

LITHUANIAN UNIVERSITY OF HEALTH SCIENCES
MEDICAL ACADEMY

Kristina Saldūnaitė

**THE EVALUATION OF THE POSSIBILITIES
FOR TOOTH DECAY PREVENTION
IN LITHUANIA AMONG 7–12 YEAR-OLD
SCHOOLCHILDREN**

Summary of Doctoral Dissertation
Biomedical Sciences, Public Health (09 B)

Kaunas, 2011

The dissertation was prepared during 2007–2011 at the Medical Academy of Lithuanian University of Health Sciences.

Scientific Supervisor:

Prof. Dr. Habil. Abdonas Tamošiūnas (Lithuanian University of Health Sciences, Medical Academy, Biomedical Sciences, Public Health – 09 B)

Consultant:

Assoc. Prof. Dr. Simona Milčiuvienė (Lithuanian University of Health Sciences, Medical Academy, Biomedical Sciences, Odontology – 07 B)

The dissertation will be defended at the Public Health Research Council of Medical Academy of Lithuanian University of Health Sciences:

Chairman:

Prof. Dr. Jūratė Klumbienė (Lithuanian University of Health Sciences, Medical Academy, Biomedical Sciences, Public Health – 09 B)

Members:

Prof. Dr. Habil. Apolinaras Zaborskis (Lithuanian University of Health Sciences, Medical Academy, Biomedical Sciences, Public Health – 09 B)

Assoc. Prof. Dr. Ričardas Radišauskas (Lithuanian University of Health Sciences, Medical Academy, Biomedical Sciences, Public Health – 09 B)

Prof. Dr. Vytautė Pečiulienė (Vilnius University, Biomedical Sciences, Odontology – 07 B)

Prof. Dr. Habil. Kęstutis Kardelis (Lithuanian Academy of Physical Education, Social Sciences, Education – 07 S)

Opponents:

Prof. Dr. Habil. Jurgis Algirdas Juozulynas (Vilnius University, Biomedical Sciences, Public Health – 09 B)

Assoc. Prof. Dr. Jurgina Sakalauskienė (Lithuanian University of Health Sciences, Medical Academy, Biomedical Sciences, Odontology – 07 B)

The dissertation will be defended at the open session of the Public Health Research Council on December 16, 2011 at 11:00 at the Department of Orthodontics of the Medical Academy of Lithuanian University of Health Sciences.

Address: J. Lukšos-Daumanto 6, Kaunas, Lithuania.

The sending out date of the summary of the dissertation: November 15, 2011.

The dissertation is available in the library of the Lithuanian University of Health Sciences.

Address: Eivenių 6, LT-50162 Kaunas, Lithuania.

LIETUVOS SVEIKATOS MOKSLŲ UNIVERSITETAS
MEDICINOS AKADEMIJA

Kristina Saldūnaitė

**DANTŲ ĖDUONIES PROFILAKTIKOS
GALIMYBIŲ VERTINIMAS LIETUVOJE
TARP 7–12 METŲ AMŽIAUS MOKSLEIVIŲ**

Daktaro disertacijos santrauka
biomedicinos mokslai, visuomenės sveikata (09 B)

Kaunas, 2011

Disertacija rengta 2007–2011 metais Lietuvos sveikatos mokslų universiteto Medicinos akademijoje.

Mokslinis vadovas

prof. habil. dr. Abdonas Tamošiūnas (Lietuvos sveikatos mokslų universitetas, Medicinos akademija, biomedicinos mokslai, visuomenės sveikata – 09 B)

Konsultantas

doc. dr. Simona Milčiuvienė (Lietuvos sveikatos mokslų universitetas, Medicinos akademija, biomedicinos mokslai, odontologija – 07 B)

Disertacija ginama Lietuvos sveikatos mokslų universiteto Medicinos akademijos Visuomenės sveikatos mokslo krypties taryboje:

Pirmininkas

prof. dr. Jūratė Klumbienė (Lietuvos sveikatos mokslų universitetas, Medicinos akademija, biomedicinos mokslai, visuomenės sveikata – 09 B)

Nariai:

prof. habil. dr. Apolinaras Zaborskis (Lietuvos sveikatos mokslų universitetas, Medicinos akademija, biomedicinos mokslai, visuomenės sveikata – 09 B)

doc. dr. Ričardas Radišauskas (Lietuvos sveikatos mokslų universitetas, Medicinos akademija, biomedicinos mokslai, visuomenės sveikata – 09 B)

prof. dr. Vytautė Pečiulienė (Vilniaus universitetas, biomedicinos mokslai, odontologija – 07 B)

prof. habil. dr. Kęstutis Kardelis (Lietuvos kūno kultūros akademija, socialiniai mokslai, edukologija – 07 S)

Oponentai:

prof. habil. dr. Jurgis Algirdas Juozulynas (Vilniaus universitetas, biomedicinos mokslai, visuomenės sveikata – 09 B)

doc. dr. Jurgina Sakalauskienė (Lietuvos sveikatos mokslų universitetas, Medicinos akademija, biomedicinos mokslai, odontologija – 07 B)

Disertacija bus ginama viešame Visuomenės sveikatos krypties tarybos posėdyje 2011 m. gruodžio 16 d. 11 val. Lietuvos sveikatos mokslų universiteto Medicinos akademijos Ortodontijos klinikoje.

Adresas: J.Lukšos-Daumanto g. 6, Kaunas, Lietuva.

Disertacijos santrauka išsiuntinėta 2011 m. lapkričio 15 d.

Disertaciją galima peržiūrėti Lietuvos sveikatos mokslų universiteto bibliotekoje.

Adresas: Eivenių g. 6, LT-50162 Kaunas, Lietuva.

ABBREVIATIONS

WHO – World Health Organization

DMF-T – number of decayed, missing, and filled teeth

D – a decayed (caries) tooth

F – a filled tooth

M – a missing tooth

11, 16, 17, 26, 27, 37, 36, 31, 46, 47 – numbers of teeth according to the WHO

OHI-S – the Oral Hygiene Index (simplified)

NPV – Net present value

Marking of statistical indices:

OR – odds ratio

CI – confidence interval

SD – standard deviation

MV – Mean value

F – Fisher's criterion

χ^2 – Chi-square criterion

p – level of significance

df – number of degrees of freedom

% – percent

n – number of cases

INTRODUCTION

Preservation of healthy teeth is one of the major issues in children's health. The World Health Organization (WHO) has analyzed the effect of various risk factors on health, paying significant attention to oral health and dysfunction resulting in poorer quality of life, and also to the detrimental effect of poor oral health on the general health of the body.

Jürgensen N. et al. (2009) noted that historically, oral diseases had been analyzed separately from other diseases. Recently, an emerging trend is to analyze oral diseases as an integral part of the body's health status because the mouth plays an important role in a number of functions, including speech, nutrition, social relationships, and a person's esthetic appearance. Poor oral health impairs a person's quality of life. Toothache affects normal nutrition, growth, and socialization. A number of health problems that we encounter later on in life and that cause much suffering to a person and economic losses to the state originate in childhood and youth.

Tooth decay is one of the major oral diseases in children and adolescents. Tooth decay causes complications whose treatment requires significant financial and time expenses. A multitude of studies performed in various countries of the world have indicated that preventive measures significantly reduce the development of tooth decay.

The development of tooth decay in children depends on a variety of factors, such as the oral hygiene status, fluoride content in water, the selected diet, and genetic factors. Pain, discomfort, and expensive treatment associated with tooth decay are the principal factors that cause stress and unpleasant sensations in children.

Even though the prevalence of tooth decay tends to decrease worldwide – especially in the Nordic countries – it still remains a common disease. The decrease in the prevalence of tooth decay is mostly seen in smooth dental surfaces, while in the occlusal surfaces this prevalence tends to increase. This is thought to be due to the fact that smooth dental surfaces can more effectively be protected by fluorides, whereas in the occlusal surfaces the penetration of fluoride is limited due to pits and grooves – which also ensure good retention of plaque.

The analysis of tooth decay statistics in Lithuania showed that the prevalence of this disease in permanent teeth of 7-8 year-old children ranged between 33.7% and 38.2%, while the prevalence of tooth decay in molars ranged from 23.4% to 69.4% of the total prevalence of tooth decay in permanent teeth. Epidemiological studies showed that throughout the

period of 10 years, the prevalence of tooth decay among 12 year-old children in different regions of Lithuania ranged between 59.4% and 92.5%. This is indeed a high prevalence, necessitating a detailed analysis of the epidemiological situation and a maximally broad and active application of tooth decay prevention measures.

Epidemiological studies performed in various countries showed that tooth decay may be successfully controlled by improving oral hygiene, and sealants may help preserve healthy occlusal surfaces. However, an important role in preserving healthy teeth in children falls on the family – i.e. on the parents' attitude to the importance of oral hygiene. It is the parents who create the necessary environment for a healthy lifestyle, increase self-confidence, and help to form habits.

In order to prevent tooth decay in the occlusal surfaces of molars, sealants may be applied together with other preventive measures and oral health programs.

The oral disease prevention program in Lithuania was introduced in 1982. However, its implementation was episodic. Currently, there is an ongoing program for the prevention of tooth decay in molars - the Children's Dental Sealant Program; this program was initiated in 2004. However, this preventive program was initiated without any real analysis of the epidemiological situation. In addition to that, so far there has been no evaluation of parents' and oral health specialists' approach towards population-wide preventive measures. The possible extent of sealant use has remained unclear, the contingent has not been accurately formulated, and the economic benefit of the program has not been evaluated. For this reason, our research aimed at clarifying these important issues in order to determine the effectiveness of the preventive dental sealant program.

It is important to promote dentistry health education that would help children and their parents understand the importance of oral health.

Scientific novelty. For the first time in Lithuania, in this epidemiological study we evaluated the prevalence and intensity of tooth decay among 9-10 year-old children. In addition to that, we evaluated the prevalence and intensity of tooth decay among 7-12 year-old children in ten county centers of Lithuania, and the prevalence of tooth decay in permanent molars of these children. We determined the percentage of children with sealant-covered teeth, calculated the mean number of sealant-protected teeth per one child, and conducted a preliminary evaluation of the economic benefit of sealant use in the tooth decay prevention program. We also determined associations between the oral hygiene index and the intensity of tooth

decay, and between sealant use and the prevalence of tooth decay. Finally, we evaluated the children's parents' and oral care specialists' approach to the tooth decay prevention program. Evaluted oral hygiene skills and oral status in different age groups.

Practical significance. The evaluation of the oral status in 7–12 year-old children from 10 county centers of Lithuania revealed the significance of tooth decay prevention measures, which would help for an effective future planning for the reduction of the prevalence of tooth decay. A detailed examination of dental surfaces affected by tooth decay allows for a better selection and differentiation of preventive measures against tooth decay in occlusal surfaces.

The obtained results may be used in student training as well as in the education of oral health specialists, public health specialists, family physicians, and the society concerning the benefit of tooth decay prevention in preserving one's health.

The results of the study were used as the basis for preparing practical recommendations for the improvement of the organization of odontological care, oriented towards children and their parents, oral health specialists, public health specialists, and members of the Lithuanian Dental Chamber.

The aim of the study:

To determine the oral status, the prevalence of tooth decay, the risk factors, and the possibilities for prevention in 7–12 year-old children from 10 county centers of Lithuania.

Objectives of the study:

1. To evaluate the prevalence and intensity of tooth decay in 7–12 year-old children from 10 county centers of Lithuania.
2. To evaluate tooth decay in the occlusal surfaces of molars in 7–12 year-old children from 10 county centers of Lithuania.
3. To determine sealant application on the occlusal surfaces in schoolchildren, to evaluate the preventive effect of sealants on the development of tooth decay, and to conduct a prognostic evaluation of the economic benefit of sealant application.
4. To evaluate the schoolchildren's oral hygiene status and oral hygiene skills.
5. To clarify the schoolchildren's parents' and oral health specialists' approach to the oral health program.

1. MATERIAL AND METHODS

1.1. The studied contingent

The contingent of the study consisted of 7–12 year-old schoolchildren. In order to clarify certain issues, the children's parents and oral care specialists were also included in the study.

The cross-sectional study on schoolchildren's *oral status* was conducted between September 2007 and May 2008. Cluster random selection was applied to select 7–8, 9–10, and 12 year-old schoolchildren from comprehensive schools of 10 county centers of Lithuania (Kaunas, Vilnius, Klaipėda, Panevėžys, Šiauliai, Alytus, Marijampolė, Telšiai, Tauragė, and Utena). *According to the plan, each age group should consist of 80 children.*

The study was performed with the permission of Kaunas Regional Biomedical Research Ethics Committee.

The study included 2,397 schoolchildren from three age groups (7–8 years, 9–10 years, and 12 years of age). The schoolchildren were included from 10 sample-homogenous ($\chi^2=0.08$, $df=9$, $p=1.0$) county centers of Lithuania.

48.9% of the subjects were boys, and 51.1% – girls ($p=0.3$). There were no significant differences in the subjects' distribution by sex between the county centers ($\chi^2=13.9$, $df=9$, $p=0.1$).

During the study, a detailed oral examination and a questionnaire survey of the schoolchildren were performed. In order to ensure the quality of the study, a pilot study was performed in April 2007 at then Kaunas University of Medicine Clinic of Oral Care and Pediatric Odontology, involving 40 schoolchildren aged 7–12 years from Kaunas city. During the study, we assessed the duration of the oral examination and the filling out of the questionnaire, and the comprehensibility of the questions in the questionnaire. The questionnaire was then adjusted according to the issues and remarks that arose during the pilot study.

