UDC 616.833.2-036.82-08 https://doi.org/10.26641/2307-0404.2020.1.200396

L.A. Dzyak,
O.O. Shul'ga

CONCEPT OF A COMPLEX THERAPY IN RESTORATIVE TREATMENT OF DISCOGENIC LUMBOSACRAL RADICULOPATHIES

SE «Dnipropetrovsk medical academy of Health Ministry of Ukraine»
Department of nervous diseases and neurosurgery
V. Vernadsky str., 9, Dnipro, 49044, Ukraine
ДЗ «Дніпропетровська медична академія МОЗ України»
кафедра нервових хвороб та нейрохірургії ФПО
(зав. – член-кор. НАМН України, д. мед. н., проф. Л.А. Дзяк)
вул. В. Вернадського, 9, Дніпро, 49044, Україна
e-mail: ashulga87@gmail.com

Цитування: Медичні перспективи. 2020. Т. 25, № 1. С. 32-44
Cited: Medicni perspektivi. 2020;25(1):32-44

Key words: *radiculopathy, discogenic radiculopathy, stenosis, quantitative sensory testing*
Ключові слова: *радикулопатія, дискогенна радикулопатія, стеноз, кількісне сенсорне тестування*
Ключевые слова: *радикулопатия, дискогенная радикулопатия, стеноз, количественное сенсорное тестирование*

Abstract. Concept of a complex therapy in restorative treatment of discogenic lumbosacral radiculopathies. Dzyak L.A., Shul'ga O.O. *Currently, the treatment of lumbosacral radiculopathy (LSR) is an urgent problem due to the frequent chronic pain syndrome, the lack of a unified methodological approach to the recommendations, taking into account the pathological characteristics of the compressed root. The purpose of the work is the development of the concept of a comprehensive etiopathogenetic treatment of acute lumbosacral radiculopathy. 100 patients, divided into two groups were examined (the main – 45 people, the control – 55 people). Each group was divided into subgroups depending on the treatment received (basic and complex). Basic therapy included treatment according to European and American recommendations. Complex treatment consisted of a combination of basic therapy and vibrotraction postisometric muscle relaxation (PIMR) with biomechanical stimulation of the paravertebral muscles. Treatment control was based on the analysis of the neurological and neuroorthopaedic status, severity of a pain syndrome using a 5-point verbal scale, PainDETECT questionnaire, the muscle syndrome index, as well as quantative sensory testing. The stages of the study were chosen taking into account the pathological stages of the disease: 1-7 days and 30 days. When analyzing the results of ELISA to IgG for urogenital infections in 46.7% of patients of the main group and 47.3% of the control, urogenital chronic infections were detected, while in the main group mycoplasmic and ureaplasmic infections were more common, and in the control group patients mostly had chlamydial infection. When antibacterial drugs were included in the treatment, the most pronounced regression of the pain syndrome was determined. Thus, it was found that the use of vibrotractional postisometric relaxation with biomechanical stimulation of the paravertebral muscles in combination with the use of NSAIDs is aimed at quickly removing the muscular-tonic and compression symtoms during 10-14 days ($p<0.05$), and the further use of neurotropic therapy led not only to a persistent analgesic effect, but also contributed to the improvement of the biomechanical indicators of the spine ($p<0.05$), positively affecting the motor activity.*

Реферат. Концепция комплексного лечения в восстановительном лечении дискогенных пояснично-крестцовых радикулопатий. Дзяк Л.А., Шульга А.А. *В настоящее время лечение острых пояснично-крестцовых радикулопатий (ПКР) является актуальной проблемой в связи с частой хронизацией болевого синдрома, отсутствием единого методического подхода к лечебным рекомендациям с учетом патоморфологических характеристик компремированного корешка. Цель работы – разработка концепции комплексного этиопатогенетического лечения острых ПКР. Было обследовано 100 пациентов, которые были разбиты на две группы (основная – 45 человек, контрольная – 55 человек). Каждая группа была разделена на подгруппы в зависимости от получаемого лечения (базового и комплексного). Базовая терапия включала медикаментозное лечение согласно Европейским и Американским рекомендациям. Комплексное лечение состояло из сочетания базовой терапии и вибротракционной постизометрической миорелаксации (ПИМР) с биомеханической стимуляцией мышц паравертебрального корсета. Контроль эффективности проведенного лечения оценивали на основании анализа неврологического и нейроортопедического статуса, выраженности болевого синдрома с помощью 5-балльной вербальной шкалы, опросника PainDETECT, индекса мышечного синдрома, а также количественного сенсорного тестирования. Этапы исследования были выбраны с учетом*

патоморфологических стадий заболевания: 1-7 сутки и 30 сутки. При анализе результатов ИФА к IgG на урогенитальные инфекции у 46,7% пациентов основной группы и у 47,3% – контрольной были выявлены урогенитальные хронические инфекции, при этом в основной группе более часто встречалась уреаплазменно – микоплазменная инфекция, а у больных контрольной группы – хламидийная инфицированность. При включении в лечение антибактериальных препаратов определялся наиболее выраженный регресс болевого синдрома. Установлено, что использование вибротракционной постизометрической релаксации с биомеханической стимуляцией паравертебральных мышц в сочетании с использованием базовой терапии направлено на быстрое снятие рефлекторной мышечно-тонической и компрессионной симптоматики в течение 10-14 дней (p<0,05) и дальнейшее использование нейротропной терапии приводило не только к стойкому аналгетическому эффекту, но и способствовало улучшению биомеханических показателей позвоночника (p<0,05), положительно влияя на двигательную активность.

In the structure of pathology of the peripheral nervous system, discogenic lumbosacral radiculopathies (LSR) occupy a leading place and make up 65-70% [1, 2, 4]. It is the second most frequent cause of respiratory disease and the third reason for hospitalization [3]. The medical and social significance of this problem is due to the great economic losses associated with the temporary disability of patients [6]. About 30% of premature cases of disability pension are associated with discogenic LSR [10, 11].

The development of degenerative-dystrophic processes in the intervertebral discs is promoted, by in addition to hereditary predisposition and unfavorable conditions of static-dynamic load on the spine, the presence in the body of intracellular infections, tropical to cartilaginous tissue [14, 15]. Thus, in recent years, there has been an increasing number of papers devoted to the role of urogenital infections in destructive degenerative processes in the vertebral-motor segments (VMS) that lead to LSR [14, 15]. In 2016, Benamin R.M. published data showing that in materials obtained during intervertebral hernia surgery, anaerobic propionic bacteria were found in 46% of cases that caused inflammation in the vertebrae and discs [13].

For a long time it was believed that in spondyloarthropathies inflammation in the joints is sterile in nature, however, used modern methods of diagnosis revealed elementary corpuscles and nucleic acids of Chlamydia trachomatis, Ureaplasma urealiticum and Mycoplasma hominis in synovial tissue and periarticular tissues. In a study by P. Kumar [14], it was found that in patients who did not present Chlamydia trachomatis in urogenital scrapes presented pathogen from synovial tissue. The author found that Chlamydia trachomatis can reproduce in the articular cartilage tissues. It is now proven that arthrosis-arthritis caused by urogenital infections accelerates degenerative changes in the intervertebral joints, leading to overloading of the intervertebral disc, resulting in herniated protrusion.

