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CASE REPORT

An Innovative Method of fabricating a Hollow Bulb Obturator

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ABSTRACT

Palatal defects cause multiple problems in speech, mastication, esthetics, and maintenance of oral hygiene. Obturators help in normal deglutition, prevent nasal regurgitation and normal speech production. The fabrication of obturators has been done by various methods in the past using different materials that are incorporated to make hollow bulb, such as modeling wax, sugar, dental stone, and putty. Difficulties have been experienced in removal of these incorporated materials. It is difficult to maintain the form of the hollow bulb and to maintain position of incorporated material as well as the thickness of the heat-cure resin during acrylization. The effect of heat during acrylization is different for different materials. Thus, the final form of the obturator, ease of removal of the incorporated material, and maintenance of hygiene postinsertion are dependent on the material chosen for incorporation in the hollow bulb. This case report describes a novel material for fabrication of a hollow bulb obturator. The fabrication is single stage and easy for the operator.

Keywords: Alum, Maxillectomy defect, Obturator.

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INTRODUCTION

"It is the God given right of every human being to appear human"—DaBreo.[1] Palatal defects cause multiple problems in deglutition, mastication, speech, esthetics, and maintenance of oral hygiene.[2-4] An obturator is defined as " a maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar/soft tissue structures [Glossary of Prosthodontic Terms (GPT) 7].[5] A maxillofacial prosthesis used to close, cover, or maintain the integrity of the oral and nasal compartments resulting from a congenital, acquired, or developmental disease process, such as cancer, cleft palate, osteoradionecrosis of the palate; the prosthesis facilitates speech and deglutition by replacing those tissues lost because of the disease process and can, as a result, reduce nasal regurgitation and hypernasal speech, improve articulation, deglutition, and mastication.[6-8] An obturator prosthesis is classified as surgical, interim, or definitive and reflects the intervention time period used in the maxillofacial rehabilitation of the patient; prosthodontic restoration of a defect often includes use of a surgical obturator, interim obturator, and definitive obturator."—GPT 9.[5] The maxillary obturator must be light weight and aid in retention, stability, patient comfort, and cleanliness.[9] The fabrication of hollow obturators has been done by various methods in the past. Different materials are incorporated to fabricate hollow bulb obturators, such as modeling clay,[10] dental stone,[11] salt,[12] and putty.[13] The effect of heat during acrylization is different for different materials. Thus, the final form of the obturator, ease of removal of incorporated material after processing, and maintenance of postinsertion hygiene are dependent on the material chosen for incorporation in the hollow bulb. In this article, the new method for fabrication of hollow bulb obturator using alum is described.

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MATERIALS AND METHODS

In this innovative method of fabricating hollow bulb obturator, the material used is alum. Alum is known as potassium aluminum sulfate (potassium alum) with the formula $KAl(SO4)_2 \cdot 12H_2O$. This method is done using a single-flask technique.[14] This method was first tried *in vitro* on a modified ideal edentulous maxillary cast on which right side maxillectomy defect was created. After the dewaxing was done, acrylic stops were made to control the position of the alum which was used to make the hollow bulb (Fig. 1). The alum block was shaped according to the defect and a cellophane paper was used to wrap the alum while packing (Fig. 2). After acrylization, the obturator was retrieved from the flask and finishing and polishing were done. A hole was drilled in the obturator and it was immersed in water for 3 to 4 hours during which entire alum got dissolved without any effort. Autopolymerized pink acrylic resin was used to block the hole. We concluded that the obturator was light weight, as it could be seen floating in water (Fig. 3). The hollow bulb was sectioned to observe the entire removal of alum (Fig. 4).

Fig. 1: Acrylic stops made after dewaxing on ideal cast

Fig. 2: Alum shaped and positioned according to defect

Fig. 3: Light weight obturator floating in water

Fig. 4: Sectioned hollow bulb clear of alum

CASE REPORT

A 67-year-old male patient was referred to the Department of Prosthodontics for prosthetic rehabilitation of a postmaxillectomy defect after surgical removal of squamous cell carcinoma from the right maxilla (Aramany's Class IV).[15] The patient complained of difficulty in chewing, nasal regurgitation of fluids, compromised esthetics, disharmony, and difficulty in speech with nasal twang in his voice (Fig. 5).

Fig. 5: Maxillectomy defect

Procedure

A preliminary impression was made using irreversible hydrocolloid (Zelgan 2002 dust-free easy mixing, Dentsply India Pvt. Ltd., Haryana). The custom tray was fabricated using autopolymerizing acrylic resin (self-cure acrylic repair material, Dentsply India Pvt. Ltd., India), and border molding was carried out using green stick impression compound (DPI Pinnacle, tracing stick, Dental Products of India, Mumbai). Final impression was made with regular body addition silicone (Express-3M ESPE) impression material and the master cast was fabricated using dental stone (Kalstone, Kalabhai Karson Pvt. Ltd., India). The master cast was retrieved and trimmed. After blocking the undercuts, record base was adapted onto the master cast and occlusion rim was made. Jaw relation was recorded, teeth arrangement and try-in were done. Flasking was carried out by single-flask technique. Dewaxing was done. Acrylic stops were made after dewaxing (Fig. 6).

