



REVIEW

By Prof. Dr. Diyan Andonov Slavchev, PhD, Department of Prosthetic Dental Medicine, Faculty of Dental Medicine, Medical University – Plovdiv

of dissertation for the awarding of the educational and scientific degree "**Doctor**" in the field of higher education 7. "Healthcare and Sports", in the professional field 7.2 "Dental Medicine" and the scientific specialty "Prosthetic Dental Medicine". Department of Prosthetic Dental Medicine, Faculty of Dental Medicine, Medical University – Plovdiv.

Autor: Dr. Viktor Yordanov Hadzhigaev

Форма на докторантурата: самостоятелна подготовка

Department: Prosthetic Dental Medicine, Faculty of Dental Medicine, MU – Plovdiv

Тема: "APPLICATION OF ENDOCROWNS AS BRIDGE RETAINERS"

Scientific supervisor – Assoc. Prof. Dr. Stefan Zlatev, PhD:

Prosthetic Dental Medicine, Faculty of Dental Medicine, MU – Plovdiv

1. General Overview of the Procedure and the Doctoral Candidate

The submitted set of materials on paper/electronic media complies with Article 70 (1) of Section I: Awarding the Educational and Scientific Degree "Doctor" and the Scientific Degree "Doctor of Sciences" at the Medical University – Plovdiv, according to the Regulations of the Medical University – Plovdiv dated January 28, 2021. The submitted materials include the following documents:

- An application to the Rector of the Medical University – Plovdiv to initiate the procedure for the defense of the dissertation.
- A curriculum vitae in European format signed by the doctoral candidate.
- A notarized copy of the higher education diploma.
- Orders for enrollment in the doctoral program, suspension of studies (due to maternity leave), continuation of studies, and withdrawal with the right to defend.
- An order for the conduct of an examination from the individual plan and the corresponding protocol for passing the examination or the doctoral minimum in the specialty.
- A protocol from the departmental council for the preliminary discussion of the dissertation and the decisions made regarding the initiation of the procedure and the composition of the scientific jury.

- The dissertation.
- Summary of a PhD thesis
- A list of scientific publications related to the dissertation topic.
- Copies of the scientific publications.
- A list of participations in scientific forums.
- A list of citations noticed.
- A declaration of originality and authenticity of the attached documents.
- Other documents related to the procedure's progress.

The doctoral candidate has included three full-text publications.

The submitted documents fully comply with the requirements specified in the Regulations for the Application of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations of the Medical University – Plovdiv.

2. Brief Biographical Data of the Doctoral Candidate

1993 – 1998: Secondary Education. French Language High School "Antoine de Saint-Exupéry," Plovdiv, Bulgaria.

1998 – 2004: Higher Education - Master's Degree in Dental Medicine, Faculty of Dental Medicine, Medical University – Plovdiv.

September 10, 2006: Joined the Department of Prosthetic Dental Medicine as an assistant after successfully passing a competitive exam.

2010: Acquired a specialization in Prosthetic Dental Medicine.

Dr. V. Hadzhigaev continues to work in the Department of Prosthetic Dental Medicine to this day.

Over his eighteen years of experience in the Department of Prosthetic Dental Medicine, Dr. Hadzhigaev has demonstrated remarkable achievements and significant scientific publication activity. He has authored sixteen full-text publications in both national and international journals.

He has participated in fourteen practical courses and seminars, mainly held in Germany, Austria, Italy, and Bulgaria, to enhance his knowledge in the field of Prosthetic Dental Medicine, specifically in implantology, prosthetics and aesthetics, periodontal issues, and prosthetic constructions.

Dr. Hadzhigaev delivers lectures and presentations related to CAD/CAM technologies, treatment of patients with severe occlusal-articulation disorders, periodontal disease treatment through prosthetic methods and tools, as well as aspects of implant treatment.

The diversity of Dr. Hadzhigaev's interests in Prosthetic Dental Medicine has undoubtedly led to the conception, maturation, and realization of the topic of his dissertation.

3. Relevance of the topic and appropriateness of the set goals and tasks

The dissertation provided for review is relevant as it explores the possibilities of using modern digital technologies to address problems associated with classical techniques for severely damaged dental crowns. The author sets the ambitious goal of applying endocrowns as bridge retainers. This approach shortens both the clinical and laboratory protocols. According to the presented literature review, endocrowns have been applied as a standalone method for treating severely damaged dental crowns that have undergone endodontic treatment. The author of the dissertation investigates their potential use as bridge retainers.

