

## AGE FEATURES OF DECIDUOUS TEETH CARIES PARAMETERS IN 3-6 YEARS OLD AGED CHILDREN

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**Liudmyla F. Kaskova, Marina O. Sadovski**

POLTAVA STATE MEDICAL UNIVERSITY, POLTAVA, UKRAINE

### ABSTRACT

**The aim:** Estimation of caries prevalence and intensity, determination for treatment necessity of deciduous teeth in 3-6 years old aged children from Poltava region for further effective development of programs for caries and its complications prevention.

**Materials and methods:** Totally 335 children from 3 to 6 years old of preschool institutions of Poltava and Poltava region aged were examined with the signed accordance of their parents. All children were examined for the prevalence (%) and intensity of caries of deciduous teeth by the Decay Extracted Filling index (DEF index). Quantitative parameters were processed by standard statistic methods. The calculation of the highest caries intensity (Significant Index of Caries) was performed according to the D. Bratthol's method. The level of dental aid (LDA) was assessed by the DEF index according to P.A. Leus recommendations. Treatment necessity of children was also determined.

**Results:** The research in caries prevalence of deciduous teeth revealed that the number of children with caries increases with their age. The most significant parameter growth is observed at the age of 4 to 5 years. Carious lesions intensity increases at the age from 4 to 5 and from 5 to 6 years most significantly.

**Conclusions:** The most common indicator in all studied groups was a D-parameter, which indicates low parents awareness about deciduous teeth treatment necessity. This case confirms low level of dental aid (14%) and significant treatment need which is 50.7%. Affection of molars always exceeds the affection of other groups of teeth. We did not find a significant difference in caries distribution among children of different genders. The obtained results encourage realization of sanitary and educational propagation on the awareness of parents on dental healthcare of their children.

**KEY WORDS:** children, deciduous teeth, caries, prevalence, intensity

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### INTRODUCTION

Despite the numerous achievements in dentistry dental caries remains one of the prior problems in children. This statement is proved by epidemiological studies held in different regions of Ukraine in different time periods, which indicate a significant prevalence of this dental disease. The above-mentioned investigations indicate a significant impact of environmental features of the region on dental morbidity. The prevalence of caries in different age groups varies from 62% to 96.5% along with the intensity of carious lesions from 3.2 to 7.2 teeth [1-6]. Significantly higher rates of dental caries are found in rural children in comparison to children living in cities [7,8].

Particular disturbance is arisen by the high incidence of early dental caries in children, which has 62% spread among children under 2 years old, and 70.3% spread in 3 years old children. This issue induces epidemiological studies performance in order to determine priority areas for deciduous teeth caries prevention in preschool children [9,10]. Receiving of up-to-date data on the prevalence and intensity of major dental diseases of different age groups provides dental scientists with a possibility to objectively assess the necessity in developing and implementation of effective prevention programs and measures. Effective prevention programs and early treatment allow to improve the

quality of children dental health and their general somatic health quality respectively [10,11].

### THE AIM

Estimation of caries prevalence and intensity, determination for treatment necessity of deciduous teeth in 3-6 years old aged children from Poltava region for further effective development of programs for caries and its complications prevention.

### MATERIALS AND METHODS

Totally 335 children from 3 to 6 years old of preschool institutions of Poltava and Poltava region aged were examined with the signed accordance of their parents.

Examinations were held in medical cabinets of preschool institutions of Poltava and its region in compliance with the rules of humane treatment of patients in accordance with the Tokyo Declaration of the World Medical Association, international recommendations of the Declaration of Human Rights of Helsinki, the Council of Europe Convention on Human Rights and Biomedicine and Scientists Code of Ethics.

