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Maxillofacial Prosthesis with an Edge: A Case Report

Dr. Apeksha Tibra[1], Dr. S. Sri Harsha[2],Dr. G. Vineela[3], Dr. M. Suresh Babu[4]
[1-3]Post Graduate Student,[4]Reader,Department of prosthodontics, SIBAR Institute of Dental Sciences,Guntur, Andhra Pradesh, India.
Corresponding Author:Dr. ApekshaTibra

Abstract: *Rehabilitation of hemimaxillectomy patients can be challenging to the prosthodontist. Maxillectomy defects result in the formation of an opening between the oral cavity and antrum or the nasopharynx. This results in problems with speech, mastication, swallowing and impaired facial esthetics. The goal of prosthodontist is rehabilitation of missing oral and extra oral structures along with restoration of the normal functions. The obturator prosthesis is commonly used as an effective means for rehabilitating hemimaxillectomy cases. This clinical report describes a technique to fabricate closed hollow bulb obturator for rehabilitation of a hemimaxillectomy patient. This technique aids in control of the bulb wall thickness and weight while not requiring any additional materials or time-consuming steps.*

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I. Introduction

"Every human has the divine right to look human"[1]. In maxillofacial prosthodontics, an obturator prosthesis is used to restore masticatory function, improve speech, deglutition and cosmetics for patients with maxillary defects[2–5]. Increased weight of the obturator prosthesis is a major concern to the prosthodontist. The obturator should be light in weight to provide favorable retention, stability, support, patient comfort and oral hygiene. Construction of a hollow bulb obturator reduces the weight of the prosthesis, making it more comfortable and efficient[6]. It has been well documented in the literature that in fabrication of a hollow maxillary obturator, the weight of the prosthesis get reduced by 33% [7-8]. This clinical report describes a simple technique for fabrication of closed hollow bulb obturator to rehabilitate speech, deglutition, mastication and esthetics of a completely edentulous patient, who has undergone hemimaxillectomy.

II. Case Presentation

An82-year-old male patient reported to the department of prosthodontics, SIBAR Institute of Dental Sciences, Guntur, with a chief complaint of inability to chew and altered speech. On examination, patient was completely edentulous and presented with anAramany's class 1 defect on maxillary arch (figure 1)[9]. Patient history revealed that he had been treated for a well differentiated squamous cell carcinoma nine years back with a partial excision of the upper left maxillary bone (figure 2). The patient's existing obturator had been fabricatedimmediately after the surgery and the patient was not satisfied with the prosthesis. Various treatment options were given and patient opted for a closed hollow bulb obturator.

III. Clinical and Laboratory Procedures

Primary Impressions: An edentulous stock tray was selected according to the configuration of the remaining maxilla. Impression compound was used to modify the boundaries of the stock tray to include all the areas of the defect. The undercuts of the defect were blocked out using gauze lubricated with petrolatum. An irreversible hydrocolloid impression material was mixed and loaded on to the tray, allowed to set and later retrieved (figure 3). For the mandible, an edentulous stock tray was used and impression was made using impression compound.

Diagnostic cast and custom tray: The impression was poured using dental stone and a diagnostic cast was obtained (figure 4). The cast was then used to fabricate the custom tray. The undesirable undercuts in the cast were blocked out using wax. Relief was provided using spacer wax and custom tray was fabricated with tray acrylic resin(figure 5).

Border molding and secondary impressions: The extensions of the tray were verified in the mouth and were adequately re-contoured. Green stick compound was used for the border molding procedure. The molding was done on the un-resected side first in order to stabilize and properly orient the tray. All the necessary functional movements were carried out during the recording. The secondary impression was made using an irreversible hydrocolloid impression material(figure 6). Beading and boxing of the impression was done and master casts were poured with type III dental stone (figure 7). The maxillary master cast was duplicated and a wax pattern was fabricated on the refractory cast for a metal denture base using Co-Cr alloy (figure 8).

Jaw relation records, teeth setting and try-in: The jaw relation records were taken in the conventional manner with wax rims on record bases and teeth arrangement was done. During the try-in stage, the centric relation, vertical dimension and esthetics of the prosthesis were verified (figure 9).

Hollow bulb fabrication: The hollowing of the maxillary prosthesis was done using thermocol balls. Initially, a layer of heat cure poly methyl methacrylate acrylic material is placed and adapted on the defect region and the balls were stuffed covering the entire defect (figure 10). Later, another layer of the acrylic material was placed on top of balls and defect was sealed (figure 11).The remaining acrylic material was placed in to the mold and flasking procedure was done. The dentures were processed in a conventional manner. The advantages of using thermocol balls are light weight and no need to retrieve them after processing.

