Prosthodontic Rehabilitation of a Patient with One Piece Hollow Bulb Obturator: A Case Report

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Abstract

A prosthesis used to close a palatal defect in edentulous or partially edentulous mouth is correctly referred to as an obdurate. Successful prosthodontic reconstruction of hemimaxilloectomy defects, is a challenging task that requires multidisciplinary approach. An obdurate should serves to restore speech, mastication, deglutition and esthetics. The present case report describes a simple procedure for restoring of subtotal maxillectomy, which was successfully rehabilitated with a one piece close hollow bulb obdurate.

Keywords: Hemimaxilloectomy, Subtotal maxilloectomy, Rehabilitation, Acquired, Congenital.

Introduction

The name obdurate is derived from the latin verb "Obturare" which means to close. According to glossary of prosthodontic terms obdurate is defined as, "A prosthesis used to close a congenital or an acquired tissue opening, primarily of hard palate and or contiguous alveolar structures"[1].

The most common defects in the maxillary arch can be either congenital or acquired. Congenital anomalies are the product of errors in embryogenesis (malformations) or the result of intrauterine events that affect embryonic and fetal growth (deformations and disruptions)[2]. Acquired defects are due to surgical resection of the tumors or due to trauma[3].

The patient with an acquired maxillary defect should be provided with an obdurate prosthesis that is comfortable, should solve the problem of swallowing and speech, and is acceptable esthetically. For achieving the best results, the obdurate should include maximum coverage of the edentulous ridge, maximum engagement of the remaining teeth for retention and movement under function[4,5].

In edentulous or partially edentulous patients support, stability, and retention of the obdurate depends on the remaining teeth, hard and soft tissues[6]. The larger the defect, greater the loss of mucogingival support[7,8]. This article describes the clinical and laboratory procedures involved in the rehabilitation of the patient with hemimaxillectomy defect, using a simple closed bulb obdurate.

Case Report-

A 61- year -old female patient reported to the department of prosthodontics with the chief complaint of missing teeth and difficulty in speech and deglutition. The patient's dental history revealed that the partial maxillectomy at right side was performed 6 months back for squamous cell carcinoma affecting the right region of maxilla passing the midline. Her medical history also revealed hypertension. On intraoral examination patient's right side of the face was disfigured and the skin below the infra-orbital margin was depressed with scar.

(Fig-1) Pre- operative view

The defect frequently was complex and involves the skin, bone, muscle, cartilage and multilayers of mucosa and also affects a variety of functions like mastication, speech, olfactory and gustatory sensation. Speech was usually unintelligible. Patients also have seepage of nasal secretions in the oral cavity, poor lip seal, and complains of xerostomia. Patient was experiencing difficulty in mastication and deglutition due to nasal reflex of food and also complained of hyper nasal speech along with average mouth opening. Intraoral examination of the patient showed subtotal maxillectomy of the right side which could be categorized under Aram any class I situation. The tooth missing were 11, 12, 13, 14,15,16,17. On the left side the patient had teeth from central incisor to second molar.

(Fig-2) Intra oral view

Posterior teeth of left region were used to provide retention for the prosthesis, by preparing retentive clasps for providing better retention for the prosthesis. The lower arch was edentulous.

According to Aram any the defect classified as Aram any class I[9]. On the basis of Aram any class I defect, patient's economical condition and intact oral tissues (hard and soft tissue) condition, a one piece hollow bulb obdurate was planned for this patient. By fabricating a one piece hollow maxillary obdurate, the weight of the prosthesis may be reduced by up to 33%[10].

Procedure:

- In the adequate mouth opening a perforated stock tray was selected for preliminary impression. Primary impression was made with irreversible hydrocolloid Zhermackneocolloid and Impression was boxed and then poured in type II stone Kalabhai Karson Pvt Ltd, Mumbai and primary cast was retrieved. Then all the unwanted undercut were blocked out with modelling wax

(Fig-3) Prilimanary impression

Special trays were fabricated on primary cast using chemically activated acrylic resin DPIcold cure and custom tray was made in the region of denture wearing area and defect area.

