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EFEKAT BAZIČNE TERAPIJE PARODONTOPATIJE NA KVALITET ŽIVOTA PACIJENATA STARIJE ŽIVOTNE DOBI

THE IMPACT OF BASIC PERIODONTAL THERAPY ON THE QUALITY OF LIFE OF ELDERLY PEOPLE

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Sažetak

Uvod: Kvalitet života u vezi sa oralnim zdravljem je važna mera bolesti i samih ishoda terapijskih intervencija. Parodontopatija je inflamatorno oboljenje koje je povezano sa opštim stanjem pacijenta i negativno utiče na kvalitet života.

Cilj ovog istraživanja bio je da se ispita efekat bazične terapije parodontopatije na kvalitet života kod pacijenata starijeg doba sa hroničnom parodontopatijom.

Materijali i metode: Pacijenti sa parodontopatijom nasumice su raspoređeni u studijsku grupu (n=44) kod kojih je sprovedena bazična terapija, i kontrolnu grupu (n=44), koja nije primila nikakav tretman. Protokol je uključivao popunjavanje upitnika OHIP-14, pre i mesec dana posle tretmana, klinički pregled i bazičnu terapiju parodontopatije. Pacijenti su popunili i dodatna pitanja o zdravlju gingive kao i uticaju parodontopatije na kvalitet života.

Rezultati: Rezultati kliničkih parodontalnih parametara nisu pokazali signifikantnu razliku među grupama na početku ispitivanja. Na kontroli je zabeleženo poboljšanje svih kliničkih parametara i signifikantna razlika između ispitivanih grupa (p<0,05), kao i u tretiranoj grupi pre i posle tretmana (p<0,001). Statistički značajne promene (p<0,001) u tretiranoj grupi zabeležene su za impakciju hrane, izbegavanje unosa određene vrste hrane, loš zadah, izbegavanje smejanja i prisustvo apscesa. Zdravlje gingive ocenjeno je sa „loše“ ili „veoma loše“ kod 42,73% ispitanika. Uticaj parodontopatije na svakodnevne aktivnosti kod pacijenata izražen je sa „često“ ili „uvek“ kada se smatralo da imaju najčešće probleme vezane za ove aktivnosti.

Zaključak: Bazična terapija parodontopatije značajno je uticala na kvalitet života pacijenata starijeg doba sa hroničnom parodontopatijom. Utvrđene su značajne razlike između odgovora pre i posle tretmana. U ovoj studiji uočen je prihvaćeni stepen svesti o problemima oralnog zdravlja u vezi sa parodontalnom bolešću kod pacijenata starijeg doba.

Ključne reči: starije osobe, parodontopatija, kvalitet života, OHIP

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Abstract

Introduction: The quality of life related to oral health is an important measure of the disease and the outcome of therapeutic interventions. Periodontitis is an inflammatory disease that is associated with the general state of the patient's organism and negatively affects the quality of life.

The aim of this study was to examine the effect of basic periodontal therapy on the quality of life in elderly patients with periodontitis.

Materials and methods: A total of 88 patients with periodontitis were randomly assigned to the group (n=44) who underwent basic therapy, while the control group (n=44) did not receive any treatment. The protocol included filling out a questionnaire OHIP-14 prior to and one month after the treatment, clinical examination and basic periodontal therapy. Patients also filled up additional questions about the gingival health as well as the impact of periodontal disease on the quality of life.

Results: Clinical periodontal parameters did not show a significant difference between the groups at the beginning of the study. Improvement of all clinical parameters showing the periodontium state and a significant difference between the investigated groups (p<0.05), as well as in the treated group before and after treatment (p<0.001) was noted at the checkup. Statistically significant changes (p<0.001) like food impaction, avoiding the intake of certain foods, bad breath, avoiding laughing, and the presence of an abscess were recorded mainly in the treated group. Gingival health was rated "bad" or "very bad" with 42.73% of respondents. The impact of periodontitis on everyday activities is expressed by a simple questionnaire. All patients who answered "often" or "always" were considered to have the most common problems associated with these activities.

Conclusion: The basic periodontal therapy has significantly affected the quality of life in elderly patients with periodontitis. Significant differences between the responses before and after treatment were identified.

Key words: elderly people, periodontitis, quality of life, OHIP

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Uvod

Hronična parodontopatija (HP) je inflamatorno oboljenje koje negativno utiče na estetiku, mastikatorne i govorne funkcije pojedinaca^{1,2}. To je multifaktorijalna bolest koja je modifikovana imunološkim, mikrobnim, genetskim i faktorima rizika iz životne sredine, koji na kraju određuju ozbiljnost kliničke slike oboljenja. Kako je parodontopatija u početnim fazama asimptomatska, pacijenti mogu biti nesvesni njihovog kliničkog statusa parodonta^{3,5} i ne primećivati ono što je potrebno za lečenje⁶. Sa razvojem oboljenja, javljaju se znakovi i simptomi koji su vidljivi i pacijentima, kao što je krvarenje, labavljenje i migracija zuba, bol kod komplikacija, problem u ishrani, nelagodnost u interdentalnim prostorima, itd.^{7,8}

Težina parodontalnog oboljenja dokumentuje se kliničkim parametrima kao što su prisustvo plaka, kamenca i konkremenata, krvarenje, dubina parodontalnih džepova i nivo pripojnog epitela⁹. Drugi simptomi parodontalnog oboljenja, koji mnogo više pacijentima zaokupljaju pažnju, a posledice su hronične upale i razaranja tkiva zuba, uključuju crvenilo i otok gingive, krvarenje pri četkanju, labavljenje zuba i loš zadah. Ovakvi simptomi su veoma relevantni sa stanovišta pacijenata i odražavaju se negativno na njihov kvalitet života¹⁰.

U poslednjih dvadesetak godina, zadovoljstvo pacijenata i njihov kvalitet života se sve više uzima u obzir kao važan ishod stomatološke terapije. Kvalitet života opisan je kao multidimenzionalni koncept terapije, koji uključuje fizičke, emocionalne, socijalne i druge faktore¹¹⁻¹³. Fazekas¹⁴ je podržao koncept potpune brige o pacijentu: ne treba samo gledati na primarno oboljenje i raditi samo osnovni tretman i prevenciju istog, već sagledati pacijenta generalno, što znači pratiti i fizičke, psihološke i socijalne aspekte bolesti i poremećaja. Reisine i Miller¹⁵ i Adulyanon i sar.¹⁶ opisali su da oralni simptomi, koji se odnose na probleme sa ishranom, govorom, interakcijom i emocionalnim i psihološkim funkcijama, kao i ideja da nelagodnost, invalidnost i oralno oštećenje utiču na kvalitet života.

Ova pažnja je dovela do razvoja različitih tipova upitnika koji mere aspekte kvaliteta života pacijenata. Percepcija kvaliteta života u vezi sa oralnim zdravljem (OHRKOL) prikazana je u velikom broju istraživanja¹⁷⁻²². Visoka validnost sadržaja za merenje uticaja tretmana na reakciju pacijentovog kvaliteta života posebno je uočena u upitniku OHIP-14.

Introduction

Chronic periodontitis (CP) is an inflammatory disease that negatively affects the aesthetics, mastication and speech functions of individuals^{1,2}. It is a multifactorial disease that is modified by immunological, microbial, genetic, and environmental risk factors, which ultimately determine the severity of the clinical picture of the disease. As periodontitis is at the initial stages asymptomatic, patients may be unaware of their clinical status of periodontal disease^{3,4,5} and do not notice what is needed for the treatment⁶. As the disease progresses, signs and symptoms such as bleeding, loosening and tooth migration, eating disorders and discomfort in interdental spaces are clearly obvious and visible by the patients^{7,8}.

The seriousness of the periodontal disease is documented by clinical parameters such as the presence of plaque, calculi, and concretions, bleeding, the depth of periodontal pockets, and the level of the adherent epithelial cells⁹. Patients are more concerned about other symptoms such as redness and gingival enlargement, bleeding, loosening and bad breath which are the consequences of chronic inflammation and destruction of tooth tissue. These symptoms are very relevant from the patient's point of view and reflect negatively on their quality of life¹⁰.

Over the past twenty years, patient satisfaction and their quality of life have been increasingly taken into account as an important outcome of dental therapy. The quality of life is described as a multi-dimensional concept of therapy that includes physical, emotional, social and other factors^{11,12,13}. Fazekas¹⁴ supported the concept of total patient care: it is not just necessary to look at the primary disease and to work only on the basic treatment and prevention but to look at the patient in general, which means monitoring the physical, psychological and social aspects of the disease and disorder. Reisine, Miller¹⁵ and Adulyanon et al.¹⁶ described that oral symptoms, related to nutritional problems, speech, interaction, and emotional and psychological functions, as well as the idea of discomfort, disability and oral damage, affect the quality of life.

This attention has led to the development of different types of questionnaires that measure aspects of patients' quality of life. Perception of oral health related to the quality

OHIP-14 je kraća verzija upitnika o oralnom zdravlju i ima dobru pouzdanost, validnost i preciznost, što je potvrđeno od strane Sladea²³. Dosta se koristi za upoređivanje razlika pre i posle terapije različitih stomatoloških problema^{20,24-33}. Rezultati ranijih istraživanja o uticaju parodontalnog tretmana na kvalitet života u vezi sa oralnim zdravljem pokazali su poboljšanja kod pacijenata, posebno za bol, jelo i žvakanje, kao i psihološku funkciju³¹.

Kvalitet života u vezi sa oralnim zdravljem je važna mera ishoda bolesti i terapijskih intervencija, koja se odražava na zadovoljstvo pacijenta u odnosu na specifične domene života³⁴⁻³⁶. Nekoliko studija je dokumentovalo da nelečena hronična parodontopatija ima negativan uticaj na kvalitet života u vezi sa oralnim zdravljem³⁷⁻⁴³.

Dokazano je da je bazična terapija efikasna u lečenju parodontalnih bolesti⁴⁴⁻⁴⁶. Rezultati istraživanja pokazali su pozitivan uticaj na kvalitet života nakon ove terapije parodontalnog oboljenja^{47,48}. Rezultati istraživanja Shanbhag i sar.⁴⁹ pokazali su da, bazična terapija, kao jedna od varijanti lečenja ovog oboljenja, ima uticaja na OHRKoL i zaključeno je da može poboljšati kvalitet života kod osoba sa hroničnom parodontopatijom.

Parodontopatija kod starijih osoba utiče na način ishrane, kao i na izbor hrane, komunikaciju i izgled, smanjujući njihov kvalitet života. Problemi sa oralnim zdravljem kod starijih osoba mogu uticati na njihovu percepciju za dobro oralno stanje, kao i na njihovo socijalno i fizičko funkcionisanje. Gubitak pojedinih ili svih zuba, migracija i labavljenje istih, slabija oralna higijena, unos mekše i kašaste hrane, kao i prisustvo raznih sistemskih stanja, može značajno uticati na kvalitet života starijih osoba.

Stoga, ovo istraživanje ima za cilj da proceni uticaj bazične terapije parodontopatije na kvalitet života kod starijih pacijenata korišćenjem OHIP-14 upitnika. Samoocenjivanje kvaliteta života vezanog za oralno zdravlje bilo je povezano sa karakteristikama parodonta i kliničkim parametrima zabeleženih kod učesnika ovog istraživanja.

of life (OHQOL-UK) was shown in a large number of studies¹⁷⁻²². The high validity of the content for measuring the impact of treatment on the patient's quality of life response is particularly noticeable in the OHIP-14 questionnaire. OHIP-14 is a shorter version of the oral health questionnaire, and OHIP-14 is reliable, valid and accurate, as confirmed by Slade²³. It is used to compare differences before and after the treatment of various dental problems^{20,24-33}. The results of earlier studies on the impact of periodontal treatment on the oral health-related quality of life have shown improvement in patients, especially regarding the pain, eating and chewing, as well as psychological function³¹.

The quality of life related to oral health is an important measure of the outcome of the disease and therapeutic interventions, which reflects the patient's satisfaction with specific aspects of life³⁴⁻³⁶. Several studies have documented that unspecified chronic periodontitis has a negative impact on the oral health-related quality of life³⁷⁻⁴³.

Basic periodontal therapy has been shown to be effective in the treatment of periodontal disease⁴⁴⁻⁴⁶. The results of the study showed a positive impact on the quality of life after this treatment of periodontal disease^{47,48}. Research results by Shanbhag et al. have shown that basic therapy, as one of the variants of treatment for this disease, has an impact on OHQoL-UK and it has been concluded that it can improve the quality of life in people with chronic periodontitis⁴⁹.

Periodontal disease in elderly affects the way of eating, as well as the choice of food, communication, and appearance, reducing their quality of life. Oral health problems in the elderly can affect their perception of a good oral state, as well as their social and physical functioning. The loss of some or all of the teeth, migration and loosening, poor oral hygiene, the intake of softer and mushy foods, as well as the presence of various systemic conditions can also affect the quality of life of elderly.

Therefore, this research aims to evaluate the effect of basic periodontal therapy on the quality of life in elderly patients using OHIP-14 questionnaires. Self-assessment of the quality of life associated with oral health was associated with the periodontal characteristics and clinical parameters recorded in participants of this study.

Materijal i metode

Ovo prospektivno istraživanje rađeno je u Službi za parodontologiju i oralnu medicinu Klinike za stomatologiju Medicinskog fakulteta u Nišu. Odobreno je od strane Etičkog odbora Klinike (br.20/6-2018-2EO). Istraživanje je trajalo 9 meseci (od 01.02. do 30.10. 2018.godine).

Pacijenti sa hroničnom parodontopatijom, koji su došli u Službu za parodontologiju Klinike za stomatologiju radi terapije parodontalnog oboljenja, nasumice su birani za ovu studiju. Svi eventualni učesnici studije upoznati su sa prirodom istraživanja i nakon usmenog pristanka, potpisali su i informativnu saglasnost pre početka tretmana. Kriterijumi za uključivanje u istraživanje bili su: (I) osobe od 60-65 godina starosti; (II) osobe sa hroničnom parodontopatijom i (III) osobe koje imaju najmanje 12 zuba. Kriterijumi isključivanja iz istraživanja su: (I) osobe kojima je rađen parodontalni tretman u proteklih 6 meseci; (II) osobe koje su bile na antibiotskoj terapiji iz bilo kog razloga unazad 6 meseci (III), osobe na terapiji sistemskim ili topikalnim nesteroidnim antiinflamatornim lekovima i (IV) mentalno hendikepirane osobe.

Odabrani učesnici (ukupno 88 pacijenata) podeljeni su u dve grupe: ispitivanu (44) i kontrolnu grupu (44). Anamnezom su prikupljeni demografski podaci učesnika, dok je kliničkim pregledom određeno stanje parodonta kod svih pacijenata.

Standardna oprema za klinički pregled sastojala se od stomatološke stolice sa veštačkom svetlošću, parodontalne sonde i stomatološkog ogledalceta. Za dijagnozu je korišćen i rendgenski snimak kada je to bilo potrebno. Klinički pregled obavio je jedan klinički lekar. Pre kliničkog pregleda, svi pacijenti popunili su OHIP-14 upitnik i modifikovan upitnik o samoproceni stanja parodonta. U okviru kliničkog pregleda određivani su parodontalni parametri uključujući prisustvo mekih naslaga (Pli), prisustvo inflamacije gingive (Gi, Ikrv), dubina parodontalnih džepova (PPD) i gubitak kliničkog pripoja (CAL) koristeći Villiams parodontalnu sondu (Hu-Friedi, Čikago SAD).

Material and methods

This prospective study was conducted in the Department of Periodontology and Oral Medicine of the Dentistry Clinic at the Faculty of Medicine in Niš. Approved by the Ethics Committee of the Clinic (No:20/6-2018-2EO). The research lasted for a period of 9 months (from February 1st to October 30th, 2018).

Patients with chronic periodontitis who came to the Periodontology Department of the Dentistry Clinic for the treatment of periodontal disease were randomly selected for this study. All potential participants of the study were familiar with the nature of the research and after the vocal consent, they also signed the informative consent before the beginning of the treatment. Criteria for inclusion in the research were: (I) 60-65 years old; (II) persons with chronic periodontitis; and (III) persons with at least 12 teeth. Criteria for exclusion from the study were: (I) persons who have undergone periodontal treatment over the past 6 months; (II) persons who have been on antibiotic therapy for any reason back for 6 months (III), persons on therapy with systemic or topical non-steroidal anti-inflammatory drugs; and (IV) mentally handicapped persons.

The selected participants (a total of 88 patients) were divided into two groups: the examined (44 of them) and the control group (44 of them). Demographic data of the participants were collected by anamnesis, while the clinical examination determined the periodontal state in all patients.

The standard equipment for clinical examination consisted of a dental chair with artificial light, a periodontal probe, and a dental mirror. An X-ray was used for diagnosis when needed. A clinical examination was performed by a clinical doctor. Before the clinical examination, all patients completed the OHIP-14 questionnaire and a modified questionnaire on self-assessment of the periodontal condition. Within the clinical examination, periodontal parameters including the dental plaque index (Pli), gingivitis (Gi, Ikrv), the depth of periodontal pockets (PPD), and clinical attachment loss (CAL) were determined using the Williams periodontal probe (Hu-Friedi, Chicago USA).

The clinical diagnosis of periodontal health was obtained on the basis of certain

Klinička dijagnoza zdravlja parodonta dobijena je na osnovu određenih kliničkih parametara učesnika istraživanja. Za klasifikaciju oboljenja korišćena je klasifikacija Američke akademije za parodontologiju (AAP) za parodontalno oboljenje⁵⁰. Prema njoj, sve forme oboljenja evidentirane su kao: umerena parodontopatija (sa parodontalnim džepovima ≤ 5 mm) i teška parodontopatija (sa parodontalnim džepovima > 5 mm).

Svi učesnici dobili su instrukcije o održavanju oralne higijene, koje su obuhvatile upotrebu četkice za zube, interdentalne četkice i zubnog konca, odgovorajuću tehniku pranja zuba (modifikovana bas tehnika), i savet za upotrebu 0,12% hlorheksidina za ispiranje usne duplje. Pacijentima iz ispitivane grupe odrađena je bazična terapija u okviru koje su uklonjene meke i čvrste naslage od strane jednog lekara uz upotrebu ultrazvučnog skalera (WOODPECKER) i Gracyevih kireta (Hu-Friedi, Chicago, IL, SAD) za uklanjanje nekrotičnog cementa i detritusa iz parodontalnog džepa. Pacijentima kontrolne grupe odrađen je klinički pregled stanja.

Nakon mesec dana, izvršena je kontrolna poseta gde je odrađena remotivacija i profesionalna profilaksa učesnicima istraživanja.

Kvalitet života u vezi sa oralnim zdravljem određivanje korišćenjem upitnika „Oral Health Impact Profile-14 (OHIP-14)“, kraća verzija⁵¹. Upitnik se sastojao od 14 pitanja podeljenih na 7 delova: funkcionalna ograničenja, fizički bol, psihološka nelagodnost, fizička nesposobnost, psihološka invalidnost, socijalna nesposobnost i hendikep. Učesnicima je jedan lekar čitao pitanja iz upitnika i dodatno objašnjavao ukoliko je bilo potrebe za tim, a pacijenti su usmeno odgovarali na osnovu skalesa odgovorima (uopšte ne-0, retko-1, često-2, veoma često-3, konstantno-4). Maksimalni broj poena je 52 i to je ukupan OHIP rezultat koji predstavlja zbir svih pojedinačnih bodova za 14 pitanja, tako da je računato da je uticaj oralnog stanja na kvalitet života bio lošiji sa većom vrednošću sabranih poena. Pacijenti obe grupe na upitnike su odgovarali dva puta: pre tretmana i mesec dana kasnije, na kontrolnom pregledu.

Pored OHIP-14 upitnika, korišćen je i modifikovan upitnik koji su koristili Cunha-cruz i sar. u studiji sprovedenoj 2007. godine⁵². Ovaj upitnik je obuhvatio opšte informacije o polu, starosti, sistemskim bolestima, pušenju, kao i pitanja koja su se reflektovala na samoprocenu zdravlja gingive, na procenu efekta prisustva parodontalnog oboljenja na svakodnevne životne aktivnosti.

clinical parameters of the participants of the study. For the classification of the disease, the classification of the American Academy of Periodontology (AAP) for the periodontal disease was used⁵⁰. According to it, all forms of illness were recorded as moderate periodontitis (periodontal pockets ≤ 5 mm) and severe periodontal disease (periodontal pockets > 5 mm).

All participants received instructions on maintaining oral hygiene, which included the use of a toothbrush, interdental brushes and dental floss, appropriate tooth brushing technique, and advice for using 0.12% chlorhexidine to rinse the oral cavity. Patients from the investigated group undergone basic therapy in which dental plaque and tartar were removed by a single doctor using the ultrasonic scaler (WOODPECKER) and Gracey's curette (Hu-Friedi, Chicago, IL, USA) for the removal of necrotic cement and detritus from a periodontal pocket. The clinical checkup was made to the patients of the control group.

After a month, a control checkup was conducted where remotivation and professional prophylaxis was given to the participants of the research.

The oral health-related quality of life was determined using the questionnaire "Oral Health Impact Profile-14 (OHIP-14)", shorter version⁵¹. The questionnaire consisted of 14 questions divided into 7 parts: functional limitations, physical pain, psychological discomfort, physical incapacity, psychological disability, social incapacity, and handicap. The doctor read questions from the questionnaire and gave further explanations if there was a need, and the patients responded on the basis of a response scale (not at all -0, rarely - 1, often - 2, very often - 3, all the time - 4). The maximum number of points is 52 and that is the total OHIP score that represents the sum of all individual points for 14 questions, so it is calculated that the impact of the oral state on the quality of life was worse with a higher value of the points collected. The patients of both groups answered the questionnaires two times: before the treatment and a month later, on a control checkup.

In addition to the OHIP-14 questionnaires, a modified questionnaire was also used, which was used by Cunha-Cruz et al. in a study conducted in 2007⁵². This questionnaire covered general information on sex, age, systemic illness, smoking, as well as the issues that reflected on the self-assessment of gingival health, to assess the effect of the periodontal disease on everyday life activities.

Statistička analiza

Svi podaci su uneti i analizirani korišćenjem programskog paketa za Windows SPSS verzije 20. Numeričke varijable su opisane kao srednja vrednost i standardna devijacija (mean±SD) i kategoričke varijable sa frekvencom i procentom. Asocijacija uparenih kategoričkih podataka procenjena je Cochran-ovim K testom . Korišćena je ANOVA za ponovljene mere da bi se testirale razlike u sredinama i unutar grupe. Nivo značajnosti je na nivou od $p < 0,05$.

Rezultati

U istraživanju je ukupno učestvovalo 88 ispitanika, od toga 47 (53,41%) muškaraca i 41(46,59%) osoba ženskog pola u obe grupe (I-15 žena i 29 muškaraca; K-26 žena i 18 muškaraca). Najveća distribucija učesnika, za obe grupe, uočena je u visokom obrazovanju (55,68%), nešto manje u srednjem (36,36%), dok je najmanji procenat učesnika bio samo sa osnovnom školom (7,96%). Većina učesnika su bili nepušači (73,86%) i osobe koje ne konzumiraju alkohol (67,05%), a 55,68% ispitanika je imalo ekonomski status koji je bio dovoljan za svakodnevni život. Prosečna starost je bila $63,27 \pm 6,67$ godine za obe grupe, sa prevalencijom osoba koje nemaju sistemsko oboljenje (61,36%). Nije bilo značajne razlike ovih demografskih podataka između ispitivane i kontrolne grupe ($p < 0,05$) (Tabela 1).

Na početku istraživanja, klinički parodontalni parametri (Pli, Gi, Ikrv, PPD i CAL) nisu pokazali signifikantnu razliku među grupama. Mesec dana kasnije, na kontrolnom pregledu, zabeleženo je poboljšanje svih kliničkih parametara koji prikazuju stanje parodonta i signifikantnu razliku između grupa ($p < 0,001$), kao i u ispitivanoj grupi pre i posle tretmana (Tabela 2).

U tabeli 3 zabeležene su sve promene iz upitnika pre i mesec dana nakon tretmana za učesnike i ispitivane i kontrolne grupe. Većina stavki pokazale su delimično smanjenje tegoba. Statistički značajne promene ($p < 0,001$), uglavnom u ispitivanoj grupi zabeležene su za impakciju hrane, izbegavanje unosa određene vrste hrane, loš zadah, izbegavanje smejanja i prisustvo apscesa.

Statistical analysis

All data are entered and analyzed using a software package for Windows SPSS version 20. Numerical variables are described as mean and standard deviation (mean ± SD) and categorical variables with frequency and percentage. Association of paired categorical data is evaluated by Cochran's K test. ANOVA was used for repeated measures to test the differences in the environment and within the group. The significance level is at level $p < 0.05$.

Results

The survey involved a total of 88 respondents, of whom 47 (53.41%) men and 41 (46.59%) women in both groups (T-15 women and 29 men, C-26 women and 18 men). The largest distribution of participants for both groups was observed with participants with a college degree (55.68%), slightly less with high school (36.36%), while the smallest percentage of participants was only with elementary school (7.96%). Most participants were nonsmokers (73.86%) and people who do not consume alcohol (67.05%), and 55.68% of respondents had an economic status that was sufficient for everyday life. The mean age was 63.27 ± 6.67 years for both groups, with the prevalence of persons without systemic disease (61.36%). There was no significant difference between these demographic data between the investigated and the control group ($p < 0.05$) (Table 1).

At the beginning of the study, clinical periodontal parameters (Pli, Gi, Ikrv, PPD, and CAL) showed no significant difference between the groups. A month later, during a checkup, an improvement of all clinical parameters was demonstrated, showing the periodontal condition and a significant difference between the groups ($p < 0.001$), as well as in the examined group before and after treatment (Table 2).

In Table 3, all changes from the questionnaire were recorded before and a month after the treatment for participants from the examined and control group. Most of the parameters showed a partial reduction in the symptoms. Statistically significant changes ($p < 0.001$), mainly in the examined group, were recorded for food impaction, avoiding the intake of certain foods, bad breath, avoiding laughing, and the presence of an abscess.

