

CASE REPORT

A SIMPLE METHOD FOR FABRICATION OF A CLOSED ONE PIECE HOLLOW DEFINITIVE OBTURATOR FOR A MAXILLECTOMY PATIENT: A CASE REPORT

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Abstract: Most acquired maxillary defects occur due to surgical resection of tumours. The most common of all intraoral defects are seen in the maxilla, in the form of an opening into the maxillary sinus and nasopharynx. These defects create disabilities in speech, deglutition, and mastication. Prosthetic rehabilitation with obturator provides both physiological and psychological benefits along with restoration of masticatory function and improvement of speech and aesthetics. One of the main objectives in the fabrication of hollow obturators is to minimize weight to optimize retention and stability as well as patient comfort. The article describes simple method for the fabrication of one piece hollow obturator for a patient with left side total maxillectomy.

Key words: Oral rehabilitation, Hollow obturator, Total maxillectomy, Retention.

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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 basis.¹ The most common of all intraoral defects are seen in the maxilla which includes hard and soft palate, maxillary sinus, floor of the nasal cavity, and the alveolar ridges. These defects may occur due to surgical resection of benign and malignant tumors, congenital malformation, and trauma.²

A maxillary oral squamous cell carcinoma is generally treated with conventional surgical excision. The resultant surgical defect often includes part of the hard and soft palates, which results in an oro-antral communication.³ A surgical approach alone without reconstruction or obturation of the surgical defect will result in air, liquid, and food escaping into the maxillary sinus and nasal cavities, causing severe speech and swallowing dysfunction with significant reduction in quality of life.^{3,4} Also maxillofacial defects result in facial disfigurement, thus leading to psychological problems. This in turn, create great difficulty in facing and accepting the social consequences.⁵ The goals of prosthetic rehabilitation for such patients

are to fabricate obturators which separate the nasal and oral cavity and improve deglutition, speech, mastication, and esthetics.²

Continuously applied stresses on the remaining tissues from a large, heavy obturator jeopardize the health of the tissues, compromise the function of the prosthesis, and affect patient comfort.⁶ Numerous methods have been described to overcome the increased weight of obturator prosthesis. A hollow maxillary obturator may reduce the weight of the prosthesis by up to 33%, depending upon the size of the maxillary defect.⁷ However in fabricating hollow bulb obturator access to the inner aspects of the bulb is limited, preventing adequate control of thickness of the walls.⁸ Controlling the thickness of hollow obturator during fabrication is important to provide adequate and uniform thickness to ensure the desired strength and weight of the prosthesis. Another important objective in the fabrication of closed hollow obturators is a watertight seal between the joined sections of the obturator.⁹

The basic technique used to produce hollow obturators is to process the obturator and grind out the unwanted interior portion.¹⁰ Another method is to fabricate the hollow obturator in two halves. After processing, the sections are joined with autopolymerizing or heat processed acrylic resin.¹¹ Material such as ice and sugar have been placed in

the hollow portion of obturators during fabrication and removed through bur holes after processing. The hollow portion is then resealed with autopolymerizing acrylic resin.¹² The use of autopolymerizing acrylic resin for sealing the hollow obturator can result in a discolored demarcation line and introduce the possibility of leakage into the hollow extension.¹³ Chalian and Barnett reported a technique for the fabrication of a one-piece hollow obturator with an inner hollow acrylic resin shim that remains as part of the finished prosthesis.¹⁴ Tanaka et al described a similar technique with a polyurethane foam core that is incorporated into the prosthesis.¹⁵ However, Worley and Kniejski state that incorporating these fillers into the hollow extension increases the weight of the final prosthesis.¹⁶ 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. The closed hollow obturator prosthesis can prevent fluid and food collection and allow for maximum extension. The article describes simple method for the fabrication of one piece hollow obturator with controlled thickness of the hollow bulb for a patient with left side total maxillectomy.

