Review

By Prof. Dr. Elena Milkova Ilieva, MD, Phd
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Of the thesis for awarding for educational and scientific degree "Doctor of Medicine" in the field of higher education 7. Health and sport, professional field 7.1 Medicine, scientific discipline Physiotherapy, Thalassotherapy and Rehabilitation of Dr. Tsvetomir Yankov Yankov – full time PhD student at Medical University Varna.

Topic: *"Study on the combined use of high-energy laser and manual therapy in patients with functional thoracic spine disorders"*

Thesis supervisor Assoc. Prof. Dr Iliya Todorov Todorov, MD.

1. Award procedure

I present a statement as an external member of the examination committee and reviewer of the PhD thesis of Dr. Tsvetomir Yankov Yankov appointed by order № P-109-639/ 21.12.2023 of the Rector of the Medical University of Varna, based on the decision according to protocol № 215/ 14.12.2023 of the Faculty council of the faculty of "Public Health" at MU Varna.

The review was developed and presented in accordance with the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria /LDASRB/, the Regulations for the Implementation of the LDASRB and the Regulations on the Development of the Academic Staff at the Medical University – Varna.

2. Biographical Data and Professional Qualifications

Dr. Tsvetomir Yankov Yankov was born on 25.05.1989 in Veliko Tarnovo. He completed his secondary education in 2008 at the "Vasil Drumev" High School of Mathematics and Nature

Science V. Tarnovo. In 2014 he completed his higher education in medicine with a Master's degree at the Medical University Varna. In 2020 he acquire a specialty in Physical and Rehabilitation Medicine.

His professional medical career began in 2014 at the CSMP in the city of Varna to the emergency branch in Dolni Chiflik, where he worked until 2016. At the same year Dr. Tsvetomir Yankov was appointed as a resident at the Clinic of Physical and Rehabilitation Medicine at the University Hospital "St. Marina" Varna EAD. Since 2020 he holds the position of assistant to the Board of "Thalasotherapy, Physiotherapy and Rehabilitation" at the Department of Physiotherapy, Rehabilitation, Talasotherapy and Occupational Diseases at Medical University Varna. He leads practical seminars for bulgarian and english speaking medical students, rehabilitation therapists, midwives and nurses. Dr. Tsvetomir Yankov Yankov has participated in a number of qualification courses for postgraduate training: laser therapy, Cyriax orthopaedic medicine, manual therapy and PNF. He has passed qualification courses "Legal basis regulating the training of PhD students", "Methodology of scientific research", "Ethics of scientific research", "Statistical methods for data processing and presentation", "Communication techniques and presentation skills", etc.

Dr. Tsvetomir Yankov Yankov is fluent in written and spoken English and Russian.

His main professional and scientific interests are in the field of manual medicine and laser therapy. Dr. Tsvetomir Yankov Yankov is a member of the Bulgarian Medical Association, the Association of Physical and Rehabilitation Medicine and the Bulgarian Society of Manual Medicine.

3. **Characteristics of the thesis submitted for review**

The dissertation of Dr. Tsvetomir Yankov Yankov is presented in 143 standard pages, in eleven adequately proportioned sections, illustrated with 42 figures, 24 tables and 16 appendices. The structure is according to the requirements specified in the Regulations for the Development of the Academic Staff of MU-Varna.

The scientific work has the following structure: „Introduction "- 4 pages, „Literature review "- 40 pages, „Aim, objectives and hypotheses "- 2 pages, „Material and methods "- 11 pages, „Results "- 37 pages, „Discussion "- 9 pages, „Conclusion "- 1 page, „Inferences "- 1 page,

„Contributions of the scientific work "- 1 page, „Scientific publications related to the thesis "- 1 page, „Annexes "- 18 pages.

The bibliography consists of 166 sources, of which 18 are in Cyrillic and 148 in Latin. About 40% of the citations are from the last ten years, 10% of which are from the last five years.

There are 3 full-text publications related to the topic of the scientific work in periodical scientific publications, in which Dr. Tsvetomir Yankov Yankov is the lead author.

The dissertation was approved and directed for defence at a meeting of the "Department of Physiotherapy, Rehabilitation and Talasotherapy" at Medical University "Prof. dr. Paraskev Stoyanov" - Varna by Protocol № 17 of 11.12.2023.

4. Significance and relevance of the topic

Functional disorders in the thoracic region are one of the common pathologies of the spine. Their prevalence has increased significantly in recent years, especially in the young and working age population. This problem is often underestimated due to the clinically more pronounced lumbar and cervical dysfunctions. The small number of scientific publications on functional disorders in the thoracic spine, as well as the lack of clear diagnostic criteria and therapeutic approach make the problem topical and debatable.

Manual therapy is a well-known and academically validated method of influencing somatic dysfunctions. High-energy laser is a high-tech physical factor used with great therapeutic success in musculoskeletal pathologies. However, there is a lack of studies describing the combination of MLS laser with manual therapy techniques and their use to influence conditions associated with functional disorders in the thoracic region.

