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CASE REPORT ARTICLE

CLOSED HOLLOW BULB OBTURATOR WITH REPLICATED PALATAL RUGAE IN A HEMIMAXILLECTOMY PATIENT-A CLINICAL REPORT.

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Abstract

Introduction: The most common intra oral defects are in the form of cleft or opening in the palate. These defects may be acquired or congenital. Acquired is due to injuries or surgical excision of tumor and congenital is due to malformation. One of the main impacts of patients submitted to maxillectomy is the impairment of speech intelligibility. Obturator is defined as prosthesis used to close congenital or acquired tissue opening, primarily of hard palate and contiguous alveolar structures. Ideally, this prosthesis should be easy to construct, be light in weight, provide better retention, support, and stability, and be functionally acceptable to the patient. To fabricate a lightweight prosthesis, a closed hollow obturator can be fabricated. There are many methods available to fabricate closed hollow bulb obturators. **Objective:** To fabricate a light weight hollow bulb obturator with duplicated palatal rugae for a hemimaxillectomy patient in a simple way. **Case:** A 32-year-old man visited the Department of Prosthodontics for the rehabilitation of a 1-year-old maxillary defect after hemimaxillectomy due to squamous cell carcinoma and was treated with hollow bulb obturator prosthesis with a duplicated palatal rugae. **Conclusion:** The hollow bulb reduces the weight of prosthesis and duplicated palatal rugae helps in improving speech intelligibility, making it comfortable for the patient.

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Introduction:-

The most common intra oral defects are in the form of cleft or opening in the palate. These defects may be acquired or congenital. Acquired is due to injuries or surgical excision of tumor and congenital is due to malformation. Definite restoration involving fixed or removable prosthesis is needed to replace missing teeth, to stabilize and align the arch segment, restore the occlusal function, provide facial support and overcome speech problems. All this is usually aided with the help of an obturator.

Obturator is defined as prosthesis used to close congenital or acquired tissue opening, primarily of hard palate and contiguous alveolar structures. On the basis of extent of involvement of the defects, this prosthesis may differ in

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shape and size. Ideally, this prosthesis should be easy to construct, be light in weight, provide better retention, support, and stability, and be functionally acceptable to the patient. (Y.L.Wu,N.G.Schaff, 1989).

For definitive obturators, the undesirable weight of the prosthesis becomes a challenge as it affects the retention, stability, and support of the maxillofacial prosthesis. These difficulties lead to traumatic functional occlusion. (T.D.Taylor, 2000).

To fabricate a lightweight prosthesis, an open hollow obturator or a closed hollow obturator can be fabricated. There are many methods available to fabricate open or closed hollow bulb obturators. The reduced weight of both types of prostheses makes them more readily acceptable to the patients. The open hollow bulb obturator is easier to fabricate and adjust; thus it is constructed more frequently than the closed hollow obturator. However, it is difficult to polish and clean the open hollow bulb obturator which may lead to accumulation of food and nasal secretions inside the hollow part. This, in turn, leads to malodor, an increase in weight, and chances of infection. (S.C.Deogade et.al, 2013)

One of the main impacts of patients submitted to maxillectomy is the impairment of speech intelligibility. The undesirable coupling between the oral and nasal cavities reduces intraoral air pressure during speech production causing articulatory imprecision, hypernasal speech, nasal air emission, and reduced vocal loudness. (Plank et.al, 1981).

Palatal rugae play a very important role in phonetics. The production of palato–lingual group of sound involve the contact between tongue and the palate. Allen advocated making the palatal portion as thin as is practical. Duplicating the rugae on palatal surface of denture reduces the problem encountered with speech. (Allen L.R, 1958) This can be done using plastic palate forms; corrugated metal palate and free hand wax carving of the anatomic palate and using elastomeric impression compound (Manvi S, Ankola A, 2012).

This article explains a simple method for fabrication of a light weight hollow bulb obturator with duplicated palatal rugae for a hemimaxillectomy patient.

