Prikaz slučaja estetske opskrbe dentalne fluoroze

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Acta Stomatol Croat
1998; 449—453

Sažetak

Pacijent u dobi od 30 godina, podrijetlom iz Gaze (Palestina), došao je na Stomatološki fakultet nezadovoljan estetskim izgledom svojih zuba. Klinički su opažene vidljive promjene zubnih površina u obliku tamnosmeđih točkica, pruga i jamica na caklini, te izražena atricija. Na osnovi kliničke slike promjena postavljena je dijagnoza dentalne fluoroze osmoga stupnja po Thylstrupu i Fejerskovu. Anamnestički su se pokušali utvrditi razlozi tako opsežne fluoroze. Kao mogući etiološki čimbenik utvrđen je neprikladan pokušaj fluoridacije pitke vode. Terapija i korekcija estetskog izgleda provedena je kompozitnim materijalom Tetric (Vivadent), u kombinaciji sa Syntac Single Component adhezijskim sustavom V. generacije koji je omogućio bolje svezivanje na tvrda zubna tkiva.

Ključne riječi: *caklina, dentalna fluoroza, estetska terapija*

PRETHODNO PRIOPĆENJE
Primljeno: 7. srpnja 1998.

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Uvod

Dentalna fluoroza označava razvojne defekte nastale unošenjem prekomjernih količina florida u organizam. To je hipomineralizacija cakline nastala zbog postojanja florida u okolini zuba za vrijeme razvoja tijekom sekretorne ili maturacijske faze amelogeneze. Ti se defekti javljaju obično endemski i to u područjima u kojima voda za piće sadržava više od 1,5-2,0 mg/1 fluora (1). Dijagnoza se postavlja većinom na osnovi kliničke slike, u kojoj nalazimo veće ili manje demineralizacijske promjene na caklini. Te promjene mogu biti pigmentirane, ali uglavnom nisu praćene karijesom.

Prije su se u terapiji tih promjena kao jedina estetska rješenja rabile estetske krunice. Uporabom novih materijala i pratećih tehnika rada stvaraju se nove mogućnosti terapije tih promjena. Prednosti tih novih metoda rada jesu:

- brža i jeftinija izradba,
- maksimalno se štede tvrda zubna tkiva,
- ugodnije su za pacijenta.

Kompozitni materijali su estetski materijali kojih uporaba osobito dolazi do izražaja upravo kod estetskih rakonstrukcija u vidljivu dijelu čeljusti. Prema veličini i kemijskome sastavu anorganskih čestica punila dijele se u tri velike skupine:

1. klasična makropunila (prosječna veličina čestica oko 5 μm)
2. mikropunila (veličina čestica kreće se između 0,001 do 0,1 μm)
3. kompleksi temeljeni na mikropunilu (veličina čestica kreće se između 0,04 do 3 μm) (2)

U Tablici 1 prikazana je još podjela kompozitnih materijala prema sustavu punila. Prema toj podjeli Tetric pripada skupini finih hibridnih punila (3).

Tablica 1. *Podjela kompozitnih materijala prema sastaavu punila:*
Table 1. *Division of composite materials according to the content of the filling:*

Tip kompozitne smole čestica (μM) Type composite resin particles (μM)	Tip punila Type of filling	Sadržaj punila (%W) Content of filling (%W)	Prosječna veličina (μM) Average size (μM)	Distribucija čestica (μM) Particles distribution (μM)
Tradicionalna makropunila Traditional macrofillings	Monomodalni: mljevene makročestice zaobljenih rubova Monomodal: ground macroparticles of round edges	60-80	>5	1-40
Male sferoidalne čestice Small spheroidal particles	Monomodalni: male mljevene sferoidalne čestice Monomodal: small, ground, spheroidal particles	85	0,6	0,01-3,5
Homogena mikropunila Homogenous microfillings	Monomodalni: pirogena silika Monomodal: pirolitic olitic silica	35-45	0,04	
Nehomogena mikropunila Non-homogenous microfillings	Monomodalni: pirogena silika + kompleksi punjenih smola Monomodal: pirolitic silica + complexes of the filled resin	45-79	0,04	1-200
Hibridi Hybrides	Bimodalni: male mljevene makročestice pirogene silike zaobljenih rubova Biomodal: small, ground macroparticles of the pirolitic silica of round edges	70-80	2-15 0,04	01-10
Fina hibridna punila Fine hybrid fillings	Bimodalni: makročestice pirogene silike Biomodal: macroparticles of the pirolitic silica	70-80	0,5-1 0,04	0,1-10

