

## STATEMENT

From  
Assoc. Prof. Dr. Maya Dimitrova Doychinova, PhD

Associate Professor in Operative dentistry and endodontics in the department of "Conservative Dentistry and Oral Pathology", FDM, MU Varna,  
external member of the scientific jury with order No. R-3384 and protocol No. 1 of the meeting of the scientific jury

Regarding the dissertation work for the award of the educational and scientific degree "Philosophy doctor"

**Author:** Dr. Nikolay Maksimov Simeonov, doctoral student of an self-preparatory form of education at the Department of "Operative Dentistry and Endodontics", FDM Plovdiv

**Doctoral program:** Therapeutic Dentistry

**Topic:** "Effect of preparation of hard dental tissues with Er:Yag laser on the adhesive layer"

**Scientific specialty:** 03.03.01

**Supervisor:** Prof. Dr. Ivan Filipov, PhD.

### 1. General presentation of the procedure and the doctoral student

The presented set of materials on paper / electronic media is in accordance with Art. 115 (1) of the Procedure for the acquisition of the the educational and scientific degree "Philosophy Doctor" at the MU - Plovdiv; Regulations of MU-Plovdiv from 2014 and includes the following documents:

- Application to the Rector of MU-Plovdiv for disclosure of the procedure for the defense of a dissertation work
- CV in European format with the doctoral student's signature
- A notarized copy of a master's degree diploma
- Orders for enrollment in doctoral studies, for deduction with right of defense
- A record of a passed exam or doctoral minimum in the specialty
- Protocol of the departmental council for preliminary discussion of the dissertation work and the decisions taken for the disclosure of the procedure and for the composition of the scientific jury
- Dissertation work
- Abstract
- A list of scientific publications on the topic of the dissertation
- Copies of scientific publications
- List of participations in scientific forums
- Declaration of originality and authenticity of the attached documents
- Certificate of completion of studies at the doctoral school of the MU Plovdiv

The submitted documents are in full compliance with the requirements of this procedure.

Dr. Nikolay Maksimov Simeonov was born on May 3, 1991. Graduated from "Academic Kiril Popov" High School of Mathematics. He graduated in the professional qualification of Master of Dental Medicine in 2018 from MU Plovdiv. He is currently a final year specialist in Operative dentistry and endodontics. Since 2018, he has been an assistant in the department of "Operative Dentistry and Endodontics" at the MU Plovdiv. He speaks English at B2 level, and German at a good level. Since March 2023, he has been a doctoral student in a self-preparatory form of study at the Department of Operative Dentistry and Endodontics.

## **2. Relevance of the topic**

The dissertation is devoted to the problem of the possibility of the dentinal wound created by means of dentin preparation with an Er:YAG laser to provide a quality substrate for bonding with a light-cured composite obturation and the characteristics of the created adhesive layer.

Different types of lasers are increasingly being used in everyday dental practice. At the same time, the surface of the laser-prepared dentin and the dentin wound obtained by rotary instruments differ qualitatively. This is a new problem for clinical practice, and I believe that the research and evidence-based recommendations for dentists related to this topic are current and timely.

## **3. Knowing the problem**

I believe that Dr. Simeonov shows solid knowledge regarding the scientific issues of the dissertation work. Scientific information is presented in a structured way, analyzed with understanding.

## **4. Research methodology**

The chosen research methods make it possible to carry out research on the formulated tasks.

## **5. Characterization of the dissertation work and assessment of contributions**

- **The dissertation** contains 165 pages and is illustrated with 18 tables and 49 figures. Structurally, the proportional relationships between the main parts of the dissertation have been respected.
- **The literature reference** contains 192 sources, of which 10 are in Cyrillic and 182 are in Latin
- **The literature review** logically and in detail presents information that is related to the main topic of the dissertation work and in this sense fully covers the requirements for it.

- **Aim and tasks**

The aim proposed on the basis of the analysis of the literature review and the defined, unsolved problems according to Dr. Simeonov, is correctly formulated. Conducting research on the tasks, analysis and discussion of the obtained results are capable of objectively contributing to the achievement of the formulated goal.

- **Materials**

The material for the assignments is sufficient, carefully selected according to strict criteria and correctly distributed. The criteria for the selection of dental material for both in vitro and clinical research are well specified. Statistical methods are precisely and skillfully selected for processing the obtained results.

- **Results and discussion:**

**The first task** is a survey of the opinion of dentists regarding the use of lasers and adhesive systems. The results of the survey show that the most preferred adhesives are the two-step ones with etch-and-rinse, and the dentists in our country are not aware if the adhesive system they use contains MDP. The laser is not preferred for etching hard dental tissues, and impaired marginal adaptation is common in dental practice and is a common reason for replacing a failed obturation.

