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PROCENA RIZIKA ZA NASTANAK ORTODONTSKIH NEPRAVILNOSTI KOD DECE U PRIGRADSKIM NASELJIMA

RISK ASSESSMENT OF ORTHODONTIC ANOMALIES IN CHILDREN IN SUBURBAN AREAS

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Sažetak

Uvod: Ortodontske nepravilnosti su veoma učestale kako u svetu, tako i kod nas. Etiologija ortodontskih anomalija je multifaktorijska, složena i uslovljena brojnim genetskim i negenetskim faktorima: endogenim i egzogenim. Sprečavanje nastanka ortodontskih nepravilnosti je moguće ukoliko imamo uvid u najčešće etiološke faktore.

Cilj: Proceniti učestalost pojedinih etioloških faktora i proceniti ukupan rizik za nastanak ortodontskih anomalija kod dece u prigradskoj sredini.

Materijali i metode: Istraživanje je izvršeno na 115 dece, učenika prvog razreda osnovne škole (28.68% od svih učenika 1. razreda), prosečne starosti od 6.8 godina, iz 4 naselja iz okoline Novog Sada: Kisač, Kač, Veternik, Futog. Istraživanje je sprovedeno u vidu anonimnih anketa na zaokruživanje za roditelje uz prethodno objašnjenje postavljenih pitanja. Pitanjima su bili obuhvaćeni etiološki faktori za nastanak ortodontskih nepravilnosti (oboljenja u trudnoći, tok porođaja, dojenje, dohranjivanje i hranjenje, vrsta cucle, položaj boce pri ishrani, loše navike, položaj pri spavanju, položaj ruku pri spavanju u odnosu na vilicu, visina uzglavlja, disanje na usta, ortodontske nepravilnosti kod roditelja).

Rezultati: Ukazuju na sledeće etiološke faktore kao najčešće: dohranjivanje i hranjenje cuclom (u 41.74% slučajeva), dojenje od 0 do 6 meseci (40.87% ispitanih) i disanje na usta (u 24.35% dece). U ispitivanju ukupnog rizika za nastanak ortodontskih nepravilnosti nizak rizik je bio ustanovljen u 95.65% slučajeva, srednji rizik u 4.35% (u Kisaču 9.38%, u Kaču 2.94%, u Veterniku 4.35%, u Futogu 0% dece), dok ispitanika sa visokim rizikom nije bilo.

Zaključak: Preventivne mere treba usmeriti na edukaciju majki o potrebi i prednostima prirodnog načina ishrane dojenjem i da za dohranjivanje i hranjenje koriste kašičicu.

Cljučne reči: ortodontske nepravilnosti, dohranjivanje deteta, dojenje, disanje na usta

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Abstract

Introduction: Orthodontic anomalies are very common both in the world and in our country. The etiology of orthodontic anomalies is multifactorial, complex and conditioned by numerous genetic and non-genetic factors: endogenous and exogenous. Prevention of orthodontic anomalies is possible if we have an insight into the most common etiological factors.

Goal: To assess the frequency of individual etiological factors and assess the overall risk of orthodontic anomalies in children in suburban environments.

Materials and methods: The research was conducted on 115 children, first grade elementary school pupils (28.68% of all 1st grade students), average age of 6.8 years, from 4 settlements around Novi Sad: Kisač, Kač, Veternik, and Futog. The research was conducted in the form of anonymous rounding surveys for parents with a preliminary explanation of the questions asked. The questions included etiological factors for the occurrence of orthodontic anomalies (diseases in pregnancy, childbirth, breastfeeding, supplementation and feeding, type of pacifier, position of the bottle when eating, bad habits, position when sleeping, position of arms when sleeping in relation to the jaw, pillow height, mouth breathing, orthodontic anomalies in parents).

Results: Results indicate the following etiological factors as the most common: supplementary feeding and bottle feeding (in 41.74% of cases), breastfeeding from 0 to 6 months (40.87% of respondents) and mouth breathing (in 24.35% of children). In the examination of the total risk for orthodontic anomalies, low-risk was found in 95.65% of cases, medium-risk in 4.35% (in Kisač 9.38%, in Kač 2.94%, in Veternik 4.35%, in Futog 0% of children), while there were no high-risk respondents.

Conclusion: Preventive measures should be aimed at educating mothers about the need and benefits of a natural way of breastfeeding and of using a spoon for supplementation and feeding.

Key words: orthodontic anomalies, breastfeeding, supplementation, mouth breathing

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Uvod

Ortodontske nepravilnosti predstavljaju stanje bilo kojeg odstupanja od normalne ili idealne okluzije. Edward H. Angle 1890. godine daje prvu jasnu i jedinstvenu definiciju normalne prirodne okluzije. Anglov postulat bio je da su gornji prvi molari ključevi okluzije i da odnos gornjih i donjih prvih molara mora biti takav da meziobukalna kvržica gornjeg prvog molara okludira sa bukalnom fisurom donjeg prvog molara. Ako su zubi poređani po lagano zakrivljenoj liniji okluzije uz prethodno spomenut odnos molara, rezultat je normalna okluzija¹.

Ortodontske nepravilnosti su veoma učestale, preko 70% kako u svetu, tako i kod nas. Takvo stanje zahteva primenu intenzivnih preventivnih mera od strane stomatologa, kao i edukacionih programa u obdaništima i obrazovnim ustanovama, jer malokluzije dovode do narušavanja izgleda lica, poremećaja u funkciji žvakanja, povećanog rizika od trauma zuba i smanjenja kvaliteta života^{1,2}.

Preventivne mere u ortodonciji obuhvataju jednostavne zahvate i preporuke koji eliminišu ili smanjuju delovanje faktora koji dovode do nastanka ortodontskih anomalija, čime se obezbeđuju povoljni uslove za normalan rast i razvoj orofacijalne regije. Preventivne mere podrazumevaju: promociju faktora koji pozitivno utiču na oralno zdravlje, preporuke higijensko-dijetetskog režima trudnica i prevenciju u doba odojčeta, mešovite i stalne denticije. Ove mere se ne mogu sprovesti samo u ordinaciji, već se moraju koristiti sva moguća sredstva da informacija stigne do krajnjeg korisnika³.

Preventivne mere treba usmeriti na edukaciju majki o potrebi i prednostima prirodnog načina ishrane dojenjem. S ortodontskog stanovišta, sisanje je podstrek za normalni razvoj lica i vilica jer se razvija 60 puta veća snaga mišića nego kod veštačke ishrane na flašicu. Kada majka nema dovoljno mleka, pa dete treba da se dohranjuje, preporučuje se da se to čini na kašičicu a ne na flašicu, da se izbegne opasnost od odbijanja dojenja, jer ono zahteva veći radni napor. Po prestanku dojenja najprirodnije je preći na ishranu pomoću čaše i kašičice⁴.

