



Case Report

Rehabilitation of maxillectomy in mucormycosis patient by using obturator: A case report

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Abstract

To rehabilitate the patients with maxillary defect prosthetically is a very daunting task. It is not easy to obtain proper retention while half of the dentition along with supporting bone is lost, so for productive prosthesis proper understanding of utilization of remaining structure is important factor. A multidisciplinary approach, incorporating the expertise of maxillofacial surgeons, prosthodontists, speech therapists, and psychologists is essential. Patient-centered care, including education, support, and regular follow-up is vital for successful rehabilitation. Mucormycosis, a potentially fatal fungal infection, has seen a recent surge, especially among COVID-19 patients, with those having weakened immune systems being most vulnerable. Surgical removal of infected tissue often leaves significant defects in the upper jaw, severely affecting patients' ability to speak, eat, and maintain facial aesthetics. This case report underscores the importance of a comprehensive, collaborative approach in achieving effective prosthodontic rehabilitation post-hemimaxillectomy.

Keywords: Maxillary defect, Mucormycosis, Hemimaxillectom

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1. Introduction

The facial features that are both practical and aesthetically pleasing are attributed to the maxilla. It is a crucial structure for swallowing, mastication, phonation, face shape aesthetics. A maxillary deficiency can congenital, traumatic, and pathological. The most common causes of acquired maxillary defects are trauma or surgery.¹ Almost majority acquired maxillary abnormalities result from the excision of an oral tumour. Congenital defects comprising 54.7%, followed by traumatic defects at 25.3%, and surgical defects at 20%.²

With the exception of those with minor oronasal and oro-antral flaws, which could be surgically closed, individuals with these anomalies are restored using prosthodontic techniques. Palatal abnormalities have long been treated with prosthodontic therapy.³

Artificial defect closure and sufficient maintenance of the artificial closure were the first treatment goals. One of the main goals of prosthodontic treatment is to provide a

comfortable, aesthetically pleasing prosthesis that recovers the compromised physiologic functions of speech, deglutition, and mastication. An obturator prosthesis that is comfortable, restores appropriate speech, deglutition, and mastication, and is acceptable cosmetically should be given to a patient with an acquired maxillary deformity.⁴

The achievement of these objectives will be influenced greatly by the size and location of the acquired defect and the quantity and integrity of the remaining structures. According to Aramany, maxillectomy defects are divided into six classes. These are; Class I: The midline resection of the maxilla; the teeth are maintained on one side of the arch. Class II: The unilateral defect, retaining the anterior teeth on the contralateral side up to 2nd premolar. Class III: The defect occurs in the central portion of the hard palate and may involve part of the soft palate. Class IV: The defect crosses the midline and involves both sides of the maxillae up to 2nd pre-molar on contralateral side. Class V: The bilateral defect and lies posterior to the remaining abutment teeth. Class VI:

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The bilateral defect and lies anterior to the remaining abutment teeth.⁵

The purpose of an obturator is to seal a defect or opening in the maxilla caused by trauma, cleft palate, or removal of the maxilla owing to pathologic mass. Obturator prosthesis can restore oro-nasal separation, which can enhance speech, mastication, swallowing, and aesthetics. Patients with acquired surgical deformities of the maxilla might get one of three types of obturators: surgical, interim, or final.⁶

2. Case Report

A fifty-year-old male patient reported to the Department of Prosthodontics for the repair of a maxillary defect. The patient's main complaint was that he was having trouble breathing, speaking with a hyper nasal accent, and having discharge come out of his nose while he was eating or drinking liquids. The patient had a history of mucormycosis of the left palate and maxillary antrum. Left maxillectomy and later radiotherapy was performed. He was rehabilitated with a definitive acrylic maxillary obturator.

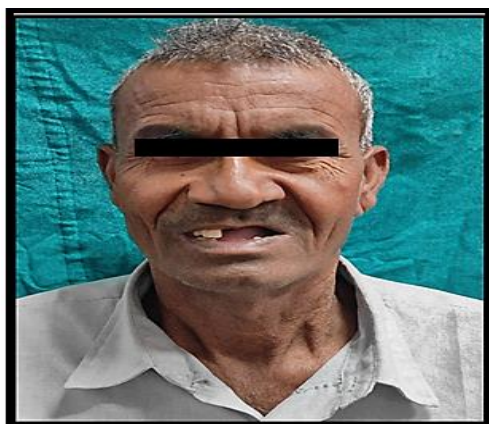


Figure 1: Pre-operative frontal view



Figure 2: Pre-operative lateral view



Figure 3: Pre-operative intra-oral view



Figure 4: Maxillary impression



Figure 5: Flasking of obturator



Figure 6: Mould after de-waxing



Figure 7: Final prosthesis



Figure 8: Post-operative intraoral view in occlusion



Figure 9: Post-operative intraoral occlusal view



Figure 10: Post-operative frontal view

A preliminary impression of the patient's maxillary arch was made using an irreversible impression material (Zhermack, Italy). A cast was poured from the primary impression to create a model of the patient's oral anatomy. A custom tray was fabricated based on the primary cast to ensure an accurate final impression using cold cure acrylic

resin (DPI RR Powder). The custom tray was loaded with a low-fusing compound green stick (DPI) and placed in the patient's mouth. The compound manipulated to mold the borders of the defect area, ensuring the final impression captures all the necessary details. A final impression was made using a medium-body silicone material (Zhermack, Italy) to capture the detailed anatomy of the defect area and surrounding tissues.

