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Rehabilitation of maxillary defect by three different types of obturators – A case series

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ABSTRACT

Surgical removal of hard and soft palate has a great impact on psychological, functional, and social well-being of a patient. Normal functions such as speaking and swallowing become difficult owing to absence of palatal roof. Because of these adverse effects, immediate and continual rehabilitation of patient with maxillary defect with obturator is essential. This article discusses about the management of three patients in different phases of disease-healing process, treated with different types of obturators.

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1. Introduction

Because of the advancement in dental and medical treatment modalities, patients suffering from carcinoma of oral and maxillofacial regions are treated successfully by radiotherapy, chemotherapy or by surgery. This places a high demand on the prosthodontist for successful rehabilitation of those patients with surgical defect using obturator or other prosthesis. Obturator is defined as prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar structures.[1] There are three different types of obturators viz., immediate surgical obturator, interim obturator, and definitive obturator.[2]

Immediate surgical obturator is fabricated from the impression made before the surgical excision of the lesion and inserted immediately after the surgery. It is usually made of heat activated clear acrylic resin to reduce the amount of residual monomer content which may pose possible irritation to the surgical wound. Immediate surgical obturator has the main advantage of restoring patient's speech and assisting in swallowing. It also serves as a matrix for the surgical dressing and provides psychological support for the patient. Retention of the prosthesis may be achieved by wrought-wire clasps or wire ligatures placed around the remaining teeth. In case, very few or no teeth remains obturator is wired to the zygomatic arches or other bony or soft tissue. No prosthetic teeth are attached to the immediate surgical obturator to avoid occlusal load transferring to surgical site.[3]

Oral soft tissues experience significant alteration in shape and size during first 3 weeks after surgery. This reduces the retention and stability of immediate surgical obturator which is already compromised. This necessitates fabrication of new surgical obturator 3–4 weeks after the surgery which is known as interim surgical obturator. It is fabricated either from a new impression made from patient or by adjusting the immediate surgical obturator by soft relining material. Full extension of the obturator prosthesis is not advisable because of its

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potential interference with healing. Prosthetic teeth limiting to the anterior segment may be added to enhance in esthetics.[3,4]

Definitive obturator is fabricated 6 months after surgery, once complete healing of the oral tissues is ensured. Heat activated acrylic resin or Co-Cr alloy is used as permanent denture base. Recently, titanium alloys are also used to reduce the weight of the prosthesis. Partially edentulous arch necessitates the fabrication of cast partial denture. Aramany has proposed following design principles for the fabrication of cast partial denture prosthesis; Class I – Linear; Class II – Tripodal; Class III – Quadrilateral; Class IV – Linear; Class V – Tripodal; Class VI – Quadrilateral.[5]

This article discusses about three patients with maxillary defect at various stages of healing rehabilitated with immediate, interim, and definitive surgical obturators, respectively.

2. Case reports

2.1. *Case I: Immediate surgical obturator*

A 52-year-old female patient reported with the chief complaint of soft tissue growth in oral cavity. Intra oral examination reveals the presence of ulcero proliferative growth involving right side of the hard palate crossing the midline (Fig. 1). Histopathologic examination confirms the diagnosis of squamous carcinoma of hard palate. On the basis of the clinical and histological findings, treatment plan of fabrication of immediate surgical obturator followed by surgical resection of entire right side of hard palate and premaxilla on contra lateral side was decided.

2.1.1. *Treatment procedure*

Impression of maxillary and mandibular arch was made using irreversible hydrocolloid (Zelgan) impression material (Fig. 2) and cast poured with type III gypsum product. Tentative extension of the surgical border was marked on the cast after discussing with surgeon (Fig. 3). Teeth and alveolar process with in the tentative surgical border was trimmed off from the cast (Fig. 4). Two layers of modeling wax was adopted to cover the entire palate till buccal and labial vestibule (Fig. 5). Processing was done with heat activated clear acrylic resin (Acrylin H) using compression molding technique. Small holes were made in the prosthesis near the interdental region of unaffected side (Fig. 6). Retention was obtained by wiring the prostheses to existing teeth using ligature wire passing through the holes (Fig. 7).



Fig. 1 – Intra oral preoperative photograph showing ulcero-proliferative lesion in right side of hard palate.



Fig. 2 – Primary impression made using irreversible hydrocolloid impression material.



Fig. 3 – Primary cast with tentative surgical out line marked.

2.2. *Case II: Interim surgical obturator*

A 29-year-old male patient reported with a chief complaint of difficulty in swallowing and speaking following surgery in the oral cavity. On eliciting dental history, it was found that patient had undergone surgical resection of premaxilla three weeks back due to mucoepidermoid carcinoma. Intraoral examination reveals resection of premaxilla along with center part of hard palate which is of Aramany class VI type (Fig. 8). Clinical finding shows inadequate healing for the fabrication of definitive prosthesis. Thus fabrication of interim obturator with heat activated acrylic resin was decided (Fig. 9).

2.2.1. *Treatment procedure*

Primary impression was made using irreversible hydrocolloid impression material (Zelgan) and cast poured using dental stone. Undercuts in the surgical site were blocked, and wax pattern for interim obturator was made. Adams clasps in 16, 26 and C-clasp in 17,27 were incorporated to enhance retention.



Fig. 4 – Primary cast with teeth and alveolar ridge present with in the surgical outline removed.



Fig. 5 – Wax up of the immediate surgical obturator covering entire palate extending up to labial and buccal sulcus.