In the involvement of the spinal roots in the process of segmental emulsion occurs, which triggers regional muscle-tonic syndromes, impairment of the static-dynamic function of the spine develops, sensitive, motor disorders and pain syndrome develop as well [7, 8, 12].

In the mechanism of development of pain in the lumbosacral radiculopathies both nociceptive component, resulting from irritation of nociceptors in the outer layers of the damaged disk and the surrounding tissues (dura, muscle tissue) and neuropathic one is present, which is associated with damage and irritation of the nerve fibers of the compressed root due to aseptic inflammation, edema, ischemia, axonal-demyelinating processes [4].

In addition to nociceptive and neuropathic components of pain in LSR, many researchers also identify a psychogenic component [20].

Treatment of lumbosacral radiculopathies is a rather difficult problem, which is caused, first of all, by the severity of the pain syndrome with subsequent possible chronicity, resistance to conventional analgesics and the lack of a unified methodological approach to recommendations which takes into account the pathophysiological characteristics.

The purpose of the study is to develop the concept of complex etiopathogenetic treatment of acute lumbosacral radiculopathies.

MATERIALS AND METHODS OF RESEARCH

The study included 100 patients aged 20 to 70 years with acute lumbosacral radiculopathies caused by vertebrogenic pathology, verified by CT. The distribution of patients by age was carried out in accordance with WHO criteria. It was found that in the main group the majority of patients were persons aged 40 to 69 years, and in the control group – from 30 to 59 years, i.e. persons of the most working age. In the study, significant gender differences in clinical groups were identified except for the control group of persons aged 50-60 years, where the number of women was 2.5 times higher.

Patients were randomized into two groups. The main group consisted of 45 individuals in whom lumbosacral radiculopathy was caused by discogenic pathology in combination with a stenotic process in

the spinal canal and (or) in the lateral openings. The control group consisted of 55 individuals in whom lumbosacral radiculopathy developed on the background of only pathology of the intervertebral disc at the level of one vertebral-motor segment.

In view of this goal, the subjects were divided into two subgroups depending on the received therapy (baseline and complex) (Table 1).

Table 1

Distribution of patients in clinical groups based on received treatment

Group / Therapy received	Main group (n= 45)		Control group (n=55)	
	Basic therapy	Complex therapy	Basic therapy	Complex therapy
Number of patients	20	25	30	25

Basic therapy included drug treatment according to European and American guidelines for the treatment of low back pain [16, 17, 19] (non-steroidal anti-inflammatory drugs and muscle relaxants), the duration of which was dependent on the severity of clinical symptoms. Complex treatment consisted of a combination of basic therapy and vibro-traction post-isometric muscle relaxation (PIMR) with biomechanical stimulation of the paravertebral muscles (10 days). Both subgroups were subsequently prescribed neurotropic therapy, which included group B vitamins and anticholinesterase agents. In the presence of infections tropical to cartilage, patients were prescribed antibiotic therapy.

Of the 45 patients in the main group, 20 patients (44.4%) received baseline therapy, and 25 (55.6%) against basic therapy – vibro-tractory postisometric muscle relaxation (PIMR) with biomechanical stimulation of muscles of the paravertebral group [9, 10, 11]. In the control group, 30 patients (54.5%) received basic therapy and 25 (45.5%) basic therapy supplemented with vibro-traction postisometric muscle relaxation. The subjects sought medical help on day 1-7 of the disease, i.e. in the stage of productive inflammation. The exclusion criteria were somatic pathology and severe cognitive deficits. All patients included in the study signed informed consent. The main diagnostic criteria for compression radiculopathy were: presence of vertebral syndrome; sensitive disorders in the segment of the affected root; reflex disorders; data of neuroimaging evaluation of the affected vertebral-motor segment.

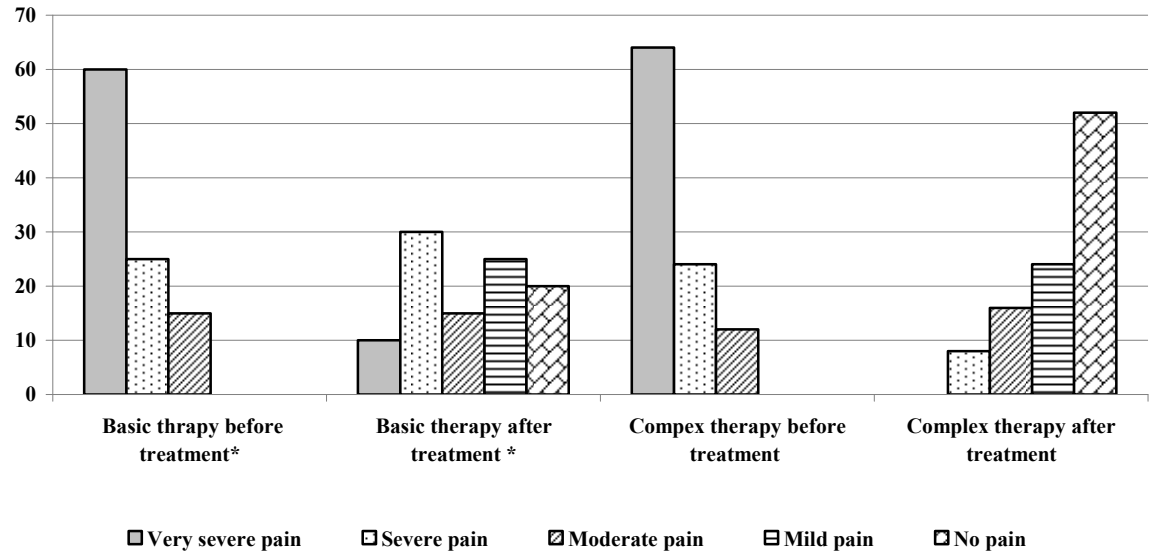
The stages of the study were determined taking into account pathomorphological stages of the disease: day 1-7 and day 30 [4].

Scheduled studies were completed by all patients. Control of the effectiveness of the treatment was evaluated on the basis of analysis of neurological status, as well as the severity of pain using a 5-point verbal scale [17], to assess the dynamics of the neuropathic component of pain PainDetect questionnaire was used [20]. The static-dynamic function of the spine was determined by the indicators characterizing the amount of movement in the lumbosacral department obtained during Schober's test, the function of extension, lateral flexion and rotation. Dynamics of changes in muscular-tonic syndrome was revealed using the index of muscle syndrome (IMS). To determine the dynamics of sensory disorders by the method of quantitative sensory testing, the study of the status of nociceptors (myelinated fibers type A-β, A-δ and nonmonic fibers) type) on a Neurometer NS3000 (Neurotron Inc., USA) was performed. For the diagnosis of urogenital infections, an enzyme-linked immunosorbent assay (ELISA) for IgG was used to detect monoclonal antibodies to surface antigens for the presence of Chlamydia trachomatis, Ureaplasma urealiticum, Mycoplasma hominis, and Trichomonas vaginalis.

