

REVIEW

From **Prof. Dr. Stefan Vasilev Peev, DMD, PhD, DSc**

Member of a scientific jury, according to an Order of the Rector of Medical University "Prof. Dr. Paraskev Stoyanov"- Varna № P-109-560 / 06.12.2021, habilitated in the professional field 7.2 Dental medicine, Department of Periodontology and Dental Implantology, Dean of the Faculty of Dental Medicine, Medical University "Prof. Dr. Paraskev Stoyanov"- Varna.

Subject: Dissertation on "**Improving the quality of life of patients with snoring and obstructive sleep apnea through intraoral devices**" for the award of the educational and scientific degree "Doctor" in the field of higher education: 7. Health and sports, professional field 7.2. Dental medicine, according to the PhD program "Orthopedic Dentistry".

Author: Dr. Lyudmil Hristov Matev, DMD, Self-training PhD student, doctoral program "Orthopedic Dentistry", Department of Dental Materials Science and Propaedeutics of Prosthetic Dentistry, Faculty of Dental Medicine, Medical University - Varna.

Supervisor: Assoc. Prof. Dr. Mario Petrov Milkov, MD, PhD; Assoc. Prof. Dr. Hristina Ivanova Arnautska, DMD, PhD.

1. General presentation of the procedure and the PhD student

This Review is prepared on the basis of an Order of the Rector of Medical University "Prof. Dr. Paraskev Stoyanov"- Varna № P-109-560 / 06.12.2021 with an appointed Scientific Jury under a procedure for public defense of the described dissertation. The set of materials on paper and electronic media is complete, presented within the period, defined by the law, and is in accordance with Art. 44 (3) of the Regulations for development of the academic staff and the Procedure for acquiring the educational and scientific degree "Doctor" at Medical University "Prof. Dr. Paraskev Stoyanov" - Varna.

2. Brief biographical data about the doctoral student

Dr. Lyudmil Hristov Matev was born in 1976 in the city of Varna. He is a graduate of "St. Kliment Ohridski" Public school - Varna. In 2003 he completed a six-year training course at the Faculty of Dental medicine, Medical University - Sofia. After a competition in 2009, he was appointed a full-time assistant in the Department of Prosthetic Dentistry and Orthodontics at the Faculty of Dental Medicine at Medical University - Varna. At the moment he is a full-time assistant in the Department of Dental Materials Science and Propaedeutics of Prosthetic Dentistry at Faculty of Dental medicine – Varna.

He is fluent in English and Russian languages.

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

Sleep is a normal, intermittent suppression of consciousness, during which the individual's body rests and recovers. A slowdown in metabolic processes is observed, as well as an inhibition of sensory information, voluntary muscle activity and reactions to external stimuli. Sleep-disordered breathing is a large group of diseases, ranging from habitual snoring to upper airway resistance syndrome, obstructive sleep apnea (OSA), Cheyne-Stokes respiration, and obesity-related hypoventilation syndrome. Sleep-disordered breathing is chronic and is caused by a collapse of the upper respiratory tract during sleep, asphyxia, sleep fragmentation, fluctuations in blood pressure and increased activation of the sympathetic part of the vegetative nervous system.

Obstructive sleep apnea is the most common type of sleep apnea and is characterized by recurrent episodes of partial or complete obstruction of the patient's airway during sleep, despite the effort he/she makes to breathe. There is also a decrease in the concentration of oxygen in the patient's blood. The American Academy of Sleep Medicine defines obstructive sleep apnea as a medical condition. Common symptoms of OSA include: unusual daytime drowsiness and fatigue, restless sleep, snoring, attention deficits and / or hyperactivity disorders (in children), difficulty concentrating, nocturnal bruxism, temporomandibular joint disorders (TMD), sexual deficits, and profuse sweating at night. Some additional symptoms may be: restless legs syndrome, sleep disturbance and lack of sleep, increased heart rate with or without an increase in blood pressure, poor performance at the workplace, dry mouth syndrome, gastroesophageal reflux disease, problems with memory, insomnia and parasomnia, morning headache, nocturia, etc.

