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Prosthodontics

SILICONE RELINING OF MAXILLARY HOLLOW OBTURATOR TO ACCOMMODATE FOR CHANGE IN ORO-NASAL DEFECT ANATOMY – A CASE REPORT

Dr. Lipika Lenka	PG student, Department of Prosthodontics, S.C.B. Dental college and hospital, Manglabag, Cuttack 753007
Dr. Anaida Acharya*	PG student, Department of Prosthodontics, S.C.B. Dental college and hospital, Manglabag, Cuttack 753007. *Corresponding Author
Dr. Tapan Kumar Patro	Professor & HOD, Department of Prosthodontics, S.C.B. Dental college and hospital, Manglabag, Cuttack 753007.
Dr. Angurbala Dhal	Associate Professor, Department of Prosthodontics, S.C.B. Dental college and hospital, Manglabag, Cuttack 753007.
Dr. Lokanath Garhnayak	Associate Professor, Department of Prosthodontics, S.C.B. Dental college and hospital, Manglabag, Cuttack 753007.
Dr Ullash Kumar	Assistant Professor, Department of Prosthodontics, S.C.B. Dental college and hospital, Manglabag, Cuttack 753007.

ABSTRACT Oral cancer constitutes 1/3rd of all human cancers and it's the 6th most occurring cancer worldwide. Maxillary neoplasm is mostly treated by surgical resection of the maxilla and adjoining structures. The ablative surgery frequently results in communication between oral and nasal cavities, this causes functional impairment of speech and swallowing which can be treated either by reconstructive surgery or rehabilitation with an obturator prosthesis. Though reconstructive surgery offers better patient comfort, it is not possible in many situations particularly when the defect is large and when there is a need for radiation therapy.

Obturator is the primary method of rehabilitating larger maxillary defects. Numerous techniques of hollow bulb fabrication have been mentioned in the literature from time to time to improve the resonance of speech and to reduce the weight of the prosthesis. In this case report a direct investment method of waxed-up closed hollow bulb obturator is used. And silicone relining of the obturator was done to improve the patient's comfort and accommodate for the change in oro-nasal defect size.

KEYWORDS : maxillectomy, silicone relined obturator, hollow obturator

INTRODUCTION

Almost 5% of all cancers affect mouth structures, tongue, oropharynx, nasopharynx and larynx. After the excision of these lesions, problems regarding chewing, swallowing and speech may appear. (1)

Reconstruction of these defects can be done either surgically or prosthetically depending on the site, size, etiology, severity, age and expectation of the patient. (2) Surgical repair is preferred for many of these patients. There are conditions, however, which would contraindicate plastic surgery, such as the age of the patient, the general health of the patient, the size and extent of the deformity and the condition of the tissues because of the poor blood supply following radiation. Furthermore, many of these patients, because of their recent illness and the expenses which they have incurred, may not be in a position to afford the time or the cost of plastic surgery. Therefore, the only treatment left for these patients is prosthetic rehabilitation. (3)

Prosthetic rehabilitation has considerable advantages, in that it offers the surgeon the opportunity to observe wound healing and evaluate the recurrence of the illness. Being scar-free, it is aesthetically superior to plastic surgery and simple to install. These factors often make prostheses the best available method for rehabilitation. (4)

The prosthodontist plays an important role in the rehabilitation of such defects, as good functional results have been reported for patients provided with obturator prostheses post surgically. (5) Obturator prostheses are fabricated to seal congenital or acquired tissue openings and defects of the maxilla, and depending on the extent of the defect, this type of prosthesis may vary in size and shape. (6) The Glossary of Prosthodontic Terms 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."(7)

Obturators fabricated with adequate extensions are often heavy, which can counteract the increased retention and stability generated by the increased extension. By decreasing the weight of the prosthesis, the retention and stability may be optimized to allow the obturator to function comfortably during mastication, phonation, and deglutition. Wu and Schaaf reported that hollowing the obturator for partial maxillectomy patients significantly decreased the weight of the obturator from 6.55% to 33.06%, depending on the size of the defect. (8)

Several methods have been described for open and closed hollow bulb obturator fabrication. Both of these types of obturators are lightweight prostheses that can be easily tolerated by the patient. However, open hollow bulb obturators often collect mucous, nasal secretion, food, fluids and need numerous cleanings or a vent placement to eliminate accumulation in the hollow bulb. It is unhygienic, foul-smelling and unpleasant for the patient. (9)This nonhygienic condition creates a medium for the growth of microorganisms(10). Hence, these require frequent cleaning. Also, it is difficult to polish and clean the internal surface from saliva, mucous crusts, and food accumulation.

