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EFIKASNOST PROCENA UPOTREBA U FAZAMA PROGRAMA PREVENCIJE KARIJESA KOD DECE IZ TRANSKARPATSKOG REGIONA

EFFICIENCY ESTIMATION OF USING PHASED PROGRAM OF CARIES PREVENTION IN CHILDREN DOMICILED IN TRANSCARPATHIAN REGION

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Sažetak

Uvod: Karijes je patološki proces koji se odvija u tvrdim tkivima zuba nakon erupcije zuba i smanjuje kvalitet života zbog značajnih komplikacija, posebno kod dece. Izuzetno visoka učestalost zubnog karijesa kod dece koja žive u transkarpatskom regionu zahteva obiman program prevencije.

Cilj ove studije bio je da se utvrdi efikasnost kompleksnog programa prevencije karijesa kod dece koja permanentno žive u područjima biogeohemijske deficijencije fluora.

Materijal and Metode: Prilikom pregleda 346 dece uzrasta 3-8 godina, među kojima 163 (46,9%) dečaka i 183 (53,1%) devojčica, utvrđilo se da je napravljen program u fazama kompleksne profilakse osnovnih bolesti zuba kod dece koja žive stalno u deficitarnim uslovima i koji uključuje: edukaciju dece predškolskog uzrasta i njihovih roditelja o higijeni, medikamentoznu spoljnu prevenciju, ranu identifikaciju i tretman karijesa korišćenjem konvencionalnih metoda prema protokolima lečenja, endogenu ne-medicinsku prevenciju, korekciju ishrane koji je dokazao svoju efikasnost.

Rezultati: Indikator efikasnosti prevencije karijesa predloženim projektom iznosi za decu 5-7 (3-5) godina, 69,5%; za decu 8-10 (6-8) godina – 66,9%.

Zaključak: Osnovni pravac pedijatrijskih stomatoloških usluga u Ukrajini treba da bude za dečju populaciju (starosti do 18 godina) formiranje nacionalnih i regionalnih programima za primarnu prevenciju glavnih bolesti zuba sa pružanjem adekvatnog finansiranja u dovoljnom obimu u cilju očuvanja zdravlja zuba nacije u dugom vremenskom periodu na 20 godina.

Ključne reči: deca, karijes, obrazovanje učenika o higijeni, biogeohemijska nedostatak fluora

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Abstract

Background: Caries is a pathological process that occurs in the hard tissues of the teeth after eruption and reduced quality of life due to significant complications, especially in children. An extremely high incidence of dental caries among children living permanently in Transcarpathian region requires a comprehensive prevention program. The aim of this study was to determine the efficiency of complex caries prevention program among children permanently living in the area of biogeochemical fluorine deficiency.

Aim of the study: To evaluate efficiency level of using phased program of caries prevention among children of different age groups domiciled in Transcarpathian region.

Material and Methods: On examination of 346 children aged 3-8 years, among which 163 (46.9%) boys and 183 (53.1%) girls, a phased program of complex prophylaxis was created, covering the basic dental diseases in children living permanently in deficiency conditions. The program included: hygienic education of preschool children and their parents; exogenous medicament prevention; early identification and treatment of caries using conventional methods according to treatment protocols; endogenous non-medical prevention, nutrition correction have proved its effectiveness.

Results: The indicator of caries prevention efficiency of the proposed scheme for children 5-7 (3-5) years is 69.5%; for children 8-10 age group (6-8) years – 66.9%.

Conclusion: The main strategy of pediatric dental services in Ukraine should be created for the children population (aged up 18 years) through national and regional programs for the primary prevention of main dental diseases with providing adequate financing in sufficient volume to preserve the nation's dental health for the next 20 years.

Key words: children, prevention, caries, hygienic education of pupils, biogeochemical deficiency of fluoride

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Uvod

Uzimajući u obzir dugogodišnje iskustvo preventivnih stomatoloških programa, sa velikom verovatnoćom možemo uvideti da je upravo prevencija stomatoloških oboljenja ekonomski opravdana, i efikasna i perspektivan pravac razvoja medicine, i predstavlja stomatologije, naročito u detinjstvu¹⁻⁵. Ovaj postulat je potvrđen tokom dugogodišnjeg iskustva u funkcionisanju ovog pravca u medicini u dobro razvijenim zemljama u Evropi i Kanadi^{6,7}.

Interesantni za analizu su preventivni programi zemalja, čiji biogeohemijski parametri odgovaraju najvećoj problematici u pogledu rasprostranjenosti i intenzitetu bolesti zuba kod dece⁸⁻¹².

Najdugoročniji preventivni program ima Švajcarska, koji se koristi preko 40 godina. Njegova efikasnost je dokazana praktično odsustvom karijesa kod stalnih zuba kod dece stare 12 godina (prevalencija karijesa 2-5%), što je perfektan rezultat. Ovaj program obuhvata: edukaciju o higijeni, endogenu nemedicinsku upotrebu fluorisanih soli i fluorisane vode za piće, topikalnu primenu lakova i krema sa fluoridima, hermetičko zalivanje fisura. Ove mere se sprovode u zavisnosti od starosti dece i obavljaju je stomatolozi^{13,14}.

Zadatak programa "Zdrav osmeh Slovačke", koji se koristi od 1997. godine u Slovačkoj, smanjio je prevalenciju osnovnih stomatoloških oboljenja kod dece svih uzrasta razmatranjem psiholoških karakteristika dece. Koordinator programa je vanredni profesor Eva Kovaliova, koja je stažirala u Švajcarskoj. Pre početka programa u istočnoj Slovačkoj, stepen širenja karijesa stalnih zuba kod dece u Slovačkoj iznosio je 85-90%. Nakon 15 godina programa pokazano je da je intenzitet karijesa stalnih zuba kod dece smanjen 5 puta^{15,16}.

Cilj studije bio je proceniti stepen efikasnosti korišćenja programa u fazama prevencije karijesa kod dece različitih starosnih grupa sa sedištem u transkarpatskom regionu.

Introduction

Considering many years of experience with preventive dental programs, we can conclude that exactly the prevention of dental diseases is economically justified, effective and perspective direction of medicine development, including dentistry, especially in childhood¹⁻⁵. This postulate is confirmed by many years of experience in functioning this direction of medicine in European developed countries and Canada^{6,7}.

Interesting for analysis are prevention programs of countries, which in biogeochemical parameters, cope with the problematics in terms of prevalence and intensity of dental diseases among children⁸⁻¹².

