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Prosthodontic Rehabilitation after Partial Maxillar Resection by Obturator Denture Retained with the System of Attachments – Case Report

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SUMMARY

Introduction Maxillar resection surgery results in unusual morphology of the remaining maxillary arch and communication between the oral and nasal cavities. Consequences are speech, mastication and swallowing difficulties, impaired face appearance and significant decrease of life quality. For the reconstruction of emerging defects after total or partial maxillar resection, the most suitable solution is prosthetic therapy with obturator dentures.
Case Report This study describes the rehabilitation of a 60-year-old male patient after partial maxillar resection with obturator dentures having radicular attachment. The patient's diagnosis was Planocellular oral carcinoma.
Conclusion Radicular attachment improves retention in comparison with conventional obturator. Successful rehabilitation of the speech and mastication was achieved. The passage of air and fluids between the oral and nasal cavity was disabled and facial asymmetry was corrected. The patient expressed satisfaction with the therapy.

Keywords: obturator; denture; attachment; maxillectomy; resection

INTRODUCTION

Surgical resection in oral and facial area caused by malign tumor results in loss of morphological and functional integrity of the upper jaw and the adjacent anatomic structures [1]. In these anatomo-morphological conditions, phonetics, mastication and swallowing functions are impaired, the symmetry of the face is lost, communication between nasal and oral cavity is present and patient's quality of life is diminished [1-5].

The most suitable methods of reconstruction after total or partial maxillar resection are primary surgical reconstruction or prosthetic therapy with obturator dentures different designs [6, 7, 8]. Planocellular carcinomas of the upper jaw are commonly treated by surgical resection, the most often without possibility for reconstruction of the defect [9]. Successful reconstruction of a defect after total or partial maxillar resection to the level of normal function and aesthetics is still challenge in prosthetic dentistry [10].

The main purpose of obturator dentures, which are similar in design to partial denture, is to establish the function of the oral and facial system. Stability and retention of the denture is determined by localization and the extent of the defect, as well as the number and the position of the remaining teeth and periodontal health [10, 11]. Nowadays, there is a wide selection of different obturator dentures, such as open or closed obturator, and they can be combined with different attachment systems and implants [9]. Attachments combined with post-resection obturator dentures are mostly used to improve retention but a certain level of resilience is necessary to compensate stress during mastication as well as to prevent food impaction into the defect.

The aim of this study was to present the case of prosthodontic rehabilitation of a patient after partial maxillar resection with obturator dentures retained with the system VKS-OC radicular attachment.

CASE REPORT

A 60-year-old man diagnosed with planocellular oral carcinoma of the anterior wall of the maxilla has been examined at the Clinic for Dentistry of Vojvodina, Division of Prosthodontics. Oral examination showed partial resection of the maxilla on the left side, corresponding to class I of Aramany classification with the remained upper right canine and absence of the teeth in the frontal region and distally from the canine. Root canal preparation of the canine was done for patrix part of the attachment similarly to preparation for the post. The impression was taken in a one-step procedure using polyvinyl siloxan silicones (Elite HD+ Light Body and Elite HD+ Putty Soft, normal setting, Zhermack, Italy). After the fabrication of patrix (vks-oc uni patrix attachment, Ø 2.2 mm, HL-patrix, cast-on 2 pieces, Bredent UK Ltd, Chesterfield) a fitting was done in the patient's mouth (Figure 1). The impression of the upper jaw defect and the patrix part of the attachment was taken using irreversible hydrocolloid (phase PLUS, fast setting chromatic dust free alginate. Zhermack, Italy) (Figure 2).

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Figure 1. Fitting of patrix of the attachment was done in the patient's mouth.
Slika 1. Provera patrice atečmena u ustima bolesnika.

Figure 2. The anatomic impression of patrix of the attachment.
Slika 2. Anatomski otisak patrice atečmena.

