

Uticaj različitih vrsta parcijalnih zubnih proteza na akumulaciju dentalnog plaka

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Influence of different types of partial dentures on dental plaque accumulation

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KRATAK SADRŽAJ

Cilj rada bio je da se utvrdi uticaj različitih vrsta parcijalnih zubnih proteza na akumulaciju dentalnog plaka. Istraživanje je obuhvatilo tri eksperimentalne i jednu kontrolnu grupu, sa po 30 ispitanika. U prvoj eksperimentalnoj grupi su bili nosioci parcijalnih akrilatnih proteza, u drugoj nosioci supradentalnih proteza, a u trećoj – nosioci skeletiranih proteza. Prisustvo dentalnog plaka na preostalim zubima, određivano je modifikovanom metodom po Silnes-Lou. Količina dentalnog plaka merena je prilikom predaja proteza, posle 6 i 12 meseci nošenja proteza. U celini, indeks dentalnog plaka je, posle 12 meseci nošenja proteza, bio relativno nizak u sve tri grupe ispitanika što je rezultat prethodne obuke i motivacije ispitanika za održavanje oralne higijene. Najveći rizik pojave oralnih oboljenja čiji je glavni uzročnik dentalni plak, ipak, postoji kod nosilaca parcijalnih akrilatnih proteza, zatim kod pacijenata sa supradentalnim protezama, a najmanje plaka je bilo kod skeletiranih proteza.

Ključne reči: parcijalna proteza, dentalni plak, oralna higijena.

SUMMARY

The aim of the paper was to assess influence of different types of partial dentures on dental plaque accumulation. The study was conducted in three experimental and one control group with 30 examinees each. In the first experimental group were patients with partial acrylic dentures, in the second were patients with overdentures and in the third group were the patients with metal skeletal dentures. Dental plaque on the remaining teeth was measured by Silness-Loe modified method. Dental plaque scores were obtained at a time when dentures were given to patients and after 6 and 12 months of wearing, respectively. The plaque index of all teeth after 12 months of wearing dentures was relatively low in all three examined groups which resulted from previous education and motivation of examinees for oral hygiene maintenance. However, the highest risk of oral diseases caused by dental plaque is in patients with partial acrylic dentures, then in patients with overdentures, and best preventive effect was achieved in patients with metal skeletal dentures.

Key words: removable partial denture, dental plaque, oral hygiene.

Dentalni plak je složena zajednica oralnih mikroorganizama koja se nalazi u matriksu salivarnog porekla, a nastaje na površini zuba i ostalih čvrstih struktura u usnoj duplji (zubne nadoknade, ispuni, ortodontski aparati).¹ Prisustvo parcijalnih proteza dovodi do kvalitativnih i kvantitativnih promena u dentalnom plaku.^{2,3}

Cilj rada bio je da se utvrdi uticaj različitih vrsta parcijalnih proteza na akumulaciju dentalnog plaka. Naučna opravdanost rada leži u činjenici da je dentalni plak jedan od glavnih uzročnika mnogih oboljenja usta i zuba (karijes, gingivitis, parodontopatije). Određivanjem indeksa dentalnog plaka, kvalitativno se može vrednovati preventivna uloga različitih vrsta parcijalnih proteza i odrediti kod koje grupe ispitanika postoji najveći rizik od oboljenja usta i zuba.

Dental plaque is a complex community of oral microorganisms implanted in salivary matrix always formed on the teeth surface and other solid surfaces in oral cavity (dentures, restorations, orthodontic appliances).¹ Wearing of partial removable dentures is resulting in qualitative and quantitative modifications in dental plaque.^{2,3}

The aim of this paper was to assess the influence of different types of partial dentures on dental plaque accumulation. Scientific rationale is based on the fact that dental plaque is one of the major causes of oral diseases (dental caries, gingivitis, periodontal diseases). By obtaining plaque indices values of the remaining teeth, it is possible to evaluate qualitatively preventive role of different types of partial dentures and recognize groups at risk of oral diseases.

