UDC: 616.314.5-002-084:615.242.07]-053.2 ISSN 0039-1743 COBISS. SR-ID 8417026

Klinička ispitivanja efikasnosti zalivača fisura i jamica u djece uzrasta 6-7 godina

DOI: 10.2298/SGS0701007I

Clinical evaluation of pit and fissure sealant efficiency in children aged 6-7

Dragan Ivanović[1], Dejan Marković[2], Nikola Stojanović[1]

[1] Katedra za dječiju i preventivnu stomatologiju. Stomatološki fakultet, Foča

[2] Klika za dečiju i preventivnu stomatologiju. Stomatološki fakultet, Beograd

ORIGINALNI RAD (OR)
ORIGINAL ARTICLE

KRATAK SADRŽAJ

Uvod: *Karijes, kao jedno od najznačajnijih oboljenja u stomatologiji, nije moguće rešiti klasičnim terapijskim merama, već su često neophodne preventivne i profilaktičke mere.*

Cilj: *Cilj ovog rada je bio da se proveri klinička efikasnost kompozitnih materijala i glas-jonomer cemenata za zalivanje fisura i jamica u prevenciji karijesa.*

Materijal i metod: *U istraživanje je uključeno 50 pacijenata (141 zub), oba pola, uzrasta 6-7 godina sa najmanje dva iznikla prva stalna molara. Osnovni dijagnostički kriterijum je bio da je površina gleđi glatka i da sonda ne zapinje za zub. Kao materijal u istraživanjima korišćeni su: 2 kompozitna materijala (Helioseal-Opak i Helioseal-Transparent) i 2 glas-jonomera (Fisurit i Fuji VII). Za kliničko praćenje efekata testiranih materijala primenjeni su modifikovani kriterijumi po Cvar-Ryge-u.*

Rezultati: *Dobijeni rezultati su pokazali da nije bilo statistički značajnih razlika između korišćenih materijala kada je analizirana retencija, marginalna adaptacija, ivična prebojenost i sekundarni karijes. Statistički značajnih razlika je bilo kada je analizirana površinska hrapavost i to između Fuji VII i Fisurita i Fuji VII i Helioseal-Opaka ($p<0.05$).*

Zaključak: *Kompozitni zalivač Helioseal-Opak i glas-jonomer Fuji VII su pokazali najbolje kliničke rezultate po svim testiranim parametrima u odnosu na Helioseal-Transparent i Fisurit.*

Ključne reči: zalivanje fisura, kompozit, glas-jonomer cement

SUMMARY

Introduction: *As one of the most important dental diseases, caries cannot be treated with classic therapeutic measures, but very often, there is a need for preventive and prophylactic measures.*

Aim: *The aim of this study was to assess clinical efficiency of composite materials and glass-ionomer cements as pit and fissure sealants in caries prevention.*

Materials and Methods: *The study comprised 50 patients (141 teeth), both sexes, 6-7 years old with at least two erupted first permanent molars. The main diagnostic criterion was smooth enamel surface with no probe faltering on the tooth. Materials tested in this study were two composite materials (Heiloseal-Opak ad Helioseal-Transparent) and two glass-ionomers (Fisurit and Fuji VII). For clinical assessment of these materials, modified Cvar-Ryge criteria were used.*

Results: *The obtained results showed no statistically significant differences among materials in respect to retention, marginal adaptation, discoloration and secondary caries. The difference was significant in respect to surface roughness between Fuji VII and Fisurit and Fuji VII and Helioseal-Opak ($p<0.05$).*

Conclusion: *Composite sealant Heiloseal-Opak and glass-ionomer Fuji VII showed better clinical results in respect to all tested parameters compared to Helioseal-Transparent and Fisurit.*

Keywords: fissure sealing, composite, glass-ionomer cement

Karijes je oboljenje tvrdih zubnih tkiva i jedno od najčešćih humanih oboljenja. Posledica je dejstva brojnih lokalnih činilaca na zub, odnosno sekundarnih faktora koji mogu djelovati u raznim fazama razvitka i funkcije zuba.[1]

Caries is the disease of hard dental tissues and one the most frequent human diseases. It is the sequel of numerous local factors affecting the tooth and secondary factors in early stages of tooth development and function.[1]

Rana pojava karijesa je usko povezana sa morfologijom okluzalne površine i češće se javlja u fisurama i jamicama nego na glatkim zubnim površinama.

