

Partial removable prosthesis in a patient with unilateral maxillectomy: A case report

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Case Report

Abstract

BACKGROUND AND AIM: Maxillofacial defects due to malignant or benign tumors or congenital defects often result in complications such as the impairment of facial aesthetic, mastication, speech, and swallowing. Remedy of these defects, especially in a dentate patient is an important challenge in prosthodontics. Maxillectomy can lead to severe anatomical changes following tumor resection and reconstruction such as decreasing skeletal soft tissue support. The present study describes an implant-supported obturator in a dentate patient.

CASE REPORT: The present study indicates an obturator prosthesis in a 58-year-old patient with hemimaxillectomy (Aramany's Class 1 defect) undergoing the treatment of mucoepidermoid carcinoma of the right palate. The research describes clinical and laboratory procedures in rehabilitation of a dentate patient with tooth, tissues, and implant-supported obturator.

CONCLUSION: In dentate patients, the maxillectomy requires careful planning for removable partial denture (RPD) framework design to achieve the best retention and soft tissue supporting. The patient was satisfied with her prosthesis in the mean aesthetic, phonetic, and swallowing aspects.

KEYWORDS: Palatal Obturators; Reconstruction; Maxillectomy; Maxillofacial Prosthesis

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Congenital defects in maxilla lead to relationships of maxillary sinus and oral cavity, oropharynx and nasopharynx, resulting in the loss of facial aesthetic, problems in swallowing and speech, and also a significant decrease in the quality of life.¹⁻⁴ Recent studies indicate that most of the maxillofacial surgeons prefer the treatment of cancer patients with jaw resection than the radiotherapy or chemotherapy.^{5,6} Maxillectomy can lead to severe anatomical changes after the tumor resection and reconstruction such as decreasing skeletal soft tissue support.² There are many options for maxillary reconstruction including prosthesis obturators, non-vascularized grafts, local flaps, regional flaps, and microvascular free tissue transfer.⁷

The most frequent option for maxillary reconstruction is an obturator prosthesis that makes a barrier between nose and oral cavity⁸ to prevent the liquid leakage into nasal cavity and hyper nasal speech.⁹ Maxillary defect obturators should restore the mastication, facial contour, face appearance, and swallowing.¹⁰ Unilateral maxillectomy obturators either total or subtotal are challenging for prosthodontics. A successful obturator depends on defect size and remained soft and hard tissues that are involved in the prosthesis stability and supporting.¹¹⁻¹³ The obturator weight can act as a dislocating force, and thus the prosthesis should be as light as possible.¹²

For the reconstruction of maxillary defects, obturators should restore the mastication, speech, deglutition, facial contours, and

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dental appearance. Clinicians need to provide a comprehensive treatment planning and sound physiological design principles for a removable partial denture (RPD) in order to achieve it for partially-edentulous patients. We should evaluate the periodontium status, conditions of remaining teeth, and abutment occlusion and remaining dentition. Size and quality of defect, accessibility to defect, maximum mandibular opening, and oral and soft tissue changes due to the radiation therapy should be considered in the design planning. Factors such as patients' age and aesthetic demands, medical conditions, tumor prognosis, motivation, and manual ability may affect the overall treatment plan. Clinical conditions are important factors in designing a practical and affordable RPD that fulfills patients' functional needs and demands.¹⁰ The present clinical report indicated a unilateral maxillectomy obturator in a dentate patient with implant and teeth for maximum retention and support.

Case Report

A 58-year-old woman with a hemimaxillectomy defect was referred to the Department of Prosthodontics at Tehran University of Medical Sciences, Tehran, Iran, for the prosthetic reconstruction of palatal defect. The patient's major complaints included the impaired speech, aesthetic, and mastication, leakage of food and liquid from the oral cavity into the nasopharynx, and also the lack of retention and stability of the surgical obturator. The patient had a history of mucoepidermoid carcinoma of the maxillary sinus that was treated by a unilateral maxillectomy followed by the post-surgical radiation therapy a year earlier.

According to Aramany, the defect was classified as a Class I curved arch form.¹⁴ Extra-oral examination revealed that the right side of her face slightly depressed inwards and also had an asymmetric smile line that built an unaesthetic appearance. An intraoral examination indicated a large unilateral defect extending from left incisor region to

the soft palate (Figure 1).



Figure 1. Preoperative maxillary occlusal view (palatal defect)

The patient had 8 viable maxillary teeth (from left central incisor to left third molar) and a mild periodontal disease. The lower arch was completely dentulous. She had a surgical obturator. The teeth examination indicated the left maxillary second and third molars and first mandibular molar with periapical abscesses, and they were hopeless. Mandibular right bridge did not have any proper level (Figure 2).



Figure 2. Preoperative mandibular occlusal view

Since the improper occlusion can affect the maxillary obturator stability, changes were considered in the mandibular bridge and right mandibular occlusal plan correction. Extraction of hopeless teeth and implant insertion in the maxillary left second molar was considered in the treatment plan.

An interim obturator was fabricated according to surgeon's recommendation three months after the radiotherapy completion.

An interim obturator was first built (Figure 3). All treatments were done such as the hopeless teeth extraction, changing the mandibular right bridge, and insertion of implant in maxillary left second molar.



Figure 3. Interim obturator

The fixture level impression was built six months after the implant insertion. The obturator pass of insertion with implant and framework was checked by attaching impression coping to analog in the cast.

The partial denture was designed based on general principles of a partial denture design. The research considered the mesial occlusal rest and circumferential clasp on the left first premolar and the embrasure rest and embrasure clasp on the left first molar and second premolar. A positioner was inserted with 4.8 mm diameter and 3 mm gingival height, and the final torque was applied in patient's mouth. Border molding was done by Green Compound Stick (Kerr, KAVO, USA) in borders and the defect was molded with ISO Functional Compound Material (GC, USA) (Figure 4). During the border molding, the patient was asked to perform the following movements: exaggerated head movements by turning right to left, opening and closing mouth, and swallowing.¹⁵ Impression was made with additional silicone (Monopren, Kettenbach, Germany) by a special tray after preparing rest seats.

