CASE REPORT

A Magnet Retained Two Piece (Open+ Closed) Hollow Bulb Obturator For A Completely Edentulous Patient operated for Maxillary Resection

Poonam Agarwal¹, Rupal J. Shah², Bhavyata J. Darji³, Chirag P. Shah⁴
1, Post graduate Student; 2 M.D.S, Professor and Head; 3, 4, B.D.S, Department Of Prosthodontics, Government Dental College And Hospital, Ahmedabad-380016, Gujarat, India.

Abstract
Obturators and facial prostheses are important not only in rehabilitation and aesthetics, but also in patient re-socialisation. The level of reintegration is directly related to the degree of satisfaction with rehabilitation. So, the maxillofacial prosthetics must provide patient satisfaction during treatment. Maxillary defects are created by surgical treatment of benign or malignant neoplasms and by trauma. Palatal defect of any extent causes multiple problems in speech, mastication and aesthetics. Prosthodontic management of palatal defects has been employed for many years. An obturator prosthesis for an edentulous patient becomes more critical in terms of its movements as there is no mechanical retention available. Denture is supported only by the underlying residual ridge and the defect. This clinical report describes the rehabilitation of maxillary resected patient with a two piece hollow bulb obturator retained with the help of magnets.

Keywords: Two piece (open+ closed) hollow bulb obturator, Magnet

Introduction
Maxillofacial prosthetics is the branch of prosthodontics concerned with the restoration and/or replacement of the stomatognathic and craniofacial structures with prostheses that may or may not be removed on a regular or elective basis¹. These deficiencies may be due to surgical treatment, trauma, pathology, or congenital malformation². Rehabilitation of these deficiencies with an obturator is a predictable intervention as it allows restoration of esthetics and function, such as mastication, deglutition, and speech, by creating an anatomic barrier³. These prostheses vary in size and shape depending on the extent of the defect and should be easily fabricated, lightweight, and provide retention, stability, and patient comfort⁵. By fabricating a hollow maxillary obturator, the weight of the prosthesis may be reduced by up to 33%³.

Numerous references in the literature describe various methods for fabricating open and closed hollow obturator prostheses ⁵, ⁶. Both types of obturators allow for the fabrication of a lightweight prosthesis readily tolerated by the patient, while effectively extending into the defect. Although open hollow obturators are easy to clean, these types of prostheses often collect moisture and require frequent cleaning or placement of a vent to eliminate the collection of moisture in the hollow section. Closed obturators have the advantage of eliminating the pooling of moisture while extending superiorly into the defect and reducing air space. It is more difficult to treat the acquired palatal defects in edentulous patients, as no natural teeth are present to take support from. As per
Aramony\textsuperscript{7} the partially edentulous palatal defect patients are classified as per Kennedy’s classification and are treated successfully by taking support from the remaining natural teeth\textsuperscript{7}. In fully edentulous patients where the support is taken only from the remaining bone, it is always mandatory to take care of what is remaining, while keeping in mind what is lost.

In this clinical report, a magnet – retained hollow bulb obturator with a removable lid combining the benefit of both closed and open hollow obturator is used to restore speech, deglutition, and facial contour of the patient with maxillary resection.

\textbf{Case report:}

The male patient, age 69 years, was referred by GCRI (Gujarat Cancer Research Institution) to the prosthodontic department of GDCH (Government Dental College And Hospital), Ahmedabad, Gujarat, for restoration of maxillary defect created after surgical intervention. The patient’s medical history revealed that the patient had undergone surgery for a maxillary tumour on the left side of the maxilla. On examination, the defect extended from the buccal mucosa to the midpalatine region medially, and anteriorly from the canine region to the posterior extend of the hard palate, involving some part of the soft palate (fig 1).

