ISSN: 2582-9904

A CASE REPORT

Rehabilitation of Maxillary Defect with Obturator

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ABSTRACT

Mucormycosis is an angio invasive, opportunistic infection caused by fungi Mucorales. Mucormycosis is also called as Black fungus otherwise medically termed as Zygomycosis. It is a rare disease predominantly occurring in immunocompromised patients. The successful treatment of mucormycosis include surgical debridement and elimination of affected tissue. Defects in maxillary / mandibular jaw can be congenital, acquired, traumatic or surgical leading to loss of some or all of hard / soft tissue. These defects can cause difficulty in articulation, airflow, deglutition. To overcome these difficulties in functional activities prosthetics are designed such prosthesis is termed as obturators. This clinical report describes the details of prosthodontic rehabilitation of a 59-year-old male patient who has undergone hemimaxillectomy due to mucormycosis.

Key words: Mucormycosis, Obturators, Zygomycosis, Maxillary defect, Aramany

How to cite this article: *V. Balakumar, Saranya M N, Shanmuga Sudhan B, M.V.Srikanth. Rehabilitation of Maxillary Defect with Obturator. J Clin Prosth Impl 2025;7(1):29-33.* ***https://doi.org/10.55995/j-cpi.2025005***

INTRODUCTION

Mucormycosis is an angio invasive opportunistic fungal infection caused by fungi Mucorales. This fungal infection is otherwise known as zygomycosis or phycomycosis. The fungi Rhizopus oryzae of order mucorales is the causative agent in most of the mucormycosis. The organism is found in soil, stale food, residue of plant, upper respiratory tract of healthy individual. This fungus affects the deep tissues when the spores are inhaled or ingested. In a healthy individual neutrophil, which are the first line of defence are capable of combating against the pathogen. Whereas immunocompromised patient such as those with leukemia, uncontrolled diabetes, AIDS or patients under long term steroid therapy are more susceptible to get affected. The clinical features of mucormycosis include fever, facial cellulitis, headache, rhinorrhea and nasal congestion.

Common bone affected due to mucormycosis is maxilla resulting in opening of antrum and nasopharynx. Due to these defects,there is disruption in airflow, difficulty in swallowing, speech production, which can lead to hypernasal speech. Phonetics sounds such as bilabial(m), dentolabial(f), dental(s), palatal sounds(j) are difficult to pronounce due to absence of closure of pharyngeal wall. To overcome these difficulties maxillofacial prosthetics is planned and designed named obturator. Glossary of prosthodontic terms obturator is a maxillofacial prosthesis used to close a congenital or acquired tissue opening primarily of the hard palate and/or contiguous alveolar or soft tissue structure. The maxillary obturator is a prosthesis has been in use from 16th century which was popularized by a person named Ambroise Pare.

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Obturators are classified based on phase of treatment as surgical, interim and definitive obturators, based on material used as metal, resin and silicone obturators. Mohammad Aramany in 1978 classified maxillary defects into 6 groups.[2]

Class I: Unilateral resection does not cross the midline.
Class II: Unilateral defect, retaining the anterior on the contralateral side.
Class III: Palatal defect occurs in the central portion of the hard palate and may involve part of the soft palate.
Class IV: Defect crosses the midline and involves both sides of the maxilla.
Class V: Surgical defects is bilateral and lies posterior to the remaining abutment teeth.
Class VI: Defect occurs mostly in trauma and the defect lies anterior to the bilaterally standing abutments.

CASE REPORT

A 59-year-old male patient reported to the department of prosthodontics with complains of inability to eat food due to loss of teeth on the upper arch. On examining the history, patient was diagnosed with mucormycosis following which surgical resection was performed. Following resection tissue grafting was performed to close the palatal defect. Extra oral examination reveals facial disfigurement and drooping of upper lip and angle of mouth. Intraoral examination reveals post-surgical defect involving right premaxilla, maxillary bone extending up to hamular notch and pterygoid plate (fig-1). Soft palate was intact and no restriction in the range of movement of soft palate was seen. Moderate amount of tissue flexibility was noted on lateral wall of defect. Patient had full complement of teeth which were attrited and periodontally inflamed with recession of gingiva on the second quadrant. Diagnostic Orthopantomogram radiograph was taken (fig-2). Treatment plan include designing an interim obturator including the missing teeth replacing the first quadrant.

Step 1: On the first appointment diagnostic impression of maxillary and mandibular arches were made using an irreversible hydrochloride material (Tropicalgin, Zhermack, Italy) in a modified perforated stock tray (fig-3). The impression was poured using type III gypsm (Goldstone Green,Rajkot,India). The study cast was surveyed with the help of Ney surveyor, with zero-degree tilt, unfavourable undercuts were blocked out and favourable undercuts were used for adequate retention and stability.

Figure 1: Intra oral view

Figure 2: Orthopantomograph showing extent

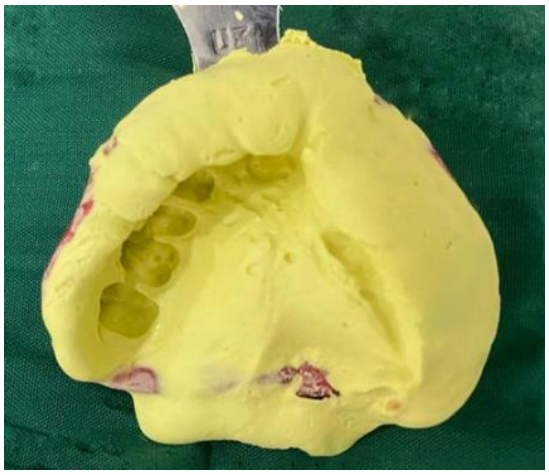

Figure 3: Primary impression of maxillary arch

Step 2: Custom tray was fabricated using auto polymerizing resin (DPI R.R-Cold Cure, Mumbai, India) on the maxillary study cast after blocking out the undercuts using double wax spacer(fig-4).

