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Case Report

Rehabilitation of Hemimaxillectomy Defect with Hollow Bulb Obturator – A Case Report

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Abstract

Goal of prosthodontics is rehabilitation of missing oral and extra oral structures with restoration of normal function of mastication, speech, swallowing, esthetics etc. Defects of orofacial region, whether congenital or acquired, affects the patient physically and psychologically leading to poor quality of life. Benign and malignant lesions in the oral region are common, which requires surgical corrections. Surgical intervention of such lesions results in defects, affecting the function and esthetics of an individual. This case report explains prosthodontic rehabilitation of maxillectomy defect caused due to surgical excision of Ameloblastoma with Hollow bulb obturator with Cast partial denture. By fabrication of this prosthesis it covers the anatomic defect which forms communication among the oral cavity, nasal cavity and maxillary sinus.

Keywords: Cast Partial Denture (CPD), Obturator, Hollow bulb Obturator, Ameloblastoma.

INTRODUCTION

The surgical treatment of tumour of head and neck region, often results in communication between the oral cavity and nasal/sinus cavities [1]. Other than tumour (acquired), the oronasal communication can be due to developmental and congenital defects.

Among the acquired defects, Ameloblastoma is the most frequent benign odontogenic tumour, which is locally aggressive and epithelial origin. The surgical option is the dissection of the wide margins of the healthy tissue surrounding the tumour, which creates functional and esthetic impairment, due to the presence of oronasal communication [2].

Patients with oronasal/orosinus communication face many problems due to hemimaxillectomy like difficulty in speech, chewing, swallowing, fluid reflux through nasal cavity and most importantly their quality of life [3]. Maxillectomy defects also creates psychological trauma due to altered facial appearance like loss of tissue and bony structures.

These defects can be closed, covered or maintained by maxillofacial prosthesis called Obturator. Palatal perforation was first treated with Obturator by Ambrose Pare, a French surgeon [4]. The shape and configuration of defect, quality and type of lining tissue, functional requirements for prosthesis retention, support, and stability are the factors determining the border and extension of the obturator. If the fabricated obturator is heavy, it affects the retention of the prosthesis as well as function. Study by Wu and Schaaf proved that there was a significant reduction in the weight from 6.55% to 33.06% when hollowing of the obturator was done [5]. Due to the limitations of a conventional, rigid obturator, a prosthetic design which involved a combination of a rigid titanium framework with hollow bulb obturator was fabricated for this patient who undergone hemimaxillectomy for Ameloblastoma.

CASE REPORT

A 63-year-old male presented to the Department of Prosthodontics and Implantology with partial maxillary edentulism, complaining of loosening of prosthesis in upper arch and associated difficulty in speech and mastication. History of cardiac surgery before 2 years and is under medication. Patient had history of Ameloblastoma, which resulted in resection

of the hard palate, leading to an Aramany Class VI maxillary defect before 20 years (Fig-1). The surface of the maxillary sinus appears yellow to white in colour, scrapable rough surface, non tender and no discharge was present. Gross facial asymmetry present with depression in the infraorbital region and cheek on right side face (Fig-2).

The existing prosthesis was attrited, loose and do not cover the defect in the passage of nasal contents into the oral cavity and vice versa. This leads to the unclear speech, malodour & difficulty in mastication, which drive the patient to fabricate a new prosthesis.