CASE REPORT

A 75-year-old female patient reported in the Department of Prosthodontics, H.P Government Dental College and Hospital, Shimla with a chief complaint of difficulty in swallowing food, liquid, and food escaping into the maxillary sinus and nasal cavities. The patient had a history of squamous cell carcinoma of left maxilla and sinus 2 years back. The patient underwent left total maxillectomy 2 years back along with post-operative radiation therapy.



Figure 1: Intra oral defect

On examination there was a palatal defect in left maxillary region (Fig.1.) The oral mucosa was healed and healthy. Teeth no. 11, 16, 17, 18, whole of left maxillary quadrant, 31, 32, 33, 37,38, 41,

42,43,44,47 and 48 were missing.34, 35 and 45 were lingually inclined. Apart from difficulty in swallowing she has difficulty in speech and unaesthetic appearance had led to psychological trauma. The patient was wearing interim obturator for past one year which was now loose and ill-fitting. The treatment plan for the patient was to provide a definitive obturator along with RPD for mandibular missing teeth. Single piece hollow obturator prosthesis made of heat cure acrylic resin was planned.

PROCEDURE

1. Perforated tray was used for making a primary impression of the defect.
2. Equal amount of impression compound and green stick compound was mixed and kneaded together in hot water, which was loaded and shaped on left side of the maxillary tray and an impression was made of the defect with light pressure (Fig.2.).
3. There after the tray was loaded with alginate with a wet gauge covering the bulb part and full arch impression was made. The gauge was used so as to prevent escaping of the alginate into the nasal cavity. Alginate impression was also made for the mandibular arch using perforated tray (Fig.3.).
4. Impressions were poured using dental stone and primary casts were obtained.
5. The undercuts were blocked using modelling wax and special tray was fabricated using auto polymerising acrylic.(Fig.4.).
6. Border moulding was done using function moments. Size and shape of the bulb was recorded using green stick compound in increments.
7. Finally impressions were made using zinc oxide eugenol impression paste and alginate for maxillary and mandibular arch with single tray dual impression technique(Fig.5.).
8. Next the impressions were poured in dental stone and final master cast were obtained (Fig.6.).
9. Shellac base plate was adapted and bite rims using modelling wax was fabricated.
10. Maxillary rim was adjusted till proper lip fullness was attained and finally the jaw relations were recorded (Fig.7).
11. Casts were mounted on the mean value articulator and teeth setting was done. Retentive clasps with respect to 12,15and pin head clasps with respect to 13,14,15 were incorporated for retention.



