

A New Technique for fabricating one Piece Hollow Obturator: A Case Report

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ABSTRACT

The consequences of acquired or congenital maxillary defects can be serious as it disturbs both form and function of normal stomatognathic system and also the facial contour. An obturator prosthesis has great role in restoring functional capabilities such as speech, oral food intake and improve patient appearance. This case report represents a technique of fabrication one-piece hollow obturator made of a combination of heat cured resilient acrylic material and conventional heat cured acrylic material.

Conclusion: Simple new technique with available resilient material allowed the obturator to engage in the undercuts without causing trauma and irritation to the soft tissues in the region of the defect.

Key words: obturator, maxillectomy, soft acryl, hollow bulb.

INTRODUCTION

Maxillary defects are created by surgical treatment of benign or malignant neoplasms, congenital malformation and by trauma. The size and location of the defects influence the degree of impairment and difficulty in prosthetic rehabilitation. Lack of support, retention, and stability are common prosthodontic treatment problems for patients who have had a maxillectomy^[1]. Resection of the hard palate causes disruption of articulation and air flow during speech production and allows nasal reflux during deglutition. The obturator prosthesis serves to restore continuity of the hard palate and separate the nasal cavity and maxillary sinus from the oral cavity^[2].

Prosthetic restoration of defect often includes use of a surgical obturator, interim obturator and definitive obturator^[3,4]. The prosthesis may be hollowed further to decrease weight. The goal is to have a well –fitting, light weight prosthesis^[5].

Numerous methods, with different materials and technologies, are described for the fabrication of definitive obturators^[6-9]. A maxillary defect can be closed with three different types of obturators, namely, a solid bulb obturator, hollow bulb obturator, or a two piece obturator which is commonly prescribed for patients with reduced mouth opening, especially after radiotherapy treatment^[10,11]. An obturator needs to fulfill certain criteria to function well, both as an obturator and a prosthesis to replace missing teeth. These criteria include lightness in weight, high tolerance by patients, tissue compatibility, ease of insertion and removal, durability, and easy cleaning. Apart from that, an obturator needs sufficient retention which is derived by engaging the undercuts within the defect region, aside from gaining retention, and stability from the remaining dentition^[7].

The present report describes a new technique for producing a hollow bulb obturator fabricated from a combination of soft acryl and conventional heat cure acrylic material which can provide better comfort for the patients.

CASE REPORT

A 60-year-old male patient was referred to the special health center of Karbala city Department of Prosthodontics with chief complaints of difficulty in eating, speaking, and poor esthetic with an old poorly fabricated removable upper obturator that made of conventional heat cure acrylicfigure1(A).

The patient had a history of squamous cell carcinoma on the left maxilla that invade the palate, maxillary sinus for which hemimaxillectomy of the same side was performed. On intraoral examination, defect was Aramany's class IV extending associated with depressed cheek, and lack of lip support. The surgery resulted in loss all of his teeth except the upper right second premolar and second molar Figure1(B).



Figure 1: (A) an old poorly fabricated removable upper obturator that made of heat cure acrylic. (B) intraoral views of the maxillary defect region.

Treatment procedure:

- 1- Impression was performed using impression compound in the defect region covered with heavy body silicon impression material (Zhermack, Germany) in stock tray as shown in figure2(A). The impression poured with stone (Zhermack, Germany) to obtain master castfigure2(B).
- 2- Maxillomandibular relation includes registration of vertical dimension and centric relation as conventional way with complete denture figure3.
- 3- Try-in procedure inside the patient mouth figure4.
- 4- Waxing of the obturator by deepening of the wax in the center of the defect region leaving a thickness of 2mm Figure 5(A). Creating a1mm ledge around the internal periphery of the hollow obturator portion as shown in figure 5(B).
- 5- Flasking and wax elimination as in conventional removable dentures construction figure 6.
- 6- Mixing powder and liquid of soft acrylic (Vertex Soft Acryl-heat cure) and pack it in the hollow part of the cast figure 7(A). With the aid of a surgical scalpel trimming of the excess parts of the soft acrylic from the border of the hollow figure 7(B).
- 7- Addition of the conventional hot cured acrylic on the second part of the flask, just on the border figure 8(A). Pressing of the two parts of the flask and curing figure 8(B).
- 8- The finished denture appears with soft acrylic and conventional hot cured acrylic as one-piece figure 9.
- 9- The hollow bulb filled with a thick mix of plaster and pumice. The superior surface should be slightly concave to allow making a convex lid figure10(A).A lid of cold cure acrylic is made over the plaster/pumice. Then trimmed, plaster and pumice removed from the hollow and finally the lid secured in its place in the prosthesis by a thin mix of cold cure acrylic figure 10(B).
- 10- Finishing and polishing of the obturatorfigure11.
- 11- The obturator inserted inside the patient's mouth, and the soft acryl material easily engaging the undercuts within the defect region. The patient was quite comfortable with obturator figure12.

