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EFFECTIVENESS OF DENTAL HOME CONCEPT AND PRINCIPLES

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ABSTRACT

The Dental Home is not a new concept in pediatric dentistry. However, it has not yet been widely adopted by dental professionals in Bulgaria.

Aim: to assess the impact of the Dental Home concept by comparing the oral health of children who have a Dental Home to those who do not.

Materials and Methods: The study involved 200 children aged 3 to 6 years, selected from two separate dental practices staffed by pediatric dentistry specialists. In the first practice, the dentists adhered to the guidelines of the Dental Home concept, while in the second practice, they did not. The selected children were contacted by phone and invited for a routine preventive examination. During this examination, their DMF(T+t) index, Green-Vermillion Oral Hygiene Index (OHIs-GV), and PUFA index were assessed and compared.

Results: The findings indicate that children with a Dental Home had lower values for all three indices compared to those in the control group.

Conclusion: The Dental Home concept may enhance oral health in young children and reduce the DMFT (dmft), OHIs, and PUFA (pufa) indices.

KEYWORDS: Dental Home, oral health, dmft index, pufa index, OHIs.

INTRODUCTION

The Dental home is not a new concept [1]. It is defined as a continuous relationship between the dentist and the patient, encompassing all aspects of oral health care delivered in a safe, culturally-sensitive, individualized, comprehensive, continuous, accessible, coordinated, compassionate, and patient- and family-centered way [2]. The concept of the Dental Home emerged in the early 21st century with the aim of creating a connection between young children and dentists. According to Nowak and Casamassimo, although the Dental Home is most often associated with the physical place - a dental office or clinic, it should be perceived as a philosophy that should be “embraced” by the dental practice [3]. The two authors describe in detail the characteristics of the Dental home and their practical advantages. According to the authors of the concept, a dental practice that includes children early and continues to care for them periodically and throughout life is an ideal option for fulfilling this task [3]. Just as

newborns visit their general practitioner or pediatrician from birth, it is equally important to schedule an early dental appointment to prevent and delay the development of oral diseases [4].

Nowak and Casamassimo describe in detail all the advantages of working on the principle of the Dental Home, many of which are aimed at preventing oral health: anticipatory guidance for parents, assessment of the risk of caries, information on diet, fluoride, oral hygiene, growth and development of teeth and jaws, etc [3]. The authors believe that the dental home concept will increase the possibility of preventing and reducing oral diseases. The two authors were the first to focus on the concept of the Dental Home in 2002 and received overwhelming support. The American Dental Association supports the Dental Home model, which has since been recognized by a number of national and international organizations [5-8]. The American Academy of Pediatric Dentistry currently maintains a leading role in the Dental Home policy [2, 9]. It supports the concept of its creation for all children, adolescents, and children with special health needs and requirements.

The Dental Home includes all oral care provided through the collaboration between the patient, parents, pediatric dentists, and other medical personnel around the young child (obstetricians, neonatologists, pediatricians, gynecologists, etc.). It is created when this entire team contacts and leads to increased awareness of all issues that affect the improvement of the patient's oral health [2, 9]. Establishing a Dental Home is an approach to providing comprehensive and high-quality dental care. It does not represent a place, physical structure, or institution, so interpretations of how to implement the main recommendations and policies of the Dental Home are numerous [3, 9].

According to basic policies of the Dental home, based on publications on this topic [10, 11], practice working on this principle should provide the following:

- Comprehensive, continuous, accessible, family-oriented, coordinated, compassionate and effective care for the child;
- Treatment of all oral diseases, emergency care, periodic preventive examinations;
- Comprehensive assessment of the risk of oral diseases (caries and periodontal diseases);
- Individual preventive program after assessment of the oral condition and caries risk;
- Guidelines on the growth and development of teeth and jaws;
- Management of acute/chronic trauma;
- Information on the proper care of teeth, gums and mucous membrane;
- Nutritional consultation and prophylaxis.

While numerous national programs incorporate the idea of a Dental Home, there is currently no standardized method for its implementation in private dental practices. We are unaware of any studies that evaluate the work of the dental home in dental practices.

The current study aims to assess the impact of the Dental Home concept by comparing the oral health of children who have a Dental Home with those who do not.