Materijal i metod

Klinička ispitivanja su obavljena u tri ogledne i jednoj kontrolnoj grupi, sa po 30 ispitanika, na Klinici za stomatologiju u Novom Sadu. Prvu oglednu grupu činili su ispitanici kojima su, kao terapijsko sredstvo, bile indikovane akrilatne subtotalne proteze (PAP), drugu – ispitanici kojima su bile indikovane supradentalne proteze (SDP), a treću grupu – ispitanici kojima su bile indikovane skeletirane parcijalne proteze (PSP). Kontrolnu grupu činili su ispitanici koji nisu nosili zubne nadoknade.

Zubne nadoknade su rađene prema savremenim biološkim principima. Pre pristupanja protetskom tretmanu, svi ispitanici oglednih grupa bili su podvrgnuti konzervativnoj preprotetskoj pripremi.

U ispitivanje nisu uključene osobe koje boluju od šećerne bolesti, krvnih diskrazija, osobe sa dermatološkim oboljenjima manifestnim u usnoj duplji (Pemphigus vulgaris, Pemphigoid bulosus, Lichen ruber planus i dr.), zatim osobe koje boluju od malignih tumora i osobe koje su izložene zračnoj terapiji, kao i gravidne žene. Osim zbog pomenutih razloga, iz ispitivanja su isključene dementne osobe, jer se njihovi iskazi moraju uzeti sa rezervom. Da bi nalazi bili međusobno uporedivi, svi ispitanici oglednih i kontrolne grupe, morali su da zadovolje kriterijume održavanja pravilne oralne higijene. U ispitivanje su uključeni samo oni ispitanici koji su dali podatak da, najmanje dva puta dnevno, četkaju zube i da četkaju proteze četkicom za zube i pastom, ili većom četkom i deterdžentnim sredstvima. U studiju su uključeni pacijenti kod kojih je prosečna vrednost indeksa dentalnog plaka po Silnes-Lou bilo manja od 1 pre pristupanja protetskoj terapiji. Prisustvo dentalnog plaka na preostalim zubima, određivano je modifikovanom metodom po Silnes-Lou. Identifikacija dentalnog plaka obavljena je na vestibularnoj, oralnoj, mezijalnoj i distalnoj površini zuba bojenjem (6% rastvor eritrozina). Posle predaje proteza, ispitanici oglednih grupa su remotivisani za održavanje pravilne oralne higijene. Svakom ispitaniku je skrenuta pažnja da su bakterije dentalnog plaka osnovni uzročnici oboljenja zuba i njihovog potpornog aparata. Naglašeno je da se naslage sa zuba i proteza mogu ukloniti samo mehaničkim putem, a da se ispiranjem, ne ostvaruje nikakav efekat. Istaknut je značaj neophodnosti redovnih kontrolnih pregleda i ukazano da od toga zavisi ishod protetskog lečenja i trajnost zubnih nadoknada.

Kolilčina dentalnog plaka merena je prilikom predaje proteza ispitanicima i posle 6 i 12 meseci nošenja proteza. Za statističku obradu podataka, korišćene su standardne statističke metode (srednja vrednost, SD, t-test, Fišerova analiza varijanse i procena F vrednosti po Šefiju).⁴

Rezultati

Istraživanje je sprovedeno na 90 ispitanika eksperimentalnih grupa (35 muškaraca i 55 žena), i 30 ispitanika kontrolne grupe (13 muškaraca i 17 žena). Prosečna sta-

Material and method

Clinical trial was conducted in three experimental and one control group of examinees, each consisted of 30 patients, at the Clinic of dentistry in Novi Sad. In the first experimental group were patients with indications of subtotal dentures (PAD), in the second group were patients with indications of overdentures (ODD) and in the third group were patients with indications of skeletal partial dentures (PSD). Control group consisted of examinees without dentures.

