Prosthetic Rehabilitation of Maxillectomy Defects, with Hollow Bulb Definitive Obturator Using Lost salt technique

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Abstract: A prosthodontist's purpose in maxillary defects is to restore intra- and extra-oral structures and provide them the ability to function normally for mastication, speech, deglutition, and aesthetics.(11) These flaws can either be acquired or congenital.(12) Anatomical flaws caused by surgical intervention allow connection between the nasal and mouth cavities. Due to poor communication, patients have problems carrying out basic tasks like speaking and swallowing. Obturators are created to help the patient deal with his or her issues. The weight of the prosthesis is the greatest obstacle to the rehabilitation of significant defects; this weight causes the prosthesis to become exceedingly bulky and nonretentive. To alleviate this suffering, hollow obturators are created using several methods. (11) In this article, case studies illustrating methods for creating hollow bulbs are shown.

Keywords: Maxillofacial prosthodontics, rehabilitation, obturator, Lost salt technique, Hollow bulb, Mucormycosis

Introduction: Serious fungal coinfections affect COVID-19 patients throughout or after their weeks or months of recovery.(16) The most prevalent variety identified during the present pandemic is COVID-19-associated rhino-orbital-cerebral mucormycosis (CAROCM), which is followed by the pulmonary variant. Uncontrolled diabetes, neutropenia, hematological malignancies, organ transplantation, trauma and burns, and the use of immunosuppressants such as corticosteroids are risk factors that put individuals at risk for mucormycosis.(16)

Patients who have to have the maxillo-mandibular structures surgically removed due to trauma, infection, or cancer have substantial psycho-social setbacks bearing on their general quality of life These flaws, particularly those following a maxillectomy, cause facial deformity, decreased speech, trouble with deglutition, and oroantral communication. A well-designed and made obturator prosthesis is needed to restore large flaws caused by a hemimaxillectomy treatment.(9)

Glossary of Prosthodontic Terms-9 defines an obturator as "a maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar/soft tissue structures.(9) For the rehabilitation of patients with such defects, surgical and prosthetic treatment options are available. Due to postoperative complications like graft rejection, the severity of the surgical defect, and the high psychological impact factor associated with repeated surgeries, prosthetic rehabilitation proves to be a successful alternative treatment option for patients who cannot be successfully rehabilitated with reconstructive surgeries. The two functional parts of the obturator are a sealant for the surgical defect and a replacement for the missing dentoalveolar structures.(8)

The hollow obturators, which come in solid and hollow forms, are the more popular choice.

According to Wu and Schathe af, depending on the magnitude of the defect, hollowing the obturator considerably decreases prosthesis weight from 6.55 percent to 33.06 percent. By filling the hollow area with substances like sugar, salt, polyurethane foam, sponge, and gas injection utilizing argon gas, a one-piece hollow bulb obturator may be created.[12]

This case report describes the fabrication of one piece closed hollow bulb definitive obturator prosthesis for a patient with the acquired maxillary defect.

Case report: A 52-year-old male patient tested positive for SARS-CoV-2. He experienced terrible fungal coinfections after months of recovery before being identified as having T2DM and mucormycosis paranasal sinus that had spread to his mouth. For that reason, he had functional endoscopic sinus surgery in addition to surgical debridement. He advised taking recommended medications after surgery, including KFT creatinine, K, Mg, electrolytes, and antibiotics, with strict follow-up every five days for the next two months.

He then presented himself to the prosthodontics, crown, and bridge department with the major complaint of difficulties with mastication, deglutition, and speech, The patient has been diagnosed with Post COVID-19 mucormycosis of the left maxilla for which hemimaxillectomy of the same side was performed. On intraoral examination, the defect was Aramany's class I associated with depressed cheek, nasolabial fold, and lack of lip support.

Technique: The master cast was then poured into the dying stone after the maxillary impressions were created using putty and light body impression substance. To create diagnostic castings, mandibular imprints were created using irreversible hydrocolloid (Zelgan, Dentsply) and Type 3 gypsum product (Kalabhai, Kaldent). An auto polymerizing resin base plate was created together with the clasp between the ages of 12 and 17. It was used to block the undercut area in the flaw. Jaw relationships were noted, tried, and completed.