Tabela 1. Demografske karakteristike učesnika
Table 1. Demographic characteristics of participants

	Sa bazičnom terapijom n (%) With basic therapy n (%)	Bez bazične terapije n (%) Without basic therapy n (%)	p vredn p value
Pol / Gender			*p< 0,05
Muški / Male	29 (65.91%)	18 (40.91%)	
Ženski / Female	15 (34.09%)	26 (59.09%)	
Edukacija / Education			*p< 0,05
Osnovno / Primary	3 (06.82%)	4 (09.09%)	
Srednje / High	14 (31.82%)	18 (40.91%)	
Visoko // College	27 (61.36%)	22 (50.00%)	
Pušenje / Smoking			*p< 0,05
Pušač / Smoker	8 (18.18%)	15 (34.09%)	
Nepušač // Nonsmoker	36 (81.82%)	29 (65.91%)	
Alkohol / Alcohol			*p< 0,05
Da / Yes	19 (43.18%)	10 (22.73%)	
Ne / No	25 (56.82%)	34 (72.27%)	
Sistemska bolest / Systemic illness			*p< 0,05
Da / Yes	15 (34.09%)	19 (43.18%)	
Ne / No	29 (65.91%)	25 (56.82%)	
Soc-ek. st. / Soc-ec. st.			*p< 0,05
Dosta / Plenty	8 (18.18%)	6 (13.64%)	
Dovoljno / Enough	21 (47.73%)	28 (63.64%)	
Nedovoljno / Not enough	15 (34.09%)	10 (22.73%)	
Godine / Ages			*p< 0,05
SV±SD / mean±SD	62,34±8,14	64,21±5,21	

*Chi-square test

Tabela 2. Komparacija parodontalnih parametara između grupa pre terapije i na kontroli
Table 2. Comparison of periodontal parameters between groups before therapy and control

	Sa bazičnom terapijom With basic therapy		Bez bazične terapije Without basic therapy		*p vredn *p value
	pre tretmana before treatment	kontrola control	pre tretmana before treatment	kontrola control	
	SV±SD; mean±SD		SV±SD; mean±SD		
Plak indeks/ Plaque index	1.92±0.56	0.59±0.36* ^a	1.95±0.58	0.63±0.49	p<0.001
Gingivalni indeks/ Gingival index	1.99±0.32	0.86±0.21* ^a	2.01±0.63	1.73±0.51	p<0.001
Indeks krvarenja/ Bleeding index	1.55±0.38	0.21±0.01* ^a	1.67±0.35	1.01±0.32	p<0.001
DPDž/PPD,					
≤ 5mm	4.12±0.39	2.68±0.29* ^a	4.21±0.38	3.96±0.21	p<0.001
> 5mm	5.22±0.66	3.77±0.42* ^a	4.98±0.61	4.54±0.54	p<0.001
NPE/CAL,					
≤ 3mm	2.54±0.28	1.71±0.11* ^a	2.79±0.32	2.13±0.22	p<0.001
> 3mm	3.18±0.19	2.16±0.08* ^a	3.56±0.57	3.04±0.49	p<0.001

*p<0,001 – posle tretmana u grupi; ^a p<0,05 – posle tretmana između grupa

PPD – dubina parodontalnog džepa; CAL – nivo pripojnog epitela

* p<0.001 – after treatment in the group; ^a p<0.05 – after treatment between groups

PPD – periodontal pocket depth; CAL – clinical attachment level

Tabela 3. Komparacija odgovora iz upitnika OHIP-14 pre i mesec dana nakon tretmana
Table 3. Comparison of responses from OHIP-14 questionnaire before and a month after treatment

		Sa bazičnom terapijom With basic therapy		*p vredn *p value	Bez bazične terapije Without basic therapy		*p vredn *p value
		pre th before th	kontrola control		pre th before th	kontrola control	
Funkcionalna ograničenja/ Functional limitations	otežano žvakanje/ difficult chewing	5 (11.36%)	2 (4.55%)	n.s.	7 (15.91%)	7 (15.91%)	n.s.
	koncentracija/ concentration	-	-	-	-	-	-
Fizički bol/ Physical pain	nelagodnost pri jelu/ discomfort at the meal	3 (6.82%)	2 (4.55%)	n.s.	1 (2.27%)	1 (2.27%)	n.s.
	apsces/ abscess	28 (63.64%)	9 (20.45%)	p<0.001	13 (29.55%)	10 (44.00%)	n.s.
Psihološka nelagodnost/ Psychological discomfort	loš zadah/ fedor	40 (90.91%)	25 (56.82%)	p<0.001	13 (29.55%)	7 (15.91%)	p<0.001
	impakcija hrane/ food impaction	25 (56.82%)	16 (36.36%)	p<0.001	17 (38.64%)	14 (31.82%)	n.s.
Fizička nesposobnost/ Physical incapacity	trošenje novca/ spending money	-	-	-	-	-	-
	dnevne aktivnosti/ daily activities	6 (13.64%)	2 (4.55%)	n.s.	4 (9.10%)	4 (9.10%)	n.s.
Psihološka invalidnost/ Psychological disability	izbegavanje smejanja/ avoiding laughing	14 (31.82%)	5 (11.36%)	p<0.001	9 (20.45%)	7 (15.91%)	n.s.
	manjak poverenja/ lack of trust confidence	7 (15.91%)	3 (6.82%)	n.s.	-	-	-
Socijalna nesposobnost/ Social incompetence	Stidljivost/ Shyness	5 (11.36%)	5 (11.36%)	n.s.	-	-	-
	izbegavanje izlaženja/ avoidance of exposure	-	-	-	-	-	-
Hendikep/ Hendicap	izbegavanje određene hrane/ avoiding certain foods	35 (79.55%)	18 (40.91%)	p<0.001	14 (31.82%)	13 (29.55%)	n.s.
	poremećaj spavanja/ sleep disorder	-	-	-	-	-	-

*Cochrane test

Tabela 4. Odgovori pacijenata na pitanje o stanju gingive i uticaju oboljenja na kvalitet života

Table 4. Answers of patients to the question of the state of the gingiva and the impact of the disease on the quality of life

forma oboljenja/ Disease form	n (%)	Odgovori pacijenata na pitanje "Kako trenutno možete opisati vaše stanje gingive?" Patients answers to the question "How can you currently describe your gingival status?"				
		Odlično/ Perfect	veoma dobro/ Very good	Dobro/ Good	Loše/ Bad	veoma loše/ Very bad
Umerena PD/ Moderate PD	59 (67.04%)	8 (13.56%)	3 (5.08%)	6 (10.17%)	24 (40.68%)	18 (30.51%)
teška PD/ Severe PD	29 (32.96%)	1 (3.45%)	2 (6.90%)	5 (17.24%)	16 (55.17%)	5 (17.24%)
Pitanja/Questions		Odgovori pacijenata na pitanja o "uticaju parodontalnog oboljenja na svakodnevne aktivnosti?" Answers patients to questions about "the effect of periodontal disease on everyday activities?"				
		Nikad/ Never	Ponekad/ Sometimes	Često/ Often	Uvek/ Always	
Da li Vam prisustvo PD utiče na ishranu? Does the presence of PD affect your meal?		12 (13.64%)	11 (12.50%)	44 (50.00%)	21 (23.86%)	
Da li Vam prisustvo PD utiče na komunikaciju sa drugim ljudima? Does the presence of PD influence your communication with other people?		9 (10.23%)	2 (2.27%)	54 (61.36%)	23 (26.14%)	
Da li imate problema sa spavanjem zbog prisustva PD? Do you have sleeping trouble because of the presence of PD?		31 (35.23%)	36 (40.91%)	14 (15.91%)	7 (7.95%)	
Da li PD utiče na pojavu anksioznosti kod Vas? Does PD affect the appearance of anxiety in you?		55 (62.50%)	23 (26.14%)	8 (9.10%)	-	
Da li imate bolove ? Do you have pain?		46 (52.27%)	18 (20.45%)	17 (19.32%)	7 (7.95%)	

Samoprocena zdravlja gingive dobijena je pitanjem: "Kako trenutno možete opisati vaše stanje gingive?". Odgovori na ovo pitanje morali su biti izabrani između sledećih tvrdnji: „odlično, veoma dobro, dobro, loše, veoma loše“. Svi pacijenti koji su izabrali „loše“ ili „veoma loše“ smatrali su se da imaju najlošiju samoprocenu zdravlja gingive.

Uticaj parodontalnog oboljenja aktivnosti svakodnevnog života izražen je jednostavnim upitnikom koji je uključivao nekoliko pitanja o uticaju na ishranu, komunikaciju sa drugim ljudima, spavanje, anksioznost i bol. Pacijenti su odgovarali jednim od sledećih odgovora: "nikada, ponekad, često i uvek". Za sve pacijente koji su odgovarali sa "često" ili "uvek" smatralo se da imaju najčešće probleme vezane za svakodnevne životne aktivnosti (Tabela 4).

Diskusija

Danas se kvalitet života sve više koristi kao validan, odgovarajući i značajan faktor prema kome se određuju potrebe i intervencije u praksi javnog zdravlja. Mere kvaliteta života povezane su sa zdravljem, uključujući objektivne i subjektivne procene u smislu sprečavanja pojave hroničnih oboljenja, kao i za procenu efikasnosti terapijskih procedura⁵³.

Stvarna promena u percepciji kvaliteta života pacijenata često se pripisivala poboljšanju kliničkog statusa. Konceptualni model kvaliteta života je osnova razvoja upitnika OHIP-14 i uključuje biopsiho-socijalni put u kome je percepcija kvaliteta života povezana sa zdravstvenim problemima. Stoga, postoje dve različite procene: (I) merenje kliničkih parametara od strane kliničara, i (II) procena oralnog zdravlja povezanog sa kvalitetom života i to kako ga doživljavaju sami pacijenti. Ranije merenje bilo je zasnovano na znakovima i simptomima koje je opisivao pacijent, a kliničari ih koristili kao indikatore zdravlja i statusa bolesti.

Hronična parodontopatija karakteriše se veoma sporom progresijom koja ide bez pojave ikakvih bolova. Iz ovog razloga, veliki broj pacijenata nije svestan prisustva parodontopatije jer bolest ne uključuje pojavu bola.

Tako se pacijent, vremenom, prilagođava pojavi određenih kliničkih simptoma, kao što su impakcija hrane, pojava fetora, labavljenje zuba, kao i krvarenje u kasnijoj kliničkoj slici oboljenja.

The self-assessment of gingival health was obtained by asking: "How can you currently describe your gingival state?" The answers to this question had to be chosen among the following statements: "excellent, very good, good, bad, very bad." All patients who chose "bad" or "very bad" were considered to have the worst self-assessment of gingival health.

The impact of periodontal disease on the daily activities was expressed by a simple questionnaire that included several questions about the effect on diet, communication with other people, sleep, anxiety, and pain. Patients responded with one of the following answers: "never, sometimes, often and always". All patients who answered "often" or "always" were considered to have the most common problems related to everyday life activities (Table 4).

Discussion

Today, quality of life is increasingly being used as a valid, appropriate and significant factor in determining needs and interventions in public health practice. The measures of quality of life are related to health, including objective and subjective assessments in terms of preventing the occurrence of chronic diseases, and assessing the effectiveness of therapeutic procedures⁵³.

The actual change in perception of the quality of life of patients was often attributed to the improvement of clinical status. The conceptual QoL model is the basis for the development of the OHIP-14 questionnaire and includes a biopsychosocial path in which the perception of quality of life is associated with health problems. Therefore, there are two different assessments: (I) measurement of clinical parameters by clinicians, and (II) assessment of oral health-related quality of life and how it is experienced by patients themselves. Earlier measurements were based on the signs and symptoms described by the patient, and clinicians used them as indicators of health and disease status.

Chronic periodontitis is characterized by a very slow progression without any pain. For this reason, a large number of patients are not aware of the presence of periodontal disease because the disease does not include the onset of pain.

Thus, over time, the patient adjusts to the appearance of certain clinical symptoms, such as food impaction, the appearance of bad breath, loosening of the teeth, and bleeding in a later clinical picture of the disease.

Veoma mali procenat pacijenata zna da hronična parodontopatija može biti uslov koji će uticati na oralno zdravlje vezano za sam kvalitet života pacijenta. Nedavna studija Akrama i sar.⁵⁴ pokazala je da je poređenjem rezultata između ispitivane i kontrolne grupe uočeno poboljšanje u svim kliničkim parodontalnim parametrima (plakindeks, gingivalni indeks i indeks krvarenja) u ispitivanoj grupi nakon 12 nedelja⁵⁴. Mnoga istraživanja^{29,31,55} su radi identifikovanja razlika pre i posle terapije koristila Cohen-ov standardizovani upitnik, koje su se pokazivale klinički značajnim razlikama⁵⁶. Saito i sar.³¹ utvrdili su u svojoj studiji da se značajno poboljšanje u kvalitetu života pacijenata javlja nakon parodontalnog tretmana. U ovom istraživanju, svi klinički parametri (plak indeks, gingivalni indeks i indeks krvarenja, kao i dubina parodontalnih džepova i nivo epitelnog pripoja), pokazali su značajno poboljšanje posle mesec dana, kako unutar ispitivane grupe, tako i u poređenju sa kontrolnom grupom, što je u saglasnosti sa gore navedenim rezultatima drugih autora. Rezultati ovog ispitivanja ukazuju na direktnu vezu između kliničkih parametara stanja parodonta pacijenata, svakodnevnih životnih aktivnosti i samoprocene zdravlja gingive, što je u saglasnosti sa rezultatima (Ng i Leung, 2006)⁵³, koji su pronašli jasnu vezu između bolesti parodonta i svakodnevnih životnih aktivnosti. Pokazalo se da je bazična terapija parodontopatije efikasna u poboljšanju kliničkih parametara kod starijih osoba, pa je zanimljivo napomenuti da ovaj način terapije parodontopatije može dati bolje kliničke ishode za oralno zdravlje, kao i sam kvalitet života pacijenta. Ovo je prvo pilot istraživanje kojim se ispitivao kvalitet života vezan za oralno zdravlje osoba starijeg doba parodontopatijom u Srbiji, u kojem se koristio modifikovani upitnik Cunha-cruz i sar.⁵². Rezultati ovog istraživanja pokazali su da odgovori na pitanja iz OHIP-14 nisu pokazali značajne promene u odgovorima kontrolne grupe na početku i mesec dana kasnije. Međutim, u ispitivanoj grupi, došlo je do značajnog poboljšanja kvaliteta života, što se vidi iz odgovora na upitnik OHIP-14.

OHIP upitnik je prvobitno koncipiran tako da se, na osnovu podataka iz istraživanja o oralnom zdravlju starijih osoba koje imaju hroničnu parodontopatiju, ispita povezanost između lične percepcije pacijenta o svom oralnom zdravlju i niza kliničkih parametara samog parodontalnog oboljenja.

A very small percentage of patients know that chronic periodontitis can be a condition that will affect oral health in relation to the quality of life. A recent study conducted by Akram et al. showed that the improvement in all clinical periodontal parameters (plaque index, gingival index, and bleeding index) was observed in the investigated group after 12 weeks by comparing the results between the examined and the control group⁵⁴. Many studies^{29,31,55} used Cohen's standardized questionnaires in order to identify differences before and after therapy, which showed clinically significant differences⁵⁶. Saito et al.³¹ found in their study that a significant improvement in the quality of life of patients occurs after the periodontal treatment. In this study, all clinical parameters (plaque index, gingival index and bleeding index, and depth of periodontal pockets and epithelial attachment level) showed significant improvement after a month, both within the investigated group and in comparison with the control group, which is in accordance with the results of the aforementioned authors. The results of this study indicate a direct relationship. The results of this study indicate a direct relationship between the clinical parameters of the patient's periodontal condition, daily life activities and self-evaluation of gingival health, which is in agreement with the results (Ng and Leung, 2006)⁵³ who have found a clear relationship between periodontal disease and daily life activities. It has been shown that the basic periodontal therapy is effective in improving clinical parameters in elderly, so it is interesting to note that this method of therapy can give the better clinical outcomes regarding the oral health, as well as the quality of patient's life itself.

This is the first pilot study to examine the quality of life associated with the oral health of older people with the periodontal disease in Serbia, using a modified questionnaire Cunha-Cruz et al.⁵². The results of this study have shown that the answers to the OHIP-14 questions have not shown significant changes in control group responses at the beginning and a month later. However, in the examined group, there has been a significant improvement in the quality of life, as it can be seen from the answers to the OHIP-14 questionnaire.

The OHIP questionnaire was originally designed so that, based on data from the research on the oral health of elderly people with chronic periodontitis, the relationship between the patient's personal.

Nedostatak ovog istraživanja takođe može biti i vreme praćenja rezultata, jer mesec dana, koliki je bio period praćenja ispitivanih pacijenata, nije bio dovoljan period da se uoče teže promene, kao što je to bio slučaj u drugim studijama u kojima je praćenje trajalo oko godinu dana^{57,58}.

U okviru odgovora na pitanja iz OHIP-14, istakle su se četiri najznačajnije stavke, fizički bol, psihološka nelagodnost, psihološka invalidnost, kao i hendikep u okviru kojeg se javlja apsces kao komplikacija parodontopatije.

Nakon odrađene terapije u ispitivanoj grupi, došlo je do značajnog poboljšanja ovih stavki, a to su "loš dah" i „impakcija hrane“ (psihološka nelagodnost), izbegavanje smejanja (psihološka invalidnost), apsces (fizički bol) i izbegavanje određene vrste hrane (hendikep). Poboljšanje „impakcije hrane“ nakon bazične terapije očekivalo bi se u svim studijama. Progresija hronične parodontopatije karakteriše se destrukcijom aleolarne kosti, a samim tim i proširenjem interdentalnih prostora, što dovodi do impakcije hrane i izbegavanja unosa određene vrste hrane.

Nakon odrađene bazične terapije i davanja instrukcija o održavanju oralne higijene, kod pacijenata ispitivane grupe došlo je do poboljšanja stanja parodonta i kvaliteta života ovih pacijenata, što je i prikazano odgovorima pre (56,82%) i posle terapije (36,36%). Pored "psihološke nelagodnosti i invalidnosti", rezultati ovog istraživanja su u saglasnosti sa rezultatima drugih istraživanja^{48,59}, i kod stavke "fizički bol" pre (63,64%) i posle terapije parodontopatije (20,45%) uočavaju se pozitivni odgovori iz upitnika OHIP-14. U ranijim istraživanjima gde je korišćen OHIP, do značajnog poboljšanja ovih parametara (fizički bol i psihološka nelagodnost) došlo je nakon detaljne korekcije mobilnih proteza kod starijih pacijenata^{60,61,54}. Poboljšanje ishrane je takođe bilo jedno od značajnih znakova koji su doveli do boljeg kvaliteta života pacijenata starijeg doba⁶²⁻⁶⁴. Slično rezultatima iz ovog istraživanja, Brauchle i sar.⁵⁹ su takođe, u svom ispitivanju, prikazali pozitivan uticaj bazične terapije na kvalitet života vezan za oralno zdravlje kod pacijenata sa hroničnom parodontopatijom⁵⁹.

Ove četiri stavke (fizička bol i psihološka nelagodnost, psihološka invalidnost, hendikep) bile su očekivani problem koji će uticati na promene odgovora iz upitnika OHIP-a pre i posle tretmana, jer je usna duplja direktno uključena u akt žvakanja i grženja, a time i u uživanju u hrani.

perception of the oral health and a number of clinical parameters of the periodontal disease itself can be examined. The disadvantage of this study may also be the time of monitoring the results because, in a month, the period of follow-up of the examined patients was not sufficient to notice all changes, as it was the case in other studies in which follow-up took about a year^{57,58}.

Within the answers to the OHIP-14 questions, four of the most significant parameters highlighted - physical pain, psychological discomfort, psychological disability, as well as handicap in which abscess appear as a complication of the periodontal disease.

After the therapy was done in the examined group there was a significant improvement in aforementioned parameters, which are "bad breath" and "food impaction" (psychological discomfort), avoidance of laughing (psychological disability), abscess (physical pain) and avoidance of certain food (handicap). The improvement of the "food impaction" after the basic therapy would be expected in all studies. The progression of chronic periodontitis is characterized by the destruction of the alveolar bone, and consequently by the expansion of interdental spaces, which leads to food impaction and avoiding the intake of certain food. After completing the basic therapy and instructions on maintaining oral hygiene, patients in the investigated group experienced improvement of the periodontal condition and quality of life, which was shown in answers to the questionnaire before (56.82%) and after the therapy (36.36%). In addition to the "psychological discomfort and disability", the results of this study are consistent with the results of other surveys^{48,59}, and in the case of "physical pain" before (63.64%) and after the therapy (20.45%) positive answers are observed from the OHIP-14 questionnaire. In previous studies where OHIP was used, significant improvement of these parameters (physical pain and psychological discomfort) occurred after detailed correction of a mobile prosthesis in elderly patients^{60,61,54}. Nutrition improvement was also one of the significant signs that led to a better quality of life in elderly patients⁶²⁻⁶⁴. Similarly to the results of this study, Brauchle et al., showed the positive impact of basic therapy on the quality of life associated with oral health in patients with chronic periodontitis⁵⁹.

Rezultati ovog istraživanja su u saglasnosti sa drugim studijama u kojima je došlo do promene kvaliteta života između grupa. Slično tome, razlika između dveju grupa nije bila značajna, iako je OHIP rađen kod različito tretiranih pacijenata. Ispitivana grupa je pokazala bolje poboljšanje, što je u saglasnosti sa rezultatima drugih studija^{65,60,61}.

Procena narušenog oralnog zdravlja sa stanovišta pacijenta poslednjih godina, zauzela je važno mesto u istraživačkom području⁶⁶. Tako se krenulo sa upotrebom mera usmerenih ka uticaju oralnog zdravlja na kvalitet života sa stanovišta percepcije samih pacijenata⁶⁷. Rezultati ovog istraživanja pokazali su da je 71,59% pacijenata izrazilo svoje zdravlje gingive kao zabrinjavajuće (loše i veoma loše), na osnovu jednog pitanja u upitniku. Pored toga, svi učesnici su naveli barem jednu životnu aktivnost koja im je ugrožena zbog prisustva parodontalnog oboljenja. Najveći problem javljao se kod komunikacije sa drugim osobama (61,36%) i prilikom ishrane (50%). Rezultati ovog istraživanja, pak, nisu u saglasnosti sa rezultatima iz sveobuhvatnog statističkog istraživanja u Americi⁶⁸, gde je 36% odraslih pacijenata izrazilo svoje zdravlje gingive kao „loše“.

Rezultati ove studije mogli bi se objasniti time da pacijenti postaju svesniji o negativnim simptomima (ogoličenje korenova, krvarenje, klaćenje, migracija i gubitak zuba) koji se mogu javiti na njihovim zubima i gingivi u toku razvoja parodontalnog oboljenja. Mali procenat pacijenata (7,95%) naveo je da je „bol“ najviše vezan za prisustvo komplikacija oboljenja koje im remete svakodnevne životne aktivnosti. Spominjanje „anksioznosti“ od strane 11% pacijenata može da se odnosi na unutrašnja osećanja pacijenata zbog lošeg kliničkog stanja gingive. Problemi sa ishranom, kao jednom od svakodnevnih životnih aktivnosti kod osoba starijeg doba sa parodontopatijom, odražavaju se na poteškoće vezane za unos uglavnom, čvrste hrane. Hajian-Tilaki i sar.⁶⁹ sprovedla je studiju za ocenu zdravstvenog statusa i kvaliteta života pacijenata na hemodijalizi. Ustanovili su da pacijenti na hemodijalizi imaju loše oralno zdravlje i stanje parodonta, ali da su bili zadovoljni svojim oralnim zdravstvenim stanjem i njihov kvalitet života u vezi sa oralnim zdravljem bio je, prema njihovoj percepciji prilično dobar. Irani i dr.⁷⁰ istraživali su uticaj statusa parodonta na kvalitet života kod pacijenata sa i bez dijabetes melitusa tipa 2 (T2DM).

These four parameters (physical pain, psychological discomfort, psychological disability, and handicap) were an expected problem that would affect the change of answers from the OHIP questionnaire before and after the treatment, because the oral cavity is directly involved in the act of chewing and biting, and therefore enjoying the food. The results of this study are in agreement with other studies in which the quality of life between groups also changed. Similarly, the difference between the two groups was not significant, although OHIP was performed in different patients. The investigated group showed better improvement, which is in agreement with the results of other studies^{65,60,61}.

Assessment of impaired oral health from the patient's point of view in recent years has taken an important place in the research area⁶⁶. So, the use of measures aimed at the impact of oral health on the quality of life from the patient's point of view began to be implemented⁶⁷. Results of this study showed that 71.59% of patients expressed their concerns about gingival health (bad and very bad), on the basis of one question in the questionnaire. In addition, all participants listed at least one life-activity that was jeopardized by the presence of periodontal disease. The biggest problem occurred when communicating with other people (61.36%) and (50%) during the eating. The results of this study are in disaccordance with statistical data in United States⁶⁸, where 36% of adult patients expressed their gingival health as "bad".

The results of this study could be explained by the fact that patients become more aware of negative symptoms (fractured tooth roots, bleeding, loose tooth, migration, and tooth loss) that can occur on their teeth and gingiva during the development of periodontal disease. A small percentage of patients (7.95%) said that "pain" is most related to the presence of complications of the disease, and it disturbed their everyday life activities. Mention of "anxiety" by 11% of patients can refer to the inner feelings of patients due to the poor clinical condition of the gingiva. Nutrition problems, as one of everyday life activities in older people with periodontal disease, are reflected into the difficulties associated with intake, mainly, solid food. Hajian-Tilaki et al.⁶⁹ conducted a study to assess the health status and quality of life in hemodialysis patients. They found that patients on hemodialysis had poor oral health and periodontitis state, but they were satisfied with their oral health status and their oral health-related quality of life was,

Otkrili su da T2DM ne utiče na ukupan kvalitet života koji je povezan sa oralnim zdravljem, već da hronična parodontopatija kod pacijenata sa dijabetesom izaziva promene u kvalitetu životu kao i samo stanje oralnog zdravlja ovih pacijenata.

Treba istaći da, sve odgovore iz upitnika, ipak treba tumačiti pažljivo, jer dugogodišnje razvijanje parodontalnog oboljenja može dovesti do smanjenja osetljivosti pacijenata. Takođe i sama svest pacijenata i njihov pogled na samo oboljenje može uticati na odgovore⁷¹. Treba uzeti u obzir i da osobe imaju različite estetske, ali i društvene normative koji diktiraju njihovu percepciju oboljenja, da posle terapije obraćaju više pažnje na stanje parodonta, ili pak da su imali ozbiljne probleme u usnoj duplji koji bi uticali na njihove odgovore. Ovo istraživanje bilo je sa malom veličinom uzorka. Rezultati drugih studija sa malim uzorkom^{47,48,60,72,73} bili su slični rezultatima ovog ispitivanja. Pošto je uzorak ovog istraživanja bio relativno mali u poređenju sa drugim istraživanjima iz oblasti kvaliteta života, koja se odnose na oralno zdravlje kod starijih osoba, može se posmatrati kao pilot studija koja se mora korigovati pre njene primene u bilo kojim daljim istraživanjima sa većim uzorkom. Rezultati ovog istraživanja mogu otvoriti vrata sveobuhvatnijim statističkim istraživanjima u istom polju.