Insertion and follow up: After processing, the dentures were finished and polished (figures 12,13). Since the undercuts were blocked during processing of dentures, a silicone soft liner was used to reline the prosthesis to aid in retention (figure 14). Patient was instructed to maintain oral hygiene, follow up and periodic recall was done at regular intervals as per the protocols.

IV. Discussion

It is challenging for a prosthodontist to rehabilitate the edentulous patient with an acquired maxillary defect. In the absence of teeth, engagement of the soft tissue undercuts, including the lateral scar band at the skin graft-mucosal junction, play a very significant role in the retention of the denture. The tissues surrounding the defect are subjected to continuous stresses from such large, heavy obturators, affecting the health of the tissues and compromising the patient function and comfort. Thus, reduction in weight of the obturator is an important consideration in improving the retention and stability, support, patient comfort and oral hygiene.The quality of retention of the prosthesis is dependent on the following factors, in addition to the development of good muscular control: (1) the size of the surgical cavity, (2) the availability of tissue undercut around the cavity and (3) indirect and direct retention provided by any remaining teeth[10-11]. The main retentive regions are the fibrous tissue scar bands in the buccal sulcus, the rolled edge of the palatal remnants, and the base of the nasal mucosa of the nasal septum. The nares may not provide adequate retention for the definitive obturator prosthesis if the bone support has been removed[12]. In completely edentulous patients, since the support is taken only from the remaining bone, it is always essential to take care of what is remaining than what is lost. The stabilization of the obturator bulb and its intimacy with the soft tissues that line and surround the defect are thought to minimize adverse effects such as nasal leakage and hypernasal speech[13]. The disadvantages of an open type of obturator are difficult to clean and polish the internal surface from saliva, mucous secretions, emit odor, bulky.

The selection of hollow design was primarily based on several advantages like,
• More comfortable and efficient due to reduced weight.
• Lightness improves retention and physiological function so that teeth and supporting tissues are not stressed Un-necessarily.
• Reduced self-consciousness of wearing a prosthesis.
• Reduced pressure on the surrounding tissues, aids in deglutition.
• Does not cause excessive atrophy and physiological changes in muscle.

The prosthetic rehabilitation was aimed at retrieving the form, function and esthetics of the patient, enable him lead a normal life.

V. Conclusion

The rewarding area of prosthodontics is the rehabilitation of patients with acquired maxillary defects. We have to extend our horizon and update our knowledge on the current methodologies of treatment options to satisfy the patient's need. In this clinical report, an innovative and simple technique has been described for the fabrication of closed hollow bulb obturator using thermocol ballswhich does not require any additional equipment's or time-consuming steps.

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Figures

Fig 1: Patient intra-oral view of defect

Fig 2: CT scan of patient intra-oral defect

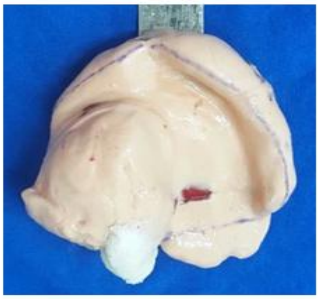

Fig 3: Primary impression

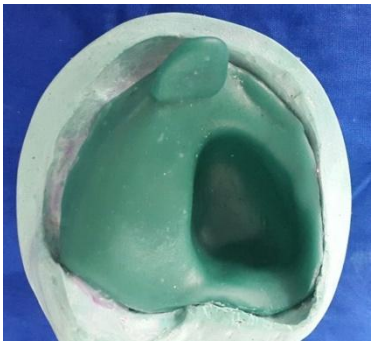

Fig 4: Primary maxillary castFig 5: Special tray Fig 6: Final impression after border molding


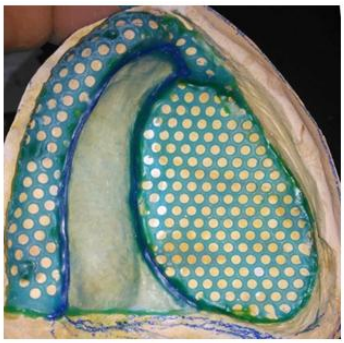


Fig 7: Secondary cast poured using die stone **Fig 8:** Wax pattern adaptation for metal substructure **Fig 9:** Try-in of the dentures


Fig 10: Stuffing of thermacol balls for hollowing**Fig 11:** Sealing of the defect



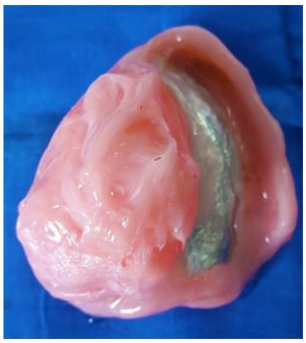

Fig 12: Finished denture**Fig 13:** Tissue surface of finished denture**Fig 14**: Relining of denture with soft liner

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