

Fabrication of Closed Hollow Bulb Obturator for Prosthodontic Rehabilitation of Hemimaxillectomy- A Case Report

Dr.Deshraj Jain¹, Dr.Alka Gupta², Dr.Swetha Sampath³

¹(Department of Prosthodontics and crown and bridge, Govt College of Dentistry, Indore)

²(Department of Prosthodontics and crown and bridge, Govt College of Dentistry, Indore)

³(Department of Prosthodontics and crown and bridge, Govt College of Dentistry, Indore)

Abstract:

Background: The maxillectomy defects can be rehabilitated with obturator. The obturator used to restore the An obturator is advised to restore masticatory function, deglutition and esthetics for patients with maxillary defect. For a larger defect, obturator is made hollow to reduce the weight of prosthesis. Various methods were used in literature to create hollow space. This paper describes a clinical report of fabricating closed hollow bulb obturator using a thermoplastic sheet for an acquired maxillary defect.

Method: After the conventional impression making and master cast fabrication, hollow bulb and lid part of the defect were formed separately using hard thermoplastic sheet and joined by self cure acrylic resin to form one sized hollow body and checked for any leakage. During packing procedure, the defect area was loaded with heat cure acrylic resin and then previously fabricated hollow body with lid was adapted over it. Then the whole area was loaded with heat cure acrylic. Final finishing and polishing done conventionally.

Conclusion: This technique uses hard thermoplastic sheet for hollow bulb fabrication which maintains the uniform thickness and is light weight . It also minimizes the disadvantages of closed hollow bulb obturator such as water leakage, infection, and discoloration.

Key Word: closed hollow bulb, hemimaxillectomy, obturator

Date of Submission: 17-07-2021

Date of Acceptance: 02-08-2021

I. Introduction:

The term “maxillectomy” may refer to any resection, in a part or full of the mouth proper. Maxillectomy is done in patients with benign and malignant tumours , inflammatory or infectious diseases, traumatic injuries involving palate and paranasal sinuses. The acquired maxillectomy may affect swallowing, mastication, esthetics, phonetics and psychology of the individuals. Reconstruction of the defect is much challenging for maxillofacial prosthodontist. Main goal of the rehabilitation is to restore the detachment between the nasal and oral cavity, restore the palatal contours and maintain the tongue space and position, replacing the missing natural dentitions, restore facial form and contours and provide retention, stability and support of the prosthesis without affecting remaining dentition and adjacent structures.

Obturator is defined as “a maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of hard palate and/ or contiguous alveolar/ soft tissue structures. The phases of prosthodontic treatment involves the **surgical obturation** placed at the time of surgery, the **interim obturation** given during healing period to maintain function and promote healing, the **definitive obturation** given after the healing¹. The definitive obturator should be hollowed to reduce the weight so that teeth and supporting structures are not stressed. The superior part of hollow bulb can be open or closed for the secretions to drain.

The defects created after surgical excision of oral tumours or trauma may vary depending on the size, location, extent and potential behaviour of the tumour². An obturator is advised to restore masticatory function, deglutition and esthetics for patients with maxillary defects³⁻⁶. Obturator is made hollow to reduce the weight of the prosthesis, making it more comfortable and efficient. Several authors have proposed different classification systems for maxillary defects that helps in planning treatment.⁷⁻⁹ The present case report explains the rehabilitation of hemi maxillectomy defect with closed hollow bulb obturator.

II. Case Presentation:

A 45 year old male patient reported to department of prosthodontics with the chief complaint of old worn out obturator. History reveals that patient had tumour involving the right maxillary side for which hemi maxillectomy was done before 2years and restored with interim obturator that had worn out by time.

Extraoral examination reveals suture scars on the right side of face. Intraoral examination involves the partial maxillectomy of right side with oro-antral communications. The extent of surgical defect includes third molar region till the distal aspect of right lateral incisor (fig1a and 1b).

PROSTHODONTIC PHASE:

The diagnostic upper and lower impression was made with reversible hydrocolloid and cast was poured in dental stone. The special tray made from diagnostic cast was used for final impression. The defect area was blocked with sterilised gauze and elastomeric putty was used to make impression of defect area. The wash impression was made with light body elastomeric material and the parts were joined using pins and retrieved as one section from the mouth (fig 2a and 2b).