Iskustvo je pokazalo da karijes nije moguće riješiti klasičnim terapijskim mjerama, nego je za njegovu eliminaciju neophodno jasno definisati preventivne i profilaktičke mjere sa primjenom fluorida, zalivanja fisura i odgovarajućom oralnom higijenom. Primjena fluorida smanjenuje prevalencu karijesa mliječnih i stalnih zuba na glatkim površinama gledji i cementa zuba[2] ali nažalost fluoridi nisu toliko efikasni kod dubokih, ampulastih, uskih i izraženih fisura zuba na kojima se najčešće i javlja karijes.

Kako endogenom i egzogenom primjenom fluorida nije moguće ostvariti potpunu redukciju karijesa na okluzalnim površinama[2] traženi su drugi modeli profilakse. Jedan takav model zaštite datira iz 1895. godine, kada je Wilson u fisure i jamice stavljao cement. Potom su brojni istraživači u fisure aplikovali različita sredstva (srebronitrat, cink-hlorid, kalijum-ferocijanat, bakarni amalgam, cijanoakrilat, diakrilat, oksifosfatni cement i sl.) radi zaštite od karijesa. Na sastanku Americke Dentalne Asocijacije (ADA), 1983. godine, zaključeno je da je primjena zalivača sigurna i efikasna profilaktička mjera koja treba da bude sastavni dio svakog preventivnog programa[3]. Na ovaj način data je prednost jednostavnom, neagresivnom, bezbolnom, neinvazivnom i jeftinom metodu zaštite dubokih fisura molara i premolara od pojave karijesa.

Prvi korišćeni materijali za zalivanje fisura su se za zub vezivali samo mehaničkom retencijom. Značajan napredak je postignut uvođenjem u svakodnevnu kliničku praksu mikromehaničke retencije uz kondicioniranje gleđi kiselinama. Time je povećana efikasnost i dugotrajnost zalivanja fisura kao profilaktičke procedure.

Iako je ova profilaktična mjera opšte prihvaćena u savremenoj stomatologiji i dalje postoji potreba za ispitivanjem kliničke efikasnosti sve brojnijih, novijih i savremenijih materijala. U tom smislu najčešće korišćeni su Glas jonomer cementi i kompozitni materijali.

Primjena GJC kao zalivača iskorišćena je zbog mogućnosti hemijskog vezivanja za gleđ bez prethodnog kondicioniranja, odnosno kontinuiranog oslobađanja jona fluora i njegove inkorporacije u okolno mineralizovano tkivo gleđi i dentina [4,5] . Uvođenje kompozitnih materijala imalo je za cilj poboljšanje mehaničke otpornosti i trajnosti zalivača jamica i fisura.

Cilj ovog rada bio je da se ispita klinička efikasnost kompozitnih materijala i GJC za zalivanje fisura i jamica u prevenciji karijesa.

Early caries occurrence is tightly connected to occlusal morphology and is more frequent in pits and fissures than smooth dental surfaces.

Experience has proved that caries is impossible to treat with classic therapeutic measures and in order to eliminate it, preventive and prophylactic measures need to be precisely defined such as fluoride application, fissure sealing and adequate oral hygiene. Fluoride application reduces caries prevalence in smooth enamel and cementum surfaces of deciduous and permanent teeth[2] but, unfortunately, fluorides are not so efficient in deep, narrow, ampoule-like fissures in which caries most often occurs.

Since endogenous and exogenous fluoride application cannot reduce occlusal caries completely[2], other prophylactic measures have been sought. One such model dates back to 1895 when Wilson put cement in pits and fissures. Later, numerous researchers applied other substances in pits and fissures in order to prevent caries. At the American Dental Association (ADA) meeting in 1983, it was concluded that pit and fissure sealants were an efficient prophylactic measure that should be incorporated into everyday preventive program.[3] In this way, a simple, painless, noninvasive, and cheap method of caries prevention in deep molar and premolar fissures have been promoted.

Early fissure sealants used only mechanical retention to "bond" to the tooth. Significant improvement was achieved when micromechanical retention with enamel etching was introduced in everyday clinical practice. This increased efficiency and longevity of sealing fissures as a prophylactic measure.

Even though this prophylactic measure is widely accepted in today's dentistry, there is a need to evaluate clinical efficiency of numerous and new materials. In this respect, glass-ionomer cements (GIC) and composite materials have been used most often.

GICs are used as fissure sealants due to their chemical bond to enamel without previous etching and continuous fluoride ion release and incorporation into the surrounding mineralized enamel and dentine.[4,5] The introduction of composite materials was aimed at increasing mechanical resistance and longevity of fissure sealants.

The aim of this study was to evaluate clinical efficiency of composite materials and GICs as pit and fissure sealants in caries prevention.

