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Evaluation of dental treatment index of primary dentition in 1–7 year-olds patients treated in the Department of Paedodontics in Lublin in 2002–2004

Decay is the most widespread disease of the masticatory apparatus, which affects the teeth from the earliest years of life (5). It develops more dynamically in the deciduous teeth than in the permanent teeth due to their different morphology. Clinical picture of decay is much different from the real size of a decay focus, which explains why decay in primary teeth often goes unnoticed or ignored by the majority of parents (6). The awareness of the decay consequences in deciduous teeth is low.

Decay frequency in deciduous teeth was found to be a prognostic factor of early decay signs in permanent dentition (8). Dental decay is caused by microorganisms which move from one tooth to another. Left untreated decayed teeth provide a considerable bacterial source for the permanent teeth that begin to erupt when the child is 5–6 years old and cause their decay soon after they have erupted (10). In our society it is very uncommon to treat decayed deciduous teeth in children under 6 years, which is expressed by very low treatment indices determined for particular age groups.

The aim of the study was to evaluate hard dental tissues of deciduous teeth in 1–7 year old children seen at the Department of Peadodontics, Medical University of Lublin over the 3-year period 2002–2004.

MATERIAL AND METHODS

The study covered 1329 children with complete sets of deciduous teeth (672 boys and 657 girls). The subjects were selected from the group of patients who were seen for the first time at the Department of Peadodontics, Medical University of Lublin during 2002–2004. Clinical examination was performed by basic diagnostic instruments and on the basis of individual patients' records kept at the Department of Peadodontics, Medical University of Lublin. To evaluate hard dental tissues *def* index was used, its components *d*, *e*, and *f*, treatment index and index of decay frequency were calculated:

$$def = d \text{ (teeth affected by decay)} + e \text{ (teeth extracted)} + f \text{ (teeth filled)}$$

$$\text{treatment index} = \frac{f}{d+f}, \text{ it ranges between 0 and 1,}$$

0–0.5 means there was no treatment or the treatment was almost ineffective,
0.5–1 means high effectiveness of treatment.

$$\text{frequency of decay} = \frac{number\ \ of\ \ patients\ \ with\ \ def\ > 0}{number\ \ of\ \ patients\ \ exam\ ined} \text{ x } 100\%$$

The subjects were divided according to the criterion of age (into 6 groups), sex and the place of living; the results are presented in Table 1.

Table 1. Structure of the population examined

	Number of children in particular age groups						
	1–2	2–3	3–4	4–5	5–6	6–7	Total
Boys	62	120	164	163	116	48	673
Girls	55	161	147	139	115	39	656
Big city	79	171	190	192	148	57	837
Small town	13	38	47	39	37	10	184
Village	25	72	74	71	46	20	308

The study determined decay frequency for particular teeth types. The results were analysed statistically by χ^2 test for parametric and nonparametric dependence, Mann-Whitney's, Kruskal-Wallis' and rang-Spearman tests, $p<0.05$ was assumed statistically significant; statistical calculations were done by STATISTICA on IBM PC (9).

RESULTS

Treatment index for the deciduous teeth in the entire population examined was 0.023 ± 0.1 and increased with age from 0 in the youngest group to 0.049 in 6–7 year olds. Decay frequency was 92.47% in the group examined. Only 101 patients out of 1329 had *def* = 0 (7.6% population examined). Mean *def* in the entire group was 7.03 ± 4.7, *d* = 6.84 ± 4.7 constituted the biggest part of *def*. Table 2 presents the indices values in particular age groups.

