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An unique technique of constructing a hollow bulb obturator

[1]Anjali Shivkumar Sharma, BDS, PG Resident, Department of Prosthodontics, Crown & Bridge and Implantology, Rishiraj College of Dental Sciences & Research Centre, Bhopal Madhya Pradesh, India.

[2]AmbikaShrivastava, BDS, MDS, Professor Department of Prosthodontics, Crown & Bridge and Implantology, Rishiraj College of Dental Sciences & Research Centre, Bhopal Madhya Pradesh, India.

[3]Siddharth Gupta, BDS, MDS, Professor Department of Prosthodontics, Crown & Bridge and Implantology, Rishiraj College of Dental Sciences & Research Centre, Bhopal Madhya Pradesh, India.

[4]Chandu G S, BDS, MDS, Professor & Head, Department of Prosthodontics, Crown & Bridge and Implantology , Rishiraj College of Dental Sciences & Research Centre, Bhopal Madhya Pradesh, India.

[5]KhushbooVerma BDS, MDS, Senior Lecturer, Department of Prosthodontics, Crown & Bridge and Implantology , Peoples Dental Academy, Bhopal Madhya Pradesh, India.

[6]Parag Mahajan, BDS, PG Resident, Department of Prosthodontics, Crown & Bridge and Implantology, Rishiraj College of Dental Sciences & Research Centre, Bhopal Madhya Pradesh, India.

Corresponding Author: Anjali Shivkumar Sharma, BDS, PG Resident, Department of Prosthodontics, Crown & Bridge and Implantology, Rishiraj College of Dental Sciences & Research Centre, Bhopal Madhya Pradesh, India.

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Abstract

Introduction: It is a fundamental human entitlement to maintain one's appearance and dignity. The face serves as a profound reflection of an individual's character and essence. However, the past two and a half years of the COVID-19 pandemic have inflicted immense loss of life and a significant decline in quality of life. Among the complications arising from this relentless disease is Mucormycosis, a perilous fungal infection that invades vital blood-rich areas such as the maxilla.

Mucormycosis, if left undiagnosed, can prove fatal. Consequently, surgical intervention often becomes necessary, resulting in increased instances of maxillary resection and subsequent defects. These defects undermine the structural integrity and functionality of both the nasal and oral cavities, leading to complications

such as hypernasal speech, fluid regurgitation, and impaired masticatory function.

To address these substantial defects, rehabilitation becomes essential, often accomplished through the use of obturators. The bulb component of these obturators not only fills the defect but also plays a crucial role in ensuring retention and stability by adequately extending into the affected area to form a secure seal. Establishing a proper seal is paramount in restoring functionality and facilitating rehabilitation efforts.

Case Characteristics: A 45-year-old male patient presented with a chief complaint of nasal regurgitation from the left side of his nose, accompanied by numbness on the left side. Upon clinical examination, a large defect was observed in the left region of the palate, which was the outcome of surgical intervention for mucormycosis.

Treatment: The fabrication of a hollow bulb obturator was completed to ensure it fills the entire maxillary defect while remaining lightweight, especially considering the patient's paresthesia on the left side.

Conclusion: Thus, the paper describes an innovative technique for fabricating a closed hollow bulb obturator.

Keywords: Hollow bulb obturator, mucormycosis, quality of life.

Introduction

Maxillary defects can arise from surgical treatments for benign or malignant neoplasms, as well as trauma. In the post-COVID-19 era, sepsis may occur following the destructive effects of SARS-CoV-2 on the human body. This can lead to secondary fungal and bacterial infections, particularly in patients who are systemically ill or affected, and who have undergone invasive emergency procedures, mechanical ventilation, prolonged hospital stays, or experienced breaches in asepsis protocols. Corticosteroid treatment in such individuals can further increase susceptibility to fungal and viral infections due to elevated spore counts in the environment, creating conducive conditions for mold infections. One such rare yet perilous fungal infection is known as black fungus, which has profoundly impacted patients by causing loss of facial features and functions. As a prosthodontist, effective prosthetic management of these defects is crucial for restoring both functional and aesthetic aspects, thereby instilling confidence in patients to engage with the world. This article focuses on an innovative technique involving the construction of a closed hollow bulb obturator to address such challenges.

Case Report

Examination and Treatment Planning

A 45-year-old male presented to the Department of Prosthodontics, Crown & Bridge, and Implantology with complaints of nasal regurgitation from the left side of his nose, accompanied by numbness on the left side. He reported a history of facial paralysis affecting the left side, which contributed to his inability to perceive sensations on that side.