Materijal i metodologija

U istraživanje je uključeno 50 pacijenta oba pola, uzrasta 6-7 godina sa najmanje dva iznikla prva stalna molara. Osnovni dijagnostički kriterijum za odabir zuba je bio da je

Materials and Methods

Fifty patients of both sexes, aged 6-7, with at least two erupted first permanent molars were included in the study. The main diagnostic criterion was smooth enamel

površina gleđi glatka i da na blagi pritisak sonda ne zapinje za zub. Ako u fisuri sonda zapinje a drugi znaci karijesa kao što je razmekšanje ili bijela mrlja podminirajuće demineralizacije nisu prisutni, tu nije potrebno raditi preparaciju kaviteta ali su ti zubi karijes rizični i treba uraditi zalivanje fisura.

U istraživanje je uključeno 141 prvi stalni molar (66 maksilarna i 75 mandibularna) . Svakom pacijentu su aplikovana dva različita zalivača. Kao materijali u istraživanjima korišćeni su 4 različita materijala **(**tab. 1.).

surface with no probe faltering on the tooth. If the probe falters in the tooth and other caries indicators such as soft tissue and white spot of undermining demineralization are absent, cavity preparation is not necessary but such teeth are caries predisposed and fissures should be sealed.

The study comprised 141 first permanent molar (66 maxillary and 75 mandibular). Two different sealants were applied in each patient. Four different sealants were used in this study (table 1).

Tabela 1.Materijali koji su korišćeni u istraživanju

Table 1. Materials tested in the study

Materijal	Proizvođač
Superlux Seal – opak	DMG Hamburg
Superlux Seal- transparent	DMG Hamburg
Fisurit	Galenika
Fuji VII	GC International

Procedura aplikovanja bila je ista za sve kompozitne materijale. Obuhvatala je čišćenje okluzalne površine zuba četkicom i pastom bez fluora i izolaciju zuba vaterolnama uz upotrebu sisaljke. Kondicioniranje gleđi sprovedeno je 37% fosfornom kiselinom (gel) oblika u trajanju od 30 sec, ispiranje vodom (15 sec) i sušenje pusterom (15 sec). Zalivač je aplikovan sondom i potom polimerizovan 30 sec. Na kraju je urađena provjera okluzije i poliranje silikonskom gumicom.

Procedura aplikovanja GJC-Fuji VII nije zahtijevala kondicioniranje gleđi, a materijal je aplikovan na očišćen i ovlaš posušen zub komprimovanim vazduhom. Zub je potom premazivan adhezivnim sredstvom i urađena je kontrola artikulacije.

Za kliničko praćenje primjenjeni su modifikovani Cvar&Ryge kriterijumi a analizirana je retencija, marginalna adaptacija, ivična prebojenost, površinska hrapavost i sekundarni karijes.

The application procedure was identical for all composite materials. It consisted of cleaning occlusal surfaces with pumice and non-fluoride paste and teeth isolation with cotton rolls and suction. Enamel etching was done with 37% phosphoric acid (gel) for 30 sec, water rinsing (15 sec) and air-drying (15 sec). A sealant was applied with a probe and polymerized for 30 sec. Occlusion was checked and polishing with silicon rubber was done in the end.

GIC-Fuji VII application did not require enamel conditioning and material was applied on cleaned and slightly dried tooth. Afterwards, the tooth was covered with adhesive and articulation was controlled.

Cvar-Ryge criteria were used for clinical assessment of retention, marginal adaptation, marginal discoloration, surface roughness and secondary caries.

Rezultati

Dobijeni rezultati su predstavljeni u tabelama 2-6 i grafikonima 1-5. Značajnost razlika u dobijenim rezultatima testirana je pomoću χ^2 i Fisherovog F-testa.

Primjenom kompozitnog zalivača Helio-seal opak 77,59% uzoraka je ocjenjeno ocjenom A, 12,07% ocjenom B a 10,34% ocjenom C. Kompozitni zalivač Fisurit je pokazao nešto slabije rezultate (64,52% je ocjenjeno ocjenom A, 25,81% ocjenom B a 9,67 % ocjenom C).

Results

The results are presented in tables 2-6 and graphs 1-5. Data was statistically analyzed using χ^2 and Fisher's F-test.