Etiologija ortodontskih anomalija je vekovima predmet interesovanja ortodonata i svih koji su se bavili razvojem orofacijalnih struktura. U manjku bazičnih genetskih znanja, mislilo se da su na razvoj različitih anomalija uticali isključivo lokalno dejstvujući faktori - upražnjavanje loših navika.

Introduction

Orthodontic anomalies represent a condition of any deviation from normal or ideal occlusion. Edward H. Angle in 1890 gives the first clear and unique definition of normal natural occlusion. Angle's postulate was that the upper first molars are the keys to occlusion, and that the ratio of the upper and lower first molars has to be such that the mesiobuccal cusp of the upper first molar occludes with the buccal groove of the lower first molar. If the teeth are arranged along a slightly curved line of occlusion with the previously mentioned molar ratio, the result is normal occlusion¹.

Orthodontic anomalies are very common; it is over 70% both in the world and in our country. Such a condition requires the application of intensive preventive measures by dentists, as well as educational programs in kindergartens and educational institutions, since malocclusions lead to impaired facial appearance, masticatory disorders, increased risk of dental trauma and reduced quality of life^{1,2}.

Preventive measures in orthodontics include simple procedures and recommendations that eliminate or reduce the effects of factors leading to the occurrence of orthodontic anomalies, thus providing favourable conditions for normal growth and development of the orofacial region. Preventive measures include: promotion of factors that positively affect oral health, recommendations of hygienic dietary regime of pregnant women and prevention in infancy, mixed and permanent dentition. These measures cannot be implemented only at the clinic; all possible means have to be used to get the information to the end user³.

Preventive measures should be aimed at educating mothers about the need and benefits of a natural breastfeeding. From an orthodontic point of view, sucking is an incentive for normal facial and jaw development because it develops 60 times more muscle strength than bottle-feeding. When the mother does not have enough milk, and the child needs to be supplemented, it is recommended to do it with a spoon and not on a bottle, to avoid the danger of refusing breastfeeding, since it requires more work. After stopping breastfeeding, it is most natural to switch to a feeding with a glass and a spoon⁴.

The etiology of orthodontic anomalies has been the subject of interest of orthodontists and all those who have dealt with the development of orofacial structures for centuries.

Međutim, razvojem genetike sve više se akcenat stavlja na nasleđe kao odlučujuć etiološki činilac za nastanak ortodontskih anomalija. Poznavanje uloge genetike je od suštinskog značaja za ortodonte koji pomažu da se razume zašto pacijent ima drugačiju okluziju, jer je ona manifestacija uticaja genetskih faktora i faktora spoljasnje sredine, i njihove međusobne interakcije na razvoj orofacijalnog kompleksa⁵.

Najveći korak ka rasvetljavanju prave etiologije ortodontskih anomalija načinjen je prepoznavanjem da je ona multifaktorijalna i složena⁶. Same ortodontske nepravilnosti mogu biti nasledne i nenasledne. U slučaju ovih drugih deluju endogeni i egzogeni negenetski faktori. Najčešće ne možemo uticati na nasleđe, te je eliminisanje egzogenih činilaca je najočiglednije rešenje.

Različita rasprostranjenost ortodontskih anomalija u svetu i u regionu upravo svedoči o njihovoj složenoj etiologiji: u izolovanim populacijama prevalencija malokluzija je veća (zbog veće zastupljenosti homozigota i recesivnih gena), ali i u modernom industrijalizovanom svetu je incidencija malokluzija značajno porasla u poslednjih 150 godina usled promenjenog načina života i prisustva loših navika⁷.

Veliki broj autora istraživanjima u različitim delovima sveta dobija podatke o prisustvu ortodontskih nepravilnosti koji se kreću u širokom rasponu i ukazuju na izraženu rasprostranjenost ovih anomalija^{7,8,9,10,11}. Najčešće dobijeni rezultati u toku ranije sprovedenih istraživanja u domaćoj i stranoj literaturi variraju od 29,42 do 81%¹².

Najveći procenat prisustva ortodontskih anomalija nalaze Lauc – 93,3% i Ciuffolo i sar. - 93%, kod dece uzrasta 7-14 i 11-14 godine, respektivno. Prema istraživanju Thilander-a i sar. kod 4724 deteta uzrasta 5-17 godina 88% ispitanih ima prisutne ortodontske anomalije. Carvalho i sar. nalaze ortodontske nepravilnosti kod 44,3% dece sa mlečnom denticijom. U našoj zemlji Đurić nalazi 72,3% dece uzrasta 3-7 godina sa različitim oblicima ortodontskih anomalija, u regionu Milinkovic nalazi 52,67% ortodontskih anomalija u uzrastu dece od osam godina¹³.

Istraživanja sprovedena sa ciljem da se proceni potreba za ortodontskim lečenjem, ukazuju na manji, ali još uvek zabrinjavajući procenat¹⁴⁻¹⁶. U istraživanjima dobijeni rezultati kreću se od 35,3% (A. Liepa i sar., 505 dece uzrasta 12-13 god.) do 74% slučajeva u kojima je potrebna ortodontska terapija (Abu Alhaja i sar., 1002 dece uzrasta 12-14 god.), a dobiju se i podaci o potrebi lečenja u 51,7%

In the absence of basic genetic knowledge, it was thought that the development of various anomalies was influenced exclusively by locally acting factors - the exercise of bad habits. However, with the development of genetics, more and more emphasis is placed on inheritance as a decisive etiological factor for the development of orthodontic anomalies. Knowledge of the role of genetics is essential for orthodontists who help understand why the patient has a different occlusion, since it is a manifestation of the influence of genetic and environmental factors and their mutual interactions on the development of the orofacial complex⁵.

The largest step towards elucidating the true etiology of orthodontic anomalies was made by recognizing that it is multifactorial and complex⁶. Orthodontic anomalies themselves can be hereditary or non-hereditary. In the case of the latter, endogenous and exogenous non-genetic factors are in action. Usually, we cannot influence the heritage, so eliminating exogenous factors is the most obvious solution.

The different prevalence of orthodontic anomalies in the world and in the region testifies to their complex etiology: in isolated populations the prevalence of malocclusion is higher (due to the higher presence of homozygotes and recessive genes); however, in the modern industrialized world as well, the incidence of malocclusion has increased significantly in the last 150 years due to a changed lifestyle and the presence of bad habits⁷.

