

## Physical rehabilitation of low back pain based on a conceptual system approaches

Lazarieva Olena<sup>1</sup>, Cieślicka Mirosława<sup>2</sup>, Stankiewicz Błażej<sup>2</sup>, Muszkieta Radosław<sup>2</sup>, Prusik Krzysztof<sup>3</sup>

National University on Physical Education and Sport of Ukraine, Ukraine<sup>1</sup>

Kazimierz Wielki University in Bydgoszcz, Poland<sup>2</sup>

Academy of Physical Education and Sports, Gdansk, Poland<sup>3</sup>

### Annotation:

In Europe, back pain is a common disease, this is according to European statistics. In accordance with the new case, the pain each year occurs in 5% of the population. *The aim* of this work is to develop a conceptual approaches to the physical rehabilitation process at the surgical treatment of patients with back pain. *Materials and methods.* There was researched an experience of the domestic and foreign researches in physical rehabilitation area. Methods of the research were the analysis of the references and theoretical research methods (as an analysis, interpretation and synthesis of scientific and educational literature on the study problem. Abstraction (or idealization and schematization) is the allocation of the essential foundations. Also we used experimenting with schemes (as a development of their content, sophistication and usability testing) at development of concepts, practical models and physical rehabilitation programs. *Results.* The physical rehabilitation concept at the surgical treatment of patients with back pain was developed, given by the modern science in the diagnostics field, performing difficult complex spinal surgery with the using of new tools and the knowledge from the physical rehabilitation improvement. *Conclusions.* The using of a systematic methodology for physical rehabilitation in the surgical treatment of patients with vertebral pathology, helps to optimize research, diagnostic, therapeutic, rehabilitative and preventive measures, providing them with the required comprehensiveness, consistency, orderliness.

### Keywords:

conceptual approaches, physical rehabilitation, back pain, neurosurgery

Лазарева Елена, Цеслицка Мирослава, Станкевич Блажей, Мушкета Радослав, Прусик Кристоф. Концептуальные подходы к проблеме физической реабилитации пациентов с вертеброгенной патологией. В Европе боль в спине является достаточно распространенным симптомом. Об этом свидетельствуют данные европейской статистики, согласно которым новые случаи боли ежегодно возникают у 5% населения. *Цель работы* состоит в разработке концептуальных подходов к процессу физической реабилитации при хирургическом лечении больных вертеброгенной патологией. *Материалы и методы.* Был исследован опыт отечественных и зарубежных специалистов в сфере физической реабилитации. Методы исследования: метод анализа источников литературы и теоретические методы исследования (анализ, осмысление и обобщение научно-методической литературы по проблеме исследования. Абстрагирование (идеализация, схематизация) - выделение существенных основ. Экспериментирование со схемами (разработка их содержательности, проверка продуманности и практичности) при разработке понятий, практических моделей и программ физической реабилитации. *Результаты.* Концепция физической реабилитации при хирургическом лечении больных вертеброгенной патологией была разработана с учётом достижений современной науки в области диагностики, выполнения сложнейших нейрохирургических операций с применением нового инструментария, совершенствования познания в области физической реабилитации. *Выводы.* Применение системной методологии в физической реабилитации при хирургическом лечении больных вертеброгенной патологией, способствует оптимизации исследовательских, диагностических, лечебных, реабилитационных и профилактических мероприятий, обеспечивая им требуемую всесторонность, последовательность, планованность.

концептуальные подходы, физическая реабилитация, вертеброгенная патология, нейрохирургия.

Лазарева Елена, Цеслицка Мирослава, Станкевич Блажей, Мушкета Радослав, Прусик Кристоф. Концептуальні підходи до проблеми фізичної реабілітації хворих із вертеброгенною патологією. У Європі біль у спині є досить поширеним симптомом. Про це свідчать дані європейської статистики, згідно з якими нові випадки болю щорічно виникають у 5% населення. *Мета роботи* полягає в розробці концептуальних підходів до процесу фізичної реабілітації при хірургічному лікуванні хворих вертеброгенною патологією. *Матеріали і методи.* Був проаналізований досвід вітчизняних і зарубіжних фахівців у сфері фізичної реабілітації. Методи дослідження: метод аналізу літературних джерел та теоретичні методи дослідження (аналіз, осмислення й узагальнення науково-методичної літератури з проблеми дослідження. Абстрагування (ідеалізація, схематизація)- виділення істотних основ. Експериментування зі схемами (розробка їх змістовності, перевірка продуманості і практичності) при розробці понять, практичних моделей і програм фізичної реабілітації. *Результати.* Концепція фізичної реабілітації при хірургічному лікуванні хворих вертеброгенною патологією була розроблена з урахуванням досягнень сучасної науки в області діагностики, виконання найскладніших нейрохірургічних операцій із застосуванням нового інструментарія, вдосконалення пізнання в галузі фізичної реабілітації. *Висновки.* Застосування системної методології у фізичній реабілітації при хірургічному лікуванні хворих вертеброгенною патологією, сприяє оптимізації дослідних, діагностичних, лікувальних, реабілітаційних та профілактичних заходів, забезпечуючи їм необхідну всебічність, послідовність, планованість.