Tablica preuzeta iz (3).
Table taken from (3).

Prema istraživanjima Tarle i sur. Tetric je pokazao najbolje polimerizacijske rezultate od svih materijala koje smo tada imali na raspolaganju (Pertac Hybrid, Pekafil, Heliomolar, Helioprogress (4). To je i bio jedan od razloga zašto smo se odlučili za taj materijal. Dentinski adhezivi, kao posredni svezujući međusloj između materijala i tvrdih zubnih tkiva, razvijali su se kroz četiri generacije (2). Prve dvije generacije nisu stvarale dovoljno jake sveze pa je njihova uporaba napuštena. Tek uvođenjem sustava treće i četvrte generacije, koji su pretvarali ili potpuno uklanjali tzv. zaostatni sloj, ostvarene su dovoljno jake sveze preko tzv. ***hibridnog sloja*** koji je spoj dentinskog tkiva i monomera na molekularnoj razini debljine 1-5 μm (5,6,7,8). U novije vrijeme pojavila se je i peta generacija, koja je bitno pojednostavila izradbeni postupak jer su i primer i adheziv u jednoj bočici. Toj petoj generaciji pripada i Sintac Single Component kojeg smo mi rabili u našemu radu.

U ovome radu opisan je slučaj terapije dentalne fluoroze u kojemu smo rabili kompozitne materijale i dentinske adhezive.

Prikaz slučaja

Pacijent u dobi od 30 godina, podrijetlom iz Gaze (Palestina), došao je na Stomatološki fakultet zbog neestetskog izgleda svojih zuba. Klinički su opažene vidljive promjene za zubnim površinama u obliku tamnosmeđih točkica i pruga, te s jamicama u caklini i izraženom atricijom (stupanj VIII. po Thylstrupu i Fejerskovu) (9). Te je promjene pacijent prvi put opazio u dobi od 10 godina na gornjim srednjim sjekutićima. Na mliječnim zubima nije imao sličnih

promjena. U pacijantovoj obitelji (otac, majka i šestero braće i sestara) jedino njegova starija sestra ima slične promjene, ali u blažem obliku koji je ocijenjen kao IV. stupanj (po Thylstrupu i Fejerskovu). Zanimljivo je da pacijentova dvije godine mlađa sestra nema promjena na zubima. To se može objasniti time što je pacijentova obitelj do njegova rođenja rabila vodu za piće iz bunara. Nakon njegova rođenja dobili su vodovod. Ta je voda u početku vjerojatno bila nekontrolirano fluoridirana. Poslije je proveden nadzor nad vodom za piće, pa je to vjerojatno i razlog što tih promjena nije bilo u njegove mlađe sestre.

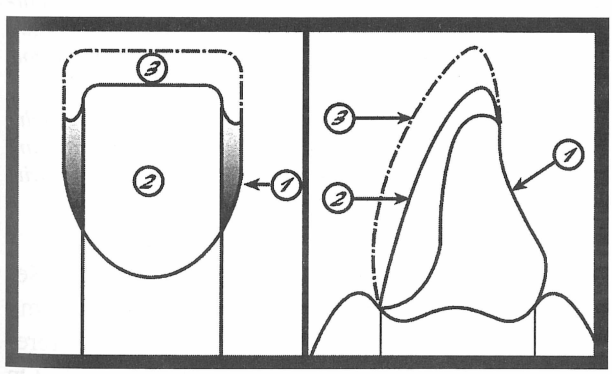
Materijali i tehnike

Za estetsku rekonstrukciju zuba u spomenutog su pacijenta rabljeni:

- Syntac Single Component adheziv (Vivadent)
- Tetric kompozitni materijal (Vivadent)

Tehnika rada:

1. *Preparacija:* Caklinu brusimo 0,5-0,8 mm na vidljivim plohama, tj. vestibularno s malim prijelazom na aproksimalne plohe i inizalne trećine oralnih ploha (Slika 1).



