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#### MINIMALNO INVAZIVNA MEKOTKIVNA KIRURGIJA UZ UPOTREBU LASERA U DJEČJOJ DENTALNOJ MEDICINI - PRIKAZI SLUČAJA

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**Cilj:** Laser (akronim od engl. *Light Amplification by Stimulated Emission of Radiation*) je uređaj za stvaranje i pojačavanje koherentnog elektromagnetskog, najčešće monokromatskog, polariziranog, usko usmjerenog zračenja. Svrha rada je prikazati kliničku upotrebu lasera u minimalno invazivnoj mekotkivnoj kirurgiji djece.

**Materijali i postupci:** Upotreba lasera u dječjoj i preventivnoj dentalnoj medicini više-struko je opravdana, s obzirom da su djeca i adolescenti populacijska skupina najosjetljivija na bol tijekom stomatološkog zahvata, krvarenje i učestale posjete stomatologu.

Prednosti lasera su gotovo bezbolna upotreba, smanjenje anksioznosti kod pacijenata kojima nelagodna stvara zvuk turbine, minimaliziranje krvarenja i postoperacijskog edema, ubrzano cijeljenje, smanjenje bakterijskih infekcija i minimalno invazivna preparacija kaviteta poštedna za zdravo zubno tkivo. Nedostaci upotrebe lasera su cijena samog uređaja, koja poskupljuje i troškove liječenja, njihova aplikacija nije potpuno bezbolna te je potrebna anestezija operativnog područja. Ne mogu se koristiti za preparaciju aproksimalnih karijesnih lezija, sekundarnog karijesa kao velikih karijesnih lezija.

Najčešće upotrebljavani laseri u dentalnoj medicini su CO<sub>2</sub> laser, Nd:YAG, erbijum laseri (Er:YAG, Er,Cr:YSGG), diodni laseri i fotobiostimulirajući laseri.

**Zaključci:** Kod djece lasere primjenjujemo za tvrda i meka tkiva. Kod tvrdih tkiva za dija-gnostiku i prevenciju karijesa, odstranjenje karijesa, preparaciju kaviteta, pečaćenje fisura i jamica, polimerizaciju svjetlosno stvrdnjavajućih materijala, izbjeljivanje vitalnih i avitalnih zubi te uklanjanje dotrajalih ispuna. Kod mekih tkiva za potpomognutu ekspoziciju krune zuba u otežanom procesu nicanja i/ili u svrhu postavljanja ortodontskih bravica, gingivoplastiku radi postizanja adekvatnih uvjeta za izradu restauracije, frenulektomija i terapija ankiloglosije, terapija gingivne hiperplazije kao posljedice ortodontskih pomaka zuba, operulektomija u području donjih molara, uklanjanje traumatskih fibroma, terapija gingivne hiperplazije kao posljedice korištenja nekih lijekova (antiepileptici, imunosupresivi), terapija aftoznih ulceracija i labijalnih lezija izazvanih Herpes virusom i laserski potpomognute pulpotomije i pulpektomije.

#### MINIMALLY INVASIVE SOFT TISSUE SURGERY USING LASER IN PEDIATRIC DENTISTRY - CASE REPORTS

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**Aim:** Laser (acronym of eng. *Light Amplification by Stimulated Emission of Radiation*) is a device that creates and amplifies a narrow, intense beam of coherent light.

The purpose of the study was to show the clinical use of lasers in minimally invasive soft tissue surgery in children.

**Materials and methods:** The use of lasers in pediatric and preventive dentistry is highly justified, considering that children and adolescents area population group that is most sensitive to the pain in dental surgery, bleeding and frequent visits to the dentist.

The advantages of using a laser are its almost painless use, reduction of anxiety in patients caused by sounds of high speed handpiece, minimized bleeding and postoperative edema, accelerated healing, reduction in bacterial infections and minimally invasive cavity preparation while sparing tooth structure. The disadvantages of using a laser are the price of the device itself, which in turn increases the price and cost of treatment; that its application is not completely painless and requires anesthesia of the surgical area. Laser cannot be used for the preparation of proximal carious lesions, secondary caries and large carious lesions. The most commonly used lasers in dentistry are CO<sub>2</sub> laser, Nd:YAG, erbium laser (Er:YAG, Er, Cr: YSGG), diode lasers and photobiostimulating lasers.

**Conclusions:** In pediatric dentistry lasers are used for hard and soft tissues. In the hard tissues, it is used for diagnosis and prevention of dental caries, caries removal, cavity preparation, sealing of the pits and fissures, polymerization of light cured materials, whitening of the vital and non-vital teeth and removal of worn fillings. In soft tissues, it is used for exposure of the tooth crown that has difficulty growing and/or following placement of orthodontic braces, gingivoplasty in order to achieve adequate conditions for making the restoration, for the frenulectomy and ankiloglosy treatment, for the treatment of gingival hyperplasia as a result of orthodontic tooth movement, for operulectomy in the lower molars, traumatic fibroma removal, treatment of gingival hyperplasia associated with using certain medications (anticonvulsants, immunosuppressants), for treatment aphthous ulcers and labial lesions caused by herpes virus and laser assisted pulpotomy and pulpectomy.

#### ZNANJE, STAVOVI I NAVIKE RODITELJA I NJIHOVE DJECE PREDŠKOLSKE DOBI O ORALNOM ZDRAVLJU

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**Cilj:** Oralno zdravlje važna je sastavnica ukupnog zdravlja. Na oralno zdravlje djece utječe velik broj čimbenika među kojima su opće zdravstveno stanje, dob djeteta, prehrane, oralna higijena, provođenje preventivnih mjera, socioekonomski status obitelji i drugi. Cilj ovog istraživanja bio je istražiti znanje, stavove i navike roditelja i njihove djece predškolske dobi o oralnom zdravlju, uključujući prehrambene, preventivne i oralnihigijenske navike.

**Materijal i postupci:** U istraživanju je sudjelovalo 249 roditelja djece predškolske dobi koja pohađaju četiri dječja vrtića na području grada Splita. Djeca u dobi od 3 do 8 godina podijeljena su u dvije dobne skupine, od kojih je 97 (39,0%) djece bilo u dobnoj skupini od 3-4 godine, a 152 (61,0%) djece u dobnoj skupini od 5 godina i više. Osnovni instrument istraživanja bio je upitnik za roditelje u kojem smo dobili podatke o informiranosti roditelja o prevenciji oralnih bolesti te o prehranbenim i oralno-higijenskim navikama njihove djece.

