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PRIMENA FLUORIDA U PREVENCIJI KARIJESA

THE APPLICATION OF FLUORIDE IN PREVENTION OF CARIES

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Kratak sadžaj

Fluoridi imaju značajno mesto u prevenciji karijesa. Nakon višegodišnjih istraživanja naučnika širom sveta, dokazana je njihova efikasnost u prevenciji karijesa, kao i neškodljivost po opšte zdravlje ljudi. Primena fluorida može biti endogena i egzogena, ali se najbolji rezultati u smislu redukcije karijesa mogu dobiti kombinacijom ovih metoda. Iako najviše kritikovano, fluorisanje vode za piće je jedna od najefikasnijih preventivnih mera koja se primenjuje u svetu. Danas, nakon više od pola veka primene fluorida, može se zaključiti da su oni u mnogome zaslužni za značajnu redukciju karijesa u razvijenim zemljama sveta.

Ključne reči: *fluor profilaksa, prevencija karijesa*

Abstract

Fluorides play a significant role in the prevention of caries. After long-term investigations conducted worldwide, their efficacy in preventing dental caries has been proved as well as their harmlessness to human health. The application of fluorides can be endogenic and exogenic; however, the best results in the sense of caries reduction can be obtained by the combination of these methods. Though being much criticized, the addition of fluoride to the public water supply is one of the most efficient measures of prevention applied in the world. Today, after more than half a century of fluorides' application, it can be concluded that they strongly influenced a significant caries reduction in the developed countries of the world.

Key words: *fluoride prophylaxis, prevention of caries*

Uvod

Karijes i parodontopatija su danas najčešća oboljenja čoveka koja imaju veliki zdravstveni, socijalni i ekonomski značaj i zbog toga se svrstavaju u jedan od najznačajnijih socijalno-medicinskih problema u našoj zemlji.

Prema izveštaju SZO karijes i dalje predstavlja svetski zdravstveni problem u mnogim razvijenim zemljama. Premda, u ovom trenutku, izgleda da je karijes u razvijenim zemljama stavljen pod kontrolu i predstavlja manje ozbiljan problem, SZO očekuje da će se zbog promenljivih životnih uslova i načina ishrane, incidenca karijesa povećati u mnogim zemljama u razvoju. Izgleda da je osnovni uzrok povećano konzumiranje šećera i neadekvatna primena fluorida.

Introduction

Currently, caries and periodontitis stand for the commonest human diseases having great health, social and economic importance, and therefore are classified as one of the most relevant social/medical problems in our country.

Though it seems at the moment that caries has been put under control, and represents a minor problem, WHO expects that, due to the changed life conditions and dietary habits, the incidence of caries will increase in many developing countries. The major blame can be laid on increased sugar consumption and inadequate fluoride application.

Caries first appears on the enamel surface as a white spot as a result of enamel demineralization. In this phase, the disease is revers-

Karijes počinje na površini gleđi pojavom bele mrlje, kao rezultat demineralizacije gleđi. U ovoj fazi bolest je reverzibilne prirode i može se profilaktičkim merama, primenom preparata fluora, postići restitutio ad integrum.

Fluoridi se mogu primenjivati endogenim (sistemskim) i egzogenim (lokalnim) putem. Endogene metode podrazumevaju sistemsko delovanje fluorida i najefikasnije su ukoliko se koriste u vreme mineralizacije zuba. Od brojnih mogućih metoda, danas se kao najefikasnija preporučuje fluorisanje vode za piće. U slučaju da se ova metoda iz bilo kog razloga ne može upotrebiti, preporučuje se davanje tableta fluora, fluorisanje kuhinjske soli i sl.

Egzogene metode podrazumevaju lokalno aplikovanje fluorida na površinu zuba, radi stvaranja kvalitetnije površine gleđi, koja bi bila otpornija na kariogene nokse. Na površinu zuba se mogu aplikovati preparati fluora visoke (profesionalna aplikacija želea), srednje (rastvori i želei) i niske (rastvori i paste za zube) koncentracije.

Istraživanja o efektima fluorida na oralno zdravlje počela su pre stotinak godina. U prvih pedesetak godina, istraživanja su bila fokusirana na odnos fluorida u vodi i prevalenciju karijesa. U drugoj polovini dvadesetog veka predmet istraživanja širom sveta bila je egzogena primena fluorida.

Primena fluorida u prevenciji karijesa je jednostavna i pogodna za masovne preventivne programe.[1,2] Istovremeno, masovna upotreba fluorida u preventivnoj stomatologiji izaziva veoma burne i kontroverzne reakcije i često neargumentovane otpore.

Antikariogeno dejstvo florida je posledica kumulativnog efekta više različitih mehanizama. Oni se mogu odigravati na površini zuba ili direktno uticati na mineralnu fazu u gleđi. Potvrđeno je da i kod sistemske primene fluorida preventivno dejstvo je najvećim delom posledica lokalnog efekta.

Svaki preventivni program u stomatologiji mora da sadrži kao osnovnu meru primenu fluorida. Preporučuje se da to bude zbir kombinovanog dejstva sistemske (endogene) i lokalne (egzogene) aplikacije.

