

CASE REPORT

Prosthodontic Management of Post Covid Mucormycosis - Case Series

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ABSTRACT

Background: Post covid mucormycosis although very uncommon, came to the limelight after the covid pandemic owing to the decrease in immunity of affected individuals. Post treatment, most of the patients were subjected to physical and mental trauma owing to the aggressive resection of the affected tissues. Patients faced difficulty in swallowing, speech and it affected the esthetics which had a negative impact on the quality of life of patients. Prosthetic management of such patients involves fabrication of maxillofacial prosthesis which replaces the resected tissue thereby restoring normal oral functions.

Aim: To manage patients affected by post covid mucormycosis prosthetically thereby improving the oral health of the individual.

Case description: In this article three cases are described which were prosthetically managed with help of obturator, cast partial denture, and hollow denture.

Conclusion: Prosthetic rehabilitation of patients affected by mucormycosis is quite complex considering the fact that surgery cannot be planned as per prosthetic requirements. Most of the time prosthodontists are left with minimal structure which would aid in retention, stability and support of denture. Rehabilitation of such patients with implants is a question of debate as more research is required to have clarity regarding the success of implants in mucormycosis affected patients. Conventional treatment with obturator, partial and complete denture is proven to be successful.

Keywords: Cast partial denture, Hollow denture, Oral rehabilitation.

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INTRODUCTION

In the aftermath of Covid pandemic, there were many patients affected by post covid mucormycosis. This was due to widespread use of Corticosteroids as a measure to control the inflammatory effects. Although steroids have been proven to be effective in reducing mortality, it can also predispose patients to secondary fungal and bacterial infection.¹

The risk factors predisposing patients to mucormycosis are uncontrolled diabetes, neutropenia, haematological malignancies, organ transplantation, trauma and burn, and use of immune-suppressants such as corticosteroids.^{2,3,4}

Fungi of the order Mucorales causes mucormycosis, a life-threatening fungal infection. Clinical evidence demonstrates that polymorphonuclear phagocytes are the major host defence mechanism against mucormycosis. Thus, neutropenic patients, patients with dysfunctional phagocytes are at higher risk for developing mucormycosis.⁵ Furthermore, Hyperglycemia and acidosis are known to impair the ability of phagocytes to move toward and kill the

organisms by both oxidative and non-oxidative mechanisms.⁶

Mucormycosis is an invasive fungal infection affecting oral/ nasal mucosa, involving para nasal sinuses and might extend into the orbital contents involving the eye and cranium (Rhino cerebral mucormycosis). Management involves early diagnosis and aggressive resection of the infected tissues. This often led to Maxillary/Facial defects which causes functional and aesthetic challenges to the patients. Prosthetic rehabilitation of such patients is complicated as it not only involves improving the function and aesthetics but improving the quality of life of the patient.

CASE DESCRIPTION

Case 1:

A 39-year-old male patient reported to the Department of prosthodontics with a history of post covid mucormycosis and had underwent sub- total maxillectomy of the left side and partial maxillectomy of the right side. Patient complains of difficulty in speech and regurgitation of food into nasal cavity. On clinical examination maxillary

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defect was present in the left maxilla with oro-antral communication (Fig1.1). All maxillary teeth were extracted except the right maxillary molars. Medical history reveals patient was a diabetic and was under treatment for past 2 years. Informed consent was obtained from the patient prior to the treatment.



Figure 1.1: Intra oral image showing oro-antral communication

After careful intra oral examination, moist gauze was placed to block the undercut in the defect and Primary impression was made with alginate with extension into the defect. A special tray was fabricated on the primary cast and the defect was recorded with green stick compound and final wash impression was made with light body impression material. Pick up impression was made with alginate to record the teeth on the right side. Bite registration and wax trial performed using conventional method. In the wax trial stage, the trial denture was evaluated for fit, occlusion, esthetics and speech. The patient was asked to pronounce letters like b and p and the sound was evaluated so that it was no longer hyper nasal. The denture was then fabricated using conventional technique and trimmed and polished. Figure 1.2 to 1.6 shows the clinical steps sequentially done.



