EVALUATING THE EFFECTIVENESS OF ORAL HEALTH PROGRAM IN DENTAL HOME AFTER 2 YEARS

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ABSTRACT:

Introduction: The Dental Home is the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated, and family-centered way. Dental practice, working on the principles of the Dental Home, increases the possibilities for caries prevention.

Aim: The study aims to evaluate the effectiveness of our educational and motivational program created in the Dental Home for caries prevention for two years.

Material and methods: The object of research and comparison are two groups of children - experimental and control. The experimental group includes 90 children who have two years of regular participation in our Dental Home and are the object of our motivational and educational program. The control group are 30 children who are visiting our Dental Home for the first time. We evaluated the effectiveness of preventive care led by the Dental Home by comparing the results in the two groups on the following criteria - dft – index, plaque index and level of caries risk.

Our results confirmed that care in Dental Home reduces the spread of caries -85.56% of the children in our experimental group stayed caries-free, compared to 46.67% of the children in the control group. Significantly lower level of plaque accumulation was shown by the children for whom we created a Dental Home. The number of children at high risk of caries development is significantly higher in the control group.

Conclusion: A dental practice that works on the principles of the Dental Home has the potential to manage children’s oral health.

Keywords: Dental home, caries prevention, first dental visit.
• Treatment plan in case of emergency;
• Comprehensive dental treatment based on the recommendations of the world’s guidelines;
• Referrals to other dental professionals (orthodontists, oral surgeons, etc.) if necessary.

PURPOSE
The study aims to evaluate the effectiveness of our educational and motivational oral health program created in the Dental Home for caries prevention for two years.

MATERIALS AND METHODS:
The object of research and comparison are two groups of children - experimental and control.

The experimental group included 90 children, who have two years of regular participation in our Dental Home and implemented the motivational and educational program “Dental Home for Children”. Their age is currently 3 to 5 years.

The criteria by which we included the children in our Dental Home are:
• Children aged 1 to 3 years;
• Children in good general health;
• Children without the need for special health and educational care;
• Children from families who can engage in regular dental visits and plan to live in Sofia for at least two years;
• Informed consent should be signed by the parents for consent to participate in the motivational and educational program “Dental Home for Children”.

The first visit to our Dental Home took place in the following steps:

1. Brief interview with the mother and anamnesis: The interview with the parent is a short conversation that will help identify some of the risk and protective factors for caries development. We conduct a 10-minute verbal information session on “Etiology of dental caries and how to prevent the disease”.

2. Preparing the child for the dental examination: To achieve relaxation in children: we read a fairy tale from our “dental books” collection; we play a “Fun game with Hippopotamus” with children over two years; we play a game “Eat me” with children over two years.

3. Clinical examination of the child: The oral examination of the child includes (1) Dental status; (2) Check-up of the child’s dft index (caries lesions were classified according to ICDAS); (3) Plaque index (Silness-Löe – our modification).

The plaque index was determined by a modified Silness-Löe plaque index by scraping the plaque in the cervical third of the representative teeth. Our modification of the Silness-Löe index refers to temporary dentition by reducing the number of representative teeth - only 4 and determining only one representative tooth surface (vestibular) for evaluation of the accumulated plaque.

The Plaque Index System:

0 - No plaque when scraping with a probe;
1 - A film of plaque adhering to the free gingival margin and adjacent area of the tooth. The soft deposit is visible after scraping with a probe;
2 - Moderate accumulation of plaque on the tooth and gingival margin which can be seen with the naked eye;
3 - Abundance of soft matter within the gingival pocket and/or on the tooth and gingival margin.

Calculation of the index: for each representative tooth (vestibular surface only) one of the marks from 0 to 3 is written. The sum of the four marks is divided by the number of representative teeth. According to the obtained result we determine the level of oral hygiene of each child on the following scale:

0 = excellent hygiene; 0.1 - 0.9 = good hygiene; 1.0 - 1.9 = unsatisfactory hygiene; 2.0 - 3.0 = poor hygiene.

4. Individual assessment of the risk of caries development: Based on the information collected from the anamnesis and the clinical examination, we assess the risk of developing caries in the child.

5. Anticipatory guidance for parents and oral health management in our Dental Home: We start with our motivational and educational program “Dental Home for Children” - verbally and through the website of the Dental Home www.dentalendom.bg on the following topics:

Bacterial transmission. We acquaint parents with the rules for preventing the early transmission of cariogenic microorganisms and encourage them to follow our instructions.

Oral hygiene: We motivate and train parents in proper oral hygiene of the child according to its age. Each mother is recommended to visit our website and read the materials provided there.