Zaključak

Bazična terapija parodontopatije poboljšava kvalitet života osoba starije dobi sa hroničnom parodontopatijom. Rezultati ovog istraživanja pokazali su da je parodontopatija uticala na pogoršanje nekoliko svakodnevnih životnih učesnika studije. Većina učesnika sa parodontopatijom označila je da je njihovo zdravlje gingive loše ili veoma loše. Ovo ukazuje na to da su pacijenti svesni negativnih promena na njihovom parodontu. Pronađena je i linearna veza između kliničkih parametara i subjektivne percepcije stanja usne duplje kod ispitanika, što se odrazilo i na pozitivnije odgovore pre i posle terapije. Međutim, kako je istraživanje urađeno na relativno malom uzorku, potrebne su novije sveobuhvatnije studije sa novim dijagnostičkim metodama.

according to their perception. pretty good. Irani et al.⁷⁰ investigated the effect of periodontal status on quality of life in patients with and without type 2 diabetes mellitus (T2DM). They found that T2DM does not affect the overall quality of life associated with oral health, but that chronic periodontal disease in patients with diabetes causes changes in quality of life as well as the state of oral health of these patients.

It should be noted that all the answers from the questionnaire should be interpreted carefully since the long-term development of periodontal disease can lead to a reduction in patients' sensitivity. Also the patient's awareness of themselves and their view of the disease itself can affect the responses⁷¹. It should also be taken into account that persons have different aesthetic and social norms that dictate their perception of the disease. So, after the therapy, the patients pay more attention to the condition of the periodontium, or they had serious problems regarding the oral cavity that would affect their responses. This study was conducted with a small sample size. The results of other studies with a small sample^{47,48,60,72,73} were similar to the results of this study. Since the sample of this study was relatively small compared to the other studies in the field of oral health-related quality of life in elderly, it can be seen as a pilot study that must be corrected prior to its application in any further studies with a larger sample. The results of this research can open the door to more comprehensive statistical surveys in the same field.

Conclusion

The basic periodontal therapy improves the quality of life of elderly people with chronic periodontal disease. The results of this study showed that periodontitis has affected the deterioration of several daily life activities of the study participants. Most participants with periodontal disease indicated that their gingival state was bad or very bad. This suggests that patients are aware of negative changes in their periodontium. A linear relationship was also established between clinical parameters and subjective perception of the oral cavity state by the respondents, which also reflected more positive responses before and after the therapy. However, as the research is done on a relatively small sample, more and more comprehensive studies are needed with new diagnostic methods.

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PARODONTOPATIJA KOD PACIJENATA SA DIJABETES MELLITUSOM TIPA 2

PERIODONTAL DISEASE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Sažetak

Uvod: Dijabetes (DM; diabetes mellitus) je jedan od najzastupljenijih endokrinih metaboličkih poremećaja. Dijabetes izaziva oštećenje usne duplje i predstavlja faktor rizika za razvoj parodontopatije. **Cilj** istraživanja je opisati parodontalni status kod pacijenata sa dijabetesom tipa 2 i proceniti demografske, socijalne, medicinske i stomatološke faktore rizika povezane sa parodontopatijom i dijabetesom.

Materijal i Metode: Analizirani su demografski podaci, medicinska i stomatološka istorija bolesti, urađen pregled parodonta (određen nivo pripojnog epitela, krvarenje pri sondiranju i prisustvo zubnog kamenca) i citomorfometrijska analiza.

Rezultati: 160 ispitanika je učestvovalo u istraživanju, starosti 64,2 (±0,2) godina, prosečne dužine trajanja DM 23,6 (±0,39) godina i srednje vrednosti HbA1c 8,70% (±0,45). Visoke vrednosti nivoa epitelnog pripoja i kamenac bili su zastupljeniji kod starijih pacijenata. Krvarenje pri sondiranju je bio istih vrednosti nezavisno od starosti pacijenata. Citomorfometrijska analiza je pokazala prisustvo većih jedara kod starijih pacijenata. Prema regresionoj analizi faktori povezani sa uznapredovalom parodontopatijom su: starost ($P<0,001$), pušenje cigareta ($p<0,001$), bivši pušači ($p<0,001$), pranje zuba ($p=0,017$), posete stomatologu ($p=0,068$), dužina trajanja DM ($p=0,034$), kserostomija ($p=0,500$), povećanje vrednosti HbA1c ($p=0,119$), neuropatija ($p=0,017$), nefropatija ($p=0,389$), retinopatija ($p=0,550$) i periferna vaskularna kardiomiopatija ($p=0,060$).

Zaključak: Parodontopatija je često oboljenje kod starijih dijabetesnih bolesnika. Pušenje cigareta u starijoj životnoj dobi je povezano sa visokom učestalošću uznapredovale parodontopatije. Pušači dijabetičari imaju visok rizik za lošu prognozu parodontopatije i moraju dolaziti na redovne parodontološke kontrolne preglede i terapiju.

Cljučne reči: parodontopatija, dijabetes, eksfolijativna citologija, oralno zdravlje

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Abstract

Background: Diabetes mellitus (DM) is one of the most prevalent endocrine metabolic disorders. It has damaging effects on the oral cavity and is reported to be a risk factor for periodontal disease. **The aim** of the study was to describe the periodontal status of patients with type 2 DM and to evaluate the multiple demographic, behavioral, medical and dental factors that may be associated with periodontal disease and DM.

Material and Methods: Demographic data and medical and dental histories were reviewed, periodontal assessments (loss of attachment, bleeding on probing, presence of supragingival calculus) and cytomorphometric analysis were made.

Results: 160 subjects participated in the study, age of 64.2 (±0.2) years, duration of DM 23.6 (±0.39) years and HbA1c 8.70% (±0.45). Severe loss of attachment and calculus were more present in older patients. Bleeding on probing was consistent among subjects in each age group. Cytomorphometric analysis revealed larger nuclear area values in older subjects. Factors possibly associated with advanced periodontal disease included in the regression analysis were: age ($P<0.001$), current smoking cigarettes ($p<0.001$), having ever smoked cigarettes ($p<0.001$), tooth brushing ($p=0.017$), visits to the dentist ($p=0.068$), duration of disease ($p=0.034$), xerostomia ($p=0.500$), HbA1c ($p=0.119$), neuropathy ($p=0.017$), nephropathy ($p=0.389$), retinopathy ($p=0.550$) and peripheral vascular disease ($p=0.060$).

Conclusion: Periodontal disease was common in adult diabetic population. Cigarette smoking and older age were associated with a higher prevalence of advanced periodontal disease. Smoker-diabetic patients are at high risk for poor periodontal prognosis, and they should be included in regular periodontal control check up and treatment.

Key words: periodontal disease, diabetes, exfoliative cytology, oral health

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Uvod

Dijabetes (diabetes mellitus; DM) predstavlja jedan od najčešćih metaboličkih endokrinih poremećaja i od njega boluje oko 100 miliona ljudi u celom svetu¹. Kod obolelih od dijabetesa javlja se poremećaj metabolizma ugljenih hidrata, masti i proteina koji sledstveno izaziva dijabetesne komplikacije poput oboljenja bubrega, očiju, nerava, perifernog vaskularnog sistema i koronarnu bolest srca². Danas, tip 2 DM čini oko 95% svih slučajeva DM i peto je po učestalosti hronično oboljenje čoveka^{3,4}. Njegova učestalost stalno raste (sada je 1% - 6%) i po uzroku smrtnosti starijih osoba nalazi se na šestom mestu u svetu⁵⁻⁸. Tip 2 DM javlja se kod osoba starijih od 40 godina, karakteriše se postepenom pojavom simptoma i konstantnim napredovanjem bolesti. Ostali oblici DM su tip 1 DM, gestacioni DM (prisutan u trudnoći) i DM u sklopu sindroma⁹.

DM oštećuje usnu duplju i smatra se faktorom rizika za parodontopatiju^{10,11}. Kod odraslih osoba sa DM tip 2 inflamacija gingive se češće javlja i predstavlja veoma značajan znak aktivnosti i progresije dijabetesa¹²⁻¹⁴. Prevencija i terapija parodontopatije kod pacijenata sa DM je od velikog značaja jer posledice parodontopatije i gubitak zuba značajno utiču na kvalitet života i na celokupno zdravlje dijabetesnih bolesnika tako što otežavaju zdravu ishranu a samim tim i adekvatnu kontrolu glikemije. Takođe, dokazano je da parodontopatija negativnim uticajem na glikemijsku kontrolu izaziva češće komplikacije DM¹⁵.

Parodontopatija započinje kao inflamacija gingive koja se razlikuje po intenzitetu i brzini napredovanja u dublja parodontalna tkiva, izaziva razaranje pripojnog epitela i na kraju gubitak zuba. Njeni znaci i simptomi obuhvataju crvenilo, otok i osetljivost gingive. Klinička dijagnoza parodontopatije se postavlja najčešće na osnovu kliničkog pregleda koji obuhvata i određivanje gubitka pripojnog epitela (clinical attachment loss - CAL). Ovakav način tradicionalnog merenja ima ograničenja jer se samo evidentiraju prethodno već nastala oštećenja, a ne otkrivaju mesta koja se trenutno razaraju u vreme ispitivanja¹⁶. Takođe, kod nekih dijabetesnih pacijenata ova merenja se ne mogu izvršiti zbog prisutnih varijacija u nivou glikemije. U ovako specifičnim slučajevima eksfolijativna citologija predstavlja praktičniju dijagnostičku metodu koja se može izvoditi čak i na inflamiranom tkivu i kod osoba sa hemoragijskim poremećajima.

Introduction

Diabetes mellitus (DM) is one of the most prevalent endocrine metabolic disorders and affects over 100 million people worldwide¹. During DM carbohydrates, fat and protein metabolism disorders may be present causing DM complications like renal disease, retinopathy, neuropathy, peripheral vascular disease and coronary heart disease². Type 2 DM accounts for approximately 95% of DM cases and is the fifth most common chronic condition nowadays^{3,4}. Its frequency has been increasing (1% - 6%) and it is the sixth leading cause of mortality among the elderly in the world⁵⁻⁸. Type 2 DM is characterized by slow onset of symptoms, usually after 40 years of age and continuous progression. Other forms of DM include type 1 DM, gestational DM (seen during pregnancy) and DM secondary to other medical conditions⁹.

DM has damaging effects on the oral cavity and is reported to be a risk factor for periodontal disease^{10,11}. In adults with type 2 DM, gingival inflammation occurs at higher rates and it is a very important sign of disease's activity and development¹²⁻¹⁴. Prevention and therapy of periodontal disease in patients with DM is very important because the consequences of periodontal disease and subsequent tooth loss influence the quality of life of a diabetic patient and significantly impact an overall health by compromising a patient's ability to maintain a healthy diet and proper glycemic control. Also, periodontal disease is shown to have potential negative effect on glycemic control and diabetic complications¹⁵.

Periodontal disease begins as gingival inflammation which can vary in intensity and progression speed into deeper periodontal tissues, resulting in the destruction of the dental attachment apparatus and consequent tooth loss. Its signs and symptoms include redness, swelling and tenderness. The clinical diagnosis of periodontal disease is usually made on the basis of clinical examination which includes measuring clinical attachment loss (CAL). This is complicated by the fact that this traditional measure of periodontal damage only measures past destruction and does not detect sites that are currently breaking down¹⁶. Also, in some diabetic cases it cannot be performed due to glycemic variations.

For such specific situations exfoliative cytology is more practical technique which can

Ona je jednostavna i neinvazivna dijagnostička procedura kojom se uzorkuju površinske deskvamirane ćelije i zatim mikroskopski analiziraju, a može se često ponavljati bez narušavanja komfora pacijenta^{12,17}.

Cilj istraživanja

Cilj istraživanja je odrediti parodontalni status kod osoba sa dijabetesom tipa 2 uz pomoć parodontalnih indeksa i eksfolijativne citologije i proceniti uticaj demografskih, medicinskih i stomatoloških faktora rizika koji mogu biti povezani sa parodontopatijom osoba sa dijabetesom.

Pacijenti i metode

U ovom istraživanju je učestvovalo 160 pacijenata, koji su dolazili na svoje redovne kontrolne preglede na Odeljenje za endokrinologiju Kliničkog centra u Nišu, koji su obuhvatali: fizički pregled pacijenta, EKG, uzorkovanje urina, procenu bubrežnih, neuroloških i kardioloških funkcija. Pacijenti koji su imali rizik od bakterijskog endokarditisa ili neke druge bakterijemije nisu uključeni u istraživanje.

Kako bi se procenilo oralno zdravlje ispitanika isti su upućivani na Odeljenje za Oralnu medicinu i parodontologiju Klinike za stomatologiju Medicinskog fakulteta Univerziteta u Nišu. Svaki ispitanik je potpisao obrazac o saglasnosti za ispitivanje i popunio upitnik. Etički komitet Medicinskog fakulteta u Nišu je odobrio istraživanje (evidencioni broj 01-2800-7).

Procena oralnog zdravlja

Za vreme prve posete anamnezom su prikupljeni demografski i medicinski podaci ispitanika. Demografski podaci su podrazumevali starost i pol ispitanika, a analiza medicinske istorije bolesti je dala uvid u trenutno lečenje pacijenta, upotrebu lekova, hospitalizaciju i bolovanje od značajnijih opštih oboljenja (hepatitis, epilepsija, alergije, prethodne operacije, trudnoća). Stomatološka istorija bolesti je dala uvid u pružene stomatološke usluge i oralnohigijenske navike. Ispitanici su odgovarali na pitanja u vezi sadašnjeg i prethodnog pušenja cigareta ili proizvoda od duvana. Konzumacija alkohola je procenjena na osnovu popunjavanja upitnika vezanog za konzumiranje piva, vina i mešovitih alkoholnih pića.

Procena stanja parodonta

Procena stanja parodonta je vršena na tri mesta sa vestibularne strane svakog zuba (mezijalno, srednje i distalno). Treći molari nisu uzimani u obzir¹⁸. Gubitak nivoa pripojnog epitela (loss of attachment - LOA) je određivan

be applied even during inflammation and hemorrhagic disorders. It is simple and noninvasive diagnostic method that picks superficial desquamated cells and analyzes them microscopically and can be repeated frequently with little discomfort to the patient^{12,17}.

The aim of the study

The aim of the study was to describe the periodontal status of patients with type 2 DM using periodontal indices and gingival exfoliative cytology and to evaluate the multiple demographic, behavioral, medical and dental factors that may be associated with periodontal disease and DM.

Subjects and methods

The 160 diabetic subjects recruited into this oral health study were ongoing participants of the Department of Endocrinology who came for their regular checkup visit which included physical exam, ECG, urine sample, evaluation of renal, neural and cardiological functions. Subjects at risk for bacterial endocarditis or other bacteriemia were excused.

For the oral health evaluation, subjects were referred to the Department for Oral medicine and Periodontology Dental Clinic, Niš University Faculty of Medicine. Approved consent form was presented and signed, and questionnaires filled. The Ethics Committee of the Faculty of Medicine in Niš approved the study protocol (evidential number 01-2800-7).

Oral Health Assessment Methodology

During the initial interview, demographic data and medical and dental histories were reviewed. Demographic data included age and gender. The medical history solicited information regarding current medical care, medications, hospitalizations, significant medical histories (hepatitis, epilepsy, allergies, surgery, pregnancy). The dental history solicited information regarding dental care and oral hygiene habits. Subjects were questioned regarding their current and lifetime history of cigarette and tobacco products use. Alcohol consumption was determined from a questionnaire that elicited consumption estimates for beer, wine and mixed drinks.

Periodontal assessments

Periodontal assessments were made on 3 sites on vestibular surface of each tooth (mesial, mid and distal). Third molars were excluded¹⁸.

Measurements from the cementenamel junction to the base of the pockets were made

merenjem rastojanja od gleđno-cementne granice do dna parodontalnog džepa uz pomoć standardne parodontološke sonde. Procena krvarenja pri sondiranju (bleeding on probing - BOP) vršena je inseriranjem parodontološke sonde u gingivalni sulkus ili parodontalni džep. BOP je evidentirano kao: prisutno ili nije prisutno. Prisustvo zubnog kamenca je određeno vizuelnim pregledom i evidentirano kao: prisutno ili nije prisutno.

Citomorfometrijska analiza

Pacijenti su prvo isiprali usta fiziološkim rastvorom u trajanju od 5 minuta, a zatim je bris uzet uz pomoć smotuljka vatiće sa vestibularne površine gingive celih usta. Zatim su brisevi prenešeni na suvo, čisto predmetno stakalce i fiksirani 95% etil alkoholom i bojani po Papanicolaou za citomorfometrijsku analizu koja je izvršena uz pomoć Image programa, NU2 mikroskop (Carl Zeiss, Nemačka) objektiv x 63 (NA 0,8)¹⁹.

Obrada i analiza podataka

Na početku analize svi podaci su detaljno pregledani u smislu njihove kompletnosti i tačnosti. SPSS softverski program je korišćen za statističku analizu. Razlike indeksa za svaku ispitivanu starosnu grupu su analizirane uz pomoć ANOVA analize za kontinuirane varijable i chi square analize za nekontinuirane varijable. Kako bi definisali parodontološke zavisne faktore, definisano je prisustvo "uznapredovale parodontopatije" kod svih ispitanika koji su imali LOA ≥ 6 mm u više od 10% pregledanih mesta. Rezultanta binarne varijable (prisutan / odsutan) za uznapredovalu parodontopatiju je korišćena kao zavisna varijabla u nominalnom logističkom regresionom modelu analize. Takođe, kao dopunske varijable korišćeni su: starost, pol, trenutno pušenje cigareta, bivši pušači, konzumiranje alkohola (više od 2 decilitra nedeljno), pranje zuba (jednom ili više puta u toku dana), da li su posetili stomatologa u prethodnih godinu dana, kserostomija, trajanje DM, HbA1c, nefropatija (da-insuficijencija bubrega, ne-početna nefropatija), neuropatija (da-uznapredovala, ne-početna neuropatija), retinopatija (da-uznapredovala, ne-početna retinopatija) i oboljenja perifernih krvnih sudova (da-uznapredovala, ne-početna).

in order to establish loss of attachment (LOA) using a standard CPITN pressure controlled probe. For bleeding on probing (BOP) measurements the periodontal probe was gently inserted into the gingival sulcus or periodontal pocket. BOP was assessed as present or absent. Visual assessments of supragingival calculus were rated as present or absent.

Cytomorphometric analysis

Patients washed mouths with normal saline for about 5 minutes and then the surface smear was taken with cotton wadding from vestibular gingival surface in whole mouth. The smears were transformed to a clean dry glass slide and fixed with 95% ethyl alcohol and prepared with Papanicolaou staining for cytomorphometric analysis. The morphometric analysis was done using Image program, NU2 microscope (Carl Zeiss, Germany) objective x 63 (NA 0.8)¹⁹.

Data management and analyses

All data were initially screened for accuracy and completeness. SPSS software program was used for the statistical analysis.

Differences in the prevalence rates of indices for each of the age categories were compared using ANOVA for continuous variables and chi square analyses for categorical variables. To address dependent factors possibly associated with periodontal disease, a classification of "advanced periodontal disease" was created. Subjects with LOA ≥ 6 mm in more than 10% of periodontal sites examined were so defined. The resultant binary variable (presence / absence) of advanced periodontal disease was used as the dependent variable in a nominal logistic regression model.

Potential explanatory variable were: age, gender, currently smoking cigarettes, having ever smoked cigarettes, alcohol consumption (greater than 2 deciliters per week), tooth brushing (one or fewer times per day), having visited a dentist in the last year, presence of xerostomia, duration of DM, HbA1c, nephropathy (yes-renal failure or no), neuropathy (yes-definite and no-early), retinopathy (yes-advanced or no-early) and peripheral vascular disease (yes-advanced and no-early).

Rezultati

160 ispitanika je učestvovalo u istraživanju, starosti 64,2 ($\pm 0,2$) godina, a srednje starost u vreme postavljanja dijagnoze DM bila je 48,4 ($\pm 0,2$) godina. Od dijabetičkih ispitanika 89 je bilo muškog, a 71 ženskog pola.

Prosečna dužina trajanja DM je bila 23,6 ($\pm 0,39$) godina, a srednja vrednost HbA1c 8,70% ($\pm 0,45$). U toku kliničkog pregleda zabeleženo je i prisustvo komplikacija dijabetesa i to: 46,88% ispitanika je imalo uznapredovalu ili proliferativnu retinopatiju, 23,75% je imalo nefropatiju ili insuficijenciju bubrega, 31,88% perifernu neuropatiju, i 10% perifernu vaskularnu bolest (Tabela 1).

Razlike u parodontalnim indeksima u zavisnosti od starosti ispitanika su prikazane u tabeli 2. Vrednosti LOA su se povećavale sa povećanjem starosti ispitanika. Veći LOA (≥ 6 mm) je zastupljeniji kod starijih ispitanika. BOP je imao iste vrednosti kod svih starosnih grupa. Veće količine zubnog kamenca bile su prisutne kod starijih ispitanika. Citomorfometrijska analiza je pokazala veće vrednosti jedara (NA) kod starijih ispitanika.

Results

160 subjects aged 64.2 (± 0.2) years participated in the study, and a mean age at the onset of DM 48.4 (± 0.2) years. This diabetic population study comprised 89 males and 71 females.

The mean duration of the disease for these diabetic subjects was 23.6 (± 0.39) years while the mean HbA1c level was 8.70% (± 0.45). Assessments of diabetic complications at the time of oral examination found 46.88% to have advanced or proliferative retinopathy, 23.75% to have overt nephropathy or renal failure, 31.88% to have definite peripheral neuropathy, and 10% to have definite peripheral vascular disease (Table 1).

Variation in periodontal disease indices with age is shown in Table 2. Measures of LOA generally increase with age. Severe LOA (≥ 6 mm) was more present in older patients. BOP was consistent among subjects in each age group. Supragingival calculus was more prevalent in the older subjects. Cytomorphometric analysis revealed larger nuclear area (NA) values in older subjects.

Tabela 1. Demografski podaci
Table 1. Data demographic

	Muškarci	Žene	Ukupno
	Males	Females	Total
Starosna grupa			
Age category			
≤ 40 godina	14	16	30
41-50 godina	20	14	34
51-60 godina	23	16	39
61-70 godina	18	15	32
71-80 godina	10	8	18
>80 godina	3	4	7
Ukupno	89	71	160
Starost (god.)	64.6 \pm 0.57	64.0 \pm 0.64	64.2 \pm 0.43
Age (year)			
Starost u vreme otkrivanja DM (god.)	48.2 \pm 0.31	48.6 \pm 0.35	48.4 \pm 0.23
Age at onset (year)			
Dužina trajanja DM (god.)	24.0 \pm 0.36	23.5 \pm 0.32	23.6 \pm 0.39
Duration of disease (year)			

Tabela 2: Vrednosti parodontalnih indeksa i citomorfometrijskih parametara u zavisnosti od starosti ispitanika**Table 2:** Variations in periodontal indices and cytomorphometric values with age

		Starost (godine) Age Category (years)						
		≤ 40	41-50	51-60	61-70	71-80	>80	Ukupno Overall
LOA*	(mm)	0.75±0.08	1.00±0.08	1.33±0.07	1.83±0.09	2.89±0.13	3.63 ±0.17	1.53± 0.04
Ispitanici sa		30.0	58.8	61.5	65.6	66.7	85.7	52.34
Subjects with								
any LOA≥4mm^a								
(%)								
Ispitanici sa		10.0	14.7	23.1	25.0	27.8	42.6	20.62
Subjects with								
any LOA≥6mm*								
(%)								
Najveći LOA	(mm)	2.69 ±1.9	3.82±0.19	4.31±0.16	4.38±0.16	4.84±0.25	5.03 ±0.35	4.01±0.08
Deepest								
svakog ispitanika								
for each subject*								
Ispitanici sa		80.0	70.6	71.8	81.2	66.7	71.4	74.4
Subjects								
with any (%)								
Ispitanici sa		20.0	29.4	25.6	31.3	33.3	42.9	28.1
Subjects with								
any kamencem calculus								
(%)								
NA		78.81±8.5	78.93±9.2	82.03±8.5	89.44±3.2	92.46±3.4	99.48±11.69	83.69±8.5

*p<0.05.

Tabela 3. Faktori povezani sa uznapredovalom parodontopatijom
Table 3. Factors possibly associated with advanced periodontal disease

Faktor	Broj Number	ZastupljenostEPD	Odnos Odds ratio	95% C.I.	p vrednost value
Demografske karakteristike Demographics prevalence					
Starost Age					
≤ 50 godina years	103	16.9%	39.7	1.82-9.63	<0.001
> 50 godina years	57	4.8%			
Pol Gender					
Muškarci Males	89	12.5%	1.52	0.73-3.20	0.261
Žene Females	71	8.4%			
Konzumiranje cigareta i alkohola Tobacco and alcohol consumption					
Trenutno pušenje cigareta Current cigarette smoking					
Da Yes	31	35.6%	9.98	4.87-20.9	<0.001
Ne No	129	4.9%			
Prethodno pušenje cigareta Cigarette smoking					

history					
Bivši pušači	56	21.9%	6.24	2.88-14.47	<0.001
Previously smoked					
Nikad nisu pušili	103	4.3%			
Never smoked					
Konzumiranje alkohola Alcohol consumption					
≥2dcl/nedeljno deciliter/week	48	13.4%	1.55	0.72-3.28	0.242
<2dcl/nedeljno deciliter/week	109	9.0%			
Oralno zdravlje Oral health					
Pranje zuba					
Tooth brushing					
≤ jednom dnevno	42	17.5%	2.43	1.16-5.04	0.017
> jednom dnevno	118	8.2%			
≤ once a day					
> once a day					
Posetili stomatologa prošle godine					
Visited dentist in a last year					
Ne No	114	15.4%	1.94	0.92-4.01	0.067
Da Yes	46	8.6%			
Simptomi vezani za kserostomiju					
Xerostomia symptoms					
Ne No	40	19.9%	1.30	0.56-2.81	0.500
Da Yes	120	10.1%			
Starost u vreme postavljanja dijagnoze DM					
Age at DM onset					
≤ 50 godina years	80	4.6%	4.36	1.90-11.17	<0.001
> 50 godina years	80	16.1%			
Trajanje DM					
Duration of DM					
> 24 godina years	71	14.7%	2.24	1.06-4.64	0.034
≤ 24 godina years	89	7.8%			
HbA1C					
Loša glikemija Poor (>10.1%)	113	12.6%	2.08	0.86-5.68	0.119
Dobra glikemija Good (≤10.1%)	48	6.3%			
Nefropatija Nephropathy					
Da (insuf. bubrega)	29	13.7%	1.46	0.58-3.19	0.389
Yes (renal failure)					
Ne No	131	9.7%			
Neuropatija Neuropathy					
Da (uznapredovala)	35	18.7%	2.48	1.14-5.19	0.017
Yes (definite)					
Ne (početna)	125	8.3%			
No (early)					
Retinopatija Retinopathy					
Da (uznapredovala)	64	11.9%	1.27	0.61-2.64	0.550
Yes (advanced)					
Ne (početna) No (early)	96	9.5%			
Periferna vaskularna oboljenja					
Peripheral vascular disease					
Da (uznapredovala) Yes (advanced)	15	21.9%	2.59	0.91-6.54	0.060
Ne (početna) No (early)	145	9.4%			

Prema regresionoj analizi, faktori povezani sa uznapredovalom parodontopatijom su: starost ($P < 0,001$), trenutno pušenje cigareta ($p < 0,001$), bivši pušači ($p < 0,001$), pranje zuba ($p = 0,017$), redovne posete stomatologu ($p = 0,068$), trajanje DM ($p = 0,034$), kserostomija ($p = 0,500$), vrednost HbA1c ($p = 0,119$), neuropatija ($p = 0,017$), nefropatija ($p = 0,389$), retinopatija ($p = 0,550$) i periferna vaskularna oboljenja ($p = 0,060$) (Tabela 3).

