OLGU SUNUMU CASE REPORT

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New Treatment Approaches for Patients Who Have Extensively Resected Maxillae

Geniş Maksiller Rezeksiyonu Olan Hastalarda Yeni Tedavi Yaklaşımları

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ABSTRACT Prosthetic treatment of the maxillectomy cases are difficult due to the problems to perform sufficient retention, stability and aesthetic. Separation of the oral and nasal passages, impairment of mastication, esthetic and phonetic problems are the main goals of treatment. In this study, the prosthetic treatment of the subtotal maxillectomy patient, who is diagnosed with adenoid cystic carcinoma was described. A patient-specific obturator was fabricated for problems regarding to reduced crest support stabilization and retention. The retention was obtained by certain parts of the obturator, one which is actively engaged to the defect undercuts and one which was designed for the limited opening of the patient's mouth. A latex tube was used for retention which was ligatured, using a 0.1 mm orthodontic wire, around a neighboring bulb portion which suits the defective undercut region. Due to the limitation of mouth opening, the obturator is designed to have a short bulb extension which is attached to the acrylic prosthesis base.

Keywords: Maxillofacial prosthesis; obturator; maxillectomy; hollow bulb

ÖZET Tutuculuk, stabilite ve estetiğin sağlanmasındaki problemlerden dolayı maksillektomi olgularının protetik tedavisi zor olabilmektedir. Tedavide amaç; oral ve nazal pasajları ayırmak, fonksiyon, fonasyon ve estetiği sağlamaktır. Bu çalışmada, adenoid kistik karsinom tanısı konulan subtotal maksillektomi hastasının protetik tedavisi anlatılmıştır. Azalmış kret desteğiyle stabilizasyon ve retansiyon problemi için özel bir obtüratör imal edilmiştir. Obtüratörün defekt "undercut"larına aktif olarak yerleşen bölümleri ile tutuculuk sağlanmış ve hastanın sınırlı ağız açıklığı için özel obtüratör bölümü tasarlanmıştır. Retansiyon için özel lateks tüp kullanılmış ve defektteki uygun "undercut" bölgesine komşu olan bulb bölümünün etrafına 0,1 mm kalınlığında ortodontik tel ile sarılarak bağlanmıştır. Sınırlı ağız açıklığı nedeniyle akrilik protez tabanına takılan kısa bulb uzantılı obtüratör tasarımı geliştirilmiştir.

Anahtar Kelimeler: Maksillofasiyal protez; obtüratör; maksillektomi; hollow bulb

Maxillofacial deformities may occur due to congenital, developmental or acquired defects.[1] Total or partial resection of maxilla is the most common treatment choice for congenital defects, traumatic etiologies or neoplastic diseases.[2] By prosthetic reconstruction, it is able to restore chewing and swallowing functions, separate oral and nasal cavities, support orbital floor, protect tissues and rehabilitate midfacial aesthetics. Obturator prostheses are used to rehabilitate maxillofacial disorders and play a main role in the prevention of fluid or food leakage between oral and nasal chambers, hypernasal speech resulting in reintegrating the patients back into their social lives.[3]

The most challenging parts of the fabrication of an obturator prosthesis are related to the retention, stability or esthetic. The defect size, existing undercuts, supporting teeth and the remaining oral tissues affect the design of the prosthesis.[4,5]

This case report describes the prosthetic rehabilitation of an edentulous partial maxillectomy patient with a limited mouth opening using a patient-specific obturator prosthesis with reduced bulb extension.

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CASE REPORT

A 68-year-old man was referred to Ondokuz Mayıs University, Faculty of Dentistry, Department of Prosthodontics. According to his medical history, he was diagnosed with adenoid cystic carcinoma, underwent subtotal maxillectomy operation and received radiotherapy after resection. He was not suitable for implant surgery because of insufficient bone volume, systemic problems and limited mouth opening. For this patient, the treatment plan was a maxillary obturator prosthesis and a mandibular complete denture. Written informed consent form was obtained from the patient.

