



PROSTHETIC MANAGEMENT OF HEMI MAXILLECTOMY DEFECT WITH HOLLOW BULB OBTURATOR- A CASE REPORT

Mahinder Dubasi	Post Graduate student, Department Of Prosthodontics, Mamata Dental College, Khammam.
Sujesh Macha	Professor, Department Of Prosthodontics, Mamata Dental College, Khammam.
Ravikumar Chitturi	Head and Professor, Department Of Prosthodontics, Mamata Dental College, Khammam.
Chalapathi Rao Duggineni	Professor, department of prosthodontics, Mamata Dental College, Khammam.

ABSTRACT 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. The prosthodontic rehabilitation of patients with acquired defects of the maxilla after surgical resection is the complete responsibility of a maxillofacial prosthodontist. He has to recreate an artificial barrier between the cavities and thus restore the functional capabilities of speech, mastication and swallowing. This clinical report describes the rehabilitation of a patient with acquired maxillary defect using heat polymerizing acrylic resin hollow bulb obturator.

KEYWORDS : Obturator, Hollow bulb, Maxillofacial prosthesis, palatal defect, prosthetic reconstruction

INTRODUCTION

The restoration of esthetics and function in patient with gross defects of the maxilla is a valuable and often dramatic service provided by maxillofacial prosthodontist. The primary objective in each case is to construct a prosthesis which will restore the defect, improve aesthetics and thereby benefit the morale of patient¹. Effective obturation of maxillary defects produces sufficient separation of the oral and nasal cavity to improve the quality and intelligibility of speech². 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^{3,4}. Hence it is desirable to design light weight prosthesis. The hollow bulb obturator design is an aid to improve the retention and the resonance of voice as it is light in weight.

This clinical report describes the fabrication of hollow bulb obturator prosthesis for a patient with a maxillary defect after undergoing partial maxillectomy procedure.

CASE REPORT

A 65 year old male patient reported to the Department Of Prosthodontics, with a chief complaint of dislodging prosthesis leading to difficulties in speech and chewing. Personal history revealed that he had undergone surgery for a maxillary tumor that was done 4 years ago. He was wearing a simple prosthesis with little extension into the defect (fig 1). His existing prosthesis was fractured and he had difficulty in eating, drinking, nasal regurgitation of fluids and difficulty in speech as there was nasal twang in his voice. Extraoral examination revealed a large defect (fig 2) with reduced fullness due to loss of support depressed nasal septum and collapsed middle third of the face. On intraoral examination revealed the presence of Armany's class I maxillary defect on left side with complete healing of the operated site⁵. The teeth present were 11,12,13,14 and the missing teeth are 15,16,17,18. The old existing dentures were compromised in retention and stability due to under extended borders along with severe occlusal wear. By considering the large size of the defect and complaints about previous prosthesis it was planned for removable over denture prosthesis to replace missing teeth along with defect. (obturator)



FIG (1) Pre operative

FIG (2) Defect area

STEPS USED FOR ENHANCING THE RETENTION OF THE PROSTHESIS

1. **Utilization of existing maxillary teeth for retention** (conversion to over denture abutments)
2. **To decrease the weight of the prosthesis** (Hollow bulb obturator)
3. **To utilize undercuts which are present within the defect** (with the help of soft liner)
4. **Technique for construction of a hollow bulb obturator**

After thorough oral prophylaxis, all undesirable undercuts were blocked using a piece of moist gauze to prevent intrusion of the material into the nasal cavity and preliminary impression were made using irreversible hydrocolloid impression (Algitex; Dental Products of India Limited, Mumbai, Maharashtra, India) Diagnostic cast was poured in type III stone (; Industries, Mumbai, India). A custom tray was fabricated using autopolymerising resin. The remaining teeth present in the maxillary arch were intentionally root canal treated (fig 3) and metal copings were placed in order to enhance the retention of the prosthesis.(fig 4) (Rapid Repair; Dentsply, INDIA) Border moulding was done using low fusing compound (DPI, Dental Products of India Limited, Maharashtra, India) to record the functional limit of surrounding soft tissue as well as the extension into the defect. Final impression was recorded with a single step impression technique using monophasic elastomeric impression material. The impression was then boxed and poured in type IV stone.

