CASE REPORT
PRIKAZ BOLESNIKA

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Mandibular overdenture retained with precision balls and bar attachment

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SUMMARY

Introduction Milled precision bar with the lateral additions of two precision attachments could significantly contribute to the primary and secondary retention of partial denture and overdenture.
This clinical case demonstrates stability of mandibular overdenture using milled precision bar and two coronally positioned precision attachments.

Case report A sixty-five years old male patient had two preserved canine roots in lower jaw. Semicircular metal-ceramic (PFM) bridge was previously fabricated for upper teeth. Decision for fabrication of milled bar and metal framework of overdenture was established due to the presence of PFM bridge in the upper jaw. The root canals of the two remaining mandibular canines were prepared for posts. After final mandibular impression using A-silicone in a custom tray, master cast with prepared canals of roots of canines was provided. Two posts connected with milled precision bar were designed. Coronal attachments-patrixs were positioned onto the tip of each coronal part of the construction with axial direction of precision attachments towards root canals. The construction was invested and casted. Metal framework of overdenture was designed and casted. After interocclusal record, the artificial anatomic teeth were selected and waxed model of overdenture with matrixes was provided for try-in clinical phase. Finally, the overdenture was flasked and polished. Metal construction of two posts and milled bar were cemented simultaneously with overdenture, using self-adhesive resin cement.

Conclusion Milled bar improves retention and stability of metal framework of overdenture. Coronally positioned patrix of attachment provides redirection of occlusal and other functional forces towards apical root parts.

Keywords: overdenture; mandible; precision attachment

INTRODUCTION

Different retention systems have been shown successful in treating subtotal edentulism (partially edentulous jaw) in cases where few retained teeth or roots were preserved while implant has not been an option. Some systems mentioned in the literature represent simpler structural solutions [1–5], while other systems, however, have more complex components in the composition of denture construction [5–8].

Very important approach in solving the problem of retention and stabilization of dentures in partially edentulous-maximally edentulous patients is evaluation and assessment of systems of precise connecting elements that will contribute the most to primary retention and secondary retention-stabilization.

The aim of this work was to present a case report from our clinical practice and possibility of improving stability of supra-dental mandibular denture, in which two precise connecting ball elements and one milled bar are primarily placed as the prosthesis bearers.

CASE REPORT

Male patient SD, 65 years old, had two endodontically treated lower canine roots. Partially edentulous upper jaw was restored with semicircular porcelain fused to metal (PFM) bridge. Endodontically treated roots of the two remaining canines in the lower jaw were prepared for prosthetic restoration by removing 2/3 of the length of one root canal filling material and removing 1/3 of the root canal material of the opposite canine. After definitive impression of the mandible and the remaining roots in the mandible with A-silicone, the master cast made of hard plaster (Elite-master with resin, type IV, Zhermack, Italy) was done. In the next procedure, wax models were shaped using modeling wax - corresponding to the shapes of the prepared space in the root canals of the remaining canines, and then wax copings (caps) were modeled over the remaining crown surfaces of the canines. Between the copings, an individualized milled bar (Bredent, VSP-FS/GS, Germany) was formed, and on the top of the wax forms of the covering copings, one patrix of a precise connecting element was placed on each side (Bredent VKS-uni 1.7 mm, Germany). Then the model of an overall construction consisting of two stakes with copings connected by a milled crossbar were inserted into a cylinder

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Figure 1. Master cast and casted framework on the overall construction consisting of two dedicated copings with ball attachments and a crossbar in the middle between the copings
Slika 1. Radni model i izliven skelet na sveukupnoj konstrukciji sačinjenoj od dve namenske kapice sa kugličastim atečmenima i prečkom u sredini između kapica

Figure 2. Master cast of the maximally edentulous mandible and a cast retention structure made of custom dedicated copings, ball-attachments on the top of custom copings and a bar in the middle, together with a hard plaster cast of antagonists
a) frontal perspective view; b) distal-posterior view
Slika 2. Radni model maksimalno krezube donje vilice pacijenta i izlivena retenciona konstrukcija sačinjena od namenskih kapica, patrica atečmena na vrhovima namenskih kapica i prečkom u sredini, i model antagonista od tvrdog gipsa
a) pogled iz prednje perspektive; b) pogled iz distalne-zadnje projekcije