A large number of authors have obtained data on the presence of orthodontic anomalies in various parts of the world, which range widely and indicate a pronounced prevalence of these anomalies^{7,8,9,10,11}. The most frequently obtained results during previously conducted research in domestic and foreign literature vary from 29,42 to 81%¹².

The highest percentage of the presence of orthodontic anomalies is found by Lauc - 93.3% and Ciuffolo et al. - 93%, in children 7-14 and 11-14 years old, respectively. According to a study by Thilander et al., of 4,724 children 5-17 years old, 88% of respondents have orthodontic anomalies. Carvalho et al. found orthodontic anomalies in 44.3% of children with deciduous dentition. In our country, Đurić finds 72.3% of children 3-7 years old with various forms of orthodontic anomalies, while Milinkovic in the region finds 52.67% of orthodontic anomalies in children who are eight years old¹³.

ispitanih (Tausche i sar., 1975 dece uzrasta 6-8 god.). Al Nimri i Richardson nalaze da je svakom trećem detetu (33% od 2002 dece) potreban interceptivni ortodontski tretman¹⁷.

Ovakvi rezultati ukazuju da postoje veliki propusti na nivou preventivnog i ranog ortodontskog delovanja prevashodno na mladu populaciju. Počev od rođenja, kroz mlečnu, mešovitu i stalnu denticiju, sagledavanjem genetskih predispozicija, insistiranjem na pravilnom vršenju orofacijalnih funkcija i interceptivnim korigovanjem početnih razvojnih odstupanja, ortopedija vilica ima mogućnosti da usmerava rast i razvoj kraniofacijalnog kompleksa, znači, može u velikoj meri da osujeći nastanak teških skeletnih nepravilnosti, sagitalnog, transferalnog i vertikalnog pravca, koje se u doba adolescencije moraju lečiti komplikovanim i skupim ortodontskohirurškim zahvatima¹⁸.

Učestalost ortodontskih nepravilnosti je danas nekoliko puta češća nego pre 1000 godina, što se smatra posledicom "civilizacijskog napretka" u kvalitetu života¹⁹.

Iz gore iznetog vidi se da su ortodontske nepravilnosti veoma učestale, te je neophodno ispitivanje njihovih etioloških činilaca. Preventivne mere možemo usmeriti najefikasnije na egzogene etiološke faktore, od kojih su najprisutniji nepravilna ishrana deteta, loše navike (disanje na usta, sisanje prsta ili različitih predmeta, tiskanje jezika, infantilno gutanje) i prevremeni gubitak zuba usled karijesa. Đurić i Milićević u istraživanjima na 167 roditelja dece od 4 do 6 godina starosti u Novom Sadu, dobiju podatke o navici sisanja u 56,89% dece, kratkom periodu dojenja kod 47,14% ispitanih, navici spavanja sa otvorenim ustima u 22,16% slučajeva, prisustvu karijesa kod 72,26% dece (kep 667 od ukupno 3007 pregledanih zuba, %k 82,28%)²⁰.

Novije istraživanje Knosel-a i saradnika iz 2016. godine pokazalo je da su malokluzije u sagitalnoj ravni i duboki zagrižaj (overjet) u kombinaciji sa teskobom u maksilarnoj regiji povezane s oralnim disanjem. U vertikalnoj ravni otvoreni zagrižaj i smanjena dubina zagrižaja (overbite) takođe su se pojavljivali češće nego u normalnoj populaciji. Osim toga u transverzalnoj ravni u bočnom segmentu ukršten zagrižaj isto tako pokazuje veću incidenciju pri disanju na usta²¹.

Preventivno delovanje u cilju smanjenja učestalosti ortodontskih anomalija je moguće ako imamo uvid u najčešće etiološke faktore u određenoj populaciji. Zbog toga smo postavili sledeći cilj.

- proceniti učestalost pojedinih etioloških faktora, kao i procenu ukupnog rizika za nastanak ortodontskih anomalija kod dece u prigradskoj sredini.

Research conducted to assess the need for orthodontic treatment indicates a lower but still worrying percentage¹⁴⁻¹⁶. The results obtained in the research range from 35.3% (A. Liepa et al., 505 children 12-13 years old) to 74% of cases in which orthodontic therapy is required (Abu Alhaia et al., 1002 children 12-14 years old), and data on the need for treatment are obtained in 51.7% of respondents (Tausche et al., 1975 children 6-8 years old). Al Nimri and Richardson find that every third child (33% of 2002 children) needs interceptive orthodontic treatment¹⁷.

These results indicate that there are major gaps in the level of preventive and early orthodontic action, primarily on the young population. Starting from birth, through milk, mixed and permanent dentition, by considering genetic predispositions, insisting on the proper performance of orofacial functions and interceptive correction of initial developmental deviations, jaw orthopedics has the ability to direct the growth and development of the craniofacial complex, so it can greatly thwart severe skeletal anomalies in the sagittal, transverse and vertical direction, which in adolescence have to be treated with complicated and expensive orthodontic surgery¹⁸.

The frequency of orthodontic anomalies is several times more common today than 1000 years ago, which is considered a consequence of "civilizational progress" in the quality of life¹⁹.

From the above-mentioned, it can be observed that orthodontic anomalies are very common, and it is necessary to examine their etiological factors. Preventive measures can be focused most effectively on exogenous etiological factors, the most common of which are improper nutrition of the child, bad habits (mouth breathing, sucking fingers or various objects, pressing the tongue, infantile swallowing) and premature tooth loss due to caries. Đurić and Milićević in their research on 167 parents of children aged 4 to 6 in Novi Sad, obtained data on the habit of sucking in 56.89% of children, short breastfeeding in 47.14% of respondents, sleeping habits with open mouth in 22.16% of cases, the presence of caries in 72.26% of children (app. 667 out of 3007 examined teeth, % k 82.28%)²⁰.

A recent study by Knosel et al. from 2016 showed that sagittal plane malocclusions and overjet combined with crowding in the maxillary region were associated with oral respiration. In the vertical plane, open bite and reduced bite depth (overbite) also occurred more frequently than in the normal population. In addition, in the transverse plane in the lateral segment, the cross-bite also shows a higher incidence in mouth breathing²¹.

Materijali i metode

Istraživanje je izvršeno na 115 deteta (učenika prvog razreda osnovne škole, prosečne starosti od 6,8 godina) iz 4 naselja iz okoline Novog Sada, i to tridesetdva deteta iz Kisača, tridesetčetvoro iz Kaća, dvadesettroje iz Veternika i dvadesetšestoro iz Futoga, što čini ukupno 28,68% od svih učenika prvog razreda.

