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#### KAKO SISTEMSKO ZDRAVLJE I LIJEKOVNI UTJEČU NA APIKALNI PARODONTITIS. KARIKA KOJA NEDOSTAJE.

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Opće je poznato da pravilan endodontski zahvat podrazumijeva liječenje endodontske infekcije koja dovodi do cijeljenja apikalnog periodontitisa. Opće zdravlje pacijenta, lijekovi koje uzima, kao i imunološki sustav domaćina, kao i genetika igraju glavnu ulogu kada raspravljamo o tretmanu i prognozi apikalnog periodontitisa. Populacija pacijenata na kojima se provodi endodontski zahvat je široka i promijenjiva. Pacijenti često boluju od brojnih bolesti i/ili su pod terapijom novim lijekovima (kao što su biološki lijekovi). Oba uvijeta dovode do međusobnih reakcija i posljedica prilikom endodontskog zahvata. Neki od ovih uvijeta i lijekova moraju se posebno uzeti u obzir prilikom endodontskog zahvata zbog mogućih promjena protokola i izmjena prilikom izvođenja određenih zahvata.

#### HOW IS APICAL PERIODONTITIS INFLUENCED BY SYSTEMIC HEALTH AND MEDICATIONS? THE MISSING LINK

Elisabetta Cotti

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It is widely-known that a correct endodontic treatment should take care of endodontic infection and promote healing of apical periodontitis. The general health of the patient affected by apical periodontitis, the medications taken, and the host predisposing factors, like genetics, have been very seldom considered when discussing the treatment and prognosis of apical periodontitis. The patient population requiring endodontic treatment is changing. Patients often suffer from a variety of pathologies and/or are under new categories of medications (like biologic drugs). Both these conditions influence the reactions and outcome of the treatment we perform. Some of these conditions and medications should be brought to the attention of the endodontist in order to enable him/her to alter the treatment and expectations consequently and to use new protocols when needed.

#### NEPOŽELJNI UČINCI IZBJELJIVANJA ZUBI

Sevil Gurgan

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U posljednje vrijeme, povećala se potreba za poboljšanjem izgleda prirodnih zubi, pa s time i potreba i želja za što bijelijim zubima, dovela je do toga da je izbjeljivanje zubi postalo jedan od najpopularnijih stomatoloških restaurativnih zahvata. Nekada je izbjeljivanje bilo rezervirano isključivo za teža obojenja zubi, pojedinačnog zuba koji je izgubio vitalitet, danas je izbjeljivanje postalo sve više popularno na vitalnim zubima. Obzirom na popularnost, porastao je i broj dostupnih preparata za izbjeljivanje na tržištu. Unatoč svemu, i dalje postoje brojne kontroverze vezane uz sigurnost samog procesa izbjeljivanja. U ovom predavanju, osvrnut ćemo se na učinak izbjeljivanja zubi na zubna tkiva, oralnu mukozu, te na dentalne materijale te će biti iznesene znanstveno poduprte činjenice i smjernice za kliničare i istraživače.

#### UNDESIRABLE EFFECTS OF DENTAL BLEACHING

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In recent years, there has been an increased demand for improvement in the appearance of natural teeth and this demand for a better appearance and whiter smile has made tooth whitening or dental bleaching one of the most popular esthetic dental treatments. Unlike those early years of tooth whitening when the procedure was reserved for severe discoloration, usually a single tooth caused by the loss of vitality, it is now common to perform complete bleaching on vital teeth. The importance of bleaching for patients and consumers has seen a dramatic rise in the number of tooth whitening products and procedures. However, controversy concerning its safety has continued. This presentation will review and discuss the effects of dental bleaching on tooth structures, oral mucosa, and major categories of dental restorative materials and provide evidence-based recommendations to the clinicians and researchers.

#### ORTODONCIJA-INTERDISCIPLINARNI PRISTUP

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U suvremenom društvu, koje je kozmetički vrlo osviješteno, estetika predstavlja integralni dio pacijentovih očekivanja. Različiti postupci iz drugih dentalnih disciplina kombiniraju se s ortodontskom terapijom kako bi se ostvario maksimalni estetski potencijal. U posljednje vrijeme, odrasli pacijenti se sve češće odlučuju za ortodontsku terapiju. Kod njih je vrlo često prisutna izrazita abrazija, često im već nedostaju neki zubi, ili su na njima već rađeni restorativni, endodontski ili protetski postupci, a i vrlo često su parodontološki kompromitirani, što biomehaniku kod odraslih pacijenata čini kompliciranijom nego kod pacijenata koji su u rastu. Mnogo je kliničkih slučajeva u svakodnevnoj praksi gdje je ortodontska terapija važan dio interdisciplinarnog pristupa. Neophodna je konstantna interakcija i komunikacija između članova interdisciplinarnog tima i pacijenta na svim razinama što je ujedno i ključ uspjeha svake interdisciplinarne terapije. Inicijalno, takav postupak može se činiti komplikiranim, međutim kada takav kolaborativan postupak redovito primjenjujemo, rezultira vrlo efikasnim protokolima, što je najveća prednost za pacijenta.

#### ORTHODONTIC TREATMENT-INTERDISCIPLINARY APPROACH

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In a cosmetically concerned society, aesthetics forms an integral part of patient expectations. Various procedures from other disciplines of dentistry can be combined with orthodontic treatment to refine aesthetic potential. In the last few decades adult patients are more likely to go into orthodontic treatment. Adult patients usually have excessive tooth wear, missing teeth, restored teeth, endodontically involved and periodontally compromised, so the biomechanics is far more complicated than in growing patients. There are a lot of clinical cases in everyday practice where the orthodontic treatment is an essential part of interdisciplinary treatment. Constant interaction and communication among the team members and the patient at all level of treatment are the keys to success of the interdisciplinary treatment. Initially, this approach may seem to be out of reach of most practitioners, however when implemented regularly, this collaborative approach results in very efficient protocols and execution that patients appreciate and benefit from.

#### NOVI PRISTUPI U OČUVANJU ORALNOG ZDRAVLJA

Darije Plančak

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Higijena usta i zuba predstavljaju jednu od najvažnijih mjera za očuvanje dobrog oralnog zdravlja. Osobe koje pravilno održavaju oralnu higijenu imaju veći postotak zdravih zuba, rjeđu pojavu gingivitisa i parodontoze. Oralno zdravlje je sastavni i vitalni dio cjelokupnog zdravlja te je važan faktor za bolju kvalitetu života. Nekada se rješenju dentalnih problema, u većini slučajeva, pristupalo konzervativnijim pristupima koji su uključivali radikalnije zahvate. Danas se sve više pristupa, što kroz preventivne mjere, što kao tera-

#### NEW APPROACHES TO ORAL HEALTH CARE

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Oral hygiene represents one of the most important measures to preserve good oral health. People who properly maintain their oral hygiene have a higher percentage of healthy teeth, less frequent gingivitis and periodontitis. Oral health is an integral and vital part of overall health and is an important factor for a better quality of life.

Previously, the solution for dental problems in most of the cases included more conserva-

pijski postupak, uporaba adekvatnih preparata za oralnu higijenu indiciranih prema stanju od kojeg pacijent pati. Svaki pacijent želi kontrolirati i očuvati svoje oralno zdravlje na dnevnoj bazi te ulagati u sudjelovati u dugoročnom planu vlastitog oralnog zdravlja, te na taj način spriječiti buduće probleme.

#### KLINIČKI POSTUPCI KOD ORALNE REHABILITACIJE POKROVNIM I POTPUNIM PROTEZAMA

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Gubitak zubi dovodi do poremećaja u okluziji, govoru i izgledu pacijenta te često i do psihosocijalne dekompenzacije. Bez obzira na sve bolju edukaciju o oralnom zdravlju i preventivnim mjerama, broj pacijenata s višestrukim i potpunim gubitkom zubi je čest u općoj populaciji. U slučajevima kada nije indicirana implantoprotetska terapija, izbor je izrada pokrovnih i potpunih proteza. Kada postoji mali broj preostalih zubi koji bi trebali retinirati protezu, prvi izbor su teleskopske ili konus krunice zbog aksijalnog opterećenja zuba. Za njihovu izradu, uz pravilnu izradu pokrovne proteze, potrebna je visoka stručnost i preciznost doktora dentalne medicine i dentalnog tehničara. Pokrovne i potpune proteze trebaju točno prilježati na površini sluznice bezubog ležišta i biti usklađene s okolnim značajnim mišićima i mišićima lica, kako bi imale dobru retenciju, stabilizaciju i pravilno prenosile značni tlak te time omogućile veliku dugotrajnost protetskih radova. To je moguće jedino pravilnim i preciznim izvođenjem kliničkih i laboratorijskih postupaka. U ovom predavanju bit će prikazane i detaljno opisane indikacije te klinički postupci izrade pokrovnih proteza retiniranih teleskopskim i konus krunicama te potpunih proteza, s prikazom više kliničkih slučajeva.

time approaches with more radical interventions. Today, there is an increase in the usage of the adequate oral hygiene formulations indicated by the patient's condition, by means of preventive or therapeutic procedures.

Each patient wants to control and preserve their oral health on a daily basis, and also to invest and participate in the long-term plan of their own oral health, thus preventing future problems.

#### CLINICAL PROCEDURES IN ORAL REHABILITATION BY MEANS OF OVERDENTURES AND COMPLETE DENTURES

Nikša Dulčić

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Tooth loss leads to disorders in the occlusion, speech and appearance of the patient, and often to his or her psychosocial decompensation. Regardless of continuously better oral health education and preventive measures, the number of patients with multiple and complete tooth loss is frequent in the general population. In cases where implant-prosthetic therapy is not indicated, the therapy of choice is fabrication of overdentures and complete dentures. If the number of the remaining teeth that should retain the denture is small, telescopic or conus crowns are the first-choice therapy, due to axial tooth load. Their fabrication requires properly fabricated overdentures and a high level of skill and precision of the dentist and dental technician. Overdentures and complete dentures should accurately fit to the mucosal surface of the denture-bearing area and be adjusted to the surrounding muscles and facial muscles, in order to maintain good retention and stabilization and to transfer the masticatory pressure correctly. This enables long-term durability of prosthetic restorations and is only possible with correct and precise clinical and laboratory procedures. This lecture will present and describe in detail indications and clinical procedures of fabrication of complete dentures and overdentures retained by telescopic and conus crowns, with several clinical case reports.

#### KOMPLEKSNA ORALNA REHABILITACIJA U FIKSNOJ PROTETICI

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U modernoj dentalnoj medicini sve više se priča o estetskom zbrinjavanju pacijenata, a sve manje o funkcijskom, iako je predujet trajne estetike i minimalno invazivne terapije kompromitiran upravo ako funkcija nije zadovoljavajuća. Kada se radi o zbrinjavanju samo prednjih zuba često se previdi potreba za analizom protruzijskih i laterotruzijskih pokreta koji se događaju na tim zubima. Čak i izrada pojedinačne krunice ili još jednostavnijeg restaurativnog zahvata može kompromitirati funkciju cijele čeljusti. U kompleksnijim slučajevima dolazimo i do promjene međučeljustnih odnosa i visine pacijentovog zagriz. U takvim situacijama potrebno je znanje o različitim tehnikama uzimanja položaja čeljusti sa svrhom što preciznijeg završnog rada i optimalne funkcije. U predavanju će se pokazati nekoliko kliničkih slučajeva oralne rehabilitacije protetskih pacijenata s uspostavom potpune funkcije i estetike.

