

PROSTHODONTIC REHABILITATION OF MAXILLECTOMY PATIENTS WITH HOLLOW BULB OBTURATOR CLINICAL SERIES

NASEER AHMED¹, MUHAMMAD ABBAS²

ABSTRACT

Prosthodontic Rehabilitation of maxillectomy defects is one of the complex treatment modalities practiced. Maxillectomy is performed for surgical treatment of congenital and acquired diseases and it is the most common of maxillofacial defects which need to be successfully rehabilitated to restore morphology, masticatory function, swallowing and speech. Prosthodontic rehabilitation of these defects is commonly done with an obturator prosthesis. Effective obturation of maxillectomy defect is a difficult task for the maxillofacial Prosthodontists. Multidisciplinary treatment planning is essential to achieve adequate function and retention for the prosthesis. The present clinical series describes the steps in fabrication of hollow bulb obturator prosthesis utilizing anatomical and mechanical means of gaining retention.

KEYWORDS: maxillectomy, hollow bulb obturator, prosthodontic rehabilitation.

INTRODUCTION

The term maxillectomy is used by maxillofacial surgeons to describe partial or total removal of the maxillae in patients suffering from benign or malignant neoplasms. Maxillectomy defects can be categorized as limited, partial, medial, subtotal, total and radical.¹ The Aarmany's classification according to size of defect consisting of six classes Midline, unilateral, central, anteroposterior, bilateral anterior and bilateral posterior resection.² The intraoral surgical defect often includes removal of the hard and soft palates, which results in an oroantral communication.³ The hard and soft palates are anatomical structures that have widely recognized roles in speech and deglutition.³ Several treatment options have been advocated for reconstruction of such defects. The strategic treatment plan must incorporate the help from oral and maxillofacial surgeon, Prosthodontist, Speech therapist, Psychiatrist, General dentist and Dental auxiliary staff.⁴

Since the surgical approach alone without prosthetic rehabilitation 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.⁴ keeping this in mind the use of an obturator prosthesis in conjunction with preprosthetic surgery for restoration of maxillary defects is a gold standard treatment option. Obturator is a prosthesis used to close a congenital or an acquired tissue opening, primarily of hard palate and contiguous alveolar structures.⁵

Effective obturation of maxillary defects produces sufficient separation of the oral and nasal cavity to improve the quality and intelligibility of speech.⁴ It also enhances masticatory function, deglutition and esthetics.⁴ The weight of maxillary obturator prosthesis is often a factor to be considered with respect to retention and comfort of the patient. The weight of the prosthesis may act as a dislocating force.⁵ Hence it is desirable to design light weight prosthesis.⁴ Obturator designs for partial and total maxillectomy defects have included open

and closed hollow obturators, inflatable obturators and 2-piece hollow obturator prosthesis.³ This clinical series describes the fabrication of hollow definite obturators utilizing mechanical means and anatomical structures of patients left at the surgical site for its retention.

CLINICAL SERIES

A twenty two year old male patient reported to the Department of Prosthodontics Dr. Ishrat-ul-Ebad Khan Institute of oral health sciences / Dow University of health sciences Karachi with a swelling on the right side of the palate. The patient was referred from the ear and nose throat department after being diagnosed as mucoepidermoid carcinoma. A surgical resection of the tumor was planned which was to be followed with prosthetic rehabilitation (Figure - I).

Figure - I: Pre operative clinical picture of palatal swelling (right); diagnosed on incision biopsy (Mucoepidermoid Carcinoma)



Diagnostic impressions of maxillary and mandibular arches were made for the fabrication of a surgical obturator, which could act as a surgical stent. The patient was then operated and the tumor was excised. The surgical resection also included a part of the palate and the following teeth. The defect category was class 1 Aramany "midline resection" (Figure - II). The surgical obturator was planned to be worn for a period of 14 days, following which the patient was given interim obturator until a satisfactory healing of the tissues is achieved (Figure - III). Since the patient was depressed and not giving regular follow up visits, so it was decided to reline the obturator and patient was sent to the psychologist for psychiatric support. After this

1. Postgraduate Resident,
2. Assistant Professor,
Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences,
DOW University of Health Sciences, Karachi.

