

CITOMORFOMETRIJSKO I KLINIČKO ISPITIVANJE GINGIVE PRE I POSLE TERAPIJE HRONIČNOG KATARALNOG GINGIVITA KOD DECE

CYTOMORPHOMETRIC AND CLINICAL ASSESSMENT BEFORE AND AFTER THE TREATMENT OF CHRONIC CATARRHAL GINGIVITIS IN CHILDREN

Marija Igić¹, Dragan Mihailović², Ljiljana Kesić³, Mirjana Apostolović¹, Ljiljana Kostadinović¹,
Dušan Šurdilović¹, Olivera Tričković Janjić¹, Branislava Stojković⁴

¹MEDICINSKI FAKULTET - KLINIKA ZA STOMATOLOGIJU- PREVENTIVNA I DEČJA STOMATOLOGIJA, NIŠ SRBIJA

²MEDICINSKI FAKULTET - INSTITUT ZA PATOLOGIJU KLINIČKOG CENTRA, NIŠ, SRBIJA

³MEDICINSKI FAKULTET - KLINIKA ZA STOMATOLOGIJU – ORALNA MEDICINA I PARODONTOLOGIJA, NIŠ, SRBIJA

⁴MEDICINSKI FAKULTET – STUDENT NA DOKTORSKIM STUDIJAMA, NIŠ, SRBIJA

¹FACULTY OF MEDICINE, DENTISTRY CLINIC, DEPT. OF PREVENTIVE AND PEDIATRIC DENTISTRY, NIS, SERBIA

²FACULTY OF MEDICINE, INSTITUTE OF PATHOLOGY, CLINICAL CENTRE, NIS, SERBIA

³FACULTY OF MEDICINE, DENTISTRY CLINIC, DEPT. OF ORAL MEDICINE AND PARADONTOLOGY, NIS, SERBIA

⁴FACULTY OF MEDICINE – Ph.D. STUDENT, NIS, SERBIA

APSTRAKT

Uvod. Kataralni gingivitis je najčešće oboljenje oralne sluzokože u dece. Osnovni etiološki faktor za nastanak kataralnog gingivitisa je dentalni plak koji ima svojstva biofilma. Pod hemijskim i toksičnim dejstvom oralnog biofilma, kao i zbog lokalne reakcije domaćina, kao posledica homeostatskih mehanizama, može doći do oštećenja ćelija, što vodi ispoljavanju bolesti na gingivi i ostalim delovima parodontata. Gingivalne epitelne ćelije su prva fizička barijera parodontalnim patogenim mikroorganizmima. Bakterijski proizvodi koji prodiru u epitel mogu direktno da poremete njegov integritet.

Cilj rada je bio da se kliničkim i citomorfometrijskim ispitivanjem prikaže stanje gingive pre i posle terapije hroničnog kataralnog gingivita kod dece.

Metodologija. Ispitivanjem je obuhvaćeno 80 dece podeljenih u dve grupe: I grupa (50 dece sa hroničnim kataralnim gingivitom, kod kojih je u lečenju primenjena bazična terapija); II grupa (30 dece sa zdravom gingivom-kontrolna grupa). Svim ispitanicima pre i posle terapije urađeni su sledeći indeksi: plak indeks po Green-Vermilionu (PI) i Muhlemannov indeks krvarenja (IKR). Za morfometrijsko ispitivanje uzimani su brisevi sa gingive pre i posle terapije kod I grupe ispitanika. Takođe su uzimani i brisevi sa gingive ispitanicima II grupe.

Rezultati. Vrednost PI u I grupi pre terapije je bila 1,94, a nakon terapije 0. U II grupi PI=0,17. Pre terapije IKR u I grupi je bio 2,02, a posle terapije 0,32. U II grupi IKR=0. Citomorfometrijskim ispitivanjem je utvrđena statistički značajna razlika ($p<0,001$) u veličini jedara ćelija pločastoslojevitog epitela gingive pre i posle terapije hroničnog kataralnog gingivitisa.

