

# A Simplified Technique for Constructing One Piece Hollow Obturator after Partial Maxillectomy

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## ABSTRACT

Preservation of remaining structures is a primary goal of prosthetic rehabilitation. Continuously applied stresses on the remaining tissues from a large, heavy obturator jeopardize the health of the tissues, compromise the function of the prosthesis and affect patient comfort. Various techniques have been described for hollowing the bulb of an obturator after processing to reduce its weight; however, access to the inner aspects of the bulb is limited, preventing adequate control of thickness of the walls. This article presents a case report of a partially edentulous patient after partial hemimaxillectomy successfully rehabilitated with closed hollow bulb obturator prosthesis. The weight of the obturator has always been a hurdle in the rehabilitation of acquired palatal defects. A simple procedure for the fabrication of one piece hollow bulb obturator has been described in this article.

**Keywords:** Hollow bulb obturator, Partial maxillectomy, Rehabilitation.

## INTRODUCTION

Acquired surgical defects of the hard or soft palates interfere with the speech pattern and the mechanism of deglutition, and of equal importance, produce a feeling of social insecurity with unfavorable psychological as well as economic consequences. Patients with palatal defects labor under handicaps that cannot be fully appreciated by those with normal palates. The dentist should use his specialized training and prosthetic abilities to treat those persons who need the precise type of prosthesis required to correct acquired openings of the hard and soft palate. Acquired openings of the hard and soft palate may be a result of trauma, disease, pathologic changes, radiation burns, or surgical intervention. The opening produced may be quite small or it may include any portion of the hard and soft palate, the alveolar ridges, and the floor of the nasal cavity. There are two important reasons for correcting the acquired palatal defect as soon as possible. First, the physical development and well-being of the patient will be protected, and, second, the morale and mental development of the patient will be greatly improved.<sup>1</sup> A myriad of methods has been employed for producing a hollow obturator. The classic method is to process a solid speech aid and subsequently grind out the unwanted portion. This necessitates a covering for the space that has been ground out. A variation is to shim the defect of the cast and simulate the ridge contour in clay. A wax template for the capping of the obturator is made. Again, both have to be processed and ultimately attached with autopolymerizing acrylic resin. Chalian and associate suggested a one piece hollow obturator which necessitates the making of a hollow

shim around which the obturator is processed. Others have suggested a two flask investing technique with an autopolymerizing seal between the two halves. All of these methods are long and tedious and require the assistance of a knowledgeable dental laboratory technician.<sup>2</sup> The weight of the maxillary obturator is a dislocating factor because the prosthesis often acts as a cantilever. The laboratory procedure generally used in the construction of a hollow obturator is rather complicated.<sup>3</sup> In this case report a patient who had undergone hemimaxillectomy was rehabilitated with a hollow bulb obturator using a simplified technique.

## CASE REPORT

A 64-year-old woman, partially edentulous, was referred to the Maxillofacial Prosthetic Clinic, Jodhpur Dental College and General Hospital of Jodhpur National University, Jodhpur, for the construction of an oral prosthesis to correct an acquired palatal defect. The patient had undergone surgery 3 years previously for the removal of a mixed cell tumor involving a portion of the hard palate (Fig. 1). Due to the patient's age, general physical condition, and the possibility of recurrence of the tumor, further plastic surgery was not recommended. A complete review of the patient's history was made, and a clinical oral examination was completed. The patient was not able to take either fluids or solid foods by mouth without considerable discomfort to the tissues involved about the postoperative opening. Deglutition and intelligible speech were almost impossible. The procedure selected for the correction of the palatal defect was the construction of a hollow bulb obturator

as a part of a cast partial denture. At that time, we considered it advantageous to discuss with the patient the advantages and disadvantage of the prosthesis in order to secure his full cooperation.

