



Cast Partial Definitive Obturator Prosthesis Fabrication for a Maxillary Defect: A Clinical Case Report.

1Dr. Payal Bhoir, 2Dr. Varsha Joteppa, 3Dr. Anilkumar Komuravelli

1MDS Post Graduate Student Department of Prosthodontics, 2MDS Senoir Lecturer, 3Professor and Head of Department, Prosthodontics

1Maharashtra University Ff health Sciences,

2Maharashtra University Of health Sciences,

3Rajiv Gandhi University Of Health Sciences

Abstract

Maxillectomy defects can result in oroantral communication that causes difficulty in mastication and deglutition, impaired speech, and facial disfigurement. The prosthodontist plays an important role in the rehabilitation of such defects with obturators. This clinical report describes the details of a prosthodontic rehabilitation of an elderly patient who was diagnosed with odontogenic myxoma sand has undergone partial maxillectomy. The palatal defect has caused problems in phonetics and mastication. A previous interim obturator was made using conventional Polymethyl methacrylate (PMMA). This obturator has caused some discomfort due to lack of retention food impaction and irritation of the fitting surface over the tissue defect areas causing erythema to the tissue surface. Therefore, the definitive prosthesis with cobalt–chromium removable partial denture gained its support from the remaining teeth and tissues. The follow-up system revealed satisfactory results with no deterioration in the prosthesis.

Introduction

The most frequent treatment modality for patients diagnosed with a malignant tumour in the maxilla includes surgical removal of the tumour which ultimately very often leaves an oro-nasal and or an oro-antral defect resulting in severe functional problems concerning mastication, deglutition and speech. An appropriate substitute for the tissue lost is therefore inevitably necessary to restore function and regain quality of life. ⁽¹⁾ The obturator prosthesis has been used to restore masticatory function and improve speech and cosmetics for maxillary defect patients. The basic design of obturator prostheses uses the

available tooth and bearing tissue to achieve maximum retention and stability. The primary goals of the obturator prosthesis are to preserve the remaining teeth and tissue and provide comfort, function, and aesthetics to the patients. The main goal of prosthetic rehabilitation for total and partial maxillectomy patients include separation of oral and nasal cavities to allow adequate deglutition and articulation, and also possible support of the orbital contents to prevent enophthalmos and diplopia, soft tissue's support to restore midfacial contour, and an acceptable aesthetic result. ⁽²⁾

In the dentulous maxillectomy patient, the loss of support on the defect side of the maxilla requires that the remaining maxillary teeth adequately retain an obturator prosthesis. An obturator prosthesis will tend to be displaced by gravity from the maxillary defect. This displacement is resisted almost entirely by the retentive design of the obturator framework. A maxillary prosthesis, as pointed out by Firtell and Grisius," must have a clasping system that actively retains the prosthesis in a passive position and conserves the remaining hard and soft tissues. ⁽³⁾

Odontogenic Myxoma is an uncommon mesenchymal odontogenic tumour arising from the dental papilla, dental follicle, or the periodontal ligament characterized by rounded and angular cells lying in an abundant mucoid stroma that replaces the cancellous bone and expands the cortex. The presence of odontogenic epithelium, association with missing or unerupted teeth and its exclusive location in the tooth-bearing areas of the jaws may be the evidence for its odontogenic origin. Clinically, it is a painless, invasive, and slowly growing mass causing marked asymmetry of the face. It usually occurs in second and third decades of life and causes expansion of bony cortices, displacement and loosening of teeth. ⁽⁴⁾

This present report describes a prosthodontic rehabilitation of a patient with Odontogenic Myxoma in the maxilla with a complete palatal coverage cast partial denture.

Case Report

A male patient aged 63 years old, came to the department of prosthodontics for the restoration of maxillary defect with chief complaint of having difficulty in breathing with hypernasal speech and discharge from nose on eating food or drinking liquids and had been diagnosed with mucoepidermoid carcinoma 2 years ago and had undergone surgery, followed by radiotherapy treatment. He was referred to the Department of Prosthodontic, Saraswati Dhanwantari Dental college and Hospital Parbhani, for the improvement of the previous obturator and a definitive prosthetic treatment. The patient had been using an obturator for about 4 months when he was first seen at our department. Upon further consultation patient complained of having some discomfort due to food impaction and irritation of the

fitting surface over the tissue defect areas. This had caused frequent erythema of the areas. The previous obturator was made of Polymethyl methacrylate (figure 2).



Figure 1 Intraoral view of the large palatal defect in the patient's mouth after the removal of mucoepidermoid carcinoma.