#### COMPLEX ORAL REHABILITATION IN FIXED PROSTHODONTICS

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In modern dental medicine we mostly discuss about esthetics and esthetic demands of the patients but function is barely mentioned. Nevertheless, there is no minimal invasive dentistry without proper function. When we do only frontal teeth it is necessary to check protrusion and lateral movements. Even single crown or simple restorative procedure can influence and compromise function. In more complex cases we have to change VDO and that functional rehabilitation is more demanding for clinician. So, there is a need for basic knowledge about different techniques of bite registration and proper planning of the rehabilitation. When we start with planning phase and executing every step planned, the therapy will be less demanding and results will be both, esthetic and functional.

#### SALIVARNE KONCENTRACIJE KORTIZOLA I ANTIOKSIDACIJSKIH ENZIMA U PACIJENATA S KRONIČNIM TEMPOROMANDIBULARNIM POREMEĆAJIMA

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**Svrha rada:** Faktori rizika povezani s temporomandibularnim poremećajima (TMP) uključuju mehaničke i psihološke stresore koji povećavaju vjerojatnost razvoja i održavanja kroničnog patološkog stanja. Cilj ove studije bio je ispitati odnos između koncentracija salivarnih antioksidansa, salivarnog kortizola i TMP-a

**Materijali i metode:** Uključeno je 12 bolesnika s dijagnozom kroničnog TMP-a i 15 zdravih osoba bez sistemskih poremećaja i parodontne bolesti. Pet mililitara nestimulirane sline sakupljeno je u graduiranu epruvetu dva puta na dan, u sedam sati ujutro i pet sati popodne. Pomoću spektrofotometrijskih metoda određene su koncentracije antioksidacijskih enzima (superoksid dismutaza (SOD) i glutation peroksidaze (GPx)), ukupnog antioksidacijskog kapaciteta (TAC), te mokraćne kiseline (UA). Salivarni kortizol određen je enzimskim imunosetom (ELISA). Za usporedbu koncentracija salivarnih biomarkera između pacijenata s TMD i kontrolne skupine korišten je T-test. Pearsonova korelacijska analiza korištena je za ispitivanje korelacije između antioksidansa i koncentracija salivarnog kortizola s razinom značajnosti od  $P < 0,05$ .

**Rezultati:** Nije pronađena značajna razlika u dobi između skupina ( $p > 0,05$ ). Između skupina utvrđene su značajne razlike u srednjim koncentracijama salivarne SOD ( $p < 0,001$ ), dok su prosječne koncentracije salivarnog kortizola, GPx, TAC i UA bile veće u skupini s TMP-om, ali bez statističke značajnosti. Rezultati su pokazali značajnu pozitivnu korelaciju ( $p < 0,05$ ) između koncentracija kortizola u slini i antioksidacijskih enzima u bolesnika s TMP-om.

**Zaključak:** U prethodnim istraživanjima primjećene su niže koncentracije antioksidacijskih enzima u bolesnika s TMP-om, što ukazuje na manjkavost antioksidacijske obrane organizma u tih ispitanika. U našem istraživanju povišene koncentracije antioksidansa u bolesnika s TMP-om, u usporedbi sa zdravom kontrolom, mogu predstavljati kompenzacijski porast kao rezultat potencijalno više razine stresa.

**KLjučne riječi:** temporomandibularni poremećaji, oksidativni stres, salivarna dijagnostika, antioksidansi, salivarni kortizol

#### SALIVARY CORTISOL AND ANTIOXIDANT LEVELS IN IN PATIENTS WITH CHRONIC TEMPOROMANDIBULAR DISORDERS

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**Aim:** Risk factors associated with temporomandibular disorders (TMD) include mechanical and psychological stressors that increase the likelihood of developing and maintaining a chronic pathologic state. The aim of this study was to investigate the relationship between salivary antioxidant parameters, salivary cortisol and TMD.

**Materials and Methods:** In total, 12 patients, who were diagnosed with chronic TMD, and 15 systemically and periodontally healthy individuals were included. Five milliliters of whole unstimulated saliva was collected into a graduated tube at 2 time intervals, 7 AM and 5 PM. Salivary anti-oxidant enzymes (superoxide dismutase (SOD), and glutathione peroxidase (GPx)), total antioxidant capacity (TAC) and uric acid (UA) were analyzed using spectrophotometric methods. Salivary cortisol was determined by enzyme-linked immunosorbent assay (ELISA). T-test was used to compare salivary biomarker levels between patients with TMD and the control group. Pearson's correlation analysis was used to study the correlation among antioxidants and salivary cortisol levels.  $P < 0.05$  was considered significant.

**Results:** No significant difference in age between groups was found ( $p > 0.05$ ). Significant differences in the mean salivary levels of SOD ( $p < 0.001$ ) between the groups were found whereas the mean salivary levels of cortisol, GPx, TAC and UA were higher in the TMD group but without statistical significance. There was a highly significant positive correlation ( $p < 0.05$ ) between salivary cortisol levels and antioxidant parameters in TMD patients.

**Conclusion:** Previous studies showed lower levels of anti-oxidant enzymes in TMD patients indicating that anti-oxidant defense is lowered in these patients. Higher levels of antioxidants in TMD patients, as compared to healthy controls, obtained in our study, could represent compensatory increase as a result of potentially higher level of stress.

**Key words:** temporomandibular disorders, oxidative stress, salivary diagnostics, antioxidants, salivary cortisol

### NAVIKE I ZNANJA POLAZNIKA PRVE GODINE UČILIŠTA AMBITIO I UČENIKA 3. RAZREDA SREDNJE MEDICINSKE ŠKOLE SPRAM ORALNOG ZDRAVLJA

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**Svrha rada:** Utvrditi i usporediti razlike u navikama i znanju o oralnom zdravlju polaznika prve godine prekvalifikacija Učilišta Ambitio i učenika 3. razreda Srednje medicinske škole.

**Materijali i metode:** Za usporedbu stajališta, navika i znanja o oralnom zdravlju korišten je upitnik *Hiroshima University-Dental Behavioural Inventory (HU-DBI)* (20 pitanja). Ispunilo ga je 54 učenika, 25 učenika prve godine prekvalifikacija Učilišta Ambitio i 29 učenika 3. razreda Srednje medicinske škole. Odgovori za pojedinu skupinu ispitanika su obrađeni deskriptivnom statistikom. Za statističku obradu podataka korišten je Fisherov egzakti test i Wilcoxon-Mann-Whitneyev test.

**Rezultati:** Prosječna vrijednost HU-DBI upitnika za polaznike Učilišta bila je 7.0, dok je za polaznike Srednje medicinske škole bila 6.7, no razlika nije statistički značajna. Značajno više polaznika 3. razreda Srednje medicinske škole odgovorilo je da ne brinu previše o odlasku doktoru dentalne medicine ( $p=0,025$ ), no na to pitanje nije pozitivno odgovorio niti jedan polaznik Učilišta. 96,0% polaznika Učilišta doktor je pohvalio da vrlo dobro četkaju zube, dok je to točno samo za 58,6% učenika Srednje medicinske škole ( $p=0,27$ ). Nitko iz obje ispitivane skupine nije primijetio ljepljive bijele naslage na zubima. 27,6% ispitanika Srednje medicinske škole misli da i bez paste mogu dobro očistiti zube, a 24% ispitanika Učilišta ne brine zbog lošeg zadaha.

**Zaključak:** Rezultati provedenog istraživanja ukazuju na podjednake navike i znanja o oralnom zdravlju u obje ispitivane skupine. Distribucija odgovora na pojedina pitanja upućuje na potrebu za dodatnim profesionalnim savjetovanjem, motivacijom i stjecanjem novih znanja u provođenju oralne higijene u obje ustanove.

**KLjučne riječi:** oralno zdravlje, HUDBI upitnik

### HABITS AND KNOWLEDGE REGARDING ORAL HEALTH OF FIRST YEAR AMBITIO SCHOOL PREQUALIFICATION PROGRAM AND THE 3RD GRADE OF THE MEDICAL HIGH SCHOOL STUDENTS

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**Aim:** To determine and compare the differences in the habits and knowledge of oral health of the first year students of the Ambitio School and the 3rd grade of the Secondary Medical School.

**Materials and Methods:** Hiroshima University-Dental Behavioral Inventory (HU-DBI) questionnaire (20 questions) was used to compare the attitudes, habits and knowledge of oral health. It was completed by 54 students, 25 first-year students of the Ambitio School and 29 students in the 3rd grade of the Medical High School. Responses for each group of respondents were processed by descriptive statistics. For statistical data processing, Fisher's exact test and Wilcoxon-Mann-Whitney test were used.

**Results:** the average HU-DBI questionnaire for the students of the Ambitio School was 7.0, while the average for the students of Medical High School was 6.7, but the difference was not statistically significant. Significantly more 3rd grade students responded that they did not care too much about attending their dentist ( $p = 0.025$ ), but none of the Ambitio School students answered positively. 96.0% of them have had their dentist tell them that they brushed their teeth very well, while only 58.6% of the Medical High School students ( $p = 0.27$ ). No one from both groups noticed the adhesive white deposits on the teeth. 27.6% of respondents of the Medical High School think that even without the paste can clean the teeth well, and 24% of the respondents of the Ambitio School do not worry about bad breath.

**Conclusion:** the results of the conducted research indicate equal habits and knowledge of oral health in both groups. The distribution of responses to individual questions points to the need for additional professional counseling, motivation and the acquisition of new knowledge in the practice of oral hygiene in both institutions.

**Key words:** oral health, HUDBI questionnaire

### OCJENJIVANJE POTREBE ZBRINJAVANJA PRVIH TRAJNIH MOLARA KOD DJEVOJAKA U GLAVNOM CENTRU ZA OBITELJSKU MEDICINU U GJILANU, KOSOVO

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**Svrha rada:** Cilj ovog istraživanja je procijeniti potrebe liječenja stalnih prvih molarnih zuba (PFM) bolesnika u Glavnom centru za obiteljsku medicinu u Gjilanu (Kosovo) i analizirati najčešći tretmani na PFM zubima.

**Materijali i metode:** Opisana je studija provedena od siječnja 2016. do prosinca 2017. na ukupno 984 bolesnika (593 žene i 391 muškarca). Potrebni podaci dobiveni su od zdravstvenog informacijskog sustava Glavnog centra za obiteljsku medicinu na Kosovu u Gjilanu. Ankete su obuhvatile WHO standardne dobne skupine, odnosno 12, 15-19, 35-44, 65-74 godina.

**Rezultati:** Od 984 bolesnika, 56,99% je podvrgnuto ekstrakciji zuba i 43,005% je podvrgnuto liječenju PFM zuba. Najveća stopa ekstrakcije (52,43%) bila je kod osoba starijih između 15-19 godina. Najčešći tretman na PFM bio je ekstrakcija zuba.

**Zaključak:** Potrebno je sustavno provoditi preventivnu oralnu njegu i zdravstvene programe orijentirane prema zajednici za kontinuirano poticanje oralnog zdravlja.

**KLjučne riječi:** prvi trajni molari, potreba za liječenjem, ekstrakcija zuba

### EVALUATION OF TREATMENT NEEDS OF PERMANENT FIRST MOLAR TEETH AMONG PATIENTS IN THE MAIN CENTER OF FAMILY MEDICINE IN GJILAN KOSOVO

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**Aim:** To evaluate the treatment needs of permanent first molar teeth (PFM) of patients in the Main Center of Family Medicine in Gjilan (Kosovo) and analyzed the most frequent treatments performed on PFM teeth.