The questionnaire survey was conducted among parents of 7, 9, and 12 year-old schoolchildren in five largest county centers of Lithuania (Vilnius, Kaunas, Klaipėda, Šiauliai, and Panevėžys). The questionnaire involved 1,248 parents (response rate – 66.8%). 9.7% ($n=121$) of the respondents were fathers, 86.7% ($n=1,082$) – mothers, 2.8% ($n=35$) – grandparents, and 0.8% ($n=10$) were other people.

Data collected by the Lithuanian Department of Statistics were used to determine the precise number of schoolchildren. Schools were selected on the basis of data from the Education Management Information System of

the Centre of Information Technologies in Education. Parents of school-children from three studied schools of each city participated in the study.

Parents of children undergoing oral status evaluation could also participate in this examination, although due to objective reasons (coding issues), their answers were difficult to associate with a concrete child's responses about the oral status; besides, this was not included in the objectives of our study.

For the aforementioned reasons, the responses of parents who participated in the study allowed for clarifying the parents' general (wider) attitude to their children's oral health, possibilities for its preservation, and associated problems.

1.2 Evaluation of the subjects' oral status

The results of the study were registered in a questionnaire prepared following the recommendations of the WHO. The data entered in the questionnaire consisted of the subject's number, examination date, age, sex, nationality, place of residence, and criteria of oral status evaluation.

1.2.1. Evaluation of the dental status

The subjects' dental status was evaluated on the basis of the WHO clinical examination criteria. The examination was conducted by using a mirror, a blunt probe, and a light source. The data were registered in a questionnaire by applying an integer registration system. Each subject's teeth were evaluated with respect to their current status and treatment needs.

1.2.2. Criteria of the evaluation of dental treatment needs

The criteria for the evaluation of treatment needs were prepared following the recommendations of the WHO, and were supplemented with criteria relevant for the current study (concerning the durability of the sealant).

1.2.3. Evaluation of dental fluorosis

Dental fluorosis was assessed following the recommendations of the WHO (the Dean index).

1.2.4. Other changes in dental hard tissues

Besides the aforementioned evaluation criteria, we also assessed color changes and other alterations in the enamel.

1.2.5. Risk factors for occlusal anomalies

The examination of the dental status also involved the evaluation of risk factors for occlusal anomalies.

The analysis of the epidemiology of dental caries involved the evaluation of the prevalence and intensity of tooth decay. The prevalence of tooth decay is understood as the number of people with carious teeth among the whole studied population. This prevalence is determined from the ratio between subjects with carious teeth and the whole studied population. The prevalence of tooth decay was expressed as percentage.

To evaluate the intensity of dental caries, the number of decayed (D), missing (M), and filled (F) teeth per one person was used – the DMF index. The DMF value was expressed in points. The composition of the index was used to identify the developed tooth decay and its treated and untreated stages. The tooth decay intensity index in a group of people can be calculated by adding up DMF values of all subjects, and then dividing the resulting value by the number of the subjects.

We separately calculated dental surface damage in molars, and their protection with sealants. Permanent molars were marked following the recommendations of the WHO – i.e. 17, 16, 26, and 27 – for the upper molars, and 37, 36, 46, and 47 were the numbers assigned to the lower molars.

1.2.6. Oral hygiene assessment

Oral hygiene status was evaluated by applying the simplified Green – Vermilion index – OHI-S. The evaluation scale was the following:

- Excellent oral hygiene: 0.
- Good oral hygiene: 0.1–0.9.
- Satisfactory oral hygiene: 1.0–1.9.
- Poor oral hygiene: 2.0–3.0.

1.3. A questionnaire survey of the subjects

The subjects' inquiry was conducted by using a self-designed questionnaire. Schoolchildren who participated in the study were asked about their personal oral hygiene habits, what oral hygiene measures they used, etc. They were also asked how frequently they visited oral hygiene specialists. Since the study was on schoolchildren, it was interesting to learn whether they observed how other family members used oral hygiene measures, because surrounding people's example and encouragement may play a critical role in forming a child's habits.

1.4. A questionnaire survey of schoolchildren's parents

The occlusal surfaces of schoolchildren's molars are frequently damaged by tooth decay. This could be prevented if one of the preventive measures, i.e. coating the grooves with sealants – was applied. Currently in Lithuania there is an ongoing program on coating the molars with sealants (the Children's Dental Sealant Program), and thus a decision was made to devise a questionnaire and to conduct a survey among schoolchildren's parents to ascertain their opinion about this program.

The parents received a questionnaire consisting of 34 questions (an example is provided in the appendix). The questions could be distributed into four groups:

- Questions in the first group were of a general type (about the person filling out the questionnaire – age, nationality, place of residence, family status, education, income, the child's age, etc.).
- Questions in the second group were aimed at clarifying how the respondents evaluated their children's and their own health and dental status, and whether they took care of their and their children's oral health.
- Questions in the third group were aimed at clarifying personal oral hygiene measures the respondents used, the knowledge they had about these measures, and frequency of and the reasons for visits to oral care specialists.
- Questions in the fourth group were designed to reveal the parents' opinion about the Children's Dental Sealant Program – an ongoing program of preventive sealant application on the grooves of children's molars – which was introduced in 2004. The program involves 7–13 year-old children. The parents were asked whether their children participated in the program, how they learned about that program, whether they had to pay for sealant application, and what their opinion about the necessity and usefulness of this program was.

1.5. A questionnaire survey of oral care specialists

As schoolchildren's parents were not the only ones whose opinion about oral health preservation issues and the Children's Dental Sealant Program we wanted to clarify, a questionnaire was designed for oral care specialists. Dentists and dental hygienists are actively participating in this activity – they cover dental grooves with sealants, teach children how to brush their teeth correctly, etc., and thus their opinion was important as well.

A detailed list of these specialists was obtained from the Lithuanian Dental Chamber because they have data on all licensed specialists. The respondents were then randomly selected from this list. According to the data of the Lithuanian Dental Chamber, 2,930 dentists, 54 pediatric dentists, and 364 dental hygienists had valid licenses in 2008. In total, 358 questionnaires were sent out, and 238 filled questionnaires were returned (response rate – 66.5%).

The questionnaire contained 13 questions (an example is provided in the appendix) that could be distributed into two main groups:

- The first group contained questions of general character: the respondent's sex, age, place of residence (county), family status, specialty, and workplace.
- The second group contained questions related to the Children's Dental Sealant Program. We wanted to learn whether the specialists knew about this program, whether they participated in it, how many children they thought were included into the program, what possible reasons for non-participation were, what the specialists' and the patients' opinions about this program were, and how this program could be improved.

1.6. A prognostic evaluation of the economic benefit of the sealants

To calculate the economic benefit of the sealants, we used the net present value (NPV) – the difference between the current market value of the investment and its costs. The NPV shows what value can be created (or lost) as a result of the investment.

1.7. Statistical analysis

The collected data were stored in a database. The statistical analysis of the collected data was conducted by applying the SPSS 18.0 software package (Chicago, Illinois, USA). Coded data of the subjects were used in the analysis (each participant was assigned a code to ensure that the subjects' identity would not be revealed during the study).

Data analysis involved the main characteristics of their distribution: mean value (MV), standard deviation (SD), mode, median, and confidence interval (CI).

The Kolmogorov-Smirnov test was used in the investigation of hypotheses about the normality of the parameter distribution.

The comparison of quantitative variables of two independent groups was performed by applying the parametric Student's t-test, and verified (if the distribution did not meet the normality presumption) by applying the non-parametric Mann-Whitney test; in cases where more than two groups were analyzed, the Fisher's criterion (F) of the parametric dispersion analysis ANOVA, and the Kruskal-Wallis test were used. Multiple comparisons were performed by applying the post hoc Bonferroni test when group number was < 8 , and Newman-Keuls test, when group number was > 8 .

The hypotheses concerning the relationship between qualitative variables were verified by applying the Chi-square (χ^2) compatibility and independence criterion.

The dependence of quantitative variables was evaluated by applying Pearson's correlation coefficient, and for qualitative variables, Spearman's or Kendall's correlation coefficients were used.

Logistic regression analysis was applied to determine which attributes had the greatest effect on the prevalence of tooth decay. A stepwise selection was applied in the model. Its parameter values were calculated using 95% CI.

The level of significance in the verification of statistical hypotheses was set at 0.05. In the Results section, the difference was marked as statistically significant if $p < 0.05$.

2. RESULTS

2.1. Prevalence and intensity of tooth decay among 7–12 year-old children

The study included 2,397 children aged 7–12 years from 10 county centers of Lithuania.

The findings of the study showed that the prevalence of dental caries in permanent teeth of the studied schoolchildren was 44.8%. The lowest prevalence was found in Šiauliai – 27.9%, and this statistically significantly ($p < 0.05$) differed from the respective findings in other county centers (Fig. 2.1.1). The prevalence of tooth decay among schoolchildren in Klaipėda was statistically significantly lower than that among schoolchildren in Tauragė, Panevėžys, and Kaunas. The prevalence of tooth decay among schoolchildren in Vilnius was also statistically significantly lower than that in Kaunas.

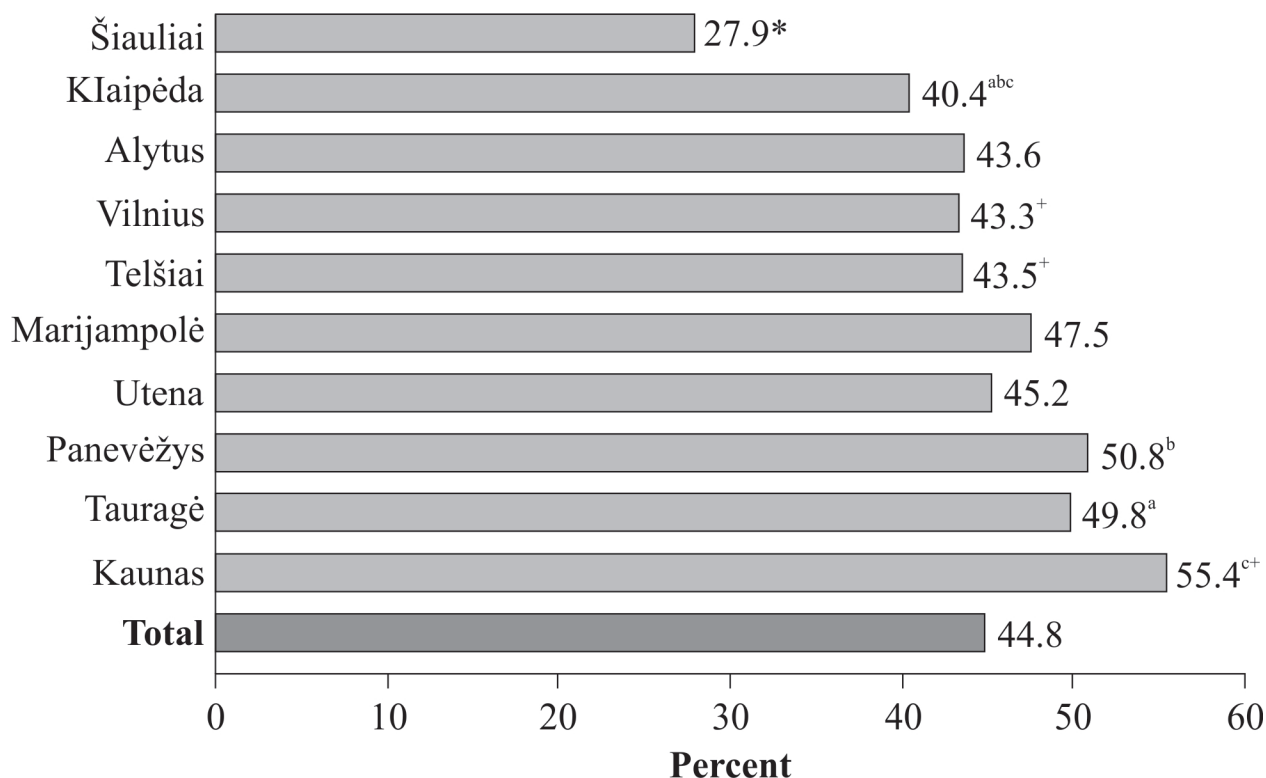


Fig. 2.1.1. *The Prevalence of tooth decay in permanent teeth of 7–12 year-old children in county centers ($\chi^2=47.4$; $df=9$; $p<0.001$)*

* $p<0.01$, comparing Šiauliai with other county centers. ^{abc} $p<0.05$ comparing Klaipėda with Tauragė, Panevėžys, and Kaunas county centers. ⁺ $p<0.01$ comparing Vilnius and Kaunas county centers.

Multiple comparisons of the prevalence of tooth decay among children of different age from county centers showed that the prevalence of tooth decay among children aged 7–8 years was significantly lower than that among children aged 9–10 years or 12 years. The highest prevalence of tooth decay among children aged 7–8 years was observed in Telšiai, and this prevalence differed significantly from that in Utena or Šiauliai. The highest prevalence of tooth decay among children aged 9–10 years was observed in Kaunas, and it significantly differed from the respective findings in other county centers. The prevalence of tooth decay in this age group in Utena – like in Vilnius – was significantly higher than that in Klaipėda or Šiauliai. In the age group of 12 years, statistically significantly the lowest prevalence of tooth decay was in Šiauliai, and it was only between Šiauliai and Alytus that the difference was not statistically significant. There was no statistically significant difference in the prevalence of tooth decay in this age group between other county centers (except for Šiauliai) (Table 2.1.1).

