Customized Alar Stent Fabrication for Atrophic Rhinitis Patient: A Non-invasive Technique

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Atrophic Rhinitis is a form of chronic rhinitis in which the nasal mucosa atrophies and hardens; eventually causing the nasal passages to dilate and dry out. Other prominent findings include foul smelling crusts and bleeding. Despite various local, medical and surgical methods suggested for the treatment of this slowly progressing disease, the problem with respect to the proper maintenance of the nasal valve area remains unsolved. The alar stent prevents the narrowing of the nostrils and helps in maintaining the airway patency. This article describes a simplified, non-invasive technique for the fabrication of a heat polymerized clear acrylic resin alar stent for treating the atrophic rhinitis patient.

Keywords: Acrylic resin alar stent, Airway patency, Atrophic rhinitis, Foul smelling crusts, Narrowing of nostrils, Non-invasive technique

INTRODUCTION

Atrophic rhinitis is a chronic nasal disease characterized by a triad of fetor, crusting, and atrophy of the nasal structures. The findings include squamous metaplasia of mucosa, nasal cavity enlargement, purulent discharge, bleeding, and headache. The causative organism for atrophic rhinitis is Klebsiella pseudomonas. Fortunately, patients with this condition are anosmic and hence they are subjectively unaware of the stench. The main goal of the treatment is to induce reversibility of the nasal mucosa by reducing the size of the nasal cavity, reducing air entry through the nose, increasing the lubrication of the nasal mucosa, and keeping the nasal cavity clean and moist so that it is free from crusts and fetor. Atrophic rhinitis presents either as primary or secondary atrophic rhinitis. Various local, medical and surgical methods are available for treating this chronic condition. Local treatment includes saline or alkaline douching, emollients and lubricants such as 25% glucose and glycerine drops, and regular decrusting. The medical management includes the use of antibiotics (fluoroquinolones and metronidazole), which are rarely successful in the long-term. The surgical techniques that have been suggested, are largely aimed at the reduction of the size of the nasal cavity, for example, the complete closure of the nostrils with small skin flaps, as suggested by Young. However, the chances of recurrences are high on reopening it. Eventually, this leads to habitual mouth breathing, a nasal intonation and unaesthetic nasal deformities. Another surgical approach suggests partial closure of the anterior nares, leaving a 3 mm opening in the nostrils for nasal breathing, in patients who succumb to mouth breathing and nasal voice.

Alar stents made of clear heat-polymerized acrylic resin have been used for the treatment of alar collapse and were reportedly well tolerated by the patients. The advantages of the stent are that the technique is non-invasive, cost effective, tissue tolerant, esthetic to the patient, comfortable to use, easy to fabricate, and clean. It maintains the patency and the contour of the nasal cavities. An effective non-invasive method of treatment by means of intranasal alar prosthesis made of clear heat polymerized acrylic resin is described in this study.

CASE REPORT

A 47-year-old female patient was referred to the Department of Prosthodontics, Yenepoya Dental College, Mangalore by the Department of Ear-Nose-Throat (ENT), Yenepoya Medical College, Mangalore for the fabrication of an intra-nasal stent to maintain the patency of the nostril. The patient had been diagnosed with atrophic rhinitis by the ENT Department. The clinical examination revealed enlarged left nasal cavity, a foul odor, and greenish discharge from the nose, which were suggestive of the infection. Treatment with local and oral drugs failed to improve the chronic condition. The patient was reluctant for undergoing a surgery and douching the nose was uncomfortable for her. So, a heat-polymerized, clear, acrylic resin alar stent was planned for the patient.

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Procedure
• The patient was made to sit upright in the dental chair
• The inner surface of the nostrils was gently coated with petroleum jelly to facilitate the subsequent ease in insertion and removal of the nasal impression
• Anesthesia was not required
• An impression of the nasal cavity was made with addition silicon putty elastomeric impression material (Aquasil; Dentsply, Dentrax, Germany)
• The material was manipulated and moulded into a rope-like form of the approximate length of the nasal cavity, and it was then inserted into each nasal vestibule of the patient (Figure 1). Care was taken not to push the material beyond the nasal cartilage
• A band of material was continued across the columella to join the two sides of the nasal cavity
• This avoids the accidental posterior displacement of the prosthesis
• When the putty was set, the impression was retrieved from the nose (Figure 2)
• The excess material was trimmed, so that when the nasal impression was reinserted, the margins of the nostrils could be seen
• The impression was invested in Type III dental stone in a dental flask (Figures 3 and 4)
• The impression was removed from the flask and processed in heat polymerizing clear acrylic resin (DPI - Heat Cure; Dental products of India, Mumbai, India)
• After deflasking, a 3 mm hole was drilled through the prosthesis to maintain the patency for the airway, followed by trimming and polishing (Figure 5). The prosthesis had a smooth outer surface to provide comfort to the nasal mucosa during insertion and removal and prevent the growth of microorganisms.

The prosthesis was inserted into the nasal vestibule (Figure 6). The patient was trained to orient the prosthesis correctly and to insert and remove the prosthesis from the nose by simple digital pressure. The patient was instructed to wear it continuously, removing it only for a short period for cleaning. The stent had adequate retention, and patient could perform the inhalation and exhalation process conveniently.
DISCUSSION

Static narrowing or obstruction of the internal nasal area is caused by crowding of its anatomic components. This involves the malposition, hypertrophy or deviation of the nasal septum, upper lateral cartilages, lateral nasal walls, inferior turbinate/nostril floor. The aim of surgery is to widen and strengthen the portion of the airway that is likely to collapse during inspiration. Often there is a recurrence of the disease that makes revision surgery more perilous because of the resultant scar/fibrous tissue in the nasal vestibule. The use of alar stent has advocated the prevention of the nasal scar contracture and post-operative narrowing of the anatomic components, thus, improving the cosmetic appearance.8,9

Alar stent reduces the unnecessary exuberant air entry through the nose, thereby providing rest to the nasal cilia and inducing the reversibility of the normal breathing pattern. The risk of night time breathing disturbances and decrease in the nocturnal oxygen arterial partial pressure is, therefore, prevented.10 The nasal stent is retentive, tissue tolerant and comfortable to the patient and there is no risk of dislocation or aspiration of nasal stent.11,12

CONCLUSION

In this report, a patient with atrophic rhinitis was successfully treated with alar stent prosthesis. It is easy to fabricate, simple, non-invasive, more economical, well tolerated by the patient and it is aesthetically made from clear acrylic resin.