CASE REPORT

Prosthetic Rehabilitation of a Post-Covid Mucormycosis Maxillectomy Defect

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Abstract

The novel Coronavirus, named as SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) is a newly discovered virus which is responsible for the causing COVID-19. In India during covid time the emergence of Mucormycosis was being reported with an alarming rise in the number of cases. Its possible explanation could have been overuse of steroids, zinc, industrial oxygen, unsterilized medical equipment, frequent intubation and pre-existing comorbidities system such as diabetes which weakened immune system. In most of the cases surgical intervention had been done followed by fabrication of obturators. Management of such maxillary defects requires a multidisciplinary approach. Prosthodontics rehabilitation by means of hollow bulb obturator is the most practical, convenient and cost effective treatment mod. It improves the patient's esthetics, function and speech.

A patient with a maxillary defect on right side reported to the department of Prosthodontics and Crown & Bridge. His past medical history revealed that he suffered from fever and cough for 1 week 5 months back which relieved on medication. After few days, he noticed swelling and tenderness on right side of the face along with tooth ache on the same side. Sputum smear analysis and CT guided pulmonary biopsy were performed and he was diagnosed with rhino-cerebral mucormycosis with post covid pneumonia. FESS along with right side partial maxillectomy was performed 4 months back. His intra oral examination revealed a large maxillary defect extending from right sided alveolar bone, along with missing base of maxilla and palatal bone. This case report highlights the fabrication of hollow bulb obturator to treat an acquired maxillary defect for a patient with post Covidmucormycosis. Patient was happy and satisfied with his improved function, speech, and esthetics.

Keywords: Maxillary defects, Obturators, Hollow bulb, Post-CovidMucormycosis

Introduction

The novel Coronavirus, named as SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) is a newly discovered virus which is responsible for the causing COVID-19.[1] It is an infection of the upper airways like many other respiratory pathogens such as flu and rhinovirus which were transmitted through the respiratory droplets from coughing and sneezing.[2] The main clinical symptoms of SAR-CoV-2 is fever, cough, fatigue, anosmia, with some of these patients also developing conjunctivitis as a consequence of the virus spreading to the ocular area.[3]

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Mucormycosis most commonly called as black fungus it is a non-septate filamentous fungal infection that causes potentially life-threatening conditions. Rhino-orbital-cerebral mucormycosis usually affects the maxillary sinus with involvement of maxillary teeth, orbits, and ethmoidal sinuses.[4]In the recent time there was sudden increase of post covidmucormycosis cases. Its possible explanation could have been overuse of steroids, zinc, use of industrial oxygen, unsterilized medical equipment, frequent intubation and pre-existing comorbidities system such as diabetes which weakened immune system.[5] Diabetes mellitus is an independent risk factor for both covid-19 as well as mucormycosis.[3,11]This case report highlights the fabrication of hollow bulb obturator to treat an acquired maxillary defect for a patient with post Covidmucormycosis. Management of such maxillary defects requires a multidisciplinary approach. Prosthodontics rehabilitation by means of hollow bulb obturator is the most practical, convenient and cost effective treatment mode.[6]

Case Report

A 35 years old male patient reported to the Department of Prosthodontics with a chief complaint of bad appearance & difficulty in chewing food due to missing teeth since 4 months.Medical history revealed that he suffered from fever and cough for 1 week since 5 months back which relieved on medication.After few days, he noticed swelling and tenderness on right side of the face along with tooth ache on the same side. Sputum smear analysis and CT guided pulmonary biopsy were performed and he was diagnosed with rhino-cerebral mucormycosis with post covid pneumonia. Patient gave no history of diabetes but on routine blood investigation it was detected that HBA1C was on the higher side. FESS along with right side partial maxillectomy was performed since 4 months back.

Immediately after surgery surgical obturator was fabricated for the patient which he worn for 7 days. Then an interim obturator was fabricated which patient was wearing since 4 months. Extraoral examination revealed facial asymmetry on the left side. **(Figure 1)**Intra oral examination revealed a large maxillary defect extending from right sided alveolar bone, along with base of maxilla and palatal bone. A scar band had been seen laterally at the skin graft- mucosa junction. Thus, it was diagnosed as partial edentulous maxillary arch withAramany Class II defect.[7]**(Figure2)**Patient was mainly concerned about his aesthetic and masticationtherefore, it was decided to fabricatehollow bulb maxillary definitive obturator prosthesis for him.

