

Oppinion

From:

Prof. Dr. Stefan Vasilev Peev, DMD, PhD, DSc, Professor, Department of Periodontology and Dental Implantology, Faculty of Dental medicine, Medical University – Varna, member of a scientific jury, according to an Order of the Rector of Medical University “Prof. Dr. Paraskev Stoyanov” - Varna № P-109-87 /23.02.2022.

On:

Dissertation: „**Tinnitus and auditory changes in patients with temporomandibular joint dysfunction**“ for the award of educational and scientific degree "**Doctor**" in the scientific specialty "**Orthopedic Dentistry**" professional field **7.2. Dental medicine**, field of higher education **7. Health and sports**.

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The dissertation presented to me for review is written on 173 standard pages. 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 bibliographic reference is actual, with titles from the last ten years predominating. The exposition is presented in detail and with the correct sequence of the individual chapters, in a high scientific style. The dissertation is with proper structure and contains all the mandatory elements: introduction, literature review, aim and tasks, material and methods, results and discussion, conclusion, concluding remarks, bibliography and appendices.

The actuality of the topic is present both in the **introduction** and in the whole literature review, which describes the need to examine in detail the relationship between tinnitus and temporomandibular joint dysfunction.

The literature review is sufficient in volume and thematically corresponds to the set tasks. The scientific literature on the anatomy of the temporomandibular joint, the ear, as well as their anatomical prerequisites for the occurrence of tinnitus and temporomandibular joint dysfunction were analyzed. The etiology and epidemiology of tinnitus are considered, the nature and possible preconditions for the occurrence of TMJ dysfunction were analyzed in detail. The relation between the presence of tinnitus and temporomandibular joint dysfunction is described in detail. Different approaches to diagnosis and treatment in patients with tinnitus and temporomandibular joint problems have been studied. Dr. Borisov is well acquainted with and discusses the issues related to the chosen topic.

The aim is stated accurately and clearly. The implementation of the aim is achieved through five main **tasks**. Modern clinical, paraclinical and statistical methods were used to perform the tasks.



The material is sufficient to derive reliable and representative results. The research methodologies are well selected and adequately focused on each of the tasks.

The first task is a demographic description of patients who underwent prosthetic treatment in connection with temporomandibular dysfunction.

On the second task was examined the presence of tinnitus of 150 patients using a specialized questionnaire and conducted two functional tests - tympanometry and audiometry. TMJ dysfunction was examined in detail at five palpation points.

On the third task was examined the correlation between tinnitus and TMJ dysfunction, using studies of questionnaires, clinical examinations, paraclinical studies, which are accurately processed statistically.

In relation with the fourth task, a risk profile of patients with tinnitus and TMJ dysfunction was prepared, using the results obtained from previous tasks and applying the statistical method Odds-Ratio, allowing a hierarchy of results.

In the last task, an algorithm for the diagnosis of patients with tinnitus and TMJ dysfunction was created, enriched with specialized diagnostic protocol for TMD in collaboration with an ENT specialist. It is based on the data obtained and the summarized results of the conducted research and the prepared risk profile of the patients.

The results

are illustrated with enough tables and figures. The statistical methods used are correctly selected, which is a prerequisite for the reliability of the conclusions made.

Dr. Borisov conducted that the mean age of the patients examined on the first task is 60.5 years \pm 12.8 years (25 years - 90 years), as about 2/3 (62.5%) of them are women. TMJ dysfunction was found in 27.6% of patients, mostly women (66.7%). 11.2% of the examined patients have joint diseases, and a proportionally weak dependence with TMJ dysfunction was found ($r=0.201$; $p=0.013$).

In the second task, the researcher found that the most common noise is similar to whistling (36.4%), followed by buzzing (22.8%). On the other hand, 87 (58.0%) patients reported that tinnitus is unilateral only in the left or right ear, and in the others the noise is in both ears. Patients in need of prosthetic treatment have a higher assessment of tinnitus ($p = 0.067$).

In the third task it was found that 28.7% of the studied patients with tinnitus were diagnosed with TMD dysfunction. The main complaints of patients that may be related to TMJ dysfunction have been identified: the most common are pain in speech (16.00%), followed by clicking of the TMJ (15.3%) and pain in chewing (14.00%).

After studies on the fourth task regarding the risk factors for TMD, it was found that the most important factor in the occurrence of tinnitus related with TMD are the parafunctions (bruxism, bruxomania), followed by the presence of joint disease. The third is the lack of prosthetic treatment if necessary and complete edentulousness.

In connection with the fifth task, an algorithm has been developed for the diagnosis of patients with tinnitus, which is extremely important because the unclear etiology of the disease delays treatment and prolongs the discomfort of patients suffering from tinnitus.

The conclusions and the concluding remarks made from the author are a consequence of the achieved results.

Contributions original for the country:

For the first time in Bulgaria, the relation between temporomandibular dysfunction and tinnitus has been subjected to critical analysis and recommendations for dental practice have been made.

Confirmatory contributions:

1. Optimization of the interdisciplinary approach for diagnosis of patients with tinnitus through the algorithm created by us.
2. A protocol for detailed examination of TMJ has been proposed, including objective and subjective criteria, which assists dentists in the differential diagnosis of patients with tinnitus.
3. The correlation between tinnitus and temporomandibular joint dysfunction was confirmed.
4. It has been confirmed that tinnitus worsens the quality of life of patients.

The dissertation work was carried out entirely by the PhD-candidate under the guidance of the scientific supervisors. In connection with the dissertation, the author has promoted his research in 3 publications. Dr. Borisov is single author in two of them, and in the third he is a leading author. I recommend Dr. Borisov to promote the results of his work by publishing the results in specialized journals.

In conclusion: The dissertation of Dr. Boris Borisov "**Tinnitus and auditory changes in patients with temporomandibular joint dysfunction**" is his own contribution to science. The scientific work, as well as the publications on the topic prove that the author has theoretical knowledge of the research problem and skills for independent research. In-depth theoretical knowledge and good practical and professional skills are evident throughout the reading of scientific research. Especially valuable is the protocol for detailed examination of the temporomandibular joint, including objective and subjective criteria, which assists dentists in the differential diagnosis of patients with tinnitus.

Due to the abovementioned, I will give my **POSITIVE** assessment for the awarding of the educational and scientific degree "PhD" to Dr. Boris Borisov.

28.03.2022

Varna

Signature:



/Prof. Dr. Stefan Vasilev Peev, DMD, PhD, DSc/