

REVIEW

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About: Dissertation defense for awarding the educational and scientific degree
"Doctor of Philosophy - PhD"
Field of higher education 7. Medicine and sports
Professional field 7.2 Dentistry
Doctoral program Pediatric Dentistry

Topic: Prevalence of white carious lesions in patients with fixed orthodontic technique and
their correlation with the level of plaque control and gingival inflammation

Author: Dr. Elena Todorova Dimova

Scientific supervisor: Prof. Dr. Radosveta Andreeva-Borisova, PhD

1. General presentation of the procedure and the doctoral student

The presented set of materials on paper and electronic media is in accordance with the Procedure for acquisition PhD degree in MU - Varna and includes the following documents:

- Dissertation

- Abstract

- PhD student's documents - CV; a copy of the diploma for completed Master's degree; order for change of supervisor and change of title; enrollment order; protocol from the doctoral minimum exam; deduction order with the right to protection; protocol from the Department Council with a positive decision on the readiness for defense; declaration of originality; list of publications related to the topic - 3 publications; a copy of the publications related to the topic of the dissertation; declaration of authenticity of the submitted documents.

Dr. Elena Todorova Dimova was born on October 12, 1992. She completed his secondary education in Dobrich. She holds a diploma of higher education in Dental Medicine from the Medical University "Prof. Dr. Paraskev Stoyanov ", Varna since 2017. In the same year she was accepted as a full-time doctoral student at the Department of Pediatric Dentistry of the Faculty of Dental Medicine. She teaches second- to fifth-year students Bulgarian and English language training in the disciplines Propaedeutics of Pediatric Dentistry, Prevention and Clinic of Pediatric Dentistry. She has knowledge in English.

Dr. Dimova has participated in local and international scientific forums, clinical trainings and conferences. She is a member of BDA, the National Association of Pediatric Dentists and SMSPDLOA - SLIPPING DENTISTRY BG.

2. Relevance of the topic

Fixed orthodontic appliances are used to treat maxillary-tooth disorders but are a risk factor for the development of dental caries, as they create retention sites for the accumulation of dental plaque. The elements of the fixed orthodontic technique change the biological balance in the oral cavity. This puts orthodontically treated patients at high risk of developing tooth decay, regardless of the presence or absence of other risk factors.

Orthodontic treatment can damage the oral health of patients who are not motivated for adequate oral hygiene and a properly designed individual prevention program. It is important for both the patient and the dentist to prevent the development of initial enamel carious lesions, problems with inflammation of the gingiva and periodontium, which could compromise the desired end result of orthodontic treatment.

So far, we have a dissertation by Dr. Ribagin, examining the epidemiology of dental deformities and related changes in oral status, in particular the impact on periodontal health of patients undergoing orthodontic treatment.

The relevance of the topic is confirmed by the fact that numerous studies show that approximately one third of patients receiving fixed orthodontic therapy develop visible carious lesions. Studies have shown that around the fixed orthodontic appliances there is a rapid increase in the number of microorganisms and a slower recovery of pH in the dental biofilm. Similarly, it has been shown that pH levels fall below the critical after consumption of carbohydrates for long periods of time in patients with a fixed technique. Below this critical pH, the processes of enamel demineralization predominate.

After the removal of the fixed technique, white carious lesions can remineralize, reduce in size and restore the normal luster of the enamel.

It is important to distinguish between the terms "remineralization of the lesion" and "limitation of the initial lesion". In the first case there is a complete restoration of demineralized enamel, whose enamel surface has not been damaged. In the second case, only the mineral weight increases in the area of the damaged enamel surface, but not the relief. Then we talk about a stationary lesion.

Determining the oral risk profile is a means of organizing and analyzing all available information related to dental caries. All this is due to the need to plan preventive measures and make the right decisions to influence it. Orthodontists and general dentists play an important role in identifying high-risk patients and directing them to an appropriate comprehensive preventive approach.

