BULLETIN OF STOMATOLOGY AND MAXILLO-FACIAL SURGERYIN OF STOMATOLOGY AND MAXILLO-FACIAL SURGERY Vol 19, No.2

DOI: 10.58240/1829006X-2023.19.2-82

FEATURES OF CONTROLLED WOUND HEALING AND ORTHOPEDIC TREATMENT IN BILATERAL RESECTION OF THE UPPER JAW. CASE REPORT

Karen Mashinyan PhD,[2]* Sergo Hovhannisyan PhD [1], Artavazd Kharazian[3] DDS, Suzan Srapyan[4],Ruzanna Bragunova[5] PhD

1 Associat professor, Department of Prosthodontics, Yerevan State Medical University after M. Heratsi, Armenia
2 Associat professor, Department of Prosthodontics, Yerevan State Medical University after M. Heratsi, Armenia
3. Dental Art Systems, Director, maxillofacial prosthodontist, anaplastologist, Russia
4 Clinical Resident, Department of Prosthodontics, Yerevan State Medical University after M. Heratsi, Armenia
5. Assistant of the Department of Propaedeutics of Dental Diseases, Peoples Friendship University of Russia, Russia

*Corresponding author: Karen Mashinyan; Associat professor, Department of prosthodontics, Yerevan State Medical University after M. Heratsi, Armenia;
e-mails: mashinyankaren@yahoo.com

Received: Feb. 26, 2023; **Accepted:** Mar. 27, 2023; **Published:** Apr. 15, 2023

Abstract

Oral and maxillofacial prosthodontics is engaged in prosthetics of congenital and acquired defects of the maxillofacial region occurred from resections of the jaws in case of neoplasms and as a result of injuries as well.

In the presence of defects in the maxillofacial region, various methods of treatment are currently used, including removable prosthetics, reconstruction of the defect with a vascularized musculoskeletal autograft, and prosthetics with implants. This direction tends to be further developed and improved, which will contribute to the full integration of the patient into society.

In this article the method of prosthetic treatment of the defect occurring at maxillary resection (clinical case) followed by prosthetic rehabilitation is presented.

Keywords: *resection of the upper jaw, defect of the upper jaw, obturator, removable prosthesis*

Introduction

Cranio-maxillo-facial defects can be caused by various factors. One of the most common causes of acquired defects is surgical treatment of neoplasms in the area of the face. MF cancer treatment may require partial or total maxillectomy, which may cause functional, aesthetic defects and hygiene problems.[1-3] As a result of the defect caused by the resection of the upper jaw, the integrity of soft and hard tissues is violated, a communication between the nasal and oral cavities is created.[4] The following will be disturbed; aesthetics, phonetics, breathing, processes of chewing and swallowing. Depending on the volume of surgery, patients may experience asymmetry of the face, lips,lowering of the lower third of the face, lowering of the corners of the mouth and nose, maceration in the corners of the mouth, etc. e.

At the same time, the speech function is disturbed, the patient develops snoring (rhinolalia), the speech becomes unclear, especially when there is communication between the oral and nasal cavities. The last circumstance also leads to the occurrence of quite serious problems with food intake, since the absence of teeth makes chewing difficult, and communication with the nasal cavity leads to the passage of nutrients into the nasal cavity and adjacent cavities. As a result, the mucous membrane of the nasal cavity is irritated, sneezing and coughing occur, as a result of which the patient refuses to eat. These

problems cause psycho-emotional disorders and a feeling of inferiority in the patient. And if the patient's disease is cured, but he remains isolated because of his physiological, aesthetic and psychological defects, how valuable is the treatment for the patient?[3]

Taking into account a number of inconveniences caused by resections of the upper jaw, there is a need to restore them with the help of special obturator prostheses.[5-8] An obturator is a maxillofacial prosthesis used to preserve the integrity of the mouth and nose, closing and overlapping the communication between them caused by congenital or acquired defects.[9-10]

The prosthesis facilitates speech and swallowing due to the replacement of tissue lost during the development of the disease, and, as a result, can reduce nasal insufficiency and hypernasal speech, improve articulation, swallowing and chewing. Surgical, temporary and final obturators are sequentially used to eliminate the defect.[8,11]

