

REVIEW

from

Prof. Dr. Mario Petrov Milkov, MD, PhD

Head of the Department "Dental Materials Science and Prosthetic Dental medicine", Faculty of Dental Medicine, Medical University "Prof. Dr. Paraskev Stoyanov" - Varna, habilitated in the Professional domain 7.1 Medicine, Medical University - Varna, member of a Scientific Jury, for awarding the educational and scientific degree - "Doctor", according to an order P-109-392/03.10.2022

Subject of the Review:

Defence of a PhD-thesis of **Dr. Desislava Kirilova Stoyanova**, a full-time PhD student, according to an order of the Rector of Medical University – Varna, №P-109-30/01.02.2019, with the topic: „**Maxillary sinus floor elevation with lateral approach – imaging, clinical and experimental research**“ for the award of the educational and scientific degree „Doctor (PhD)“, Professional domain 7.2. Dental medicine, Higher education: 7. Health care and sports, Specialty „Therapeutic dental medicine“.

Research Supervisor: Prof. Dr. Stefan Peev, DMD, PhD, DSc

Assoc. Prof. Dr. Nikolay Rumenov Sapundziev, MD, PhD

Brief biographical data of the doctoral student:

Dr. Desislava Kirilova Stoyanova was born on 10.06.1986 in the town of Varna, Republic of Bulgaria. In 2012, she graduated as a master – physician in dental medicine from the Faculty of Dental Medicine at Medical University "Prof. Dr. Paraskev Stoyanov" - Varna. In 2015, Dr. Stoyanova obtained a master's degree in "Health Management", Medical University - Varna. Since 2018, she has recognized rights in the specialty "Dental Implantology", acquired at Medical University – Varna. From 2020 and up to the present moment, Dr. Stoyanova is a resident in the specialty "Periodontology". As an additional qualification, in 2021 she completed a course for Pedagogical competence, level I.

In the period 2017-2020, Dr. Desislava Stoyanova was an assistant at the Department of Periodontology and Dental Implantology, Faculty of Dental medicine – Varna. In the period 2020-2022, she held the position of administrative assistant of the Department. Since 2021, she has been a quality auditor at the University Medical and Dental Center, Faculty of Dental medicine, Medical University – Varna. In 2019, she was enrolled as a full-time doctoral student at the Department of Periodontology and Dental Implantology, Faculty of Dental medicine, Medical University - Varna.

Dr. Stoyanova's willingness to participate in a number of postgraduate professional qualification courses in the field of Dental Implantology, bone augmentation, piezosurgery, etc., and in various scientific forums and congresses in the country and abroad, including with active presentation of scientific developments, makes a good impression. This proves the desire of the candidate under this procedure to further improve her skills and knowledge in the field.

Relevance and structure of the dissertation work

The presented dissertation is structured correctly, written over 136 pages from which: Content – 3 pages, Abbreviations used – 2 pages, Introduction – 2 pages, Literature Review – 23 pages, Aim and Tasks – 1 page, Materials and methods – 30 pages, Results – 31 pages, Discussion – 7 pages, Conclusion – 2 pages, Concluding remarks – 2 pages, Contributions – 2 pages, References – 19 pages, Applications – 9 pages, Publications and scientific reports, connected with the PhD-thesis – 1 page. The PhD-thesis is richly illustrated with 44 figures and 23 tables. Contributions are eight (8). The bibliographic reference to the dissertation consists of 180 literature sources, of which 5 are in Cyrillic, and 175 – in Latin. The presentation of the text of the dissertation submitted for a review is presented clearly and concisely, in a very good scientific style.

The topic of the dissertation is up-to-date and current. This is confirmed through the detailed and analytical literature review, which is sufficient in volume and thematically fully corresponds to the set aim and tasks. The scientific literature in the field of Otorhinolaryngology and Dental implantology is analyzed, given the fact that both disciplines deal with the diagnosis and treatment of disorders in borderline anatomical areas of the human body.

The analysis of the literature review in the presented dissertation work is up-to-date and includes a sufficient number of contemporary authors, dealing with the problems related to the tasks of the study performed, including Bulgarian ones.

My conclusion is that Dr. Stoyanova is well-acquainted with the issues involved in the topic.