Istraživanje je sprovedeno u vidu anonimnih anketa na zaokruživanje za roditelje, uz prethodno objašnjenje u anketi postavljenih 12 pitanja. Pitanjima su bili obuhvaćeni etiološki faktori odgovorni za nastanak ortodontskih nepravilnosti:

- Oboljenja u trudnoći
- Tok porođaja
- Dojenje
- Dohranjivanje i hranjenje
- Vrsta cucle
- Položaj boce pri ishrani
- Loše navike
- Položaj pri spavanju
- Položaj ruku pri spavanju u odnosu na vilicu
- Visina uzglavlja
- Disanje na usta
- Ortodontske nepravilnosti kod roditelja

Roditelji su davali odgovore zaokruživanjem jednog od ponuđenih odgovora. Svaki odgovor je nosio određen broj bodova, koji su na kraju sabirani. Stepen rizika za nastanak ortodontskih nepravilnosti zatim je procenjivan na osnovu sledećeg kriterijuma (maksimalni broj bodova bio je 18):

Preventive action in order to reduce the frequency of orthodontic anomalies is possible if we have an insight into the most common etiological factors in a particular population. That is the reason to set the following goal:

- to assess the frequency of individual etiological factors, as well as the assessment of the overall risk of orthodontic anomalies in children in the suburban environment.

Materials and Methods

The research was conducted on 115 children (first grade elementary school pupils, average age of 6.8 years) from 4 settlements around Novi Sad, namely thirty-two children from Kisač, thirty-four from Kać, twenty-three from Veternik and twenty-six from Futog, which makes a total of 28.68 % of all first grade pupils.

The research was conducted in the form of anonymous rounding surveys for parents with a preliminary explanation of 12 questions asked in the survey. The questions covered the etiological factors responsible for the occurrence of orthodontic anomalies:

- Diseases in pregnancy
- The course of labour
- Breastfeeding
- Supplementary feeding and feeding
- Type of pacifier
- Bottle position when feeding
- Bad habits
- Sleeping position
- Position of the arms when sleeping in relation to the jaw
- Pillow height
- Mouth breathing
- Orthodontic anomalies in parents

Parents gave answers by circling one of the offered answers. Each answer carried a certain number of points, which were eventually added up. The risk level for the occurrence of orthodontic anomalies was then assessed on the basis of the following criteria (maximum number of points was 18):

Broj bodova/Number of points	Stepen rizika/Risk level
0-6	nizak/low
7-12	srednji/medium
13-18	visok/high

Po prikupljenim anketama izvršena je statistička obrada podataka. According to the collected surveys, statistical data processing was performed.

Rezultati

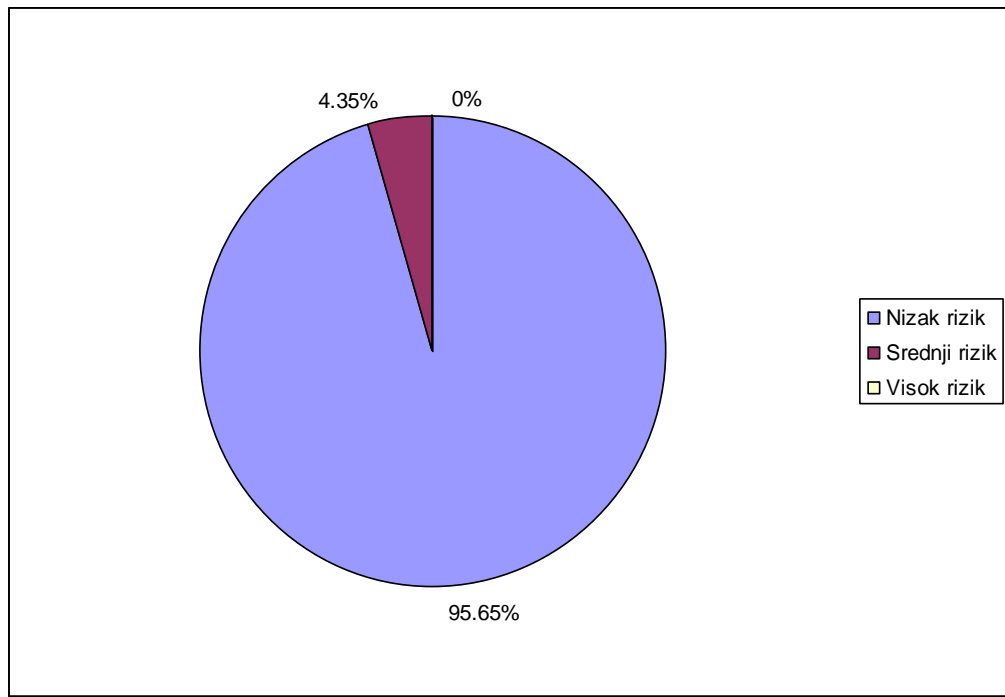
Rezultati istraživanja prikazani su u Tabelama 1 i 2 i na Grafikonima 1, 2 i 3

Results

The results of the research are shown in Tables 1 and 2 and in Graphs 1, 2 and 3

Tabela 1: Rezultati ankete
Table 1: Survey results

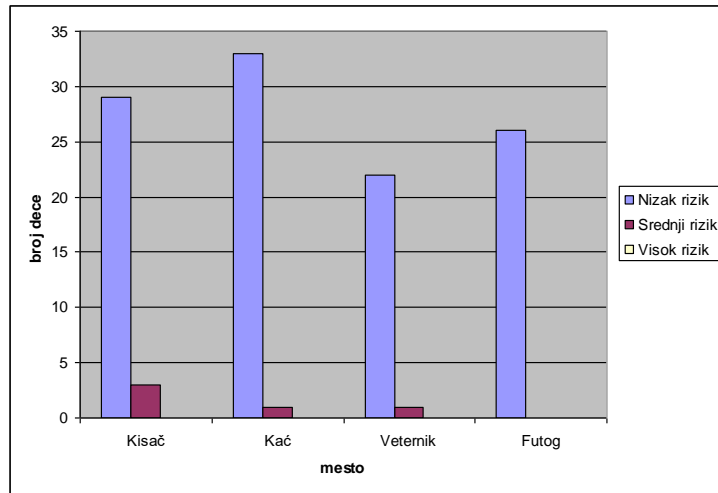
PITANJA/QUESTIONS	ODGOVORI/RESPONSES	BROJ/NUMBER	%
Oboljenja u trudnoći/ Diseases in pregnancy	ne/no	108	93.91
	da/yes	7	6.09
	rubeola/rubella	0	0
Porodaj/ Childbirth	lak/carski rez/easy / caesarean section	102	88.7
	težak/difficult	12	10.43
	forcepsom/forceps	1	0.87
Dojenje/ Breastfeeding	7-9 meseci/months	68	59.13
	3-6 meseci/months	38	33.04
	manje od 2 meseca/less than 2 months	9	7.83
Dohranjivanje i hranjenje/ Supplementation and feeding	kašičicom/with spoon	67	58.26
	cuclom/With pacifier	48	41.74
Vrsta cuclе/ Type of pacifier	anatomska/anatomical	101	87.83
	ostalo/other	14	12.17
Položaj boce pri ishrani/ The position of the bottle during feeding	pravilan/regular	109	94.78
	nepravilan/irregular	6	5.22
Loše navike/ Bad habits	nema/no	103	89.57
	ima/yes	12	10.43
Položaj pri spavanju/ Sleeping position	pravilan/regular	110	95.65
	nepravilan/irregular	5	4.35
Položaj ruku pri spavanju u odnosu na vilicu/Position of arms when sleeping in relation to the jaw	pravilan/regular	109	94.78
	nepravilan/irregular	6	5.22
Visina uzglavlja/ Pillow height	pravilna/regular	110	95.65
	nepravilna/irregular	5	4.35
Disanje na usta/ Mouth breathing	ne/no	87	75.65
	da/yes	28	24.35
Ortodontske nepravilnosti kod roditelja/Orthodontic anomalies in parents	Nema/no	101	87.83
	Ima/yes	14	12.17



