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Case Report

Prosthodontic rehabilitation of maxillectomy defect in a patient of mucormycosis: A clinical case report

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ABSTRACT

Mucormycosis (Zygomycosis) is an opportunistic fungal infection caused by saprophytic fungus that invades rapidly and it is mainly associated with medically compromised patients. Paltauf first discovered this uncommon infection in human being in 1885. This clinical case report describes a post-operative prosthodontics management of acquired right side total maxillectomy defect caused by mucormycosis in a known uncontrolled diabetic female patient. As a treatment modality for mucormycosis, surgical resection of involved region has been done and surgical intervention creates a communication between the oral cavity and nasal cavity and missing some part of maxillofacial region with a loss of normal functions like mastication, swallowing, speaking, resonance etc. The goal of prosthodontics is the rehabilitation of missing oral and extraoral structures along with restoration of normal functions like mastication, speech, swallowing etc. But the prosthetic rehabilitation of maxillectomy defect can be challenging because of difficulty in getting adequate retention, stability and support. The obturator prosthesis is commonly used for rehabilitating this type of total maxillectomy cases by restores the missing structures and acts as a barrier to the communication between oral & nasal cavities.

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1. Introduction

Mucormycosis (previously called zygomycosis) is a rare but serious angio-invasive infection caused by a group of fungi called mucormycetes (WHO). Mucormycosis is the third most common invasive fungal infection,¹ following aspergillosis and candidiasis and accounts for 8.3–13.0% of all fungal infections found in autopsies of hematologic patients.² Spores of these ubiquitous fungi (commonly found in soil, fallen leaves, compost, animal dung and air) can be inhaled and then infect the lungs, sinuses and extend into the brain and eyes. Mucormycosis is not a contagious disease, it cannot be spread from one person to another. Mucormycosis mainly affects people who are immunocompromised patients already infected

with other diseases.³ High risk groups include people with diabetes,⁴ solid organ transplantation, neutropenia, long-term systemic corticosteroid use, HIV Positive. Fungal infections including mucormycosis, aspergillosis and invasive candidiasis, have been reported in patients with severe COVID-19 or those recovering from the disease.

Mucormycosis is an aggressive, life-threatening infection requiring prompt diagnosis and early treatment. Treatment usually consists of antifungal medications and surgery (by WHO). There are several clinical forms of infection based on the organ involvement. These are Rhinocerebral, pulmonary, gastrointestinal, cutaneous and disseminated. The most common form is Rhinocerebral which involve the nose, paranasal sinuses, maxilla, orbits and central nervous system. Oral mucormycosis is usually caused by inhalation of spores or direct contamination of open oral wound.⁵

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Rhizopus is more commonly associated with diabetes because of the active ketone reductase system it can thrive well in high glucose and acidotic conditions.⁶ The most frequent treatment is surgical removal of the affected area which results in a large defect with oronasal/oro-antral communication. According to Adam et al., mortality rate of mucormycosis are- 16% for cutaneous type, 67% for rhinocerebral, 83% for Pulmonary and 100% for GIT and disseminated type.

Acquired palatal defects resulting from hemi-maxillectomy may cause major difficulties with speech, swallowing and mastication. In turn, these functional problems may affect the quality of life. Change in appearance resulting from the loss of tissue and underlying structures may also lead to emotional stress and depression.⁶ Reconstruction of the maxillectomy with an obturator has several advantages. Besides replacing the missing soft and hard tissues, it enables the patient to swallow, masticate and speak approximately in the normal way and forms a barrier between nasal and oral cavities.

This clinical case report presents a case of prosthodontic rehabilitation of post-surgical acquired maxillary defect as a consequence of rhinocerebral mucormycosis in a covid 19 positive, uncontrolled diabetic female patient. Here, rehabilitation done with an interim obturator prosthesis.

2. Case Report

A 32-years old female diabetic patient reported to the Department of Prosthodontics and Crown and Bridge at Dr R Ahmed Dental College and Hospital. she was referred from ENT department of NRS Medical College & Hospital, Kolkata. The patient had a history of mucormycosis of right maxillary antrum with COVID-19 positive with pneumonia for which she had a right side total maxillectomy one year ago. Patient reported with chief complaint of broken previous prosthesis. Therefore, difficulty in mastication and regurgitation of fluid from the nose, pain and redness present in defect region and aesthetically non-pleasing appearance. Extraoral examination revealed a tissue contracture on the right side of the face (Figure 1). On intraoral examination, the maxillary defect with some redness were present in palate & right quadrant of maxilla, extended from right upper central incisor to right upper 2nd molar and the left maxillary quadrant was found to be intact with all teeth present (Figure 2). This was class I maxillary defect according to Aramany's classification (1978) of partially edentulous maxillary arch defect. The mandible had a full component of natural teeth. The patient had adequate mouth opening and normal jaw movement. The defect presented with an oronasal communication & undercut was present within the defect.