**Rezultati:** Ukupno 202 (81,1%) roditelja su potvrdno odgovorila na pitanje je li njihovo

#### ORAL HEALTH KNOWLEDGE, ATTITUDES AND HABITS OF PARENTS AND THEIR PRESCHOOL CHILDREN

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**Objectives:** Oral health is an important component of general health. The children's oral health is affected by a number of factors, including the condition of general health, the child's age, diet, oral hygiene, applied preventive measures, socio-economic status of the family, ect. The aim of this study was to investigate the knowledge, attitudes and habits of parents and their preschool children about child's oral health, including dietary, preventive and oral hygiene measures.

**Material and methods:** There were 249 parents of preschool children from four kindergartens in the city of Split included in this study. Children aged 3-8 years old were divided in two age groups; there were 97 (39.0 %) children at the age of 3-4 and 152 (61.0 %) children at the age of 5 and older. Basic research instrument was a questionnaire for parents consisting 18 questions about how well they were informed about the prevention of oral diseases and the dietary and hygienic habits of their children.

**Results:** The results of our study showed that according to the questionnaire, 202 (81.1%) preschool children visited a dentist. Mean age for the visit was at the age of 3.5 years. Only

dijete ikad posjetilo doktora dentalne medicine. Prosječna dob u kojoj je većina djece prvi put posjetila doktora dentalne medicine bila je 3,5 godine. Samo petero djece (2%) posjetilo je doktora dentalne medicine u preporučeno vrijeme, s godinu dana. Čak 47 djece (18,9%) od njih 249 nikada nije posjetilo doktora dentalne medicine. Prema odgovorima roditelja, 75 djece (30,2%) imalo je karijes, a djelomično ili potpuno sanirane zube imalo je 109 (44,3%) predškolske djece. U dijelu upitnika o prehrambenim navikama predškolske djece rezultati su pokazali kako 51,4% djece jede grickalice i slatkiše svaki dan, a njih 81,4% pije zaslađene napitke svaki dan. Rezultati su pokazali da značajno više djece starije dobne skupine samostalno pere zube, u usporedbi s mladom djecom (65,1% vs. 37,1% djece,  $P < 0,001$ ).

**Zaključak:** Ovim istraživanjem pokazali smo da je stupanj oralne higijene i svijesti o oralnom zdravlju predškolske djece u gradu Splitu nezadovoljavajući. Roditelji prvi put odvođe svoju djecu doktoru dentalne medicine kasnije od preporučene dobi. Prehrambene i oralnohigijenske navike također su se pokazale nezadovoljavajućima.

#### ANALIZA UTJECAJA PH ZUBNIH PASTI S RAZLIČITIM KONCENTRACIJAMA FLUORA NA PREVENCIJU DEMINERALIZACIJE CAKLINKE

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**Cilj:** Cilj ovog istraživanja bio je odrediti utjecaj četiriju komercijalno dostupnih zubnih pasti s različitim koncentracijama fluora na sprječavanje demineralizacije zubne cakline te učinak istih nakon njihova zakiseljenja.

**Materijali i postupci:** Stotinu i dvanaest zdravih zuba iskorišteno je za pripremu caklinskih izbrusaka nakon čega se izmjerila početna mikrotvrdoća cakline po Vickersu. Izbrusci su podijeljeni u 16 skupina i podvrgnuti demineralizacijskom protokolu koji se sastojao od 5 svakodnevnih ciklusa kroz 10 uzastopnih dana. Jednom dnevno, poslije zadnjeg ciklusa demineralizacije, izbrusci su bili po 30 minuta izloženi otopini zubne paste koja je sadržavala 1450 ppm, 1000 ppm, 450 ppm, odnosno 0 ppm fluora. Otopine zubnih pasta bile su izvornog pH, odnosno zakiseljene na 6,50, 6,00 te 5,50 pH. Nakon toga im je ponovno izmjerena mikrotvrdoća po Vickersu. Razlika između testiranih grupa je procijenjena ANOVA i Newman-Keuls testom ( $P < 0,05$ ).

**Rezultati:** Najveći porast mikrotvrdoće ustanovljen je poslije tretiranja zubnom pastom koja je sadržavala 1450 ppm fluora pri njenom izvornom pH (postotak porasta mikrotvrdoće iznosio je 6,20%). Najveće smanjenje mikrotvrdoće ustanovljeno je poslije tretiranja pastom koja nije sadržavala fluor, također pri njenom izvornom pH (postotak smanjenja mikrotvrdoće iznosio je 6,82%), no ova usporedba se nije pokazala statistički značajnom.

**Zaključak:** Primjena fluorida može smanjiti pojavnost karijesa, ali istodobno povećava mogućnost pojave dentalne fluorozije. Postoje brojna istraživanja koja ukazuju na toksičnost fluora te se stoga povećava broj ljudi koji odbijaju koristiti fluoridne zubne paste. Prema dobivenim rezultatima u ovom istraživanju, caklinska mikrotvrdoća nije bila statistički značajno različita nakon primjene pasta s fluoridima u odnosu na caklinsku mikrotvrdoću nakon primjene paste bez fluora koja je u svom sastavu sadržavala ksilitol. Stoga se može zaključiti kako paste s ksilitolom mogu biti alternativna fluoridnim zubnim pastama. **Titel:** Analysis of influence of toothpaste pH on its capacity to prevent enamel demineralization

#### STANJE ORALNOG ZDRAVLJA DJECE PREDŠKOLSKE DOBI U GRADU ZAGREBU

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**Uvod:** Pojavnost karijesa u svijetu već godinama bilježi pad dok u gradu Zagrebu karijes i njegove posljedice još uvijek predstavljaju veliki javnozdravstveni problem. U sklopu Programa prevencije karijesa djece predškolske dobi u Gradu Zagrebu provedeno je istraživanje kako bi se dobili recentni podatci o oralnom zdravlju predškolske djece grada Zagreba koji nedostaju u literaturi.

