

Primljen / Received on: 09.04.2021
 Revidiran / Revised on: 18.08.2021
 Prihvaćen / Accepted on: 31.08.2021

ORIGINALNI RAD
 KLINIČKA STUDIJA
 ORIGINAL ARTICLE
 CLINICAL STUDY
 doi: 10.5937/asn2184232K

STATISTIČKA ANALIZA KRITERIJUMA ZA PROCENU EFIKASNOSTI ISPUNA NA STALNIM ZUBIMA KOD DECE

STATISTICAL ANALYSIS OF CRITERIA FOR EFFICIENCY OF FILLING OF PERMANENT TEETH IN CHILDREN

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Sažetak

Uvod: Efikasnost lečenja karijesa zavisi od mnogih faktora, kao što su stanje zubnih tkiva, stadijum razvoja korena, period denticije, kvalitet preparacije i izolacije i optimalan izbor materijala za restauraciju. Problem izbora materijala za plomiranje zuba aktuelan je pri svakom tretmanu karijesa kod dece sa mešovitim i stalnom denticijom.

Cilj: Utvrditi i statistički potkrepiti parametre za odabir restaurativnog materijala za stalne zube kod dece sa različitim fazama razvoja korenazuba.

Materijali i metode: Ispitano je 248 dece uzrasta od 7 do 11 godina (122 dečaka i 126 devojčica) i 246 dece uzrasta od 12 do 17 godina (120 dečaka i 126 devojčica) učenika Srednje škole broj 20 u Užgorodu. Ispitivani su materijali za restauraciju "Polofil Supra" (VOCO, Nemačka) i "Dyract eXtra" (Dentsply, SAD). Analizirani su sledeći kriterijumi: pH vrednosti pljuvačke, područje destrukcije okluzalne površine bočnih zuba, stadijum razvoja korena, dubina i topografija lezije, kao i otpornost gleđi na kiselinu. U svrhu statističkog opravdanja odabranih parametara, koji su se pokazali značajnima pri izboru restaurativnih materijala, kao i radi analize međusobnih odnosa proučavanih parametara, određen je Spearmanov koeficijent korelacije (r). Koeficijent korelacije smatrao se statistički značajnim kada je $p < 0,05$.

Rezultati: Za decu uzrasta od 7 do 17 godina, za restauraciju stalnih zuba tokom perioda mešovite i stalne denticije, najbolji materijali za upotrebu bili su: "Polofil Supra" (VOCO, Nemačka) i "Dyract eXtra" (Dentsply, SAD).

Zaključak: Za restauraciju stalnih zuba, u bilo kojoj fazi razvoja korena, racionalno je koristiti kompozitni materijal "Dyract eXtra" ($r = 0,80$), a kompozitni materijal "Polofil Supra" uslovima završenog rasta korena, zanivopH pljuvačke veći od 6,2, uz visok stepen otpornosti gleđi na kiselinu i područje destrukcije okluzalne površine zuba manje od 0,55 ($r = 0,72$).

Cljučne reči: dečja stomatologija; karijes; stalni zubi; kompozitni materijali; statistička opravdanost

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Abstract

Introduction: The effectiveness of caries treatment depends on many factors, such as the condition of dental tissues, the stage of root development, the period of dentition, the quality of preparation and isolation, the optimal choice of material for restoration. The problem of choosing the filling material is acute in each treatment of caries in children with mixed and permanent dentition.

The aim: To determine and statistically substantiate parameters for choosing restorative material for permanent teeth in children with different stages of root development.

Materials and methods: 248 children aged 7 to 11 (122 boys and 126 girls) and 246 children aged 12 to 17 (120 boys and 126 girls), students of Uzhgorod Secondary School №20 were examined. Restoration materials - "Polofil Supra" (VOCO, Germany) and "Dyract eXtra" (Dentsply, USA). The following criteria were investigated: saliva pH, area of destruction of the occlusal surface of masticatory teeth, stage of root development, depth of the lesion and cavity topography, the acid resistance of the enamel. For the purpose of statistical justification of the selected parameters that pointed as significant in the choice of restorative materials, and for the analysis of the interrelations of the parameters studied, the Spearman correlation coefficient (r) was determined. The correlation coefficient was considered statistically significant when $p < 0,05$.

Results: For children aged 7-17 years to restore permanent teeth during the period of mixed and permanent dentition, the best materials in use were: "Polofil Supra" (VOCO, Germany) and "Dyract eXtra" (Dentsply, USA).

Conclusion: To restore permanent teeth in any stage of root development, it is rational to use a compomer material "Dyract eXtra" ($r = 0,80$), and a composite material "Polofil Supra" - under the conditions of the formed root, at a pH level of more than 6.2, a high degree acid resistance of the enamel and the area of destruction of the occlusal surface less than 0.55 ($r = 0,72$).