Switzerland has the most long-term prevention programs, which have been in use for over 40 years. Its efficiency is proved by practical absence of caries in permanent teeth of 12-year-old children (caries prevalence 2-5%), which is a perfect result. This program includes: hygienic education, endogenous non-medical use of fluorinated salts and fluorinated drinking water, topical fluoride varnishes and creams, tooth hermetic sealing of fissures. These measures are age-related and performed by the dentists^{13,14}.

The task of the program "Healthy smile of Slovakia", which has been operating since 1997. in Slovakia has decreased the prevalence of basic dental diseases in children of all ages, by considering the children's psychological features. The coordinator of the program is Associate Professor Eva Kovalyova, who interned in Switzerland. Before starting the program in Eastern Slovakia, the level of caries spreading in permanent teeth of children in Slovakia was 85-90% in total. After 15 years of the program implementation, it was shown that the intensity of caries in permanent children's teeth decreased by 5 times^{15,16}.

Aim of the study To evaluate the efficiency level of using phased program of caries prevention among children of different age groups domiciled in Transcarpathian region.

Materijali i metode

Da bi se poboljšalo zdravlje zuba kod dece koja žive u transkarpatskom regionu, uspostavljena je šema rane dijagnostike, prevencije i postepenog lečenja karijesa.

Sema je uključila sledeće faze

1. higijensko obrazovanje predškolske dece i njihovih roditelja,
2. egzogena medikamentozna prevencija uz upotrebu remineralizacionog laka Bifluorid-12, VOCO, Nemačka i Remin Pro VOCO, Nemačka,
3. hermetičko zalivanje fisura zuba – prvih molara u starosti 6-7 godina,
4. tretman lezija čvrstih zubnih tkiva u vidu karijesa i njihovih komplikacija korišćenjem akonvencionalnih postupaka lečenja prema protokolima lečenja,
5. endogena nemedicinska prevencija, korekcija ishrane.

Ovo je ojačani program državne uprave Transkarpatskog regiona "Program za poboljšanje dentalnog zdravlja populacije regiona" odobren od strane Regionalnog Transkarpatskog Saveta, № 395, od 29. Novembra 2007.(period izvođenja 2008.-2012.) i programa, obezbeđenja dentalnog zdravlja kod dece u periodu od (2009.-2013.) odobreno od Gradskog Saveta Uzhgoroda, №1148 iz jula 2009.¹⁴

Ukupno je bilo 6,136 dece od 3-6 god. iz vrtića i prvog razreda škole u Uzhgorodu.

Procena kvaliteta oralne higijene bila je kvalitet pranja, koji je proveravao stomatolog-pripravnik pri drugoj poseti u ordinaciji. Za vizualizaciju je korišćen metod bojenja stomatološkog plaka rastvorom «Finder Plaque» (Curaprox, Švajcarska). To je vrlo efikasno sredstvo motivacije za kvalitet oralne higijene. Kako je iskustvo pokazalo deca i adolescenti nisu bili ni svesni da čišćenjem njihovih zuba plak ne može biti skinut uopšte ukoliko je korišćena pogrešna metoda četkanja.

Prilikom sedme kontrole kvaliteta higijene četkanja, higijena kod najvećeg broja dece je bila mnogo bolja. Da bi se procenila efikasnost predloženog projekta kompleksne profilakse karijesa, izabrana su deca prvog i drugog razreda dve srednje škole u Uzhgorodu (srednja škola №10; srednja škola №20) i četiri obdaništa, ukupan broj dece 346, od 3do8 godina, uključujući i 163 (46,9%) dečaka i 183 (53,1%) devojčica, od kojih je 163 predškolske dece i 186 dece osnovne škole.

Kontrolna grupa se sastojala od 175 dece sličnih godina, kod kojih nije izvršena

Materials and methods

To increase the level of dental health in children in Transcarpathia, a scheme of early diagnosis, prevention and phased treatment of caries was established.

The scheme included the following stages:

1. Hygienic education of preschool children and their parents.
2. The exogenous medicamentous prevention with the use of remineralization varnish Bifluorid- 12, VOCO, Germany and Remin Pro, VOCO, Germany.
3. Hermetic sealing of teeth's fissures - first molars in the age of 6-7 years.
4. The treatment of hard tooth tissues lesions in the form of caries and its complications using conventional methods of treatment according to treatment protocols.
5. Endogenous non-medicinal prevention, correction of nutrition.

To this dedicated section of the program in Transcarpathian Regional State Administration "Program of improving dental health of population in the region", approved by the Regional Council of Transcarpathian № 395 dated 29 November 2007. (period of performance 2008.-2012.)and "Programs providing dental health of children population in 2009.-2013. years" approved by the City Council of Uzhgorod №1148 of 16 July 2009.¹⁴

A total of 6.136 children, aged 3-6 years, who were in kindergarten and first class of the school in Uzhgorod were fully involved in the program.

Evaluation of the hygienic oral care quality was quality brushing, which was checked by interns-dentists at the second visit to the dental office. For visualization the method of staining dental deposit with a solution «Finder Plaque» (Curaprox, Switzerland) was applied. It is a very effective means of motivation for the quality oral hygiene. As shown by experience, children and adolescents were not aware that during cleaning their teeth, using an incorrect method of brushing, not all the plaque can be removed.

After the seventh repetition and quality control of brushing, hygiene in most children was much improved. To assess the effectiveness of the proposed scheme of complex prophylaxis of dental caries, children of the first and second class of two secondary Uzhgorod schools (secondary school №10 were selected; №20), and four

terapija remineralizacije i zalivanja fisura, učenici drugih škola koji nisu obuhvaćeni programom (osim obuke higijene).

U cilju izvođenja higijene korišćene su metode grupnog učenja (priča, dijalog, ponavljanje pokreta), individualno učenje (instruktor za petoro dece), pozorišne predstave, uključujući i grupe omiljenih likova iz crtanih filmova.

Pri drugoj poseti sproveden je ponovni trening i kontrola tačnosti pokreta četkicom. Treća i četvrta poseta dece stomatologu je bila individualno sprovedena bojenjem plaka koji jasno pokazuje nedostatke oralne higijene i načine njegove eliminacije. Metod je korišćen za podsticanje psihološke motivacione metode, predviđajući novčanu naknadu za učešće u posebnim obrazovnim i informativnim programima.