Table 2. Indices values in age groups

Age groups	1–2	2–3	3–4	4–5	5–6	6–7	Total
Number of patients	117	281	311	302	231	87	1329
Treatment index	0	0.002	0.017	0.032	0.038	0.049	0.023
Decay frequency (%)	88.88	86.12	93.56	95.36	94.80	96.55	92.47
def	5.82	5.94	7.43	7.86	7.37	7.76	7.03
d	5.82	5.93	7.26	7,60	7.02	7.38	6.84
e	0	0	0.045	0.033	0.068	0.027	0.029
f	0	0.011	0.125	0.228	0.286	0.356	0.168
Number of patients with = 0	13	39	20	14	12	3	101

A child's age affects the values of the indices examined considerably. The results suggest *def*, decay frequency and treatment index increase with age, which is statistically significant ($p < 0.00005$). Figure 1 illustrates the correlation between *def* and age.

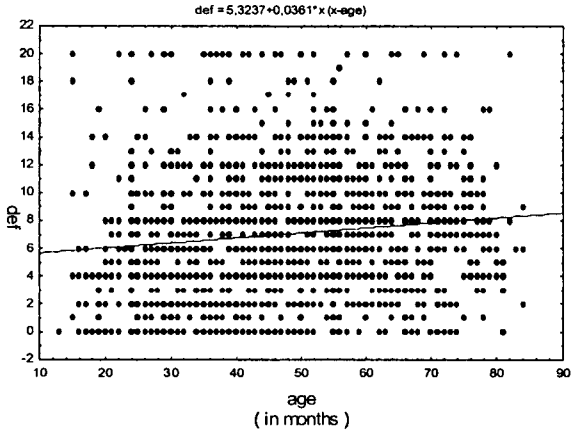

Fig. 1. Correlation between *def* and age

The study also found a statistically significant dependence between *def* and its component *d* and the child's sex. Higher *def* and *d* were observed in boys. Mann-Whitney's test found the differences were statistically significant ($p<0.05$). In the group of boys $d = 7.19 \pm 4.8$ and in the group of girls $d = 6.49 \pm 4.7$, $p = 0.0058$. In the group of boys $def = 7.38 \pm 4.8$ and in the girls $def = 6.68 \pm 4.7$, $p = 0.0058$. No statistically significant differences were found between the number of extracted teeth and sex ($p = 0.936$), number of fillings and sex ($p = 0.948$) and treatment index and sex ($p = 0.709$) (Mann-Whitney's test). The analysis of χ^2 test found no statistically significant differences between decay frequency and sex ($p = 0.092$). $def = 0$ was determined in 43 boys (6.39%) and 58 girls (8.84%). The results are presented in Table 3.

Table 3. Indices values in reference to age

Sex	number	*d*	*e*	*f*	*def*	Treatment index	Decay frequency
Boys	673	7.19±4.8	0.03±0.3	0.15±0.7	7.38±4.8	0.024±0.1	93.61
Girls	656	6.49±4.7	0.03±0.2	0.16±0.7	6.68±4.7	0.022±0.1	91.31
Total	1329	6.85±4.7	0.03±0.3	0.16±0.7	7.03±4.7	0.023±0.1	92.47

In addition to that the parameters were referred to the place of living. The highest *def* was observed in the group of children from small towns (8.15 ± 5.01) and the lowest in big cities (6.52 ± 4.6). Kruskal-Wallis test found statistically significant differences of *def* between the subjects from big cities and villages and small towns ($p = 0.000139$). *def* was not statistically significantly different between the subjects living in villages and small towns. The analysis of dependence between the place of living and treatment index found no statistically significant differences ($p = 0.1137$). The highest frequency of decay was observed among the subjects who live in small towns (96.2%) and villages (94.8%), the lowest among those from big cities (90.8%). The analysis by $\div^2$ test found statistically significant differences ($p = 0.013$). The number of patients with $def = 0$ was 77 (9.20%) in big cities, 17 (5.52%) in villages and 7 (3.80%) in small towns.

Table 4. Indices values in reference to the place of living

Place of living	n	Mean *def*	Treatment index	Decay frequency
Village	308	7.76±4.73	0.017±0.1	94.8
Small town	184	8.15±5.01	0.031±0.1	96.2
Big city	837	6.52±4.6	0.024±0.1	90.8

Besides, the study also determined the percentage of teeth both upper and lower with active decay foci. Figure 2 illustrates the percentage of decayed teeth.

