REVIEW

by

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Member of the scientific jury by order № R-109-312 / 21/07/2025 of the Rector
of MU – Varna

On dissertation for awarding the educational and scientific degree

"Doctor of Philosophy"

Topic: Coronary artery pathology in patients with peri-implantitis

Sphere of higher education: 7. Health and sports

Professional field: 7.2. Dental Medicine

Scientific specialty: Therapeutic Dentistry

Author: Velislava Deyanova Slavova

Form of doctorate programme: regular

Department: Periodontology and dental implantology, FDM, MU – Varna

Scientific supervisor: Prof. Stefan Vasilev Peev, DMD, PhD, DSc

GENERAL PRESENTATION OF THE PROCEDURE AND THE PHD STUDENT

The presented set of documents and materials is prepared in compliance with the requirements of the LDASRB, the Regulations for its implementation, art. 69 of the Regulations for the development of the academic staff at the MU – Varna, and includes:

1. Enrollment order № R-109-464 / 03/11/2020;
2. European form of CV signed by the author;
3. Copy of the diploma of completed Master's degree and copy of the diploma of acquired specialty;
4. Doctoral minimum exam reports – in the specialty and in foreign language;
5. Protocol from the Department's Council №123 / 15/07/2025 with positive decision on the readiness for defense;
6. Deduction order № R-109-312 / 21/07/2025 for the right to defense;
7. Declaration of originality;
8. List of publications related to the topic of the dissertation;
9. Copies of the same publications;
10. Dissertation;
11. Abstract;
12. Declaration of credibility of data and of registered scientific profiles;
13. Declaration of registered scientific profiles;
14. Similarity reference;
15. Reference for registered scientific profiles.

Biographical data of the PhD student

Dr. Velislava Deyanova Slavova is born on September 30th 1994 in Kubrat. She graduated from high school in 2013 ("St. Constantine Cyril the Philosopher" SGESEL – Ruse), and in 2019 she obtained a Master's degree in Dentistry at Medical University of Varna (diploma №005792). In 2025 she acquired a specialty in Dental Implantology (diploma №5135). Since 2019 Dr. Slavova has been working as an assistant professor at the Department of Periodontology and dental implantology at the Faculty of Dental Medicine, MU – Varna, taking part in the educational course of the subjects "Periodontology and oral diseases" and "Dental Implantology", both in Bulgarian and English.

CHARACTERISTICS AND EVALUATION OF THE DISSERTATION

Relevance of the Topic

The pursuit of a healthier lifestyle in modern society, based on balanced nutrition, physical activity, and preventive healthcare, has led to the development and clinical adoption of innovative and minimally invasive treatment methods. A notable example is implantological treatment, which restores dental arch integrity and aesthetics while simultaneously contributing to the prevention of periodontal disease. Unfortunately, complications are not uncommon. These may be provoked by local factors, such as inadequate treatment planning, insufficient patient preparation, or improper implant placement technique, as well as systemic factors, including smoking, diabetes, osteoporosis, or cardiovascular diseases.

The association between peri-implant infection and cardiovascular disease has long been postulated. This relationship is bidirectional: systemic disease increases the risk of peri-implantitis, while peri-implantitis may contribute to the progression of coronary artery pathology.

For this reason, a dissertation that investigates and compares the etiological characteristics of periodontal, peri-implant, and coronary disease, as well as their interrelationship, is of clear contemporary relevance.

Dissertation Structure

Dr. Slavova's dissertation complies with the requirements of the Regulations for Academic Development at the Medical University of Varna. It consists of 121 standard pages, illustrated with 61 tables, 10 figures, and 7 appendices. The bibliography includes 179 references, of which 1 is in Cyrillic and 178 in Latin script; 72 (40%) of them were published within the last ten years.

Knowledge of the Problem

The introduction is concise and well-focused, guiding the reader to the central research problem. **The literature review** presents the available information on coronary artery pathology in patients with peri-implantitis, with emphasis on peri-implant infection – microorganisms and microbial complexes, mechanisms of inflammation, and diagnostic approaches. Special attention is given to the risk and modifying factors of peri-implantitis, and the similarities and differences with periodontal infection are highlighted. Detailed descriptions are provided of the main periodontopathogens implicated in coronary disease – *Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, Tannerella*

forsythia, and *Treponema denticola*. The etiological and pathogenic mechanisms of atherosclerosis associated with peri-implant infection are also discussed. The analysis points to unresolved questions, particularly the lack of sufficient evidence regarding the relationship between periodontal pathogens and cardiovascular disease, as well as the possibility of preventing the latter through regular periodontal care.

Aim and Objectives

The aim of the dissertation is to investigate the role of periodontal pathogens in the etiology of coronary stenosis in patients with dental implants. **Four objectives** were formulated, which are well-chosen and entirely sufficient for achieving the research aim.

Materials and Methods

Dr. Slavova conducted her research on patients with cardiovascular disease who were indicated for elective or emergency coronary angiography. The primary exclusion criterion was a history of past or current rheumatologic autoimmune disease.

