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## CASE REPORT

# Rehabilitation of a Patient with Partial Maxillectomy: A Case Report

Meriem Ouaalla , Khadija EL Assraoui, Rajae Zeroual, Samira Bellemkhannated  
Department of Removable Prosthodontics, Faculty of Dentistry, Hassan II University, Casablanca, Morocco

### ABSTRACT

The loss of maxillary bone is accompanied by serious functional, aesthetic, psychological, and social problems. The maxillofacial obturator prosthesis remains a therapeutic tool that improves aesthetics and restores the various functions of chewing, swallowing, and phonation.

A tight collaboration between the maxillo-facial surgeon and the dentist is essential to obtain an optimal prosthesis both functionally and aesthetically, thus allowing a socio-professional reintegration of the patient.

The rehabilitation of a maxillary defect and the partially edentulous patient goes through three stages. First, an immediate obturator prosthesis is realized, then the secondary obturator prosthesis accompanies the healing process, and finally, the definitive obturator prosthesis.

This paper describes a clinical report of different steps to fabricate a partial denture with an obturator in a partially edentulous patient with a maxillary defect.

**KEYWORDS:** Maxillectomy, partially edentulous patient, maxillary defect.

**Correspondence:** Dr. Meriem Ouaalla, Department of Removable Prosthodontics, Faculty of Dentistry, Hassan II University, Casablanca, Morocco. Email: [dr.ouaalla@hotmail.com](mailto:dr.ouaalla@hotmail.com)

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### INTRODUCTION

The loss of substance secondary to otolaryngological and cervico-maxillofacial cancer resections causes complex rehabilitation problems. A multidisciplinary approach involving surgeons, plastic surgeons, odontologists, radiotherapists, psychiatrists, orthophonists, and prosthetists is necessary.

These excisions concern many anatomical structures. As a result, there are extensive functional (respiration, phonation, mastication) and aesthetic disorders with psychological and relational repercussions [1, 2, 3].

With the damage created, the rehabilitation of the defect is required. It is done by surgical procedures (flaps, bone grafts) or prosthetic rehabilitation [4].

Despite the advances in surgical reconstruction and microsurgery, the conventional obturator prosthesis remains the ideal therapeutic solution in some particular clinical situations to overcome the consequences of maxillectomy. The role of this prosthesis is to restore function, aesthetics and improve the psychological condition of the patient [5].

The obturator prosthesis must be designed to respect the requirements of Housset's triad (sustentation, retention, and stabilization), in addition to the need to establish tightness by using an obturator [6, 7].

This present case report describes steps of fabrication of a definitive removable partial denture where the cast framework served as an impression tray for the obturator.

### CASE REPORT

A 34-year-old male patient was referred to the department of prosthodontics for postsurgical rehabilitation of an acquired maxillary defect.

Patient history revealed that he had been treated for an Adenoid cystic carcinoma of the left maxillary sinus with partial excision of the upper left maxillary bone (Figure 1). The patient complained of difficulty in mastication, nasal regurgitation of fluids, the nasal tone in her voice, and facial asymmetry.

Intra-oral examination showed a partially edentulous maxilla CL-II of Kennedy [8], and the defect was classified as Aramany's class IV defect with a curved arch form [9]. All teeth were present on the opposite side of the arch (Figure 2).

The patient's existing palatal obturator plate was fabricated immediately after surgery (Figure 3).



**Figure 1:** Extra-oral view of the maxillary defect.



**Figure 2:** Intraoral I view of the hemi-maxillectomy defect.



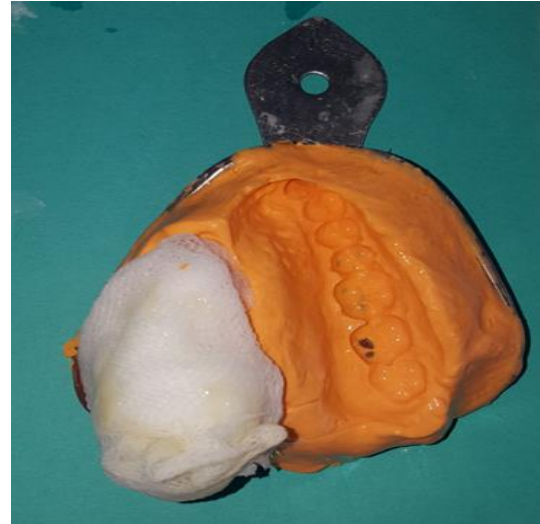
**Figure 3:** Temporary obturator plate.