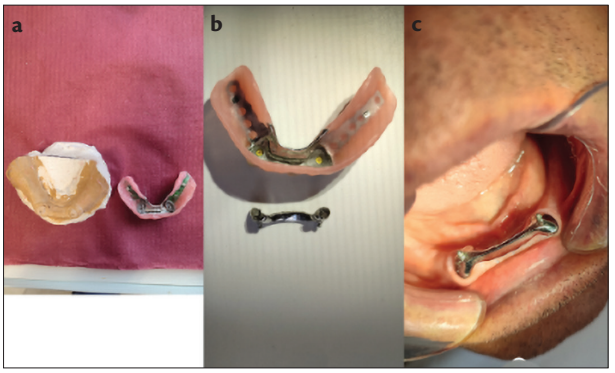

Figure 3. Casted overall retentive construction
a) in the appropriate position in the overdenture, separated from the master cast; b) separated from the supradental prosthesis; c) correctly placed on supporting tissues of the patient's mandible
Slika 3. Izliven metalni sveukupni retencioni oblik
a) na odgovarajućoj poziciji u prekrivnoj protezi, odvojen od radnog modela; b) razdvojen od supradentalne proteze; c) pravilno postavljen na odgovarajuće mesto u donjoj vilici pacijenta

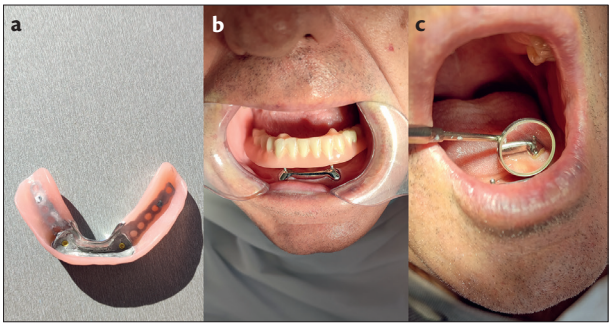

Figure 4. a) Completed lower supradental prosthesis-overdenture immediately before placement in the mouth of the SD patient;
b) Retention structure in place in the mouth and the lower overdenture above it;
c) Surface of the metal protective coping in the mouth- oral view
Slika 4. a) Završena donja supradentalna prekrivna proteza neposredno pre postavljanja u usta pacijenta SD;
b) Retenciona konstrukcija na mestu u ustima i donja supradentalna proteza iznad nje;
c) Površina metalne zaštitne kapice u ustima, posmatrana sa oralne strane.

Figure 5. Lower supradental prosthesis in the patient's mouth
Slika 5. Donja supradentalna proteza u zagrižaju u ustima pacijenta

with investment mass and casted with an alloy of specific metals (Wironit® Bego, USA).

In the next procedure, the framework of the base of the future lower supra-dental prosthesis was shaped using wax profiles, which was inserted and casted of Co-Cr-Mo alloy (Remanium GM 800, Dentaurum, Germany) (Figure 1). Using the master cast of the lower jaw waxed occlusal rim was formed, including the casted framework as the base of the covering-supra-dental prosthesis. After the clinical phase of determining the jaw relationships, a selection of anatomically shaped artificial teeth was made. In the next procedure, the wax model of supra-dental prosthesis for the lower jaw with the matrices of precise connecting elements and artificial teeth arrangement was performed. At the end, the model of the lower covering prosthesis was inserted, polymerized and the prosthesis was definitively processed and polished (Figure 2). The metal construction made of two pins under the covering caps with the pins of precise connecting elements on

the tops of the copings connected by a milled bar was cemented using self-binding adhesive cement (Totalcen, dual-cure, Itena Clinical, France) (Figures 3-5).

DISCUSSION

The retention of natural teeth or their roots is considered a biological concept that can significantly contribute to the preservation of the level of the remaining alveolar ridge in the jaws, and serve as retention of supra-dental prostheses [1, 3, 4, 5, 9, 10]. On the other hand, an increasing number of articles suggests extraction of the remaining teeth and placement of at least two (or four) implants as the best solution in treating edentulism: using supra-dental covering prosthesis [8, 11–14].

With regards to therapeutic approach in the repair and rehabilitation of the edentulous lower jaw in our patient, there were certain doubts regarding the solution and placement of the final prosthetic construction. When planning the definitive structure, the most important thing was to ensure axial transmission via precise connecting element-attachment towards the remaining roots. The decision to make a metal cast form of a milled bar as a definitive construction, and later an overdenture with a base reinforced with a metal framework, was conditioned by the presence of a metal-ceramic semicircular bridge in the upper jaw. The milled individual bar improves both retention and stability of the overdenture. Coronally placed attachment patrix ensures redistribution of occlusal and other forces that may occur in the function of the oro-facial system, towards the apical surfaces of the retained roots of the remaining supporting teeth [5, 9].