Da bi se procenila sklonost ka karijesu korišćeni su ključni indikatori: učestalost, intenzitet povećanje/smanjenje intenziteta karijesa¹⁷. Karijes prevalencija – odnos broja ljudi (u procentima) koji ima karijes, plombirani i izvađeni zubi kod ukupnog broja pacijenata. Intenzitet karijes indeksa je određen CS+ CSE računajući iznos zuba zahvaćenih karijesom, plombiranih i izvađenih, gdje je C – konstanto kvarenje zuba; N – plombirani stalni zub; E – izvađen stalni zub; c – privremeni kvar zuba; a – privremena plomba.

Za procenu stanja oralne higijene je korišćen indeks Fedorov-Volodkina (1971)¹⁷, koji je određen bojenjem vestibularne površine šest donjih prednjih zuba rastvorom Shillier-Pisarev ili drugih rastvora koja sadrže jod. Kriterijumi evaluacionih tački: 1-odsustvo boje, 2-obojena ¼ krune, 3 -obojena krana 1/2, 4- 3/4 krune, 5- boja preko cele površine krune zuba. Izračunavanje je izvedeno korišćenjem formule: $IH = S / 6$, gde je S – zbir svih indeksa zuba. Kvantitativna procena je izvršena pomoću skale od pet bodova: 1,1-1,5 bod - dobar IH; 1,6-2,0 boda - zadovoljavajući IH; 2,1-2,5 boda - nezadovoljavajući IH; 2,6-3,4 boda - loša IH; 3,5-5,0 poena - vrlo loše IH.

Da bi se procenila efikasnost primenjenih metoda zdravstvene zaštite utvrđena je stopa smanjenja karijesa, u poređenju sa kontrolnom grupom, koja je sprovela prevenciju 16, 17 i to: smanjenje/povećanje karijesa = $\frac{Mc}{Ms} \times 100\%$, gde je Mc - prosečna stopa rasta u kontrolnoj grupi, Ms - prosečna stopa rasta u poređenoj grupi.

kindergartens, the total number of children at the age of 3-8 years was 346, including 163 (46,9%) boys and 183 (53,1%) girls, of which 163 were of preschool and 186 children of primary school age.

The control group consisted of children with similar age, in whom remineralization therapy and hermetization of fissures were not performed, the students of other schools not covered by the program (except hygiene training); the total number of children was 175.

To provide personal hygiene, the methods of group learning were used (talking, dialogue, repeating movements), individual learning (instructor for 5 children), theatrical performances including groups of favorite cartoon characters.

At the second visit, re-training and control of accuracy of brush movements were conducted. At the third and fourth visit of children, staining of the plaque that clearly shows the shortcomings of hygienic oral care and the ways of its elimination was individually carried out. Method was used for encouraging – a psychological motivational method including financial compensation for participation in specific educational and informative programs.

To evaluate the tendency to dental caries, the key indicators were used - prevalence, intensity, increase / reduction of the intensity of caries¹⁷. The caries prevalence - a ratio of the number of people (in percent) having caries, sealed and removed teeth out of the total number of patients. The intensity of caries index was determined by CS + CSE by calculating the amount affected by caries, sealed and removed the teeth, where C is constant tooth decay; S - seal permanent tooth; E - permanent tooth removed; c - temporary tooth decay; s - temporary tooth filling.

To evaluate the condition of oral hygiene, indices of Fedorov - Volodkina (1971)¹⁷ were used, which was determined by staining vestibular surface of six lower front teeth with solution of Shillyer-Pisarev or other iodine-containing solution. Criteria of evaluation points: 1-absence of coloring, 2 - ¼ of the crown colored, 3 - ½ of crown colored, 4 - ¾ of crown colored, 5 - color across the whole surface of the tooth crown. The calculation was performed using the formula $IH = \Sigma / 6$, where Σ - sum of all index teeth. Quantitative evaluation was performed by a five-point scale: 1,1-1,5 points - good IH; 1,6-2,0 points - satisfactory IH; 2,1-2,5 points - unsatisfactory IH; 2,6-3,4 points - poor IH; 3,5-5,0 points - very bad IH.

Karijes profilaktička efikasnost je ocenjena pomoću metode koju je predložio Kosenko KN i sar¹⁶. (2006), a određuje se po formuli: $CPE = CSEs2 \times 100 / CSEs1$, gde je CPE-karijes profilaktički efekat, stepen smanjenja intenziteta karioznih lezija, CSEs1 – indeks intenziteta karijesa broja kavitacija u tretman CSEs2 – indeks intenziteta karijesa broja kavitacija 18 meseci nakon tretmana.

Za planiranje i analizu efikasnosti terapije definisan je povećan intenzitet otiska karijesa - razlika između odgovarajućeg perioda prošle godine (CSE) i istog pokazatelja (CSE), koji je postavljen na pregledu u ovom trenutku. $N = A1 - A2$, gde je P - dobitak; A1 - indikator godine; A2 – prošle godine. Dobitak je određen do dve godine.

Indikator preventivnih mera – smanjenje karijesa zuba, koji se izračunava po formuli: $CPE = 100 - (CSEs1 \times 100 / CSEs2)$, gde je CPE – karijes propfilaktički efekat; CSEs1 - infestation karijesa u profilaktičkoj grupi; CSEs2 – karijes prevalencija u kontrolnoj grupi.

Statistička analiza podataka je obavljena korišćenjem metoda parametrijske i neparametrijske statistike. Saglasnost empirijski statistička distribucija parametara teorijske Gausove normalne distribucije je procenjena pomoću Kolmogorov-Smirnov kriterijuma (K.-S.) i Šapiro - Wilks (W), Vasan indikator pouzdanosti.

Rezultati

Na osnovnom pregledu 346 dece starosti od 3 do 8 godina, među kojima 163 (46,9%) dečaka i 183 (53,1%) devojčica, utvrđeno je da je nivo higijene dobar a među dečacima se nije sreo zadovoljavajući nivo. Loša higijena je preovladala u 57,4% (93 pregledanih) dečaka i 45,9% (84 pregledanih) devojčica. U 27,2% – 45% dečaka i 22,2% – 41 devojčica higijena je bila veoma slaba (Tabela 1).

To evaluate the effectiveness of the implementation of health care methods, we determined the rate of reduction / increase of the caries, compared with the control group, in which prevention was carried out as follows^{16, 17}: Reduction / increase of caries = $Mc / Ms \times 100\%$, where Mc - the average growth rate in the control group, Ms - the average growth rate in the control group.