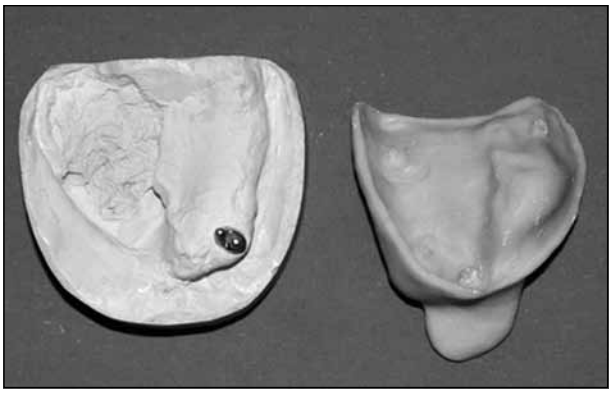

Figure 3. The preliminary gypsum model and the individual impression tray.
Slika 3. Preliminarni radni model i individualna kašika.

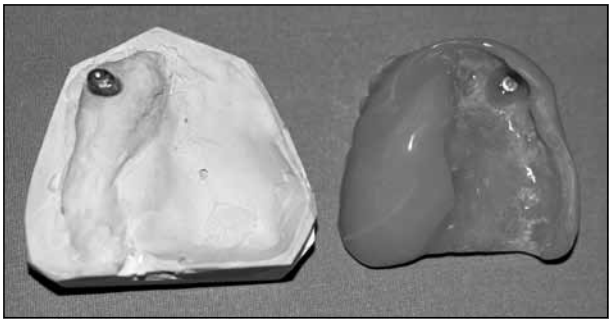

Figure 4. Obturator denture and the matrix part of attachment.
Slika 4. Opturator i matrica atečmena.

Figure 5. Obturator denture placed in the patient's mouth.
Slika 5. Opturator postavljen u ustima bolesnika.

After fabrication of an individual tray (SR Ivolen, autopolymerizing acrylic, Ivoclar, Vivadent) (Figure 3) and taking impression of the tissue in function with additional silicone materials (Elite Hd+ Light Body, normal setting and Elite HD+ Super Light Body, fast setting, Zhermack, Italy). Finally, obturator denture (Biokril-RN, heat polymerized acrylic resin, Galenika, Belgrade) with matrix attachment (vks-oc metal matrix, Ø 2.2 mm, 2 pieces, Bredent UK Ltd, Chesterfield) (Figure 4) was made, obeying all the rules of modern prosthetic dentistry and the design of partial denture. Patrix part of the attachment was cemented first using glass ionomer cement (GC Fuji, GC Corporation, Tokyo, Japan) than obturator denture was placed (Figure 5). The patient received all necessary instructions for the use and maintenance of the denture.

DISCUSSION

The aim of reconstruction of the defect made after total or partial maxillar resection is to prevent communication between nasal and oral cavities and to restore adequate mastication and speech function, as well as to achieve acceptable aesthetics [7]. The obturator has benefits such as ability to inspect emerging defect and to detect early signs of relapse, inability of food and fluid accumulation in undercuts of the defect and good support for soft facial tissue. By extension of the obturator denture, air space is reduce and nasal speech is corrected [8, 12].

Aramany classification of defects after total or partial maxillectomy is very applicable and useful in everyday work. It makes easier communication between prosthodontists and maxillofacial surgeons. There are six classes depending of the localization of the defect and its relationship to the remaining teeth. The class I category represents maxillary resection defect where the hard palate, alveolar ridge and teeth are removed up to the midline and this is the most frequent category which occurs in practice [13].

The use of implants combined with obturator dentures tremendously increases their retention and stability. However, the situation is more complicated if the patient is also supposed to have radiation therapy [14]. For that reason, our decision was to against combination of implants and obturator denture. The consequences of radiation therapy are modifications in hard and soft tissues

in oral and facial area what increases the risk of osteoradionecrosis in the bone where implants are placed. The processes that can occur in irradiated tissue are: necrosis of osteocytes, obliteration of Haversian canals, loss of cells and impaired vascularization of periosteum [15].