One of the possible solutions was to make cast extensions on the remaining roots, and telescope-double crowns with retentive extension bars for the retention in casted partial denture [9, 15, 16]. However, double telescopic crowns imposed the problem of over-dimensioning and aesthetically unsatisfactory effect as they were located in a visible sector of the mouth. The next possibility was the insertion of two or more implants – left and right, that is, distally in the edentulous ridge of the lower jaw. A decision for this solution was not made in the first place for financial reasons, and partly due to the poor bone quality of the edentulous ridge in our patient.

In our clinical case, a structure consisting of two dedicated copings (caps) with retention stakes in the prepared root canals was used. Between the dedicated copings was a milled crossbar [13]. In order to improve retention and stabilization of the covering supra-dental prosthesis on the basic metal structure with a bar, one dedicated coping could have been added distally, both left and right and one precise attachment pad in the shape of ring, regardless of the already existing ball-shaped attachment-patrix on top of each dedicated coping [16]. This solution was not applied in our case because the dedicated copings on the roots of the remaining canines were not massive enough, i.e. the area was not large enough to additionally accept the ring on the lateral surface of the coping (such construction would be too bulky, and in addition there would

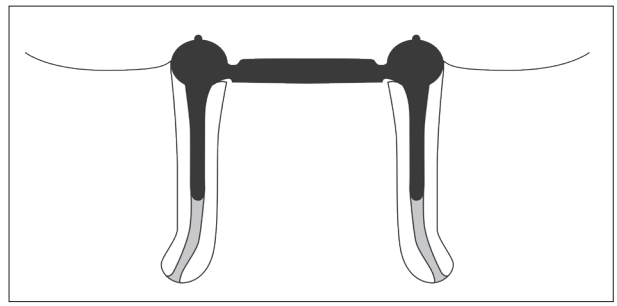

Figure 6. The roots of the canines in the parallel position and the possibility to remove up to 2/3 of the definitive endodontic filling from the root canal
Slika 6. Korenovi očnjaka u paralelnom položaju i mogućnost da se iz kanala korenova ukloni do 2/3 definitvnog endodontskog punjenja

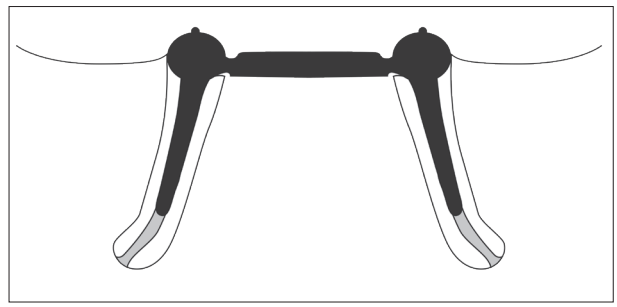

Figure 7. Divergently placed canine roots in the lower jaw-diagram illustrating the posts placed in the depressions after removal of up-to 2/3 of the length of the definitive endodontic filling in the canals of the left and right roots, after which it would not be possible to place the construction on the supporting tissues and the casted posts in the root canals.
Slika 7. Divergentno postavljeni korenovi očnjaka u donjoj vilici – dijagram ilustruje kočiće postavljene u udubljenja posle uklanjanja 2/3 dužine kanala i levog i desnog korena, posle čega ne bi bilo moguće postaviti konstrukciju na noseća tkiva i kočiće u kanale korenova.

be a problem of difficult or too intense separation and parting of the matrices from the abutments in the overall construction, which after some time could have caused the bonding cement to crack and the overall milled metal construction to separate from the roots together with the supra-dental prosthesis.

Since the roots of the remaining teeth have been endodontically treated, it was necessary to include cast metal posts in the definitive construction. Therefore, the root canal filling material was removed at least in the amount of ½ the length of the canal, or the best in the amount of 2/3 of the total length of the root canal (Figure 6). Difficulties, however, arise if the roots of the remaining teeth in the jaw are not parallel (Figures 7, 8). The dis-parallelism of the two remaining tooth roots can be overcome by calculating the permissible deviation and, accordingly, the value of the angle between the two not-parallel posts that still allow the placement of the supporting metal structure in one manual manipulation by the therapist. Good approach would also be to remove up to 2/3 of the length of the root canal from one remaining root, and from the other one to remove about 1/3 or possibly up to ½ of the filling, and then make (waxed) models of retentive posts (Figure 9, 10). However, the difference in convergence of the apical segments of the roots towards the medial line