The present dissertation work aims to study the effectiveness of diagnostic and therapeutic approaches to improve the quality of life in patients with snoring and obstructive sleep apnea and pathological dental status. The topic is relevant, given the presence of a large number of patients with a metabolic syndrome conditions, hypertension, cerebrovascular and other diseases and obstructive sleep apnea and snoring. These patients have a severely deteriorated quality of life, as well as socially significant problems related to their daily work.

Dental sleep medicine is the fastest growing subdiscipline in the field of the Dental Medicine. It is the result of the professional belief of dentists who consider that their patients presenting with symptoms of sleep-disordered breathing (such as OSA) need to be adequately examined and treated. Such patients usually visit their dentist for diagnosis and treatment not of obstructive sleep apnea, but of the disorders resulting from it. Diagnosis and treatment of sleep-disordered breathing is often neglected by patients.

4. Understanding of the problem

It is evident from the dissertation submitted for a review that the doctoral student Dr. Lyudmil Matev knows in detail the risk factors for obstructive sleep apnea - family history of OSA, male gender, menopausal women, age (50 years and older), obesity, snoring, craniofacial insufficiencies or anatomical predispositions in the oropharyngeal area, race, smoking and alcohol use, taking certain medications.

Dr. Matev understands thoroughly and strictly follows all standards and guidelines for the diagnosis and treatment of patients with disorders in the field of prosthetic dentistry and dental sleep medicine (American Dental Association, ADA; American Academy of Dental

Sleep Medicine, AADSM; American Academy of Sleep Medicine, AASM; EADSM - European Academy of Dental Sleep Medicine). Extensive knowledge of the stages of sleep and the use of dental intraoral devices have also been demonstrated. The provisions for keeping the documentation of the examined and treated patients are also obeyed to.

To clarify the problem, the doctoral student Dr. Matev has structured 5 tasks, described in Chapter Two of the dissertation submitted for review. Through them the goal of the dissertation was reached. Dr. Matev has shown serious interest and knowledge of the problem, given the fact that he is a dentist by profession and can adequately assess the impact of pathological dental status on the condition of patients with sleep apnea. Attention is paid to the advantage of the polygraphic method, which is performed at the patient's home, given the outbreak COVID-19 pandemic in January 2020.

5. Research methodology

The Methodology section is written over 8 pages, with a detailed description of the number of patients included in the study, the diagnostic equipment and the methods that will be used in the course of the research. It is clear which indicators will be tested for each patient with problems with obstructive sleep apnea and snoring, as well as the selection criteria - inclusion in and exclusion from the study.

In the course of writing the dissertation, the doctoral student performed clinical examinations on 120 patients to determine their general dental status. Under Tasks One and Two, patients are also examined by an otolaryngologist in order to determine the status of the rhinopharyngeal area. Tasks Three and Four compared the functional indicators of respiration and quality of life in 120 patients before and after the application of intraoral devices and CPAP-therapy for treatment of obstructive sleep apnea. The doctoral student identified 3 groups - treatment with intraoral apparatus (30 patients), CPAP therapy (71 patients), group of patients without treatment (19 patients)

The diagnostic criteria of the dental examination, which allow or not, the treatment with intraoral devices, are clearly described. Attention is also paid to the involvement of an otolaryngologist in the diagnosis of these patients. Methodology used in the presented work is adequate for each task. Results are subjected to in-depth statistical analysis and are well illustrated with tables and figures. The number and date of the permission received from the Commission for Ethics of Research at MU-Varna are also entered.

6. Characteristics and evaluation of the dissertation

The presented dissertation is written clearly, in a very good scientific style. It contains 165 pages and is illustrated with 81 figures, 6 tables and 3 applications. It is structured correctly and contains the sections: Introduction, Literary Review, Aim and Tasks, Methodology, Results and Discussion, Conclusions, Contributions, References, Applications.

The doctoral student has reached to 14 conclusions, which I consider important for deepening and re-confirming the scientific knowledge on the topic of the dissertation.