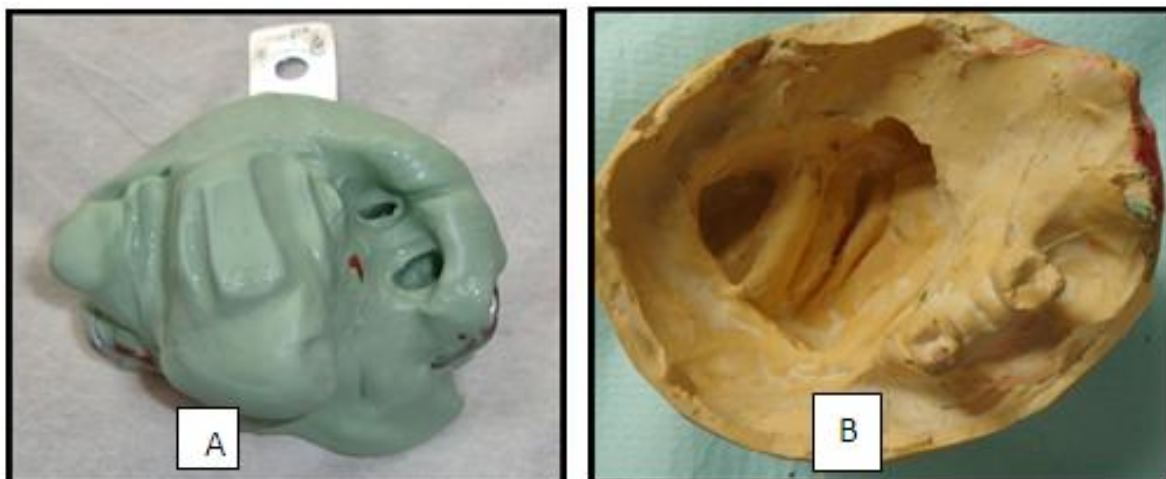


Figure2: (A)impression of the hemimaxillactomy.(B)master cast

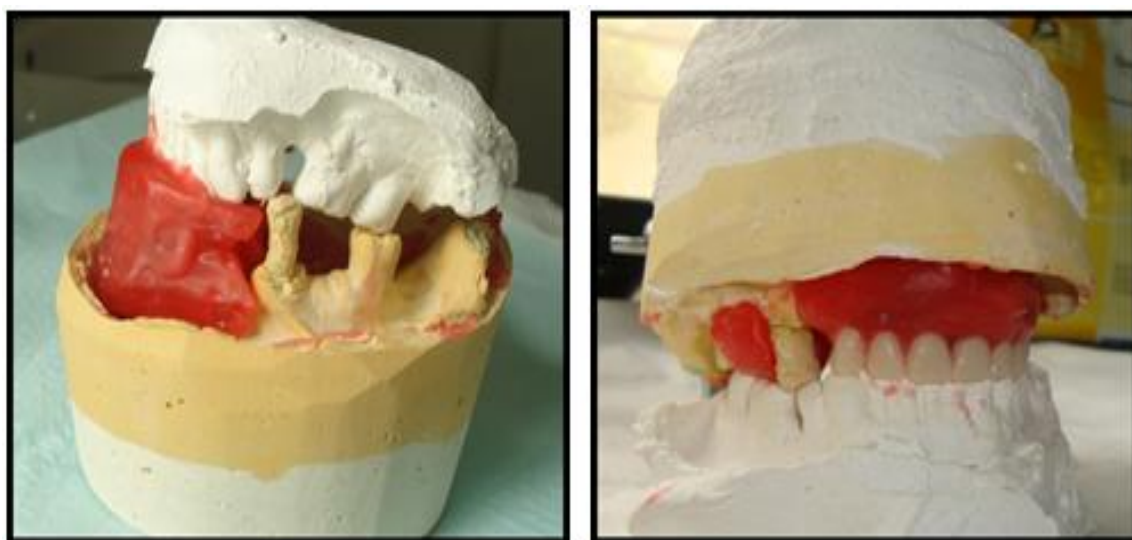


Figure (3): Maxillomandibular relation includes registration of vertical dimension and centric relation



Figure (4): try-in procedure inside the patient mouth.

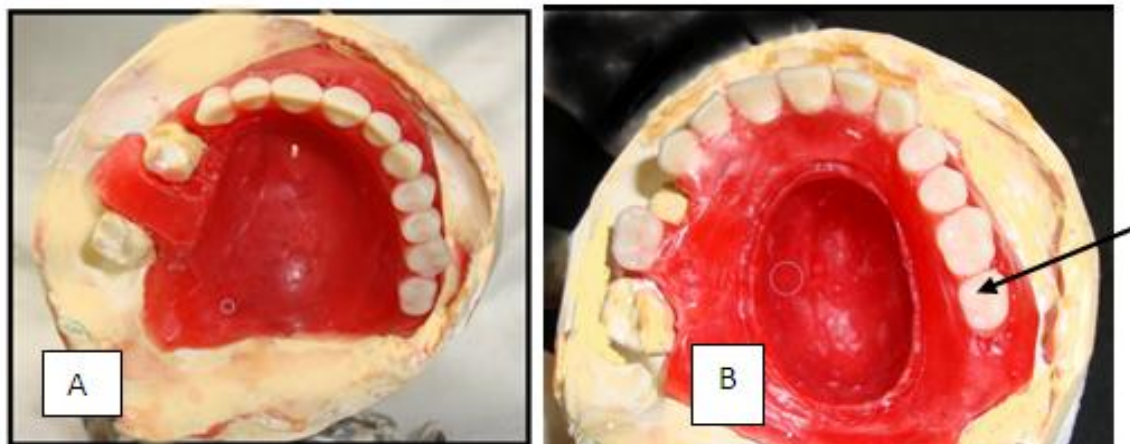


Figure 5(A): deepening of the wax in the center of the defect. **(B):** creating 1mm ledge round the internal periphery of the hollow obturator portion



Figure (6): flasking and wax elimination of the obturator.

