

A Case Report on Prosthetic Rehabilitation of Post-Mucormycosis-Clinical Cases

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Abstract

Mucormycosis is an opportunistic fungal infection, which mainly affect immuno compromised patients. Once the maxilla and orbit are involved, surgical resection and debridement of the necrosed areas can result in extensive defects .in prosthetic rehabilitation of such cases the major challenge is the replacement of missing soft and hard tissues following surgical resection. Hence an acceptable replacement of such defects becomes a challenge to maxillofacial prosthodontists. This case series describes two cases of post mucormycosis rehabilitation. The first case describes the fabrication of an orbital silicone prosthesis retained with medical grade adhesive and the second case describes fabrication of a hollow bulb obturator for hemimaxillectomy. The final prosthesis in both the cases were esthetically pleasing, functionally efficient and boosted the patient's morale, encouraging them to lead a normal life.

Keywords: Mucormycosis, Clinical Cases

INTRODUCTION

Mucormycosis (previously known as Zygomycosis) is a rare but serious fungal infection caused by a group of moulds known as mucoromycetes. Infections in the maxillofacial region can cause debilitating symptoms such as facial disfigurement, impaired speech due to hypernasality, rumination, and a significant impact on the patient's quality of life^[1]. Because of the inhalation of fungal spores, the infection begins in the nose and paranasal sinuses. By direct invasion or through blood vessels, this infection can spread to the orbital and intracranial structures. The fungus infiltrates the arteries, causing thrombosis and necrosis of hard and soft tissues. Early detection and treatment of this fungal infection can limit this invasion.

Disfigurement of the face as a result of eye exenteration is a very traumatic event in a person's life, not only physically but also psychologically and emotionally, because the face and eyes are essential parts of a person's identity. It is then necessary to replace these structures with artificial prosthesis so that these patients can live normal lives. This case series describes two post mucor mycosis cases.

Case Report - I

A 49-year-old male patient presented to the Department of Prosthodontics and Maxillofacial Prosthetics, People's Dental Academy, Bhopal, with the chief complaint of an aesthetically unappealing appearance due to a massive defect on the right side of his face involving the loss of the right eye and associated

structures. The patient described a COVID-19 infection in May 2019 and subsequent mucormycosis. The patient had diabetes and hypertension for four years and is on medication for both.



Fig 1- Pre operative Photograph

Extra oral findings

There was obvious facial asymmetry, average lip mobility, tapered facial form, and affected masticatory . The right globe of the eye and the eyelid were not present on examination of the defect. The defect was massive and saucer-shaped, with a significant depth. [Fig-1]. The patient also demonstrated a loss of muscle tonicity and mobility on the affected side. The treatment plan included the creation of a customised silicone orbital prosthesis that was held in place with adhesive and mechanical undercuts. The treatment plan was thoroughly discussed, and informed written consent was obtained.



Fig 2- Primary Impression 0

A) Impression making

To make a primary impression of the face, small gauze pieces were placed near the lacrimal fossa, optic canal, palatine bone, and the two nasal openings, and then tied for retrieval after impression making. The patient was draped for impression procedures, and his or her brows and eyelashes were lubricated with petroleum jelly to make removal of the impression material easier and less painful for the patient.[Fig-2]. An irreversible hydrocolloid impression (Zelgan 2002 dust-free easy mixing, DENTSPLY

India Pvt. Ltd., Haryana) was taken, and Type I dental plaster was applied to the base. Beading and boxing were completed after the impression was poured with Type III stone. Later, facial moulage was obtained, fabrication of a special tray with holes and a customised handle [Fig-3]. The secondary impression, which was made with Addition Silicon (Reprosil, DENTSPLY Caulk, USA) in a single step procedure. The impression was made with Type IV Dental stone (Kalstone, Kalabhai Karson Pvt. Ltd., India), and a master moulage was made [Fig-4,5].



