

Cast Retainer Hollow Bulb Obturator for a Maxillary Defect -A Case Report

Ashish. R. Jain *, Jacob Mathew Philip, R. Pradeep, C. J. Venkata Krishnan, Narasimman. M

Department of Prosthodontics, Tagore Dental College and Hospitals, Chennai, India

*Corresponding author: dr.ashishjain_r@yahoo.com

Received November 12, 2014; Revised November 24, 2014; Accepted November 30, 2014

Abstract One of the most rapidly growing areas of dentistry of both interest and need is maxillofacial prosthetics. Malignant tumours of the upper gum and hard palate account for 1-5% of malignant neoplasms of the oral cavity; two thirds of the lesions which involve these areas are squamous cell carcinomas. Most of these carcinomas are diagnosed late, when they invade the underlying bone. The procedures of choice for removal are: alveolectomy, palatotomy, maxillectomy, which may be total or partial. Still the rehabilitation of these patients is a daunting job. Rehabilitating patients with maxillofacial defects is one of the most difficult therapies of the stomatognathic system. Factors that affect the management of maxillary defects are the presence of teeth, amount of remaining support area and defect characteristics. When these factors are not favorable and negatively impact the treatment outcome, then successful prosthetic management of the defect becomes more challenging. For good prognosis, sufficient retention of the prosthesis is a prerequisite. Simultaneously, the prosthesis should be comfortable to the supporting and surrounding tissues, which have undergone surgery. This article presents case of a Maxillary defect (Aramany class III-Central resection) patient, where rehabilitation is carried out with a Cast partial hollow bulb obturator, which is light in weight and aids in better retention and comfort of the patient.

Keywords: Cast retainers, Aramany Class III, hollow bulb obturator prosthesis, prosthetic rehabilitation

Cite This Article: Ashish. R. Jain, Jacob Mathew Philip, R. Pradeep, C. J. Venkata Krishnan, and Narasimman. M, "Cast Retainer Hollow Bulb Obturator for a Maxillary Defect -A Case Report." *International Journal of Dental Sciences and Research*, vol. 2, no. 6 (2014): 164-167. doi: 10.12691/ijdsr-2-6-11.

1. Introduction

Maxillofacial defects may be a result of congenital malformations, trauma or surgical resection of tumors. The primary objective of rehabilitating these defects is to eliminate the disease and to improve the quality of life for these individuals. Among various maxillofacial defects, intra oral defects in the form of clefts and opening into the palate are very common. Several methods have been advocated for reconstructing these defects. The use of an obturator prosthesis is one of them [1]. According to the glossary of prosthodontic terms obturator is defined as prosthesis used to close a congenital or an acquired tissue opening, primarily of hard palate and or contiguous alveolar structures. The name obturator is derived from the Latin verb "obturare" which means close or to shut off ² Effective obturation of maxillary defects produces sufficient separation of the oral and nasal cavity to improve the quality and intelligibility of speech. It also enhances masticatory function, deglutition and esthetics. The weight of maxillary obturator prosthesis is often a factor to be considered with respect to retention and comfort of the patient. Hence it is desirable to design light weight prosthesis. Prosthetic intervention should occur at the time of surgical resection and will be necessary for the remainder of the patient life. This clinical report describes

the fabrication of Cast retainer hollow bulb obturator prosthesis for a patient with a Aramany Class III Maxillary defect [3,4,5,6].

2. Case Report

A 29-year-old male patient reported to the Department of Prosthodontics with a defect in the posterior centre of the hard palate (Figure 1). The patient was referred from the oncology department after being diagnosed for SCC (T3n0M0) involving the hard palate on the median line and infiltration of the floor of the nasal fossa, the third anterior inferior of the nasalseptum and the columella. Prior to surgery, a stomatological evaluation was carried out to prepare the obturator prosthesis. Later, a paralateronasal approach was taken for inferior median maxillectomy, resection of the nasal septum involved and the area of the columella, opening up the area between the oral cavity and the floor of the nasal fossas. During surgery, a stomatological re-evaluation was made in order to obtain an impression of the defect to be treated with prosthetic rehabilitation.

3. Procedure

Diagnostic impressions of maxillary and mandibular arches were made with irreversible hydrocolloid for the

fabrication of a pre surgical obturator, which could act as a surgical stent. The patient was then operated and the tumor was resected. The surgical resection included a centre part of the palate and the following teeth were missing 14,15,26,27. The surgical obturator was worn for a period of 7 days, following which the patient was given a series of interim obturators until a satisfactory healing of the tissues was achieved, after which definitive obturator prosthesis was planned for the patient.