Statistical processing of the results was performed using Microsoft® Excel and software STATISTICA for Windows 6.1 (Microsoft®). For statistical processing of study materials correlation analysis with the calculation of Spearman rank correlation coefficients (rs) nonlinear multidimensional relationship estimation was used as well as linear regression analysis with calculation of multiple correlation coefficient (R) and determination coefficient (R2) [5].

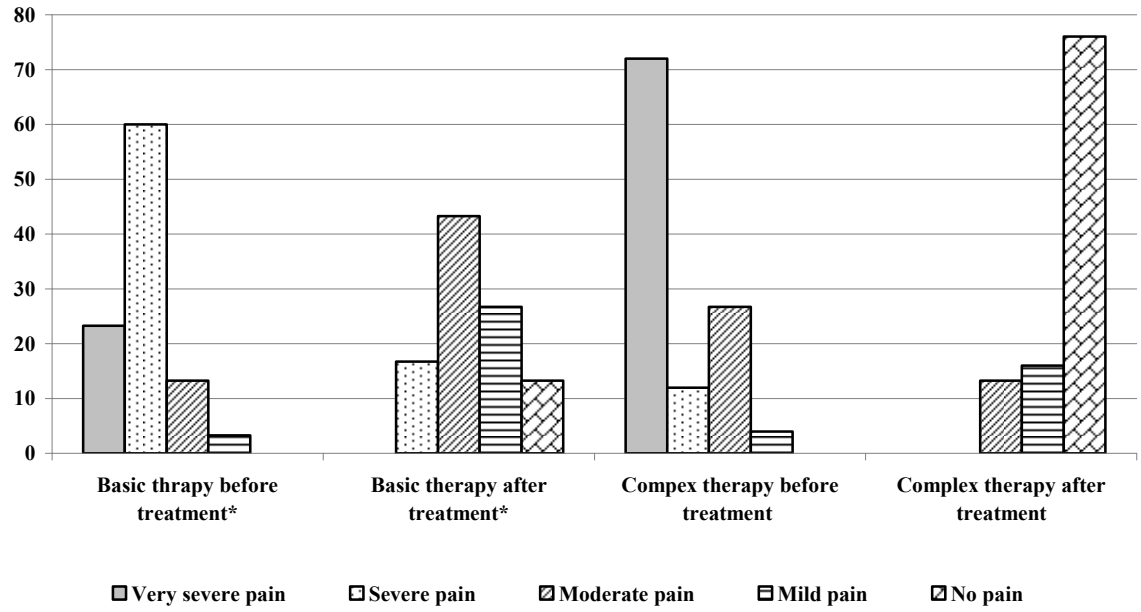
RESULTS AND DISCUSSION

When assessing the dynamics of pain intensity in selected clinical groups using a 5-point verbal scale as a result of treatment, it was found that the degree of pain intensity varied not only depending on the duration of treatment, but also on the methods used in the main and control group ($p < 0.05$) (Figs. 1 and 2).



Note. * – $p<0.05$ relative to the subgroup receiving complex treatment.

Fig. 1. Dynamics of pain intensity by a 5-point verbal scale in patients of the main group against the background of treatment ($p<0.05$)



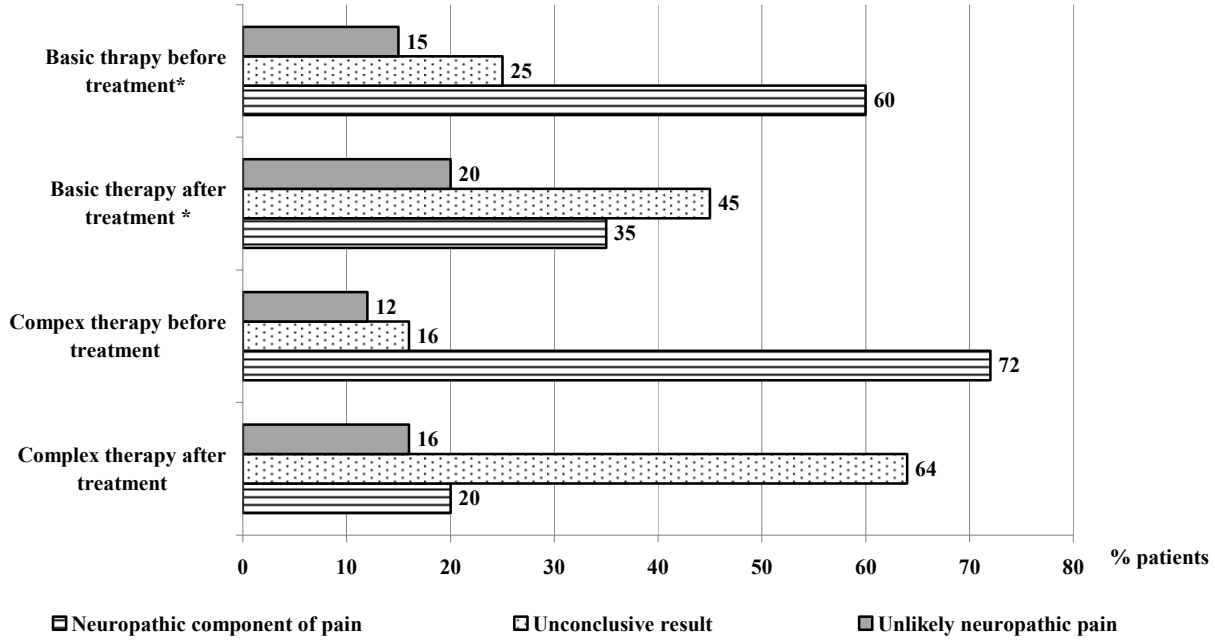
Note. * – $p<0.05$ relative to the subgroup receiving complex treatment.

Fig. 2. Dynamics of pain intensity by a 5-point verbal scale in patients of the control group on the background of treatment ($p<0.05$)

Thus, in patients in the main group before baseline treatment (n=20), very severe pain was verified in 60% of cases, severe pain – in 25%, moderate pain – in 15%. As a result of the treatment, significant positive dynamics was observed ($p<0.05$): very severe pain was observed in 10% of cases, severe pain – in 30%, moderate pain – in 15%, mild pain – in 25% and in 20% no pain was notrd. Somewhat different results were obtained in the main group in patients receiving baseline therapy combined with vibro-traction postisometric muscle relaxation of the paravertebral muscles (n=25). Before treatment, very severe pain was defined in 64% of cases, severe pain – in 24%, moderate pain – in 12%. After comprehensive treatment, a positive dynamics in the intensity of pain in patients in this group was noted: severe pain was manifested in 8%, moderate pain – in 16%, mild pain – in 24%, and no pain – in 52% of cases.