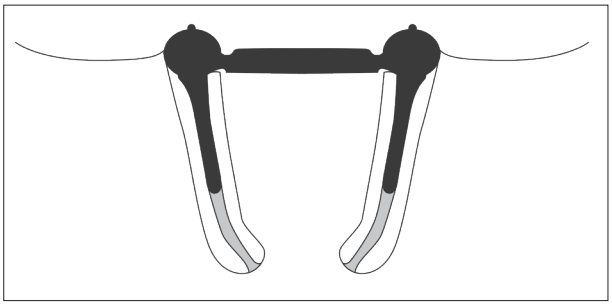

Figure 8. Not-parallel and convergent roots of canines (tips of the roots are located significantly closer to the reference medial line)
Slika 8. Disparalitet i konvergentnost korenova očnjaka (vrhovi korenova su locirani značajno bliže referentnoj medijalnoj liniji)

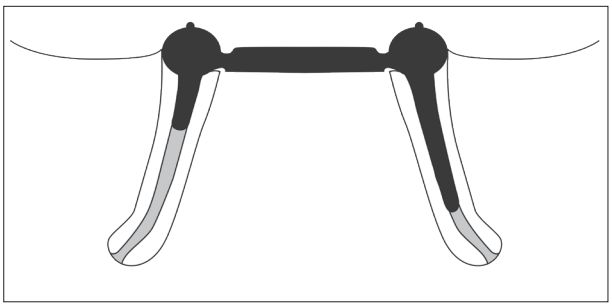

Figure 9. The drawing illustrates the situation when a definitive endodontic filling in the amount of 2/3 of the length of the root canal was prepared and removed in the right root canal, while a maximum of 1/3 of the root canal length (or even less) was removed in the left root which created favorable conditions for simultaneous manual cementation of the retention structure in both root canals.
Slika 9. Crtež ilustruje situaciju kada je u desnom kanalu korena preparirano i uklonjeno definitivno endodontsko punjenje u iznosu od 2/3 dužine kanala korena, dok je iz levog kanala korena ekstrahovano najviše do 1/3 dužine kanala korena (ili čak i manje), čime su stvoreni povoljni uslovi za jednovremeno manuelno cementiranje retencione konstrukcije u oba korenska kanala.

(Figure 8) could not be solved by the construction shown in our paper - in such cases the construction with two retention casted posts could not be placed in the roots of supporting teeth. Likewise, parallel roots of the remaining roots could be the problem too. In such cases, it would actually not be a good idea to form posts up to ½ the length of the root canal. Rather, it would be necessary to prepare deeper, and remove the canal filling before making the post model at least from 2/3 of the canal length of each canine root (Figure 6). Anatomically parallel root canals of the canines in the lower jaw represent a difficulty and a weakly resistant surface of the supra-structure could be easily removed from the root canal, as they are parallel between them as well as with separating, parting and removal of the prosthesis (Figure 6).

Regarding the shape of the dedicated copings over the surfaces of the remaining roots, three approaches could be considered in choosing the shape of the coping: 1) the first approach would imply that the copings are made symmetrically (like a hemisphere); 2) in the second approach, copings would be shaped as oval (more or less elongated, i.e. ellipsoidal) forms and 3) for dedicated covering copings to be additionally milled. According to the authors, the first approach is the most favorable in achieving the

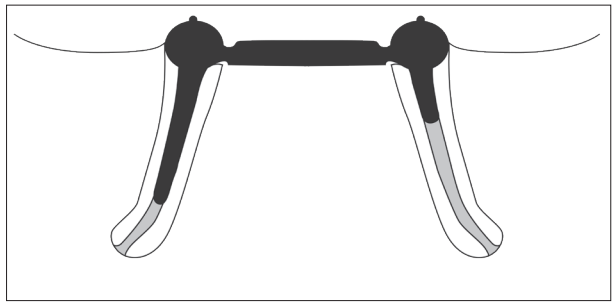

Figure 10. The drawing illustrates the situation when a definitive endodontic filling in the amount of 2/3 of the root canal length was prepared and removed in the left root canal, while in the right root canal only 1/3 of the root canal length (or even less) was removed, which created favorable conditions for simultaneous manual cementation of the retention structure in both root canals.
Slika 10. Crtež ilustruje situaciju kada je u levom kanalu korena preparirano i uklonjeno definitivno endodontsko punjenje u iznosu od 2/3 dužine kanala korena, dok je iz desnog kanala korena ekstrahovano najviše do 1/3 dužine kanala korena (ili čak i manje), čime su stvoreni povoljni uslovi za jednovremeno manuelno cementiranje retencione konstrukcije u oba korenska kanala.