In Helio-seal opak group, 77,59% of samples were marked A, 12,07% as B and 10,34% as C. Fisurit composite sealant showed slightly worse results (64,52% were marked A, 25,81% as B and 9,67% as C). In Helio-seal transparent group, 56,25% of samples were marked A, 12,5% as B and 31,25% as C. When GIC Fuji VII was used as fissure sealant, 69,44% of samples

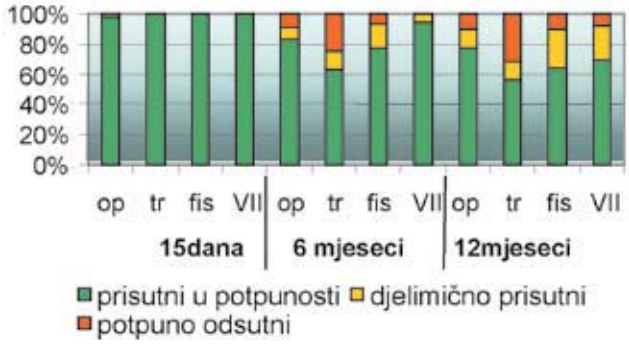
Primjenom kompozitnog zalivača Helio-seal transparenta 56,25% uzoraka je ocjenjeno ocjenom A, 12,5% ocjenom B a 31,25% ocjenom C. Kada je kao zalivač korišćen GJC Fuji VII 69,44% uzoraka je ocjenjeno ocjenom A, 22,22% ocjenom B a 8,34% ocjenom C.(Tab 2, Graf 1) Statističkom analizom rezultata za retenciju nakon 12 mjeseci nije utvrđena značajnost razlika među ispitivanim materijalima.

were marked A, 22,22% as B and 8,34% as C. (table 2, graph 1) There was no statistically significant difference among tested materials in respect to retention after 12 months.

Tabela 2.Retencija zalivača nakon 12 mjeseci

Table 2. Sealant retention after 12 months

zalivač	ocjena A n %	ocjena B n %	ocjena C n %	Ukupno n %
Helio-seal opak	45 77,59 %	7 12,07 %	6 10,34 %	58 100 %
Helio-seal transparent	9 56,25 %	2 12,5 %	5 31,25 %	16 100 %
Fisurit	20 64,52 %	8 25,81 %	3 9,67 %	31 100 %
Fuji VII	25 69,44 %	8 22,22 %	3 8,34 %	36 100 %

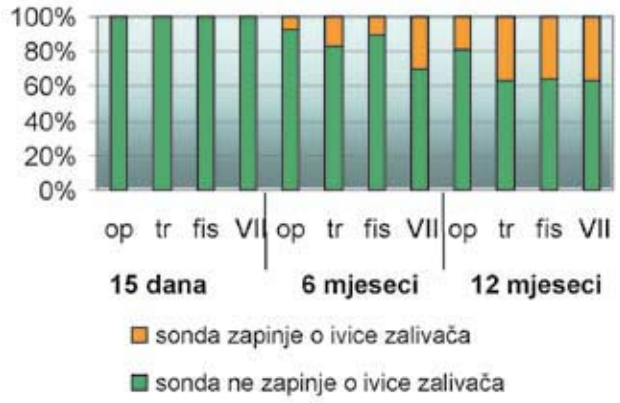


Grafikon 1. Retencija ispitivanih materijala
Graph 1. Retention of tested materials

Tabela 3. Marginalna adaptacija nakon 12 mjeseci

Table 3. Marginal adaptation after 12 months

zalivač	ocjena A n %	ocjena B n %	ukupno n %
1.Helio-seal opak	42 80,77 %	10 19,23 %	52 100 %
2.Helio-seal transparent	7 63,64 %	4 36,36 %	11 100 %
3.Fisurit	18 64,29 %	10 35,71 %	28 100 %
4.Fuji VII	21 63,64 %	12 36,36 %	33 100 %



Grafikon 2. Marginalna adaptacija ispitvanih zalivača
Graph 2. Marginal adaptation of tested sealants

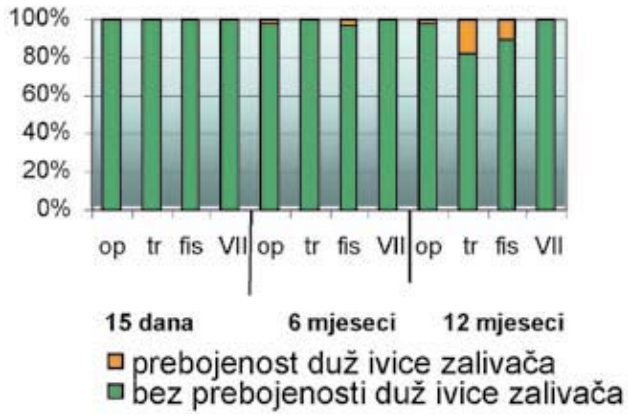
Primjenom kompozitnog zalivača Helio-seal opak 80,77% uzoraka ja ocjenjeno ocjenom A a ocjenom B 19,23%. Kompozitni zalivač Helio-seal transparent je pokazao slabije rezultate (63,64% uzorka je ocjenjeno ocjenom A a 36,36 % uzorka ocjenom B). Primjenom kompozitnog zalivača Fisurita 64,29% uzorka je ocjenjeno ocjenom A a 35,71% uzorka je ocjenjeno ocjenom B. Kada je kao zalivač korišćen GJC Fuji VII 63,64% uzorka je ocjenjeno ocjenom A a 36,36% uzorka je ocjenjeno ocjenom B. Statističkom analizom rezultata za marginalnu adaptaciju materijala nakon 12 mjeseci nije utvrđena značajnost razlika među ispitivanim materijalima.(Tab 3,Graf. 2)