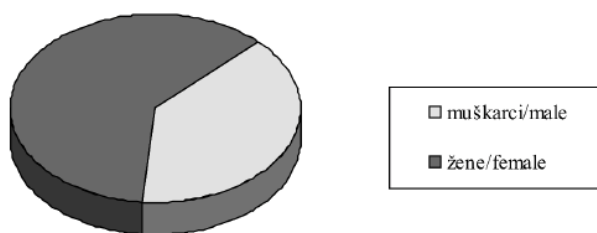
Dentures were prepared according to contemporary biological principles. Before prosthetic procedures, all examinees of the experimental groups were admitted for preprosthetic conservative preparation. All persons with diabetes mellitus, blood disorders, dermatological diseases manifested in oral cavity (Pemphigus vulgaris, Pemphigoid bulosus, Lichen ruber planus and others), also persons with malignancies and persons who were exposed to therapeutic radiation and pregnant women were excluded from this trial. Along with these reasons, demented persons were excluded as well, because their statements are unreliable. In order to compare the results, all examinees from the experimental and the control group had to meet criteria for proper oral hygiene maintenance. All examinees who confirmed brushing their teeth at least twice per day and brushing their dentures at least twice per day with a tooth brush and tooth paste or with a larger brush and detergents were included in this trial. The next criterion for inclusion was that patients had Silness-Loe plaque index average value less than 1 before prosthodontic therapy. Dental plaque on remaining teeth was noted by modified Silness-Loe method. Dental plaque was identified on vestibular, oral, mesial and distal surfaces of the teeth by coloring them (eritrosine sol. 6%). Patients of experimental groups were remotivated for oral hygiene maintenance when they received their dentures. Every patient was instructed that bacteria from dental plaque are the major cause of oral diseases. It was emphasized that plaques from teeth and dentures can be removed only mechanically and that rinsing is not effective whatsoever. Patients were informed that longevity of their dentures and the outcome of prosthodontic treatment are depending on regular control examinations. Dental plaque was measured at the time of dentures completion, after 6 and 12 months, respectively. For statistical analysis of obtained data, standard statistical methods were used (mean value, SD, T-test, Fisser's variance analysis and F-value according to Scheffea).⁴

Results

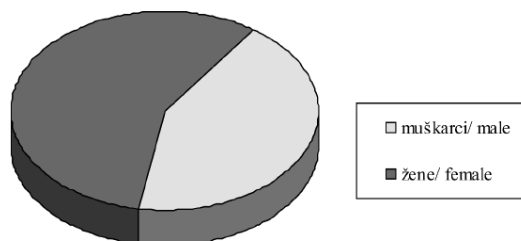
The trial was conducted in 90 examinees of the experimental groups (35 males and 55 females) and 30 examinees of the control group (30 males and 17 females). Average

rost ispitanika eksperimentalnih grupa bila je 58.8 godina, a kontrolne grupe – 43.7 godina. (Grafikon 1 i 2)

age of examinees in the experimental groups was 58.8 years old and the control group 43.7 years old (Graph 1 and 2).



Grafikon1 Zastupljenost ispitanika po polu u eksperimentalnim grupama.
Graph 1. Gender distribution in experimental groups



Grafikon 2 Zastupljenost ispitanika po polu u kontrolnoj grupi.
Graph 2. Gender distribution in control group

Rezultati merenja indeksa dentalnog plaka svih zuba po Silnes-Lou, pre predaje proteza, posle 6 i 12 meseci nošenja proteza, ukazuju na porast vrednosti u svim eksperimentalnim grupama (Tabela).

Plaque index measurements of all teeth before delivery of the dentures, after 6 and 12 months of wearing dentures, are showing increased values in all experimental groups (Table).

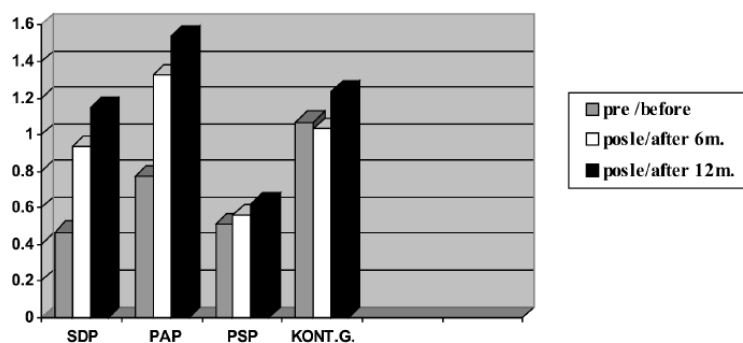
Tabela: Plak indeks zuba kod ispitanika sa parcijalnom akrilatnom protezom (PAP), sa supradentalnom protezom (SDP) i kod ispitanika sa skeletiranom potezom (PSP) pre predaje proteze i nakon opservacionog perioda od 6 i 12 meseci