Table 2.1.1. *The prevalence of tooth decay in permanent teeth of 7-12 year-old children by age groups and county centers*

Age groups/ County centers n (in age groups)	Prevalence of tooth decay, %			
	7–8 years	9–10 years	12 years	df=2 p with respect to age groups
Tauragė 81/80/80	24.7 ^{ab}	50.0 ^{ac}	75.0 ^{bc}	$\chi^2=40.8$; $p<0.001$
Panevėžys 80/75/85	26.3 ^{ab}	48.0 ^{ac}	76.5 ^{bc}	$\chi^2=41.9$; $p<0.001$
Marijampolė 77/83/80	23.4 ^{ab}	49.4 ^{ac}	68.8 ^{bc}	$\chi^2=32.6$; $p<0.001$
Alytus 56/93/87	17.9 ^{ab}	43.0 ^{ac}	60.9 ^{bc}	$\chi^2=25.7$; $p<0.001$
Šiauliai 80/80/80	12.5 ^b	23.8 ^c	47.5 ^{bc}	$\chi^2=25.4$; $p<0.001$
Telšiai 79/80/80	29.1 ^b	36.3 ^c	65.0 ^{bc}	$\chi^2=23.4$; $p<0.001$
Vilnius 80/80/80	16.3 ^{ab}	50.0 ^a	63.8 ^b	$\chi^2=38.9$; $p<0.001$
Klaipėda 80/80/80	23.8 ^b	33.8 ^c	63.8 ^{bc}	$\chi^2=28.8$; $p<0.001$
Kaunas 81/80/79	17.3 ^{ab}	71.3 ^a	78.5 ^b	$\chi^2=72.8$; $p<0.001$
Utena 80/80/81	12.5 ^{ab}	53.8 ^{ac}	69.1 ^{bc}	$\chi^2=55.6$; $p<0.001$
df=9 p with respect to county centers	$\chi^2=14.97$; p=0.09	$\chi^2=48.2$; p<0.001	$\chi^2=26.8$; p=0.002	
Total: 774/811/812	20.4	45.9	66.9	$\chi^2=36.5$; $p<0.001$

χ^2 – Chi-square criterion, df – number of degrees of freedom, p – level of significance. ^a $p<0.05$ comparing 7–8 year-old and 9–10 year-old age groups. ^b $p<0.001$ comparing 7–8 year-old and 12 year-old age groups. ^c $p<0.05$ comparing 9–10 year-old and 12 year-old age groups.

The prevalence of tooth decay also differed depending on the subjects' sex: the prevalence among boys was 42.7%, while among girls – 46.9%. It was only in Klaipėda that the difference was statistically significant (boys – 32.7%, girls – 47.2%, $p=0.02$). No statistically significant differences in the prevalence of tooth decay between boys and girls were found in other county centers.

Morbidity from tooth decay is reflected not only by the prevalence of this condition among the subjects, but also by its intensity expressed as the mean number of decayed, missing, and filled teeth in one subject. The mean tooth decay intensity index (DMF-T) in our studied children was 1.08(1.64) (mean value, and standard deviation in brackets): decayed teeth – 0.43(1.02), filled teeth – 0.62(1.2), and missing teeth – 0.02(0.18).

Multiple comparisons showed that the tooth decay intensity index DMF-T (D – decayed, M – missing, and F – filled teeth) among 7–8 year-old children was significantly lower than that among children aged 9–10 or 12 years, while DMF-T among 9–10 year-old children was significantly lower than that among children aged 12 years.

Table 2.1.2 shows that the tooth decay intensity index (DMF-T) and its component for filled teeth were significantly higher among girls than among boys. The analysis of DMF-T and filled teeth conducted among children of different age groups showed that this tendency persisted only in the group of 12 year-olds: DMF-T in boys was 1.76(1.99), and in girls – 2.07(2.1); $p=0.03$, while the F value was, accordingly, 1.06(1.48) and 1.35(1.73), $p=0.009$. DMF-T in 7–8 year-old boys was 0.36(0.91), while in girls – 0.29(0.63), $p=0.3$; the F value was, respectively, 0.14(0.53) and 0.12 (0.41), $p=0.6$. In the age group of 9–10 year-old children, DMF-T in boys was 0.92(1.39), and in girls – 0.97(1.35), $p=0.6$; F, respectively – 0.47(0.92) and 0.51(0.87), $p=0.5$.

Table 2.1.2. Mean values and standard deviations of the tooth decay intensity index (DMF-T) and its components in permanent teeth of 7–12 year-old children

Age	DMF-T	D	F	M
	MV (SD)			
7–8 years (n=774)	0.33 (0.78) ^{ab}	0.19 (0.62) ^{ab}	0.13 (0.47) ^{ab}	0.001 (0.04) ^b
9–10 years (n=811)	0.94 (1.37) ^{ac}	0.44 (0.99) ^{ac}	0.49 (0.9) ^{ac}	0.02 (0.14) ^c
12 years (n=812)	1.93 (2.06) ^{bc}	0.66 (1.28) ^{bc}	1.22 (1.63) ^{bc}	0.05 (0.27) ^{bc}
	F=229.5; df=2; $p<0.001$	F=43.2; df=2; $p<0.001$	F=197.3; df=2; $p<0.001$	F=13.2; df=2; $p<0.001$
Sex				
Boys (n=1171)	1.0(1.59)	0.43(1.05)	0.55(1.1)	0.03(0.22)
Girls (n=1223)	1.16(1.69)	0.44(1.0)	0.7(1.29)	0.02(0.14)
p value	0.02	0.7	0.002	0.1

MV – mean value, SD – standard deviation, F – Fisher's criterion, df – number of degrees of freedom, p – level of significance. ^a $p<0.05$, comparing 7–8 year-old and 9–10 year-old age groups. ^b $p<0.05$, comparing 7–8 year-old and 12 year-old age groups. ^c $p<0.05$, comparing 9–10 year-old and 12 year-old age groups.

There was no statistically significant difference between county centers in the value of the M component of the DMF-T index ($F=0.7$; $df=9$; $p=0.7$).

The DMF-T index for permanent teeth (Fig. 2.1.2) was the lowest in subjects from Šiauliai, and it was only with respect to Klaipėda that the difference was not statistically significant. The highest DMF-T index was observed in Kaunas, but the difference was statistically significant only with respect to Klaipėda and Šiauliai. A statistically significant difference was found in DMF-T between Klaipėda and Panevėžys.

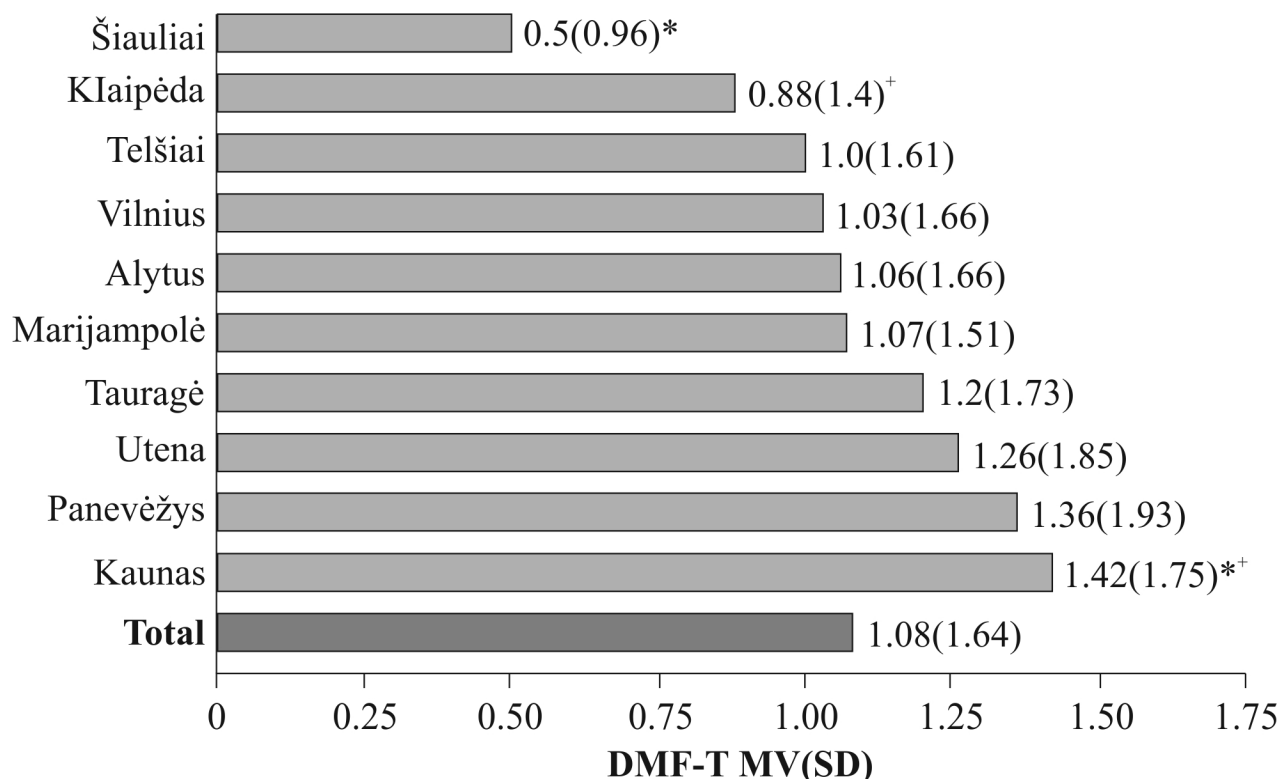


Fig. 2.1.2. Mean values of the tooth decay intensity index (DMF-T) in permanent teeth of 7–12 year-old children ($F=6.4$; $df=9$; $p<0.001$)

*⁺ $p<0.001$, comparing Kaunas with Klaipėda and Šiauliai county centers.

Table 2.1.3 shows that in all county centers, DMF-T statistically significantly differed between children aged 7–8 and 9–10 years, between children aged 9–10 and 12 years, and between 7–8 and 12 year-old children, except for Kaunas (the difference between 9–10 and 12 year-olds, $p>0.05$) and Klaipėda, Telšiai, and Šiauliai (the difference between 7–8 and 9–10 year-olds, $p>0.05$).

Table 2.1.3. Mean values of the DMF-T index in permanent teeth of 7–12 year-old children by age groups and county centers

County centers / n (age groups)	7–8 years	9–10 years	12 years
	DMF-T V(SD)		
Tauragė 81/80/80	0.43 (0.9) ^b	1.00 (1.27) ^c	2.19 (2.29) ^{bc}
	F=26.0. df 2. p<0.01		
Panevėžys 80/75/85	0.43 (1.07) ^b	1.01 (1.38) ^c	2.55 (2.32) ^{bc}
	F=34.45. df 2. p<0.01		
Marijampolė 77/83/80	0.34 (0.75) ^{ab}	0.93(1.21) ^{ac}	1.93 (1.86) ^{bc}
	F=27.3. df 2. p<0.05		
Alytus 56/93/87	0.20 (0.44) ^b	0.80 (1.10) ^c	1.89 (2.20) ^{bc}
	F=23.15. df 2. p<0.01		
Šiauliai 80/80/80	0.28 (0.81) ^b	0.34 (0.72) ^c	0.89 (1.118) ^{bc}
	F=10.56. df 2. p<0.01		
Telšiai 79/80/80	0.42 (0.74) ^b	0.55 (0.82) ^c	2.04 (2.21) ^{bc}
	F=31.4. df 2. p<0.01		
Vilnius 80/80/80	0.29 (0.76) ^{ab}	1.03 (1.47) ^{ac}	1.78 (2.11) ^{bc}
	F=18.3. df 2. p<0.05		
Klaipėda 80/80/80	0.40 (0.80) ^b	0.55 (1.14) ^c	1.68 (1.74) ^{bc}
	F=23.5. df 2. p<0.01		
Kaunas 81/80/79	0.30 (0.76) ^{ab}	2.00 (1.97) ^{ac}	1.99 (1.68) ^{bc}
	F=31.8. df 2. p<0.01		
Utena 80/80/81	0.16 (0.48) ^b	1.28 (1.52) ^c	2.33 (2.30) ^{bc}
	F=36.0. df 2. p<0.01		

MV – mean value, SD – standard deviation, F – Fisher’s criterion, df – number of degrees of freedom, p – level of significance. ^ap<0.05, comparing 7–8 year-old and 9–10 year-old age groups. ^bp<0.05, comparing 7–8 year-old and 12 year-old age groups. ^cp<0.05, comparing 9–10 year-old and 12 year-old age groups.

2.2. Tooth decay in permanent molars

An important point in this epidemiological study was clarification of the situation of tooth decay in permanent molars of the studied schoolchildren because molars erupt the first when deciduous teeth are replaced by permanent ones, and thus molars are important for the occlusion and

especially require protection in order to preserve the integrity of hard tissues.

