

## OPINION

by Professor Dr. Snezhanka Zaprinova Topalova-Pirinska, PhD  
Department of Conservative Dentistry, FDM, MU - Sofia  
of a dissertation for awarding the educational and scientific degree  
"Doctor of Philosophy - PhD"  
Field of higher education 7. Medicine and sports  
Professional field 7.2 Dentistry  
Doctoral program Pediatric Dentistry

**Author:** Dr. Elitsa Romanova Veneva-Raichinova  
**Form of doctoral studies:** independent preparation  
**Department:** Pediatric Dentistry, FDM, MU-Plovdiv  
**Topic:** Non-pharmacological strategies for control of pain and anxiety associated with local analgesia in children  
**Scientific supervisor:** Prof. Dr. Ani Belcheva-Krivorova, PhD

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

As an external member of the Scientific Jury, I present an opinion on a completed dissertation pursuant to Article 32 of Regulations for application of the Law on Dental Medicine, Order № P-66/ 18.01.2021 of the Rector of MU-Plovdiv and according to Protocol №1 of meeting of the Scientific Jury.

Dr. Elitsa Veneva was born on May 1, 1988. She graduated from the English Language School "Plovdiv" in 2007 with intensive study of German and English. In the same year she began her studies at the FDM, MU - Plovdiv, graduated in 2013 and started practicing as a dentist in "Dent-E-AIPPPDM" Ltd. From 01.06.2016 she started specialization in pediatric dentistry, and from January 2017 she was appointed as an assistant in the Department of Pediatric Dentistry, FDM, MU-Plovdiv. She was enrolled as a doctoral student in independent training on 23.07.2020, and from 21.12.2020 was given the right to defense by order № P-7 / 06.01.2021 of the Rector of MU - Plovdiv.

### Topicality of the subject

The right of the patient, including pediatric one, to a painless treatment requires the application of appropriate pain relief in accordance with their age, health and behavior, the necessary treatment, the experience of the dentist and the equipment of his practice. The provision of effective injection anesthesia depends on the overcoming of children's anxiety and fear of dental manipulations, including injections, through pre-limited analgesia at the site of anesthetic administration.

The search for new, modern means for non-pharmacological pain control is a necessary and current trend in dental medicine, which will create conditions for quality dental treatment of children and maintaining their oral health. I consider the choice of dissertation topic to be timely and reliable.

### Structure of the dissertation

The completed scientific work corresponds to the approved norms for dissertation in FDM, MU - Plovdiv, and is in accordance with the requirements of Law on the development of the academic staff in the Republic of Bulgaria.

The total volume is 193 pages and includes the generally accepted main parts for the dissertation. The literature guide on the topic covers a total of 214 publications, 16 of which are in Cyrillic. There are 7 appendices.

### **Knowledge of the problem**

The literature review has a sufficient volume - 30 pages. Possibilities to reduce injection pain during conventional local anesthesia are explored with anesthetics and non-pharmacological strategies through anesthetic preconditioning, site of application, choice of analgesic technique, use of physical methods, and good practices in local anesthesia of children before dental treatment are discussed. Dr. Veneva demonstrates knowledge about the control of pain and the behavior of children in need of dental treatment. The literature review is informative enough and structured to provide a summary of scientific knowledge and practical experience, and to address unresolved issues, goal selection, and research objectives.

The PhD student aims to explore the possibilities for non-pharmacological effects of pain and anxiety associated with local analgesia in pediatric patients. She defines 5 tasks to fulfill the stated goal: 1) to study the efficiency of the vibrating device DentalVibe for reducing the pain and anxiety of children; 2) to study the efficiency of a virtual reality device; 3) to compare the efficacy of these two devices for non-pharmacological management of pain by distraction of children; 4) to study the use of Er: YAG laser for photobiomodulation and achieving safe laser analgesia before dental treatment of children with two subtasks - SEM investigation for evaluation of impact on the enamel of extracted teeth and a clinical study on the efficacy of a specific protocol for laser preemptive analgesia; 5) to prepare recommendations for non-pharmacological control of pain and anxiety related to local analgesia in pediatric dental patients.

### **Methodology of the investigation**

In general, the section "Material and methods" is described in order of the set objectives. Appropriate research methods have been used for the defined tasks: sociological method (survey of children, observation, registration); clinical methods (determination of pulse rate, local analgesia, laser analgesia, EPY, thermal pulp sensibility diagnostics, non-pharmacological method of pain management, treatment of symmetrically selected upper teeth - surgical or conservative), experimental investigation (SEM) and statistical methods. The statistical package IBM SPSS Statistics version 22, significance level  $p < 0.05$  and graphical analysis Excel MS Office 2013 were used.

As the results show, the chosen research methods allow to achieve the set goal and get an adequate answer to the tasks.

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

The studies were conducted in 2017-2019. The dissertation is based mainly on randomized, controlled, crossover, clinical trials in which each patient is self-controlled.

The research material is sufficient, and it is collected, processed and presented for defense relatively quickly - the beginning of the dissertation coincides with the entry of Dr. Veneva in the Department of Pediatric Dentistry as an assistant professor. Unlike the previous already successfully defended dissertations in the same department, this dissertation work was performed mainly in clinical conditions. The manipulations were performed on 8-12 year old children selected according to certain criteria - dental patients in need of extraction or treatment of carious lesions of symmetrical upper teeth.