In patients of the control group receiving only basic therapy (n=30) before its onset, very severe pain was manifested in 23.3% of cases, severe pain – in 60%, moderate pain – in 13.3%, mild pain – in 3.3%. After treatment, significant ($p<0.05$) positive dynamics was observed. Thus, severe pain was observed in 16.7% of patients, moderate intensity pain – in 43.3%, mild pain – in 26.7%, absence of pain - in 13.3%. In the subgroup where complex treatment was applied (n=25), the results differed from the group in which patients received only basic therapy. Thus, before the start of treatment, very severe pain was verified in 72% of cases, severe pain in 12%, moderate intensity pain in 12%, and mild pain in 4%. At the end of the treatment, a significant ($p <0.05$) decrease in pain intensity was detected: moderate intensity pain was noted in 8% of cases, mild pain – in 16%, and no pain – in 76%.

When assessing the dynamics of the severity of the neuropathic component of pain using the PainDETECT questionnaire (Figs. 3 and 4), no significant differences were found before treatment in both groups ($p>0.05$), but against complex treatment in both groups significant positive dynamics ($p<0.05$) was observed with divergence of indicators.

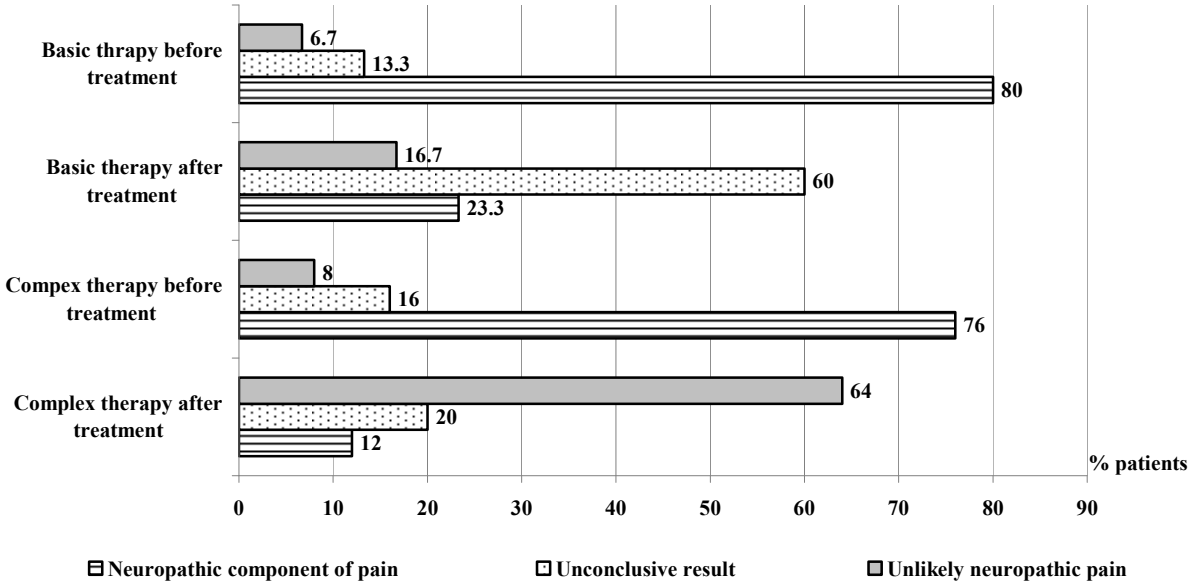


Note. * – $p<0.05$ relative to the subgroup receiving complex treatment.

Fig. 3. Dynamics of severity of neuropathic component of pain according to the analysis of the PainDETECT questionnaire in patients of the main group at the stages of treatment

Thus, in patients of the main group before baseline treatment, the presence of neuropathic pain was determined in 60% of cases, until the end of therapy the neuropathic component of pain continued to be registered in another 35% of patients, i.e. the absence of regression of this pain was observed in the majority of subjects. And when connecting basic therapy to vibro-traction PIMR with biomechanical stimulation of the muscles that are part of the affected VMS, almost from the first days

there was a significant positive dynamics. By the end of treatment, the pain in the legs decreased more than by 4 times (from 72% of cases before treatment to 20% – after), therewith in all 20% of cases the pain was much less intense. Similar changes were found in the control group. Thus, in 80% of cases, neuropathic pain was reported, which by the end of basic therapy was only 23.3%. And in the subgroup receiving complex treatment, neuropathic pain regressed much faster than in the subgroup with baseline therapy. Thus, from 76% of cases before the start of treatment at the end of treatment, the neuropathic component of pain persisted only in 12% of cases and in all patients this pain was insignificant in intensity, and in 64% of cases it was absent.



Note. * – $p<0.05$ relative to the subgroup receiving complex treatment.

Fig. 4. Dynamics of severity of neuropathic component of pain according to the analysis of the PainDETECT questionnaire in control patients at the stages of treatment

Against the background of treatment in patients in both groups, there was a positive dynamics in the static-dynamic function of the spine (Table. 2).

Thus, patients from both clinical groups showed marked impairment of spinal statics and dynamics during Schober's test before treatment. In the main group on the background of basic therapy the volume of movements increased by 1.8 times, while against the background of complex treatment – by more than 2 times ($p<0.05$). Patients in the control group showed normalization of the volume of movements on the background of basic and complex therapy equally ($p<0.05$) on day 30 of treatment.

When evaluating extensing function in patients in both clinical groups before the start of treatment, a marked impairment of static-dynamic function was noted. On the background of treatment (basic, complex) in the main group a significant increase in the angle of extension by 1.5 times ($p<0.05$) was revealed. The control group also noted positive dynamics, but more significantly it was against the background of complex therapy (increase in the angle of extension by 2.5 times) ($p<0.05$).

Evaluating the rotational component of static-dynamic spine function, it was found that in both groups the amplitude was significantly less than normal before treatment ($p<0.05$). Thus, in the main group, on the background of basic therapy, there was a significant increase in the angle of rotation, and after complex treatment, the angle approached the normal values (36.4±2.5). In the control group, more significant dynamics was also observed against the background of complex treatment (38.7±3.0). Thus, the condition of patients 30 days after the start of therapy showed that the most pronounced positive dynamics of static-dynamic impairments of the spine was observed in patients of both groups receiving complex therapy.

Table 2

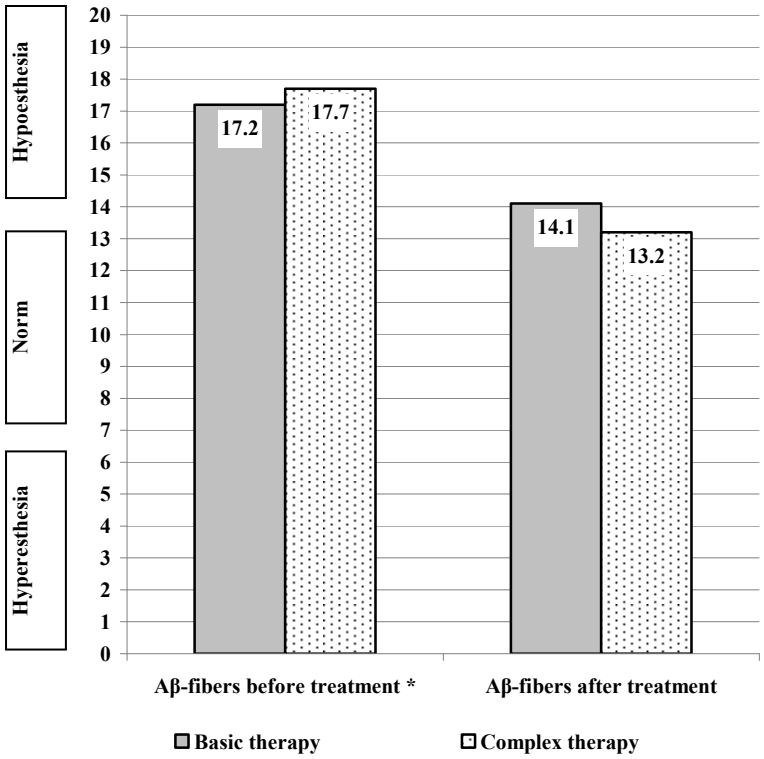
Dynamics of static-dynamic function of spine in clinical groups against the background of treatment in dynamic follow-up (M±m)

