

## Case Report

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### Prosthetic Rehabilitation of a Rhinocerebral Mucormycosis Patient

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#### ABSTRACT

Mucormycosis is a fungal infection caused by a typically saprobic organism belonging to the Zygomycetes class. Pulmonary and rhinocerebral mucormycosis are the most common types of mucormycosis. Rhinocerebral mycormycosis usually begins in the maxillary antrum, especially in diabetics who are poorly managed. Necrotizing ulceration of the palate with a blackish slough and bone exposure might result from invasion of surrounding tissue.<sup>1</sup>

This clinical report describes prosthetic management of a post surgical mucormycosis patient presenting with a disfigured face, palatal perforation and exenteration of left orbit. For the palatal defect, a removable partial denture with obturator was planned. And for the exenterated eye, a silicone orbital prosthesis was made.

#### Introduction

Mucormycosis is a common invasive fungal infection in post COVID-19 times. Rhino-orbital cerebral mucormycosis is the most common form in India. It is a non- contagious yet life threatening infection. Patient with uncontrolled Diabetes Mellitus are at a greater risk of mucormycosis. They require strict infection control and extensive debridement. If not controlled properly, it can lead to loss of vital body parts. Due to its aggressive and invasive nature they often lead to resection of maxillae, loss of teeth, eye and oro-nasal abnormalities which accounts for facial disfigurement, improper speech, and inefficient mastication and deglutition.<sup>2</sup>

In such instances, a well-maintained, user-friendly, removable maxillofacial prosthesis is essential for successful prosthetic rehabilitation. The most important aspect of rehabilitation should be to provide comfort and protection to the remaining soft and hard tissues.<sup>3</sup>

This article discusses the prosthetic rehabilitation of a patient undergone palatotomy and exenteration of eye due to mucormycosis invasion.

## Case report

A 60 year-old female patient reported to the Department of Prosthodontics, People's Dental Academy, Bhopal with postoperative orbital and palatal defects due to Rhino-orbital cerebral mucormycosis(ROCM). The patient's main complaint was facial disfigurement due to loss of teeth and part of maxillae and left eye globe following surgery. The patient was severely depressed and had become an introvert during post surgery period. (Fig.1)



**Fig.1- Pre Operative Photograph**

An intraoral examination revealed, anterior transverse palatectomy (left) and enucleation of the left eye globe, which led to the collapse of the left nostril and nasal wall. Intra-oral examination showed a postsurgical defect of size 3 x 2 cm in the region of the left maxilla and the hard palate. The palatal defect was in continuation with the ocular defect. (Fig.2)

The defect can be classified as-

According to Aramany's Classification- **Class VI-** Anterior maxillary defect with abutment teeth present bilaterally in posterior segment.

According to Okay *et al.* **Class Ib-** Defects that involved any portion of the maxillary alveolus and dentition posterior to the canines or that involved the premaxilla<sup>4</sup>.



**Fig.2- Preoperative Intraoral Photograph**

## OBTURATOR PROSTHESIS

For the obturator, complete maxillary impression was made using a stock tray using irreversible hydrocolloid impression material (Primex Products, India). A diagnostic cast was poured on which a custom tray was prepared and a final impression was taken using Green Stick impression compound ( Pyrex Products, India) and Addition Silicone putty and Light Body impression material ( Zhermack, Germany). Final impression was poured using Type II Dental Stone (Kalastone, India) and a Master cast was obtained. (Fig.3) The prosthesis was designed by incorporating a long Adam's and Pin head clasp made of 19 gauge stainless steel wire (Samit Products, India) to ensure a well-retained prosthesis with the remaining natural teeth. Denture base and occlusal rim were fabricated and a tentative jaw relation was made. Teeth shade selection was done with respect to adjacent remaining natural teeth. Try in was done following which processing was done for the prosthesis. The prosthesis so obtained was finished and polished.



**Fig.3- Master Cast**

The ultimate objective for restoring masticatory function was achieved by a snugly fitting maxillary plate with an obturator completely covering the defect. The patient was given training in how to wear the prosthesis and recalled for follow up after 7days. (**Fig.4**)



**Fig.4- Palatal Obturator Prosthesis**

## **ORBITAL PROSTHESIS**

For the exenterated left eye and orbital defect a spectacle retained orbital prosthesis was planned.

### ***Impression making***

The impression for the facial moulage was made with a thin mix of alginate (irreversible hydrocolloid) (Primex Products, India). The hydrocolloid was reinforced with open gauze pads to help keep the Plaster of Paris backing in place. (**Fig.5**)



**Fig.5- Facial Moulage**

The impression was cleaned and evaluated for accuracy and detail once it was removed. Type IV dental stone (Kalastone, India) was poured in the defect area, and Type III dental stone (Kalastone, India) was poured as a second pour layer and a cast was obtained.

