

ISSN 2082-1867

# Acta Balneologica

JOURNAL OF THE POLISH BALNEOLOGY AND PHYSICAL MEDICINE ASSOCIATION

2024

SEPTEMBER-OCTOBER

VOL. LXVI

ISSUE 5 (183)



Aluna Publishing

# CONTENTS

---

## ORIGINAL ARTICLES

- Valery Y. Kalashnikov, Oleksandr M. Stoyanov, Volodymyr V. Prokopyshyn  
**Complex physiotherapy in the treatment of cervical pain in military men** 303
- Mariia G. Aravitska, Eduard Y. Lapkovskiy, Svitlana P. Nakonechna, Nelia P. Dolynko, Hanna M. Karpenko  
**Assessment of long-term therapeutic adherence to lifestyle modification and the possibility of its correction in the program of rehabilitation and clinical management of obese patients** 308
- Myroslava V. Danylevych, Larysa V. Masenko, Roman V. Chopyk, Serhii H. Kushniriuk, Liudmyla O. Konovalska, Vadym L. Samoilenko, Andrii I. Sobolenko  
**Interrelation of students' motor activity and physical state as a basis for determining individual health-improving motor regimen** 313
- Hennadiy Slabkiy, Victoria Bilak-Lukyanchuk, Yuliia Dutkevych-Ivanska  
**Accessibility of rehabilitation services to the population of the mountainous geographical zone of Transcarpathian Region** 318
- Grygoriy P. Griban, Natalia A. Lyakhova, Romana R. Sirenko, Nataliia O. Terentieva, Oksana M. Sahach, Svitlana V. Salnykova, Oksana P. Kanishcheva  
**State of students' health and physical fitness under the restrictions of martial law** 324
- Oleksii V. Tymoshenko, Zhanna H. Domina, Larysa V. Masenko, Olena V. Pliushchakova, Larysa P. Arefieva, Roman O. Prots, Roman L. Fedoryschak  
**Dependence of stress level on the strength of nervous processes and development of special types of endurance in 16-17-year-old men** 330
- Tetiana O. Timokhina, Olena V. Anoprienko, Anastasiia Y. Tokarchuk, Kateryna L. Yurtschenko, Bohdan M. Melnyk  
**Assessment of the quality of life of children with congenital cleft lip and palate and associated dental diseases** 335
- Kostiantyn V. Prontenko, Ivan M. Okhrimenko, Mariia M. Rohovenko, Yurii V. Dutchak, Vira B. Bazylchuk, Viktoriia V. Veselova, Lyudmila L. Kharchenko-Baranetska  
**Correction of physical health and psycho-emotional state of student youth under martial law** 345
- Joanna Łuczak, Michał Szczerba, Elżbieta Szymańska, Joanna Jarosz-Popek, Anna Czaplicka, Irena Walecka  
**Evaluation of temporomandibular joint disorders in patients with systemic sclerosis after two years of rehabilitation** 352
- ## REVIEW ARTICLES
- Hennadiy Slabkiy, Mariana Sabadosh, Rostislav Kartavtsev 359  
**National classifier of medical devices nc 024:2023 as a standard and methodological basis for providing the rehabilitation system with medical devices**
- Valeriya V. Brych, Angelika O. Keretsman, Mariana M. Dub 363  
**Possibilities of integration of health promotion into the rehabilitation process**

# Complex physiotherapy in the treatment of cervical pain in military men

Valery Y. Kalashnikov<sup>1</sup>, Oleksandr M. Stoyanov<sup>2</sup>, Volodymyr V. Prokopysyn<sup>3</sup>

<sup>1</sup>KHARKIV NATIONAL MEDICAL UNIVERSITY KHARKIV, UKRAINE

<sup>2</sup>ODESA NATIONAL MEDICAL UNIVERSITY, ODESA, UKRAINE

<sup>3</sup>PHYSIOTHERAPY AND REHABILITATION CENTER, TYACHIV, UKRAINE

## ABSTRACT

**Aim:** Study of the effectiveness of complex physiotherapeutic treatment of cervicgia in the MM of the AFU.

**Materials and Methods:** 45 male MM of the AFU aged 27–62 years, average age  $42.3 \pm 5.8$  years, with pain in the cervical spine were examined. The effectiveness of drug and combined drug and complex physiotherapeutic treatment of cervical pain was evaluated according to the indicators of the NPAD scales, NDI and VAS.