Caries prophylactic effectiveness was evaluated with the method proposed Kosenko KN et al. (2006)¹⁶ and determined by the formula: $CPE = CSEs2 \times 100 / CSEs1$ where CPE – caries prophylactic effect, the degree of reduction in the intensity of caries lesion, CSEs1 - the index of the intensity of caries in the number of cavities to treatment CSEs2 - index of intensity of caries the number of cavities 18 months after treatment.

For planning and analysis of the effectiveness of therapy increase, the intensity of impression caries was defined - the difference between the corresponding period of the last year (CSE) and the same indicator (CSE), which is set at the time of examination. $P = A1 - A2$, where P is gain; A1 - an indicator of the year; A2 - last year. The gain was determined up to two years.

The indicator of preventive measures - reduction of caries, which is calculated by the formula: $CPE = 100 - (CSEs1 \times 100 / CSEs2)$ where CPE – caries prophylactic effect; CSEs1 - infestation of caries in prophylactic group; CSEs2 - caries prevalence in control group.

Statistical analysis of the data was performed using the methods of parametric and nonparametric statistics. Compliance empirical statistical distribution parameters of the theoretical Gaussian normal distribution was evaluated using the Kolmogorov-Smirnov criterion (K.-S.) and Shapiro - Wilks (W), was an indicator of reliability²⁹.

Results

At primary examination of 346 children aged of 3-8 years, among which 163 (46.9%) boys and 183 (53.1%) girls, a satisfactory level CECA was not achieved among boys. Poor hygiene prevailed in 57.4% (93 examined) boys and 45.9% (84 examined) girls. In 27.2% - 45% of boys and 22.2 - 41 girl hygiene was very poor (Table 1).

Tabela 1. Stanje oralne higijene pregledane dece starosti 3-8 godina na inicijalnom pregledu**Table 1.** Oral hygiene state of examined children aged 3-8 years at the initial examination

Pol Sex Interpretation	Dečaci (n=163) Boys (n=163)		Devojčice (n=183) Girls (n=183)	
	Abs	%	abs	%
1,1–1,5 poena – dobro HI 1,1–1,5 points – good HI	–	–	–	–
1,6–2,0 poena – zadovoljavajući HI; 1,6–2,0 points – satisfactory HI	–	–	22	12,2
2,1–2,5 poena – nezadovoljavajući HI; 2,1–2,5 points – unsatisfactory HI	25	15,4	36	19,7
2,6–3,4 poena – loše HI; 2,6–3,4 points – bad HI;	93	57,4	84	45,9
3,5–5,0 poena – veoma loše HI. 3,5–5,0 points – very bad HI.	45	27,2	41	22,2

Tabela 2. Stanje oralne higijene pregledane dece starosti 3-8 godina na inicijalnom pregledu posle 12 meseci**Table 2.** The state of oral hygiene in examined children aged 3-8 years after 12 months

Pol Sex Interpretation	Dečaci (n=163) Boys (n=163)		Devojčice (n=183) Girls (n=183)	
	abs	%	abs	%
1,1–1,5 points – dobro HI 1,1–1,5 points – good HI	62	37,7	83	45,4
1,6–2,0 points – zadovoljavajući HI; 1,6–2,0 points – satisfactory HI;	85	52,5	91	49,7
2,1–2,5 points – nezadovoljavajući HI; 2,1–2,5 points – unsatisfactory HI;	16	9,8	9	4,9
2,6–3,4 points – loše HI; 2,6–3,4 points – bad HI;	–	–	–	–
3,5–5,0 points – veoma loše HI. 3,5–5,0 points – very bad HI.	–	–	–	–

Nivo higijene značajno je bio bolji 12 meseci nakon prve posete poboljšana, pokazano u (Tabeli 2). Kod sve ispitivane dece preovladavao je zadovoljavajući nivo higijene, odnosno kod 52,5% – 85 dečaka i 49,7% – 91 devojčica; dobra higijena je bila kod 37,7% – 61% dečaka i 45,4% – 83 devojčica.

Konstatovan je mali procenat nezadovoljavajuće higijene kod 9,8% – 16 dečaka i 4,9% – 9 devojčica. To se može objasniti nedostatkom učešća roditelja u poboljšanju edukacije dece o higijeni, što igra značajnu ulogu.

U principu, tokom prvog ispitivanja dece dobar indeks higijene nije dijagnostikovano, zadovoljavajući je bio kod 22 deteta – 6,0%, nezadovoljavajući HI – kod 61 deteta – 18,0%, loše HI – kod 177 dece – 51,0% veoma loše HI – kod 86 dece – 25,0%. Posle 12 meseci od početka obuke o higijeni, indikatori su se radikalno promenili, posebno kod 145 dece – 42,0% indeks higijena je bila dobra, kod 176 dece – 51,0% bila je zadovoljavajuća a samo 7,0% – 25 dece su imala nezadovoljavajući HI (Slika 1).

Uz to, kod dece predškolskog uzrasta ovi pokazatelji su bili znatno viši nego kod dece osnovnoškolskog uzrasta, kao što se vidi na slici 1, što se može objasniti karakteristikama psihološke percepcije predškolaca i stresne situacije na početku škole.

Rezultati prevalencije i intenziteta karijesa kod ispitivane dece kliničke grupe predstavljeni su u Tabeli 3. Kontrolna grupa se sastojala od dece predškolskog uzrasta i učenika osnovnih škola, 85 osoba, 3-5 godina starosti i 90 osoba, 6 do 8 godina godina n h b Rold.

Prevalencija karijesa u starosnoj grupi od 3 do 5 godina iznosila je: u glavnoj grupi – $98,3 \pm 4,3$, u kontrolnoj grupi – $97,9 \pm 3,4$; u starosnoj grupi 6 do 8 godina, prevalencija karijesa u glavnoj grupi je bila – $95,3 \pm 3,2$, u kontrolnoj grupi – $94,1 \pm 3,7$. Terapiju remineralizacije tvrdih tkiva zuba sproveo je stomatolog korišćenjem Bifluorid-12, (VOCO, Nemačka) kod dece osnovne škole i krem Remin Pro (VOCO, Nemačka), kod predškolaca je sprovedena kod kuće primenom četkice za zube u večernjim satima nakon pranja tokom tri meseca sa naknadnom kontrolom. Terapija remineralizacije učenika prvih i drugih razreda se sastojala od premazivanja dva puta Bifluoridom - 12, (VOCO, Germani) svih zuba sa intervalom od 6 meseci nakon detaljnog čišćenja sa pastom Clint (VOCO, Nemačka).