Diskusija

Dijabetes predstavlja značajno globalno hronično oboljenje ljudi koje je Svetska Zdravstvena Organizacija (World Health Organization - WHO) zbog velike učestalosti proglasila epidemijom. Ovaj izražen porast učestalosti, pre svega na osnovu povećanja broja obolelih od DM tipa 2, javlja se i u zemljama u razvoju i u razvijenim zemljama. Takođe, kao dodatak mnogobrojnim nalazima koji potvrđuju da je dijabetes rizik faktor za loše parodontalno zdravlje, postoji sve više naučnih dokaza koji ističu da parodontalna infekcija loše utiče na glikemijsku kontrolu i pojavu dijabetesnih komplikacija^{1,4}. Ipak, navedene podatke treba uzeti obazrivo u obzir, jer sami dobijeni rezultati istraživanja zavise od godine kada je rađeno istraživanje, kriterijuma procenjivanja, interpretacije dobijenih rezultata i specifičnih populacionih karakteristika⁸. U ovom istraživanju LOA je pokazao veće vrednosti sa povećanjem starosti ispitanika što je u saglasnosti sa drugim istraživanjima koja ističu da stariji ispitanici imaju uznapredovali oblik parodontalne bolesti i veći rizik za napredovanje bolesti nego mlađe osobe^{20,21}. U ovom istraživanju, za razliku od literaturnih podataka nije uočena povezanost BOP sa starošću ispitanika što nam sugerise da inflamacija gingive i BOP zavise od akumulacije oralnog biofilma i oralne higijene²⁰. Može se reći da je BOP značajan pokazatelj održavanja parodontalnog zdravlja^{22,23}. Mnogobrojna istraživanja ističu da je pušenje cigareta značajan etiološki faktor za pojavu LOA^{24,25}. Hyman i sar.²⁶ su sproveli ispitivanje kod 12,325 odraslih osoba u SAD-u i uočili, kao i mi u ovom istraživanju, da su veće vrednosti LOA povezane sa pušenjem cigareta. Ovo je posebno uočljivo kod osoba starijih od 50 godina. U našem istraživanju, prisustvo zubnog kamenca se povećavalo sa porastom starosti ispitanika (20,0% do 42,9%), kao što je uočeno i u istraživanjima drugih autora^{21,22,27}.

Factors possibly associated with advanced periodontal disease included in the regression analysis were: age ($P < 0.001$), current smoking cigarettes ($p < 0.001$), having ever smoked cigarettes ($p < 0.001$), tooth brushing ($p = 0.017$), visits to the dentist ($p = 0.068$), duration of disease ($p = 0.034$), xerostomia ($p = 0.500$), HbA1c ($p = 0.119$), neuropathy ($p = 0.017$), nephropathy ($p = 0.389$), retinopathy ($p = 0.550$) and peripheral vascular disease ($p = 0.060$) (Table 3).

Discussion

Diabetes is an important chronic disease globally as reflected in the World Health Organization (WHO) declaring the rate of increase in diabetes prevalence is an epidemic. This growth in diabetes prevalence, driven principally by increasing prevalence of type 2 diabetes, is occurring in both developing and developed countries. In addition to the substantial evidence demonstrating diabetes as a risk factor for poor periodontal health, there is a growing body of evidence supporting periodontal infection adversely affecting glycemic control and diabetes complications^{1,4}. However, the specific values should be compared to published surveys with caution because the actual values vary depending on the year when the study was performed, assessment criteria, examiner interpretations and specific population characteristics⁸. In our study LOA shows enlargement trends with age as noticed in other studies which emphasize that older subjects have more advanced form of periodontal disease and a greater risk of disease progression than younger subjects^{20,21}. Trends in BOP with age are essentially nonexistent in our study as noticed in literature data which point out that gingival inflammation and BOP are related with plaque accumulation and oral hygiene²⁰. It is thought that BOP is a reliable predictor for the maintenance of periodontal health^{22,23}. Many studies emphasize the role of cigarette smoking in the etiology of LOA^{24,25}. Hyman²⁶ conducted the study of 12,325 US adults and noticed, as we did in our study, that higher LOA was associated with current smoking. This was especially noticeable among those aged 50 years or more. In our study, the prevalence of supragingival calculus seems to increase with age (20.0% to 42.9%) as seen in studies conducted by other authors^{21,22,27}.

Poslednjih godina, raste interesovanje za primenu eksfolijativne citologije kao standardne tehnike za otkrivanje patoloških promena u usnoj duplji. Citomorfometrijska analiza eksfolijativnih ćelija se preporučuje kao ključna tehnika za identifikaciju ćelijskih promena i mnogi istraživači su vršili ispitivanja različitih delova usne duplje kod dijabetesnih ispitanika. Ipak, podaci vezani za uzorkovanje gingivalnog tkiva su oskudni^{28,29}. Smatra se da su veće vrednosti NA dobijenih citomorfometrijskom analizom oralne mukoze povezane sa većom starosti ćelija kod dijabetesnih bolesnika³⁰⁻³³. Hiperglikemija kod pacijenata sa DM izaziva nakupljanje produkata glikolizacije na nivou bazalne membrane malih krvnih sudova, čime se sužava lumen krvnih sudova, smanjuje perfuzija i razmena hranjivih materija. Na ovaj način dolazi do usporene keratinizacije i usporenog procesa diferencijacije epitelnih ćelija što vodi povećanju broja zrelih ćelija. Zrele ćelije imaju veliko jedro kao svoju osnovnu karakteristiku što može biti razlog većih vrednosti NA uočenih kod dijabetesnih bolesnika³¹.

U ovom istraživanju 120 (75%) ispitanika je imalo simptome kserostomije. Smanjeno lučenje pljuvačke kod dijabetesnih bolesnika može dovesti do dehidracije usne duplje i atrofije oralne mukoze. Brisevi sa atrofične mukoze obično imaju ćelije koje su manje po veličini ali imaju veliko jedro pa daju utisak da su vrednosti NA veće, kao što je uočeno u istraživanju. Uprkos tome što je istraživanje pokazalo da DM tip 2 izaziva ćelijske promene u gingivalnom epitelu, ove promene nisu specifične za DM. Ovakva ćelijska oštećenja se takođe javljaju kod pacijenata sa endokrinim i respiratornim oboljenjima, povezanim sa smanjenom keratinizacijom koja je i razlog povećanja veličine jedra. Patel i sar.²⁸ su pokušali da postave osnove u načinu prepoznavanja patoloških briseva gingive i sugerisali su da je inflamacija jedan od faktora koji može povećati veličinu NA i dovesti do lošeg očuvanja citoplazme. Istraživači su uočili slične promene u toku poremećaja keratinizacije kod osoba koje su pušači^{34,35}. Naši nalazi potvrđuju značajnu ulogu duvana u povećanoj učestalosti i težini parodontopatije.

Odnos od 9,98 u povezanosti pušenja i parodontopatije koje smo pronašli u našem sprovedenom istraživanju je u skladu sa navodima iz literature²⁶.

In recent years, there has been increasing interest in the role of exfoliative cytology as a standard technique in screening of oral pathologies. Cytomorphometric analysis of exfoliated cells has been suggested as a key approach to identify the cellular changes and many investigators have evaluated different sites in oral cavity of diabetic patients. However, data on gingival tissue is scarce^{28,29}. It is suggested that higher NA values in cytomorphometric analysis of oral mucosa could be related to increased cellular age in patients with DM³⁰⁻³³. Hyperglycemia in patients with DM causes agglomeration of advanced glycation end products in the basement membrane of the small blood vessels narrowing of the vessel lumen and decreasing perfusion and cell turnover. This can explain slow keratinization and epithelial differentiation processes which lead to an increase in the number of mature cells. Mature cells have large nucleus as a primary characteristic and can be related to higher NA values noticed in diabetic patients³¹.

In our study 120 (75%) of patients had xerostomia symptoms. Decreased salivation in diabetic patients may lead to dehydration which causes mucosal atrophy. Smears from atrophic mucosa usually have cells that are smaller in cell size, but have larger nuclei and give an impression of higher NA values as noticed in our study. Although our study showed that DM type 2 produces cellular changes in the gingival epithelium, these changes are not specific to DM. Cellular alterations are also present in patients with endocrine and respiratory diseases, associated with a decreased rate of keratinization which is the reason for the increase in the nuclear size. Patel et al.²⁸ attempted to define a baseline for pathological smears obtained from gingival tissue and suggested that inflammation is one of the factors that can increase NA and lead to a poorly preserved cytoplasm. Investigators noticed similar changes during keratinization alteration in smoking subjects^{34,35}. Our results confirm the important role of tobacco in the prevalence and severity of periodontal disease. The odds ratio of 9.98 for the association with smoking found in the current study agrees with the literature data²⁶.

Epidemiological studies have shown that DM is a risk factor for periodontal disease and

Epidemiološka istraživanja su pokazala da je DM rizik faktor za parodontopatiju i smatra se da će osobe sa DM tri puta verovatnije imati parodontopatiju u odnosu na zdrave osobe^{36,37}. Ako se sagleda pušenje cigareta kao faktor rizika, rizik za razvitak parodontopatije je 20 puta veći. Prema literaturnim podacima, dijabetesni bolesnici koji su pušači imaju dublje parodontalne džepove i veće vrednosti LOA u odnosu na nepušače^{38,39}. Pušenje negativno utiče na tok parodontopatije kod dijabetesnih bolesnika i povećava rizik za gubitak nivoa epitelnog pripoja⁴⁰.

Glikolizirani hemoglobin (HbA1c) se kontinuirano formira u eritrocitima kao produkt neenzimske reakcije između proteina hemoglobina, koji nosi molekule kiseonika i glukoze. Ova veza je visoko stabilna i hemoglobin ostaje u glikoliziranom stanju za vreme života eritrocita⁴¹. Određivanje nivoa HbA1c daje predstavu o nivou glukoze u krvi kroz duži vremenski period (1-3 meseca), pri čemu se više vrednosti glukoze u krvi pokazuju kao više vrednosti HbA1c⁴². Takođe, vrednosti HbA1c su u pozitivnoj vezi sa prisustvom dijabetesnih komplikacija. Preporučene ciljne vrednosti HbA1c kod dijabetesnih bolesnika su <7,0%. Postizanje ovog cilja je teško, i novija istraživanja su pokazala da samo 36% osoba sa DM tipa 2 postiže ciljnu vrednost HbA1c manju od 7,0%⁴³. U našem istraživanju kontrola glikemije je bila loša, ali nije pokazala povezanost sa parodontopatijom u regresionoj analizi. Slično, mnoga istraživanja nisu uspela da objasne jasnu vezu između metaboličke kontrole i težine parodontopatije. Ono što je istaknuto u literaturi je pozitivna veza između visokih vrednosti HbA1c i medicinskih komplikacija dijabetesa koje su znak lošeg zdravstvenog ponašanja i zainteresovanosti bolesnika.

Značajan rizik faktor parodontopatije kod dijabetesnih bolesnika su starost i trajanje dijabetesne bolesti. Ispitanici u ovom istraživanju bili su starosti 48,4 ($\pm 0,2$) godina u vreme postavljanja dijagnoze dijabetesa tipa 2, a bolest je trajala u proseku 23,6 ($\pm 0,39$) godina. Krajnji, regresioni model (tabela 3) je pokazao da su starost, pušačke navike, trajanje DM i prisutne dijabetesne komplikacije povezani sa uznapredovalom parodontopatijom. Klinički i epidemiološki dokazi prisutni u mnogobrojnim istraživanjima podržavaju koncept da parodontalna infekcija doprinosi dijabetesnim komplikacijama.

it is believed that people with type 2 DM are three times more likely to have periodontal disease compared to healthy controls^{36,37}. If smoking as a risk factor is considered, the risk for developing periodontal disease is 20 times higher. According to the literature, smoker-diabetic patients have deeper periodontal pockets and greater LOA compared to non-smokers^{38,39}. Smoking negatively influences the course of diabetic periodontal disease and increases the risk of attachment loss⁴⁰.

Glycohemoglobin is formed continuously in erythrocytes as a product of the non-enzymatic reaction between the hemoglobin protein, which carries oxygen molecules, and glucose. This link is highly stable and hemoglobin remains glycated for the life span of the erythrocyte⁴¹. Determination of HbA1c levels provides an estimate of the average blood glucose level over time (the preceding 1–3 months), with higher average blood glucose levels reflected in higher HbA1c values⁴². Also, HbA1c levels correlate well with the development of diabetic complications. The recommended HbA1c target value for people with diabetes is <7.0%. Achieving this goal is difficult, and recent population studies showed that only 36% of people with type 2 diabetes achieved a target HbA1c of <7.0%⁴³. In our investigation glycemic control was poor but not associated with periodontal disease in the final regression model. Similarly, many studies have failed to reveal any conclusive association between metabolic control and the severity of periodontal disease. They noticed positive correlation of high HbA1c values with medical complications of DM and may be possibly be viewed as poor health behavior.

Significant risk factors associated with periodontal disease in diabetic populations include both age and duration of the disease. The current population had a mean onset age of 48.4 (± 0.2) years and duration of disease of 23.6 (± 0.39) years. The final regression model (Table 3) showed age, smoking habits, duration of DM and diabetic complications to be related to advanced periodontal disease. The clinical and epidemiological evidence noted in numerous studies provides support for the concept that periodontal infection contributes to DM complications. On the other hand DM complications negatively influence

Sa druge strane, dijabetesne komplikacije negativno utiču na aktivnost i prognozu parodontalne bolesti^{15,16,26,36}. Ipak, neophodna su dalja rigorozna, kontrolisana istraživanja kako bi se čvrsto ustanovilo da li terapija parodontalne infekcije može uticati na smanjenje komplikacija dijabetesa.

Zaključak

Parodontopatija je česta i uznapredovala kod odraslih dijabetesnih bolesnika. Pušenje cigareta i starija životna dob su povezani sa većom učestalošću uznapredovale parodontopatije. Dijabetesni bolesnici koji su pušači imaju povećani rizik za loše parodontalno zdravlje i lošu prognozu parodontopatije, i moraju biti uključeni u redovne parodontološke kontrolne preglede i terapiju. Lečenje i prevencija uznapredovale parodontopatije kod dijabetesnih bolesnika mora obuhvatiti stroge preporuke za prekid pušenja, redovne stomatološke preglede i striktno održavanje oralne higijene.

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the activity and prognosis of periodontal disease^{15,16,26,36}. However, further rigorous, controlled trials are warranted to firmly establish that treating periodontal infections can be influential in the reduction of the burden of complications of diabetes mellitus.

Conclusion

Periodontal disease is common and advanced in adult diabetic population. Cigarette smoking and older age are associated with a higher prevalence of advanced periodontal disease. Smokerdiabetic patients are at high risk for poor periodontal health and prognosis, and they should be included in regular periodontal assessment and treatment. Management and prevention of advanced periodontal disease in diabetics should include strong recommendations to discontinue cigarette smoking, regular dental visits and oral hygiene.

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PRIKAZ SLUČAJA
CASE REPORT
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IZRADA FIKSNIH ZUBNIH NADOKNADA KOD PARAFUNKCIJSKIH AKTIVNOSTI OROFACIJALNOG SISTEMA - PRIKAZ SLUČAJA

FABRICATION OF FIXED DENTAL RESTORATIONS IN PATIENT WITH PARAFUNCTIONAL ACTIVITIES OF THE OROFACIAL SYSTEM - CASE REPORT

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Sažetak

Uvod: Bruksizam je ponavljana aktivnost mišića i zglobova koja se karakteriše škripanjem i struganjem zubima, a klinički se, pre svega, može dijagnostikovati prisustvom izraženih brusnih faseta. Cilj rada bio je prikaz pacijenta sa bruksizmom kome je usled dijagnostikovane krezubosti indikovana izrada gornjeg i donjeg polucirkularnog metalo-keramičkog mosta. Kliničkim pregledom utvrđeno je značajno oštećenje prethodno izrađenih fiksnih nadoknada. Povećanjem vertikalne dimenzije okluzije, stabilnim okluzalnim kontaktima metalo-keramičkih članova i izradom intraoralnih splintova od meke plastike postignuti su optimalni terapijski rezultati, a oštećenja mosta su izostala.

Zaključak: Izrada protetskih radova kod pacijenata sa bruksizmom ima za cilj da primarno reši nedostatak izgubljenih zuba, ali i preventivno deluje na moguća oštećenja orofacijalnog sistema parafunkcijskim aktivnostima.

Ključne reči: fiksna nadoknada, bruksizam

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Abstract

Introduction: Bruxism is a repetitive activity of muscles and joints, which is characterized by creaking and scraping of teeth, and clinically, above all, it can be diagnosed by the presence of expressed abrasive facets.

The aim of the paper was to present a patient with bruxism, whom, due to diagnosis of the partial edentulism, has been indicated production of the upper and lower semi-circular metal ceramic bridge. A clinical examination found significant damage to the previously created fixed denture. By increasing the vertical dimension of the occlusion, making stable occlusal contacts, and by making of intraoral soft-plastic splint, optimal therapeutic results have been achieved, and the damage to the bridge has been missed.

Conclusion: Making prosthetic restorations in patients with bruxism aims to primarily solve the lack of lost teeth, but also prevents possible damage to the orofacial system by parafunctional activities.

Key words: fixed restoration, bruxism

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za stomatologiju Niš. Sva prava zadržana.

Uvod

Bruksizam je parafunkcionalno i patološko stanje orofacijalnog sistema. Prema Lobbezo i sar¹, bruksizam je ponavljana aktivnost mišića i zglobova koja se karakteriše škripanjem i struganjem zubima udruženim sa stiskanjem donje vilice¹. Američka akademija za orofacijalnu bol (*American Academy of Orofacial Pain*) bruksizam definiše kao dnevnu ili noćnu parafunkcionalnu aktivnost koja uključuje stiskanje, škripanje, škrgutanje i mlevenje zubima i koja se može jasno klinički dijagnostikovati prisustvom izraženih brusnih faseta koje nisu mogle nastati mastikacijom². Sa druge strane, iako ne postoji jasan konsezus struke, većina dostupne literature bruksizam opisuje kao noćnu aktivnost. Dnevni bruksizam se naziva bruksomanija i predstavlja nekontrolisano stiskanje zuba u slučajevima akutne nervne razdražljivosti ili jačeg fizičkog napora³. Dokazano je da se dnevni bruksizam češće javlja kod žena, dok u slučaju prevalencije noćnog bruksizma nema razlike u odnosu na pol i uzrast^{4,5}.

Jedini objektivni način za dokazivanje bruksizma su elektromiografija i polisomnografija⁶. Ove metode zahtevaju sofisticiranu tehnologiju, nedostupnu u svakodnevnoj kliničkoj praksi, te se koriste isključivo u naučne svrhe. Radi olakšavanja postavljanja dijagnoze, Američka asocijacija za poremećaj sna (*American Sleep Disorders Association*) smatra da je bruksizam prisutan ukoliko postoji bar jedan od simptoma: trošenje zuba, zvukovi u zglobovima prilikom pokreta donje vilice ili osetljivost žvačnih mišića, koji se ne mogu pripisati nijednom drugom poremećaju⁷⁻⁹. Dijagnoza se, dakle, postavlja na temelju dobre anamneze i objektivnih znakova pri kliničkom pregledu.

Uzrok nastanka bruksizma još uvek je izvor polemika, ali su autori saglasni u činjenici da je kompleksne i multifaktorijske etiologije. Neuromuskularna teorija, veoma citirana sredinom prošloga veka, smatra da malokluzija, posebno okluzijske interference, uzrokuju parafunkcijske pojave kao što su škripanje i stiskanje zuba¹⁰. Sa druge strane, danas zastupljena psihofiziološka teorija podrazumeva da primarni uzroci bruksizma jesu stres i emocionalni faktori, koji razvojem parafunkcije pokreću mehanizme oslobađanja tenzije¹¹. Dokazano je da se bruksizam može javiti i kod osoba kod kojih postoje pravilni okluzijski odnosi ili blaga odstupanja, kao i da ga nema u slučajevima izuzetno narušenih okluzijskih odnosa⁹.

Introduction

Bruxism is the parafunctional and pathological state of the orofacial system. According to Lobbezo et al., bruxism is a repetitive activity of muscles and joints, characterized by squeezing and scraping teeth associated with clenching of the lower jaw¹. The American Academy of Orofacial Pain defines bruxism as a daily or nightly parafunctional activity that involves squeezing, crunching, and grinding teeth and which can be clearly diagnosed clinically by the presence of expressed abrasive facets that could not be caused by mastication². On the other hand, although there is no clear professional consensus, most available literature describes bruxism as a night activity. Daily bruxism is called bruxomania and represents an uncontrolled tooth compression in cases of acute nervous irritability or stronger physical effort³. Daily bruxism has been proven to be more common in women; however, concerning the prevalence of night bruxism, there is no difference in sex and age^{4,5}.

The only objective way to prove bruxism is electromyography and polysomnography⁶. These methods require sophisticated technology, inaccessible in everyday clinical practice, and are used exclusively for scientific purposes. In order to facilitate diagnosis, the American Sleep Disorders Association finds that bruxism is present if there is at least one of the symptoms: tooth wear, sounds in the lower jaw movement, or sensitivity of chewing muscles, which cannot be attributed to any other disorder⁷⁻⁹. The diagnosis is therefore based on good anamnesis and objective signs in a clinical examination.

The cause of the occurrence of bruxism is still a source of controversy, but the authors agree with the fact that it is complex and multifactorial etiologies. A neuromuscular theory, widely quoted in the middle of the last century, considers that malocclusion, especially occlusal interference, can cause parafunctional phenomena such as creaking and tooth clenching¹⁰. On the other hand, the present-day psychophysiological theory implies that the primary causes of bruxism are stress and emotional factors which, by the development of parafunction, trigger mechanisms for the release of tension¹¹. It has been proven that bruxism can occur in patients with proper occlusal relationships or slight deviation, but it lacks in the cases of extremely degraded occlusal relationships⁹.

Etiologija bruksizma vezuje se za poremećaj u regulaciji na nivou centralnog nervnog sistema, a empirijski je dokazano da je češći kod osoba sa depresijom, anksioznošću i paranoidnim poremećajem⁸. Kod odraslih se bruksizam povezuje sa Huntingtonovom i Parkinsonovom bolešću¹²⁻¹⁴.

Za razliku od funkcionalnih kretnji donje vilice, parafunkcionalne kretnje kod bruksizma razvijaju znatno jače horizontalne sile pri zubnim kontaktima koje oštećuju zube i čitav orofacijalni sistem. Bruksizam se pojavljuje u horizontalnom i vertikalnom obliku. Horizontalni oblik (škripanje) nastaje kada su klizne kretnje ekstremne, što izaziva ozbiljno trošenje incizalnih ivica prednjih i kvržica bočnih zuba. Smanjuje se horizontalni i vertikalni preklop. Drugi je oblik vertikalni (stiskanje), u kojem je kretanja minimalna, svega nekoliko milimetara. Troši se lingvalna površina gornjih i labijalna površina donjih prednjih zuba, ali im se dužina ne menja¹⁵.

S obzirom da je prevalencija bruksizma, koja se u zavisnosti od izvora iz literature kreće od 8 do 31,4%, zabrinjavajuća, neophodno je uspostaviti dobre terapijske modalitete, a posebnu pažnju obratiti na prevenciju poremećaja^{6,16,17}. Protetsko zbrinjavanje pacijenata sa bruksizmom praćeno je brojnim poteškoćama, ali je istovremeno i stručni izazov.

Cilj rada bio je prikaz pacijenta sa bruksizmom kome je usled dijagnostikovane krezubosti bila indikovana izrada gornjeg i donjeg polucirkularnog metalo-keramičkog mosta.

Prikaz slučaja

Pacijent NP, muškog pola, star 52 godine, primljen je u Službu za stomatološku protetiku Klinike za stomatologiju u Nišu radi protetske rehabilitacije. Motiv za dolazak stomatologu bio je delimični nedostatak zuba u obe vilice, kao i poteškoće u izgovoru pojedinih glasova. U anamnestičkim podacima pacijent je naveo upotrebu leka Remitra 30 mg - Actavis (mitrazepin) u cilju lečenja depresivne epizode. Kliničkim pregledom utvrđena je krezubost gornje i donje vilice, kao i distalni dentoalveolarni odnos sa retroinklinacijom gornjih frontalnih zuba. Utvrđeno je smanjeno otvaranje usta pri govoru, kao i blaga hipertrofija maseteričnih mišića (slika 1). Nije evidentirano prisustvo bruksosfasete.

Etiology of bruxism is linked to the abnormal regulation of the central nervous system, and the empirically has been proven to be more common in people with depression, anxiety and paranoid disorder⁸. In adults, bruxism is still associated with Huntington and Parkinson's disease¹²⁻¹⁴.

In contrast to the functional movements of the lower jaw, parafunctional movements in bruxism develop considerably stronger horizontal forces in teeth contacts that damage teeth and the whole orofacial system. Bruxism occurs in horizontal and vertical form. Horizontal form (creaking) occurs when sliding gestures are extreme, causing severe wear of the incisal edges of the front and cusps of the lateral teeth. Horizontal and vertical overlap is reduced. The second is a vertical form (clenching) in which the movement is minimal, only a few millimeters. The lingual surface of the upper and labial surfaces of the lower front teeth are worn, but their length is not changed¹⁵.