Slika 1. *Caklina, - dentin, - kompozitni materijal*
Figure 1. *Enamel, - dentin, - composite material*

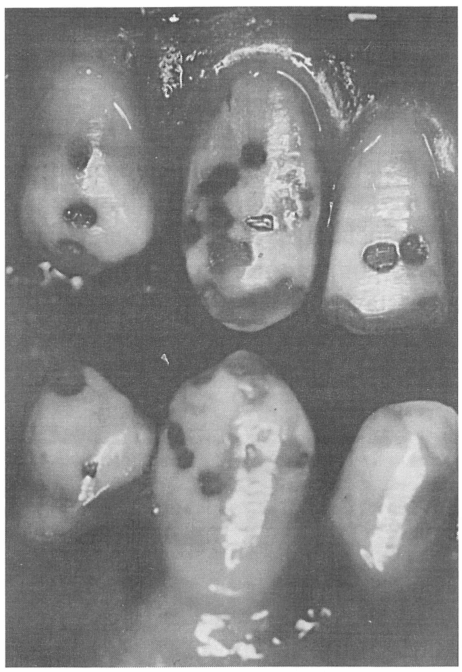
2. *Jetkanje cakline:* Nakon izolacije caklina se jetka 37%-tnom otopinom ortofosforne kiseline u trajanju od 15-30 sekundi, nakon čega se jetkana površina ispere i posuši.
3. *Primjena adheziva:* Na jetkanu posušenu caklinu nanese se prvi sloj adheziva. Nakon 20 sekundi površina se ispuše i polimerizira. Zatim se nanese drugi sloj koji se odmah ispuše i polimerizira.
4. *Materijal za ispun:* Tetric kompozitni materijal visoko je disperzan hibridni materijal koji se polimerizira s pomoću svjetla valne dužine od 400 do 500 nm, tj. s pomoću modroga dijela halogenog svjetla. Postavlja se u više slojeva debljine 1-2 mm i polimerizira najprije s oralne strane.
5. *Završna obrada:* Odstranjujemo suvišak stvrdnuta materijala i poliramo ispun.

Rasprava

Fluoroza je simetrična i javlja se uglavnom na trajnim zubima zato što placentarna membrana onemogućuje znatniji prodor pripravka fluora tijekom intrauterinog razvoja mliječnih zuba (1). Klinički je karakterizirana bijelim mutnim područjima cakline koje nastaju na homolognim zubima. Promjene mogu varirati od bijelih pruga do manjih ili većih ploha mutne cakline. Posteruptivno mogu nastati pigmentacije ili defekti cakline. Težina i distribucija ovise o koncentraciji fluorida (10), o vremenu djelovanja, stupnju ameloblastične aktivnosti i o individualnoj podložnosti organizma (11). Sve do sada navedene karakteristike dentalne fluoroze možemo uočiti i u našega pacijenta (Slike 2 i 3).