**Materials and Methods:** A descriptive study carried out from January 2016 to December 2017 in a total of 984 patients (593 females and 391 males). The necessary data were obtained from the Healthcare Information System of the Main Center of Family Medicine in Gjilan Kosovo. WHO standard age groups were covered by the survey, that is ages 12, 15-19, 35-44, 65-74. **Results:** Out of 984 patients, 56.99% underwent tooth extraction and 43.005% underwent treatment of PFM teeth. The highest rate (52.43%) of extraction occurred for those 15-19 years. The most frequent treatment on PFM was tooth extraction.

**Conclusion:** The systematic implementation of preventive oral care and community oriented health programs are needed for the continuous promotion of oral health.

**Keywords:** permanent first molar, treatment needs, tooth extraction

### ISTRAŽIVANJE MEHANIČKIH SVOJSTAVA NAGRIZNIH UDLAGA PROIZVEDENIH DIGITALNIM TEHNOLOGIJAMA

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**Svrha rada:** Udlage su okluzijske ortopedске naprave koje se koriste kao terapijsko sredstvo u liječenju temporomandibularnih poremećaja. Najčešće se izrađuju iz polimetilmetakrilata (PMMA) koji predstavlja zlatni standard. Daljnjim razvojem tehnologije omogućena je i izrada udlaga putem CAD/CAM te aditivnim tehnologijama. Svrha ovog rada bila je istražiti mehanička svojstva različitih vrsta materijala za izradu nagriznih udlaga izrađenih različitim tehnologijama s naglaskom na digitalne tehnologije (CAD/CAM i

### INVESTIGATION OF MECHANICAL PROPERTIES OF OCCLUSAL SPLINTS PRODUCED BY DIGITAL TECHNOLOGIES

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**Aim:** Splints are occlusal orthopedic devices used as a therapeutic agent for the treatment of temporomandibular disorders. Most commonly, they are made of polymethylmethacrylate (PMMA) which is a gold standard. Further development of technology enabled fabrication of



3D printanje)

**Materijali i metode:** Istraživanje je obuhvatilo 7 različitih materijala za izradu nagriznih uldaga na kojima su testirana mehanička svojstva: 3 vrste hladnopolimerizirajućeg akrilata (Ortocril, Resilit S, Probase Cold), 2 vrste akrilata za 3D printanje (VarseoWax Splint, Orthorigid) i dvije vrste CAD/CAM materijala (Ceramil Splintec, Copradur). Uzorci dimenzija 64x10x3,3mm korišteni su pri ispitivanju savojne čvrstoće i tvrdoće dok su uzorci dimenzija 39x8x4mm korišteni pri ispitivanju žilavosti (10 uzoraka za svaku ispitnu skupinu, sveukupno 140 uzoraka). Ispitivanje savojne čvrstoće provedeno je „three-point bend“ testom, ispitivanje tvrdoće provedeno je Brinellovom metodom dok je žilavost ispitana na Charpy-evom batu.

**Rezultati:** Statistička analiza potvrdila je da između dobivenih rezultata mjerenja postoje statistički značajne razlike. Hladnopolimerizirajući akrilati imaju najviše vrijednosti tvrdoće te najniže vrijednosti žilavosti. Copradur i Varseo su imali najniže vrijednosti tvrdoće i jedini se nisu slomili pri ispitivanju savojne čvrstoće. Copradur i Probase Cold su imali veće prosječne vrijednosti udarnog rada loma.

**Zaključak:** Svi ispitani materijali su postigli zadovoljavajuće rezultate mehaničkih ispitivanja te se smatraju prikladnima za izradu okluzijskih uldaga. Utvrđene razlike sugeriraju moguće razlike u djelovanju nagriznih uldaga proizvedenih različitim materijalima.

**Gljučne riječi:** uldaga, CAD/CAM, 3D printanje, mehanička svojstva

occlusal splints using CAD/CAM and additive technologies. The main purpose of this study was to investigate mechanical properties of different types of materials used for fabrication of occlusal splints, with a special focus on digital technologies (CAD/CAM and 3D printing).

**Materials and methods:** The study included 7 different materials for the production of occlusal splints on which the following mechanical properties were tested: 3 types of cold-polymerizable acrylate (Ortocril, Resilit S, Probase Cold), 2 types of acrylate for 3D printing (VarseoWax Splint, Orthorigid) and two types of CAD/CAM material (Ceramil Splintec, Copradur). 64x10x3,3mm dimension samples were used for bending strength test and hardness testing, while 39x8x4mm dimension samples were used for toughness testing (10 samples for each test group, a total of 140 samples). The bending strength test was carried out by a “three-point band” test; hardness testing was carried out using the Brinell method while toughness was tested on Charpy's bar.

**Results:** Statistical analysis confirmed that there are statistically significant differences between obtained measurement results. Cold-polymerizable acrylate had the highest hardness values and the lowest toughness values. Copradur and Varseo had the lowest hardness values, and were the only ones that did not break during bending strength test. Copradur and Probase Cold had higher average firing rate.

**Conclusion:** All tested materials have achieved satisfactory mechanical test results and are considered suitable for the production of occlusal splints. The observed differences suggest possible differences in activity of occlusal splints produced by different material.

**Key words:** occlusal splint, CAD/CAM, 3D printing, mechanical properties

## PERFEKCIJAZAM USMJERAVA PROMJENE U KVALITETI ŽIVOTA IZAZVANE IZBJELJIVANJEM ZUBI: RANDOMIZIRANI, DVOSTRUKO SLIJEPI, PLACEBO KONTROLIRANI POKUS.

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**Svrha rada:** Veća svjetlina i niža kroma prednjih zuba čine ljude zadovoljnijima estetikom osmijeha, međutim, ti elementi boje su slabi prediktori zadovoljstva. Jedan od razloga nezadovoljstva pacijenata može biti stupanj perfekcionizma. Stoga je cilj ovog istraživanja istražiti utjecaj perfekcionizma na kratkotrajne promjene u zadovoljstvu s estetikom osmijeha i kvalitetom života uzrokovanim izbjeljivanjem zubi.

**Materijali i metode:** Ukupno je 95 ispitanika procijenjeno na prihvatljivost, 70 ih je slučajno dodijeljeno aktivnoj i placebo skupini, a nakon praćenja 60 ispitanika je analizirano i nasumično dodijeljeno aktivnoj ili placebo skupini (N = 30 pojedinačno). Njihov raspon dobi bio je 19 do 28 godina (medijan 22 godine, interkvartni raspon 20-23 godina), a 75% ženki. Prednji zubi aktivne skupine bili su izbjeljeni fotoaktivnim gelom. Upitnici su se odnosili na kvalitetu života povezanu sa estetikom osmijeha i višedimenzionalnu skalu perfekcionizma. Povjerenstvo za institucionalni pregled dalo je svoj pristanak za ovo istraživanje (br. 2170-24-01-15-04), a svi ispitanici potpisali su informirani pristanak. Registriran je na ClinicalTrials.gov (NCT03380702).

**Rezultati:** Aktivna skupina pokazala je porast dentalnog samopouzdanja i smanjenje nezadovoljstva bojom (p < 0,05). Stupanj promjene boje nije linearno koreliralo s promjenom nezadovoljstva, niti kvalitetom života. Kod ispitanika s višim perfekcionizmom, povećanje promjene boje dovodi do većeg smanjenja dentalne samosvjesnosti.

**Zaključak:** Perfekcionizam smanjuje percepciju estetike osmijeha.

**Gljučne riječi:** boja, izbjeljivanje zuba, kvaliteta života, perfekcionizam, orofacijalna estetika

## CHANGES IN QUALITY OF LIFE INDUCED BY TOOTH WHITENING ARE MODERATED BY PERFECTIONISM: A RANDOMIZED DOUBLE-BLINDED PLACEBO-CONTROLLED TRIAL

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**Aim:** Higher lightness and lower chroma of anterior teeth make people more satisfied with their smile esthetics, however, these elements of color are weak predictors of satisfaction. One of the reasons of patients' dissatisfaction could be a degree of perfectionism. Therefore the aim of this research is to explore the influence of perfectionism on the short-term changes in satisfaction with smile esthetics and quality of life induced by tooth whitening.

**Materials and Methods:** A total of 95 participants were assessed for eligibility, 70 were randomly assigned into active and placebo group and after follow-up sixty subjects were analysed, randomly assigned to active or placebo group (N=30 each). Their age range was 19 to 28 years (median 22 years, interquartile range 20-23 years) and 75% were females. Anterior teeth of active group were whitened with a photo-activated gel. Questionnaires Smile Esthetics-Related Quality of Life and Multidimensional Perfectionism Scale were administrated. Institutional Review Board gave its consent for this study (No: 2170-24-01-15-04), and all the subjects signed the informed consent. It was registered on ClinicalTrials.gov (NCT03380702).

**Results:** Active group demonstrated increase in dental self-confidence and decrease in dissatisfaction with color (p<0.05). The amount of color change did not correlate linearly with change of dissatisfaction nor quality of life. In subjects with higher perfectionism, increasing the color change leads to more decrease in dental self-consciousness.

**Conclusion:** Perfectionism moderates perception of smile esthetics.

**Key words:** color, tooth whitening, quality of life, perfectionism, orofacial esthetics

## POVEZANOST VRIJEDNOSTI INDEKSA TJELESNE MASE S MANJKOM ZUBI

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**Svrha istraživanja:** Pretilost, definirana indeksom tjelesne mase (ITM) većim od 30 kg/m<sup>2</sup>, multisistemske je poremećaj sa povišenim rizikom perioperacijskih komplikacija, posebice vezanih za održavanje dišnog puta tijekom opće anestezije. Oralno-kirurški zahvati u pretiilih bolesnika dodatno povisuju rizik respiracijskih komplikacija. Cilj istraživanja bio je procijeniti postoji li povezanost između broja zuba, pretilosti i otežane intubacije.

**Ispitanici i metode:** U prospektivnoj studiji koja je dio kliničkog istraživanja prijavljenog u ClinicalTrials.gov (NCT03144609), nakon etičkog odobrenja (protokol 05-PA-26-1 / 2016), sudjelovalo je 75 bolesnika (30-65 godina) tijekom oralno-kirurških zahvata u općoj anesteziji. Određivao se ukupan broj prirodnih zubi, broj prednjih zubi, ITM i omjer opsega struka i bokova (W/H). Procijenjena je povezanost između manjka zubi i ITM. Za numeričke varijable ROC analizom ispitivane su granične vrijednosti za predikciju otežane intubacije.

**Rezultati:** Srednja vrijednost ITM-a bila je 35,6 (5,6) kg/m<sup>2</sup>. Od ukupno 75 bolesnika, 3 su bila bezzuba (4%). Ispitanici su imali prosječno 22 (±4) zubi, od čega prednjih 9 (±3). Manjak zubi nije bio u korelaciji s povećanjem niti ITM-a (r = 0,048 P = 0,679) niti W/H omjera (r = -0,0003, P = 0,997). Nije bilo moguće utvrditi povezanost između otežane

## TOOTH LOSS AND OBESITY AMONG ORAL-SURGICAL PATIENTS

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**Aim:** Obese patients undergoing oral surgery may provide a unique set of anesthetic challenges associated with airway management. The aim of the study was to evaluate if differences according to tooth loss exist in the association between the teeth number and obesity.