The master cast poured with die stone. The undercuts of the defect was blocked out and record base with rims was fabricated and bite made. Using self cure resin, a denture record base was prepared and wax occlusal rim was made over it. Maxillomandibular relationship was recorded and transferred to a semiadjustable articulator (Hanau Wide Vue Articulator). Selection and arrangement of teeth were done and try-in was performed on the patient for retention, stability, function, and esthetics (fig 3).

FABRICATION OF OBTURATOR:

The obturator was fabricated in two parts- bulb and lid part. The elastomeric index of the defect area was made and thermoplastic resin sheet of 1.5mm thickness was adapted on superior and inferior surfaces in order to create a hollow bulb (fig 4). The bulb part and lid part were bonded with self cure resin to obtain a single hollow body. The tight seal of obturator was confirmed by immersing it in water.

After successful try-in and hollow bulb fabrication, flasking and dewaxing procedures were carried out (Fig 5). During the packing procedure, the defect area was first loaded with heat polymerizing acrylic resin and then the previously fabricated hollow thermoplastic body was adapted over it. Then the whole area was loaded with heat cure acrylic resin and curing was done. Finishing and polishing of prosthesis was carried out in a conventional manner . The obturator prosthesis was inserted in the patient mouth (Fig 6). Patient was satisfied with his improved function, speech, and esthetics.



Fig1a and 1b : Intraoral photograph showing the maxillary defect



Fig 2a And 2b : Final Impression with Elastomeric Putty And Light Body Material.



Fig 3: Wax try - in



Fig 4: Hollow bulb part made with putty index and hard thermoplastic resin

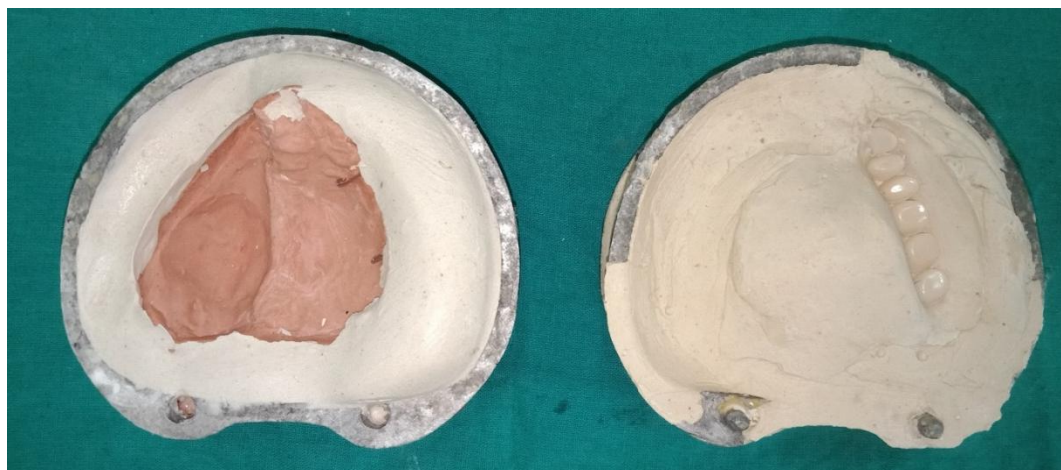


Fig 5: Dewaxing



Fig 6: Obturator with closed hollow bulb in mouth

III. Discussion:

Obturators are commonly used for the rehabilitation of patients with maxillary defects. To reduce the weight of intra oral prosthesis, bulb portion of the prosthesis to be made hollow. Various methods have been described in literature to fabricate hollow bulb obturators¹⁰⁻¹⁶. Incorporation of certain materials like sugar, salt and ice, into the resin during the packing stage can produce a hollow bulb obturator, although the simplest method is to grind out the interior of the obturator bulb after acrylisation. A lid can be secured to the hollow obturator to convert an open bulb into a closed one.

Oh and Roumanas¹³ proposed a double processing technique to optimise the thickness of the bulb. Habib and Driscoll¹⁴ suggested a method whereby a part of the bulb similar to a lid is removed and then joined back to the prosthesis after the bulb has been hollowed. Similarly, Asher *et al*¹⁵ suggested a quick and easy technique in which a plaster index was made on the bulb before the bulb was hollowed. Auto-polymerising resin was then used to approximate back onto the prosthesis to form a lid. But the thickness of the lid may vary. Different attachment systems were used to join the pieces of obturator together.^{17,18} However, there may be a chance of dimensional instability with such technique. In the literature, thermoplastic resin materials have been used as an immediate or interim prosthesis and for fabrication of base plate of an obturator. The variation in thickness and weight of hollow bulb can be controlled by usage of commercially available thermoplastic resin sheets. The use of single flask considerably reduces the time required for fabrication and also makes the process easier to handle. In the present case, elastomeric putty index was made on the bulb part, later thermoplastic sheet of 1.5mm thickness was adapted. The bulb and lid part was joined using autopolymerising resin. The seal of hollow bulb was checked by immersion in water. However, there may be some difficulty during adaptation of preformed hollow bulb template in the defect area before packing, which may lead to a faulty final prosthesis. There might be an impact on the strength of the prosthesis during bench curing process and also on the stability to temperature during acrylization. These steps to be carried out with caution.

