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## Case Report

# Rehabilitation of post mucormycosis surgical defect using definitive obturator with cast metal framework- A case report

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### ABSTRACT

The recent outbreak of covid-19 disease has led to development of mucormycosis in immunocompromised individuals. Treatment options include antifungal drugs, surgical removal of infected tissues, and management of underlying metabolic disorders. Surgery typically includes the complete excision of the diseased region. These defects put the patient at risk for nasal twang, fluid leaks into the nasal cavity, and poor masticatory function. In such defects, the obturator prosthesis can create an oro-nasal seal. This case report describes the rehabilitation of post mucormycosis surgical defect using definitive obturator using cast metal framework.

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## 1. Introduction

Mucormycosis is a deep invasive mycotic infection. This black fungal disease has spread widely due to recent outbreak of covid-19 disease. The causative factor for mucormycosis is mucormycetes. It shows the significant effect in the immunocompromised individuals. Diabetes mellitus, malignancies, transplants, iron overload, corticosteroid medication, trauma, persistent neutropenia, and malnutrition are the most frequent factors that predispose individuals to mucormycosis.<sup>1</sup> It is presented in different clinical forms – rhinocerebral, rhinomaxillary, pulmonary, gastrointestinal, cutaneous, and disseminated.<sup>2</sup> Inhaling fungus spores is the primary method of contamination.<sup>3</sup>

Treatment options include antifungal drugs, surgical removal of infected tissues, and management of underlying metabolic disorders. Surgery typically includes the complete excision of the diseased region. The disorder has

the potential to quickly extend to the midfacial and orbital regions, resulting in long-term consequences such as palatal defects, oro-antral fistulas, maxillectomy, blindness, and related craniofacial damage.<sup>2</sup>

These defects put the patient at risk for nasal twang, fluid leaks into the nasal cavity, and poor masticatory function. In such defects, the obturator prosthesis can create an oro-nasal seal.<sup>4</sup> The Glossary of Prosthodontic Terms defines an obturator 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”.<sup>5</sup> The extent of obturator extension into the defect differs depending on the form of the defect, the nature of its lining tissue, and the functional requirements for prosthesis stabilisation, support, and retention.<sup>6</sup>

The standard prosthetic treatment of defects plays a significant role in developing function for the patient. The present article describes the prosthetic rehabilitation of postsurgical defect due to mucormycosis.

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## 2. Case Report

A 40 years old male patient reported to the Department of Prosthodontics and Crown & Bridge with complaints of nasal regurgitation of water and food, difficulty in chewing, nasal voice and loss of lip contour leading to poor facial appearance due to a postsurgical defect in the left side of palate.

Medical history revealed that patient was diabetic and underwent left partial maxillectomy for post covid-19 mucormycosis of maxilla 1 year back.

Extraoral examination revealed asymmetry of face with collapsed cheek and prominent nasolabial fold on left side of the face. Intraoral examination revealed complete healing of residual maxillary defect. Oro-antral and oro-nasal communication could be seen due to partial maxillectomy on the left side (Figure 1). Missing teeth included 11, 21, 22, 23, 24 and 25. Alveolar ridge was missing with obliteration of labial and buccal vestibule on the same side. On intraoral examination the defect was categorized as Aramany's Class-VI type.



**Fig. 1:** Intraoral view

Panoramic radiograph showed missing maxillary teeth on the left side with a radiolucency extending into the maxillary sinus was observed.

After detailed intraoral, extraoral and radiographic examination patient was advised oral prophylaxis. The various prosthetic treatment options were presented to the patient, such as reconstruction of hard and soft tissue followed by implants supported prosthesis and rehabilitation with a definitive obturator with a cast metal framework. Due to financial constraints patient selected rehabilitation with a definitive obturator with a cast metal framework.

## 3. Procedure

After oral prophylaxis, a primary impression was made with irreversible hydrocolloid impression material (Vignette

chromatic, Dentsply, India) using a stock tray. Primary impression was poured with dental stone (Kalstone; Kalabhai Karson, Mumbai, India). Primary cast was retrieved from the impression and surveying was done using Ney surveyor. The framework was designed. Direct retainers were planned on 14,15,16,17,26 and 27. Indirect retention was obtained from 16,17. Mesh type of denture base minor was planned over the defect. complete palatal major connector was planned (Figure 2).

