
Ravi M B
Prakash P
Sai Pranathi Putta
Anupama Aradya
Rashmi S

See next page for additional authors

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Authors
Ravi M B, Prakash P, Sai Pranathi Putta, Anupama Aradya, Rashmi S, and Dhakshaini M R
CASE REPORT

Hollow Bulb Definitive Obturation of a Post-covid Mucormycosis Maxillectomy Defect — A Case Report


Abstract

The novel Coronavirus, also known as SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), causes COVID-19. In the wake of COVID-19, incidences of mucormycosis were rising alarmingly, especially rhino-orbital-cerebral mucormycosis. Most cases required surgical intervention followed by the fabrication of obturators. A hollow obturator is the most practical, convenient, and cost-effective solution for prosthodontic rehabilitation.

A patient with pain over the maxillary region (left) reported to the department of Prosthodontics and Crown & Bridge. His past medical history revealed that he tested and recovered from SARS-CoV-2. Clinical, radiographic, and smear tests confirmed rhino-cerebral mucormycosis with post-covid pneumonia. Surgical left partial maxillectomy performed 4 months back. His intra-oral examination revealed a large maxillary defect extending from the left-sided alveolar bone, along with a missing base of the maxilla and palatal bone. The case report presents a hollow bulb definitive obturator fabrication for the treatment of acquired maxillary defects after COVID-19-caused mucormycosis.

Keywords: Mucormycosis, Definitive prosthesis, Obturators, Hollow bulb

1. Introduction

The previously known novel coronavirus, also known as SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), is the cause of COVID-19, an infection of the upper airways [1]. The major clinical signs of SAR-CoV-2 include fever, cough, exhaustion, and anosmia, with some patients also suffering conjunctivitis as a result of the virus migrating to the ocular region [2].

Mucormycosis, often known as black fungus, is a non-septate filamentous fungal infection that can be fatal. The maxillary sinus is often affected by rhino-orbital-cerebral mucormycosis, which may also infect the orbits and ethmoidal sinuses [3].

The patient is more likely to have hypernasal speech, fluid leaks into the nasal cavity, and poor masticatory performance as a result of palatal deformities. Such deformities necessitate the use of a customized prosthesis to produce an oronasal seal, which can be given by an obturator prosthesis [4]. The open hollow obturator has disadvantages, such as the accumulation of food, debris, and mucus inside the hollow part, which leads to malodor and increased weight of the prosthesis. Obturators with a closed hollow design prevents water and food retention, enable cleaning, and are lighter and extend further [5].

This case report features the fabrication of a hollow bulb obturator to treat a maxillary deformity for...
a patient with post-Covid mucormycosis. Such maxillary deformities require a multidisciplinary approach and prosthodontic recovery by method for hollow bulb obturator is the most down-to-earth, convenient treatment mode [6].

2. Case report

2.1. Patient information

A 46-year-old male patient reported to the Department of Prosthodontics with a chief complaint of pain over the left maxillary region for five days. The patient tested positive for COVID-19 and recovered in 2 months. Further medical tests revealed Type 2 DM and he is undergoing medication for it.

2.2. Clinical findings

Clinical examination shows tenderness over the left maxillary region and the septum deviated towards the left with mucoid discharge in the left nasal cavity.

2.3. Diagnostic assessment

Radiographic (MRI PNS & ORBIT) examination features the sign of invasive fungal sinusitis involving the left nasal cavity, left maxillary and ethmoid sinuses with extension to the left pterygoid palatine and infratemporal fossa [Fig. 1(b) (c)&(d)]. Sputum smear analyses were performed and he was diagnosed with rhino-cerebral mucormycosis with post-covid pneumonia.

Fig. 1. (a) A 46-year-old male patient who presented with facial asymmetry after left maxillectomy procedure. (b)&(c) Axial and coronal section of MRI examination features the sign of invasive fungal sinusitis involving the left nasal cavity, left maxillary and ethmoid sinuses with extension to the left pterygoid palatine and infratemporal fossa.
The patient received a surgical obturator immediately following surgery, which he wore for 7 days. After that, an interim obturator was made and worn by the patient for 4 months [Fig. 2]. An extraoral examination indicated left-sided facial asymmetry [Fig. 1(a)]. Upon intra-oral examination, the base of the maxilla, the palatal bone, and a large maxillary defect were all seen in [Fig. 3]. On the lateral side of the skin graft–mucosa interface, a scar band was shown. Accordingly, it was identified as it had an aramany Class II defect and a partly edentulous maxillary arch [7].