**Results:** Cervicocranial pain (37.8%) and cervicobrachial pain (33.3%) prevailed in the structure of the pain syndrome in the MM of the AFU. Against the background of the treatment, a significant decrease in the severity of the pain syndrome and complaints was observed in a significant majority of patients. There was a statistically significant decrease in the intensity of the pain syndrome according to the VAS (from  $6.8 \pm 0.8$  points to  $5.2 \pm 0.5$  points in group 1, and from  $6.2 \pm 0.4$  points to  $4.8 \pm 0.6$  points in group 2). There was also a trend towards normalization of indicators on the NPAD scales (from  $61.8 \pm 3.6$  points to  $57.3 \pm 4.1$  points in group 1 and from  $62.2 \pm 4.1$  points to  $50.2 \pm 3.8$  points in group 2) and NDI (from  $36.7 \pm 3.2$  points to  $29.1 \pm 4.3$  points in group 1 and from  $37.5 \pm 3.8$  points to  $25.3 \pm 3.2$  points in the 2nd group).

**Conclusions:** 1. Cervical pain syndrome of the spine in MM of the AFU most often manifests itself in the form of cervicocranialgia and cervicobrachialgia. 2. Drug treatment of cervicgia demonstrates an effective reduction in pain intensity according to VAS, especially when combined with physiotherapeutic treatment. 3. Complex physiotherapeutic treatment in combination with drug therapy in MM of the AFU leads to regression of pain syndrome and improvement of quality of life and reduction of disability according to the diagnostic scales of NPAD and NDI.

**KEY WORDS:** cervicgia, physiotherapy, military men, VAS, NPAD, NDI

Acta Balneol. 2024;66(5):303–307. doi: 10.36740/ABAL202405101

## INTRODUCTION

The issue of diagnosis and treatment of pain syndromes caused by spine pathology is one of the most common problems of modern medicine. This issue became extremely acute precisely in the conditions of wartime, when almost every second patient turns to the doctor with complaints of back pain [1].

Pain is a kind of feeling that arises as a result of strong irritations of the nervous system and is one of the most common diseases in the world. Estimates of the prevalence of vertebrogenic pain syndromes in Europe vary from 32.9% to 70% [2, 3].

Dorsalgia is pain and a feeling of muscle tension or stiffness in the back. May involve the cervical, thoracic, or lumbar spine and radiate along one or both upper extremities to the trunk or along one or both lower extremities. Dorsalgia can be: vertebrogenic, which is associated with spine pathology, and non-vertebrogenic, which is caused by stretching of muscles and ligaments, psychogenic factors, somatic diseases. The cause of dorsalgia can be intervertebral hernias, osteoporosis, scoliosis, a sedentary lifestyle or working in the wrong position, physical exertion and overstretching of the back muscles, hypothermia, back injuries, deficiency of group B vitamins, etc. [1].

Degenerative – dystrophic lesions of the cervical spine (CS) initiate motor and sensory disorders, neurological deficits, pain syndrome, etc. [4]. The latter is a medical problem, actuality which progressively in recent years grows: in ten years it's the frequency increased by 21% [5] and can reach 41% [6, 7].

Musculoskeletal and connective tissue disorders rank third in the incidence structure among the adult population of Ukraine with a steady upward trend [8]. Up to 350,000 cases of primary osteoarthritis are registered annually in Ukraine, of which more than 60% are of working age [8]. Primary disability due to diseases of the musculoskeletal system occupies the third place in the structure of primary disability of both the adult population (more than 11%) and the population of working age (13%) [9].