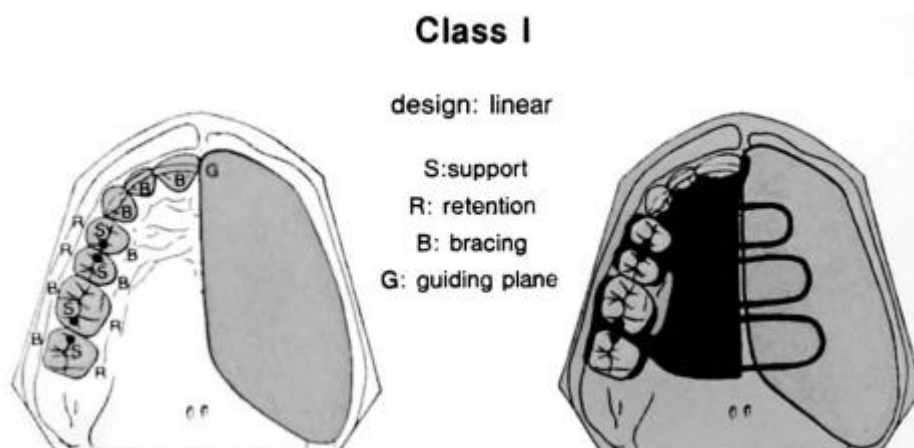


the Figure 2 Interim obturator

Intraorally, the soft palate defects extended from posterior one third of hard palate up to the

anterior one third of hard palate (figure 1). Reddish areas were spotted on the soft tissues overlying the defect areas. There were teeth present unilaterally on the maxilla; from the central incisor to the second molar. All the teeth are still periodontally strong. Their preservation could add to a better retention of the obturator. Based on the discussion with the patient, it was decided to construct a new obturator with an addition of cast partial denture framework. The patient was fully informed about the treatment and written consent was taken prior to treatment procedures.

The treatment plan for the construction of the definitive obturator (a cast-metal removable dental prosthesis) was rolled out. Aramany's class II obturator design principles were applied. Class II includes arches in which the premaxilla and the premaxillary dentition on the contralateral side is maintained. A single, unilateral defect is located posterior to the remaining teeth. This arch is similar to a Kennedy class II in that a bilateral, tripodal design can always be used.



The primary impression was made using irreversible hydrocolloid (tropicalgin, Zhermack) (Figure 2) and was poured with dental stone (Kalstone, Kalabhai) to obtain a primary cast (Figure 3). The defect was blocked with a gauze piece lubricated with petroleum jelly prior to impression making.



Figure 1 Primary Impression

The primary cast was then surveyed on a surveyor and the framework was designed. The design included a tripodal obturator design with complete palate as the major connector. Direct retention was obtained from an embrasure clasp with an occlusal rest on right first and second molar. Indirect retention was provided by cingulum rest on right canine and an I bar on central incisor.

A custom tray was constructed on the primary cast with cold-cure acrylic resin (DPI RR). Green stick compound (DPI Pinnacle) was used for border molding and the final impression (Fig. 12) was made using polyvinyl siloxane (PVS) (Oranwash L, Zetaplus, Zhermack, Italy). This was poured with dental stone type III to produce the secondary working cast, which was then duplicated to produce the refractory cast, on which the wax up of the framework was performed (Fig. 13).



Figure 2 Border Molding

The framework was casted using cobalt–chromium alloy. The fit of the framework is evaluated with the help, of pressure indicating paste (PIP, MIZZY Inc. USA). Bite rim blocks were constructed on the framework. Centric jaw relation record was obtained and the casts were mounted on a Semiadjustable articulator (Hanau Whipmix).



Figure 3 Final Impression

Acrylic denture teeth (Ruthenium Acryrock B2 teeth set) were arranged and the prosthesis was tried to verify the occlusion with the mandibular teeth, esthetic appearance, and support for the underling

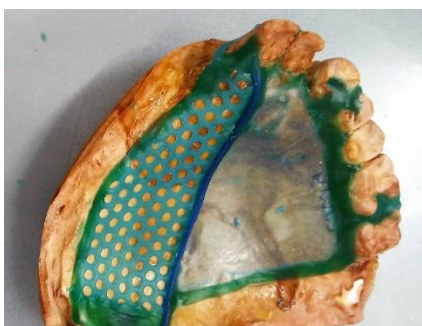


Figure 5 Wax Pattern for Cast Partial Denture



Figure 4 fit of the Framework and bite rim fabrication

tissues. Then, the prosthesis was processed, finished, and polished in the usual manner. At insertion, the pressure indicator paste (PIP) was used to inspect for any pressure areas. The denture was inserted and post-insertion

instructions were given to the patient in the care and use of the obturator. The patient was re-viewed bimonthly for three months, then the visits were arranged to be every 3 months



Figure 7 Try In occlusal view



Figure 6 Try In frontal view



Figure 8 Heat cure acrylised obturator

Discussion

The reconstruction of maxillary defects with obturator prosthesis is one option to rehabilitate patients. In a short period of time, the patient can improve his abilities of deglutition and speech and therefore take part in a normal social life. Particularly, in older patients, patients with a high morbidity rate and patients with an unfavourable life expectancy, a quick and sufficient prosthetic rehabilitation is of great importance to preserve and restore a maximum of quality of life. ⁽¹⁾ Obturator prosthesis plays a crucial role in the recovery of oral function in postsurgical maxillectomy patients.