Key words: pediatric dentistry, caries, permanent teeth, composite materials, statistical justification

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Uvod

Veliki broj naučnih i naučno-stručnih istraživanja posvećen je pitanju dijagnoze i izboru metoda restauracije tvrdih zuba kod dece¹⁻⁷. Izbor materijala za restauraciju izgubljenih tvrdih zubnih tkiva kod dece, obično je, osim karakteristika materijala, ograničen i periodom denticije i funkcionalnom grupom, kojoj zubi pripadaju, što dovodi do komplikacija, kao što su defekti i gubitak ispuna i razvoj komplikacija karijesa⁸⁻¹⁰. Međutim, postoji niz faktora, kao što su lokalni oralni faktori (pH vrednosti pljuvačke, higijena, razvoj korena zuba, otpornost gleđina karijes, dubina karijesne lezije, područje destrukcije okluzalne površine bočnih zuba) koji igraju značajnu ulogu u kvalitetu i izdržljivosti ispuna. Stoga, razvoj jasnih kriterijuma za dijagnozu i optimizaciju izbora restaurativnog materijala zahteva dalje proučavanje⁷⁻¹⁰.

Pružanje kvalifikovane, visokokvalitetne stomatološke nege deci komplikovano je i uslovljeno specifičnostima psihoemocionalnog statusa ovih pacijenta. Deca su, u velikoj većini slučajeva, u strahu, što zahteva jasnu i brzu primenu svih medicinskih manipulacija, upotrebu minimalno invazivnih i, istovremeno, najinformativnijih dijagnostičkih mera i jasnih kriterijuma za izbor restaurativnih materijala¹¹⁻¹⁴.

S obzirom na gore navedeno, postoji potreba za razvojem jasnih i objektivnih, statistički značajnih dijagnostičkih kriterijuma, koji će dovesti do poboljšanja kvaliteta stomatoloških usluga namenjenih deci.

Efikasnost lečenja karijesa zavisi od mnogih faktora, kao što su stanje zubnog tkiva, stadijum razvoja korena, period denticije, kvalitet preparacije i izolacije, kao i optimalan izbor materijala za restauraciju^{1-5,10}. Problem izbora materijala za plomiranje aktuelan je pri svakom tretmanu karijesa kod dece sa mešovitom i stalnom denticijom^{15,16}. Ograničen pristup usnoj duplji, obilno lučenje pljuvačke, različita struktura zubnog tkiva u različitim fazama razvoja korena, uznemirenost deteta tokom stomatološke intervencije i brojni drugi faktori iziskuju kriterijume koje treba da zadovolje materijali za zubne ispune u dečjoj stomatologiji¹⁷⁻²⁰.

Cilj ovog rada je utvrditi i statistički potkrepiti parametre za odabir materijala za restauraciju stalnih zuba kod dece sa različitim fazama razvoja korena.

Introduction

A large number of scientific and scientific-practical researches are devoted to the issue of diagnosis and choice of methods of restoration of hard tissues of teeth in children¹⁻⁷. The choice of material for the restoration of lost hard tissues of teeth in children, usually, in addition to the characteristics of the material, is limited by the period of dentition and group affiliation of the tooth, which leads to complications such as filling defects and their loss, the development of complicated caries⁸⁻¹⁰. However, there are a number of factors such as local oral factors (pH of saliva, hygiene, tooth root development, enamel caries resistance, the depth of carious cavity, the area of destruction of the occlusal surface of the masticatory teeth) which play a significant role in quality and durability. Therefore, the development of clear criteria for diagnosis and optimization of the choosing of restorative material requires further study⁷⁻¹⁰.

The provision of qualified high-quality dental care to the children's contingent is complicated by the peculiarities of the psycho-emotional status of the patient. Children, in the vast majority of cases, are under stress, which requires a clear and rapid implementation of all medical manipulations, requires the use of minimally invasive and, at the same time, the most informative diagnostic measures and clear criteria for choosing restorative material¹¹⁻¹⁴.

Considering the above, there is a need to develop clear objective statistically significant diagnostic criteria, which will lead to an improvement in the quality of dental services to the children.

The effectiveness of caries treatment depends on many factors, such as the condition of dental tissues, the stage of root development, the period of dentition, the quality of preparation and isolation, the optimal choice of material for restoration^{1-5,10}. The problem of choosing the filling material is acute in each treatment of caries in children with mixed and permanent dentition^{15,16}. Limited access to the cavity, abundant salivation, different structure of tooth tissues at different stages of its development, excitement of the child during dental manipulations and a number of other factors causes criteria that should meet filling materials for use in pediatric dentistry¹⁷⁻²⁰.