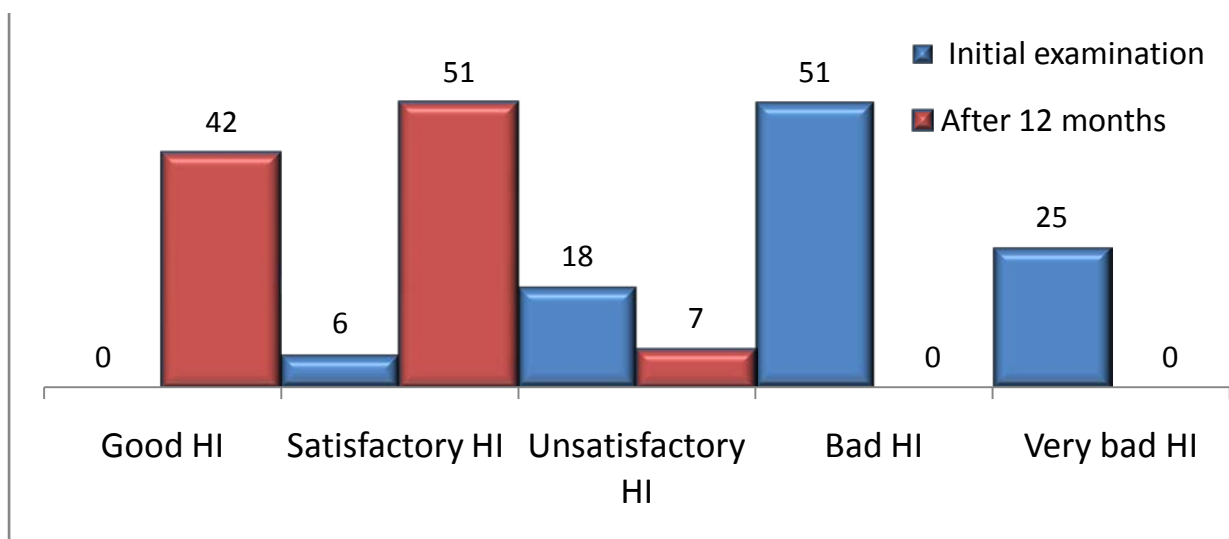
Twelve months after the first visit, the hygiene level was significantly improved, which is shown in Table 2. In all examined children a satisfactory level of hygiene prevailed, namely in 52,5% - 85 boys and 49,7% - 91 girls; good hygiene was found in 37,7% - 61% boys and 45,4% - 83 girls.

A small percentage of unsatisfactory hygiene was diagnosed in 9,8% of children - 16 boys and 4,9% - 9 girls. It can be explained by the lack of parent's participation in improving the hygienic education of children that plays a significant role.

In general, during the initial examination of children, good hygiene index was not diagnosed at all, satisfactory was observed in 22 children – 6,0%, unsatisfactory HI – in 61 children – 18,0%, bad HI - in 177 children – 51,0% very bad HI – in 86 children – 25,0%. After 12 months from the beginning of hygienic training, the indicators radically changed, particularly in 145 children – in 42,0% the hygiene index was good, in 176 children – 51,0% was satisfactory and only 7,0% - 25 children had unsatisfactory HI (Figure 1).

In preschool children these indicators were significantly higher than in children of primary school age, as seen in Figure 1, which can be explained by the features of psychological perception of preschoolers and stressful situation at beginning school.

Results of the prevalence and caries intensity in examined children of clinical group are represented in the Table 3. The control group consisted of preschool children and primary school children 85 persons 3-5 years old and 90 persons 6-8 years years n h b rold. Caries prevalence in the age group 3-5 years equaled: in the main group - $98,3 \pm 4,3$, in the control group - $97,9 \pm 3,4$; in the age group 6-8 years, the prevalence of caries was in the main group - $95,3 \pm 3,2$, in the control group - $94,1 \pm 3,7$. Remineralization therapy of hard tooth tissue carried out by dentist using Bifluorid-12, (VOCO, Germany) in children of primary school and cream Remin Pro (VOCO, Germany) in preschoolers at home applying toothbrush in the evening after brushing during three months with the subsequent control. Remineralization therapy of pupils of the first and second class consisted of varnishing with Bifluorid- 12 for two times, (VOCO, Germany) of all teeth with an interval 6 months after the thorough cleaning with paste Clint (VOCO, Germany).



Slika 1. Indikatori indeksa higijene kod ispitivane dece na primarnom pregledu i posle 12 meseci.

Picture 1. Indicators of hygiene index in examined children at the primary examination and after 12 months

Table 3. Rasprostranjenost i karijes intenzitet kod dece prema uzrastu na primarnom pregledu

Table 3. The prevalence and dental caries intensity in children according to the age at the primary examination

Indikatori Indicators	Prevalencija karijesa, % Caries prevalence, %	Intensity of caries, unit. Intensiti od karijesa, jedinice					
		C	F	C	F	D	cf, cf+CFD
Glavni 3-5 godina (n=163) Main 3-5 years (n=163)	98,3±4,3	10,1±0,9	4,1±0,1	-	-	-	14,2±1,2
Kontrola 3-5 godina (n=85) Control 3-5 years (n=85)	97,9±3,4	8,7±0,9	5,2±0,1	-	-	-	13,9±0,9
Glavni 6-8 godina (n=186) Main 6-8 years (n=186)	95,3±3,2	5,1±0,2	2,2±0,1	4,1±0,1	1,9±0,1	-	13,3±0,9
Kontrola 6-8 godina (n=90) Control 6-8 years (n=90)	94,1±3,7	4,9±0,2	2,5±0,1	3,8±0,1	1,9±0,1	-	13,1±0,8

Zalivanje fisura zuba sprovedeno je svetlosno polimerizujućim zalivaćima, prema indikacijama. Kontrola zaptivanja se vršila u toku godine.

Obnova tvrdih zubnih tkiva sprovedena je sa glasjonomerima i kompozitnim materijalima, prema indikacijama korišćenja, prednost je data kompomernim materijalima na mlečnim zubima (Tvinki Star, VOCO, Nemačka) i nano kompozitnim svetlosno-polimerizujućim materijalima Polofil supra (VOCO, Nemačka) za grupu bočnih zuba i Amaris (VOCO, Nemačka) za prednje zube.

