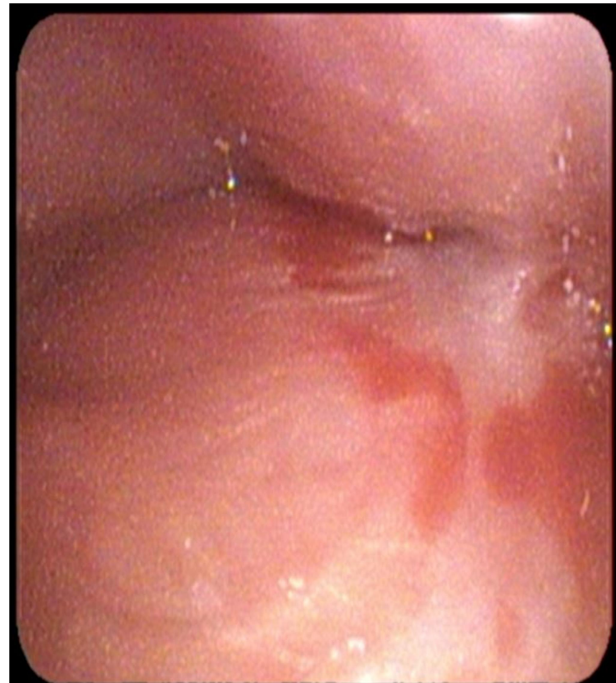


Figure 2. Nasofibroscopy is performed, where nasopharyngeal stenosis is observed on the right side.

Nasopharynx: The superior, middle, and inferior turbinates are enlarged. At 9 cm from the right nostril, there is a non-passing stenosis when attempting to pass the bronchoscope. (**Figure 2**)

Next, an endoscope is introduced under direct visualization through the oral cavity, with no apparent abnormalities. Diagnostic Impression: Nasopharyngeal stenosis.

After the endoscopy team enters and confirms the diagnosis, the plastic and reconstructive surgery department proceeds to mark the right pharyngeal pillar and soft palate, and a solution containing ropivacaine, epinephrine, and lidocaine is infiltrated. After waiting for latency, an incision is made along the marked area. An incision is made along the right pillar to the lateral wall, with a Z design to release the stenosis (100%). (**Figure 1b**) The pharyngeal wall is dissected to create a lower-based pharyngeal flap with right-sided predominance. (**Figure 3**) A Z-plasty is performed on the left pillar to release 75% of the stenosis. Proper permeability is confirmed, and the Z-plasty and pharyngeal flap are closed with 6-0 Vicryl sutures. Nasopharyngeal tubes are placed and secured with 5-0 Vicryl sutures. (**Figure 1c**)

Discussion

Surgical procedures are often performed without a thorough investigation of the patient's underlying pathology. In this case, the patient underwent a rhinoplasty and uvuloplasty to address a ventilation issue, without proper referral of her clinical

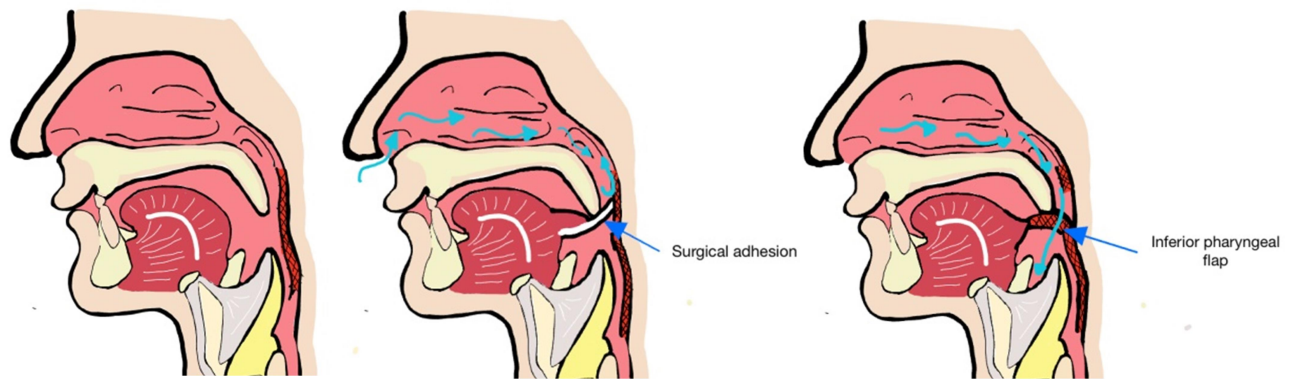


Figure 3. a) Normal anatomy lateral view of the oral and nasopharynx. b) Defect of the surgical band that interrupts the connection between the nasopharynx and oropharynx. c) Inset of the lower pharyngeal flap that lowers the base of the tongue and creates a connection between the nasopharynx and oropharynx, improving the patient's ventilation.

condition, despite having nasopharyngeal stenosis caused by a previous tonsillectomy.