Zaključak. Bazičnom terapijom se hronični kataralni gingivitis kod dece može uspešno sanirati, što je i potvrđeno odgovarajućim kliničkim parametrima. Citomorfometrijskom analizom je utvrđeno da se nakon terapije veličina jedara ćelija pločastoslojevitog epitela gingive smanjuje, ali ne do veličine jedara zdrave gingive. Dešavanja unutar ćelija pločastoslojevitog epitela gingive još uvek nisu u potpunosti rasvetljena, što iziskuje dalja istraživanja.

Ključne reči: gingivitis, deca, citomorfometrija.

ABSTRAKT

Introduction. Catarrhal gingivitis is the most common disease of oral mucosa in children. The principal etiologic factor in its occurrence is dental plaque with biofilm characteristics. Under the chemical and toxic action of oral biofilm and with local reaction of the host, as the consequence of homeostatic mechanisms, cell damage may result, leading to the disease of the gingiva and other parts of the parodontium. Gingival epithelial cells constitute the first physical barrier for parodontal pathogenic microorganisms. Bacterial products penetrating the epithelium may directly disturb its integrity.

Our aim with this paper was to assess the status of the gingiva before and after the treatment for chronic catarrhal gingivitis in children, using clinical and cytomorphometric studies.

Methods. The study enrolled 80 children divided into two groups: group I (50 children with chronic catarrhal gingivitis, treated with basic therapy) and group II (30 children with healthy gingiva as controls). The following indexes were determined for all the examinees before and after treatment: plaque index according to Green and Vermillion (PI) and the Muhlemann bleeding index (MBI). Gingival swabs were taken before and after treatment from group I examinees for morphometric investigation. Gingival swabs were taken from group II subjects as well.

Results. The values of PI in group I were 1.94 before, and 0 after treatment. The value of PI in group II was 0.17. Before treatment, the MBI in group I was 2.02, and 0.32 after treatment, while in group II MBI was 0. Cytomorphometric analysis revealed a statistically significant difference ($p<0,001$) in the size of the nuclei of stratified squamous gingival epithelium cells before and after treatment for chronic catarrhal gingivitis.

Conclusion. Basic treatment is capable of successfully resolving chronic catarrhal gingivitis in children, which was confirmed by the appropriate clinical parameters. Cytomorphometric analysis established that the size of the nuclei of stratified squamous epithelial cells of the gingiva was reduced, although not to the size characterizing healthy gingiva. The events occurring within the cells of the stratified squamous epithelium have not yet been fully elucidated, which deserves further research.

Key words: gingivitis, children, cytomorphometrics

Uvod

Gingiviti nastaju kao posledica reakcije gingivalnog tkiva na oštećenja i nadražaje izazvane lokalnim agensima. Nadražaje i oštećenja najčešće prouzrokuju živi agensi, a to su mikroorganizmi i njihovi produkti, poreklom iz dentalnog plaka, ali uzročnici mogu biti i drugi činioci, mehaničke i hemijske prirode.

Kataralni gingivit (gingivitis superficialis, gingivitis simplex, gingivitis marginalis, papilitis) je najčešće oboljenje oralne sluzokože u dece. To je inflamacija gingive eksudativne prirode. Osnovni etiološki faktor za nastanak kataralnog gingivita je dentalni plak koji ima svojstva biofilma. Značajna saznanja o biofilmu postala su dostupna tokom prethodne decenije. Jedna od najviše ispitivanih zajednica bakterija je dentalni plak¹⁻⁵. Primenom novih mikroskopskih i molekularnih metoda, dokazano je da biofilmovi nisu proste bakterijske naslage, već da su u pitanju biološki sistemi sa visokim stepenom organizovanosti, u kojima mikroorganizmi grade koordinisane i funkcionalne zajednice². Pod hemijskim i toksičnim dejstvom oralnog biofilma, kao i pod dejstvom lokalne reakcije domaćina, kao posledica homeostatskih mehanizama, može doći do oštećenja ćelija, što vodi ispoljavanju bolesti na gingivi i ostalim delovima parodonta.

