



PROSTHETIC REHABILITATION OF A CASE OF POST-COVID MUCORMYCOSIS WITH HOLLOW OBTURATOR- AN INNOVATIVE TECHNIQUE

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ABSTRACT

INTRODUCTION: Maxillary obturator prosthesis is the most frequent treatment option for management of partial or total maxillectomy. Heavy weight of the obturators is often a dislocating factor. Hollowing the prosthesis can reduce its weight.

CASE REPORT: This article presents a case report of a maxillectomy patient post-covid mucormycosis, rehabilitated with fabrication of a hollow obturator. It highlights an innovative technique used for fabrication of hollow obturator by using orthodontic wire and Ryle's tube. A pre-shaped ryles tube and orthodontic wire was incorporated inside the flasks during packing of the heat-polymerized acrylic resin to create the hollow space.

CONCLUSION: Fabrication a light weight prosthesis aids in its retention. This technique used for fabrication of hollow obturator overcomes the disadvantages of previously described methods.

Keywords: Hollow obturator, Maxillectomy, Ryle's tube, orthodontic wire

INTRODUCTION

Mucormycosis (earlier called Zygomycosis) is a fungal infection caused by a group of molds called mucoromycetes. It is a potentially lethal infection which occurs primarily in immunocompromised patients. Post-COVID 19 patients are at an increased risk to develop Mucormycosis as they are treated with steroids and other drugs to manage COVID-19 that may reduce their ability to fight environmental pathogens or it may occur due to history of previous uncontrolled diabetes mellitus. [14] First line of treatment included antifungal medications along with surgical debridement or resection of infected tissues. [18] Resection of maxilla due to such infections can lead to facial asymmetry, impaired functions like mastication, deglutition,

articulation and a significant impact on patients' quality of life.[18] maxillary resection is the surgical removal of a part or all of the maxillae; syn, MAXILLECTOMY.[21]

Obturator is a maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar/soft tissue structures.[21] An obturator prosthesis, is a convenient and efficient removable prosthetic option for edentulous or partially edentulous patients who have undergone total or subtotal resection of the maxilla.[5] It replaces the missing dentition, supporting tissues and also provides an artificial palate.[12] It is a challenging task for the prosthodontic team to accomplish the retention and stability for such removable partial dentures due to the huge bony defect and invariably bulky prosthesis.

To reduce the weight and bulk of the prosthesis it can be made hollow. Numerous methods and materials have been used to decrease the weight of prosthesis.[13,10] Methods including use of a solid 3D spacer, cellophane wrapped asbestos[22], silicone putty[9], modelling clay, thermocol, salt, and fabricating dentures in two halves.

This article describes the fabrication of hollow obturator by using orthodontic wire and ryles tube for the rehabilitation of a patient with maxillectomy due to Post-covid mucormycosis.

CASE REPORT

A 65 year old male patient reported to the Department of Prosthodontics, government dental college and hospital Aurangabad, after partial maxillectomy post Covid-19 mucormycosis for prosthetic rehabilitation. The patient's overall appearance was mesomorphic with a medical history of unregulated diabetes mellitus since past 10 years. The patient had used an interim obturator (without teeth incorporation) for the past 6 months. Intraoral examination revealed well healed surgical defect in the maxillary right buccal vestibule creating an oro-antral communication. Two maxillary left molars and complete mandibular dentition were examined clinically as well as radiographically (panoramic) and found to be caries-free with no significant gingival/periodontal problems. Masticatory and phonetic functions of the patient were severely affected due to missing maxillary structures.

TECHNIQUE

The patency in the maxillary arch was blocked using gauze piece and a preliminary impression was made using irreversible hydrocolloid (Zhermack Tropicalgin Dental Alginate). It was poured with dental stone to obtain a primary cast.

The custom tray was fabricated using autopolymerizing acrylic resin and border molding was carried out using green stick impression compound (DPI Pinnacle, tracing stick, Dental Products of India, Mumbai). Final impression was made with light viscosity addition silicone impression material. (Figure 1).

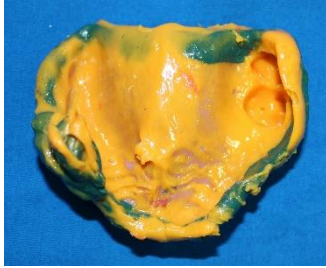


Figure-1

The master cast was fabricated using dental stone. (Figure 2) The undesirable undercuts present in the defect were blocked out in wax.

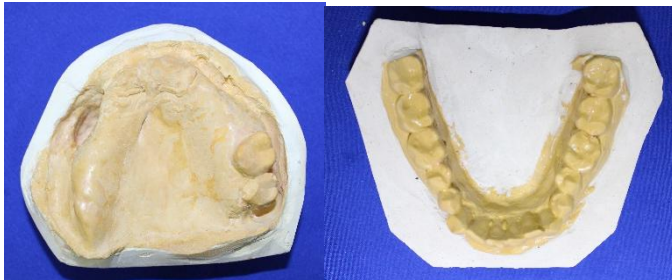


Figure-2

Using autopolymerizing resin, a denture record base was prepared and wax occlusal rim was made over it. Maxillomandibular relationship was then recorded (figure 3) and transferred to an articulator. (Figure 4)



Figure-3



Figure-4

Selection and arrangement of teeth were done and try-in was performed on the patient for retention, stability, function, and esthetics. (Figure 5)



Figure-5

After successful try-in, flasking and dewaxing procedures were carried out.