Dynamics of static-dynamic function of spine	Main group				Control group			
	Basic therapy		Complex therapy		Basic therapy		Complex therapy	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment*	After treatment*	Before treatment	After treatment
Schober's test (cm)	2.3±0.7	4.3±0.7	2.2±0.5	4.5±0.6	2.8±0.7	4.4±0.7	3.1±0.7	4.6±0.5
Flexion (in degrees)	15.5±2.3	20.5±3.2	16.2±1.5	24.5±1.5	16.8±2.2	25.2±2.1	17.8±1.2	26.6± 1.6
Lateral flexion (in degrees)	8.5±2.1	15.9±2.5	9.7±1.7	19.6±2.4	8.7±1.9	17.2±1.0	9.5±1.8	16.8±2.1
Rotation (in degrees)	19.7±1.5	30.1±2.6	21.9±2.1	36.4±2.5	21.5±2.9	31.5± 3.3	22.5± 2.4	38.7± 3.0
IMS (points)	12.8±1.9	5.1±1.3	12.2±1.2	3.3±0.8	11.4±1.5	4.3±0.8	12.2±1.5	3.3± 0.7

Note. * – significance of differences (p <0,05) relative to the subgroup receiving complex treatment.

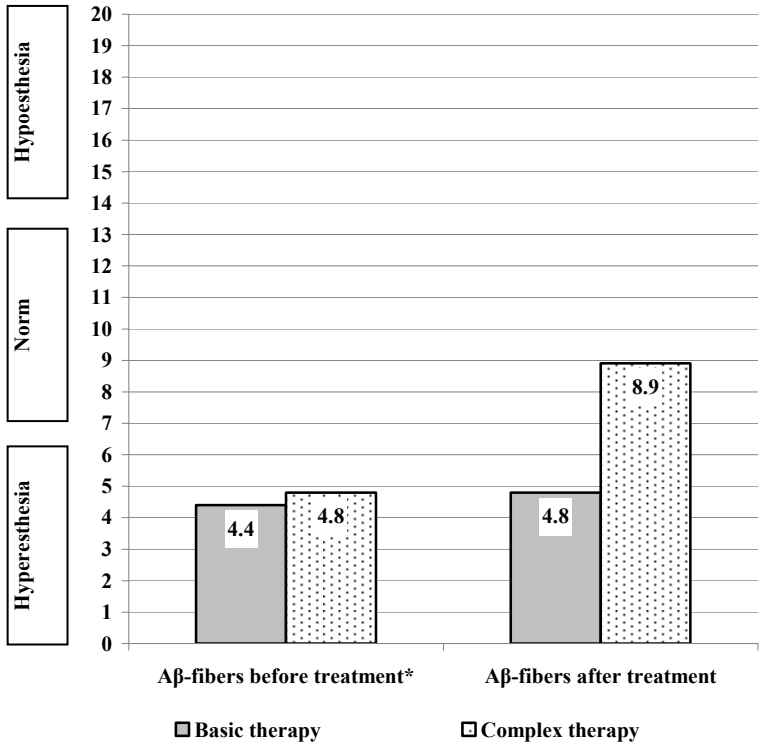
Before treatment, the severity of muscle-tonic syndrome, as assessed by the Muscle Syndrome Index (MSI), was defined as "severe" in patients in both groups. But after basic therapy, a significant regress in the severity of musculo-tonic syndrome was found in the main group, which was approaching a mild degree (5.1±1.3), while in complex treatment MSI had the minimal value (3.3±0.8). In the control group, the severity of musculo-tonic syndrome also regressed to normal: on the background of basic treatment up to 4.3±0.8, and the most significant results were obtained after complex therapy (3.3±0.7). Thus, the muscular-tonic syndrome regressed significantly faster (by 64.7%) in patients of both main and control groups when connecting baseline therapy to vibro-traction PIMR with biomechanical stimulation of the muscles of the affected VMS.

When evaluating the dynamics of sensory disorders (Fig. 5-10) by the method of quantitative sensory testing (QST) before the onset of treatment at the threshold value of stimulation, significant changes in the control group were of a hyperesthetic nature, with thin non-myelinated C-fibers functionally affected the least (6.2±1.8 in patients receiving complex treatment and 5.9±2.3 – in patients receiving baseline therapy). In the main group, sensory changes indicated hypesthesia, and the response to C-fiber irritation was also minimal (13.9±2.1 in patients receiving complex treatment and 14.2±2.4 receiving basic treatment). The most pronounced hypesthetic changes in the main group were observed in the irritation of Aβ and Aδ fibers. When evaluating the functioning of Aβ- and Aδ-afferents in patients of the main group, the most significant improvement in neural conductivity was observed during complex therapy. Thus, by the final stage of the study, when evaluating conductivity along β-fibers on the background of basic therapy, the figure was 14.1±2.7, and in complex treatment – 13.2±2.0. Similar changes were observed in the conductivity along Aδ-fibers – 12.9±3.5 and 12.5±2.4, respectively. In the control group, the recovery of conductivity on the test fibers also tended to improve in all indicators, with the most significant being in patients receiving complex therapy.



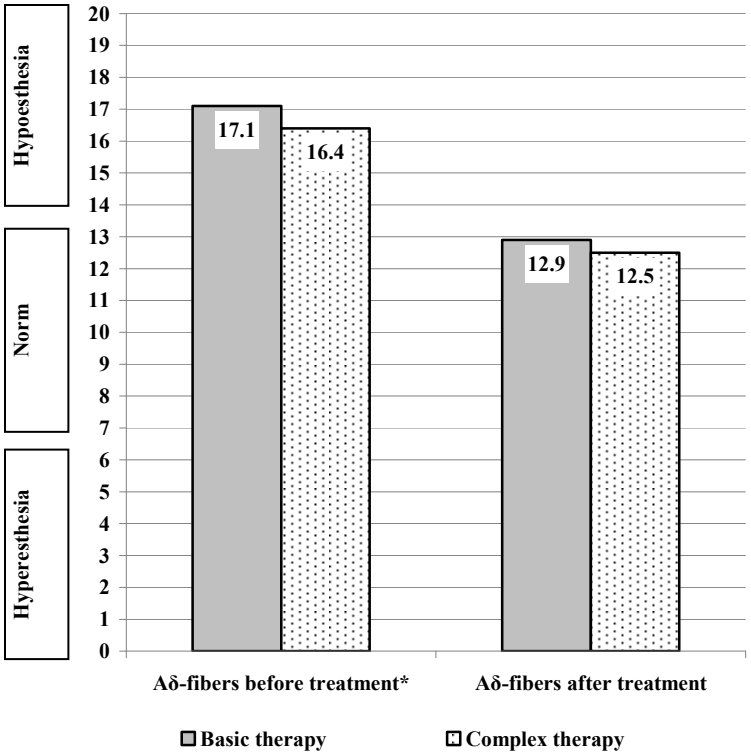
Note. * – p <0.05 relative to the subgroup receiving complex treatment.