Gingivalne epitelne ćelije su prva fizička barijera parodontalnim patogenim mikroorganizmima. Ranije se smatralo da je epitel pasivna barijera. U novije vreme gingivalnom epitelu se pridaje važna uloga u relaciji domaćin – bakterijska infekcija⁶. Epitel reaguje na bakterijske napade integrisanjem urođenih i stečenih imunoloških reakcija. Bakterijski produkti koji prodiru u pripojni epitel mogu direktno da poremete njegov strukturni i funkcionalni integritet⁷.

Terapija kataralnog gingivita obuhvata pre svega uklanjanje kauzalnih agenasa, kao i motivaciju i obučavanje dece u održavanju adekvatne oralne higijene.

Cilj rada je bio da se kliničkim i citomorfometrijskim ispitivanjem prikaže stanje gingive pre i posle terapije hroničnog kataralnog gingivita kod dece.

Introduction

Gingivites are the consequence of reaction of the gingival tissue to injuries and stimuli induced by local agents. The stimuli and injuries are most commonly produced by living agents, microorganisms and their products, originating from dental plaque, but other causative agents of mechanical and chemical nature may be implicated as well.

Catarrhal gingivitis (gingivitis superficialis, gingivitis simplex, gingivitis marginalis, papillitis) is the most common disease of the oral mucosa in children. It is a gingival inflammation of exudative nature. The principal etiologic factor in the onset of catarrhal gingivitis is dental plaque with biofilm characteristics. During the last decade, significant knowledge of biofilm was accumulated. One of the most extensively studied bacterial communities is dental plaque¹⁻⁵. Using new microscopic and molecular methods, it has been demonstrated that biofilms are not just bacterial deposits; instead, these are biologic systems with a high degree of organization, within which various microorganisms build up coordinated and functional communities². Under the chemical and toxic action of oral biofilm and with local reaction of the host, as the consequence of homeostatic mechanisms, cell damage may result, leading to the disease of the gingiva and other parts of the parodontium.

Gingival epithelial cells constitute the first, physical barrier to parodontal pathogenic microorganisms. In the past, epithelium was thought to be a passive barrier. In recent times, gingival epithelium has gained an important role in the relationship host-bacterial infection⁶. Epithelium reacts to bacterial attacks integrating congenital and acquired immunologic reactions. Bacterial products infiltrating the attaching epithelium may directly disturb its structural and functional integrity⁷.

The treatment of catarrhal gingivitis principally involves the removal of causative agents, as well as the efforts to motivate and educate children to maintain adequate oral hygiene.

Aim of the paper was to demonstrate the status of the gingiva before and after treatment for chronic catarrhal gingivitis in children, using clinical and cytomorphometric assessment.

Metodologija

Ispitivanjem je obuhvaćeno 80 dece sa stalnom denticijom približno jednake polne zastupljenosti. Svi ispitanici su podeljeni u dve grupe: I grupa (50 ispitanika sa hroničnim kataralnim gingivitom) i II grupa (30 ispitanika sa zdravom gingivom – kontrolna grupa). Ispitanicima I grupe, posle postavljene dijagnoze u lečenju hroničnog kataralnog gingivita primenjena je bazična terapija koja podrazumeva uklanjanje mekih naslaga pomoću paste i rotirajućih četkica i uklanjanje čvrstih naslaga – kamenca i konkremenata, srpastim instrumentom.

Svim ispitanicima pre i posle terapije urađeni su sledeći indeksi: plak indeks po Green-Vermilionu (PI) i Muhlemannov indeks krvarenja (IKR).

Pre i posle terapije ispitanicima I grupe uzimani su brisevi sa gingive i pravljen je direktni razmaz na pločici. Takođe su uzimani i brisevi sa gingive ispitanicima II grupe.

Za morfometrijsku analizu korišćen je program Image J, na mikroskopu NU2 (Carl Zeiss, Jena, Germany), objektiv x 63 (NA=0,8). Na citološkom materijalu, morfometrijskom analizom praćene su sledeće varijable: areal jedra, optička gustina, standardna devijacija optičke gustine, modna vrednost optičke gustine, minimalna vrednost optičke gustine, maksimalna vrednost optičke gustine, obim jedra, cirkularnost jedra, Feret-ov dijametar i integrisana optička gustina (IOD).

Statistička analiza vršena je primenom Studentovog t-testa i Pearsonovog χ^2 testa.