The aim. To determine and statistically substantiate the parameters for choosing restorative material for permanent teeth in children with different stages of root development.

Materijali i metode

Ovaj članak je deo istraživačkog rada Odeljenja za dečju stomatologiju, Nacionalnog univerziteta Užgorod „Sveobuhvatno opravdanje za pružanje stomatološke zaštite deci koja žive na području biogeohemijskog nedostatka fluora i joda“ (Državni registracioni broj 0119U101329). Studija je dobila odobrenje Komisije za bioetiku Medicinskog fakulteta Nacionalnog univerziteta Užgorodu Ukrajini.

Restauraciji defekata kruničnog dela zuba, naklinici, prethodilo je eksperi-mentalno potkrepljivanje kriterijuma za izbor materijala za restauraciju. U tu svrhu, proučavali smo prirodu prijanjanja restaurativnih materijala na tvrda tkiva zuba laboratorijskim studijama, koristeći odabrane materijale i to kompomer "Dyract eXtra" (Densply, SAD) i svetlosnopolimerizujućikompozit "Polofil Supra" (VOCO, Nemačka).

Pregledano je 248 dece uzrasta od 7 do 11 godina (122 dečaka i 126 devojčica) i 246 dece uzrasta od 12 do 17 godina (120 dečaka i 126 devojčica), učenika Srednje škole broj 20 u Užgorodu. Ovo je klinička baza Odeljenja za dečju stomatologiju Stomatološkog fakulteta Nacionalnog univerziteta Užgorod, prema sporazumu između Nacionalnog univerziteta Užgorodi Srednje škole broj 20, Užgorod, o zajedničkim aktivnostima, u oblasti obuke i medicinsko-konsultantskog rada (od 01.03.2013). Anketa je sprovedena uz informisani pristanak roditelja ili staratelja. Rezultati istraživanja evidentirani su u zdravstvene knjižice stomatoloških pacijenta N 043 / o.

Indeks destrukcije okluzalne površine zuba (IDOST) određen je metodom koju je predložio V. Ju. Milikevich (1984)¹⁰: celokupno područje okluzalne površine zuba uzima se kao jedinica. Indeks destrukcije izračunava se iz jedinice, odnosno područja cele okluzalne površine. Ako je IDOST jednak 0 – 0,55, odnosno manje od 55% okluzalne površine zuba je destruirano–preporučuje se lečenje ispunom. Ako je IDOST jednak 0,56 – 0,6, odnosno više od 55% okluzalne površine je uništeno, indikovana je upotreba inleja, ako je indeks veći od 0,8 – indikovana je restauracija kolčićem.

Prirodna pH vrednost pljuvačke određena je pomoću test trakica^{10,14}. Prethodno je pacijent pljunuo nestimulisanu pljuvačku u posebnu čašu. Test traka je stavljena u pljuvačku na 10 sekundi, zatim je boja trake upoređena sa bojamana standardnoj skali i procenjena prema prirodi boje: crvena –pH u rasponu od 5,0 do 5,9; žuta –pH u rasponu od 6,0 do 6,7; zelena –pH u rasponu od 6,8 do 7,8.

Materials and methods

This article is a fragment of the research work of the Department of Pediatric Dentistry, Uzhhorod National University «Comprehensive justification for providing dental care for children living in the area of biogeochemical deficiency of fluorine and iodine» (State Registration № 0119U101329). The study received a positive approval from the Commission on Bioethics of the Medical Faculty of Uzhhorod National University, Ukraine.

The restoration of defects of the coronal part in the Clinic was preceded by experimental substantiation of the criteria for choosing the restorative material. To this end, we studied the nature of the adhesion of restorative materials to the hard tissues of the teeth through laboratory studies using selected materials, namely the compomer "Dyract eXtra" (Densply, USA) and light-cured composite "Polofil Supra" (VOCO, Germany).

Two hundred forty-eight children aged 7 to 11 (122 boys and 126 girls) and 246 children aged 12 to 17 (120 boys and 126 girls), students of Uzhhorod Secondary School №20 were examined. This is the clinical base of the Department of Pediatric Dentistry of the Faculty of Dentistry of Uzhgorod National University, under the Agreement between Uzhhorod National University and Uzhhorod Secondary School № 20 on joint activities in the field of training and medical and consulting work (of 1.03.2013). The survey was conducted with the informed consent of parents or guardians. The results of the research were recorded in the medical card of the dental patient N 043/o.

