ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at: www.ijdsir.com
Volume – 6, Issue – 2, April - 2023, Page No. : 268 – 273

Prosthetic Rehabilitation of a Post-Covid Mucormycosis Maxillectomy Defect Using Hollow Obturator: A case report

[1]Dr. Santosh Dixit, Head of Department, Department of Prosthodontics and Crown & Bridge, Pandit Deendayal Upadhyay Dental College & Hospital, Solapur, Maharashtra.

[2]Dr.Priyanka Jeve, Post Graduate student, Department of Prosthodontics and Crown & Bridge, Pandit Deendayal Upadhyay Dental College & Hospital, Solapur, Maharashtra.

[3]Dr. Varun Deshpande, Reader, Department of Prosthodontics and Crown & Bridge, Pandit Deendayal Upadhyay Dental College & Hospital, Solapur, Maharashtra.

[4]Dr. Vikram Rathod, Reader, Department of Prosthodontics and Crown & Bridge, Pandit Deendayal Upadhyay Dental College & Hospital, Solapur, Maharashtra.

[5]Dr. Pooja Radke, Post Graduate student, Department of Prosthodontics and Crown & Bridge, Pandit Deendayal Upadhyay Dental College & Hospital, Solapur, Maharashtra.

Corresponding Author: Dr. Priyanka Jeve, Post Graduate student, Department of Prosthodontics and Crown & Bridge, Pandit Deendayal Upadhyay Dental College & Hospital, Solapur, Maharashtra.

Citation of this Article: Dr. Santosh Dixit, Dr. Priyanka Jeve, Dr. Varun Deshpande, Dr. Vikram Rathod, Dr. Pooja Radke, "Prosthetic Rehabilitation of a Post-Covid Mucormycosis Maxillectomy Defect Using Hollow Obturator: A case report", IJDSIR- April - 2023, Volume – 6, Issue - 2, P. No. 268 – 273.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Maxillectomy accomplished in acquired lesions is often very extensive and it causes communication with the nasopharyngeal complex. These defects need both surgical and prosthetic rehabilitation. The role of a prosthodontist is to rehabilitate the intra and extra-oral structures and to enable the normal function of mastication, speech, deglutition, and esthetics. To overcome the problems encountered by the patient, obturators are fabricated. The main difficulty accompanying the rehabilitation of large defects is the weight of the prosthesis; the prosthesis becomes very heavy and non-retentive due to its weight. This case report describes a simplified method of fabrication of a definitive hollow bulb obturator using the lost salt technique for the rehabilitation of a maxillary defect.

Keywords: Maxillary Defect, Obturator, Lost Salt Technique

Introduction

Maxillary resection due to carcinoma and/or any infection leads to many problems, including anatomical disfigurement of the face, impaired and unintelligible

speech due to hypernasality causing a significant impact on patient's quality of life. Maxillary necrosis occurs due to bacterial infections, such as osteomyelitis, viral infections, such as herpes zoster or fungal infections, such as mucormycosis, aspergillosis etc.[1]

Post-COVID Mucormycosis has had a devastating effect on patients. Mucormycosis is an opportunistic fungal infection, which mainly infects immunocompromised patients. Long-term corticosteroid treatment in such susceptible patients and high fungal spore counts in the hospital setting create a conducive environment for fungal infections. The infection begins in the nose and paranasal sinuses due to the inhalation of fungal spores.[1,2] It can spread to orbital and intracranial structures either by direct invasion or through the blood vessels. The fungus invades arteries leading to thrombosis that subsequently causes necrosis of hard and soft tissue.