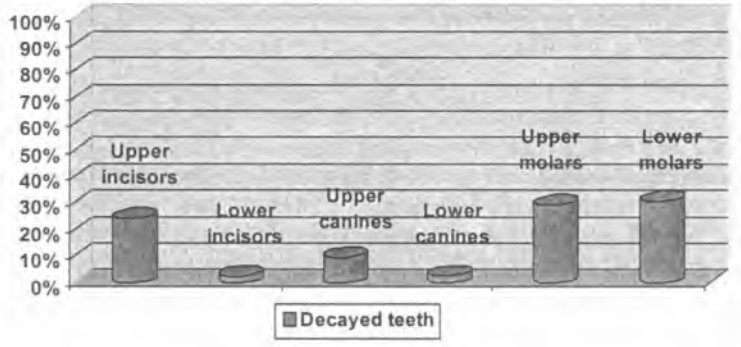

Fig. 2. Percentage of decayed teeth in particular teeth types

In the study group the number of decayed upper teeth was higher than the number of decayed lower teeth. Decay affected upper incisors and molars most often ($\div^2$ test found no statistically significant differences between the upper and lower molars). Upper incisors were less susceptible to decay than molars. The study found a statistically significant dependence ($p < 0.001$), the result of which is different from the evidence reported in the literature (13). Lower incisors and canines were attacked by decay least frequently. The data concerning decay in particular teeth types are presented in Table 5.

Table 5. Teeth types affected by decay

Teeth types	Upper incisors	Lower incisors	Upper canines	Lower canines	Upper molars	Lower molars
Number of patients	679	72	267	79	820	856
% teeth	24.5	2.6	9.6	2.8	29.6	30.9

DISCUSSION

In the literature there are only few reports on the treatment index investigated in the deciduous teeth. Treatment index determined in the population examined was extremely low. It increased gradually with age from 0 in the youngest group to 0.049 in the group of 6–7 year olds. In the population examined total treatment index was 0.023 (in the group of 4-year olds – 0.017). It was slightly higher in Łódź (in the group of 4-year olds – ca. 0.037) and the highest in Warsaw (in the group of 4-year olds

– ca. 0.087) (4, 11, 13). There was a noticeable growth of treatment index in the group of 4–7 year old children in comparison to the younger group (1–4 years old). In four year olds, who are mature enough, dental treatment is likely to be easier. The biggest size of 4–5 year old groups suggest that the parents decide to begin dental treatment at that age and that at that moment dental problems develop most often. (Groups of older children were less numerous, which was due to the fact that the children with mixed dentition were excluded from the study).

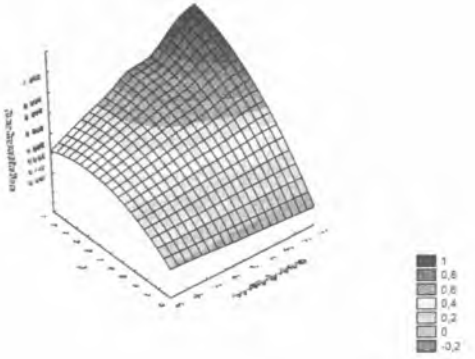

Fig. 3. Correlation between treatment index and age

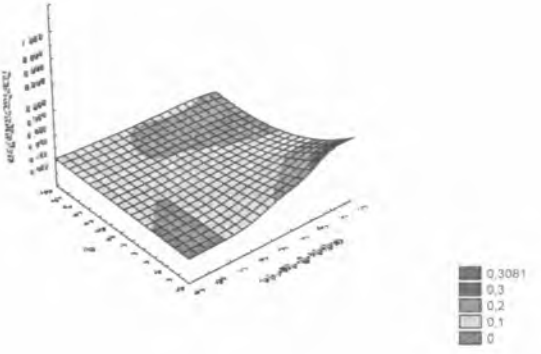

Fig. 4. Correlation between treatment index and decay and age

Treatment index was higher in the group of older children with fewer cavities. The group included children who come to the dentist for regular check-ups. Treatment index = 0 was found in the youngest group with average decay frequency and in the oldest group with high frequency of decay. In that case the first contact with the dentist was due to a toothache.