On the other hand, orthodontic appliances cause local soft tissue reactions. The proximity of orthodontic appliances to the gingival sulcus, the accumulation of plaque and the obstacles they create for oral hygiene habits, further complicate the process of orthodontic treatment. The effects observed clinically after the placement of orthodontic appliances in the oral cavity may contribute to chronic infection, gingival hyperplasia, loss of attachment and gingival recessions.

The object of attention of the dissertation are the initial carious lesions with diagnostic threshold D1a, whose etiology are precisely the fixed orthodontic appliances, deprived of special oral hygiene procedures. I define the topic as relevant and informative.

3. Knowledge of the problem

The dissertation presented to me for review is written on 154 pages, of which 40 pages are an overview, 17 pages - material and methods, 52 results and discussion. It is illustrated with 56

figures and 22 tables. 305 literature sources were used, of which 9 in Cyrillic and the rest in Latin.

The dissertation is properly structured, contains all the main elements for the presentation of a dissertation: introduction, literature review, purpose and tasks, material and methods, results and discussion, summary and conclusions, bibliography and appendices.

The **literature review** is contemporary, sufficiently informative and orderly. The scientific literature on the initial carious lesions and the conduct of orthodontic treatment is analyzed. In some places the information covers the lecture course on the topic. The connections between orthodontic treatment and the development of a carious process are examined. The possible causes as well as the consequences of gingival inflammation are less considered. The main reasons for the demineralization processes, the methods and index systems for their diagnosis, which are known and traditionally applied, are considered.

The literature review ends with unsolved and undiscussed problems, which justifies the development of the chosen scientific topic.

The aim of the research is to study the prevalence and severity of white carious lesions in relation to the level of plaque control and gingival inflammation in patients with fixed orthodontic techniques.

The implementation of the goal is realized through six main tasks. The five tasks are based on the same total number of patients 123 and controls also 123, which are monitored over time for available lesions, as well as to assess their plaque accumulation. The last task is to develop an algorithm for prevention of white carious lesions in patients with fixed orthodontic technique based on a survey.

4. Research methodology

The methodologies are focused on each of the set tasks.

The methods used from tasks 1 to 5 are related to the clinical evaluation of various but known indicators, which are described in detail, there are unnecessary repetitions in some places. The number of children included as material is sufficient in volume but is not standardized by age groups. The methodology for developing a set of recommendations for oral health prevention in children with orthodontic treatment is similar to that used in practice, taught and included in many studies of prevention in children at high risk of caries.

The results are well described and accompanied by tables and figures. Sufficient statistical methods have been selected; some need further explanation. It is not explained why it is necessary to apply parametric and non-parametric analysis in the same study, nor is it mentioned which tests were used to establish a normal distribution in the study groups.

The conclusions are summarized. There are 10 main conclusions on the considered tasks. After the conclusions there are conclusions on all tasks, which are better to be before the conclusions. Some of the conclusions repeat the results. Such repetition is unnecessary.

5.Characteristics and evaluation of the dissertation and contributions

The material studied is sufficient with few exceptions. An interpretation and discussion of the obtained results was made.

The dissertation offers the following contributions:

Since there is a dissertation on a similar topic, I define the contributions as:

Confirmatory contributions:

1. The connection between orthodontic treatment with fixed technique and increased cariousness, gingival inflammation and the accumulation of dental plaque has been proven.
2. The duration of orthodontic treatment, metal braces and male gender have been shown to be negative for oral health.

3. It has been proven that with the cooperation of the patient better results are achieved in terms of the overall course of treatment, maintaining good oral hygiene and prevention of caries and gingival inflammation.

Practical contributions:

1. A risk profile has been developed for the development of white carious lesions in patients undergoing orthodontic treatment with a fixed technique.
2. An algorithm for prevention and follow-up of patients undergoing orthodontic treatment with a fixed technique has been developed and proposed.
3. Protocols for prevention of white carious lesions in children with low risk, in children with high risk and / or poor cooperation, as well as at the beginning of the development of white carious lesions have been developed and proposed.
4. Informative motivational materials have been developed for children conducting orthodontic treatment with a fixed technique, as well as for their parents regarding nutrition and maintaining effective oral hygiene.