Za smanjenje nivoa oralne disbioze i mikroba uvedena je korekcija u ishrani sledećih proizvoda: brusnica, jošta, crvene ribizle za svu decu u glavnoj grupi. Posle 24 meseci izvršen je pregled i ponovo je utvrđivano povećanje intenziteta karijesa i indeks smanjenja karijesa. Povećanje/smanjenje intenziteta karijesa u predškolskoj starosnoj grupi od 3 do 5 godina (5-8 godina) bilo je u glavnoj kliničkoj grupi $F = 4,6-14,2 = 9,6$; u kontrolnoj grupi, $P = 15,1-13,9 = 1,2$. (Tabela 4, slika 2).

Hermetic sealing of teeth fissures was carried with light fissures sealants, according to indications. Control of hermetization was performed during the year.

Restoration of hard tooth tissue conducted with glass ionomer and composite materials, according to indications of use, and preference was given to compomers for the temporary teeth (Twinky Star, VOCO, Germany) and nanocomposite light curing materials such as Polofil supra (VOCO, Germany) for masticatory groups of the teeth and Amarys (VOCO, Germany) for the frontal teeth.

To reduce the level of oral dysbiosis and microbial landscape, correction in the diet with the following products was introduced: cranberry, jostaberry, red currants for all children of the main group. After 24 months, they were examined and increase in the intensity of caries and caries reduction index was re-determined. Increase / reduction of caries intensity in preschool age group 3-5 years (5-8 years) was in the main clinical group $F = 4,6-14,2 = 9,6$; in the control group, $F = 15,1-13,9 = 1,2$. (Table 4, Picture 2).

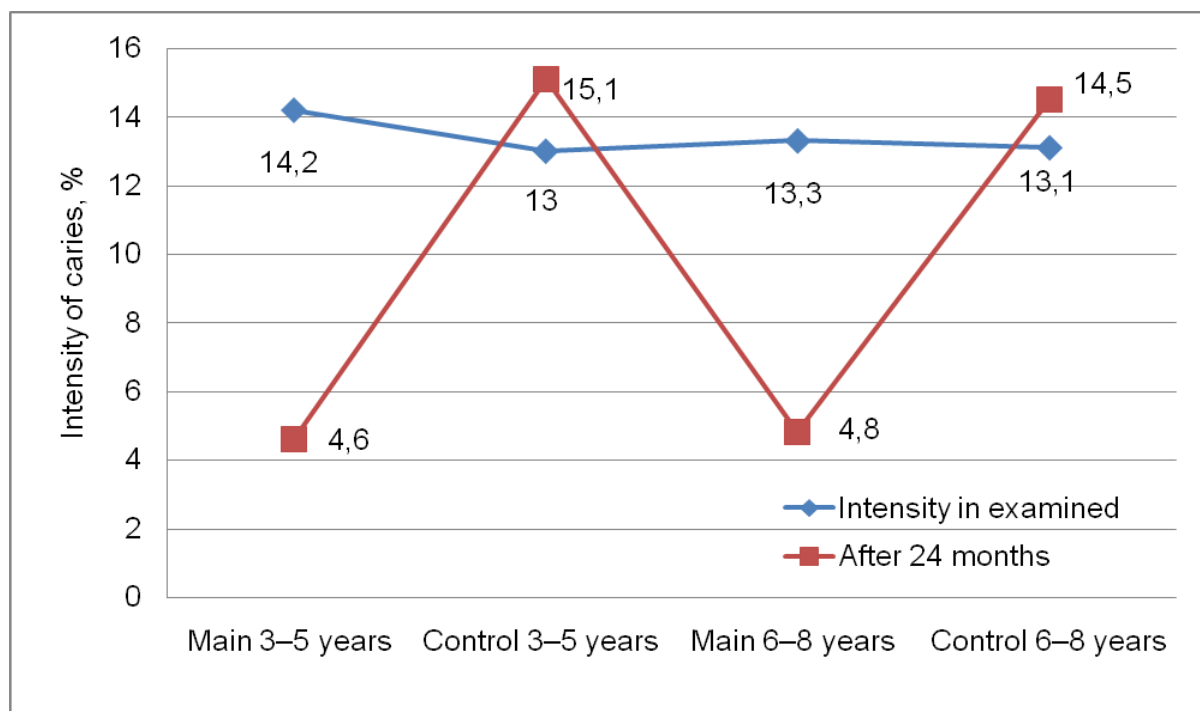
Tabela 4. Rasprostranjenost i intenzitet karijesa kod dece prema uzrastu, posle 24 meseci

Table 4. Prevalence and intensity of caries in children according to age after 24 months

Indikatori Indicators	Intenzitet karijesa, jedinice Intensity of caries, units.					
	C	F	C	F	D	cf+CFD
Kliničkagrupa Clinical groups						
Glavna 5–7 godina (n=163) Main 5–7 years (n=163)	1,2±0,2*	1,9±0,1	0,3±0,1*	1,2±0,1*	–	4,6±0,4*
Kontrolna 5–7 godina (n=85) Control 5–7 years (n=85)	8,2±1,1	2,5±0,1	4,2±0,2	0,2±0,1	–	15,1±1,2
Glavna 8–10 godina (n=183) Main 8–10 years (n=183)	1,4±0,2*	1,5±0,1	0,3±0,1*	1,6±0,2	–	4,8±0,8*
Kontrolna 8–10 godina (n=90) Control 8–10 years (n=90)	5,1±0,2	2,2±0,1	4,1±0,1	1,9±0,1	1,2±0,1	14,5±1,1

Beleška. * - Indikatori pouzdanosti prema pokazateljima kontrolne grupe koje odgovaraju uzrastu ($p < 0,05$).

Note. * - Indicators of reliability comparatively to indicators of control groups corresponding to the age ($p < 0,05$).



Slika 2. Pokazatelji intenziteta zubnog karijesa kod dece u glavnoj i kontrolnoj grupi
Picture 2. Indicators of dental caries intensity in children of the main and control group

Kod dece osnovne škole 6-8 godina (8-10 godina) povećanje intenziteta karijesa u glavnoj grupi je bilo $I = 4,8-13,3 = -8,5$; u kontrolnoj grupi sličnih godina $I = 14,5-13,1 = 1,4$. Dakle, u kliničkoj grupi dece posle 24 meseci smanjenje intenziteta karijesa bilo je 9,6 u starosnoj grupi 3-5 godina (5-8 godina) i 8,5 u starosnoj grupi 6-8 (8-10) godina.