The surgical obturator is placed immediately at the end of the operation. This is a simple device that is made according to the model obtained in the postoperative period and, thus, can reduce the frequency of local infection. Installation of a surgical obturator during surgery can minimize defects caused by maxillectomy and provide immediate restoration of facial contours, preventing their deformations, which can have important physical and psychological consequences for the patient.[10,12]The surgical obturator is replaced by a temporaryobturator a few weeks after the operation. It is madeaccording to a post-operative cast, has an artificial palate, a part that goes into the opening of the defect (abutment) and can initially contain teeth or betoothless with a tendency to add them later. The surgical obturator is replaced by a temporary obturator a few weeks after the intervention. It is made according to a post-operative cast, has an artificial palate, a part that goes into the hole of the defect and can initially artificial teeth or be toothless with a tendency to add them later. Thetemporary obturator is replaced by the final obturator, which completely replaces the missing tissues and fills the defects of the latter. The final prosthesis can be made 6 months after the operation. However, the terms may vary depending on the size of the defect, the progress of healing, the prognosis of tumor control, the effectiveness of the obturator, and the presence or absence of teeth.

The size and location of defects affect the course of prosthetics and the prognosis of successful treatment.

The choice of restoration method depends on the cause of the defect, its localization, size, degree of expression, age and willing of the patient, diseases, complications that occurred during the surgery, refusal of the patient from further restorative treatment[8,11]

The lack of tissue, which leads to a decrease in the support surface of the prosthesis, leads to a decrease in retention and stability. They are the main complications of orthopedic treatment of maxillofacial patients.[9] Therefore, at the stage of prosthetics planning, the available tissues and teeth should be used as much as possible, trying to minimize these problems as much as possible. A combination of surgical and orthopedic treatment of patients with resection of the upper jaw is mandatory.[12,13] It should be noted that scarring changes that occur in the post-traumatic or post-operative stage in the maxillo-facial region directly led to permanent changes in the contours of the face, the return of which to the aesthetic norm requires certain surgical interventions. It is possible to correct deformations with the help of certain surgical interventions.[14-18]

The purpose of this case report is to demonstrate the benefits and applicability of appropriate maxillofacial prosthetic rehabilitation following surgical resection cancer of the upper jaw.

Clinical case

A 52-year-old man was diagnosed with cancer of the upper jaw, and according to the patient's treatment plan, resection of the upper jaw was to be performed. For the manufacture of the surgical obturator, an impression was made with alginate impression material. In a well-planned extensive operation, which will be accompanied by the loss of soft tissues and bone support, a surgical obturator is applied, obtained as a result of joint work with the surgeon at the preparatory stage. The impression was sent to the laboratory, from which a plaster model was obtained. The areas to be resected were marked by the surgeon on the model (figure 1), immediate surgical obturator was made in the laboratory according to the instructions (figure 2 a, b). The latter was placed in the oral cavity during the operation itself. Correction of

the surgical obturator was performed during several post-operative appointments (Figure 3).

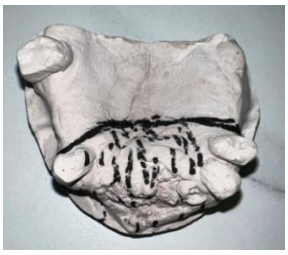

Figure1. The part to be removed is projected onto the initial model

Figures 2 a, b. Immediate surgical prosthesis

Figure 3. Immediate surgical prosthesis in the oral cavity

The long and painful edges were polished, the edges were enlarged in some areas with the help of acrylic material, and refixation with soft acrylic was also performed to control the directed regeneration of soft tissues (Figure 4).

Figure 4. The appearance of the defect after surgery

Only after the final healing of the adjacent tissues is it possible to make the final prosthesis, which is carried out in five treatment visits. The first treatment visit, which is held a few hours after the surgical stage, after healing of tissues in the area of the defect, is a preliminary impression of an individual spoon. At this stage, they determined the class of the defect, evaluated the tissue of the wound area, the state of the existing teeth, the appearance, and then proceeded to take an impression. After resection of the upper jaw, the patient's aesthetic problem is combined with functional problems drooping of the upper lip and asymmetry of the face. According to Aramani, the defect formed belongs to the VI class of the classification of acquired defects of the upper jaw.[19] There are 27 teeth on the jaw, which were used during prosthetics as a support with the available tissues, maximally contributing to the stability and retention of the prosthesis.