The goal of the dissertation is clearly and precisely formulated. Through it, Dr. Stoyanova gives the main directions of her research work, namely - to study the possibilities for optimizing the intervention for elevation of the floor of the maxillary sinus.

The fulfillment of the goal was achieved through four (4) main tasks; modern diagnostic, clinical, sociological and statistical methods were used.

The tasks formulated are as follows:

- To prepare a specification of the available subantral bone in cases with maxillary sinus floor elevation.
- To analyze the methods for the application of implants in conditions of subantral bone deficiency compared to the available subantral bone in the cases where the floor of the maxillary sinus has been lifted.
- To explore the possibilities of the endoscopic access.
- To analyze clinical observations on access for endoscopic control in maxillary sinus floor elevation.

I fully believe that the set tasks fully correspond to the topic and are sufficient to achieve the scientific goal of this research work.

The material and methods are adequately planned and implemented and are sufficient in volume to produce reliable and representative results.

The study was approved by the Commission on Ethics of Research (KENI) of MU-Varna – Protocol №116/28.04.2022. The requirements for adding KENI's approval at the end of the dissertation have been met.

For the implementation of Task 1, a single-centered, retrospective study of preoperative cone beam computed tomography (CBCT) images taken in the Imaging Diagnostics sector at the University Medical Dental Center (UMDC) of patients who underwent an augmentation

procedure to elevate the floor of the maxillary sinus with lateral access, unilateral or bilateral, with immediate or delayed placement of dental implants for the purpose of rehabilitation of the masticatory apparatus in the period 2014-2021 by physicians in dental medicine. In the study, Dr. Stoyanova included 76 three-dimensional images (of 50 males and 26 females) of the entire upper jaw and maxillary sinuses, in which no change was observed in the sinus mucoperiosteum. 108 maxillary sinuses were observed, and in all cases an absence of the first molar was diagnosed. A total of 305 teeth were found to be missing. Measurement of height and width of available subantral bone as well as sinus width was performed.

Under task 2, a single-centered, retrospective study of preoperative cone beam computed tomography (CBCT) images taken, analogously to the images according to Task 1, Imaging Diagnostics sector at the University Medical Dental Center (UMDC) of patients who had an augmentation procedure for elevating the sinus floor with lateral access, unilateral or bilateral, with immediate or delayed placement of dental implants was carried out in order to rehabilitate the masticatory apparatus in the period 2014 until 2021 by four operators – physicians in dental medicine. In the study of Dr. D. Stoyanova, 76 three-dimensional images of the entire upper jaw and maxillary sinuses were included, in which no change in the sinus mucoperiosteum was observed. Single edentulous areas in the upper first molar area, partially distally limited and unrestricted edentulous areas up to a totally edentulous upper jaw were diagnosed in the selected images. An augmentation procedure was performed on 107 sinuses, and the absence of 305 teeth was rehabilitated with the placement of 161 implants, of which 100 were placed simultaneously with the elevation of the maxillary sinus floor, and 61 – by following the method of delayed implant placement, after performing the sinus floor augmentation procedure.

According to task 3, an experimental study was conducted on three-dimensional simulation models of the upper jaw and maxillary sinuses. To make them in scale 1:1, slow print speed type, high quality 0.08 mm, 20 pre-operative CBCT images from the ones discussed in Task 1 were used. Each sinus of the 3D-models was measured for percentage of visibility from the bottom of the floor of the maxillary sinus in the antero-posterior direction using an endoscope ENDOCAMELEON ENT HOPKINS Telescope Karl Storz with built-in optics with an angled visual axis deviated from 15° - 90° to the axis of the instrument.

The data obtained in task 3 was subjected to a detailed statistical analysis using the IBM SPSS Statistics 25 software, applying the following statistical methods: parametric tests -

Student's t-test (t-test) for dependent samples and ANOVA - a test for comparing more than two groups and non-parametric tests – Wilcoxon test for dependent samples, Kruskal–Wallis and Fridman test for comparing more than two groups.

Under task 4, a prospective clinical study was conducted at the UMDC of 23 patients with deteriorated conditions for rehabilitation through implementing the implant treatment methods. These patients underwent elective unilateral surgery via an endoscopically guided augmentation procedure. The purpose of the study was to evaluate the access for endoscopic control.