Sistemskoj aplikaciji pripadaju sve one metode kojima se sistemskim davanjem fluorida u vreme mineralizacije zuba želi uticati na veću ugradnju fluorida u tvrda zubna tkiva, kako bi ona bila otpornija na nastanak karijesa. Primenom lokalnih metoda, direktnom aplikacijom

ible in nature, and by the application of prophylactic measures restitutio ad integrum can be achieved.

Fluorides can be applied in endogenic (systemic) as well as exogenic (local) way. The endogenic methods point to systemic fluoride effect and are the most efficient if applied at the time of tooth mineralization. Of the numerous possible methods, the most efficient one recommended today is the fluoridation of the public water supply. In the case that this method cannot be applied for any reason, then fluoride tablets administration, salt fluoridation etc. are recommended.

The exogenic methods mean the local application of fluoride on the tooth surface so as to contribute to the more quality enamel surface which would be more resistant to cariogenic noxae. On the tooth surface, the fluoride preparations of high (professional gel application), medium (solutions and gels) and low (solutions and toothpastes) concentrations can be applied.

The investigations about the fluoride effects on oral health started around one hundred years ago. In the first fifty years, the investigations focused on the relation between fluorides in water and caries prevalence. In the second half of the 20th century, the subject of researches worldwide was the exogenic fluoride application.

The application of fluorides in prevention of caries is simple and convenient in extensive prevention program implementation.[1,2] The simultaneous enormous use of fluorides in preventive dentistry is the cause of very violent and controversial reactions, and quite often groundless resistance.

The anticariogenic fluoride effect is the consequence of the cumulative effect of different mechanisms. They can act on the tooth surface or directly influence the mineral phase in the enamel. It has been confirmed that in the systemic fluoride application, the preventive effects are greatly the result of a local effect.

The application of fluorides must be the major preventive measure in dentistry. Such measure is recommended to be the sum of combined effects of systemic (endogenic) and local (exogenic) applications.

The systemic application comprises all the methods which, through systemic administration of fluorides at the time of mineralization, affect the greater incorporation of fluorides into hard dental tissues in order to make them more

jom fluorida na površine izniklih zuba, želi se povećati njihova otpornost na karijes.

Kako se ni jednom pojedinačnom metodom primene fluorida ne mogu 100% zaštititi zubi od karijesa, usledili su pokušaji da se kombinovanom primenom više metoda postignu što bolji rezultati. Pored jedne sistemske, (fluorisanje vode ili primena tableta i sl.) mogu se uspešno primeniti nekoliko lokalnih metoda.

Rezultati analiza efikasnosti primene kombinacija različitih metoda fluorida u prevenciji karijesa širom sveta, ukazuju da nema modela koji bi neku kombinaciju lokalnih primena fluorida proglasio metodom univerzalnog izbora. U različitim evropskim državama, primenom različitih kombinacija aplikacije fluorida, došlo je do slične redukcije karijesa.

Na Islandu i u Norveškoj postoji shvatanje da je fluor profilaksa glavna preventivna mera, dok se u Švedskoj fluor preporučuje samo kod pacijenata sa visokim rizikom za karijes.[3]

Pranje zuba pastama sa fluorom je važna mera u prevenciji karijesa.[4,5] Paste za zube sa fluorom uvedene su krajem šezdesetih i u ranim sedamdesetim godinama prošlog veka. Nakon desetak godina od njihovog pojavljivanja na tržištu postigla se značajna redukcija karijesa.[6] Efikasnost paste za zube sa fluorom zavisi od ponašanja pojedinca i cele porodice u smislu redovne upotrebe ovog proizvoda. Istraživanja nekih autora ukazuju da koncentracija fluora u pastama ne obezbeđuje potrebnu zaštitu od karijesa, pa je neophodna primena i visokokoncentrovanih fluorovih preparata kako bi se ispoljila redukcija karijesa.[7,8,9]

Fluor profilaksa, kao samostalna preventivna mera, ne može da profilaktički deluje na karijes. Kod dece sa visokim rizikom za karijes primenom niskokoncentrovanih fluor preparata nije moguće profilaktički delovati na karijes.[10]

Pozitivan profilaktički efekat fluora, kod pacijenata sa visokim rizikom za karijes, može se dobiti jedino profesionalnom aplikacijom visoko koncentrovanih fluorovih preparata četiri puta godišnje, s tim da je uz ovo neophodno i održavanje oralne higijene pastama sa fluorom, minimalno dva puta dnevno u trajanju od najmanje jedan minut.[11]

Fluorisanje vode za piće je masovna preventivna zdravstvena mera koja je do sada najviše kritički analizirana. Danas se sa sigurnošću može reći da predstavlja apsolutno sigurnu, ekonomičnu i efikasnu metodu u prevenciji

resistant to caries. By the application of local methods as well as direct application of fluoride on the erupted tooth surface, what is desired is their resistance to caries.

