

Determination of Oral Hygiene Status (OHIs) of Two Groups of Children and Comparison With Caries Incidence of Temporary Teeth and Age

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ABSTRACT

Objective: Enamel demineralization can be improved by controlling plaque microbial biofilm, dietary modification and fluoride. On the surface of the tooth, demineralization is the first sign of the carious lesion. The lesion, which is limited to the enamel, does not require a restoration, except in the cases of fracture after deepening and cavities present.

Material and Methods: Object of observation - there are 300 children from the city of Varna, aged 4 to 6 years, distributed equally in standardized age groups, with the same number of boys and girls. The study was carried out in the Faculty of Dental Medicine, Varna, 2015-2016, with the permission of the University's Scientific Ethics Committee, with informed consent from each parent. The selection of children is random. Surveillance Authorities: PhD student specialized in pediatric dentistry. All carious (d), missing (m) and filling teeth (f), are recorded.

Registration of data: in the statistical maps. To determine the level of oral hygiene, a Greene-Vermilion Oral Hygiene Index (OHIs) was used. The presence of plaque after staining on the corresponding surfaces of the representative teeth was recorded. Statistical Data Processing Methods - StatSoft, Inc., STATISTICA Manual (Data Analysis Software System), Version 10.0, 2010.

Results: The average of OHI-S for the entire sample is 1.07 ± 0.67 . The presence of increasing linear dependence ($b = 1.501911 > 0$) is established, with increasing OHIs, the values of the dmft index also increase. The resulting logarithmic dmft dependence on OHIs is $dmft = 3,759 + 3,6789 * \log_{10}(OHIs)$. To prove the dependence of the dmft values of OHI-S and age, as the dmft values are integer, we applied Poisson regression.

Conclusion: With increasing OHIs, the values of the dmft index also increase. The resulting p-levels for the two explanatory variables are less than 0.05, indicating that the variable dmft is also dependent on the OHIs and age factors.

Keywords: caries, OHIs, dmft, temporary teeth

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I. INTRODUCTION

According to Anderson and Elliott healthy enamel is resistant to acidic dissolution, but with prolonged action of acids, it weakens, and demineralization progresses through the line of linear enamel, following the direction of the enamel prisms at a constant velocity (Anderson and Elliott, 2000) [1,5,7,9]. On the surface of the tooth, demineralization is the first sign of the carious lesion [6,8,10]. The lesion, which is limited to the enamel, does not require a restoration, except in the cases of fracture after deepening and cavities present.

Enamel demineralization can be improved by controlling plaque microbial biofilm, dietary modification and fluoride (Frencken and Holmgren, 1999) [2,3,4].

II. MATERIAL AND METHODS

1.1. Tooth decay epidemic of tooth teeth and surfaces - dmft and dmfs and frequency.

1.2. Caries and oral hygiene status in the study children.

(OHIs) and correlation with reversible and irreversible carious lesions.

Carious status

Object of observation - there are 300 children from the city of Varna, aged 4 to 6 years, distributed equally in standardized age groups, with the same number of boys and girls.

Total number of temporary teeth - 5900.

Total number of caries lesions - 759 / reversible and irreversible /, on teeth and surfaces.

Criteria for inclusion of children: clinically healthy, without general and systemic diseases, without gingival and stomatitis diseases; accompanied by parents who regularly visit our ambulatory office. Methodology: Dental status is assessed and registered according to WHO criteria. Data on dental caries are obtained through a one-time review. The study is conducted with a view, after drying the teeth. A visual diagnostic method is applied. The lesions d1b, d2 and d3 and d4 are diagnosed in general. Initial Diagnostic Threshold **d1b** - is a visible enamel lesion with a preserved surface layer defined as active or inactive.

All carious (d), missing (m) and filling teeth (f), are recorded.

For the registration of the oral status of the children, an epidemiological map for oral health assessment was used for the needs of the study. It includes a short passport, tooth status, registration of the level of oral hygiene, assessment of the caries risk and characterization of the available caries lesions.

