Case Report

DOI: JCDR/2012/4014:1941

Nasal Stent Fabrication for an Atrophic Rhinitis Patient: A Simplified Technique

Dentistry Section

E. NAGARAJ, NITIN SHETTY, NIVEDITA MANKANI, SUBRAMANIAN M. RAO, SUNIL KUMAR GURRAM

ABSTRACT

Atrophic rhinitis is a chronic nasal disease which is 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. Atrophic rhinitis has become less common in countries where the social conditions and the health have generally improved. Various local, medical and surgical methods are available for the treatment of this slowly progressive and disabling disease, but all have had limited success. This article describes a simplified non-invasive technique of fabricating a polymethyl methacrylate, acrylic resin nasal stent for treating an atrophic rhinitis patient.

Key Words: Atrophic rhinitis, Nasal stent, Non-invasive technique, Acrylic resin nasal stent and foul-smelling nasal cavities

INTRODUCTION

Atrophic rhinitis is a chronic nasal disease which is 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 greatly enlarged nasal cavities [1].

Atrophic rhinitis presents either as primary or secondary atrophic rhinitis. The treatment options for atrophic rhinitis have had limited success [2]. Various local, medical and surgical methods are available for treating this uncommon condition. Local treatment with saline or alkaline douching, emollients and lubricants such as 25% glucose and glycerine drops, and regular decrusting may suffice. The medical management includes the treatment of the infection with antibiotics (fluoroquinolones and metronidazole), which are rarely successful in the long term [3]. The surgical procedures which have been suggested, are largely aimed at the reduction of the size of the cavity, all with limited success [3]. The complete closure of the nostrils with small skin flaps, as advocated by Young [4], can be helpful, but a relapse often occurs on reopening it [3]. This also results in mouth breathing, a nasal voice and non-aesthetic nasal deformities. Another surgical approach is the partial closure of the anterior nares, leaving a 3-mm opening in the nostrils for nasal breathing, in patients who object to the mouth breathing and the nasal voice [5].

An effective, non-invasive method for treating atrophic rhinitis by means of a nasal stent prosthesis which was made of heat polymerized clear acrylic resin has been described. The advantages of the stent are, that the technique is non-invasive, cost-effective, tissue tolerant, aesthetic to the patient, comfortable to use, easy to fabricate and easy to clean. It maintains the patency and the contour of the nasal cavities.

CLINICAL REPORT

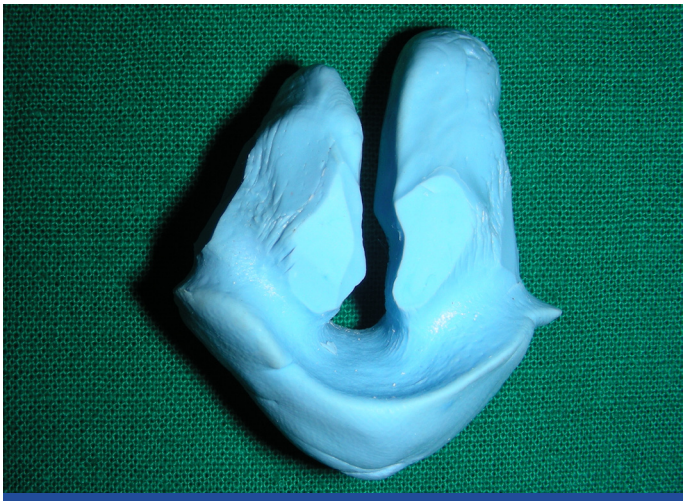
A 27-year-old male patient was referred to the Department of Prosthodontics, P M Nadagouda Memorial Dental College and Hospital, Bagalkot, Karnataka, India, with the diagnosis of atrophic rhinitis, from the Department of Otolaryngology, S Nijalingappa Medical College and Hospital, Bagalkot, Karnataka, India. The clinical examination revealed enlarged nasal cavities, a foul smell from the nose, and a discharge of greenish crusts from the nose, which were suggestive of an infection. There was no improvement in the condition after treatment with local and oral drugs. The patient declined surgery and douching the nose was not comfortable for him. So, a heat-polymerized, clear, acrylic resin nasal stent was planned for the patient.