Gauze soaked in Vaseline was placed in the holes opening into the nasal cavity and adjacent cavities in the area of the defect to avoid the penetration of the remnants of the stamp material into the alveolar cavities surrounding the defect (Figure 5). Then, with the help of a standard, modified beeswax spoon of the appropriate size and a modified syringe (for introducing the impression material into the area of the defect), an alginate impression (Figure 6) was made with the subsequent production of an individual spoon in the dental laboratory.

Figure 5. The opening to the nasal cavity is closed with vaseline-coated gauze

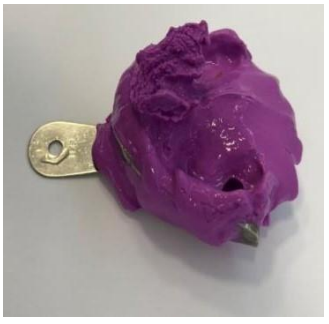

Figure 6. Initial alginate impression

During the second treatment visit, an individual evaluation of the spoon, oral testing, formation of the edges and areas of the defect with the help of thermoplastic impression material and obtaining the final impression with the help of silicone impression material were carried out.

First, we form the edge of an individual impression tray with a thermoplastic stamp, and then proceed to the part of the defect. The design of an individual impression tray, inserted into the area of the defect, is of great importance for the complete preparation of the occlusal part of the future prosthesis, the elimination of the defect, and is aimed at correcting the symmetry of the face and the appearance of the cleft lip. For this, we shape the surface of the obturator part of an individual impression tray, directed to the soft tissues of the lip and saliva, with a thermoplastic stamp, applying several layers.

Then we apply glue on the inner surface and edge of the impression tray and make a stamp with a silicone stamp, covering the throat cavities with a stamp lubricated with petroleum jelly.

After solidification of the impression material, it is extracted from the oral cavity, evaluated, sent to the laboratory, where the dental technician receives the plastic support of the prosthesis and sends it to the clinic for the next treatment appointment.

During the third visit first, we evaluate the plastic support in the oral cavity, then we move on to the confirmation of the back edge of the upper tooth row (A-line), which is performed in the same way as with ordinary prosthetics. Then they made a roller and installed it on the support of the prosthesis at the level of natural teeth. They noted the vertical height of the face, the intermaxillary central ratio, the contour of the smile and the midline of the face (Figure 7). They conduct buccal protocol and fix the model of the upper jaw to the articulator, after which the model of the lower jaw is also fixed to the articulator with a plaster bandage with the recording of the centric relation. At the end of the visit, as a result of the conversation with the patient, the color and shape of the teeth were determined. Preliminary alignment of the teeth was performed on the articulator in the laboratory (Figure 8).

Figure 7. Wax roller after

Figure 8. Upper denture on hard abutment

Figure 9. Esthetic assessment of dentures.Recording the intermaxillary relationship

During the fourth appointment, an initial alignment test is performed, vertical height and central ratio are checked, eccentric ratio is recorded, aesthetic assessment by the doctor and the patient (Fig. 9), registration of existing inaccuracies, transfer to the laboratory for correction and final preparation of prosthetics are completed.

And on the during the fifth appointment, a custom-made prosthesis (fig. 10 a, b, c, d) was placed in the oral cavity, the final aesthetic appearance of the patient was evaluated (figure 11), the final aesthetic appearance of the patient was evaluated (fig. 11), pronunciation, correspondence of the prosthesis to the tissues of the oral cavity.

Figure 10 a. View of the final prosthesis from the left side

Figure 10 b. View of the final prosthesis from the right side

Figures 10 c, d. Final prosthesis on the windward side

Figure 11. Esthetic assessment of dentures

Applying zinc oxide paste to the inner surface of the prosthesis, placing it in the oral cavity, we first found contact points, then long edges, thick areas and all asymmetries. Places of premature contact should be selectively grinded if necessary.