Case Report:-

A 32-year-old man visited the Department of Prosthodontics, Jagadguru Sri Shivarathreeshwara Dental College, Jagadguru Sri Shivarathreeshwara University, Mysuru-570015, Karnataka for the rehabilitation of a 1-year-old maxillary defect after partial hemimaxillectomy due to squamous cell carcinoma of the left maxilla. Extraoral examination showed depressed left malar region with scars along the left ala of the nose and limited mouth opening. Intraoral examination revealed an Aramany's Class II maxillectomy defect on the left side. (Aramany, 1978). (**Fig 1**) The teeth missing were 22, 23, 24, 25, 26, 27. The palatal defect showed complete healing with a band of scar tissue on the lateral margin. The patient had difficulty in mastication and speech. A light weight hollow bulb definitive obturator with duplicated palatal rugae was planned for the rehabilitation of this patient.

Procedure:-

- ❖ A perforated stock tray was selected for a preliminary impression. A gauze piece was packed in the defect and floss was tied to it for retrieval after the impression was made. Primary impressions of the defect and edentulous ridges were made with irreversible hydrocolloid (Algitek, Dust free easy mixing, DPI). Impression was boxed and then poured in type III stone (Kalabhai Karson Pvt Ltd, Mumbai). Special trays were fabricated using autopolymerized acrylic resin (Self cure acrylic Repair material, DPI).
- ❖ Border molding was done to record the soft tissues surrounding the defect using green stick impression compound (DPI pinnacle tracing sticks). Several perforations are made for the exit of the impression material with at least 3 perforations along the medial palatal margin. And final impressions were made using light viscosity addition silicone impression material. (Ivoclar Vivadent Virtual Light Body Regular Set). (**Fig 2**)
- ❖ Impressions were poured and final casts of type III dental stone (Kalabhai Karson Pvt. Ltd, Mumbai) were obtained (**Fig 3**) and record bases, as well as occlusal rims, were made for the recording of maxillomandibular relationship. (**Fig 4**) Teeth arrangement was done and try in performed on patient. (**Fig 5**)
- ❖ Before acrylization, replication of palatal rugae on the palatal contour of obturator was done.

Duplication of palatal rugae:-

- ❖ Make an index of palatal rugae with an elastomeric putty material i.e addition silicone. (Dentsply Aquasil Soft Regular Set) (Fig 6)
- ❖ Apply separating medium on the cast. Autopolymerized acrylic resin is added on to the palatal area of the cast and putty index is used to contour the rugae on the resin. When the acrylic sets, remove it from the cast.
- ❖ The palatal rugae area of the trial based denture was removed and replaced with the acrylic duplicated rugae. (Fig 7) After approval of denture for esthetics and comfort from the patient, the waxed up denture along with obturator was ready to be processed for acrylization.

Fabrication of hollow bulb obturator:-

- ❖ The cast for obturator in a flask is invested in the normal manner. Dewaxing was done in a normal manner. (Fig 8) Separating medium was applied onto the two parts of the flask. Heat-curing acrylic resin was rolled out to an approximate 2 mm thickness when it was in the doughy stage.
- ❖ The periphery and the base of the obturator was packed with rolled out clear heat cure acrylic resin.
- ❖ The center of the concavity created in the previous step was filled with table salt to within approximately 2 mm of the top. The mould is packed with rolled out heat-curing resin in the usual manner.
- ❖ Processing was done according to manufacturer's specifications. The prosthesis was deflasked. The weight of the prosthesis was weighed and noted and it was 38.7 gms. (Fig 9)
- ❖ Using a No.8 bur, a hole was drilled in the superior surface of the obturator. The salt was poured out. (Fig 10) Autopolymerizing acrylic resin was used to seal the hole made by the bur. To ensure a complete seal, the denture was allowed to float in a bowl of water. The weight of the obturator was again noted after removal of salt which was 29.3. (Fig 11) A 24 % reduction in weight was noted after the salt is removed.
- ❖ It was then finished and polished. (Fig 12) The final prosthesis was inserted to evaluate for extension, occlusion, and speech. There was considerable improvement in speech, deglutition, and aesthetics. On review, the patient reported that he was very satisfied with the function and comfort of the prosthesis.(Fig 13)
- ❖ During the time of insertion, the patient was given the necessary instructions for use. Recall check-up was done after 24 hours, 1 week, first, third and sixth months with satisfactory results.



Fig 1:- Intraoral view of the defect.