**Cilj:** Utvrditi pojavnost karijesa u dječjim vrtićima grada Zagreba bilježeći KEP indeksi (zbroy karioznih (K), zuba s ispunom (P) i ekstrahiranih (E) trajnih zubi) i kep indeksi mliječnih zubi.

**Ispitanici i metode:** U razdoblju od 2013. do 2016. pregledano je 4609 djece u dobi od 3 do 8 godina iz 22 vrtića u Zagrebu, Hrvatska. Četiri specijalista dječje stomatologije Stomatološke poliklinike Zagreb pregledala su djecu, koristeći kriterije Svjetske zdravstvene organizacije za utvrđivanje karijesa. Pregled je proveden stomatološkim ogledalom i batrijskom lampom u prostorijama dječjih vrtića, uz prethodno potpisani informirani pristanak roditelja/staratelja. Zabilježeni su spol, dob i dentalni status djece. Za statističku obradu podataka korišten je MS Excel. Podaci su dobiveni primjenom  $\chi^2$  testa.

5 children (2%) visited dentist at the recommended age of one, while 18.9% of children included in this study never visited a dentist. According to parents' answers, 75 (30.2%) children had caries, while 109 (44.3%) of included children had partially or totally restored teeth. According to the questions about dietary habits of preschool children, our results showed that 51.4% of children ate snacks and drank sweet beverages every day. Our results also showed that significantly more older preschool children ( $\geq 5$  years old) in comparison to the younger preschool children (3-4 years old) brush their teeth without parents' assistance (65.1% vs. 37.1% children,  $P < 0.001$ ).

**Conclusion:** This study demonstrated that the level of oral hygiene and awareness of oral health of preschool children in Split according to parents' answers are unsatisfactory. Parents take their children to the dentist later than the recommended age. Also, the dietary and hygienic habits of preschool children are unsatisfactory.

#### ANALYSIS OF INFLUENCE OF TOOTHPASTE PH ON ITS CAPACITY TO PREVENT ENAMEL DEMINERALIZATION

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**Purpose:** This study evaluated *in vitro* the remineralization capacity of commercial toothpastes with different F concentrations and their effectiveness when they are acidified.

**Materials and methods:** 112 caries free teeth were used to prepare enamel specimens and baseline surface Vickers microhardness was measured. After that they were divided in 16 groups and were subjected to the pH cycling regime involved 5 demineralization challenges each day for 10 days, and final surface Vickers microhardness was then measured. Once daily, specimens were exposed for 30 minutes after last demineralization challenge of the day to the slurry of the each toothpaste containing 1450 ppmF, 1000 ppmF, 450 ppmF and 0 ppmF. The slurry was in original pH or acidulated on 6.50, 6.00 or 5.50 pH. The difference among tested group was assessed by ANOVA and Newman-Keuls test ( $p < 0.05$ ).

**Results:** The highest increase in microhardness was detected after treatment with toothpaste containing 1450 ppmF, in its original pH (percentage of increase in microhardness was 6.20%), and the biggest loss was detected after treatment with toothpaste containing no flour, also in its original pH (percentage of decrease was 6.82%), but there was no significant difference between tested groups.

**Conclusion:** Use of fluoride has led to reducing the incidence of dental caries, but has also increased the rate of dental fluorosis. They are a many studies about toxicity of fluoride exposure and an increasing number of people refuse to use fluoride toothpaste. According to obtained results, the enamel micro-hardness was not statistically significant after treatment with fluoride containing toothpaste versus fluoride free toothpaste. Therefore, toothpaste containing xylitol could be an alternative to fluoride toothpaste.

#### ORAL HEALTH STATUS OF PRESCHOOL CHILDREN IN THE CITY OF ZAGREB

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**Introduction:** Despite a decrease in the prevalence of dental caries globally, caries and its consequences still represent a major public health problem in Zagreb. Since the recent literature on oral health of preschool children in Zagreb is scarce, a study was conducted as a part of the Dental Caries Prevention Program in Preschool Children in Zagreb.

**Aim:** To evaluate the prevalence of dental caries in kindergartens in Zagreb by recording the DMFT index (number of decayed (D), missing due to caries (M) and filled (F) permanent teeth), and dmft index for primary dentition.

**Materials and methods:** A total of 4609 children aged 3-8 years from 22 kindergartens in Zagreb, Croatia were examined in the period 2013-2016. Four specialists in pedodontics from Dental Polyclinic Zagreb performed dental examinations based on the World Health Organization criteria. The visual inspection was performed with dental mirror and flashlight, in kindergartens. The informed consent was previously obtained from parents/caregivers. Gender, age and dental status were recorded. For statistical analysis the MS Excel was used and data were obtained by using the chi-square test.

**Results:** 2372 boys (51,46%) and 2237 girls (48,54%) were examined. Caries prevalence

**REZULTATI:** Pregledano je 2372 dječaka (51,46%) i 2237 djevojčica (48,54%). Prevalencija karijesa iznosila je 65,96% (3040), kep indeks 3,72 ( $\pm 0,06$ ), a KEP indeks 0,09 ( $\pm 0,01$ ). Djece s intaktnim zubima bilo je 29,55% (1362), a djece sa svim saniranim zubima bilo je 4,49% (207). Od ukupnog broja djece s karijesom, 69,57% (2115) nema saniran niti jedan zub. Od 3433 pregledana prva trajna kutnjaka, 8,13% (279) je bilo s karijesom.

**ZAKLJUČAK:** Visoka prevalencija karijesa, visok kep indeks i veliki broj nesanimiranih karijesa kod djece vrtičke dobi u gradu Zagrebu pokazuju potrebu za programima prevencije karijesa u svrhu poboljšanja stanja oralnog zdravlja djece.

#### MARDEN-WALKER SINDROM – PRIKAZ SLUČAJA

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**Uvod:** Marden-Walker sindrom je sindrom čija etiologija nije jasna. Pretpostavlja se da se radi o poremećaju u razvoju središnjeg živčanog sustava koji se nasljeđuje autosomno recesivno. Uz tri glavna klinička znaka: blefarofimozu, kongenitalne kontrakture zglobova i bezizražajno lice u ovih se bolesnika može naći i niz drugih anomalija poput malformacije lica, rascjep nepca, mikrognatija, intrauterini zastoj rasta, mikrocefalija, malformacije srca, poremećaji u genitourinarnom sustavu, anomalije oka, nabor na vratu. Genska podloga ovog entiteta do sada nije poznata. Analizom kromosoma u sve opisane djece nađen je normalan kariogram.