**The second task** was conducted as an in vitro study by micromorphological assessment of the adhesive layer and the penetration of a self-etching adhesive system into dentin prepared with an Er:YAG laser using a confocal laser scanning microscope. The processing and discussion of the obtained results lead to the formulation of several conclusions. In the samples prepared with Er:YAG laser and Clearfil SE Bond 2 adhesive system applied, a significantly greater resin-tags length ( $>32.67 \mu\text{m}$ ) was demonstrated compared to samples in which Clearfil SE Bond 2 adhesive system was applied, not an Er:YAG laser was used, but a rotary mechanical removal tool. This effect was observed regardless of duration.

**The third task** is devoted to the composition of an elemental analysis of dentin and adhesive layer during preparation with an Er:YAG laser using an energy dispersive spectrometer

The results of this study show that different methods of dentin preparation lead to differences in the chemical composition of the dentin surface.

**The fourth task** is a clinical study focusing on the clinical evaluation of direct composite restorations in Class I cavities of vital teeth prepared with Er:YAG laser or rotary instruments and a self-etching adhesive system containing 10-MDP. In this assignment, the PhD student also investigates the relationship with the patient's caries risk. Based on the

obtained and statistically processed results, it was concluded that at a follow-up of one year, the preparation of hard dental tissues with Er:YAG laser does not differ from the preparation with classic rotary instruments in terms of obturation of Class I carious lesions. The preparation of hard dental tissues with the Er:YAG laser and the use of a self-etching adhesive system with 10-MDP can be successfully applied in dental practice. Regarding caries risk, it is expected to reduce the clinical durability of direct composite restorations, regardless of the preparation method used.

**The fifth scientific objective** summarizes the conclusions drawn and the clinical experience of the PhD student by synthesizing them into 8 practical guidelines for removing dental caries with the Er:YAG laser.

- **Contributions:** I consider the self-assessment of the contributions from the developed scientific work to be correct - original and of a confirmatory nature..
- It is my opinion that the general recommendations to the dentists regarding the removing of dental caries with the Er:YAG laser have their structural place as a separate part of the thesis, parallel to the contributions, and not as formulated as the fifth task. I have described this in "critical notes".

## 6. Assessment of the PhD student's publications and personal contributions

On the basis of what has been said so far, I fully accept that Dr. Simeonov's survey, in vitro experiments and clinical research, the results obtained from them, the conclusions drawn and recommendations presented clearly in the dissertation work and the author's abstract to it, contribute to supplementing the scientific and clinical knowledge regarding the interaction between a dentinal wound created as a result of Er:YAG laser treatment and a self-etching adhesive system containing MDP. The problem of the quality of the adhesive layer, the long-term influence on the clinical condition of obturation are systematically analyzed. Conclusions, contributions and clinical recommendations are made.

The dissertation work was carried out entirely by the doctoral student under the supervision of his supervisor. In connection with his dissertation work, the author has promoted his scientific developments in 4 full-text publications and 2 scientific communications.

### Critical notes

In terms of structure, I believe that the fifth scientific objective formulated by the doctoral student is rather a separate part of the dissertation. Recommendations that are of high clinical value have their logical place after the contributions, not as a separate task. The description of the recommendations in a meaningful and structural plan does not correspond to the required development of the scientific objective as a structural and meaningful part of the dissertation - with the materials and methods, the results and their discussion, and the conclusions.

Заличено на основание  
Чл.5 §1, б. "В" Регламент (ЕС)2016/679

## **Abstract**

The abstract of the dissertation work is properly structured, well illustrated and corresponds to the main parts of the development. I believe that it is presented in the appropriate volume required by the rules laid down in the Regulations for the Development of the Academic Staff of the MU Plovdiv, as well as in proportion to the full volume of the scientific development.

## **Conclusion**

Dissertation work of Dr. Nikolay Maksimov Simeonov is comprehensive and complete and represents his own contribution to science. The scientific work, as well as the publications on the subject, show that the PhD student has the theoretical knowledge of the treated problem and the skills to independently conduct research. Good professional skills, in-depth knowledge are evident throughout the course of the dissertation project, in which theoretical literary data, own results and their interpretation are meaningfully and logically arranged, the most important conclusions are drawn and practical recommendations are created. In this way and in this sense, I consider that the set goal has been fulfilled.

The derived results and conclusion are original and applied in nature.

The dissertation contains applied results, **which represent an original contribution to science and meet all** the requirements of the Development of the Academic Staff of the Republic of Bulgaria Act (DASRBA), the Regulations for the Implementation of the DASRBA and the Regulations of the Academy of MU - Plovdiv. The presented materials and the dissertation results fully meet the specific requirements adopted in connection with the Regulations of the Ministry of Education - Plovdiv for the application of the DASRBA.

My opinion is that Dr. Simeonov and his dissertation have the necessary merits and deserve to be evaluated positively.

Due to the mentioned above, I confidently give my **positive assessment and propose to the honorable scientific jury to award the educational and scientific degree "Philosophy Doctor"** to Dr. Nikolay Maksimov Simeonov, in the doctoral program in Therapeutic Dentistry.

Varna  
09.01.2023г.

  
/Assoc. Prof. Dr. Maya Doychinova, PhD/