The Index of Destruction of the Occlusal Surface of the Teeth (IDOST) was determined by the method proposed by V. Yu. Milikevich (1984)¹⁰: the entire area of the occlusal surface of the tooth is taken as a unit. The index of destruction is calculated from the unit, that is, the area of the entire occlusal surface. If the IDOST is equal to 0–0.55, that is, less than 55% of the occlusal surface of the tooth is destroyed–treatment with filling is recommended. If the IDOST is equal to 0.56–0.6, i.e., more than 55% of the occlusal surface is destroyed, the use of inlays is indicated, if the index is more than 0.8–pin restorations is indicated.

The natural pH of saliva was determined using a strip test^{10,14}. Previously, the patient spit unstimulated saliva into a special cup. The test strip was placed in the saliva for 10 seconds, then the color of the strip was compared on a standard scale and evaluated by the nature of the color: red–pH in the range of 5.0–5.9; yellow–pH in the range of 6.0–6.7; green–pH in the range of 6.8–7.8.

Da bismo statistički potkrepili jasnoću parametara, koji su važni pri izboru restaurativnog materijala i za analizu odnosa proučavanih parametara, odredili smo Spearmanov koeficijent korelacije (r). Koeficijent korelacije smatran je statistički značajnim pri $p < 0,05$ ¹⁶.

Vrednost koeficijenta korelacije karakteriše zavisnosti vrednosti prema linearnom funkcionalu, što odgovara vrednosti $r \pm 1$ koeficijenta korelacije. Ako je $r_{xy} > 0$, korelacija je pozitivna. To znači da sa rastom jedne od vrednosti, druga takođe, u proseku, raste. U slučaju kada je $r_{xy} < 0$, korelacija je negativna, odnosno, sa povećanjem jedne od vrednosti, druga opada, u proseku.

U nedostatku statističkog odnosa između vrednosti, koeficijent korelacije je nula. Nivo p-kriterijuma (statistička značajnost) zavisi i od vrednosti koeficijenta korelacije i od veličine eksperimentalne grupe, za koju je koeficijent korelacije određen^{13,16}.

Predloženi skup studija omogućio je da se na osnovu morfološke analize utvrde glavni kriterijumi, koje treba uzeti u obzir u fazi odabira materijala za restauraciju zuba.

U skladu sa utvrđenim ciljevima studije, ponekad je izvršena dodatna podela glavnih grupa na podgrupe. Izračunavanje prognostičkih koeficijenata za svaki znak izvedeno je matematičkom obradom dobijenih vrednosti prema Baiesovoj formuli:

$$PC = 10 \lg P1/P2;$$

PC – prognostički koeficijent;

P1 i P2 – verovatnoća prisustva znaka u svakoj grupi;

$P1 = S1/n1$, $P2 = S2/n2$, gde je S1, S2 – učestalost znaka u svakoj grupi;

n1, n2 – broj pacijenata koji su proučavani u svakoj grupi;

$10 \lg P1/P2$ – logaritam verodostojnosti, koji je zbog pogodnosti povećan 10 puta.

Rezultati

Za decu uzrasta od 7 do 17 godina, upotrebljeni su najbolji materijali za restauraciju stalnih zuba u mešovitoj i stalnoj denticiji: Polofil Supra (VOCO, Nemačka) i Dyract eXtra (Dentsply, SAD).

Za određivanje parametara, po kojima ovi materijali najbolje funkcionišu, izabrani su kriterijumi ocenjivanja, koji pokazuju direktnu korelaciju sa efikasnošću prijanjanja proučavanih materijala. Slika, takođe, prikazuje proporciju pozitivnih rezultata stomatološkog tretmana, upotrebom proučavanih materijala. Stoga, analizirano je 8 kriterijuma prikladnosti upotrebe istraživanog materijala, opisanih u prethodnom pododeljku.

In order to perform statistical substantiation of clarified parameters, which are important in choosing restorative material and for the analysis of the relationships of the parameters that were studied, we determined the correlation coefficient (r) of Spearman. The correlation coefficient was considered statistically significant at $p < 0.05$ ¹⁶.

The correlation value of the coefficient characterizes the degree of proximity of the dependence between the values to the linear functional, which corresponds to the value of $r \pm 1$ correlation coefficient. If $r_{xy} > 0$, the correlation is positive. This means that with the growth of one of the values, the second—also, on average, increases. In the case when $r_{xy} < 0$ —the correlation is negative, i.e. with increasing one of the values, the second—decreases on average.

In the absence of a statistical relationship between the values, the correlation coefficient is zero. The level of the p-criterion (statistical significance) depends on both the value of the correlation coefficient and the size of the experimental group for which the correlation coefficient is determined^{13,16}.

The proposed set of studies made it possible, on the basis of morphological analysis, to determine the main criteria that should be considered at the stage of selection of restorative material.

