

## Prosthetic Rehabilitation by Palatal Hollow Bulb Obturator with Cast Metal Denture Base: A Case Report

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### ABSTRACT

**Background:** Prosthetic reconstruction of partial maxillectomy defects is a challenging procedure that requires multidisciplinary expertise to achieve an acceptable function, speech and esthetics. This procedure improves the quality of life for the patient as a normal individual. Obturation of the defect depends on its volume and position of remaining hard and soft tissues which determine the retention, stability and support for the prosthesis. The prosthesis should be simple to handle, easy to maintain, biocompatible, light in weight and convenient for future adjustments. This case report describes a clinical case of partial maxillectomy which was successfully rehabilitated with a definitive closed hollow bulb obturator and cast metal denture base.

**Keywords:** Aesthetics, Dentures, Obturators.

### INTRODUCTION

Maxillary defects can be caused by congenital malformations or the acquired defects resulting from surgeries. The maxillofacial prosthodontist can achieve the objectives by restoring the functions of mastication, deglutition and speech with normal orofacial appearance<sup>1</sup>. Defect of the maxilla, which occurs as a result of tumor, surgery or congenitally may be closed with an obturator.

Obturators are classified as solid, open hollow and closed hollow as to the nature of their extension into defect site<sup>2</sup>. 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.

### CASE REPORT

A 50 year old male patient reported to St. Gregorios Dental College, Chelad with a chief complaint of inflow of nasal secretions into mouth, facial deformity, reduced salivation and difficulty in eating. The patient had noticed an irregular soft tissue thickening in nasolabial fold in midline and upper buccal mucosa (size 4cm x 1.6cm). It was diagnosed as squamous cell carcinoma. Then followed by surgical correction, left subtotal maxillectomy, right inferior partial maxillectomy and excision of nasal septum was done before 8 months (Figure 1).

On examination, the size of the palatal defect was nearly (2x1cm) and was completely edentulous. The patient was not wearing any prosthesis. During this time period a considerable

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amount of tissue contraction occurred which resulted in reduced mouth opening. The ingress of nasal secretions into the oral cavity was a major concern along with facial deformity.



**Fig 1:** Maxillectomy defect.



**Fig 2:** Primary impression.



**Fig 3:** Final impression.



**Fig 4:** De-waxing procedure.



**Fig 5:** Final prosthesis.



**Fig 6:** a. Pre-treatment photograph. b. Post-treatment photograph.

The patient had xerostomia due to the radiation therapy carried out prior to surgical resection. The oral hygiene status was poor. The treatment plan was to fabricate a maxillary closed hollow bulb definitive obturator with cast metal denture base and mandibular complete denture for rehabilitation of the patient to restore esthetics, speech and function. Primary impressions were made using stock trays and alginate impression material (Figure 2). Self-cure acrylic resin special trays were fabricated on the primary casts obtained. Border molding and secondary impressions were made using elastomeric impression material [putty/light body] (Figure 3). The maxillary metal denture base was fabricated with a slight extension to the defect. The fit was verified clinically. Occlusal rims of adequate dimensions were fabricated for recording jaw relation. After completing jaw relation; teeth selection was done. Shade A2, mould size anteriors 41 and posteriors D39 (ACRY ROCK ) was used for teeth arrangement with class I molar relation and anterior edge to edge relation due to patient's skeletal class III maxilla-mandibular relation. The denture try-in was completed.

**HOLLOW BULB FABRICATION**

The maxillary metal trial denture base was then sealed to the master cast. After application of

the separating media on the cast, the counter portion was poured. This was followed by the dewaxing procedure (Figure 4). After separation of the counter parts, a layer of modeling wax was adapted in to the defect area, which provided the space for heat cure resin to flow between the bulb and the defect portion of the cast. Three tissue stops were created in the wax which prevented the tissue ward movement of the prosthesis in to the defect. 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<sup>3</sup>.

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. Following this separating medium was applied on to the cast and the counter portion. Heat cure resin was adapted in to the defect area after which the hollow bulb and the framework were placed back in to their respective position on the cast. The heat cure resin was also packed in to the mould space and the two parts were clamped. Together this unit was subjected to the regular curing cycle. Following deflasking procedures, the prosthesis was trimmed, finished, polished and inserted in to the patient's mouth after minor corrections (Figure 5).

Post insertion instructions were given and the patient was taught how to use the prosthesis. The patient was called after 24 hours for checkup. Recall visits were also scheduled after 1 week, 3 and 6 months (Figure 6).

## DISCUSSION

Obturator prostheses are commonly used in the rehabilitation of total or subtotal maxillectomy patients<sup>4</sup>. The most important consideration when restoring maxillectomy defects is the retention of the obturator prosthesis. The longevity of the prosthesis could be attributed to the strength of the metal. Further, the thermal conductivity of the metal made it sensitive to

temperature changes and the patient showed better functional acceptance to the prosthesis<sup>5</sup>. The metal base proved to be effective in decreasing the fungal growth typically present in patients wearing conventional acrylic complete dentures. It can also be used in patients who are particularly prone to higher incidences of fungal infections<sup>6</sup>. As the patient had xerostomia the incidence of fungal infections was high and the incorporation of metal frame work in the palatal obturator aided in reducing the incidence of fungal infections.

A hollow bulb design was chosen for the obturator in order to reduce the bulk of the prosthesis which in turn made it light and more comfortable for the patient. The hollow bulb further added resonance, thus improving the clarity of the speech<sup>7,8</sup>. The presented prosthesis not only improved the speech and function but also provided better comfort for the patient.

## CONCLUSION

The present case report describes the prosthetic rehabilitation of a partial maxillectomy patient using a hollow bulb definitive obturator. It involved the fabrication of a cast framework onto which hollow bulb prosthesis was attached. 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. The metal frame work helped to reduce the high incidence of fungal infections. The use of a hollow bulb design improved the comfort of the patient by decreasing the weight of the prosthesis.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

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