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A New Clinical Approach in the Fabrication of A Closed Hollow Bulb Obturator: A Case report

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ABSTRACT
Maxillofacial prosthesis such as Obturators are the most common treatment modality compared to surgical reconstruction for Maxillectomy in oral cancer patients. This prosthesis proved to be very helpful during Mucormycosis outburst in Covid-19 pandemic. The obturators frequently become bulky in the defect area. To reduce its weight, hollowing of the obturator is suggested. This case report presents the technique of fabrication of a closed hollow bulb obturator for an adult patient who had undergone Maxillectomy. The obturator was constructed using self cured acrylic resin shim filled with wax in the defect area then subsequent elimination of wax after curing.This is a one step technique forming walls of uniform thickness around the hollow area thus maintaining least possible weight. This process attains probable internal facet of the hollow space with uniform wall thickness of the prosthesis.
Keywords: *Closed hollow bulb,Maxillectomy, Obturator, Oral Cancer, Self cure acrylic resin*

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INTRODUCTION

The various deformities of the palate and the oral cavity whether congenital or acquired in nature require a prosthesis for adequate sealingo1].Anobturator is used to seal a window formed on the hard palate or the alveolar ridge which may be congenital or acquired in origin[2] An Obturator differs in shape and size based on the area and extent of the defects. Preferably, this prosthesis should be fabricated keeping in mind that along with appropriate retention, support and stability it should be light in weight so that it is comfortable to the patient and does not restrict any function[3].In maxillectomy patients, an obturator is an essential part of the post op rehabilitation plan[4].However, this prosthesis can be unnecessarily bulky at times especially in the areas of defect thus causing inadequate retention, stability and support, which ultimately leads to improper seal in the oro-nasal and the oro-antral regions[5]. To bypass these complications, a hollow obturator of either open or closed type, can be fabricated[6]

Open and closed hollow bulb obturators can be fabricated by various techniques [7]. The fact that these obturators are lightweight aids a great deal in making them easily acceptable to the patient [8]. Of the two types, it is comparatively easier to fabricate an open hollow bulb obturator, therefore this prosthesis is more commonly used but it has its share of drawbacks as well. Since these obturators are difficult to clean and polish, they allow food accumulation and deposition of nasal secretions in the hollow area[8]. These accumulations not only cause malodour and infections but also end up eventually increasing the weight of the prosthesis. Whereas, with closed obturators such problems are avoided since the air space is reduced significantly[9]. There have been described various techniques to construct a closed hollow obturator which prevents water leakage[10].

The previously used techniques are much more technique sensitive and thus a simpler technique is needed. This paper presents a simpler method for fabrication of a closed hollow obturator as a single unit having the hollow area surrounded by walls of uniform thickness using self cure acrylic resin and wax making it as lightweight as practically possible.

CASE REPORT

A 70-year-old male patient was referred to the Department of Prosthodontics after surgical removal of a Mucoepidermoid Carcinoma from the right side of the maxilla. The patient's chief complaint was inability

to chew food, nasal spewing of fluids, and difficulty in speech with increased nasal tone in the voice. Facial disproportion with depressed right molar region was seen extra orally (Figure1). Intra orally, the patient presented with a healthy post maxillectomy defect associated to the posterior hard palate, maxillary tuberosity, alveolar ridge and some part of the soft palate in the right side with compromised 23,24,25,26 with a partially edentulous mandibular arch (Figure 2). A closed hollow bulb obturator for the maxillary arch and RPD for mandibular arch were planned for the patient. A fixed treatment plan was delayed for a period of 1 year to avoid chances of Osteoradionecrosis as the patient had undergone radiotherapy.

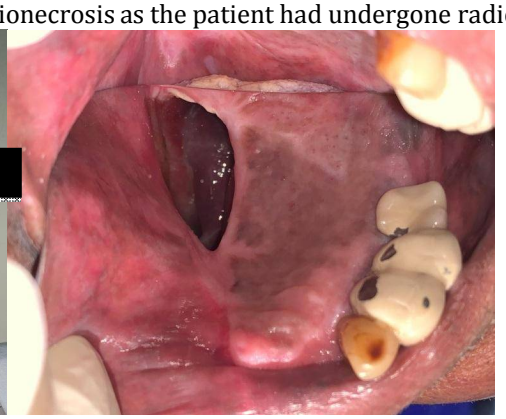

Figure-1: Extraoral view Figure-2: Intraoral view showing Maxillary defect

Procedure:

Prior to impression making proper tray selection was done and the connection of the defect with nasal cavity was blocked using gauze piece tied with a thread to avoid entrance of impression material into it. Then the primary impression was made with alginate (Figure 3).alginate Anautopolymerizing acrylic resin was used to make the custom tray (Figure 4)

Figure-3: Primary impression with Figure-4:Self cure acrylic resin tray

The border moulding was done with a green stick impression compound and the final impression was made using light viscosity addition silicone impression material and the pickup impression was made using Alginate (Figure 5)