Complete dental arch only can support normal biostatic and biodynamic relations in orofacial system. After partial maxillar resection, loss of teeth, parts of the alveolar ridge and hard palate change the balance, therefore it is very important to coordinate obturator denture fabrication with biomechanical demands. Obturator denture for unilateral palatomaxillar defect is placed in the anterior part of the mouth. One of the most frequent complications is loss of retention during time. This can be avoided by placing attachments, as it was in this case, the system of VKS-OC radicular attachment seemed to be the most appropriate solution [16]. The forms of the retention obtained by attachments are different and depend on the construction of attachments, such as retention based on friction or the cone effect, by mechanical joints or by magnetic forces. Retention by VKS-OC system is based on elasticity of the attachment material and friction between patrix and matrix. VKS-OC system of attachments is simple to make and use. Also it is durable and reliable. Some of the advantages of this reconstruction technique is better initial retention and the stability of the denture, simple reparation and the lining procedure. The necessity for additional laboratory and clinical phases in fabrication of the obturator is its disadvantage [10].

CONCLUSION

By combination of obturator denture with radicular attachment, restoration of the functions in oral and facial system was achieved and facial asymmetry was corrected. After three months, the patient was satisfied with the results of the therapy and there were no sign of the damage of the retention tooth during follow-up appointments. In order to make valid comparison of the success of treatment, similar researches need to be done in the future. The importance of use these kind of methods for prosthetic reconstruction is not only in the functional aspect but also in psychosocial aspect.

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Protetička rehabilitacija nakon parcijalne resekcije gornje vilice primenom opturator-proteze retinirane sistemom atečmena – prikaz bolesnika

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KRATAK SADRŽAJ

Uvod Resekciono hirurško lečenje gornje vilice dovodi do promene izgleda preostalog dela gornje vilice i komunikacije između usne i nosne duplje. Posledice su smetnje u govoru, žvakanju i gutanju, izmenjena estetika lica i znatno pogoršanje kvaliteta života bolesnika. U rekonstrukciji novonastalih oštećenja nakon totalne i parcijalne resekcije maksile najpogodnije rešenje je protetička rehabilitacija opturator-protezama.

Prikaz slučaja Prikazan je slučaj rekonstrukcije palatomaksilarnog oštećenja nakon parcijalne resekcije maksile kod šezdesetogodišnjeg muškarca sa dijagnozom planocelularnog oralnog karcinoma, kod kojeg je urađena opturator-proteza sa radikularnim atečmenom.

Zaključak Primena radikularnog atečmena je protetičko rešenje s poboljšanom retencijom u poređenju s klasičnim opturatorom. Kod bolesnika je obnovljena funkcija govora i žvakanja. Prolaz vazduha i tečnosti između usne i nosne duplje je onemogućen i korigovana je asimetrija lica. Bolesnik je bio veoma zadovoljan ishodom lečenja.

Ključne reči: opturator; proteza; atečmen; maksilektomija; resekcija

UVOD

Resekcija malignih tumora orofacijalne regije za posledicu ima gubitak morfološke i funkcionalne celovitosti gornje vilice i okolnih anatomskih struktura [1]. U takvim anatomsko-morfološkim uslovima značajno se remeti funkcija govora, žvakanja i gutanja, menja se simetrija lica uz stvaranje komunikacije između nosne i usne duplje, te značajno smanjuje kvalitet života bolesnika [1-5].

Izbor najpogodnije metode rekonstrukcije nakon totalne ili parcijalne resekcije maksile može biti primarna hirurška rekonstrukcija ili protetička terapija opturator-protezama različitog dizajna [6, 7, 8]. Planocelularni karcinomi gornje vilice se uopšteno leče metodama hirurške resekcije, što je obično problem u adekvatnoj rekonstrukciji oštećenja [9]. Uspešna rekonstrukcija oštećenja nakon totalne ili parcijalne resekcije maksile, s postizanjem određenog nivoa funkcije i izgleda, i dalje je izazov u stomatološkoj protetici [10].