best results due to the fact that only the hemispherical shape allows centric-axial loading on the top of the hemispherical surface (which is significant in this clinical case due to the placement of the supplementary connecting element-patrix on the surface of the hemisphere), and it also enables more favorable redistribution of the forces acting on the surface of the coping during the functions of the oro-facial (stomatognathic) system [9]. The second approach - which involves designing a dedicated ovoid, i.e. oval-shaped coping in this case could not be recommended, both because of the impossibility of directing the occlusal and all other forces in the function of the oro-facial system in axial direction, as well as because of the difficulties in determining the exact position of supplementary precise connecting element-attachment on the top of the dedicated coping. The third possibility, which refers to the milling of the copings, could not be applied in our case, as milled surface, although it significantly contributes to the primary and secondary retention of the dedicated coping in general [7], would not achieve either sufficient or significantly large surface of the prosthesis resting on the milled surfaces, and therefore secondary retention-stabilization would not be significantly improved.

Special protective coping needs to be designed to protect the tooth structure of the remaining carrier teeth and prevent loosening and falling the roots of retained carrier teeth in the jaw [11]. Protective copings are considered as a very necessary ones, even in cases where the remaining last teeth are planned to be extracted and be replaced with implants as a supporting structure [13].

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Terapija donje vilice supradentalnom prekrivnom protezom retiniranom prečkom i preciznim kugličastim veznim elementima

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KRATAK SADRŽAJ

Uvod Frezovana prečka sa dodatkom dva precizna atečmena lateralno levo i desno na krajevima fiksne konstrukcije može značajno doprineti poboljšanju primarne i sekundarne retencije ne samo parcijalne proteze već i prekrivne proteze.

Cilj rada je da na osnovu prikaza slučaja iz kliničke prakse ukaže na mogućnost poboljšanja stabilnosti prekrivne proteze u donjoj vilici u kojoj su postavljena dva precizna vezna elementa i jedna frezovana prečka.

Prikaz slučaja Pacijent muškog pola star 65 godina imao je dva endodontski sanirana korena očnjaka sa desne i sa leve strane u donjoj vilici. Krezubost u gornjoj vilici je zbrinuta postavljanjem semicirkularnog mosta. Odluka da kao definitivna konstrukcija bude izrađena metalna frezovana prečka i kasnije i prekrivna proteza sa bazom ojačanom metalnim skeletom je bila uslovljena prisustvom metalokeramičkog semicirkularnog mosta u gornjoj vilici. Endodontski lečeni i zbrinuti kanali korenova dva preostala očnjaka u donjoj vilici su preparirani za postavljanje livenih kočića. Posle definitivnog otiskivanja donje vilice i preostalih korenova u donjoj vilici A-silikonom u individualnoj kašici, izliven je radni model od tvrdog gipsa sa reprodukcijama prepariranih kanala korenova očnjaka. Zatim su izlivena dva metalna kočića i kapice povezane frezovanom prečkom. Patrice preciznih veznih elemenata su zatim postavljene na vrhove prekrivnih kapica u sveukupnoj protetskoj konstrukciji vodeći pri tome računa da bude ostvaren aksijalni prenos preko preciznog veznog elementa prema korenu kanala očnjaka na desnoj i na levoj strani vilice. Model protetske konstrukcije je zatim odvojen od radnog modela donje vilice i uložen i izliven. U sledećem postupku je oblikovan skelet baze buduće donje prekrivne proteze koji je uložen i izliven. Posle faze određivanja međuviličnih odnosa izvršen je izbor anatomski oblikovanih akrilatnih veštačkih zuba. U sledećem postupku je u ustima obavljena proba voštanog modela donje prekrivne proteze sa postavljenim matricama preciznih veznih elemenata. Na kraju je model prekrivne proteze uložen, polimerizovan i proteza je difinitivno obrađena i ispolirana. Metalna konstrukcija sačinjena od dva kočića ispod prekrivnih kapica sa patricama preciznih veznih elemenata na vrhovima kapica povezanih frezovanom prečkom cementirana je pomoću samovezujućeg adhezivog cementa istovremeno sa postavljanjem prekrivne proteze na noseća tkiva.

Zaključak Frezovana individualizovana prečka poboljšava i retenciju i stabilnost prekrivne proteze. Koronarno postavljena patrica atečmena obezbeđuje preraspodelu okluzionih i drugih sila koje se mogu javiti u funkciji orofacijalnog sistema, prema apikalnim površinama korenova preostalih zuba nosača.