### ***Orientation of orbital prosthesis***

A suitable acrylic resin ocular shell, with the color of its iris/pupil complex, dimensions, and sclera similar to the contralateral eye, was selected and adapted in the orbital exenterated defect area of the working cast with the baseplate wax (Primex Products, India). Next, a paper tape was applied on the forehead and lateral surface of patient's face. Wax pattern was seated on patient's face and orientation points were made for the missing orbital defect using the contralateral natural eye as a reference. The stock ocular prosthesis was adjusted anteroposteriorly, mediolaterally, and superioinferiorly.

### ***Making wax pattern of facial defect***

An extension of wax pattern was fabricated up to the nasal bridge, created a customized groove for the seating of the spectacles. (**Fig.6**)The orientation marks were transferred to the working cast and the ocular shell was seated and positioned in the defect according to the marked points. Baseplate wax was used to sculpt the

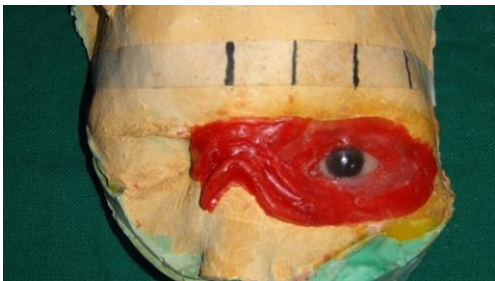
eyelids. By carving in lines and wrinkles observed around the normal eye, the final surface contour and skin texture were established. (Fig.7) This wax pattern was transferred to the patient's exenterated orbital defect, and the patient was instructed to look straight. Try in was done.



**Fig.6- Orientation marks on patient and wax pattern try in with spectacle**

#### *Selection of spectacle frame*

A well fitted, comfortable spectacle frame was selected that blended with the shade selected for the silicone prosthesis. It was seated on the customized groove and was checked for adequate covering of the defect when viewed from the front, the sides, and above.



#### **Fig.7- Facial Moulage with Wax Pattern Orientation marks**

##### *Fabrication of mold*

The working cast was trimmed. The pattern was then sealed to the working cast and invested in the conventional denture flask. Two thin sprues were made of clear acrylic and were attached on the scleral surface of the ocular segment to retain the ocular shell orientation in place. (Fig.8)



**Fig.8- Flashed wax pattern with orientation sprues attached**

##### *Shade matching and packing*

An adequate amount of silicone material was dispensed (Room temperature vulcanized [RTV] silicone, Factor II, Incorporated Inc.USA) on a ceramic tile. Intrinsic pigments were added and mixed to achieve the shade of the skin color of the contralateral side of the face. Silicone material was packed and kept for polymerization for 24 hours in bench press. After 24 hours, molds were separated, the silicone prosthesis was retrieved, and finishing was done. Cosmetic eyelashes were attached to the prosthesis using an adhesive. (Fig.9)

### ***Attachment of prosthesis to the spectacles***

The prosthesis was held in place in the orbital defect, and the patient was asked to wear the spectacles over the prosthesis. Auto polymerizing acrylic resin was mixed and was used to attach the prosthesis to the spectacles. The acrylic was painted brown to match the frame of the spectacles. (Fig.10)



**Fig.9- Final Prosthesis- Palatal Obturator and Orbital Prosthesis**



**Fig.10- Post Operative Photograph**

### **Discussion**

When mucormycosis extends superiorly from the maxillary sinus, it affects the orbital contents. The other pathway for the orbital involvement is through the pterygopalatine and infratemporal fossa. Orbital exenteration is a procedure involving resection of the

whole of the contents of the orbit, which includes periorbita, eyelids with or without the adjoining skin. Post-operative complications include difficulty in eating, speaking, and nasal regurgitation of fluids due to the palatectomy. If the resection includes orbital exenteration then blindness is also a post-operative complication. Oral dysfunction frequently leads to a lower overall quality of life. The surgical management of ROCM is known to cause facial, nasal, and oral abnormalities.

The physical and psychological well-being of the patient is improved by the replacement of the facial deformity and lost eye. The success of the orbital prosthesis is dependent on the precise alignment of the prosthetic eye. Eye patches, spectacles, magnets, adhesives, or a combination of those and osseointegrated implants are some of the ways to keep a facial prosthesis retained in place. Although osseointegrated implants provide superior retention, the patient's unwillingness for another surgery and her economic status limited us to spectacle retained silicone prosthesis.<sup>5</sup>

Silicone elastomers have great heat stability and are chemically inert, making them ideal for use in biological tissues. When the deformity involves moving soft tissue, silicone's flexibility proves useful. Silicones can be easily processed, cleaned, molded, and colored to give a texture and appearance closely simulating skin<sup>6</sup>.

### **Conclusion**

During the second wave of the COVID-19 pandemic, the incidence of mucormycosis grew dramatically over the world. Patients with uncontrolled diabetes, predisposing co-morbidities, and those who are immunocompromised are at a higher risk if they are not treated in a timely

manner. In this article a simple and cost effective technique for fabrication of silicone orbital prosthesis is described. The patient was happy with prosthesis and a 7 day recall and examination gave a satisfactory result.

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