**Prikaz slučaja:** Dvanaestogodišnja djevojčica s kliničkim karakteristikama Marden-Walkerova sindroma i bolovima u usnoj šupljini liječi se na odjelu fizikalne terapije Opće bolnice u Vinkovcima. Pregled doktora dentalne medicine zbog jakog spazma muskulature u više navrata nije bio izvediv. Primijenjena je tehnika po Vojti, u kontinuitetu kroz pet dana, kojom je popustio spazam cervikofacijalne muskulature te je omogućen pregled doktora dentalne medicine. Ovaj prikaz slučaja podsjeća i naglašava potrebu kontinuirane psihomotorne stimulacije s ciljem sprječavanja progresije i komplikacija prisutnog deficita kao i važnost evaluacije motornog razvoja i specifičnog individualiziranog rehabilitacijskog pristupa te plana ovisno o potrebama i zahtjevima pojedinog djeteta. Na taj se način unatoč ograničenjima pojedinog djeteta nastoji povećati samostalnost te olakšati funkcioniranje u svakodnevnicu roditelja i djeteta.

was 65,96% (3040), dmft 3,72 ( $\pm 0,06$ ) and DMFT 0,09 ( $\pm 0,01$ ). No cavities was found in 29,55% (1362) children. 4,49% (207) children had all their teeth restored or healthy. Of total number of children with caries, 69,57% (2115) have no teeth restored. Among 3433 examined first permanent molars, 8,13% (279) had caries.

**CONCLUSION:** High dental caries prevalence, high dmft index and large number of untreated carious teeth among preschool children in Zagreb indicate the need for caries prevention programs aimed at improving their oral health.

#### MARDEN-WALKER SYNDROME – CASE REPORT

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**Introduction:** Marden-Walker syndrome is a syndrome whose underlying pathological mechanism has not yet been clearly established. It is assumed that it is a developmental disorder of the central nervous system which is inherited in an autosomal recessive manner. Three main characteristics and diagnostic criteria are blepharophymosis, congenital joint contractures and mask-like face. Numerous other anomalies have been described such as facial malformations, cleft palate, micrognathia, intrauterine growth retardation, small circumference of the head, hearth malformations, disorders of the genitourinary system, eyes abnormality and short neck. The exact gene that causes the disease is not known. All patients had normal karyotypes.

**Case report:** We present a twelve-year girl with Marden-Walker syndrome and pain in the mouth. Medical examination repeatedly was not possible because the strong cervico-facial muscles spasm. Vojta principles were applied during five days, resulting in reduced spasm thus enabling the doctor of dental medicine to examine the child. This case report reminds and highlights the importance of continuous psychomotor stimulation because of prevention of the progression and complications of deficits, as the importance of evaluating motor development and creating specific rehabilitation plan for each child. In this way we try maximizing the quality of child's life and independence in accordance with the possibilities in everyday life of the parents and the child.

#### STAJALIŠTE ADOLESCENATA U HERCEGOVINI O ORALNOM ZDRAVLJU

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**Cilj:** Na oralno zdravlje imaju utjecaj različiti društveni čimbenici kao što su socijalni status, izobrazba, osobne higijenske i zdravstvene navike, životno okruženje, te zdravstvene službe. Dosadašnja istraživanja pokazuju poveznicu između oralnih navika u djetinjstvu i kasnije oralno-dentalne patologije. Cilj ovog istraživanja bio je odrediti stajalište adolescenata svih adolescentskih dobi o oralnom zdravlju u Hercegovini.

**Ispitanici i postupci:** U istraživanje je bilo uključeno 120 ispitanika (35 muških, 85 ženskih, srednje dobi 16,43  $\pm$  2,89) s područja Hercegovačko-neretvanske županije, koji su došli na dentalni pregled. Svi ispitanici ispunili su standardizirani Hiroshima University-Dental Behavioural Inventory (HU-DBI) test. Podaci su statistički analizirani korištenjem Mann-Whitneyev U testa.

**Rezultati:** Na osnovu frekvencija i postotka odgovora "DA" na pitanja HU-DBI testa najviše ispitanika odgovorili su potvrdno na 3. *Vodim brigu o boji mojih zuba*, 12. Često nakon pranja zuba koristim ogledalo da se uvjerim jesu li zubi čisti i 13. *Zabrinut/a sam zbog lošeg zadaha iz usta nakon buđenja*, pokazujući da je najveća briga ispitanika estetski izgled. Odgovori na pitanja 17. *Koristim zubnu četkicu sa tvrdim vlaknima*, 18. *Ako nisam izvršio/la jaki pritisak četkicom imam osjećaj da moji zubi nisu dobro oprani* i 10. *Nikada nisam imao/la profesionalnu poduku o pranju zuba* ukazuju kako su adolescenti neadekvatno informirani od strane profesionalne osobe. Statistički značajne razlike s obzirom na adolescentsku dob pokazuju da u srednjoj adolescentskoj dobi (15-18 godina) ispitanici češće idu kod doktora dentalne medicine samo kada ih boli zub i da su manje zabrinuti za boju svog zubnog mesa. Mišljenja su da bez korištenja zubne paste mogu dobro oprati zube. U ovoj dobi smanjuje se roditeljska potpora i kontrola, što rezultira lošijim oralno-higijenskim stavovima nego u ranoj (11-14 godina) i kasnoj adolescenciji (19-21 godina).

U kasnoj adolescentskoj dobi ispitanici misle da su im zubi sve lošiji unatoč svakodnevnoj higijeni, da ne mogu dobro oprati zube bez zubne paste, te često ogledalom kontroliraju

#### ORAL HEALTH ATTITUDE AMONGST ADOLESCENTS IN HERCEGOVINA

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**Aim:** Oral health of individuals today is being influenced by many different social factors such as social status, education, personal hygiene and general health maintenance habits, environmental factors and efficiency of health services. Studies conducted so far have shown the link between oral habits during childhood and later on oral-dental pathology. The aim of present study was to determine oral health attitudes of adolescents in Herzegovina.

