

# A Simplified Approach of Customized Acrylic Nasal Stent Fabrication

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## ABSTRACT

Post-traumatic nasal obstruction is a common phenomenon which leads to difficulty in breathing and thus affecting the patient's life expectation. Even after surgical correction, a nasal stent is needed to hold the valve area. The present article describes modifications in nasal stent fabrication which provides adequate retention, accuracy and ease in insertion and removal.

**Keywords:** Customized acrylic stent, Nasal deformity, Nasal obstruction, Nasal stent.

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## INTRODUCTION

The sequelae of trauma to the nose include nasal deformity and nasal obstruction that can have a long-term negative impact on patient quality of life. Successful management of post-traumatic nasal obstruction relies on a detailed history, careful analysis and accurate diagnosis.<sup>1</sup> The correction of fixed nasal obstruction requires surgical maneuvers that aim to widen and strengthen areas of anatomic narrowing.<sup>2</sup> If nasal patency is not maintained by a stent, chances of recurrences are there even after successful surgical correction of the obstruction. Nasal stents are routinely used to maintain nasal cavity space during the initial healing period. Definitive or interim stents may be needed after the initial healing period to prevent collapse of the nasal air space from the weight of the flap. The purpose of the nasal stent is to reshape the outer nasal passage over a period of months. Duration of using nasal stent varies from individual to individual depending on the severity and extent of the obstruction. Reshaping the nasal valve area may be compared to retainers worn after braces are removed. Retainers must often stay in place for at least 6 to 13 months to prevent teeth from drifting back into their original position. This article presents a simple method for the fabrication of a customized nasal stent for a patient with post-traumatic unilateral nasal stenosis. The method yields a surgical stent that fits accurately into place, allows nasal breathing and is retentive and esthetic.

## CASE REPORT

A 57-year-old male patient reported in the department with the surgical correction of the nasal obstruction done

approximately 1 week before. The patient was referred by an ENT surgeon, with the packed gauze piece in the left nostril. A nasal stent had to be fabricated for maintaining the patency of the nostril. Patient consent and ethical approval from the ethical committee of the institution was taken before starting the treatment. On examination, healing wound was seen with no active site of inflammation and thus it was decided to make the impression of nostril at the same time.

## Technique

The inner surface of the left nostril was lightly coated with petroleum jelly (Vaseline; Unilever, Greenwich, Connecticut, USA). A hot water bath was used to soften and temper medium fusing impression compound (Y-Dents impression compound; MDM Corporation, New Delhi, India) to fabricate a custom tray for alginate impression material (Zelgan, Dentsply India Pvt Ltd, India). First, a base of compound was shaped to take impression of the columela and ala of nose and then a thin cylinder of compound was attached to the base for insertion into the nostril. The tray was inserted into the nostril keeping in view that it was loose fitting and could be easily inserted and removed from the nostril. The surface of the cylindrical portion was roughed and holes were made in the base portion for retention of alginate (Fig. 1). The impression was made with the alginate impression material (Fig. 2) and the cast was poured with type III dental stone (Kalstone; Kalabhai Karson Pvt Ltd, Mumbai, India) (Fig. 3). After application



Fig. 1: Impression compound tray



Fig. 2: Alginate impression of the left nostril



Fig. 4: Acrylic nasal stent



Fig. 3: Final cast



Fig. 5: Insertion of nasal stent

of separating media transparent autopolymerized acrylic resin (Dental Products of India Ltd, New Delhi, India) was mixed and applied into the nostril portion of the cast in the dough stage. At the same time, a wax spatula was used to make hole for creating a breathing passageway in such a way that 1 to 1.5 mm thick walls of the autopolymerized resin could be made. A hook of 21-gauge stainless steel orthodontic wire was made and embedded into the acrylic resin before polymerization. It was embedded at the medial upper side near the columella, in such a way that the wire was not distinguished from front. After the acrylic got polymerized, the stent was removed from the cast and final finishing and polishing was done (Fig. 4). The stent was kept in hot water at 50°C for at least 60 minutes and then checked in the patient's nasal cavity (Fig. 5). The accuracy and patency of the stent was checked by asking the patient to close his right nostril and breathe forcibly through the left nostril. The stent was well-retained and patient could perform the inhalation and exhalation process (Fig. 6). Instructions were given regarding the use and maintenance of the nasal stent.



