

Hollow Bulb One Piece Maxillary Definitive Obturator - A Simplified Approach

Abstract

In maxillary defects, role of a prosthodontist is to rehabilitate the intra- and extra-oral structures and to endow with the normal function of mastication, speech, deglutition, and esthetics. Malignancies are common in the oral region and are treated usually through surgical intervention. Surgical intervention creates anatomical defects creating communication between oral and nasal cavity. Patients pose difficulties while performing normal functions such as swallowing and speaking, due to this communication. To overcome the problems encountered by the patient, obturators are fabricated. The main problem with rehabilitation of large defect is the weight of prosthesis; the prosthesis becomes very bulky and nonretentive due to its weight. Hollow obturators are fabricated to conquer this tribulation by different techniques. This case report describes a simplified method of fabrication of a definitive hollow bulb obturator for rehabilitation of a maxillary defect (Aramany's class I) by insertion of balloon.

Keywords: Definitive obturators, hollow bulb, maxillary defect

Introduction

Ablative surgical therapy is frequently adopted for the control of malignancies and other abnormal growths in oral cavity. The consequences of postsurgical effect can be serious as it disturbs both form and function of normal stomatognathic system and also the facial contour. Postsurgical maxillary defects predispose the patients to hypernasal speech and fluid leakage through the nose, including possibility of aspiration.^[1] As a critical member of the team, primary objective of prosthodontist should be to preserve and restore the function of speech and swallow. Prosthetic rehabilitation with obturator prosthesis is a predictable intervention to recreate an anatomic barrier between the cavities and to restore functional capabilities of speech, oral food intake, and deglutition.^[2]

Rehabilitation of maxillary defect with obturator has been well defined as comprehensive treatment care to achieve optimal success in improving posttreatment quality of life.^[1] The degree of extension of obturator in the defect part depends on factors such as configuration of defect, character of lining tissue and functional requirements for prosthesis retention,

support, and stability.^[3] In large defects, obturator is aggressively extended vertically to engage the surgical defect and horizontally to engage the undercuts at the expense of its size and weight. Increased weight of obturator makes the prosthesis uncomfortable as well as nonretentive for the patient jeopardizing its function.^[4,5]

To reduce the weight of prosthesis, hollow bulb obturators are fabricated. According to Wu and Schaaf, hollowing of the obturator significantly reduces prosthesis weight from 6.55% to 33.06% depending on the size of the defect.^[5] This case report describes the fabrication of one piece closed hollow bulb definitive cast partial obturator prosthesis for a patient with acquired maxillary defect (Aramany's class I) on the left side.

Case Report

A 21-year-old male patient was referred to the Department of Prosthodontics with chief complaints of difficulty in eating, speaking, and deformity of upper midface due to surgical removal of lesion. The patient had a history of squamous cell carcinoma on the left maxilla for which hemimaxillectomy of the same side was performed. On intraoral examination, defect was Aramany's class I extending till floor of the orbit associated

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with depressed cheek, nasolabial fold, and lack of lip support [Figure 1].

The patient was initially rehabilitated with interim obturator for 6 months and then planned for one piece closed hollow bulb definitive cast partial obturator prosthesis.

Technique

- Maxillary and mandibular primary impressions were made with irreversible hydrocolloid (Zelgan, Dentsply) and poured in Type 3 gypsum product (Kalabhai, Kaldent) to obtain diagnostic casts
- Diagnostic casts were surveyed, and a cast partial framework was planned with the following components: Embrasure clasps in relation to 14, 15; occlusal rest on 16 and 17, cingulum rest on 13, modified complete palatal type of major connector extended till palatal surfaces of teeth. Distal surface of 11 was also prepared to act as a guiding plane^[4]
- Mouth preparation was done before making final impression with polyvinylsiloxane impression material (Affinis, Coltene Whaledent) and master cast was then poured in die stone (kalabhai, Ultrastone). Wax pattern was adapted on refractory cast and casting of metal framework was carried out. Trial of finished and polished framework and needed adjustments were done [Figure 2]
- Autopolymerizing resin was attached with framework on defect side so that impression of the defect part would be made more precisely. The impression of the defect was made with low fusing impression compound (DPI, Mumbai) relined with polyvinylsiloxane (light body consistency) (Affinis, Coltene Whaledent) [Figure 3]. Cast was poured by altered cast technique
- Autopolymerizing resin attached to the framework was removed with bur and wax sheet was adapted on the roof of defect in the cast and size of balloon was approximated by adapting in the defect portion of cast
- The curing of the prosthesis was done in two parts: First bulb portion and then remaining part of the prosthesis containing teeth. Bulb portion of the prosthesis was made hollow by sandwiching water filled balloon between two layers of heat cure resin [Figure 4a] and curing was completed using short curing cycle [Figure 4b]. Water was removed during processing, and bulb portion was made hollow. Balloon was not removed later on as it would have no affect on prosthesis function
- Bulb portion was held *in situ* during adjustments with retentive clasps of cast partial framework and adjusted in the patient's mouth by disclosing paste
- Jaw relations were recorded and try in done over the cured bulb portion which was found to be satisfactory. Curing of remaining part of the prosthesis containing teeth was done over the bulb portion
- Final prosthesis was adjusted in the patient's mouth and occlusal adjustments were done to make passive

contacts on defect side [Figure 5a and b]. Prosthesis was functionally and esthetically pleasing [Figure 6a and b].