Fig. 6 – Immediate obturator with holes along the embrassure area to aid in retention.



Fig. 7 – Obturator inserted immediately after surgery and retained by ligature wire through the holes.



Fig. 8 – Intra-oral view showing the resected premaxilla along with center of hard palate.

Prosthetic teeth from 14 to 23 were placed to enhance esthetics.

Processing was done using heat activated acrylic resin (Acrylin H).

2.3. *Case III: Definitive surgical obturator*

A 22-year-old male patient reported with the chief complaint of difficulty in swallowing and speaking. Intra-oral examination reveals the presence of cleft palate of premaxilla opening into the nasal cavity which is of Aramany class VI defect. Maxillary arch was constricted with presence of few remaining teeth (16,17,18,25,26,27,28). Preprosthetic orthopantomograph shows missing maxillary anterior teeth along with 14,15,24 and opening of oral cavity into nasal cavity is evident (Fig. 10). Hard and soft tissues were completely healed, and there is no evidence of active inflammation. Thus fabrication of definitive obturator replacing remaining natural teeth was decided.

2.3.1. *Treatment procedure*

Primary impression was made using alginate (Fig. 11) and cast poured by type II gypsum product (Fig. 12). Cast was surveyed to delineate the retentive undercut. Since it is Aramany Class



Fig. 9 – Interim obturator made of heat activated acrylic resin retained by Adams clasp and C clasp.

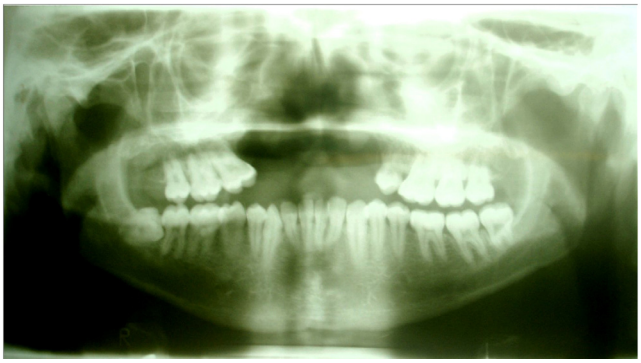


Fig. 10 – Pre prosthetic orthopantomograph.

VI defect quadrilateral design was proposed and following designing was done.

Major connector: Complete palate

Clasp: Embrasure clasp between 16–17 and 26–27 with retentive arm in buccal side and reciprocal arm in palatal side.

Prosthetic teeth: 11,12,21,22

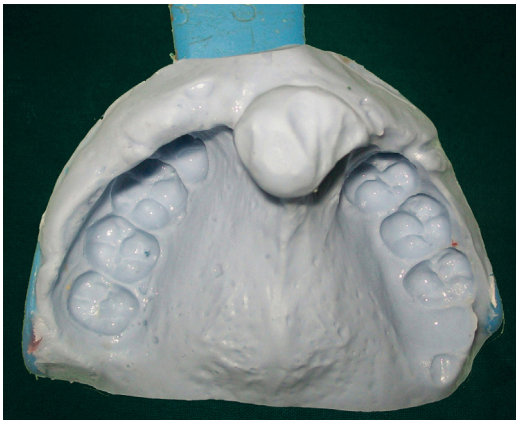


Fig. 11 – Primary impression made using irreversible hydrocolloid impression material.



Fig. 12 – Primary cast showing the maxillary defect.



Fig. 13 – Wax pattern fabricated in refractory cast.

Mouth preparation was done and final impression made using addition silicone impression material by putty wash technique. Master cast was made using dental stone, duplicated using agar duplicating material and refractory cast made using type V gypsum product. Wax pattern fabricated based on the proposed design (Fig. 13) and casted by cobalt–chromium alloy. Fit of the metal frame work was verified (Fig. 14) followed by try in and acrylization using heat activated acrylic resin (Acrylin-H) (Fig. 15).

3. Discussion

Management of patients with maxillary defects was a great challenge for the restoring prosthodontist because of compromised support and retention obtained from remaining oral structures. Moreover, the expectation level of the patients was often so high that it is not possible to achieve.[6] The case series described here explained the conventional way of rehabilitating the patients with maxillary defect. Various advancements have been evolved which overcome the pitfalls namely poor retention, lack of stability etc., associated with conventional removable prosthesis used for rehabilitation of patients with maxillary defects.



Fig. 14 – Checking the fit of the metal frame work.



Fig. 15 – Definitive obturator retained by embrasure clasp in 16–17 and 26–27.

One modification of maxillary prosthesis uses the hollow bulb obturator to close the defect. This has greatly reduced the weight of the prosthesis and enhances the function. Use of dental implants had greatly enhanced the retention and stability of the prosthesis and helped to improve the psychological makeup of the patients. In case of compromised ridges, the zigoma implants were also used to achieve the predictable results.[7] Institution of CAM-CAM technology in prosthesis fabrication results in dramatic improvement in the fit of the prosthesis, which further increases retention.[8]

In spite of the above-mentioned advantages associated with fixed prosthesis, removable prostheses most commonly used because of lack of adequate abutment, risk of osteoradionecrosis due to previous radiotherapy, fear of the patient toward further surgical intervention, and financial status of the patient. The drawbacks associated with management by removable obturator can be overcome by psychological counseling of the patient prior to the surgery.[3] Proper interaction between the surgeon and the Prosthodontic fraternity is also mandatory for the successful rehabilitation of the patient both from psychological and functional points of view.

Conflicts of interest

The authors have none to declare.

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