Closed hollow bulb obturators, on the other hand, do not pool moisture, while still extending adequately into the defect. The bulb portion, which accommodates the defect area must add retention and stability by extending adequately into the defect to achieve a seal. However, the greater extension means additional weight to the prosthesis and with the gravitational force, these forces may exert a dislodging effect on the obturator. (6)

To obtain a lightweight, closed hollow bulb obturator prosthesis, various materials and methods have been advocated. Some of these materials include light-cured resin, auto-polymerizing acrylic resin, and silicone rubber. Silicone rubber, while advantageous in specific clinical conditions, is still porous, and has poor long-term durability, requiring routine periodic replacement. Another advantageous material is heat-cured acrylic resin, which is still considered one of the most durable and biocompatible materials for the fabrication of the obturator.

Various methods available to fabricate a hollow bulb obturator include the fabrication of an obturator either as one piece or by processing in two halves and sealing using auto-polymerizing resin. One piece hollow bulb obturator can be fabricated by filling the hollow portion

using materials such as sugar, salt, polyurethane foam, sponge and gas injection using argon gas. A non-detachable screw cap can also be used to cover the opening made to pour out the sugar or salt. (11)

Another effective method to reduce the weight is by hollowing out a PMMA resin bulb and adding a silicone layer over it. An obturator made in this manner combines the rigidity of the PMMA core with the resilience of the silicone covering to enhance tissue contact and patient comfort.

A practical way of achieving this combination of both materials in a resource-challenged setting is by using a resilient silicone denture liner over a slightly miniaturized PMMA bulb. These resilient liners have been known to improve retention, stability, and function in obturator prostheses (12) and have a useful service life of 3 to 5 years

This article describes a clinical report of a patient with an acquired maxillary defect, managed with a silicone relined closed hollow bulb obturator processed using a single flask and one-time processing method.

CASE REPORT

A 45-year-old male patient was referred to Dept of Prosthodontic and Crown & Bridge with the complaint of difficulty in eating and speaking. He had a history of maxillectomy in the Oral & Maxillofacial Surgery department in the year 2021 due to mucormycosis after a COVID-19 infection. After the surgery, the patient was given an interim obturator. He had no other relevant medical history.

On clinical examination, a defect due to maxillectomy was present from the midline to the soft palate on the right side. The tissue showed good signs of healing and the defect was classified as Aramany class I defect which measured 2 cm mediolaterally and 3.5 cm suprainferiorly (Figure 1). The remaining teeth exhibited significant periodontal breakdown and mild supraeruption. The treatment plan was formulated and a definitive prosthesis was decided to be given to the patient. A hollow bulb obturator was planned as the definitive prosthesis.

The Patient was satisfied with the prosthesis for 2-3 weeks. But three weeks post insertion patient complained of difficulty in inserting the prosthesis. On examination, a change of defect anatomy was noticed and instead of fabricating an entire new prosthesis silicone relining of the existing prosthesis was planned after explaining to the patient regarding the hygiene maintenance and possible multiple relining which may be required.

Figure 1- Defect Area

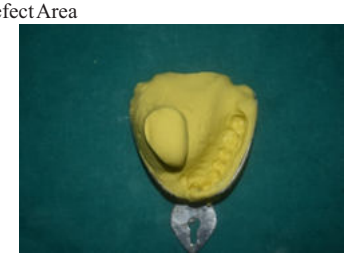

Figure 2- Preliminary impression

Figure 3- Try-in

Figure 4- Incorporation of salt in packing

Figure 5- Finished and Polished hollow bulb obturator

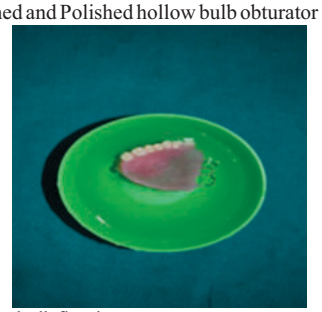

Figure 6- Hollow bulb floating on water

Figure 7- Hollow Bulb Obturator in the patient's mouth

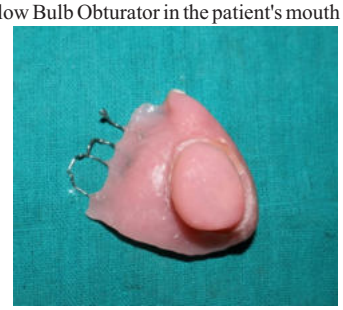

Figure 8- 90 degree trimmed at borders

Figure 9- Silicone relined bulb

PROCEDURE:

The primary impression of the defect and surrounding structures was made using alginate (Dentalgin; Prime Dental Products, Mumbai, India) (Figure 2). Primary cast obtained on which a special tray was fabricated. Border molding was done using green stick compound

(DPI green stick) and the final impression (light body elastomeric) was made using elastomeric impression material. One pinhead clasp on 1st premolar, one C clasp on 2nd premolar and one adams clasp on the molar tooth were made for retention by stainless steel orthodontic wire (Smith stainless steel wire; shape round, 23 gauge: K.C Smith & Co, Redbrook road, Monmouth NPS 3 NB (U.K). The denture base was made on the master cast with auto-polymerizing acrylic resin (DPI cold cure; Dental Products of India, Mumbai, India). Occlusal rims were fabricated, and jaw relation was recorded. This was followed by a try-in procedure in which the occlusion was verified (Figure 3).

