

Prosthetic Rehabilitation of a Partial-maxillectomy Patient with Closed Hollow Bulb Obturator Prosthesis

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ABSTRACT

Post-surgical maxillary defects pre-dispose the patient to hypernasal speech, fluid leakage into the nasal cavity, and impaired masticatory function. Such defects need special prosthesis to establish oro-nasal seal and rehabilitate the patient. In this report we have fabricated closed hollow bulb obturator prosthesis using thermoplastic resin sheet for a 56-year-old female patient by one-step polymerizing technique. The advantages of this technique are reduced laboratory time, simple procedure (one-time processing) to fabricate obturator that is lightweight, promotes a good seal and is completely covered with heat-cured acrylic resin. Closed hollow obturator prosthesis helped in functional rehabilitation and improving quality of life of the patient.

Keywords: Closed hollow bulb obturator; partial maxillectomy; prosthetic rehabilitation; thermoplastic resin.

INTRODUCTION

Intraoral maxillofacial defects can be either congenital or acquired. Acquired defects can occur as a result of surgical resection of the tumors, trauma or pathological changes.¹ Post-surgical maxillary defects predispose the patient to hypernasal speech, fluid leakage into the nasal cavity, and impaired masticatory function. Such defects need special prosthesis to establish oro-nasal seal.¹ 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 or soft tissue structures.”² The obturator prosthesis is used to restore masticatory function and improve speech, deglutition and cosmetics for maxillary defect patients.^{1,3} These prostheses vary in size and shape depending on the extent of the defect and should be easily fabricated, lightweight, and provide retention, stability, and patient comfort.^{4,5} Depending on the size of defect, significant weight reduction

of 6.55% to 33.06% can be obtained by hollowing the obturator.⁶ The open hollow obturator has disadvantages such as accumulation of food, debris, mucus inside the hollow part leading to malodor and an increase in weight.^{5,7} The closed hollow obturator prevents water and food retention, enables cleaning, has a reduced weight and maximum extension.⁷

CASE REPORT

A 56-year-old female presented to Department of Prosthodontics, College of Dental Surgery, BP Koirala Institute of Health Sciences with chief complaints of difficulty in mastication, nasal regurgitation of fluids and nasal tone in voice. Her medical history revealed that she had undergone right partial maxillectomy for squamous cell carcinoma of right maxillary sinus seven months ago. She had worn surgical and interim obturator. On extraoral examination, she had reduced lip fullness in the right side (Figure 1). Patient showed difficulty in mandibular movements with reduced mouth opening. On intraoral examination,



Figure 1: Extraoral view of the patient.



Figure 2: Intraoral view.



Figure 3: Intraoral view of defect.

all teeth on maxillary right quadrant except central incisor were missing (Figure 2). There was post maxillectomy defect involving part of hard palate, alveolar ridge, maxillary tuberosity and some part of soft palate (Figure 3). The defect was classified as Aramany's Class II maxillary defect and treatment plan was made to rehabilitate the patient with closed hollow bulb obturator prosthesis using thermoplastic resin sheet. After the treatment plan was explained to the patient and was accepted by her, treatment was carried out.

The primary impression was made using irreversible hydrocolloid and primary cast was poured with dental stone (Figure 4, Figure 5). The defect was blocked with gauze piece prior to impression making. Custom tray was fabricated using autopolymerising acrylic resin. The defect site was molded using greenstick compound and final impression of the defect was made using light body addition silicone (Figure 6). The primary cast was altered using final impression

of the defect area and the master cast was obtained by altered cast technique (Figure 7). Denture base and occlusion rim was fabricated. Maxillomandibular relationship was recorded, articulation and teeth arrangement was done (Figure 8, Figure 9). The wax try-in was carried out to check occlusion, phonation and esthetics (Figure 10).

After try-in hollow bulb was fabricated using thermoplastic resin sheet. Baseplate wax was adapted in the defect with stoppers for relief (Figure 11). Thermoplastic resin 1.5 mm thick (Erkodent) was used to fabricate the bulb part of the obturator in a thermoforming unit (Erkopress 300Tp). Lid part of the obturator (hollow bulb) was also made with the thermoplastic resin (Erkodent). The bulb and lid portions were sealed with autopolymerising resin to obtain a single hollow body (Figure 12). The denture was flaked and dewaxed in the usual manner (Figure 13).