Fig 2:- Secondary impression



Fig 3:- Master cast

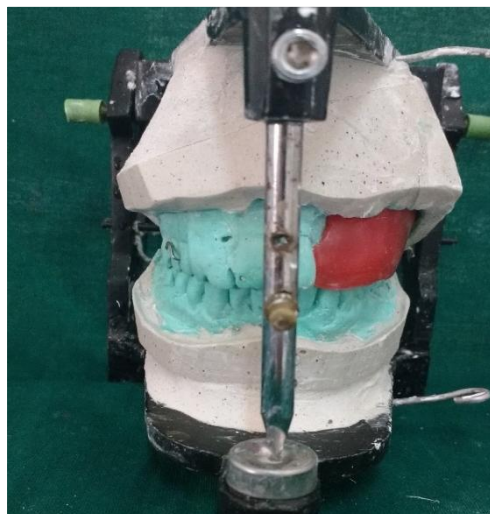


Fig 4- Jaw relation recording

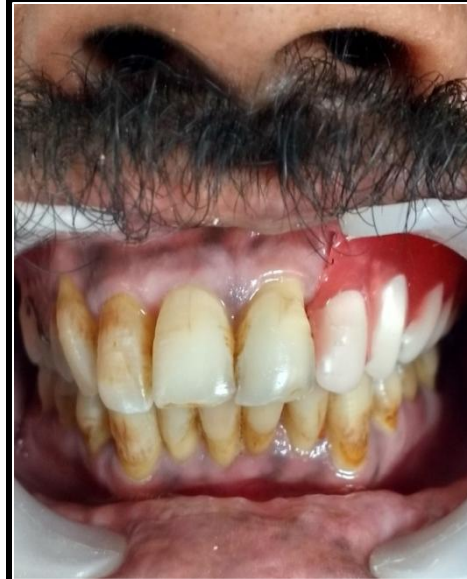


Fig 5:- Try in procedure



Fig 6:- Putty index of palatal rugae area.



Fig 7:- Waxed up obturator with duplicated palatal rugae.



Fig 8:- Dewaxing



Fig 9:- Weight of the obturator before removing the salt (in grams)



Fig 10:- Holes made on the palatal surface of the obturator. Salt being poured out through holes.



Fig 11:- Weight of the obturator after removing the salt (in grams)



Fig 12:- Finished and Polished obturator



Fig 13:- Post insertion photograph of the hollow obturator.

Discussion:-

Obturator is the treatment of choice for hemimaxillectomy and maxillectomy patients once the defect is the result of surgical removal of pathology or neoplasm. The functional demands of speech, mastication, and deglutition require that the obturator seals the defect to prevent loss of air and fluid through the nose. A bulb extension is required to improve the resonance of sounds to be heard with noticeable clarity. This extension, if made of solid acrylic, possesses undesirable weight to the prosthesis that hampers the retention, stability, and support of it and results in patient's dissatisfaction. (Tanaka et.al, 1977).

Wu and Schaaf found that a hollow maxillary obturator prosthesis reduced the weight of the prosthesis by 7 to 33%, depending upon the size of the maxillary defect. (Y.L.Wu, N.G.Schaff, 1989.).

A hollow bulb obturator along with a hollowed-out denture considerably reduces the weight of the prosthesis and offers the following advantages: (1) increased retention and thus improved physiologic functions, such as

deglutition; (2) improved patient comfort and efficiency; (3) decreased pressure on the surrounding tissues; (4) good regeneration of tissues; (5) reduced chances of excessive atrophy and physiologic changes in the muscle balance; and (6) improved self-confidence of the patient.(Nidiffer TJ, 1957).

The technique described in this article gives a simple way of making lightweight hollow bulb obturator by incorporating of salts during packing of acrylic and improving phonetics for the patient by duplicating the palatal rugae onto the obturator. The reduced weight of approximately 24% helped in achieving better retention, stability, and support of the obturator that was a part of a maxillary complete denture. The patient after wearing the prosthesis had better comfort, function and appearance.

Conclusion:-

A majority of Patients with congenital and acquired defects of the maxilla can be rehabilitated with a fair amount of clinical success if the prosthodontist has a sound knowledge and skill of diagnosis, the principles, and techniques involved in the fabrication of an obturator prosthesis. A properly fabricated obturator can help restore the anatomy and function of the lost tissues and goes a long way in rehabilitation and improving the quality of life of such patients.

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