All children were examined for the prevalence (%) and intensity of caries of deciduous teeth by the DEF-index, according to which "D" is for decayed, "E" is for extracted due to caries

**Table I.** Prevalence and intensity deciduous teeth caries in children of 3 to 6 years old (M±m)

Age (years old)	Quantity of children	Caries prevalence		Caries intensity (DEF index)
		absolute	%	
3	53	18	34,0±6,57	1,3±0,36
4	86	31	36,0±5,20	1,5±0,31
	p <sup>3-4</sup>		>0,05 t=0,25	>0,05 t=0,41
5	101	64	63,4±4,82	2,0±0,32
	p <sup>3-5</sup>		<0,01 t=3,61	<0,01 t=2,61
	p <sup>4-5</sup>		<0,01 t=3,85	<0,01 t=2,40
6	95	66	69,5±4,75	3,1±0,44
	p <sup>3-6</sup>		<0,001 t=4,38	<0,001 t=3,52
	p <sup>4-6</sup>		<0,01 t=2,91	<0,01 t=2,68
	p <sup>5-6</sup>		>0,05 t=0,90	>0,05 t=1,37
Total	335	182	53,4±2,72	2,3±0,21

Note. P<sup>3-4</sup> ... - difference probability of parameters in children of different age.

**Table II.** Caries indices of deciduous teeth in children of 3 to 6 years old with gender consideration (M±m)

Age (years old)	Total	Gender, quantity	Caries indices		
			Prevalence		Caries intensity (DEF index)
			abs.	%	
3	53	girls 26	9	34,6±9,51	0,88±0,43
		boys 27	9	33,3±9,25	1,74±0,56
		p <sup>3 b-g</sup>		>0,05 t=0,10	>0,05 t=1,21
4	86	girls 39	10	25,6±7,08	1,05±0,40
		boys 47	21	44,7±7,33	1,89±0,44
		p <sup>4 b-g</sup>		>0,05 t=1,87	>0,05 t=1,40
5	101	girls 43	27	26,7±3,9	2,62±0,50
		boys 58	37	38,9±4,4	2,53 ±0,42
		p <sup>5 b-g</sup>		>0,05 t=0,14	>,05 t=0,14
6	95	girls 39	27	62,8±6,8	3,67 ± 0,91
		boys 56	39	67,2±6,0	3,09 ± 0,56
		p <sup>6 b-g</sup>		>0,05 t=0,49	>0,05 t=0,53
3-6	335	girls 147	73	49,7 ± 14,5	2,18 ± 0,30
		boys 188	106	56,4 ± 14,1	2,43 ± 0,24
		p <sup>3-6 b-g</sup>		>0,05 t=0,33	>0,05 t=0,64

Note. P<sup>3 b-g</sup> ... - difference probability of parameters in children of different gender in each age group.

complications, "F" is for filled deciduous teeth. Quantitative parameters were processed by standard statistic methods.

The calculation of the highest caries intensity (Significant Index of Caries) was performed according to M. Nishi and D. Bratthol's method [12], which supposed the estimation of individual DEF index for each child, followed by the definition of 1/3 of children with the highest values of caries intensity. Afterwards the calculation of the average DEF index of the selected subgroup was performed.

The level of dental aid (LDA) was assessed by the DEF index according to P.A. Leus recommendations using the following formula:

$$LDA = 100\% - 100 \times (D/DEF),$$

where D is the average number of untreated carious (decayed) lesions, including secondary caries, DEF is the average intensity of caries of deciduous teeth in the researched group [13].

LDA should be interpreted as the following: 0-9% - poor level; 10-49% - insufficient level; 50-74% - satisfactory level; 75-100% - good level.

