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Case Report

AN INNOVATIVE TECHNIQUE FOR FABRICATION OF HOLLOW BULB OBTURATOR: A CASE REPORT

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ABSTRACT

Surgical correction of benign or malignant tumors of mouth and oropharyngeal region often results in the maxillofacial defects. The acquired maxillectomy defects results in the impairment of speech, mastication, swallowing and facial esthetics. The prosthodontist plays a significant role in the rehabilitation of the acquired maxillectomy defects by fabricating obturator prosthesis. A special emphasis on the reduction of the weight of the obturator prosthesis in large maxillary defect is given to enhance its retention and stability. This article describes an innovative technique for fabricating a closed hollow bulb obturator which is simple and less time consuming and allows the control of the obturator bulb's wall thickness and weight more effectively.

Keywords: Obturator, Hollow bulb obturator, Hemi-maxillectomy

INTRODUCTION

Maxillary defects are often the result of surgical treatment of benign or malignant tumours, congenital malformations or by trauma[1]. These defects result in the formation of an opening between the oral cavity and the antrum and/or the nasopharynx, creating problems with speech, mastication, swallowing and impaired facial esthetics. To overcome such problems, obturator prostheses are provided. The usual treatment sequence includes placement of a surgical obturator during the intervention; then 5–10 days later this obturator is removed, and a removable interim obturator is constructed and placed for the duration of the wound healing period; finally, the definitive obturator is constructed and placed about 3–6 months post-surgery, when major changes in tissue conformation are no longer expected. The design of an obturator is to engage the remaining natural teeth and tissue-bearing areas to optimize retention and stability. Obturators fabricated with adequate extensions are often heavy, which can counteract the increased retention and stability generated by the increased extension. By decreasing the weight of the prosthesis, the retention and stability may be optimized to allow the obturator to function comfortably during mastication, phonation, and deglutition.This clinical report describes an innovative technique of using silicone putty as a spacer for fabrication of hollow bulb obturator prosthesis. This technique is simple and less time consuming and allows the control of the obturator bulb's wall thickness and weight more effectively.

CASE REPORT

A 32 year old female patient reported to the Department of Prosthodontics, PMNMDC&H, Bagalkot, Karnataka, with a right side palatal defect. Medical history revealed that she had undergone surgery for adenocystic carcinoma one month back. The surgical resection included right side of the hard palate including all the teeth on that side of the maxillary arch. The defect was unilateral and bounded medially by the mid line of the hard palate, laterally by the buccal mucosa, and posteriorly by the soft palate (Aramany class I). (fig-1). She had difficulty in swallowing, mastication and had a characteristic nasal twang speech.

TREATMENT PLAN

After thorough examination it was found that the defect was classical Aramany's class I defect. As the defect was large, a hollow bulb obturator was planned for increasing the retention and stability. As it was still in a healing phase and the patient had to undergo radiotherapy, it was decided to fabricate temporary obturator rather than definitive. The treatment plan was explained to the patient and informed consent was signed.

Treatment:

1. Upper and lower diagnostic impressions were made using elastomeric putty impression material (Aquasil soft putty, Dentsply, Batch no-100945, Germany) after blocking out defect undercuts with petrolatum laden gauge.
2. Diagnostic casts were obtained and a 2 mm thickness wax spacer (Maark, Shiva products, Mumbai, India: batch no.111) was adapted on to it and special tray covering the defect and the remaining teeth was fabricated using auto polymerizing acrylic resin (DPI-RR, Batch No-1131, Mumbai).

Fig. 1 – Intra oral view of the palatal defect

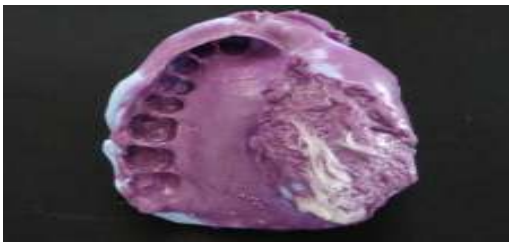

Fig. 2 – Final impression

Fig. 3 – Master cast showing the defect

Fig. 4 – Try in

3. Border moulding was done using green stick compound (DPI Pinnacle, Batch no.10154) and final impression was made using putty elastomeric impression material. This impression was again refined using medium body addition silicone (Aquasil Monophase, Dentsply, Lot-100407, Gernany).(fig-2) The master cast was obtained after pouring the impression in type III dental stone (Gold stone, Asian Chemical, Rajkot, Gujarat, India; batch no. 1959/200) (fig-3) and temporary denture base was fabricated using autopolymerising acrylic resin and occlusal rim was constructed.
4. Jaw relations were recorded and transferred to the articulator and teeth arrangement was done. Try in was accomplished in the conventional manner. (fig-4).
5. The trial denture was processed in the standard manner through the wax elimination stage.
6. Two mm thick base plate wax was adapted in the defect area corresponding to the thickness of future lid of the hollow bulb. (fig-5).

