

# The construction of physical rehabilitation programs in the preoperative period for patients that will remove of intervertebral disc' prolapse in the lumbar spine

Lazarieva Elena<sup>1</sup>, Kormiltsev Vladimir<sup>1</sup>, Prusik Krzysztof<sup>2</sup>, Cieślicka Mirosława<sup>3</sup>

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

Academy of Physical Education and Sports, Gdansk, Poland<sup>2</sup>

Kazimierz Wielki University in Bydgoszcz, Poland<sup>3</sup>

## Annotation:

The ineffectiveness of conservative treatment will make the need for surgery in 4-5% of patients suffering from low back pain with hernias of the lumbar and sacral spine. Despite the surgical removal of the source of compressed roots, nerves and blood vessels, require a comprehensive system of rehabilitation therapy in order to eliminate manifestations of disease and relief of disease progression. **The aim of the work** is to substantiate the general approaches for the using of physical rehabilitation and diagnostics static component of the dynamic stereotype in the preoperative period in patients to remove intervertebral disc prolapse. **Materials:** There was examined 96 with low back pain. Methods are applied in this research: analysis of a literature, observation methods. **Results.** In conjunction with the physician was determined "diagnosis for rehabilitation" and "prognosis of the rehabilitation". The formulation of the basis of the diagnosis for rehabilitation was performed through the examination during the rehabilitation (as a taking an anamnestic data, examination and palpation), studies of intact sensory and motor functions, the results of objective research tool. **Conclusions.** The identification of preserved anatomical and functional entities, the definition of the initial level of compensation for lost functions and forecast further recovery is a fundamental approach to program development in the preoperative period in patients with low back pain aimed at the removal of intervertebral disc herniations.

Лазарева О.Б., Кормильцев В.В., Прусик Кристоф, Цеслицка Мирослава. Побудова програм фізичної реабілітації в передопераційному періоді у хворих остеохондрозом хребта спрямованих на видалення гриж міжхребцевих дисків. Неефективність консервативного лікування призводить до необхідності хірургічного втручання у 4-5% хворих, що страждають на остеохондроз ускладнений грижами попереково-крижового відділу хребта. Незважаючи на хірургічне видалення джерела компресії корінців, нервів і судин, потрібне проведення системної комплексної відновної терапії, спрямованої на усунення проявів захворювання і купювання подальшого прогресування захворювання. **Метою роботи** є обґрунтування загальних підходів до застосування засобів фізичної реабілітації та діагностики статичної складової динамічного стереотипу в передопераційному періоді у хворих на остеохондроз хребта спрямованих на видалення гриж міжхребцевих дисків. **Матеріал:** Були вивчені результати передопераційного обстеження 96 пацієнтів з болем у спині спрямованих на видалення гриж міжхребцевого диска. Застосовувалися: метод аналізу джерел літератури, педагогічні спостереження. **Результати.** Спільно з лікарем визначався «реабілітаційний діагноз» і «реабілітаційний прогноз». Постановка реабілітаційного діагнозу здійснюється на підставі: реабілітаційного огляду (анамнестичних відомостей, огляду та пальпації), дослідження збережених чутливих і рухових функцій, результатів об'єктивних інструментальних досліджень. **Висновки:** виявлення збережених анатомо-функціональних утворень, визначення вихідного рівня компенсації втрачених функцій та прогнозування подальшого відновлення є основоположним підходом до розробки програм у передопераційному періоді у хворих на остеохондроз хребта спрямованих на видалення гриж міжхребцевих дисків.