Framework designs for obturators may vary based on the classification system of the defect. All removable obturator prosthesis should be dictated by basic prosthodontic principles which include broad stress distribution, cross arch stabilization with the use of a rigid major connector, and stabilizing and retaining components at locations within the arch to best minimize dislodging functional forces. ^(5,6) The Aramany classification system of postsurgical maxillary defects is a



Figure 9 Insertion of final prosthesis

useful tool for teaching and developing framework designs for obturator prostheses and for enhancing communication among prosthodontists. There are series of obturator prosthesis design templates and the relevant considerations for each situation. In all situations, a quadrilateral or tripodal design is

favoured over a linear design because this allows a more favourable application of leverage design for the support, stabilization, and retention of the prosthesis. A tripod design was selected for this case. Support of the prosthesis was provided by the remaining teeth, palate, and rest. ⁽⁷⁾

Different types of retentive aids such as magnets, Snap-On (friction-type) attachments, acrylic buttons, retentive clips, and implants are used for the conventional obturator prosthesis. The use of implant is a new advancement in maxillofacial prosthodontics. They effectively improve the retention of prosthesis without the help of another appliance. However, cost, health of the patient, and bone qualities are some of the factors which limit the use of implants. The advantages of metal framework obturator prosthesis are the longevity of the prosthesis and thermal conductivity of metal which made it sensitive to temperature change. ^(8,9)

The patient was totally satisfied with the obturator as she can function better now. Overall, the quality of life of the patients with maxillary defects can be improved with the provision of a properly designed obturator. Besides, these patients can also continue their social life in the normal way.

Conclusion

The great challenge in rehabilitating a partial maxillectomy patient is to obtain adequate retention, stability, and support. Thorough knowledge and skills coupled with a better understanding of the needs of the patients enable the successful rehabilitation of such patients. Definitive obturator prosthesis fabricated with maximum extension and proper design rehabilitates the patient by improving masticatory efficiency, increasing the clarity of speech and quality of life. ^(10,11)



Figure 11 Preoperative



Figure 10 Post Operative

References

1. Lethaus B, Lie N, De Beer F, Kessler P, De Baat C, Verdonck HW. Surgical and prosthetic reconsiderations in patients with maxillectomy. *Journal of oral rehabilitation*. 2010 Feb;37(2):138-42.
2. Cardelli P, Bigelli E, Vertucci V, Balestra F, Montani M, De Carli S, Arcuri C. Palatal obturators in patients after maxillectomy. *ORAL & implantology*. 2014 Jul;7(3):86.
3. Martin JW, King GE. Framework retention for maxillary obturator prostheses. *The Journal of prosthetic dentistry*. 1984 May 1;51(5):669-72.
4. Alhajj MN, Ismail IA, Khalifa N. Maxillary obturator prosthesis for a hemimaxillectomy patient: A clinical case report. *The Saudi Journal for Dental Research*. 2016 Jul 1;7(2):153-9.
5. Singh M, Limbu IK, Parajuli PK, Singh RK. Definitive obturator fabrication for partial maxillectomy patient. *Case reports in dentistry*. 2020 Mar 21;2020.
6. Parr GR, Tharp GE, Rahn AO. Prosthodontic principles in the framework design of maxillary obturator prostheses. *The Journal of prosthetic dentistry*. 1989 Aug 1;62(2):205-12.
7. ROSLAN H. Palatal obturator prosthesis: a clinical case report. *Cumhuriyet Dental Journal*. 2018;21(1):55-60.
8. Lyons KM, Beumer III J, Caputo AA. Abutment load transfer by removable partial denture obturator frameworks in different acquired maxillary defects. *The Journal of prosthetic dentistry*. 2005 Sep 1;94(3):281-8.
9. Desjardins RP. Early rehabilitative management of the maxillectomy patient. *The Journal of prosthetic dentistry*. 1977 Sep 1;38(3):311-8.
10. Ramasamy TV, Chandra J. An innovative sectional silicone obturator in a patient with partial maxillectomy: A Case report. *The Journal of the Indian Prosthodontic Society*. 2020 Jan;20(1):115.
11. Iqbal ZA, Raza Kazmi SM, Yazdanie NA, Mehmood Z, Ali S. Maxillary obturator prosthesis: Support and retention case series. *Pak J Med Sci*. 2011;2:394-9.
12. Trivedi MK, Guddu G, Daftary M, Devikaa TC, Chaudhary RK, Kumar P. Management of Maxillary defect via Obturator: A Case Report with Review of Literature. *Turkish Journal of Physiotherapy and Rehabilitation*.;32:3.
13. Punjabi AR, Mistry G, Shetty O, Rathod A. Maxillary hollow-bulb obturator: A paradigm shift. *The Journal of the Indian Prosthodontic Society*. 2019 Jan;19(1):74.