

## REVIEW

by **Prof. Dr. Ani Bozhidarova Belcheva - Krivorova, DDS, PhD**

**Head of the Department of Pediatric Dentistry, FDM, MU - Plovdiv**

member of a scientific jury, included by order of the Rector of MU-Varna №

**P-109-470 / 05.11.2021**

**Subject:** Dissertation work for awarding the educational and scientific degree "Doctor"

in scientific specialty Therapeutic dental medicine, professional direction 7.2. Dental medicine, field of higher education 7. Healthcare and sports.

**Topic:** "Application of cone-beam computed tomography in the endodontic practice"

**Author:** Dr. Slavena Svetlozarova Georgieva, PhD student in regular training at the Department of "Conservative dentistry and oral pathology", Faculty of Dental Medicine, Medical University "Prof. Dr. Paraskev Stoyanov" - Varna.

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

### 1. General presentation of the procedure and the doctoral student

The presented set of materials on paper and electronic media is in accordance with the Procedure for acquiring ONS "Doctor" in MU - Varna and includes the following documents:

- Dissertation

- Abstract

- Doctoral student's documents - CV; a copy of the diploma for completed qualification "Master"; enrollment order; protocol from the doctoral minimum exam; deduction order with the right to protection; protocol from the department council with a positive decision for readiness for defense; declaration of originality; list of publications, related to the topic - 3 publications; a copy of the publications related to the topic of the dissertation; declaration of authenticity of the submitted documents.

Dr. Slavena Svetlozarova Georgieva was born in the city of Varna on May 17, 1991. She graduated at the High School "John the Exarch", Varna in 2009. Afterwards she graduated the Medical University Prof. Dr. Paraskev Stoyanov", Varna, specialty dental medicine and acquired a Master's degree in Dental Medicine in 2017. From 19.09. 2017 she is a part-time assistant at the Department of Conservative Dentistry and Oral Pathology. After winning a competition in March 2018 became a full-time assistant at the Department of Conservative dentistry and oral pathology. On 01.12.2018 begins specialization in Operational dentistry and endodontics with training base UMDC, FDM,

MU-Varna. It is credited as a full-time doctoral student at the Department of Conservative Dentistry and Oral Pathology on 02/01/2019.

She is fluent in written and spoken German and English.

## **2. Relevance of the topic**

Imaging studies find an essential application for determining the location and the morphology of the teeth, the number of root canals, the size and degree of calcification of the pulp chamber, the direction and degree of curvature of the roots, the presence of fractures, iatrogenic accidents, as well as the degree of development of dental caries. Radiographs support every step of the treatment - from diagnosis to the choice of method for treatment and monitoring of long-term results. They allow the diagnosing of periapical pathology, as well as specifying the presence and extent of root or bone resorption. Radiographic images appointed in the course of endodontic treatment are targeted to visualize the patency of the root canal and can be carried out with placed endodontic instruments or gutta-percha points in it. Radiographs taken immediately after obturation of the root canal, aim to determine the quality of the root canal filling. For a long time, periapical radiographs were the main and only imaging tool used in the diagnosis and treatment of endodontic complications. Two-dimensional radiographic images are also associated with some limitations that prevent their independent application. The complex volume characteristic of the root canal anatomy and surrounding structures, as well as their overlap in obtaining a two-dimensional image can make it difficult to interpret correctly and can lead to a misdiagnosis or misreporting of the result of the conducted treatment. CBCT is an extraoral device that allows three-dimensional imaging of the oral and maxillofacial structures and thus avoids some of the mentioned shortcomings. Its introduction in 1996 marks the beginning of the practical application of 3D-diagnostics in endodontics. Cone-beam computed tomography is determined as an effective tool to facilitate the diagnosis and treatment of conditions such as early stages of apical periodontitis, root fractures, root resorption, treatment of teeth with complex anatomy and anomalies in the form, planning of apical surgery.

The relevance of the topic is indisputable, confirmed by the fact that during the study hundreds of planar images of the study area are made. With a single rotation CBCT provides a precise three-dimensional image of the whole studied anatomical area. Cone-beam computed tomography allows obtaining clear images with high resolution, lower cost and radiation dose compared to the standard, used in medicine, CT.

The object of attention of the dissertation are the anatomical variations in the configuration of the root canal system and the number of root canals. The identification of the number of root canals, their location and configuration not only helps with the easier detection of orifices, but also helps to optimize in some cases minimizing the cavity for endodontic access

I define the topic as interesting and informative.

