

Fabricating a hollow bulb obturator

Ali Riza Tuncdemir, DDS, PhD,^a Fatih Sari, DDS, PhD^b

^aDepartment of Prosthodontics, Faculty of Dentistry, Mustafa Kemal University, Hatay, Turkey.

^bDepartment of Prosthodontics, Faculty of Dentistry, Gaziantep University, Gaziantep, Turkey.

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ABSTRACT

Obturator are generally used in the rehabilitation of the maxillectomy defects. Ideally, obturators should be light, properly fit and construction should be made easily. By decreasing the weight of the prosthesis, the retention and stability may be optimized to allow the obturator for function comfortably during mastication, phonation, and deglutition. In this case, a 65-year-old male patient underwent surgical removal of left part of the maxilla due to the squamous cell carcinoma. In this technique fabrication of a hollow bulb obturator prosthesis as a single unit in heat-cured acrylic resin using a single-step flasking procedure was described. The patient's functional and esthetic expectations were satisfied.

Keywords: Hollow bulb obturator, maxillectomy.

INTRODUCTION

Intraoral defects are observed in the maxilla generally and it may includes hard and soft palate, floor of the nasal cavity and the alveolar ridges.¹ The aim of the prosthetic treatment for total and partial maxillectomy patients is separation of nasal and oral cavities to provide adequate deglutition, to support soft palate, good mastication and esthetic.²

Obturator are made for patients with congenital or acquired defects of palate and other contiguous tissues.³ Obturator shape and size are varied according to defect size and shape. Lots of techniques have been described to fabricate the open and closed hollow obturators to make them lightweight. Most of these methods have their own limitations, such like multiple processing techniques while fabricating.^{4,5}

But generally classification of the hollow obturators are solid, open and closed obturators.^{6,7}

Stability and retention are crucial factors for prosthesis achievement. Weight is very important for prosthesis stability and retention especially for maxillary prosthesis. The structures in the remaining maxilla amenable to providing obturator retention are limited to the remaining natural teeth and the borders of the defect.⁸ So hollowing to obturators may optimize retention and stability of the prosthesis. The lightness of the obturator improves one of the fundamental problems of retention and increases physiological function so that teeth and supporting tissues are not stressed unnecessarily.⁸ Obturators extending into the defect so it should be compatible for patients. Hollow obturators have some advantages for patients, such as they are light, it can be cleaned easily and patient can speak more intelligible. Closed hollow prosthesis is more useful than open hollow obturators. Because they have poor hygienic conditions with preventing food and fluid collection^{9,10} and also varnishing inner of the open hollow obturator is so difficult. A hollow bulb design is not necessary when

Fatih SARI
Department of Prosthodontics,
Faculty of Dentistry,
Gaziantep University,
27310, Gaziantep, Turkey.
Tel: +90342 3606060-76611
Fax: +90342 3610610
e-mail: fatihsa00@hotmail.com

the defect is small and where healthy ridges exist. This design is aimed to supply voice resonance to lighten the weight on the unsupported and large side.¹¹

In this case report fabrication of a hollow bulb obturator prosthesis as a single unit in heat-cured acrylic resin using a single-step flasking procedure was described.