The results of the study showed that the prevalence of tooth decay in permanent molars of 7–12 year-old children was 42.8%: 40.2% in boys, and 45.5% in girls ($p=0.01$); the mean tooth decay score was 0.94(1.3): 0.84(1.26) in boys, and 0.99(1.38) in girls ($p=0.005$). There was a statistically significant ($\chi^2=324.5$; $df=2$; $p<0.001$) difference in the prevalence of tooth decay and the mean tooth decay score in the subjects' age groups – 7–8 years: prevalence – 19.6%, mean tooth decay score – 0.3(0.7); 9–10 years: prevalence – 43.4%, mean tooth decay score – 0.81(1.13); and 12 years: prevalence – 64.4%, mean tooth decay score – 1.6(1.61) (Fig. 2.2.1).

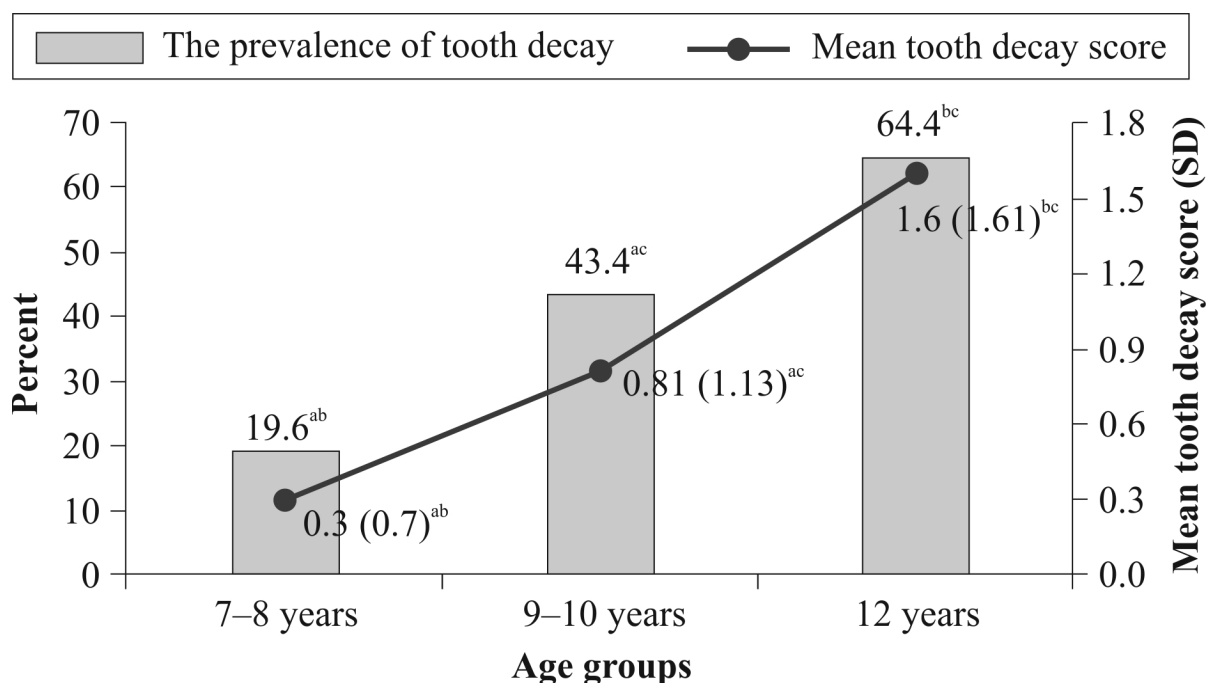


Fig. 2.2.1. The prevalence of tooth decay ($\chi^2=324.5$; $df=2$; $p<0.001$) and the mean tooth decay score ($F=236.0$; $df=2$; $p<0.001$) in permanent molars of 7–12 year-old children by age groups

^a $p<0.05$, comparing 7–8 year-old and 9–10 year-old age groups. ^b $p<0.05$, comparing 7–8 year-old and 12 year-old age groups. ^c $p<0.05$, comparing 9–10 year-old and 12 year-old age groups.

The comparison of age group data showed that that the prevalence of tooth decay and the mean tooth decay score in permanent molars among children aged 7–8 years was significantly lower than those among children aged 9–10 or 12 years. The lowest prevalence of tooth decay in 7–8 year-old children was observed in Šiauliai, and the highest – in Telšiai. In the age group of 9–10 years, the lowest prevalence of tooth decay was observed in Šiauliai, while the highest – in Kaunas; in the age group of 12 years, the trend remained the same (Table 2.2.1).

Table 2.2.1. Tooth decay of permanent molars in children aged 7–12 years by age and county centers

County centers / n (in age groups)	7–8 years	9–10 years	12 years	7–8 years	9–10 years	12 years
	Mean tooth decay score, (SD)			Prevalence, %		
Tauragė 81/80/80	0.43 (0.89) ^{ab}	0.99 (1.27) ^{ac}	1.75 (1.67) ^{bc}	24.7 ^{ab}	50.0 ^{ac}	71.3 ^{bc}
	F=20.4; df=2; p<0.001			$\chi^2=35.0$; df=2; p<0.001		
Panevėžys 80/75/85	0.30 (0.64)	0.93 (1.22)	2.05 (1.80)	22.5	46.7	74.1
	F=36.9; df=2; p<0.001			$\chi^2=44.0$; df=2; p<0.001		
Marijampolė 77/83/80	0.34 (0.74) ^b	0.77 (1.05) ^c	1.58 (1.69) ^{bc}	23.4	43.4	62.5
	F=20.3; df=2; p<0.001			$\chi^2=24.5$; df=2; p<0.001		
Alytus 56/93/87	0.18 (0.43)	0.72 (1.03)	1.55 (1.68)	16.1	40.9	58.6
	F=23.1; df=2; p<0.001			$\chi^2=25.4$; df=2; p<0.001		
Šiauliai 80/80/80	0.23 (0.75) ^b	0.33 (0.73) ^c	0.80 (1.07) ^{bc}	10.0	22.5	46.3
	F=10.1; df=2; p<0.001			$\chi^2=28.0$; df=2; p<0.001		
Telšiai 80/80/80	0.42 (0.74) ^b	0.48 (0.8) ^c	1.75 (1.60) ^{bc}	29.1 ^b	31.3 ^c	65.0 ^{bc}
	F=36.0; df=2; p<0.001			$\chi^2=26.5$; df=2; p<0.001		
Vilnius 80/80/80	0.26 (0.67)	0.79 (1.01)	1.41 (1.45)	16.3	47.5	61.3
	F=22.1; df=2; p<0.001			$\chi^2=35.0$; df=2; p<0.001		
Klaipėda 80/80/80	0.40 (0.81) ^b	0.46 (1.07) ^c	1.31 (1.38) ^{bc}	23.8 ^b	30.0 ^c	60.0 ^{bc}
	F=16.8; df=2; p<0.001			$\chi^2=25.5$; df=2; p<0.001		
Kaunas 81/80/79	0.30 (0.77)	1.56 (1.4)	2.53 (2.11)	17.3	68.8	77.2
	F=43.4; df=2; p<0.001			$\chi^2=68.1$; df=2; p<0.001		
Utena 80/80/81	0.16 (0.48)	1.14 (1.33)	1.85 (1.70)	12.5	53.8	69.1
	F=35.4; df=2; p<0.001			$\chi^2=55.6$; df=2; p<0.001		
	F=1.4. df=9. p=0.2	F=8.7. df=9. p<0.001	F=6.3. df=9. p<0.001	$\chi^2=16.4$. df=9; p=0.06	$\chi^2=51.8$. df=9; p<0.001	$\chi^2=25.5$. df=9; p<0.002

SD – standard deviation, F- Fisher's criterion, df – number of degrees of freedom, p – level of significance. ^ap<0.05, comparing 7–8 year-old and 9-10 year-old age groups. ^bp<0.05, comparing 7–8 year-old and 12 year-old age groups. ^cp<0.05, comparing 9–10 year-old and 12 year-old age groups.

The highest prevalence of tooth decay in the age groups of 9–10 years was observed in Kaunas, and it was only with Utena county that the difference was not statistically significant; meanwhile, the prevalence of tooth decay in Šiauliai differed statistically significantly from that in Tauragė, Panevėžys, Utena, and Kaunas counties. In the age group of 12 years, the lowest prevalence of tooth decay was in Šiauliai, and it differed statistically significantly from that in Tauragė, Panevėžys, Telšiai, Kaunas, and Utena counties (Table 2.2.1.).

The findings of this epidemiological study showed that the most vulnerable teeth were the first lower molars (the prevalence of tooth decay in these teeth among 12 year-old children reached 45%); the prevalence of tooth decay in the upper molars ranged between 25.1% and 28.6% (Fig. 2.2.2).

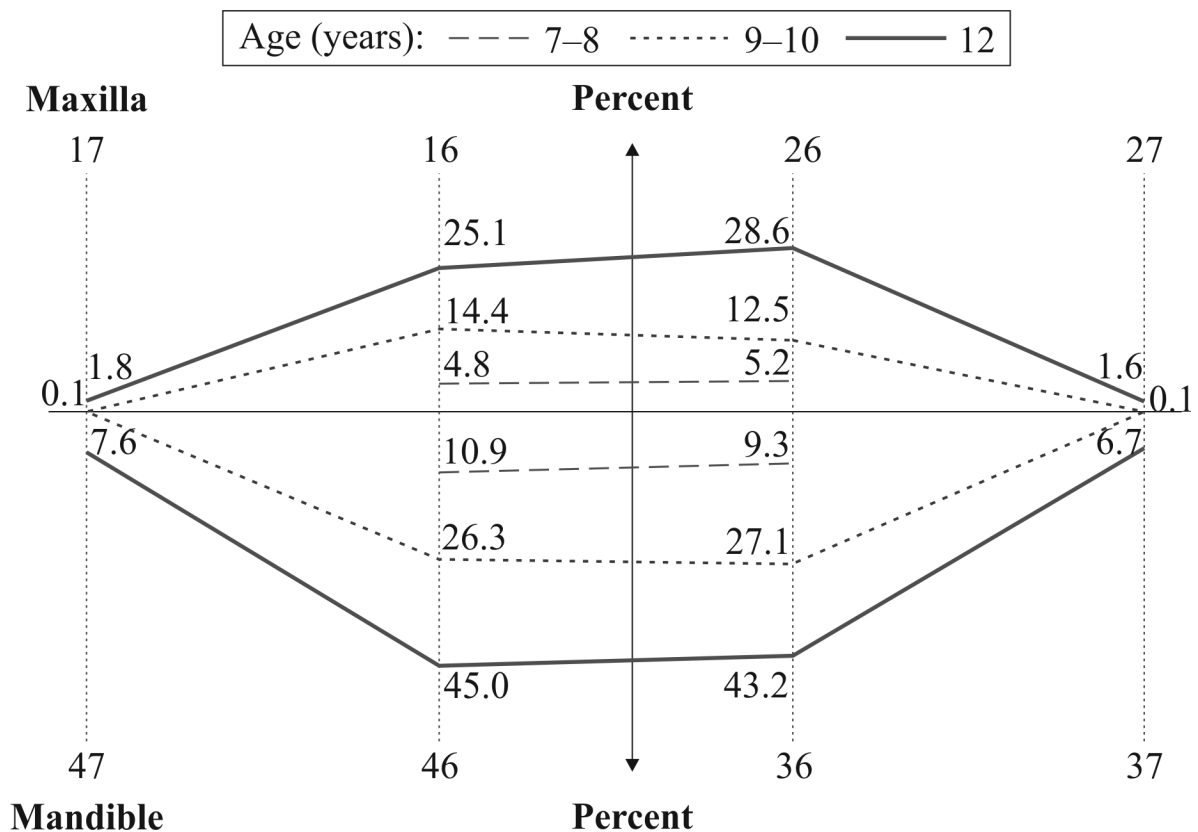


Fig. 2.2.2. The prevalence of tooth decay in permanent molars of 7–12 year-old children by age groups and teeth

The analysis of tooth decay of molars in children of different sexes showed that in girls, more molars were affected, compared to boys: the prevalence of tooth decay in the first lower permanent molars among girls was from 28.9% to 30.4%; the second permanent molars were also more damaged in girls.

2.3. Application of sealants on the occlusal surfaces of permanent teeth in 7–12 year-old children

The epidemiological study showed that 45.5% of the studied children had their occlusal surfaces of permanent teeth covered with sealants. Compared to other county centers, significantly fewer children with sealant-protected teeth were found in Telšiai – 19.2%. Only 27.5% of such children were found in Marijampolė – which is significantly less than in other county centers, albeit more than in Telšiai. The percentage of children with sealant-protected teeth in Tauragė, Utenoje, Šiauliai, and Panevėžys was significantly lower than that in Kaunas, Vilnius, and Alytus, while the percentage of such children in Kaunas was significantly lower than that in Klaipėda (Fig. 2.3.1).

