



PROSTHETIC REHABILITATION OF A HEMI-MAXILLECTOMY PATIENT SECONDARY TO MUCORMYCOSIS

Shayistha M U*	Junior resident, Department of Prosthodontics and Crown & Bridge Government Dental College, Thiruvananthapuram, Kerala. *Corresponding Author
Puvvadi Kalyani	Junior resident, Department of Prosthodontics and Crown & Bridge Government Dental College, Thiruvananthapuram, Kerala.
Kavitha Janardanan	Associate Professor, Department of Prosthodontics and Crown & Bridge Government Dental College, Thiruvananthapuram, Kerala.
Karunakaran Harshakumar	Professor & Head, Department of Prosthodontics and Crown & Bridge Government Dental College, Thiruvananthapuram, Kerala.

ABSTRACT Mucormycosis, a rare fungal infection seen in diabetes, is currently manifested very frequently owing to the deadly triad of COVID-19 infection, diabetes, and rampant use of corticosteroids. Immediate management revolves around therapeutic drugs like antifungals, antibiotics, and aggressive surgical debridement. Aggressive surgical debridement like hemi-maxillectomy alters the facial appearance, functions, and an individual's overall quality of life. Prosthetic rehabilitation with obturators or reconstruction with soft tissue flaps are the techniques to manage the defect. Obturator function and quality of life have a strong correlation. This case report describes the prosthetic management of a hemi-maxillectomy patient secondary to mucormycosis during the peak surge of COVID-19 but who tested negative for COVID-19.

KEYWORDS : Mucormycosis, obturator, hemi-maxillectomy.

INTRODUCTION

Mucormycosis is a life-threatening infection occurring in immunocompromised patients as in diabetic ketoacidosis, neutropenia, organ transplantation, trauma and burns, malignant hematologic disorders, deferoxamine therapy in patients receiving hemodialysis and/or increased serum levels of available iron^(1,2,3). Nosocomial or community outbreaks have also been described. Mucormycosis is caused by a fungi belonging to the order Mucorales⁽⁴⁾. *Rhizopus oryzae* is the most common organism isolated from patients with mucormycosis and is responsible for 70% of all cases of mucormycosis⁽⁵⁾. As there is an increase in prevalence of diabetes mellitus, cancer, and organ transplantation in the modern era, the number of patients at risk for this deadly infection is also increasing⁽⁶⁾.

Mucormycosis is characterized by host tissue infarction and necrosis resulting from vasculature invasion by hyphae starting with a specific interaction with endothelial cells. Most common clinical presentations are rhino-orbito-cerebral and pulmonary. The infection begins in the nose and paranasal sinuses due to the inhalation of fungal spores^(7,8). This infection can spread to the orbital and intracranial structures by direct invasion or through the blood vessels^(9,10). The fungus invades the arteries leading to thrombosis that subsequently causes necrosis of hard and soft tissues. Early diagnosis and treatment can reduce the mortality and morbidity of this lethal fungal infection. Treatment for mucormycosis includes aggressive therapy, like surgical debridement leading to facial disfigurement and adjunctive toxic antifungal therapy, despite which the overall mortality rate is high.

This article is a case report of rehabilitation of a hemi-maxillectomy patient who had a history of mucormycosis.

Case report

A 68 year old male patient was referred from a private hospital in Thiruvananthapuram to The Department of Prosthodontics, Government Dental College, Thiruvananthapuram for the prosthetic rehabilitation of a maxillectomy defect. Eight months ago, the patient had severe pain below the left eye. He had a history of sinusitis 15 years ago and hence this pain was thought to be of the same nature. The patient was prescribed painkillers but to no avail. A thorough MRI and endoscopy investigation revealed it as a case of mucormycosis. A hemi-maxillectomy was done and the patient was given an interim prosthesis. The patient needed a definitive obturator along with the replacement of his teeth. An extraoral examination revealed facial asymmetry, with a lack of support for the eyes, lips and cheek on the left side. Mouth opening of the patient was slightly restricted, with defective hypernasal speech. Intraoral examination revealed an Aramany class I defect of the palate (Figure 1).