Fig. 5 – 2mm thick wax adapted

7. Elastomeric putty impression material was manipulated and packed inside the defect over the adapted 2mm thick base plate wax and the upper surface of the putty index was till the level of hard palate. (fig-6) After the setting of the putty impression material, the putty index was removed and 2mm wax spacer was also removed.

Fig. 6 – Putty packed inside the defect

8. Once the flask was ready to be packed, small amount of heat-polymerized acrylic resin (DPI heat cure, Batch No-7102, Mumbai) was placed at the apex of the defect to eventually become the lid.
9. Then this acrylic resin was covered with a piece of clear acetate sheet. The acetate sheet was overextended onto the acrylic resin by 3 to 4 mm in all directions. (fig-7)

Fig. 7 – Acetate sheet placed over acrylic resin

10. The putty index was placed over the acetate sheet and the rest of the obturator prosthesis was packed in the

conventional manner and polymerized. Bonding of the 2 masses of acrylic resin was prevented by the acetate sheet acting as a separating medium and the hollow space was maintained by inert putty index. (fig-8 a,b).

11. After polymerization the newly formed lid at the acetate-acrylic resin junction was pried and set aside. (fig-9).
12. Putty index was removed and obturator bulb's wall of uniform thickness was achieved.
13. The lid was sealed with autopolymerizing acrylic resin and an air-tight seal was confirmed by placing the obturator prosthesis into a beaker of water and verified that it remains afloat. (fig-10)

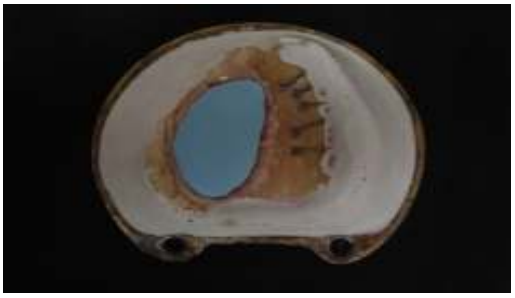

Fig. 8(a) – Putty index placed over

Fig. 8(b) – Packing of remaining bulb acetate sheet

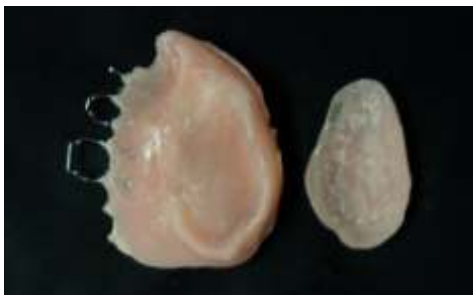

Fig. 9 – Lid is pried off superior surface

Fig.10 – Floating hollow denture

14. Polished hollow obturator was inserted in patient's mouth. 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. (fig-11)

DISCUSSION

The name obturator is derived from the Latin word "obturare" which means to close or to shut off. According to glossary of prosthodontic terms obturator is defined as prosthesis used to close a congenital or an acquired tissue opening, primarily of hard palate and or contiguous alveolar structures[2]. Obturator prosthesis are provided to the patients with maxillary defects to close the communication of oral and nasal cavities which causes difficulty in swallowing and nasal reflux thus improving unintelligible speech and unaesthetic appearance. Ambroise Pare was the first to use artificial means to close a palatal defect as early in the 1500s[3]. Since then various modifications in the design of obturator were made. In 1957, Nidiffer and shipman[4] was the first to write about hollow bulb obturator for acquired palatal defects. A hollow bulb obturator offers certain advantages like reduction in weight, making it more retentive, comfortable and efficient. Hollow bulb can be either open or closed. Closed bulb obturator is preferred because open bulb has many disadvantages such as accumulation of nasal secretions leading to odour and added weight, difficulty in polishing and cleaning the internal surface and the inability to obtain support from the superior aspect in the defect area. Numerous techniques for the fabrication of hollow obturators were given in the literature[5-12].

The classic technique for hollowing an obturator is to grind out the interior of the bulb after processing while monitoring the thickness of the walls[13]. Once hollow, various procedures have been developed to fasten the lid to the superior border.[13-15] Additional techniques include the use of combinations of casts, impressions, and complex laboratory procedures[4,7,8,15-22], rendering them cumbersome, inefficient, and limited in application.

To simplify the procedure Barry H. Habib and Carl F. Driscoll[3] developed a single step and simple technique in which an acetate sheet is used as a separating media for easy removal of lid. Later on obturator was made hollow by grinding out the interior of the bulb while monitoring the thickness of the walls. This was time consuming and the even thickness of the bulb was arbitrarily maintained. To overcome this problem, an innovative technique is presented here in which silicone putty was adapted on the 2 mm even thickness of the wax to achieve same thickness of the wall of the bulb of the obturator after polymerization. This innovative technique avoids the cumbersome trimming of the acrylic bulb for hollowing it thus making it efficient, simple and less time consuming.

Fig.11 – Post treatment frontal view

CONCLUSION

The present case report describes an innovative technique for fabrication of hollow bulb obturator. In this innovative technique silicone putty spacer is used to control the thickness of the hollow bulb walls of the obturator thus making it efficient, simple and less time consuming.

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