### TECHNIQUE FOR CONSTRUCTING A HOLLOW BULB OBTURATOR

The technique to be described is simple, and it is given in a step-by-step sequence which should challenge the dentist who has not considered rendering this type of service to do so, when it is indicated. The palatal defect was sprayed with 10% lignocaine hydrochloride to reduce the sensitivity of the involved tissue (Fig. 1). One inch petroleum jelly gauze was used to pack off the nasal portion of the defect and to block out the undercut region. A stock impression tray of adequate size was selected. Alginate (Zelgan plus, Dentsply) impression material was mixed with a water powder ratio of 16 gm powder with 45 ml water to make the primary impression of the defect. The impression was beaded, boxed (utility wax) and poured with dental stone to make a primary cast (Fig. 2). Undercuts were blocked and a special tray was fabricated to make a more

detailed impression. Mouth preparations were done following the principles of Aramany's class IV obturator linear design (Fig. 3). Final impression (Fig. 4) was made using putty and light body elastomeric impression material (3M ESPE polyvinyl siloxane).<sup>4,5</sup> The secondary impression was poured in die stone undercuts were blocked and a duplicate refractory cast was made. Pattern wax was adapted on this refractory cast and casting was done to obtain the metal framework (Fig. 5). Wax occlusal rim (Fig. 5) was made and bite registration was done. Teeth arrangement was done in accordance to the existing occlusion (Fig. 6). After teeth arrangement the waxed up obturator was tried in the patient's mouth. Occlusal contacts and fit is verified.

### PROCESSING HOLLOW BULB OBTURATOR

The waxed up obturator was invested in big maxillofacial flask follow the same procedure as for complete denture. After the invested plaster is set the wax was boiled out and separating medium was applied using camel hair brush (Fig. 7). The upper member of the flask was holding the teeth. The lower member of the flask was holding the framework and the defect.



Fig. 1: Patient with acquired palatal defect



Fig. 3: Aramany's class IV design



Fig. 2: Primary cast



Fig. 4: Secondary impression



Fig. 5: Metal framework with wax occlusal rim



Fig. 6: Teeth arrangement in semiadjustable articulator after face bow transfer

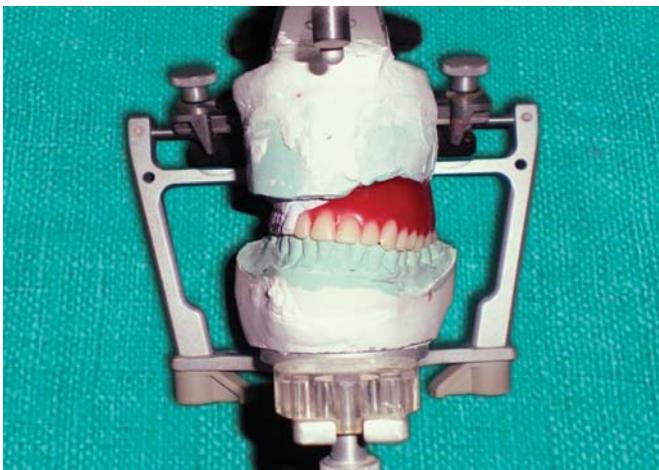


Fig. 7: After wax boil out

The defect and the framework was lined with approximately 2 mm thick layer of heat-cure resin. The center of the defect was then filled with table salt to fill the concavity created by the pervious step, then another layer of heat-cure resin was placed to within approximately 2 mm on the top (Fig. 8). Pack the mold with heat-curing acrylic resin in the usual manner. Process the acrylic resin according to manufacturer's specifications. Deflask the prosthesis. Using a No. 8 bur, drill a hole in the superior surface of the obturator. Pour out the salt (Fig. 9). Use autopolymerizing acrylic resin to seal the hole made by the bur. Finish the restoration in the customary manner. The obturator was then inserted intraorally; fit of the obturator framework was verified. Any sore points that can irritate the nasal mucosa were relived clinically and also check by asking the patient, if she was feeling any pain or discomfort (Fig. 10).