Since the healing of tissues is still ongoing, the tissues surrounding the defect are constantly changing. Added to this was the fact that our patient removed the obturator in the evening before going to bed (which is undesirable in all cases). And, finally, after all the corrections, the prosthesis was handed over to the patient and the necessary instructions for the care of the prosthesis were given. A final prosthesis was planned to be made 6 months after the surgery. In the future, the prosthesis will be relined regularly.

Discussion

Prosthetics of maxillofacial defects, which is the maximum possible restoration of missing tissues with the help of an obturator, minimizes both functional and mental problems of the patient, contributing to his integration into society.[20,23] Maxillary obturator is very important in the speech rehabilitation of patients with surgically acquired maxillary defects.[24]

Immediate surgical obturators have facilitated retention of the surgical bandage, promoting healing with minimal postoperative infection and scar contracture formation. This ensured the restoration of acceptable aesthetics and maintenance of oral function at an acceptable level in the initial postoperative period. The definitive obturators restored aesthetics, oral function, and fluid management to a satisfactory level. Satisfactory functional and aesthetic results are achieved in patient with extensive acquired defects of the upper jaw after surgical resection cancer using obturator prostheses.

Conclusion

The loss of any part of the maxillary region, in addition to physical problems, causes severe mental trauma to the patient. Prosthodontic treatment should be started before the operation, taking into account that the patient should be given the best rehabilitation assistance. Cooperation between the surgeon and the maxillofacial orthopedist during treatment is mandatory, as joint activity leads to full recovery.

Funding

This research received no external funding.

Institutional Review Board Statement

The study was conducted by the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee).

Informed Consent Statement

Informed consent was obtained from patient involved in the study.

Data Availability Statement

Not applicable.

Conflicts of Interest

The authors declare no conflict of interest**.**

REFERENCES

1. Singh M, Kapoor S, Kumar L, Pal US, Singh A, Anwar M. Prevalence of maxillectomy defects among patients visiting in an institutionalized hospital setting: A prospective, single-institute study. *Natl J Maxillofac Surg.* 2020 Jul;11(2):231-235. doi: 10.4103/njms.NJMS_61_20

2. Cordeiro PG, Chen CM. A 15-year review of midface reconstruction after total and subtotal maxillectomy: part I. *Algorithm and outcomes. Plast Reconstr Surg*. 2012;129(1):124-136. doi: 10.1097/PRS.0b013e318221dca4

3. Desjardins RP. Early rehabilitative management of the maxillectomy patient. *J Prosthet Dent.* 1977;38(3):311-8. doi: 10.1016/0022-3913(77)90308-0

4. Iyer S, Thankappan K. Maxillary reconstruction: Current concepts and controversies. *Indian J Plast Surg.* 2014;47(1):8-19. doi: 10.4103/0970-0358.129618

5. Parr GR, Tharp GE, Rahn AO. Prosthodontic principles in the framework design of maxillary obturator prostheses. *J Prosthet Dent.* 1989;62(2):205-12. doi: 10.1016/0022-3913(89)90315-6

6. Firtell DN, Grisius RJ. Retention of obturator-removable partial dentures: a comparison of buccal and lingual retention. *J Prosthet Dent.* 1980;43(2):212-7. doi: 10.1016/0022-3913(80)90189-4

7. Javid NS, Dadmanesh J. Obturator design for hemimaxillectomy patients. *J Prosthet Dent.* 1976;36(1):77-81. doi: 10.1016/0022-3913(76)90236-5

8. The Glossary of Prosthodontic Terms: Ninth Edition. *J Prosthet Dent.* 2017;117(5S):e1-e105. doi: 10.1016/j.prosdent.2016.12.001

9. Keyf F. Obturator prostheses for hemimaxillectomy patients. *Journal of Oral Rehabilitation.* 2001;28:821-829. doi: 10.1111/j.1365-2842.2001.00754.x

10. Garg AK, Malo M, Dorado LS, Duarte F. Postsurgical management with maxillary obturators after maxillectomy. *Gen Dent.* 1998;46(1):75-8. PMID: 9667166

11. Singh M, Bhushan A, Kumar N, Chand S. Obturator prosthesis for hemimaxillectomy patients. Natl *J Maxillofac Surg.* 2013;4(1):117-20. doi: 10.4103/0975-5950.117814.