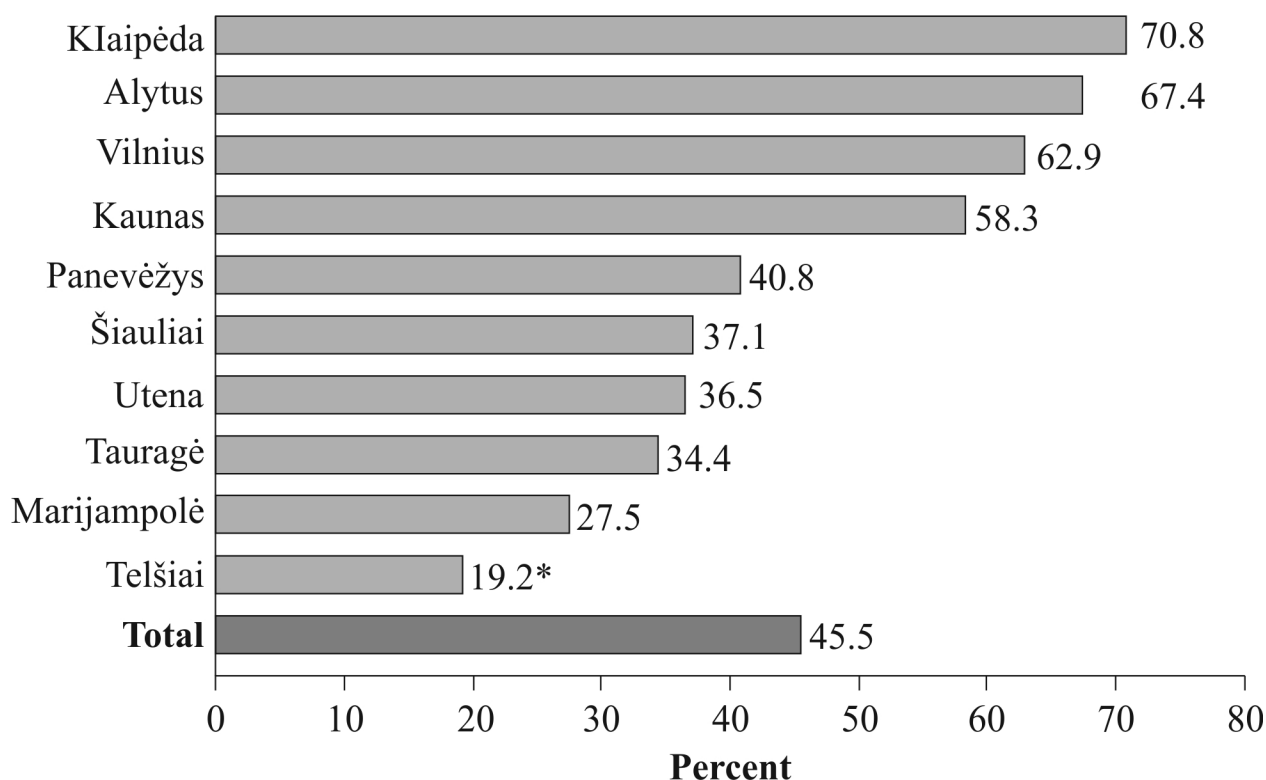


Fig. 2.3.1. The distribution of 7–12 year-old children with sealant-covered permanent teeth by county centers ($\chi^2=279.5$; $df=9$; $p<0.001$)

* $p<0.05$, comparing Telšiai with other county centers.

The mean number of sealant-covered teeth in 7–12 year-old children was 1.27(1.9) (min – 0; max – 14): in the maxilla – 0.6(1.05) (min – 0; max – 8) teeth, and in the mandible – 0.67(1.05) (min – 0; max – 8) teeth.

2.3.1. Sealant application on the occlusal surfaces of permanent molars

The analysis of the findings of our epidemiological study showed that the protection of the occlusal surfaces of permanent molars via the application of sealants differed between county centers and age groups.

With respect to age groups, there was no statistically significant difference between the number of 7–12 year-old children with sealant-covered molars in Alytus and Kaunas. In Tauragė, Šiauliai, Telšiai, Vilnius, and Klaipėda, 7–8 year-old children had significantly more sealant-covered molars, compared to 9–10 year-olds. In Marijampolė, Šiauliai, and Vilnius, 7–8 year-old children had significantly more sealant-covered molars, compared to 12 year-old children. A significant difference when comparing the age group of 9–10 years with the age group of 12 years was found in Tauragė, Panevėžys, Šiauliai, Telšiai, Klaipėda, and Utena (Table 2.3.1.1).

Table 2.3.1.1. *The distribution of 7–12 year-old children with sealant-covered permanent molars by age groups and county centers*

Age groups / County centers n (in age groups)	Percentage of children with sealant-covered teeth			
	7–8 years (n=774)	9–10 years (n=811)	12 years (n=812)	df=2; p with respect to age groups
Tauragė 81/80/80	27.2 ^a	55.0 ^{ac}	18.8 ^c	$\chi^2=25.8$; $p<0.001$
Panevėžys 80/75/85	36.3	42.7 ^c	22.4 ^c	$\chi^2=7.8$; $p<0.05$
Marijampolė 77/83/80	31.2 ^b	28.9	17.5 ^b	$\chi^2=4.5$; $p<0.05$
Alytus 56/93/87	75.0	69.9	59.8	$\chi^2=4.0$; $p=0.1$
Šiauliai 80/80/80	40.0 ^{ab}	60.0 ^{ac}	11.3 ^{bc}	$\chi^2=41.1$; $p<0.001$
Telšiai 79/80/80	6.3 ^a	42.5 ^{ac}	8.8 ^c	$\chi^2=41.9$; $p<0.001$
Vilnius 80/80/80	28.8 ^{ab}	71.3 ^a	62.5 ^b	$\chi^2=32.4$; $p<0.001$
Klaipėda 80/80/80	58.8 ^a	91.3 ^{ac}	62.5 ^c	$\chi^2=24.5$; $p<0.001$
Kaunas 81/80/79	45.7	56.3	59.5	$\chi^2=3.3$; $p<0.01$
Utena 80/80/81	37.5	42.5 ^c	23.5 ^c	$\chi^2=6.9$; $p=0.1$

χ^2 – Chi-square criterion, df – number of degrees of freedom, p – level of significance. ^a $p<0.05$, comparing 7–8 year-old and 9–10 year-old age groups. ^b $p<0.05$, comparing 7–8 year-old and 12 year-old age groups. ^c $p<0.05$, comparing 9–10 year-old and 12 year-old age groups.

Fig 2.3.1.1 shows that the lowest mean value for sealant-covered teeth was observed in Telšiai, and this value differed statistically significantly from that in Šiauliai, Kaunas, Klaipėda, Alytus, or Vilnius county centers. In Klaipėda, this value was significantly higher than that in all county centers except for Alytus.

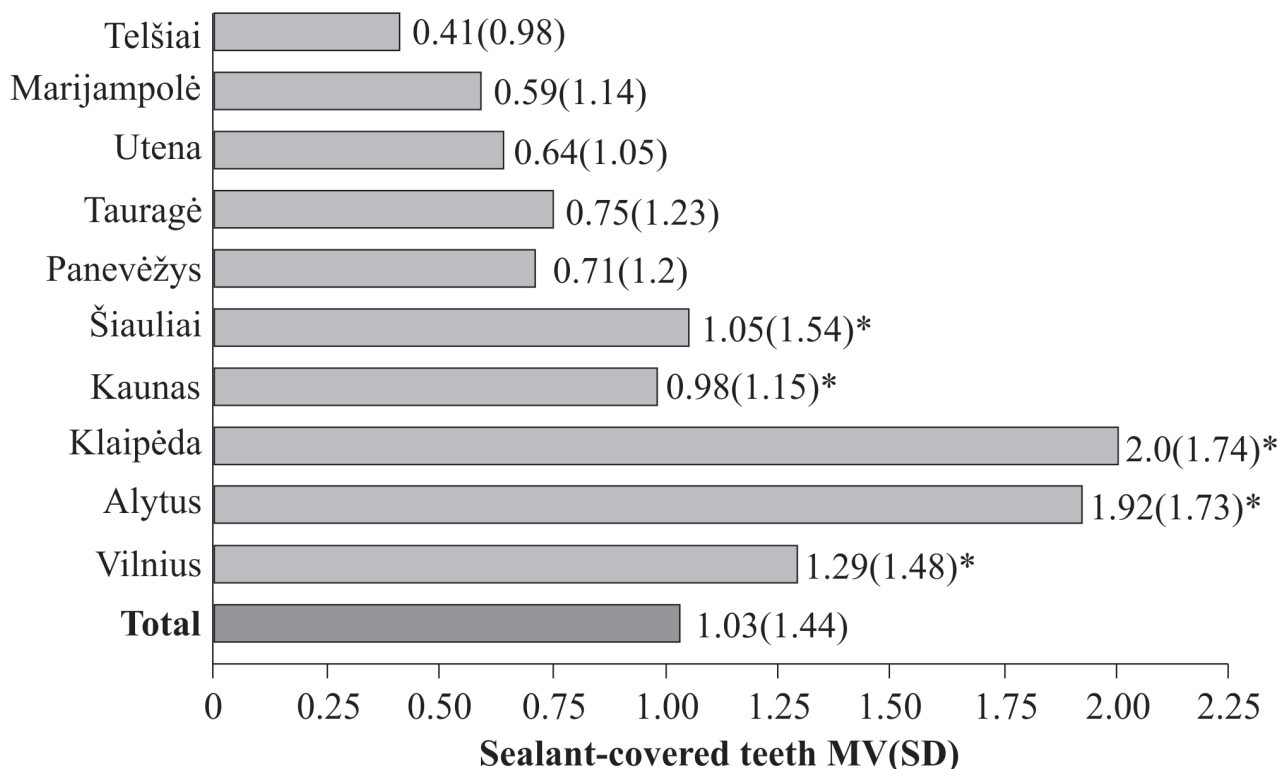


Fig. 2.3.1.1. Mean values and standard deviations for sealant-covered permanent molars in 7–12 year-old children by county centers ($F=39.2$, $df=9$, $p<0.001$)

* $p<0.05$, compared to Telšiai county center.

We found a negative significant ($r=-0.235$; $p<0.001$) correlation between the intensity of tooth decay (DMF-T) in molars and the protection of teeth with sealants. In children whose teeth were covered with sealants (37.3%), tooth decay was statistically significantly ($p<0.001$) less prevalent than among those whose teeth were unprotected (47.1%). The intensity of tooth decay was also statistically significantly ($p<0.001$) lower – respectively, 0.66(1.07) and 1.14(1.53).

The analysis by age groups showed that 37.6% of 7–8 year-old children had their molar covered with sealants, compared to 56.2% of 9–10 year-olds, and the difference was statistically significant. In the age group of 12 years, 34.7% of children had sealant-covered teeth, which statistically significantly differed from the age groups of 9–10 years ($\chi^2=89.8$; $df=2$; $p<0.001$) (Table 2.3.1.2).

Table 2.3.1.2. *The distribution of 7–12 year-old children with sealant-covered molars by age groups*

	7–8 years n=774 % (n)	9–10 years n=811 % (n)	12 years n=812 % (n)
Have no sealants	62.7(483) ^a	43.8(355) ^{ac}	65.3(530) ^c
Have 1 sealant-covered tooth	9.2(71) ^{ab}	16.2(131) ^{ac}	12.6(102) ^{bc}
Have 2 sealant-covered teeth	9.8(76) ^a	17.8(145) ^{ac}	8.6(70) ^a
Have 3 sealant-covered teeth	7.6(59) ^a	13.2(107) ^{ac}	5.5(45) ^c
Have 4 or more sealant-covered teeth	11.0(85)	9.0(73) ^b	8.0(65) ^b

$\chi^2=120.19$, $df=8$; $p<0.001$. ^a $p<0.001$, comparing 7–8 year-old and 9–10 year-old age groups. ^b $p<0.001$, comparing 7–8 year-old and 12 year-old age groups. ^c $p<0.001$, comparing 9–10 year-old and 12 year-old age groups.

The findings of our study showed that in children whose molars were not protected by sealants, the odds ratio (OR) for tooth decay was by 1.49-fold (1.26–1.76) (OR (95% CI)) higher than in those whose molars were covered with sealants.

2.4. Schoolchildren's knowledge about oral hygiene

The schoolchildren's inquiry aimed at determining their oral hygiene habits, i.e. whether they frequently brushed their teeth, whether they used dental floss, and what toothbrushes they used.

The inquiry showed that 55.0% of the schoolchildren brushed their teeth more than once daily, 37.0% – once per day, and 8.1% of the schoolchildren did not brush their teeth every day or did not brush at all.

Significantly more children brushed their teeth more than once daily in the age group of 9–10 years, compared to 7–8 year-olds. In the age group of 7–8 years, significantly more children did not brush their teeth every day or did not brush at all, compared to children aged 8–9 or 12 years (Table 2.4.1).

Table 4.4.1 also shows that significantly more boys brushed their teeth once daily, did not brush their teeth every day or did not brush at all, compared to girls; conversely, significantly more girls brushed their teeth more frequently than once daily. The findings showed the same tendency in the age group of 12 years. In the age group of 7-8 years, no statistically significant difference between boys and girls who did not brush their teeth every day or did not brush at all was found (12.5% of boys and 9.9% of

girls). In the age group of 9–10 years, no statistically significant difference was found between boys and girls who brushed their teeth once daily (36.9% of boys and 32.2% of girls).