Лазарева Е.Б., Кормильцев В.В., Прусик Кристоф, Цеслицка Мирослава. Построение программ физической реабилитации в предоперационном периоде у больных остеохондрозом позвоночника направленных на удаление грыж межпозвоноковых дисков. Неэффективность консервативного лечения приводит к необходимости хирургического вмешательства у 4-5% больных страдающих остеохондрозом с грыжами пояснично-крестцового отдела позвоночника. Несмотря на хирургическое удаление источника компрессии корешков, нервов и сосудов, требуется проведение системной комплексной восстановительной терапии, направленной на устранение проявлений заболевания и купирование дальнейшего прогрессирования заболевания. **Целью работы** является обоснование общих подходов к применению средств физической реабилитации и диагностики статической составляющей динамического стереотипа в предоперационном периоде у больных остеохондрозом позвоночника направленных на удаление грыж межпозвоноковых дисков. **Материал:** Были изучены результаты предоперационного обследования у 96 пациентов с болями в спине направленных на удаление грыжи межпозвонокового диска. Применялись: метод анализа источников литературы, педагогические наблюдения. **Результаты.** Совместно с лечащим врачом определялся «реабилитационный диагноз» и «реабилитационный прогноз». Постановка реабилитационного диагноза осуществляется на основании: реабилитационного осмотра (анамнестических сведений, осмотра и пальпации), исследования сохранных чувствительных и двигательных функций, результатов объективных инструментальных исследований. **Выводы:** выявление сохранных анатомо-функциональных образований, определение исходного уровня компенсации утраченных функций и прогнозирование дальнейшего восстановления является основополагающим подходом к разработке программ в предоперационном периоде у больных остеохондрозом позвоночника направленных на удаление грыж межпозвоноковых дисков.

## Keywords:

low back pain, rehabilitation, diagnosis, prognosis.

остеохондроз, реабілітаційний, діагноз, прогноз.

остеохондроз, реабилитационный диагноз, прогноз.

## Introduction.

According to the statistics from the World Health Organization, approximately 80% of the world's population suffering from back pain [1,4, 13]. One of the causes of back pain may be prolapse of the intervertebral disc, that's manifested polymorphic neurological syndromes (as a reflexive, compression, compression-reflexive and compression-reflexive etc.). The rising pathology brings to acute pain, some changing in muscle, changes in the

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biomechanical area are important in the formation of postural balance, these all change static and dynamic stereotype, disruption of perception of body position in space and in the synthesis of arbitrary motor response, which gives the loss or disruption of motor function and social maladjustment home patient [2,5,13]. Patients often have abnormal strain curves of the spine (as a reflexive scoliosis, hyperlordosis, lumbar kyphosis, or a "flatback" [3,5,11]), it connected with free time during the programming of restorative treatment, it is necessary not for only to stop pain and strengthen the muscular system, but also

to hold events directed to correct reflex strain of lumbar spine, after surgery especially, that had not drawn some attention of specialists [10,12].

The ineffectiveness of conservative treatment will make the need for surgery in 4-5% of patients suffering from low back pain with hernias of the lumbar and sacral spine. Despite the surgical removal of the source of compressed roots, nerves and blood vessels, require a comprehensive system of rehabilitation therapy in order to eliminate manifestations of disease and relief of disease progression [7, 12].

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

*The hypothesis of the work:* there is assumed that the preoperative planning process of physical rehabilitation, taking into account the deformation of the reflex correction in the lumbar spine for patients to remove intervertebral disc prolapsed, reduce the recovery period, help to reduce the number of relapses and a more complete recovery of motor function and social adaptation of patients.

*The aim of the work* is to substantiate the general approaches for the using of physical rehabilitation and diagnostics static component of the dynamic stereotype in the preoperative period in patients to remove intervertebral disc prolapse.

*The methods* are applied in this research: analysis of a literature, observation methods.

**Results and discussion.**

In the case with some features of the motor system pathology in patients with intervertebral disc prolaps, we require specialized strategical approach, as in the assessment of compensation of the lost functions, and in the principles of recovery.

In conjunction with the physician was determined “**diagnosis for rehabilitation**” and “**prognosis of the rehabilitation**”. The formulation of the basis of the diagnosis for rehabilitation was performed through the examination during the rehabilitation (as a taking an anamnestic data, examination and palpation), studies of intact sensory and motor functions, the results of objective research tool. The main objective of rehabilitation is identification of intact anatomical and functional entities and the definition of the initial level of compensation for lost functions and prognosis for the further recovery. A figurative expression of L.D.Potehin [6], rehabilitation should be identified as a “is not what is not, and what’s left.”