4. Definitive Prosthesis

A perforated stock tray was selected for making the preliminary impression. The stock tray was modified using impression compound corresponding to the area of the defect. The primary impression of the maxillary arch is made with irreversible hydrocolloid, after blocking the defect area using wet cotton. The lower impression is also made at the same appointment using the same material. The primary casts were surveyed and the necessary mouth preparation was performed on the patient before making secondary impression. A custom tray was fabricated with autopolymerizing resin (Acralyn "R" –Asian Acrylates). Border molding was done to record the functional depth and width of the labial and buccal soft tissues, surrounding the defect using green stick compound. The final impression of the defect was made with light body

material (Aquasil LV -Dentsply-USA). A pick up impression of the remaining natural teeth were made using alginate (Figure 2). The master cast was poured in type IV stone (Figure 3). The block out of the master cast is done using wax. This will provide sufficient thickness of the acrylic material for the strength of the obturator and makes the mold space for construction of the future prosthesis (Figure 4). Cast partial denture design of the prosthesis was finalized and the framework was fabricated (Figure 5). Then the framework was tried in the patient's mouth to check for the fit. At this stage a denture base was fabricated and the jaw relations were recorded. The missing teeth were arranged and try in procedure was performed.



Figure 1. Intraoral view of the defect

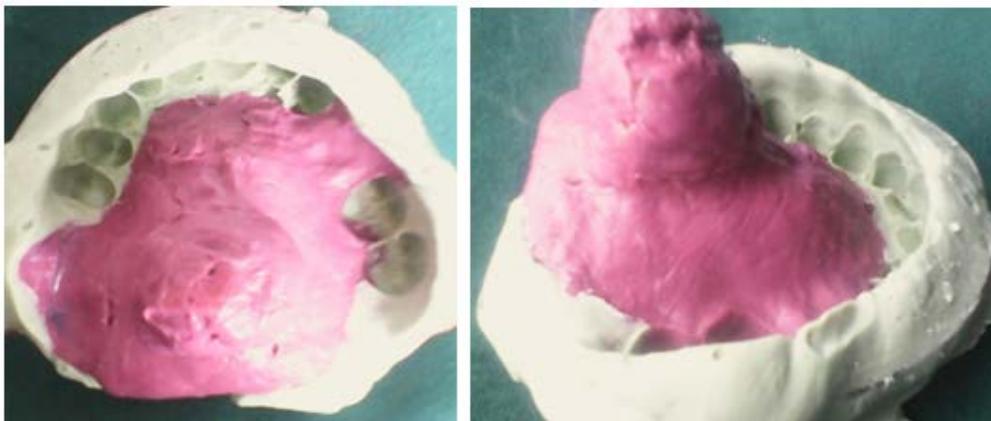


Figure 2. Final impression of the maxillary arch



Figure 3. Occlusal view of the master cast

5. Fabrication of the Hollow Bulb

The trial denture was then sealed to the master cast. After application of the separating media on the cast, the counter portion was poured. Since the defect area was too large, a conventional flask could not be used. Hence the base portion of the cast as well as the counter portion was made thicker using boxing wax. This was followed by the dewaxing procedure. After separation of the counter parts, a layer of modeling wax was adapted in to the defect area, which provided the space for heat cure resin to flow between the bulb and the defect portion of the cast. Three tissue stops were created in the wax which prevented the tissue ward movement of the prosthesis in to the defect. Auto polymerizing clear acrylic resin was adapted over the wax to fabricate a shim. The wax was eliminated and the shim was filled with sugar crystals. A lid was made

and sealed to the shim to make it a bulb. A small escape vent was created in the bulb using a straight fissure bur. It was then placed in a bowl of water to dissolve the sugar crystals. Hence making the bulb hollow. The hollow bulb was placed back into the defect. A clearance of 1mm was seen between the outer layer of the bulb and the defect, which was to be occupied by the heat cure resin. The framework and the bulb were placed back on the cast and checked for any interference. Following this separating medium was applied on to the cast and the counter portion. Heat cure resin was adapted into the defect area after which the hollow bulb and the framework were placed

back into their respective position on the cast. The heat cure resin was also packed into the mould space and the two parts were clamped. Together this unit was subjected to the regular curing cycle. Following deflasking procedures, the prosthesis was trimmed, finished, polished. The prosthesis was then inserted into the patient's mouth after minor corrections (Figure 6). Post insertion instructions were given and the patient was informed how to use the prosthesis. The patient was called after 24 hours for the check up. Recall visits were also scheduled after 1 week, 1 month, 3 and 6 months.



Figure 4. Wax pattern for the framework



Figure 5. Cast partial framework

6. Discussion

Generally, the palatal obturator is used as a simple reconstruction solution for minor palatal defects, while larger maxillary palatal defects represent a challenge for functional and aesthetic reconstruction in both solutions. The obturator prosthesis offers several advantages, which include the possibility to immediately restore dentition without need of further surgery and enables the residual cavity to be kept under control in case of recurrences of the disease [7,8,9]. On the other hand, the flap composed of vascularised bone provides permanent closure of the oral nasal passage with an osteointegrated implant, but as reported by Cordeiro et al, there are systemic complications in 11.7% of the patients and in 9.1% re-exploration is necessary because the vessels of the free

flap are compromised with partial necrosis in 1.8% [10,11]. Various techniques for making hollow bulb obturators have been suggested and many materials for obturation of the defect have been tried. Parel and La Fuede filled the hollow part of the obturator with sugar and covered it with acrylic resin. The sugar was later removed by making an opening in the acrylic lid [12]. Elliotts used clay instead of sugar, which was later removed in the same fashion [13]. El Mahdy introduced fabricating of hollow bulb obturator using two flasks technique [14]. Challian and Barnett used a double flask technique to construct one piece hollow obturator [15]. Aaron Schneider used crushed ice to fill the defect, which was covered by acrylic resin. Once the resin was processed, openings were made on acrylic lid to drain the water, which were later sealed with autopolymerizing resin [16]. Ashok Jhanji and Steve T Stevens presented a technique to make a one piece obturator using silicone putty [17].