PROCEDURE

1. A nasal impression was obtained with the patient-sitting upright in the dental chair.
2. Petroleum jelly was applied to the anterior nares to facilitate the subsequent removal of the impression.
3. Anaesthesia was not required.
4. An impression of the nasal cavity was made with additional silicon putty elastomeric impression material (Aquasil; Dentsply, Dentray, Germany).
5. The material was mixed and molded into a cylindrical form of the approximate length of the nasal cavity and it was then inserted into each nasal vestibule of the patient. Care was taken not to push the material beyond the cartilaginous pyramid of the nasal cavity.
6. A band of material was left across the columela to join the 2 sides [Table/Fig-1]. This prevented the accidental posterior displacement and the possible inhalation of the prosthesis.
7. When the putty was set, the impression was removed from the nose [Table/Fig-2]. The excess material which was external to the nares was trimmed, so that when the putty was reinserted, the margin of the nostril could be seen.
8. The impression was invested in artificial dental stone (Kala stone; Kala bhai pvt ltd, Mumbai) in a dental flask.
9. The impression was removed from the flask and processed in heat polymerizing clear acrylic resin (DPI – heat cure; Dental products of India, Mumbai).
10. After deflasking, a 3-mm hole was drilled through the prosthesis to provide an airway, followed by trimming and polishing [Table/Fig-3 & 4]. The prosthesis had a smooth outer surface to provide comfort and to prevent injury to the nasal mucosa and the growth of microorganisms.

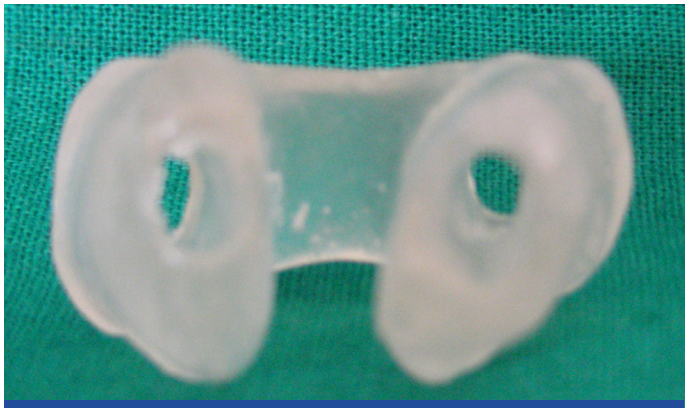
11. The prosthesis was inserted into the nasal vestibule [Table/Fig- 5]. The patient was trained to orient the prosthesis correctly and to insert and remove the prosthesis from the nose. The patient was instructed to wear it continuously, removing it only for a short period of time for cleaning.
12. Recall checkups were scheduled after 1 month, 3 months, 6 months and 9 months to make necessary adjustments. The nasal cavities were clean and they were reduced insize, with an absence of crusts and the associated foul odour. The patient had relief from the nasal blockage and he was free from the disease at 9 months of follow-up [Table/Fig-6].

[Table/Fig-1]: Impression of nasal cavities



[Table/Fig-2]: Impression

[Table/Fig-3]: Finished nasal stent prosthesis



[Table/Fig-4]: 3 mm holes in the prosthesis

[Table/Fig-5]: Nasal stent prosthesis in nasal cavity

[Table/Fig-6]: Disease free nasal cavities

DISCUSSION

Atrophic rhinitis presents either as primary or secondary atrophic rhinitis. Primary atrophic rhinitis has been attributed to an infection, which is most notably caused by a gram-negative organism (Klebsiella pneumonia, subspecies Ozaenae), but it may also relate to environmental factors and general health conditions, like endocrine balance and an autoimmune basis, which are possibly initiated by a virus or which owe to vitamin or iron deficiencies. This condition is characterized by a progressive atrophy of the mucosa, with loss of the turbinate bone, resulting in a capacious cavity full of foul-smelling crust, of which the patient may be unaware. The copious crusts often bleed when they detach and they may extend into the nasopharynx, producing an unpleasant choking sensation and snorting. The nose paradoxically feels blocked, owing to the drying effect in the abnormally patent

airway. Secondary atrophic rhinitis has been attributed to trauma, radiotherapy, and chronic granulomatous conditions and following excessive surgery [3].

Dentists may become involved in the provision of prosthesis in the field of otolaryngology because of their specialized knowledge of impression procedures and allied techniques which are necessary for the fabrication of prostheses. One such application is the construction of alar stents. The primary function of the alar stents is to maintain the nasal airway for patients in whom nasal collapse on inspiration causes a significant level of respiratory inconvience [6]. Internal nares inserts were fabricated with heat-polymerized acrylic resin to restore the nasal airways, which were lost after reconstructive nasal surgery for a deviated nasal septum. These inserts restored the support for the lateral nasal tissues and allowed the free passage of air through the nasal cavities. The tissue acceptance of this prosthesis was excellent [7].

