



**FABRICATION OF A HOLLOW BULB OBTURATOR USING PVC SHEET AND  
PLASTER INDEX WITH THE HELP OF A CUSTOMISED CURING FLASK**

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**ABSTRACT**

Post surgical hemi-maxillectomy defect predisposes the patient to hypernasal speech, fluid leakage into the nasal cavity, cosmetic deformity and impaired masticatory function. The problem with a large defect is fabrication of a heavy prosthesis which leads to discomfort to the patient. Hence a hollow bulb obturator is the treatment of choice in such patients. This case report describes the fabrication of a single piece definitive hollow bulb obturator for a patient who has undergone hemimaxillectomy by the use of a PVC sheet and plaster index and also caters to the problem of difficulty in curing of large casts as result of a large defect area in conventional curing flasks by the help of fabrication of a customized curing flask.

**INTRODUCTION**

An obturator is designed for patients after maxillectomy as a part of management of neoplasms of antral and /or ethmoidal sinuses [1]. It is defined as prosthesis used to close a congenital or an acquired opening in the palate

[2].

Increased weight of the obturator prosthesis is usually a major concern to the Prosthodontist. The obturator should be light in weight to provide favorable retention,

stability, support, patient comfort and cleanliness. Since the weight of an obturator is often the most common reason to dislodge a denture, it should be as light as possible [3, 4].

Reduction in weight of the obturator is attained by hollowing the prosthesis. A light weight hollow obturator optimises retention and stability as well as patient comfort. Hollow obturators can be either open or closed. A closed obturator is found to prevent percolation of fluid and reduce air space in the defect. Various methods have been advocated for fabrication of a hollow obturator like the Challian technique [5], using a thermoplastic resin [6], wax sheet [7] or a substance like sugar or salt. Most of these techniques have their own limitations, such as multiple processing steps while fabrication [8, 9]. Also a large defect poses a problem during the curing of the prosthesis in a conventional curing flask due to a large cast hence for the ease of curing and processing a customized flask can be designed. This case report describes the use of a plaster index and PVC sheet during processing in the fabrication of a single piece definitive hollow bulb obturator with a help of a PVC sheet and plaster index thereby enhancing the retention and speech and also reducing the weight satisfactorily.

## CLINICAL REPORT

A 38 year old male patient reported to the Dept of Prosthodontics, KGMU with the chief complaint of difficulty in eating food and speaking. His previous history suggested Odontogenic Myxoma with subsequent hemi-maxillectomy and class I defect by Aramany *et al* [10] as seen in (Figure 1). After examining his interim prosthesis it was decided to use as a custom tray to take final impression. Initially all the borders were adjusted in interim prosthesis, tissue surface was slightly trimmed to make some space for the wash impression, border molding was done with green stick compound (DPI) and one step pickup impression was taken with poly vinyl siloxane light body impression material (PYRAX). The impression was poured with type III gypsum material (KALABAI) (Figure 2).

All the undercuts were blocked with clay material and duplicated with agar impression material (SUPERGEL) to fabricate a refractory cast with type 4 gypsum product (ULTRAROCK). After surveying the refractory cast, pattern wax was applied for metal frame work in the unaffected area and a sheet of modeling wax on the defect area. Three stops were cut on this area in the center of the defect for plaster index stability. A plaster index was fabricated in the defect

area using type 2 gypsum material (NEELKANTH) and was reduced by approximately 4mm in all the areas except the stops. After the trimming it was checked to be 4mm below the wax pattern framework (Figure 3).

Two 2mm thick PVC sheets (MARK) were used to fabricate the hollow bulb. A single sheet was applied on one side of the plaster index and a separating medium such as petroleum jelly was applied onto it to prevent adherence of the two sheets and to facilitate easy removal of the plaster index from the sheets, later these sheets were joined by cyanoacrylate adhesive as seen in (Figure 4).

After trial of the metal frame work and fabrication of a self cure denture base (Figure 5). A facebow record and jaw relation was made in the usual manner (Figure 6). Since the defect was large, it was difficult to use the conventional curing flask; hence a curing flask was customized according to the

size of the defect by using a 4-inch PVC pipe. It was fabricated in three parts i.e 1) base, 2) body and 3) lid. Three grooves were placed on the flask to ensure exact fit of all the parts of the flask and two vent holes were perforated on the lid to ensure the removal of flash during curing as seen in (Figure 7).

After investing and dewaxing, silicone hollow bulb was removed and cleared from the wax and self cure acrylic (DPI). Metal frame work was also cleared from acrylic. Initially first layer of heat cure acrylic resin (DPI) was placed on defect side following which hollow bulb was placed at the same side in correct position. Finally a bulk of heat cure acrylic was packed on hollow bulb and remaining part of palate. During this step, putty material (DPI) which was adapted on the metal framework previously should not be removed. The entire step after this procedure was same as denture fabrication. After curing, hollow bulb obturator was finished, polished and inserted (Figure 8).



Figure 1



Figure 2



Figure 3



Figure 4

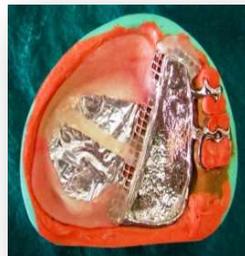


Figure 5



Figure 6



Figure 7



Figure 8

## DISCUSSION

Rehabilitation of patients who have undergone hemi-maxillectomy requires restoration of mastication, speech and deglutition. A large defect poses the problem of a heavy prosthesis. Hence ability to reduce the weight of the prosthesis by hollowing the obturator is found to be beneficial. Several techniques have been advocated in the

fabrication of hollow obturators. Each of these technique offers several advantages and disadvantages. A hollow bulb obturator can either be open or closed. The closed obturator is found to prevent percolation of fluid and decrease air space in the defect; however, it is also found that fluids can be absorbed through the porosities in the acrylic resin seal and in such situations, patients were unable to clean

the inner surface of the closed system. This unhygienic situation harbours the growth of microorganisms.

Controlling the thickness of hollow obturator walls is important to provide adequate strength and weight of the prosthesis. Materials such as salt and sugar have been used in the defect portion during curing and then removed through holes after processing [10]. The disadvantage being irregular distribution of salt or sugar due to which irregular hollowing occurs. This case report describes the fabrication of a post-surgical single-piece hollow bulb obturator using 2mm silicone sheet to fill the defect. The added advantage of this technique is that we can sandwich this silicone sheet hollow bulb in between two layers of heat cure acrylic resin in one step without any type of perforation and distortion, whereas use of sugar tents to distort the shape as a result of the pressure applied during packing.

Use of PVC pipe for the fabrication of a customized curing flask offers advantages of being an economical, easily available and non technique sensitive method of curing a large and bulky prosthesis which are otherwise difficult to be cured by a conventional flask.

### SUMMARY

The use of PVC sheet hollow bulb gives the benefit to fabricate a obturator of a large

defect in single step, as well as reduced distortion of prosthesis and a customized curing flask facilitates easy and economical curing of large obturator prosthesis.

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