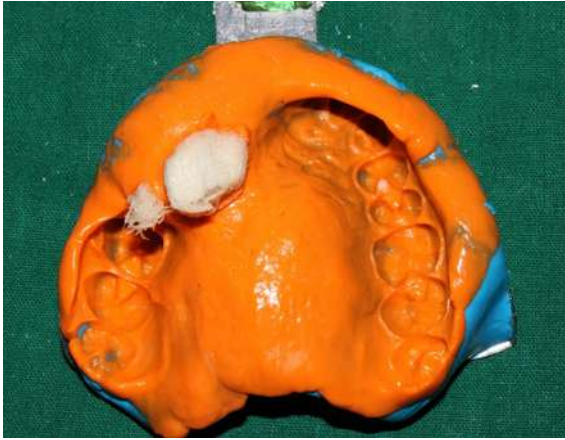


**Fig. 2:** CPD framework design

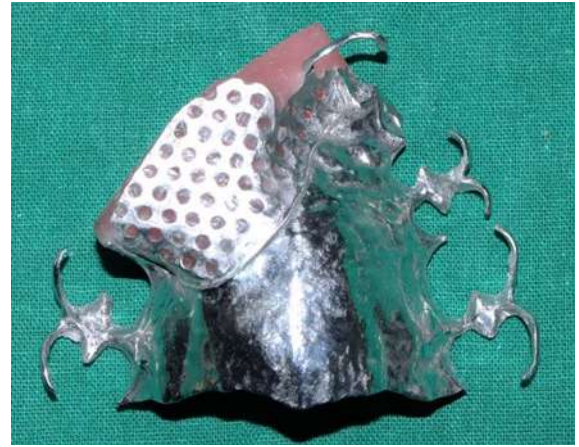
The mesio-occlusal rest seats were prepared on 15,17 and 27. The disto-occlusal rest seats were prepared on 14, 16 and 26. The canine rest seat was prepared on 13. The final impression was made with polyvinyl siloxane impression material using putty and light body (Avue gum putty and light body, Dental Avenue, India) (Figure 3). The final impression was poured with dental stone (Kalstone; Kalabhai Karson, Mumbai, India). The master cast was retrieved from the final impression (Figure 4).

The defect was blocked with wax on the master cast and the cast was duplicated to obtain a refractory cast. This refractory cast was scanned with scanner. The framework was designed digitally on the scanned refractory cast using EXOCAD software (Figure 5). This framework was 3D printed with castable resin followed by investing and casting using conventional procedure. The framework was polished using different abrasive stones (Figure 6). The fitting of the framework was checked intraorally. The occlusal rim was made over the missing segment using baseplate wax (Figure 7) (Modeling wax; Deepti Dental Products, Ratnagiri, India).

The occlusal rim was modified and the defect was recorded using the framework with low fusing impression compound (greenstick) (DPI Pinnacle, Tracing Sticks Dental Products of India, Ltd) (Figure 8). The occlusal



**Fig. 3:** Final impression



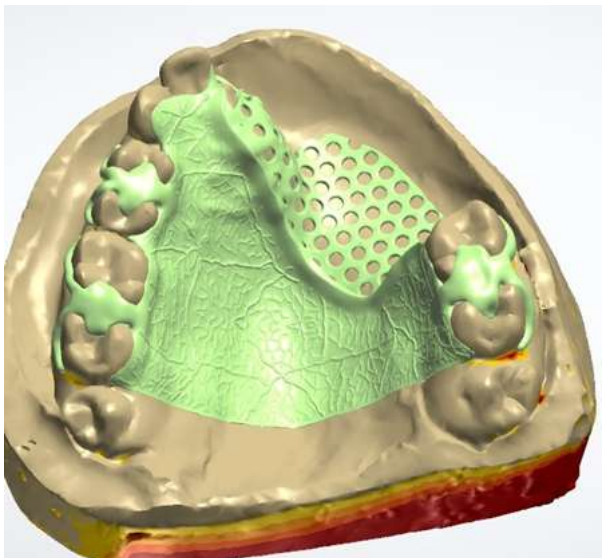
**Fig. 6:** Intaglio surface of framework



