

REVIEW

by Assoc. Prof. Dr. Elena Ilieva Firkova, MD, PhD, DDS
Department of Periodontology and Oral Diseases, Faculty of Dental Medicine,
Medical University - Plovdiv

Concerning dissertation for awarding the educational and scientific degree 'doctor'
professional field Dental Medicine
doctoral program "Periodontology and diseases of the oral mucosa"

Author: Dr. Ivan Venkov Nachkov

Form of doctoral studies: independent preparation

Department: "Periodontology and oral diseases", Faculty of Dental Medicine, Medical University
- Plovdiv

Topic: Laser-assisted therapy of periimplantitis with Er: YAG laser

Scientific advisers: Assoc. Prof. Dr. Georgi Tomov, MD; Faculty of Dental Medicine, Medical
University - Plovdiv; Prof. Dr. Plamen Zagorchev, PhD, PhD, Faculty of Pharmacy, Medical
University - Plovdiv;

1. General presentation of the procedure and the PhD student

The presented set of materials on electronic media is in accordance with Article 70 (1) of
Section I. Acquisition of educational and scientific degree "DOCTOR" MU-Plovdiv; Regulations
of MU-Plovdiv from 28.01.2021 and includes the following documents:

- Application to the Rector of MU-Plovdiv for disclosure of the procedure for defense of the
dissertation;
- Curriculum vitae in European format with the signature of the doctoral student;
- Notarized copies of the diploma for higher education and the appendix to it;
- Order and protocol from the extended department council for enrollment in doctoral studies
of independent preparation and order for expulsion with the right to defense;
- Protocol for passed exam - doctoral minimum in the specialty;
- Minutes of the department council for preliminary discussion of the dissertation and the
decisions taken to open a procedure for deduction with the right to defense and for the composition
of a scientific jury;
- Dissertation work;
- Abstract;

- List and copies of scientific publications on the topic of the dissertation;
- Information cards of the National Center for Information and Documentation for Defensive Dissertation in Bulgarian and English.
- Certificate for received credits from the training according to the group curriculum;
- Declaration of originality and authenticity of the attached documents;

The doctoral student has attached 3 publications related to the topic of the dissertation, 2 of which are in non-refereed editions and 1 - in refereed, still in print.

2. Brief biographical data.

Dr. Ivan Nachkov was born in 1977. He graduated in dental medicine and obtained a Master's degree in 2004, and in 2013 he graduated in medicine. He has a specialty in maxillofacial surgery since 2009, and in the period 2017 - 2020 he specialized in dental implantology. Dr. Nachkov has been working as an assistant in the Department of Periodontology and diseases of the oral mucosa since 2013; works as an intern in a clinic of maxillofacial surgery at MHAT "St. Panteleimon" and in DCC "Pulmed" - Plovdiv.

3. Relevance of the topic of the dissertation and expediency of the set goals and objectives

The incidence of periimplantitis worldwide is 22%. It is constantly growing due to the increasing number of implants placed every year. The treatment approaches for this specific inflammatory disease are conservative (mechanical cleaning, disinfection) and surgical (bone and soft tissue regeneration and augmentation).

In the last decade, the possibilities of diode, Er: YAG, CO₂, Er, Cr: YSGG and Nd: YAG lasers for impact on the biofilm on the implant surface have been actively studied, as mechanical means (curettes, ultrasonic tips and air-abrasive systems) can damage the titanium surface and contribute to bacterial colonization and, accordingly, recurrence or aggravation of the process.

The results of studies with different lasers are still mixed and there is no consensus regarding the type of lasers, their parameters, their integration into treatment protocols and their effectiveness for the treatment of periimplantitis. In this regard, the dissertation of Dr. Nachkov, examining the effects of Er: YAG under certain experimental conditions and in a clinical study, is quite relevant. The results and especially the temperature changes in and around the implant after irradiation of the surfaces with Er: YAG, CO₂ and diode laser at this stage are a contribution to the current knowledge on the problem.