In Helio-seal opak group, 80,77% of samples were marked A and 19,23% as B. Helio-seal transparent showed slightly worse results (63,64% of samples were marked A and 36,36% as B). Fisurit composite sealant was marked A in 64,29% of cases and B in 35,71%. GIC Fuji VII sealant was marked A in 63,64% of cases and B in 36,36%. Statistical analysis of data for marginal adaptation of the materials after 12 months revealed no significant differences. (table 3, graph 2)

Tabela 4. Ivična prebojenost posle 12 mjeseci

Table 4. Marginal discoloration after 12 months

zalivač	ocjena A n %	ocjena B n %	ukupno n %
Helio-seal opak	51 98,08 %	1 1,92 %	52 100 %
Helio-seal transparent	9 81,82 %	2 18,18 %	11 100 %
Fisurit	25 89,29 %	3 10,71 %	28 100 %
Fuji VII	33 100 %	0	33 100 %



Grafikon 3. Ivična prebojenost zalivača
Graph 3. Marginal discoloration of sealants

Primjenom kompozitnog zalivača Helio-seal opak 98,08% uzorka je ocjenjeno ocjenom A a 1,92% uzorka ocjenom B. Kompozitni zalivač Helio-seal transparent je pokazao nešto slabije rezultate (81,82% je ocjenjeno ocjenom A a 18,18% ocjenom B). Primjenom kompozitnog zalivača Fisurita 89,29% uzorka je ocjenjeno ocjenom A a 10,71% ocjenom B. Zalivač Fuji VII iz grupe GJC je pokazao najbolji rezultat (100% uzorka je ocjenjeno ocjenom A). Statističkom analizom rezultata za ivičnu prebojenost nakon 12 mjeseci nije utvrđena značajnost razlika među ispitivanim materijalima. (Tab 4, Graf. 3)

Primjenom kompozitnog zalivača Helio-seal opak 94,23% uzorka je ocjenjeno ocjenom A a 5,77% ocjenom B. Kompozitni zalivač Helio-seal transparent je pokazao slabije rezultate (72,73% je ocjenjeno ocjenom A a 27,27% ocjenom B). Kompozitni zalivač Fisurit je ocjenjen 92,86% ocjenom A a 7,14% ocjenom B. Zalivač Fuji VII iz grupe GJC je ocjenjen 72,72% ocjenom A a 27,28% ocjenom B. Statističkom analizom rezultata za površinsku hrapavost posle 12 mjeseci uočena je značajna razlika na nivou $p<0,05$ između Fuji VII i Fisurita kao i između Fuji VII i Helio-seal opak. (Tab 5, Graf. 4).

Primjenom kompozitnog zalivača Helio-seal opak 98,28% uzorka je ocjenjeno ocjenom A a 1,72% ocjenom B. Kompozitni zalivač Helio-seal transparent je ocjenjen 87,5% uzorka ocjenom A a 12,5% uzorka ocjenom B. Kompozitni zalivač Fisurit je ocjenjen 93,55% uzorka ocjenom A a 6,45% uzorka ocjenom B. Zalivač Fuji VII iz grupe GJC je u 100% uzorka ocjenjen ocjenom A. Statističkom analizom rezultata za sekundarni karijes nakon 12 mjeseci nije utvrđena značajnost razlika među ispitivanim materijalima.(Tab 6,Graf. 5)