Table: Dental plaque index in patients with PAD, ODD and PSD

	Plak indeks/ dental plaque index								
	SDP			PAP			PSP		
	Pre/ before	Posle/ after 6m	Posle/ after 12m	Pre/ before	Posle/ after 6m	Posle/ after 12m	Pre/ before	Posle/ after 6m	Posle/ after 12m
\bar{x}	0,467	0,934	1,144	0,770	1,324	1,534	0,513	0,558	0,620
SD	0,283	0,439	0,473	0,210	0,375	0,440	0,202	0,219	0,280
xmax	0,875	1,750	2,000	0,950	2,000	2,200	0,969	1,031	1,340
xmin	0,000	0,000	0,270	0,000	0,330	0,330	0,167	0,200	0,000

Kod ispitanika sa supradentalnim i parcijalnim akrilatnim protezama, došlo je do statistički značajnog povećanja vrednosti indeksa dentalnog plaka posle 6 i 12 meseci. Kod ispitanika sa parcijalnim skeletiranim protezama, došlo je do povećanja količine plaka na svim zubima, ali statistički značajna razlika nije utvrđena ($p < 0.05$). Analizom rezultata merenja posle 6 meseci, utvrđeno je da postoji statistički značajna razlika aritmetičkih sredina između grupe sa PSP i grupe sa PAP, a pri merenju posle 12 meseci – između grupe sa PSP i grupa sa PAP i SDP. (Grafikon 3)

In patients with overdentures and partial acrylic dentures plaque index was significantly statistically increased after 6 and 12 months, respectively. In patients with partial skeletal denture plaque index of all teeth was increased but with no statistically significant difference ($p < 0.05$). Six months data analysis has shown statistically significant difference of mean values between groups of patients with PSD and PAD, and after 12 months that difference extended between the group of patients with PSD and groups with PAD and ODD (Graph 3).



Grafikon 3 Srednje vrednosti plak indeksa zuba kod ispitanika sa parcijalnom akrilatnom protezom (PAP), sa supradentalnom protezom (SDP), kod ispitanika sa skeletiranom protezom (PSP) i ispitanika kontrolne grupe pre predaje proteze i nakon 6 i 12 meseci .

Graph 3: Plaque index mean values in patients with PAD, ODD and SPD

Analizom dobijenih rezultata, utvrđeno je da ne postoji statistički značajna razlika prosečnih vrednosti indeksa dentalnog plaka među polovima kod sve tri grupe ispitanika, što se odnosi na sva urađena merenja.

Poređenje rezultata merenja dentalnog plaka kontrolne grupe sa rezultatima prvog i drugog merenja u eksperimentalnim grupama, uočava se razlika između PAP i kontrolne grupe na drugom merenju dok kod ostalih grupa, nema statistički značajnih razlika.

Diskusija

Broj od 30 ispitanika u svakoj eksperimentalnoj i u kontrolnoj grupi, što je ukupno 120 ispitanika, omogućio je dobijanje relevantnih rezultata. Podela pacijenata u eksperimentalne grupe urađena je na osnovu postavljenih indikacija za protetsku terapiju.

Iako su svi ispitanici pripadali populaciji koja ima dobre navike u održavanju oralne higijene, a osim toga, bili ponovo obučeni i remotivisani na identičan način, prilikom kontrolnog pregleda posle 6 meseci nošenja proteza, nivo oralne higijene je bio različit. U celini, može se reći da je primećen pad nivoa oralne higijene kod nosilaca parcijalnih akrilatnih proteza, a slede nosioci supradentalnih proteza. Razlike između ta dva nalaza nisu statistički značajne. Kod ispitanika sa parcijalnim skeletiranim protezama, utvđen je najmanji porast indeksa dentalnog plaka zuba, ali nije bio statistički značajan.

