

Maxillofacial Obturator Prosthesis in a Post-mucormycosis Maxillectomy Patient – A Case Report

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Abstract

Patients afflicted with maxillofacial defects secondary to surgical resection suffer from physical, functional, esthetic, and psychological impairment. In clinics, these patients present with varying range of chief complaint. Most of the patients present with symptoms such as difficulty in chewing, swallowing, and also impaired articulation and phonation of speech. As a clinician, our main aim should be addressing the chief complaint and helping in restoring the form, function, and esthetics of the patient. These patients can be successfully managed with maxillofacial obturator treatment. However, the clinical success depends on the ability to adequately rehabilitate such patients and improve their oral health-related quality of life.

Keywords: Hemi-maxillectomy, Maxillofacial obturator, Maxillofacial prosthesis, Mucormycosis.

INTRODUCTION

A maxillary obturator is a prosthetic device that is used to restore the loss of function and compromised esthetics in patients who have undergone surgical resection of all or part of maxilla due to various reasons such as tumor, trauma, infection, or due to congenital defects.^[1,2] Prosthodontic rehabilitation of maxillary acquired defects is divided into three phases of treatment, that is, immediate, interim, and definitive.^[1] Immediate surgical obturator is given after the surgery which forms the stable matrix for surgical packing, helps during initial healing, and enables the patient to speak and swallow more effectively. Interim obturator is given 2 weeks after the surgery which has acrylic denture teeth and light contact with opposing tooth.

Definitive obturator is given 3–6 month after the surgery and once the defect site has completely healed and further no scar contraction is speculated.

Maxillary obturators can be divided into two categories: Conventional and implant-retained.^[3] Conventional obturators are removable and are retained by means of mechanical and physiological factors while implant-retained obturators are anchored to dental implants. Implant-retained obturators provide greater stability and retention and are typically preferred in cases where conventional obturators do not provide sufficient support or retention. However, it has

certain limitations considering its high cost and complications associated with surgical procedure.^[3]

Cast partial maxillary obturator is given in cases where surgery is contraindicated and in cases where size and extent of deformity contraindicates the surgery.^[1]

The design of a maxillary obturator is crucial in ensuring optimal fit and function. The prosthesis should be designed to provide adequate coverage of the defect, while also avoiding excessive bulk and impingement on the soft tissues.^[4] The material used in the fabrication of the obturator should be lightweight, durable, and biocompatible. This report elucidates a method to rehabilitate a maxillary defect using obturator prosthesis.

CASE REPORT

A 38-year-old male patient was referred to the department of prosthodontics for the fabrication of immediate surgical obturator. Patient history revealed that the patient had tested

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positive for COVID-19 and was diagnosed with mucormycosis involving nasal cavity up to the hard palate. Medical history revealed that the patient was diagnosed with diabetes during the COVID-19 infection. On extraoral examination, there was a mild diffuse swelling on the left side of face. On palpation, the swelling was tender and soft. No lymph-nodes were palpable or tender. Eye movements were normal; there was no complaint of visual impairment by the patient. Patient was also having a nasal twang while speaking.

Intraoral examination revealed palatal lesion of 2*2 cm involving a hard palate extending from the first premolar to the second premolar region. Lesion presented with denuded bone with irregular margins. The lesion was covered with brown and yellowish slough. Patient had overall good dentition except grossly decayed 28 and missing 35, 37, and 47 (Figure 1).

A pre-operative impression was made using irreversible hydrocolloid impression material (Algingum, Prime Dental Products Pvt., Ltd.) in a perforated stock tray. Impression was poured in Type III gypsum (Kal Stone, Kalabhai) (Figure 1). The study model was sent to the surgeon, to mark the area planned for resection. An immediate surgical obturator was fabricated using clear acrylic resin material (Dental product of India [DPI]). Surgical debridement was done by ear, nose, and throat (ENT) surgeon under general anesthesia. Patient was advised mouth rinse using 2% of dilute hydrogen peroxide and betadine mouthwash (povidone-iodine USP 1.0%). Patient reported after 7 days to the department. Clinical examination was carried out and obturator adjustment was done. Patient was kept in follow-up for next 3 months and was shifted to an interim obturator during this follow-up period.

During the follow-up, patient's left upper quadrant was seen mobile; patient was referred back to ENT department for revaluation and repeat fungal test. Patient was diagnosed with fungal involvement of the left alveolar region. Patient underwent further debridement and resection of the left

maxillary alveolar region. An immediate surgical obturator was newly fabricated for the patient. An interim obturator was fabricated after 15 days and patient kept on follow-up for the next 6 months.

Patient reported back after 6 months and was referred to ENT surgeon for follow-up and fungal test, and for a clearance certificate for the fabrication of definitive obturator. An orthopantomogram (OPG) was advised for the radiological examination. OPG was evaluated and a definitive obturator was planned for the patient.