Fig. 5. Dynamics of sensory disorders in Aβ-fibers by QST in the main group against background of treatment



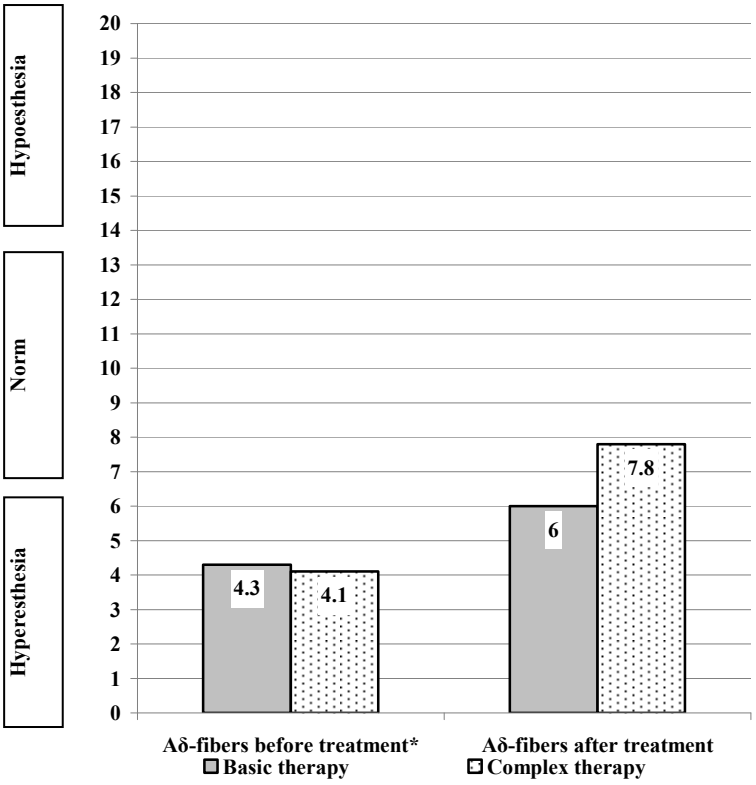
Note. * – p <0.05 relative to the subgroup receiving complex treatment.

Fig. 6. Dynamics of sensory disorders in Aβ-fibers by QST in the control group against background of treatment



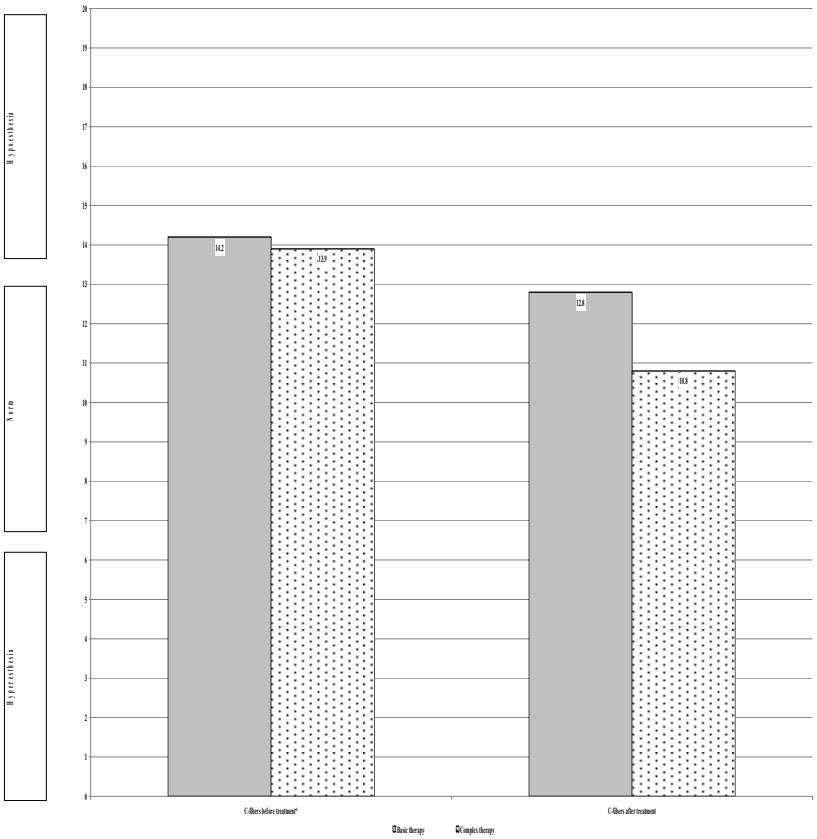
Note. * – p<0.05 relative to the subgroup receiving complex treatment.

Fig. 7. Dynamics of sensory disorders in Aβ-fibers by QST in the main group against the background of treatment



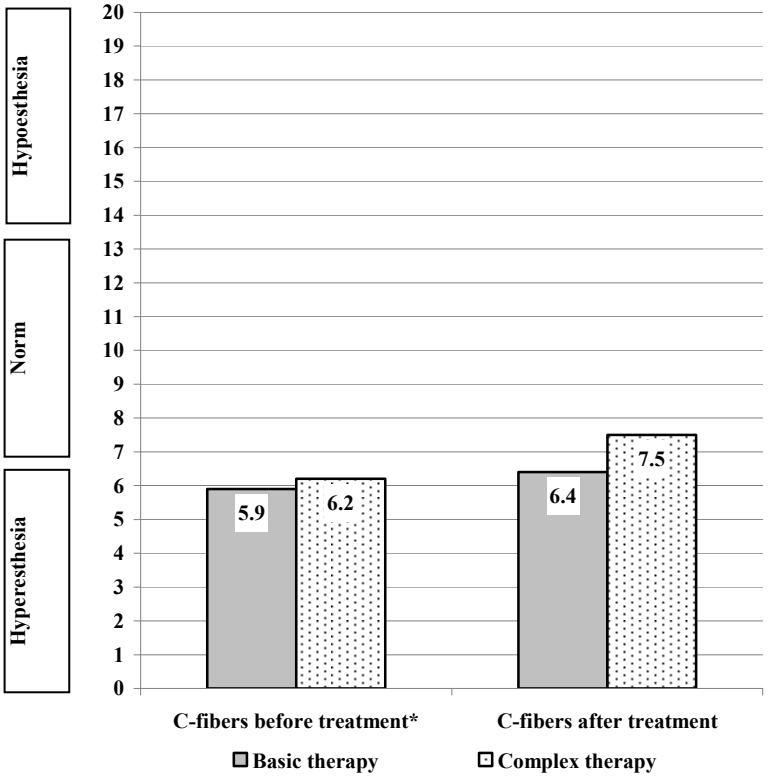
Note. * - p <0.05 relative to the subgroup receiving complex treatment

Fig. 8. Dynamics of sensory disorders in Aβ-fibers by QST in the control group against background of treatment



Note. * – p<0.05 relative to the subgroup receiving complex treatment.