The incidence and prevalence of diseases of the musculoskeletal system increases with age [10]. Annually, 39 million people (0.5%) worldwide suffer from spondylolisthesis, 403 million (5.5%) people have symptomatic disc degeneration and 103 million (1.4%) people worldwide suffer from spinal canal stenosis [11].

In the case of degenerative-dystrophic changes in CS and in the clinical manifestation of the disease, complaints of varying degrees of pain prevail in patients. In fact,

a similar clinical picture affects more than half of the world's population, and its prevalence in industrialized countries is 60-80% [12].

Physiological cervical lordosis takes part in the process provides cushioning of the spine when walking and running processes chewing, breathing, vocalization, eye movements, etc. [13]. Its pathological deformation, especially at the level between segments C<sub>5</sub>, C<sub>6</sub> and C<sub>7</sub>, leads to significant clinical consequences: painful reflex phenomena disorders, paresis and paralysis upper and lower limbs [14, 15]. The above accompanied by a number of related diseases from violation blood supply to the brain, vegetative symptoms dysfunctions cervical and higher level [13, 16].

Back pain is currently one of the most common syndromes among military men (MM) of the Armed Forces of Ukraine (AFU). In the conditions of being at the front, back pain occurs in military personnel mostly as a result of increased physical load on the spine, in particular, as a result of wearing protective equipment. Almost half of the MM of the AFU, who sought neurological help for back pain, associated the occurrence of pain with wearing a body armor. This was especially true of men over 40 years of age, in whom the development of back pain syndrome is also associated with age-related changes in the body [3]. Among all cases of dorsalgia in the MM, cervical pain occupies a significant place not only due to its prevalence, but also due to the significant impact on the general condition of patients, in particular, on cerebral functions. The prevalence of cervical pain in the MM of the pain syndrome of the cervical spine requires the development of new methods of pain syndrome treatment.

## AIM

Study of the effectiveness of complex physiotherapeutic treatment of cervicgia in the MM of the AFU.

## MATERIALS AND METHODS

On the basis of the Center of Physiotherapy and Rehabilitation in Tyachiv, 45 men of the MM of the AFU aged 27-62 years, average age  $42.3 \pm 5.8$  years, with pain in the cervical spine were examined. Inclusion criteria: cervicgia lasting more than 3 months, consent to participate in the study. Exclusion criteria: presence of malignant neoplasms, acute infectious, rheumatological and neurodegenerative diseases, heart failure, allergies, presence of indications for neurosurgical intervention.

All patients underwent a clinical and neurological examination and magnetic resonance imaging (MRI) of the cervical spine. Degenerative changes in the intervertebral discs (IVD), hypertrophy of the facet joints, stenosis of the spinal canal, herniated IVD and others were detected during MRI. Analysis of the intensity of the pain syndrome in dynamics was carried out according to the visual analog scale (VAS), as well as functional indicators according to the NPAD and NDI scales [17-19]. VAS is a horizontal line 10 cm long, anchored with word descriptors at each end (0: no pain, 10: most severe possible pain). Patients they ask paint vertical mark through the horizontal line, which is best,

reflects pain level VAS is widely used a tool evaluations with proven reliability and validity. The NPAD consists of 20 items divided into 4 dimensions; neck problems; pain intensity; emotions and cognition; and interference with life activities. The item score ranges from 0 (no pain or limitation of activity) to 5 (extreme pain or maximum limitation). The overall NPAD score ranges from 0 to 100 points. The NDI consists of ten items: pain intensity, personal care, lifting, reading, headaches, concentration, work, driving, sleep and rest. Each item contains six different statements expressing a progressive level of pain or activity limitation. The item score ranges from 0 (no pain or limitation) to 5 (as much pain as possible or maximum limitation). The total NDI score ranges from 0 to 50 points.