Before starting the rehabilitation measures aimed at the restoring of lost motor function as were imagined as a paralysis or paresis, motor function was assessed the possibility of the patient, the presence of refined sensory impairments and mobility of joints and determine the reasons for limitation of movement.

Particular attention was paid to indices of social and household mobility and intensity of pain. Also, there was evaluated the quantitative biogeometrical profile of posture and viscoelastic properties of muscles, aimed at identifying the predominant type of reflex spinal deformity, pathology of static and motor stereotypes that may hinder the success of the rehabilitation measures, and determine the “prognosis of rehabilitation” and “patient’s rehabilita-

tion potential.”

**Prognosis of rehabilitation** is a reasonable likelihood of achieving the goals of rehabilitation in a certain period of time, given to the nature of the disease, its course, individual resources and compensatory possibilities patient that is a sufficient rehabilitation potential.

**Rehabilitation potential of the patient** is a scientifically based recovery of the deficit limit of lost physiological functions in a particular clinical case.

Based on the rehabilitation diagnosis, prognosis and potential, was constructed an individual physical rehabilitation program for the patient with back pain aimed at removal at the intervertebral discs herniation, including the appropriate volume of rehabilitation with quantitative indices of the biogeometrical profile of the posture; severity of neuromuscular disorders; musculoskeletal functional disorders, disorders of the static stereotype; postoperative course, quality of life, general condition, age, sex and exercise tolerance.

On the basis of periods of clinical course, characteristics of operations on the spine were identified following rehabilitation periods: the preoperative, early postoperative period, the late postoperative period, the recovery period.

The preoperative, early and late postoperative periods partially held in stationary conditions (from 3 days before surgery to 7-16th day after surgery). Accordingly, the length of staying in hospital after various operations ranged from 5 to 18 days.

After hospital discharge, patients were at home, they continued course of rehabilitation and restorative and late postoperative periods up to 12 weeks. Further, if necessary, in patients with different levels of rehabilitation potential was carried out a rehabilitation plan with learning new movements and exercises for differentiated programs.

Rehabilitation activities started immediately after diagnosis or decision about the upcoming surgery.

The aim of the preoperative period was the complete preparation of the patient for the upcoming surgical treatment and the further implementation of rehabilitation measures.

The problems of preoperative preparation are:

1. The compensation of cardio-pulmonary failure caused by prolonged painful syndrome.
2. An improvement of the psycho-emotional status of the patient;
3. A preparation for the anesthesia;
4. The conversation and acquaintance with the patient’s recovery program for the early postoperative period, self-service skills.
5. The training exercises of an early postoperative period.
6. An education turns, rise out of bed and walking to the preservation of correct postural synergies.

Patients were trained in basic motor locomotion: as an active turns in bed, getting up, standing up, walking according to the method of Nekrasov A.D. [9], thus significantly expand the range of physical activity of patients after surgery and reduce the risk of neurological compli-

cations. Stabilization of the lumbar spine was performed on the basis of the formation of a new motor stereotype, precluding bending, straightening of the lumbar spine in all planes, as well as twisting, by performing a set of physical exercises designed to develop motor skills are there follows:

“Turning from back to side on a horizontal surface”;

“Transition from vertical to horizontal position”;

“Turning from back to side with the transition into a sitting position”;

“Turning from laying on a stomach to side with the transition into a sitting position”;

“Landing on a chair”;

“Transition from a seated position in the standing position.”

The motions were performed at the stabilization of the lumbar spine in all planes due to concomitant tensing the muscles of the trunk.

The content and amount of an exercise in the main part of the procedure of therapeutic exercises were chosen through the including the basic and variable parts.

An exercise of the basic part are follows: a generally developmental, exercises for the prevention of common postoperative complications, to prevent contractures, joint stiffness, muscle atrophy, to improve the static endurance of the back and abdominal muscles, to enhance collateral circulation, facilitating the mobility of the spinal membranes, aimed at relaxing “sound” gymnastics.