Ključne reči: supradentalna proteza; donja vilica; precizni vezni element

UVOD

U domaćoj i inostranoj literaturi iz stomatološke protetike postoji čitav niz navoda i prikaza različitih retencionih sistema koji mogu biti primenjeni u rešavanju suptotalne krezubosti, u slučajevima kada u ustima pacijenta još uvek postoji nekoliko zadržanih zuba, ili korenova zuba i kada još uvek nije postignut konsenzus oko ugradnje implanta.

Pojedini, u literaturi pominjani, sistemi predstavljaju jednostavnija konstrukciona rešenja. [1–5]. Drugi sistemi, međutim, imaju složenije komponente u sastavu dentalne protetske konstrukcije [5–8].

Uzimajući u obzir čitav spektar različitih retencionih sistema koji danas postoje na dentalnom tržištu, vrlo važan pristup u rešavanju problema retencije i stabilizacije proteza kod pacijenata sa suptotalnom krezubošću čine sagledavanje i procena takvog sistema preciznih veznih elemenata koji će za dati tip krezubosti najviše doprineti primarnoj retenciji i sekundarnoj retenciji – stabilizaciji.

Cilj ovog rada je da na osnovu prikaza slučaja iz kliničke prakse ukaže na mogućnost poboljšanja stabilnosti prekrivne proteze u donjoj vilici u kojoj su primarno postavljena dva precizna vezna elementa i jedna frezovana prečka kao nosioci proteze.

PRIKAZ SLUČAJA

Pacijent muškog pola SD, star 65 godina, imao je dva endodontski sanirana korena očnjaka sa desne i sa leve strane u donjoj vilici. Krezubost u gornjoj vilici je zbrinuta postavljanjem semicirkularnog mosta. Endodontski lečeni i zbrinuti kanali disparalelnih korenova dva preostala očnjaka u donjoj vilici su preparirani i pripremljeni za protetsku sanaciju uklanjanjem 2/3 dužine jednog kanalnog punjenja i uklanjanjem 1/3 dužine kanala korena suprotnog preostalog očnjaka. Posle definitivnog otiskivanja donje vilice i preostalih korenova u donjoj vilici A-silikonom u individualnoj kašici je izliven radni model od tvrdog gipsa (Elite-master sa smolom, tip IV, Zhermack, Italy) sa reprodukovanim konično oblikovanim udubljenjima u prepariranim kanalima korenova očnjaka. U sledećem postupku, pomoću voska za modelaciju oblikovani su voštani kočići odgovarajući oblicima prepariranih udubljenja u kanalima korenova preostalih očnjaka, a zatim su modelovane kapice od voska nad preostalim kruničnim površinama očnjaka. Između kapica je oblikovana individualizovana frezovana prečka (Bredent, VSP-FS/GS, Germany), a na vrhovima voštanih oblika prekrivnih kapica je postavljena sa svake strane po jedna patrica preciznog veznog elementa (Bredent VKS-uni 1.7 mm, Germany). Zatim je model sveukupne konstrukcije koja se sastojala od dva kočića sa kapicama povezanim frezovanom prečkom uložen u cilindar sa masom za ulaganje i izliven legurom specifičnih metala (Wironit® Bego, USA).

U sledećem postupku je korišćenjem voštanih profila oblikovan skelet baze buduće donje prekrivne supradentalne proteze, koji je uložen i izliven od Co-Cr-Mo legure (Remanium GM 800, Dentaurum, Germany) (Slika 1). Na radnom modelu krezube vilice oblikovani su voštani bedem i zagrižajna šablona, u čijem sastavu se nalazio i izliven skelet baze prekrivne supradentalne proteze. Posle faze određivanja međuviličnih odnosa izvršen je izbor anatomski oblikovanih veštačkih zuba. U sledećem postupku je obavljena proba voštanog modela donje prekrivne proteze sa postavljenim matricama preciznih veznih elemenata. Na kraju je model donje prekrivne proteze uložen, polimerizovan i proteza je definitivno obrađena i ispolirana (Slika 2). Metalna konstrukcija sačinjena od dva kočića ispod prekrivnih kapica sa patricama preciznih veznih elemenata na vrhovima kapica povezanih frezovanom prečkom cementirana je pomoću samovezujućeg adhezivog cementa (Totalcen, dual-cure, Itena Clinical, France) istovremeno sa postavljanjem prekrivne proteze na noseća tkiva (slike 3, 4, 5).