Rezultati

Za plak indeks kod I grupe ispitanika dobijene su sledeće vrednosti: pre terapije PI=1,94, a nakon terapije PI=0. Kod II grupe ispitanika PI=0,17 (Tabela 1). Na osnovu Pearsonovog χ^2 testa utvrđeno je da postoji statistički visoko značajna razlika ($p<0,001$) između vrednosti plak indeksa pre terapije ispitanika I grupe u odnosu na plak indeks ispitanika II (kontrolne) grupe. Studentovim t-testom zavisnih uzoraka dobijena je statistički visoko značajna razlika ($p<0,001$) između plak indeksa pre i plak indeksa posle terapije kod prve grupe ispitanika.

Methodology

The study enrolled 80 children with permanent dentition, with well balanced presence of both genders. The examinees were divided into two groups: group I (50 children with chronic catarrhal gingivitis) and group II (30 children with healthy gingiva as controls). Group I examinees, after the established diagnosis of chronic catarrhal gingivitis, received basic therapy, involving the removal of soft deposits with paste and rotating brushes and removal of hard deposits – plaque and concretions – with sickle scalers.

The following indexes were determined before and after therapy in all of the examinees: the plaque index according to Green and Vermillion (PI) and Muhlemann bleeding index (MBI).

Before and after treatment, gingival swabs were taken from group I examinees and directly smeared on glass slides. Gingival swabs were taken from group II examinees as well.

The Image J program was utilized for the purpose of morphometric analysis on the NU2 microscope (Carl Zeiss, Jena, Germany), with x63 objective (NA=0.8). Using morphometric analysis, the following variables were observed in the cytologic material: nuclear area, optical density, standard deviation of optical density, optical density modal value, minimum value of optical density, maximum value of optical density, nuclear circumference, nuclear circularity, Feret's diameter, and integrated optical density (IOD).

Statistical analysis was performed using the Student's t-test and Pearson's chi-square (χ^2) test.

Results

The following values were obtained for the plaque index in group I examinees: pre-treatment PI=1.94; post-treatment PI=0. In group II examinees PI=0.17 (Table 1). Based on Pearson's χ^2 test, it was established that there was a statistically significant difference ($p<0.001$) between the pre-treatment values of plaque index in group I subjects and the corresponding values in group II subjects (controls). By way of Student's t-test of dependent samples, a highly significant difference was observed ($p<0.001$) between pre-treatment and post-treatment values of plaque index in group I examinees.

TABELA 1. Srednje vrednosti plak indeksa (PI) ispitanika u ispitivanim grupama pre i posle terapije
TABLE 1. Mean values of plaque index (PI) in the studied groups before and after therapy

Grupa Group	PI pre terapije PI before therapy				PI posle terapije PI after therapy			
	X	SD	n	Cv	X	SD	n	Cv
I	1,94	0,62	50	31,95	0,00	0,00	50	-
II	0,17	0,38	30	227,43	-	-	-	-

TABELA 2. Srednje vrednosti indeksa krvarenja (IKR) ispitanika u ispitivanim grupama pre i posle terapije
TABLE 2. Mean values of bleeding index (MBI) in the studied groups before and after therapy

Grupa Group	IKR pre terapije MBI before therapy				IKR posle terapije MBI after therapy			
	X	SD	n	Cv	X	SD	n	Cv
I	2,02	0,68	50	33,90	0,32	0,47	50	147,25
II	0,00	0,00	30	-	-	-	-	-

Indeks krvarenja pre terapije kod I grupe ispitanika je bio 2,02, a nakon terapije 0,32. U II grupi IKR=0 (Tabela 2). χ^2 testom utvrđena je statistički visoko značajna razlika ($p<0,001$) između IKR pre terapije ispitanika I i II grupe. Takođe, postoji statistički visoko značajna razlika ($p<0,001$) između IKR pre terapije i IKR posle terapije kod prve grupe ispitanika.

Rezultati poredjenja ispitivanih varijabli citomorfometrijskom analizom I grupe posle terapije i II grupe prikazani su na tabeli 3. Primenom t – testa, nadjene su statistički visoko značajne razlike ($p<0,001$) za sve ispitivane varijable osim za cirkularnost jedra.