**Patients and Methods:** This was an explorative single-center prospective observational study, part of clinical research registered at ClinicalTrials.gov (NCT03144609). Following ethical approval (protocol 05-PA-26-1/2016) and signed written informed consent, 75 obese patients (30-65 year old) undergoing oral surgery were enrolled. The total number of natural teeth, front teeth number, BMI and waist-to-hip (W/H) ratio was assessed. Interaction between tooth loss and BMI was further assessed. Receiver operating curve (ROC) analyses were performed to identify predictors of difficult intubation.

**Results:** The mean BMI was 35.6 (±5.6) kg/m<sup>2</sup>, with 42 males. Out of a total of 75 patients, 3 participants were edentate (4%). The average number of front teeth and total teeth was 9 (±3) and 22 (±4), respectively. Increasing tooth loss was not positively associated with increased BMI (r=0,048 P=0,679) or W/H ratio (r=-0,0003, P=0,997). Any correlation between difficult intubation and the front teeth number or BMI (r=0,023, p=0,97), could not be found. Only W/H ratio above 1 had 80% sensitivity and 50% spec-

intubacije i broja prednjih zubi ili ITM-a ( $r = 0,023$ ,  $p = 0,97$ ). Vrijednost W/H omjera iznad 1 imala je 80% osjetljivosti i 50% specifičnosti u predikciji otežane intubacije.

**Zaključak:** U našoj populaciji pretilih bolesnika nismo našli povezanost broja zubi sa parametrima pretilosti ili otežanom intubacijom. Potrebna su daljnja istraživanja pretilosti populacije dizajnirane na specifičiranom demografskom i kulturološkim karakteristikama.

**Glavne riječi:** oralno-kirurški zahvati, broj zubi, pretilost, otežana intubacija

#### MINIMALNO INVAZIVNA ESTETSKA I FUNKCIONALNA REHABILITACIJA KOD PACIJENTA SA EROZIJOM ZUBA

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**Svrha istraživanja:** Erozijski zubni fenomen koji se sve češće pojavljuje kod mladih osoba. Ova patologija može dovesti do ozbiljnih posljedica sa estetske i funkcionalne točke gledišta. Restorativni zahvat kod pacijenta sa erozijom zubi potrebno je temeljiti na minimalno invazivnom postupku, čak i u slučajevima opsežnog gubitka zubnog tkiva, te shodno tome treba izbjegavati prekomjerno odstranjivanje zdravog zubnog tkiva.

**Materijali i metode:** Daljnji prikaz slučaja opisuje pristup kojim se uzajamno štiti okluzija (stražnji zubi štite prednje od pretjeranih dodira u maksimalnoj interkuspidaciji, a prednji razdvajaju stražnje tijekom ekscentričnih kretnji). Estetiku smo poboljšali multidisciplinarnim parodontološko protetskim pristupom, zbog asimetričnih gingivnih rubova i malih prednjih zuba. „Digital smile design“ je korišten kao dijagnostički alat za procjenu veličine, oblika i položaja zuba, kao i konture gingive. Sama vizualizacija završnog ishoda zahvata prije započetog postupka ohrabruje pacijenta i pomaže mu u prihvaćanju mnogo zahtjevnijih zahvata. Klinički je obraden slučaj mlade pacijentice koja se žalila na izgled istrošenih prednjih zubi, čije se stanje iz godine u godinu sve više pogoršavalo, te na preosjetljivost stražnjih zubi, koji su također bili istrošeni.

**Rezultati:** Kombinacijom produljenja kliničke krune zuba, estetskih ljuski i punih cirkonskih krunica nadomješteni su opsežno istrošeni zubi. Privremenim je nadomjescima uspostavljeno i u ustima testirano stabilno, estetsko i funkcijsko prednje vođenje prije izrade i cementiranja trajnih nadomjestaka.

**Zaključak:** Postignuti prirodan osmijeh uklapa se u kompoziciju lica. Primjećuje se razlika u duljini gornjeg zubnog luka, kao i promjena u obliku i boji; poboljšano je zdravlje, funkcija i estetika.

**Glavne riječi:** dentalna erozija, minimalno invazivna rehabilitacija

ificity in the prediction of difficult intubation.

**Conclusion:** In our population of obese patients undergoing oral surgery we did not observe any association between general obesity, difficult intubation and tooth loss. Further research of obese population designed on the cultural and demographic context are required.

**Key words:** oral surgery, tooth loss, obesity, intubation, difficult

#### MINIMALLY INVASIVE AESTHETIC AND FUNCTIONAL REHABILITATION IN PATIENTS AFFECTED BY DENTAL EROSION

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**Aim:** Dental erosion is a constantly growing phenomenon, increasingly common in younger people. This pathology can lead to serious aesthetic and functional consequences. The restorative surgery, in a patient with teeth erosion, should be based on a minimally invasive procedure, even in cases of extensive loss of dental tissue, avoiding therefore excessive removal of healthy dental tissue.

**Materials and Methods:** A further case study describes an approach which protects the occlusion (the back teeth protect the front ones from excessive contact in their maximum intercuspation, while the front teeth separate the back during eccentric movements). We have improved the aesthetics with a multidisciplinary periodontal prosthetic approach, because of the asymmetric gingival edges and small front teeth. „Digital smile design“ is used as a diagnostic tool for the estimate of the size, shape and position of the teeth as well as the contours of the gingiva. The visualization of the final outcome of the treatment before the first treatment session, encourages and helps the patient to undertake much more demanding procedures. The case study of a young patient who complained of the appearance of her worn front teeth and higher sensitivity of her back teeth, whose condition worsened year by year, was clinically elaborated.

**Results:** The extensively worn teeth were replaced by a combination of a dental crown lengthening procedure, aesthetic veneers and full zirconium crowns. Temporary replacements were set up in the oral cavity as a stable, aesthetic and functional frontal guiding before cementing the permanent crowns.

**Conclusion:** The achieved natural smile fits into the face composition. A distinction is noted in the length of the upper dental arch, as well shape and color changes; health, function and aesthetics are improved.

**Key words:** dental erosion, minimally invasive rehabilitation

#### POUZDANOST FOTOGRAFIJE PRILIKOM ODREĐIVANJA BOJE ZUBA- PILOT ISTRAŽIVANJE

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**Svrha rada:** Tehnika određivanja boje zuba dentalnim spektrofotometrom u modernoj dentalnoj medicini kao objektivna i numerički izražena, smatra se standardom. Dentalna fotografija također se smatra pouzdanim izvorom za određivanje boje zuba, te je stoga svrha ovog rada bila izmjeriti podudarnost boje zuba dobivene spektrofotometrom in vivo sa bojom zuba na fotografijama istih ispitanika koristeći digitalni softver.

**Materijali i metode:** Frontalne snimke ispitanika učinjene su u standardiziranim uvjetima, u sobi s umjetnim osvijetljenjem prema CIE standardu (Just Normlicht, Weilheimer Teck, Njemačka), fotoaparatom na stativu (Canon EOS Rebel T5), uz udaljenost 1.2 m od ispitanika. U istim uvjetima osvijetljena određena je boja središnjeg desnog maksimalnog sjekutića spektrofotometrom Vita Easyshade Advance 5.0 (Vita Zahnfabrik, Bad Säckingen, Njemačka). Na učinjenim fotografijama digitalnim putem, softverskim paketom Adobe Photoshop (Adobe Systems, San Jose, Kalifornija, SAD) određena je boja zuba tj. L, a i b komponenta. Rezultati su komparirani za svaku L, a i b komponentu posebno koristeći ponavljajuća mjerenja T-testa. Procedura je ponavljana nakon korekcije podataka uzetih s fotografija.

**Rezultati:** Postojale su razlike u spektrofotometrom uzetim mjerenjima i onima s fotografija ( $p < 0,05$ ). Prosječne razlike su mjerene i iznosile su 21,12 +/- 3,19 za L komponentu, -21,45 +/- 2,26 za a komponentu i 23,4 +/- 3,34 za b komponentu. Nakon korekcije nisu nađene statistički značajne razlike između ove dvije vrste mjerenja  $p > 0,05$ .

**Zaključak:** Određivanje boje zuba putem mjerenja komponenti boje Lab na fotografijama usporedivo je s istim mjerenjima koristeći dentalni spektrofotometar. Prosječne razlike u ovom istraživanju za sve tri komponente mjerenja bile su 21,99.

**Glavne riječi:** određivanje boje zuba, fotografija

#### RELIABILITY OF DIGITAL PHOTOGRAPH TECHNIQUE IN EVALUATING TOOTH COLOUR-PILOT STUDY

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**Aim:** In modern dental medicine tooth colour determination using dental spectrophotometer is considered to be a standard since it is objective and numerically determined technique. Dental photography is also considered to be a reliable source for tooth colour determination. The aim of this study was to compare reproducibility of tooth colour measured by spectrophotometer in vivo and also on photographs using digital software.

**Materials and Methods:** Frontal photographs of the participants were taken in standardized conditions, in a room with artificial illumination by CIE standards (Just Normlicht, Weilheimer Teck, Germany), using digital camera on stand (Canon EOS Rebel T5), in a distance of 1.2 m from the participant. In the same conditions colour of the central right maxillary incisor was taken using spectrophotometer Vita Easyshade Advance 5.0 (Vita Zahnfabrik, Bad Säckingen, Germany). Lab components were determined on photographs using digital software (Adobe Systems, San Jose, California, USA). Results were compared for L, a and b component separately using repeated measurements student T-test. Procedure was repeated after correction data taken from photographs.

**Results:** There was a difference between measurements taken by spectrophotometer and ones taken by photographs ( $p < 0,05$ ). Average differences were calculated and they were 21,12 +/- 3,19 for L component, -21,45 +/- 2,26 for a component and 23,4 +/- 3,34 for b component. After correction there was no statistically differences between two types of measurements  $p > 0,05$ .

**Conclusion:** Taking Lab color measurements from photographs is comparable with taking same measurement using spectrophotometer Vita Easyshade Advance 5.0 (Vita Zahnfabrik, Bad Säckingen, Germany). Average differences for all three components of measurement in this investigation were 21,99.

**Key words:** evaluating tooth colour, digital photograph technique

#### PROCJENA TOKSIČNOSTI NATRIJ LAURIL SULFATA IZ ZUBNIH PASTA NA ORALNIM STANICAMA IN VIVO

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#### IN VIVO EVALUATION OF SODIUM LAURYL SULFATE IN TOOTHPASTE REGARDING TOXICITY ON ORAL CELLS

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**Svrha istraživanja:** Natrijev lauril sulfat (SLS) je najčešće korišten deterdžent u zubnim pastama koji može izazvati štetne učinke na oralnoj sluznici. Ova studija je procjenjivala učinak zubnih pasta s SLS-om na stanicama oralne sluznice u *in vivo* uvjetima.

**Materijali i metode:** Četrdeset dobrovoljaca izabrano je među studentima dentalne medicine i podijeljeno u dvije eksperimentalne skupine. Svaka grupa koristila je prvo fluoridiranu zubnu pastu bez SLS-a kroz period od dva mjeseca, nakon čega je slijedila uporaba fluoridiranog vrsta istog proizvođača kroz isto vrijeme korištenja, ali s SLS-om. Oralne epitelne stanice su uzorkovane prije početka korištenja te 30, 60, 90 i 120 dana od početka uporabe ispitanih vrsta zubnih pasta. Kromosomska oštećenja analizirana su mikronukleus testom.