12. Shah SA, Naqash TA, Abdullah S et. al. Prosthetic rehabilitation of a patientwith limited mouth opening consequent to partial maxillectomy: A clinical report. *Int J Health Sci Res.* 2013;3(2):82-87

13. Taylor TD. *Clinical Maxillofacial Prosthetics*; Quintessence Publishing: Hanover Park, IL, USA, 2000

14. Rashid H, Bashir A. Surgical and prosthetic management of maxillary odontogenic myxoma. *Eur J Dent.* 2015;9(2):277-283. doi: 10.4103/1305-7456.156842

15. Curtis TA, Beumer J, 3rd Maxillofacial rehabilitation: Prosthodontic and surgical considerations. Restoration of Acquired Hard

Palate Defects: Etiology, Disability, and Rehabilitation. Beumer J, Curtis TA, Marunick MT, Eds.; *Ishiyaku Euro America: St. Louis, MO, USA*. 1996:188–284.

16. Omondi BI, Guthua SW, Awange DO, Odhiambo WA. Maxillary obturator prosthesis rehabilitation following maxillectomy for ameloblastoma: case series of five patients. *Int J Prosthodont.* 2004;17(4):464-468

17. Rieger J, Wolfaardt J, Seikaly H, Jha N. Speech outcomes in patients rehabilitated with maxillary obturator prosthesis after maxillectomy: A prospective study. *Int. J. Prosthodont.* 2002;15:139–144

18. Rathee M, Bhoria M, Malik P. Prosthodontic rehabilitative therapy through surgical obturator for maxillectomypatient: A Review. *CancersRev.* 2014;1:52–58. doi: 10.18488/journal.95/2014.1.2/95.2.52.58

19. Aramany MA, Basic principles of obturator design for partially edentulous patients. Part II: Design principles. *J. Prosthet. Dent.* 2001;86:562–568. doi: 10.1067/mpr.2001.121619

20. Sullivan M, Gaebleer C, Beukelman D, et al. Impact of palatal prosthodontic intervention on communication performance of patients maxillectomy defects: A multilevel outcome study. *Head Neck.* 2002;24:530–538. doi: 10.1002/hed.10095

21. Jain M, Bulbule N, Anasane N. A collaborative approach towards speech analysis in patients rehabilitated with maxillary obturator prosthesis: Case review. *Int. J. Curr. Res.* 2017;9:48396–48398

22. Bohle G, Rieger J, Huryn J, Verbel D, Hwang F, Zlotolow I. Efficacy of speech aid prostheses for acquired defects of the soft palate and velopharyngeal inadequacy-clinical assessments and cephalometric analysis: A Memorial Sloan-Kettering Study. *Head Neck.* 2005;27:195–207. doi: 10.1002/hed.10360

23. Umino S, Masuda G, Ono S, Fujita K. Speech intelligibility following maxillectomy with and without prosthesis: An analysis of 54 cases. *J. Oral Rehabil.* 1998;25:153–158. doi: 10.1046/j.1365-2842.1998.00238.x

24. Arigbede AO, Dosumu OO, Shaba OP, Esan TA. Evaluation of Speech in Patients with Partial Surgically Acquired Defects: Pre and Post Prosthetic Obturation. *J. Contemp. Dent. Pract.* 2006;7:89–96

ՎԵՐԻՆ ԾՆՈՏԻ ԵՐԿԿՈՂՄԱՆԻ ՌԵԶԵԿՑԻԱՅԻ ԺԱՄԱՆԱԿ ՎԵՐԱՀՍԿՎՈՂ ՎԵՐՔԵՐԻ ԲՈՒԺՄԱՆ և ՕՐԹՈՊԵԴԻԿ ԲՈՒԺՄԱՆ ԱՌԱՆՁՆԱՀԱՏԿՈՒԹՅՈՒՆՆԵՐԸ. ԿԼԻՆԻԿԱԿԱՆ ԴԵՊՔ

