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Case Report

Prosthetic Rehabilitation of Bilateral External Nasal Valve Area after Nasal Reconstruction for a Congenitally Missing Nose: A Clinical Report

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Abstract:

Deformities of the nostrils and alar region are among the very common clinically defects, which interfere with the functional anatomy of the nose. This case paper exemplifies the management of a bilateral external nasal valve area defect in a patient following a nasal reconstruction done using a forehead flap. The nasal stents were rendered to the patient for comfortable breathing by maintaining patency of the nasal passage after the surgical procedure and also improve speech and esthetics.

Key Words: External nasal valve, prosthetic management, stents

Introduction

The nose is the most prominent feature of the face and carries great importance both aesthetically and functionally.¹ Located at the very center of the face, the nose may suffer losses caused by trauma, and burns as well as for oncologic and congenital reasons.² One of the most important types of functional losses occurs in the internal or external valve structures.³ The internal nasal valve region is described as the area comprising the nasal septum, the caudal edge of the upper lateral cartilage, the inferior turbinate region, and the pyriform aperture with the nasal base.⁴ The anatomical defects in these structures cause an internal nasal dysfunction. In general, such dysfunctions occur due to a collapse caused by previous operations or scar contractures.

Another valvular structure of the nose, the external nasal valve is composed of the nostril, the lobule-columella, and the alar complex. The importance of this area of the nostril, of which the size and shape depend on age and ethnicity, stems from its function as the entrance for the air passage. Nostril Stenosis

in the vestibular line may be either congenital or acquired. The reasons for an acquired nostril stenosis include infection, trauma, burns, tumors, chemical agents, nasal tampons that exert long-term pressures, and surgery to the vestibular line.⁵

Obstructions of the anterior portion of the nasal passage that is the region of the naris, vestibule, and external nasal valve, are typically of congenital, traumatic, or iatrogenic etiology.⁶ Obstructions located more posterior can have many etiologies, for example, excess bony growth of the nasal process of the maxilla (pyriform aperture stenosis), dermoids, nasolacrimal duct cysts, gliomas, and failure of the nasobuccal membrane to rupture during development (choanal atresia).⁷ A key objective after surgical opening of any nasal obstruction is preventing the newly established airway from closing again due to granulation or shrinkage processes. When the obstruction is deeply seated, for example, in choanal atresia, the stent will typically consist of rigid or inflatable tubing.⁸ Prosthodontics treatment in most of the situations proceeds as a part of multidisciplinary approach along with other specialties. There are various techniques and combinations defined for the repair of this deformity. Positive functional results may be obtained through the reconstruction of the anatomical integrity of the external nasal valve during the repair. This clinical report presents a patient with congenital bilateral nasal deformity for which nasal reconstruction was done and postoperatively after the surgery customized nasal stents were placed. The focus of this manuscript is the method of stent fabrication.

Case Report

A female patient who was 18-year-old and underwent a nasal reconstruction for congenitally missing nostril, lobule-columella, and the alar complex of the nose reported to the department of Prosthodontics, government dental college and hospital for a nasal prosthesis. Patient was treated at ENT hospital for nasal reconstruction with forehead flap⁹ and was referred to the department of prosthodontics after 2 days for immediate nasal stents Figure 1. Nasal stents were required for the patient to prevent adhesions and to prevent collapsing of nostrils, to allow proper breathing. Upon through clinical examination, it was seen that the surgical site was in healing phase and making of impression was difficult to construct customized stents.

Hence, nasal stents were fabricated by taking age into consideration, as age is one of the important criteria which determines nasal anatomy to an extent and impressions of

same-aged female patients nostril were made with impression compound and heat processed solid acrylic stents were fabricated which were hallowed out to allow air passage and highly polished and inserted to the patient and instructed to wear continuously, removing it only for short period of time for removal and maintenance.

