



ISSN Print: 2394-7489  
ISSN Online: 2394-7497  
IJADS 2023; 9(2): 552-555  
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[www.oraljournal.com](http://www.oraljournal.com)  
Received: 17-02-2023  
Accepted: 21-03-2023

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## Prosthetic rehabilitation in a rare case of mandibular Mucormycosis with osteomyelitis

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DOI: <https://doi.org/10.22271/oral.2023.v9.i2g.1774>

### Abstract

In this case report our main goal was to preserve the patient's remaining teeth and providing a prosthesis during the healing period which will serve for both mastication and healing. Mandibular anterior teeth were lost due to osteomyelitis, leaving unhealed necrotic area. Curettage was done to salvage the remaining perfused bone. Use of a removable prosthesis with teeth on occlusal surface and silicone soft liner on intaglio surface, served the purpose of mastication and prevented the underlying operated soft tissues from further trauma. Major emphasis was given on keratinization of the soft tissues for preparation of a better foundation for placement of occlusal stress. Implant supported prosthesis was not opted for, to prevent the patient from the trauma of major surgical intervention. The removable prosthesis used in our case, served to fulfil the nutritional and aesthetic needs of the patient.

**Keywords:** Mucormycosis, osteomyelitis, mastication, esthetics, silicones

### Introduction

COVID-19, a deadly illness epidemic that has engulfed human populations in both developing and developed countries, is currently plaguing the entire planet. The World Health Organization has declared the disease a pandemic [1]. It is caused by the SARS-CoV-2 virus and is widely known as Coronavirus infection in general public. COVID-19 is a disease that has been afflicting people in India since March 2020 [2]. Fever, cough, headache, hypoxia, thromboembolic diseases, lethargy, dyspnea, diarrhea, anosmia, and ageusia are common signs and symptoms [3].

A large percentage of affected people have no symptoms. 81 percent of symptomatic patients had mild to moderate symptoms, whereas 14% have severe symptoms and 5% have significant symptoms [4]. People who are Immunocompromised or elderly are more likely to develop severe symptoms. Symptoms may appear 1-14 days after COVID-19 exposure, and some patients may continue to have symptoms. The most common reason for death is acute respiratory distress in patients induced by viral invasion into lung tissues, resulting in viral infection and pneumonia [5].

In patients with or without pre-existing co-morbidities, a wide variety of COVID-19 treatment procedures may produce bacterial and/or fungal co-infections. COVID associated Mucormycosis (CAM), an angio-invasive infection caused by saprophytic Rhizopus species, is one of these fungal illnesses [6].

The most common site of initiation is the nose, which can spread to the paranasal sinuses, orbit, and cranial cavitation. The earliest signs are generally loose teeth, gingival abscess, and dental extraction. Mucormycosis in the bone marrow can stimulate fungal growth by destroying the endothelium lining of vessels, causing vascular insufficiency and bone necrosis, which can progress to fungal osteomyelitis [7].

Various cases of Mucormycosis have been reported during post COVID time. However, mandibular Mucormycosis was a rare occurrence. This case report discusses about the prosthodontic rehabilitation of a rare case of mandibular Mucormycosis along with osteomyelitis.

### Case report

A female patient in her late 60s reported to the Department of Prosthodontics, with a complaint of difficulty in eating and problem with speech, esthetics from the past two months. The patient gave the history of Mucormycosis (Post COVID complication) with osteomyelitis 1 month back. Curettage w.r.t mandible had been done w.r.t left side crossing the mid line.

The clinical examination of the patient revealed painful swelling in the left side of the jaw. For radiographic examination, non-contrast computerized tomography (NCCT) w.r.t. maxillary and mandibular region was performed, which was suggestive of mucosal thickening of the gingival mucosa in relation to the lower 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> molar teeth. Cortical irregularity with erosion was seen along the outer margin of the body of the mandible of right side with involvement of respective alveolar sockets. Soft tissue swelling surrounding the left submandibular region likely involving the submandibular lymph nodes was seen. Fine needle aspiration cytology (FNAC) of the nodes, suggested acute inflammation. Three dimensional - cone beam computerized tomography (3D-CBCT) scan suggested osteomyelitis surrounding the left body of the mandible. Histopathologic examination was suggestive of chronic osteomyelitis. Potassium hydroxide (KOH) wet mount was positive for fungal elements, resembling Zygomycetes (broad aseptate hyphae with branching at right angles). The patient was treated conservatively by injectable liposomal Amphotericin B, followed by bone curettage under local anaesthesia. No history for hyperbaric oxygen therapy administration was given, the patient was maintaining stable oxygen saturation at room air with stable vitals on discharge with no associated life-threatening co-morbidities. The drug regimen followed by the patient was Isavuconazole 200 mg BD, with regular weekly follow up.