**Rezultati:** Rezultati pokazuju veću incidenciju stanica s piknozom kod ispitanika koji su koristili Sensodyne zubnu pastu s SLS-om u odnosu na ispitanike koji su koristili isti brend zubne paste, ali bez SLS-a u istim vremenima uzorkovanja ( $1,20 \pm 1,01$  i  $2,20 \pm 0,95$  naspram  $0,02 \pm 0,41$  i  $0,00 \pm 0,00$ ), te stanica s karioreksijom ( $1,90 \pm 0,91$  i  $2,35 \pm 1,14$  naspram  $0,30 \pm 0,57$  i  $0,85 \pm 0,93$ ) i nuklearnim pupovima ( $1,25 \pm 0,85$  i  $1,35 \pm 0,68$  naspram  $0,35 \pm 0,59$  i  $0,45 \pm 0,51$ ). Ispitanici koji su koristili Plidentinu zubnu pastu s SLS-om pokazuju veću incidenciju broja stanica s piknozom u odnosu na one koji su koristili istu zubnu pastu bez SLS-a, ali samo u prvom mjesecu korištenja ( $0,90 \pm 0,45$  naspram  $0,25 \pm 0,44$ ).

**Zaključak:** Iako su zubne paste sa SLS-om u ovoj studiji značajno povećale incidenciju različitih citogenetskih parametara u oralnim epitelnim stanicama, kako bi se potvrdile ove tvrdnje potrebno je provesti daljnja istraživanja na većem broju ispitanika i kroz duže vrijeme korištenja.

**Gljučne riječi:** citogenetska oštećenja, oljuštene bukalne stanice, mikronukleus test, natrijev lauril sulfat, zubna pasta

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**Aim:** Sodium lauryl sulfate (SLS) is the most commonly used detergent in dentifrices, which can cause adverse effects on oral soft tissues. The present study addressed the effect of SLS content of toothpastes on oral epithelial cells in *in vivo* conditions.

**Materials and methods:** Forty volunteers were selected among students of dental medicine and assigned into two experimental groups. Each group used regular fluoride toothpaste without SLS for initial two months, followed by the use of fluoride toothpaste with SLS of the same brand for the next two months. The buccal epithelial cells were sampled at baseline and 30, 60, 90 and 120 days after the beginning of the research. Effect on DNA damage was analyzed by micronucleus assay

**Results:** The results have shown that Sensodyne brand toothpaste with SLS at different testing points has significantly higher incidence of pyknotic cells ( $1.20 \pm 1.01$  and  $2.20 \pm 0.95$  vs  $0.02 \pm 0.41$  and  $0.00 \pm 0.00$ ) and cells with karyorrhexis ( $1.90 \pm 0.91$  and  $2.35 \pm 1.14$  vs  $0.30 \pm 0.57$  and  $0.85 \pm 0.93$ ) and nuclear buds ( $1.25 \pm 0.85$  and  $1.35 \pm 0.68$  vs  $0.35 \pm 0.59$  and  $0.45 \pm 0.51$ ) than toothpaste of same brand without SLS at the same time of use. While Plidentina toothpaste with SLS has shown significantly higher incidence only in number of pyknotic cells in first month of use compared to Plidentina toothpaste without SLS ( $0.90 \pm 0.45$  vs  $0.25 \pm 0.44$ ).

**Conclusion:** Although the SLS dentifrices in this study significantly increased the incidence of different cytogenetic parameters in oral epithelial cells, to confirm these allegations, it is necessary to conduct further research on a larger number of subjects and for a longer period.

**Key words:** cytogenetic damage, exfoliated buccal cells, micronucleus assay, sodium lauryl sulfate, toothpaste

#### PROCJENA CITOGENETSKIH OŠTEĆENJA U STANICAMA ORALNE SLUZNICE DENTALNIH TEHNIČARA MIKRONUKLEUS TESTOM

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**Svrha istraživanja:** Dentalni tehničari redovito su izloženi metalnoj prašini i monomerima akrilnih smola koji mogu ozbiljno ugroziti njihovo zdravlje. Cilj ove presjecne studije bio je procijeniti u usporedbi pojavnost mikronukleusa i drugih jezgrinih anomalija na stanicama bukalne sluznice dentalnih tehničara.

**Materijali i metode:** Studija je provedena na 45 dentalnih tehničara, te 50 doktora dentalne medicine i 50 dentalnih asistenata kao kontrolnih skupina. Oštećenje DNA analizirano je mikronukleus testom.

**Rezultati:** Rezultati pokazuju manju incidenciju pojave mikronukleusa kod doktora dentalne medicine i dentalnih asistenata nego kod dentalnih tehničara ( $0,68 \pm 0,74$ ,  $0,58 \pm 0,81$  i  $1,58 \pm 2,07$ ), kariolize ( $0,10 \pm 0,30$ ,  $0,20 \pm 0,49$  i  $1,42 \pm 1,25$ ), kondenziranog kromatina ( $0,16 \pm 0,37$ ,  $0,14 \pm 0,35$  i  $0,76 \pm 0,98$ ) i piknoze ( $0,04 \pm 0,20$ ,  $0,08 \pm 0,27$  i  $0,96 \pm 1,24$ ). Tehničari koji se bave primarno metalom imaju značajno više stanica s karioreksijom ( $0,67 \pm 0,55$ ) u odnosu na one koji se bave akrilatom ( $0,02 \pm 0,40$ ), te onih koji rade s keramikom ( $0,13 \pm 0,34$ ).

**Zaključak:** Rezultati ove studije ukazuju na povećanu učestalost citogenetskih oštećenja epitelnih stanica bukalne sluznice kod dentalnih tehničara u odnosu na kontrolne skupine, što može biti povezano s većom izloženosti potencijalno štetnim sastojcima materijala kojima se koriste u svakodnevnom radu.

**Gljučne riječi:** bukalne epitelne stanice; dentalni tehničari; doktori dentalne medicine; DNK oštećenje; mikronukleus test

#### CYTOGENETIC BIOMONITORING OF DENTAL TECHNICIANS: MICRONUCLEUS ASSAY IN BUCCAL EPITHELIAL CELLS

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**Aim:** Dental technicians are regularly exposed to metal dust and monomers of acrylic resins that can seriously jeopardize their health. The aim of this cross-sectional study was to assess the incidence of micronuclei and other nuclear abnormalities in buccal epithelial cells of dental technicians.

**Materials and Methods:** The study was conducted on 45 dental technicians vs. two controls groups: 50 dentists and 50 dental assistants. DNA damage was analyzed by micronucleus assay.

**Results:** The results have shown that dentists and dental assistants have significantly lower incidence of micronucleated cells than technicians ( $0,68 \pm 0,74$ ,  $0,58 \pm 0,81$ ,  $1,58 \pm 2,07$ ; respectively), kariolytic cells ( $0,10 \pm 0,30$ ,  $0,20 \pm 0,49$  and  $1,42 \pm 1,25$ ; respectively), condensed chromatin ( $0,16 \pm 0,37$ ,  $0,14 \pm 0,35$  and  $0,76 \pm 0,98$ ; respectively) and pyknotic cells ( $0,04 \pm 0,20$ ,  $0,08 \pm 0,27$  and  $0,96 \pm 1,24$ ; respectively). Dental technicians who work primarily with metal alloys have significantly more cells with karyorrhexis ( $0,67 \pm 0,55$ ) than those dealing with acrylate ( $0,02 \pm 0,40$ ) or ceramics ( $0,13 \pm 0,34$ ).

**Conclusion:** The results of this study imply the increase in number of cytogenetic biomarkers in dental technician buccal mucosa compared to control groups, which may be associated with more extensive exposure to potentially harmful components of the materials used in everyday dental practice.

**Key words:** buccal epithelial cells, dental laboratory technicians, dentists, DNA damage, micronucleus assay

#### PROPISIVANJE ANTIBIOTIKA U ENDODONTSKIM INFJEKCIJAMA: USPOREDNA STUDIJA IZMEĐU DOKTORA DENTALNE MEDICINE U ZAGREBU, HRVATSKA I STUDENATA 6. GODINE STOMATOLOŠKOG FAKULTETA SVEUČILIŠTA U ZAGREBU, ZAGREB, HRVATSKA.

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**Svrha istraživanja:** Danas smo suočeni s pojavom bakterijskih sojeva otpornih na antibiotike i prekomjernom uporabom antibiotika, koja je postala ozbiljan globalni zdravstveni problem. Neodgovarajuća uporaba antibiotika od strane kliničara dovodi do rezistencije na antibiotike. Cilj ovog istraživanja je ispitati obrazac propisivanja antibiotika od strane doktora dentalne medicine u Zagrebu, a u odnosu na studente 6. godine Stomatološkog fakulteta Sveučilišta u Zagrebu i istražiti potencijalne razlike između dviju skupina.

#### ANTIBIOTIC PRESCRIPTION IN ENDODONTIC INFECTIONS: A COMPARATIVE SURVEY BETWEEN DENTAL PRACTITIONERS (DMDS) IN ZAGREB, CROATIA AND FINAL-YEAR STUDENTS OF SCHOOL OF DENTAL MEDICINE, UNIVERSITY OF ZAGREB, IN ZAGREB, CROATIA

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**Aim:** Nowadays, we are faced with the emergence of antibiotic-resistant bacterial strains and the overuse of antibiotics, which has become a serious global health concern. Inappropriate use of antibiotics by clinicians leads to antibiotic resistance. The aim of this research is to examine the pattern of antibiotic prescription of dental practitioners (DMDS) in comparison to final-year students of School of Dental Medicine, within the city of Zagreb, Croatia, and investigate the potential differences between the two groups.

**Materials and Methods:** The research will be carried throughout two-part online ques-



**Materijali i metode:** Istraživanje će se provoditi putem dvodijelnog online upitnika. Prvi dio zabilježit će opće informacije o doktorima dentalne medicine i studentima, dok će drugi dio uključiti niz hipotetskih kliničkih situacija u kojima će sudionici biti pitani bi li ili ne bi propisali antibiotik. Drugi dio će također uključivati pitanja o trajanju, vrsti i doziranju antibiotičke terapije.

**Očekivani rezultati:** Ovim istraživanjem očekujemo definirati obrazac propisivanja antibiotika u liječenju endodontskih infekcija od strane doktora dentalne medicine i studenata. Na temelju rezultata sličnih istraživanja, očekujemo da studenti budu više svjesni problema rezistencije na antibiotike i da su upoznati s smjernicama vezanim uz indikacije za sustavnu uporabu antibiotika u endodonciji.

**Zaključak:** Mnogi stomatolozi propisuju antibiotike u situacijama u kojima nisu indicirani. Primjena antibiotika treba biti ograničena na slučajeve teške sistemske infekcije. Treba uvesti obrazovne inicijative i precizne smjernice kako bi se racionalizirala uporaba antibiotika i smanjila otpornost na antibiotike.

**Gljučne riječi:** antibiotici, endodontske infekcije

## ZNANJE I STAVOVI PEDIJATARA U REPUBLICI HRVATSKOJ O ORALNOM ZDRAVLJU U DJECE

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**Svrha istraživanja:** Glavni cilj istraživanja je bio ispitati pedijatre koji rade na teritoriju Republike Hrvatske i njihova znanja o rizičnim čimbenicima za nastanak oralnih bolesti, stavove o oralnom zdravlju, fluoru i načinima prevencije oralnih bolesti.