The published literatures regarding the disadvantages of the thermoplastic resin over conventional denture base resins are limited and require further research for clarification.

IV. Conclusion:

The larger maxillary defects can be rehabilitated with obturator which is made hollow for effective retention, comfort and function of the prosthesis. Several methods for making hollow obturator has been described in the literature. The method of using thermoplastic sheet can control the thickness of bulb part of obturator and light weight closed hollow prosthesis can be made. The prosthesis fabricated using a single flask considerably reduces the laboratory time and makes the procedure simple. Thus the use of thermoplastic resin sheet to be considered for fabrication of hollow part of obturator.

References:

- [1]. Curtis TA. Treatment planning for intraoral maxillofacial prosthetics for cancer patients. *J Prosthet Dent* 1967;18:70–6 .
- [2]. Lang BR, Bruce RA. Presurgical maxillectomy prosthesis. *J Prosthet Dent* 1967;17:613–19
- [3]. Taylor TD. Clinical maxillofacial prosthetics. Quintessence Publishing, 2000:85–102
- [4]. Chalian VA, Drane JB, Standish SM. Maxillofacial prosthetics. Multidisciplinary practice. Baltimore: Williams & Wilkins, 1971:133–48
- [5]. Beumer J, Curtis TA, Firtell DN. Maxillofacial rehabilitation. St. Louis: Mosby, 1979:188–243
- [6]. Singh M, Bhushan A, Kumar N, et al. Obturator prosthesis for hemimaxillectomy patients. *Natl J Maxillofac Surg* 2013;4:117–20
- [7]. Aramany MA. Basic principles of obturator design for partially edentulous patients. Part I: classification. 1978. *J Prosthet Dent* 2001;86:559–61
- [8]. Okay DJ, Genden E, Buchbinder D, et al. Prosthodontic guidelines for surgical reconstruction of the maxilla: a classification system of defects. *J Prosthet Dent* 2001;86:352–63
- [9]. Spiro RH, Strong EW, Shah JP. Maxillectomy and its classification. *Head Neck* 1997;19:309–14
- [10]. Didier M, Laccoureye O, Brasnu D, et al. New surgical obturator prosthesis for hemimaxillectomy patients. *J Prosthet Dent* 1993;69:520–3
- [11]. Wang RR, Hirsch RF. Refining hollow obturator base using light-activated resin. *J Prosthet Dent* 1997;78:327–9
- [12]. McAndrew KS, Rothenberger S, Minsley GE. 1997 Judson C. Hickey Scientific Writing Awards. An innovative investment method for the fabrication of a closed hollow obturator prosthesis. *J Prosthet Dent* 1998;80:129–32
- [13]. Oh WS, Roumanas ED. Optimization of maxillary obturator thickness using a double-processing technique. *J Prosthodont* 2008;17:60–3
- [14]. Habib BH, Driscoll CF. Fabrication of a closed hollow obturator. *J Prosthet Dent* 2004;91:383–5
- [15]. Asher ES, Psillakis JJ, Piro JD, et al. Technique for quick conversion of an obturator into a hollow bulb. *J Prosthet Dent*. 2001;85:419–20
- [16]. Deogade SC, Mantri SS, Naitam D, et al. A direct investment method of closed two-piece hollow bulb obturator. *Case Rep Dent* 2013;2013:326530.
- [17]. Gunasekar C, Nasser KS, Sabarigirinathan C, et al. Modified snap-on attachment with ‘O-ring’ for two piece hollow bulb obturator. *Indian J Dent Res* 2013;24:507–10
- [18]. Elangovan S, Loibi E. Two-piece hollow bulb obturator. *Indian J Dent Res* 2011;22:486–8

Dr.Deshraj Jain, et. al. “Fabrication of Closed Hollow Bulb Obturator for Prosthodontic Rehabilitation of Hemimaxillectomy- A Case Report.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(07), 2021, pp. 49-53.