PROCEDURE

- Initially a thin layer of gauze piece coated with Vaseline is placed on the defect area to prevent the aspiration of the impression material and to limit the extend of the impression (Fig-3).
- Then condensation silicone (Zeta plus) was mixed and impression of the defect was made (Fig-4) followed by impression making with same putty material in stock tray (Primary impression) (Fig-5).
- Rest seat preparation was carried out prior to the secondary impression making.
- Special tray was fabricated over the primary cast after blocking the undercut in the defect area, followed by border molding with greenstick compound (Fig-6).
- Secondary impression was then made with monophase impression material (Aquasil, Dentsply) followed by pick-up impression with alginate impression material (Algitex) (Fig-7).
- A definitive cast was made after beading and boxing of the final impression (Fig-8).
- Over the master cast, wax pattern was adapted and casting was done for fabrication of Cast partial denture framework (Fig-9).
- It was then checked for proper fit and need of adjustment (Fig-10) followed by bite registration (Fig-11).
- Try-in was done.
- The curing of the prosthesis was done in two parts: First bulb portion and then remaining part of the prosthesis containing teeth.
- Bulb portion of the prosthesis was made by wax up for shim first and acrylising the shim alone. Followed by placing the acrylised shim in the cast (Fig-12) and salt was placed over it to create hollow space (Fig-13) and wax up for acrylisation of the remaining tooth portion was done.
- After dewaxing, shim was placed in the defect area and covered with salt and a thin layer of heat cure material was added over the salt and the remaining portion is packed with heat cure acrylic and processed. Salt was removed after processing through small hole made on the obturator and thus the bulb portion was made hollow.
- Finally the acrylised prosthesis was trimmed, polished and delivered to the patient (Fig14A, Fig-14B & Fig-14C).

Fig-1: Aramany Class VI maxillary defect

Fig-2: Extra oral view. Gross facial asymmetry present with depression in the infraorbital region and cheek on right side face

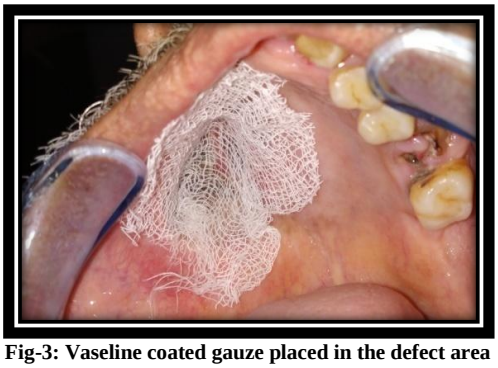

Fig-3: Vaseline coated gauze placed in the defect area

Fig-4: Impression of the defect area with Condensation silicone

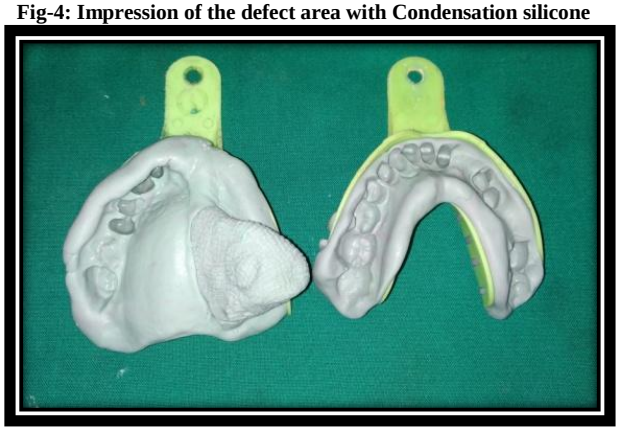

Fig-5: Primary impression with condensation silicone

Fig-6: Border molding of the special tray with green stick compound

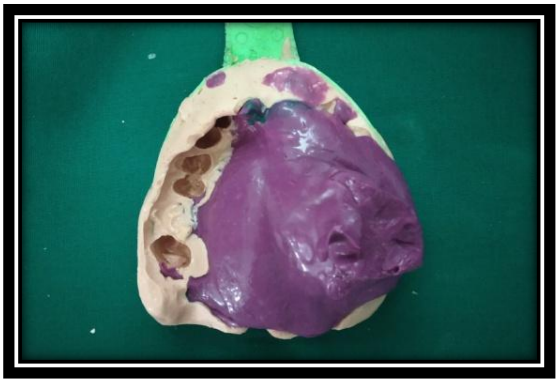

Fig-7: Seconday impression with monophase impression material and pickup with Alginate impression material