Fabrication of the Obturator

Prior to make the preliminary impression, the defect should be clean and free of dried crusts of mucus. The edentulous stock tray was selected according to the configuration of remaining maxilla. Before the impression was made, the undesirable undercuts like medial and anterior margins of the defect was blocked out with gauze.A primary impression was made with irreversible hydrocolloid impression material **(Figure3)** using a stock tray. After obtaining the primary cast, a special tray was fabricated with self-cure acrylic resin. **(Figure 4)** Border moulding was done **(Figure 5)** with low fusing compounds. It was completed initially on the unresected side, then on the resected side including medial margin of the defect, because this stabilizes and orients the tray to the defect. Patient was asked to perform exaggerated head movements turning right and left with the head level and then with the neck flexed and extended to record defect area. The mouth should be open and closed and the mandible moved laterally then asked the patient to swallow. After completion of border moulding secondary impression was made with light body polyvinyl siloxane impression material in which posterior and lateral undercuts were recorded to aid in retention. A pick-up impression was made with alginate to record existing dentate segment **(Figure 6)**. The master cast was obtained with type III gypsum, undesirable undercuts are blocked out with wax **(Figure 7)** than a trial denture base with occlusal rim was fabricated on the master cast. Bite registration was done and casts were mounted on the semi-adjustable articulator. Teeth arrangement was done. At the time of try-in occlusion, aesthetics and phonetics were evaluated and found to be acceptable by the patient. A C-clasp on canine and molar as well as ball-ended clasps in the embrasures between canine and premolars were given to enhance retention and wax-up was done. **(Figure 8)**For the fabrication of hollow bulb, flasking and dewaxing has been done in a conventional method. A small piece was cut from the rubber gloves to make a rubber pouch then sand was filled within the pouch and knot was given. During packing one layer of acrylic resin was placed at the base of the defect area, over that sand bag was placed then another layer of resin material was placed on top of the defect. After curing, a hole was drilled through the lateral wall of bulb through which sand was drained away and rubber piece was taken out by tweezer. The hole was closed with cold cure acrylic resin.After finishing and polishing the cured denture **(Figure 9)** was inserted into the patient's mouth and post insertion instructions were given. **(Figure 10)**Prosthesis retention, stability and esthetics were carefully assessed. Patient was happy and satisfied with his improved function, speech, and esthetics.

Discussion

The primary goal of a prosthodontist is to rehabilitate a maxillary defect by closing the oronasal communication with a retentive and a stable seal using an obturator. Obturator is a maxillofacial prosthesis used to close, cover, or maintain the integrity of the oral and nasal compartments resulting from a congenital, acquired, or developmental disease process, i.e. carcinoma, cleft palate, osteoradionecrosis of the palate.[6] It helps to restore the continuity of the hard palate and oral cavity from nasal cavity, maxillary sinus and orbit.[7]

Prosthodontic rehabilitation can be divided into 3 phases with separate objectives, initial phase is surgical obturator. Second phase is interim obturator and third phase is definitive obturator. Three to 4 months after surgery, consideration may be given to the construction of definitive obturator prosthesis. It depends upon several factors like as the size of the defect, the progress of healing, the prognosis for tumor control, the use and timing of postsurgical radiation therapy, the effectiveness of the present obturator, and the presence or absence of teeth. At the skin graft-mucosa junction scar band was formed.It is flexible and will permit the prosthesis to be inserted but will tend to resist

dislodging forces. The skin graft above the scar band will tend to stretch, so modest pressure exerted by the prosthesis against the skin graft laterally will enhance both retention and support of the prosthesis.[8,9]Obturator bulbs can be made from different materials such as acrylic resin or silicone.[10] In the present case, acrylic bulb was chosen because it has many advantages. Acrylic can be relined or rebased to compensate for the changes which will continue to occur for 1 year secondary to scar contraction and further organization of the wound, particularly in defect area. On the other hand silicone has many disadvantages. It cannot be used in larger sized defects, poor wettability. Silicone needs to be replaced once every 6 months as the prosthesis loses its physicalproperties, such as color, flexibility and also dimensional changes are observed.[8]

To reduce weight of the prosthesis hollow obturator was fabricated. Hollowing of the obturator not only reduce the weight but also adds resonance to speech. Wu and Schaaf found that hollow maxillary obturator prosthesis reduced the weight of the prosthesis from 7%to 33%, depending upon the size of the maxillary defect. The superior surface can be either left open or closed. When the defect was closed, a satisfactory aesthetics, phonation and function were achieved.[8]

Conclusion

Prosthodontic rehabilitation of the maxillofacial defect patient is a tedious process.[7] However, if attention is paid to the proper sequencing and details of treatment, it can be one of the most satisfying procedures. Prosthetic rehabilitation will improve the patient's quality of life and confidence.[6]

Figure 1: Extra-oral examination

Figure 2: Intraoral examination of defect area (Mirror image)

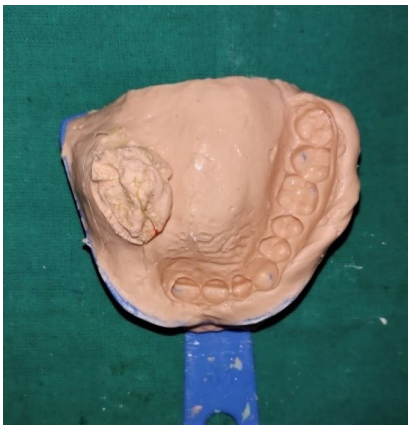

Figure 3: Maxillary primary impression

Figure 4: Maxillary primary cast

Figure 5: Border molding

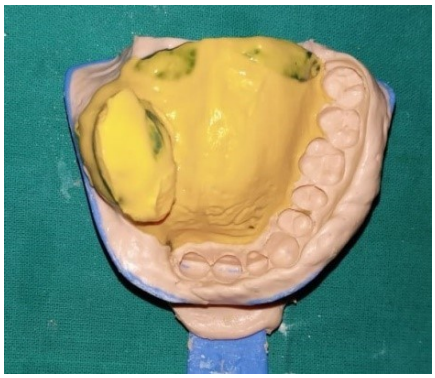

Figure 6: Maxillary final impression

Figure 6: Maxillary master cast

Figure 7: Try-in

Figure 9: Finished and polished denture

Figure 10: Postoperative view

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