The maxillary crest support was not adequate therefore, it was planned to use retentive undercuts in the defect area to obtain adequate retention for the patient (Figure 1).

Furthermore, a specific obturator portion was planned to increase the retention and stability of maxillary prosthesis. A latex tube was used for retention which was ligatured, using a 0.1 mm orthodontic wire, around a neighboring bulb portion which suits the defect undercut region. The location of the defect and maxillary dental arch impression had been recorded separately because of the limited mouth opening (32 mm). The defect was isolated using a sponge-gauze coated with petroleum jelly to prevent the impression material from flowing into the airway. The anatomical impression of the defect area and dental arch were taken with irreversible hydrocolloid (Palgat QuickPlus, 3M ESPE, Seefeld, Germany). To prepare individual acrylic resin tray which extend to palatal defective area, models were poured with Type III dental stone (Giludur; BK Giulini, Ludwigshafen, Germany) (Figure 2). The defect region outlines and

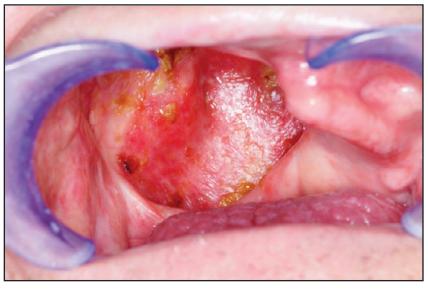

FIGURE 1: Intraoral view of the defect area and edentulous right maxillary crest.

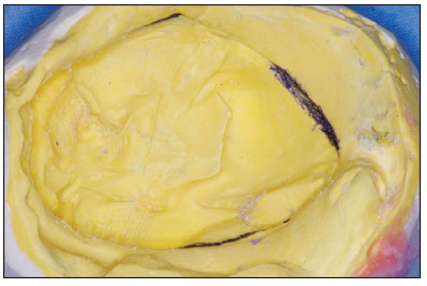

FIGURE 2: Highlighted undercut areas in the maxillary model.

dental arch functional shaping were done with modelling plastic impression compound (Kerr, Salerno, Italia). A second impression was obtained by using an irreversible hydrocolloid and poured again. As a final impression of undercuts and nasal cavities in defect area, an individual impression tray was prepared by a base plate (Cavex dental baseplates; Cavex, Haarlem, The Netherlands) and undercuts of the defect area were recorded with irreversible hydrocolloid.

The obturator part of maxillary prosthesis was prepared by heat-polymerized acrylic resin (Paladent 20; Heraeus Kulzer GmbH, Hanau, Germany), and the obturator portion neighboring the fibrous tissue undercut areas were designed in a concave manner and a latex retentive tube was secured using an orthodontic wire around this portion (Figure 3, Figure 4). The aim was to pass through the undercuts easily, then return to its former state and provide retention and stability. The patient's centric and vertical relationships were recorded, acrylic teeth were arranged in accordance with bilateral balanced occlusion and conventional prosthesis finishing procedures were done (Figure 5).

The finished removable prosthesis were controlled in the jaws (Figure 6, Figure 7). Then the obturator portion and the maxillary prosthesis design was placed into the mouth. After seeing that the design was suitable, the obturator and maxillary prosthesis parts were held in occlusion. A small amount of autopolymerized acrylic resin has been used to fix these 2 parts (Figure 8, Figure 9). The fixed connection was strengthened extraorally using heat-polymerized acrylic resin.

Functional requirements such as occlusion, stabilization, and chewing efficiency were evaluated, and the path of insertion was adjusted so that all the parts of the obturator and prostheses were correctly oriented to the defective region. The quality of the phonation and the excessive forces in the undercut areas were controlled.

There was no pain, hypernasal speech, or liquid leakage observed from the mouth, the nose, etc.