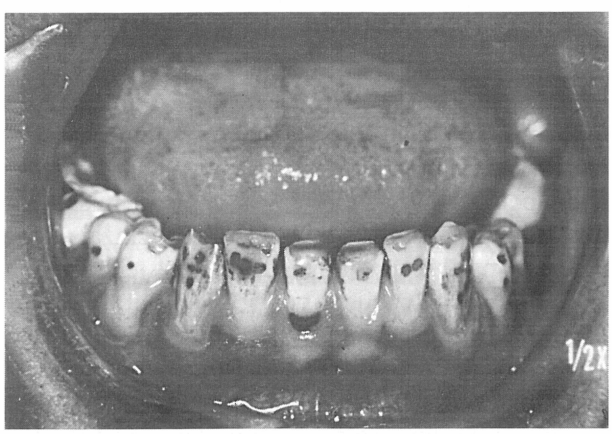
U etiologiji fluoroze spominju se mnogi čimbenici. Danas se kao najvažniji uzročnik fluoroze navodi uporaba vode za piće zasićene visokim koncentracijama fluora, što osobito dolazi do izražaja u toplijim klimatskim uvjetima gdje je unos tekućine veći. Kako je naš pacijent podrijetlom upravo iz toplijih krajeva, poznavanje te činjenice, kao i u raspravi već spomenutih karakteristika dentalne fluoroze, na kraju nam je i olakšalo postaviti konačnu dijagnozu. Drugi važan uzročnik dentalne fluoroze jest gutanje sredstava za topikalnu fluoridaciju. Od patofizioloških čimbenika važni su poremećaj acidobazne ravnoteže (12), malnutricija, te bolesti bubrega koje dovode do povećanja diureze. Takvih čimbenika nije bilo u našega pacijenta.

Za lakše prepoznavanje poremećaja i intenziteta promjena na zubima imamo nekoliko klasifikacija. Prvu je još davne 1934. godine dao Dean (Dean's Community index of dental fluorosis, tzv. FCI). Ta



Slika 2. *Na gornjim i donjim incizivima jasno se vide defekti cakline u obliku većih ili manjih jamica i fisura*

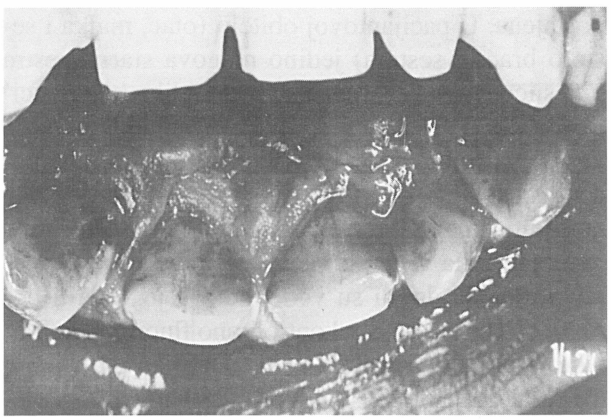
Figure 2. *On the upper and lower incisors enamel defects in the from of larger or smaller pits and fissures*



Slika 3. *Osim jamica i fisura vidi se i izražena abrazija*

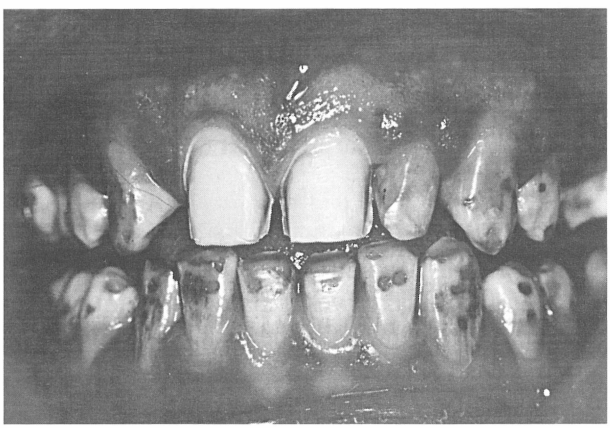
Figure 3. *Apart from pits and fissures a visible abrasion is observed*

je podjela uglavnom primjenljiva na jače izraženu fluorozu, no za slabije izražene slučajeve nije primjenjiva jer Dean nije uzeo u obzir postojanje nakupine plaka na površini zuba. Uzevši u obzir taj propust, Thylstrup i Fejerskov su godine 1978. na-