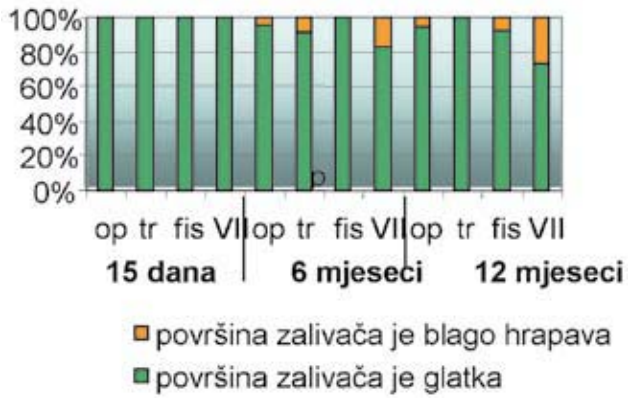
In Helio-seal opak group, 98,08% of samples were marked A and 1,92% as B. Composite sealant Helio-seal transparent showed slightly worse results (81,82% of samples were marked A and 18,18% as B). In Fisurit composite sealant group, 89,29% of samples were marked A and 10,71% as B. GIC Fuji VII sealant showed the best result (marked A in 100% of cases). Statistical analysis of data for marginal discoloration after 12 months revealed no significant differences. (table 4, graph 3)

After Helio-seal opak application, 94,23% of cases were marked A and 5,77% as B. Composite sealant Helio-seal transparent showed slightly worse results (72,73% of samples were marked A and 27,27% as B). Fisurit composite sealant was marked A in 92,86% of cases and B in 7,14%. GIC Fuji VII was marked A in 72,72% of samples and B in 27,28%. Statistical analysis of data for surface roughness after 12 months revealed significant difference between Fuji VII and Fisurit ($p<0.05$) and Fuji VII and Helio-seal opak ($p<0.05$). (table 5, graph 4)

After Helio-seal opak application, 98,28% of cases were marked A and 1,72% as B. Composite sealant Helio-seal transparent was marked A in 87,5% of cases and B in 12,5%. Fisurit composite sealant was marked A in 93,55% of cases and B in 6,45%. GIC Fuji VII sealant was marked A in 100% of cases. Statistical analysis of data for secondary caries after 12 months revealed no significant differences. (table 6, graph 5)

Tabela 5. Površinska hrapavost nakon 12 mjeseci
Table 5. Surfac roughness after 12 months

zalivač	ocjena A n %	ocjena B n %	ocjena C n %	ukupno n %
Helio-seal opak	49 94,23 %	3 5,77 %	0	52 100 %
Helio-seal transparent	8 72,73 %	3 27,27 %	0	11 100 %
Fisurit	26 92,86 %	2 7,14 %	0	28 100 %
Fuji VII	24 72,72 %	9 27,28 %	0	33 100 %

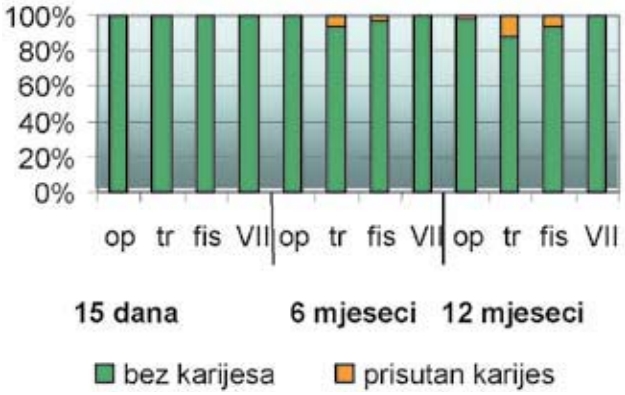


Grafikon 4. Površinska hrapavost zalivača
Graph 4. Surface roughness of sealants

Tabela 6. Sekundarni karijes nakon 12 mjeseci

Table 6. Secondary caries after 12 months

Zalivač	Ocjena A n %	Ocjena B n %	Ukupno n %
Helio-seal Opak	57 98,28 %	1 1,72 %	58 100 %
Helio-seal Transparent	14 87,5 %	2 12,5 %	16 100 %
Fisurit	29 93,55	2 6,45 %	31 100 %
Fuji VII	36 100 %	0	36 100 %



Grafikon 5. Sekundarni karijes ispod zalivača
Graph 5. Secondary caries underneath the sealants

Diskusija

Zalivanje jamica i fisura je značajna profilaktična mjera u redukciji karijesa kod djece.[5]

Uvođenjem novih materijala koji zahtjevaju mikromehaničku retenciju uz kondicioniranje gleđi kiselinama značajno je povećana efikasnost i dugotrajnost zalivača. Međutim i pored postignute karijes redukcije odnos kompozitnih zalivača sa zidovima fisura ne zadovoljava potpuno i tu se često formira mikroprostor [6] . Nova generacija kompozitnih zalivača koji otpuštaju fluoride, obezbjeđuju i povećavaju otpornosti gleđi i jačaju procese remineralizacije. Nažalost oslobađanje fluorida iz kompozitnih zalivača nije dugotrajno [8] .