Table 2.4.1. *The percentage distribution of the frequency of toothbrushing among 7–12 year-old children by age groups and sex*

Age	Brush their teeth			
	More than once per day	Once per day	Not every day or do not brush at all	
	%			
7–8 years (n=768)	50.8 ^a	38.0	11.2 ^{a,b}	$\chi^2=20.2$; df=4; p<0.001; ^a p<0.001, compared to the age groups of 7–8 and 9–10 years. ^b p<0.001, compared to the age groups of 7–8 and 12 years.
9–10 years (n=806)	58.6 ^a	34.6	6.8 ^a	
12 years (n=810)	55.4	38.3	6.3 ^b	
Total	55.0	37.0	8.1	
Sex:				*p<0.001 with respect to sex
Boys	48.5*	40.6*	10.9*	
Girls	61.2	33.5	5.3	

χ^2 – Chi-square criterion, df – number of degrees of freedom, p – level of significance.

2.4.1. Usage of oral hygiene means

The findings of the inquiry showed that 32.2% of children aged 7–12 years used soft toothbrushes, 56.6% of the children used medium-bristled toothbrushes, and 11.2% of the children used hard-bristled toothbrushes. Significantly more children used soft-bristled toothbrushes in the age group of 7–8 years (44.0%), compared to children aged 9–10 years (29.3%) or 12 years (23.9%) ($\chi^2=77.8$, df=2, $p<0.001$). There was no significant difference in the responses to this question between children of different sexes.

16.5% of the children indicated that they used mouthwashes. There was no statistically significant difference in the percentage distribution of children who used mouthwashes with respect to age groups ($\chi^2=2.1$, df=2, $p=0.3$), sex ($p=0.9$), or counties ($\chi^2=12.9$, df=9, $p=0.2$).

35.9% of the children indicated that they used dental floss for cleaning interdental spaces: 12.7% of the respondents answered “yes”, and 23.2% –

“sometimes”. Significantly more girls (40.1%) used dental floss, compared to boys (31.5%). Older children significantly more frequently used dental floss (28.1% of 7–8 year-old children, 35.6% of 9–10 year-old children, and 43.6% of 12 year-olds; $\chi^2=41.1$, $df=2$, $p<0.001$) than younger children did. Significantly more children used dental floss in Tauragė and Vilnius county centers, while in Šiauliai the percentage of such children was significantly lower than that in other county centers.

2.4.2. Evaluation of the oral hygiene status

The oral hygiene status was evaluated by using the simplified (OHI-S) index. The findings of the study showed that the value of this index ranged from 0 to 3, while the most common value was 1.0 (mode). In 35.7% of the studied schoolchildren, the OHI-S value was 0–1 points.

The mean value of the oral hygiene index was 0.997(0.62) points: in the age group of 7–8 years, this value was 0.896(0.58) points, which was significantly less than that in the age groups of 9–10 years (1.06(0.62) points) or 12 years (1.03(0.65) points). In girls, the OHI-S value (0.93(0.59) points) was significantly lower than that in boys (1.07(0.64) points). The analysis of the subjects by sex revealed that this tendency existed in all age groups and in most county centers. No significant difference between sexes was found in Telšiai, Klaipėda, Kaunas, or Utena county centers.

The epidemiological study aimed at revealing children's attitude to smoking. It is highly important to detect this harmful habit in children, since smoking is a risk factor for a number of diseases. 97.4% of children (97.1% of boys and 97.7% of girls; $p=0.4$) indicated that their attitude to smoking was negative. The children's responses differed depending on their age: 95.6% of 12 year-old children stated that their attitude to smoking was negative, which significantly differed from the respective percentage (98.4%) in the age groups of 7–8 and 9–10 years.

96.5% of children aged 7–12 stated that they did not smoke, while 3.5% of them indicated that they were smokers: 2.1% of the subjects answered “sometimes”, and 1.3% – “yes”. Among the smokers, 2.0% of children were 7–8 years of age, 2.1% – 9–10 years, and 6.3% – 12 years of age ($\chi^2=28.5$, $df=2$, $p=0.001$); with respect to sex, 5.2% of boys were smokers, and 1.9% – of girls ($p<0.001$). The comparison by county centers showed that the highest number of children who indicated that they smoked was observed in Vilnius, and it was only with respect to Alytus and Klaipėda county centers that the difference was not statistically significant.

2.5. Manifestation of the permanent dentition DMF-T index and its components among 7–12 year-old children from ten county centers of Lithuania, with respect to certain factors

Our study, among other things, aimed at identifying the factors that affected the DMF-T index of permanent teeth. We investigated the association of tooth decay on age, sex, the place of residence, smoking, the use of hygiene products (dental floss, toothbrush, and mouthwash), and sealant application.

Table 2.5.1 shows statistically significant odds ratios for the emergence of the DMF-T index and its components, obtained by applying univariate logistic regression analysis, with respect to the variables that had a significant effect on this index and its components.

Table 2.5.1. Odds ratios for the emergence of the components of the DMF-T index (D and F) in 7–12 year-old children with respect to various factors

Variables	DF-affected teeth OR (95% CI)	Decayed teeth OR (95% CI)	Filled teeth OR (95% CI)
Age, years			
7–8	1	1	1
9–10	3.3 (2.6–4.1)	2.3 (1.8–3.0)	4.2 (3.1–5.5)
12	7.9 (6.3–9.9)	3.4 (2.6–4.4)	10.4 (7.9–13.8)
Sex			
Boys	1		1
Girls	1.2 (1.0–1.4)		1.3 (1.1–1.6)
Smoking			
Non-smokers	1		1
Smokers	1.6 (1.0–2.4)		1.9 (1.2–3.0)
Flossing			
Use	1		1
Do not use	1.2 (1.0–1.4)		1.3 (1.1–1.5)
Toothbrushing			
1–2 times per day			1
Less frequently			1.5 (1.1–2.1)
Toothbrush used			
Soft	1		1
Medium or hard bristles	1.2 (1.0–1.4)		1.3 (1.0–1.5)

Table 2.5.1. Odds ratios for the emergence of the components of the DMF-T index (D and F) in 7–12 year-old children with respect to various factors (continued)

Variables	DF-affected teeth OR (95% CI)	Decayed teeth OR (95% CI)	Filled teeth OR (95% CI)
County			
Šiauliai	1	1	1
Klaipėda	1.8 (1.2–2.6)	1.4 (0.9–2.4)	2.1 (1.4–3.3)
Vilnius	2.0 (1.4–2.9)	1.8 (1.1–3.0)	1.7 (1.1–2.6)
Telšiai	2.0 (1.4–2.9)	2.9 (1.8–4.7)	1.4 (0.9–2.3)
Alytus	2.0 (1.4–2.9)	1.8 (1.1–3.0)	2.4 (1.6–3.7)
Utena	2.1 (1.5–2.1)	3.6 (2.3–5.8)	1.5 (0.98–2.4)
Marijampolė	2.3 (1.6–3.4)	3.0 (1.9–4.8)	1.5 (0.9–2.3)
Tauragė	2.6 (1.8–3.7)	2.2 (1.4–3.6)	2.5 (1.6–3.8)
Panevėžys	2.7 (1.8–3.9)	2.9 (1.8–4.6)	2.5 (1.7–3.9)
Kaunas	3.2 (2.2–4.7)	1.4 (0.8–2.3)	4.8 (3.2–7.3)
County			
Šiauliai	1	1	1
Others	2.3 (1.7–3.0)	2.3 (1.5–3.4)	2.2 (1.5–3.1)
Sealants			
Present		1	
Absent		1.7 (1.4–2.1)	

OR – odds ratio; CI –confidence interval.

As indicators of the possibility for the emergence of DMF-T, D, and F, all the variables listed in Table 2.5.1 were included into the multiple logistic regression analysis model, as they all differed significantly in the comparative analysis.

The analysis of the development of tooth decay in the studied population revealed its significant association with age, sex, smoking, dental floss use, the selection of a suitable toothbrush, and the county. A higher prevalence of tooth decay was detected among older children. In addition to that, its prevalence was higher among girls than among boys, and among smokers, compared to non-smokers. The prevalence of tooth decay was significantly lower among those who used dental floss and a suitable toothbrush (this indicates that these children paid more attention to their oral care). The evaluation of the significant associations between the variables (multicollinearity) showed that age significantly correlated with smoking (smokers: 2.0% – in 7–8 year-olds, 2.1% – in 9–10 year-olds, and 6.3% – in 12 year-old children; $\chi^2=28.5$, $df=2$, $p<0.001$); sex significantly correlated with

dental floss use (31.5% of boys vs. 10.1% of girls; $p<0.001$). Significantly higher odds ratios were obtained if the subjects were girls – 1.2(1.0–1.4), if they were smokers – 1.7(1.1–2.7), if they used medium or hard-bristled toothbrushes – 1.3(1.0–1.5), and if they were from counties other than Šiauliai – 2.2(1.6–3.0).

Significantly higher odds ratios for the prevalence of tooth decay could be prognosticated in the following cases: 2.6 (2.0–3.4), if the child's age was 9-10 years, 3.7 (2.8–4.8), if the child was 12 years of age, 1.9 (1.6–2.3), if the child's teeth were not covered with sealants, and 2.2 (1.6–3.0), if the child was from a county other than Šiauliai.

Significantly higher odds ratios for the prevalence of filled teeth were seen in the following cases: 1.6(1.1–2.2), if the child brushed his/her teeth less frequently than 1-2 times per day, 1.3(1.0–1.5), if the child used a medium or hard-bristled toothbrush, 2.1(1.3–3.3), if the child smoked, 1.2(1.0–1.5), if the child did not use dental floss, and 2.0(1.4–2.9), if the child was from a county other than Šiauliai.

The analysis of the epidemiological study data revealed how many children had a high oral hygiene index, i.e. OHI-S ≥ 2 . The distribution according to age groups was the following: OHI-S ≥ 2 was found in 8.0% of 7–8 year-old children, in 15.2% of children aged 9–10 years, and in 14.9% of 12 year-olds. A significant difference was observed between the age group of 7–8 years, and the age groups of 9–10 and 12 years ($\chi^2=22.6$, $df=2$, $p=0.001$). Concerning the relationship between DMF-T and OHI-S, the study showed that the DMF-T index was higher in the presence of poorer oral hygiene.

The study showed that if the OHI-S index was < 2 , 43.0% of the studied children had decayed teeth, and if OHI-S was ≥ 2 , decayed teeth were found in 58.6% of the studied children.

The analysis in all age groups of children (7–12 years of age) showed that if OHI-S was ≥ 2 , the odds ratio for the presence of decayed teeth was higher by 1.9-fold (1.5–2.4) ($p<0.001$).

If OHI-S was ≥ 2 , and the child was 7–8 years of age, the odds ratio for the presence of decayed teeth was higher by 1.6-fold (0.9–2.9) ($p>0.05$). If the child was 9-10 of age, and his/her OHI-S was ≥ 2 , the odds ratio for the presence of decayed teeth was higher by 1.5-fold (1.0–2.2) ($p=0.05$). If the child's age was 12 years, and his/her OHI-S was ≥ 2 , the odds ratio for the presence of decayed teeth was higher by 1.9-fold (1.2–3.1) ($p<0.01$).

2.6. The parents' attitude to their and their children's oral health

The study included 1,248 parents from the major cities of Lithuania: 20.8% (n=259) – from Vilnius, 21.5% (n=268) – from Kaunas, 19.7% (n=246) – from Klaipėda, 18.9% (n=236) – from Šiauliai, and 19.2% (n=239) – from Panevėžys. The respondents' mean age was 37.2(6.4) years. The respondent's distribution by the education level showed that the majority of the parents had higher university-level education (36.2%); 25.8% of the respondents had higher non-university education, 14.3% of the respondents were vocational school graduates, 20.3% of the respondents had secondary education level, and 3.5% – had not completed secondary education.

The responses to the question of whether the income per capita was sufficient allowed for the distribution of the respondents into two groups: group I – sufficient or totally sufficient income (45.3%), and group II – insufficient or totally insufficient income (54.7%).

With respect to the education level, the respondents were distributed into two groups as well: group I – further or higher education (62.0%), and group II – unfinished secondary, secondary, vocational, or other education (38.0%).

Respondents from Kaunas city evaluated their children's health quite well – 2.03(0.62), and the respondents' evaluation of their own health were quite good in Kaunas and Šiauliai – respectively, 2.36(0.63) and 2.36(0.65). The parents' inquiry about their children's dental status showed that the evaluation was sufficiently good – 2.34(0.8), and no significant differences in the answers between different cities were found. The study showed that in all cities that were included in the inquiry, the parents presented better evaluations of their own oral status, compared to that of their children – 2.63(0.82). The analysis of the obtained findings showed that the parents took better care of their own oral health (although only slightly so) – 2.15(0.61) than they did of their children's (1.53(0.51)).

The mean number of children's visits to an oral health specialist (an odontologist and/or an oral hygienist) for the previous year (12 months) was 2.5(2.3) (min – 0, max – 35, median – 2), while 6.9% (n=86) of the subjects did not visit their oral health specialist during the aforementioned period.

Fig. 2.6.1 shows that throughout the previous year (12 months), school-children in Vilnius (39.4%) statistically significantly more frequently ($p<0.05$) visited their oral health specialists (odontologists and/or an oral hygienists) for preventive check-ups or for oral hygiene training, compared

to schoolchildren from Panevėžys (28.5%). A statistically significantly ($p<0.05$) lower percentage of children from Šiauliai (52.1%) visited their oral specialists for dental treatment, compared to the respective percentage in Vilnius (62.5%) or Kaunas (63.4%). Conversely, compared to children from other cities, the children from Šiauliai statistically significantly ($p<0.05$) more frequently (41.5%) visited their oral health specialists for the application of sealants on dental grooves. Children from Šiauliai statistically significantly ($p<0.05$) more frequently visited their oral health specialists for other reasons than children from Kaunas (9.3%) or Klaipėda (8.5%) did.