Patient’s plain and contrast enhanced CT scan shows post-operative changes on left side with partial resection of left side of hard palate, left upper alveolus and defect in floor of left maxillary sinus. No abnormal soft tissue prominence or no abnormal enhancement is seen along the resected margins to suggest any tumour recurrence. The patient presented with an obvious and typical nasal twang and he was experiencing difficulty in speech and deglutition.

On extra-oral examination, it was found that the left half of the patient’s face was disfigured, thereby stretching the left labial and the nasal regions.

\textbf{Treatment plan}

It was clearly evident that the oral tissues, the palatal bone and the remaining residual ridge were incapable of supporting the prosthesis. Owing to such unfavorable conditions, it was necessary to plan a prosthesis that would be light and easy to wear. The weight of the prosthesis could jeopardize the health of the tissues and compromise the function of the prosthesis.

In the year 2000, Taylor\textsuperscript{8}, insisted that obturator for a large defect should be routinely made hollow to reduce the weight. But leaving it open at the top may create difficulty for the patient in its maintenance. He advises placing a lid on the superior surface. So, after considering all these conditions a magnet retained (closed + open) two piece hollow bulb obturator was planned for the patient to restore his lost teeth and to make things easier for him in terms of mastication, communication, and aesthetic.

\textbf{Procedure}

After taking a thorough medical and dental history, the patient was educated and prepared psychologically to undergo the procedure of obturator making.

1. A primary impression was made in irreversible hydrocolloid impression material and a primary cast was retrieved out of it.

2. Proper border molding was done on the non-defect side of the denture, by following the conventional methods of denture fabrication. A final impression of the defect area was made in putty, while the wash impression was made in light body
rubber base impression material (fig 2,3)

(Figure 1 Pre-operative intraoral photograph)

(Figure 2 Border molding of the non-defected area and Putty impression of the defected area)

(Figure 3 Light body impression of the defected & non-defected area)

3. A master cast was procured out of it and the borders were outlined for the record bases. The undercuts on the sides of the defect were blocked with wax and also, the internal part of the cavity was painted with a thin layer of wax before making the acrylic record bases.  

4. A jaw relation record was made by a conventional method. The usual tracing devices were not used in this case because of the lack of a resistant base (palate).

5. The rules of aesthetics were borne in mind during the selection and the setting of the teeth. Waxed up dentures were tried and checked for retention, stability, and comfort in the mouth. Phonetics was a cause of concern and so, the denture movements were re-checked during phonation, and corrections were made accordingly.

6. After this, an occlusal bite was made in centric relation position by rubber base putty material that would be used in the later stages for the occlusal orientation.

7. Before commencing with the laboratory procedures, the posterior part of the wax rim over the defect area (with three posterior teeth set in position) was removed carefully with a sharp scalpel and was preserved till the definite prosthesis was ready (Fig. 4).

(Figure 4 scraping of posterior half of wax rim with teeth)

8. Both the maxillary and the mandibular dentures were finished, polished and the palatal margins around the obturator opening were trimmed to be flush with the remaining hard palate (fig 5).
9. The next step was to prepare the lid or cap for the defect area. For the fabrication of the lid, 4-5 orientation grooves / notches were scored all around the defect wall of the denture.

10. Notches of 1.5 mm depth were created to ease the re-orientation of the lid. The open defect area of the denture was filled with plaster, 2-3 mm away from the palatal surface of the denture. A lead foil was spread over the defect as a separating medium and then the wax was shaped to level and prepare the false palate. (fig-6)

11. The scraped part of the wax rim with the teeth affixed on it, (which was removed before processing the dentures) was replaced, positioned, and adjusted again on the posterior half of the denture on the defect side. Thereafter, the rubber base occlusal bite was used for checking the orientation and the occlusion of the denture prosthesis. (fig-7)

12. The lid with the posterior teeth was separately cured in heat cure resin, and was later finished and polished. The next step was to embedded the magnet on the tissue side of the lid in the area corresponding to the keeper in the bulb, this will close the open defect area by placing the lid in the position with the help of the pre-constructed orientation grooves (Fig-8,9).