Figure 1: Preoperative intraoral

A conical bur was used to index the cast's land area, and the trail denture was then glued to the final cast. A reversible hydrocolloid was used to replicate the trial denture, which was then poured into the dental stone. A 0.5-mm thermoplastic sheet (Duran 0.5 125 mm, code 111; Liberal Traders Pvt. Ltd., New Delhi) was modified and placed on the recovered cast using a vacuum heat-pressing device to create a template for the replicated trial denture (Biostar). The trial denture was then processed in the standard manner up to the wax elimination stage. Two layers of baseplate wax were adapted to the definitive cast in the drag, conforming to the border extensions. This baseplate wax was placed in a second flask and treated as usual. Following deflation, the transparent matrix was positioned on the final cast using the seating indices in the land area (Fig 3). To make sure there is enough space between the resin and the teeth, the distance between the matrix and the treated base was measured using an endodontic file with a rubber stop. The dewaxed mold was correctly covered with half of the heat-cure poly methyl methacrylate (PMMA) (Trevalon, Dentsply India Pvt. Ltd., Gurgaon, India) in the dough stage before salt crystals were added (Fig. 4).

The remaining heat cure resin was then put over it and dried at 74°C for 7-8 hours. Three holes were drilled in the thickest palatal region of the denture after it had healed. The remaining salt crystals were eliminated by flushing water through the perforations with the high-pressure syringe. The escape holes were sealed with auto polymerizing glue once all the salt crystals had been eliminated (Trevalon, Dentsply India Pvt. Ltd., Gurgaon, India). Immersing the denture in water to test the hollow cavity seal revealed no air bubbles, indicating a good seal (Fig 5). After the patient's mouth was fitted with the dentures (Fig. 6), care, cleanliness, and maintenance guidelines were provided.

Figure 2:- Teeth arrangement

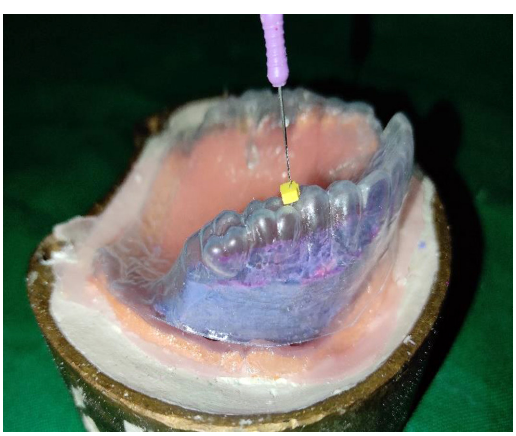

Figure 3:- Endodontic instrument used to measure space between clear template and permanent denture base

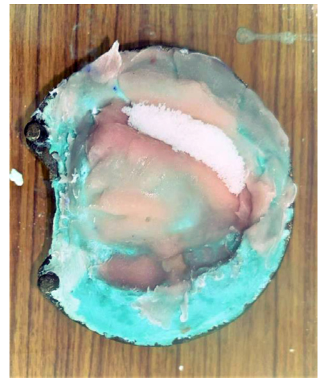

Figure 4:- Salt crystals placement over heat cure resin

Fig 5: Denture Floating in Water

Figure 6: post-operative

Discussion: Patients who have had a maxillectomy often have functional as well as cosmetic facial abnormalities, thus a prosthodontist is needed to restore both function and appearance.[11] Giving prosthetic obturation, which seals the defect and divides the oral cavity from the sinonasal cavities, is the main objective of treating a maxillectomy defect. The degree of disability and complexity of prosthetic rehabilitation depends on the size and location of the abnormalities. Because it is simpler to make and maintain than surgical repair, maxillary obturator prostheses are the most often used form of therapy.

After providing resonance, bulb extension is essential to improve speech.(7) Extensions for bulbs might be solid, open- or closed-hollow. Benefits of the hollow bulb include less weight, better retention, and more comfortable prosthetics. Closed hollow bulb obturators have the benefit of minimizing airway space, limiting fluid and food buildup, and enabling maximal extension. Different procedures have been devised to hollow down obturators, although the majority of them take a lot of effort complex.(15) Materials such as sugar and ice were used to create the hollow space inside the processed resin.(2) Processing the two halves of the obturator separately followed by joining them with an auto polymerizing resin was also well explained in the previous literature. Two-step processing techniques using preformed plastic shapes or plaster matrices were tried by some authors.(5) The acrylic resin shim and a polyurethane foam were incorporated into the defect area during packing to create e hollow space for some authors. Patil and Patil presented a method of hollow obturator by inserting a preshaped wax bolus while packing of t cured material. Elangovan and Loibi presented a method of fabrication of a hollow bulb obturator by the use of attachments. Although the method was simply the cost of treatment would be high with the use of attachments. The technique described in this case report was superior to other methods because of its simplicity and economical from the patient's perspective.(11)

Conclusion: In the presented case report technique described was a variation of some previously described methods but the ability of this technique to provide a durable-piece closed hollow bulb obturator justifies its novelty. The ease of fabrication reduced time and reduced cost were the added advantages of this technique. The obturator provided to the patient increased function by providing better masticatory efficiency, and phonetics by adding resonance, and also improved the esthetics.

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