Two split dental flasks with interchangeable top halves were used to construct a hollow obturator.

2mm thickness of modelling wax adapted to the definitive cast. (Figure 6) Second cope was used to invest the modelling wax and wax elimination process completed.



Figure-6

Packed with heat-polymerized acrylic resin and processed. Counter flask separated, with the permanent denture bases still attached to the master cast.

Now, in the original dewaxed cope, distance from ridge-lap area of tooth to the sulcus depth margin was measured. From the total distance 2 mm thickness of denture base and 2 mm distance from the ridge lap of the tooth is subtracted considering the strength of the denture. The value obtained determines the area for the spacer.

After knowing the value for the spacer, Ryle's tube diameter according to available space was selected. Length of the tube is decided according to the arch form. Use of 19 gauge stainless steel orthodontic wire, length slightly more than the length of the catheter, as this will aid in easy retrieval of the wires after processing of the dentures leaving a hollow space. wires inserted into the catheter to fill the space in the catheter, so that the desired diameter is maintained.

This unit (catheter with wires) was modified to the arch form of the cast, fixed onto the cast with permanent record base using cyanoacrylate adhesive. (Figure7)



Figure-7

Trial closure with original cope using putty to determine whether adequate space is there for acrylic.

Reseated the original flask and verified complete closure of the flask. Mixed, packed, and polymerized the acrylic resin in usual manner. Recovered the processed obturator.

The orthodontic wires were retrieved from the catheter. Opening was closed using auto-polymerizing acrylic resin. Finishing and polishing of the obturator is done in usual manner. (Figure 8)



Figure-8

The dentures were inserted in the patient's mouth and was reviewed after 24 hours. (Figure 9)



Figure-9

DISCUSSION

The present case report described the fabrication of a hollow obturator prosthesis for a patient with maxillary defect Post-Covid Mucormycosis infection. As the world is facing the increased

cases of post-covid mucormycosis which require rehabilitation of maxillofacial region. Prosthodontist play an important role in enhancing the quality of life for these patients. Oral in such cases presents diverse clinical and technical problems. The usual treatment sequence includes placement of a surgical obturator during the intervention; then 5–10 days later this obturator is removed, and a removable interim obturator is constructed and placed for the duration of the wound healing period; finally, the definitive obturator is constructed and placed about 3–6 months post-surgery, when major changes in tissue conformation are no longer expected[4]

Extensive volume of the obturator provided to patients with severe residual ridge resorption causes poor denture bearing ability. Prosthesis weight reduction have been tried by making the denture hollow[4]. Hollow obturator not only help in reducing the weight of but also reduce the extra loads on underlying tissues and remaining amount of bone [6]

The procedure described in this article incorporates the use of Ryle's tube and orthodontic wires for the fabrication of hollow cavity. This method is advantageous over the previous techniques, as it allows easy removal of the orthodontic wires leaving a hollow space. And one opening for retrieval of the material, less repair area.

Previously, vinyl poly-siloxane putty being used for the fabrication of hollow prosthesis. However, removal of putty from within the cavity, especially from the anterior region was found to be very difficult. 2-4 Methods have also described fabrication of dentures in two parts and fusing these segments using auto-polymerizing resin. The long seated junction creates a site of potential leakage and discoloration over a period of time.

The different techniques for fabricating the hollow bulb obturator by using alum, sugar, salt during packing the defect area have been described by various authors. El Mahdy et al. (1969) [15] described the two-flask technique to process the obturator and the tooth portion separately. Matalon and LaForte (1976) [16] used sugar during the processing of the obturator, which was removed by drilling a hole and then flushed out. Mc Andrew et al. (1998) [17] fabricated the prosthesis in two halves and sealed them using autopolymerizing resin. Asher et al. (2001) [1] used plaster index as a matrix to fabricate a hollow obturator. Iramaneerat et al. (2004) [11] fabricated a hollow bulb obturator by injecting argon gas into the obturator bulb. Buzayan et al. (2013) [3] used a rigid thermoforming splint to fabricate a hollow bulb obturator. Few authors suggested the use of acrylic resin shim and polyurethane foam while packing (Patil PG, Patil SP, 2012). [19] Use of attachment for hollow bulb obturators have also been suggested. However, the cost may be high (Elangovan S, 2011). [9]

CONCLUSION

This article describes an innovative technique for fabrication of hollow obturator using Ryle's tube and orthodontic wires. This technique overcomes the disadvantages of other methods as it aids in easy retrieval of orthodontic wires creating a hollow space. And a single opening for retrieval of wires which is closed using auto-polymerizing acrylic resin.

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