Step 3: On the second appointment tray adhesive (3M VPS Tray Adhesive) was applied on the custom tray border moulding was performed in maxilla using polyvinyl siloxane (Kulzer Variotime Easy Putty Elastomeric Impression Material, Germany). Single step border moulding was done. Wax spacer was removed and vent holes were made.

Figure.4: Custom Tray

Step 4: Final impression was made using polyvinyl siloxane (Kulzer Variotime Light Body Elastomeric Impression Material,Germany) (fig-5). Impression was poured using type III gypsm (Goldstone Green, Rajkot, India) and master cast of maxilla was obtained (fig-6). Cast was analyzed undercuts were blocked.

Figure 5: Final impression of maxilla

Figure 6: Master cast of maxilla

Step 5: Record base was fabricated using autopolymerizing resin (DPI-RR Cold Cure,Mumbai,India) and biterims were constructed. Vertical jaw relation was recorded, occlusal rims were adjusted with modelling wax thereby supporting the soft tissues in the affected area. The modelling wax(Hindustan Modelling Wax No.2, Hydrebad, India) was softened and patient was instructed to perform functional movements repeatedly there by achieving compromise between the support of facial tissues and stability of the obturator.

Step 6: Using semi-anatomical acrylic teeth, teeth arrangement was done accordingly and occlusion was adjusted in relation to mandibular teeth(fig-7). Class I relation was followed in the anterior segment, posteriorly cross bite was given on the affected side. Maxillomandibular relation was checked during the trial stage and patient was instructed to repeat functional movements to verify soft tissue support.

Figure 7: Wax Trial

Step 7: A "C" shaped wrought wire clasp was designed on the dentulous area with maximum extension to reduce stress. Care was taken for complete palatal wax up. post damming was carved for additional retention.

Step 8: The prosthesis was processed using heat activated acrylic resin (DPI Heat Cure, Mumbai, India) using compression moulding technique (fig-8).

Figure.8: Processed obturator

Step 9: At insertion stage the prosthesis was checked for retention, stability, support and overextension (fig-9,10). The borders of the prosthesis were checked for any sharp edges.

Figure 9: Insertion of prosthesis

Figure 10: Insertion of prosthesis

Patient was instructed about path of insertion and removal of prosthesis. The patient was educated on maintenance of oral hygiene and hygiene of prosthesis. Recall visit were advised.

DISCUSSION

Mucormycosis otherwise named as "Black fungus" is one among the complications of COVID-19. It is a rare fungal infection caused by fungi Mucorales[3]. It predominantly affects immune-compromised patients such as those with leukemia, uncontrolled diabetes, AIDS or patients who have undergone organ transplantation and in long term steroid therapy[3]. A study was conducted for patients with COVID-19 associated mucormycosis which has shown that 80% of patient are diabetic and 76% of patients had taken steroids for treatment of COVID-19. In these patients there is decrease in cytotoxic cells and T-helper cells, thereby creating favorable environment for other opportunistic infections. In India as of November 29, 2021 51,775 COVID associated mucormycosis cases were reported [4]. Statistical data shows that in the last 50 years only 23 cases of mandibular mucormycosis have been reported from seven different countries, among this 8.34% of the cases were reported in India [5]. Common signs of mucormycosis are headache, bloody nasal discharge, congestion, fever, swelling, facial and trigeminal nerve palsy and looseness of teeth.

Generally surgical resection of the affected area is treatment of choice. The resected parts due to mucormycosis are rehabilitated using an obturator. Depending upon the intensity of surgical resection, the type of obturator differs from a single palatal coverage to hollow bulb obturator. The challenging parts of designing the prosthesis are to achieve soft tissue support, retention and stability[6]. The soft tissue support can be achieved by softening of the occlusal rims, following the neutral zone concept. Functional activities are considered and instructed to perform repeatedly to achieve optimal soft tissue support which would help in positioning of maxillary teeth and selection of cuspal inclination of artificial teeth such as semi-anatomical, non-anatomical would help to achieve the desired stability of the prosthesis[7]. However, tissue conditioner (GIC SOFT- LINER 1-1 PKG) can be used to reline the obturator, to gain support.

Retention of the prosthesis is achieved by C-shaped wrought wire clasp and post damming[8]. An effective obturation of the nasal and oral cavities are also evaluated by sipping water in small quantities. Resonance of dental (s) and linguopalatal consonants, (r) and (j), (yh) were difficult in pronunciation, but over a period of 2 weeks, patient was trained for better articulation. Sequel of hygiene maintenance including the prosthesis and oral cavity were evaluated during recall visit.

CONCLUSION

Mucormycosis or any other pathology resulting in hemimaxillectomy can be rehabilitated with an obturator that fulfills the primary objectives such as improvised masticatory and speech abilities which will help the patient with their day-to-day activities and improve quality of life.

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