Figure 1.3: Bite Registration



Figure 1.4: Wax Trial



Figure 1.5: Final Prosthesis



Figure 1.6: Denture Insertion

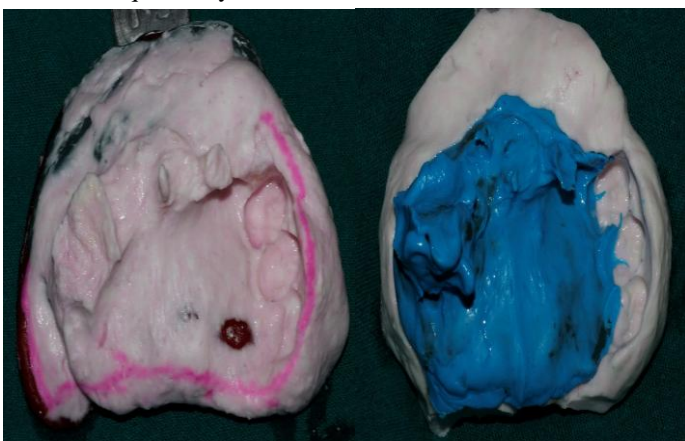


Figure 1.2: Maxillary Primary and secondary impression

During denture insertion (Fig 1.6), the denture was once again checked for fit, comfort, occlusion, speech and esthetics. The obturator portion was sufficiently relieved so that it does not injure the mucosa, yet be sufficiently retentive. Patient was recalled the next day, after one week and after one month for review and was evaluated.

Case 2:

A 40-year-old male patient reported to the Department of Prosthodontics with complaint of missing tooth in left upper back tooth region for past 4 months and associated with difficulty in mastication. On eliciting the history, patient had a past history of developing post covid mucormycosis and has underwent surgical resection of the left maxilla. On careful clinical examination, all the left maxillary teeth were missing associated with hard tissue and soft tissue loss (Figure 2.1). There was no oro- antral communication present and the patient did not have much difficulty in speech. A cast partial denture was planned for the patient. Informed consent was obtained from the patient prior to the treatment.



Figure 2.1: Intra oral view



Figure 2.2: Final impression

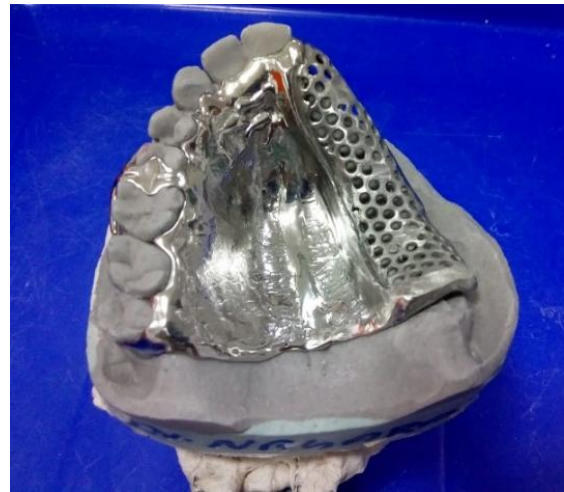


Figure 2.3: Metal Framework



Figure 2.4: Jaw Relation



Figure 2.5: Denture Insertion



Figure 2.6: Occlusal view

Accordingly, a diagnostic impression was made and evaluated for fabrication of cast partial denture. Primary cast was surveyed and the design of the cast partial denture was finalised. Mouth preparation procedure was performed and final impression was made with addition silicone impression material (Figure 2.2). An I-bar type of direct retainer was planned in right maxillary central incisor, occlusal rest seat was prepared in the distal fossa of second premolar and mesial fossa of first molar for placement of embrasure clasp, cingulum rest prepared in the right maxillary canine for indirect retention. Complete coverage palatal plate type major connector was chosen and mesh type minor connector in the saddle area.

The metal framework (Figure 2.3) was then tried for fit in the patient's mouth. Jaw relation and wax trial (Figure 2.4, 2.5) was performed in the conventional method. In the wax trial stage, the aesthetics, and occlusion is evaluated and the denture was processed. During the denture delivery (Figure 2.6), occlusion was checked for any occlusal premature contacts and was corrected by selective grinding. Patient recalled and reviewed after one week and one month.

Case 3:

A 37-year-old male patient reported to the Department of Prosthodontics with complaint of missing tooth in left upper back tooth region for past 8 months associated with difficulty in mastication. On eliciting the history patient gave a past history of developing post covid mucormycosis and had underwent surgical resection of the left maxilla. Clinical examination revealed missing left maxillary teeth associated with hard tissue and soft tissue loss (Fig 3.1). There was no oro- antral communication present and the patient did not have much difficulty in speech. Due to economic constraints, the patient opted for conventional acrylic removable partial denture. Since the denture had to replace the hard tissue and soft tissue loss, the increased weight of the denture would lead to poor retention. Hence it was decided to fabricate a hollow denture to reduce the weight and enhance retention. Informed consent was obtained from the patient prior to the treatment.