Dr. Dimova's dissertation contributes to the awareness of the risk of harmful effects of sugars and reduced pH and increased acidity in the oral cavity in children with orthodontic treatment. The results of her research will be useful for both dental practice, patients and parents of children.

6. Evaluation of the publications

The dissertation has 3 publications related to the dissertation.

I assume that Dr. Dimova has performed the specialized clinical work independently, under the guidance of her supervisor.

7. Critical remarks and recommendations (to the conducted research and the presented materials).

This is my first reading of the dissertation. I consider it appropriate to give some recommendations and present my critical remarks on the work, without belittling the work of the dissertation.

When presenting the results of all tasks, there are no tables with detailed data from the distribution of participants in each of the conducted studies. This does not allow for a correct interpretation of the results.

This general presentation of the results does not allow to check whether they correspond to the statistical method used. Only averages are given.

In the section "Material and methods" there is no data to show how many girls, how many boys from both the experimental and control groups. How many of them *ин еацх* are group, because the eating and oral hygiene habits of the participants are commented and compared. It is appropriate to specify that after the age of 12 children enter adolescence. Here it should be borne in mind that the hormonal changes of the body begin, which are accompanied by poor oral hygiene and the development of periodontal disease in this age group.

The "Results and discussion" section:

In figure 18 are compared two average values of the EDI index - average values are given, from which nothing is understood, there is no explanation.

Figure 19 presents the average values of the EDI index - according to age. Values are given, but the age groups that are commented on in the text are not presented. It is not clear in what context and why it is presented in this difficult way.

Table 4 shows a linear regression analysis of the relationship between treatment duration and EDI, but the correlation itself is not explained, and that we follow a certain index.

Some results are given from the table, and the duration of treatment is written below. This is also the case for correlation analysis with values without distribution in table form. It is not clear how many months of treatment are presented.

In order to use the linear regression analysis, four requirements must be met, which are not met here, which reduces the reliability of the statistics made.

I find some inaccuracies: Fig. 62 and 63 do not explain how the results were obtained. Assuming that 123 are the children in the experimental group, how to explain these relative shares?

Table 20 shows that the study was conducted 67 of 123 participants. It is not specified why the remaining units were lost.

On page 102, assuming that all children are 100%, the total percentage of those who brush their teeth 1,2,3 or more times should give a total of 100%, and the results show another or need an additional explanation of the numbers.

In the photo material, it is better to mark the lesions with an arrow to see what is meant. Some photos do not show the described changes.

When considering the last task, a survey on eating habits was conducted. It is not specified how many people took part in the survey in order to assess the reliability. How many boys, how many girls, in order to correctly present the results of the figures. A clinical case of a 17-year-old child in adolescence is presented on the spot, which is not the most appropriate example. The survey remains an end in itself and does not connect logically with the rest of the presentation.

The results of the accepted hypotheses are not described. Are they confirmed or rejected?

8. Abstract

The content and quality of the abstract corresponds to the developed work and is made according to the requirements of MU-Varna. Reflects the main results achieved in the dissertation, the conclusions and contributions.

CONCLUSION

The dissertation submitted for review meets the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation and the Regulations of MU - Varna.

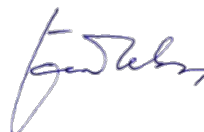
The dissertation examines a very contemporary topic and shows that the doctoral student Dr. Elena Todorova Dimova has advanced and upgrading theoretical knowledge in the scientific specialty of pediatric dentistry. A large part of the developed work demonstrates opportunities for gathering and interpreting scientific information.

This gives me reason, despite the inaccuracies and remarks made, to give my own positive evaluation of the presented dissertation “Distribution of white carious lesions in patients with fixed orthodontic technique and their correlation with the level of

plaque control and gingival inflammation” and propose to the scientific jury to award the educational and scientific degree ‘Doctor of Philosophy- PhD’ Dr. Elena Todorova Dimova, full-time PhD student in the doctoral program in Pediatric Dentistry.

2.09.2021

Reviewer :



/ Prof. Ani Belcheva, DDS, PhD/