

Statement for awarding
educational and scientific degree "Doctor"

STATEMENT

from

Assoc. Prof. Dr. Georgi T. Tomov, Ph.D.

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Appointed by order № P-109-87/23.02.2022 for a member of scientific jury about procedure for obtaining the educational and scientific degree "**Doctor**" in a professional field 7.2. *Dental medicine* in the doctoral program "*Orthopedic Dentistry*".

Author: *BORIS YANKOV BORISOV*

Form of doctoral program: full-time education

Department: Dental materials science and propaedeutics of prosthetic dental medicine,
Faculty of Dental medicine in Medical University - Varna

Topic: *TINNITUS AND AUDITORY CHANGES IN PATIENTS WITH TEMPOROMANDIBULAR JOINT DYSFUNCTION*

Scientific supervisors:

*PROF. DR. MARIANA IORDANOVA DIMOVA-GABROVSKA, PhD, DSc
ASSOC. PROF. MARIO PETROV MILKOV, MD, PhD*

1. General presentation of the procedure and the PhD student

The review of the documents shows that the procedure for deduction of the doctoral student and the procedure for declaring the defense are followed, the documents are prepared in accordance with the requirements of the Regulations for development of the academic staff in Bulgaria, the Regulations for its implementation and the Regulations on the terms and conditions for obtaining scientific degrees and holding academic positions at the Medical University - Varna. The doctoral student has given the required **three** full-text publications.

2. Brief biographical data about the doctoral student

Dr. Boris Yankov Borisov graduated in 1997 from the Faculty of Dental medicine at the Medical University - Plovdiv, obtaining a master's degree in Dental medicine. Since 2011, he has been working as an assistant at the Department of Dental Materials Science and Propaedeutics of

Prosthetic Dental medicine in Faculty of Dental medicine in Medical University of Varna. In 2020, he was enrolled as a full-time doctoral student at the same department. In connection with the dissertation, the candidate has published 3 full-text articles in which he is the first author.

3. Relevance of the subject and expediency of the set goals and objectives

The topicality of the problem developed in the dissertation, in scientific and scientific-applied terms, is high. Diseases of the temporomandibular joint have an extremely diverse etiological spectrum - disorders of joint development, inflammatory diseases (arthritis), which are nonspecific, specific, rheumatoid, traumatic, degenerative diseases of the TMJ (arthrosis) - sclerotic and dystrophic, arthritic associated with restricted joint movement - ankylosis and contractures, functional disorders based on anatomical disharmony between the elements of the joint (luxations and subluxations), myofascial dysfunctional pain syndrome and very rarely neoplastic diseases. One of the manifestations of TMJ pathology is the presence of tinnitus. As the etiology of temporomandibular joint disorders is multifactorial, collaboration between different health professionals and the application of an interdisciplinary approach to alleviate tinnitus and other otological symptoms associated with temporomandibular joint disorders are needed. Proper recognition of the etiology of tinnitus is essential for its adequate treatment. In this context, the lack of specific protocols for diagnosis and treatment of these patients in our country is a serious omission, which justifies the main purpose of the presented dissertation.

4. Understanding of the problem

The literature review of the dissertation is highly informative and consistently examines the anatomy of the temporomandibular joint and the ear, the nature and etiology of tinnitus, as well as its epidemiology. A special place is given to the dysfunction of the temporomandibular joint (TMD) and its correlation with tinnitus. A separate chapter is devoted to diagnostic modalities and treatment. The focus of the literature review, however, remains the disorders of TMJ function and the place of the dentist in the multidisciplinary team for diagnosis and treatment of tinnitus in dental patients. The very impressive fact is that in addition to the experience of foreign authors, the doctoral student knows and presents the achievements of the Bulgarian dental school in this field. Since somatosensory tinnitus is a widespread condition, which, however, is rarely correctly diagnosed in the context of TMD and even less often properly and timely treated, B. Borisov makes a reasonable assumption that further studies are needed to clarify the diagnosis and optimizes treatment by creating a unified clinical-diagnostic protocol. The author has repeatedly mentioned that tinnitus is often associated with TMD. According to him, this suggests that the diagnosis and treatment of TMD should be approached interdisciplinary in order to expand and maximize their effect. It can be concluded that Dr. Borisov has thoroughly studied the topic. The review stands out with an analysis that clearly outlines the unresolved issues, the most important of which is the lack of specific protocols for the diagnosis of tinnitus and auditory changes in patients with temporomandibular joint dysfunction in our country. This analysis organically connects the review with the goal and tasks formulated by the doctoral student.

5. Research methodology

The aim is clearly formulated, and the five tasks for its solution are logically and comprehensively selected. Sufficient clinical material was used to solve them (152 patients for task 1 and 150 patients for the other tasks). Patients were recruited from the clinical halls of the FDM - Varna, the University Medical and Dental Center and the Audiovestibular laboratory at the FDM - Varna. The selection of participants is subject to well-defined criteria. In the first task, the doctoral student aims to systematize the demographic and clinical information about patients who underwent prosthetic

treatment in connection with temporomandibular dysfunction (TMD), based on a specially designed ambulatory list. In the second task the doctoral student examines patients with tinnitus (questionnaire and two functional tests - tympanometry and audiometry), assessing both tinnitus and dysfunction of TMJ (clinical studies of TMJ at 5 points and paraclinical studies – radiography). The third task assesses the relation between tinnitus and TMJ dysfunction (statistical methods). In the fourth task, B. Borisov prepares a risk profile of patients with tinnitus and TMJ dysfunction (statistical methods). In the fifth task, which summarizes the results of the previous four, the author proposes an algorithm for diagnosing patients with tinnitus and TMJ dysfunction, enriched with a closely specialized diagnostic protocol for TMD in collaboration with an ENT specialist. The methods and the scheme of conducting the researches are exhaustively described. The statistical methods used are correctly selected, which is a prerequisite for the reliability of the conclusions.