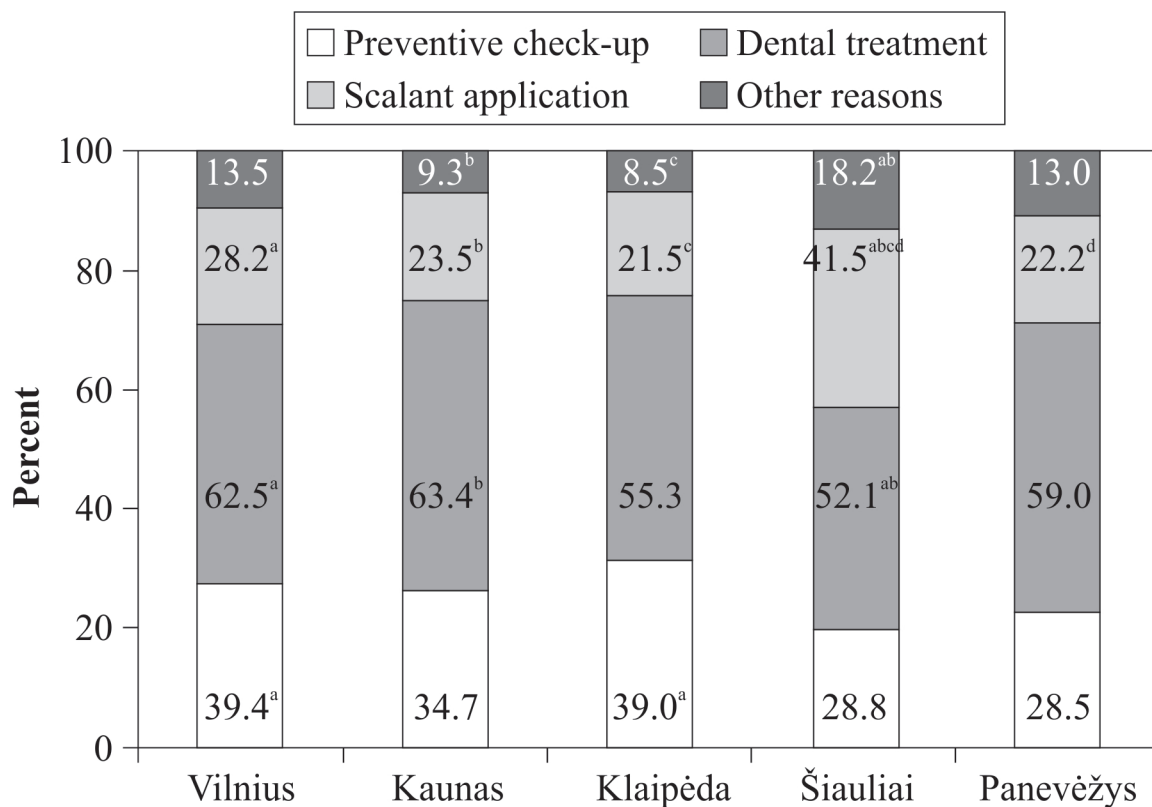


Fig. 2.6.1. Reasons for and frequency of visits to an oral health specialist among 7–12 year-old children

(preventive check-up – $\chi^2=12.2$, $df=4$, $p<0.016$, ^apreventive check-up $p<0.05$, comparing Panevėžys with Vilnius, dental treatment – $\chi^2=9.4$, $df=4$, $p<0.05$, ^{ab}dental treatment $p<0.05$, comparing Šiauliai with Vilnius and Kaunas, sealant application – $\chi^2=33.4$, $df=4$, $p<0.001$, ^{abcd}sealant application $p<0.05$, comparing Šiauliai with Vilnius, Kaunas, Klaipėda, and Panevėžys, other reasons – $\chi^2=13.4$, $df=4$, $p<0.05$, ^{ab}other reasons $p<0.05$, comparing Šiauliai with Kaunas and Klaipėda)

Children from Vilnius city significantly more frequently ($p<0.05$) visited oral health specialists in private clinics (70.7%), compared to children from other cities included into the study.

The analysis of the parents' questionnaire survey showed that 98.5% of the children used fluoridated toothpaste; 21.8% of the respondents indicated that children used dental floss, 27.3% - that their children used toothpicks, and 23.0% of the respondents indicated that their children used sugar-free chewing gum. Significant differences were found only in the number of children who used dental floss. Children from Vilnius used dental floss more frequently (29.7%), and the difference was statistically significant with respect to all cities except for Kaunas.

The percentage of the respondents who replaced their toothbrushes less frequently than once a year was the highest in Šiauliai city (5.9%), and it was only with respect to Panevėžys that the difference was not statistically significant. In addition to that, significantly more ($p < 0.01$) children from this city replaced their toothbrushes every year (20.3%). Significantly more ($p < 0.01$) children from Kaunas (30.6%), compared to those from Panevėžys (20.5%), replaced their toothbrushes twice a year. The percentage of children who replaced their toothbrushes three times per year was significantly ($p < 0.05$) higher in Kaunas (35.1%) than in Šiauliai (25.0%), while the percentage of those who replaced four times a year – significantly ($p < 0.01$) higher in Vilnius (34.4%) and Panevėžys (34.7%) than in Šiauliai (22.9%).

The questionnaire survey showed that 72.5% of the schoolchildren's parents knew about the ongoing program for the prevention of tooth decay in molars - the Children's Dental Sealant Program. The highest percentage of the respondents who knew about this program was found in Klaipėda (78.0%) and Panevėžys (76.6%) – the frequency of their positive responses significantly differed from that in Šiauliai (66.9%) city. The respondents indicated that 61.1% of the children participated in this program, and the difference was not statistically significant in different cities.

Most commonly, the respondents learned about the program from healthcare workers (44.0%). Significantly more ($p < 0.01$) children who learned about this program from TV, the radio, the press, etc. were found in Panevėžys (18.4%), compared to Kaunas (6.3%). Healthcare specialists least frequently informed the respondents about this program in Klaipėda (38.6%), and this percentage differed significantly from that in Kaunas (45.1%) and Panevėžys (45.4%). Significantly ($p < 0.01$) more children who indicated that they learned about this program in school were found in Šiauliai (21.2%) than in Vilnius (5.4%) or Panevėžys (6.7%). The respondents from Vilnius significantly ($p < 0.01$) more frequently (13.1%), compared to the respondents from Kaunas (3.4%) or Klaipėda (6.1%),

indicated that their friends recommended this program to them. The respondents from Šiauliai city most frequently (5.9%) indicated that they were invited to participate, and it was only with respect to Klaipėda that the difference was not statistically significant.

81.9% of the respondents indicated that it was important to cover the molars with sealants in order to preserve their children's healthy teeth. Compared to other cities, significantly ($p < 0.05$) fewer respondents from Šiauliai (31.8%) thought that this was important.

2.7. A questionnaire survey of oral health specialists

A questionnaire survey was conducted in order to clarify oral health specialists' opinion about the ongoing oral health program.

With respect to the place of residence, the respondents were distributed into two groups: those living in large cities (Vilnius, Kaunas, Klaipėda, Šiauliai, and Panevėžys), and those living in other cities (Alytus, Marijampolė, Utena, Tauragė, and Telšiai).

The questionnaire survey showed that 91.6% of the oral health specialists knew about the ongoing Children's Dental Sealant Program, and 62.2% of them participated in it. 68.6% of the respondents positively evaluated this program. 75.0% of the oral health specialists with < 10 years of working experience showed interest and participated in the preventive program, compared to 91.8% of the specialists whose work experience was > 10 years ($p < 0.001$). Specialists working in primary healthcare centers more actively showed interest in this program (96.6%), compared to those working in private odontology clinics (76.9%, $p < 0.001$).

The study also aimed at clarifying how the specialists participated in the program. 56.9% of the specialists with < 10 years of working experience participated in the program, while those with greater experience participated more actively (67.2%). 91.4% of the specialists working in primary healthcare centers participated in the program, compared to those working in private odontology units (46.9%, $p < 0.001$).

In order to optimize the realization of the program, the respondents were asked about possibilities for its improvement. 44.5% of the respondents thought that the program would be more successful if children could participate in it in schools, if more resources were allocated for the program (32.4%), and if additional specialists would participate (24.4%).

2.8. Prognostic evaluation of the economic benefit of sealants

High prices for services and odontological materials are a highly relevant recent issue in odontology. For this reason, it is very important to calculate the economic benefit of preventive measures applied for the protection of hard dental tissues against damage.

So far, no analysis of the possible economic effect of sealant application has been conducted in Lithuania. In order to evaluate the cost-effectiveness, expenditures and expected benefits should be compared in 2 patient groups (in the group where preventive measures were applied, and in the control group). In the first group, the expenditures would be the costs of the application of preventive measures, while in the control group these expenditures would equal to 0.

The price of one of the tooth decay prevention techniques – sealant application on dental grooves – in our country may vary to a significant extent. In private clinics, the price may reach 40-50 Lt. On the basis of the decree of the Ministry of Health dated May 9, 2008 (amendment No. V-444), it has been calculated that the cost of sealant application on one tooth was 19.9 Lt; thus we set this sum as the mean cost of sealant application on the occlusal surfaces of one molar.

The benefit was evaluated with respect to the extent of tooth decay, the respective treatment needs, and treatment expenditures.

The clarification of a possible benefit requires knowledge concerning how long the sealants last and what the probability of the development of secondary caries is. Since our survey was anonymous, a follow-up dental examination in the studied children could not be conducted because there was no possibility to compare the same children's oral condition after a year or two. For this reason, we tried to prognosticate the economic benefit on the basis of literature data. We used a study performed in Poland (Jodkowska E (2008)) and compared its findings with those of our study; we prognosticated that with similar conditions (the same climate zone, similar nutrition habits, oral status, etc.), the sealant durability in both countries should also be similar.

On the basis of this researchers' study, we tried to prognosticate the probability of the development of tooth decay according to our epidemiological study. Our study showed that 7–8 year-old children had 747 sealant-covered molars. Using the findings obtained by E. Jodkowska (2008), we calculated the number of teeth that become affected by tooth decay in the presence of fully intact sealants. This is evaluated during

follow-up examinations conducted after 5, 10, and 15 years, compared to the control group where the occlusal surfaces of molars were not covered with sealants. After 5 years, 8 teeth would be decayed even though the sealant would remain fully intact; after 10 years, the number of such teeth would be 16, and after 15 years – 23. In the control group, the number of decayed teeth after 5 years would be 254, after 10 years – 422, and after 15 years – 508 decayed molars.

Thus, the prognostication showed a significantly higher number of decayed teeth in the control group where tooth decay prevention measures were not applied, which would result in greater treatment needs in this group.

The cost of treatment may range between 52 and 125.04 Lt, depending on the severity of the damage. Based on price variation, we selected the mean price, and calculated mean expenditures for tooth decay treatment – 80 Lt.

The cost of sealant application on 747 teeth would constitute 14,865.30 Lt. The comparison between the two groups showed significant differences in finances allocated for the treatment of tooth decay.

On the basis of the conducted calculations, one could prognosticate that if sealants are applied on the grooves of molars, 90,960 Lt can be saved in the future. It can be prognosticated that if a child would have, on the average, four decayed teeth, 284 children would need no dental treatment. The positive effect would be even greater because apart from direct financial expenses for the manipulation, the time spent for the treatment procedure by the specialist and the client, the child's anxiety, possible pain, and discomfort should also be financially evaluated.

Considering the fact that the expenditures for prevention are sustained at present, while the economy will become apparent after several years, the net present value of the whole monetary stream should be evaluated. This value (discount - 5%) is positive and amounts to 63,671.21 Lt. Thus, it can be stated that the application of sealants on dental grooves is economically efficient because it reduces the number of teeth that would have to be treated in the future, and the reduced dental treatment expenses should be seen as the benefit of prevention. The sum saved due to avoided treatment (even at its current value) significantly exceeds the costs of preventive measures. For this reason, it can be stated that sealant application for the prevention of tooth decay in children not only reduces the risk of the emergence of new cases of tooth decay, but also is useful economically.