A total of 200 hospitalized patients were screened at the Department of Invasive Cardiology (Second Clinic of Cardiology), University Hospital "St. Marina," Medical University "Prof. Dr. Paraskev Stoyanov," Varna. Based on eligibility criteria, the final study cohort comprised 37 patients with dental implants (included in all objectives), along with a control group of 51 patients with natural dentition (analyzed in Objective 4).

Each eligible patient provided informed consent. Blood samples were taken for complete blood count, coronary angiography was performed, periodontal status was assessed, and peri-implant tissue samples were collected for PCR analysis. For each participant, a clinical record was compiled, including demographic and anthropometric data, medical history (hypertension, diabetes, smoking, angina pectoris, ischemic events), hepatic and renal function, and inflammatory markers. Coronary anatomy was analyzed, and patients were classified according to indications for invasive diagnostics. Periodontal charts included O'Leary's plaque index, Ainamo & Bay's gingival index, periodontal status, and microbiological findings (PCR).

Data analysis was performed using IBM SPSS Statistics and Jamovi Statistical Software, with MS Office Excel 2013 employed for graphical and tabular presentation.

Results and Discussion

With regard to the **first objective**, Dr. Slavova found that angina pectoris was the most common cardiovascular condition in the study group. Overall, patients were in

relatively good health: the majority did not smoke, were non-diabetic, had normal inflammatory markers and hepatic function, though evidence of early-stage renal disease was present. Periodontal and peri-implant conditions were compromised: many patients had peri-implantitis, with *T. denticola* (detected in higher quantities and with greater bacterial load) and *P. gingivalis* identified as the predominant pathogens. Unfortunately, the relationship between biological implant complications and cardiovascular disease remains insufficiently studied, making it difficult to draw generalized conclusions.

The results for the **second objective** established the association between major periodontopathogens and peri-implant inflammation. Inflammation was most pronounced in the molar region, and both plaque and gingival indices correlated with the total microbial load. *T. denticola* and *P. gingivalis* were isolated, but not *A. actinomycetemcomitans*. Higher levels of *P. gingivalis* correlated with peri-implantitis, whereas greater *T. denticola* burden was associated with peri-mucositis. Overall, the findings confirmed published data. An interesting observation was that as peri-implantitis progressed, *T. denticola* levels increased again, while *P. gingivalis* levels declined.

The results for the **third objective** confirmed a correlation between peri-implantitis and coronary disease. Increasing levels of *T. denticola* and *P. gingivalis* were associated with more advanced atherosclerosis, predominantly affecting the right coronary arteries. Diabetes was identified as a significant aggravating factor, whereas smoking appeared to have the opposite effect. These findings are consistent with other reports.

Analysis for the **fourth objective** compared two groups – patients with peri-implantitis and those with periodontitis. General health data were broadly similar, though the control group included more smokers (50%), not all had hypertension, and fibrates were more commonly prescribed. Regarding periodontal infection, the control group demonstrated a higher overall microbial burden, with detection of *A. actinomycetemcomitans* in addition to *P. gingivalis* (at levels similar to the main group) and lower levels of *T. denticola*. In terms of coronary disease, the right coronary arteries were most frequently affected in both groups, but stenosis was more pronounced among patients with peri-implantitis.

Characteristics and Evaluation of the Dissertation

The stated aim and objectives were fully achieved. The thirteen conclusions presented are a logical consequence of the results and are expressed with scientific precision.

Contributions and Significance for Science and Practice

Dr. Slavova classifies her contributions into three categories: original, original for Bulgaria, and confirmatory. This formulation and the contributions themselves (excluding item 3 from the original category) may be accepted.

Evaluation of Publications Related to the Dissertation

The results of the research have been disseminated through three publications. Dr. Slavova is first author on two of them, demonstrating her leading role in the study.

Author's Abstract

The author's abstract consists of 75 pages, presented in appropriate length. It is properly structured, well-illustrated, and corresponds to the sections of the dissertation.

Critical Remarks and Recommendations

Dr. Slavova has addressed the recommendations provided during an earlier stage of the review. Two observations remain: minor errors and inaccuracies are present in places, and the bibliography contains only one Bulgarian-language reference. Nonetheless, the concise presentation of the material is commendable.

CONCLUSION

Dr. Velislava Deyanova Slavova, doctoral student and an assistant professor at the Department of Periodontology and dental implantology at the Faculty of Dental Medicine – Varna has submitted for statement a completed dissertation.

The dissertation meets the criteria for acquiring the educational and scientific degree "Doctor of Philosophy", set out in the Law for development of the academic staff in the Republic of Bulgaria, the Regulations for its implementation, and the Regulations for the development of the academic staff at MU – Varna.

This gives me grounds for **positive assessment and I propose to the esteemed Scientific Jury to award the educational and scientific degree "Doctor of Philosophy"** to Dr. Velislava Deyanova Slavova in scientific specialty of Therapeutic Dentistry.

Varna

25/08/2025   (Assoc. Prof. Miglena Balcheva-Eneva, DMD, PhD)