

## REVIEW

By

**Prof. Dr. Karen Briyanov Dzhambazov, MD, PhD,**

Head of the Department of ENT-diseases, Faculty of Medicine, Medical University Plovdiv, CEO of University multiprofile hospital for active treatment "Sveti Georgi" – Plovdiv, habilitated in the professional domain 7.1 Medicine, Medical University - Plovdiv, Member of a scientific jury, by an Order No. R-109-255/23.06.2022 by the Rector of Medical University - Varna "Prof. Dr. Paraskev Stoyanov" for a competition for awarding the academic title "Professor" for the specialty "Ear-nose-throat diseases", announced in State Gazette, issue 32/26.04.2022

### **In connection with:**

A competition for awarding the academic title "Professor" in Higher education area 7. Health care and sports, Professional domain 7.1. Medicine, Specialty „Ear-nose-throat diseases“, announced in State Gazette, issue 32/26.04.2022.

**Candidate:** Assoc. prof. Dr. Mario Petrov Milkov, MD, PhD

**1. Biographical data of the candidate for the competition:** Assoc. prof. Dr. Mario Petrov Milkov, MD, PhD was born in the city of Varna, Republic of Bulgaria on 06.06.1968. He graduated from the 3rd Science and Mathematics High School-Varna in 1986. In 1995, Dr. Milkov graduated Medicine and became master physician from the Faculty of Medicine, Medical University – Varna. In 1998, he started specializing in Otorhinolaryngology at the Department of Ear, Nose and Throat Diseases at Medical University – Varna. In 1998, he was enrolled as a full-time doctoral student at the Department of Otorhinolaryngology of Medical University – Varna. In 2006, he obtained the title of "Doctor" after successfully defending his dissertation on the topic: "Creation of Bulgarian prostheses for ossicular reconstruction in case of defects of the auditory circuit". In the period 1998-2001, he was a resident in Otorhinolaryngology, and in 2002 acquired his specialty in ear, nose and throat diseases. Over the years, Assoc. prof. Mario Milkov has specialized in renowned clinics in otorhinolaryngology, head and neck surgery in: University Clinic in the city of Würzburg, Germany in 2001; "Inselspital", Bern, 2002, Switzerland; "Ruhr University" - Bochum 2006,

Germany; Bergen, Norway 2008; "Suara Medical Center" Tel Aviv, Israel 2008; "Cos Clinic" Beziers 2010, France; "UPMS" Pittsburgh, USA 2018 and others.

In the period 2008-2013, he held the academic position of "Assistant professor" in the Department of Prosthetic Dentistry and Orthodontics at the Faculty of Dental Medicine, MU-Varna.

In the period 2012-2014, he graduated from Health Management at the University "Prof. Dr. Asen Zlatarov"-Burgas. Dr. Milkov has participated in a number of national and international conferences in the field of otorhinolaryngology, otology, rhinology, sleep medicine and vestibology. He became a member of a number of international and Bulgarian scientific societies. He showed interest in scientific inventions and became a member of the Union of Scientists and the Union of Inventors in Bulgaria.

In 2013, he obtained his habilitation and took the position of Associate Professor at the department. From 2018 is the Head of the Department of Dental Materials Science and Propaedeutics of Prosthetic Dental medicine. Since 2018, he has been the Chairman of the "Alumni Club and Friends" at Medical University "Prof. Dr. Paraskev Stoyanov"-Varna.

Assoc. prof. Mario Milkov is also the Head of the Scientific Group "Biomaterials, Implantology and Genetic Engineering" - at the "Scientific Research Institute" of MU-Varna. He is the Head of 3 ongoing projects: in Science Fund and Scientific Research Fund. He participated in a project under the Medical Science Fund of MU-Varna. He is a member of a large number of international scientific and professional organizations in the field of otorhinolaryngology, head and neck surgery, neurootology, otoneurology, cochlear implantation, obstructive sleep apnea and others.

Author of many scientific articles published in prestigious scientific journals in Bulgaria and around the world, publishes monographs and is co-author of several scientific aids on otology, otoneurology, biomaterials and sleep apnea.

