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A New Technique for Nasal Stent Fabrication for Atrophic Rhinitis: A Clinical Report

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Abstract

Atrophic rhinitis is a chronic nasal disease characterized by progressive atrophy of the nasal mucosa accompanied by the formation of foul-smelling thick, dry crusts in the nasal cavities. Mild conditions of atrophic rhinitis can be treated by nasal irrigations and prescription of intravenous or topical aminoglycosides. In severe conditions, surgery can close the airways. The problem can also be managed by prosthodontic measures which include the fabrication of a poly methyl methacrylate acrylic resin nasal stents. This article describes a new procedure for fabricating a clear acrylic nasal stent with an alternative laboratory technique using small cylinders of soft putty as spacers for maintaining a 3-mm restricted nasal airway during processing.

Atrophic rhinitis is a chronic nasal disease characterized by progressive atrophy of the nasal mucosa and the underlying bones of the nasal turbinate, accompanied by the formation of foul-smelling thick, dry crusts in the nasal cavities.[1] Atrophic rhinitis, Synonym–ozena (which in Latin means fetor odor) is caused by a variety of conditions including infectious causes (gram-negative organism, *Klebsiella pneumonia* subspecies ozaenae), granulomatous disease, trauma, cocaine use, surgery, aging, and radiation therapy.[2]

Clinical features include mucosal changes, which along with aging, lead to decreased function, decreased ability to condition the inspired air, and decreased secretion production resulting in rhinitis symptoms. Nasal mucosa gradually changes from functional to nonfunctional mucosa, with loss of mucocillary clearance and neurologic regulation. Crusting and fetor, mucosal atrophy, and widely patent nasal cavities are seen in patients. Normal airflow is changed, contributing to a sensation of congestion and obstruction.

Therefore, various medical and surgical methods for treating this uncommon condition are available. The medical management includes the treatment of infection with antibiotics and regular nasal douching with a solution of diluted sodium bicarbonate, sodium chloride, and sodium borate. Alternatively, application of nasal cotton wool tampons soaked in glycerin containing 25% glucose for 24 hours is also used.[3]

Surgical procedure includes the complete closure of anterior nares (Young's operation), which causes patient discomfort because of the resultant mouth breathing and nasal voice. Surgery can also result in nonesthetic nasal deformities. Another surgical alternative is partial closure of anterior nares leaving a 3-mm opening in the nostrils for nasal breathing in patients who object to mouth breathing.

The problem can also be managed by prosthodontic measures which include the fabrication of a clear poly methyl methacrylate (PMMA) acrylic resin nasal stents with 3-mm openings[4] for restricting the nasal airway. The nasal stents overcome the disadvantages of surgical reduction of the airway. The purpose of this article is to describe a new procedure for fabricating a clear acrylic nasal stent with a simple laboratory technique for maintaining a 3-mm restricted nasal airway during processing.

Clinical report

A 39-year-old female patient reported to the Department of Prosthodontics, Yenepoya Dental Hospital with the diagnosis of atrophic rhinitis from the Department of Otolaryngology at Yenepoya Medical Hospital. Due to the shortcomings of surgical procedures and also due to the absence of any improvement in the condition with oral and local drugs, a heat-polymerized clear PMMA nasal stent was planned for the patient.

Procedure

Impression of the nasal cavity was made with low-fusing stick impression compound[5] (DPI Tracing Sticks®; Dental Products of India, Mumbai, India) by softening and molding the compound into cylindrical form and then inserting it into each nasal cavity. Care was taken not to extend the compound beyond the cartilaginous pyramid of the nasal cavity.

Figure 1 Impression of the nasal cavity with beading and boxing.

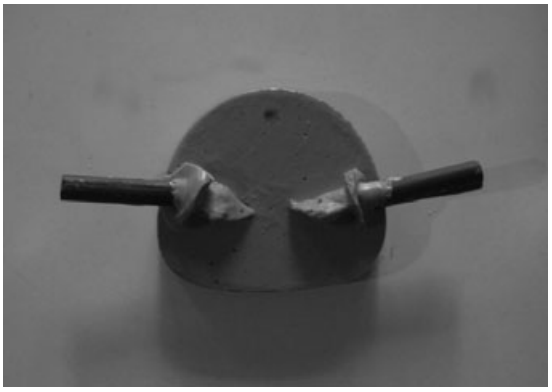

Figure 3 Fabrication of the split cast.