## **3. Knowledge of the problem**

The dissertation presented to me for review is written on 228 pages, of which 52 pages literature overview, 25 pages - material and methods, 106 results and discussion. Illustrated is with 100 figures and 115 tables. 376 literature sources were used, of which 5 of Cyrillic and 371 in Latin.

### **Structure of the dissertation**

The dissertation is properly structured, contains all the basic elements of a dissertation: introduction, literature review, purpose and tasks, material and methods, results and discussion, summary and conclusions, bibliography and appendices.

**The literary review** is contemporary, sufficient in volume and well organized. The scientific literature has been analyzed on the possibilities of different methods for obtaining dental images. The connections between indications and certain methods, advantages and disadvantages are examined. The literature review ends with analysis and motivation, which justifies the development of the presented dissertation.

**The aim** of the scientific work is to study the possibilities of CBCT in the discovery of anatomical variations of the endodontic space and root canal system among the Bulgarian population. The fulfillment of the goal is realized through four specific tasks. The tasks are on a different number of patients, described in detail in the methodology.

### **Research methodology**

The methodologies are focused on each of the set including and exclusion criteria.

**The results** are well described and accompanied by tables and figures.

**The conclusions** are concrete and clear and follow the results obtained. There are 5 main conclusions of the tasks.

**The bibliography** is up-to-date with sources from the last 5 years and shows the skills of the dissertation student to search for scientific information, to systematize it and to present science, evidence-based.

### **5. Characteristics and evaluation of the dissertation and contributions**

The studied material is sufficient and there is an interpretation and discussion of the received results. I accept the following proposed contributions:

#### **Confirmatory contributions:**

1. The advantages of CBCT application in the field of endodontics have been proven.
2. The high frequency of available additional root canals at maxillary and mandibular molars, maxillary second premolars and mandibular incisors has been proven.
3. The accuracy of the CBCT measurements when determining the working length is confirmed.
4. The possibilities to establish the configuration of the RCS by CBCT-diagnostics are confirmed as well as the presence of denticles and calcifications in the RCS.

5. The role of CBCT diagnostics in supporting the detection of root fractures has been confirmed.

**Contributions of original character for the country:**

1. For the first time, a study with such a scope has been carried out to demonstrate the application of CBCT in the field of endodontics.

2. For the first time a comparative study of the accuracy of determining the working length by CBCT - measurement and by electrometric method has been conducted.

3. For the first time, the frequency of available additional root canals by groups of teeth among the Bulgarian population, using CBCT as a diagnostic tool was established.

4. For the first time, a CBCT study was performed to establish bilateral symmetry between the number of roots, RCs and the type of RCS configuration in symmetrical pairs of teeth among the Bulgarian population.

5. For the first time, a CBCT study was performed to analyze the configuration of the root-canal system in each root by groups of teeth among the Bulgarian population.

**6. Evaluation of the publications and personal contribution of the doctoral student**

The dissertation has 3 publications related to the dissertation. The author also popularized her development with 2 participations in national forums in Plovdiv and Varna.

Dr. Georgieva performed the specialized clinical work independently, under the guidance of her supervisor.

**7. Critical remarks and recommendations (to the conducted research and the presented materials).**

All the critical remarks I made about the structure of the arrangement and inclusion of the studied material are compliant. Dr. Georgieva correctly reflected the changes, which only supplement the large amount of processed material, the refined statistics and are in support of the competently performed scientific work and its shaping.

**8. Abstract**

The content and quality of the abstract corresponds to the developed work and is made according to the requirements of MU-Varna. Reflects the main results achieved in the dissertation, the conclusions and contributions made.

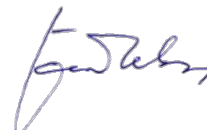
**CONCLUSION**

The dissertation work submitted for review meets the requirements of The Law for the Development of the Academic Staff in the Republic of Bulgaria (LASRB), the Regulations for its application and the Regulations of MU - Varna. The dissertation deals with a widely discussed and up to date topic. The doctoral student Dr. Slavena Svetlozarova Georgieva has advanced and upgrading theoretical knowledge in the scientific specialty of Therapeutic dentistry. In the developed work are demonstrated opportunities for gathering and interpreting scientific

information. This gives me reason to give my positive assessment of the dissertation on the topic "Application of cone-beam computed tomography in the endodontic practice". I propose to the scientific jury to award the educational and scientific degree 'Doctor' of Dr. Slavena Svetlozarova Georgieva, PhD student in a doctoral program in Therapeutic dental medicine at MU-Varna.

28.11. 2021

Reviewer:



/ prof. Dr. Ani Belcheva, DDS, PhD/