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 presence of increasing OHIs, the values of the dmft index also increase. The resulting logarithmic dmft dependence on OHIs is dmft = 3.759 + 3.6789 * log₁₀(OHIs).

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

I. INTRODUCTION

According to Anderson and Elliot, 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.

Caries 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, obturalized 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 hypinerinated 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 Vermillion: 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.

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 OHI-S, the values of the dmft index also increase. The pattern of this linear model (straight line) is: dmft (OHI-S) = 1.96 + 1.51 * OHI-S, 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 / OHI-S. In the obtained model this is only 7% fig 1.

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 OHI-S and age factors.

The resulting logarithmic dmft dependence on OHI-S is $dmft = 3.759 + 3.6789 \cdot \log_{10}(OHI-S)$. To prove the dependence of the dmft values of OHI-S and age, as the dmft values are integers, we applied Poisson regression (Table 1).

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

<table>
<thead>
<tr>
<th>dmft - Test of all effects</th>
<th>Distribution : POISSON</th>
<th>Link function: LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degr. of - Freedom</td>
<td>Wald - Stat.</td>
</tr>
<tr>
<td>Intersect</td>
<td>1</td>
<td>139.2957</td>
</tr>
<tr>
<td>OHI-S</td>
<td>1</td>
<td>32.7099</td>
</tr>
<tr>
<td>Age</td>
<td>2</td>
<td>248.1251</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Level of Effect</th>
<th>Column</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Wald Stat.</th>
<th>Lower CL - 95, %</th>
<th>Upper CL - 95, %</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1</td>
<td>0.75988 1</td>
<td>0.064384</td>
<td>139.2957</td>
<td>0.63369</td>
<td>0.886071</td>
<td>0.000000</td>
</tr>
<tr>
<td>OHI-S</td>
<td>2</td>
<td>0.24373 3</td>
<td>0.042616</td>
<td>32.7099</td>
<td>0.16021</td>
<td>0.327259</td>
<td>0.000000</td>
</tr>
<tr>
<td>Age 4</td>
<td>3</td>
<td>0.28035 7</td>
<td>0.050300</td>
<td>31.0662</td>
<td>0.18177</td>
<td>0.378944</td>
<td>0.000000</td>
</tr>
<tr>
<td>Age 5</td>
<td>4</td>
<td>-0.98797 3</td>
<td>0.070393</td>
<td>196.9853</td>
<td>-1.12594</td>
<td>-0.850006</td>
<td>0.000000</td>
</tr>
<tr>
<td>Scale</td>
<td></td>
<td>1.00000 0</td>
<td>0.000000</td>
<td>1.00000</td>
<td>1.00000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 2. Poisson regression for values of the dependent vertex 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

<table>
<thead>
<tr>
<th>Age</th>
<th>dmft - Mean</th>
<th>dmft - Std.Err.</th>
<th>dmft - -95,00</th>
<th>dmft - +95,00</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>3.675692</td>
<td>0.052200</td>
<td>3.317820</td>
<td>4.072165</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>1.033975</td>
<td>0.100000</td>
<td>0.849741</td>
<td>1.258153</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>5.635016</td>
<td>0.043240</td>
<td>5.176595</td>
<td>6.134033</td>
</tr>
</tbody>
</table>

The corresponding graph of these estimates is: Figure 3.

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.

REFERENCES