Correspondence to:

Dr. Naseer Ahmed

Postgraduate Resident of Prosthodontics,
Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences,
DOW University of Health Sciences, Karachi.
E-Mail: naseer_ahmed752@yahoo.com

Figure - II: Intraoral view of midline defect



making of definitive obturator prosthesis was planned for the patient.

Figure - III: Surgical obturator prosthesis



Another young male 27 year old patient, surgically operated three times for maxillary osteomyelitis in a private hospital presented with subtotal maxillectomy in Prosthodontics department. He had an obturator in use which was now disintegrating (Figure - IV) it was repetively dropping (unretentive) even during the interview.

Figure - IV: Obturator in use by the patient



On examination it was found to be a conventional obturator base loaded with permanent relining material, it was heavy in weight and lack tissue surface morphology. After diagnosis a new obturator fabrication with hollow bulb was planned to best fulfill the patient's need.

DEFINITIVE PROSTHESIS: Primary impression of both patients

was made in perforated stock tray. The tray was first modified using impression compound corresponding to the area of the defect and then loaded with irreversible hydrocolloid to make the impression of maxillary arch. The impression of the mandibular arch was recorded using irreversible hydrocolloid material. The primary casts were obtained from the impression and undesirable undercuts were blocked on the cast with soft plaster and finally duplicated in type 3 dental stone. The custom tray was constructed on the duplicated cast using self cure acrylic resin.

The secondary impression of the defect area was made using single stage monophasic technique, first the medium body addition silicone was injected directly in the defect and then the custom tray was loaded with same material. A pick up impression of the remaining natural teeth were made using alginate in the case of midline maxillary defect. The impression was then poured to obtain master cast which was then duplicated to gain processing cast. The unnecessary undercuts were blocked and design of the prosthesis was finalized (Figure - Va and b).

Figure - V: (A) Master cast of the patient(subtotal maxillectomy)

Figure - V: (B) Obturator design marked with RED color



Fabrication of the hollow bulb: The retention in the two cases was gained by utilizing soft tissue undercuts in anterior nares and posterior half of soft palate and by multiple wrought wire clasps on abutment teeth (Figure - VI). After application of the separating media on the cast, a wax pattern of 3 mm thickness with modeling wax closely adapted to the defect wall and remaining part of hard palate was made for denture base construction. The framework of hollow bulb was constructed in the wax pattern, on the polished side of wax pattern covering the defect area lid seat were created (Figure - VI) and a contoured wax pattern of 2 mm thickness for lid construction was made separately. Since the defect area was too large, a large flask was used for dewaxing and curing of obturator base. The obturator base was tried in the mouth and found to fit accurately. The patient's dexterity in manipulating the clasp was assessed at this stage and found to be satisfactory. Following occlusal registration, tooth selection and setup, the obturator final trial was completed.

Figure - VI: Wax up for lid construction



Processing of Obturator: The trial obturator was then sealed to the cast and invested in college pattern flask according to the standards. After application of the separating media on the cast, the middle portion of flask was positioned and poured. This was

followed by the dewaxing procedure. After separation of the counter parts, separating medium was applied again on to the cast and the counter portion, where required. Heat cure resin was adapted in to the teeth portion, and trial closure was carried out. The excess flash of dough was removed and processed to the regular curing cycle. The lid of obturator was processed in a separate small flask. Following deflasking procedures, after initial trimming the lid was attached precisely over the hollow bulb portion of obturator with self cure acrylic resin (Figure - VII).

Figure - VII: Obturator base (impression surface)



The obturator was then finished, polished to perfection and stored in a humid environment (Figure - VIII and IX).