Considering that the prevalence of bruxism, which varies from 8 to 31.4% depending on the literature source, is of concern, it is necessary to establish good therapeutic modalities, and pay special attention to the prevention of disorders^{6,16,17}. Prosthodontic care of patients with bruxism is associated with many difficulties, but it is also a professional challenge.

The aim of this paper was to present a patient with bruxism, whom was indicated fabrication of the upper and lower semi-circular metal ceramic bridge due to the diagnosis of partial edentulism.

Case report

A male patient N.P., aged 52, was admitted to the Clinic of Dentistry in Niš, Department for prosthodontics, for prosthodontic rehabilitation. The motive for the coming to the dentist was the partial lack of teeth in both jaws, as well as the difficulty in pronouncing certain voices. In anamnestic data, the patient mentioned the use of Remitra 30 mg - Actavis (mitrazepin) for the treatment of a depressive episode. Clinical examination determined the partial edentulism of the upper and lower jaw as well as the distal dentoalveolar relationship with the retro-inclination of the upper frontal teeth. It also revealed reduced mouth opening during speech, as well as mild hypertrophy of the masseteric muscles (Figure 1). The presence of bruxofacet was not recorded.

Nakon preprotetske pripreme, koja je podrazumevala ekstrakciju razlabavljenih zuba i sanaciju karijesa, pristupilo se izradi najpre gornjeg, a zatim i donjeg semicirularnog metalo-keramičkog mosta. U cilju potpune rehabilitacije izvornog okluzijskog obrasca ispoštovana je postojeća visina zagrižaja, a preklop gornjih i donjih frontalnih zuba iznosio je oko 2-3 mm, sa blago izraženom retroinclinacijom (slika 2). Pacijentu su date jasne smernice o održavanju oralne higijene, korekciji ishrane i načinu konzumacije hrane.



Slika 1. Izraženi maseterični mišići mogu ukazivati na njihovu hiperaktivnost

Figure 1. Expressed masseteric muscles may indicate their hyperactivity

Nakon dva meseca pacijent se javio sa frakturom spojnice između zuba 22 i 23, verovatno izazvanog jakim mastikatornim pritiskom. Na većini metalokeramičkih kruna uočene su abrazivne fasete. Abrazija keramike na labijalnoj i lingvalnoj strani sekutića ukazivala je na vertikalni tip bruksizma (slika 3). Uočena je jaka inflamacija desni u gornjoj i donjoj vilici, a pacijent je potvrdio da ne održava oralnu higijenu. Žalio se na mali prostor za jezik i nemogućnost da govori. Pri govoru je slabo otvarao usta, delovao napeto, a uočavale su se i kontrakcije masetra. Imajući u vidu prisutne objektivne znake, postavili smo početnu dijagnozu bruksizma, te se koncentrisali na iscrpnu anamnezu u vezi sa para-funkcijskim ponašanjem.

Pacijent je na pitanje da li stiska zube odgovorio pozitivno. Pri tome, nije svestan noćnog bruksizma, ali je primećivao da u toku dana vrši pritisak na mostove, što on nije mogao da iskontroliše. Nije osećao bolove u mišićima i viličnim zglobovima.

After preprosthetic treatment, which involved the extraction of loosened teeth and the repair of caries, firstly the upper and then lower semicircular metal ceramic bridge were made. For the purpose of complete rehabilitation of the original occlusive form, the existing intermaxillary relationship has been maintained, and the folding of the upper and lower frontal teeth was about 2-3 mm, with a mildly pronounced retroinclination of them (Figure 2). The patient is given clear guidelines on maintaining oral hygiene, nutrition correction and manner of food consumption.



Slika 2. Prvobitno izrađene mostne konstrukcije pozicionirane na izvornoj visini zagrižaja

Figure 2. Initially made bridge constructions positioned at the original bite height

After two months, the patient appeared with the fracture of the commissure between teeth 22 and 23, probably caused by a strong mastication pressure. Abrasive facets were found on most metal ceramic crowns. Abrasion of ceramics on the labial and lingual side of the incisors indicated a vertical type of bruxism (Fig. 3). There was a strong gum inflammation in the upper and lower jaws, and the patient confirmed that he did not maintain oral hygiene. He complained about a small space for tongue and an inability to speak. While speaking, he opened his mouth slightly, he seemed tense, and masseter contractions were noticed. Bearing in mind the objective signs, we set up the initial diagnosis of bruxism, and concentrated on the exhaustive anamnesis associated with para-functional behavior.

The patient was asked if he clenched his teeth, to which he responded positively. In doing so, he was not aware of the night bruxism, but he noticed that during the day he was putting pressure on the bridges, which



Slika 3. Bruksofasete na labijalnoj i lingvalnoj površini donjih frontalnih zuba. Izražen ainflamacija desni

Figure 3. Bruxofacets on the labial and lingual surfaces of the lower frontal teeth. Noticeable gingival inflammation



Slika 4. Određivanje međuviličnih odnosa – podizanje vertikalne dimenzije okluzije

Figure 4. Determination of intermaxillary relationships - lifting the vertical dimension of occlusion

Glavobolja nije bila prisutna. U farmakološkoj anamnezi navodi dalju upotrebu mitrazepina, kao i novodijagnostikovanu Parkinsonovu bolest, zbog koje je radno pošteđen.

Pacijentu je skinut gornji metalo-keramički most. U konsultaciji sa parodontologom, sanirana je inflamacija gingive uz motivacioni kurs o održavanju oralne higijene i krenulo se sa izradom nove gornje mostne konstrukcije. U cilju obezbeđenja prostora za jezik i iz fonetskih razloga, odlučili smo da povećamo vertikanu dimenziju okluzije i smanjimo preklap prednjih zuba (slika 4). Izrađen je gornji metalo-keramički most sa jače izraženim konektorima, koji je nakon adaptacije u ustima pacijenta privremeno cementiran. U istoj aktu uklonjen je stari donji most i počelo se sa sanacijom desni. Nakon parodontološkog tretmana, pacijent se vratio u Službu za stomatološku protetiku radi uzimanja otiska. Intraoralnim pregledom uočeno je oštećenje keramičke fasete privremeno cementiranog gornjeg mosta, iako je pacijent kao antagoniste imao brušene zube. Most je vraćen u zubnu tehniku radi reparacije. Nakon izrade donje zubne nadoknade i iscrpne analize okluzalnih kontakata, pacijentu su privremeno cementirana oba mosta.

Pacijentu su izrađene gornja i donja meka udloga koje bi trebalo da koristi noću, ali i u toku dana, kako ne bi došlo do oštećenja mostova i kako bi se mastikatorni mišići rasteretili (slika 5).

he could not control. He did not feel pain in the muscles and jaw joints. Headache was not present. In the pharmacological history, further use of mitrazepine was reported, as well as the newly diagnosed Parkinson's disease, due to which he was exempt from work.

The upper metaloceramic bridge was removed. In consultation with the periodontologist, gingival inflammation was remediated with a motivation course on maintaining oral hygiene and started with the construction of a new upper bridge structure. In order to provide space for the tongue and for phonetic reasons, we decided to increase the vertical dimension of the occlusion and reduce the overlap of the front teeth (Fig. 4). An upper metaloceramic bridge with stronger connectors was created, which was temporarily cemented after the adaptation in the patient's mouth. In the same session, the old lower bridge was removed and the gum repair started. After a periodontal treatment, the patient returned to the Department of prosthodontics for the purpose of taking an impression of the lower teeth. Intraoral examination showed damage to the ceramic facet of the temporarily cemented upper bridge, although the patient as an antagonist had prepared teeth. The bridge was returned to dental technician for reparation. After the production of the lower dental restoration and exhaustive analysis of occlusal contacts, both bridges were temporarily cemented.



Slika 5. Izrada mekih udloga preko modela gornjeg i donjeg semicirkularnog mosta

Figure 5. Making soft splints over the upper and lower semicircular bridge models

U trenutku predaje most je bio bez ikakvih mehaničkih oštećenja, a pacijent je bio zadovoljan njihovom funkcijom i izgledom (slika 6). Pacijentu su data uputstva o održavanju higijene mosta, o načinu ishrane sa zubnim nadoknadama, kao i o svakodnevnom korišćenju zaštitnih folija u toku noći.

Na kontroli nisu uočena oštećenja mosta, a pacijent je protetičkim zadovoljan radom. Podizanjem zagrižaja i uspostavljanjem stabilnih kontakata svih članova gornjeg i donjeg fiksnog rada postignuti su zadovoljavajući funkcionalni, estetski i fonetski rezultati, pa je usledilo definitivno cementiranje mostova glas jonomer cementom. Oralna higijena pacijenta bila je zadovoljavajuća.

Terapija bruksizma je kompleksna i dugotrajna, te su redovne kontrole predviđene na tri meseca.

Diskusija

Terapija bruksizma je kompleksna, kao i svaka terapija pojava i stanja koja nemaju jasnu etiologiju. Ciljevi terapije bruksizma su redukcija psihičkog stresa, uspostavljanje optimalnih okluzalnih odnosa, tretiranje simptoma orofacijalne parafunkcije, kao i zaustavljanje ustaljenih neuromuskularnih navika^{18,19}.

U terapiji bruksizma izdvajaju se dve komponente: kontrola stresa i njegovog uticaja na neuromišićni sistem (promena životnih navika, farmakoterapija i fizikalna terapija), kao i stomatološka terapija, koja obuhvata optimalnu okluzalnu rehabilitaciju i primenu intraoralnih udloga^{18,20}.



Slika 6. Izgled pacijenta sa izrađenim gornjim i donjim metalo-keramičkim mostovima i zaštitnim splintovima

Figure 6. Patient's appearance with upper and lower metal ceramic restorations and protective splints

The upper and lower soft splint for the patient were made, which should be used at night, but also during the day, in order to prevent bridge damage, and to relieve masticatory muscles (Figure 5). At the time of delivery, the bridge was without any mechanical damage, and the patient was satisfied with their function and appearance (Figure 6). The patient was given instructions for maintaining the hygiene of the bridge, the diet with dental restorations, and for the daily use of protective films during the night.

On the next control, no damage was detected on the bridge, and the patient was satisfied with the restorations. By raising the bite and establishing stable contacts of all bridge units of the upper and lower fixed work, satisfactory functional, aesthetic and phonetic results were achieved, and finally the cementing of the bridges with a glass ionomer cement followed. Oral hygiene of the patient was satisfactory.

The therapy of bruxism is complex and long-lasting, and the regular control of the patient is scheduled for every three months.

Discussion

Therapy of bruxism is complex, like any treatment of phenomena and conditions that do not have a clear etiology. The goals of bruxism therapy are the reduction of psychic stress, the establishment of optimal occlusal relationships, the treatment of orofacial parafunctional symptoms, and cessation of established neuromuscular habits^{18,19}.

In the treatment of bruxism, two components are distinguished: control of stress

Kontrola stresa uključuje pomoć psihologa ili psihijatra, kao i fizikalnu terapiju. Farmakološka terapija bazira se na lekovima kao što su benzodiazepini i mišićni relaksansi. U opisanom slučaju, pacijent je pod kontrolom i na terapiji propisanoj od strane specijaliste psihijatrije, što je faktor koji konkretno doprinosi rešavanju problema bruksizma. Pacijentu nije predložena fizikalna terapija, s obzirom da nije ukazao na probleme sa bolom u mišićima i viličnom zglobo, kao ni na glavobolju.

Izrada protetskih radova kod pacijenata sa bruksizmom, bilo da su u pitanju mobilne ili fiksne zubne proteze, podrazumeva optimalnu korekciju okluzalnih kontakata, kako eventualne interference ne bi dovele do pogoršanja stanja. Sa druge strane, od okluzalne rehabilitacije se očekuje da umanjí simptome bruksizma¹⁹. U slučaju koji smo prikazali okluzalna rehabilitacija podrazumevala je korekciju vertikalne dimenzije okluzije (povećanje visine zagrižaja) i ravnomernu raspodelu pritiska mastikacije uspostavljanjem istovremenih kontakata članova gornjeg i donjeg semicirkularnog mosta, kako u bočnim tako i u interkaninom sektoru. Pri novouspostavljenoj visini zagrižaja pacijent je prijavio rasterećenje u predelu viličnih zglobova i opuštenost maseteričnih i temporalnih mišića, što smatramo pozitivnim učinkom terapije. Sem toga, obezbeđen je prostor za jezik, pa je pacijent razgovetnije govorio. Nasuprot našim kliničkim rezultatima, Yap i sar. su utvrdili da uklanjanje okluzalne interference povišenjem vertikalne dimenzije okluzije ne zaustavlja bruksizam⁸.

Pacijent je još u vreme izrade donjeg mosta parafunkcionalnim pokretima oštetió keramiku na gornjem, privremeno cementiranom mostu. Kinsel i Lin su zaključili da metalo-keramičke krune imaju značajno veći rizik od preloma kod pacijenata sa bruksizmom kod kojih nije korišćen okluzalni splint²¹. Mikeli i sar. su ispitujući problem preloma porcelanskih faseta našli da se oni u 70% slučajeva javljaju kod bruksista²². Nasuprot tome, Souza Melo i sar. u svojoj metaanalizi nisu ustanovili povezanost „noćnog bruksizma“ i terapije keramičkim nadoknadama²³. Terapija okluzijskom udlagom može redukovati negativne posledice parafunkcionalnih aktivnosti, ali ih ne može zaustaviti.

and its influence on the neuromuscular system (change in habits of life, pharmacotherapy and physical therapy), as well as dental therapy that includes optimal occlusal rehabilitation and application of intraoral splints^{18,20}.

Stress control includes the help of a psychologist or psychiatrist, as well as physical therapy. Pharmacological therapy is based on drugs such as benzodiazepines and muscle relaxants. In the described case, the patient is under control and on the treatment prescribed by a specialist psychiatrist, which is a factor that specifically contributes to solving the problem of bruxism. Physical therapy was not proposed to the patient because he did not point to the problems with muscular and jaw pain, as well as headache.

Making prosthetic restorations in patients with bruxism, whether mobile or fixed dental prostheses are concerned, implies optimum correction of occlusal contacts, as possible interferences do not lead to worsening of the condition. On the other hand, occlusive rehabilitation is expected to diminish the symptoms of bruxism¹⁹. In the case that we presented occlusal rehabilitation meant the correction of the vertical dimension of occlusion (increasing bite height) and even distribution of the pressure of mastication by establishing simultaneous contacts of the upper and lower semicircular bridge units, both in the lateral as well as in the intercanine sector. At the newly established bite height, the patient reported relief in the area of the joints and the relaxation of the masseteric and temporal muscles, which we considered to be a positive effect of the therapy. In addition, the tongue space was increased, so the patient spoke more clearly. Contrary to our clinical results, Yap et al. have found that the removal of occlusal interference by elevating the vertical dimension of occlusal does not stop bruxism⁸.

During making the lower bridge, the patient damaged ceramics by parafunctional movements on the upper, temporarily cemented bridge. Kinsel and Lin concluded that metal ceramic crowns had a significantly higher risk of fracture in patients with bruxism in whom no occlusive splint was used²¹. Mikeli et al. were examining the problem of fracture of porcelain facets and found that in 70% of cases they occur in bruxists²². Contrary, Souza Melo et al. in their metaanalysis did not establish the association between "night bruxism" and therapy with ceramic restorations²³.

Macedo i sar. se osvrću na nekritičku učestalost upotrebu okluzalnih udlaga u svakodnevnoj praksi označavajući je simptomatskim terapijskim sredstvom²⁴.

Cilj okluzijske terapije je stvaranje uslova u kojima će se zaustaviti štetno dejstvo bruksizma. Udlaga smanjuje hiperaktivnost, odnosno relaksira mastikatorne mišiće; pozicionira kondil u terapijski položaj – položaj centralne relacije; štiti zube, njihov potporni aparat i meka tkiva od bruksizma; bihevioralnim učinkom podiže samosvesnost o položaju, funkciji i parafunkciji donje vilice, ali postiže i placebo efekat. Zanimljivo je istraživanje koje pokazuje da 80-90% ispitanika nakon terapije udlagom doživljava poboljšanje simptoma, iako je u samo 50% slučajeva zaista i dokazano smanjenje vrednosti žvačnih sila²⁵. Sve to govori u prilog njenoj ulozi u redistribuciji sila i rasterećenju mišića i viličnih zglobova. Negativna strana udlage je što ne zaustavlja noćni bruksizam, već modifikuje parafunkcijske aktivnosti i menja distribuciju traume mastikatornog sistema, čime smanjuje simptome, koji nakon prestanka terapije egzacerbiraju^{19,24}.

U zavisnosti od uloge okluzijske udlage razlikujemo interdentalne štitnike, repozicijske i stabilizacijske udlage^{19,20}. Mogu biti izrađeni od mekog ili čvrstog materijala. Meki polivinilski splintovi imaju zaštitnu ulogu i ne služe za korekciju okluzalnih interferenci. Udlage napravljene od akrilata imaju prevashodno stabilizacionu ulogu i trajniji su od mekih splintova. S obzirom na korekciju okluzalnih kontakata u toku protetske rehabilitacije prikazanog pacijenta, u opisanom slučaju odlučili smo se za meku udlagu pružajući pacijentu istovremenu zaštitu i komfor.

Zaključak

Terapija bruksizma je multifaktorijalna i zahteva usku saradnju lekara specijalista različitih oblasti. Izrada protetskih radova kod pacijenata sa bruksizmom ima za cilj da primarno reši nedostatak izgubljenih zuba, ali i preventivno deluje na moguća oštećenja orofacijalnog sistema parafunkcijskim aktivnostima.

Therapy with occlusal splint can reduce negative effects of parafunctional activities, but cannot stop them. Macedo et al. point to the uncritical frequent use of occlusal splints in everyday practice, designating it as a symptomatic therapeutic remedy²⁴.

The goal of occlusal therapy is to create conditions in which the harmful effects of bruxism will be stopped. The splint reduces hyperactivity, respectively relaxes the mastication muscles; positions the condyle in the therapeutic position - the position of the central relationship; protects the teeth, their supporting tissues and soft tissues from bruxism; by behavioral effect raises self-awareness of the position, function and parafunction of the lower jaw, but also makes a placebo effect. Interestingly, a study shows that 80-90% of respondents after the treatment with the splint experience an improvement in symptoms, although in only 50% of cases there is a proven reduction in chewing forces²⁵. All this speaks in favor of its role in the redistribution of forces and relaxation of muscles and jaw joints. The negative side of the splint is that it does not stop the night bruxism, but modifies the parafunctional activities and changes the distribution of the trauma of the masticatory system, which reduces the symptoms^{19,24} that, after cessation of therapy, exacerbate.

Depending on the role of occlusal splint, we distinguish interdental shields, repositioning and stabilizing splints^{19,20}. They can be made of soft or hard material. The soft polyvinyl splints have a protection role and do not serve to correct occlusal interferences. Splints made of acrylate have a predominantly stabilizing role and are more durable from soft splints. Due to the correction of occlusal contacts during prosthetic rehabilitation of the presented patient, in the described case we decided to use soft splint providing the patient protection and comfort simultaneously.

Conclusion

The therapy of bruxism is multifactorial and requires close cooperation between specialists in different areas. Making prosthetic restorations in patients with bruxism aims to primarily solve the lack of lost teeth, but also prevents possible damage to the orofacial system by parafunctional activities.

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PRIMENA RADIOTALASA U ORALNOJ HIRURGIJI

THE USE OF RADIOFREQUENCY ABLATION IN ORAL SURGERY

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Sažetak

Uvod: Aparati koji koriste elektromagnetno zračenje u vidu visokofrekventnih radiotalasa sve češće nalaze primenu u mnogim granama medicine, a u poslednje vreme i u oralnoj hirurgiji. Rade na istom principu kao i elektrokauteri, s tom razlikom što elektrokauteri koriste talase frekvencije od 300kHz do 500kHz, a radiotalasni aparati talase frekvencije 4MHz. To im omogućava daleko manju dubinu prodiranja energije, manju destrukciju i ograničeno lateralno oštećenje tkiva, bez opekotinskog efekta. Zarastanje rana je brže, formiranje ožiljaka je manje, a kozmetički efekat je izraženiji. U toku godinu dana na Odeljenju za oralnu hirurgiju primenjivane radiotalasni aparat kod mnogih oralnih hirurških intervencija. Sečenje tkiva bez dodira, simultano, sa izrazitim hemostatskim efektom ili čista koagulacija sprovode se vrlo jednostavno i uspešno. Aparat je testiran prilikom rada na mekim tkivima kože i sluzokože. Pravilnim i stručnim rukovanjem izbegavaju se eventualni štetni efekti. Kod pacijenata sa srčanim pejsmejerom treba biti posebno obazriv i pridržavati se protokola. Ukoliko pacijent ima ugrađene dentalne implantate kontraindikovano je njihovo dodirivanje u toku rada aktivnom elektrodom.

Zaključak: Radiotalasna hirurgija ima niz prednosti u odnosu na konvencionalnu hirurgiju u određenim indikacionim područjima.

Ključne reči: visokofrekventni radiotalasi, hirurgija, koagulacija

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Abstract

Introduction: Appliances that use electromagnetic radiation in the form of high frequency radioablation are increasingly applied in many branches of medicine and in recent times in oral surgery. They work on the same principle as the electrocauteries, with the difference that the electrocauteries use wave frequencies from 300kHz to 500kHz and the radiolayers use the frequency of wavelengths of 4MHz. This allows them a far lower energy penetration depth, less destruction and limited lateral tissue damage, without burning effect. Wound healing is faster, scarring is less, and cosmetic effect is more pronounced. During one year at the Department of Oral Surgery, a radiotherapeutic appliance is used in many oral surgery interventions. Treatment of non-contact tissues simultaneously with a hemostatic effect or pure coagulation is performed very easily and successfully. The appliance is tested when working on soft tissue of the skin and mucous membranes. With proper and professional handling any adverse effects are avoided. Special attention should be paid to patients with cardiac pacemaker and adhere to the protocol. If patient has dental implants, touching them is contraindicated while working with active electrode.

Conclusion: The radiowave surgery has advantages in relation to conventional surgery with respect on indication areas.

Key words: radiofrequency ablation, surgery, coagulation

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Uvod

Primena toplote za zaustavljanje krvarenja poznata je još iz neolitskog perioda. Stari Egipćani (3000 g. pre n.e.) opisali su upotrebu usijanih metalnih instrumenta za lečenje čireva i tumora dojki. Hipokrat (469-370) je koristio toplotu da ukloni tumor na vratu. Rimljani su već uveliko zagrevali različite metalne instrumente i kontrolisali krvarenje¹. U slične svrhe kroz istoriju je korišćeno vrelo ulje, pa čak i barut (sagorevanje u tkivu), koji je pronađen u Kini u 13. veku. Sa pojavom električne struje, sredinom osamnaestog veka, prvi put je opisano njeno korišćenje za zagrevanje instrumenata kojima je vršena koagulacija². Ubrzo su se razvili termokauteri čiji se radni deo sastojao od žice koja se pomoću struje zagrevala do usijanja i tako zaustavljala krvarenje. Termokauteri se uveliko koriste i danas, naročito u stomatologiji i sastavni su deo većine stomatoloških aparata. Otkriće naizmjenične struje vrlo brzo uticalo je na razvoj elektrohirurgije. Jedan od najbitnijih parametara naizmjenične struje je frekvencija. Ona označava broj promena smera struje u jednoj sekundi. Otkriveno je da naizmjenična struja niske frekvencije prolaskom kroz ljudsko telo izaziva kontrakciju mišića, dok naizmjenična struja visoke frekvencije ne izaziva kontrakciju mišića, već prouzrokuje zagrevanje tkiva. Tako se vrlo brzo razvila diatermija (grčki: dia-kroz, therme-toplota), koja se zasniva na povećanju toplote određenog dela tela zbog otpora tkiva na prolaz visokofrekventne struje. Kada visokofrekventna struja protiče preko velike površine efekat zagrevanja tkiva je mali i ostaje u nivou fizioloških granica (40–45°C). Ovi aparati našli su primenu u fizikalnoj medicini. Međutim, kada je gustina visokofrekventne električne struje koncentrisana na male tačkaste površine, efekat zagrevanja je veliki (250–600°C), što omogućava sečenje i koagulaciju tkiva. Ovakvi aparati našli su primenu u hirurgiji. Villiam T. Bovie 1920. godine konstruisao je prvi elektrohirurški aparat³. Od tada se elektrohirurgija ubrzano razvija i danas je zastupljena u većini hirurških ustanova.

Radiotalasi su vrsta elektromagnetnog zračenja. Predstavljaju deo elektromagnetnog spektra odmah iznad infracrvenog zračenja, talasne dužine od 0,3 metra do nekoliko kilometra, frekvencije od 3Hz do 300GHz. Dobijaju se pomoću generatora naizmjenične električne struje.

Introduction

The application of heat in order to stop the bleeding is known from the Neolithic period. Ancient Egyptians (3000 BC) described the use of metal instruments for the treatment of the ulcers and breast tumor. Hippocrates (469-370 BC) used the heat to remove the tumor from the neck. The Ancient Romans, had already warmed the various metal instruments for the control of bleeding¹. Hot oil, and even gunpowder (combustion in tissue), found in China in the 13th century were used for similar purposes throughout history. In the mid-eighteen century, with the appearance of electricity, for the first time its use for heating instruments to perform coagulation was described². The thermo-cauteries were developed soon; their working part made of wire was heated to candescence and used to stop the bleeding. Thermocauteries are widely used today, especially in dentistry and are integral part of most dental devices. The discovery of alternating currents quickly affected the development of electrosurgery. One of the most important parameters of alternating power is the frequency. It indicates the number of power changes in one second. It was discovered that alternating current frequencies, by moving through the human body, cause muscle contraction, while alternating high frequency current does not cause muscle contraction, but tissue warming. Thus, the diathermia (Greek: Through, Therme – heat) was rapidly developed; it was based on increasing the heat of a particular part of the body due to the resistance of the tissues to the high-frequency power pass. When the high frequency flows over a large surface the effect of warming tissue is small and remains within the physiological range (40–45°C). These appliances have been used in physical medicine. However, when the density of high frequency electricity is concentrated on small dotted surfaces, the heating effect is large (250 – 600°C), which enables cutting and coagulation of tissues. These appliances have been used in surgery. William T. Bovie 1920. constructed the first electrosurgical appliance³. Since then, electrosurgery has been rapidly evolving and is now represented in most surgical institutions.

Radio waves are a kind of electromagnetic radiation. They are part of an electromagnetic spectrum immediately above infrared radiation, wavelengths of 0.3 to a few kilometers, frequencies from 3Hz to 300GHz. They are obtained using the alternating power generator.