During these years, he became an active member of the European Academy of Otology and Neurootology, the Politzer Association, the German and Austrian Society of Otorhinolaryngology, the Meniere Association, the Association of Sleep Medicine for Children, the Balkan Society of Otorhinolaryngology, Head and Neck Surgery, the European Sleep Research Association, World Association of Sleep Medicine and Neurootology. Permanent member of the editorial board of numerous international scientific journals. Founder and Editor-in-Chief of the International Bulletin of Otorhinolaryngology. Co-founder of the Bulgarian Society of Obstructive Sleep Apnea and Snoring and the Black Sea Society of Otology and Neurootology.

He was secretary of the Balkan Society of Otorhinolaryngology, Head and Neck Surgery, secretary of the Bulgarian Society of Otorhinolaryngology, Head and Neck Surgery. Secretary of EAONO for Bulgaria. He is currently a member of the international board of the Balkan ENT Society and one of the vice-presidents of the Bulgarian Society of Otorhinolaryngology.

He has a patent registration and 3 independent certificates for brand registrations.

He is fluent in written and spoken German, English and Russian.

Assoc. prof. Milkov is married and has one child.

**2. Overall evaluation of the materials, handed in by the candidate for the competition:** After having familiarized myself in details with all the materials, provided for participation in the competition for the employment of the academic position of "Professor", I consider that the procedure for disclosure, announcement and participation in the competition has been fully complied with. The documents for the competition have been prepared in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation at Medical University - Varna.

**3. Evaluation of the research activity, characteristics of the publication activity and scientific production of the candidate:**

According to the list, all the publications in foreign and Bulgarian scientific journals of Assoc. prof. Dr. Mario Milkov, MD, PhD are a total of 37 and reflect the scientific research activity in the period 2013 - 2022. There are 8 publications in Bulgarian and 29 in foreign (English) languages. According to the candidate's place in the author team in the scientific publications (foreign and in Bulgarian), after the defense of the dissertation, the distribution is as follows: the candidate is the sole author in 5 publications. and in co-authorship – in 32 nos. publications, of which the first author is in 11, the second author is in 8 publications, the third author is in 9, the fourth author is in 2 publications, the sixth and next author is in 2 publications.

According to the requirements, Assoc. prof. Dr. Mario Petrov Milkov, MD, PhD - a candidate in the competition, has attached an Academic reference for publications, citations, monographs, scientific profiles. It includes information on:

- Dissertation work for the acquisition of the educational and scientific degree "Doctor" on the topic: "Creation of Bulgarian prostheses for ossicular reconstruction in defects of the auditory circuit", 2006, Medical University - Varna (*according to Indicator A1*)

- Habilitation work - monograph on the topic: "Prevention of obstructive sleep apnea and snoring in professional drivers", 2021, Medical University - Varna (*according to Indicator B3*)

- Published monographs that are not presented as the main habilitation work on the topics: "Clinical Audiology" Nedev P., Milkov M. 2015, Steno; Protheses for reconstruction of the Auditory ossicles. Milkov M., Marinov G., Guidoin R. 2018, Steno (*according to Indicator D5*)

- Publications and reports, published in scientific journals, referenced and indexed in world-renowned databases with scientific information - 5 items (*according to Indicator D7*)

- Publications and reports published in non-referenced journals with scientific review or published in edited collective volumes – 23 items (*according to Indicator D8*)

- Published chapter of a collective monograph – 3 chapters (*according to Indicator D9*)

The candidate has submitted 2 more articles, beyond the minimum scientometric requirements for acquiring the academic title "Professor".

The required total number of points was fulfilled by the candidate - 597.81pts.

Assoc. prof. Milkov has submitted 23 citations for the current competition with a total number of 225 points (*according to Indicators D10-D12*). It makes an impression that the quoted articles were published in both Bulgarian and international journals, which contributes to the greater visibility of the production of scientists from Medical University - Varna.