Rezultati poređenja ispitivanih varijabli citomorfometrijskom analizom I grupe pre i posle terapije prikazani su na tabeli 4. Primenom t-testa dobijena je statistički visoko značajna razlika ($p<0,001$) za sve ispitivane varijable.

Diskusija

Oboljenja parodontalnih tkiva su među najučestalijim oboljenjima dece i adolescenata⁸. Rana dijagnoza i terapija parodontalnih oboljenja dece i adolescenata je važna jer parodontalno oboljenje koje je u početnoj fazi, ukoliko se ne leči, vremenom može preći u podmaklu formu parodontalnog oboljenja.

Bleeding index before therapy in group I examinees was 2.02 and 0.32 after therapy, while in group II MBI=0 (Table 2). By way of χ^2 test, a high, statistically significant difference ($p<0.001$) in pre-treatment MBI values between group I and group II examinees was observed. Moreover, there was a statistically significant difference ($p<0.001$) in MBI values before and after therapy in group I subjects.

The results of comparison of the variables studied using cytomorphometric analysis in group I examinees after therapy with those in group II were shown in Table 3. Using t-test, statistically significant differences ($p<0.001$) were found for all studied variables, except for nuclear circularity.

The results of comparison of the variables studied using cytomorphometric analysis before and after therapy in group I subjects were shown in Table 4. Using t-test, statistically significant differences ($p<0.001$) were found for all studied variables.

Discussion

Diseases of the parodontal tissue are among the most common diseases of children and adolescents⁸. Early diagnosis and treatment of parodontal diseases in these populations is important; if left untreated, parodontal diseases may gradually progress from their early forms to advanced parodontal disease.

TABELA 3. Rezultati poređenja ispitivanih varijabli I grupe posle terapije i II grupe
 TABLE 3. Results of the comparison of studied variables in group I post-treatment and in group II

Ispitivane varijante Studied variables	I grupa posle terapije I group post-treatment	II grupa II group	t	p
areal jedra Nuclear area	60,42	38,57	-7,32	0,000
optička gustina Optical density	0,32	0,37	4,64	0,000
standardna devijacija optičke gustine Standard deviation of optical density	0,03	0,02	-3,90	0,000
modna vrednost optičke gustine Optical density modal value	0,33	0,37	3,24	0,001
minimalna vrednost optičke gustine Minimal value of optical density	0,23	0,29	9,25	0,000
maksimalna vrednost optičke gustine Maximal value of optical density	0,39	0,43	2,72	0,007
obim jedra Nuclear circumference	29,55	24,02	-7,53	0,000
cirkularnost Circularity	0,85	0,82	-1,92	0,057
Feret-ov dijametar Feret's diameter	10,42	8,30	-7,55	0,000
IOD	19,37	13,87	-5,37	0,000

TABELA 4. Rezultati poređenja ispitivanih varijabli I grupe pre i posle terapije
 TABLE 4. Results of the comparison of studied variables in group I before and after therapy

Ispitivane varijante Studied variables	I grupa pre terapije I group before therapy	I grupa posle terapije I group after therapy	t	p
areal jedra Nuclear area	77,80	60,42	4,978	0,0000
optička gustina Optical density	0,33	0,32	0,82	0,4137
standardna devijacija optičke gustine Standard deviation of optical density	0,02	0,03	-1,86	0,0649
modna vrednost optičke gustine Optical density modal value	0,33	0,33	0,19	0,8481
minimalna vrednost optičke gustine Minimal value of optical density	0,24	0,23	2,14	0,0339
maksimalna vrednost optičke gustine Maximal value of optical density	0,41	0,39	1,18	0,2403
obim jedra Nuclear circumference	33,63	29,55	5,20	0,0000
cirkularnost jedra Circularity	0,85	0,85	0,20	0,8430
Feret-ov dijametar Feret's diameter	11,79	10,42	4,68	0,0000
IOD	24,95	19,37	5,04	0,0000

Gingivitis se klinički karakteriše upalom marginalne gingive, dok ostali delovi parodontala nisu zahvaćeni inflamacijom. Sa histološkog aspekta, ispod epitela dolazi do infiltracije ćelija koje izazivaju upalu vezivnog tkiva. Pripojni epitel ostaje na cementno-gleđnoj granici i posle uklanjanja dentalnog plaka, infekcija prestaje da se širi i dolazi do potpune remisije. Hronični gingivitis se znatno razlikuje od parodontopatije kod koje su patološke promene ireverzibilne⁹.