Osnovni cilj izrade opturator-proteze, koja dizajnom prati parcijalnu protezu, jeste uspostavljanje funkcija orofacijalnog sistema. Stabilnost i retencija proteze su određene lokalizacijom i veličinom oštećenja, kao i brojem i položajem preostalih zuba, odnosno stanjem potpornog aparata [10, 11]. Danas postoji nekoliko različitih oblika opturator-proteza, kao što su nadoknade s otvorenim, odnosno zatvorenim opturacionim segmentom, ili kombinacije s različitim sistemima tzv. atečmena i implantatima [9]. Primena atečmena u kombinaciji s postresekcionom opturator-protezom indikovana je, pre svega, radi poboljšanja retencije. Osnovni zahtev je da mora postojati određeni stepen elastičnosti radi kompenzovanja stresa tokom funkcije proteze, odnosno sprečavanja prodora hrane u oštećenje [10].

U ovom radu prikazan je slučaj protetičke rehabilitacije bolesnika nakon parcijalne resekcije maksile primenom opturator-proteze retinirane sistemom VKS-OC radikularnog atečmena.

PRIKAZ BOLESNIKA

Muškarac star 60 godina sa dijagnozom planocelularnog oralnog karcinoma prednjeg zida maksile javio se na Odeljenje stomatološke protetike Klinike za stomatologiju Vojvodine u Novom Sadu. Kliničkim pregledom je ustanovljena parcijalna resekcija gornje vilice na levoj strani, što odgovara I klasi prema Aramanijevoj (*Aramany*) klasifikaciji, prisutnim gornjim desnim očnjakom, izostankom zuba u frontalnoj regiji i distalno od očnjaka. Preparacija kanala korena očnjaka za smeštaj patrice atečmena izvedena je po svim pravilima izrade ležišta za livenu nadogradnju. Nakon preparacije uzet je otisak primenom jednofazne tehnike pomoću polisiloksan silikonskih materijala (Elite HD+Light Body i Elite HD+Putty Soft, normal setting; Zhermack, Italy). Nakon izrade patrice (vks-oc uni patrix attachment, Ø 2.2 mm, HL-patrix, cast-on 2 pices, Bredent UK Ltd, Chesterfield) izvršena je provera u ustima bolesnika (Slika 1). Usledili su otiskivanje patrice atečmena i oštećenja gornje vilice irerverzibilnim hidrokoloidima (phase PLUS, fast setting chromatic dust free alginate; Zhermack, Italy) (Slika 2), izrada individualne kašike (SR Ivolen, autopolymerizing acrylic; Ivoclar, Vivadent) (Slika 3) i uzimanje funkcionalnog otiska adicionim silikonskim materijalima (Elite Hd+Light Body, normal setting i Elite HD+ Super Light Body, fast setting. Zhermack, Italy). Po svim principima savremene stomatološke protetike i dizajna parcijalne proteze izrađena je opturator-proteza (Biokril-RN, heat polymerized acrylic resin; Galenika, Beograd) sa matricom atečmena (vks-oc metal matrix, Ø 2.2 mm, 2 pices, Bredent UK Ltd, Chesterfield) (Slika 4). Patrica je cementirana glasjonomer-cementnim materijalom (GC Fuji, GC Corporation, Tokyo, Japan), a zatim je primenjena opturator-proteza (Slika 5). Data su sva neophodna uputstva bolesniku za korišćenje i održavanje proteze.

DISKUSIJA

Cilj rekonstrukcije oštećenja nakon totalne ili parcijalne resekcije maksile je da se onemogući komunikacija usne i nosne duplje i obezbede adekvatna funkcija žvakanja, govora i gutanja, odnosno prihvatljiv estetski izgled [7]. Prednosti opturatora su mogućnost inspekcije novonastalog oštećenja i eventualno rano otkrivanje recidivantnih promena, nemogućnost nakupljanja hrane i tečnosti u podminiranim delovima oštećenja, odnosno dobra potpora mekim tkivima lica. Ekstenzijom opturator-proteze smanjuje se prostor ispunjen vazduhom i omogućava korigovanje nazalnog govora [8, 12].