An exercises of the variable part are follows: exercises for the eliminating a postoperative complications to improve mobility in the non-operated spine, in the presence of functional units and the absence of events instability; corrective exercises are for restoring the static component of the dynamic stereotype; an individually selected exercises for the posture correction, for increase the strength of the paretic muscle groups and muscle hardness with low voltage, depending on the level and extent of damage, for restoring the functional capacity of the damaged joints of the lower limbs to increase the strength of the muscles that stabilize the damaged joints of the lower limb; also there was respiratory exercises performed considering surgical access and muscles stretching with high hardness alone.

Patients were taught active turns in bed, while maintaining spinal immobilization of a single block. Hand, the same name turn, pulled up with the opposite hand found a foothold on the side of the turn, tossed the opposite rotation of the cross leg, the supporting arm flexing the forearm was carried out and made the turn - to roll back hard on the stomach.

In the formation of a new motor stereotype hold the position of the body so that the line connecting the acromion and the line connecting the great trochanter, located in the frontal plane and the distance between points on both sides of the torso, with the projection of the center

of mass of the body combined with the center square feet.

Patients will form the motor skills to implement the principle of stability of the lumbar spine at the exit of the car, at an inclination of the body. The way to compensate for functional impairment of the spine by ligaments stabilizes was performed through the functional muscle on a regular basis. Patients were explained the need to implement rules of conduct in the postoperative period. Not recommended for the following motor acts:

- Start out sitting,
- Lift the legs straight up from the supine position,
- Sudden movements,
- Torsion of spine,
- Bending forward and sideways,
- Lifting weight,
- A long ride in the car.

Patients should be aware that can not tilt the body and in a sitting position no need to sit only on the basis. When reducing the pain the patient should be instructed about the inadmissibility of standing poses with the body tilted forward. Later, with the increasing burden of therapeutic exercises, motor mode to provide optimum opportunity affected in the intervertebral disc. It should be permanently excluded sudden movement.

Patients create a positive psycho-emotional attitude, the installation of a successful outcome, explained the aims and objectives of the forthcoming post-operative treatment. The main means of risk factors were:

1. Breathing exercises are static and dynamic (without involvement of the affected segment of the motor act of spine);
2. Passive and ideomotor exercises;
3. Active-facilitated exercises for the lower extremities;
4. Active exercises for the upper limb girdle (except for patients with lesions of the cervical spine);
5. Active exercises with little resistance;
6. Active tension and relaxation of the pelvic floor muscles;
7. Massage of the limbs;
8. Orthosis;

Method of training was an individual.

Due to the fact that the nature of the clinical manifestations of the disease depended on the location and extent of the pathological process, the technique of restorative treatment in this period was based on an individual rehabilitation plan.

### Conclusions

The identification of preserved anatomical and functional entities, the definition of the initial level of compensation for lost functions and forecast further recovery is a fundamental approach to program development in the preoperative period in patients with low back pain aimed at the removal of intervertebral disc herniations.

**References:**

1. Chevan J. *Physical Therapy Management of Low Back Pain (Contemporary Issues in Physical Therapy and Rehabilitation Medicine)*. / J. Chevan, P. Clapis., Burlington: JBLearning, 2011. – 22 p.
2. Dagenais S. *Evidence-Based Management of Low Back Pain* / S. Dagenais, S. Haldeman, Mosby; 1 edition, 2011. – 478 p.
3. Evans C. A randomized controlled trial of flexion exercises, education and bed rest for patients with acute low back pain. / C. Evans // *Physiother Can.* 2009. - №39. - pp. 96–101.
4. Geisen T. *Disability Management and Workplace Integration* / T. Geisen, H. Harder., Gower Publishing, Ltd., 2011. – 250 p.
5. Khabirov F.A. *Clinical neurology spine*. - Kazan, 2001. – 469 p.
6. Leontiev M.A. *Rehabilitological examination of spinal patient* / Mark A. Leontiev // Novokuznetsk, 2002 Federal State Institution «Novokuznetsk Scientific-Practical Center of Medical and Social Examination and Rehabilitation of Disabled Persons» - 31 p.
7. Luppova I.V. *Restorative treatment of patients which got the early invasive operations after minimally discogenic radiculopathy* / Irina V. Luppova. [Electronic resource]: the Dissertation ... Ph.D. : Moscow, 2001, 14.00.51. – 100 p.
8. Patent 2289382 Russian Federation МПК А61Н 1/00 Method of prophylaxis and treatment of the manifestations of lumbar osteochondrosis / Nekrasov, A.D. The patent owner Nekrasov, A.D. (RU); Zhdanov S.E. (RU); Sosnowski V.L. (RU); Chikunov A.V. (RU); Krivoshapkin A.L. (RU) № 2006103994/14, appl. 2006.02.10, published 2006.12.20. – 4 p.
9. Petrov C.B. *Rehabilitation defects of posture and shape*. / Petrov, C.B. Novokuznetsk, 1998. - 147 p.
10. Rezvani M. H. *Physical rehabilitation of patients with reflexion of the vertebrogenic deformities of the lumbar spine* / Mohammad Hossein Rezvani: Dis. Ph.D.: 13.00.04, 14.00.51: Moscow, 2004, p. 137
11. Sakai Y. *Low back pain pathogenesis and treatment* / Janeza Trdine, Croatia, 2012. – 256 p.
12. Tyravska O.I. *Physical rehabilitation of persons operated on intervertebral discs of the lumbar spine: abstract. dis. ... Ph.D. : 24.00.03 / Oksana Tyravska., 2010. - 20 p. :*
13. Yepifanov V.A. *Restorative treatment of diseases and injuries of the spine* / V.A. Epifanov, A.V. Epifanov.-M.: MEDpress-Inform, 2008. - 384p.