Kod dece kontrolne grupe bilo je značajnog porasta karijesa – 1,2 u predškolce, a kod mlađih učenika – 1,4. Poređenjem pokazatelja intenziteta zubnog karijesa kod dece glavne i kontrolne grupe starosti 3-5 godina (5-7 godina) i 6-8 godina (8-10 godina) uspostavljeno je značajno smanjenje intenziteta kod dece glavnih grupa posle 24 meseci od početka preventivnih mera uključujući broj dece u glavnoj grupi od 3-5 godina je bio $c = 1,2$; $f = 1,9$; $C = 0,3$; $P = 1,2$ ($CF + ZS = 4,6$), u poređenju sa početnim pokazateljima $c = 10,1$; $f = 4,1$ ($cf = 14,2$); kod dece indikator kontrolne grupe nije značajno povećan $c = 8,2$; $F = 2,5$; $C = 4,2$; $P = 0,2$; $D = 0$ ($CF + ZS = 15,1$) u poređenju sa početnim pokazateljima $c = 8,7$; $F = 5,2$ ($CF = 13,9$). Kod dece 6-8 (8-10) godina bilo je istih tendencija. Kod dece glavne grupe pokazalo se značajno smanjenje intenziteta karijesa $cf + CFD = 4,8$ ($c = 1,4$,

In children of primary school 6 - 8 years (8-10 years), an increase in dental caries intensity in the main group was $I = 4,8-13,3 = -8,5$; in the control group of similar age $I = 14,5-13,1 = 1,4$. Therefore, in the clinical group of children after 24 months reduction of caries, intensity was 9,6 in the age group 3-5 years (5-8 years) and 8,5 in the age group 6-8 (8-10) years.

In children of the control group, there was a marked increase in caries – 1.2 in preschoolers, and 1.4 in junior pupils. When comparing the indicators of dental caries intensity in children of the main and control groups, aged 3-5 years (5-7 years) and 6-8 years (8-10 years), a significant decrease in intensity in children of the main groups after 24 months from the beginning of preventive measures was established, including the number of children in the main group aged 3-5 years: $c=1.2$; $f=1.9$; $C=0.3$; $F=1.2$ ($cf+CFD = 4.6$), compared with initial indicators $c=10.1$; $f=4.1$ ($cf=14.2$); in children of the control group indicators did not increase significantly, $c=8.2$; $f=2.5$; $C=4.2$; $F=0.2$; $D=0$ ($cf+CFD = 15.1$) compared with initial indicators $c=8.7$; $f=5.2$ ($cf=13.9$). In children aged 6-8 (8-10) years, there was the same tendency. In children of the main group a significant decrease of

f = 1,5, C = 0,3; P = 1,6; D = 0) u poređenju sa početnim indikatorima cf + CFD = 13,3 (c = 5,1, f = 2,2, C = 4,1; P = 1,9 D = 0); u kontrolnoj grupi dece sličnih uzrasta nije uočeno značajno povećanje intenziteta karijesa cf + CFD = 14,5 (c = 5,1; f = 2,5 C = 4,1, f = 1,9; d = 1,2) u poređenju sa početnim indikatorima - cf + CFD = 13,1 (c = 4,9; f = 2,5; C = 3,8; F = 1,9). Procenjen je indikator preventivnih mera efikasnosti - smanjenje karijesa. Kod dece uzrasta od 5 do 7 godina indikator karijes prevencije efikasnosti predloženog projekta je 69,5%. Za decu 8 do 10 godina efikasnost prevencije je bila 66,9%.

Diskusija

Velika pažnja je posvećena istraživanju pitanja prevencije karijesa kod dece iz Ukrajine, međutim, visoka prevalencija ove vrste patologije određuje veliku potrebu novim pristupima i novim načinima rešavanja. Najveće stope su zabeležene u oblastima u kojima postoji nedostatak mikroelemenata u vodi i zemljištu, kao što je transkarpatski region. Komplikovano pitanje je takođe i zbog nedovoljnog broja dečjih stomatologa i zubnih higijeničara. Iskustvo vodećih zemalja veliku pažnju u prevenciji karijesa dodelio je individualnoj oralnoj higijeni kao najefikasnijem i ekonomski održivim načinom prevencije⁴.

Najpovoljniji uzrast za postizanje pozitivnih rezultata je predškolski i osnovnoškolski, a za ovu studiju je izabrana upravo ova ciljna grupa za koji je sprovedena edukacija o higijeni i oralna sanacija⁵.

Glavni zadatak - popularizacija racionalne individualne oralne higijene i obuke o kvalitetnoj oralnoj nezi. Obuka je sprovedena u vrtićima i školama u gradu Užgorod. Instruktori - medicinski pripravnici Stomatološkog fakulteta Higher Educational Establishment "Užgorod Nacionalnog univerziteta", kao deo programa u delu "Prevencija bolesti zuba" i lekari-stomatolozi odeljenja za decu transkarpatskog regiona stomatološke klinike, održalo je sastanak sa decom, pokazujući opšta pravila higijene i oralnog zdravlja u vidu igara i higijenskih mera za motivaciju dece¹⁴.

Vrtić i prvi razred škola u Užgorodu gotovo u potpunosti su uključeni u program, naime, deca uzrasta od 3 do 6 godina.

dental caries intensity was observed - cf + CFD = 4.8 (c=1.4; f=1.5; C=0.3; F=1.6; D=0) compared with initial indicators cf+CFD =13.3 (c=5.1; f=2.2; C=4.1; F=1.9; D=0); in the control group with children of the similar age, a non-significant increase of dental caries intensity was observed cf+CFD= 14.5 (c=5.1; f=2.5; C=4.1; F=1.9; D=1.2) compared with the initial indicators - cf+CFD = 13.1 (c=4.9; f=2.5; C=3.8; F=1.9). We estimated the indicator of preventive measures effectiveness - reduction of dental caries. Children in the age group 5-7 years indicator of caries prevention effect of the proposed scheme was 69.5%. For children 8-10 years age group prevention efficiency was 66.9%.

Discussion

Much attention is devoted to the research of prevention of caries among children of Ukraine, however, the high prevalence of this type of pathology determines the high need of new approaches and new ways of solving it. The highest rates are recorded in the regions where there is a lack of microelements in the water and soil, such as Transcarpathian region. This issue is complicated also due to the insufficient number of children's dentists and dental hygienists. The experience of the developed countries is that considerable attention in the prevention of caries is assigned to individual oral hygiene as the most efficient and economically viable method of prevention⁴.

Most favorable age to achieve a positive result is the pre-school and primary school age, and for this study such group was selected, in which hygiene education and oral sanitation were conducted⁵.