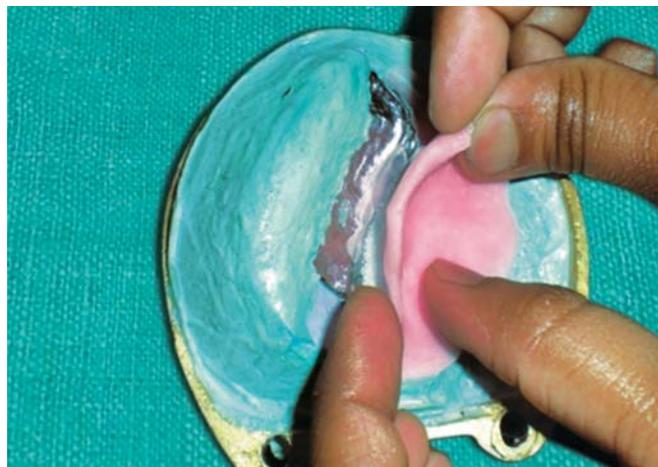
## DISCUSSION

Prosthetic rehabilitation of acquired palatal defects is a challenging procedure that requires multidisciplinary expertise to achieve acceptable functional speech and swallowing outcomes. The Aramany classification system of postsurgical maxillary defects is a useful tool for teaching and developing

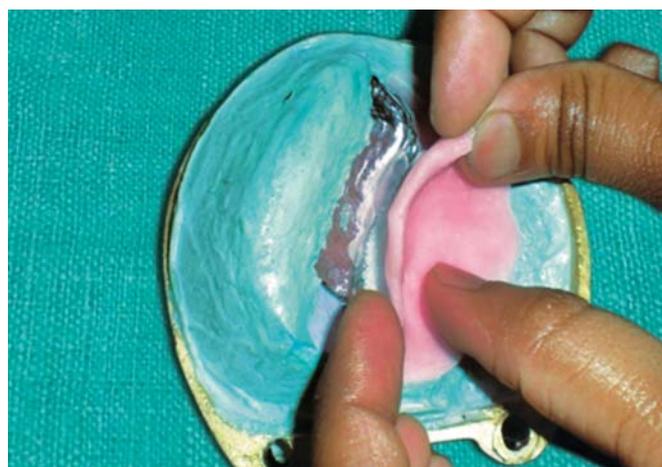
framework designs for obturator prostheses and for enhancing communication among prosthodontists. A series of obturator prosthesis design templates and the relevant considerations for each have been discussed by Aramany. In all situations, a quadrilateral or tripod design is favored over a linear design because this allows a more favorable application of leverage design for the support, stabilization and retention of the prosthesis.<sup>4,5</sup> In dentate patients, primary retention, support, and stability of an obturator depends on the number and distribution of remaining teeth.<sup>6-9</sup> Engagement of soft tissue undercuts, including the scar band at the skin graft mucosal junction, may also play a significant role, particularly in edentulous patients.<sup>10</sup> Wide surgical resections for the control of malignancies frequently result in a small number of remaining, unilaterally clustered teeth. These remaining teeth serve as abutments for the obturator and are subjected to constant, nonaxial, cantilever forces.<sup>11,12</sup> The weight of an obturator can be significantly reduced by hollowing out the bulb.<sup>13</sup> Various studies have also shown a remarkable difference in the speech intelligibility between patient with and without obturator prosthesis after palatal defects. Kornblith et al reported that obturators were more functional during communication and swallowing in patients with smaller resections of the hard palate. In addition, maxillectomies, particularly the larger ones, restrict the contact



**Fig. 8:** The defect filled with table salt and packed with heat-cure resin



**Fig. 9:** After processing the salt poured out to obtain a hollow bulb obturator



between the tongue and palate, impairing speech intelligibility. Depending upon the nature of the defect, movement of the obturator varies and creates soreness and discomfort for the patient. These pressure sores are adjusted at the postinsertion and subsequent follow-up appointments. Patient benefits from the reduced weight of the obturator offset the costs and additionally incurred laboratory procedures. This article describes a very simple technique of fabricating a one piece hollow bulb obturator bypassing the cost and processing difficulties in other techniques of creating a hollow bulb obturator.

## SUMMARY

Every dentist should be challenged to assist in rehabilitating the increasing number of patients with palatal defects which are not recommended for surgical correction. The prosthodontist, due to his specialized training, is prepared to construct precise oral prostheses for these patients. A simplified step-by-step technique for fabrication of a one piece hollow obturator for patients who have had maxillary resection has been described. The prosthesis is simple to construct, light in weight, and easy



**Fig. 10:** Obturator is fitted in the patient, checked for fit, any sore points relieved and occlusion is verified

to clean. It requires little more laboratory time than needed for making the usual complete denture.

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