

REVIEW

By Assoc. Prof. Dr. Evgenia Petrova Dimova, MD, PhD
Department of Physiotherapy, Rehabilitation and Thalassotherapy
Faculty of Public Health

Medical University "Prof. Dr Paraskev Stoyanov" – Varna
regarding

dissertation work for the acquisition of the educational and scientific degree
"Doctor" in area 7. Health care and sports, professional direction 7.1. Medicine,
in the scientific speciality "Physiotherapy, Resort Therapy and
Rehabilitation",

prepared by

Yasen Todorov Petrov, MD

PhD student at the Faculty of Public Health

Medical University "Prof. Dr Paraskev Stoyanov" – Varna

Dissertation topic:

**“A Comparative Study of the Effects of Deep Oscillation /Deep Oscillation/
and Physical Therapy Modalities in Patients with Cervical Spondylosis”**

The basis for drawing up the opinion: By the order of the Rector of MU-Varna N P-109-165/09.05.24, I am obliged to participate with a review on the defence of Dr Petrov.

1. Biographical information of the doctorate candidate:

Dr. Yasen Petrov was born on May 20, 1994, in the city of Varna. 2013, he finished his secondary education at "Dr. Petar Beron" Mathematical High School in Varna. While there, he pursued advanced studies in information technologies, French, and English. In 2019, he obtained his undergraduate degree in Medicine from the Medical University - Varna. Throughout his university studies, he completed multiple student internships in various clinics and departments of the university hospital. These included the pulmonology and cardiac surgery clinic, the orthopaedics and traumatology department, the neurosurgery department, and the Clinic of Physical Therapy and Rehabilitation Medicine, when he expressed his interest in the field of physiotherapy and rehabilitation for the first time. During the summer of 2016, he completed a student internship at the "Ruzhinov" Faculty Hospital in Bratislava, Slovakia, where he was assigned to the Department of Orthopaedics and Traumatology.

Between September and December 2018, he was a demonstrator at the Department of Neurosurgery and ENT Diseases at the Medical University of Varna. While pursuing his master's degree, he actively participated in the Student Council at MU-Varna.

After concluding his higher education, he began his career as a physician at the Medical Centre for Rehabilitation and Sports Medicine in Varna. From December 2019 to April 2020, he worked as a physician at the Centre for Emergency Medical Assistance in Varna.

From April 2020 to the present, he has worked as a doctor-assistant at the UMBAL "St. Marina" in Varna and the Department of Physiotherapy, Rehabilitation, and Thalassotherapy at the Faculty of Public Health of the Medical University "Prof. Dr Paraskev Stoyanov" in Varna. He has successfully completed numerous postgraduate training courses in pedagogy, innovative and educational technologies, and physical and rehabilitation medicine.

2. Key features of the doctoral thesis:

Dr. Petrov's dissertation follows a traditional format, consisting of 205 pages and featuring 47 tables and 68 figures. The doctoral student's scientific work consists of 13 sections: introduction, bibliography, appendices, participation in scientific forums, and 9 chapters. These chapters include a literature review, study purpose, tasks and hypotheses, material and methods, results, discussion, conclusions, contributions, and publications, all of which are relevant to the dissertation.

The bibliography consists of 336 literary sources, 31 of which are in Cyrillic and 307 in Latin. More than 40% of the sources cited are from the last ten years, and 18% are from the last five years. Eight appendices are included. The dissertation is written scientifically soundly in clear, accessible, and understandable language. The text is well-structured and easy to read. The author has presented his ideas in a logical and coherent manner, with a smooth transition between the individual parts.

3. Relevance of the problem:

Cervical osteochondrosis is a progressive condition that affects the intervertebral discs, facet joints, and articular cartilages of the cervical spine. It is marked by a range of symptoms, including neck pain and stiffness, headaches, dizziness, weakness and numbness in the upper limbs, tinnitus, blurry vision, and problems with coordination and balance. These symptoms can significantly affect patients' quality of life.

Due to its high prevalence, the variety of symptoms and the negative impact on the quality of life, cervical osteochondrosis is a socially significant disease, the treatment of which often requires high socio-economic costs, and the loss of workability and reduced productivity can have significant economic consequences.

Early identification of the condition, prompt diagnosis and treatment, prevention and avoiding complications, and enhancement of the patient's quality of life are crucial for managing it.

Considering the absence of a universally applicable therapeutic approach for cervical osteochondrosis and the need to customise treatment for each patient, exploring novel therapeutic strategies for managing this condition is crucial.