Materials and Methods: The study involved 200 children aged 3 to 6 years, selected from two separate dental practices where pediatric dentistry specialists work. The process for selecting patients is detailed in Table 1.

Table 1 *(Distribution of Children in the Study.)*

Group	Number	Descpription
Control group - Children without Dental home	100 children	Children are patients at a dental practice that specializes in pediatric dentistry. This practice does not follow the principles of the dental home model. Additionally, the children visit the dental office for the first time before they turn one year old.
Experimental group - Children with Dental home	100 children	Children who are patients at a dental practice that specializes in pediatric dentistry adhere strictly to the principles of the Dental Home. This includes children who have visited the dental office for the first time before reaching the age of one.

The criteria for including patients in the study were as follows:

- Children aged 3 to 6 years;
- Children in good general health, without common diseases;
- Children who have been patients of one of the two dental practices since early childhood;
- Children who last visited the dental office for prophylaxis or treatment at least 6 months prior;

Written informed consent for participation in the clinical study was obtained from the parents of the children. Additionally, approval was granted by the Ethics Committee of the Medical University of Sofia.

The selected children were contacted by phone and invited for a routine preventive examination. During this examination, their DMF(T+t) index, Green-Vermillion Oral Hygiene Index (OHIs-GV), and PUFA index were assessed. Carious lesions were classified according to the ICDAS II criteria. The data from the two study groups were analyzed comparably using the statistical software SPSS version 19.0 (SPSS Inc., Chicago, IL, USA).

Methodology of registering dmft and DMFT index [12]: A thorough clinical examination of the child's oral cavity was conducted. Each tooth that is decayed (D-d), missing due to caries (M-m), or filled (F-f) was identified and recorded. For mixed dentition, this involved assessing both primary and permanent teeth separately. We used the dmft index for primary teeth and the DMFT index for permanent teeth. Then, we calculated the total score by summing the number of decayed, missing, and filled teeth.

Methodology of registering OHIs-GV [13]: The OHI-s is scored on six specific teeth: Maxillary right first molar (buccal surface); Maxillary right central incisor (labial surface); Maxillary left first molar (buccal surface); Mandibular left first molar (lingual surface); Mandibular left central incisor (labial surface); Mandibular right first molar (lingual surface).

Scoring Debris (DI-s): Each of the six selected teeth is examined for soft debris. The buccal or labial and lingual surfaces are scored as follows:

- **0:** No debris or stain present.
- **1:** Soft debris covering not more than one-third of the tooth surface, or presence of extrinsic stains without debris.
- **2:** Soft debris covering more than one-third but not more than two-thirds of the exposed tooth surface.
- **3:** Soft debris covering more than two-thirds of the exposed tooth surface.

Scoring Calculus (CI-s): Each of the six selected teeth is examined for calculus. The buccal or labial and lingual surfaces are scored as follows:

- **0:** No calculus present.
- **1:** Supragingival calculus covering not more than one-third of the exposed tooth surface.
- **2:** Supragingival calculus covering more than one-third but not more than two-thirds of the exposed tooth surface, or flecks of subgingival calculus around the cervical portion of the tooth.
- **3:** Supragingival calculus covering more than two-thirds of the exposed tooth surface, or a continuous heavy band of subgingival calculus around the cervical portion of the tooth.

Calculating the Index: The DI-s and CI-s scores for each tooth are summed separately. The total DI-s score is divided by the number of teeth scored to obtain the average DI-S. The total CI-s score is divided by the number of teeth scored to obtain the average CI-S. The OHI-S is the sum of the average DI-S and CI-S scores. This methodology provides a quantitative measure of oral hygiene status, facilitating the assessment and monitoring of oral health in clinical and epidemiological studies.

Methodology of registering PUFA index [14]: The PUFA (Pulp, Ulceration, Fistula, Abscess) index is a clinical index used to assess the presence and severity of oral conditions resulting from untreated dental caries. All teeth in the oral cavity are examined, including both primary and permanent teeth.

