Case Report

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Functional Rehabilitation of Hemimaxillectomy Patient with Hollow Bulb Cast Obturator: A Clinical Case Report

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ABSTRACT

Background: Hemi-maxillectomy patients with large defect are more challenging for oral rehabilitation due to its complexity. The extent and location of the defects influence the degree of impairment and difficulty in prosthetic rehabilitation. The Lack of support, retention and stability are common prosthodontic treatment problems for patients who had a hemi-maxillectomy. Maxillofacial defects result in difficulty in mastication, deglutition, regurgitation of food, nasal twang and facial disfigurement thus leading to psychological problems. In the present case hemi-maxillectomy defect was rehabilitated with cast partial obturator with hollow bulb which helps in retention of prosthesis, reducing the weight of the prosthesis and restore the facial appearance of the patient.

Keywords: Cast partial framework, hollow bulb obturator, hemi-maxillectomy, maxillofacial prosthesis.

INTRODUCTION

Maxillo-facial defects may be either congenital or acquired. Acquired defect may occur due to surgical excision of tumor or trauma. Maxillofacial prosthetic therapy for acquired defects has become more complex and sophisticated with advances in surgical, physical and rehabilitative medicine.[1] Maxillectomy defects can result in oroantral communication that causes difficulty in swallowing, deglutition, impaired speech and facial disfigurement.[2]

A definitive obturator can provide both physiological and psychological benefits during the difficult period of adjustment after surgery. An obturator must be comfortable, esthetically acceptable, easy to fabricate, and lightweight and must restore functions such as mastication, deglutition, and speech.[3] The traditional design of maxillary obturator provides insufficient retention and stability. To achieve stability of this type of prosthesis, it is necessary to extend the flanges to the lateral scar band, the mesial wall of the defect, and anatomical undercuts.[4] Materials and techniques used for fabrication of these obturator vary from patient to patient depending upon location and extent of defect. The increased volume and weight of the obturator, however, impairs retention and results in prosthetic loosening. To minimize the weight, a closed or open hollow design is recommended.[5] In this article, a novel fabrication technique of rehabilitating an acquired maxillary defect using a hollow bulb obturator incorporated on a cast partial denture.

CASE REPORT

A 42 year old male patient reported to the Department of Prosthodontics, MIDSR dental college, Latur with a chief complaint of regurgitation of food, difficulty in mastication and

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deglutition. He had undergone surgery for squamous cell carcinoma of maxilla on the right side, 6 months back. Intraoral examination of the patient reveled subtotal maxillectomy of the right side which could be categorized under Aramany class II situation.[6]

Fig 1: Photograph showing right maxillary defect.

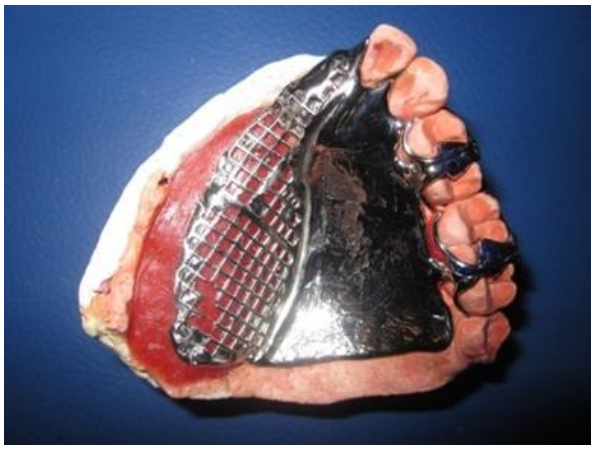

Fig 2: Cast partial framework with modified meshwork on defect side.

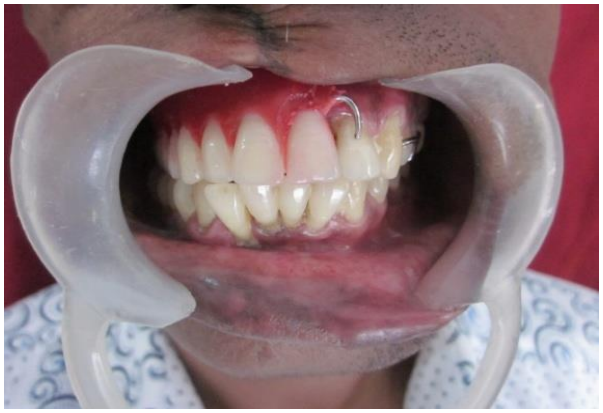

Fig 3: Intraoral photograph showing try in of prosthesis.

Fig 4: Photograph of waxed up prosthesis.

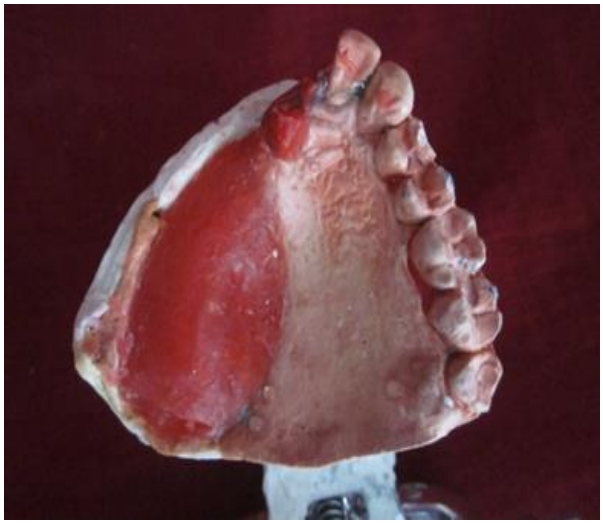

Fig 5: Photograph showing counter portion of hollow bulb.