Ovo istraživanje uključuje kompozitne zalivače za zalivanje fisura (neprovidni sa puniocem, transparentni i sa fluorom) i glas jonomerne materijale za zalivanje fisura. Neprovidni kompozitni zalivači sa puniocem (Helioseal-opak) se lako zapažaju, pa čak i sami pacijenti ih mogu uočiti**.** Transparentni kompozitni zalivači (Helioseal-transparent) su providni, teže se uočavaju i na kontrolnim pregledima je potrebna sonda za lakšu dijagnostiku postavljenog zalivača. Kompozitni zalivač sa fluorom ima i karijes protektivno dejstvo uz već dobre mehaničke osobine kompozitnih zalivača (Fisurit).

Istraživanja su pokazala da je uloga i efekat fluorida iz kompozitnih zalivača mnogo manji od fluorida iz glas jonomernih zalivača [8]. Uvođenjem GJC kao materijala za

Discussion

Sealing pits and fissures is an important prophylactic measure in caries reduction in children.[5]

The introduction of new materials with micromechanical retention and enamel etching has improved significantly sealant efficiency and longevity. Despite caries reduction, adaptation of composite sealants to fissure walls is not completely satisfactory and microgaps sometimes occur.[6] New generation of composite sealants release fluorides, enhance enamel resistance and remineralization. Unfortunately, fluoride release from composite sealants is not always long-lasting.[8]

This study comprised composite sealants (non-transparent with fillers, transparent and fluoride containing) and GIC sealants. Non-transparent composite sealants with fillers (Helioseal-opak) are easily visible and patients can see them as well. Transparent composite sealants (Helioseal-transparent) cannot be detected so easily and a probe is necessary during follow-ups to diagnose sealant *in situ.* Composite sealant containing fluoride has caries protective effect beside good mechanical properties of composite sealants (Fisurit).

Previous studies have shown that fluorides from composite sealants have lesser role and effect than those from GICs.[8] The introduction of GICs as fissure sealants has increased caries prevention. Fluoride release from

zalivanje fisura ostvarena je visoka efikasnost u sprečavanju nastanka karijesa. Oslobađanje fluorida iz zalivača obezbjeđuje njihovu snažnu difuziju u gleđ [9] , tako da se i poslije ispadanja zalivača nastavlja oslobađanje fluorida [10]. Svetloružičasta boja materijala omogućava laku kontrolu inspekcijom, a popravljene mehaničke osobine, veća adheziona sposobnost, oslobađanje fluorida su glavni razlozi što je ovaj materijal korišćen u ovom istraživanju. Naročitu primjenu su našli u zaštiti okluzalnih površina prvog stalnog molara u periodu početka nicanja do položaja normalne okluzije. GJC se hemijski spaja za zubno tkivo, tj. hemijska adhezija se ostvaruje putem razmjene jona. Osim toga posjeduju nisku viskoznost, predstavljaju ‘’depoe ‘’ fluorida i ne iritiraju meka tkiva kao ni zubno tkivo i pulpu.

Rano ispadanje zalivača najčešće je posledica prisustva pljuvačke u nekoj od faza rada [11]. Izolacija zuba je bila samo sa vaterolnama jer u većini slučajeva koferdam nije mogao biti postavljen zato što zub nije dostigao visinu okluzalne ravni.

Najčešći parametri za kliničko praćenje zalivača svode se na retenciju i sekundarni karijes [4,12] U ovim istraživanjima je zabilježen visok stepen retencije posle primjene Helio seal-opak kompozitnog materijala što je u skladu sa rezultatima drugih autora [4,13], dok su ostali ispitivani kompozitni materijali i Fuji VII (GJC) pokazali nešto niži stepen retencije. Kariostatične osobine kompozitnih zalivača ostvaruju se putem fizičke opturacije fisura i jamica, što je sa preventivnog stanovišta njihov najvažniji parametar [14].

Kompozitni materijal-Helio seal opak je takođe pokazao dobre rezultate za marginalnu adaptaciju u opservacionom periodu što je u skladu sa nalazima Mejare i Mjora [4].

sealants provides their powerful diffusion into enamel [9] and even after the loss of sealant, fluoride release continues.[10] Light-pink colour of these materials enables easy inspection and improved mechanical properties, greater adhesive ability and fluoride release were main reasons for including such a material in this study. These materials are particularly applied to protect occlusal surfaces of first permanent molars during eruption until normal occlusal position is reached. GIC is chemically bonded to dental tissue i.e chemical adhesion is achieved through ion exchange. They also possess low viscosity, fluoride “depots” and do not irritate soft tissues as well as dental and pulp tissue.