A master cast was poured with type III dental stone (Neelkanth, India) from the final impression, which will be used to create the obturator. Plan the design of the prosthesis, considering factors like retention, stability, aesthetics, and functionality. For removable prostheses, create a framework that will support the prosthetic components.

Rims were constructed on the master cast, allowing the patient to try it in their mouth to check for fit and comfort jaw relation was recorded and mount it on the articulator. Arrange artificial teeth (Premadent, India) in wax to simulate the final prosthesis. Wax setup was placed in the patient's mouth to check for fit, occlusion (bite), aesthetics, and patient comfort. Make any necessary adjustments to the wax setup based on feedback from the trial fitting. Once the wax try-in is approved, the denture was processed using heat-cured acrylic resin to create the final obturator.

Place the wax pattern in a flask and encase it in dental stone or plaster (Neelkanth, Dentico, India). Heat the flask to remove the wax, leaving a mold for the prosthetic material. Fill the mold with the chosen prosthetic material, such as heat cure acrylic resin (Pyrex, France). The flask is then closed and placed in a hydraulic press of about 100kg/cm² to eliminate any voids and improve the density of the acrylic. The closed flask is placed in a water bath or oven to cure the acrylic resin heated to 74⁰ C for 8hrs.

The curing process typically involves both heat and pressure to ensure a strong and durable prosthesis. After curing, the flask is allowed to cool before it is opened and the investment material is removed. The obturator is trimmed and polished by using carbide burs, rubber wheels acrylic stone burs and sand paper to remove any rough edges and ensure a smooth surface that is comfortable for the patient.

Place the finished prosthesis in the patient's mouth and check for proper fit and function. Make any necessary final adjustments to ensure comfort and functionality. Provide detailed instructions on how to care for the prosthesis, including cleaning and maintenance tips. Like clean atleast twice per day by using soft bristle toothbrush, cleaning of defect with long cotton buds, take obturator out during bed time and put in cold water. Arrange regular follow-up appointments to monitor the prosthesis and make any needed adjustments over time.

3. Discussion

Handling the various issues that crop up while making a complicated maxillofacial prosthesis necessitates thoughtful consideration and evaluation. In this instance, ensuring sufficient retention for the prosthesis was the primary problem. The patient must practise good oral hygiene and carefully follow post-operative instructions for the obturator prosthesis to function well in the long run.

It is important to emphasise the significance of occlusion in order to support maxillary obturator prosthesis. The prosthetic teeth's occlusal plane that connects to the jaw flange ought to be encouraged. In order to minimise or eliminate occlusal imbalances for the maxillary prosthesis repairing a maxillary defect, the mandibular dentition should be corrected as best as feasible. If the forces of occlusion during mastication directed the prosthesis upward, inward, and posteriorly in bilateral simultaneous posterior tooth contact, the stability of the maxillary prosthesis would be improved. The patient is also reminded of the need for routine review visits in order to replace it.⁷

The treatment of a patient who has undergone a hemimaxillectomy (surgical removal of one side of the upper jaw) typically involves the use of an obturator, a prosthesis designed to close the defect. This process is typically managed in three stages:

Immediate Surgical Obturator: This obturator is placed immediately after surgery. Its primary functions are to provide support to the surgical site, control bleeding, and protect the wound. It also helps the patient maintain some function for speaking and swallowing. Made prior to the surgery based on pre-operative impressions. It's typically made of clear acrylic to allow for post-operative observation of the wound.

Interim (Temporary) Obturator: This is fitted after the initial healing phase, usually a few weeks post-surgery. It provides better function and aesthetics compared to the immediate surgical obturator and aids in the patient's adaptation to changes in oral structure. The interim obturator is more refined and comfortable than the immediate one. Adjustments are made as the healing process continues and the tissue changes.

Definitive (Permanent) Obturator: This is the final stage, typically undertaken several months after surgery, once healing is complete and tissue changes have stabilized. The definitive obturator is designed to provide optimal function and aesthetics. Custom-made for the patient, it offers the best fit, comfort, and functionality. It is often made from durable materials and can be adjusted over time if needed. These stages ensure that the patient receives the necessary support and functionality immediately after surgery and continues to improve their quality of life as healing progresses.⁸

Patients who wear obturators for extended periods of time report nasal reflux and hypernasal speech due to air leakage. The primary cause of this is the ongoing fibrosis of the tissues around the prosthesis.⁹

A maxillary obturator prosthesis's mechanics can be affected by a variety of conditions, which may lead to prosthetic failure. Clinical scenarios that are appropriate for prosthetic success may not be presented by defects of greater size or defect topologies that impair prosthetic stability, retention, and support. Furthermore, a poor patient result might be expected if the maxillary defect has poor overlying tissue quality, making the remaining gingiva or mucosa friable or readily irritated.¹⁰

4. Conclusion

Obturator prosthesis fabrication does not necessitate the use of particular skills to build a prosthesis extension into a defect or to arbitrarily extend a prosthesis into a defect.¹¹

In order to fabricate an obturator prosthesis, patients without maxillary abnormalities must be treated using fundamental prosthodontic principles. Because of the type and placement of the remaining structures, several concepts need to be adjusted. To provide stability, retention, and support for an obturator prosthesis, the defect must be utilised in concert with the remaining structures. Applying fundamental prosthodontic principles will determine the obturator's size and extension, minimising the wide range in obturators that is frequently observed. In order to offer comfort, function, cosmetics, and little alteration to the weakened residual components, conservative prosthesis design in conjunction with routine maintenance treatment constitute acceptable prosthodontic therapy for patients with tile-acquired maxillary defects.¹²

5. Source of Funding

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6. Conflict of Interest

None.

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