**Treatment Plan:**

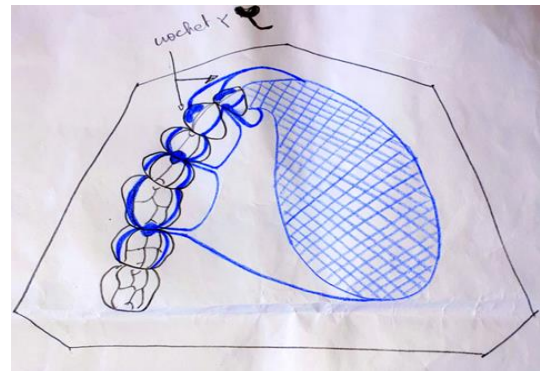
Various treatment options were given, and the patient opted for a removable partial denture obturator with a cast metal framework. A preliminary impression was made with irreversible hydrocolloid using the perforated stock tray after filling the defective area with gauze, lubricated with petroleum jelly. (Figure 4).

The impression was poured using a dental stone, and a diagnostic cast was obtained. These casts were surveyed then the framework was designed.

The design included a full palate central connector, 'Y' bar retentive clasp on 12, 13, and embrasure clasp on 14, 15 & 16, 17 (Figure 5).



**Figure 4:** Primary impression.



**Figure 5:** Framework design.

The necessary preparation of abutment teeth has been carried out, and the impression was made with an irreversible hydrocolloid. The cast metal framework, which will be used as a custom tray for the appearance of the defective area, was fabricated (Figure 6).



**Figure 6 :** Metallic framework.

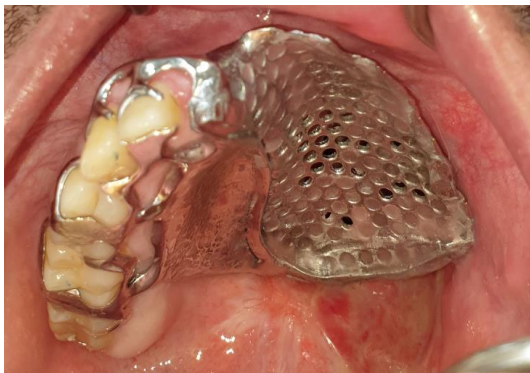


The framework is tried in the patient mouth. A trial impression is made using a pressure indicator to ensure no impingement on the underlying soft tissue. If any pressure spots are noted, they should be removed [10] (Figure 7).

**The imprint of defects area:**

An ambulatory impression was made with a tissue conditioner that registered in a few days the state of the mucous surface, the area around the loss of substance, and the peripheral structures during physiological functions [10-11] (Figure 8).

After three days in the oral cavity, a Pick-up impression was made over it with an irreversible hydrocolloid perforated stock tray (Figure 9). The model was poured, and the intermaxillary relation was registered and transferred to an articulator. The teeth were placed on the metal framework, and a wax try-in was performed (Figure 10).



**Figure 7:** Try-in of cast partial denture framework.



**Figure 8 :** Functional Ambulatory Impression of the defects area.



**Figure 9:** Pick-up impression.



**Figure 10:** Waxed up Prosthesis.

After the trial, the wax obturator was treated in a conventional manner. The finishing and polishing of the obturator prosthesis were carried out (Figure 11a). Subsequently, the obturator was relined with a permanent soft liner to fill the lateral defects (Figure 11b). It was then inserted into the patient's mouth after intraoral adjustments (Figure 12).



**Figure 11.a-**Finished prosthesis



**11. b-** The permanent obturator with soft liner.



**Figure 12:** Intraoral view of the obturator removable partial dental prosthesis.

The patient was examined periodically for 12 months. He was very satisfied with his prosthesis both functionally and aesthetically (Figure 13).



**Figure 13:** Smiling profile of the patient before and after installation of cast partial denture.

## DISCUSSION

Surgical resection of tumors of the maxilla and paranasal sinuses causes the loss of bone and teeth [12]. The resultant acquired palatal defects are associated with major speech, swallowing, and chewing difficulties. These functional problems can affect the quality of life [13]. The appearance change resulting from the loss of underlying tissue and structures can also lead to emotional stress and depression [14].

Prosthetic rehabilitation is preferable to reconstructive surgery in some cases, especially for patients who have

malignant tumours since it facilitates inspection of residual tissue after surgery. Indeed, a possible recurrence can be detected early in these patients in the post-operative period, which is not clinically easy after reconstructive surgery [13,15].

Following such resections, the support, retention, and stability of the removable partial denture acting as an obturator depend on the remaining hard and soft tissues [12].