The main task is the popularization of rational individual oral hygiene and training of quality oral care. The training was conducted in kindergartens and schools in the city of Uzghorod. Instructors were medical interns of dental faculty Higher Educational Establishment "Uzhhorod National University" as part of the curriculum in the section "Prevention of dental diseases" and doctors-dentists of pediatric department of Transcarpathian regional dental clinics that hold meetings with children, demonstrate the general rules of hygiene and oral health in the form of games and motivate children to conduct hygiene measures¹⁴.

Kindergarten and first classes of Uzghorod's schools, children at the age of

Ova kategorija korektno motivacije je moguća za lako i brzo upoznavanje sa novim materijalom u cilju lišavanja osećaja straha pred stomatološku intervenciju i opšteg straha od zubara i stomatološke ordinacije. Svakom detetu je data prilika tokom posete stomatološkoj ordinaciji da se obuče kao lekar, stavi rukavice i masku za istinski pregled prijatelja koji deluju kao pacijenti. Nakon nekog vremena "doktor" i "pacijent" su zamenili uloge.

Ova igra ima veliki značaj za decu u eliminisanju straha od stomatološke ordinacije, jer sve manipulacije koje će služiti stomatologu neće biti nove i stoga se deca neće plašiti. Ova vrsta istraživanja sprovedena je na fantomima stomatoloških jedinica koje u potpunosti odgovaraju savremenoj stomatološkoj opremi koja je izuzetno efikasna.

Poseta dečje grupe fakultetu traje 30-40 minuta, nastavnici škola i vrtića u gradu su njihov sastavni deo nakon dogovora sa roditeljima svakog deteta koji razumeju potrebu održavanja zdravog načina života i rezultata održavanje zdravlja deteta.

Psihološki ispravna je šema pružanja lekcija. Posebno zanimljiva jeste činjenica da se učenje u okviru ovog programa vrši sa decom predškolskog i osnovnoškolskog uzrasta i da ih zainteresuje u formi igara koje uključuju omiljene likove iz crtanih filmova. Važno je da se ilustruje metod i vizuelizacija higijene zuba (deca sa ponašaju kao lekari i ispituju jedni druge u stomatološkoj stolici) koja smanjuje strah od posete stomatologu i pokazuje bezbednost. Treći blok časa bio je učenje metode čišćenja zuba pojedinačno sa instruktorom, vežbanje vredno pokreta četkanja za efikasno uklanjanje plaka. Prosečan broj časova nije bio više od 10-12 minuta, što je dovoljno da dete u ovom uzrastu fokusira pažnju. Ovaj metod je najefikasniji za podučavanje dece i omogućava da se razviju komunikacijske veštine budućih doktora koji studiraju ne samo praktične veštine, već i komunikaciju sa različitim pacijentima.

Sve jedinice programa su visoko efikasne zbog njihove kompleksne upotrebe; sprovedena analiza efikasnosti pokazuje perspektivu korišćenja regionalnih programa u Ukraini i vodi do značajnog smanjenja prevalencije i intenziteta glavnih oboljenja zuba, posebno kod dece, koja su obezbeđena principima školskog stomatološkog sistema, organizacija od stomatoloških ordinacija u strukturi predškolskih ustanova, škola i 3-6

years, were almost completely involved in the program. This category at the correct motivation is able for easy and quick perception of new material aimed to deprive the feeling of fear before dental procedures and general fear of the dentist and dental surgeries. Every child is given the opportunity during his visit to the dental department to try himself as a doctor and medical vdyahnuvshy suit, gloves and a mask to inspect their friends who act as patients. After some time, the "doctor" and "patient" switch roles.

This game has a great interest in children and eliminates fear of dental office because all manipulations that will serve the dentist are not new, and therefore children are not afraid of it. This kind of study was performed on phantoms of dental units that fully correspond to the modern dental equipment that is extremely effective.

A visit of children's group at the faculty lasts 30-40 minutes, teachers of schools and kindergartens accompany them as parents agree and understand the necessity to maintain a healthy lifestyle.

Psychologically the correct is scheme of providing lesson. Especially interesting is the fact that learning under this program is carried out with children of preschool and primary school age and interesting them in the form of games involving favorite cartoon characters. It is important to illustrate the method and visualization of dental hygienist (children act as doctors who examine each other in the dental chair) that reduces the fear of visiting the dentist and shows safety being a doctor. The third block of classes was learning the methods of cleaning teeth individually with an instructor, practising diligently brushing movements for efficient removal of plaque. Average number of blocks was no more than 10-12 minutes, which is enough to focus the attention of children at this age. This method is most effective for teaching children and allows to develop communication skills in future doctors who study not only practical skills, but also communication with different patients' population. perspective for using of regional programs in Ukraine and lead to significant decrease of prevalence and intensity of main dental diseases, especially among school and other educational institutions (colleges and universities), whose activity is regulated by state and regional programs of

drugih obrazovnih institucija (fakulteti i univerziteti), čija je delatnost regulisana državnim i regionalnim programima primarne prevencije glavnih stomatoloških oboljenja kod dece i adolescenata i koja će se rukovoditi principima kliničkog pregleda ove populacione grupe.

Kriterijum kvaliteta rada dečjih stomatologa u dečjim grupama razmotrio je broj zdrave dece. Za geografski udaljene regione savetuje se da se postepeno dozvoli kvalifikovana stomatološka zaštita za decu od strane opšteg stomatologa i po ovom osnovu da se poveća dostupnost nege deci.

Zaključak

Osnovni pravac pedijatrijskih stomatoloških usluga u Ukrajini treba stvoriti je za dečju populaciju (starosti do 18 godina) nacionalnih i regionalnih programa za primarnu prevenciju glavnih oboljenja zuba sa pružanjem adekvatnog finansiranja u dovoljnom obimu kako bi se očuvalo zdravlje zuba nacije za dugogodišnji period od 20 godina.

children, which is provided on the principles of the school dentistry system, organization of dental offices in the structure of pre-school, primary prevention of main dental diseases in children and adolescents and will be guided by the principles of clinical examination of this population groups.

The criteria for work quality of pediatric dentists in children's groups considered the number of healthy children. For geographically remote regions, it is advisable to gradually allow the provision of qualified dental care for children by general dentist and to increase accessibility of care for children.

Conclusion

The main strategy of pediatric dental services in Ukraine should be creating of national and regional programs for the population up to 18 years and for the primary prevention of main dental diseases with providing adequate financing in sufficient volume to preserve the nation's dental health for the next 20 years.

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