Složena etiopatogeneza oboljenja parodontalnih tkiva koja se razvijaju u kompleksnom anatomskom supstratu otežava njihovo praćenje. Patološki procesi koji zahvataju parodontalno tkivo započinju bez spoljašnje manifestacije, a početne reakcije su bez mogućnosti detekcije.

Gingivitis je izlečiv, a njegova terapija mora biti usmerena ka smanjenju etioloških faktora (bakterije, meke i čvrste naslage), kako bi se smanjila ili eliminisala upala i tako omogućilo gingivalnom tkivu da zaraste^{10,11}.

Uznaredovalost oboljenja je od presudnog značaja kada je reč o potrebnom tretmanu i prognozi samog oboljenja. Iz tih razoga je potrebno svaki gingivitis terapijski tretirati, kako ne bi došlo do progrediranja bolesti u dublja parodontalna tkiva i nastanka ireverzibilnih promena.

Rezultati ovog istraživanja pokazuju da je nakon uklanjanja oralnog biofilma kod prve grupe ispitanika došlo do značajnog poboljšanja stanja gingive, što je potvrđeno odgovarajućim indeksima (PI, IKR). I istraživanja drugih autora potvrđuju da je sanacija gingivita u direktnoj vezi sa redukcijom oralnog biofilma¹².

Inflamacija gingive je kod dece česta. Epitelne ćelije tada, nezavisno od stepena diferencijacije pokazuju odstupanja u veličini i obliku. Uporedo sa citološkim promenama koje nastaju u toku inflamacije, dolazi i do smanjene keratinizacije.

Citomorfološkim ispitivanjima pruža se mogućnost uočavanja povezanosti građe i funkcije pojedinih vrsta tkiva. Tako povezujući morfološka i fiziološka zapažanja mogu se uočiti reakcije organizma, koje se ispoljavaju na površinskom epitelu gingive.

Višeslojni pločasti epitel usne duplje podvrgnut je neprestanom procesu deskvamacije. Ovaj proces zavisi od mitotičke aktivnosti

Gingivitis is clinically characterized by the inflammation of marginal gingiva, while other parts of the parodontium are not involved. From the histologic point of view, beneath the epithelium there is cellular infiltration inducing connective tissue inflammation. Attached epithelium remains at the cement-enamel junction after the removal of dental plaque, infection ceases to spread, resulting in complete remission. Chronic gingivitis differs significantly from parodontopathy, in which pathologic changes are irreversible⁹.

Complex etiopathogenesis of the diseases of parodontal tissues developing in a complex anatomic substratum complicates their monitoring. The onset of pathologic processes involving parodontal tissue is usually without external manifestations, and initial reactions cannot be detected.

Gingivitis is curable and the treatment has to be directed towards the suppression of etiologic factors (bacteria, soft and hard plaque), aiming to reduce or eliminate inflammation and enable healing of the gingival tissue^{10,11}.

The status of the disease progression is of utmost importance regarding the necessary treatment and prognosis. It is thus necessary to treat each and every gingivitis in order to prevent disease progression into the deeper parodontal tissues and to avoid thus created irreversible changes.

The results of this study demonstrate that gingival status was significantly improved after the removal of oral biofilm in group I examinees (confirmed by PI and MBI indexes). Other authors have also stated that gingival healing is directly correlated with the reduction of oral biofilm¹².

Inflammation of the gingiva in children is a common occurrence. Independent of the degree of differentiation, epithelial cells then demonstrate deviations from normal in their size and shape. Parallel to cytologic changes during inflammation, keratinization is also reduced.

Cytomorphologic studies provide an insight into the association of composition and function of particular tissue types. The association of morphologic and physiologic observations provides an insight into the reactions of an organism, manifest at the level of superficial gingival epithelium.