CONCLUSIONS

1. The prevalence of tooth decay in permanent teeth of 7–12 year-old children from 10 county centers of Lithuania reached 44.8%. The lowest tooth decay indices were observed in Šiauliai, and the highest – in Kaunas. The DMF-T index in the children of this age reached 1.08(1.64). The DMF-T index was significantly higher in 7–12 year-old girls (1.16(1.69)) than in boys (1.0(1.59)). The prevalence and the intensity of tooth decay significantly increased with age.
2. The prevalence of tooth decay in permanent molars of 7–12 year-old children from 10 county centers of Lithuania reached 42.8%. The prevalence among boys was 40.2%, and among girls – 45.5%. The mean tooth decay score reached 0.94(1.3): 0.84(1.26) – among boys, and 0.99(1.38) – among girls. The study showed that the permanent first lower molars were most susceptible to tooth decay. Tooth decay in molars was more prevalent among girls than among boys.
3. 42.9% of the occlusal surface grooves in the permanent molars of 7–12 year-old children from 10 county centers of Lithuania were covered with sealants. The mean percentage of sealant-protected molars in 7–12 year-old girls was significantly higher than that in boys. The prevalence of tooth decay was statistically significantly lower in children who had their molars covered with sealants, compared to those whose molars remained unprotected. Covering the grooves of the molars with sealants not only prevents the development of tooth decay and eliminates the need for treatment, but is also economically beneficial.
4. 55.0% of 7–12 year-old children brushed their teeth more frequently than once daily, 37.0% of the children brushed their teeth once daily, and 8.0% of the children brushed their teeth less frequently than once daily or did not brush their teeth at all. The evaluation of the oral hygiene status in 7–12 year-old children from 10 county centers of Lithuania showed that their oral hygiene status was satisfactory. In girls, the OHI-S (0.93(0.59) points) was significantly lower than that in boys (1.07(0.64) points). The analysis of the association between OHI-S and DMF-T showed that the higher the OHI-S value, the more common was tooth decay.
5. The parents quite positively evaluated their own and their children's dental condition. On the average, children visited oral health specialists

2.5(2.3) times within the previous year, and dental treatment was the most common reason for the visits. 72.5% of the schoolchildren's parents knew about the ongoing program for the prevention of tooth decay in molars – the Children's Dental Sealant Program, yet only 61.1% of the children participated in this program. Parents with higher or further education levels and those with sufficient income showed a greater interest in the program.

6. The questionnaire survey of oral health specialists showed that 91.6% of them knew about the Children's Dental Sealant Program, and 62.2% of the respondents participated in it. 68.6% of the respondents gave positive evaluations of this program. A more active participation in the program was observed among specialists whose working experience exceeded 10 years (91.8%), and among those working in primary healthcare centers (96.6%).

LIST OF THE AUTHORS PUBLIKATIONS

1. Saldūnaitė K, Pūrienė A, Milčiuvienė S, Brukienė V, Kutkauskienė J. 7–12 metų Lietuvos moksleivių krūminių dantų ėduonies profilaktikos programos analizė. Medicina (Kaunas) 2009; 45(11).
2. Saldūnaitė K, Tamošiūnas A, Milčiuvienė S. Moksleivių nuolatinių dantų krūminių paviršių pažeidžiamumas ėduonimi ir jų išsaugojimo galimybės. Lietuvos bendrosios praktikos gydytojas. 2010; XIV(9): 624-630.

SUMMARY IN LITHUANIAN

Sveikų dantų išsaugojimas – viena svarbiausių vaikų sveikatos problemų. Pasaulio sveikatos organizacija (PSO) nagrinėja įvairių rizikos veiksnių poveikį sveikatai, didelį dėmesį skiria burnos sveikatos būklei, jos funkcijos pablogėjimui, nes šie veiksniai gali lemti blogesnę gyvenimo kokybę bei bendrą organizmo sveikatą.

Mokslininkai pastebi, kad istoriškai burnos ligos buvo analizuojamos atskirai nuo kitų ligų. Pastaraisiais metais stengiamasi nagrinėti burnos ligas neatskiriant nuo bendros organizmo sveikatos, nes burna svarbi daugeliui funkcijų: kalbai, mitybai, socialiniams ryšiams, žmogaus estetinei išvaizdai. Bloga burnos sveikata prastina gyvenimo kokybę. Dantų skausmas turi įtakos mitybai, augimui, socializacijai. Daugelio sveikatos problemų, su kuriomis susiduriama vėlesniais amžiaus tarpsniais ir kurios sukelia daug skausmo žmogui bei ekonominių nuostolių valstybei, priežastys glūdi vaikystėje ir jaunystėje.

Dantų ėduonis yra viena iš pagrindinių vaikų ir paauglių burnos ligų. Dantų ėduonis sukelia komplikacijas, kurioms reikia daug lėšų ir laiko. Daugybė tyrimų, atliktų įvairiose pasaulio šalyse rodo, kad profilaktikos priemonės žymiai sumažina dantų ėduonies išsivystymą.

Vaikų dantų ėduonies atsiradimas priklauso nuo daugelio veiksnių: burnos higienos būklės, fluoro kiekio geriamame vandenyje, mitybos pasirinkimo pobūdžio, genetikos.

Dantų ėduonies sukeltas skausmas, diskomfortas, brangus gydymas yra bene pagrindiniai veiksniai, sukeliantys vaikams stresą ir nemalonius pojūčius.

Nors pasaulyje, ypač Skandinavijos šalyse, stebimos dantų ėduonies mažėjimo tendencijos, bet ši liga yra vis dar plačiai paplitusi. Labiausiai mažėja dantų ėduonies lygiuosiuose paviršiuose, o kramtomuosiuose paviršiuose – yra tendencija didėti. Manoma, jog tai gali būti todėl, kad lygiuosius dantų paviršius galima efektyviau apsaugoti fluoridais, o į kramtomuosius paviršius dėl gilių duobelių ir vagelių fluoras prasiskverbia mažiau, be to, tai įgalina gerą apnašo retenciją.

Analizuojant dantų ėduonies paplitimą Lietuvoje nustatyta, kad 7–8 m. amžiaus vaikų nuolatinių dantų ėduonies paplitimas sudaro nuo 33,7 proc. iki 38,2 proc., krūminių dantų ėduonies pažeidimai sudaro 23,4 proc. – 69,4 proc. viso dantų ėduonies paplitimo nuolatiniuose dantyse. Atlikti epidemiologiniai tyrimai parodė, kad skirtingose Lietuvos vietovėse dešimties metų laikotarpiu dvylikamečių vaikų dantų ėduonis paplitimas svyruoja nuo 59,4 proc. iki 92,5 proc. Tai tikrai aukštas rodiklis, todėl

būtina detaliai išanalizuoti epidemiologinę situaciją ir kuo plačiau bei aktyviau taikyti dantų ėduonies profilaktikos priemonės. Įvairiose šalyse atliktos epidemiologinės studijos parodė, kad sėkmingai kontroliuoti dantų ėduonį galima gerinant burnos higienos būklę, o siekiant išsaugoti sveikus kramtomuosius paviršius tikslinga naudoti silantus. Be to didelį vaidmenį išsaugant sveikus vaikų dantis vaidina šeima – tėvų požiūris į burnos higienos svarbą. Tai ji sukuria sveikai gyvensenai būtiną aplinką, didina pasitikėjimą savimi, padeda formuoti įpročius.

Siekiant išvengti krūminių dantų kramtomųjų paviršių ėduonies, kartu su kitomis profilaktikos priemonėmis bei burnos sveikatos programomis gali būti naudojami silantai.

Lietuvoje nuo 1982 m. buvo vykdyta burnos ligų profilaktikos programa. Tačiau ji buvo taikoma epizodiškai. Nuo 2004 m. pradėta taikyti ir šiuo metu vyksta „Krūminių dantų padengimo silantinėmis medžiagomis“ programa. Tačiau ši profilaktikos programa pradėta vykdyti be realios epidemiologinės situacijos analizės. Taip pat iki šiol nebuvo įvertintas tėvų ir burnos priežiūros specialistų požiūris į profilaktikos priemones. Nebuvo įvertinta silantų naudojimo apimtis, nebuvo tiksliai suformuotas kontingentas, numatyta programos ekonominė nauda, todėl mūsų moksliniame darbe ir bandyta išsiaiškinti šias svarbias problemas, padėsiančias nustatyti silantų profilaktikos programos efektyvumą.

Svarbu skatinti visuomenės švietimą apie odontologinę sveikatą – jis padėtų vaikams ir jų tėvams suprasti burnos sveikatos svarbą.

Darbo tikslas:

Ištirti dešimties Lietuvos apskričių centrų 7–12 m. amžiaus moksleivių burnos būklę, dantų ėduonies paplitimą, rizikos veiksnius bei profilaktikos galimybes.

Tiksliui pasiekti išsikelti tokie uždaviniai:

1. Įvertinti dešimties Lietuvos apskričių centrų 7–12 m. amžiaus moksleivių dantų ėduonies paplitimą ir intensyvumą.
2. Įvertinti dešimties Lietuvos apskričių centrų 7–12 m. amžiaus moksleivių krūminių dantų kramtomųjų paviršių pažeidimą ėduonimi.
3. Nustatyti moksleivių dantų kramtomųjų paviršių padengimą silantais, įvertinti jų profilaktinį poveikį ėduonies išsivystymui bei atlikti silantų ekonominės naudos prognostinį vertinimą.
4. Įvertinti moksleivių burnos higienos būklę bei burnos higienos įgūdžius.
5. Išsiaiškinti moksleivių tėvų ir burnos priežiūros specialistų požiūrį į burnos sveikatos programą.

Išvados:

1. Lietuvos dešimties apskričių centrų 7–12 m. vaikų dantų ėduonies paplitimas nuolatinuose dantyse siekia 44,8 proc. Žemiausi dantų ėduonies rodikliai stebimi Šiauliuose, o aukščiausi Kaune. Šio amžiaus vaikų KPI-D siekia 1,08 (1,64). 7–12 m. mergaičių (1,16(1,69)) KPI-D yra reikšmingai didesnis nei berniukų (1,0(1,59)). Dantų ėduonies paplitimas ir intensyvumo rodiklis reikšmingai didėja su amžiumi.
2. Dešimtyje Lietuvos apskričių centrų 7–12 m. amžiaus vaikų nuolatinių krūminių dantų ėduonis paplitęs 42,8 proc.: berniukų – 40,2 proc., mergaičių – 45,5 proc. Ėduonies pažeidimų vidurkis siekia 0,94(1,3): berniukų – 0,84(1,26), mergaičių – 0,99(1,38). Tyrimas parodė, kad labiausiai pažeidžiami nuolatiniai pirmi apatiniai krūminiai dantys. Mergaičių krūminių dantų pažeidimai dažnesni nei berniukų.
3. Nuolatinių krūminių dantų kramtomųjų paviršių vagelės buvo padengtos silantais 42,9 proc. dešimties Lietuvos apskričių centrų 7-12 metų vaikams: mergaičių nuolatinių krūminių dantų padengtų silantais, vidurkis reikšmingai didesnis nei berniukų. Ėduonis statistiškai reikšmingai mažiau paplitęs tarp tų vaikų, kurių dantys padengti silantais, negu tarp tų, kurių šie dantys nepadengti silantais. Krūminių dantų vagelių padengimas silantais ne tik apsaugo nuo ėduonies atsiradimo ir gydymo, bet yra ir ekonomiškai naudingas.
4. Dažniau negu kartą per dieną dantis valo 55,0 proc. 7–12 m. amžiaus vaikų, 37,0 proc. dantis valo vieną kartą dienoje, 8,0 proc. valo dantis ne kiekvieną dieną arba visai nevalo. Įvertinus dešimties Lietuvos apskričių centrų 7–12 m. vaikų burnos higieną, galima teigti, kad ji patenkinama. Mergaičių OHI-S (0,93(0,59) balai) buvo reikšmingai mažesnis nei berniukų (1,07(0,64) balai). OHI-S ir KPI-D tarpusavio ryšio analizė parodė, kad kuo didesnis OHI-S, tuo dažnesnis ėduonimi.
5. Tėvai, savo ir vaiko dantų būklę vertina pakankamai gerai. Vidutiniškai pas burnos priežiūros specialistą vaikas lankosi vidutiniškai 2,5(2,3) karto per paskutinius metus – dažniausiai dėl dantų gydymo. 72,5 proc. moksleivių tėvų žino apie vykdomą „Krūminių dantų dengimo silantinėmis medžiagomis“ dantų ėduonies profilaktikos programą, tačiau joje dalyvauja tik 61,1 proc. vaikų. Labiau domisi šia programa tėvai, turintys aukštąjį ar aukštesnįjį išsilavinimą bei pakankamas pajamas.

6. Anketinė burnos priežiūros specialistų apklausa parodė, kad 91,6 proc. respondentų žino apie vykdomą dantų ėduonies profilaktikos programą, o joje dalyvauja 62,2 proc. 68,6 proc. apklausos dalyvių šią programą vertina teigiamai. Aktyviau programoje dalyvauja tie specialistai, kurių darbo stažas didesnis nei 10 m. (91,8 proc.) ir tie, kurie dirba pirminiame sveikatos priežiūros centre (96,6 proc.).

AUTHOR (CV)

Name, Surname **Kristina Saldūnaite**

Adress: Lithuanian University of Health Sciences, Medical Academy, Clinic of Oral Health and Pediatric Dentistry
J. Lukšos–Daumanto str. 6, LT- 50106 Kaunas, Lithuania.

E-mail: ksaldunaite@yahoo.com

Education:

1991-1995 Kaunas Academy of Medicine, Faculty of Nursing (Kaunas, Lithuania), BH

1999-2001 Educology, Kaunas University of Technology, Faculty of Social Sciences (Kaunas, Lithuania), MD

2007-2011 PhD studines, at the Medical Academy of Lithuanian University of Health Sciences.
(Kaunas, Lithuania)

Current Position:

from 1995 Assitant, Oral hygienist, Clinic of Oral Health and Pediatric Dentistry at the Lithuanian University of Health Sciences Medical academy
(Kaunas, Lithuania)

Position in Professional societies:

Member of the Lithuanian Dental Chamber
Member of the Lithuanian Society of Oral Hygienist