To enhance therapeutic strategies, conducting a comparative analysis of various physical therapy methods and gaining a more profound comprehension of their mechanisms can help identify the most effective treatment options for patients with cervical osteochondrosis.

Deep oscillation is a patented therapeutic procedure using resonating tissue vibrations through electrostatic attraction and friction, which produces mechanical vibrations not only in the skin area but also in the deeper tissues of the treated areas of the patient's body. It is a relatively new physiotherapeutic modality that is increasingly being imposed as an effective factor in physical and rehabilitation medicine, given its analgesic, anti-inflammatory, and trophic effects. Applying a low-frequency pulsed electrostatic field has demonstrated promising outcomes in treating various musculoskeletal disorders, including cervical osteochondrosis. From this perspective, the comparative analysis of the effects of deep oscillation and certain preformed physical factors in patients with cervical osteochondrosis is a significant and up-to-date study that has the potential to enhance the treatment of this widespread disease.

4. Evaluation of the dissertation work.

4.1. Literature review:

The literature review is presented on seventy pages, demonstrating the PhD student's comprehensive understanding of the topics discussed in the dissertation and his profound literary awareness. Dr. Petrov's literature analysis consolidates information from multiple scientific sources and concisely summarises the latest scientific findings on the pathology and kinesiology of the cervical region. It also thoroughly examines the anatomophysiology of the cervical spine, the pathogenesis of cervical osteochondrosis, and the pathophysiology of neck pain. The clinical picture of the disease, the possibilities for diagnosis and differential diagnosis, and the forms of conservative and surgical treatment are clearly presented. The overview ends with logical, precisely formulated conclusions. The information in the literature review is presented logically and structured, making it easier to understand and remember. The literature review presented in this way can serve as a valuable aid for studying the anatomy, physiology, kinesiology and pathology of the cervical spine.

4.2. Formulation of the goal and tasks:

The aim of the dissertation is clearly formulated. It investigates the effect of the combined application and compares the effect of deep oscillation and some routine physical factors used in the treatment of patients with cervical osteochondrosis.

The tasks are eight in number, clearly and correctly formulated and correspond to the purpose of the scientific work. Three hypotheses are formulated regarding the expected results of the study.

The relevance of the problem developed in the dissertation in scientific and scientific-analytical terms is given.

4.3. Design and methodology of the research:

The research study is prospective, parallel and single-blind. For its purposes, a total of 121 patients with cervical osteochondrosis aged between 18 and 55 years were observed. All ethical principles and rules for medical research on humans were followed. The scientific research was conducted in accordance with the principles of the Declaration of Helsinki and approved by the Ethics Committee for Scientific Research of the Medical University of Varna - Protocol No. 116/28.04.2022. The duration of the study is 19 months - from 28.04.2022 to 4.12.2023.

According to the study design, patients are divided into three groups - group "A" (deep oscillation therapy, TENS and kinesitherapy); group "B" (phonophoresis with NSAIDs, TENS and kinesitherapy) and a third group "C" (placebo deep oscillation, TENS and kinesitherapy). Patients are randomly assigned to one of the three groups.

All patients were followed up at three different time points: at the start of treatment (T0), at the end of treatment (T1) (day 10 after the start) and on day 45 after the start of treatment (T2).

The methods used to assess the functional state of the patients objectively were selected in accordance with the set objective—the investigation of pain, changes in muscle tone, and the range of motion of the cervical spine. Given the psycho-emotional component in the aetiology of cervical osteochondrosis, it makes a good impression that Dr Petrov also examined the changes in the psycho-emotional state of the people included in the study by using the Tsung self-assessment test for anxiety and depression and the Neck Disability Index questionnaire.

The doctoral candidate has chosen adequate modern statistical, descriptive and graphical methods that allow him to obtain an appropriate answer to the tasks set in the thesis and to draw valid conclusions.

The survey data was organised using MS Office Excel 2019 and SPSS Statistics for Windows v. 29.0.

4.4. Consistency between the goal, the results and the conclusions:

The results and the discussion are presented on 73 pages with well-illustrated tables and figures, which, together with statistical analyses, follow the progress of the set goal and the tasks set. The analysis of the results demonstrates the doctoral student's skills in evaluating and analysing the information and data obtained. The results obtained confirm the hypothesis that patients in therapy group A, in which treatment is carried out with a low-frequency pulsed electrostatic field (deep oscillations), show better clinical and functional recovery than patients in group B and group C. The analysis of the results also confirms the hypothesis that therapeutic group A, which performs a treatment with deep oscillations to the main physiotherapeutic complex, shows a better clinical and functional recovery than the patients of group B, which performs a treatment with

an additional procedure of therapeutic ultrasound to the main physiotherapeutic complex.