6. Characteristics and evaluation of the dissertation

The dissertation is written on 173 standard pages and it is illustrated with 9 tables, 89 figures, 4 photos and 4 applications. The bibliography includes 325 literary sources, of which 20 are in Cyrillic and 305 in Latin.

The dissertation begins with a literature review on the issue, which is competently written, informative and consistently examines the relation between tinnitus and TMJ dysfunction. The tools for assessment of TMJ and hearing are presented in detail in the light of current understandings and recommendations. The review clearly outlines the unresolved issues, the most important of which is the lack of specific algorithms for the diagnosis and treatment of tinnitus and hearing changes in patients with temporomandibular joint dysfunction in Bulgaria. This analysis organically connects the review with the aim and the tasks formulated by the doctoral student.

After formulating the aim and the five tasks, the dissertation presents the materials and methods used in the dissertation.

The results of clinical, paraclinical and statistical studies obtained during the tasks are correctly described and accompanied by well-structured tables and figures (some of which are photographic material).

I think that the development of the dissertation has yielded significant results, the nature of which can be defined as enriching existing knowledge about hearing changes in patients with temporomandibular joint dysfunction and the need for an interdisciplinary approach in their treatment. Discussion of the results is synthetic in nature and reveals the logical connection between them. A comparison was made between the data from Dr. Borisov's research and the similar results found in the literature. The concluding remarks made are reliable and largely reflect the contributions of the developed work.

7. Contributions and significance of the development for science and practice

Four original contributions and two confirmatory ones have been formulated, which I accept. Among the original contributions of the dissertation is the analysis of the correlation between temporomandibular dysfunction and tinnitus, on the basis of which recommendations for dental practice are made. The second important contribution of a practical nature is the optimization of the interdisciplinary approach for the diagnosis of patients with tinnitus through the algorithm developed by the doctoral student. The third significant contribution is the protocol for detailed examination of TMJ, including objective and subjective criteria, which assists dentists in the differential diagnosis of patients with tinnitus. A theoretical contribution is the risk profile of a patient with tinnitus (in the context of TMJ dysfunction).

8. Evaluation of the publications on the dissertation

In connection with his dissertation, Dr. B. Borisov has published three full-text articles. The first, published in the International Journal of Science and Research, examines the demographic characteristics of patients with TMJ dysfunction. The second article, published in the same journal, formulates the risk profile of patients with tinnitus and TMJ dysfunction. The third publication is in the Journal of the Union of Scientists-Varna and examines the correlation between tinnitus and temporomandibular disorders. He is the first author in all three publications. As the publications were made in the period 2019-2022, they have not been cited and their impact is yet to be assessed, but given the relevance of the topic, I assume that they will attract the attention of specialized audiences.

9. Personal participation of the PhD student

The personal participation of the doctoral student in the work, the results obtained and the formulated contributions are without a doubt. I must take into account that although Dr. B. Borisov works in the Department of Dental Materials Science and Propaedeutics of Prosthetic Dentistry of the FDM - Varna, some of the most scientifically significant contributions of the dissertation have been received in collaboration with a specialist from the audiovestibular laboratory at the Faculty of Dental medicine, which is proof of the true interdisciplinary nature of the development of the scientific work and in particular the doctoral student's ability to work in a team. Collaboration with an ENT specialist further enriches the doctoral student's knowledge and contributes both to the completeness of the work and to the competent understanding and interpretation of this complex issue. I cannot fail to note that Dr. B. Borisov has made considerable efforts to master the methodology and interpretation of some of the main methods for paraclinical diagnosis of tinnitus, such as tympanometry and audiometry.

10. Abstract

The presented abstract reflects in a synthesized form the structure and content of the dissertation.

11. Critical remarks and recommendations

As the doctoral program has time constraints that do not allow to monitor and analyze the patients included in the study for a longer period of time, some of the concluding remarks may be adjusted. In this sense, I recommend Dr. B. Borisov to continue his observations on the same patients for a longer period of time.

12. Recommendations for future use of dissertation contributions and results

I think that the doctoral student B. Borisov, who demonstrates in his dissertation really good knowledge not only of the basic methodological tools needed for analysis of such topics, but also of some highly specialized diagnostic methods, can and should continue his future research in this direction. I consider the proposed algorithm for the diagnosis of patients with tinnitus and TMJ dysfunction to be the most important contribution to his work. It is desirable that it be more widespread, both among dentists treating these patients and among medical professionals.

CONCLUSION


The dissertation contains scientific, *scientific-applied and practical results, which represent an original contribution to science* and **meet all the requirements** of the Regulations for development of the academic staff in Bulgaria, the Regulations for its implementation and the

relevant Regulations of MU - Varna. The presented materials and dissertation results fully comply with the specific requirements of MU - Varna.

The dissertation shows that the doctoral student BORIS YANKOV BORISOV **has** in-depth theoretical knowledge and professional skills, **demonstrating** qualities for independent research.

Due to the abovementioned, I confidently give my *positive assessment* for the conducted research, presented by the reviewed above dissertation, abstract, achieved results and contributions, and ***I propose to the esteemed Scientific Jury to award the educational and scientific degree "Doctor" of BORIS YANKOV BORISOV in the doctoral program "Orthopedic Dentistry".***

25. 04. 2022

Reviewer: 
Assoc. Prof. Dr. Georgi T. Tomov, PhD