J Indian Prosthodont Soc (July-Sept 2013) 13(3):358–361
DOI 10.1007/s13191-012-0166-1

CLINICAL REPORT

Prosthetic Management of Post Surgical Nasal Skin Graft Contracture

Shitu Jindal · Atul Bhatnagar · Ankita Singh · Romesh Soni · B. P. Singh

Received: 23 July 2011 / Accepted: 16 July 2012 / Published online: 27 July 2012

Abstract The sequelae of trauma to the nose include nasal deformity and nasal obstruction that can have a long term negative impact on patient's quality of life. Successful management of posttraumatic nasal obstruction relies on a detailed history, careful analysis, and accurate diagnosis. Treatment must balance the seemingly disparate goals of re-establishing structure, improving contour and esthetics, as well as restoring the nasal airway. Indications and technical steps for fabricating bilateral nasal stents are presented, for a case of surgical opening of bilateral nasal synechia necessitated due to failed initial corrective surgery, post contracture and collapse of skin grafts. The objective of nasal stent was to maintain patency of nasal passage post surgical intervention. This is achieved by support to graft and residual tissues and prevention of mouth breathing. The nasal stents were modified post insertion at regular intervals to ensure adaptation to changes in mucosal lining of nasal.

Keywords Nasal synechia · Nasal stent · Airway patency · Restenosis

Introduction

Synechia is adhesion of parts of an organ [1]. Nasal synechia may be due to congenital, thermal trauma, endonasal surgeries, infection and sometimes due to chemical burn injuries [2]. Existence of bilateral nasal cavity synechia, as presented in the patient of this clinical report can result in complete nasal obstruction which forces the patient to resort to oral breathing [3]. Congenital defects, neoplastic disease or trauma inflicted on the midfacial region leading to disfigurement of the nose demands immediate action because of compromised esthetics and difficulty in nasal breathing directly affected by extent of nasal obstruction [4]. Surgical nasal repair management requires, as adjunct, a prosthetic reconstruction, to prevent constriction, contraction or collapse of tissues leading to unfavorable functional and esthetic result.

The normal anatomy of the nose can be described as having three component parts; an internal lining, a support structure, and an external lining. Surgical reconstruction of the nose has also been compartmentalized into three units: cover, framework, and lining [5, 6]. Framework of the nose created by bone and cartilage grafts is to achieve and maintain profile and patency of the airway [7]. Such a reconstruction requires skin grafting to the denuded surfaces. If the graft is unsupported or if scar contracture is excessive, the internal airway chambers may collapse or stenose, producing functional as well as esthetic problem [8].

A nasal stent is fabricated to act as an internal scaffold to support the graft and residual tissues. The purpose of the stent is to maintain internal airway patency and to prevent collapse and contracture of the donor tissues. A vented stent through which the patient can breathe is indicated when the obstruction is bilateral and for patients younger than 9 months [9]. In case of older children with established oral breathing ability, or when the obstruction is unilateral, solid stent can be used to maintain patency.

This clinical report describes the prosthodontic management of a patient having bilateral nasal obstruction using customized clear acrylic nasal stent.

S. Jindal · A. Bhatnagar · A. Singh · R. Soni (✉) · B. P. Singh
Prosthodontic unit, Department of Dentistry, Faculty of Dental Sciences, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India
e-mail: rsoni80@yahoo.com

Clinical Report

A young female patient aged 23 years was referred to the Department of Prosthodontics, Institute of Medical Sciences, Banaras Hindu University from the Department of Plastic Surgery, IMS, Banaras Hindu University, Varanasi for the fabrication of nasal stent.

She had a history of chemical burn caused due to family dispute. She had undergone surgical intervention in early 2010 to make the nostrils patent. The nostrils were blocked due to graft contracture (Fig. 1). She again underwent a second surgery for the same in late 2010 and was referred to the department of Prosthodontics for the prosthetic rehabilitation (Fig. 2). On examination, it was found that nostrils were insufficiently patent thus effecting function and esthetics of the patient. Treatment planning was done to fabricate user friendly nasal stent for prosthetic rehabilitation of the patient.

Fig. 1 Blocked nostrils due to graft contracture after first surgery

Fig. 2 Pretreatment photograph just after second surgery

Green stick compound (Pinnacle tracing green stick, DPI, Mumbai, India) was used as a receptacle for impression making of nasal vestibules. Grooves were made on the green stick surface such to provide retention locks for impression material (Fig. 3). Patient was seated in upright position, during impression making procedure, to prevent distortion of soft tissues and limit posterior–superior flow of impression material. Light application of lubricating media (Asian oil company, Narshi Natha Street, Mumbai, Maharashtra, India) to the anterior nares was carried out to facilitate removal of impression. Primary impression was made with addition silicone elastomeric impression material (Aquasil soft putty, Dentsply, Germany) (Figs. 4, 5). Orientation marks were placed on the skin as well as on impression material around nostrils for guidance during final impression. Putty was uniformly scraped and loaded with light body addition silicone elastomeric material for wash impression. The impression was judged to be acceptable by presence of anterior and posterior portion and good surface detail of lateral as well as medial wall of nasal vestibule (Figs. 6, 7). Extra green stick was trimmed and impressions were flasked and cured in heat cured acrylic resin (DPI-heat cure, Bombay Burmah trading Corporation Ltd., Wallace street, Mumbai) (Fig. 8).