Technique

Nasal cavities of donor nostrils is lubricated with petroleum jelly before making an impression, impression was made with modeling plastic impression compound extending up to inferior nasal concha. Plastic impression compound which is rigid, compliant, and did not dangle due to gravity and it can be re-used if impression can't be made in the single shot was chosen as impression material. However, the modeling plastic impression compound had to be meticulously inserted, taking care not to damage the nasal mucosa.

The compound was softened, and added onto handle made up by bunch of 3 matchsticks joined with cyanoacrylate glue, impression compound molded into cylindrical core of



Figure 1: Pre-operative photo of the patient after the nasal reconstruction using the forehead flap.



Figure 2: Impression being taken from the donor patient of the same age group.

approximate length was added onto the prepared handle, and inserted into each nasal vestibule of donor-patient Figure 2, after it is set impression was retrieved and checked for accuracy. Impressions were flaked using split mould technique in dental flask, kept in hot water for 5 min at 80° to soften the compound later flask was opened and compound impressions were retrieved and discarded and mold was created into which heat cured clear acrylic in dough stage was packed and acrylized in conventional processing manner, stents were retrieved, hallowed out, and highly polished Figure 3 and inserted into the patient nostrils Figure 4.

The external prosthesis junction was established at mucocutaneous junction from cosmetic standpoint and the prosthesis was self-retentive as it was slightly wider than the reconstructed nostrils of the patient and patient was allowed to practice removal and insertion before dispersing the patient from the department.

Discussion

When present, a nostril defect causes oral breathing and reduces the quality of the life in these patients. It may be caused by tissue loss, scarring and/or contracture for numerous reasons, representing single or multiple deformities of the



Figure 3: Prepared nasal stents.



Figure 4: Postoperative photo of the patient after placement of the bilateral nasal stents.

lobule-columella-ala complex.⁵ The therapeutic goal was to maintain a patent nasal airway during the healing process while minimizing the risk of pressure necrosis and maximizing comfort for the patient. Custom-made acrylic or silicone stents are indicated when the obstruction is anterior, that is, in the region of the external valve and vestibule.

Hard acrylic resin stents have the advantage that they can be precisely shaped, trimmed, and polished to a smooth finish. Soft flexible stents are more difficult to modify after processing; however, when properly designed, they tend to be most comfortable. Furthermore, they can accommodate slight undercuts and reportedly provide a scaffold for mucosal regeneration and minimize scar formation. On the other hand, some authors have argued that soft stents are more susceptible to fungal growth than hard (e.g. acrylic) stents.⁸

Constructing the nasal stents from an correct impression of the defect has tested to be the foremost logical approach in managing these defects. Nasal stents are made of either medical grade silastic synthetic rubber or heat-processed acrylate resin. Each materials are biocompatible; but, synthetic rubber can't be extremely polished, and it's porous and friable which could result in natural action of fluids, irritation of tissues from adhesion of secretion crust, and tearing of the fabric. In distinction, heat-processed acrylic resin can be extremely polished, has lesser tendency for water sorption, and secretion crust rarely adheres to its extremely polished surface.¹⁰

Intranasal stents are contrived with heat-processed acrylic resin to revive nasal airways and to keep up patency of the passage, after rehabilitative nasal surgery for the congenitally missing external nose. These stents restore support for the nasal tissues and permit free passage of air through the nasal cavities. The benefits of the stent are that technique is non-invasive, cost-efficient, apparent to fabricate.

Conclusion

This article provides a manageable method for fabrication of heat processed clear acrylic resin intranasal stent after nasal reconstruction with forehead flap for indirect restoration of nasal airway of patient by maintaining the patency of nostrils by using impression of nasal cavity of same-aged patient as donor for stent fabrication. This method yields an intranasal stent that fits quite accurately, which maintains and molds the shape of nostrils, allows comfortable nasal breathing and is self-retentive as it is slightly larger than the established external nasal opening and maintains esthetics.

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