Fig. 6: Acrylic stops made after dewaxing

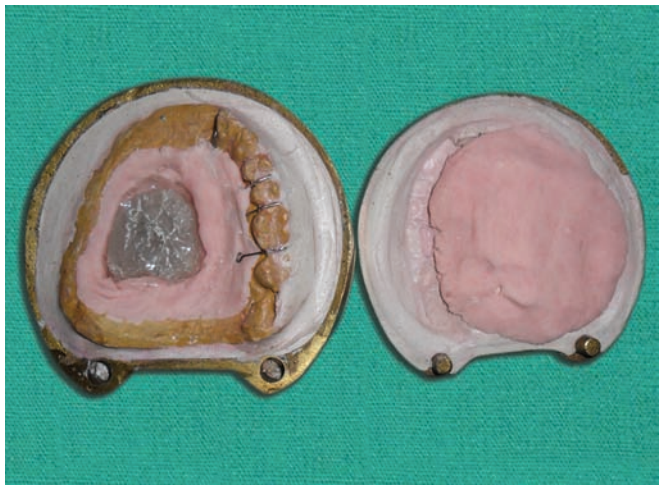

Fig. 7: Alum wrapped in cellophane while packing

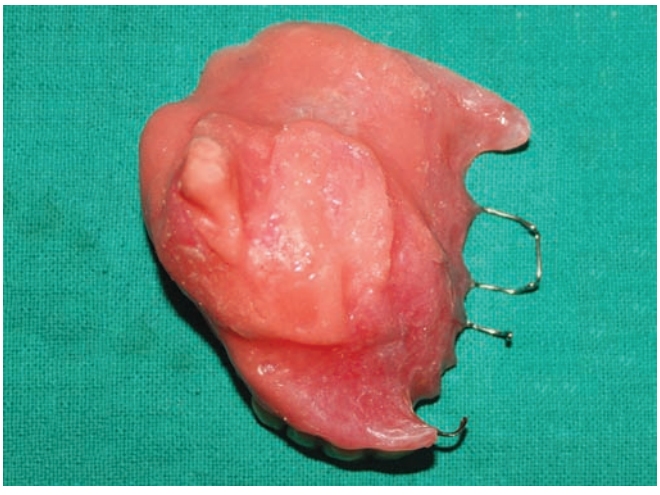

Fig. 8: Obturator relined with soft liner

Fig. 9: Intraoral photograph postinsertion

Fig. 10: Extraoral photograph postinsertion

The alum block was shaped according to the defect and a cellophane paper was used to wrap the alum while packing (Fig. 7). Acrylization was done and the obturator was retrieved from the flask. Finishing and polishing were carried out. A hole was drilled and the obturator was immersed in water for 3 to 4 hours for the removal of alum from the hollow bulb. Entire alum got dissolved without any effort. The hole was sealed with autopolymerizing acrylic resin and lined with permanent soft liner[16] (GC Reline Soft) (Fig. 8). Final fit of the obturator was adjusted intraorally and any interferences were removed (Figs 9 and 10).

DISCUSSION

There are several methods available in the literature for fabrication of obturators. The two broad types of hollow bulb obturators are the open bulb and closed bulb. There are methods which fabricate a hollow bulb by using materials inside the bulb part during packing stage and allowing those materials to escape through holes post-acrylization.[17] McAndrew et al[18] described a technique where heat-cure acrylic was used to fabricate a two-part obturator prosthesis which was heat processed twice. Fattore et al[19] used a variation of the double-flask technique for obturator fabrication. There may be a chance of dimensional instability with such a technique, as the rejoining of two parts of the obturator is difficult. Other

materials used, such as modeling clay,[10] dental stone,[11] salt,[12] putty,[13] and sugar[20] have their disadvantages. Modelling clay, dental stone, and putty are difficult to remove because of their hardness and inability to dissolve in water. With sugar and salt, operator cannot give or maintain a definite form and position as desired according to the shape of the hollow bulb during packing and curing.

Alum is an astringent and is known to be used as a natural cleansing agent for dentures and prosthesis. So incorporating alum in hollow bulb obturator is safe and hygienic. In the above-described method, several other merits can be attributed to the use of alum for fabrication of closed hollow bulb obturators. In a case report by Connor,[21] alum crystals were used to fabricate a hollow bulb obturator but a different technique was used and no emphasis was given to its ease of fabrication with regard to other materials. No literature has been found on comparison between alum and other materials with regard to final weight of the obturator.

In our method, prosthesis is fabricated using a single flask which considerably reduces the laboratory time and makes the procedure simple. By using alum, we can control the mass of the material, as we can easily shape the alum according to the defect. By giving acrylic stops before packing, the thickness of heat-cure acrylic material is controlled all over without displacement of filling material. Removal of alum after curing is easy, as it is completely dissolvable even in cold water. As it is a single-flask technique, the separate fabrication of a lid and rejoining is not required. The technique is cost-effective in terms of material used and time. At the time of follow-up at monthly interval since past 6 months, the patient is very comfortable using the obturator and hygiene is well maintained.

CONCLUSION

Various materials have been used to fabricate a hollow bulb obturator and each presents a different challenge in removal after the fabrication is complete. The use of alum is simple as well as the removal being convenient. It is safe and hygienic and the obturator can be made in single step. The technique presented is a simple, operator-friendly, cost-effective, and time-saving method for the fabrication of a hollow bulb obturator.

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