Sistem Aramanijeve klasifikacije oštećenja nakon totalne ili parcijalne resekcije maksile vrlo je primenljiv i koristan u svakodnevnom radu, jer značajno olakšava komunikaciju i saradnju među specijalistima stomatološke protetike i maksilofacijalne hirurgije. Ovaj sistem sadrži šest klasa u zavisnosti od lokalizacije oštećenja i njegovog odnosa s preostalim zubima. Klasa I je oblik resekcije gornje vilice gde su tvrdo nepce, alveolarni greben i zubi uklonjeni sve do medijalne linije; ovo je najčešće oštećenje koje se sreće u praksi [13].

Primena implantata u kombinaciji s opturator-protezom značajno povećava retenciju i stabilnost proteze. Međutim, situacija se klinički komplikuje ako je kod bolesnika indikovana i zračna terapija [14]. Stoga nije odlučeno da se uradi kombinacija s implantatima, jer zračna terapija za posledicu ima promene u tvrdim i mekim tkivima orofacijalne regije, čime se značajno povećava rizik od pojave osteoradionekroze na mestu ugradnje implantata. Promene u zračenim tkivima obuhvataju nekrozu osteocita, obliteraciju Haversovih kanala i gubitak ćelija i vaskularizacije periosta [15].

Samo intaktan zubni niz omogućava normalne biostatičke i biodinamičke odnose u stomatognatom sistemu. Gubitak zuba, delova alveolarnog grebena i tvrdog nepca nakon parcijalne resekcije maksile remeti ravnotežu, te je veoma važno da se uskladi izrada opturator-proteze sa zahtevima biomehanike. Kod opturator-proteza koje se izrađuju u slučaju unilateralnog palatomaksilarnog oštećenja koncentracija sila koje nastaju tokom funkcije je najveća u prednjem delu protezne ploče. Jedna od najčešćih komplikacija kod primene opturatora je gubitak retencije proteze tokom vremena. Ovo se može predupredi primenom atečmena, pa je zato u ovom slučaju izbor protetičke rekonstrukcije opturator-protezom sa sistemom VKS-OC radikularnog atečmena bio najprihvatljivije rešenje [16]. Oblici ostvarivanja retencije kod primene atečmena su različiti. Retencija zavisi od konstrukcije atečmena, a može se obezbediti na osnovu trenja, konusnog efekta, mehaničkim spajanjem ili magnetnim silama. Retencija kod primene VKS-OC sistema zasniva se na elastičnosti materijala od kojeg je atečmen izrađen i trenja dodirnih površina patrice i matrice. VKS-OC sistem atečmena je jednostavan za izradu i primenu, trajan i pouzdan. Prednosti tehnike rekonstrukcije oštećenja nakon parcijalne resekcije maksile primenom opturator-proteze u kombinaciji s radikularnim atečmenom su bolja inicijalna retencija i stabilnost proteze, relativno jednostavna reparacija i jednostavan postupak podlaganja proteze. Nedostaci su zahtevne i dodatne laboratorijske i kliničke faze u izradi ovih opturatora [10].

Primenom opturator-proteze u kombinaciji s radikularnim atečmenom omogućeno je obnavljanje skoro svih funkcija orofacijalnog sistema i ostvarena zadovoljavajuća korekcija asimetrije lica. Na kontrolnim pregledima nakon tri meseca bolesnik je bio zadovoljan učinkom lečenja, a nisu uočena oštećenja retencionog zuba. Iako je, radi validnog poređenja uspešnosti lečenja, neophodno izvesti opsežnija istraživanja, sigurno je da ovakve metode protetičke rekonstrukcije i rehabilitacije, osim funkcionalnog, imaju i značajan psihosocijalni aspekt.