Figure - VIII: Finished and polished obturator



Figure - IX: Final finish of obturator base (impression surface)

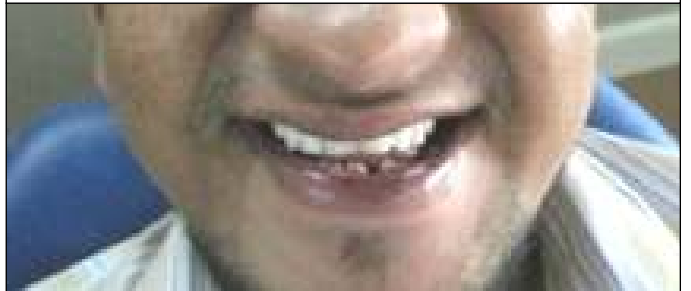


Insertion and maintenance phase: The obturators was placed intraorally using a rotational path of insertion (Figure X and XI) The posterior extension was positioned first over the soft palate, and the anterior portion was then rotated upward and outward onto the space that was originally occupied by the anterior nasal bone. The clasps are then positioned laterally on the corresponding abutment teeth. The prosthesis and oral cavity were moistened to facilitate successful placement of obturator. The patients were educated how to position, remove, clean the obturator and patients were also instructed to remove the prosthesis only when cleaning it. The retention and stability of the prosthesis were evaluated subjectively. Swallowing evaluation revealed no leakage or nasal regurgitation. The seal around the obturator was checked using valsalva maneuver.

Figure - X: Definite obturator in situ



Figure - XI: Patient with obturator in situ



The nasal resonance was evaluated with words beginning with nasal consonants such as (beat) were compared with words beginning with non nasal consonants such as /p/, /m/. The patient returned for several adjustments of the intaglio and occlusal surface of the prosthesis. At further subsequent review appointments, the patients reported satisfaction with the aesthetics, function and retention of the prosthesis.

DISCUSSION

Successful prosthodontic rehabilitation of maxillectomy defects is a challenging procedure that requires multi-disciplinary expertise to achieve acceptable speech, swallowing and chewing function. The patients presented in this case series, Oral and ENT surgeon resected the palatal tumor and acquired infection, and preserved half of hard palate and complete soft palate in one case and posterior third of the soft palate in second case. After surgical resection, the defects could be categorized under Aramany class I situation and subtotal maxillary defect². Though the patients had no history of maxillary radiation therapy still the dental implants was not an option because of the lack of bone at the potential site and cost. Therefore mechanical and anatomical means of gaining retention were used.⁴

A closed hollow bulb design obturator with required components was constructed for the patient in this clinical series. The design was selected to make the prosthesis light weight and comfortable for the patient.⁶ The design also added resonance, which improves the articulation function. The method used in the fabrication of the obturator in this series involved a two step technique in which the obturator body and its lid were processed separately and then joined together with self cure acrylic resin. The obturator framework was made using only heat processed acrylic resins without cast metal incorporation⁷ to achieve light weight since the defects in both cases were large in size. The framework incorporated multiple wrought wire clasps and acrylic extensions in base plate at anterior nares and posterior soft palate region to provide adequate retention, support and stability. Literature on using the anterior nares retention is scarce.³ Our clinical experience with this obturator prosthesis provides further support of this technique to facilitate retention. Finally, referral to speech therapist to provide objective assessment and rehabilitation of speech and swallowing capabilities. The psychologist assisted the patients to combat stress and mental trauma. It is important that clinicians do not overlook the importance of referral to the speech therapist and psychologist.

CONCLUSION

The rehabilitation of subtotal and midline maxillectomy defects represents a complex challenge for the maxillofacial prosthodontist. Multidisciplinary approach in treating maxillectomy defects would enable the patient to speak and swallow successfully. The present clinical series showed prosthodontic rehabilitation of a partial and subtotal maxillectomy patients using hollow bulb definitive obturators utilizing anatomical and mechanical means for gaining retention. The prosthesis rehabilitated the patient in terms of

function by providing adequate chewing efficiency and phonetics by adding resonance to the voice hence improving the clarity of speech and also improved the esthetics of the patient. The use of a hollow bulb design enhance comfort of the patient by decreasing the weight of the prosthesis.

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