4. Knowledge of the problem

The doctoral student Dr. Ivan Nachkov knows the current state of the discussed problem, analyzes and interprets the scientific information. The literature review on the topic was prepared on the basis of a total of 326 literature sources. 8 of them are by Bulgarian authors, and 6 are dissertations in the respective field.

5. Research methodology

The selected research methods allow to achieve the set goal and obtain adequate results of the tasks set in the dissertation.

6. Characteristics and evaluation of the dissertation

The dissertation work of Dr. Nachkov is presented on a total of 194 computer pages, 28 of which are cited bibliographic sources and 9 - the appendices.

The literature review is detailed and well structured. It ends with an analysis of the clinical effectiveness and potential of lasers for integration in the treatment of periimplantitis, which leads to the formulated goal of the dissertation. The conducted experimental (3 main, with subtasks to each) and 1 clinical task correspond to the set goal. The materials and methods used in each task are described in detail and illustrated with photographs. The results and the discussion are systematized and arranged according to each of the set tasks, followed by the conclusions. The results are illustrated with 5 tables and 71 figures.

The results, their discussion and the conclusions are directly related to the set tasks.

7. Contributions and significance of development for science and practice

The contributions of scientific and scientifically applied nature in the dissertation of Dr. Nachkov are presented in summary:

- Conducted for the first time in Bulgaria electron microscopic examination of implant surfaces treated with Er: YAG laser;
- The reflection coefficient from the titanium surface during laser treatment has been established;
- The temperature changes in the operative field of a thermostated biological model are clarified, which most closely resembles the physiological conditions in the oral cavity;
- Registration of temperature changes in real time through a thermal camera during irradiation;
- Surgical protocol for Er: YAG laser-assisted therapy of periimplantitis.

The study of temperature changes in titanium implant and in the implant interface by thermometry with infrared chamber and thermocouples after irradiation with diode, CO₂ and Er: YAG is an indisputable contribution. It is important for clinical practice to conclude that only the Er: YAG laser, with standard parameters, provides safe application.

8. Evaluation of publications related to the dissertation

Dr. Nachkov presents 3 full-text publications. 1 of them - "Temperature limits during irradiation in laser-assisted treatment of peri-implantitis - laboratory research" is accepted and is published in a referenced edition. The other two are in unreferred editions.

No evidence of participation in national or international scientific forums has been provided.

9. Personal participation of the doctoral student

In my opinion, the personal participation of Dr. Nachkov in the formulation of the scientific thesis, goals and tasks and their practical implementation is indisputable and are his personal merit, successfully coordinated with his supervisors - Assoc. Prof. T. Tomov and Prof. Pl. Zagorchev

10. Abstract

The abstract of Dr. Nachkov has been prepared according to the requirements of the relevant regulations and essentially reflects the structure of the dissertation.

11. Critical remarks and recommendations.

I have no critical remarks on the final version of the dissertation.


CONCLUSION

The dissertation contains scientific, scientific-applied and applied results, which represent an original contribution to science and meet all the requirements of the Academic Staff Development Act in the Republic of Bulgaria (LDASRB), the Regulations for implementation of LDASRB and the Regulations of MU - Plovdiv. The presented materials and dissertation results correspond to the specific requirements adopted in connection with the Regulations of MU - Plovdiv for application of LDASRB.

The dissertation shows that the doctoral student Dr. Ivan Venkov Nachkov has theoretical knowledge and professional skills in the scientific specialty "Periodontology and diseases of the oral mucosa" and has the qualities and skills for independent research.

Due to the above, I give my positive assessment of the presented dissertation, abstract, results and contributions, and **I offer the esteemed scientific jury to award the educational and scientific degree 'Doctor' to Dr. Ivan Venkov Nachkov** in a doctoral program in "Periodontology and Diseases of the oral mucosa. '

29.11.2021 г.

Reviewer.....
Assoc. Prof. Dr. Elena Firkova, MD, PhD, DDS