**Fig. 4:** Master cast



**Fig. 7:** Checking of the occlusal rim after framework trial



**Fig. 5:** Digitally designed framework

surface of the rim was softened and the bite was recorded (Figure 9). Tooth shade was selected using natural teeth as a reference. The altered cast was made for the defect portion following the tissue moulding. The jaw relation was transferred to a mean value articulator followed by teeth arrangement (Figure 10). The try-in was done to evaluate the occlusion, aesthetics, and phonetics (Figure 11). The obturator was processed followed by finishing and polishing (Figure 12). The prosthesis was delivered to the patient and post insertion instructions were given (Figure 13).

#### 4. Discussion

Mucormycosis is one of the rare opportunistic fungal infections presenting in different clinical forms. Patients with diabetes are vulnerable to getting rhinocerebral and pulmonary forms of mucormycosis. Early diagnosis and treatment can avoid complications. Treatment options include antifungal medications, surgical excision of the diseased tissues, and management of underlying metabolic disorders.



**Fig. 8:** Recording of the defect



**Fig. 9:** Recording of bite



**Fig. 10:** Teeth arrangement

Obturator prosthesis plays an essential part in postsurgical maxillectomy patients in the recovery of oral function.<sup>7</sup> The framework designs for obturators could differ depending on the defect classification. The design of the prosthesis should include broad stress distribution, cross arch stabilization with the use of a rigid major connector, and stabilizing and retaining components to best minimize dislodging functional forces.<sup>6</sup>

The obturator can be classified as solid, open hollow, and closed hollow based on the extension of the obturator into



**Fig. 11:** Try in



**Fig. 12:** Processed obturator



**Fig. 13:** Delivery of prosthesis

the defect. Retention is compromised due to lack of bony base. Retention is obtained by proper recording of defect and from abutment teeth by using direct retainers.

There are various impression materials available to record such defects such as putty with light body, regular body impression material. In this case we used low fusing impression compound to record the defect using the framework as a tray to improve the accuracy. We also incorporated digital designing of the framework using EXOCAD software, is best available method, to prevent the errors caused by conventional casting of the framework.

In this present case embrasure clasps were given on 14, 15, 16, 17, 26, 27. Canine rest on 13. I bar clasp was given on 12. The complete palate major connector was used to ensure maximum distribution of the functional load to the tissue. The mesh type denture base minor connector was used. Missing teeth were replaced by acrylic teeth in order to achieve function.<sup>8–10</sup>

In edentulous patients, the remaining teeth provide the retention, support and stability to the obturator. The remaining teeth or ridge, lateral section of the defect, soft tissue undercut, and scar band can all help with retention. Indirect retention and stabilization components must be effectively positioned to prevent the defect extension part from moving away from its terminal position.<sup>11</sup>

Thermal conductivity and longevity of the prosthesis are the advantages of metal framework obturator prosthesis. The prognosis of an obturator is multifactorial which includes the volume/extent and location of the defect, underlying and surrounding structures, adjacent teeth and biomechanics. The stability of the obturator was assessed during 1 week, 1 month, 3 month & 6 month follow-ups to ensure patient satisfaction in bringing back the physiologic functions.

The disadvantage of such type of obturator is if any tooth which is included in the framework gets compromised or lost for any reason, the stability and retention of the prosthesis gets hampered. And also because of the greater tissue supported area, if any abutment tooth is compromised, there will be greater bone resorption in the edentulous area leading to misfit of the prosthesis. If the bone condition is found to be suitable for implant placement, then with the written informed consent from the patient, a hybrid prosthesis would be suggested as a next possible treatment option in such case.

## 5. Conclusion

Dentist should be vigilant in cases of perforation of palate especially in immunocompromised patients. It will be of great benefit to the patient in terms of preventing widespread surgical resection, post-surgical complications and even fatalities. Definitive prosthodontic treatment attempts to alleviate the posed by various anatomical and functional deficiencies. A properly constructed prosthesis serves the purpose of rehabilitation of the patient's lost function, aesthetics and improves the quality of life. It also boosts

patient's confidence and helps improve their acceptance in the society.

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## 7. Conflict of Interest

None.

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