All patients were treated according to the current clinical protocol "Guideline 00398. Pain in the neck and shoulder joint" [20]. In order to objectify the effect of physiotherapeutic treatment on the severity of the pain syndrome, all patients were divided into 2 groups. 1 group (24 patients) received treatment according to the clinical protocol (nonsteroidal anti-inflammatory drugs, muscle relaxants, B vitamins). Patients of the 2nd group (21 patients), in addition to treatment according to the protocol, received complex physiotherapy treatment (CPT) aimed at the cervical spine: stretching the spine (spinal traction device V5), electrophoresis with karipain (B-500 device), shockwave therapy (Shock Master-2500 shockwave therapy device), point myostimulation therapy (point myostimulation device Shaper); equipment manufactured by the Health Time company (Ukraine). The duration of one CPT session is 45 minutes. Volume of treatment: 10 sessions.

The research was carried out in compliance with modern bioethical requirements in accordance with the ethical standards of the Declaration of Helsinki (1975) with amendments of 2005, as well as the "Convention on the Protection of Human Rights and Dignity in the Application of Biology and Medicine: Convention on Human Rights and Biomedicine" [21] in agreement with the commission in bioethics of Odessa National Medical University.

Statistica 14 software (TIBCO, USA) [22]. Differences between indicators before and after treatment in both groups were considered statistically significant at a value of  $p < 0.05$ .

## RESULTS

According to the MRI data of CS, IVD herniation were observed in 8 (17.8%) patients, protrusions – in 31 (68.9%), stenosis of the spinal canal – in 24 (53.3%), deforming spondyloarthrosis – in 35 (77.8%), spondylolisthesis – in 11 (24.4%), narrowing of the intervertebral openings – in 38 (84.4%), hypertrophy of the posterior longitudinal and yellow ligaments – in 26 (57.8%).

All patients complained of long-term neck pain, which had the character of cervicocranialgia in 17 (37.8%) patients, cervicobrachialgia in 15 (33.3%), cervicothoracalgia in 7 (15.6%), isolated cervicgia in 6 (13.3%). Intensity pain for VAS at the time of application was  $6.4 \pm 0.5$  points. Scored by NPAD was  $61.3 \pm 4.8$  points, for NDI –  $37.2 \pm 2.4$  points.

**Table 1.** Indicators of the severity of the pain syndrome and functional status in patients with cervical pain in the background treatment.

	NPAD (points)		NDI (points)		VAS (points)	
	To	After	To	After	To	After
Group 1 n=24	61.8 ± 3.6	57.3 ± 4.1	36.7 ± 3.2	29.1 ± 4.3	6.8 ± 0.8	5.2 ± 0.5*
Group 2 n=21	62.2 ± 4.1	50.2 ± 3.8*	37.5 ± 3.8	25.3 ± 3.2*	6.2 ± 0.4	4.8 ± 0.6 *

\**p* < 0.05.

Main pain in cervicocranial pain more often localized in the occiput site (11 (64.7%) patients), less often had a diffuse nature (6 (35.3%) patients). Cephalgia mainly had average intensity, mainly in the second in the middle of the day, were accompanied soreness skin covers head during palpation, were associated with irritation pericranial muscles were provoked fatigue, psychophysical voltage

Dizziness was one of the leading clinical syndromes in the examined patients and occurred in 27 cases (60%). Also during the neurological examination, the following were recorded: increased tendon reflexes – in 33 patients (73.3%), numbness in the upper limbs – in 28 (62.2%), weakness in one or two upper limbs – in 9 (20%), muscle atrophy of varying severity – in 7 (15.6%), myalgic syndrome – in 7 (15.6%), fascicular twitching – in 2 (4.4%).

On the background of the treatment, improvement of the condition and reduction of severity of complaints was noted in 17 (70.9%) patients of the 1st group and in 18 (85.7%) patients of the 2nd group. All patients with cervicocranial pain experience regression or reduction in headache intensity. Symptoms of dizziness regressed in 19 of 27 patients (70.4%), symptoms of numbness in limbs in 22 of 28 patients (78.6%), weakness in limbs in 7 of 9 (77.8%).