**Materijali i metode:** Ovo istraživanje je obuhvatilo 132 pedijatra od kojih je 52 odgovorilo. Upitnik se sastoji se od 5 odjeljaka čija pitanja obuhvaćaju demografske podatke ispitanika, poznavanje rizičnih čimbenika u nastanku oralnih bolesti, stavove o oralnom zdravlju, načinima prevencije nastanka oralnih bolesti i potreba za novim informacijama.

**Rezultati:** Rezultati ovog istraživanja su pokazali kako pedijatrima nedostaju specifična znanja te ih je 80,77% odgovorilo kako dojenje ne može biti uzrokom karijesa. Vlastitu ulogu u očuvanju oralnog zdravlja važnom smatra 88,46% pedijatra. Ipak, 76,92% pedijatra ne preporučuje druge topikalne načine primjene fluora osim četkanja zubi fluoridnom pastom. Sistemsku primjenu fluora preporučuje 21,15% pedijatra, od kojih 63,33% ne regulira dozu prema koncentraciji fluora u vodi za piće. Dodatne edukacije o oralnim bolestima i njihovoj prevenciji potrebna smatra 78,85% pedijatra.

**Zaključak:** Temeljem dobivenih rezultata, može se zaključiti kako pedijatri prepoznaju važnost vlastite uloge u očuvanju oralnoga zdravlja. Međutim imaju deficitarna znanja, nedovoljno dobro provode preventivne aktivnosti te su im potrebne dodatne edukacije.

**Gljučne riječi:** oralno zdravlje u djece, stavovi pedijatra

tionnaire. First section will record general information on DMDs and the students, whereas the second section will include a series of hypothetical clinical scenarios, where the participants will be asked to state whether they would or would not prescribe antibiotics. The second section will also include questions about duration, type and dosage of antibiotic therapy.

**Expected results:** With this study we expect to define the pattern of antibiotic prescription in treatment of endodontic infections within DMDs and dental students. Regarding the results of similar studies we expect students to be more aware of the antibiotic resistance problem and also more familiar with guidelines concerning indications for systemic use of antibiotics in endodontics.

**Conclusion:** Many dentists prescribe antibiotics in situations where they are not indicated. Administration of antibiotics should be restricted to cases of severe systemic infection. Educational initiatives and precise guidelines should be introduced in order to rationalize the use of antibiotics and to reduce antibiotic resistance.

**Key words:** antibiotic prescription, endodontic infections

## KNOWLEDGE AND ATTITUDE OF PEDIATRICIANS REGARDING CHILDREN'S ORAL HEALTH IN CROATIA.

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**Aim:** The main objective of this study was to examine knowledge, practices and attitude regarding the prevention of oral diseases among pediatricians in Croatia.

**Materials and Methods:** A random sample of 132 pediatricians was sent a five-part questionnaire, out of which 52 responded. The questions referred to socio-demographic and dental practice characteristics; knowledge on risk factors; attitude and practices towards the prevention of oral diseases.

**Results:** The results indicated a lack of specific knowledge, 80.77% of pediatricians answered that breastfeeding cannot be cause of dental caries. Almost all, 88.46% of pediatricians believed in importance of their role in preserving oral health. On the other hand, 76.92% of them do not recommend any other topical use of fluoride but tooth brushing with the fluoride toothpaste. Only 21.15% of pediatricians recommended systematic use of fluoride, but 63.33% do not regulate its dosage with concentration presented in the potable water. Additional education on oral diseases and their prevention is considered necessary by 78.85% of pediatricians.

**Conclusion:** Based on results, we found that pediatricians believe they have an important role in preserving oral health. Nevertheless, when it comes to the prevention of oral diseases, a lack of knowledge, insufficient activities and need for further education play an important role.

**Key words:** children's oral health, attitude of pediatricians

## PORAST TEMPERATURE TIJEKOM POLIMERIZACIJE EKSPERIMENTALNIH KOMPOZITA S UDJELOM BIOAKTIVNOG STAKLA

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**Svrha istraživanja:** Istražiti porast temperature tijekom polimerizacije eksperimentalnih remineralizirajućih kompozita temeljenih na bioaktivnom staklu 45S5 (BG).

**Materijali i metode:** Pet svjetlosno polimerizirajućih kompozita temeljenih na Bis-GMA/TEGDMA smolastoj matrici s težinskim udjelom BG od 0-40% i ukupnim težinskim udjelom punila od 70% su pripremljeni u dvostruko asimetričnoj centrifugalnoj miješalici. Tri komercijalna kompozita su služili kao referenca. Cilindrični uzorci kompozita (d=6 mm, h=2mm, n=5) su svjetlosno polimerizirani 30 s pomoću polimerizacijskog uređaja Bluephase G2 (Ivoclar Vivadent) i porast temperature je praćen u stvarnom vremenu (20 s<sup>-1</sup>) pomoću T-tipa termočlanka. Po završetku svjetlosno aktivirane polimerizacije uzorci su ostavljeni do hlađenja na razinu sobne temperature nakon čega je polimerizacijski uređaj dodatno aktiviran u vremenu od 30s. Na taj način omogućeno je odvajanje učinaka zagrijavanja polimerizacijskim uređajem i topline oslobođene u polimerizacijskoj reakciji.

**Rezultati:** Eksperimentalni remineralizirajući kompoziti pokazali su značajno veći porast temperature (12,2-14,0 °C) od komercijalnih referenci (9,6-12,5°C). Ta razlika može se pripisati većoj količini topline oslobođenoj tijekom polimerizacijske reakcije kod eksperimentalnih materijala (3,1- 5,8°C) u usporedbi s referentnim materijalima (1,8-3,8°C). Doprinos zagrijavanja polimerizacijskim uređajem bio je sličan za sve materijale (7,8- 9,1°C). Postupni porast udjela BG od 0-40% pokazao je postupni pad u količini topline oslobođene tijekom polimerizacije kao i duže vrijeme potrebno za postizanje temperaturnog maksimuma. Ovi nalazi su u skladu s prethodnim podacima o nižem stupnju konverzije i nižoj razini polimerizacije kod kompozita s većim udjelom BG.

**Zaključak:** Porast temperature pri polimerizaciji eksperimentalnih kompozita je bio usporediv s literaturnim podacima o komercijalnim kompozitima i može se smatrati sigurnim za zubnu pulpu. Trendovi zapaženi kod viših udjela BG sugeriraju mogući učinak BG na kinetiku polimerizacije i maksimalni stupanj konverzije.

**Gljučne riječi:** temperatura, polimerizacija, eksperimentalni kompoziti

## TEMPERATURE RISE DURING LIGHT CURING OF EXPERIMENTAL COMPOSITES CONTAINING BIOACTIVE GLASS

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**Aim:** To investigate the temperature rise during the polymerization of experimental remineralizing composites based on bioactive glass 45S5 (BG).

**Materials and methods:** Five light-curable composites based on a Bis-GMA/TEGDMA resin system with BG amount between 0-40 wt% and total filler load of 70 wt% were prepared in a dual asymmetric centrifugal mixer. Additionally, three commercial composites were used as a reference. Cylindrical composite specimens (d=6 mm, h=2 mm, n=5) were light-cured for 30 s with Bluephase G2 (Ivoclar Vivadent) while simultaneously monitoring their temperature in real-time (20 s<sup>-1</sup>) with a T-type thermocouple. After the curing was completed, specimens were left to return to room temperature and the curing unit was activated for additional 30 seconds. This procedure allowed the separation of the curing unit heating effect from the polymerization reaction exotherm.

**Results:** Experimental remineralizing composites showed significantly higher temperature rise (12.2-14.0 °C) than commercial references (9.6-12.5 °C). This difference was attributable to higher reaction exotherm of the experimental series (3.1-5.8 °C) than the reference materials (1.8-3.8 °C), while the heating contribution of the curing unit was comparable among all materials (7.8-9.1 °C). The progressive increase in the BG amount from 0-40 wt% showed a gradual decline in the reaction exotherm, as well as longer times required to attain the peak temperature. These findings are in line with our previous findings of lower conversion and lower reaction rate in composites with higher BG amount.

**Conclusion:** The temperature rise of experimental composites was comparable to literature data of commercial composites and thus can be considered safe for dental pulp. Additionally, trends observed with higher BG amount imply a possible influence of BG on polymerization kinetics and maximum attainable conversion.

**Key words:** temperature rise, experimental composite, polymerization

### UTJECAJ POSTTRAUMATSKOG STRESNOG POREMEĆAJA NA FACIJALNU BOL U PACIJENATA SA KRONIČNIM RINOSINUITISOM

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**Svrha istraživanja:** Kronični rinosinitis (KRS) i posttraumatski stresni poremećaj bolsti su od kojih boluje oko 11% do 15% stanovništva razvijenih zemalja, sa velikim očekivanim komorbiditetom. Bol nije glavni simptom KRS-a dok je facijalna bol izražena u 5-24% pacijenata s PTSP-om. Namjera našeg rada je da utvrdimo kliničke osobine facijalne boli u pacijenata sa komorbiditetom KRS-a i PTSP-a.

**Materijali i metode:** Pacijenti su ispunjavali SNOT-22, SF-36 i VAS upitnike, svim pacijentima učinjena je CT snimka koja je bodovana po Lund Mackayu. Odvojena su pitanja iz upitnika vezana za bol. Nakon toga izvršena je podjela na nisku i visoku percepciju boli tako što su izdvojeni ispitanici kod kojih su rezultati u pitanjima o boli veći od medijana za ta pitanja (medijan=20), te su tako su dobivene dvije skupine, s „visokom percepcijom boli“ i „niskom percepcijom boli“.

**Rezultati:** Nadenno je da 80% ispitanika sa KRS/PTSP-om ima visoku percepciju boli, a 80% pacijenata sa KRS-om nisku percepciju boli. PTSP/KRS pacijenti sa visokom percepcijom boli postižu više rezultate u bodovanju po Lund Mackayu ( $t = -2.776$ ;  $p < 0.05$ ). Rezultati upućuju na model uzajamne povezanosti između nosne opstrukcije zadržanom sluznicom i boli, na način da nosna opstrukcija svraća pozornost na sinonazalno područje. **Zaključak:** Zbog moguće kortikosteroidne rezistencije u pacijenata sa PTSP/KRS-om kirurško rješavanje opstrukcije bila bi metoda izbora u tih pacijenata.

**Ključne riječi:** posttraumatski stresni poremećaj, facijalna bol, kronični rinosinitis

### THE IMPACT OF POSTTRAUMATIC STRESS DISORDER ON FACIAL PAIN IN PATIENTS WITH CHRONIC RHINOSINUSITIS

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**Aim:** Chronic rhinosinusitis (CRS) and posttraumatic stress disorder (PTSD) affect about 11%-15% of the population of developing countries. Pain in CRS is not the main symptom while the prevalence of chronic facial pain in a patient with PTSD is 15-24%. Our aim was to determine clinical presentation of facial pain in a patient with CRS/PTSD.

**Material and Methods:** Patients filled out SNOT-22, SF-36 and VAS questionnaire. CT scan of paranasal sinuses was scored according to Lund Mackay. We separated all the questions in the questionnaire related to pain. There was a division to a high and low perception of pain by separating the subjects that had results of questions about pain greater than the median for those questions.

**Results:** It was found that 80% of subjects in the PTSD/CRS group have a high perception of pain, while 80% of the subjects in the CRS group have a low perception of pain. The PTSD/CRS patients with a higher perception of pain achieve significantly higher scores on the scale of the Lund Mackay scores ( $t = -2.776$ ;  $p < 0.05$ ). Result suggests that mutual maintenance connection exists between nose obstruction caused by hypertrophic mucosa (high Lund-Mackay) and pain, in the manner that the nose obstruction draws attention to the sinonasal area in the patient with PTSD.