Stratified squamous epithelium of the oral cavity undergoes constant desquamation. The process depends on the mitotic activity of the basal layer of epithelial cells, enzymatic pro-

bazalnog sloja epitelnih ćelija, od enzimskih procesa u epitelnim ćelijama i od delovanja mehaničkih iritacija¹³.

U ovom istraživanju koristili smo eksfolijativnu citologiju gingive i analizirali ćelije površinskog epitela gingive radi procene dijametra jedara ovih ćelija, u odnosu na prisustvo ili odsustvo kliničkih znaka inflamacije.

Poznato je da tokom zapaljenskih reakcija dolazi do uvećanja jedara ćelija pločasto-slojevitog epitela. Rezultati koje smo dobili pokazuju razliku u veličini jedara inflamirane i zdrave gingive. Međutim, posebno je interesantno da i nakon sanacije hroničnog kataralnog gingivita bazičnom terapijom, veličina jedara ćelija pločasto slojevitog epitela gingive ne odgovara veličini jedara ovih ćelija kod zdrave gingive.

Kako u literaturi ne postoje studije eksfolijativne citologije gingive kod dece, trenutno je nemoguće porediti dobijene rezultate. Dobijeni rezultati predstavljaju pionirski pokušaj da se prikažu zbivanja unutar ćelija gingive u toku inflamacije, kao i promene koje nastaju nakon terapije hroničnih kataralnih gingivitisa kod dece. Podaci koji su dostupni jedino ukazuju da se veličina jedara povećava sa starenjem¹⁴.

Histološka istraživanja prirode i mehanizma nastanka parodontalnih lezija pružaju detaljan uvid u kvantitativna i kvalitativna svojstva zapaljenskog infiltrata, kao i redosled događaja tokom patogeneze gingivita. Posebno su važna sofisticirana histološka istraživanja, koja doprinose boljem razumevanju promena u fenotipskoj ekspresiji epitelnih i vezivnih ćelija, kao i njihovoj biohemijskoj aktivnosti. Ova saznanja bacaju novo svetlo na patogenetska zbivanja tokom gingivitisa, ali doprinose i boljoj dijagnozi, terapiji i prognozi bolesti.

Zaključak

Nakon terapije hroničnog kataralnog gingivita kod dece bazičnom terapijom, došlo je do smirivanja znakova inflamacije, što je i potvrđeno odgovarajućim kliničkim parametrima (PI i IKR).

Citomorfometrijskim ispitivanjem je utvrđena statistički značajna razlika u dijametrima jedara ćelija pločastoslojevitog epitela gingive pre i posle terapije hroničnog kataralnog gingivita. Osim toga, nakon sanacije

cesses within the epithelial cells, and mechanical irritation¹³.

In this study, we made use of exfoliative cytology of the gingiva and analyzed the cells of the superficial gingival epithelium in order to assess their diameter, related to the presence or absence of clinical signs of inflammation.

It is well known that the nuclei of the stratified squamous epithelium are enlarged during inflammatory reactions. Our results clearly demonstrated the difference in size of the nuclei in the inflamed and healthy gingivas. It is especially interesting, however, that even after chronic catarrhal gingivitis had been cured using the basic therapy, the size of the nuclei of the stratified squamous epithelium does not match the size of the nuclei in healthy gingiva.

Since in the literature there are no studies dealing with exfoliative cytology of the gingiva in children, it is not possible to compare our results with the results of others. Our results could be thought of as a pioneering attempt to describe the events within the gingival cells in the process of inflammation, as well as the changes occurring after the treatment of chronic catarrhal gingivitis in children. The data available suggest only that the size of the nuclei increases with ageing¹⁴.

Histologic studies of the nature and mechanisms of onset of parodontal lesions provide a detailed insight into the quantitative and qualitative characteristics of inflammatory infiltrate, and the sequence of events in the pathogenesis of gingivitis. Sophisticated histologic studies are of special importance in that regard, contributing to a better understanding of the changes in the phenotypic expression of epithelial and connective cells and their biochemical activity. The knowledge of these could shed new light on the pathogenetic events during gingivitis, contributing at the same time to a better diagnosis, treatment, and prognosis of the disease.