Scoring Criteria:

- **P (Pulpal involvement):** A tooth is scored as P if there is visible pulpal involvement due to caries. This includes teeth with open pulp chambers or those with carious lesions extending into the pulp.
- **U (Ulceration):** A tooth is scored as U if there is ulceration of the oral mucosa caused by sharp edges of a dislocated tooth fragment.
- **F (Fistula):** A tooth is scored as F if there is a presence of a fistula, indicating a chronic infection with a sinus tract.
- **A (Abscess):** A tooth is scored as A if there is an abscess, characterized by a localized collection of pus associated with the tooth.

Each tooth is examined and scored based on the presence of any of the PUFA conditions. The scores are recorded separately for primary teeth (lowercase letters: p, u, f, a) and permanent teeth (uppercase letters: P, U, F, A). The total PUFA score for an individual is the sum of all PUFA conditions present in the mouth. The index can be expressed as the number of teeth affected by each condition (e.g., P=2, U=1, F=0, A=1). The PUFA index has been shown to have good reliability and validity in various studies (14). This methodology provides a comprehensive assessment of the clinical consequences of untreated

dental caries, facilitating the evaluation of oral health status in both clinical and epidemiological settings [14].

Statistical methods: The registered data were processed statistically with the SPSS software (version 19, SPSS Inc., USA).

RESULTS

The results in Table 2 show the data on the oral health of the studied children in both groups - DMFT, OHIs, and PUFA Index.

Table 2 *(Oral health related indices of the children in the study.)*

Index / Group	DMFT (dmft)		OHIs		PUFA (pufa)	
	n	Mean ± SD	n	Mean ± SD	n	Mean ± SD
Control	100	3.16 ± 1.82	100	1.28 ± 0.58	100	0.17 ± 0.51
Experimental	100	2.28 ± 1.42	100	0.71 ± 0.43	100	0.07 ± 0.29
Paired sample test	**t=3.698, p=0.000**		**t=9.264, p=0.000**		**t=1.787, p=0.077**	

The table shows that the children with dental homes have low values for all three indexes compared with the children in the control group.

DISCUSSION

The Dental Home is not a new concept but is not yet widely known in Bulgarian society. The authors give several tips and recommendations on what a Dental Home should offer [3]. However, most publications lack practical guidelines for dental professionals on how to implement and apply this concept in a real dental office [15]. Therefore, we decided to compare the oral health of children with a Dental Home to those without one. The results were promising, showing significantly lower DMFT (decayed, missing, and filled teeth), OHIs (Oral Hygiene Index scores), and PUFA (pulpal involvement, ulceration, and fistula) indexes in children who had established a Dental Home, compared to those in the control group (table 2). Organizing a Dental home and taking preventive steps together with a pediatric dentist, mother, and father can help prevent cavities in their children during early childhood [16].

According to the authors, plaque decay is one of the most reliable indicators and predictors of the risk of developing cavities in young children [17]. We assessed plaque in two groups of children and found that those with a Dental Home had significantly lower average OHIs (table 2). These findings demonstrate the effectiveness of the Dental House in improving oral hygiene among children.

Other studies also prove that Dental Homes have a positive effect. The Dental Home Program in New Hampshire has been shown to decrease biofilm accumulation, gingivitis, and participants' dmft index. Other studies also report a positive effect of dental home programs after two years, indicating a decrease in the average number of carious dental surfaces and an eightfold reduction in mutans streptococci [18].

A survey conducted three years ago revealed that only about 10% of dentists in Bulgaria are familiar with the concept of a Dental Home. In contrast, over 77% are unaware of it, while nearly 13% have only partial knowledge of the concept and its role [19]. A dental practice that serves children from infancy provides an easy, quick, and effective way to maintain a child's oral health over time. Children who regularly visit their Dental home tend to have a lower incidence and severity of dental caries compared to the control group of children who visit dental praxis that do not embrace the Dental home concept [20]. The Dental Home model is comprehensive, incorporating preventive dental services, nutritional consultations, thorough evaluations of oral health, guidance for parents, and more [20]. Establishing a dental home ensures that children receive appropriate oral care, which helps to reduce the frequency of early childhood caries.

CONCLUSION

The concept of a Dental home could enhance oral health in young children and reduce the DMFT (dmft), OHIs, and PUFA (pufa) indices.

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