The dynamics of indicators of the severity of the pain syndrome and functional status by clinical groups against the background of treatment is given in Table 1.

Improvement of indicators on all scales was observed in both clinical groups. According to the VAS scale, the severity of pain syndrome decreased from 6.8 ± 0.8 points to 5.2 ± 0.5 points (*p* < 0.05) in group 1, and from 6.2 ± 0.4 points to 4.8 ± 0.6 b (*p* < 0.05) in the 2nd group. A significant difference between groups was observed when analyzing NPAD and NDI indicators, which reflect the impact of pain syndrome on quality of life and disability. A decrease in indicators on both scales was observed in both clinical groups (from 61.8 ± 3.6 points to 57.3 ± 4.1 points in 1 group, from 62.2 ± 4.1 points to 50.2 ± 3.8 points (*p* < 0.05) in group 2 according to NPAD and from 36.7 ± 3.2 points to 29.1 ± 4.3 points in group 1, from 37.5 ± 3.8 points to 25.3 ± 3.2 points (*p* < 0.05) in the 2nd group according to NDI). The change in indicators on all three scales was statistically significant in patients of group 2.

## DISCUSSION

Currently, there are a large number of different schemes for the treatment of pain syndromes of the cervical spine. The basis of most domestic schemes is a combination of massage with manual therapy [23], massage with physical exercises [24], massage with kinesiotherapy, physical exercises, electrotherapy [25]. At the same time, most English-language sources indicate the effectiveness of combining manual therapy with physical exercises [26-28]. The task of our research was to combine classic physiotherapeutic methods with the latest treatment technologies, as well as with methods of physical impact on the cervical spine and the muscular system. For the first time, we performed complex treatment with the simultaneous use of spinal traction, electrophoresis with karipain, shock wave therapy and myostimulation. The conducted study demonstrated the effectiveness of combining medical treatment of cervical pain according to protocols with complex physiotherapeutic treatment. The given scheme proved to be very effective for regression of pain syndrome, improvement of quality of life and reduction of the negative impact of degenerative-dystrophic changes of the cervical spine on work capacity. In our opinion, it is promising to develop new schemes for complex treatment of cervical pain, possibly with the addition of physical rehabilitation methods to drug therapy and physiotherapy.

## CONCLUSIONS

1. Cervical pain syndrome of the spine in MM of the AFU most often manifests itself in the form of cervicocranialgia and cervicobrachialgia .
2. Drug treatment of cervicalgia demonstrates an effective reduction in pain intensity according to VAS, especially when combined with physiotherapeutic treatment.
3. Complex physiotherapeutic treatment in combination with drug therapy in MM of the AFU leads to regression of pain syndrome and improvement of quality of life and reduction of disability according to the diagnostic scales of NPAD and NDI.