Associate prof. Milkov is a participant in 1 project under the Medical Science Fund of MU-Varna according to protocol 20.11.2012. and certificate number ND-99-135 on the topic: "Evaluation of the effect of the application of endooral, endonasal devices in the treatment of patients with habitual snoring and obstructive sleep apnea." Assoc. prof. Milkov is the Head of 3 current projects - 2 under the Science Fund: 20011 - "Investigation of vestibular function with the method of static and dynamic posturography in patients with craniofacial deformities", 2020, 2020-2023; 21006 - "Rinomanometer study of the characteristics and quality of nasal breathing in patients with obstructive sleep apnea and snoring proposed for conservative treatment with intraoral devices", 2021, 2022-2025; and 1 under the Scientific Research Fund: "Investigation of the characteristics and quality of speech in patients before and after dental treatment using a laryngostroboscope", 2021, 2021-2024. (*according to Indicators E16, E18*). (*according to Indicators E16, E18*)

In the attached documents, the applicant has added a reference to the participation in Bulgarian and international forums with lectures and posters, which for the period 2014-2022, are 70. From the presented list of reports presented at scientific forums, the leading participation of the candidate as the sole or first author in the author groups is evident.

The main directions of his research work and the resulting publication activity, which is significant in terms of volume and quality, in which the competition candidate works, are related to the theoretical, applied and clinical aspects of biomaterials, otorhinolaryngology, clinical audiology and vestibulology, as well as the diagnostics, treatment and prevention of obstructive sleep apnea and a number of diseases in the field of ear, nose and throat diseases. There is both continuity in terms of the thematic focus of scientific research during this period after the habilitation as an associate professor in 2013, as well as significant enrichment and innovation in the studied issues, the emergence of the latest and most relevant interdisciplinary scientific areas. A significant place is given to the prophylaxis and prevention of socially significant diseases such as sleep medicine, auditory-cognitive disorders, the introduction of new biomaterials and modern research in the field of audiovestibulology. The candidate describes his main directions of work, namely:

- Application of biomaterials in otology (Direction 1)
- Obstructive sleep apnea and snoring (Direction 2)
- Clinical audiology and vestibulology (Direction 3)
- Otorhinolaryngological diseases related to other medical specialties (Direction 4)

*In Direction 1:* Associate professor Milkov researched biomaterials in a historical aspect and the development of the shape and physical-acoustic parameters of ossicular prostheses in the scientific literature. Modern biomaterials used for the reconstruction of the ossicular chain have been studied in biological models in interdisciplinary international teams. Using modern methods, he succeeded in validating a new ossicular prosthesis from the materials "Targis Vectris" and "Adoro" in an experimental guinea pig model. General principles in the study of the morphological features of ossicular prostheses have been summarized. The mechanical and dynamic properties of the newly created prosthesis have been fully investigated. The bioactivity and biostability of the prosthesis were monitored. The sound conductivity of the prosthesis was

also investigated. In a modern aspect, the creation of a 3D-model of an ossicular prosthesis is also proposed, which is currently being worked on.

*In Direction 2:* Associate Professor Milkov has been working hard on prevention, diagnosis and treatment of the Obstructive sleep apnea and Snoring. In 2006, he managed to be one of the first in Bulgaria to use radiofrequency surgery to treat patients with snoring and sleep disorders after a course in Mannheim and Cologne. After specialization in Frankfurt and Bergen, he introduced coablation in patients with OSA and snoring. For the first time at the Faculty of Dental Medicine at MU-Varna, he used scientific projects to study sleep and apply new methods for treating patients.

In the Faculty of Dental Medicine at the Medical university – Varna, as well as in the University medical and dental center, the problem of dental sleep medicine is being developed and prophylactic examinations of professional drivers have been started. Diagnostics is carried out with innovative equipment, won by a project for patients with obstructive sleep apnea and snoring (OSAS). A critical analysis of previously treated patients is performed. An algorithm for the treatment of patients with different types of OSA and snoring was introduced. At the University medical and dental center, treatment with intraoral appliances is introduced for patients with milder forms of sleep apnea and snoring, after preliminary clinical selection.