Conclusion

After the treatment of chronic catarrhal gingivitis in children, the signs of inflammation subsided, which was confirmed using the appropriate clinical parameters (PI and MBI).

Cytomorphometric investigation revealed a statistically significant difference in diameters of the nuclei of the cells in the stratified squamous gingival epithelium before and after treatment of chronic catarrhal gingivitis. Moreover, even after chronic catarrhal gingivitis had

hroničnog kataralnog gingivita bazičnom terapijom, veličina jedara ćelija pločasto slojevitog epitela gingive se statistički značajno razlikuje od veličine jedrara ovih ćelija zdrave gingive.

Sve ovo ukazuje da su potrebna dalja citološka istraživanja, koja bi doprinela boljem razumevanju promena koje se dešavaju unutar ćelija pločasto slojevitog epitela gingive kod dece u toku hroničnog kataralnog gingivita, kao i nakon njegove terapije.

been cured using the basic therapy, the size of the nuclei of the stratified squamous epithelium differs significantly from the size of the nuclei in healthy gingiva.

All these facts underline the need for further cytologic studies, which could contribute to a better understanding of the changes in the cells of the stratified squamous gingival epithelium in children during chronic catarrhal gingivitis and after its treatment.

LITERATURA / REFERENCES

1. Filoche SK, Zhu M, Wu CD: In situ biofilm formation by multi-species oral bacteria under flowing and anaerobic conditions. *J Dent Res* 2004; 83(10): 802-806.
2. Scheie AA, Petersen FC: The biofilm concept: Consequences for future prophylaxis of oral diseases? *Crit Rev Oral Biol Med* 2004; 15(1):4-12.
3. Marsh PD: Dental plaque as a microbial biofilm. *Car Res* 2004; 38:204-211.
4. Kolenbrander PE, Andersen N, Blehert DS, Eglund PG, Foster JS, Palmer Jr. RJ: Communication among oral bacteria. *Microbiol Mol Biol Rev* 2002; 66(3): 486-505.
5. Roberts AP, Pratten J, Wilson M, Mullany P: Transfer of a conjugative transposon Tn5397 in a model oral biofilm. *FEMS Microbiol Lett* 1999; 177:63-66.
6. Dale BA. Periodontal epithelium: a newly recognized role in health and disease. *Periodontol* 2000 2002; 30:70-8.
7. Bosshardt DD, Lang NP. The junctional epithelium: from health to disease. *J Dent Res* 2005, 84(1):9-20.
8. Oh TJ, Eber R, Wang HL. Periodontal diseases in the child and adolescent. *J Clin Periodontol* 2002; 29:400-410.
9. Dibart S. Children, adolescents and periodontal diseases. *J Dent* 1997; 25:79-89.
10. Modeer T, Wondimu B. Periodontal diseases in children and adolescents. *Dent Clin N Am* 2000; 44:633-659.
11. Tae-Ju OH, Eber R, Wang H-L. Periodontal diseases in the children and adolescent. *J Clin Periodontol* 2002; 29:400-410.
12. Feres M, Haffajee AD, Allard K, Socransky SS. Change in subgingival microbial profiles in adult periodontitis subjects. *J Clin Periodontol* 2001; 28:597-609.
13. Anuradha A, Sivapathasundharam B. Image analysis of normal exfoliated gingival cells. *Indian J Dent Res* 2007; 18(2):63-66.
14. Nayar AK, Sivapathasundharam B. Citomorphometric analysis of exfoliated normal buccal mucosa cells. *Indian J Dent Res* 2003; 14:(2):87-93.

Adresa za korespondenciju:
 Doc.dr Marija Igić
 Klinika za stomatologiju
 Bul. Z. Đinđića 52
 18000 Niš, Srbija
 E-mail: igicmarija@gmail.com

Address of correspondence:
 Ass. Prof. Marija Igić, D.D.S., MSC, Ph.D.
 Dentistry Clinic
 Blvd Dr Z. Đinđića 52
 18000, Nis, Serbia
 E-mail: igicmarija@gmail.com