The bibliographic reference to the dissertation consists of 332 sources, of which 7 are in Cyrillic and 325 in Latin.

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

The contributions made in the dissertation are:

The problems of obstructive sleep apnea should not be ignored. Only timely diagnosis and adequate treatment can not only significantly improve the quality of life of patients, but also protect them from the negative effects of obstructive sleep apnea on other organs and systems of the human body.

The doctoral student has distinguished 4 contributions with scientific-applied, 4 with original, 4 with confirmatory and 2 with applied matter.

As long as the contributions of scientific and applied nature are concerned, Dr. Lyudmil Matev clearly describes them: for the first time in the country an assessment of the frequency, risk factors, diagnosis, treatment and quality of life of dental patients with obstructive sleep apnea was made. A critical analysis of the use of intraoral devices for the treatment of obstructive sleep apnea has also been made. Special attention is paid to the importance of a dentist to be present in the diagnostic and treatment team of such patients. Emphasis is also placed on the importance of the relationship between a dentist and a dental technician in the manufacture of intraoral devices.

Contributions of an original nature show that for the first time in the country the quality of life of patients with obstructive sleep apnea treated with intraoral devices is studied. Risk factors for snoring and obstructive sleep apnea in patients with dental pathologies were also studied for the first time. For the first time, the diagnosis of patients with suspected sleep apnea was diagnosed with a polygraphic device. The importance of the axis otorhinolaryngologist - dentist in the diagnosis and treatment of patients with obstructive sleep apnea and snoring has also been proven.

Dr. Matev pointed out that the contributions of a confirmatory nature confirm the role of multidisciplinary of medical teams in diagnosing diseases in nearby anatomical areas. The conclusion that intraoral devices are a good treatment for mild forms of obstructive sleep apnea has been re-confirmed, and that individually designed devices based on the patient's prosthetic field should be preferred over factory-made devices. The polygraph test has again been shown to be sufficient to diagnose mild obstructive sleep apnea cases.

Dr. Matev noted that in the course of writing the dissertation, contributions of an applied nature were achieved - a diagnostic and therapeutic algorithm was developed for elderly patients with snoring and obstructive sleep apnea who have pathological dental status. There is a development of a critical analysis of polygraphy in patients with dental pathology.

8. Evaluation of the publications on the dissertation

3 full-text publications are presented, 2 of which were published in international journals. The volume of scientific articles in connection with the dissertation is completely sufficient and corresponds to the legal requirements.

9. Personal participation of the PhD student

Dr. Lyudmil Matev is a leading author in the field of research, which shows his personal contribution. He has also worked with other clinicians, proving his ability to work in a team.

10. Abstract

The abstract of the dissertation summarized its content in a concise form and meets the requirements of the laws in the country and the regulations of MU-Varna. The main results, conclusions and contributions of the dissertation are clearly reflected.

CONCLUSION

The dissertation contains scientific-theoretical and scientific-practical contributions, which are up-to-date and original contributions to science. This meets all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for the Application of the Law and the Regulations of Medical University - Varna. The presented materials and dissertation results meet the specific requirements of Medical University "Prof. Dr. Paraskev Stoyanov" - Varna.

The dissertation shows that the doctoral student Dr. Lyudmil Hristov Matev possesses in-depth theoretical knowledge and professional skills in the scientific specialty "Orthopedic Dentistry", in professional field 7.2. Dental medicine, field of higher education 7. Health and sports. Qualities and skills for independent research are demonstrated.

Due to the abovementioned, I confidently give my **POSITIVE** assessment of the dissertation on "**Improving the quality of life of patients with snoring and obstructive sleep apnea through intraoral devices**", I will vote "YES" and propose to the esteemed Scientific Jury to award the educational and scientific degree "Doctor" to Dr. Lyudmil Hristov Matev in the doctoral program "Orthopedic Dentistry", in the professional field 7.2. Dental medicine, field of higher education 7. Health and sports.

24.01.2022

Reviewer:



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