The results are shared through the media to educate the public about this socially significant and dangerous disease and the annual road trauma and mortality. During World and European scientific forums, the results of the diagnostic and treatment activities are reported. The opportunity to examine the quality and quantity of patients' sleep at home, which in the context of the global COVID-19 pandemic provides convenience and security, is highlighted.

On the initiative of Assoc. prof. Milkov, in 2016, the celebration of the World Sleep Day was organized for the first time at Medical University - Varna. The elective student discipline "Obstructive sleep apnea and snoring. Diagnosis. Treatment. Prevention", in which students of the Bulgarian and English-language programme from the 4th and 5th year can be trained in the methods of diagnosis, treatment and prevention of OSA syndrome and snoring.

He made a critical analysis of the use of radiofrequency surgery and coablation in his practice, being one of the first to report instability of the results in somnoplasty with radiofrequency surgery, creating an algorithm for primary sleep analysis and then for an interdisciplinary approach. Supports ending the use of Teflon implants in somnoplasty. Methods are proposed for the treatment of children with impaired nasal breathing and tonsillar hypertrophy with the modern methodology of radiofrequency surgery and coablation.

In 2018, after the suggestion of Associate Professor M. Milkov, the "Bulgarian Academy of Sleep Medicine" with the aim of developing and generalizing scientific approaches in this area and uniting specialists from various specialties.

*In Direction 3:* Assoc. prof. Milkov for the first time examined children in maternity hospitals and initiated the screening of newborns in Varna. He also introduced the use of otoacoustic emissions (OAE) for the first time in Varna and the region. He organized a number of free preventive hearing screening campaigns for newborns, as well as for children in the infancy and preschool age. He participated in a project of the Health commission with the municipality of Varna to conduct preventive examinations in nurseries and children of different ages in schools in Varna, examining more than 900 children for a period of two years. Children are studied in schools and in remote regions of the district under the auspices of Medical university - Varna. The World Hearing Day, organized by the WHO, is being celebrated for the first time in Bulgaria at Medical University - Varna. In addition to mass screening free examinations, the aim is to promote the prevention of hearing disorders at different ages. Attention is paid to the environment and noise and hearing hygiene and tinnitus.

Significant progress in the scientific and medical activities of Associate Professor Milkov was observed after the establishment of the Audio-vestibular and sleep laboratory at Medical University - Varna in the summer of 2020 with the most modern and high-tech equipment. In the University medical and dental center, equipment was purchased and began to function for the examination of hearing, tinnitus, vestibular symptoms, in many patients with neurological problems and gait instability. After winning a project under the Science Fund, a posturological office also began to function. Recent advances in the interdisciplinary field of audio-vestibular and dental diseases are discussed. The important interrelationships between the science of posture of the human body - posturology, vestibular disorders and dentistry - are identified. Its importance in pediatric dentistry is highlighted. Correlations between malocclusions and abnormalities in body posture, as well as between posture and orthodontic deformities, have been studied. The pathogenesis and treatment of tinnitus in patients with dental disorders are analyzed. Correlation between sleep problems and vestibular manifestations in patients with proven sleep apnea, unsteadiness, dizziness, and vertigo was confirmed. Prevention and examination of patients, professional divers and amateurs are introduced.

*In Direction 4:* Assoc. prof. Mario Milkov has special interests in oral pathology and the use of new biomaterials in the oral cavity. He also works in the field of respiratory disorders

associated with allergic rhinitis and hypertrophy of the palatine tonsils. Actively participates in detection and research of neoplastic processes in the oral cavity. He has scientific interests in the phoniatic problems in professional singers and dysphagia.

Assoc. Prof. Milkov pioneers in the creation of interdisciplinary teams of otorhinolaryngologists, physicians in dental medicine, neurologists, pulmonologists, health care specialists. Proof of this is the main diagnostic and treatment activities and expertise that he gives to his patients.

Assoc. Prof. Milkov has active scientific profiles in the following research databases: Google Scholar, ORCID, ResearchGate. An IF-reference has also been presented.