A Cast partial hollow bulb obturator was fabricated for the patient mentioned in this case report. After surgical resection, the defect could be categorized under Armany class III situation. Based on this the cast partial framework was designed with the required components. The regular complete palate major connector was Fabricated in order to achieve a greater support from the palate, as the defect was large. The metal framework provided good retention, support and stability. The longevity of the prosthesis could be attributed to the strength of the metal. Further, the thermal conductivity of the metal made it sensitive to the temperature changes and the patient showed better functional acceptance to the prosthesis. A hollow bulb design for the obturator was chosen in order to reduce the bulk of the prosthesis which in turn made it light weight and more comfortable for the patient. The hollow bulb further added resonance, thus improving the clarity of the speech. The present prosthesis not only improved the

speech and function but also provided better comfort for the patient.



Figure 6. Insertion of cast partial hollow bulb obturator prosthesis

7. Conclusion

The present case report showed the prosthetic rehabilitation of a Aramany class III maxillary defect patient using a Cast retainer hollow bulb definitive

obturator. It involved the fabrication of a cast partial denture framework onto which a hollow bulb prosthesis was made. The prosthesis rehabilitated the patient in terms of function by providing better masticatory efficiency, phonetics by adding resonance to the voice hence improving the clarity of speech and also improved the esthetics of the patient. The use of a hollow bulb design improved the comfort of the patient by decreasing the weight of the prosthesis.

References

- [1] Beumer J, Curtis T, Marunick M. Maxillofacial rehabilitation: prosthodontic and surgical considerations. St Louis: Ishiyaku EuroAmerica, Inc.; 1996:240-285.
- [2] Lapointe HJ, Lampe HB, Taylor M. Comparison of maxillectomy patients with immediate versus delayed obturator prosthesis placement. *J Otolaryngol.* 1996; 25: 308-312.
- [3] Lang BR, Bruce RA. Presurgical maxillectomy prosthesis. *J Prosthet Dent.* 1967; 17: 613-619.
- [4] Aramany MA. Basic principles of obturator design for partially edentulous patients. Part I: Classification. *J prosthet dent.* 2001; 86(6): 559-561.
- [5] Aramany MA. Basic principles of obturator design for partially edentulous patients. Part II: Design principles. *J prosthet dent.* 2001; 86(6): 562-568.
- [6] Gregory RP, Gregory ET, and Arthur OR, Prosthodontic principles in the framework design of maxillary obturator prostheses. *J Prosthet Dent* 2005; 93: 405-411.
- [7] Shaker KT. A simplified technique for construction of an interim obturator for a bilateral total maxillectomy defect. *Int J Prosthodont.* 2000; 13: 166-168.
- [8] Yoav Grossmann, and Igal Savion. The use of a light polymerized resin-based obturator for the treatment of the maxillofacial patient. *J Prosthet Dent* 2005; 94: 289-292.
- [9] Mark A. Pigno, Conventional prosthetic rehabilitation after free flap reconstruction of a maxillectomy defect: A clinical report. *J Prosthet Dent* 2001; 86: 578-581.
- [10] Won-suck Oh and Eleni D. Roumanas. Optimization of Maxillary Obturator Thickness Using a Double-Processing Technique. *Journal of Prosthodontics.* 2008, 17: 60-63.
- [11] Cordeiro Pg, Santamaria E. A classification system and algorithm for reconstruction of maxillectomy and midfacial defects. *Plast reconstr Surg* 2000; 105: 2331-46.
- [12] Parel SM, La Fuente H. Single visit hollow obturators for edentulous patients. *J Prosthet Dent* 1978; 40(4): 426-9.
- [13] Elliott DJ. The hollow bulb obturator: Its fabrication using one denture flask. *Quintessence Dent Technol* 1983; 7(1): 13-4.
- [14] El Mahdy AS. Processing a hollow obturator. *J Prosthet Dent* 1969; 22(6):682-6.
- [15] Chalian VA, Barnett MO. A new technique for constructing a one-piece hollow bulb obturator after partial maxillectomy. *J Prosthet Dent* 1972; 28(4): 448-53.
- [16] Schneider A. Method of fabricating a hollow obturator. *J Prosthet Dent* 1978; 40(3): 351-3.
- [17] Jhanji A, Stevens ST. Fabrication of one piece hollow obturators. *J Prosthet Dent.* 1991; 66(1): 136-138.