Observation units: temporary teeth and surfaces with / without carious lesions, active caries lesions at the level of diagnostic threshold d1b.

Signs of observation: carious, obturated or carious temporary tooth / surface. The presence of at least one carious lesion / surface.

Diagnostic criteria

Criteria for activity - d1b caries lesions under the plaque, pre-location, with loss of brilliance and smoothness, lack of clear; Criteria for positioning d1b lesions - with smooth surfaces, with brilliance and clear boundaries.

Diagnostic scale - codes:

d1b - white elastic lesion, visible without drying.

d2 - white enamel cavity lesion.

d3-d4 - dentinal lesion without and with pulp involvement

A - active (d1b, d2)

NA - inactive (d1b, d2)

Reversible caries lesions - (d1b, d2)

Irreversible caries lesions - d3 and d4.

Non-carious lesions and hypomineralized spots.

Caries and oral hygiene status in the studied children

Oral hygiene status

To determine the level of oral hygiene, a Greene-Vermilion Oral Hygiene Index (OHIs) was used. The presence of plaque after staining on the corresponding surfaces of the representative teeth was recorded.

Survey methodology - The index of representative teeth (55, 51, 65 and 71 - vestibular, 75 and 85 lingual) is taken into account. The sum of the surface scores divided by the number of surfaces to be tested is the result for the tooth. - from 0-3.

Surveyed metrics:

Based on the value of PLI, children are divided into three groups, according to the degree of plaque buildup:

0.1-1.1 - good oral hygiene; 1,1-2,0-satisfactory oral hygiene; 2.1-3.0-poor oral hygiene.

The relative shares of the children, broken down by groups, according to the values of OHI-S by Greene

Vermilion: 0-1; 1,1-2; 2.1-3.

Time and place of observation: The study was carried out in the Faculty of Dental Medicine, Varna, 2015-2016, with the permission of the University's Scientific Ethics Committee, with informed consent from each parent.

The selection of children is random.

Surveillance Authorities: PhD student specialized in pediatric dentistry.

Registration of data: in the statistical maps.

Statistical Data Processing Methods - StatSoft, Inc., STATISTICA Manual (Data Analysis Software System), Version 10.0, 2010.

III. RESULTS

The average of OHI-S for the entire sample is 1.07 ± 0.67 . The presence of increasing linear dependence ($b = 1.501911 > 0$) is established, with increasing OHIs, the values of the dmft index also increase. The pattern of this linear model (straight line) is: $dmft(OHIs) = 1.96 + 1.51 * OHIs$, but the model does not describe the observations, since $R^2 = 0.07384028$ is much lower than the maximum $R^2 = 1.00$. The determination factor, multiplied by 100, gives in% how much of the variation of the dependent variable dmft is due to the variance of the explanatory variable / predictor / OHIs. In the obtained model this is only 7% fig 1.

