OPINION

from

Associate Professor Dimitar Kirov, Ph.D.,

Department of "Prosthetic Dentistry,"

Medical University, FDM - Sofia

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

of Dr. Georgi Atanasov Alexandrov

External doctoral student at the Department of Prosthetic Dentistry

Medical University, Faculty of Dental Medicine–Plovdiv

The dissertation is on the topic: **"Comparative evaluation of the accuracy of conventional and digital impressions in the All on four concept - in vitro study."**

Research supervisor: Prof. Dr. Hristo Kalchev Kisov, MD

1. General presentation of the procedure and the Ph.D student

The presented materials follow the Regulations for the Acquisition of the Educational and Scientific Degree "DOCTOR" and the Regulations for implementing the Law on the Development of the Academic Staff in the Republic of Bulgaria of MU-Plovdiv and include all necessary documents.

The Ph.D. student has attached four scientific publications, one in a refereed journal (Q4) and three participations in scientific forums.

2. Short biographical data for the Ph.D student

Dr. G. Alexandrov graduated in Dental Medicine at the Faculty of Medicine of the MU - Plovdiv in 2009.

From 2013 - 2019, he worked as a dentist in Augsburg, Germany.

2015-2017 - medical college in Münster, Germany, where he acquired the professional qualification "Master of Science in Implantologie and Dental Surgery" under the guidance of Prof. Dr. Ulrich Joos.

Since 2019, he has worked in independent practice with a digital dental laboratory.

3. Relevance of the topic

The digitization of every single step, from planning to creating the aesthetic restorations and their placement in the patient's mouth, has dramatically shortened the time to perform each clinical stage and laboratory manipulation, its financial value, and the precision of execution. Taking an impression of the prosthetic field that accurately reflects the volumetric and spatial relationships of the structures in the oral cavity is of utmost importance for the success of prosthetic treatment. Conventional impression-taking techniques create specific difficulties and limitations related to volumetric changes in impression and laboratory materials.

The development of modern technologies has also led to the digitization of imprinting techniques. This naturally raises questions about the accuracy and security of digital fingerprints. In his dissertation, the author focused his efforts on a comparative analysis of conventional impression-taking techniques and modern digital methods.

4. Knowledge of the problem

The dissertation work of Dr. G. Alexandrov is written on 225 computer pages, including 44 tables (Appendices 1, 2, and 3), 60 data tables (Appendices 4, 5, and 6), 22 diagrams, 110 figures, and 7 appendices. The literary overview in a volume of 54 pages included 246 literary sources, of which 54 are in Cyrillic, and is detailed and well structured. Over half of the used literary sources are from the last five years.

The literature review comprehensively and thoroughly presents the printing techniques in the prosthetic field. Furthermore, the analysis of the literature data and the conclusions at the end of the literature review give me a reason to believe that the doctoral student knows the problem's specifics and peculiarities.

5. Purpose and tasks

The objective is well formulated and consistent with the chosen topic. In order to fulfill the goal thus set, the dissertation sets four tasks, which are clearly formulated and sufficiently comprehensive in scope.

6. Material and methods

The criteria for selecting the material for the research are described in detail in the dissertation. The methods for each task are optimally selected and sufficient to produce representative results. They are precisely selected and provide the opportunity to derive significant qualitative and quantitative results.

7. Results and discussion

The results are systematized and arranged according to the tasks. Finally, they are illustrated with photographic material, end tables, and diagrams.

The conclusions and conclusions made for the first task are based on the survey results regarding the popularity of digital impression methods and the established conventional impression methods in prosthetics on implants in the practice of LDM in Bulgaria and Germany.

The results of the second task are a consequence of the developed experimental output model representing KVV4 (master model), on which the experimental studies for comparing the accuracy were carried out.

To display the results of the third task, various individual spoons were made with a particular program, after which the spoons were printed on a 3D printer.

The results of the fourth task were obtained after entering the digital data from the intraoral and the laboratory scanners into a specially developed program for 2D/3D analysis of objects and CAD designs, and a comparison of the following parameters was made:

- deviation of each implant along the three axes of the model;
- the inter-implant distance;
- The sagittal angle of each implant;

The discussion is made according to the modern requirements for structuring a dissertation work, separately for each of the tasks.

The conclusion and conclusions are directly related to the obtained results.

The contributions reveal the modern direction of scientific work.

8. Contribution and significance of the dissertation for the science and practice

The dissertation was written according to the Law on the Development of the Academic Staff of the Republic of Bulgaria, the Regulations for its implementation and the Regulations of the MU, Plovdiv in a good Bulgarian language. The conducted research is complete. The conducted research and the achieved results have both a scientific and a scientific-practical nature and are of considerable clinical significance.

The author's contributions are mainly of a confirmatory and scientific-applied nature.

9. Evaluation of the publications and personal contribution of the Ph.D student

Research results have been published in 4 full-text articles in Bulgarian and foreign journals (in which he is the first author) and 3 national and international scientific forums.

10. Abstract book

The 77-page abstract attached to the dissertation meets the requirements and reflects the work in an abbreviated form. The tables and figures presented in it are sufficient to visualize the research conducted and the results obtained.

11. Critical notes

The bibliographic reference uses some literary sources that cannot be found in scientific literature databases.

CONCLUSION

The dissertation on the topic **"Comparative assessment of the accuracy of conventional and digital impressions in the concept of All on four - in vitro research"** for awarding the scientific degree "Doctor" with author Dr. Georgi Atanasov Alexandrov is an up-to-date and valuable modern scientific work with an emphasis scientific and applied to mean. From the analysis, I believe that in terms of the volume of research and the results achieved, the dissertation meets the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria, the Regulations for its implementation, and the Regulations of MU-Plovdiv. Furthermore, the studies show that Dr. Alexandrov possesses in-depth theoretical knowledge and professional skills in the scientific specialty "Prosthetic Dentistry," demonstrating qualities and skills for independent conducting scientific research and interpreting the obtained results.

My opinion is positive, and I will vote "YES" to award the educational and scientific degree "Doctor" to Dr. Georgi Atanasov Alexandrov in the Doctoral Program in "Prosthetic Dentistry."

Prepared the opinion: .....

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