Fig. 6: View of nasal stent in patient's left nostril

## DISCUSSION

Static narrowing or obstruction of the internal nasal valve area is caused by crowding of its anatomic components. This involves malposition, hypertrophy or deviation of the nasal septum, upper lateral cartilages, lateral nasal walls,



inferior turbinates or nostril floor. The goal of surgery is to widen and strengthen the portion of the airway that is liable to collapse during inspiration. The use of nasal stent to prevent nasal scar contracture and postoperative narrowing has been used for a very long time. A number of materials are used for this purpose, which include ribbon gauze (Clauden nasal ribbon gauze; Lohmann Technologies Corp, Hebron, Kentucky, USA), fingerstall packing (Rhinotamp; Vostra, Aachen, Germany), cellulose packs (Surgicell; Johnson & Johnson Medical, Arlington, Texas, USA), foam packs (Gelfoam; Mallinckrodt Baker Inc, Phillipsburg, New Jersey, USA), catheters (Ethmo Ballooncatheter; Spiggle & Theis, Dieburg, Germany) and Argyle nonconductive connective tubing (Argyle, Division of Sherwood Medical, St Louis, Missouri).<sup>3-8</sup> These materials keep the wound surfaces apart, prevent formation of hematoma and prevent restenosis due to scarring. Eventually, epithelization occurs around them, securing the long-term patency of the surgically established airway.<sup>3,9</sup> The length of time of packing or surgical stenting varies from 2 weeks to 6 months.<sup>3-8</sup> The customized acrylic stent described was a superior alternative to other stenting methods.<sup>10</sup> Essentially, these devices have been used to support collapsed ala nasi in order to reduce nasal obstruction and improve cosmetic appearance.

In the present article, a customized medium fusing impression compound was used to provide a rigid support for the alginate impression material. Impression compound tray can be easily customized according to individual shape and size of the nose and thus has the advantage of ease in manipulation and also cost-effectiveness. A transparent acrylic resin was used for esthetic purpose and to make the stent nondistinguishable. Orthodontic wire was attached on medial side for the purpose of easy insertion and removal of the stent in the patient nose. The stent was placed in 50°C hot water to reduce its cytotoxic potential by leaching out of the monomer.<sup>11</sup> The use of nasal stents made from acrylic resin is a safe, convenient and economic treatment for the prevention of contracture after surgical correction of nostril stenosis or nasal valve insufficiency. This technique has advantages over other methods, previously described in the literature.<sup>3-8</sup> The treatment procedure is customized according to individual's nostril, easy to fabricate and a chair-side procedure. There is no risk for dislocation and aspiration of the nasal stent. The nasal airway is secured with a patent stent, and the patient can immediately return to nasal respiration. The risk of night-time breathing disturbances and decrease in nocturnal arterial oxygen partial pressure is, therefore, prevented. Treatment

must balance the seemingly disparate goals of reestablishing structure, improving contour and esthetics as well as restoring the nasal airway. The surgical stent is relatively inconspicuous and allows the patient to return to normal activity as soon as the patient is released from the hospital.

## REFERENCES

1. Corey CL, Most SP. Treatment of nasal obstruction in the post-traumatic nose. *Otolaryngol Clin North Am* 2009;42(3):567-78.
2. Egan KK, Kim DW. A novel intranasal stent for functional rhinoplasty and nostril stenosis. *Laryngoscope* 2005;115:903-09.
3. Sharon-Buller A, Golender J, Savion I, Sela M. Technique for fabrication of splint preventing postsurgical restenosis in choanal atresia. *J Prosthet Dent* 2003;90:301-03.
4. Brown OE, Pownell P, Manning SC. Choanal atresia: A new anatomic classification and clinical management applications. *Laryngoscope* 1996;106:97-101.
5. Lazar RH, Younis RT. Transnasal repair of choanal atresia using telescopes. *Arch Otolaryngol Head Neck Surg* 1995;121:517-20.
6. Weber R, Keerl R, Hochapfel F, Draf W, Toffel PH. Packing in endonasal surgery. *Am J Otolaryngol* 2001;22:306-20.
7. Weber R, Hochapfel F, Draf W. Packing and stenting in endonasal surgery. *Rhinology* 2000;38:49-62.
8. Lemon JC, Martin JW, Wesley PJ, King GE. Use of nonconductive tubing for nasal stent fabrication. *J Prosthet Dent* 1994;71(3):301-2.
9. Casey DM, Schaaf NG. Custom surgical stent for naris stenosis. *Plast Reconstr Surg* 1997;1:108-14.
10. Pavithran P, Pujary K, Mahesh SG, Parul P, Aziz B. Customised acrylic nasal stents following recanalisation of modified Young's procedure. *J Laryngol Otol* 2010;124(8):864-67.
11. Tsuchiya H, Hoshino Y, Tajima K, Takagi N. Leaching and cytotoxicity of formaldehyde and methyl methacrylate from acrylic resin denture base materials. *J Prosthet Dent* 1994;71:618-24.

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