Standardni aparati za elektro-kauterizaciju koriste radiotalase frekvencije od 300kHz do 500kHz⁴. Elektrokauteri se sastoje od dve elektrode, katode i anode, od kojih je jedna pasivna i dovodi se u kontakt sa površinom tela, a druga aktivna i hirurrg je drži u ruci kojom manipulira. Prilikom kontakta aktivne elektrode sa tkivom, uspostavlja se strujno kolo pri čemu se elektromagnetna energija pretvara u toplotnu energiju kojom se ostvaruje koagulacija i sečenje tkiva. Znači termički efekat prisutan je samo oko aktivne elektrode, gde je gustina struje najveća. Ona može biti različitog oblika. Tanke oštre aktivne elektrode stvaraju struju velike gustine i prema tome visoku temperaturu. Služe za sečenje tkiva. Aktivne elektrode veće površine stvaraju struju manje gustine i prema tome nižu temperaturu. Služe za koagulaciju. Struja dalje protiče kroz tkivo do pasivne elektrode, koja ima znatno veću površinu, čime se smanjuje gustina struje i neželjeni termalni efekti nisu prisutni. Dubina prodiranja toplotne energije na nivou aktivne elektrode iznosi više od 1 mm⁵. To prouzrokuje destrukciju ćelija, šire lateralno oštećenje tkiva, sporije zarastanje rana i formiranje većih ožiljaka. U toku rada vrlo je bitno ostvariti dobar direktan kontakt pasivne elektrode sa pacijentovom kožom. Pritom, ona privlači oslobođenu energiju i vraća je ponovo u aparat, što znači da se najbolji efekat postiže ako je pasivna elektroda što bliže operisanoj regiji⁶. Primena klasičnih aparata za elektrokauterizaciju daje nejednake i nedovoljno kontrolisane rezultate. Osim toga ipak postoji opasnost od opekotina.

Za razliku od elektrokautera radiotalasni aparati koriste radiotalase frekvencije od 4MHz. Pri njihovom radu elektromagnetna energija u kontaktu sa tkivom ne pretvara se u toplotnu energiju, već se toplota generiše u samom tkivu, tj. apsorbuje u vodenoj komponenti ćelije izazivajući njeno isparavanje⁷. Aktivna elektroda ne mora da ostvari prislan odnos sa tkivom (radi se simultano), jer funkcioniše kao antena, a ne kao elektroda⁸. Ona ostaje hladna, nema dima ili ga ima vrlo malo. Može biti različitog oblika (igla, kuglica, pločica, omča). Krvni sudovi apsorbuju ćelijsku plazmu, tako da nema ostataka nekrotičnog tkiva. Dubina prodiranja energije radiotalasa iznosi manje od 0,02 mm, što prouzrokuje manju traumu ćelija, minimalno lateralno oštećenje tkiva bez opekotina, brže zarastanje rana i formiranje manjih ožiljaka⁹. Savremeni radiotalasni aparati imaju veći broj različitih talasnih oblika sa različitim efektom dejstva na tkiva. U toku rada pasivna elektroda ne zahteva direktan kontakt sa pacijentovom kožom. Može da deluje i preko tanke tkanine (pantalone, suknja) tako da je dovoljno da

Standard appliances for electro-cauterization use radio waves frequency of 300kHz to 500kHz⁴. Electrocauterics consist of two electrodes, a cathode and an anode, one of it is passive and is brought into contact with the surface of the body, while the other is active and the surgeon is holding it in his hand which he moves. During the contact of the active electrode with the tissue, an electric circuit is established, whereby electromagnetic energy is converted into heat energy that achieves coagulation and tissue cutting. So the thermal effect is present only around the active electrode, where the density of the current is greatest. It can be of different shapes. Thin sharp active electrodes create a high density current and therefore a high temperature. It is used to cut tissue. Active electrodes of large surfaces create currents of less density and therefore lower temperatures. They serve for coagulation. The current flows further through the tissue to the passive electrode, which has a much larger surface area, which reduces the density of the current and unwanted thermal effects are not present. The depth of penetration of thermal energy at the level of the active electrode is more than 1 mm⁵. This causes cell destruction, spreads lateral tissue damage, slower healing of the wounds and the formation of larger scars. During work, it is important to have a good direct contact of the passive electrode with the patient's skin. In addition, it attracts freed energy and returns it back to the appliance, which means that the best effect is achieved if the passive electrode is as close as possible to the operating region⁶. Application of conventional electrocautery appliances gives unequal and insufficiently controlled results. In addition, there is a risk of burns. In contrast to electrocautery, radio waves appliances use radio frequencies of 4MHz. In their work electromagnetic energy in contact with tissue does not turn into heat energy, but heat is generated in the tissue itself, i.e. is absorbed into the aqueous cell component causing it to evaporate⁷. The active electrode does not have to achieve a close relationship with the tissue (it works simultaneously) because it functions as an antenna rather than an electrode⁸. It stays cold, there is no or very little smoke. It can be of a different shape (needle, ball, tile, loop). Blood vessels absorb cell plasma, so there are no remains of necrotic tissue. The depth of penetration of radio waves of energy is less than 0.02 mm, causing a smaller cell trauma, minimal lateral damage to the tissue without burns, faster healing of the wound and the formation of smaller scars⁹.

Modern radiowave apparatuses have a number of different waveforms with a different

pacijent samo sedne ili se nasloni na elektrodu. Vrlo je bitno ne postavljati pasivnu elektrodu u blizinu srca (ventrikularna fibrilacija). Treba je postaviti bliže hirurškom polju¹⁰. Primena radiotalasnih aparata daje predvidljive i kontrolisane rezultate, kao i veliku terapijsku sigurnost. Opasnosti od opekotina gotovo da nema.

Kod radiofrekventog aparata može se, kao i kod elektrokauteza, primeniti metoda koagulacije pincetom. Postupak se sastoji u hvatanju krvnog suda pincetom, zatim se aktivnom elektrodom dodiruje pinceta i aktivira aparat. Pinceta tada služi kao produžetak aktivne elektrode, a koagulacija se odvija na mestu dodira instrumenta i krvnog suda.

Aparat za radiotalasnu hirurgiju po dimenzijama je vrlo sličan elektrokautezi. Često se isporučuje sa prikladnim i vrlo korisnim postoljem, nije težak, jednostavan je za upotrebu i lako prenosiv. Može uspešno da se koristi kako u hirurškim salama tako i u ambulantom oralne hirurgije.

Autori su primenjivali radiohirurški aparat RWSU 70 – PROXIMA medical technology, snage 70W, frekvencije 4MHz, sa nožnim komandovanjem. Aparat je korišćen za sečenje i koagulaciju tkiva u toku sprovođenja različitih oralnih hirurških procedura na mekim tkivima u periodu od godinu dana. Sve hirurške intervencije urađene su na Odeljenju za oralnu hirurgiju Klinike za stomatologiju Medicinskog fakulteta u Nišu.

Radioaparat poseduje tri moda režima rada (pure cut, blend cut i soft coag) čijim jednostavnim odabirom prilagođavamo karakter delovanja na nivou aktivne elektrode.

Pure Cut (sečenje)–Monopolarni talasni oblik gde elektrohirurški generator proizvodi kontinuiranu struju i napon, bez prekida. Sečenje (isparavanje, vaporizacija) se sprovodi tankim elektrodama u obliku igle ili noža. Igla ima vrlo malu površinu kroz koju struja velike gustine napušta elektrodu i prelazi u tkivo. Dok se aktivna elektroda približava tkivu, vazdušni jaz je sve kraći i u jednom trenutku varnica iz elektrode prelazi u tkivo u vidu veoma uske udarne zone. Usled trenutnog zagrevanja tečnosti ćelija tkivo isparava i javlja se efekat sečenja. Radi se simultano i tkivo se aktivnom elektrodom skoro ne dodiruje.

Blend Cut (sečenje-koagulacija) – Monopolarni talasni oblik gde elektrohirurški generator proizvodi struju i napon nekontinuirano, sa prekidima.

effects on the tissue. During the operation, the passive electrode does not require direct contact with the patient's skin. It can also work through thin fabrics (trousers, skirts) so that it is enough for the patient to sit or lean on the electrode. It is very important not to place a passive electrode near the heart (ventricular fibrillation). It should be placed closer to the surgical field¹⁰. The use of radio wave appliances provides predictable and controlled results, as well as great therapeutic safety. There is almost no risk of burns.

In the case of a radio wave appliances, as with electrocautery, tweezers coagulation method can be applied. The procedure consists of capturing the blood vessel with tweezers, and then the active electrode touches the tweezers and activates the apparatus. The tweezers then serve as an extension of the active electrode, and the coagulation takes place at the point of contact of the instrument and the blood vessel.

The appliance for radio wave surgery by dimensions is very similar to electrocautery. It often comes with a convenient and very useful stand, not heavy, easy to use and easily portable. It can be successfully used in surgical room and in oral surgery ambulance.

The authors used the radiosurgical appliance RWS 70 - PROXIMA medical technology, 70W power, 4MHz frequency, with foot control. The apparatus was used to cut and coagulate the tissues during the implementation of various oral surgical procedures on soft tissues over a period of one year. All surgical interventions were done at the Department of Oral Surgery at the Clinic for Dentistry at the Medical Faculty in Niš.

The radio appliance has three modes of work (pure cut, blend cut and soft coag), whose simple selection adjusts the character of the action at the level of the active electrode.

Pure Cut (cutting)-Monopolar wave form where the electro-surgical generator produces continuous current and voltage, without interruption. Cutting (evaporation, vapor-ization) is carried out by thin electrodes in the form of a needle or knife. The needle has a very small surface through which the high density current leaves the electrode and passes into the tissue. As the active electrode approaches the tissue, the air gap is shorter and, at one point, the spark from the electrode passes into the tissue in the form of a very narrow impact zone.

Efekat koagulacije zavisi od trajanja pauze umetnute u signal. Duže trajanje pauze znači veći efekat koagulacije i obrnuto. Odnos trajanja signala i trajanje pauze u signalu izražen je u procentima i može biti 75% i 50%.

Ukoliko bi se koristio veći mod za sečenje tkiva to bi zahtevalo korišćenje većeg napona, što bi prouzrokovalo veća termalna bočna oštećenja tkiva.

Soft Coag (koagulacija i koagulacija prskanjem-bezkontaktni fenomen)–Monopolarni talasni oblik gde elektrohirurški generator proizvodi struju i napon sa najviše prekida. Odnos trajanja signala i trajanja pauze za kontaktnu koagulaciju je od 50%, a za koagulaciju prskanjem (fulguracija) i do 6%. Kako ima najduže trajanje pauze u signalu za istu izlaznu snagu ova vrsta moda zahteva vrlo visoke napone i time povećava verovatnoću neželjenih efekata. Vršiti se elektrodama u obliku manjih ili većih kugli. Dodirivanjem tkiva povećava se površina sa koje struja napušta elektrodu i prelazi u tkivo. Smanjuje se gustina struje što prouzrokuje postepeno zagrevanje ćelijskih tečnosti, dehidraciju i isušivanje ćelija koje još uvek zadržavaju svoj oblik. Temperatura iznosi od 70 do 80°C i pojavljuje se beli koagulum. To znači da je koagulacija dobro obavljena. Aktivna elektroda mora biti u dovoljno dugom kontaktu (sekunde ili deo sekunde) sa tkivom, radi postizanja efekta koagulacije i isušivanja. Dalje zagrevanje tkiva dovodi do karbonizacije tkiva i krvi na elektrodama. Nagomilani materijal na elektrodama povećava otpor, zbog čega se povećava napon zarad održanja iste izlazne snage. Čiste elektrode zahtevaju manji napon za prenos iste snage na tkivo. Naša iskustva pokazuju da radiotalasna hirurgija predstavlja alternativnu varijantu konvencionalnoj hirurgiji sečenja mekih tkiva, s obzirom da je minimalno invazivna metoda, vrlo precizna, atraumatska, bez napora i bez dodira - simultana, sa hemostatskim efektom i čistim operativnim poljem. Znatno manje krvarenje u toku rada skraćuje vreme trajanja hirurških zahvata, što rezultira lakšim i bržim postoperativnim oporavkom.

Za razliku od elektrokautilera, koji daje veliki lateralni morbiditet rane, radiotalasna

Due to the instantaneous heating of the liquid in the cells, the tissue evaporates the effect of cutting is appeared.

This is done simultaneously so the tissue is nearly not touched by the active electrode.

Blend Cut (cutting-coagulation) is a monopolar waveform where electrosurgical generator creates electricity and voltage, discontinuously, with stops. The effect of coagulation depends on the duration of pause imported in the signal. Longer duration of the pause means larger effect of coagulation and vice versa. Ratio between the duration of the signal and pause inside the signal is displayed in percentage and it can be 75% and 50%.

If we were about to use larger mode for cutting tissue, it would require more voltage, which would cause bigger thermal lateral tissue damage.

Soft Coag (coagulation and coagulation spraying-non-contact phenomenon) is a monopolar waveform where electrosurgical generator creates electricity and voltage with most stops. Ratio between the duration of signal and duration of pause for contact coagulation is 50%, and for spraying coagulation (fulguration) goes up to 6%. As it has the longest duration of pause in signal for the same form of power, this type of mode requires very high voltage, thereby increasing the probability of adverse effects. It is performed by electrodes in shapes of smaller or larger globes. By touching the tissue, the area where the current leaves electrode is increased and transferred into the tissue. The density of electricity is decreased, which causes warming up of cellular fluids, dehydration and drainage of cells which still maintain their shape and form. Temperature goes from 70 to 80°C and white coagulum is formed. This means the coagulation is performed well. The active electrode has to be in sufficiently long contact (one second or half of second) with the tissue, for maintaining of effect of coagulation and dehydration. Further heating of the tissue causes carbonification of the tissue and the blood on the electrodes. Piled material on electrodes increases resistance, which increases voltage for maintaining the same source of power. Clean electrodes require lower voltage for transferring the same amount of power on tissue. Our experience shows that radiofrequency (radio wave) surgery is an alternative to conventional surgery in methods

hirurgija izvanrednom preciznošću i minimalnim oštećenjem tkiva pruža veliku sigurnost naročito kada se radi u blizini osjetljivih anatomskih struktura, kao što su nervi, krvni sudovi, estetske zone i sl.

Talasni oblik „blend cut” naročito je pogodan za rad u dobro vaskulariziranim anatomskim regijama kao što su glava i vrat, uključujući i usnu duplju. Pokazuje veliku prednost kod incizija, ekscizija i cirkumcizija tkiva. Za to služe specijalni radni dodaci u obliku igala različite dužine, oblika i promera. Naročito je pogodan za uklanjanje benignih tumorskih lezija gingive i mekih tkiva usne duplje, kao i svih vrsta mekotkivnih cističnih promena. Talasni oblik „soft coag” i kuglični radni nastavci različite veličine idealni su za zaustavljanje krvarenja iz mekih tkiva, gingive, periodoncijuma, a delimično i iz koštanih tkiva.

Na koži radiofrekventna hirurgija je svrsishodna za uklanjanje furunkula i karbunkula, posebno srednje trećine lica, radi sprečavanja širenja infekcije prema kavernoznom i sagitalnom venskom sinusu. Pogodna je za uklanjanje nevusa, bradavica, fibroma, hemangioma, keratoza, kao i sitnih kapilara kože lica. Uklanjanje promena postiže se rezom koji je lagan, bez pritiska i simultan. Zarastanje rana je brzo, a stvaranje ožiljnog tkiva je minimalno. Zbog toga se na koži postiže idealan kozmetički rezultat.



Slika 1. Frenulektomija radio nožem
Picture 1. Frenectomy with radiofrequency knife



Slika 2. Postoperativni nalaz
Picture 2. Postsurgical appearance

of cutting soft tissues, as it is minimally invasive, very precise, atraumatic, without effort and without touch - simultaneous, with haemostatic effect and clean operative field. There is significantly less bleeding during surgery which decreases the duration of procedures and results in easier and faster postoperative recovery.

As opposed to electrocautery, which gives large lateral morbidity to the wound, radio wave surgery with outstanding precision and minimal tissue damage brings greater security, especially when it is done near sensitive anatomical structures, like blood vessels, nerves and aesthetical zones.

Waveform „blend cut“ is particularly convenient for working in very well vascularised anatomical regions like head and neck regions including oral cavity. It shows great precision in performing incisions, excisions and circumcisions of the tissue. Special working supplements like needles different in size, shape and girth are used for this purpose. Further, it is particularly effective in removing benign gingival tumor lesions, and lesions of soft tissues in oral cavity, as well as all the types of cystic lesions. Wave form „soft coag“ and globular working installments of different size are ideal for stopping bleeding from soft tissues, gingival tissues, periodontal and partly bone tissues.



Slika 3. Rana u zarastanju
Picture 3. Wound during healing process



Slika 4. Radio frekventni nož
Picture 4. Radiofrequency knife

Sam efekat koagulacije radiotalasnim aparatom u mnogome zavisi od sadržaja vode u tkivu, tj. što je veći procenat vode, veći je otpor i koagulacija je slabija. Voda isparava, koagulacija tkiva i otpor rastu do tačke u kojoj ono ne provodi električnu struju. Iz tog razloga vrlo je bitno da polje rada u trenutku koagulacije bude maksimalno suvo. To se postiže dobrom sinhronizacijom rada oralnog hirurga i njegovog asistenta. Različite vrste tkiva imaju različitu otpornost na proticanje električne struje. Za tkiva sa većom otpornošću potreban je veći radni napon i obrnuto. Zbog toga je vrlo važno pravilno odabrati aktivnu elektrodu i mod rada kako bi se u što kraćem vremenu delovanja postigao optimalni rezultat.

Važno je napomenuti da radiotalasni aparat može svojim radom destabilizaciju aktivnosti srčanog pejsmejкера. Iz tog razloga je potrebno pasivnu elektrodu postaviti što dalje od pejsmejкера. Posle hirurške procedure obavezna je kontrola rada pejsmejкера.

Kad god je moguće u takvim situacijama treba primeniti bipolarnu metodu koagulacije. Struja u tom slučaju ne prolazi kroz telo pacijenta ka pasivnoj elektrodi, već od jednog kraja bipolarne pincete ka drugom, uspostavljajući strujno kolo i sledstvenu koagulaciju.

Ukoliko pacijent ima ugrađene dentalne implantate kontraindikovano je njihovo dodirivanje u toku rada aktivnom elektrodom.

Komplikacije su najčešće posledica nestručnog rada i nepridržavanja principa rada. Ogljedaju se u stvaranju opekotina i većem lateralnom oštećenju tkiva što prouzrokuje dugotrajnije i bolnije zarastanje rana i formiranje većih ožiljaka.

On the skin, radiofrequency surgery is used for removing of furunculus and carbunculus, especially in the middle third of the face, to prevent spreading of infections towards the cavernous sinus, and sagittal venous sinus. It is suitable for removing of nevi, papillomas, fibromas, haemangiomas, keratoses and small capillaries of the face. Removing of these is done with the incision which is light, without pressure, and simultaneous. Healing of the wound is fast, and the creation of scar tissue is minimal. Because of that, we have ideal cosmetic results on the skin.

The effect of coagulation with radiowave device depends on the amount of water in the tissue, which means that when the percentage of water is larger, so is the resistance, and then the coagulation is weaker. The water evaporates, coagulation of the tissue and resistance are rising up to the point in which electricity is not transferred. For this reason, it is very important that the working area (field) is absolutely dry in the moment of coagulation. It is achieved with good synchronicity of work between oral surgeon and his assistant. Different types of tissues have different resistance for the transmission of electricity. For tissues with higher resistance we need bigger working voltage and vice versa. Because of that, it is extremely important to pick adequate active electrode and working mode so that we can have optimal results in shorter time of duration.

It is important to notice that radiowave device with its effect can destabilize the activity of the heart's pacemaker. For this reason, it is necessary to put passive electrode farther from it. After the surgical procedure, it is necessary to control how the pacemaker works.

Always when it is possible in that situation bipolar method should be used. Electricity does not pass through the body, but from one end of bipolar tweezers to the other end, making electricity circuit and coagulation.

If patient has dental implants, touching them is contraindicated while working with active electrode.

Complications are often caused by bad practice, or avoiding principles of working with this appliance.

This may cause burns, lateral tissue damage, that lead to long lasting wound healing and making great scars.

Zaključak

Radiotalasna hirurgija ima niz prednosti u odnosu na konvencionalnu hirurgiju:

- Simultana incizija i koagulacija
 - Jednostavnost izvođenja uz skraćenje vremena operacije
 - Rad u blizini osetljivih anatomskih struktura i inficiranom tkivu
 - Minimalno lateralno oštećenje tkiva
 - Manji postoperativni bol i otoci
 - Bolje i brže zarastanje rana
 - Minimalno stvaranje ožiljnog tkiva
 - Mnogostrana upotreba zbog velikog broja raspoloživih elektroda
 - Pouzdanost procedure
- Odsustvo opasnosti od opekotina pasivnom elektrodom

Conclusion

The radio wave surgery has the many advantages in relation to conventional surgery:

- Simultaneous incision and coagulation
 - Ease of performance by shortening the time of operation
 - Work near sensitive anatomic structures and infected tissue
 - Minimal lateral tissue damage
 - Smaller postoperative pain and swelling
 - Better and faster healing of wounds
 - Minimal creation of scar tissue
 - Multiple use due to large number of available electrode
 - Reliability of procedures
- No risk of burns by a passive electrode

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PRIMENA KORTIKOSTEROIDA U STOMATOLOGIJI APPLICATION OF CORTICOSTEROIDS IN DENTISTRY

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Sažetak

Uvod: Kortikosteroidi(KS) su prirodni ili sintetički hormoni koji utiču na skoro svaki aspekt ljudske fiziologije. Smanjenjem simptoma zapaljenja i imunosupresijom, u kliničkom smislu, KS deluju simptomatski, olakšavajući tegobe osnovne bolesti ili trenutnog stanja kod pacijenata. Prema načinu uporebe, kortikosteroide u stomatologiji delimo na topikalno, lokalno i sistemski primenjene. Topikalna upotreba vazokonstrikcijom sprečava degranulaciju mastocita, smanjuje propustljivost kapilara delujući na smanjenje količine histamina koji se oslobađa iz bazofila i mastocita. Glavni cilj ove terapije kortikosteroidima je ukloniti ili barem smanjiti bol kod pacijenata, što ima uticaj na celokupno zdravlje, ishranu, govor. Neinfektivne upale mekog tkiva koje zahtevaju primenu KS su: rekurentni aftozni stomatitis, oralna submukozna fibroza, keloidi i hipertrofični ožiljci, mukokele. Kod bolnih sindroma sa manifestacijama u predelu glave i vrata: Bechet sindrom, bulozni pemfigoid, oralni lichen planus itd. U oralnoj hirurgiji već se dugo u postoperativnoj terapiji donjeg impaktiranog umnjaka i drugih težih intervencija, pored analgetika (NSAIL i narkotički analgetici) koriste KS u cilju smanjenja tizmusa, otoka i bola. Postoje brojne studije koje sugerišu na vreme i put administracije KS u hirurgiji donjeg impaktiranog umnjaka, kao i različite kombinacije KS sa drugim medikamentima u cilju smanjenja morbiditeta posle ovakvih intervencija. Lokalna primena KS indikovana je u lečenju gigantomocelularnih lezija i može zameniti hiruške procedure.

Zaključak: Kortikosteroidi našli su široku primenu u stomatologiji u svojim indikacionim područjima.

Ključne reči: kortikosteroidi, stomatologija, inflamacija

Abstract

Introduction: Corticosteroids (CS) are natural or synthetic hormones that affect nearly every aspect of human physiology. In the clinical sense, by reducing the symptoms of inflammation and immunosuppression, CS act symptomatically, decreasing problems of the underlying disease or the current state of the patient. According to application, corticosteroids are divided into topical, local and systemic way of use. Topical use of CS makes vasoconstriction, lowers mast cells degranulation, and reduces the permeability of capillaries reducing the amounts of released histamine from basophils and mast cells. The main goal of this therapy is to relieve or at least reduce pain in patients, which has an impact on overall health, nutrition, speech. Soft tissue inflammations that require the application of CS are: recurrent aphthous stomatitis, oral submucosal fibrosis, keloids and hypertrophic scars, mucocele; painful syndrome with manifestations in the head and neck: Bechet syndrome, pemfigoid syndrome, bullous pemfigoid, Oral Lichen planus, etc.; that reduces the need for taking analgetics. In oral surgery they are used for the treatment of the impacted wisdom teeth and other serious interventions which apart from analgesics (NSAIDs and narcotic analgesics) require CS in order to reduce trismus, swelling and pain. There are numerous studies that suggest the time and route of the administration CS in lower impacted wisdom teeth surgery, as well as different combinations of CS with other medications in order to reduce morbidity this such an intervention. Local application of CS is indicated in this treatment of gigantocellular lesions and can replace the surgical procedures.

Conclusion: Corticosteroids have wide application in dentistry in their indicational areas.

Key words: corticosteroids, dentistry, inflammation

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Uvod

Kortikosteroidi (KS) su prirodni ili sintetički hormoni koji utiču na skoro svaki aspekt ljudske fiziologije. Još sredinom devetnaestog veka, Addison i Brown-Sequard proučavali su ulogu nadbubrežnih žlezda u regulaciji fizioloških funkcija ljudskog organizma. Godine 1950. trojica naučnika Philip Hench, Edward Kendall i Tadeus Reichstein dobijaju Nobelovu nagradu za otkrića vezana za funkciju kore nadbubrežne žlezde¹.

Svakog dana nadbubrežna žlezda proizvodi oko 24-30 mg kortizola. Polovina količine ukupnog dnevnog kortizola izluči se u ranim jutarnjim satima. Najviši nivo kortizola je rano ujutru, između 8 i 9 sati, tokom dana opada i najniži nivo dostiže sat ili dva po početku spavanja². Nadbubrežna žlezda može proizvesti i do 300 mg kortizola dnevno u uslovima povećanog stresa. Povećano lučenje kortizola može dovesti do supresije hipotalamo-hipofizno-nadbubrežne sprege, kojoj treba i do godinu dana za potpuni oporavak. Ipak, funkcionalni odgovor na stres može se oporaviti za dve nedelje do mesec dana³.

Hipotalamus - hipofizno - nadbubrežni sistem ima važnu ulogu u regulisanju signala od strane glukokortikoidnih receptora, koji postoje na skoro svim ćelijama organizma. Neuronski, endokrini i citokini signali u vezi su sa periventrikularnim jedrima hipotalamusa kako bi se kontrolisala sekrecija hormona koji oslobađaju ACTH u hipofizi. 90% izlučenog kortizola vezuje se za kortizol-vezujuće globuline krvi. Nevezani, slobodni kortizol biološki je aktivan oblik hormona i pretvara se u kortizon.