DISKUSIJA

Zadržavanje preostalih zuba, odnosno korenova zuba u vilicama, još uvek se smatra biološkim konceptom koji može značajno doprineti očuvanju nivoa preostalog alveolarnog grebena u vilicama i poslužiti za prihvatanje prekrivne supradentalne proteze [1, 3, 4, 5, 9, 10]. Sa druge strane, u stručnoj, posebno inostranoj literaturi, može se naći sve veći broj radova koji navode podatak da je upravo ekstrakcija dva ili jednog preostalog zuba u vilici i postavljanje najmanje dva, odnosno četiri implanta najboje rešenje u primenjenoj terapiji uslovne krezubosti, odnosno bezubosti supradentalnom prekrivnom protezom [8, 11–14].

U pogledu terapijskog pristupa u saniranju i rehabilitovanju krezube donje vilice, kod ovog pacijenta je bilo izvesnih nedoumica u pogledu rešenja i postavljanja konačne protetske konstrukcije. Pri planiranju definitivne konstrukcije najviše se vodilo računa o tome da obavezno bude ostvaren aksijalni prenos preko preciznog veznog elementa prema korenu kanala očnjaka na desnoj i na levoj strani vilice. Odluka da kao definitivna konstrukcija bude izrađena metalna livena forma frezovane prečke, a kasnije i prekrivna proteza sa bazom ojačanom metalnim skeletom bila je uslovljena prisustvom metalokeramičkog semicirkularnog mosta u gornjoj vilici. Frezovana individualizovana prečka poboljšava i retenciju i stabilnost prekrivne proteze. Koronarno postavljena patrica atečmena obezbeđuje preraspodelu okluzionih i drugih sila koje se mogu javiti u funkciji orofacijalnog sistema, prema apikalnim površinama zadržanih korenova preostalih zuba nosača [5, 9].

Inače, prema mogućnostima koje bi bile na raspolaganju na osnovu prikaza sličnih slučajeva iz domaće, a takođe i iz strane literature, jedan od mogućih pristupa je bio da na preostalim korenovima budu napravljene livene nadogradnje, i zatim teleskop-dvostruke krune sa retencionim produžecima za skeletiranu parcijalnu protezu [9, 15, 16]. U tom smislu odmah su nametnuti i problem predimenzioniranosti i problem estetski nezadovoljavajućeg efekta dvostrukih teleskopskih kruna na očnjacima, koji se zapravo nalaze u veoma vidljivom sektoru u ustima, tako da svako, makar i diskretno, povećanje dimenzija fasete ili spoljašnje krune u celini narušava spontanost i harmoniju u estetskom i fizičkom izgledu pacijenta. Sledeća mogućnost u terapijskom pristupanju sanacije krezubosti donje vilice pacijenta je bila ugradnja dva ili više implantata – levo i desno, odnosno distalno u bezubi greben donje vilice. Za ovakvo rešenje nije doneta odluka u prvom redu iz finansijskih razloga, a delimično i stoga što je kvalitet kosti bezubog grebena na jednoj strani donje vilice bio unekoliko sporan i oslabljen.

U pogledu razmatranja dizajna konstrukcije koja je izabrana kao rešenje u zbrinjavanju krezubosti i protetskoj rehabilitaciji pacijenta u ovom kliničkom slučaju je primenjena konstrukcija koja se sastoji od dve namenske kapice sa kočićima za retencije u prepariranim kanalima korenova. Između namenskih kapica se nalazi frezovana prečka [13]. Jedna od mogućnosti je bila i da se, u cilju poboljšanja retencije i stabilizacije prekrivne proteze na osnovnoj metalnoj konstrukciji sa prečkom dodatno distalno, na lateralnoj distalnoj strani desne namenske kapice i na lateralnoj distalnoj strani leve namenske kapice doda po jedna patrica preciznog atečmena u obliku prstena, bez obzira na već postojeću patricu atečmena kugličastog oblika na vrhu svake namenske kapice [16]. Ovakvo rešenje nije primenjeno u ovom slučaju iz razloga što namenske kapice na korenovima preostalih očnjaka nisu bile dovoljno masivne, odnosno po površini velike da dodatno prihvate i prsten na lateralnoj površini kapice (takva konstrukcija bi bila preglomazna, a pored toga bi postojao i problem otežanog ili previše intenzivnog odvajanja i razdvajanja matrica od patrica u sveukupnoj konstrukciji, što bi posle izvesnog vremena moglo uzrokovati pucanje vezujućeg cementa i odvajanje sveukupne frezovane metalne konstrukcije od korenova zajedno sa supradentalnom protezom).