Fig 6: Photograph showing hollow bulb prosthesis.

Fig 7: Photograph showing final prosthesis.

Fig 8: Photograph of post insertion hollow bulb cast obturator.

The teeth missing were 11, 12, 13, 14,15,16,17 and 21. The maxillectomy defect area was healed properly (Fig.1). The perforated stock tray was selected for preliminary impression. A gauze piece was packed in the defect and floss was tied to it for retrieval after the impression was made. Impression was made with condensation silicon elastomeric impression material (Zetaplus,zhermack,Rovigo-Italy).Impression was boxed and then poured in type II stone (Kalabhai Karson Pvt Ltd, Mumbai).

The cast was then surveyed. It was planned to give complete palatal framework with modified mesh on defect region with embrasure clasp between first premolar and second premolar as well between first molar and second molar on left side of arch. I bar clasp was given to engage right lateral incisor. Pre-prosthetic mouth preparation was done with rest seat prepared on distal fossa of first premolar and mesial fossa of second premolar as well between first molar and second molar. Special tray was then fabricated with self-cure resin with spacers and stops on dentulous portion (premolar and molar). Border molding was done to record the soft tissues surrounding the defect using putty and final impression was made with medium body elastomeric impression material (Reprosil, Dentsply). Complete palate cast partial framework was fabricated with modified meshwork on right side (fig 2). It was then tried in the patient's mouth to check for fit. Jaw relation was then recorded on the permanent metal frame. Teeth setting was done followed try-in to check for occlusion and esthetics (fig 3).

Trial denture was sealed (fig 4, 5) and counter portion was poured after the application of separating media which was followed by dewaxing procedure . After separation of counter parts, layer of modeling wax was adapted into the defect area which in turn provides space for heat cure resin to flow between the bulb and the defect portion of the cast.

Auto polymerizing clear acrylic resin was adapted over the wax to fabricate a shim. The wax was eliminated and the shim was filled with sugar crystals. A lid was made and sealed to the shim to make it a bulb. A small escape vent was created in the bulb using a straight fissure bur. It was then placed in a bowl of water to dissolve the sugar crystals. Hence, making the bulb hollow. The hollow bulb was placed back into the defect. A clearance of 1mm was seen between the outer layer of the bulb and the defect, which was to be occupied by the heat cure resin. The framework and the bulb were placed back on the cast and checked for any interference. Heat cure resin was adapted into the defect area after which the hollow bulb and the framework were placed back into their respective position on the cast. The heat cure resin was also packed into the mould space and the two parts were clamped. Together this unit was subjected to the regular curing cycle (fig 6). Following deflasking procedures, the prosthesis was trimmed, finished, polished (fig 7).

The prosthesis was inserted and checked for fit, occlusion and esthetics (fig 8). During the time of insertion the patient was given the necessary instructions for use. Recall check-up was

done after 24 hours,1 week, first ,third and sixth months with satisfactory results.

DISCUSSION

The major objectives of the rehabilitation a maxillectomy patient are restoration of the functions of mastication, deglutition, speech and normal orofacial appearance. Undesirable weight of palatal obturators for postoperative maxillary defects is a common problem in maxillofacial prosthetics.[7]

Several methods have been described for open and closed hollow bulb obturator fabrication. Both of these types of obturators are lightweight prostheses that can be easily tolerated by the patient.[8] Fabrication of the hollow bulb obturator, including the use of materials such as sugar and ice as matrices inside the bulb to maintain its hollow nature during processing then luting them with autopolymerizing acrylic resin. However, the previously mentioned methods generally create a sealed area, which is a potential site of leakage and discoloration.[9]

Chalian and Barnett[10] introduced the placement of an acrylic resin shim, while Tanaka et al[11] advocated the incorporation of polyurethane foam into the defect area to produce the hollow section. Minsley et al[12] suggested the use of a plaster index for the fabrication of the hollow bulb of the obturator, while simultaneously fabricating a heat-cured acrylic denture base used for maxillomandibular records followed by final waxing and processing of the obturator. McAndrew et al[13] introduced an investment method for fabrication of a closed hollow bulb obturator.

In the present case, the regular complete palate major connector was fabricated in order to achieve a greater support from the palate, as the defect was large. The metal framework provided good retention, support and stability. Further, the thermal conductivity of the metal made it sensitive to the temperature changes and the patient showed better functional acceptance to the prosthesis. A hollow bulb design for the obturator was chosen in order to reduce the bulk of the prosthesis which in turn made it light weight and more comfortable for the patient. The hollow bulb further added resonance, thus improving the clarity of the speech. The present prosthesis not only improved the speech and function but also provided better comfort for the patient.

CONCLUSION

Prosthetic rehabilitation of a maxillary defect using a cast partial hollow bulb obturator provides better masticatory efficiency, phonetics and improved the esthetics of the patient. The use of a hollow bulb design improved the comfort of the patient by decreasing the weight of the prosthesis.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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