Fig – 3 Special Tray with handle

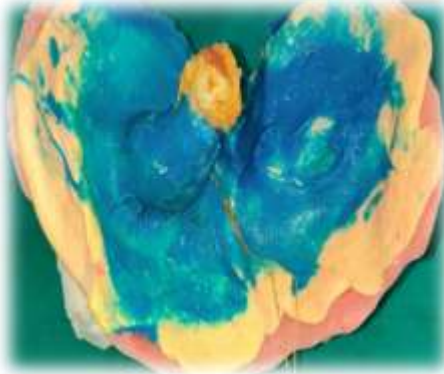


Fig – 4 Secondary Impression



Fig – 5 Final Moulage

B) Fabrication of prosthesis

The facial landmarks, such as the midline, inner canthus of the eye, pupil, outer canthus of the eye, and horizontal plane through the pupil of the eye, were marked using a customised facial markings, which was made by placing micropore bilaterally. The customised facial markings were used to compare the mediolateral, anteroposterior, and superio-inferior positioning of the eye to that of the normal eye. [Fig-6]. The stock shell's periphery was trimmed to ensure proper fit, and the stock shell was positioned on the defect with modelling wax. At the conversational gaze, the eyeball was tested for alignment with the patient's eye on the normal side. The modelling wax was used to carve and sculpt the periorbital tissues. The final wax pattern was tried on the patient and its symmetry, position, and border extension to merge with the margins of the defect were all checked. The wax pattern was invested after an acceptable aesthetic, symmetry, and extensions were achieved [Fig- 7]. During the investment procedure, the orientation of the stock eye was maintained by incorporating clear acrylic tags on both sides that were attached to the scleral part of the stock eye and dewaxing was performed.



Fig- 6 Facial markings

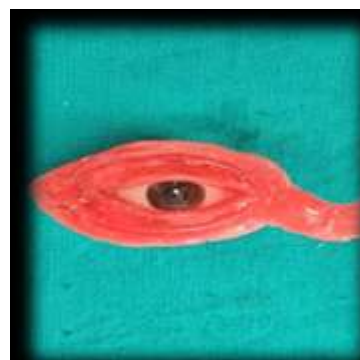


Fig- 7 Wax pattern

A translucent and colourless material called room temperature vulcanizing silicone (RTV Silicones) was used. Shade palettes were created by combining different primary colours, and shade matching was performed in natural daylight. The RTV silicone was packed into the mould space and bench cured for 24 hours after the appropriate shade was matched, closest to the patient's skin shade. The silicone prosthesis was retrieved, trimmed, and finished. The patient's natural hair was used to attach and stitch the eyelashes and brows. The final prosthesis was tested on the patient to ensure aesthetics, colour matching, and blending with the patient's facial contours and margins [Fig-8]. The final prosthesis was attached to the defect with water-based adhesive that was painted onto the prosthesis's tissue surface with a brush. The patient was given a pair of spectacles to help camouflage the borders of the prosthesis [fig- 9].



Fig- 8 Final Prosthesis



Fig- 9 Final Prosthesis

Case- II

A 38-year-old man was referred to People's Dental Academy's Department of Prosthodontics and Crown and Bridge in Bhanpur, Bhopal. The patient had a hemimaxillectomy for mucormycosis infection.

Intraoral examination revealed an Aramany class I surgical defect in the maxilla that extended to the paranasal sinuses. The patient complained of difficulty masticating, nasal exudate seepage into the oral cavity, restricted mouth opening, and unintelligible speech [Fig- 1(a&b)]. The treatment plan chosen was the fabrication of a maxillary obturator, which was thoroughly explained to the patient, and written permission was obtained from the patient to use photographs of treatment for publication purposes.



(a)



(b)

Fig- 1(a,b) Intra-oral Photograph

A) Impression making procedure

An impression was taken in two steps: first, the defect was recoded using green stick impression compound (DPIPinnacle, tracing stick, Dental Products of India, Mumbai). Green stick was chosen as the material of choice due to its flow property and ability to properly record margins; and second, an irreversible hydrocolloid impression was taken to record the teeth on the contralateral side in order to obtain a cast [fig 2].

B) Fabrication of interim obturator

An interim obturator made of heat cure acrylic resin (heat-cure acrylic repair material, DENTSPLY India Pvt. Ltd., India) with a hollow bulb held in place by stainless steel retentive clasps on the non-defect side was planned to help the patient eat and get used to the prosthesis. The undercut defect region and the clasps made on the non-defect side-central incisor, canine, first premolar, and first molar teeth-will be used to retain the prosthesis.



Fig -2 Pick up Impression

C) Designing and fabrication of Metal framework

The cast was surveyed to design the cast partial framework, since the defect was extensive, a definitive obturator was planned as the final treatment to facilitate easy handling of the prosthesis. The mouth was prepared for the cast partial prosthesis, and the secondary impression was taken with polyvinyl siloxane impression material (Reprosil, DENTSPLY Caulk, USA). Ni- Cr alloy was used to create a cast partial denture with a single palatal plate and mesh on the edentulous side for additional acrylic retention [fig- 3]. A framework trial was conducted to assess the fit of the cast partial design.