**Subjects and methods:** Data was collected from 120 participants (35 male, 85 female, the mean age 16,43  $\pm$  2,89) who came to have their dental check-up, and they were all from Herzegovina-Neretva Canton. All participants were obliged to fill out Hiroshima University-Dental Behavioural Inventory (HU-DBI) test. All the information collected during data collection process was analyzed by using Mann-Whitney U test.

**Results:** Item 3: "I worry about the colour of my teeth", Item 12: ("I often check my teeth in a mirror after brushing") and Item 13: ("I worry about having bad breath in the morning, after I wake up") in HU-DBI test, showed the highest percentage of participants' agreement; based on participants' response, and frequency of their answer "YES". As evident from the results of the test, participants were more worried about aesthetic aspect of their teeth. Further responses to HU-DBI test items, which are: Item 17: ("I use a toothbrush which has hard bristles"), Item 18: ("I don't feel I've brushed well unless I brush with strong strokes") and Item 10: ("I have never been taught professionally how to brush my teeth"), all indicate that adolescents are not well informed about their oral hygiene by professionals.

Statistically significant differences shown, teenagers going through middle stage of their adolescence (15-18 years) are usually putting off going to the dentist until they have a toothache and they are less worried about the colour of their gums. They think they can clean their teeth without using toothpaste. In the middle stage of adolescence teenagers don't get as much control and support from their parents as they did before which inevitably re-

čistoću opranih zuba. Stavovi u ovoj dobi povezani su sa sazrijevanjem adolescenata i njihovim sagledavanjem uloge oralno-higijenskih navika na oralno zdravlje.

**Zaključak:** Implementacija edukacijskih programa o promicanju oralnog zdravlja tijekom srednjoškolskog obrazovanja potrebna je zbog unapređenja oralno-higijenskih stavova i navika kod adolescenata u Hercegovini.

## KOMPOMERI U DJEČJOJ STOMATOLOGIJI

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Mliječni zubi su privremeni s poznatim i predvidivim rokom trajanja. Odabirom odgovarajućeg materijala za ispun želimo osigurati ispun koji se neće trebati mijenjati dok traje i mliječni zub. Što i kada odabrati za ispune na miječnim zubima? Suvremenim materijalima za ispune na mliječnim zubima smatraju se staklenoionomerni cementi, smolom modificirani staklenoionomerni cementi, kompomeri, te konvencionalni kompoziti. Kompomeri su polikiselinski modificirane kompozitne smole i dizajnirani za da kombiniraju estetiku tradicionalnih kompozita s otpuštanjem fluorida i prijanjanjem staklenoionomernih cemenata. Unatoč prisutnosti dodatnih komponenti, kompomeri su slični kompozitnim smolama koje su u osnovi hidrofobne, iako manje nego konvencionalne kompozitne smole. Oni nemaju sposobnost vezanja za tvrdo zubno tkivo, tako da je potrebno primjenjivati adhezive. Njihovo otpuštanje fluorida znatno je niže od staklenoionomernih cemenata. Posebnost kompomera je da nakon početne reakcije polimerizacije uzimaju male količine vlage što aktivira reakciju između kiselih baza staklenog punila i kiselih grupa funkcionalnih monomera. Taj proces uzrokuje otpuštanje fluorida iz staklenih punila u matricu, odakle se može lako otpustiti u usta, i djelovati antikarijesno. Polimerizacija je povezana s kontrakcijom i razvojem mjerljiva naprezanja, a može biti da sorpcija vode predstavlja neki dio u smanjenju tih naprezanja *in vivo*. U predavanju su prikazani i rezultati najnovijih znanstvenih istraživanja kompomera. Komparirana su fizička svojstva kompomera i staklenoionomernih cemenata, te nanohibridnih kompozita. Kompomeri su pokazali izvrsna fizička svojstva, naročito kolorirani. Uporaba koloriranog kompomera kod djece predškolskog uzrasta može biti vrlo motivirajući čimbenik za prihvaćanje liječenja i za brigu o oralnom zdravlju.

## KLINIČKA PRIMJENA DENTALNIH STAKLENIH MATERIJALA (GIC)

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Dentalni stakleni materijali danas imaju široku kliničku primjenu. Zbog svoje izvrsne biokompatibilnosti imaju svojstvo kemijskog svezivanja na tvrda zubna tkiva te mogu poslužiti za nadoknadu tkiva mliječnih i trajnih zuba. Adhezijski međuspoj između tvrdih zubnih tkiva i materijala omogućuje izvrsno rubno zatvaranje i gotovo je bez rubne pukotine. Oslobođanje iona fluora iz materijala omogućuje korištenje materijala za prevenciju ali i terapiju remineralizacijom karijesne lezije. Tehnika rukovanja materijalom, korištenjem grijanja staklenog materijala, što je poznato kao "Thermo-curing" može značajno poboljšati mehanička i adhezivna svojstva staklenih materijala i učiniti ih prikladnim i za trajne ispune na trajnim zubima. Također, biomimetička sposobnost materijala da se mineralizira znači da pečat ili ispun polako postaju mineralno tkivo ili idealni, biološki ispun. Danas, postupak preventivne endodontije ili revaskularizacija mladih trajnih zuba s nekrotičnom pulpom može se provesti korištenjem PRF tehnike i mineralizirajućim staklenim materijalom kao materijalom za formiranje krova pulne komore revaskulariziranog zuba. U zaključku se može reći da dentalni stakleni materijali imaju široku kliničku indikaciju, izvrsnu biokompatibilnost i biomimetičko djelovanje i mogu se preporučiti u svakodnevnoj kliničkoj praksi.

## FARMAKOLOŠKI PRISTUP U PRIPREMI PACIJENTA ZA SANACIJU

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Farmakološki pristup u pripremi pacijenta za sanaciju u velikoj mjeri određuju pacijentovo fizičko i emocionalno stanje, specifične potrebe i očekivanja te razina suradnje. Ako se ne može postići zadovoljavajuća suradnja primjenom bihavioralne tehnike, prilikom planiranja terapije u nekooperativnog pacijenta najčešće je indicirana inhalacijska i peroralna sedacija uz primjenu lokalne anestezije. Zadnja opcija je opća anestezija. Pacijenti koji zahtijevaju posebnu pripremu jesu vrlo mala djeca, prve posjete stomatologu, pacijenti s naglašenim strahom od stomatološkog zahvata, pacijenti s izrazitom fobijom od injek-

sults in poorer oral hygiene in comparison when they were younger (11-14 years) or when they get older (19-21 years). Older adolescents usually think their teeth are getting worse despite their daily brushing, that they cannot clean their teeth well without toothpaste and they often check their teeth in the mirror after brushing. Attitude towards oral health in this stage of adolescence is closely related to teenagers maturing and becoming aware of oral hygiene and its influence on their general health.

