Rehabilitation of Hemimaxillectomy Patient with Definite Hollow Characterized Obturator Prosthesis

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ABSTRACT
Surgical removal of benign or malignant tumors, congenital malformation, and trauma may lead to acquired maxillary defects. Surgery or trauma can result in cosmetic, functional, and psychological impairment greatly affecting the patient’s quality of life (QoL). Surgical reconstruction of the maxillary defects can be carried out by using either a temporal flap or a wide range of microvascularized flaps. Rehabilitation via palatal obturators to obturate a palatal defect in a dentulous or edentulous patient is one of the choices in restoring masticatory function and improving speech, deglutition, and facial appearance. Rehabilitation of such patients is quite challenging and requires a multidisciplinary team approach for comprehensive care and optimal posttreatment functional outcomes. Hence, it is crucial to work in close collaboration with the team members who make the prosthesis and who evaluate the case for planning the surgical procedures and obtaining the necessary anatomical and functional information.

Keywords: Acquired defects, Hollow obturators, Maxillectomy, Prosthetic rehabilitation.


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INTRODUCTION
In the past two decades, treatment for head and neck cancers has evolved with multiple treatment modalities, including radiation and chemotherapy, in an effort to preserve anatomical structures and improve overall survival and quality of life (QoL). Surgery is the first choice for early cancers and for cancers that do not respond to radiation and chemotherapy in the form of salvage.1 Surgery can result in cosmetic, functional, and psychological impairment greatly affecting the patient’s QoL.2 Surgical reconstruction as the first option may facilitate cosmetic rehabilitation and/or improve the foundation for a predictable prosthetic rehabilitation. However, management of such patients is quite challenging and requires a multidisciplinary team approach in planning and executing comprehensive treatment care to achieve optimal success in improving the posttreatment QoL. As a critical member of the team, the maxillofacial prosthodontist plays an important role in many facets of patient care. The primary objective of rehabilitation is to preserve and restore the function of speech and swallow, preludes to the image restoration and boosts confidence of the patients who have suffered the ravages of disfigurement so that they can return to the society.

Postsurgical maxillary defects predispose the patient to hypernasal speech and fluid leakage through the nose, including possibility of aspiration and impaired masticatory function. An obturator is used to close an unnatural opening or defect that restores oronasal separation to allow an increase in intraoral pressure and a decrease in nasal airflow rate.2 To reestablish the midfacial contour of a maxillectomy patient, the prosthetic rehabilitations sights the separation of oral and nasal cavities to allow sufficient articulation and deglutition, in order to achieve satisfactory esthetic results and contribute to the patient’s discernment of a better QoL.3-5 Definitive prosthesis is a more permanent prosthesis designed and fabricated when the surgical site is stable usually between 6 months and a year and local recurrence is ruled out. This article presents a case report of rehabilitation of an acquired maxillary defect patient with definitive cast partial characterized hollow bulb obturator prosthesis.

CASE REPORT
A 26-year-old male patient reported to the Department of Prosthodontics in the Regional Dental College, Guwahati, Assam, with chief complaints of difficulty in eating, speaking, and deformity of the left upper mid-face due to surgical removal of a tumor. The patient treatment report revealed that he was suffering from ossifying fibroma of maxillary left posterior alveolar ridge extending from 23 to 27 regions (Fig. 1), which was operated upon 10 days ago in the Department of Oral and Maxillofacial Surgery, Regional Dental College, Guwahati.
On intraoral examination, class 1 Armany maxillectomy defect was found on the left side associated with depressed cheek, nasolabial fold, and lack of lip support (Fig. 2). The patient was initially rehabilitated with an interim obturator for a period of 6 months and then planned for definitive cast partial hollow bulb obturator prosthesis with characterized denture flange in the smile zone and replacing teeth number 22 to 26.