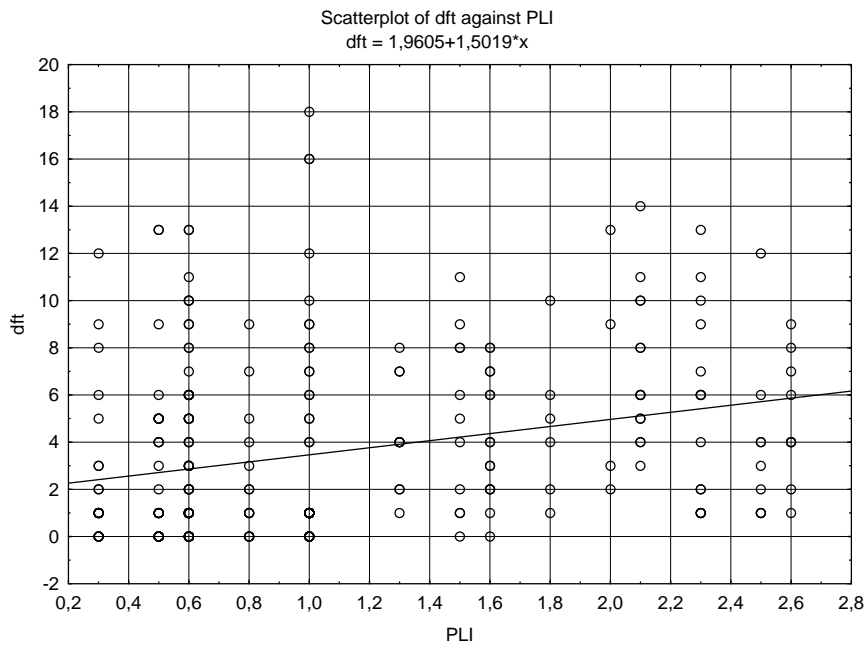


Fig. 1. Poisson regression for the values of the dependent variable dmft from OHI-S (PLI) of Green Vermillion

From the chart for this linear dependence of the upper graph (with red) and the OHI-S measured points and the corresponding dmft, it is better to apply Poisson regression since the values of the dependent variable dmft are integers. The obtained coefficient of determination is 0.97, which proves the adequacy of the model. The resulting p-levels for the two explanatory variables are less than 0.05, indicating that the variable dmft is also dependent on the OHIs and age factors.

The resulting logarithmic dmft dependence on OHIs is $dmft = 3,759 + 3,6789 * \log_{10}(OHIs)$. To prove the dependence of the dmft values of OHI-S and age, as the dmft values are integer, we applied Poisson regression: (Table 1).

Table 1. Poisson regression of the values of the variable dmft

dmft - Test of all effects Distribution : POISSON Link function: LOG			
	Degr. of - Freedom	Wald - Stat.	p
Intercept	1	139,2957	0,0000001
OHI-S	1	32,7099	0,00000001
Age	2	248,1251	0,00000002

The resulting p-levels are less than 0.05, indicating that the variable dmft (dental caries frequency) also depends on the OHI-S values and the age factor of the three groups of children tested (Table 2 and Figure 2).

Table 2. Poisson regression of the values of the variable dmft

dmft - Parameter estimates								
Distribution : POISSON								
Link function: LOG								
	Level of - Effect	Column	Estimate	Standard - Error	Wald - Stat.	Lower CL - 95, %	Upper CL - 95, %	P
Intercept		1	0,759881	0,064384	139,2957	0,63369	0,886071	0,000000
OHI-S		2	0,243733	0,042616	32,7099	0,16021	0,327259	0,000000
Age	4	3	0,280357	0,050300	31,0662	0,18177	0,378944	0,000000
Age	5	4	-0,987973	0,070393	196,9853	-1,12594	-0,850006	0,000000
Scale			1,000000	0,000000		1,00000	1,000000	