Chemical Activated Acrylin Resin Custom Tray

• Final impression of the defect area was made in the medium body elastomeric Reprisal, DENTSPLY, and retrieved the master cast with accurate reproduction of defect portion. Again, the minor undercuts in the defect were blocked out using the modelling wax in master cast.

(Fig-4) final impression

Master cast

(Fig-5) Master cast with blockout undercut

• Base plate and occlusal rims were fabricated on the casts and Jaw relation were transferred to a Non-Arcon semi adjustable articulator

• Teeth arrangement was done by conventional method and after Try-in the denture, Retentive clasp on second molar and Pin Head clasp in between first and second pre molar, were fabricated.

(Fig-6) Try-in procedure

• After try-in step, defect was blocked by light modelling wax. A chemically activated acrylic resin thin plate was fabricated only over the defect and filled by using salt. And then it was covered by a lid made of chemically activated acrylic resin. Whole denture wax up done along with retentive clasps.

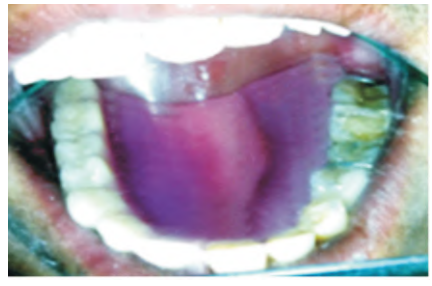
(Fig-7) chemically activated acrylic resin plate filled by salt then covered by chemically activated acrylic resin lid

• After dewaxing procedure, the chemically activated acrylic resin plate along with its lid was remain inserted in to the defect. And the denture was packed following the routine procedure.

(Fig-8) Dewaxing Procedure

• After deflasking, a small hole is drilled on the bulb surface and the salt was teased out to make the obdurate hollow.

• The hole was then resealed using chemically activated acrylic resin. The denture was trimmed, polished and fit and insertion done. During denture fit-in, care should be taken that there were no rough borders that can traumatize the tissues. Fig-9,10



(Fig-9) Hollow bulb cast obdurate

(Fig-10) Post operative view

Patient was trained adequately for easy insertion and removal of the prosthesis. And post insertion instructions were given. The hyper nasality of the speech was corrected,

the function and esthetic were restored. The patient was recalled after 24 hours. Recall visits were also schedules after 1 week, 1, 3 and 6 months.

Discussion

The purpose of an obdurate are to serve as a temporary prosthesis during the period of surgical correction and restore the esthetic appearance of the patient for social contact. Some factors like the surgical primary closure, the age of the patient, the local avascular condition of the tissues, and if the patient is susceptible to recurrence of the original lesion which produced the deformity, are contraindicates surgery[11].

Obturators for acquired defects of palate. Almost all acquired palatal defects extent treatment is dependent on the size, location, and potential behavior of the tumor[11,12]. Prosthodontic therapy for patients with acquired surgical defects of the maxilla can be divided into three phases of treatment as surgical obdurate, temporary obdurate, and definitive obdurate.

The surgical obdurate is a base plate appliance which is constructed from the preoperative impression cast and inserted at the timeof resection of the maxilla in the operating room.Two types- 1) IMMEDIATE-inserted at the time of surgery 2) DELAYED-inserted 7-10days after surgery. It allows patient to take oral nutrition immediately after surgey. This will be in service for about 5-10days. The patient must have a presurgical dental examination and a maxillary cast must be made. Edentulous surgical obturators must be secured by circumzygomatic wires and sutures Dentulous surgical obturators are secured by means of simple clasps.