5. Literature review

Dr. Tsvetomir Yankov has presented a detailed literature review showing a thorough awareness of functional disorders in the thoracic department. It focuses on the analysis of anatomical features and kinematics of movements in the thoracic spine. The etiology, pathogenesis and classification of functional disorders in the thoracic department are discussed in detail, and the main risk factors and clinical picture of the condition are presented. The methods of treatment of functional disorders in the thoracic region known to date are shown,

with the main emphasis on the factors of physical medicine. Manual therapy is presented in detail as the main method for treatment of somatic dysfunctions. The available studies on the effect of manual medicine in patients with functional thoracic disorders are systematically reviewed. The characteristics of laser radiation, the device and mode of operation of lasers, their parameters and interaction with biological tissues are described in detail. The historical application and clinical experience with high-energy MLS laser and its advantages in musculoskeletal dysfunctions are presented.

6. Aim task and hypothesis

The dissertation is based on a clearly formulated aim - to investigate the effect of combined application of high-energy MLS laser and manual therapy in patients with functional thoracic spine disorders.

The tasks and hypotheses are logically formulated in accordance with the preliminary studies and subordinated to the stated goal.

7. Methodology and organization of the study

A total of 82 individuals of both sexes with functional thoracic disorders who met specific inclusion and exclusion criteria participated in the study. They were randomly assigned to two groups, each with 41 patients. Study participants in group A received monotherapy with manual therapy, and those in group B received a treatment protocol combining manual therapy and a high-energy MLS laser.

Dr. Tsvetomir Yankov has made a detailed anamnestic and manual-diagnostic examination of the patients, using a number of tests to objectify the effect of the treatment. Ott's flexion-extension test and goniometry with an inclinometer for rotation movements were used to assess the functional status of the thoracic spine. The McGill short form pain questionnaire (SF- MPQ) and assessment of spontaneous and palpatory pain using the visual analogue scale (VAS) were used to objectify pain. The Functional Rating Index was also used to quantify subjective perception of limitation in the performance of daily living activities for musculoskeletal spine disorders. Patients were screened at three different time points: at baseline before treatment initiation, after completion of the treatment course, and on day 45 after initiation of therapy.

The manual techniques used to manipulate the thoracic motor segments and the protocol for performing MLS laser therapy are clearly described.

The chosen statistical methods provide a complete and reliable evaluation of the data, in accordance with the purpose of the presented study.

8. Main results and contributions

The results are in accordance with the set objectives. Dr. Tsvetomir Yankov has well synthesized and illustrated with tables and figures the distribution of patients in different groups according to sex, age, occupation, physical activity, level of functional disorders in the thoracic department and the data obtained from the monitored parameters.

From the analysis of the socio-demographic characteristics of the subjects and the baseline values of the methods used to monitor the effect of the treatment, it is evident that there is no statistical difference between the two groups, which results in their homogeneity relative to each other.

There is a statistically significant effect for both therapeutic protocols used in terms of pain and range of motion in the thoracic spine. These results are established after the end of treatment and in the long term at day 45. Through the comparative analysis of the data between the two groups, the superiority of the combined treatment of manual therapy and high-energy laser over the monotherapy of manual therapy in terms of pain and functional index was demonstrated. Equal therapeutic efficacy was found for both methods in terms of influencing the range of motion in the thoracic region recorded by the described methods

The discussion is well systematize, and the results are compared with other studies in the world literature. The most important results of the study are summarized in the conclusion.

Through this dissertation, the data presented so far in the literature that manual therapy is an essential and effective method for the treatment of functional disorders in the thoracic spine are confirmed. Combining it with a physical factor - high-energy MLS laser in a common protocol is a novel approach to treating these conditions, showing high therapeutic efficacy. In the context of public health, the importance of the practical application of laser radiation and manual therapy is determined by the possibility of a faster and more efficient impact on pain symptomatology, muscle spasm and limited range of motion, which are the main symptoms of

functional thoracic spine disorders. This significantly increases the patient's quality of life and reduces the period of temporary disability.

Based on the results obtained and their interpretation, six conclusions are drawn that comprehensively summarize the data from the study. The dissertant has indicated four theoretical-methodological and three practical-applied contributions of the dissertation for Bulgaria.

9. Abstract

The abstract is presented in 61 pages, structured in accordance with the requirements, reflecting faithfully and comprehensively the main points of the thesis.

10. Conclusion

The thesis of the PhD candidate Dr Tsvetomir Yankov on The presented dissertation entitled "Study on the combined use of high-energy laser and manual therapy in patients with functional thoracic spine disorders" presents results and conclusions with original contribution to science and meets all the requirements of the Academic Staff Development in the Republic of Bulgaria Act (ASDRBA), the ASDRBA Implementing Regulations and the Regulations of MU-Varna. The thesis shows that the PhD candidate Dr. Tsvetomir Yankov Yankov has acquired in-depth theoretical and practical knowledge, demonstrating qualities and skills for independent scientific research.

In view of the aforementioned, I undoubtedly give my positive assessment of the thesis.

I propose that the highly esteemed Examination Committee award Dr. Tsvetomir Yankov Yankov the educational and scientific degree DOCTOR.

Date: 26.01.2024

Prepared the review:

Prof. Dr. Elena Ilya, MD, PhD