Upon extraoral examination, facial asymmetry characterized by a collapsed cheek and depressed nasolabial folds on the left side was noted. Intraoral examination revealed a well-healed residual maxillary defect with an oro-antral communication resulting from partial maxillectomy on the left side. Additionally, teeth 21 to 28 on the left side and 11 to 12 on the right side, along with the alveolar ridge, were missing, leading to obliteration of the labial and buccal vestibules on the same side. Radiographic examination revealed missing maxillary teeth on the left side with a radiolucency extending into the maxillary sinus.

A treatment plan was formulated following examination of the defect. It was decided to rehabilitate the patient using a hollow bulb obturator after performing oral prophylaxis. Intraorally, the defect was classified as

Aramany's Class-IV type(refer to FIG. 1). Retention for the obturator was achieved by designing continuous clasps on the remaining dentition.

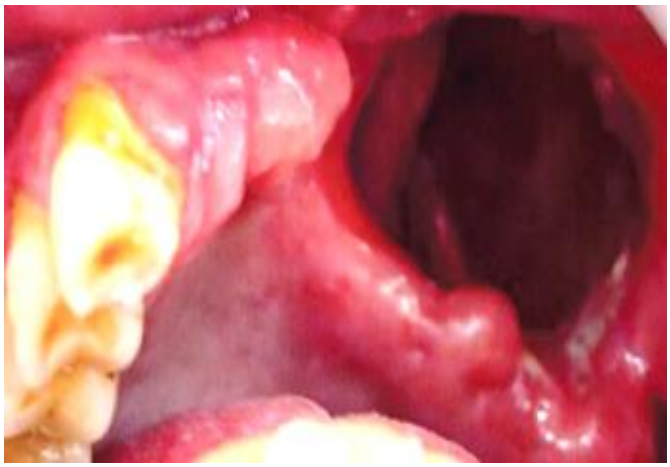

Figure 1: Intra-Oral Image of the Defect.

Fabrication Technique

The appropriate intraoral soft tissue undercuts were meticulously recorded in the impression.

1) Initially, a primary impression was made.
2) Using irreversible hydrocolloid impression material with a stock tray. Subsequently, after retrieving the primary cast, a special tray was fabricated using self-cure acrylic resin.
3) A final pick-up impression was executed with alginate to capture the existing dentate segment, followed by the use of type IV gypsum to produce the master cast. (refer to Fig.2 and 3).

Figure 2: Master Cast of The Defect.

Figure 3: Baseplate and wax rim.

4) A continuous clasp was meticulously fabricated on the master cast to enhance retention and stability (refer to Fig. 4).

Figure 4: Continuous Clasp

5) The occlusal rim was fabricated on the record base, and a precise bite registration was obtained. Subsequently, the maxillary and mandibular casts were mounted, and teeth arrangement was carried out accordingly (refer to Fig. 5).

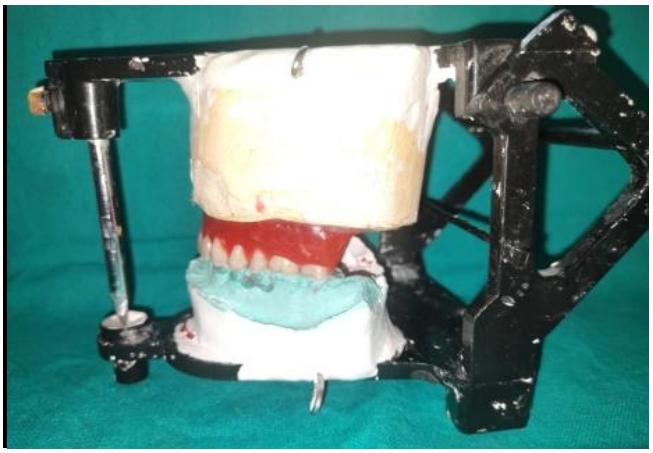

Figure 5: Teeth Arrangement

6) Following the try-in phase, thorough evaluations of occlusion, aesthetics, and phonetics were conducted, which were deemed acceptable by the patient. Final wax-up procedures were then performed.(refer to Fig.6)

Figure 6: Maxillary Defect Areas Depth and Teeth Arrangement.