Kompleks kortizol-receptor koji nastaje u citoplazmi, dolazi do jedra, vezuje se kao homodimer na DNA sekvenci poznatoj kao glukokortikoid reagujući element. Nastali kompleks aktivira transkripcione faktore u jedru koji menjaju strukturu hromatina (proces poznat kao transaktivacija), čime se olakšava ili inhibira sastavljanje bazalnog transkripcijskog mehanizma za inicijaciju transkripcije RNK polimerazom II, (slika 1). Na taj način dolazi do promene u regulaciji ekspresije gena-transrepsija⁴.

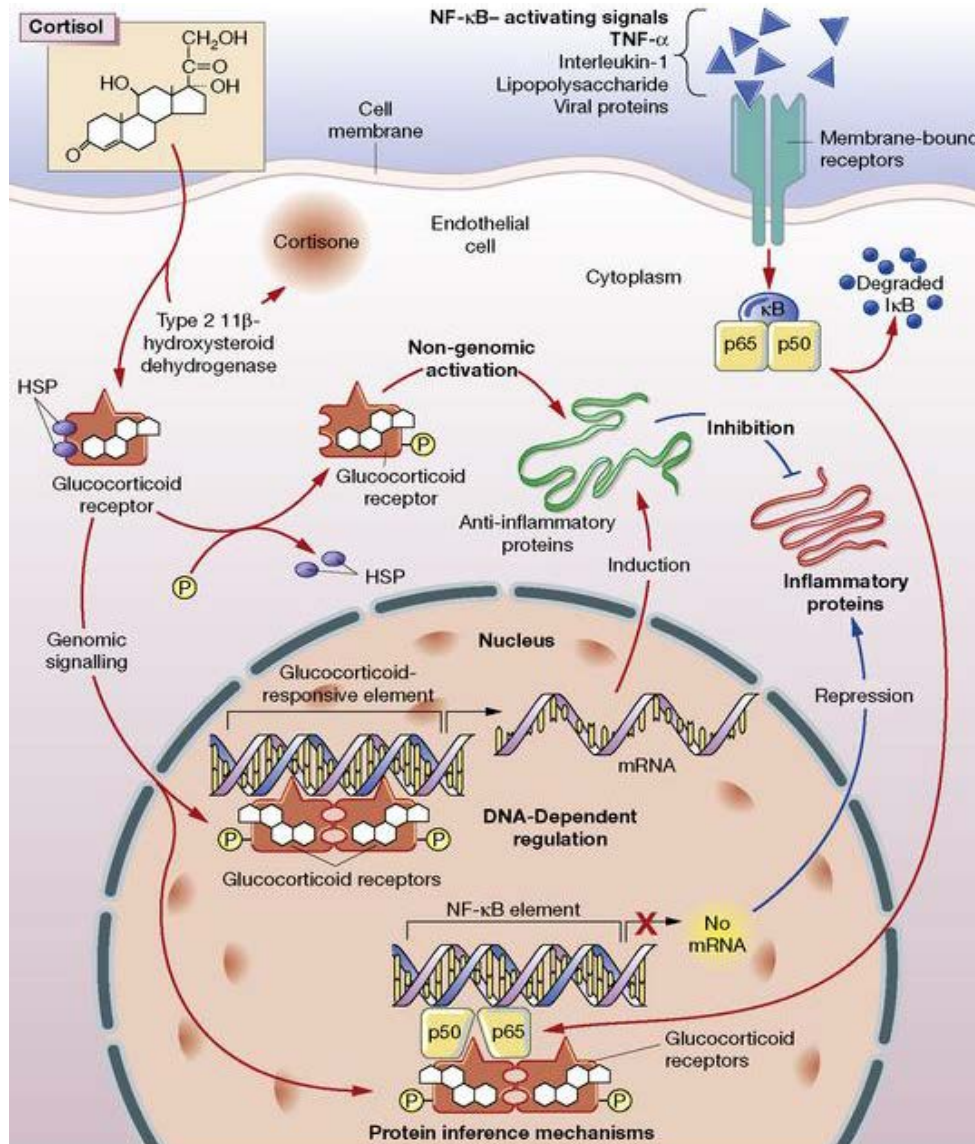
Introduction

Corticosteroids (CS) are natural or synthetic hormones that affect nearly every aspect of human physiology. In the mid nineteenth century, Addison and Brown-Sequard studied the role of the adrenal glands in the regulation of the physiological functions of the human body. In 1950 three scientists, Philip Hench, Edward Kendall and Thaddeus Reichstein won The Nobel Prize for discoveries related to the function of adrenal gland cortex¹.

Every day, adrenal glands produce about 24-30 mg of cortisol. Half of the amount of the total daily cortisol is secreted in the early morning hours. Cortisol levels are the highest early in the morning, between 8 and 9 a.m., decline throughout the day and reach their lowest 1-2 hours after falling asleep². The adrenal glands can produce up to 300 mg of cortisol daily in periods of increased stress. Increased secretion of cortisol can lead to suppression of the hypothalamus-pituitary-adrenal axis, which takes up to a year for a full recovery. However, the functional response to stress may recover in 2-4 weeks³.

Hypothalamus-pituitary-adrenal system plays an important role in regulating signals of glucocorticoid receptor, which exist in almost all cells of the organism. Neural, endocrine and cytokine signals are connected to periventricular nuclei of the hypothalamus to control the secretion of the hormones that release ACTH in the pituitary gland. Ninety per cent of secreted cortisol is bound to cortisol-binding blood globulins. Free cortisol is the biologically active form of the hormone and is converted to cortisone.

Cortisol-receptor complex, formed in the cytoplasm, reaches the nucleus and is bound as a homodimer to the DNA sequence known as glucocorticoid response element. Thus formed complex activates transcription factors in the nucleus, which change the structure of chromatin (a process known as transactivation) and facilitate or inhibit the basal transcription mechanism for RNA PCR II transcription initiation (figure 1). That leads to the change in the gene expression regulation- transrepression⁴.



Slika 1. Metabolički efekat KS⁴⁰

Fig. 1. Metabolic effect of CS⁴⁰

Kortikosteroidi inhibiraju enzim fosfolipazu A2, koja je prvi enzim uključen u konverziju fosfolipida u arahidonsku kiselinu. Od arahidonske kiseline nastaju upalni produkti kao što su prostaglandini, leukotrieni, tromboksan A2 i druge supstance povezane sa ovim osnovnim medijatorima zapaljenja (slika 2).

Sintetički analozi kortizolu proizvode se od polovine prošlog veka. Kod njih su farmaceutskom tehnologijom suprimirani metabolički, a potencirani antiinflamatorni i imunosupresivni efekti.

Corticosteroids inhibit enzyme phospholipase A2, that is the first enzyme included in conversion of phospholipides to arachidonic acid. Arachidonic acid produces inflammation products such as prostaglandins, leukotrienes and tromboxane A2, and other substances that are in relation with mediator of inflammation (figure 2).

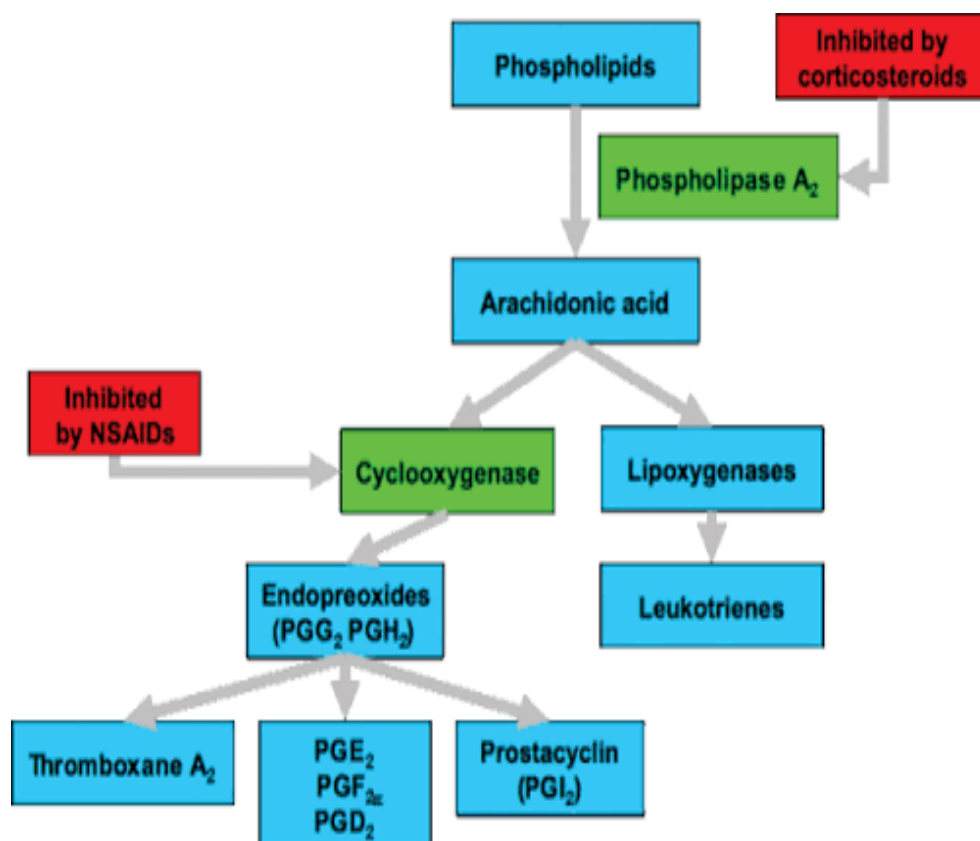
Synthetic analogues of cortisol have been produced since the end of last century. By using pharmaceutical technology, metabolic effects are suppressed, and anti-inflammatory effects are potentiated in them.

U kliničkom smislu glukokortikoidi, smanjenjem simptoma zapaljenja i imunosupresijom, deluju simptomatski, olakšavajući tegobe osnovne bolesti ili trenutnog stanja kod pacijenata.

Upale su, bez obzira na uzrok, praćene pojavom ekstravazacije i infiltracije leukocita u zahvaćenom tkivu. U njima dolazi do niza interakcija adhezijskih molekula na leukocitima i na endotelnim ćelijama. Protivupalno dejstvo kortikosteroida ogleda se njihovim delovanjem na broj, rasprostranjenost i funkciju perifernih leukocita kao i supresivnim delovanjem na upalne citokine, hemokine i ostale posrednike upale.

In the clinical sense, glucocorticoids, by reducing the symptoms of inflammation and by immunosuppression, relieve symptoms of the underlying disease or the current patient condition.

Inflammation is, regardless of cause, always followed by the extravasation and infiltration of leukocytes in the affected tissue, leading to a series of adhesion molecule interaction on leukocytes and endothelial cells. The anti-inflammatory property of corticosteroids is their effect on the number, distribution and function of peripheral leukocytes, as well as their suppression of cytokines, chemokines and other inflammatory agents.



Slika 2. Farmakološki efekat KS⁴⁰
Fig. 2. Pharmacological effect of CS⁴⁰

Glukokortikoidi inhibiraju oslobađanje mediatora zapaljenja iz mnogih tipova ćelija uključenih u inflamatorne procese kao što su makrofagi, T-limfociti, mastociti, dendritične ćelije i neutrofilni leukociti⁵.

KS takođe imaju sposobnost stabilizovanja lizozimskih membrana, smanjuju propustljivost kapilara i redukuju diapedezu redukuju sintezu bradikinina, snažne vazodilatatorne supstance⁶.

Posle jednokratne doze glukokortikoida, broj neutrofila u cirkulaciji raste zbog njihovog povećanog pristizanja iz koštane srži u krv i zbog njihove smanjene migracije iz krvnih sudova. Broj limfocita, monocita, eozinofila i bazofila smanjuje se zbog kretanja iz mreže krvnih sudova u limfatično tkivo. To će za posledicu imati smanjeni broj ćelija na samom mestu upale. Delujući na makrofage, glukokortikoidi ograničavaju njihovu sposobnost fagocitoze i uništavanja mikroorganizama, stvaranja faktora nekroze tumora- α , interleukina-1, metaloproteinaza i aktivatora plazminogena⁷. Najizraženije dejstvo KS je 6 sati posle primene, a farmakološko dejstvo traje do 24 sata posle primene.

Upotreba glukokortikoida u terapijske svrhe raste iz godine u godinu. Oni se mogu upotrebljavati samostalno ili u kombinaciji sa drugim medikamentima. U medicini se koriste u skoro svim granama.

Glukokortikoidi upotrebljavaju se još od prenatalnog perioda kod majki kod kojih je moguć prevremeni porođaj, kao i kod prevremeno rođene dece, u cilju stimulacije formiranja surfaktanata u plućima. Oni pospešuju sintezu fosfolipida i produkciju proteina koji su važni za sintezu surfaktanta⁸. Glukokortikoidi se koriste u tretmanu kaheksije kod pacijenata koji boluju od tumora bronha i ostalih vrsta malignih tumora⁹. Njihov efekat na apetit uključuje inhibiciju sinteze i / ili otpuštanja pro-inflamatornih citokina kao što je TNF- α ; IL-1 koji direktno smanjuje potrebu za hranom. Slično tome, oni utiču na druge medijatore, kao što su leptin, kortikotropin otpušajući faktor (CRF) i serotonin¹⁰. Kortikosteroidi mogu povećati nivo neuropeptida Y (NPY) u hipotalamusu koji mogu donekle povećati apetit i poboljšati ishranu¹¹.

Glucocorticoides inhibit the releasing of inflammation products from many cell types involved in inflammation such as macrophages, T lymphocytes, mast cells, dendritic cells and neutrophil leukocytes⁵.

Corticosteroides also have the ability to stabilize membrane of lysosomes that can cause inflammation, reduce vascular permeability, and reduces diapedesis. They reduce the synthesis of bradykinins, powerful vasodilator substance⁶.

After a single dose of corticosteroids, the number of neutrophils in circulation rises due to their increased inflow from the bone marrow into the blood, and because of their reduced migration from the blood vessels. The number of lymphocytes, monocytes, eosinophils and basophils decreases due to their movement from the blood vessel network into the lymphatic tissue. This in turn reduces the number of cells at the site of inflammation. When it comes to macrophages, glucocorticoids limit their capability of phagocytosis and destruction of microorganisms, as well as creation of tumor necrosis factors, interleukins-1, metalloproteinase and plasminogen activators⁷. The effect of CS is the most pronounced 6 hours after administration, while their pharmacological effect lasts up to 24 hours.

The use of glucocorticoids for therapeutic purposes is increasing every year. They can be used alone or in combination with other medications. They are used in almost all fields of medicine.

Glucocorticoids are even used in the prenatal period in mothers at risk of premature delivery, as well as in prematurely born children to stimulate the formation of surfactants in the lungs. They enhance the synthesis of phospholipids and production of proteins important for the synthesis of surfactants⁸. Glucocorticoids are further used in the treatment of cachexia in patients suffering from bronchogenic carcinoma and other types of malignant tumors⁹. Their effect on appetite includes the inhibition of synthesis and/or release of pro-inflammatory cytokines such as TNF- α ; or IL-1 which directly reduce nutrition. Similarly, they affect other mediators, such as leptin, central corticotropin release factor (CRF) and serotonin¹⁰. Corticosteroids can increase the level of neuropeptides Y (NPY) in hypothalamus which can, to an extent, increase appetite and improve nutrition¹¹.

Upotreba KS u stomatologiji

Prema načinu upotrebe kortikosteroide u stomatologiji delimo na topikalno, lokalno i sistemski primenjene.

Topikalna upotreba KS vazokonstrikcijom sprečava degranulaciju mastocita, smanjuje propustljivost kapilara, delujući na smanjenje količine histamina koji se oslobađa iz bazofila i mastocita. Na ovaj način KS koriste se za prekrivanje pulpe i preosetljivosti dentina, kao i za sprečavanje i ublažavanje upalnih reakcija, crvenila i edema kod vezikulobuloznih i ulcerativnih bolesti poput afti, pemfigusa, pemfigoida i lichen planusa. Glavni cilj ove terapije kortikosteroidima je ukloniti ili barem smanjiti bol kod pacijenata, što ima uticaj na celokupno zdravlje, ishranu, govor.

Neinfektivne upale mekog tkiva koje zahtevaju primenu KS su: 1. Rekurentni aftozni stomatitis; 2. Oralna submukozna fibroza; 3. Keloidi i hipertrofični ožiljci; 4. Mukokele. Kod bolnih sindroma sa manifestacijama u predelu glave i vrata: 5. Behcet (Behčēt) sindrom; 6. Bulozni pemfigoid; 7. Oralni lichen planus; 8. Pemphigus vulgaris; 9. Erythema multiforme, 10. Stevens-Johnson sindrom, 11. Belova paraliza; 12. Ramsay Hunt sindrom (Remzi Hant sindrom); 13. Postherpetična neuralgija. Poremećaji lokomotornog sistema ove regije: 14. Disfunkcije temporomandibularnog kompleksa. Neinfektivne bolesti tvrdih oralnih tkiva: 15. Sprečavanje resorpcije korena; 16. Centralni gigantocelularni granulom; 17. Rekurentni pulbit.

1. Rekurentni aftozni stomatitis: Afte minor se karakterišu manjim brojem ulcerativnih promena (od 1 do 5), promera do 1 cm. Bolest obično prolazi za 8 do 14 dana, spontano i bez posledica. Afte major su promera preko 1 cm, perzistiraju nedeljama čak i mesecima. KS se kod ovog oboljenja primenjuju topikalno i intralezijski, ređe, u najtežim slučajevima parenteralno^{3,12}.

2. Oralna submukozna fibroza je podmukla, hronična, rezistentna bolest koja se javlja na mukozama, submukozi usne duplje uključujući ždrelo i jednjak. Bolest je praćena jakom salivacijom, peckanjem, otežanim, gutanjem i ograničenim otvaranjem usta. Topikalna primena orobaza sa KS ubrzava zarastanje ulceracija i smanjuje bol, jer dovodi do supresije T limfocita, redukuje broj fibroblasta i smanjuje formiranje kolagena. U poslednje vreme intralezijska primena KS daje najbolje rezultate u lečenju manifestacija ove bolesti¹³.

The application of corticosteroids in dentistry

According to the route of administration, corticosteroid application in dentistry is divided into topical, local and systemic.

Topical application acts vasoconstrictory preventing degranulation of mast cells, reducing the permeability of capillaries and thus lowering the levels of histamine released from basophils and mast cells. Consequently, corticosteroids are used to protect the pulp, reduce dentin sensitivity and prevent or relieve inflammatory reactions, redness and edema in vesicobullous and ulcerative diseases such as aphthae, pemphigus, pemphigoid and lichen planus. The main goal of this treatment is to eliminate or at least reduce pain in patients, which has an impact on overall health, nutrition, speech. Noninfectious inflammations of soft tissue that require the application of corticosteroids are: 1. Recurrent aphthous stomatitis; 2. Oral submucous fibrosis; 3. Keloids and hypertrophic scars; 4. Mucocele; 5. Bechet syndrome; 6. Bullous pemphigoid; 7. Oral lichen planus; 8. Pemphigus vulgaris; 9. Erythema multiforme; 10. Stevens-Johnson syndrome; 11. Bell's paralysis; 12. Ramsay Hunt syndrome; 13. Postherpetic neuralgia. Furthermore, corticosteroids are used to treat locomotory system disorders, such as: Temporomandibular complex dysfunction; 14. Noninfectious diseases of the hard oral tissue; 15. Prevention of root resorption; 16. Central gigantocellular granuloma; 17. Recurrent pulpitis.

1. Recurrent aphthous stomatitis: Aphthae Minor are characterized by a small number of ulcerative changes (1-5) diameters up to 1 cm. Disease usually disappears in 8-14 days, spontaneously and without consequences. Aphthae Major are in diameter over 1 cm, persist for weeks and even months. Corticosteroids are here used topically and intralesionally, and rarely, in the most severe cases parenterally^{3,12}.

2. Oral submucous fibrosis is an insidious, chronic, resistant disease that occurs in the mucosa and submucosa of the oral cavity including pharynx and esophagus. The disease is accompanied by strong salivation, tingling sensation, difficulty swallowing and limited opening of mouth. Topical application of orobase with corticosteroids accelerates the healing of ulceration and reduces pain, because it suppresses T-lymphocytes and reduces fibroblast numbers and the formation of collagen. Lately, intralesional application of corticosteroids produces the best results in the treatment of the disease manifestation¹³.

3. Keloidni i hipertrofični ožiljci (HO) predstavljaju patološko zarastanje tkiva zbog prekomerne produkcije kolagena usled povrede kože. Keloid zarasta sa znatno većom produkcijom kolagena nego hipertrofični ožiljak. Uzrok nije potpuno razjašnjen, ali infekcija, tenzija rane i genetski faktori imaju presudni značaj u pojavi ovakvog stanja tkiva. Keloidi se protežu dalje od granica rane, razvijaju se i više meseci posle povrede i retko regresiraju. HO je prominirajući ožiljak koji ostaje ograničen na područje rane, obično se javlja za nekoliko nedelja i može regresirati bez intervencije i zahteva hirurško uklanjanje. Glukokortikoidi redukuju upalne procese u rani, smanjuju sintezu kolagena i glikozaminoglikana, pospešuju degeneraciju kolagena i fibroblasta. Najbolji efekat se postiže intralezijskom primenom KS u cilju smanjenja i regresije promene, kao i za prevenciju recidiva.

4. Mukokela je cista ispunjena mukusom koja se javlja u usnoj šupljini i paranazalnim sinusima, veličine 1 ili 2 mm do nekoliko centimetara. Karakteristično je da fluktuiraju, ali su neke mukokele čvrste na palpaciju. Najčešće se javljaju na donjoj usni, podu usta, ventralnoj strani jezika, nepcu, bukalnoj sluznicu i retromolarnom predelu. Uzrok nastanka je trauma ili opstrukcija izvodnog kanala pljuvačne žlezde. Intralezijska aplikacija KS može dovesti do privremene regresije promene, ali definitivno lečenje podrazumeva hirurški tretman¹⁴.

5. Behcetova bolest je multisistemska, hronična, inflamatorna bolest nepoznatog uzroka, koja se karakteriše recidivantnim oralnim aftaznim ulceracijama, genitalnim ulkusima, uveitisom i kožnim lezijama. Postoji i niz sporednih manifestacija, kao što su promene na zglobovima, centralnom nervnom sistemu, vaskularne i intestinalne lezije različite težine. Imunosupresivna terapija ima za cilj modifikaciju aktivnosti neutrofila. U akutnoj fazi daje se pulsna terapija KS u kombinaciji sa drugim imunosupresivnim sredstvima. Lokalna primena KS može biti od koristi samo kod vrlo blagih oblika, gde se promene javljaju samo na sluzokoži^{3,12}.

6. Bulozni pemfigoid je autoimuno oboljenje koje češće zahvata stariju populaciju. Ovaj tip autoimune reakcije dovodi do stvaranja antitela na dermoepidermalnim vezama, pogađa hemidezmozome, stvarajući subepidermalne bule.

3. Keloid and hypertrophic scars are a pathological remodeling of tissue due to excessive production of collagen caused by skin injuries. Keloid scars heal with significantly higher production of collagen than hypertrophic scars. The cause is not fully understood, but infection, wound tension and genetic factors have crucial significance in the appearance of this condition. Keloids extend beyond the borders of wounds, develop even several months after injury and rarely regress. Hypertrophic scar is a prominent scar that remains limited to the area of the wound, usually occurs within a few weeks, can regress without intervention and requires surgical removal. Glucocorticoids reduce inflammatory processes in the wound, decrease the synthesis of collagen and glycosaminoglycan and enhance the degeneration of collagen and fibroblasts. The best effect is achieved by intralesional application of corticosteroids used to reduce and regress the changes, as well as for the prevention of recurrence.

4. Mucocele is a cyst filled with mucus that occurs in the oral cavity and paranasal sinuses, 1 or 2 mm to several centimeters in size. It typically fluctuates, but there are some mucoceles that present hard to palpation. They most commonly occur on the lower lip, floor of the mouth, ventral side of the tongue, palate, buccal mucosa and retromolar area. The cause is trauma or salivary gland. Although the intralesional application of corticosteroids can lead to a temporary change regression, complete remission requires surgical removal¹⁴.

5. Behcet's disease is a chronic inflammatory multisystemic disease with an unknown cause which is characterized by recurrent oral aphthous ulcerations, genital ulcers, uveitis and skin lesions. There is a number of secondary symptoms, such as changes in the joints, central nervous system, vascular and intestinal lesions of different severity. Immunosuppressive therapy is aimed at modifying the activity of neutrophils. In the acute stage, a pulse corticosteroid treatment is administered in combination with other immunosuppressive agents. Local application of corticosteroids is only useful with very mild forms, where the changes occur only on mucosa^{3,12}.

Razlikuje se od pemfigusa po izgledu bula, zatim po negativnom testu Nikolsky i manjem mortalitetu. Kod pemfigoida je prisutan svrab u predelu promena i oralne lezije javljaju se kod jedne trećine pacijenata, za razliku od pemfigusa gde nema svraba, a manifestacije bolesti su većinom prisutne u ustima¹⁵. Lečenje podrazumeva primenu KS per os do remisije bolesti, pri čemu se doza obično smanjuje na polovinu početne radi održavanja postignutog stanja.

7. Pemphigus obuhvata grupu retkih hroničnih mukokutanih bolesti koje se karakterišu bolnim lezijama uzrokovanim intraepidermalnim dezintegrisanim struktura u koži i sluznici. Oralne mukozne lezije javljaju se u 50% do 70% slučajeva i pretežno se javljaju kao bukalne erozije u okluzalnoj liniji koja je najizloženija trauma, kao i na nepcu, gingivi i jeziku¹³. Pemfigus je praćen intraepitelnim buloznim formacijama zbog autoantitela koja reaguju sa proteinima dezmozomsko-tonofilamentnog kompleksa između keratinocita¹⁶. Pemphigus vulgaris (PV) ima visoku stopu morbiditeta bez lečenja. Cilj lečenja je smanjiti pojavu bula i bolove pacijentu. Lečenje podrazumeva upotrebu KS i drugih imunosupresiva uz pomoć kojih je morbiditet smanjen sa 60% do 90% na 30%. Topikalna primena KS nema značajnog efekta, osim na oralnu sluzokožu¹⁷. Akutna faza pemfigusa povezana je sa promenama na mukozi želuca, pa ovakvo stanje može još otežati resorpciju KS.