Flasking and dewaxing procedures were completed conventionally. The mold space was packed with heat-polymerizing acrylic material (DPI, Mumbai, India). During the packing of the material, a pouch of salt was used to hollow the bulb by the lost salt technique (Figure 4). Curing procedures were performed according to the manufacturer's instructions. The cured obturator was then retrieved after deflasking. The salt was removed after drilling 2mm holes. After the complete removal of salt, holes were closed with auto-polymerizing resin. The finished and polished obturator was then checked in a bowl of water to see if it is floating (Figure 6). Floating obturators signify reduced weight. The finished and polished obturator was then checked on the master cast for proper fit. After performing adjustments, the hollow bulb obturator was checked in the patient's mouth (Figure 7).

At the final insertion, the patient was advised to follow post-insertion instructions. Three weeks post-insertion, the patient complained of soreness at the bulb region of the prosthesis and difficulty during insertion.

Silicone relining of the prosthesis was planned. The walls of the bulb projection in the prosthesis were reduced while maintaining a 90-degree angle (Figure 8). Then silicone relining was done using Ufi Gel P (VOCO, Germany) (Figure 9).

CONCLUSION

The silicone-relined hollow bulb obturator given to the patient rehabilitated his function by improving masticatory efficiency and phonetics by adding resonance to the voice. Thus, it improved the clarity of speech and the esthetics of the patient. It improved the comfort of the patient by decreasing the weight of the prosthesis.

The simplicity of fabrication and assurance of accuracy are the basic advantages of this technique. The technique provides control of the thickness of the hollow bulb, subsequently reducing the overall weight. The patient's functional and esthetic requirements were fulfilled satisfactorily. It improved the morale of the patient greatly.

The palatal obturator in the defect which is subsequently relined with a soft liner greatly enhances the comfort of the patient as it is flexible and protects the integrity of the adjoining moving tissues. A proper maintenance regimen with chlorhexidine mouthwash and comprehensive education on the manipulation of the prosthesis increases the success and survival rate of maxillary obturator.

REFERENCES:

1. Goiato MC, Pesqueira AA, Ramos da Silva C, Filho HG, Micheline dos Santos D. Patient satisfaction with maxillofacial prosthesis. Literature review. J Plast Reconstr Aesthetic Surg. 2009;62(2):175–80.
2. Shankar R. Extra oral implants as retentive aids for maxillofacial prosthesis□: A review Extra oral implants as retentive aids for maxillofacial prosthesis□: A review. J Appl Dent Med Sci NLM ID 101671413 ISSN2454-2288 Vol 2 Issue 2 April - June 2016. 2016;2(January).
3. Drane M and. Maxillofacial Prosthesis and its role as a healing art. J Pros Den Jan-Feb, 1959. 1957; Volume 9 N.
4. Cobein M V., Coto NP, Crivello Junior O, Lemos JBD, Vieira LM, Pimentel ML, et al. Retention systems for extraoral maxillofacial prosthetic implants: a critical review. Br J Oral Maxillofac Surg [Internet]. 2017;55(8):763–9. Available from: http://dx.doi.org/10.1016/j.bjoms.2017.04.012
5. Buzayan MM, Ariffin YT, Yunus N, Muaiyed Buzayan CM. Closed Hollow Bulb Obturator-One-Step Fabrication: A Clinical Report. J Prosthodont. 2013;22:591–595.
6. Buzayan MM, Ariffin YT, Yunus N. Closed hollow bulb obturator-one-step fabrication: A clinical report. J Prosthodont. 2013;22(7):591–5.
7. Driscoll CF, Freilich MA, Guckes AD, Knoernschild KL, Mcgarry TJ, Goldstein G, et al. The Glossary of Prosthodontic Terms Ninth Edition. J Prosthet Dent. 1923;117(5s):1–105.
8. Habib BH, Driscoll CF. Fabrication of a closed hollow obturator. 2004;(April):383–5.
9. Elangovan S, Loibi E. Two-piece hollow bulb obturator. 2011;22(3):486–8.
10. Phankosol P, Martin JW. Hollow obturator with removable lid. J Prosthet Dent. 1985;54(1):98–100.
11. Sridevi JR, Kalavathy N, Jayanthi N, Manjula N. Techniques for fabricating hollow obturator□: Two case reports. 2014;5(2):143–6.
12. Ikusika OF, Dosumu OO, Ajayi DM, Ogunrinde TJ. Effect of resilient lining of obturator bulbs on patients with maxillectomies. J Prosthet Dent. 2016;116(6):932-936.e1.