концептуальні підходи, фізична реабілітація, вертеброгенна патологія, нейрохірургія.

### Introduction.

The level of public health in the former Soviet countries at the present time is not high enough. Just in the Ukraine, there is performing some activity for saving the public health, but through the influence of a various reasons, actual results are far from desirable: the overall incidence is increasing, and therefore increasing the financial cost in the society. Through the rising of a primary disease, there can be rising the chronic diseases, that not only due to the increasing in life expectancy. The content the chronic diseases among the young and middle age also increases. However, it should be noted, that this situation

is not unique and generally follows the world trends [8].

Researches, performed by the European Office of the WHO and other organizations, suggest that the chronic non-infectious diseases are the most exposed part of the workable population of Ukraine. From these diseases, there is unable for any work and die in 5-10 times more people in this age group than in the countries of the European Union. Today, the average life expectancy in Ukraine is on a level of 67.5 years (for men is 61.7, for women is 73.4), in Japan it's nearly 82 years old (78 y.o. are in a men, 85 y. o. are in a women), in Sweden it's 79 years old (78 y.o. for men, 83 y.o. for women), and the average healthy life is nearly 55 years old (in Japan is 72 years, in Australia is 71 years, in Canada, Germany, the Netherlands are 70 years, in the UK is 69 years, in

the USA is 67 years), respectively, it's on a 11.7 and 12.4 years lower than in the economically developed and socially advantaged countries [9].

The number of chronic diseases is increasing, it has a connection not only with the increasing in life expectancy: in recent years the rise of chronic diseases observed among the young and middle age. The main reasons for the steady growth of the lot of chronic diseases are unfavorable lifestyle and incomplete recovery [9].

One of the best manifestations of this combination are degenerative and dystrophic diseases of the motor system and particularly in the spine, it's occupying one of the first places on the prevalence in the world population [4, 10, 11]. The contingent of patients are the most rising-up and people of working age from 24 to 45 years [3], that's all resulting for a significant economic losses [13]. Urgency of this problem has prompted the WHO to declare a back pain (BP) for the priority research into the structure of the bone and joint decade (in 2000-2010 years).

The data about the prevalence of the BP are contradictory: based on the Ministry of Health of Ukraine, in our country from 14,3 to 21,8% of the population suffers from this disease. Foreign sources [16, 17] give a different picture: according to the epidemiological studies, performed in the United States and West Europe, the prevalence of BP reaches from 40 to 80%.

In Europe, BP is a common disease, this is according to European statistics. In accordance with the new case, the pain each year occurs in 5% of the population. According to official data released by National Health Interview Survey, the rate of this disease in the USA is nearly 2.3% of the total population. Today, BP constantly suffers from 15 to 20% of the population, from 60 to 80% of people at least once in their lives have experienced of the pain. In this regard, in the developed countries BP comparable in scale to the pandemic disease and it's becomes a serious health and social and economic problem. It was founded, that about 25% of the adult population in the different countries of the world at least once in their life were away from work due to BP, the content of missed work days per year is nearly 15% of the total disability. Although in many cases, BP is not accompanied by a loss of ability for a work, however, it deteriorates the quality of life in people.

Such significant variation of a prevalence, apparently due to the fact that there are different diagnostic criteria for the disease, as a from elementary to severe clinical forms of the disease [10, 11, 17].

In the case of BP, as a lower and sacral pain in most cases performing a successful conservative treatment [3, 5] however, in some cases, the efficiency of this treatment is insignificant. In addition, the patient has a fear of losing professional form and trying to be treated without interrupting the main activity. Often, it's brings to a chronic disease with severe degenerative and dystrophic changes of all elements in the spine.