Fig.2. Impression made with impression compound

Fig.3. Primary impression

Fig.4. Special tray fabricated

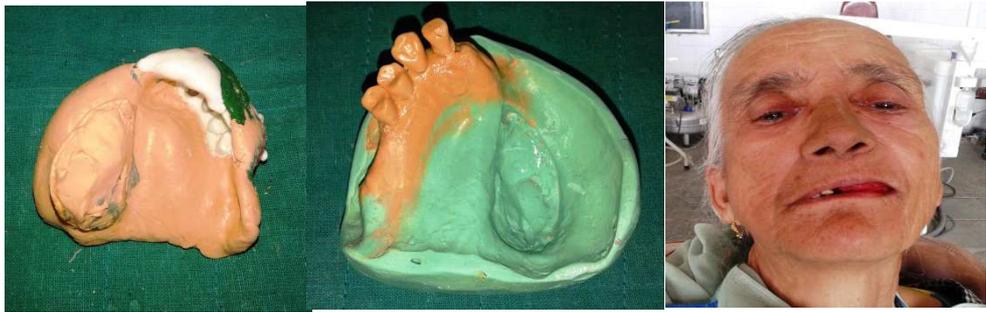


Fig.5. Final impression made

Fig.6. Master cast

Fig.7. Bite registration



Fig.8. Trial making

Fig.9. Dewaxed casts

Fig.10. Heat cure acrylic adapted to the defect

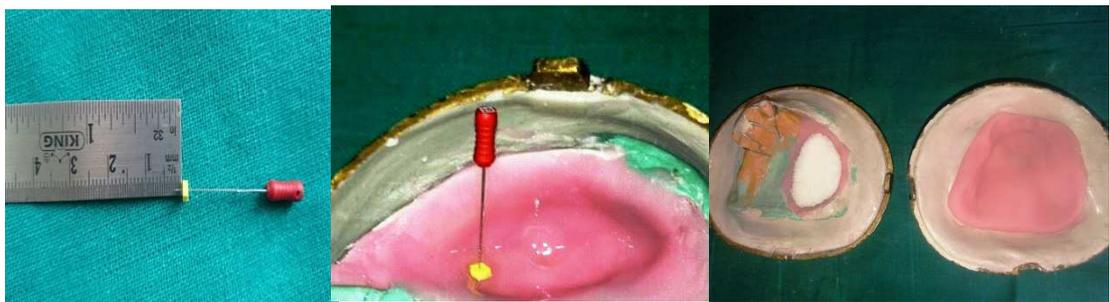


Fig.11. Stopper measured 2mm from the tip of reamer

Fig.12. Thickness maintained with the reamer

Fig.13. Hollow defect filled with salt

12. Trial was made and evaluated for aesthetics, phonetics and functional occlusion (Fig.8.).
13. There after proper wax up was done and casts were dearticulated.
14. Flasking and dewaxing were carried out in usual manner (Fig.9.).
15. Heat cure acrylic resin was mixed and at the time of packing (doughy stage), a small portion of mix was adapted to the defect with light pressure (Fig.10.).
16. Thickness of the inner bulb was maintained at 1.5 to 2mm thickness. This was achieved by

- pressing a reamer into the acrylic with 2mm of stopper maintained from the tip¹⁶(Fig.11&12.).
- The hollow defect was filled with the salt and finally the remaining heat cure acrylic was packed in the usual manner (Fig.13.).

- Routine curing procedure was followed for the fabrication of prosthesis.
- The obturator was grossly trimmed and finally polished using standard procedures (Fig.14a&14b.).



Fig.14 a & 14 b.Finished and polished obturator



Fig.15.Hole drilled and salt removed



Fig.16a. Patient without obturator



Fig.16b. Patient without obturator



Fig.17a. Patient with obturator



Fig.17b. Patient with obturator

- A hole was drilled onto the palatal surface of the bulb and the salt was drained out of it using water with syringe. The hole was closed using auto polymerizing acrylic resin (Fig.15.).
- Finally obturator insertion was done after making necessary occlusal adjustments and post insertion instructions were given to the patient for proper maintenance of the prosthesis (Fig.16a, 16b&17a, 17b.).

DISCUSSION

The patient was recalled on periodic visits and whatever corrections required was made. Initially the patient had slight problem with speech and mastication which improved with time during her subsequent visits. The patient was comfortable with the prosthesis and her appearance, masticatory efficiency, speech were drastically improved.^{5,6,17} The hollow bulb obturator was light weight which

helped in better retention, stability and acceptance by the patient.^{7,17} Closed one piece hollow obturator provides an overall water tight hollow chamber as compared to other obturators which are fabricated by sealing the bulb to the obturator thus increasing the chances of seepage of fluids between the joints.^{9,11}

CONCLUSION

The design and fabrication of the bulb portion is the most important and demanding task for the success of an obturator prosthesis. A full bulb is likely to increase the weight of the prosthesis and therefore, it cannot be used successfully. The technique outlined in this article is practical for patients with an advantage of convenience, time, and cost savings and at the same time provides light weight prosthesis for better retention and acceptability by the patient. Prosthodontic care for a patient with maxillary defect should include cautious prosthesis designing, combined with routine maintenance and ample care to provide comfort, function, aesthetics and minimal changes to the remaining compromised structures.

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