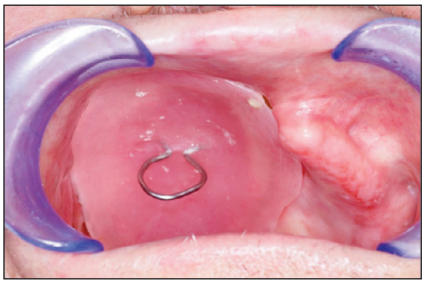

FIGURE 6: Obturator part which was inserted to the defect.

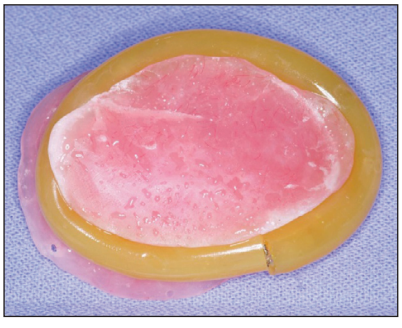

FIGURE 3: Superior side of the obturator part which surrounded with a latex tube.

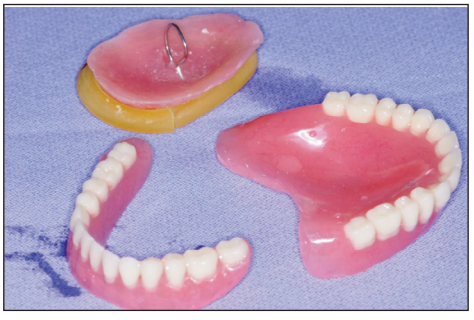

FIGURE 7: All parts of the prosthesis.

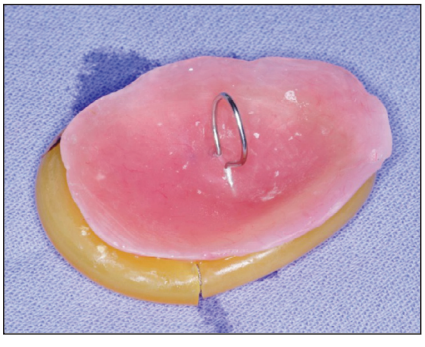

FIGURE 4: Inferior side of the obturator. Orthodontic wire used to fix between obturator and maxillary prosthesis parts.

FIGURE 8: Combined maxillary complete and obturator parts.

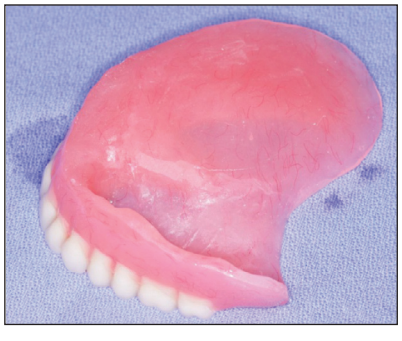

FIGURE 5: Maxillary complete prosthesis part.

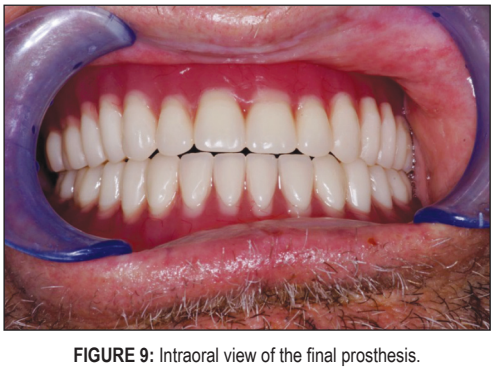

FIGURE 9: Intraoral view of the final prosthesis.

The patient has been informed about the use and maintenance of the prosthesis. The patient was checked on a weekly basis.

At the first follow up session, the pressure areas in the soft tissues were eliminated, according to the irritation zones, and the liquid leakage was minimal due to the latex tube design. The care and function of the prosthesis were explained again. The patient was very satisfied and pleased with his improved function, speech and esthetics. He was recalled for 2 times after the first and the third month.