In recent years there has been a consistent trend towards younger BP syndromes, dramatically increase the percentage of severe complications such as vertebral

and intervertebral hernia with radicular compression-vascular and spinal syndromes [7, 11, 17]. In this regard, significantly increase the number of surgical interventions on the spine [1]. The number of operations performed in the neurosurgical departments of Ukraine for help to the patients with BP from 2001 to 2010 years had been doubled [[http://www.neuro.kiev.ua/UserFiles/File/Statistics/Zvit\\_za\\_2010\\_for\\_web.pdf](http://www.neuro.kiev.ua/UserFiles/File/Statistics/Zvit_za_2010_for_web.pdf)]. There was developed a various types of surgical interventions. There use the rear, front, anterolateral approaches. Also there was applied classical open, minimal access and endoscopic techniques. For the spinal stabilization using different types of transplants and metal-fixation [14, 15]. All of this is talking about the diversity of existing approaches in a spinal neurosurgery and the choice of methods of physical rehabilitation for full recovery of the patient's health [15].

But the problem of the development of the strategy of physical rehabilitation for different types of surgical intervention in our opinion is the one of the most urgent and no outstanding problems. The lot of clinical forms and features of the surgical treatment of vertebral disease entails a variety the ways of recovery: it must be comprehensive, differentiated, considering the peculiarities of the clinical forms of destruction, individual responses of patients to particular methods ([http://www.neuro.kiev.ua/UserFiles/File/Statistics/Zvit\\_za\\_2010\\_for\\_web.pdf](http://www.neuro.kiev.ua/UserFiles/File/Statistics/Zvit_za_2010_for_web.pdf)) [8, 15] and the impact of the whole.

#### **Purpose, tasks of the work, material and methods**

*The aim of this work* is to develop conceptual approaches to the physical rehabilitation process at the surgical treatment of patients with BP.

*Methods of the research* were the analysis of the references and theoretical research methods (as an analysis, interpretation and synthesis of scientific and educational literature on the study problem. Abstraction (or idealization and schematization) is the allocation of the essential foundations. Also we used experimenting with schemes (as a development of their content, sophistication and usability testing) at development of concepts, practical models and physical rehabilitation programs.

#### **Results of the researches**

**Conception** (lat. *conceptio* is an understanding, or system) was given as an ideologically coherent and meaningful, or reasonably coherent and complete presentation of original scientific theory or version [18]. The physical rehabilitation concept at the surgical treatment of patients with BP was developed, given by the modern science in the diagnostics field, performing difficult complex spinal surgery with the using of new tools and the knowledge from the physical rehabilitation improvement.

The basis of the physical rehabilitation organization in neurosurgery treatment of BP should put on the Anokhin's theory of functional systems [2]. It allows to take a different view on the already well-known approaches, but not always comprehensible of the biological phenomena, and in addition, allows to change the principles of the practical using of the knowledge that

based system approach. The system approach is a form of application of the knowledge theory and dialectics to the study of processes in biological organisms (a process is the dynamic changes in the system over time). Its essence is the implementation of the requirements of general systems theory, according to this theory, every object in the course of its study should be seen as a large and complex system, and at the same time as part of a general system. In the low-educational sense of a systematic approach, it requires the using of the system (or complex) of methods to the studying of phenomena and processes in living biological system, which outlines the elements of internal and external communications [8].

According to P.K. Anokhin [2], it is a complex of interacting components, aiming at obtaining of the useful results.

Based on the representations of the body as a complex multi-component system of internal and external interactions, V. D. Troshin [13] considers the obvious, that understand the laws of his behavior and management is not enough rely solely on the final stable performance. There must be taking care, and the dynamics of their production, analyze the impact of varying processes of some parts on the other and the system as a whole. Thus, the system methodology requires mastering in the rehabilitation, therapist assess the likely effectiveness of a particular type of treatment, the relative forecasting results of the study or the dynamics of the disease, etc. The accuracy of the probabilistic prognosis depends on the depth and comprehensiveness of the known phenomena, so a systematic approach in such situations is an essential educational tool.

The term as a “systems approach” in the physical rehabilitation must necessarily be complemented by the term as a “**structural**” (the structure is a stability of the relationship between elements of the system [6]), as there is a dialectical interdependence of structural features and functional-system processes in living biological systems are well known. We have modified some conceptual approaches to be followed in the implementation of a systematic approach to physical rehabilitation in the surgical treatment of patients with vertebral pathology:

*The systematic and target conceptual approach* is enable the scientific definition of the objectives of physical rehabilitation at the surgical treatment of patients with BP at each stage of recovery, their mutual coordination among themselves.

*The systematic and resource conceptual approach* is to allow the identifying the resources, required for the implementation of the objectives of each phase and the period of physical rehabilitation in the surgical treatment of patients with BP and allows to use a lot of tools of physical rehabilitation for restoring a function of individual cells and the organism as a whole.

*The systematic elemental conceptual approach* is obligatory consideration of all the factors for determining the nature and direction of physical rehabilitation measures in the surgical treatment of patients with vertebral pathology. These factors include:

- A neurological defects;
- The rate and nature of disability;
- A handicap level;
- The amount and nature of the surgery;
- A surgical access;
- The stage and the period of physical rehabilitation;
- The duration of the post-operative recovery.

