CASE REPORT

Maxillary obturator prosthesis for a hemimaxillectomy patient: A clinical case report

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Abstract This clinical report describes a comprehensive prosthodontic treatment of a young patient diagnosed with Odontogenic Myxoma. The treatment procedures included surgical removal of the tumor, immediate surgical plate, interim obturator, orthodontic treatment, and definitive obturator. The definitive prosthesis was 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.

1. Introduction

Treatment modalities of a malignant tumor in the maxilla are varied according to many factors such as; size, type, severity, etiology and location of the tumor. The most frequent treatment is surgical removal of the affected area which results in a large defect with oro-nasal/antral communication. In turn, these functional problems may affect the quality of life. Change in appearance resulting from the loss of tissue and underlying structures may also lead to emotional stress and depression. In addition, social phobia and anxiety tend to occur more often in patients who lose part of their maxillofacial complex than those who lose another part of their body as arm or leg or even both of them.

Rehabilitation of the patient presenting with a malignant tumor in the maxilla requires a multidisciplinary approach including surgical treatment, radio/chemotherapy, phonetic rehabilitation, physiotherapy, and prosthetic treatment. These defects can be repaired surgically using free microvascularized flaps or pedicled flaps. When there are large resections of the maxilla, the defect may be obturated with a dental or maxillofacial prosthesis. Support for this prosthesis can be gained either from the remaining teeth and tissues or using dental implants.

Reconstruction of the maxillectomy with an obturator has several advantages. Besides replacing the missing soft and hard mastication. In turn, these functional problems may affect the quality of life. Change in appearance resulting from the loss of tissue and underlying structures may also lead to emotional stress and depression. In addition, social phobia and anxiety tend to occur more often in patients who lose part of their maxillofacial complex than those who lose another part of their body as arm or leg or even both of them.

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Reconstruction of the maxillectomy with an obturator has several advantages. Besides replacing the missing soft and hard
tissues, it enables the patient to swallow, masticate, and speak approximately in the normal way, and forms a barrier between nasal and oral cavities. Other advantages include that the obturator can be removed from the patient’s mouth permitting for a clear vision and early detection of any recurrent tumor; and a better facial appearance can be achieved with the presence of the obturator where it can provide support for the tissues of the face.\textsuperscript{5,15,16}

Odontogenic Myxoma is an uncommon mesenchymal odontogenic tumor 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.\textsuperscript{17,18}

This present report describes a prosthodontic rehabilitation of a patient with Odontogenic Myxoma in the maxilla.

2. Clinical report

A young male patient aged 18 years presented to the Khartoum Dental Teaching Hospital (KDTTH) in Sudan complaining of a swelling in the left maxillary posterior region (Fig. 1). The involved teeth expressed no pain or mobility.

Clinical and radiographic examination was carried out. A biopsy was sent for investigation. The histopathologic result revealed an Odontogenic Myxoma involving the left maxillary posterior area. The patient was then referred to the graduate prosthodontic clinics at the University of Khartoum, Faculty of Dentistry for construction of a surgical obturator/plate.

The pre-operative impression was made using an irreversible hydrocolloid material (Hydrogum 5, Zhermack, Italy) in a modified perforated stock tray. The impression was poured with dental stone (Gyproc, Prevest Denpro, Jammu, India) to produce the positive template/cast. The cast was sent to the surgeon to delineate area of resection (Fig. 2), and an immediate surgical obturator was fabricated accordingly. In the operating room resection of the maxilla was done to remove the tumor (Figs. 3 and 4) and a surgical closure was attempted using the remaining and neighboring soft tissues. The defect was large and the available tissues were not sufficient to completely close the defect. The surgical obturator was inserted immediately after resection of the maxilla and held in position using Adam’s clasps on the remaining natural teeth (Fig. 5).

One week after surgery the patient came for review to rule out complications, and proper position of the plate was ensured. The patient presented with a hemimaxillectomy defect extending from the midline to the soft palate in the left side. Clinical intra-oral examination showed a small hollow remaining with an oro-nasal communication, while the remaining teeth, gingiva, and palate appeared within the normal limits. Crowding of the teeth in the canine region was observed and poor oral hygiene was noticed. Lack of oral hygiene may have been due to the inability of the patient to clean his teeth properly because of the plate in his mouth. Extra-oral examination showed a curved profile, an asymmetrical face, no deviation of the mandible, no palpable or tender lymph nodes, and a normal TMJ. Radiographic examination revealed that the supporting bone of the remaining teeth was normal and so was the crown root ratio. The defect was classified as Aramany class I defect. The patient was shown how to remove and replace the plate and how to maintain a good oral hygiene. Another appointment was arranged for one week later when a tissue conditioning material was applied to improve the fit and increase the comfort of the patient.

After two weeks the clinical intra- and extra-oral examination revealed a good initial healing at the defect site. The extra-oral suture was removed at the surgery department. The fabrication of an interim obturator was initialized. The usual steps in fabricating the conventional acrylic partial denture were followed (Figs. 6–10). The retention for this type of obturator was gained from the remaining teeth with wrought wire clasps on the teeth 11, 14, 16. In this stage, a buccal canine retractor was incorporated into the acrylic denture.

![Figure 1](image1.png)  
**Figure 1**  Intra-oral pre-operative view.  