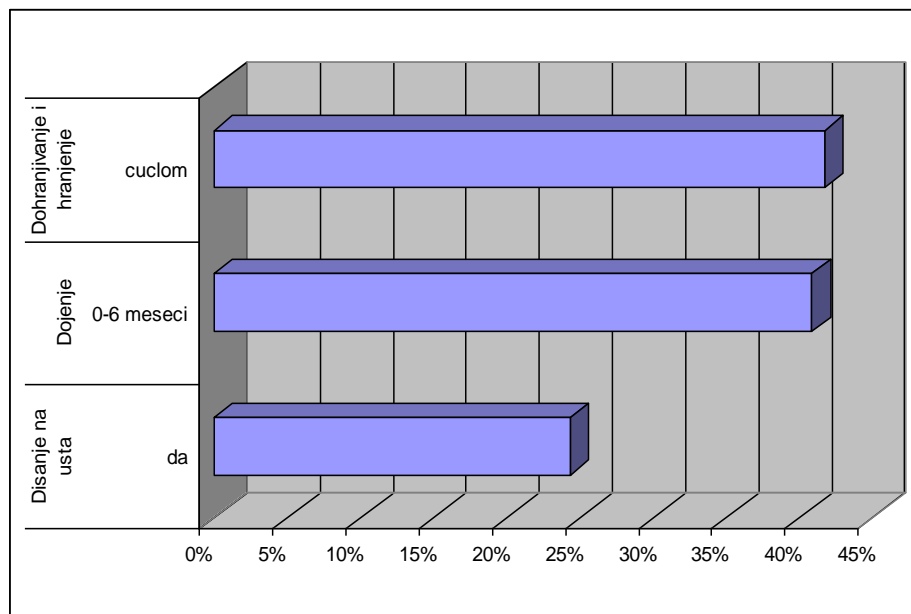
Grafikon 1: Ukupan rizik za nastanak ortodontskih nepravilnosti
Graph 1: Total risk of orthodontic anomalies

Tabela 2 : Stepen rizika za nastanak ortodontskih anomalija po naseljima
Table 2: Risk level for the occurrence of orthodontic anomalies per settlements

	Nizak rizik/ Low-risk	Srednji rizik/ Medium-risk	Visok rizik/ High-risk
Kisač	29 (90.62%)	3 (9.38%)	0
Kač	33 (97.06%)	1 (2.94%)	0
Veternik	22 (95.65%)	1 (4.35%)	0
Futog	26 (100%)	0	0
Ukupno/Total	110 (95.65%)	5 (4.35%)	0



Grafikon 2 : Stepen rizika za nastanak ortodontskih anomalija po naseljima
Graph 2: Risk level for the occurrence of orthodontic anomalies per settlements



Grafikon 3: Najčešći etiološki faktori za pojavu ortodontskih anomalija
Graph 3: The most common etiological factors for the occurrence of orthodontic anomalies

Diskusija

Na osnovu našeg istraživanja najčešći etiološki faktori za nastanak ortodontskih anomalija su (grafikon 3): hranjenje i dohranjivanje cuclom (flašicom) umesto kašičice (41,74% ispitanih) i dojenje kraće od 7 meseci (u 40,87% slučajeva). U relativno velikom procentu je prisutno i disanje na usta (24,35%).

Aktivnost obraza i jezika kod novorođenčeta pomaže u razvoju okluzije i u rastu vilica.

Discussion

Based on our research, the most common etiological factors for the occurrence of orthodontic anomalies are (Chart 3): feeding and supplementation with a pacifier (bottle) instead of a spoon (41.74% of respondents) and breastfeeding for less than 7 months (in 40.87% of cases). A relatively large percentage of mouth breathing is also present (24.35%).

The activity of the cheeks and tongue in the new-born helps in the development of occlusion and in the growth of the jaws.

Poboljšanje okluzije u velikoj mjeri zavisi od naponskih sila koje nastaju tokom različitih orofacijalnih funkcija. Stoga početna faza postnatalnog života igra izuzetno važnu ulogu. Čini se da je malokluzija povezana sa neravnotežom funkcionalnih snaga oralne i facijalne muskulature²².

Poznato je da neefikasno dojenje utiče na obrascu rasta kod pojedinaca, uzrokujući malokluzije i deformitete govora, estetska odstupanja i poremećaj funkcije²³.

Korišćenje flašice sa cuclom za ishranu deteta može da prouzrokuje ortodontske nepravilnosti kao i skraćenje potrebe za dojenjem²⁴ i to ima reperkusije ne samo na razvoj orofacijalnih struktura već i celog tela²⁵. Rano uvođenje flašice za hranjenje negativno utiče na mišićnu aktivnost i razvoj alveolarnih grebenova i tvrdog nepca, a to dovodi do posledične pojave ukrštenog zagrižaja u postkaninom sektoru²⁶.