**Conclusion:** There is a need for setting up oral health programs in high schools in order to improve oral health attitudes and behaviour of adolescents in Herzegovina.

## COMPOMERS IN PEDIATRIC DENTISTRY

Tomislav Škrinjarčić

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Primary teeth are temporary with a known and predictable duration time. By selecting the appropriate restorative material we want to provide restoration that will not need to be changed during the time of deciduous dentition. What to choose as filling materials for primary teeth? The current filling materials for primary teeth are considered glass ionomers, resin-modified glass ionomers, compomers and conventional composites. Compomers are polyacid-modified composite resins and are designed to combine the aesthetics of traditional composites with the fluoride release and adhesion of glass-ionomers. Despite the presence of these additional components, compomers are similar to composite resins and are basically hydrophobic, although less than conventional composites. They do not bind to dental hard tissues and it is necessary to apply adhesives. Their level of fluoride releasing is much lower than that of glass ionomers. A distinctive feature of compomers is that, following the initial polymerization reaction, they take up small amounts of moisture what triggers an acid-base reaction between the reactive glass filler and the acid groups of the functional monomer. This process causes fluoride releasing from the glass filler to the matrix, from where it can readily be released into the mouth, and act as an anticariogenic agent. Polymerization is associated with contraction and the development of measurable stresses. It is possible that the sorption of water plays some part in reducing these stresses *in vivo*. The lecture also contains the results of the latest scientific researches of compomers. Physical properties of compomers were compared with glass ionomers and nanohybrid composites. Compomers showed excellent physical properties, particularly coloured ones. Application of coloured compomers in children of preschool age can be very motivating factor for acceptance of the treatment and care of their oral health.

## CLINICAL APPLICATION OF DENTAL GLASS MATERIALS

Domagoj Glavina, Professor

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Dental glass materials today can have a wide range of clinical applications. Because of their excellent biocompatibility properties to chemically bond to hard tooth tissues they can serve as restoratives on deciduous and permanent teeth offering excellent bonding of interphase of dental hard tissues and material with practically no leakage. Release of fluoride ions from dental glass enable preventive effect as well as therapeutic use as remineralising agent for caries treatment. Technique of material manipulation, using heating of glass based material, known as "Thermo-curing", can significantly improve mechanical and adhesive properties of dental glass materials making them suitable for permanent fillings on permanent teeth. Also, biomimetic capability of mineralisation of material itself means that sealant or restoration became slowly mineral tissue or ideal, biological filling. Today, preventive endodontic treatment, or revascularisation treatment of young permanent teeth with non vital pulp can be performed with PRF technique and covered with mineralising dental glass as a material that can build up pulp chamber roof of newly revascularised tooth. In conclusion it could be said that dental glass materials serve variety of indications on most biocompatible and biomimetic way and therefore should be recommended in every day clinical practice.

## PHARMACOLOGICAL APPROACH IN PREPARING A PATIENT FOR DENTAL TREATMENT

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Pharmacological approach in preparing a patient for the treatment is largely determined by a patient's physical and emotional state and specific needs and expectations as well as his level of cooperation. If satisfactory level of cooperation cannot be achieved by applying a behavioral technique, treatment planning in a non-cooperative patient usually indicates inhalation and oral sedation together with local anesthesia. The last option is general anesthesia. Patients who require special approach are very young children, the first visits to the

cijske igle i pacijenti s prijašnjim neugodnim i bolnim iskustvom. Metoda inhalacijske sedacije provodi se primjenom dušičnog oksidula. Provodi se prema određenom protokolu koji je u skladu sa smjernicama AAPD-a (Američke akademije za dječju stomatologiju) i EAPD-a (Europske akademije za dječju stomatologiju), a indicirana je u svrhu relaksacije pacijenta prije aplikacije lokalne anestezije, koja pak služi isključivo u svrhu kontrole boli. Osim inhalacijske metode sedacije, u kliničkoj se praksi često primjenjuje peroralna i intranazalna sedacija. U tu svrhu najčešće se koristi preparat midazolam. Prije provedbe inhalacijske sedacije potrebno je uzeti detaljnu povijest bolesti pacijenta i evidentirati prisutanak roditelja/staratelja. Pacijenta treba također detaljno informirati o tijeku i provedbi postupaka tijekom inhalacijske sedacije. Konačno, u postizanju adekvatne komunikacije i pristanka pacijenta na zahvat, klinička praksa često nalaže kombiniranje farmakološkog i psihološkog pristupa.

#### MED I PČELINJI PROIZVODI U OČUVANJU ORALNOG ZDRAVLJA

Prof. dr. sc. Danko Bakarčić

Medicinski fakultet Sveučilišta u Rijeci, Studij dentalne medicine, Zavod za dječju i preventivnu stomatologiju

Med kao jedna od najzdravijih namirnica ima svoje mjesto u očuvanju zdravlja usne šupljine. No uvijek se postavlja pitanje i njegove sigurnosti vezano uz nastanak karijesa. Znamo da se med velikim dijelom sastoj od šećera, a isto tako znamo i njihovu pogubnost za zube. Dakle, nameće se pitanje kako upotrebljavati med, a da ne ugrozimo zube. Isto tako med ima i antiseptička svojstva koja više nego dobro pokrivaju raspon raznih patoloških stanja u usnoj šupljini u smislu prevencije i liječenja. Tako je na primjer med sa svojim ne samo antiseptičkim već i ostalim svojstvima izvrstan čimbenik u cijeljenju rana i liječenju nekih patoloških stanja oralne sluznice.

Propolis se također vrlo često koristi u svrhu liječenja tih istih stanja i kod određenih osoba stvarno djeluje pozitivno, no njegova manjkavost proizlazi iz dosta velikog alergijskog potencijala. Također većina pripravaka s propolisom su alkoholne otopine što priječi njegovu upotrebu kod djece. No, kako god bilo ne treba ga izolirati i izbaciti iz upotrebe već oprezno koristiti uz savjetovanje sa svojim liječnikom ili stomatologom.