The results of the conducted study show that the complex therapy, which includes deep oscillations in patients with cervical osteochondrosis, leads to a reduction in clinical manifestations and an improvement in functional status and has high efficiency, quick and lasting results, has a positive effect on the psycho-emotional state and quality of life of the patients. The proven effectiveness of the method, both in the short and long term, shows that it can be effectively used in the complex treatment and rehabilitation of cervical osteochondrosis.

The dissertation ends with 9 clearly and concretely formulated conclusions logically following the tasks. The conclusions drawn correctly reflect the analysis of the results and correspond to the objective set.

5. Contributions of the dissertation work:

4 theoretical-methodological and 2 practical-applicable contributions of the dissertation are given, which are objective and arise from the results obtained.

For the first time in Bulgaria, a targeted comparative study of the effect of the combined application of a low-frequency variable electrostatic field (Deep Oscillation) and physical factors from routine practice in cervical osteochondrosis is conducted. The therapeutic efficacy of the combined application of Deep Oscillation, TENS and kinesitherapy in patients with cervical osteochondrosis has been proven. The Neck Disability Index - a standardised instrument for assessing and monitoring the functional state of patients with cervical osteochondrosis and the Tsung test for assessing the psycho-emotional state and effectiveness of treatment of patients with cervical osteochondrosis - were applied.

A complex physiotherapy program has been developed that includes deep oscillations, which have proven effective in treating cervical osteochondrosis. The therapeutic effectiveness of the combined therapy with TENS, ultrasound, and kinesitherapy has been confirmed.

6. Abstract:

The summary is 95 pages long and is sufficient to summarise the presentation of the dissertation and the results and contributions achieved.

7. Publications and participation in scientific events on the dissertation work:

In connection with the dissertation, Dr Yassen Petrov has submitted 3 non-referenced full-text publications and two participations in scientific forums, thus fulfilling the required quantitative criteria.

8. Critical remarks and recommendations:

I have no critical comments. Recommendation—Maintain good publication activity and publish all results related to the dissertation work. Increase the PhD student's scientific activity in national and international scientific forums with reports, posters, or scientific announcements. Disseminate the Zung Self-Assessment Test for Anxiety and Depression and the Neck

Disability Index in the practice of specialists in physical and rehabilitative medicine.

9. Personal evaluation of the candidate:

I have been working with Dr Yassen Petrov since 2020 when he was hired as a resident in the Department of Physical and Rehabilitative Medicine. During our time together, he has shown himself to be courteous and respectful to everyone he works with, responsible, and motivated to grow professionally. Dr. Yassen Petrov is tolerant of different points of view, organised, and knows how to manage his time effectively.

Dr Petrov is responsible and a strong leader. He has demonstrated his ability to work in a team and communicate without conflict. He is adaptable, knows how to deal with rapidly changing circumstances, and can remain calm in stressful situations. Dr Petrov is a colleague with all the qualities required for a successful professional career.

Conclusion:

The dissertation work presented by Dr Yassen Todorov Petrov on the topic *"A Comparative Study of the Effects of Deep Oscillation /Deep Oscillation/ and Physical Therapy Modalities in Patients with Cervical Spondylosis."*

has clearly formulated goals and objectives, correct and well-founded conclusions, and original theoretical-methodological and practical-applicable contributions. The research presented is thorough and scientifically sound and, at the same time, written in an accessible and understandable language. It demonstrates the doctoral student's ability to gather and analyse scientific information.

The materials presented comply with the requirements of the Law for the Development of Academic Staff of the Republic of Bulgaria and the Regulations and Rules for acquiring scientific degrees and holding academic positions in the Medical University of Varna.

Based on the above, and after evaluating Dr Yassen Petrov's dissertation work and his complex studies, results, and original contributions of scientific and practical significance, I recommend to the members of the esteemed scientific jury that Dr Yassen Todorov Petrov be awarded the educational and scientific degree "Doctor" for his dissertation work *"A Comparative Study of the Effects of Deep Oscillation /Deep Oscillation/ and Physical Therapy Modalities in Patients with Cervical Spondylosis"*

23.06.24
Varna

Assoc. Prof. Dr. Evgenia Vladeva, MD, Ph.D.

Заличено на основание чл. 5,
§1, б. „В“ от Регламент (ЕС)
2016/679