Alternative therapeutic options include endoscopic excision of nasopharyngeal stenosis using the cold technique, which has shown success rates ranging from 80-100%. Another approach is CO₂ laser excision combined with balloon dilation, which has a success rate of 40-60%. Additionally, the use of postoperative topical nasal steroids has proven effective in repairing pharyngeal stenosis, offering a less invasive alternative to pharyngeal flap procedures. [7]

While the inferior pharyngeal flap has proven to be an effective surgical option for correcting velopharyngeal incompetence and nasopharyngeal stenosis, it carries risks such as postoperative airway obstruction or obstructive sleep apnea, which require close monitoring postoperatively. Early identification of nasopharyngeal stenosis in this patient allowed for timely surgical intervention, resulting in significant improvement in nasal breathing and a reduction in long-term complications.

Furthermore, the choice of Z-plasty was essential in this case, as it facilitated the partial release of the stenosis, ensuring airway permeability and reducing the risk of obstruction recurrence. This approach is supported by studies demonstrating the effectiveness of Z-plasty in releasing pharyngeal and nasopharyngeal stenosis, particularly in patients with complex surgical histories.

Conclusion

This case underscores the importance of thorough diagnostic evaluation and preoperative assessment to ensure an accurate diagnosis before surgical intervention. Identifying the underlying cause of symptoms is crucial to avoid operating on patients without a clear understanding of their pathology, thereby preventing potential future complications. In this case, the use of an inferior pharyngeal flap combined with Z-plasty was effective in restoring airway patency and improving speech function. It

highlights the need for a tailored, patient-specific approach in managing complex airway and speech issues, particularly in cases with a history of multiple surgeries.

Conflicts of interests

There was no conflict of interest during the study, and it was not funded by any organization.

Acknowledgements

I would like to express my sincere gratitude to Anna Friné Juárez Martínez for her invaluable support in the creation of the illustrative material for this article.

References

1. Visser A, van der Biezen JJ. Inferior-based pharyngeal flap for correction of stress velopharyngeal incompetence in musicians: case reports and review of the literature. *J Plast Reconstr Aesthet Surg*. 2012;65(7):960-2. doi: 10.1016/j.jbips.2011.11.049.
2. Sloan GM. Posterior pharyngeal flap and sphincter pharyngoplasty: the state of the art. *Cleft Palate Craniofac J*. 2000;37(2):112-22. doi: 10.1597/1545-1569_2000_037_0112_ppfasp_2.3.co_2.
3. Mitchell RB, Archer SM, Ishman SL, et al. Clinical Practice Guideline: Tonsillectomy in Children (Update). *Otolaryngol Head Neck Surg*. 2019;160(1 Suppl):S1-S42. doi: 10.1177/0194599818801757.
4. Mitchell RB, Archer SM, Ishman SL, et al. Clinical Practice Guideline: Tonsillectomy in Children (Update)-Executive Summary. *Otolaryngol Head Neck Surg*. 2019;160(2):187-205. doi: 10.1177/0194599818807917.
5. Seshamani M, Vogtmann E, Gatwood J, Gibson TB, Scanlon D. Prevalence of complications from adult tonsillectomy and impact on health care expenditures. *Otolaryngol Head Neck Surg*. 2014;150(4):574-81. doi: 10.1177/0194599813519972.
6. Patel VA, Carr MM. Congenital nasal obstruction in infants: A retrospective study and literature review. *Int J Pediatr Otorhinolaryngol*. 2017;99:78-84. doi: 10.1016/j.ijporl.2017.05.023.
7. Nassif SJ, Michel EG, Scott AR, Tracy L, Tracy JC. Acquired nasopharyngeal stenosis after radiation treatment for nasopharyngeal carcinoma. *Am J*

Otolaryngol. 2023;44(3):103819. doi:
10.1016/j.amjoto.2023.103819. Epub 2023 Mar 1.
PMID: 36878173.

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