Hranjenje na flašicu ograničava potencijalnu upotrebu perioralnih mišića i na taj način deluje kao primarni agens u etiologiji malokluzije²⁷. Proces sisanja se razlikuje kod dece koja se doje i one koja se hrane iz flašice. Deca koja su dojena pokazuju veću aktivnost mišića lica od dece koja su hranjena na flašicu, čime se promovise adekvatniji kraniofacijalni rast i razvoj kostiju vilice. Kretanje usana i jezika tokom dojenja primorava dete da usisava majčino mleko putem ceđenja, dok je kod dece koja se hrane na flašicu pokret za dobijanje mleka pasivniji, stoga postoji veći potencijal za razvoj malokluzije. Format brahikefalnog mandibularnog luka lakše se postiže kada se dete doji, što zauzvrat omogućava odgovarajuće nicanje zuba. Još jedan aspekt anatomije u korist dojenja je da se majčina bradavica prilagođava unutrašnjem obliku usne duplje, omogućavajući savršeno oralno zaptivanje, što zauzvrat dovodi do zadovoljavajućeg razvoja nazalnog disanja. Dobro je poznato da deca koja dišu na nos imaju manje šanse da razviju držanje otvorenih usta, što zauzvrat može dovesti do prevelike vertikalne dimenzije lica²⁸. Ovakvi efekti prvenstveno nastaju ukoliko cucla nije anatomski, tj. ne imitira oblik mamile. Anatomski cucla je kratka, čvrsta i spljoštena, a otvor treba da bude prilagođen konzistenciji hrane. Uprkos visokom procentu korišćenja cucle, zadovoljavajući je podatak da su anatomsku vrstu cucle upotrebili kod 87,83% dece i položaj boce pri ishrani bio pravilan kod 94,78% ispitanih - boca je u pravilnom položaju ukoliko je postavljena skoro horizontalno, tako da dete koristi muskulaturu slično sisanju prilikom dojenja.

Improvement of occlusion largely depends on the stress forces generated during different orofacial functions. Therefore, the initial phase of postnatal life plays an extremely important role. Malocclusion appears to be associated with an imbalance in the functional strength of the oral and facial muscles²².

Inefficient breastfeeding is known to affect growth patterns in individuals, causing malocclusions and speech deformities, aesthetic deviations, and dysfunction²³.

The use of a bottle with a pacifier for feeding a child can cause orthodontic anomalies as well as shorten the need for breastfeeding²⁴ and this has repercussions not only on the development of orofacial structures but also the whole body²⁵. Early introduction of the feeding bottle negatively affects the muscle activity and development of the alveolar ridges and the hard palate, and this leads to the consequent appearance of cross-bite in the post-canine sector²⁶.

Bottle feeding limits the potential use of perioral muscles and thus acts as a primary agent in the etiology of malocclusion²⁷. The process of sucking differs between breastfed babies and bottle-fed babies. Breastfed infants show more facial muscle activity than bottle-fed infants, thus promoting more adequate craniofacial growth and jaw bone development. The movement of the lips and tongue during breastfeeding forces the child to suck the mother's milk by squeezing, while in bottle-fed infants, the movement for obtaining milk is more passive; therefore there is a greater potential for the development of malocclusion. The format of the brachycephalic mandibular arch is easier to achieve when the child is breastfed, which in turn enables the proper teething. Another aspect of anatomy in favour of breastfeeding is that the mother's nipple adapts to the internal shape of the oral cavity, allowing perfect oral sealing, which in turn leads to the satisfactory development of nasal breathing. It is well known that children who breathe through their noses are less likely to develop an open mouth, which in turn can lead to an excessive vertical dimension of the face²⁸. Such effects primarily occur if the pacifier is not anatomical, i.e. does not imitate the form of the decoy. The anatomical pacifier is short, firm and flattened, and the opening should be adjusted to the consistency of the food. Despite the high percentage of pacifier use, it is satisfactory that 87.83% of children used the anatomical type of pacifier and the position of the bottle while feeding was correct

Međutim, često korišćenje cucle može dovesti do pojave "baby bottle" ili "nursing" karijesa, koji izaziva prerani gubitak mlečnih zuba i sekundarnu teskobu²⁰.

Dojenje je prirodni put ka nastanku efektivne veze između majke i deteta. Majčino mleko predstavlja najadekvatniju hranu za odojče²⁹, a sam akt sisanja ima nezamenljivo mesto u razvoju stomatognatog sistema. Duže dojenje povezano je sa smanjenom incidencijom malokluzija i ima preventivni efekat na razvoj ukrštenog zagrižaja u postkaninom sektoru i distookluzije²⁰. Takođe se uočavaju i opšte zdravstvene prednosti dojenja, pospešivanje rasta i razvoja bebe, imunološka zaštita deteta, sazrevanje želudačne mikroflore, zaštita od upale srednjeg uha za razliku od upotrebe cucle, prevencija gastrointestinalnih poremećaja³⁰, zaštita od dijabetesa tipa 2 i dugotrajne gojaznosti³¹, smanjuje rizik od raka dojke i jajnika kod majki³².

Đurić i Milićević u istraživanjima u Novom Sadu nalaze period dojenja kraći od 7 meseci u 42,02% slučajeva²⁰. Slični rezultati su dobijeni i u našem istraživanju (40,87%), znači da je ovaj problem podjednako prisutan u urbanoj i ruralnoj sredini. Kao moguće rešenje, Ball predlaže spavanje zajedno ("bed-sharing") sa odojčecom, što po njenim rezultatima u istraživanju na 253 majke, predstavlja stimulaciju za duže dojenje³³.

Disanje kroz nos je prva vitalna refleksna funkcija novorođenčeta. Disanje na usta predstavlja nefiziološku radnju, koja nastaje kao posledica različitih oboljenja, najčešće respiratornih infekcija u periodu odojčeta, ili kao loša navika. Zajedno sa nenutritivnim sisanjem, disanje na usta predstavlja najznačajniji etiološki faktor rizika za nastanak malokluzije, jer ometaju normalan kraniofacijalni razvoj. Bebe imaju urođen, biološki nagon za sisanje, koji se može zadovoljiti nutritivnim sisanjem, uključujući dojenje i dojenje na flašicu, ili preko nenutritivnog sisanja predmeta kao što su varalice ili igračke koje mogu zadovoljiti psihološke potrebe.

Dok je sisanje normalno ponašanje kod odojčadi i male dece, produženo trajanje takvog ponašanja može imati posledice na razvoj orofacijalnih struktura i razvoj pravilne okluzije³⁴. Takođe, uzrok može biti i nepravilan položaj deteta pri spavanju, kada dolazi do prinudnog otvaranja usta³⁵.

Prema našim istraživanjima, ovaj poslednji etiološki faktor prisutan je samo kod 4-5% svih ispitanih, dok disanje na usta kod svakog četvrtog deteta.

in 94.78% of respondents - the bottle is in the correct position if placed almost horizontally, so the child uses muscles similar to sucking when breastfeeding. However, a frequent use of a pacifier can lead to "baby bottle" or "nursing" caries, which causes premature loss of baby's teeth and secondary crowding²⁰.