**References:**

1. Chevan J., Clapis P. *Physical Therapy Management of Low Back Pain (Contemporary Issues in Physical Therapy and Rehabilitation Medicine)*. Burlington, JBLearning, 2011, 22 p.
2. Dagenais S., Haldeman S. *Evidence-Based Management of Low Back Pain*. 1 edition, Mosby, 2011, 478 p.
3. Evans C. A randomized controlled trial of flexion exercises, education and bed rest for patients with acute low back pain. *Physiotherapy Canada*. 2009, vol.39, pp. 96–101.
4. Geisen T., Harder H. *Disability Management and Workplace Integration*. Gower Publishing, Ltd., 2011, 250 p.
5. Khabirov F.A. *Clinical neurology spine*. Kazan, 2001, 469 p.
6. Leontiev M.A. *Rehabilitological examination of spinal patient*. Novokuznetsk, Federal State Institution, 2002, 31 p.
7. Luppova I.V. *Restorative treatment of patients which got the early invasive operations after minimally discogenic radiculopathy*. Cand. Diss., Moscow, 2001, 100 p.
8. Nekrasov A.D. Zhdanov S.E., Sosnowski V.L., Chikunov A.V., Krivoshapkin A.L. Method of prophylaxis and treatment of the manifestations of lumbar osteochondrosis. *Patent 2289382 Russian Federation*. 2006, 4 p.
9. Petrov C.B. *Rehabilitation defects of posture and shape*. Novokuznetsk, 1998, 147 p.
10. Rezvani M. H. *Physical rehabilitation of patients with reflexion of the vertebrogenic deformities of the lumbar spine*. Cand. Diss., Moscow, 2004, p. 137.
11. Sakai Y. *Low back pain pathogenesis and treatment*. Croatia, 2012, 256 p.
12. Tyravska O.I. *Physical rehabilitation of persons operated on intervertebral discs of the lumbar spine*. Cand. Diss., 2010, 20 p. :
13. Yepifanov V.A., Epifanov A.V. *Restorative treatment of diseases and injuries of the spine*. Moscow, MEDpress-Inform, 2008, 384 p.

**Информация об авторах:**

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

**Кормильцев Владимир Владимирович:** ORCID: 0000-0002-0533-0354; rectorat@uni-sport.edu.ua; Национальный университет физического воспитания и спорта Украины; ул. Физкультуры 1, г.Киев, 03680, Украина.

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

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

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**Information about the authors:**

**Lazarieva 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.

**Kormiltsev V.V.:** ORCID: 0000-0002-0533-0354; rectorat@uni-sport.edu.ua; National University of Physical Education and Sport of Ukraine; Fizkultury str. 1, Kiev, 03680, Ukraine.

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

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

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