Fig. 9. Dynamics of sensory disorders in C-fibers by QST in the main group on background of treatment



Note. * – p<0.05 relative to the subgroup receiving complex treatment.

Fig. 10. Dynamics of sensory disorders in C-fibers by QST in the control group on background of treatment

When analyzing the results of ELISA for IgG in urogenital infections in patients of both clinical groups, it was found that 46.7% of patients in the main group and 47.3% of the control group were infected with urogenital infections. Attention is drawn to the fact that in the presence of mono-infectious lesion (6 cases – 13.3% in the main group and 8 cases – 14.5% in the control) ureaplasmic and mycoplasma infections were dominant in the main group, Chlamydia trachomatis – in the control group. Most of the infected in both groups had a mixed infection. The combination of chlamydial and ureaplasmic pathology (9.1%), chlamydial and trichomonadic (3.6%) and chlamydial-mycoplasma-trichomonad infection (3.6%) was observed only in control patients. In the main group, a combination of ureaplasma-trichomonad-chlamydia and 4.4% of cases of ureaplasma-mycoplasma-chlamydial infection occurred in 2.2% of cases. There were no such combinations in the control group. The other combinations of mixed infections in both groups were approximately of the same nature. Thus, in patients of the main group ureaplasma-mycoplasma infection, including in mixed variants occurred more often, and in patients of the control clinical group both mono-chlamydial infection and chlamydial infection in mixed variants were more frequent. When including in the treatment of antibacterial drugs in patients with urogenital infections, a more pronounced regression of pain was noted.

Thus, the analysis made it possible to develop a conceptual model of a complex etiopathogenetic treatment taking into account the stage of aseptic disease course, as well as the pathophysiological mechanisms of clinical manifestations in the area of disco-radicular conflict.

At the stage of alternative-exudative inflammation, it is recommended to administer NSAIDs, the choice of which is due to the somatic profile of patients, to conduct paravertebral blockages with local anesthetics and glucocorticosteroids. Specific antibacterial therapy is recommended in patients with detected urogenital infections that are tropical to cartilage. In the presence of a neuropathic component of pain, patients are prescribed anticonvulsants (first-line drug – pregabalin), antidepressants.

At the stage of productive inflammation on the background of drug therapy to reduce the reflex musculo-tonic and compression root symptoms, ensuring rapid and complete restoration of musculoskeletal function of the spine, vibration traction postisometric muscle relaxation with biomechanical stimulation of muscles of paravertebral corset (for 14-14 days), massage, physiotherapy treatment is used.

At the stage of proliferative inflammation for improving the processes of regeneration of the compressed nerve root, neurotropic therapy is recommended: group B vitamins, anticholinesterase drugs.

CONCLUSIONS

1. The conceptual scheme for the treatment of patients with discogenic acute lumbosacral radiculopathies (ALSR) should include a compulsory comprehensive individual approach for determining the infection of urogenital diseases that are tropical to cartilage, taking into account the pathophysiological stage of asepticisation of the asepticus.
2. Manual treatments for ALSR should only be integrated into complex therapy from the stage of productive inflammation.
3. The use of vibro-traction postisometric muscle relaxation followed by biomechanical stimulation of the muscles of the paravertebral corset can be recommended as a method of effective etiopathogenetic treatment and early rehabilitation of patients with acute lumbar and sacral radiculopathies on the background of hernias and hernias and their combination with stenosing lesions of vertebral canal and lateral foramens.

REFERENCES

1. Dadasheva MN, Agafonov BV. [Radiculopathy, modern patient management tactics]. Russkiy meditcinskiy zhurnal. 2016;3:163-5. Russian.
2. Dzyak LA, Shul'ga AN, Shul'ga AA. [New features in the diagnosis of lumbosacral radiculopathy, caused by the intervertebral discs]. Mizhnarodnnyi nevrologichnyi zhurnal. 2012;5(51):58-65. Russian.
3. Ivanova MA, Parfenov VA, Isaykin AI. [Surgical and conservative treatments for discogenic lumbar radiculopathy]. Nevrologiya, neyropsikhiatriya, psikhosomatika. 2019;11(2):40-45. Russian.
4. Isaykin AI, Ivanova MA, Kavelina AV. [Discogenic lumbalgia]. 2016;24:1599-605. Russian. Available from: https://www.rmj.ru/articles/nevrologiya/Diskogennaya_lyumbalgiya/
5. Lang TA. [How to describe statistics in medicine. Guide for authors, editors and reviewers]. 2nd ed. Leonova VP, editor. Moskva: Prakticheskaya meditsina; 2016. p. 480. Russian.
6. Levin OS. [Vertebrogenic lumbosacral radiculopathy: modern approaches to diagnosis and treatment]. Effektivnaya farmakoterapiya. Terapiya

boli. 2015;3:40-48. Russian. Available from: http://umedp.ru/upload/iblock/ac7/levin.pdf

7. Morozova OG, Yaroshevskiy AA. [Back pain: experience with the use of Sinmeton and Protekon in complex therapy]. Zhurnal nevrologii im. BM. Man'-kovskogo. 2015;1(3):91-96. Russian.

8. Krupatkin AI, Kuleshov AA, Sokolova TV, Gospod AO. [Pathophysiological aspects of pain in the lower back]. Nevrologiya i psihiatriya. 2017;4:102-6. Russian.

9. [The method of combined conservative treatment of hernias of the intervertebral discs of the lumbosacral spine]. Ukrainian patent 37907, N 8. 2003. Aug 15. Ukrainian.

10. [Method of conservative treatment of neuropathic pain in lumbosacral radiculopathies caused by lateral stenoses, extrusions and hernias of the intervertebral discs]. Ukrainian patent 127314. 2018 Feb 23. Ukrainian.

11. [The method of treatment of vertebrogenic radiculopathies caused by herniation of the intervertebral discs of the lumbosacral spine using vibratory postisometric muscle relaxation]. Ukrainian patent 109943. 2016 Sept 26. Ukrainian.

