

## OPINION

by

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**Subject:** Dissertation on the topic: "Application of CBCT in the endodontic practice" for the award of educational and scientific degree "Doctor" in the scientific specialty "Therapeutic Dentistry", professional field 7.2. Dental medicine 7. Health and sports.

**Author:** Dr. Slavena Svetlozarova Georgieva, PhD student in full-time education at the Department of Conservative Dentistry and Oral Pathology at the FDM, MU-Varna.

**Scientific supervisor:** Assoc. Prof. Dr. Tsvetelina Iliyanova Borisova-Papancheva, MD, PhD

The dissertation is written on 228 standard pages and includes 115 tables and 100 figures. Structurally, the proportional relations between the main parts of the dissertation are being kept.

The literature review includes 376 sources, of which 5 in Cyrillic and 371 in Latin.

Making an accurate diagnosis, preparing an optimal treatment plan and predicting the outcome of the endodontic treatment is a process unthinkable without adequate diagnostic imaging. The disadvantages of orthopantomography have been repeatedly discussed and their low sensitivity to the detection of periapical lesions, root fractures and follow-ups of the healing process after treatment make them an extremely uncertain method for the endodontic practice. Periapical radiographs are the method of choice in the higher percentage of endodontic cases and have a relatively good diagnostic and prognostic value. The two-dimensional and slightly enlarged image of the periapical radiographs, the superposition of hard dental and bone tissues, close anatomical structures, as well as the impossibility to actually obtain information about the ratios in the endodontic space in the sagittal plane require the use of a three-dimensional imaging system, namely of CBCT. CBCT-imaging is becoming more and more accessible to dentists and in this sense it is necessary to study in detail the possibilities of the method, as well as its difficulties and shortcomings for the purposes of the endodontic practice. In this sense, I consider the topic of the dissertation well chosen.

**Literature review:** The literature review consistently and systematically presents the accumulated knowledge about the role of diagnostic imaging in endodontics. All possible indications for CBCT before, during and after endodontic treatment have been clarified in sufficient detail.

The **aim** formulated in this way has **four tasks** appropriately selected.



**Materials:** The material for all four tasks is sufficient, carefully selected according to strict indicators and correctly distributed. The processing methods are well thought out and scientifically sound.

The **statistical methods** are precisely and skillfully selected for processing the collected data.

**Results and discussion:** The results of all four tasks were thoroughly checked.

Under the **first task**, the author conducts analyzes of CBCT-images in order to establish bilateral symmetry in terms of number of roots, root canals and types of RCS among the Bulgarian population. The author found a higher percentage of asymmetry in the group of the first mandibular and maxillary molars than in the second. According to her, this is due to the greater variability of the RCS of these groups of teeth, as well as the higher frequency of the presence of additional root canals in them. When analyzing the results for the group of mandibular canines, a high percentage of symmetry was found regarding the number of roots, root canals and the type of the RCS. The analysis of the results obtained on this task leads to the conclusion that the knowledge of a high percentage of symmetry should serve as a guidance prior endodontic treatment, because even in cases of symmetry regarding the number of roots, strong asymmetry with respect to the number of canals is possible, as well as the available connections between them.

The **second task** aims to establish the frequency of additional root canals and the type of RCS-configuration by groups of teeth among the Bulgarian population. A high frequency of the presence of an additional root canal in the MB root of the upper first molars was established. CBCT provides a detailed diagnosis of the presence and shape of the additional MB root canal, but analytically the author believes that the increased radiation dose does not allow the use of CBCT for these purposes.

The frequency of additional root canal in single-rooted mandibular incisors is also high among the Bulgarian population. This necessitates its purposeful search in the vestibulo-lingual direction and analysis of CBCT, due to the impossibility to visualize it on two-dimensional intraoral radiographs. According to Dr. Svetlozarova, again the routine use of CBCT to detect a second canal in mandibular incisors is not justified in terms of accurate radiation dose.

The results obtained for the second task differ to varying degrees from the results of other studies affecting other populations. According to the doctoral student, the differences are mainly explained by the different ethnicity of the examined patients, as well as by the different technical characteristics of the used diagnostic tools and software for image processing.

The **third task** consists in determining the working length by groups of teeth and comparing the working length determined in this way and the one determined electrometrically with an apex locator. The average working lengths of the examined groups of teeth established in this way have an approximate value. The author's analysis again



establishes differences in the average values of working lengths of root canals of the Bulgarian population in comparison with similar studies among other ethnic groups. The second group of results on the third task is related to the comparison of the accuracy of the CBCT- measurement and the electrometric one, for determining the working length. Despite the minimal deviations in the obtained results, the author considers it irrational to use cone-beam computed tomography instead of the traditional electrometric measurement of the working length. Moreover, in the presence of apical and coronal root canal curves, the diagnostic value of the working length measured by CBCT would decrease.

The **fourth task** aims to determine the frequency of the presence of denticles in the RCS and root fractures after endodontic treatment.

The results regarding the presence of denticles again show a difference in their frequency among the Bulgarian population compared to the frequency of similar studies among other ethnic groups.

I believe that the results obtained and their analysis regarding the examination of existing root fractures after endodontic treatment is of great clinical importance. The author documents one of the shortcomings of CBCT in this case, namely the impossibility of categorically detecting a fracture line of the sound dental tissues due to existing artifacts from the root canal filling materials. In this regard, she considers that the method should not be a method of choice, but rather an additional method, always preceded by a clinical examination and a conventional radiographic examination.

**Contributions:** I consider the self-assessment of the contributions from the developed scientific work to be correct.

The dissertation work was carried out entirely by the doctoral student under the guidance of her supervisor. In connection with her dissertation, the author has popularized her research in 3 full-text publications and 2 scientific papers. Dr. Slavena Svetlozarova Georgieva is a leading author in the three full-text publications and the 2 scientific papers.

The abstract is properly structured, well illustrated and corresponds to the individual sections of the research. I believe that it is presented in the appropriate volume required by the rules set out in the Regulations for the development of the academic staff of MU Varna, as well as in relation to the full volume of scientific research. There are no omissions in the documentation attached by Dr. Slavena Svetlozarova Georgieva.

**Conclusion:** The dissertation of Dr. Slavena Svetlozarova Georgieva is complete and represents its own contribution to science. The scientific work, as well as the publications on the topic, show that the doctoral student has theoretical knowledge on the treated problem and skills for independent research. Good professional skills, in-depth knowledge are evident throughout the course of scientific development, in which semantic and logical theoretical literature data, own results and their interpretation are arranged and the most important conclusions are drawn. In this way and in this sense, I believe that the goal has been achieved

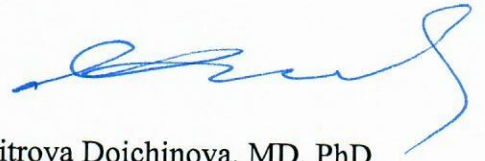
The results and conclusion are of original and applied nature.



My opinion is that Dr. Svetlozarova and her dissertation meet the necessary criteria and deserve to be evaluated positively and therefore, I will vote "Yes" for the award of educational and scientific degree "Doctor" to Dr. Slavena Svetlozarova and I recommend to the members of the respected scientific jury to vote positively for awarding the educational and scientific degree "Doctor" to Dr. Slavena Svetlozarova Georgieva in the scientific specialty "Therapeutic Dentistry"

24.11.2021 г., Varna

Signature:

A handwritten signature in blue ink, consisting of several fluid, connected strokes that form a cursive script. The signature is positioned to the right of the printed word "Signature:".

Assoc.prof. Dr. Maya Dimitrova Doichinova, MD, PhD