(Figure 5 Orientation grooves / notches)

(Figure 6 Lead foil as a separating medium)

(Figure 7 Replaced scraped part of the wax rim with the teeth affixed on it)

(Figure 8 Two piece prosthesis with embedded magnet in keeper and in lid (tripoding effect))

(Figure 9 Final finished and polished two piece (open+ closed) hollow bulb denture obturator)
13. Patient was extremely happy with the masticatory efficiency and the improved quality of speech instantaneously (fig10). Necessary instructions were given on technique of placement, removal, and maintenance of the prosthesis. Post-insertion follow-up and patient care were carried out at the regular intervals of time.

(Figure 10 Satisfied patient with denture obturator)

Discussion

Oral cancer is a major health care concern in elderly patients. Among elderly patients, it is particularly important not only to detect and treat this condition early but also to rehabilitate postoperative patients. Cancers of oral cavity, oropharynx, nasopharynx, hypopharynx, larynx and major salivary glands account for 5% of all cancers in the united states. Obturator prosthesis play an important role in the recovery of oral function in postsurgical maxillectomy patients. Lack of support, retention, and stability are common prosthodontic treatment problems for patients who have had a maxillectomy. Factors that affect the prosthetic prognosis for these patients are the size of defect, number of remaining teeth, amount of remaining bony structure, quality of existing mucosa, radiation therapy, and patient’s own ability to adapt to the prosthesis.

For completely edentulous patients, the maxillectomy procedure usually results in poor prosthetic prognosis because of inadequate denture bearing area, lack of cross arch stabilization, and lack of structures for denture retention. In the present case to restore the maxillary defect a magnet retained open + closed hollow bulb obturator has been planned. Magnets were first introduced for application in dentistry in the year 1953 in the field of orthodontics. In 1976, Federick rehabilitated a patient with large orofacial defect using a two component obturator that was locked to each other with the help of magnets. Coated magnets exhibited, no adverse physiologic effects, favorable bone response, enhanced denture retention and encouraged tissue reaction. A hollow bulb prosthesis (either one piece or two piece) is a better choice, as it is lighter in weight and is more hygienic. Light weight has also been considered for maxillary resection prosthesis, by Chalian and Barnett. In the year 1972, they explained a simple technique of fabricating a single piece, hollow obturator prosthesis. In the year 1985, Phankosol and Martin developed a technique of constructing a hollow obturator with a removable lid combining the benefit of both closed and open hollow obturators. They suggested that a closed obturator is needed to prevent collection of nasal secretion and food. Whereas an open top would reduce the weight of the obturator and it will be easy for the patient to maintain the hygiene of the obturator. In the present case a permanent soft denture liner, resilient silicone based (Molloplast-B) is used in fabrication of bulb portion of obturator, as it is comfortable to wear and is resistant to mechanical pressure and it also has an antiplaque and antifungal effect. Finally the prosthetic rehabilitation of the post maxillectomy generally requires an immediate postsurgical prosthesis, an interim prosthesis, and a permanent prosthesis.
Conclusion

Obturators and facial prostheses are important not only in rehabilitation and aesthetics, but also in patient re-socialisation. The level of reintegration is directly related to the degree of satisfaction with rehabilitation. So, the maxillofacial prosthetics must provide patient satisfaction during treatment. The rehabilitation of maxillary resected patient with a two piece hollow bulb obturator retained with the help of magnets is a better choice, as it is lighter in weight and is more hygienic.

References


10. Yellowitz JA, Goodman HS, Faroop NS. Knowledge, opinion and practice related to oral cancer: Results of three elderly racial groups. Spec Care Dentist 1997;17:100-104.


Address of correspondence

Dr. Poonam Agarwal
House no-357, Old housing board colony, Palwal, Haryana, PIN-121102
Mobile No-09274268758
E-mail: poonamsomu@yahoo.com

No conflict of interest reported