The objective of the dissertation encompasses contemporary technologies (computer simulations) as well as classical methods of clinical and laboratory research.

The four tasks, with two subtasks in the second task, logically follow the set objective.

The subtasks of the second task are of the greatest relevance:

- Validation of a method for studying complex geometric objects;
- Investigation of the bonding surface area with different preparation designs.

4. Understanding of the Problem

Achieving high therapeutic, functional, aesthetic, and prophylactic outcomes following endodontic treatment is a multifaceted process that requires extensive knowledge. From a prosthetic perspective, it is necessary to consider factors such as the statics (stability of the construction), strength,

and optimal aesthetics. This complexity in the interaction of all components leads to optimal results in prosthetic restorations.

In his comprehensive presentation of the dissertation, Dr. Hadzhigaev demonstrates a very high level of understanding of the issues related to the design and fabrication of endocrowns. Going beyond the usual, he focuses on the application of endocrowns as bridge retainers.

The issue addressed is not new only in our country; it is also a global concern. Dr. Hadzhigaev illustrates this with Figure 1. Over a twenty-year period, publications on the topic have increased from one and a half in 1999 to 37 in 2020.

Dr. Hadzhigaev takes a creative approach to analyzing and interpreting the literature review, as well as in discussing and analyzing the data obtained.

5. Research Methodology

The chosen research methodology allows for the achievement of the set objective and provides an adequate response to the tasks addressed in the dissertation.

6. Characteristics and evaluation of the dissertation

The dissertation submitted for my review meets all the requirements regarding its structure. It is composed of seven chapters, including an introduction, a literature review, objectives and tasks, materials and methods, results and discussion, conclusions and contributions, and a reference section that includes the bibliography, appendices, publications, and participation.

The literature review spans thirty-three pages and references a total of 244 sources, 16 of which are in Cyrillic and 228 in Latin script. The review discusses the fundamental factors related to prosthetic restorations, covering the historical, classical methods and advancing to modern CAD/CAM technologies and materials.

The literature review concludes with an analysis of clarified, debated, and unresolved questions—the use of endocrowns as bridge abutments. This conclusion serves as a starting point for setting the objectives and tasks of the dissertation.

The goal is clearly formulated, along with the four tasks derived from it and two sub-tasks under the second task. The materials and methods are appropriately presented according to the stated tasks and sub-tasks.

The conducted research is suitable for obtaining reliable results after statistical processing. For the completion of the second task, high-tech equipment with corresponding software and the required number of experimental bodies were used.

The materials and methods used for the third task are entirely adequate for obtaining reliable results. To address the third task, high-tech equipment and machines were utilized to achieve the final results.

Task Four is clinical in nature and involves the evaluation of all-ceramic bridge constructions. To this end, 22 participants were selected who met eight pre-established criteria. The initial selection of participants was conducted randomly, and final selection was made using the American Dental Association (ADA) method with a step of $n=3$. Each patient provided informed consent, approved by the Ethics Committee of MU-Plovdiv. The observation period for the clinical evaluation of the all-ceramic bridge constructions spanned ten years, from September 2012 to March 2022. For each patient, a card was created that included criteria for the clinical evaluation of the restorations, as well as methods for observation and assessment.

The obtained results are a consequence of the use of statistical methods and functions that are accurately described. The data are presented in two tables and seventeen charts, which are well-structured and easy to interpret.

The discussion of the results is thorough and accurate, based on the data obtained from the author's own research on the set tasks. There are results of a confirmatory nature, as well as some that are fundamentally different from the findings of other authors cited in the literature review.

7. Contributions and Significance of the Research for Science and Practice

From the research conducted in the dissertation, the candidate Dr. Viktor Hadzhigaev makes eight conclusions that are relevant for dental practice. The use of modern technologies and materials indicates that endocrowns have a promising future due to reduced clinical and laboratory protocol times, as well as fewer visits required for the restoration of heavily damaged teeth with prosthetic methods and materials.

The application of endocrowns increases the adhesive surface area by over 25% compared to conventional restoration methods, which results in higher resistance to debonding under equal conditions.