All materials (information about parents, informed consent, clinical files, enrollment schemes, etc.) are precisely prepared and included in 7 appendices. The clinical charts for tasks 1, 2 and 4.2 for registration of the individual data and for the calculations have been

prepared especially analytically. The emphasized confidentiality in data collection and storage of the evidence for the conducted researches is impressive.

The obtained results, and subsequently their discussions, are presented sequentially by tasks. I read these parts of the dissertation with special interest, because similar tendencies and dependencies are established gradually in tasks 1 and 2, in the first and second visit. The evidence is included in 17 tables, 37 figures and 7 appendices and has been interpreted in detail. Own results and literature are analyzed analytically. The discussion was done skillfully, unambiguously, relatively restrained and without unnecessary repetitions.

As a result, the planned recommendations for non-pharmacological control of pain and anxiety related to local analgesia in children have been formed, which I consider to be especially useful for the dental practice. They are aimed at 4 points: parents, dentists, professional organizations and the faculties of dentistry.

Descriptively presented are 5 conclusions (the last two of task 4), which determine: the effectiveness of the vibrating device DentalVibe and the other virtual reality device to reduce pain and anxiety in children during local infiltrative anesthesia; the similar efficacy of the two devices as non-pharmacological distraction methods; the dangers of structural changes in the enamel surface of the teeth after simulation of laser analgesia and the insufficient efficiency of preemptive laser analgesia with the proposed protocol. On this basis 4 generalized conclusions are drawn. They are formulated according to their significance and not according to their origin from the performed research tasks.

Dr. Veneva - Raychinova identifies a total of 11 contributions, of which 7 original (scientific-theoretical, methodological and scientific-applied) and 4 of a confirmatory nature. She makes original contributions: on the operation of several Er: YAG laser settings in order to find a suitable for preemptive laser analgesia without damaging the enamel tooth surface; offers a safe clinical protocol for preemptive laser analgesia in children; applies combined testing of pulp sensibility and assessment of subjective and objective sensation of pain during treatment with Er:YAG laser; proves the non-pharmacological effect of pain and anxiety during local infiltration anesthesia by means of a vibrotactile device and by means of a virtual reality creation device, the efficiency of which does not differ.

The developed dissertation contains conclusions and recommendations based on scientific facts, which are applicable in the dental practice. As the doctoral student herself points out, they should be promoted among students, dentists and pediatric dentists in order to be useful in the treatment and protection of children's dental health.

#### **Evaluation of the publications on the dissertation and the personal contribution of the doctoral student**

A list of scientific reports related to the dissertation with the participation of Dr. E. Veneva - Raychinova is added to the dissertation. Included are 3 real publications on the topic of the dissertation - one scientific article in a Bulgarian issue (2018) and 2 in refereed international scientific journals (2018) - all are collective. In them Dr. Veneva-Raychinova is the first author.

11 scientific reports have been announced, in which she is also the first author. Five have been presented at various international scientific congresses held abroad and 6 have been presented at national scientific forums. They were made in the period from 2017 to 2019.

For this extremely short period of work as an assistant professor and as a doctoral student, she has a very good publishing activity and real scientific articles with her own participation and contribution. The personal participation of the doctoral student is underlined by the fact that in all reported scientific reports she is the first author.

The presented dissertation shows that Dr. Elitsa Veneva - Raychinova has in-depth theoretical knowledge, has achieved professional skills in the scientific specialty of Pediatric Dentistry and can independently conduct research.

### **Author's abstract**

The abstract reflects the content of the dissertation abbreviated to 51 pages. As accepted, the literature review and bibliography are not included. Own research is presented consistently and accurately. The evidence is set out in 15 tables and 37 figures. The conclusions of the 4 tasks and the 5 recommendations for non-pharmacological control of pain and anxiety related to local analgesia in pediatric dental patients are described clearly enough. Corresponding to the main dissertation, the doctoral student's contributions are also presented. The abstract ends with a list of publications and scientific reports in connection with the dissertation.

### **Critical remarks and recommendations**

The common parts of the materials and methods (pp. 38-59) are partially repeated in the methodology of the clinical protocol and the chronology of the study of tasks 1, 2 and 4.2 (pp. 60-69). Thus, the systematic approach is lost when arranging in the section for materials and methods. Repetitions such as "... a researcher other than the operator determines ..." are also observed in many places in the methodology and in the presentation of the results. Some expressions in the review sound translated and are outside the literary Bulgarian word order, style and grammar.


Despite the noted findings and considerations, the overall development is methodically planned, timely implemented and accurately presented.

### **CONCLUSION**

Dr. Elitsa Veneva-Raichinova has conducted appropriate, well-planned, completed research work and presents a dissertation with thematic relevance, sufficient evidence, *scientific-theoretical, methodological and scientific-applied results, which are original contributions to science* and meet of the requirements and criteria of Law on the development of the academic staff in the Republic of Bulgaria, the Regulations for application of Law on the development of the academic staff in the Republic of Bulgaria and the respective Regulations of MU - Plovdiv.

I am convinced of my *positive assessment* of the presented dissertation "Non-pharmacological strategies for control of pain and anxiety associated with local analgesia in children", the author's abstract, the results and contributions, and I *offer the esteemed scientific jury to award the educational and scientific degree "Doctor of Philosophy - PhD" Dr. Elitsa Romanova Veneva - Raychinova* in a doctoral program in Pediatric Dentistry.

22.01.2021

  
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