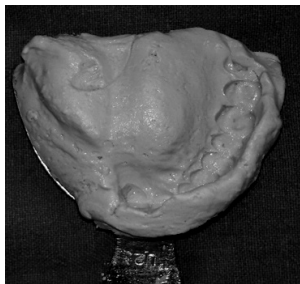


Figure 4: Primary maxillary impression.

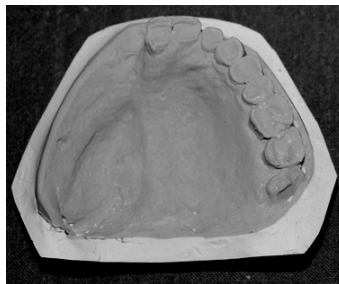


Figure 5: Primary maxillary cast.

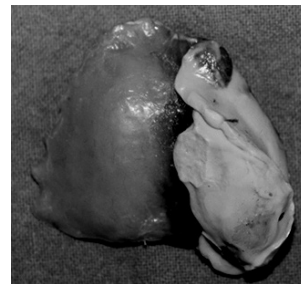


Figure 6: Final Impression of the defect made with addition silicone light body.

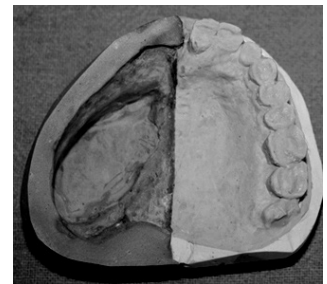


Figure 7: Master cast obtained with altered cast technique.

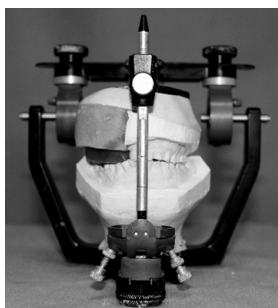


Figure 8: Articulation.

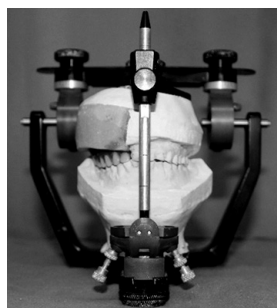


Figure 9: Teeth arrangement.



Figure 10: Wax try-in.

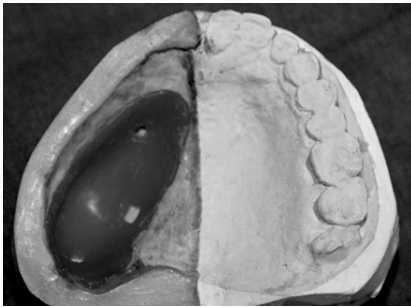


Figure 11: Adaptation of baseplate wax in the defect with stoppers for relief.

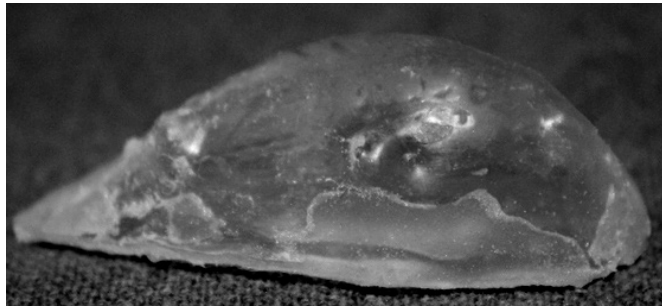


Figure 12: Internal hollow bulb portion after being sealed with auto polymerising acrylic resin.

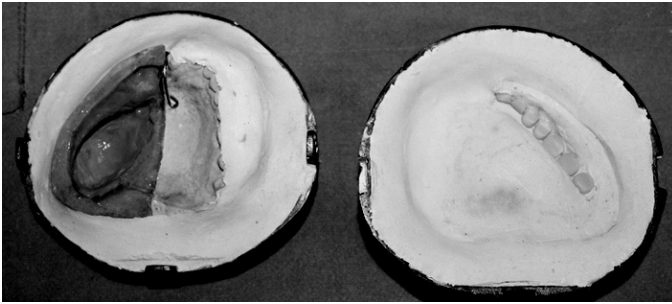


Figure 13 : Dewaxing.