In accordance with the established objectives of the study, additional division of the main groups into subgroups was sometimes carried out. Calculation of prognostic coefficients for each sign was carried out by mathematical processing of the obtained values according to Bayes formula:

$$PC = 10 \lg P1/P2,$$

PC—prognostic coefficient;

P1 and P2—probability of presence of a sign in each group;

$P1 = S1/n1$, $P2 = S2/n2$, where S1, S2—the frequency of the sign in each group;

n1, n2—the number of patients studied in each group.

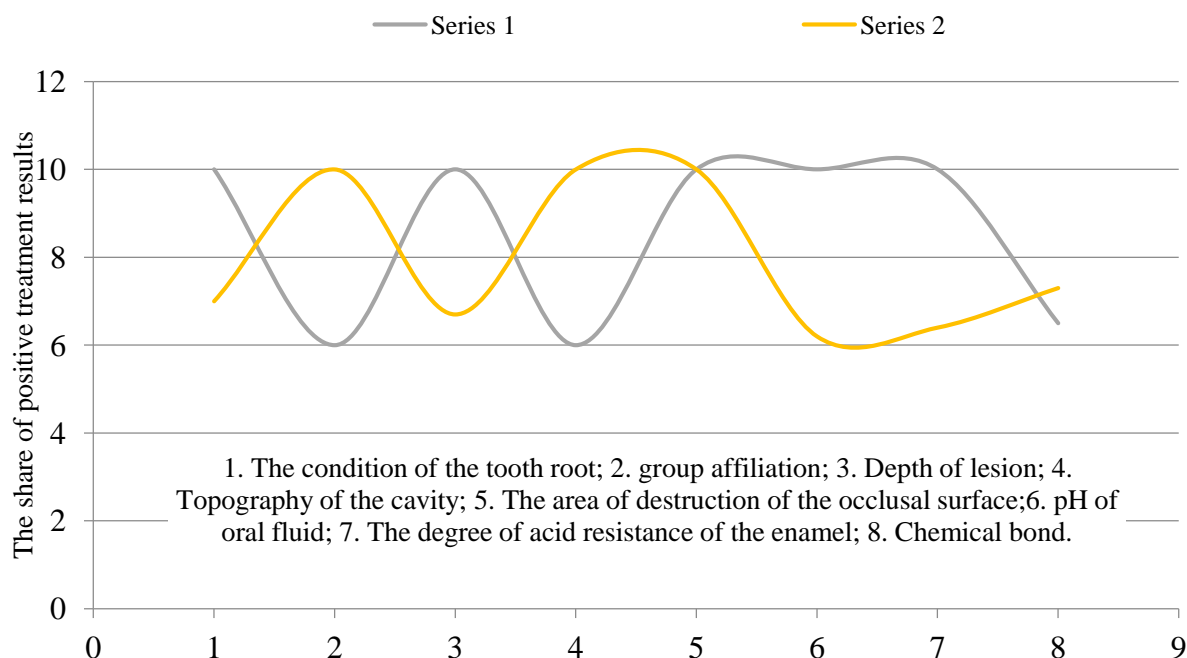
$10 \lg P1/P2$ —the logarithm of plausibility, which for convenience increased 10 times.

Results

For children aged 7–17 years, the best materials used to restore permanent teeth during alternating and permanent dentition were: Polofil Supra (VOCO, Germany) and DyracteXtra (Dentsply, USA).

Maksimalna vrednost na slici–10 pokazuje da se materijal sa ovim parametrom uvek može koristiti; 0 – materijal se uopšte ne može koristiti. Niz „prosečna vrednost“ pokazuje podobnost materijala za upotrebu, prema svim prosečno proučenim kriterijumima (Slika 1).

To determine the parameters at which these materials work best, evaluation criteria were selected that show a direct correlation with the adhesion efficiency of the studied reducing materials.