**Conclusion:** Surgical removal of the nasal obstruction in CRS/PTSD patients is the treatment of choice because of the possibility of the stress-related steroid resistance.

**Key words:** posttraumatic stress disorder, facial pain, chronic rhinosinusitis

### ZNANJE STUDENATA ČETVORTE I PETE GODINE STUDIJA DENTALNE MEDICINE O RAKU USNE ŠUPLJINE

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**Svrha istraživanja:** Istraživanja pokazuju nedovoljno znanje o raku usne šupljine među studentima i liječnicima obiteljske medicine i stomatolozima pa je cilj bio utvrditi znanje o raku usne šupljine među studentima viših godina studija dentalne medicine.

**Ispitanici i metode:** Istraživanje je obuhvatilo ukupno 83 studenta (raspon dobi 21 - 28 godina, medijan 24 godine); 40 studenata četvrte godine (7 mladića i 33 djevojke, prosječne dobi 23 godina (raspon 22-26 godina) i 43 studenta pete godine (14 mladića (25.3%) i 29 djevojaka (74.7%) raspon dobi 23 do 28 godina, medijan 24 godine). Studentima je podijeljen anketni upitnik sa 16 pitanja o raku usne šupljine koji su ispunjavali neposredno nakon nastave.

**Rezultati:** Većina studenata (55.42%) je svoje znanje o raku usne šupljine ocijenila ocjenom dobar. Skoro svi navode alkohol i pušenje kao rizične čimbenike, a većina smatra da je najčešća lokalizacija jezika, a prekancerозна lezija lichen planus. Studenti pete godine su pokazali veće znanje o prevenciji oralnog karcinoma. Bolje su informirani o raku, češće su pregledavali bolesnike i vodili preventivne razgovore s bolesnicima. Gotovo svi studenti su se očitovali da bolesnika sa sumnjivom lezijom treba uputiti specijalisti oralne medicine.

**Zaključak:** Teoretsko znanje studenata četvrte i pete godine o raku usne šupljine je dobro, ali je većina studenata nezadovoljna mogućnostima stjecanja praktičnog znanja jer rijetko pregledavaju i razgovaraju s takvim pacijentima. Zato je nužno nastavni program i satnicu kliničkih vježbi kolegija koji obuhvaćaju nastavu o raku usne šupljine, proširiti s dodatnom edukacijom o prevenciji i ranoj dijagnostici raka usne šupljine.

**Ključne riječi:** rak usne šupljine, znanje studenata

### KNOWLEDGE OF FOURTH AND FIFTH YEAR DENTAL STUDENTS ON ORAL CANCER

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**Aim:** Studies show insufficient knowledge on oral cancer among students, general physicians and dentists. The aim was to establish knowledge about oral cancer among dental students of fourth and fifth year of study.

**Subjects and Methods:** Study included 83 students (age range 21 - 28 years, median 24 years); among which 40 students of the fourth year (7 men and 33 women, the average age 23 years (range 22-26 years) and 43 students of the fifth year (14 men (25.3%) and 29 women (74.7%)) range from 23 to 28 years, median 24. The students were asked to answer a questionnaire with 16 questions about oral cancer, which was given immediately after the course.

**Results:** 55.42% students rated their knowledge of oral cancer as good. Almost all stated that alcohol and smoking are main risk factors, the most common localization is tongue, and precancerous lesion lichen planus. Students of the fifth year have shown greater knowledge about the prevention of oral cancer. They were better informed about cancer, more often examined patients, and perform preventive conversations. Almost all students stated that patients with suspicious lesion should be referred to oral medicine specialist.

**Conclusion:** Fourth and fifth year students' theoretical knowledge of oral cancer is good, but most students are dissatisfied with the ability to acquire practical knowledge because they rarely assess such patients. Therefore, it is necessary to extend the curriculum and the schedule of clinical exercises involving oral cancer to expand student's knowledge with additional education on prevention and early diagnosis.

**Key words:** dental students knowledge, oral cancer

### PRIVREMENA PROTETSKA REHABILITACIJA PACIJENTA U ADOLESCENTSKOJ DOBI

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**Svrha istraživanja:** Prikazati funkcijsku i estetsku rehabilitaciju fiksnim metal keramičkim mostovima u frontu i fleksibilnim protezama (valplast) u posteriornoj regiji.

**Materijali i metode:** Šesnaestogodišnoj pacijentici dijagnosticirana je caklinska demineralizacija s brojnim karijesnim lezijama. Kliničkim pregledom utvrđen je nedostatak zubi 14, 15, 24, 25, 26, 34, 36, 46, 47. Naknadno su još izvađeni korijenovi 11, 12, 33, 43. U frontalnoj regiji izrađen je metal keramički most, dok je u posteriornoj regiji izrađena fleksibilna proteza (valplast) iz estetskih i funkcionalnih razloga.

**Rezultati:** Imedijatni i estetski rezultati postignuti su metal keramičkim mostom u frontalnoj regiji, dok je to isto učinjeno u distalnoj regiji korištenjem fleksibilne proteze (valplast) čime je poboljšani zvučni i estetski učinak pacijentice.

### TEMPORARY PROSTHETICS REHABILITATION IN ADOLESCENTS PATIENT

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**Aim:** to show the functional and esthetics rehabilitation with fixed prosthetic metal-porcelain bridges in the front and flexible dentures (valplast) in posterior area.

**Materials and methods:** A 16 years old female patient was diagnosed with enamel demineralization with numerous caries cavities. Therefore, in the intraoral inspection there were missing 14, 15, 24, 25, 26 and 16, also 34, 36, 46, 47. Extracted radix relicta 11, 12, and 33 and 43. Front teeth in maxilla and mandible were used for metal-porcelain bridges. Whereas, posterior part was covered with valplast flexible mobile prosthesis for rehabilitation of the patient for esthetic and functional reasons.

**Results:** Immediate aesthetics and functional improvements were achieved with metal-porcelain bridges in front of maxilla and mandible, and posterior part covered with val-



**Zaključak:** Uzimajući u obzir godine pacijenta i nakon konzultacije s pedodontom, zaključili smo da je najbolje koristiti oboje, fiksni most zbog estetskih razloga i fleksibilnu protezu zbog funkcionalnih razloga. Ovaj slučaj pratit ćemo dvije godine zbog rasta maksile i mandibule.

**Cljučne riječi:** fiksni most, fleksibilna proteza

plast flexible mobile prosthesis. This contributed to increase functional masticatory effect and aesthetic moment of the patient.

**Conclusion:** Taking into account the age of the patient, and consulting with pedodontics specialists we decided to use both, fix prosthetics for aesthetics reason and mobile flexible dentures for functional reason. For two coming year the case will be followed closely to change the prosthetics because of growth and development of mandible and maxillae.

**Key words:** fix prosthetics, flexible mobile prosthesis

#### MUKOGINGIVALNA TERAPIJA DIODNIM LASEROM

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**Svrha istraživanja:** Diodni laser s valnom duljinom od 975 nm, Laser HF, HAEGER WERKEN, Grmany korišten je u mukogingivnoj kirurgiji mekog tkiva.

**Materijali i metode:** Liječenje je obavljeno u Dentalnom centru Sveučilišne klinike na Kosovu, a na pacijentima su obavljani zahvati frenulektomije, uklanjanja granulomatozoz epitela, dok je na posljednjem pacijentu prikazan zahvat gingivoplastike.

**Rezultati:** Diodni laser predstavlja minimalno invazivnu tehnologiju, s vrlo malo intraoperativnog krvarenja, uz učinkovitu hemostazu, male postoperativne bolove, te manju potrebu za lokalnom anestezijom, a operativne rane se brže oporavljaju.

**Zaključak:** Diodni laser danas ima značajno mjesto u području zahvata na mekim tkivima te pokazuje vrlo dobre rezultate. Pruža maksimalnu udobnost nakon operacije pacijenta.

**Cljučne riječi:** diodni laser, meko tkivo

#### MUKOGINGIVAL SURGICAL INTERVENTIONS WITH LASER DIODE

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**Aim:** Diode laser, with a wavelength of 975 nm, Laser HF, HAEGER WERKEN, Grmany was used in the soft tissue mucogingival surgery.

**Materials and Methods:** Treatment was performed at the University Clinical Dental Centre of Kosovo and will be presented patient where was applied frenulectomia applied to one patient with pathological frenulum, the other one with excision of epulis granulomatosa and the last patient with gingivoplastica.

**Results:** Diode laser is a minimally invasive technology, there is very little intraoperative bleeding, hemostasis is efficient, postoperative pains are smaller, needs less local anesthetic, and operative wound heal faster.

**Conclusion:** The diode laser has wide range of applications at mucogingival surgery with very good results. It offers maximum postoperative patient comfort.

**Key words:** laser, soft tissue

#### KLINIČKI NEPREPOZDAT KARIJES U DENTINU – KLINIČKI PRIKAZ SLUČAJA

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**Svrha istraživanja:** Nedijagnosticiran karijes u dentinu nije rijedak problem u rutinskoj stomatološkoj praksi. Uporaba fluorida u širokim razmjerima može interferirati s prevalencijom ovog problema.

**Materijal i postupci:** Tridesetogodišnji muškarac je došao u stomatološku ambulantu na pregled 5 dana prije puta u inozemstvo na 2 godine. Učinjeni su intraoralni i ekstraoralni pregled te je klinički uočena promjena boje distoaproximalnog grebena zuba 16, mezoaproximalnog grebena zuba 26 kao i distoaproximalnog grebena zuba 25, bez klinički zamijećenih kavitacija. Pacijent je upućen sumnjive zube tehnikom uzgiza u traku.

**Rezultati:** Snimke uzgizom u traku su ukazale na caklinske proksimalne karijese, od kojih je karijesna lezija dosegla dentin na distalnoj plohi zuba 16. Na snimci se vidi duboka karijesna lezija mezijalno u zubu 17.

**Zaključak:** Tehnika snimanja uzgizom u traku je dobar dodatni postupak kliničkom pregledu pri otkrivanju karijesnih lezija.

**Cljučne riječi:** karijes u dentinu, dijagnostika

#### CLINICALLY UNDETECTED DENTINE CARIES – A CLINICAL CASE

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**Aim:** Clinically undetected dentine caries is not unusual in routine dental practice. It has been suggested that the widespread use of fluorides could interfere in the prevalence of this problem.

**Material and Methods:** A 30 year old male came to the dental office to check his dental status 5 days before leaving Croatia for 2 years. Clinical extraoral and intraoral examinations were performed. The clinical examinations indicated a change in colour of the distal ridge of tooth 16 as well as of the mesial ridge of 26 and distal ridge of 25, all of these without clinically observed cavitation. The patient was sent to do bitewings of teeth 16, 17, 25 and 26.

**Results:** On the bitewings a few enamel proximal caries were observed, reaching the dentine at the distal surface of 16. In tooth 17 radiographic signs of deep mesial carious lesion were observed.