Necessity of caries treatment of children is an indicator that determines the percentage of children who require dental care. This figure was calculated by the following formula:

**Table III.** Caries affection of different deciduous teeth groups of maxilla and mandible in children of 3 to 6 years

Age (years old)		Quantity of affected teeth, %					Total
		I	II	III	IV	V	
3	Maxilla	11,4±5,59	8,6±5,72	0	24,3±7,34	17,1±6,30	61,4±11,52
4		15,4±4,56	11,5±3,88	0,8±0,77	15,4±4,29	14,6±4,28	57,7±8,14
5		16,9±3,37	8,5±2,44	1,2±1,30	13,8±2,72	14,6±3,05	55,0±5,85
6		15,2±2,81	9,5±2,35	3,2±1,43	17,1±2,81	14,2±2,66	59,2±5,40
3-6		15,5±1,85	9,4±1,47	1,8±0,78	16,4±1,76	15,7±1,72	57,7±2,94
3	Mandible	0	0	0	22,9±6,80	15,7±6,32	38,6±8,70
4		0	0	0,8±0,77	20,0±4,95	21,5±5,33	42,3±6,96
5		0,8±1,27	0,8±1,27	0,8±1,14	23,1±3,65	19,6±3,39	45,0±5,12
6		2,2±1,35	1,3±1,01	1,6±1,22	20,3±3,21	15,5±2,71	40,8±4,50
3-6		1,2±0,61	0,8±5,43	1,0±7,07	21,4±2,07	17,9±1,88	42,3±2,65

**Table IV.** The value of the deciduous teeth caries intensity components in children of 3 to 6 years old

Age (years old)	Quantity of children	DEF index	The value of DEF index components					
			D		F		E	
			absolute	%	absolute	%	absolute	%
3	53	70	62	88,6±27,42	8	11,4±5,95	0	0
4	86	130	117	90,0±20,04	9	6,9±4,91	4	3,1±3,08
5	101	260	232	89,3±13,32	23	8,8±3,06	5	1,9±1,15
6	95	316	260	81,9±13,76	40	12,9±4,17	16	5,2±2,93
Total	335	776	671	86,3±8,27	80	10,4±2,21	25	3,3±1,35

Need of caries treatment =  $n / N \times 100\%$ ; "n" is the number of children who have intreated carious teeth, "N" is the number of examined children.

## RESULTS

The prevalence of deciduous teeth caries in children increases from the age of 3 to 6 years old (Table I). The largest growth in the number of children with carious lesions is observed within the age 4 to 5 years old (27.4%). Comparison of other age periods revealed a slight increasement in the prevalence of deciduous teeth caries: from the age 3 to 4 years - 2% and from the age 5 to 6 years - 1%.

Caries intensity increases of 3 to 6 years old in children and most significantly within period of 5 to 6 years old. The average rate of caries intensity in 6-year-old children was higher by 1,1 teeth compared to the 5-year-olds children. The increasement was less significant in other age periods (within 3 to 4 years old - by 0.2; within 4 to 5 years old - by 0.5 teeth). The intensity of deciduous teeth caries increases by 2.4 times in the age of 3 to 6 years old children ( $p < 0,001$ ).

The study of the deciduous teeth caries prevalence and intensity in 3 to 6 years old children did not reveal a significant difference between both genders (Table II). I.e the frequency of caries in girls and boys is even. However, the quantity of boys with caries is higher both in general at the age of 3-6 years old and in each age period as well as the caries intensity is slightly higher ( $p > 0,05$ ) than in girls.

At the age of 3 caries caries was found 1.6 times more often in maxillary teeth than in mandibular ones. We did not observe any case of affected incisors or canines on mandible and canines on maxilla (Table III). In 80% of cases deciduous molars were affected by caries in 3 years old children. At the age of 4 years old 71.5% of molars were carious, while in 5 years old the percentage was 70.7% and 66.2% in 6 years old children. Generally, deciduous molars are affected in 69.9% of cases at the age of 3-6 years. This group of teeth provides such functions of the masticatory apparatus as chewing, maintaining the height of the bite. Therefore, prevention and early treatment of deciduous molars at this age are very important for maintainance the integrity of the dentition and the possibility of adequate mastication.