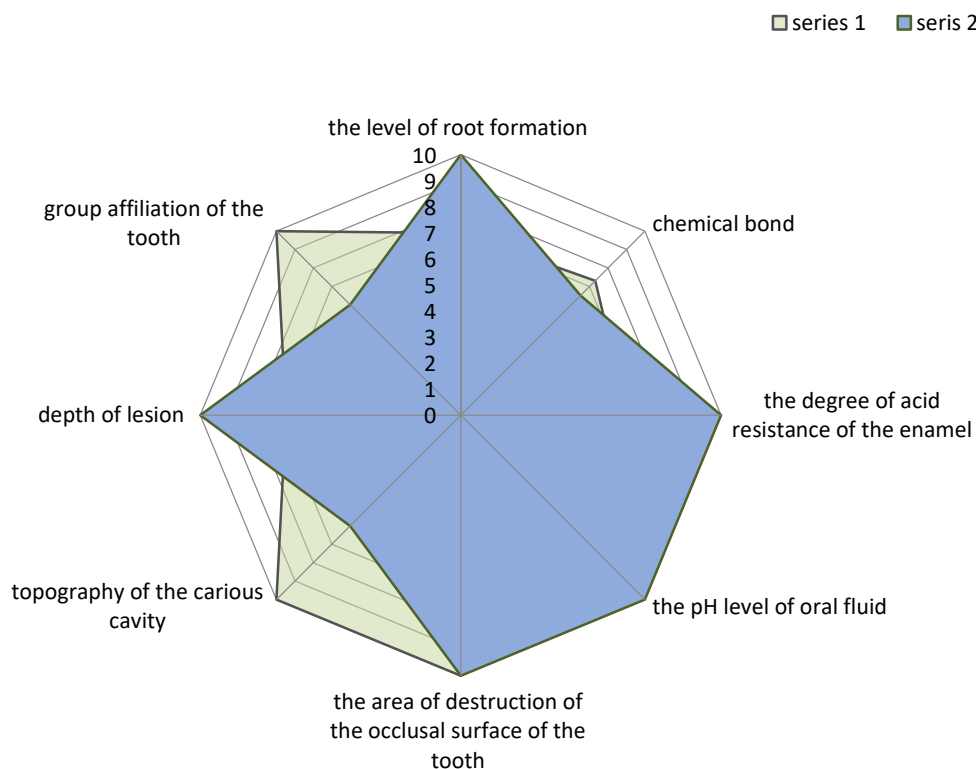


Slika 1. Indikatori upotrebe materijala za ispunje kod dece sa različitim kriterijumima
Figure 1. Indicators of the use of filling materials in children with different criteria

Rezultati složenih kliničkih i morfoloških studija, u kojima su ispitivana svojstva restaurativnih materijala i njihova naknadna statistička potkrepljenja, pokazuju da je kompozitni materijal „Dyract eXtra“ (Densply, SAD) visoko efikasan za upotrebu u slučajevima restauracije karijesnih lezija stalnih zuba u frontaloj i žvačnoj regiji zuba grupe (10 bodova), u stadijumu formiranog i neoformljenog korena (10 bodova), za lečenje karijes medije i dubokog karijesa (10 bodova), sa IDOST vrednostima <0,55 (10 bodova). PH nivo pljuvačke i stepen otpornosti glede na kiselinu nisu odlučujući kriterijumi pri izboru ovog materijala (10 bodova). Adhezivna svojstva optimalna su za gleđ i dentin (10 bodova). Ne preporučuje se upotreba kompozitnog materijala „Dyract eXtra“ (Densply, SAD) unutar cementa (3 poena) i sa vrednošću IDOST > 0,55 (0 poena) (Slika 2).

The Figure 1 also shows the proportion of positive results of dental treatment using the studied materials. Thus, 8 criteria of suitability of use of the researched material described in the previous subsection are analyzed. The maximal value in the table–10 shows that the material can always be used with this parameter, 0–the material cannot be used at all. The string “average value” shows the suitability of the material for use on all the criteria studied on average (Figure 1).

The results of complex clinical and morphological studies of the properties of restorative materials and their subsequent statistical substantiation show that the compomer material "DyracteXtra" (Densply, USA) is highly effective for use in cases of restoration of carious cavities of permanent teeth, both frontal and masticatory groups (10 points), at the stage of formed and unformed root (10 points), for the treatment of moderate and deep caries (10 points), with IDOST values <0.55 (10 points).



Slika 2. Gradacijska skala pokazatelja optimalne upotrebe materijala za restauraciju stalnih zuba

Figure 2. Gradation scale of indicators of optimal use of filling materials for restoration of permanent teeth

Kao rezultat sveobuhvatne kliničke i morfološke studije svojstava kompozitnog materijala „Polofil Supra“ (VOCO, Nemačka) i naknadne statističke analize, utvrđeni su sledeći parametri: upotreba za restauraciju karijesnih lezijastalnih zuba žvačne i frontalne grupe (10 bodova), sa razvijenim korenima zuba (9,8 bodova), za lečenje superficijalnog karijesa (10 bodova), karijes medije (10 bodova) i dubokog karijesa (6 bodova), uzimajući u obzir područje destrukcije okluzalne površine zuba <0,55 (10 poena), kada je pH pljuvačke veća od 6,2 (6,2 poena), sa visokim (10 poena) i srednjim (7,4 poena) stepenom otpornosti gleđi na kiseline.

Kompomerni materijal „Dyract eXtra“ (Dentsply, SAD) optimalan je za restauraciju stalnih zuba, bez obzira na stanje razvoja korena, dubinu karijesnog procesa, kada je vrednost indeksa destrukcije okluzalne površine zuba manji od 0,55, pri bilo kom

The pH level of the saliva and the degree of acid resistance of the enamel are not determining criteria when choosing this material (10 points). Adhesive properties are optimal for enamel and dentin (10 points). It is not recommended to use the compomer material "DyracteXtra" (Densply, USA) within the cement (3 points) and with the value of IDOST>0.55 (0 points) (Figure 2).