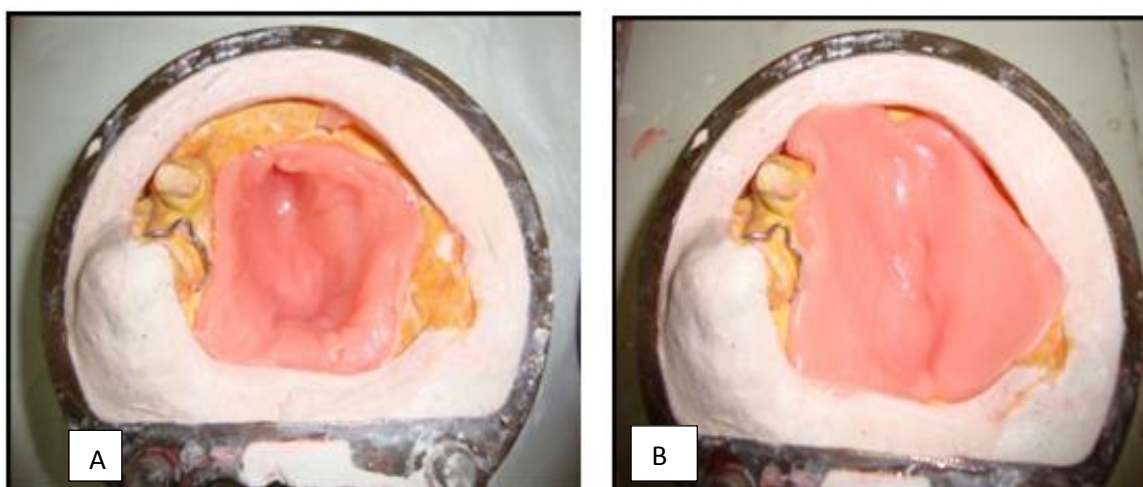


Figure 7: (A) packing of the soft acrylic in the hollow part of the cast. **(B):** trimming of the excess parts of the soft acrylic by surgical scalpel.



Figure 8: (A): addition of the conventional hot cured acrylic on the second part of the flask, just on the border. (B): Pressing of the two parts of the flask and curing



Figure 9: The finished denture appears with soft acrylic and conventional hot cured acrylic as a one-piece.



Figure 10: (A) the hollow bulb filled with a thick mix of plaster and pumice. (B): A lid of cold cure acrylic is made over the plaster/pumice.



Figure 11: Finishing and polishing.



Figure 12: the obturator inserted inside the patient's mouth.

DISCUSSION

Surgical resection is an established and common method for the treatment of maxillofacial cancer. Acquired surgical defects of hard and soft palates interfere with the speech pattern and mechanism of deglutition. The prosthetic rehabilitation for maxillectomy patients aims at the separation of the oral and nasal cavities to allow adequate deglutition and articulation, to restore the mid-facial contour, and to provide acceptable results^[3].

The prosthetic rehabilitation of patients with maxillary resection is a very complicated multi-stage process, correlated with many difficulties and problems. Due to the variety of defects and clinical cases, there is no universal treatment method^[12, 13].

There are several methods available in the literature for the fabrication of obturators. There are methods which fabricate a hollow bulb by using bioplast flexible materials (polycarbonate) which need mechanical bonded to the denture^[14]. One of the materials which is commonly used in recent years to fabricate obturators is the permanent heat cured resilient acrylic^[9]. This material is tissue compatible, able to engage in the soft tissue undercuts, and provides easy maintenance^[7]. Cone-beam computed tomography (CBCT) can be used to provide primary reconstruction as a primary cast combined with Stereo lithography (SLA) is the extension of CAD CAM technology in order to produce 3D prototype models and construct parts or complete removable prostheses reducing the chair side pain and anxiety of surgically treated patients. However, the clinicians should consider the procedure cost, the accuracy of the manufacturing system and materials used^[6].

In this report the technique was using a combination of two types of materials for the construction of hollow obturator and the acrylic denture. The hollow obturator made of soft acryl (heat curing). Vertex Soft has an excellent adhesion to both

new and existing dentures. The outstanding surface density makes the material simple to finish and polish with the special polishing instruments. The obturator was both comfortable and retentive depending on the softness of the vertex and its ability to engage undercut without causing injury to the delicate soft tissue. The advantages of hollow obturator its light weight compared to the old conventional acrylic resin one, resulting in lighter prosthesis and which in turn increase retention. Also the chemical union between the soft acrylic and the hot cure acrylic gives a good seal that prevent the entrance of fluids inside the hollow cavity which may decompose and produce bad odors. The applied method for obturator fabrication allowed easy insertion in the defect and shortened the adaptation period.

CONCLUSION

Simple new technique with available resilient material allowed the obturator to engage in the undercuts without causing trauma and irritation to the soft tissues in the region of the defect.

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