Figure 1. Maxillary defect

A preliminary impression was taken with irreversible hydrocolloid (Algitex, DPI, India) after recording the defect using admix technique (DPI Pinnacle tracing sticks, DPI Pinnacle functional impression compound, DPI, India). The diagnostic cast was poured with Type III gypsum (Gem Stone, Shruthi products, India). The maxillectomy defect was outlined in the cast and it was surveyed for designing a titanium metal framework. Mouth preparation was done which included a guide plane on mesial side of 11, an I - bar clasp engaging the distal undercut of 11, a circumferential clasp on 14 and an embrasure clasp involving 16 and 17. A two-step impression was taken with polyvinyl siloxane putty (Avue gum putty, Dental Avenue, South Korea) and light body material (Avue gum light body, Dental Avenue, South Korea). A titanium metal framework was fabricated, its fit was checked intraorally and necessary adjustments were made. The framework was extended along the defect area using cold cure acrylic (Acryton-'R', Orthoplast, India) and border molding was completed. The defect area was recorded using admix technique and final impression was taken with polyvinyl siloxane light body material. Altered cast technique was done wherein the master cast was cut off on the defect side and the metal framework with the final impression was placed onto the altered master cast and boxed. The impression was poured to obtain the working cast. The hollow bulb portion of the obturator was fabricated (Figure 2) upon which the wax occlusal rim was made and the patients jaw relation was recorded.

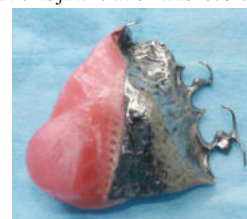


Figure 2. Hollow bulb fabricated on the titanium metal framework

Try in was completed followed by the final processing of the denture. The denture was inserted after standard finishing and polishing (Figure 3). The patient showed considerable improvement in esthetics, phonation, and the obturator was very effective in preventing nasal regurgitation of food and fluids. The patient was very much satisfied with the prosthesis. Periodic recall appointments were scheduled for the evaluation of the prosthesis. The follow-up appointments showed satisfactory results with no deterioration of comfort and function with the prosthesis.



Figure 3. Titanium obturator in-situ.

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. Prosthetic rehabilitation of maxillary defects can be categorized into three stages in which different type of obturators are fabricated in each stage, viz., immediate surgical obturator, interim obturator, and definitive obturator. A definitive obturator is not indicated until the surgical site is healed and dimensionally stable and the patient is prepared physically and emotionally for the restorative care that maybe necessary. Although few researchers suggest that free surgical flaps offer the surgeon with an opportunity of dealing with the issues of prosthetic obturation like nasal leakage, cleansing, and regular prosthetic correction, it must be realized that surgical flap reconstruction remains associated with increased operation time, failure rates, and donor site morbidity. The fabrication of an obturator prosthesis shortens the operation time extensively and gives the opportunity of immediate rehabilitation.

The obturator may be displaced superiorly with the stress of mastication and will tend to drop without occlusal contact especially when there is no posterior abutment on the defect site as in this case. Heaviness of the obturator also causes the prosthesis to loosen due to gravity. The weight of the prosthesis can be greatly reduced by using a titanium framework combined with a hollow bulb in the prosthesis. Titanium is a suitable material for obturator applications as it combines a unique mixture of strength and material lightness. The main advantages of titanium are its low density (4500 kg/m³), good corrosion resistance, and high strength.

In this case of hemi-maxillectomy, altered cast technique was used. Altered cast or corrected cast technique offers many advantages to the prosthesis like improved stability, minimal stress to the abutment teeth and more predictable occlusion. The patient may also be referred to a speech pathologist in order to adequately improve the ability to speak and swallow.

CONCLUSION

Rehabilitation of the maxillectomy defect with an obturator prosthesis appears to be a functional and effective treatment modality. A proper diagnosis and treatment planning combined with a properly fabricated obturator improves the functional, phonetic and esthetic needs of the patient. With proper diagnosis and treatment planning, an obturator will help the patients to lead a life with self-confidence and respect. This case report discussed the prosthetic treatment of a maxillary defect with a titanium cast hollow definitive obturator.

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