7) The block outs was done with the dental plaster.(refer to Fig. 7)

Figure 7: Block Out Done

8) To create a hollow obturator, a self-cure cone was prepared according to the depth of the defect (refer to Fig. 8 and Fig. 9). The hollowness of the cone was meticulously verified by passing a flashlight through it. Subsequently, a thin layer of heat-cure acrylic resin was placed in the defect area, followed by insertion of the self-cure cone. The remaining area was then filled with heat-cure acrylic resin.

Figure 8:- Wax Cone and Self Cure Cone.

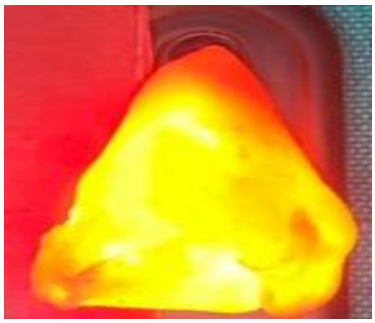

Figure 9: Self Cure Cone In Flashlight To Check Its Hollowness

9) Followed by Packing and dew axing .(refer to Fig. 10)

Figure 10: Packed And Then Dewaxing Done.

9) Upon insertion of the obturator, necessary corrections and occlusal adjustments were made to ensure proper fit and function. Final finishing and polishing procedures were meticulously carried out

before the insertion of the obturator (refer to FIG. 11 and Fig. 12).

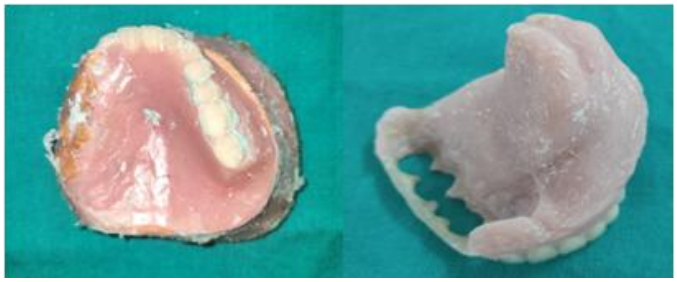

Figure 11: Removal of the Obturator With Hollow Bulb.

Figure 12: Intraoral Images

Discussion

Mucormycosis, commonly known as Black Fungus, poses a significant threat as an invasive opportunistic fungal infection caused by mucorale species. In the context of this article, a novel technique for crafting a hollow bulb obturator is introduced. This technique offers several advantages, including simplicity, efficiency, and reduced fabrication time compared to traditional methods.

One notable advantage of this approach is its time-saving nature. By eliminating the need for intricate steps such as creating holes in the final denture to remove materials like salt, wax, or water, the fabrication process becomes streamlined. Additionally, the resulting obturator is lightweight, which can contribute to patient comfort and acceptance.

Prosthetic rehabilitation plays a crucial role in restoring oral function and alleviating psychological distress for individuals affected by maxillary defects caused by conditions like mucormycosis. The use of obturators with adequate retention not only enhances masticatory efficiency but also improves speech intelligibility. This, in turn, can significantly improve the quality of life for affected individuals.

One of the key features of this technique is its ability to provide a predictable internal dimension of hollow space, facilitating the creation of a closed hollow obturator in a single-step processing procedure. This streamlined approach, particularly utilizing heat-cured resin as a single unit, contributes to its efficiency and effectiveness.

In summary, the described technique offers a promising solution for the fabrication of hollow bulb obturators, particularly in cases of maxillary defects resulting from conditions like mucormycosis. Its simplicity, efficiency, and ability to provide predictable results make it a valuable addition to the prosthetic rehabilitation armamentarium, ultimately benefiting patients in need of such interventions.

Conclusion

Prosthetic rehabilitation presents a significant challenge, particularly in cases of extensive maxillectomy defects. The successful fabrication of an obturator prosthesis hinges upon the application of fundamental prosthodontic principles, especially in constructing the maxillary closed hollow bulb obturator. In this clinical context, the adoption of a single-piece closed hollow bulb obturator design proved advantageous, allowing for the minimization of prosthesis weight while effectively addressing the patient's requirements for both appearance and function.

Ensuring acceptable prosthodontic care for patients with acquired maxillary defects entails careful consideration of prosthesis design, coupled with regular maintenance to optimize comfort, function, aesthetics, and preservation of the compromised remaining structures.

This technique not only demonstrates effectiveness but also offers a cost-effective approach to construction,

utilizing readily available materials to meet the diverse needs of patients. By emphasizing simplicity, efficiency, and affordability, this approach contributes to improving access to prosthetic rehabilitation for individuals with maxillary defects, ultimately enhancing their quality of life and well-being.

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