1. External impression of the nose and the upper lip was made with irreversible hydrocolloid (Tropicalgin™, Zhermack, Rovigo, Italy) with the nasal impression in the nasal cavity. The impression was reinforced with dental plaster (Fig 1).
2. Beading and boxing of the impression was done, and the impression was poured in type III dental stone (Fig 2).
3. Due to the presence of undercuts in the cast, the wax pattern was difficult to retrieve; thus, an impression of each nasal vestibule in the cast was made with light-bodied vinylpolysiloxane (VPS) (3M ESPE Express STD®, 3M ESPE Dental Products, St. Paul, MN), and a split mold[6] was fabricated (Fig 3).
4. Inlay wax was melted and poured in the split mold and allowed to cool, and the wax patterns were retrieved.
5. Wax try-in was done, and two wax patterns were joined with an orthodontic wire loop adapted around the columella region.
6. Wax patterns were invested and dewaxed in the conventional manner. Then two small cylinders of VPS soft putty, hereafter referred to as "putty ropes," (Aquasil™ Soft Putty; Dentsply DeTrey, Konstanz, Germany) of 3-mm diameter were prepared by rolling between two glass plates.
7. Each of these two putty ropes was lubricated with petroleum jelly and stabilized individually with cyanoacrylate adhesive in the center of both the left and right mold cavity in the cope portion of the flask (Fig 4).
8. Initially, a small amount of heat-cured PMMA was packed in the flowable state so as not to displace the putty ropes following which the rest of the mold was packed with resin in the dough stage. A long curing cycle was followed.
9. The clear nasal stent was deflasked. A radiograph of the nasal stent was taken to show the putty ropes (Fig 5). The putty ropes were then removed easily by pulling with an explorer, leaving a 3-mm nasal airway.
10. The external prosthesis junction in the patient was established at the mucocutaneous junction from a cosmetic standpoint after which it was finished and polished (Fig 6).

Discussion

Mild conditions of atrophic rhinitis can be treated by gentle removal of crusts by nasal irrigations with the help of an alkaline solution of diluted sodium bicarbonate, sodium borate, and sodium chloride. Intravenous or topical aminoglycosides can also be prescribed. In severe conditions, surgery is done to close

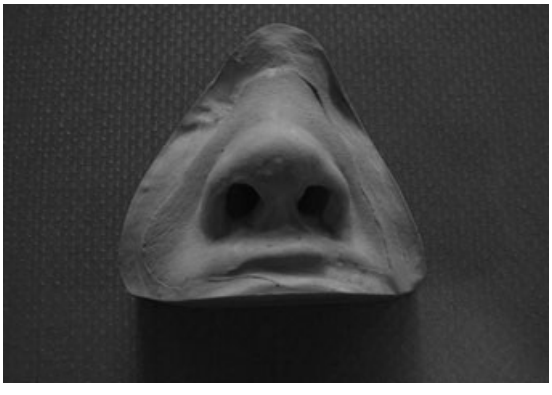

Figure 2 Diagnostic cast poured in type III gypsum.

Figure 4 Dewaxing done and small putty ropes stabilized in the center of both the left and right mold cavity.

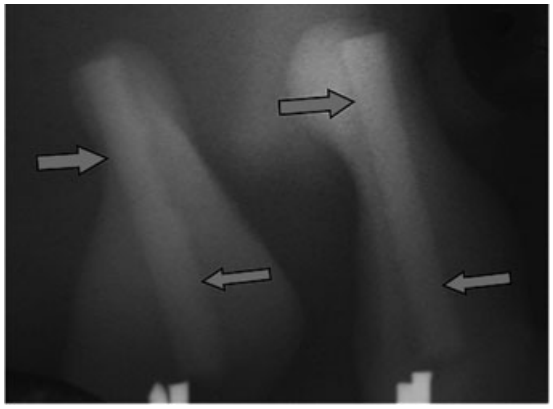

Figure 5 A radiograph of the nasal stent shows the putty ropes.

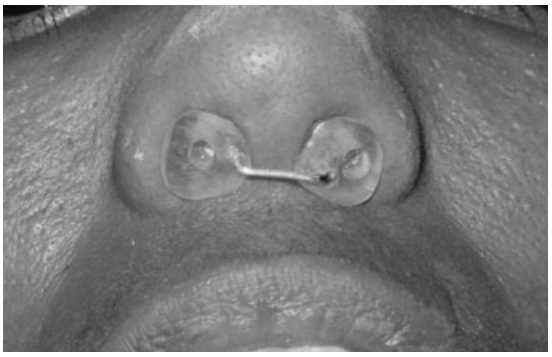

Figure 6 External prosthesis junction in the patient established at the mucocutaneous junction.

the airways (Young's procedure), but it may result in difficulty in breathing, nasal voice, and mouth breathing at a later date. Prosthodontic management with a nasal stent as in the above case avoids the above-mentioned complications associated with surgery and helps in providing rest to the nasal cilia and aids in healing. Nasal stents are also well tolerated by the patients.

Furthermore, this article describes a simple technique for maintaining a 3-mm restricted nasal airway using small cylinders of soft putty (putty ropes) as spacers during processing as compared to the traditional technique of using laboratory rotary instruments for drilling the nasal airway in the finished nasal stent, which is tedious, time consuming, can result in a wider airway passage than desired, and can even lead to perforation on the external surface of the nasal stent if not cautiously performed.

Summary

Prosthodontic management of patients with a clear acrylic nasal stent for the treatment of atrophic rhinitis has been described with an alternative laboratory technique for maintaining a restricted nasal airway. The use of a nasal stent resulted in appreciable reduction in the symptoms of atrophic rhinitis, thus making it an effective treatment modality for the same.

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