Eruption and dental development: The eruption’s order and specifics are discussed with the parents and the ways to soothe the irritated gums during the eruption.

Diet and nutrition: We encourage breastfeeding each child according to global recommendations. We advise the mother that breastfeeding should end with cleaning with a damp gauze or rinsing with water. Every mother who feeds her child with an adapted baby formula gets acquainted with the rules for choosing an appropriate bottle and pacifier. Mothers of children over the age of one and a half received individual advice on maintaining a proper, healthy, and varied diet.

Prevention of injuries and orthodontic problems: every mother should read the articles about those two topics on the website of the Dental Home (www.dentalendom.bg).

6. Creating a Prevention plan: After the oral examination, the dentist fills in a form “Card for self-management of parental behavior” (author’s proposal), which is a kind of prevention plan for the child with specific recommendations and advice for behavior change, which the child and the parents must fulfill until the next visit. For training and motivation in maintaining good oral health for their mother’s children, we offer also educational brochures (fig. 1).
Fig. 1. Educational brochure

7. Plan for subsequent visits: For children with a low or medium risk of caries, follow-up visits were scheduled every six months, and for those with a high risk - additional appointments were scheduled between the routine visits. At each follow-up visit, the mothers were provided with anticipatory guidance on each topic related to the child’s oral health and appropriate for its age.

The control group of our study included 30 children (random selection), aged between 3 and 5, who are visiting our Dental Home for the first time and have not passed our motivational and training program. They have never visited a dentist until that moment. The children were examined and evaluated: dft index, plaque index and risk of caries development.

We evaluated the effectiveness of preventive care led by the Dental Home by comparing the results in the two groups on the following criteria - dft index, plaque index and level of caries risk. Program IBM SPSS Statistics, v.19 (SPSS Inc., Chicago, IL, USA) was used for data processing.

RESULTS
The comparative analysis gives us an idea of the effectiveness of our motivational and educational program Dental Home. The effectiveness of our Dental Home in the prevention of caries lesions is presented in tables 1, 2, 3 and 4.

Table 1. Comparative analysis of dft values in the two studied groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>dft score</th>
<th>Paired Samples Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean +/- SD</td>
</tr>
<tr>
<td>Experimental</td>
<td>90</td>
<td>0.48 +/- 1.36</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>2.03 +/- 2.48</td>
</tr>
</tbody>
</table>

The data in Table 1 show that the average score of the dft index in children who visit the Dental Home for the first time is 2.03, which is significantly more than the average value of the index in our experimental group – 0.48 (t =-4.313, p = 0.000).

Table 2 presents the relative share of children with caries and those without caries in the two study groups.

Table 2. Share of children without caries lesions in the two studied groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>dft = 0</th>
<th>dft&gt;1</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n    % +/- sp</td>
<td>n    % +/- sp</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>77    85.56 +/- 3.56</td>
<td>13 14.44 +/- 3.71</td>
<td>t = 3.95, p &lt; 0.05</td>
</tr>
<tr>
<td>Control group</td>
<td>14    46.67 +/- 9.11</td>
<td>16 53.33 +/- 9.11</td>
<td></td>
</tr>
</tbody>
</table>

The results in Table 2 show that more than half of the children (53.33%) in the control group have one or more than one caries lesion, compared to our experimental group, where this percentage is about 15%. More than 85% of the children in our Dental home are free from dental decay after a 2-year participation in our program. Data are supported by a statistically significant difference (t = 3.95, p < 0.05).

Table 3 presents a comparison of the mean values of the plaque index between the experimental group (children from our Dental Home after 2 years) and the control group of children without the Dental Home.

Table 3. Comparative analysis of average values of the plaque index of the two studied groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Plaque index</th>
<th>Paired Samples Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n    Mean +/- SD</td>
<td>T=14.631, p=0.000</td>
</tr>
<tr>
<td>Experimental</td>
<td>90  0.56 +/- 0.45</td>
<td></td>
</tr>
<tr>
<td>Control group</td>
<td>30  1.40 +/- 0.52</td>
<td></td>
</tr>
</tbody>
</table>
The results show that the mean value of the plaque index in the control group (1.40) is higher by almost one unit compared to that in the experimental group (0.56) (p <0.05). A significantly lower level of plaque accumulation was shown by the children for whom we created a Dental Home and had regular preventive examinations for a period of two years.

We present the results of caries risk assessment in the two compared groups in Table 4.