Utvrđeno je da postoji značajna razlika između porasta indeksa dentalnog plaka u grupi sa parcijalnim akrilatnim protezama i grupi sa parcijalnim skeletiranim protezama već posle 6 meseci. Ovaj nalaz se može dovesti u vezu sa materijalom od kojeg su proteze izrađene. Ispitanici, čije su baze proteza bile izrađene od akrilata, imali su statistički značajno veći porast indeksa dentalnog plaka. Ovakav rezultat je u saglasnosti sa nalazima Todorovića^{5,6}, Nabila i sar.⁷ i Jusofa i sar.⁸ Pored toga, značajna je činjenica da među ispitivanim grupama postoji razlika u odnosu proteza prema marginalnoj gingivi, i prema preostalim zubima. Skeletirana parcijalna proteza ostvaruje kontakt samo sa retencionim zubima, parcijalna akrilatna proteza – sa velikom površinom svih ostalih zuba, a supradentalna proteza pokriva zube u celini.⁹ Pokrivenost zubnih površina protezom smanjuje efekte samočišćenja čime se favorizuje akumulacija dentalnog plaka, što ističu i Koeljo i sar.¹⁰ Ovakvog mišljenja su i Nabil i sar.⁷, Čendler i sar.¹¹ i Švalm i sar.¹²

Rezultati merenja indeksa dentalnog plaka zuba u kontaktu sa protezom nisu se razlikovali od nalaza plaka na svim ostalim zubima i sa slažu se sa nalazima Čendlera i Brudvika.¹¹ Nešto veća količina plaka registrovana je na distalnim površinama najudaljenijih zuba što se slaže sa nalazima Todorovića^{5,6}, Stamenkovića¹³, Tihaček¹⁴ i Jiunga¹⁵, ali u ovoj studiji nije utvrđena statistički zna-

Analysis of the obtained data has indicated that no statistically significant difference of plaque index mean values exists between genders in all three experimental groups, in all taken measurements.

When dental plaque scores of the controlled group were compared to the results of the first and second measurements in the experimental groups, the only difference appeared between PAD and the control group after second measurement while between other groups there was no statistically significant difference.

Discussion

Number of 30 examinees in each experimental and the control group, total number of 120, made possible obtaining relevant results. Patients were selected for different experimental groups based on prosthodontic indications.

Despite all examinees had good habits in oral hygiene maintenance, and were re-educated and remotivated in identical way subsequently, at the clinical examination after 6 months of wearing dentures their oral hygiene level has varied. Increased plaque index values, i.e. decrease of the oral hygiene level were observed. Plaque index of all teeth was highest in patients with partial acrylic dentures, then in patients with overdentures. Differences between them were not statistically significant. In patients with partial skeletal dentures plaque index increase was the lowest though not statistically significant.

Significant difference was noted between plaque index increase in the group of patients with partial acrylic dentures and the group with partial skeletal dentures after 6 months already. These results may be associated with the material from which dentures were made. Patients with denture bases from acrylic have statistically higher increase of plaque index values. This result is coinciding with findings of Todorovic^{5,6}, Nabil et al.⁷, Yusof et al.⁸ Beside that, the important fact is that in these experimental groups, there are differences in relations between dentures and marginal gingiva and the remaining teeth, respectively. Skeletal partial denture is in contact only with retentive teeth, partial acrylic denture is in contact with the large surface of all remaining teeth, while overdentures are covering teeth completely.⁹ Effects of auto-cleaning teeth are decreased by covered teeth surfaces with the denture and that is favorable for plaque accumulation, also confirmed by Coelho et al.¹⁰ The same opinion is shared by Nabil et al.⁷, Chandler et al.¹¹, Schwalm et al.¹² Plaque index measurements of teeth adjacent to denture did not differ from plaque results of all other teeth and are coinciding with findings of Chandler and Brudvik.¹¹ Higher amount of plaque was noted on distal surfaces of the most distal teeth which coincides with findings of Todorovic^{5,6}, Stamenkovic¹³, Tihacek¹⁴ and Yeung¹⁵, but in this study no statisti-