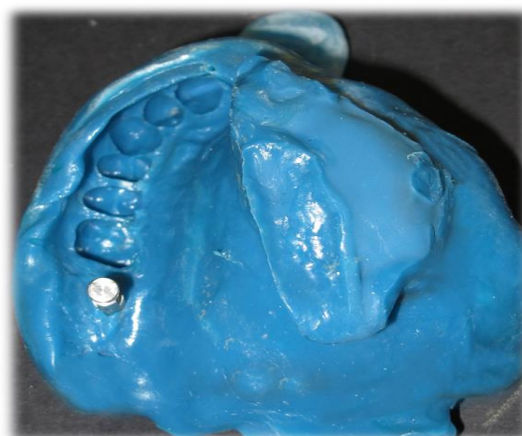


Figure 4. Implant level closed tray impression

Laboratory procedures consisting of beading, boxing, and casting were done, and master and duplicate casts were relieved and blocked out. Framework design was waxed on a duplicate cast. Framework laboratory procedure consisting of the sprue insertion, investing, casting, finishing, and polishing were done. Complete framework path of oral insertion was checked in patient by the chloroform rouge. Occlusal record was done by an acrylic base attached to the framework. Wax rim was adjusted based on the lip support, smile line, V, F, and S sounds. Maxillary record was transferred to the articulator with face bow. Teeth were selected according to color and shape of the remaining teeth. Group function occlusion was also considered. The occlusal adjustment was done in articular and oral cavity after the whole laboratory procedures (Figures 4-12).



Figure 5. Abutment level closed tray final impression



Figure 6. Relief and block out

The patient was instructed in hygiene procedures, and follow-up appointments were recommended to evaluate the denture fit and oral mucosa.



Figure 7. Refractory cast

The obturator treatment provided the patient's aesthetics, proper retention and speech, and no penetration of water and foods into nose, and generally fulfilled the patient satisfaction.

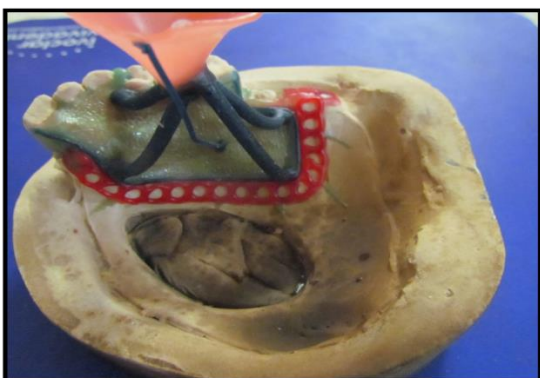


Figure 8. Sprue placement



Figure 9. Partial denture implant-assisted framework

Discussion

Reconstruction of maxillectomy cases is challenging for clinicians and patients. Factors such as size of the defect and its extension, number and quality of the remaining teeth, and quality of available bone play important roles in choosing the best treatment plan.^{16,17}



Figure 10. Occlusal recording

Radiotherapy has side effects and complications such as hyposalivation, decreased or loss of taste, xerostomia, decreased prosthetic restoration tolerance, compromised bone remodeling, and trismus.¹⁸



Figure 11. Final set-up and waxing

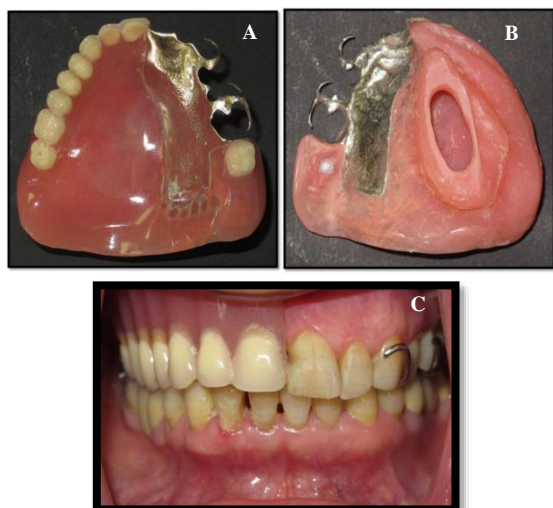


Figure 12. Final prosthesis from external view (A), internal view (B) and in mouth (frontal view) (C)

There was limitation in mouth opening in patients' with maxillectomy due to the secondary intention healing and formation of scar tissue after the radiotherapy.¹⁹

This case was Class II arch form, that edentulous area was unilateral from upper right central to posterior area. In the present case, support achieved from the left canine and first molar and edentulous area. In traditional design for partial removable prostheses, circumferential clasp, cast I bar, and wrought wire were used to achieve retention from the nearest abutment tooth

from the missing area.²⁰

The advantages of maxillofacial prostheses included the improved mastication, swallowing, and speech, improved social life after surgery, easy removal of obturator in order to examine the prosthesis' underneath tissues, and ease of use by patients.²¹

Conclusion

In dentate patients, the maxillectomy requires careful planning for RPD framework design to achieve the best retention and soft tissue supporting. In the present clinical report, we made an obturator with a RPD which was implant, tooth, and tissue-supported. We followed all the principles of RPD design to maximize the retention and support, which is very crucial in such patients. We also used tissue conditioner in order to have maximum use of tissue undercuts without too much force on remaining teeth. The patient was satisfied with her prosthesis in the mean aesthetic, phonetic, and swallowing aspects.

Conflict of Interests

Authors have no conflict of interest.

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