### Table 4. Comparative analysis of the risk of caries development

<table>
<thead>
<tr>
<th>Caries-risk level</th>
<th>Low</th>
<th>Average</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>n</td>
<td>% +/- sp</td>
<td>n</td>
</tr>
<tr>
<td>Experimental group</td>
<td>29</td>
<td>32.22 +/- 4.93</td>
<td>48</td>
</tr>
<tr>
<td>Control group</td>
<td>6</td>
<td>20 +/- 7.30</td>
<td>4</td>
</tr>
<tr>
<td>t-test</td>
<td>t = 1.39, p &gt; 0.05</td>
<td>t = 4.92, p &lt; 0.05</td>
<td>t = 5.57, p &lt; 0.05</td>
</tr>
</tbody>
</table>

The results show that the number of children at high risk of caries development was significantly higher in the control group (t = 5.57, p <0.05). Over 65% of children without a prevention program are at high risk for caries. No significant difference was found between low-risk children in the two groups (t = 1.39, p> 0.05)

### DISCUSSION

The term Dental Home is widespread and although it has a precise and clear definition [1, 13], the evaluation of its effectiveness is difficult and is carried out according to various criteria by different authors [14, 15, 16, 17]. National programs have been set up in Europe and America to improve access to dental care. These initiatives methods and target groups vary, but their overall aim is to improve access to regular dental check-ups and visits [18, 19, 20]. Although all the programs use the general concept of Dental Home, there is no standard for implementing it.

In Bulgaria, the idea of creating a real Dental home for every child is not known enough. There is no model of a functioning Dental Home. There are no tested appropriate educational and motivational tools with which dental care for children can be carried out. That is why we set ourselves on the task to develop the concept for creating a Dental Home by preparing a program for training and motivation of parents of children under three years of age. Our Dental Home program works on the following model:

- first dental examination according to a specially developed protocol with the assessment of dft index, plaque index and assessment of the risk of caries development; child behavior management card;
- a program to motivate and educate parents by providing anticipatory guidance on all aspects of oral development and care;
- special training brochures;
- periodic control re-assessment of the dft-index, reassessment of the risk of caries development;
- regular control visits according to the needs of the child.

The mothers positively received our Dental home, and they strictly followed all our preventive guidelines and instructions and their regular visits. The results showed that children with Dental Home had maintained good oral health after two years of implementing our program. Motivated and trained mothers who followed the elements of the program kept their children with low values of the dft and plaque index (Tables 1, 2 and 3) and a low risk of caries (Table 4). Similar results are found in other research [21, 22, 23].

An early first visit to the dentist can have long-term benefits for the child’s oral health and should be an integral part of pediatric health [12, 13]. A study by Savage found that children who sought dental care before the age of 18 months needed fewer restorative procedures and had less financial expense with the dentist [18]. Nowak also confirmed that children who sought a dentist early had fewer obturations, pulpotomies, or extractions than children who had their first dental examination later in life (after four years) [19]. The costs for the treatment of this group of children are also lower [19]. Our study showed that children who have established Dental home early have fewer caries lesions and are at lower risk of caries in the future (Tables 1, 2, 4). Delays in seeking dental care can lead to caries complications [18]. Early preventive care has the potential to reduce the number of dental emergencies and the cost of dental care [19].

Lee et al. published an article reviewing the scientific evidence and rationale for early dental visits [20]. During the first dental visit, the emphasis should be on the anticipatory guidelines for parents. Our Dental home also provides anticipatory guidance for parents. The authors proved that preschool children who had an early preventive visit to the dentist (up to 1 year) are more likely to take follow-up preventive care. They also had lower dental costs [20].

Studies have shown that caries often affects the youngest children [24, 25]. Researchers are publishing different prevalence rates. Dental caries is an important health problem for children under 3 years of age and various causal factors play a role in its etiology. Prevention of dental caries in children under the age of three depends not only on the fight against risk factors but also on improved access to dental care for the youngest patients [26].

### CONCLUSION

Our experience has confirmed that dental practice that works on the principles of the Dental Home has the potential to manage children’s oral health and reduce the spread of caries. The two-year training program “Dental Home for Children”, which we implement in our Dental Home, successfully reduces the severity and spread of caries.
REFERENCES:

1. APD. Definition of dental home. American Academy of Pediatric Dentistry. 2021:15. [Internet]
3. ADA. Statement on early childhood caries. 2000. [Internet]
6. First Dental Visit by Age One. Association of State and Territorial Dental Directors (ASTDD). August 31, 2012. [Internet]
7. CDA. Early Childhood Caries. April 2010. [Internet]
10. Poornima P, Meghna B, Nagaveni NB, Roopa KB, Subba Reddy VV. Dental home - A new approach for child oral health care. CODS J Dent. 2014;6(1):30-34. [Crossref]

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