**4. Evaluation of teaching activity of the candidate:** From the provided Teaching Experience Certificate, it can be clearly seen that the candidate for the competition has been working at Medical University - Varna since 2008. Over the years, he has successively held the academic positions of "Assistant professor" (2008-2010), "Chief Assistant professor" (2010-2013), "Associate professor" (from 2013 up to the moment). The total teaching experience at the time of submitting the documents for the competition is 13 years and 8 months. From the provided Study Load Report for the last four years is visible that associate professor Milkov has fully fulfilled the annual norm for teaching activity of 126 academic hours, established by decision of the Academic council of Medical university – Varna (Protocol No. 30/11.04.2011) – for the 2017/2018 academic year – 152 academic hours, for the 2018/2019 academic year – 219 academic hours, for the 2019/2020 academic year – 190 academic hours, for the 2020/2021 academic year – 199 academic hours.

Assoc. prof. Milkov is a renowned and experienced university teacher. He participates in the teaching of the mandatory disciplines "Otorhinolaryngology", "Dental Materials Science" for students of the Bulgarian and English language programme, the elective subject "Obstructive sleep apnea and snoring. Diagnosis. Treatment. Prevention". He is an examiner of semester exams in the listed disciplines.

It is evident from the attached Doctoral Student Training Reference that Associate Professor Milkov has successfully supervised four doctoral students, and is currently the supervisor of five more:

- Stefan Ivanov Mirchev – a doctoral student in the doctoral program "Otorhinolaryngology", with second supervisor, Assoc. prof. Dr. Alexander Valkov, MD, PhD. The doctoral student acquired the educational and scientific title "doctor" on 27.11.2017.
- Alexander Metodiev Donchev – a doctoral student in part-time study in the doctoral program "Organization and management outside the sphere of material production"



(Social activities), enrolled on 05.02.2018 in the Department of "Social Work" of Shumen University "Bishop Konstantin Preslavski", with second supervisor Prof. Georgi Kolev, (leaders from various scientific fields) The doctoral student acquired the educational and scientific title "doctor" on 04.10.2020.

- Lyudmil Hristov Matev – a doctoral student in independent form of study in the doctoral program "Orthopedic Dentistry", field of higher education 7. Health care and sports, professional domain 7.2. Dental Medicine, with a second scientific supervisor - Assoc. prof. Dr. Hristina Ivanova Arnautska, DMD, PhD, at the Department of "Dental Materials Science and Propaedeutics of Prosthetic Dental medicine", Faculty of Dental Medicine, Medical University - Varna. The doctoral student acquired the educational and scientific title "doctor" on 25.02.2022.

- Boris Yankov Borisov – a doctoral student in full-time study in the doctoral program "Orthopedic Dentistry", field of higher education 7. Health care and sports, professional domain 7.2. Dental medicine, with a second supervisor - Prof. Dr. Mariana Yordanova Dimova-Gabrovska, DMD, PhD, DSc, at the Department of "Dental Materials Science and Propaedeutics of Prosthetic Dental medicine", Faculty of Dental Medicine, Medical University – Varna. The doctoral student acquired the educational and scientific title "doctor" on 18.04.2022.

- Boris Plamenov Kyosev – a doctoral student in full-time study in the doctoral program "Orthopedic Dentistry", field of higher education 7. Health care and sports, professional domain 7.2. Dental medicine, with a second scientific supervisor - Prof. Dr. Metodi Zahariev Abadjiev, DMD, PhD, DSc at the Department "Clinic of Prosthetic Dental Medicine", Faculty of Dental Medicine, Medical University - Varna.

- Miroslav Stoykov Stoykov – a full-time doctoral student in the "Orthopedic Dentistry" doctoral program, higher education field 7. Health care and sports, professional domain 7.2. Dental medicine, with a second scientific supervisor - Assoc. prof. Dr. Hristina Ivanova Arnautska, DMD, PhD, at the Department of "Dental Materials Science and Propaedeutics of Prosthetic Dental medicine", Faculty of Dental Medicine, Medical University – Varna.