As a result of a comprehensive clinical and morphological study of the properties of the composite material "Polofil Supra" (VOCO, Germany) and subsequent statistical analysis, the following parameters were established: the use in the restoration of carious cavities of permanent teeth of the masticatory and frontal group (10 points), with developed roots (9, 8 points), for the treatment of superficial (10 points), medium (10 points) and deep (6 points) caries, taking into account the area of destruction of the occlusal surface of the tooth <0.55 (10 points), when the pH of the saliva is more than 6.2 (6.2 points), with

nivou pH pljuvačke i stepenu otpornosti gledajući na kiselinu, sa Spearmanovim koeficijentom korelacije ($r = 0,80$).

Kompozitni materijal „Polofil Supra“ (VOCO, Nemačka) je materijal izbora u lečenju stalnih zuba, u restauraciji karijesnih lezija bilo koje grupe zuba, kod zuba sa završenim razvojem korena, za lečenje površinskog i sekundarnog karijesa, u estetski značajnim područjima i za restauraciju sa intenzivnim mehaničkim opterećenjem, pri pH vrednosti pljuvačke 6,2, visokom i srednjem stepenu otpornosti gledajući na kiseline, sa Spearmanovim koeficijentom korelacije ($r = 0,72$).

Diskusija

Budući da lečenje karijesa stalnih zuba kod dece sa različitim stepenom razvijenosti ovog oboljenja podrazumeva hirurško uklanjanje zahvaćenih tvrdih zubnih tkiva i restauraciju anatomskog i funkcionalnog integriteta zuba, optimalan izbor materijala za restauraciju značajan je faktor u efikasnosti lečenja ovog oboljenja i određuje njegovu trajnost.

Raznolikost restaurativnih materijala dostupnih na stomatološkom tržištu zahteva jasne kriterijume odabira za svaki pojedinačni slučaj. Obično su glavne indikacijske karakteristike materijala period denticije i grupa kojoj zub pripada, što dovodi do komplikacija, kao što su defekti i gubitak ispunai razvoj komplikacija karijesa.

Statistička istraživanja pokazala su toda sledeći faktori igraju važnu ulogu u kvalitetu i trajnosti restauracije tvrdog tkiva stalnih zuba: period denticije i, shodno tome, stepen razvoja korena i grupa kojoj zub pripada, kao i lokalizacija i dubina karijesnih lezija. Lokalni oralni faktori, kao što su higijena, pH pljuvačke i otpornost zubne gleđi na kiselinu, imaju značajan uticaj.

Izbor materijala za plombiranje zavisi od karakteristika samog materijala, poput hemijske ili adhezivne veze sa tkivima zuba, što je u korelaciji sa dubinom oštećenja zuba, čvrstoćom i modulom elastičnosti materijala, koji određuju izbor, u zavisnosti od pripadnosti zuba određenoj grupi i topografske lokacije lezija. Kriterijum destrukcije okluzalnih površina bočnih zuba takođe je važan.

Koristeći statističku skalu gradacije napred navedenih parametara, istaknute su korelacione zavisnosti, sa različitim kriterijumima korelacije i istaknut je Spearmanov koeficijent korelacije, kao najznačajniji.

high (10 points) and medium (7.4 points) degrees of acid resistance of enamel.

Compomer material "DyractExtra" (Dentsply, USA) is optimal for the restoration of permanent teeth, regardless of the state of root development, the depth of the carious process, when the value of the index of destruction of the occlusal surface of the tooth is less than 0.55, at any pH level and the degree of acid resistance of the enamel with the Spearman correlation coefficient ($r = 0.80$).

Composite material "Polofil Supra" (VOCO, Germany) serves as a material of choice in the treatment of permanent teeth, in the restoration of carious cavities of any group, in the state of the developed root, for the treatment of superficial and secondary caries, in aesthetically significant areas and for restoration, carrying an intense mechanical load, at the pH value of saliva at 6.2, high and medium degrees of acid resistance of enamel with a Spearman correlation coefficient ($r = 0.72$).

Discussion

Because the treatment of permanent teeth caries in children with varying degrees of caries is surgical removal of the affected hard tissues and restoration of the anatomical and functional integrity of the tooth, the optimal choice of material for restoration is a significant factor in treatment effectiveness and determines its durability. The variety of restorative materials available on the dental market requires clear selection criteria for each case. Usually, the main indications are the characteristics of the material, the period of dentition and the group affiliation of the tooth, which leads to complications such as filling defects and their loss, the development of complicated caries.