Zaključno možemo reći da pčelinji proizvodi imaju svoje mjesto u očuvanju oralnog zdravlja, ali njihova upotreba ne smije biti nekritična i treba se držati određenih pravila.

#### SUVREMENI POSTUPCI I MATERIJALI U DJEČJOJ I PREVENTIVNOJ STOMATOLOGIJI - KLINIČKA ANALIZA

prof. dr. sc. Walter Dukić

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Svrha i cilj moderne preventivne stomatologije je očuvanje zubnih struktura i visoki stupanj prevencije od karijesa. S obzirom da postoje brojni materijali i postupci na tržištu, mnogi nemaju dostatna klinička istraživanja i znanstvenu utemeljenost kako bi dokazala svoju superiornost prema drugim postupcima i materijalima. Pregledom literature su se analizirali objavljeni klinički radovi s meta analizom pojedinih postupaka te pregled svih objavljenih radova. Analizirali su se radovi objavljeni do 2016. godine. Radom su obuhvaćeni postupci pečenja fisura, klorheksidin glukonat (CHX), Ksilitol, fluorni lakovi, CPP-ACP, mikroinvasivni aproksimalni postupak te restauracijski materijali za stražnje zube. Rezultati su pokazali da postoje razlike u kliničkoj percepciji i marketingu pojedinih postupaka i materijala u odnosu na objavljena klinička relevantna istraživanja. Postupak pečenja fisura pokazuje visoki stupanj kliničke prevencije karijesa kao i standardi preparati fluora, te su superiorni prema drugim postupcima prevencije karijesa. Također, za neke postupke nema dovoljno dugoročnih kliničkih istraživanja. Restauracijski materijali tipa Bulk Fill kompoziti za sada ne pokazuju superiornost prema standardnim materijalima zbog vrlo malog broja objavljenih kliničkih radova. Zaključno, potrebna su dugoročna klinička istraživanja novih materijala i postupaka kako bi se dokazala njihova korisnost u odnosu na standardne materijale i postupke. Za sada je preporuka da se koriste klinički i znanstveno provjereni materijali i postupci za prevenciju karijesa.

#### SEDACIJA U ORDINACIJI DENTALNE MEDICINE

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Sedacija dušičnim oksidulom ili inhalacijska sedacija relativno je jednostavan brz i učinkoviti način opuštanja pacijenta prije stomatološkog zahvata. Najčešće se kombinira sa primjenom lokalne anestezije, kako bi se postigla maksimalna učinkovitost glede ponašanja i boli kod pacijenata koji su nespreni (prestrašeni i nekooperativni) za zahvat ili zbog nekog razloga ne prihvaćaju tretman. Radi se o kemijski induciranom promijenjenom psihološkom stanju svijesti u svrhu otklanjanja straha i boli. Kako bi se postigla maksimalna

dentist, patients with elevated fear of dental procedures or extreme phobia of needles, and patients with a previous unpleasant and painful experience. Inhalation sedation is carried out by using nitrous oxide. The protocol complies with the AAPD (American Academy of Pediatric Dentistry) and EAPD (European Academy of Paediatric Dentistry) guidelines and is indicated for the purpose of relaxing a patient prior to application of local anesthesia, which on the other hand is used exclusively for pain control. In addition to inhalation method of sedation, oral and intranasal sedation are often used in clinical practice. Midazolam is the most common drug used for that purpose. Prior to implementing inhalation sedation, it is necessary to obtain a patient detailed medical history and a written consent signed by a parent/guardian. The patient should also be informed in details about the progress and procedures used during inhalation sedation. However, in achieving adequate communication and a patient consent for surgical procedures clinical practice usually requires combining both pharmacological and psychological approaches.

#### HONEY AND BEE PRODUCTS IN ORAL HEALTH PRESERVATION

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As one of the healthiest foods honey has his place in oral health maintenance. But still remains the question of its security related to the formation of dental caries. We know that honey is largely consisted of various sugars, and there is well known their deleterious effects on teeth. So, the question is how to use honey, and at the same time avoid to endanger the teeth. Also, honey has antiseptic properties which can cover wide range of various pathological conditions in the oral cavity in terms of prevention and treatment. Honey has not only antiseptic, but also other characteristics of a great value in wound healing and the treatment of certain pathological conditions of the oral mucosa.

Propolis is also often used to treat these same conditions and in certain patients really has a positive effect. Downsides of his properties results from the quite high allergic potential. Also most of the preparations with propolis are the alcoholic solutions which prevents its use in children. But either way, it should not be isolated and excluded from use, but it should be used carefully in consultation with doctor or dentist.

In conclusion we can say that the bee products have their place in oral health maintenance, but their use must be well controlled and should adhere to certain rules.

#### MODERN PREVENTIVE PROCEDURE AND MATERIALS IN CHILD AND PREVENTIVE DENTISTRY- CLINICAL ANALYSIS

Walter Dukić, Associate Professor

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The main goal of modern preventive dentistry is preserve of hard dental tissues and high level of caries prevention. Because of many materials and procedures for caries prevention on dental market, many of them lack of clinical and scientific evaluation and proof and their superiority over standard and traditional materials and procedures cannot be justified. This paper analyzed published scientific papers with heading of meta-analysis, reviews and randomized clinical trials till year 2016. Fissure sealing, chlorhexidine gluconate (CHX), Xylitol, fluoride materials, CPP-ACP, microinvasive proximal procedures and restorative materials for teeth filling were analyzed. The results showed differences in clinical perception of materials and procedures due to the marketing of manufacturers in contrast to recent published scientific reports. The fissure sealing procedure and fluorides results in high caries prevention, showing its superiority among other preventive procedures and materials. Moreover, some preventive procedures lack of long term clinical scientific reports. The new Bulk Fill composite materials don't have superior clinical results over traditional restorative materials and lack in long term clinical analysis. In conclusions, there is high need for long term clinical randomized trials for new materials and procedures and their justification for daily clinical use in term of high caries prevention. For now, it is wisely to use standard and scientifically proven materials and procedures for caries prevention.