- Damyan Tsankov Tsanev – a doctoral student in full-time study in the doctoral program "Orthopedic Dentistry", field of higher education 7. Health care and sports, professional domain 7.2. Dental medicine, with a second supervisor - Assoc. prof. Dr. Desislava Atanasova Konstantinova, DMD, PhD, at the Department of "Dental Materials Science and

Propaedeutics of Prosthetic Dental medicine", Faculty of Dental Medicine, Medical University - Varna.

- Dimo Krasimirov Nedelchev – a full-time doctoral student in the doctoral program "Orthopedic Dentistry", field of higher education 7. Health care and sports, professional domain 7.2. Dental medicine, with a second supervisor - Assoc. prof. Dr. Desislava Atanasova Konstantinova, DMD, PhD, at the Department of "Dental Materials Science and Propaedeutics of Prosthetic Dental medicine", Faculty of Dental Medicine, Medical University - Varna.

- Stoyanka Hristova Yancheva – a full-time doctoral student in the "Health Care Management" doctoral program, field of higher education 7. Health care and sports, professional domain 7.4. Public Health, with a second supervisor - Associate Professor Mariana Nikolova Dimitrova, PhD, at the Department of Health Care, Faculty of Public Health, Medical University – Varna.

I believe that the data provided to the candidate fully meet the requirements of the recruitment competition for acquiring the academic position "Professor".

**V. Evaluation of the medical and diagnostic activity:** Assoc. Prof. Mario Milkov is an established specialist in otorhinolaryngology and has more than 20 years of extensive medical and diagnostic experience in the specialty. His international specializations, courses, congresses help his clinical activity. He managed to introduce into practice new technological equipment for research, diagnosis and treatment in the field of sleep medicine and audio-vestibular medicine. He succeeded in validating and implanting an ossicular prosthesis constructed and tested by himself. In the last few years, Assoc. prof. Mario Milkov has been working in interdisciplinary teams in the field of audio-vestibular medicine, where he daily applies state-of-the-art equipment for the analysis of patients with vertigo, imbalance, dizziness, reduced hearing, tinnitus, severe forms of neurological and dystrophic diseases.

In his activity as the Head of a laboratory for problems in sleep disorders, he daily solves problems of patients with socially significant diseases in collaboration with dentists, pulmonologists and neurologists.

His activity with participation in preventive programs to establish the absence or reduction of hearing, in which he is a leading figure, contribute to the early detection of diseases in newborns and in early childhood.

His scientific knowledge in the field of sleep medicine and his in-depth work with patients decisively contribute to raising the authority of the specialty of otorhinolaryngology, head and neck surgery in these interdisciplinary teams.

## CONCLUSION

The documentation presented by Assoc. prof. Dr. Mario Petrov Milkov, MD, PhD is complete and meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria. In my opinion, Assoc. Professor Mario Milkov, applying for the academic position of "Professor" fully meets the requirements of the law and the Rules for its implementation and can be awarded the academic position "Professor".

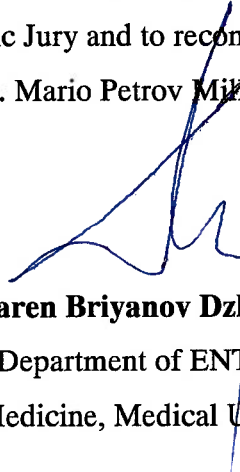
I am fully convinced that the long-term professional experience as an otorhinolaryngologist, his extensive knowledge in the field of audio-vestibular and sleep medicine, as subspecialties of otorhinolaryngology, give us the full right to consider Assoc. prof. Dr. Mario Milkov as a worthy candidate for the academic position "Professor".

Active scientific work of assoc. prof. Milkov as a university teacher and a proven specialist-otolaryngologist with international recognition, gives me the reason to give a **POSITIVE** evaluation before the respected Scientific Jury and to recommend the awarding of the academic position "Professor" to Assoc. Prof. Dr. Mario Petrov Milkov, MD, PhD.

14.07.2022

Plovdiv

Reviewer:

  
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