Discussion

Maxillectomy patients suffer from functional as well as facial deformity so role of a prosthodontist comes into play to restore function and esthetics. The primary goal of the treatment of maxillectomy defect is to give a prosthetic obturation which closes the defect and separates the oral cavity from the sinonasal cavities. The size and location of the defects influence the degree of impairment and difficulty in prosthetic rehabilitation. Maxillary obturator prosthesis is the most accepted treatment modality than surgical reconstruction due to ease of fabrication and maintenance.^[6] Bulb extension is required to improve speech after providing resonance. Bulb extension can be solid, open hollow and closed hollow. Hollow bulb provides advantages such as reduction in weight, increased retention, and making prosthesis comfortable.^[7] Closed hollow bulb obturators provide the advantage of preventing fluid and food accumulation, reducing airway space, and allow for maximum extension.^[8]

Various materials are used for making obturators such as heat cure resin and light cure resin but fabricating the prosthesis with metal provides durability, biocompatibility, and longevity of the prosthesis. Different methods have been developed for making obturators hollow, but most of the techniques described are time-consuming and complex. Materials such as sugar and ice were used to create the hollow space inside the processed resin. Processing the two halves of the obturator separately followed by joining them with an autopolymerizing resin was also well explained in the previous literature. Two-step processing technique, using preformed plastic shapes or plaster matrix were tried by some authors. The acrylic resin shim and a polyurethane foam were incorporated into the defect area during packing to create hollow space by some authors.^[6] Patil and Patil^[6] presented a method of hollow obturator by inserting a preshaped wax bolus while packing of heat cured material. Elangovan and Loibi presented a method of fabrication of hollow bulb obturator by the use of attachments.^[9] Although the method was simple the cost of treatment would be high with the use of attachments.

The patient presented here had a well-healed defect so definitive hollow bulb obturator prosthesis was planned for rehabilitation. Cast partial framework was planned for prosthesis as it increases longevity and durability of the prosthesis. The technique described in this case report was superior to other methods because of its simplicity and economical from patient's perspective. Moreover, most of the methods presented in literature used autopolymerizing resin material which leaches out with use, but on the contrary, in the presented method only heat cure resin material was used which aids in novelty of this approach.



Figure 1: Preoperative intraoral photograph of the patient



Figure 2: Cast partial metal framework

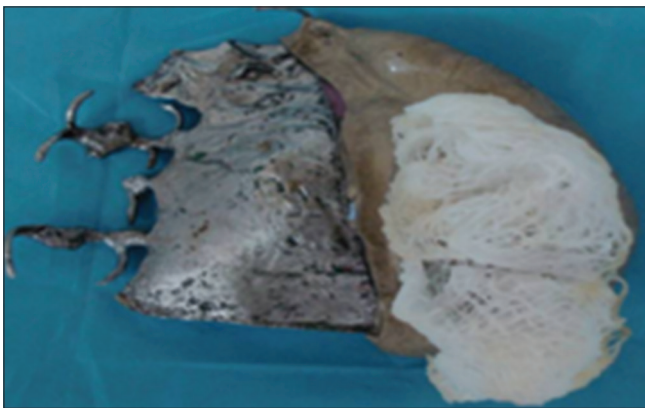


Figure 3: Definitive impression of defect portion

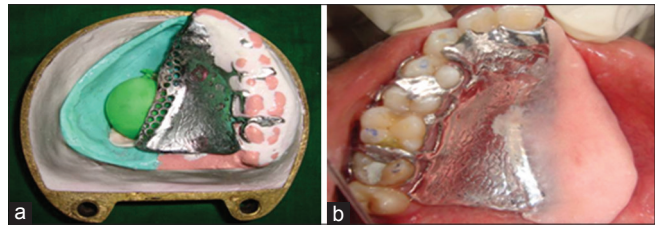


Figure 4: (a) Fabrication of bulb portion by balloon. (b) Final acrylic bulb portion of the prosthesis

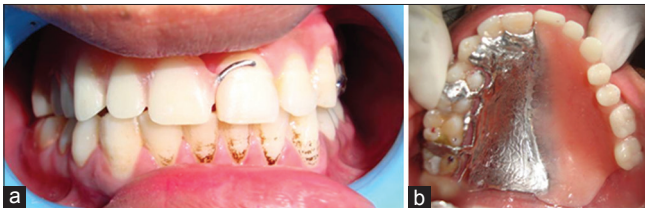


Figure 5: (a) Intraoral frontal view. (b) Intraoral occlusal view



Figure 6: (a) Extraoral preoperative frontal view. (b) Extraoral postoperative frontal view

Conclusion

In the presented case report technique described was a variation of some previously described methods but the ability of this technique to provide durable cast partial denture along with one piece closed hollow bulb obturator justifies its novelty. The ease of fabrication reduced time and reduced cost were the added advantages of this technique. The obturator provided to the patient increased function by providing better masticatory efficiency, phonetics by adding resonance, and also improved the esthetics.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have

given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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