After completion of extraoral & intraoral examination, treatment planning was done and decided to rehabilitate the patient with interim obturator in place of definitive obturator



Figure 1: Extraoral view of the patient



Figure 2: Intraoral view of the patient

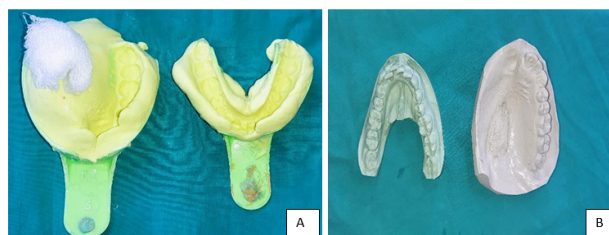


Figure 3: A): Primary impression, B): Primary cast

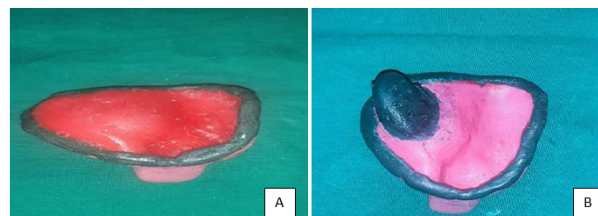


Figure 4: Border moulding

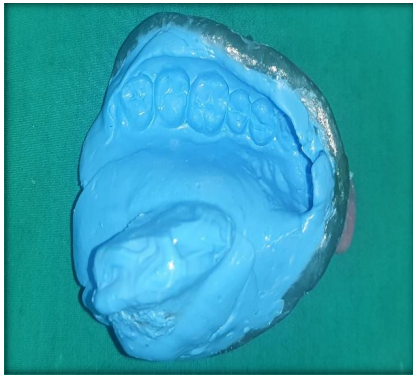


Figure 5: Final impression of maxillary arch and the defect



Figure 9: Intraoral view of obturator



Figure 6: Master cast



Figure 10: Check occlusion



Figure 7: A): Jaw relation taken, B): Try in done in patient Mouth



Figure 11: Obturator after delivery to the patient

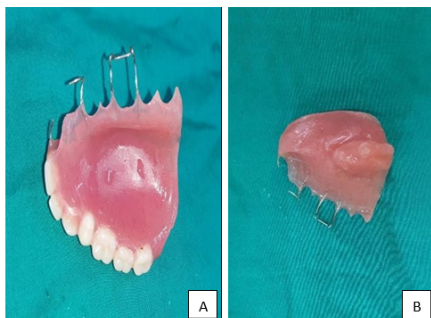


Figure 8: Processed obturator

because of tissues were still in healing process. Before begin with the procedure, oral prophylaxis was done and primary impression was taken with alginate impression material in a selected stock tray (Figure 3A). The defect area was packed with sterile gauze impregnated with petroleum jelly before the impression was taken. The primary cast was made (Figure 3B). Then double layer of modelling wax sheet was adapted over the dentulous area & single layer wax sheet was adapted on rest of the region of maxillary cast followed

by the fabrication of special tray with cold cure acrylic resin. Special tray was adjusted in patient's mouth and border moulding was done using low fusing green stick impression compound (Figure 4A).

Then, admix material (mixture of impression compound and green stick in 3:7 ratio) was used to record the defective portion (Figure 4B). Then tray adhesive was applied over the tray and wait for sometimes for dry out of tray adhesive and final impression was taken with medium body addition silicon elastomeric impression material (Figure 5). The final impression was poured with type III gypsum material and master cast was made (Figure 6).

After that, occlusal rim was fabricated on the master cast and the jaw relation was taken (Figure 7A) and mounting was done. After teeth setting, try in was done in patient mouth (Figure 7B). The retention for this type of obturator was gained from the remaining teeth with wrought wire clasps on the teeth. Therefore, one adam's clasp was placed in upper left 1st molar, two circumferential clasp was placed - one in left upper canine and another in left upper central incisor. Thereafter, conventional laboratory procedure flasking, dewaxing, packing and acrylization were done. After deflasking, prosthesis was finished and polished (Figure 8) and it was delivered to the patient.

3. Discussion

Prosthetic rehabilitation of maxillary acquired defects could be organized into three stages of treatment. For each step a different type of obturator is fabricated.⁷ Obturator is used to protect the oronasal or oropharyngeal communications and restore the functions such as mastication, swallowing, resonance & speech etc. It also improves the aesthetics as well as build-up the patient psychological well-being and confidence. Other advantages include that the obturator can be removed from the patient's mouth permitting for a clear vision and early detection of any recurrent lesion or tumor. The sequence of fabrication includes a surgical, a provisional and definitive prosthesis. The surgical prosthesis will provide support for skin grafts at the time of surgery. Provisional combination oral and extraoral prostheses can be constructed and delivered 2 to 3 weeks after surgery. Fabrication of definitive prostheses can be started when adequate healing has taken place.⁸ Presurgical records (photographs, vertical dimension and impressions) will facilitate the fabrication of prosthesis. Tissue adaptation modification can be accomplished with denture tissue-conditioning materials.⁸ In this present case report, an Aramany's Class I defect was rehabilitated with the interim obturator. If the prosthesis becomes loose, relining can be done in subsequent follow-ups and occlusal adjustment can be done as per requirements until the fabrication of definitive prosthesis.

4. Conclusion

Quality of life of patients with maxillary defects could obviously be improved through a proper diagnosis and well-designed treatment planning. A non-specific palatal ulcer could be the presenting sign of mucormycosis and it is therefore essential for dental practitioner be alert to early signs and symptoms of this disease, especially when evaluating the patients with the high-risk group.

The role of prosthodontists is crucial for rehabilitation of post-surgical maxillofacial defects to restore the lost oral functions along with rectification of aesthetic appearance, unaffected regions must be preserved to improve the retention and stability of an obturator prosthesis, which can be accomplished through proper surgical planning and prosthesis design. Surgical obturator (only acrylic plate without artificial teeth) is the treatment of choice for immediate closure and healing of the defect followed by fabrication of interim obturator to restore the lost oral functions until definitive prosthesis is fabricated. Psychological support/counselling is also an important factor which helps in treatment prognosis of a patient with maxillofacial defect.

5. Patient Consent

Patient consent was taken before publication.

6. Conflict of Interest

None.

7. Source of Funding

None.

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