As none of the methods of fluoride application cannot fully protect teeth from caries, there have been some attempts to combine these methods so as to achieve better results. Besides one systemic method (water fluoridation or tablet application, etc), several local methods can be successfully applied.

The analysis results on efficacy of the application of various methods of fluoridation in the prevention of caries worldwide indicate that there are no models which could favor some combination of local applications of fluoride as the method of universal choice. In various European countries, a similar reduction of caries occurred due to the application of different combinations of fluoride application.

In Iceland and Norway, there is an opinion that fluoride prophylaxis is the main preventive measure, while in Sweden, fluoride is recommended only to patients at high risk of caries.[3]

Using fluoride toothpastes is a preventive measure in the prevention of caries.[4,5] Toothpastes containing fluoride were introduced in the late sixties and early seventies in the 20th century. The efficacy of these toothpastes depends on the habits of an individual as well as the whole family in the sense of a regular usage of this product. The investigations of some authors indicate that the concentration of fluoride in toothpastes does not provide the necessary protection from caries, so that the use of high-concentration fluoride preparations is needed to ensure the reduction of caries.[7,8,9]

Fluoride prophylaxis, as an independent preventive measure, cannot have the prophylactic effects on caries. In children at high risk of caries, it is not possible to achieve these effects by the application of low-concentration fluoride preparations.[10]

The positive fluoride prophylactic effect in patients at high risk of caries can only be obtained by professional application of fluoride preparations four times per year. Besides, it is indispensable to maintain the oral hygiene with toothpastes containing fluoride at least two times per day in duration of one minute.

Drinking water fluoridation as an extensive preventive measure has been analyzed far beyond some others. Today, we can say with cer-

karijesa.[12,13,14,15] Antikariogeni efekat fluorisane vode za piće je mnogo veći ukoliko se koristi u periodu pre i posle nicanja zuba.[16]

Fluorisanje vode za piće je, ne bez razloga, svrstano u najbolju preventivnu meru dosad primenjenu u svetu, a rezultati njene primene porede se sa onima koji su postignuti vakcinacijom u iskorenjivanju pojedinih zaraznih bolesti.

Pitanje sigurnosti i bezbednosti primene fluorida po opšte zdravlje ljudi, postavlja se od samog početka. Apsolutna neškodljivost bilo koje supstance teško da se može dokazati, ali je najvažnije utvrditi korisnost i štetnost količine neke supstance, jer i supstance neophodne za život postaju toksične u većim količinama. Takođe, prekomerno unošenje ili nepravilna primena fluorida može izazvati nastanak fluoroze zuba ili skeletne fluoroze, kao i poremećaje u digestivnom i urinarnom sistemu, a pri unošenju većih količina i smrt.

Sa sigurnošću se može tvrditi da nema ni jednog laboratorijskog, kliničkog, epidemiološkog ili drugog naučnog dokaza koji je pokazao da optimalne količine fluorida u vodi za piće ili ostale proverene preventivne i profilaktičke mere primene fluorida, izazivaju povećanje incidencije kancera, oboljenja srca ili bilo kog drugog oboljenja. Ljudi u pojedinim područjima širom sveta svakodnevno unose optimalne ili povećane količine fluorida koje se prirodno nalaze u vodi. Izuzev fluoroze zuba koja se javlja u područjima gde su koncentracije fluorida veće od optimalnih (1-1,2mg/l), i skeletne fluoroze koja se endemski javlja u područjima gde su prirodne količine fluorida veće od 8 ppm F, ne postoji ni jedno oboljenje čija je incidencija povećana u ovim područjima, u poređenju sa onim gde su koncentracije fluorida u vodi za piće niske.

tainty that is stands for an absolutely safe, economic and efficient method in the prevention of caries. [12,13,14,15] The anticariogenic effect of fluoridated drinking water is much stronger if used before and after the tooth eruption.[16]

Not without reasons, drinking water fluoridation has been classified as the best preventive measure applied in the world so far; the results of its application can be compared to those achieved by vaccination in the process of some infectious diseases' eradication.

The question of fluoride application safety in regard to human health has been raised from the very beginning. An absolute harmlessness of any substance can hardly be proved, but the most important thing is to determine both usefulness and harmfulness of the given quantity of any substance, since even the substances indispensable to living can become toxic when administered in greater doses. In addition, the overdoses or irregular fluoride application can cause dental or skeletal fluorosis as well as the digestive and urinary system disorders, and even death after some higher doses intake.

It can be claimed with certainty that there is not a single laboratory, clinical, epidemiological or some other scientific proof which could confirm that optimal quantities of fluorides in drinking water or other proved preventive and prophylactic measures in fluoride application can increase the incidence of cancer, heart diseases or any other disease. In some regions of the world, every day, people take the optimal or increased doses of fluorides that can be naturally found in water. Besides dental fluorosis that appears in the regions where the concentrations of fluorides are higher than the optimal (1-1,2 mg/l), and skeletal fluorosis which occurs in the regions with fluoride concentration higher than 8 ppm F, there is no any disease with increased incidence in these regions, when compared to those where the concentrations of fluorides in the drinking water are low.

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