Breastfeeding is a natural way to create an effective bond between mother and child. Breast milk is the most adequate food for an infant²⁹, and the very act of sucking has an irreplaceable role in the development of the stomatognathic system. Prolonged breastfeeding is associated with a reduced incidence of malocclusions and has a preventive effect on the development of cross-bite in the post-canine sector and dystocclusion²⁰. There are also general health benefits of breastfeeding, promoting growth and development of the baby, immune protection of the child, maturation of gastric microflora, protection against otitis media as opposed to pacifier use, prevention of gastrointestinal disorders³⁰, protection against type 2 diabetes and long-term obesity³¹, as well as lowering the risk of breast and ovarian cancer in mothers³².

Đurić and Milićević in their research in Novi Sad found a breastfeeding period shorter than 7 months in 42.02% of cases²⁰. Similar results were obtained in our study (40.87%), which means that this problem is equally present in urban and rural areas. As a possible solution, Ball suggests "bed-sharing" with the baby, which according to her results in a study of 253 mothers, is an incentive for longer breastfeeding³³.

Breathing through the nose is the first vital reflex function of a new-born. Mouth breathing is a non-physiological action which occurs as a consequence of various diseases, most often respiratory infections in infancy, or as a bad habit. Together with non-nutritive sucking, mouth breathing is the most important etiological risk factor for malocclusion, as they interfere with normal craniofacial development. Babies have an innate, biological urge to suck, which can be satisfied by nutritional sucking, including breastfeeding and bottle-feeding, or through non-nutritive sucking of items such as decoys or toys that can meet psychological needs.

While sucking is normal behaviour in infants and young children, prolonged duration of such behaviour may have consequences for the development of orofacial structures and the development of proper occlusion³⁴.

Likewise, the cause can be an incorrect position of the child during sleep, when there is a forced opening of the mouth³⁵.

To bi značilo da kod velikog broja dece postoji loša navika disanja na usta kao posledica trenutnih ili ranijih infekcija disajnih puteva. Rezultati istraživanja Đurića i Milićevića novosadske dece bi potvrdili ovu pretpostavku: 20% dece je imalo oboljenje nazofarinksa jednom u 2 meseca u prvoj godini života i 38,18% jednom u 6 meseci u istom periodu života, a navika spavanja sa otvorenim ustima prisutna je u 22,16% slučajeva²⁰.

Disanje kroz usta dovodi do uskosti maksilarnih lukova i nastanka visokog nepca, otvorenog zagrižaja napred, bočno ukrštenog zagrižaja, povećanja incizalnog razmaka i devijacije. Rezultati istraživanja su pokazali da su mandibula i maksila rotirane unazad i nadole, a da je okluzalna ravan strma. Pored toga, disanje na usta predstavlja tendenciju labijalne inklinacije gornjih sekutića. Stenoza disajnih puteva bila je česta kod dece koja dišu na usta³⁶. Potrebna je bliska saradnja između različitih stručnjaka (pedijatar, alergolog, ORL specijalista, ortodont, logoped) za promovisanje rane dijagnoze i lečenja ovih nepravilnosti³⁷. Kuroishi RC je čak prijavio nisko akademsko postignuće i lošije fonološko radno pamćenje kod dece sa disanjem na usta, u poređenju sa učesnicima sa nazalnim disanjem³⁸. Zbog toga zdravstveni radnici treba da obrate posebnu pažnju na decu sa disanjem na usta i razmotre upotrebu vestibularnog štita.

Na povezanost respiratornih oboljenja, disanja na usta i ortodontskih nepravilnosti ukazuje nalaz De Freitas-a i sar.: na uzorku od 101 dete sa alergičnim rinitisem nalazi veću visinu nepca za 1,73 mm u odnosu na kontrolnu grupu³⁹. Löfstrand-Tideström i sar. takođe dobiju nalaze o užoj gornjoj vilici, većoj visini nepca, kraćem donjem zubnom luku i lateralnom ukrštenom zagrižaju kod dece sa opstrukcijom disajnih puteva u odnosu na kontrolnu grupu⁴⁰. Interesantno je primetiti da od 644 deteta, koja su bila uključena u ovo ispitivanje u Švedskoj, samo 48 (7,45%) je imalo bilo kakav poremećaj disanja, što je signifikantno manje u odnosu na naše rezultate, te ukazuje na potrebu preventivnog delovanja u smislu pravovremenog i potpunog lečenja oboljenja disajnih puteva u ranom uzrastu u našoj populaciji.

Ohrabrujući su podaci o relativno maloj učestalosti oboljenja tokom trudnoće (7 slučajeva – 6,09%) i malom broju komplikovanih porođaja: 13 slučajeva naspram 102 porođaja, koji su bili laki ili izvođeni carskim rezom.

According to our research, this last etiological factor is present in only 4-5% of all subjects, while mouth breathing is recorded in every fourth child. This would mean that a large number of children have a bad habit of breathing through their mouths as a result of current or previous respiratory infections. The results of Đurić and Milićević's research on children from Novi Sad confirms this assumption: 20% of children had nasopharyngeal disease once in 2 months in the first year of life and 38.18% once in 6 months in the same period of life, and the habit of sleeping with open mouth is present with 22.16 % of cases²⁰.

Breathing through the mouth leads to the narrowing of the maxillary arches and the formation of a high palate, overbite, lateral cross-bite, increased incisal spacing and deviation. The results of the study show that the mandible and maxilla were rotated back and down, and that the occlusal plane was steep. In addition, mouth breathing is a tendency of the labial inclination of the upper incisors. Respiratory stenosis was common in children who breathed through the mouth³⁶. Close cooperation between different specialists (pediatrician, allergist, ENT specialist, orthodontist, speech therapist) is needed to promote early diagnosis and treatment of these anomalies³⁷. Kuroishi RC even reported low academic achievement and poorer phonological working memory in children with mouth breathing, compared with participants with nasal breathing³⁸. Therefore, healthcare professionals should pay special attention to children with mouth breathing and consider using a vestibular shield.

The connection between respiratory diseases, mouth breathing and orthodontic anomalies is indicated by the findings of De Freitas et al.: in a sample of 101 children with allergic rhinitis, he found a higher palate height by 1.73 mm compared to the control group³⁹. Löfstrand-Tideström et al. also obtained findings of a narrower upper jaw, higher palate height, shorter lower dental arch, and lateral cross-bite in children with airway obstruction compared to the control group⁴⁰.

It is interesting to note that of the 644 children included in this study in Sweden, only 48 (7.45%) had some respiratory disorder, which is significantly less than our results, indicating the need for preventive action in terms of timely and complete treatment of respiratory diseases at an early age in our population.