No major complications or ulceration were encountered.

DISCUSSION

In addition to the general prosthesis rules, special techniques and plans should be made for each maxillo-facial prostheses patient. In practice, it is emphasized that obturator portion must be placed tightly in the defective area of the nasal passage to prevent air, fluid and food leakage. However, this tight relation can cause increased irritation in the soft tissues contact with the obturator portion and oral function deteriorates.[6] The retention for the edentulous patient with the large maxillary defect and the loss of soft-tissue support is obtained through these engaging key areas within the surgical defect.[7] This means that the undercut areas are reproduced and used at maximum level. Obturator prostheses are usually tried to be extended in transversal, vertical and horizontal directions.[5] Unfortunately, this increases volume and weight of the obturator. In particular, the superstructure causes an increase in the height of the medial wall therefore reaching the defective area of unwanted forces caused by occlusal movements.[8] Hence, undercut areas of large obturators and remaining support tissues are subjected to repeated intense stress, causing loss of oral functions and discomfort of the patient. In this aspect, obturators are preferred to be lightweight.[9]

The obturator design should be one piece, if possible, to provide better colour matching and maximal patient acceptance. It should always be closed superiorly.[10] There are two design of obturators: 1-hollow bulb (closed bulb) 2-buccal extension (open bulb).[11] There are many advantages and disadvantages of both forms. To make and adjust an open bulb obturator is easy. But it is known that open bulb obturators cause putrefaction and hygiene problems due to accumulation of nasal secretions as compared to hollow bulb obturators.[12] If the obturator is left open, nasal secretions accumulate leading to odour and added weight. The other disadvantages of an open bulb obturator include difficulty in polishing and cleaning the internal surface, from saliva, mucous crusts, food accumulation (unhygienic, foul smelling), and the inability to obtain support from the superior aspect in the defect area. Nearby the hollow bulb obturators had a negative effect on quality of speech by blocking the nasal resonance chamber, but are more effective in terms of cleanability and stability.[12-14] According to reports, the weight of the obturator can be reduced by 33.6% by choosing a hollow bulb design in the choice of obturator.[14] By closed bulb design, their weight is reduced. In addition to the obturator design, the size of the defective area and the anatomical neighborhood are important. Such patients have difficulty in inserting and removing obturators made of hard acrylic with conventional treatment method and this process is causing trauma in the defect area which becomes more problematic when the lack of manipulation is added.[15]

In this case, a patient-specific obturator was designed with a simpler use due to the patient's inability to have implant surgery and his limited mouth opening. A latex tube is attached to the concave obturator portion neighboring the fibrous undercut area of the defect by means of a ligature wire passed through it. By this design; it is intended to provide the maximum retention from the undercut areas and minimize the irritation in non-keratinized tissues by reducing the pressure forces transmitted to the side walls of the defect. With the alternative treatment method we have designed, speech quality of the patient has been improved and both light and cleanable prosthesis has been made.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Murat Yenisey, Gözde Özköylü Özil;* ***Design:*** *Murat Yenisey;* ***Control/Supervision:*** *Göknil Ergün Kunt, Murat Yenisey, Gözde Özköylü Özil;* ***Data Collection and/or Processing:*** *Göknil Ergün Kunt, Murat Yenisey;* ***Analysis and/or Interpretation:*** *Göknil Ergün Kunt, Gözde Özköylü Özil, Murat Yenisey;* ***Literature Review:*** *Gözde Özköylü Özil;* ***Writing the Article:*** *Göknil Ergün Kunt, Murat Yenisey;* ***Critical Review:*** *Göknil Ergün Kunt, Murat Yenisey;* ***References and Fundings:*** *Göknil Ergün Kunt, Murat Yenisey;* ***Materials:*** *Gözde Özköylü Özil.*

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