The patient's aesthetic and mastication difficulties were his major concerns, hence it was decided to fabricate a hollow bulb maxillary definitive obturator prosthesis for him.

2.4. Fabrication of definitive obturator

The defect should be dried mucus crusts and cleaned before making a first impression. The remaining maxilla morphology was taken into consideration while choosing the edentulous stock tray. The medial and anterior borders of the defect's unfavorable undercuts were gauze-blocked before the impression was taken. Using a stock tray and irreversible hydrocolloid impression, a primary impression was made. After the primary cast, a custom tray was fabricated using self-curing acrylic resin. Two-stage putty wash technique was used (addition silicone putty as tray material and light body polyvinyl siloxane as syringe material). [Fig. 4].

To record the defect region, the patient was instructed to make swift head movements to the right and left while keeping their head level, as well as to flex and stretch their necks. Before asking the patient to swallow, the mouth should be opened and closed and the jaw should be adjusted laterally. The master cast was obtained with type III gypsum, and undercuts are blocked out with modeling wax. The master cast was surveyed, designed, and cast using titanium alloy. A framework trial was done, and then a trial framework with an occlusal rim was fabricated on the master cast. [Fig. 5(a) and (b)&(c)]

Casts were mounted on the semi-adjustable articulator once bite registration was completed. The teeth arrangement and try-in procedure were also completed in [Fig. 6(a)&(b)]. Aesthetics and phonetics were evaluated at the time of try-in occlusion and deemed to be acceptable by the patient. Flasking and dewaxing were done using a conventional method to produce hollow bulbs. Using lost salt technique to create a hollow in the bulb of the obturator [8]. After finishing and polishing the cured...
denture was inserted into the patient’s mouth. [Fig. 7(a) and (b)&(c)] and post-insertion instructions were given. The patient expressed satisfaction and happiness with his improved function, speech, and appearance [Fig. 8].

Fig. 4. Two-stage putty wash technique was used with self cure custom tray.

Fig. 5. (a) and (b): A framework trial was done, and then a trial framework with an occlusal rim was fabricated on the master cast.

Fig. 6. (a)&(b): Teeth arrangement and try-in procedure done.

Fig. 7. Insertion of definitive cast partial denture with hollow bulb obturator.
3. Discussion

Obturator prosthesis is crucial for people who have undergone surgical maxillectomy to recover oral function. Framework designs for obturators may vary based on the defect classification. All removable obturator prostheses are based on prosthetodontic principles which include cross-arch stabilization, broad stress distribution with the use of a rigid major connector, and stabilizing and retaining components at locations within the arch to best minimize dislodging functional forces [9]. Support for the prosthesis was provided by the remaining teeth, palate, and rest. Rest was prepared on the right first and second premolars, first and second molars of the right quadrant of the maxilla. The complete palate was designed to ensure maximum distribution of the functional load to the tissue. An indirect retainer was planned on the anterior remaining teeth (central, lateral, and canine). Direct retention was provided by the I-bar clasp placed on the right central incisor, embrasure circumferential clasp between the right first and second (premolars, molars) [10–12].

The advantage of using titanium alloy in rehabilitating maxillary defect is its exceptional corrosion resistance, appropriate mechanical Properties, less metal allergy, lightweight, and better fitness accuracy [13]. In dentulous patients, the remaining teeth play an important role in providing support, retention, and stability to the obturator. The remaining teeth or ridge, the lateral part of the defect, the soft tissue undercut, and the scar band could all help with retention. To avoid the defective extension section from moving away from its terminal location, stabilization and indirect retention components must be positioned appropriately [14].

In the conventional obturator prosthesis, different types of retentive aids are used, including magnets, Snap-On attachments (friction-type attachments), acrylic buttons, retentive clips, and implants. Implants are an advancement in maxillofacial prosthetics. They improve the retention of the prosthesis without using other appliances. Nonetheless, implants are limited by their cost, patient health, and bone quality [15]. In addition to longevity, a metal framework obturator prosthesis can be sensitive to temperature changes due to its thermal conductivity [5,16].

4. Conclusion

The greatest challenge in the rehabilitation of a Hemi-maxillectomy patient is to achieve adequate retention, stability, and support. Successful rehabilitation of these patients requires thorough knowledge and skills, as well as an understanding of their needs.

A definitive obturator prosthesis with maximum extension and proper design rehabilitates patients in a variety of ways by improving masticatory efficiency, enhancing speech clarity, and improving quality of life.

Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References