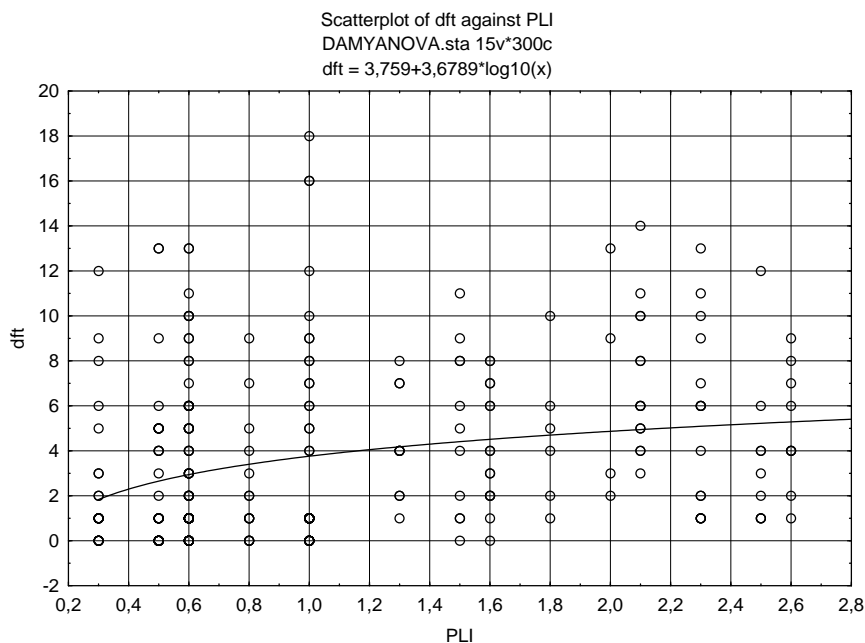


Fig. 2. Poisson regression for values of the dependent variable dmft of Green Vermillion OHI-S (PLI) and age of children

Predicted average dmft and 95% confidence intervals for age factors are listed in the table below (Table 3).

Table 3. The average values estimated by the Poisson regression model and the confidence interval

By Age Predicted Means Wald $X^2(2)=248,13, p=0,0000$ (Computed for continuous predictors at their means)						
	Age	dmft - Mean	dmft - Std.Err.	dmft - -95,00	dmft - +95,00	N
1	4	3,675692	0,052200	3,317820	4,072165	100
2	5	1,033975	0,100000	0,849741	1,258153	100
3	6	5,635016	0,043240	5,176595	6,134033	100

The corresponding graph of these estimates is: Figure 3.

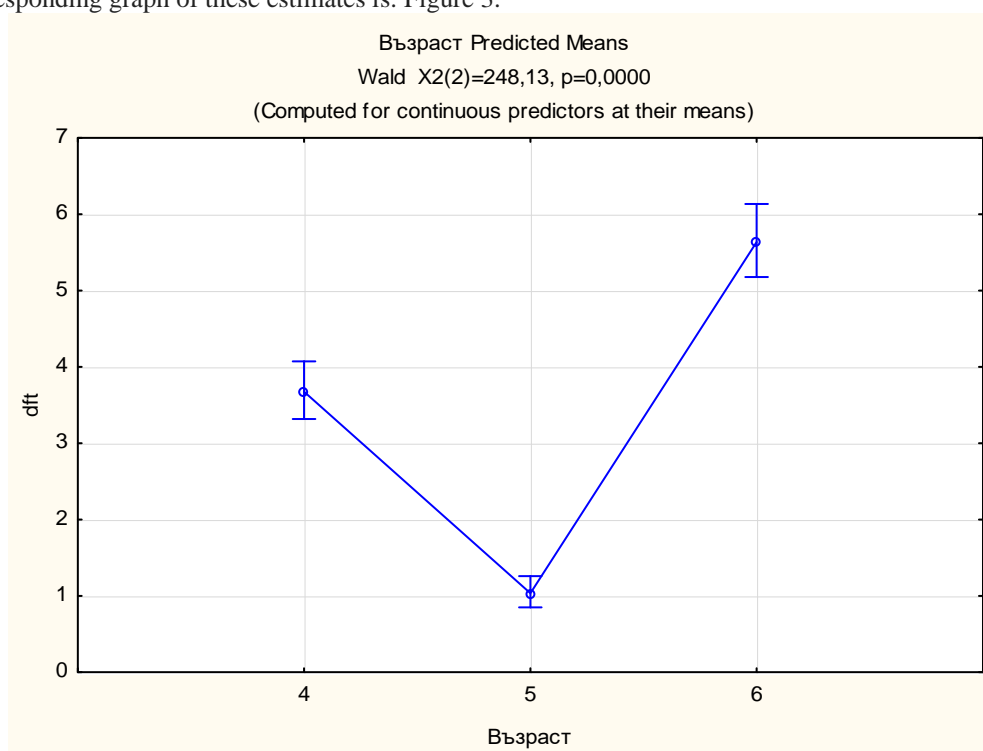


Fig. 3. Predicted average Poisson regression model and confidence interval

IV. CONCLUSION

1. With increasing OHIs, the values of the dmft index also increase.
2. The resulting p-levels for the two explanatory variables are less than 0.05, indicating that the variable dmft is also dependent on the OHIs and age factors.

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