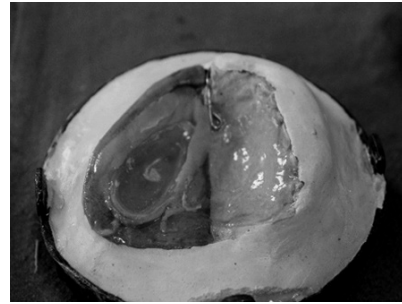


Figure 14: Adaptation of hollow bulb in the defect.

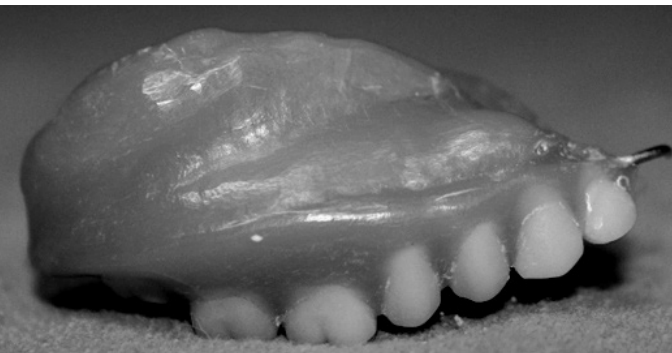


Figure 15: Final Prosthesis (lateral view and intaglio surface).

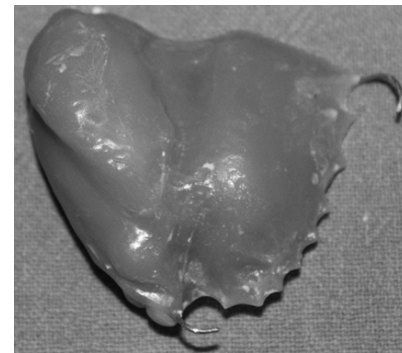


Figure 16: Prosthesis inserted in the mouth showing fit and adaptation.

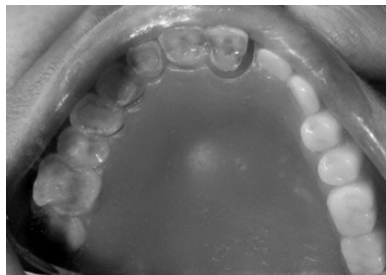


Figure 17: Extra-oral view of the patient with prosthesis in situ.

The defect area was loaded with heat-polymerising resin and preformed hollow body was adapted over it (Figure 14). Packing and curing was done. Finishing and polishing of the prosthesis was done (Figure 15). The prosthesis was inserted after intraoral adjustments (Figure 16). Patient was happy and

satisfied with the improved function, speech and esthetics (Figure 17). The prosthesis was comfortable to the patient and had good retention. The patient was instructed about maintenance of the prosthesis. Regular periodic recall checkups were done to verify condition of surgical site and prosthesis evaluation.

DISCUSSION

Several techniques have been advocated in the literature for fabrication of hollow obturators. Materials such as ice, salt, sugar, silicone rubber, wax shim have been used in the defect portion during processing and then removed through holes after processing. Malaton and La Fuente described the technique of adding sugar during processing of the obturator, which is later removed by drilling a hole in the superior surface and the hole is filled with autopolymerising resin.⁸ El Mahdy et al described the two flask technique to process the obturator and the tooth portion separately.⁹ Mc Andrew et al described the technique of fabricating the prosthesis in two halves and sealing them using autopolymerising resin.⁴ The disadvantages of these techniques are; additional processing time required to process the lid, seepage of fluids is possible if the seal is improper. The method described in this report solves these problems and has several advantages. The separate

fabrication of a lid is not needed in this technique. So, chance of water leakage, food accumulation, bacterial overgrowth can be prevented since bulb template has been pre-formed and is completely covered by heat cure acrylic resin.¹⁰ The prosthesis is fabricated using a single flask which considerably reduces the laboratory time and makes the procedure simple (one-time processing). The thickness of the hollow bulb can be controlled and light weight closed hollow bulb prosthesis can be fabricated.¹⁰

The hollow bulb obturator prosthesis helped in functional rehabilitation of the patient by providing better masticatory efficiency, improved phonetics, esthetics and contributed to psychological well-being of the patient. Prosthetic rehabilitation with hollow bulb obturator prosthesis helped in improving quality of life of the patient.

JNDA

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