Upon involvement of the maxilla, surgical resection and debridement of the affected areas results in extensive maxillary defects.[3] The defect may be in the form of a small opening resulting in communication from the oral cavity into the maxillary sinus, or it may include a portion of the hard and soft palate, alveolar ridge and the floor of the nasal cavity.[4] In patients with extensive removal of the maxilla, in addition to facial disfigurement, hypernasal speech and masticatory difficulties, there may be fluid leakage through the nose and may be associated with acute and chronic episodes of sinusitis.[4–6]

Maxillectomy performed in mucormycosis spares very less hard and soft tissue in the oral cavity.Such defects are usually treated with surgical and prosthetic rehabilitation, Obturator prosthesis post maxillectomy provides a seal between the oral and nasal cavity and assists the patients in speech and swallowing.[1]As there is minimal or no ridge tissue is left behind in total maxillectomy cases, retaining a denture intraorally is a difficult task. This is mostly due to a lack of hard tissue support and secondly due to the heaviness of the prosthesis.[2]

An obturator prosthesis is a removable appliance used to close the congenital or acquired tissue opening primarily of the hard palate and/or soft palate.[3] This bulb of the obturator engages the defect to gain retention for the prosthesis and form a hurdle for oral and nasopharyngeal communication.[4] The bulb of the obturator prosthesis increases the weight of the prosthesis, which may hamper the retention of the prosthesis.[5]To prevent this, the obturator prosthesis should be made hollow.The present case report defines a method for rehabilitating patients with a total maxillectomy defect with the lost salt technique.

Case report

A 50-year-old male patient reported to the Department of prosthodontics with a chief complaint of difficulty in the consumption of food and speech discrepancies.Past medical history revealed that the patient underwent maxillectomy for post Covid-19 necrosis of the maxilla due to mucormycosis nine months back.Intraoral examination revealed a large maxillary defect on the left side with oroantral communication and a partially edentulous arch**as shown in figure 1**. Mobility was prominent in the anterior segment of the palate and alveolar region along with teeth present inthe maxilla in the labial-lingual direction which was the secondary spread of the infection. Extra-orally defect was extended towards the orbital region. The patient was sent for surgery again as it was suspected of secondary infection or incomplete debridement.

Figure 1: Showing intraoral examination

He was then advised for a surgical obturator /plate. This assisted the patient to feed on oral fluids, speak with comfort, improved healing of the wound, and hence prepared the defect area for a prosthesis .The patient visited again to the department of prosthodontics4 weeks after surgery, complete debridement was observed**as shown in figure 2**. Alginate impression was made for the maxillary and mandibular arch and thenthe delayed surgical obturator was modified to an interim obturator with few maxillary anterior teeth for the patient's psychological comfort.

Figure 2: Showing complete debridement of the necrotic part

Frequent recalls were scheduled to assess the healing and stability of the prosthesis. Three months later, the patient was symptomatically better and hence planned for the fabrication of a definitive obturator.

It was a large defect present in the anterior to right maxillary region communicating the nasal cavity superiorly and the maxillary sinus region towards the right side. Antero-posteriorly defect starts from the midpalate towards the buccal vestibule. Medially extends until the midline of the palate and laterally until the left upper first molar region. The defect was surrounded by a part of the alveolus bearing the upper left third molar.

Treatment plan

A) Fabrication technique

A primary impression was made with alginate material using a stock trayand poured in type 3 gypsum product to obtain diagnostic casts**as shown in figure 3 and 4.**

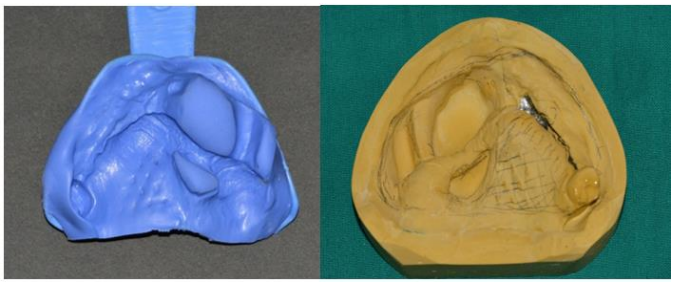

Figure 3 and 4: Showing the primary impression

After obtaining the primary cast,a custom tray was fabricated with self-cure acrylic resin.The custom tray was fabricated with auto-polymerizing acrylic resin. Border molding was performed with greenstick and the impression was made with putty A-silicon impression material and poured in type 3 gypsum product to obtain the final cast **as shown in figure 5 and 6**.