The structures in the remaining maxilla amenable to providing obturator retention are limited to the remaining natural teeth, the borders, and the undercut areas within the defect [16].

The larger a surgical resection, the greater the loss of support and, therefore, the higher the unfavorable forces were acting on the remaining teeth.

It is very important to keep a significant number of teeth after resection. It will reduce movement around the fulcrum line under function. Square or tapering arch form creates less of a linear arrangement of the dentition, improves the location of the fulcrum line, and increases the effectiveness of the indirect retainers. But this is not always possible. [12].

A proper diagnosis and a well-designed treatment plan will result in pleasant outcomes [14].

Improper design and construction of the obturator prosthesis can cause pathological stresses on the remaining hard and soft tissues, leading to premature loss of the abutment teeth and chronic soft tissue irritation. There are intrinsic areas within and around the defect that may provide retention and stability of the obturator itself. These include the residual soft palate, the residual hard palate, the anterior nasal aperture, the lateral scar band, and the height of the lateral wall. The mechanical retention of obturators can also be increased by engaging undercuts around the edges of the defect [16].

Contact of the obturator portion of the prosthesis with the medial line of resection, the anterior and lateral walls of the defect, the pterygoid plates, and the residual soft palate minimizes anteroposterior, mediolateral, and rotational movement of the prostheses.

The bracing components of the prosthesis framework are also used to minimize movement in all three directions [16].

The basic principles of the design of removable partial dentures should be reviewed when designing the framework for an obturator. Major connectors should be rigid [17], occlusal rests should direct occlusal forces along the long axis of the teeth, guide planes should be designed to facilitate stability, and direct retainers should provide bracing and retention.

All these elements must respect the physiological limits of the periodontal ligament of the abutment teeth [18, 12].

In this case, the cast framework serves as an impression tray for the obturator portion extending into the surgical defect.

This technique provides a differentiated impression of the defect area by reducing the displacement of the bearing surface tissue. In addition, the impression material is better transported into the defect area.

The use of a framework as an impression trial allows obtaining approximately the same insertion axis of the obturator and the metal framework [10].

The support was gained from the remaining teeth and palate. Maximum distribution of support was achieved by incorporating more of the remaining teeth into the framework's design and maximizing the use of occlusal and cingulum rests.

Rests were placed on the molars, premolars, canine and lateral incisor, a Y-clasp on the teeth immediately adjacent to the resection; two embrasure clasps with buccal retainers; and retentive undercuts of 0.25 mm.

Full coverage of the remaining palate was decided to ensure maximum distribution of the functional load [14]. Regarding the defective area, the metal plate has a retention grid. [19].

The cingulum rests direct occlusal forces toward the long access of the tooth and helps prevent the framework from moving in a lingual direction or toward the defect. For these reasons, cingulum rests are the recommended rests in the anterior region for these resections [12].

The occlusion has a very important impact on the stability of the prosthesis. The reasonable choice of the occluso-prosthetic concept, the use of stabilizing elements of the metal frame, and the elimination of premature contacts reduce the stress created by the lateral forces [16].

The left side naso-maxillary region of the presented case was depressed due to bone loss which was evident on further oral examination.

The role of prosthetic rehabilitation was not only to restore function but also to improve aesthetics after surgery. During the maxillo-mandibular relations recording phase, it was taken into consideration to reproduce proper lips support that had disappeared after surgery using the occlusion rim.

Post-treatment photographs of the patient showed a marked improvement in aesthetics.

The obturator prosthesis allows aesthetic and functional rehabilitation by replacing the missing teeth and restoring the depressed facial region and the masticatory function [20].

Good oral hygiene education using chlorhexidine-based mouthwashes and compliance with follow-up visits increase the success and survival rate of the oromaxillary obturator [21].

## CONCLUSION

Rehabilitation of deficiencies after a maxillectomy with an obturator is beneficial for the patient because it allows restoring aesthetics and function, such as chewing, swallowing, and speaking, by creating an anatomical barrier between the oral cavity and the nasal and/or sinus cavity. The patient's quality of life with maxillary defects could be improved by placing a well-designed, stable, and retentive obturator. They are rehabilitating the patients aesthetically and functionally, allowing them to live their lives as close to normal as possible.

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## AUTHORS' CONTRIBUTIONS

The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the [Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals of the International Committee of Medical Journal Editors](#). Indeed, all the authors have actively participated in the redaction, the revision of the manuscript, and provided approval for this final revised version.

## COMPETING INTERESTS

The author declare no competing interests with this case.

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## PATIENT CONSENT

Written informed consent was obtained from the patient for the publication of this case report.



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