Preliminary impression was made using alginate (Algingum, Prime Dental Products Pvt., Ltd.). Surveying was carried out to assess retentive and undesirable undercuts. Undercuts were marked and metal framework designing done following which mouth preparation was carried out.

A custom tray was fabricated using self-polymerizing acrylic (DPI) for secondary impression. Border molding was carried out using low fusing impression compound and wash impression made using Monophase impression material. The impression was poured in Type IV gypsum (Elite Rock, Zhermack). Wax-up of framework was done. The framework was subsequently casted in cobalt chromium alloy. Metal framework trial was done; cold cure acrylic resin was adapted to the framework in the defect side for recording the defect using low-fusing compound. An occlusal rim was fabricated which was supported with low fusing compound as it assures the proper seating of the framework while making the impression of defect. The defect impression was accommodated in the master cast through altered cast technique (Figure 2).

Occlusal rims were fabricated using hard wax. Orientation jaw relation was recorded using a facebow. Facebow and centric relation record were used to mount the models to a semi-adjustable articulator. Tooth mold was selected for the patient according to the patients existing shade and size of existing teeth. Teeth arrangement and denture trial were done to assess occlusion, phonetics, and esthetics. The denture



Figure 1: Intraoral view showing defect site, primary impression using irreversible hydrocolloid



Figure 2: Photograph showing metal framework with impression of the defect

was then processed using heat-polymerizing acrylic resin (Figure 3). Since the defect was large, a hollow bulb design was fabricated for the defect using the “lost salt technique.” Finished and polished denture was inserted and post-insertion instructions explained to the patient (Figure 4). The patient was subsequently followed up after 24 h, 7 days, and 1 month for necessary adjustments and evaluation.

DISCUSSION

Mucormycosis affecting hard palate is an aggressive lesion involving surgical removal of affected part, when such defects are compared with defects due to malignancies, the dynamic nature of the defect precludes prior prognostic evaluation. Surgical rehabilitation is compromised in cases of mucormycosis as the defect is large due to aggressive nature of lesion.

For optimal reconstruction of maxillary defects, various therapeutic approaches can be used, including prosthetic obturators, non-vascularized grafts, local flaps, regional flaps, and free tissue transfer.^[1] Reconstruction of maxillary defects by either reconstructive surgery or an obturator prosthesis

is dependent on patient characteristics, such as age, medical history, and defect size. Hence, surgical correction of defect is not possible in all cases due to deficient bone and additional morbidity and complications associated with surgical procedure.^[5]

During the healing phase, scar tissues contract; hence, the predictability of prosthetic treatment outcome is compromised. In any given situation, obtaining adequate retention, support, and stability is primarily important for the success of prosthesis.^[3] The denture base should be extended properly to include the maximum area available for seating of the prosthesis.^[4,6] Altered cast technique can be used to reproduce available supporting structure for adequate denture base extension and favorable physiologically support when prosthesis is seated. Teeth arrangement should be done in neutral zone which aids in retention. Prosthesis for mid-facial structures usually has extensions in the form of bulb which should be hollowed to reduce the weight of prosthesis. This makes patients more acceptable for the treatment. It also provides resonance to the voice and helps in speech.^[7,8]

Fabrication of prosthesis has advantage over surgical procedure as this is less invasive and requires less time. It helps in restoring lost teeth, oral structures, and functioning.

Quality of life (QoL) of patients with maxillary defects improves with the provision of a properly designed obturator. The prosthetic obturator can restore mastication, swallowing, esthetic, and phonetics. Patients having maxillofacial defects with prosthetic rehabilitation are benefited psychologically and help in socialization.^[9]

Kornblith *et al.* reported that obturator prosthesis helps in improving psychological well-being and the QoL for maxillectomy patients by well-functioning prosthesis.^[3] Therefore, maxillofacial prosthesis is good treatment modality for achieving satisfactory esthetic and functional results.^[10]

The obturator functioning scale (OFS) (developed at Memorial Sloan Kettering Cancer Center) can be used for assessing the functioning of an obturator.^[11] It has been concluded that the OFS was sensitive in indicating that an obturator was central to the QoL experienced by their patients and that QoL was largely dependent on the obturator's impact on improved speech and eating.

CONCLUSION

Loss of mid-facial structure can cause functional (speech, mastication, and swallowing) and esthetic limitations secondary to trauma, infections, or malignancies. Maxillary obturator is an effective and minimally invasive way to treat such defects. The obturator provides both functional and esthetic benefits to the patients allowing them to speak, eat, and swallow comfortably and confidently. The success of the obturator depends on how well the principles of retention, support, and stability are followed. Despite some challenges associated with the use of the obturator, such as discomfort



Figure 3: Photograph showing design of metal framework



Figure 4: Intraoral photograph of the obturator prosthesis

and difficulty in cleaning, the overall benefits far outweigh the drawbacks.

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