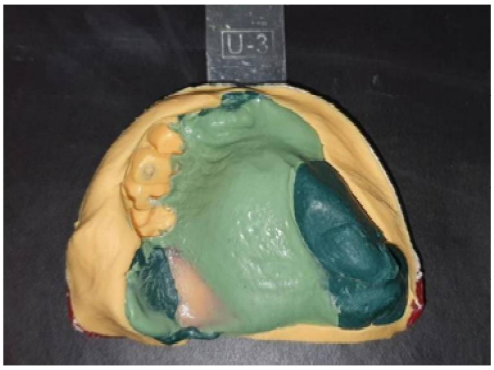

Figure-5: Final Impression with Border Moulding

Lastly, the master cast was fabricated with the help of dental stone.
The undesirable undercuts were blocked out using wax and the base plate was made with an autopolymerizing acrylic resin over which occlusal wax rims were made and jaw relation was recorded. The casts were mounted and teeth setting was done and after trial insertion appointment the wire clasps were made on the cast for additional retentive purpose of the obturator and the surrounding acrylic record base was trimmed from that area where the clasps were reseated. The waxed up trial prosthesis was sealed using modelling wax as done normally. The master cast along with the trial prosthesis was invested in the flask and kept under a mechanical clamp. After dewaxing, the base was removed from the flask and left to cool down. Before the packing procedure, separating medium was applied in the defect area and a thin self cure acrylic resin was loaded in the area and allowed to set (Figure 6). After setting it was removed from the defect and thinned from the inner surface (Figure 7).It was again seated in its position in the defect area and then Vaseline was applied in its inner surface and was filled with wax up till the upper surface of the defect area then again Vaseline was applied on the wax surface (Figure 8).

igure-6 : Separating medium applied area Figure-7 : Thinned out self cure acrylic base reseated in defect area

Figure-8 : Wax filled in the self cure acrylic resin in defect area

A heat polymerizing acrylic resin was mixed and packed into the flasks which were tightened under the mechanical clamp. For 2 hours, the assembled flasks and clamp were kept at room temperature after which the curing cycles were initiated. Following the completion of the curing cycle, the clamp-flask assembly was subjected to bench cooling at room temperature for 24 hours. Then the clamp was removed and the flasks were opened. Two holes in the intaglio surface of the prosthesis in the defect area were made using a round carbide bur. Wax was removed by using a hot water bath and the forceful stream of hot water was applied through one of the holes to eliminate any residual wax through the other hole leading to the formation of a hollow space (Figure 9). Autopolymerizing acrylic resin was used to seal the holes (Figure 10). The prosthesis was finished and polished (Figure 11).The obturator was seated in the patient's mouth covering the entire defect area(Figure 12,Figure 13).


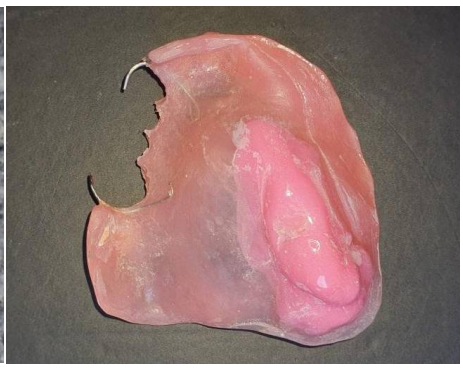

Figure-9: Wax elimination by making holes Figure-10: Holes sealed


Figure-11: Finished and Polished Final Prosthesis

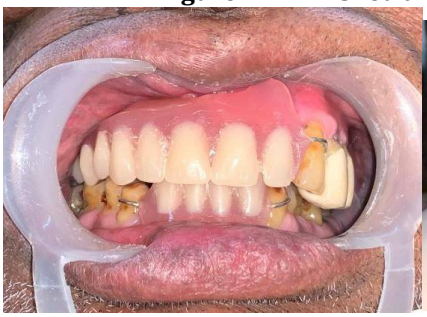


Figure-12 : Intraoral View of the Obturator covering whole of the defect area

Figure-13: Extraoral view of Patient wearing Final Obturator prosthesis

Post Insertion instructions with prosthesis care and insertion and its removal were instructed to the patient. Patient was also instructed for follow up appointments after every 3 months for a period of 1 year. The patient had no complaints in the follow up appointments.

Obturators have proven to be indispensable in the functional rehabilitation of patients who have undergone maxillectomy. Such patients present a great challenge for prosthetic rehabilitation mainly in retention of the prosthesis due to its bulk which in turn poses difficulty in speech and mastication. There have been several attempts in the past to overcome this problem by fabricating a light weight hollow obturator. Trimming out the unnecessary part directly after processing[11], closure of superior border of defect in prosthesis with lid[12], incorporating materials like sugar[13] and ice[14] are few techniques

used to create the hollow prostheses. The processing technique in this article is superior tooth erosion the following terms: (1) It presents the whole prosthesis as one single unit and (2) Walls of uniform thickness are achieved. This technique takes inspiration from some of the previously mentioned ways in which a pre-shaped wax bolus is used to get a hollow space of known dimensions [15]. For the best possible results with this technique, the following steps should be noted- (1) The proper seating of self cure acrylic resin shim in defect area should be achieved before final curing of prosthesis. (2) Bench-polymerization is essential to avoid wax-bolus distortion in curing process. (3) The wax needs to be completely eliminated from the bulb of the prosthesis. (4) It is advised, to understand the compatibility of heat cure and self cure acrylic resin material for a long term period after processing with this technique.

CONCLUSION

A number of advantages can be credited to the above mentioned technique. Since the obturator is made using only one flask, it notably saves the laboratory time. It is simple and ensures a prosthesis which has adequate retention, stability and support, has a reduced risk of infections and is light enough to be readily accepted by the patients.

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