



Review of PhD „Doctor“

REVIEW

of Prof. Angelina Pecheva Vlahova-Petrova, DMD, PhD

Head of the Department of Prosthetic Dentistry,

Faculty of Dental Medicine, Medical University-Plovdiv, Bulgaria

Of Dissertation for PhD Degree '**Doctor**'

Professional direction: Dental Medicine

Doctor's program: Prosthetic Dentistry

Author: Dr. Yanko Dimitrov Zhekov

Form of dissertation: self-preparation

Department: Prosthetic Dental Medicine

Topic: *“Speciality in the application of fibrous composite splints, made by CAD / CAM technology, in the treatment of periodontally damaged teeth”*

Scientific Supervisor: Prof. Christo Kissov, DMD, PhD and Assoc. Prof. Elena Firkova, DMD, PhD

1. General presentation of the procedure and the PhD student

The presented set with the materials on paper and electronic variant is in accordance with Article 115 (1) of the Procedure for PhD Defense of MU-Plovdiv; Regulations of MU-Plovdiv (2021) and includes the following documents:

- Report to the Rector of MU-Plovdiv for disclosure procedure of PhD defense
- Signed CV in European format
- notarized copy of university diploma
- orders for PhD student and for deduction with the right to make final defense
- order for individual plan exam and protocol of PhD student exam according to the specialty
- protocol of department meeting for discussion of the dissertation with decisions for starting procedure of final defense and choice of scientific jury

- Dissertation
- Abstract book
- list of publications connected with the topic of the dissertation
- copies of the publications
- list of participations in scientific forums
- list of noticed citations
- declaration of originality and reliability of the documents
- other documents.

The PhD student has 3 publications (1 of them in referred journal) and 3 participations in scientific forums.

Notes and comments for the documentation:

The documents are properly prepared and submitted.

2. Short CV data of the PhD student

Dr. Yanko Dimitrov Zhekov was born in the town of Kardzhali.

He graduated from high school in “Christo Botev” language school with German language in 2009. From 2009 to 2015 he was a student of Dental medicine at FDM-Plovdiv. Since 2016 he has been a specialist in the Department of Prosthetic Dentistry. Since 2017 he has been an Assistant Professor in the Department of Prosthetic Dentistry. In 2020 he acquired a degree in Prosthetic Dentistry. He is a member of BDA and BAES.

3. Relevance of the topic and expediency of the aim and the tasks of the dissertation

Pathological mobility of the teeth can be eliminated by splinting them. The active development of dental materials in the late 20th century led to the development of new methods for immobilizing teeth. Composite splints reinforced with glass or polyethylene fibers are widely used. These splints are durable, do not cause discomfort and meet the aesthetic requirements of patients, which have recently increased sharply. However, when they are used, retention areas are created, which favor the growth of microorganisms and impair oral hygiene, which in turn reduces the service life of the splinting structure.

Currently, CAD/CAM technologies are widely used in Dentistry, allowing to obtain accurate and at the same time aesthetic designs, reproducing all planned parameters, such as shape, thickness

of the fixing layer, distance to the gum edge and the cutting edge of the tooth. The use of CAD/CAM technology minimizes the human factor influencing the accuracy of the restorations.

Problems with milling accuracy, the choice of materials for these purposes and fixing materials remain unresolved. The ways to solve them lie in the study of the physical and mechanical properties of structural materials, the study of polishability and adhesive properties of fixing materials.

All of these facts make the topic of the dissertation actual and appropriate.

The dissertation aim and tasks are clear, precise and understandable formulated.

4. Knowledge of the problem

The PhD student Dr. Yanko Dimitrov Zhekov has an excellent knowledge about the problem and creative evaluation about the material. A proof of this is the detailed literature review based on 229 literature sources, 68 of them on Cyrillic, richly illustrated with figures and photos.

5. Methods of the investigation

The chosen methods of the investigation allow achievement of the aim and tasks of the dissertation.

6. Characteristics and evaluation of the dissertation

The dissertation of Dr. Zhekov has 186 pages, 25 of which Bibliography and 7 applications.

According to the literature review the wide range of the Bibliography gives the impression (229 literature sources, 68 of them in Cyrillic). The used literature is present (after 2010).

The literature review is detailed and well structured.

The aim and the tasks of the dissertation are formulated according to the topic.

The presentation and the illustration with figures and graphics of the own investigations is on the desired level according to the materials and the methods.

The results are systemized and arranged according to the tasks. They are illustrated with photo material, final tables and schemes.