Slika 4. *Faza brušenja (oralno) Oralno se bruse incizalne trećine zuba*

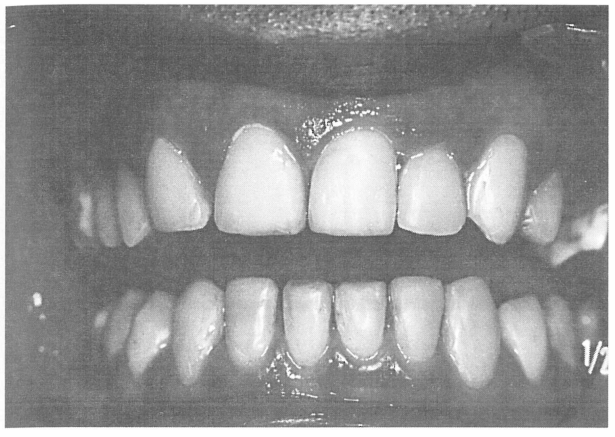
Figure 4. *Grinding phase (orally): Icisal thirds of teeth are ground orally*



Slika 5. *Faza brušenja (vestibularno), i jetkanja: Vestibularne plohe frontalnih zuba i premolara bruse se do gingivalnoga ruba i zatim se jetka 37%-tnom ortofosfornom kiselinom*

Figure 5. *Grinding phase (vestibularly), and etching: Vestibluar surface of the front teeth and premolars are ground up to the gingival edge, and then etched with 37% orthophosphoric acid*

pravili novu podjelu kojoj prethodi čišćenje i sušenje zuba komprimiranim zrakom (13). U našeg smo pacijenta rabili upravo tu podjelu. Još jednu interesantnu podjelu dao je Loben (1968. godine) (14). On je opisao jakost vanjske obojenosti zuba. Nadalje imamo tzv. FRI indeks (Fluorosis Risk Index) (15). Njime se može utvrditi veza između razvoja dentalne fluoroze i dobi kada je osoba bila izložena djelovanju fluorida. Na kraju treba reći kako je svrha prikaza ovoga slučaja da praktičari budu obaviješteni o novim materijalima i tehnikama rada u estetskoj opskrbi dentalne fluoroze (Slike 4, 5 i 6).



Slika 6. *Konačni izgled zuba nakon završene obradbe i poliranja*

Figure 6. *Final appearance of the teeth after the final procedures and polishing*

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Case Presentation of Aesthetic Treatment of Dental Fluorosis

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Acta Stomatol Croat
1998; 455—457

PRELIMINARY COMMUNICATION
Received: July 7, 1998

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Summary

A 30-year-old patient, from Gaza (Palestine), came to the School of Dental Medicine dissatisfied with the aesthetic appearance of his teeth. Clinically, visible changes were observed on the surface of the teeth in the form of dark-brown spots, fissures and pits on the enamel and pronounced attrition. On the basis of the clinical status dental fluorosis, grade VIII, according to Thylstrup and Fejerskov, was diagnosed. Attempts were made to determine the reasons for such pronounced fluorosis. A possible etiologic factor was inadequate fluoridation of drinking water. Therapy and correction of aesthetic appearance was carried out with the composite material Tetric (Vivadent) in combination with Syntac Single Component adhesive system V. generation, which enabled better adhesion to the hard dental tissue.

Key words: *enamel, dental fluorosis, aesthetic therapy*

Introduction

Dental fluorosis denotes developmental defects, caused by ingestion of excessive amounts of fluoride into the organism, i.e. hypomineralisation of enamel due to the presence of fluoride in the dental environment during the phase of development during secretory or maturational phases of amelogenesis. Such defects usually occur endemically, in areas where the drinking water contains more than 1.5 - 2.0 mg/l (1). Diagnosis is generally made on the basis of clinical status, where more or less demineralisational changes are found on the enamel. These changes may be pigmented, but are not usually accompanied by caries. Aesthetic crowns were previously the only aesthetic solution to such changes.