*The systematic integrational conceptual approach* is to allow to perform an analysis the elements of the physical rehabilitation system at the surgical treatment of patients with BP and their relationships within a particular organizational structure, as a medical institution, clinic, sanatorium, rehabilitation or fitness center. Proposed activities should not perform against the basic medical process. Each stage of the rehabilitation period must be organically linked with accepted medical establishment treatments and medical rehabilitation.

*The systematic evolutionary conceptual approach* is determine the nature of the process and recording the physical rehabilitation of patients based on the theme of phasing and the continuity of their activities, identifying criteria of efficiency or ability to analyze the body condition at each stage, as well as the possible prospects of recovery or compensation functions.

*The systematic communicational conceptual approach* could be for the identifying external relations of the object with the other, its relations with the environment, it allows to consider the body as a whole and at the same time, as a subsystem of the higher levels. Higher levels in relation to patients with BP are social environment, the influence of environmental conditions on the patient’s body, specific professional activities, especially the patient’s lifestyle, etc.

*The systematic structural conceptual approach* consists of exposure by physical rehabilitation means in the surgical treatment of patients with vertebral pathology to a single biomechanical chain, as a “spine - pelvis - limbs”, it was given that the deformation of one link of the human body inevitably leads to a compensatory response by the other biomechanical parts.

*The systematic functional approach* provides a conceptual identification of the factors limiting recovery of function in patients with vertebral pathology and their remedies. This approach allows to solve some re-adaptational and re-social problem, a feature of which is to develop a new (or optimal), static and movement patterns, the restoration of the affected spine and motor system as a whole, helps prevent further damage the spine and return the patient to his former employment.

**Conclusion.** The using of a systematic methodology for physical rehabilitation in the surgical treatment of patients with vertebral pathology, helps to optimize research, diagnostic, therapeutic, rehabilitative and preventive measures, providing them with the required comprehensiveness, consistency, orderliness.

*Prospects for future research* are to develop the principles of physical rehabilitation in the surgical treatment of patients with vertebral pathology.

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**Информация об авторах:**

**Лазарева Елена Борисовна:** д.н. ФВиС, проф.; ORCID: 0000-0002-7435-2127 ; helenka\_l@mail.ru; Национальный университет физического воспитания и спорта Украины; ул. Физкультуры 1, г.Киев, 03680, Украина.

**Цеслицка Мирослава Зигмунтовна:** ORCID: 0000-0002-0407-2592; cudaki@op.pl; Университет Казимира Великого в Быдгощ; ул. Ходкевича 30, г.Быдгощ 85-064, Польша.

**Станкевич Блазей Янович:** ORCID: 0000-0001-6743-1073; blazej1975@interia.pl; Университет Казимира Великого в Быдгощ; ул. Ходкевича 30, г.Быдгощ 85-064, Польша.

**Мушкета Радослав Каролиевич:** д.п.н., проф.; ORCID: 0000-0001-6057-1583; radek@muszkiet.com; Университет Казимира Великого в Быдгощ; ул. Ходкевича 30, г.Быдгощ 85-064, Польша.

**Прусик Кристоф Янович:** д.п.н., проф.; ORCID: 0000-0001-7534-675X; prusik@hotmail.pl; Академия физического воспитания и спорта; Ул. Веска 1, 80-336, Гданьск, Польша.

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**Information about the authors:**

**Lazareva E.B.:** ORCID: 0000-0002-7435-2127 ; helenka\_l@mail.ru; National University of Physical Education and Sport of Ukraine; Fizkultury str. 1, Kiev, 03680, Ukraine.

**Cieślicka Mirosława:** ORCID: 0000-0002-0407-2592; cudaki@op.pl; Kazimierz Wielki University in Bydgoszcz; Chodkiewicza str. 30, 85-064 Bydgoszcz, Poland.

**Stankiewicz Błażej:** ORCID: 0000-0001-6743-1073; blazej1975@interia.pl; Kazimierz Wielki University in Bydgoszcz; Chodkiewicza str. 30, 85-064 Bydgoszcz, Poland.

**Muszkiet Radosław:** ORCID: 0000-0001-6057-1583; radek@muszkiet.com; Kazimierz Wielki University in Bydgoszcz; Chodkiewicza str. 30, 85-064 Bydgoszcz, Poland.

**Prusik Krzysztof:** ORCID: 0000-0001-7534-675X; prusik@hotmail.pl; Academy of Physical Education and Sports; ul. Wiejska 1, 80-336 Gdansk, Poland.

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