Od komplikovanih, u jednom slučaju su korišćena porođajna klešta-forceps, čija upotreba često dovodi do teških maternalnih i fetalnih negativnih posledica. Al-Kadri i sar.⁴¹, nalaze da od 92 porođaja izvođenih pomoću forcepsa, 26 nisu bila uspešna. Porođajna klešta su bila korišćena u 2,3% od svih porođaja. U našem istraživanju ovaj procenat iznosi 0,87%.

Ortodontske nepravilnosti kod roditelja su prisutne u 12,17% slučajeva. Nasleđe je glavni etiološki faktor u određenom broju ortodontskih anomalija. Marković u istraživanjima o malokluziji II klase 2. odeljenje, upoređuje 2812 ljudi iz opšte populacije, gde su malokluzije prisutne u 8,21%, sa 442 člana jedne porodične populacije, u kojoj 46,61% članova ima malokluzije. U istoj studiji takođe nalazi statistički značajnu razliku konkordantnosti kod jednojajnih i dvojajnih blizanaca za malokluziju II klase 2. Odeljenje⁴². Stoga kod izvesnog broja dece, zbog genetski determinisanih predispozicija za nastanak određenih ortodontskih nepravilnosti, preventivno delovanje u smislu uklanjanja egzogenih faktora neće bitnije uticati na pojavu anomalija.

Interesantno je primetiti veliku razliku u prisustvu loših navika između dece u ruralnoj i urbanoj sredini. Prema našim istraživanjima, sve loše navike prisutne su u 10,43% dece, a Đurić i Milićević dobiju podatak da je navika sisanja prsta ili varalice bila ili je još uvek prisutna kod 56,89% dece iz Novog Sada²⁰. Objašnjenje za ovu pojavu bi se moglo naći u različitom načinu življenja. "Seoska" deca su bliža prirodi i aktivnostima na otvorenom, koji zahtevaju puno energije i stoga ređe pribegavaju upražnjavanju loših navika od "gradske" dece, koja većinu vremena provedu u stanu, dosađuju se i loše navike postaju prinudna alternativa za zabavu.

The data on the relatively low incidence of the disease during pregnancy (7 cases-6.09%) and the small number of complicated births are encouraging: 13 cases versus 102 births which were easy or performed by caesarean section. Of the complicated ones, in one case, labour forceps were used, the use of which often leads to severe maternal and fetal negative consequences. Al-Kadri et al.⁴¹ found that of the 92 births performed using forceps, 26 were unsuccessful. Birth forceps were used in 2.3% of all births. In our study, this percentage is 0.87%.

Orthodontic anomalies in parents are present in 12.17% of cases. Heredity is a major etiological factor in a number of orthodontic anomalies. In the research on class II division 2 malocclusion, Markovic compares 2,812 people from the general population, where malocclusions are present in 8.21%, with 442 members of one family population, in which 46.61% of members have malocclusions. In the same study, he also found a statistically significant difference in concordance in monozygotic and dizygotic twins for class II division 2 malocclusion⁴². Therefore, in a number of children, due to genetically determined predispositions for the development of certain orthodontic anomalies, preventive action in terms of removing exogenous factors will not significantly affect the occurrence of anomalies.

It is interesting to note the large difference in the presence of bad habits between children in rural and urban areas. According to our research, all bad habits are present in 10.43% of children, and Đurić and Milićević obtained the data that the habit of sucking a finger or a pacifier was or is still present in 56.89% of children from Novi Sad²⁰. The explanation for this phenomenon could be found in a different way of life. "Rural" children are closer to nature and outdoor activities, which require a lot of energy and therefore less often resort to bad habits than "urban" children, who spend most of their time in the apartment, get bored and bad habits become a forced alternative for fun.

Zaključak

Na osnovu dobijenih rezultata mogu se izvesti sledeći zaključci:

- U 95,65% ispitanika utvrđen je nizak rizik za nastanak ortodontskih anomalija, kod 4,35% srednji rizik, dok osobe sa visokim rizikom nisu nađene
- Loše navike su prisutne u manjem procentu kod dece u prigradskoj sredini u odnosu na gradsku decu;
- Najčešći etiološki faktori za nastanak ortodontskih nepravilnosti kod dece u prigradskim naseljima jesu;
 - korišćenje cucle (flašice) za hranjenje i dohranjivanje umesto kašičice (kod 41,74% dece);
 - kratak period dojenja - manje od 7 meseci (u 40,87% slučajeva);
 - disanje na usta (24,35% ispitanih).

Upravljanje oralnim zdravljem, u cilju uspostavljanja zdrave denticije i ublažavanja ili izbegavanja malokluzije od nicanja prvog mlečnog zuba do dobijanja stalnih zuba, od velikog je značaja u pedijatrijskoj populaciji. Zbog toga preventivne mere treba usmeriti na edukaciju majki o potrebi i prednostima prirodnog načina ishrane dojenjem i da za dohranjivanje i hranjenje koriste kašičicu. Postoji potreba za informisanjem roditelja o značaju pravovremenog i potpunog lečenja infekcija disajnih puteva.

Odgovarajuće planiranje oralnog zdravlja može smanjiti pojavu težih malokluzija koji mogu dovesti do komplikovanih ortodontskih tretmana u stalnoj denticiji. Stoga, i znanju o etiologiji i upravljanju problemima malokluzije treba dati veći naglasak u budućim istraživanjima⁴³.

Conclusion

Based on the obtained results, the following conclusions can be made:

- In 95.65% of respondents, a low risk for the development of orthodontic anomalies was found, in 4.35% a medium risk, while persons with a high risk were not found;
- Bad habits are present in a smaller percentage of children in suburban areas compared to children in the cities;
- The most common etiological factors for the occurrence of orthodontic anomalies in children in suburban areas are:
 - using a pacifier (bottle) for feeding and supplementary feeding instead of a spoon (in 41.74% of children);
 - short breastfeeding period - less than 7 months (in 40.87% of cases);
 - mouth breathing (24.35% of respondents)

Oral health management, in order to establish healthy dentition and alleviate or avoid malocclusion from the eruption of the first deciduous tooth to the acquisition of permanent teeth, is of great importance in the paediatric population. Therefore, preventive measures should be aimed at educating mothers about the need and benefits of a natural way of breastfeeding and at using a spoon for supplementation and feeding. There is a need to inform parents about the importance of timely and complete treatment of respiratory infections.

Proper oral health planning can reduce the occurrence of more severe malocclusions that can lead to more complicated orthodontic treatments in permanent dentition. Therefore, the knowledge of the etiology and management of malocclusion problems should be given more emphasis in the future research⁴³.

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