The discussion is made following the present requirements for the structure of the dissertation, separately for every task. There are also tables and diagrams with the statistical data.

The conclusions are in a direct connection with the evaluated results.

The contributions present the modern focus of the dissertation.

7. Contribution and significance of the dissertation for the science and practice

The contributions of the dissertation of Dr Zhekov are systemized and divided into two groups: with confirmatory and with scientific-practical character.

Contributions with confirmatory character

1. It has been established that there is no universal method for unraveling materials for CAD / CAM technology that will be adhesively cemented.

2. The roughing of the Trilor and BioHPP materials showed the best results when treated with a sandblasting machine. Other rake methods can be used as an alternative to sandblasting.

3. The use of Er: YAG laser to create a retention surface can be used as an alternative to sandblasting in Trilor and Vita Enamic fibrous composite material.

4. The use of a diamond bur for roughing gives the best results in ZrO₂ ceramics and Vita Enamic hybrid ceramics.

5. Chemical glazing of the materials used in the study shows better results compared to polishing except for ZrO₂ ceramics where similar results are observed.

6. It was found that from the materials used in the study for CAD / CAM technology it is possible to make extracoronary splints.

7. Clinical follow-up examinations at 6 months and 1 year show fibrous composite material as suitable for splinting periodontally damaged teeth.

Contributions with scientific-practical character

1. For the first time, a load element of a universal testing machine is modified in order to conduct a connection strength test according to an international standard.

2. Prototypes have been developed which allow two-way testing of the bond strength.

3. For the first time a laboratory protocol for planning and manufacturing of extracoronary splints using CAD / CAM technology has been developed and recommended.

4. For the first time a clinical protocol for cementation of extracoronary splints made with CAD / CAM technology has been developed and recommended, based on laboratory results and tested in clinical conditions.

5. BioHPP was first used to make coronary splints.

6. For the first time, fibrous composite material for CAD / CAM technology is used to make extracoronary splints.

8. Assessment of the dissertation publications

The full text publications and participations associated with the dissertation of Dr Zhekov are 6 and can be classified of:

- full text publications – **3, 1 of them in referred journal in English** (Journal of IMAB), 1 in a textbook of Scientists Union in Bulgaria, Plovdiv and 1 in non-referred journal in English (International Journal of ScienceandResearch (IJSR));

- participations in conferences - **3**, all of them on international conference „Международной научно-практической конференции, посвященной 110- летию профессора В.Ю.Курляндского-Современны материалы и технологии в ортопедической стоматологии “. Moscow, Russia.

9. Personal engagement of the PhD student

According to my opinion the personal engagement of Dr Zhekov in the dissertation study is dominant and the approved contributions and the final results are his own personal merit and a merit of his Scientific Supervisors Prof. Kissov and Assoc. Prof. Firkova.

10. Abstract book

The Abstract book of Dr Zhekov is designed according to the requirements and presents the main results of the dissertation.

The contents and the quality of the Abstract book meet the requirements.

11. Critical notes and recommendations

I have no critical notes connected to the final variant of the dissertation.

12. Personal impressions

Dr. Zhekov is hardworking and ambitious. He has a potential for academic development, and I hope that he will become a Chief Assistant Professor soon.

13. Recommendations for future application of the dissertation contributions and results

I recommend to Dr. Zhekov to continue his work in the field of the application of fibrous composite splints, made by CAD / CAM technology, in the treatment of periodontally damaged teeth, and to improve his clinical experience in this area.

CONCLUSION

The dissertation has scientific, scientific-practical and practical results that are an original contribution in the science and respond to all the requirements of the Law for academic development in Bulgaria (ЗПАСРБ), the Regulations of ЗПАСРБ and the Regulations of MU-Plovdiv. The materials and results of the dissertation respond to all the specific requirements of MU-Plovdiv.

The dissertation present that the PhD student Dr. Yanko Dimitrov Zhekov has exhaustive theoretical knowledge and professional skills of the scientific specialty “Prosthetic Dentistry” and demonstrates qualities and abilities for self-conduct scientific study.

Due to the above, I confidently give my **positive assessment** for the investigation presented in the Dissertation, Abstract book, Results and Contributions, and propose to the honorable scientific jury to award an educational and scientific degree „Philosophy Doctor (PhD)” to Dr. Yanko Dimitrov Zhekov in PhD program of Prosthetic Dentistry”.

15. 11. 2021

Plovdiv

Reviewer:
(Prof. Angelina Vlahova, DMD, PhD)