Ukoliko su korenovi preostalih zuba endodontski tretirani, neophodno je u definitivnu konstrukciju uključiti izlivene metalne kočiće. U tom smislu punjenje iz kanala korena treba ukloniti bar u iznosu od 1/2 dužine kanala, a najbolje bi bilo ukoliko bi punjenje bilo uklonjeno u iznosu od 2/3 od ukupne dužine kanala korena (Slika 6). Teškoće, međutim, nastaju ukoliko su korenovi preostalih zuba u vilici disparalelni. Što je disparalelitet veći, problem je izraženiji (slike 7 i 8) Disparalelitet dva preostala korena zuba može se prevazići izračunavanjem dozvoljenog odstupanja i shodno tome vrednosti ugla između dva disparalelna kočića koji još uvek dopuštaju postavljanje noseće metalne konstrukcije u jednoj manuelnoj manipulaciji terapeuta. U tom smislu, takođe je dobar pristup ukloniti do 2/3 dužine kanala korena iz jednog preostalog nosača, a iz drugog ukloniti oko 1/3 ili eventualno najviše do 1/2 punjenja, i zatim napraviti modele retencionih kočića (slike 9 i 10). Međutim, disparalelitet u smislu konvergencije apikalnih segmenata korenova prema medijalnoj liniji (Slika 8) ne može se rešiti konstrukcijom prikazanom u ovom radu – u takvim slučajevima konstrukcija sa dva retenciona izlivena kočića ne bi mogla biti postavljena u korenove zuba nosača. Isto tako, prilično izražen problem mogu predstavljati i paralelno postavljeni korenovi preostalih očnjaka u kosti. U takvim slučajevima zapravo ne bi bilo dobro oblikovati kočiće u dužini do 1/2 kanala korena, već bi bilo potrebno preparirati dublje, i kanalno punjenje pre izrade modela kočića ukloniti bar iz 2/3 dužine kanala svakog korena očnjaka (Slika 6). Anatomski paralelno postavljeni kanali korenova očnjaka u donjoj vilici predstavljaju teškoću i slabo otpornu površinu konstrukcije, koja može biti lako izvađena iz kanala korenova, s obzirom na činjenicu da se nalazi u istom pravcu koji je ujedno i pravac odvajanja, iznošenja i vađenja proteze (Slika 6).

U pogledu oblika namenskih kapica nad površinama preostale zubne supstance levog i desnog očnjaka mogla bi se

razmatrati tri pristupa u oblikovanju kapice: 1) prvi pristup bi podrazumevao da kapice budu napravljene simetrično (kao polulopta); 2) u drugom pristupu bi trebalo uzeti u obzir i mogućnost da kapice budu oblikovane kao ovalne (manje-više izdužene, odnosno elipsoidne) forme i 3) da namenske prekrivne kapice budu dodatno frezovane. Prema mišljenju autora, prvi pristup najviše pogoduje u ostvarenju najboljeg rezultata u terapiji krezubosti donje vilice iz razloga što samo poluloptasti oblik dozvoljava centrično-aksijalno opterećenje na vrhu poluloptaste površine (što je u ovom kliničkom slučaju značajno zbog postavljanja dopunskog veznog elementa – patrice na površinu polulopte), a takođe i omogućava povoljniju preraspodelu sila koje deluju na površinu kapice tokom funkcija orofacijalnog, (stomatognatog) sistema [9]. Drugi pristup, gde se podrazumeva oblikovanje namenske kapice ovoidnog, odnosno ovalnog oblika, u ovom slučaju ne bi mogao biti preporuka, kako zbog nemogućnosti usmeravanja okluzionih i svih drugih sila u funkciji orofacijalnog sistema u aksijalnom pravcu, tako i zbog teškoća u određivanju tačnog položaja dopunskog preciznog veznog elementa na vrhu namenske kapice. Treća mogućnost, koja se odnosi na frezovanje kapica, takođe ne bi mogla doći u obzir da bude primenjena u ovom radu, iz razloga što frezovana površina, iako značajno doprinosi primarnoj i sekundarnoj retenciji namenske kapice uopšte [7], ne bi ostvarila ni dovoljnu, niti značajno veliku površinu naleganja proteze na frezovane površine, pa samim tim ni sekundarna retencija– stabilizacija ne bi bila značajno poboljšana.

Zaštitne namenske kapice je potrebno oblikovati da bi se zaštitila zubna supstanca preostalih zuba nosača i preveniralo labavljenje i ispadanje korenova zadržanih zuba nosača u vilici [11]. Zaštitne kapice se smatraju veoma potrebnim čak i u slučajevima kada je planirano da i poslednji zubi budu izvađeni i da na njihovom mestu budu ugrađeni implantati kao nosači konstrukcije [13].