**PROCEDURE**

- Maxillary and mandibular impressions were made using irreversible hydrocolloid (DPI, Plastalgin). The impressions were poured using ADA Type 3 Gypsum product-dental stone (Kalabhai, Kaldent) and diagnostic casts were obtained.
- These casts were surveyed, and a cast partial framework was planned with the following components: Embrasure clasps in relation to 16, 17 and 15, 14; cingulum rest on 13 and 21, modified complete palatal type of major connector where extension to palatal surface will act as guiding planes and provide indirect retention. The distal surface of 21 will also be prepared as a guiding plane.
- The mouth was prepared before making the final impression with polyvinylsiloxane impression material (3M, ESPE). The master cast was then poured with die stone (Kalabhai, Ultrastone).
- Different types of blocking on the master cast was done before duplicating the same as the refractory cast on which a wax pattern was adapted (Fig. 3). Casting of the metal frame work was carried out. Trial of the finished and polished framework and needed adjustments were done (Fig. 4).
- Wax occlusal rim was made on the framework and the jaw relation was recorded.
- Trial of the waxed-up prosthesis was done. The bulb was extended into the ridge area to make it to bulge in the zygomatic buttress area to restore the lost support. Once satisfactory esthetic and phonetics was achieved, the prosthesis was processed.
• In order to make a lightweight prosthesis, hollowing of the prosthesis was done.

• After dewaxing, heat cure acrylic resin (DPI, Heat cure) was packed in the counter flask in the ridge area, then the resin was scooped out from the center of the ridge area from the counter flask and filled with sugar to hollow it out (Fig. 5), the heat cure acrylic resin was then packed once again in the remaining portion of the flask.

• Now, the lid was closed and curing was done, followed by finishing and polishing. Sugar was removed from the cured denture by injecting hot water through a small hole made in the prosthesis, which was then closed with self-cure acrylic resin (DPI, Cold cure).

• The prosthesis was characterized to match the color of the soft tissue on the contralateral side using external staining method (Fig. 6).

• The prosthesis was finished and insertion procedure was done (Figs 7 and 8).

DISCUSSION

Obturator prosthesis plays an important role in the recovery of oral function in postsurgical maxillectomy patients. Loss of support, retention, and stability are common prosthodontic treatment problems for patients who have had a maxillectomy. A hollow-bulb prosthesis (either one piece or two piece) is a better choice, as it is lighter in weight, more hygienic, and also comfortable. The patient presented here, had a well-healed defect and so was rehabilitated with definitive hollow-bulb obturator prosthesis for rehabilitation of esthetic, structural, and functional integrity. The prosthesis was made hollow with the main objective to minimize the weight. Light weight has also been considered for maxillary resection prosthesis by Chalian and Barnett. In 1972, they explained a simple technique of fabricating a single-piece, hollow obturator prosthesis. Tanaka et al in 1977 simplified the fabrication process for a lightweight obturator. They felt that using polyurethane foam as core to reduce the weight of the
obturator would be efficient and economical. Parel and LaFuente\textsuperscript{10} in 1978 formed a hollow prosthesis in a single visit. First, a resilient liner material was adapted to the defect on all surfaces except at the palatal side. This was then filled with sugar to the level of the palate. Autopolymerizing resin was used to form the lid for the palatal side. Sugar was drained later through a small bur hole on the lid, which was sealed with more autopolymerizing resin. The same procedure was followed to make the prosthesis hollow for the case presented in this report. Beder and Todo\textsuperscript{11} in 1978 explained yet another rapid technique for constructing a hollow bulb. They used hollow plastic forms of different shapes and sizes, which were modified according to the requirements. They were enclosed in autopolymerizing resin to form to the walls of the defect. Phankosol and Martin\textsuperscript{12} in 1985 developed a technique for constructing a hollow obturator with a removable lid combining the benefit of both closed and open hollow obturators.

**CONCLUSION**

Prosthetic rehabilitation is the treatment of choice for patients with large defects of the maxillary complex following surgical resection of tumors. Hollow-bulb obturator prosthesis can be prescribed to a patient with large maxillectomy defect for predictable rehabilitation of esthetic, structural, and functional integrity.

The present case report shows the rehabilitation of the structural and functional integrity of the patient with special attention to the esthetic appearance, which most of the time in such patients is neglected, thus deteriorating the QOL of the patient.

**REFERENCES**