With the introduction of new materials and accompanying work techniques, new therapeutic possibilities for such changes emerged. The advantages of these new methods are numerous:

- Fast and cheap construction
- Hard dental tissue is maximally spared
- More comfortable for the patient

Composite materials are aesthetic materials, and their useful application is particularly evident during aesthetic reconstructions in the visible part of the jaw. They are divided into three large groups according to size and chemical composition of the inorganic particles of the filling:

1. Classic macrofilling (average particle size around 5 μm)
2. Microfilling (particle size ranges from 0.001 to 0.1 μm)
3. Complex based on microfilling (particle size ranges from 0.04 to 3 μm) (2)

Table 1 shows further division of composite materials according to the composition of the filling. Thus, Tetric belongs to the group of fine hybrid fillings (3).

In their investigations Tarle et al. found that Tetric showed the best polymerisational results of all the materials available at the time (Pertac Hybrid, Pekafil, Heliomolar, Heliprogress) (4), which was one of the reasons why we chose this material for our study. Dental adhesives, as a mediating bonding inter-layer between the material and the hard dental tissue, developed over four generations (2). The first two generations did not create sufficiently strong bonds and thus their use was abandoned. Only with the introduction of the third and fourth generation systems, which transformed or completely removed the so-called remaining layer, were sufficiently strong bonds created through a so-called ***hibrid layer,*** which is the junction of the dental tissue and monomer on the molecular level, thickness 1-5 μm (5,6,7,8). More recently a fifth generation appeared which greatly simplified the construction procedure, because both the primer and adhesive are contained in one small bottle. In our study we used Sintac Single Component, which belongs to this fifth generation. A case of dental fluorosis will be described, in which composite materials and dental adhesives were used.

Case presentation

A 30-year-old man from Gaza (Palestine) came to the School of Dental Medicine because of the non-aesthetic appearance of his teeth. Clinically, visible changes could be seen on the dental surfaces in the form of dark-brown spots, fissures, and pits on the enamel, and marked attrition (grade VIII according to Thylstrup & Fejerskov) (9). The changes were first noticed by the patient at the age of 10 years on the upper middle incisors. Such changes had not occurred on the milk teeth. In his family (father, mother and six brothers and sisters) only his older sister had similar changes, although in a mild form (grade IV according to Thylstrup & Fejerskov). The patient's two years younger sister did not have such changes on her teeth. This can be explained by the fact that the patient's family had been drinking water from a well before he was born. After his birth waterworks were introduced and most likely the water was initially uncontrollably fluoridized. Later, drinking water was controlled, which probably explains why such changes did not occur in his younger sister.

Materials and techniques

For aesthetic reconstruction of the teeth in this patient, the following were used:

- Syntac Single Component adhesive (Vivadent)
- Tetric composite material (Vivadent)

Techniques:

1. *Preparation:* Enamel was ground 0.5-0.8 mm on the visible surfaces, i.e. vestibularly with a slight transition onto the approximal surfaces and incisal thirds of the oral surfaces (Figure 1).
2. *Etching of enamel:* After isolation the enamel was etched with 37% solution of orthophosphoric acid for 15-30 seconds, after which the etched surface was washed and dried.
3. *Application of adhesive:* The first layer of adhesive was spread onto the etched and dried enamel, and after 20 seconds the surface was blow-dried and polymerised.
4. *Filling material:* Tetric composite material is a highly dispersate, hybrid material which is polymerised by means of light wave length from 400 to 500 nm, i.e. by means of the blue part of a halogenic light. It is spread in several layers 1-2mm thick and polymerised at first from the oral side.
5. *Final procedure:* Excess, hardened material is removed and the filling polished.

Discussion

Fluorosis is symmetric and usually appears on permanent teeth, because the placental membrane prevents any significant penetration of fluoride during intrauterine development of milk teeth (1). Clinically it is characterised by white, matt areas in the enamel, which appear on homologous teeth. The changes may vary from white /fissures to smaller or larger areas of matt enamel. Pigmentation or enamel defects can occur post-eruptively. The severity