

Hollow bulb magnet retained two piece maxillary obturator prosthesis rehabilitation: A simplified approach

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Abstract

Malignancies and fungal infection are common in oral region which are most frequently treated through surgical intervention although there are many treatment modalities depending upon type, severity, size and etiology. Acquired maxillary defects resulting from these surgical interventions may cause major difficulties with speech, swallowing, mastication appearance etc.

Smaller defects can be surgically repaired using microvascular or pedicled flaps, but when there are large resections of maxilla, the defect may be obturated with dental or maxillofacial prosthesis.

Obturator allows the patient to eat or drink food without the fear of food entering the oral cavity. This case report describes about the comprehensive treatment of a patient diagnosed with mucormycosis, surgically treated for the same with a partial maxillectomy and the successful rehabilitation of the patient with a definitive two piece hollow obturator prosthesis retained with embedded magnets.

Keywords: Hollow bulb obturator, magnet retained prosthesis, maxillary defect.

Case report

A 54 year old partially edentulous male patient was referred to the department of prosthodontics with a chief complaint of difficulty in speech and mastication and with a past medical history of diabetes mellitus. He was affected by rhinocerebral mucormycosis followed by diabetic ketoacidosis. The patient had then undergone partial maxillectomy 1 ½ months before for the debridement of the same. Therefore there was an open communication between the oral and nasal cavities altogether extending upto the orbital floor. The defect was a Aramany’s class IV defect associated with depressed cheek, nasolabial fold and lack of lip support.

Initial healing had already taken place and the patient was then given an interim obturator prosthesis fabricated as a single unit prosthesis with auto polymerizing resin. The patient was then recalled after 24 hrs, final adjustments were made until the patient was satisfied and mentioned improvement in speech and mastication.

Around six months after the surgery, the surgical site was completely healed and dimensionally stable . **(figure 1)**. So the patient was then planned for a definitive obturator prosthesis which was needed. One drawback in the interim prosthesis delivered to him earlier was that the patient experienced mild difficulty in removing and inserting the obturator prosthesis as it was fabricated as a single unit prosthesis. So now a two-piece hollow bulb obturator was planned to be designed which were reinforced with magnets for additional retention.

Technique

All the undercuts were blocked using a wet gauze and the defect area was moulded using a low fusing impression compound (DPI pinnacle, tracing stick, Dental products of India, Mumbai.). **{figure 2}**

Maxillary and mandibular primary impressions were made with irreversible hydrocolloid (Tropicalgin, Zhermack) and poured with type 3 gypsum product dental stone (kalabhai, kaldent) to obtain diagnostic casts.

The primary cast was then surveyed on a surveyor and the framework was designed. Because only a few posterior teeth were remaining located in a relatively straight line it included a linear obturator design following the principles of Aramany's class IV obturator design with the following components: Embrasure clasps in relation to 15, 16 ; 17,18 and modified complete palatal type of major connector extended till palatal surfaces of teeth. Retention in this is problematic, thus a mixture of buccal retention in premolars and palatal retention in molars is used due to reduced posterior occlusion{size and number of teeth} Support is provided by double mesio-occlusal and disto-occlusal rest on the remaining teeth. Mesial surface of 15 was also prepared to act as a guiding plane.{figure 3} Mouth preparation was done before making final impression with polyvinylsiloxane impression material { zetaplus putty (zhermack) bharti dent ,new delhi}and

master cast was then poured in die stone (kalabhai, Ultrastone). One variation in this approach was that the hollow bulb was fabricated first from the diagnostic cast and an pick up impression was made along with the hollow bulb in its place,this was done to attain a proper fit between the bulb and obturator plate and to avoid any marginal surface hindrances that would disrupt a proper fit between the two. Wax pattern was adapted on refractory cast and casting of metal framework was carried out. Trial of finished and polished framework and needed adjustments were done.

Jaw relation was recorded and transferred to a semiadjustable articulator (Hanau Wide Vue Articulator) . **{figure 4}**

Teeth were arranged on the metal framework, and wax try-in was carried out over the cured bulb portion which was found to be satisfactory.

After wax try in,waxed up obturator was processed conventionally upto flasking and dewaxing,then here we used double flask,double body pour lost salt technique for the fabrication of the hollow obturator plate. **{figure 5}**

The hollow bulb obturator was first placed , then the cast partial denture framework withn the prosthetic teeth was then tried In patient's mouth, and evaluated for extension ,retention,stability,occlusion and phonetics.

Cobalt samarium magnets of 4mm dimension were placed over the tissue side of cast partial denture framework and the corresponding pair was fixed on the obturator using autopolymerizing acrylic resin (DPI,india). **{figure 6}**

The retention was excellent with magnetic keepers the obturator was subsequently relined with permanent soft liner (Permasoft) to completely obturate the lateral defects.**{figure 7}**. Patient was reviewed periodically for 12 months and he experienced great comfort, enhanced mastication and phonetics with the prosthesis.