8. Lichen Planus (LP) je jedinstveni inflamatorni poremećaj koji se ispoljava promenama na koži, sluzokožama, noktima i kosi. Prvi put je opisan i imenovan od strane Erasmus Wilsona (Erasmus Vilsona) 1869¹⁸. Patogeneza LP nije potpuno razjašnjena. Radi se o poremećaju celularnog imuniteta koji je izazvan egzogenim antigenima, čije se manifestacije registruju na epidermisu. LP može biti praćen erozijama, bulama i ulceracijama. Prednost steroida može se u određenoj meri objasniti antiimunološkim svojstvima sa potisnutim funkcijama T limfocita i smanjenom sintezom IgG.

6. Bullous pemphigoid is an autoimmune disease that occurs more often in the older population. This type of autoimmune reaction leads to the formation of antibodies on the dermoepidermal junctions, affects hemidesmosomes, creating subepidermal bullae. It differs from Pemphigus in appearance the negative Nikosky test and lower per cent of mortality. Pemphigoid presents with itching in the affected area and with oral lesions occurring in one-third of patients, whereas pemphigus doesn't cause itching and the symptoms of the disease are almost always present in the mouth¹⁵. Treatment involves application of corticosteroids per os until remission, when the dosage is typically reduced to half of the initial one in order to maintain the status achieved.

7. Pemphigus includes a group of rare chronic mucocutaneous diseases characterized by painful lesions caused by intraepidermal desintegrated structures in the skin and mucosa. Oral mucous lesions occur in 50%-70% of cases, mainly as buccal erosion in the occlusal line, which is the most exposed to trauma, and on the palate, gingiva and tongue. Pemphigus is accompanied by intraepithelial bullous formations, due to autoantibodies reacting with desmosome-tonofilament complex proteins between keratinocytes¹⁶. Pemphigus vulgaris (PV) has a high morbidity rate without treatment. The goal of treatment is to reduce the occurrence of bullae and to relieve the pain. Treatment consists of corticosteroids and other forms immuno-suppressive therapy, which reduce morbidity from 60%-90% to 30%. Topical application of KS has no significant effect, except on oral mucosa¹⁷. The acute phase of pemphigus is associated with changes in gastric mucosa, and this condition can make it more difficult to absorb KS.

8. Lichen Planus (LP) is a unique inflammatory disorder which presents with changes on the skin, mucosa, nails and hair first described and named by Erasmus Wilson in 1869¹⁸. Pathogenesis of LP is not completely clarified. It is a cellular immunity disorder caused by exogenous antigens causing pathological changes on the epidermis.

Ublažavanjem upale smanjena je destrukcija tkiva i tako se oslobađanje antigena svodi na minimum. Na ovaj način (KS) prekidaju začarani krug¹⁹. Kod ovog oboljenja KS koriste se topikalno, u vidu orobaze ili gela, dok se u težim slučajevima mogu davati i intralezijski od 2 do 3 dana. U teškim formama sistemska primena KS je neophodna.

9. Erythema Multiforme je kožna bolest koja je klinički poznata još od prve polovine XIX veka. Nastaje zbog preosetljivosti na infekciju i medikamente. Sastoji se od polimorfnih eruptivnih makula, papula i karakterističnih "cilinih" lezija koje su simetrično raspoređene na distalnim ekstremitetima. Sluzokoža je minimalno zahvaćena. Herpes simplex virus (HSV) je u etiologiji ove reakcije preosetljivosti u više od 50 posto slučajeva identifikovan kao uzrok. Erythema multiforme (EM) je nekada bila smatrana kao manifestacija Stevens-Johnsonovog sindroma (SJS), povezanog sa toksičnom epidermalnom nekrozom (TEN). Danas je prihvaćeno da postoji razlika između EM i SJS. Trenutno postoje dve različite klasifikacije: Prva – eritema multiforme spektar (major i minor) i druga – SJS i TEN spektar.

10. SJS i TEN, su retke mukokutane bolesti koje mogu biti opasne po život i gotovo uvek uzrokovane lekovima. SJS je prvi put opisan 1922. godine od strane dva lekara Stevensa i Johnsona, koji su uočili da se u sklopu promena koje prate eritemu multiforme pojavljuju još i gnojni konjuktivitis, stomatitis i groznica²⁰. Terapija eriteme multiforme uključuje određivanje etiologije kada je to moguće i prestanak konzumacije leka.

Protokol upotrebe KS kod pacijenata obolelih od EM je različit, zavisno od težine kliničke slike. Mogu se upotrebiti topikalni, u vidu orobaze ili gela, ili vodica za ispiranje usta. U težim slučajevima koristi se inhalacioni rastvor. Kod Stevens Johnsonog sindroma i težim oblicima eriteme multiforme može se upotrebiti pulsna terapija do 500 mg Pronizona koji se daje i u trajanju tročasovne infuzije, tri dana. Na ovaj način izbegava se dugotrajna upotreba KS, koji smanjuju otpornost organizma na herpes simplex virusne infekcije, a koje dovode do rekurentne eriteme multiforme. Autori su opisali pleomorfni učinak deksametazona na imunološki sistem, uključujući inhibiciju epidermalne apoptoze pomoću nekoliko mehanizama. Ti mehanizmi uključuju supresiju različitih citokina, kao što je TNF-alfa, inhibiciju interferon-gama-inducirane apoptoze i inhibiciju FAS posredovane keratocitne apoptoze²¹.

LP can be accompanied by bullae, erosions and ulcerations. The advantage of steroids can to some extent be explained by their anti-immune properties, demonstrated in suppressed T lymphocyte functions and reduced synthesis of IgG. By reducing inflammation, the destruction of tissue is decreased and the release of antigens is minimized. That way, corticosteroids disrupt the vicious cycle¹⁹. With this disease, corticosteroids are usually applied topically, in the form of orobase or gel, while in more severe cases they can also be administered intralesionally for 2 to 3 days. In the most severe case, systemic application of corticosteroids is necessary.

9. Erythema Multiforme is a skin disease caused by hyper-sensitivity to infection and medication that has clinically been known since the first half of the 19th century. It presents with polymorphous eruptive maculae, papules and characteristic "target" lesions that are symmetrically distributed on the distal extremities. Mucosa is minimally affected. Herpes simplex virus (HSV) is identified as the cause of this hyper-sensitivity reaction in more than 50 percent of the cases. Erythema multiforme (EM) used to be considered a clinical presentation of Stevens-Johnson Syndrome (SJS) associated with toxic epidermal necrosis. Nowadays it is widely accepted that there is a difference between EM and SJS. Currently there are two different classifications: first, erythema multiforme spectrum (major and minor) and second, SJS and TEN spectrum.

10. SJS and TEN are rare mucocutaneous diseases that can be life-threatening and are almost always caused by medication. SJS was first described in 1922 by two doctors, Stevens and Johnson, who observed that changes accompanying erythema multiforme also include purulent conjunctivitis, stomatitis and fever²⁰. The treatment of erythema multiforme consists of determining the etiology where possible, and discontinuing the medication. Protocol of corticosteroid application in patients with EM varies, depending on the severity of the clinical presentation. They can be applied topically in the form of orobase, gel, or mouthwash solution. In severe cases inhalation solution is used. With Stevens-Johnson syndrome and with severe cases of erythema multiforme, pulse therapy of up to 500 mg of Pronison can be used intravenously in three-hour infusion for three days. This way, long-term use of corticosteroids which decrease human body's resistance to Herpes Simplex Virus infections leading to erythema

11. Belova paraliza je idiopatska paraliza lica. Najverovatnije se radi o inflamaciji n. facialis i njegovog koštanog kanala. Ovaj akutni poremećaj nervusa facialis može početi sa simptomima bola u mastoidnom predelu i dovesti do pune ili delimične paralize jedne strane lica. Paraliza n. facialis može biti kongenitalna ili neoplastična ili može nastati zbog infekcije, ishemije, autoimunih mehanizama, traume, delovanja toksina ili jatrogenih uzroka. Ima dokaza da je glavni uzrok Belove paralize reaktiviranje latentnog herpes simplex virusa tipa 1 iz kranijalnih nervnih ganglija. Kako virus oštećuje n. facialis nije razjašnjeno. Bolost počinje naglo, maksimalna paraliza jedne strane lica razvija se u toku prvih od 2 do 5 dana. Većina pacijenata posle terapije KS bude u potpunosti izlečena. KS daju se u visokim dozama, prva od 3 do 4 dana, a onda se doza u narednom periodu od 7 do 10 dana smanjuje²².

12. Ramsay Hunt sindrom (RHS) uzrokovan je reaktiviranjem prethodne infekcije virusom *Varicella zoster (VZV)*. RHS je potencijalno ozbiljna virusna infekcija koja u 12% slučajeva može pratiti nerve orofacijalnog predela²³. VZV se širi duž određenog nerva i zahvata određeno područje kože ili sluzokože, tzv. "dermatom", na kome se pojavljuju sitne vezikule i kasnije kruste. Uz alarmantnu paralizu lica, RHS može biti praćen ozbiljnom otalgijom, delimičnim gubitkom sluha, vrtoglavicom, bolnim vezikulama kože i agezijom usled širenja duž *n. maxillaris* ili *n. mandibularis*. Definitivni tretman sastoji se od antivirusne terapije i ponekad uključuje steroide kod paralize lica. Međutim, postoji oprez sa primenom steroidne terapije, naročito kod periokularnih lezija, zbog mogućnosti prenošenja VZV infekcije²⁴.

13. Postherpetična neuralgija (PHN) i dalje predstavlja značajan klinički problem, jer se 25% pacijenata žali na neuropatiju zahvaćenog nerva i posle povlačenja promena na koži i ostalih kliničkih simptoma, kao i nakon akutnih simptoma *herpes zoster* virusa²⁵. Obično, pacijenti mogu osetiti oštar ili dubok bol u tom području gde su se prvi put pojavile vezikule. Smatra se da ponovljeni bolni nadražaji koji su stizali do CNS-a mogu dovesti do centralne senzibilizacije nociceptivnog sistema, najvažnijeg mehanizma koji leži u osnovi dugotrajnog hroničnog bola.

multiforme is avoided. Authors explained pleomorphic effect of dexamethasone on the immune system, including the inhibition of epidermal apoptosis, with several mechanisms of action. These mechanisms include suppression of various cytokines, such as TNF-alfa, the inhibition of interferon gamma induced apoptosis and inhibition of FAS mediated keratocyte apoptosis²¹.

11. Bell's palsy is an idiopathic facial paralysis. It most probably occurs due to the inflammation of the facial nerve and its bone canal. This acute disorder of the facial nerve can begin with pain in the mastoid region and lead to a full or partial paralysis of one side of the face. It can be congenital or neoplastic, or it can be a result of infection, ischemia, autoimmune mechanisms, trauma, toxins or iatrogenic causes. There is evidence that the major cause of Bell's palsy is the reactivation of latent herpes simplex virus type 1 from the cranial nerve ganglia. How the virus damages the facial nerve is not clarified. The disease starts suddenly and the maximal paralysis of one side of the face develops within the first 2-5 days. The majority of patients treated with corticosteroids recover completely. High doses of corticosteroids are administered in the first 3-4 days, after which they are reduced in the following 7 to 10-day period²².

12. Ramsay Hunt syndrome (RHS) is caused by a reactivation of the previous infection with varicella zoster virus (VZV). It is a potentially serious viral infection that can, in 12% of cases, affect orofacial area nerves²³. VZV spreads along a certain nerve and affects a specific area of skin or mucosa, a so-called "dermatome", on which tiny vesicles and later crusts appear. Together with alarming paralysis, RHS may be accompanied by severe otalgia, partial hearing loss, dizziness, painful skin vesicles and ageusia due to its spreading along the maxillary nerve or mandibular nerve. Definitive treatment consists of antiviral therapy and sometimes includes steroids for facial paralysis. However, steroids should be used with caution, especially with periocular lesions, due to the possibility of transmitting the VZV infection²⁴.

13. Postherpetic neuralgia (PHN) still remains a significant clinical problem because 25% of patients complain of affected nerve neuropathy even after the regression of skin changes and other clinical symptoms of acute herpes zoster infection²⁵. Usually, patients may feel sharp or deep pain in the area where vesicles first appeared. It is considered that

14. Temporomandibularne disfunkcije podrazumevaju kliničke poremećaje temporomandibularnog zgloba ili mastikatornih mišića ili udružene promene koštano-mišićnog sistema. Trauma, naročito hronična mikrotrauma najčešći je uzrok ovih poremećaja. Od ostalih uzroka u etiologiji ovog poremećaja najčešće se javljaju benigne i maligne neoplazme, razvojne anomalije i sistemske bolesti. Zavisno od uzroka, pored ostale farmako i fizikalne terapije, KS imaju važnu ulogu u lečenju ovakvih stanja, jer smanjuju bolove, hipomobilnost TMZ i inflamaciju. Intrakapsularna injekcija KS može u velikoj meri olakšati simptome bolesti²⁶.

15. Centralni gigantocelularni granulom je benigni tumor koštanog tkiva koji se javlja kod dece i omladine, sa dvostruko većom incidencijom kod ženskog pola. Sastoji se od slabe vezivnotkivne strome sa velikim brojem proliferišućih fibroblasta, multijedarnim džinovskim ćelijama i hemoragičnim žarištima. Smatra se da su ćelije tumora poreklom od odontoklasta, koji resorbuju koren mlečnih zuba za vreme fiziološke smene zuba²⁷. KS se mogu upotrebiti za intralezijisko davanje u cilju smanjenja promene delujući na redukciju broja fibroblasta i angiogenezu^{28,29}.

16. Kortikosteronidi se upotrebljavaju u endodonciji u sastavu lekova za prekrivanje pulpe, jer smanjenjem inflamacije smanjuju mogućnost niene nekroze. Isto tako već se dugo koriste u medicaciji kanala korena kombinovani sa antibioticima. Forsiranje kanala korena i delovanje KS na periapikalno tkivo povećava uspeh endodontske terapije.

17. U cilju smanjenja bola posle endodontskih zahvata, naročito rekurentnog pulpita, mogu se primeniti *per os*, intramuskularno, intraligamentarno i subperiostalno u predelu problematičnog zuba^{30,31}. Ovakva primena pre endodontskog tretmana može smanjiti bol kod pacijenata sa akutnim pulpitom efikasnije nego primena morfina³².

18. U oralnoj hirurgiji već se dugo, u postoperativnoj terapiji donjeg impaktiranog umnjaka i drugih težih intervencija, pored analgetika (NSAIL i narkotički analgetici) koriste KS u cilju smanjenja tizmusa, otoka i bola. Na pojavu i intenzitet bola utiču dve klase enzima: fosfolipaza i ciklooksigenaza. Fosfolipaza sintetise arahidonsku kiselinu iz fosfolipida, dok ciklooksigenaza sintetise prostaglandine. Steroidni antiinflamatori deluju inhibicijom fosfolipaze A2, što smanjuje proizvodnju i koncentraciju prostaglandina i leukotriena.

repeated painful stimuli which reached the CNS may lead to a central sensitization of the nociceptive system, the most important mechanism in long-term chronic pain.

14. Temporomandibular dysfunction includes clinical disorders of the temporomandibular joint or masticatory muscles, or combined musculoskeletal system changes. Trauma, especially chronic microtrauma, is the most common cause of these disorders. Among the other causes in the etiology of this disorder, benign and malignant neoplasms, developmental anomalies and systemic diseases are the most common ones. Depending on the cause, in addition to other pharmaco-physical treatment, corticosteroids play an important role in the treatment of such conditions because they reduce pain, temporomandibular joint hypomobility and inflammation. Intracapsular corticosteroid injection can ease the symptoms of the disease to a significant extent²⁶.

15. Central gigantocellular granuloma is a benign bone tissue tumor that occurs in children and young people, twice as frequently in females than in males. It consists of low connective tissue stroma with a large number of polyphyletic fibroblasts, multinuclear giant cells and hemorrhagic hot spots. It is believed that the tumor cells originate from odontoclasts, which absorb the root of primary teeth in the physiological teeth change²⁷. Corticosteroids can be applied intralesionally to decrease the extent of changes by reducing the number of fibroblasts and angiogenesis^{28,29}.

16. Corticosteroids are applied in endodontics as part of the pulp capping medications because they lower the possibility of pulp necrosis by reducing inflammation. They have also been long used in root canal treatment in combination with antibiotics. Forcing of the root canal and corticosteroid application to periapical tissue increases the success of endodontic treatment.

17. In order to reduce the pain after endodontic surgery, especially that of recurrent pulpitis, corticosteroids can be applied *per os*, intramuscularly, intraligamentary and subperiosteally in the affected tooth area^{30,31}. Their application before the endodontic treatment can reduce pain in patients with acute pulpitis more effectively than morphine³².

18. In oral surgery, corticosteroids have long been used (together with NSAIDs and narcotic analgesics) postoperatively after lower impacted wisdom teeth removal and other major procedures in order to reduce trismus, swelling and pain.

Nesteroidni antiinflamatorni lekovi deluju inhibicijom ciklooksigenaznih enzima, što smanjuje prostaglandine, ali ne utiču na proizvodnju leukotriena.

Najčešći put administracije KS je *per os*, intramuskularno ili intravenski. Najizraženiji efekat KS imaju u prvih 24h posle operacije, ali se ordiniraju do 3 dana posle operacije, iako sa nešto manjim dejstvom. Postoje brojne studije koje sugerišu na vreme i put administracije KS u hirurgiji donjeg impaktiranog umnjaka, kao i različite kombinacije KS sa drugim medikamentima u cilju smanjenja morbiditeta posle ovakvih intervencija³³⁻³⁷.

Međutim, neki autori sugerišu da je submukozna injekcija deksametazona ubrizgana u pterigomandibularni prostor, posle intervencije, pokazala jednako dobar efekat na bol, otok i trizmus posle hirurškog vađenja donjeg impaktiranog umnjaka, kao parentralno data u istoj dozi.

Isto tako, postoje podaci da povećanje doze KS (deksametazona), preko 4 mg, nema veći efekat na bol, otok i trizmus posle operacije trećeg molara.

U maksilofacijalnoj hirurgiji, KS su nezaobilazni u postoperativnom periodu kod većine hirurških intervencija, kao i težih infekcija, jer olakšavaju postoperativni period pacijentu, a sa njihovom primenom smanjuje se i broj dana provedenih u bolnici³⁸.

Kontraindikacije i neželjeni efekti primene KS

Topikalna primena kortikosteroida kontraindikovana je u lečenju primarnih bakterijskih infekcija dok se sistemski KS ne primenjuju kod peptičkog ulkusa, dijabetes melitusa, hipertenzije, trudnoće, tuberkuloze i drugih infekcija, osteoporoze, *herpesa simplex* virusa, psihoza, epilepsije, kongestivnog srčanog zastoja i zastoja bubrega.

Nuspojave zavise od vrste i doze leka kao i dužine lečenja. Mogu se javiti povećanje težine, poremećaji rasta, insuficiencija nadbubrežne žlezde, smanjena otpornost na infekciju, miopatija, osteoporoza, osteonekroza, katarakta, glaukom, frakture, hipertenzija, nesanicna, šećerna bolest i peptički ulkus³⁹.

The occurrence and intensity of pain depends on two classes of enzymes: phospholipase and cyclooxygenase. Phospholipase synthesizes arachidonic acid from phospholipids, while cyclooxygenase synthesizes prostaglandins. Steroid anti-inflammatory drugs act by inhibiting phospholipase A2, which reduces the production and concentration of prostaglandins and leukotrienes. Nonsteroid anti-inflammatory drugs inhibit the cyclooxygenase enzymes, which reduces the production of prostaglandins, but does not affect leukotrienes.

The most common route of administration of corticosteroids is *per os*, intramuscular or intravenous. The effect of corticosteroids is the strongest in the first 24 hours after surgery, but they are prescribed for up to 3 days after surgery, although with somewhat less of an effect. There are numerous studies that suggest the time and route of corticosteroid administration in lower impacted wisdom teeth surgery, as well as different combinations of corticosteroids with other medications in order to reduce morbidity after such interventions³³⁻³⁷. However, some authors suggest that a submucous injection of dexamethasone to pterygo-mandibular area after a surgical removal of the lower impacted wisdom tooth has the same effect on pain, swelling and trismus as parenteral application. Similarly, some data suggest that increasing the dose of corticosteroids (dexamethasone) to over 4 mg doesn't improve its effect on pain, swelling and trismus following third molar surgery.

In maxillofacial surgery, corticosteroids are indispensable in the postoperative period for most surgical interventions, as well as more severe infections, because they make the postoperative period easier for the patient and reduce the time spent in hospital³⁸.

Contraindications and side-effects of corticosteroids

Topical application of corticosteroids is contraindicated in the primary treatment of bacterial infections, as well as their systemic application with peptic ulcer, diabetes mellitus, hypertension, pregnancy, tuberculosis and other infections, osteoporosis, *herpes simplex* virus, psychosis, epilepsy, congestive heart failure and kidney failure.

Topikalno lečenje može dovesti do atrofije kože, hipopigmentacijskog kontaktnog dermatitisa, oralne kandidijaze, gubitka potkožnog masnog tkiva, i Cushingoidnog efekta posle sistemske apsorpcije. Nuspojave izazvane inhalacijom kortikosteroida su orofaringealna kandidijaza, disfonija, refleksni kašalj, bronhospazam, faringitis⁴⁰.

Zaključak

Kortikosteroidi su našli široku primenu u stomatologiji, oralnoj i maksilofacijalnoj hirurgiji.

Side effects depend on the type of medication, its dosage and the length of treatment. Weight gain, growth disorder, adrenal gland insufficiency, reduced resistance to infection, myopathy, osteoporosis, osteonecrosis, cataract, glaucoma, fractures, hypertension, insomnia, diabetes and peptic ulcer may occur³⁹.

Topical application may lead to skin atrophy, contact dermatitis hypopigmentation, oral candidiasis, loss of subcutaneous fat and Cushingoid effect after systemic absorption. Side effects caused by corticosteroid inhalation are oropharyngeal candidiasis, dysphonia, reflex cough, bronchospasm and pharyngitis⁴⁰.

Conclusion

Corticosteroides has found wide application in dentistry, oral and maxillofacial surgery.

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UPUTSTVA AUTORIMA

Acta Stomatologica Naissi je naučni časopis Stomatološke klinike, Medicinskog fakulteta Univerziteta u Nišu, koji publikuje radove iz svih oblasti stomatologije i srodnih medicinskih grana.

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Svi predati radovi za štampanje moraju biti napisani na srpskom i engleskom jeziku. Apstrakti treba da budu pripremljeni pored srpskog i na preciznom i gramatički ispravnom engleskom jeziku (US engleski stil) (videti niže). Izbegavati korišćenje latinskih izraza; ako su potrebni staviti ih u zagrade.

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Kada se radi o eksperimentima na humanom materijalu ili pacijentima, ukazati da li je primenjen postupak u skladu sa etičkim standardima odgovornog komiteta za ljudske eksperimente ili sa Deklaracijom iz Helsinkija (1964, amandmani iz 1975 i 1983) Svetske medicinske asocijacije.

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APSTRAKTI I KLJUČNE REČI

Originalni radovi moraju da sadrže strukturalni apstrakt od 250 reči, podeljenih na sledeća 4 paragrafa:

Uvod: opisuje problem o kome se radi u radu

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Rezultati: opisuje primarno rezultate

Zaključak (ci): saopštenje autora o zaključcima proisteklim iz rezultata, i implicira njihovu kliničku primenljivost.

Strukturalni apstrakti nisu potrebni kod uvodnika i pisma. Ispod apstrakta stoje ključne reči i to tri do pet. Ključne reči mogu biti uzete samo iz Medical Subjects Headings (MeSH).

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TABELE I FIGURE

Svaka tabela sa jasnim naslovom na srpskom i engleskom treba da bude otkucana sa duplim proredom na odvojenom papiru. Obeležiti brojevima tabele jednu za drugom kako nailaze posle prvog navođenja u tekstu (obeležavaju se arapskim brojevima). Dati svakom kolumni kratko ili skraćeno zaglavje. Staviti objašnjenja u legendama svih nestandardnih skraćenica korišćenih u tabeli. Za jedinice i merenja vidi odeljak niže. Ne koristiti unutrašnje horizontalne i vertikalne linije. Staviti sve tabele na kraju vašeg fajla. Uvek odvojiti posebne kolumne upotrebom tabulatora, a ne upotrebom razmaknice, tabele moraju biti u tekst formatu.

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Priznanja i zahvalnosti prethode literaturi specificirajući generalnu podršku kao i odeljenje i ime šefa odeljenja, priznanja tehničkoj pomoći i konačno finansijskoj i materijalnoj pomoći. Navesti naziv i broj projekta, odnosno naziv programa u okviru koga je nastao članak i naziv institucije koja je finansirala projekat, u posebnoj napomeni pri dnu prve strane članka

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RADOVI U ČASOPISIMA

1. Standardni članak u časopisu (lista svih autora, ali ako je broj veći od šest citirati tri i dodati et al): Glass DA, Mellonig JT, Towle HJ. Histologic evaluation of

bone inductive proteins complexed with coralline hydroxyapatite in an extraskeletal site of the rat. J Periodontol 1989; 60:121-125.

2. Organizacija kao autor: Federation Dentaire Internationale. Technical Report No. 28. Guidelines for antibiotic prophylaxis of infective endocarditis for dental patients with cardiovascular disease. Int Dent J 1987;37:235.

3. Nije dat autor: Coffee drinking and cancer of the pancreas (editorial).BMJ 1981;283:628

4. Volumen sa suplementom: Magni R, Rossoni G, Berti R, BN52021 protect guinea pig from heart anaohylaxis. Pharmacol Res Comm 1988; 20 Suppl 5:75-8.

Knjige ili druge monografije

5. Lični autor (i): Tullman JJ, Redding SW. Systemic Disease in Dental Treatment. St.Louis: The CV Mosby Company;1983:1-5.

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Reference-elektronski citati

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ACKNOWLEDGEMENTS

Acknowledgements are positioned before the reference list specifying general support by department chairman, acknowledgements of technical as well as financial and material support. Acknowledgement includes the title and number of the project, i.e. the title of the programme within which the article was composed and the title of the institution funding the project; it should be written as a separate notification at the bottom of the first page of the article.

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2. Corporate author: Federation Dentaire Internationale. Technical Report No.28. Guidelines for antibiotic prophylaxis of infective endocarditis for dental patients with cardiovascular disease. *Int Dent J* 1987;37:235.

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4. Volume with supplement: Magni R, Rossoni G, Berti R, BN52021 protect guinea pig from heart anaphylaxis. *Pharmacol Res Commun* 1988;20 Suppl 5:75-8.

Books or other monographs:

5. Personal author(s): Tullman JJ, Redding SW. Systemic Disease in Dental Treatment. St. Louis: The CV Mosby Company; 1983:1-5.

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