The loss of fissure sealant as previously described is most often the result of salivary presence in any stage.[11] Tooth isolation was accomplished with cotton rolls only because in most cases rubber dam could not have been placed as the tooth did not reach the occlusal plane.

The most common parameters for clinical assessment of fissure sealants are retention and secondary caries.[4,12] In the present study, high degree of retention was recorded in Helioseal-opak group as reported in previous studies[4,13] while other composite materials and Fuji VII (GIC) showed slightly lower degrees of retention.

Cariostatic potential of fissure sealants acts through physical obturation of fissures and pits being the most important parameter regarding the preventive aspect.[14]

Composite material Helioseal-opak also exhibited good results for marginal adaptation during observation period as reported by Mejare and Mjor.[4]

Zaključak

Kompozitni zalivač Helio seal opak i Fuji VII-glas jonomerni materijal za zalivanje fisura su pokazali najbolje kliničke rezultate po svim ispitivanim parametrima. Ostali testirani materijali su pokazali nešto slabije rezultate ali i značajnu zaštitu od okluzalnog karijesa. Na osnovu ovih istraživanja može se zaključiti da je zalivanje fisura sa kompozitnim zalivačima i glas jonomernim materijalima za zalivanje fisura veoma efikasna preventivna mjera.

Conclusion

Composite sealant Helioseal-opak and GIC Fuji VII fissure sealant showed the best clinical results in respect to all evaluation parameters. Other tested materials had slightly worse results despite significant protection against occlusal caries. Based on the present study, it can be concluded that fissure sealing with composite and GIC sealants is a very efficient preventive measure.

Literatura / References

1. *Vulovic M.* Preventivna stomatologija, Drasler Beograd 2005 godina
2. *Disney JA, Bohannan HM.* The role of Occlusal Sealants in Preventive Dentistry. Dental Clinics of North America 1984; 28:1
3. NIH Consensus Development Conference Summary: Dental sealants in the prevention of tooth decay. *Br Dent Jour* 1984;
4. *Mejare J, Mjor JA*. Glass ionomer and resin-based fissure sealants: a clinical study. *Scand J Dent Res* 1990; 98(4) 345-50
5. *Overbo RC, Raadal M.* Microleakage in fissures sealed with resin or glass ionomer cement. *Scand J Dent Res* 1990, 98:66-9.
6. *Vojinović J, Tatić E, Anđelić P i sar.* Preventivni program u stomatologiji, Beograd, Naučna knjiga, 1990.
7. *Vojinović MJ.* Glas-jonomer cementi u stomatologiji, Nauka Beograd 1996
8. *Ilijin I, Karajović D, Vulićević Z.* Fluoride release from various dental materials. *Int Dent Jour* 1996; 46, Abstract 65

9. *Komatsu H, Shimokobu H, Matsui i sar.* Enamel fluoride uptake from glass-ionomer cement designed for sealent, *Japanese J Conserv Dent* 1989, 32:688-92
10. *Oshima K, Ikeda T, Kaneshige J i sar.* The change of fluoride concentration in enamel after removal of glass-ionomer cement in vivo, *Japanese J Conser Dent* 1989, 32:986-91
11. *Pereira JC, Vieira SR, Franco EB, Souza MHS.* Sealant penetration in occlusal fissures and prevalence of carious fisures in clinically sound teeth. *J Dent Res Spec Issue* 1996;Abstract 2157
12. *Liebenberg WH.* The fissure sealant imphasse. *Quint Int* 1994; 25: 11
13. *Fiegal RJ.* The use of pit and fissure sealants. *Pediatric Dentistry* 2002; 24:5-9
14. *Torppa-Saarinen E, Seppa L.* Short-term retention og glass ionomer fissure sealants. *Proc Finn Dent Soc* 1990; 86(2):83-8

Autor odgovoran za korespondenciju

Dragan Ivanović
Stomatološki fakultet Foča
Katedra za dječiju i preventivnu stomatologiju
Studentska bb
73300 Foča, BIH
Tel: +387 58 210 171
e-mail: ivanovic_dragan2002@yahoo.com

Address for correspondence

Dragan Ivanović
School of dentistry, Foca
Studentska bb
73300 Foča, Bosnia and Herzegovina
Tel: +387 58 210 171
e-mail: ivanovic_dragan2002@yahoo.com