## REFERENCES

1. Selyuk MM. Osoblyvosti vedennia patsiientiv iz vertebrohennym bolem v umovakh voiennoho chasu: na styku rekomendatsii. [Peculiarities of management of patients with vertebral pain in wartime conditions: at the junction of recommendations]. *Zdorov'ya Ukrainy* 21 storichchya. 2023;3(539):46. (Ukrainian)
2. Edwards J, Hayden J, Asbridge J, Magee K. The prevalence of low back pain in the emergency department: a descriptive study set in the Charles V. Keating Emergency and Trauma Centre, Halifax, Nova Scotia, Canada. *BMC Musculoskelet Disord*. 2018;19(1):306. doi: 10.1186/s12891-018-2237-x.
3. Teshchuk VY, Teshchuk NV, Ruskikh OO et al. Syndrom «bronzehyletu». [The "body armor" syndrome]. *Visnyk mors'koyi medytsyny*. 2023;1(98):16-24. doi: 10.5281/zenodo.7795812 (Ukrainian).
4. Andreeva T, Chebotaryova G, Stoyanov O et al. Nabutyi stenoz spynnomozkovoho kanalu. Porivnialne doslidzhennia liudei ta sobak. [Acquired stenosis of the spinal canal. A comparative study of humans and dogs]. *INJ*. 2022;18(4):24-29. doi: 10.22141/2224-0713.18.4.2022.955. (Ukrainian)
5. Diseases and Injuries Collaborators. Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396(10258):1204-1222. doi:10.1016/S0140-6736(20)30925-9.
6. Saini A, Mukhdomi T. Cervical Discogenic Syndrome. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing. 2022. <https://www.ncbi.nlm.nih.gov/books/NBK555960/> [Accessed 05 June]
7. Kaiser JT, Reddy V, Launico MV et al. Anatomy, Head and Neck: Cervical Vertebrae. [Updated 2022 Oct 6]. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2023. <https://www.ncbi.nlm.nih.gov/books/NBK539734/> [Accessed 05 June]
8. Doskaliuk B, Zaiats L, Yatsyshyn R et al. Pulmonary involvement in systemic sclerosis: exploring cellular, genetic and epigenetic mechanisms. *Rheumatol Int*. 2020;40(10):1555-1569. doi: 10.1007/s00296-020-04658-6.
9. Dolhopolov OV, Polishko VP, Yarova ML. Epidemiolohiia zakhvoriuvan kistkovo-miazovoi cystemy v Ukraini za period 1993-2017 rr. [Epidemiology of Diseases of the Musculoskeletal System in Ukraine for the Period 1993-2017]. *Ortopediya, travmatolohiya ta protezuvannya*. 2019;4:101-108. doi: 10.37647/0132-2486-2019-103-4-96-104. (Ukrainian)
10. GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018;392(10159):1789-1858. doi: 10.1016/S0140-6736(18)32279-7.
11. Lacroix M, Nguyen C, Burns R et al. Degenerative Lumbar Spine Disease: Imaging and Biomechanics. *Semin Musculoskelet Radiol*. 2022;26(4):424-438. doi: 10.1055/s-0042-1748912.
12. Brinjikji W, Luetmer PH, Comstock B et al. Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations. *AJNR Am J Neuroradiol*. 2015;36(4):811-816. doi: 10.3174/ajnr.A4173.
13. Been E, Shefi S, Soudack M. Cervical lordosis: the effect of age and gender. *Spine J*. 2017;17(6): 880-888. doi: 10.1016/j.spinee.2017.02.007.
14. Guo GM, Li J, Diao QX et al. Cervical lordosis in asymptomatic individuals: a meta-analysis. *J Orthop Surg Res*. 2018;13(1):147. doi: 10.1186/s13018-018-0854-6.
15. Wang Z, Luo G, Yu H et al. Comparison of discover cervical disc arthroplasty and anterior cervical discectomy and fusion for the treatment of cervical degenerative disc diseases: A meta-analysis of prospective, randomized controlled trials. *Front Surg*. 2023;10:1124423. doi: 10.3389/fsurg.2023.1124423.
16. Kalashnikov VY, Stoyanov OM, Vastyanov RS et al. Osoblyvosti mozkovoho krovotoku u patsiientiv z riznymi vydamy holovnoho boliu [Peculiarities of cerebral blood flow in patients with various types of headache]. *Naukovyy visnyk Uzhhorod's'koho universytetu. Seriya «Medytsyna*. 2023;1(67):115-120. doi: 10.32782/2415-8127.2023.67.21. (Ukrainian)