TECHNIQUE

Preliminary impression of the post operative maxilla was carried out with alginate and custom tray was fabricated on the cast of the maxillary defect (Figure 1). The final impression of the defect was carried out with alginate (Aroma Fine Df III, GC Corb, Tokyo, Japan). Poured with the ADA type III Stone (Advastone; GC Corp) and the cast was obtained (Figure 2). Undercuts on the defect area were blocked out with the wax (Sybron/Kerr, Romulus, MI). Surgical area was filled with silicone (Lab Putty, Coltene, Whaledent, Inc., Cuyahoga Falls, OH) and acrylic base was done on it and after the conventional procedure the cast was taken the flask (Figures 3, 4 and 5). A thin layer acrylic resin was placed in the surgical defect area on the stone cast which will be top of the bulb (Figure 6). Acrylic was filled with silicone and route was done on it with silicone again to get out silicone after polymerization of the acrylic (Figure 7). The obturator was flaked, the wax was boiled out, and the obturator was subjected to a second processing procedure using heat-activated acrylic resin (Lucitone 199; Dentsply International Inc, York Pa) at 138⁰F for 12 hours. Prosthesis was finished in conventional method with heat cured acrylic resin and was polished with 400- and 600-grit silicon carbide papers and polishing pastes (pumice/water) (Figure 8). Care should be taken not to over thin the bulb, because perforation may occur during the using of the prosthesis. The patient was educated how to position, remove, and clean the obturator and

instructed to remove the prosthesis for cleaning (Figure 9).



Figure 1. Preliminary impression of the post operative maxillary.



Figure 2. Cast of the maxillary defect.



Figure 3. Surgical area was filled with silicone.



Figure 4. Acrylic base was done on surgical area.



Figure 7. Acrylic was filled with silicone and route was done on it with silicone again to get out silicone after polymerization of the acrylic.



Figure 5. Cast was taken to the flask.



Figure 8. Prosthesis was finished with conventional method.



Figure 6. A thin layer acrylic resin was placed into the surgical defect area.



Figure 9. The patient was educated how to position, remove, and clean the obturator.

DISCUSSION

Fabricating a successful obturator prosthesis for the rehabilitation of congenital or acquired defects in maxilla, depends on making a detailed impression and constructing the prosthetic parts compatible with the oral mucosa. Beside of this it must be light especially in maxilla. The weight of an obturator can be reduced by hollowing the bulb.⁸ Hollow obturators can be done with using Visible Light Cured (VLC) resin¹² or soft liners.¹³ VLC's are expensive with regard to heat activated polymerized resins and soft liners have some disadvantages. These are porosity, leading to bacterial contamination and precipitation of undesirable odours and mucosal irritations.

Soft liners generally used patients who can not tolerate a hard denture base. Recently, soft liners have been improved and new materials have become available. Soft reline material and denture can not be union successfully so fluids can pass in to the hollow cavity and it can make bad odor. Soft reline material must be changed in certain periods and bonds poorly to visible light cured resins.¹³ Soft liners show high absorption and solubility.¹⁴ Wang et al.¹⁵ showed that the color stability of soft liners connected with residual monomers. The residual monomer can be identified like a plasticizer remains in the polymerized resin and increasing to porosity and can affect the physical properties of the acrylic resin. A one year clinical study showed extensive fungal colonization formation on the soft liners and the bond strength of Molloplast-B to acrylic resin reduces dramatically in short time periods.^{16,17} As a result of these studies soft liners shouldn't be used in long term with a definitive prosthesis.

Both open and closed hollow obturators allow for the fabrication of a lightweight prosthesis that is readily tolerated by the patient while effectively extending into the defect.¹⁸

The use of a hollow maxillary obturator may reduce the weight of the prosthesis by up to 33%, depending on the size of the maxillary defect.¹⁹ Shaker used medical-grade silicone to fabricate the obturator part of the prosthesis with mushroom-like extensions. It was retained by this resilient material which engaged the soft tissue undercuts within the defect.²⁰

Hou et al described the use of an air valve in a hollow silicone obturator to manufacture an inflatable obturator.²¹ But these methods are more complicated and expensive according to this study and soft reline materials do not maintain optimal properties for long periods of time. The patient's functional and esthetic expectations were satisfied. Follow-up sessions are required to check the compability of the obturator.

CONCLUSION

The construction simplicity of the prosthesis is the advantage of this technique. Heat cured acrylic was used in this technique. Soft materials can be used several times during the period of wound healing to fit the defect as it changes over time but heat cured acrylic is more proper according to disadvantages of soft materials. It may be restored again with heat cured acrylic during wound healing period.

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