Figure 3.1: Intra oral image

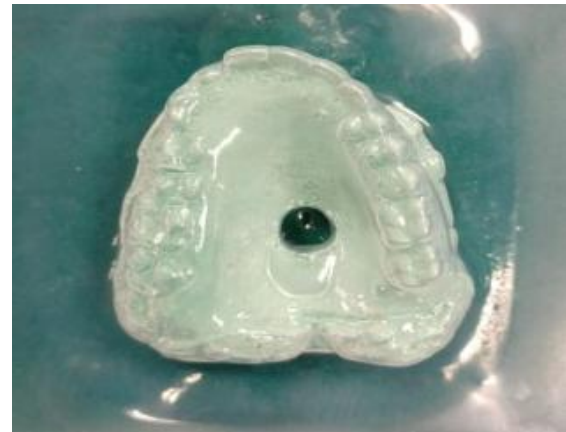


Figure 3.2: Duplicated cast with Clear template



Figure 3.3: Flasking & de-waxing done



Figure 3.4: Wax adapted to the master cast



Figure 3.5: Template placed on heat cure denture base to check for clearance



Figure 3.6: Wax placed



Figure 3.7: Self cure Acrylic shim with vents



Figure 3.8: Final Prosthesis

Conventional prosthetic procedures were followed till wax trial stage. Retention was achieved by placing clasps in the molar and premolars in the first quadrant. The trial denture was waxed up, notches were made on the land area of the cast and the cast was duplicated using alginate. The duplicated cast was used to make a template using clear polythene sheet (Figure 3.2). The trial denture was then flaked in an interchangeable dental flask. The second pour was done and dewaxing was performed (Figure 3.3). Modelling wax was adapted to the master cast (Figure 3.4) in the flask 1 and flask 2 was used to pour the counter. After dewaxing, the record base was then fabricated with heat cure denture base resin. The clear template which was fabricated on the duplicated cast was placed on the heat cure denture base (Figure 3.5) and oriented using the notches in the master cast and the space available between the denture base and teeth was evaluated. Wax can then be placed on the record base, (Figure 3.6) making sure that sufficient space for acrylic material is available on the buccal, palatal and occlusal surface. The template was removed and a thin shim was fabricated with self-cure acrylic resin on top of the wax (Figure 3.7) leaving vents on the posterior ends. Once the resin sets, the wax can be removed by placing in hot water. The posterior vent was sealed with self-cure resin and the counter of flask 1 with acrylic teeth was used for packing with heat cure denture base resin. This way, the denture can be made hollow to reduce its weight. Figure 3.8 shows the final prosthesis.

DISCUSSION

The Mucormycosis caused by certain fungal species generally does not affect the healthy individual. Patients who have uncontrolled diabetes mellitus and weak immune response due to certain systemic disorders are affected by contact with the fungal spores.^{7,8,9} Covid pandemic saw an increase in the incidence of post covid mucormycosis especially in India.¹⁰ This can be attributed by the fact that the India has the highest prevalence of Diabetes mellitus. The treatment involves the control of systemic metabolic disease like diabetes along with

administration of IV antifungal medications, and aggressive surgical resection of affected tissue. Intravenous or oral administration of amphotericin B, posaconazole, or isavuconazole is effective mode of treatment.

Surgery leads to extensive scarring of the tissues, thereby hampering the normal function of the individual. Primary treatment involves conventional dentures or obturators to advanced treatment like implants. As surgical treatment of mucormycosis requires aggressive resection of the infected tissue, surgical planning for prosthetic rehabilitation is limited.⁸ Prosthetic rehabilitation can be done only after complete recovery and healing of the tissues. Most of the cases present with oro-antral defect which causes the obturator to be directly placed over the non-keratinized mucosa thereby affecting the stability of the denture and causing discomfort for the patient. In the first case the obturator portion was sufficiently relieved so that it does not irritate the mucosa yet be sufficiently retentive. When the tissue is not suitable for placement of the prosthesis, skin grafts can be placed to protect the raw tissues and prosthesis can be fabricated.⁸ In the second case, cross arch stabilisation was achieved with the help of complete coverage palatal plate type major connector, retention was achieved by the I bar clasp and embrasure clasp. The third case, although did not have oro-antral defect, posed a significant challenge in fabrication of the prosthesis owing to the increased weight of the prosthesis which would hamper the retention. Hence measures to decrease the weight of the denture by fabricating hollow denture was logical which improved the retention, stability and support of the denture. Due to financial constraints, implants were not considered for all the three patients. Although all three cases were similar in clinical findings and etiology, the treatment protocol were different due to the available bone and soft tissue. In the first case, there was a oro-antral communication and hence a hollow bulb obturator was chosen to close the defect and restore speech and mastication. The second and third case although did not have a oro- antral communication, had severe soft tissue loss due to surgical procedure and hence a cast partial denture was chosen (second case) as it would provide better cross arch stabilisation and even distribution of masticatory forces. Acrylic removable partial denture (hollow denture) was the treatment of choice in the third patient as the patient was not willing for a Cast partial denture due to financial constraints.

CONCLUSION

The principles of prosthetic management are simple and fundamental. The design of the prosthesis is varying with the type and extension of the defect. The advanced treatment with implant is less reported in the literature. It can be due to the lesser prevalence of the disease in past years. The use of implant and

other options is planned with fundamental principles that can help in improving the quality of life of patients

CONFLICT OF INTEREST

There is no conflict of interest

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