Statistical studies have shown that the following factors play an important role in the quality and durability of hard tissue restoration of permanent teeth: the period of dentition and, accordingly, the degree of root development and group affiliation of the tooth, localization of carious lesions and its depth. Local oral factors such as hygiene, saliva pH and acid resistance of tooth enamel have a significant effect.

The choice of filling material depends on the characteristics of the material itself, such as chemical or adhesive bond with the tissues of the tooth, which correlates with the depth of tooth damage; the strength of the material and elasticity module, which

Za stomatologe za decu, propisane sujasne indikacije za upotrebu različitih vrsta restaurativnih materijala za lečenje karijesa stalnih zuba kod dece i adolescenata, u zavisnosti od perioda razvoja zuba, stanja razvoja korena, pripadnosti zuba određenoj funkcionalnoj grupi, dubine i topografije karijesnog procesa, pH pljuvačke, stepena otpornosti gleđi na kiselinu i područje destrukcija okluzalne površine zuba.

Kompozitni materijal "Polofil Supra" (VOCO, Nemačka) treba koristiti u lečenju karijesa svih grupa stalnih zuba, u fazi formiranog korena, pri bilo kojoj dubini karijesnog procesa, bez obzira na klinički tok karijesa, pri pH vrednosti pljuvačke $> 6,2$, za obnavljanje lezija u estetski značajnim područjima i područjima koja nose intenzivno mehaničko naprezanje.

Kompomerni materijal „Dyract eXtra“ (Densply, SAD) može se preporučiti za restauraciju žvačnih zuba u lečenju karijesa, bilo koje dubine, sa nezavršenim rastom korenom zuba, bez obzira na stepen otpornosti gleđi na kiselinu i prirodu karijesnog procesa.

Zaključak

Utvrđeno je prisutvo korelacija između stepena funkcionalne zrelosti zubnog tkiva, perioda denticije, stanja razvoja korena, prirode karijesnog procesa, dubine i topografije karijesne lezija, indeksa destrukcijeokluzalne površine zuba, pH nivoa pljuvačke i stepena otpornosti zubne gleđina kiseline.

Za restauraciju stalnih zuba, bez obzira na stepen razvoja korena zuba, na topografiju karijesne lezije i njene dubine, pH nivoa pljuvačke, stepen otpornosti gleđi na kiseline, pri vrednosti IDOST $<0,55$, racionalno je koristiti kompomerni materijal „Dyract eXtra“ ($r = 0,80$), i kompozitni materijal „Polofil Supra“ u uslovima razvijenog korena zuba, pri pH vrednosti većoj od $6,2$, uz visok stepen otpornosti gleđi na kiselinu i područje destrukcije okluzalne površinemanje od $0,55$ ($r = 0,72$).

determines the choice depending on the group affiliation of the tooth and the topography of the cavity location. The criterion of destruction of the occlusal surface of the masticatory teeth is important.

Using the statistical-gradation scale of the above parameters, correlation dependencies with different correlation criteria were highlighted and the most significant Spearman was distinguished.

For pediatric dentists, clear indications for the use of different types of restorative materials in the treatment of caries of permanent teeth in children and adolescents, depending on the period of dentition, the state of root development, group affiliation of teeth, depth and topography of carious process, pH of saliva, the degree of acid resistance of the enamel and the area of destruction of the occlusal surface of the tooth.

Composite material "Polofil Supra" (VOCO, Germany) should be used in the treatment of caries of all groups of permanent teeth, at the stage of the formed root, at any depth of carious process, regardless of the clinical course of caries, pH value > 6.2 , to restore cavities in aesthetically significant areas and areas that carry intense mechanical stress.

Compomer material "DyracteXtra" (Densply, USA) can be recommended for the restoration of masticatory teeth in the treatment of caries of any depth, with unformed tooth root, regardless of the degree of acid resistance of the enamel and the nature of the carious process.

Conclusion

The presence of correlations between the degree of functional maturity of dental tissues, the period of dentition, the state of root development, the nature of the carious process, the depth and topography of the carious cavity, the index of destruction of the occlusal surface of the tooth, the pH level of saliva and the degree of the acid resistance of tooth enamel have been established.

To restore permanent teeth in any condition of root development, regardless of the topography of the carious cavity, its depth, pH level of saliva, the degree of acid resistance of the enamel, at the value of IDOST <0.55 rational to use compomer material "DyracteXtra" ($r = 0,80$), and composite material "Polofil Supra" - under the conditions of the root development, at a pH level greater than 6.2 , a high degree of acid resistance of the enamel and the area of destruction of the occlusal surface is less than 0.55 ($r = 0.72$).

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