I believe that the methods used were adequately focused on each of the tasks. There is a rich illustration with histograms, tables and figures. They meet the set tasks by applying the necessary research methods.

The analysis of the results is accurate and critical. **Ten (10) inferences** have been deducted. The publications on the topic are sufficient in number – **three (3)** and well present the experience of the author.

The presented Conclusion of the PhD-work is logical and justifies the conclusions of the dissertation.

Contributions of the PhD-thesis are **eight (8)** in number, divided correctly into two groups: *of an original (2) and of a confirmatory (6) origin:*

Contributions of an original origin:

1. For the first time, a visibility share of the total observation area of the sinus floor through an endoscope was investigated, when entering in the antero-posterior direction in two positions 10 and 20 mm, observation degree 15°, 45° and 90°, as well as opening for the endoscopic access along the fossa canina in three directions.
2. For the first time, the trocar-guided technique and the machine osteotomy technique for creating an opening for endoscopic access are compared.

Contributions of a confirmatory origin:

1. The thesis confirms that the height of the available subantral bone decreases from the premolar to the molar region, and the width of the available subantral bone and the width of the maxillary sinus increase from the molar to the premolar region.
2. The dissertation confirms a significant inverse relationship between the width of the maxillary sinus and the height of the available subantral bone, and a significant direct relationship is observed between the width of the maxillary sinus and the width of the available subantral bone.
3. The dissertation confirms that the height of the available subantral bone where a lateral access sinus floor elevation with immediate implant placement is undertaken acquires a wider range.
4. The dissertation confirms that the height of the available subantral bone is a factor when undertaking an implant application method in conditions of subantral deficiency when raising the sinus floor with lateral access with immediate placement of implants
5. The dissertation confirms that the three-dimensional fused deposition modelling (FDM) anatomical simulation models can be included in the preoperative preparation and planning of the surgical intervention, in order to understand the individual anatomy of certain objects, through their visualization, as well as to serve as a physical object for training in performing specific surgical techniques to improve the operator's dexterity.
6. The dissertation confirms that for the needs of Dental implantology, when conducting an endoscopically guided sinus floor lift procedure, it is appropriate for the endoscopic access to be carried out through the fossa canina.

The dissertation was carried out solely by the doctoral student Dr. Desislava Stoyanova, under the guidance of her academic supervisors: Prof. Dr. Stefan Peev, DMD, PhD, DSc and Assoc. prof. Dr. Nikolay Sapundzhiev, MD, PhD. The obtained results are thoroughly summarized and reliably and adequately interpreted. Both the theoretical knowledge of Dr. Stoyanova on the topic of the researched issues, as well as her ability to actively participate and carry out independent scientific research, which present credible results, have been demonstrated.

The Thesis summary, written over 75 pages and illustrated with 14 tables and 34 figures on the conducted research, representing a shortened version of the PhD-thesis, fully meets the requirements for writing abstracts for dissertation works of Medical University - Varna.

The PhD-student Dr. D. Stoyanova popularized the results of the conducted research in **three (3) full-text scientific publications in English**, published in a renowned international journal.

CONCLUSION

I sincerely believe that the dissertation work „*Maxillary sinus floor elevation with lateral approach – imaging, clinical and experimental research*“ submitted to me for a Review fully covers all the scientific requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations of it at MU-Varna for the acquisition of the educational and scientific degree "Doctor" and fully meets the modern requirements of science. My more than two decades of experience as a clinician and teacher in the field of Otorhinolaryngology give me the reason to highly assess the presented dissertation work. The topic is of significant interest for the development of Dentistry and Medicine, as professional fields, on the one hand, and Dental implantology and Otorhinolaryngology, as medical specialties, on the other.

I hereby confirm that the presented scientific work, personal qualities and professional experience of the PhD student let me give a **POSITIVE** assessment to the Scientific Jury for the award of the educational and scientific degree - "Doctor" to the candidate of the following procedure – **Dr. Desislava Kirilova Stoyanova**.

07.11.2022

Varna

Reviewer:



/Prof. Dr. Mario Petrov Milkov, MD, PhD/