17. Wheeler AH, Goolkasian P, Baird A et al. Development of the Neck Pain and Disability Scale. Item analysis, face, and criterion-related validity. *Spine (Phila Pa 1976)*. 1999;24(13):1290-4. doi: 10.1097/00007632-199907010-00004.
18. Blozik E, Himmel W, Kochen MM et al. Sensitivity to change of the Neck Pain and Disability Scale. *Eur Spine J*. 2011;20(6):882-9. doi: 10.1007/s00586-010-1545-0.
19. Vernon H. The Neck Disability Index: state-of-the-art, 1991-2008. *J Manipulative Physiol Ther*. 2008;31(7):491-502. doi: 10.1016/j.jmpt.2008.08.006.
20. Nastanova 00398. Bil u diliansi shyi taplechovoho suhloba. [Instruction 00398. Pain in the area of the neck and shoulder joint]. <https://guidelines.moz.gov.ua/documents/3261> [Accessed 04 June 2024] (Ukrainian)
21. Miller FG. Bioethics as a Vocation. *Perspect Biol Med*. 2020;63(3):429-443. doi: 10.1353/pbm.2020.0031.
22. TIBCO Statistica® User's Guide <https://docs.tibco.com/pub/stat/14.0.0/doc/html/UsersGuide/GUID-058F49FC-F4EF-4341-96FB-A785C2FA76E9-homepage.html> <https://guidelines.moz.gov.ua/documents/3261> [Accessed 04 June 2024]
23. Greida N, Lavrynyuk V, Kyrylyuk V. Zasoby fizychnoi terapii pry osteokhondrozi shynoho viddilu khrebta z kardialnym syndromom. [Means of physical therapy for osteochondrosis of the cervical spine with cardiac syndrome]. *Physical culture and sport: scientific perspective*. 2024;2:15-19. doi: 10.31891/pcs.2024.2.2 (Ukrainian).
24. Shevchuk OA, Grigus I.M. Fizychna terapiia osib litnoho viku z osteokhondrozom shynoho viddilu khrebta. [Physical therapy of elderly people with osteochondrosis of the cervical spine]. *Rehabilitation and Recreation*. 2020;7:62-69 (Ukrainian).
25. Pavlenko OV, Golyachenko AO. Fizioterapiia ta osoblyvosti yii zastosuvannya u patsiientiv z nevertebrohennym bolovym syndromom shynoho viddilu khrebta. [Physiotherapy and features of its use in patients with non-vertebral pain syndrome of the cervical spine]. *Nursing*. 2022;4:53-56 (Ukrainian).
26. Verhagen AP. Physiotherapy management of neck pain. *J Physiother*. 2021;67(1):5-11. doi: 10.1016/j.jphys.2020.12.005.
27. Sterling M, de Zoete RMJ, Coppieters I et al. Best Evidence Rehabilitation for Chronic Pain Part 4: Neck Pain. *J Clin Med*. 2019;8(8):1219. doi: 10.3390/jcm8081219.
28. de Zoete RMJ. Exercise Therapy for Chronic Neck Pain: Tailoring Person-Centred Approaches within Contemporary Management. *J Clin Med*. 2023;12(22):7108. doi: 10.3390/jcm12227108.

*The article was made as part of scientific research work "Peculiarities of the clinical and pathogenetic mechanisms of the restoration of the function of the nervous system after traumatic, infectious and vascular lesions against the background of diseases of other systems" (State registration No. 0103U007906).*

### CONFLICT OF INTEREST

The Authors declare no conflict of interest

### CORRESPONDING AUTHOR

**Valery Y. Kalashnikov**

Kharkiv National Medical University

58 Amosova St., 61176 Kharkiv, Ukraine

e-mail: dr.valkalash@gmail.com

### ORCID AND CONTRIBUTIONSHIP

Valery Y. Kalashnikov: 0000-0002-7012-1698 **A B D F**

Oleksandr M. Stoyanov: 0000-0002-3375-0452 **A C E F**

Volodymyr V. Prokopyshyn: 0009-0009-8815-6766 **B D E**

**A** – Work concept and design, **B** – Data collection and analysis, **C** – Responsibility for statistical analysis, **D** – Writing the article, **E** – Critical review, **F** – Final approval of the article

**RECEIVED:** 07.06.2024

**ACCEPTED:** 03.09.2024