čajna razlika. Ovaj nalaz se može tumačiti tako što su distalni zubi, odnosno, njihove distalne površine, najmanje dostupni prilikom četkanja zuba. Dobar rezultat indeksa dentalnog plaka kod ispitanika sa skeletiranim parcijalnim protezama, može se tumačiti korišćenjem savremenim konceptom izrade skeletiranih proteza, koji podrazumeva formiranje vodeći ravni na gleđi zuba ili namenskim nadoknadama. Takvog mišljenja je i Saito.¹⁷ U grupi ispitanika sa supradentalnim protezama, utvrđen je statistički značajan porast indeksa dentalnog plaka u odnosu na prvo merenje, ali je manji u odnosu na nalaze Ettingera i sar.¹⁶ koji navode izuzetno visok porast količine plaka.

Porast vrednosti indeksa dentalnog plaka posle 6 meseci nošenja proteza beleži i Brković¹⁸, ali ne veći od porasta vrednosti kod ispitanika sa parcijalnim akrilatnim protezama, što se slaže sa našim nalazima. Ovo se, donekle, može objasniti boljim uslovima za održavanje oralne higijene kod ispitanika sa supradentalnim protezama u odnosu na ispitanike sa parcijalnim akrilatnim protezama kod kojih dužina kliničke krune, podminirani prostori na retencionim zubima i prisustvo kukica – to otežavaju. Postavlja se pitanje u kojoj meri se nedovoljno održavanje oralne higijene može isključiti tako da se nalaz povećanja količine plaka kod ispitanika sa parcijalnom akrilatnom protezom i supradentalnom protezom u odnosu na ispitanike sa parcijalnom skeletiranom protezom može tumačiti manjom motivisanošću i spremnošću za održavanje oralne higijene, ili samim konstrukcionim rešenjem proteze.

Zaključak

U celini posmatrano, indeks dentalnog plaka zuba posle 12 meseci nošenja proteza bio je relativno nizak u sve tri grupe ispitanika što je rezultat prethodne obuke i motivacije za održavanje pravilne oralne higijene. Najveći rizik pojave oboljenja usta i zuba čiji je glavni uzročnik dentalni plak, postoji kod nosilaca parcijalnih akrilatnih proteza, zatim kod ispitanika sa supradentalnim protezama, a najmanje plaka je bilo kod skeletiranih parcijalnih proteza. Obuka pacijenata pravilnoj oralnoj higijeni, motivacija i česte remotivacije na kontrolnim pregledima, neophodan su uslov za održavanje postignutih rezultata terapije parcijalnim protezama.

cally significant difference was observed. This result can be explained by difficult approach to brush distal teeth and their distal surfaces. Good plaque index scores in patients with skeletal partial dentures can be explained by use of contemporary concept in skeletal dentures construction which means formation of guiding planes in teeth enamel or present appliances. This is supported also by Saito.¹⁷ In the group of patients with overdentures statistically significant increase in plaque score comparing to first measurement was noted but it was less when compared to the results of Ettinger et al.¹⁶, who are reporting significantly high increase of plaque index.

Plaque index increase after 6 months of wearing dentures was also noted by Brković¹⁸ but it did not exceed increased values in the examinees with partial acrylic dentures which confirm our results. It can be partially explained by better conditions for oral hygiene maintenance in patients with overdentures comparing to those with partial acrylic dentures where length of the clinical crown, undermined gaps on retentive teeth and wire extensions are making it difficult. The question is to what extent insufficient oral hygiene can be excluded so that increase of dental plaque amount in patients with partial acrylic dentures and overdentures, compared to the patients with partial skeletal dentures, can be explained by lower motivation and readiness to maintain oral hygiene or by specific denture construction.

Conclusion

It was observed that plaque index after 12 months of wearing dentures was relatively low in all three examined groups which is the result of previous education and motivation for oral hygiene maintenance. However, the highest risk for oral diseases caused by dental plaque exists in patients with partial acrylic dentures than in patients with overdentures, while the best preventive effect was in patients with skeletal dentures. Education on oral hygiene maintenance motivation and frequent remotivation at control examinations are a necessary condition for maintaining results achieved by treatment with partial dentures.

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