Figure 5 and 6: Showing custom tray and final cast

Then wax rim was fabricated and Jaw relation was recorded **as shown in figure 7** to assist in teeth arrangement. Teeth arrangement and wax-upwere done. Try-in procedure was carried out**as shown in figure 8.**

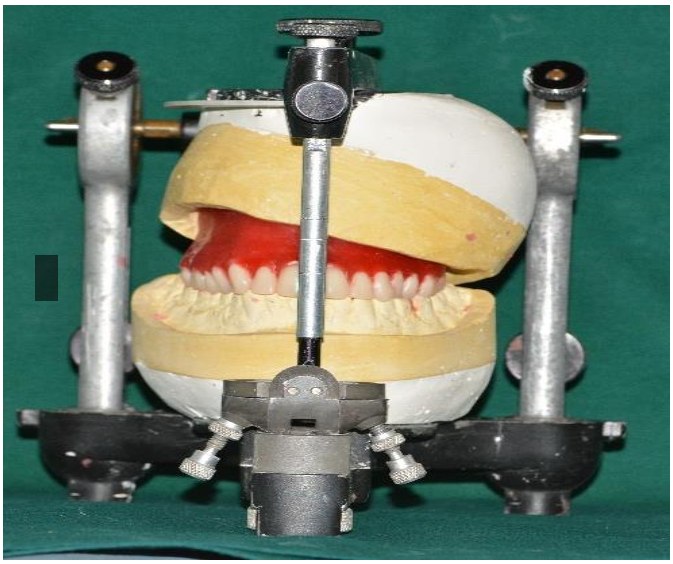

Figure 7: Showing the recorded jaw relation

Figure 8: Showing Try-in procedure

The denture was invested in a denture-curing flask and acrylised to fabricate a hollow bulb obturator using the lost salt technique. After processing, the salt was removed by injecting water.This step also significantly decreased the weight of the prosthesis as the thickness of the prosthetic bulb extending into the defect was reduced. The open bulb was closed using a thin sheet of wax. The auto-polymerizing resin was mixed and placed on the index and approximated back onto the prosthesis. The wax helped to seal the open bulb and to prevent the acrylic from flowing into the hollow cavity. After the acrylic had been set, the obturator was polished and delivered to the patient **as shown in figure 9 (a) and (b).**

Figure 9 (a) and (b): Showing the delivered prosthesis to the patient

Discussion

Maxillectomy patients suffer from functional as well as facial disfigurement so the role of a prosthodontist comes into play to restore function and esthetics.[6] The primary aim of the management of maxillectomy defect is to give a prosthetic obturation that closes the defect and separates the oral cavity from the sino-nasal cavities.[7]Obturator prostheses are usually used for the rehabilitation of patients accompanying maxillary defects. The bulb, or part of the prosthesis extending into the defect, is usually hollow to reduce the weight of the prosthesis.[8]

Various methods have been described to fabricate hollow bulb obturators. Different materials, such as sugar, salt, and ice, can be incorporated into the resin during the packing stage to produce a hollow bulb obturator, although the simplest procedure is to grind out

the interior of the obturator bulb after acrylisation.[9] Different methods have been developed for making obturators hollow, but most of the methods specified are time-consuming and complex.Different methods have been advocated for making hollow bulb obturators.[10]

Oh, and Roumanas suggested a double processing technique to optimize the thickness of the bulb.[11] Habib and Driscoll suggested a method by which a part of the bulb similar to a lid is removed and then joined back to the prosthesis after the bulb has been hollowed. The resin was further well explained in the earlier literature.[12] Two-step processing method, using preformed plastic shapes or plaster forms were tried by some authors. The acrylic resin contents and a polyurethane foam were included in the defect area during packing to create hollow space by a few authors. Patil and Patil presented a method of hollow obturator by inserting a pre-shaped wax bolus while packing of heat-cured acrylic material.[13-15]

The patient presented here had a well-healed defect so definitive hollow bulb obturator prosthesis was planned for rehabilitation. superior to other methods because of its simplicity and economical from the patient's perspective. Moreover, most of the methods presented in the literature used auto polymerizing resin material that leaches out with use, but on the contrary, in the given method only heat cure resin material was used which aids in the novelty of this approach.