12. Baron R, Binder A. How neuropathic is sciatica? The mixed pain concept. Orthopade. 2004;33:568-75. Available from: https://doi.org/10.1007/s00132-004-0645-0

13. Benyamin RM, Staats PS. MILD Is an Effective Treatment for Lumbar Spinal Stenosis with Neurogenic Claudication: MiDAS ENCORE Randomized Controlled Trial. Pain Physician. 2016;19(4):229-42. Available from: https://www.ncbi.nlm.nih.gov/pubmed/27228511?dopt=Abstract

14. Praveen Kumar, Geetika Khanna, Sumit Batra, Vinod K Sharma A, Sangita Rastog. Chlamydia trachomatis elementary bodies in synovial fluid of patients with reactive arthritis and undifferentiated spondyloarthropathy in India; International Journal of Rheumatic Diseases. 2014;1-6. doi: https://doi.org/10.1111/1756-185x.12364

15. Urquhart DM, Zheng Y, Cheng AC, et al. Could low grade bacterial infection contribute to low back pain? A systematic review. BMC Med. 2015;13:13 doi: https://doi.org/10.1186/s12916-015-0267-x

16. Va/DoD Clinical Practice Guidelines. Diagnosis and treatment of low back pain (LBP).-2017. Available from: https://www.healthquality.va.gov/guidelines/Pain/lbp/VADoDLBPCPG092917.pdf

17. Guideline for the evaluation and management of low back pain. American Pain Society; 2017. Available from: https://www.mccofaz.com/media/3741/evaluation-and-management-of-low-back-pain.pdf

18. Karcioglu O, Topacoglu H, Dikme O. A systematic review of the pain scales in adults: wich to use? The American Journal of Emergency Medicine. 2018;36(4):707-14.
doi: https://doi.org/10.1016/j.ajem.2018.01.008

19. Low back pain and sciatica in over 16s: Assessment and management NICE Guideline [NG59]. Available from: https://www.nice.org.uk/guidance/ng59. doi: https://doi.org/10.1016/j.jphys.2017.02.012

20. Keller T, Freynhagen R, Tölle TR, Liwowsky I, Möller P, Hüllemann P, Gockel U, Stemmler E, Baron R. A retrospective analysis of the long-term test–retest stability of pain descriptors of the painDETECT questionnaire, Current Medical Research and Opinion. 2016;32(2):343-9.
doi: https://doi.org/10.1185/03007995.2015.1125869

СПИСОК ЛІТЕРАТУРИ

1. Дадашева М. Н., Агафонов Б. В. Радикулопатии, современная тактика ведения пациентов. *Рус. медицинский журнал.* 2016. № 3. С. 163-165. URL: https://www.rmj.ru/articles/bolevoy_sindrom/Radikulopatii_sovremennaya_taktika_vedeniya_pacientov/

2. Дзяк Л. А., Шульга А. Н., Шульга А. А. Новые возможности в диагностике пояснично-крестцовых радикулопатий, обусловленных грижами межпозвоночных дисков. *Міжнар. неврологічний журнал*. 2012. Т. 51, № 5. С. 58-65.

3. Иванова М. А., Парфенов В. А., Исайкин А. И. Хирургические и консервативные методы лечения дискогенной поясничной радикулопатии. *Неврология, нейропсихиатрия, психосоматика.* 2019. Т. 11, № 2. С. 40-45.

4. Исайкин А. И., Иванова М. А., Кавелина А. В. Дискогенная люмбалгия. *Рус. медицинский журнал*. 2016. № 24. С. 1599-1605.
URL: https://www.rmj.ru/articles/nevrologiya/Diskogennaya_lyumbalgiya/

5. Ланг Т. А., Сесик М. Как описывать статистику в медицине: руководство для авторов, редакторов и рецензентов / пер. с англ. под ред. В.П. Леонова. 2-е изд. Москва: Практ. медицина, 2016. 480 с.

6. Левин О. С. Вертеброгенная пояснично-крестцовая радикулопатия: современные подходы к диагностике и лечению. *Эффективная фармакотерапия. Терапия боли.* 2015. С. 40-48. URL: http://umedp.ru/upload/iblock/ac7/levin.pdf

7. Морозова О. Г., Ярошевский А. А. Боль в спине: опыт применения в комплексной терапии препаратов Синметон и Протекон. *Журнал неврологи им. Б.М. Маньковского*. 2015. Т. 3, № 1. С. 91-96.

8. Патофизиологические аспекты болевых синдромов в нижней части спины / А. И. Крупаткин и др. *Неврология и психиатрия*. 2017. № 4. С. 102-106. URL: https://doi.org/10.17116/jnevro201711741102-106

9. Спосіб комбінованого консервативного лікування гриж міжхребцевих дисків попереково-крижового відділу хребта: пат. 37907 Україна. заявл. 04.05.2000; опубл.15.08.2003, Бюл. №8.

10. Спосіб консервативного лікування невропатичного болю при попереково-крижових радикулопатіях, обумовлених латеральними стенозами, екстру-

зіями та грижами міжхребцевих дисків: пат. 127314 Україна. заявл. 23.02.2018; опубл. 25.07.2018 Бюл. №14.

11. Спосіб лікування вертеброгенних радикулопатій, обумовлених грижами міжхребцевих дисків попереково-крижового відділу хребта за допомогою вібротракційної постізометричної міорелаксації: пат. 109943 Україна. опубл. 26.09.2016, Бюл. №18.

12. Baron R., Binder A. How neuropathic is sciatica? The mixed pain concept. *Orthopade*. 2004. Vol. 33. P. 568-575.
URL: https://link.springer.com/article/10.1007%2Fs00132-004-0645-0

13. Benyamin R. M., Staats P. S. MILD Is an Effective Treatment for Lumbar Spinal Stenosis with Neurogenic Claudication: MiDAS ENCORE Randomized Controlled Trial. Pain Physician. 2016. Vol. 19, No. 4. P. 229-242. URL: https://www.ncbi.nlm.nih.gov/pubmed/27228511?dopt=Abstract

14. Chlamydia trachomatis elementary bodies in synovial fluid of patients with reactive arthritis and undifferentiated spondyloarthropathy in India / Praveen Kumar et al. *International Journal of Rheumatic Diseases*. 2014. P. 1-6. DOI: https://doi.org/10.1111/1756-185x.12364

15. Could low grade bacterial infection contribute to low back pain?: a systematic review / D. M. Urquhart et al. *BMC Med.* 2015. Vol. 13. P. 13. DOI: https://doi.org/10.1186/s12916-015-0267-x

16. Diagnosis and treatment of low back pain: Va/DoD Clinical Practical Guidelines. *LBIP*. 2017. URL: https://www.healthquality.va.gov/guidelines/Pain/lbp/VADoDLBPCPG092917.pdf

17. Guideline for the evaluation and management of low back pain. *American Pain Society*. 2017. URL: https://www.mccofaz.com/media/3741/evaluation-and-management-of-low-back-pain.pdf

18. Karcioglu O., Topacoglu H., Dikme O. A systematic review of the pain scales in adults: wich to use? *The American Journal of Emergency Medicine.* 2018. Vol. 36, No. 4. P. 707-714.
DOI: https://doi.org/10.1016/j.ajem.2018.01.008

19. Low back pain and sciatica in over 16s: Assessment and management NICE Guideline. *NG59*. URL: https://www.nice.org.uk/guidance/ng59.
DOI: https://doi.org/10.1016/j.jphys.2017.02.012

20. Retrospective analysis of the long-term test–retest stability of pain descriptors of the pain DETECT questionnaire / T. Keller et al. *Current Medical Research and Opinion.* 2016. Vol. 32, No. 2. P. 343-349. DOI: https://doi.org/10.1185/03007995.2015.1125869

The article was received
2019.06.24