The temporary obdurate is constructed from the postsurgical impression cast which has an artificial palate and artificial ridge and generally has no teeth. The closed bulb extending into the defect area is hollow. The patient is usually seen every two weeks because of the rapid soft tissue changes that occur within the defect during the organization and healing of the wound. And the last phase is definitive obdurate. The Definitive obdurate a prosthesis that artificially replaces part or all of the maxilla and the associated teeth lost due to surgery or trauma. It is fabricated when tissue healing and contraction are complete. Made 2-6 months postoperatively.A definitive obdurate is not indicated until the surgical site is healed and dimensionally stable and the patient is prepared physically and emotionally for the restorative care that maybe necessary. Changes associated with healing and remodeling will continue to occur in the border areas of the defect for at least one year. Dimensional changes are primarily related to the peripheral soft tissues rather than to bony support areas.

Early 1500s Ambroise Pare[13] was the first to use artificial means to close the palatal defect. Fry described the use of impressions before surgery in 1927[14], and In 1956 the Steadman described the use of an acrylic resin prosthesis lined with gutta-percha to hold a skin graft with in a maxillectomy defect. In 1953 Ackerman fabricated hollow obdurate prosthesis[15,16].

Several techniques have been advocated in the fabrication of hollow obturators. In the year 1972, Chalian and Barnett explained a simple technique of fabricating a single-piece, hollow obdurate prosthesis[17]. Tanaka et al in 1977 used polyurethane foam as core to reduce the weight of the obdurate would be efficient and economical[18]. Parel and LaFuente in 1978 formed a hollow prosthesis in single visit. First a resilient liner material was adapted to the defect on all surfaces except at the palatal side. This was then filled with sugar to the level of the palate. Autopolymerizing resin was used to form the lid for the palatal side. Sugar was drained later through a small bur hole on the lid, which was sealed with more autopolymerizing resin[19].Phankosol and Martin in the year 1985 developed a technique for constructing a hollow obdurate with a removable lid combining the benefit of both closed and open hollow obturators[20].

A definitive obdurate is not indicated until the surgical site is healed and dimensionally stable and the patient is prepared physically and emotionally for the restorative care that maybe necessary. The obdurate maybe displaced superiorly with the stress of mastication and will tend to drop without occlusal contact. The degree of movement will vary with the number and position of teeth, the size and configuration of the defect, the amount and contour of the remaining palatal area, height of the residual alveolar ridge, the size, contour, and lining mucosa of the defect, and the availability of undercuts. Lack of retention, stability, and support are common problems of treatment for patients who have had a maxillectomy.

In present case closed hollow bulb obdurate fabricated by using heat activater denture base resin.The hollow bulb obdurate is found to prevent percolation of fluid and decrease air space in the defect, allows fabrication of a light weight prosthesis, which is readily accepted by the patient while effectively extending into the defective areas. It reduces the weight, is more hygienic, easy to fabricate, and increase speech clarity. It also prevents fluid and food collection unlike an open bulb obdurate which is unhygienic, foul smelling and unpleasant for the patient

Controlling the thickness of hollow obdurate walls is important to provide adequate strength and weight of the prosthesis.

This case report describes the fabrication of a hollow bulb obdurate using medium body to fill the defect. The added advantage of this technique is that since the materials hardens on setting, the contours are maintained.

Conclusion

Rehabilitation of patients who have undergone eradication of neoplasm of the maxillae requires restoration of mastication, speech and deglutition The concept of rehabilitation of patients with large defects of the maxilla with hollow bulb obturators provides a means of enhancing the retention, mastication, deglutition, speech and esthetics in the post-operative period.

In hollow buIb obdurate the weight of the prosthesis was reduced, making it more comfortable and efficient. The lightness of the prosthesis changes one of the fundamental problems of retention and increases physiologic function. A hollow bulb prosthesis (either one piece or two piece) is a better Choice, as it is lighter in weight, control to maintain the bulb wall thickness and is more hygienic. Here the technique used which gives an accurate fabrication of one piece hollow bulb obdurate.

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