A temporary record base extending onto the surface of the defect was fabricated using auto polymerizing acrylic resin on the master cast. Occlusal rims were fabricated and jaw relations were recorded by face bow transfer and mounting done to semi adjustable articulator at predetermined vertical dimension followed by teeth arrangement. (fig 5) The wax prosthesis was verified at the trial insertion appointment. This was then invested and wax was eliminated to create a mould space which was replaced by heat polymerizing acrylic resin (DPI; Dentsply, INDIA).



FIG (3) Root canal treatment done on existing teeth

FIG (4) Metal copings placed after tooth preparation



FIG (5) Face bow transfer

PREPARATION OF THE LID

The lid portion was waxed separately prepared by placing modelling clay in defect area (fig 6) keeping in mind the contours of the palate and was fused to the prosthesis using auto polymerizing acrylic resin (Fig 7). This reduces the weight of the prosthesis (fig 8,9) Undercuts which are present within the defect were also used to enhance the retention (with the help of soft liner). A **soft liner** is fitted between the surface of a denture and underlying oral tissues. It absorbs shock between the hard base of denture and underlying tissues and it also helps in utilising the anatomic undercuts which improves the retention and stability of the prosthesis.(fig 10)

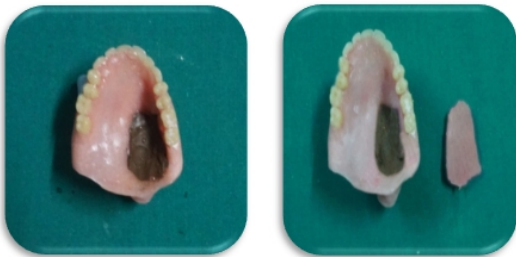


FIG (6) Modeling clay placed in defect area placed

FIG (7) Preparation of the lid



FIG (8) Lid attached using self cure resin

FIG (9) Decreased weight of the prosthesis

The prosthesis was finished, polished and placed intraorally using rotational path of insertion. Prosthetic retention and stability were evaluated. Patient was instructed on home care and prosthesis maintenance. The patient was scheduled for the first post insertion adjustment 24 h and 1-week after the insertion. This was scheduled to ensure health of the tissues, to relieve the prosthesis from pressure areas on the tissues and to emphasize hygiene and home care. The patient reported satisfaction with the outcome of the treatment (fig 11,12). The patient was placed on a 3 months recall for evaluation of the prosthesis and any recurrence of the disease.

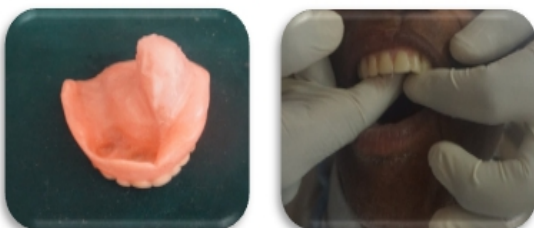


FIG (10) Soft liner application to enhance retention



FIG (11) Pre operative

FIG (12) Post operative

DISCUSSION

The most common of all acquired defects are in the maxilla, in the form of an opening into antrum and nasopharynx.

For the rehabilitation of the maxillectomy patient, the prime primary objectives are :

- To restore the functions of mastication, deglutition, and speech
- To achieve normal orofacial appearance
- The rehabilitation of a maxillary defect involves a multidisciplinary approach. For the proper function the obturator needs to be well retained and stable inside the defect. Various means of retaining the prosthesis has been reported in the literature.⁶ However, the design of the prosthesis depends on the volume of the defect, residual anatomic structures, remaining natural teeth and the economic status of the patient. With the advent of implants lot many cases of prosthetic rehabilitation after maxillectomy are being carried in the recent times.⁷ Lack of retention, stability and support are common prosthodontic treatment problems for patients who have had a maxillectomy.⁸
- Here the patient's main concern was dislodging of the existing prosthesis. So the retention, stability and support can be increased by the support from the remaining natural teeth (if present), and also from the existing defect.
- The teeth are the greatest asset for providing retention of the Obturator prosthesis.

