

## REVIEW

**On Dissertation work of Tania Ivanova Sbirikova**

**For the Academic degree PhD**

Topic:

***CONTROL OF POSTOPERATIVE PAIN - PSYCHOLOGICAL, fMRI AND  
IMMUNOLOGICAL EXAMINATIONS***

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Scientific adviser: Assoc. Prof. Dr. Deyan Neychev, MD

**Reviewer: Professor Radka Ivanova Massaldjieva, PhD**

**Health care management department, Medical University in  
Plovdiv**

### **General presentation of PhD student**

**DR.TANIA IVANOVA SBIRKOVA** has a master's degree in dentistry with a diploma from MU - Plovdiv, Faculty of Dental Medicine since 2006. She has a specialty in Oral Surgery since 2011. She is enrolled in a doctoral program in Oral Surgery and has been working as an assistant at the Faculty of Dental Medicine at the Medical University of Plovdiv and at the same time as a dentist for about 9 years. She speaks French and English.

It is important to note her productive scientific activity:

- Participation in 22 full-text publications in Bulgarian and English;
- Presentation (as part of a team) of scientific reports at 16 scientific forums;
- Two citations in 2020, one in a publication referenced in Web of Science.

I know Dr. Sbirikova as a competent and very well organized specialist who has in-depth approach to the professional activity.

### **Relevance and significance of the topic**

The dissertation is dedicated to postoperative pain. Its focus is on psychological and immunological aspects, as well as on connections with brain function. The topic is relevant and significant. Management of postoperative pain requires a good knowledge of its physiological, neurological, cognitive and emotional manifestations and taking into account the influence of intervening factors, such as mental state, qualities of attention, awareness, individual expectations and others. Postoperative pain is a multifactorial problem. It can be successfully studied only with a relevant scientific design, developed after a detailed acquaintance with the existing achievements and significant problem areas. The design in the work of Dr Sbirikova meets these requirements..

The importance of the topic and the need for its study are very convincingly defended in the text of the dissertation.

### **Knowledge of the problem**

Dr. Sbirikova presents and analyses theories of pain and many aspects of postoperative pain and its impact on patients' quality of life. The constructs occupying an important place in the dissertation issues are presented in detail in the literature review, among them:

- Dental anxiety;
- Bioactive substances, with regard to the transmission of nociceptive information;
- Techniques used to control postoperative pain

A careful review of the dissertation leads to the conclusion of a very good acquaintance of its author with the problems studied. The doctoral student also shows a very good knowledge of the scales for measuring and evaluating pain, applied in the research conducted so far.

The competence of Dr. Sbirikova in the field of the studied aspects of postoperative pain is demonstrated both by the analysis of the literature data and by the conducted research and its results.

### **Research methodology**

A randomized, double-blind, placebo-controlled study with a design relevant to the objectives was performed. The need for this design is related to Task 3 - to examine serum levels of neurotransmitters and inflammatory pain mediators, and their response to medications. Clinical, imaging, psychological and immunological

methods are applied. Imaging methods also include a Resting-state fMRI study, in connection with the task of activating areas in the brain after removal of impacted mandibular third molars. The selection of areas of interest by fMRI is based on existing literature data. The surgical procedure and other examinations are described in detail and adequately illustrated.

The methods and subjects are appropriately selected. The inclusion and exclusion criteria of the studied patients at a young age (N = 40) are presented in detail.

The statistical methods used are comprehensively presented. The statistical processing of the data is fully in line with the set goals.

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

The dissertation presented for discussion contains 176 pages. The paper is subdivided into: 1 / Introduction 2 / Literary review 3 / Own research 4 / Results and discussion 5 / Conclusions 6 / Contributions in connection with the dissertation 7 / Bibliography 8 / Appendices. The literature review is 44 pages. Seventy-seven pages are devoted to the experimental study.

The work is illustrated with 20 tables, 18 figures and 33 diagrams of very good quality. The introduction presents the studied variables and briefly argues the need for their study.

The goal is consistent with unresolved issues in the field of postoperative pain, which are presented separately by the PhD student and are derived from an in-depth literature analysis of published studies on the control and objectification of postoperative pain after extraction of impacted third mandibular molar. The focus of the dissertation is aimed at assessing the influence of various factors on the intensity of postoperative pain through the use of modern technologies such as fMRI and psychological assessment of anxiety; study of CGRP and Procalcitonin as diagnostic markers for a general inflammatory process in the body and monitoring for the existence of a relationship between the size of postoperative edema and postoperative pain; evaluation of the effect of two drugs.