Սերգո Հովհաննիսյան,[1] Կարեն Մաշինյան [2] Արտավազդ Խարազյան[3], Սյուզաննա Սրապյան[4], Ռուզաննա Բրագունովա[5]

1. Երևանի Մ. Հերացու անվան պետական բժշկական համալսարանի Օրթոպեդիկ ստոմատոլոգիայի ամբիոնի դոցենտ, Հայաստան
2. Երևանի Մ. Հերացու անվան պետական բժշկական համալսարանի Օրթոպեդիկ ստոմատոլոգիայի ամբիոնի դոցենտ, Հայաստան
3. Դենտալ արտ սիստեմս, տնօրեն, դիմածնոտային օրթոպեդ, անապլաստոլոգ, Ռուսաստան
4. Երևանի Մ. Հերացու անվան պետական բժշկական համալսարանի Օրթոպեդիկ ստոմատոլոգիայի ամբիոնի կլինիկական օրդինատոր, Հայաստան
5. Ժողովուրդների բարեկամության Ռուսաստանի համալսարան, Ստոմատոլոգիական հիվանդությունների պրոպեդևտիկայի ամբիոնի ասիստենտ, Ռուսաստան

Ամփոփում

Դիմածնոտային օրթոպեդիան զբաղվում է դիմածնոտային շրջանի բնածին և ձեռքբերովի արատների պրոթեզավորումով, որոնք առաջանում են նորագոյացությունների ծնոտների ռեզեկցիայից, ինչպես նաև վնասվածքների հետևանքով:

Դիմածնոտային շրջանի արատների առկայության դեպքում ներկայումս օգտագործվում են բուժման տարբեր մեթոդներ, այդ թվում՝ շարժական պրոթեզավորում, թերության վերականգնում անոթային հենաշարժական ավտոփոխպատվաստումով և պրոթեզավորում՝ իմպլանտների միջոցով: Այս ուղղությունը հակված է հետագա զարգացման և կատարելագործման, ինչը կնպաստի հիվանդի լիարժեք ինտեգրմանը հասարակությանը: Այս հոդվածը ներկայացնում է վերին ծնոտի ռեզեկցիոն արատի պրոթեզավորման կարգը (կլինիկական դեպք), որին հաջորդում է պրոթեզային վերականգնումը:

ОСОБЕННОСТИ УПРАВЛЯЕМОГО ЗАЖИВЛЕНИЯ РАН И ОРТОПЕДИЧЕСКОГО ЛЕЧЕНИЯ ПРИ БИЛАТЕРАЛЬНОЙ РЕЗЕКЦИИ ВЕРХНЕЙ ЧЕЛЮСТИ. КЛИНИЧЕСКИЙ СЛУЧАЙ

Серго Оганисян[1] кмн., Карен Машинян[2] кмн., Артавазд Харазян[3],Сюзанна Срапян[4], Рузанна Брагунова[5] кмн..
1. Доцент кафедры Ортопедической стоматологии Ереванского государственного медицинского университета им. М. Гераци, Армения
2. Доцент кафедры Ортопедической стоматологии Ереванского государственного медицинского университета им. М. Гераци, Армения
3. Дентал Арт Систем, директор, челюстно - лицевой ортопед, анапластолог, Россия
4. Клинический ординатор кафедры Ортопедической стоматологии Ереванского государственного медицинского университета им. М. Гераци, Армения
5. Ассистент кафедры Пропедевтики Стоматологических Болезней Российского Университета Дружбы Народов, Россия

Резюме

Стоматологическая и челюстно-лицевая ортопедия занимается протезированием врожденных и приобретенных дефектов челюстно-лицевой области, возникших в результате резекции новообразований челюстей, а также травм. При наличии дефектов челюстно-лицевой области в настоящее время применяют различные методы лечения, в том числе съемное протезирование, замещение дефекта васкуляризированными аутотрансплантатами, протезирование имплантатами. Данное направление имеет тенденцию к дальнейшему развитию и совершенствованию, что будет способствовать полной интеграции пациента в общество.
В статье представлено протезирование резекционного дефекта верхней челюсти (клинический случай) с последующим ортопедическим восстановлением.