The research carried out in Scandinavia produced reports that emphasize the necessity of early visits to the dentist when the baby is about 12 months. Those visits provide adaptation and information for the baby and the carer as well as they reduce fear of the dentist, correct dietary errors and teach proper oral hygiene (12).

In the group provided dental treatment at the Department of Paedodontics the state of dental health is very bad. In Lublin Voyevodship the frequency of decay in deciduous teeth was very high, about 92% (2, 3). Similarly high values were obtained in Warsaw (87.55%), considerably lower in Poznań (66.98%) and Łódź (46.5%) (7, 11, 13).

As far as *def* is concerned the situation is analogous. Its value is dramatically influenced by high *d* component. It defines general needs for conservative treatment. *d* component usually increases with age. Reduction of *def* can be accomplished by preventive measures aimed at inhibiting the growth of *d*. *f* component is an index of treatment intervention. In the treatment index the comparison of *d* with *f* gives the evaluation of how effective conservative treatment of decay is, i.e. *d* is reduced with advantage on *f* (5). A low treatment index suggests that dental care of deciduous dentition is insufficient. Only 7.6% patients with healthy teeth come for check-ups. Probably little patients are brought for their first visit too late with visible symptoms of decay or a toothache. Few parents bring their children for routine check-ups, which is due to insufficient awareness of oral health. There is a need to create educational programmes for the parents (studies report on their effectiveness). (10, 14, 15) We can hope that the real *def* value is lower and the children without decay do not come to the Department of Peadodontics. To obtain data that define the stage of decay in deciduous teeth it is necessary to introduce screening examination programmes of the entire population.

CONCLUSIONS

1. The effectiveness of prevention and treatment of decay is very low in the group examined.
2. Treatment index in the deciduous teeth is very low.
3. Mean *def* value is high, *d* is its dominating component.
4. *def* is higher among boys than girls.
5. *def* is the lowest in big cities.
6. Small percentage of children with healthy teeth come for dental check-ups.
7. Decay most often attacks deciduous molars and maxillary incisors.
8. Prevention of decay in deciduous teeth is necessary and should attract attention of the dentists and parents.
9. Professional dental care at all stages of child's development (in nurseries and kindergartens) makes early dental intervention possible.

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SUMMARY

Decay of deciduous dentition is a serious problem in our region as the recent findings imply. The examination covered 1329 children with deciduous teeth seen at the Department of Paedodontics, Medical University of Lublin in 2002–2004. Treatment index determined in the group examined was very low, 0.023. The value of *def* increased from 5.82 in the group of 1–2 year olds to 7.76 among 6–7 years old children. The high level of decay in particular age groups suggests the need to create a program of intense prevention and dental care for the youngest patients.

Ocena wskaźnika leczenia zębów mlecznych u dzieci w wieku od 1 roku do 7 lat w analizie materiału Zakładu Stomatologii Wieku Rozwojowego w Lublinie w latach 2002–2004

Próchnica zębów mlecznych stanowi poważny problem w naszym regionie, na co wskazują wyniki ostatnich badań. Badaniem objęto 1329 dzieci z uzębieniem mlecznym, zgłaszających się do Zakładu Stomatologii Wieku Rozwojowego Akademii Medycznej w Lublinie w latach 2002–2004. Wskaźnik leczenia w badanej grupie był bardzo niski i wyniósł 0,03. Wraz z wiekiem zwiększała się liczba puw od 5,82 w grupie 1–2-latków do 7,73 w grupie 6–7-latków. Wysoki poziom próchnicy w poszczególnych grupach wiekowych sugeruje potrzebę stworzenia intensywnego programu profilaktyki i opieki stomatologicznej dla najmłodszych pacjentów.