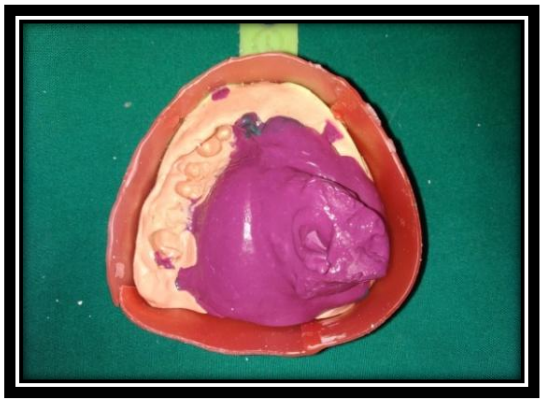

Fig-8: Beading and boxing of final impression

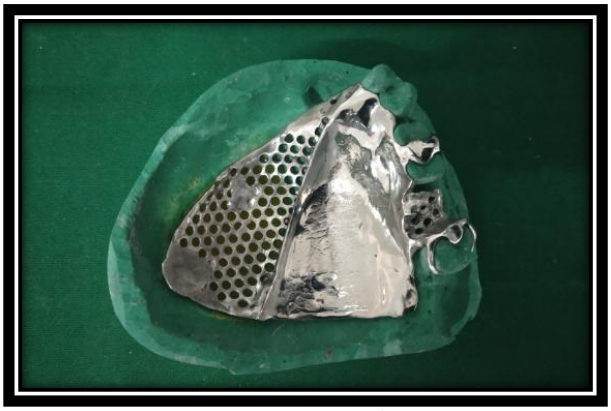

Fig-9: Cast partial denture framework

Fig-10: Try-in of Cast partial framework

Fig-11: Bite registration

Fig-12: Acrylic shim was fabricated over the defect area

Fig-13: Salt placed over the shim to maintain the hollow space

Fig-14A: Acrylised prosthesis

Fig-14B: Insertion of the denture

Fig-14C: Intraoral view of denture

Fig-14D: Post operative view

DISCUSSION

It is really a tough task to rehabilitate acquired maxillary defect as it present with functional and facial deformity. It becomes a great challenge to the prosthodontist to restore the form, function, and the esthetics of such patients.

In this case report, patient who undergone surgical removal of Ameloblastoma before 20 years is rehabilitated with Hollow bulb obturator with Titanium Cast partial denture prosthesis.

The primary goal of the obturator prosthesis was to cover the defect and separate the oral cavity from the nasal cavity. It is preferred over surgical reconstruction as they are easy to maintain, are easy to fabricate and most importantly the cavity underneath the obturator can be examined at any time to check for the signs of tumour recurrence [6-8]. Other advantages of fabrication of obturator includes decrease in the fluid leakage into the nasal cavity & sinus cavity, also improves the efficiency of mastication, swallowing and speech [7, 9, 10].

In this clinical case, Aramany class IV defect was present. The resection cavity was present on the right palate crossing the midline. The obturator prosthesis was retained with the Titanium CPD with retentive clasp designs on the premolars and second molar. The location and morphology of the remaining teeth are sufficient to obtain retention for the prosthesis.

Two types of impression materials are explained in the literature namely: Alginate and Silicone impression material [11, 12]. Singh et al described a technique to prevent the extravasations of the impression material into the sinus cavity by placing gauze dipped in Vaseline in the defect area prior to impression making [13]. In this present case study,

gauze piece was placed in the cavity space and impression was made with condensation silicone and monophase impression material.

The obturator was fabricated with heat cure acrylic resin, which facilitated easy cleanliness and maintenance & thereby reducing the colonization of Microorganisms. Titanium cast framework is chooses as it is half the weight of Co-Cr framework. If Co-Cr is used, it may affect the retention of the prosthesis due to added weight of the obturator.

Patient satisfaction was more with the CPD than the normal acrylic prosthesis given before 20 years. Obturator with CPD improved the retention, stability, speech & phonation and masticatory efficiency of the patient.

CONCLUSION

Rehabilitation of the maxillectomy defects are complex and challenge to prosthodontists. A proper treatment method have to be selected for the defect coverage. Rehabilitation with hollow bulb obturator with CPD prosthesis appears to be a functional and effective treatment modality. This paper discussed the prosthetic treatment of acquired maxillary defect due to surgical removal of Ameloblastoma. The obturator provided to the patient increased function by providing better masticatory efficiency, phonetics by adding resonance, and also improved the esthetics.

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