Fig- 3 Cast partial denture framework



(a)



(b)

Fig – 4 (a& b) Wax pattern try-in

D) Try-in,flasking,dewaxing,packing

The occlusal rim was made on a self cure acrylic (self-cure acrylic repair material, DENTSPLY India Pvt. Ltd., India) denture base, and a tentative jaw relation was taken and mounted. The obturator was waxed up for processing after the denture was tried in [Fig-4]. The traditional method of flaking and dewaxing was used. After dewaxing, the obturator portion of the prosthesis was packed in two sections with heat-cured polymethyl methacrylate resin (Trevalon powder, Denture Base Material, Dentsply India Pvt Ltd, Gurgaon, India) using the tea bag technique to create a hollow bulb obturator.



Fig – 5 Flasking and Dewaxing



Fig -6 Trial Closure



Fig – 7 hollowing with tea bag



Fig -8 final prosthesis



Fig- 9 patients profile after prosthesis insertion



Fig-10 intra oral view of final prosthesis

This was done to reduce the weight of the obturator and ensure proper retention. After curing, the tea bag was flushed out with a syringe through a small escape hole in the prosthesis's side. After finishing and polishing the obturator, it was delivered to the patient with intraoral adjustments. The patient was instructed on how to care for the prosthesis and when to return for a recall check-up. The patient was evaluated for mastication improvement, prosthesis retention, and subjective pain and discomfort assessment. He was given instructions on how to keep the prosthesis clean and was called back after two weeks, one month, and three months

Discussion - Prosthetic rehabilitation is the treatment of choice for patients who have a large facial defect of the maxillary-orbital complex following tumour resection. Many successful techniques are available to the practitioner when treating a patient who requires a custom orbital and obturator prosthesis^[3]. Depending on the extent of the defect, an orbital prosthesis that replaces the eyelids, periocular structures, eyelashes, and the globe of the eye is created. The inverted markings were transferred onto the cast to mimic the size, shape, and orientation of the normal side's eye. The orbital rehabilitation using silicone prosthesis is a less invasive and less expensive procedure. Medical-grade room temperature vulcanizing silicones are commonly used in the fabrication of such orbital prostheses (RTV silicones)^[4]. They have a better marginal adaptation and are easier to fabricate, as well as being cost-effective, biocompatible, and having a natural appearance.

A spectacle frame, paint-on adhesives, double-sided adhesive tapes, magnets, and implants are commonly used to keep the orbital prosthesis in place. When compared to other modes of retention, spectacles help to camouflage the defect area, whereas implants and magnets provide better retention^[5,6]. However, due to factors such as the patient's systemic condition, financial constraints, and aversion to any other invasive procedure, a paint-on adhesive was chosen as the mode of retention for the prosthesis.

The fabrication of a customised definitive hollow-bulb obturator prosthesis for a patient with maxillary defect was described in this case report. According to the standard treatment, a surgical obturator is placed; 5-10 days later, this obturator is removed, and a removable interim obturator is constructed and placed for the duration of the wound healing period; finally, the definitive obturator is constructed and placed about 3-6 months after surgery, when major changes in tissue conformation are no longer expected^[7]. In this case, the patient reported to the department two years after the surgery. Until the patient becomes accustomed to the prosthesis, an interim obturator provides a comfortable and functional prosthesis. When rehabilitating a patient with a maxillary defect, the goal is to seal the defect

with the prosthesis's bulb to provide retention and resonance during speech. An obturator can be solid or hollow. An interim hollow bulb obturator has the advantage of being lighter in weight, which allows for better retention and comfort for the patient^[8]. The different techniques for fabricating the hollow bulb by using alum, sugar, salt during packing the defect area have been described by various authors. El Mahdy et al.(1969) described the two-flask technique to process the obturator and the tooth portion separately Matalon and LaFuente(1976)^[10] used sugar during the processing of the obturator, which was removed by drilling a hole and then flushed out. Mc Andrew et al.(1998)^[11] fabricated the prosthesis in two halves and sealed them using autopolymerizing resin. Asher et al.(2001)^[12] used plaster index as a matrix to fabricate a hollow obturator. Iramaneerat et al.(2004)^[13] fabricated a hollow bulb obturator by injecting argon gas into the obturator bulb. Buzayan et al.(2013)^[14] used a rigid thermoforming splint to fabricate a hollow bulb obturator. Few authors suggested the use of acrylic resin shim and polyurethane foam while packing (Patil PG, Patil SP, 2012)^[15] Use of attachment for hollow bulb obturators have also been suggested. However, the cost may be high (Elangovan S, 2011).

Conclusion

Fabrication of an orbital prosthesis and hollow bulb obturator is an economic and advantageous method which helps the patient in improving his/her quality of life. The hollow bulb obturator not only reduces the weight of the prosthesis but also aids in achieving retentive seal around the defect. It also helps to improve the resonance during speech. It is an easy and conventional method of prosthodontic rehabilitation of a patient with acquired maxillofacial defect by which the prosthodontist can help improve the quality of life for the patient.

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