The research in components of DEF index is considered to be important. Great attention is drawn by the significant quantity of carious teeth in all age groups and in children of 3 to 6 years old, in particular (Table IV). 86.3% of carious teeth stay unfilled while the percentage of treated and filled teeth makes 10.4% only. 3.3% of teeth are extracted due to caries complications.

The level of dental care among 335 children of 3 to 6 years old is 14% ( $LDA = 100\% - 100\% (3.7 / 4.3)$ ), which corresponds to an insufficient level. The treatment need of children makes 50.7% ( $170/335 \times 100\%$ ). The received results evidences that parents of children of the studied age do not pay sufficient attention to maintaining of dental health of their children.

The calculation of the highest caries intensity (Significant Index of Caries) of children with affected teeth was calculated. For 3 years old children this indicator of was  $3,8 \pm 0,76$ , while in 4-year-olds increased to  $4,4 \pm 0,62$ . In 5-year-olds the parameter grew to  $6,3 \pm 0,51$ . The highest SIC index was in 6-year-old children which made  $8, 2 \pm 0,75$ . The analysis of the obtained data revealed a statistically significant increase in the SIC index with the children age. The average highest rate of caries intensity in 3 to 6 years old children was determined at the level of  $5.8 \pm 0.35$ .

## DISCUSSION

The prevalence of caries of deciduous teeth in 3-6 years old aged children from Poltava region is  $53.4 \pm 2.72\%$ , the intensity is  $2.3 \pm 0.21$  teeth, which is lower than in other regions of Ukraine, where such studies were conducted. For example, in children of Precarpathian region the prevalence of caries of deciduous teeth in preschool children is  $90.95 \pm 2.66\%$ , the intensity of caries is  $3.52 \pm 0.43$  teeth [14], and in children of Transcarpathian region the prevalence of caries among children aged 5-6 years was  $98.0 \pm 2.2\%$  ( $98.1 \pm 2.1\%$  among boys and  $97.9 \pm 2.3\%$  among girls), and DEF index was  $14.9 \pm 1.9$  regardless of the sex of the subjects [15]. This requires a detailed study of risk factors for dental pathology in children of different regions of residence. We determined the treatment necessity of children, it is 50.7%, which is much better than in other areas [14,15]. We also found that temporary molars of children aged 3-6 years are affected in 69.9% of cases, and according to clinicians of Precarpathian region -  $51.29 \pm 2.47\%$  [15], in Transcarpathian region -  $89.5\%$  [14]. This group of teeth provides certain important functions of the dentition (chewing, maintaining the height of the bite). Therefore, prevention and early treatment of deciduous molars at this age are very important to maintain the integrity of the dentition. The results indicate the need for timely detection and treatment of dental caries in children, which should draw the attention of parents and emphasize their attention to strengthening measures to preserve the dental health of children.

## CONCLUSIONS

The study of deciduous teeth caries prevalence in children revealed that the number of children with caries increases with age. The most significant growths of the index is observed at the age of 4 to 5. The intensity of carious lesions increases at the age of 4 to 5 and 5 to 6 most significantly. In all investigated age groups the most common index was a "D" index, which indicates low parents awareness about deciduous teeth treatment necessity. Also, it confirms the low level of dental aid (14%) and a significant need for treatment, which is 50.7%. The affection of molars always exceeds the affection of other groups of teeth. We did not find a significant difference in teeth affection between children of different gender.

The obtained results encourage realization of sanitary and educational propagation on the awareness of parents on dental healthcare of their children.

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**ORCID and contributionship:**

Liudmyla F. Kaskova: 0000-0003-0855-2865 <sup>A,E,F</sup>

Marina O. Sadovski: 0000-0002-8233-8405 <sup>B,C,D</sup>

**Conflict of interest:**

*The Authors declare no conflict of interest.*

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**CORRESPONDING AUTHOR****Marina O. Sadovski**

Poltava State Medical University  
23 Shevchenko st., 36024 Poltava, Ukraine

tel: +380501954923

e-mail: mk.stom87@gmail.com

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