The only concern in the fabrication of acrylic obturator is the weight of the prosthesis in case of large surgical defect. Studies conducted by Wu and Scaaf reported that hollowing the prosthesis reduced the weight of the obturator by 6.55–33.06%.⁹ Furthermore, the weight of the prosthesis may act as a dislocating force. Hence a hollow bulb obturator was planned. Hollow bulb obturators are lighter in weight and improve the resonance of voice. Cast partial dentures are lighter in weight and do not pose problems to the health of the gingiva and supporting tissues.¹⁰

In the present case the patient wanted a more esthetic appliance without the metal, though the metal was not in the esthetic zone. So heat polymerizing acrylic resin was used as an alternative. The heat polymerizing acrylic resin is easy to fabricate and adjust, esthetic, light in weight and cost effective which together met the patient needs. The method used in the fabrication of the hollow bulb obturator involved two step procedures in which the obturator bulb and lid were processed separately and then joined together. There are a variety of techniques that can be used to form a one piece hollow bulb obturator^{11,12}. The classic technique used previously involved the fabrication of a solid complete bulb. This was then modified to grind out the excess portion to make it hollow which was then followed by fabrication of a covering for the space that was ground out. A modification of this is to shim the defect of the cast and simulate the ridge contour using wax. A template for the covering is also fabricated out of wax. Both are then processed and attached ultimately using auto polymerizing acrylic resin. Materials like sugar and ice were also used for authors to create the hollow space. In a few cases a removable lid has also been tried.^{13,14} However, the point of concern is the uniform wall thickness of the hollow bulb. The technique used in this case report is a modification of the laboratory technique to bring out uniform thickness of the walls of the obturator using easily available and cost effective materials which is less time consuming as well.

CONCLUSION

The procedure followed in this report has the advantage that the closed hollow bulb obturator could be fabricated with onetime processing,

therefore reducing laboratory time while maintaining the obturator's light weight and cleanliness. This technique could also provide an obturator that promotes a good seal and is completely covered with heat-cured acrylic resin. The fabrication of obturator prosthesis in two parts and joining them with an auto polymerized acrylic resin making inside the bulb a hollow space reduces the weight of obturator prosthesis significantly. This reduced weight of prosthesis gives the patient better comfort as the retention, stability and support of the prosthesis is improved.

REFERENCES

1. Beumer J, Curtis T, Marunick M. Maxillofacial rehabilitation: prosthodontic and surgical considerations. St Louis: IshiyakuEuroAmerica, Inc.; 1996. p.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. Tanaka Y, Gold HO, Pruzansky S. A simplified technique for fabricating a lightweight obturator. *J Prosthet Dent.* 1977; 38:638-642.
4. Robert L, over dentures, *Essentials of complete denture prosthodontics*, second edition, Sheldon Winkler(2000). 384-403.
5. Mohamed A. Aramany, Basic principles of obturator design for partially edentulous patients. Part I: Classification. *The journal of prosthetic dentistry*, 1978; 40 (5), 554-557.
6. Antoniou DV, Toljanic JA, Graham L. Obturator prosthesis retention for edentulous patients with large palatal defects: A clinical report. *J Prosthet Dent* 1996; 76:227-9.
7. Keyf F. Obturator prostheses for hemimaxillectomy patients, *Journal of Oral Rehabilitation.* 2001; 28: 821-829.
8. Aydin C, Delilbasi E, Yilmaz H, Karakoca S, Bal BT. Reconstruction of total maxillectomy defect with implant-retained obturator prosthesis. *N Y State Dent J* 2007; 73:38-41.
9. Wu YL, Schaaf NG. Comparison of weight reduction in different designs of solid and hollow obturator prostheses. *J Prosthet Dent* 1989; 62:214-7.
10. Thota KK, Tella S, Avinash A, Ravuri R. A prosthodontist rehabilitation of a partial maxillectomy patient with hollow bulb obturator. *IJDA* 2010; 2: 383-6.
11. Chalian VA, Drane JB, Standish SM. *Maxillofacial Prosthetics Multidisciplinary Practice-Intraoral Prosthetics.* Baltimore: The Williams and Wilkins Company; 1971. p. 133-57.
12. Singh BK. A Simplified Technique for Constructing One Piece Hollow Obturator after Partial Maxillectomy. *Intl. J Prostho and Restor Dent.* 2011; 1:118-22.
13. Matalon V, LaFuente H. A simplified method for making a hollow obturator. *J Prosthet Dent* 1976; 36:580-2.
14. Schneider A. Method of fabricating a hollow obturator. *J Prosthet Dent* 1978; 40:351. 24. Phankosol P, Martin JW. Hollow obturator with removable lid. *J Prosthet Dent* 1985; 54:98-100.