![Figure 2](image2.png)  
**Figure 2**  Delineated area of resection.
base to move the canine down and palatally to be realigned in its correct position on the dental arch (Fig. 10). A follow-up system was scheduled for three months later. Tissue conditioner was applied as needed and a continuous activation of the buccal canine retractor was done. The patient was able to speak, swallow and maintain good oral health effectively.

Six months later the patient presented with good extra-oral healing. No significant disfigurement on the face was observed. The oral hygiene was obviously improved. After ensuring that the healing of the wound had taken place (Fig. 11), the treatment plan for the construction of the definitive obturator (a cast-metal removable dental prosthesis) was rolled out. At this stage the desired position of the canine was achieved (Fig. 15).

The primary impressions were made using irreversible hydrocolloid material (Hydrogum 5, Zhermack, Italy) and the primary casts were obtained. The maxillary cast was surveyed, the undercuts were observed and the necessary mouth preparations were done. For the design of the framework the tripod design was selected. For this design the rest seats were prepared on the right first and second molars, first premolar, and on the canine. A custom tray was constructed on the primary cast with cold-cure acrylic resin (Superacryl Plus, SpofoDental, Markova, Czech). Green stick compound (Tracing Sticks, kemdent, UK) 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). The framework was casted using cobalt-chromium alloy. This was tried in the patient’s mouth to evaluate the fit with the underlining structures, with the help of pressure indicator 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 semi-adjustable articulator (Whip Mix, Whip Mix Corporation, Louisville, USA). Acrylic denture teeth (Trubyte, Dentsply, Gloucestershire, England) were arranged and the prosthesis was tried to verify the occlusion with the mandibular teeth, esthetic appearance, and support for the underlying tissues. Then, the prosthesis was processed, finished, and polished in the usual manner (Fig. 14). At insertion, the pressure indicator paste (PIP) was used to inspect for any pressure area(s). The denture was inserted (Fig. 15) 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.

3. Discussion

Rehabilitation of patients with acquired maxillary defects is relatively simpler than rehabilitation of defects in the mandible, and pleasing as well as accepted outcomes can be identified at the end of treatment. On the other hand, great efforts should be given in dealing with large defects to obtain the substantial requirements for retention and support of the prostheses.19

The infiltrative nature and pattern of Odontogenic Myxoma in the maxilla makes it difficult to remove completely, which can explain the high recurrence rate of this type of tumor.20–22 For this reason, rehabilitation with prosthetic obturator is preferred.11,16 Moreover, in less-developed countries, like Sudan, the economic factor plays an important role which should be taken into account during treatment decision.23 Our patient had a low financial income making it difficult for him to meet more advanced treatment modalities.

Prosthodontic rehabilitation of maxillary acquired defects could be organized into three stages of treatment. For each step a different type of obturator is fabricated.19
3.1. Immediate surgical obturator/plate

This type of appliance is constructed from an impression obtained prior to the operation day and inserted at the conclusion of resection of the maxilla. Many benefits of using immediate surgical plate can be gained including: provision of a stable matrix for the surgical packing; it can form a barrier between the oral cavity and wound during the initial healing; it enables the patient to speak and swallow more effectively. The major deficits and difficulties that occur after resection may have a psychological impact on the patient that may be alleviated by the presence of the surgical plate.  

For this case, the immediate surgical plate was fabricated before surgery and inserted at the day of surgery immediately after resection. No teeth were added and the retention was gained from the remaining teeth. Occlusion between the remaining upper and lower teeth, without any obstruction, was ensured.

3.2. Interim obturator

Two weeks after resection, the construction of interim obturator can be started. This type is totally acrylic incorporated with stainless steel wrought wire clasps engaging the remaining teeth for the purpose of retention. The patient should be seen every two weeks as the healing of the soft tissues in defect side exhibits more progress and lining materials can be placed. In this case, fabrication of the interim obturator
was performed two weeks after the surgery. Retention was gained from the remaining teeth by incorporating wrought wire clasps in the form of Adam’s and C-clasps. Acrylic denture teeth were added and a light contact with the opposing teeth was ensured. Orthodontic movement of the canine was achieved using a buccal canine retractor incorporated into the denture base of the interim obturator. The position of the canine was checked periodically and the retractor was activated as needed.

3.3. Definitive obturator

The definitive obturator should not be constructed until the defect site is completely healed and is dimensionally stable. This may take from 3 to 6 months after surgery varying according to many factors e.g., prognosis of the tumor, size of the defect, healing progress and presence or absence of teeth. Designs for this type of obturators may vary based on the classification system of the defect. For this case, a tripod design was selected. Support was gained from the remaining teeth and palate. Rests were placed on the molars, first premolar, and canine. Full coverage of the remaining palate was decided to ensure maximum distribution of the functional load.

Quality of life of patients with maxillary defects could obviously be improved with the provision of a properly designed obturator. The prosthetic obturator can restore mastication, swallowing, esthetic particularly the midface, resonance and speech. Patients with maxillofacial defects who undergo rehabilitation can resume their social habits in the normal way. 7,8,26,27

4. Conclusion

A proper diagnosis and a well-designed treatment plan will result in pleasant outcomes. Rehabilitation with obturator prosthesis appears to be a functional and effective treatment modality. This paper discussed the prosthetic treatment of acquired maxillary defect with one piece definitive obturator.

Conflict of interest

There is no conflict of interest.

References