Fig. 3 Low fusing modeling compound used as receptacle for impression material

Fig. 4 Impression making of right nostril with heavy body addition silicone

Fig. 5 Impression making of left nostril with heavy body addition silicone

Fig. 6 Final Impression of right nostril with light body addition silicone

Fig. 7 Final Impression of left nostril with light body addition silicone

Post curing, stents were retrieved; their external surfaces were finished to remove sharp projections while maintaining the closest possible adaptation to the tissues of nasal vestibule. The splints were hollowed out with a straight fissure bur (Mani dental carbide burs, Guangzhou My Best Dental Instruments Co. Ltd. China) (Fig. 9) to provide patent airway and the internal surfaces were polished to reduce adherence of nasal secretions. Optimum

Fig. 8 Flasking of both impressions

Fig. 9 Final hollowed nasal stents

Fig. 10 Patent nasal stents in position

esthetics was achieved through external extension of the splint at the mucocutaneous junction of the external nares [10]. The limited external projection was satisfactory from a cosmetic standpoint and was delivered to the patient (Fig. 10).

Patient was instructed on use and removal of the stent (Fig. 11). The removal was affected by slight digital pressure to the side of the nose and with the aid of long tweezers. She was also instructed on homecare and hygiene of the stent with ear buds using mild soap and water. Patient was kept on follow-up for 6 months and the incremental relining was done intermittently at every 10 days interval to provide further support to the graft and for required patency.

Fig. 11 Patient practicing wearing of nasal stents in mirror

Discussion

Otorhinolaryngologists and plastic surgeons frequently solicit the support of prosthodontists to make prosthesis, splints and stents because of their specialized knowledge of impression procedures and laboratory techniques involved in the fabrication of dental prostheses [10]. Nasal stent helps to establish internal airway space and supports the form of the graft and residual tissues thereby improving the final esthetic results. A common complication of surgeries for synechia correction is restenosis. To overcome this problem, the new surgically formed channel is packed or surgically stented. A number of materials are used for this purpose. These include ribbon gauze, fingerstall packing, cellulose packs, foam packs and catheters, to name a few. Surgical nasal stent scores over these methods as there is no risk for dislocation and aspiration. The risk of nighttime breathing disturbances and decrease nocturnal arterial oxygen partial pressure is prevented. The device inserted in the above case was found to be retentive and there was no need to suture the stent to the nasal septum, which can be painful for the patient at the time the appliance is removed. The surgical nasal stent is relatively inconspicuous and allows the patient to return to normal activity as soon as the patient is released from the hospital [11].

Heat-cured clear acrylic resin stents have the advantage that they are rigid thus preventing collapsing of tissues, can be easily trimmed and polished to a smooth finish [12]. Soft flexible stent are more difficult to modify after processing. Some authors argued that soft stents are more susceptible to fungal growth than the hard acrylic stents [13]. The technique for fabricating patent nasal stent is simple and straightforward [14]. 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. The nasal stent is retentive and there is no risk for dislocation and aspiration of the nasal stent. The advantages of the nasal stent are that the technique is noninvasive, cost-effective, tissue tolerant, comfortable to the patient and easy to insert and remove.

Proper orientation of the stent was highly emphasized during the insertion phase [14]. Frequent post-insertion appointments were necessary to ascertain that pressure areas were eliminated, the tissues surrounding the stent were not inflamed, and the patient was comfortable. Therefore, fabrication and insertion of a hard and patent nasal stent of heat-cure acrylic resin avoided a graft contracture, subsequent complete obstruction of breathing and a repeat reconstructive surgical intervention.

Conclusion

In the present case report, a patient with bilateral nasal obstruction was successfully treated with nasal stent prosthesis. It is easy to fabricate, simple, non-invasive, more economical, well tolerated by the patient. Further, for better aesthetics, it can be made from clear acrylic resin. Therefore, conventional intranasal stent is an operator and patient friendly aid to assist in achieving the reconstructive goals, and significantly contribute to improve the quality of life of some patients.

References

1. Dorland Newman WA (2003) Dorland's illustrated medical dictionary, 30th edn. St. Louis, Elsevier, p 1837
2. Sharon-Buller A, Golender J, Savion I, Sela M (2003) Technique for fabrication of splint preventing post surgical restenosis in choanal atresia. J Prosthet Dent 90:301–303
3. Hickey AJ, Vergo TJ (2000) Prosthetic alternative treatment for choanal atresia: a clinical report. J Prosthet Dent 83:456–458
4. Converse JM (1997) Reconstructive plastic surgery, vol 2, 2nd edn. Saunders, Philadelphia
5. Ko SE, Fine L, Robinson JE (1980) Total rhinoplasty of prosthesis? J Prosthet Dent 44:74–76
6. Millard DR (1966) Total reconstructive rhinoplasty and a missing link. Plast Recontstr Surg 37:167–183
7. Parel SM (1980) Intranasal conformers. J Prosthet Dent 43(4): 439–444
8. Wong F, Smith CR (2009) Surgical stent fabrication for unilateral nasal obstruction of the anterior portion of the nasal airway. J Prosthodont 18:272–275
9. Seals RR et al (1988) Intranasal prostheses, splint and stents. J Prosthet Dent 60(5):595–601
10. Savion I et al (2005) Constriction of a surgical stent for post traumatic nasal synechia. J Prosthet Dent 94:462–465
11. Casey DM, Schaaf NG (1997) Custom surgical stent for naris stenosis. Plast Reconstr Surg 100:108–114
12. Pasquini E, Sciarreta V, Saggese D et al (2003) Endoscopic treatment of congenital choanal atresia. Int J Pediatr Otorhinolaryngol 67:271–276
13. Schaefer KS, Taylor TD (1999) Treatment of nasopharyngeal stenosis with a conformer prosthesis: a clinical report. J Prosthet Dent 81:507–509
14. Zaki HS (1997) Prosthetic management of large nasal septal defects. J Prosthet Dent 77:335–338