

Prosthetic Rehabilitation of a Maxillectomy Patient with Closed Hollow Bulb Definitive Obturator: A Case Report

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Abstract

Prosthetic rehabilitation of a partial or total maxillectomy patient with an obturator prosthesis is a predictable intervention to recreate an anatomic barrier between the oral and nasal cavities, and to restore mastication, deglutition, speech and esthetics. The use of a hollow bulb design reduces the weight of the prosthesis and gives better comfort to the patient as the retention, stability and support of the prosthesis is improved. This case report describes fabrication of single piece hollow bulb definitive obturator prosthesis for a patient with left side total maxillectomy.

Key words: Maxillectomy, closed hollow bulb obturator, retention

Introduction

The term maxillectomy refers to partial or total removal of maxilla in a patient suffering from benign or malignant neoplasm.¹ The resultant surgical defect often includes part of the hard and soft palates, which results in an oro-antral and/or oro-nasal communication.^{1,2,3,4} A team approach is critical for treatment of a patient with partial or total maxillectomy. A surgical approach alone without reconstruction or obturation of the surgical defect will result in air, liquid, and food escaping into the maxillary sinus and nasal cavities, causing severe speech and swallowing dysfunction with significant reduction in quality of life.² To overcome such problems, obturator prostheses are provided. The usual treatment sequence is placement of a surgical obturator during the surgery for 5–10 days, followed by a removable interim obturator that is placed for the duration of the wound healing period and the definitive obturator that is placed for about 3–6 months post-surgery, when major changes in tissue conformation are no longer expected.^{3,5} For the definitive palatal obturators, the undesirable weight of the prosthesis becomes the challenge as it affects the retention, stability and support of this maxillofacial prosthesis.⁵ To reduce the weight of the prosthesis, the bulb portion of the obturator is generally hollowed.⁶

Wu and Schaaf showed that hollowing the obturator for partial maxillectomy patients significantly decreased the weight of the obturator from 6.55% to 33.06%, depending on the size of the defect.⁷ A hollow bulb obturator allows fabrication of a light weight prosthesis, that is readily tolerated by the patient while effectively extending into the defective areas.⁸ This case report describes fabrication of a one piece closed hollow obturator prosthesis for a patient with a maxillary defect on left side after undergoing maxillectomy procedure.

Case report

A 50 year-old female patient was referred from the Department of Otorhinolaryngology, IGMC Shimla to the Department of Prosthodontics, HP Government Dental

College and Hospital, Shimla for the prosthetic rehabilitation. The patient had a history of squamous cell carcinoma of left maxilla one year back and underwent total maxillectomy of the same side, for which a surgical obturator was given immediately followed by an interim obturator after 10 days. Patient had been wearing an interim obturator since then, which had become loose and was without teeth. So the patient needed a partial denture to restore her lost teeth and an obturator to overcome the defect and facilitate mastication, speech and esthetics.

After thorough examination it was found that the defect was Aramany's class I defect (Fig. 1). As the defect was large, a single piece closed hollow bulb definitive obturator was planned for increasing retention, stability and support.

Technique

1. Impression compound was softened and loaded on the left side of perforated tray, and impression of the defect was made with light pressure. Then the impression tray was loaded with irreversible hydrocolloid with a wet gauge covering the bulb part and full arch impression was made (Fig.2) and cast was poured with dental stone (Fig.3).
2. Special tray was fabricated on the primary cast using light-cure resin.
3. Border moulding of the defect was done with green stick compound and final impression was made in zinc oxide eugenol impression paste and irreversible hydrocolloid using single tray dual impression technique (Fig.4) and the master cast was obtained (Fig.5).
4. The trial denture base was fabricated with light cure resin, over which occlusal rims were fabricated using modelling wax.
5. Jaw relation was recorded and casts were articulated on mean value articulator.
6. After try-in (Fig.6), flasking and dewaxing was carried out in conventional manner.
7. Heat-polymerizing resin in dough stage was adapted to the defect with light pressure.
8. A reamer with stopper at 2 mm was pressed

into the acrylic resin (Fig.7) to maintain the thickness of inner wall of the bulb.

9. After filling the hollow portion with damp pumice (Fig. 8), remaining heat polymerizing resin was packed in conventional manner.
10. The prosthesis was retrieved after curing, and finishing and polishing was done. On the palatal surface of the bulb a hole was drilled and the pumice was drained out of it using water with syringe. The hole was then closed using auto polymerizing acrylic resin (Fig.9a,9b,9c).

After minor adjustments, the prosthesis was inserted into patient's mouth and post insertion instructions were given (Fig.10).

Discussion

Prosthetic rehabilitation with an obturator prosthesis is a predictable intervention to recreate an anatomic barrier between the cavities and to restore the functional capabilities of speech and deglutition.⁴ A bulb extension is required to improve the resonance of sounds to be heard with noticeable clarity.⁵ The bulb extension can be solid, open hollow and closed hollow.⁵ A hollow bulb offers certain advantages like reduction in weight, making it more retentive, comfortable and efficient.⁷ Both open and closed hollow obturators allow for the fabrication of a lightweight prosthesis that can be tolerated by the patient while effectively extending into the defect.⁹ The closed hollow obturator prosthesis can prevent fluid and food collection, reduce air space, and allow for maximum extension.⁷

Different materials like Silicone rubber, visible-light-cured resin and heat cure resin have been used to fabricate the obturators. Heat-polymerizing acrylic resin is one of the strongest, tissue compatible and durable materials for the fabrication of such prostheses.

Various methods have been described in the literature to fabricate the closed-hollow obturators in heat-polymerizing acrylic resin. Uniform wall thickness of a hollow prosthesis ensures the least possible weight without hampering the durability of the material. But most of the processing techniques, with which



uniform wall thickness can be achieved, are complex and time-consuming.¹

The technique described in this article is superior to all other techniques previously described as it gives the complete prosthesis as a single unit in a heat cured acrylic resin. The size and shape of the hollow space achieved allow uniform wall thickness for closed hollow obturator. This technique is a variation of some previously described techniques which comprises the use of a pumice bolus to maintain a predictable internal dimension of a hollow space.

Summary and conclusion

The present case report showed the prosthetic rehabilitation of a total maxillectomy (left side) patient using a closed hollow bulb definitive obturator. The use of a hollow bulb design reduces the weight of the prosthesis and gives better comfort to the patient as the retention, stability and support of the prosthesis is improved. The prosthesis rehabilitated the

patient in terms of function by providing better masticatory efficiency, phonetics by adding resonance to the voice hence improving the clarity of speech and also improved the esthetics of the patient. A one step flasking procedure to fabricate the prosthesis as a single unit with uniform wall thickness is the characteristic feature of this technique. The ease of fabrication, reduced time and cost are all potential benefits of this technique.

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Legends

- Fig.1 Intraoral view of the maxillectomy defect
- Fig.2 Primary impression
- Fig.3 Primary cast
- Fig.4 Final impression
- Fig.5 Master cast
- Fig.6 Try in
- Fig.7 Reamer in place to maintain thickness
- Fig.8 Hollow portion of defect filled with damped pumice
- Fig.9 (A) Tissue surface showing closed bulb (B) polished surface (C) Floating hollow obturator prosthesis
- Fig. 10 Patient with obturator prosthesis