Discussion

Acquired maxillary defects due to various etiologic factors pose a great challenge to the clinician. These maxillectomy patients suffer from functional as well as facial deformity especially a severe deficit in the masticatory and phonetics function. Salvaging teeth during the surgical procedure reduces the number of occlusal units in the oral cavity and significantly hampers masticatory efficiency [6]. It also substantially compromises pronunciation of words which occurs in the form of nasal twang and increased cubicle space resulting in poor articulation with linguodental and linguopalatal consonants [7]. In addition, regurgitation and transportation of food and fluids from the oral cavity to nasal cavity via the defect cause severe discomfort to the patient.

The primary goal of the treatment of such patient is to rehabilitate with such prosthesis that seals the defect and separates the oral cavity from the sinonasal cavities, however the size and location of the defect influence the degree of impairment and difficulty in prosthetic rehabilitation. Maxillary obturator prosthesis is the most accepted treatment modality than surgical reconstruction due to ease of fabrication and maintenance.

Bulb extension is required to improve speech after providing resonance. It tremendously improves the quality of voice as it completely seals the lateral palatal defect as well as the maxillary defect. One of the problems associated with oromaxillary obturator is insertion of the prosthesis due to compromised anatomic morphology in different planes [9]. Hence it is mandatory to design an obturator in two sections wherein the obturator is inserted initially followed by oropalatal metal framework [10]. The two sections are retained together in function as one unit by retentive devices subsequently.

Another problem with maxillofacial obturator is the increased weight of the prosthesis due to the bulk of the resin occupied in the defect area and hence the weight was reduced by fabrication of hollow bulb obturator using lost salt technique [13]

Among the various retentive devices available to secure the two pieces in position, the magnetic attachments are more user friendly and cost effective when compared to internal attachments which required extreme precision and good neuromuscular coordination from the patient to insert and use the prosthesis.[11] Cobalt samarium magnets undergo less corrosion when compared to conventional iron boron magnets hence the former were selected for the Case. The disadvantage of magnetic attachment is the possible loss of magnetism during function during extended period of time. But they can be magnetized with reasonable ease [12].

The hollow bulb obturator in the defect which is subsequently relined with a soft liner greatly enhances the comfort of the patient as it is flexible and protects the integrity of the adjoining moving tissues. A proper maintenance regimen with chlorhexidine mouth wash and a comprehensive education on the manipulation of the prosthesis increases the success and survival rate of oromaxillary obturator.

Conclusion

This paper discussed the prosthetic management of acquired Oromaxillary defect with a two-piece cast partial hollow bulb definitive obturator with magnetic attachment and tissue liners. The ease of fabrication, reduced time, reduced cost were the added advantages of this technique. The obturator provided to the patient increased function by providing better masticatory efficiency, phonetics by adding resonance, and also improved the esthetics.

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Legend Figures



Figure 1

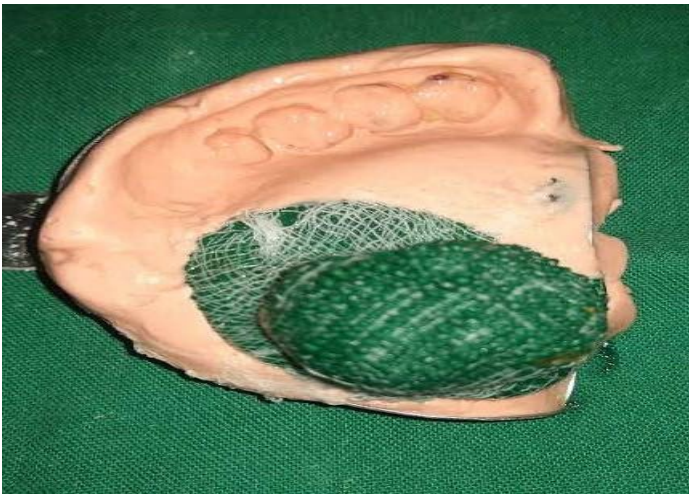


Figure 2



Figure 5



Figure 3



Figure 6



Figure 4

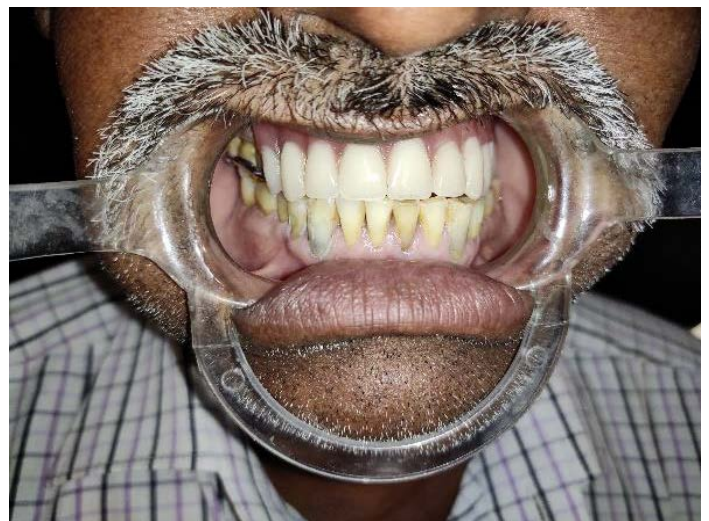


Figure 7