**Conclusion:** Bitewing is a good additional diagnostic tool for detecting caries lesions.

**Key words:** dentine caries, diagnostics

#### KORELACIJA HISTOPATOLOŠKOG I SEROLOŠKOG NALAZA U BOLESNIKA S PRIMARNIM SJÖGRENOVIM SINDROMOM

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**Svrha istraživanja:** Biopsija malih labijalnih žlijezda slinovnica (MLŽS) predstavlja zlatni standard u postavljanju dijagnoze primarnog Sjögrenovog sindroma (pSS). Cilj ove pilot studije bio je utvrditi korelaciju serološkog i histopatološkog nalaza u bolesnika sa suhoćom usta i sumnjom na primarni Sjögrenov sindrom kako bi se utvrdilo da li je biopsija (MLŽS) obavezna ili popratna dijagnostička pretraga kod sumnje na Sjögrenov sindrom.

**Materijali i metode:** Istraživanje je uključilo 29 ispitanika, od kojih 28 žena i 1 muškarac (medijan dobi 62 godine, raspon 29 do 81 godina) koji su upućeni na serološku dijagnostiku (anti-SSA, anti-SSB) i u kojih je provedena biopsija malih labijalnih žlijezda slinovnica. Pozitivnim histopatološkim nalazom se smatrao nalaz žarišnog zbira veći od 1.

**Rezultati:** Pozitivan histopatološki nalaz imalo je deset ispitanika (34%). Pozitivan nalaz autoantitijela anti-SSA imalo je 38% ispitanika, anti-SSB 28%, a kombinaciju anti-SSA i anti-SSB 24%. Kod svih ispitanika sa pozitivnim serološkim nalazom anti-SSA, anti-SSB i

#### CORRELATION OF HISTOPATHOLOGICAL AND SEROLOGICAL FINDINGS IN PATIENTS WITH PRIMARY SJÖGREN SYNDROME

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**Aim:** Biopsy of small labial salivary gland (SLSG) is a gold standard in the diagnosis of primary Sjögren's syndrome (pSS). The aim of this pilot study was to determine the correlation between serological and histopathological findings in patients with xerostomia and suspected primary Sjögren's syndrome to determine if biopsy (SLSG) is a mandatory or accompanying diagnostic test for Sjögren's syndrome.

**Materials and Methods:** The study included 29 subjects, of whom 28 women and 1 male (median age 62, range 29 to 81 years) who were referred to serological diagnostics (anti-SSA, anti-SSB) and in which small labial salivary glands biopsy was performed. Positive histopathological finding was considered to be a focal spot finding more than 1.

**Results:** Positive histopathological findings had ten (34%) patients. Positive autoantibodies to anti-SSA had 38% of respondents, anti-SSB 28%, and combination of anti-SSA and anti-SSB 24%. In all subjects with positive serological findings of anti-SSA, anti-SSB and

njihovom kombinacijom dokazana je visoka korelacija s pozitivnim histopatološkim nalazom (73-100%). Visoka osjetljivost dokazana je za anti-SSA (100%), za anti-SSB (83%), a manje za kombinaciju anti-SSA i anti-SSB (77%).

**Zaključak:** Primarni Sjögrenov sindrom dokazan je u trećine ispitanika u kojih je dokazana visoka korelacija pozitivnog histopatološkog nalaza i autoantitijela (anti-SSA, anti-SSB, kombinacija anti-SSA i anti-SSB). Time je pokazano da histopatološka dijagnostika u slučaju pozitivnog nalaza protutijela može biti popratna dijagnostička pretraga uzimajući u obzir visoku osjetljivost protutijela SSA i SSB i slučajeve kad je biopsija kontraindicirana.

**Cljučne riječi:** Sjögrenov sindrom, biopsija

their combination high correlation with positive histopathological findings (73-100%) was found. High sensitivity has been demonstrated for anti-SSA (100%), for anti-SSB (83%) and less for combination anti-SSA and anti-SSB (77%).

**Conclusion:** Primary Sjögren syndrome has been demonstrated in a third of subjects with high correlation of positive histopathological findings and autoantibodies (anti-SSA, anti-SSB, and combination anti-SSA and anti-SSB). In the case of a positive antibodies titer finding, histopathological diagnosis may be a accompanying diagnostic test rather than mandatory taking into account the high sensitivity of antibodies to SSA and SSB and in cases when biopsy is contraindicated.

**Key words:** Sjögren syndrome, biopsy

#### USPOREDBA DIMENZIJSKIH PROMJENA STAKLENO IONOMERNIH CEMENATA I GIOMERA METODOM DIGITALNE LASERSKE INTERFEROMETRIJE

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**Svrha:** Svrha rada bila je odrediti linearno polimerizacijsko skupljanje dvaju smolom modificiranih stakleno ionomernih cemenata i jednog giomera tijekom polimerizacije.

**Materijali i metode:** Metoda digitalne laserske interferometrije omogućuje izravno mjerenje dimenzijskih promjena u materijalima tijekom njihovog stvrdnjavanja. U istraživanju su korišteni Fuji II LC (F2LC) (GC, Tokyo, Japan), Photac Fil Quick Aplicap (PFQ) (3M ESPE, Seefeld, Germany) i Beautifil II (B2) (Shofu, Kyoto, Japan) polimerizirani LED (light emitting diode) polimerizacijskim uređajem (Bluephase G2, Ivoclar-Vivadent, Schaan, Liechtenstein) polimerizacijskim programom „high“ (1200 mW/cm<sup>2</sup>) kroz 20 s. Za potrebe mjerenja polimerizacijskog skupljanja napravljeno je po 10 uzoraka debljine 0,85 mm i promjera 10 mm prema uputama proizvođača za svaki ispitivani materijal. Dimenzijske promjene snimane su u stvarnom vremenu uz brzinu prikupljanja podataka od 50 s<sup>-1</sup> tijekom polimerizacije te kroz 5 minuta nakon prestanka osvjetljivanja. Dohiveni rezultati mjerenja polimerizacijskog skupljanja analizirani su pomoću ANOVA-e, uz Tukey post hoc test za višestruke usporedbe (p<0.01).

**Rezultati:** Svi ispitivani materijali u našem istraživanju pokazali su početno širenje: B2 0.10±0.04%, F2LC 0.03±0.02%, PFQ 0.03±0.03% te posljedično skupljanje B2 1.15±0.23%, F2LC 1.59±0.40%, PFQ 1.31±0.61%. F2LC je imao najveće linearno skupljanje materijala. B2 je imao značajno manje skupljanje od F2LC i PFQ (p<0.01).

**Zaključak:** Digitalna laserska interferometrija je metoda koja omogućava izravno promatranje dimenzijskih promjena u materijalima tijekom polimerizacije i stvrdnjavanja u stvarnom vremenu. Fuji II LC pokazao je najveće skupljanje, a Beautifil II najniže skupljanje i najviše širenje.

**Cljučne riječi:** stakleno ionomerni cementi, giomeri, laserska interferometrija

#### LINEAR DIMENSIONAL CHANGES EVALUATION OF RESIN-MODIFIED GLASS IONOMER CEMENTS AND GIOMER USING DIGITAL LASER INTERFEROMETRY

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**Aim:** The aim of this study was to evaluate the linear dimensional changes of two resin-modified glass ionomer cements and a giomer polymerized with a light emitting diode (LED) curing unit during the setting time period.

**Materials and Methods:** In this study, digital laser interferometry was used to measure dimensional changes of Fuji II LC (F2LC) (GC, Tokyo, Japan), Photac Fil Quick Aplicap (PFQ) (3M ESPE, Seefeld, Germany) and Beautifil II (B2) (Shofu, Kyoto, Japan) polymerized with a LED light curing unit (Bluephase G2, Ivoclar-Vivadent, Schaan, Liechtenstein) using high power mode (1200 mW/cm<sup>2</sup>) for 20 sec. For each tested material, 10 discoid specimens of 0.85 mm thickness and a diameter of 10 mm were prepared according to the manufacturer's instructions. The dimensional changes were recorded during the polymerization process in real-time at the data collection rate of 50 s<sup>-1</sup>, for up to 5 min. The results were analyzed by ANOVA, and Tukey post hoc test was used for multiple comparisons (p < 0.01).

**Results:** All tested materials showed an initial setting expansion: B2 0.10±0.04%, F2LC 0.03±0.02%, PFQ 0.03±0.03% and a subsequent setting shrinkage B2 1.15±0.23%, F2LC 1.59±0.40%, PFQ 1.31±0.61%. B2 showed significantly lower shrinkage, followed by F2LC and PFQ (p < 0.01).

**Conclusion:** Digital laser interferometry is a method that enables direct observation of dimensional changes in materials during the polymerization process and the setting period in real-time. Fuji II LC showed the highest setting shrinkage, while Beautifil II showed the lowest contraction and the highest expansion.

**Key words:** glass ionomer, giomer, dimensional changes, setting shrinkage, digital laser interferometry

#### PROPISUJEMO LI PREVIŠE ANTIBIOTIKA?

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**Svrha rada:** Istražiti propisivanje antibiotika u hitnoj stomatološkoj službi grada Zagreba prema razlikama među doktorima, radnim dijagnozama i praksi propisivanja antibiotika bez provođenja bilo kakvog stomatološkog zahvata.

**Materijali i metode:** Podatci prikupljeni iz elektroničkih kartona prikazani su deskriptivnom statistikom. Razlike u propisivanju antibiotika uspoređene su z-testom za proporcije s Bonferroni post-hoc prilagodbom.

**Rezultati:** Analizirano je 20,879 posjeta pacijenata tijekom 1,5-godišnjeg razdoblja. Kako bi se istražile razlike među doktorima i dijagnozama, učestalost primjene antibiotika bila je uspoređena između doktora za svaku pojedinu dijagnozu. Učestalost propisivanja antibiotika značajno se razlikovala između doktora i iznosila je između 15-72% od ukupnog broja posjeta. Štoviše, zabilježeno je kako doktori propisuju antibiotike za dijagnoze poput pulpitisa i karijesa, tj. u slučajevima u kojima nema indikacije za primjenu antibiotika. Praksa propisivanja antibiotika bez obavljanja stomatološkog zahvata zabilježena je kod svih doktora i razlikovala se po učestalosti u rasponu od 18-45%.

**Zaključak:** Ovo istraživanje ukazuje na visoku učestalost propisivanja antibiotika i heterogenost individualnih kriterija o potrebi za primjenom antibiotika. Učestala je bila i neispravna praksa propisivanja antibiotika umjesto izvođenja stomatološkog zahvata.

**Cljučne riječi:** antibiotici, propisivanje

#### ARE WE PRESCRIBING TOO MUCH ANTIBIOTICS?

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**Aim:** To analyze antibiotic prescription in emergency dental service in the city of Zagreb according to differences among doctors, working diagnoses and the practice of antibiotic prescription without performing any dental treatment.

**Materials and methods:** The data were collected from electronic medical records and presented through descriptive statistic. Differences in antibiotic prescription were compared by means of z-test for proportions with Bonferroni post-hoc adjustment.

**Results:** The study analyzed 20,879 patient visits during the 1.5-year period. To explore the differences among doctors and diagnoses, the frequency of antibiotic prescription was compared among the doctors for each diagnosis. The frequency of antibiotic prescription differed significantly among the doctors and ranged from 15-72% of all visits. Moreover, it was noted that doctors prescribed antibiotics for diagnoses such as pulpitis and caries, i.e. in cases for which there is no indication for antibiotic use. The practice of prescribing an antibiotic without performing any dental treatment was observed in all doctors and its frequency varied in the range of 18-45%.

**Conclusion:** This study indicates a high frequency of antibiotic prescribing and heterogeneity of individual doctor's criteria whether an antibiotic is required. An incorrect practice of prescribing antibiotics instead of performing an actual dental treatment was rather common.

**Key words:** antibiotics, prescription