#### SEDATION IN DENTAL OFFICE

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Sedation or nitrous oxide inhalation sedation is relatively simple, quick and effective way to relax the patient prior to dental procedures. Most often it is combined with the application of local anesthesia, in order to achieve maximum efficiency in terms of behavior and pain in patients who are unprepared (frightened and uncooperative) for surgery or for some reason do not accept treatment. It is a chemically-induced altered psychological state of mind in order to eliminate the fear and pain. To achieve maximum efficiency, it is

učinkovitost, potrebno je pravilno selektirati pacijente, postaviti indikacije i kontraindikacije, te ovladati tehnikom primjene metode. Relativna analgezija postiže se na način da se podiže prag boli na nivou limbickog sustava i retikularne formacije u talamusu. Pozitivni efekti ove metode su postizanje sedacije, analgezije te supresije laringealnog refleksa.

necessary to properly select patients, set indications and contraindications, and to master the technique of application methods. Relative analgesia is achieved in a way as to raise the pain threshold at the level of the limbic system and reticular formation of the thalamus. The positive effects of this method are to achieve sedation, analgesia and suppression of laryngeal reflexes.

#### KOMPOZITNI ISPUN U DISTALNOJ REGIJI – KOJE SU ZAMKE I KAKO IH IZBJEĆI?

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U današnjoj svakodnevnoj praksi velika većina pretkutnjaka i kutnjaka restaurira se kompozitnim materijalima, prije svega zbog njihovih estetskih osobina. Svjesni smo da pri tome postoji veliki broj različitih čimbenika koji mogu dovesti do neuspjeha terapije s posljedičnim ranim ili kasnim greškama, koje izravno skraćuju vijek izrađenog ispuna kao i njegova estetska svojstva. Koje su sve greške tijekom kliničkog rada moguće te kako kompenzirati nedostatke kompozitnog materijala u svrhu estetskog i funkcijskog poboljšanja naših restauracija? Kako u potpunosti najbolje iskoristiti potencijal suvremenih estetskih dentalnih materijala tijekom restauracija stražnjih zuba? Koje su prednosti i ograničenja suvremenih adhezivnih postupaka? Koji su razlozi neuspjeha? Sve su ovo pitanja koja postaju aktualna tijekom svakodnevnog kliničkog rada te pred kliničara stavlja iskušenja koja je moguće bolje sagledati tek kada imamo dovoljna teorijska znanja o samom materijalu ali i osobitostima kliničkih postupaka koji je temelje na minimalno intervencijskom liječenju karijesa. Tek tada krajnji rezultati našega rada ostvarit će maksimalni učinak tijekom liječenja degenerativnih bolesti tvrdih zubnih tkiva.

#### COMPOSITE FILLING IN THE DISTAL REGION - WHAT ARE THE PITFALLS AND HOW TO AVOID THEM?

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In today's daily practice, the vast majority of premolars and molars are restored with composite materials, primarily because of their aesthetic properties. We are aware that in fact there are a number of different factors that can lead to treatment failure with consequent early or late mistakes, which directly shorten the life of our fillings as well as its aesthetic properties. What are the major errors in our clinical work and how to compensate all possible shortcomings of composite resin materials for long lasting aesthetic and functional restorations? How can we fully exploit the potential of modern aesthetic dental materials for restoration of posterior teeth? What are the advantages and limitations of modern adhesive procedures? What are the reasons for failure? These are all issues that become very important during everyday clinical work and the clinician puts in temptations that we can be better only when we have sufficient theoretical knowledge about used material, and important characteristics of clinical procedures based on minimal intervention treatment of caries. Only then the final outcome of our work will achieve maximum effect during treatment of degenerative disease of hard dental tissues in distal region.

#### ADOLESCENT U ORDINACIJI DENTALNE MEDICINE

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Adolescencija predstavlja vrlo važno razdoblje odrastanja u kojemu se dijete formira u odraslu osobu, psihički i fizički. Često je to veoma stresno razdoblje koje se odražava i na oralno zdravlje pacijenta. Sve je manji utjecaj roditelja te adolescenti počinju sami brinuti o svom oralnom zdravlju. Mnogi to dobro rade, ali postoji određen broj adolescenata koji nisu dovoljno motivirani za održavanje oralne higijene, te zapuštaju svoj izgled i svoje zdravlje. Hormonskim promjenama koje se događaju u organizmu, promjenama u kemijskom sastavu sline, neadekvatnoj prehrani koja se bazira na povišenom unosu šećera i nerafiniranih ugljikohidrata postaju podložni povećanom riziku za nastanak karijesa, gingivitisa i parodontitisa. Uz to važan je i faktor stresa koji se odražava na oralno zdravlje, a kojeg izaziva povećana odgovornost i obaveze koje odrastanje nosi sa sobom.

U tom periodu liječnik dentalne medicine ima veliku ulogu u suzbijanju straha od stomatološkog liječenja i poticanju motivacije pacijenta. Liječnik dentalne medicine mora biti svjestan razlike koja se javlja u komunikaciji u djeteta s 13 ili 18 godina. Također odrastanjem estetika postaje važan razlog zbog kojeg se pacijenti javljaju liječniku dentalne medicine, jer često predstavlja presudan čimbenik u emocionalnom razvoju i socijalnom okruženju.

#### ADOLESCENT IN PAEDIATRIC DENTISTRY PRACTICE

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Adolescence is a very important period of growth in which the child grows up physically and mentally. Often this is a very stressful time that is reflected in the oral health of the patient. Parental influence is lower and adolescents begin to take care of your oral health. Many of them doing this very good, but there are a number of adolescents who are not motivated enough to maintain oral hygiene and neglect their appearance and health. Hormonal changes in the body, changes in the chemical composition of saliva, inadequate diet based on high intake of sugar and refined carbohydrates become subject to increased risk for caries, gingivitis and periodontitis. In addition, an important factor of stress that affects the oral health, and which causes increased responsibilities and obligations that growing up brings.

In that period, a doctor of dental medicine has an important role in suppression the fear of dental treatment and encourage motivation of the patient. The doctor of dental medicine must be aware of the difference that occurs in communication with the child 13 or 18 years. In this period of growing up, aesthetics becomes an important reason why patients visit their doctor of dental medicine, because aesthetics is often a critical factor in the emotional development and social environment.