On extra oral examination, no gross asymmetry of the face was evident. Intra oral examination revealed, dentulous maxillary arch and partially edentulous mandibular arch with unhealed area having swelling and redness over the ridge of the mandible w.r.t right and left quadrants (Figure 1). KOH (Potassium Hydroxide) mount was the preliminary investigation for evaluating fungal elements, which was negative. For Radiographic examination orthopantomogram (OPG) was prescribed, which revealed extensive loss of bone

structure w.r.t left side of mandible with no infection remaining (Figure 2). Prognosis of the remaining mandibular teeth 47, 48 seemed fine. After thorough examination of the patient, treatment plan was decided. The patient was explained in detail about the procedure and written informed consent was obtained. The undercut areas in the mandibular defect region were blocked out with gauze, followed by impression making in irreversible hydrocolloid (Zelgan; Dentsply Intl) (Figure 3). Diagnostic casts were poured with Type III dental stone (Kalstone, Kalabhai). Surgical prosthesis was made with auto polymerising acrylic resin (DPI Cold Cure; DPI) which acted as a splint for the gauze dressing during the healing (Figure 4). Oral rinses with betadine and proper dressing was advised.

After initial healing (Figure 5), fabrication of interim prosthesis was started. Mandibular impression was made in a customised acrylic resin impression tray (DPI Heat Cure; DPI), border molded with type I low fusing impression compound (DPI tracing stick; DPI). Definitive impression was made with light body polyvinyl siloxane (EliteHD+, Zhermack) and a definitive cast was poured with Type III dental stone (Kalstone, Kalabhai). Denture base and wax occlusal rims were fabricated over the definitive casts followed by tentative jaw relation record (Figure 6). Articulation of the casts was done followed by teeth arrangement. Intra oral try-in was done and denture processing was done using heat polymerised acrylic resin (DPI Heat Cure; DPI). The prosthesis was retrieved, finished and polished (Figure 7). Preliminary insertion of the prosthesis was done along with the application of a chair side silicon soft liner (MOLLOSIL; DETAX), to prevent soft tissue irritation (Figure 8). The patient was put on a maintenance protocol and weekly follow up visits to review the necessity for relining and assessment of the healing. Frequent relining was done using silicon soft liner (MOLLOSIL, DETAX), during healing in 8 month follow up. Hygiene instructions were given corroborative with the use of dentures. 8 month follow up revealed satisfactory response with the prosthesis in place. The patient had undergone curettage of the necrotic bone thrice at 2, 3 and 5 months, post the initial appointment. With the conservative treatment protocol, favorable changes were seen, which prepared the patient for definitive treatment options, with improved oral function.



**Fig 1:** Pre op intra oral picture at first visit (note the limited amount of mouth opening, hindering the view of compromised tissues)



**Fig 2:** OPG



**Fig 3:** 2<sup>nd</sup> recall visit depicting minimal healing but improved mouth opening



**Fig 5:** Establishment of vertical dimension with the splint in place



**Fig 4:** Alginate impression of the defect in custom tray for dentulous arch



**Fig 6:** Prosthesis with teeth for function and esthetics in place



**Fig 7 a:** Intaglio surface of the prosthesis with chair side soft liner in place for cushioning effect on the defect tissues.



**Fig 7b:** Cameo surface of the prosthesis

### Discussion

Diabetes mellitus is usually a propagating factor for maxillary osteomyelitis<sup>[8]</sup>. Collateral blood supply, porous nature and thin cortices of maxilla, reduces the chance of osteomyelitis in maxilla when compared to the mandible<sup>[9]</sup>. Literature reveals that zygomycosis is less documented in mandible<sup>[10]</sup>.

1. Our case report showed a rare finding of mandibular Mucormycosis with osteomyelitis. The case report showed the application of a non-invasive prosthodontic management of the defect while it was yet to be epithelized. The prosthesis aided in formation of a keratinized surface, which helped in bearing occlusal stress and improved aesthetics.
2. Definitive prosthodontic treatment should only be considered once the healing is complete, where the presentation of the permanent defect is decided based on the healing process and scar contraction. The phases of treatment are arbitrarily divided into surgical, interim and definitive. The use of prosthesis supported on osseointegrated dental implants is also a viable treatment option, however availability of sufficient bone, keratinized mucosa, and feasibility of distraction Osteogenesis and the psychological trauma of another surgical procedure are the major factors limiting this approach.

In this case, the use of a removable dental prosthesis assisted in making fibrous changes to the necrotic tissue. Application

of chair side soft liner provided the cushion like effect needed to protect the tissues from further injury. The use of teeth on the occlusal surface helped in fulfilment of oral function and nutritional requirement of the patient. However, the limitation was slow healing during follow up visits, leading to frequent need for relining the prosthesis. Nevertheless, the use of a splinted removable prosthesis for management of mandibular Mucormycosis can prove to be a successful treatment option.

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#### How to Cite This Article

Bhandari R, Tripathi DS, Tripathi S, Chand P. Prosthetic rehabilitation in a rare case of mandibular Mucormycosis with osteomyelitis. *International Journal of Applied Dental Sciences.* 2023;9(2):552-555.

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