Conclusion

Prosthetic rehabilitative challenges are faced in comprehensive maxillectomy defects.The single-piece completely hollow design selected in this clinical report allowed us to maintain the prosthesis weight as minimum as possible and was established to be an effective mode for rehabilitation. The ease of fabrication reduced time and reduced cost were the additional benefits of this technique. The obturator given to the patient increased function by providing better masticatory effectiveness, and phonetics by adding resonance, and also improved the esthetics.

References

1. Beumer J, Curtis T, Marunick M. Maxillofacial rehabilitation: prosthodontic and surgical considerations. St. Louis (MO): Ishiyaku EuroAmerica; 1996:21(2):40-285.
2. Lapointe HJ, Lampe HB, Taylor M. Comparison of maxillectomy patients with immediate versus delayed obturator prosthesis placement. J Otolaryngol. 1996; 25(3):308–312.
3. Shaker KT. A simplified technique for construction of an interim obturator for a bilateral total maxillectomy defect. Int J Prosthodont. 2000;13(2):166–168.
4. Rani S, Gupta S, Verma M. Hollow bulb one-piece maxillary definitive obturator- A simplified approach. Contemp Clin Dent 2017;8(3):167-70
5. Raghuthaman A, Prema, Raveendran A. Hollow denture-a solution to post covid total maxillectomy patients: A case report. *IP Ann Prosthodont Restor Dent* 2022;8(2):104-107.
6. Kumar JA, Babu P, Prabu K, Kumar P. Mucormycosis in maxilla: Rehabilitation of facial defects using interim removable prostheses: A clinical case report. J Pharm Bioallied Sci. 2013 Jul;5(2):163-5.
7. Chalian, VA, Drane JB, Standish SM. The evolution and scope of maxillofacial prosthetics. In: Chalian VA, Drane JB, Standers SM editors. Maxillofacial Prosthetics: Multidisciplinary Practice. Williams and Wilkins Company; Baltimore: USA, 1972.
8. Taylor TD, editor. Clinical Maxillofacial Prosthetics. Chicago: Quintessence 2000;12(3):103-120.

9. Jacob RF. Clinical Management of the Edentulous Maxillectomy patient. In: Taylor TD editor. Clinical Maxillofacial Prosthetics, Quintessence Publishing Co, Illinois. 2000:10(1):21-28.
10. Shah RJ, Katyayan MK, Katyayan PA, Chauhan V. Prosthetic Rehabilitation of Acquired Maxillary Defects Secondary to Mucormycosis: Clinical Cases. J Contemp Dent Pract 2014;15(2):242-249.
11. Roumanas M. Oh M, Chit V. Technique of Fabrication of Definitive Hollow Obturator for Partial Maxillectomy Patient. International Journal of Prosthodontics & Restorative Dentistry. 2017; 7: 38-41.
12. McAndrew KS, Rothenberger S, Minsley GE: An innovative investment method for the fabrication of a closed hollow obturator prosthesis. J Prosthet Dent 1998; 80: 129-132.
13. Didier M, Laccoureye O, Brasnu D, et al. New surgical obturator prosthesis for hemi-maxillectomy patients. J Prosthet Dent 1993; 69: 520-523.
14. Keyf F. Obturator prostheses for hemi-maxillectomy patients. J Oral Rehabil 2001; 28: 821-829.
15. Buzayan MM, Ariffin YT, Yunus N. Closed hollow bulb obturator one-step fabrication: a clinical report. J Prosthodont. 2013; 22(7): 591– 595.