The dissertation includes:

Literature review with a thematic scope that corresponds to the modern scientific and research frameworks in which the postoperative pain is considered. As a specialist in clinical psychology and neuropsychology, I can comment on the inclusion in the content of the dissertation of a study of patients with FMR and

anxiety rating scales, which is a fertile ground for an innovative research approach to pain. Functional nuclear magnetic resonance imaging is considered to be a technology that allows more research into human pain experience instead of animal studies and extrapolation of the results (Renton, T., 2008). Dental anxiety is intensively studied and there are many publications on the subject, but its inclusion in the experimental model, together with functional nuclear magnetic neuroimaging and immunological variables is an element of novelty.

The review of literature sources is well structured, in-depth and logically consistent and demonstrates a conscientious and in-depth knowledge of the topic, as well as an ability to analyze, formulate scientific conclusions and derive unresolved research problems through which the results of this study are interpreted.

The purpose and tasks are clearly formulated and correspond to the title and content of the work. The results, discussion and conclusions are structured according to the objectives of the study.

Presenting the results task by task facilitates orientation, especially given the large volume of data and the complexity of the experimental design. A regression model was constructed that included the predictor variables of pain in the time intervals of the study. The difficulty of surgery is the factor with the strongest influence on postoperative pain, which corresponds to previous studies. The lack of influence of the controlled demographic factors on the strength of the postoperative pain was also reported. The results of the fMRI study are processed and presented. They allow for a deeper understanding of the cognitive and emotional components of the pain experience. The leading importance of the difficulty of surgical intervention for the strength of pain is reaffirmed. The results obtained for the activity in the selected brain areas of interest have an explanatory force in terms of the lower intensity of pain after the second surgery. This is another confirmation of the relevance of the content and structure of the experimental model of the present work.

The relationship between the size of the postoperative edema and the intensity of pain during the first and second extraction was sought and analyzed; as well as between serum levels of proinflammatory markers and the magnitude of edema; the effect of the drugs used in the study. The influences of anxiety parameters are also taken into account - preoperative anxiety leads to an increase in postoperative pain.

The obtained results are discussed through the prism of the reported data from other author teams. The presented discussion once again confirms the skills of the

author to analyze data, to explain and compare them with other results from the scientific literature.

The formulated conclusions are optimized in terms of content and structure and fully correspond to the obtained results and their interpretation.

Contributions in connection with the dissertation: Four theoretical and five practically applied contributions are presented. They fully correspond to the scale of the original theoretical and experimental study and result from the interpretation of the collected data. As it is clear from the organization of the research, the motivation for its development largely stems from the professional experience of the author, which is successfully combined with scientific research interest. In my opinion, this is another guarantee for the applicability of the results obtained and the contributions of this work.

The presented work is based on 271 literature sources, mostly from recent years and in English, which confirms a thorough acquaintance of Dr. Sbirikova with the developed topic. Tables from the processing of the study with fMRI, some of the methodologies and others are presented in 7 appendices.

#### **Assessment of publications and personal contribution**

In the period of doctoral studies Sbirikova has three full-text scientific publications and two participations in scientific conferences on the topic of the dissertation. All publications are in English and are published in editions referenced in international databases. They are a collective work, the need for which can be deduced from the interdisciplinary nature of the topic. The PhD student is the first author of two of the publications and the second - in one of them.

It is absolutely clear that Dr. Sbirikova has a leading role in the preparation, organization, conduct of the study and presentation of the results. Her personal merit is also the results' discussion, the formulated conclusions and the contribution made.

I have no critical remarks.

I would like to recommend the doctoral student to continue her work on the topic and to publish her achievements.

The abstract is made according to the requirements and reflects the main goals, objectives and results achieved in the dissertation.

## **Conclusion**

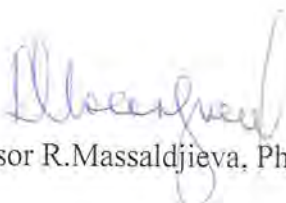
1. The proposed topic is significant and relevant, contains scientific novelty and has the potential to add significant theoretical and applied contribution.

2. The dissertation Dr. T. Sbirikova shows a serious acquaintance with the literature and the opinions in it, as well as the ability to process data and present results, in-depth analysis and formulation of conclusions.

3. The conducted research and the obtained results contribute to a better understanding of the postoperative pain in the dental practice and to its more effective treatment.

All the above in relation to the presented dissertation gives me reason for my high marks for the dissertation, abstract and their contributions and I propose to the scientific jury to award the educational and scientific degree "PhD" of Tanya Ivanova Sbirikova in the scientific specialty of Oral Surgery.

20.05.2021

  
Professor R. Massaldjieva, PhD