Various local, medical and surgical methods are available for treating this disease. The local treatment involves nasal douching with an alkaline solution of diluted sodium bicarbonate, sodium borate and sodium chloride [8]. To keep the nasal cavities clean from the crusts, nasal douching must be performed twice daily for 6 weeks to provide relief. This was uncomfortable for our patient [9]. The medical line of treatment with antibiotics are rarely successful in the long term [3]. Surgery was tried in severe cases by completely closing the nasal cavities, which resulted in a difficulty in breathing, a nasal voice and mouth breathing [10]. Recurrence of the disease is more common, which makes a revision surgery more difficult because of the exuberant scar/fibrous tissue in the nasal vestibule. Treatment with a nasal stent prosthesis helps in overcoming the disadvantages of the local, medical and the surgical procedures. A nasal stent prosthesis reduces the air entry through the nose, thereby providing rest to the nasal cilia and inducing the reversibility of the nasal mucosa condition [10]. The nasal stent is retentive and there is no risk for dislocation and aspiration of the nasal stent [11]. The advantages of the nasal stent are that the technique is non-invasive, cost-effective, tissue tolerant, comfortable to the patient and easy to insert and remove [12].

CONCLUSION

In this report, a patient with atrophic rhinitis was successfully treated with a nasal 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.

REFERENCES

[1] Zohar Y, Talmi YP, Strauss M, Finkelstein Y, Shvilli Y. Ozena revisited. *J Otolaryngol* 1990; 19:345-9.
[2] Irwin SR, Irwin R, Curley FJ, Grossman RF. Diagnosis and treatment of the symptoms of the respiratory tract.
[3] Snow Jr BJ, Ballenger JJ. Ballenger's Otorhinolaryngology. *Head and Neck Surgery* (ed 16). Hamilton, Canada, Decker, 2002.
[4] Young A. Closure of the nostrils in atrophic rhinitis. *J Laryngol Otol* 1967; 81:515-24.
[5] Sinha SN, Sardana DS, Rajvanshi VS. A nine years' review of 273 cases of atrophic rhinitis and their management. *J Laryngol Otol* 1977; 91: 591-600.
[6] Davenport JC, Brain DJ, Hunt AT. Treatment of an alar collapse with nasal prostheses. *J Prosthet Dent* 1981; 45:435-7.
[7] Young JM. Internal nares prosthesis. *J Prosthet Dent* 1970; 24: 320-3.
[8] Shehata M, Dogheim Y. Surgical treatment of primary chronic atrophic rhinitis (an evaluation of silastic implants). *J Laryngol Otol* 1986; 100:803-7.
[9] Shenoy VK, Shetty P, Alva B. Pin hole nasal prosthesis: A clinical report. *J Prosthet Dent* 2002; 88:359-61.
[10] Sajjad A. A new technique for nasal stent fabrication for atrophic rhinitis: A clinical report. *J Prosthodont* 2011; 20: 326-28.
[11] Savion I, Lee Miller MD, Malloy RB. Construction of a surgical stent for posttraumatic nasal synechia. *J Prosthet Dent* 2005; 94: 462-65.
[12] Kumar NS, Chandra TS. Prosthetic management of atrophic rhinitis. *Indian Journal of Otolaryngology and Head and Neck Surgery* 2008; 60: 379-81.

AUTHOR(S):

1. Dr. E. Nagaraj
2. Dr. Nitin Shetty
3. Dr. Nivedita Mankani
4. Dr. Subramanian M. Rao
5. Dr. Sunil Kumar Gurram

PARTICULARS OF CONTRIBUTORS:

1. Senior Lecturer, Dept. of Prosthodontics, PMNM Dental College and Hospital, Bagalkot, Karnataka, India.
2. Senior Lecturer, Dept. of Prosthodontics, D.Y. Patil Dental College, Navi Mumbai, India.
3. Senior Lecturer, Dept. of Prosthodontics, PMNM Dental College and Hospital, Bagalkot, Karnataka, India.
4. Senior Lecturer, Dept. of Periodontics, PMNM Dental College and Hospital, Bagalkot, Karnataka, India.
5. Reader, Dept. of Prosthodontics, Mamata Dental College, Kaammam, AP, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. E. Nagaraj, Senior Lecturer
Dept. of Prosthodontics, PMNM Dental College and Hospital, Bagalkot, Karnataka, India.
E-mail: dr_nagaraj_e@yahoo.co.in

FINANCIAL OR OTHER COMPETING INTERESTS:
None.

Date of Submission: **Aug 12, 2011**
Date of Peer Review: **Jan 14, 2012**
Date of Acceptance: **Jan 20, 2012**
Date of Publishing: **May 01, 2012**