Alongside the positive aspects, it is important to acknowledge the mechanical strength weakness of the distal connection of the bridge body and the endocrown as a bridge retainer.

The research conducted for the second task, including its two sub-tasks, contributes original findings. For the first time, a protocol for determining irregularly shaped objects in dental practice is

utilized, and macro samples of identical dimensions are created where only one parameter can be altered.

These contributions can be successfully applied in scientific practice, particularly in the study of complex structures such as prosthetic constructions, direct restorations, and post-operative restorations.

8. Evaluation of the publications related to the dissertation

The candidate has included three full-text publications related to the dissertation topic. Dr. Hadzhigaev is the first author in two of these publications and the third author on the third publication.

In addition to the full-text articles, the author has also provided documentation of three participations in scientific forums: Brazil 2012 (IADR), Turkey 2015 (IADR), Bulgaria 2015 (Folia Medica). In all three of these forum participations, Dr. Hadzhigaev is listed as the first author.

9. Personal Contribution of the Doctoral Candidate

The dissertation provided for review is the personal work of the doctoral candidate, Dr. Viktor Hadzhigaev. The results obtained, the conclusions drawn, and the formulated contributions are his personal achievements.

10. Summary of PhD thesis

The Summary of PhD thesis provided for Dr. Viktor Hadzhigaev's dissertation is presented on 57 pages in A⁵ format. It includes the following sections: Table of Contents, Objectives and Tasks, Material and Methods, Results and Discussion, Conclusion, General conclusions, Contributions, Publications and Presentations related to the Dissertation

The abstract is illustrated with 24 color figures of high quality and correctly labeled. Additionally, it includes 14 diagrams and 2 tables. The visual material described is based on conducted research, both laboratory and clinical, and the results subjected to statistical analysis.

The abstract encompasses all the sections of the dissertation and provides sufficient detail to support the thesis of the scientific research. The author emphasizes the conclusions drawn and the contributions of the dissertation.

Based on the above, I believe that the abstract meets the requirements regarding content and quality, as well as the main results achieved in the dissertation.

11. Critical Remarks and Recommendations

Based on the discussion so far, there are no critical remarks to be made.

Regarding recommendations, I advise Dr. Hadzhigaev to promote this method of constructing prosthetic devices. In the near future, additional materials used in prosthetic restorations, suitable for contemporary technologies such as printing and milling, could be included in the research.

12. Personal Impressions

I have known Dr. Viktor Hadzhigaev since he was a student. I have gained more impressions of him after his appointment as a full-time assistant in the Department of Prosthetic Dental Medicine, following a successfully passed competitive examination. Over the years, Dr. Hadzhigaev has established himself as a leading prosthodontist and a sought-after assistant by students. His proficiency in three foreign languages at a very high level enables him to work effectively with English-speaking students (6th year students - interns). Throughout his long career, Dr. Hadzhigaev has proven to be a colleague willing to assist anyone eager to learn from his knowledge in dental medicine.

13. Recommendations for Future Use of the Dissertation's Contributions and Results

The creation of a digital protocol for determining the surface area of irregularly shaped objects such as teeth, dental abutments, and prosthetic construction holds significant importance for prosthetics, direct restorations, and post-resection prostheses. This method should be popularized and adopted as a research approach that allows for predictability of treatment outcomes.

CONCLUSION

The dissertation *contains scientific, applied scientific, and practical results that represent an original contribution to science and meet all the requirements* of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the Implementation of LDASRB, and the corresponding Regulations of the Medical University - Plovdiv. The presented materials and dissertation results **fully** comply with the specific requirements of the Medical University – Plovdiv.

The dissertation shows that the doctoral candidate, Dr. Viktor Hadzhigaev, **possesses** in-depth theoretical knowledge and professional skills in the scientific specialty within the field of Higher

Education 7. Healthcare and Sports, Professional Field 7.2. Dental Medicine; Prosthetic Dental Medicine. It also **demonstrates** his abilities and skills for conducting independent scientific research.

Based on the above, I confidently give my **positive** evaluation for the research conducted, as presented in the reviewed dissertation, abstract, achieved results, and contributions. **I recommend that the esteemed academic committee award the educational and scientific degree of 'Doctor'** to Dr. Viktor Hadzhigaev in the doctoral program in Prosthetic Dental Medicine.

23. 08. 2024. г.

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

Reviewer...
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